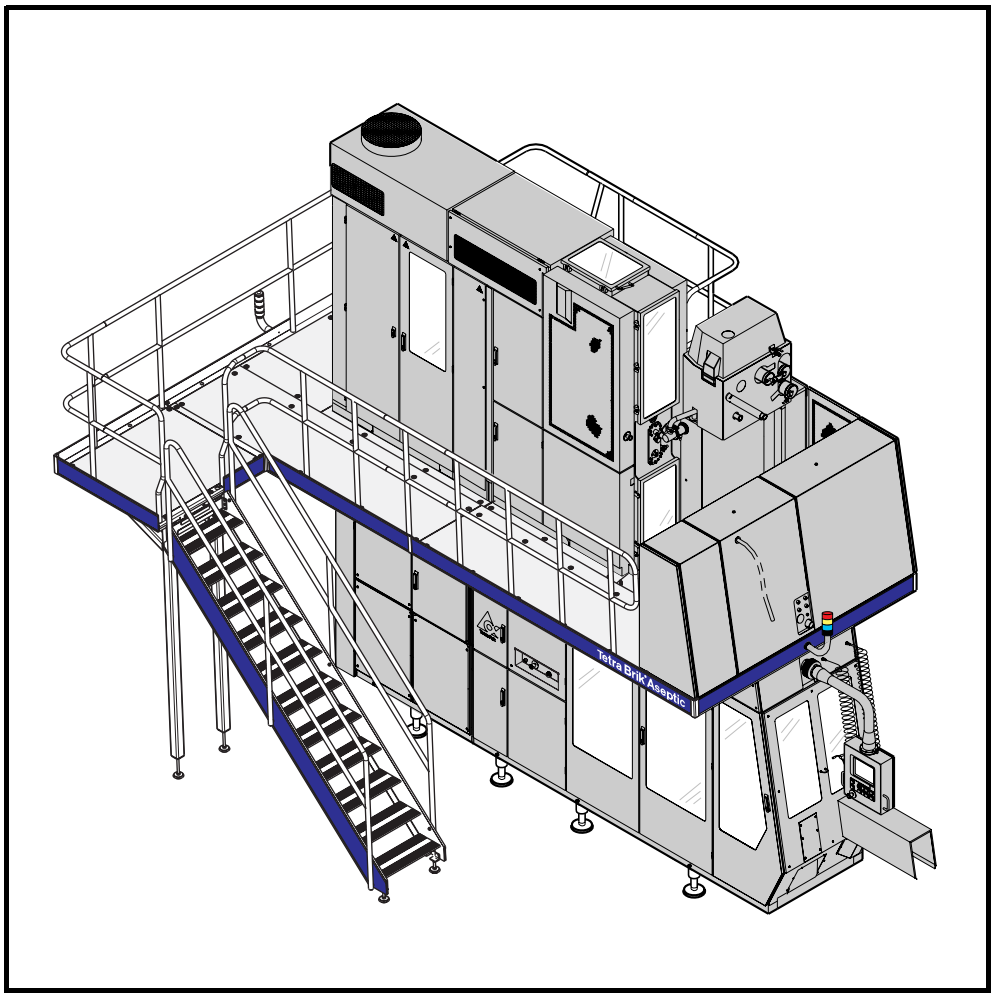
MM

Maintenance Manual

TBA/21 050V

648570-0500

TechPub_2614345_0105 - MM_81534_0111fro.fm



WARNING

Read and follow all safety precaution instructions throughout this manual and on safety signs attached to this equipment.

Failure to follow all safety precaution instructions could result in death or serious injury.

Tetra Pak

Doc. No. MM-81534-0111

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The content of this manual is in accordance with the design and construction of the machine or equipment at the time of publishing. Tetra Pak reserves the right to introduce design modifications without prior notice.

The English version of this document is the original language version.

This document was produced by:

Tetra Pak Company SpA
Via Delfini 1
41100 MODENA
Italy

Additional copies can be ordered from Tetra Pak. When ordering additional copies, always provide the document number.

Doc. No. MM-81534-0111

Issue 2006-05

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This manual is valid for:

Series No./ Machine No. Sign.

MM

Maintenance Manual

TBA/21 050V
648570-0500

i Introduction

ii Safety Precautions

1 Superstructure

2 Machine Body

3 Drive

4 Jaw System

5 Final Folder

6 Service Unit

7 Strip Applicator

8 Automatic Splicing Unit

9 Electrical Cabinet

10 General

iii Index

Machine or equipment configurations that this manual is valid for are described on the next page.

Doc. No. MM-81534-0111

Issue 2006-05

Tetra Pak

Tetra Pak Company SpA

TechPub_2614345_0105 - MM_81534_0111fro.fm

Valid for:

Name	Drawing Specification and Development Step	Additional Information
TBA/21 050V	648570-0500	Volume and Package Shape: - TPA 250 Sq - TPA 330 Sq - TPA 500 Sq - TPA 1000 S - TPA 1000 Sq - TBA 200 B - TBA 200 S - TBA 250 B - TBA 250 S - TBA 330 S - TBA 500 B - TBA 500 S - TBA 1000 B - TBA 1000 S - TBA 1000 Sq - TBA 1500 S Optional Kit: - 2607083-0200 Set of ANSI Signs - 2611389-0200 Balanced air flow - 2656000-0100 Peroxide pump - 2569794-0100 TPA 1000 Sq ReCap to StreamCap conversion - 2613803-0100 TPA 1000 Sq StreamCap to ReCap conversion - 1558536-0100 Peroxide concentration meter - 1498480-0100 Filling system with floater Upgrade Kit: - 2826557-0100 New Water Filter - 2774361-0100 New LS Support - 2579606-0200 Volume flaps shaft - 2748901-0100 Power Supply Replacement - 2723137-0100 Bracket and Spring for Catches, Pressure Side - 2603238-0200 Cooling Unit Replacement - 2721043-0100 Final Folder - 4th station - 2569865-0100 Peroxide Cooling Kit - 2578567-0100 Aseptic Chamber rollers replacement - 2629062-0200 JUMO recorder - 2579607-0100 Dolly replacement - 2503486-0100 New lighter pendulum roller - 2564340-0100 ASU material holder improvement - 1549380-0200 Cutting arms - 2545546-0100 Hydraulic oil extra cooler - 1549382-0100 Compensation tank (Cooling circuit) - 2562469-0100 Bellows replacement - 1549734-0100 Flap heater nozzles - 2509605-0100 Sterile air blower - 2537280-0100 Waste conveyor - 1558714-0100 TBA 1000 Sq improvement - 1538057-0100 CIP Switch - 1538871-0100 Photocell bracket - 1517215-0100 Bath infeed roller - 1511271-0100 Drive unit lifetime improvement - 1523831-0100 Regulating valve condense

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Update Log for Doc. No. MM-81534-0111

This table shows all changes made to this manual, including installed rebuilding kits, added or removed pages. Page numbering on added pages begins with UP.

Date	Installed Kit	Added Pages (Doc. No.)	Removed Pages	Signature

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Date	Installed Kit	Added Pages (Doc. No.)	Removed Pages	Signature

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i Introduction

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About the Introduction Chapter

This chapter contains basic information about this manual and the related Tetra Pak equipment.

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Abbreviations and Terminology

Abbreviation/ Terminology	Meaning	Translation
Approx.	Approximately	
APV	Aseptic Product Valve	
ASU	Automatic Splicing Unit	
ASSU	Automatic Strip Splicing Unit	
CIP	Cleaning In Place	
DI	De-ionizing	
DMC	Digital Motion Controller	
EM	Electrical Manual	
FFU	Final Folder Unit	
h	Hour, Hours, Height	
IM	Installation Manual	
IS	Inner Strip	
LH	Left Hand	
LS	Longitudinal Seal(ing)	
LED	Light Emitting Diode	
min.	Minimum	
max.	Maximum	
MM	Maintenance Manual	
N.A.	Not Applicable	
OM	Operation Manual	
OE	Optional Equipment	
OK	Optional Kit	
PC	Personal Computer	
PE	Polyethylene	
p/h	Packages per Hours	
PLC	Programmable Logic Controller	
RC	Reference Count	
RH	Right Hand	
SA	Strip Applicator	
Std	Standard	
SPC	Spare Parts Catalogue	
TBA	Tetra Brik Aseptic	
TMCC	Tetra Pak Multi-purpose Compact Controller	
TP	Tetra Pak	
TP No.	Tetra Pak Part Number	
TPMS	Tetra Pak Maintenance System	
TPIH	Tetra Pak Induction Heating	
TPOP	Tetra Pak Operator Panel	
TS	Transversal Sealing	

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Manual Information

Tetra Pak recommends reading all delivered manuals carefully. Make sure that the delivered manuals are available to personnel who operate or maintain the equipment.

It is important to keep this manual for the lifetime of the equipment and to pass the manual on to any subsequent holder or user.

Tetra Pak will not be held responsible for any damage to the equipment caused by not following the instructions given in this manual.

Delivered Manuals

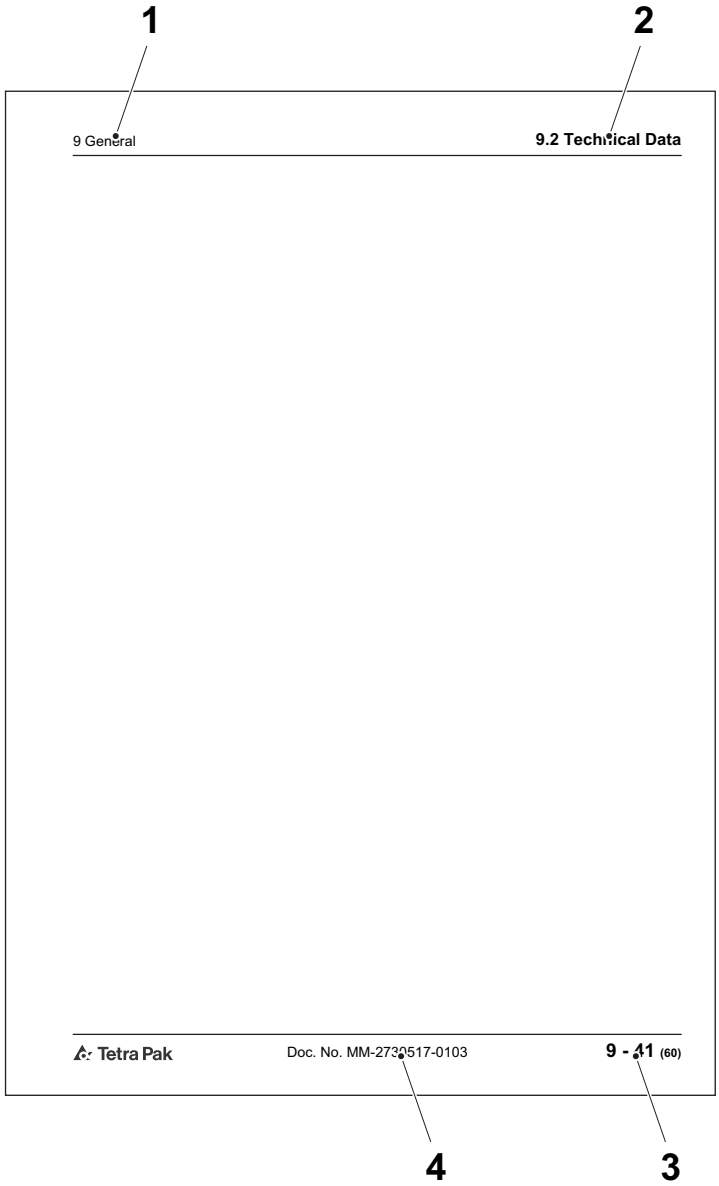
Manuals delivered with this equipment:

- CM
  The Conversion Manual provides technicians with information on converting the equipment between different production modes.
- EM
  The Electrical Manual provides technicians with information about the equipment's electrical system.
- IM
  The Installation Manual provides technicians with information required to safely install the equipment.
- MM
  The Maintenance Manual provides technicians with information on maintaining the equipment.
- OM
  The Operation Manual manual provides the operator with information on handling and operating the equipment before, during, and after production.
- SPC
  The Spare Parts Catalogue provides the information necessary to order spare parts from Tetra Pak

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Page Layout

Every main page in a manual contains a header and a footer. The page header contains the chapter name (1) and the section name (2). The page footer contains the page number (3), and the document number (4). See also the Page Numbering section.



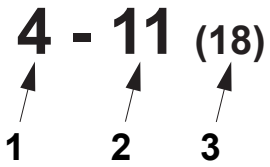
1 Chapter name
2 Section name
3 Page number
4 Document number

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Page Numbering

A page number has three parts:

- chapter number (1)
- consecutive page number (2) within the chapter
- total number of pages (3) in the chapter.



1 Chapter number
2 Consecutive page number
3 Total number of pages

Typographical Conventions

Controls on the operator panel, emergency stop devices, and program steps are printed in CAPITAL LETTERS.

Cross-references are underlined.

Symbols

Symbols used in illustrations.

	A pointer arrow indicates the position of an object.
	A zoom arrow indicates that an object view is enlarged. The arrow points towards the enlarged view of the object.
	A rotation movement arrow indicates rotational movement of an object. The arrow points in the direction of rotation.
	A straight movement arrow indicates movement of an object. The arrow points in the direction of movement.

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Machine Introduction

Intended Use of the Equipment

The intended use of this Tetra Pak equipment is to pack liquid food products.

All other use is prohibited. Tetra Pak will not be held responsible for injury or damage if the equipment is used for any other purpose.

Manufacturer

This Tetra Pak equipment has been manufactured by

Tetra Pak Company SpA
Via Delfini 1
41100 MODENA
Italy

Support and Feedback

If you encounter problems when operating this equipment or have other inquiries, comments, or suggestions for improvement, contact Tetra Pak.

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Identification

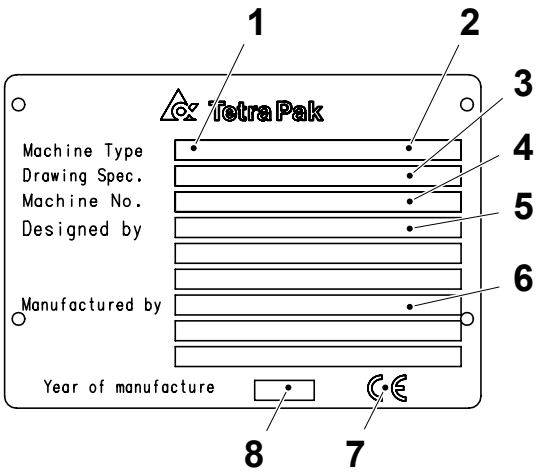
CE Classification

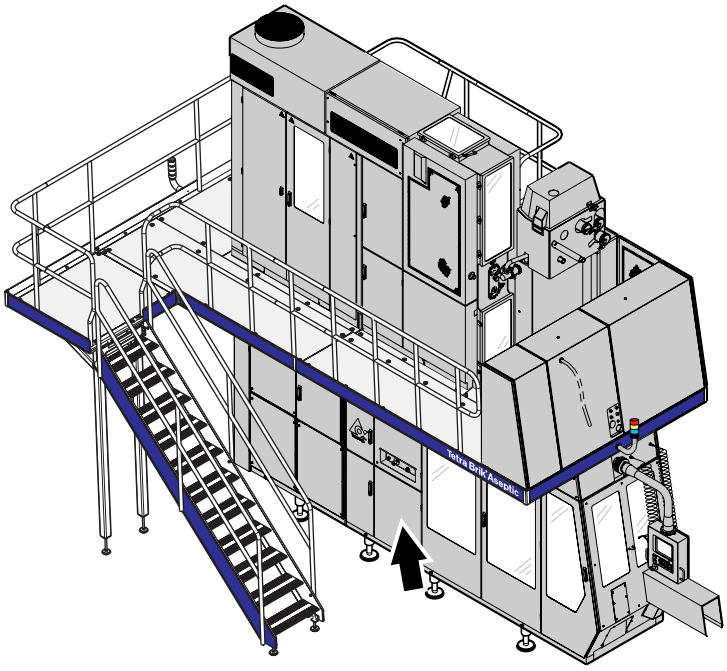
This equipment complies with the basic health and safety regulations of the European Economic Area (EEA).

Machine Plate

The illustration below shows an example of the machine plate and its location on the equipment. The machine plate carries data needed when contacting Tetra Pak concerning this specific equipment.

Make sure that the equipment data in the front pages of this manual corresponds to the machine plate data and the machine specification.



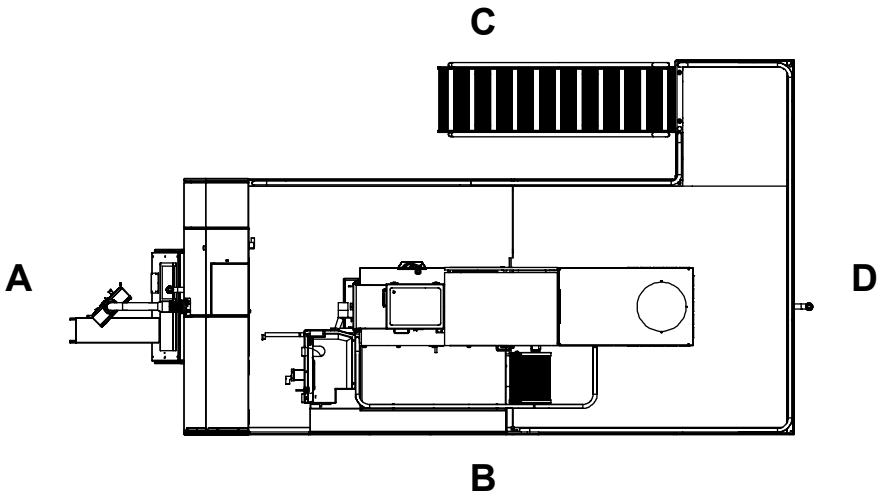


1 Machine type
2 Volume
3 Drawing specifications
4 Machine serial number
5 Designed by
6 Manufacturer
7 CE mark
8 Year of manufacture

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Orientation

The illustration below shows the orientation of the equipment. This orientation information will be used throughout this manual. The arrows indicate the flow of material.



A Front
B Right-hand side
C Left-hand side
D Back

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Hygiene

Packaging Material

Avoid microbiological contamination of the packaging material:

- Always protect your packaging material against contamination.
- Always keep the doors to the filling room (area) closed. To prevent contamination via air streams, never open a window when the machine is in production.
- Never clean the floors or the machine in the filling room (area) when the machine is in production.
- Compressed air used for cleaning purposes is to be used only for cleaning filters and should only be used outside of the filling room (area) or in the final folder compartment of the filling machine.
- Prepare the splicing of the packaging material as late as possible.
- Disinfect your hands before touching anything that may come into contact with the product. Use code H disinfectant. See the Technical Data chapter of the Maintenance Manual.
- Keep your hands clean.
- Always wear some type of hair protection (cap or hairnet) and clean clothes (preferably white).
- Do not wear a watch, ring, necklace, earrings, or any other exposed jewellery.

Steam Barrier in the Product Valve

The filling machine’s product valve employs a steam barrier to separate the product supply line from the filling machine. The steam barrier allows the machine and the product supply line to be independently sterilised to commercial sterility conditions.

- Never disengage the steam barrier, and never interrupt the steam supply when the filling machine or the product supply line is being brought to the pre-sterilization phase, or when the machine is already in the production phase.
- If any maintenance activity requires disengagement of the steam barrier or the interruption of the steam supply to the machine, make sure that the product supply line is idle and empty of product.

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How to Use This MM

Procedures

The name of the chapters and sections in the MM correspond to the groups in the structure of the equipment. Procedures correspond to a chapter or a section:

- The dashes indicate that it is a procedure heading. The example below shows a heading for Procedure number 3 in Section 1.5.
- The text after the second dash tells what type of procedure it is. Check, Change and Set are common procedure types.

1.5-3 Outfeed Servo - Change Bearings

Maintenance procedures in this manual are connected to the Tetra Pak Maintenance System, TPMS. See the TPMS section.

Procedure Start Table

Procedures in this manual begin with a table providing information needed to begin the procedure.

- Machine Status (1) shows actuator status, program step, and any other machine status necessary to begin the procedure.
- Special Equipment (2) shows a list of personal protective equipment and special tools that are not normally carried by a service technician, but are needed in the procedure.
- Consumables (3) shows items, such as lubricants, that are required to perform the procedure. Consumables do not include replacement parts.
- SPC Reference (4) shows the assembly number, found in the index of the SPC.

1	Machine Status	Power supply disconnector OFF Air valve OFF Water valve OFF
2	Special Equipment	Hook spanner TP No. 777170-0105 Dial indicator
3	Consumables	Grease code F
4	SPC Reference	2501234-0100

1 Machine Status
2 Special Equipment
3 Consumables
4 SPC Reference

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TPMS

To ensure uninterrupted production, all machines and equipment must be maintained on a regular basis.

Tetra Pak has developed a planned maintenance system to keep pace with the ongoing development of new and existing machines and equipment from Tetra Pak, and to meet the demands set by customers for higher efficiency and better economy.

Planned Maintenance Program

The Tetra Pak planned maintenance system reduces unplanned downtime and maintenance time for complete production lines, as well as for individual machines and equipment.

With the Tetra Pak planned maintenance system, preventive maintenance can be performed before production is affected. The system is continually updated based on experience with Tetra Pak machines and equipment worldwide.

The Tetra Pak planned maintenance system maintains records of when maintenance is performed, when parts are changed, whether alterations are made, and so on. These records, combined with usage statistics, enable reliable predictions of the service life of all machine and equipment parts.

Checklists and Spare Parts Recommendations

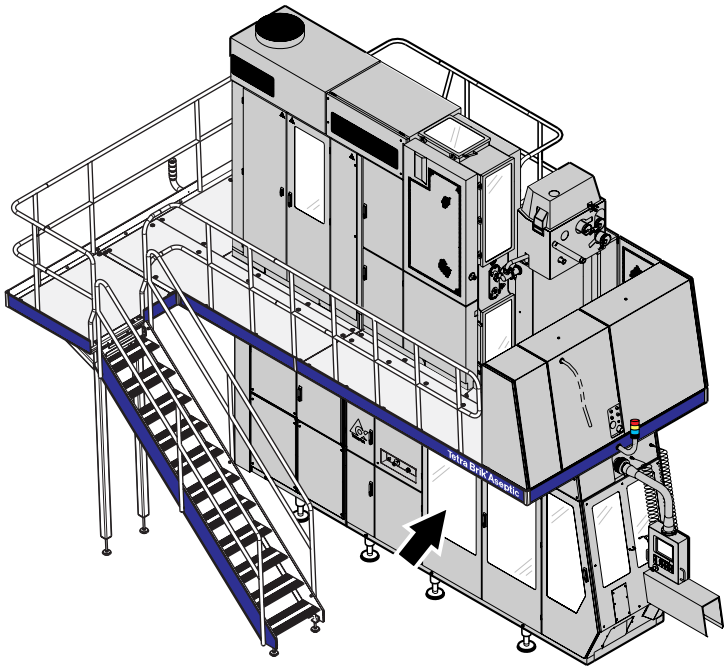
Customers using the Tetra Pak planned maintenance system receive checklists from their local Tetra Pak office whenever planned maintenance is due. These checklists are individualised for each customer, according to the type of machine, equipment usage, and maintenance occasion. In addition, the system recommends spare parts, rotation units, tools, and templates according to the statistics collected.

Tip! Contact the local Tetra Pak office for additional information about the Tetra Pak Maintenance System and its planned maintenance program.

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Protractor Information

All values in this manual, unless otherwise stated, given in decimal degrees refer to the scale of the protractor of the main curve (scale with 256 / revolution), and are readable on the angle encoder display, see arrow.



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ii Safety Precautions

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Safety Precaution Instructions

WARNING

Read all safety precaution instructions throughout this manual and on safety signs attached to this equipment.

Failure to follow all safety precaution instructions could result in death or serious injury.

Definition of Lockout Procedure

A lockout procedure is a procedure to put each necessary energy isolating device in its safe position to prevent the energisation of the equipment, such as when a maintenance procedure should be carried out.

A lockout is the use of a device, for example, a padlock, to make sure that an energy isolating device cannot be operated.

An energy isolating device is a mechanical device that physically prevents transmission or release of energy, such as a power supply disconnector.

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Safety Messages Description

A safety message is always accompanied by a safety alert symbol and a signal word.

The safety alert symbol is used to alert about potential personal injury hazards. To avoid hazards, obey all safety messages that follow this symbol.

The following safety alert symbols and signal words are used in this manual to inform the user of hazards.

DANGER	Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Warning indicates a potentially hazardous situation which, if not avoided, **could** result in **death or serious injury**.
CAUTION	Caution indicates a potentially hazardous situation which, if not avoided, **may** result in **minor or moderate injury.** It may also be used to alert against unsafe practices.
CAUTION	Caution without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, **may** result in **property damage**.

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Personnel Requirements

Note! Personnel includes all persons working on or near this equipment.

Only skilled or instructed persons are allowed to work with this equipment.

Skilled Person

A skilled person must have relevant education and experience to enable him or her to identify hazards, analyse risks, and avoid hazards which electricity, machinery, chemicals, other energies, and supply systems on this equipment can create.

Skilled persons must meet local regulations, such as certifications and qualifications for working with these energies and systems.

Instructed Person

An instructed person must be adequately advised or supervised by a skilled person. The skilled person enables the instructed person to identify hazards, analyse risks, and avoid hazards which electricity, machinery, chemicals, other energies, and supply systems on this equipment can create.

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Safety Signs

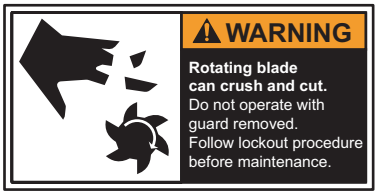
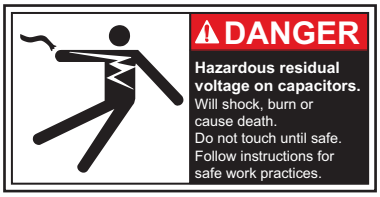
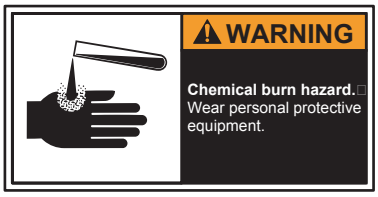
WARNING

Damaged or missing safety signs increase the risk of death or serious injury.

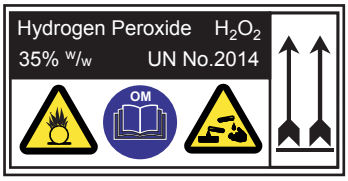
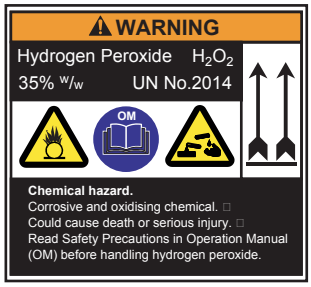
Replace all missing or damaged safety signs immediately.

Safety signs are attached to the equipment. The table below lists all the signs that are used, and illustrations show their locations on the equipment. Each position number refers to two variants of a safety sign in the table, but only one is used on the equipment.

- Make sure that each safety sign is legible and in its correct position after installation and maintenance.
- Replace all missing or damaged safety signs immediately.

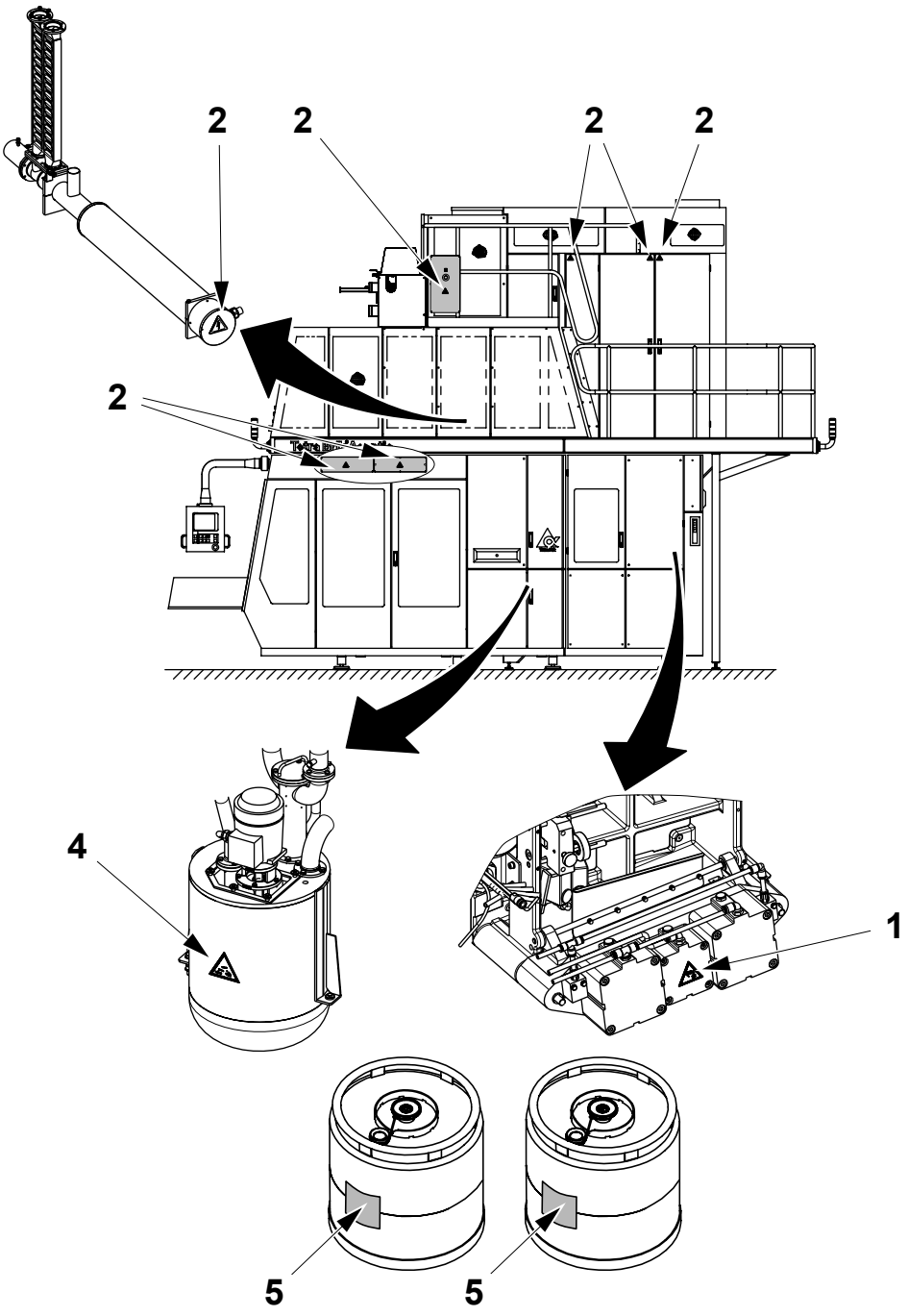
Pos.	ISO sign	ANSI sign
1		
	Rotating blade can crush and cut. Do not operate with guard removed. Follow lockout procedure before maintenance.	
2		
	Hazardous voltage. Will shock, burn, or cause death. Follow lockout procedure before maintenance.	
3		
	Hazardous residual voltage on capacitors. Will shock, burn or cause death. Do not touch until safe. Follow instructions for safe work practices.	
4		
	Chemical burn hazard. Wear personal protective equipment.	

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Pos.	ISO sign	ANSI sign
5		
	Chemical hazard. Corrosive and oxidising chemical. Could cause death or serious injury. Read Safety Precautions in Operation Manual (OM) before handling hydrogen peroxide.	
6		
	Hot surface. Do not touch. Follow lockout procedure before maintenance.	

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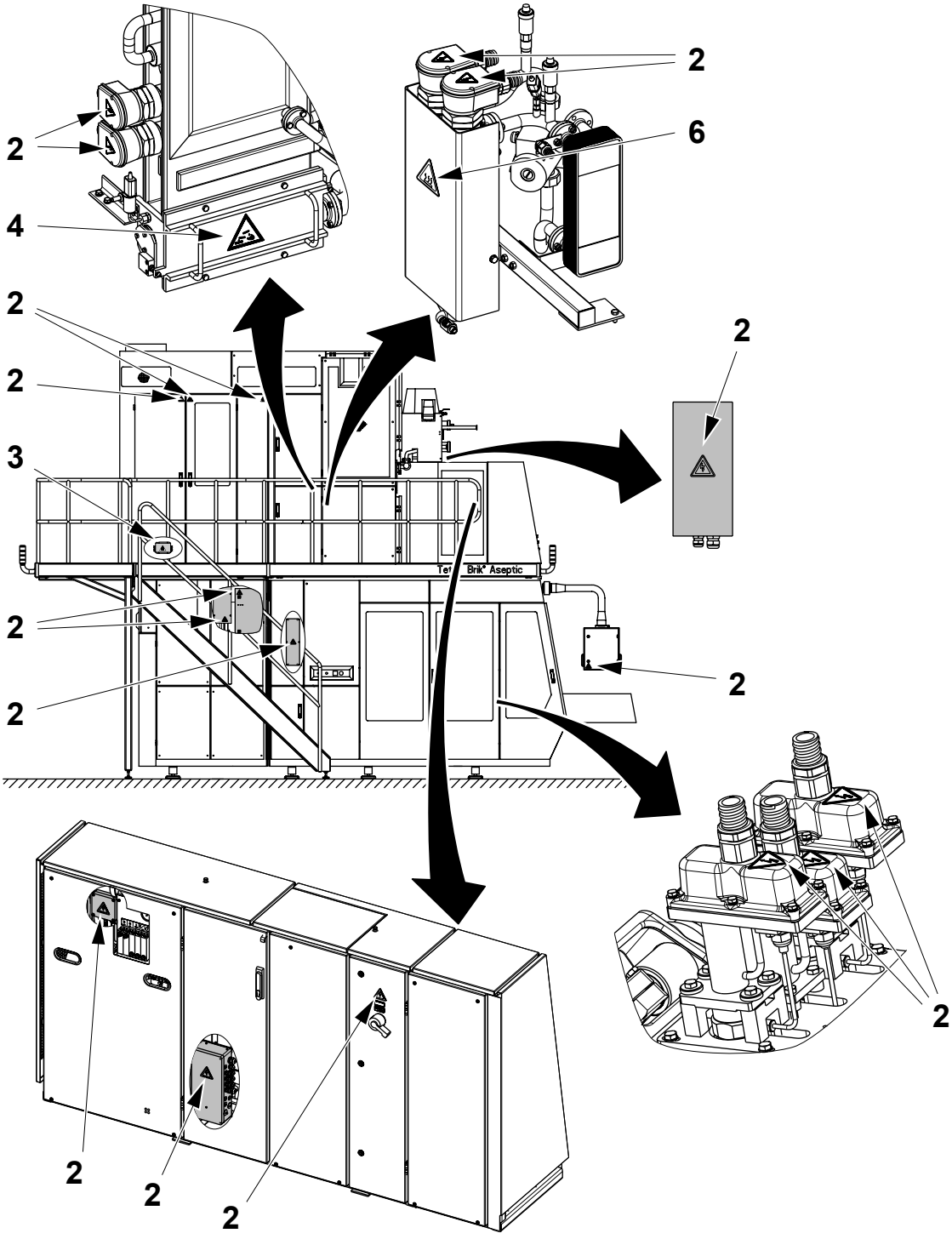
Locations of Safety Signs



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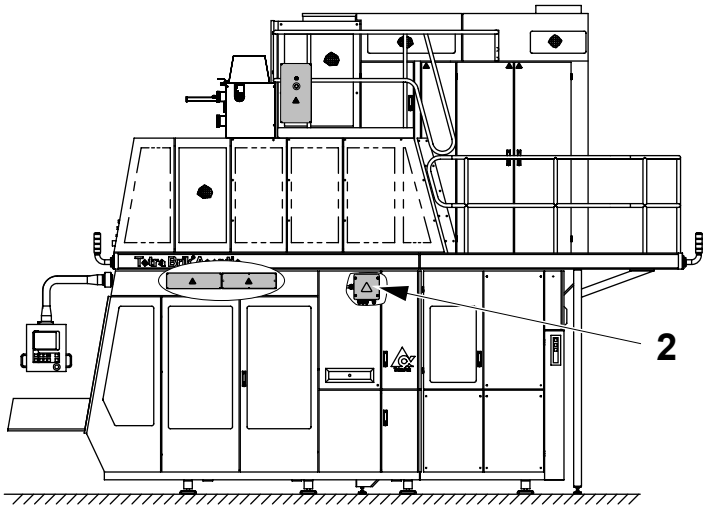


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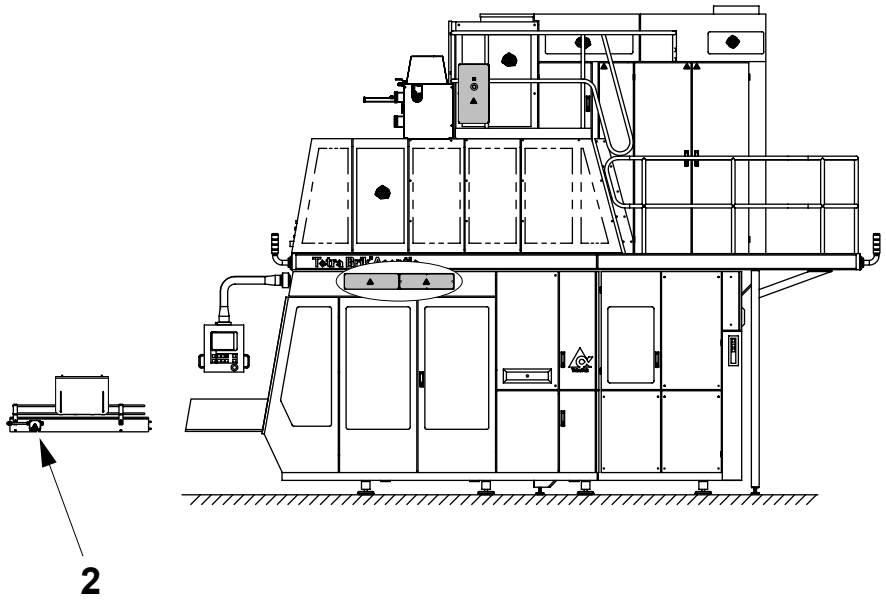
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Valid for TBA/21 050V with HI



Valid for TBA/21 050V with Last Point DE



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Protective Devices

WARNING

Hazardous zones.

Hazardous zones are safeguarded and provided with protective devices. Do not inch or run this equipment if any protective device is inoperative.

Change inoperative components of the safety system immediately.

WARNING

Hazardous voltage.

Hazardous voltage remains on this equipment after activating an EMERGENCY STOP or an interlocking device.

Emergency Stop

Emergency stop devices are used to stop this equipment immediately in an hazardous situation. Learn the positions of all emergency stop devices and how to use them.

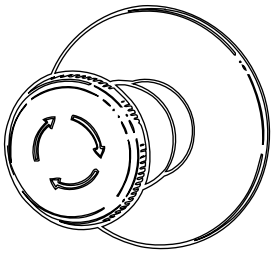
Instructions for a normal production stop are included in the Stop chapter of the Operation Manual.

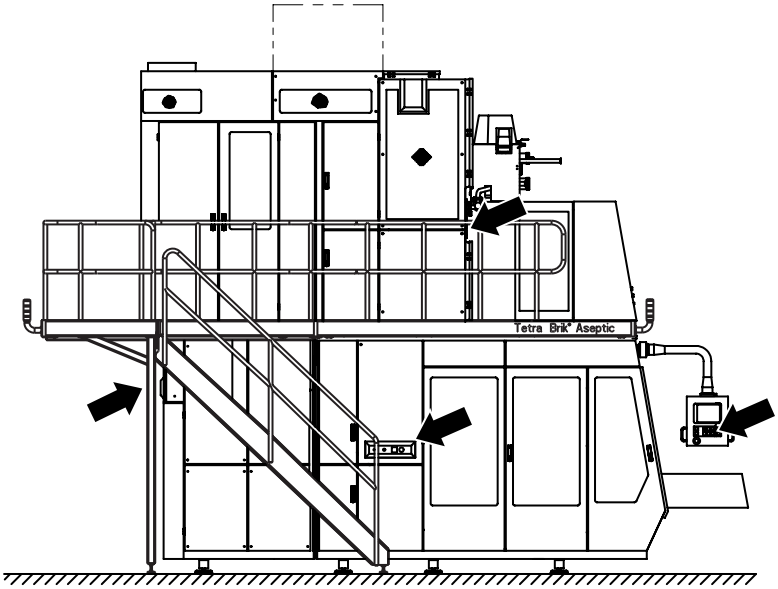
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Emergency Stop Push-Buttons

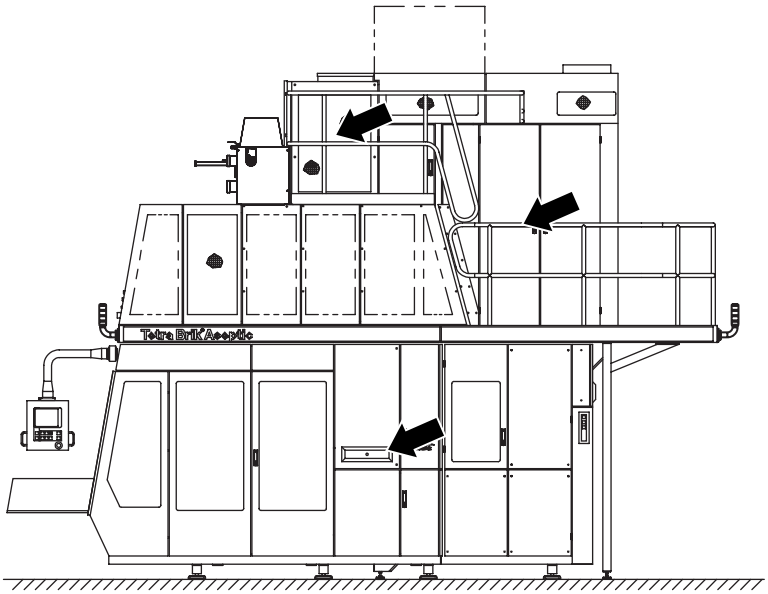
Push one of the EMERGENCY STOP push-buttons to stop this equipment immediately.

The location of each EMERGENCY STOP push-button is shown by an arrow.





LH side



RH side

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Safeguards

WARNING
Moving machinery.
Never defeat or bypass the interlocking devices.

Movable guards, for example, doors and covers leading to hazardous zones, are fitted with interlocking devices where required. These devices are usually electric safety switches that are parts of the safety system and must never be defeated, bypassed, or otherwise made inoperative.

WARNING
Corners and edges.
To prevent injury from corners and edges of open doors and covers, close them unless they must be open during such work. Be careful when working under an open door, cover or elsewhere below parts of the equipment with corners and edges.

CAUTION
Burn hazard.
Parts of this equipment may be hot after operation.

After installation and maintenance, and before this equipment is inched or run, check that all safeguards are in place and that they operate correctly.

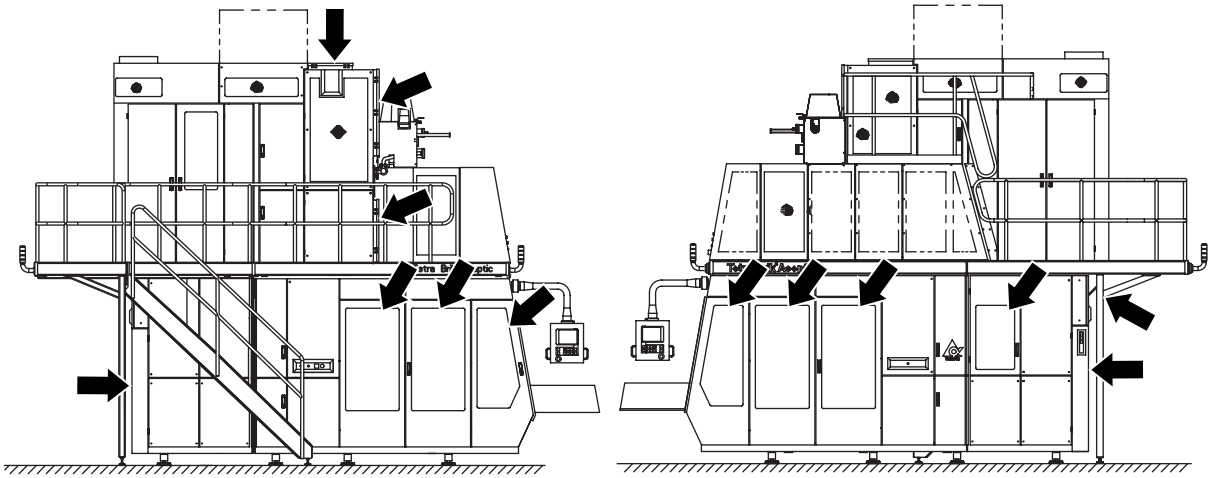
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CAUTION
Equipment damage.
Never stop this equipment by opening an interlocking guard.

The location of each interlocking guard is shown by an arrow.



LH side RH side

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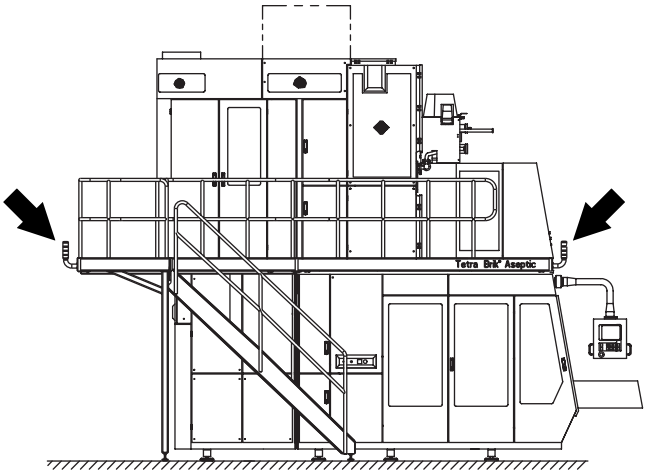
Warning Lamp

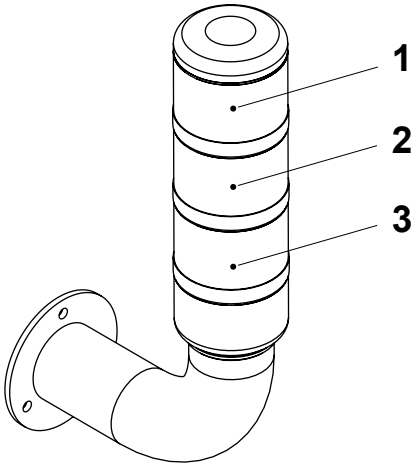
A warning lamp is a column of warning lights:

- A red light (1) indicates a hazardous condition. This is a situation that requires immediate action.
- A yellow light (2) indicates an abnormal or impending critical condition. This is a condition calling for action by the operator.
- A blue light (3) indicates that operator action is required.

Audible Alarm

The audible alarm produces a warning signal every time this equipment is about to start. The warning signal sounds for approximately three seconds prior to starting to alert personnel.





1 Red light
2 Yellow light
3 Blue light

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Personal Protection

This section applies to all personnel at all times when this equipment is in operation. For special personal protection required when handling hazardous substances, see the Hazardous Substances section.

Noise Hazard

WARNING

Hazardous noise.

Risk of impaired hearing.

Wear hearing protection whenever this equipment is in operation.

CAUTION

Hazardous noise.

Risk of impaired hearing.

Hearing protection is recommended whenever this equipment is in operation.

Entanglement Hazard

WARNING

Risk of entanglement.

Do not wear jewellery or loose clothing when working on or near this equipment. Long hair may not be loose.

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Hazardous Substances

WARNING

Contact with chemicals can cause death, serious injury, or illness.
Always read and follow the instructions in the safety data sheet supplied by the manufacturer or local supplier, when handling chemicals.

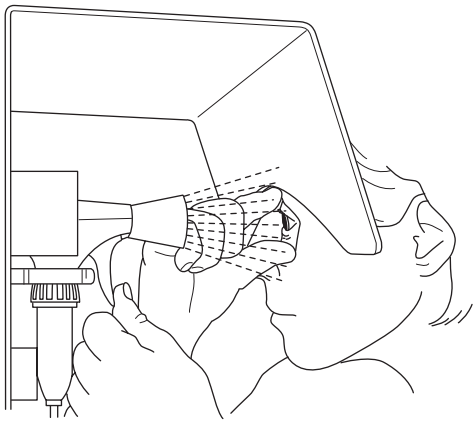
Make sure that

- the safety data sheet is available
- the showers work
- an eyewash device, movable or wall-mounted, is available and operational
- additional washing facilities are nearby

Note! Learn the locations of all washing facilities in order to act immediately in case of an accident







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Disposal of Chemical Substances

Always read and follow the disposal instructions in the safety data sheet supplied by the manufacturer or local supplier.

It is strongly recommended that used chemical containers are

- disposed of according to the instructions immediately after use
- not used as disposal containers for other chemicals in order to avoid uncontrolled chemical reactions within the container

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Hydrogen Peroxide (H_2O_2)

WARNING
Corrosive chemical.
Wear personal protective equipment.

In both liquid and gas states, hydrogen peroxide may cause irritation or damage if it comes into contact with skin, mucous membranes, eyes, or clothes. Call for medical attention immediately if there is an accident.

Liquid hydrogen peroxide in concentrations of less than 1% is generally considered harmless to humans.

Consult the instructions on the label of the tank or container.

Emergency Procedures

If there is an accident involving hydrogen peroxide, rinse the affected area as soon as possible with large amounts of water.

If hydrogen peroxide is swallowed

- do not attempt to cause vomiting
- drink large amounts of lukewarm water to dilute the peroxide
- call for medical attention immediately

If splashes or vapour from hydrogen peroxide come in contact with the eyes

- wash the eyes thoroughly with lukewarm water for 15 minutes (keep eyelids wide apart)
- call for medical attention immediately

If hydrogen peroxide comes into contact with skin or clothes

- rinse immediately with plenty of water
- call for medical attention immediately if skin burns appear
- thoroughly wash the clothes before wearing them again

If irritation or pain is experienced due to having **inhaled** hydrogen peroxide vapour

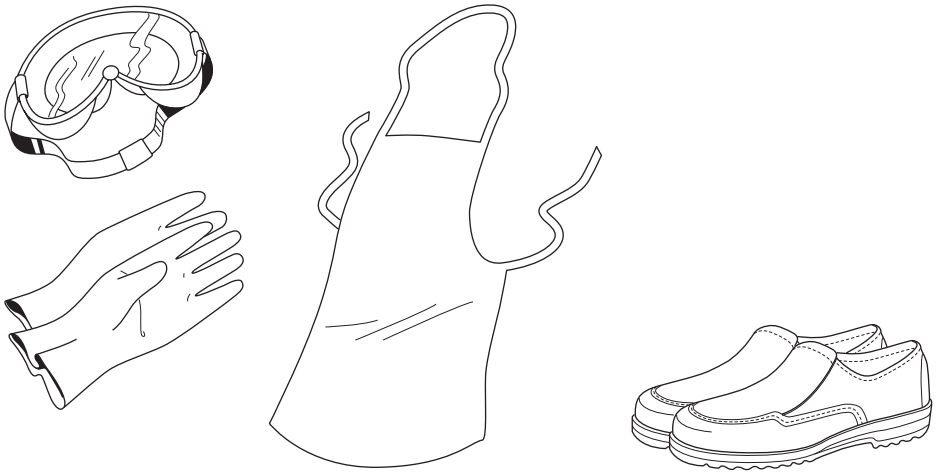
- leave the affected area and get some fresh air
- call for medical attention if the symptoms get worse

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Personal Protective Equipment

The personal protective equipment for hydrogen peroxide is

- protective goggles (TP No. 90303-11)
- protective gloves made of neoprene (TP No. 90303-12)
- protective apron (TP No. 90303-13)
- protective shoes made of PVC, PE plastic, or rubber



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Handling of Hydrogen Peroxide

WARNING

Sudden and violent chemical reaction.

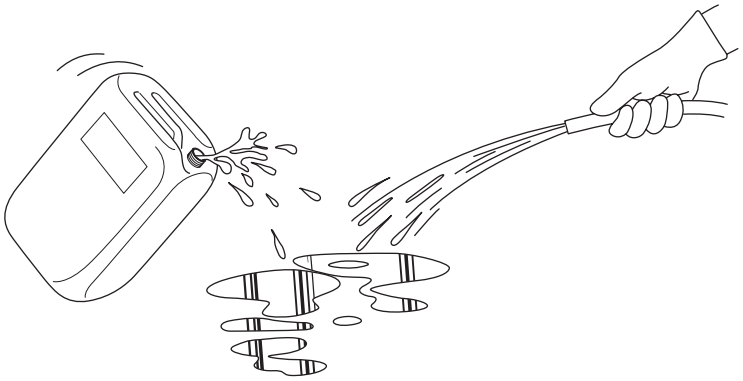
Avoid any contamination of hydrogen peroxide.

Hydrogen peroxide reacts suddenly and violently with many compounds or if it is contaminated. The reaction is a violent decomposition liberating oxygen and heat, with a big increase in volume due to the oxygen produced by the peroxide decomposition.

Never pour surplus hydrogen peroxide back into the original container if it contains fresh hydrogen peroxide. There is a risk of explosion when hydrogen peroxide is in a closed container.

Ensure that equipment used for handling and diluting hydrogen peroxide is clean before it comes in contact with hydrogen peroxide. Pumps or other equipment used for handling hydrogen peroxide must be **used for this purpose only** and must be manufactured from appropriate materials, such as stainless steel 316 L, glass, polyethylene, or teflon. After use, make sure that all peroxide residue is rinsed away.

If hydrogen peroxide is spilled, dilute it with large amounts of water. Dispose of the diluted hydrogen peroxide according to local regulations.



WARNING

Self-ignition.

Never wipe up hydrogen peroxide with materials such as rags or paper as these may self-ignite several hours after contact.

If there is a fire, spray with large quantities of water.

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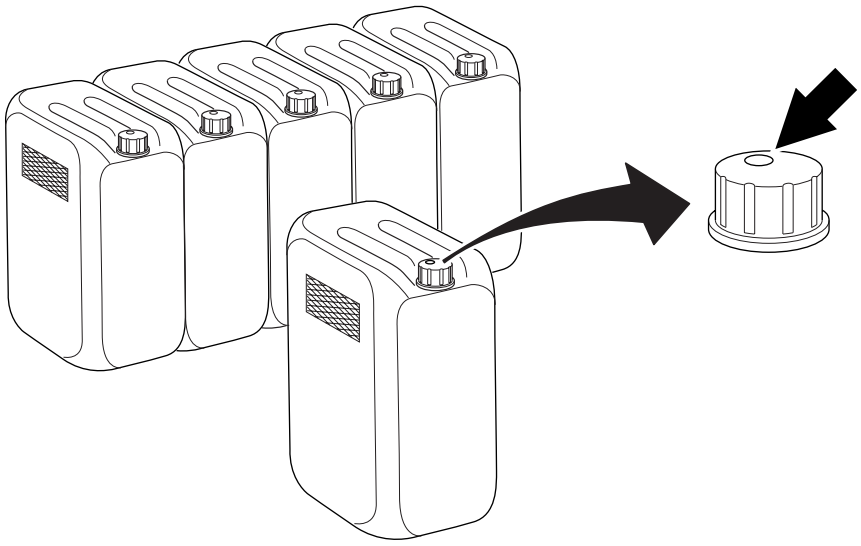
Storage of Hydrogen Peroxide

DANGER

Containers may explode if not properly ventilated.
Keep the container upright and fitted with its proper ventilation cap. If there is a fire, cool all containers by spraying them with large quantities of water.

Hydrogen peroxide decomposes much faster with increasing temperature. There is a risk of explosion at high temperatures, since the ventilation cap cannot release the gases produced quickly enough.

Hydrogen peroxide **must** be stored in the **original container** delivered by the supplier. Keep the container upright and fitted with its proper ventilation cap, which allows oxygen to escape. Otherwise, there can be an explosion if decomposition of the peroxide occurs violently.



Make sure that the container is always properly closed.

(Cont'd)

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(Cont'd)

Commercial food-grade hydrogen peroxide has been stabilized to inhibit the catalytic decomposition effects of metals and other impurities, but it can decompose into oxygen and water if it is exposed to heat or contaminated.

Make sure that the area used for storage of hydrogen peroxide is

- cool, clean, and well ventilated
- shielded from direct sunlight
- kept free from combustible materials

Disposal of Hydrogen Peroxide

Always read and follow the disposal instructions in the safety data sheet supplied by the manufacturer or local supplier.

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Cooling Media R134a

WARNING

Refrigerant gas.

High concentration of cooling media R134a vapour can cause dizziness, headache, confusion and unconsciousness. In liquid form R134a can cause frostbite injuries on contact with skin. Always wear personal protective equipment.

Emergency Procedures

Inhaling large quantities of cooling media R134a vapour can cause dizziness, headache, confusion and unconsciousness. In liquid form cooling media R134a can cause frostbite injuries on contact with skin.

In the case of an accidental release of this refrigerant:

- leave the affected area immediately
- remove victims to fresh air and if necessary administer expired air resuscitation and/or cardiopulmonary resuscitation. Call for immediate medical attention
- in case of contact with eyes or skin, soak the exposed areas with luke warm water, not hot or cold. Call for immediate medical attention
- allow the vapour to dissipate, use auxiliary ventilation if available.

Handling and Storage of Cooling Media R134a

When handling cooling media R134a, make sure that:

- the cylinders are stored in a cool dry place away from direct sunlight or sources of heat
- the areas used for the storage and handling of this refrigerant are adequately ventilated
- the cylinders are transported carefully
- the cylinder valves are opened slowly.

Disposal of Cooling Media R134a

Cooling media R134a should whenever possible be reprocessed or recycled. Contact the manufacturer or supplier for information on authorised refrigerant reclamation and recycling programs.

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Supply Systems

Power Supply

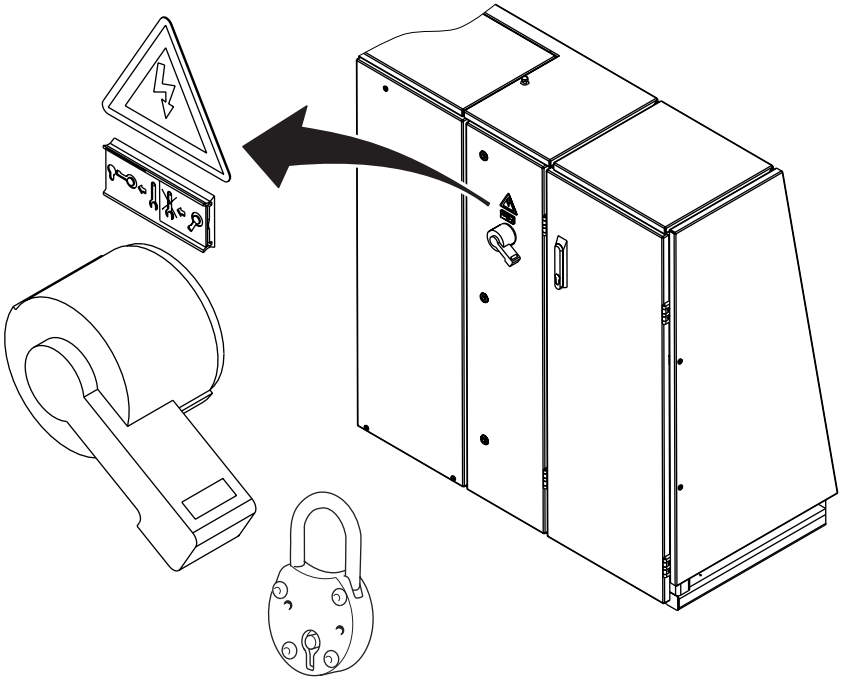
DANGER

Hazardous voltage and moving machinery.
The power supply disconnector must be turned off and secured with a lock before any maintenance.

Note! The key to the lock must be removed by the technician and retained in his/her possession until all work is completed.

Certain maintenance procedures may require power supply systems to be on. These exceptions are clearly stated in the Maintenance Manual.

The illustrations show the power supply disconnector and its location.



Residual Voltage

DANGER

Hazardous voltage.
Do not touch any terminals immediately after the power supply disconnector is turned off. Ensure that no residual voltage remains on the capacitors before touching. Wait five minutes. Failure to observe this information will cause death or serious injury.

After the power supply disconnector is turned off, residual voltage remains in the capacitor circuits.

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Electrical Cabinet

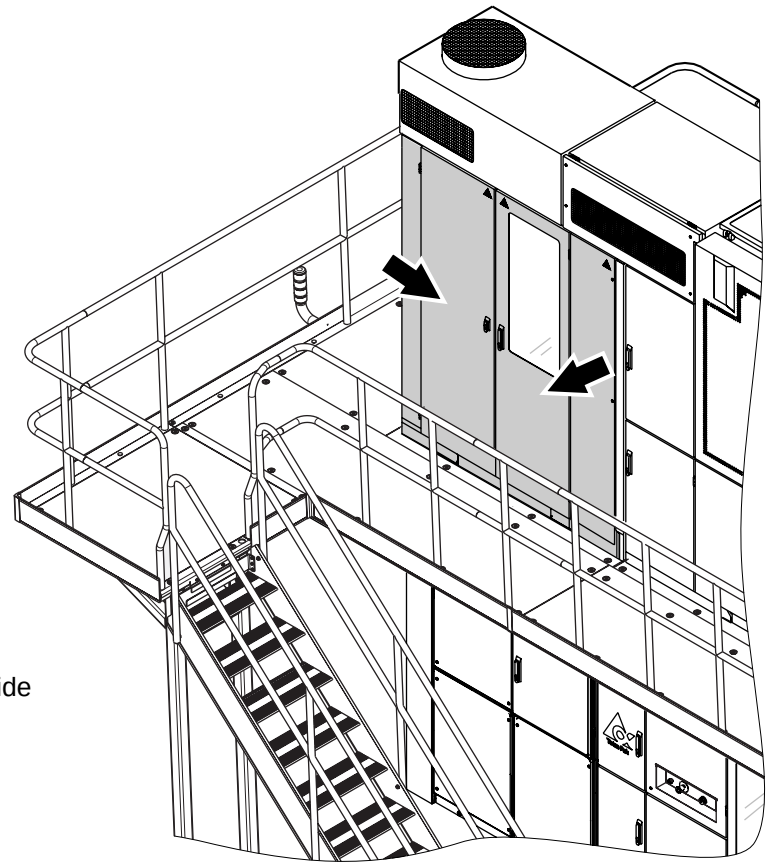
DANGER

Hazardous voltage.
Will shock, burn, or cause death.
The power supply disconnector must be turned off and secured with a lock before maintenance inside the electrical cabinet.

Note! The key to the lock must be removed by the technician and retained in his/her possession until all work is completed.

Make sure that the electrical cabinet doors are closed after working inside the electrical cabinet. Doors with lock must be locked.

The location of each electrical cabinet is shown by an arrow.



LH side

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Socket Outlet

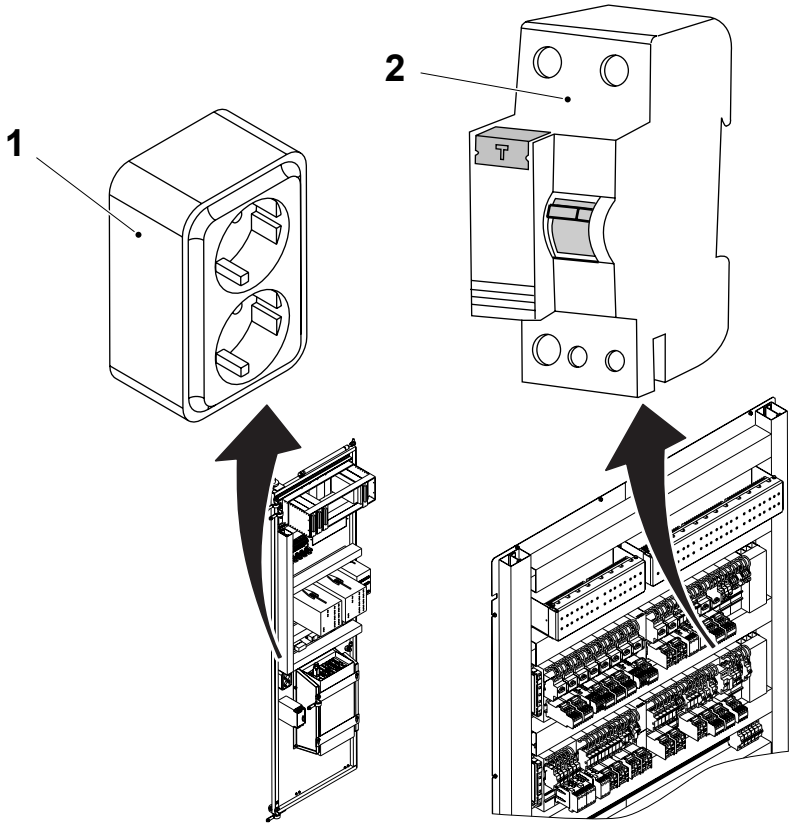
WARNING

Hazardous voltage.

Can shock, burn, or cause death. Read the Maintenance Manual before using this socket outlet.

The socket outlet (1) is connected to a residual current device (2) to protect users against electrical shock if there is an earth fault in the connected equipment. The residual current device shall be tested each time before the socket outlet is being used. See the MM for test procedure.

The illustrations show the socket outlet, the residual current device, and their location.



1 Socket outlet
2 Residual current device F029

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Air Supply

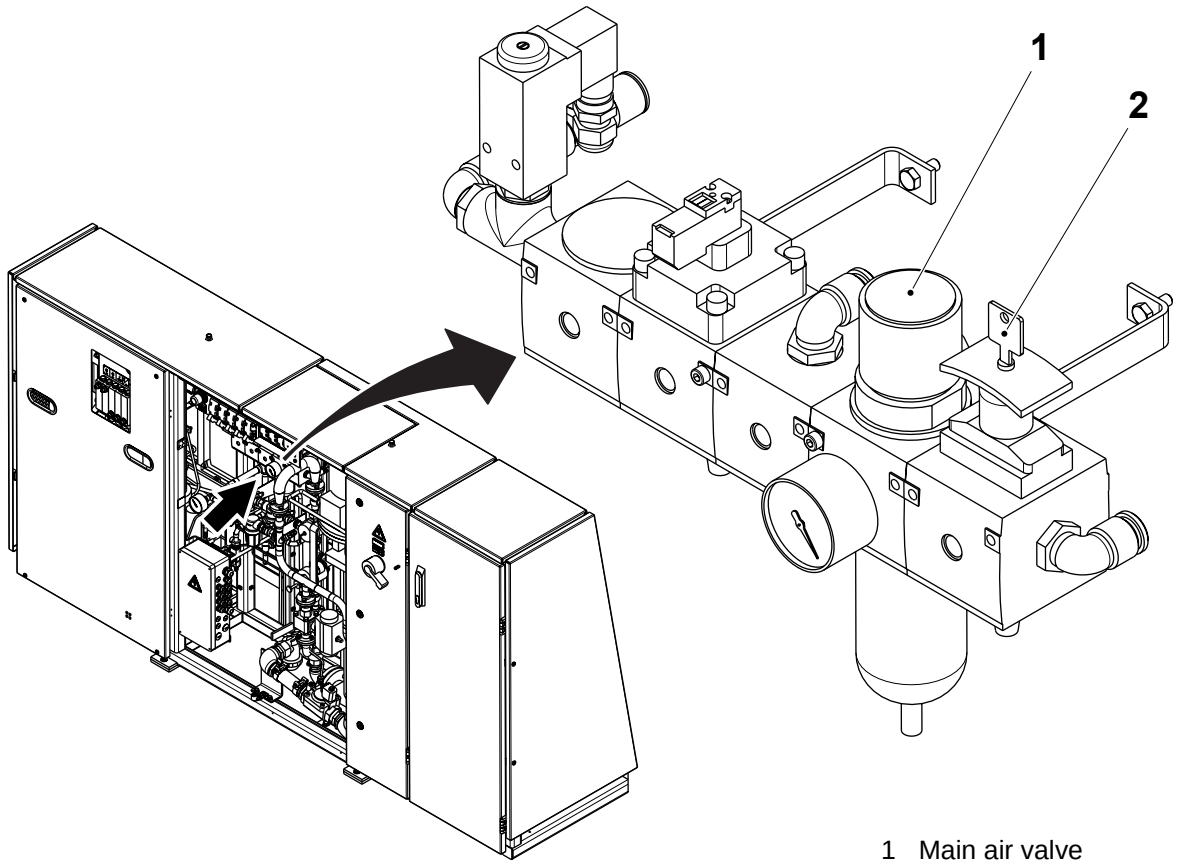
WARNING

Compressed air and moving machinery.
Close the main air valve and lock it before any maintenance.

Note! The key to the lock must be removed by the technician and retained in his/her possession until all work is completed.

Certain maintenance procedures may require air supply systems to be on. These exceptions are clearly stated in the Maintenance Manual.

The illustrations show the main air valve (1), the lock (2), and their location.



1 Main air valve
2 Lock

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Steam Supply

WARNING

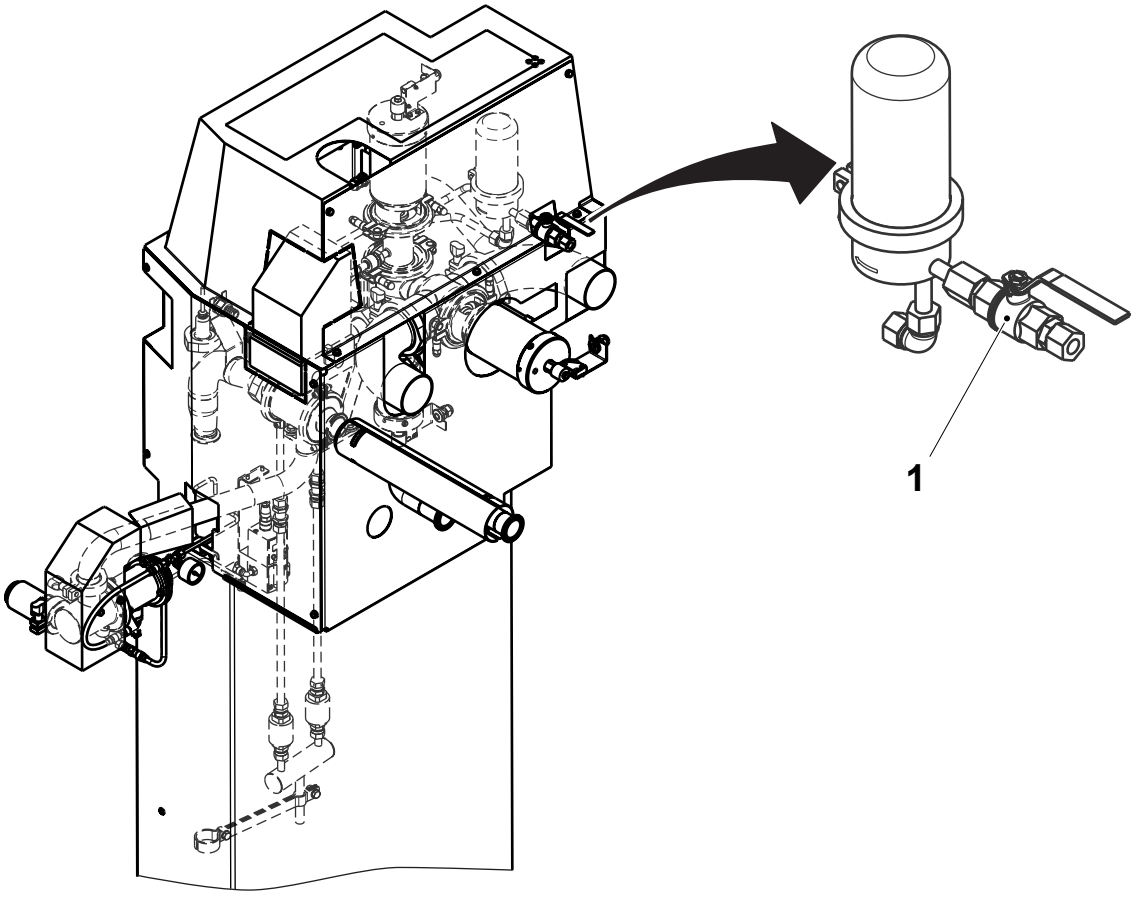
Hot steam can cause scalds.

Pressurized steam can be discharged unexpectedly.
Close the steam supply valve and lock it, depressurize and vent all steam safely before any maintenance on parts with steam, such as pipes and valves.

Note! The key to the lock must be removed by the technician and retained in his/her possession until all work is completed.

Certain maintenance procedures may require steam supply systems to be on. These exceptions are clearly stated in the Maintenance Manual.

The illustrations show the steam supply valve (1), and its location.



1 Steam supply valve

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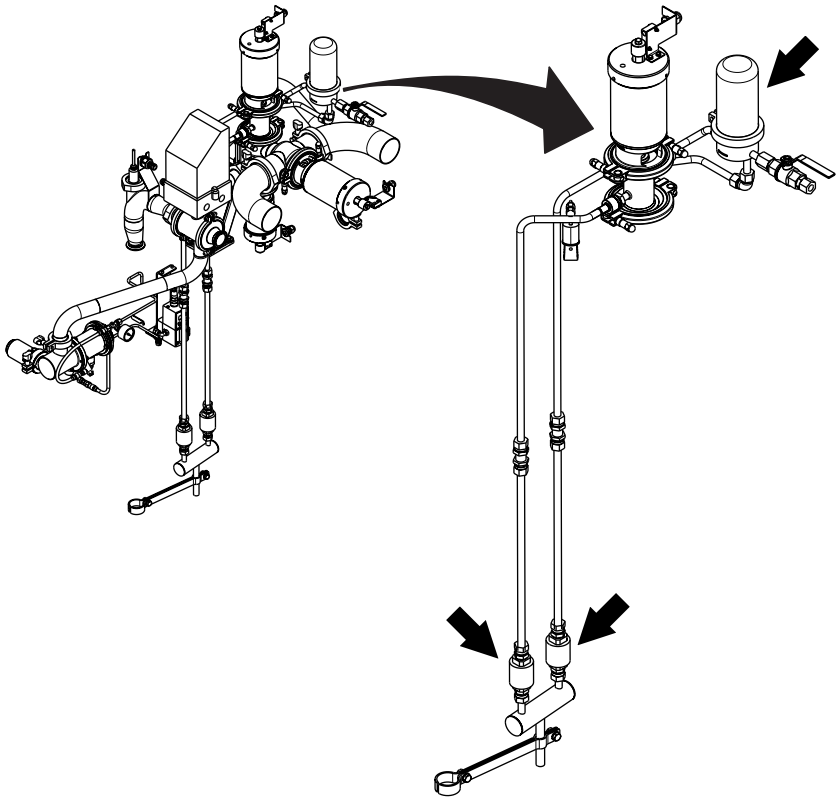
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WARNING

Hot parts can cause severe burns.

Pipes, valves, and other parts containing steam can be extremely hot. Do not touch hot parts.

The illustration shows hot parts of this equipment.



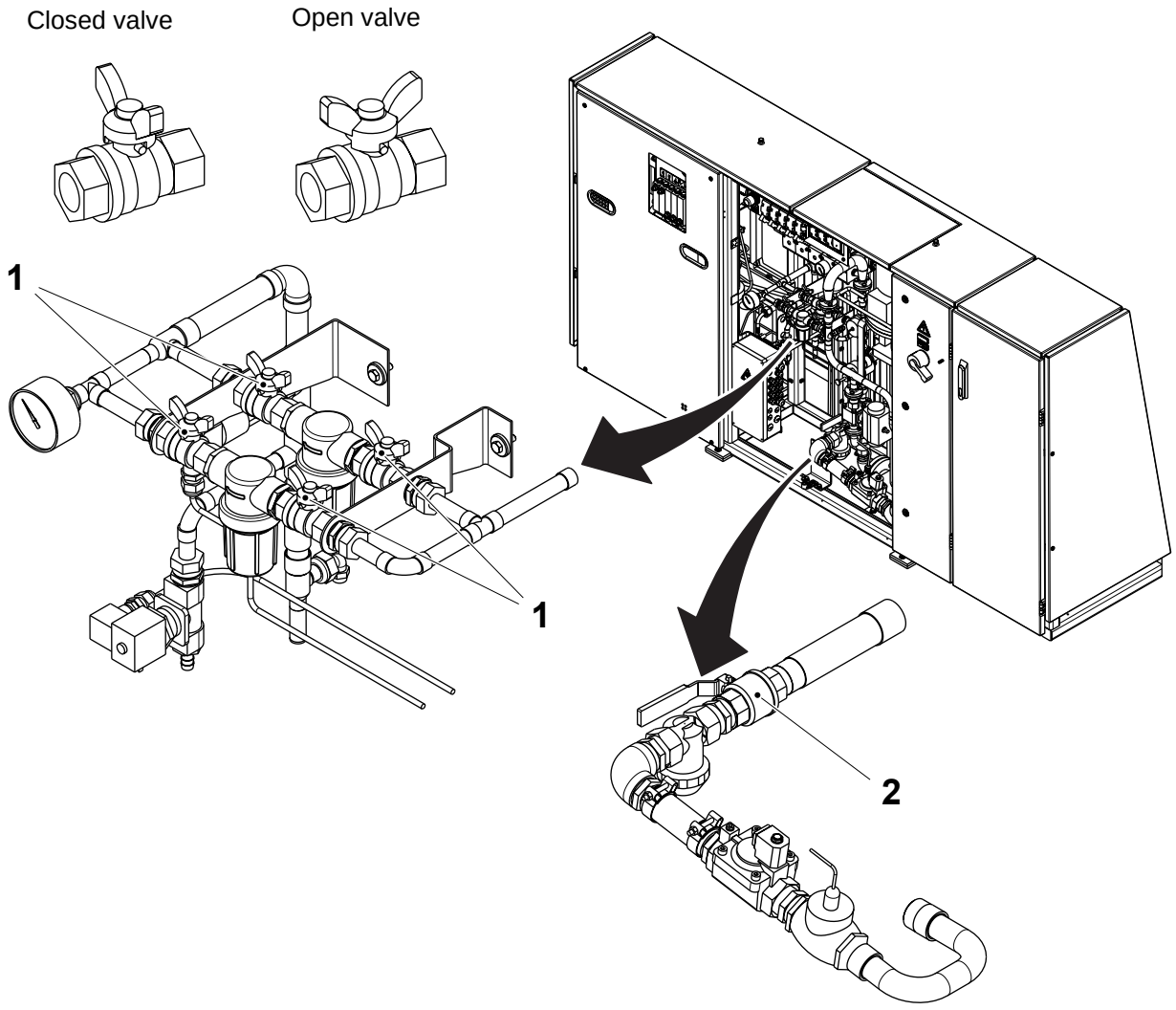
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Water Supply

CAUTION
Water under pressure.
Close the water supply valves before any maintenance.

Certain maintenance procedures may require water supply systems to be on. These exceptions are clearly stated in the Maintenance Manual.

The illustrations show the water supply valves (1) and (2), and their location.



1 Cold water supply valve
2 Hot water supply valve

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Equipment for Lifting and Moving Loads

WARNING

Risk of crushing injury.

Make sure that the capacity of the lifting equipment is adequate and that the equipment itself is in proper working order.

If lifting tackle must be joined to make up the necessary lengths, make sure that the joints are secure and have the same lifting capacity as the rest of the lifting tackle.

Always engage safety clips fitted to lifting hooks to prevent the lifting tackle from slipping off.

Use ropes or poles to steady and manoeuvre suspended loads. Do **not** use hands or feet.

Make sure that the route and destination are free from obstacles before moving a suspended load. It must always be possible to quickly and safely lower the load to the floor in an emergency.

When depositing loads, keep lifting tackle in place until the stability of the load has been substantiated.

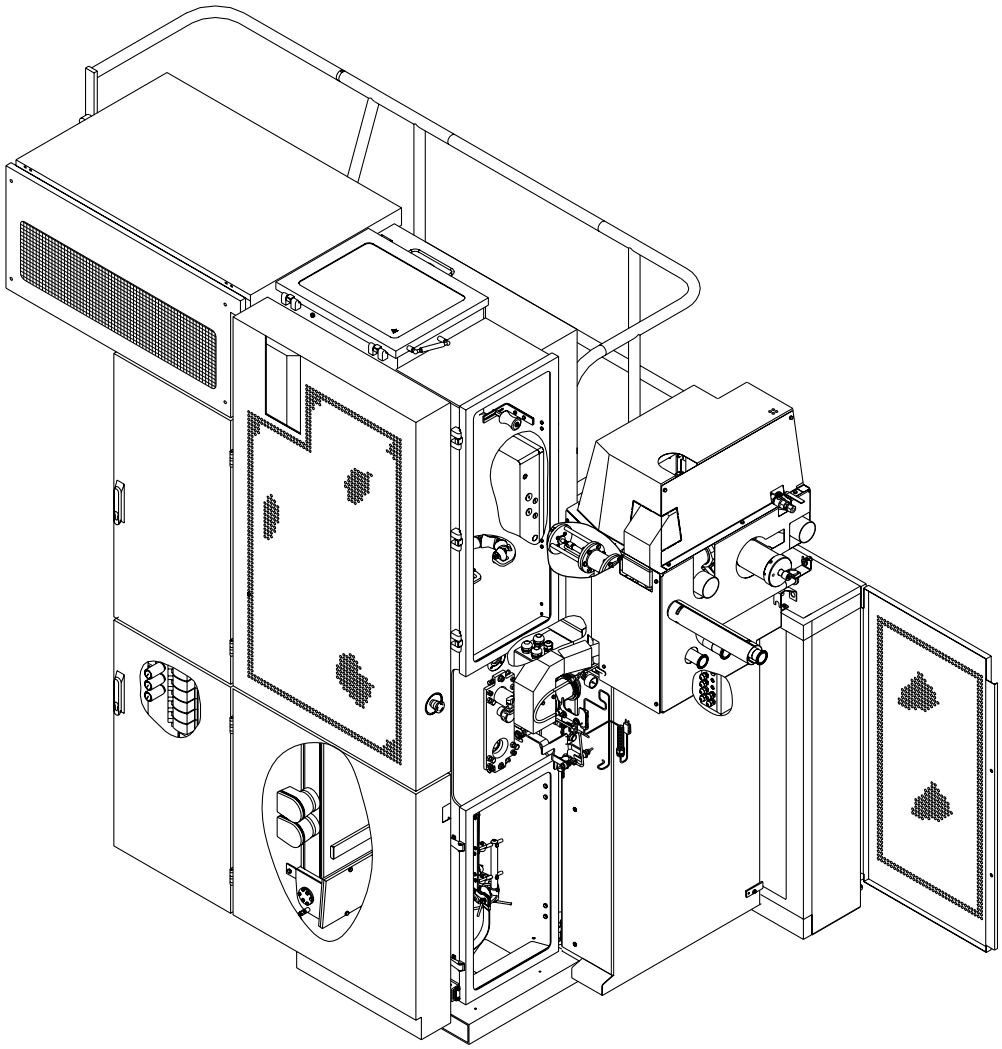
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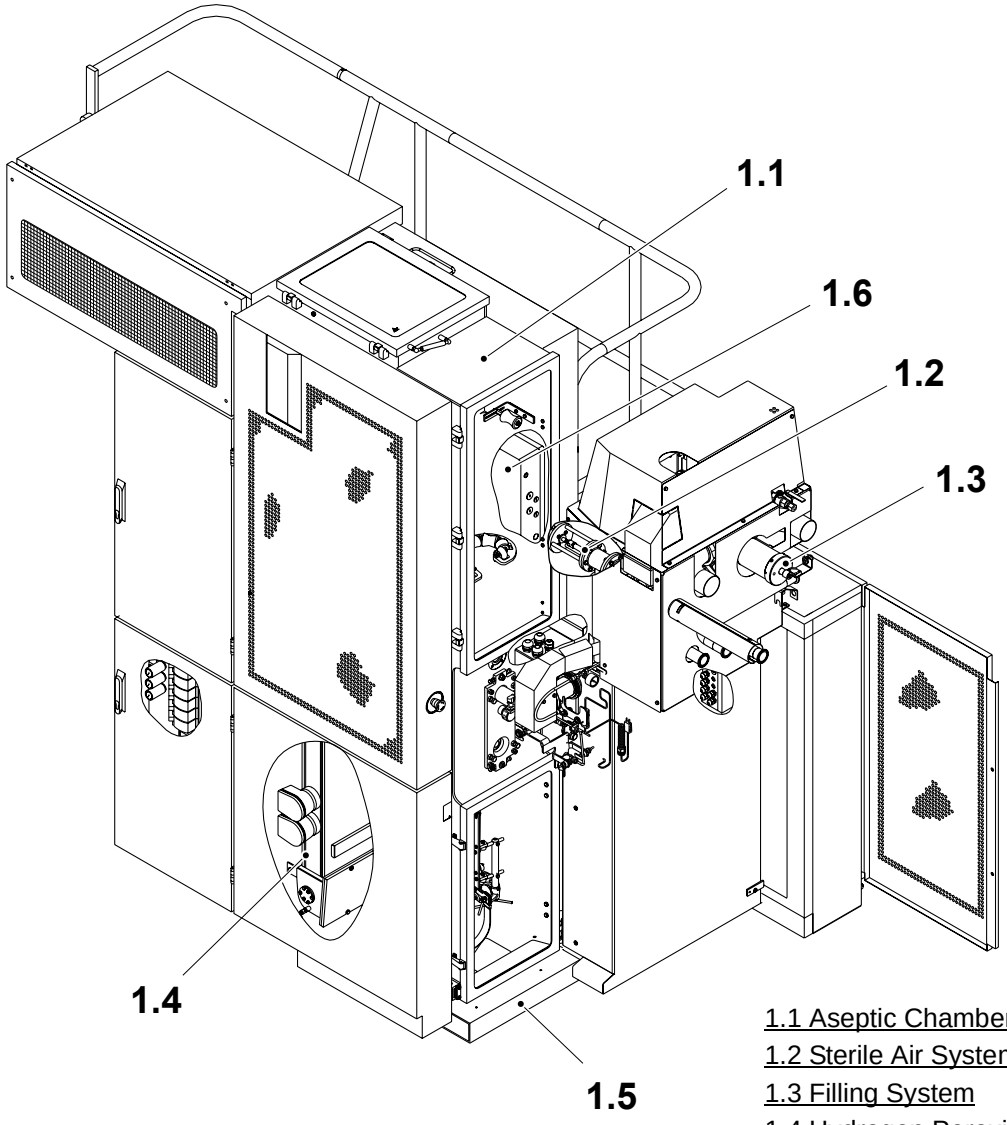
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1 Superstructure



Superstructure - Description

SPC Reference	648511-0600



1.1 Aseptic Chamber
1.2 Sterile Air System
1.3 Filling System
1.4 Hydrogen Peroxide
1.5 Frame Section Upper
1.6 Connection Box

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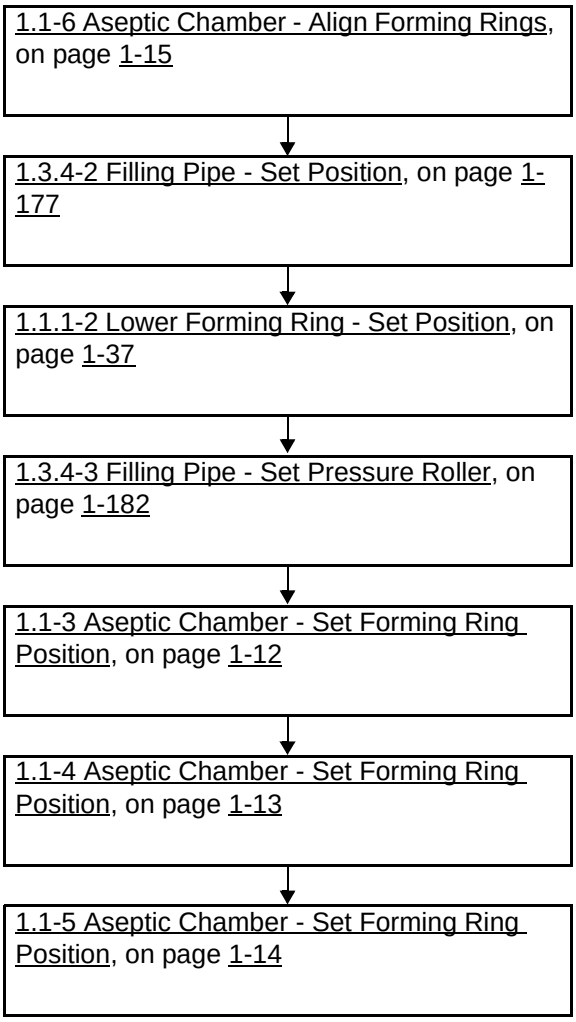
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1 Superstructure

1-1 Superstructure Setting - Diagram



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1.1 Aseptic Chamber

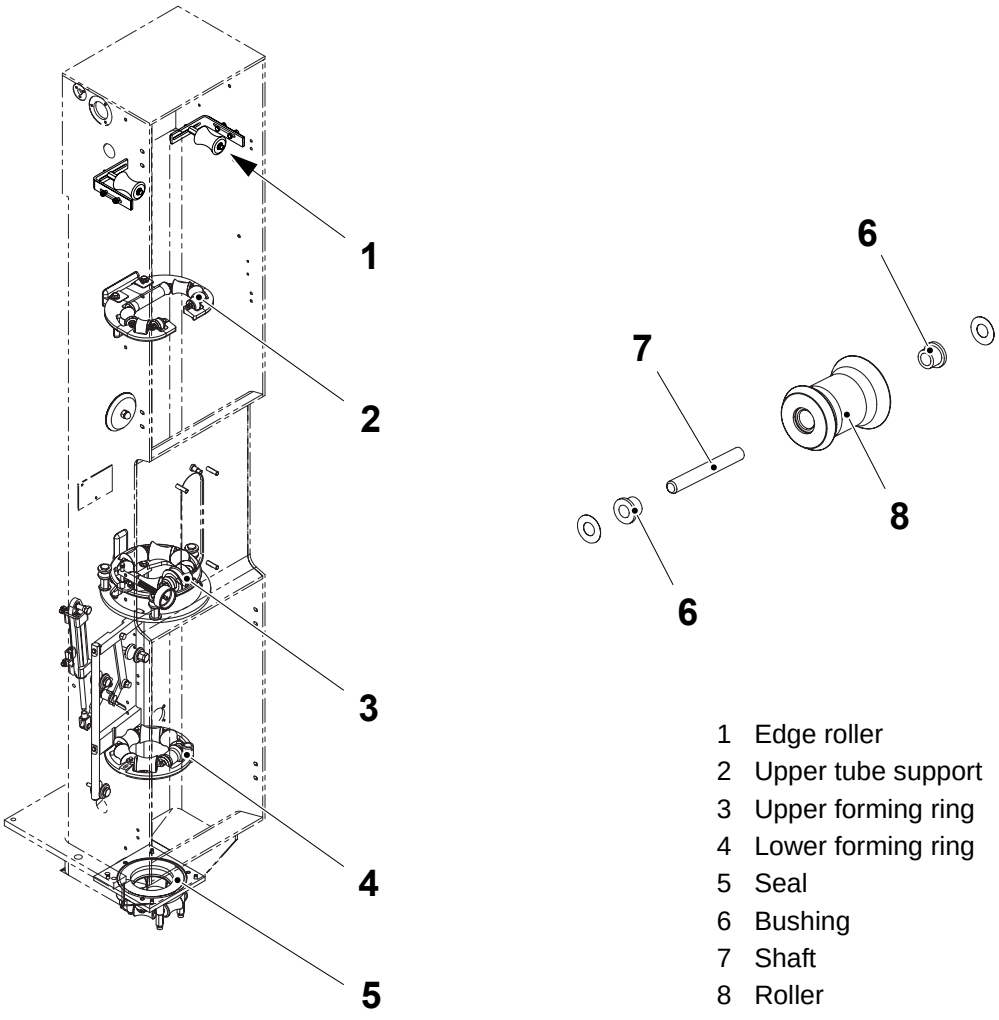
SPC Reference	1095881-0300

1.1-1 Aseptic Chamber - Check Forming Rings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095881-0300

a) Check that the rollers (8) in the edge roller (1), upper tube support (2), upper forming ring (3), lower forming ring (4) and seal (5) rotate freely. If not, clean all the rollers (8) as required.
If not, remove the rollers (8) and change the bushings (6) and/or the shaft (7), see 1.1-2 Aseptic Chamber - Change Forming Ring Bushings.

b) Check that the rollers surfaces are not damaged. Change the rollers as required, see 1.1-2 Aseptic Chamber - Change Forming Ring Bushings.



1 Edge roller
2 Upper tube support
3 Upper forming ring
4 Lower forming ring
5 Seal
6 Bushing
7 Shaft
8 Roller

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1.1-2 Aseptic Chamber - Change Forming Ring Bushings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095881-0300

a) Remove the cap nut (4) and the lock plates (5).

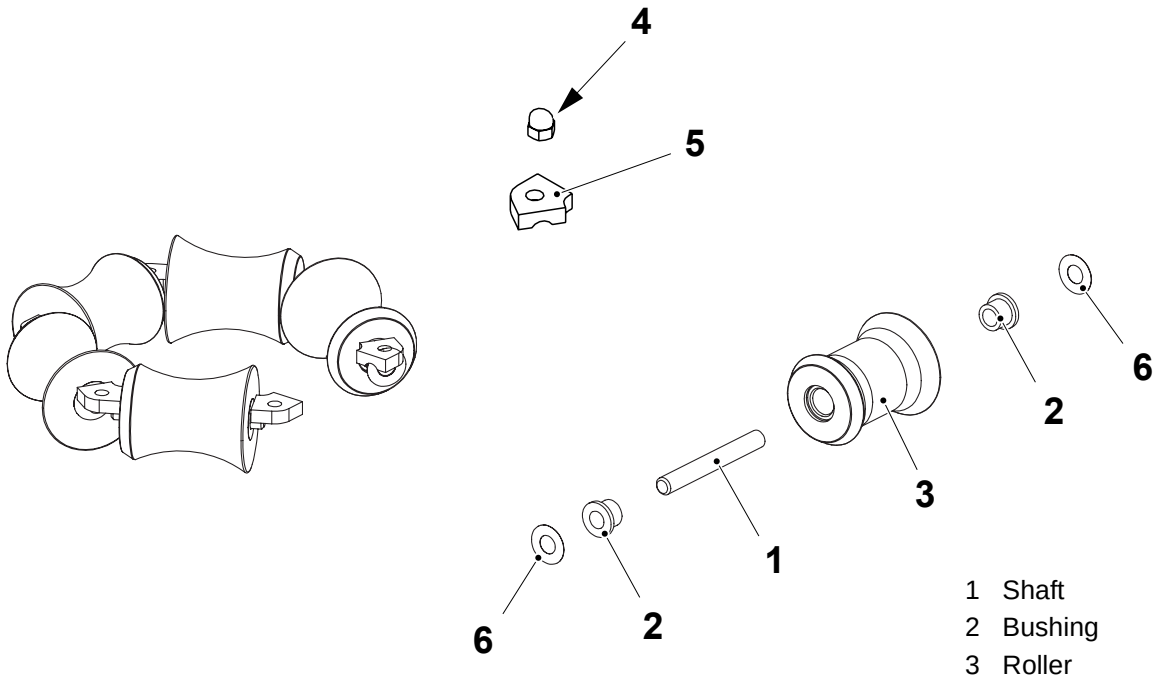
b) Remove the rollers (3) and the washers (6).

c) Change the bushing (2) and/or the shaft (1) if required.

d) Assemble in the reverse order.

Note! Make sure that the lock plates (5) and the washers (6) are fitted in the previous position.

e) Check the play between the rollers (3) and set as required, see 1.1.1-1 Lower Forming Ring - Set Clearance.



1 Shaft
2 Bushing
3 Roller
4 Cap nut
5 Lock plate
6 Washer

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1.1-3 Aseptic Chamber - Set Forming Ring Position

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1095881-0300

Note! Valid for: 1500 S, 1000 B, 1000 S, 1000 Sq, 500 B, 500 S, TPA 1000 S, TPA 500 Sq and TPA 1000 Sq.

Before performing this setting, follow the instructions as described in 1-1 Superstructure Setting - Diagram, for the right setting sequence.

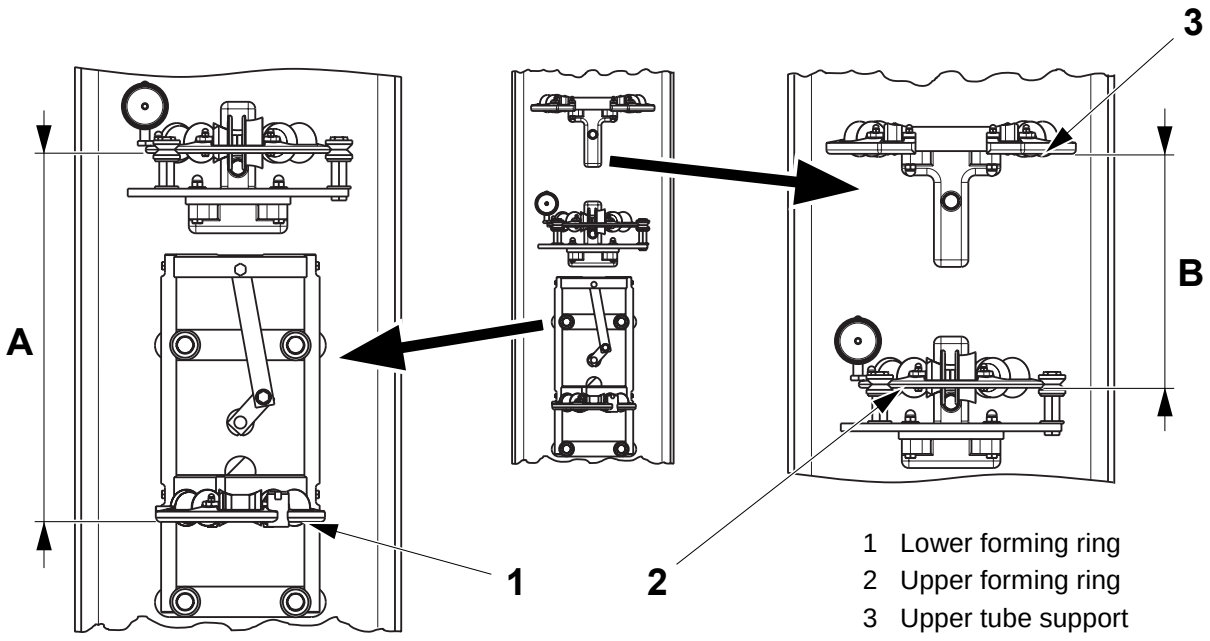
Note! The height settings for the forming rings are based on the upper position of the lower forming ring (1).

Height Position

a) Set the distance **A**, between the lower forming ring (1) and the upper forming ring (2) (underside to underside), see table below.

b) Set the distance **B** between the upper forming ring (2) and the upper tube support (3) (underside to underside), see table below.

Package	A ±1 (mm)	B ±1 (mm)	Package	A ±1 (mm)	B ±1 (mm)
1500 S - 1000 B - 1000 S - 500 B	552	786	500 S	567	783
TPA 1000 S	554	785	1000 Sq	560	780
TPA 1000 Sq	545	824	TPA 500 Sq	556	782



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1.1-4 Aseptic Chamber - Set Forming Ring Position

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1095881-0300

Note! Valid for: 200 S and TPA 250 Sq.

Before performing this setting, follow the instructions as described in 1-1 Superstructure Setting - Diagram, for the right setting sequence.

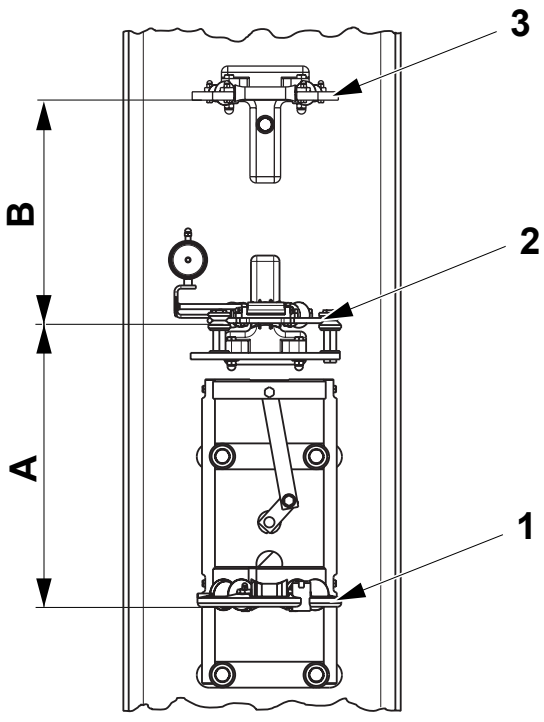
Note! The height settings for the forming rings are based on the upper position of the lower forming ring (1).

Height Position

a) Set the distance **A**, between the lower forming ring (1) and the upper forming ring (2) (underside to underside), see table below.

b) Set the distance **B** between the upper forming ring (2) and the upper tube support (3) (underside to underside), see table below.

Package	A ±1 (mm)	B ±1 (mm)
200 S	510	525
TPA 250 Sq	505	555



1 Lower forming ring
2 Upper forming ring
3 Upper tube support

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1.1-5 Aseptic Chamber - Set Forming Ring Position

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1095881-0300

Note! Valid for: 200 B, 250 B, 250 S, 330 S and TPA 330 Sq.

Before performing this setting, follow the instructions as described in 1-1 Superstructure Setting - Diagram, for the right setting sequence.

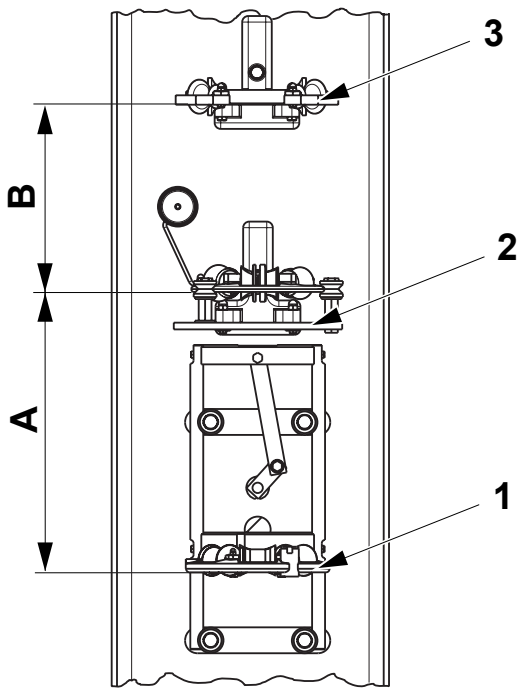
Note! The height settings for the forming rings are based on the upper position of the lower forming ring (1).

Height Position

a) Set the distance **A**, between the lower forming ring (1) and the upper forming ring (2) (underside to underside), see table below.

b) Set the distance **B** between the upper forming ring (2) and the upper tube support (3) (underside to underside), see table below.

Package	A ±1 (mm)	B ±1 (mm)
200 B - 250 B - 330 S	479	761
TPA 330 Sq	484	761
250 S	495.2	753.4



1 Lower forming ring
2 Upper forming ring
3 Upper tube support

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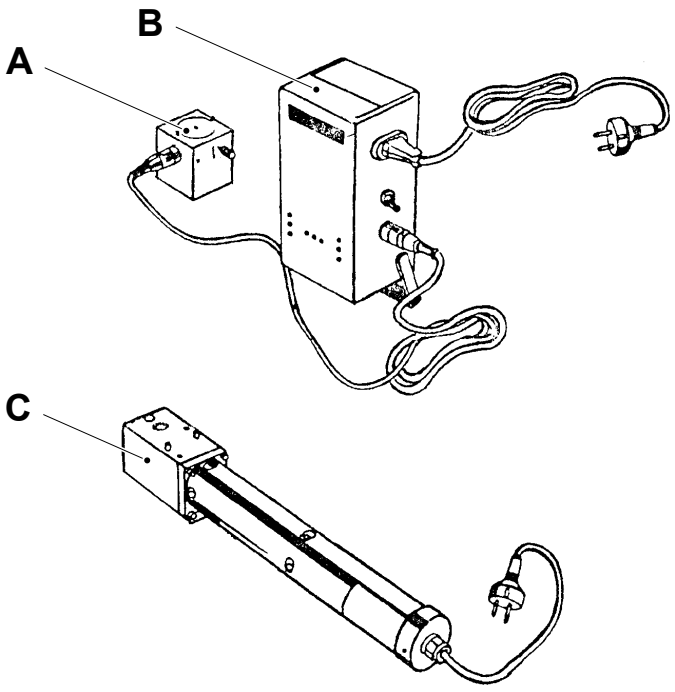
1.1-6 Aseptic Chamber - Align Forming Rings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Laser equipment TP No. 90243-0446 (for 110V) Laser equipment TP No. 90243-0447 (for 230V) Template tube forming TP No. 1512327-0100
SPC Reference	1095881-0300

Note! For volume dependency templates and tools codes, see 10.2 Templates and Tools.
This setting sequence is referred to the **"Easy-laser Paraline"** alignment tool.

If the **"old laser equipment" (TP No. 76594-020V)** is used, all the instructions of this sequence are valid, but the following information must be considered.

The laser detector (A) has three measuring ranges. Always start with basic setting and conclude with fine setting. When the setting-alignment is correct, only the three green LEDs on the display box (B) will be lit up. Shield the detector so that surrounding light will not affect it. If affected by such light, the detector will indicate the correct setting even if the setting is incorrect.



A Laser detector
B Display box
C Laser projector

(Cont'd)

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(Cont'd)

Before performing the instructions below check, and if required adjust:

- the relative position of the pressure and of the counter pressure rollers according to 1.1.1-2 Lower Forming Ring - Set Position.
- the height of the forming rings according to 1.1-3 Aseptic Chamber - Set Forming Ring Position.
- the paper tube alignment for the upper forming ring according to 1.1.5-2 Upper Forming Ring - Set Paper Tube Alignment.

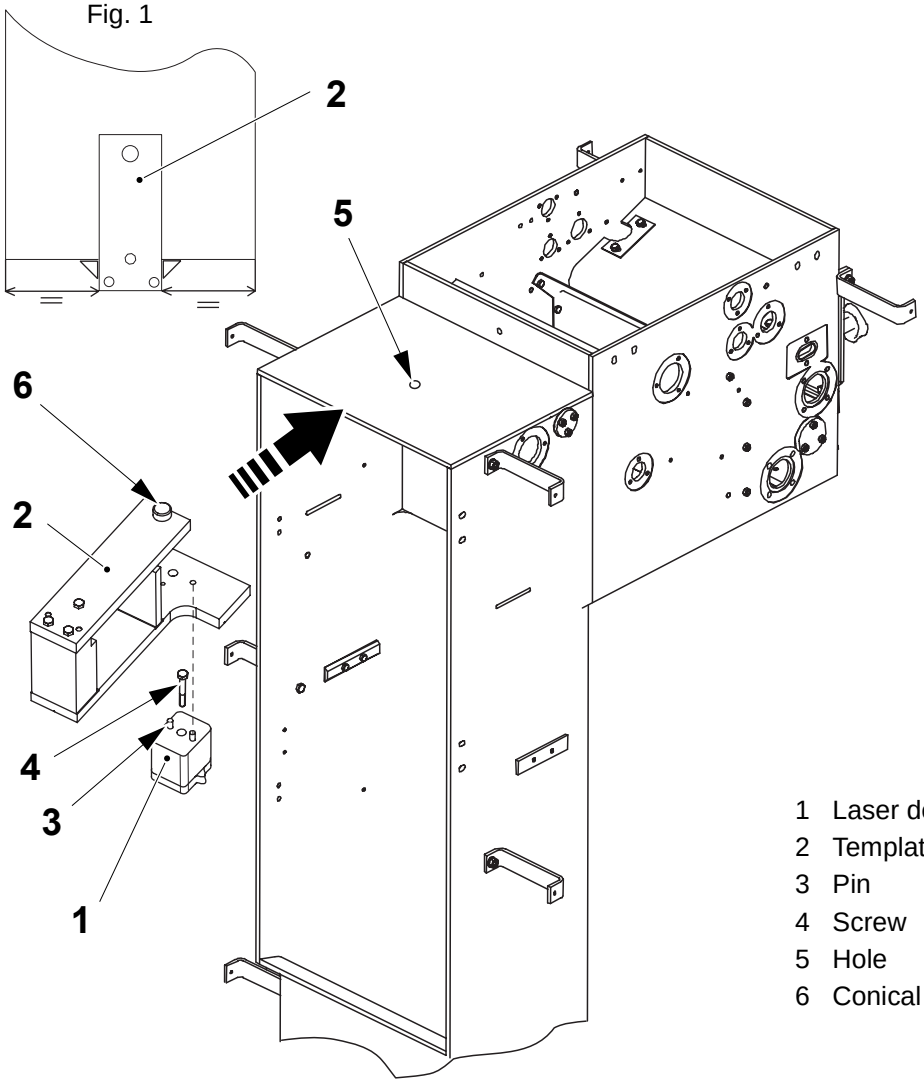
a) Remove the filling pipe according to 1.3.4-7 Filling Pipe - Change.

b) Fit the laser detector (1) on to the template (2) by means of the two pins (3) and the screw (4).

c) Fit the template (2) into the hole (5) by means of the conical screw (6).

d) Check that the template (2) is perpendicular, and centred on the top face of the aseptic chamber, see **figure 1**.

Fig. 1



1 Laser detector
2 Template
3 Pin
4 Screw
5 Hole
6 Conical screw

(Cont'd)

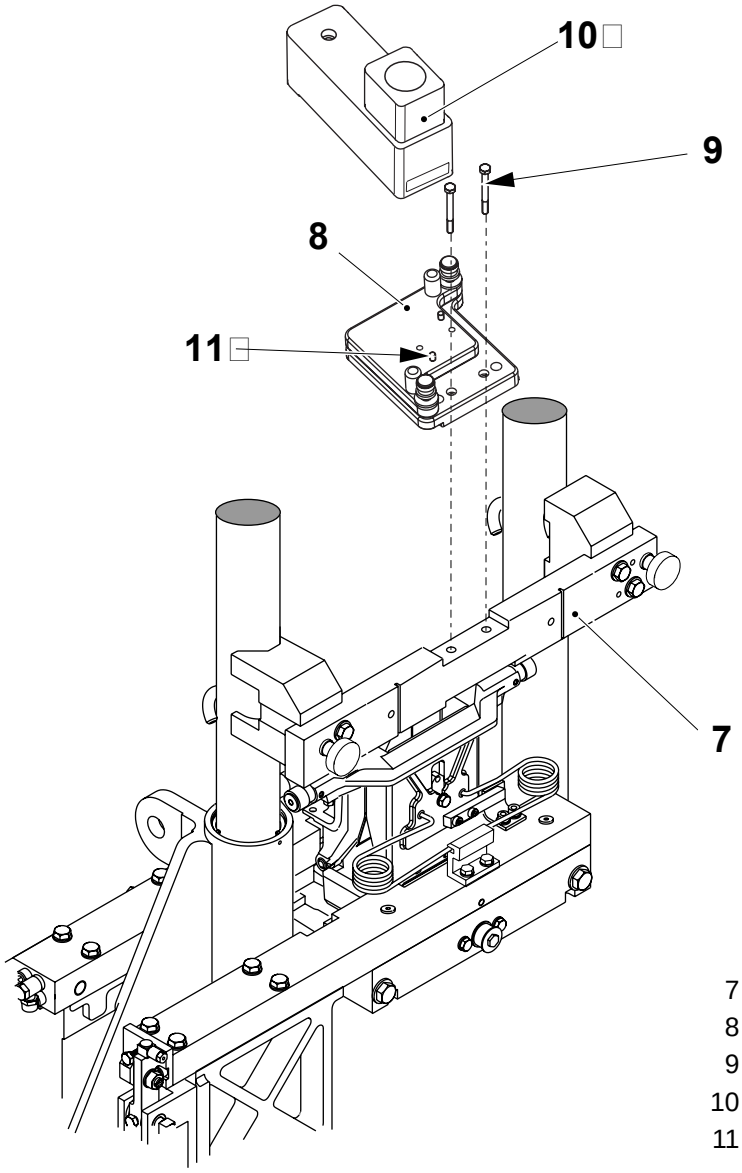
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(Cont'd)

e) Fit the jaw setting tool (7) between the yoke guides.

f) Fit the laser transmitter (10) on to the template (8) by means of the two screws (11).

g) Fit the template (8) on the jaw setting tool (7) by means of the two screws (9).



7 Jaw setting tool
8 Template
9 Screw
10 Laser transmitter
11 Screw

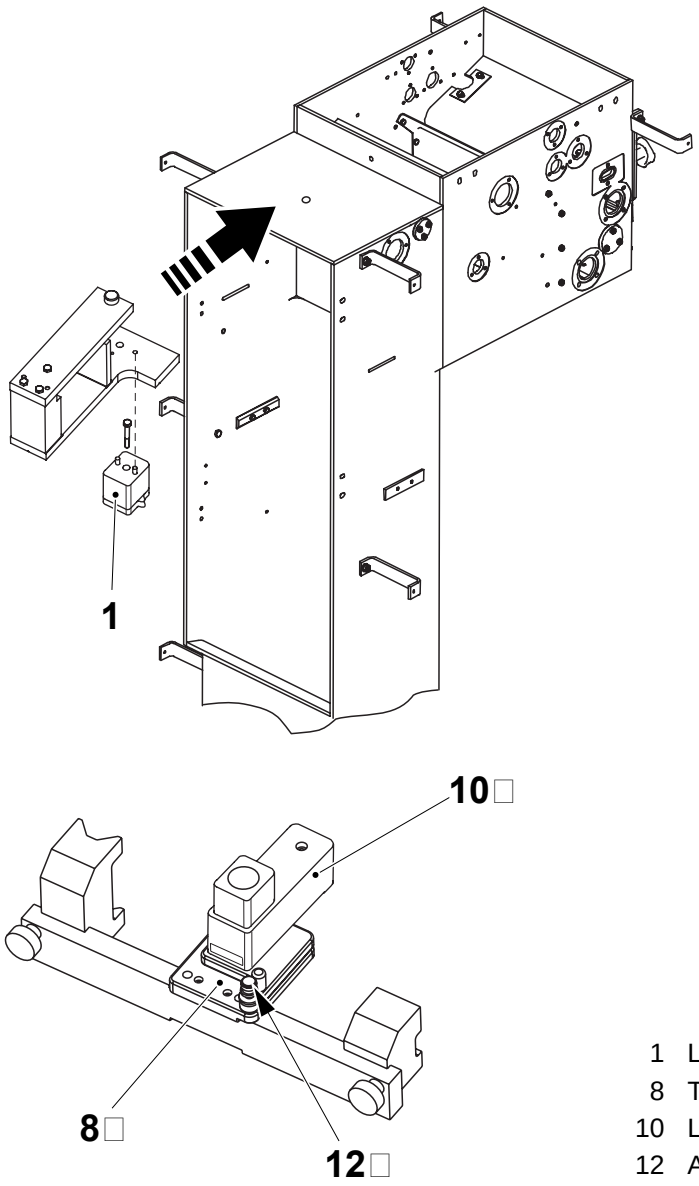
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(Cont'd)

h) Switch on the laser transmitter (10) and check the position of the laser beam. If the beam is not on the laser detector (1), adjust the template (8) by means of the two adjusting screws (12).

Note! If the beam is not visible on the laser detector (1) check the aseptic chamber for obstructions, and especially the internal roller of the upper forming ring. Remove obstructions as required.



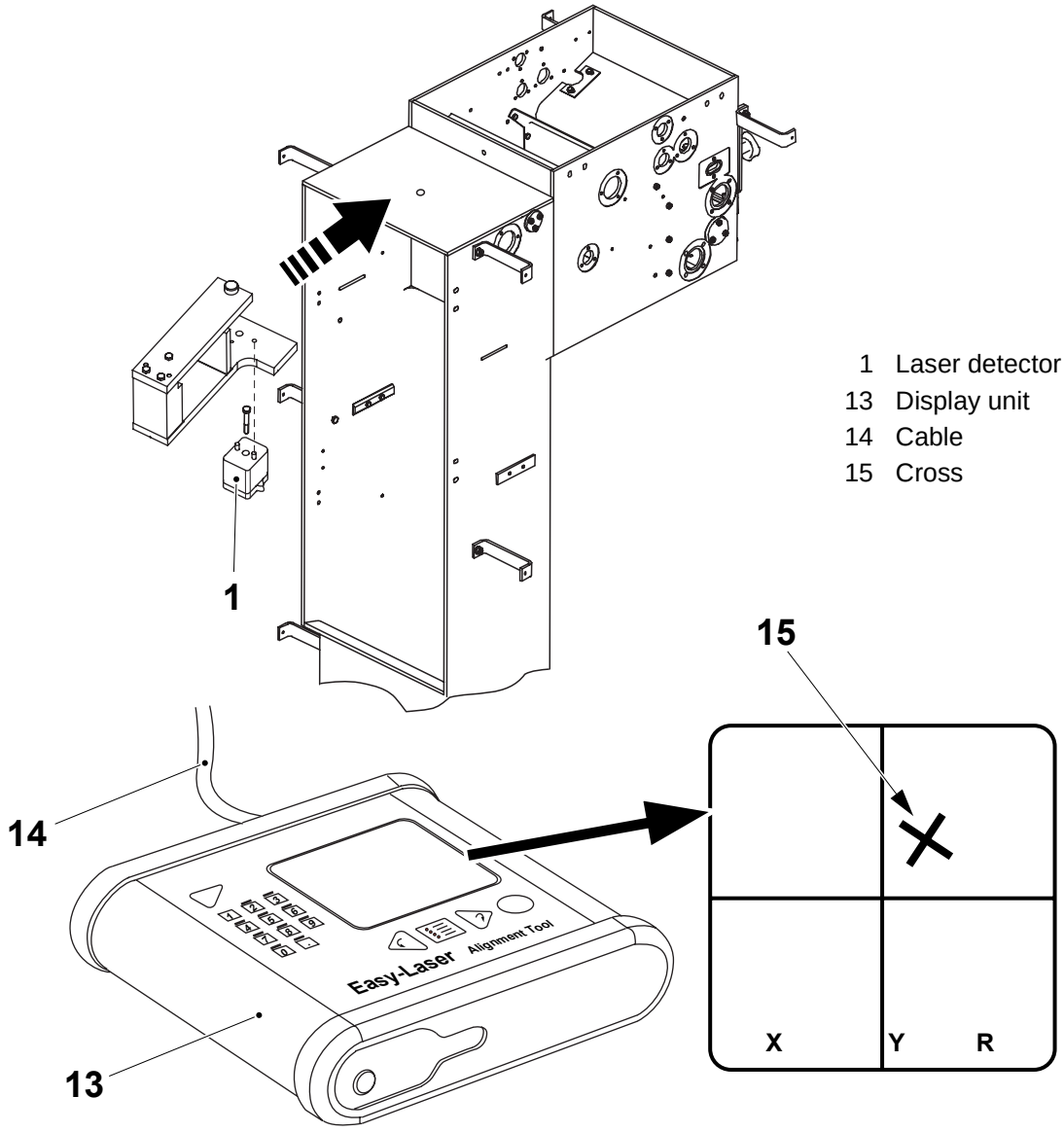
1 Laser detector
8 Template
10 Laser transmitter
12 Adjusting screw

(Cont'd)

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(Cont'd)

i) Connect the display unit (13) to the laser detector (1) by means of the cable (14). When the laser beam is within **20 mm** inside the window of laser detector (1), a cross (15) is displayed showing the laser beam.



1 Laser detector
13 Display unit
14 Cable
15 Cross

(Cont'd)

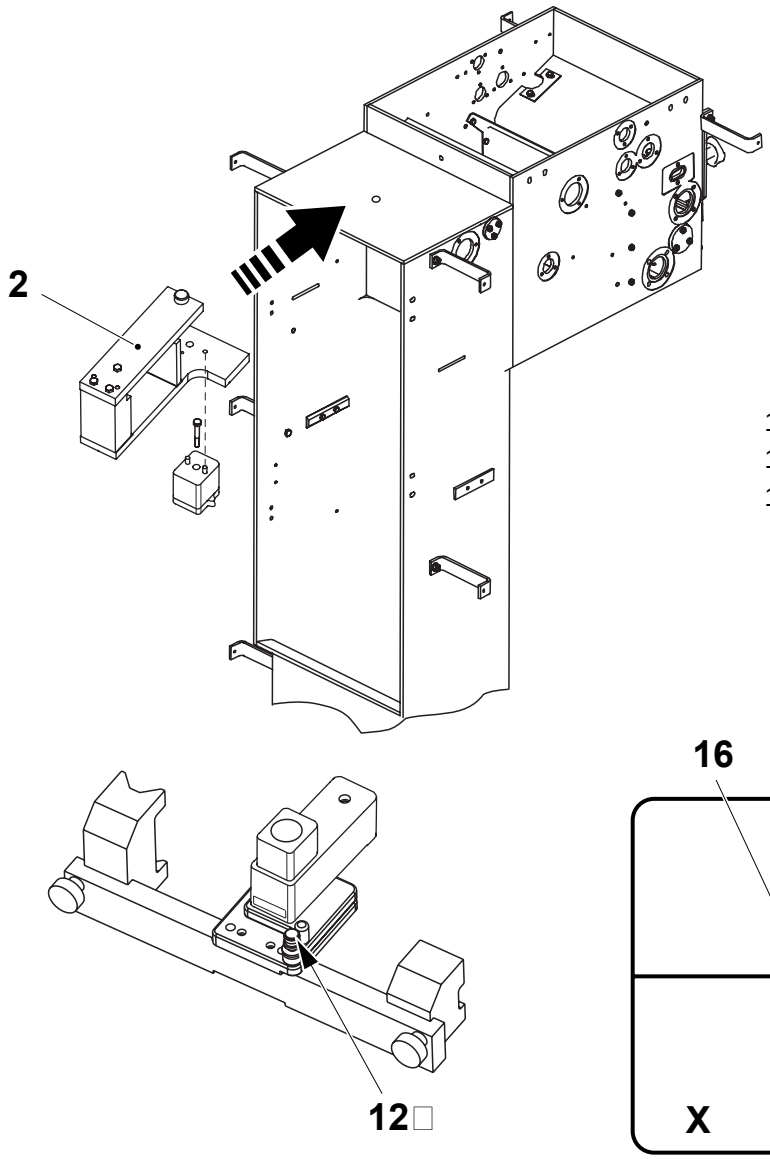
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(Cont'd)

j) Try to reach the centre of the display (16) with the cross (15) by means of the adjusting screws (12).

Note! In order to understand how to move the laser beam, in the lower part of the template (2), a grow indicates the “X axis” direction.

Note! If it is not possible to reach the centre of the display (16) the max. values allowed for “X” and “Y” are **±0,2 mm**. The “R” value (rotation) should be between **±3**. If required, check the position of the template (2) related to the front of the aseptic chamber.



2 Template
12 Adjusting screw
15 Cross
16 Display centre

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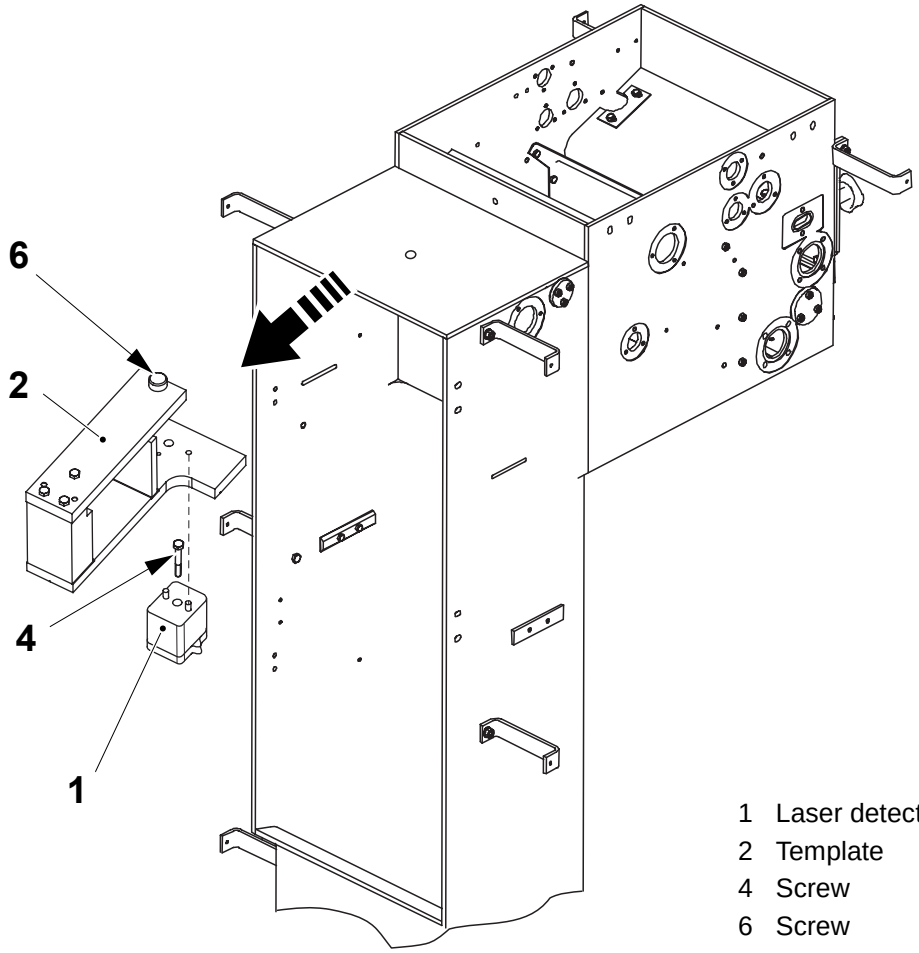
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Note! Once the position of the beam is vertically aligned, it is possible to start the setting of each forming rings. Be careful not to change the position of the laser transmitter during the setting procedure.

Note! To protect the laser transmitter from accidental fall of objects during the work, cover the hole between the aseptic chamber and the jaw system with a piece of cardboard.

k) Remove the template (2) by means of the screw (6).

l) Remove the laser detector (1) by means of the screw (4).



1 Laser detector
2 Template
4 Screw
6 Screw

(Cont'd)

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(Cont'd)

m) Remove the screws (20) and the nuts (21).

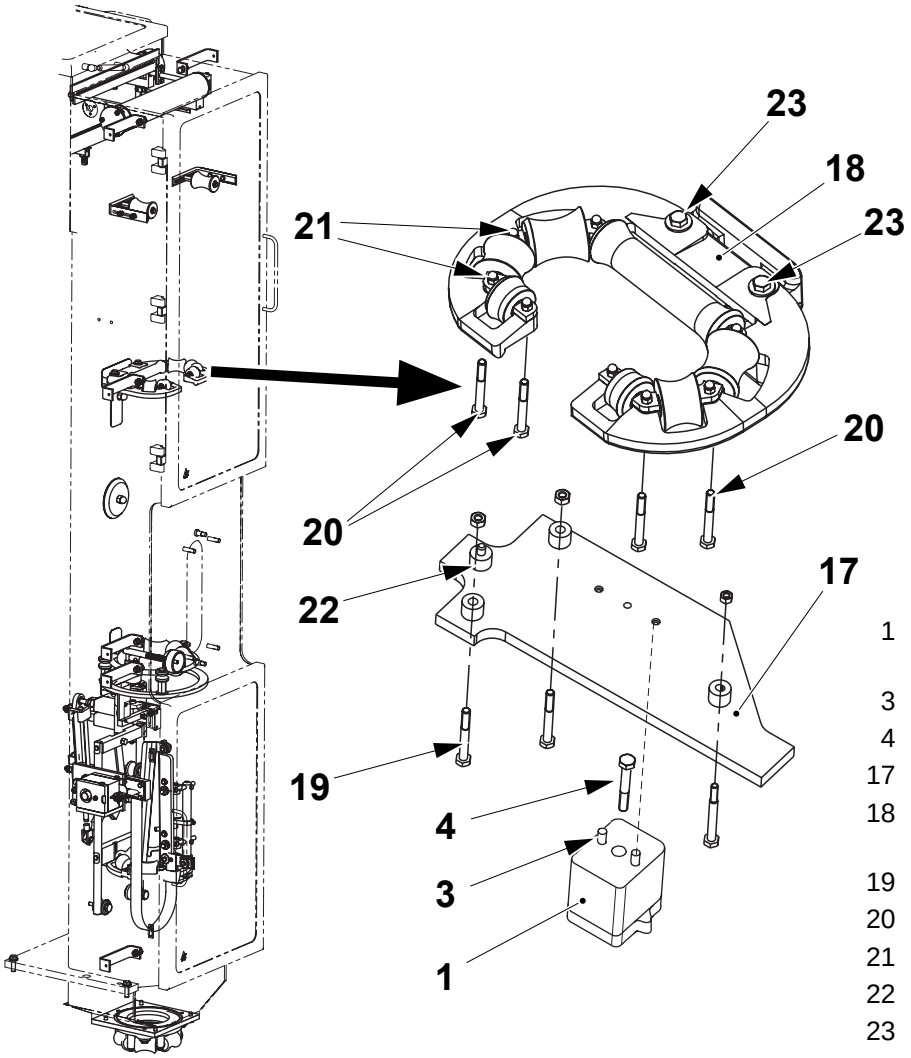
Note! The screws (20) must be removed according to the required volumes.

n) Fit the template (17) under the upper tube support (18) by means of the screws (19) and the pin (22).

Note! Fit the template (17) according to the marks (e.g. upper-front) on it.

o) Fit the laser detector (1) under the template (17) by means of the two pins (3) and the screw (4).

p) Switch on the laser transmitter and check, by means of the display unit, the “X”, “Y” and “R” values. These values should be not greater then the values on the upper part of the aseptic chamber. If required adjust the upper tube support (18) by means of the two screws (23).



1 Laser detector
3 Pin
4 Screw
17 Template
18 Upper tube support
19 Screw
20 Screw
21 Nut
22 Pin
23 Screw

(Cont'd)

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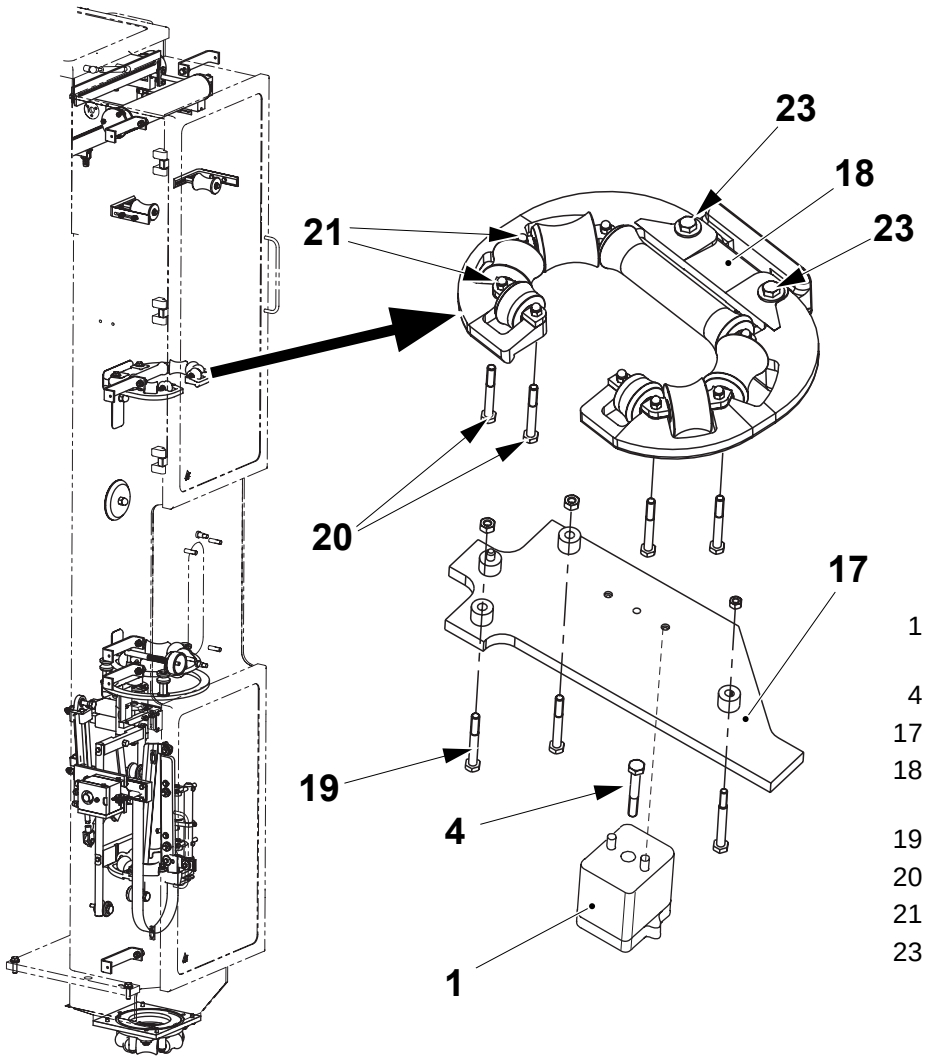
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q) Tighten the two screws (23) and check once more the correct position of the upper tube support (18).

r) Remove the laser detector (1) from the template (17) by means of the screw (4).

s) Remove the template (17) from the upper tube support (18) by means of the screws (19).

t) Fit the screws (20) and the nuts (21).



1 Laser detector
4 Screw
17 Template
18 Upper tube support
19 Screw
20 Screw
21 Nut
23 Screw

(Cont'd)

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(Cont'd)

u) Remove the screws (24) and the nuts (25).

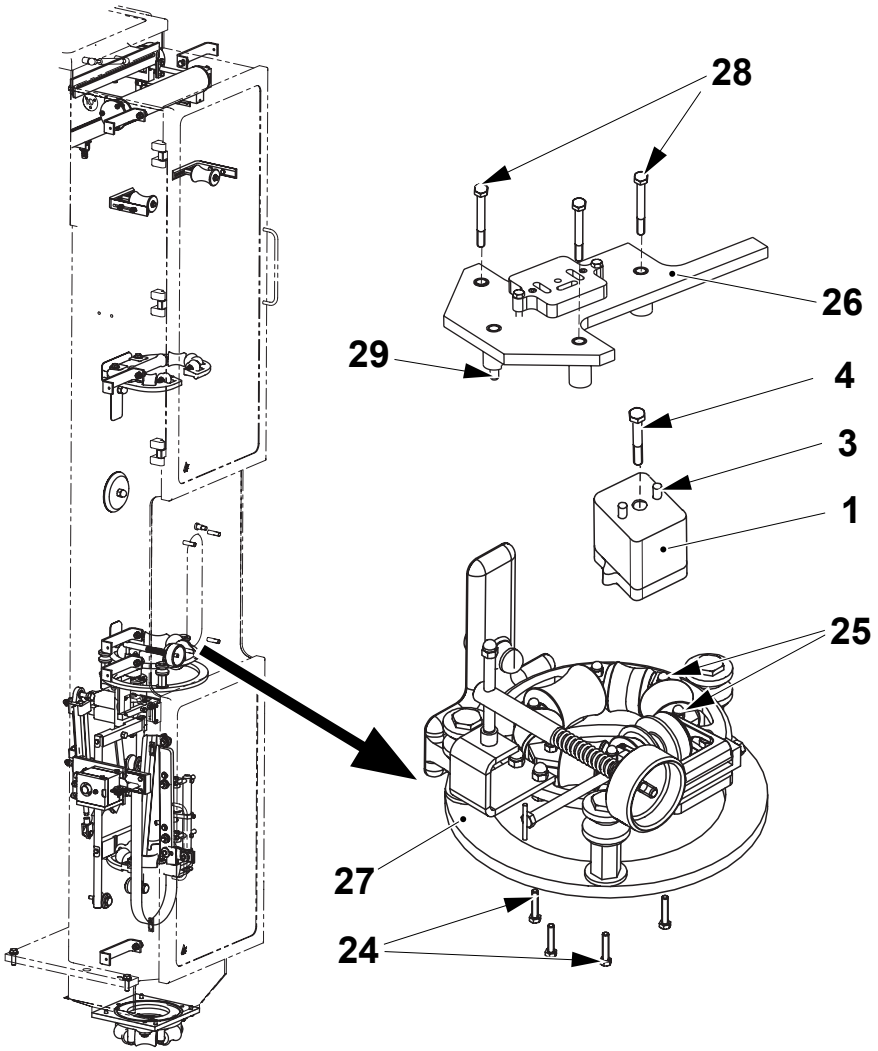
Note! The screws (24) must be removed according to the required volumes.

v) Fit the template (26) on the upper forming ring (27) by means of the screws (28) and the pin (29).

Note! The plate on the upper part of the template (26) must be used only with the old laser equipment.

Note! Fit the template (26) according to the marks (e.g. upper-front) on it.

w) Fit the laser detector (1) **under** the template (26) by means of the two pins (3) and the screw (4). Only for **250 S**, fit the laser detector (1) **on top of** the template (26).



1 Laser detector
3 Pin
4 Screw
24 Screw
25 Nut
26 Template
27 Upper forming ring
28 Screw
29 Pin

(Cont'd)

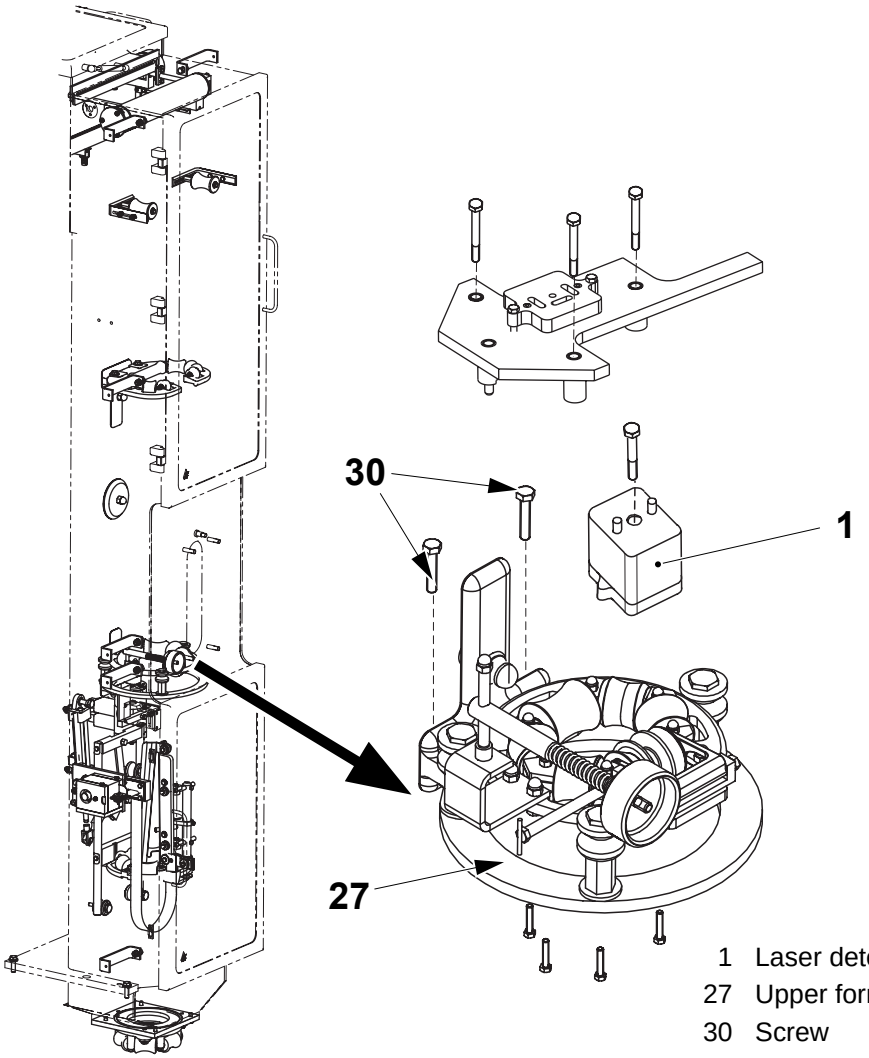
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(Cont'd)

x) Switch on the laser transmitter and check, by means of the display unit, the “X”, “Y” and “R” values. These values should be not greater than the values on the upper part of the aseptic chamber. If required adjust the upper forming ring (27) by means of the two screws (30).

y) Tighten the two screws (30) and check once more the position of the upper forming ring (27).

z) Remove the laser detector (1) and assemble the upper forming ring (27) in the reverse order.



1 Laser detector
27 Upper forming ring
30 Screw

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

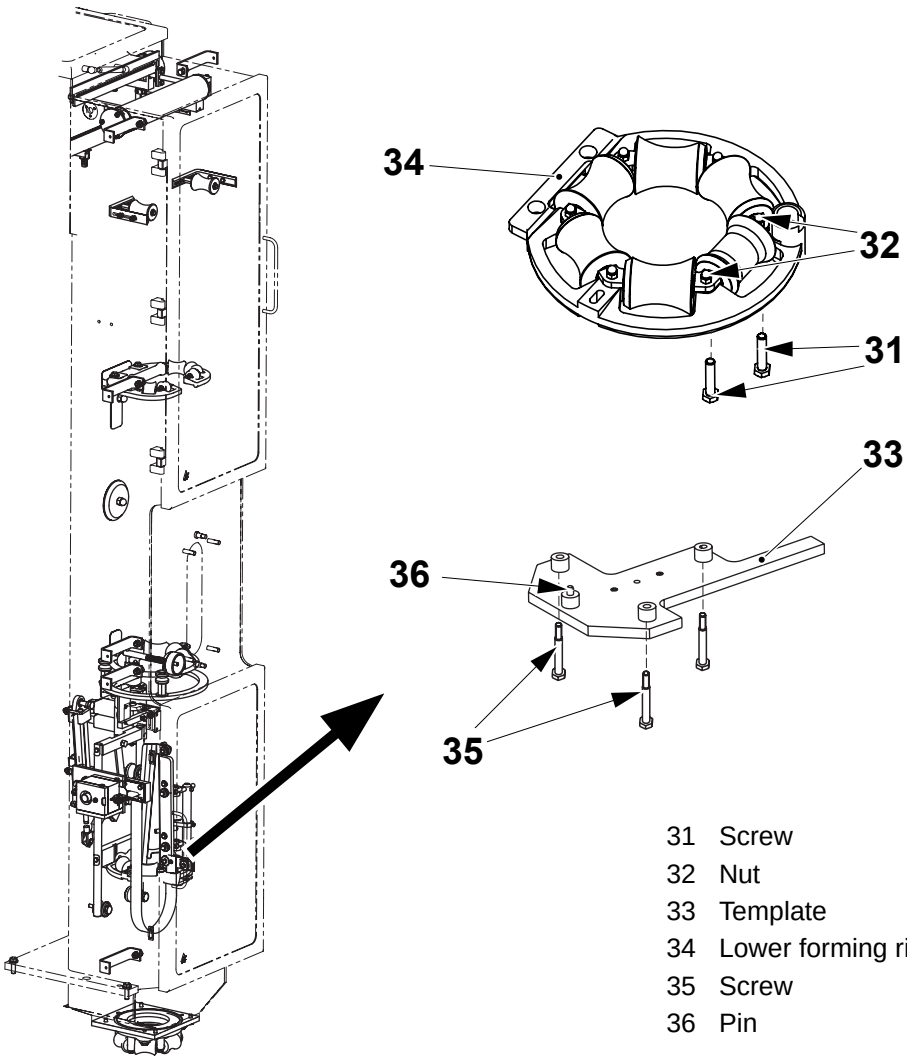
(Cont'd)

aa) Remove the screws (31) and the nuts (32).

Note! The screws (31) must be removed according to the required volumes.

ab) Fit the template (33) under the lower forming ring (34) by means of the screws (35) and the pin (36).

Note! Fit the template (33) according to the marks (e.g. upper-front) on it. Make sure that the lower forming ring (34) is in the upper position (production).



31 Screw
32 Nut
33 Template
34 Lower forming ring
35 Screw
36 Pin

(Cont'd)

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(Cont'd)

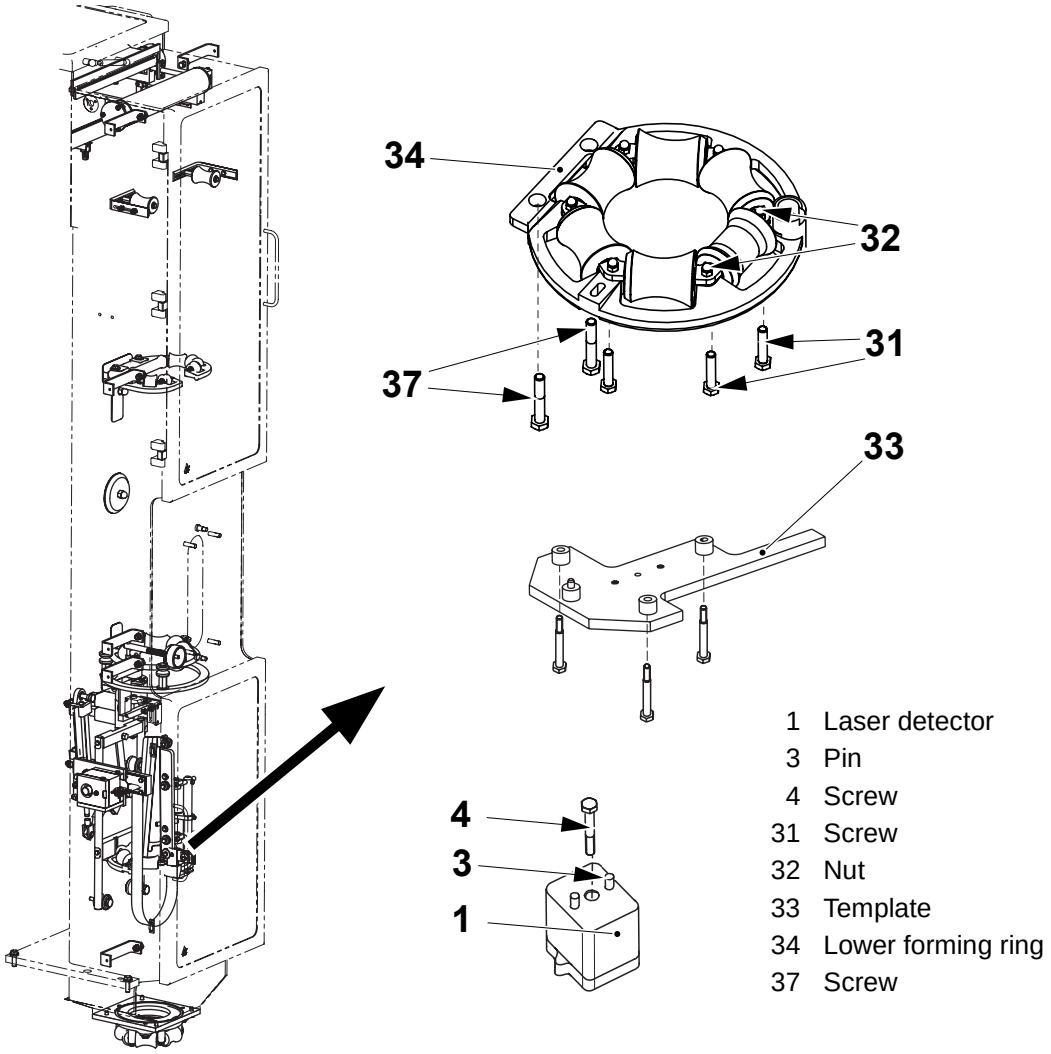
ac) Fit the laser detector (1) under the template (33) by means of the two pins (3) and the screw (4).

ad) Switch on the laser transmitter and check, by means of the display unit, the “X”, “Y” and “R” values. These values should be as close as possible to 0, especially the “R” value. If required adjust the lower forming ring (34) by means of the two screws (37).

ae) Tighten the two screws (37) and check once more the position of the lower forming ring (34).

af) Remove the laser detector (1) and the template (33) from the lower forming ring (34).

ag) Fit the screws (31) and the nuts (32).



(Cont'd)

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(Cont'd)

Note! Instructions from item ah) to item am) must be performed only for the volume TPA 1000 S. For all the other volumes follow the instructions from item an) to item ap).

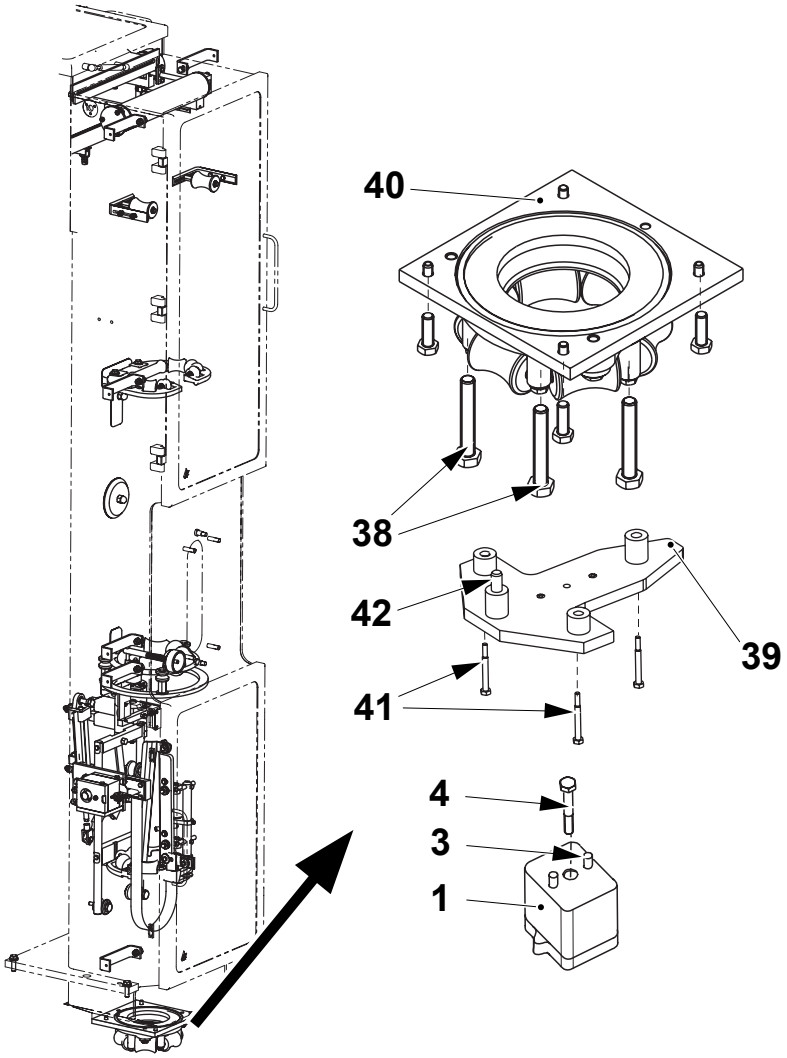
ah) Remove the screws (38).

Note! The screws (38) must be removed according to the required volumes.

ai) Fit the template (39) under the seal (40) by means of the screws (41) and the pin (42).

Note! Fit the template (39) according to the marks (e.g. upper-front) on it.

aj) Fit the laser detector (1) under the template (39) by means of the two pins (3) and the screw (4).



1 Laser detector
3 Pin
4 Screw
38 Screw
39 Template
40 Seal
41 Screw
42 Pin

(Cont'd)

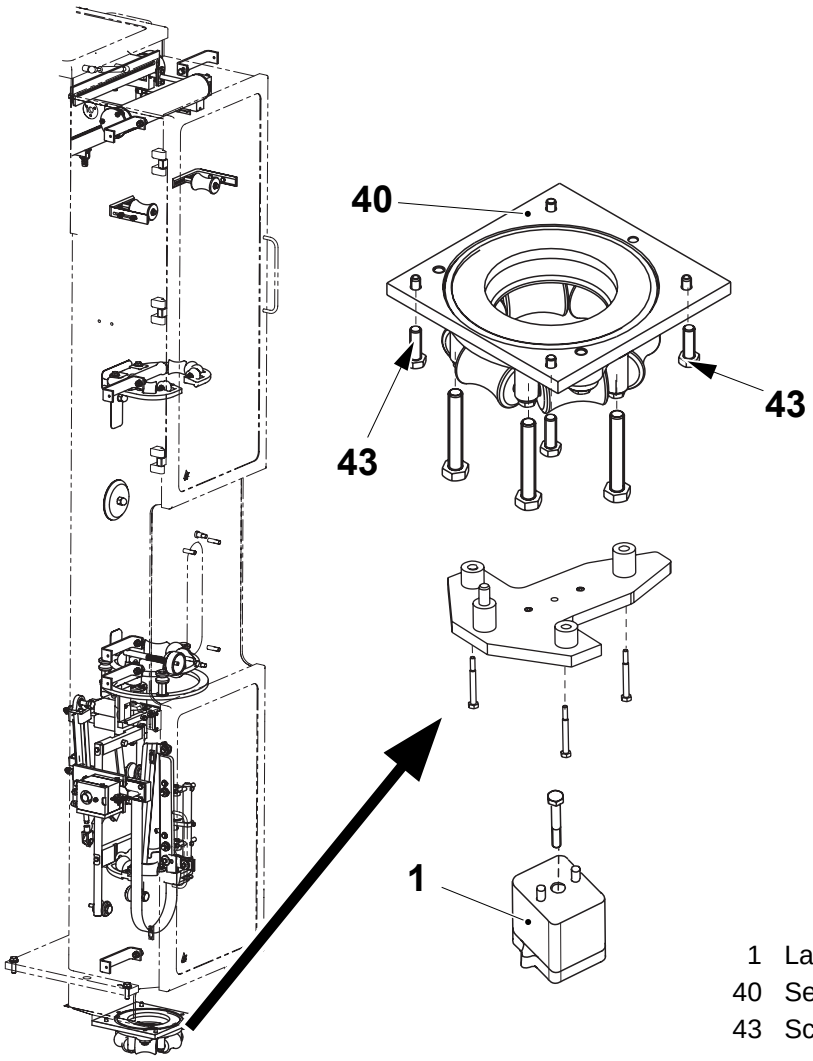
TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

ak) Switch on the laser transmitter and check, by means of the display unit, the “X”, “Y” and “R” values. This values should be as close as possible to 0, in particular the “R” value. If required adjust the seal (40) by means of the screws (43).

al) Tighten the screws (43) and check once more the position of the seal (40).

am) Remove the laser detector (1) and assemble the seal (40) in the reverse order.



1 Laser detector
40 Seal
43 Screw

(Cont'd)

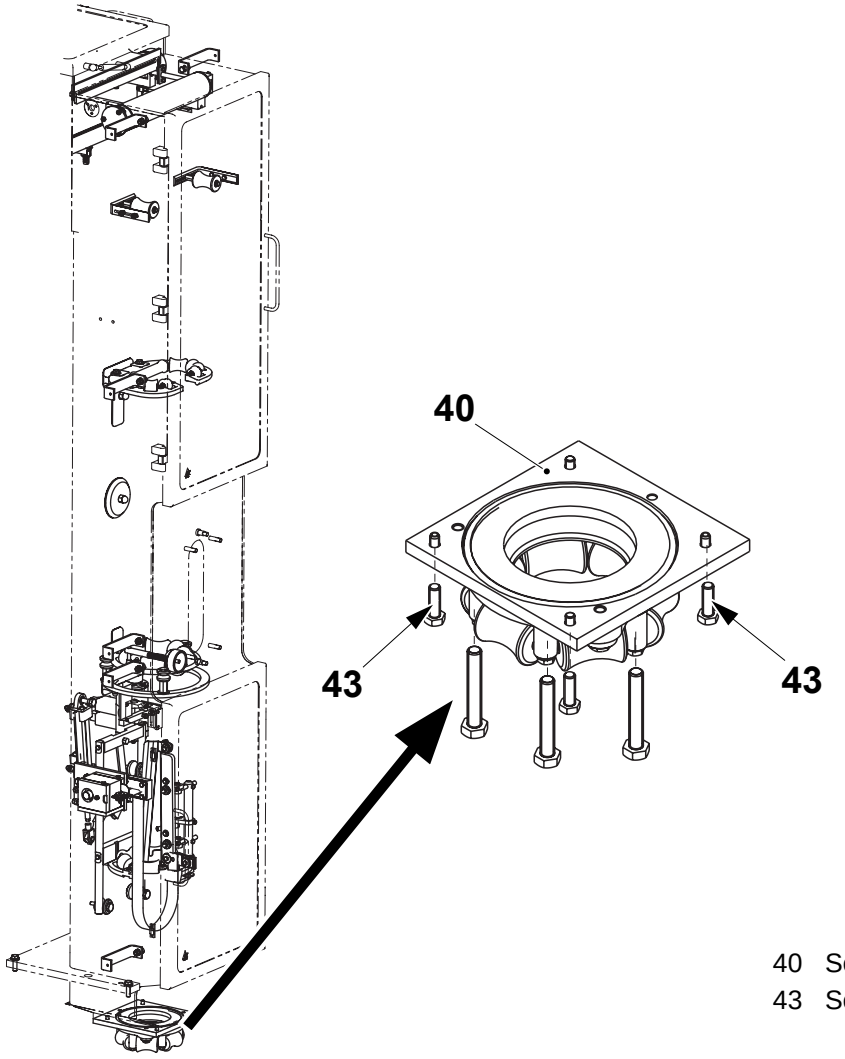
TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

an) Loosen the screws (43) and release the seal (40).

ao) Step up the machine to step TIGHT TUBE and check that the paper tube is running and that the seal is set in the right position.

ap) Tighten the screws (43).



40 Seal
43 Screw

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1.1-7 Aseptic Chamber - Check Bending Rollers

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095881-0300

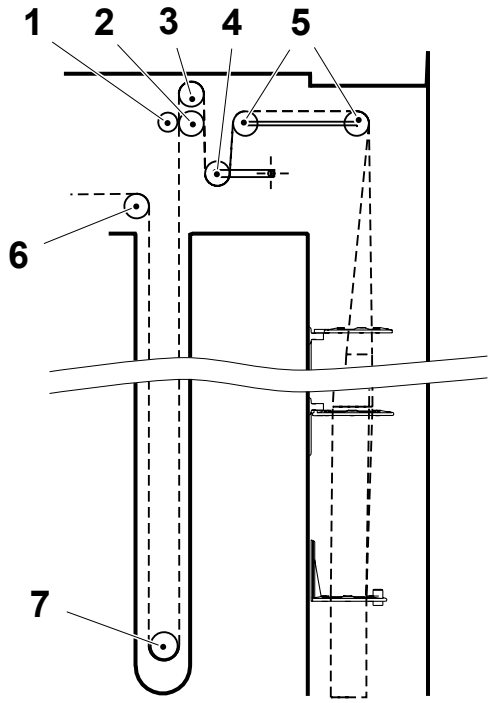
WARNING

Hydrogen peroxide.

Follow the Safety precautions.

Check the following rollers for visual wear and/or damage:

- the calender roller (1)
- the drive roller (2)
- the bending roller (3)
- the pendulum roller (4)
- the paper guide roller (5)
- the roller (6)
- the bath roller (7).



1 Calender roller
2 Drive unit roller
3 Bending roller
4 Pendulum roller
5 Paper guide roller
6 Roller (pillar)
7 Bath roller

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1.1-8 Aseptic Chamber - Check Overpressure

Machine Status	PRODUCTION
Special Equipment	Pressure gauge TP No. 90243-137
SPC Reference	1095881-0300

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

a) Check the overlap, see 1.1.1-4 Lower Forming Ring - Set Overlap.

b) Check the seals, see 1.1.8-1 Seal - Check.

c) Remove the door damper (2) and connect the pressure gauge (1) in the hole (3) in the aseptic chamber, see figure.

Check the pressures in the aseptic chamber as follows:

Note! Before starting, check the sterile air pressure **(25 kPa)**, see 1.2.2-1 Compressor Unit - Check Pressure, item a).

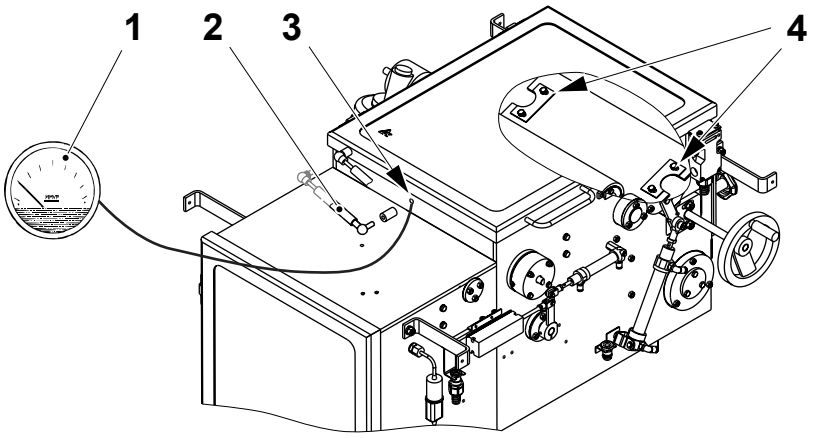
Machine in SHORT STOP

Overpressure: **50 - 100 Pa** (5-10 mm WC) on the pressure gauge (1). Adjust by moving the plates (4).

Machine in PRODUCTION

Overpressure: **200 - 300 Pa** (20-30 mm WC) on the pressure gauge (1).

Note! If the overpressure cannot be obtained, check with the equipment for tracing leakages, see 1.1-9 Aseptic Chamber - Leakage Detection.



1 Pressure gauge
2 Damper
3 Hole
4 Plates

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1.1-9 Aseptic Chamber - Leakage Detection

Machine Status	PRODUCTION
Special Equipment	Tracing leakage equipment TP No. 533014-0100 Pressure gauge TP No. 90243-137
SPC Reference	1095881-0300

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

a) Operate the machine in PRODUCTION and perform a SHORT STOP.

b) Step down the machine to ZERO with the paper tube filled with product. If possible let the machine cool down.

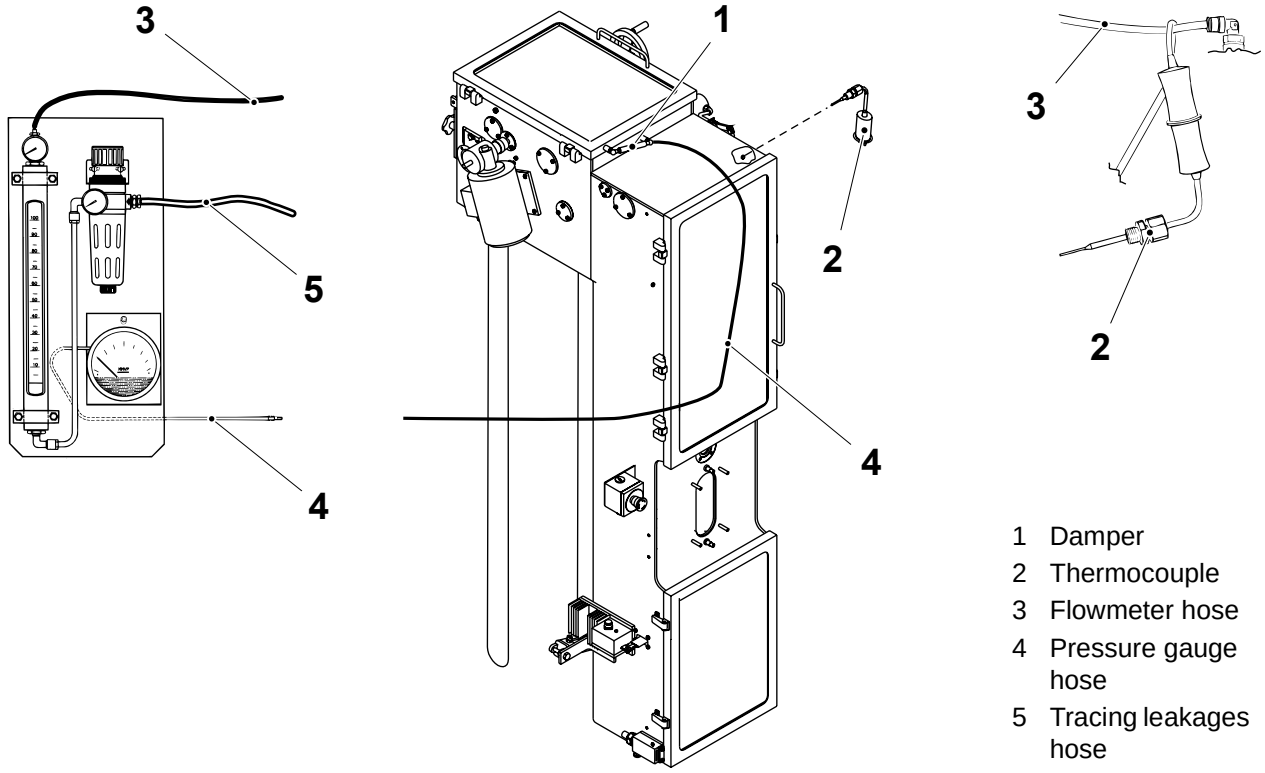
c) Check the overlap, see 1.1.1-4 Lower Forming Ring - Set Overlap.

d) Remove the door damper (1) and connect the pressure gauge hose (4) in the threaded hole.

e) Remove the thermocouple (2) connection.

f) Connect the equipment for tracing leakages hose (5) to a compressed air line.

g) Connect the flowmeter hose (3) to the thermocouple (2) connection.



1 Damper
2 Thermocouple
3 Flowmeter hose
4 Pressure gauge hose
5 Tracing leakages hose

(Cont'd)

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(Cont'd)

h) Check that all connections and screws in the aseptic chamber are tight.

i) Check the door locks, the door hinges and the micro switch, so that the sealing is properly tight and no leaks occur.

j) Check the aseptic chamber seals. See also 1.1.8-1 Seal - Check and 1.1.13-1 Pillar - Check Seal.

k) Close the reference point valve by turning off the valve **Y1112**.

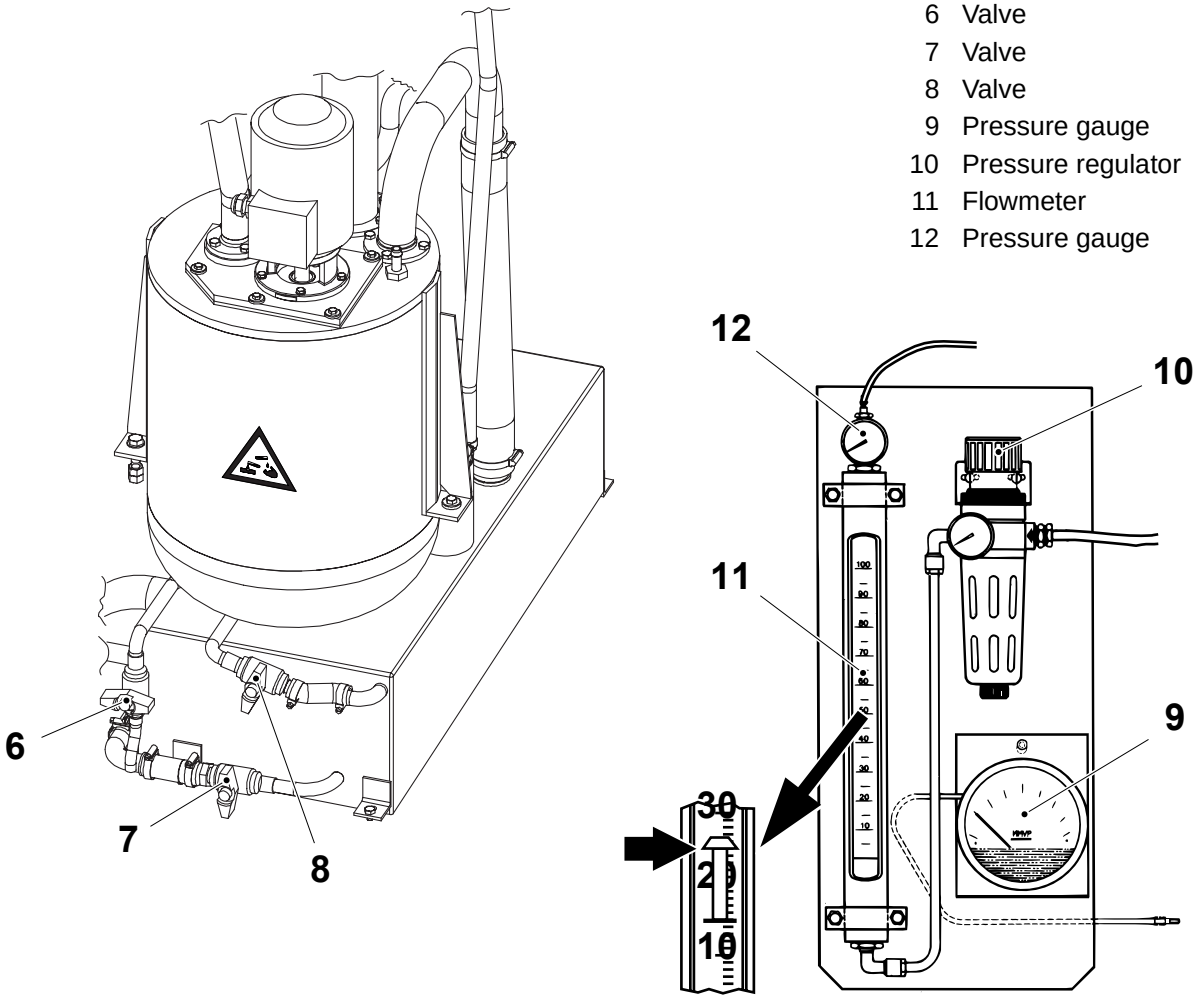
l) Close the valves (6), (7) and (8) in the dilution tank.

m) Slowly open the pressure regulator (10) until **200 Pa** (20 mm WC) is reached on the pressure gauge (9).

n) Read the flow **F%** on the flowmeter (11) and the pressure **P2** on the pressure gauge (12).

o) Enter the values on the diagram (see next page) and read the leakage **Q**. **The maximum leakage allowed is 2m3/h**.

6 Valve
7 Valve
8 Valve
9 Pressure gauge
10 Pressure regulator
11 Flowmeter
12 Pressure gauge



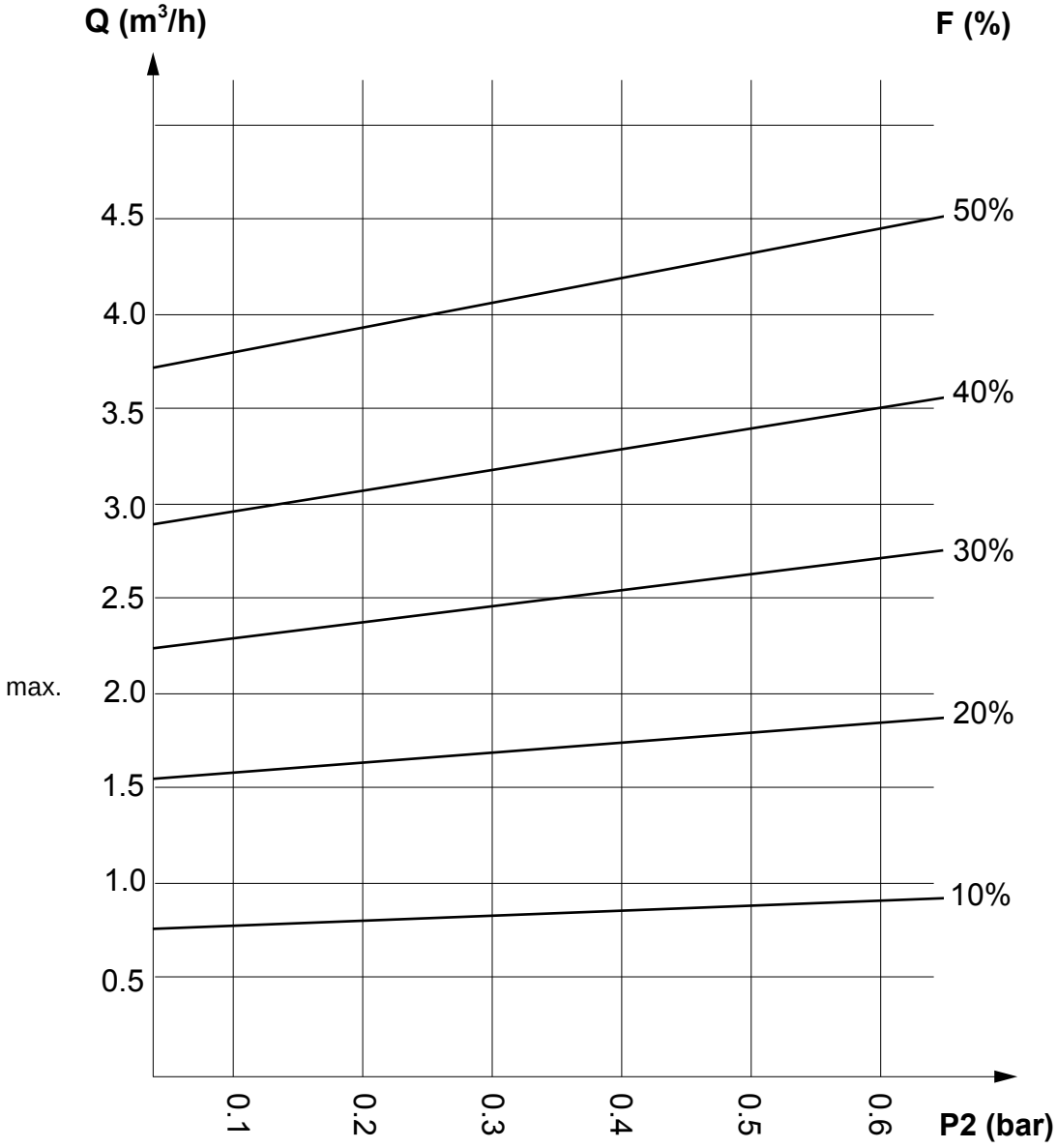
(Cont'd)

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(Cont'd)

p) If the maximum allowed leakage is exceeded, check tightness at the following points:
   - the safety lids in the hydrogen peroxide tank
   - the door seals of the aseptic chamber
   - the plug holes in the aseptic chamber
   - the chain seals in the drier
   - the bath entry seal; change as required; see 1.1.13-2 Pillar - Change Seal and Bushings
   - the seal in the pillar; see 1.1.13-1 Pillar - Check Seal

q) If not, disconnect the equipment for tracing leaks.



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1.1.1 Lower Forming Ring

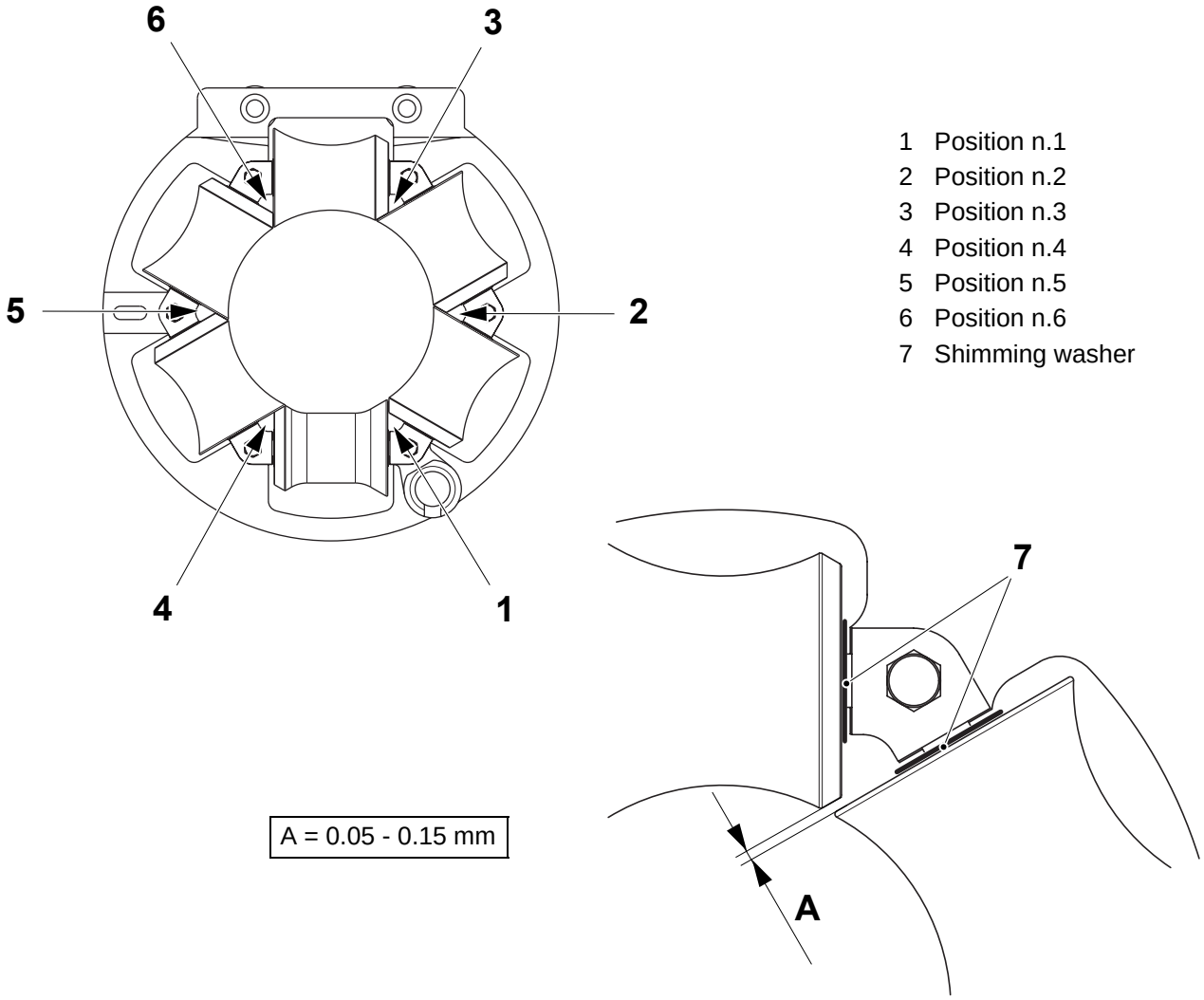
1.1.1-1 Lower Forming Ring - Set Clearance

Machine Status	Mains Power OFF Air ON Steam ON Water OFF Filling Pipe Removed
SPC Reference	1095907-0300

a) Make sure that the filling pipe is removed from the machine.

b) Set the distance **A** between the rollers by adding or removing the shimming washers (7).

Note! Always follow the setting position order: 1-2-3-4-5-6.



1 Position n.1
2 Position n.2
3 Position n.3
4 Position n.4
5 Position n.5
6 Position n.6
7 Shimming washer

A = 0.05 - 0.15 mm

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1.1.1-2 Lower Forming Ring - Set Position

Machine Status	Mains Power ON Air ON Steam ON Water ON
SPC Reference	1095907-0300

Before performing this setting, follow the instructions described in 1-1 Superstructure Setting - Diagram and make sure that the filling pipe is installed on the machine.

Basic setting

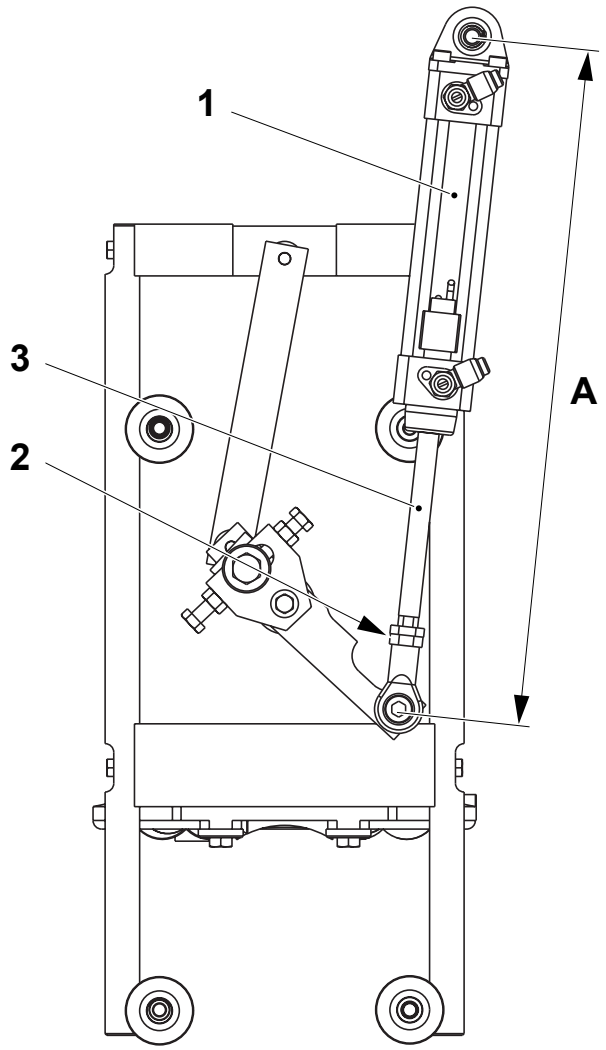
a) Activate the valve **Y1401** for the cylinder (1).

b) Loosen the nut (2).

c) Set the distance **A** by turning the cylinder piston rod (3).

d) Tighten the nut (2).

A = 392 ±1 mm



1 Cylinder
2 Nut
3 Piston rod

(Cont'd)

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(Cont'd)

Fine Setting with Template

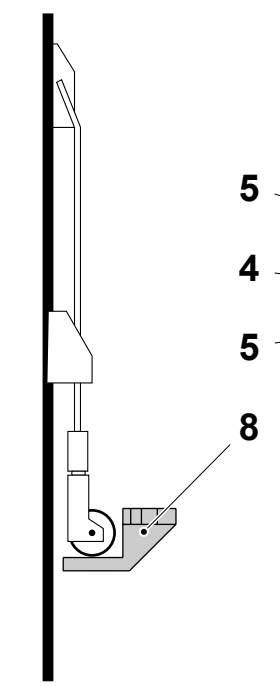
a) Step up the machine to step PREPARATION.

b) Loosen the screw (4) and the nuts (5).

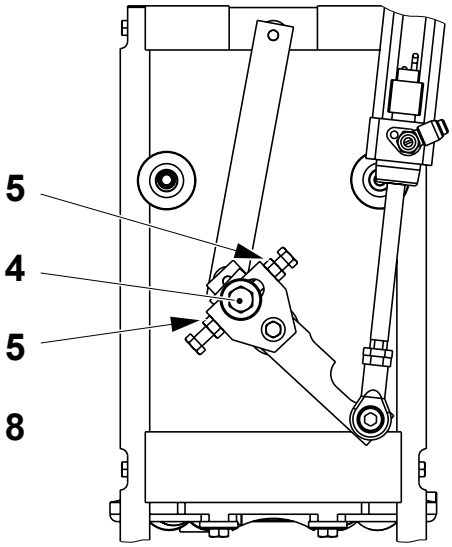
c) Remove the roller (6) by means of the screws (7).

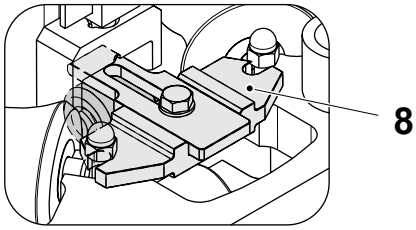
d) Fit the template (8) by means of the screws (7).

Package	Template (8) TP No.		Package	Template (8) TP No.
200 B - 250 B - 330 S	1539721		1000 Sq	1539761
500 S - TPA 1000 S	1539765		1000 S	1334987
1000 B - 500 B -1500 S	1334986		TPA 500 Sq	2564543
200 S - 250 S - TPA 250 Sq	1539722		TPA 330 Sq	2611700
TPA 1000 Sq	2745304			

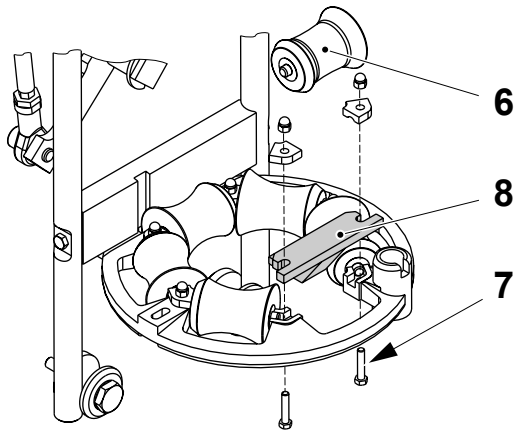


All other volumes





TPA 1000 Sq - double roller



4 Screw
5 Nut
6 Roller
7 Screw
8 Template

(Cont'd)

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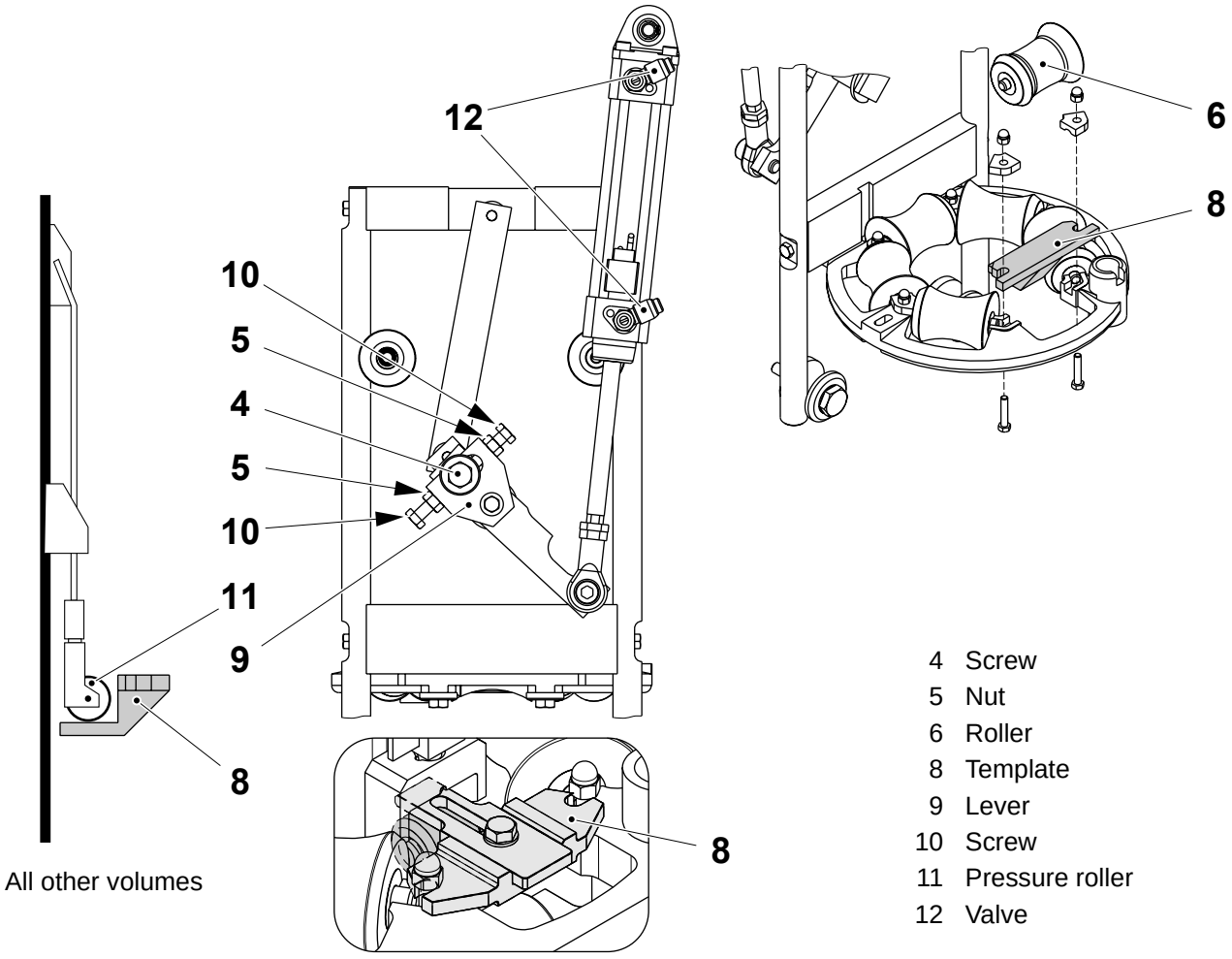
(Cont'd)

e) Adjust the lever (9) position by means of the screws (10) until the template (8) touches the pressure roller (11), see figure.

f) Tighten the nuts (5) and the screw (4).

g) Fit back the roller (6).

h) Set the lower forming ring movement by regulating the valves (12) to obtain a smooth movement of the lower forming ring.



4 Screw
5 Nut
6 Roller
8 Template
9 Lever
10 Screw
11 Pressure roller
12 Valve

TPA 1000 Sq - double roller

(Cont'd)

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(Cont'd)

Fine Setting Without Template

Note! Use this instruction only when no template is available.

a) Step up the machine to step PREPARATION.

b) Loosen the screw (1) and the nuts (2).

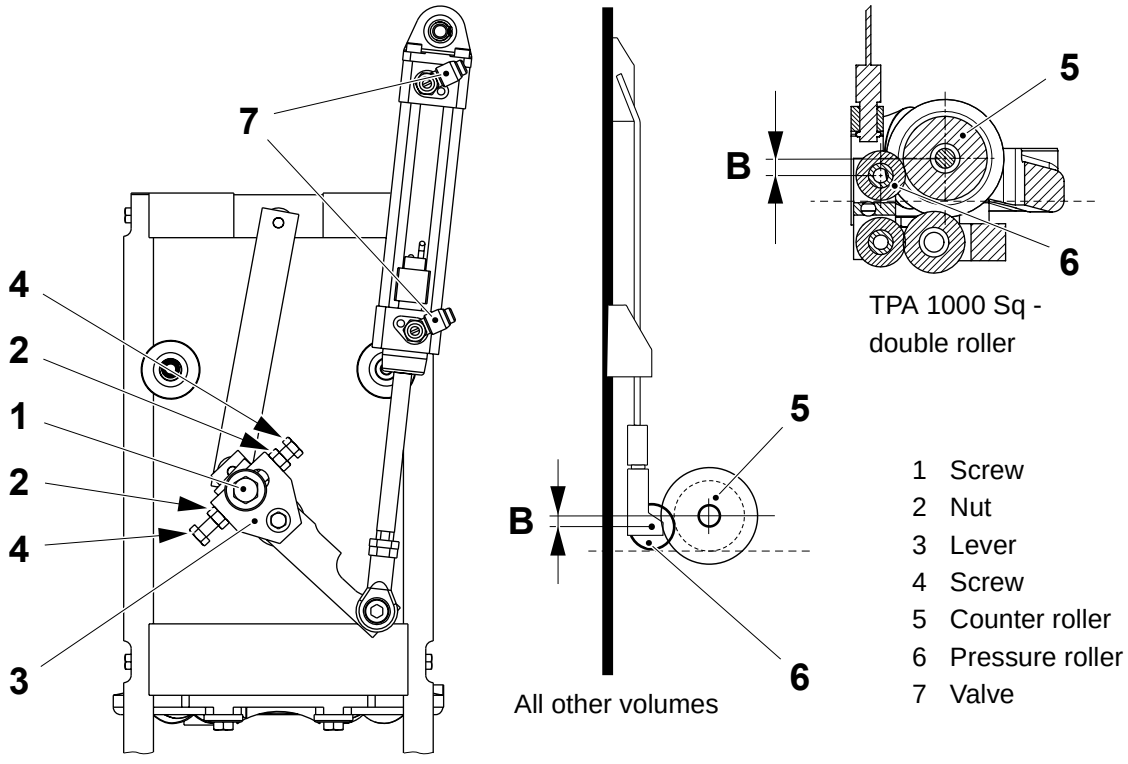
c) Adjust the lever (3) position by means of the screws (4) until the distance **B** between the counter roller (5) and the pressure roller (6) is obtained.

Note! For the packages 500 B and 1000 B the lower part of both rollers (6) and (5) must be on the same line.

d) Tighten the nuts (2) and the screw (1).

e) Set the lower forming ring movement by regulating the valves (7) to obtain a smooth movement of the lower forming ring.

Package	B ±0.5 (mm)
1500 S - 1000 B - 500 B	7
TPA 1000 Sq	5
TPA 330 Sq	4
1000 S - 1000 Sq - TPA 1000 S - TPA 500 Sq - 500 S - 250 S - TPA 250 Sq - 200 B - 250 B - 200 S - 330 S	2



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1.1.1-3 Lower Forming Ring - Set Cylinder

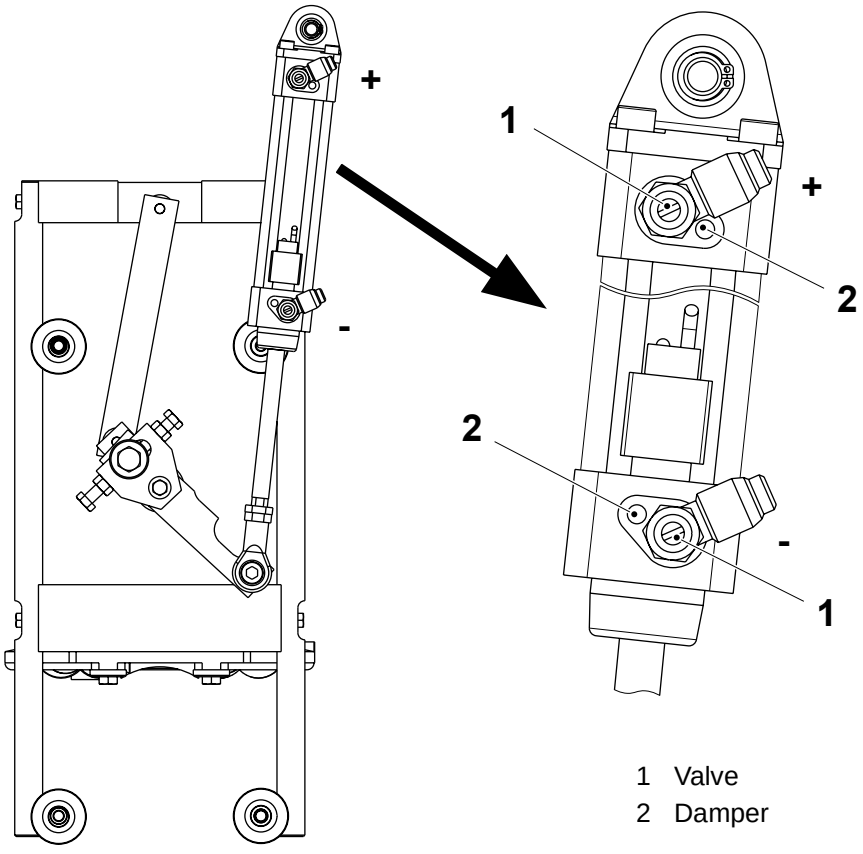
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095907-0300

Adjust the cylinder air restriction valve (1) and the damper (2) as described below to obtain a smooth movement of the lower forming ring.

a) Close the air restriction valve (1) and the damper (2) on both the plus (+) and minus (-) side.

b) On the minus (-) side:
   - open the restriction valve (1) **2.5** turns
   - open the damper (2) **1** turn.

c) On the plus (+) side:
   - open the restriction valve (1) **6.5** turns
   - open the damper (2) **2** turns.



1 Valve
2 Damper

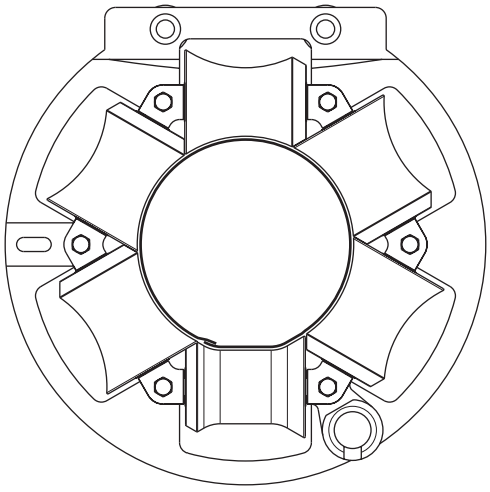
TechPub_2614345_0105 - 01_MM81534_11en.fm

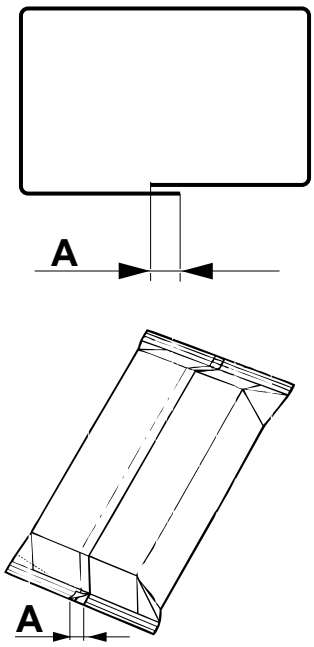
1.1.1-4 Lower Forming Ring - Set Overlap

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095907-0300

Pick up a package and measure the LS overlap **A**.
The table below shows the **nominal** overlap value for each **nominal** packaging material width. If the width of the packaging material used is not the same as the nominal value, the overlap must be increased or decreased to produce the correct diameter tube.

Package	Nominal packaging material width (mm)	Nominal overlap A (mm)	Standard roller TP No.	Minus roller TP No.	Plus roller TP No.
1000 B - 1500 S - 500 B	322	8.0	1349851	1349852	1349853
1000 S	305	8.0	567746-1	567746-3	567746-2
200 S - TPA 250 Sq	174	4.0	1317933	752465	752464
200 B - 250 B - 330 S	214	8.0	751502	752463	752462
TPA 1000 S	279	6.0	1490764	1346386	1346385
1000 Sq	292	6.0	1490765	1490763	1490767
500 S	252	7.0	1499636	1538617	1538616
TPA 330 Sq	202	6.0	929279	929283	929282
TPA 1000 Sq	260	7.0	1524156	1524544	1524546
250 S	188	6.0	574346	574447	574446
TPA 500 Sq	227	7.0	2530211	2503686	2503687





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(Cont'd)

Set the overlap **A** by changing rollers in the lower forming ring.

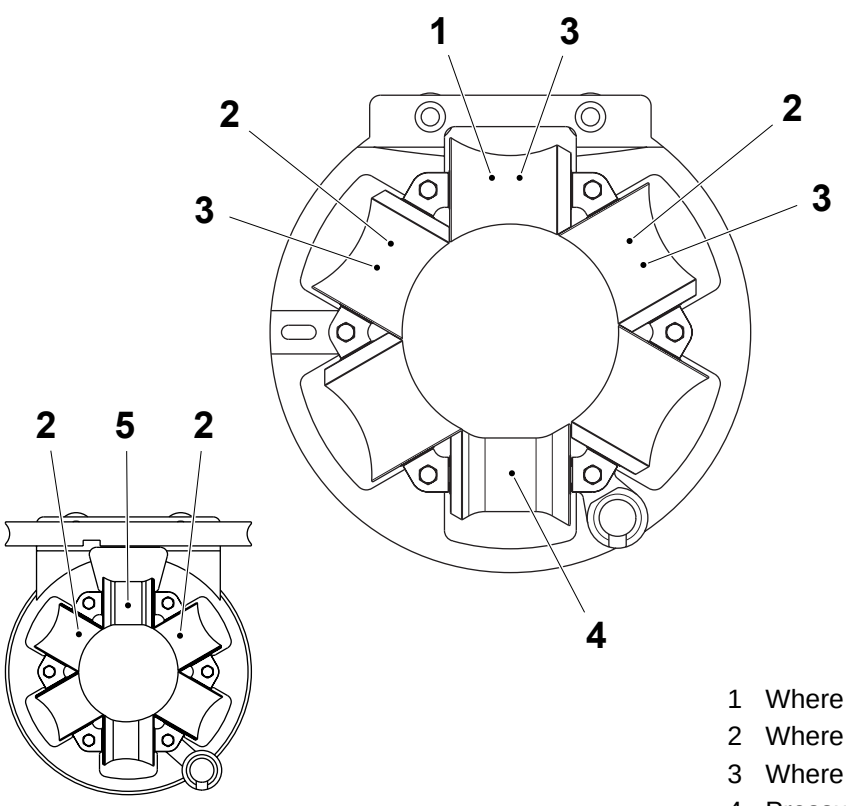
- to **increase** the overlap **A**, change up to three standard rollers for minus trimming rollers
- to **decrease** the overlap **A**, change up to three standard rollers for plus trimming rollers.

Note! The tolerance of the overlap **A** for the volume **200 S** is **±0.5 mm,** for all other volumes the tolerance of the overlap **A** is **±1.0 mm**.

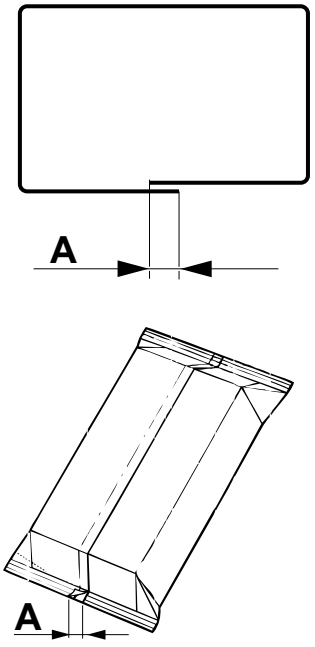
Note! For **TPA 500 Sq** is it only possible with **none** or **two** trimming rollers because of the StreamCap roller (5).

Always fit trimming rollers symmetrically with respect to the pressure roller (4). **Never** fit plus and minus trimming rollers together.

After the forming ring has been set it will function correctly with all packaging material widths within the given limits.



TPA 500 Sq



1 Where to put one trimming roller
2 Where to put two trimming rollers
3 Where to put three trimming rollers
4 Pressure roller
5 StreamCap roller

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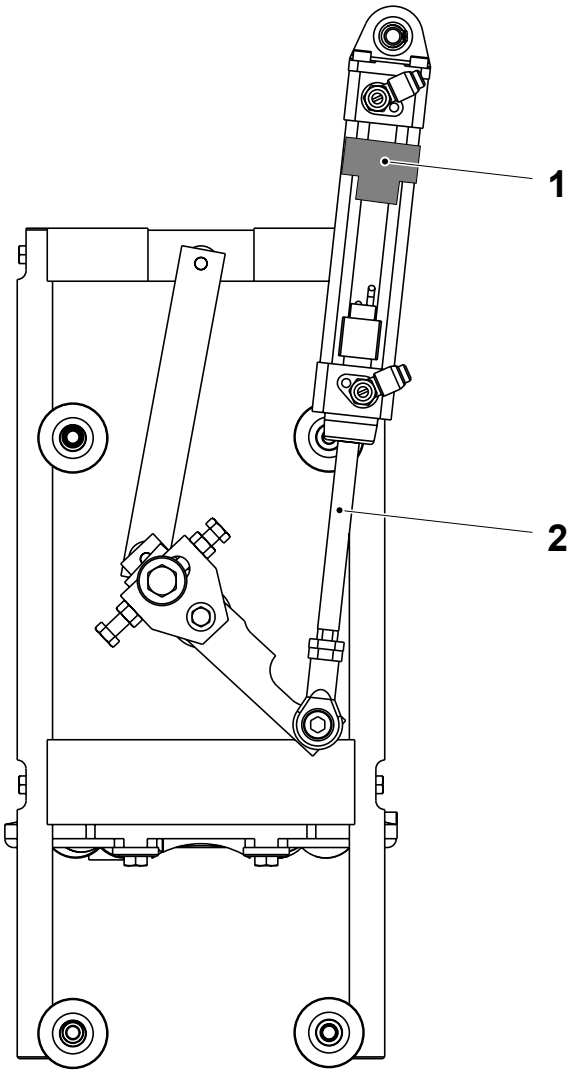
1.1.1-5 Lower Forming Ring - Set Proximity Switch

Machine Status	PREPARATION
SPC Reference	1095907-0300

a) Perform the setting for the position of the lower forming ring, see 1.1.1-2 Lower Forming Ring - Set Position.

b) Set the proximity switch (1) position so that it is activated when the piston (2) is fully in.

c) Check that when the piston (2) is fully out the proximity switch (1) is deactivated.



1 Proximity switch
2 Piston

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.1-6 Lower Forming Ring - Check LS Overlap

Machine Status	PRODUCTION
SPC Reference	1095907-0300

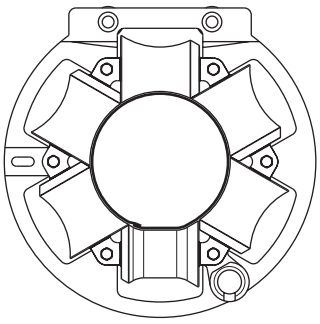
a) Pick out two packages and check the LS overlap **A**, see table.

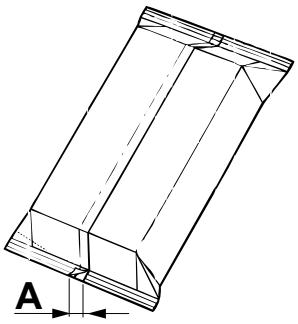
Note! The table below shows the **nominal** overlap value for each **nominal** packaging material width. If the width of the packaging material used is not the same as the nominal value, the overlap must be increased or decreased to produce the correct tube diameter.

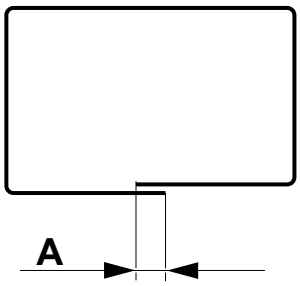
Note! The width of the material web can vary from the nominal width by **±1.0 mm**. The nominal width for the LS overlap will vary by the same amount.

Note! The tolerance of the overlap **A** for the volume **200 S** is **±0.5 mm,** for all other volumes the tolerance of the overlap **A** is **±1.0 mm**.

Package	**Nominal packaging material width (mm)**	**Nominal overlap A (mm)**	**Standard roller TP No.**	**Minus roller TP No.**	**Plus roller TP No.**
1000 B - 1500 S - 500 B	322	8.0	1349851	1349852	1349853
1000 S	305	8.0	567746-1	567746-3	567746-2
200 S - TPA 250 Sq	174	4.0	1317933	752465	752464
200 B - 250 B - 330 S	214	8.0	751502	752463	752462
TPA 1000 S	279	6.0	1490764	1346386	1346385
1000 Sq	292	6.0	1490765	1490763	1490767
500 S	252	7.0	1499636	1538617	1538616
TPA 330 Sq	202	6.0	929279	929283	929282
TPA 1000 Sq	260	7.0	1524156	1524544	1524546
250 S	188	6.0	574346	574447	574446
TPA 500 Sq	227	7.0	2530211	2503686	2503687







(Cont'd)

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(Cont'd)

b) If the overlap is not correct, check the tube alignment by observing the position of the crease lines, see *Package checks* in the OM for more information.

c) If the tube alignment is correct and the problem remains, step down to ZERO and check the web alignment/threading, see the OM for more information.

d) If the web alignment/threading is correct and the problem remains, check the following machine settings:

- all rollers for wear and position, see 1.1-1 Aseptic Chamber - Check Forming Rings
- all rollers for play, see 1.1.1-1 Lower Forming Ring - Set Clearance, 1.1.2-1 Upper Tube Support - Set Clearance, 1.1.3-1 Upper Tube Support - Set Clearance, 1.1.4-1 Upper Tube Support - Set Clearance and 1.1.5-1 Upper Forming Ring - Set Clearance
- the setting of the lower forming ring, see 1.1.1-2 Lower Forming Ring - Set Position
- the setting of the finger roller, see 1.1.15-2 Longitudinal Sealing - Set Element and Roller Position
- the finger roller should **only touch** the packaging material
- the distance between upper and lower forming ring, see 1.1-3 Aseptic Chamber - Set Forming Ring Position, 1.1-4 Aseptic Chamber - Set Forming Ring Position and 1.1-5 Aseptic Chamber - Set Forming Ring Position
- the position for the environmental ring should be aligned with the lower forming ring, see 1.1.8-3 Seal - Set
- all rollers for paper residue

e) If all machine settings are correct and the problem remains, check if all rollers in the lower forming ring are regular rollers. Also measure the material web to determine if the width is the nominal value ±1.0 mm.

f) If the material web width is within tolerance but some rollers are plus or minus rollers, check the LS overlap using all regular rollers.

(Cont'd)

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(Cont'd)

g) If the problem remains, replace the rollers in the lower forming ring as follows:

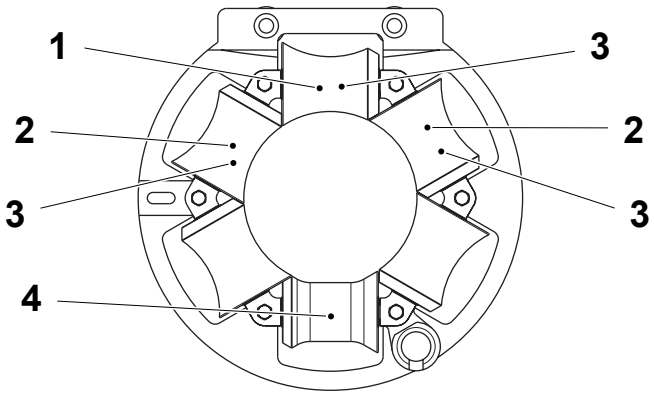
- **increase** the overlap **A**, change up to three standard rollers for **minus** trimming rollers, see table on page 1-45
- **decrease** the overlap **A**, change up to three standard rollers for **plus** trimming rollers, see table on page 1-45

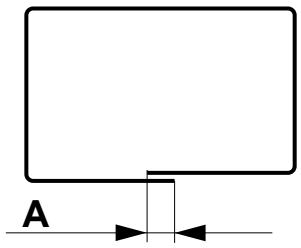
Note! The tolerance of the overlap **A** for the volume **200 S** is **±0.5 mm,** for all other volumes the tolerance of the overlap **A** is **±1.0 mm**.

Note! For **TPA 500 Sq** is it only possible with **none** or **two** trimming rollers because of the StreamCap roller.

Note! One trimming roller gives approximately 0.5 mm in difference in overlap. **Always** fit trimming rollers symmetrically with respect to the pressure roller (4). **Never** fit plus and minus trimming rollers together. After the forming ring has been set it will function correctly with all packaging material widths within the given limits.

Package	Nominal overlap A (mm)		Package	Nominal overlap A (mm)
1000 B - 1500 S - 500 B	8.0		500 S	7.0
1000 S	8.0		TPA 330 Sq	6.0
200 S - TPA 250 Sq	4.0		TPA 1000 Sq	7.0
200 B - 250 B - 330 S	8.0		250 S	6.0
TPA 1000 S	6.0		TPA 500 Sq	7.0
1000 Sq	6.0			





1 Where to put one trimming roller
2 Where to put two trimming rollers
3 Where to put three trimming rollers
4 Pressure roller

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1.1.2 Upper Tube Support

1.1.2-1 Upper Tube Support - Set Clearance

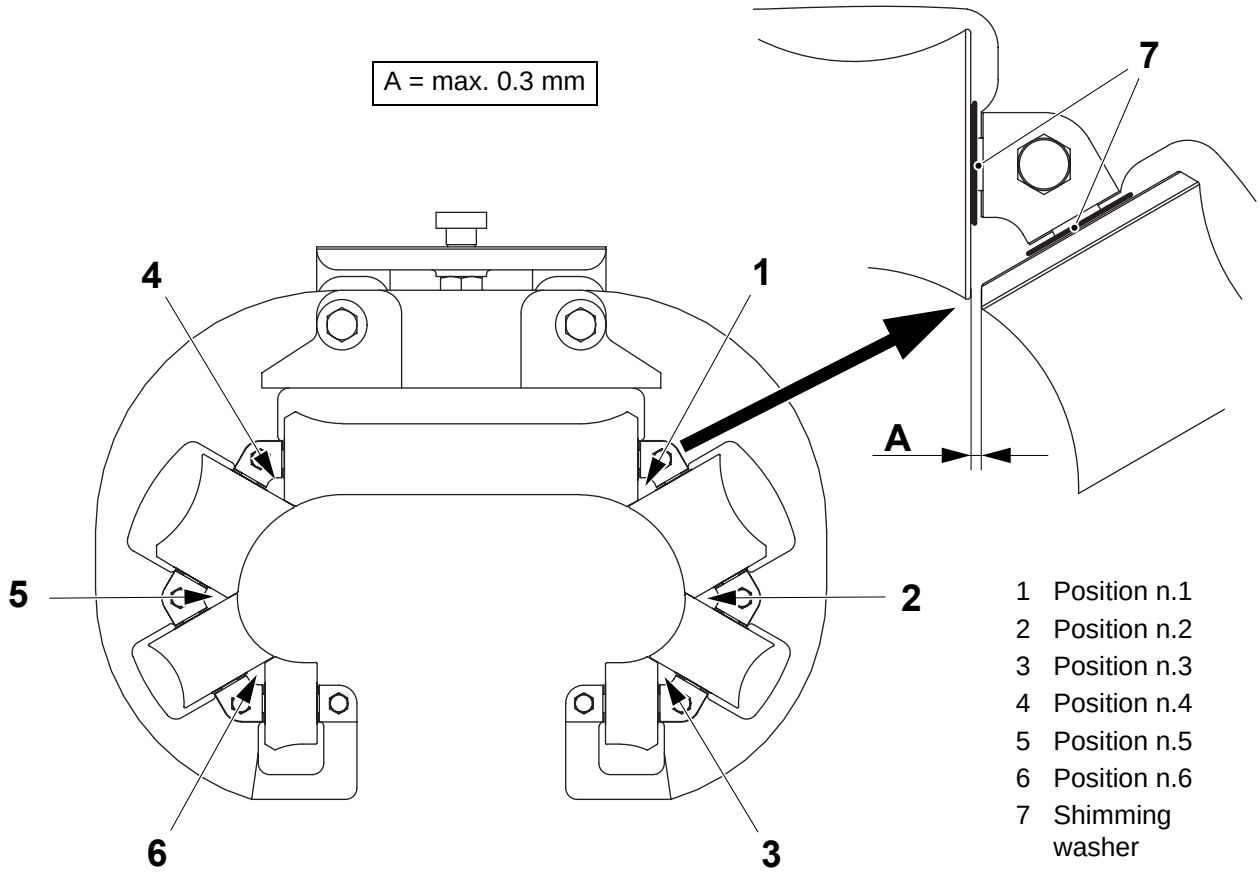
Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	996392-0200

Note! Valid for: 1500 S, 1000 B, 1000 S, 1000 Sq, 500 B, 500 S, TPA 1000 S, TPA 500 Sq and TPA 1000 Sq.

a) Make sure that the filling pipe is removed from the machine.

b) Set the distance **A** between the rollers by adding or removing the shimming washers (7).

Note! Always follow the setting position order: 1-2-3-4-5-6.



1 Position n.1
2 Position n.2
3 Position n.3
4 Position n.4
5 Position n.5
6 Position n.6
7 Shimming washer

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.3 Upper Tube Support

1.1.3-1 Upper Tube Support - Set Clearance

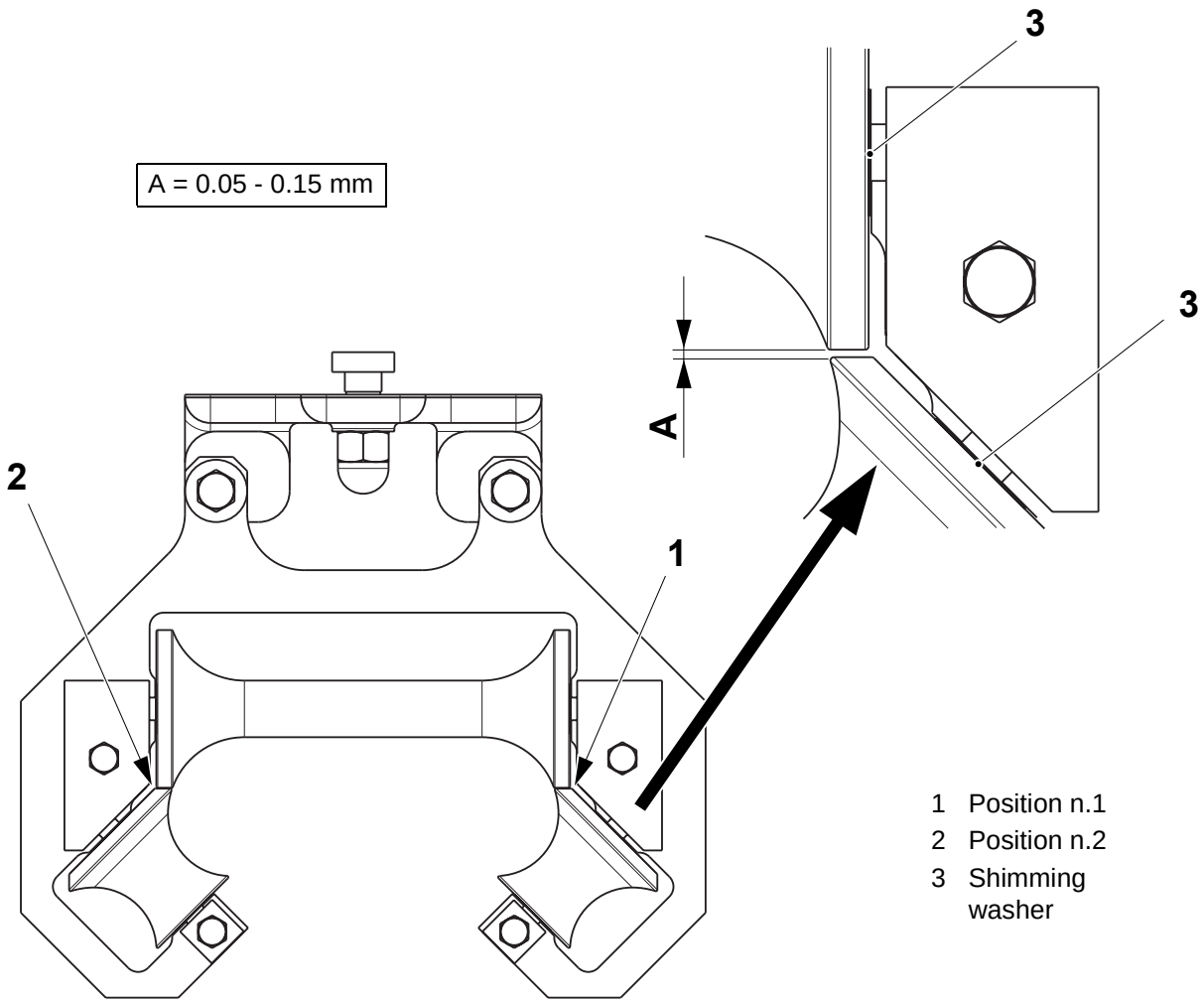
Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	996392-0200

Note! Valid for 200 B, 250 B, 330 S and TPA 330 Sq.

a) Make sure that the filling pipe is removed from the machine.

b) Set the distance **A** between the rollers by adding or removing the shimming washers (3).

Note! Always follow the setting position order: 1-2.



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1.1.4 Upper Tube Support

1.1.4-1 Upper Tube Support - Set Clearance

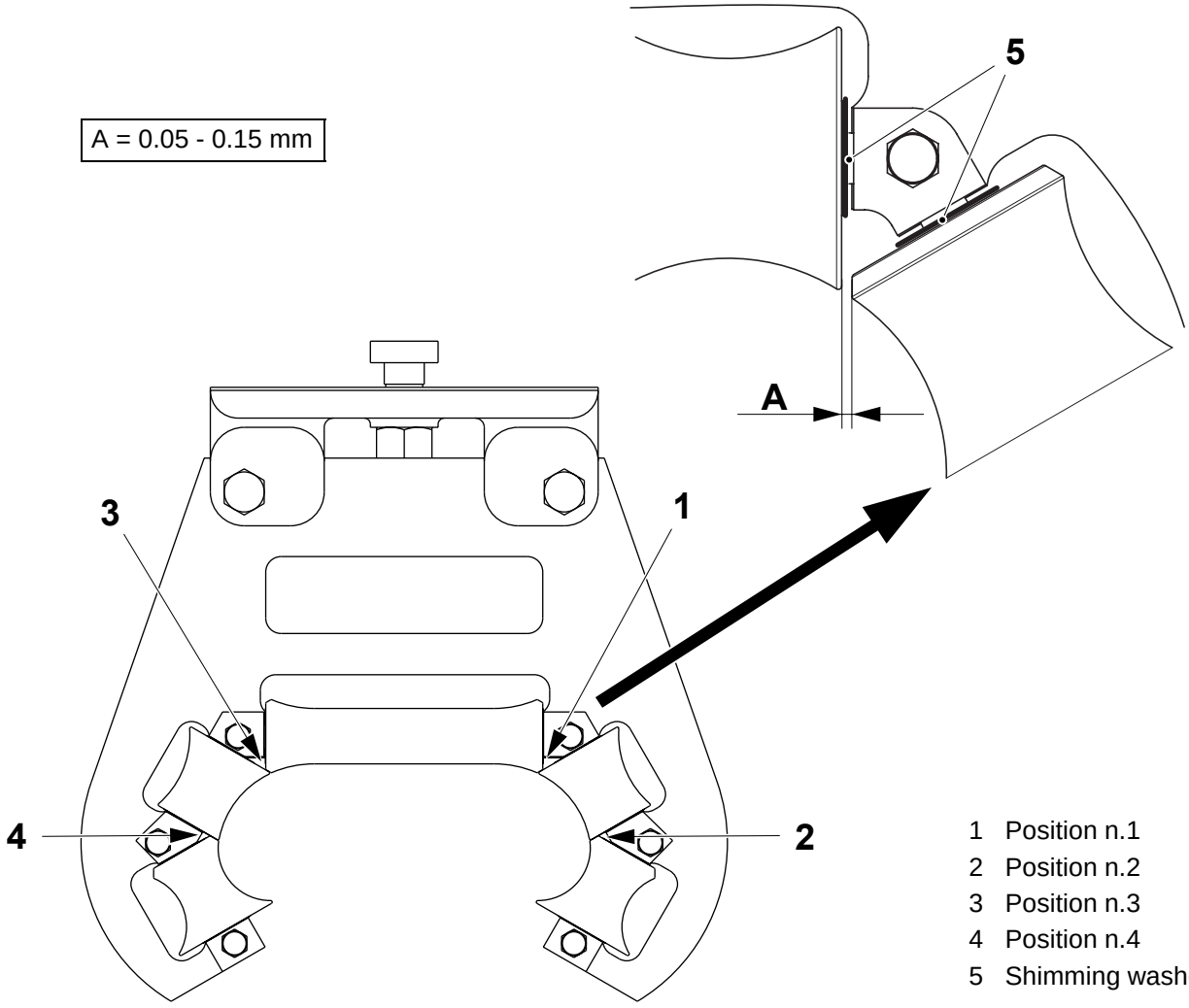
Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1035113-0100

Note! Valid for 200 S, 250 S and TPA 250 Sq.

a) Make sure that the filling pipe is removed from the machine.

b) Set the distance **A** between the rollers by adding or removing the shimming washers (5).

Note! Always follow the setting position order: 1-2-3-4.



1 Position n.1
2 Position n.2
3 Position n.3
4 Position n.4
5 Shimming washer

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.5 Upper Forming Ring

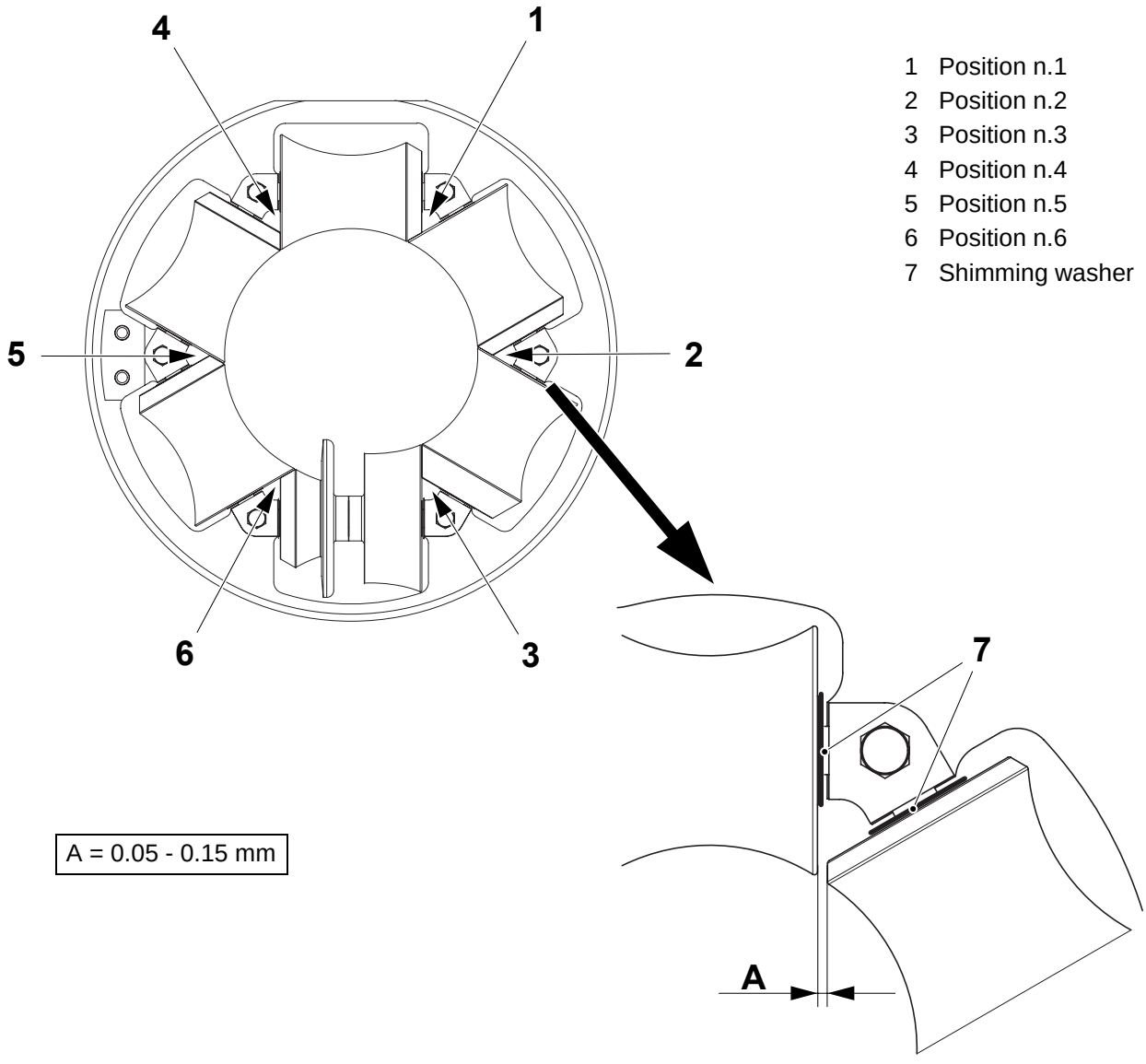
1.1.5-1 Upper Forming Ring - Set Clearance

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1195343-0300

a) Make sure that the filling pipe is removed from the machine.

b) Set the distance **A** between the rollers by adding or removing the shimming washers (7).

Note! Always follow the setting position order: 1-2-3-4-5-6.



1 Position n.1
2 Position n.2
3 Position n.3
4 Position n.4
5 Position n.5
6 Position n.6
7 Shimming washer

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.5-2 Upper Forming Ring - Set Paper Tube Alignment

Machine Status	PRODUCTION
SPC Reference	1195343-0300

a) Pick out two packages and check that the crease lines (marked with arrows) on the packages are opposite one another (**Fig. 1**) or displaced symmetrically (**Fig. 2** and **Fig. 3**).

Note! The pictures show the top of the package, with the flaps unfolded.

b) If required, set the tube alignment by means of the shifter handle (1).

Note! Turning the shifter handle (1) clockwise moves the paper tube as illustrated on **Fig. 4**.

c) Pick out some new packages and check the crease position.

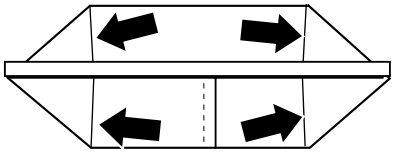


Fig. 1

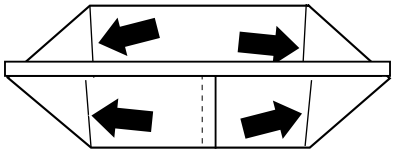


Fig. 2

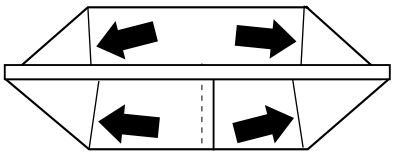


Fig. 3

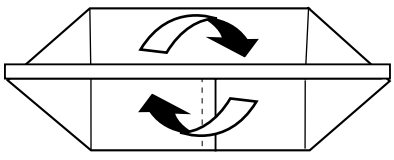
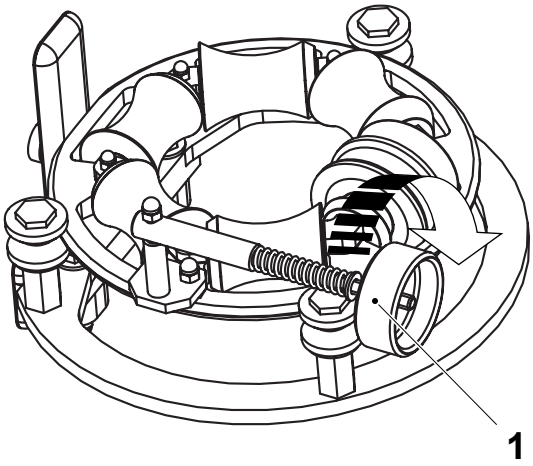


Fig. 4



1 Shifter handle

TechPub_2614345_0105 - 01_MM81534_11en.fm

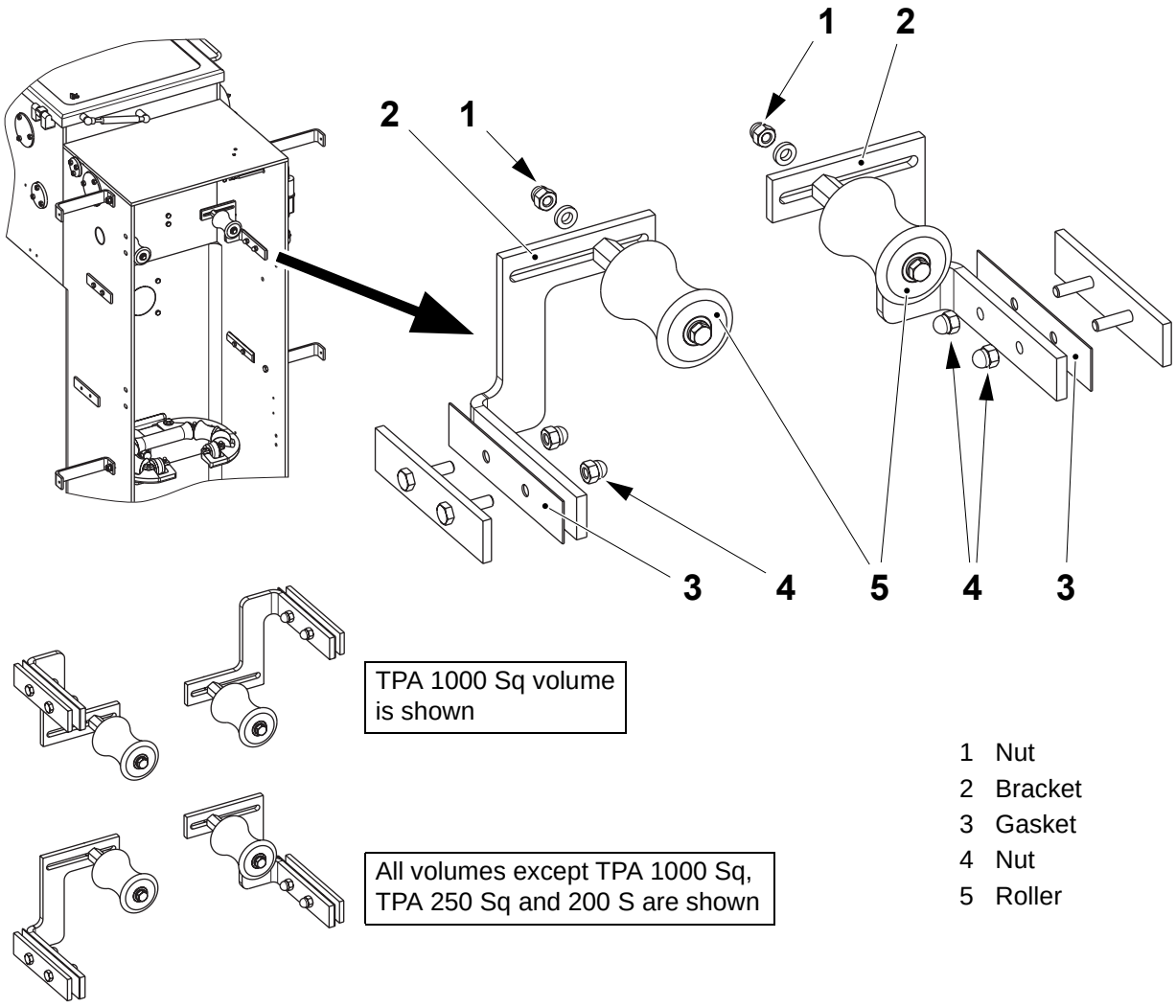
1.1.6 Edge Roller

1.1.6-1 Edge Roller - Set

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996449-0100

a) Set the two edge rollers (5) so that the packaging material web is in contact with the central area of the rollers (5).
   - Adjust the position of the bracket (2) by means of the nuts (4).
   - Adjust the position of the roller (5) by means of the nuts (1).

b) Check that the gaskets (3) are positioned inside the aseptic chamber.



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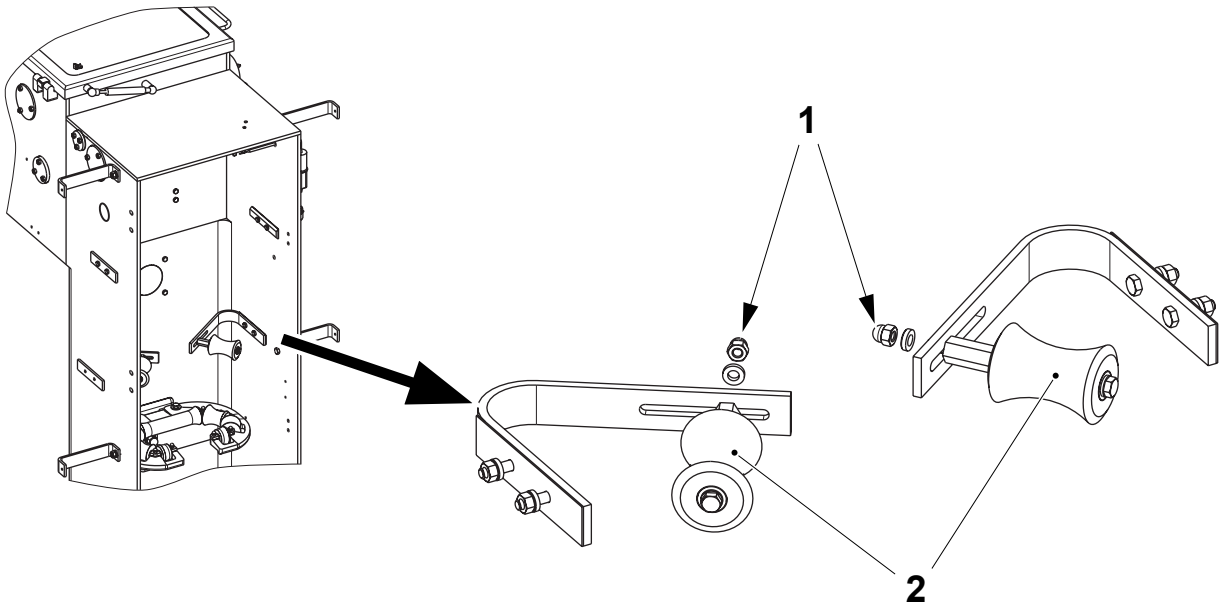
1.1.7 Edge Roller (Only 200 S and TPA 250 Sq)

1.1.7-1 Edge Roller (Only 200 S and TPA 250 Sq) - Set

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996449-0100

a) Set the two edge rollers (2) in such a way that the packaging material web is in contact with the central area of the rollers (2).

b) Adjust by means of the screws (1).



1 Screw
2 Edge roller

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.8 Seal

1.1.8-1 Seal - Check

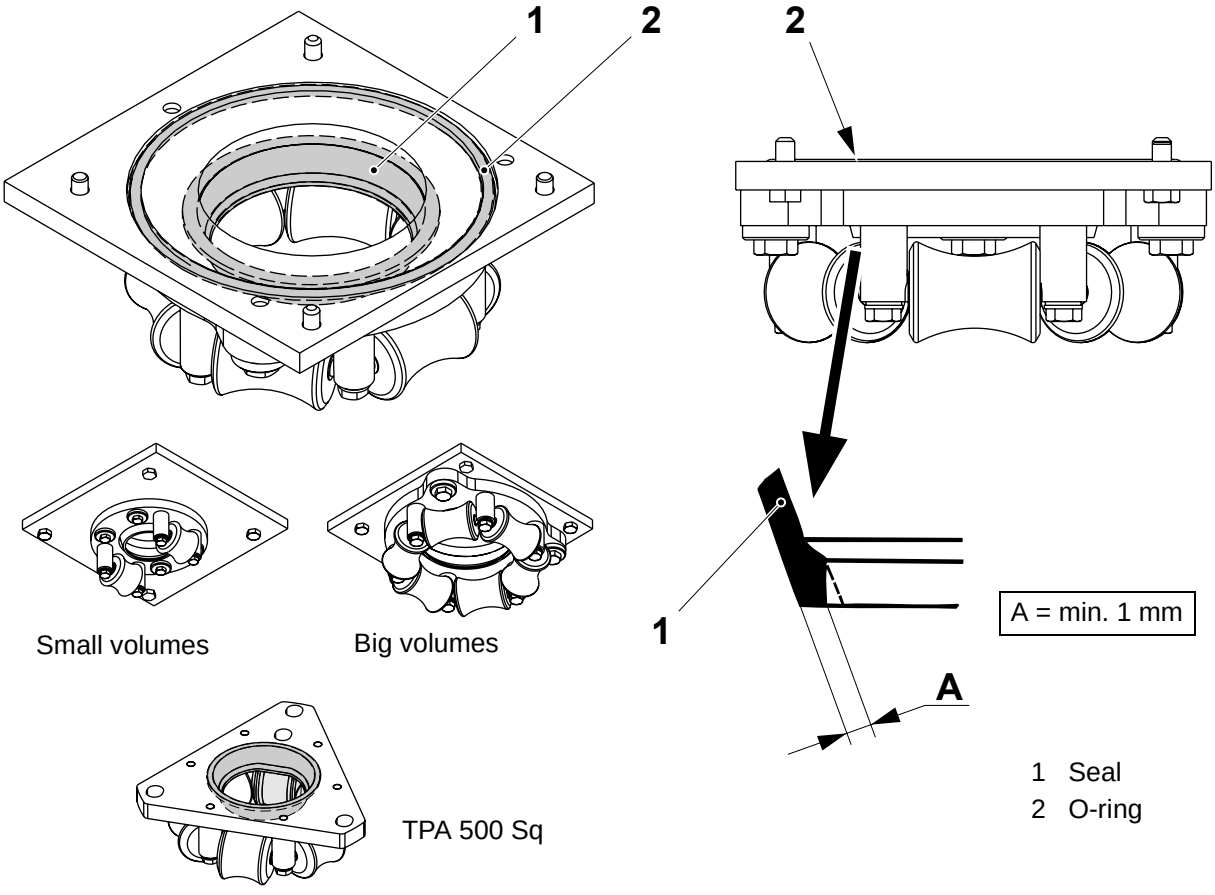
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996456-0200

Check that:

- the seal (1) is not worn and/or damaged. Change the seal (1) if the thickness is less than the distance **A**
- the O-ring (2) is not damaged. Change as required
- the front and rear roller are in contact with the paper with the same pressure
- all rollers in the seal unit rotate freely and are intact. Clean or change the rollers as required.

Overhaul the seal unit as required, see 1.1.8-2 Seal - Overhaul.

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1.1.8-2 Seal - Overhaul

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996456-0200

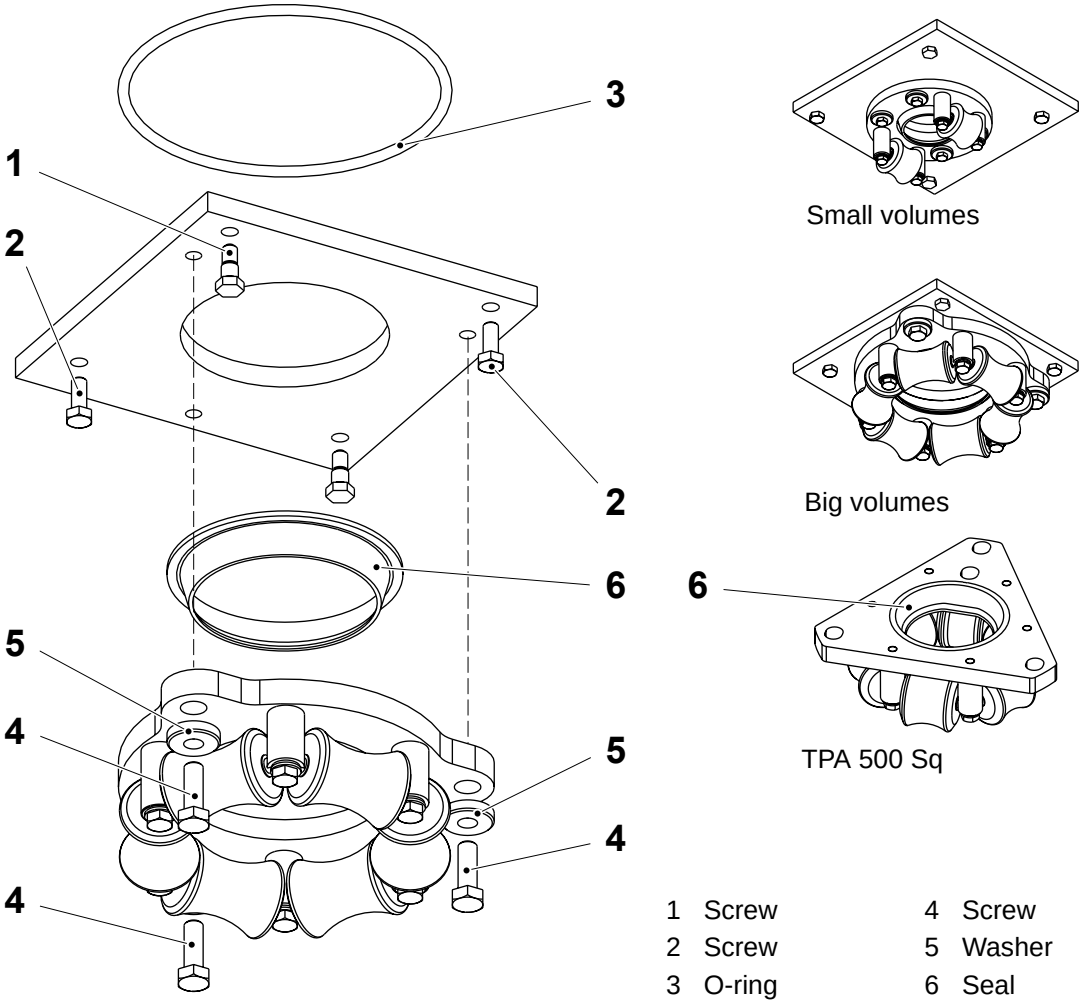
a) Make sure that the filling pipe is removed from the machine.

b) Remove the screws (1) and (2) and change the O-ring (3).

c) Remove the screws (4), the washer (5) and pull out the seal unit.

d) Change the seal (6).

Note! Make sure that the O-ring (3) and seal (6) are correctly fitted in their seats.



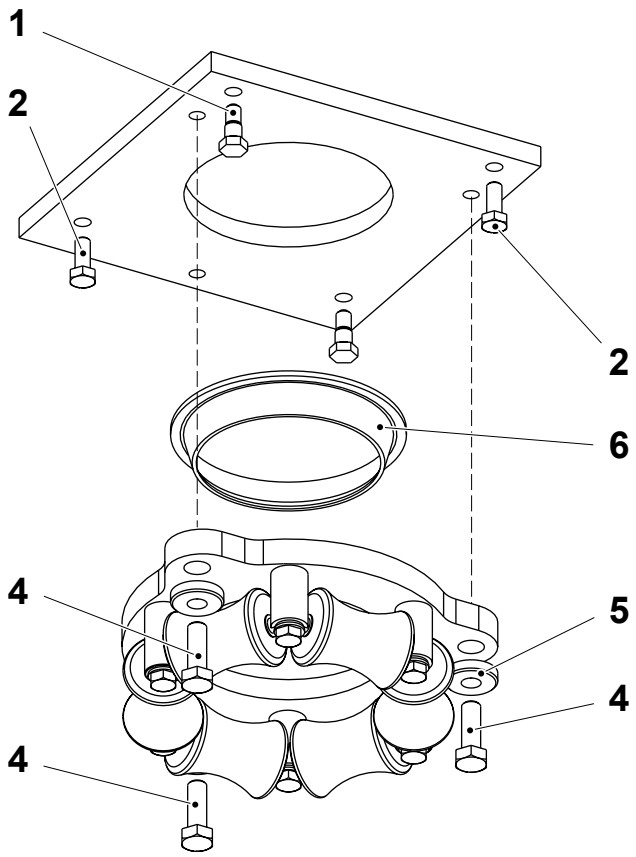
1 Screw
2 Screw
3 O-ring
4 Screw
5 Washer
6 Seal

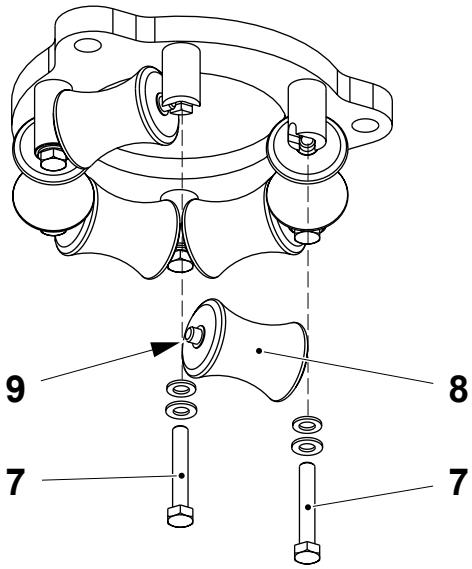
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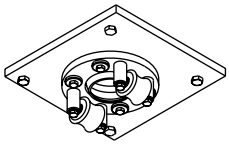
(Cont'd)

e) Remove the screws (7) and change the rollers (8) and the shafts (9).
f) Tighten the screws (7).
g) Fit the seal (6) unit and the washer (5).
h) Tighten the screws (4), (2) and (1).

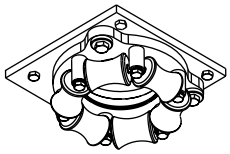




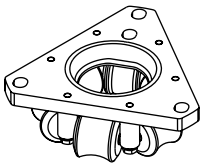
1 Screw
2 Screw
4 Screw
6 Seal
7 Screw
8 Roller
9 Shaft



Small volumes



Big volumes



TPA 500 Sq

TechPub_2614345_0105 - 01_MM81534_11en.fm

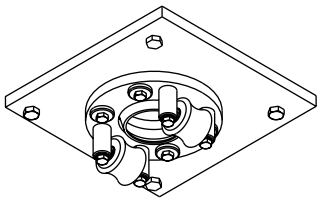
1.1.8-3 Seal - Set

Machine Status	PRODUCTION
SPC Reference	996456-0200

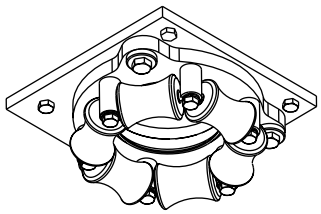
a) Loosen the screws (1) and set the seal (2) to self-adjust along with the position of the paper tube.

b) For TBA 1000 Sq only, move the seal (2) approximately **2 mm** towards the FFU chamber.

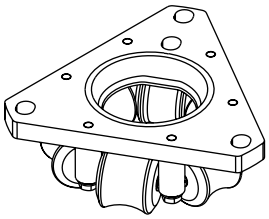
c) Tighten the screws (1).



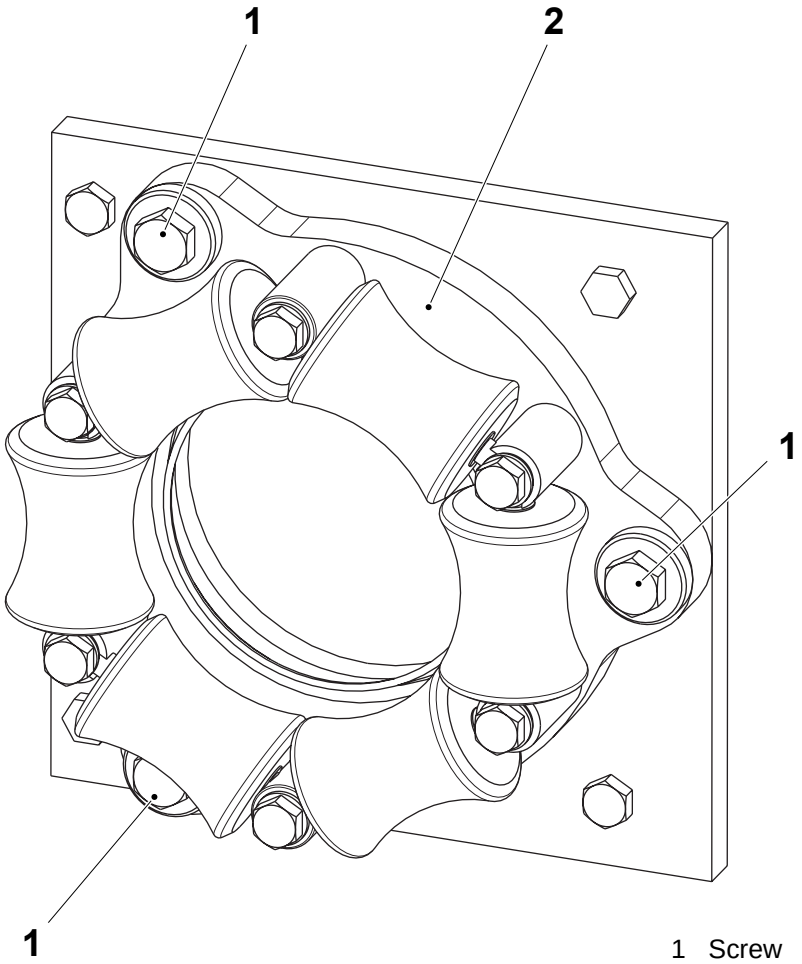
Small volumes



Big volumes



TPA 500 Sq



1 Screw
2 Seal

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.9 Pendulum Roller

1.1.9-1 Pendulum Roller - Check

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Teflon grease code N
SPC Reference	996425-0300, 996425-0400

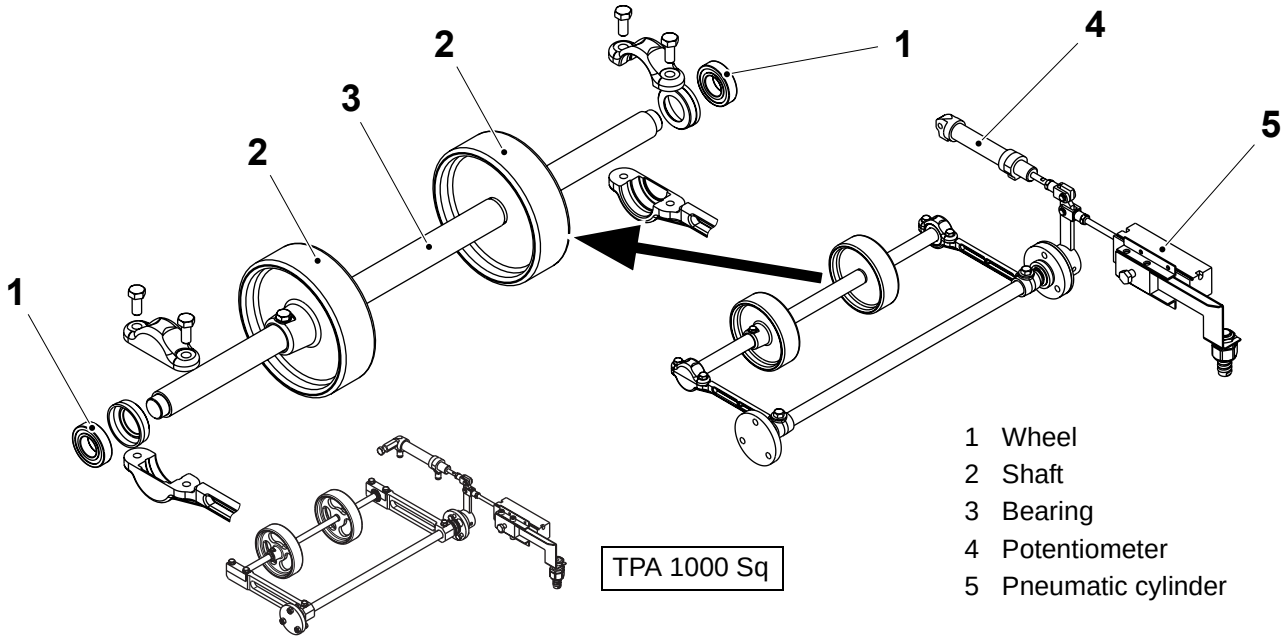
Valid Only for New Variant of Pendulum Roller and TPA 1000 Sq or Machines Rebuilt with UK-2503486-0100 Pendulum Roller Light

CAUTION
Moving part can crush and cut.
Follow the Safety precautions.

Check that:

- the two wheels (2) turn freely
- the radial play in the ball bearings (1) on the shaft (3) is not excessive If required, change the ball bearings (1) and apply plenty of teflon grease, code N, on the ball bearings (1)
- the linear potentiometer (5) is working properly. Set it as required, see 1.1.9-3 Pendulum Roller - Set Linear Potentiometer.

Checking During PRODUCTION
Turn **On** the main air supply and check that the pneumatic cylinder (4) moves easily. Check also for air leakages.



(Cont'd)

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(Cont'd)

Valid Only for Old Variant of Pendulum Roller

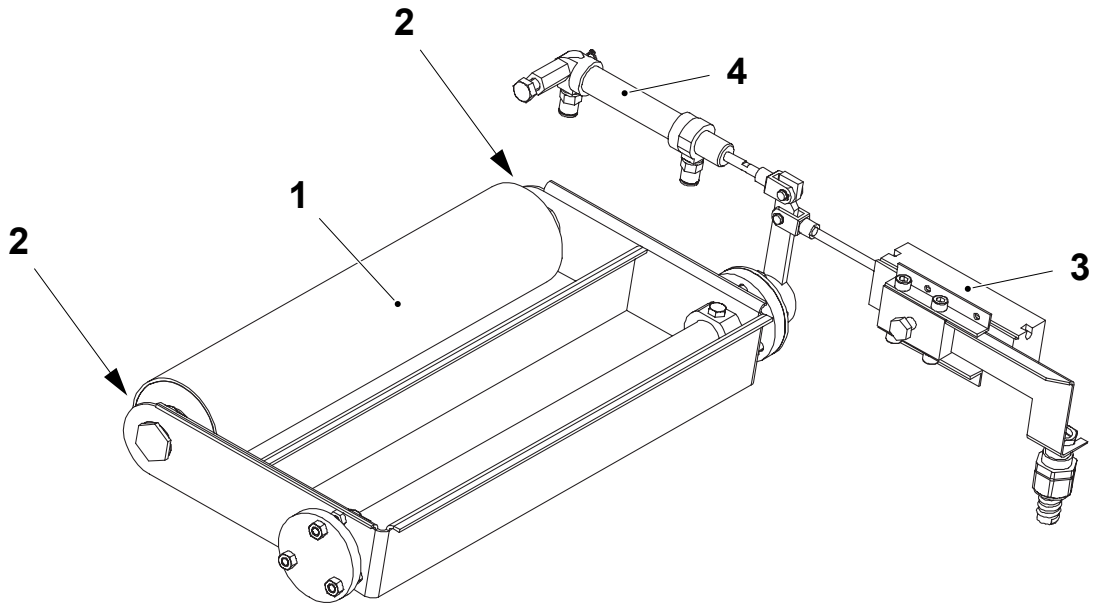
CAUTION
Moving part can crush and cut.
Follow the Safety precautions.

Check that:

- the surface of the roller (1) is not worn or damaged
- the radial play in the flange bushings (2) is not excessive. If not, change them as required
- the linear potentiometer (3) is working properly. Set it as required, see 1.1.9-3 Pendulum Roller - Set Linear Potentiometer.

Checking During PRODUCTION

Turn **On** the main air supply and check that the pneumatic cylinder (4) moves easily. Check also for air leakages.



1 Pendulum roller
2 Flange bushing
3 Potentiometer
4 Pneumatic cylinder

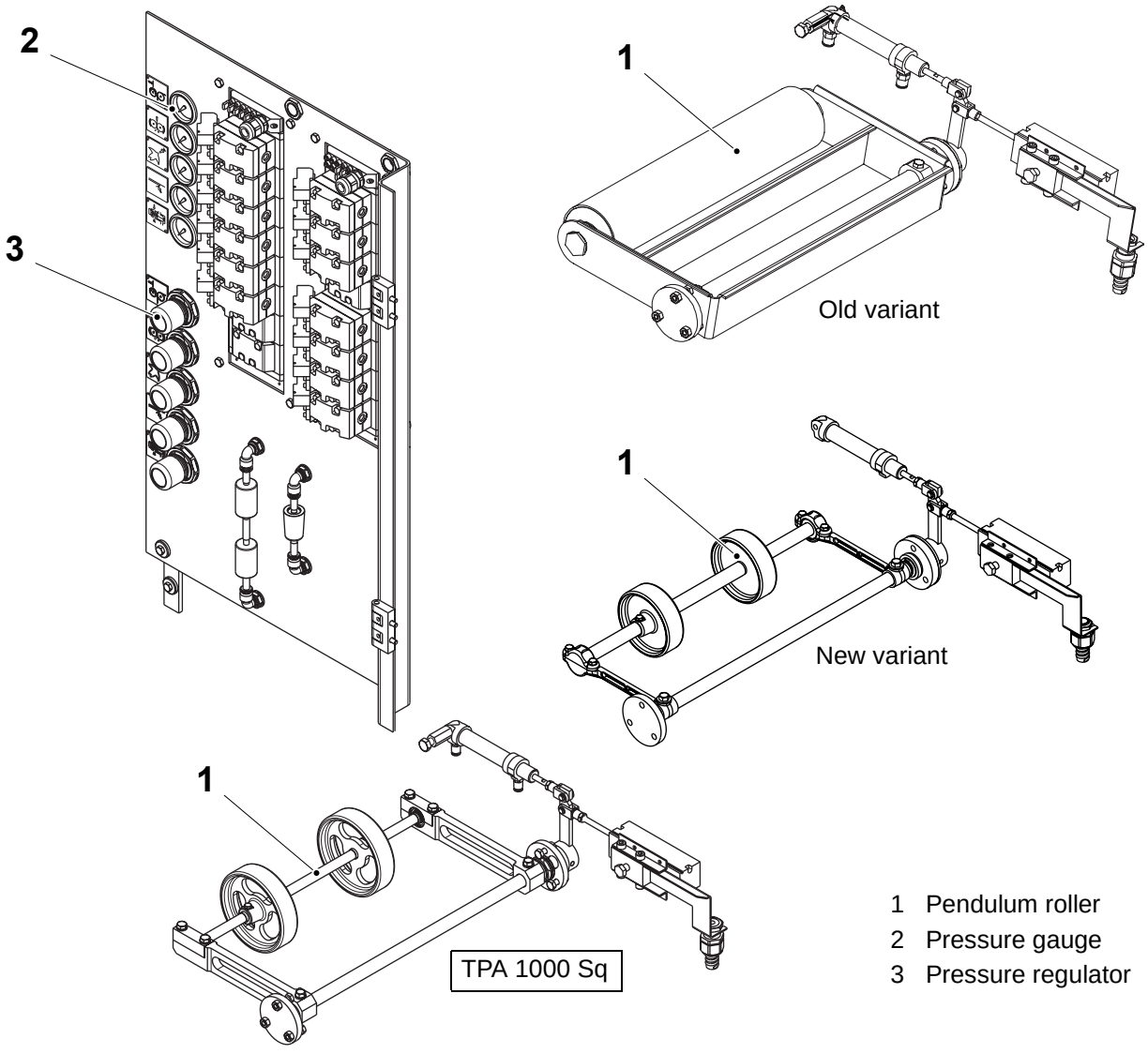
TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.9-2 Pendulum Roller - Set Pressure

Machine Status	PRODUCTION
SPC Reference	996425-0300 996425-0400

Set the air pressure of the pendulum roller (1) by means of the pressure regulator (3) located on the superstructures air panel. Check the pressure on the pressure gauge (2), see table below.

Package	**Pressure (bar)**
TPA 1000 Sq	3.0
1000 B - 1000 S - 1500 S - TPA 1000 S	2.0
200 S - 250 S - 200 B - 250 B - 500 S - 500 B - 330 S - TPA 330 Sq - TPA 500 Sq	1.0
TBA 1000 Sq - TPA 250 Sq	0.5



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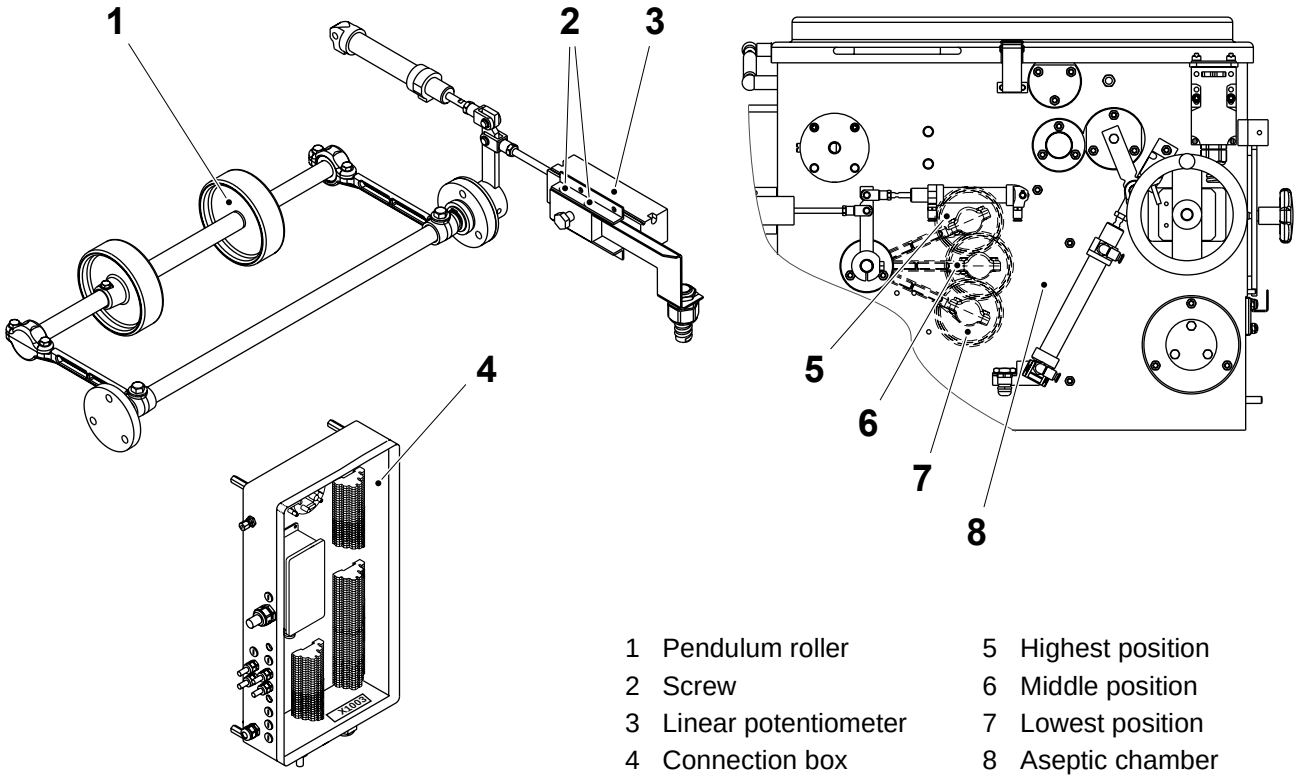
1.1.9-3 Pendulum Roller - Set Linear Potentiometer

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
Special Equipment	Multimeter TP No. 90220-78
SPC Reference	996425-0300 996425-0400

a) Set the linear potentiometer (3) so that it does not reach its end position within the total swing of the pendulum roller (1) and so that the working area is in the middle of its stroke. Adjust by means of the screws (2).

b) Remove the cover of the connection box (4) in the superstructure. Connect a multimeter between terminal **128** and **(-)** located in the terminal board **X1003**.

c) Find approximately the middle position (6) of the total swing of the pendulum roller (1) by measuring the highest position (5) and the lowest position (7) of the pendulum roller (1) from the roof of the aseptic chamber (8).



1 Pendulum roller
2 Screw
3 Linear potentiometer
4 Connection box
5 Highest position
6 Middle position
7 Lowest position
8 Aseptic chamber

(Cont'd)

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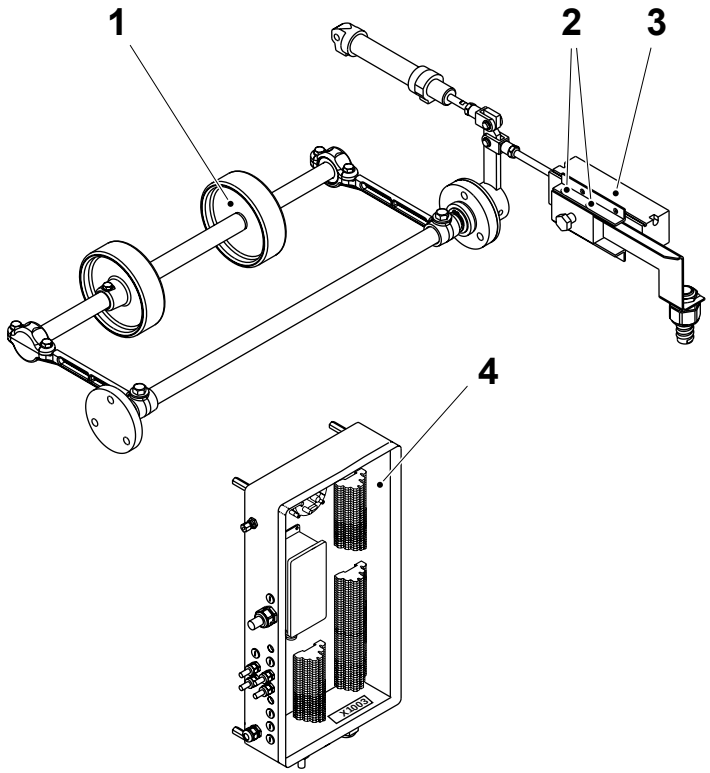
d) Loosen the screws (2).

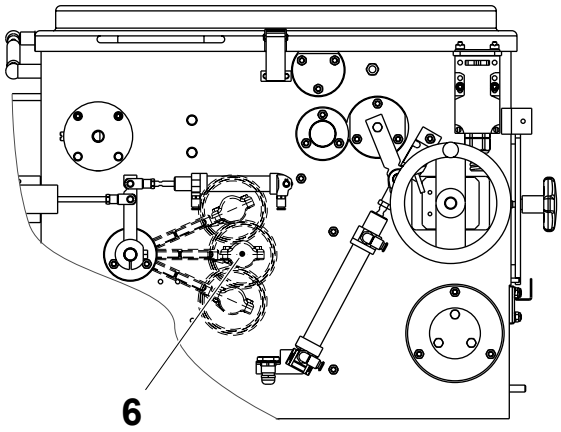
e) By keeping the pendulum roller (1) steady in its middle position (6), slide the linear potentiometer (3) sideways until the output voltage is **5 Volt** on the multimeter display.

f) Tighten the screws (2) in order to fix the linear potentiometer (3) to its slides.

Note! Check while the machine is running if the pendulum roller (1) swings around the middle position (6), which means that the multimeter reads approximately **5 Volt**.

g) Remove the multimeter and fit the cover of the connection box (4).





1 Pendulum roller
2 Screw
3 Linear potentiometer
4 Connection box
6 Middle position

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1.1.10 Drive Unit

1.1.10-1 Drive Unit - Check

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	996427-0200

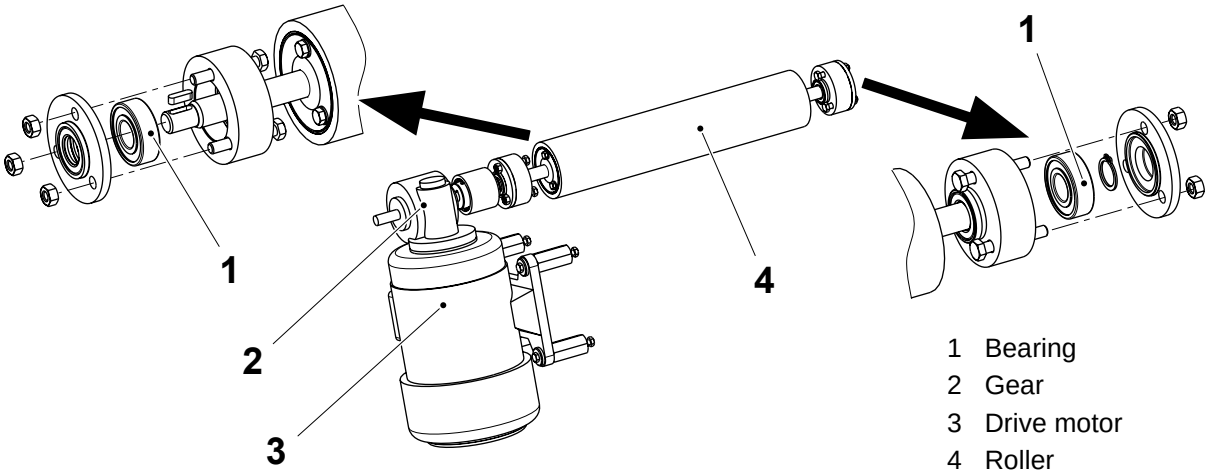
Check the following parts for visual wear and/or damage:

- the drive motor (3) and gear (2) for abnormal noises
- the roller (4)
  Check especially the surface of the roller (4) for any marks.
  Check also for excessive play in the bearings (1) by turning the roller (4) back and forward.
- the bearings (1) are correctly greased, see 1.1.10-3 Drive Unit - Change Bearing.

Change as required.

Checking During Production

Check that there are no drops of hydrogen peroxide after that the packaging material web passes the rollers. If necessary, determine the cause of the problem, see 1.1.14-1 Calender Roller - Check and 1.1.14-2 Calender Roller - Set Pressure.



1 Bearing
2 Gear
3 Drive motor
4 Roller

1.1.10-2 Drive Unit - Set Motor Acceleration

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	996427-0200

Set the drive unit circuit board according to 9.5.3-1 Frequency Converter - Set.

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1.1.10-3 Drive Unit - Change Bearing

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Teflon grease code N
SPC Reference	996427-0200

a) Remove the three nuts (7), the lid (10) and the retaining ring (9).

b) Change the bearing (8) and apply plenty of teflon grease, code N, on the bearing (8).

c) Fit the retaining ring (9), the lid (10) and the three nuts (7).

d) Loosen the screw (2) on the shaft coupling (1).

e) Remove the motor (12) by means of the four screws (11).

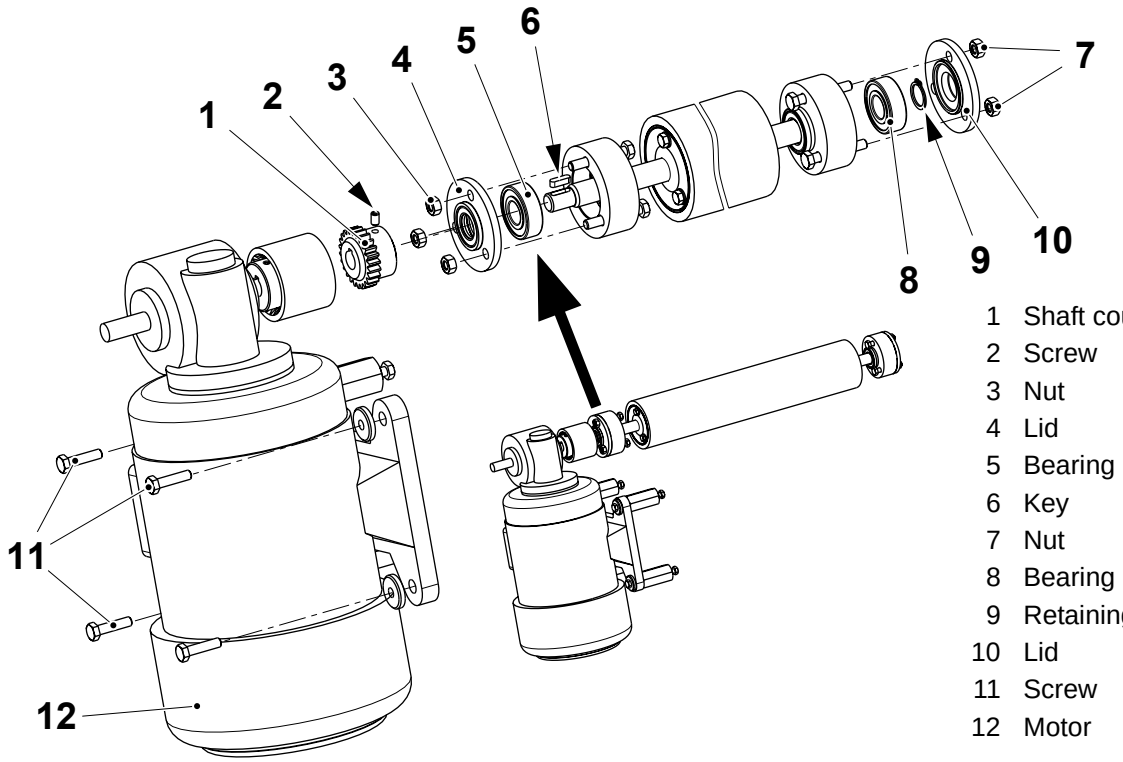
f) Remove the key (6), the three nuts (3) and the lid (4).

g) Change the bearing (5) and apply plenty of teflon grease, code N, on the bearing (5).

h) Fit the lid (4), the three nuts (3) and the key (6).

i) Fit the motor (12) by means of the four screws (11).

j) Tighten the screw (2) on the shaft coupling (1).



1 Shaft coupling
2 Screw
3 Nut
4 Lid
5 Bearing
6 Key
7 Nut
8 Bearing
9 Retaining ring
10 Lid
11 Screw
12 Motor

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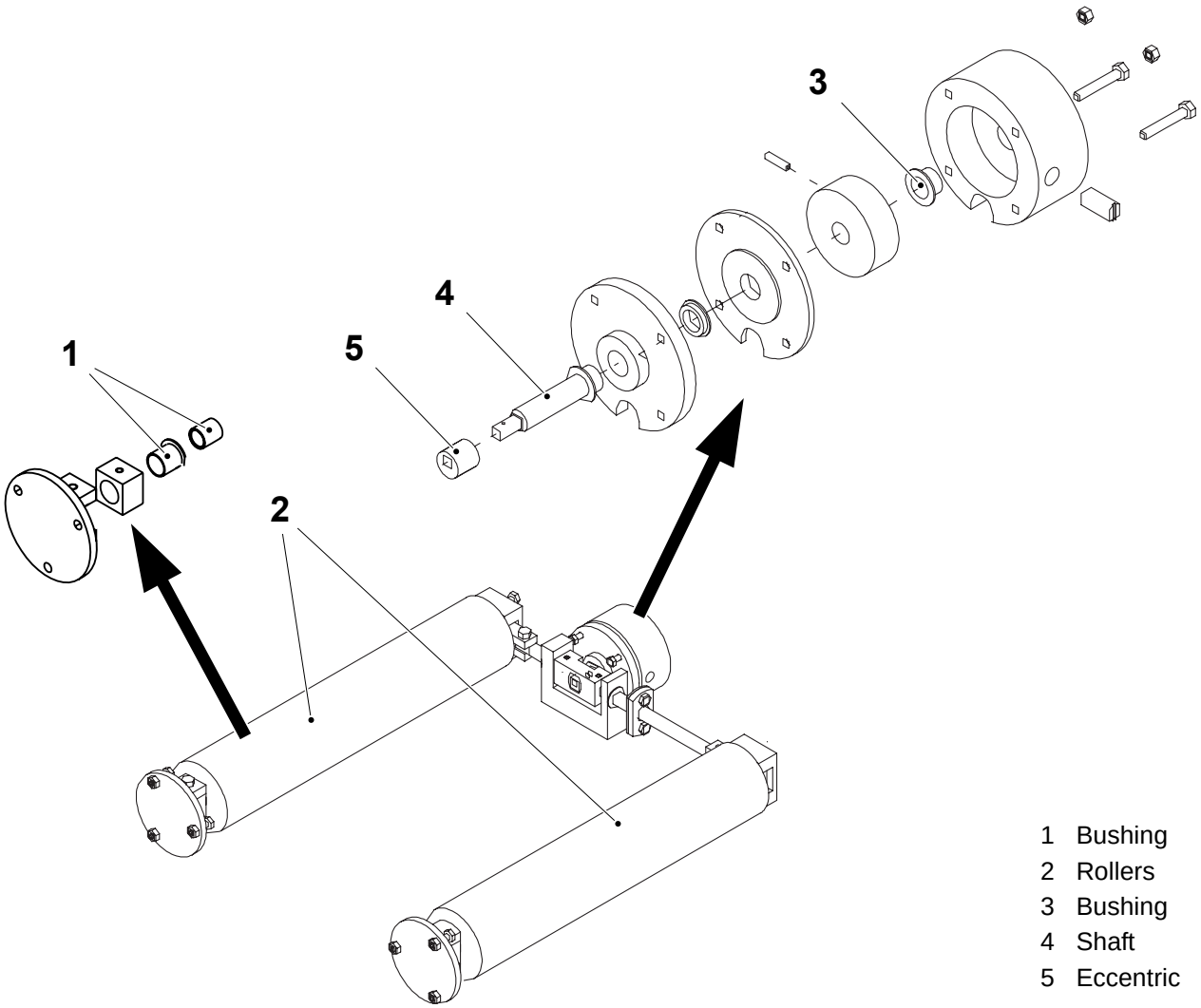
1.1.11 Paper Guide

1.1.11-1 Paper Guide - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996428-0300

Check that:

- the radial play of the bushings (1) is not excessive
  Change them as required.
- the rollers (2) rotates freely and the surfaces are not worn out
- the bushing (3), the shaft (4) and the eccentric (5) are not worn out
  Change them as required.



1 Bushing
2 Rollers
3 Bushing
4 Shaft
5 Eccentric

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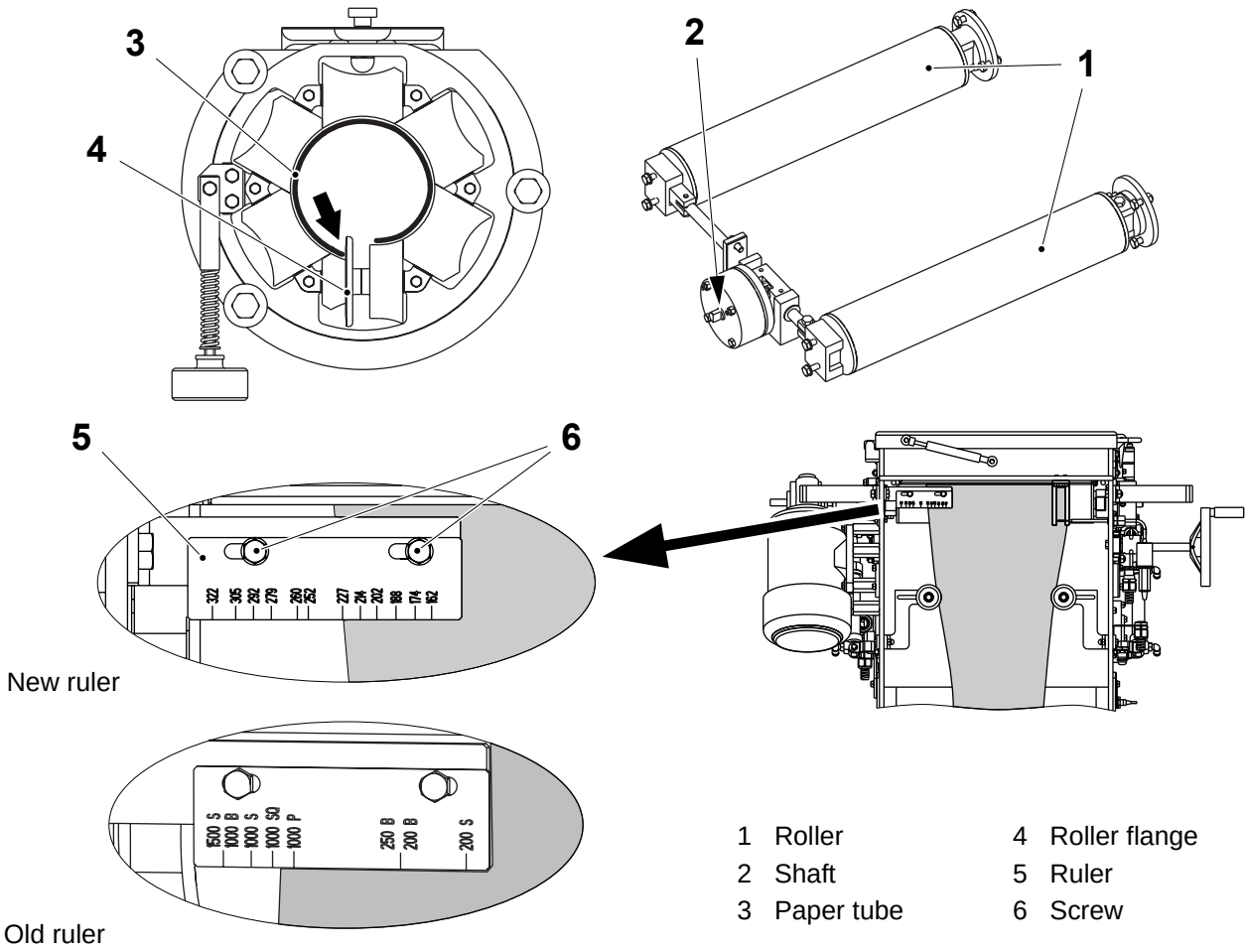
1.1.11-2 Paper Guide - Set

Machine Status	TIGHT TUBE
SPC Reference	996428-0300

a) Adjust the rollers (1) by means of the shaft (2) so that the paper tube (3) touches the roller flange (4).

b) When the paper track is stabilised set the ruler (5), according to the running volume, by means of the screws (6).

Package	Web width (mm)	Package	Web width (mm)
1500 S - 1000 B - 500 B	322	TPA 500 Sq	227
1000 S	305	250 B - 200 B - 330 S	214
1000 Sq	292	TPA 330 Sq	202
TPA 1000 S	279	250 S	188
TPA 1000 Sq	260	200 S - TPA 250 Sq	174
500 S	252		



1 Roller
2 Shaft
3 Paper tube
4 Roller flange
5 Ruler
6 Screw

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1.1.12 Crank

1.1.12-1 Crank - Check Chain

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996451-0100

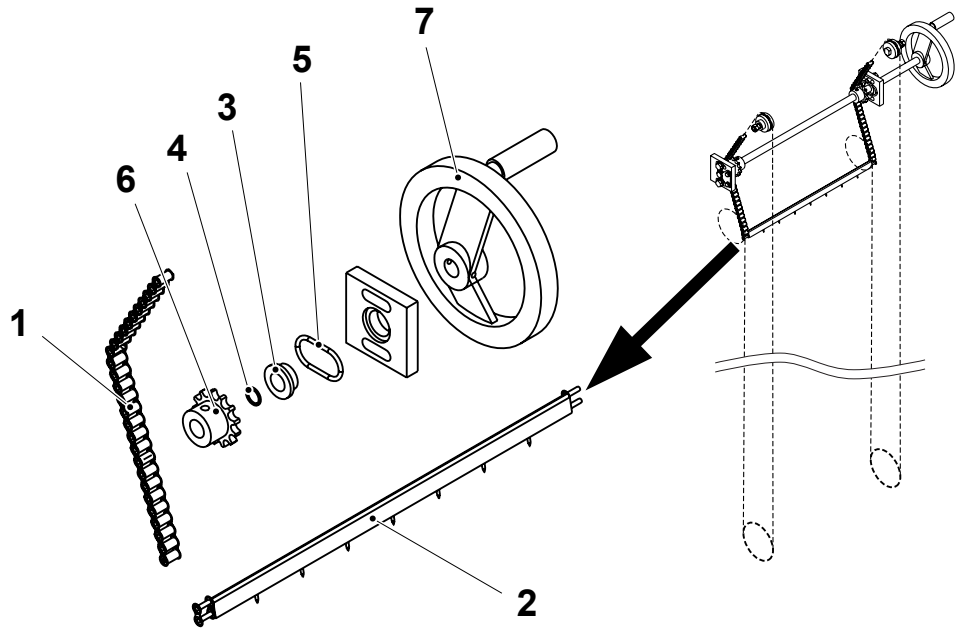
WARNING

Risk of injury due to pinching or crushing.

Follow the Safety precautions.

Crank the paper carrier (2) with the handle (7) until it reaches its highest position and check the following parts for visual wear and/or damage:

- the chain (1)
  Crank the chain (1) and check that it moves freely.
- the paper carrier (2)
  Check that the teeth in the paper carrier (2) are not damaged. Change as required.
- the bushing (3)
  Check also that the radial play is not excessive.
- the O-rings (4) and (5)
  Change as required.
- the sprocket (6)



1 Chain
2 Carrier
3 Bushing
4 O-ring
5 O-ring
6 Sprocket
7 Handle

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1.1.13 Pillar

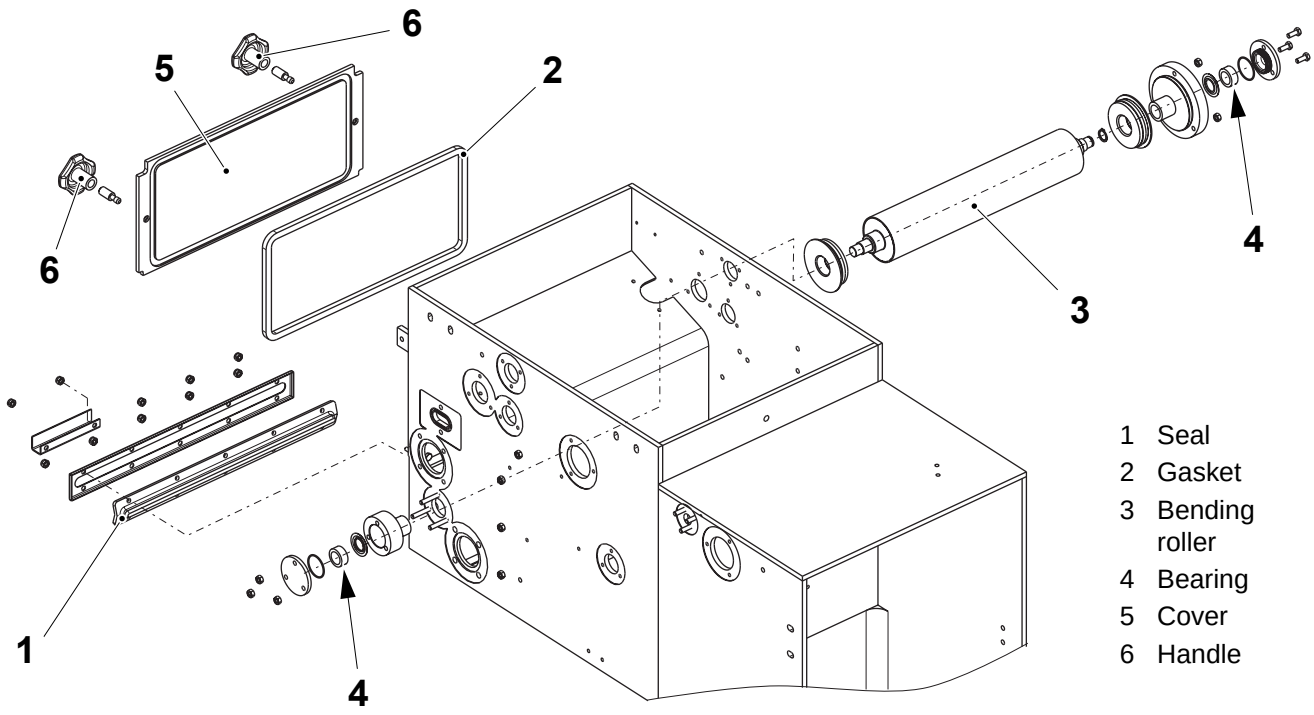
1.1.13-1 Pillar - Check Seal

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035001-0400

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Check the following parts for wear and/or damage:

- the seal (1)
  Change it as required, see 1.1.13-2 Pillar - Change Seal and Bushings.
- the gasket (2)
- the bending roller (3)
  Make sure that the surface is not damaged and that it rotates freely. The radial play of the bearings (4) is not excessive. If excessive, change them, see 1.1.13-2 Pillar - Change Seal and Bushings.
- the bearings (4) are correctly greased, see 1.1.13-2 Pillar - Change Seal and Bushings
- the cover (5)
  Make sure that it is properly fitted against the column by means of the handles (6).



1 Seal
2 Gasket
3 Bending roller
4 Bearing
5 Cover
6 Handle

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1.1.13-2 Pillar - Change Seal and Bushings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035001-0400

WARNING

Hydrogen peroxide.

Follow the Safety precautions.

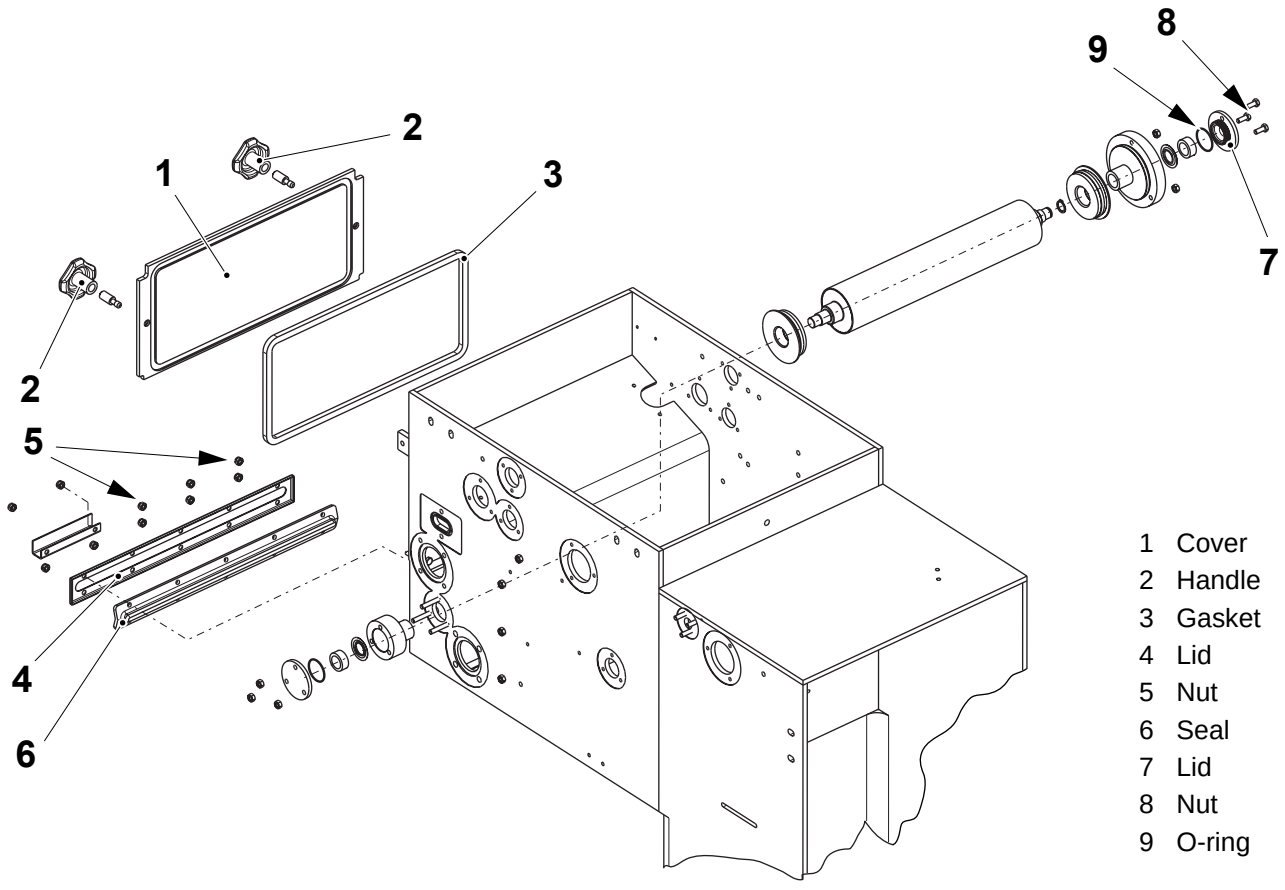
a) Remove the cover (1) by means of the handles (2).

b) Remove the gasket (3) and change it as required.

c) Remove the lid (4) by means of the nuts (5).

d) Pull out the seal (6) and change it as required.

e) Remove the lid (7) by means of the nuts (8) and change the O-ring (9) as required.



1 Cover
2 Handle
3 Gasket
4 Lid
5 Nut
6 Seal
7 Lid
8 Nut
9 O-ring

(Cont'd)

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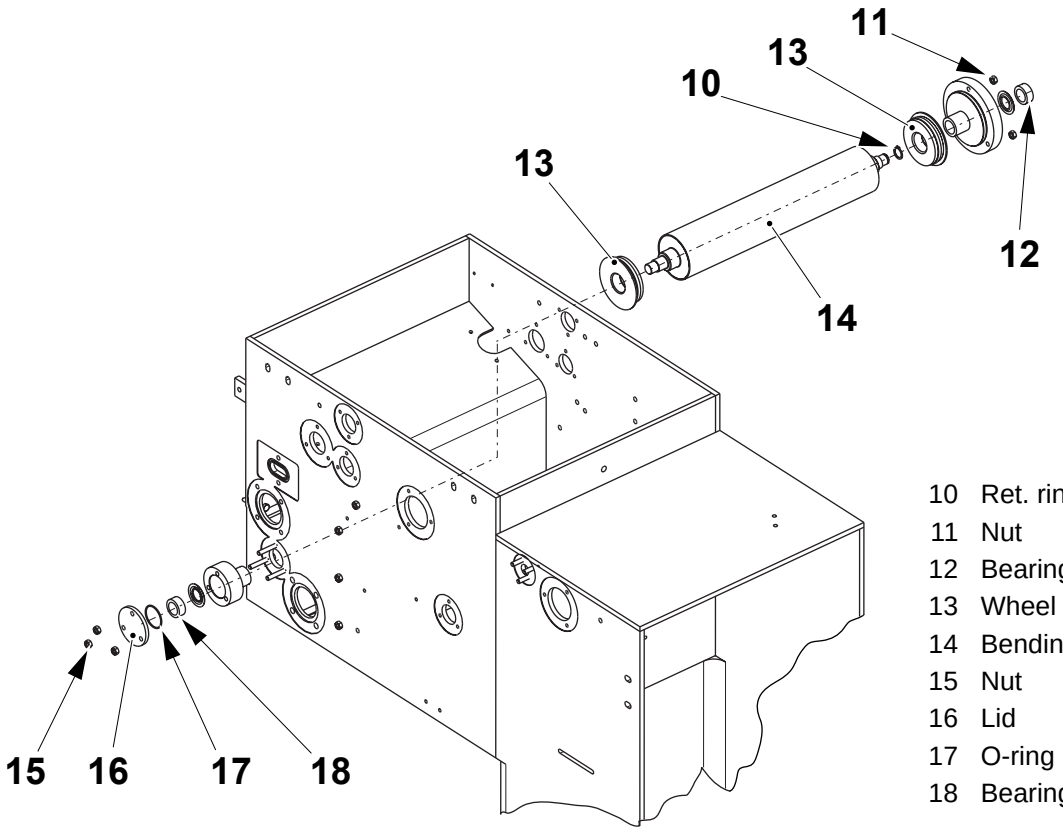
f) Remove the retaining ring (10) and the nuts (11).

g) Change the bearing (12), the wheels (13) or the bending roller (14) as required.

h) Remove the nuts (15) to remove the lid (16)

i) Change the O-ring (17) and the bearing (18) as required.

j) Assemble in the reverse order.



10 Ret. ring
11 Nut
12 Bearing
13 Wheel
14 Bending roller
15 Nut
16 Lid
17 O-ring
18 Bearing

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1.1.13-3 Pillar - Change LS Cable

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095881-0300 1035001-0400

WARNING
Risk of burns.
Follow the Safety precautions.

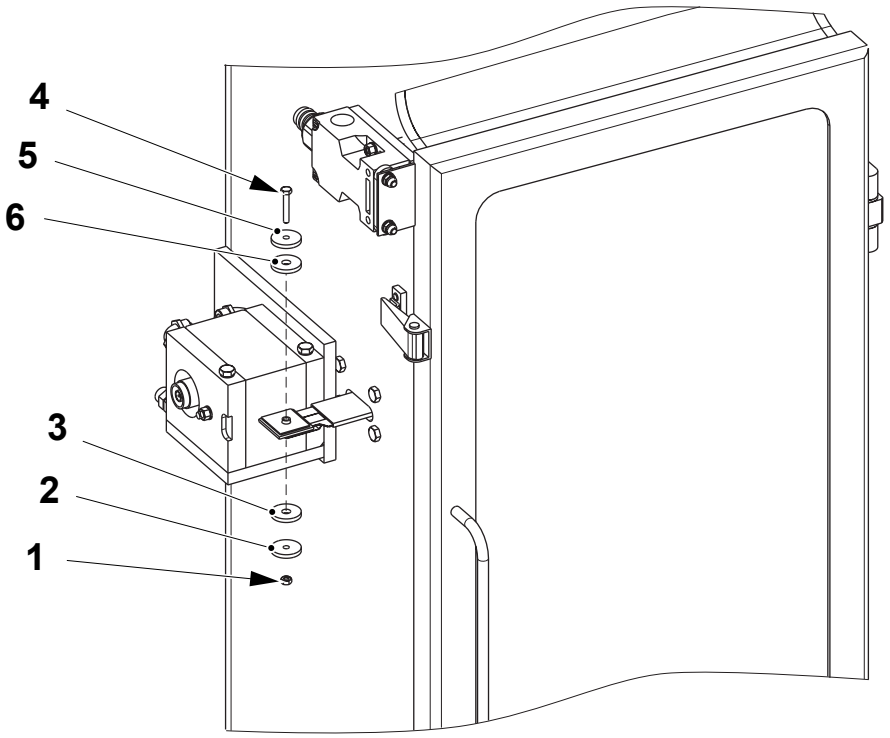
New LS cable or machines rebuilt with UK-1538873-0100 LS cable

Note! For the machines with the old LS cable, see Old LS cable on page 1-75.

a) Switch **Off** the mains power.

b) Unscrew the nut (1) and remove the washers (2) and (3).

c) Remove the screw (4), the washers (5) and (6).



1 Nut
2 Washer
3 Washer
4 Screw
5 Washer
6 Washer

(Cont'd)

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(Cont'd)

d) Open the lower door of the aseptic chamber.

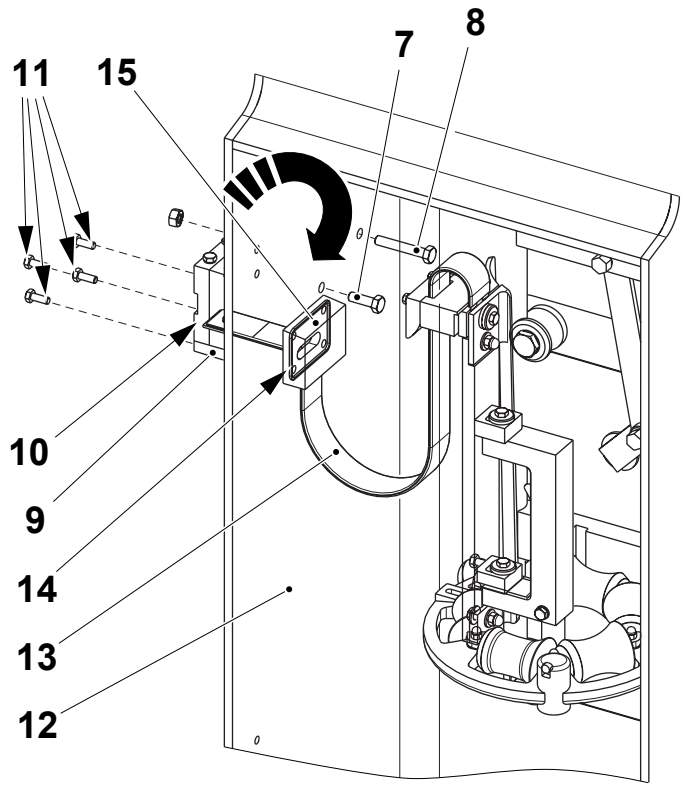
e) Remove the screw (7) and loosen the screw (8).

f) Turn the cantilever (9) together with the transformer (10) assembly ninety degrees clockwise.

g) Remove the four screws (11) from the aseptic chamber pillar (12).

h) Pull out the end of the LS cable (13) from the pillar slot.

i) Remove the O-ring (14) underneath the LS cable block (15). Change the O-ring as required.



7 Screw
8 Screw
9 Cantilever
10 Transformer
11 Screw
12 Pillar
13 LS cable
14 O-ring
15 Block

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

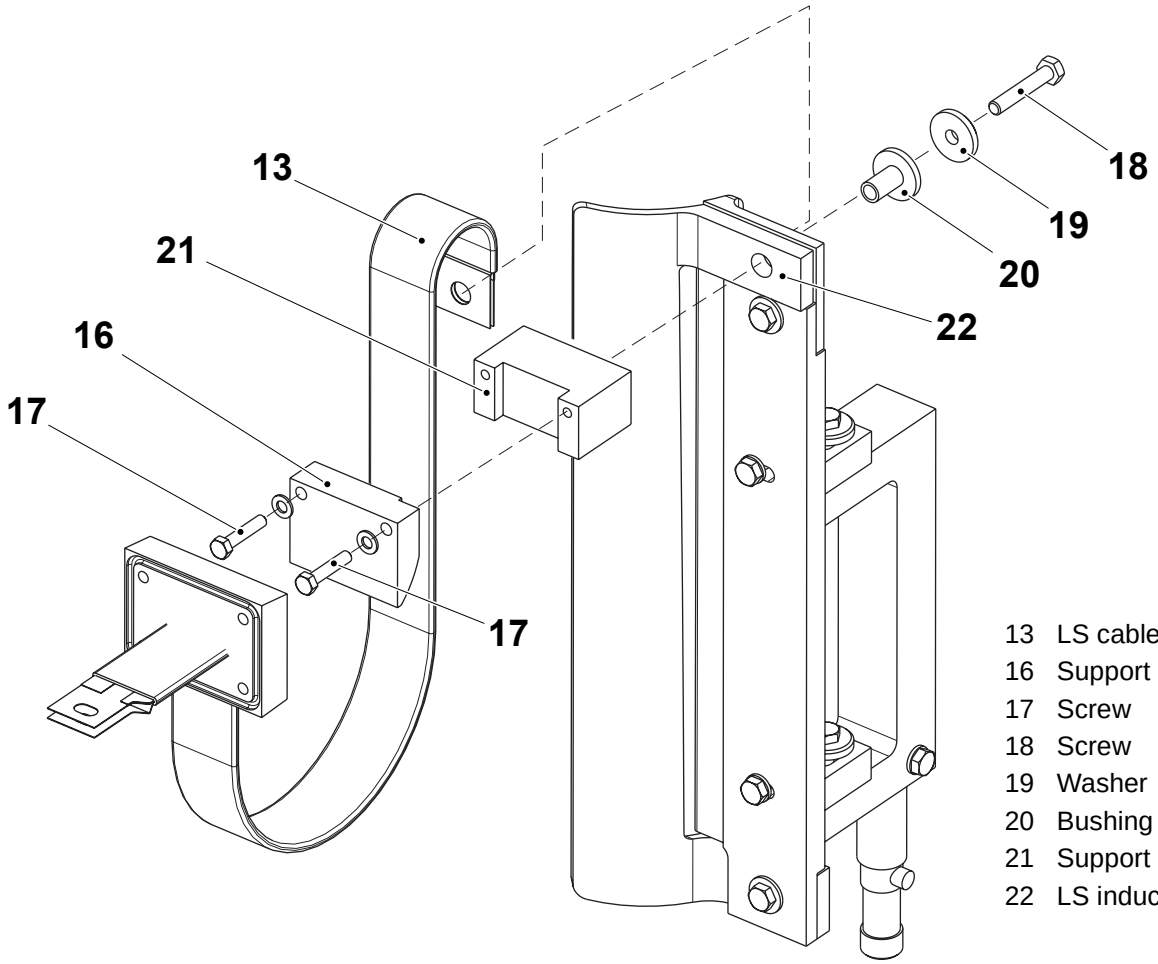
(Cont'd)

j) Remove the support block (16) and the screws (17).

k) Remove the screw (18) together with the washer (19), the bushing (20) and the support block (21) from the LS inductor (22).

l) Change the LS cable (13).

m) Assemble in the reverse order.



13 LS cable
16 Support block
17 Screw
18 Screw
19 Washer
20 Bushing
21 Support block
22 LS inductor

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

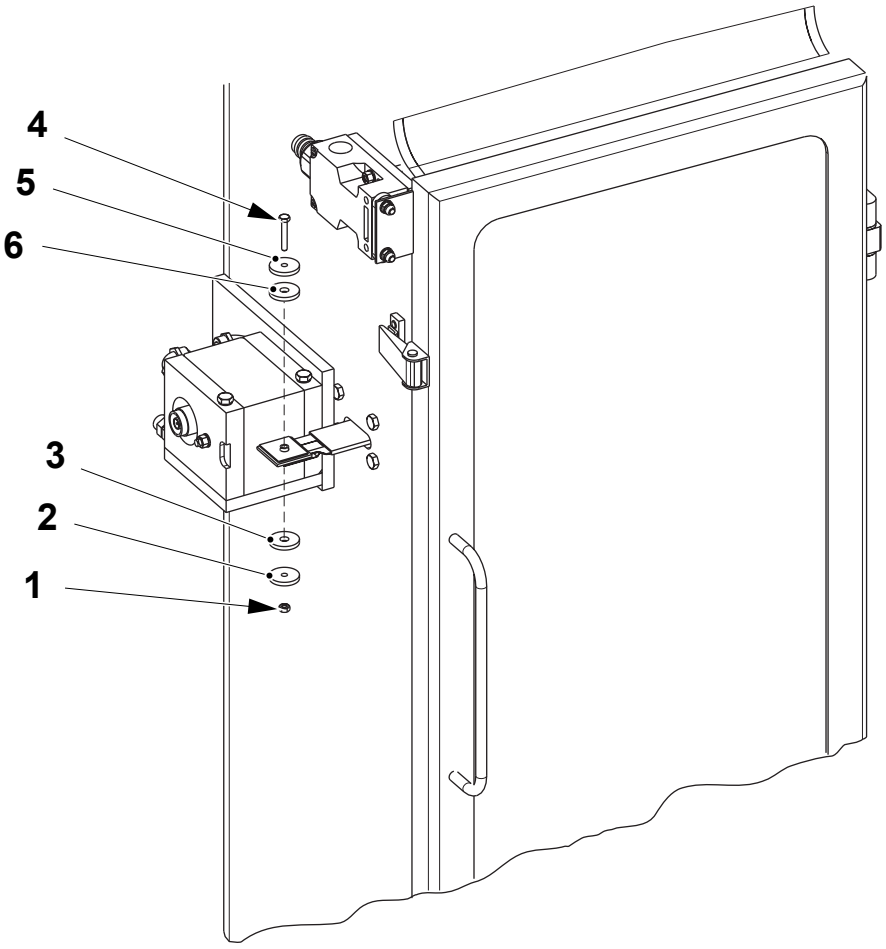
Old LS cable

Note! For the machines with the new LS cable or machines rebuilt with UK-1538873-0100 LS cable, see New LS cable or machines rebuilt with UK-1538873-0100 LS cable on page 1-72.

a) Switch **Off** the mains power.

b) Unscrew the nut (1) and remove the washers (2) and (3).

c) Remove the screw (4), the washers (5) and (6).



1 Nut
2 Washer
3 Washer
4 Screw
5 Washer
6 Washer

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

d) Open the lower door of the aseptic chamber.

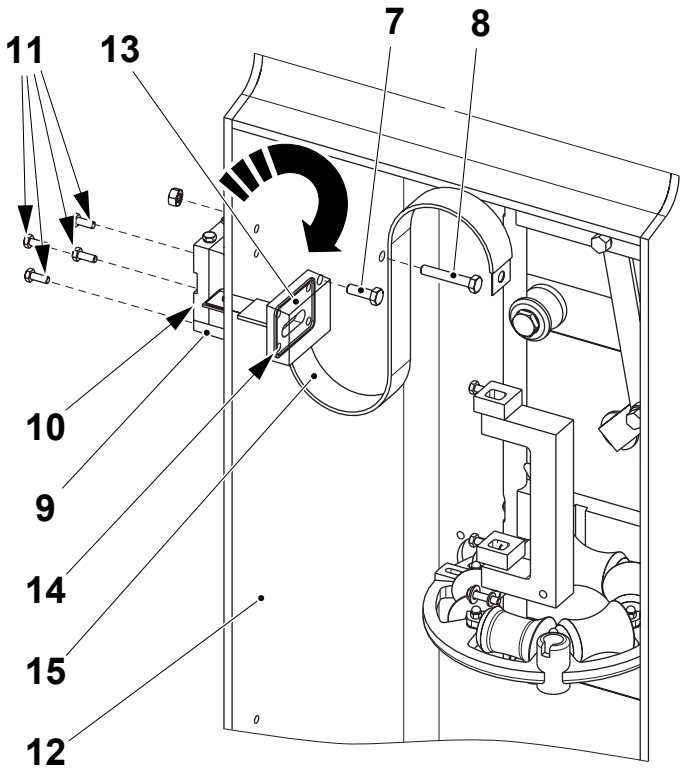
e) Remove the screw (7) and loosen the screw (8).

f) Turn the cantilever (9) together with the transformer (10) assembly ninety degrees clockwise.

g) Remove the four screws (11) from the aseptic chamber pillar (12).

h) Pull out one end of the LS cable (13) from the pillar slot.

i) Remove the O-ring (14) underneath the LS cable block (15). Change the O-ring as required.



7 Screw
8 Screw
9 Cantilever
10 Transformer
11 Screw
12 Pillar
13 LS cable
14 O-ring
15 Block

(Cont'd)

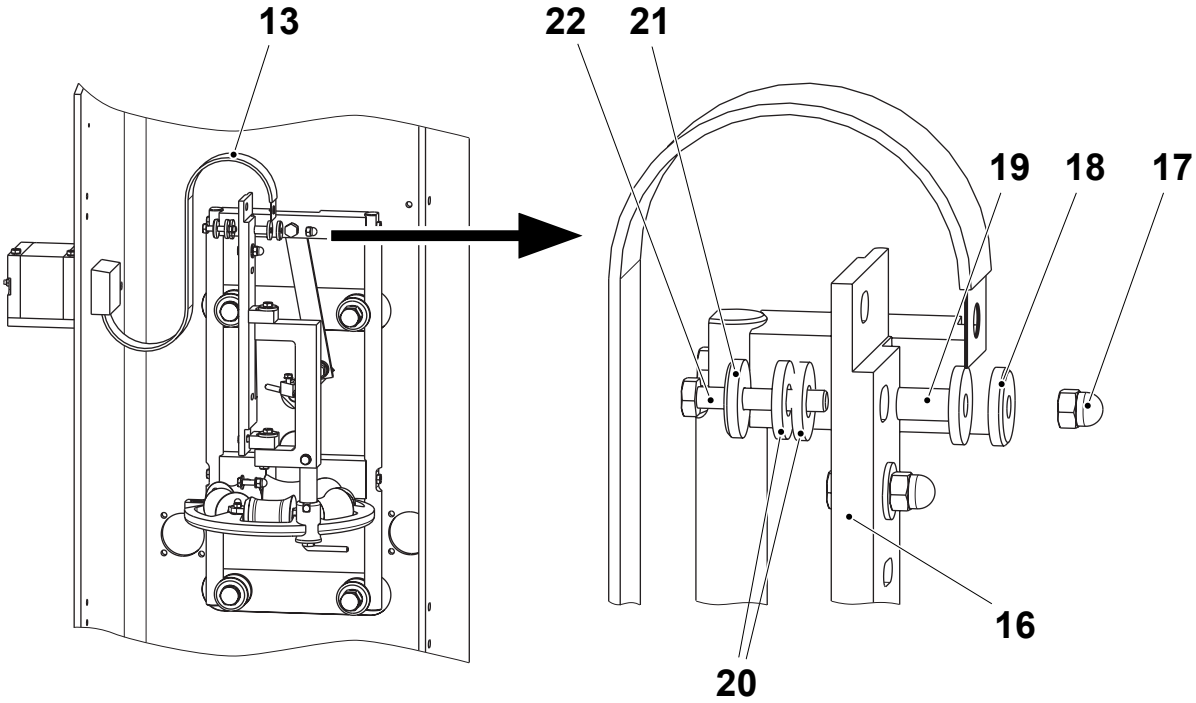
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(Cont'd)

j) On the insulating plate (16) remove the following:
   - the nut (17)
   - the washer (18)
   - the bushing (19)
   - the washers (20)
   - the washer (21)
   - the screw (22).

k) Change the LS cable (13).

l) Assemble in the reverse order.



13	LS cable	19	Bushing
16	Insulating plate	20	Washer
17	Nut	21	Washer
18	Washer	22	Screw

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.14 Calender Roller

1.1.14-1 Calender Roller - Check

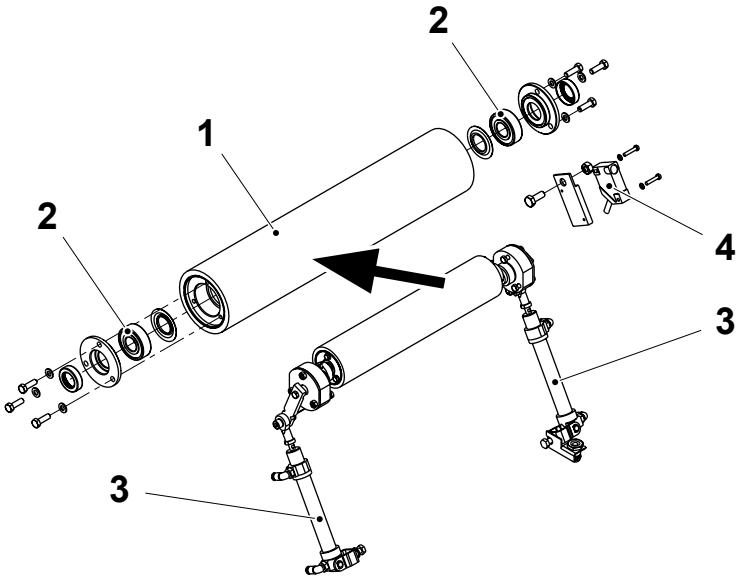
Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1282884-0200

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Check that:

- the roller (1) is not worn or damaged
  Check also that it rotates freely and the surface is undamaged.
- the radial play of the ball bearings (2) is not excessive
  If excessive, change them, see 1.1.14-3 Calender Roller - Change Bushings and Ball Bearings.
- the ball bearings (2) are correctly greased, see 1.1.14-3 Calender Roller - Change Bushings and Ball Bearings
- the two pneumatic cylinders (3) move easily
- the proximity switch (4) functions correctly
  Set as required, see 1.1.14-5 Calender Roller - Set Proximity Switch.

Change as required.



1 Roller
2 Ball bearing
3 Pneumatic cylinder
4 Proximity switch
5 Stop screw

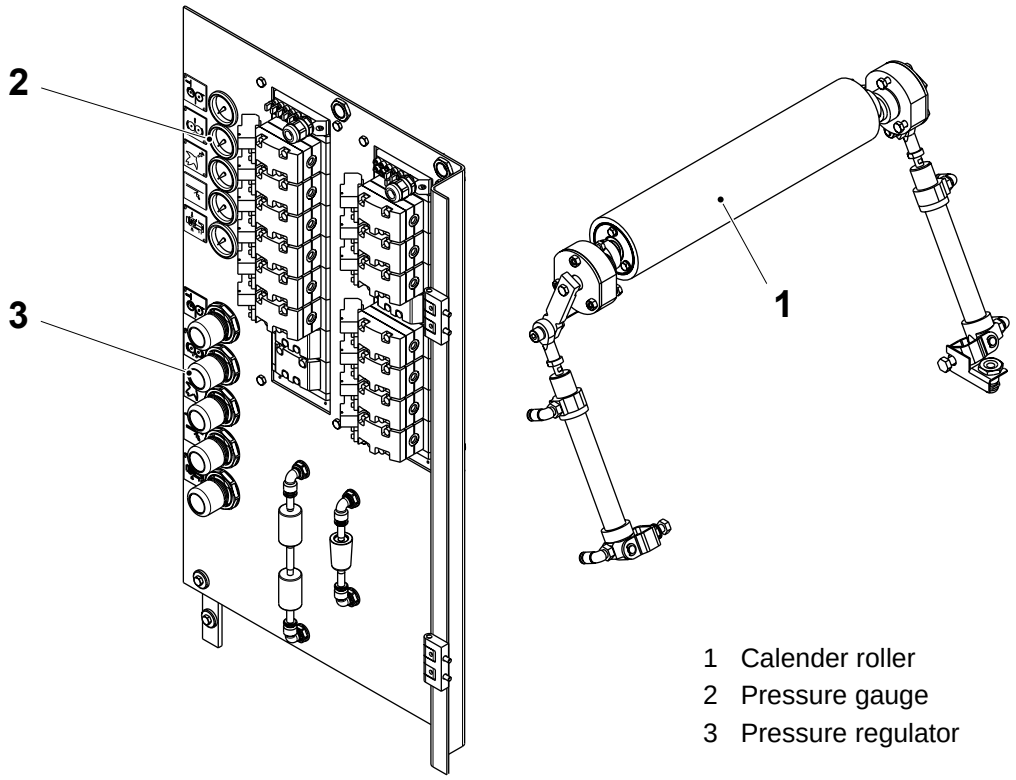
TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.14-2 Calender Roller - Set Pressure

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1282884-0200

Set the air pressure of the calender roller (1) by means of the pressure regulator (3) located on the superstructure air panel. Check the pressure on the pressure gauge (2), see table below.

Package	Pressure (bar)
TPA 1000 Sq	min. 3.0
1000 B - 1000 S - 1500 S - 200 S - 250 S - 200 B - 250 B - 500 S - 500 B - 1000 Sq - 330 S - TPA 1000 S - TPA 500 Sq - TPA 330 Sq - TPA 250 Sq	min. 2.0



1 Calender roller
2 Pressure gauge
3 Pressure regulator

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.14-3 Calender Roller - Change Bushings and Ball Bearings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Teflon grease code N
SPC Reference	1282884-0200

WARNING

Hydrogen peroxide.

Follow the Safety precautions.

a) Open the top aseptic chamber door.

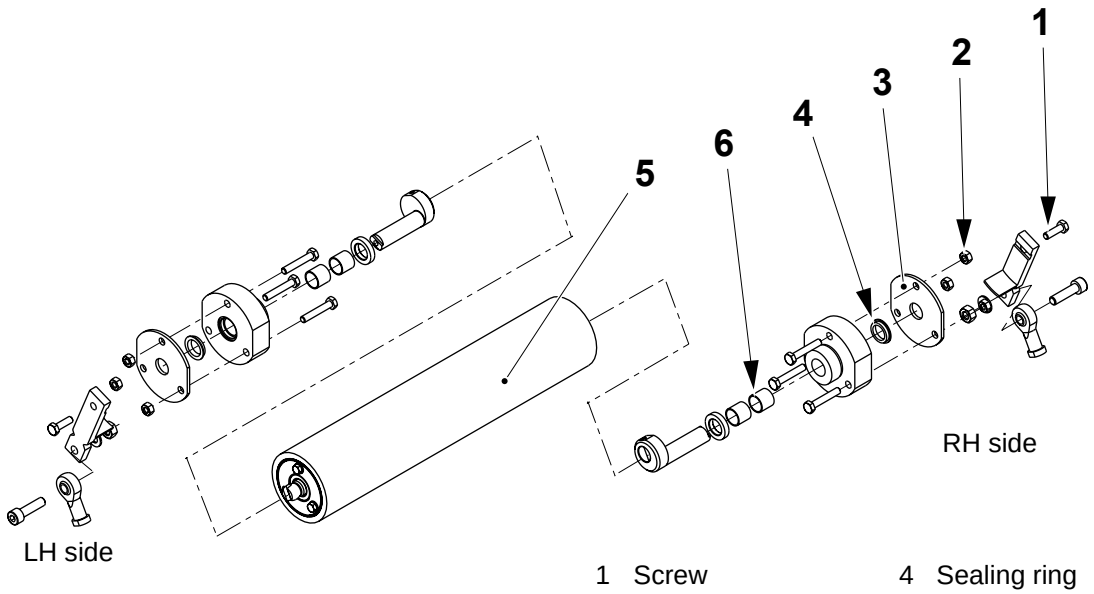
b) Loosen the screw (1) on the RH side of the machine.

c) Loosen the three nuts (2) and remove the cover (3) and sealing ring (4).

d) Remove the roller assembly (5).

e) Repeat items b) and c) on the LH side of the machine.

f) Check the two bushings (6) for wear and/or damage, on both sides, and change them as required.



1 Screw
2 Nut
3 Cover
4 Sealing ring
5 Roller assembly
6 Bushing

(Cont'd)

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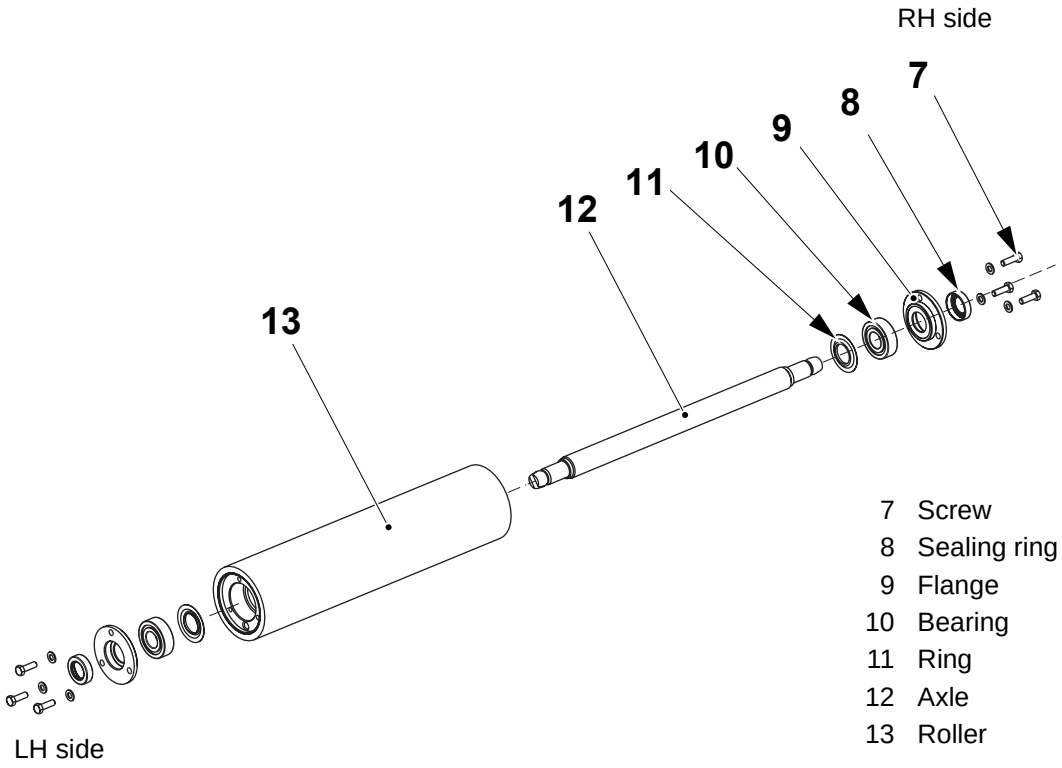
g) Loosen screws (7) at the end of the roller and remove the sealing ring (8), flange (9), bearing (10) and ring (11).

h) Pull out the axle (12) from the roller (13), and repeat item g) at the other end of the roller.

i) Change the bearings (10) as required.

j) Assemble in the reverse order.

Note! Apply plenty of teflon grease, code N, on the bearings (10) before assembling.



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1.1.14-4 Calender Roller - Set Distance

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1282884-0200

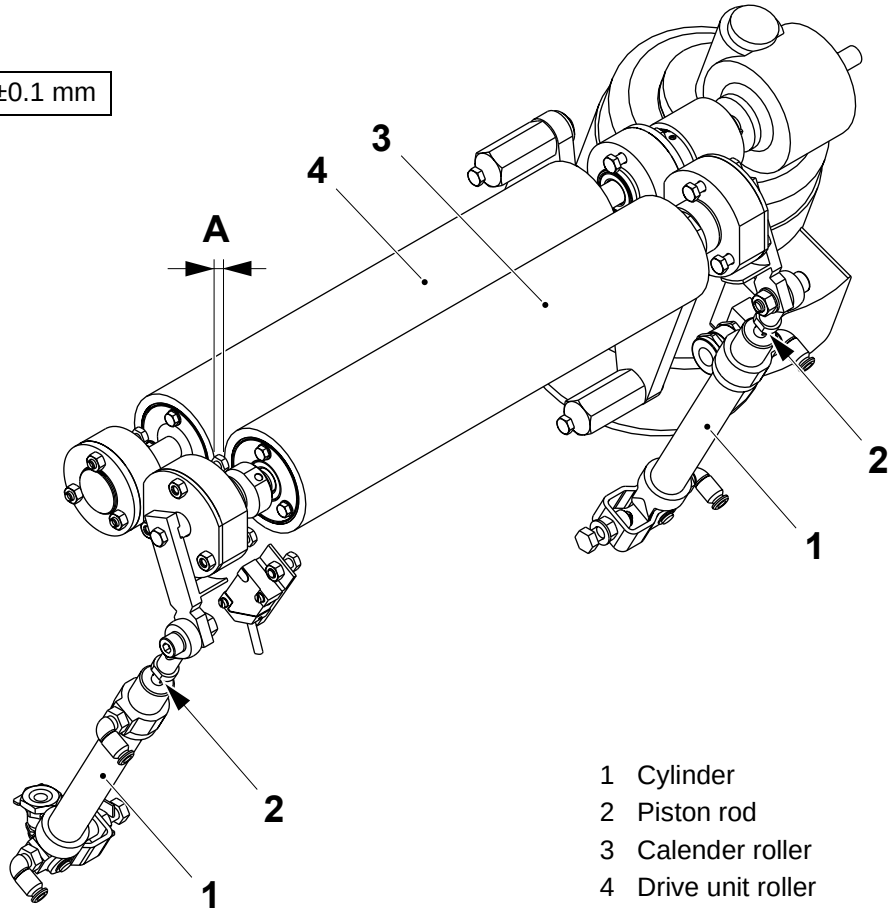
a) Make sure that the valve **Y1502**, located on the superstructure air panel, for the cylinders (1) is deactivated.

b) Check that the piston rod (2) on the cylinders (1) are fully in.

CAUTION
Risk of damage to the equipment.
The calender roller (3) for some volumes and the drive unit roller (4) are made of rubber and can be easily damaged.

c) With the aid of a feeler gauge, adjust the piston rod (2) on both cylinders until the distance **A** between the calender roller (3) and the drive unit roller (4) is obtained.

A = 4.6 ±0.1 mm



1 Cylinder
2 Piston rod
3 Calender roller
4 Drive unit roller

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.14-5 Calender Roller - Set Proximity Switch

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1282884-0200

a) Set the distance between the calender roller and the drive unit roller, see 1.1.14-4 Calender Roller - Set Distance.

b) Activate the valve **Y1502**, located on the superstructure air panel, for the cylinders (1).

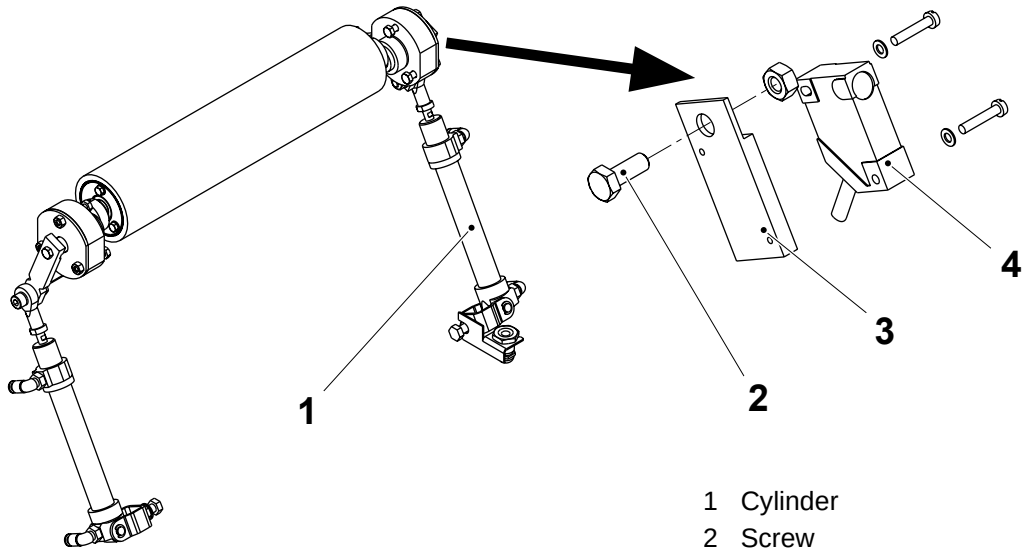
c) Check that the cylinders (1) are extended.

d) Loosen the screw (2) and adjust the angle bracket (3) until the proximity switch (4) LED lights up.

e) Tighten the screw (2).

f) Check once more that the proximity switch (4) LED lights up when the cylinders (1) are extended.

g) Deactivate the valve **Y1502**, located on the superstructure air panel, for the cylinders (1).



1 Cylinder
2 Screw
3 Angle bracket
4 Proximity switch

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1.1.15 Longitudinal Sealing

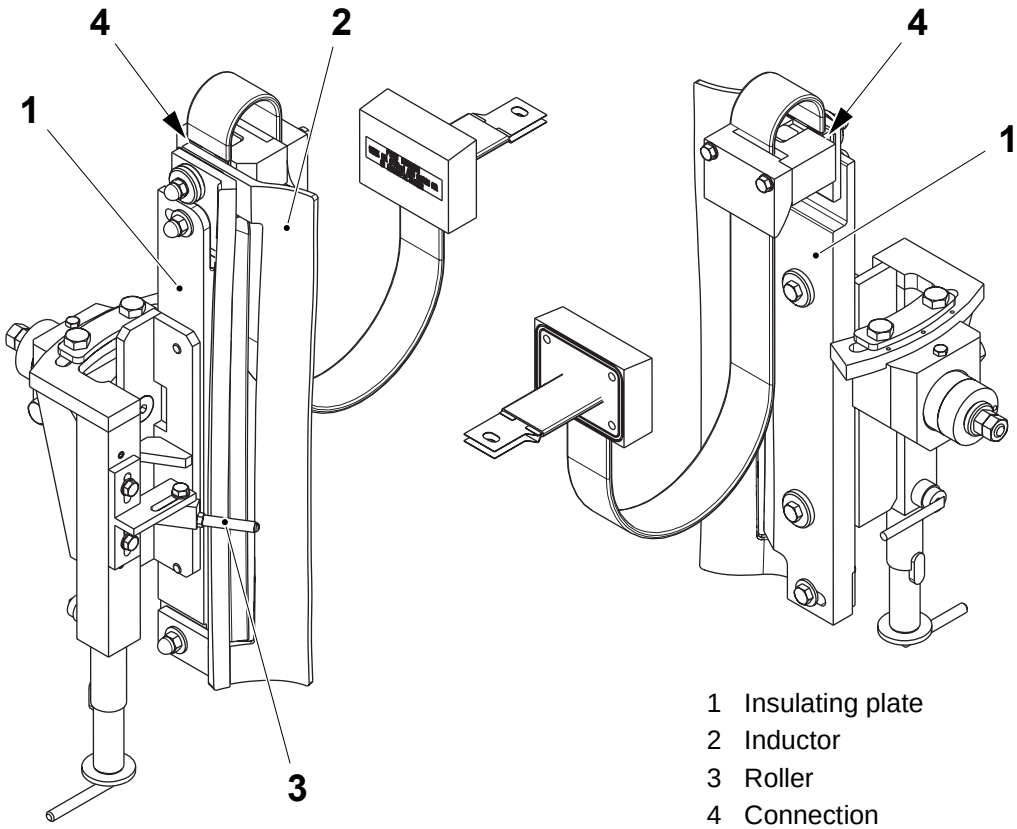
1.1.15-1 Longitudinal Sealing - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095746-0100 2774361-0100

Valid only for TPA 1000 Sq or for Machines Rebuilt with UK-2774361-0100 New LS Support Kit

Check that:

- the inductor (2) is not damaged
- the roller (3) is not damaged
- there are no plastic deposits on the inductor (2) and on the insulating plate (1). Clean as required.
- there are **no fragments or waste** in the cable connection (4). Clean as required.



1 Insulating plate
2 Inductor
3 Roller
4 Connection

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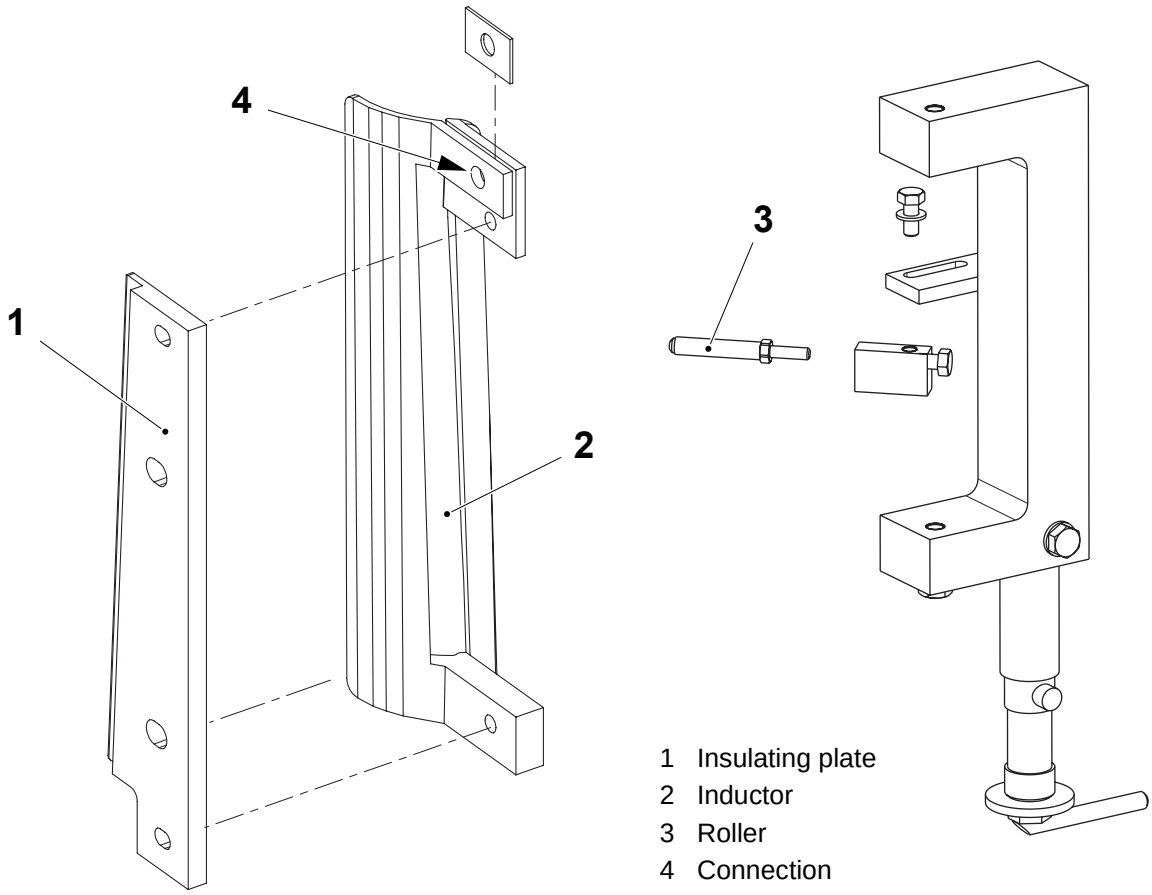
(Cont'd)

(Cont'd)

Valid for Old LS Support

Check that:

- the inductor (2) is not damaged
- the roller (3) is not damaged
- there are no plastic deposits on the inductor (2) and on the insulating plate (1). Clean as required.
- there are **no fragments or waste** in the cable connection (4). Clean as required.



1 Insulating plate
2 Inductor
3 Roller
4 Connection

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.15-2 Longitudinal Sealing - Set Element and Roller Position

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Drill - Ø3 mm
SPC Reference	1095746-0100 2774361-0100

Valid only for TPA 1000 Sq or for Machines Rebuilt with UK-2774361-0100 New LS Support Kit.

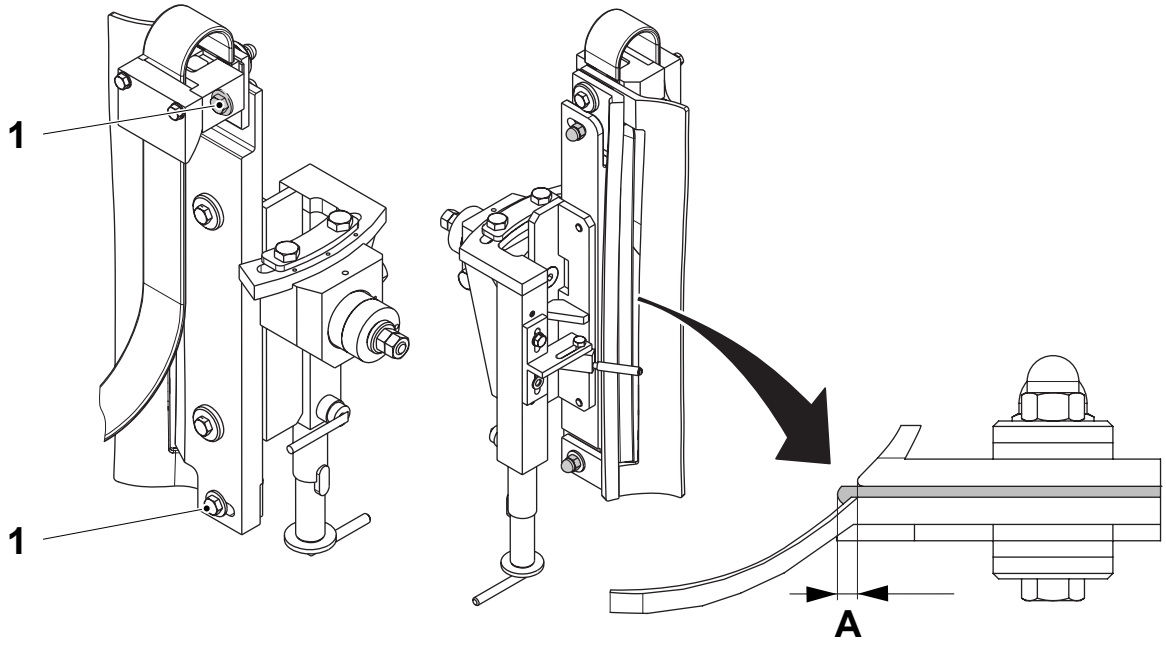
Note! For machines with the old LS support solution, see page 1-91.

Inductor and Return Conductor

a) Make sure that the paper tube is sealed, centred and filled.

Note! The paper tube functions as a reference for all the measures.

b) Set the distance **A** by means of the adjustment screws (1).



A = 1 mm

1 Screw

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(Cont'd)

(Cont'd)

c) Loosen the nuts (2) and the screws (3), (4) and (5).

d) Set the distances **B**, **C** and **D** starting with the distance **B**.

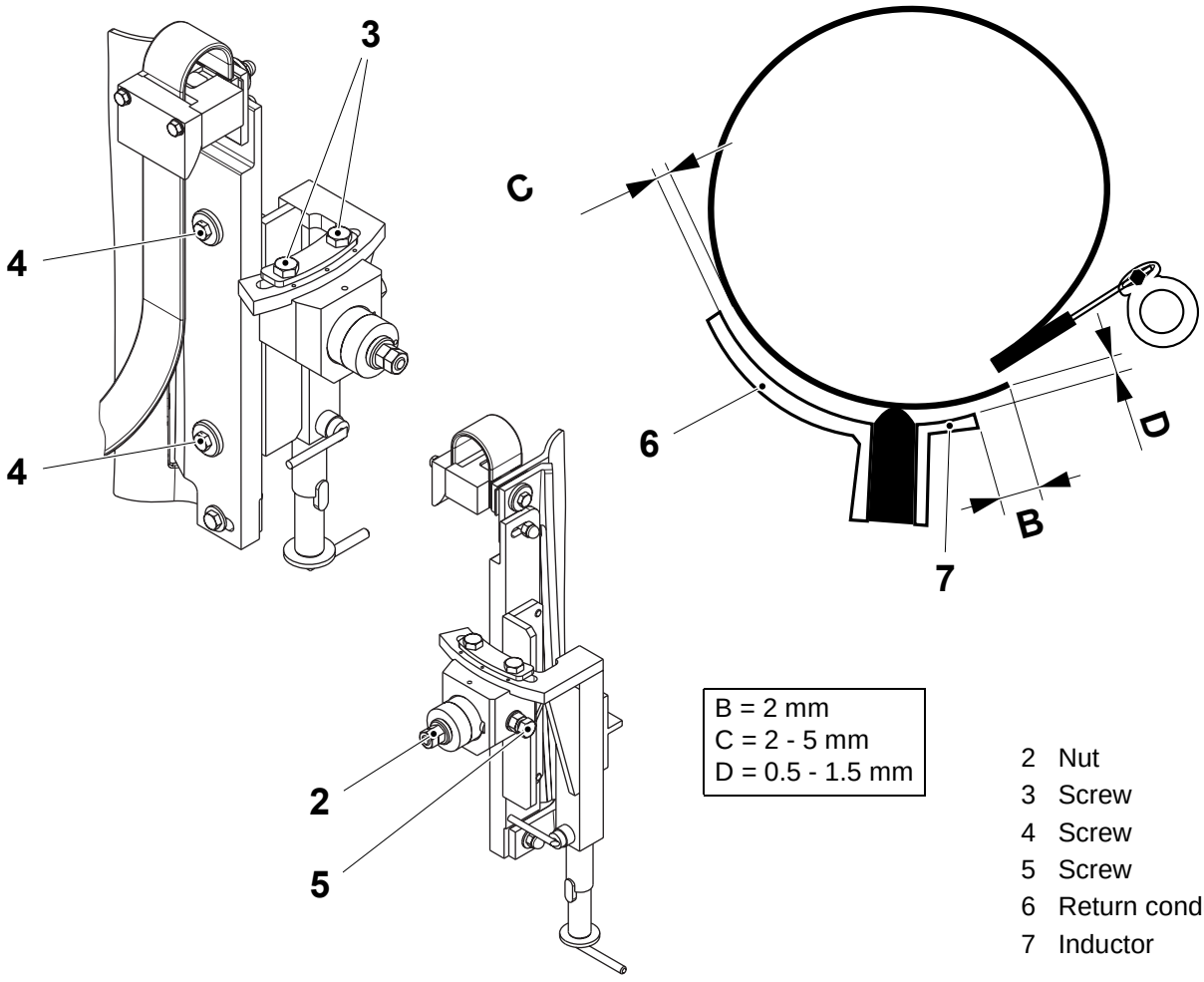
e) Tighten the nuts (2) and the screws (3), (4) and (5).

f) Make sure that the distances **B**, **C** and **D** are the same for the **whole** paper tube length.

Note! The paper tube functions as a reference for all the measures.

Note! It is more important to be within the specified measures for the inductor (7) than for the return conductor (6).

Note! The inductor (7) and return conductor (6) should not touch the paper tube.



B = 2 mm
C = 2 - 5 mm
D = 0.5 - 1.5 mm

2 Nut
3 Screw
4 Screw
5 Screw
6 Return conductor
7 Inductor

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

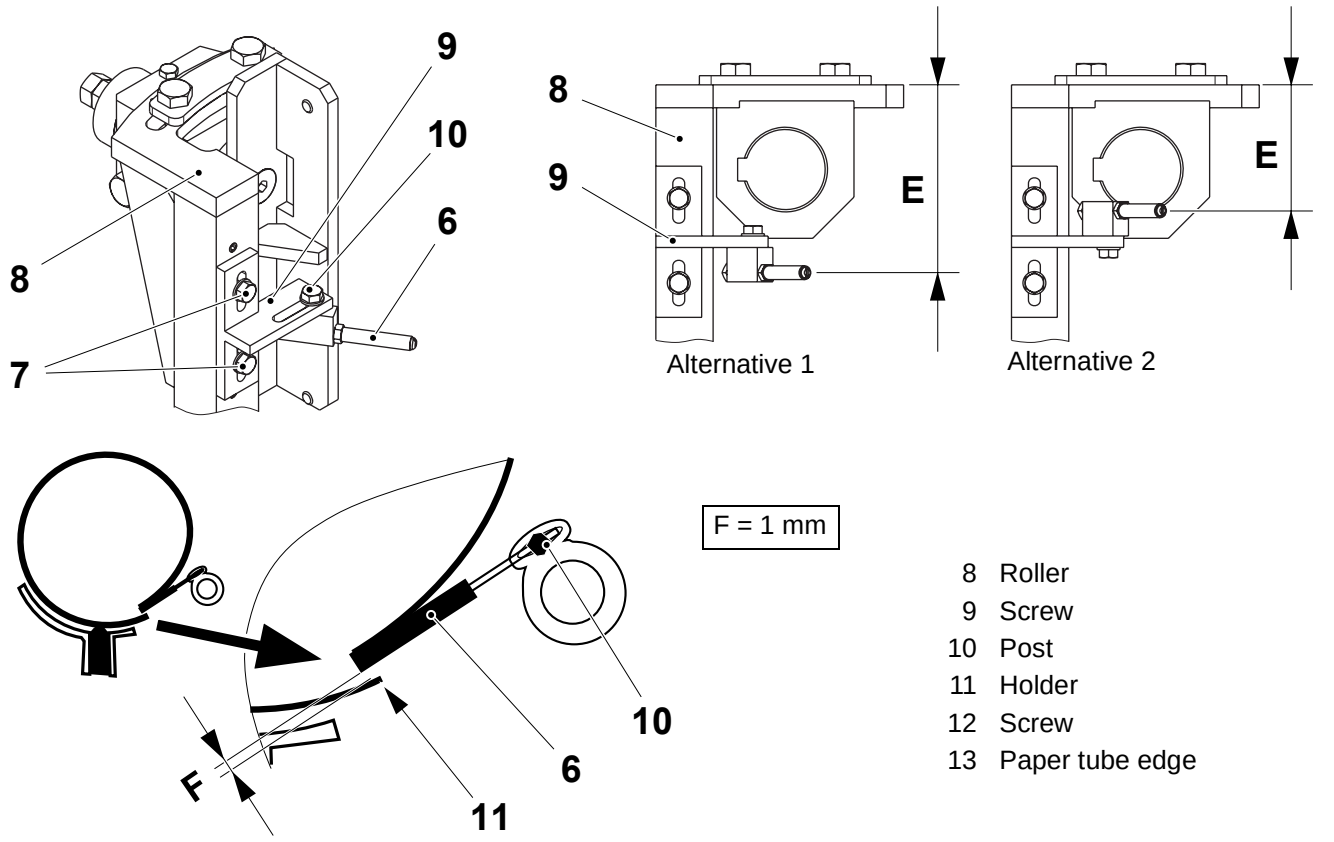
(Cont'd)

Roller

CAUTION
Risk of damage to the equipment.
Do not set the roller (6) too low or there is risk of damaging the paper tube.

a) Loosen the screws (7).
b) Set the distance **E** between the centre of the roller (6) and the top of the post (8) by shifting the holder (9).
c) Tighten the screws (7).
d) Loosen the screw (10) and set the distance **F** between the roller (6) and the paper tubes edge (11).
e) Tighten the screw (10).

Package	E (mm)	Package	E (mm)
1000 B - 1000 S - TPA 1000 S - TPA 330 Sq - 200 S - 250 S - 200 B - 250 B - 500 B - 1500 S	approx. 46	1000 Sq - 500 S - TPA 250 Sq	approx. 73
TPA 500 Sq	approx. 53	330 S - TPA 1000 Sq	approx. 78



F = 1 mm

8 Roller
9 Screw
10 Post
11 Holder
12 Screw
13 Paper tube edge

TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

(Cont'd)

Pin Inductor and Return Conductor

CAUTION
Risk of damage to the equipment.
Make sure to test the LS thoroughly before pinning the inductor and the return conductor in position. If the test results are not satisfactory then do not pin the inductor and the return conductor in position.

Note! Using water as a product will allow the machine to be stepped up again without having to perform CIP.

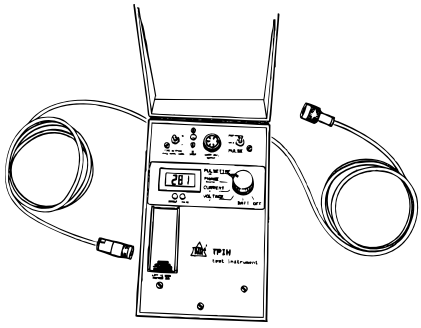
a) Step the machine up to PRODUCTION and run the machine with water as a product.

b) Check the LS according to the Package Checks section in the OM.
   - if the result is incorrect, step the machine down to STEP ZERO and repeat Inductor and Return Conductor on page 1-86
   - if the result is correct, continue with step c).

c) Run the machine in PRODUCTION with a normal product.

d) Check the LS according to the Package Checks section in the OM.
   - if the result is incorrect, step the machine down to STEP ZERO and and perform CIP. Repeat Inductor and Return Conductor on page 1-86
   - if the result is correct, continue with step e).

e) If the TPIH test instrument, TP No. 68462-0101, is available then:
   - connect the TPIH test instrument between the LS transformer and the TPIH generator.
   - run the machine in PRODUCTION with a normal product
   - check that the phase shift beteen the voltage and the current is as close as possible to zero, see 9.1.1-2 TPIH Generator - Check Function. If necessary, adjust the inductor and return conductor to get the optimal combination between the LS sealing and the phase shift.



TPIH test instrument,
TP No. 68462-0101

(Cont'd)

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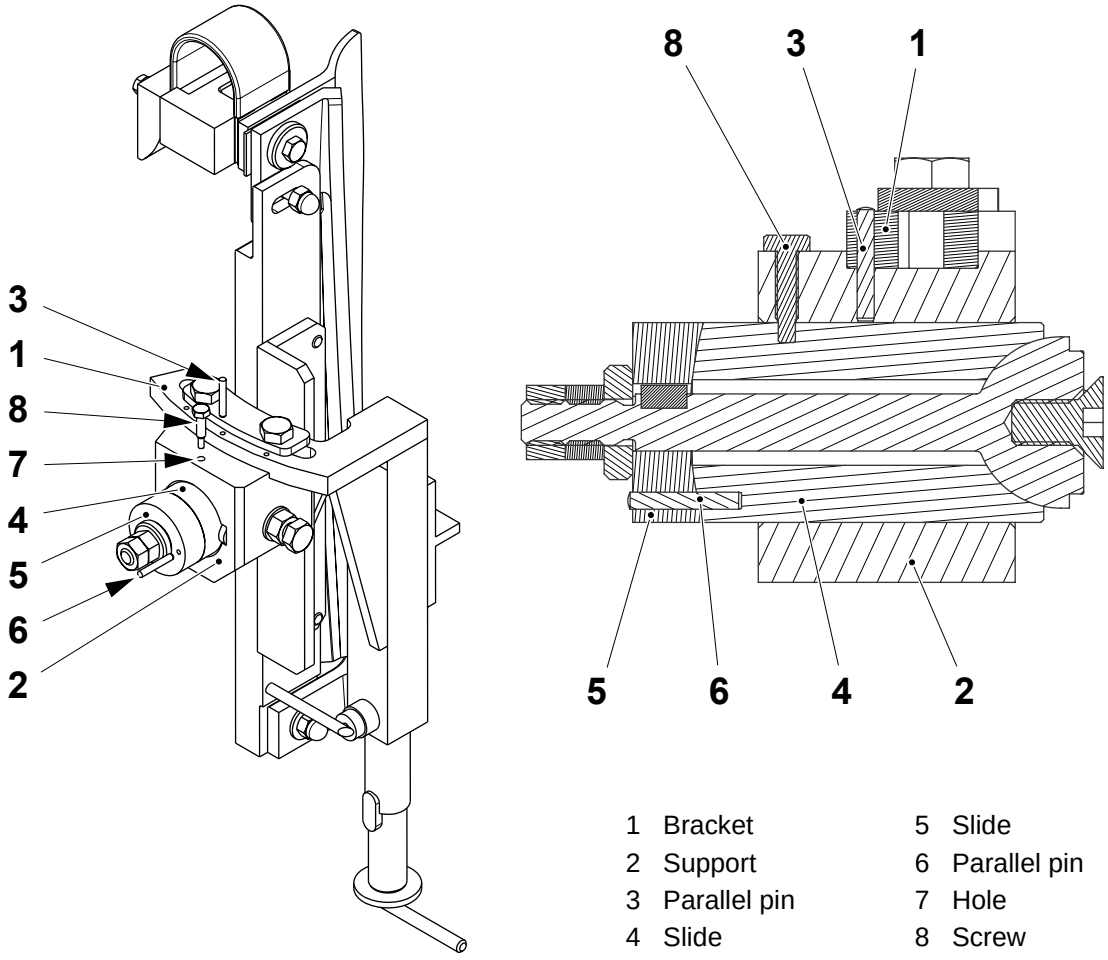
(Cont'd)

f) Drill the bracket (1) and support (2) and pin with the parallel pin (3).

g) Drill the slides (4) and (5) and pin with the parallel pin (6).

CAUTION
Risk of damage to the equipment.
Be careful to not damage the thread when drilling through the threaded hole (7). The depth of the drilled hole must not exceed 4.0 mm.

h) Drill the slide (4) through the threaded hole (7) by means of a drill bit Ø3 mm and fit the screw (8).



1	Bracket	5	Slide
2	Support	6	Parallel pin
3	Parallel pin	7	Hole
4	Slide	8	Screw

(Cont'd)

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(Cont'd)

Valid for Old LS Support

Note! For machines rebuilt with UK-2774361-0100 New LS Support Kit, see page 1-86.

Inductor and return conductor

a) Make sure that the paper tube is sealed, centred and filled.

b) Set the distance **D** by means of the adjustment screws (1).

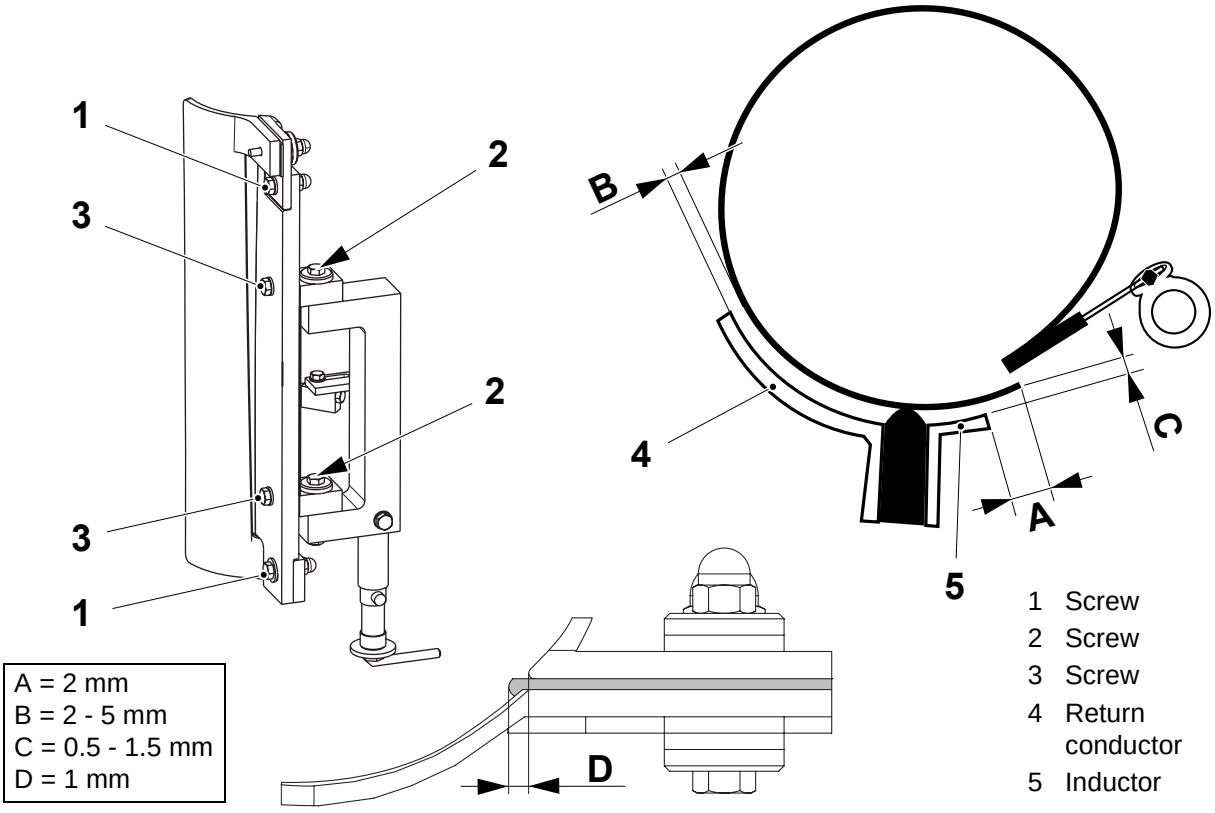
c) Set the distances **A**, **B** and **C** by means of the adjustment screws (2), (3) starting with the distance **A**.

d) Make sure that the distances **A**, **B**, **C** are the same for the **whole** paper tube length.

Note! The paper tube functions as a reference for all the measures.

Note! It is more important to be within the specified measures for the inductor (5) than for the return conductor (4).

Note! The inductor (5) and return conductor (4) should not touch the paper tube.



(Cont'd)

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(Cont'd)

Roller

CAUTION

Risk of damage to the equipment.

Do not set the roller (6) too low or there is risk of damaging the paper tube.

a) Loosen the screws (7).

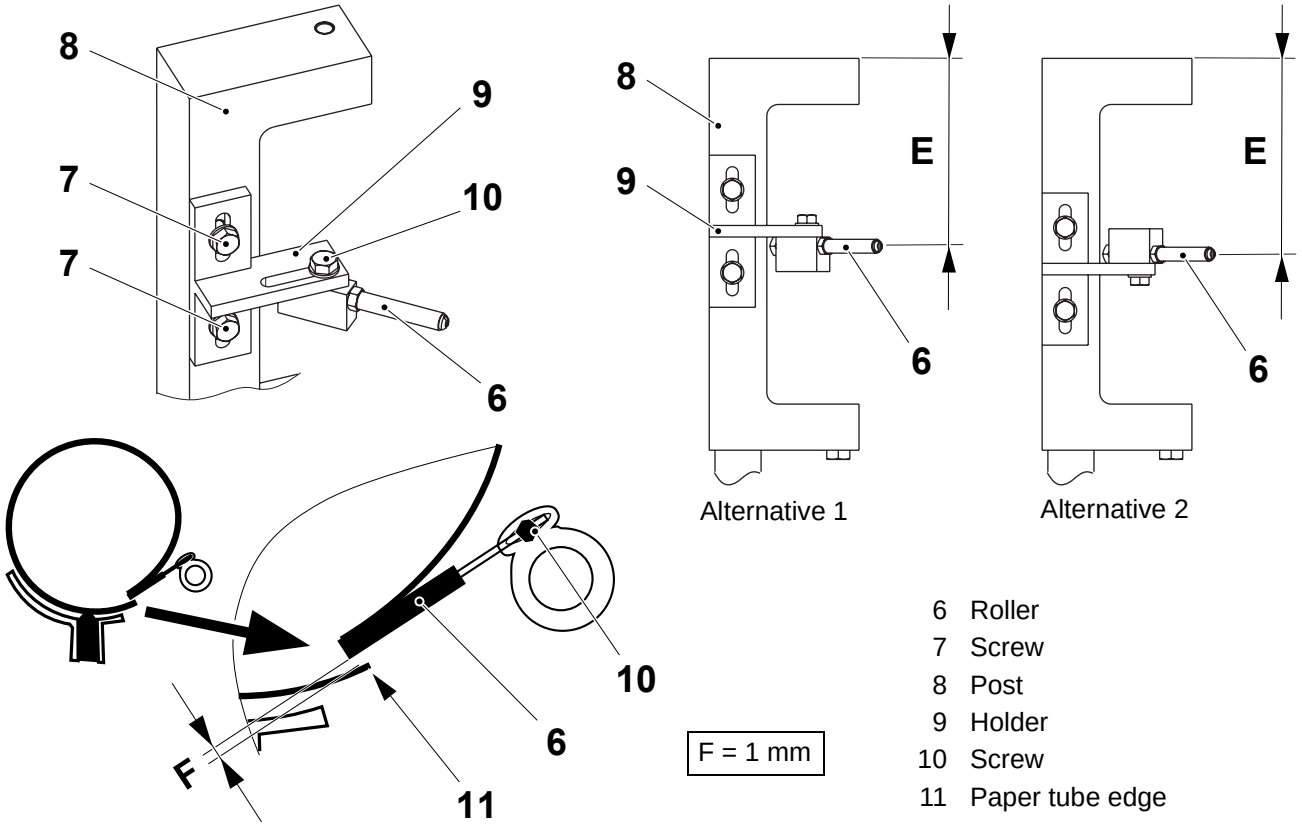
b) Set the distance **E** between the centre of the roller (6) and the top of the post (8) by shifting the holder (9).

c) Tighten the screws (7).

d) Loosen the screw (10) and set the distance **F** between the roller (6) and the paper tubes edge (11).

e) Tighten the screw (10).

Package	E (mm)	Package	E (mm)
1000 B - 1000 S - TPA 1000 S - TPA 330 Sq - 200 S - 250 S - 200 B - 250 B - 500 B - 1500 S	approx. 53	1000 Sq - 500 S - TPA 250 Sq	approx. 80
TPA 500 Sq	approx. 60	330 S	approx. 85



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1.1.16 Spray System

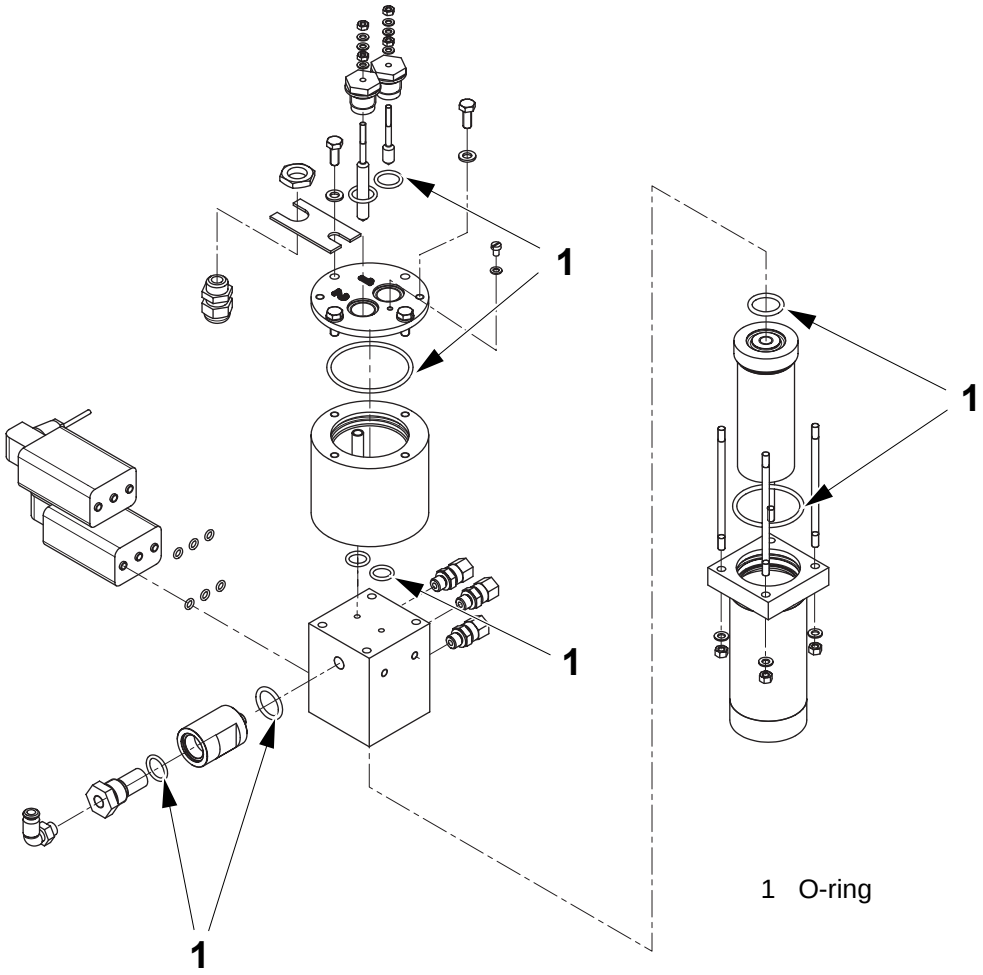
1.1.16-1 Spray System - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095864-0300

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Check for peroxide leakages in the complete spray unit.

Change the O-rings (1) if damaged or worn out.



1 O-ring

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.16-2 Spray System - Clean Peroxide Filter

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095864-0300

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

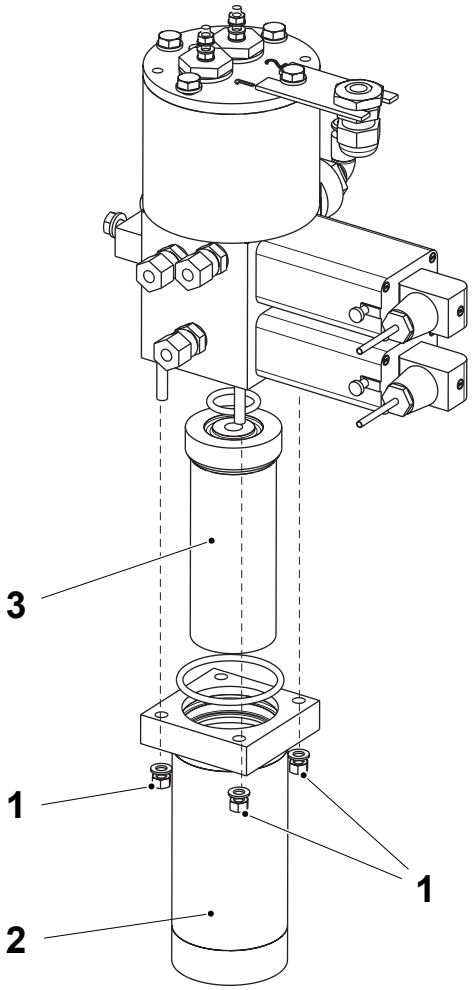
a) Unscrew the four nuts (1) and remove the filter housing (2).

b) Pull out the peroxide filter (3) and rinse it with distilled water. Clean it with compressed air. Rinse the peroxide filter (3) with distilled water.

c) If required change the peroxide filter (3).

d) Fit back the peroxide filter (3) and the filter housing (2).

e) Tighten the nuts (1).



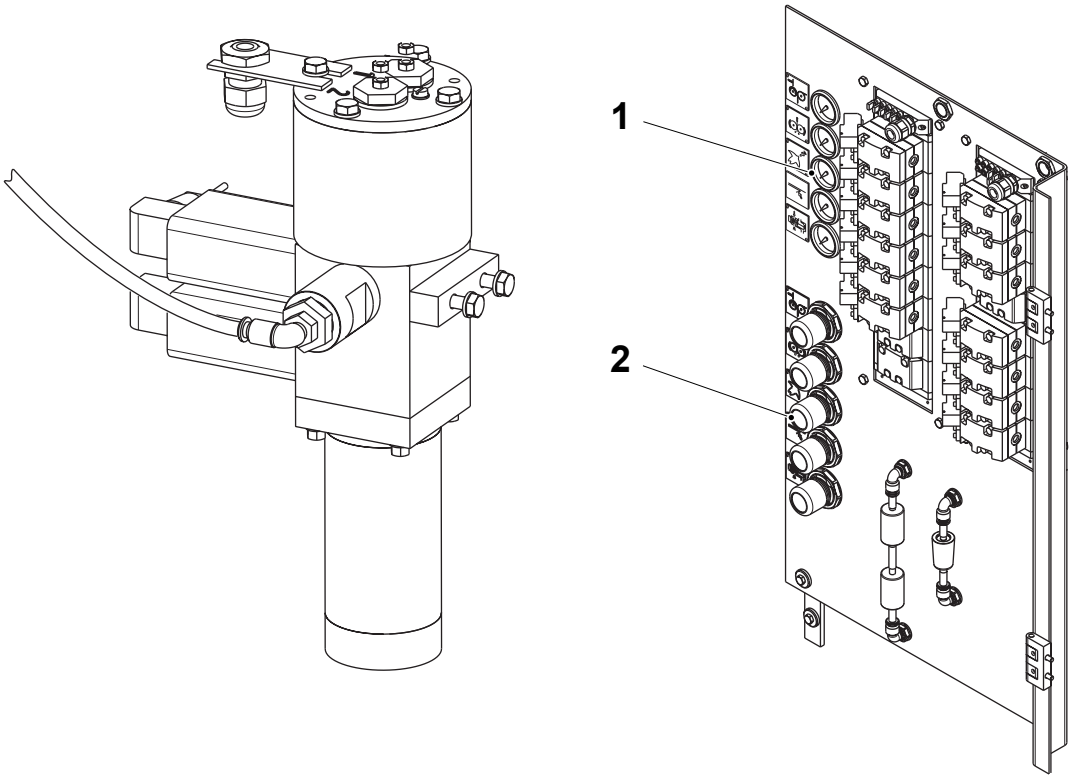
1 Nut
2 Filter housing
3 Peroxide filter

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.16-3 Spray System - Set Pressure

Machine Status	HEAT STERILIZATION
SPC Reference	1095864-0300

Set the air pressure for the spray system according to 10.1 Technical Data, by means of the pressure regulator (2) located on the superstructures air panel. Check the pressure on the pressure gauge (1).



1 Pressure gauge
2 Pressure regulator

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.16-4 Spray System - Clean Filter

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095864-0300

WARNING

Hydrogen peroxide.

Follow the Safety precautions.

a) Disconnect the air pipe (1) from the filter group (2).

b) Remove the filter group (2).

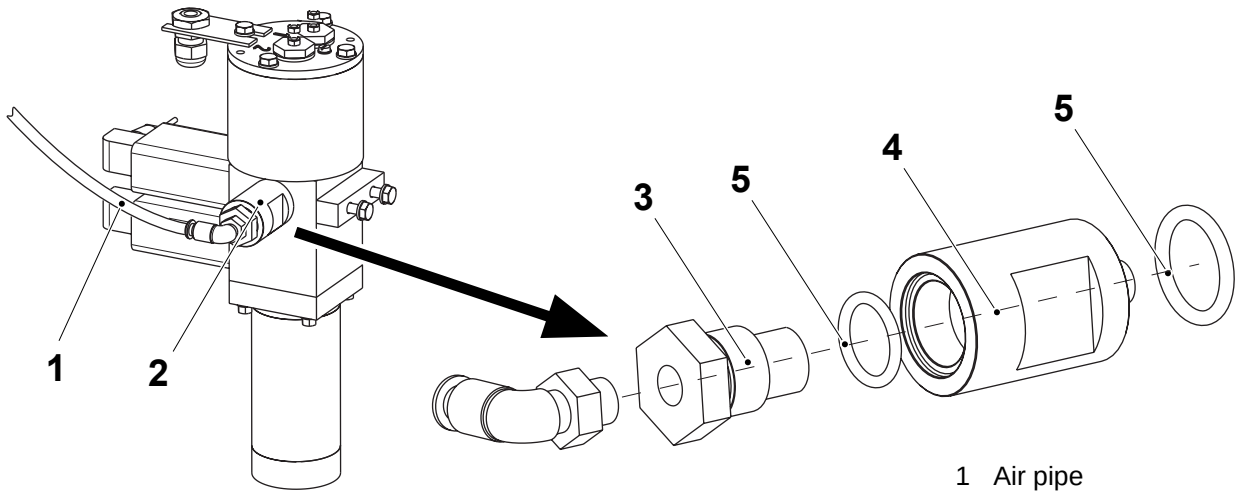
c) Remove the filter (3) from the filter house (4).

d) Clean the filter (3) as required with compressed air. Rinse the filter (3) with distilled water.

e) Check the gaskets (5) for wear or damage and change them as required.

Note! While assembling make sure to fit the gaskets (5) in the proper way.

f) Assemble in the reverse order.



1 Air pipe
2 Filter group
3 Filter
4 Filter house
5 Gasket

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.1.17 Bending Roller

1.1.17-1 Bending Roller - Change

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	577099-0200

WARNING

Hydrogen peroxide.

Follow the Safety precautions.

a) Loosen the nuts (1) and remove the screws (2) on both sides.

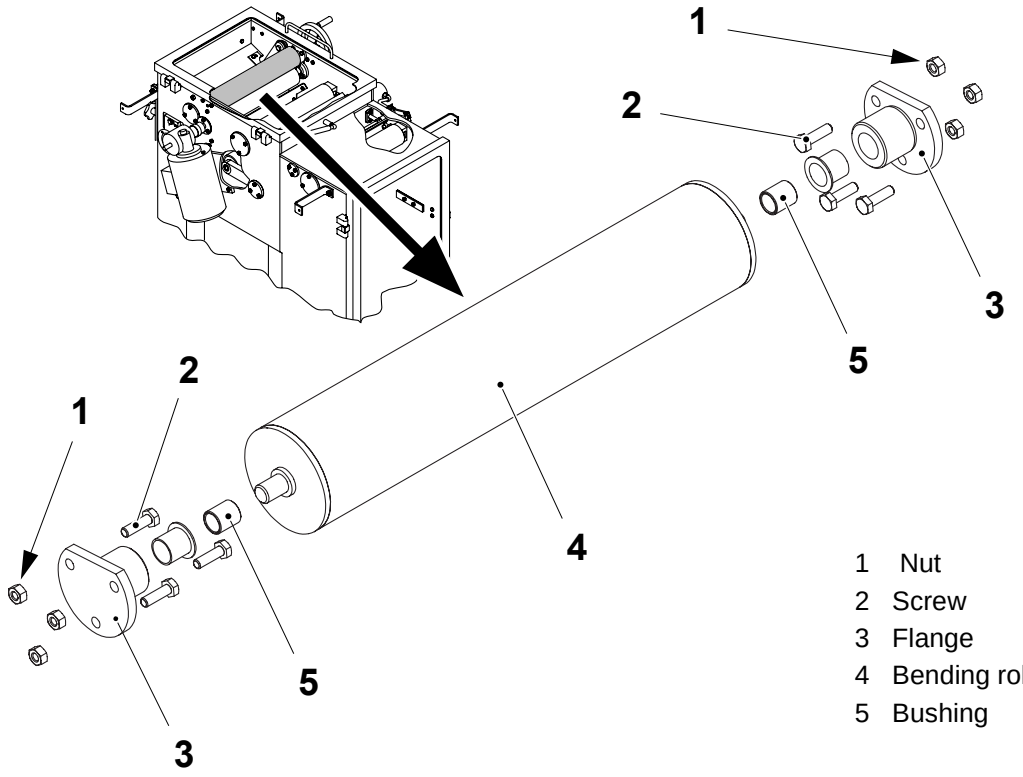
b) Remove the bending roller (4) assembly from its place.

c) Remove the two flanges (3).

d) Remove the bushings (5) and check them for wear and/or damage. Change the bushings (5) as required.

e) Remove the bending roller (4) and check the surface/rotation of the roller (4).

f) Change the bending roller (4).



1 Nut
2 Screw
3 Flange
4 Bending roller
5 Bushing

(Cont'd)

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(Cont'd)

Valid for TPA 1000 Sq only

a) Loosen the nuts (1) and remove the screws (2) on both sides.

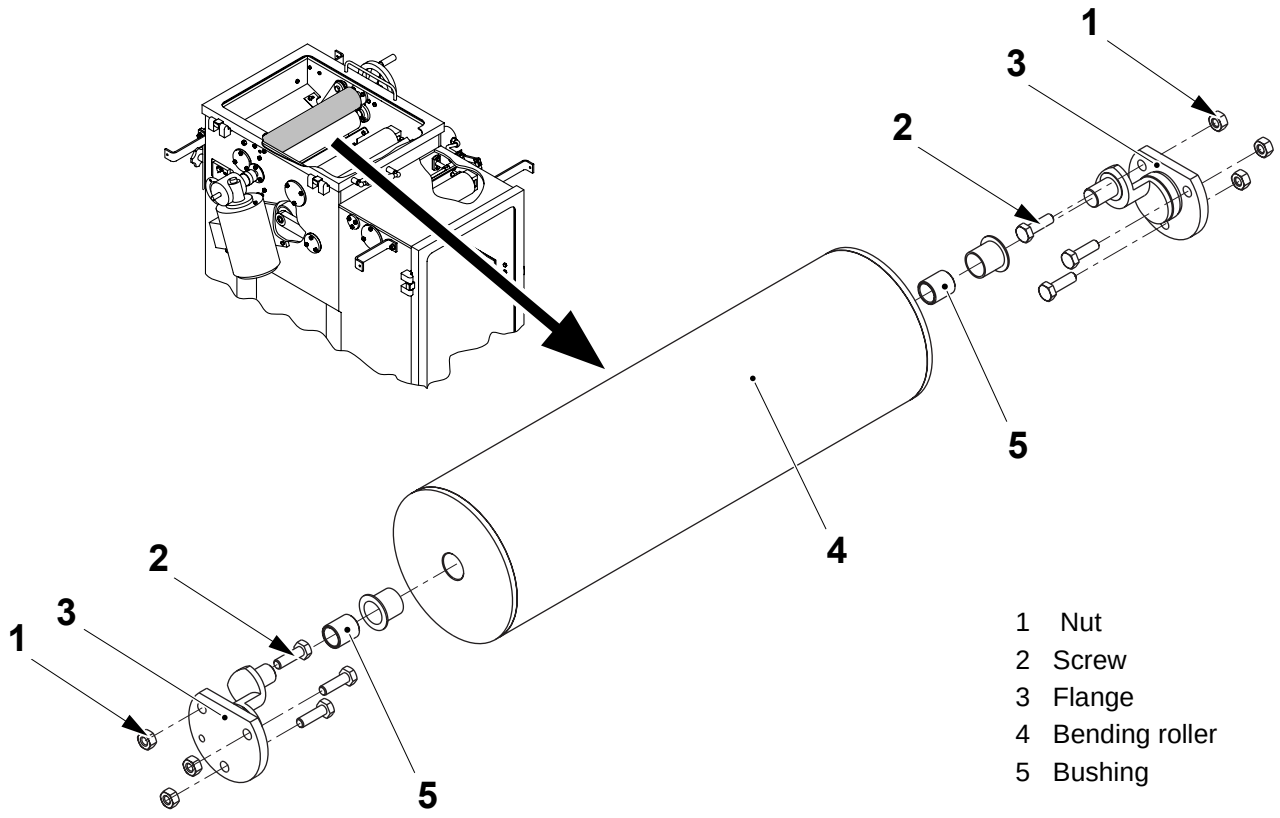
b) Remove the bending roller (4) assembly from its place.

c) Remove the two flanges (3).

d) Remove the bushings (5) and check them for wear and/or damage. Change the bushings (5) as required.

e) Remove the bending roller (4) and check the surface/rotation of the roller (4).

f) Change the bending roller (4).



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1.2 Sterile Air System

SPC Reference	1095755-0200

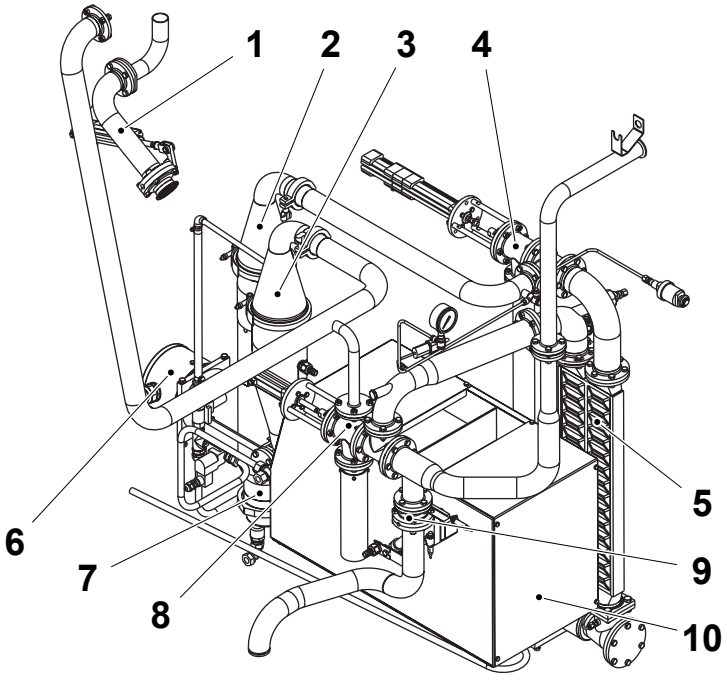
1.2-1 Sterile Air System - Check Leakages

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095755-0200

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Check the connections for air leakages at the following points:

- the valve reference point (1)
- the separator (2)
- the scrubber (3)
- the valve heat exchanger (4)
- the heat exchanger (5)
- the air superheater (6)
- the pressure regulator (7)
- the air valve (8)
- the butterfly valve (9)
- the compressor unit (10).



1 Valve reference point
2 Separator
3 Scrubber
4 Valve heat exchanger
5 Heat exchanger
6 Air superheater
7 Pressure regulator
8 Air valve
9 Butterfly valve
10 Compressor unit

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1.2.1 Air Super Heater

1.2.1-1 Air Super Heater - Check

Machine Status	HEAT STERILIZATION
SPC Reference	996478-0200

WARNING

Risk of burns.

Follow the Safety precautions.

Make sure that the air superheater (1) temperature reaches **360 °C**. Check the temperature on the TPOP panel and set it as required, see 10.1 Technical Data.

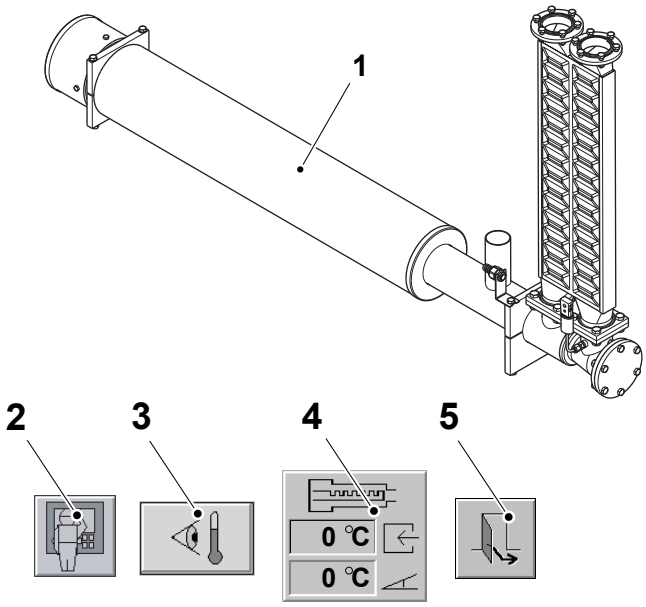
a) Touch the MANOEUVRE SYSTEM button (2) on the TPOP display.

b) Touch the OVERVIEW OF TEMPERATURE MONITORS/ REGULATORS button (3).

c) Check the indication on the Air super heater display (4).

d) Touch the EXIT button (5) to close the window.

Check the temperature on the TPOP panel and set it as required, see 10.1 Technical Data.



1 Air super heater
2 MANOEUVRE SYSTEM button
3 OVERVIEW OF TEMPERATURE MONITORS/REGULATORS button
4 Air super heater display
5 EXIT button

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.2.1-2 Air Super Heater - Check Heat Exchanger Air Tightness

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lime scale removal acid
Special Equipment	Blank-off flange TP No. 1348263 Hydrostatic test TP No. 565536 Flange TP No. 979951
SPC Reference	996478-0200

WARNING

Risk of burns.

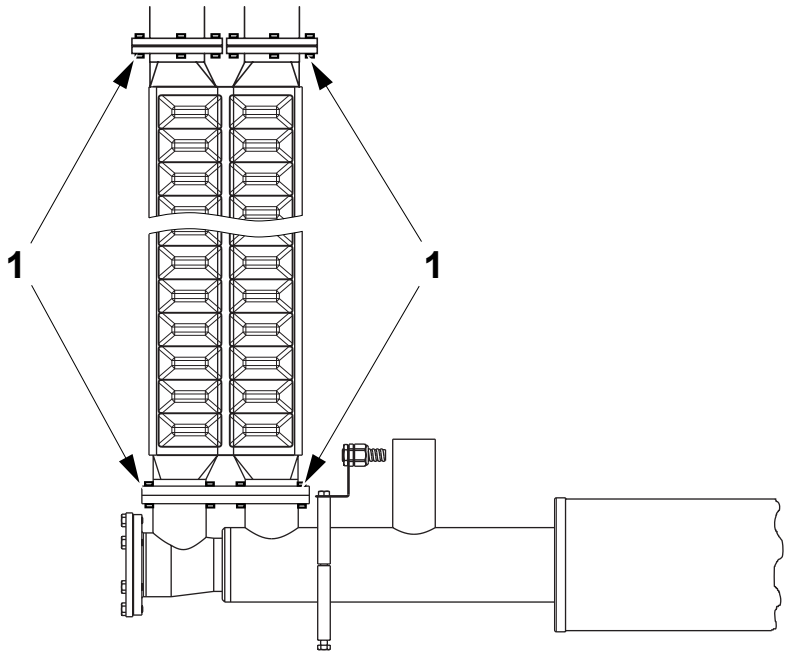
Follow the Safety precautions.

a) Remove the twelve screws (1) from the upper flanges and the eight screws (1) from the lower flanges.

b) Remove the heat exchanger from the machine.

c) If the temperature of the top aseptic chamber exceeds **95 °C** during PRODUCTION, remove the lime scale from the heat exchanger with one of the four acid solutions listed on the next page.

Note! All solutions must be at ambient temperature during lime scale removal.



1 Screw

(Cont'd)

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(Cont'd)

WARNING
Chemical products.
Acids. Follow the Safety precautions.

WARNING
Chemical products.
Only use the acids listed below and do **not** use hydrochloric acid (HCl).

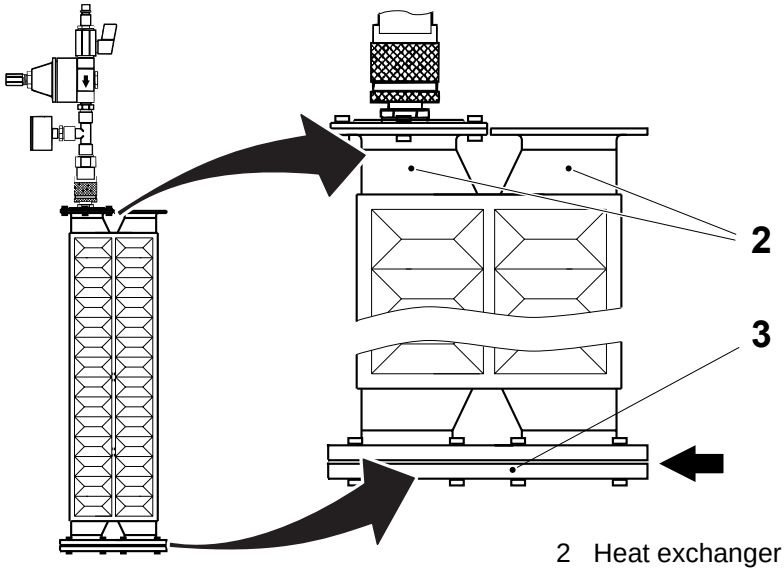
- acetic acid (CH_3COOH), 20%
- nitric acid (HNO_3), 5-10%
- citric acid ($C_6H_8O_7$), 20%
- phosphoric acid (H_3PO_4), 5-10%

  After lime scale removal flush with water and the last rinse is done with softened or distilled water.

d) Check the heat exchanger for leaks as described below.

e) Plug one of the heat exchanger connections by means of blank-off flange (3) (TP No. 1348263).

f) Connect the hydrostatic test equipment (TP No. 565536-0101) with the flange (TP No. 979951), to one of the heat exchanger connection (2).



2 Heat exchanger connection
3 Blank-off flange

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

Note! Make sure that the equipment is connected in the correct direction. The flow must run **from** the valve (5) **towards** the pressure gauge (8) in the direction of the arrow.

CAUTION
Risk of damage to the equipment.
Before turning on the compressed air, turn the adjustment screw (7) anti-clockwise until the spring load is released and close the valve (5).

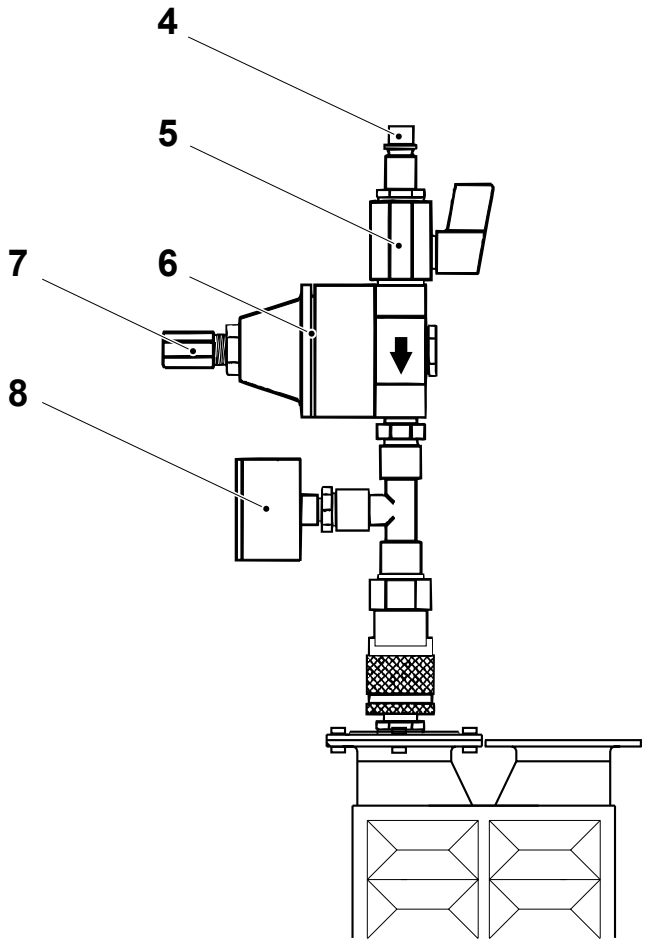
g) Connect the compressed air connection (4).

h) Submerge the whole heat exchanger in water. Take care **not** to drench the pressure controller (6). Let the air bubbles disappear.

i) Open the valve (5). Adjust the pressure to **50 kPa (0.5 bar)** on the pressure gauge (8), by means of the adjustment screw (7). Air bubbles will immediately show any leakage points in the heat exchanger.

j) Repeat the procedure with the other cooling coil (other connections).

k) If leakage is suspected, change the heat exchanger.



4 Compressed air connection
5 Valve
6 Pressure controller
7 Adjustment screw
8 Pressure gauge

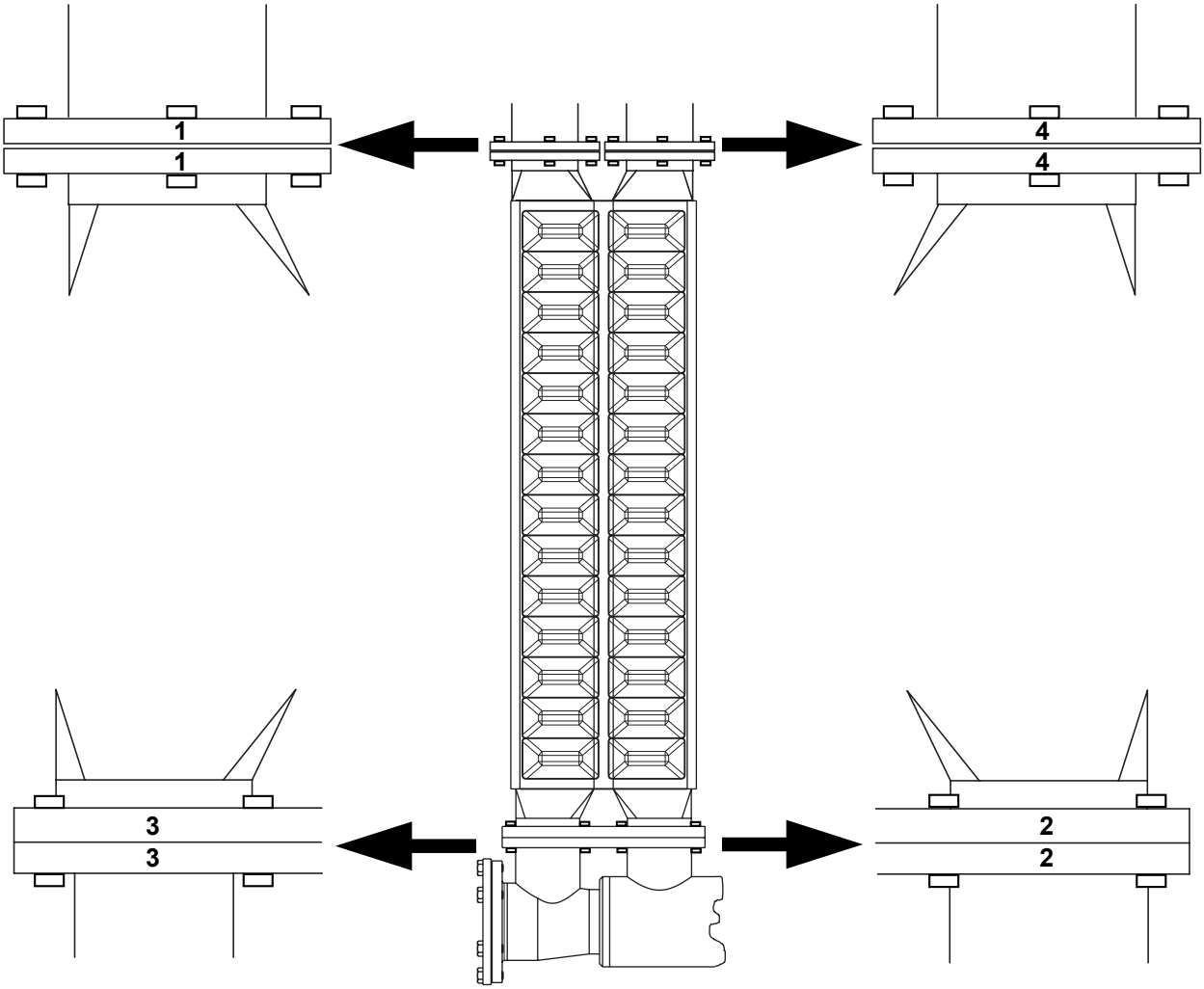
(Cont'd)

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(Cont'd)

l) Change the joint gaskets.

m) Fit the heat exchanger on to the machine. Make sure that the numbers on the heat exchanger flanges correspond with those on the pipes.



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1.2.2 Compressor Unit

1.2.2-1 Compressor Unit - Check Pressure

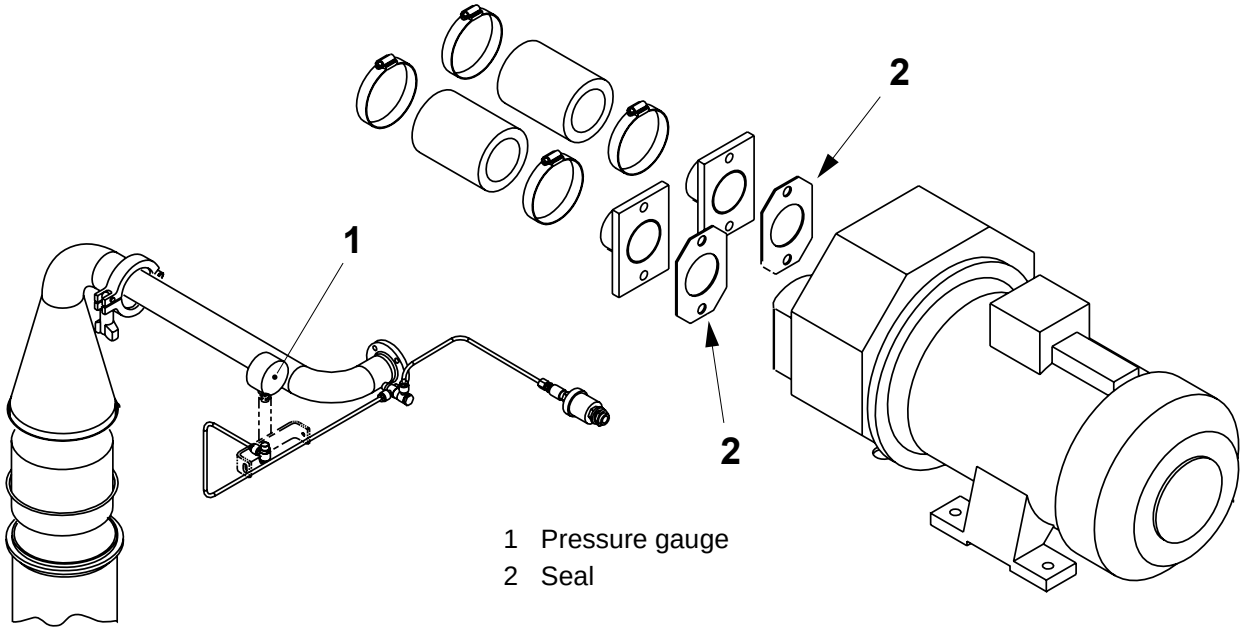
Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	996475-0200

WARNING
Risk of burns.
Follow the Safety precautions.

a) Check that the pressure gauge (1) of the water separator indicates more than **30 kPa (0.30 bar)**.
   - Too high pressure may be due to a blockage somewhere in the air system.
   - Too low pressure may be due to a leak in the air system, a blocked filter in the suction pipes, or insufficient compressor capacity.

b) If checks according to steps above have been carried out, but the prescribed pressure cannot be reached, change the pressure gauge (1) or change the seals (2) according to 1.2.2-3 Compressor - Change Seals.

Note! Only for **60 Hz** machines.
The pressure is adjusted by means of a by-pass throttle.
See also 1.2.9-1 Pressure Regulator (60 Hz) - Set.



1 Pressure gauge
2 Seal

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1.2.2-2 Compressor Unit - Check For Leaks and Vibrations

Machine Status	HEAT STERILIZATION
SPC Reference	996475-0200

WARNING

Risk of burns.

Follow the Safety precautions.

a) Remove the compressor cover.

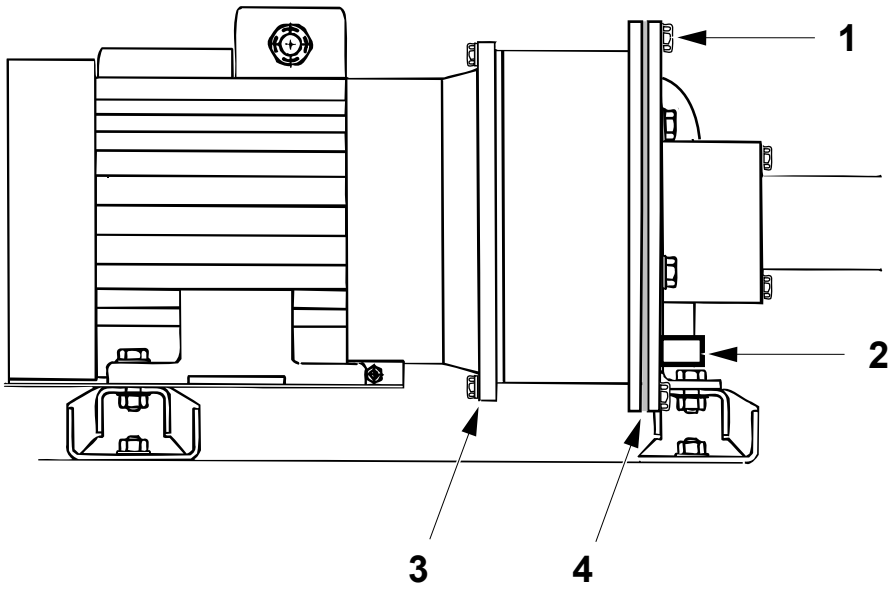
b) Check that the compressor is running without any abnormal noises. Abnormal noise may be caused by dirt. If required,
   - step down to ZERO
   - remove the drain plug (2)
   - flush the compressor with water to clean it.

c) Step down to ZERO.

d) Check the gasket (3) for leaks. Change the axial seals as required, see 1.2.2-3 Compressor - Change Seals.

e) Check the gasket (4) for leaks. Remove the screws (1) and change the joint gasket as required.

f) Fit back the compressor cover.



1 Screw
2 Plug
3 Gasket
4 Gasket

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1.2.2-3 Compressor - Change Seals

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Extractor TP No. 74305-101
SPC Reference	996475-0200

WARNING

Risk of burns.

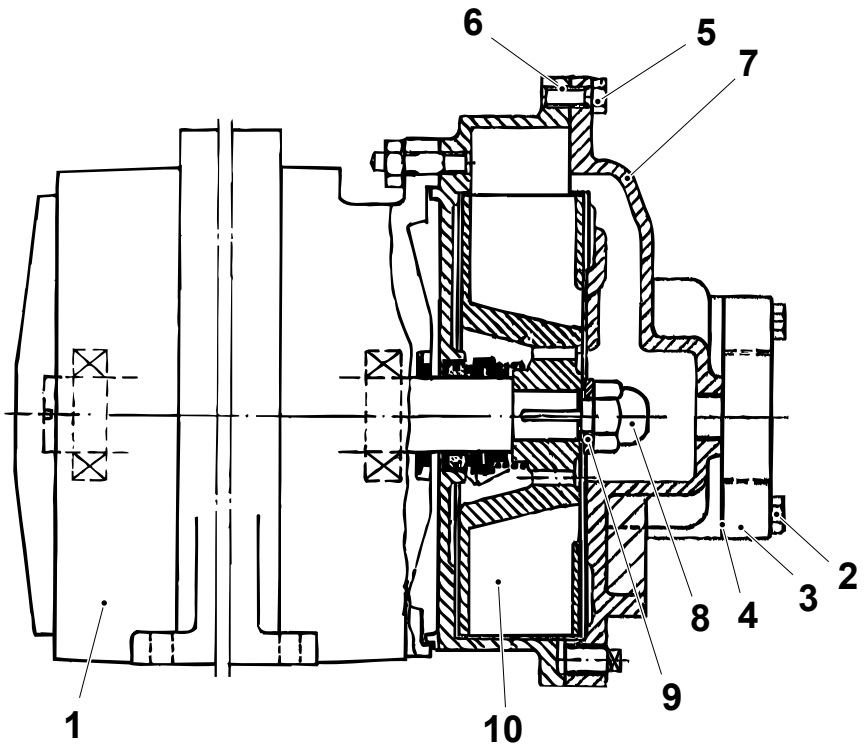
Follow the Safety precautions.

a) Remove the screws (2), the inlet and outlet flanges (3) and the gasket (4) from the compressor (1).

b) Remove the screws (5), the gasket (6) and the end cover (7).

c) With the aid of an extractor (TP No.V3-74305-0101), remove the locking nut (8), the washer (9), and the rotor (10).

Note! There are two holes in the rotor for the extractor.



1 Compressor
2 Screw
3 Flange
4 Gasket
5 Screw
6 Gasket
7 End cover
8 Locking nut
9 Washer
10 Rotor

(Cont'd)

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(Cont'd)

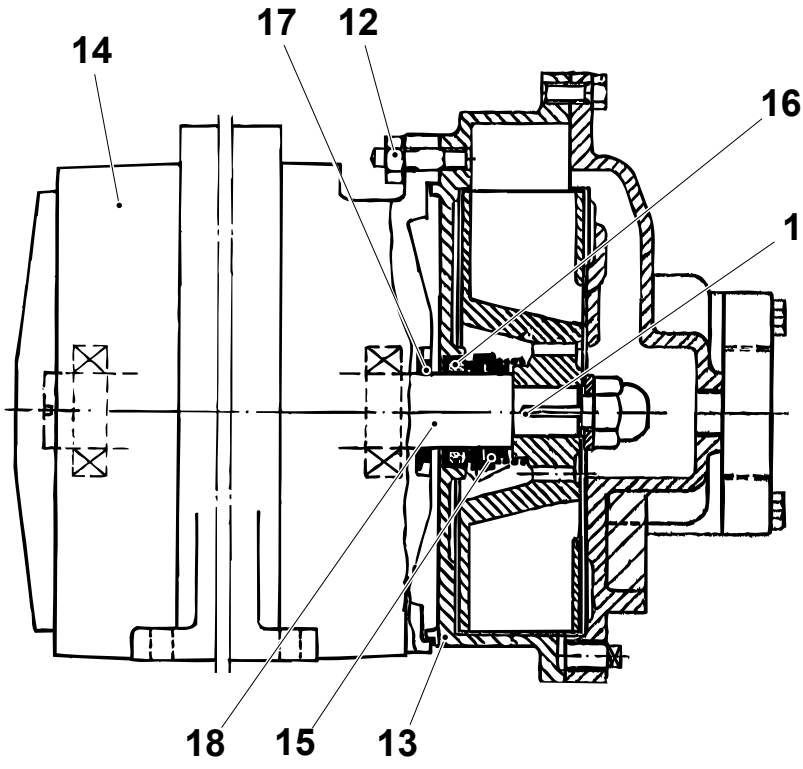
d) Remove the rotor key (11).

e) Remove the nuts (12) and separate the pump housing (13) from the motor (14). The mechanical shaft seal (15) will then come away with the pump housing (13) when it is detached. Take care not to damage the ceramic sealing surfaces when removing the pump housing (13).

f) Remove the fixed sealing section (16) from the pump housing (13) by applying an even pressure from the motor side and fit the new one using a thin film of oil on the rubber sleeve.

CAUTION
Risk of damage to the equipment.
Do not put grease on the sealing surfaces.

g) Fit the water deflector ring (17) on the motor shaft (18).



11 Rotor key
12 Nut
13 Pump housing
14 Motor
15 Shaft seal
16 Fixed sealing
17 Deflector ring
18 Shaft

(Cont'd)

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(Cont'd)

h) Mount the pump housing (13) against the motor (14).

i) Fit the rotating seal (19) on the motor shaft (18). Fit the coil spring (20).

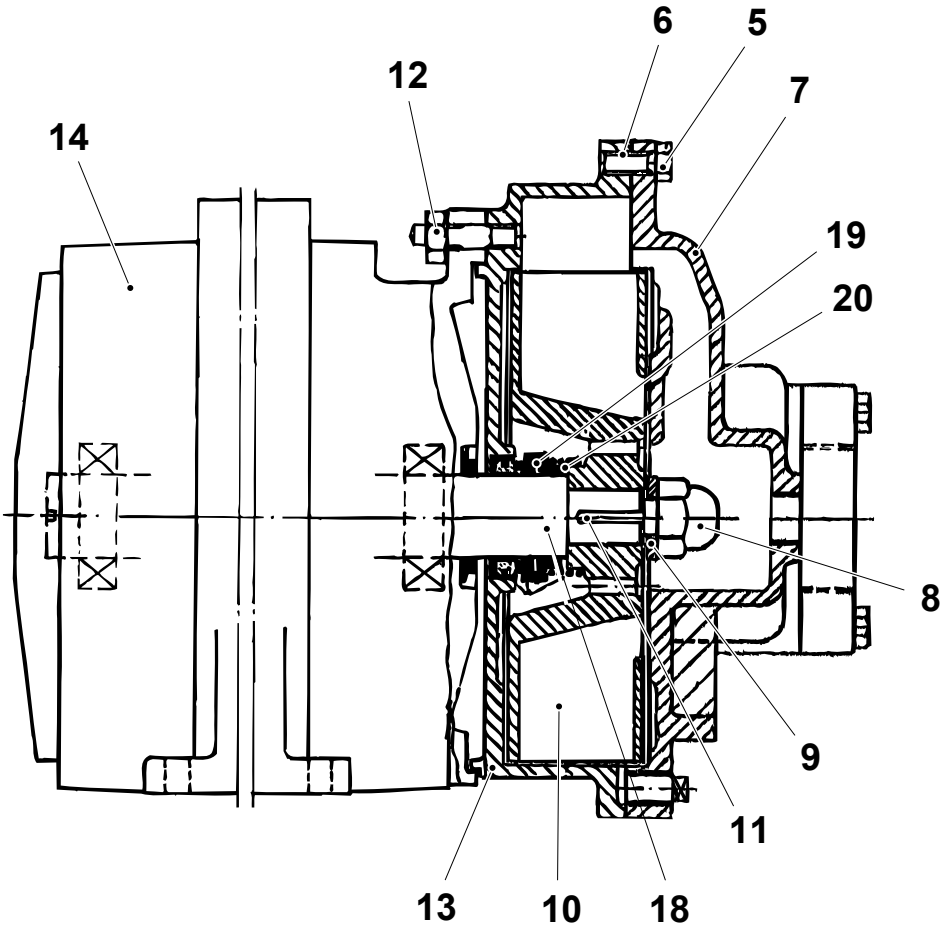
j) Place the rotor key (11) in the shaft (18).

k) Fit the rotor (10).

l) Fit the washer (9) and locking nut (8) on to the shaft and tighten properly.

m) Put the compressor housing gasket (6) in to place. Fit the end cover (7) by means of the screws (5).

Note! Remove the nuts (12) before tightening the end cover screws (5).



5 Screw
6 Gasket
7 End cover
8 Locking nut
9 Washer
10 Rotor
11 Rotor key
12 Nut
13 Pump housing
14 Motor
18 Shaft
19 Rotating seal
20 Coil spring

(Cont'd)

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(Cont'd)

n) Fit the shims (21) at the screws (22). Shim thickness as follows: Measure the gap **A** on the screws (22) with the nuts (12) loosened. Add **0.1 - 0.2 mm** to the average value of the gap **A**.

o) Tighten the nuts (12).

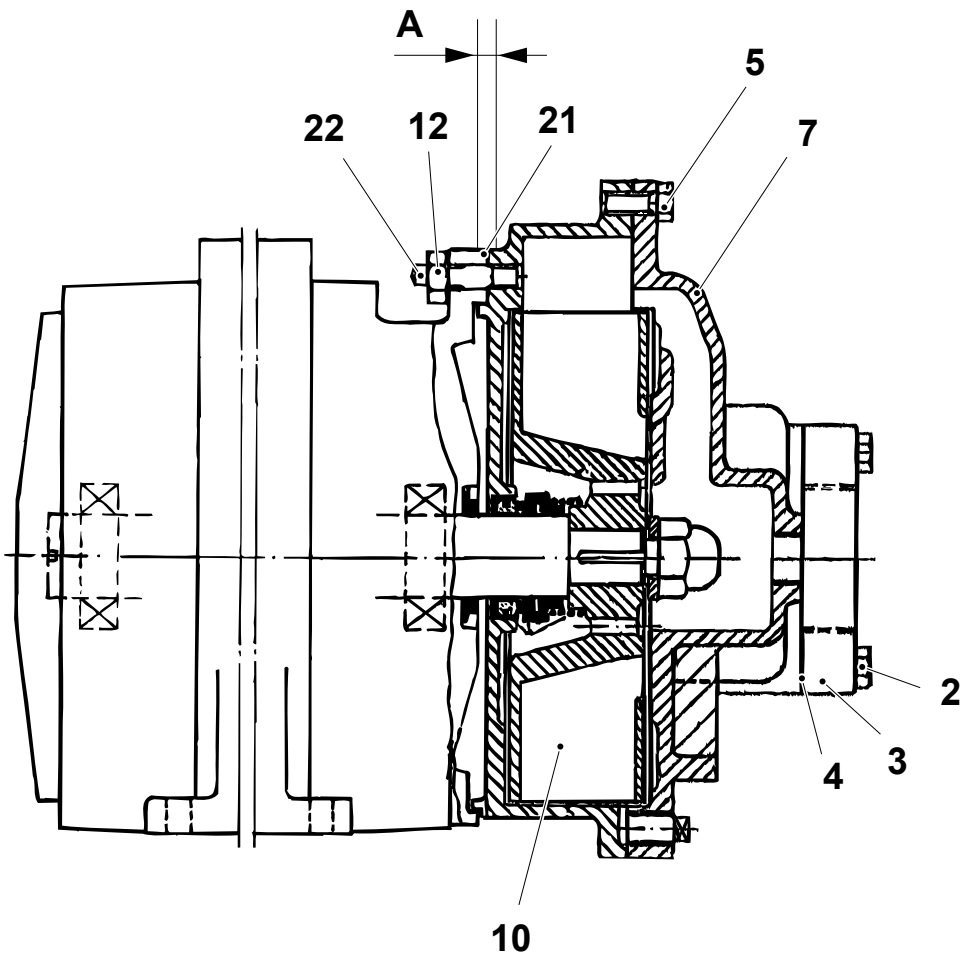
p) Check that the gap between the rotor (10) and the end cover (7) is approximately **0.1 mm** by inserting a feeler gauge through the inlet or outlet pipe.

q) Loosen the screws (5) again. Position the end cover (7) in to the centre. Tighten the screws (5).

r) Check that the rotor (10) does not come in contact with the cover (7) when turned (turn by the motor fan).

s) Fit the inlet and outlet flanges (3) and the gasket (4) with the screws (2).

t) Check once more that the rotor (10) rotates freely.



2 Screw
3 Flange
4 Gasket
5 Screw
7 End cover
10 Rotor
12 Nut
21 Shims
22 Screw

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1.2.3 Heat Exchanger Valve

1.2.3-1 Heat Exchanger Valve - Overhaul

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Torque wrench min. 50 Nm
SPC Reference	996477-0100

WARNING

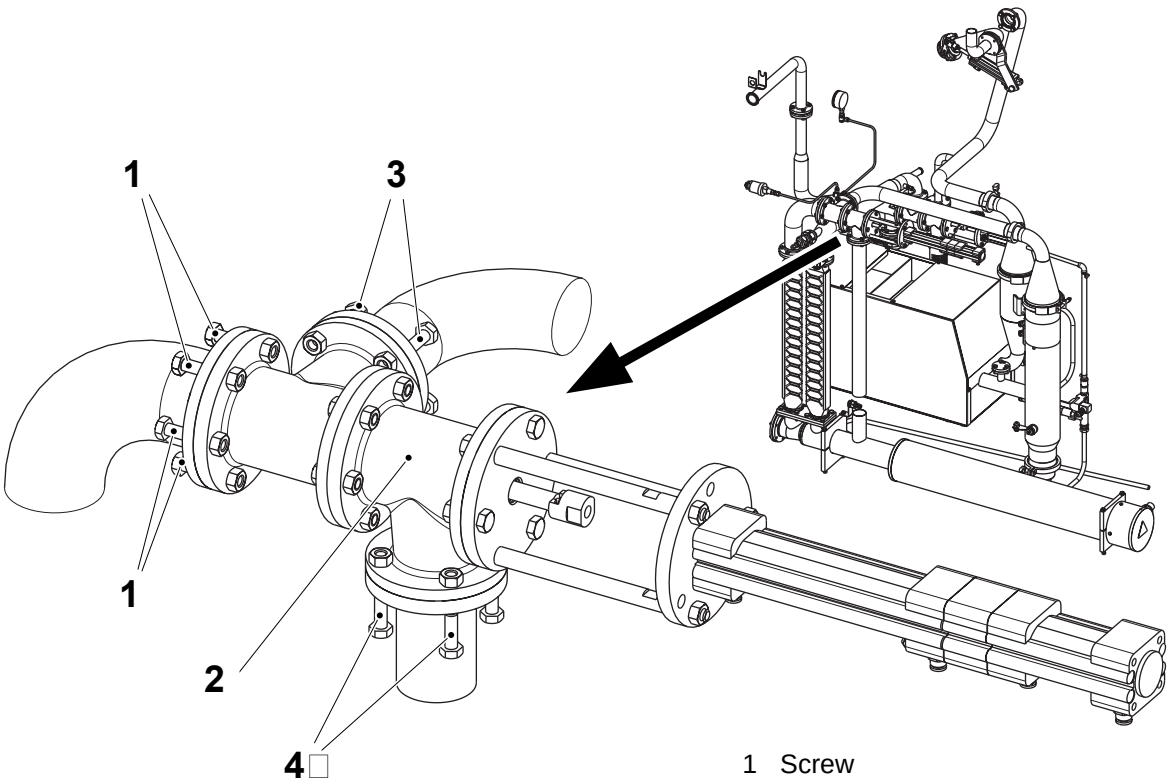
Risk of burns.

Follow the Safety precautions.

a) Remove the six screws (1) and nuts securing the flange to the heat exchanger valve (2).

b) Remove the four screws (3) and nuts securing the flange to the heat exchanger valve (2).

c) Remove the four screws (4) and nuts securing the flange to the heat exchanger valve (2).



1 Screw
2 Heat exchanger valve
3 Screw
4 Screw

(Cont'd)

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(Cont'd)

d) Change the gaskets (5), (6) and (7).

e) Remove the screws (8) and change the gasket (9).

f) Remove the valve cone (10) and change the seal rings (11) and (12).

g) Remove the screws (13) and change the gasket (14).

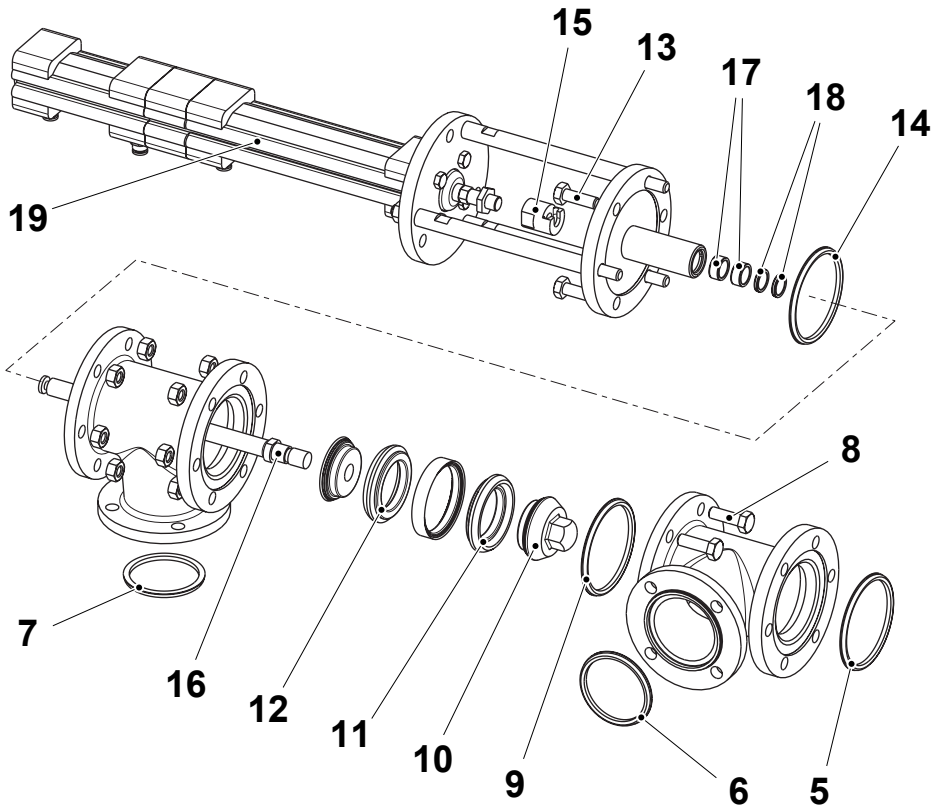
h) Disconnect the joint (15) and make sure that the shaft (16) is not damaged or bent. Change the shaft (16) as required.

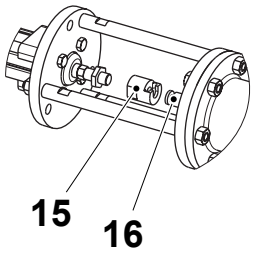
i) Change the bearings (17) and the O-rings (18).

j) Check that the cylinder (19) moves freely. Change as required.

k) Assemble in the reverse order.

Note! With the aid of the torque wrench, tighten the valve cone (10) to **50 Nm**.





5 Gasket
6 Gasket
7 Gasket
8 Screw
9 Gasket
10 Valve cone
11 Seal ring
12 Seal ring
13 Screw
14 Gasket
15 Joint
16 Shaft
17 Bearing
18 O-ring
19 Cylinder

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1.2.3-2 Heat Exchanger Valve - Set

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996477-0100

WARNING

Risk of burns.

Follow the Safety precautions.

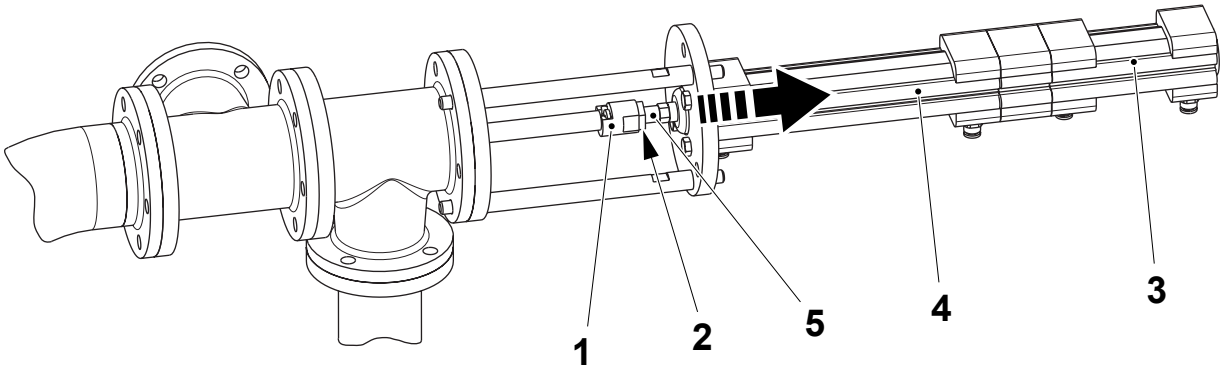
a) Unscrew completely the pendulum suspension (1) from the counter nut (2).

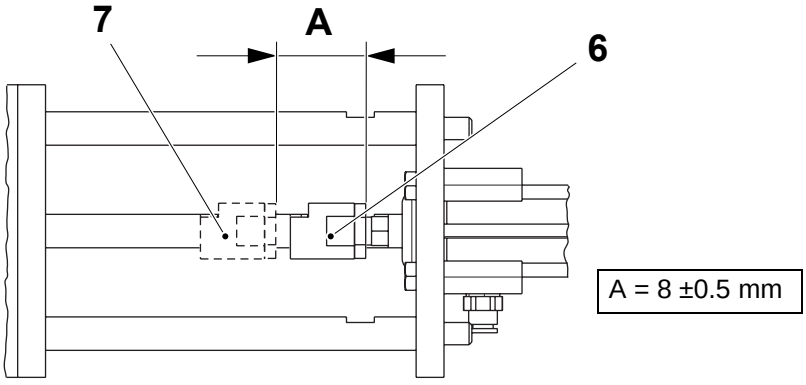
b) By manually activating the valves **Y1107** and **Y1108** move the cylinders (3) and (4) to a position of max. cooling, see arrow.

c) Screw in the pendulum suspension (1) on to the cylinder shaft (5) until the pendulum suspension (1) starts to pull out the cylinder shaft (5).

d) Continue to screw in one more complete turn (clockwise) with the pendulum suspension (1) and tighten by means of the counter nut (2).

Note! Check the difference between the Max. cooling (6) and the Min. cooling (7) position, distance **A**.





1 Pendulum suspension
2 Counter nut
3 Cylinder
4 Cylinder
5 Shaft
6 Max. cooling
7 Min. cooling

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1.2.4 Valve Reference Point

1.2.4-1 Valve Reference Point - Set Position

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	996481-0300

WARNING

Risk of burns.

Follow the Safety precautions.

a) Make sure that when the cylinder piston rod (3) is fully extended, (position **A**), the butterfly valve (2) is completely closed.

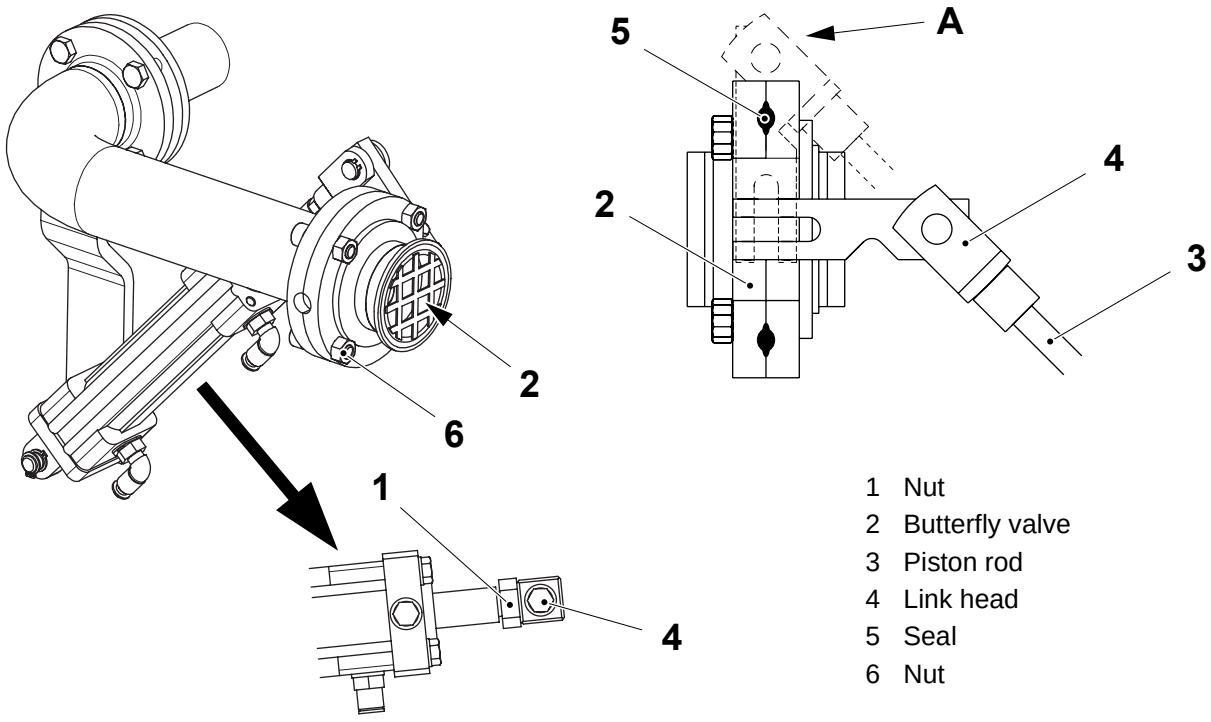
b) If not, activate the valve **Y1112**.

c) Loosen the nut (1) and adjust the butterfly valve (2) position by means of the link head (4).

d) Tighten the nut (1) and deactivate the valve **Y1112**.

e) Check that the seal ring (5) is not damaged. Change as required by removing the nuts (6).

Note! Incorrect valve (2) position can create peroxide residue in the system.



1 Nut
2 Butterfly valve
3 Piston rod
4 Link head
5 Seal
6 Nut

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1.2.5 Air Valve

1.2.5-1 Air Valve - Overhaul

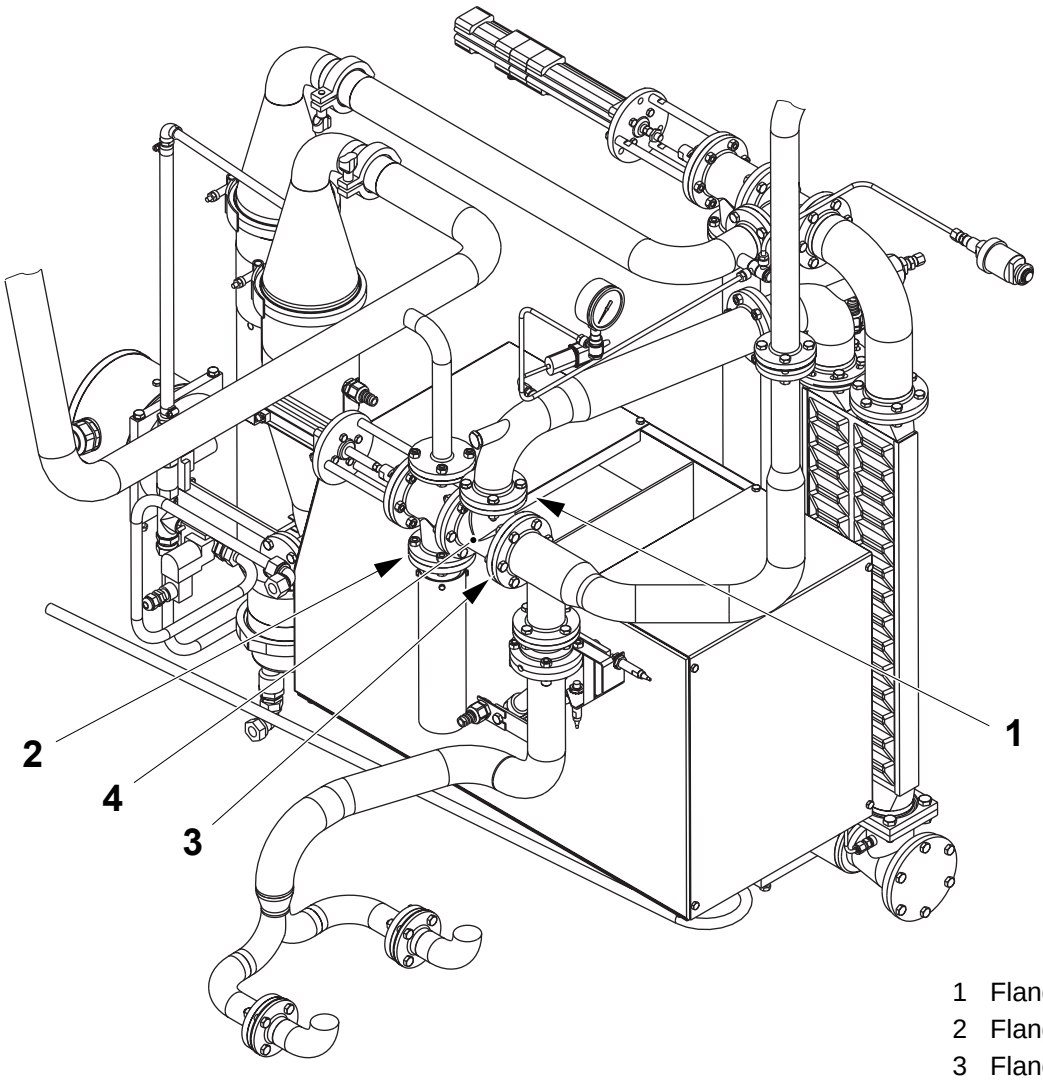
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996479-0100

WARNING

Risk of burns.

Follow the Safety precautions.

a) Remove the screws in the flanges (1), (2) and (3) and the air hoses, then pull out the air valve (4).



1 Flange
2 Flange
3 Flange
4 Valve

(Cont'd)

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(Cont'd)

b) Change the gaskets (5), (6) and (7).

c) Remove the screws (8) and change the gasket (9).

d) Remove the valve cone (10) and change the seal rings (11) and (12).

e) Remove the screws (13) and change the gasket (14).

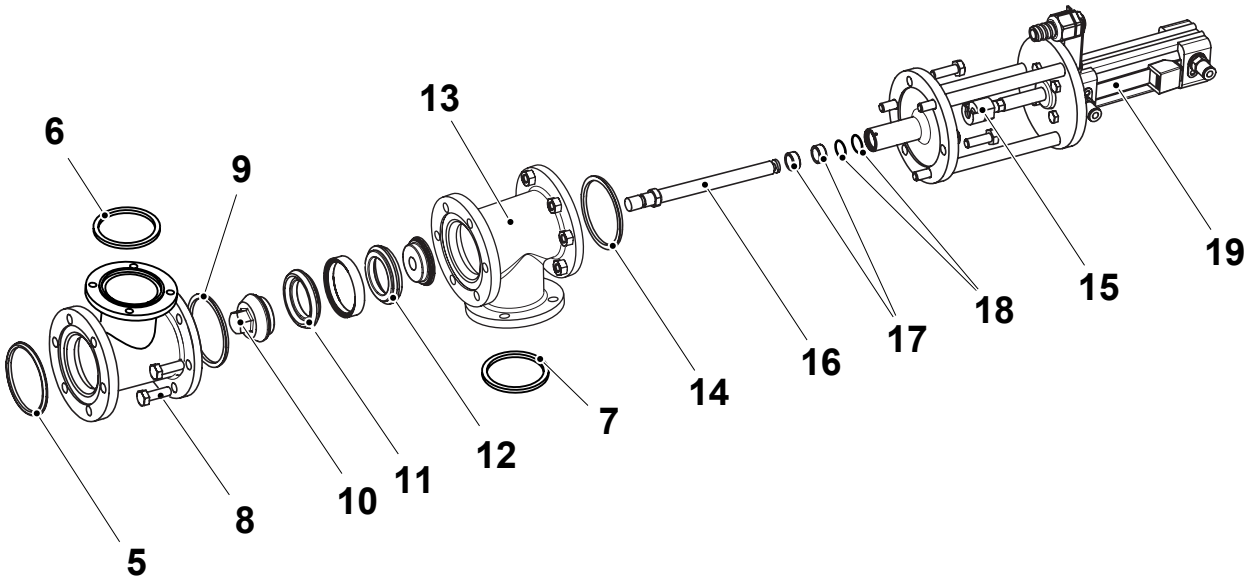
f) Disconnect the joint (15) and check that the shaft (16) is not damaged or bent. Change as required.

g) Change the bearings (17) and the O-rings (18).

h) Check that the cylinder (19) moves freely. Change as required.

i) Assemble in the reverse order.

Note! With the aid of the torque wrench, tighten the valve cone (10) to **50 Nm**.



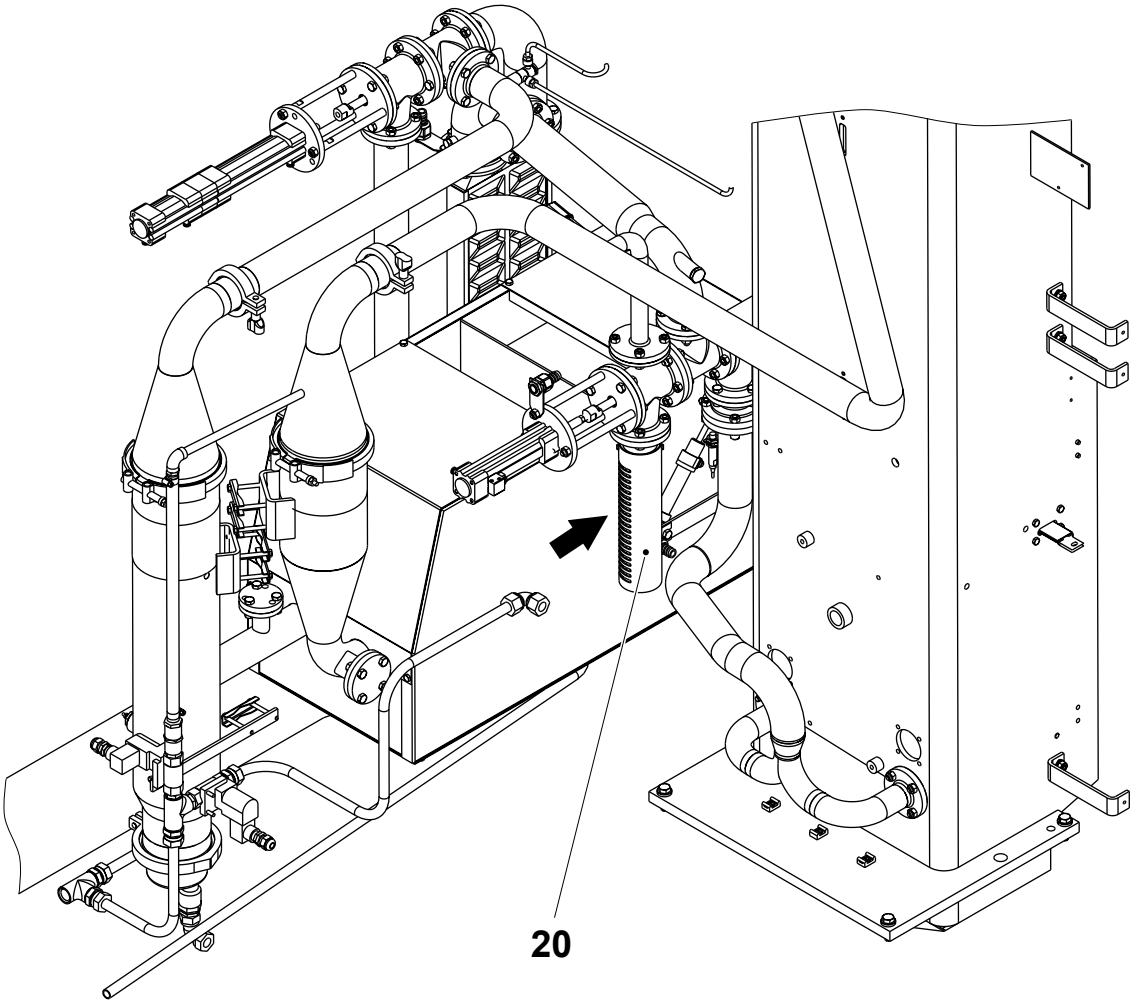
5	Gasket	13	Screw
6	Gasket	14	Gasket
7	Gasket	15	Joint
8	Screw	16	Shaft
9	Gasket	17	Bearing
10	Valve cone	18	O-ring
11	Seal ring	19	Cylinder
12	Seal ring		

(Cont'd)

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(Cont'd)

Note! While assembling make sure to fit the silencer (20), as shown in the picture, with the grid towards the inner of the machine, see arrow.



20 Silencer

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1.2.5-2 Air Valve - Set Proximity Switch

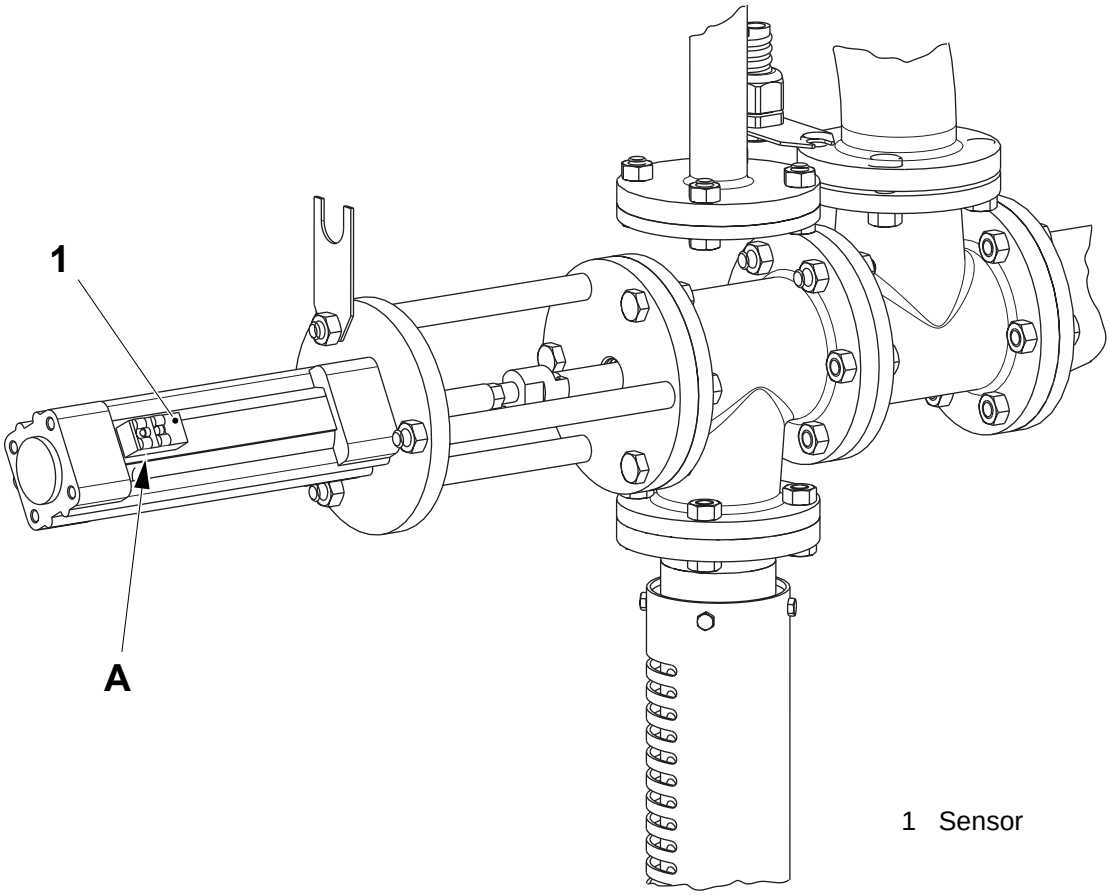
Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	996479-0100

WARNING
Risk of burns.
Follow the Safety precautions.

a) Make sure that the sensor (1) B1111 is placed in the position **A**.

b) Make sure that the sensor (1) works properly by manually activating the valve **Y1111**.

CAUTION
Risk of damage to the equipment.
The sensor (1) must be activated with the cylinder completely in.



1 Sensor

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1.2.5-3 Air Valve - Check Silencer

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	996479-0100

WARNING

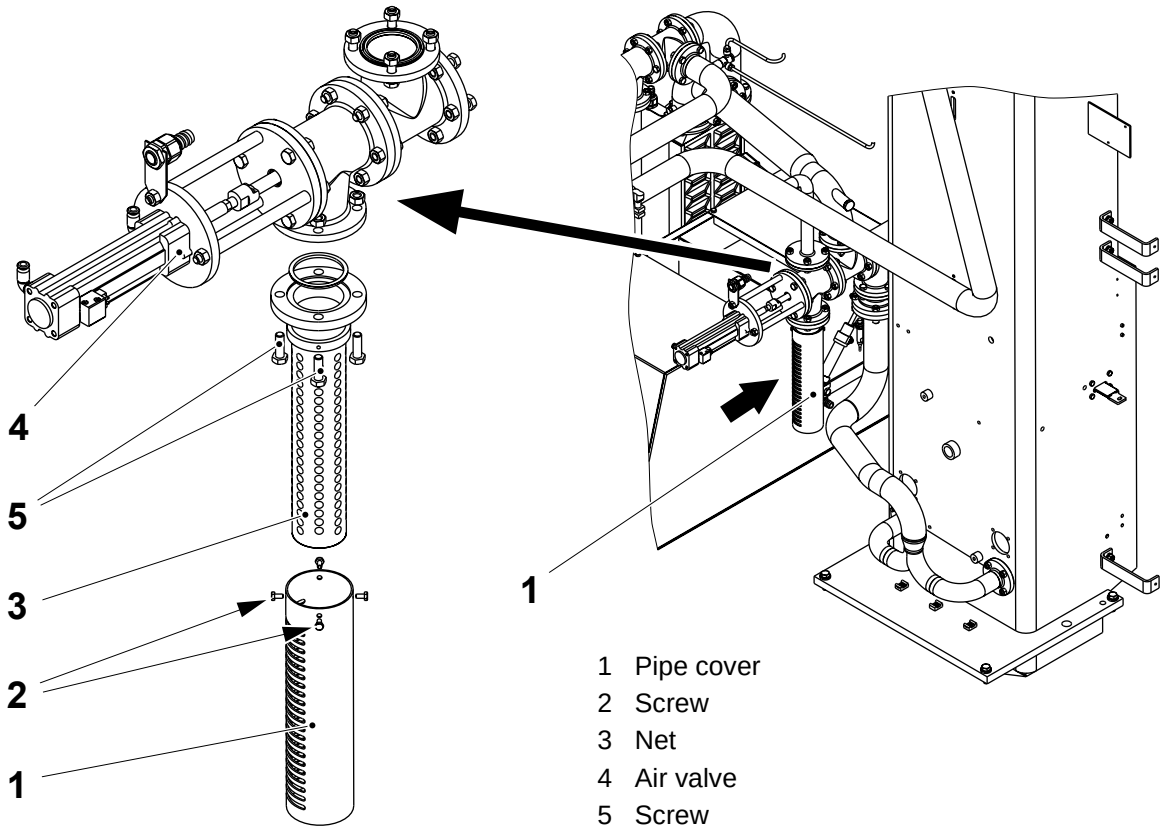
Risk of burns.

Follow the Safety precautions.

a) Remove the pipe cover (1) by means of the four screws (2).

b) Check that the net (3) is not clogged with lime scale. If required:
   - remove the net (3) from the air valve (4) by means of the screws (5)
   - clean the net (3) with a lime scale removal solution, follow the procedure in 1.2.6-2 Scrubber - Clean Filters
   - fit the net (3) to the air valve (4) by means of the screws (5).

c) Fit the pipe cover (1) by means of the four screws (2). Make sure to fit the pipe cover (1), as shown in the picture, with the grid towards the inner of the machine, see arrow.



1 Pipe cover
2 Screw
3 Net
4 Air valve
5 Screw

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1.2.6 Scrubber

1.2.6-1 Scrubber - Clean Constant Flow Valve

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996483-0300

a) Remove the constant flow valve (3) from the line and open it.

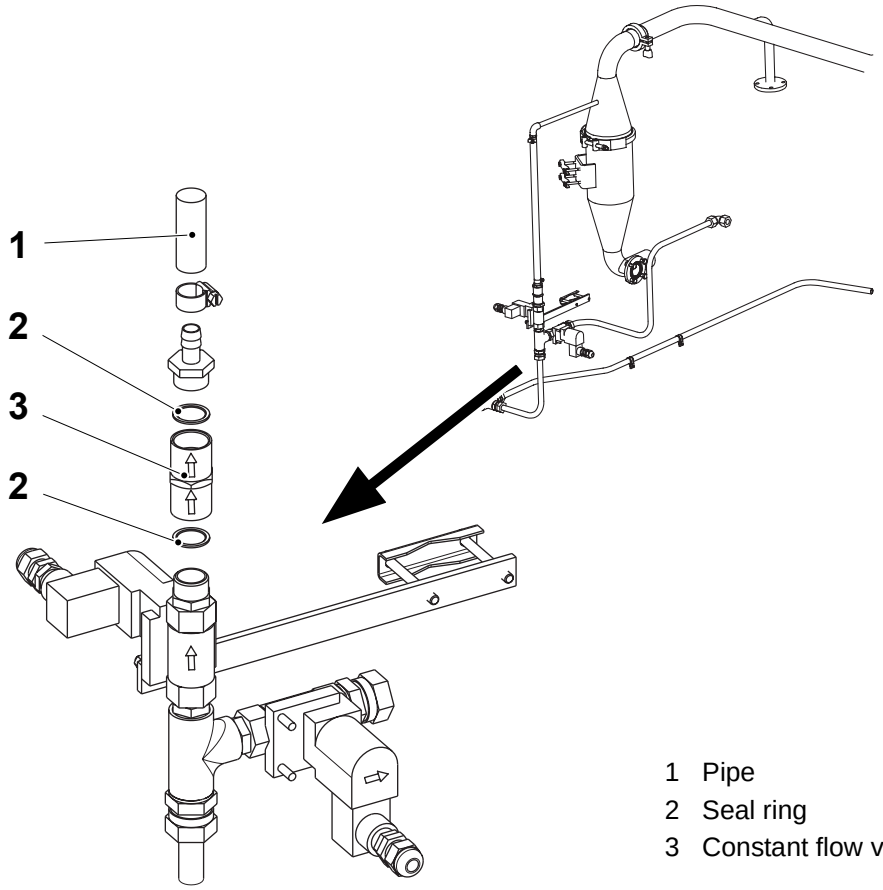
b) Clean the inside of the constant flow valve (3) with a damp sponge.

c) Blow compressed air through the pipe (1) and make sure that is not blocked.

d) Check the seal rings (2) for damage. Change as required.

e) Fit back the constant flow valve (3).

Note! Be careful when tightening not to break the constant flow valve (3).



1 Pipe
2 Seal ring
3 Constant flow valve

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1.2.6-2 Scrubber - Clean Filters

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lime scale removal acid
SPC Reference	996483-0300

WARNING

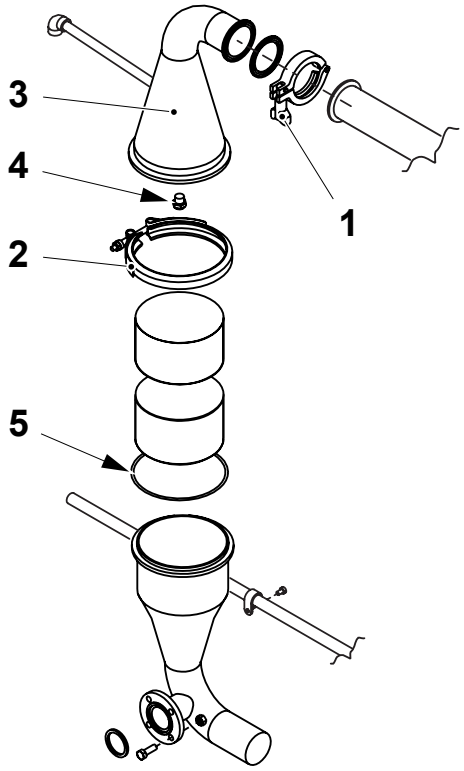
Chemical products.

Acids. Follow the Safety precautions.

a) Loosen the clamp (1) and the holder (2) and remove the upper section cover (3).

b) Remove and clean the nozzle (4) with compressed air. If required, use a needle to very carefully clean it.

c) Remove the O-ring (5) and change as required.



1 Clamp
2 Holder
3 Upper section cover
4 Nozzle
5 O-ring

(Cont'd)

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(Cont'd)

WARNING

Chemical products.

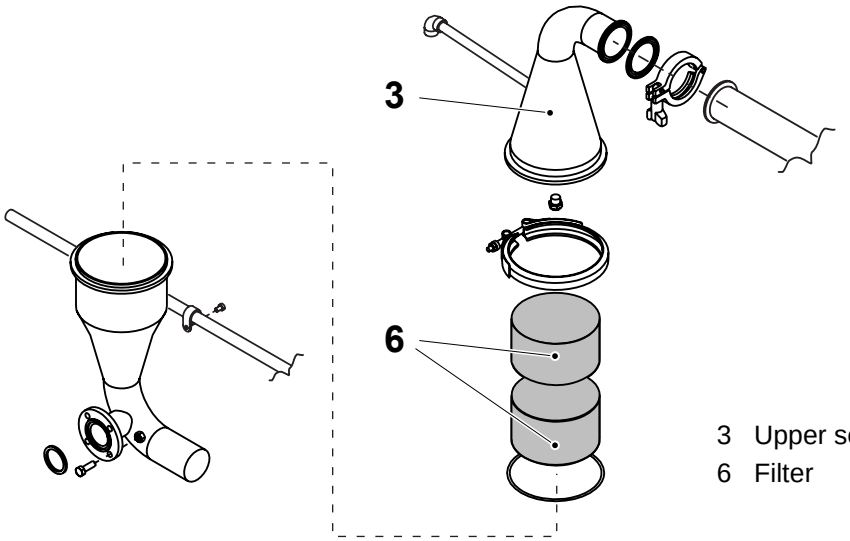
Only use the acids listed below and do **not** use hydrochloric acid (HCl).

Note! All solutions must be at ambient temperature during lime scale removal.

d) Pull out the filters (6) and remove lime scale with one of the four acid solutions listed below.
   - acetic acid (CH_3COOH), 20%
   - nitric acid (HNO_3), 5-10%
   - citric acid ($C_6H_8O_7$), 20%
   - phosphoric acid (H_3PO_4), 5-10%

e) After lime scale removal flush with water and the last rinse is done with softened or distilled water.

f) Assemble in the reverse order and make sure that the upper filter (6) is in close contact with the upper section cover (3).



3 Upper section cover
6 Filter

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1.2.7 Separator

1.2.7-1 Separator - Check Pressure Guard

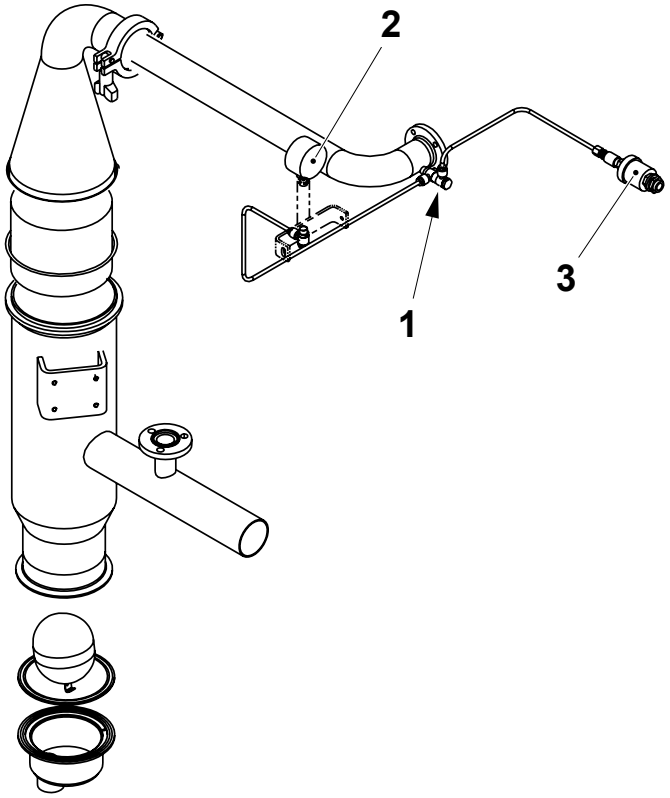
Machine Status	HEAT STERILIZATION
SPC Reference	1095754-0100

a) Loosen (slowly) the pipe connection (1) to the pressure switch (3).

b) Check the water separator pressure gauge (2) that the machine steps down to step TIGHT TUBE when the pressure drops to about **14 kPa (0.14 bar)**.

c) If not, change the pressure switch (3).

d) Tighten the pipe connection (1).



1 Pipe connection
2 Pressure gauge
3 Pressure switch

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1.2.7-2 Separator - Clean Filter and Floater

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lime scale removal acid
SPC Reference	1095754-0100

WARNING

Risk of eye injury.

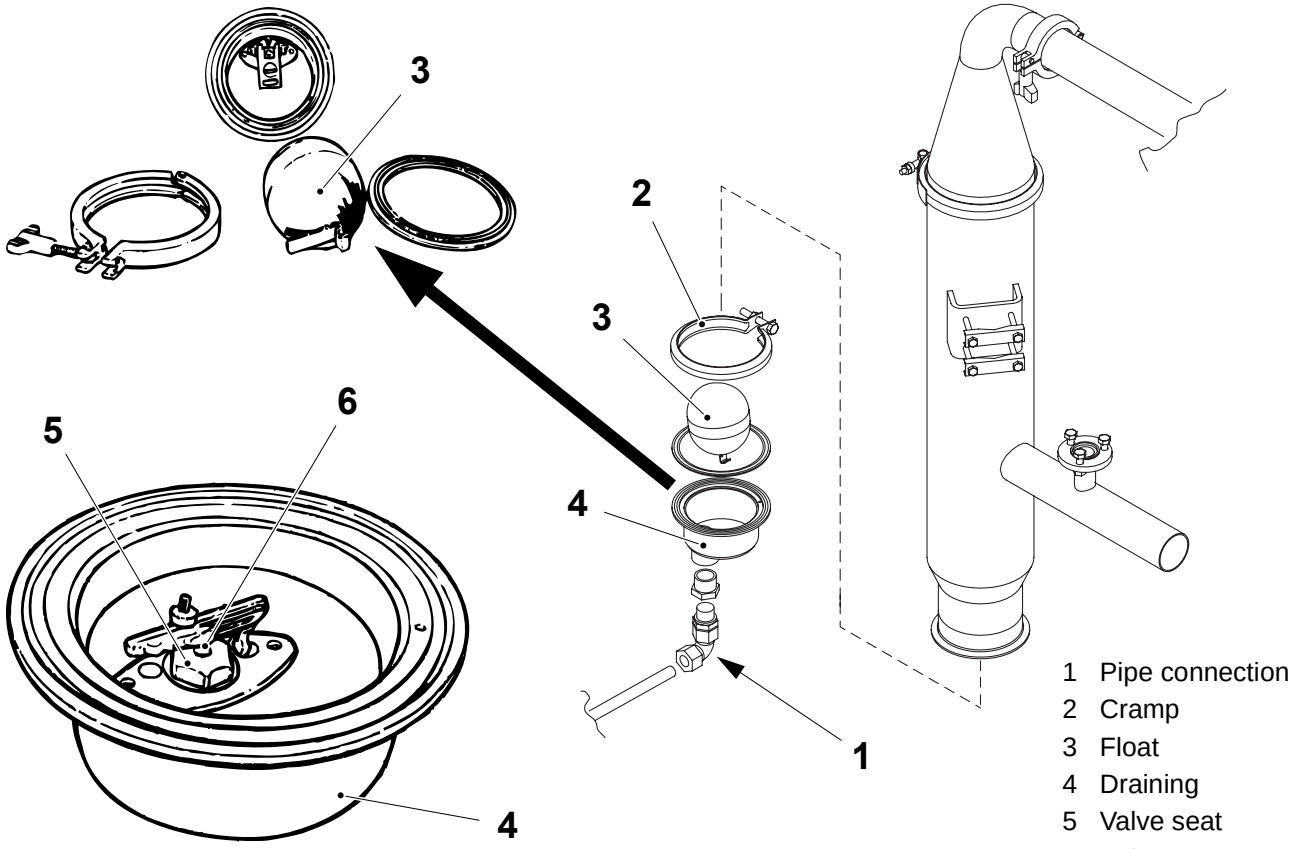
Follow the Safety precautions.

a) Unscrew the pipe connection (1).

b) Undo the clamp (2) and remove the draining (4) and the float unit.

c) Remove the float (3) from its arm and clean it. Shake the float (3) to check that no liquid has leaked into it. Change the float (3) as required.

d) If the valve (6) or the valve seat (5) is defective, overhaul them as required, see 1.2.7-3 Separator - Overhaul.



1 Pipe connection
2 Cramp
3 Float
4 Draining
5 Valve seat
6 Valve

(Cont'd)

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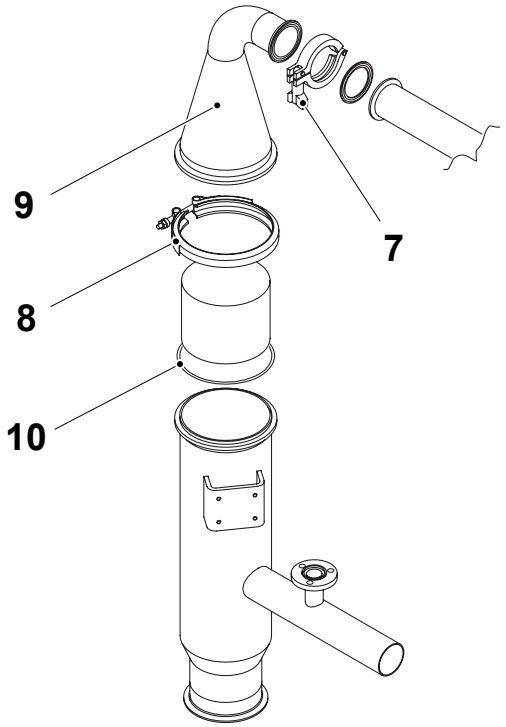
(Cont'd)

e) Clean the inside of the separator with a sponge and water. Blow dry with compressed air.

Note! Do not use detergents.

f) Undo the clamps (7) and (8).

g) Remove the upper section cover (9) and the O-ring (10).



7 Clamp
8 Clamp
9 Cover
10 O-ring

(Cont'd)

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(Cont'd)

WARNING
Chemical products.
Acids. Follow the Safety precautions.

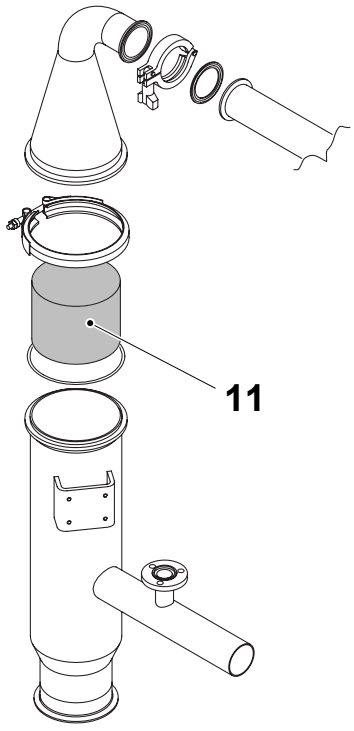
CAUTION
Chemical products.
Only use the acids listed below and do **not** use hydrochloric acid (HCl).

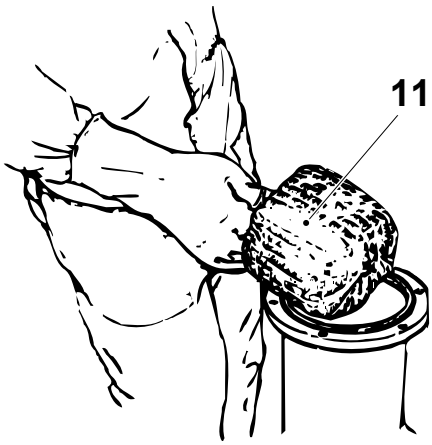
h) Remove lime scale from the filter (11) with one of the four acid solutions listed below. All solutions must be at ambient temperature during lime scale removal.

i) acetic acid (CH_3COOH), 20%
   - nitric acid (HNO_3), 5-10%
   - citric acid ($C_6H_8O_7$), 20%
   - phosphoric acid (H_3PO_4), 5-10%

j) After lime scale removal flush with water and the last rinse is done with softened or distilled water.

k) Assemble in the reverse order and set the float unit, see 1.2.7-4 Separator - Set Float Unit.





11 Filter

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1.2.7-3 Separator - Overhaul

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095754-0100

a) Remove the float unit, see 1.2.7-2 Separator - Clean Filter and Floater.

b) On the draining (1), unscrew the nut (2) and lift off the valve lever (3).

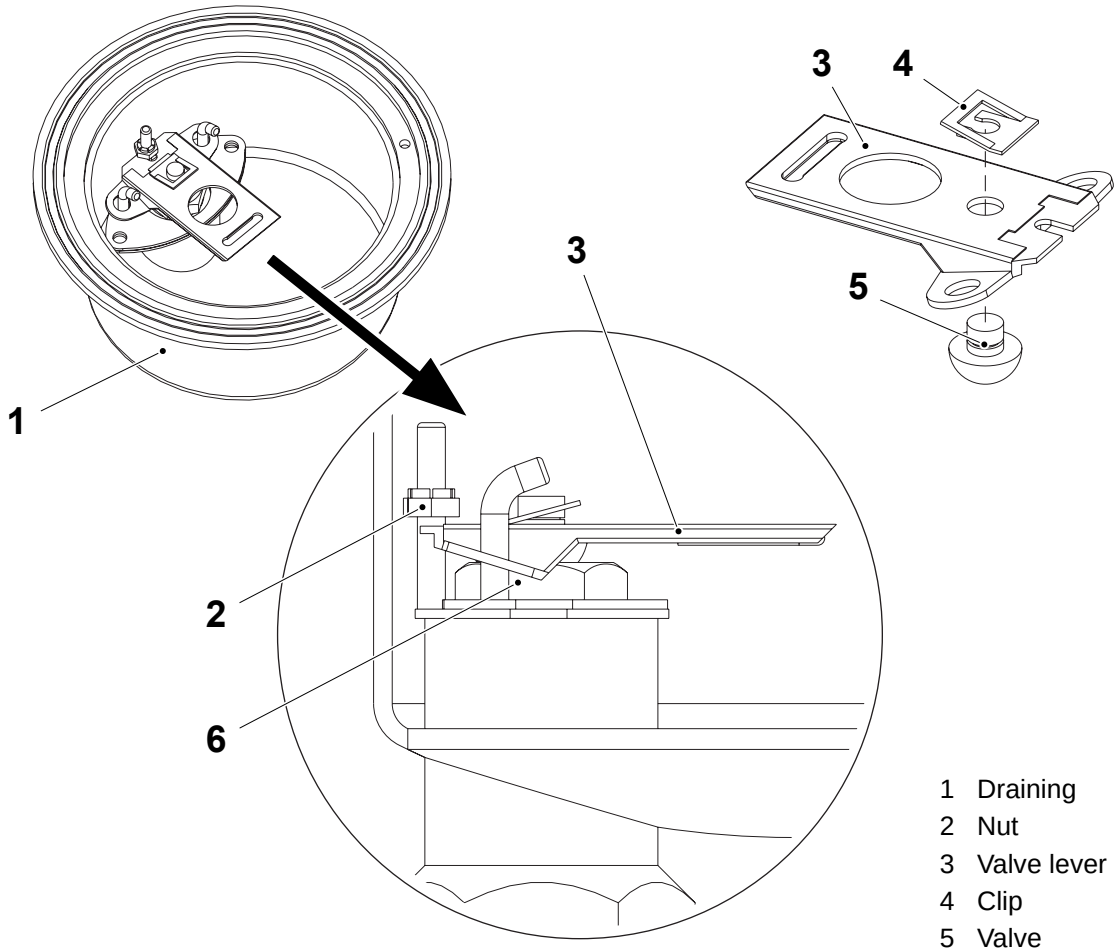
c) Remove the clip (4), the valve (5) and the valve seat (6).

d) Change the valve (5) and the valve seat (6).

e) Fit the valve lever (3) and the nut (2).

f) Set the float unit, see 1.2.7-4 Separator - Set Float Unit.

g) Assemble the float unit in the reverse order, see 1.2.7-2 Separator - Clean Filter and Floater.



1 Draining
2 Nut
3 Valve lever
4 Clip
5 Valve
6 Valve seat

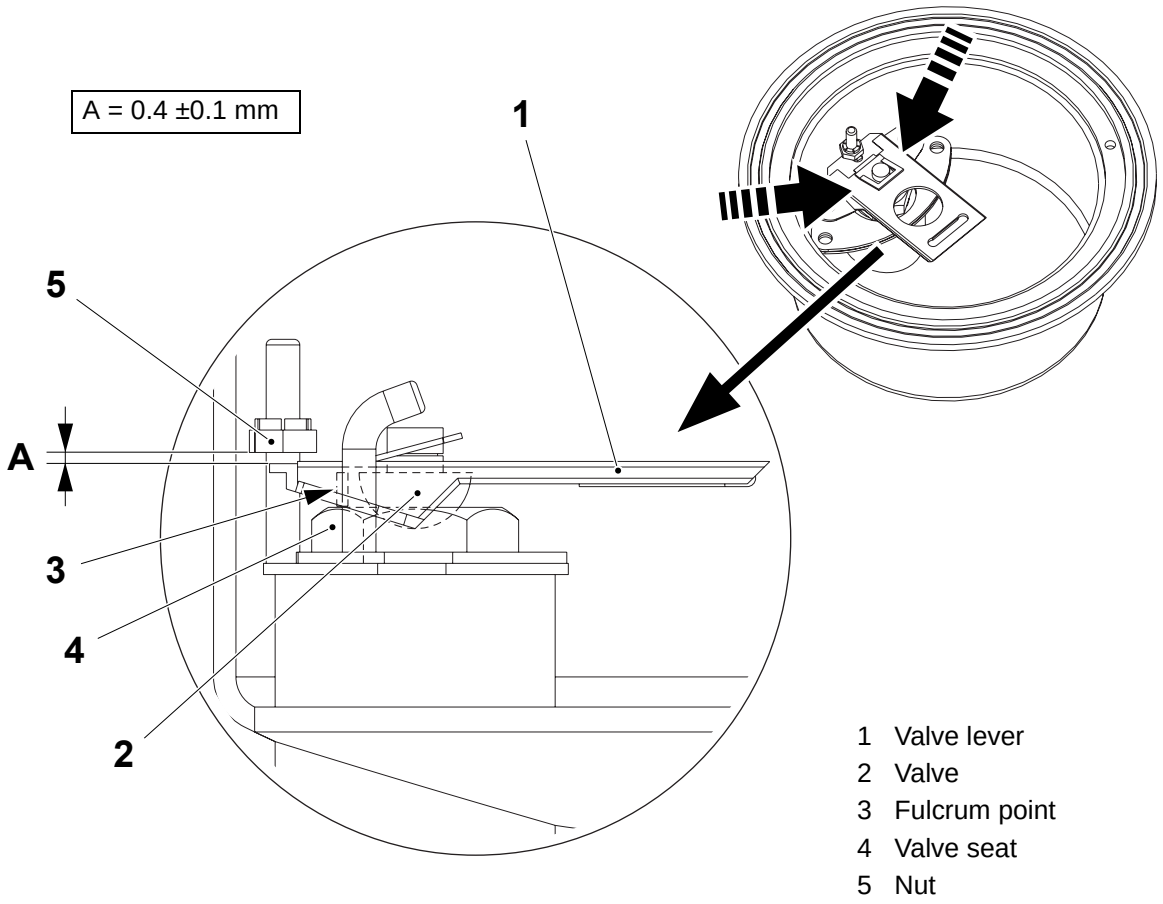
TechPub_2614345_0105 - 01_MM81534_11en.fm

1.2.7-4 Separator - Set Float Unit

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095754-0100

Press down on the valve lever (1) on each side of the valve (2), as indicated by the arrows in the illustration, to make the fulcrum points (3) horizontal on the valve seat (4).

In this position, set the distance **A** between the nut (5) and the valve lever (1).



1 Valve lever
2 Valve
3 Fulcrum point
4 Valve seat
5 Nut

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1.2.8 Pipe Line

1.2.8-1 Pipe Line - Clean Spray Nozzle and Balls

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Acid 5-10% HNO_3
SPC Reference	1095830-0300

WARNING
Risk of burns.
Follow the Safety precautions.

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

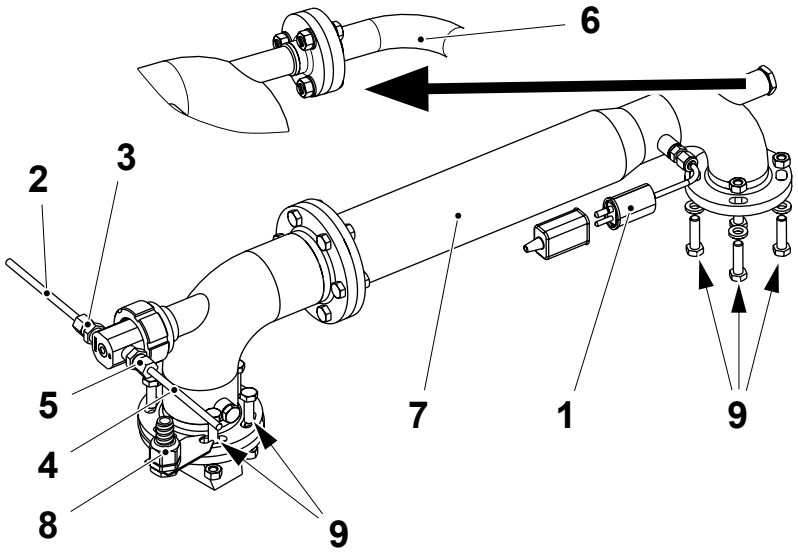
a) Disconnect the electrical connection from the thermocouple (1).

b) Remove the H_2O_2 pipe (2) from the connection (3) and the compressed air pipe (4) from the connection (5).

Note! Perform item c) only if the machine is running with volumes TPA 500 Sq, TPA 330 Sq, TPA 250 Sq or TPA 1000 Sq.

c) Remove the pipe (6).

d) Remove the spray generator (7) and the holder (8) by means of the screws (9).



1 Thermocouple
2 H2O2 pipe
3 Connection
4 Air pipe
5 Connection
6 Pipe
7 Spray generator
8 Holder
9 Screw

(Cont'd)

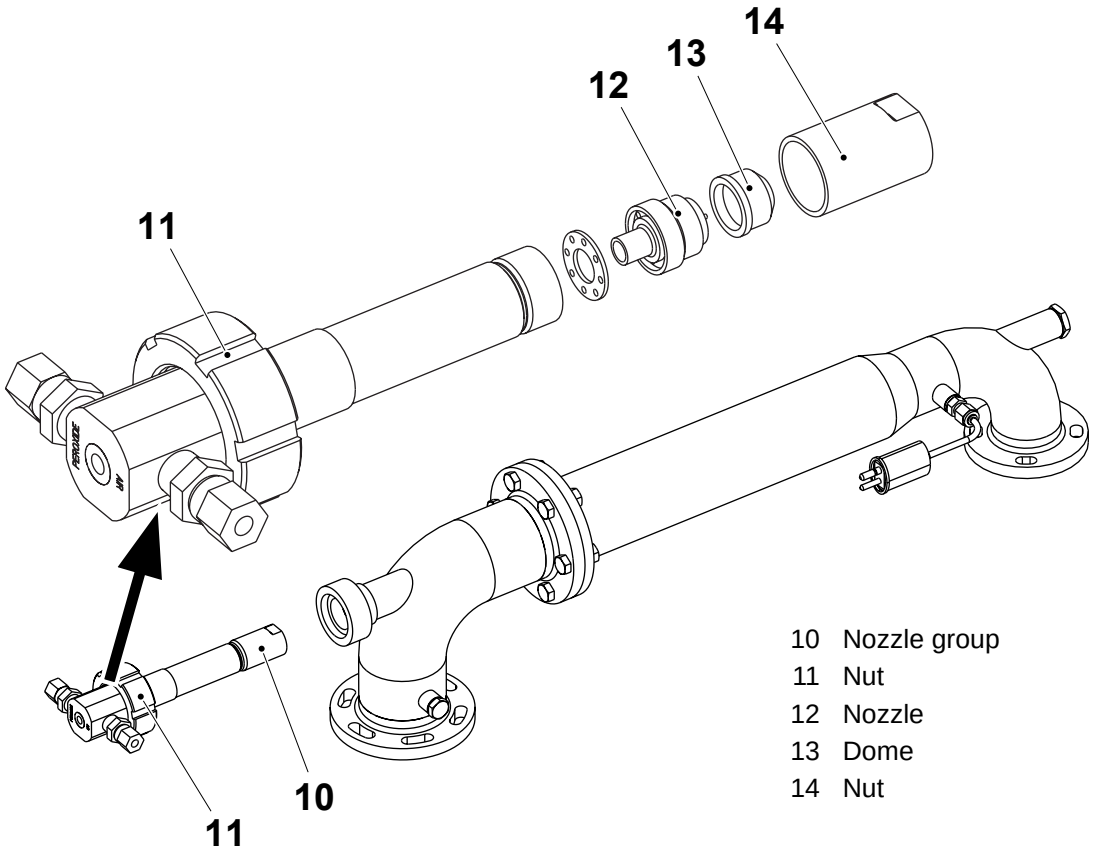
TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

e) Remove the spray nozzle group (10) by means of the nut (11).

f) Remove the spray nozzle (12) by means of its nut.

g) Disassemble the nozzle (12) from the dome (13) and the nut (14) and clean all the parts with compressed air.



10 Nozzle group
11 Nut
12 Nozzle
13 Dome
14 Nut

(Cont'd)

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(Cont'd)

h) Disconnect the pipe (15) from the pipe (16) by means of the screws (17) and the nuts (18).

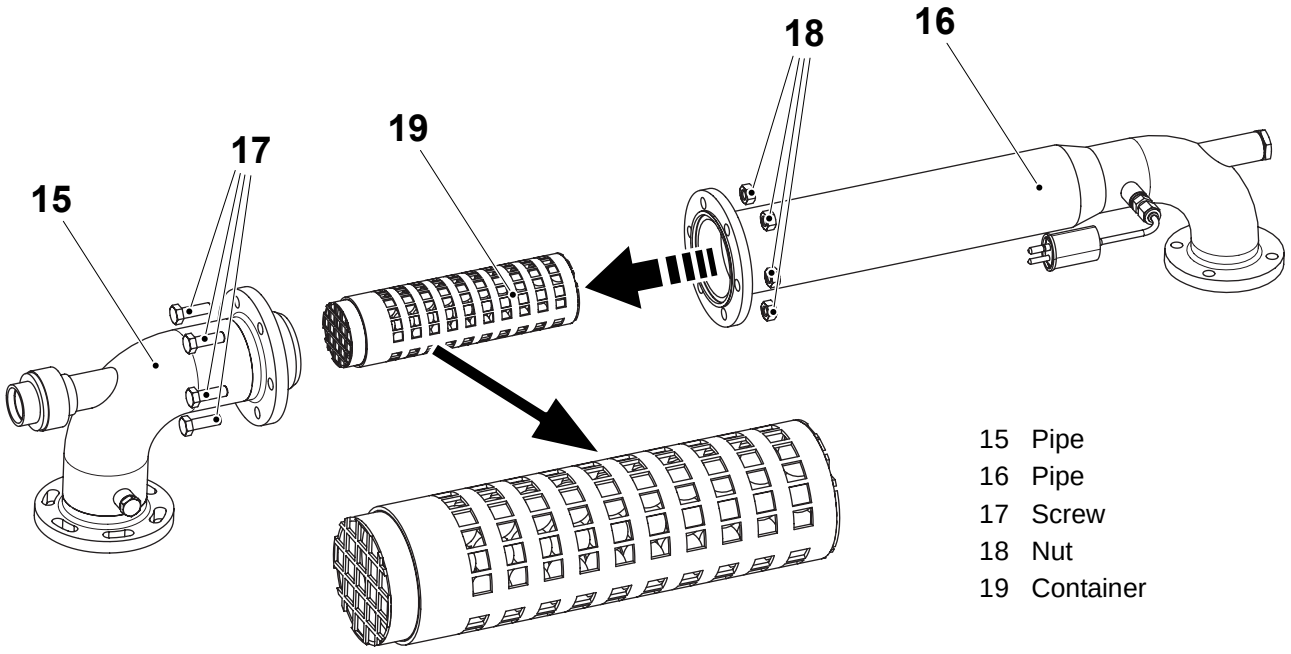
i) Unthread the container (19).

j) Clean the container (19) containing the balls with nitric acid (HNO_3) at 5-10%. The solution must have a temperature of **50 - 60 °C** during peroxide residue removal.

WARNING
Chemical products.
Acids. Follow the Safety precautions.

k) After peroxide residue removal flush the container (19) with water and the last rinse is done with softened or distilled water.

l) Assemble in the reverse order.



15 Pipe
16 Pipe
17 Screw
18 Nut
19 Container

TechPub_2614345_0105 - 01_MM81534_11en.fm

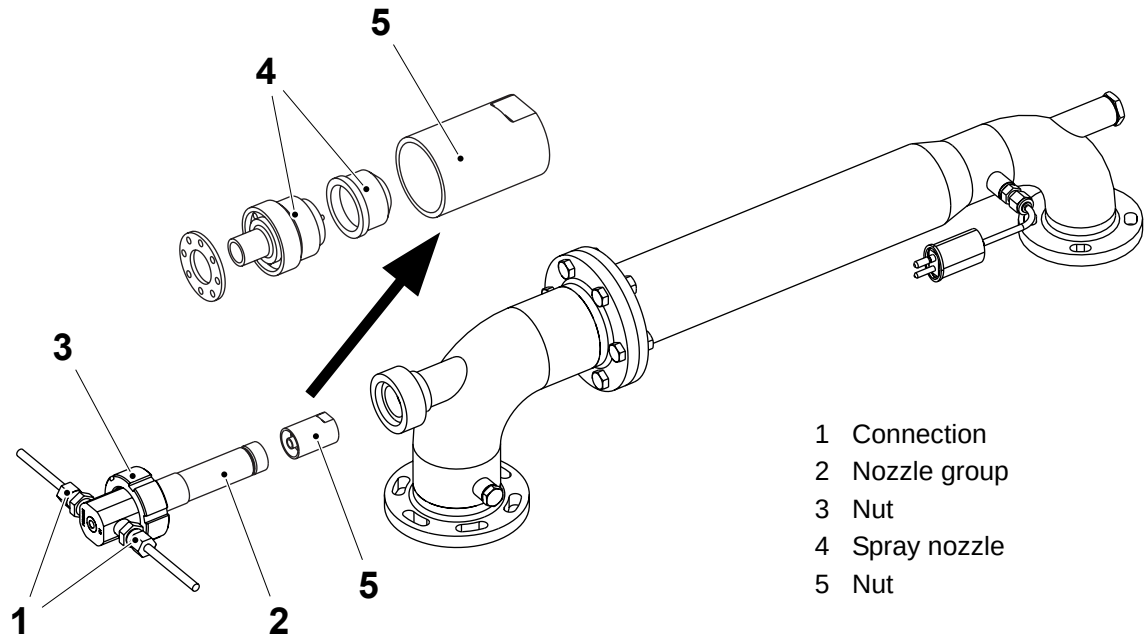
1.2.8-2 Pipe Line - Check Spray Nozzle

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Teflon tape
SPC Reference	1095830-0300

WARNING
Risk of burns.
Follow the Safety precautions.

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

a) Remove the pipes from the connections (1).
b) Remove the spray nozzle group (2) by means of the nut (3).
c) Remove the spray nozzle (4) parts by means of the nut (5).



1 Connection
2 Nozzle group
3 Nut
4 Spray nozzle
5 Nut

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

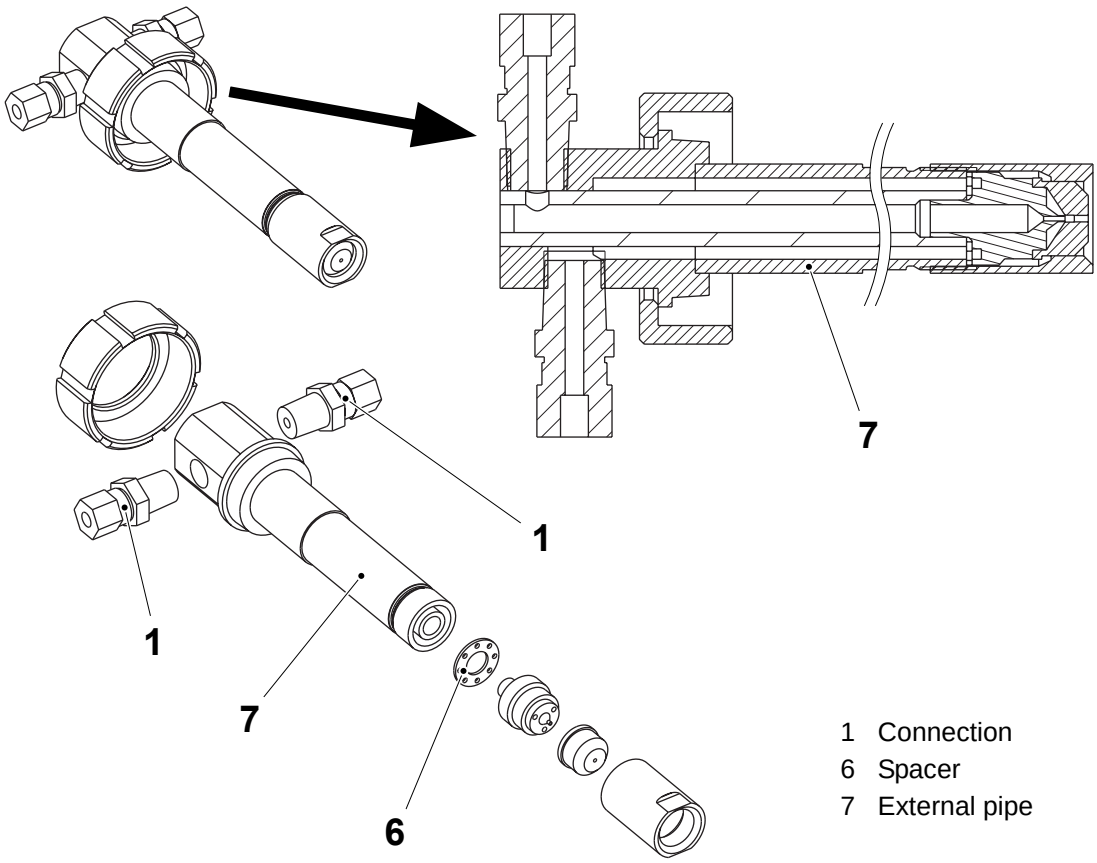
(Cont'd)

d) Check all the parts for wear or damage and clean them as required with compressed air, see 1.2.8-1 Pipe Line - Clean Spray Nozzle and Balls.

e) Assemble in the reverse order.

Note! While assembling make sure to fit correctly the spacer (6).

Note! If the connections (1) have been removed from the external pipe (7), when reassembling make sure to use Teflon tape on the joints to avoid leakages.



1 Connection
6 Spacer
7 External pipe

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.2.9 Pressure Regulator (60 Hz)

1.2.9-1 Pressure Regulator (60 Hz) - Set

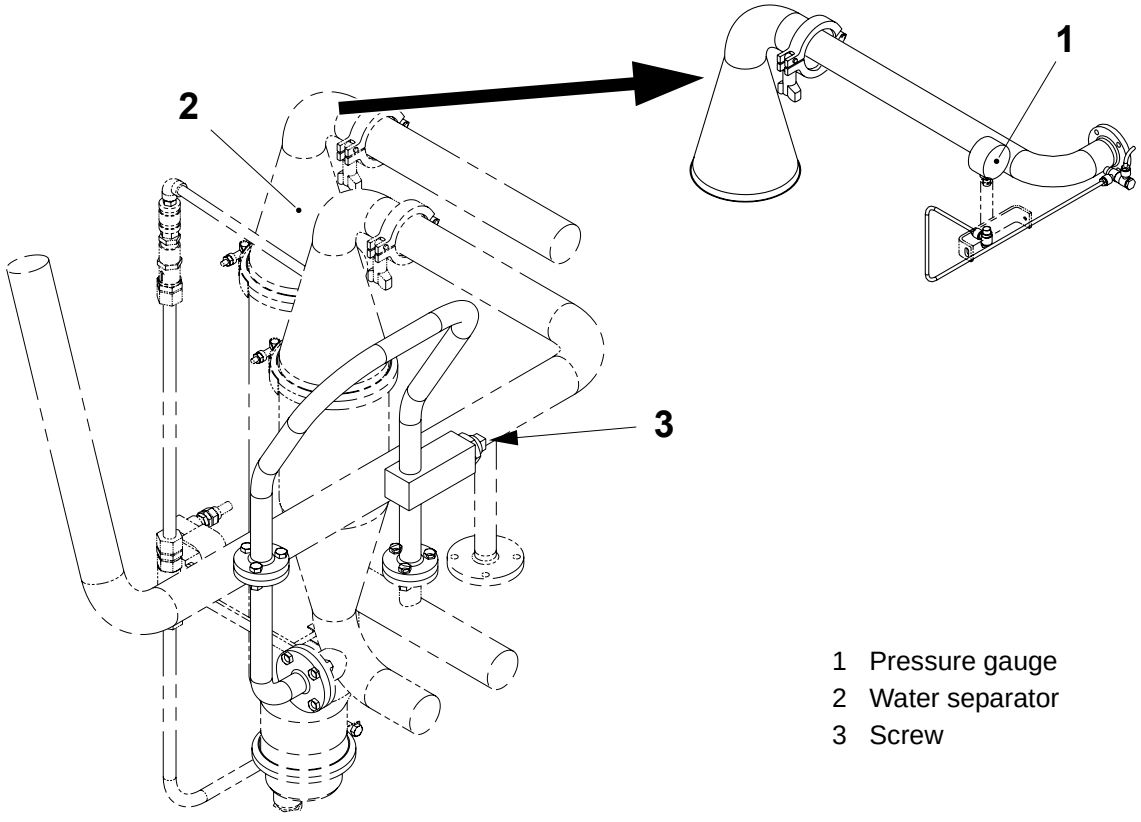
Machine Status	PRODUCTION
SPC Reference	996482-0100

WARNING
Risk of burns.
Follow the Safety precautions.

Check that the pressure gauge (1) of the water separator (2) indicates more than **30 kPa (0.30 bar)**. If required, adjust the sterile air pressure by means of the throttle screw (3).

Note! If the right sterile air pressure is not correct then set as follows:

- the cause of **too high** sterile air pressure may be blockage somewhere in the out feed of air in a pipe or nozzle
- the cause of **too low** sterile air pressure may be leakage in the air system, a blocked filter in the suction pipes or insufficient compressor capacity.



1 Pressure gauge
2 Water separator
3 Screw

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1.2.10 Butterfly Valve

1.2.10-1 Butterfly Valve - Change Cylinder

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1490043-0100

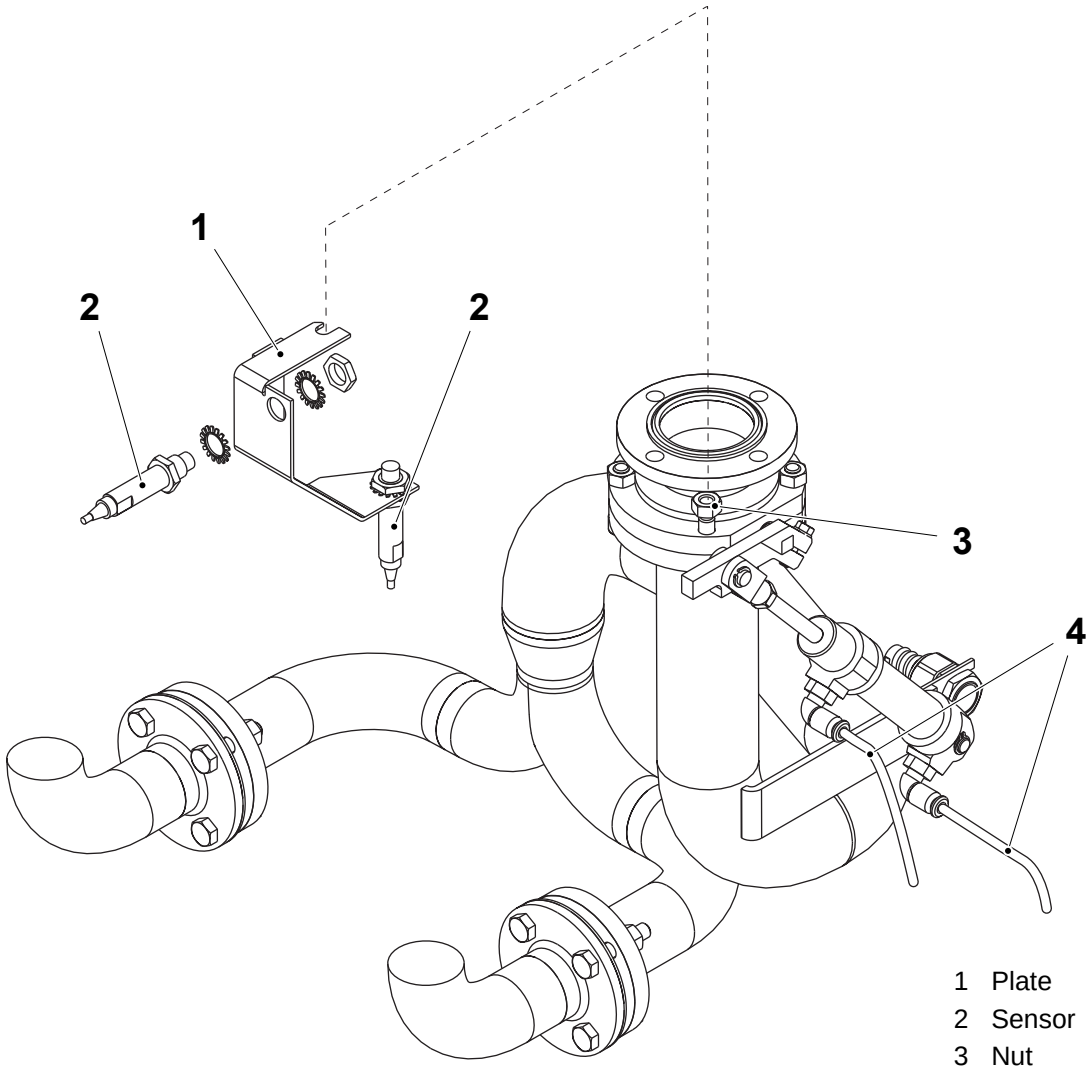
WARNING

Risk of burns.

Follow the Safety precautions.

a) Remove the plate (1) and the sensors (2) by removing the nut (3).

b) Remove the air hoses (4).



1 Plate
2 Sensor
3 Nut
4 Air hose

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

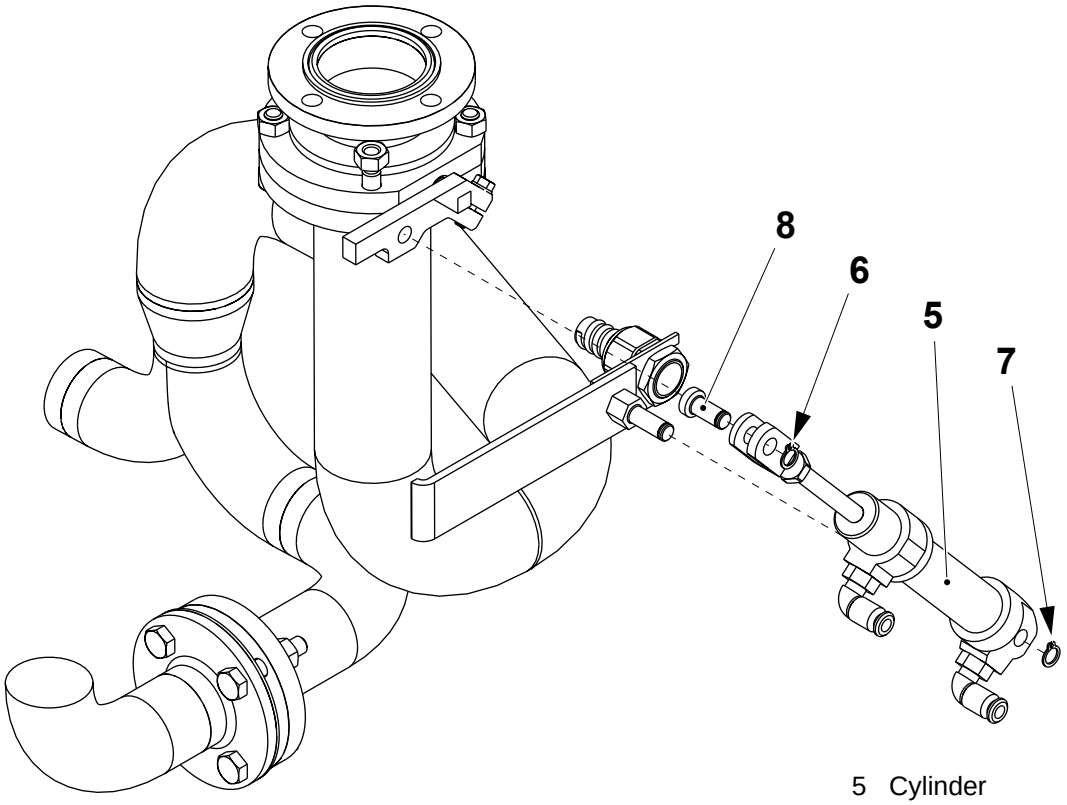
(Cont'd)

c) Remove the cylinder (5) by means of the retaining rings (6), (7) and the shaft (8).

d) Check the cylinder and change as required.

e) Assemble in the reverse order and set as required, see 1.2.10-4 Butterfly Valve - Set Position.

f) Check the sensors as required, see 1.2.10-2 Butterfly Valve - Check Sensors.



5 Cylinder
6 Retaining ring
7 Retaining ring
8 Shaft

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.2.10-2 Butterfly Valve - Check Sensors

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1490043-0100

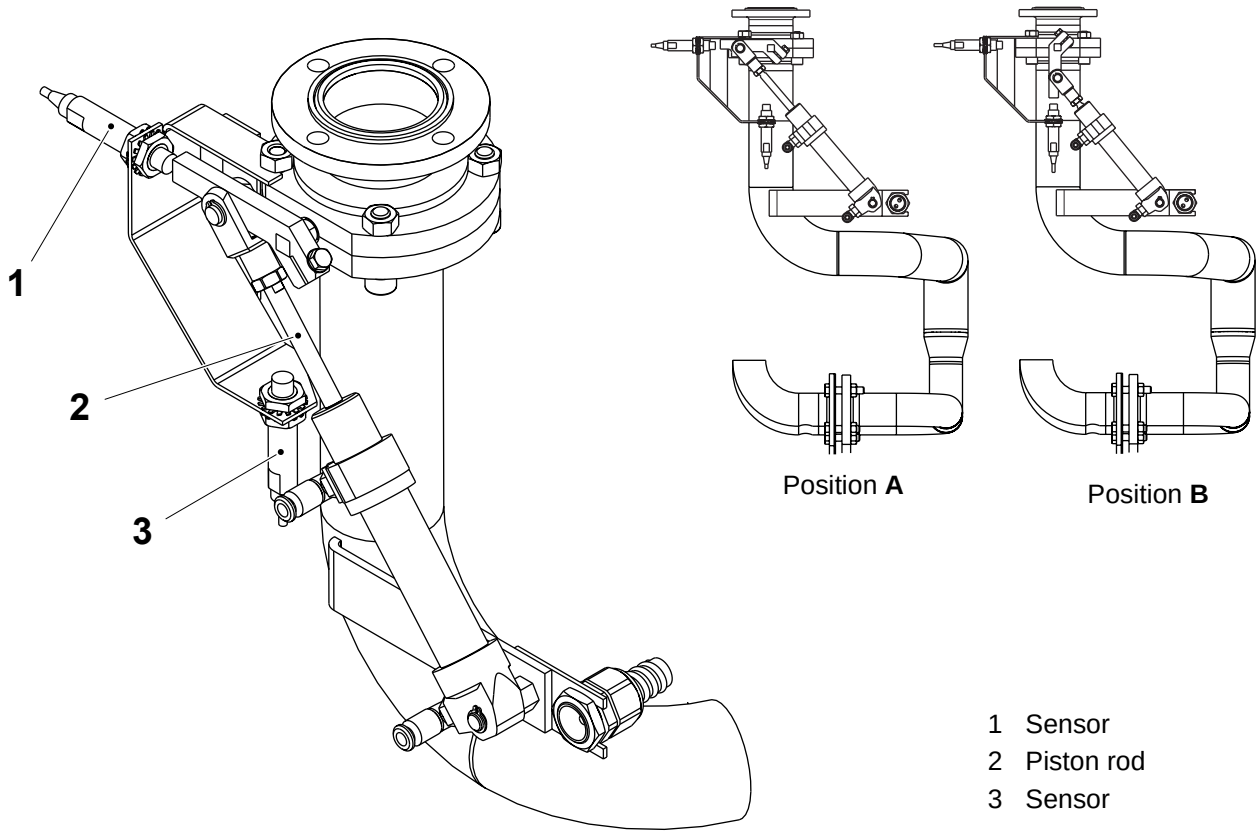
WARNING

Risk of burns.

Follow the Safety precautions.

a) Make sure that the LED on the sensor (1) is **On**, when the piston rod (2) is fully extended, (position **A**). Change the sensor (1) as required.

b) Make sure that the LED on the sensor (3) is **On** when the piston rod (2) is fully retracted, (position **B**). Change the sensor (3) as required.



1 Sensor
2 Piston rod
3 Sensor

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1.2.10-3 Butterfly Valve - Change Bushings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1490043-0100

WARNING

Risk of burns.

Follow the Safety precautions.

a) Remove the plate (1) and the sensors (2) by removing the nut (3).

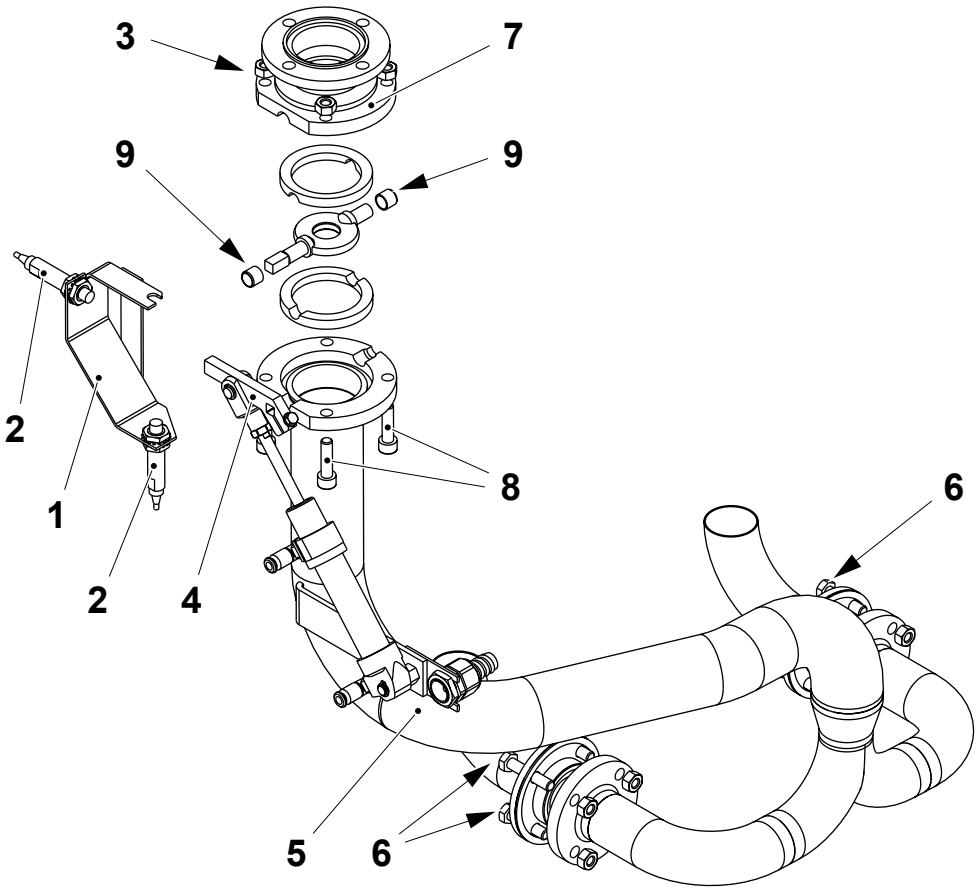
b) Disconnect the lever (4) from the butterfly valve.

c) Loosen the pipe (5) by means of the screws (6).

d) Remove the flange (7) by means of the screws (8).

e) Check the bushings (9) for wear or damage. Change as required.

f) Assemble in the reverse order, see 1.2.10-4 Butterfly Valve - Set Position



1 Plate
2 Sensor
3 Nut
4 Lever
5 Pipe
6 Screw
7 Flange
8 Screw
9 Bushings

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.2.10-4 Butterfly Valve - Set Position

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1490043-0100

WARNING

Risk of burns.

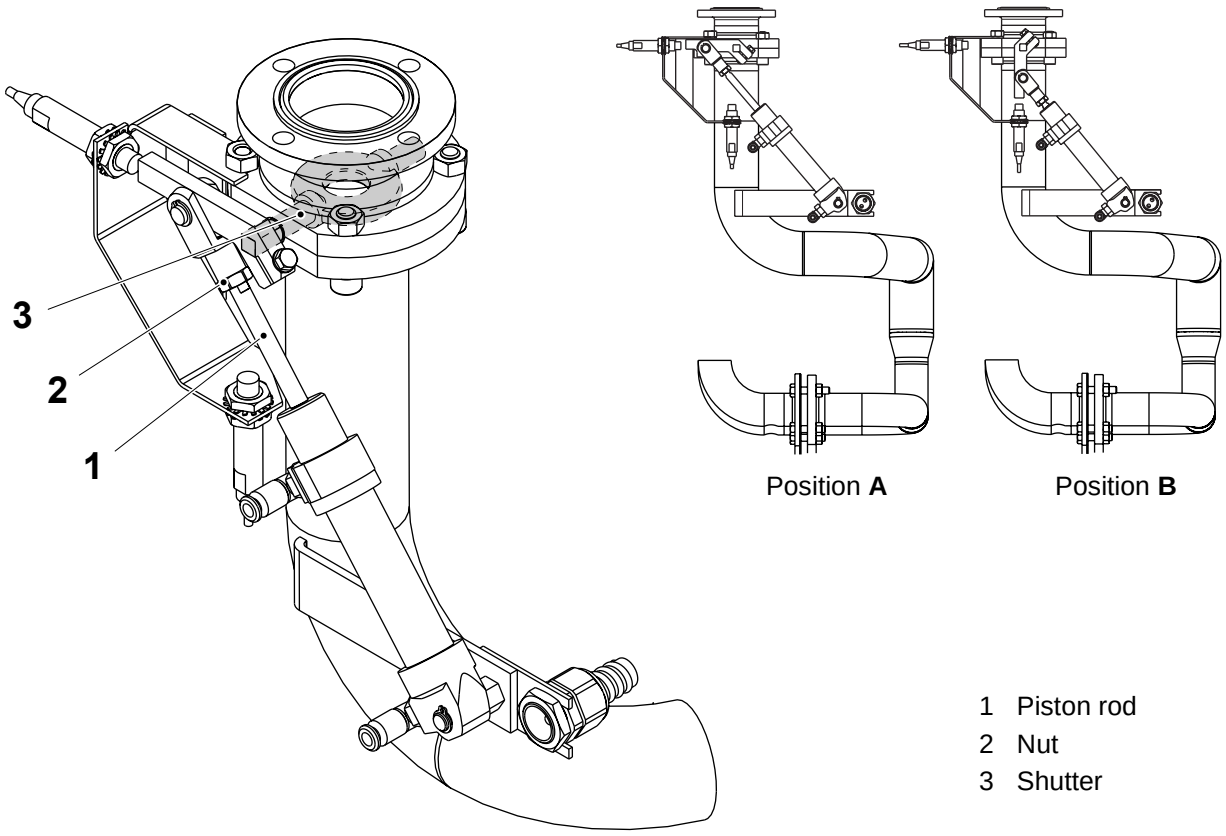
Follow the Safety precautions.

a) Activate the valve **Y1241**.

b) Make sure that when the piston rod (1) is fully extended, (position **A**), the butterfly valve is completely closed and that the mark on the shutter (3) is positioned horizontally, see picture below.

c) Loosen the nut (2) and adjust the piston rod (1) position.

d) Tighten the nut (2) and deactivate the valve **Y1241**.



1 Piston rod
2 Nut
3 Shutter

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.2.10-5 Butterfly Valve - Set Sensors

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1490043-0100

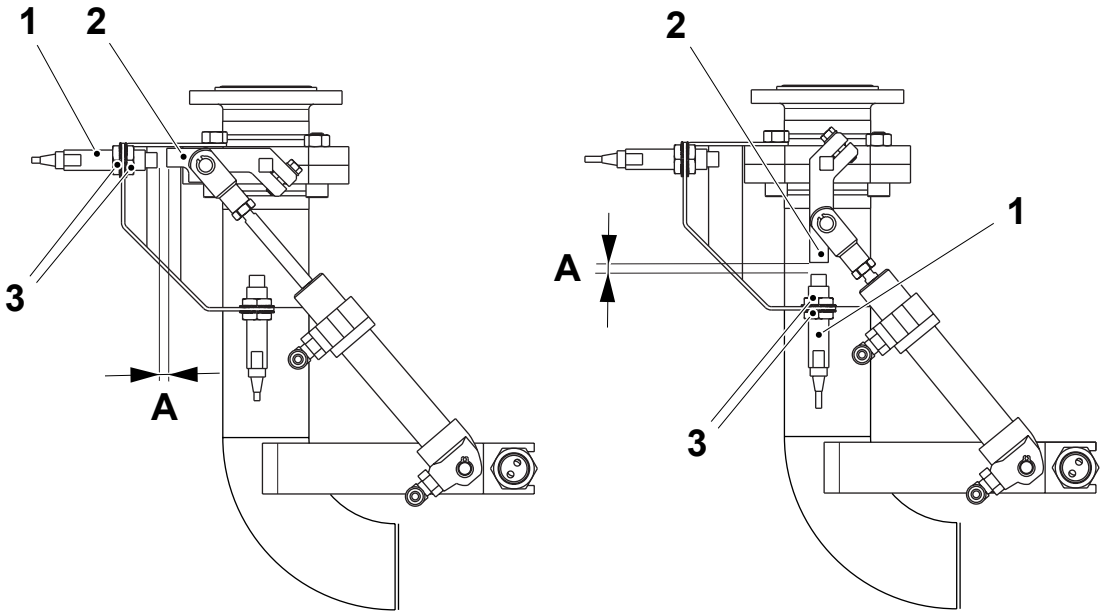
WARNING

Risk of burns.

Follow the Safety precautions.

Set the distance **A** between the sensors head (1) and the lever (2) by means of the nuts (3).

A = max. 3.0 mm



1 Sensor
2 Lever
3 Nut

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.2.11 Sterile Air Blower (OE)

1.2.11-1 Sterile Air Blower (OE) - Set

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF Packaging Material Threaded
SPC Reference	1095755-0200 2509605-0200

Note! Valid for TPA 500 Sq, TPA 330 Sq, TPA 250 Sq and TPA 1000 Sq.

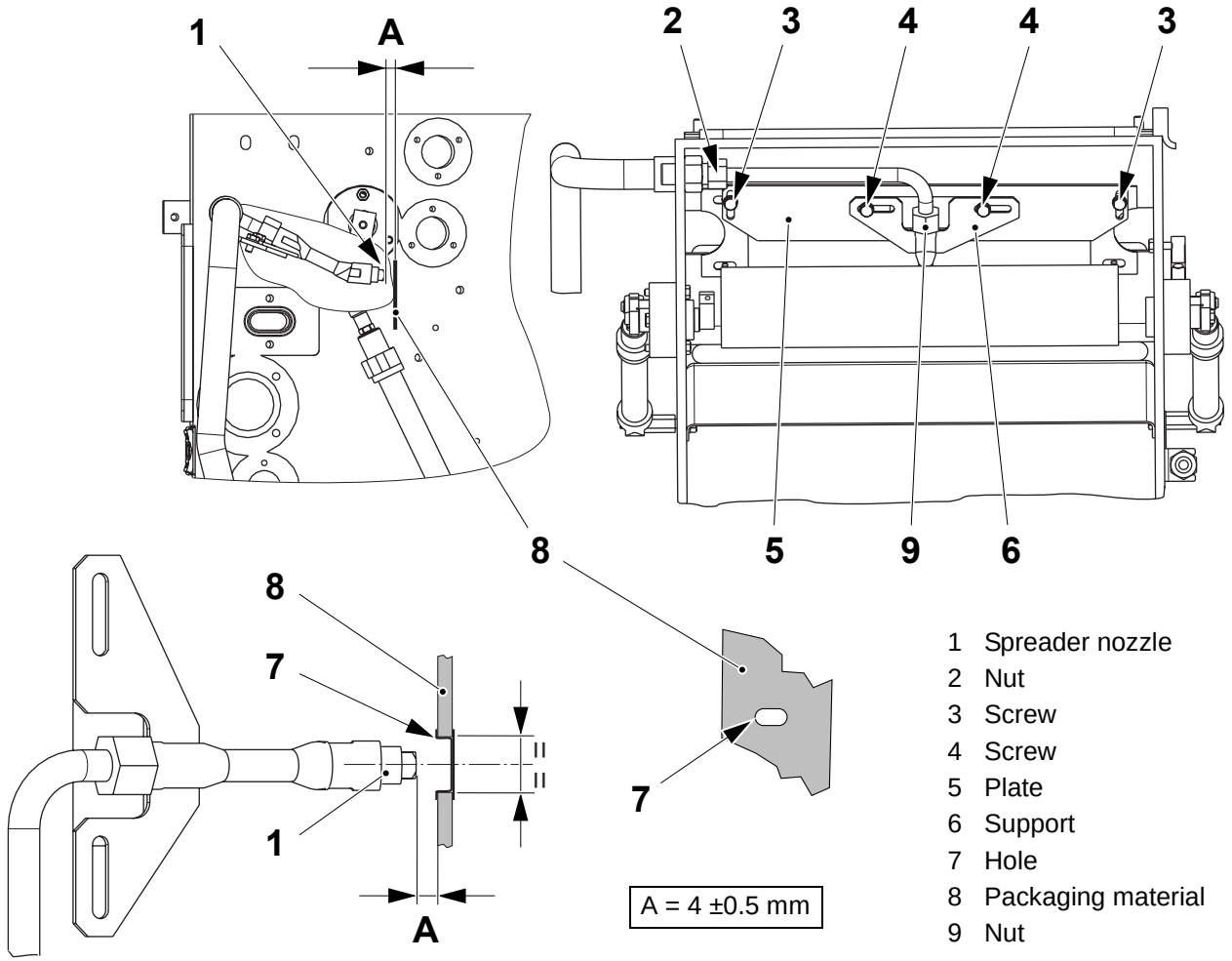
a) Loosen the screws (3).

b) Set the distance **A** between the spreader nozzle (1) and the packaging material (8) by adjusting the plate (5) position. Tighten the screws (3).

c) Loosen the nut (2), the screws (4) and the nut (9).

d) Set the spreader nozzle (1) so that it is positioned in the middle of the hole (7) by adjusting the support (6) position.

e) Tighten the nut (2), the screws (4) and the nut (9).



1 Spreader nozzle
2 Nut
3 Screw
4 Screw
5 Plate
6 Support
7 Hole
8 Packaging material
9 Nut

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1.3 Filling System

SPC Reference	1095782-0300

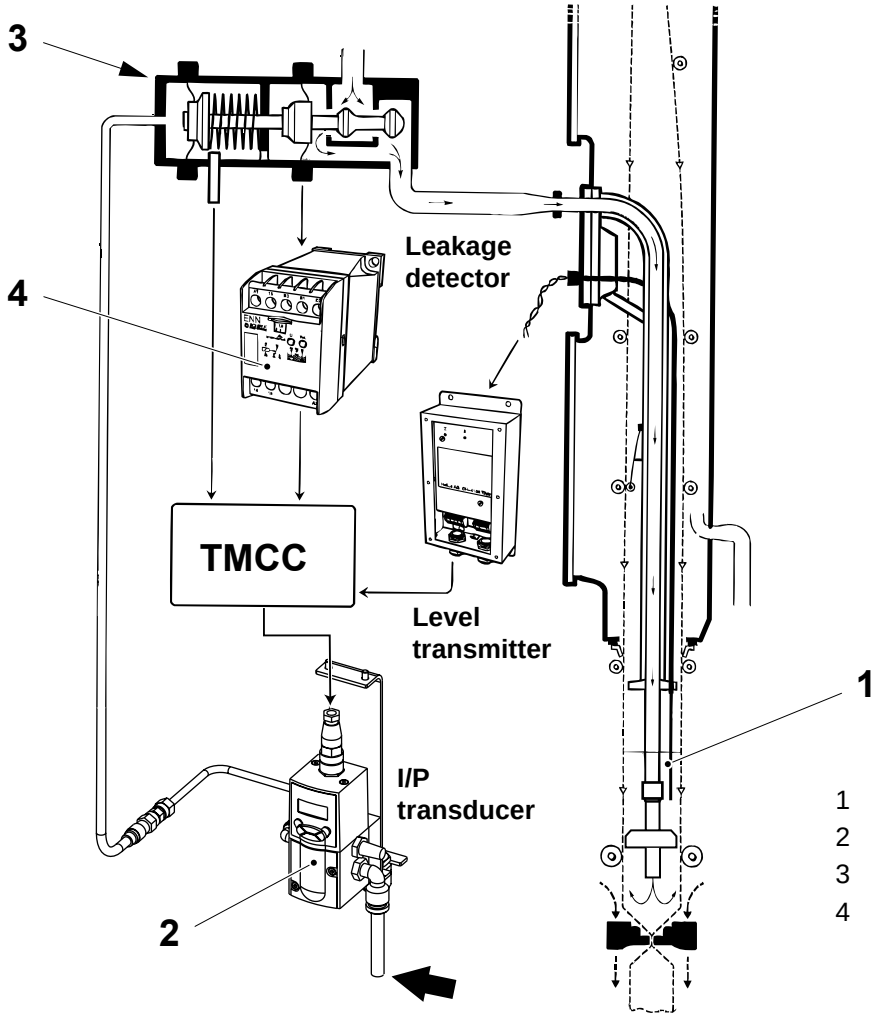
1.3-1 Filling System - Description (Level Probe)

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095782-0300

The level probe (1) uses the conductivity in the product to determine the level inside the paper tube and transmit a signal to the TMCC.

The electrical signal is converted to a compressed air signal in an IP transducer (2), which regulates the air pressure to the regulating valve (3) to keep constant the product flow even if the product pressure changes.

A leakage detector (4) detects leaks in the membranes of the regulating valve (3).



1 Level probe
2 IP transducer
3 Regulating valve
4 Leakage detector

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

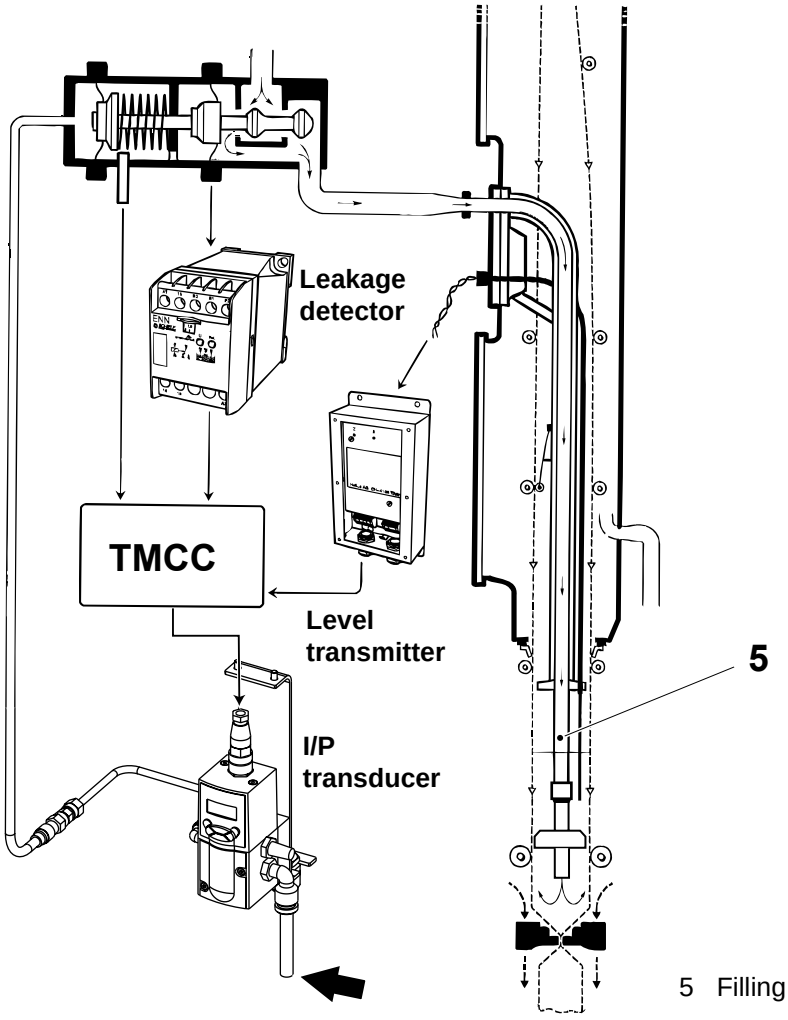
(Cont'd)

Change membranes if the alarm lights up.

See also 1.3.2-1 Flow Regulator - Overhaul Regulating Valve.

The filling pipe (5) consists of two parts; the outlet that is below the product level to prevent foaming, and the counter pressure flange to increase the pressure at the bottom of the paper tube when the jaw system forms the package.

On a standard machine there is a pipe that can be manually turned to the CIP position.



5 Filling pipe

TechPub_2614345_0105 - 01_MM81534_11en.fm

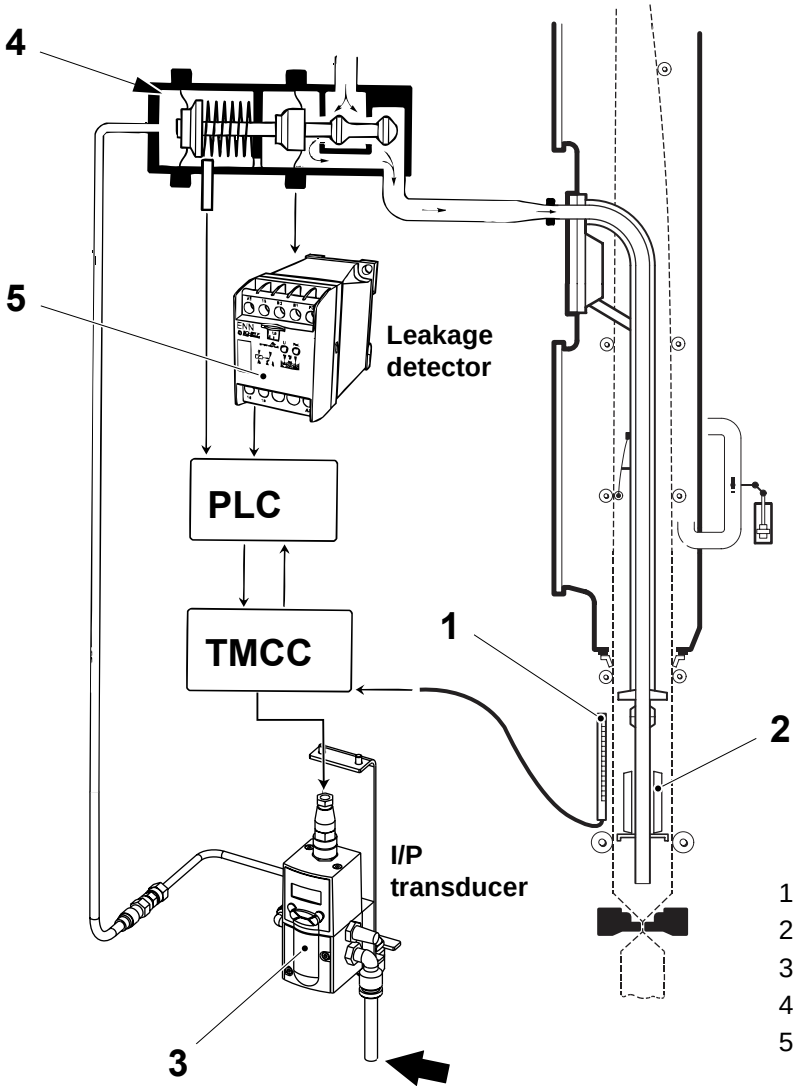
1.3-2 Filling System - Description (Floater)

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095782-0300

The magnetic level detector (1) uses the position of the floater (2) to determine the level of the product inside the paper tube and transmit a signal to the TMCC.

The electrical signal is converted to a compressed air signal in an IP transducer (3), which regulates the air pressure to the regulating valve (4) to keep constant the product flow even if the product pressure changes.

A leakage detector (5) detects leaks in the membranes of the regulating valve (4).



1 Level detector
2 Floater
3 IP transducer
4 Regulating valve
5 Leakage detector

(Cont'd)

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(Cont'd)

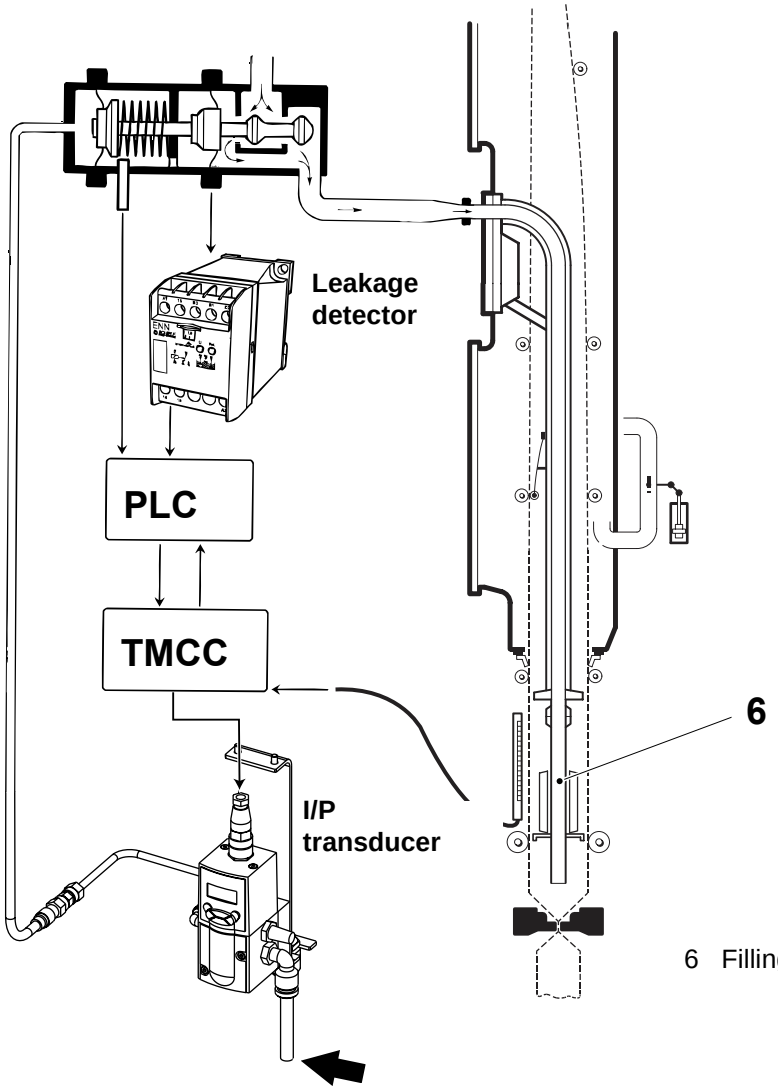
Change membranes if the alarm lights up.

See also 1.3.2-1 Flow Regulator - Overhaul Regulating Valve.

The filling pipe (6) consists of two parts; the outlet that is below the product level to prevent foaming, and the counter pressure flange to increase the pressure at the bottom of the paper tube when the jaw system forms the package.

On a standard machine there is a pipe that can be manually turned to the CIP position.

Note! For level control device instructions, see 2.8 Level Control Device Floater.



6 Filling pipe

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1.3.1 Product Valve Group

1.3.1-1 Product Valve Group - Remove Pneumatic Cylinders, AP-valve

Machine Status	Mains Power OFF Air OFF Steam OFF Water OFF
Special Equipment	Handle tool TP No.449969-101
SPC Reference	1035016-0300

WARNING

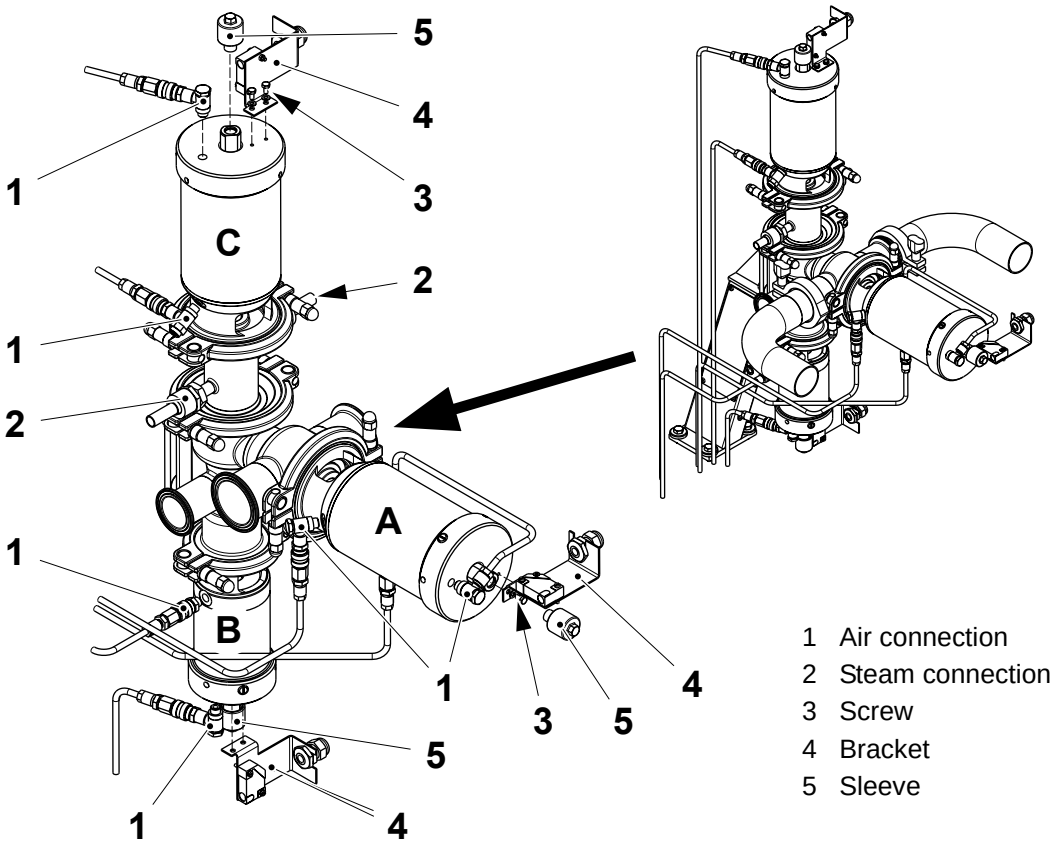
Risk of personal injury.

Make sure that the steam and the compressed air have been turned off. Make sure that there is no product, steam or cleaning liquid on the line. In case of an accident call for medical attention.

a) Remove the air connections (1) and, when required, the steam connections (2) from the cylinders.

b) Remove the screws (3) and the proximity switch brackets (4).

c) Screw out the sleeves (5) from the cylinders.



1 Air connection
2 Steam connection
3 Screw
4 Bracket
5 Sleeve

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

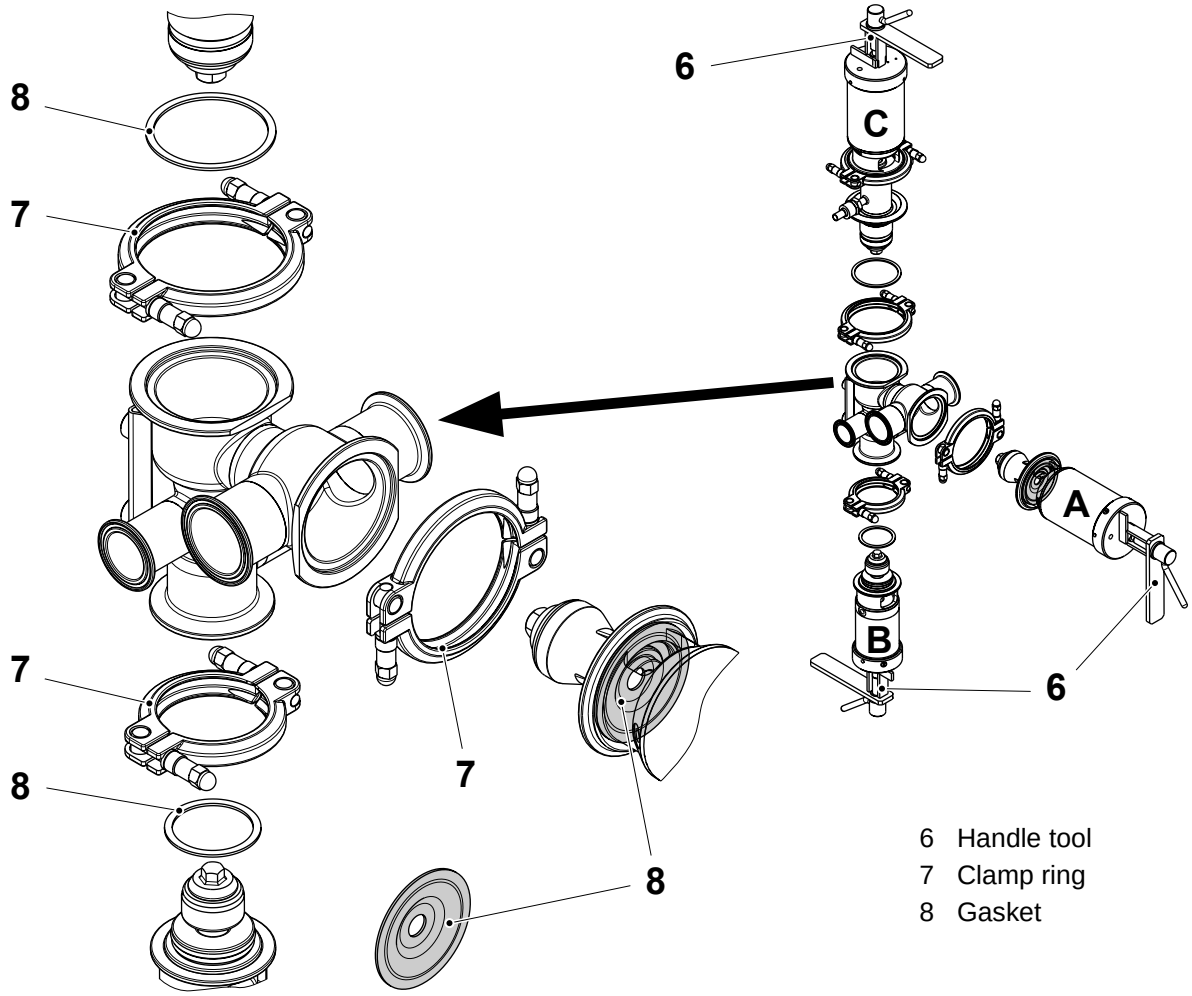
d) Fit the handle tool (6) and turn the handle clockwise (approximately 5 turns) to release the piston pressure from the valve site.

e) Remove the clamp ring (7) and the valve **A**.

f) Check the gasket (8) and change it as required.

g) Change the O-rings as required, see 1.3.1-3 Product Valve Group - Change O-rings, AP-valve.

h) Repeat the same procedure for the valves **B** and **C**.



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1.3.1-2 Product Valve Group - Change Seals and Membranes, AP-valve

Machine Status	Mains Power OFF, Air OFF Steam OFF, Water OFF
Special Equipment	Torque wrench min. 50 Nm Handle tool TP No.449969-101
SPC Reference	1035016-0300

WARNING

Risk of personal injury.

Make sure that the steam and the compressed air have been turned off.
Make sure that there is **no product, steam or cleaning liquid** on the line.
In case of an accident call for medical attention.

Product Valve (A)

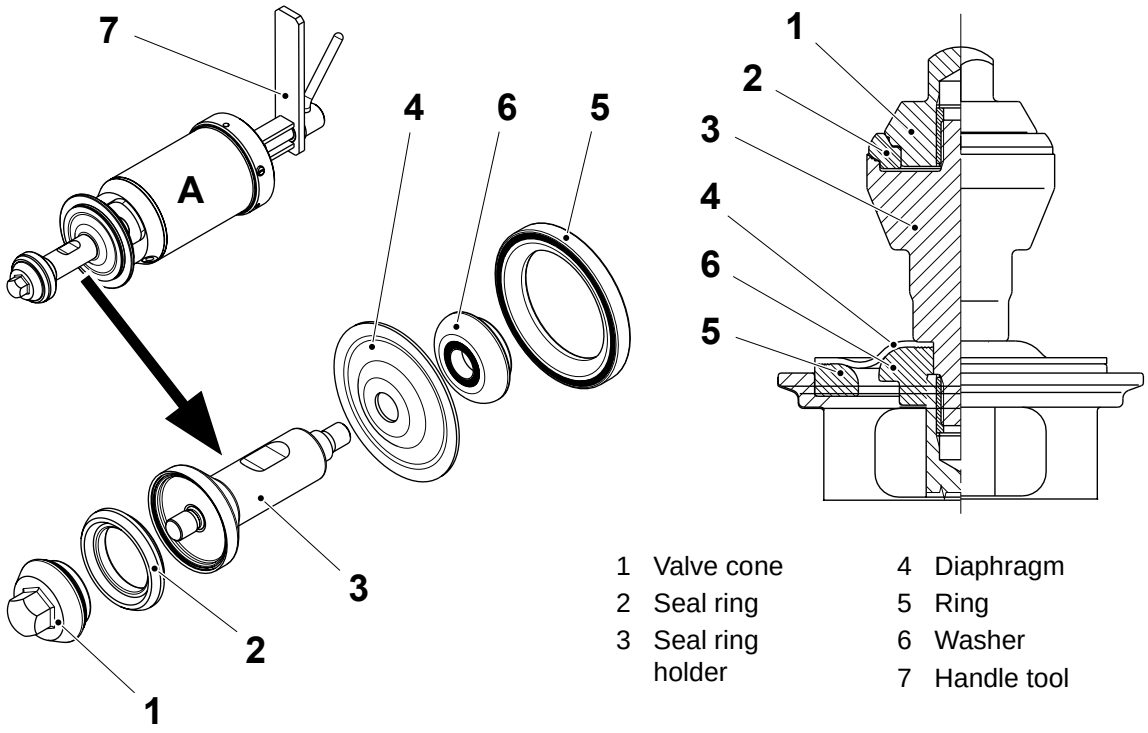
a) Remove the valve, see 1.3.1-1 Product Valve Group - Remove Pneumatic Cylinders, AP-valve.

b) Release the cylinder spring completely by means of the handle tool (7).

c) Remove the valve cone (1). Check the seal ring (2) and change it as required.

d) Remove the seal ring holder (3), the diaphragm (4), the ring (5) and the washer (6). Check the diaphragm (4) for damage and change as required.

e) Fit back the ring (5) and the washer (6) in the cylinder housing with the grooves facing upwards.



1 Valve cone
2 Seal ring
3 Seal ring holder
4 Diaphragm
5 Ring
6 Washer
7 Handle tool

(Cont'd)

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(Cont'd)

f) Fit the new diaphragm (4) and the complete seal ring holder (3) onto the piston rod.

WARNING

Risk of serious production fault.

Make sure to fit the diaphragm (4) with the bulge facing away from the valve.

g) Tighten the seal ring holder (3) completely.

h) Fit the seal ring (2) and the valve cone (1).

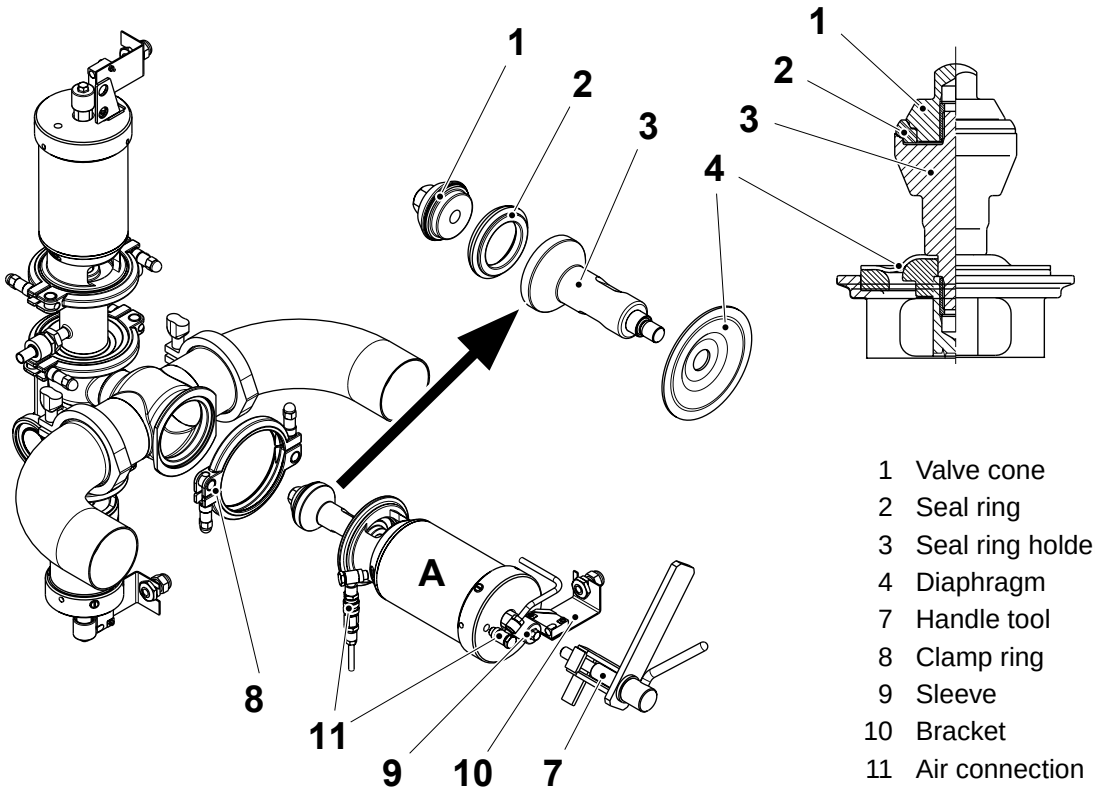
Note! Slowly tighten the valve cone (1) with a torque wrench set to **50 Nm**. Repeat every 10-20 seconds, allowing the diaphragm (4) to penetrate into the grooves of the parts.

i) Compress the cylinder spring completely by means of the tool (7).

j) Fit the cylinder and tighten the clamp ring (8).

k) Remove the tool (7) and screw the sleeve (9) onto the cylinder.

l) Fit back the proximity switch bracket (10) and the air connections (11).



1 Valve cone
2 Seal ring
3 Seal ring holder
4 Diaphragm
7 Handle tool
8 Clamp ring
9 Sleeve
10 Bracket
11 Air connection

(Cont'd)

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(Cont'd)

Sterile Air Valve (B)

a) Remove the valve, see 1.3.1-1 Product Valve Group - Remove Pneumatic Cylinders, AP-valve.

b) Release the cylinder spring completely by means of the handle tool (7).

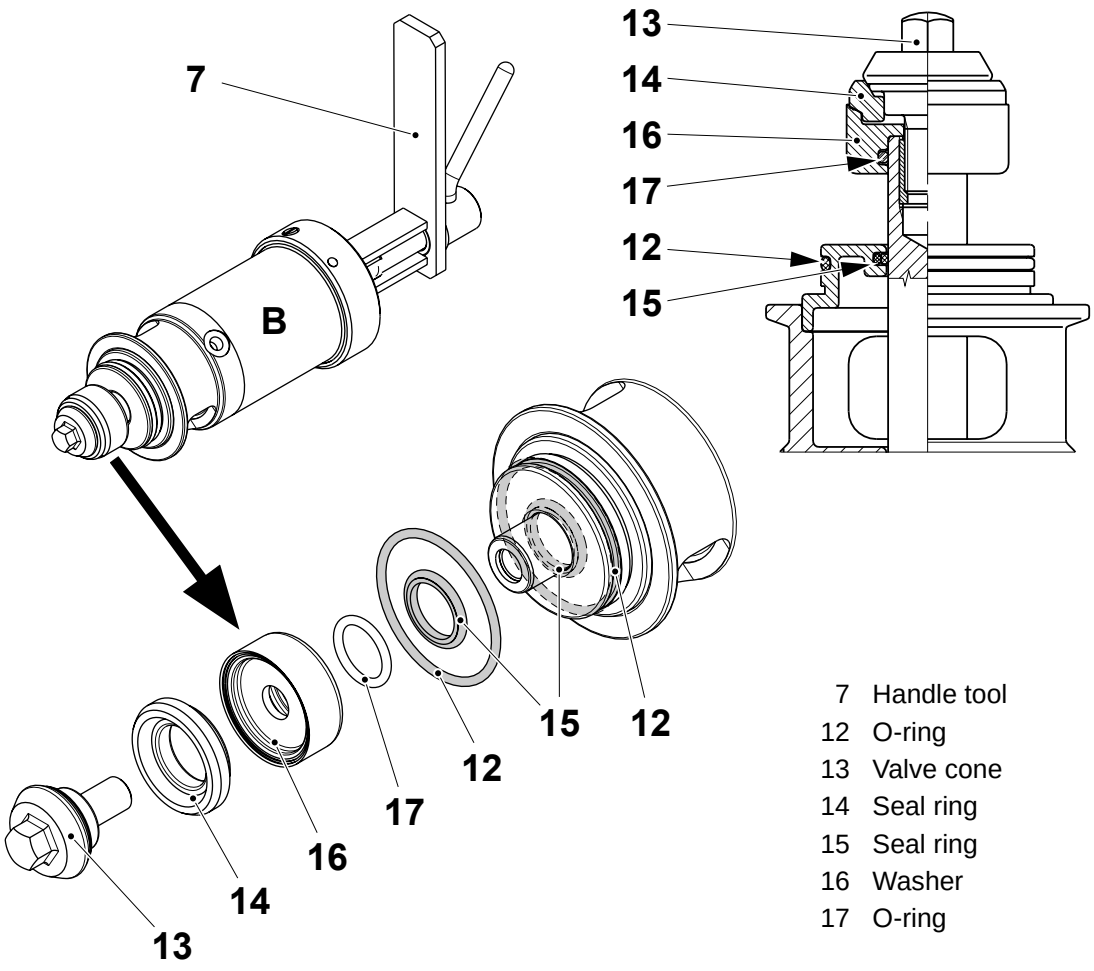
c) Change the O-ring (12).

d) Remove the valve cone (13) and change the seal rings (14) and (15).

e) Remove the washer (16) and change the O-ring (17).

f) Assemble in the reverse order.

Note! Tighten the valve cone (13) with a torque wrench set to **50 Nm**.



7 Handle tool
12 O-ring
13 Valve cone
14 Seal ring
15 Seal ring
16 Washer
17 O-ring

(Cont'd)

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(Cont'd)

Steam Valve (C)

a) Remove the valve, see 1.3.1-1 Product Valve Group - Remove Pneumatic Cylinders, AP-valve.

b) Release the cylinder spring completely by means of the handle tool (7).

c) Remove the valve cone (18) and the ring (19).

d) Check the seal rings (20) and change as required.

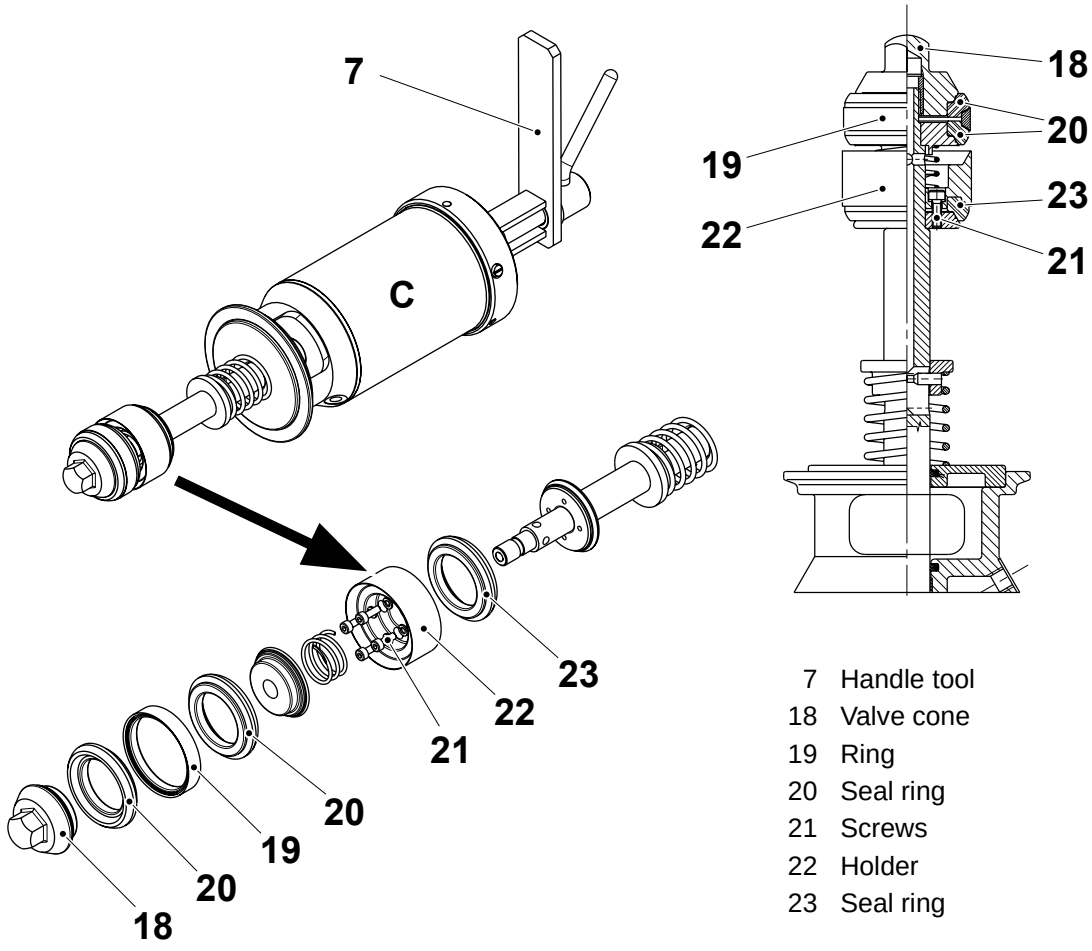
e) Loosen the screws (21) and remove the holder (22).

f) Check the seal ring (23) and change as required.

g) Assemble in the reverse order.

h) Tighten the valve cone (18) with a torque wrench set to **50 Nm**.

Note! If the product has a high viscosity, the steam valve **C** takes longer to close.



7 Handle tool
18 Valve cone
19 Ring
20 Seal ring
21 Screws
22 Holder
23 Seal ring

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1.3.1-3 Product Valve Group - Change O-rings, AP-valve

Machine Status	Mains Power OFF Air OFF Steam OFF Water OFF
Special Equipment	Handle tool TP No.449969-101
Consumables	Silicon grease code L
SPC Reference	1035016-0300

WARNING

Risk of personal injury.

Make sure that the steam and the compressed air have been turned off.
Make sure that there is **no product, steam or cleaning liquid** on the line.
In case of an accident call for medical attention.

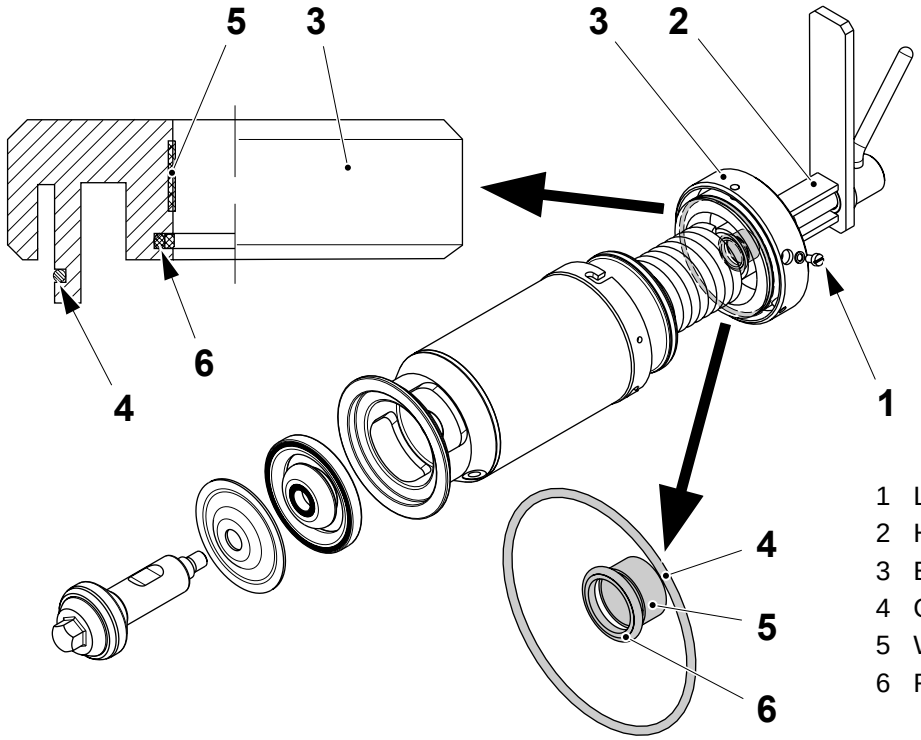
A-Cylinder (Product Valve)

a) Remove the product valve, see 1.3.1-2 Product Valve Group - Change Seals and Membranes, AP-valve.

b) Remove the lock screw (1).

c) Loosen the handle tool (2) and remove the end section (3).

d) Check the O-ring (4), the wear ring (5) and the rod seal (6). Change as required.



1 Lock screw
2 Handle tool
3 End section
4 O-ring
5 Wear ring
6 Rod seal

(Cont'd)

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(Cont'd)

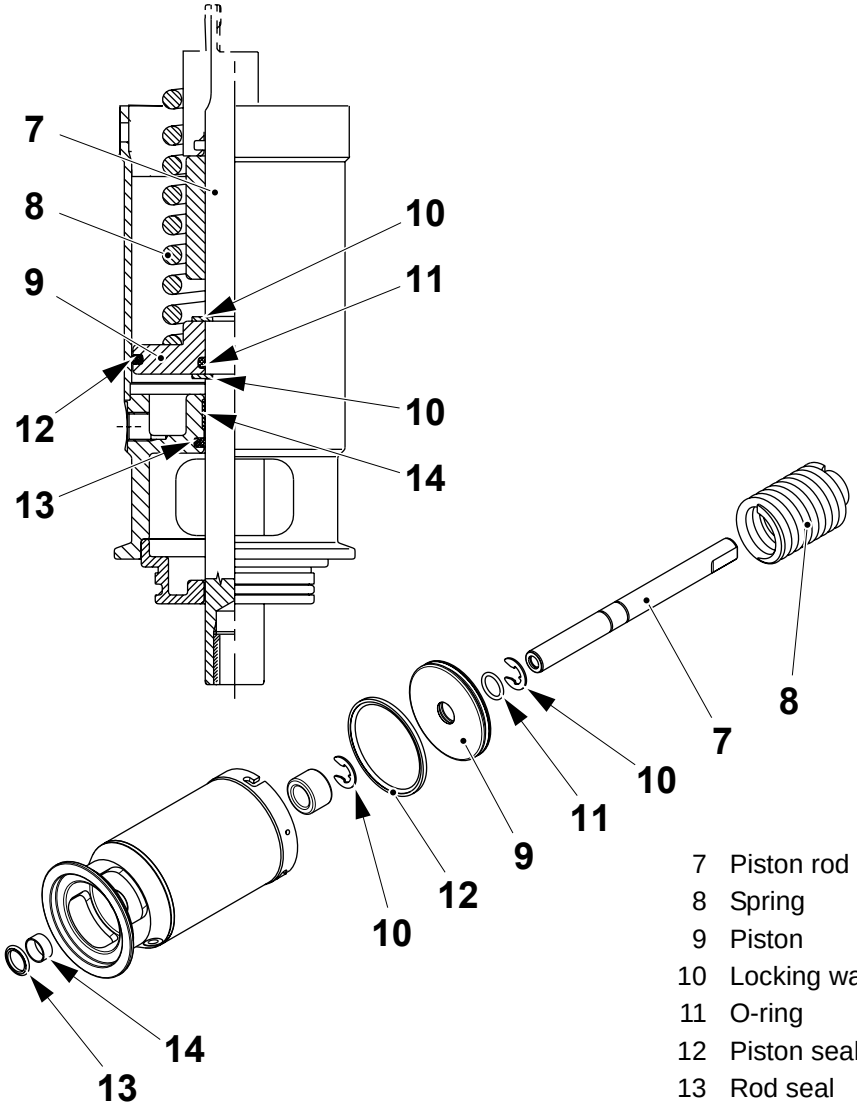
e) Remove the piston rod (7) with the spring (8) and the piston (9).

f) Remove the locking washers (10) and disassemble the piston (9) from the piston rod (7).

g) Check the O-ring (11), the piston seal (12), the rod seal (13) and the wear ring (14). Change as required.

h) Lubricate the threads of the piston rod (7) with silicon grease code L, see 10.3-1 Lubricants.

i) Assemble in the reverse order.



7 Piston rod
8 Spring
9 Piston
10 Locking washers
11 O-ring
12 Piston seal
13 Rod seal
14 Wear ring

(Cont'd)

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(Cont'd)

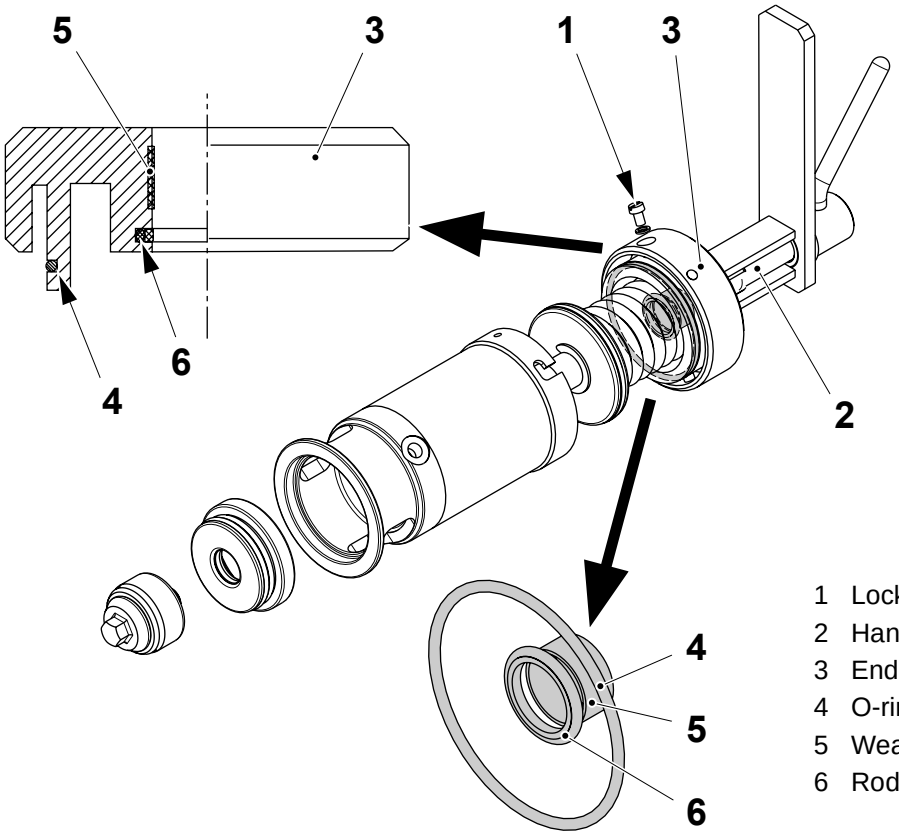
B-Cylinder (Sterile Air Valve)

a) Remove the sterile air valve, see 1.3.1-2 Product Valve Group - Change Seals and Membranes, AP-valve.

b) Remove the lock screw (1).

c) Loosen the handle tool (2) and remove the end section (3).

d) Check the O-ring (4), the wear ring (5) and the rod seal (6). Change as required.



1 Lock screw
2 Handle tool
3 End section
4 O-ring
5 Wear ring
6 Rod seal

TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

(Cont'd)

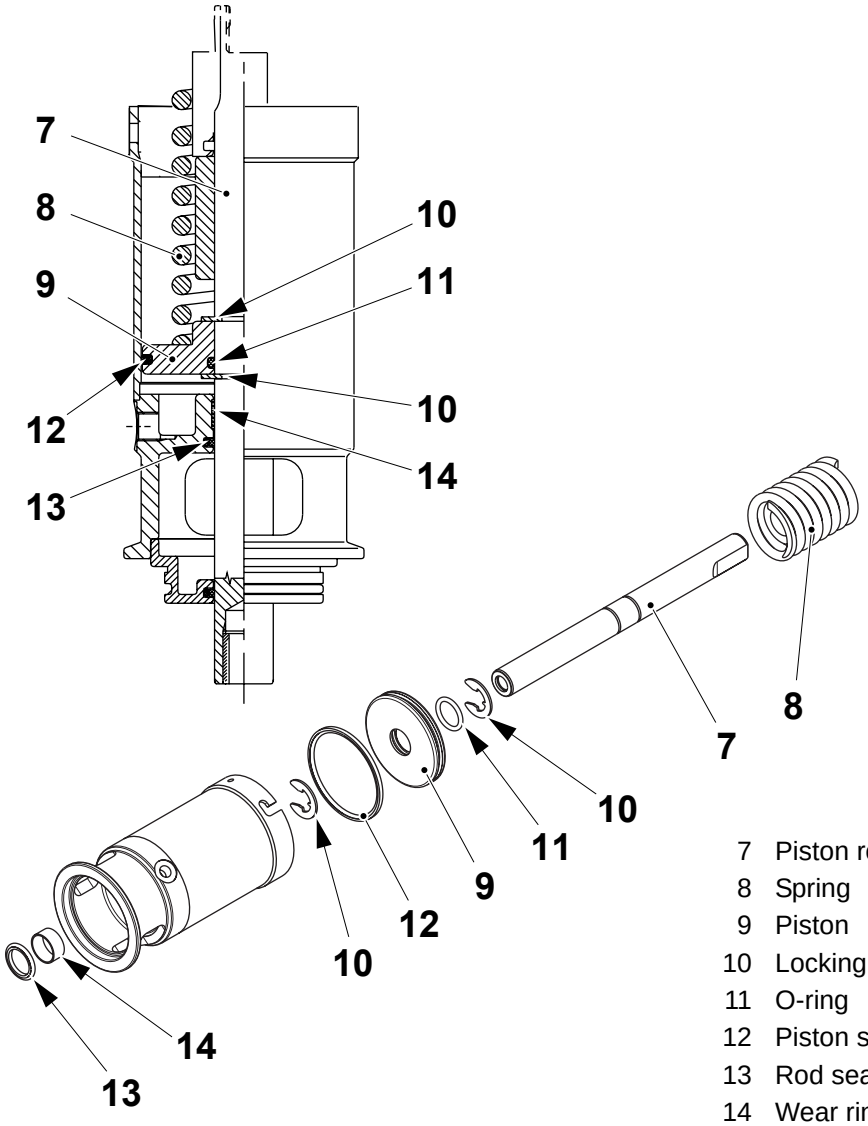
e) Remove the piston rod (7) with the spring (8) and the piston (9).

f) Remove the locking washers (10) and disassemble the piston (9) from the piston rod (7).

g) Check the O-ring (11), the piston seal (12), the rod seal (13) and the wear ring (14). Change as required.

h) Lubricate the threads of the piston rod (7) with silicon grease code L, see 10.3-1 Lubricants.

i) Assemble in the reverse order.



7 Piston rod
8 Spring
9 Piston
10 Locking washers
11 O-ring
12 Piston seal
13 Rod seal
14 Wear ring

(Cont'd)

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(Cont'd)

C-Cylinder (Steam Valve)

a) Remove the steam valve, see 1.3.1-2 Product Valve Group - Change Seals and Membranes, AP-valve.

b) Remove the lock screw (1).

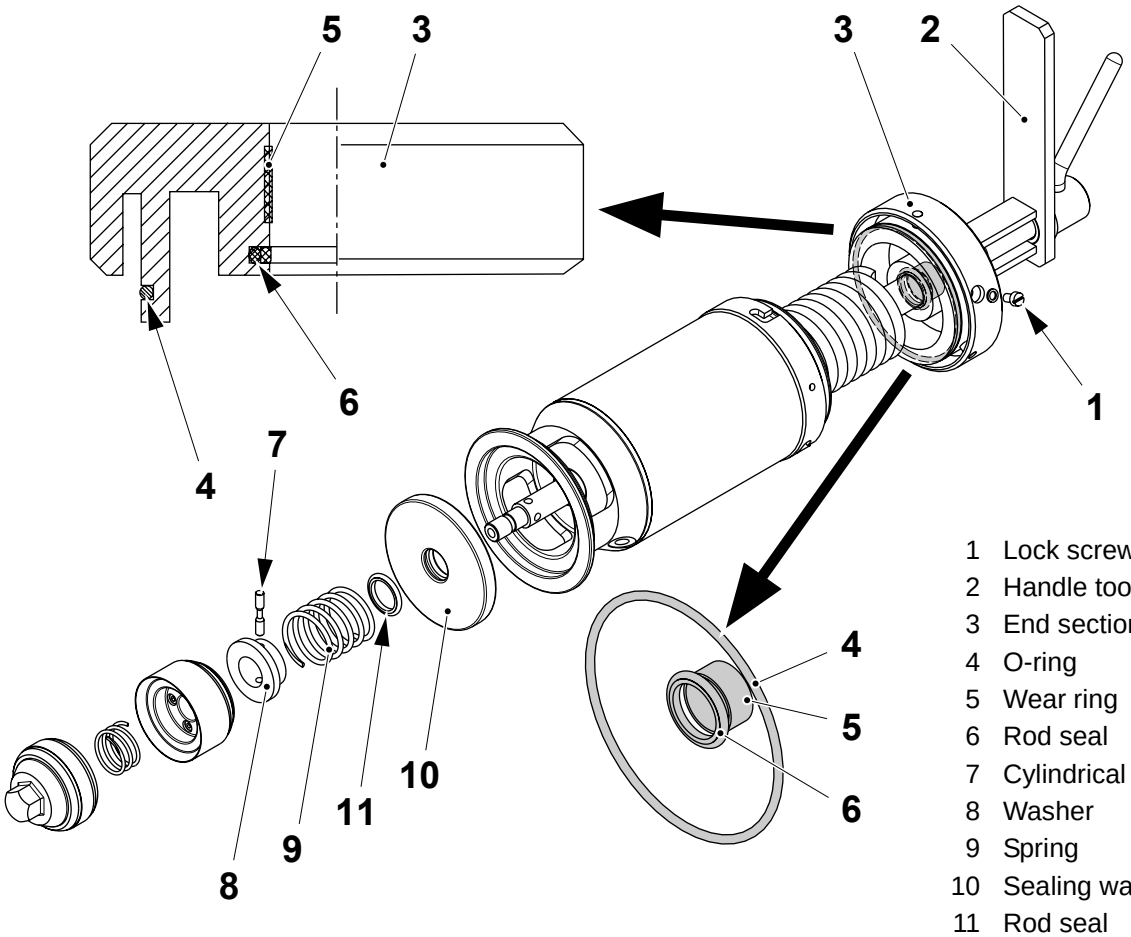
c) Loosen the handle tool (2) and remove the end section (3).

d) Check the O-ring (4), the wear ring (5) and the rod seal (6). Change as required.

e) Remove the cylindrical pin (7), the washer (8) and the spring (9).

f) Remove the sealing washer (10).

g) Check the rod seal (11). Change as required.



1 Lock screw
2 Handle tool
3 End section
4 O-ring
5 Wear ring
6 Rod seal
7 Cylindrical pin
8 Washer
9 Spring
10 Sealing washer
11 Rod seal

(Cont'd)

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(Cont'd)

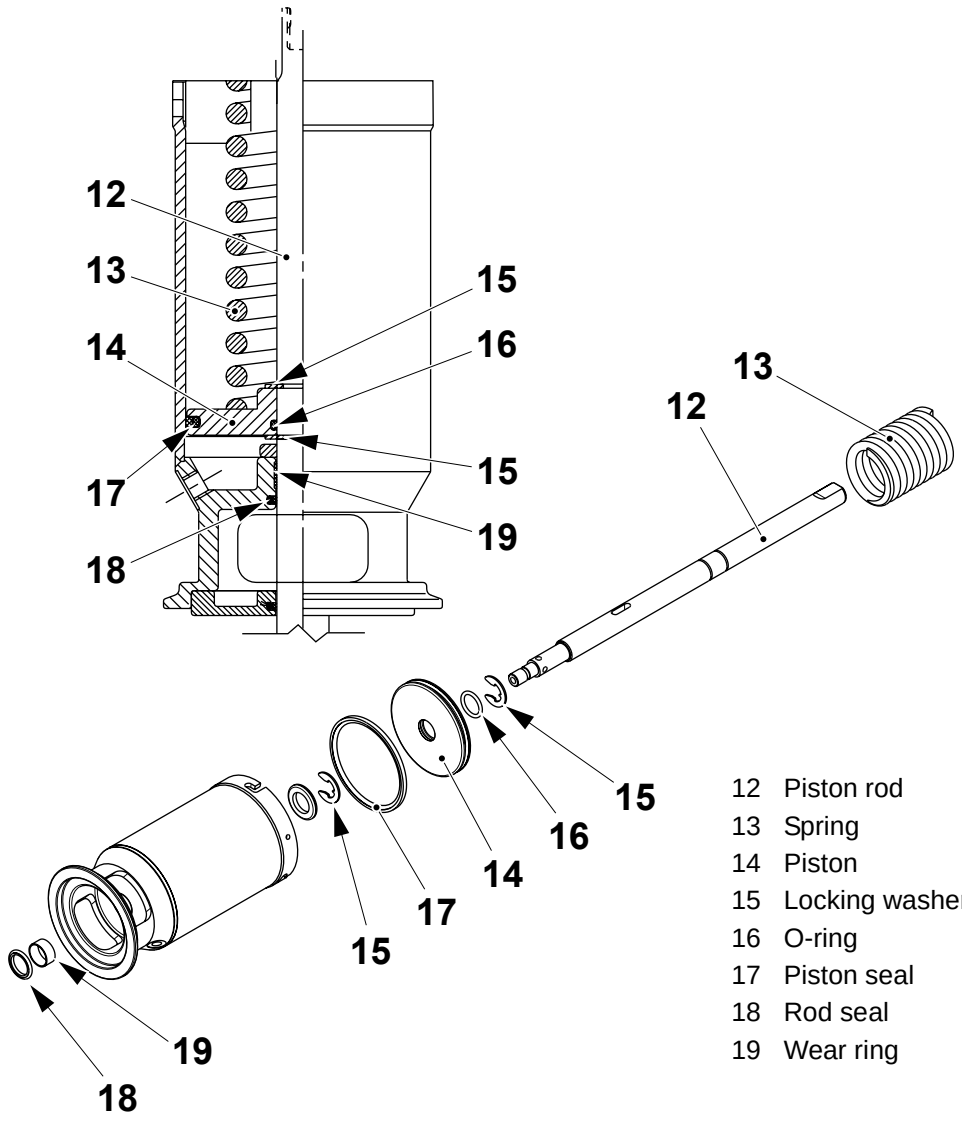
h) Remove the piston rod (12) with the spring (13) and the piston (14).

i) Remove the locking washers (15) and disassemble the piston (14) from the piston rod (12).

j) Check the O-ring (16), the piston seal (17), the rod seal (18) and the wear ring (19). Change as required.

k) Lubricate the threads of the piston rod (12) with silicon grease code L, see 10.3-1 Lubricants.

l) Assemble in the reverse order.



12 Piston rod
13 Spring
14 Piston
15 Locking washers
16 O-ring
17 Piston seal
18 Rod seal
19 Wear ring

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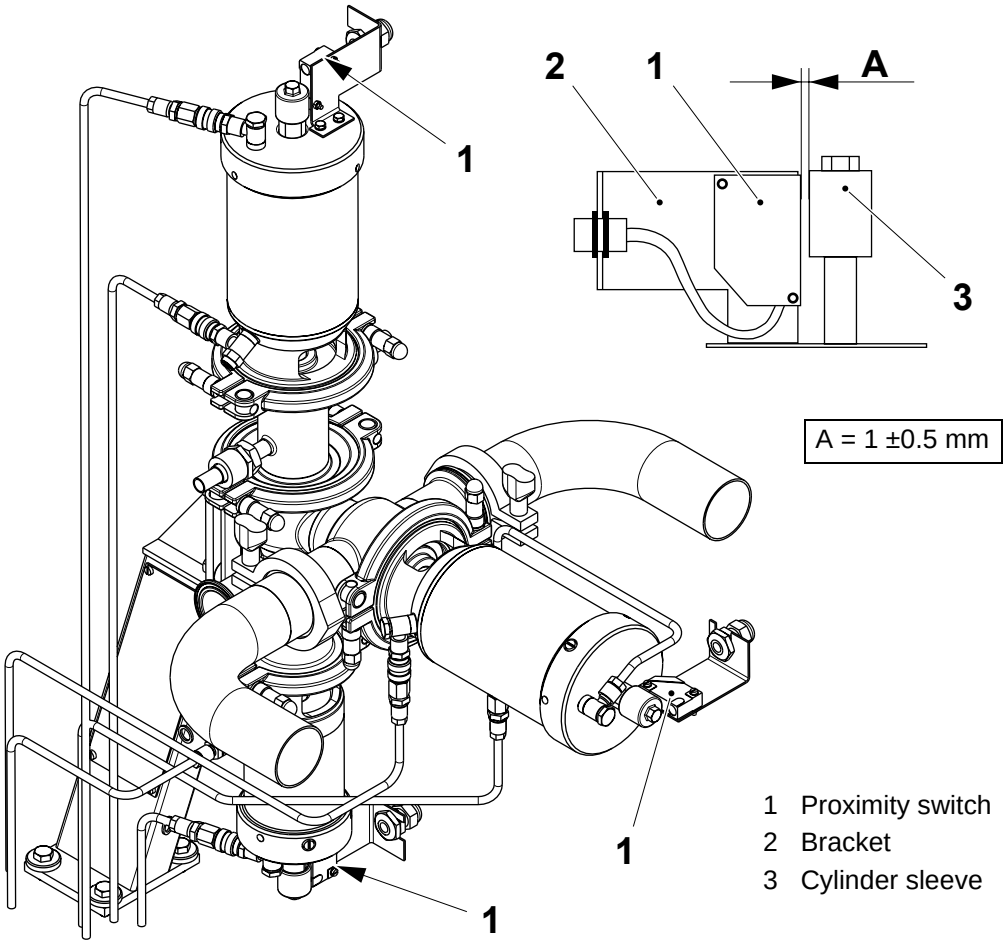
1.3.1-4 Product Valve Group - Set Proximity Switches

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1035016-0300

a) Set the position of the proximity switches (1) so that they are activated when the cylinder sleeve (3) is in its highest position.

b) Adjust by moving either the proximity switch (1) or the bracket (2).

c) Set the distance **A** between the proximity switch (1) and the cylinder sleeve (3).



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1.3.2 Flow Regulator

1.3.2-1 Flow Regulator - Overhaul Regulating Valve

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Spirit level TP No. 777200-101 Coupling wrench
SPC Reference	1095774-0300

Remove

a) Remove the pneumatic pipe (1) from the connection.

b) Loosen the screw (2) and remove the proximity switch (3) and its bracket.

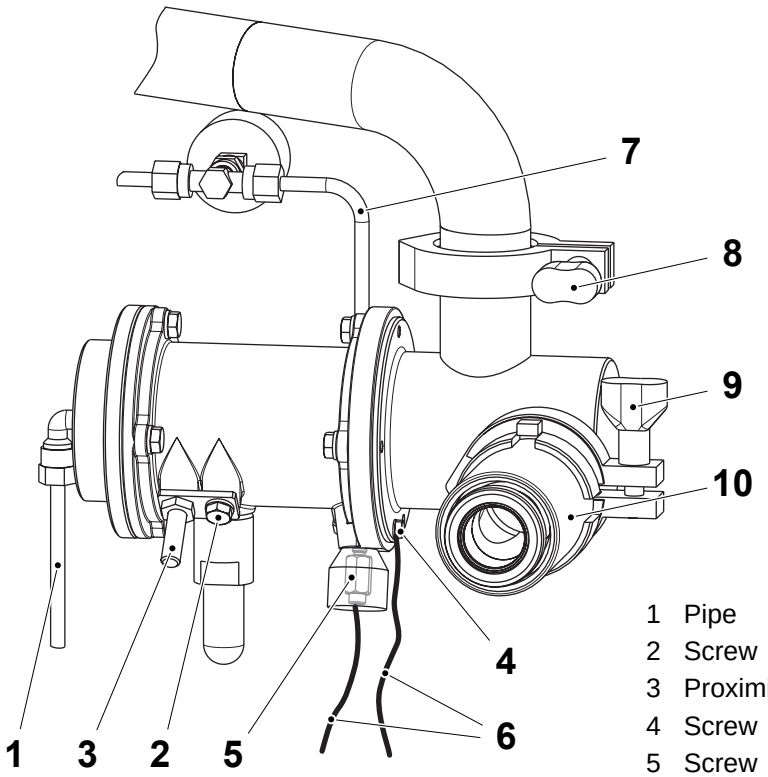
c) Loosen the screws (4) and (5) and remove both the electrical wires (6).

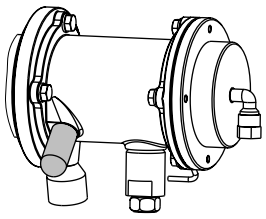
d) Remove the pipe (7) from the regulating valve.

e) Remove the clamp (8) and the locking device (9).

f) Loosen the nut (10) and pull out the regulating valve.

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Moved position of the air filter on the new variant of flow regulator.

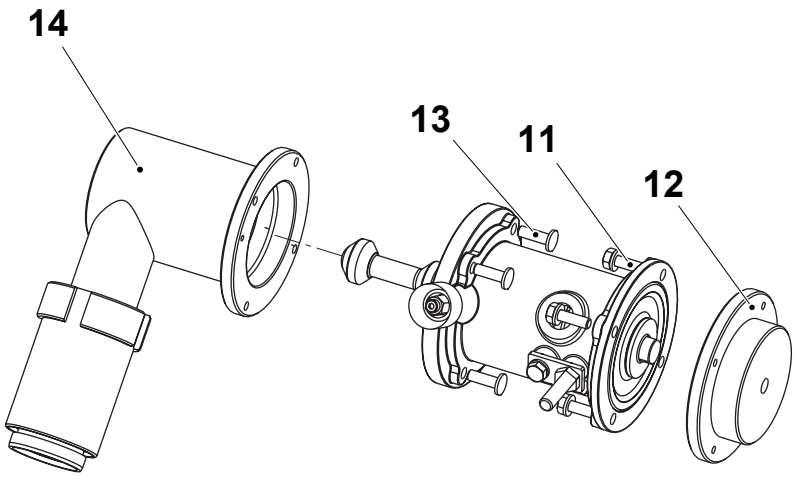
1 Pipe
2 Screw
3 Proximity switch
4 Screw
5 Screw
6 Wire
7 Pipe
8 Clamp
9 Locking device
10 Nut

(Cont'd)

(Cont'd)

g) Loosen the screws (11) and remove the cover (12) from the regulating valve.

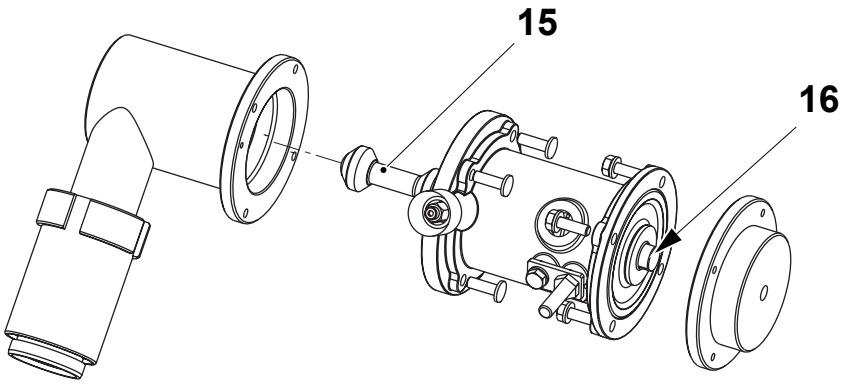
h) Loosen the screws (13) in small steps and in sequence, and **carefully** remove the regulator body (14) from the central body.



11 Screw
12 Cover
13 Screw
14 Regulator body

CAUTION
Risk of damage to the equipment.
Take care **not to damage** the shutter (15).

i) Remove the shutter (15) by locking the screw (16) and turning the shutter (15).



15 Shutter
16 Screw

(Cont'd)

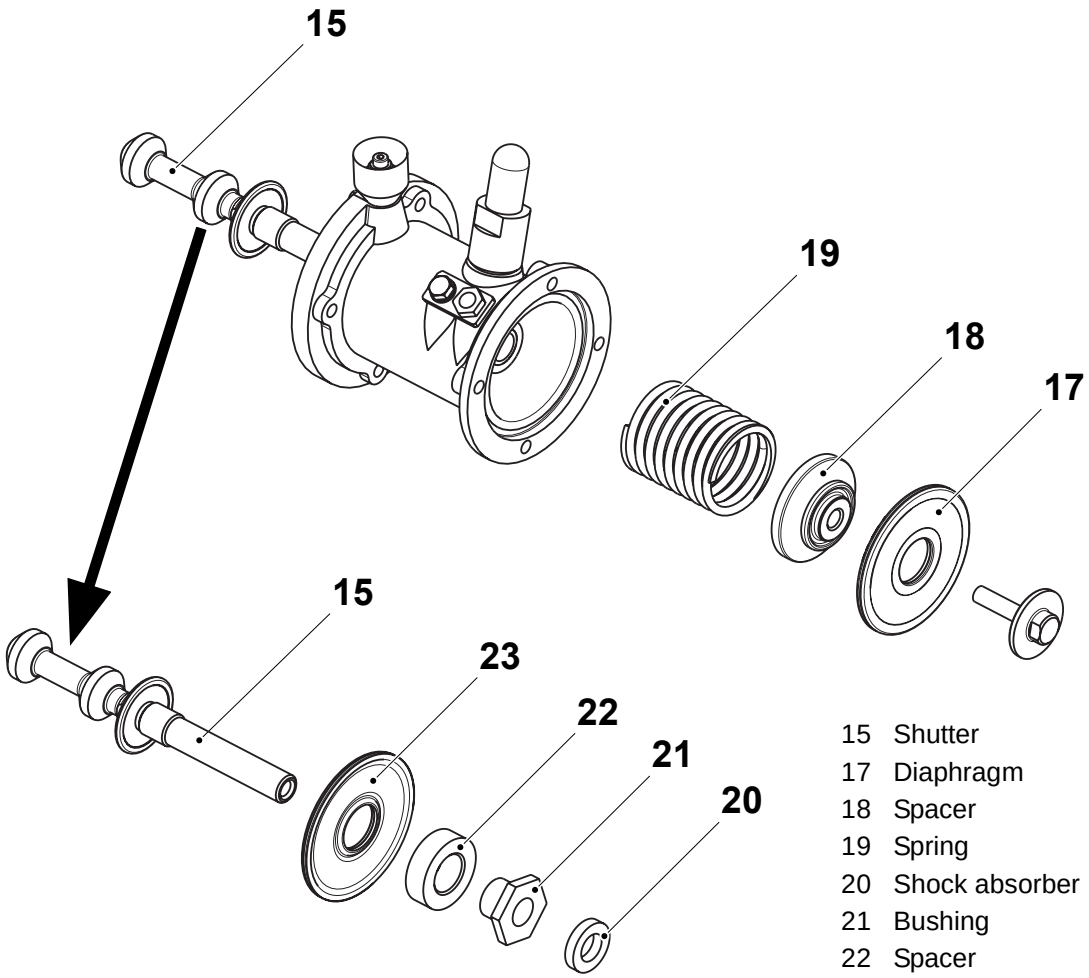
TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

j) Remove the diaphragm (17), the spacer (18), the spring (19) and pull out the shutter (15).

k) Remove the shock absorber (20). Loosen the bushing (21) and remove the spacer (22) and the diaphragm (23).

l) Change the diaphragms (17) and (23), the bushing (21) and the shock absorber (20) as required.



15 Shutter
17 Diaphragm
18 Spacer
19 Spring
20 Shock absorber
21 Bushing
22 Spacer
23 Diaphragm

(Cont'd)

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(Cont'd)

Assemble

CAUTION
Risk of damage to the equipment.
Make sure that all parts are **clean and dry**. **Do not** lubricate.

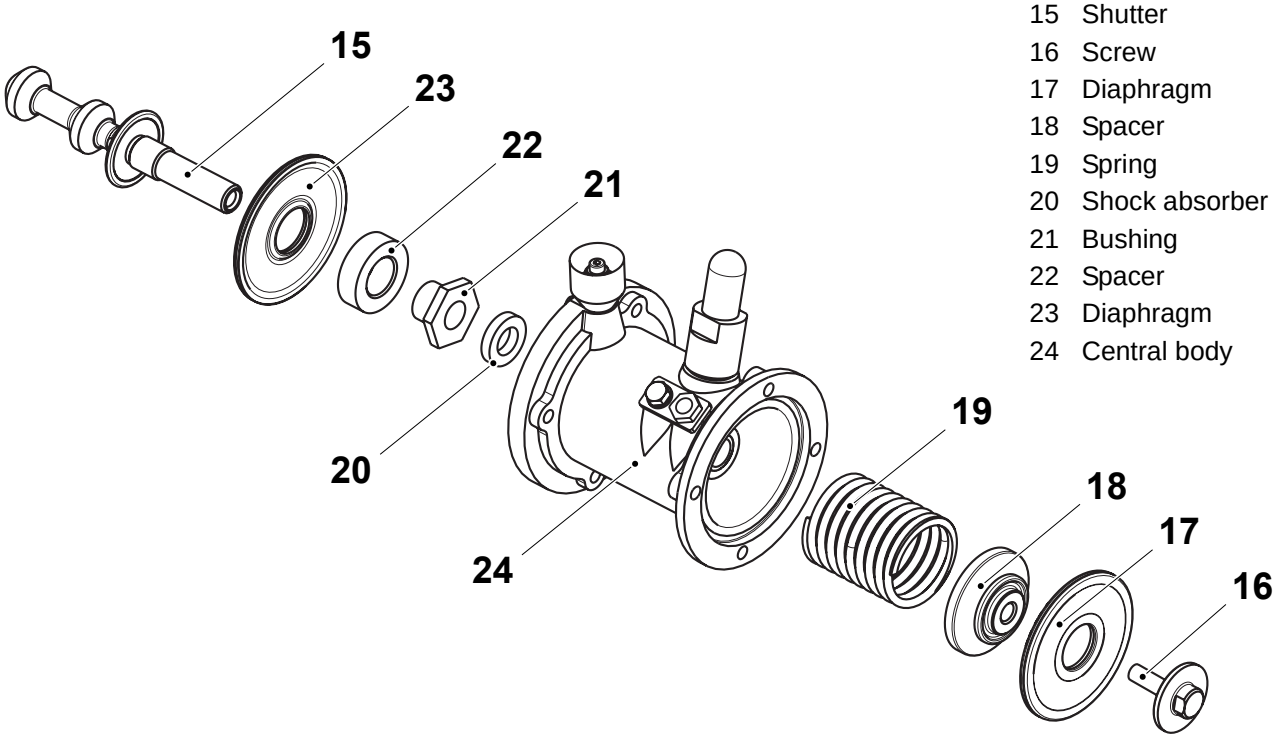
CAUTION
Risk of damage to the equipment.
Make sure **not to damage** the diaphragm (23) and that it is turned in the **correct direction** (the **transparent side** of the diaphragm (23) must be against the **product side**).

a) Assemble the diaphragm (23) and the spacer (22) on the shutter (15) and fit the bushing (21). Tighten until the bushing reaches its stop position.

b) Fit the shock absorber (20) on the shutter (15) and insert the shutter assembly in the central body (24).

CAUTION
Risk of damage to the equipment.
Make sure **not to damage** the diaphragm (17) and that it is turned in the **correct direction** (the t**ransparent side** of the diaphragm (17) must be against the **air side**).

c) Fit the spring (19), the spacer (18), the diaphragm (17) into the central body (24) by means of the screw (16).



15 Shutter
16 Screw
17 Diaphragm
18 Spacer
19 Spring
20 Shock absorber
21 Bushing
22 Spacer
23 Diaphragm
24 Central body

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(Cont'd)

CAUTION
Risk of damage to the equipment.
Be careful **not to bend** the shutter (15).

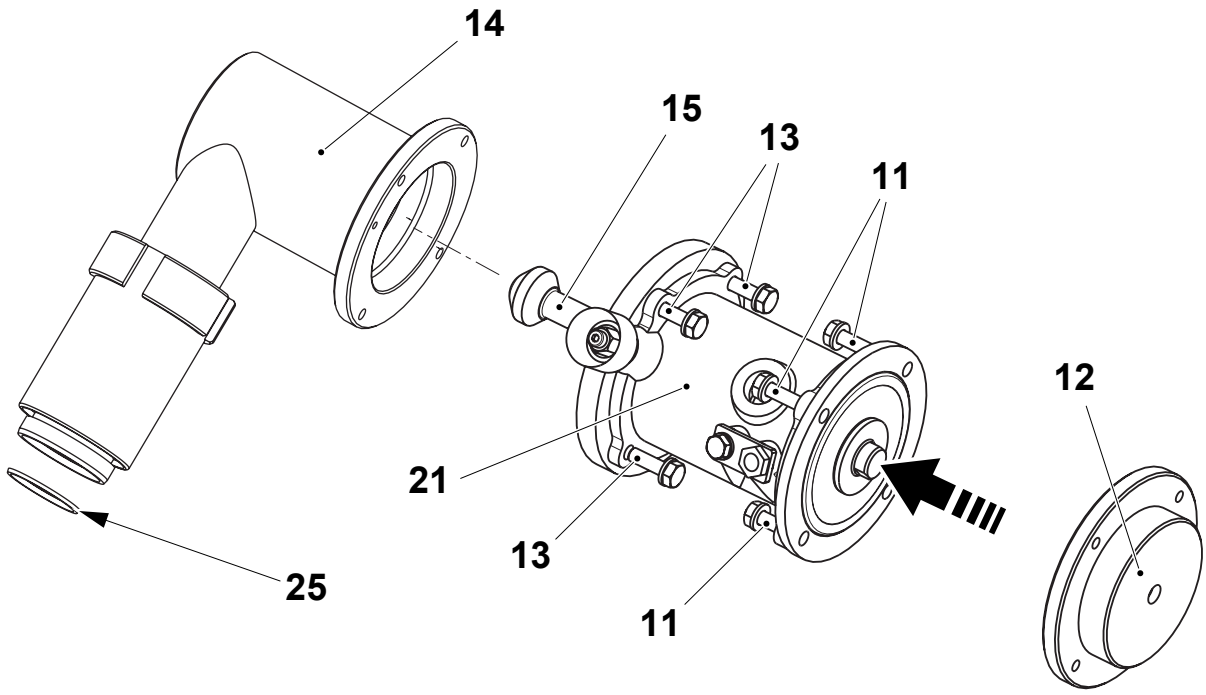
d) Fit the regulator body (14) to the central body (21). Tighten the screws (13) crosswise in small steps.

e) Check, by manually pushing the screw, see arrow, so that the shutter (15) **moves smoothly**.

f) If not, change the shutter (15) as required.

g) Fit the cover (12) to the central body (21). Tighten the screws (11) crosswise.

h) Change the gasket (25).



11 Screw
12 Cover
13 Screw
14 Regulator body
15 Shutter
21 Central body
25 Gasket

(Cont'd)

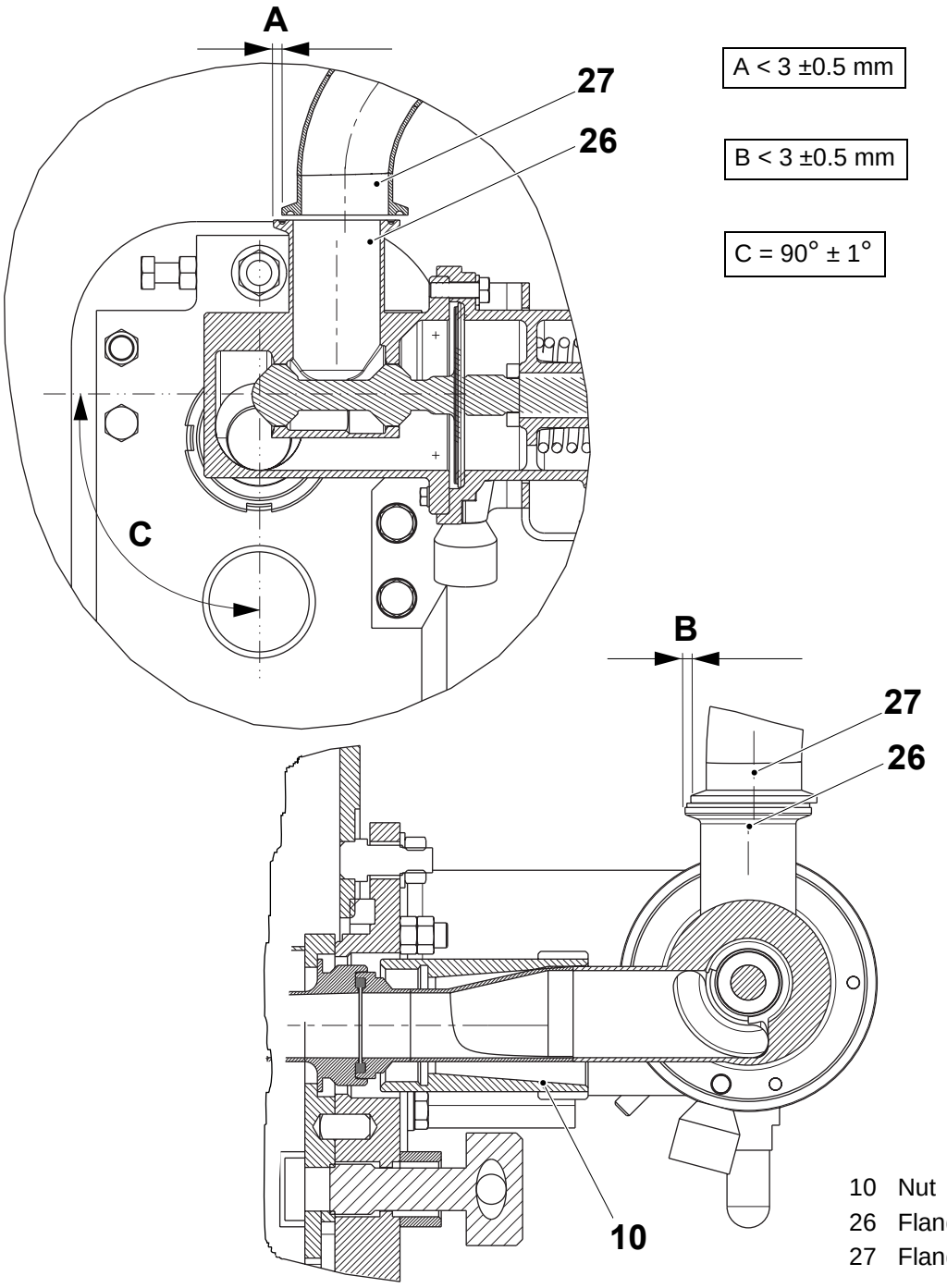
TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

i) Fit the regulating valve by means of the nut (10) and tighten smoothly.

j) Check the angle **C** between the regulating valve axle and the fastening plate axle.

k) Check the alignment and the parallelism of the flanges (26) with (27), see distance **A** and **B**.



(Cont'd)

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(Cont'd)

l) Fit the clamp (8) and tighten the nut (10).

m) Fit the locking device (9).

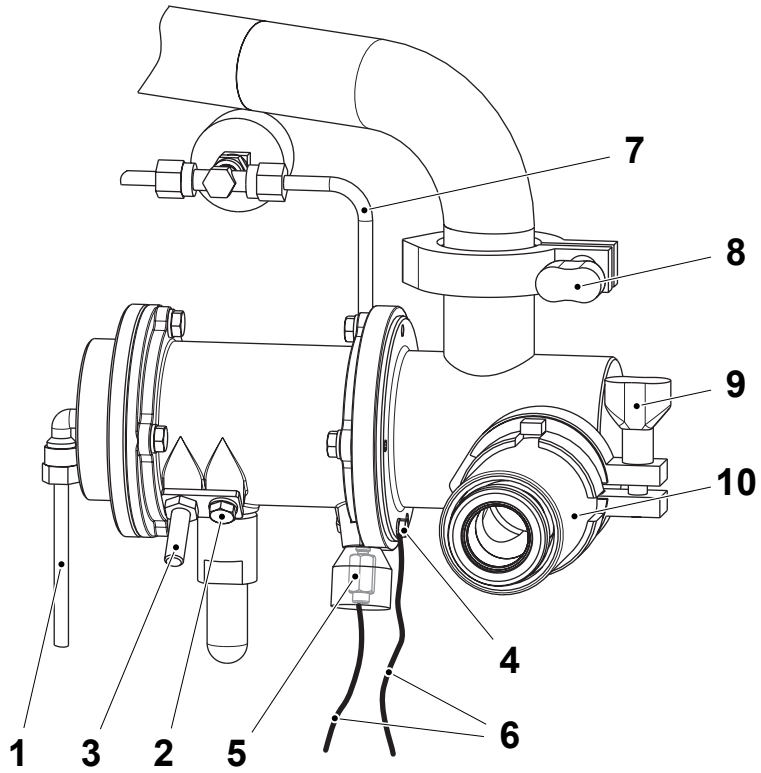
n) Fit the pipe (7) to the regulating valve.

o) Connect the electrical wires (6) and tighten the screws (4) and (5).

p) Fit the proximity switch (3) and tighten the screw (2).

q) Set the proximity switch (3), see 1.3.2-3 Flow Regulator - Set Proximity Switch.

r) Connect the pneumatic pipe (1).



1 Pipe
2 Screw
3 Proximity switch
4 Screw
5 Screw
6 Wire
7 Pipe
8 Clamp
9 Locking device
10 Nut

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1.3.2-2 Flow Regulator - Change Diaphragms

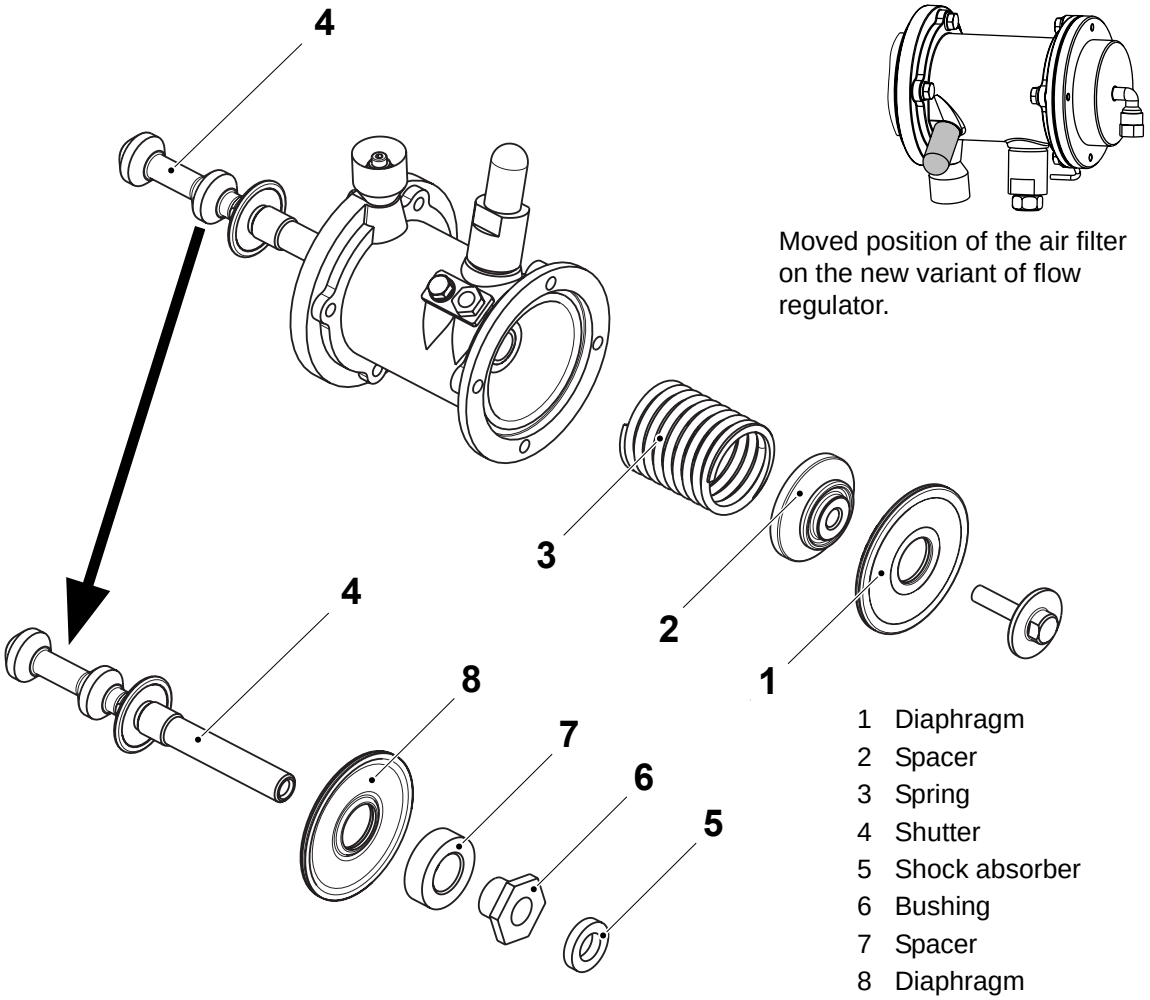
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Spirit level TP No. 777200-101 Coupling wrench
SPC Reference	1095774-0300

a) Dismantle the regulating valve, see 1.3.2-1 Flow Regulator - Overhaul Regulating Valve.

b) Remove the diaphragm (1), the spacer (2), the spring (3) and pull out the shutter (4). Change the diaphragm (1) as required.

c) Remove the shock absorber (5). Loosen the bushing (6) and remove the spacer (7) and the diaphragm (8). Change the diaphragm (8) as required.

d) Assemble in the reverse order, see 1.3.2-1 Flow Regulator - Overhaul Regulating Valve.



Moved position of the air filter on the new variant of flow regulator.

1 Diaphragm
2 Spacer
3 Spring
4 Shutter
5 Shock absorber
6 Bushing
7 Spacer
8 Diaphragm

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1.3.2-3 Flow Regulator - Set Proximity Switch

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1095774-0300

a) Remove the pipe (1) from the air connection and connect an external air supply.

b) Activate the external air supply, (to compress the spring to the maximum stroke).

c) Loosen the nut (3) and screw out the proximity switch (2).

d) Screw in the proximity switch (2) until it just touches the spacer (4).

e) Make sure that the LED (5) in the proximity switch (2) lights up.

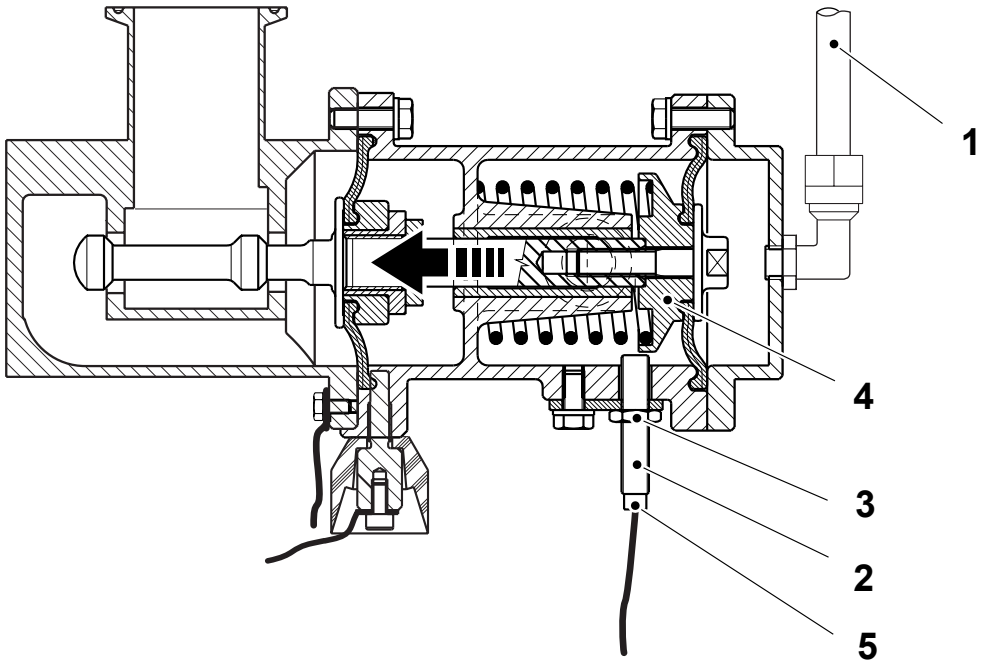
f) Screw the proximity switch (2) out one half turn and tighten the nut (3).

g) Make sure that the LED (5) is still lit.

h) Deactivate the external air supply and check that the LED (5) goes out.

i) Remove the external air supply and connect the pipe (1).

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1 Pipe
2 Proximity switch
3 Nut
4 Spacer
5 LED

1.3.2-4 Flow Regulator - Set Overpressure (OK)

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1095774-0300

a) Set the flow regulator main overpressure according to 10.1 Technical Data by means of the pressure regulator (1) on the valve panel (2).

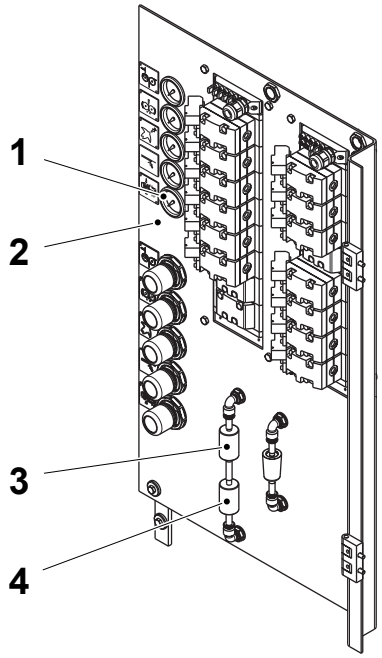
Note! The pressure gauge (1) may be placed on different valve panels depending if the machines was rebuilt or had the option installed from the beginning.

b) Check the following parts:
   - if the filter (3) is coloured **red**, it must be changed
   - if the filter (4) is coloured **pink**, it must be changed.

c) Set the air pressure indicated on pressure gauge (5) to **0.4 bar** by means of the throttle (6) and check that air flows from the silencer on the regulating valve.

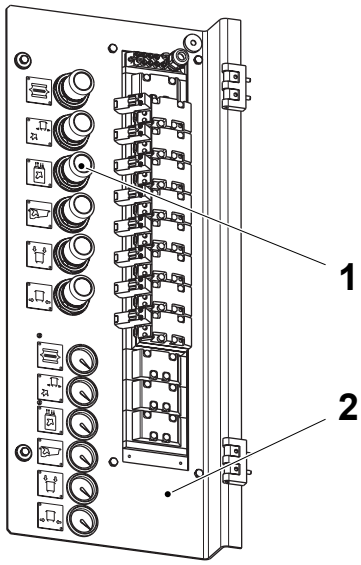
Note! The air pressure to the regulating valve should not be higher than **0.4 bar** because the regulating valve may be affected negatively during production.

Superstructure valve panel

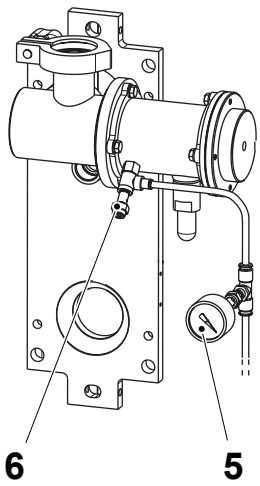


New machines not rebuilt with RK-1523831-0100 Regulating valve condense

Machine body valve panel



Machines rebuilt with RK-1523831-0100 Regulating valve condense



1 Pressure regulator
2 Valve panel
3 Filter
4 Filter
5 Pressure gauge
6 Throttle

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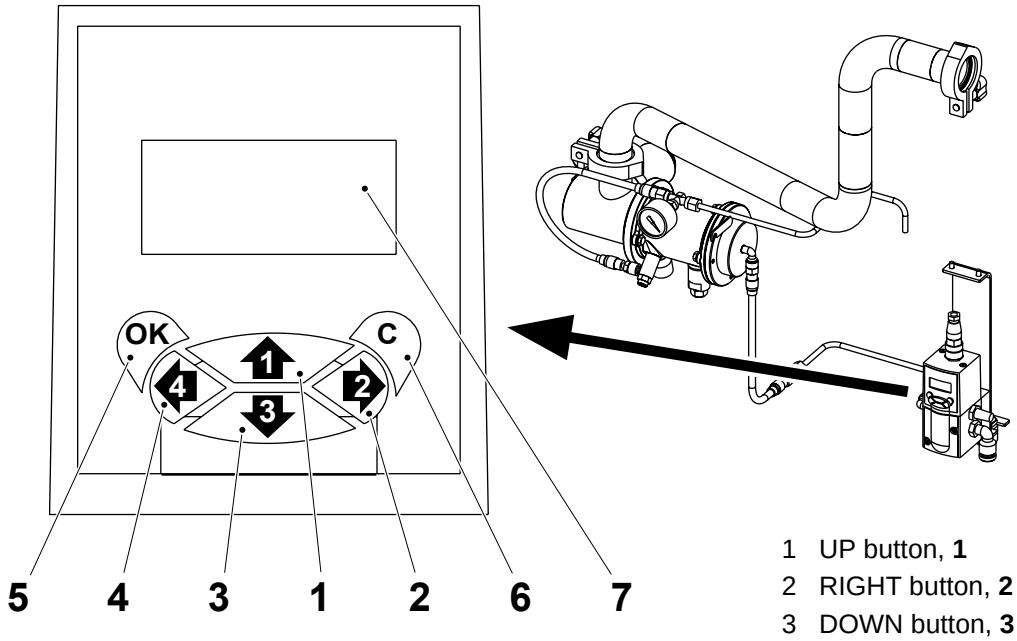
1.3.2-5 Flow Regulator - Set I/P Transducer

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1095774-0300

Valid for new I/P transducers only

Note! The transducer interface is navigated using a six-button keypad UP (1), DOWN (3), LEFT (4), RIGHT (2), OK (5) and CANCEL (6) buttons:

- use the OK button (5) to enter the menu from the default screen, move to the next level of the menu structure and accept changes within the functions
- use the CANCEL button (6) to move back through the levels of the menu structure and to cancel changes within the functions
- use the UP button (1) and DOWN button (3) to move between menu options within a level and to set digit values within the functions
- use the LEFT button (4) and RIGHT button (2) to move between digits within the functions.



1 UP button, **1**
2 RIGHT button, **2**
3 DOWN button, **3**
4 LEFT button, **4**
5 OK button
6 CANCEL button, **C**
7 Display

(Cont'd)

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(Cont'd)

a) Press the OK button (5). The display (7) shows “Password OK?”.

b) Enter the password, **2121**, by means of the LEFT (4), DOWN (3), UP (1) and RIGHT (2) buttons. The display (7) shows “Display Setup”.

c) Press the DOWN button (3). The display (7) shows “Offline Setup”.

d) Press the OK button (5). The display (7) shows “Min Setup”.

e) Press the OK button (5). The display (7) shows “00.0 bar 00.0V”.

f) Press the OK button (5). The display (7) shows “Warning P2 Shift”.

g) Press the OK button (5). The display (7) shows “Min Setup”.

h) Press the DOWN button (3). The display (7) shows “Max Setup”.

i) Press the OK button (5). The display (7) shows “06.0 bar 10.0V”. Set the pressure to **4.00 bar** by means of the DOWN (3) and UP (1) buttons.

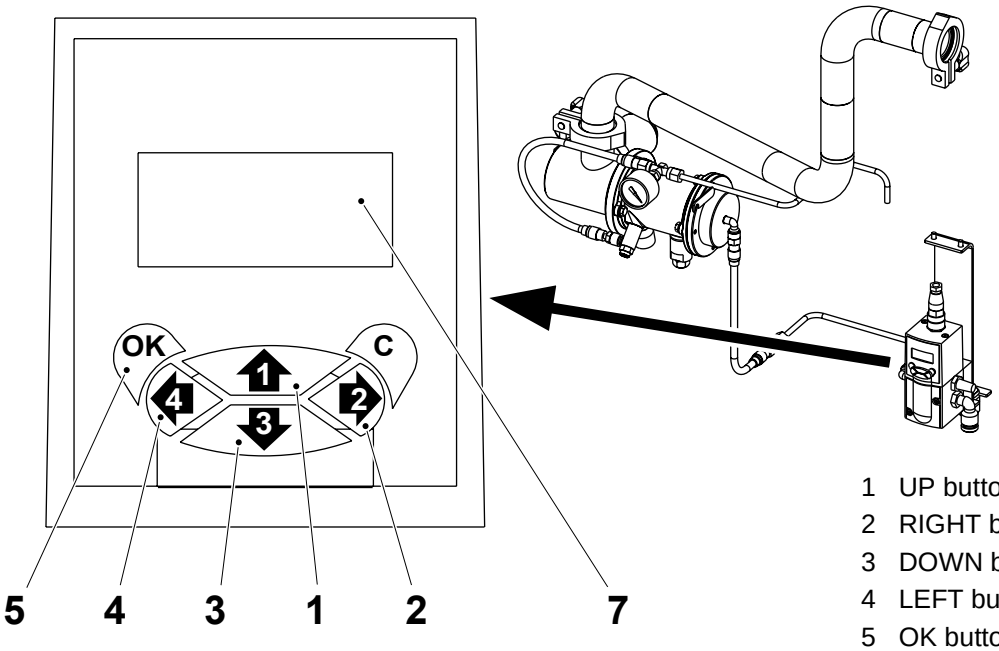
j) Press the OK button (5). The display (7) shows “Warning P2 Shift”.

k) Press the OK button (5). The display (7) shows “Max Setup”.

l) Press the DOWN button (3). The display (7) shows “Speed Setting”.

m) Press the OK button (5). Set the value to **0** by means of the DOWN (3) and UP (1) buttons.

n) Press the OK button (5). The display (7) shows “Speed Setting”.



1 UP button, **1**
2 RIGHT button, **2**
3 DOWN button, **3**
4 LEFT button, **4**
5 OK button
7 Display

(Cont'd)

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(Cont'd)

o) Press the DOWN button (3).
   - If the display (7) shows “Dither Amp.” then continue with items p) to y)
   - If the display (7) shows “Dynamic Response” then continue with items z) to af).

p) Press the OK button (5). Set the value to **2** by means of the UP (1) and DOWN (3) buttons.

q) Press the OK button (5). The display (7) shows “Dither Amp.”.

r) Press the DOWN button (3). The display (7) shows “Prop Gain”.

s) Press the OK button (5). Set the value to **4** by means of the UP (1) and DOWN (3) buttons.

t) Press the OK button (5). The display (7) shows “Prop Gain”.

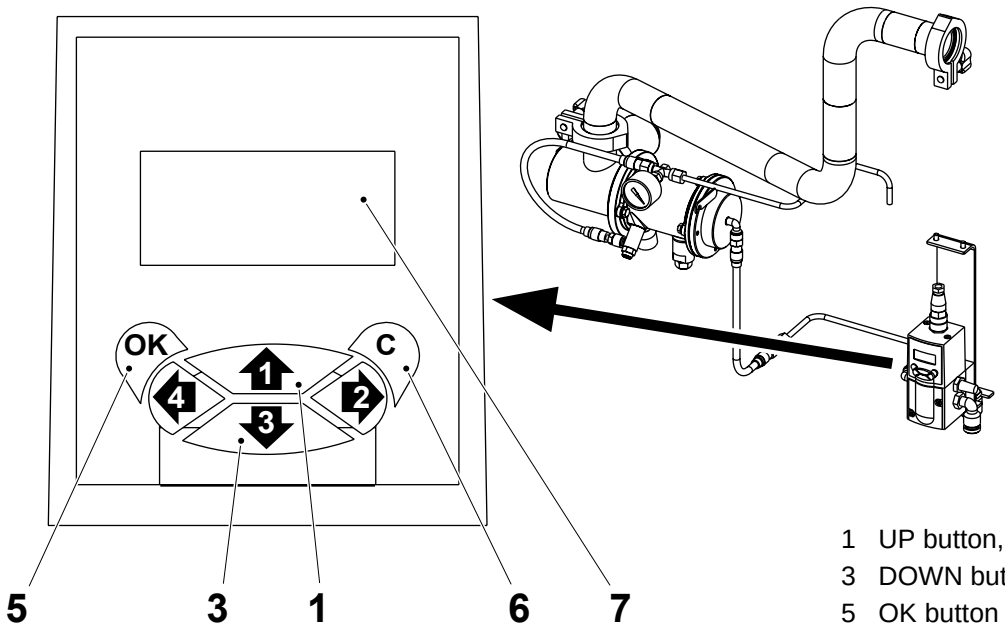
u) Press the DOWN button (3). The display (7) shows “Int Gain”.

v) Press the OK button (5). Set the value to **4** by means of the UP (1) and DOWN (3) buttons.

w) Press the OK button (5). The display (7) shows “Int Gain”.

x) Press the CANCEL button (6). The display (7) shows “Offline Setup.”.

y) Press the CANCEL button (6). The display (7) shows “00.0 bar 00.0V”.



1 UP button, **1**
3 DOWN button, **3**
5 OK button
6 CANCEL button, **C**
7 Display

(Cont'd)

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(Cont'd)

z) Press the OK button (5). Set the value to **2** by means of the DOWN (3) and UP (1) buttons.

aa) Press the OK button (5). The display (7) shows “Dynamic Response”.

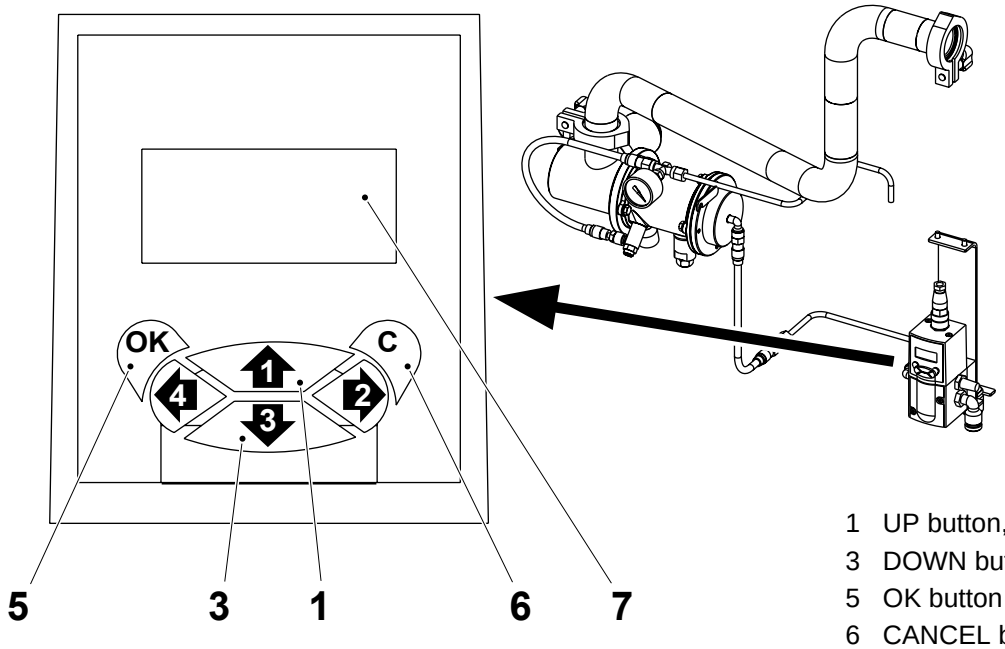
ab) Press the DOWN button (3). The display (7) shows “Dither Amp.”.

ac) Press the OK button (5). Set the value to **4** by means of the DOWN (3) and UP (1) buttons.

ad) Press the OK button (5). The display (7) shows “Dither Amp.”.

ae) Press the CANCEL button (6). The display (7) shows “Offline Setup.”.

af) Press the CANCEL button (6). The display (7) shows “00.0 bar 00.0V”.



1 UP button, **1**
3 DOWN button, **3**
5 OK button
6 CANCEL button, **C**
7 Display

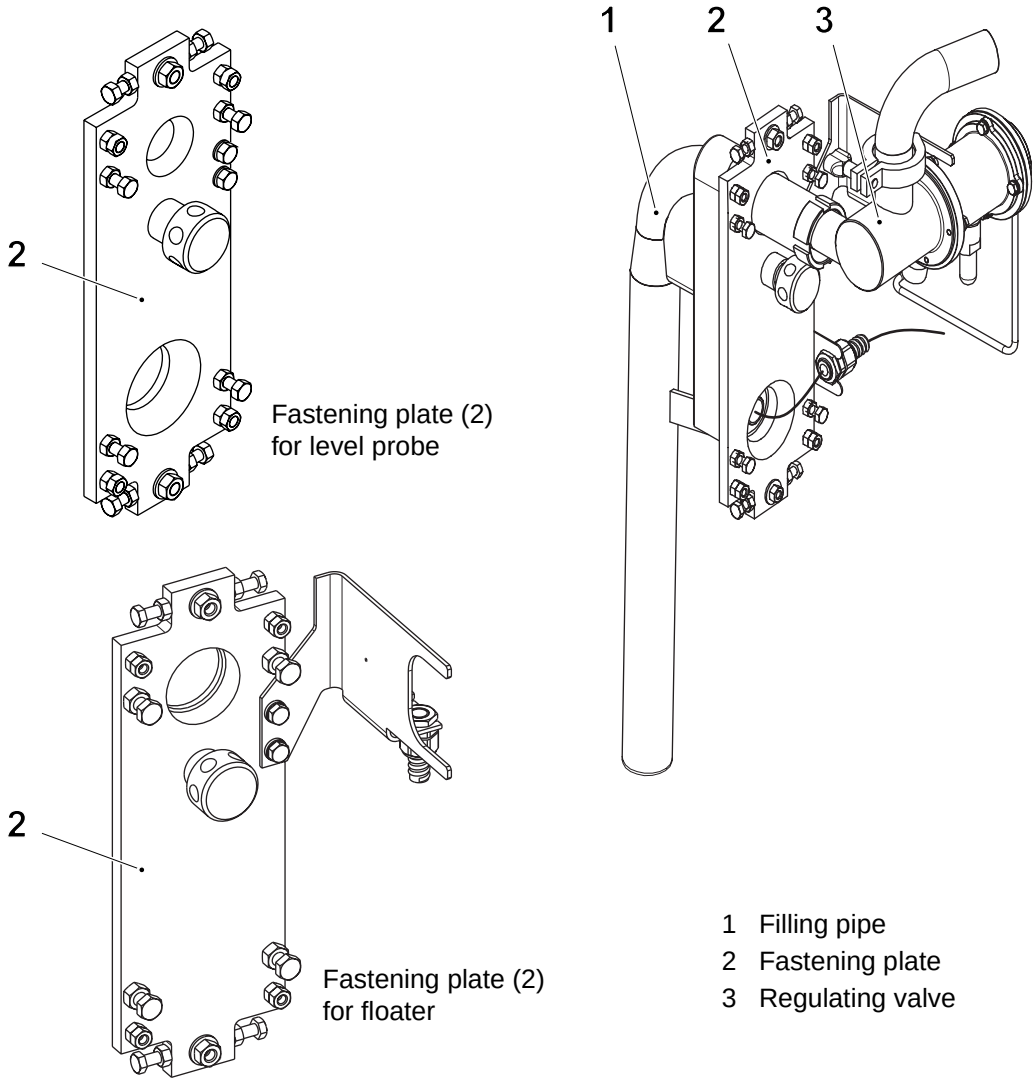
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1.3.3 Fastening Plate

1.3.3-1 Fastening Plate - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1334052-0200 1334992-0100

a) Remove the regulating valve (3), see 1.3.2-1 Flow Regulator - Overhaul Regulating Valve from item a) to item f) and the filling pipe (1), see 1.3.4-7 Filling Pipe - Change.



1 Filling pipe
2 Fastening plate
3 Regulating valve

(Cont'd)

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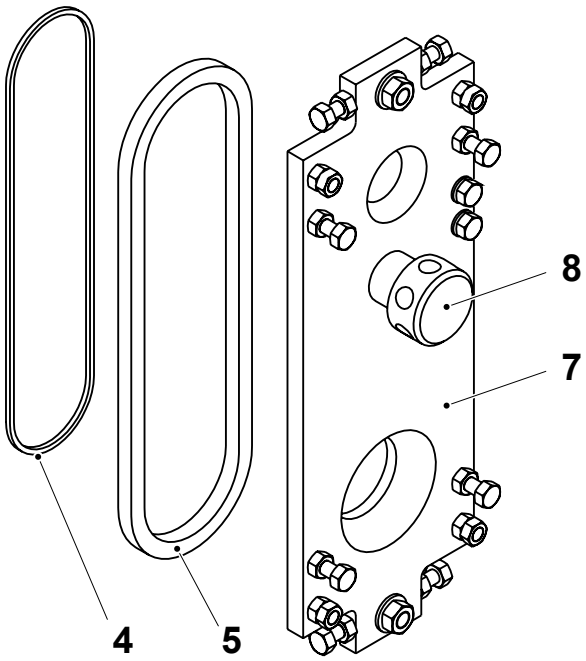
(Cont'd)

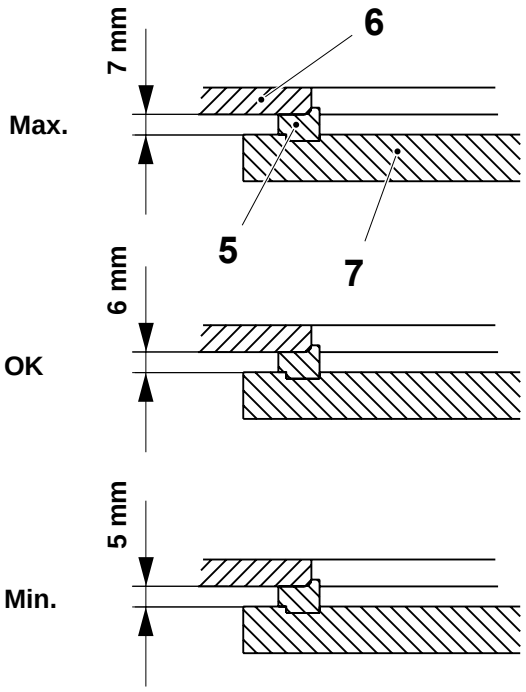
b) Check the following parts for visual wear and/or damage:
   - the gasket (4)
   - the seal (5)
     Make sure that the compression of the seal (5), between the column (6) and the fastening plate (7), is within the max. and min. tolerances. Set as required, see 1.3.4-2 Filling Pipe - Set Position.
   - the screw (8)
     Make sure that it is properly tightened.

c) Change as required.

Note! Change the gasket (4) between the filling pipe and the regulating valve during the assembling.

d) Assemble the regulating valve, see 1.3.2-1 Flow Regulator - Overhaul Regulating Valve and the filling pipe, see 1.3.4-7 Filling Pipe - Change.





4 Gasket
5 Seal
6 Column
7 Plate
8 Screw

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1.3.4 Filling Pipe

1.3.4-1 Filling Pipe - Check

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1334053-0200 1334991-0100

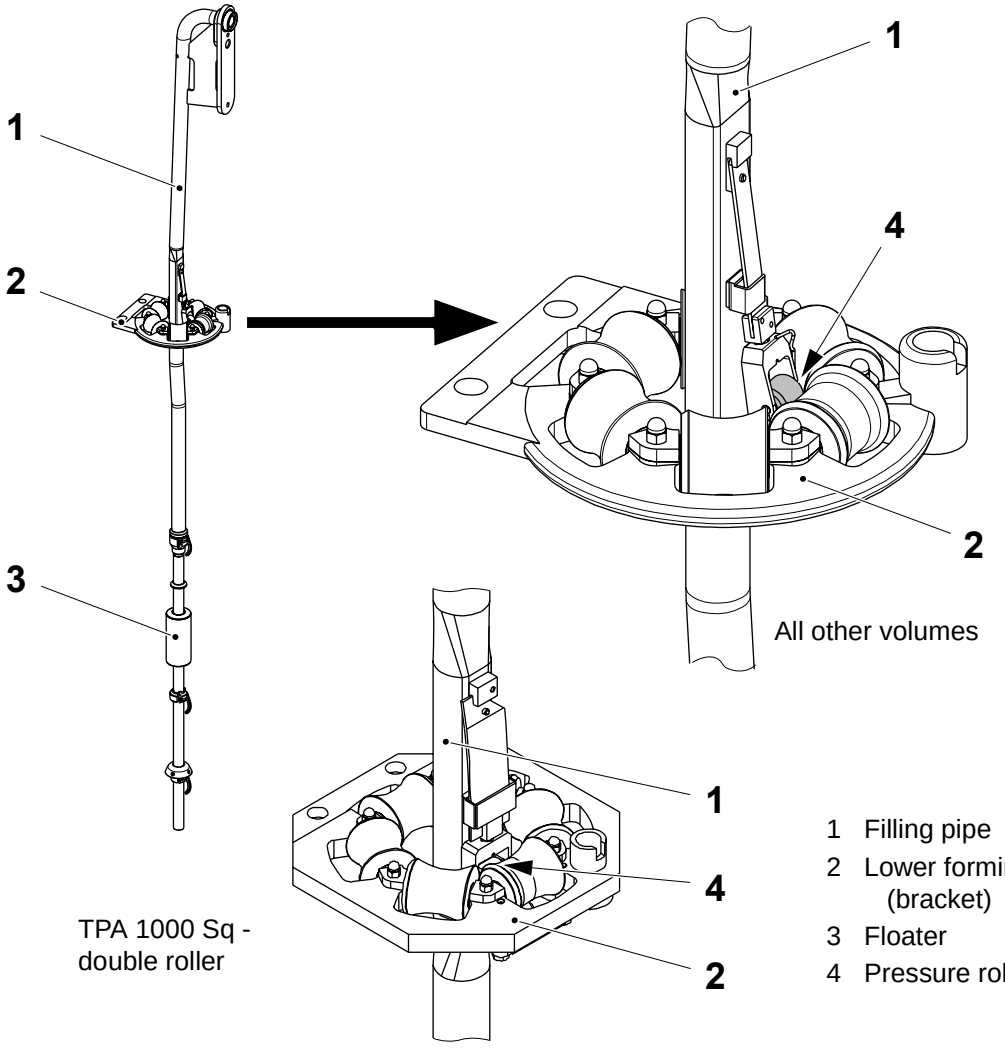
Floater

Check that the pressure roller (4) is intact and rotates freely. Change the roller as required.

Note! TPA 1000 Sq has two pressure rollers (4) instead of the normal one pressure roller (4) solution.

Check that the floater (3) is intact and slides freely. Change the floater as required.

Check that the filling pipe (1) is centred to the lower forming ring (2). Set it as required, see 1.3.4-2 Filling Pipe - Set Position.



(Cont'd)

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(Cont'd)

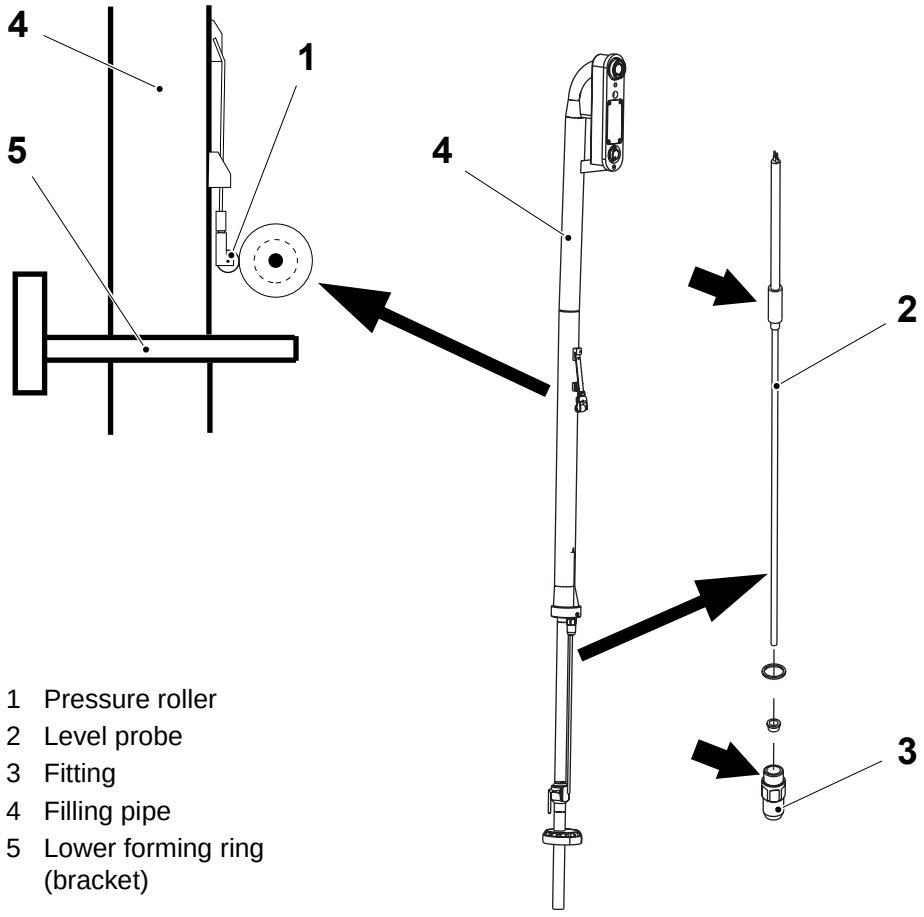
Level Probe

Check that the pressure roller (1) is intact and rotates freely. Change the roller as required.

Check that the level probe (2) is intact. Change it as required, see 1.3.4-6 Filling Pipe - Change Level Probe.

Check that the fitting (3) is intact. Change it as required, see 1.3.4-5 Filling Pipe - Change Fitting (Level Probe).

Check that the filling pipe (4) is centred to the lower forming ring (5). Set it as required, see 1.3.4-2 Filling Pipe - Set Position.



1 Pressure roller
2 Level probe
3 Fitting
4 Filling pipe
5 Lower forming ring (bracket)

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1.3.4-2 Filling Pipe - Set Position

Machine Status	PREPARATION
SPC Reference	1334053-0200 1334991-0100

Note! For volume dependency templates and tools codes, see 10.2 Templates and Tools. Before performing this setting, see 1-1 Superstructure Setting - Diagram, for the correct setting sequence. For small volumes only make sure that the support rollers have been set, see 4.4.1-8 Cantilever - Set Support Rollers.

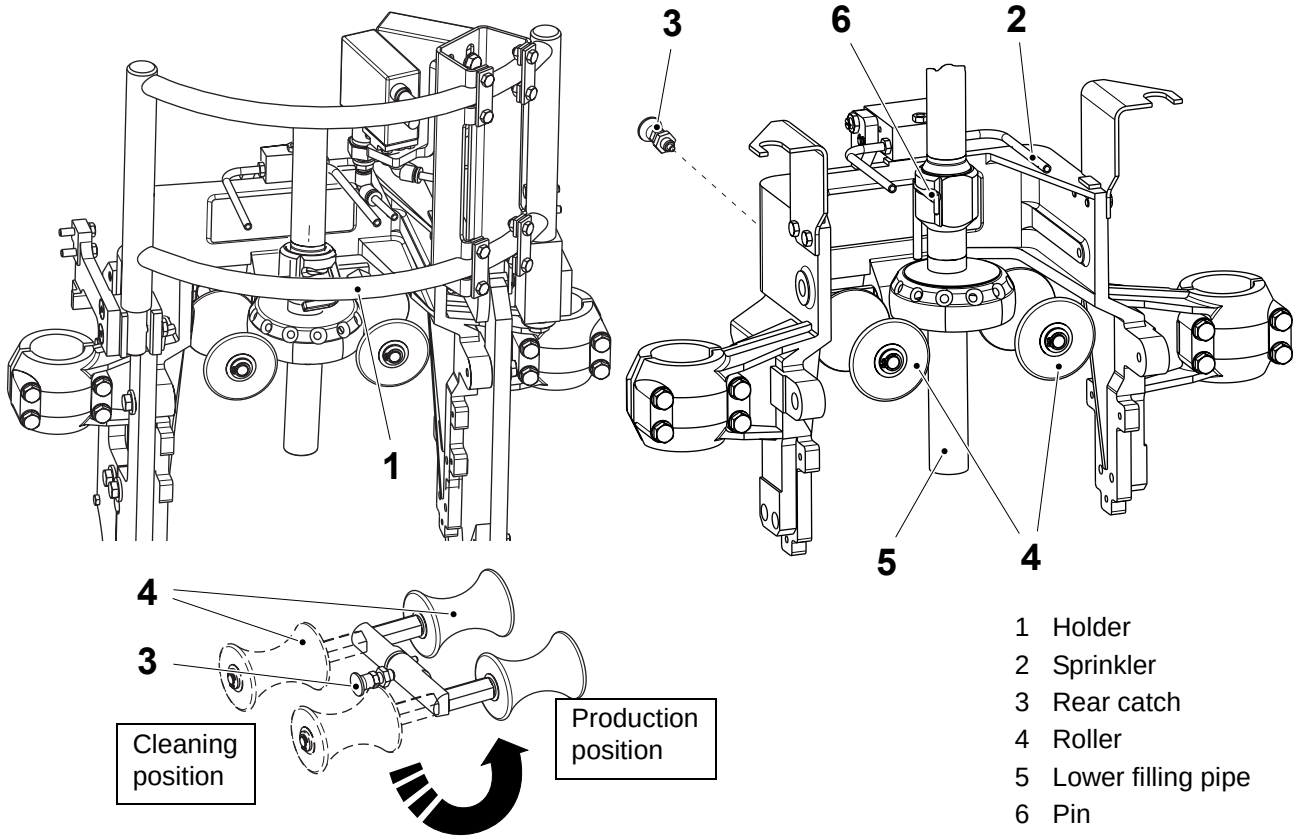
a) Remove the regulating valve, see 1.3.2-1 Flow Regulator - Overhaul Regulating Valve from item a) to item f).

b) Swing out the design correction photocell holder (1).

c) Lift the sprinkler (2) to cleaning position.

d) If required, remove the lower filling pipe (5) by means of the pin (6), pull out the rear catch (3), turn the tube support rollers (4) to production position and fit back the lower filling pipe (5).

CAUTION
Risk of damage to the equipment.
Make sure that the rollers lock in position.



1 Holder
2 Sprinkler
3 Rear catch
4 Roller
5 Lower filling pipe
6 Pin

(Cont'd)

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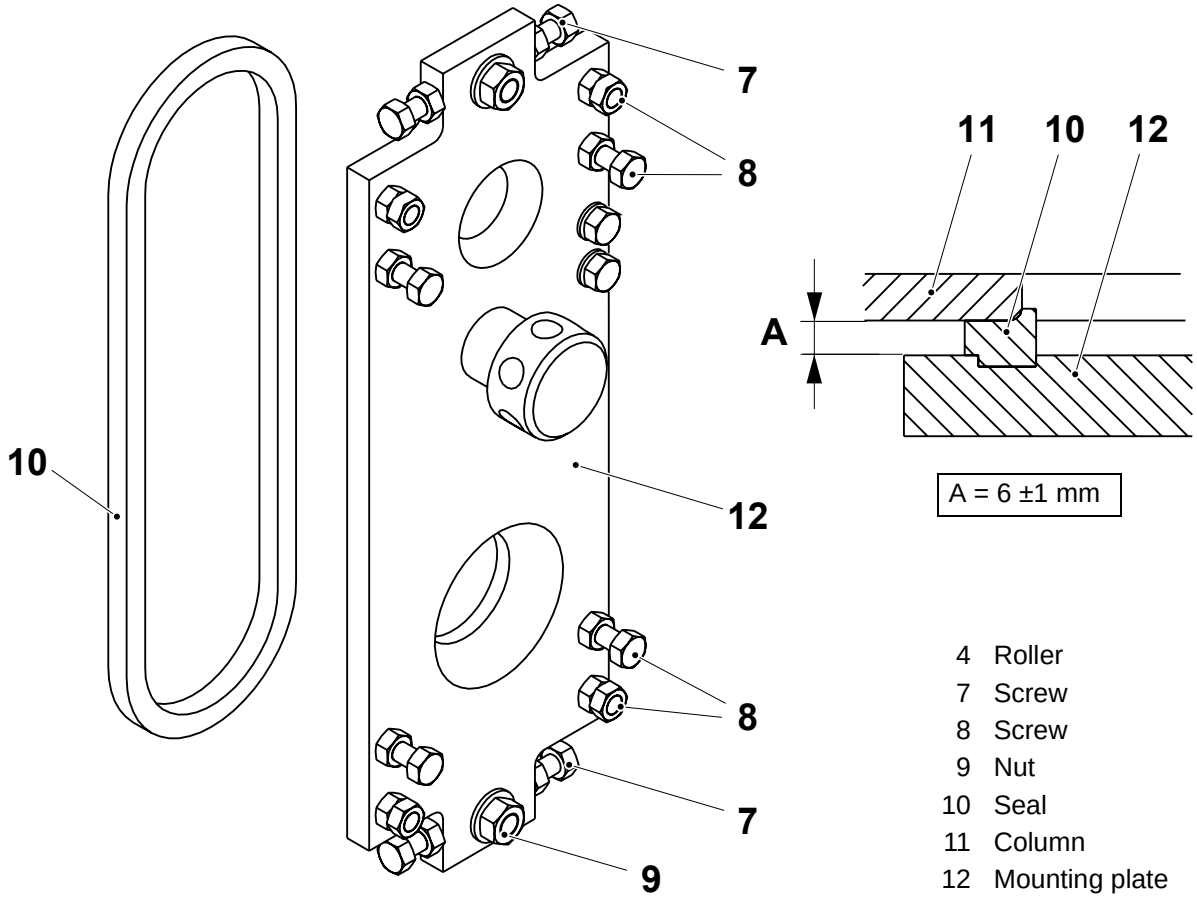
(Cont'd)

Note! The lower forming ring must be in its upper position. Put a double piece of packaging material between the pressure roller and the counter roller, see 1.3.4-3 Filling Pipe - Set Pressure Roller.

e) Loosen the screws (7) and (8).

f) Tighten completely the nuts (9).

g) Set the compression of the seal (10), to distance **A**, between the column (11) and the mounting plate (12) by means of the screws (8).



4 Roller
7 Screw
8 Screw
9 Nut
10 Seal
11 Column
12 Mounting plate

Fastening plate for level probe

(Cont'd)

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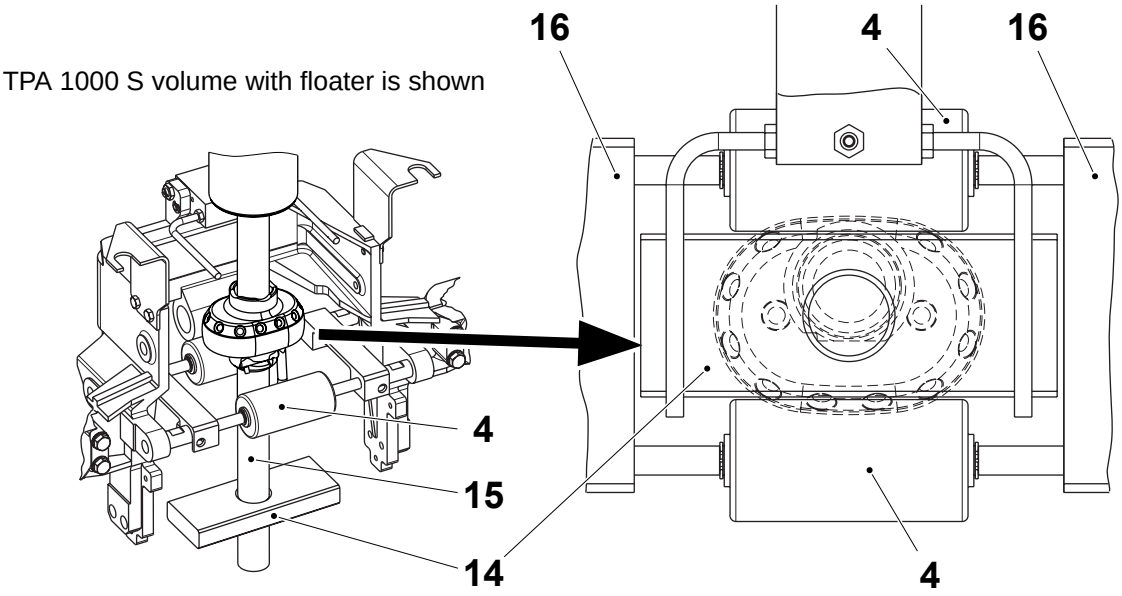
Note! For the volume TPA 1000 S with floater perform items from h) to j). For all the other volumes with floater perform items from k) to m). Otherwise perform item n) for all the volumes with level probe.

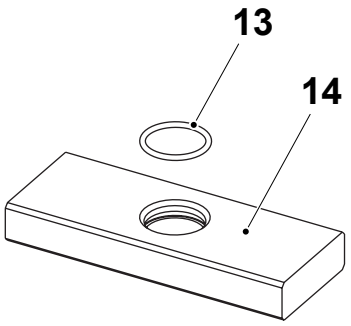
h) Fit the O-ring (13) on to the template (14).

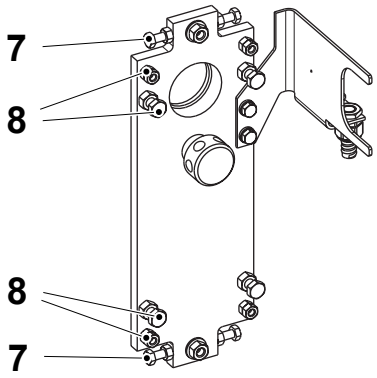
i) Fit the template (14) on to the filling pipe (15).

j) Set the filling pipe (15) position so that the template (14) is centred with respect to the tube support rollers (4) and the brackets (16). For transversal setting use the screws (7) and for longitudinal setting use the screws (8).

TPA 1000 S volume with floater is shown







4 Support roller
7 Screw
8 Screw
13 O-ring
14 Template
15 Filling pipe
16 Bracket

(Cont'd)

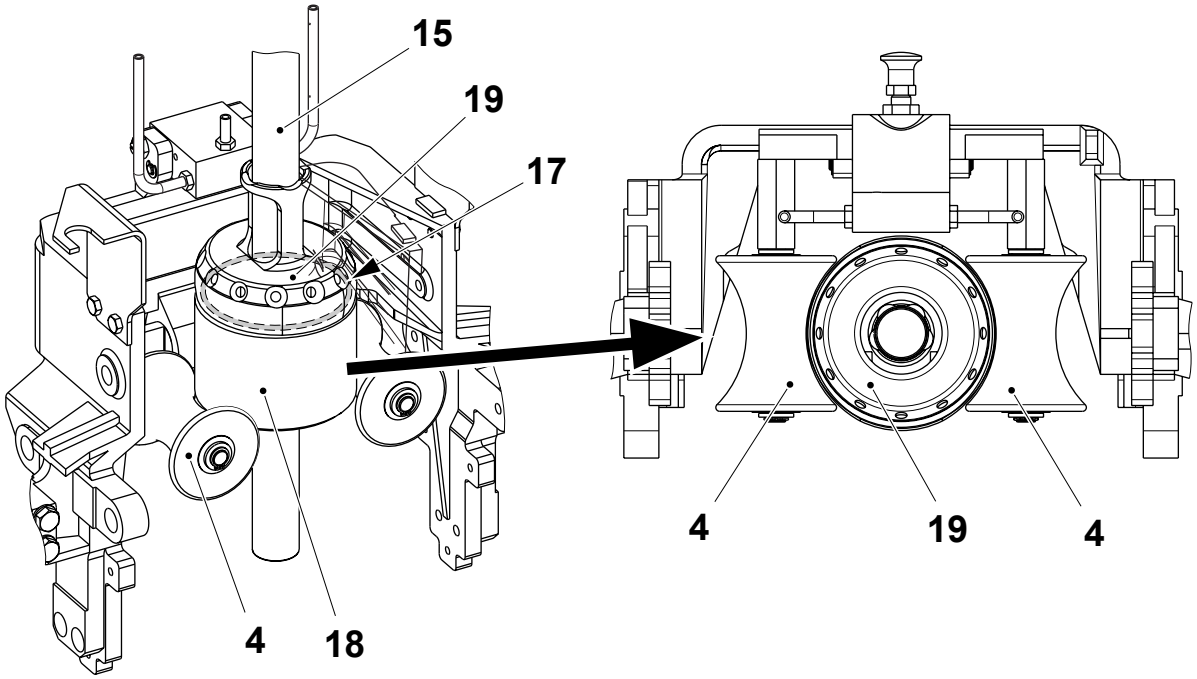
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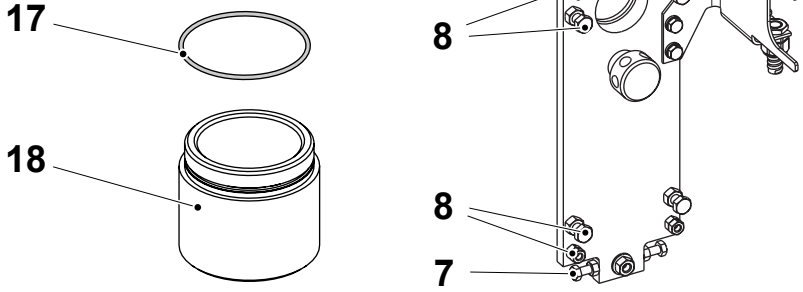
(Cont'd)

k) Fit the O-ring (17) on to the template (18).

l) Fit the template (18) on to the flange (19).

m) Set the filling pipe (15) position so that the template (18) is centred with respect to the tube support rollers (4). For transversal setting use the screws (7) and for longitudinal setting use the screws (8).





All other volumes with floater are shown

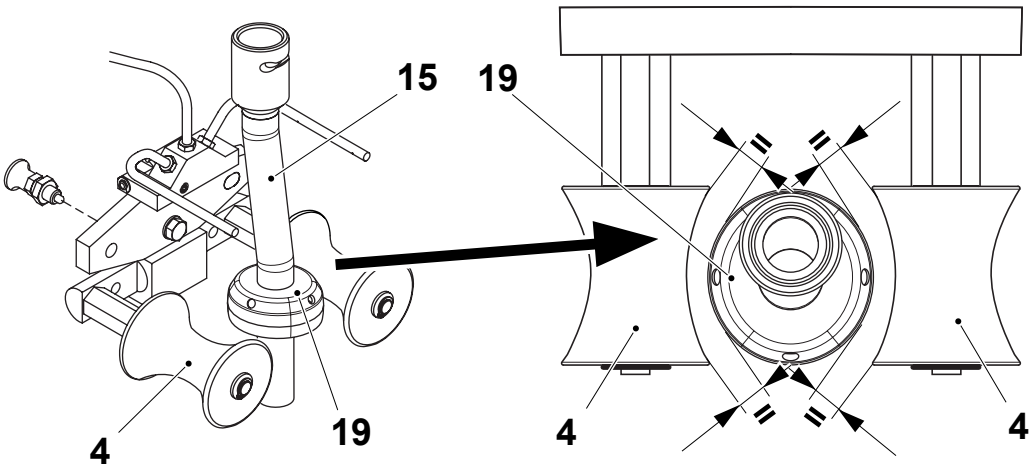
4 Roller
7 Screw
8 Screw
15 Filling pipe
17 O-ring
18 Template
19 Flange

(Cont'd)

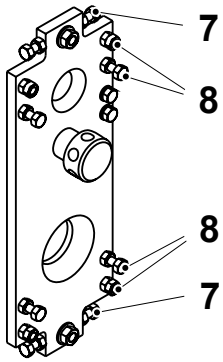
TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

n) Set the filling pipe (15) position so that the flange (19) is centred with respect to the tube support rollers (4). For transversal setting use screws (7) and for longitudinal setting use screws (8).



All volumes with a level probe are shown



4 Support roller
7 Screw
8 Screw
15 Filling pipe
19 Flange

Note! Change the gasket between the filling pipe and the regulating valve during assembling.

o) Assemble the regulating valve, see 1.3.2-1 Flow Regulator - Overhaul Regulating Valve.

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1.3.4-3 Filling Pipe - Set Pressure Roller

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Dynamometer TP No. 74767-102 Dynamometer TP No. 90459-7315 (for TPA 1000 Sq)
SPC Reference	1334053-0200 1334991-0100

Note! Before performing this setting, see the 1-1 Superstructure Setting - Diagram, for the correct setting sequence.

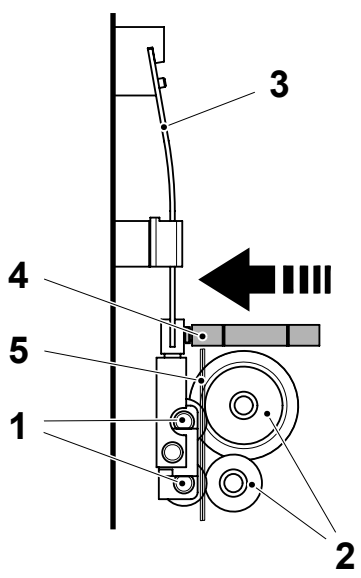
a) Fold a double piece of packaging material (5) and put it between the pressure roller (1) and the counter roller (2).

b) Press the dynamometer (4) tool against the spring (3). Take an accurate reading when the packaging material slips down, see table below.

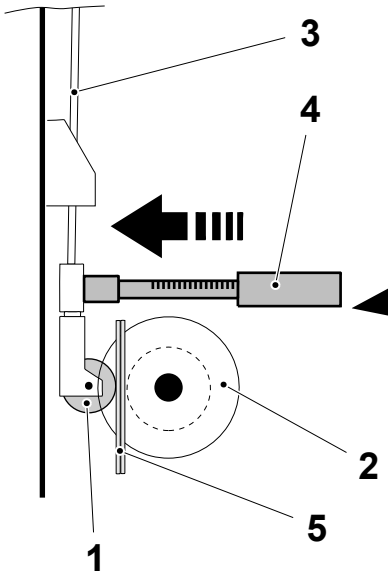
c) Adjust by bending or changing the spring (3) until the correct force is obtained.

d) Check the filling pipe position, see 1.3.4-2 Filling Pipe - Set Position.

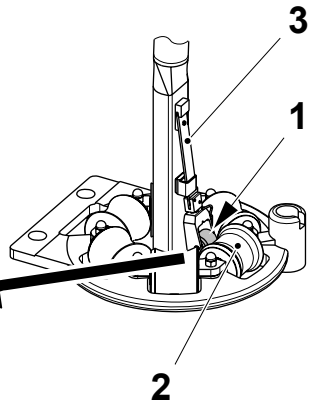
Package	Spring force (N)	Package	Spring force (N)
1000 B - 1000 S - 1000 Sq - TPA 1000 S - TPA 330 Sq - TPA 250 Sq - 250 S - 330 S	60 - 70	200 S - 250 B - 200 B	30 - 40
500 S - 500 B - TPA 500 Sq	50 - 60	1500 S	70 - 75
TPA 1000 Sq	140 ±10		



TPA 1000 Sq - double roller



All other volumes



1 Pressure roller
2 Counter roller
3 Spring
4 Dynamometer tool
5 Packaging material

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1.3.4-4 Filling Pipe - Set Level Probe

Machine Status	PREPARATION
Special Equipment	Template TP No. 1254449-1 Multimeter TP No. 90220-78
SPC Reference	1334053-0200

a) Fit the template (1) on the filling pipe until the level probe (2) is completely covered.

b) Connect the multimeter to the terminals **(120)** and **(120-)** in the superstructure terminal board.

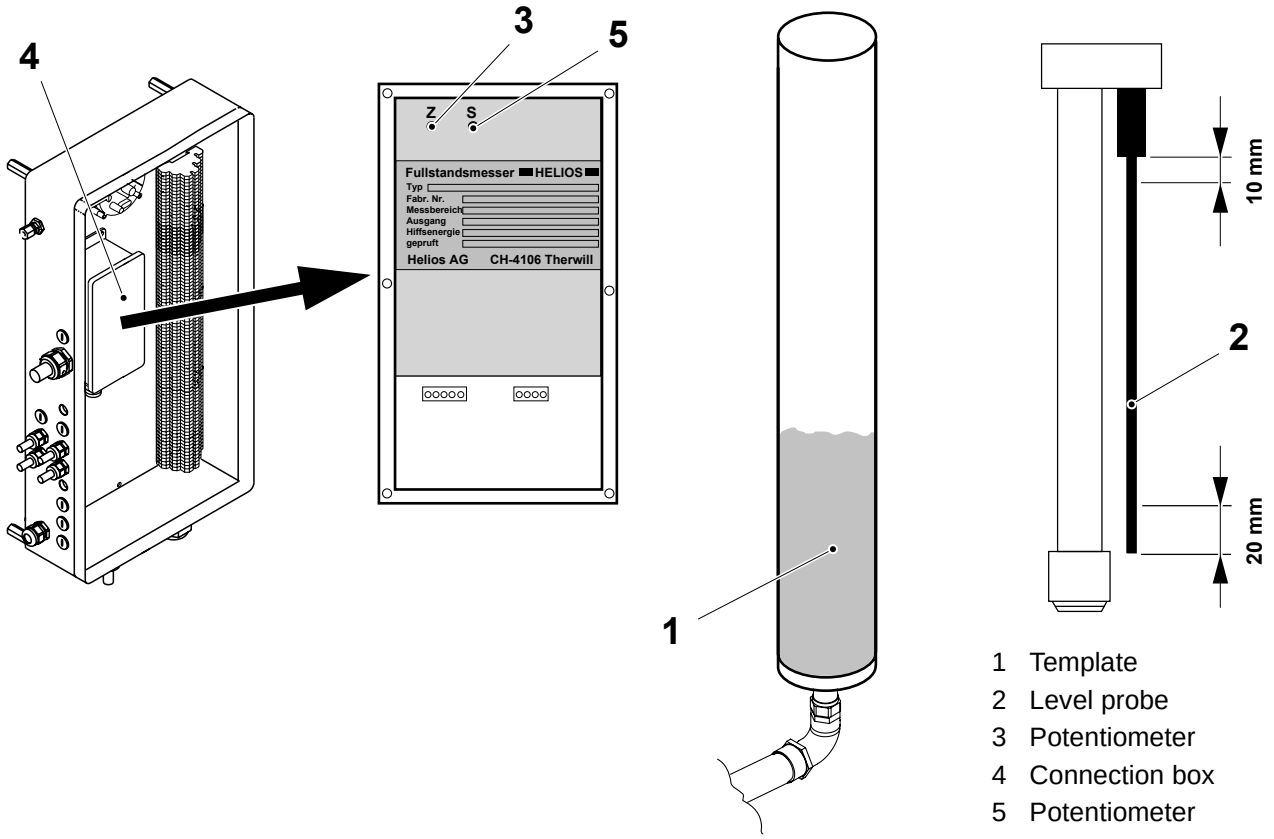
c) Fill the template (1) with water up to **20 mm** over the end of the level probe (2).

d) Set the voltage on the multimeter as close as possible to **0 Volt** by means of the potentiometer (3), located in the connection box (4).

e) Fill further the template (1) until the water level is **10 mm** below the first thick part of the level probe (2).

f) Set the voltage on the multimeter as close as possible to **10 Volt** by means of the potentiometer (5), located in the connection box (4).

g) Disconnect the multimeter and remove the template (1).



1 Template
2 Level probe
3 Potentiometer
4 Connection box
5 Potentiometer

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1.3.4-5 Filling Pipe - Change Fitting (Level Probe)

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumable	Lubrication grease TP No. 90296-0091 Silicon glue TP No. 90157-0044
SPC Reference	1334053-0200

a) Remove the fitting (1), the sealing ring (2) and the sealing (3).

b) Apply a thin layer of lubrication grease on the external surface of the level probe (4) and on the internal surface of the sealing (3), see Fig.1.

c) Fit the sealing (3) on the level probe (4).

d) Fit the sealing ring (2) on the fitting (1).

e) Apply a thin layer of food approved silicon glue on the thread of the fitting (1) and on the external surface of the level probe (4), see Fig. 2.

f) Fit the fitting (1) on the level probe (4).

Note! The level probe (4) must not be rotated during the installation of the fitting (1).

Note! In order to dry-out the silicon glue **wait 10-12 hours** before re-starting the machine.

Fig. 1

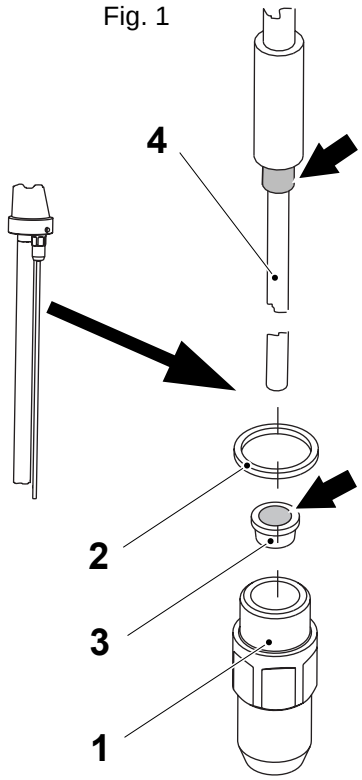
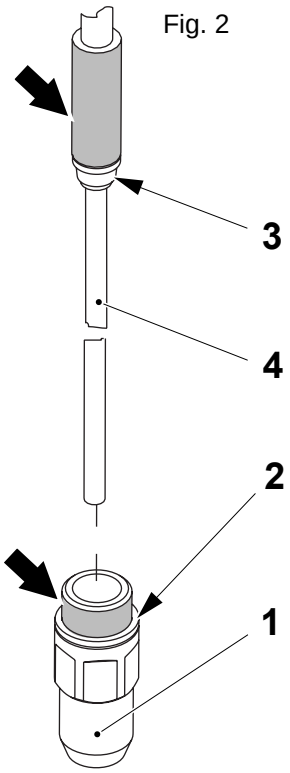


Fig. 2



1 Fitting
2 Sealing ring
3 Sealing
4 Level probe

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1.3.4-6 Filling Pipe - Change Level Probe

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1334053-0200

a) Remove the regulating valve, see 1.3.2-1 Flow Regulator - Overhaul Regulating Valve from item a) to item f).

b) Remove the screws (3), (2) and (1).

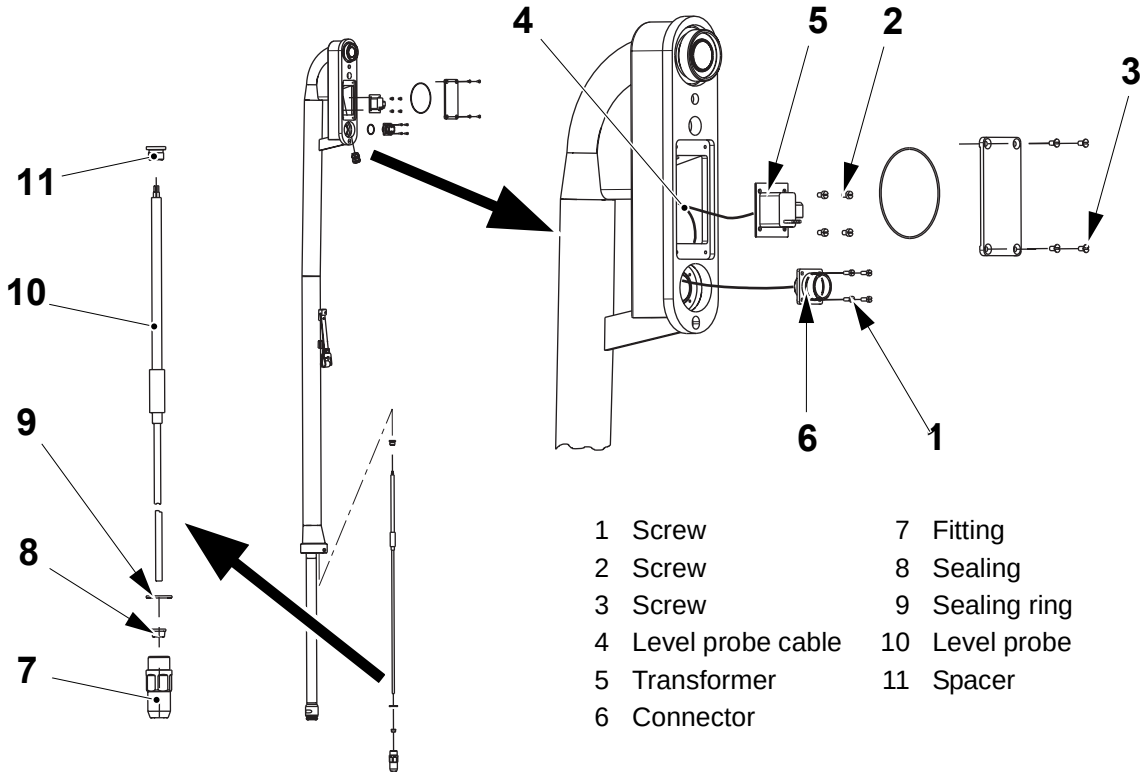
c) Mark and disconnect the level probe cables (4) from the transformer (5) and the connector (6).

d) Remove the fitting (7), the sealing (8) and the sealing ring (9).

e) Connect the level probe cables (4) to a steel wire approximately four metres long by **1 mm** diameter.

f) Remove, gently, the level probe (10) from the filling pipe.

g) Remove the spacer (11) from the level probe (10).



1 Screw
2 Screw
3 Screw
4 Level probe cable
5 Transformer
6 Connector
7 Fitting
8 Sealing
9 Sealing ring
10 Level probe
11 Spacer

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

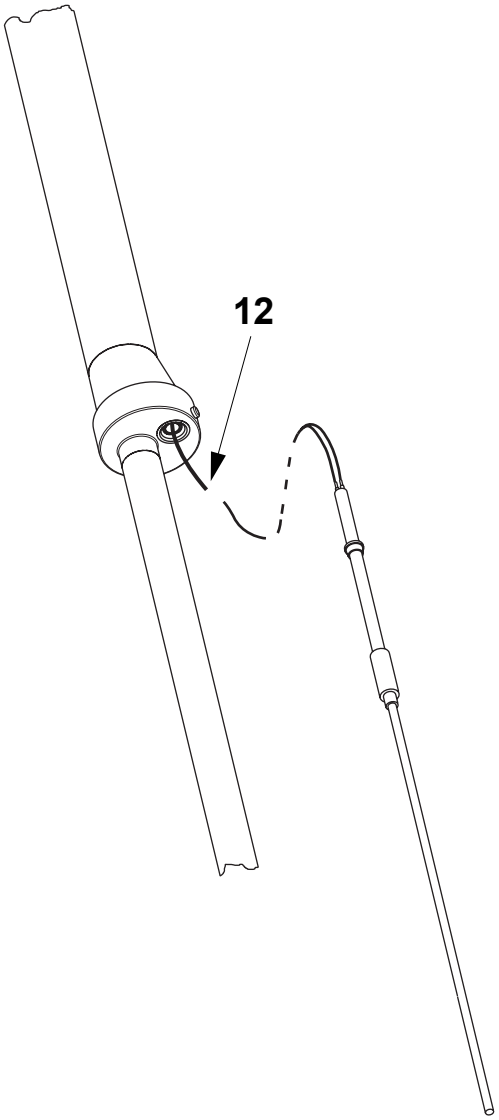
(Cont'd)

Note! Assemble the fitting in the proper way according to 1.3.4-5 Filling Pipe - Change Fitting (Level Probe).

h) Assemble in the reverse order by means of the steel wire (12).

Note! Change the gasket between the filling pipe and the regulating valve during assembling.

i) Assemble the regulating valve, see 1.3.2-1 Flow Regulator - Overhaul Regulating Valve.



12 Wire

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1.3.4-7 Filling Pipe - Change

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1334053-0200 1334991-0100

Floater

Note! The filling pipe is rather heavy and a step ladder may be helpful.

a) Remove the locking pin (1).

b) Remove the lower filling pipe (2).

c) Remove the locking device (3) and loosen the nut (4).

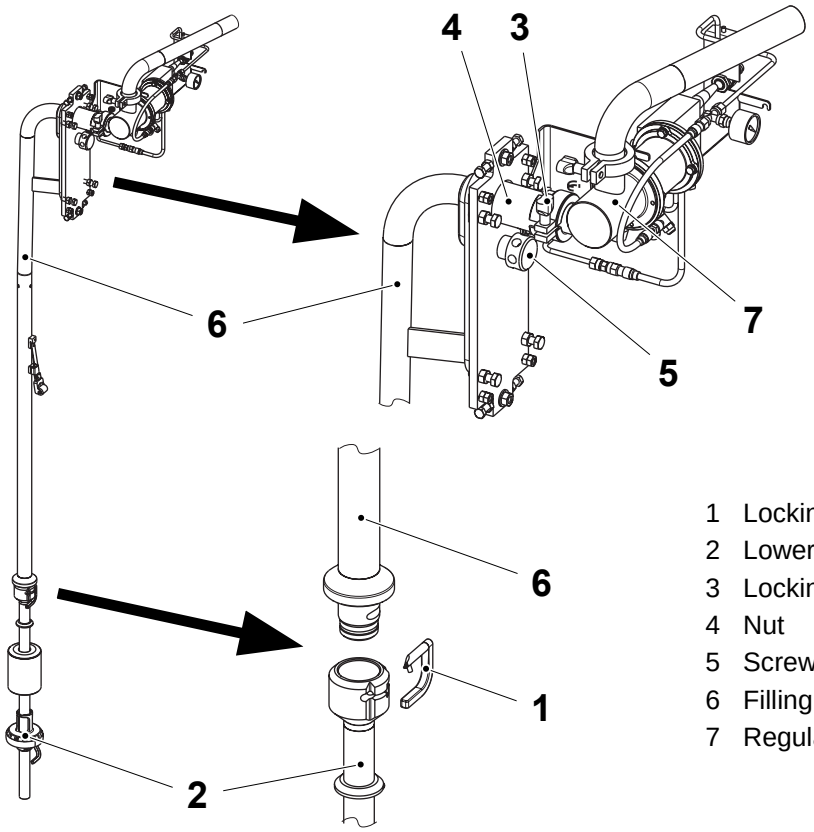
d) Unscrew the screw (5) and lift out the filling pipe (6).

e) Change the filling pipe (6).

Note! Change the gasket between the filling pipe (6) and the regulating valve (7) during assembling.

f) Assemble in the reverse order.

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1 Locking pin
2 Lower filling pipe
3 Locking device
4 Nut
5 Screw
6 Filling pipe
7 Regulating valve

(Cont'd)

(Cont'd)

Level Probe

Note! The filling pipe is rather heavy and the level sensor (1) is **very** touch sensitive and a step ladder may be helpful.

a) Remove the locking pin (2).

b) Remove the lower filling pipe (3).

c) Disconnect the level sensor cable (4) from the cable connection (5).

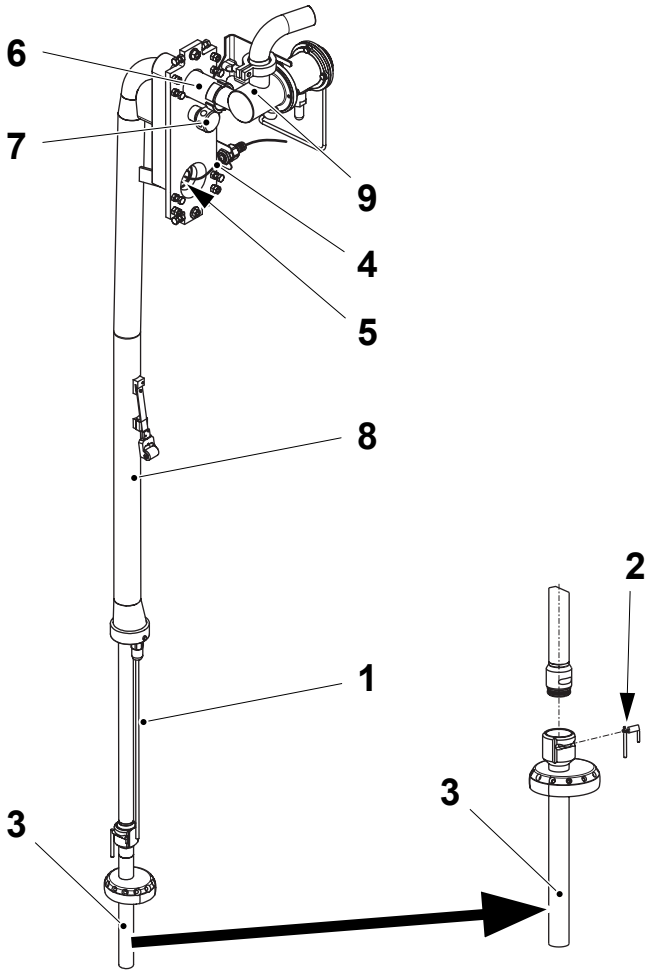
d) Loosen the nut (6).

e) Unscrew the screw (7) and lift out the filling pipe (8).

f) Change the filling pipe (8).

Note! Change the gasket between the filling pipe (8) and the regulating valve (9) during assembling.

g) Assemble in the reverse order.



1 Level sensor
2 Locking pin
3 Lower filling pipe
4 Level sensor cable
5 Cable connection
6 Nut
7 Screw
8 Filling pipe
9 Regulating valve

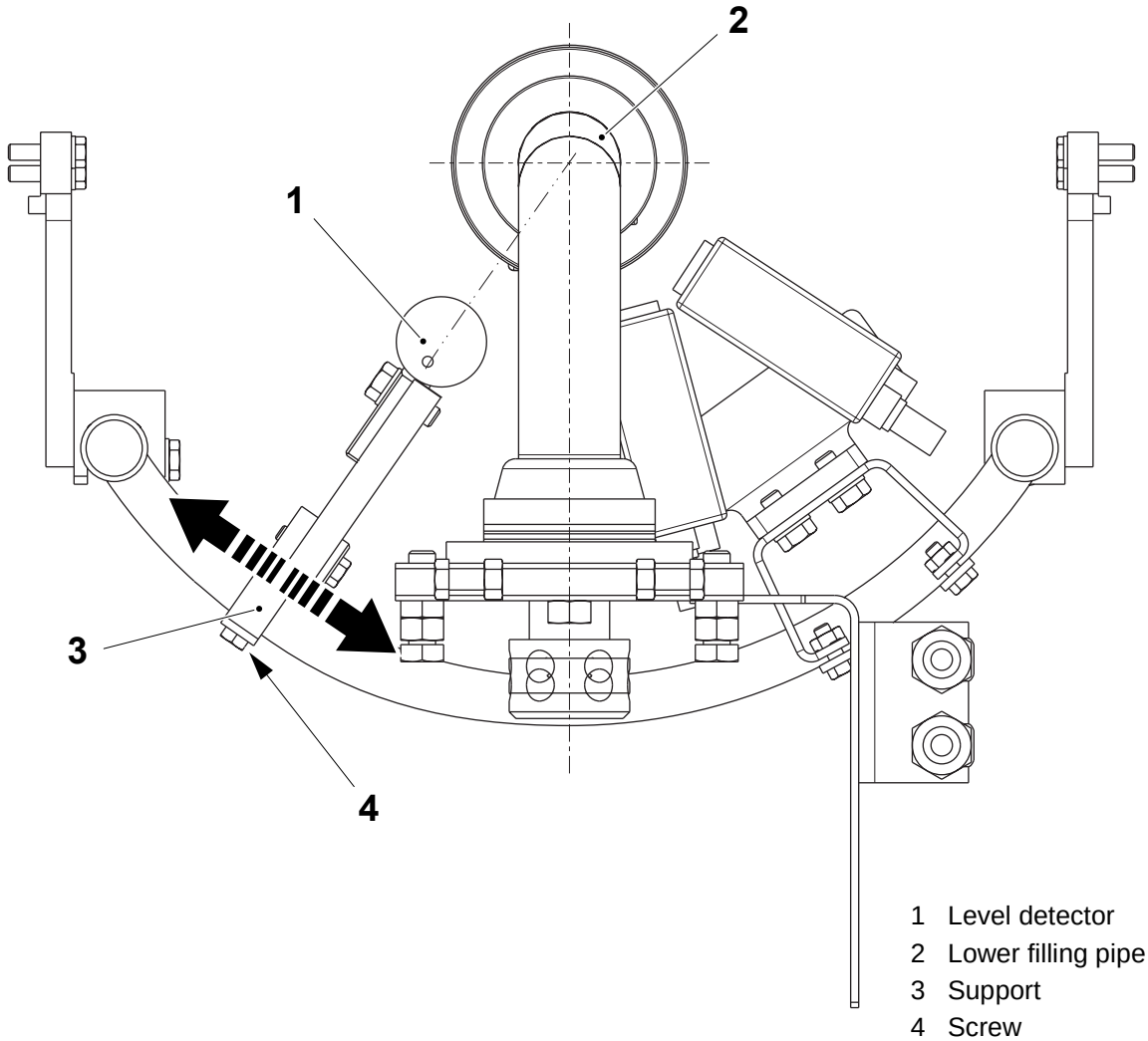
TechPub_2614345_0105 - 01_MM81534_11en.fm

1.3.4-8 Filling Pipe - Check Level Control Device Floater Alignment

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648502-0600 1523216-0100

a) Check the alignment of the level detector (1) with the lower filling pipe (2).

b) If required adjust moving the support (3) by means of the screws (4).



1 Level detector
2 Lower filling pipe
3 Support
4 Screw

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.3.4-9 Filling Pipe - Set Level Control Device Floater Position

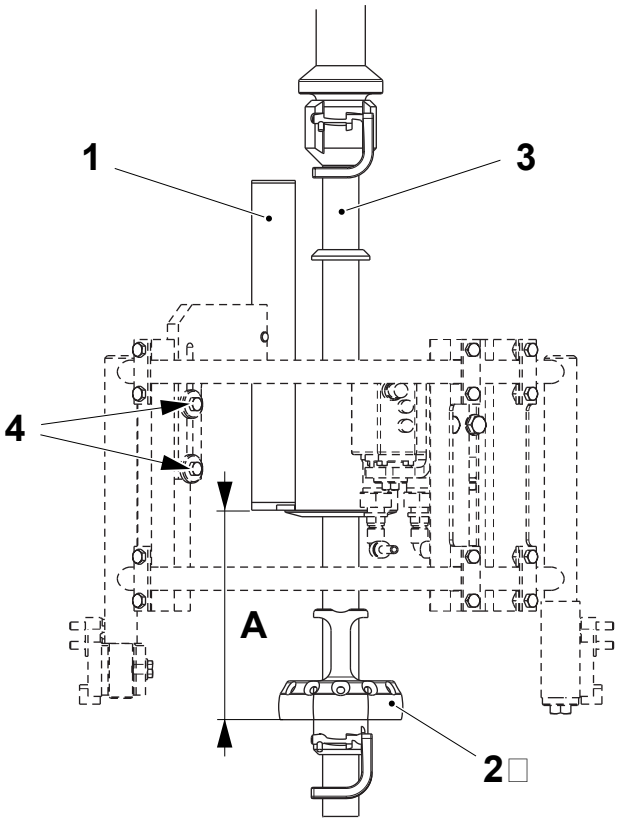
Machine Status	Mains Power ON, Air ON Steam ON, Water ON
SPC Reference	648502-0600 1523216-0100

a) Check the distance **A** between the level detector (1) and the pressure flange (2). If required set the distance **A** by means of the screws (4).

b) Check that the level detector (1) is parallel and aligned to the filling pipe (3), see 1.3.4-8 Filling Pipe - Check Level Control Device Floater Alignment.

c) Step up the machine to step TIGHT TUBE.

Package	A ±1.0 (mm)		Package	A ±1.0 (mm)
1000 B	61.0		250 B	224.0
1000 S	36.0		200 B	257.0
1000 Sq	40.0		500 S	100.0
1500 S	53.0		200 S	180.0
TPA 1000 S	26.0		500 B	61.0
TPA 330 Sq	185.0		TPA 250 Sq	209.0
TPA 1000 Sq	47.0		TPA 500 Sq	85.0
330 S	165.0		250 S	210.0



1 Level detector
2 Pressure flange
3 Filling pipe
4 Screw

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

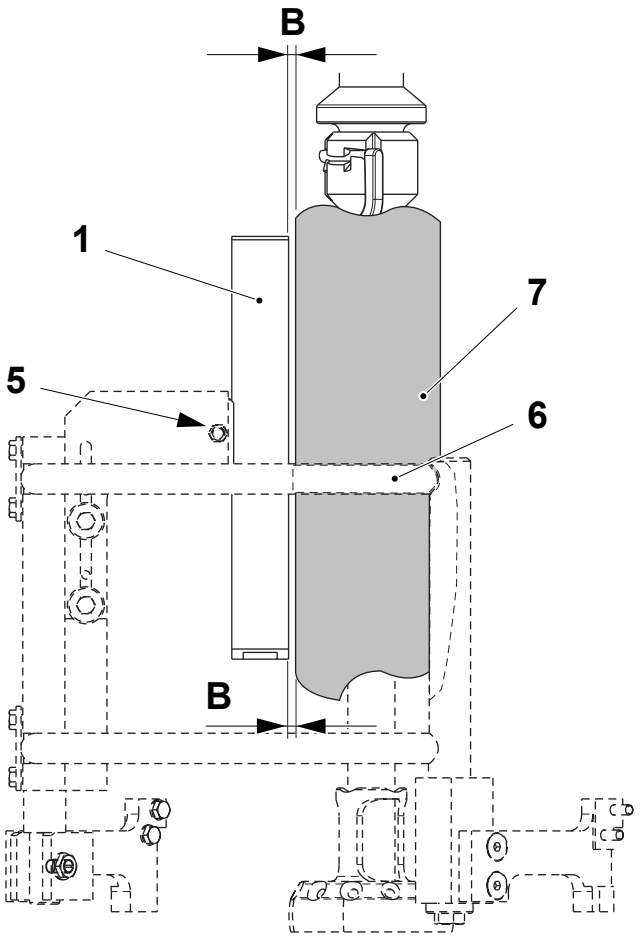
(Cont'd)

d) Check that the level detector (1) is parallel and aligned to the paper tube (7). If required set the level probe.

e) Check the distance **B** between the level detector (1) and the paper tube (7). If required set the distance **B** by means of the screw (5).

Note! Check the distance **B** each time the touch guard (6) is opened.

Package	B (mm)
1000 B - 1000 S - 1000 Sq - 1500 S - TPA 1000 S - TPA 1000 Sq	2.0 ±1.0
250 B - 200 B - 200 S- 250 S - 500 S - 500 B - TPA 330 Sq - TPA 500 Sq - TPA 250 Sq - 330 S	3.0 ±0.5



1 Level detector
5 Screw
6 Touch guard
7 Paper tube

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.3.4-10 Filling Pipe - Check Level Control Device Floater Function

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	648502-0600 1523216-0100

a) Connect a voltmeter to the terminal board X031 in the electrical cabinet

b) Cut a small slot (1) in the paper tube (2) above the pressure flange, so that is possible to reach the floater (3).

c) Make sure that the floater (3) is in the lower position by lifting it up and release it.

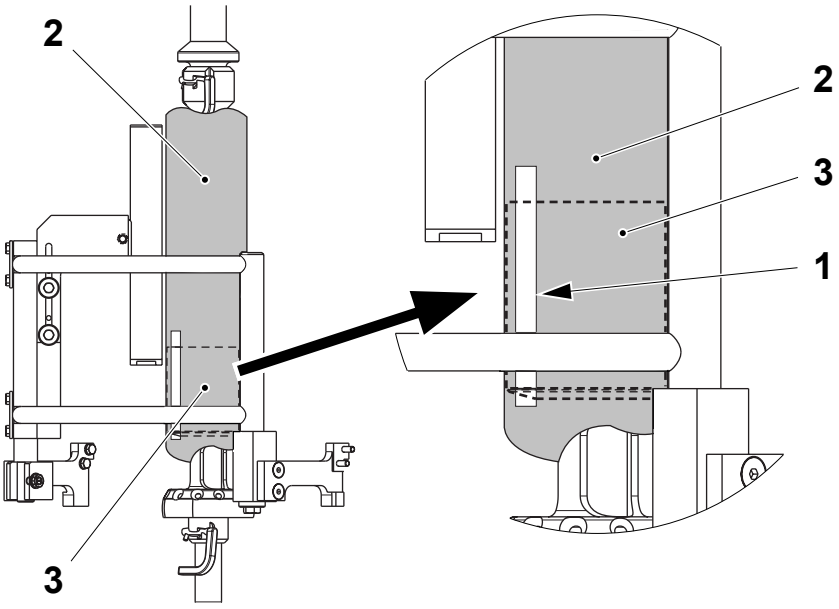
d) Check that the voltmeter shows approximately **0.6 Volt** and verify that, by moving the floater (3) up and down, the LED on the level regulator TMCC card works.

Note! If the LED is not working verify the TMCC card program downloading procedure, see 9.2.1-4 TMCC Controller - Load Program.

e) Check as required:

- the level detector setting, see 1.3.4-9 Filling Pipe - Set Level Control Device Floater Position
- the level detector alignment, see 1.3.4-8 Filling Pipe - Check Level Control Device Floater Alignment.

f) Change the level detector as required.



1 Slot
2 Paper tube
3 Floater

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.3.5 Cleaning Sleeve

1.3.5-1 Cleaning Sleeve - Set Sensors (Level Probe)

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1334054-0100

a) Remove the lock pin (1) and remove the lower part of the filling pipe.

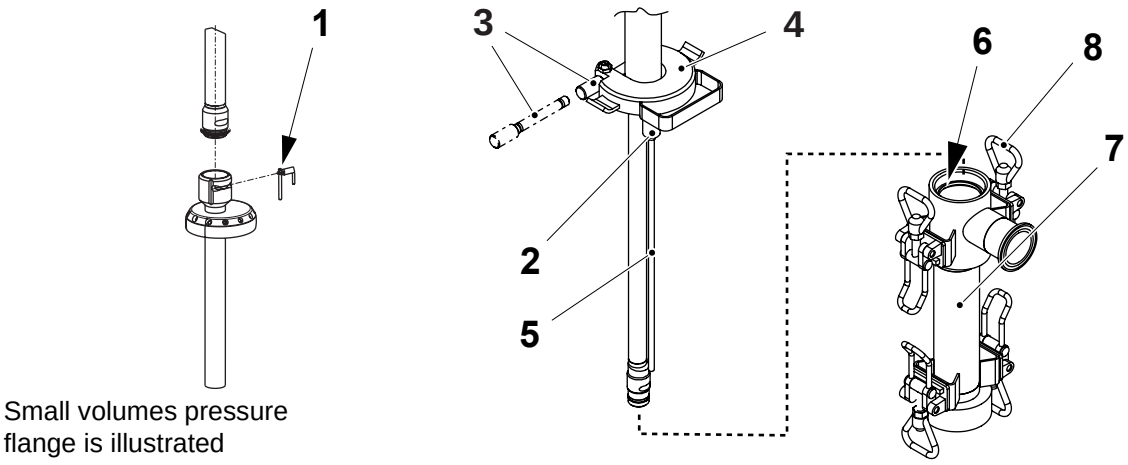
b) Remove the pin (3) from the cleaning sleeve flange (4).

CAUTION
Risk of damage to the equipment.
Take care not to hit the fitting (2) and the probe (5) when placing the cleaning sleeve flange (4).

c) Place the cleaning sleeve flange (4) on the flange of the filling pipe. Secure the cleaning sleeve flange (4) with the pin (3).

d) Check and change as required the gasket (6) on the upper cleaning sleeve (7).

e) Fit the upper cleaning sleeve (7) through the filling pipe and secure it with the two catches (8).



Small volumes pressure flange is illustrated

1 Lock pin
2 Fitting
3 Pin
4 Flange
5 Level probe
6 Gasket
7 Upper cleaning sleeve
8 Catch

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

CAUTION
Risk of damage to the equipment.
Take care not to hit the probe (5) when fitting the cleaning sleeve.

f) Check and change as required the gasket (9) on the lower cleaning sleeve (10).

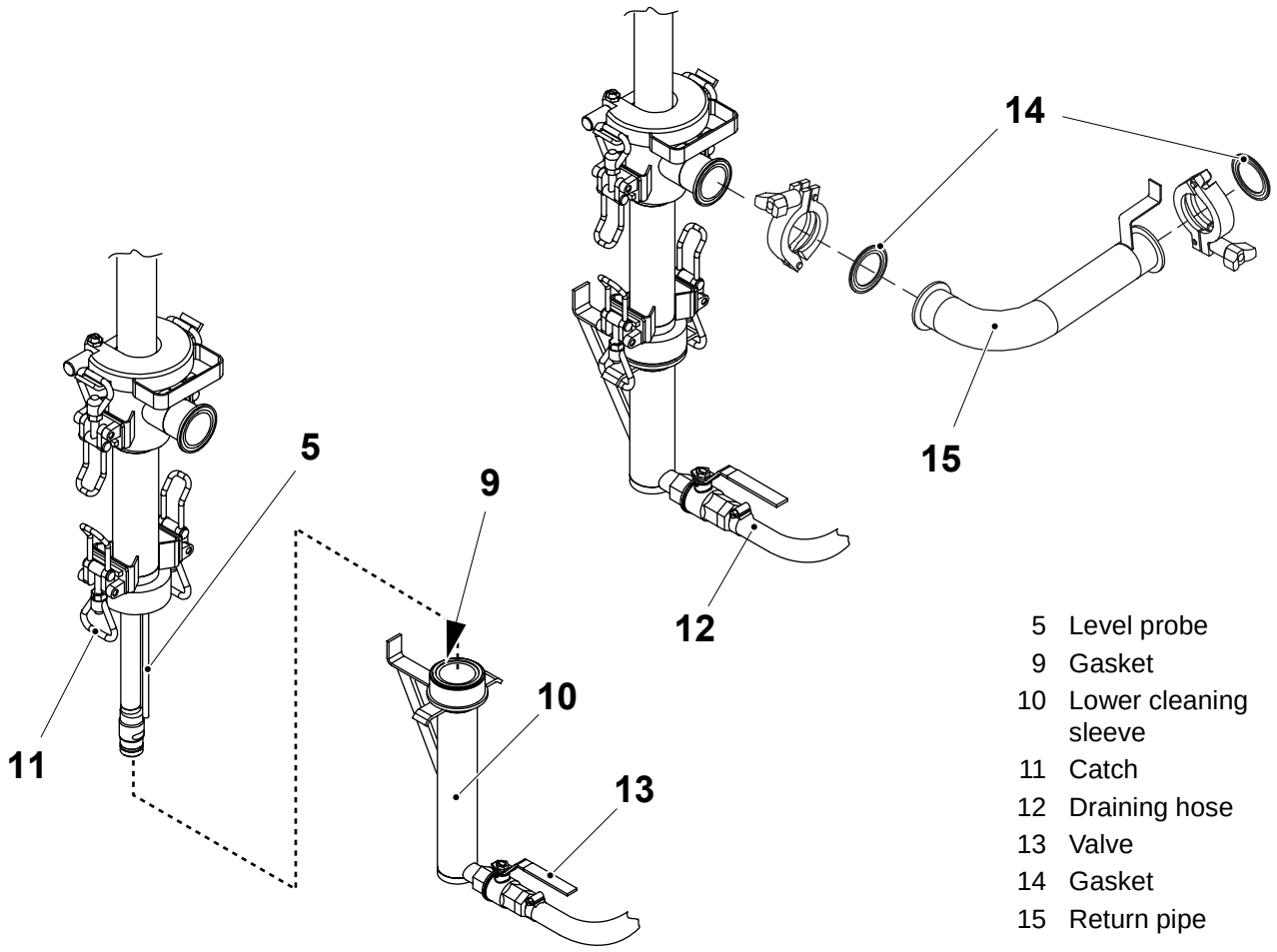
g) Fit the lower cleaning sleeve (10) through the filling pipe to the upper cleaning sleeve and secure it with the two catches (11).

Note! Place the draining hose (12) safely away from the jaws or from the final folder movements.

h) Close the valve (13) on the lower cleaning sleeve (10).

i) Check and if required change the gaskets (14) on the return pipe (15).

j) Fit the return pipe (15) with the gaskets (14) to the cleaning sleeve and to the machine body frame.



5 Level probe
9 Gasket
10 Lower cleaning sleeve
11 Catch
12 Draining hose
13 Valve
14 Gasket
15 Return pipe

TechPub_2614345_0105 - 01_MM81534_11en.fm

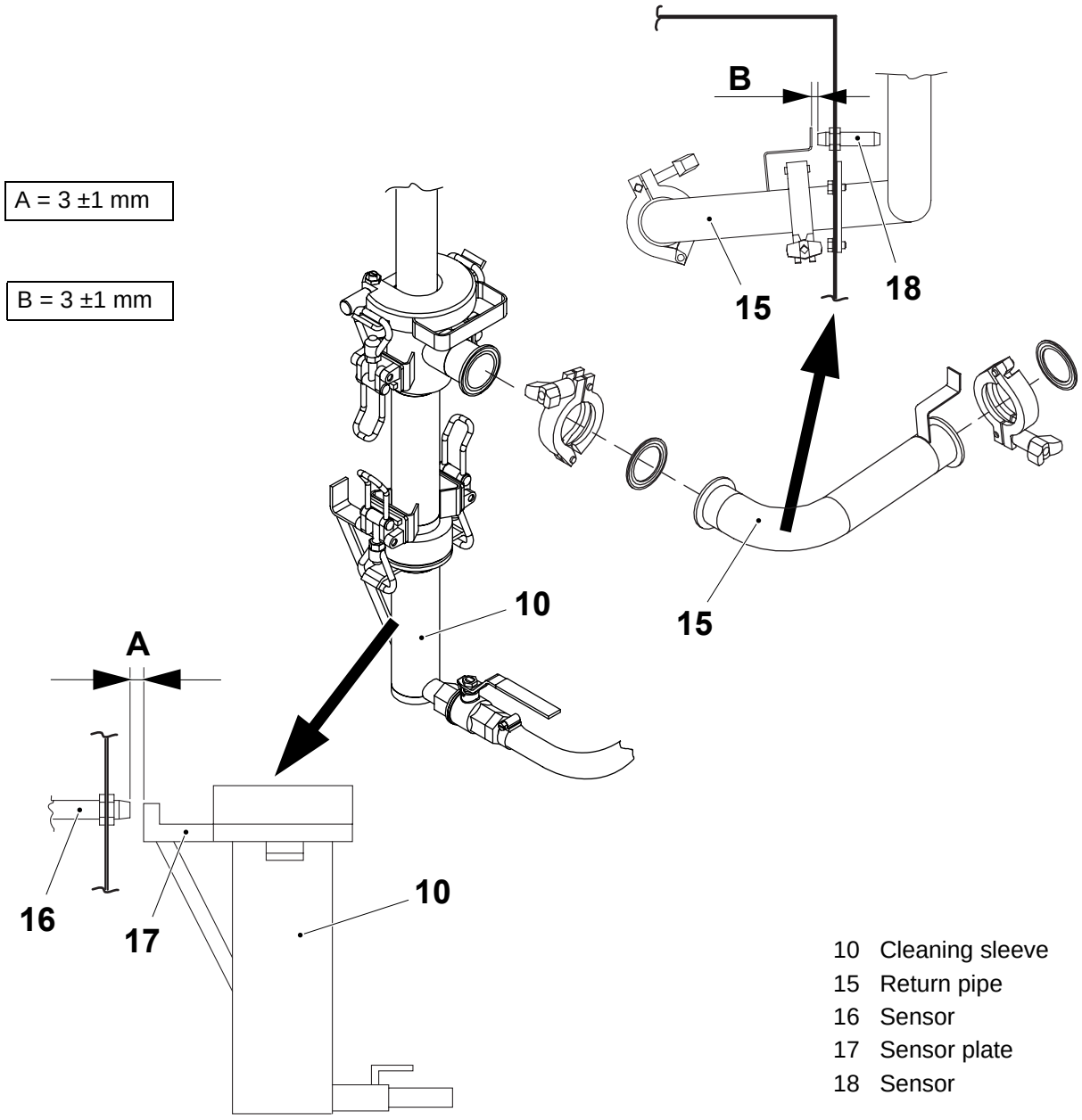
(Cont'd)

(Cont'd)

k) Turn the mains power **On**.

l) Set the distance **A** between the sensor (16) and the sensor plate (17) so that the sensor (16) is activated when the lower cleaning sleeve (10) is in cleaning position.

m) Set the distance **B** between the sensor (18) and the sensor plate on the return pipe (15).



10 Cleaning sleeve
15 Return pipe
16 Sensor
17 Sensor plate
18 Sensor

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.3.5-2 Cleaning Sleeve - Set Sensors (Floater)

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1334054-0100

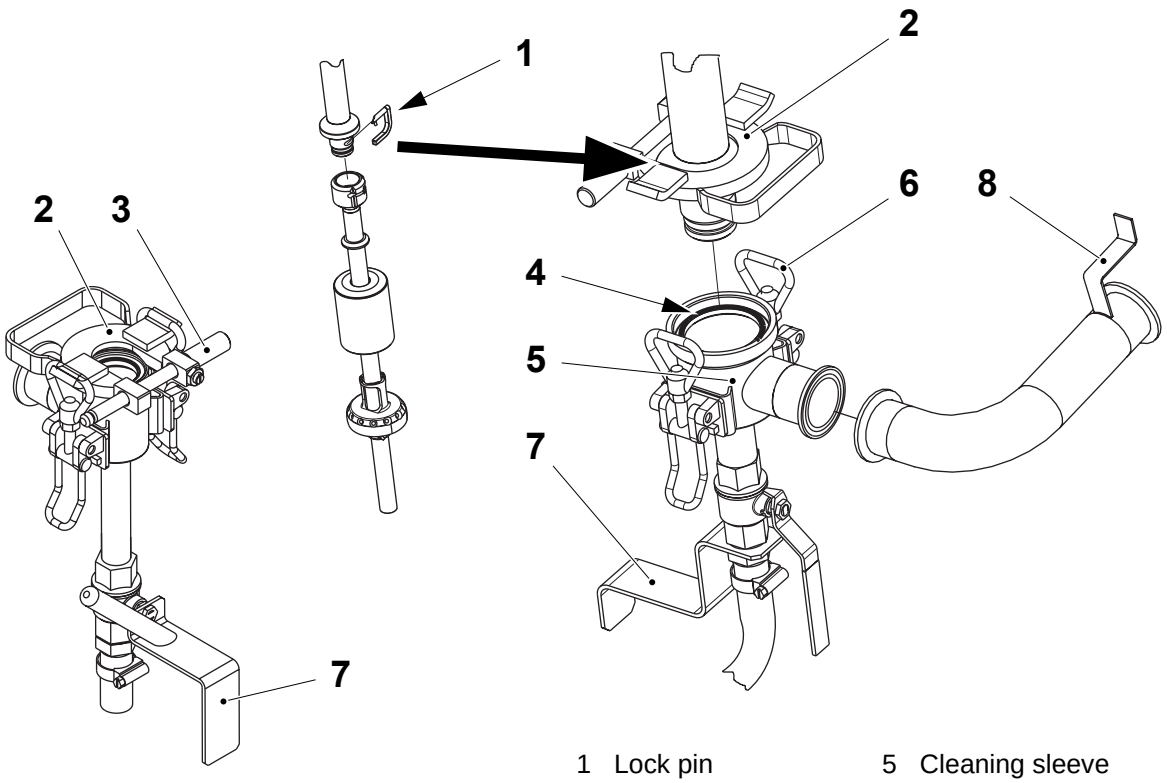
a) Remove the lock pin (1) and remove the lower part of the filling pipe.

b) Place the cleaning sleeve flange (2) on to the flange of the filling pipe. Secure the cleaning sleeve flange (2) with the pin (3).

c) Check and change as required the gasket (4) on to the cleaning sleeve (5).

d) Fit the cleaning sleeve (5) to the filling pipe and secure it with the two catches (6).

Note! Make sure that the sensor plates (7) and (8) are in front of their sensors. The cleaning sleeves (5) with the new combined valve and sensor plate (7) have a better control when the draining valve is opened or closed.



A cleaning sleeve with the new combined valve and sensor plate (7)

1 Lock pin
2 Flange
3 Pin
4 Gasket
5 Cleaning sleeve
6 Catch
7 Sensor plate
8 Sensor plate

TechPub_2614345_0105 - 01_MM81534_11en.fm

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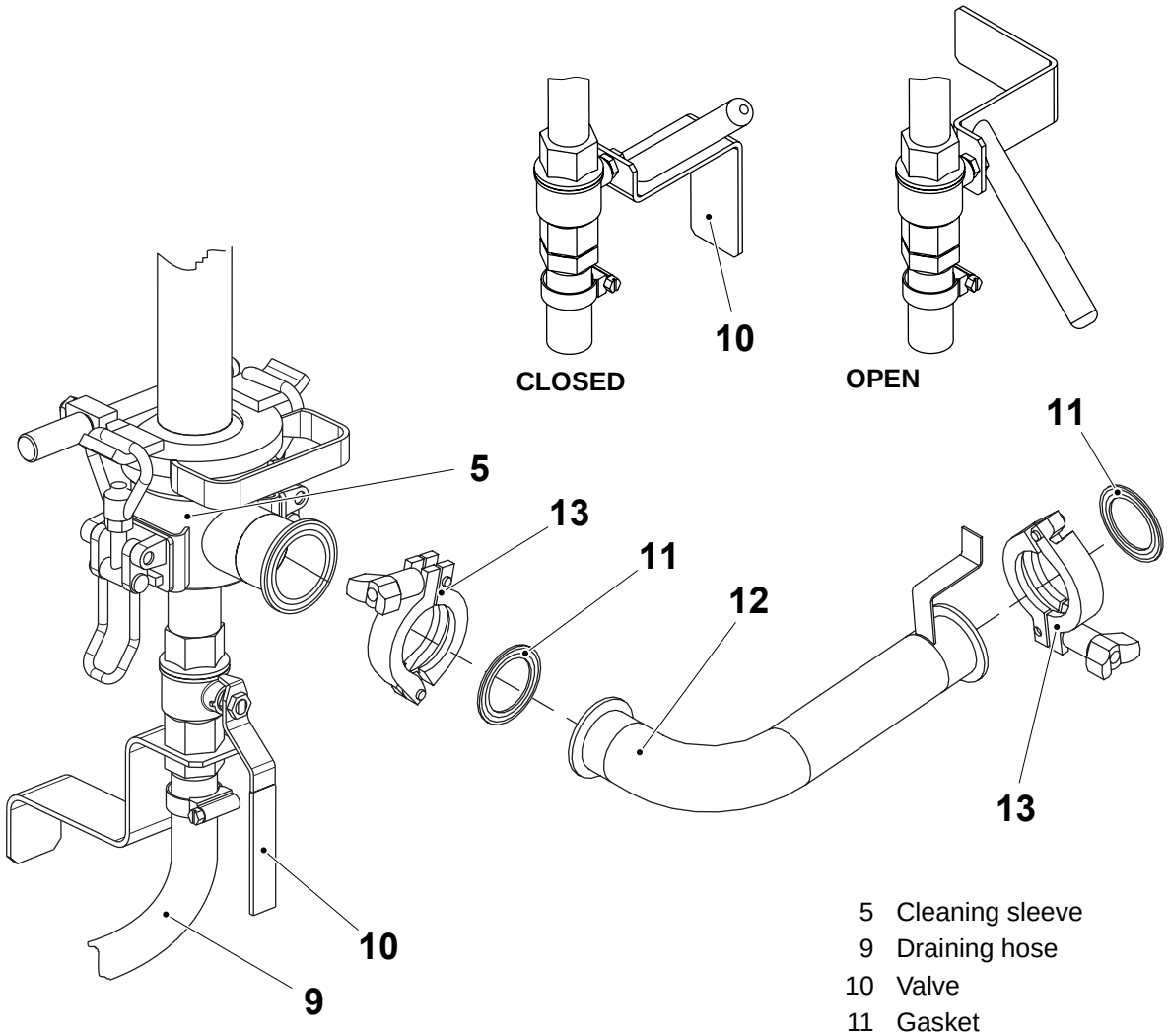
Note! Place the draining hose (9) safely away from the jaws or from the final folder movements.

e) Close the valve (10) on the cleaning sleeve (5).

f) Check and change as required the gaskets (11) on the return pipe (12).

g) Fit the return pipe (12) and its gaskets (11) to the cleaning sleeve (5) and to the machine body frame by means of the clamps (13).

A cleaning sleeve with the new combined valve and sensor plate



5 Cleaning sleeve
9 Draining hose
10 Valve
11 Gasket
12 Return pipe
13 Clamp

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

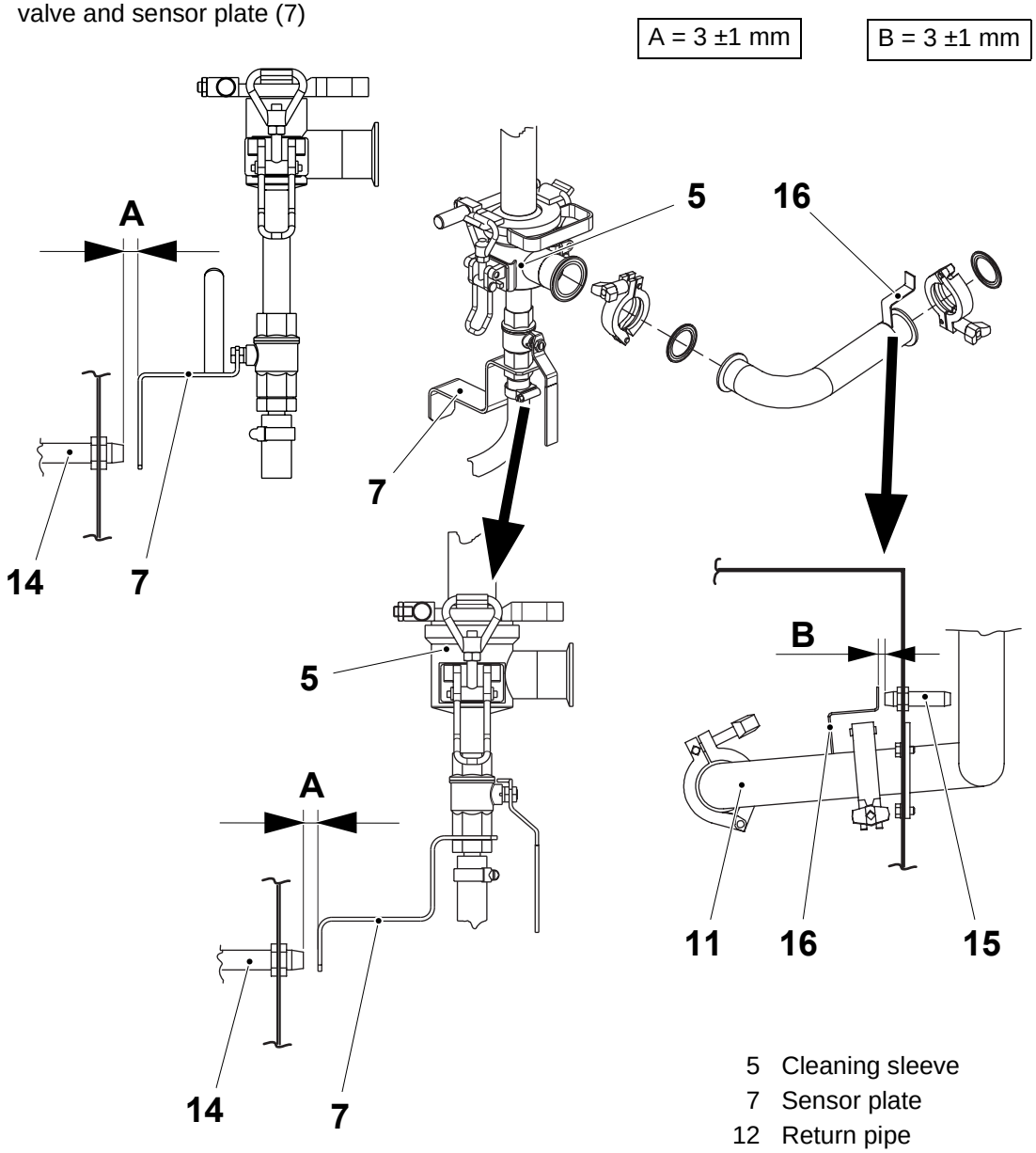
(Cont'd)

h) Turn the mains power **On**.

i) Set the distance **A** between the sensor (14) and the sensor plate (7) so that the sensor (14) is activated when the cleaning sleeve (5) is in the cleaning position.

j) Set the distance **B** between the sensor (15) and the sensor plate (16) of the return pipe (12).

A cleaning sleeve with the new combined valve and sensor plate (7)



5 Cleaning sleeve
7 Sensor plate
12 Return pipe
14 Sensor
15 Sensor
16 Sensor plate

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1.3.6 C.I.P. Switch (OE)

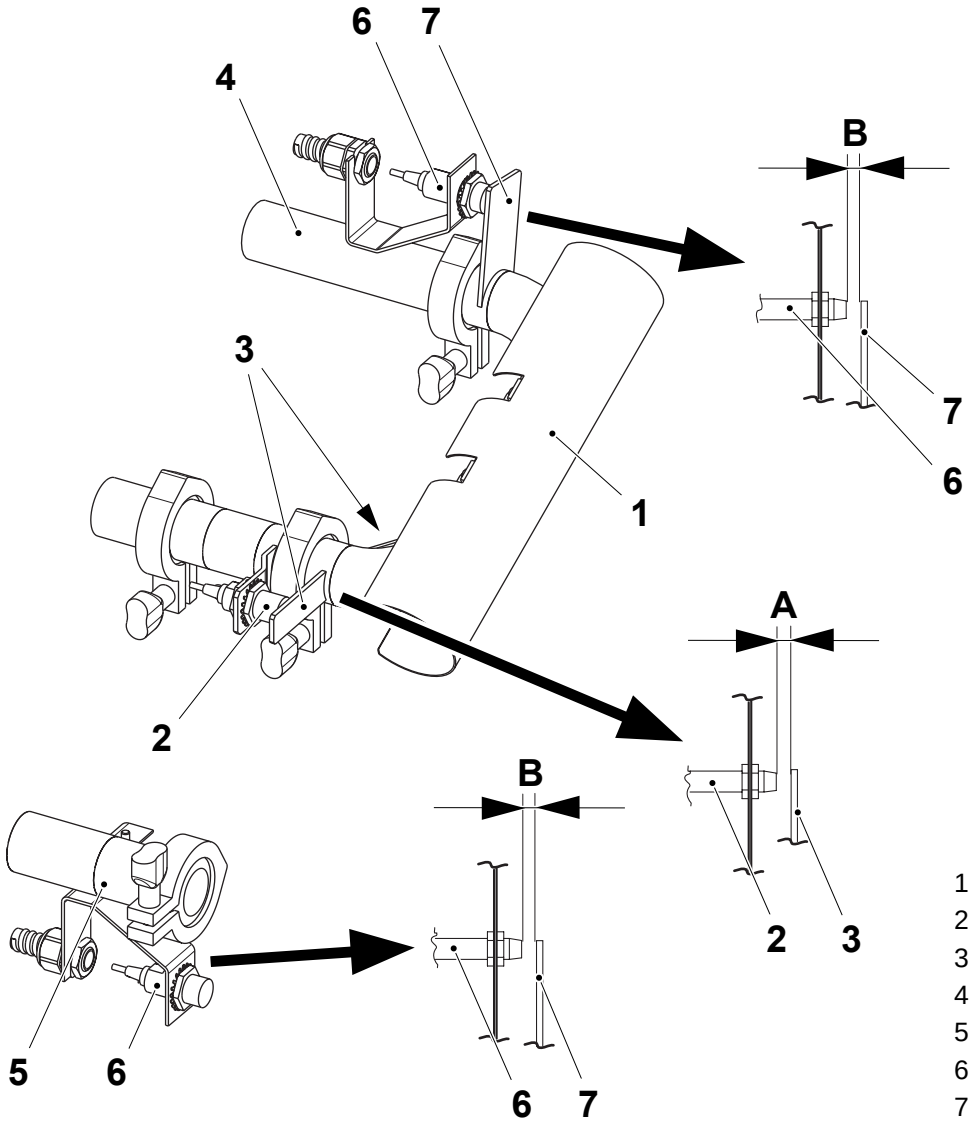
1.3.6-1 C.I.P. Switch (OE) - Set

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1035107-0300

a) Fit the switch-over pipe (1) and set the distance **A** between the proximity switch (2) and the sensor plate (3).

b) Check the switch-over pipe (1) setting both in cleaning position (4) and in production position (5).

c) Set the distance **B** between the proximity switches (6) and the sensor plate (7) both in cleaning position (4) and in production position (5).



A = 2 ±1 mm

B = 2 ±1 mm

1 Switch-over pipe
2 Proximity switch
3 Sensor plate
4 Cleaning position
5 Production position
6 Proximity switch
7 Sensor plate

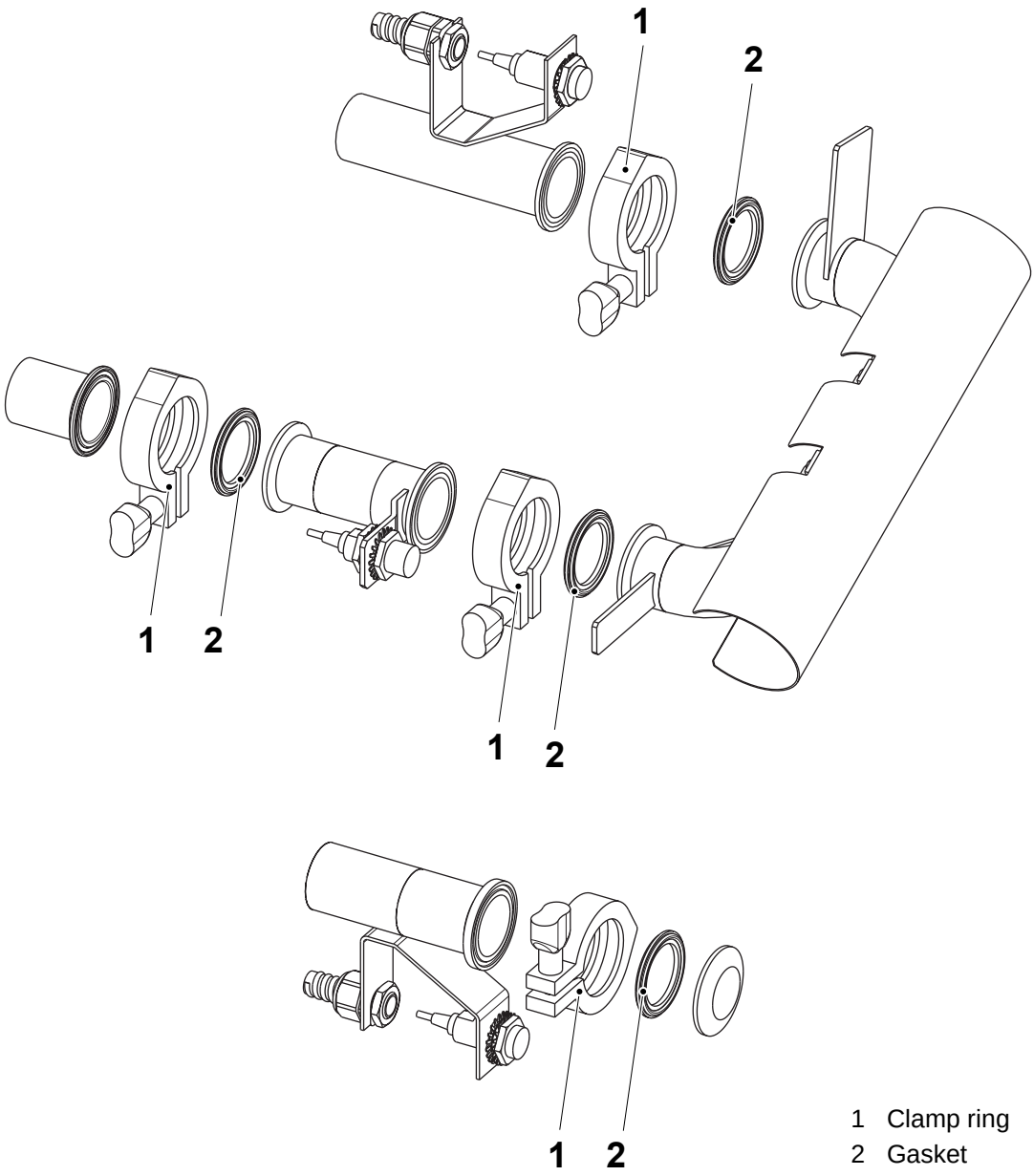
TechPub_2614345_0105 - 01_MM81534_11en.fm

1.3.6-2 C.I.P. Switch (OE) - Check Gaskets

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035107-0300

a) Remove the clamp rings (1) and check the gaskets (2) for wear and/or damage.

b) Change the gaskets (2) as required.



1 Clamp ring
2 Gasket

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.3.7 Steam System

1.3.7-1 Steam System - Check Filter

Machine Status	Mains Power OFF Air OFF Steam OFF Water OFF
SPC Reference	1346549-0200

WARNING

Risk of personal injury.

Make sure that the steam and the compressed air have been turned off. Make sure that there is **no product, steam or cleaning liquid** in the line. In case of an accident call for medical attention.

WARNING

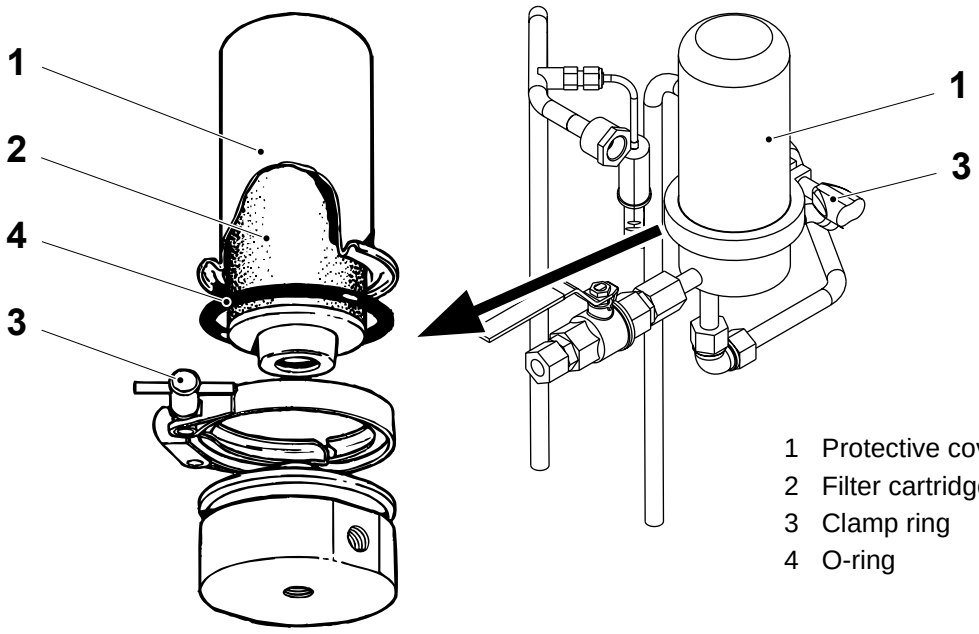
Risk of personal injury.

The steam system and adjacent components may be hot. If required wear heat-resistant protective gloves.

a) Loosen the clamp ring (3) and remove the protective cover (1). Clean the inside of the cover as required.

b) Check the O-ring (4) and change it as required.

c) Remove and, if required, clean the filter cartridge (2) by following the procedure described in 1.3.7-3 Steam System - Clean Filter.



1 Protective cover
2 Filter cartridge
3 Clamp ring
4 O-ring

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1.3.7-2 Steam System - Clean Steam Trap

Machine Status	Mains Power OFF Air OFF Steam OFF Water OFF
SPC Reference	1346549-0200

WARNING

Risk of personal injury.

Make sure that the steam and the compressed air have been turned off. Make sure that there is **no product, steam or cleaning liquid** in the line. In case of an accident call for medical attention.

WARNING

Risk of personal injury.

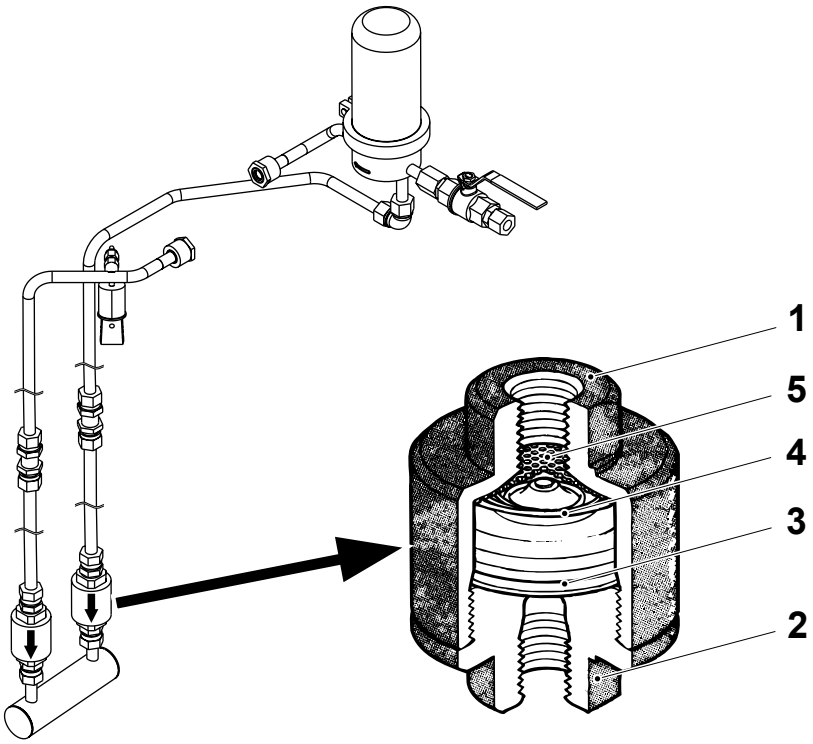
The steam system and adjacent components may be hot. If required wear heat-resistant protective gloves.

a) Remove the steam traps (1) from the line.

b) Unscrew the cap (2).

c) Remove the spacer (3), the spring (4) and the strainer (5). Clean the parts as required.

d) Assemble in the reverse order.



1 Steam trap
2 Cap
3 Spacer
4 Spring
5 Strainer

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.3.7-3 Steam System - Clean Filter

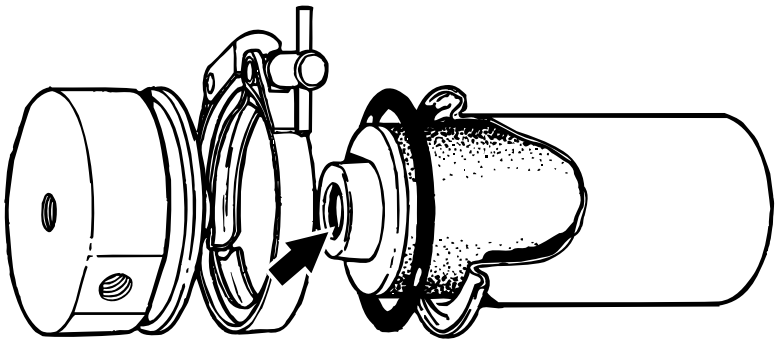
Machine Status	Mains Power OFF Air OFF Steam OFF Water OFF
Special Equipment	Tank 50 litres Filter Pall Profile 10µm Coalecher element Pall SU range Thermometer Pressure gauge
Consumables	Nitric acid 14 - 15% (w/w)
SPC Reference	1346549-0200

WARNING

Risk of personal injury.

Make sure that the steam and the compressed air have been turned off. Make sure that there is **no product, steam or cleaning liquid** in the line. In case of an accident call for medical attention.

Remove the O-ring (arrow) from the filter cartridge.



(Cont'd)

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(Cont'd)

General information

CAUTION

Risk of damage to the equipment.

If the cartridge is highly contaminated or if the recommended cleaning procedure cannot be executed correctly, contact **Pall Scientific & Laboratory Services** for advice.

To obtain optimum performance of the filter cartridge:

- clean the filter cartridge thoroughly (or return to Pall for cleaning and testing) before reusing
- label and store used cartridges **after** removing the O-ring.

Water used during cleaning should be distilled **and** filtered.

For rinsing, use a 50 litre tank, designed to avoid “dead spaces”. Incoming water (renewal rate 5 l/min.) must be filtered with Pall Profile 10 µm.

The contents of the tank should be agitated by means of compressed air, filtered through a Coalecher element from the Pall SU range.

Cleaning with nitric acid

WARNING

Risk of personal injury.

Nitric Acid. Follow the Safety precautions. The cleaning procedure must not contravene with any legal or local safety regulations.

a) Immerse the filter cartridge **in 14 - 15%** (w/w) nitric acid at **60 - 70 °C** for 10 - 20 minutes.

b) Rinse the cartridge in water for **at least** 10 minutes.

c) Empty the tank and refill with water. The **pH level** of the tank contents should now be **6 - 8**.

d) Rinse the cartridge again for at least two hours, or until the pH level of the tank contents is the same as that of the incoming water.

e) Flush the cartridge in the reverse direction with water. If the water emerging from the cartridge is discoloured or contains visible contaminants, repeat the first two steps of the cleaning procedure.

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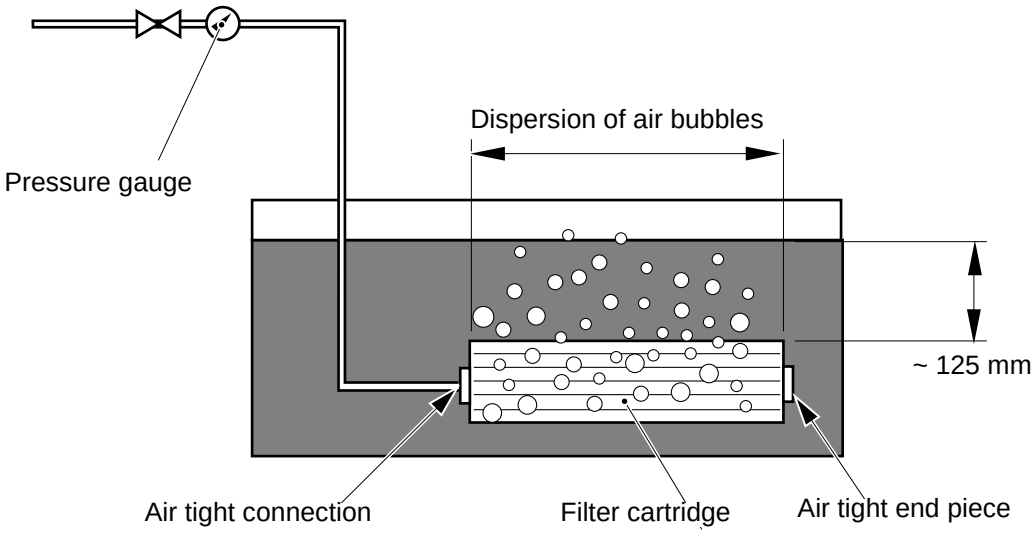
Reverse bubble point testing

Note! Perform these steps **immediately** after the cleaning procedure.

a) Thoroughly soak the filter cartridge in water.

b) Plug one end of the cartridge and connect the other end to a compressed air line. The pressure should be in the range of **0 - 13 kPa**.

c) Submerge the filter cartridge in water. The filter should be kept approximately **125 mm** below the surface.



d) Gradually increase the air pressure while rotating the cartridge slowly, until air bubbles can be seen emerging from it. Record the air pressure at this point.

e) Carefully inspect the filter cartridge to ensure that the air bubbles emerge at a similar rate from the entire cartridge. If not, contact **Pall Scientific & Laboratory Services** for advice.

f) Lower the pressure to half the recorded pressure. If air bubbles emerge from an isolated area of the cartridge at this pressure, contact **Pall Scientific & Laboratory Services** for advice.

Drying procedure

a) Dry the filter at **105 - 120 °C** for **1 - 2 hours**.

b) After drying, visually check the filter cartridge for damage and corrosion. Change the cartridge as required.

c) Before fitting the filter cartridge, fit a new O-ring.

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.4 Hydrogen Peroxide

SPC Reference	1095833-0400

1.4-1 Hydrogen Peroxide - Check Leaks

Machine Status	Mains Power OFF Air ON Steam ON Water ON
SPC Reference	1095833-0400

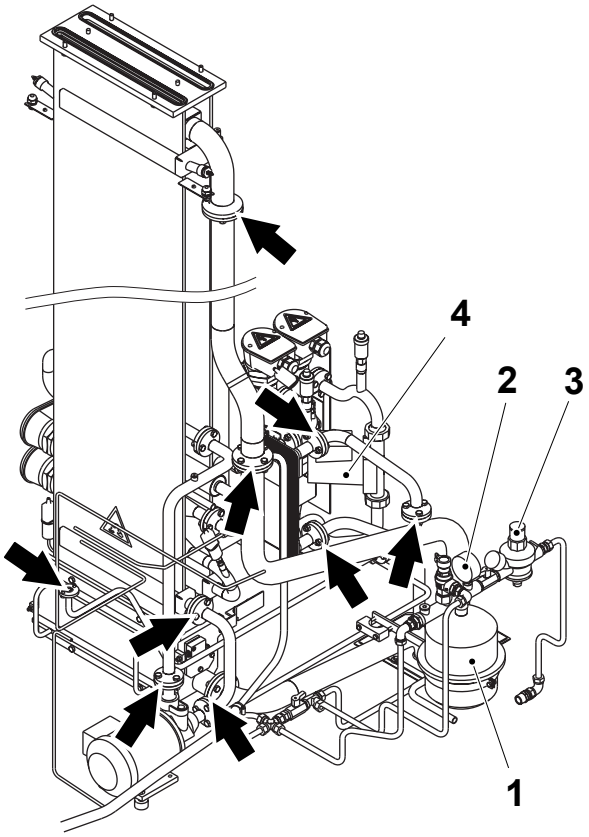
WARNING
Hydrogen peroxide.
Follow the Safety precautions.

a) Check that the pressure in the liquid container (1) reaches **2 bar,** on the pressure gauge (2). If not set the pressure as required by means of the automatic feeder (3), see 2.5-3 Hydrogen Peroxide - Set Pressure.

b) Step up the machine to step HEAT STERILIZATION.

c) Check the pipe connections for leaks, see arrows. Change the seals as required.

d) Check the pump (4) for abnormal noise or vibrations.



1 Container
2 Pressure gauge
3 Automatic feeder
4 Pump

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.4-2 Hydrogen Peroxide - Fill Water System

Machine Status	Mains Power OFF Air OFF Steam ON Water ON
SPC Reference	1095833-0400

WARNING

Hydrogen peroxide.
Follow the Safety precautions.

Note! Make sure that the gasket underneath the top cap, on the venting valves (1) and (2), is removed.

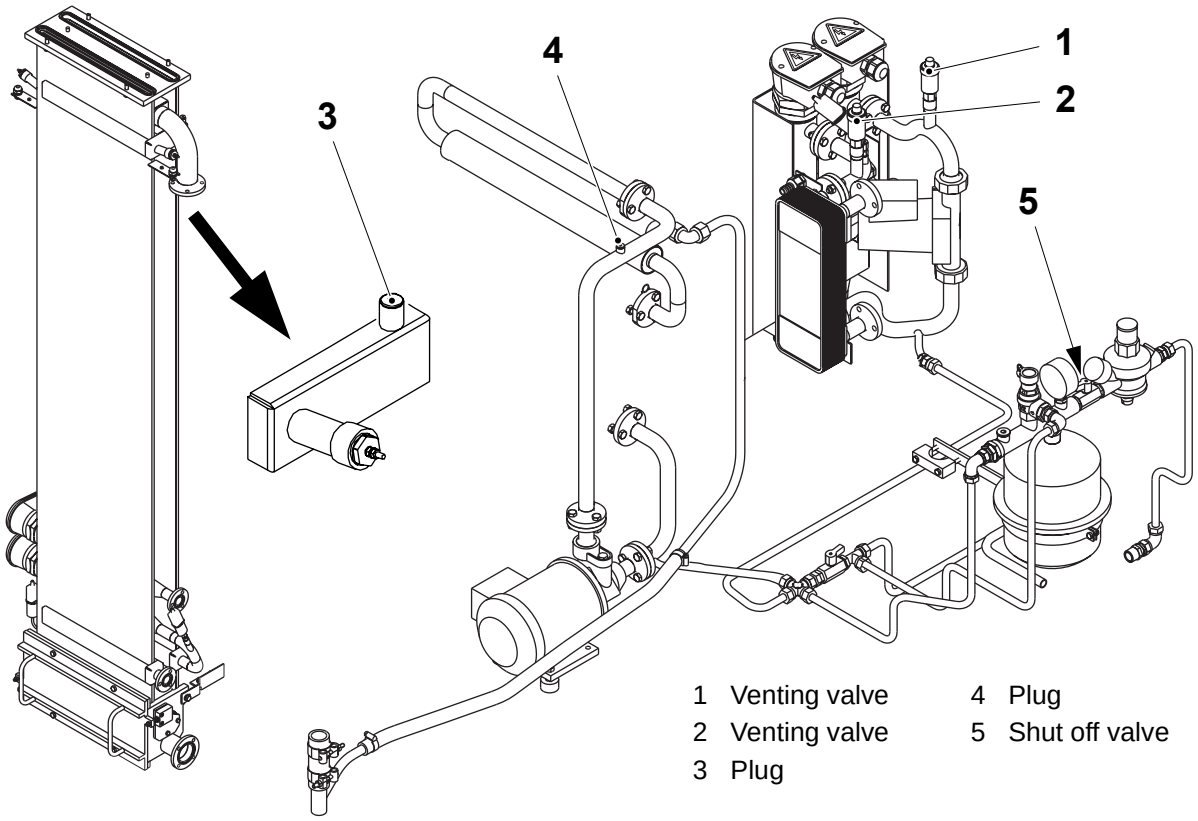
a) Loosen the plugs (3) and (4).

b) Start to fill the circuit with water by opening the shut off valve (5).

c) Continue to fill until the water reaches the plug (4).

d) Tighten the plug (4) and continue to fill until the water reaches the plug (3).

e) Tighten the plug (3).



1 Venting valve
2 Venting valve
3 Plug
4 Plug
5 Shut off valve

(Cont'd)

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(Cont'd)

f) Read the pressure of the liquid container (6) on the pressure gauge (7). The pressure must be between **2** and **2.5 bar**. If not set the pressure as required by means of the automatic feeder (8), see 2.5-3 Hydrogen Peroxide - Set Pressure.

g) Bleed air from the pump (9) by unscrewing the plug (10) a few turns. Screw back in the plug (10) when the water runs from the hole and there are no more air bubbles.

WARNING

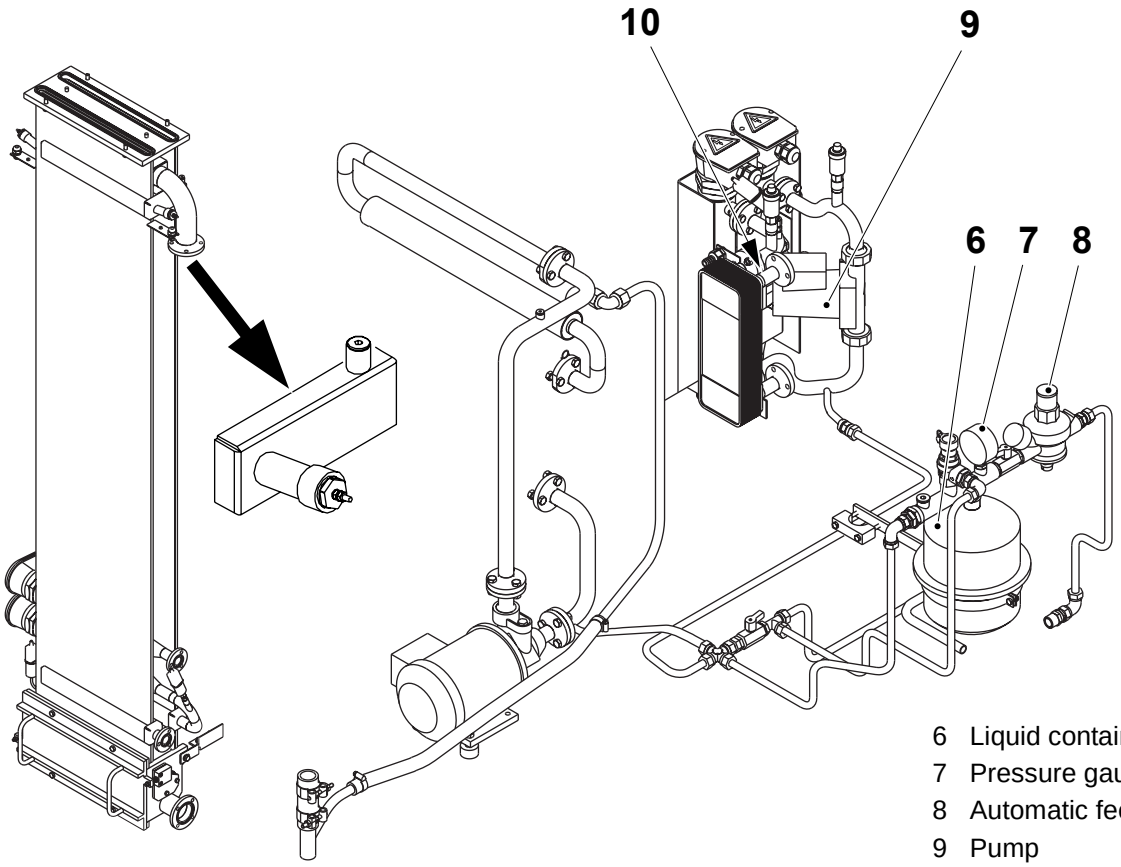
Risk of personal injury.

The hydrogen peroxide system and adjacent components may be hot. If required wear heat-resistant protective gloves.

h) Step up the machine to HEAT STERILIZATION.

i) Check the pressure on the pressure gauge (7) and set it as required.

j) Repeat the bleeding sequence at four hourly intervals during machine run, until the water system is free from air bubbles.



6 Liquid container
7 Pressure gauge
8 Automatic feeder
9 Pump
10 Plug

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1.4.1 Bath

1.4.1-1 Bath - Check Roller

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1035008-0400

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

a) Loosen the two screws (1).

Note! The two screws (1) are used to position the cover (2) for assembly.

b) Remove the screws (3) and the cover (2).

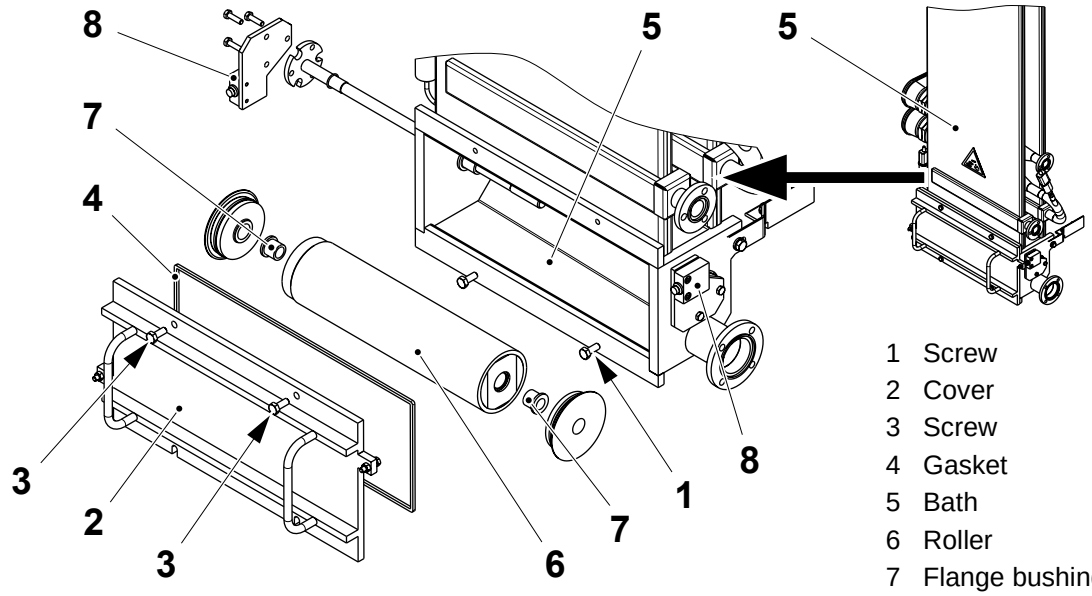
c) Check the gasket (4) and change it as required.

d) Clean up any strip residue from the bath (5) and check the surface/ rotation of the roller (6). Make sure the roller (6) rotates freely.

e) Check the radial play on the flange bushings (7). If excessive play change them, see 1.4.1-3 Bath - Change Roller Bushings.

f) Fit the cover (3) by means of the screws (2). Tighten the screws (1) and (2).

Note! The two switches (8) must not be activated until the screws (1) and (2) have been fully tightened. Check the alarm functions on the TPOP panel.



1 Screw
2 Cover
3 Screw
4 Gasket
5 Bath
6 Roller
7 Flange bushing
8 Switch

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.4.1-2 Bath - Change Heating Elements

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Sleeve socket holder TP No. 90206-330
Consumables	Thread sealant TP No. 90157-34
SPC Reference	1035008-0400

WARNING

Hydrogen peroxide.
Follow the Safety precautions.

a) Drain the water bath by opening valve (1).

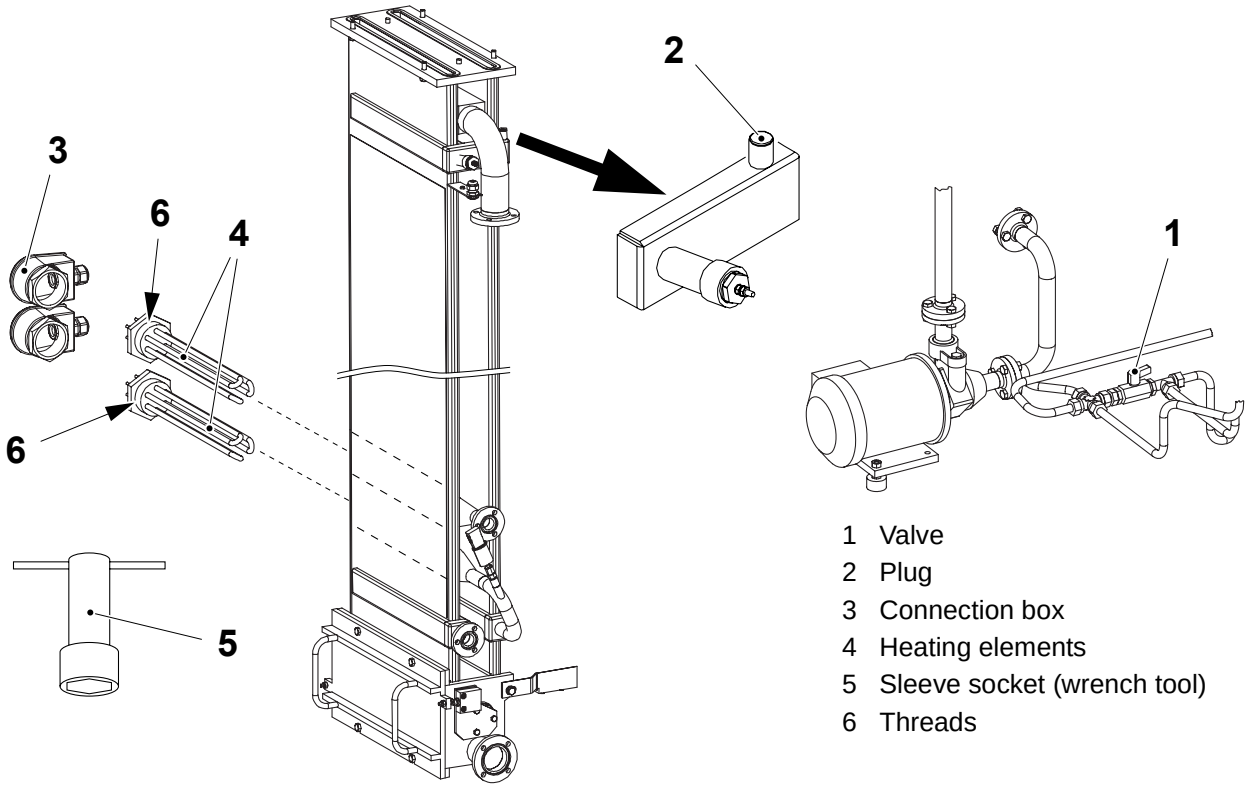
b) Remove the plug (2) and the connection boxes (3).

c) Mark and remove the electrical connections.

d) Remove the heating elements (4) with the aid of the sleeve socket wrench tool (5).

e) Change the heating elements (4). Coat the threads (6) of the heating elements with thread sealant.

f) Assemble in the reverse order and refill the bath, see 1.4-2 Hydrogen Peroxide - Fill Water System.



1 Valve
2 Plug
3 Connection box
4 Heating elements
5 Sleeve socket (wrench tool)
6 Threads

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.4.1-3 Bath - Change Roller Bushings

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1035008-0400

WARNING

Hydrogen peroxide.
Follow the Safety precautions.

a) Loosen the two screws (1).

Note! The two screws (1) are used to position the cover (2) for assembly.

b) Remove the two screws (3) and the cover (2).

c) Remove the gasket (4) and change it as required.

d) Loosen the tension on the chain and, on the LH side of the bath, remove the screws (5) and the plate (6).

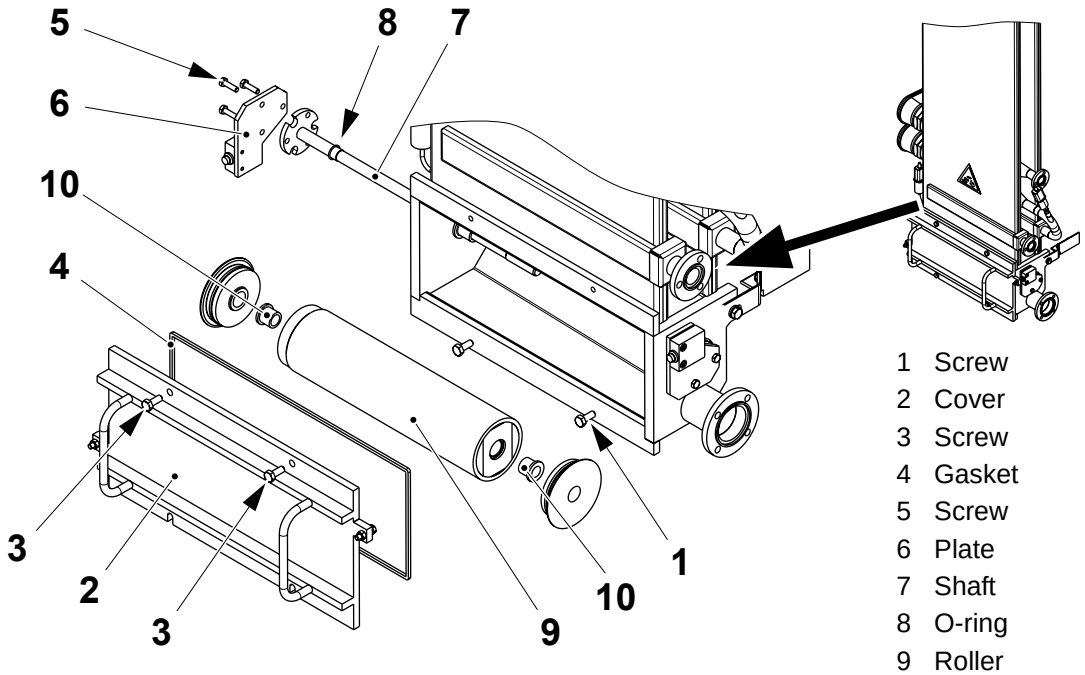
e) Pull out the shaft (7) and change it as required.

f) Remove the O-ring (8) from the shaft and change it as required.

g) Pull out the roller (9) and change it as required.

h) Remove and change the flange bushings (10).

i) Assemble in the reverse order.



1 Screw
2 Cover
3 Screw
4 Gasket
5 Screw
6 Plate
7 Shaft
8 O-ring
9 Roller
10 Flange bushing

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.4.2 Heating Unit

1.4.2-1 Heating Unit - Change Heating Element

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Special Equipment	Sleeve socket holder TP No. 90206-330
Consumables	Thread sealant TP No. 90157-34
SPC Reference	1334506-0200

WARNING

Hydrogen peroxide.

Follow the Safety precautions.

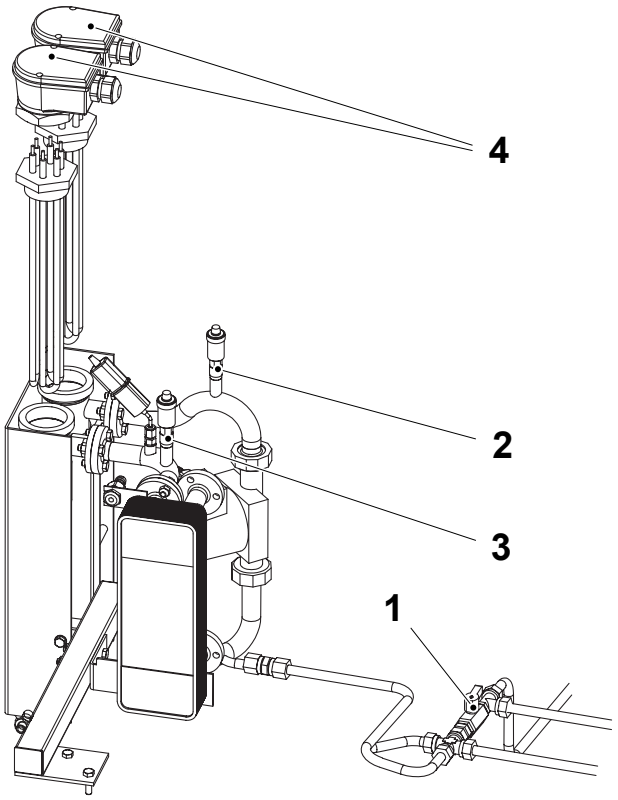
WARNING

Risk of personal injury.

The hydrogen peroxide system and adjacent components may be hot. If required wear heat-resistant protective gloves.

a) Drain the water system by opening the shut off valve (1) and slightly unscrew the venting valves (2) and (3).

b) Remove the connection boxes (4).



1 Shut off valve
2 Venting valve
3 Venting valve
4 Connection box

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

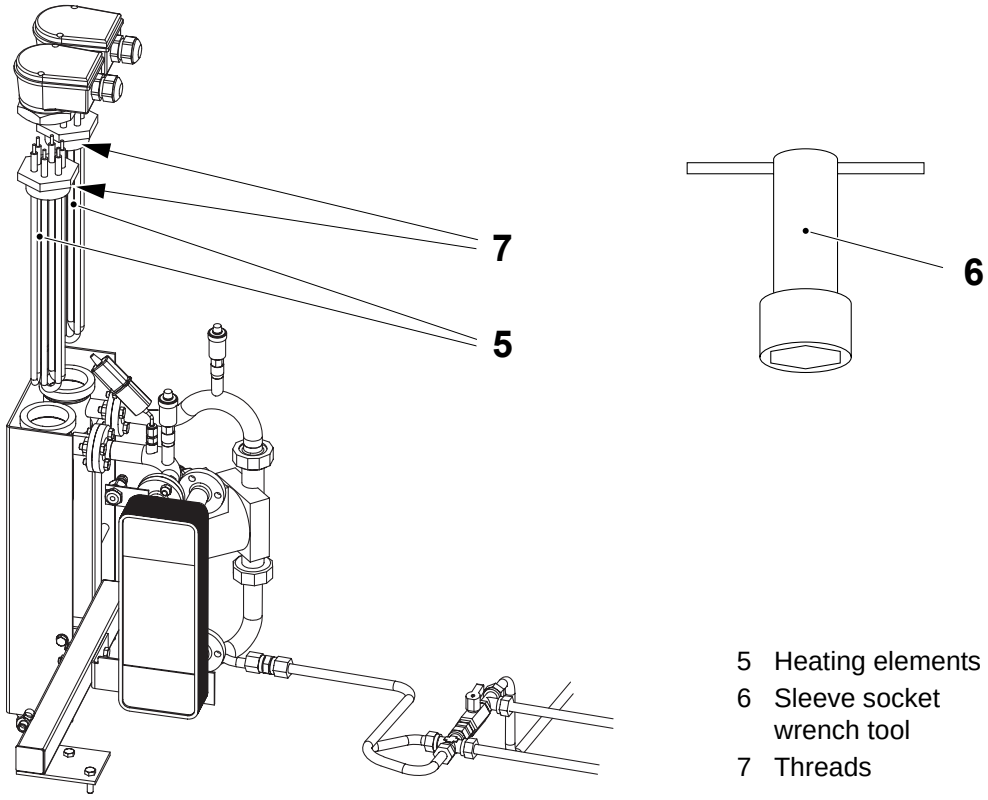
(Cont'd)

c) Mark and remove the electrical connections.

d) Remove the heating elements (5) with the aid of the sleeve socket wrench tool (6).

e) Change the heating elements (5). Coat the threads (7) of the heating elements with thread sealant.

f) Assemble in the reverse order and refill the water circuit, see 1.4-2 Hydrogen Peroxide - Fill Water System.



5 Heating elements
6 Sleeve socket wrench tool
7 Threads

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.4.2-2 Heating Unit - Change Heat Exchanger

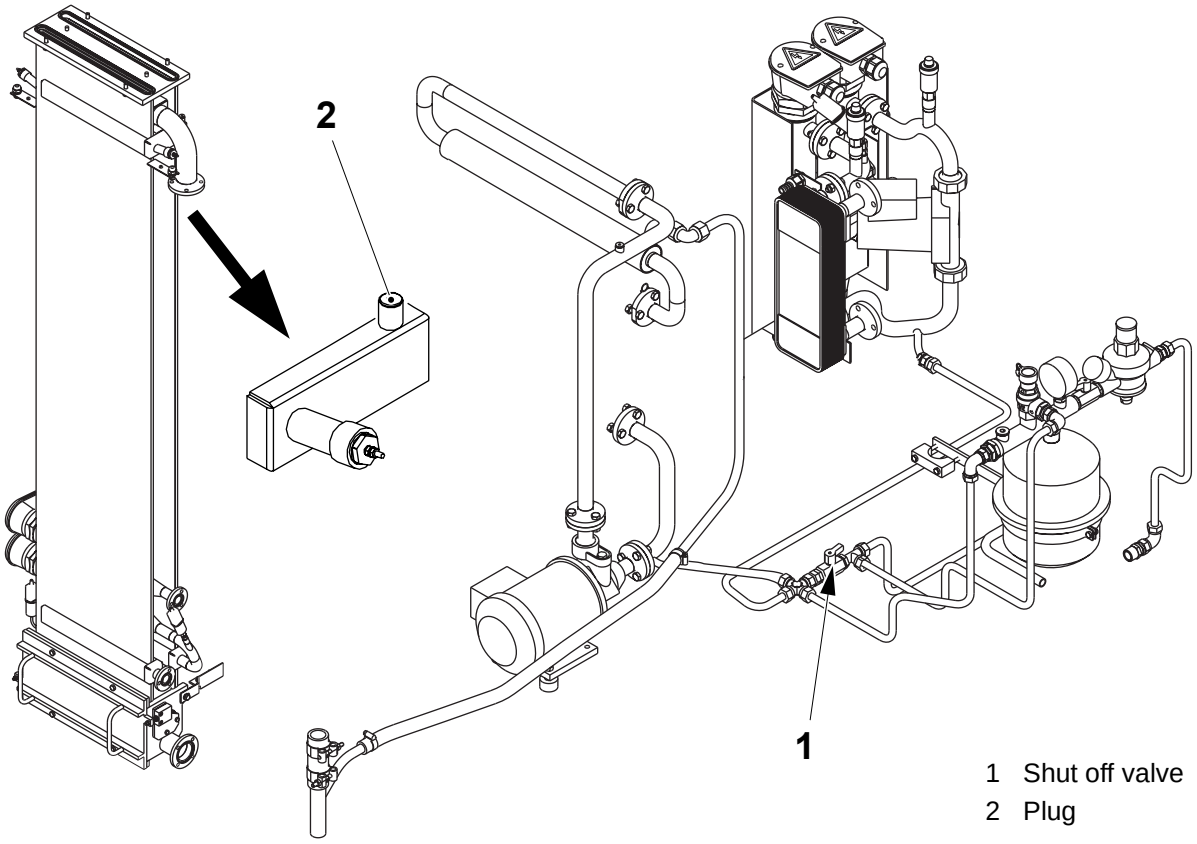
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1334506-0200

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

WARNING
Risk of personal injury.
The hydrogen peroxide system and adjacent components may be hot. If required wear heat-resistant protective gloves.

a) Drain the water system by opening the shut off valve (1).

b) Remove the plug (2).



1 Shut off valve
2 Plug

TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

(Cont'd)

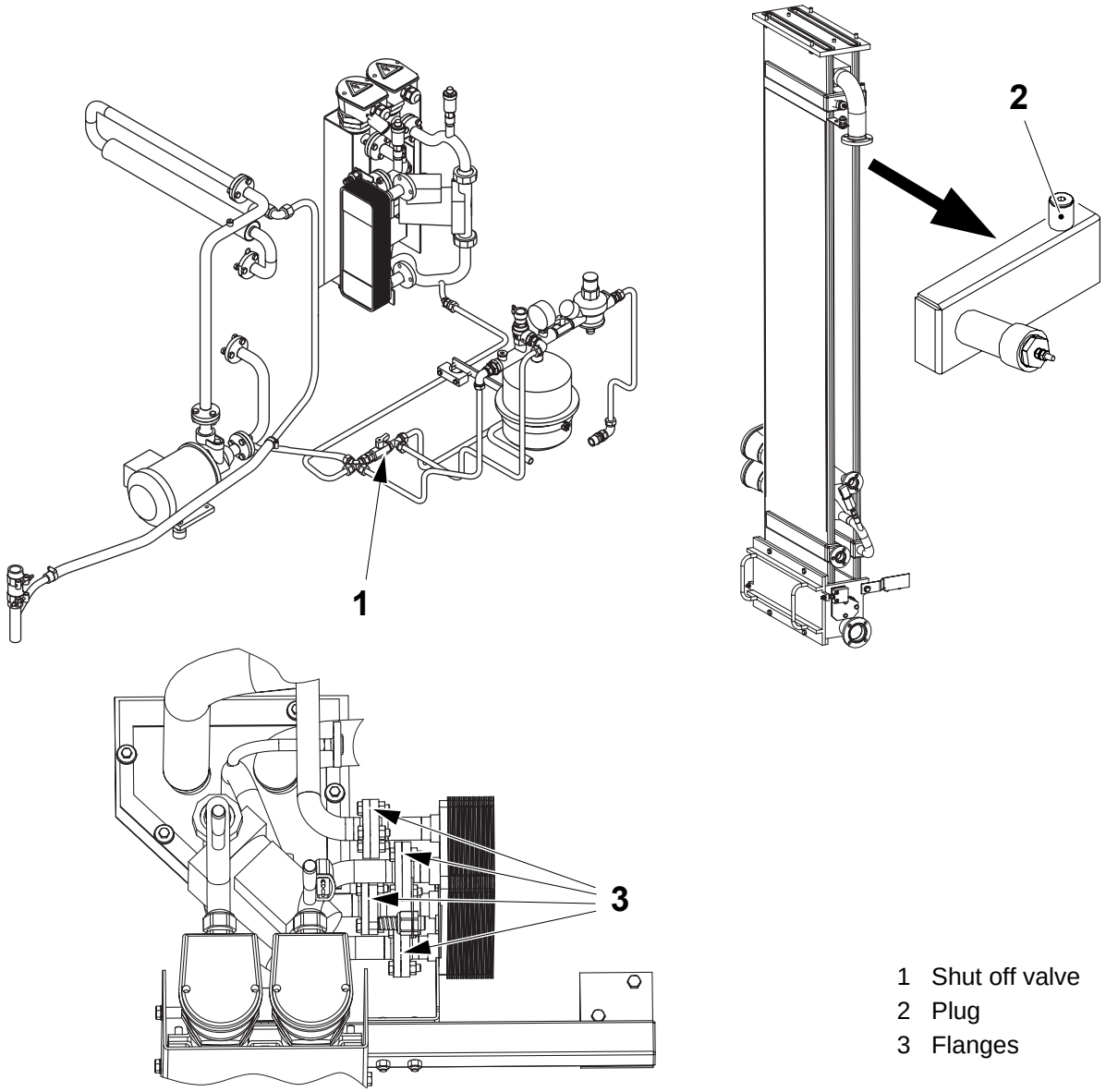
c) Loosen the flanges (3) on the heat exchanger and remove it.

d) Change the heat exchanger, ensuring that the flanges (3) are sealed by means of new gaskets.

e) Fit back the plug (2).

f) Close the shut off valve (1) and fill the heating unit, see 1.4-2 Hydrogen Peroxide - Fill Water System.

g) Check for leaks, see 1.4-1 Hydrogen Peroxide - Check Leaks.



1 Shut off valve
2 Plug
3 Flanges

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.4.2-3 Heating Unit - Drain Heating Unit U-bend

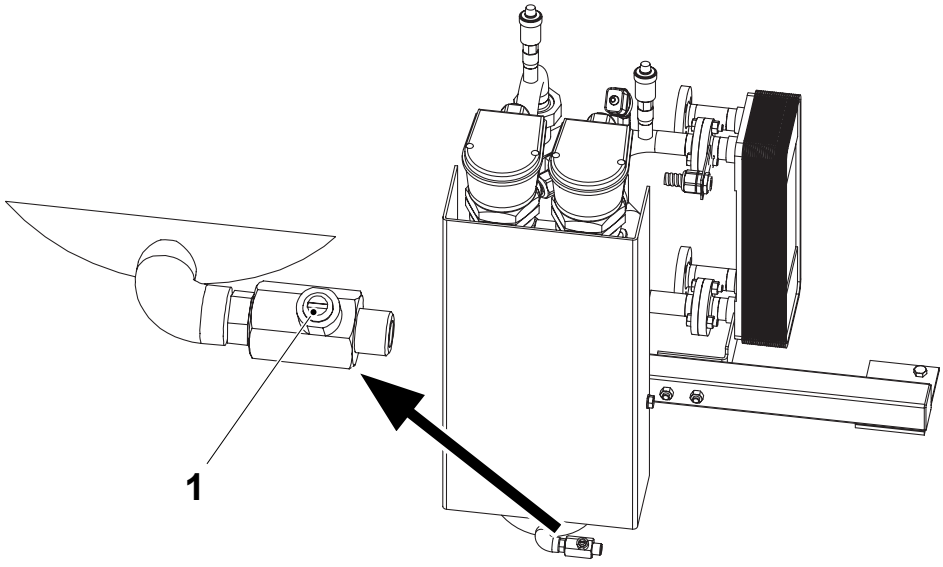
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1334506-0200

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

WARNING
Risk of personal injury.
The hydrogen peroxide system and adjacent components may be hot. If required wear heat-resistant protective gloves.

a) Cut off the water supply to the heating unit and drain the system, see 1.4.2-2 Heating Unit - Change Heat Exchanger.

b) With the aid of a screwdriver, open the valve (1) and drain water from the heating unit U-bend into a bucket.



1 Valve

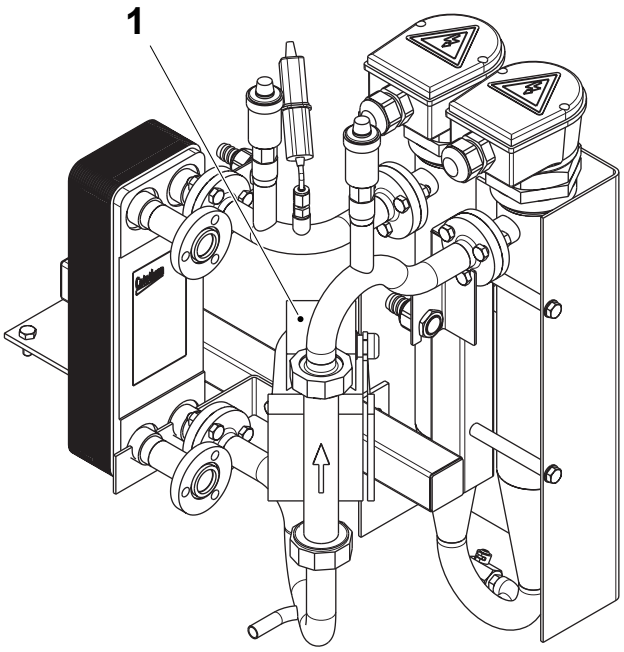
TechPub_2614345_0105 - 01_MM81534_11en.fm

1.4.2-4 Heating Unit - Check Pump

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1334506-0200

Check the pump (1) for leakages or excessive noise.

Note! Make sure that the pump (1) is set at the highest speed.



1 Pump

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1.5 Frame Section Upper

SPC Reference	1095791-0400

1.5.1 Bending Roller

1.5.1-1 Bending Roller - Check

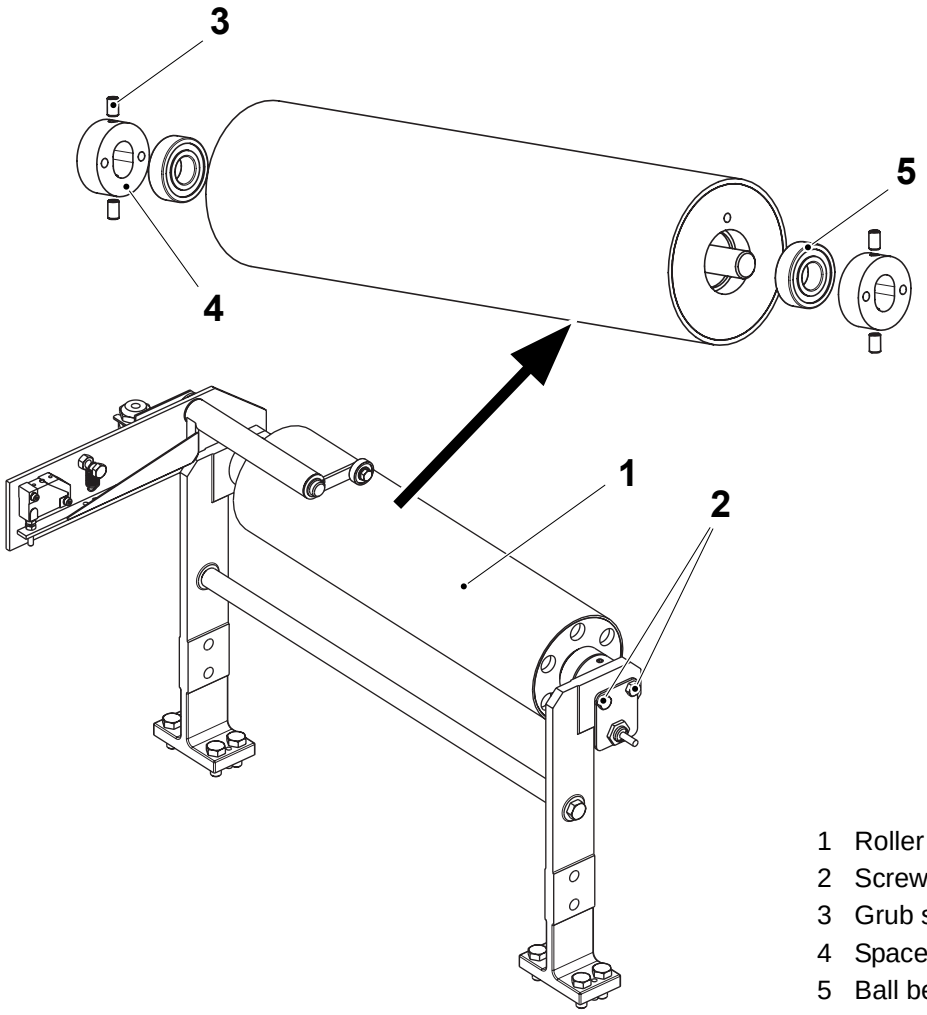
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1487743-0100

a) Check that the roller (1) rotates freely. If not, remove the screws (2) on both sides and pull out the roller.

b) Remove the grub screws (3) and remove the spacers (4).

c) Remove and change the ball bearings (5).

d) Assemble in the reverse order and set as required, see 1.5.1-2 Bending Roller - Set Position and 1.5.1-4 Bending Roller - Set Splice Detector.



1 Roller
2 Screw
3 Grub screw
4 Spacer
5 Ball bearing

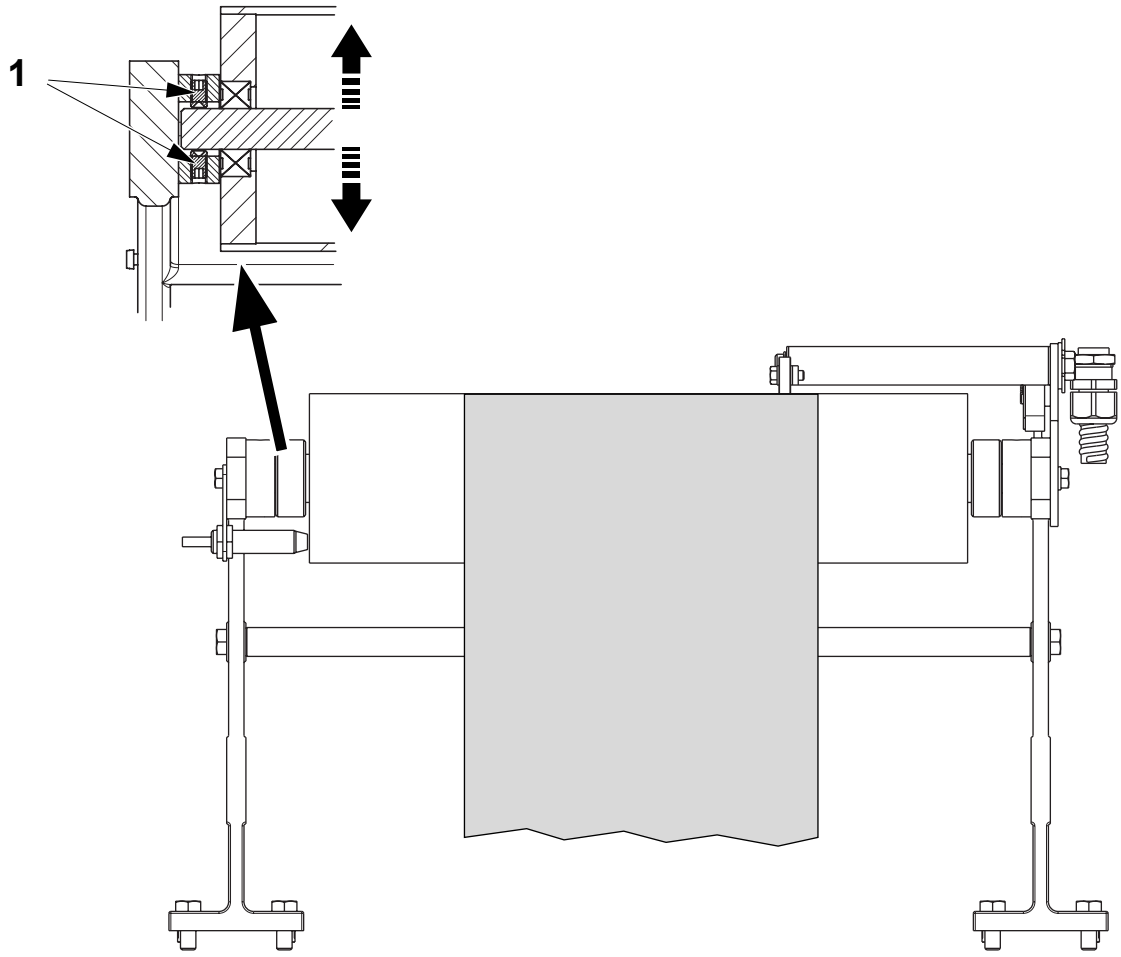
TechPub_2614345_0105 - 01_MM81534_11en.fm

1.5.1-2 Bending Roller - Set Position

Machine Status	TIGHT TUBE
SPC Reference	1487743-0100

a) Set the correct packaging material tracking by means of the grub screws (1).

b) Set the splice detector, see 1.5.1-4 Bending Roller - Set Splice Detector.



1 Grub screw

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1.5.1-3 Bending Roller - Check Splice Detector

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1487743-0100 1095806-0200

a) Check that the ball bearing (2) rotates easily. Change as required.

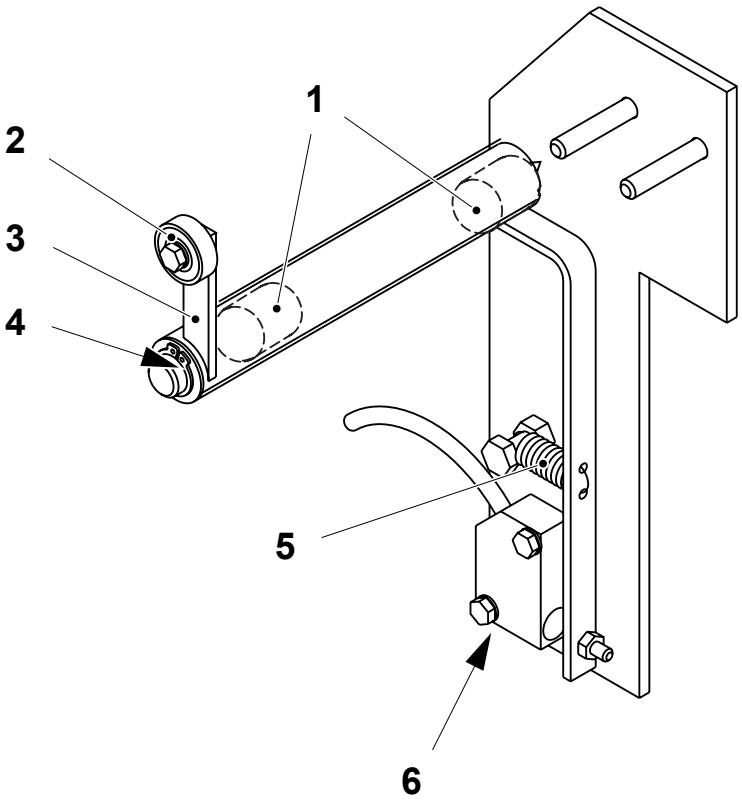
b) Check that the spring (5) is intact. Change as required.

c) Check that the bracket (3) is easy to turn. If not, remove the circlip (4), the spring (5) and pull out the bracket. Clean and, if required, change the bushings (1) and assemble in the reverse order.

d) Place a piece of packaging material under the ball bearing (2) and check that the proximity switch LED (6) lights up.

e) Place a piece of double packaging material underneath the ball bearing (2) and check that the proximity switch LED (6) goes out. If not, set the splice detector, see on 1.5.1-4 Bending Roller - Set Splice Detector.

f) Check that the machine ejects three packages, and that the package with the taped piece is among these.



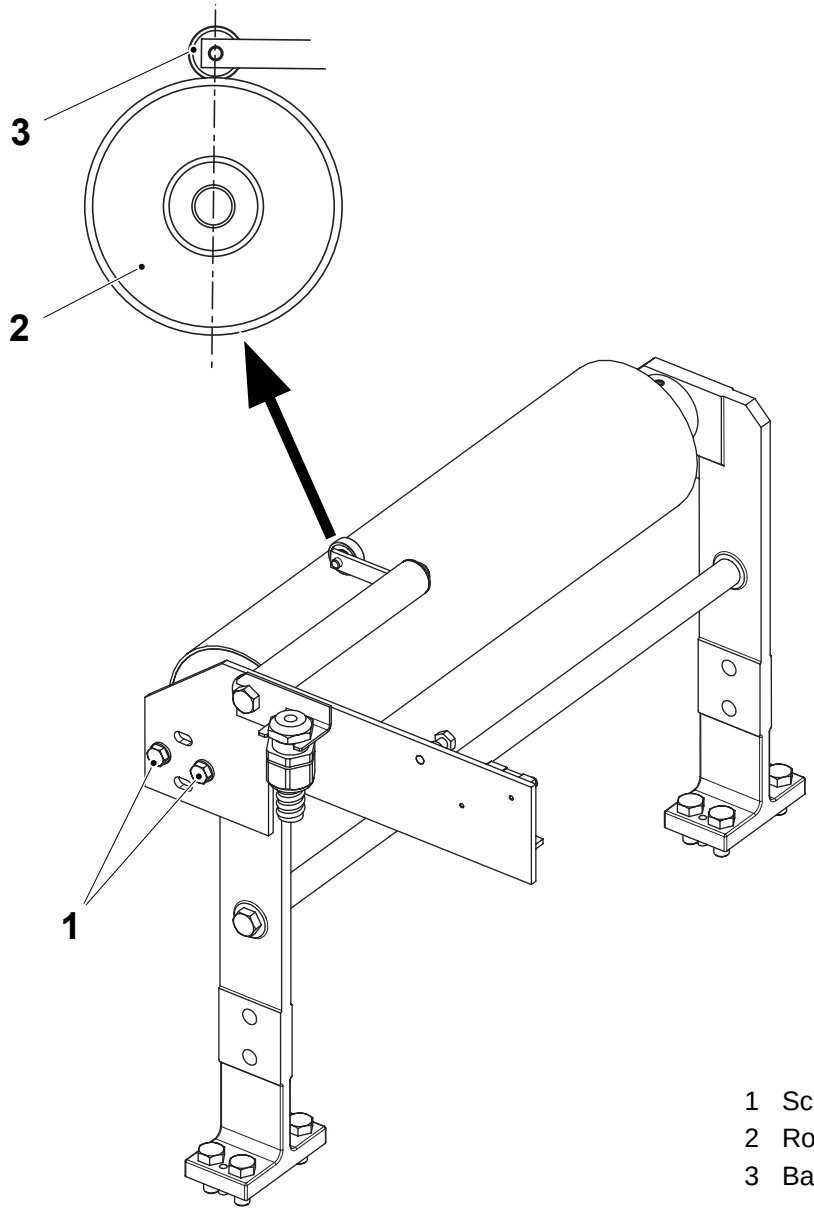
1 Bushing
2 Ball bearing
3 Bracket
4 Circlip
5 Spring
6 LED

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1.5.1-4 Bending Roller - Set Splice Detector

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1487743-0100 1095806-0200

a) Set the ball bearing (3) just in contact with the roller (2) and centred to the roller (2) by means of the screws (1).



1 Screw
2 Roller
3 Ball bearing

(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

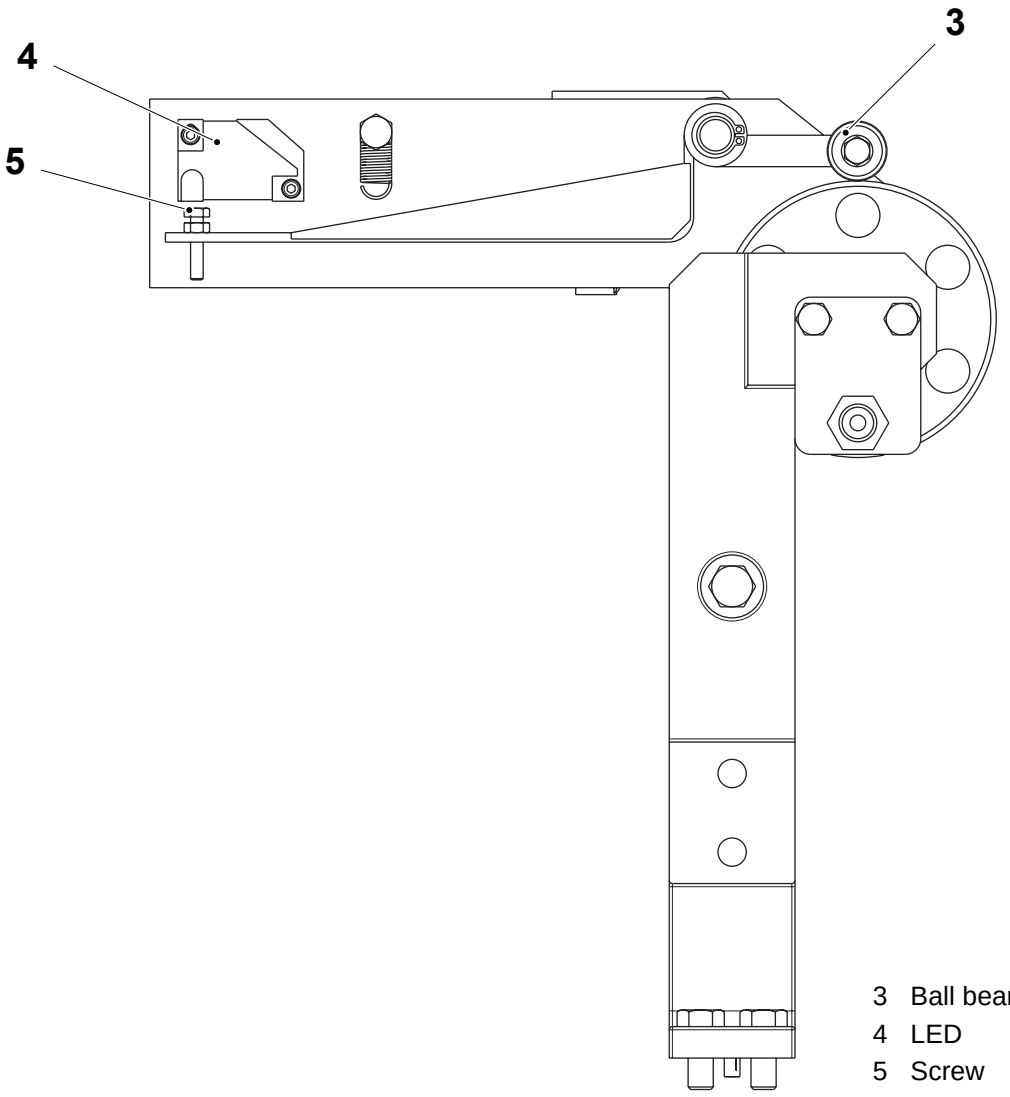
(Cont'd)

b) Set the screw (5) so that it touches the proximity switch and the LED (4) lights up.

c) Place a piece of double packaging material under the ball bearing (3).

d) Screw in the screw (5) until the LED (4) goes out.

e) Check with a single piece of packaging material that the LED lights up and that with a double piece of packaging material it goes out.



3 Ball bearing
4 LED
5 Screw

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1.5.2 Paper Guide

1.5.2-1 Paper Guide- Set

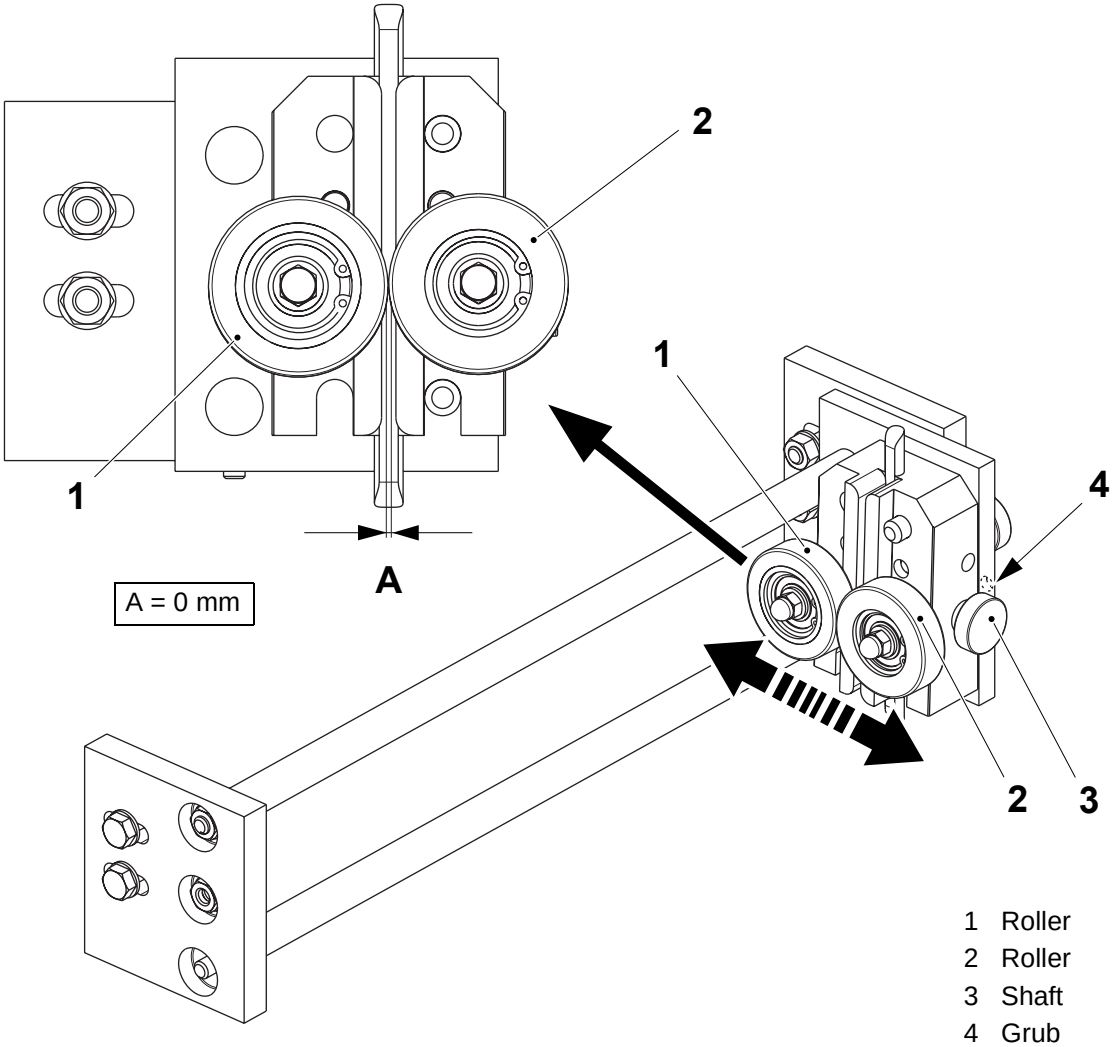
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1487852-0100

a) Loosen the grub screw (4).

b) Set the distance **A** (without packaging material) between the rollers (1) and (2) by means of the shaft (3) so that they touch each other.

c) Tighten the grub screw (4).

d) Turn the roller (1) by hand and check that the roller (2) rotates freely.



1 Roller
2 Roller
3 Shaft
4 Grub screw

TechPub_2614345_0105 - 01_MM81534_11en.fm

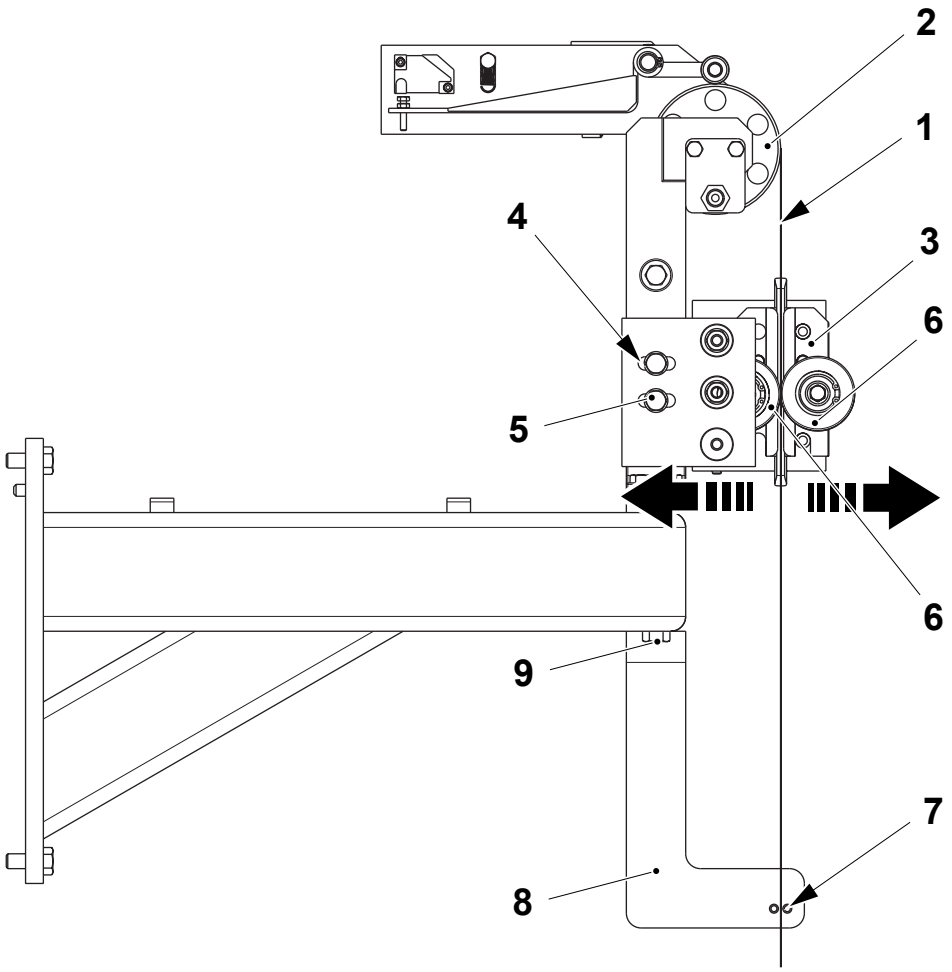
1.5.2-2 Paper Guide - Set Longitudinal Position

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1487852-0100

a) Attach a lead wire (1) to the bending roller (2).

b) Adjust the paper guide (3) by means of the slots (4) and the screws (5) so that the lead wire (1) is between the two rollers (6)

c) Make sure that the lead wire (1) is between the guides (7). If required adjust the paper guide arm (8) by means of the screws (9).



1 Lead wire
2 Bending roller
3 Paper guide
4 Slot
5 Screw
6 Roller
7 Guide
8 Paper guide arm
9 Screw

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1.5.2-3 Paper Guide - Set Transversal Position

Machine Status	TIGHT TUBE
SPC Reference	1487852-0100

a) Make sure to have a correct packaging material tracking, see the MM for the PT21 (if present on the machine).

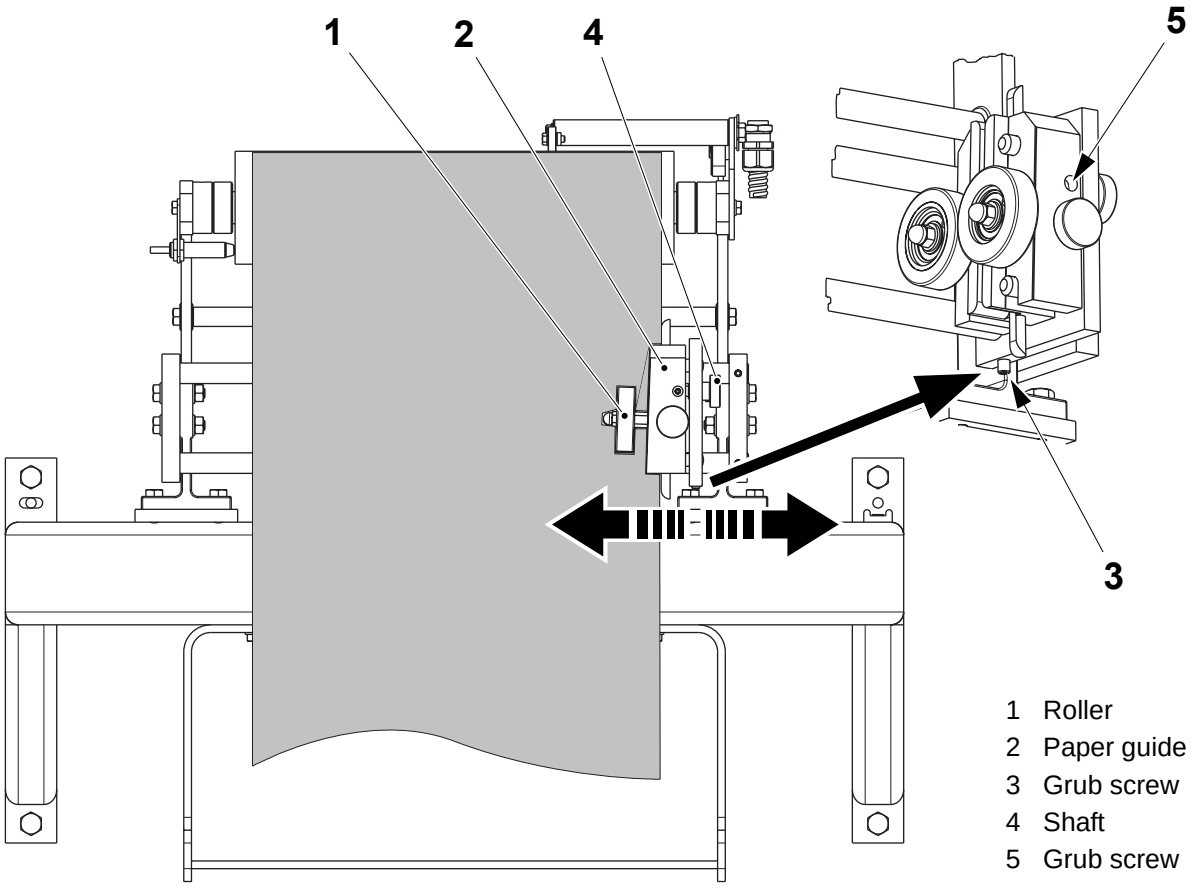
b) Check that the rubber roller (1) is mounted on the printed web side.

c) To obtain a correct packaging material tracking, perform the main adjustment of the paper guide (2) by means of the grub screw (3).

d) Loosen the grub screw (5).

e) Fine setting by means of the shaft (4).

f) Tighten the grub screw (5).



1 Roller
2 Paper guide
3 Grub screw
4 Shaft
5 Grub screw

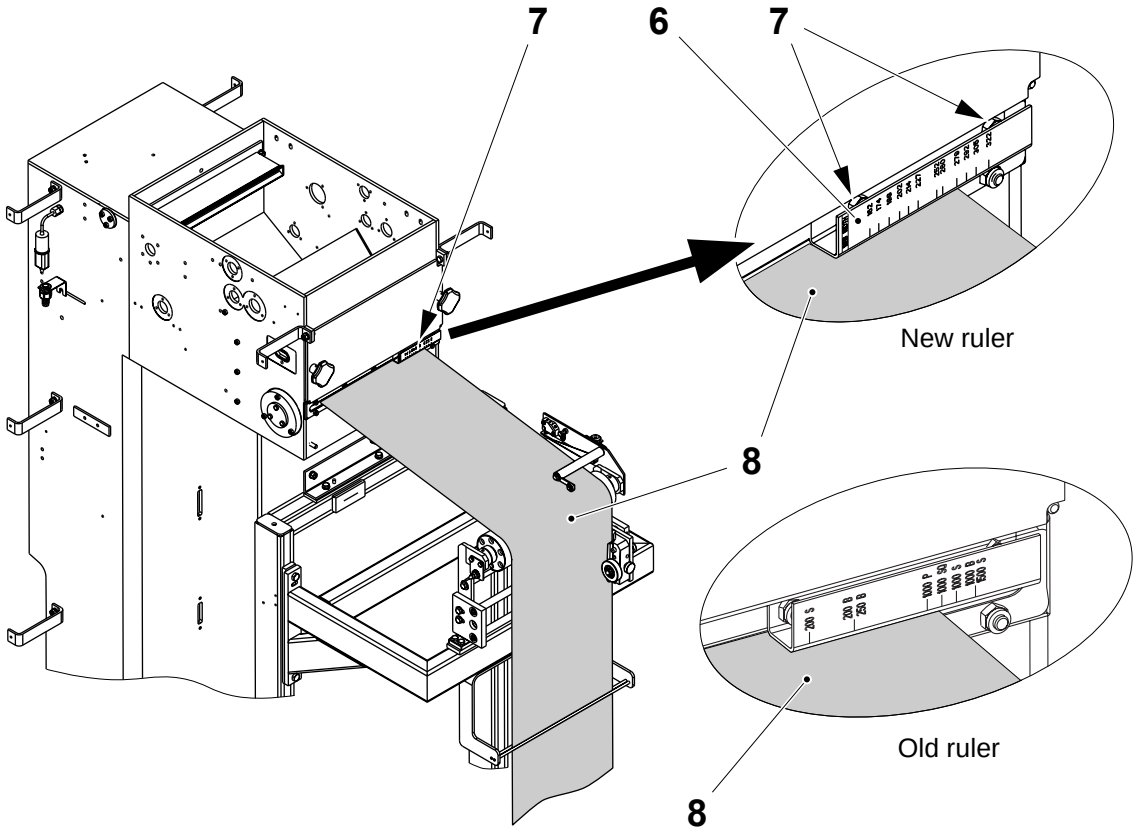
(Cont'd)

TechPub_2614345_0105 - 01_MM81534_11en.fm

(Cont'd)

g) When the packaging material (8) track is stabilized set the ruler (6), according to the running volume, by means of the nuts (7).

Package	Web width (mm)		Package	Web width (mm)
1500 S - 1000 B - 500 B	322		TPA 500 Sq	227
1000 S	305		250 B - 200 B - 330 S	214
1000 Sq	292		TPA 330 Sq	202
TPA 1000 S	279		250 S	188
TPA 1000 Sq	260		200 S - TPA 250 Sq	174
500 S	252			



6 Ruler
7 Screw
8 Packaging material

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1.5.3 Tab Folder (for PullTab Unit Version Only)

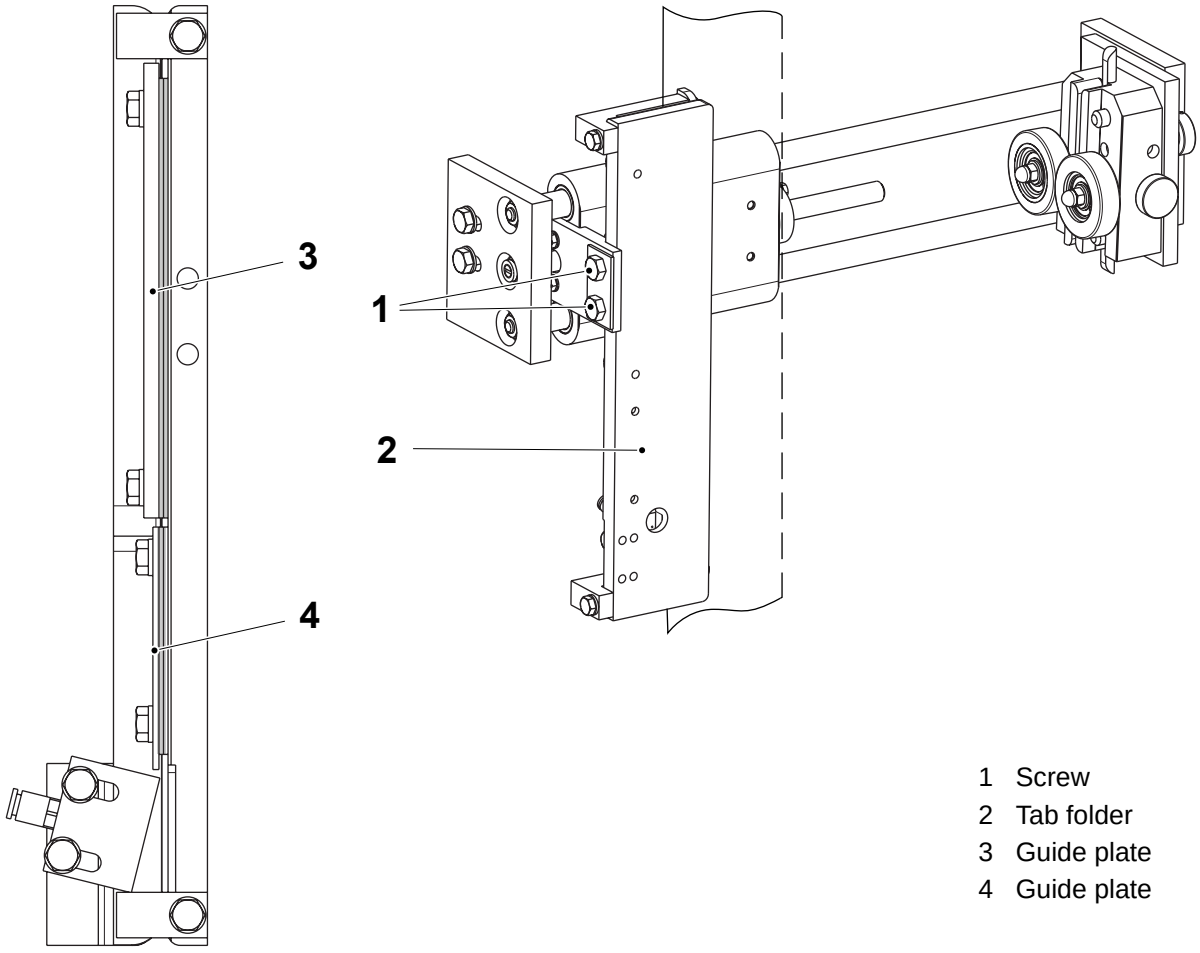
1.5.3-1 Tab Folder - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1498276-0100

ReCap, ReCap2 and SlimCap

a) Remove the tab folder (2) by means of the two screws (1).

b) Check the guide plates (3) and (4) for damage and/or wear. Change as required, see 1.5.3-2 Tab Folder - Overhaul Guide Plate.



1 Screw
2 Tab folder
3 Guide plate
4 Guide plate

(Cont'd)

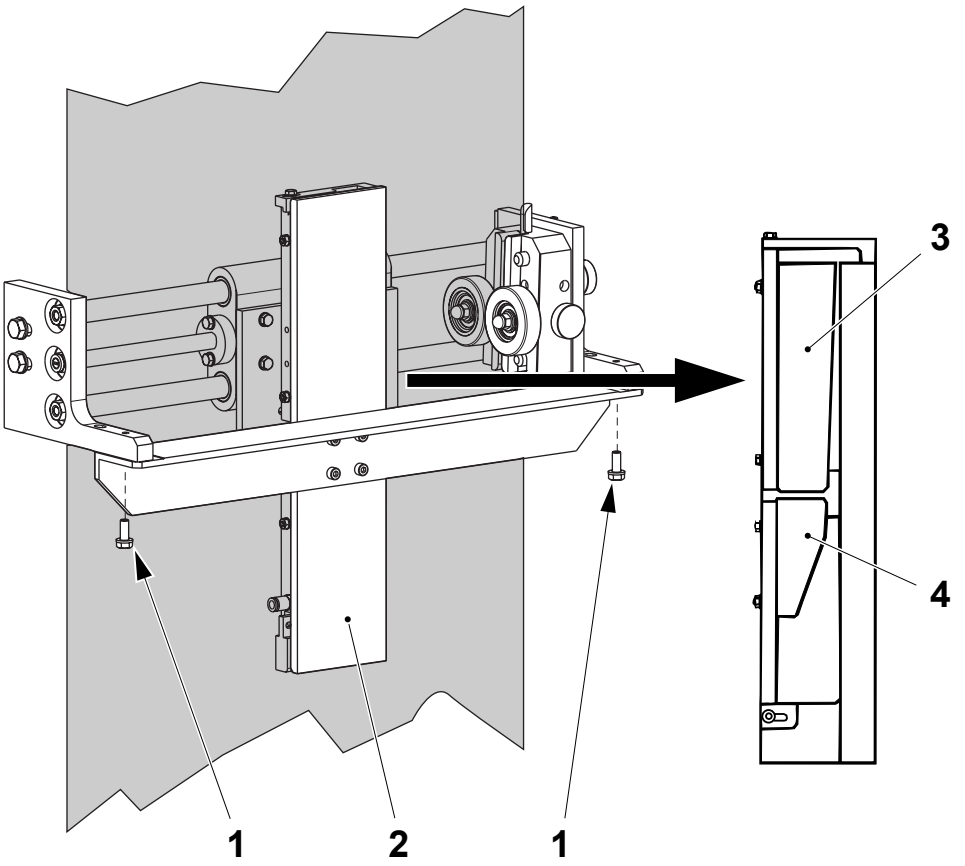
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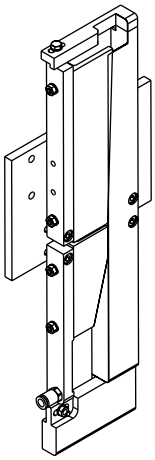
ReCap3 and ReCap3P

a) Remove the screws (1) and remove the angle bar (2) of the tab folding unit.

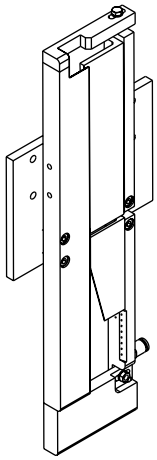
b) Check that the guide plates (3) and (4) are not damaged/or worn.



1 Screw
2 Angle bar (Plate)
3 Guide plate
4 Guide plate



Tab folder for all other holes.



Tab folder for hole 21.

TechPub_2614345_0105 - 01_MM81534_11en.fm

1.5.3-2 Tab Folder - Overhaul Guide Plate

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1498276-0100

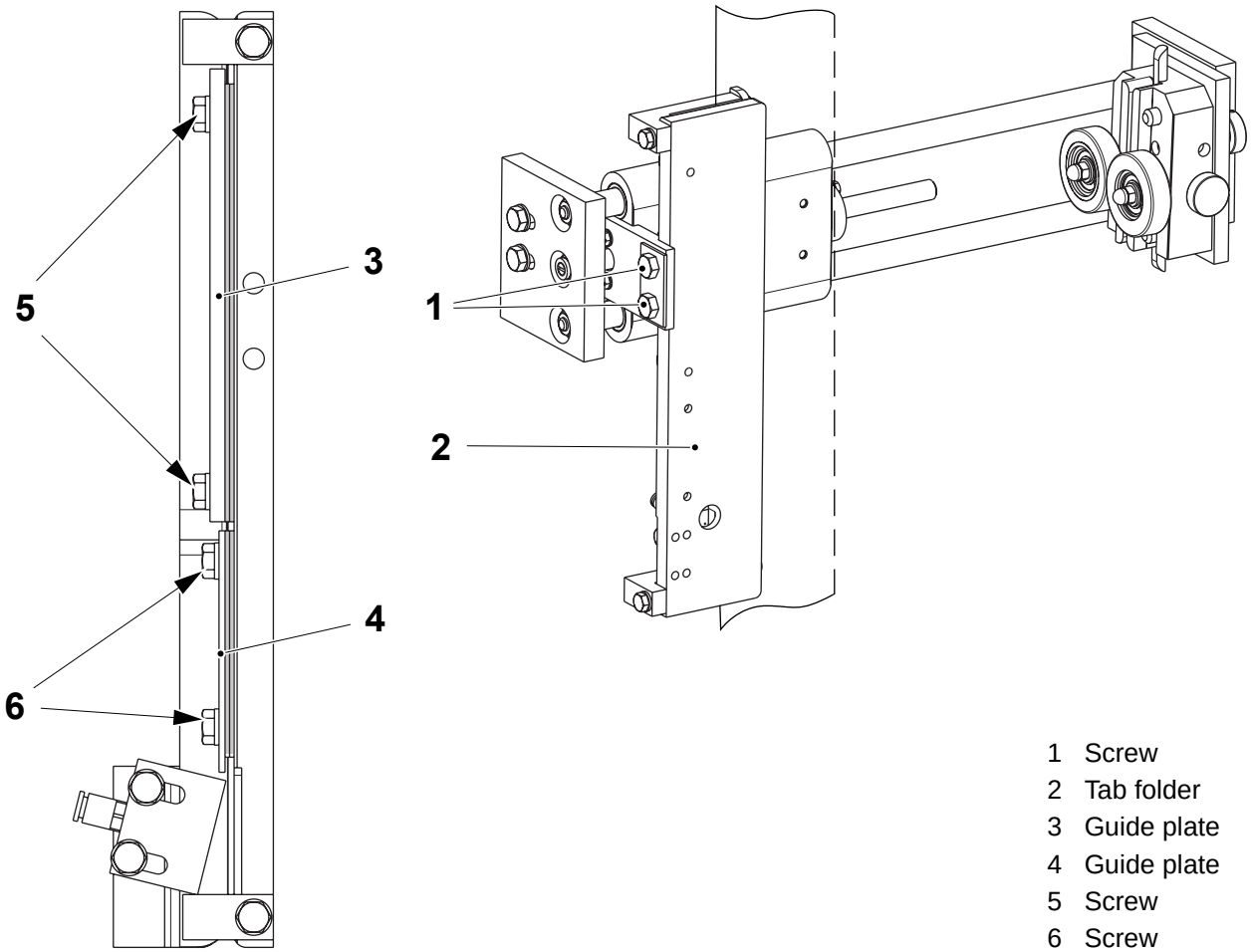
ReCap, ReCap2 and SlimCap

a) Remove the tab folder (2) by means of the two screws (1).

b) Remove the guide plates (3) and (4) by means of the screws (5) and (6).

c) Assemble in the reverse order.

d) Check the settings, see 1.5.3-3 Tab Folder - Set.



1 Screw
2 Tab folder
3 Guide plate
4 Guide plate
5 Screw
6 Screw

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1.5.3-3 Tab Folder - Set

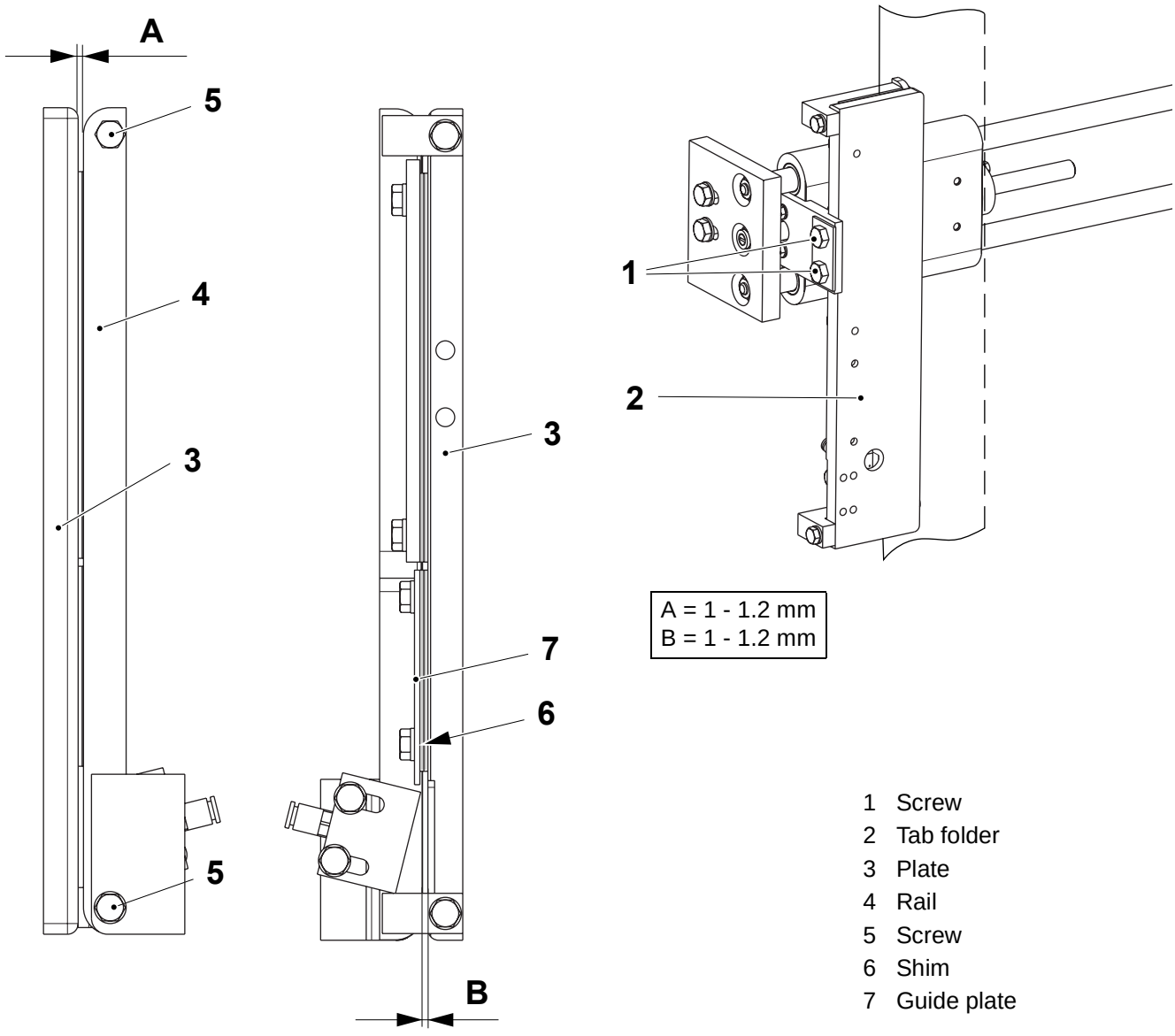
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1498276-0100

ReCap, ReCap2 and SlimCap

a) Remove the tab folder (2) by means of the two screws (1).

b) Loosen the screws (5) and set the distance **A** by adjusting the rail (4) so that triple packaging material can pass between the rail plate (4) and the plate (3). Tighten the screws (5).

c) Set the distance **B** by means of the peelable shims (6) under the guide plate (7) so that triple packaging material can pass between the guide plate (7) and the plate (3).



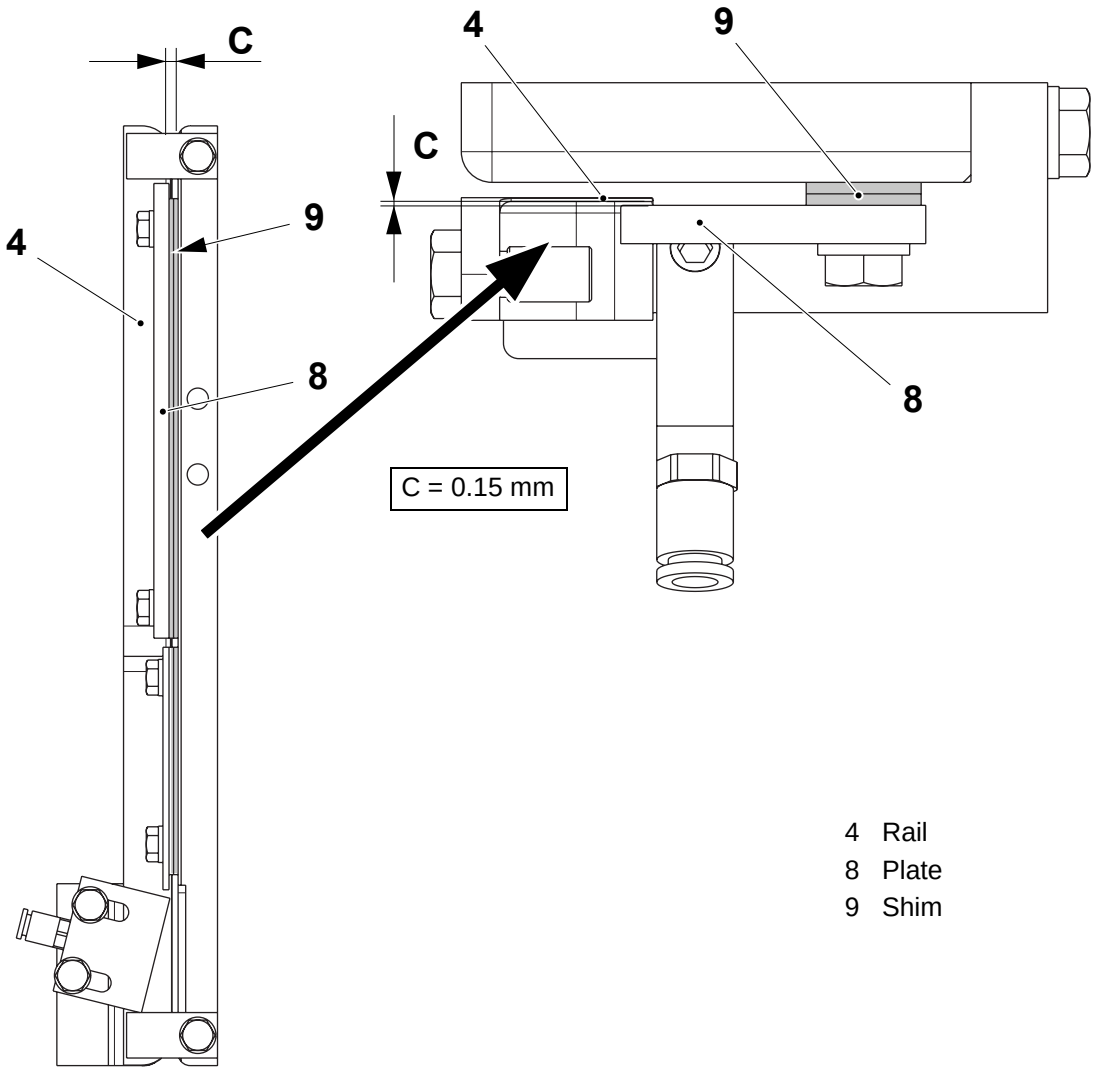
1 Screw
2 Tab folder
3 Plate
4 Rail
5 Screw
6 Shim
7 Guide plate

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(Cont'd)

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d) Set the distance **C** between the guide plate (8) and the rail (4) by adjusting the peelable shims (9) under the guide plate (8).



4 Rail
8 Plate
9 Shim

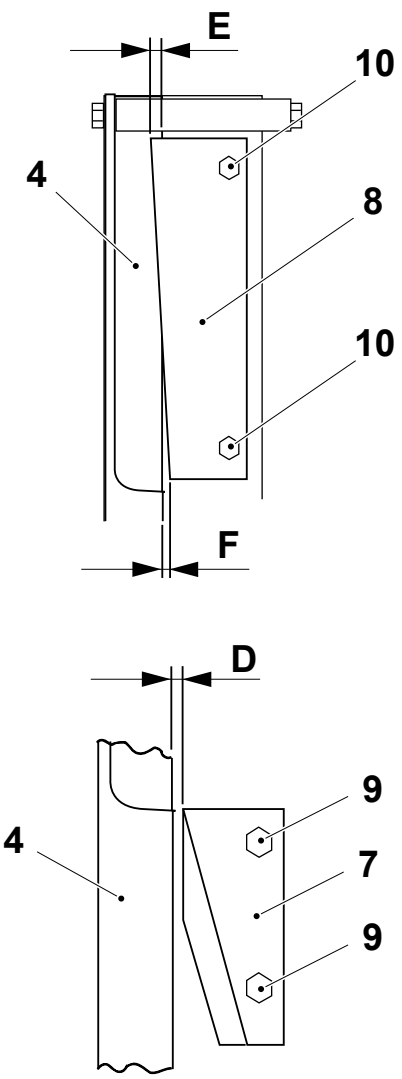
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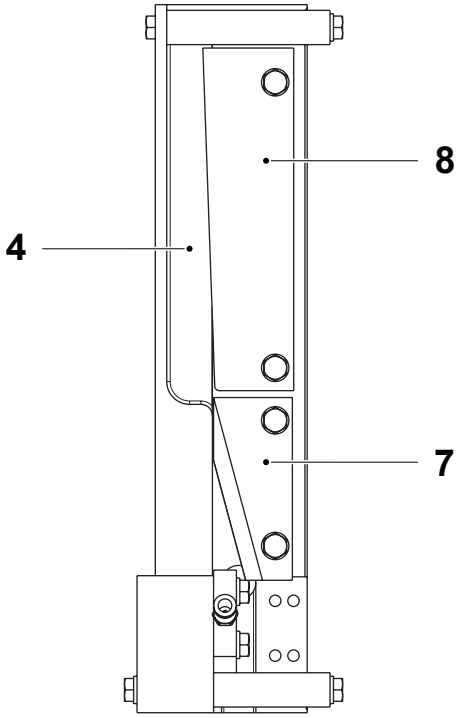
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e) Set the distance **D** between the edge of the guide plate (7) and the rail (4) by means of the screws (9).

f) Set the guide plate (8), by means of the screws (10), so that it overlaps the edge of the rail (4) by the distance **E** at the top, and by the distance **F** at the bottom.



D = 0.15 mm
E = 4 mm
F = 1.5 mm



4 Rail
7 Guide plate
8 Guide plate
9 Screw
10 Screw

(Cont'd)

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(Cont'd)

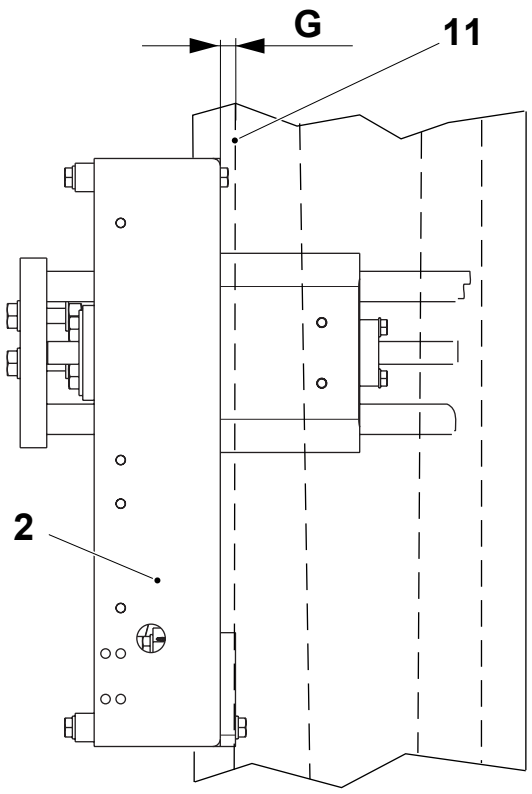
g) Fit the tab folder (2) by means of the screws (1).

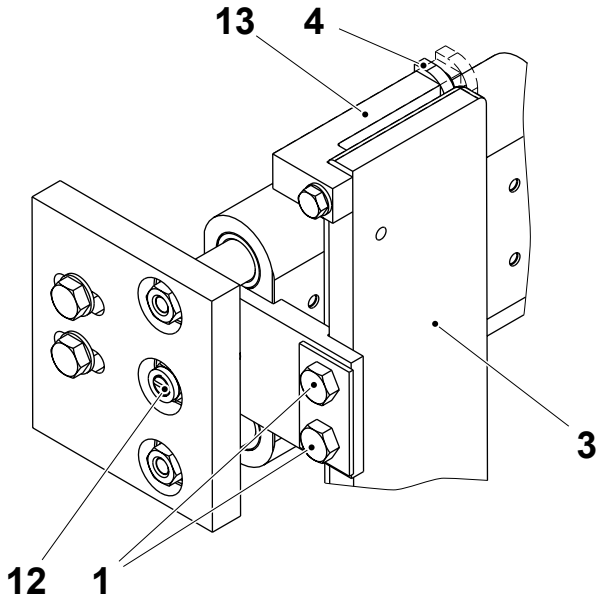
h) Set the distance **G** between the edge of the plate (3) and the centre of the crease (11) by means of the adjustment screw (12).

Note! For the old tab folders without the SlimCap bracket (13), TP No. 2603965-2, use the column **"Old bracket"**.
For the new tab folders or tab folders updated with the SlimCap bracket (13), TP No. 2603965-2, use the column **"New bracket"**.

Package	Hole type	Old bracket	New bracket	Package	Hole type	Old bracket	New bracket
		G ±1.0 (mm)	G ±1.0 (mm)			G ±1.0 (mm)	G ±1.0 (mm)
TBA 1000 B ReCap2	45 - 65	11	21	TBA 1000 B ReCap3	85	9	19
TBA 1000 S ReCap2	45 - 65	11	21	TBA 1000 S ReCap3	85	9	19
TBA 1500 S ReCap2	45 - 65	9.5	19.5	TBA 1500 S ReCap3	85	9.5	19.5
TBA 1000 B ReCap	50	12	22	TBA 1000 S SlimCap	90	2.5	12.5
TBA 1000 S ReCap	50	12	22	TBA 1500 S SlimCap	90	2.5	12.5
TBA 500 S ReCap2	55	1.4	11.4				

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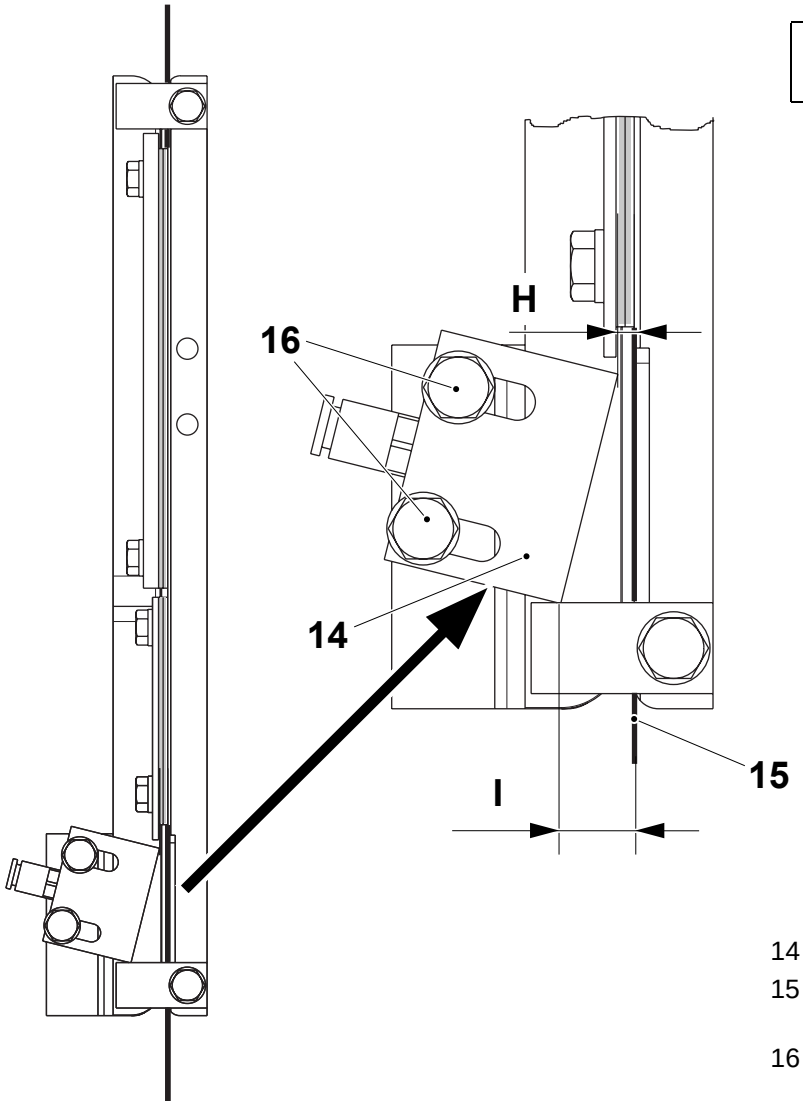


1 Screw
2 Tab folder
3 Plate
4 Rail
11 Crease
12 Adjustment screw
13 Bracket

(Cont'd)

(Cont'd)

i) Set the distances **H** and **I** between the upper and the lower edge of the air nozzle (14) and the packaging material web (15) by means of the screws (16).



14 Nozzle
15 Packaging material web
16 Screw

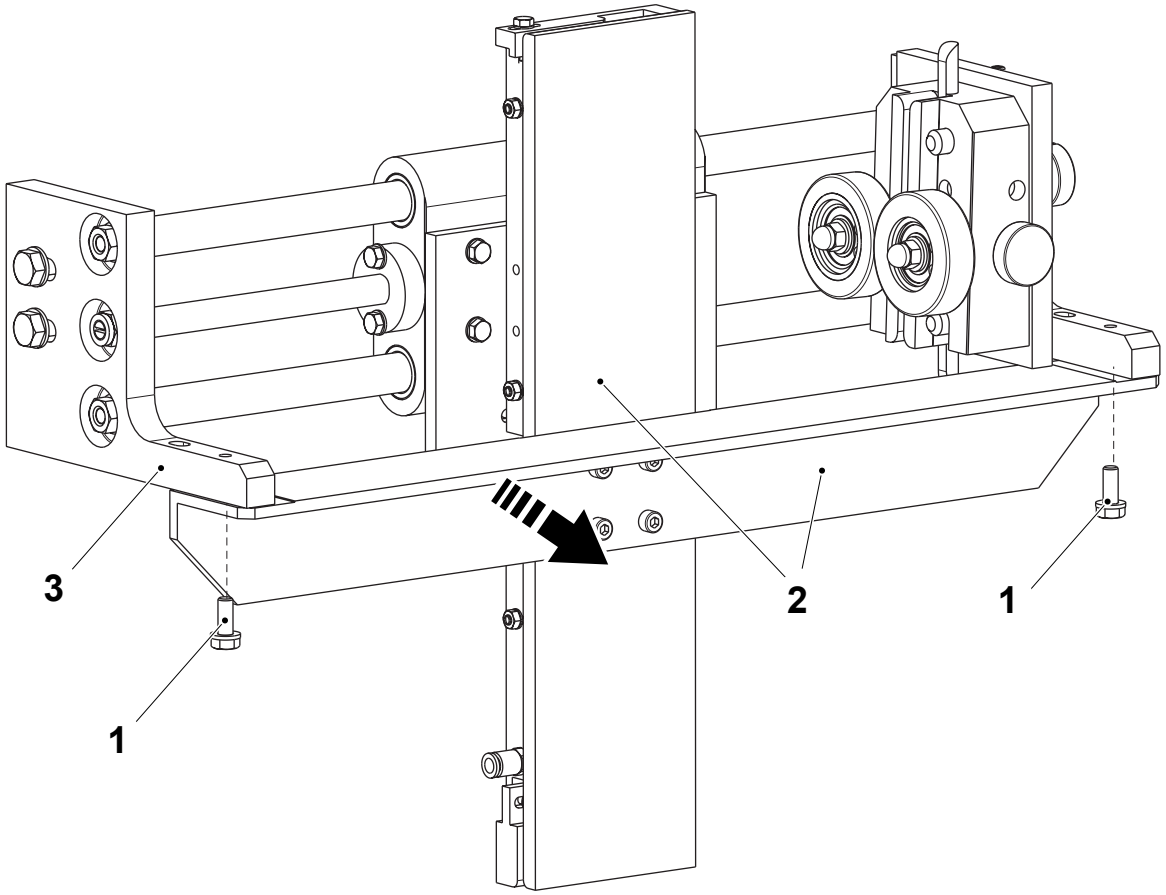
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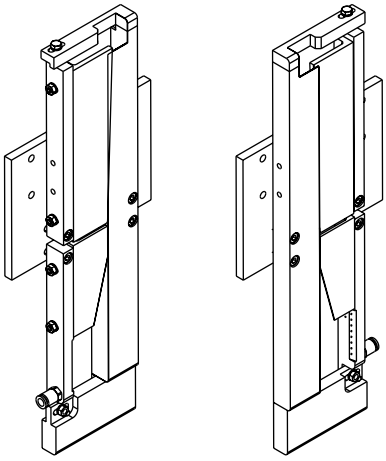
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ReCap3 and ReCap3P

a) Remove the outer tab folding plates (2) from the bracket (3) by means of the screws (1).



1 Screw
2 Outer tab folding plate
3 Bracket



Tab folder for all other holes.

Tab folder for hole 21.

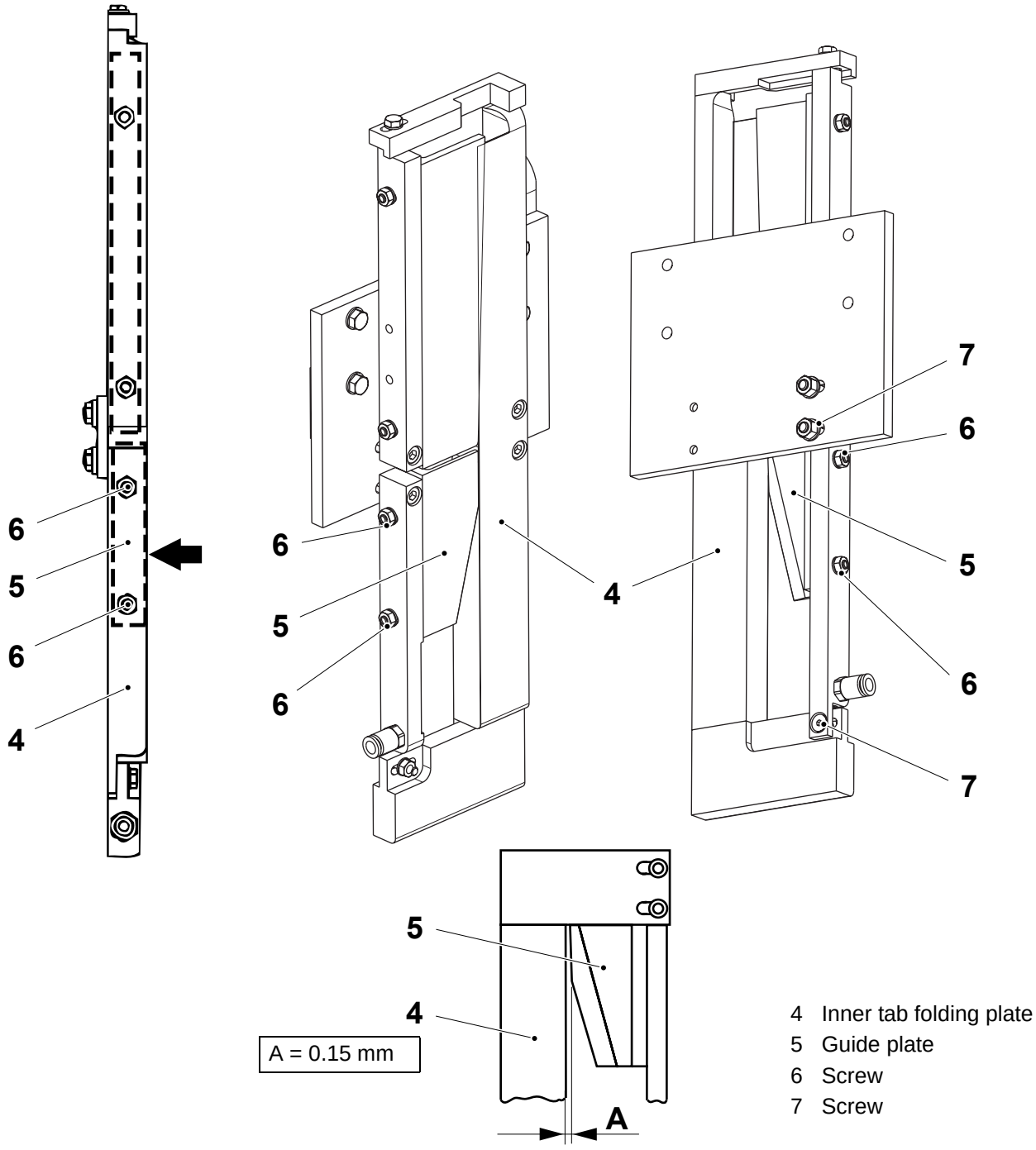
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b) Adjust the position of the guide plate (5) with the screws (6) so that it is aligned with the side of the inner tab folding plate (4) (left arrow).

c) Set the distance **A** between the edge of the guide plate (5) and the inner tab folding plate (4) by means of the screws (7).



4 Inner tab folding plate
5 Guide plate
6 Screw
7 Screw

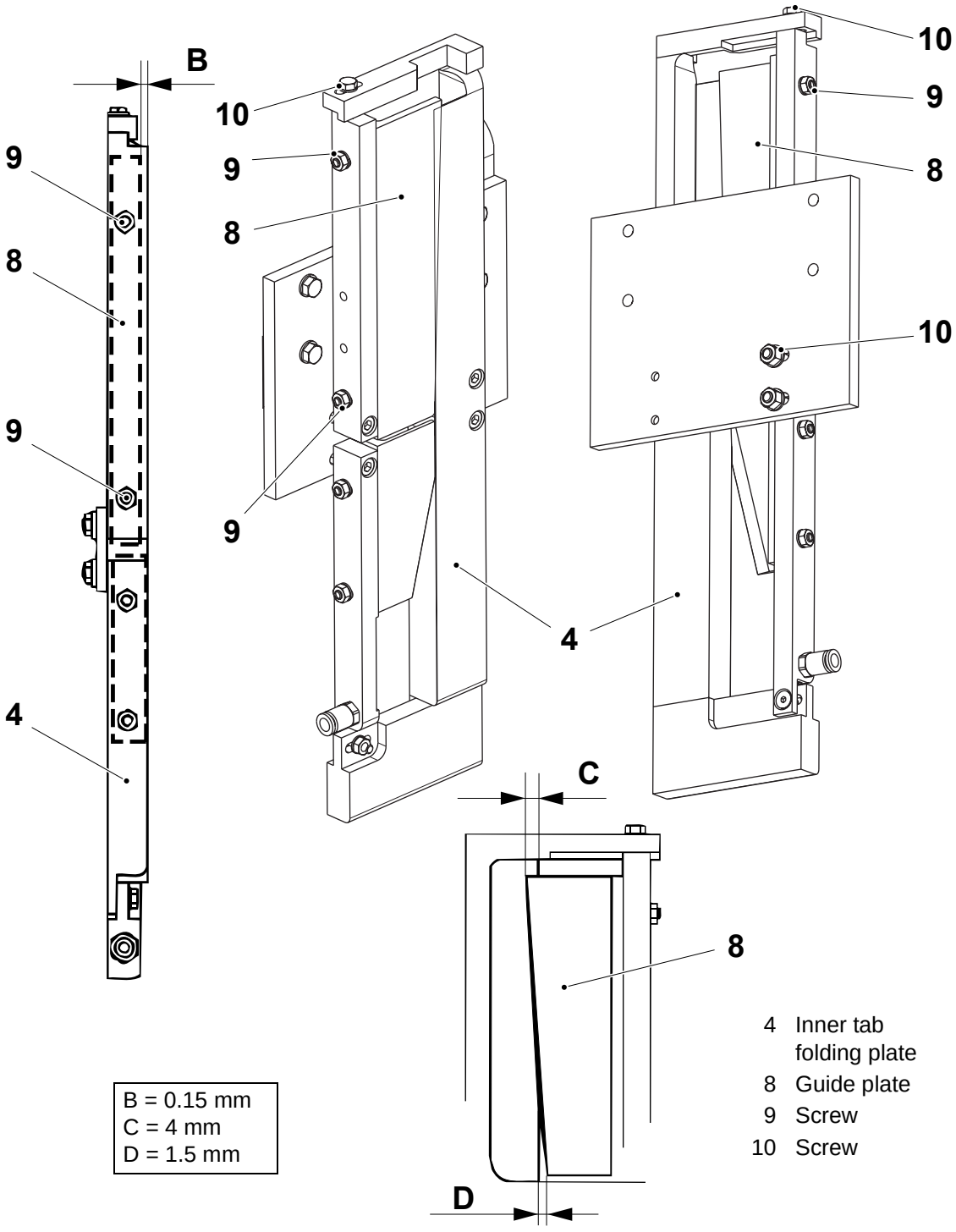
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(Cont'd)

d) Set the distance **B** between the edge of the guide plate (8) and the side of the inner tab folding plate (4) by means of the screws (9).

e) Set the guide plate (8) by means of the screws (10) so that it overlaps the edge of the inner tab folding plate (4) by the distance **C** at the top and by the distance **D** at the bottom.

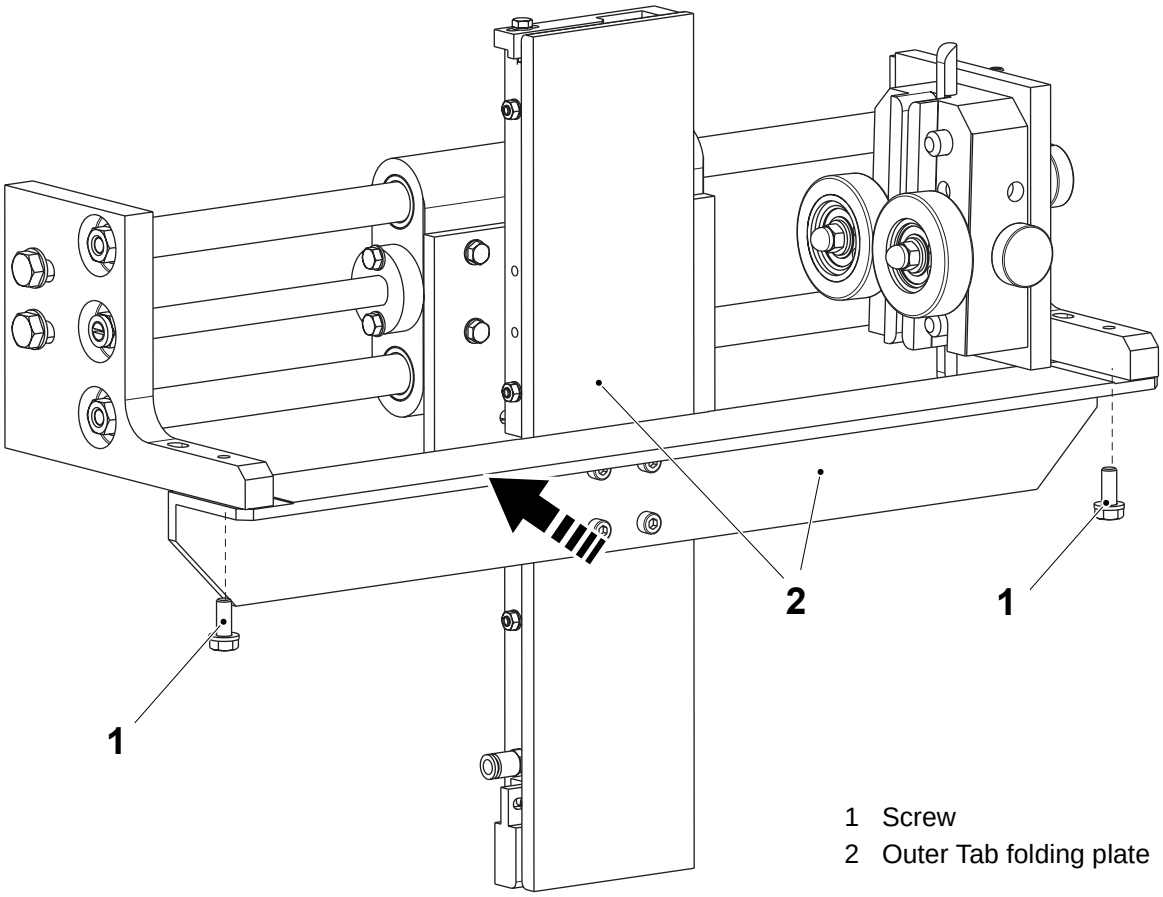


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f) Fit back the outer tab folding plates (2) by means of the screws (1).



1 Screw
2 Outer Tab folding plate

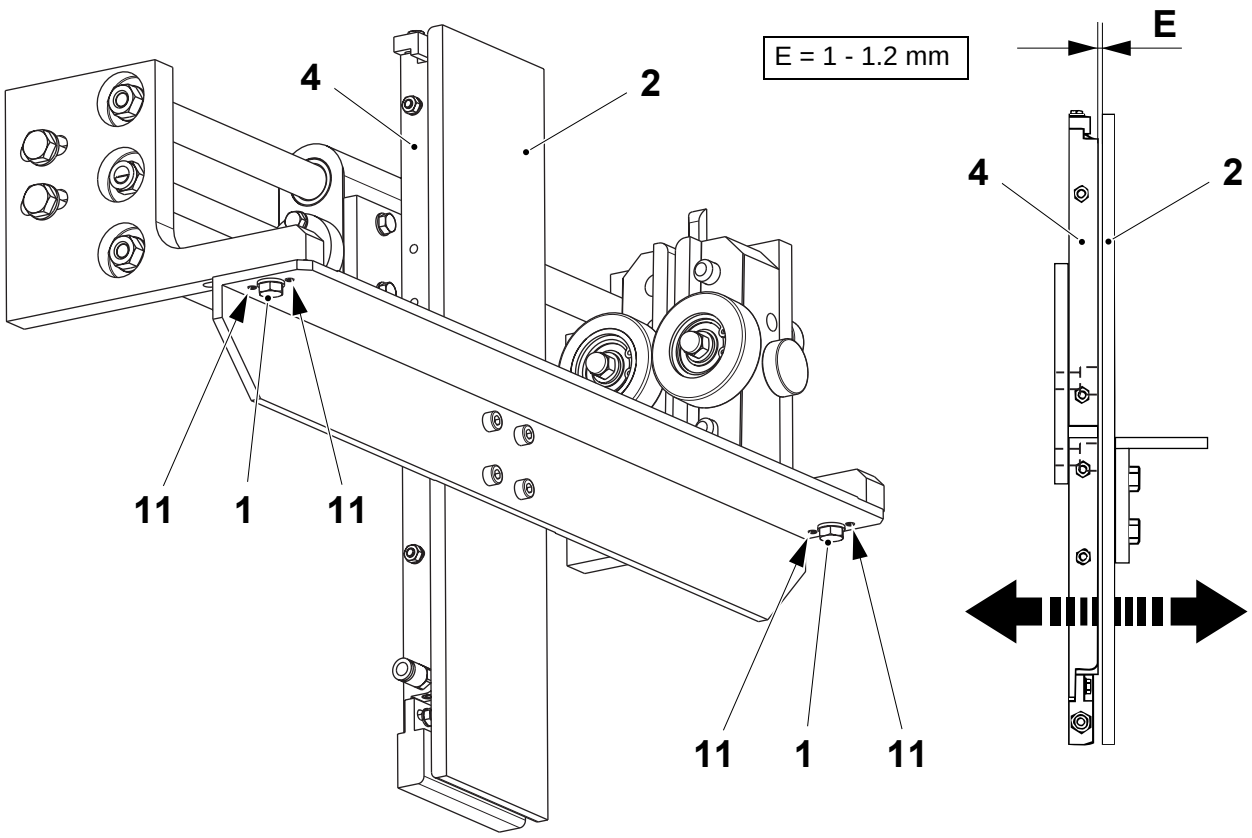
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(Cont'd)

g) Set the outer tab folding plate (2) parallel to the inner tab folding plate (4) by means of the grub screws (11).

h) Set the distance **E** between the inner tab folding plate (4) and the outer tab folding plate (2) by means of the screws (1).



1 Screw
2 Outer folding plate
4 Inner folding plate
11 Grub screw

(Cont'd)

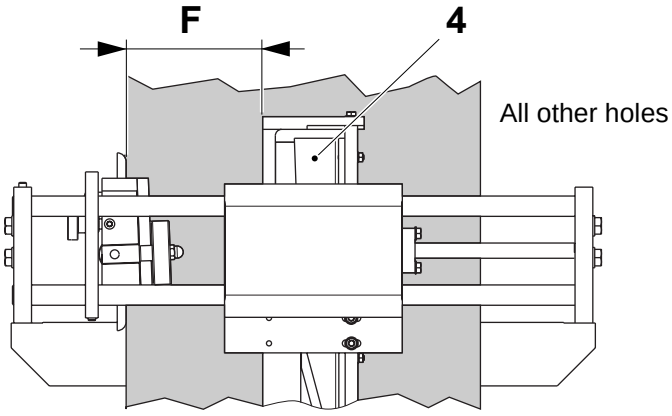
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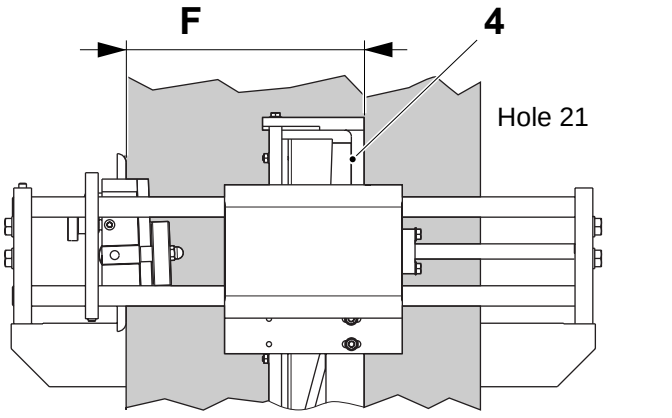
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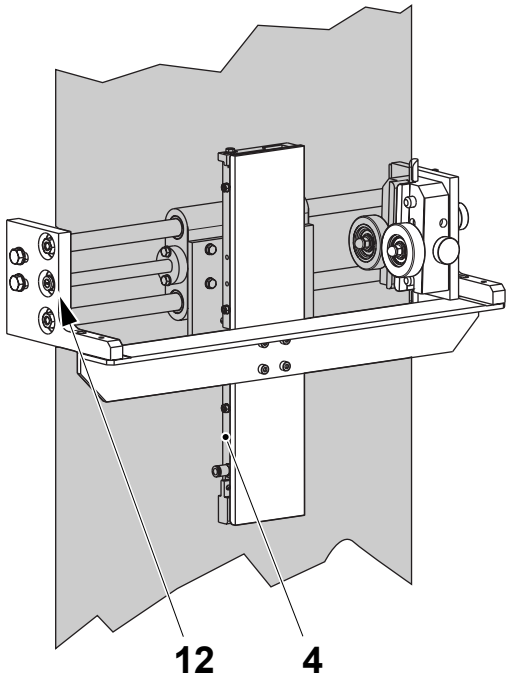
i) Set the distance **F** between the edge of the inner tab folding plate (4) and the edge of the paper web by means of the adjustment screw (12).

j) Step up the machine to PRODUCTION and check the tabs position on the packaging material.

Package	Hole type	F ±2.0 (mm)	Package	Hole type	F ±2.0 (mm)
TBA 250 B ReCap	21	202.5	TBA 1000 S ReCap 3	85	265
TPA 1000 S ReCap 3P	60	114	TBA 1000 B ReCap 3	85	280
TPA 1000 Sq ReCap 3P	60	114	TBA 1000 Sq ReCap 3	85	119
TBA 1000 Sq ReCap 2	65	114	TBA 1500 S ReCap 3	85	282







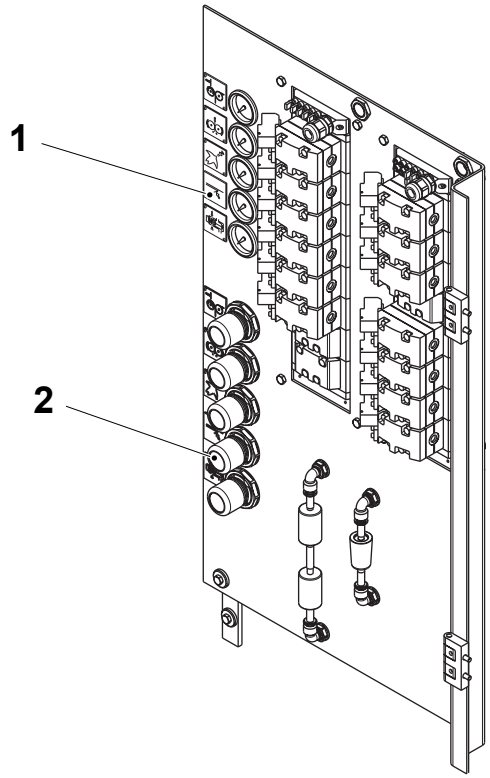
4 Inner folding plate
12 Adjustment screw

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1.5.3-4 Tab Folder - Set Pressure

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1498276-0100

Set the air pressure for the tab folder according to 10.1 Technical Data, by means of the pressure regulator (2) located on the superstructure air panel. Check the pressure on the pressure gauge (1).



1 Pressure gauge
2 Pressure regulator

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1.6 Connection Box

SPC Reference	1095824-0300

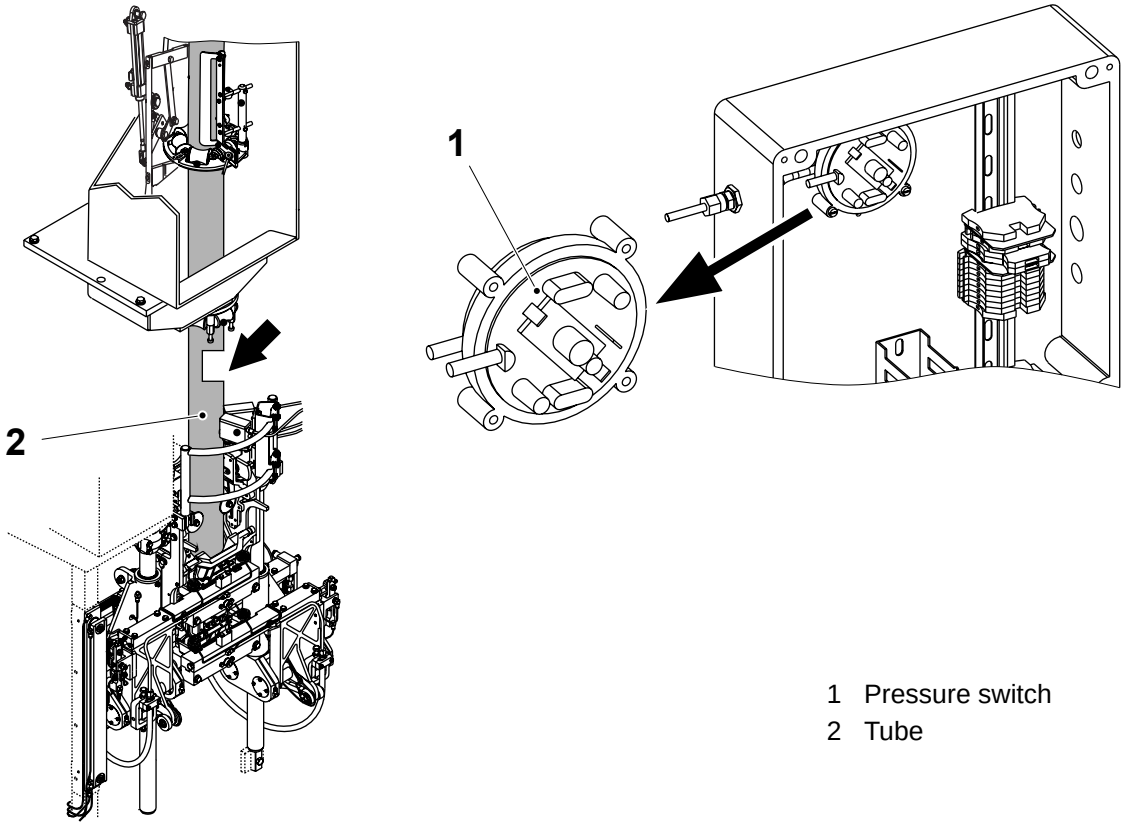
1.6-1 Connection Box - Check Pressure Switch

Machine Status	SIGNAL FROM STERILIZER
SPC Reference	1095824-0300

a) Open the doors to the jaw system and cut the tube (2), see arrow.

b) Check that the machine program steps down to the ZERO position. If the machine do not step down to the ZERO position then:

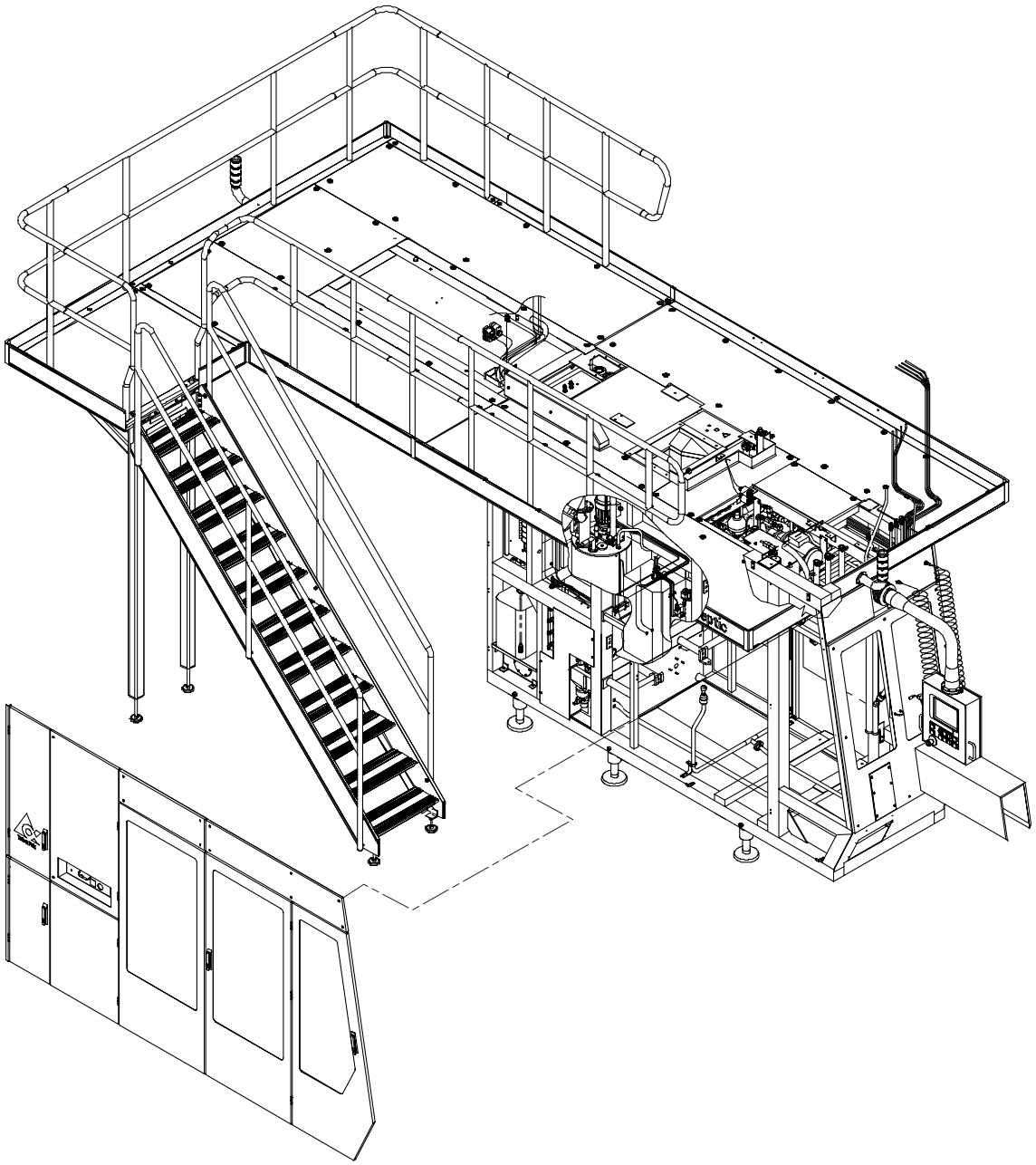
- change the pressure switch (1), located in the superstructures connection box
- perform the check of the pressure switch again.



1 Pressure switch
2 Tube

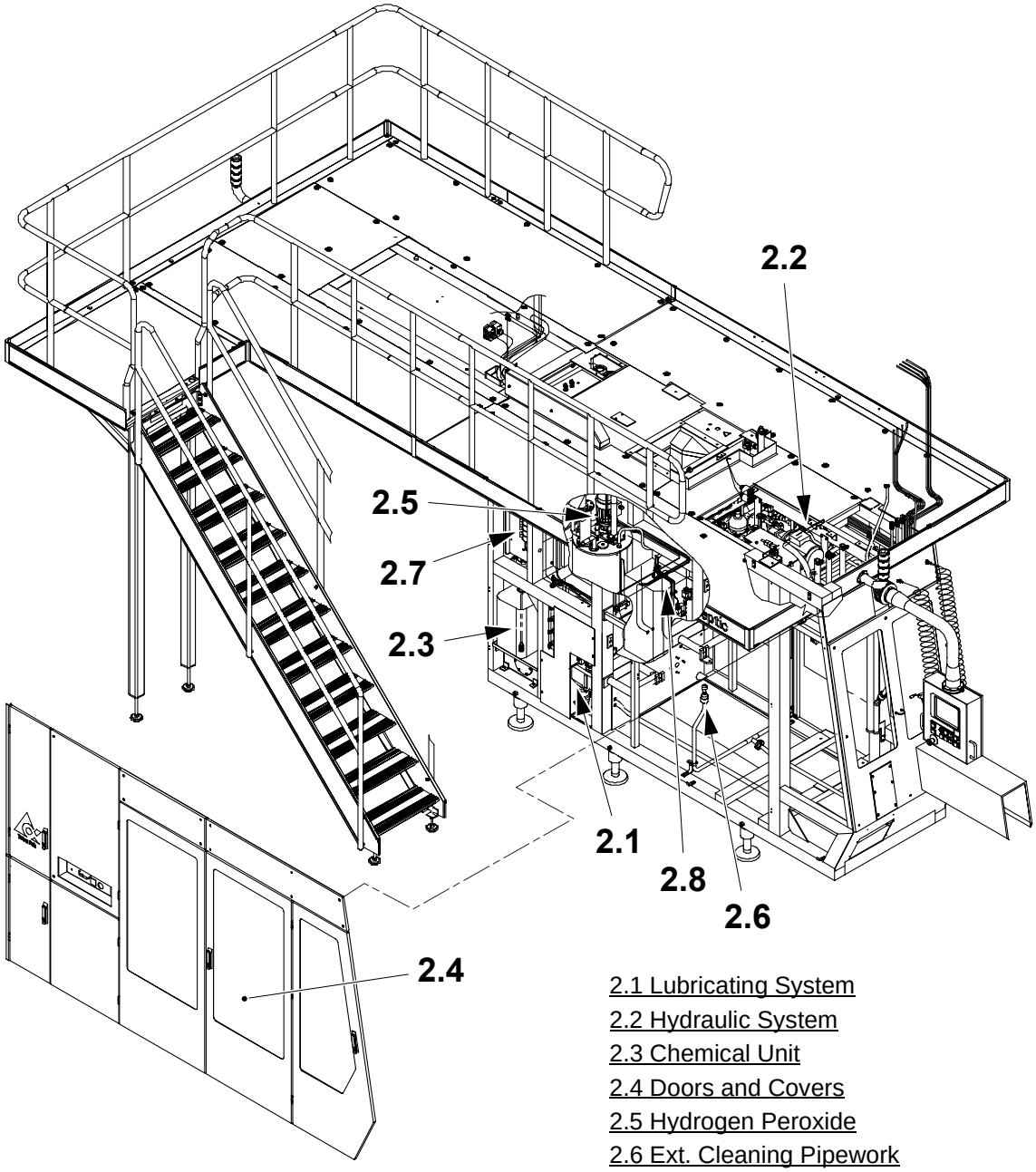
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2 Machine Body



Machine Body - Description

SPC Reference	648502-0600



2.1 Lubricating System
2.2 Hydraulic System
2.3 Chemical Unit
2.4 Doors and Covers
2.5 Hydrogen Peroxide
2.6 Ext. Cleaning Pipework
2.7 Pneumatic System
2.8 Level Control Device Floater

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2.1.1-2 Central Lubrication - Check Oil Pressure . . . . . 2 - 8
2.1.1-3 Central Lubrication - Check Oil Feed . . . . . 2 - 9
2.1.1-4 Central Lubrication - Clean Oil Tank . . . . . 2 - 10
2.1.1-5 Central Lubrication - Bleed . . . . . 2 - 11
2.1.1-6 Central Lubrication - Change Oil . . . . . 2 - 12
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2.8-2 Level Control Device Floater - Set Position . . . . . 2 - 93
2.8-3 Level Control Device Floater- Check Function . . . . . 2 - 93

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2.1 Lubricating System

SPC Reference	1255273-0200

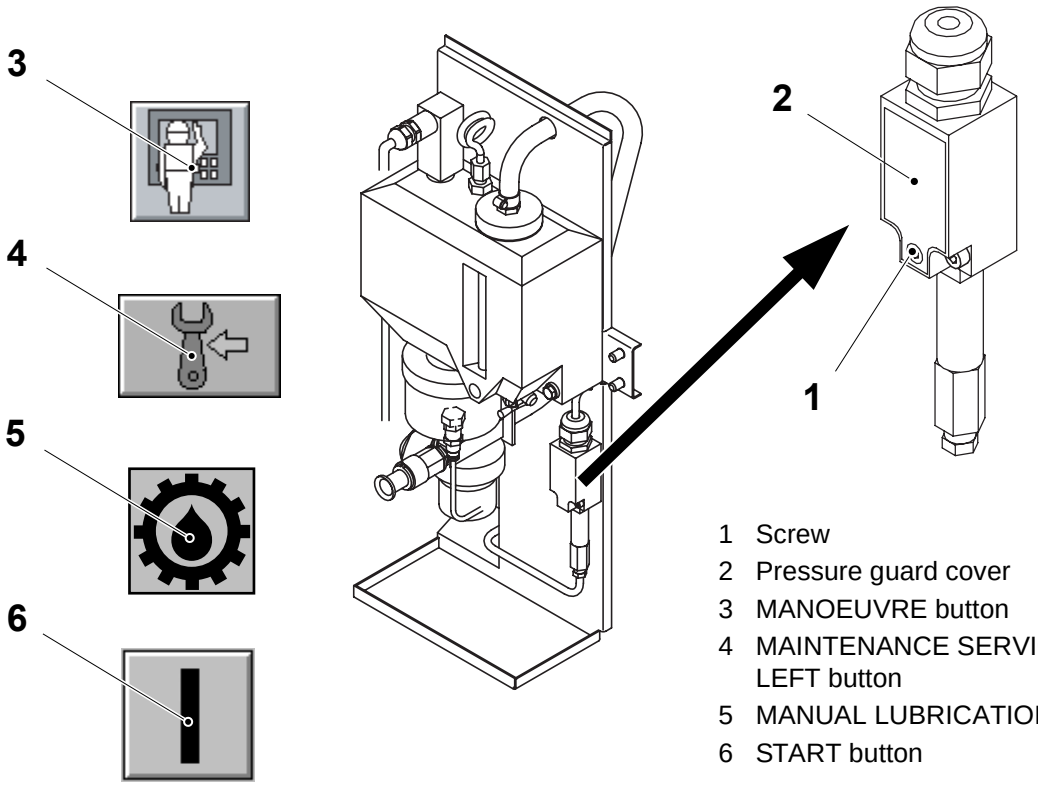
2.1.1 Central Lubrication

2.1.1-1 Central Lubrication - Check

Machine Status	Mains Power ON, Air ON Steam ON, Water OFF
SPC Reference	1095911-0100

WARNING
Risk of personal injury.
Wear protective gloves.

a) Loosen the screw (1).
b) Remove the pressure guard cover (2).
c) Touch the MANOEUVRE button (3) on the TPOP.
d) Touch the MAINTENANCE SERVICE UNIT LEFT button (4).
e) Touch the MANUAL LUBRICATION button (5).
f) Touch the START button (6) to enable the lubricating system.
g) Check that the mechanism inside the pressure guard is working. If not, change the pressure guard as required.



1 Screw
2 Pressure guard cover
3 MANOEUVRE button
4 MAINTENANCE SERVICE UNIT LEFT button
5 MANUAL LUBRICATION button
6 START button

2.1.1-2 Central Lubrication - Check Oil Pressure

Machine Status	Mains Power ON, Air ON Steam ON, Water OFF
Consumables	Lubricant code H
SPC Reference	1095911-0100

WARNING
Risk of personal injury.
Wear protective gloves.

a) Remove the hose (1) and connect a 0-6 MPa pressure gauge (2) to the hose nipple (3).

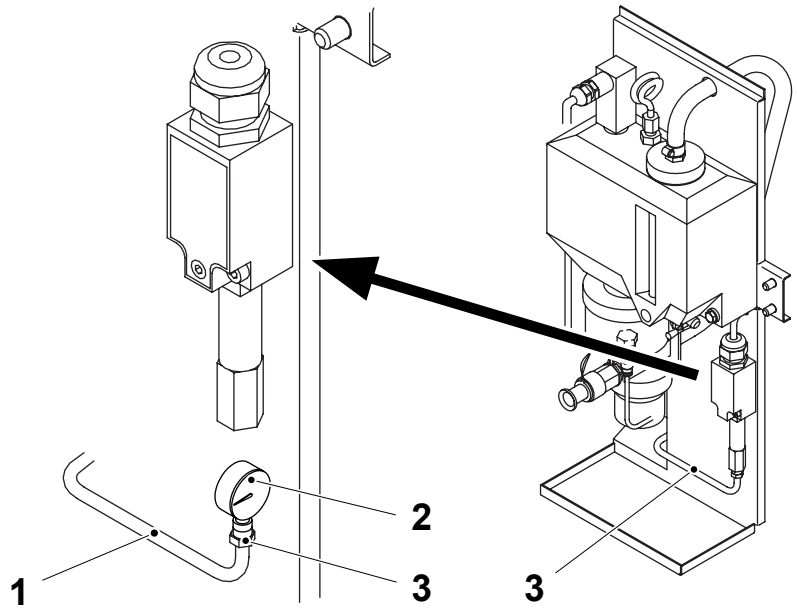
b) Perform items c), d), e) and f), see 2.1.1-1 Central Lubrication - Check.

c) Check that the pressure rises to at least **3 MPa (30 bar)**.

d) Thereafter, within 30 seconds, the pressure must drop to a value below **0.1 MPa (1 bar)**.

e) If not, check for oil leakages in the lubricating system or change the pump as required, see 2.1.1-6 Central Lubrication - Change Oil.

f) If the pressure is satisfactory remove the 0-6 MPa pressure gauge (2) and fit back the hose (1).



1 Hose
2 Pressure gauge
3 Nipple

2.1.1-3 Central Lubrication - Check Oil Feed

Machine Status	Mains Power ON, Air ON Steam ON, Water OFF
SPC Reference	1095911-0100

WARNING
Risk of personal injury.
Wear protective gloves.

a) Perform items c), d), e) and f), *see* 2.1.1-1 Central Lubrication - Check.

b) Make sure that the oil reaches the places marked with arrows in the:
   - jaw system and design correction, see Fig.1
   - drive unit, see Fig.2
   - final folder, see 5.2.1-1 Central Lubrication - Check.

c) Check for any oil leakages by looking for air bubbles in the oil hoses. This means that the lubrication pump is leaking or there is a leakage in the lubrication system.

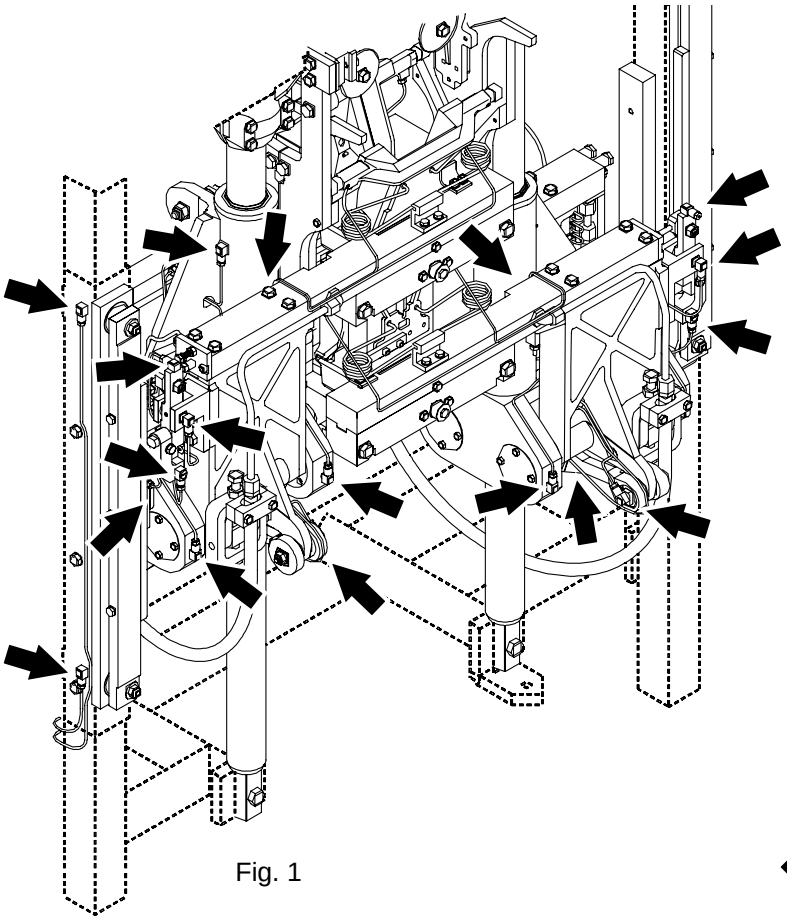


Fig. 1

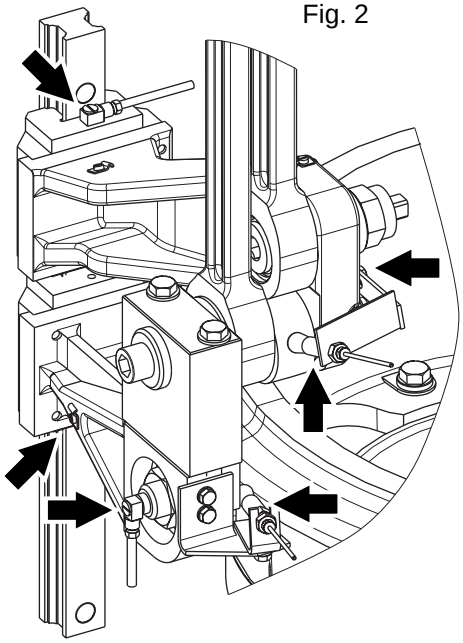


Fig. 2

2.1.1-4 Central Lubrication - Clean Oil Tank

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Lubricant code H
SPC Reference	1095911-0100

WARNING
Risk of personal injury.
Wear protective gloves.

a) Open the valve (1) and drain the oil until the tank is empty.

b) Disconnect the level probe (4) connection.

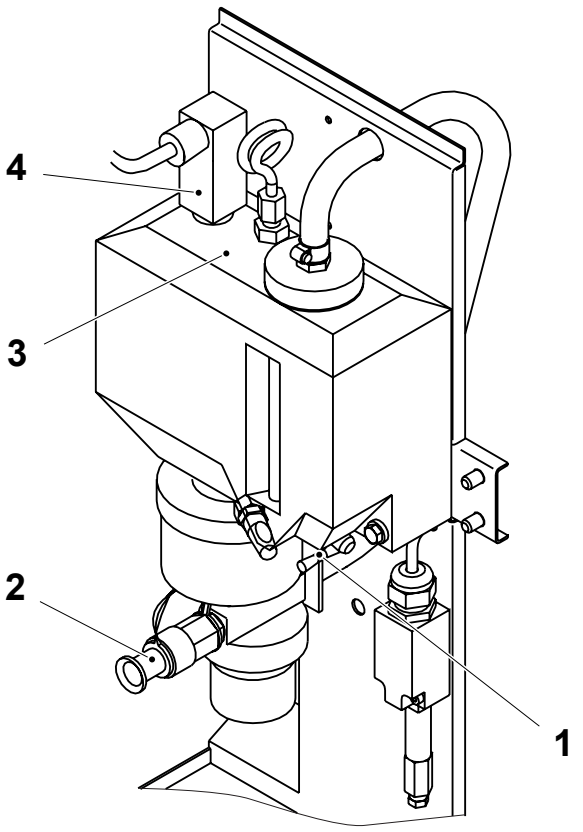
c) Remove the cover (3).

d) Clean the tank with lint-free cloths. Make sure that there is no lint after cleaning.

e) Assemble in reverse order and fill up through the nipple (2). Use oil code H, see 10.3-1 Lubricants.

f) Bleed the system according to 2.1.1-5 Central Lubrication - Bleed.

g) Check the oil pressure according to 2.1.1-2 Central Lubrication - Check Oil Pressure.



1 Drain valve
2 Nipple
3 Cover
4 Level probe

2.1.1-5 Central Lubrication - Bleed

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1095911-0100

Note! Loosen one bleeding point at a time.

WARNING
Risk of personal injury.
Wear protective gloves.

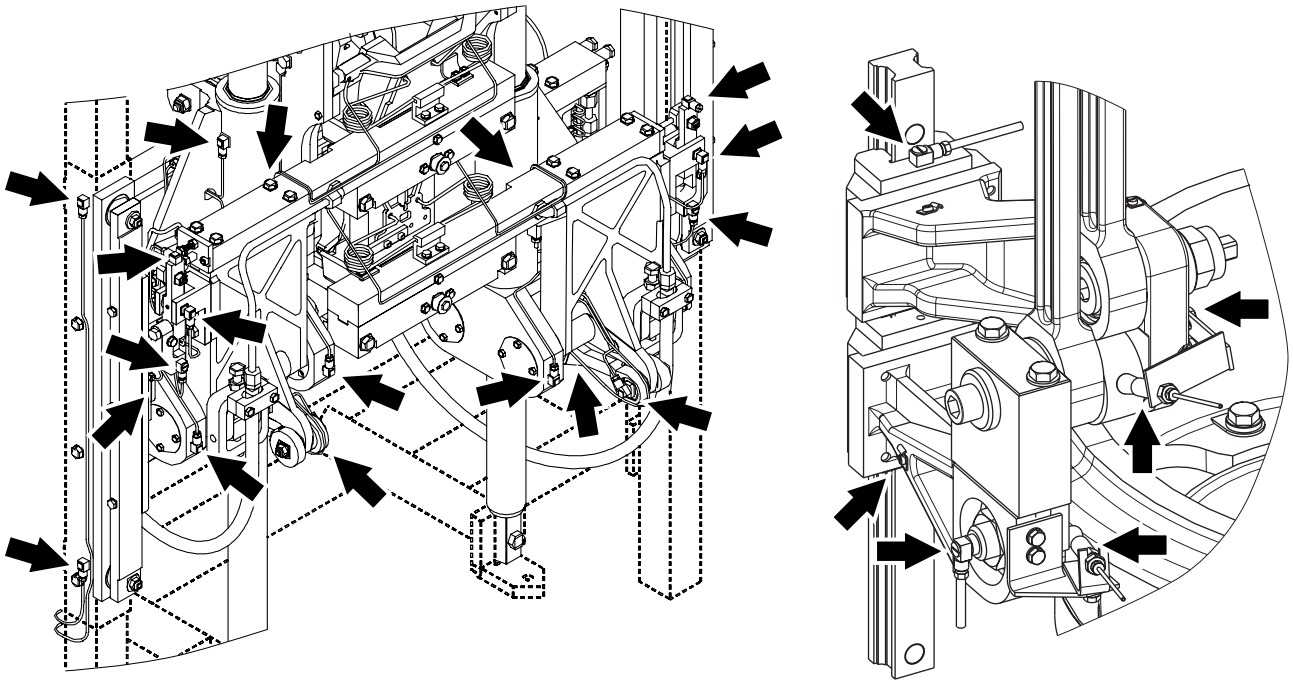
a) To bleed the lubrication system loosen:
   - one distribution bleeding nipple or hose nipple indicated by the arrows
   - one venting valve on each drive unit runner block.

b) Perform items c), d) and e), see 2.1.1-1 Central Lubrication - Check.

c) Perform item f), see 2.1.1-1 Central Lubrication - Check, at **5 minute** intervals until air free oil is bled out.

d) Tighten the distribution venting valve, the bleed nipple or the hose nipple.

Note! Always bleed the system whenever one of the main lines between the pump and the metering valve has been disconnected.



2.1.1-6 Central Lubrication - Change Oil

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Lubricant code H
SPC Reference	1095911-0100

WARNING
Risk of personal injury.
Wear protective gloves.

a) Open the drain valve (3) and drain the oil until the tank (6) is empty.

b) Remove in the following order:
   – the level probe connection (1)
   – the screws (4)
   – the pump (2).

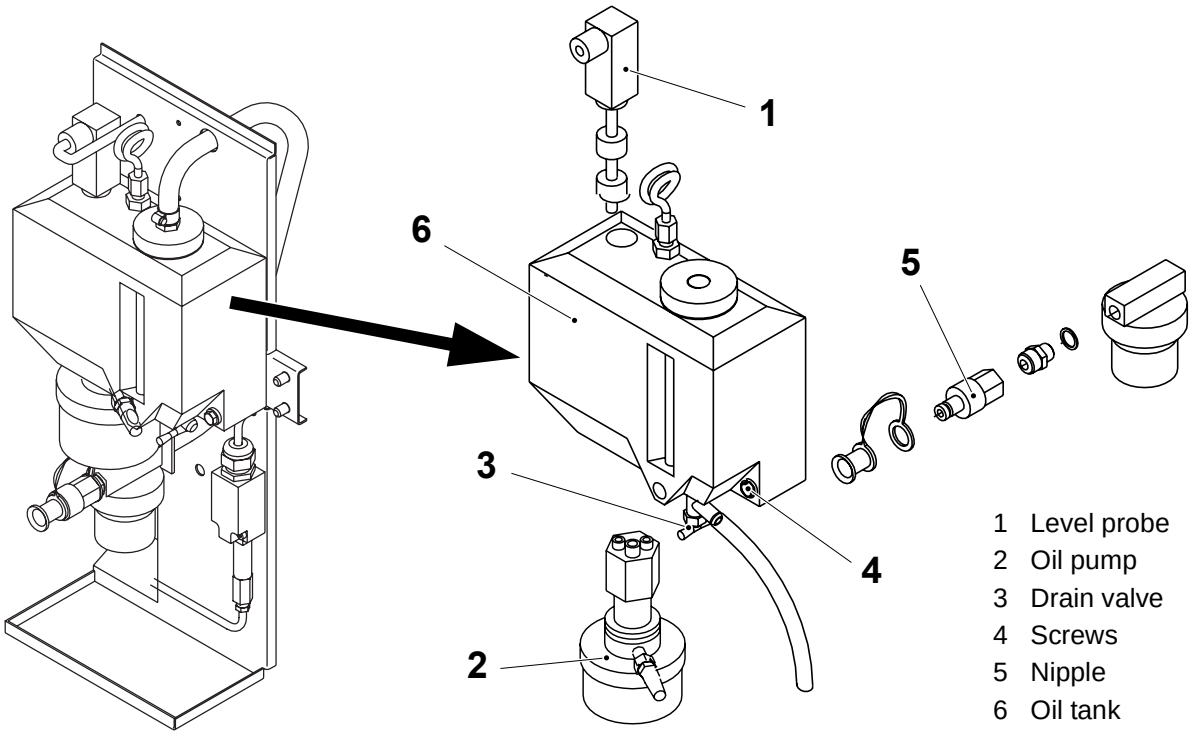
c) Remove the oil tank (6) and change it as required.

d) Assemble in the reverse order.

e) Close the drain valve (3) and fill up through the nipple (5) approximately 2 litres of oil. Use oil code H, see 10.3-1 Lubricants.

f) Bleed the system according to 2.1.1-5 Central Lubrication - Bleed.

g) Check the oil pressure according to 2.1.1-2 Central Lubrication - Check Oil Pressure.



2.1.1-7 Central Lubrication - Change Filter Insert

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lubricant code H
SPC Reference	1095911-0100

WARNING
Risk of personal injury.
Wear protective gloves.

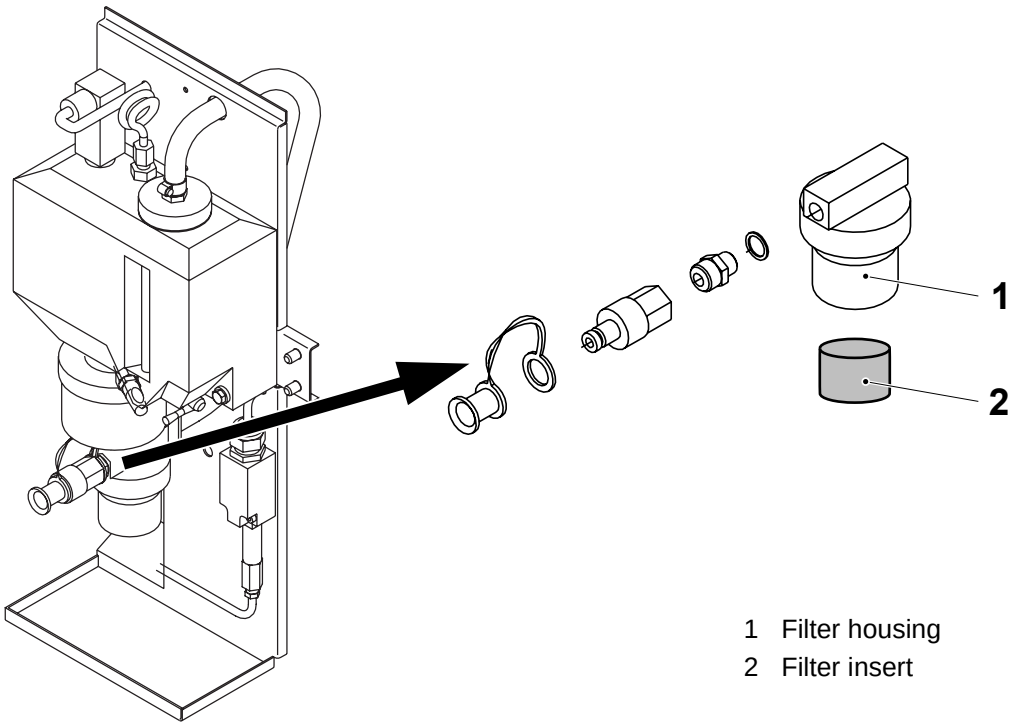
a) Unscrew the filter housing (1) and pull out the filter insert (2).

b) Remove and clean the filter insert (2) with compressed air. Change it as required.

c) Fit back the filter insert (2) and tighten the filter housing (1).

d) Bleed the system according to 2.1.1-5 Central Lubrication - Bleed.

e) Check the oil pressure according to 2.1.1-2 Central Lubrication - Check Oil Pressure.



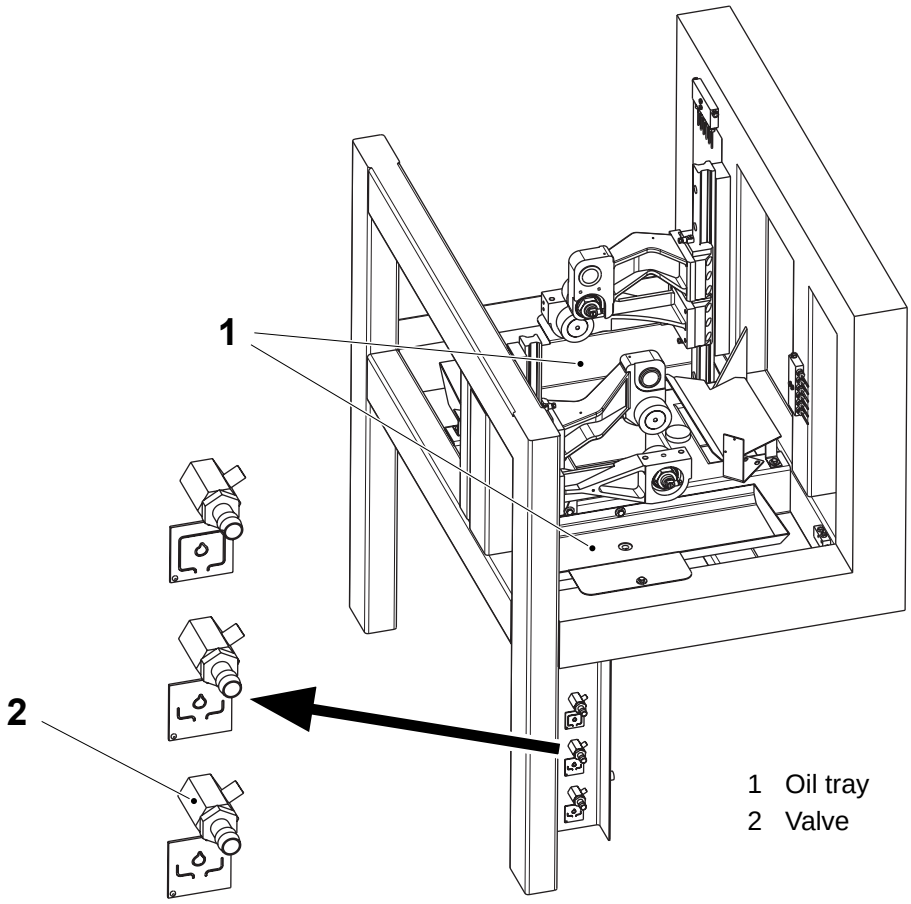
1 Filter housing
2 Filter insert

2.1.1-8 Central Lubrication - Empty Oil Trays

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095911-0100

WARNING
Risk of personal injury.
Wear protective gloves.

a) Check the oil level in the oil trays (1) every 500 working hours.
b) If required, empty the oil trays (1) by opening the valve (2).
c) Place a vessel under the valve (2) in order to collect the oil coming out.
d) Close the valve (2).



2.2 Hydraulic System

SPC Reference	1255133-0300

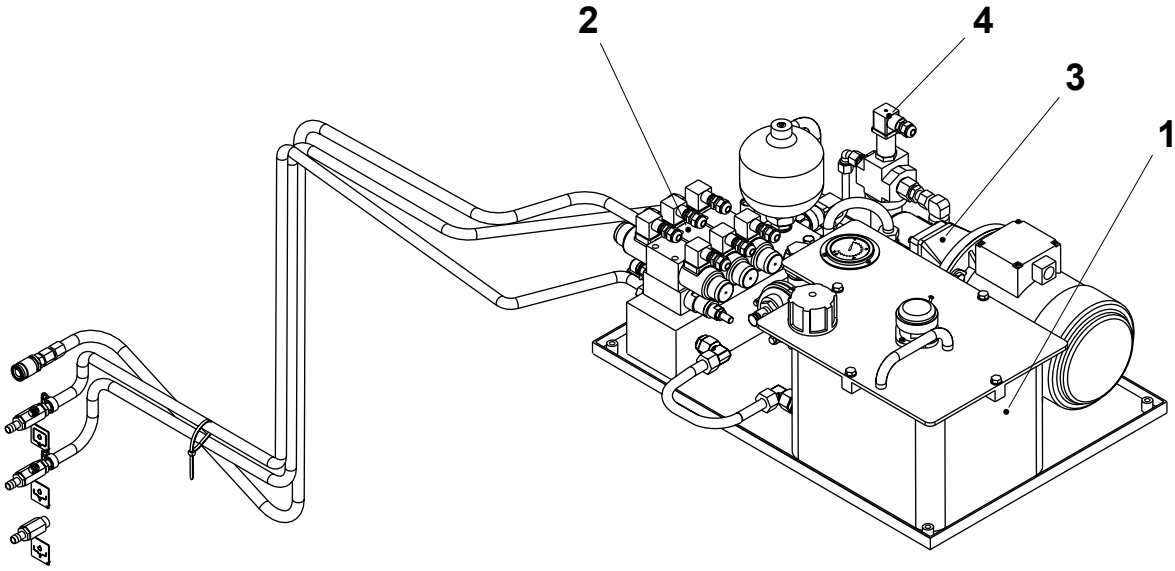
2.2-1 Hydraulic System - Functional Description

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1255133-0300

The function of the hydraulic system is to provide the hydraulic cylinders in the jaw system with oil.

The movement of the pressure jaws and the cutting jaws in the jaw system are controlled by three hydraulic valves (2). The oil to the hydraulic valves (2) comes from the hydraulic tank (1) via the hydraulic pump (3).

The oil passes through a hydraulic pressure filter (4) before it reaches the hydraulic valves (2). The return oil from the jaw system passes through the hydraulic valves (2) before it reaches the hydraulic tank (1).



1 Hydraulic tank
2 Hydraulic valve
3 Hydraulic pump
4 Hydraulic pressure filter

(Cont'd)

(Cont'd)

The hydraulic tank (1) serves as a buffer for the hydraulic system.

The pressure filter (5) cleans the oil before reaching the manifold block.

The air filter (6) prevents particle contamination from entering the hydraulic tank.

The bi-stable/directional valves (7) are spring centred valves with two solenoids and a manual override.

The pressure relief valve (8) limits the hydraulic system pressure and at the same time the hydraulic pressure to the “Catches”.

The pressure reducing valve (9) limits the hydraulic pressure to the “Knifes”.

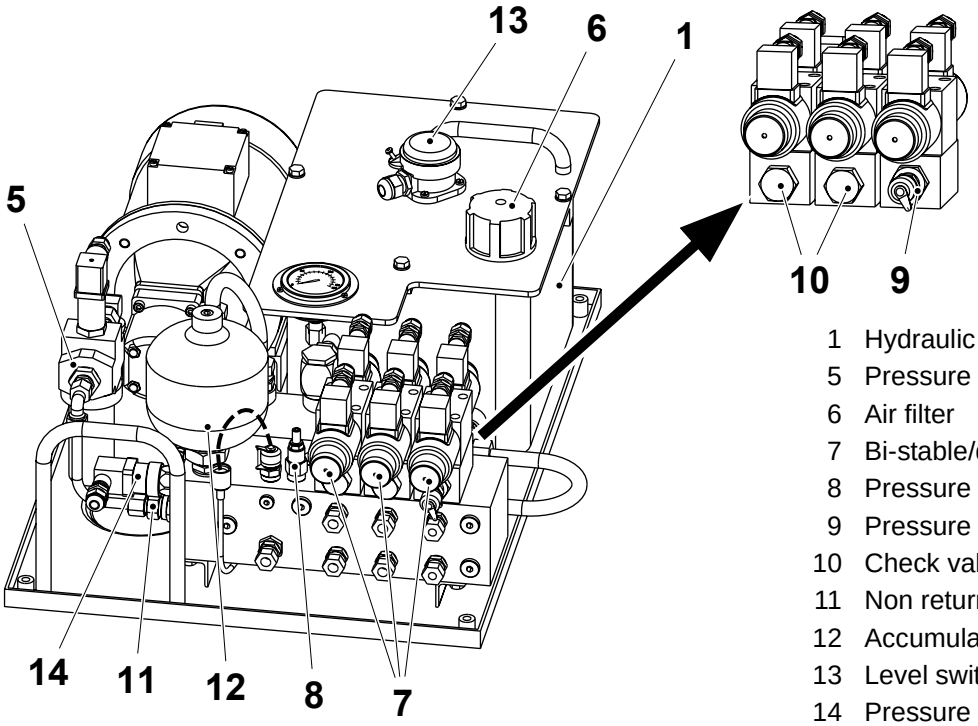
The check valves (10) prevent the “Catches” from being released due to loss of pressure.

The non return valve (11) prevents the pump from being pressurised backwards by the hydraulic system.

The accumulator (12) is used for storing hydraulic oil making it possible to operate the cylinders with high speed.

The level switch (13) monitors the oil level and temperature in the hydraulic tank (1).

The pressure switch (14) gives signal when the oil pressure decreases.



1 Hydraulic tank
5 Pressure filter
6 Air filter
7 Bi-stable/directional valve
8 Pressure relief valve
9 Pressure reducing valve
10 Check valve
11 Non return valve
12 Accumulator
13 Level switch
14 Pressure switch

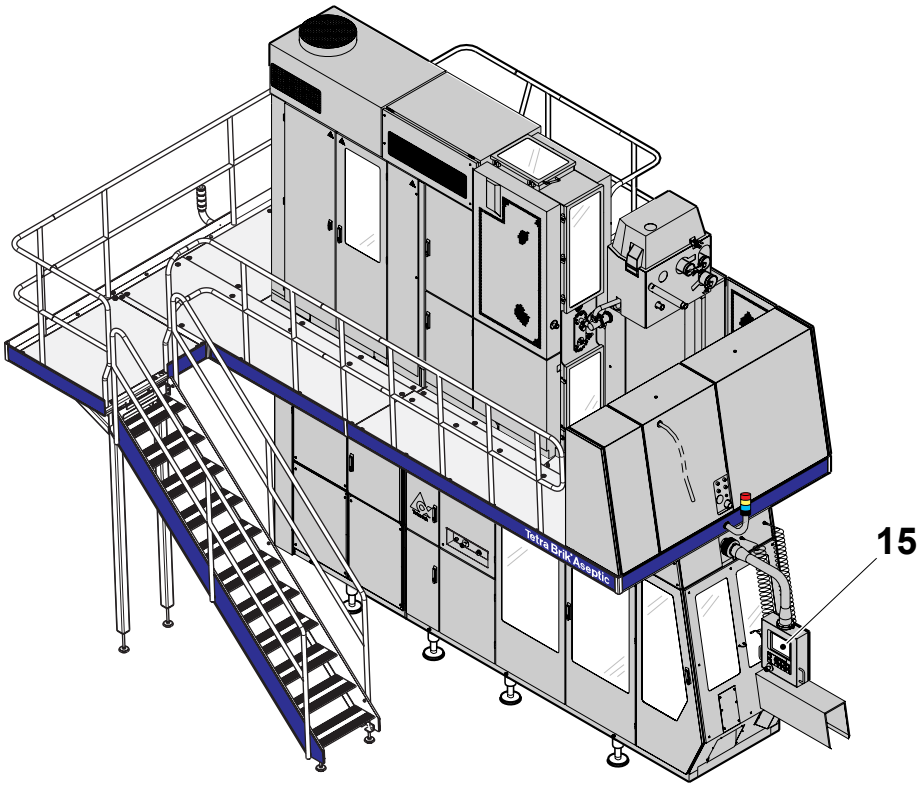
(Cont'd)

(Cont'd)

The TPOP (15) will show the following alarms:

- low oil pressure
- blocked pressure filter element
- low oil level
- high oil level
- high oil temperature.

For the proper values, see 10.1 Technical Data.



15 TPOP

2.2-2 Hydraulic System - Change Oil

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
Consumables	Lubricant code C
SPC Reference	1255133-0300

WARNING

Hydraulic oil.

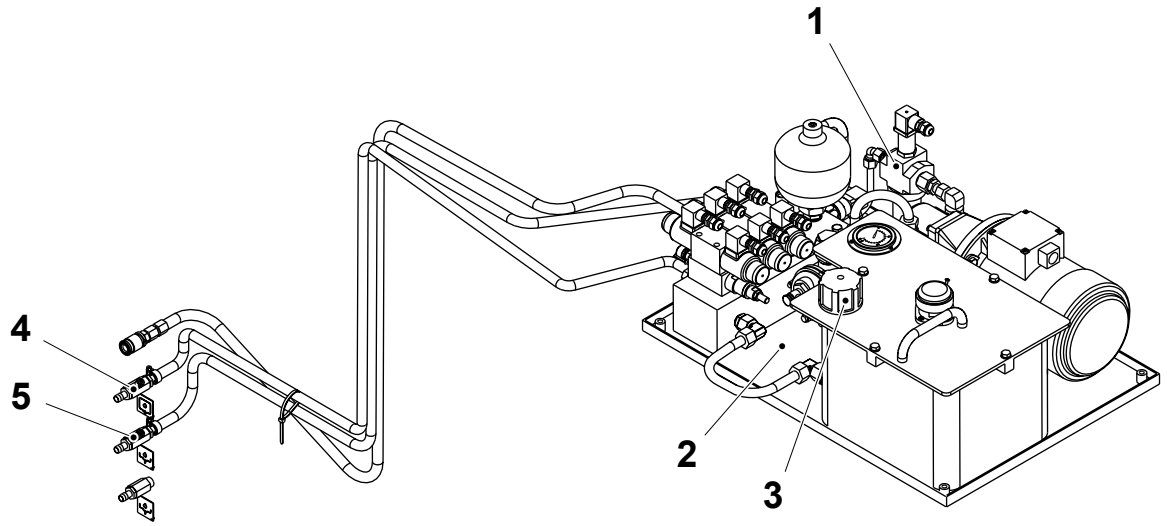
Wear protective gloves and eye protection.

a) Drain the oil in the tank by opening the valve (4).

b) Open the drain valve (5) to empty the collecting vessel (2).

c) Change the pressure filter (1), see 2.2.4-1 Hydraulic Pump - Change Filter Element and the air filter (3), see 2.2.2-3 Hydraulic Tank - Change Air Filter.

d) Close the drain valves (4) and (5).



1 Pressure filter
2 Vessel
3 Air filter
4 Drain valve
5 Drain valve

(Cont'd)

(Cont'd)

e) Touch the MANOEUVRE button (6) on the TPOP.

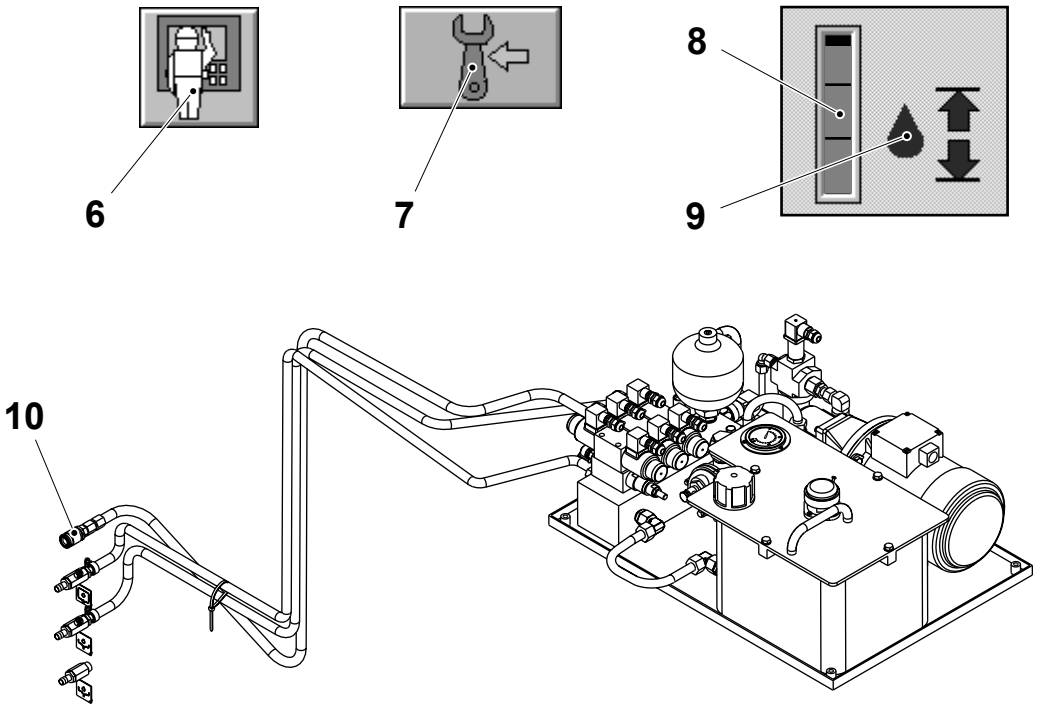
f) Touch the MAINTENANCE SERVICE UNIT LEFT button (7).

g) Touch the HYDRAULIC OIL LEVEL button (8).

Note! Do not overfill!

h) Fill up with oil through the nipple (10) until the maximum level in the **Hydraulic oil level** display (9) is reached according to 10.1 Technical Data. Use oil code C, see 10.3-1 Lubricants.

i) Bleed the circuit, see 2.2-4 Hydraulic System - Bleed.



6 MANOEUVRE button
7 MAINTENANCE SERVICE UNIT left
8 HYDRAULIC OIL LEVEL button
9 Hydraulic oil level display
10 Nipple

2.2-3 Hydraulic System - Clean Tank

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lubricant code C
SPC Reference	1255133-0300

WARNING

Hydraulic oil.

Wear protective gloves and eye protection.

a) Drain the oil by opening the drain valve (1).

b) Remove the level probe (2) according to 2.2.2-2 Hydraulic Tank - Change Level Probe.

c) Remove the four screws (3) and the cover (4).

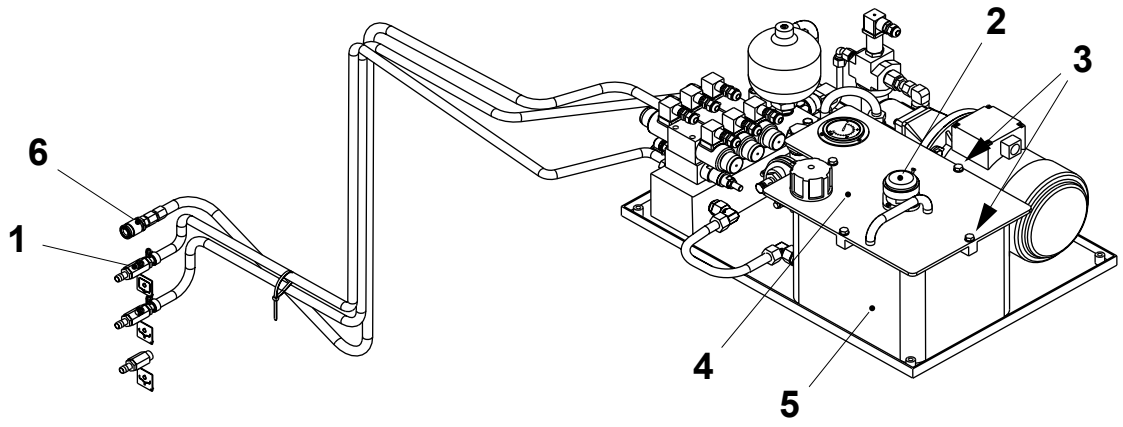
d) Clean the tank (5) with lint-free cloths.

Note! Make sure that there is no lint left after cleaning.

e) Assemble in the reverse order.

f) Close the drain valve (1) and fill up with oil through the nipple (6), see 2.2-2 Hydraulic System - Change Oil. Use oil code C, see 10.3-1 Lubricants.

g) Bleed the circuit, see 2.2-4 Hydraulic System - Bleed.



1 Drain valve
2 Level probe
3 Screw
4 Cover
5 Tank
6 Nipple

2.2-4 Hydraulic System - Bleed

Machine Status	Mains Power ON, Air ON Steam ON, Water OFF
Consumables	Lubricant code C
SPC Reference	1255133-0300

WARNING

Risk of eye injury.

The venting screws (2), (3) and (4) may be ejected with force by the hydraulic pressure. Never loosen the screws by more than one turn.



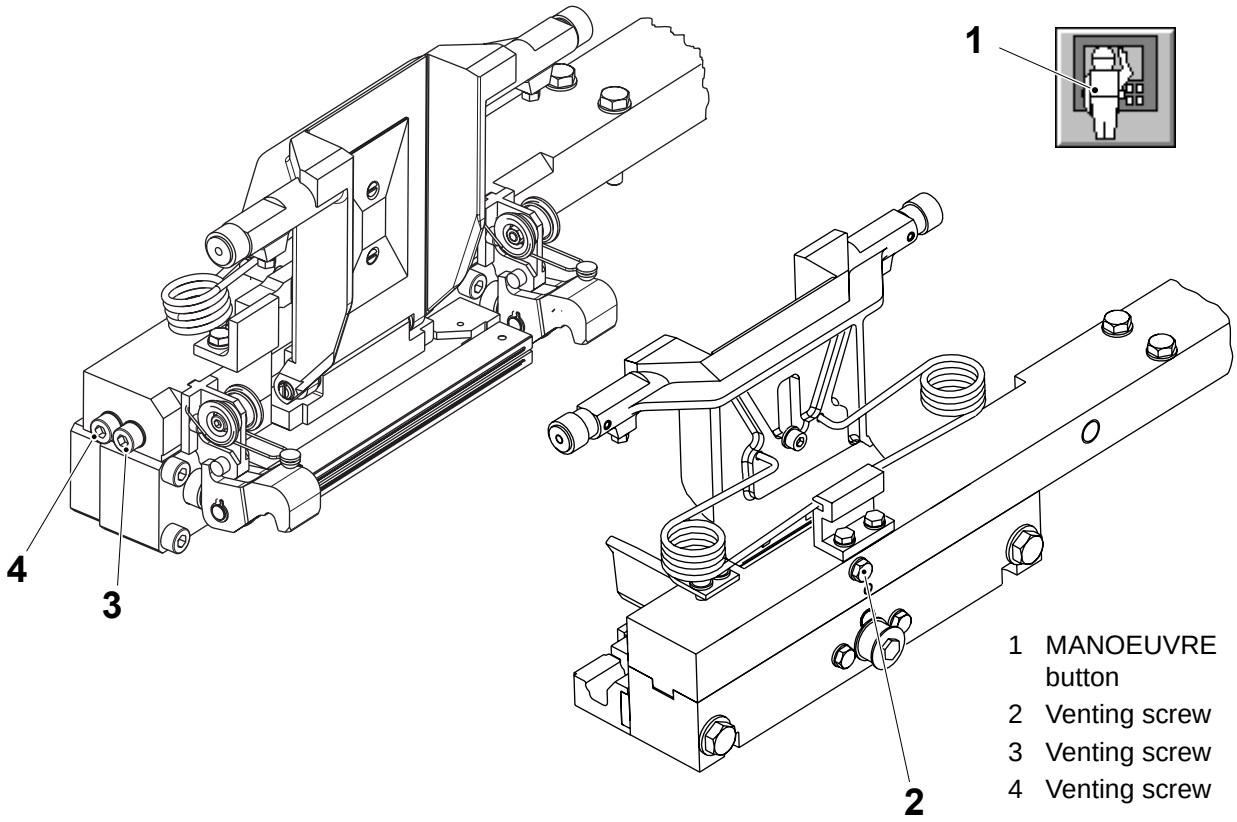
a) Start the hydraulic unit by means of the MANOEUVRE button (1) on the TPOP. For more details see 4-11 Jaw System - Set Cutting Alignment.

b) Crank the machine so that there is pressure on the knife and until the catches are engaged.

c) Loosen slightly the venting screw (2) on the cutting jaw and the venting screw (3) on pressure jaw. Bleed until oil with no air bubbles emerges.

d) Tighten the screws (2) and (3).

e) Crank backwards until the catches are disengaged.



1 MANOEUVRE button
2 Venting screw
3 Venting screw
4 Venting screw

(Cont'd)

(Cont'd)

f) Loosen slightly the venting screw (4) on the pressure jaw and bleed until oil with no air bubbles emerges.

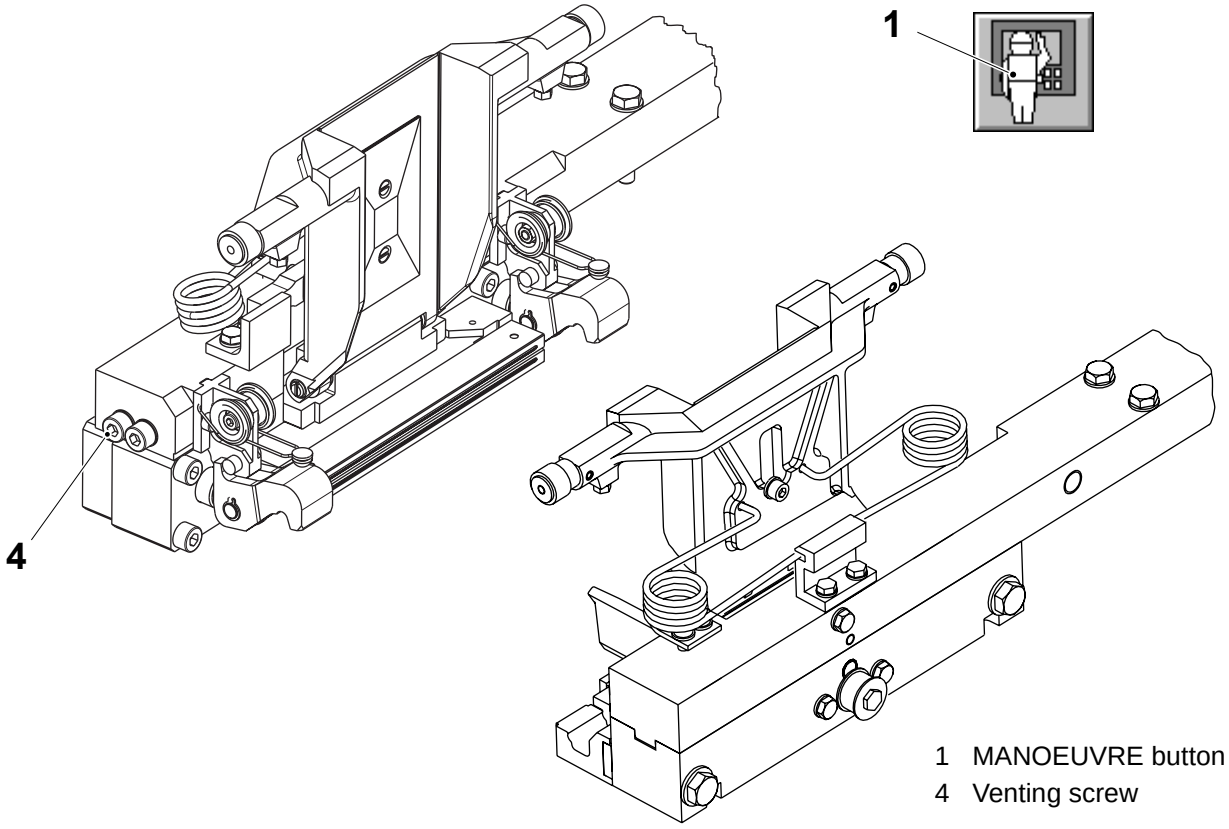
g) Tighten the screw (4).

h) Proceed as above for the other jaw pair.

i) Make sure there are no oil leaks.

j) Stop the hydraulic pump by means of the MANOEUVRE button (1) on the TPOP. For more details see 4-11 Jaw System - Set Cutting Alignment.

k) Fill up the oil tank as required, see 2.2-2 Hydraulic System - Change Oil.



1 MANOEUVRE button
4 Venting screw

2.2.1 Hydraulic Unit

2.2.1-1 Hydraulic Unit - Check

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1549211-0100 1549211-0200

WARNING

Hydraulic oil.

Wear protective gloves and eye protection.

Check the following parts for visual wear and/or damage:

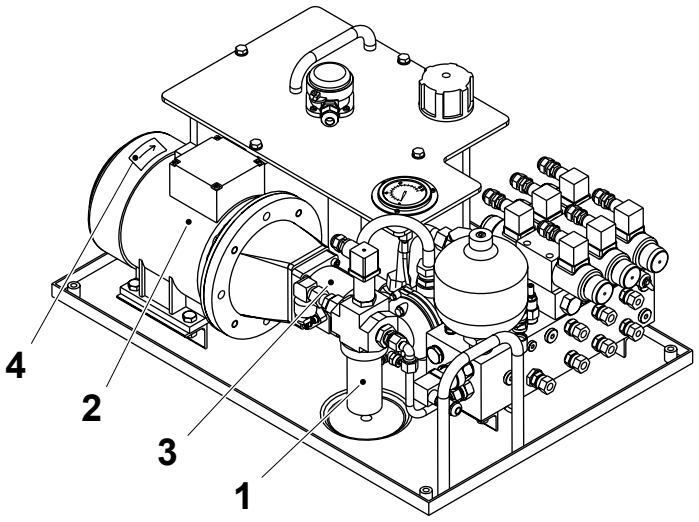
- the hydraulic pump (3)
  Check also for noise. Change as required according to 2.2.4-2 Hydraulic Pump - Change Pump.
- the hydraulic circuit
  Check for leaks in the hydraulic system.

Check that all connections are tightened.

Make sure that the pressure filter (1) contains filter element, see 2.2.4-1 Hydraulic Pump - Change Filter Element.

Start the hydraulic unit and check that the rotation on the electrical motor (2) is correct according to the arrow (4).

Check that the oil tank is filled with oil. If required refill the oil tank according to 2.2-2 Hydraulic System - Change Oil.



1 Pressure filter
2 Electrical motor
3 Hydraulic pump
4 Arrow

(Cont'd)

(Cont'd)

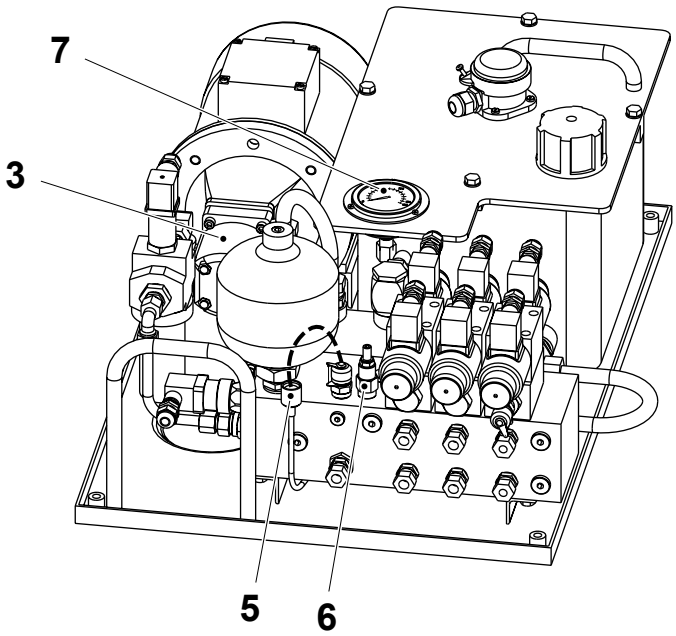
Make sure that the test hose (5) is connected to the test connection (6).

Check the condition of the hydraulic pump (3) on the pressure gauge (7). It should be **100 bar**.

Check that the cutting jaw and pressure jaw cylinders move correctly. If not, see 2.2-4 Hydraulic System - Bleed.

Check the complete system for oil leaks.

Check that there are no alarms on the TPOP.



3 Hydraulic pump
5 Test hose
6 Test connection
7 Pressure gauge

2.2.1-2 Hydraulic Unit - Set Pressure

Machine Status	Mains Power ON Air ON Steam ON Water ON
SPC Reference	1549211-0100 1549211-0200

WARNING
Hydraulic oil.
Wear protective gloves and eye protection.

Jaw pressure setting

Note! Make sure that the machine is in step ZERO.

a) Connect the test hose (2) to the test connection system (3).

b) Step up the machine to step PREPARATION.

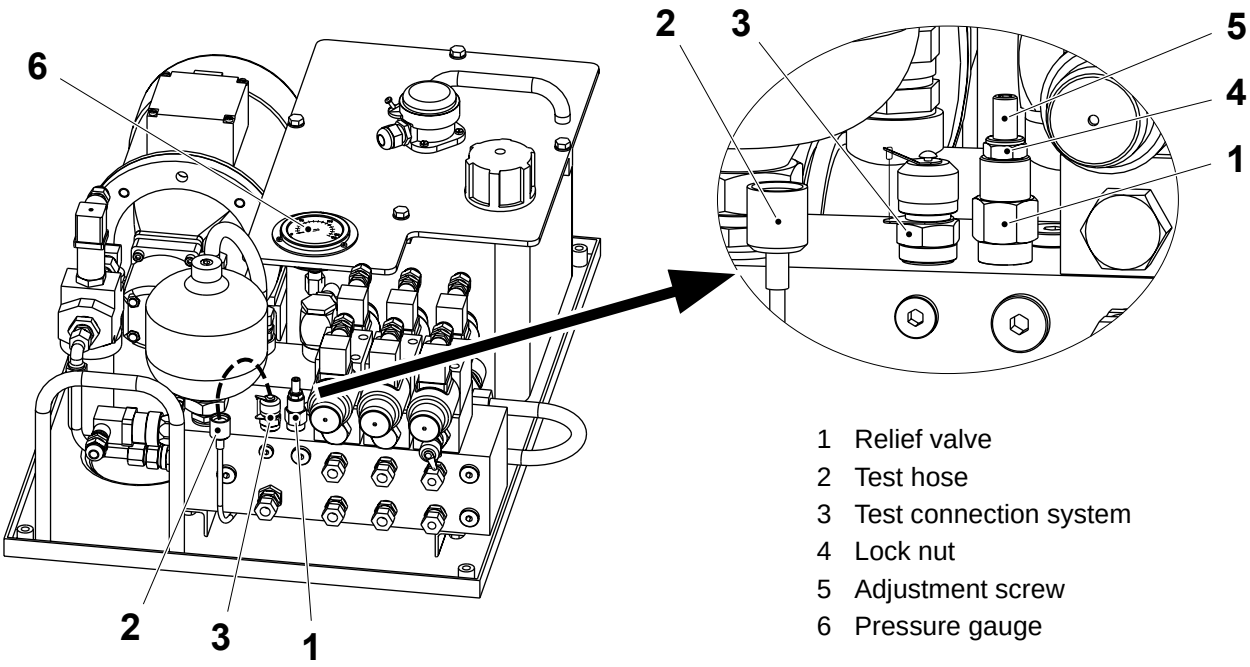
c) Loosen the lock nut (4).

d) Set the jaw pressure according to 10.1 Technical Data, by turning the screw (5) on the relief valve (1) until the pressure gauge (6) shows the correct value.

e) Tighten the lock nut (4).

f) Step down the machine to step ZERO.

g) Disconnect the test hose (2).



1 Relief valve
2 Test hose
3 Test connection system
4 Lock nut
5 Adjustment screw
6 Pressure gauge

(Cont'd)

(Cont'd)

Cutting pressure setting

Note! Make sure that the machine is in step ZERO.

a) Connect the test hose (2) to the test connection cutting (7).

b) Step up the machine to step PREPARATION.

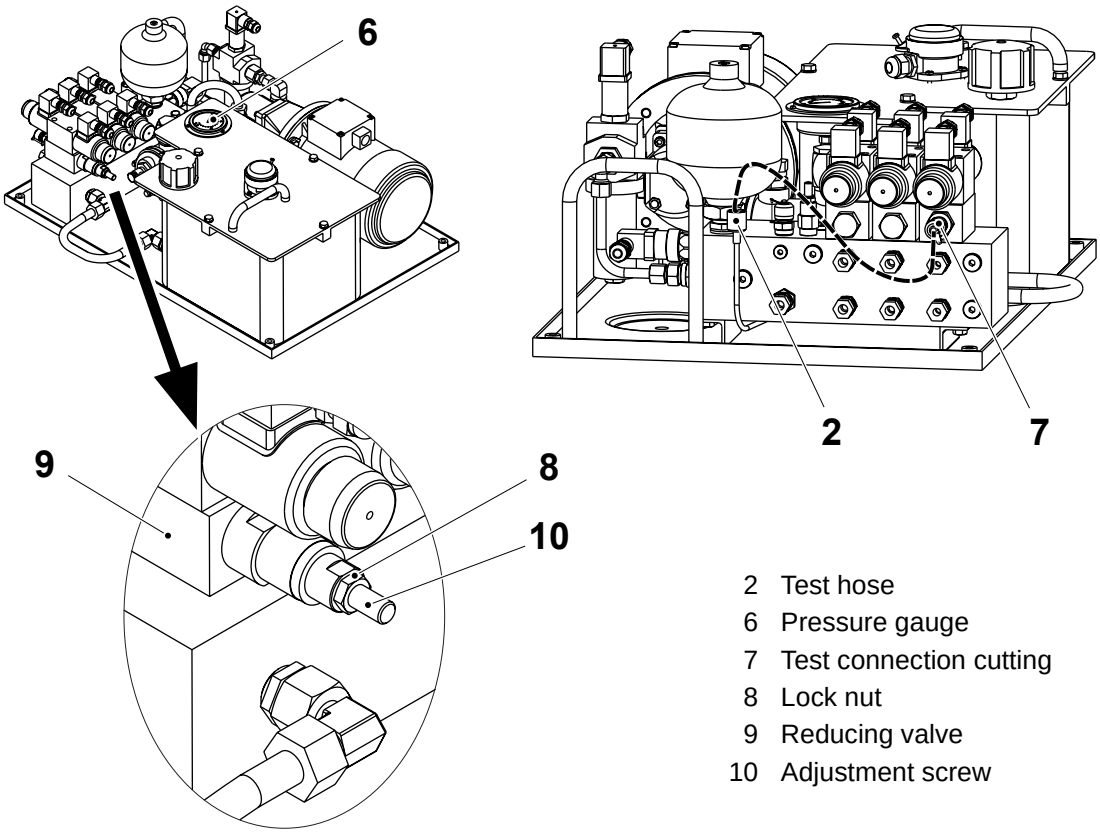
c) Loosen the lock nut (8).

d) Set the cutting pressure according to 10.1 Technical Data, by turning the screw (10) on the reducing valve (9) until the pressure gauge (6) shows the correct value.

e) Tighten the lock nut (8).

f) Step down the machine to step ZERO.

g) Disconnect the test hose (2).



2 Test hose
6 Pressure gauge
7 Test connection cutting
8 Lock nut
9 Reducing valve
10 Adjustment screw

2.2.1-3 Hydraulic Unit - Set Pressure Guard

Machine Status	Mains Power ON Air ON Steam ON Water OFF
Special Equipment	Ohmmeter
SPC Reference	1549211-0100 1549211-0200

WARNING

Hydraulic oil.

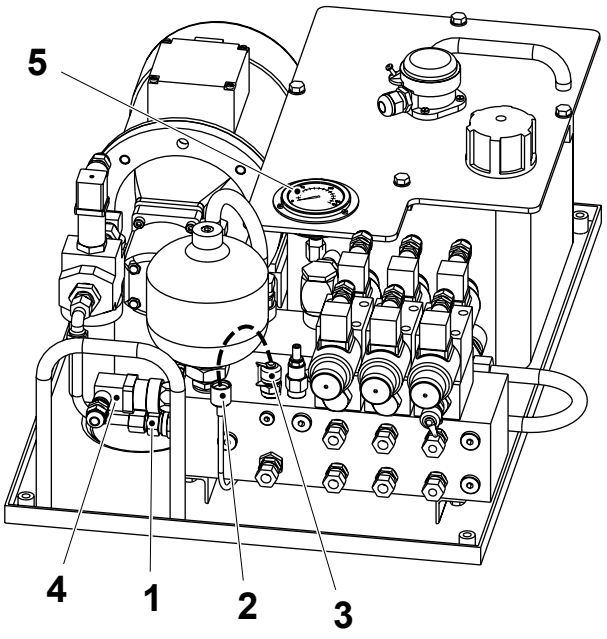
Wear protective gloves and eye protection.

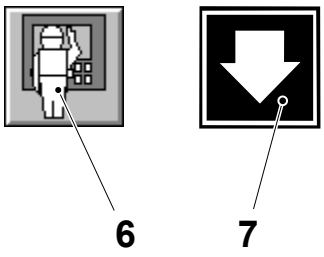
a) Make sure that the test hose (2) is connected to the test connection system (3).

b) Remove the contact (4).

c) Start the hydraulic unit by means of the MANOEUVRE button (6) on the TPOP and note that the pressure is increasing on the pressure gauge (5).

d) Stop the hydraulic unit by means of the PROGRAM DOWN button (7) on the TPOP and measure the pressure when the pressure guard (1) switches. When the pressure reaches **80 bar** the pressure guard (1) must switch over.





1 Pressure guard
2 Test hose
3 Test connection system
4 Contact
5 Pressure gauge
6 MANOEUVRE button
7 PROGRAM DOWN button

(Cont'd)

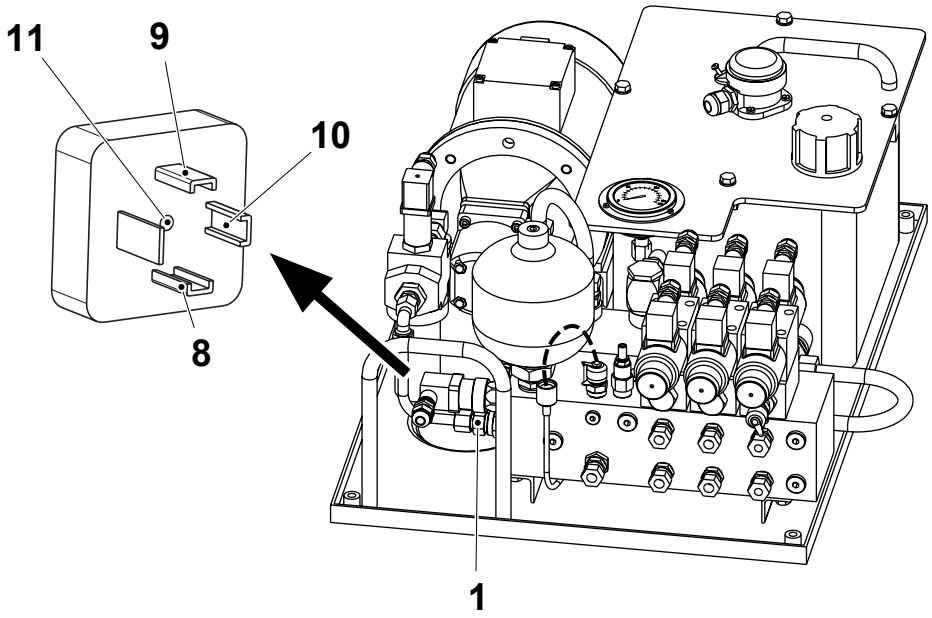
(Cont'd)

Note! Measure the resistivity on the pins by means of an ohmmeter when it goes from signal to no signal or vice versa. If pressure is present, there is resistance between the pin 1 (8) and the pin 4 (10). If not, there is resistance between the pin 1 (8) and the pin 2 (9).

e) Adjust the pressure guard (1) by means of the adjustment screw (11), until the desired change-over pressure **80 bar** is reached.

f) Repeat item c), d) and e) until change-over is reached.

g) Fit back the contact (4).



1 Pressure guard
8 Pin 1
9 Pin 2
10 Pin 4
11 Adjustment screw

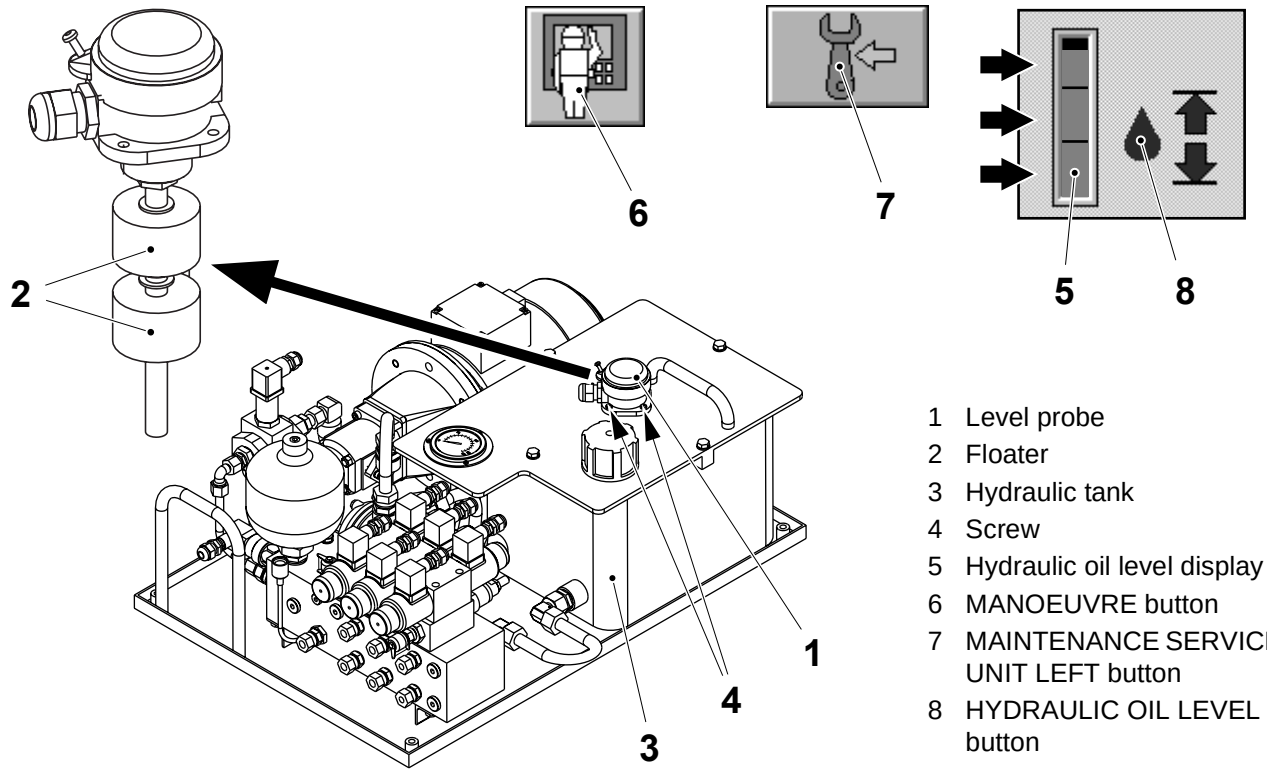
2.2.2 Hydraulic Tank

2.2.2-1 Hydraulic Tank - Check Level Probe

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1549209-0100 1549209-0200

WARNING
Hydraulic oil.
Wear protective gloves and eye protection.

a) Remove the four screws (4).
b) Remove the level probe (1) from the hydraulic tank (3).
c) Touch the MANOEUVRE button (6) on the TPOP.
d) Touch the MAINTENANCE SERVICE UNIT LEFT button (7).
e) Touch the HYDRAULIC OIL LEVEL button (8).
f) Move the floaters (2) up and down and check that the level shown on the **Hydraulic oil level** display (5) on the TPOP is moving up and down.
g) Assemble in the reverse order.



1 Level probe
2 Floater
3 Hydraulic tank
4 Screw
5 Hydraulic oil level display
6 MANOEUVRE button
7 MAINTENANCE SERVICE UNIT LEFT button
8 HYDRAULIC OIL LEVEL button

2.2.2-2 Hydraulic Tank - Change Level Probe

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1549209-0100 1549209-0200

WARNING

Hydraulic oil.

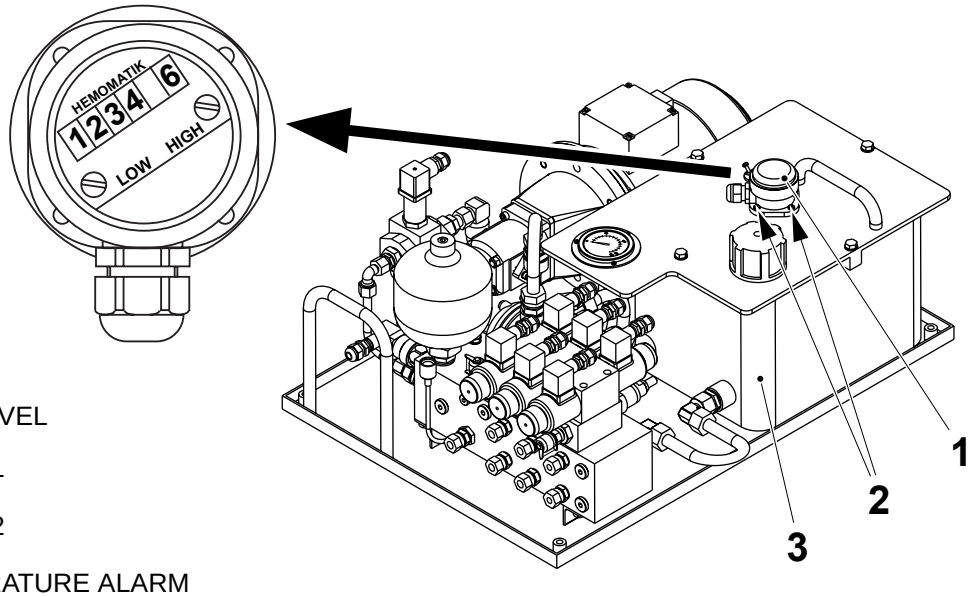
Wear protective gloves and eye protection.

a) Remove the cable from the level probe (1).

Note! Remember the positions of the cable connections. There are five different wires connected.

b) Remove the four screws (2) and remove the level probe (1) from the hydraulic tank (3).

c) Assemble the new level probe (1) and the cables.



S	1	HIGH LEVEL
O	2	ALARM 1
O	3	ALARM 2
T	4	TEMPERATURE ALARM
	6	GROUND

1 Level probe
2 Screw
3 Hydraulic tank

2.2.2-3 Hydraulic Tank - Change Air Filter

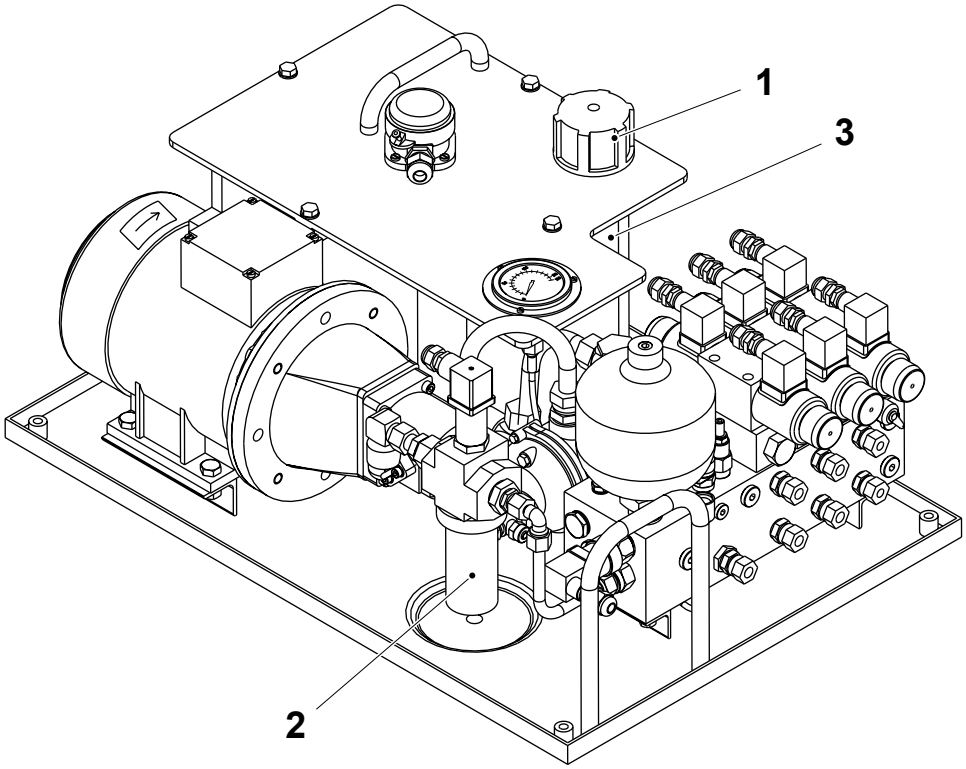
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1549209-0100 1549209-0200

Note! Change the air filter (1) only when the pressure filter element (2) is replaced or when it is clogged (visual check).

a) Remove the air filter (1) by screwing it out from the hydraulic tank (3).

b) Change the air filter (1) as required.

c) Assemble in the reverse order.



1 Air filter
2 Pressure filter element
3 Hydraulic tank

2.2.2-4 Hydraulic Tank - Check Oil Level

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1549209-0100 1549209-0200

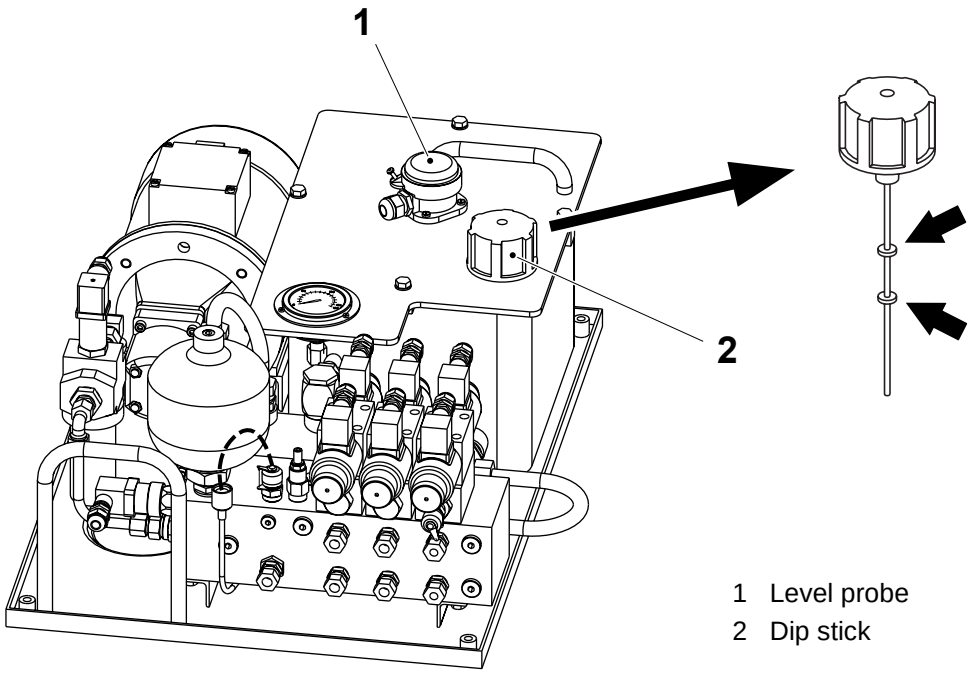
WARNING

Hydraulic oil.

Wear protective gloves and eye protection.

Note! The oil level check is performed normally on the TPOP by the level probe (1) and on special occasions by means of the dip stick (2).

Check that the oil level on the dip stick (2) is between the red and green marks, see picture below.



1 Level probe
2 Dip stick

2.2.2-5 Hydraulic Tank - Drain Water

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1549209-0100 1549209-0200

WARNING

Hydraulic oil.

Wear protective gloves and eye protection.

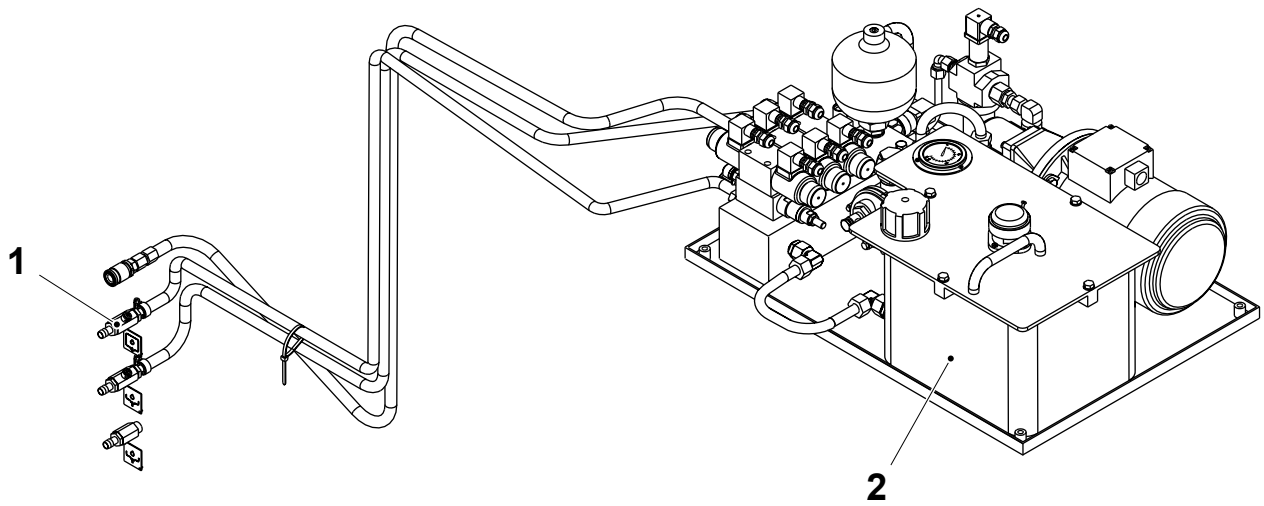
a) Place a collecting vessel under the drain valve (1).

b) Open the drain valve (1) until pure oil flows out.

c) Close the drain valve (1).

Note! This water should be handled as hazardous waste.

d) Fill the hydraulic tank (2) with oil according to 2.2-2 Hydraulic System - Change Oil.



1 Drain valve
2 Hydraulic tank

2.2.3 Hydraulic Valve

2.2.3-1 Hydraulic Valve - Check Accumulator

Machine Status	Mains Power ON, Air ON Steam ON, Water OFF
SPC Reference	1549208-0100 1549208-0200

a) Make sure the test hose (1) is connected to the test connection system (2).

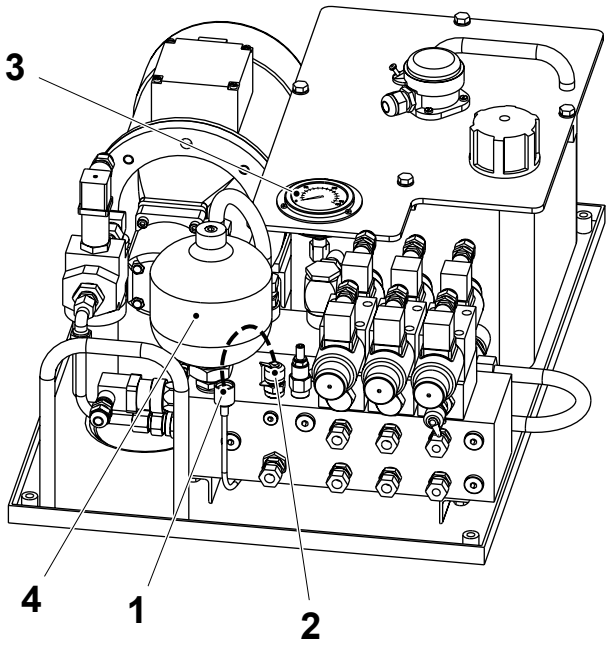
b) Start the hydraulic unit by means of the MANOEUVRE button (5) on the TPOP. For more details see 4-11 Jaw System - Set Cutting Alignment.

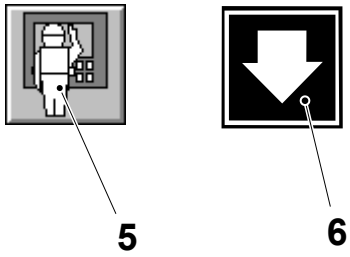
c) Stop the hydraulic unit by means of the PROGRAM DOWN button (6) on the TPOP. For more details see 4-11 Jaw System - Set Cutting Alignment.

Note! The oil temperature must by at least be 30 °C. The accumulator is pre-charged at delivery to 7.0 MPa (70 Bar) and the pressure in the accumulator (4) is dependent of the temperature.

d) Check the hydraulic pressure on the pressure gauge (3). The hydraulic pressure first drops slowly to an intermediate pressure before the pressure drops quickly to zero.

e) If the intermediate pressure is below **4.0 MPa (40 bar)**, step down the machine to step ZERO and change the accumulator (4), see 2.2.3-2 Hydraulic Valve - Change Accumulator.





1 Test hose
2 Test connection system
3 Pressure gauge
4 Accumulator
5 Manoeuvre button
6 Program down button

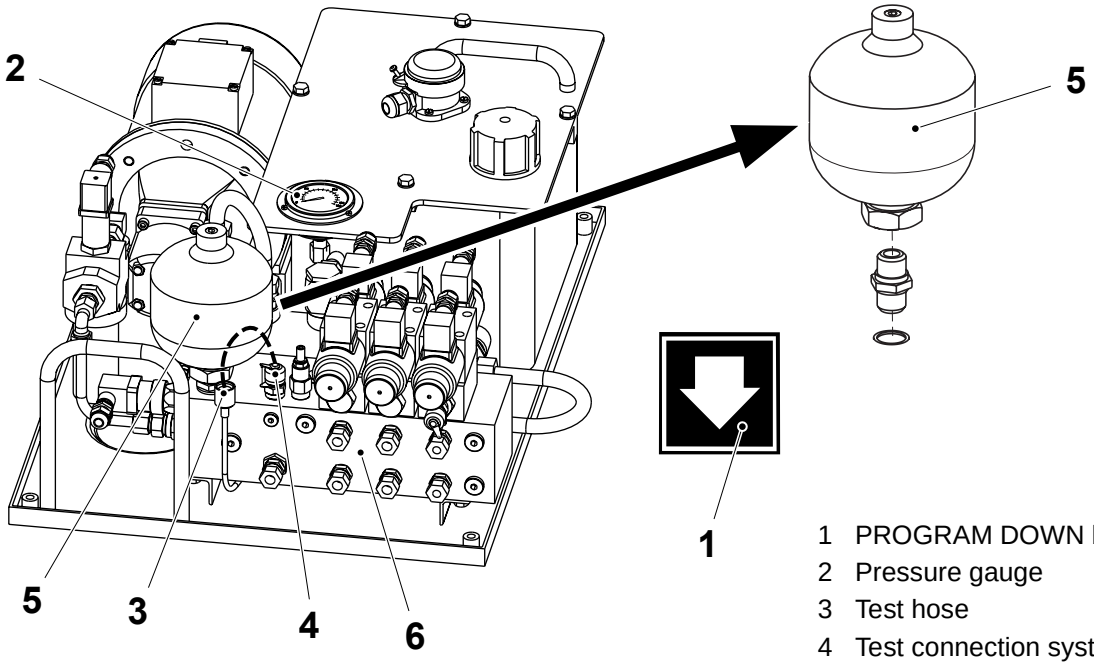
2.2.3-2 Hydraulic Valve - Change Accumulator

Machine Status	Mains Power ON Air ON Steam ON Water OFF
Special Equipment	Oil filter pliers
SPC Reference	1549208-0100 1549208-0200

WARNING
Hydraulic oil.
Wear protective gloves and eye protection.

a) Stop the hydraulic unit by means of the PROGRAM DOWN button (1) on the TPOP and wait until pressure gauge (2) shows **0 bar**. Make sure that the test hose (3) is connected to the test connection system (4).

b) Remove the accumulator (5) by means of the oil filter pliers from the manifold block (6).



1 PROGRAM DOWN button
2 Pressure gauge
3 Test hose
4 Test connection system
5 Accumulator
6 Manifold block

(Cont'd)

(Cont'd)

c) Remove the double nipple (7) from the accumulator (5) by holding the accumulator nut (8).

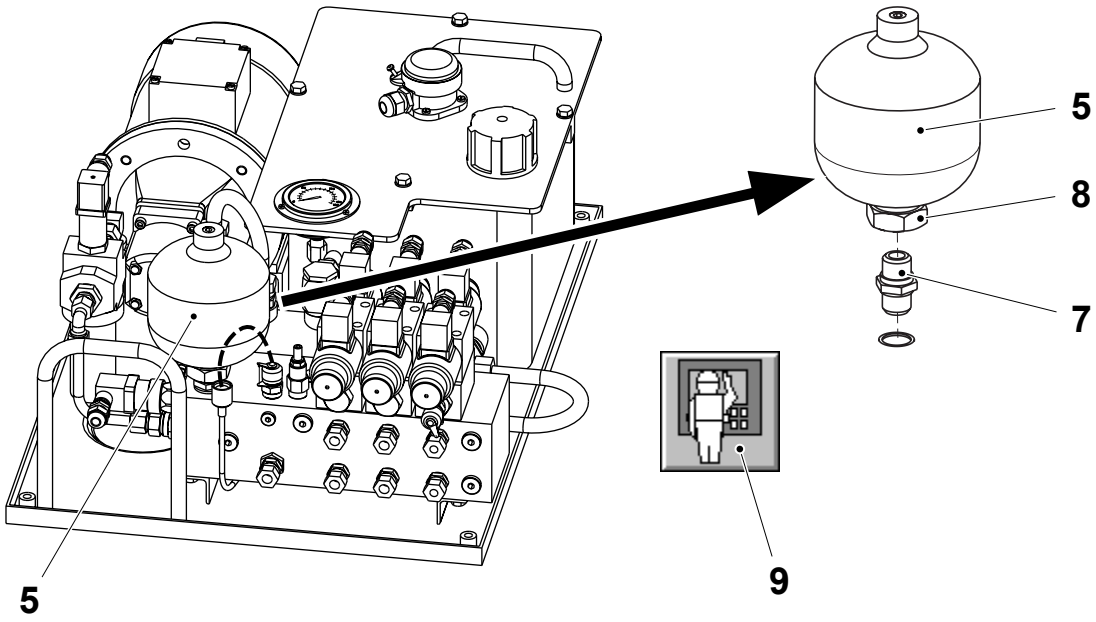
d) Change the accumulator (5) as required.

e) Assemble in the reverse order.

f) Start the hydraulic unit by means of the MANOEUVRE button (9) on the TPOP.

g) Bleed the system according to 2.2-4 Hydraulic System - Bleed.

h) Check for leaks in the hydraulic system.



5 Accumulator
7 Double nipple
8 Accumulator nut
9 MANOEUVRE button

2.2.3-3 Hydraulic Valve - Change bi-stable Valve, Directional Valve and Solenoid

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Torque wrench min. 7 Nm
SPC Reference	1549208-0100 1549208-0200

WARNING

Hydraulic oil.

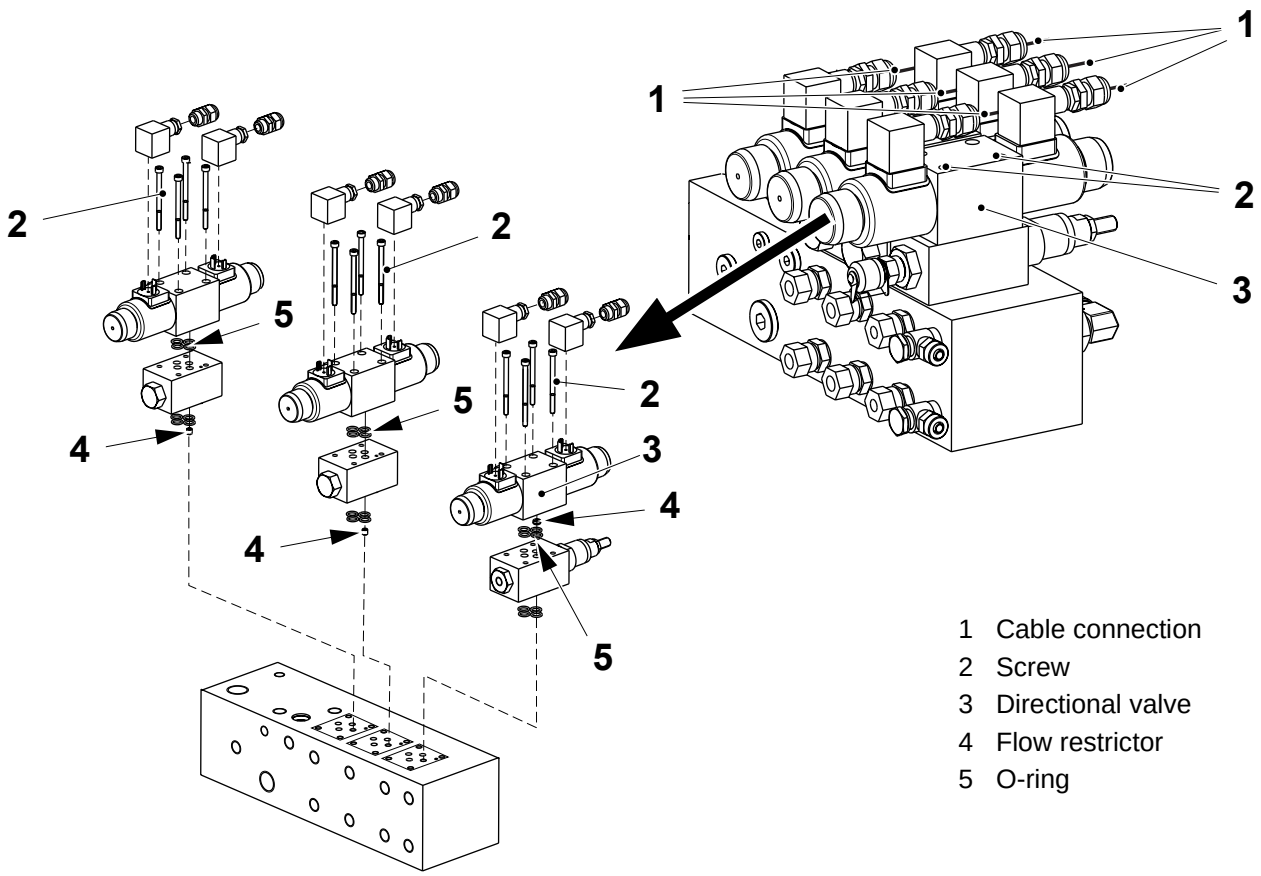
Wear protective gloves and eye protection.

Change bi-stable and directional valve

a) Remove all the cable connections (1).

b) Remove the four screws (2).

Note! Check that the flow restrictor (4), underneath the directional valve (3), is in place. Check the O-rings (5) and change them as required.



1 Cable connection
2 Screw
3 Directional valve
4 Flow restrictor
5 O-ring

(Cont'd)

(Cont'd)

c) Change the bi-stable valve (6) and/or the directional valve (3).

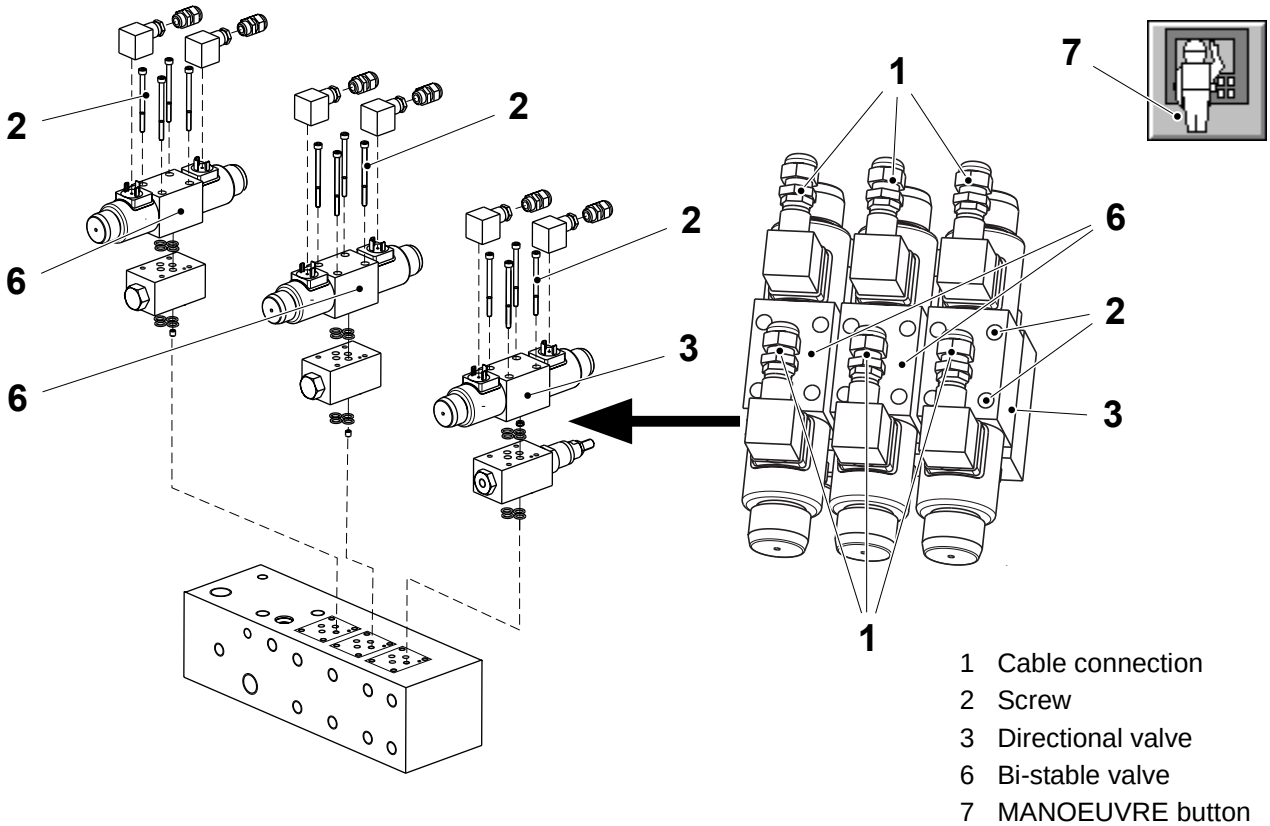
d) Fit back the four screws (2) with a torque of **7-9 Nm** with the aid of a torque wrench.

e) Connect the cable connections (1).

f) Start the hydraulic unit by means of the MANOEUVRE button (7) on the TPOP.

g) Bleed the system according to 2.2-4 Hydraulic System - Bleed.

h) Check for leaks in the hydraulic system.



1 Cable connection
2 Screw
3 Directional valve
6 Bi-stable valve
7 MANOEUVRE button

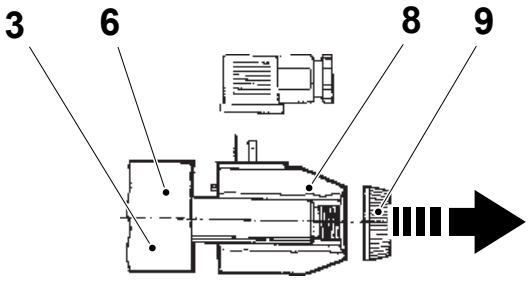
(Cont'd)

(Cont'd)

Change solenoid

a) Remove the solenoid (8) from the bi-stable (6) or directional valve (3) by unscrewing the nut (9).

b) Assemble the new solenoid (8) on the bi-stable (6) or directional valve (3) by tightening the nut (9).



3 Directional valve
6 Bi-stable valve
8 Solenoid
9 Nut

2.2.3-4 Hydraulic Valve - Change Check Valves

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1549208-0100 1549208-0200

WARNING

Hydraulic oil.

Wear protective gloves and eye protection.

a) Remove the bi-stable valves (1) according to 2.2.3-3 Hydraulic Valve - Change bi-stable Valve, Directional Valve and Solenoid.

b) Remove the check valves (2).

c) Change the O-rings (4) as required according to 2.2.3-3 Hydraulic Valve - Change bi-stable Valve, Directional Valve and Solenoid.

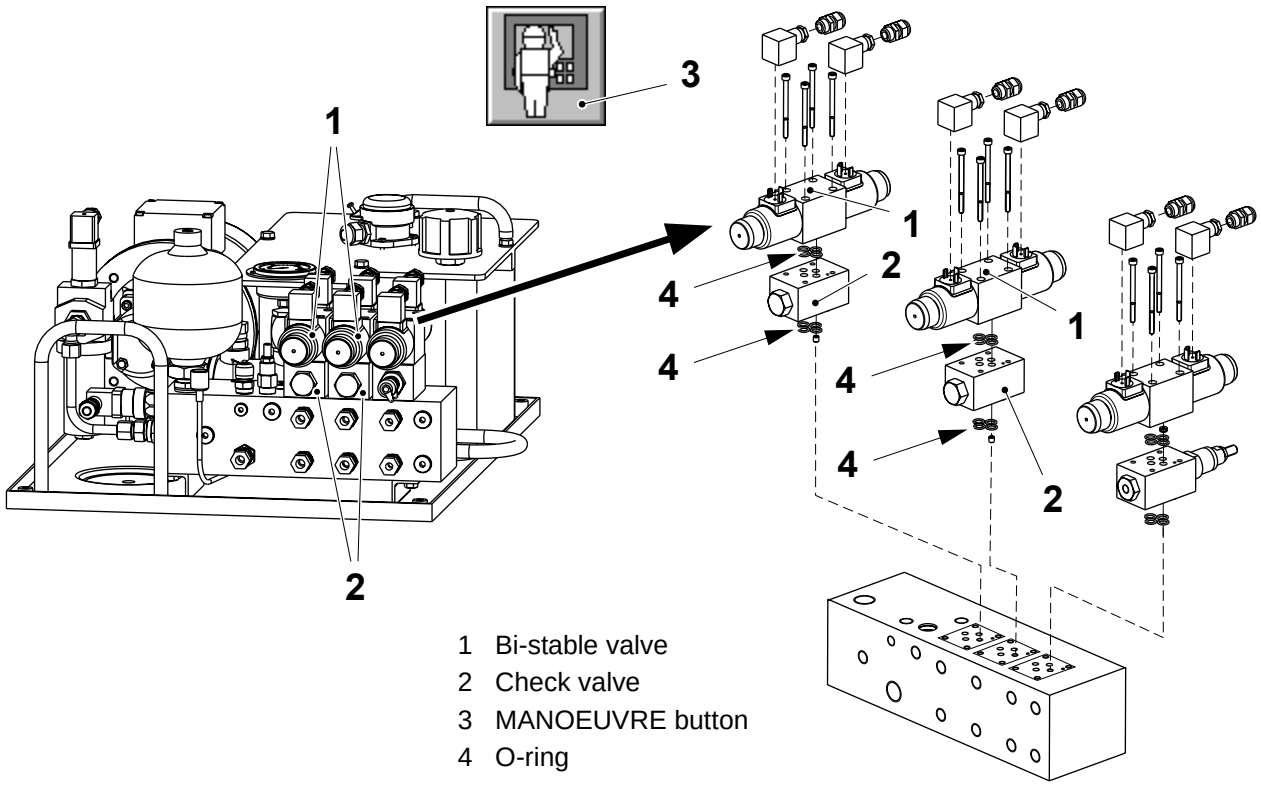
d) Assemble the new check valves (2).

e) Assemble the bi-stable valves (1) according to 2.2.3-3 Hydraulic Valve - Change bi-stable Valve, Directional Valve and Solenoid.

f) Start the hydraulic unit by means of the MANOEUVRE button (3) on the TPOP.

g) Bleed the system according to 2.2-4 Hydraulic System - Bleed.

h) Check for leaks in the hydraulic system.



1 Bi-stable valve
2 Check valve
3 MANOEUVRE button
4 O-ring

2.2.3-5 Hydraulic Valve - Change Pressure Reducing Valve

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1549208-0100 1549208-0200

WARNING

Hydraulic oil.

Wear protective gloves and eye protection.

a) Remove the directional valve (1) according to 2.2.3-3 Hydraulic Valve - Change bi-stable Valve, Directional Valve and Solenoid.

b) Remove the test connection cutting (3) from the pressure reducing valve (2).

c) Change the pressure reducing valve (2).

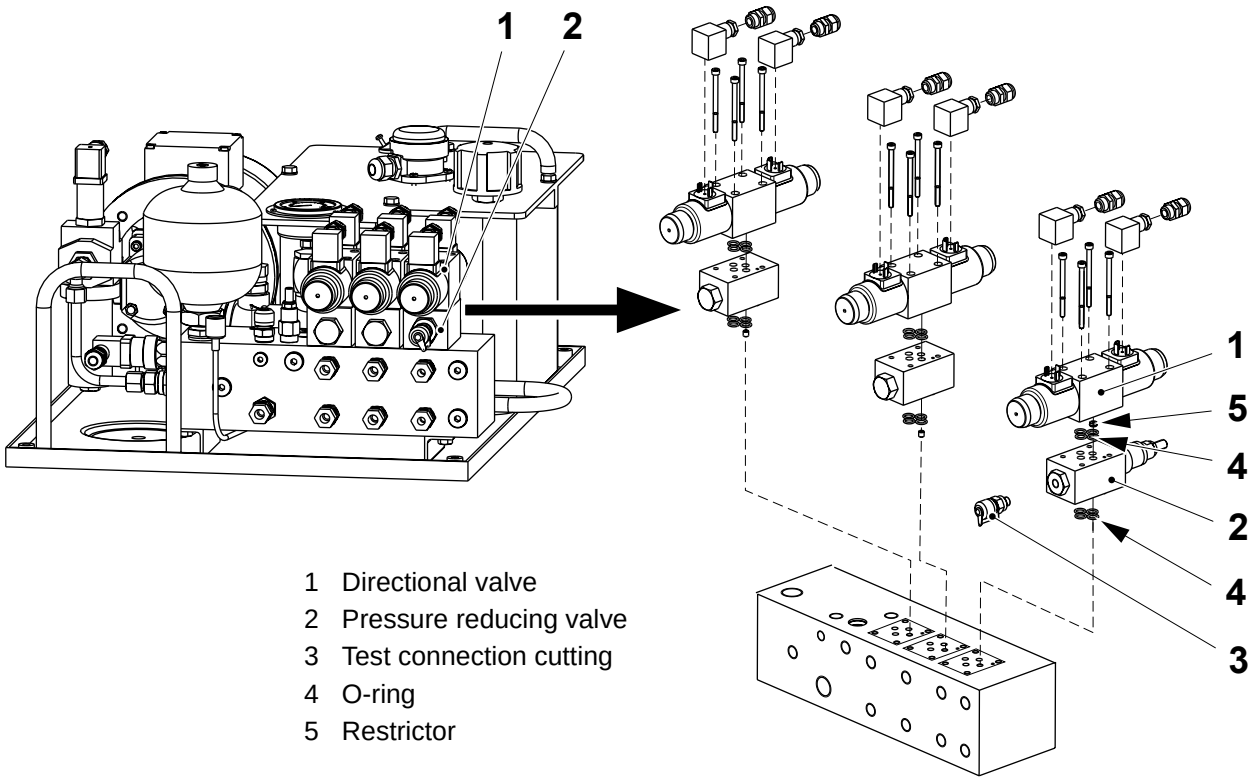
d) Change the O-rings (4) as required.

e) Make sure the restrictor (5) is correctly fits in place.

f) Set the pressure according to 2.2.1-2 Hydraulic Unit - Set Pressure.

g) Bleed the system according to 2.2-4 Hydraulic System - Bleed.

h) Check for leaks in the hydraulic system.



1 Directional valve
2 Pressure reducing valve
3 Test connection cutting
4 O-ring
5 Restrictor

2.2.3-6 Hydraulic Valve - Change Pressure Relief Valve

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Torque wrench min. 35 Nm
SPC Reference	1549208-0100 1549208-0200

WARNING

Hydraulic oil.

Wear protective gloves and eye protection.

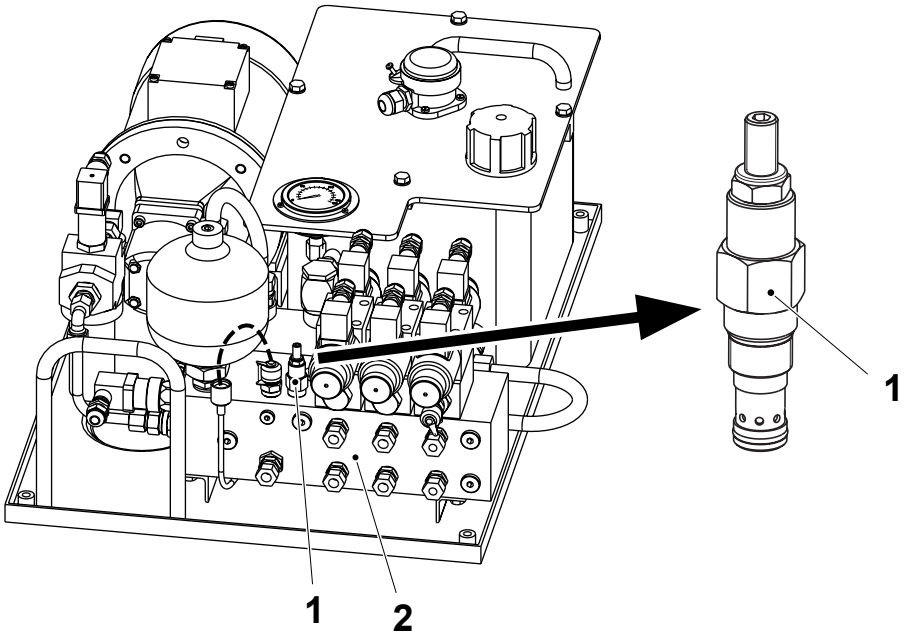
a) Screw out the pressure relief valve (1) from the manifold block (2).

b) Fit the new pressure relief valve (1) and tighten with a torque of **35-40 Nm** with the aid of a torque wrench.

c) Set the pressure relief valve (1) according to 2.2.1-2 Hydraulic Unit - Set Pressure.

d) Bleed the system according to 2.2-4 Hydraulic System - Bleed.

e) Check for leaks in the hydraulic system.



1 Pressure relief valve
2 Manifold block

2.2.4 Hydraulic pump

2.2.4-1 Hydraulic Pump - Change Filter Element

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
Consumables	Lubricant code C
SPC Reference	1549210-0100 1549210-0200

WARNING

Hydraulic oil.
Wear protective gloves and eye protection.

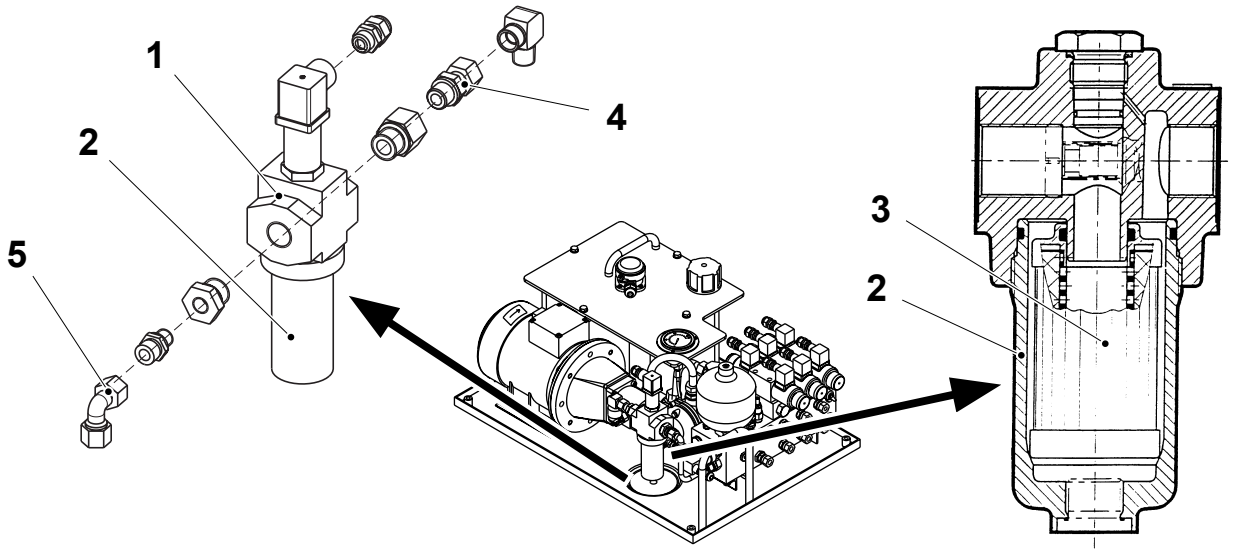
Note! Change the filter element (3) when the TPOP shows the alarm **Blocked pressure filter element**.

a) Loosen the straight connection (4) and the elbow connection (5) and remove the pressure filter (1).

b) Remove the filter bowl (2) by unscrewing it.

c) Remove the filter element (3) and check for dirt residue and particles.

Note! Presence of dirt residue and particles may be due to damaged components within the systems. Change the damaged parts as required.



1 Pressure filter
2 Filter bowl
3 Filter element
4 Straight connection
5 Elbow connection

(Cont'd)

(Cont'd)

d) Clean the inside of the filter bowl (2) with the aid of a lubricant.

e) Change the O-rings (6) as required. Lubricate the O-rings (6) with clean oil before assembling.

f) Fit the new filter element (3). Fit the filter bowl (2) completely and then loosen it by a quarter of a turn.

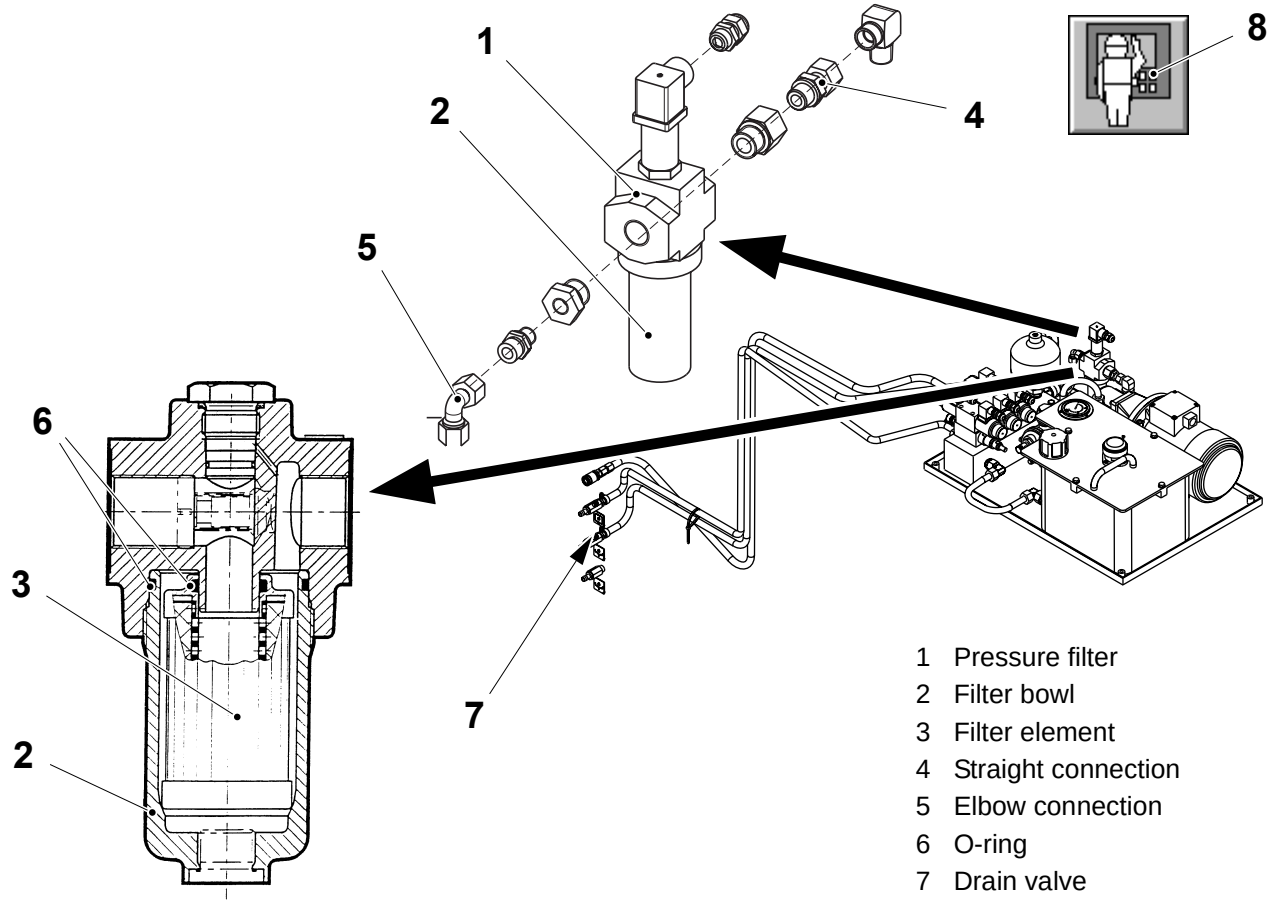
g) Fit the pressure filter (1) in place and tighten the straight connection (4) and the elbow connection (5).

h) Open the drain valve (7) to empty the collecting tray.

i) Start the hydraulic unit by means of the MANOEUVRE button (8) on the TPOP.

j) Bleed the system according to 2.2-4 Hydraulic System - Bleed.

k) Check for leaks in the hydraulic system.



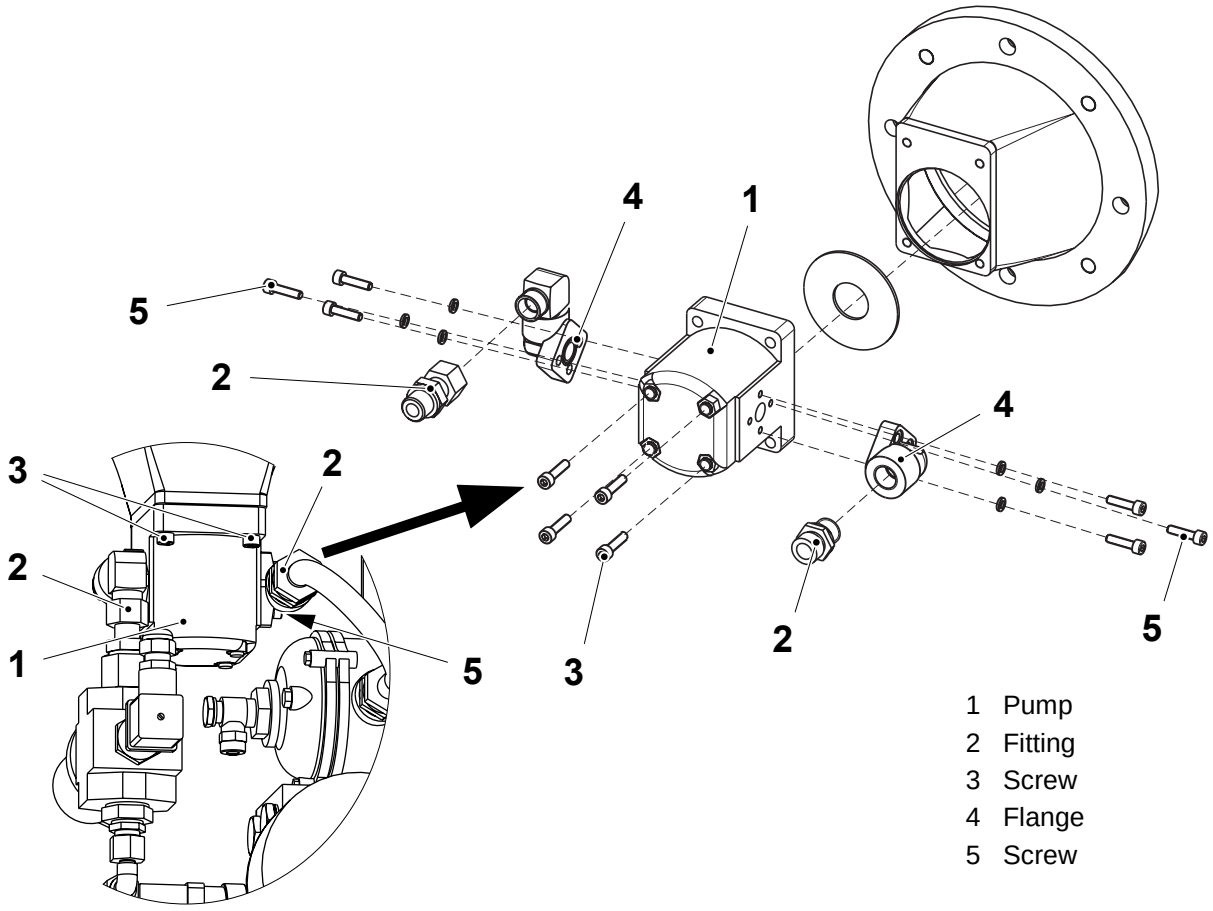
1 Pressure filter
2 Filter bowl
3 Filter element
4 Straight connection
5 Elbow connection
6 O-ring
7 Drain valve
8 MANOEUVRE button

2.2.4-2 Hydraulic Pump - Change Pump

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1549210-0100 1549210-0200

WARNING
Hydraulic oil.
Wear protective gloves and eye protection.

a) Remove the two fittings (2).
b) Remove the pump (1) by means of the four screws (3).
c) Remove the flanges (4) by means of the three screws (5).
d) Fit the flanges (4) to the new pump and tighten the screws (5).



1 Pump
2 Fitting
3 Screw
4 Flange
5 Screw

(Cont'd)

(Cont'd)

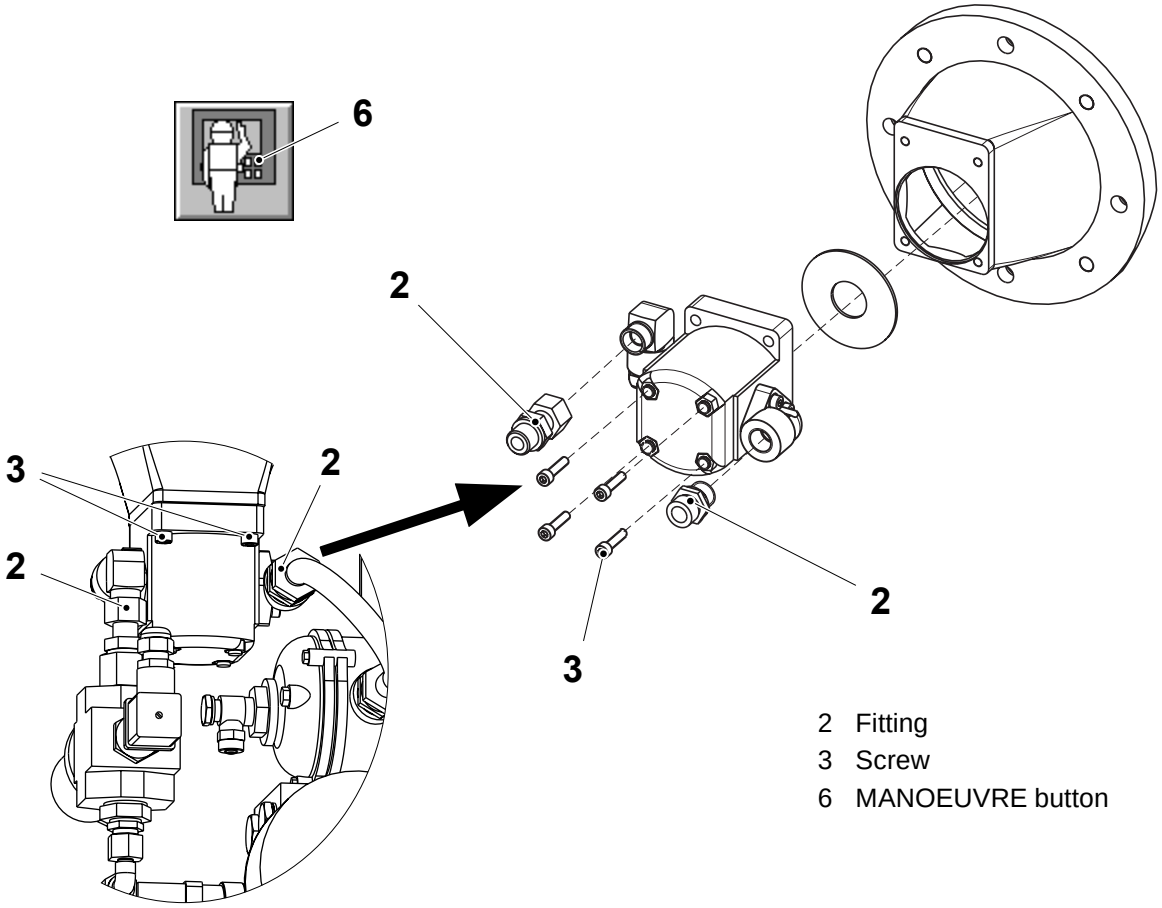
e) Fit the new pump in place by means of the four screws (3).

f) Fit the two fittings (2).

g) Start the hydraulic unit by means of the of the MANOEUVRE button (6) on the TPOP.

h) Bleed the system according to <u>2.2-4 Hydraulic System - Bleed</u>.

i) Check for leaks in the hydraulic system.



2 Fitting
3 Screw
6 MANOEUVRE button

2.2.4-3 Hydraulic Pump - Change Electrical Motor

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1549210-0100 1549210-0200

WARNING

Hydraulic oil.

Wear protective gloves and eye protection.

a) Remove the cable (10) from the electrical motor (1).

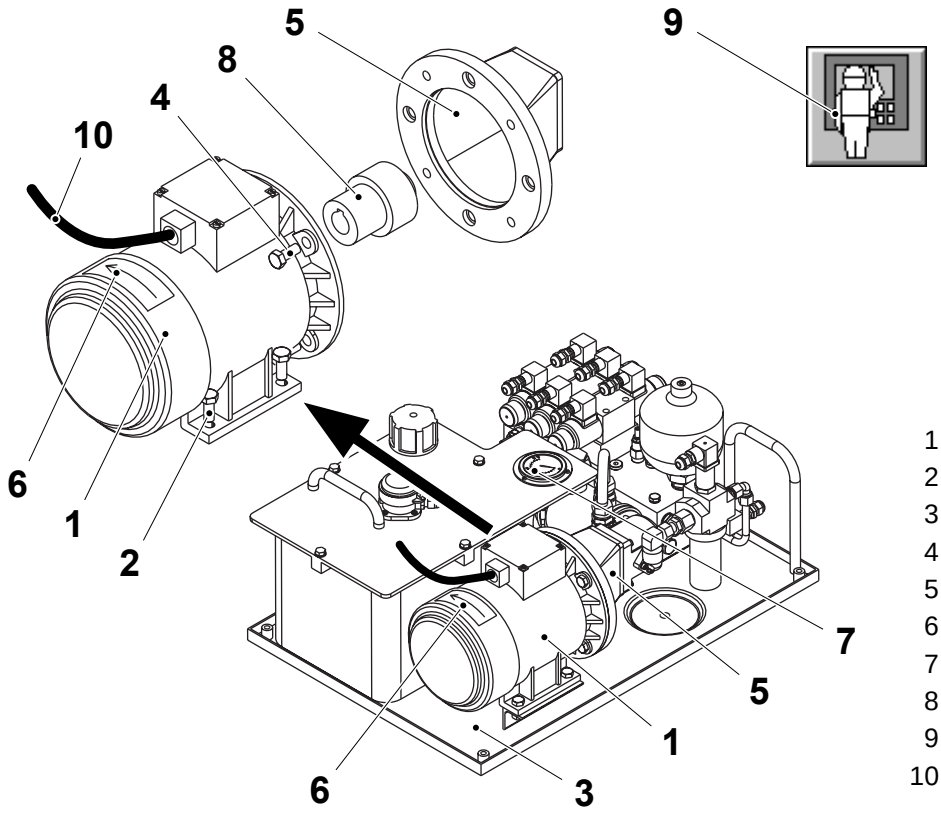
b) Remove the four screws (2) holding the electrical motor (1) to the collecting tray (3).

c) Remove the four screws (4) holding the electrical motor (1) to the spacer piece (5).

d) Remove and change the electrical motor (1) and the shaft coupling (8).

e) Assemble in the reverse order.

f) Start the hydraulic unit by means of the MANOEUVRE button (9) on the TPOP and check that the pressure gauge (7) shows **10.0 MPa (100 bar)** and that the rotation on the electrical motor (1) is correct according to the arrow (6).



1 Electrical motor
2 Screw
3 Collecting tray
4 Screw
5 Spacer piece
6 Arrow
7 Pressure gauge
8 Shaft coupling
9 MANOEUVRE button
10 Cable

2.3 Chemical Unit

SPC Reference	1095794-0200

2.3-1 Chemical Unit - Check

Machine Status	Mains Power ON, Air ON Steam ON, Water OFF
SPC Reference	1095794-0200

WARNING

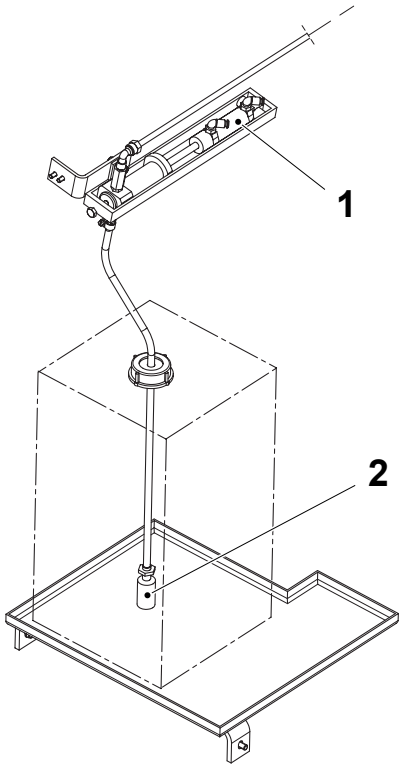
Chemical products.

Acids. Follow the Safety precautions.

Check that:

- the pump (1) runs smoothly without noise
- the connections are free from detergent residue
  Clean as required.
- there are no leakages at the pipe connections
- the filter (2) is not clogged
  Clean with compressed air or change as required.

Detergent	Consumption (lt/cycle)
Alkali	1.2



1 Pump
2 Filter

2.4 Doors and Covers

SPC Reference	1095729-0400

2.4-1 Doors and Covers - Remove

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095729-0400

Note! The RH side (2) door or cover must always be removed first, even if only the LH side (1) door or cover needs to be removed.

Note! Remove any electrical connections from the doors before removal.

Remove the doors and the covers by following these procedures:

a) Close the corresponding LH side (1) door or cover.

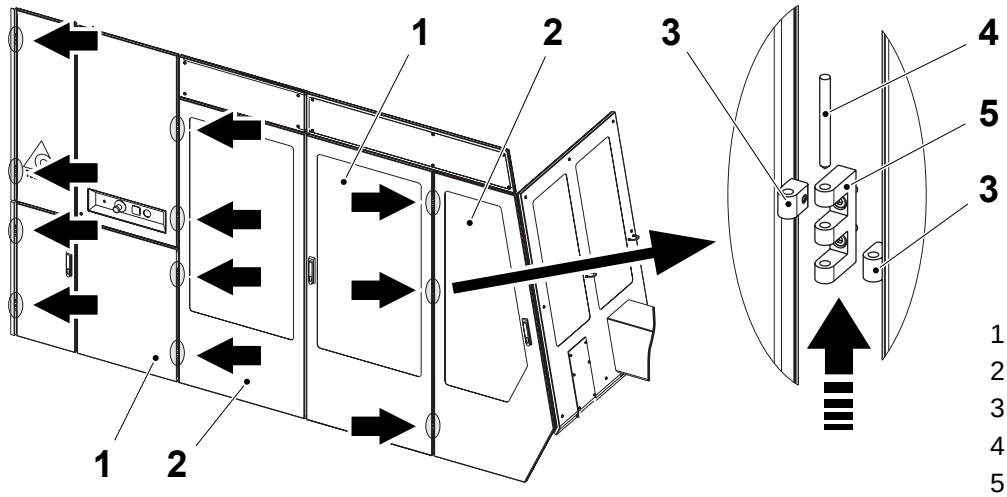
b) Support the RH side (2) door or cover.

Note! Doors with glass panes especially are very heavy.

Note! The pivot pins (4) can only be tapped out from the underside of the E-hinge (5).

c) Pull out the pins (4) in the following order:
   - top hinge pin
   - bottom hinge pin
   - middle hinge pin or pins (when used).

d) Move the door or cover to disengage the blocking pieces (3) from the E-hinges (5).

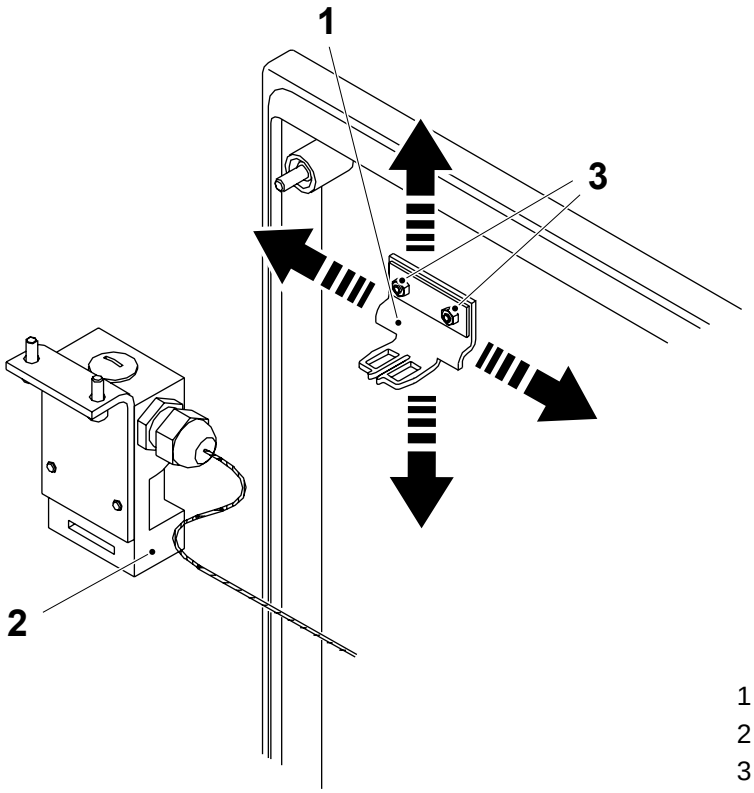


1 Left hand side
2 Right hand side
3 Blocking piece
4 Pivot pin
5 E-hinge

2.4-2 Doors and Covers - Set Safety Switch

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095729-0400

By loosening the nuts (3), adjust the safety switch key (1) to a position where it fits easily into the safety switch (2) so that the door or the cover opens and closes easily.



1 Switch key
2 Safety switch
3 Nut

2.5 Hydrogen Peroxide

SPC Reference	1095831-0400

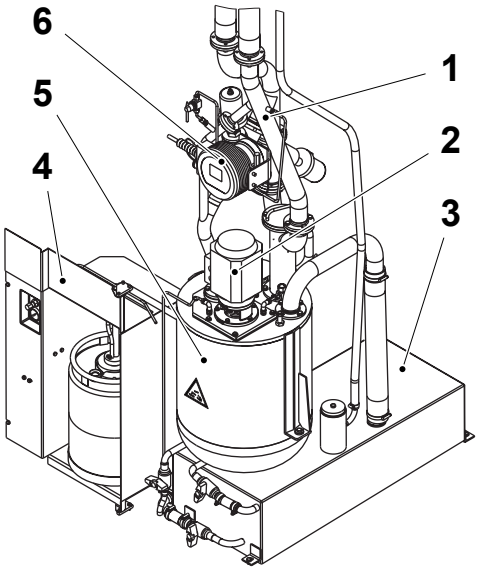
2.5-1 Hydrogen Peroxide - Check Leakages

Machine Status	HEAT STERILISATION
SPC Reference	1095831-0400

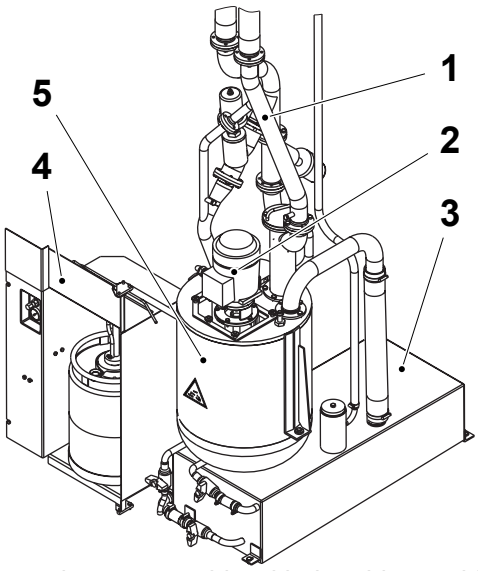
WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Check the connections for leakages at the following points:

- the peroxide pipes (1), see 2.5.1-1 Peroxide Pipe - Check
- the peroxide pump (2)
- the dilution tank (3)
- the cabinet (4)
- the peroxide tank (5)
- the H_2O_2 concentration meter (6) (for new machines or machines rebuilt with OK-1558536-0100 Peroxide concentration meter).



Hydrogen peroxide with the H_2O_2 concentration meter (6) and the new peroxide pump (4), TP No. 996388-0500



Hydrogen peroxide with the old peroxide pump (4), TP No. 996388-0400

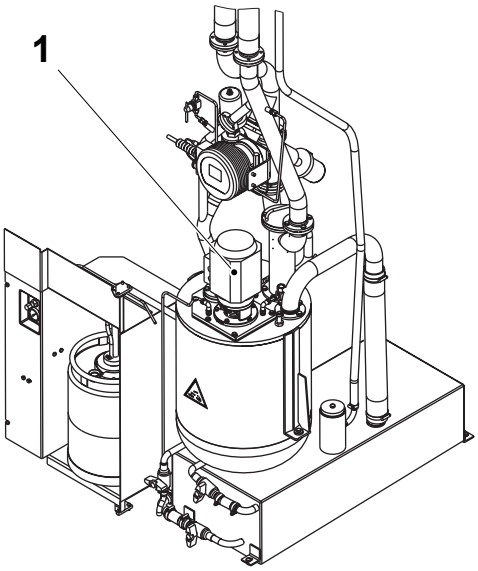
1 Peroxide pipe
2 Dilution tank
3 Cabinet
4 Peroxide pump
5 Peroxide tank
6 H2O2 concentration meter

2.5-2 Hydrogen Peroxide - Check Pump

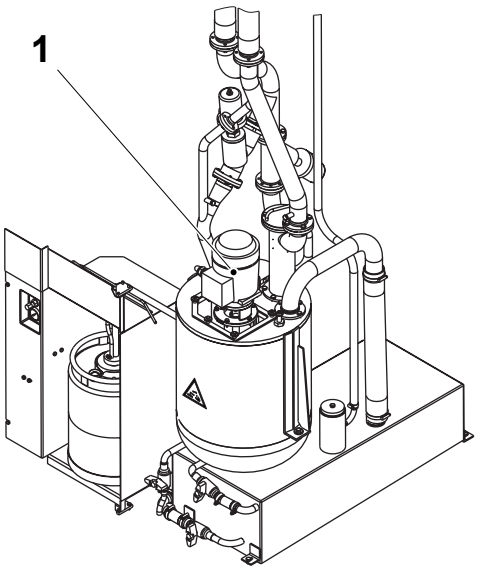
Machine Status	HEAT STERILISATION
SPC Reference	1095831-0400

Put a screwdriver in contact with the peroxide pump (1) and listen for abnormal noise or vibrations in the pump.

Change the pump as required, see 2.5.4-1 Peroxide Pump - Change Pump.



Hydrogen peroxide with the new peroxide pump (4), TP No. 996388-0500



Hydrogen peroxide with the old peroxide pump (4), TP No. 996388-0400

1 Peroxide pump

2.5-3 Hydrogen Peroxide - Set Pressure

Machine Status	HEAT STERILISATION
Special Equipment	Allen key (10 mm)
SPC Reference	1095831-0400

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

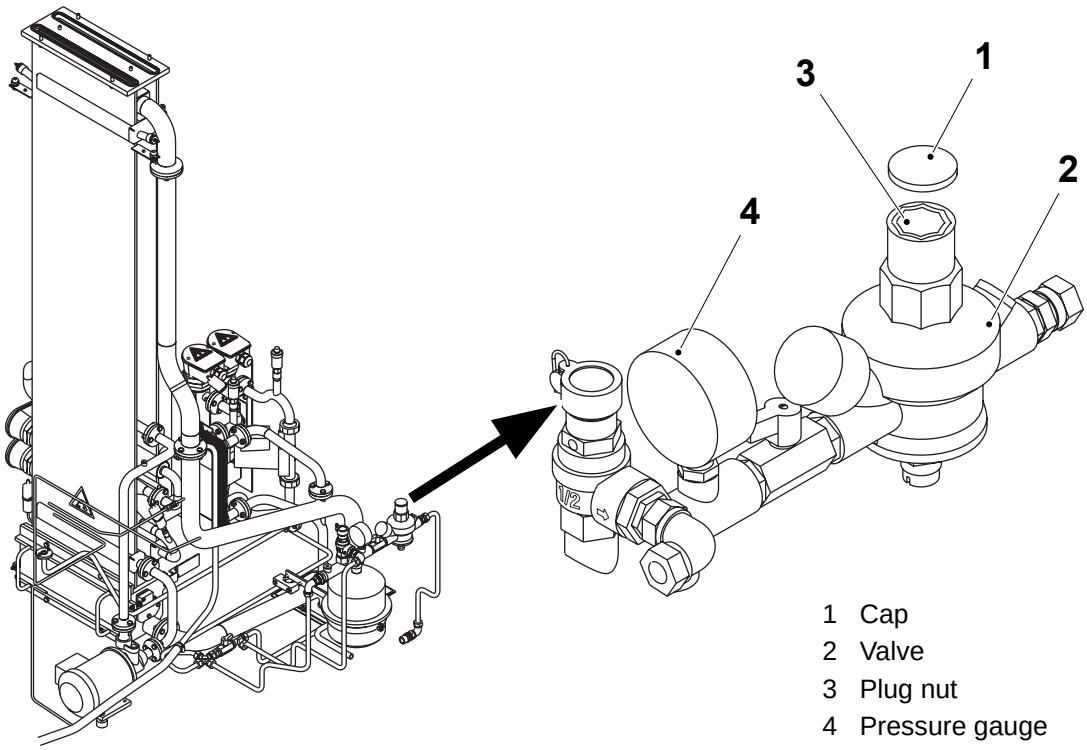
a) Unscrew and remove the cap (1) from the valve (2).

b) Unscrew the plug nut (3) a few turns by means of an allen key. When the pressure on the gauge (4) reaches **2.0 - 2.5 bar,** screw back the plug nut (3).

c) Screw back the cap (1).

Note! Item d) must be performed during the first three hours of the machines run.

d) Check every half hour the pressure by means of the gauge (4).



1 Cap
2 Valve
3 Plug nut
4 Pressure gauge

2.5.1 Peroxide Pipe

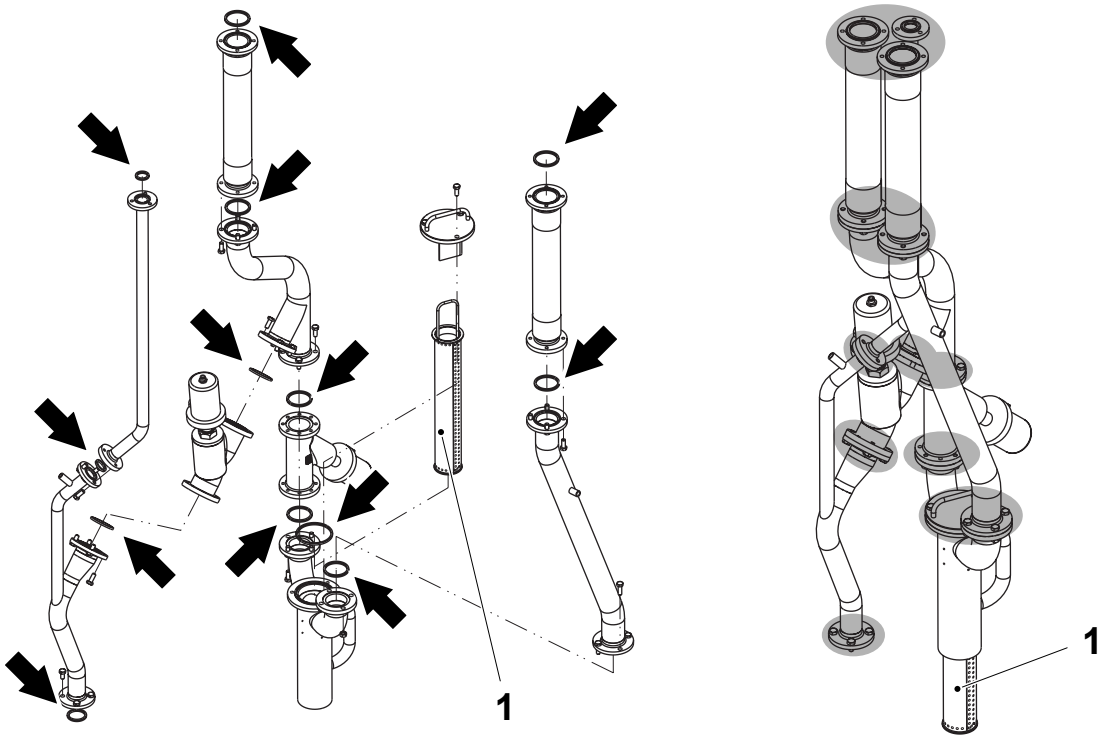
2.5.1-1 Peroxide Pipe - Check

Machine Status	PRODUCTION
SPC Reference	1282895-0100 1282895-0200

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Valid for the new peroxide pipes, TP No. 1282895-0200
Check that the strainer (1) is not dirty. Clean or change it as required, see 2.5.1-2 Peroxide Pipe - Clean Strainer.

Check the pipe connections during PRODUCTION for any peroxide leakages. If there are leaks, change the gaskets (indicated by the arrows) as required.



1 Strainer

(Cont'd)

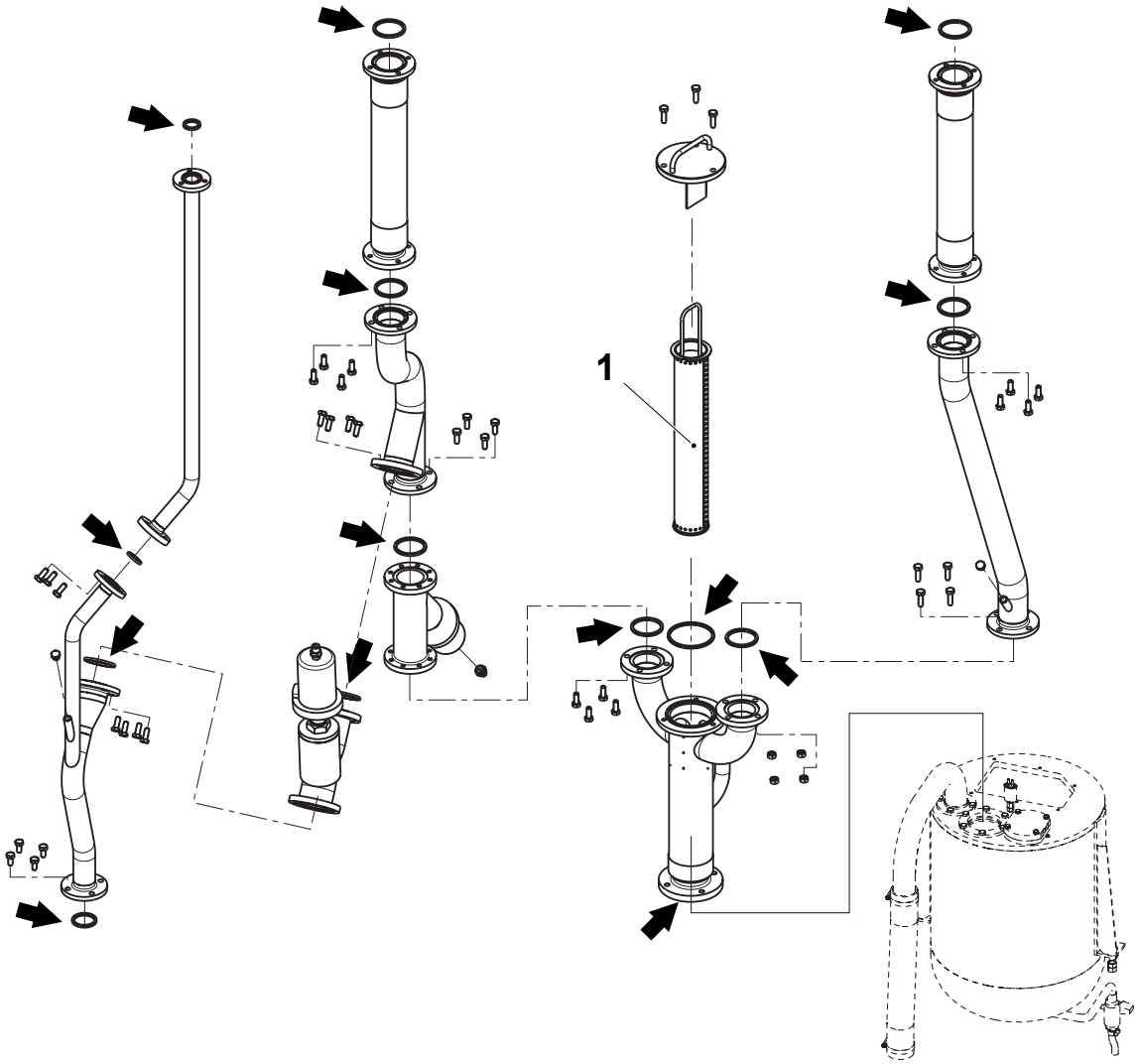
(Cont'd)

Valid for the old peroxide pipes, TP No. 1282895-0100

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Check that the strainer (1) is not dirty. Clean or change it as required, see 2.5.1-2 Peroxide Pipe - Clean Strainer.

Check the pipe connections during production for any peroxide leakages. If there are leaks, change the gaskets (indicated by the arrows) as required.



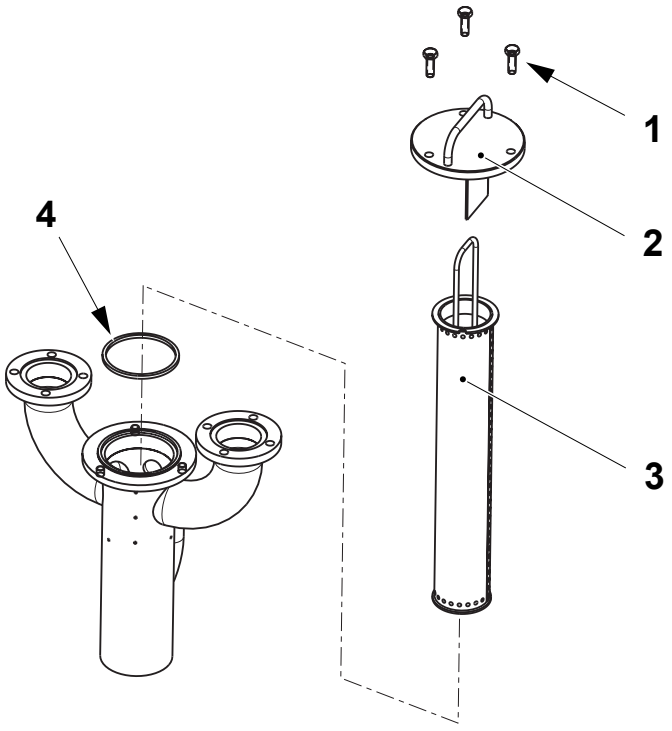
1 Strainer

2.5.1-2 Peroxide Pipe - Clean Strainer

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1282895-0100 1282895-0200

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

a) Remove the screws (1).
b) Lift up the cover (2) and remove the strainer (3).
c) Clean the strainer (3) with distilled water and, if required, blow dry with compressed air. Rinse the strainer (3) with distilled water.
d) Change the strainer (3) as required.
e) Check the gasket (4) and change it as required.
f) Assemble in the reverse order.



1 Screw
2 Cover
3 Strainer
4 Gasket

2.5.2 Dilution Tank

2.5.2-1 Dilution Tank - Check

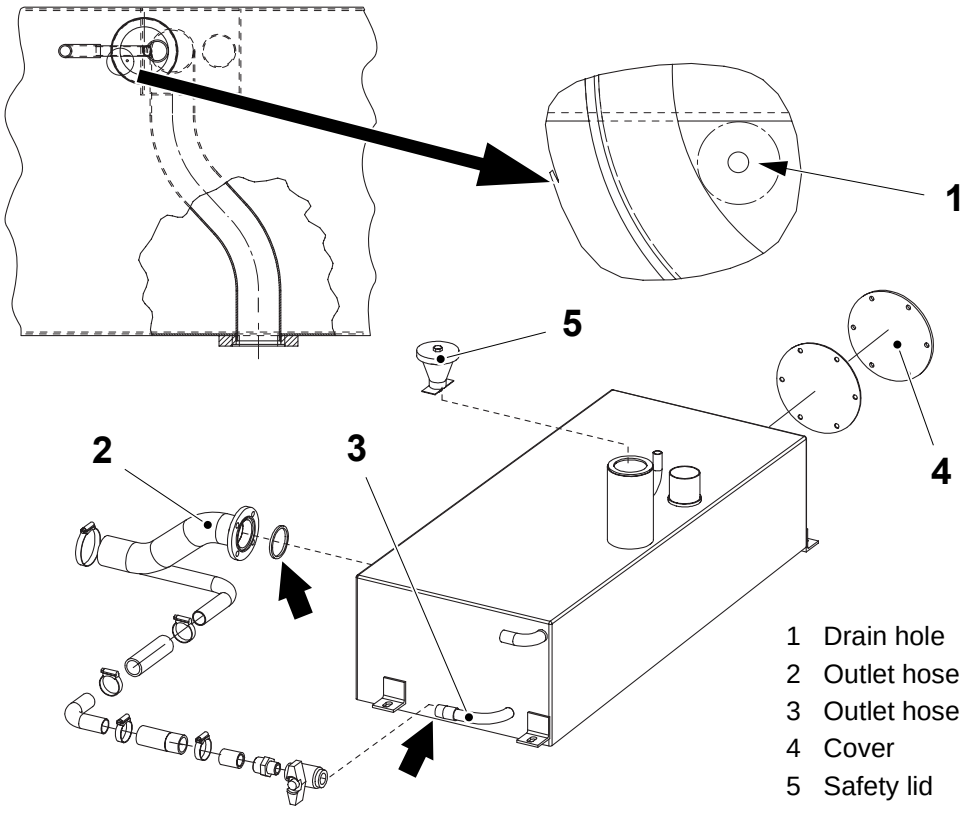
Machine Status	PRODUCTION
SPC Reference	1282896-0100

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Check that:

- the drain hole (1) is not clogged
  If required, clean the drain hole (1) by means of a proper tool bar.
- the outlet hoses (2) and (3) do not leak, see arrows
- the cover (4) does not leak
- the safety lid (5) is not stuck
  Make sure that it moves freely, lifting by hand.
  If required remove the safety lid (5) and clean it with water.

Note! To ensure that the outlet concentration of peroxide is less than **1% w/w**, twenty hours of production **must always** be run before emptying the dilution tank.



1 Drain hole
2 Outlet hose
3 Outlet hose
4 Cover
5 Safety lid

2.5.3 Cabinet

2.5.3-1 Cabinet - Check

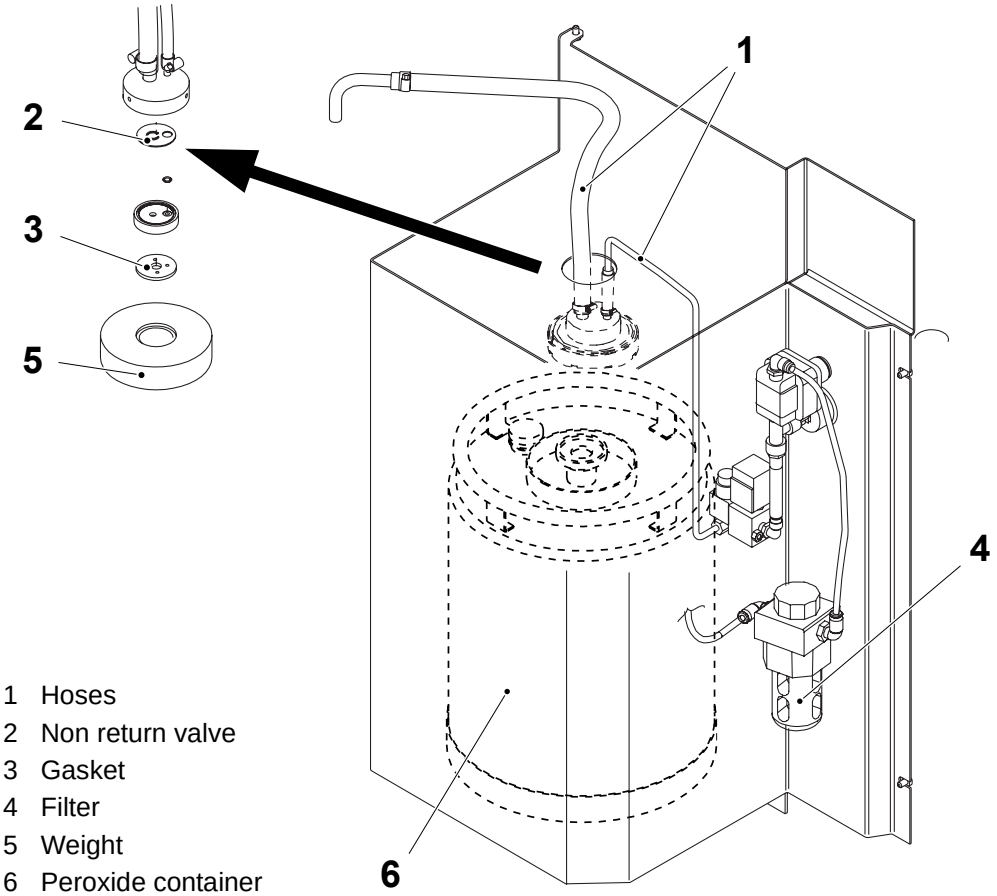
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095825-0100

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Check that:

- the hoses (1), the non return valve (2) and the gasket (3) do not leak
  Change the non return valve (2) and the seal (3) as required, see 2.5.3-2 Cabinet - Change Gasket and Non Return Valve.
- the filter (4) is not dirty
  Clean or change as required, see 2.5.3-3 Cabinet - Clean Filter.

Checking during PRODUCTION
Check that the weight (5) is properly installed on the peroxide container (6) and that it does not leak.



1 Hoses
2 Non return valve
3 Gasket
4 Filter
5 Weight
6 Peroxide container

2.5.3-2 Cabinet - Change Gasket and Non Return Valve

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095825-0100

WARNING

Hydrogen peroxide.

Follow the Safety precautions.

a) Remove the weight (1) from the peroxide container (2).

b) Remove the two screws (3) securing the hose attachment (4) to the weight (1).

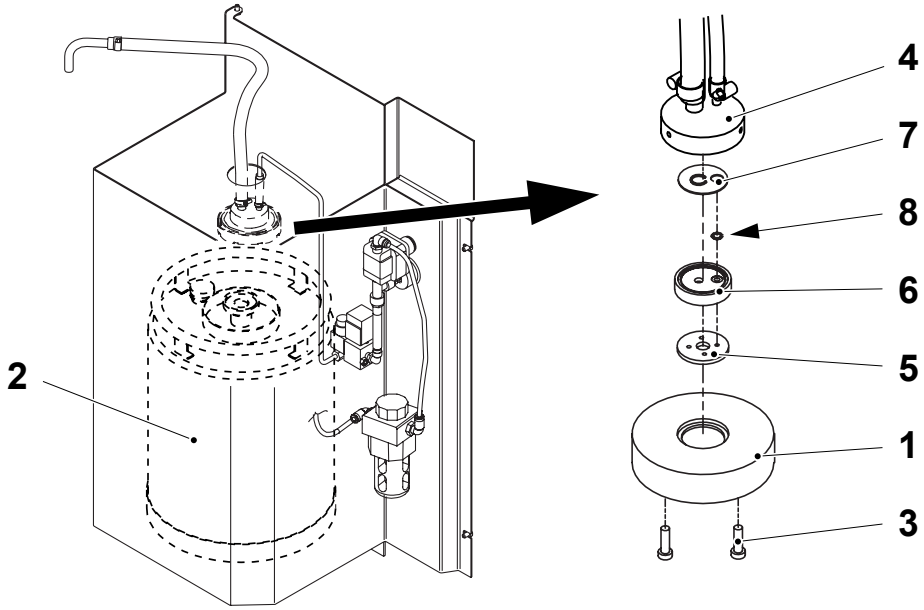
c) Remove the weight (1).

d) Remove the gasket (5) and change the gasket as required.

e) Remove the washer (6) from the weight (1).

f) Remove the non return valve (7) from the attachment (4) and change the non return valve (7) as required.

g) Assemble in the reverse order. Make sure the O-ring (8) is fitted correctly.



1 Weight
2 Container
3 Screw
4 Attachment
5 Gasket
6 Washer
7 Non return valve
8 O-ring

2.5.3-3 Cabinet - Clean Filter

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Special Equipment	Pliers
Consumables	Soap
SPC Reference	1095825-0100

WARNING

Hydrogen peroxide.

Follow the Safety precautions.

a) Loosen the screws (1) and open the peroxide cabinet door (2).

b) Remove the filter cover (3).

c) Remove the reservoir (4) and change the O-ring as required.

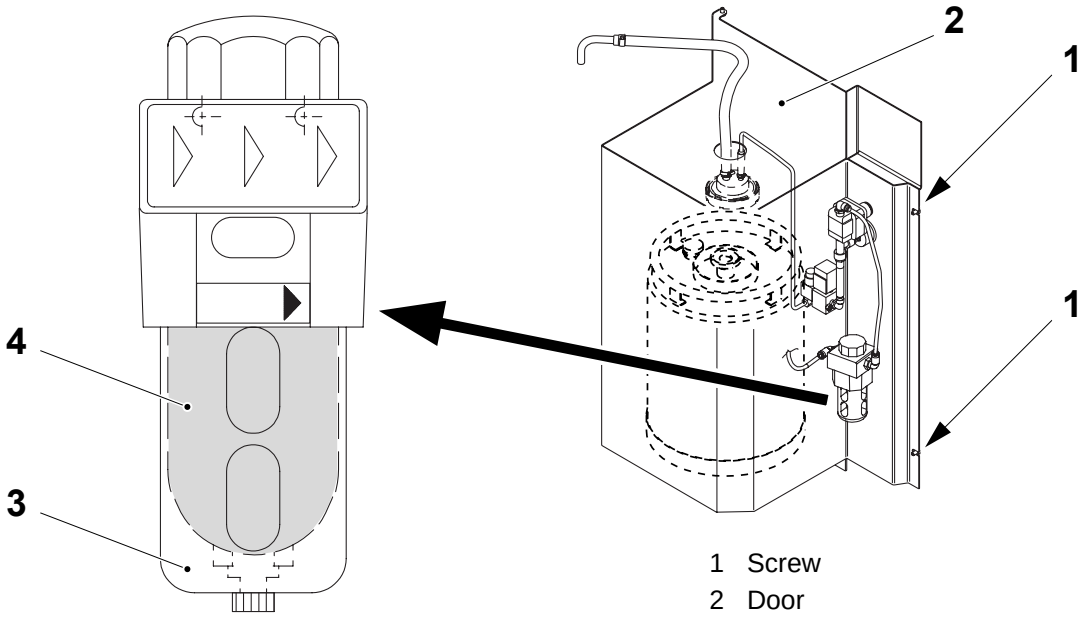
d) Clean the reservoir (4) with soapy water and rinse with plenty of distilled water.

e) With the aid of a pliers remove and clean the filter insert inside the reservoir (4). Change it as required.

f) Fit back the reservoir (4) and make sure that the O-ring is correctly fitted.

g) Fit back the filter cover (3).

h) Close the peroxide cabinet door (2) and tighten the screws (1).



1 Screw
2 Door
3 Filter cover
4 Reservoir

2.5.4 Peroxide Pump

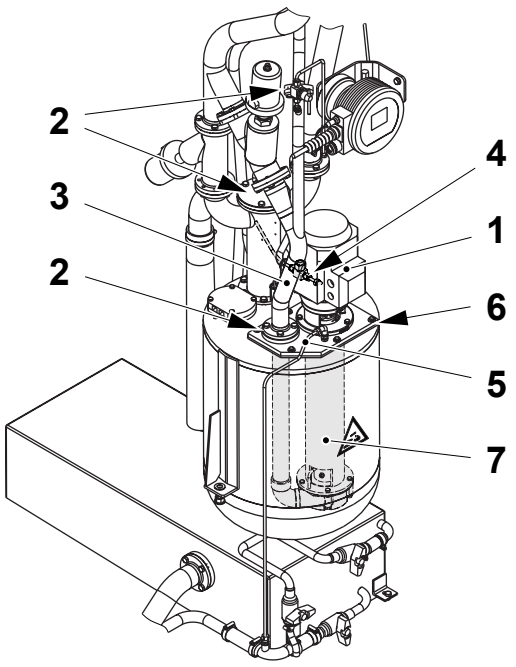
2.5.4-1 Peroxide Pump - Change Pump

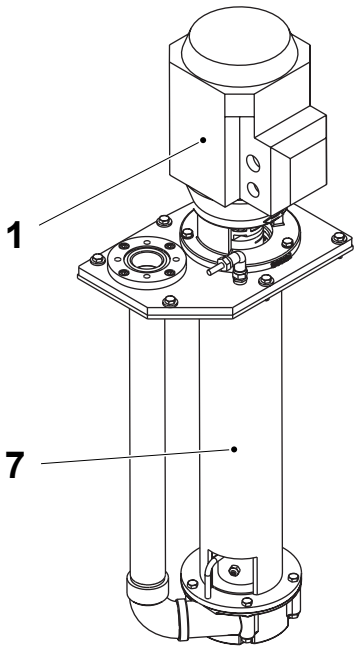
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996388-0400 996388-0500

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Valid for the new peroxide pump, TP No. 996388-0500

a) Make sure that the hydrogen peroxide is not too concentrated and then drain the dilution tank and rinse carefully with distilled water.
b) Label and disconnect the electrical connections to the motor (1).
c) Remove the screws (2) at the flanges.
d) Remove the pipe (3).
e) Remove the pipes (4) and (5).
f) Remove the screws (6).
g) Lift and change the motor (1) with the pump (7).
h) Assemble in the reverse order.





1 Motor
2 Screw
3 Pipe
4 Pipe
5 Pipe
6 Screw
7 Pump

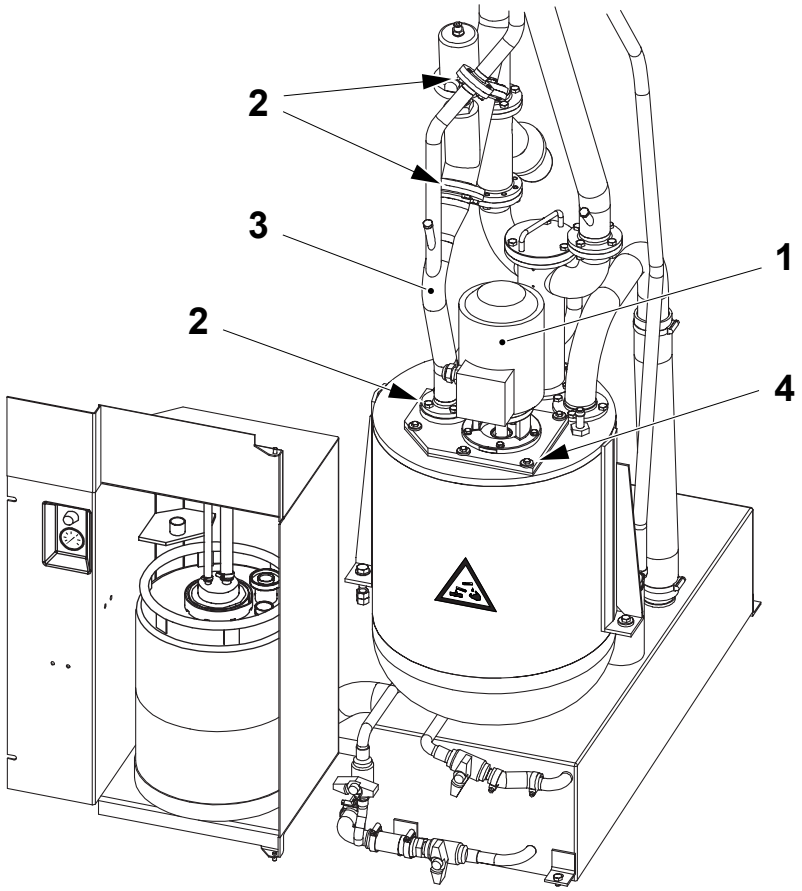
(Cont'd)

(Cont'd)

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Valid for the old peroxide pump, TP No. 996388-0400

a) Make sure that the hydrogen peroxide is not too concentrated and then drain the dilution tank and rinse carefully with distilled water.
b) Label and disconnect the electrical connections to the motor (1).
c) Remove the screws (2) at the flanges.
d) Remove the pipe (3).
e) Remove the screws (4).
f) Lift and change the motor (1) with the pump.
g) Assemble in the reverse order.



1 Motor
2 Screw
3 Pipe
4 Screw

2.5.4-2 Peroxide Pump - Overhaul Pump

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996388-0400 996388-0500

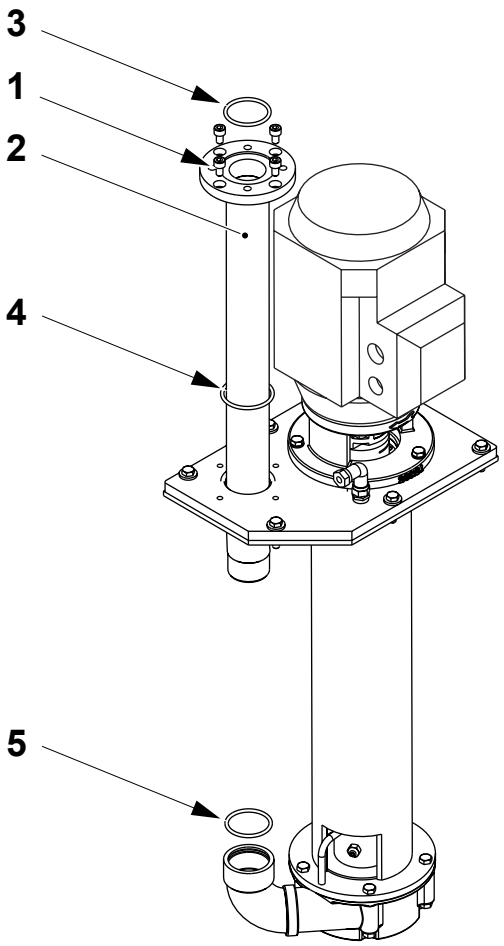
WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Valid for the new peroxide pump, TP No. 996388-0500

a) Remove the peroxide pump, see 2.5.4-1 Peroxide Pump - Change Pump.

b) Unscrew the screws (1) and remove the pipe (2).

c) Remove the O-rings (3), (4) and (5). Change the O-rings (3), (4) and (5) as required.



1 Screw
2 Pipe
3 O-ring
4 O-ring
5 O-ring

(Cont'd)

(Cont'd)

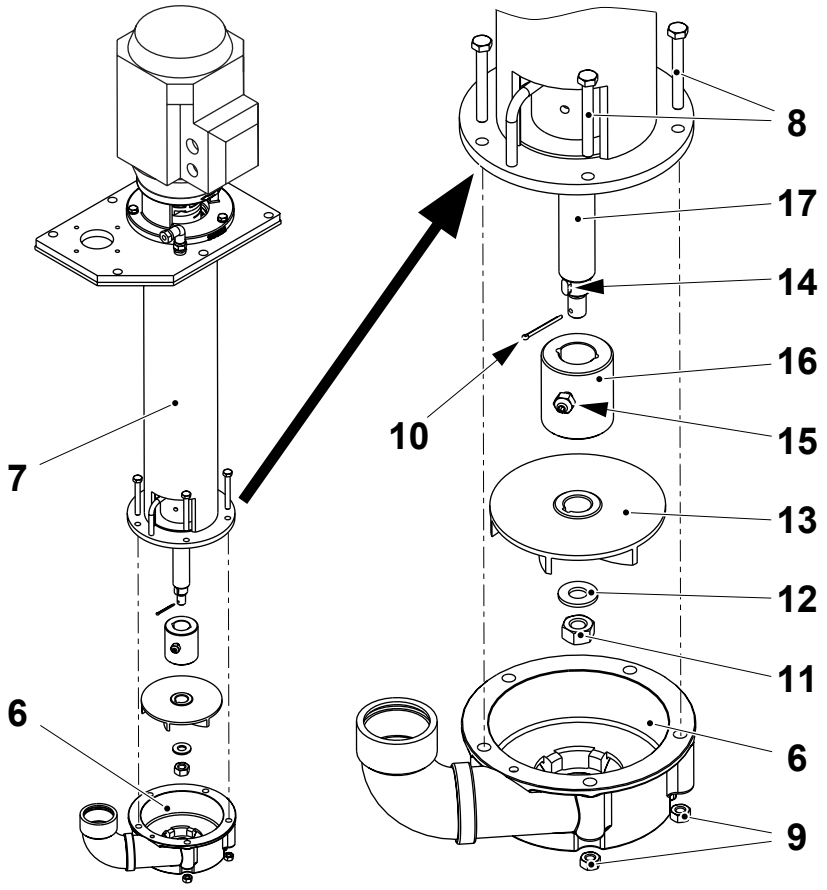
d) Mark the position of the pump housing (6) on the extension pipe (7).

e) Remove the screws (8), the nuts (9) and the pump housing (6).

f) Remove the split pin (10), the nut (11) and the washer (12).

g) Remove the impeller wheel (13) and the key (14). If required, change the impeller wheel (13).

h) Loosen the two screws (15) and remove the bushing (16) from the shaft (17).



6 Pump housing
7 Extension pipe
8 Screw
9 Nut
10 Split pin
11 Nut
12 Washer
13 Impeller wheel
14 Key
15 Screw
16 Bushing
17 Shaft

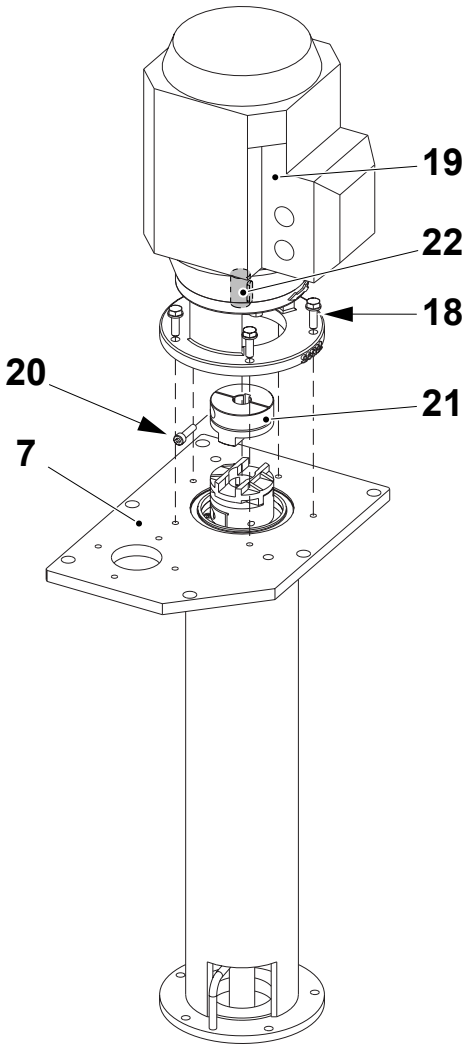
(Cont'd)

(Cont'd)

i) Mark the position of the motor assembly (19) on the extension pipe (7).

j) Remove the screws (18) and the motor assembly (19).

k) Loosen the screw (20) and remove the coupling (21) from the motor shaft (22).



7 Extension pipe
18 Screw
19 Motor assembly
20 Screw
21 Coupling
22 Motor shaft

(Cont'd)

(Cont'd)

l) Remove the coupling disc (23).

m) Loosen the screw (24) and remove the coupling (25) from the shaft (17).

Note! When assembling the peroxide pump, check that the play between the coupling disc (23) and the couplings (21) and (25) is less than **0.3 mm** with a feeler gauge.

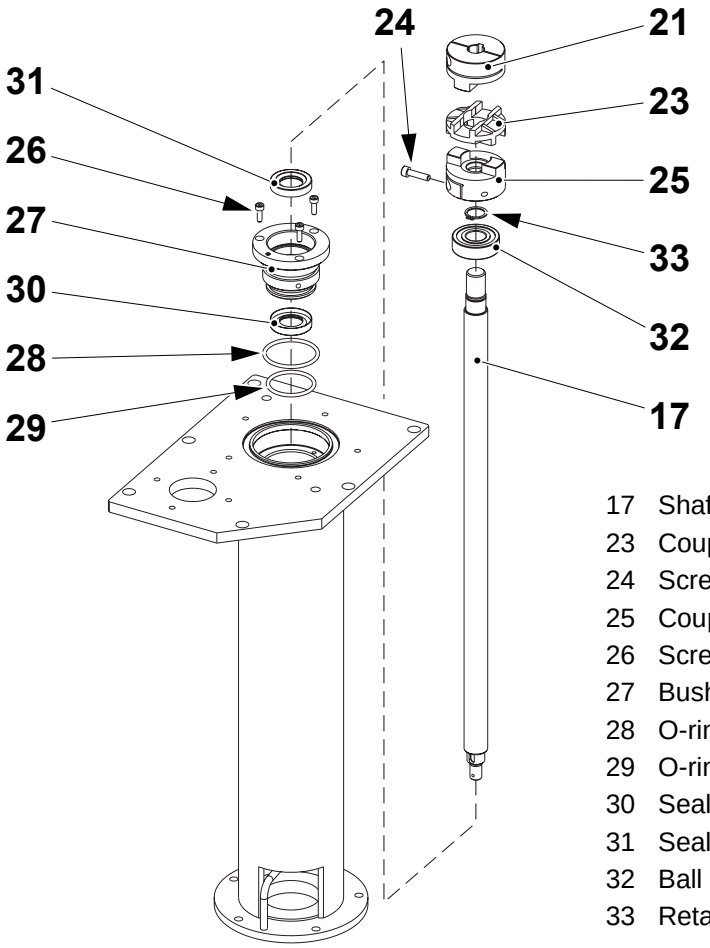
n) Remove the screws (26) and the bushing (27) with the shaft (17).

o) Change the O-rings (28) and (29), the seal rings (30) and (31) and the bearing (32).

p) Check the retaining ring (33), the coupling disc (23) and the couplings (21) and (25). Change as required.

q) Set the impeller, see 2.5.4-3 Peroxide Pump - Set Impeller.

r) Assemble in the reverse order.



17 Shaft
23 Coupling disc
24 Screw
25 Coupling
26 Screw
27 Bushing
28 O-ring
29 O-ring
30 Seal ring
31 Seal ring
32 Ball bearing
33 Retaining ring

(Cont'd)

(Cont'd)

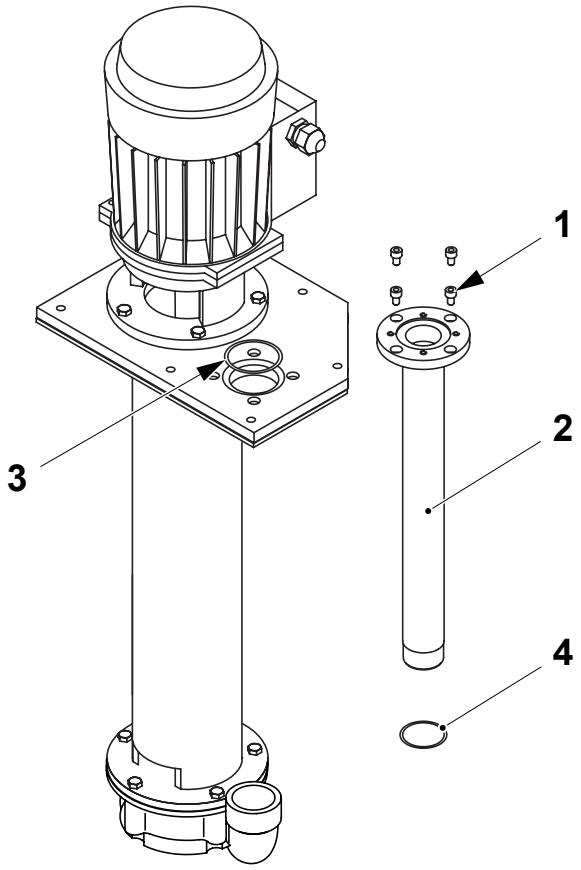
WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Valid for the old peroxide pump, TP No. 996388-0400

a) Remove the peroxide pump, see 2.5.4-1 Peroxide Pump - Change Pump.

b) Unscrew the screws (1) and remove the pipe (2).

c) Remove the O-rings (3) and (4) and change them as required.



1 Screw
2 Pipe
3 O-ring
4 O-ring

(Cont'd)

(Cont'd)

Note! Mark the position of the pump housing (6) on the extension pipe (11).

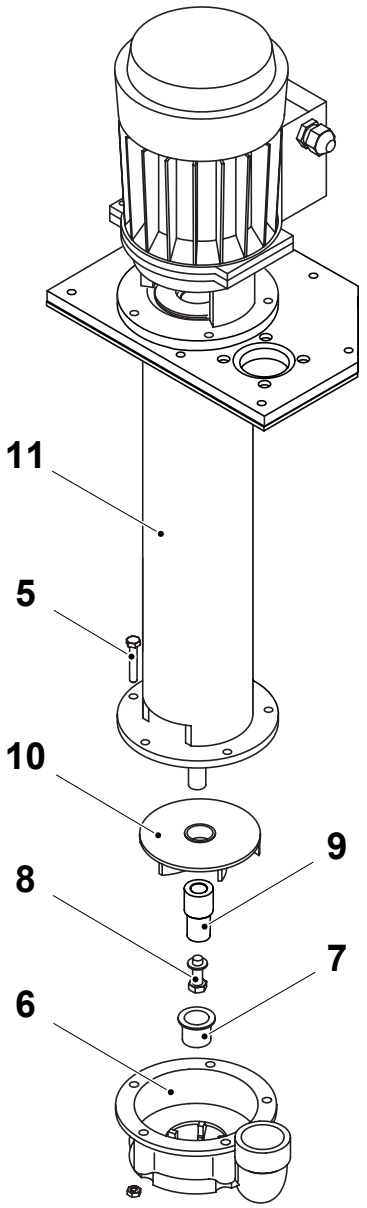
d) Remove the screws (5) with the nuts and the pump housing (6).

e) Change the bushing (7).

f) Remove the screw (8) with the washer.

g) Pull out the sleeve (9) and change it as required.

h) Remove the impeller (10) and change it as required.



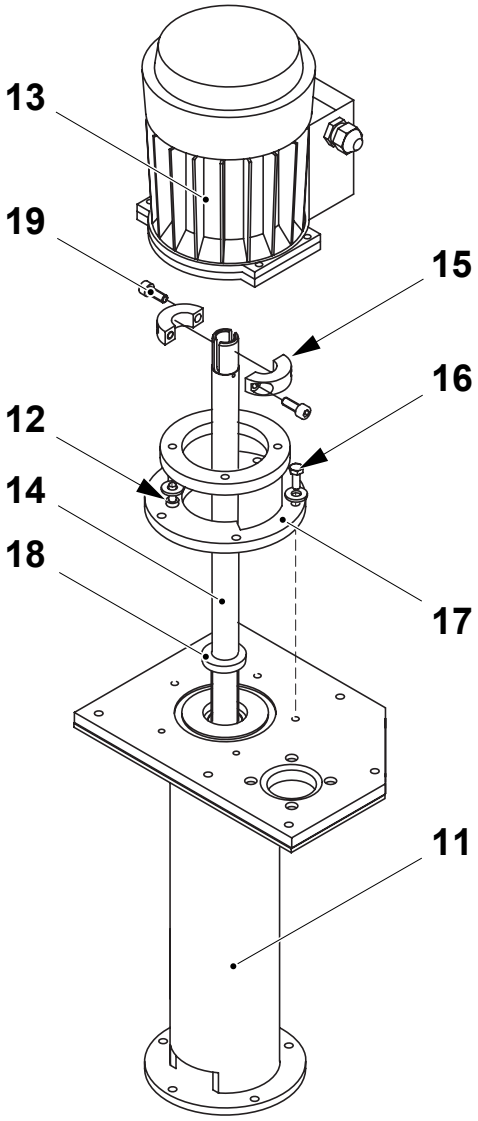
5 Screw
6 Pump housing
7 Bushing
8 Screw
9 Sleeve
10 Impeller
11 Extension pipe

(Cont'd)

(Cont'd)

Note! Mark the position of the motor (13) on the extension pipe (11).

i) Remove the screws (12) and pull out the motor (13) with the shaft (14).
j) Unscrew the screws (19) and remove the two clamps (15).
k) Check the shaft (14) for wear and/or damage. Change as required.
l) Unscrew the screws (16) and remove the flange (17).
m) Pull out and change the seal ring (18).
n) Set the impeller as required, see 2.5.4-3 Peroxide Pump - Set Impeller.
o) Assemble in the reverse order.



11 Extension pipe
12 Screw
13 Motor
14 Shaft
15 Clamp
16 Screw
17 Flange
18 Seal ring
19 Screw

2.5.4-3 Peroxide Pump - Set Impeller

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	996388-0400 996388-0500

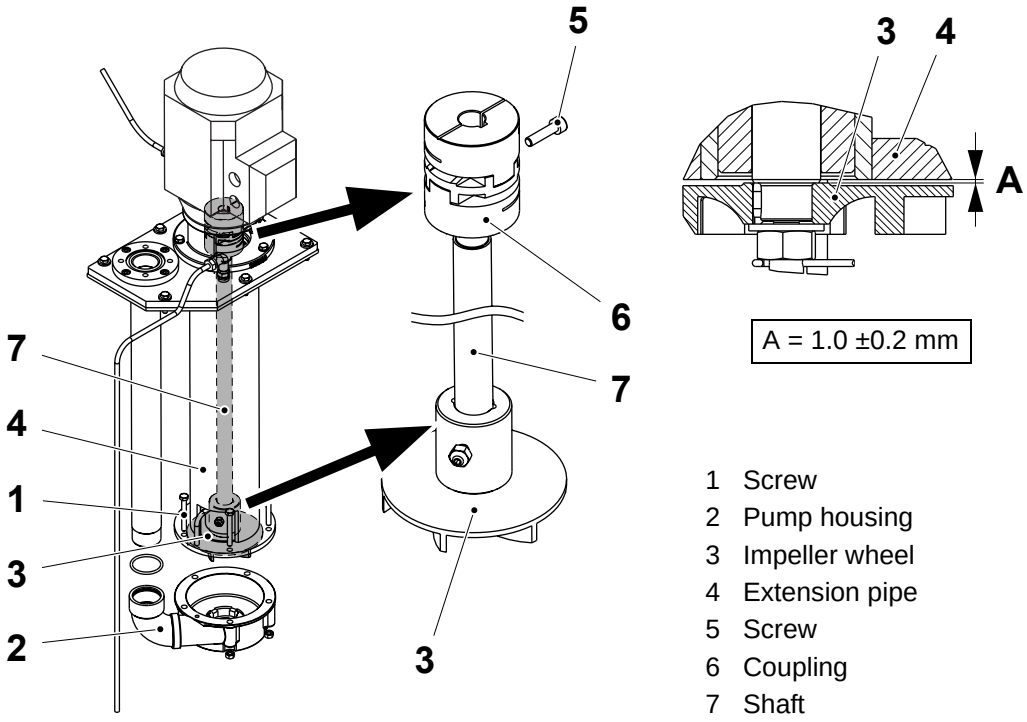
WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Valid for the new peroxide pump, TP No. 996388-0500

a) Remove the peroxide pump, see 2.5.4-1 Peroxide Pump - Change Pump.

b) Remove the screws (1) with the nuts and the pump housing (2).

c) Check the distance **A** between the impeller wheel (3) and the extension pipe (4) by means of a feeler gauge. If required, set the distance **A** between the impeller wheel (3) and the extension pipe (4) by means of:
   – loosen the screw (5) to the coupling (6)
   – lower the shaft (7)
   – set the distance **A** by means of a feeler gauge
   – tighten the screw (5).



1 Screw
2 Pump housing
3 Impeller wheel
4 Extension pipe
5 Screw
6 Coupling
7 Shaft

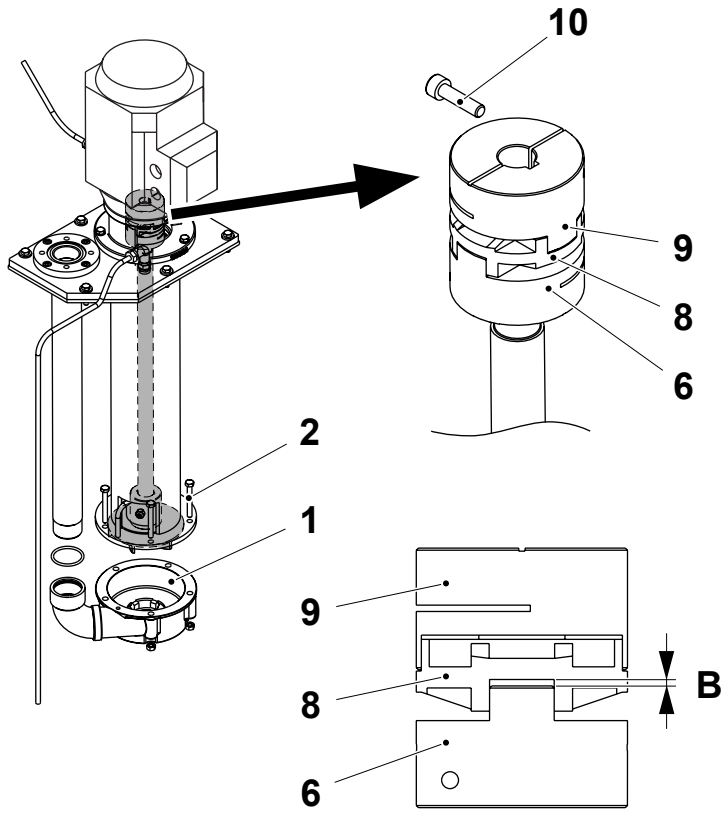
(Cont'd)

(Cont'd)

d) Check the total play, distance **B**, between the coupling (6), the coupling disc (8) and the coupling (9) by means of a feeler gauge. If required, set the distance **B** between the coupling (6) and the coupling disc (8) by means of:
   - loosen the screw (10) to the coupling (9)
   - lower the coupling (9)
   - set the distance **B** by means of a feeler gauge
   - tighten the screw (10).

e) Fit back the pump housing (2) and tighten the screws (1).

f) Fit the peroxide pump, see <u>2.5.4-1 Peroxide Pump - Change Pump</u>.



B = max. 0.3 mm

1 Screw
2 Pump housing
6 Coupling
8 Coupling disc
9 Coupling
10 Screw

(Cont'd)

(Cont'd)

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Valid for the old peroxide pump, TP No. 996388-0400

a) Remove the screws (1) with the nuts and the pump housing (2).

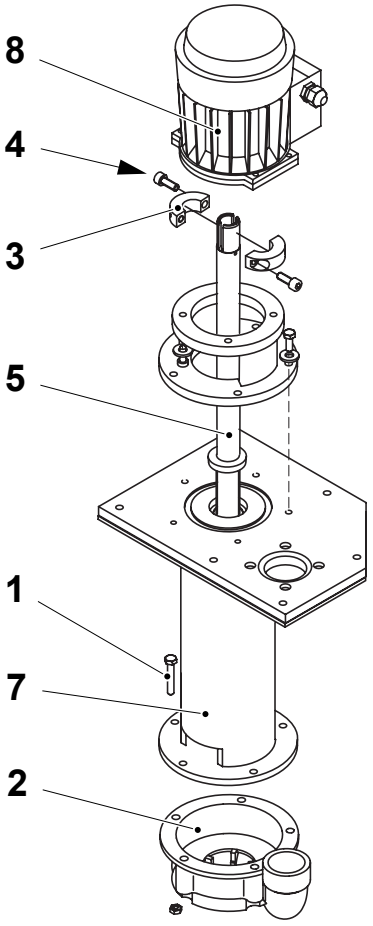
b) Loosen the clamp (3) by means of the screws (4) so that the shaft (5) moves freely.

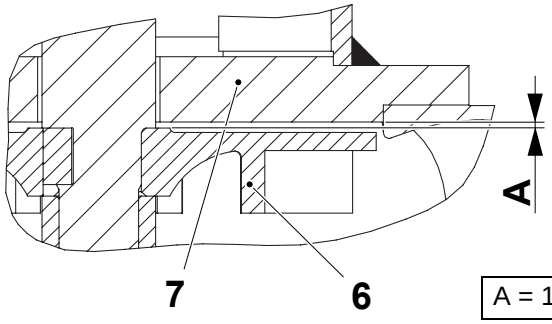
c) Lower the shaft (5).

d) Set the distance **A** between the impeller (6) and the extension pipe (7) by means of a feeler gauge.

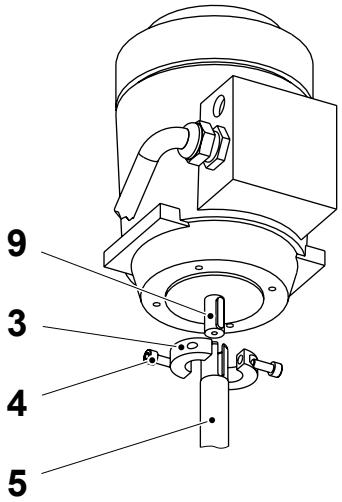
e) Fit the clamp (3) on the shaft (5) and the motor shaft (9) in contact with the motor (8). Tighten the screws (4).

f) Fit back the pump housing (2) and tighten the screws (1).





A = 1.0 ±0.2 mm



1 Screw
2 Pump housing
3 Clamp
4 Screw
5 Shaft
6 Impeller
7 Extension pipe
8 Motor
9 Shaft

2.5.5 Peroxide Tank

2.5.5-1 Peroxide Tank - Check

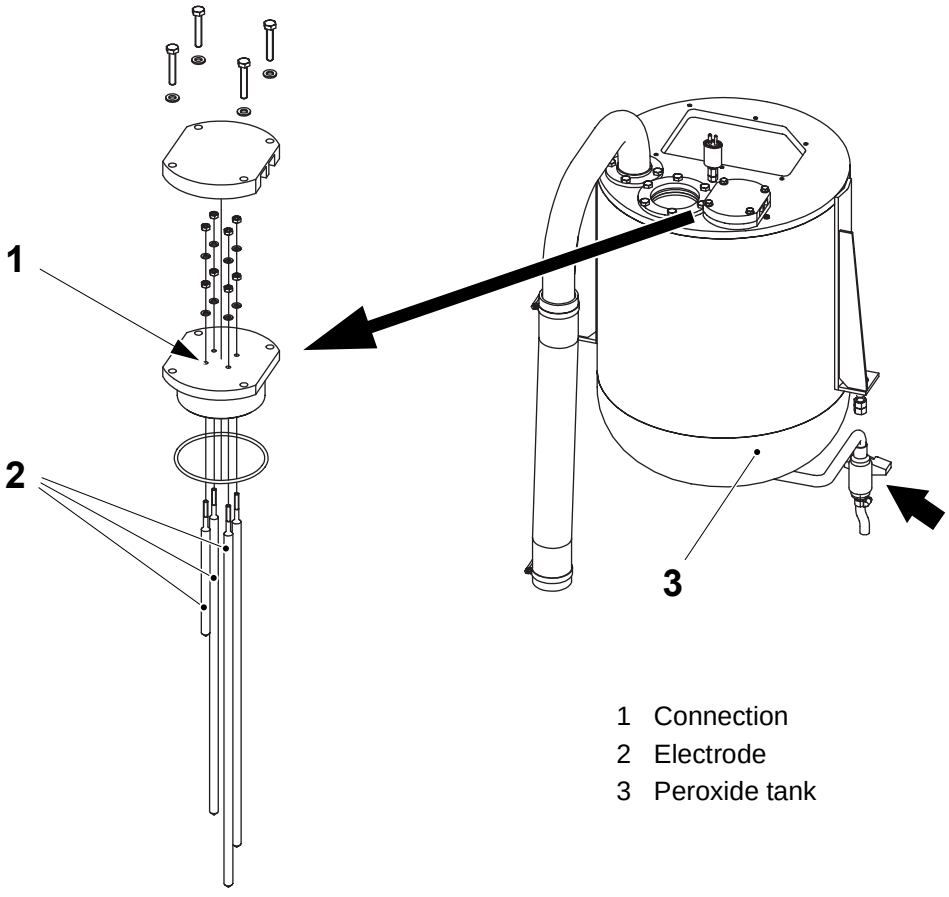
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Brass brush
SPC Reference	1282894-0100

WARNING
Hydrogen peroxide.
Follow the Safety precautions.

Check that:

- the electrodes (2) connections (1) are not rusted
  Clean the connections (1) with a brass brush as required.
- there are no leaks at the connections, see arrow, on the peroxide tank (3).

Change as required.



1 Connection
2 Electrode
3 Peroxide tank

2.5.6 H_2O_2 Concentration Meter

2.5.6-1 H_2O_2 Concentration Meter - Check Desiccant Cartridge

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	2519574-0100

WARNING

Hydrogen peroxide.

Follow the Safety precautions. Wear personal protective equipment.

For new machines or machines rebuilt with OK-1558536-0100 Peroxide concentration meter

CAUTION

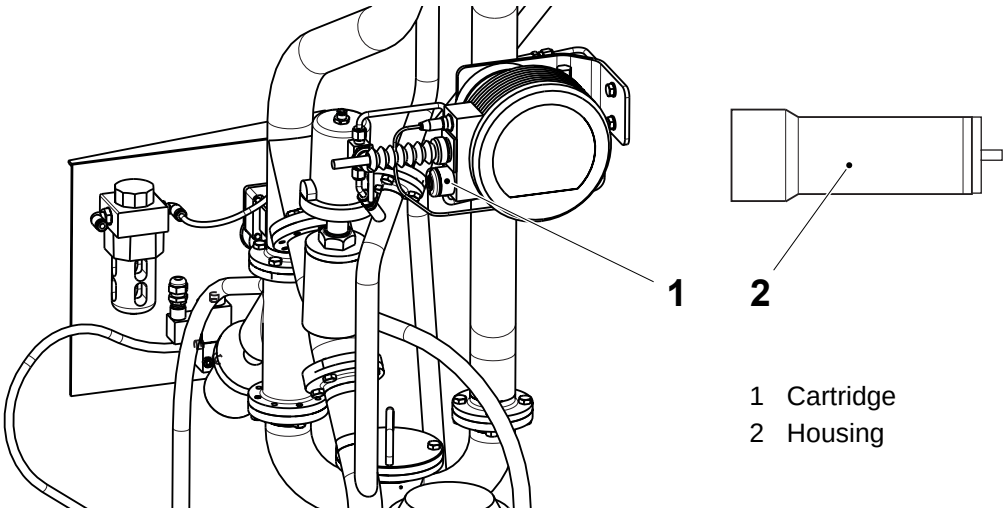
Risk of damage to the equipment.

In case the replacement of a cartridge (1) has to be done, prepare the new cartridge before removing the old one and perform the replacement as quickly as possible to avoid humidity entering into the meter. Humidity may cause reading errors.

Check the colour of the cartridge (1). If it is light-cyan or white change it as follows:

a) Unscrew the old cartridge using the housing (2) delivered with the new cartridge (1).

b) Fit the new cartridge (1).



1 Cartridge
2 Housing

2.5.6-2 H_2O_2 Concentration Meter - Change O-ring

Machine Status	STEP ZERO
Consumables	Cleaning powder TP No. 90459-1098 Distilled water
SPC Reference	2519574-0100

WARNING

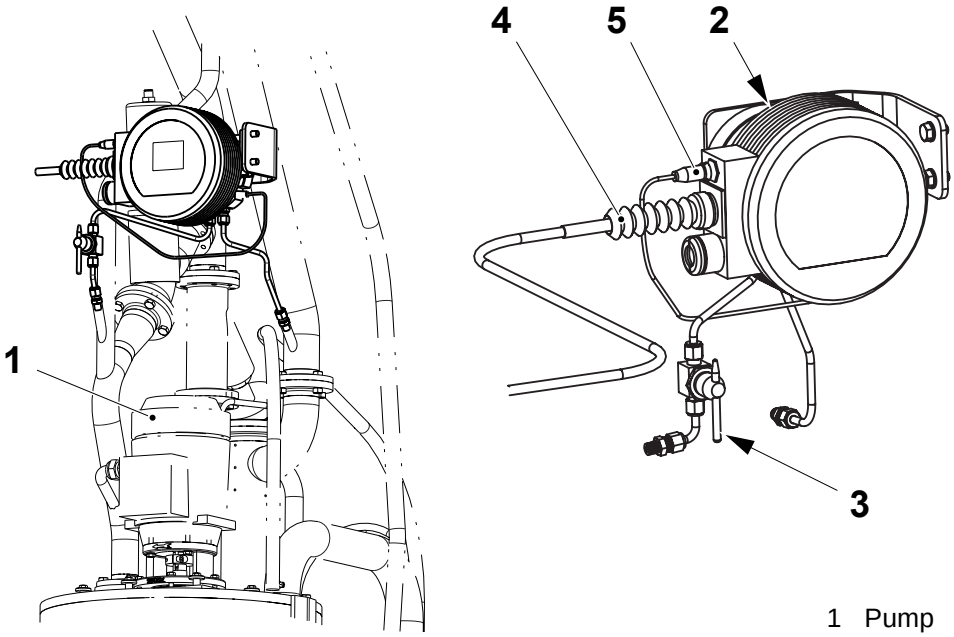
Hydrogen peroxide.
Follow the Safety precautions. Wear personal protective equipment.

For new machines or machines rebuilt with OK-1558536-0100 Peroxide concentration meter

a) Protect the pump (1) with a plastic bag. Peroxide may still be present in the deflector (2).

b) Close the tap (3).

c) Disconnect the power connections (4) and the PT100 connection (5).



1 Pump
2 Deflector
3 Tap
4 Power connection
5 PT100 connection

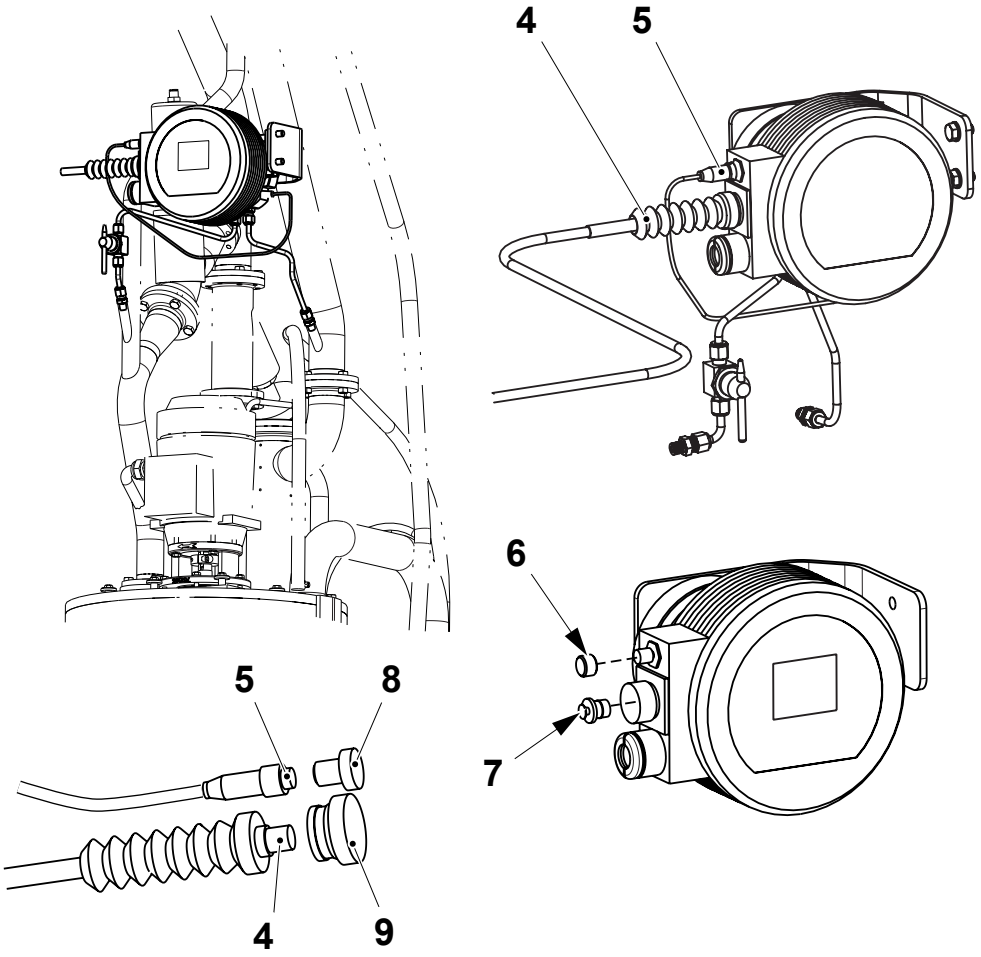
(Cont'd)

(Cont'd)

CAUTION
Risk of damage to the equipment.
Seal the cables with the plugs to prevent oxidization and damage by peroxide.

d) Fit the plugs (6) and (7).

e) Seal the cable connections (4) and (5) with the plugs (9) and (8).



4 Power connection
5 PT100 connection
6 Plug
7 Plug
8 Plug
9 Plug

(Cont'd)

(Cont'd)

f) Remove the clamp (10) and the peroxide monitor (11).

CAUTION
Risk of damage to the equipment.
Avoid scratching the glass.

g) Dissolve **7 gram** of cleaning powder (TP No. 90459-1098) in **3 millilitre** of distilled water and mix them. Pour it on the prism (14) and wipe it off with clean paper until the peroxide residues are removed.

h) Clean the deflector (2) with paper soaked in distilled water. Remove any rubber residue that remains in the deflector (2).

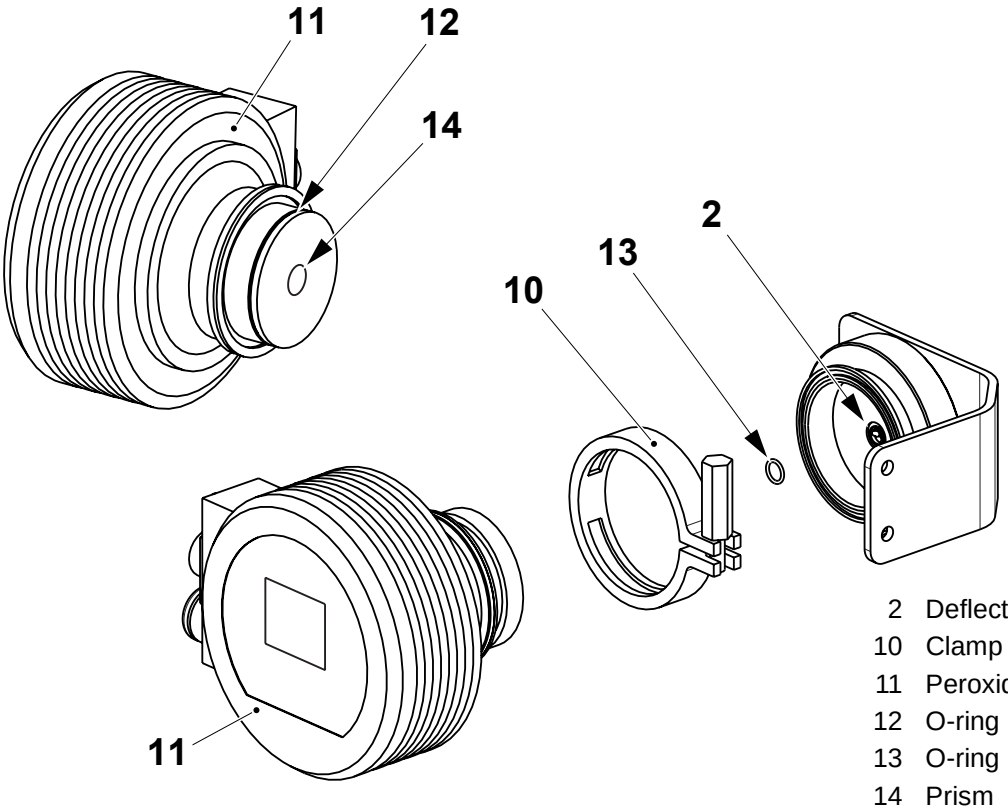
i) Change the O-ring (12) of the peroxide monitor (11).

j) Change the O-ring (13).

Note! When assembling, connect the PT100 connection before the power connection.

k) Assemble in the reverse order.

l) Open the tap.



2 Deflector
10 Clamp
11 Peroxide monitor
12 O-ring
13 O-ring
14 Prism

2.5.6-3 H_2O_2 Concentration Meter - Remove

Machine Status	STEP ZERO
SPC Reference	2519574-0100

WARNING

Hydrogen peroxide.

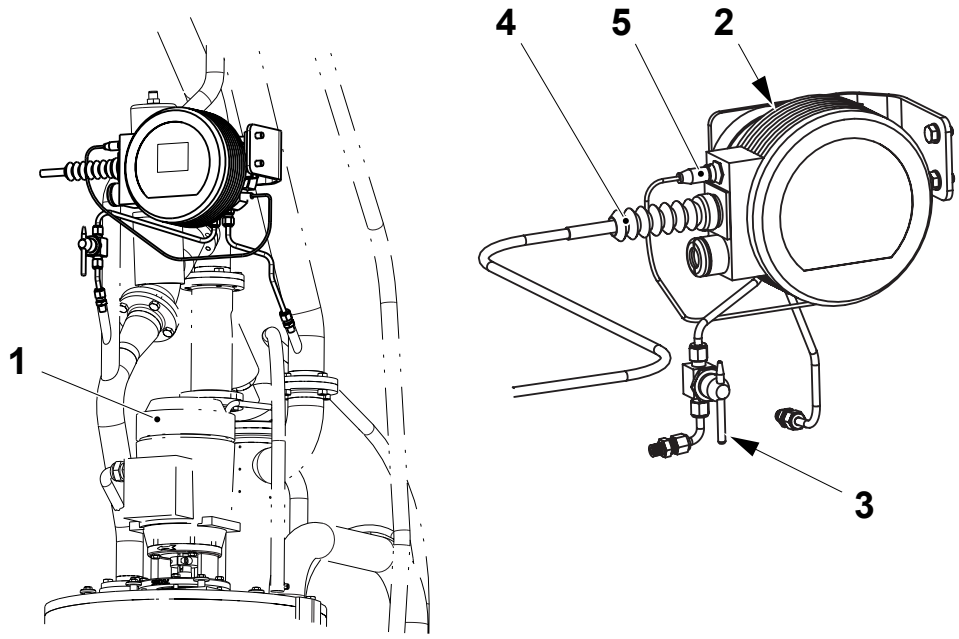
Follow the Safety precautions. Wear personal protective equipment.

For new machines or machines rebuilt with OK-1558536-0100 Peroxide concentration meter

a) Protect the pump (1) with a plastic bag. Peroxide may still be present in the deflector (2).

b) Close the tap (3).

c) Disconnect the power connection (4) and the PT100 connection (5).



1 Pump
2 Deflector
3 Tap
4 Power connection
5 PT100 connection

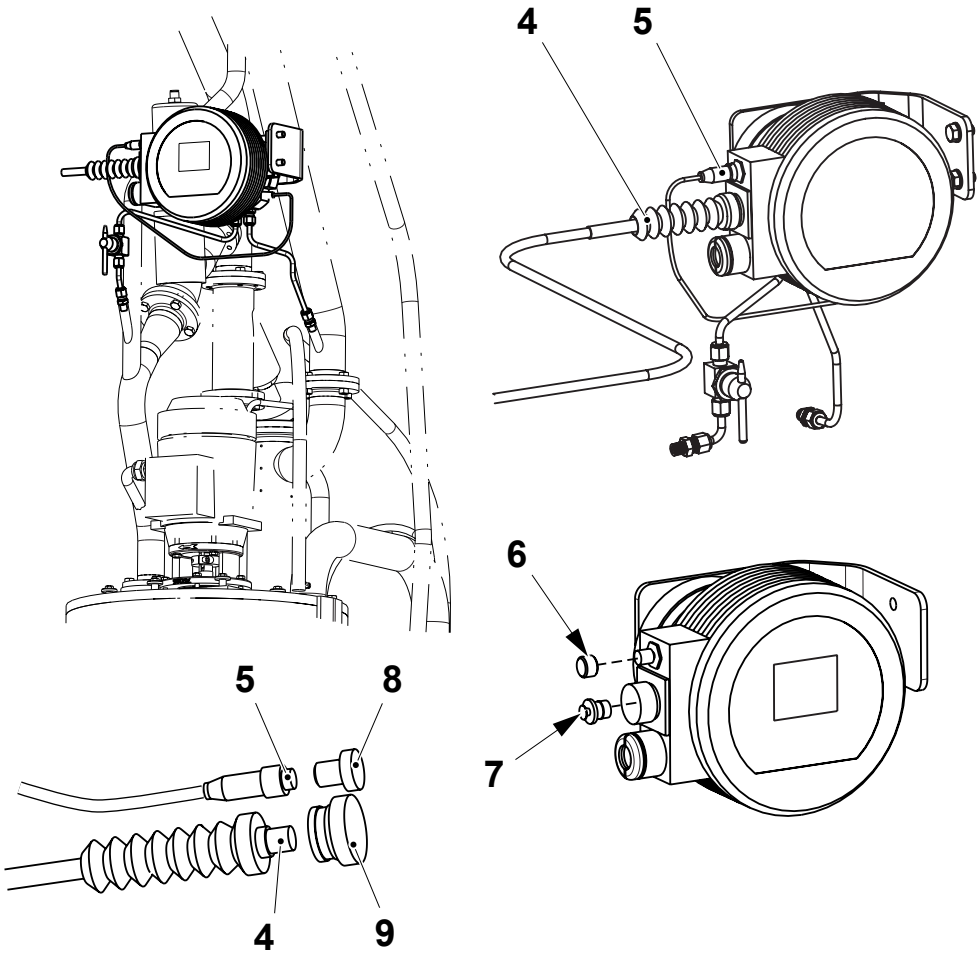
(Cont'd)

(Cont'd)

CAUTION
Risk of damage to the equipment.
Seal the cables with the plugs to prevent oxidization and damage by peroxide.

d) Fit the plugs (6) and (7).

e) Seal the cable connections (4) and (5) with the plugs (9) and (8).

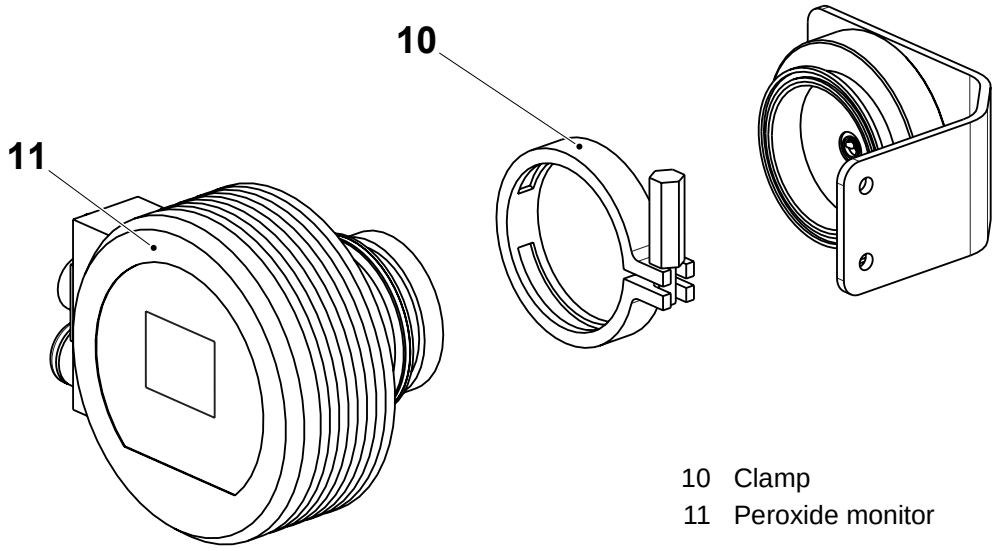


4 Power connection
5 PT100 connection
6 Plug
7 Plug
8 Plug
9 Plug

(Cont'd)

(Cont'd)

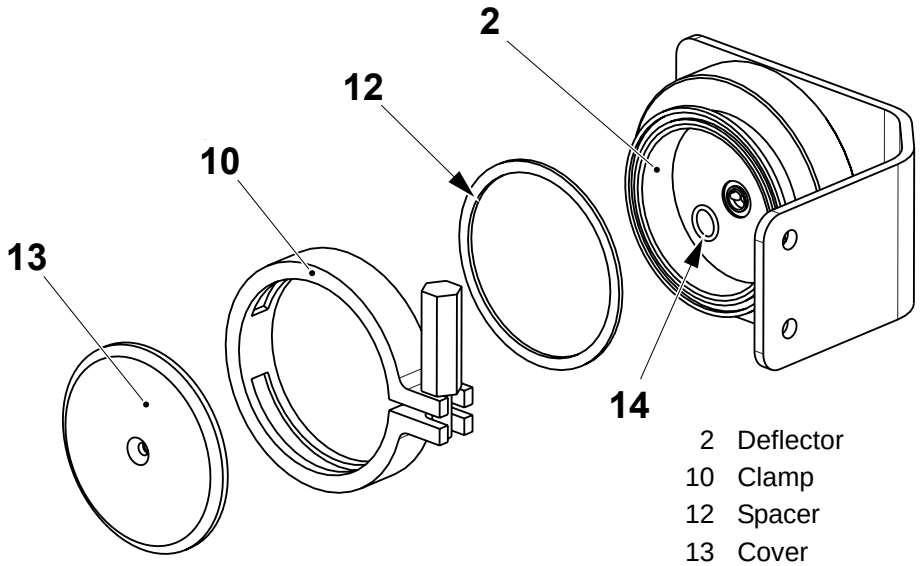
f) Remove the clamp (10) and the peroxide monitor (11).



10 Clamp
11 Peroxide monitor

WARNING
Risk of hydrogen peroxide leakage.
Make sure that the O-ring (14) is in place and in good condition before assembling the cover (13).

g) Fit the spacer (12) and cover (13) in position on the deflector (2) and lock them together with the clamp (10).



2 Deflector
10 Clamp
12 Spacer
13 Cover
14 O-ring

2.5.6-4 H_2O_2 Concentration Meter - Check PT100

Machine Status	PRODUCTION
Consumables	Teflon tape
SPC Reference	2519574-0100

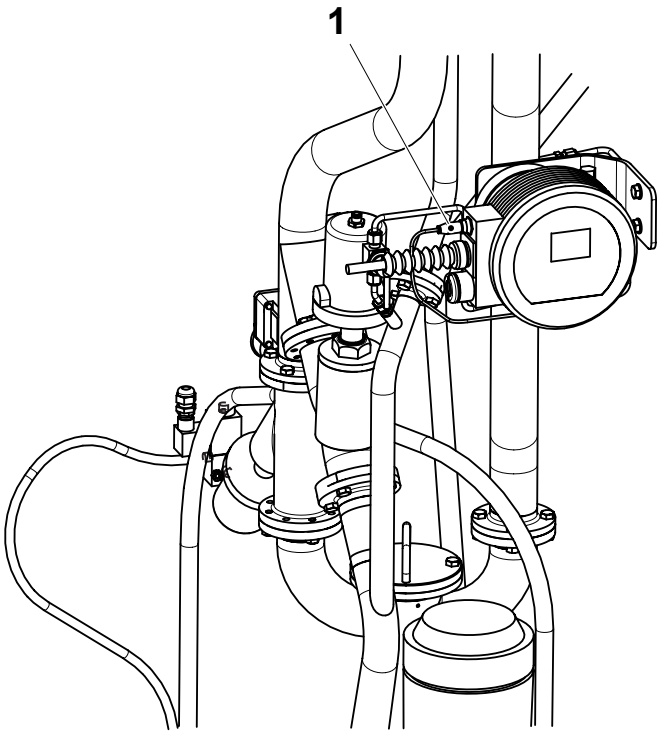
WARNING

Hydrogen peroxide.
Follow the Safety precautions. Wear personal protective equipment.

For new machines or machines rebuilt with OK-1558536-0100 Peroxide concentration meter

Check the peroxide temperature, see the TPOP.

Check the peroxide temperature in the tank, see the TPOP. If the temperature values differs more than 3-5 °C check the contacts of the PT100 connection (1) for oxidation. If required, proceed as follow:



1 PT100 connection

(Cont'd)

(Cont'd)

a) Step down the machine and close the tap (2).

b) Disconnect the power connection (3).

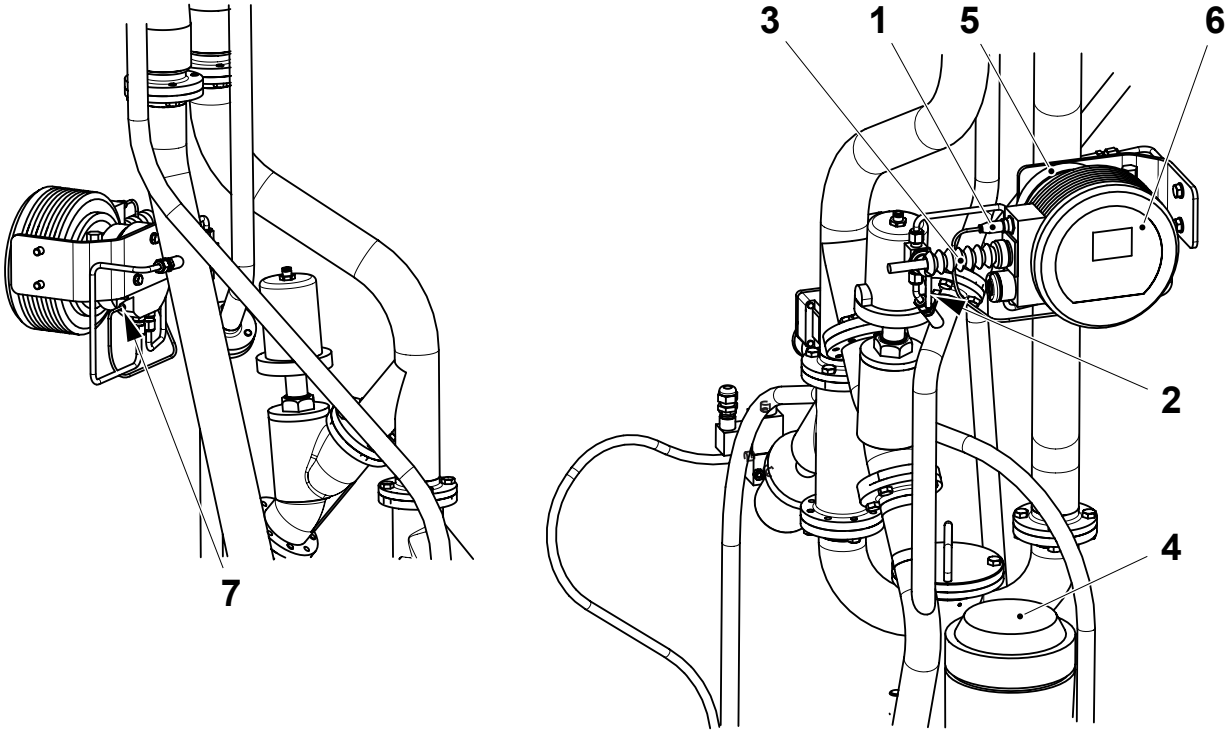
c) Protect the pump (4) with a plastic bag. Peroxide may still be present in the deflector (5).

d) Unscrew the PT100 connector (1) from the peroxide monitor (6) and from the deflector connection (7).

CAUTION
Risk of damage to the equipment.
Apply teflon tape to the threads before fitting a new PT100 cable.

e) Fit a new cable to the peroxide monitor (6) and to the deflector connection (7).

f) Connect the power connection (3).



1 PT100 connection
2 Tap
3 Power connection
4 Pump
5 Deflector
6 Peroxide monitor
7 Deflector connection

2.5.6-5 H_2O_2 Concentration Meter - Check Prism and LED

Machine Status	PRODUCTION
SPC Reference	2519574-0100

WARNING
Hydrogen peroxide.
Follow the Safety precautions. Wear personal protective equipment.

For new machines or machines rebuilt with OK-1558536-0100 Peroxide concentration meter

a) Press the button (1) and hold it for 10 seconds until a menu appears.

b) Read the numeric value in the **Deriv. value** field (2).

c) The value must be higher than 55000. If lower, clean the prism and change the O-ring, see 2.5.6-2 H_2O_2 Concentration Meter - Change O-ring.

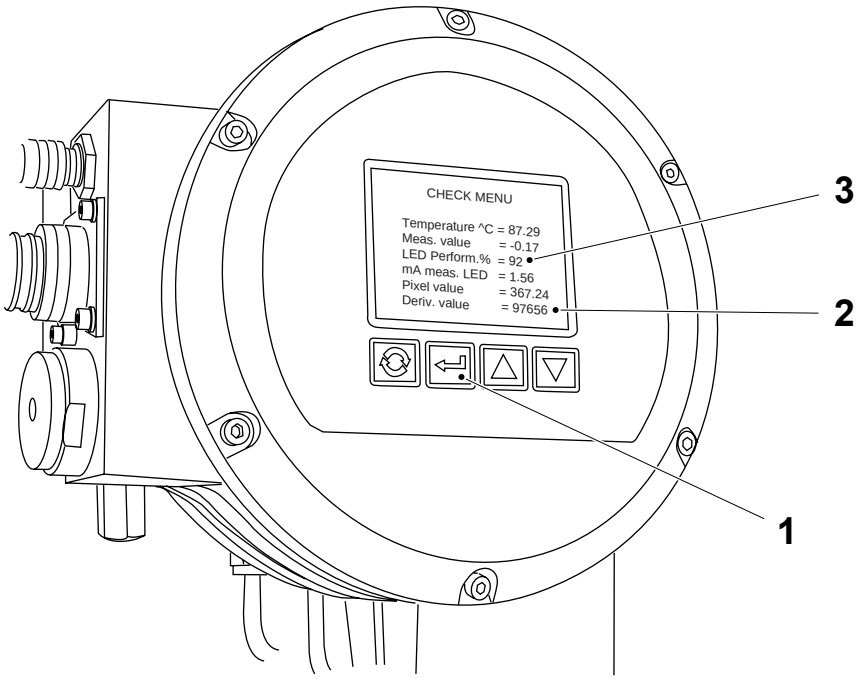
d) Read the numeric value in the **LED perform.%** field (3).

Note! If the value is lower than 50% the machine will stop.

e) If the value is between 50% and 60% an alarm will lit up on the TPOP. Clean the prism, see 2.5.6-2 H_2O_2 Concentration Meter - Change O-ring.

f) If after cleaning the alarm is still present, remove the instrument and send it to the manufacturer, see 2.5.6-3 H_2O_2 Concentration Meter - Remove.

g) To return to the main menu, press the button (1) twice.



1 Button
2 Deriv. value
3 LED perform.%

2.6 Ext. Cleaning Pipework

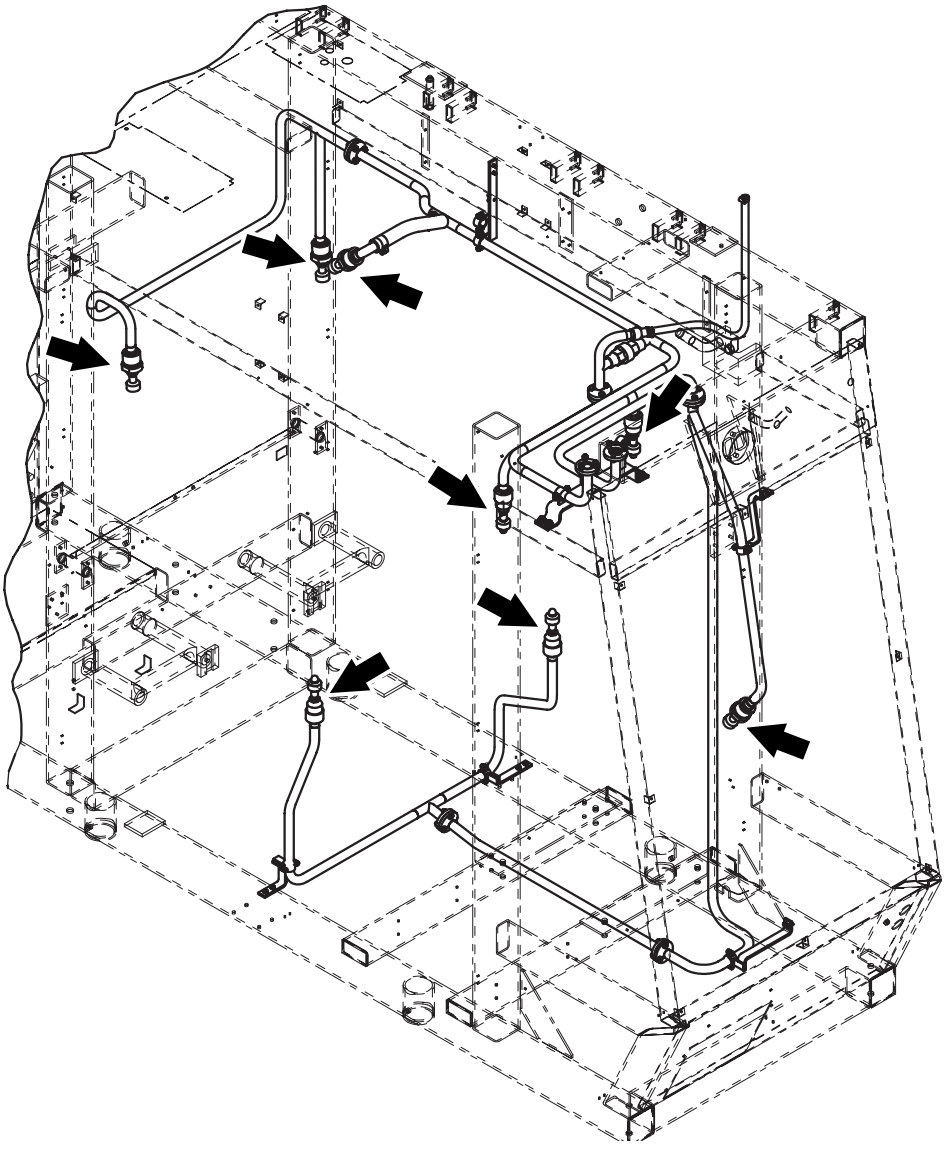
SPC Reference	1095837-0300

2.6-1 Ext. Cleaning Pipework - Check Nozzles

Machine Status	EXTERNAL CLEANING
SPC Reference	1095837-0300

Check that all the nozzles, see arrows, rotate easily.

Check that all the nozzles are not clogged and are free from any cleaning solution deposit.
If required, remove the nozzles and clean or remove the lime scale from them.



2.7 Pneumatic System

SPC Reference	1095691-0300

2.7-1 Pneumatic System- Set Pressure Switch

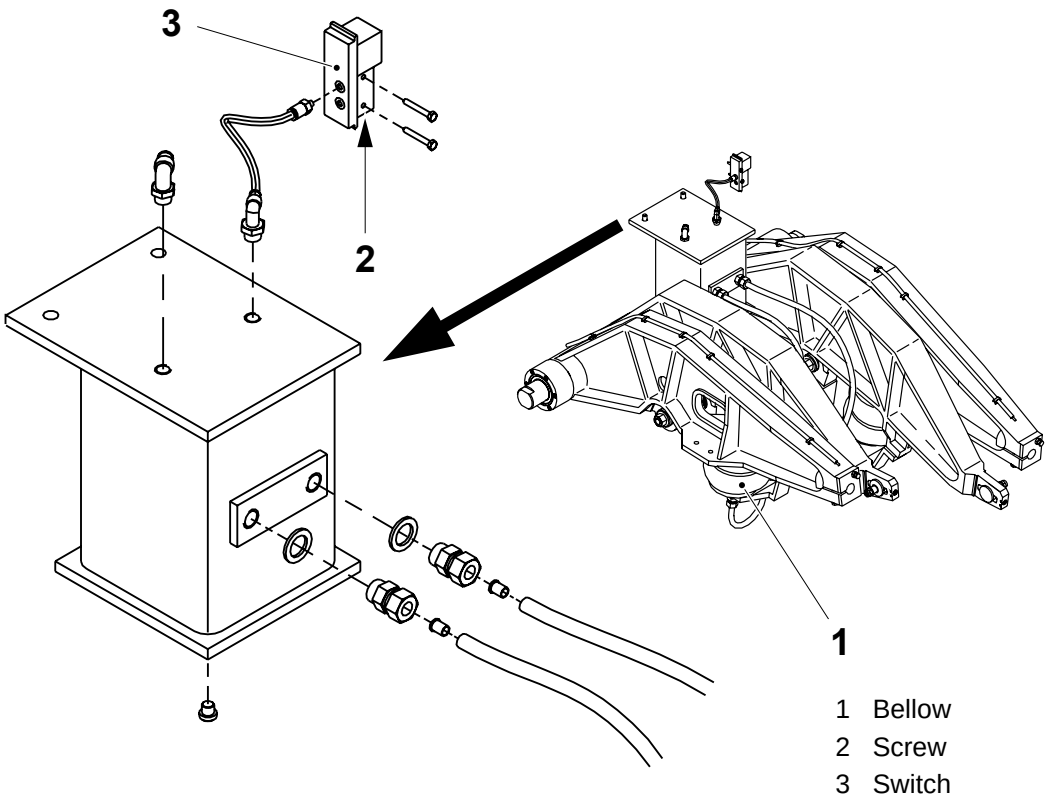
Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1095691-0300

a) Reduce the air pressure serving the bellows (1) to a pressure of
   - **2.2 bar** for the new bellows (1) or rebuilt with UK-2562469-0100 Bellows replacement, TP No. 90459-1252
   - **2.5 bar** for the old bellows (1), TP No. 90239-0288

b) Turn the adjustment screw (2) on the pressure switch (3) until the LED lights up.

c) Turn the adjustment screw (2) in the opposite way until the LED on the pressure switch (3) switches off.

d) Set the air pressure serving the bellows (1) see 3.6-3 Bellows - Set Bellows Pressure.



1 Bellow
2 Screw
3 Switch

2.7.1 Valve Panel

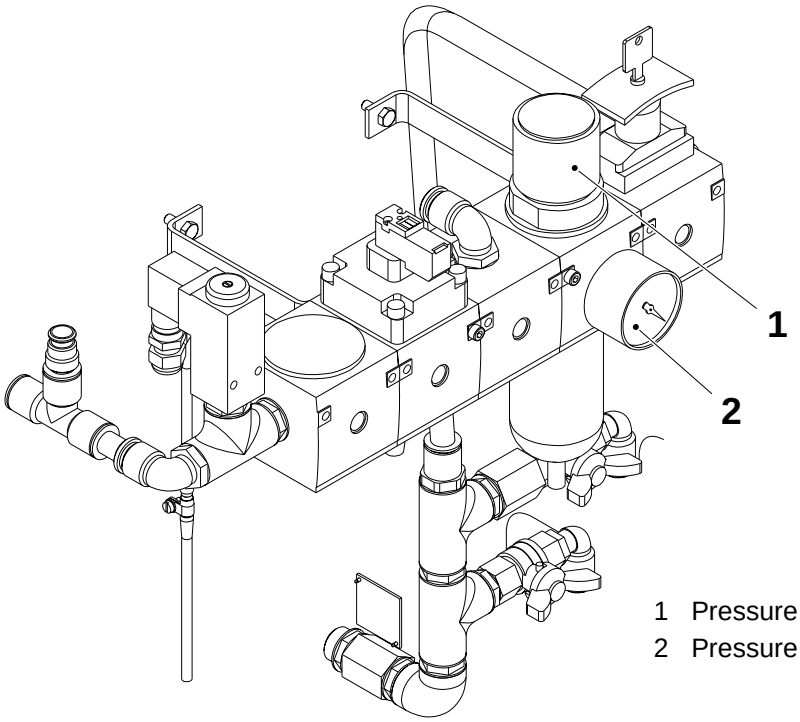
Note! Valid for the machines rebuilt with MKS 2749391-0100 Drop Chute Interlock.

2.7.1-1 Valve Panel - Set Pressure Switch

Machine Status	PREPARATION
Special Equipment	Multimeter
SPC Reference	1095691-0300 2749391-0100

a) Use the pressure regulator (1) in the service unit to reduce the main air supply pressure to **4.0 bar** as indicated by the pressure gauge (2).

Note! When the main air supply pressure is less than **5.5 bar**, the AIR SUPPLY ALARM will flash on the TPOP.

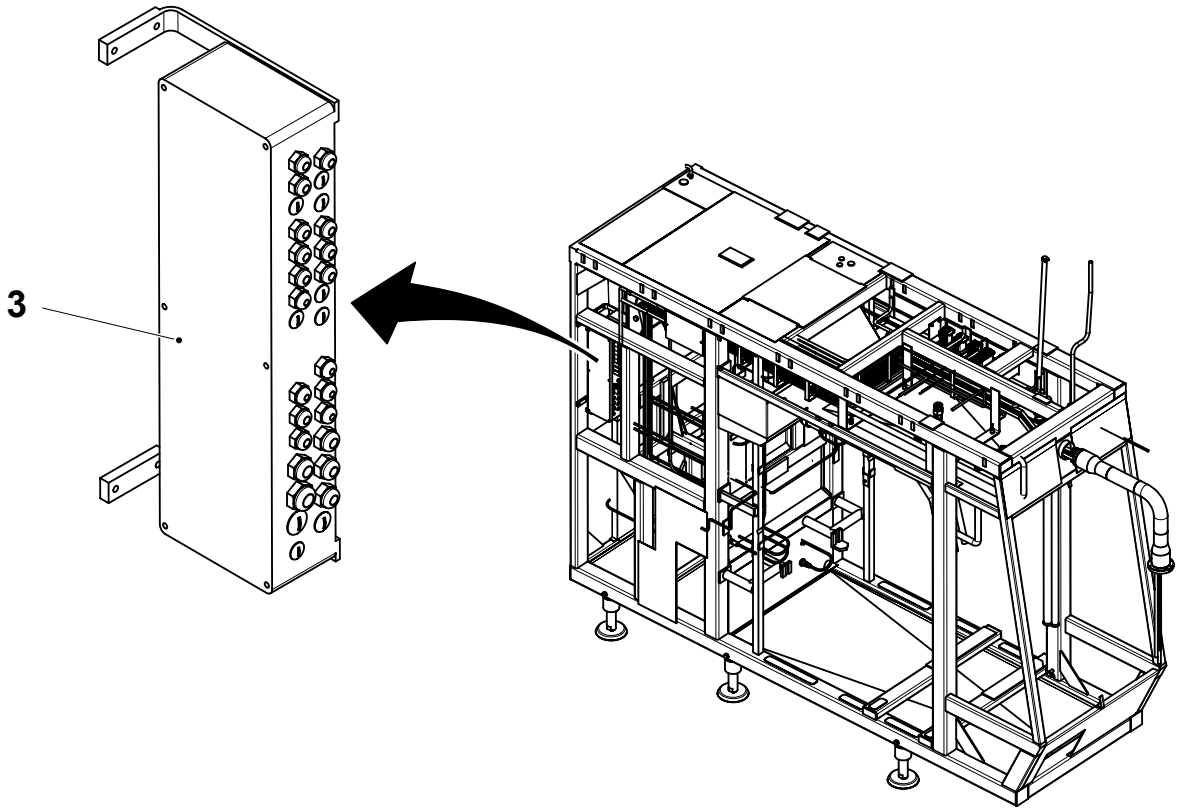


1 Pressure regulator
2 Pressure gauge

(Cont'd)

(Cont'd)

b) Remove the cover from the connection box X4000 (3) and connect the multimeter between terminals X4000:119 and X4000:Ground. Check that the multimeter indicates a value other than zero.



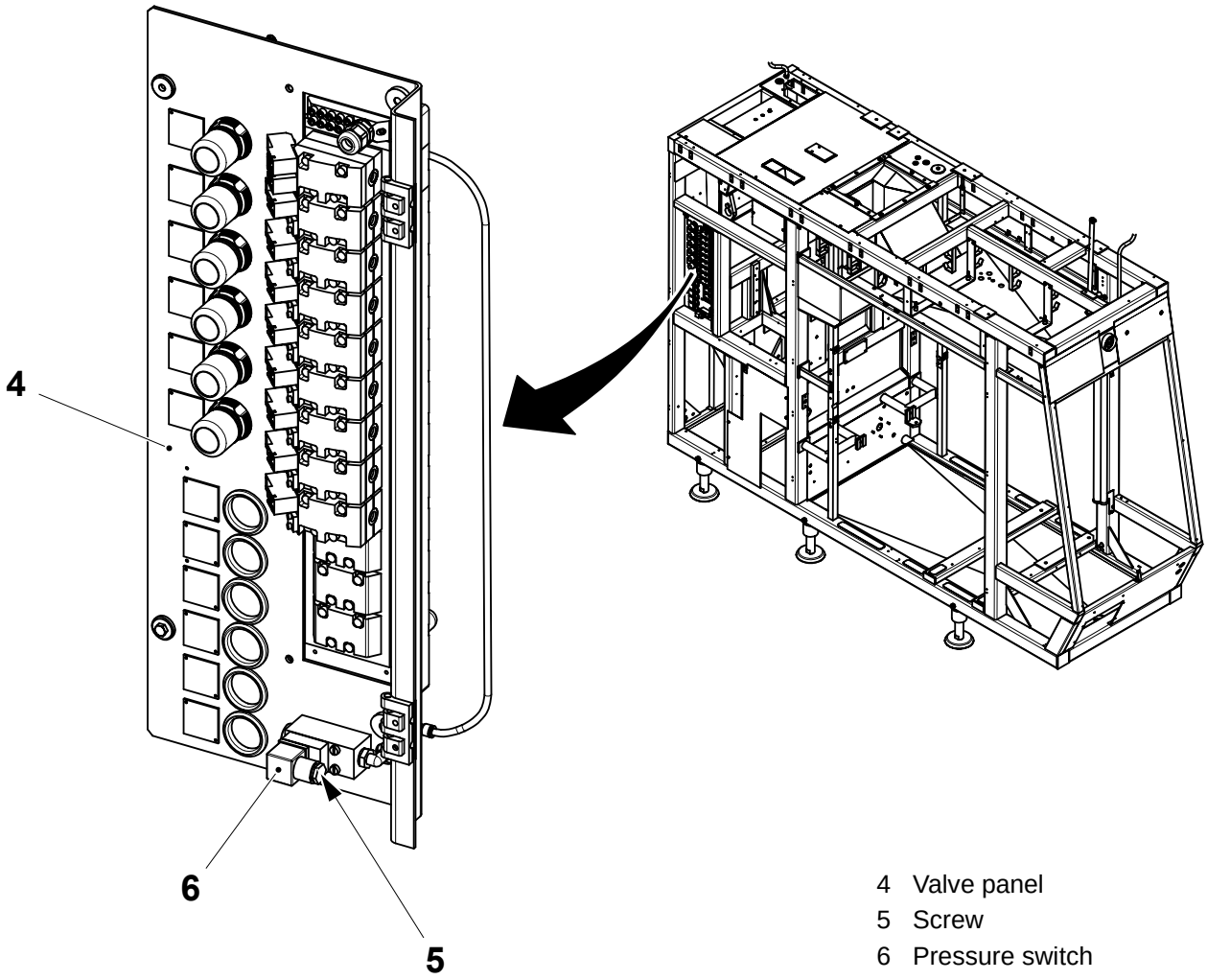
3 Connection box X4000

(Cont'd)

(Cont'd)

Note! When the pressure switch is set correctly, the PRESSURE GUARD DROP CHUTE ALARM will flash when the air supply pressure is **4.0 bar** or less.

c) On the valve panel (4), turn the screw (5) on the pressure switch (6) clockwise until the multimeter indicates zero and the PRESSURE GUARD DROP CHUTE ALARM flashes.



4 Valve panel
5 Screw
6 Pressure switch

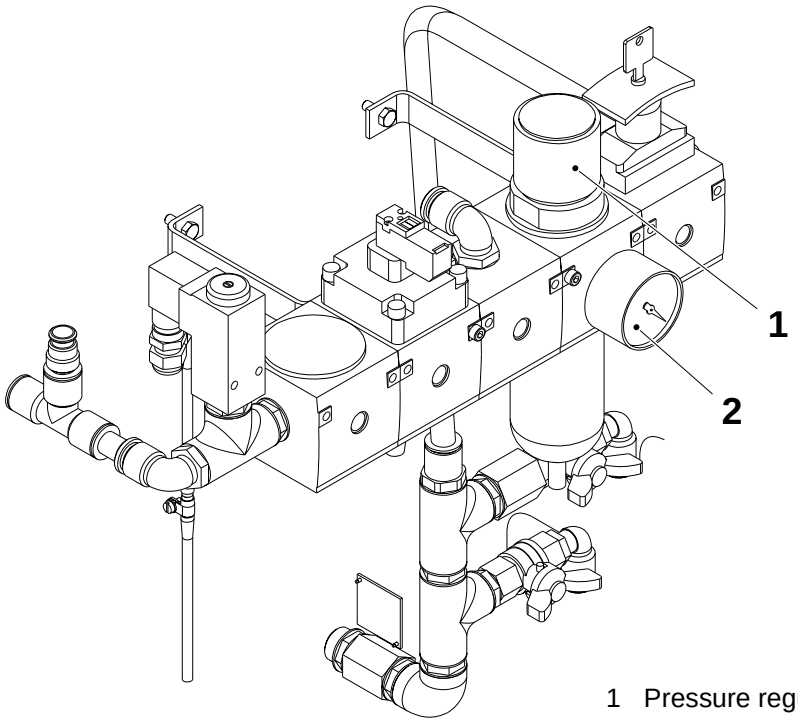
(Cont'd)

(Cont'd)

d) Using the pressure gauge (1), increase the air supply pressure to **6 - 7 bar** as indicated by the pressure gauge (2) and check that the PRESSURE GUARD DROP CHUTE ALARM disappears.

e) Reduce the pressure again and check that the PRESSURE GUARD DROP CHUTE ALARM flashes when the pressure is **4.0 bar** or less.

f) Set the main air supply pressure to **6 - 7 bar**.



1 Pressure regulator
2 Pressure gauge

2.7.1-2 Valve Panel - Check Drop Chute Velocity

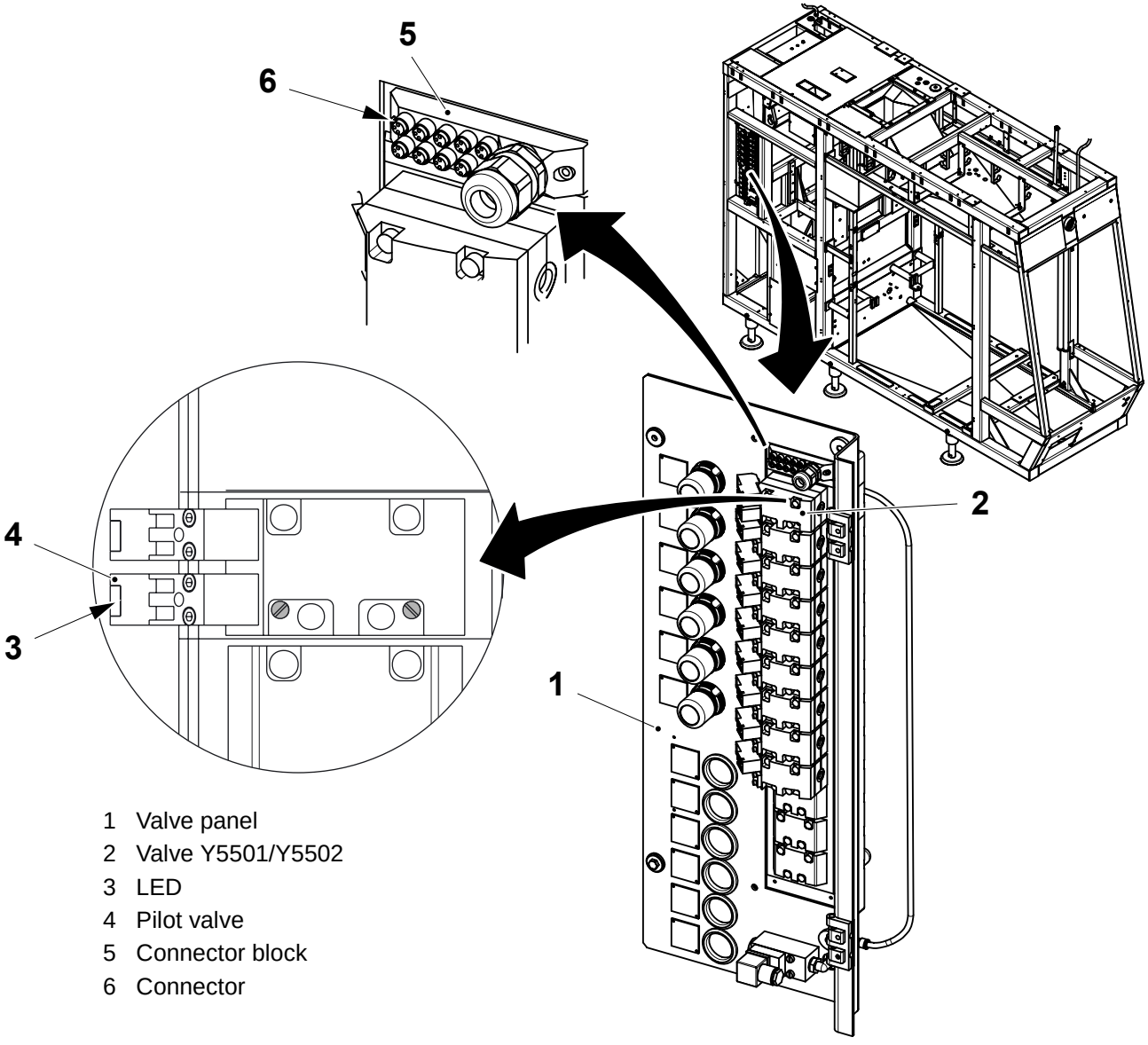
Machine Status	PREPARATION
Special Equipment	Multimeter
SPC Reference	1095691-0300 2749391-0100

a) Step the machine up to PREPARATION.

Note! The position of the valve **Y5501/Y5502** is variant dependant.

b) Locate the valve **Y5001/Y5002** (2). The LED (3) in the pilot valve (4) for valve **Y5502** will be lit.

c) On the valve panel connector block (5), disconnect the connector (6) to de-energize valve **Y5502**. The connector is +M-X4058-1. When the connector is removed, the LED (3) in the pilot valve (4) will go out.



1 Valve panel
2 Valve Y5501/Y5502
3 LED
4 Pilot valve
5 Connector block
6 Connector

(Cont'd)

(Cont'd)

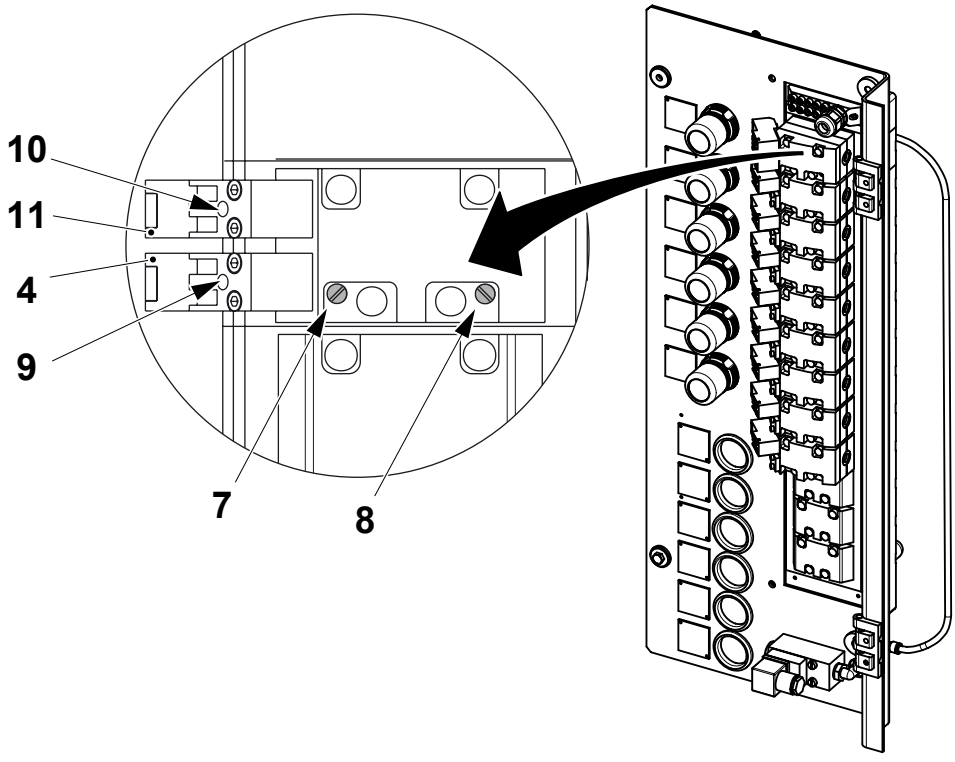
CAUTION
Machine damage.
It is important that the drop chute is forced into the WASTE position by activating valve **Y5502** before activating valve **Y5501** to move the drop chute into the PRODUCTION position.

d) Turn the throttle screws (7) and (8) fully clockwise and then 1 turn counter-clockwise.

e) Push and hold the button (9) in the pilot valve (4) for valve **Y5002** to ensure that the drop chute is in the WASTE position.

f) Release the button (9) and at the same time push and hold the button (10) in the pilot valve (11) for valve Y5001 to move the drop chute into the PRODUCTION position.

g) Repeat steps e) and f) at intervals and, at the same time, adjust the throttle screws (7) and (8) so that the drop chute moves to the WASTE and PRODUCTION positions quickly but gently.



4 Pilot valve for Y5502
7 Throttle screw
8 Throttle screw
9 Button
10 Button
11 Pilot valve for Y5501

(Cont'd)

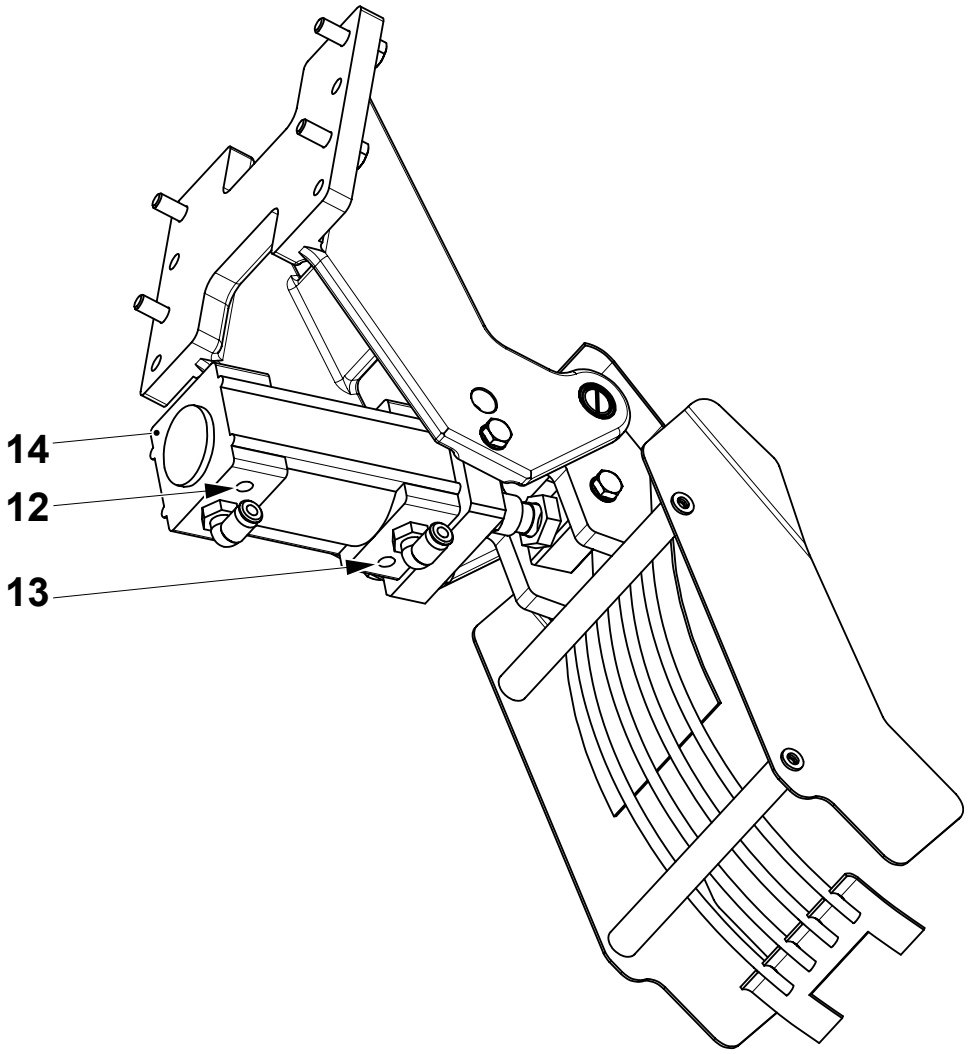
(Cont'd)

h) If the drop chute moves to the WASTE or the PRODUCTION position and then rebounds on its arrival. Continue below, otherwise restore normal conditions.

i) Open the jaw system doors and adjust the throttle valves (12) and (13) on the drop chute cylinder (14) approximately half a turn.

j) Close the doors and repeat steps e) to g).

k) Repeat steps i) and j) until the correct result is obtained.



12 Throttle valve
13 Throttle valve
14 Drop chute cylinder

2.8 Level Control Device Floater

SPC Reference	1523216-0100

2.8-1 Level Control Device Floater- Check Alignment

SPC Reference	1523216-0100

Follow the procedure described in 1.3.4-8 Filling Pipe - Check Level Control Device Floater Alignment.

2.8-2 Level Control Device Floater - Set Position

SPC Reference	1523216-0100

Follow the procedure described in 1.3.4-9 Filling Pipe - Set Level Control Device Floater Position.

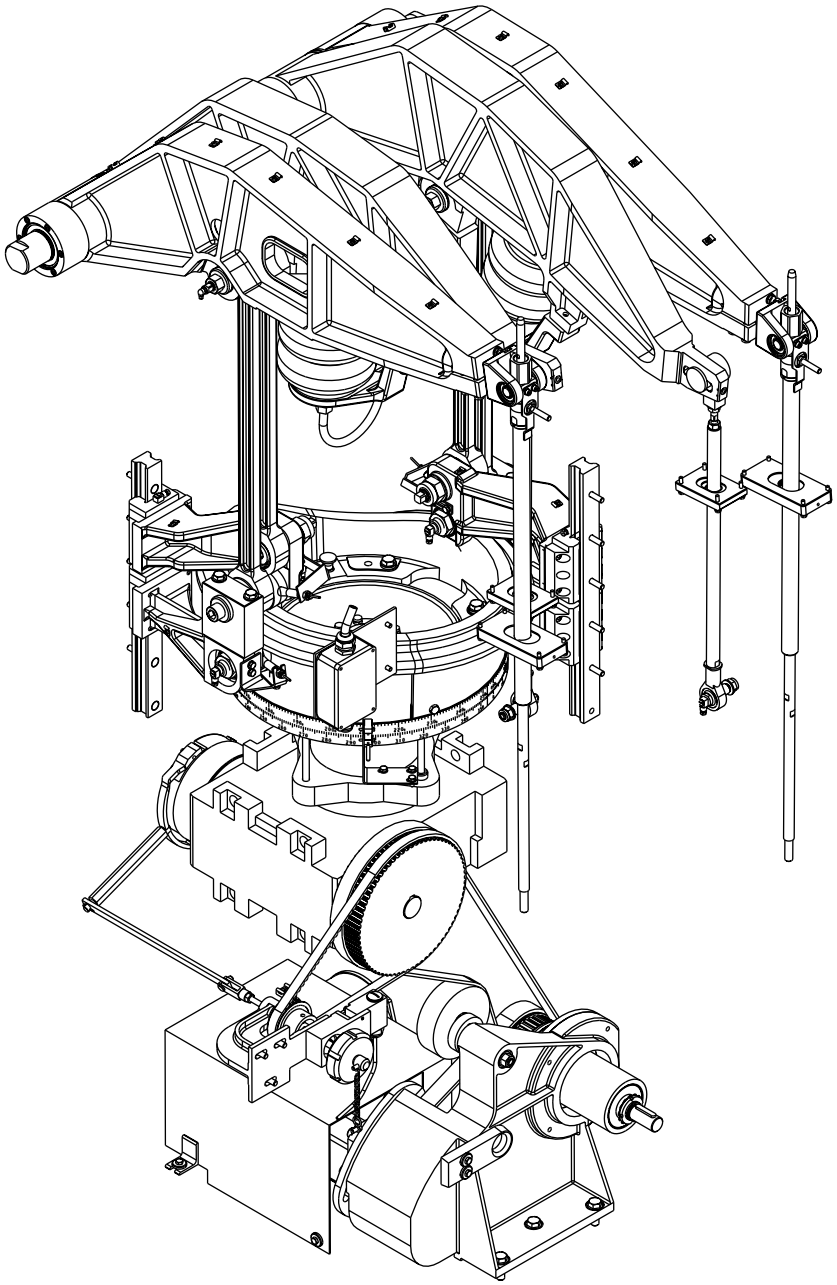
2.8-3 Level Control Device Floater- Check Function

SPC Reference	1523216-0100

Follow the procedure described in 1.3.4-10 Filling Pipe - Check Level Control Device Floater Function.

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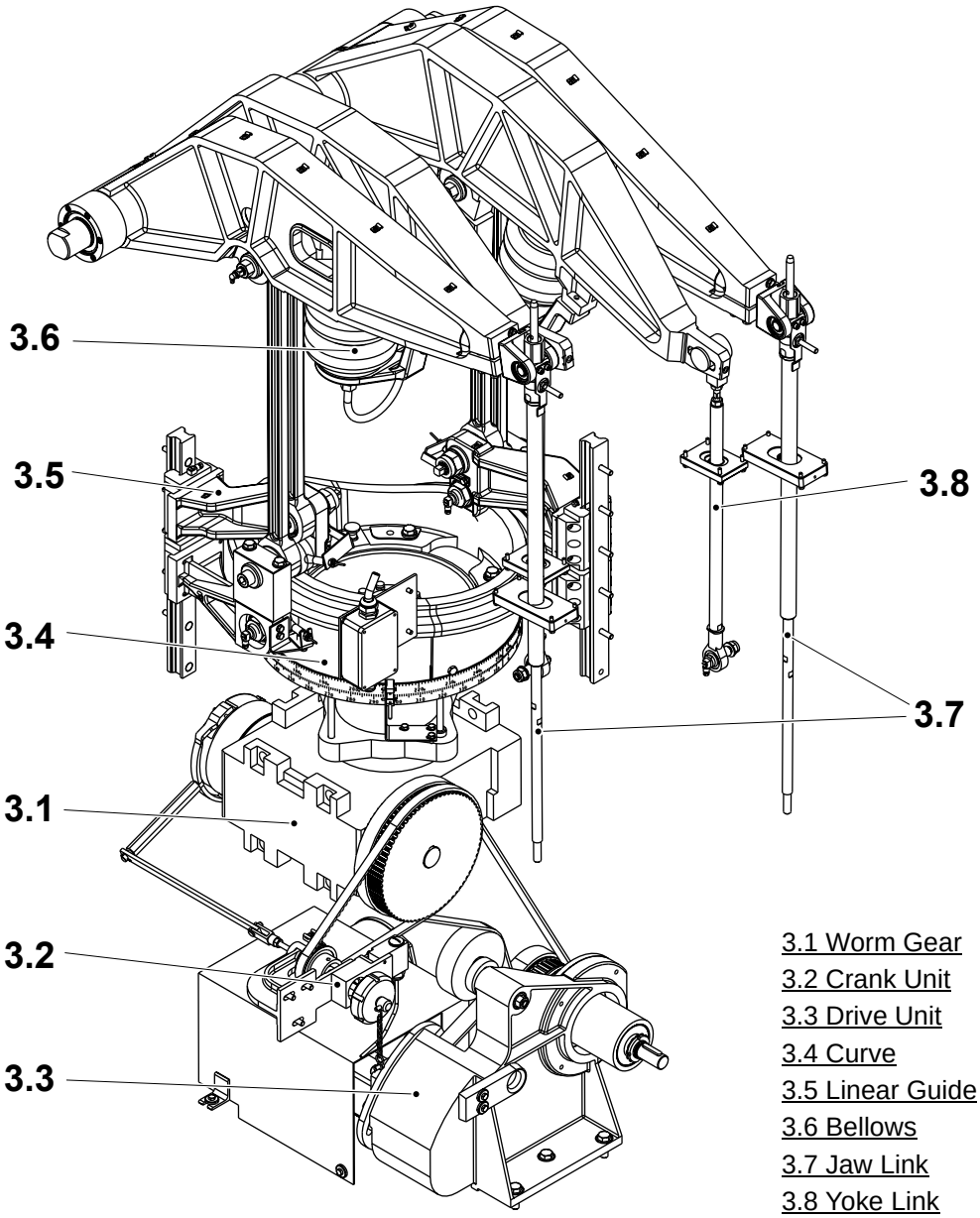
3 Drive



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Drive - Description

SPC Reference	648503-0500



3.1 Worm Gear
3.2 Crank Unit
3.3 Drive Unit
3.4 Curve
3.5 Linear Guide
3.6 Bellows
3.7 Jaw Link
3.8 Yoke Link

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3.1 Worm Gear . . . . . 3 - 5

3.1-1 Worm Gear - Check Oil Level . . . . . 3 - 5

3.1-2 Worm Gear - Set Distance . . . . . 3 - 6

3.1-3 Worm Gear - Check Brake Distance . . . . . 3 - 7

3.1-4 Worm Gear - Set Brake Distances . . . . . 3 - 8

3.1-5 Worm Gear - Check Brake Function . . . . . 3 - 9

3.1-6 Worm Gear - Change Oil . . . . . 3 - 10

3.1-7 Worm Gear - Lubricate . . . . . 3 - 11

3.1-8 Worm Gear - Change Seals . . . . . 3 - 12

3.1.1 Connection Box . . . . . 3 - 15

3.1.1-1 Connection Box - Set Angle Encoder . . . . . 3 - 15

3.1.1-2 Connection Box - Set Display . . . . . 3 - 16

3.1.1-3 Connection Box - Check Angle Encoder . . . . . 3 - 17

3.2 Crank Unit . . . . . 3 - 18

3.2-1 Crank Unit - Check . . . . . 3 - 18

3.2-2 Crank Unit - Set . . . . . 3 - 19

3.3 Drive Unit . . . . . 3 - 22

3.3-1 Drive Unit - Check Timing Belts and Bearings . . . . . 3 - 22

3.3-2 Drive Unit - Change Timing Belts . . . . . 3 - 23

3.3-3 Drive Unit - Change Bearings . . . . . 3 - 25

3.3-4 Drive Unit - Set Belt Tension . . . . . 3 - 26

3.3.1 Connection . . . . . 3 - 28

3.3.1-1 Connection - Check Distance . . . . . 3 - 28

3.3.1-2 Connection - Check Bearings . . . . . 3 - 28

3.3.1-3 Connection - Change Bearings . . . . . 3 - 29

3.3.1-4 Connection - Set Distance . . . . . 3 - 33

3.4 Curve . . . . . 3 - 34

3.4-1 Curve - Check . . . . . 3 - 34

3.4-2 Curve - Remove Curve and Plate . . . . . 3 - 35

3.4-3 Curve - Assemble Plate and Curve . . . . . 3 - 38

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3.5-1 Linear Guide - Check Oil Brushes . . . . . 3 - 44
3.5-2 Linear Guide - Check Cam Rollers . . . . . 3 - 45
3.5-3 Linear Guide - Check Upper and Lower Bearings . . . . . 3 - 47
3.5-4 Linear Guide - Check Rails and Carriages . . . . 3 - 48
3.5-5 Linear Guide - Remove Link Bearings . . . . . 3 - 49
3.5-6 Linear Guide - Change Rail and Carriage . . . . 3 - 56
3.5-7 Linear Guide - Change Cam Rollers . . . . . 3 - 58
3.5-8 Linear Guide - Assemble Link Bearings . . . . . 3 - 60
3.5-9 Linear Guide - Lubricate Link Bearings . . . . . 3 - 66

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3.6-1 Bellows - Check Bellows and Pneumatic System . . . . . 3 - 67
3.6-2 Bellows - Change Bellows . . . . . 3 - 68
3.6-3 Bellows - Set Bellows Pressure . . . . . 3 - 71

3.7 Jaw Link . . . . . 3 - 72

3.7-1 Jaw Link - Check Slides and Switch Cable . . . 3 - 72
3.7-2 Jaw Link - Check Overload Function . . . . . 3 - 73
3.7-3 Jaw Link - Change Slides . . . . . 3 - 74
3.7-4 Jaw Link - Overhaul . . . . . 3 - 75
3.7-5 Jaw Link - Set Link and Proximity Switch . . . . 3 - 77

3.8 Yoke Link . . . . . 3 - 78

3.8-1 Yoke Link - Check Slides . . . . . 3 - 78
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3.8-4 Yoke Link - Set Link . . . . . 3 - 80

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3.1 Worm Gear

SPC Reference	1095701-0400

3.1-1 Worm Gear - Check Oil Level

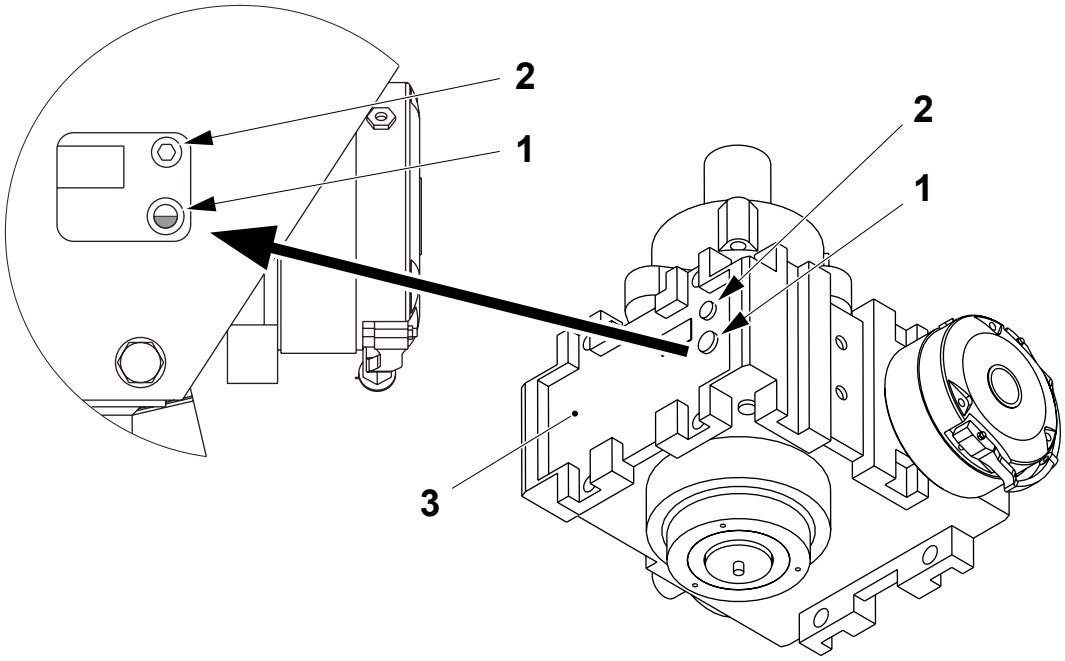
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lubricant TP No. 90459-3876
SPC Reference	1095701-0400

WARNING
Risk of personal injury.
Wear protective gloves.

Check the oil level in the level gauge (1) when the worm gear (3) is cold.

If required, fill up with oil through the oil inlet plug (2) until the right level is reached in the level gauge (1).

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1 Level gauge
2 Plug
3 Worm gear

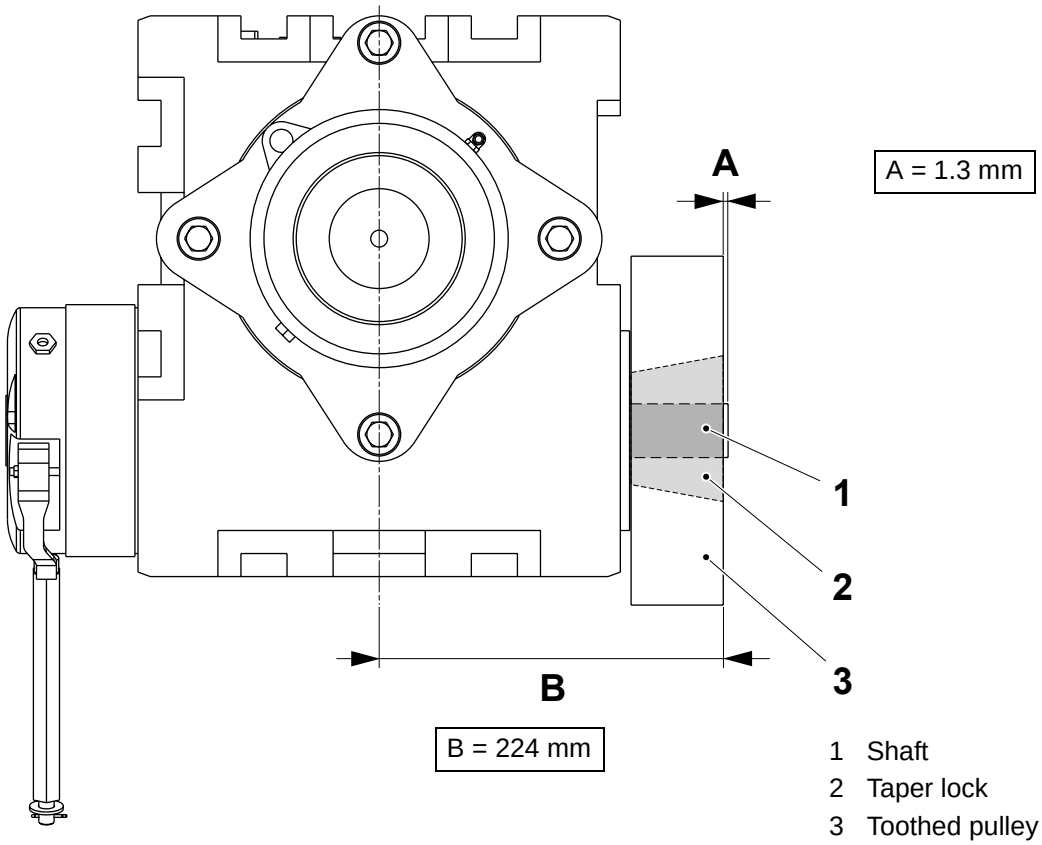
3.1-2 Worm Gear - Set Distance

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095701-0400

a) Loosen the taper lock (2).

b) Set the distance **A** between the toothed pulley (3) and the end of the worm gear shaft (1) by shifting the toothed pulley (3).

c) Tighten the taper lock (2).



1 Shaft
2 Taper lock
3 Toothed pulley

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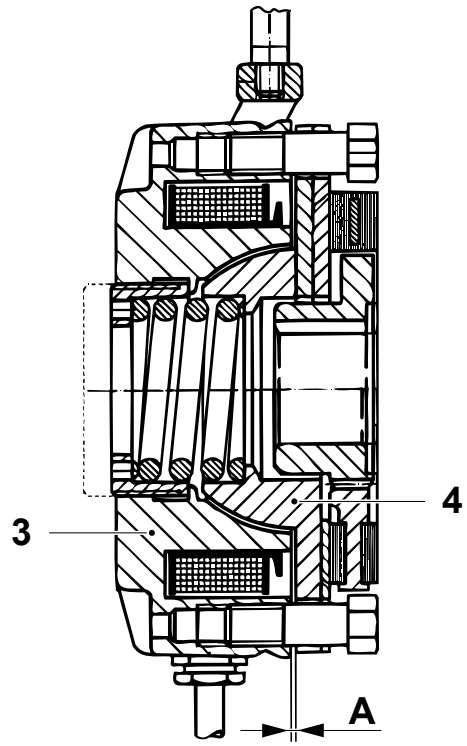
3.1-3 Worm Gear - Check Brake Distance

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095701-0400

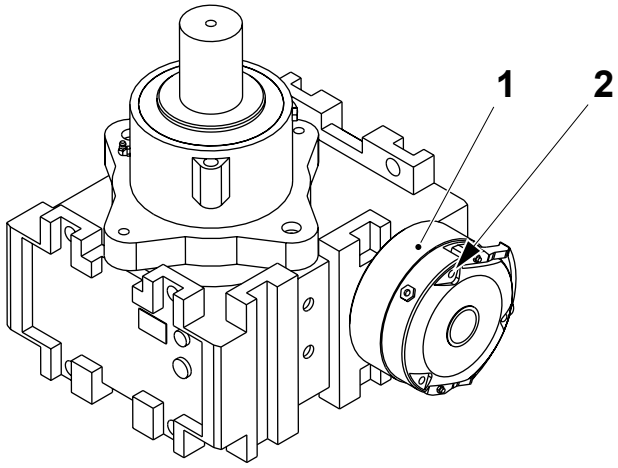
a) Pull back the rubber cover (1).

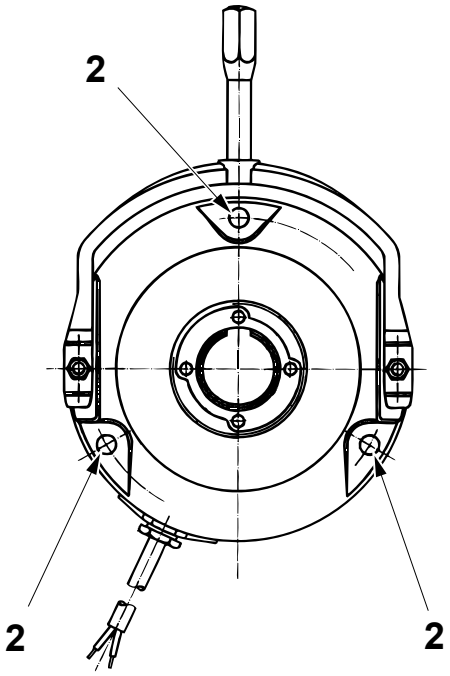
b) Check the distance **A** on the three screws (2) between the brake housing (3) and the brake disc (4) by means of a feeler gauge. Set as required, see 3.1-4 Worm Gear - Set Brake Distances.

c) Fit back the rubber cover (1).



A = 0.3 mm





1 Rubber cover
2 Screw
3 Brake housing
4 Brake disc

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3.1-4 Worm Gear - Set Brake Distances

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095701-0400

a) Pull back the rubber cover.

b) Loosen the screws (1).

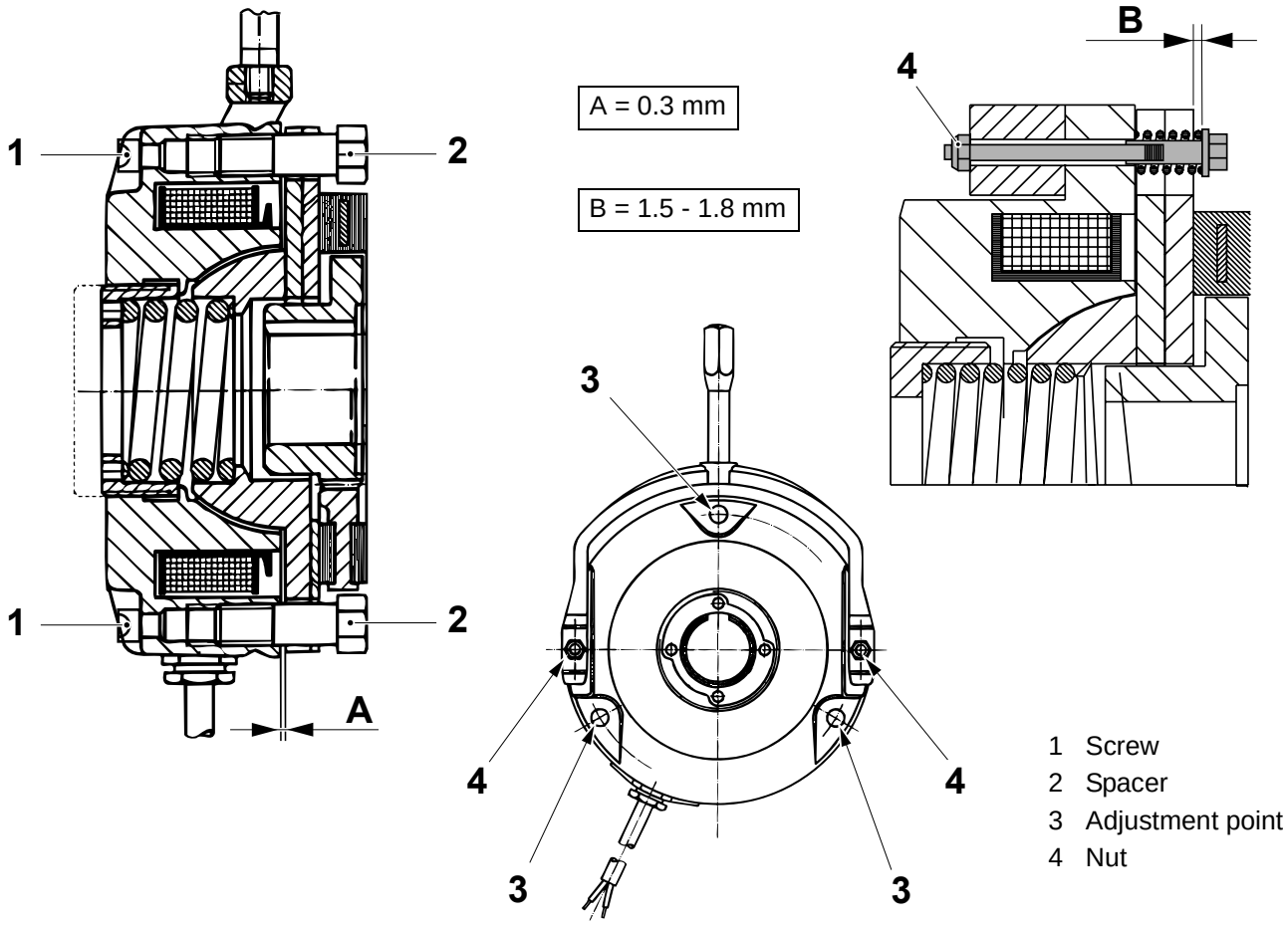
c) Set the distance **A** by turning the adjustable spacer (2) on all the three adjustment points (3).

d) Tighten the screws (1).

e) Check the distance **A** on all the three adjustment points (3) once more after the setting.

f) Set the distance **B** by turning the nuts (4) on the brake.

g) Fit back the rubber cover.



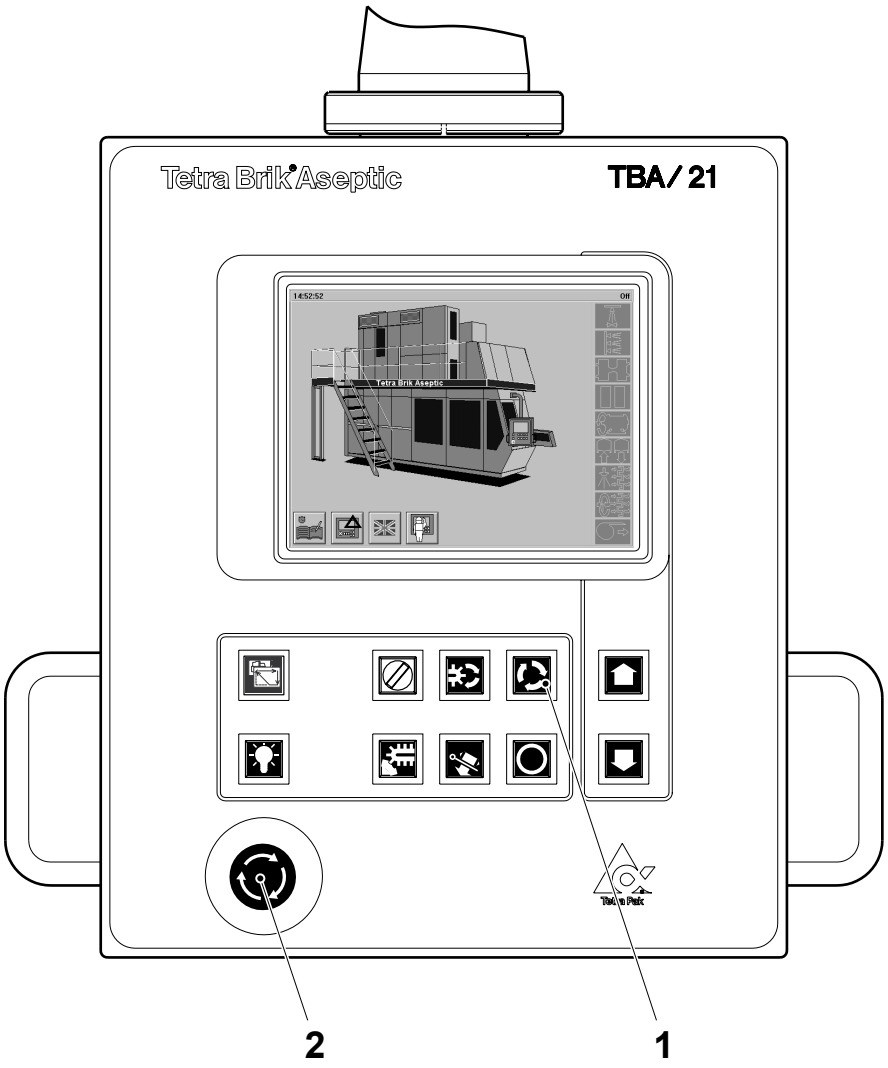
TechPub_2614345_0105 - 03_MM81534_11en.fm

3.1-5 Worm Gear - Check Brake Function

Machine Status	PREPARATION
SPC Reference	1095701-0400

a) Inch the machine at high speed with the JAW SYSTEM INCHING button (1).

b) Press the EMERGENCY STOP button (2) and check that the machine stops immediately.



1 JAW SYSTEM INCHING button
2 EMERGENCY STOP button

TechPub_2614345_0105 - 03_MM81534_11en.fm

3.1-6 Worm Gear - Change Oil

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lubricant TP No. 90459-3876
SPC Reference	1095701-0400

WARNING

Risk of personal injury.

Wear protective gloves.

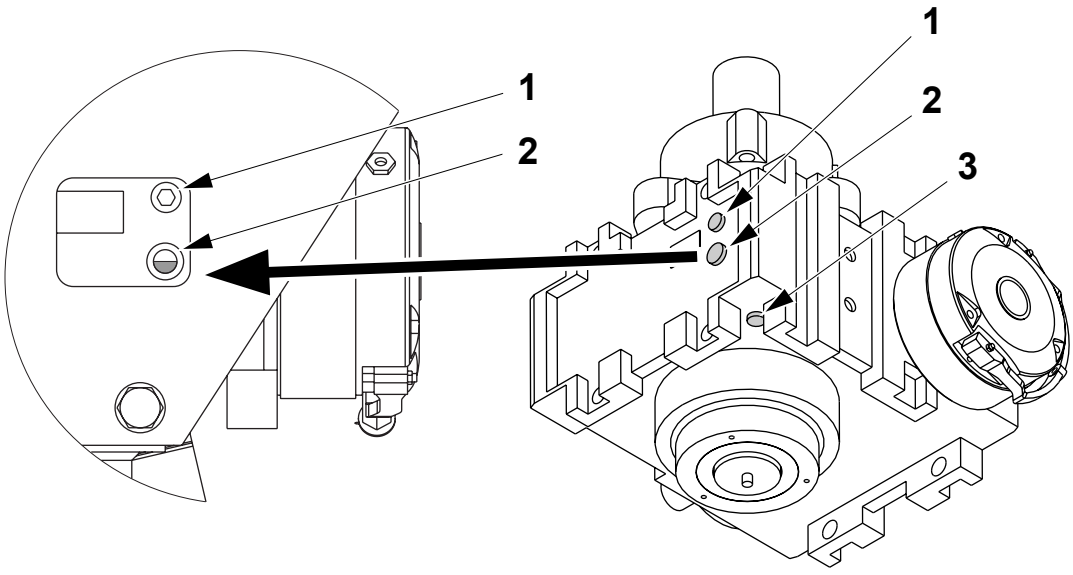
a) Remove the inlet plug (1) and the outlet plug (3) and drain the oil.

Note! Collect the exhausted oil in a container.

b) Fit the outlet plug (3)

c) Fill up with oil, approximately **3.2** litres, through the inlet plug (1) until the right level is reached in the level gauge (2).

d) Fit the inlet plug (1).



1 Inlet plug
2 Level gauge
3 Outlet plug

TechPub_2614345_0105 - 03_MM81534_11en.fm

3.1-7 Worm Gear - Lubricate

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Grease TP No. 90459-1052
SPC Reference	1095701-0400

WARNING

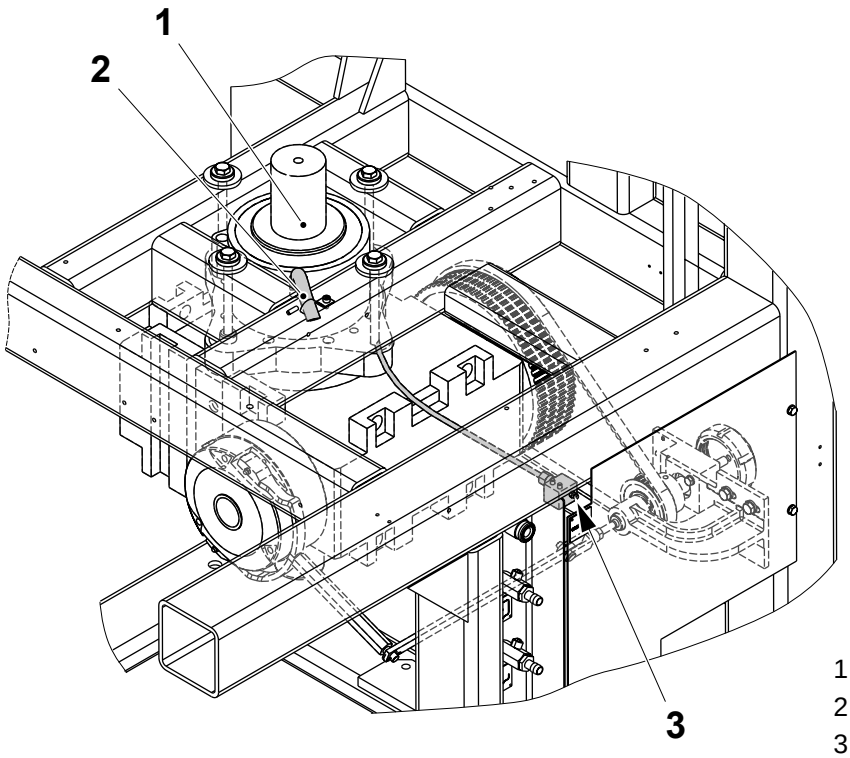
Risk of personal injury.
Wear protective gloves.

Note! An alternative grease is TP No. 90459-1063.

a) Run the machine until the worm gear (1) is warm.

b) Lubricate the worm gear (1) through the nipple (3) until the new grease is ejected from the hose (2). The colour of the ejected grease must be clear.

Note! When lubricating the worm gear (1) do not use too much force with the grease gun, the seals and the gaskets may be moved out of position inside the worm gear (1).



1 Worm gear
2 Hose
3 Nipple

TechPub_2614345_0105 - 03_MM81534_11en.fm

3.1-8 Worm Gear - Change Seals

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Grease TP No. 90459-1052
SPC Reference	1095701-0400

WARNING

Risk of personal injury.

Wear protective gloves.

Check the following parts for damage and/or worn:

- the radial seals (1), (2), (3) and (5)
- dust cover (4).

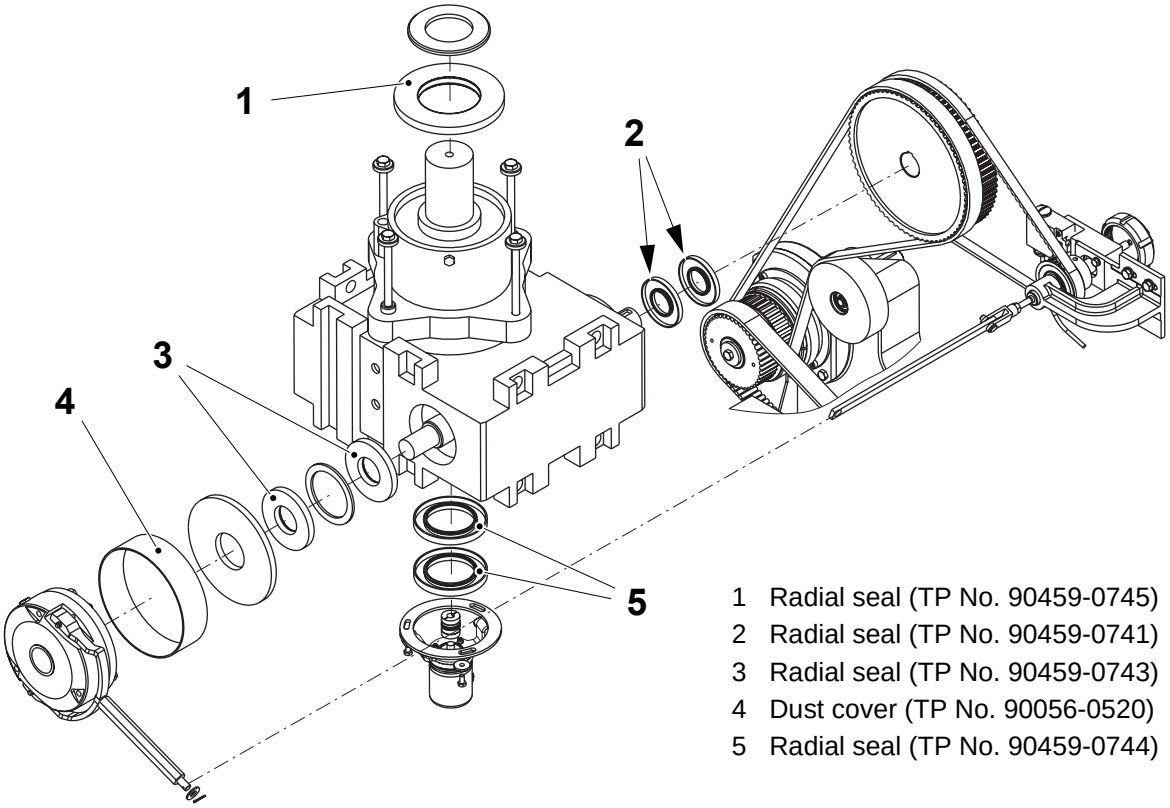
Change all the parts as required.

Change Radial Seal (1)

a) Remove the curve unit, see 3.4-2 Curve - Remove Curve and Plate.

b) Change the radial seal (1).

c) Assemble the curve unit, see 3.4-3 Curve - Assemble Plate and Curve.



1 Radial seal (TP No. 90459-0745)
2 Radial seal (TP No. 90459-0741)
3 Radial seal (TP No. 90459-0743)
4 Dust cover (TP No. 90056-0520)
5 Radial seal (TP No. 90459-0744)

(Cont'd)

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(Cont'd)

Change Radial Seals (2)

a) Loosen the tension sprocket (9) and the three screws (10).

b) Remove the toothed pulley (7) and the timing belts (6) and (8).

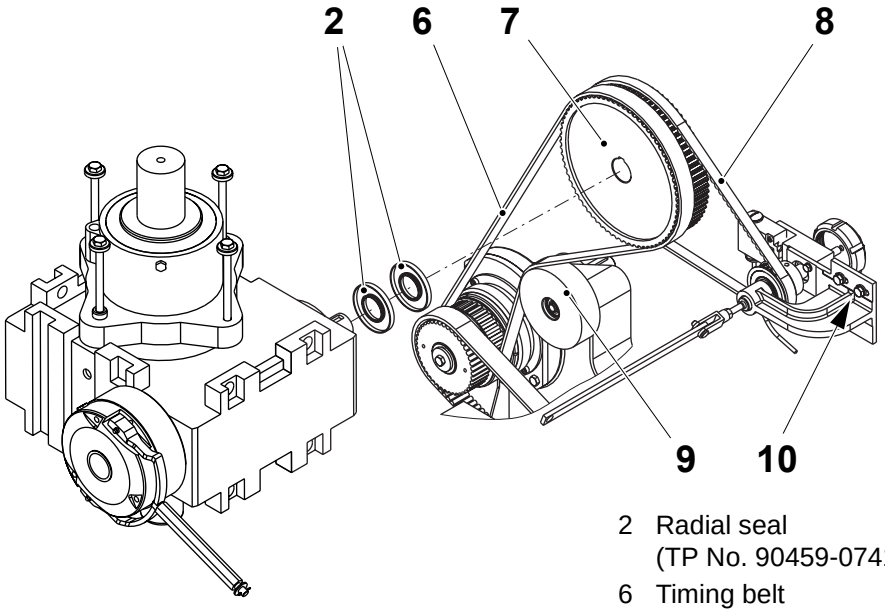
c) Change the radial seals (2).

d) Fit the toothed pulley (7).

e) Set the toothed pulley (7), see 3.1-2 Worm Gear - Set Distance.

f) Fit the timing belts (6) and (8).

g) Set the timing belts (6) and (8), see 3.3-4 Drive Unit - Set Belt Tension and 3.2-2 Crank Unit - Set.



2 Radial seal (TP No. 90459-0741)
6 Timing belt
7 Toothed pulley
8 Timing belt
9 Tension sprocket
10 Screw

(Cont'd)

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(Cont'd)

Change Radial Seals (3) And Dust Cover (4)

a) Remove the adapter (14) from the pin (19) by means of the split pin (20).

b) Loosen the three screws (15) on the plate (12) and remove the plate (12) from the worm gear (11).

Note! The plate (12) is fitted to the brake (13) with an another set of three screws.

c) Change the radial seals (3) and the dust cover (4).

d) Fit the plate (12) to the worm gear (11) by means of the three screws (15).

e) Fit the adapter (14) to the pin (19) by means of the split pin (20).

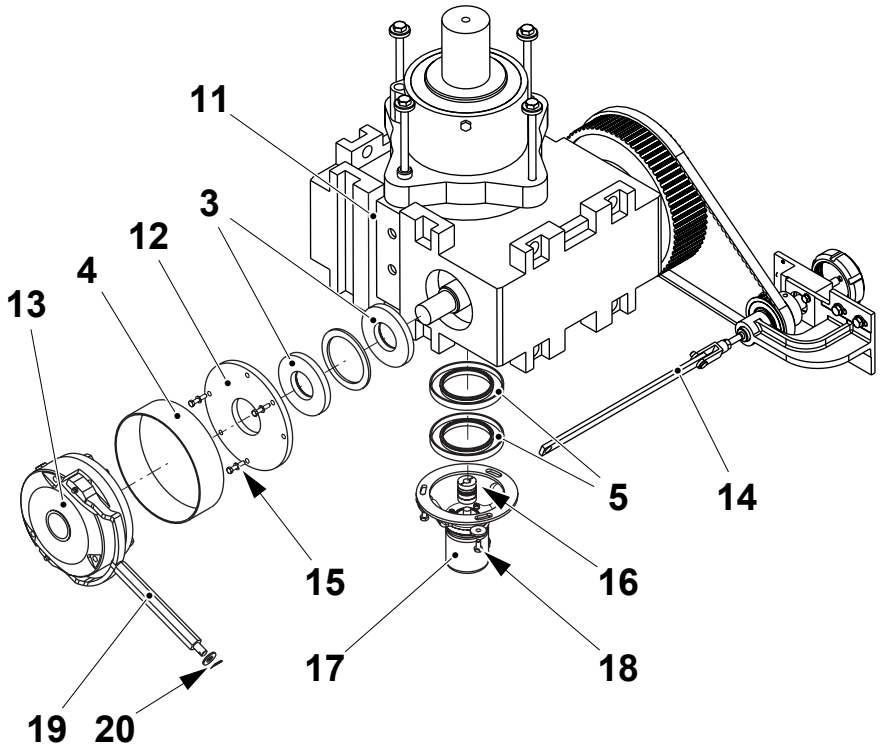
Change Radial Seals (5)

a) Remove the angle encoder (17) by means of the three screws (18) and the coupling (16).

b) Change the radial seals (5).

c) Fit the angle encoder (17) by means of the three screws (18) and the coupling (16).

d) Set the angle encoder, see 3.1.1-1 Connection Box - Set Angle Encoder.



3 Radial seal (TP No. 90459-0743)
4 Dust cover (TP No. 90056-0520)
5 Radial seal (TP No. 90459-0744)
11 Worm gear
12 Plate
13 Brake
14 Adapter
15 Screw
16 Coupling
17 Angle encoder
18 Screw
19 Pin
20 Split pin

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3.1.1 Connection Box

3.1.1-1 Connection Box - Set Angle Encoder

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
Special Equipment	Zero tool TP No.1036061
SPC Reference	1095702-0100

a) Crank the machine until the zero tool (1) fits completely into the zero hole.

b) Loosen the screws (2) and turn the angle encoder bracket (8) until the display (4) shows 0 decimal degrees.

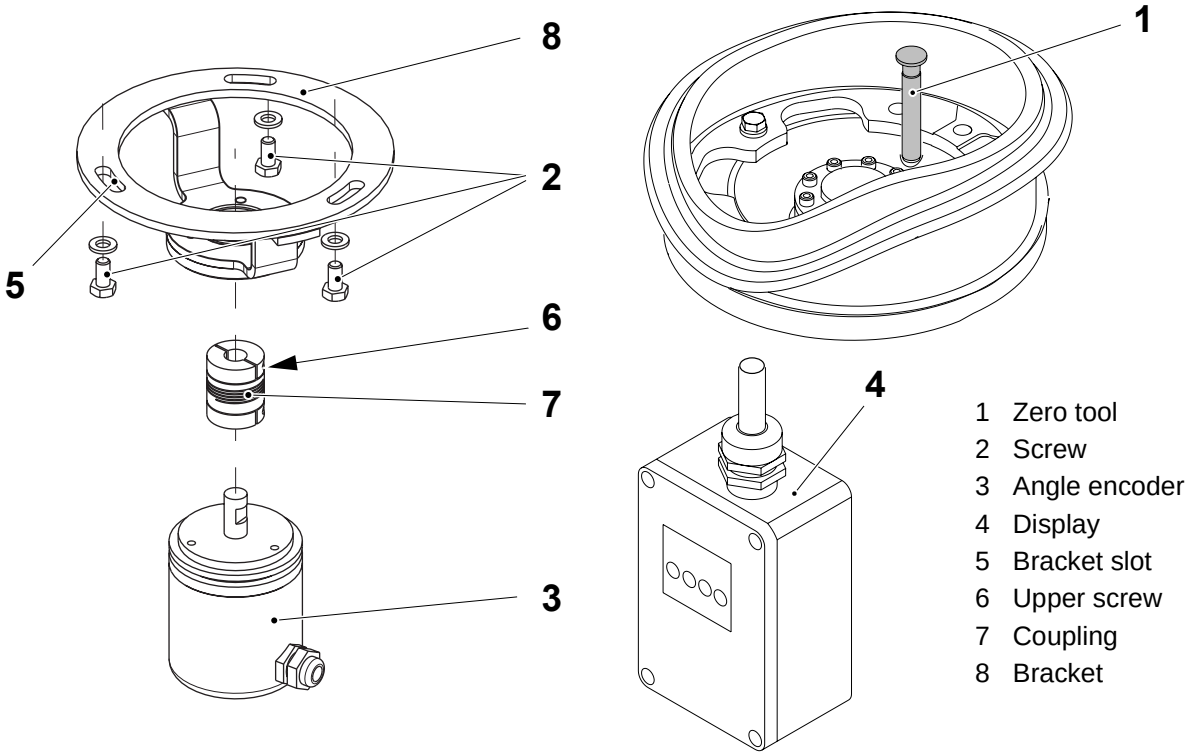
c) Tighten the screws (2).

d) Check that the display (4) still shows 0 decimal degrees.

e) Remove the zero tool (1).

If there is not enough adjustment space in the bracket slots (5) perform the following instructions:

- Tighten the screws (2) in the middle of the slots.
- Loosen the upper screw (6) on the coupling (7) and turn it until the display (4) shows 0 decimal degrees.
- Tighten the upper screw (6).



1 Zero tool
2 Screw
3 Angle encoder
4 Display
5 Bracket slot
6 Upper screw
7 Coupling
8 Bracket

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3.1.1-2 Connection Box - Set Display

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095702-0100

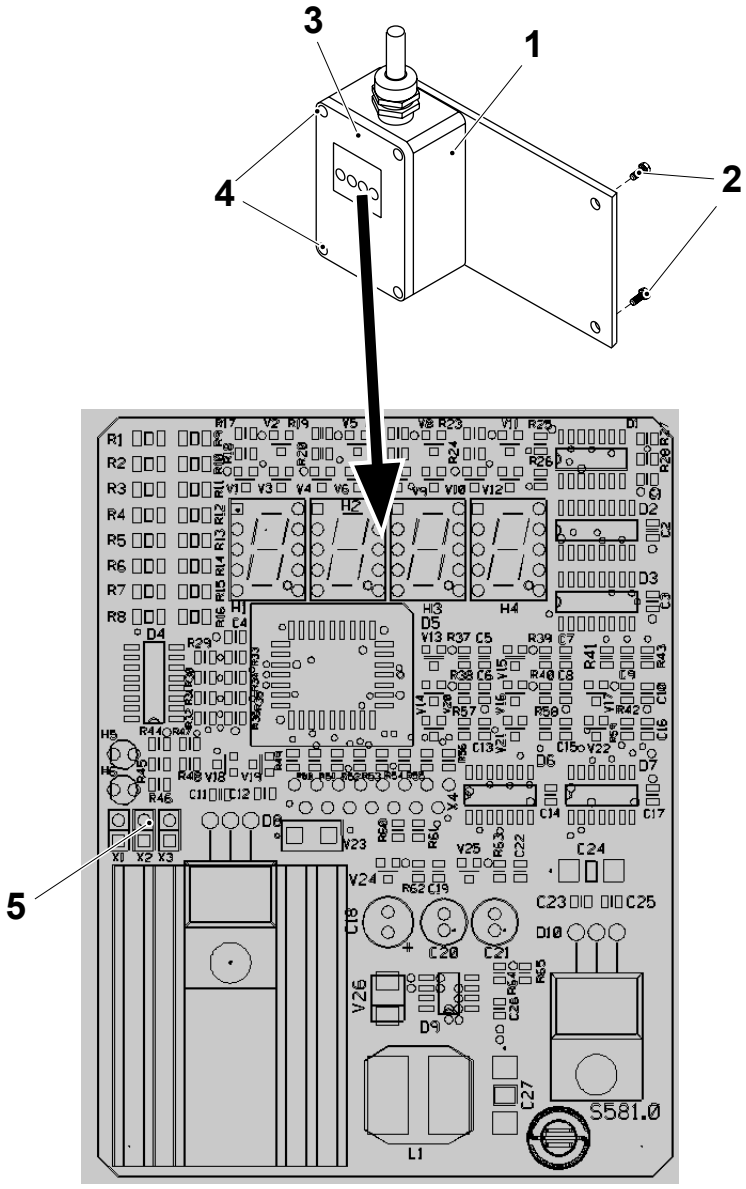
a) Remove the angle encoder display (1) with the bracket by means of the screws (2).

b) Remove the cover (3) by means of the screws (4).

c) Set the jumpers (5) as follows:

- X1 Disconnected
- X2 Connected
- X3 Connected.

d) Assemble in the reverse order.



1 Encoder display
2 Screw
3 Cover
4 Screw
5 Jumper

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3.1.1-3 Connection Box - Check Angle Encoder

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1095702-0100

a) Crank the machine to 170 decimal degrees.

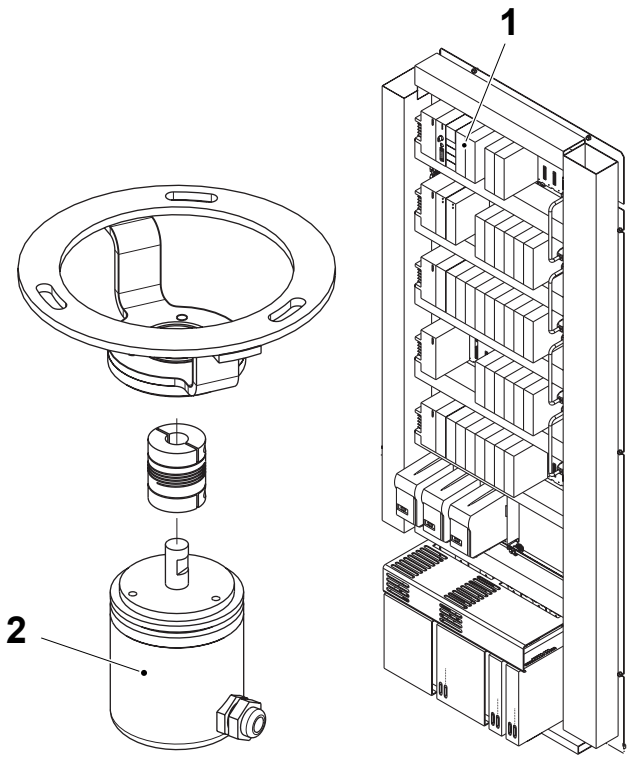
b) On the PLC input module (1) A102 check that the LEDs (from A1 to A8) are **On**.

c) Crank the machine to 0 decimal degrees.

d) On the PLC input module (1) A102 check that the LEDs (from A1 to A8) are **Off**.

e) If not, check all the connections between the angle encoder (2) and the PLC input module (1) A102.

f) Change the angle encoder (2) or the PLC input module (1) as required, see 3.1.1-1 Connection Box - Set Angle Encoder.



1 Input module
2 Angle encoder

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3.2 Crank Unit

SPC Reference	1095700-0300

3.2-1 Crank Unit - Check

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095700-0300

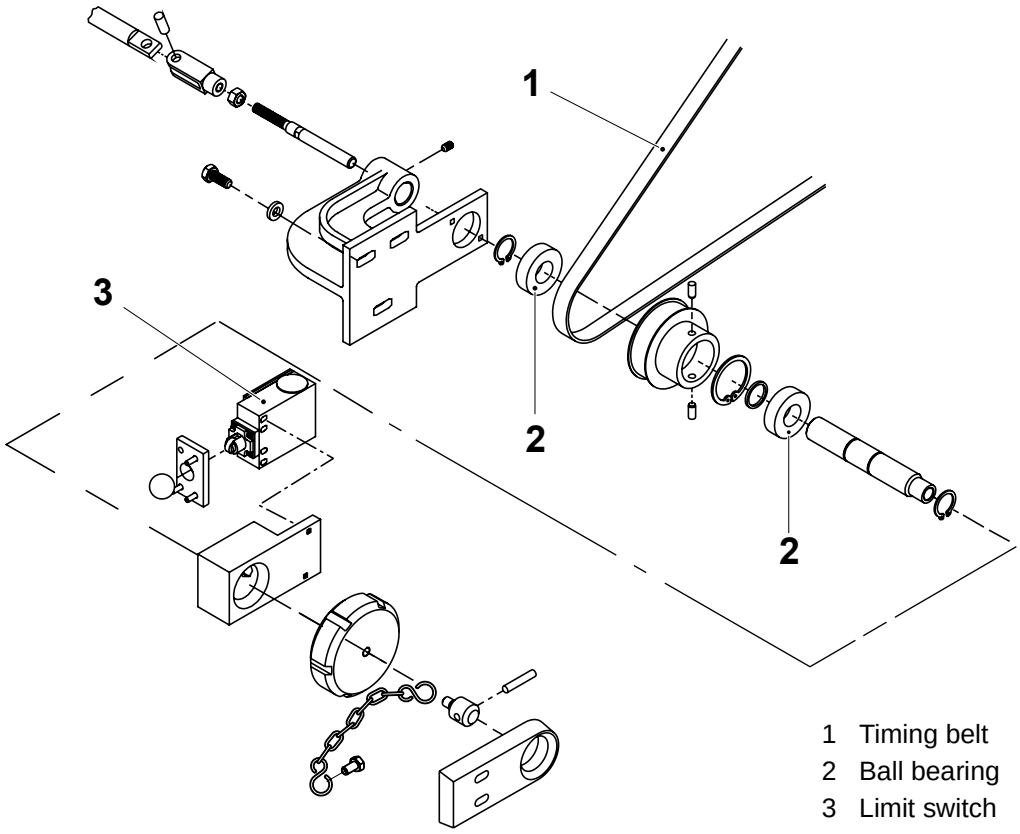
WARNING

Risk of personal injury due to pinching or crushing.
Do not release the brake while working with the unit.

Check the following parts for visual wear and/or damage:

- the timing belt (1)
  Check the belt tension.
  Set as required, see 3.2-2 Crank Unit - Set.
- the ball bearings (2)
  Insert the crank and check that it turns easily and smoothly.
- the limit switch (3) function
  Switch **On** the mains power, insert the crank and check that the TPOP panel shows the crank guard alarm on the screen.

Change as required.



1 Timing belt
2 Ball bearing
3 Limit switch

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3.2-2 Crank Unit - Set

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Special Equipment	Dynamometer TP No. 74764-102
SPC Reference	1095700-0300

WARNING

Risk of personal injury due to pinching or crushing.
Do not release the brake while working with the unit.

Timing belt

a) Loosen the screws (1) on the bracket (2).

b) Set the tension of the timing belt (3) by shifting the bracket (2) sideways, see arrows.

c) Set **10 ±1 mm** deflection at point **A** with **15 ±1 N**, load force.

d) Tighten the screws (1).

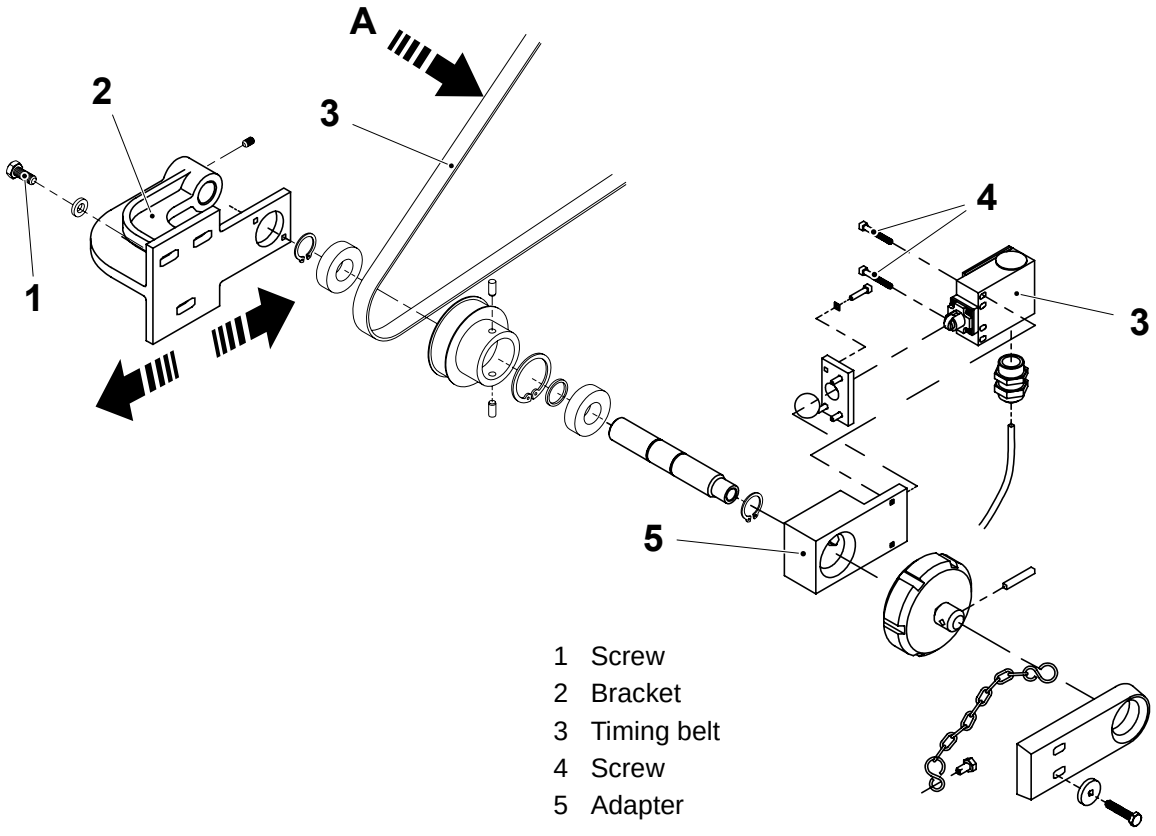
Switch alignment

a) Loosen the two screws (4) on the adapter (5).

b) Insert the crank in cranking position and check that it is fitted correctly.

c) Tighten the two screws (4).

d) Remove the crank.



1 Screw
2 Bracket
3 Timing belt
4 Screw
5 Adapter

(Cont'd)

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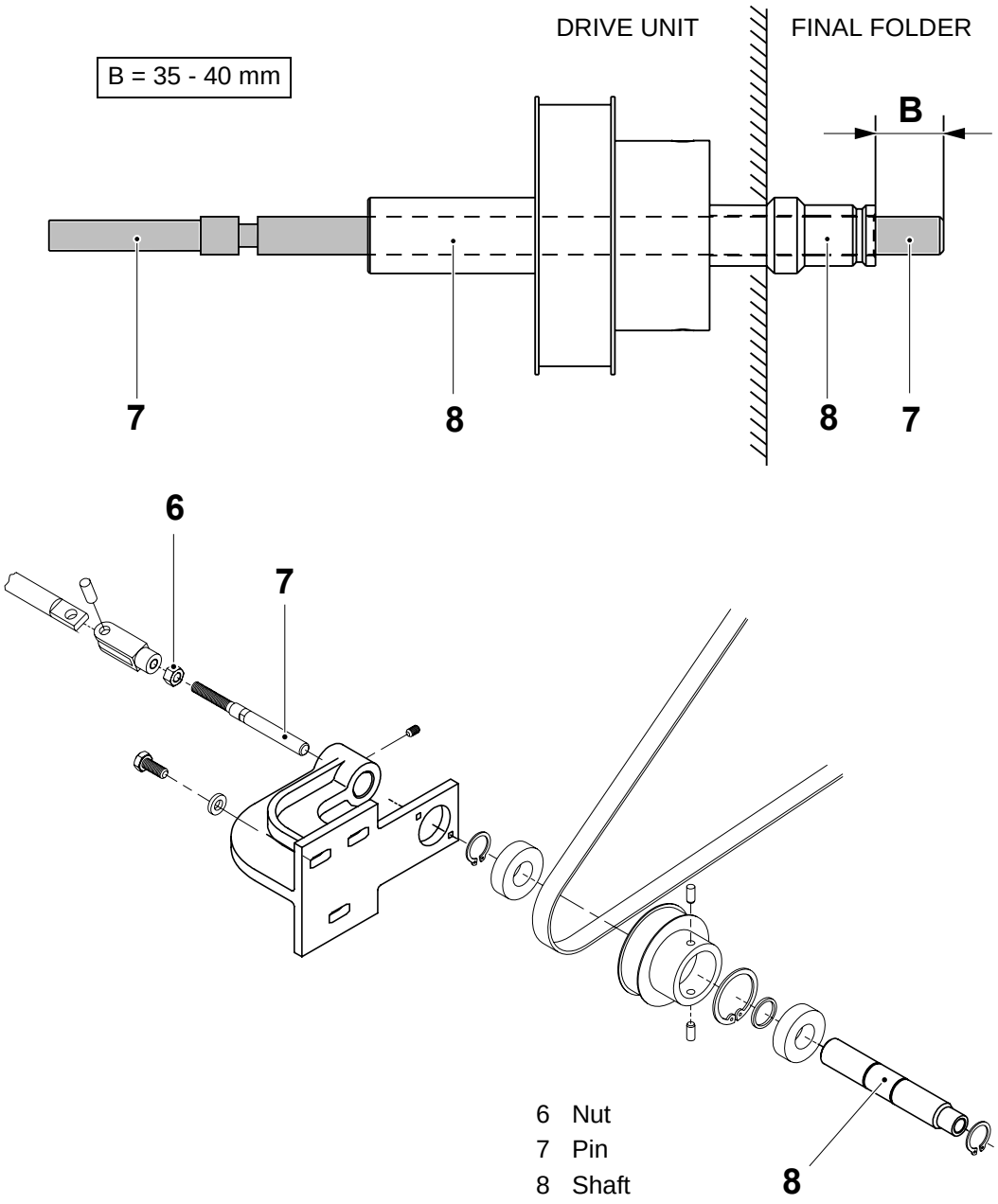
(Cont'd)

Shaft

a) Loosen the nut (6) on the pin (7).

b) Set the distance **B** between the pin (7) and the shaft (8) by turning the pin (7) clockwise or anti-clockwise.

c) Tighten the nut (6).



(Cont'd)

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(Cont'd)

Crank

a) Make sure that the slots on the crank (9) are free, see **Fig. 1**. If not turn the handle (10) fully anti clockwise.

b) Fit the crank (9) and push it firmly to disengage the brake and to match the pins (11) in the toothed pulley (12).

c) Turn the handle (10) fully clockwise to hook the crank (9) to the pins (11), see **Fig. 2**.

WARNING

Risk of personal injury due to pinching or crushing.
The crank and the jaw system could unexpectedly move by itself.

d) Crank to verify that the Drive unit and the Jaw system are moving.

e) Push firmly the crank (9) and turn the handle (10) fully anti clockwise to remove the crank (9).

f) The brake is now re-engaged with the worm gear.

Fig. 1

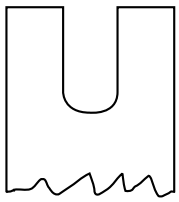
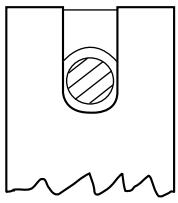
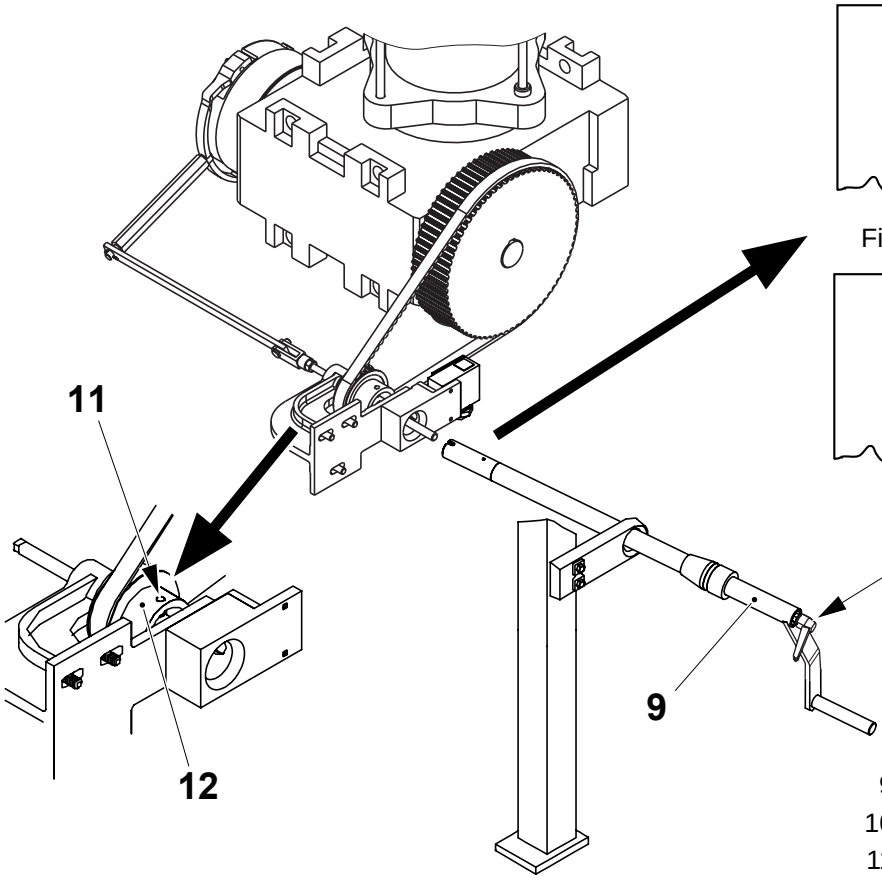


Fig. 2





9 Crank
10 Handle
11 Pin
12 Toothed pulley

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3.3 Drive Unit

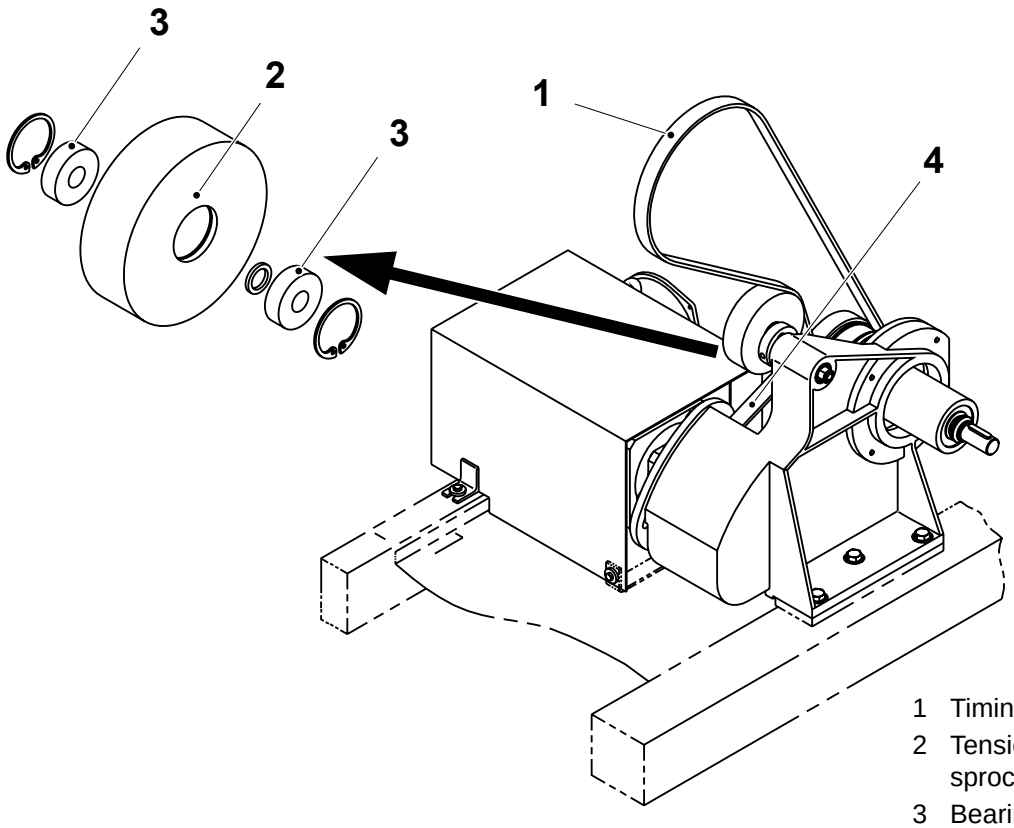
SPC Reference	1095684-0300

3.3-1 Drive Unit - Check Timing Belts and Bearings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095684-0300

Check the following parts for visual wear and/or damage:

- the timing belts (1) and (4)
  Check the belts tension.
  Set as required, see 3.3-4 Drive Unit - Set Belt Tension.
- the tension sprocket (2)
  Check that it turns freely by releasing the belts tension.
  If not change the bearings (3) as required, see 3.3-3 Drive Unit - Change Bearings.
  Set the belts tension, see 3.3-4 Drive Unit - Set Belt Tension.



1 Timing belt
2 Tension sprocket
3 Bearing
4 Timing belt

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3.3-2 Drive Unit - Change Timing Belts

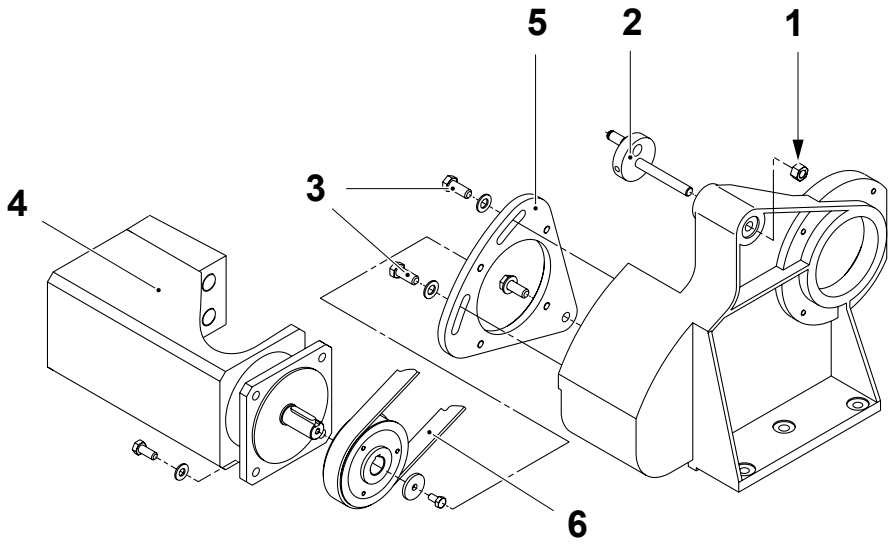
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095684-0300

a) Loosen the nut (1).

b) With the aid of a screwdriver, turn the shaft (2) **90°** and release the tension of the timing belt (10).

c) Loosen the three screws (3) and turn the motor (4) by means of the slots in the motor plate (5).

d) Remove the timing belt (6) and change it.



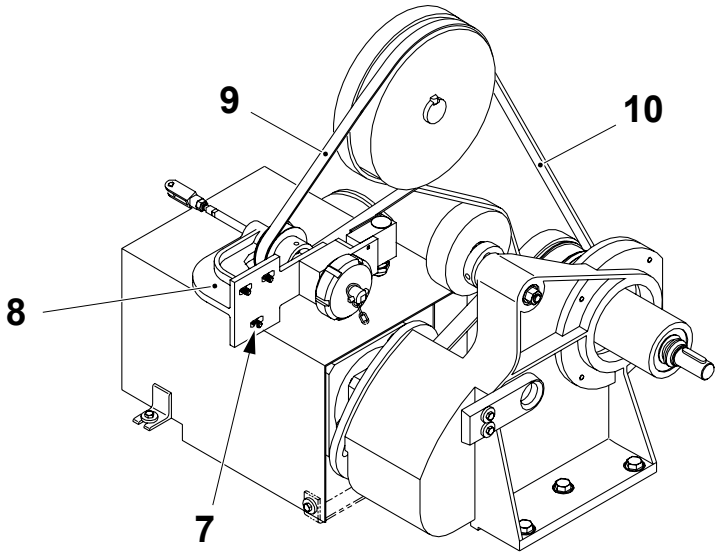
1 Nut
2 Shaft
3 Screw
4 Motor
5 Motor plate
6 Timing belt

(Cont'd)

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(Cont'd)

e) Loosen the screws (7) and shift the cantilever (8).
f) Remove the timing belts (9) and (10) and change them.
g) Set the belts tension, see 3.3-4 Drive Unit - Set Belt Tension.
h) Assemble in the reverse order.



7 Screw
8 Cantilever
9 Timing belt
10 Timing belt

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3.3-3 Drive Unit - Change Bearings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Grease code F
SPC Reference	1095684-0300

a) Loosen the nut (1).

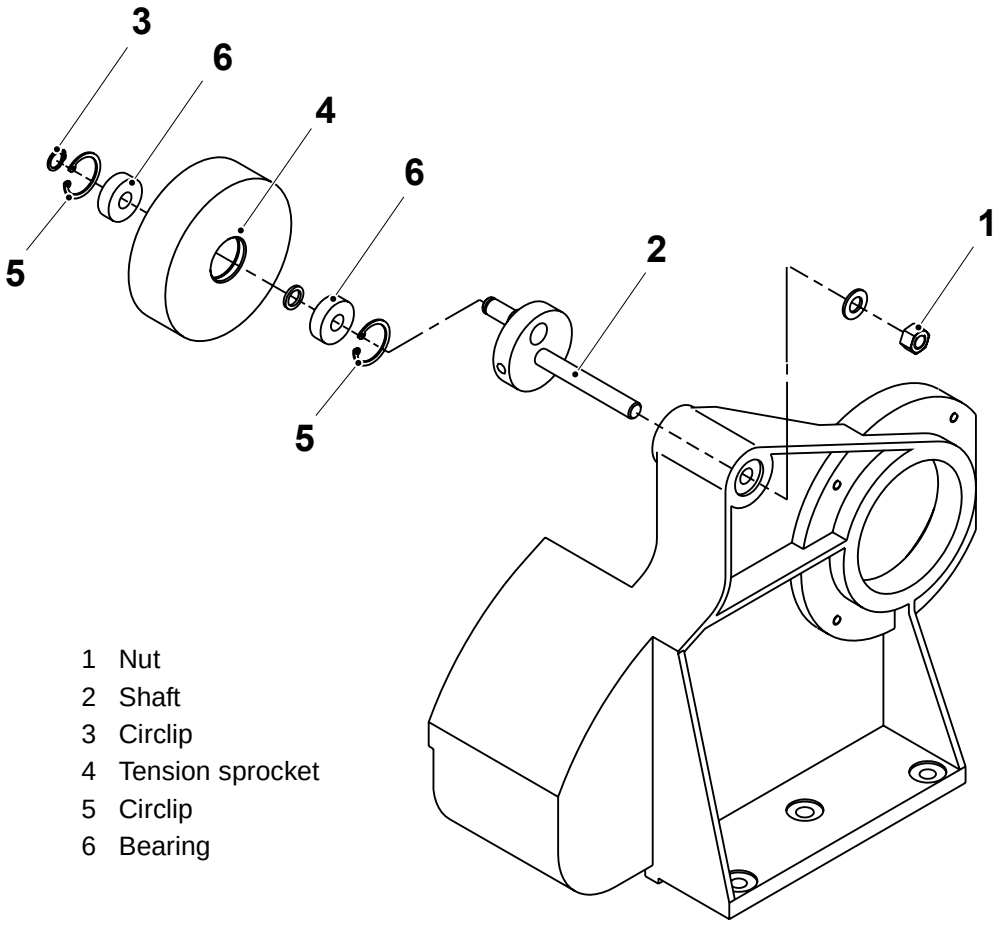
b) Turn the shaft (2) **90°**, with the aid of a screwdriver, and release the belts tension.

c) Remove as follows:
- the circlip (3)
- the tension sprocket (4)
- the circlips (5).

d) Remove the bearings (6) from the tension sprocket (4) and change them as required. Apply grease, code F, on the bearings (6) before assembling.

e) Assemble in the reverse order.

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1 Nut
2 Shaft
3 Circlip
4 Tension sprocket
5 Circlip
6 Bearing

3.3-4 Drive Unit - Set Belt Tension

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Dynamometer TP No. 74764-102
SPC Reference	1095684-0300

Set the tension of the timing belt (1) as follows:

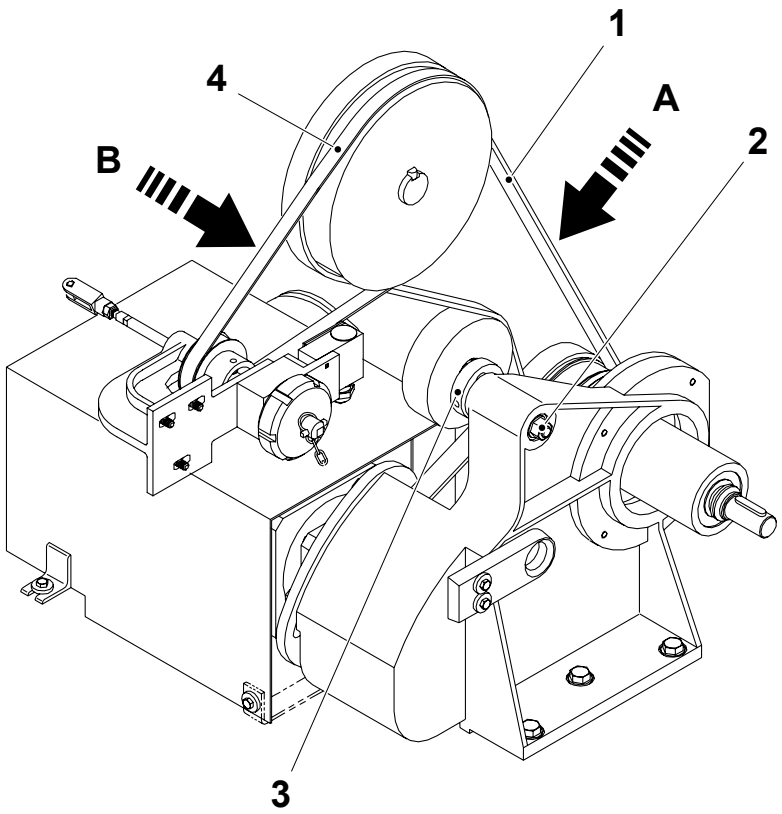
a) Loosen the nut (2).

b) Turn the shaft (3) by means of a screwdriver.

c) Set **10 ±1 mm** deflection at point **A** with **15 ±1 N** load force, see figure.

d) Tighten the nut (2).

Set the tension of the timing belt (4) at point **B**, see 3.2-2 Crank Unit - Set.



1 Timing belt
2 Nut
3 Shaft
4 Timing belt

(Cont'd)

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(Cont'd)

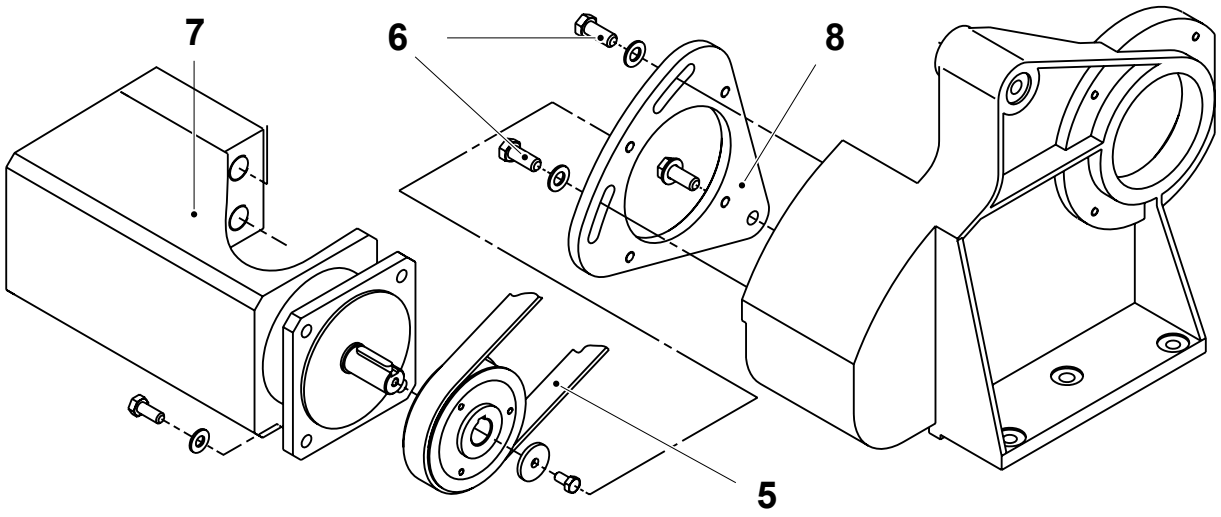
Set the tension of the timing belt (5) as follows:

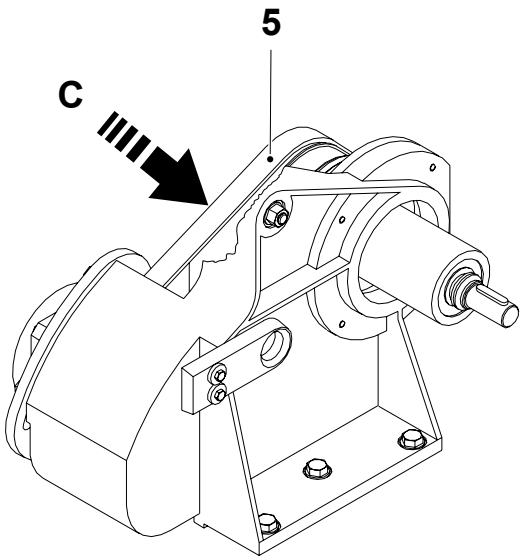
a) Loosen the three screws (6).

b) Turn the motor (7) by means of the slots in the motor plate (8).

c) Set **10 ±1 mm** deflection at point **C** with **15 ±1 N** load force, (see figure).

d) Tighten the screws (6).





5 Timing belt
6 Screw
7 Motor
8 Motor plate

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3.3.1 Connection

3.3.1-1 Connection - Check Distance

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095683-0400

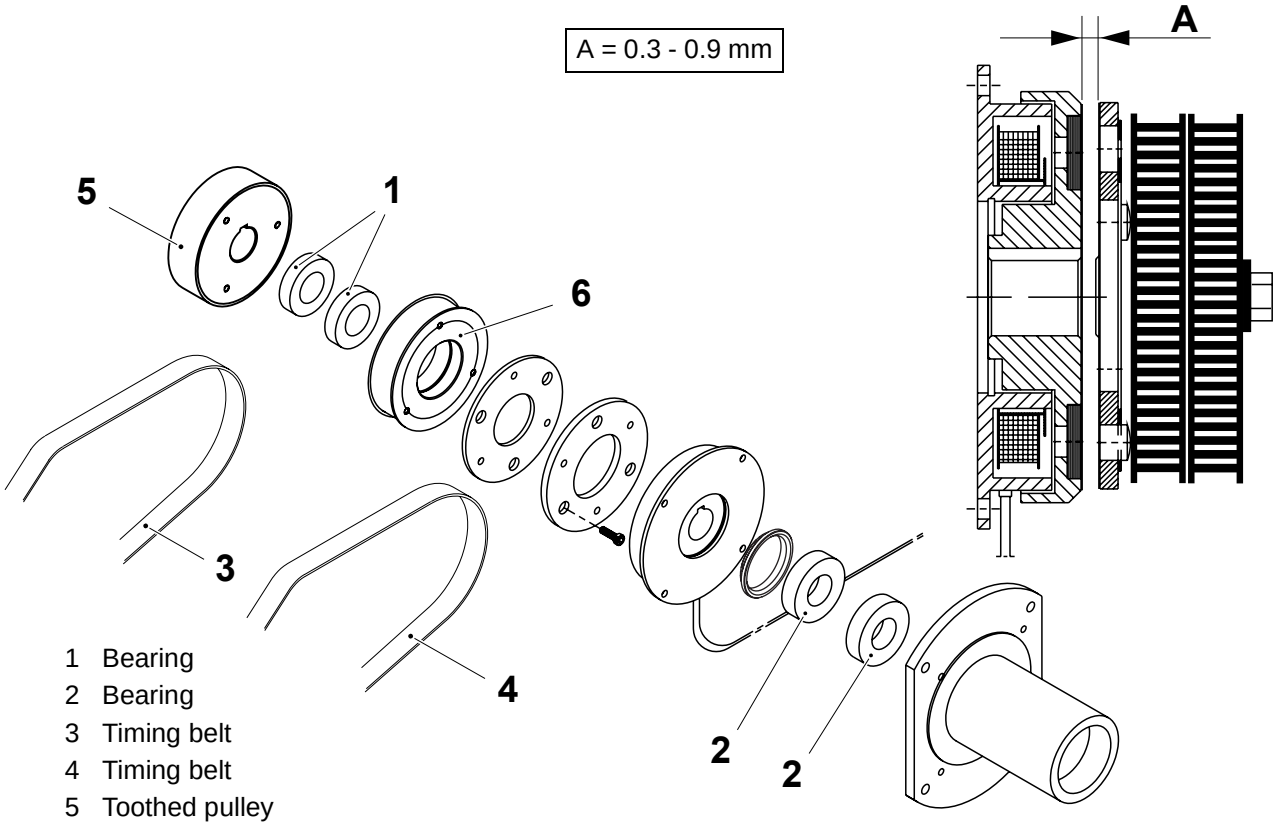
Check the distance **A** on three points around the clutch by means of a feeler gauge. Set as required, see 3.3.1-4 Connection - Set Distance.

3.3.1-2 Connection - Check Bearings

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Grease code F
SPC Reference	1095683-0400

Check the bearings (1) and (2) for wear and/or damage without disassembly but only by unloading the tension of the timing belts (3) and (4) and shaking by hand the toothed pulleys (5) and (6).

Change as required. Apply grease, code F, on the bearings (1) and (2) before assembling.



1 Bearing
2 Bearing
3 Timing belt
4 Timing belt
5 Toothed pulley
6 Toothed pulley

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3.3.1-3 Connection - Change Bearings

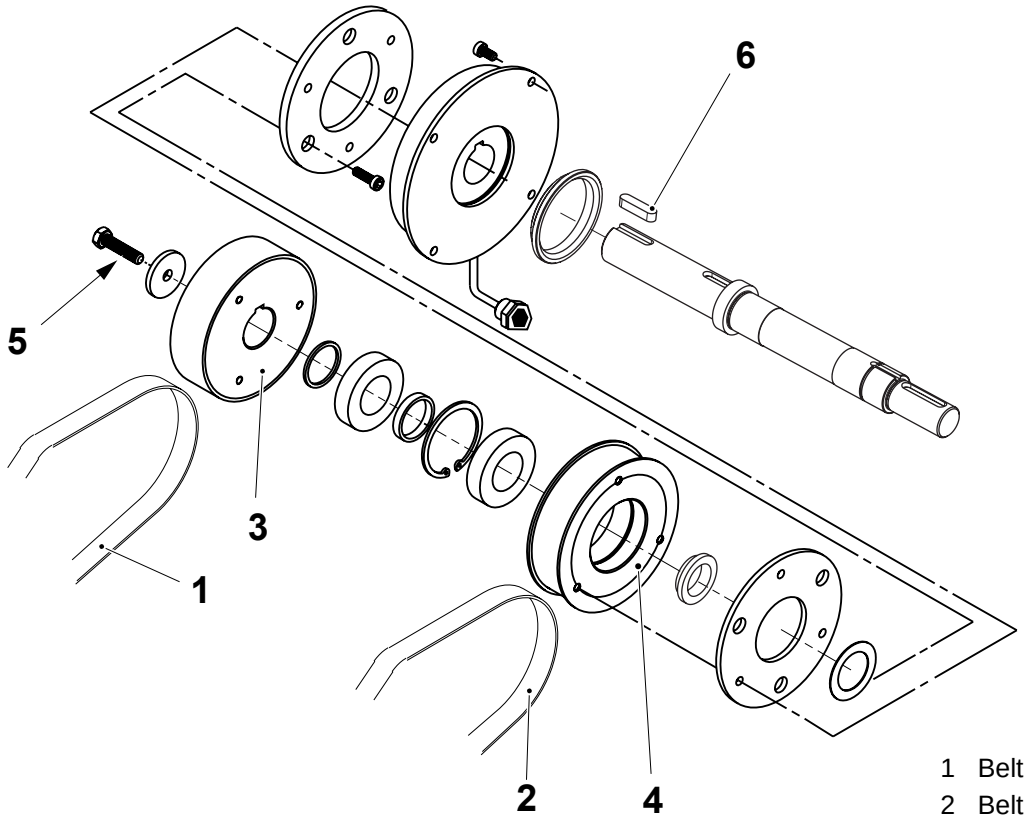
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Torque wrench min. 20 Nm
Consumables	Grease code F
SPC Reference	1095683-0400

a) Remove the timing belts (1) and (2) from the toothed pulleys (3) and (4).

b) Unscrew the screw (5).

Note! Tighten the screw (5) to **20 Nm** when assembling.

c) Remove the toothed pulley (3), the flat wedge (6) and the toothed pulley (4).



1 Belt
2 Belt
3 Toothed pulley
4 Toothed pulley
5 Screw
6 Flat wedge

(Cont'd)

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(Cont'd)

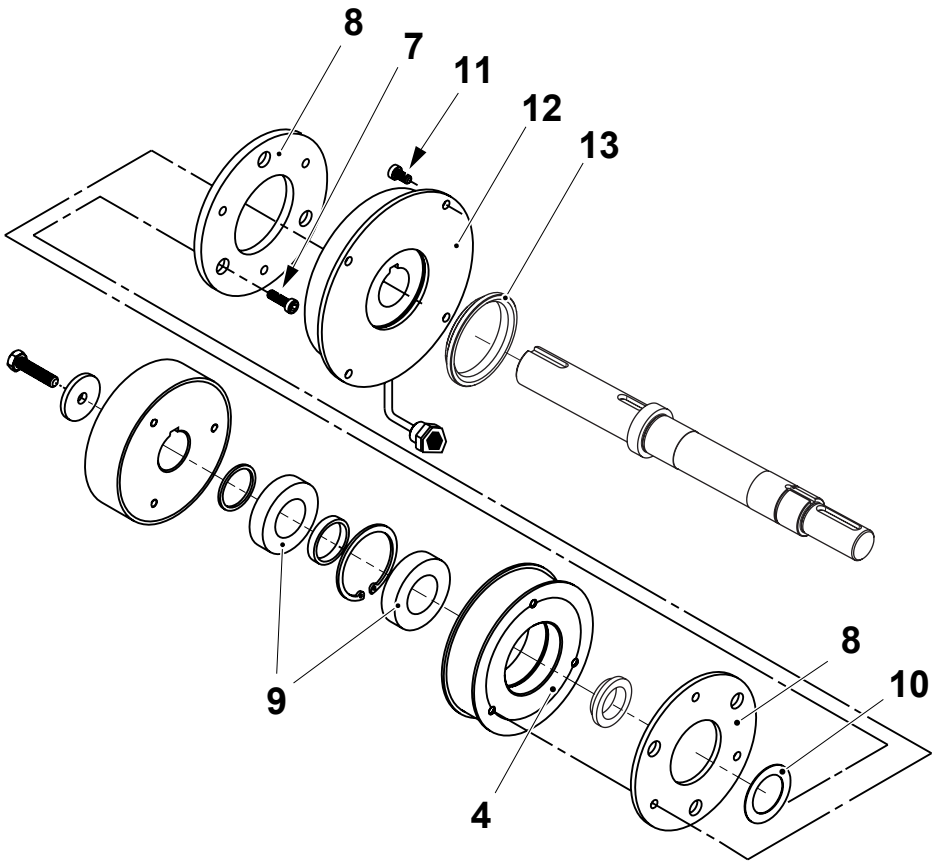
d) Loosen the screws (7) and remove the two washer (8) from the toothed pulley (4).

e) Remove and change the bearings (9) as required. Apply grease, code F, on the bearings (9) before assembling.

f) Remove the shims (10).

g) Unscrew the screws (11) and move aside the magnetic clutch (12).

h) Remove the spacer (13).



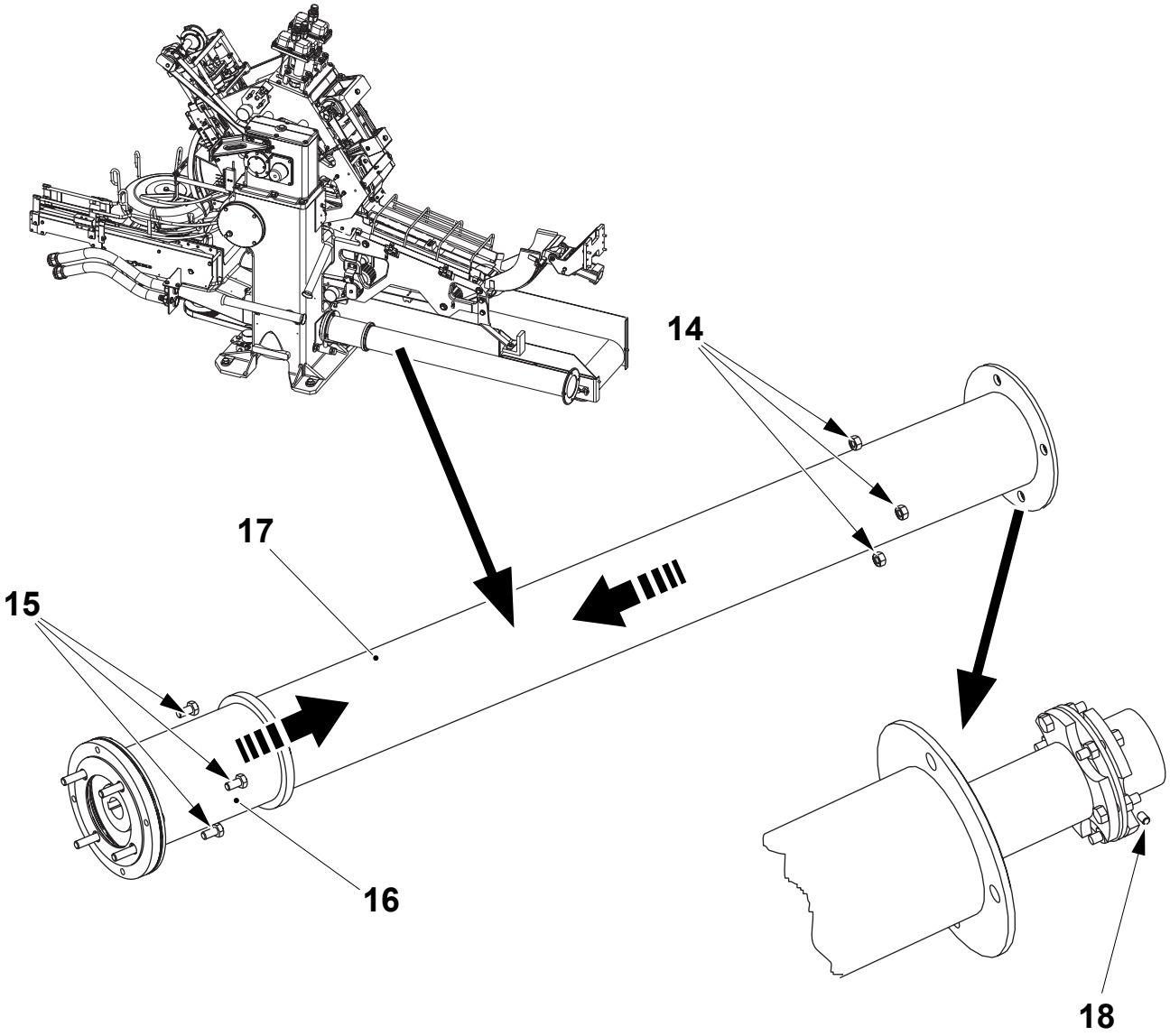
4 Toothed pulley
7 Screw
8 Washer
9 Bearing
10 Shim
11 Screw
12 Clutch
13 Spacer

(Cont'd)

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(Cont'd)

i) Remove the nuts (14) and the screws (15).
j) Slide the muff (16) and the protection (17).
k) Remove the grub screw (18).



14 Nut
15 Screw
16 Muff
17 Protection
18 Grub screw

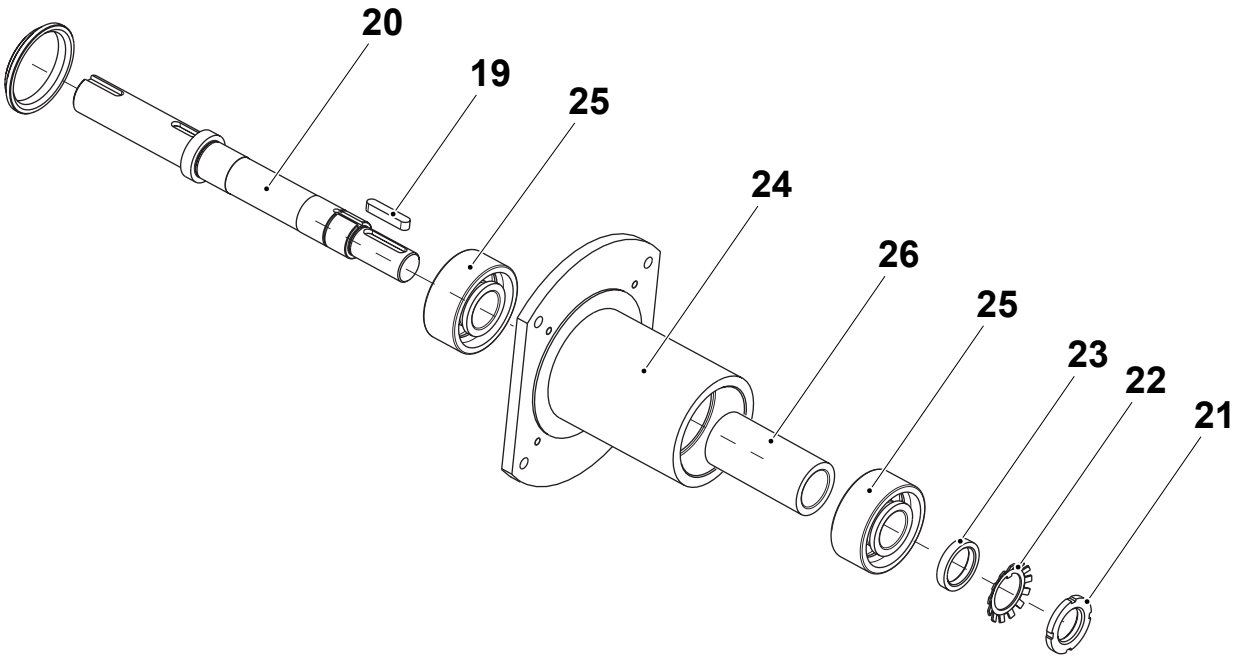
(Cont'd)

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(Cont'd)

l) Remove the flat wedge (19) from the shaft (20).
m) Remove the nut (21), the safety washer (22) and the spacer (23).
n) Remove the shaft (20) from the fastening plate (24).
o) Remove the bearings (25) and the sleeve (26).
p) Change the bearings (25). Apply grease, code F, on the bearings (25) before assembling.
q) Assemble in the reverse order.

Set as required, see 3.3.1-4 Connection - Set Distance.



19 Wedge
20 Shaft
21 Nut
22 Washer
23 Spacer
24 Fastening plate
25 Bearings
26 Sleeve

TechPub_2614345_0105 - 03_MM81534_11en.fm

3.3.1-4 Connection - Set Distance

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Torque wrench min. 20 Nm
SPC Reference	1095683-0400

a) Check the distance **A** and record the difference from the setting value.

b) Remove the timing belts (1) and (2) from the toothed pulleys (3) and (4).

c) Remove the screw (5).

Note! Tighten the screw (5) to **20 Nm** when assembling.

d) Remove the toothed pulleys (3) and (4).

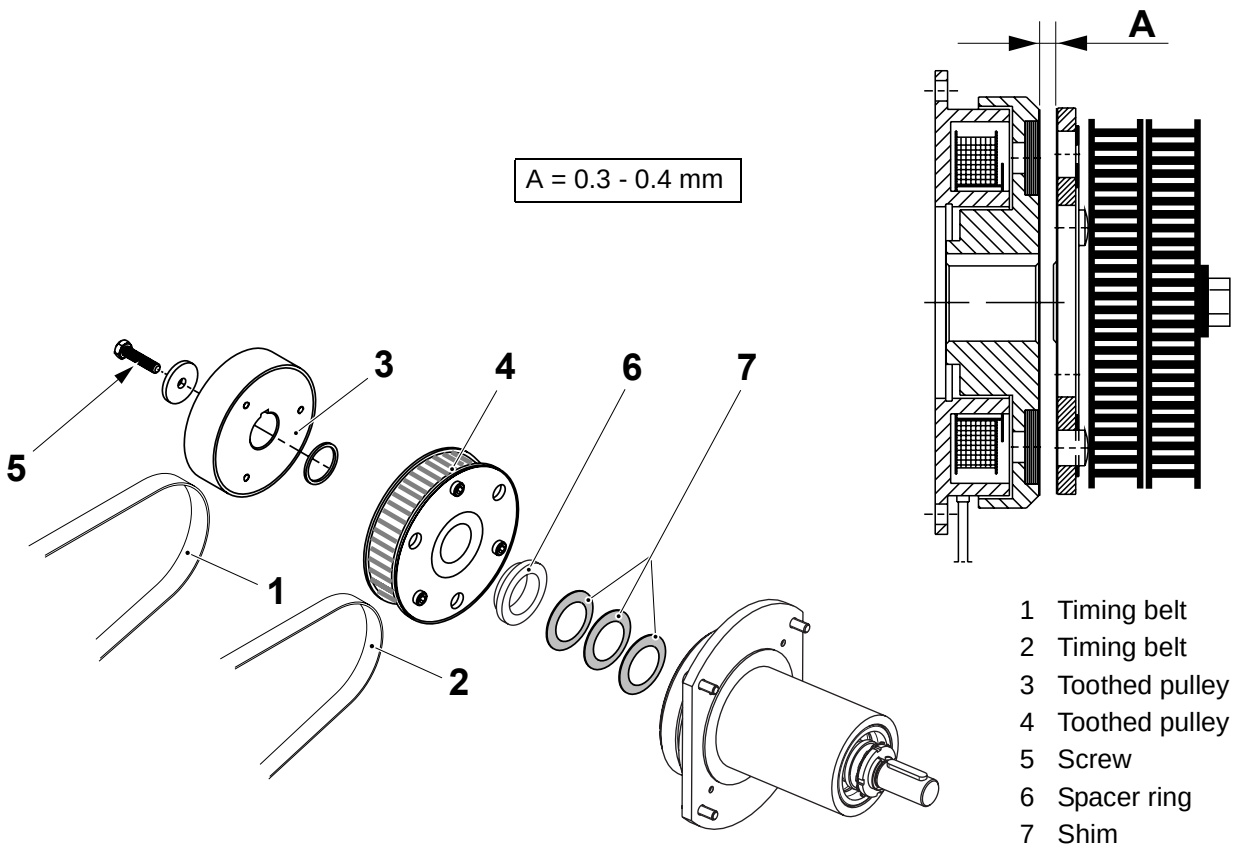
e) Remove the spacer ring (6).

f) Set the distance **A** by adding or removing the shims (7).

Note! Check the distance **A** once more after the setting.

g) Assemble in the reverse order.

TechPub_2614345_0105 - 03_MM81534_11en.fm



1 Timing belt
2 Timing belt
3 Toothed pulley
4 Toothed pulley
5 Screw
6 Spacer ring
7 Shim

3.4 Curve

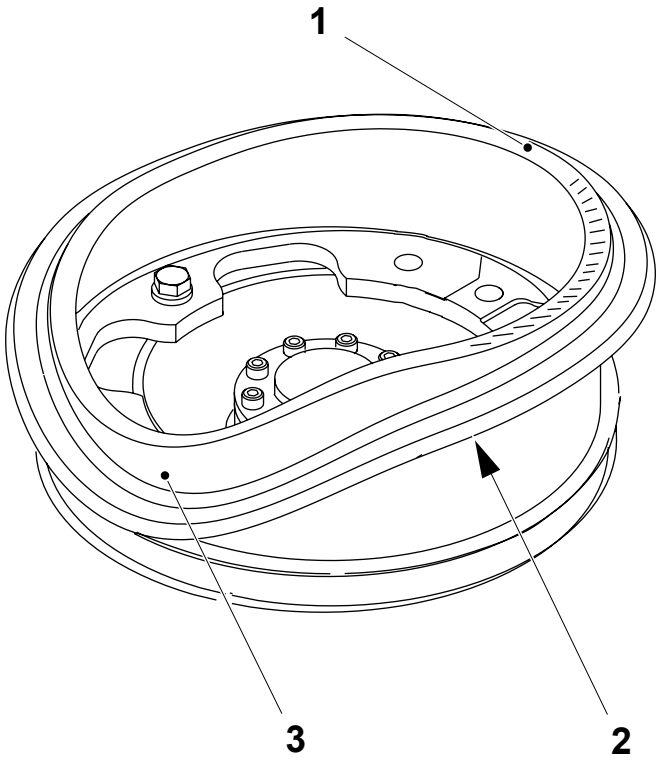
SPC Reference	1095758-0300

3.4-1 Curve - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095758-0300

Check the yoke roller surface (1) and the jaw roller surface (2) on the curve (3) for wear and/or damage. Pay special attention to check that there are no marks on the two surfaces. Check also for rust due water infiltration from the structure above.

Change the curve (3) as required.



1 Yoke roller surface
2 Jaw roller surface
3 Curve

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3.4-2 Curve - Remove Curve and Plate

Machine Status	Mains Power OFF, Air ON Steam ON, Water OFF
Special Equipment	Stop tools approx. 180 mm in height
SPC Reference	1095758-0300

WARNING

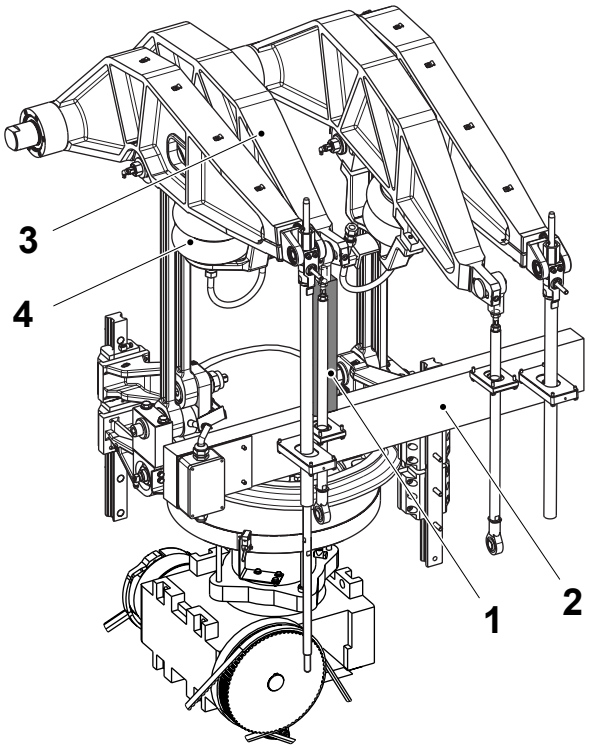
Risk of injury due to pinching or crushing.
The curve weighs approximately 35 Kg.

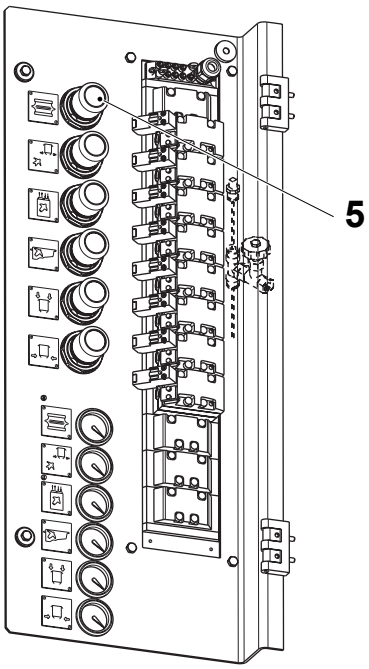
a) Crank the machine to the lowest position for the **LH side**.

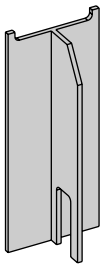
b) Crank further until the stop tool (1) fits between the beam (2) and the **LH** yoke arm (3).

Note! If the support tool is available, TP No. 1254145-0000, use it as a stop tool (1).

c) Reduce the air pressure serving the bellows (4) to a pressure of **0.5 bar** by means of the pressure regulator (5).







Support tool TP No. 1254145-0000

1 Stop tool
2 Beam
3 Yoke arm
4 Bellow
5 Pressure regulator

(Cont'd)

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(Cont'd)

d) Crank the machine **backwards** until the **LH** yoke cam roller (7) is lifted from the curve surface.

e) By means of the air valve (6), located at the rear of the valve panel, discharge the air pressure serving the bellows (4) until the **LH** yoke arm (3) barely stays up.

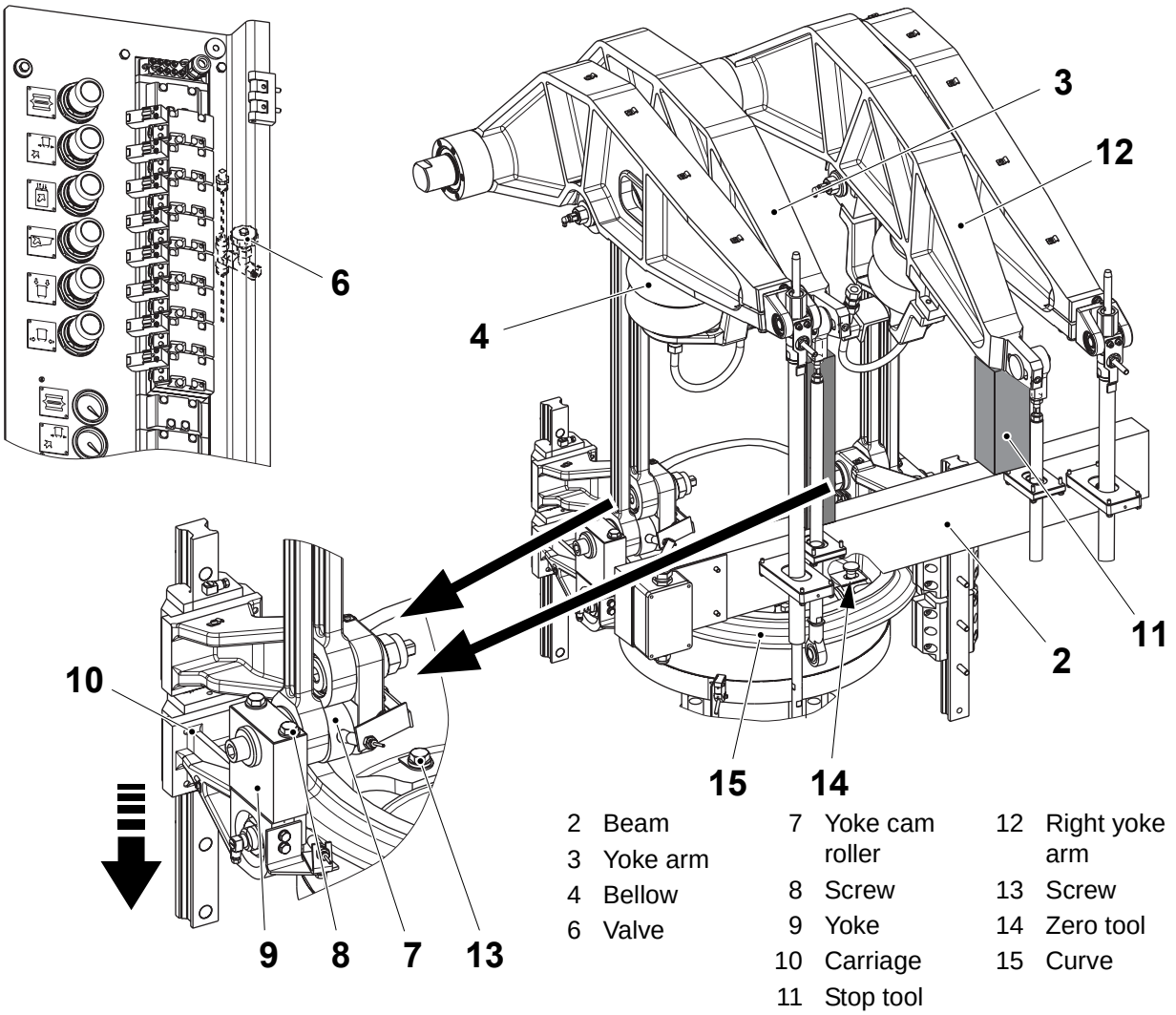
f) Remove the two screws (8) on the **RH** yoke (9) and check that the **RH** carriage (10) moves downwards.

g) Fit the stop tool (11) between the beam (2) and the **RH** yoke arm (12) by using a jack or manually lifting the **RH** side of the jaw system.

Note! Pay special attention in preventing collision in the jaw system.

h) Remove the screws (13) and the two zero tools (14).

i) Remove the curve (15) from the **RH** side of the machine.



2	Beam	7	Yoke cam roller	12	Right yoke arm
3	Yoke arm	8	Screw	13	Screw
4	Bellow	9	Yoke	14	Zero tool
6	Valve	10	Carriage	15	Curve
		11	Stop tool		

(Cont'd)

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(Cont'd)

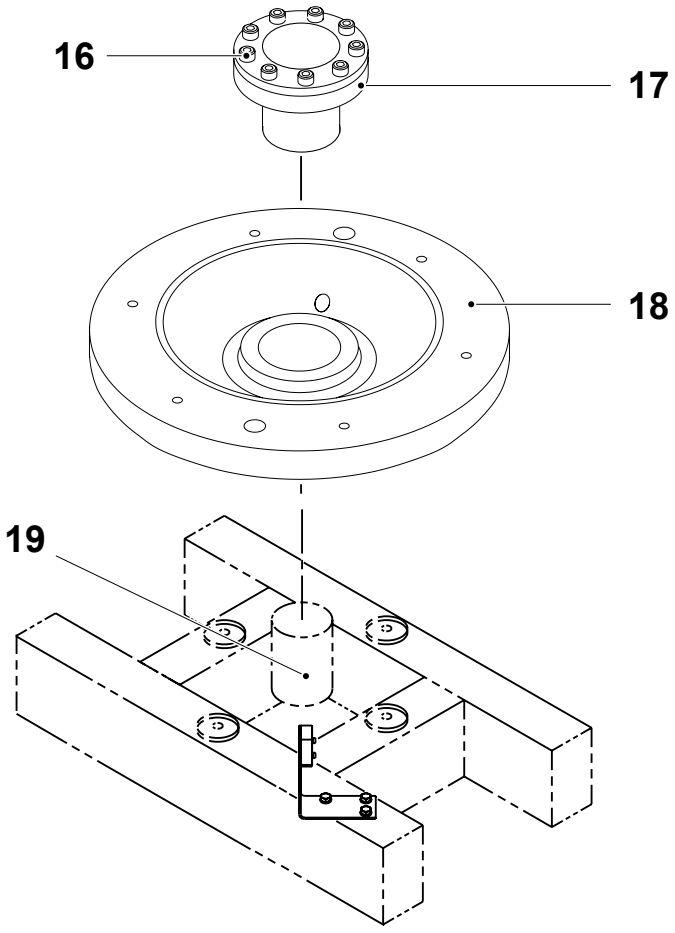
WARNING

Risk of injury due to pinching or crushing.

The plate (18) weighs approximately 10 Kg.

j) Remove the clamp fitting (17), by loosening the screws (16) in sequence around the flange.

k) Remove the plate (18) from the gear box shaft (19) and change it if required.



16 Screw
17 Clamp fitting
18 Plate
19 Shaft

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3.4-3 Curve - Assemble Plate and Curve

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Silicon grease TP No. 92296-0002
Special Equipment	Zero tool TP No. 1254023-0100 Press tool TP No. 1254023-0100 Stop tools approx. 180 mm in height Torque wrench min. 70 Nm
SPC Reference	1095758-0300

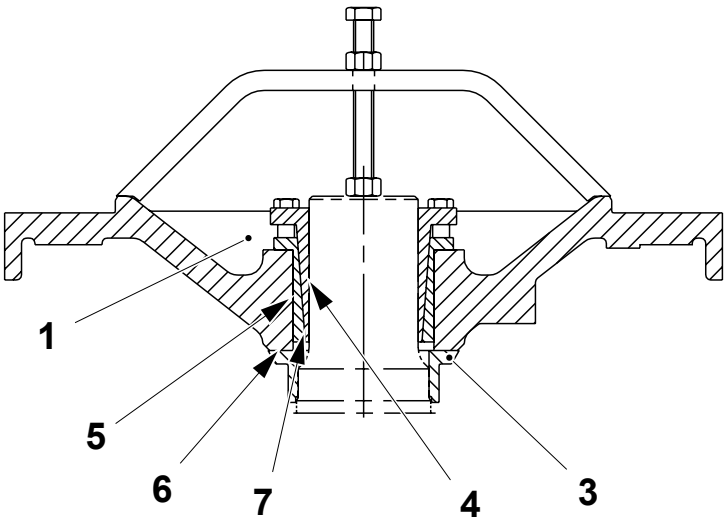
WARNING

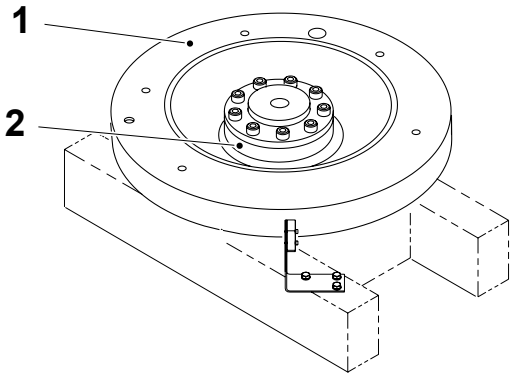
Risk of injury due to pinching or crushing.
The plate (1) weighs approx. 10 Kg.

Note! The shaft / clamp contact surface (4), the plate / clamp contact surface (5) and the plate/gear box surface (6) must be cleaned before mounting the clamp (2) into position.

Note! Apply grease (TP No. 92296-0002) to the clamp inner surface (7).

a) Fit the plate (1) and the clamp (2) together on the plate support (3).





1 Plate
2 Clamp
3 Plate support
4 Surface
5 Surface
6 Surface
7 Surface

(Cont'd)

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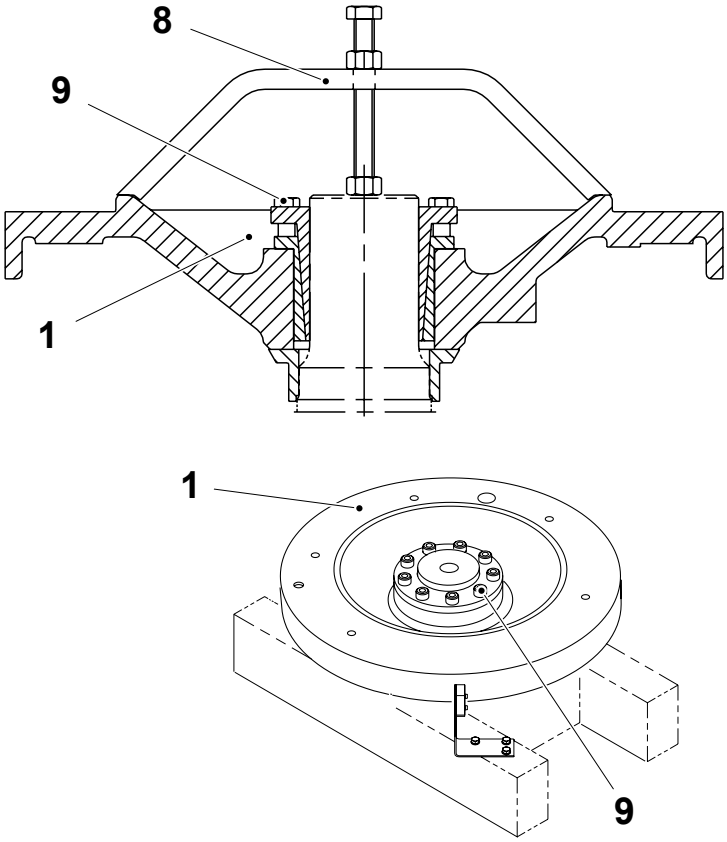
(Cont'd)

b) Fit the press tool (8) onto the plate (1).

c) Tighten the clamp fitting screws (9) crosswise in small steps. Torque **35 ±2 Nm**.

d) Remove the press tool (8).

e) Set the angle encoder, see 3.1.1-1 Connection Box - Set Angle Encoder.



1 Plate
8 Press tool
9 Screw

(Cont'd)

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(Cont'd)

WARNING

Risk of injury due to pinching or crushing.
The curve (10) weighs approx. 35 Kg.

f) With the aid of a lifting device, place the curve (10) on the plate (2).

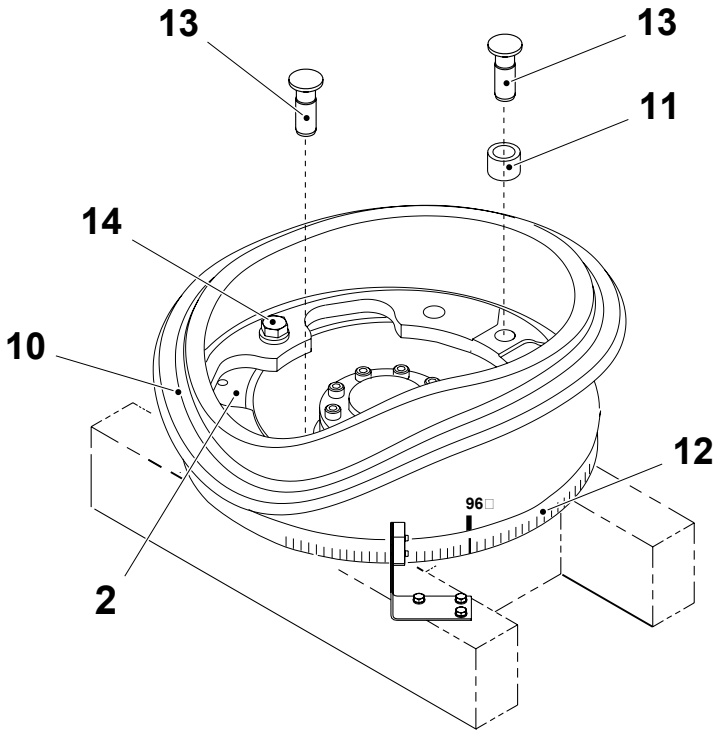
Note! Make sure that the drill bushings (11) stay in position on the curve (10).

Note! Clean the plate surface before inserting the curve (10). Make sure not to have oil on the plate surface.

g) Shift the curve (11) until the **zero mark** on the curve (10) is aligned with the **96 decimal degrees** on the protractor (12).

h) Fit the two zero tools (13) into the two zero holes onto the curve (10).

i) Tighten the screws (14) crosswise with a torque force of **70 Nm**.



2 Plate
10 Curve
11 Drill bushing
12 Protractor
13 Zero tools
14 Screw

(Cont'd)

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(Cont'd)

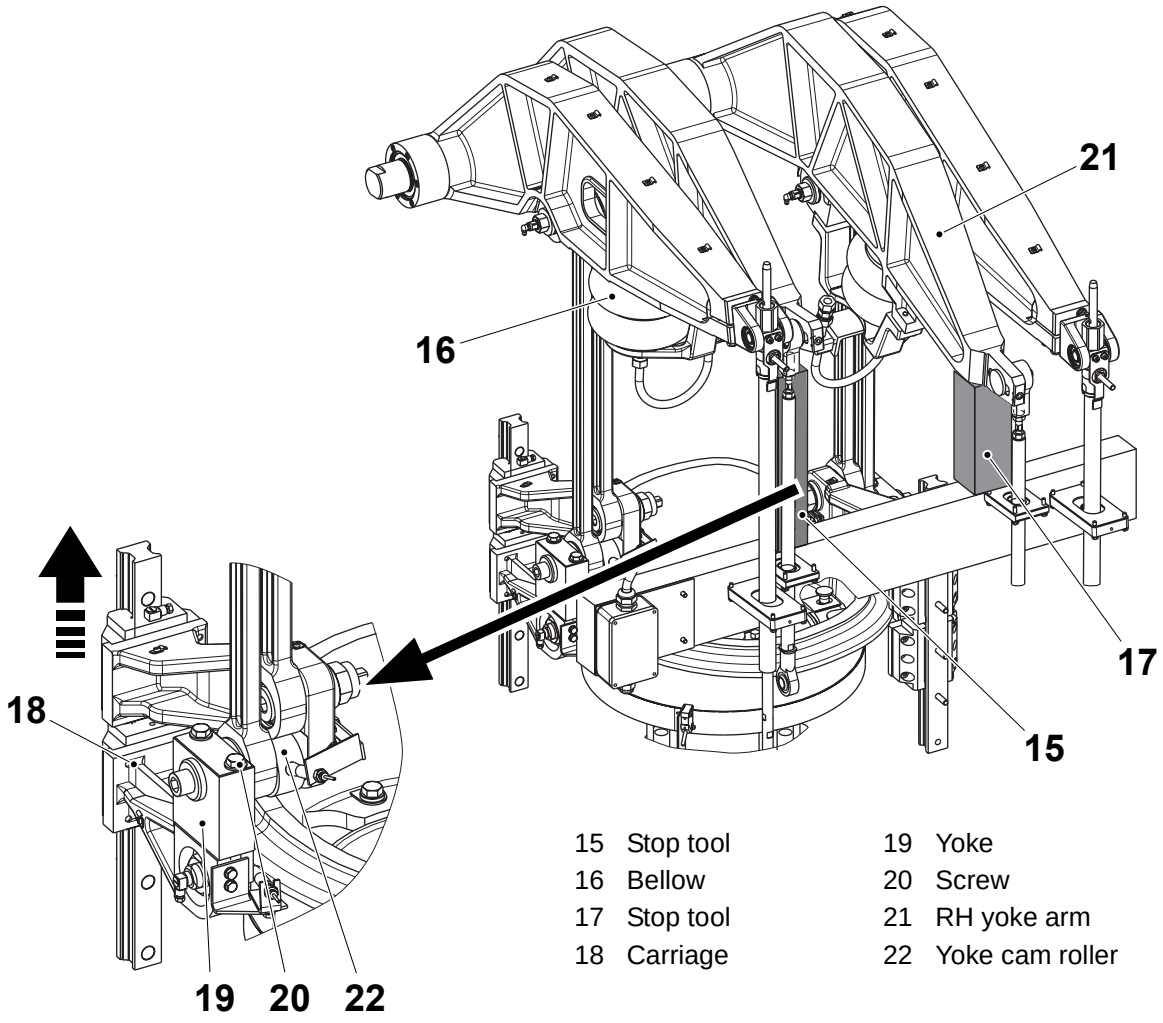
j) Remove the stop tool (17) on RH side and carefully lower the RH yoke arm (21) until the yoke cam roller (22) is back on the curve surface.

k) Pull the RH carriage (18) upwards and fit the RH yoke (19) to the carriage (18) by means of the two screws (20).

Note! The screws (20) must be tightened to **40 Nm**.

l) Carefully crank the machine until the stop tool (15) on the LH side can be removed.

m) Set the air pressure serving the bellows (16), see 3.6-3 Bellows - Set Bellows Pressure.



15	Stop tool	19	Yoke
16	Bellow	20	Screw
17	Stop tool	21	RH yoke arm
18	Carriage	22	Yoke cam roller

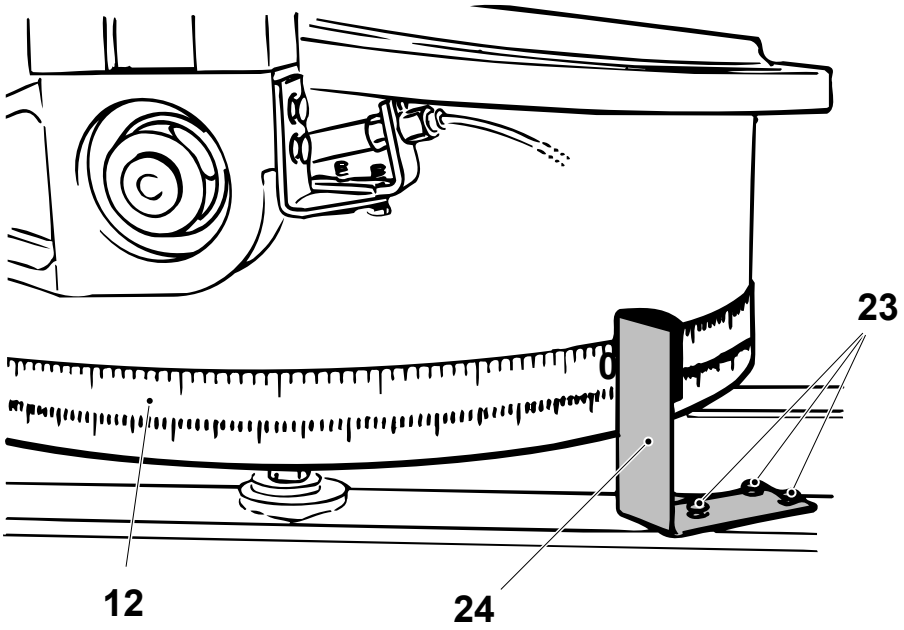
(Cont'd)

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(Cont'd)

n) Crank the machine until the angle encoder display shows **"0"** decimal degrees.

o) Loosen the screws (23) and adjust the switch bracket (24), until it is aligned against the **"0"** on the protractor (12).



12 Protractor
23 Screw
24 Bracket

(Cont'd)

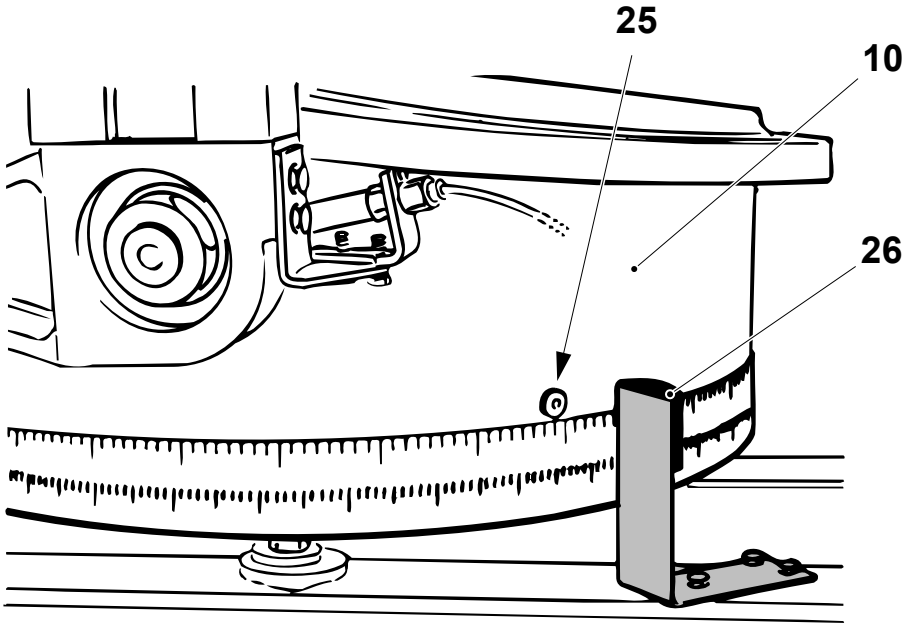
TechPub_2614345_0105 - 03_MM81534_11en.fm

(Cont'd)

p) Set the gap between the screw (25), on the curve (10), and the inductive switch (26) to **0.5 mm**.

q) Measure the gap with the aid of a feeler gauge.

Note! Crank the machine a full revolution and make sure that the inductive switch (26) is activated by the screw (25) only.



10 Curve
25 Screw
26 Inductive switch

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3.5 Linear Guide

SPC Reference	1487187-0100 1487188-0100 1487189-0200 1487190-0200

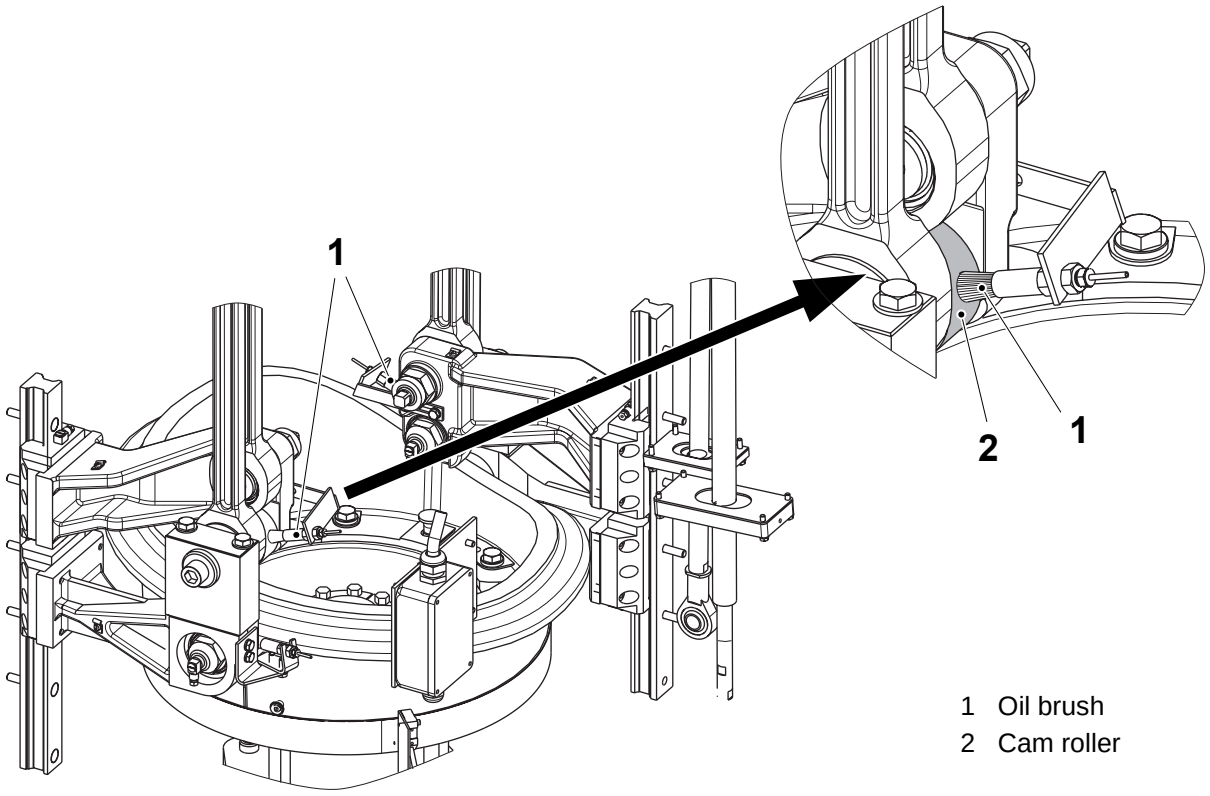
3.5-1 Linear Guide - Check Oil Brushes

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1487187-0100 1487188-0100

a) Check the oil brushes (1) for visual wear and/or damage.

b) Check that the oil reaches the cam rollers (2) through the oil brushes (1).

c) Change the oil brushes (1) as required.



1 Oil brush
2 Cam roller

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3.5-2 Linear Guide - Check Cam Rollers

Machine Status	Mains Power OFF, Air ON Steam ON, Water OFF
Special Equipment	Stop tool approx. 180 mm in height
SPC Reference	1487187-0100 1487188-0100

WARNING

Risk of personal injury.

The rollers may be hot. If required wear heat-resistant protective gloves.

Lower cam rollers

a) Crank the machine to the lowest position for the LH side.

CAUTION

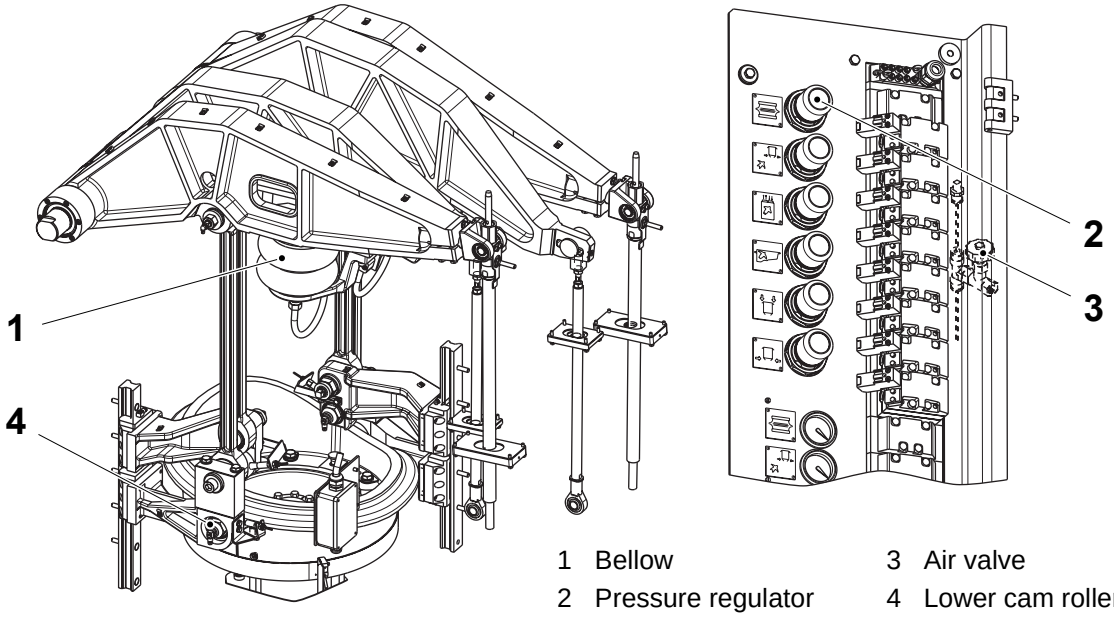
Risk of damage to the equipment.

Pay special attention in preventing collision in the jaw system.

b) Reduce the air pressure serving the bellows (1) to a pressure of **0.5 bar** by means of the pressure regulator (2).

c) By means of the air valve (3), located at the rear of the valve panel, discharge the air pressure serving the bellows (1) until the LH yoke arm barely stays up.

d) Check the lower cam rollers (4) for wear and/or damage. Check especially for marks due to high temperature, and that they turn freely.



1 Bellow
2 Pressure regulator
3 Air valve
4 Lower cam roller

(Cont'd)

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(Cont'd)

e) Set the air pressure serving the bellows, see 3.6-3 Bellows - Set Bellows Pressure.

Upper cam rollers

a) Crank the machine to the lowest position for the LH side.

b) Reduce the air pressure serving the bellows (1) to a pressure of **0.5 bar**.

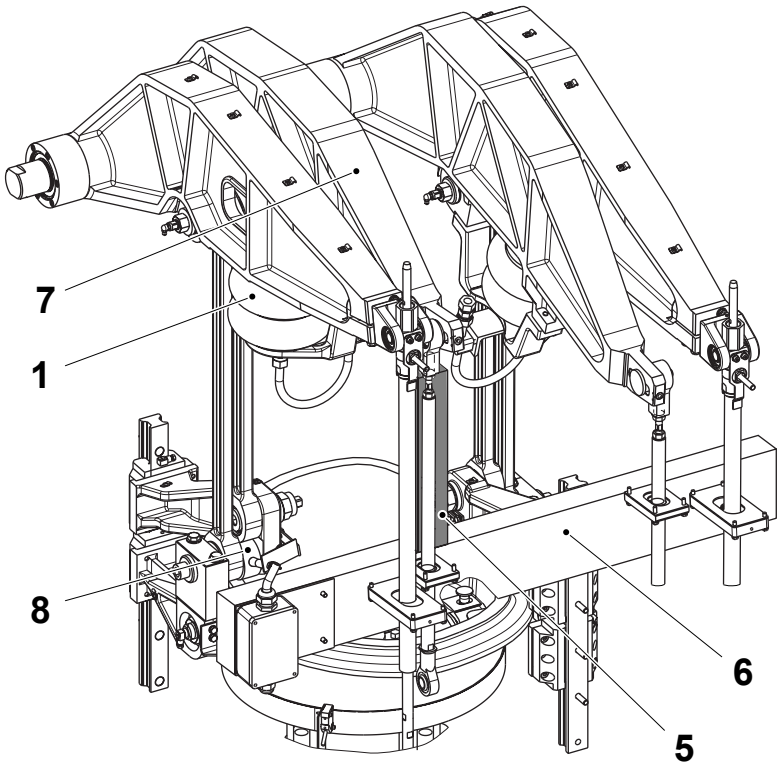
c) Crank further until the stop tool (5) fits between the beam (6) and the LH yoke arm (7).

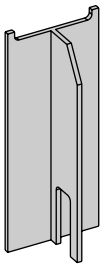
Note! If the support tool is available, TP No. 1254145-0000, use it as a stop tool (5).

d) Crank the machine backwards until the upper cam roller (8) is lifted from the curve surface.

e) Check the upper cam rollers (8) for wear and/or damage. Check especially for marks due to high temperature, and that they turn freely.

f) Remove the stop tool (5) and set the air pressure serving the bellows, see 3.6-3 Bellows - Set Bellows Pressure.





Support tool
TP No. 1254145-0000

1 Bellow
5 Stop tool
6 Beam
7 Left yoke arm
8 Upper cam roller

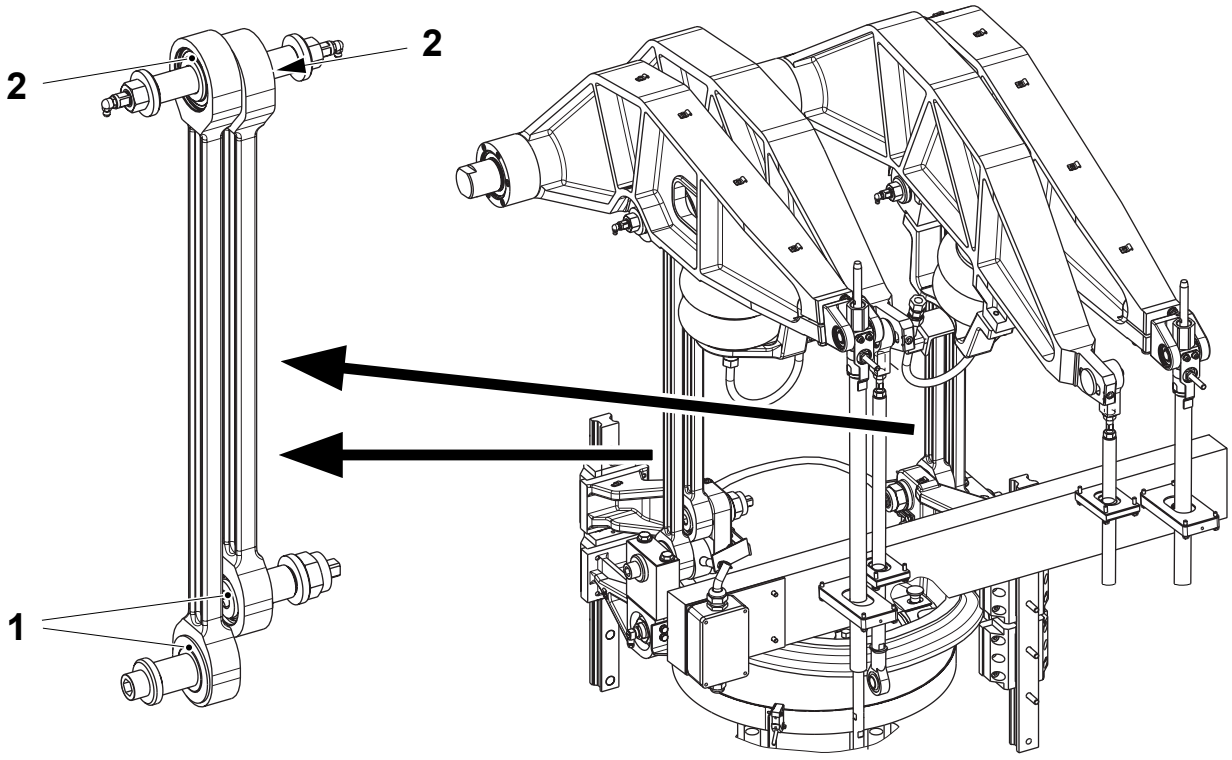
TechPub_2614345_0105 - 03_MM81534_11en.fm

3.5-3 Linear Guide - Check Upper and Lower Bearings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1487187-0100 1487188-0100 1487189-0200 1487190-0200

Note! Before starting any action release the arms load, see 3.5-5 Linear Guide - Remove Link Bearings.

Check the two lower bearings (1), and the two upper bearings (2), on both sides, for visual wear and/or damage.



1 Lower bearing
2 Upper bearing

TechPub_2614345_0105 - 03_MM81534_11en.fm

3.5-4 Linear Guide - Check Rails and Carriages

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1487187-0100 1487188-0100

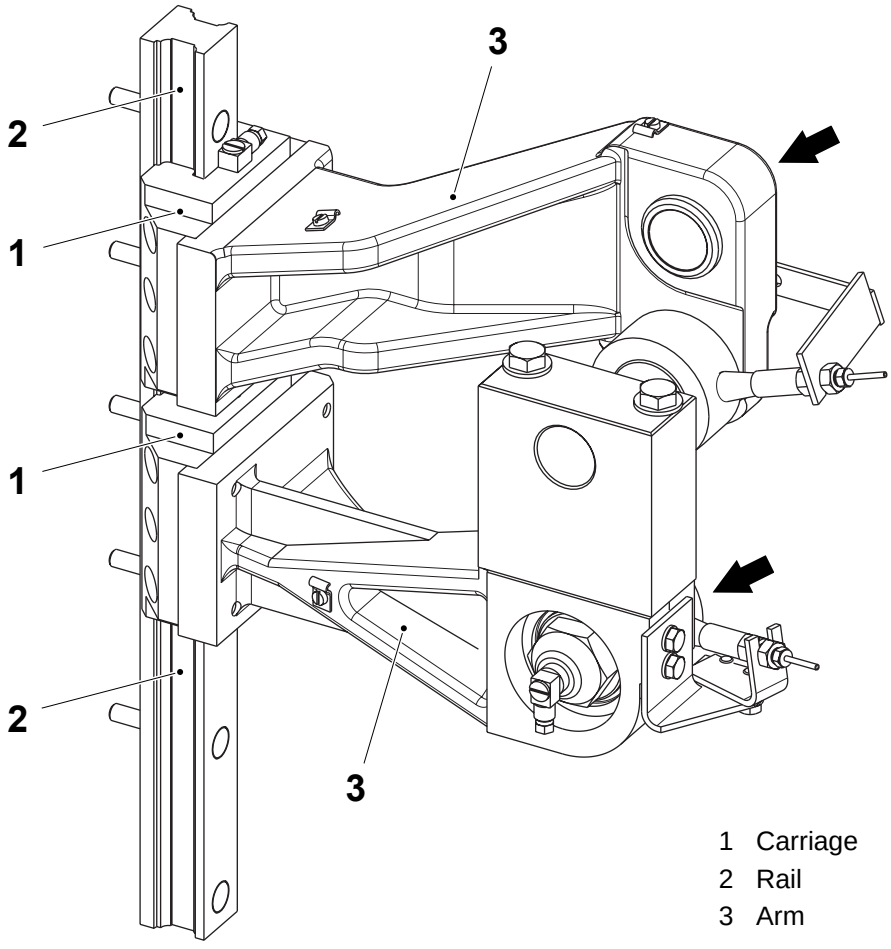
a) Release the arms load, see 3.5-5 Linear Guide - Remove Link Bearings before starting any actions.

b) Check that there is not excessive play between the carriages (1) and the rails (2) by means of a force applied to the edge of the arms (3), see arrows.

c) Change the carriages (1) as required, see 3.5-6 Linear Guide - Change Rail and Carriage.

d) Check the rails (2) for visual wear and/or damage. Check carefully for marks on the surface of the rails (2).

e) Change the rails (2) as required, see 3.5-6 Linear Guide - Change Rail and Carriage.



1 Carriage
2 Rail
3 Arm

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3.5-5 Linear Guide - Remove Link Bearings

Machine Status	Mains Power OFF, Air ON Steam ON, Water OFF
Special Equipment	Stop tool approx. 180 mm in height
SPC Reference	1487189-0200 1487190-0200

WARNING

Risk of injury due to pinching or crushing.
The links weigh approximately 15 Kg.

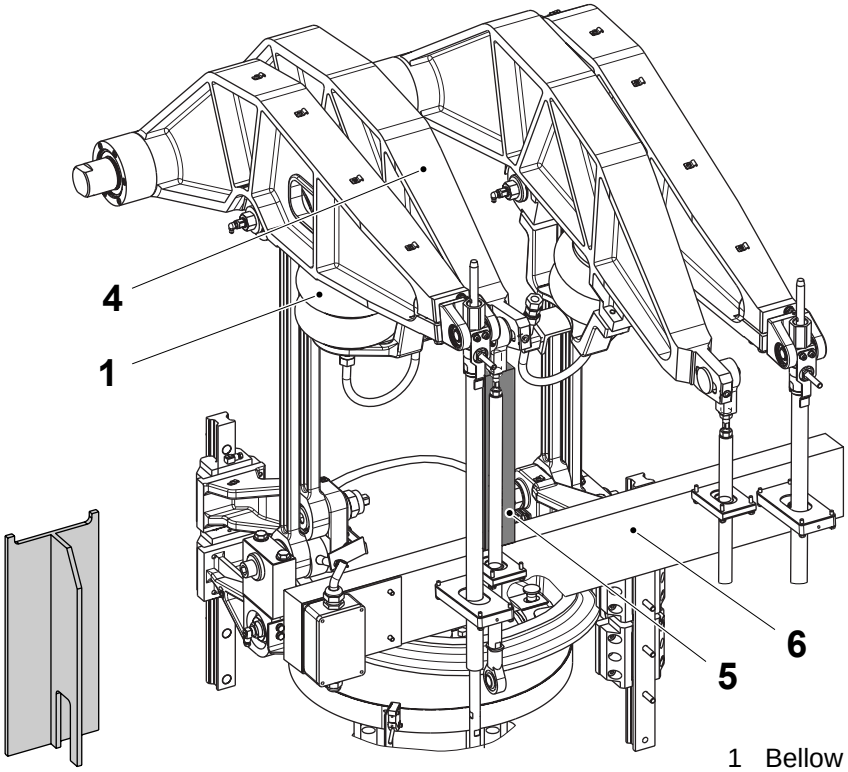
a) Crank the machine to the lowest position for the LH side.

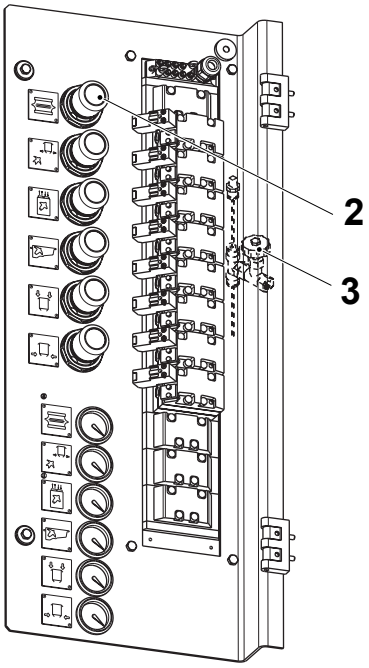
b) Crank further until the stop tool (5) fits between the beam (6) and the LH yoke arm (4).

Note! If the support tool is available, TP No. 1254145-0000, use it as a stop tool (5).

c) Reduce the air pressure serving the bellows (1) to a pressure of **0.5 bar** by means of the pressure regulator (2).

d) By means of the air valve (3), located at the rear of the valve panel, discharge the air pressure serving the bellows (1) until the LH yoke arm (4) barely stays up.





Support tool
TP No. 1254145-0000

1 Bellow
2 Pressure regulator
3 Air valve
4 Left yoke arm
5 Stop tool
6 Beam

(Cont'd)

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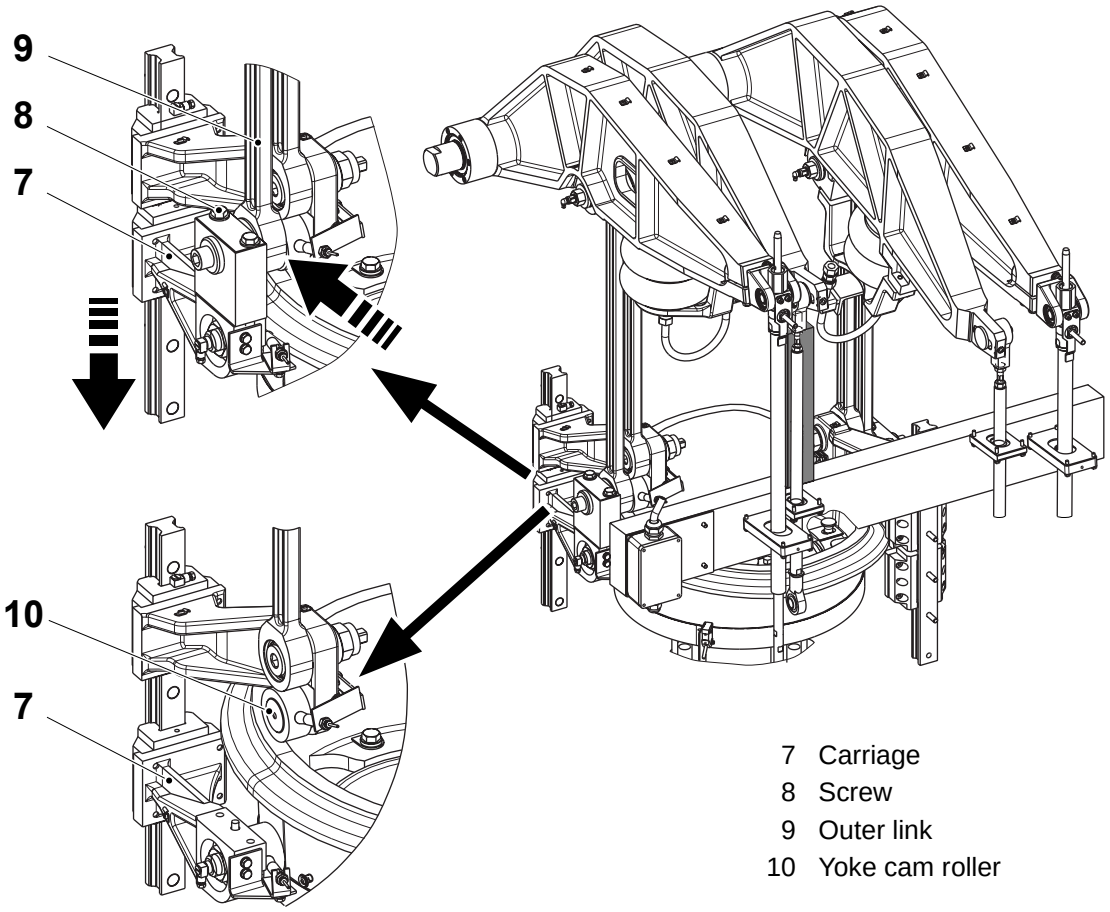
(Cont'd)

e) Disconnect and move downwards the carriage (7) by means of the screws (8).

f) Shift sideways the outer link (9).

CAUTION
Risk of damage to the equipment.
Pay special attention in preventing collision in the jaw system.

g) Crank the machine backwards until the yoke cam roller (10) is lifted from the curve surface.



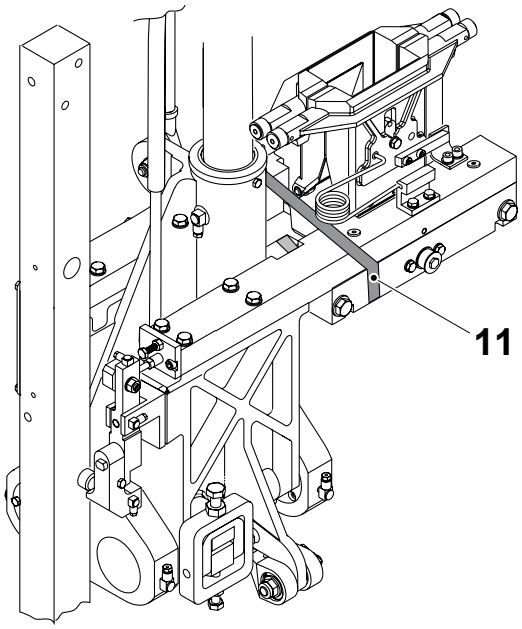
7 Carriage
8 Screw
9 Outer link
10 Yoke cam roller

(Cont'd)

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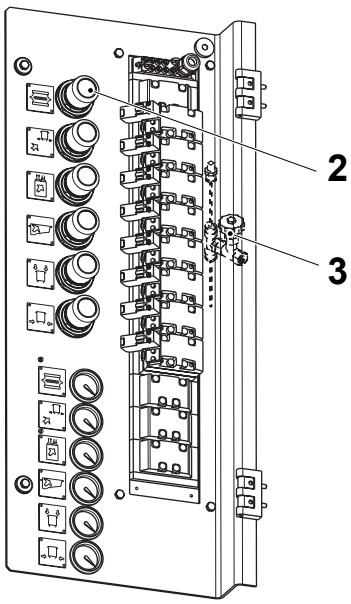
h) Make sure the jaws are blocked in the current position by means of a strip (11).



11 Strip

i) Reduce the air pressure serving the bellows to a pressure of **0 bar** by means of the pressure regulator (2).

j) By means of the air valve (3), located at the rear of the valve panel, discharge the air pressure serving the bellow.



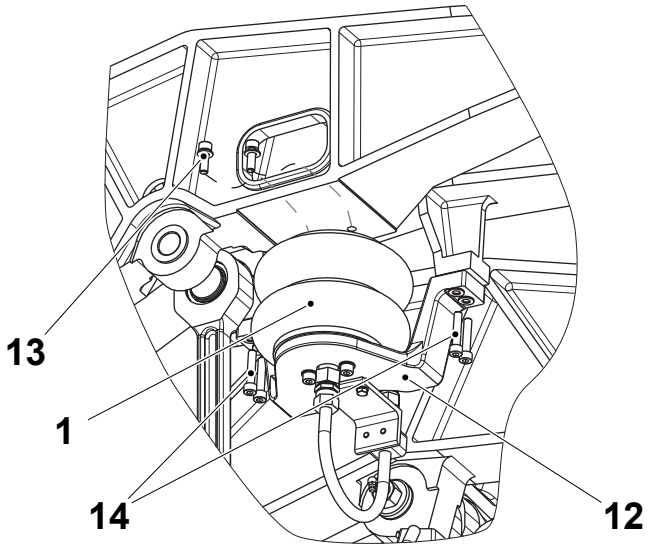
2 Pressure regulator
3 Air valve

(Cont'd)

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(Cont'd)

k) Remove the bellow (1) and the bracket (12) by means of the screws (13) and (14).

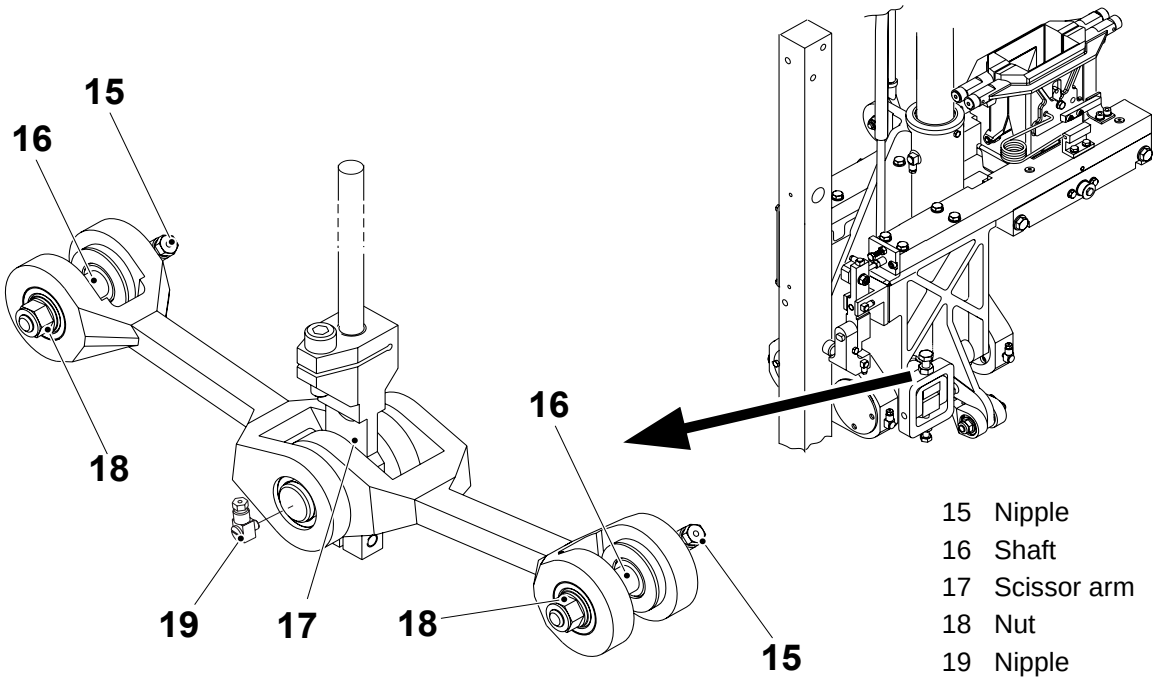


1 Bellow
12 Bracket
13 Screw
14 Screw

l) Remove the nipples (15) on the scissor arm (17).

CAUTION
Risk of damage to the equipment.
When removing the shafts (16), hold the scissor arm (17) up to prevent it from falling.

m) Remove the shafts (16) by means of the nuts (18). Remove the nipple (19).



15 Nipple
16 Shaft
17 Scissor arm
18 Nut
19 Nipple

(Cont'd)

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(Cont'd)

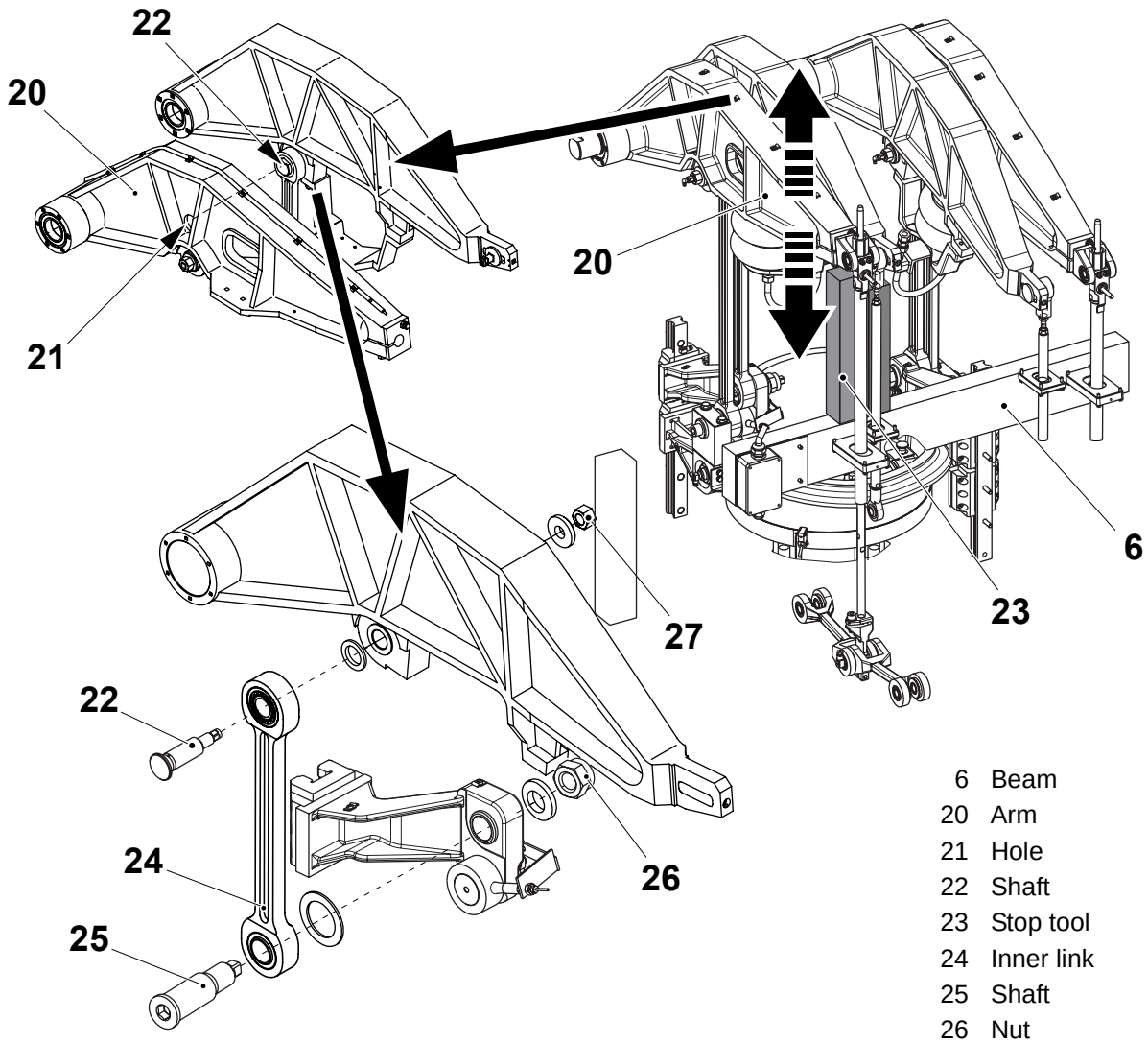
n) Move the jaw arm (20) in order to align the hole (21) with the shaft (22).

o) Fit the stop tool (23) between the beam (6) and the jaw arm (20).

CAUTION
Risk of damage to the equipment.
When performing items p) and q), hold the inner link (24) up to prevent it from falling.

p) Remove the shaft (25) by means of the nut (26).

q) Remove the inner link (24) by means of the shaft (22) and the nut (27).



6 Beam
20 Arm
21 Hole
22 Shaft
23 Stop tool
24 Inner link
25 Shaft
26 Nut
27 Nut

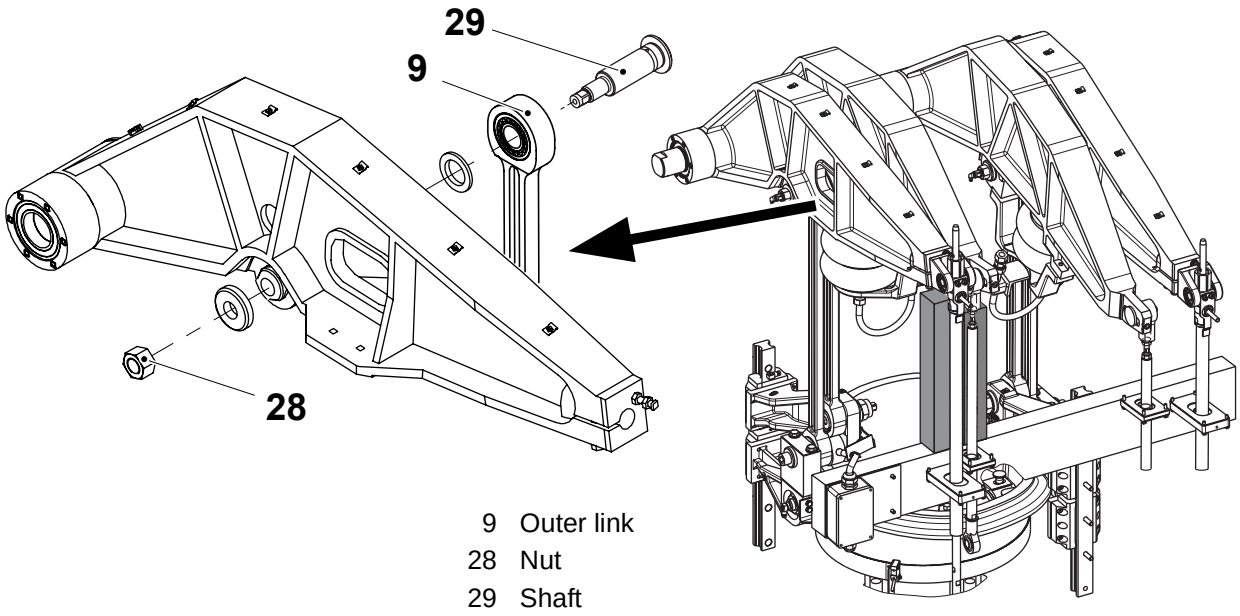
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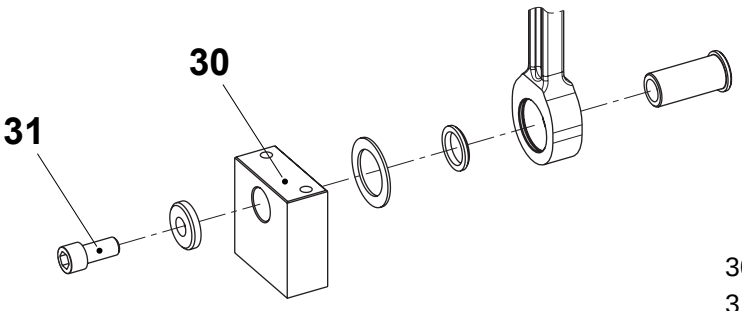
CAUTION
Risk of damage to the equipment.
When performing item r), hold the outer link (9) up to prevent it from falling.

r) Remove the outer link (9) by means of the nut (28) and the shaft (29).



9 Outer link
28 Nut
29 Shaft

s) Remove the yoke (30) by means of the screw (31).



30 Yoke
31 Screw

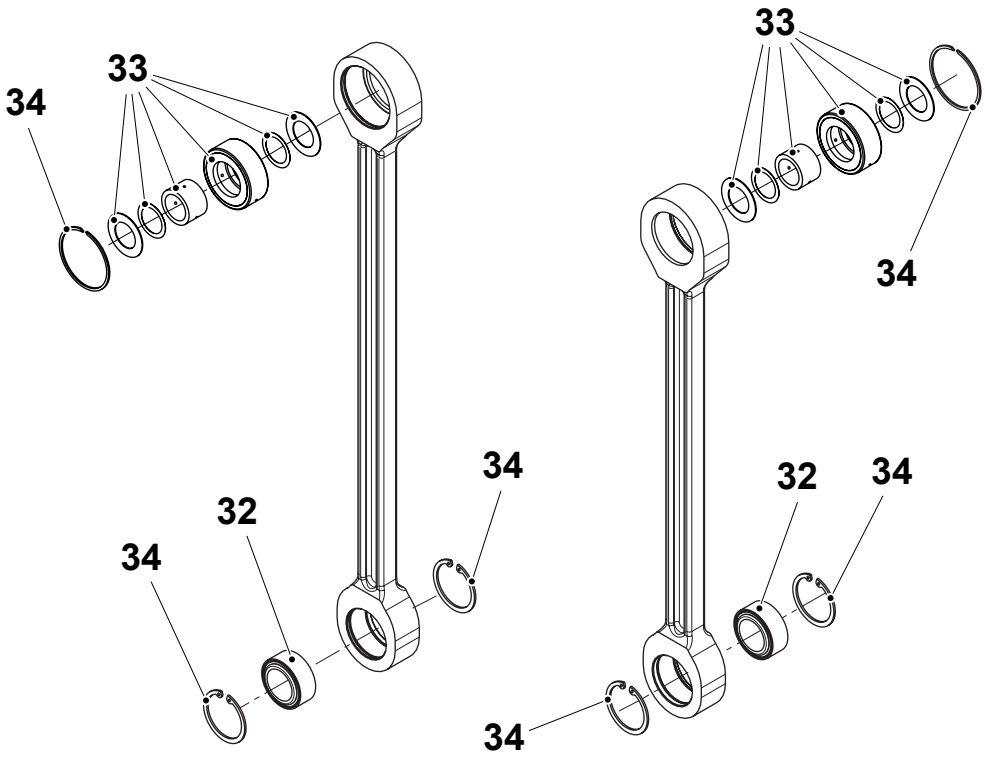
(Cont'd)

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(Cont'd)

t) Remove the bearing (32) and the bearing (33) by means of the retaining rings (34), and change them as required.

Note! When assembling lubricate the bearings (33), see 3.5-9 Linear Guide - Lubricate Link Bearings.



32 Bearing
33 Bearing
34 Retaining ring

u) Assemble in the reverse order, see 3.5-8 Linear Guide - Assemble Link Bearings.

v) Repeat the entire procedure for the RH side.

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3.5-6 Linear Guide - Change Rail and Carriage

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1487187-0100 1487188-0100

a) Remove the nipples and the oil tray in order to have better access to the rails.

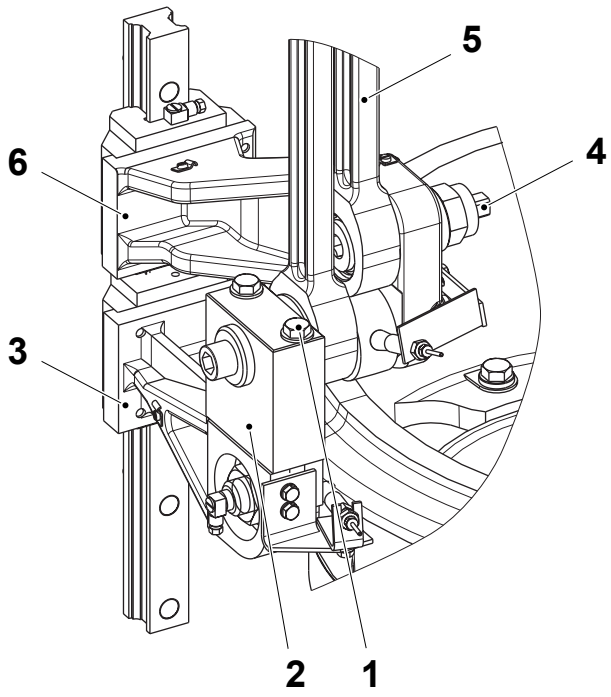
b) Perform items from a) to d), see 3.5-5 Linear Guide - Remove Link Bearings.

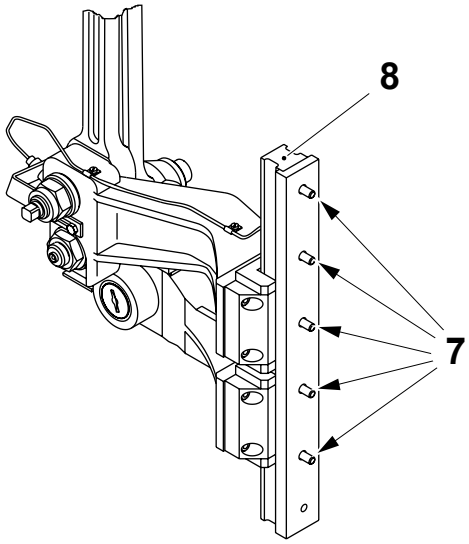
c) Remove the screws (1) and separate the yoke (2) from the jaw carriage (3).

d) Remove the screw (4) and separate the inner link (5) from the yoke carriage (6).

e) Pull the yoke carriage (6) upwards.

f) Unscrew the screws (7) on the rail (8).





1 Screw
2 Yoke
3 Jaw carriage
4 Screw
5 Inner link
6 Yoke carriage
7 Screw
8 Rail

(Cont'd)

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(Cont'd)

g) Remove the rail (8) together with the jaw carriage (3).

h) Change the rail (8) if worn out or damaged.

i) Unscrew the four screws (9) on both carriages (10).

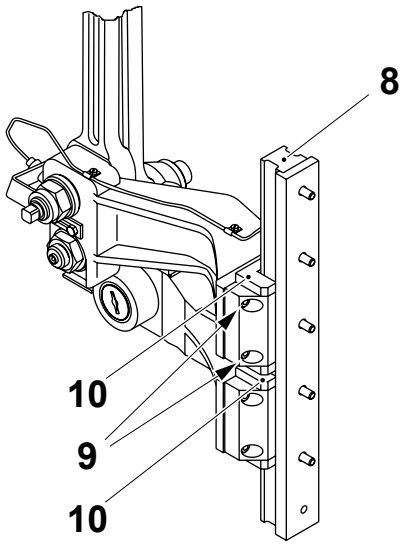
j) Remove the two carriages (10) and change them if damaged.

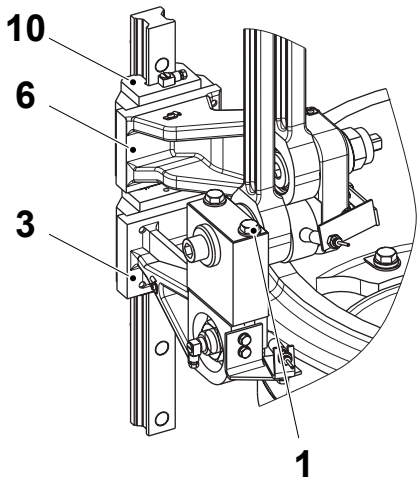
k) Assemble in the reverse order.

Note! Pay special attention when fitting back the jaw carriage (3) and the yoke carriage (6). The reference surface on the carriage (10) must slide on the stop face of the jaw carriage (3) and of the yoke carriage (3).

Note! Pay special attention to ensure that the lip sealing fits properly when fitting back the carriage (10).

Note! The screws (1) must be tightened to **40 Nm**.





1 Screw
3 Jaw carriage
6 Yoke carriage
8 Rail
9 Screw
10 Carriage

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3.5-7 Linear Guide - Change Cam Rollers

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
Special Equipment	Stop tool approx. 180 mm in height Torque wrench min. 220 Nm
SPC Reference	1487187-0100 1487188-0100

WARNING

Risk of injury due to pinching or crushing.
The links weigh approximately 15 Kg.

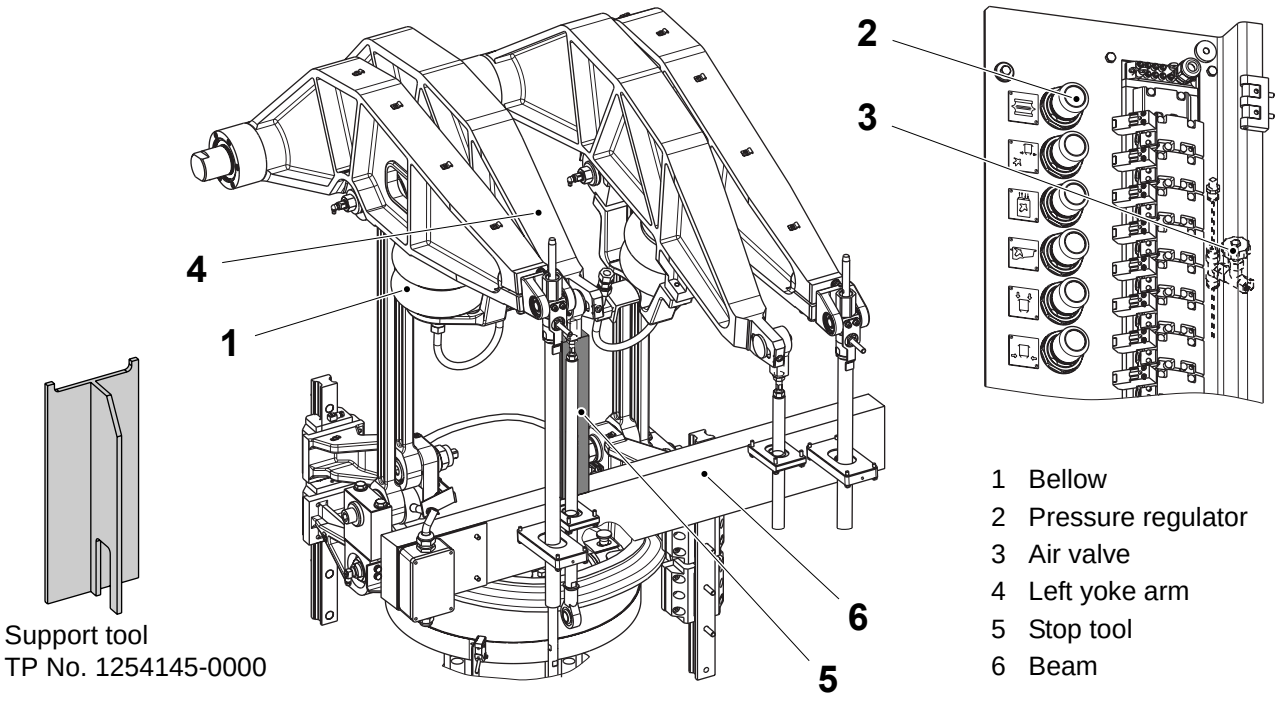
a) Crank the machine to the lowest position for the LH side.

b) Crank further until the stop tool (5) fits between the beam (6) and the LH yoke arm (4).

Note! If the support tool is available, TP No. 1254145-0000, use it as a stop tool (5).

c) Reduce the air pressure serving the bellows (1) to a pressure of **0.5 bar** by means of the pressure regulator (2).

d) By means of the air valve (3), located at the rear of the valve panel, discharge the air pressure serving the bellows (1) until the LH yoke arm (4) barely stays up.



Support tool
TP No. 1254145-0000

1 Bellow
2 Pressure regulator
3 Air valve
4 Left yoke arm
5 Stop tool
6 Beam

(Cont'd)

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(Cont'd)

e) Crank the machine backwards until the upper cam roller (7) is lifted from the curve surface.

f) Remove the two screws (9) on the yoke (10) and check that the carriage (11) moves downwards.

g) Unscrew the nut (8) and remove the upper cam rollers (7).

h) Change them as required.

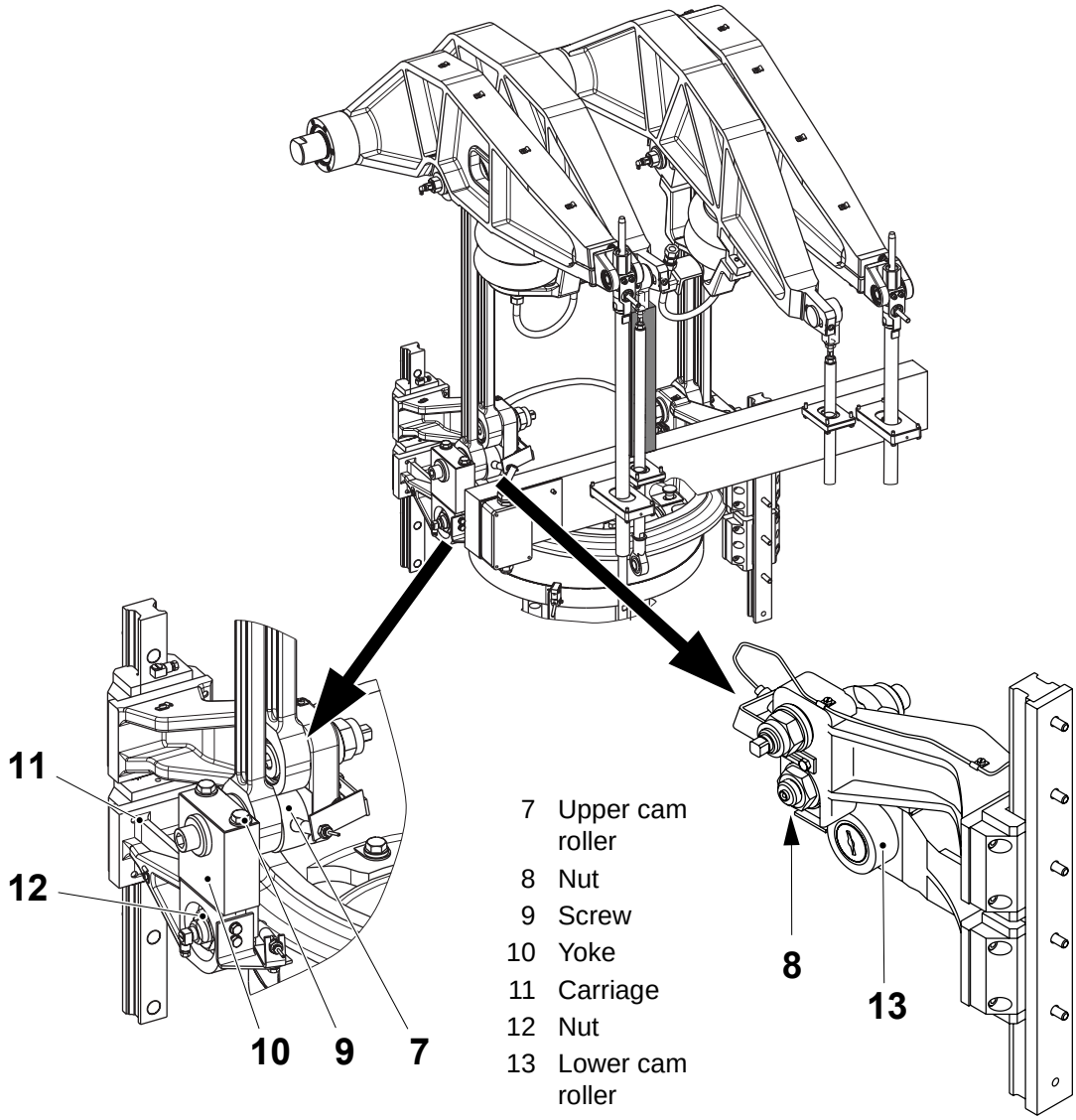
i) Unscrew the nut (12) and remove the lower cam rollers (13).

j) Change them as required.

k) Assemble in the reverse order.

l) Set the air pressure serving the bellows, see 3.6-3 Bellows - Set Bellows Pressure.

Note! The nuts (8) and (12) must be tightened to **220 Nm**.



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3.5-8 Linear Guide - Assemble Link Bearings

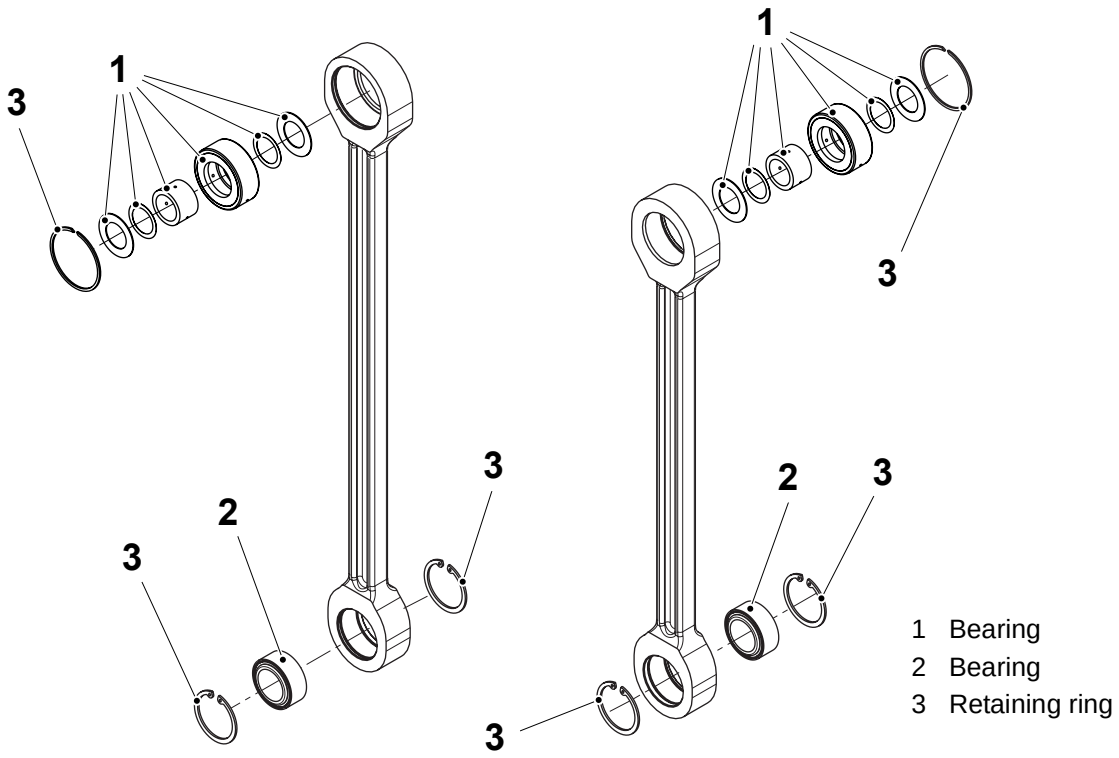
Machine Status	Mains Power OFF Air ON Steam ON Water OFF
Special Equipment	Torque wrench min. 40 Nm
SPC Reference	1487189-0200 1487190-0200

WARNING
Risk of injury due to pinching or crushing.
The links weigh approximately 15 Kg.

CAUTION
Risk of damage to the equipment.
Make sure that the air pressure serving the bellows is set to **0 bar**.

a) Fit the bearings (1) and the bearings (2) by means of the retaining rings (3).

Note! When assembling lubricate the bearings (1), see 3.5-9 Linear Guide - Lubricate Link Bearings.



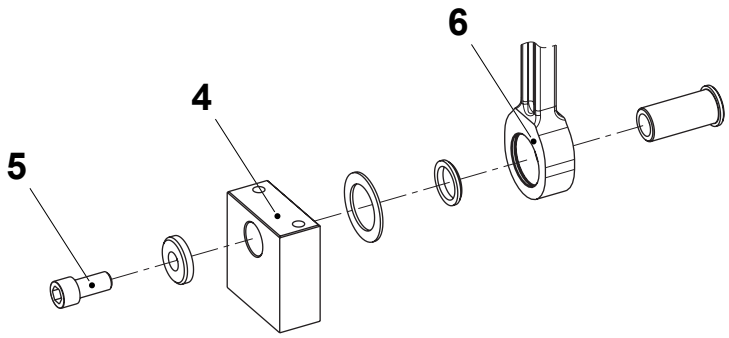
1 Bearing
2 Bearing
3 Retaining ring

(Cont'd)

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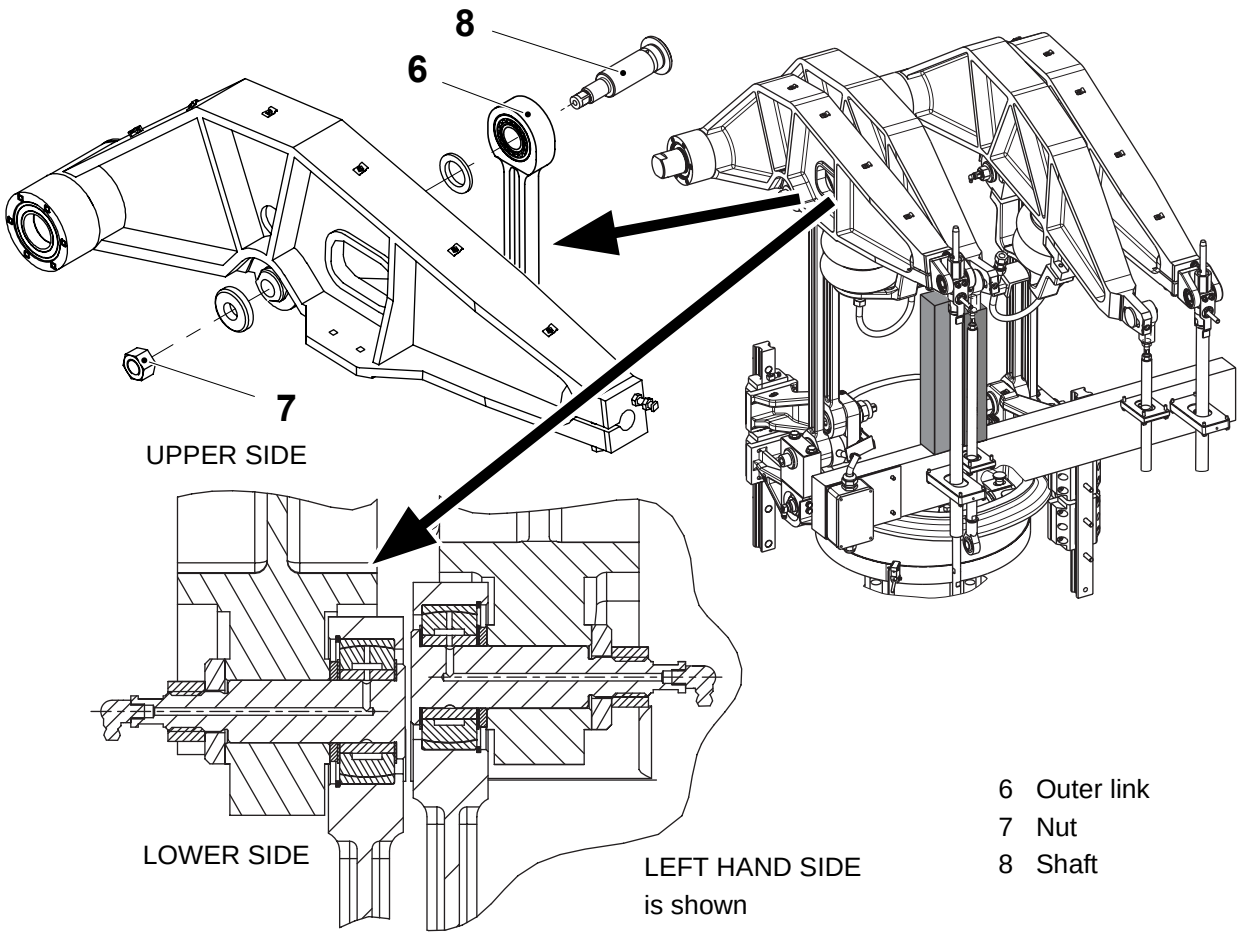
(Cont'd)

b) Fit the outer link (6) on the yoke (4) by means of the screw (5).



4 Yoke
5 Screw
6 Outer link

c) Fit the upper part of the outer link (6) by means of the nut (7) and the shaft (8). Make sure that the links are assembled as shown below.



6 Outer link
7 Nut
8 Shaft

(Cont'd)

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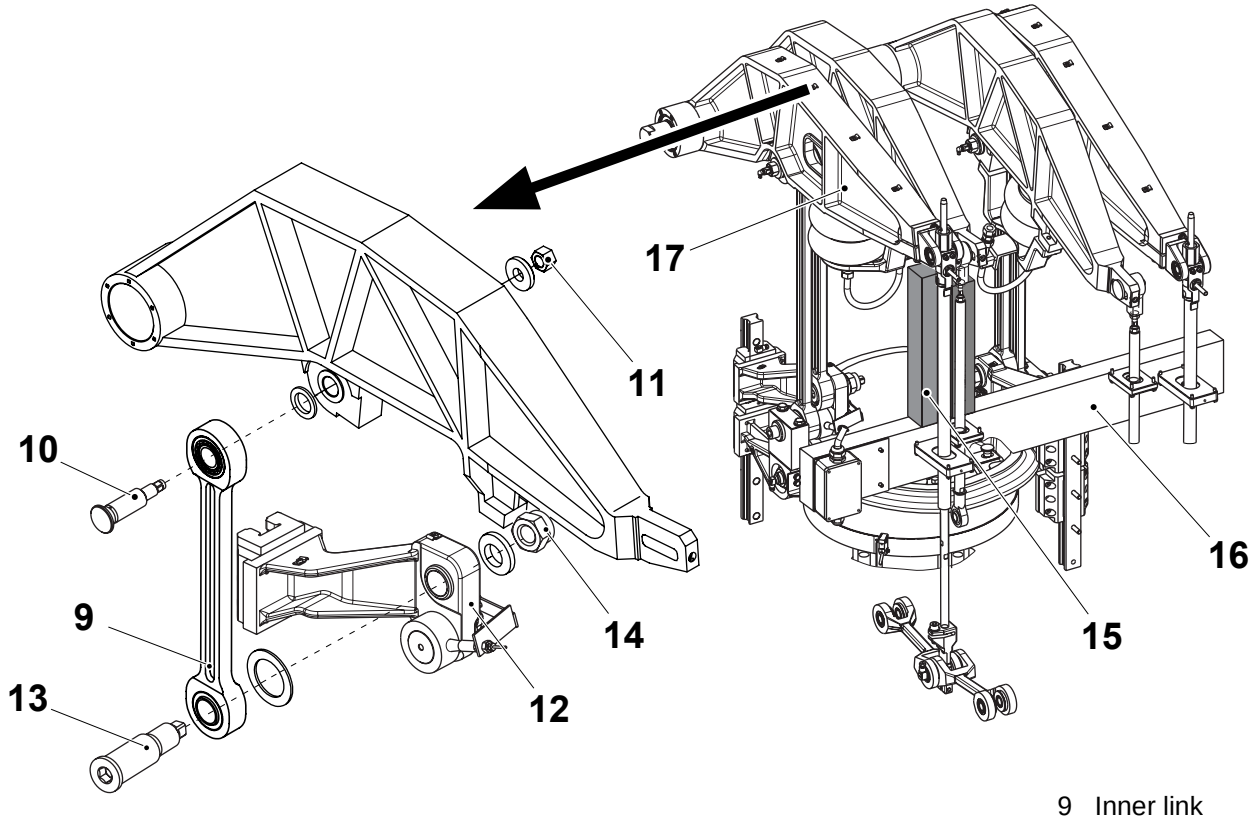
(Cont'd)

d) Fit the upper part of the inner link (9) by means of the shaft (10) and the nut (11).

e) Fit, on the carriage (12), the lower part of the inner link (9) by means of the shaft (13) and the nut (14).

CAUTION
Risk of damage to the equipment.
When performing item f), hold the jaw arm (17) to prevent it from falling.

f) Remove the stop tool (15) between the beam (16) and the jaw arm (17).



9 Inner link
10 Shaft
11 Nut
12 Carriage
13 Shaft
14 Nut
15 Stop tool
16 Beam
17 Jaw arm

(Cont'd)

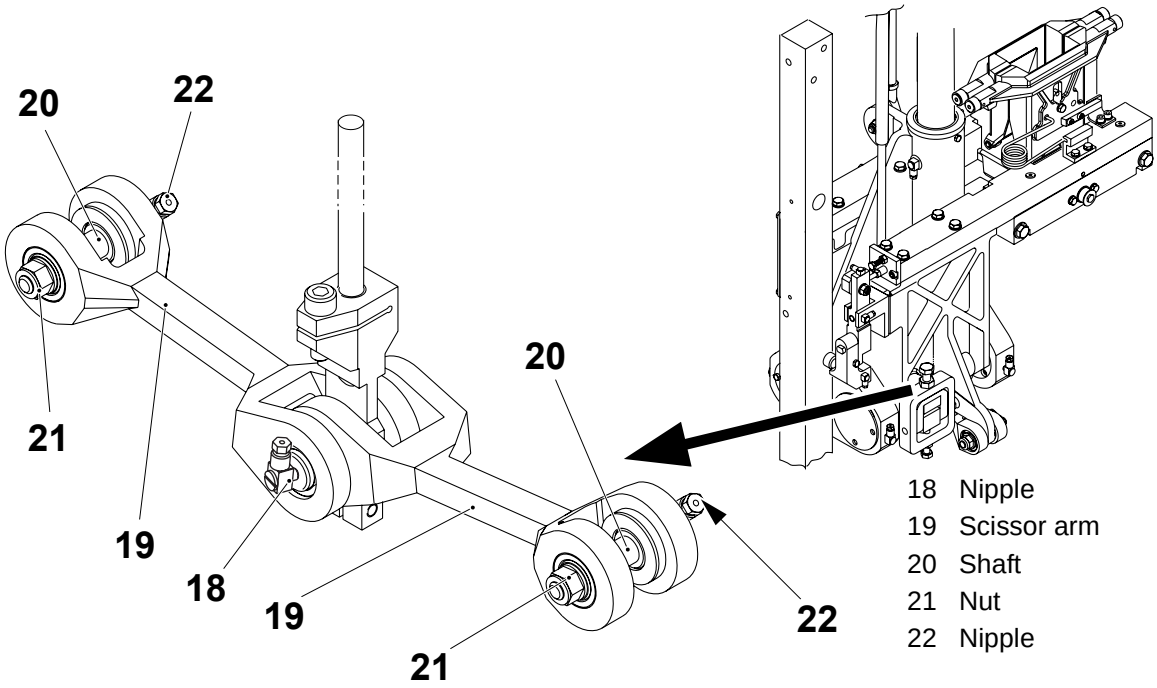
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(Cont'd)

g) Fit the nipple (18) on the scissor arm (19).

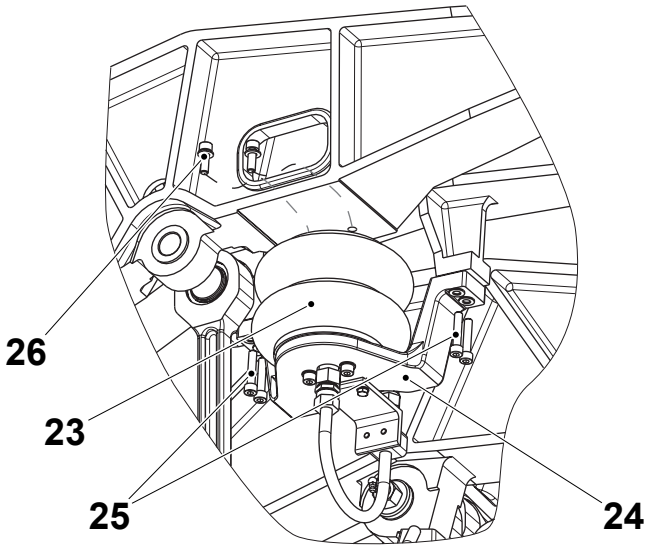
h) Fit the scissor arm (19) by means of the shafts (20) and the nuts (21).

i) Fit the nipples (22) on the shafts (20).



18 Nipple
19 Scissor arm
20 Shaft
21 Nut
22 Nipple

j) Fit the bellow (23) and the bracket (24) by means of the screws (25) and (26).



23 Bellow
24 Bracket
25 Screw
26 Screw

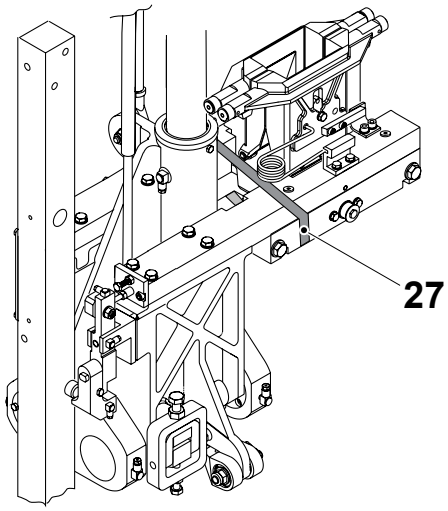
(Cont'd)

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(Cont'd)

CAUTION
Risk of damage to the equipment.
When performing items k) *and* m), pay attention in preventing collisions in the jaw system.

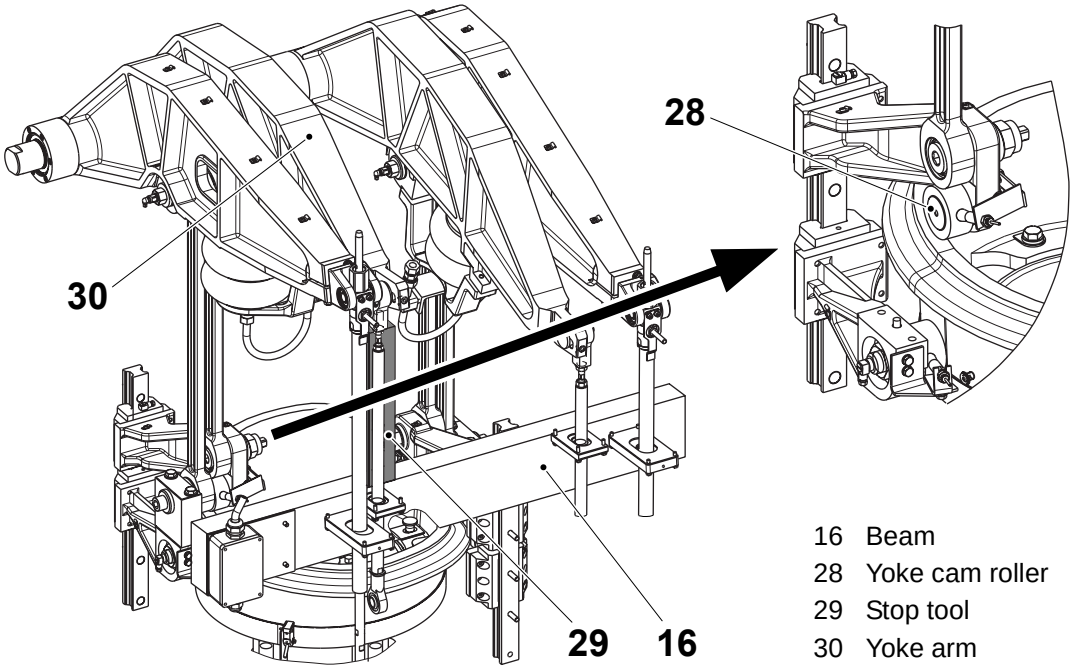
k) Remove the strip (27) which blocks the jaws.



27 Strip

l) Crank the machine forwards until the yoke cam roller (28) touches the curve surface.

m) Remove the stop tool (29) between the beam (16) and the yoke arm (30).



16 Beam
28 Yoke cam roller
29 Stop tool
30 Yoke arm

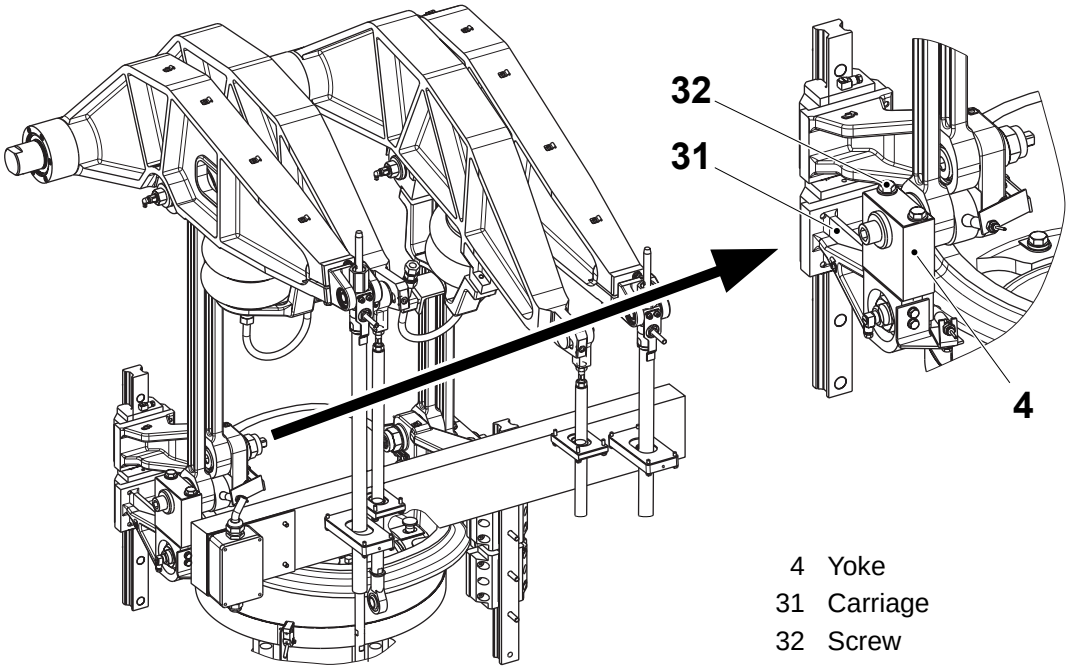
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(Cont'd)

n) Fit the yoke (4) on the carriage (31) by means of the screws (32).

Note! The screws (32) must be tightened to **40 Nm**.



4 Yoke
31 Carriage
32 Screw

o) Set the air pressure serving the bellow, see 3.6-3 Bellows - Set Bellows Pressure. Increase gradually the air pressure in order to prevent collisions between the lower roller and the main cam.

p) Check the jaw over jaw setting, see 4-12 Jaw System - Set Jaw Over Jaw and the jaw gap setting, see 4-9 Jaw System - Set Jaw Gap.

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3.5-9 Linear Guide - Lubricate Link Bearings

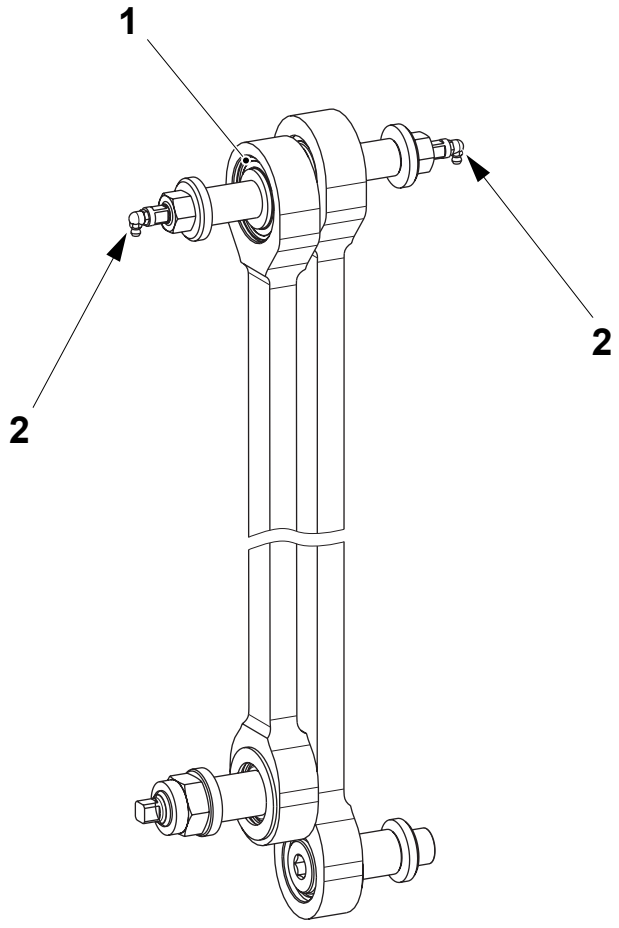
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Grease code F
SPC Reference	1487189-0200 1487190-0200

WARNING
Risk of personal injury.
Wear protective gloves.

Fill up the bearings (1) by means of the grease nipples (2). Use grease code F, see 10.3-1 Lubricants.

Fill up until the grease starts to come out from the edges

Note! Lubricate on both sides of the machine.



1 Bearing
2 Nipple

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3.6 Bellows

SPC Reference	1487192-0200 1487192-0300

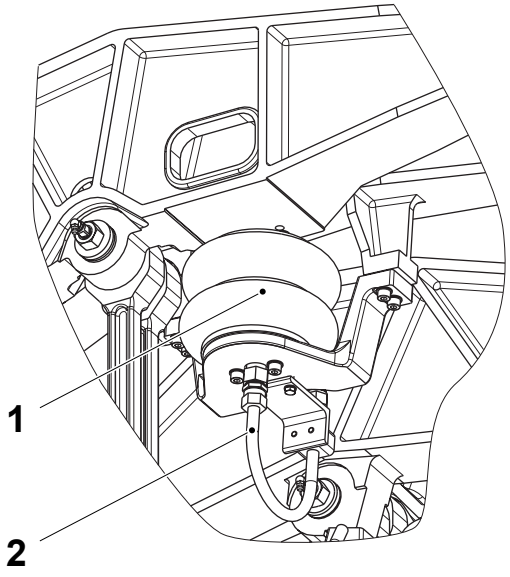
3.6-1 Bellows - Check Bellows and Pneumatic System

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1487192-0200 1487192-0300

a) Check the bellows (1) for wear and/or air leaks when they are compressed and un-compressed. If required set the air pressure serving the bellows (1), see 3.6-3 Bellows - Set Bellows Pressure.

b) Check the pneumatic system for air leaks and damaged, bent, or cracked air pipes (2).

c) Change as required.



1 Bellow
2 Air pipe

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3.6-2 Bellows - Change Bellows

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1487192-0200 1487192-0300

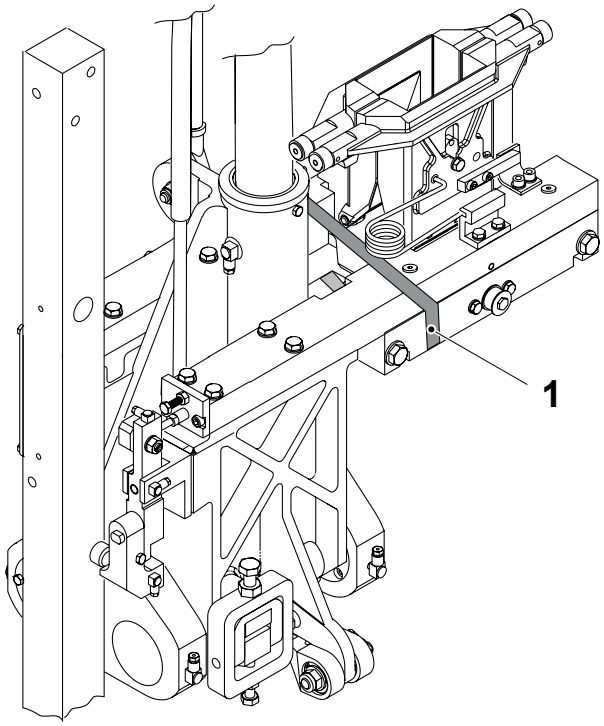
New bellows or rebuilt with UK-2562469-0100 Bellows replacement, TP No. 90459-1252

Note! For the machines with the old bellows, see Old bellows, TP No. 90239-0288 on page 3-70.

a) Crank the machine to 0 decimal degrees for the RH side.

b) Make sure the jaws are blocked in the current position by means of a strip (1).

CAUTION
Risk of damage to the equipment.
Avoid collision in the jaw system.



1 Strip

(Cont'd)

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(Cont'd)

c) Reduce the air pressure serving the bellow (2) to a pressure of **0 bar**.

d) Loosen the screws (3).

e) Remove the screws (4) and the nut (5).

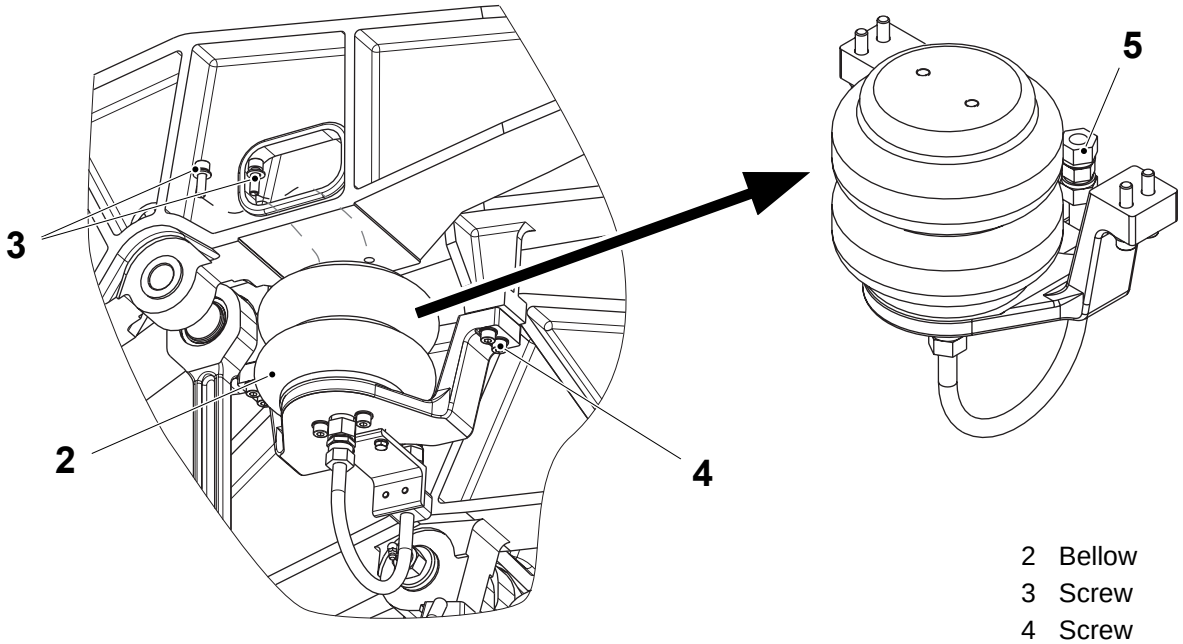
f) Remove the screws (3).

g) Remove and change the bellow (2).

h) Assemble in the reverse order.

i) Crank the machine to 128 decimal degrees and proceed in the same way for the LH side.

j) Set the air pressure serving the bellows, see 3.6-3 Bellows - Set Bellows Pressure.



2 Bellow
3 Screw
4 Screw
5 Nut

(Cont'd)

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(Cont'd)

Old bellows, TP No. 90239-0288

Note! For the machines with the new bellows or rebuilt with UK-2562469-0100 Bellows replacement, see New bellows or rebuilt with UK-2562469-0100 Bellows replacement, TP No. 90459-1252 on page 3-68.

a) Crank the machine to 0 decimal degrees for the RH side.

b) Make sure the jaws are blocked in the current position, see item b) on page 3-68.

CAUTION
Risk of damage to the equipment.
Avoid collision in the jaw system.

c) Reduce the air pressure serving the bellows (1) to a pressure of **0 bar**.

d) Loosen the nut (2).

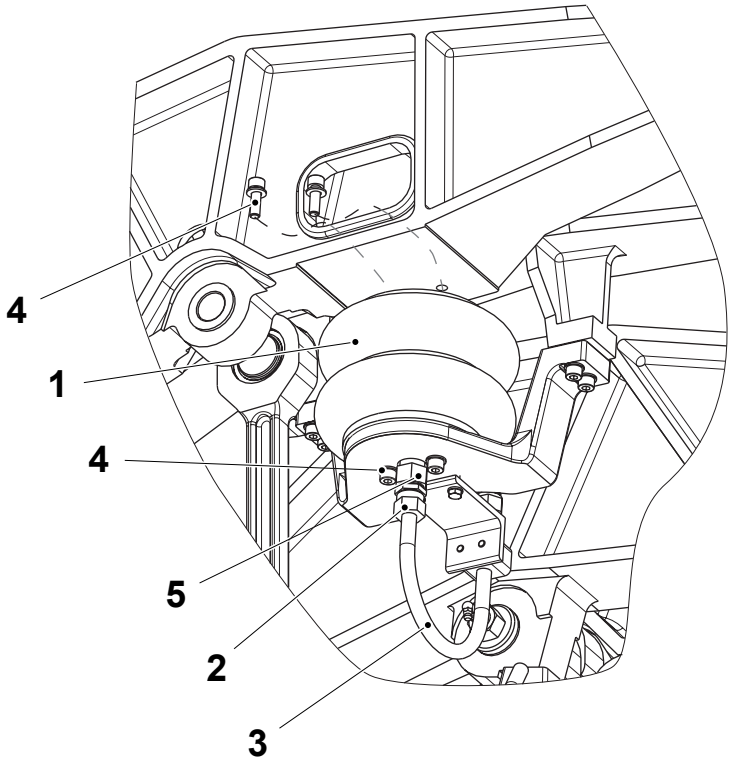
e) Remove the air pipe (3), the adapter (5) and the screws (4).

f) Remove the bellows (1) and change them.

g) Assemble in the reverse order.

h) Crank the machine to 128 decimal degrees and proceed in the same way for the LH side.

i) Set the air pressure serving the bellows, see 3.6-3 Bellows - Set Bellows Pressure.



1 Bellow
2 Nut
3 Air pipe
4 Screw
5 Adapter

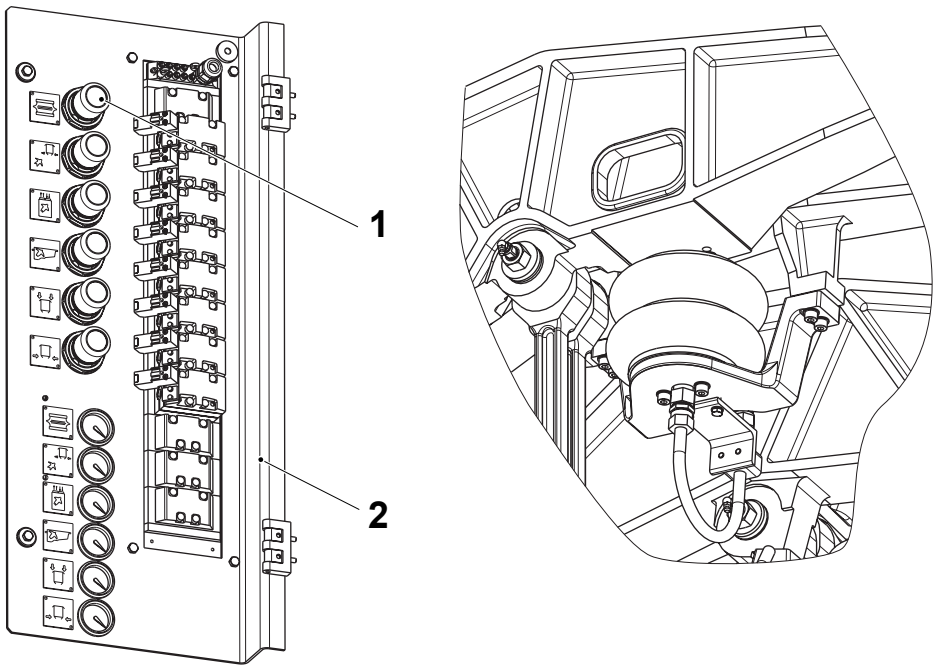
TechPub_2614345_0105 - 03_MM81534_11en.fm

3.6-3 Bellows - Set Bellows Pressure

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1487192-0200 1487192-0300

Set the bellows air pressure by means of the pressure regulator (1) on the machine body pneumatic air panel (2).

Variant	**Pressure (bar)**
New bellows or rebuilt with UK-2562469-0100 Bellows replacement, TP No. 90459-1252	2.4
Old bellows, TP No. 90239-0288	2.7



1 Pressure regulator
2 Air panel

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3.7 Jaw Link

SPC Reference	1035220-0400 1255561-0200

3.7-1 Jaw Link - Check Slides and Switch Cable

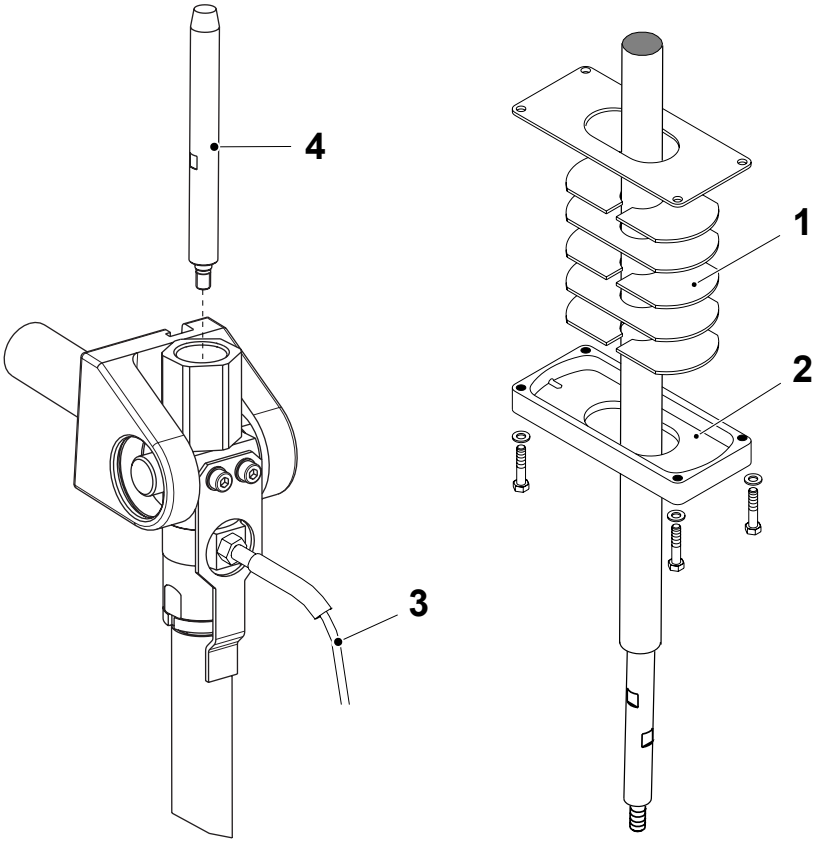
Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1035220-0400 1255561-0200

Check the following details for visual wear and/or damage:

- the slides (1)
- the lid (2)
- the switch cable (3)
  Check especially that it is not bent or cracked and that it is correctly clamped to the main arm.

Change as required.

Note! Do not clamp the switch cable to the pin (4).



1 Slide
2 Lid
3 Switch cable
4 Pin

TechPub_2614345_0105 - 03_MM81534_11en.fm

3.7-2 Jaw Link - Check Overload Function

Machine Status	Mains Power ON Air ON Steam ON Water OFF
Special Equipment	Tool approx. 100 mm in height (no hard material such as steel)
SPC Reference	1035220-0400 1255561-0200

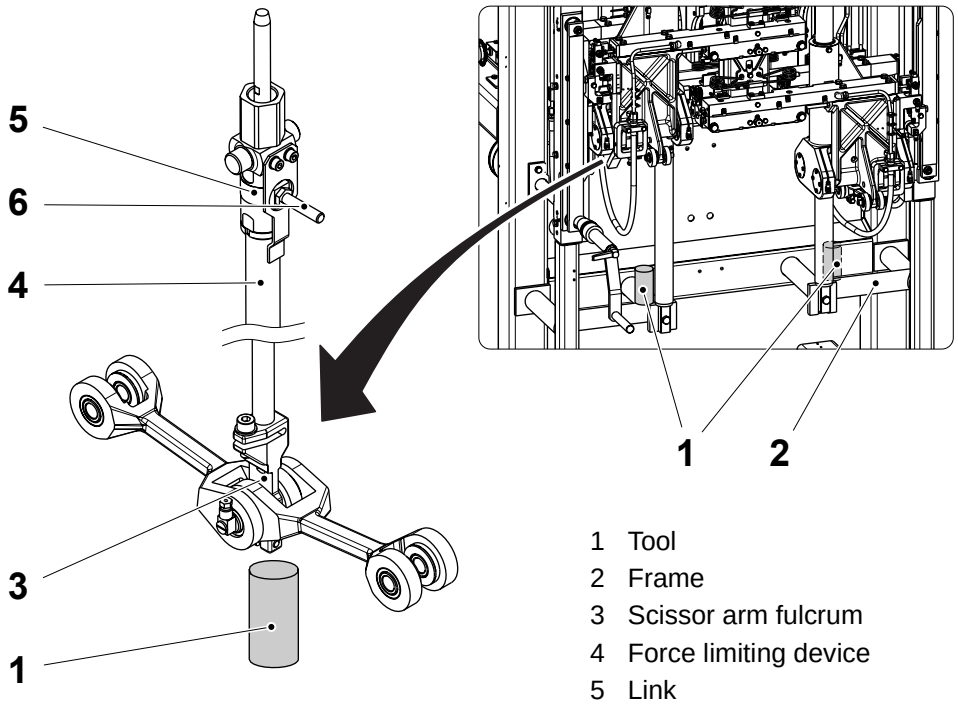
a) Place the tool (1) (a rubber hammer or a piece of wood) on the RH side between the frame (2) and the scissor arm fulcrum (3).

b) Crank the machine so that the link (4) moves inside the force limiting device (5) and the jaw overload alarm is displayed on the TPOP.

c) Check that the proximity switch (6) is working. In normal condition the LED is lit up and in overload condition the LED goes out on the proximity switch (6).

d) Crank the machine and repeat items a) to c) for the LH side.

Note! After the checking of the overload function (LED goes out) the jaws must be moved back to the working position (LED lights up).



1 Tool
2 Frame
3 Scissor arm fulcrum
4 Force limiting device
5 Link
6 Proximity switch

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3.7-3 Jaw Link - Change Slides

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1035220-0400 1255561-0200

a) Crank the machine to 21 decimal degrees for the RH side.

b) Remove the screws (1).

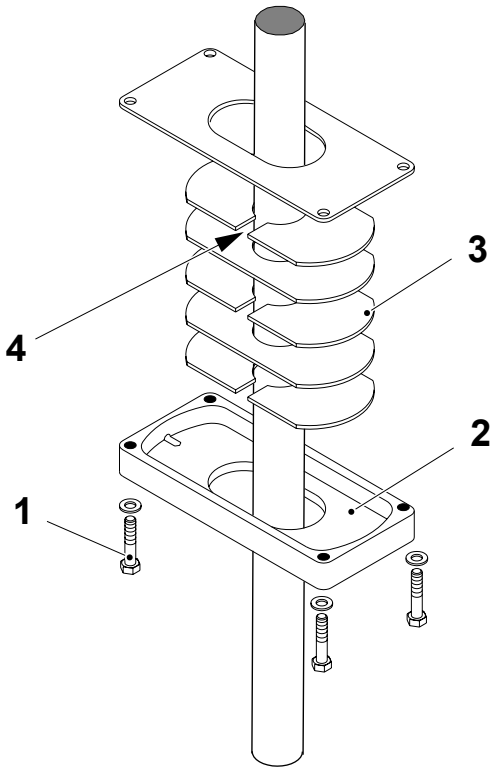
c) Pull the lid (2) downwards.

d) Remove the slides (3) and change them.

e) Assemble in the reverse order.

f) Crank the machine to 149 decimal degrees and proceed as above for the LH side.

Note! Fit the slides (3) so that the slits (4) are turned in alternate directions.



1 Screw
2 Lid
3 Slide
4 Slit

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3.7-4 Jaw Link - Overhaul

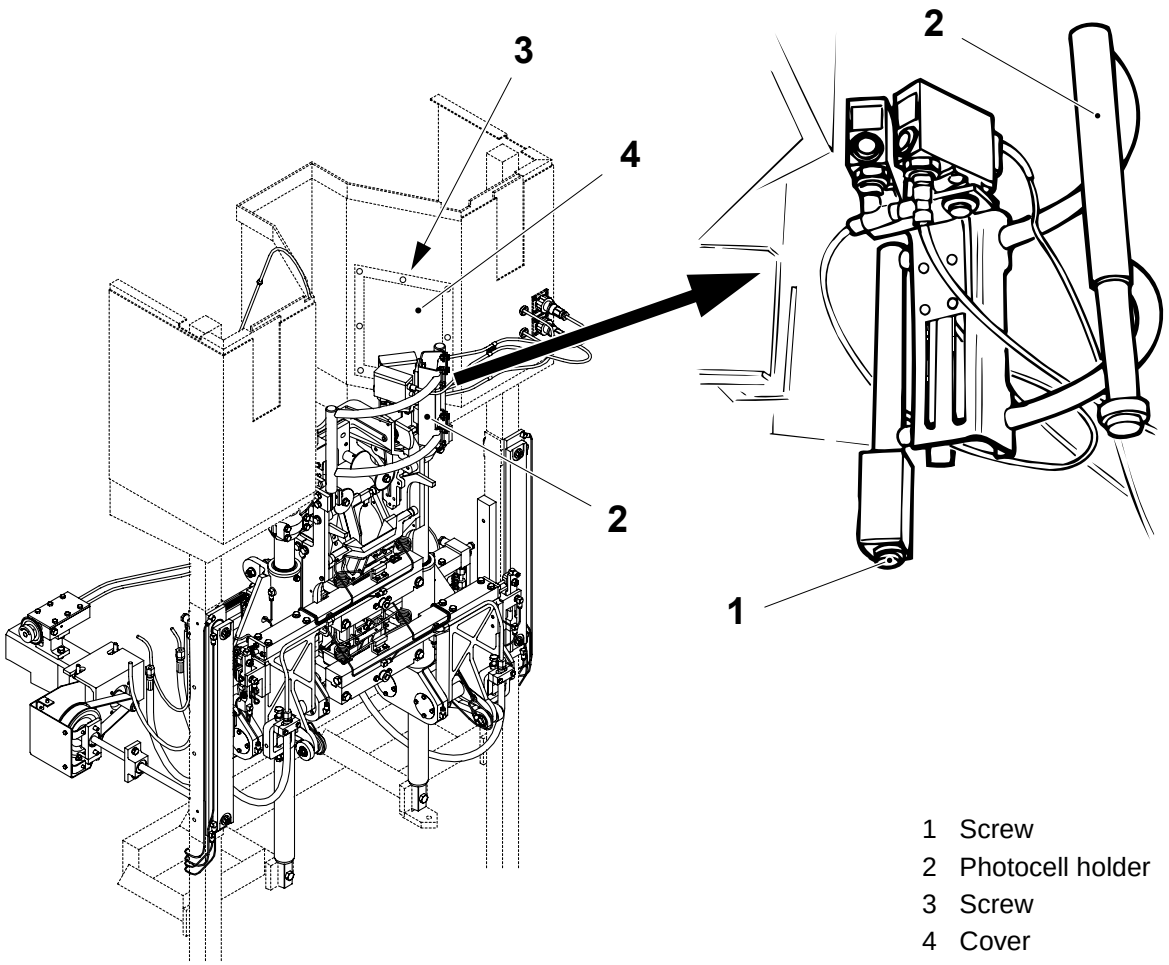
Machine Status	Mains Power OFF Air ON Steam ON Water OFF
Consumables	Locking fluid TP No. 90157-16 Grease code F
SPC Reference	1035220-0400 1255561-0200

a) Crank the machine to 144 decimal degrees RH side (16 decimal degrees LH side).

Note! For TBA 1000 Sq only, crank the machine to 102 decimal degrees RH side (230 decimal degrees LH side).

b) Loosen the screw (1) and remove the photocell holder (2).

c) Remove the screws (3) and the covers (4).



1 Screw
2 Photocell holder
3 Screw
4 Cover

(Cont'd)

TechPub_2614345_0105 - 03_MM81534_11en.fm

(Cont'd)

d) Loosen the nut and remove the proximity switch (5).

e) Remove the screws (6) and lower the sleeve (7).

f) Unscrew the nut (8).

g) Separate the axle (9) and the shaft (10) from the force limiting device (11) and remove the force limiting device (11).

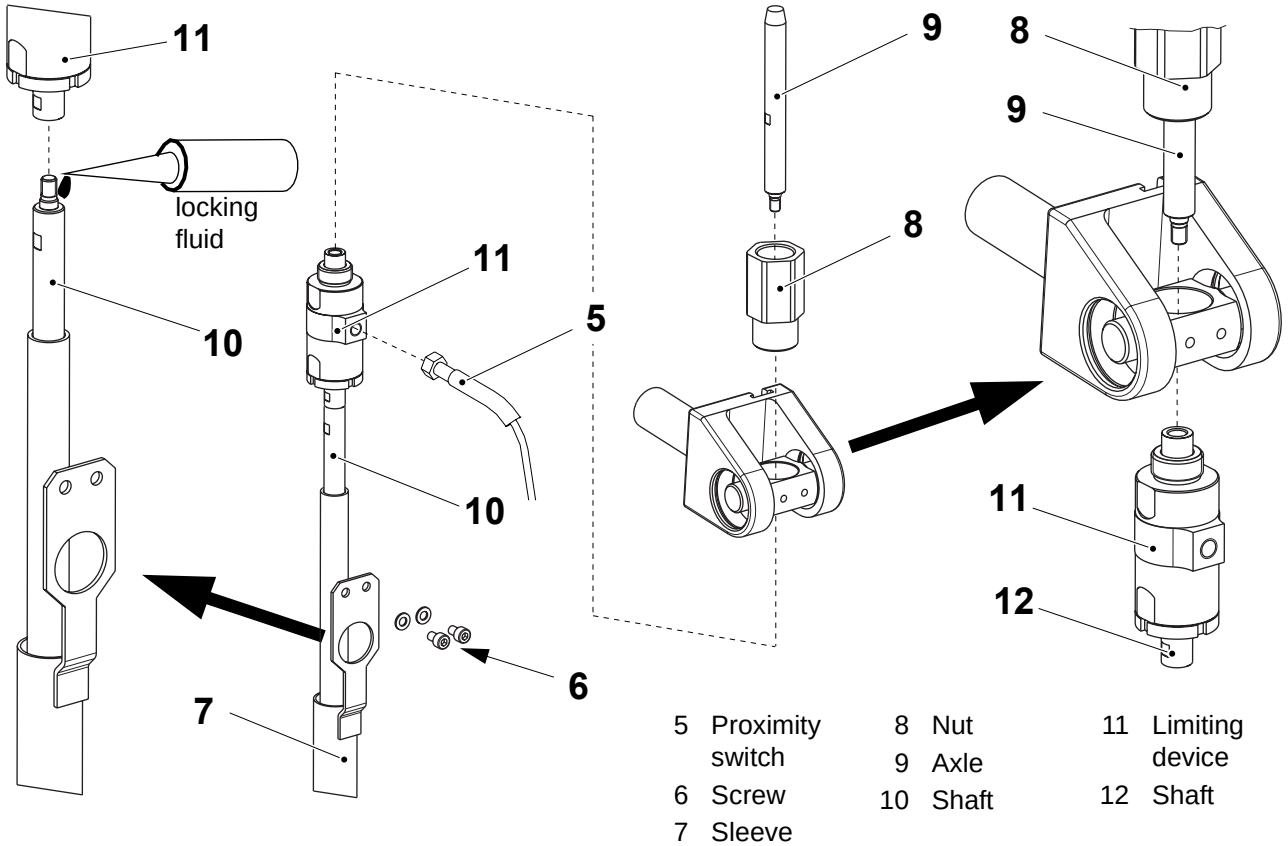
h) Overhaul the force limiting device (11) as required.

Note! Verify for any axial play between the shaft (12) and the new force limiting device (11).

i) Assemble in the reverse order and set the proximity switch (5), see 3.7-5 Jaw Link - Set Link and Proximity Switch.

Note! If the shaft (10) has been separated from the force limiting device (11) it must be fitted with locking fluid.

Note! If the axle (9) has been removed from the force limiting device (11), they must be externally lubricated with grease, code F, before assembling.



5 Proximity switch
6 Screw
7 Sleeve
8 Nut
9 Axle
10 Shaft
11 Limiting device
12 Shaft

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3.7-5 Jaw Link - Set Link and Proximity Switch

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1035220-0400 1255561-0200

Link

a) Loosen the screws (1) and the nut (5).

b) Set the distance **A** between the arm (2) and the fork head (3) by means of the screw (4).

c) Tighten the screws (1) and the nut (5).

Proximity Switch

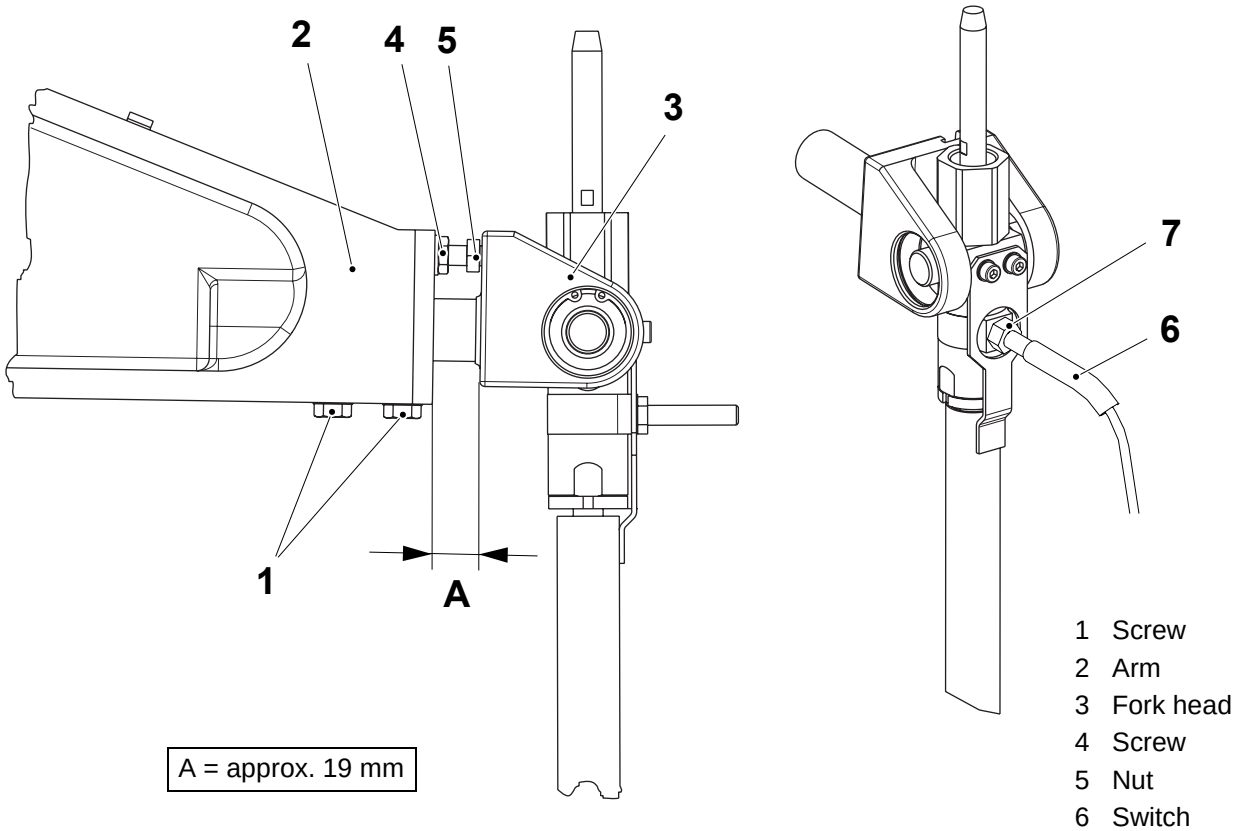
a) Fit the proximity switch (6) and tighten carefully, by hand, until it stops.

b) Turn the proximity switch (6) a quarter of turn anti-clockwise.

c) Tighten the nut (7).

d) After the setting, check that it functions correctly.

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A = approx. 19 mm

1 Screw
2 Arm
3 Fork head
4 Screw
5 Nut
6 Switch
7 Nut

3.8 Yoke Link

SPC Reference	1035221-0400

3.8-1 Yoke Link - Check Slides

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1035221-0400 1487301-0100

Check the following parts for visual wear and/or damage:

- the slides (1)
- the lid (2).

Change as required.

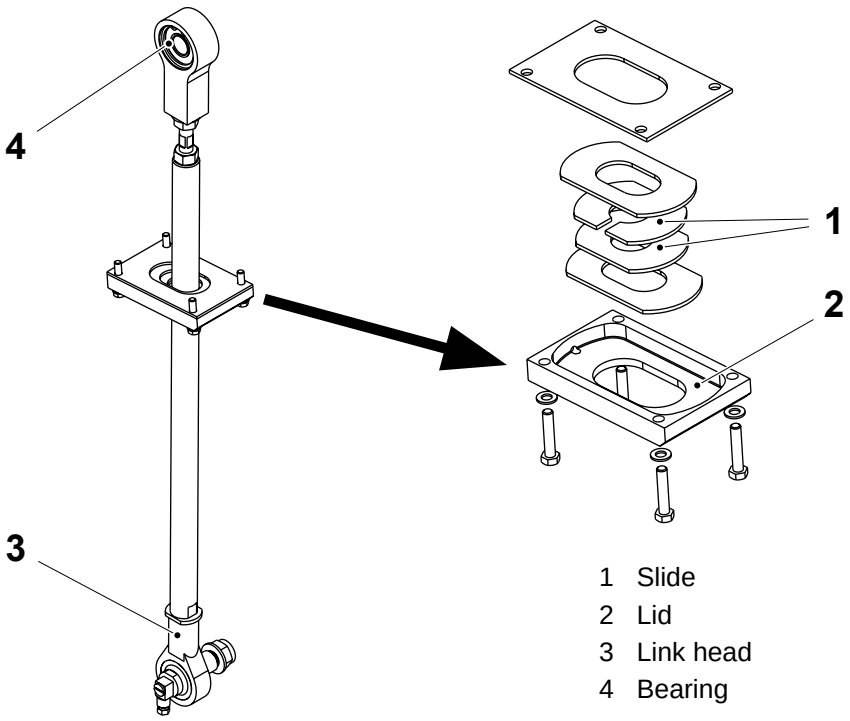
3.8-2 Yoke Link - Check Link Head and Bearing

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1035221-0400

Check the following parts for visual wear and/or damage:

- the lower link head (3)
- the bearing (4).

Change as required.



1 Slide
2 Lid
3 Link head
4 Bearing

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3.8-3 Yoke Link - Change Slides

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035221-0400 1487301-0100

a) Crank the machine to 21 decimal degrees for the RH side.

b) Remove the screws (1).

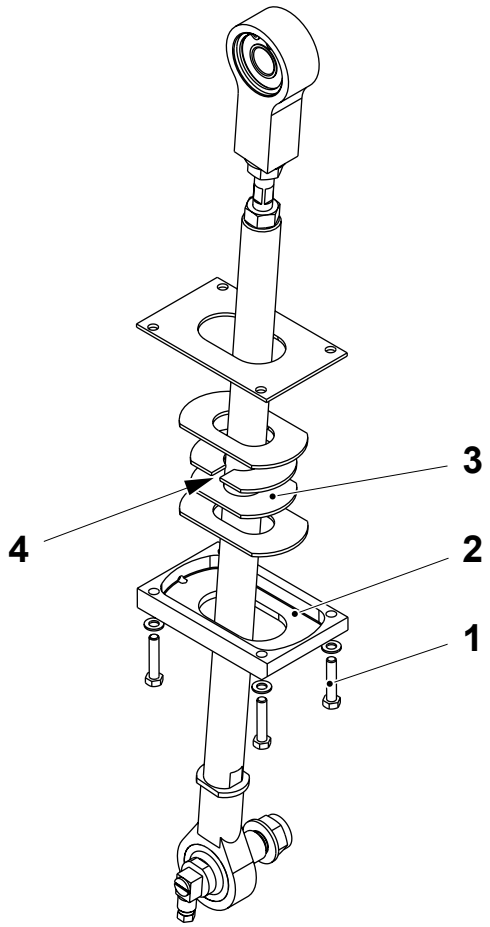
c) Pull down the lid (2).

d) Remove the slides (3) and change them if damaged.

e) Assemble in the reverse order.

Note! Fit the slides so that the slits (4) are turned in alternate directions.

f) Crank the machine to 149 decimal degrees and proceed as above for the LH side.



1 Screw
2 Lid
3 Slide
4 Slit

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3.8-4 Yoke Link - Set Link

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035221-0400

a) Loosen the nut (1).

b) Set the distance **A** between the edge of the axle pin (2) and the machined edge of the arm (3) using the screw (4).

c) Tighten the nut (1).

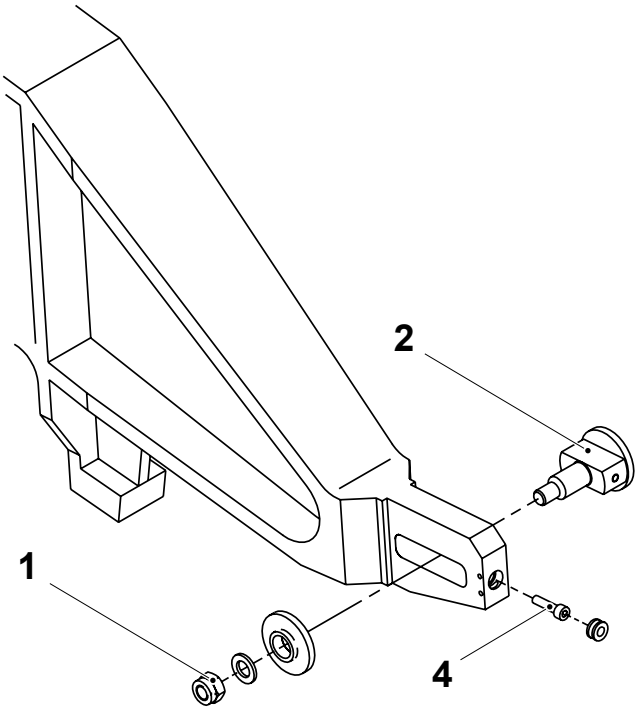
d) On the LH side, set the distance **B** between the link head (5) and the link (6).

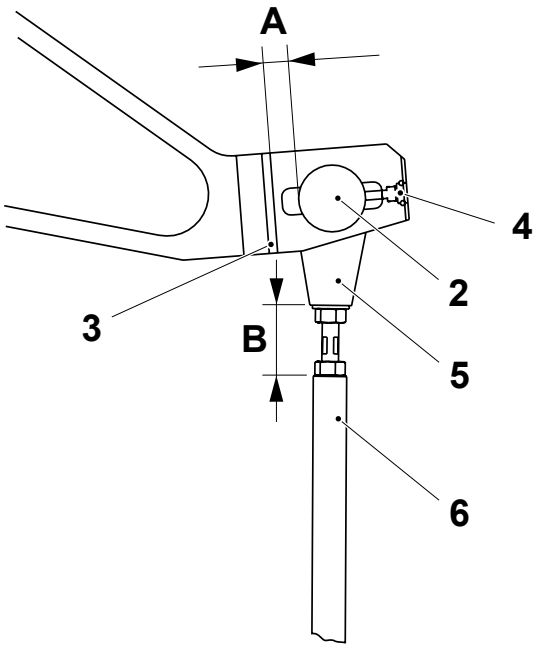
Note! After the distance **B** the Jaw system must be set, see 4-12 Jaw System - Set Jaw Over Jaw.

Note! After the distance **A** the Jaw system must be set, see 4-4 Jaw System - Set Stroke.

A = approx. 15 mm

B = 42 mm

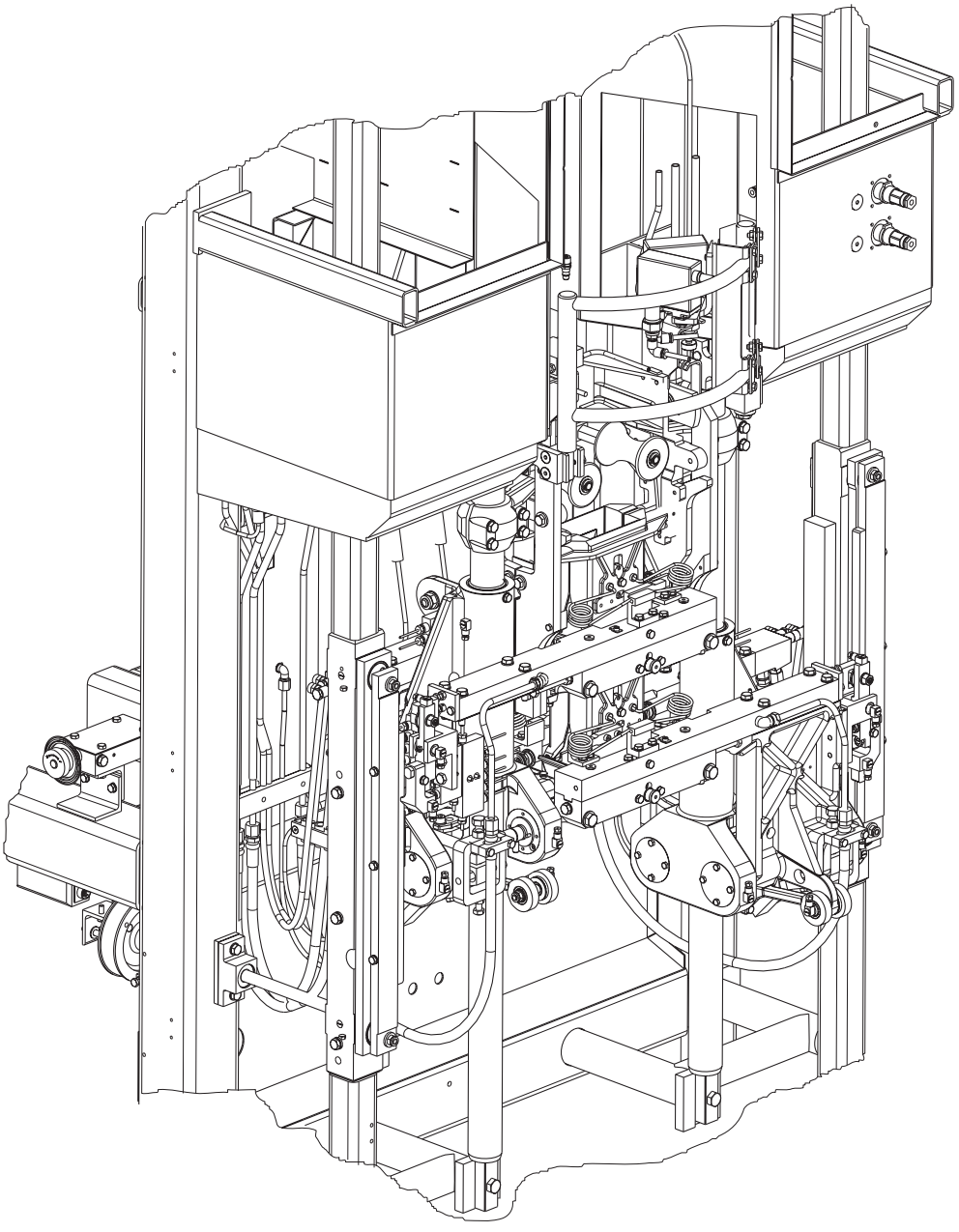




1 Nut
2 Axle pin
3 Arm
4 Screw
5 Link head
6 Link

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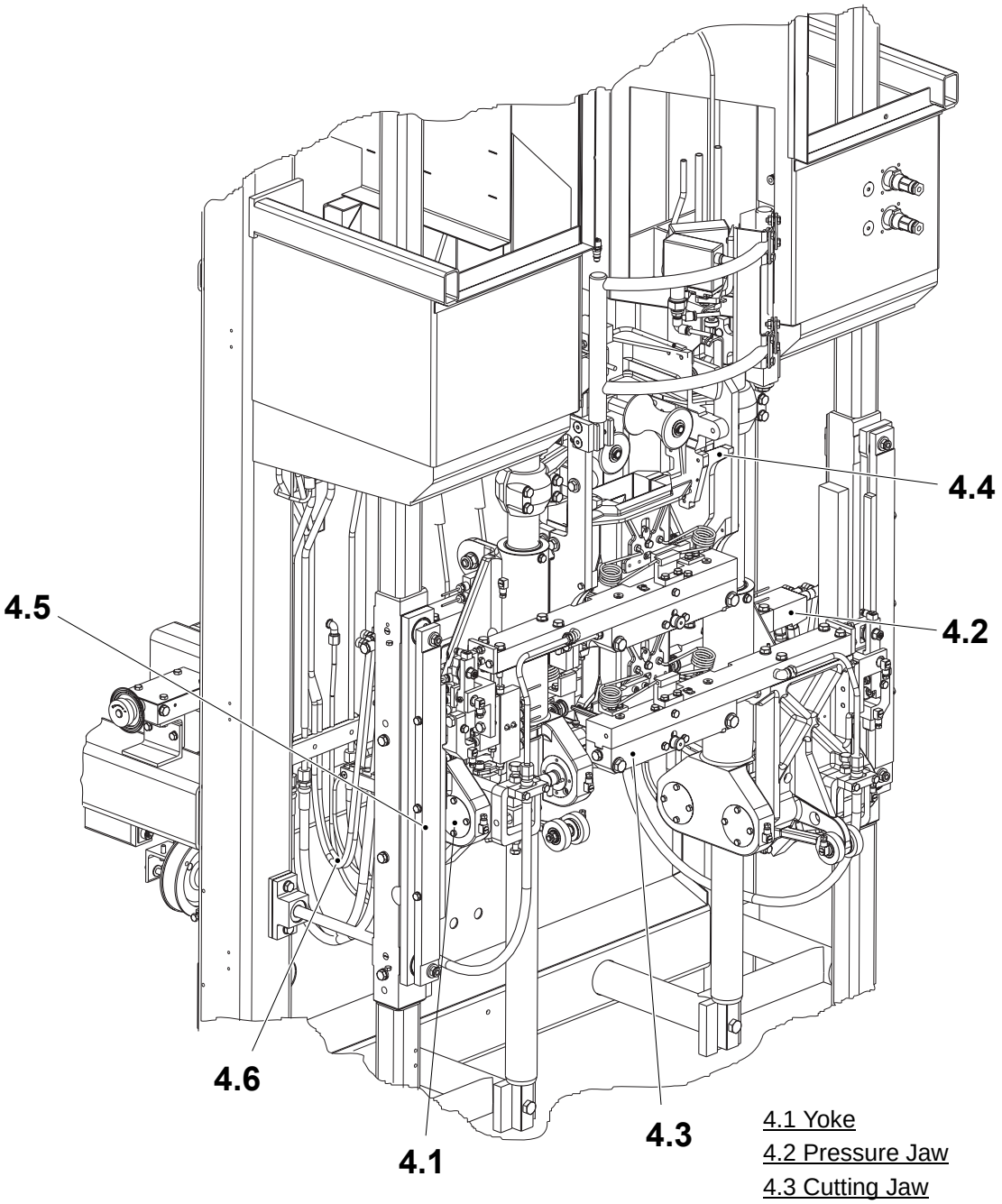
4 Jaw System



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Jaw System - Description

SPC Reference	648504-0500



4.1 Yoke
4.2 Pressure Jaw
4.3 Cutting Jaw
4.4 Volume Adjuster
4.5 Design Correction
4.6 Cables and Hoses

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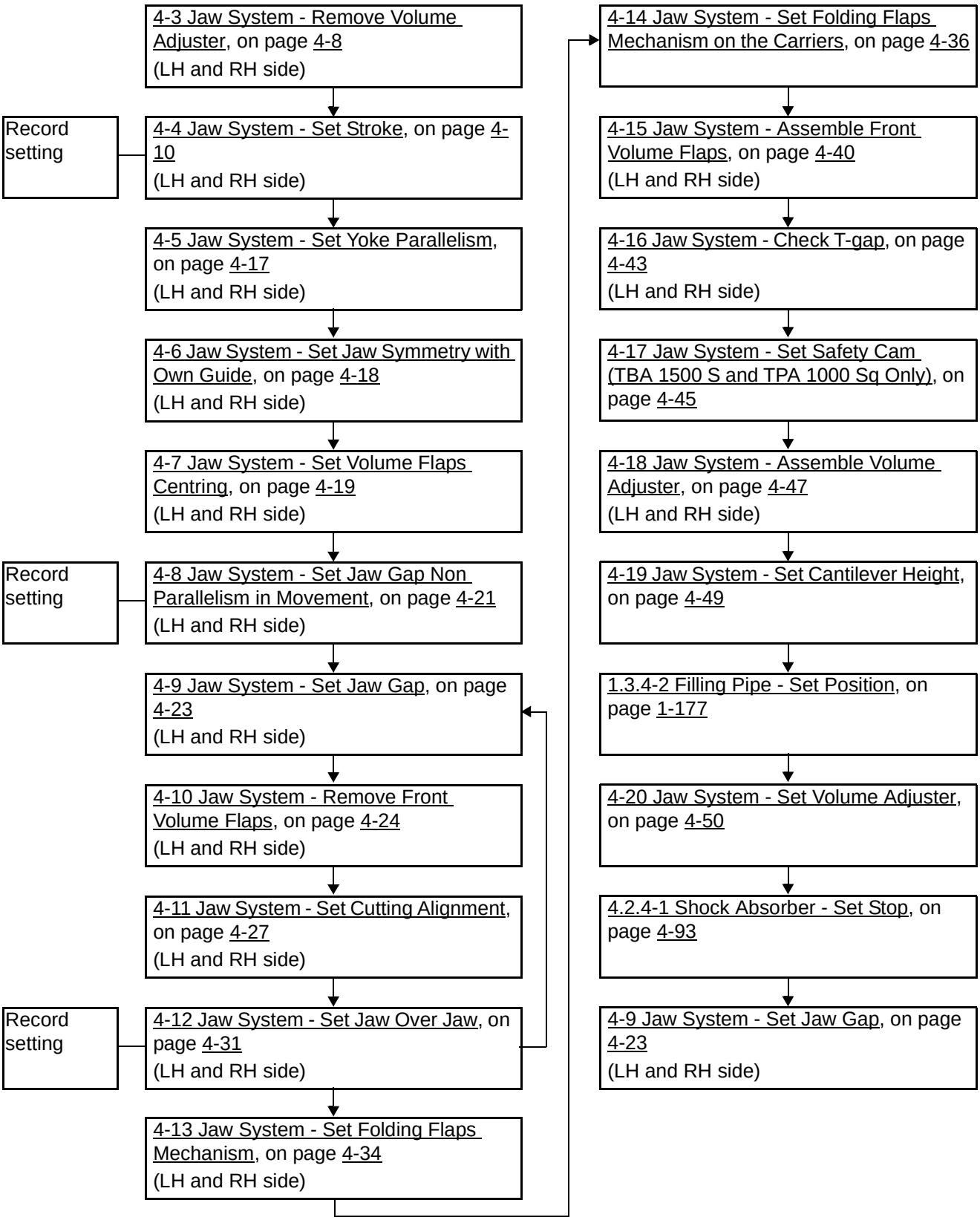
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4 Jaw System

4-2 Jaw System - Setting Sequence



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4-3 Jaw System - Remove Volume Adjuster

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648504-0500

Note! For 1000 Sq only perform the instruction 4-10 Jaw System - Remove Front Volume Flaps before performing the following items.

a) Crank the machine to 160 decimal degrees LH side (32 decimal degrees RH side).

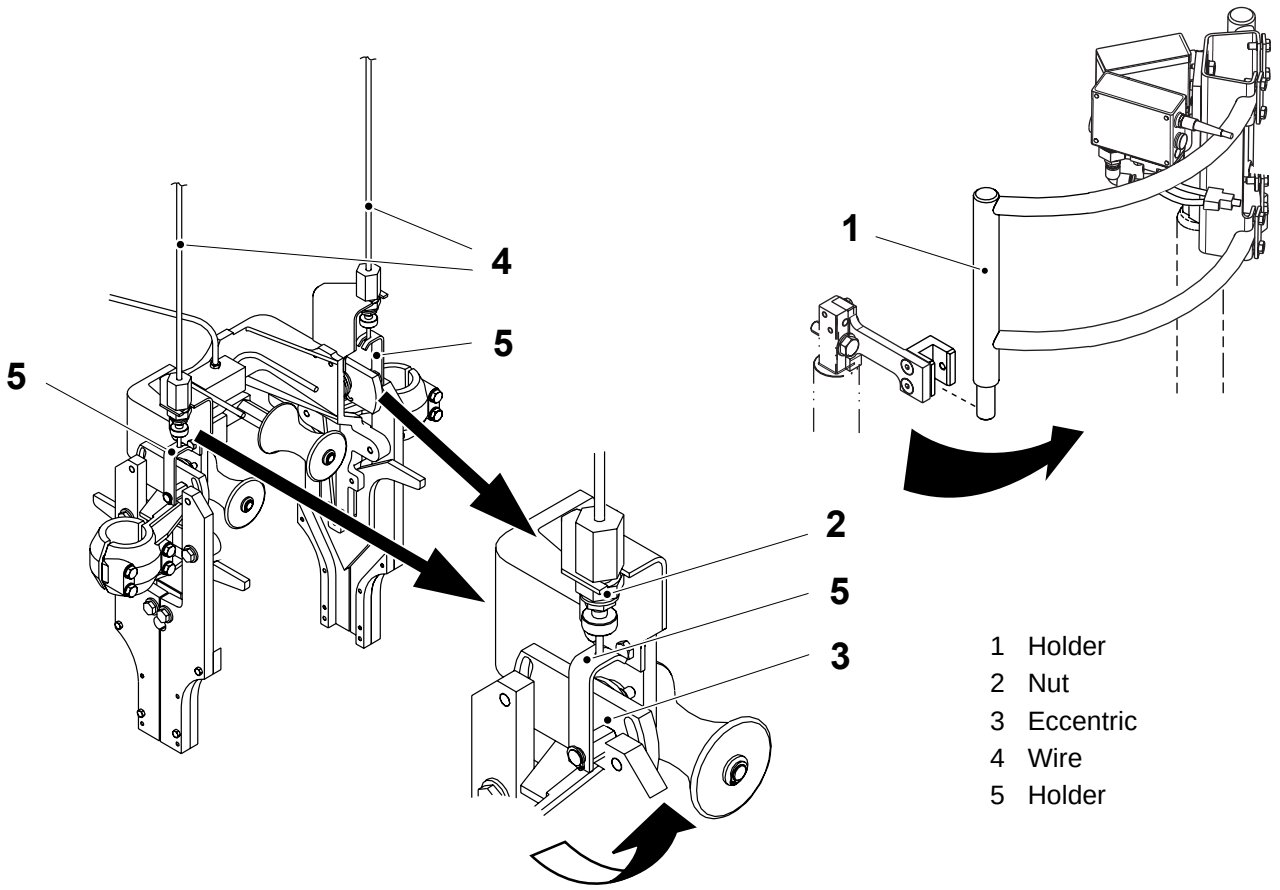
Note! For 1500 S and 1000 Sq only crank the machine to 166 decimal degrees LH side (38 decimal degrees RH side).

b) Move aside the photocell holder (1), see figure.

c) Loosen the nuts (2).

d) Pull the curve unit eccentrics (3) upwards.

e) Remove the wires (4) from the slot on the curve unit holders (5).



1 Holder
2 Nut
3 Eccentric
4 Wire
5 Holder

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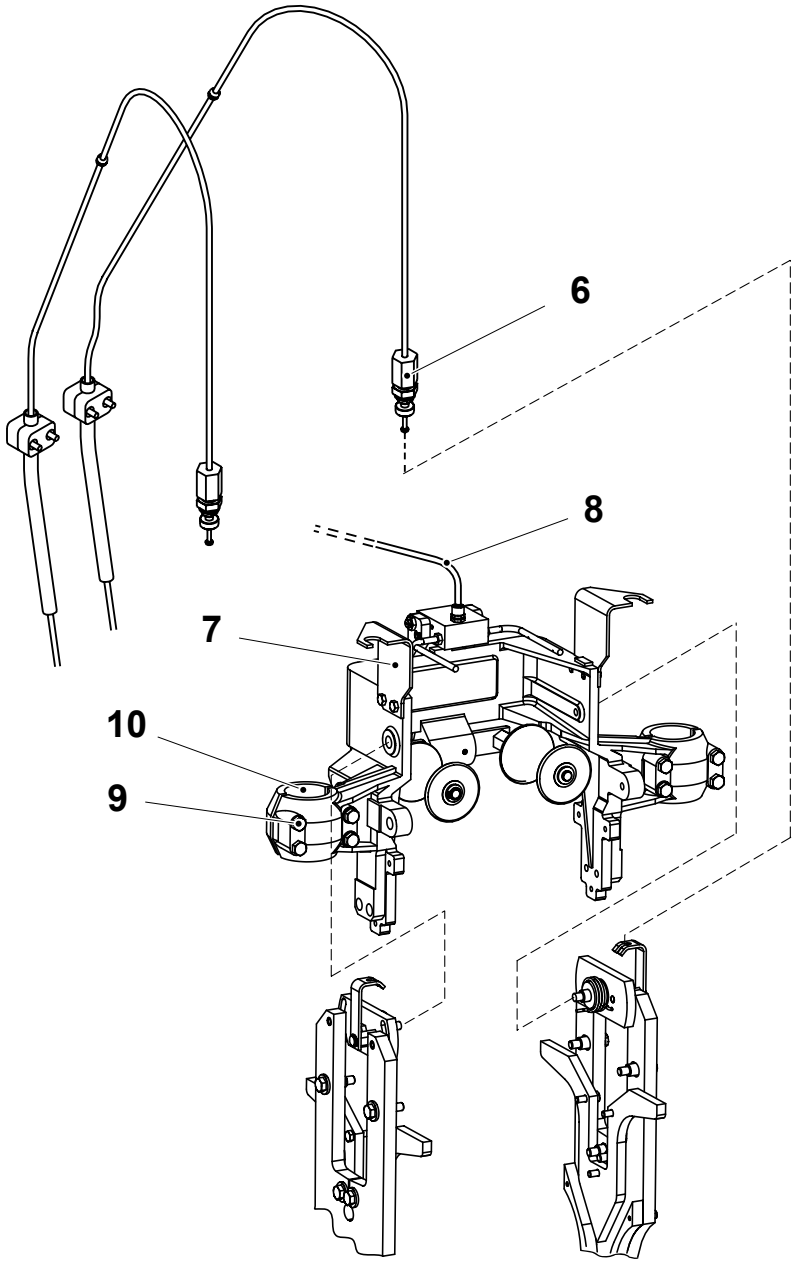
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f) Remove the sleeves (6) from the cantilever holders (7).

g) Remove the water hose (8) from the plug located on the machine frame.

h) Remove the screws (9) from the cantilever (10).

i) Remove the volume adjuster assembly from the yoke guides.



6 Sleeve
7 Holder
8 Hose
9 Screw
10 Cantilever

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4-4 Jaw System - Set Stroke

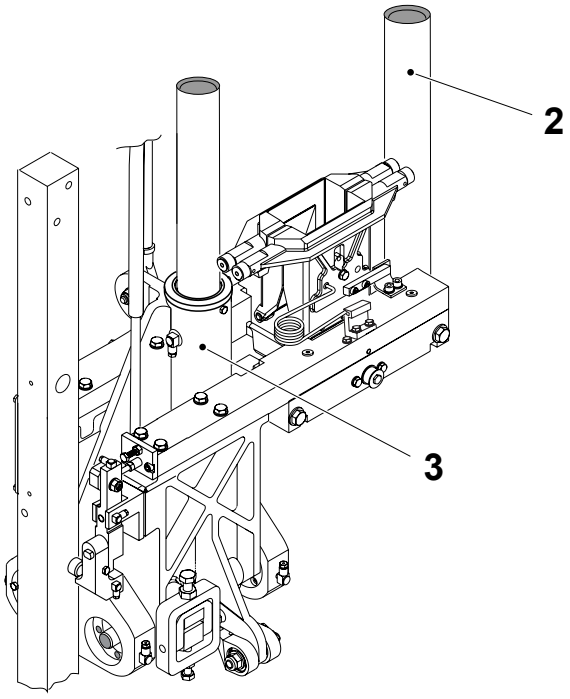
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Clamp TP No. 1035362-0101 Micrometer
SPC Reference	648504-0500

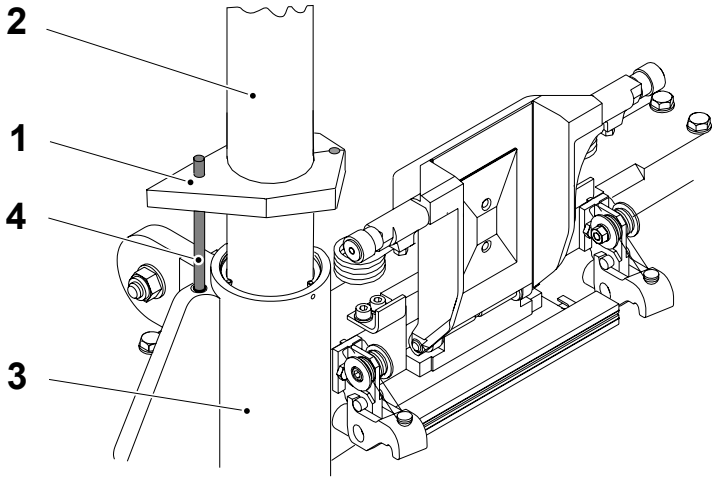
a) Crank the machine to 32 decimal degrees for the LH side.

Note! For 1500 S and TPA 1000 Sq only, see page 4-14.

b) Fit the point measuring clamp (1) on the LH side guide (2).

c) Crank the machine so that the left yoke (3) presses against the measuring clamp pin (4).





1 Point measure clamp
2 Guide
3 Yoke
4 Clamp pin

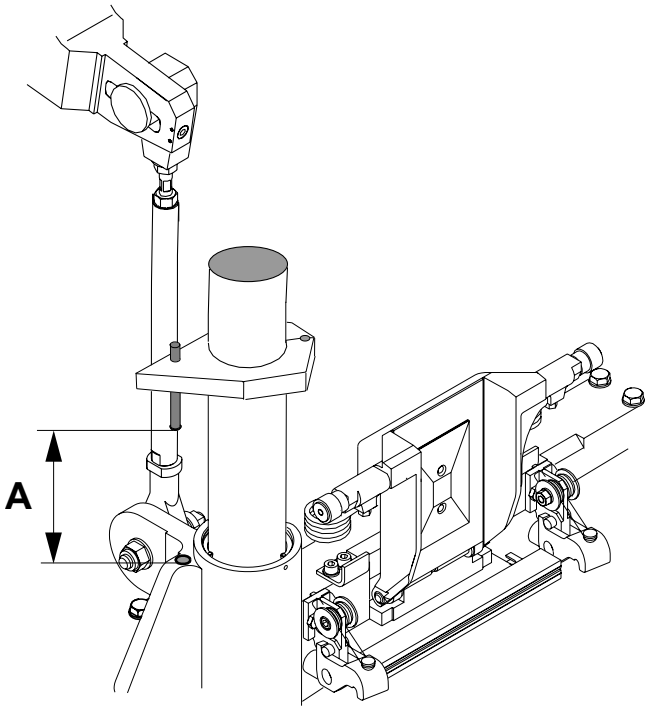
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(Cont'd)

d) Crank the machine further until it reaches approximately its lower turning position, see table.

Package	A (nominal value)	Lower turning position
1000 B	306.69	114 / 242
1000 S	340.30	114 / 242
200 S	221.30	114 / 242
250 B	201.35	114 / 242
200 B	179.12	114 / 242
TPA 1000 S	336.90	114 / 242
1000 Sq	347.71	114 / 242
500 S	274.76	114 / 242
500 B	186.84	114 / 242
TPA 330 Sq	229.30	114 / 242
TPA 250 Sq	236.25	118 / 246
250 S	239.9	117 / 244
330 S	248.37	114 / 242
TPA 500 Sq	273.50	114 / 242



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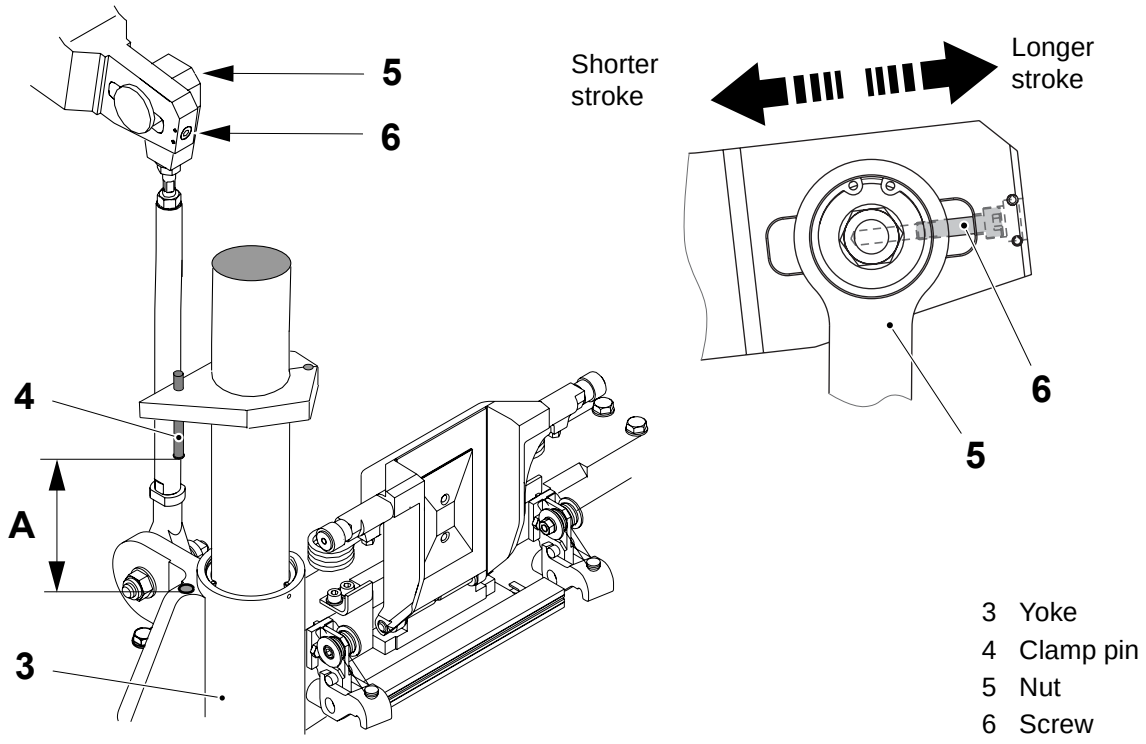
e) With the aid of a micrometer, measure the distance **A** (stroke) between the measuring clamp pin (4) and the yoke (3).

Note! Move gently the crank and make sure to measure the biggest value of the distance **A** (stroke) and record it.

f) Crank the machine to 160 decimal degrees and repeat the procedure on the RH side.

g) Crank the machine to 48 decimal degrees RH side (176 decimal degrees LH side), and adjust the distance **A** (stroke) by loosening the nut (5) and turning the screw (6), located on the yoke link. Turn clockwise for longer stroke or anti-clockwise for shorter stroke.

Note! The difference between the two sides must not exceed **0.1 mm**.



3 Yoke
4 Clamp pin
5 Nut
6 Screw

(Cont'd)

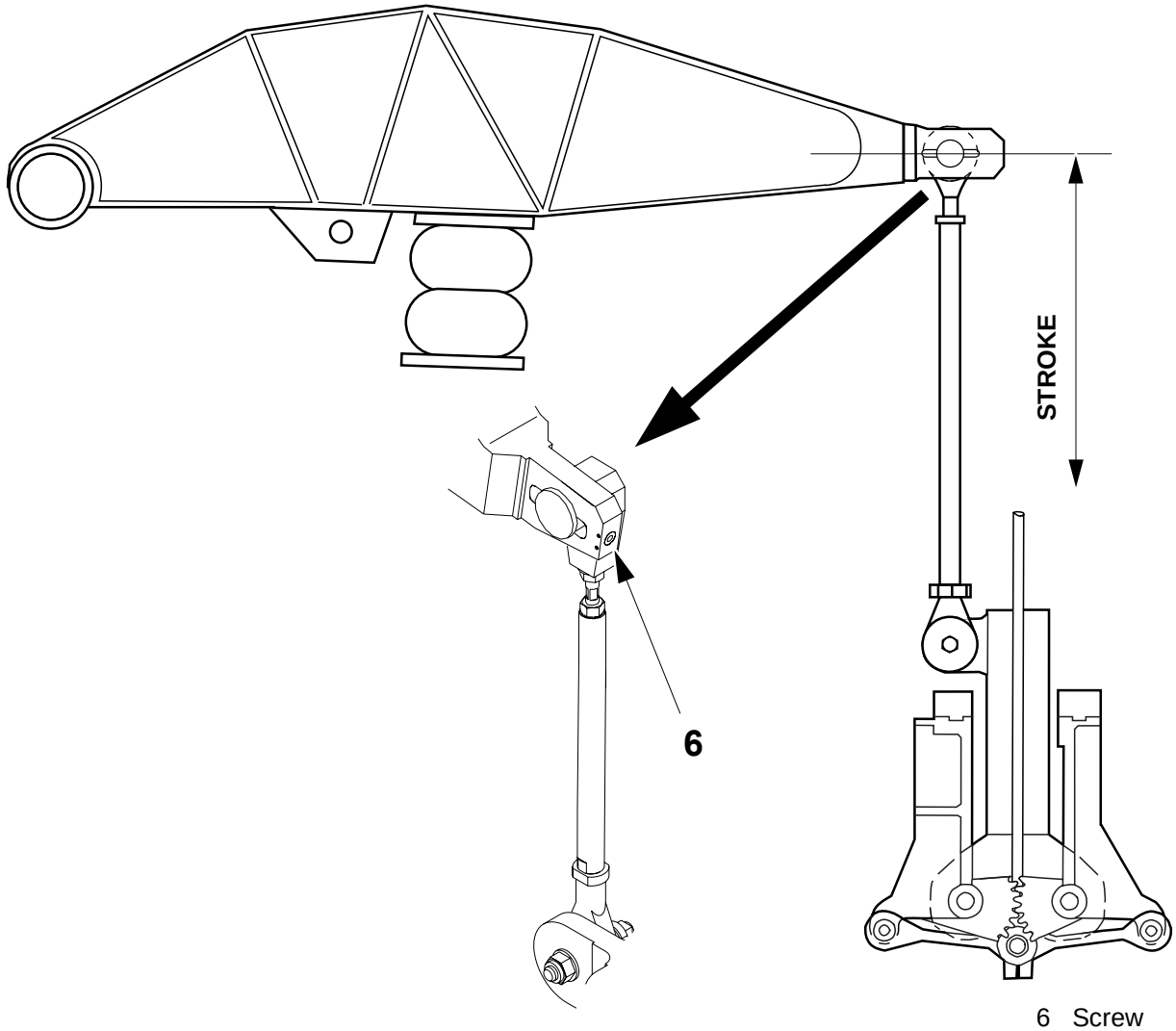
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Results of the Stroke Length Alterations

By turning the screws (6) one turn, the stroke length will change as shown in the following table.

Package	Alteration (mm)		Package	Alteration (mm)
1000 S - 1000 Sq - TPA 1000 S	0.32		TPA 250 Sq	0.27
500 S - TPA 500 Sq	0.25		1000 B	0.28
200 S - 330 S - TPA 330 Sq	0.21		250 B	0.19
500 B - 200 B	0.17		250 S	0.26



6 Screw

(Cont'd)

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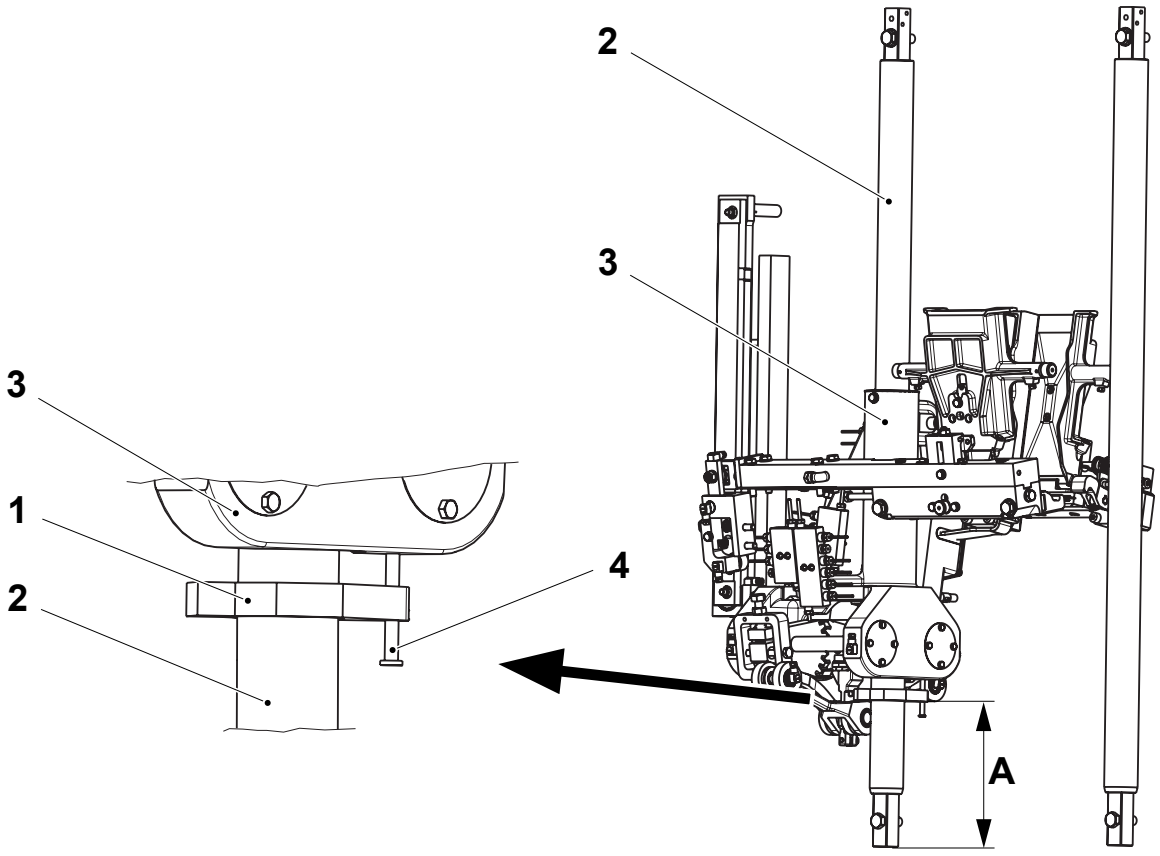
Set Stroke (1500 S and TPA 1000 Sq only)

a) Crank the machine to 216 decimal degrees for the LH side.

b) Fit the point measuring clamp (1) under the yoke (3) approximately **190 mm** (**A**) from the edge of the LH side guide (2). The tip of the clamp pin (4) has to be upwards.

c) Fit the point measuring clamp (1) on the LH side guide (2).

d) Crank the machine so that the left yoke (3) presses against the measuring clamp pin (4).



1 Point measure clamp
2 Guide
3 Yoke
4 Clamp pin

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(Cont'd)

(Cont'd)

e) Crank the machine further until it reaches approximately its upper turning position, see table.

Package	B (nominal value)	Approx. upper turning pos
1500 S	405.08	50 / 178
TPA 1000 Sq	374.82	48 / 176

f) With the aid of a micrometer, measure the distance **B** (stroke) between the measuring clamp pin (4) and the yoke (3).

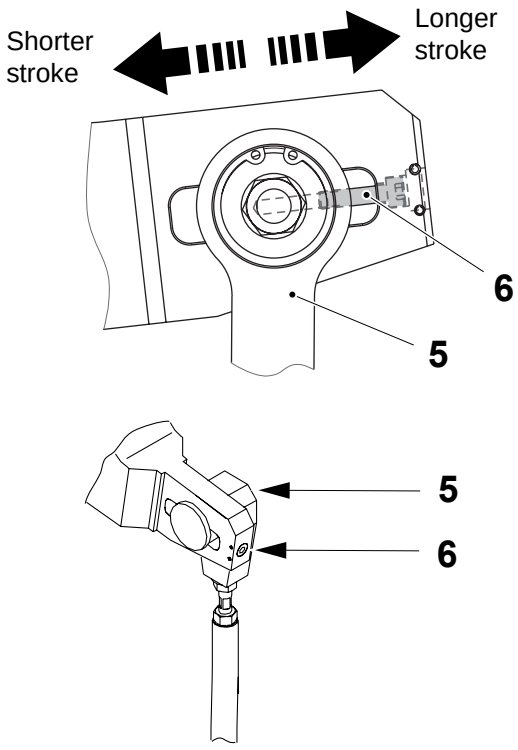
Note! Move gently the crank and make sure to measure the biggest value of the distance **B** (stroke) and record it.

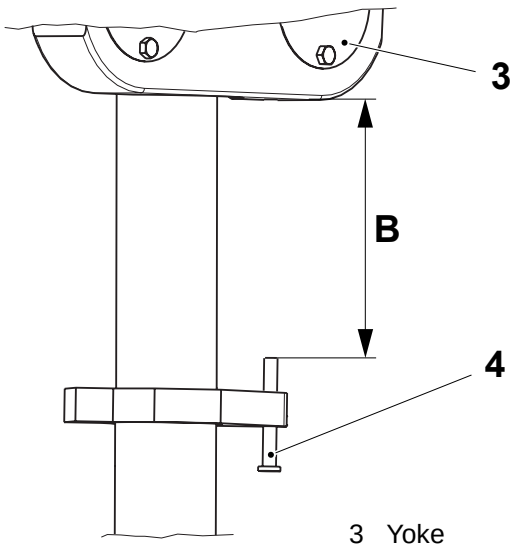
g) Crank the machine to 160 decimal degrees and repeat the procedure on the RH side.

h) Crank the machine to 48 decimal degrees RH side (176 decimal degrees LH side), and adjust the distance **B** (stroke) by loosening the nut (5) and turning the screw (6), located on the yoke link. Turn clockwise for longer stroke or anti-clockwise for shorter stroke.

Note! The difference between the two sides must not exceed **0.1 mm**.

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3 Yoke
4 Clamp pin
5 Nut
6 Screw

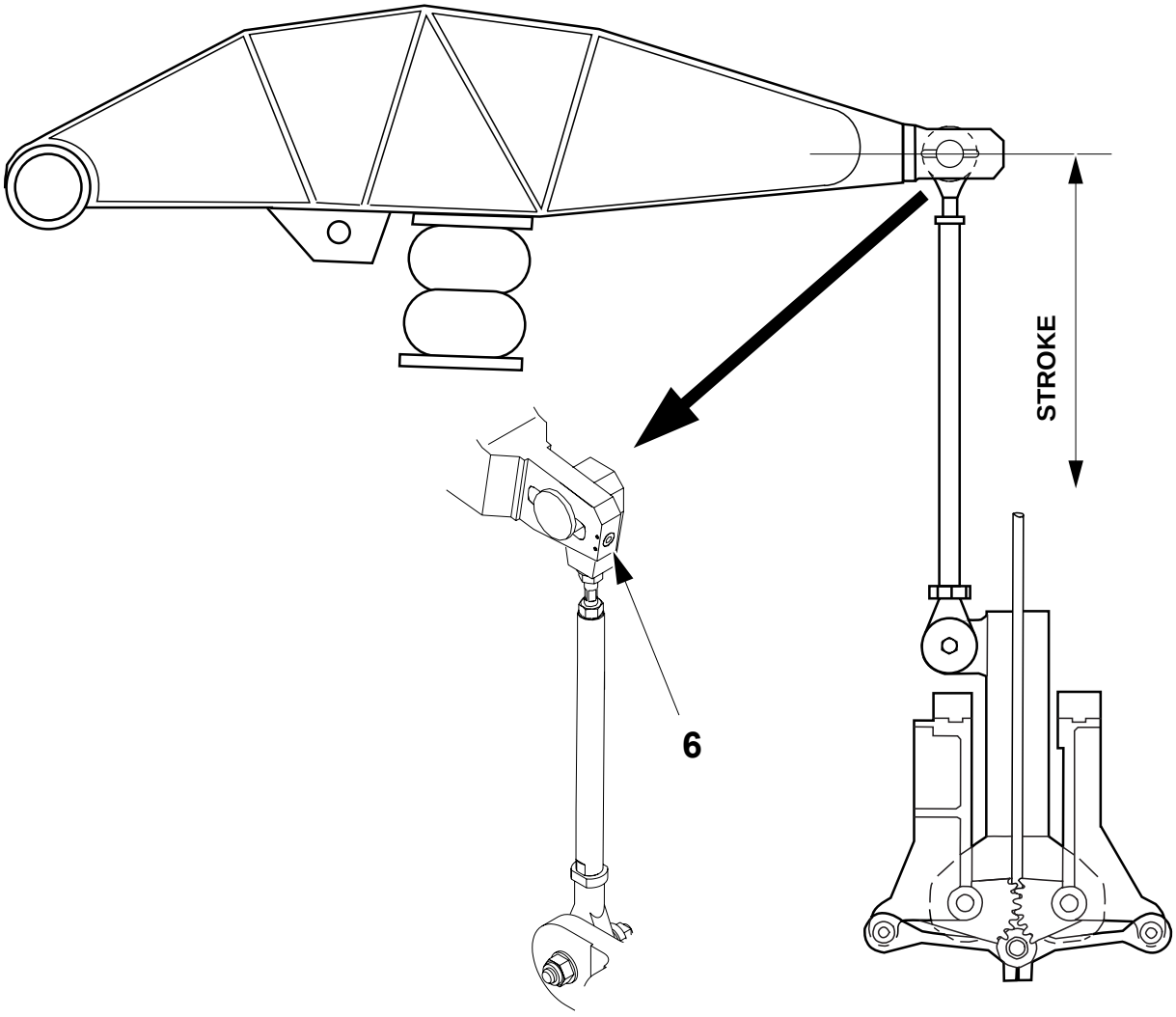
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(Cont'd)

Results of the Stroke Length Alterations

By turning the screws (6) one turn, the stroke length will change as shown in the following table.

Package	Alteration (mm)
1500 S	0.38
TPA 1000 Sq	0.32



6 Screw

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4-5 Jaw System - Set Yoke Parallelism

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648504-0500

a) Check that the wear of the locating piece (1) is not less than the distance **A**. If damaged or worn out change it as follows.

b) Crank the machine approx. to 6 decimal degrees LH side (134 decimal degrees RH side).

c) Remove the banjo connection (2).

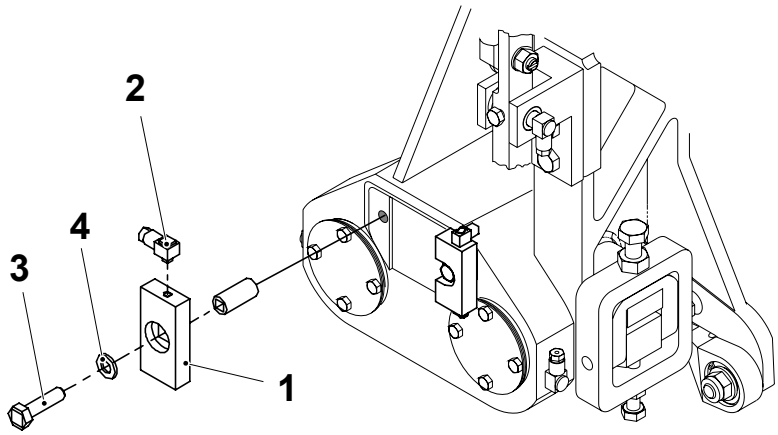
d) Remove the screw (3) and the washer (4).

e) Pull out the locating piece (1) and change it as required.

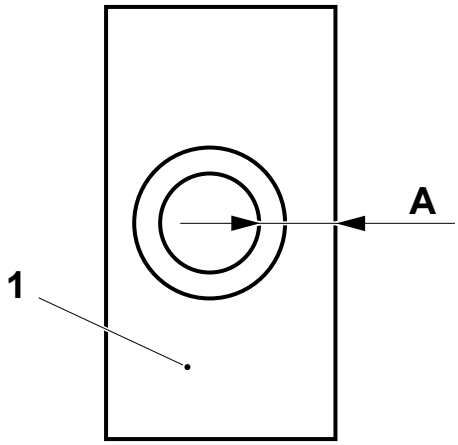
f) Assemble in the reverse order.

Note! Make sure that during the assembly, the locating piece (1) is pressed against its guide on the machine body beam.

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A = min. 10.4 mm



1 Locating piece
2 Banjo connection
3 Screw
4 Washer

4-6 Jaw System - Set Jaw Symmetry with Own Guide

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
Special Equipment	Jaw setting tool TP No.1095956 Spring tool TP No. 72846-101
SPC Reference	648504-0500

a) Crank the machine approximately to 16 decimal degrees, or until the jaws are at the same height, to set the RH jaw.

b) Fit the jaw setting tool (1) between the yoke guides.

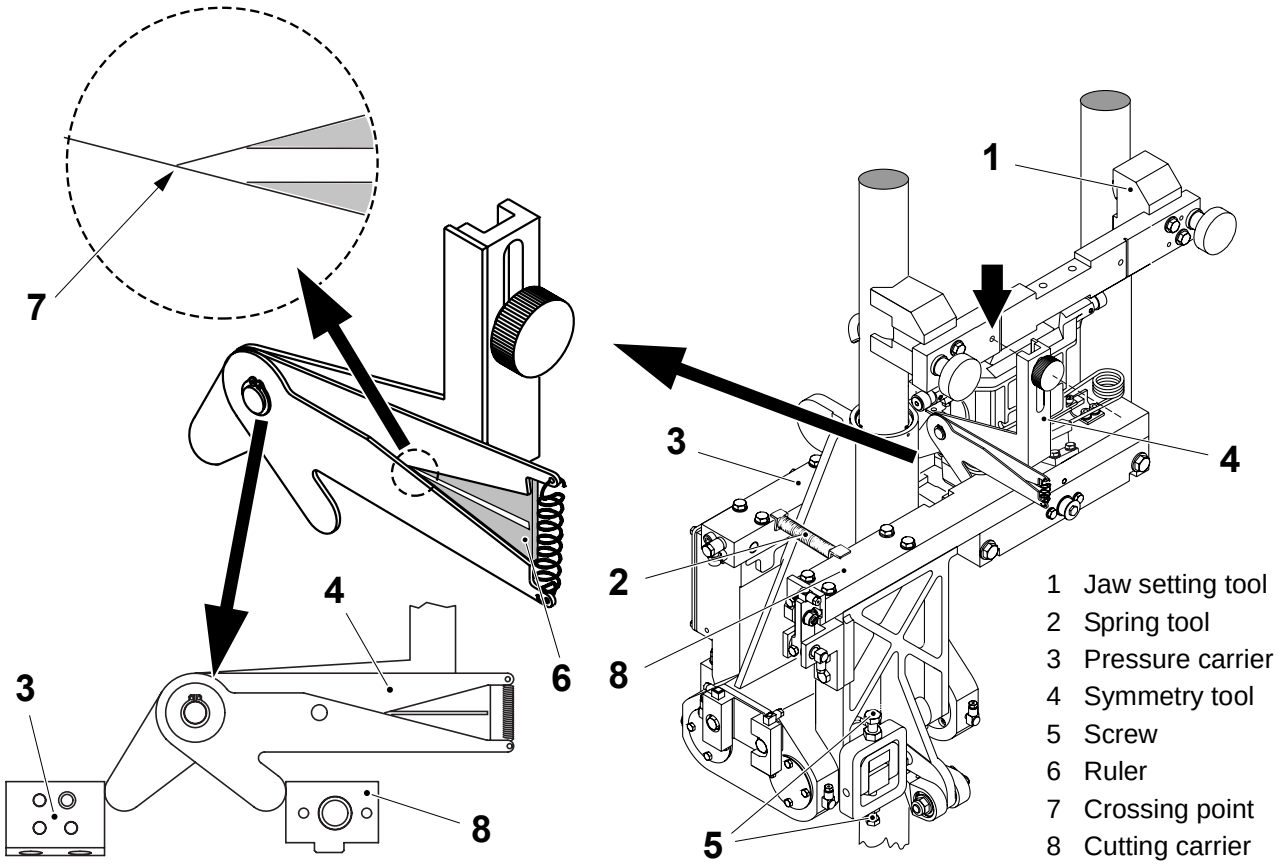
c) Fit the spring tool (2) between the two carriers (3) and (8).

d) Fit the symmetry tool (4) on the jaw setting tool (1) so that the fingers touch the internal face of the pressure carrier (3) and cutting carrier (8).

e) Set the jaws by means of the bow clamp unit screws (5) so that the slot inside the ruler (6) matches with the crossing point (7), see figure.

f) Remove the symmetry tool (4), the spring (2) and the jaw setting tool (1).

g) Crank the machine approximately to 144 decimal degrees, or until the jaws are at the same height and repeat the setting for the LH jaw.



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4-7 Jaw System - Set Volume Flaps Centring

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Special Equipment	Jaw setting tool TP No.1095956 Volume flaps align. tool TP No.1095956 Ruler tool TP No. 1095956
SPC Reference	648504-0500

Note! For volume dependency templates and tools codes, see 10.2 Templates and Tools.
For 1000 Sq only perform instruction 4-15 Jaw System - Assemble Front Volume Flaps before performing the following items.

a) Crank the machine to 16 decimal degrees to set the RH jaw.

b) Fit the jaw setting tool (1) and the volume flaps alignment tool (2).

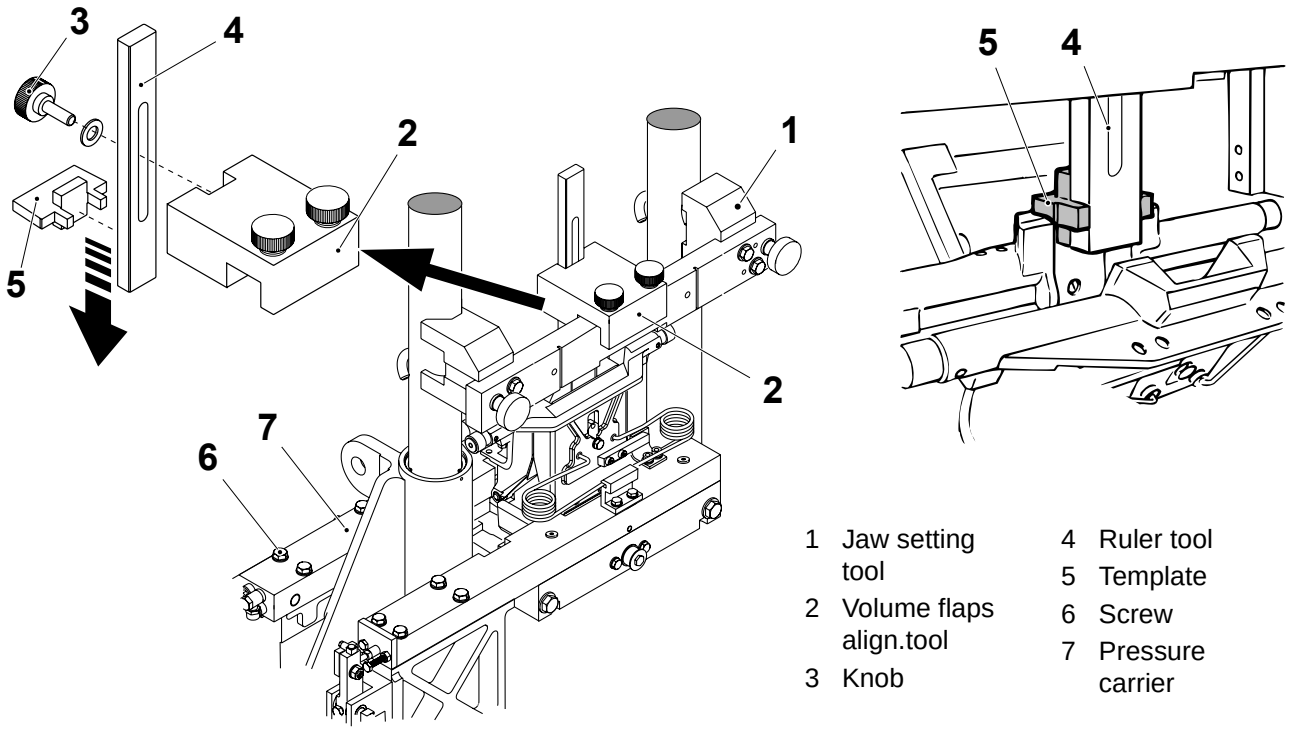
c) Loosen the knob (3) and adjust the ruler tool (4) until it moves downwards into the volume flaps. Tighten the knob (3).

d) Place the template (5) on the ruler tool (4) and slide it into the **inner** volume flap. Move the ruler tool (4) as required.

e) Loosen the screws (6) and adjust the pressure carrier (7) so that the template (5) can be inserted inside with a depth of approx. **5-10 mm** by moving the pressure carrier (7).

f) Tighten the screws (6).

g) Remove the template (5) from the ruler tool (4).



1 Jaw setting tool
2 Volume flaps align.tool
3 Knob
4 Ruler tool
5 Template
6 Screw
7 Pressure carrier

(Cont'd)

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(Cont'd)

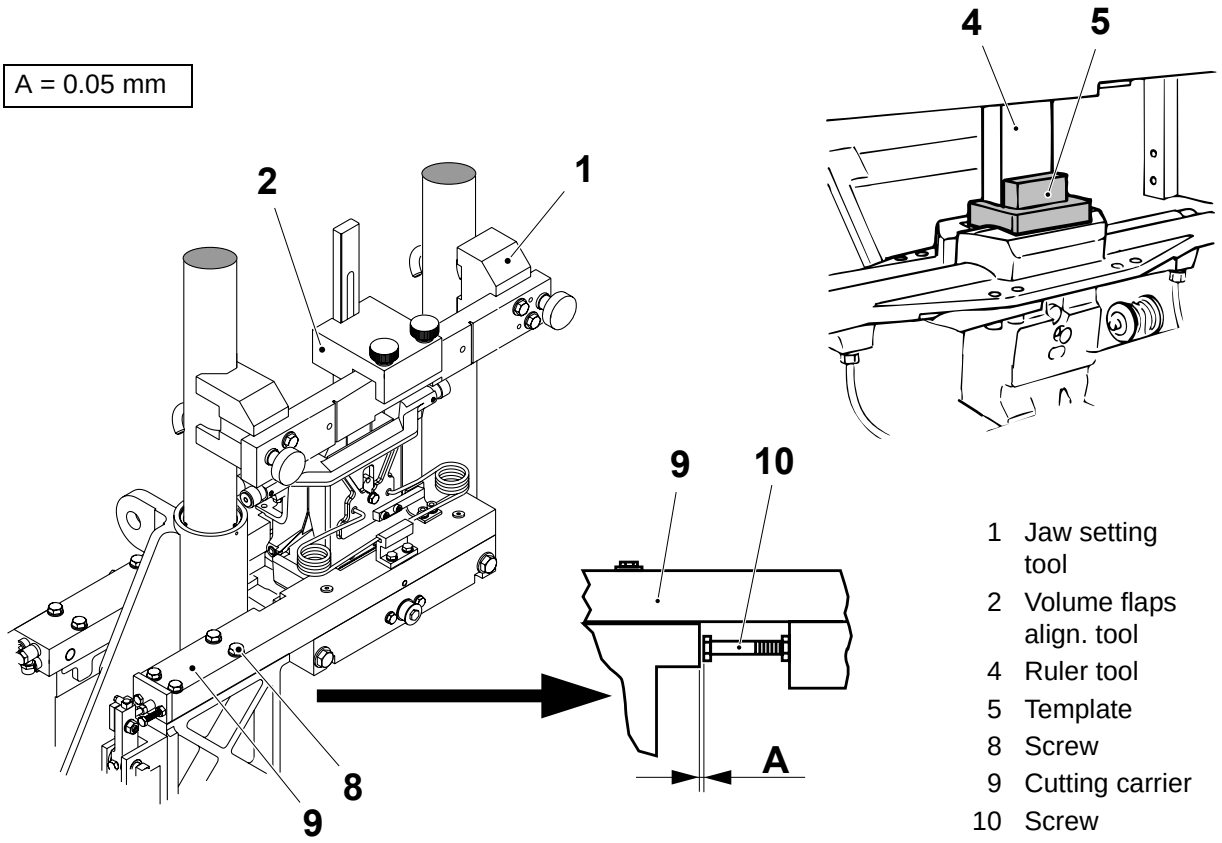
h) Place the template (5) on the ruler tool (4) and slide it into the **outer** volume flap. Move the ruler tool (4) as required.

i) Loosen the screws (8) and adjust the **outer** volume flap so that the template (5) can be inserted inside with a depth of approx. **5-10 mm** by moving the cutting carrier (9). Tighten the screws (8).

j) Remove the template (5) and the tools (4), (2), (1).

k) Set the distance **A** between the jaw and the screws (10).

l) Crank the machine to 144 decimal degrees and repeat from item a) to set the LH jaw.



1 Jaw setting tool
2 Volume flaps align. tool
4 Ruler tool
5 Template
8 Screw
9 Cutting carrier
10 Screw

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4-8 Jaw System - Set Jaw Gap Non Parallelism in Movement

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
Special Equipment	Spring tool TP No.72846-101
SPC Reference	648504-0500

a) Crank the machine to the measuring point **A**.

b) Fit the spring tool (1) between the two carriers (2).

c) Measure and record the jaw gap between the pressure jaw (3) and the cutting jaw (4).

d) Crank the machine to the measuring point **B**.

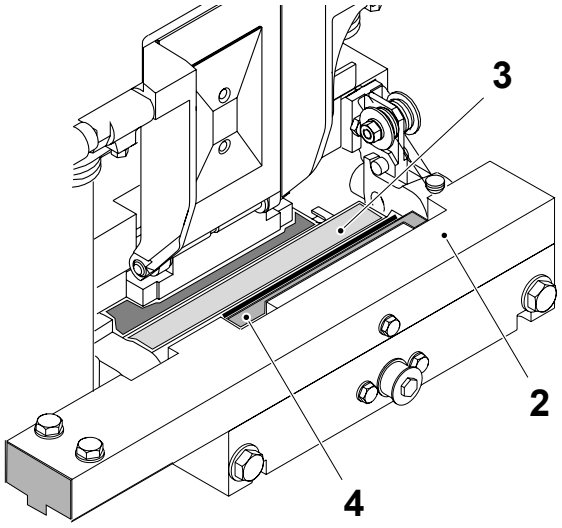
e) Measure and record the jaw gap between the pressure jaw (3) and the cutting jaw (4).

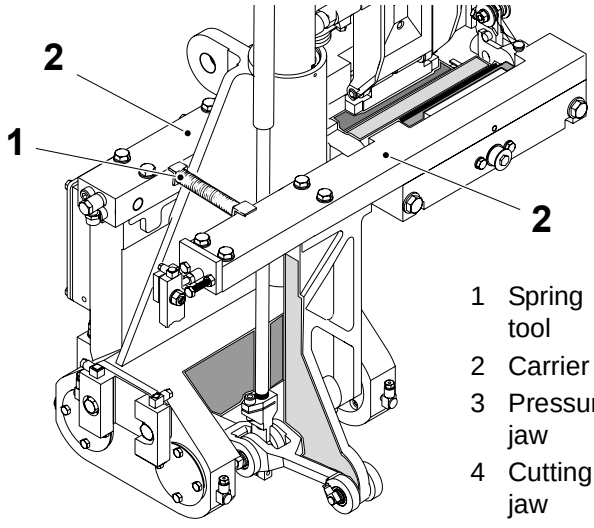
f) Crank the machine to the measuring point **C**.

g) Measure and record the jaw gap between the pressure jaw (3) and the cutting jaw (4).

h) If the jaw gap on the three measuring points is bigger or smaller than the values shown in the table below, the jaw gap must be set as indicated on the next page.

Measuring point			
/	**A**	**B**	**C**
RH	213	21	85
LH	85	149	213
Jaw gap	1.5	1.5 (-0.2 / +0)	1.5 (-0.2 / +0)





1 Spring tool
2 Carrier
3 Pressure jaw
4 Cutting jaw

(Cont'd)

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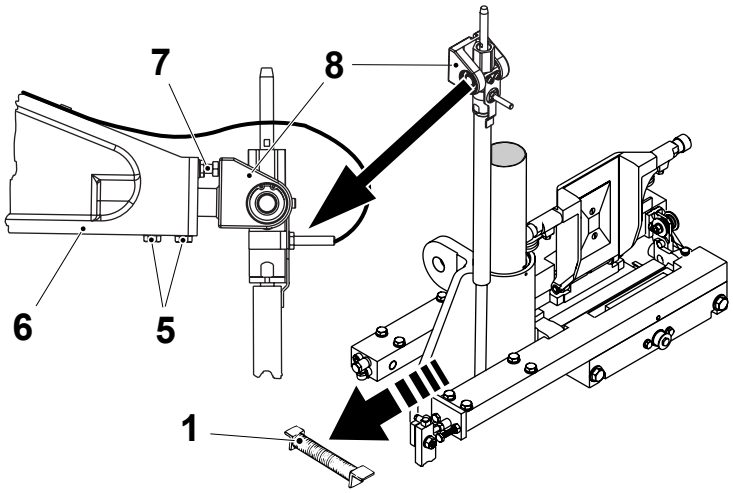
i) Loosen the screw (5) on the jaw arm (6) and adjust on the screw (7), located on the fork head (8).

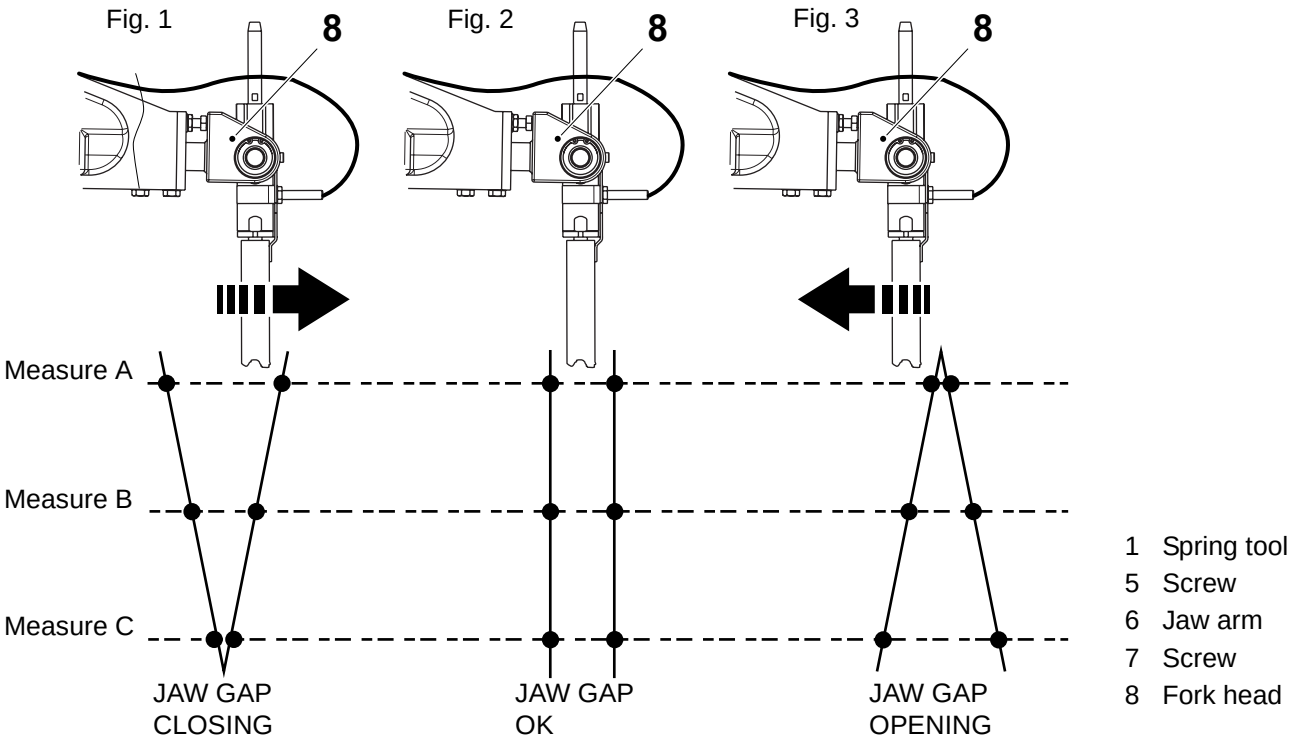
j) Adjust the fork head (8) according to the **figures 1** and **3**.
   – If the jaw gap is **closing** move the fork head (8) as shown in **figure 1**.
   – If the jaw gap is **opening** move the fork head (8) as shown in **figure 3**.

k) Tighten the screw (5) and remove the spring tool (1).

l) Repeat from item a) for the other jaw pair.

m) Set the jaw gap, see 4-9 Jaw System - Set Jaw Gap.





1 Spring tool
5 Screw
6 Jaw arm
7 Screw
8 Fork head

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4-9 Jaw System - Set Jaw Gap

Machine Status	Mains Power OFF, Air ON Steam ON, Water OFF
Special Equipment	Spring tool TP No. 72846-101 Key tool TP No. 1095956
SPC Reference	648504-0500

a) Crank the machine to 85 decimal degrees to set the LH jaw.

b) Fit the spring tool (3) between the two carriers (4).

c) Measure the jaw gap **A** between the pressure jaw and the cutting jaw as shown in the picture.

d) Loosen the screw (1) on the adjustment bracket with the aid of the key tool (5).

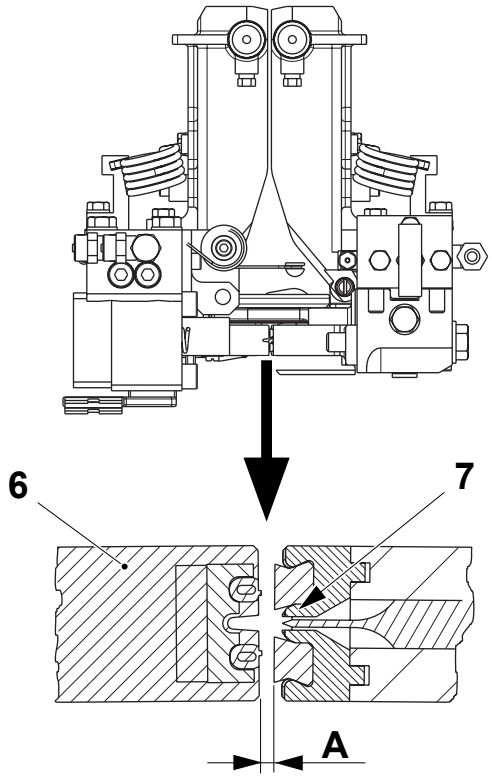
e) Set the jaw gap **A** between the inductor (6) and the dolly (7) by turning the jaw link (2).

f) Tighten carefully the screw (1) and remove the spring tool (3).

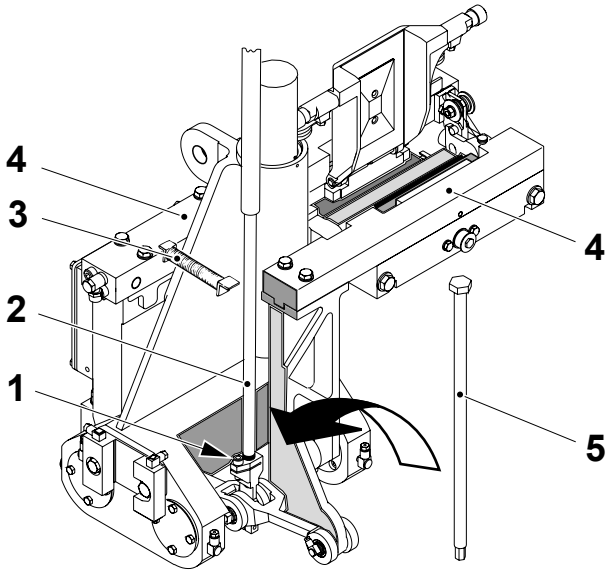
g) Crank the machine to 213 decimal degrees and repeat the setting for the RH jaw.

Note! Do **not** remove the volume flap springs during the jaw gap setting.

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A = 1.5 ±0.1 mm



1 Screw
2 Jaw link
3 Spring tool
4 Carrier
5 Key tool
6 Inductor
7 Dolly

4-10 Jaw System - Remove Front Volume Flaps

Machine Status	Mains Power ON Air ON Steam ON Water ON
SPC Reference	648504-0500

Not valid for 1000 Sq

a) Crank the machine to 21 decimal degrees for the LH side.

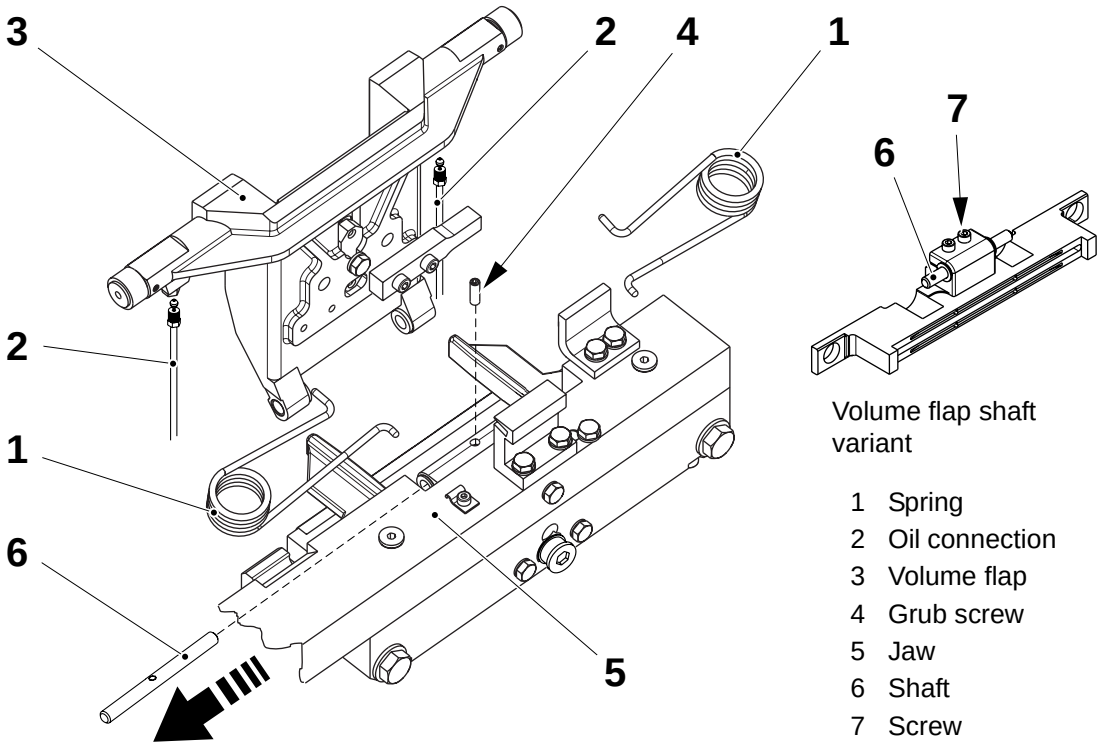
Note! For 1500 S only crank the machine to 246 decimal degrees for the LH side.

b) Remove the two springs (1).

c) Remove the oil connections (2) from the front volume flap (3).

d) Loosen the grub screw (4) from the jaw (5) and remove the shaft (6).

Note! For some volumes the shaft (6) is without the grub screw (4) which is replaced by the two screws (7).



Volume flap shaft variant

1 Spring
2 Oil connection
3 Volume flap
4 Grub screw
5 Jaw
6 Shaft
7 Screw

(Cont'd)

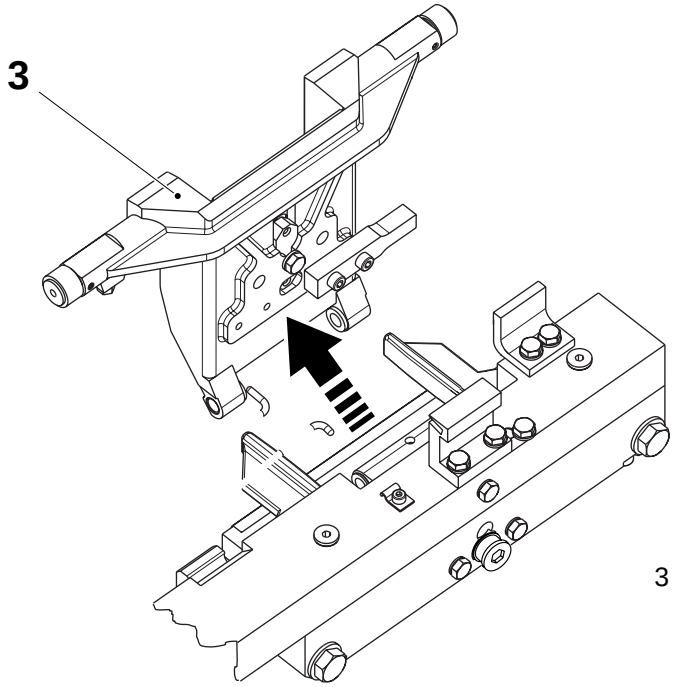
TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

e) Remove the front volume flap (3).

f) Crank the machine to 149 decimal degrees and proceed as above for the RH side.

Note! For 1500 S only crank the machine to 118 decimal degrees for the RH side.



3 Volume flap

(Cont'd)

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(Cont'd)

Valid for 1000 Sq only

a) Crank the machine to 13 decimal degrees for the LH side.

b) Remove the two springs (1).

c) Remove the oil connections (2) from the front volume flap (3).

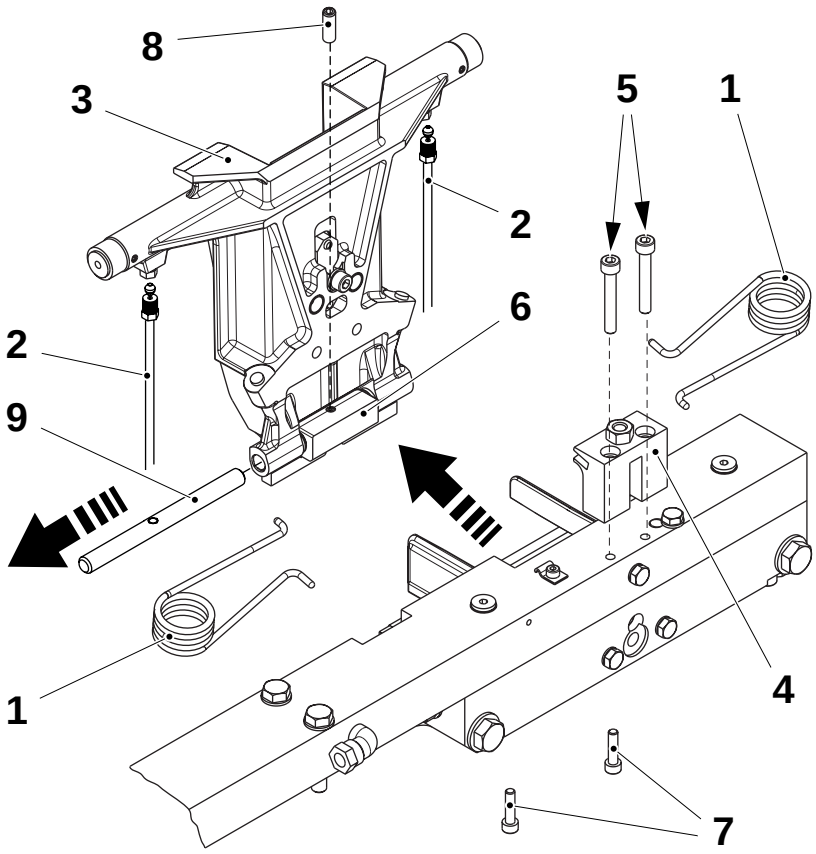
d) Remove the cantilever (4) by means of the screws (5).

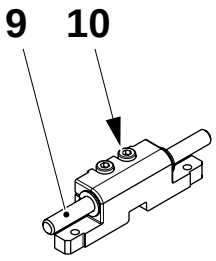
e) Remove the front volume flap (3) and its support (6) by means of the screws (7).

f) Loosen the grub screw (8) and remove the shaft (9).

Note! For 1000 Sq, rebuilt with UK-2579606-0200 Volume flaps shaft, the shaft (9) is without the grub screw (8) which is replaced by the two screws (10).

g) Crank the machine to 141 decimal degrees and proceed as above for the RH side.





Volume flap shaft variant

1 Spring
2 Oil connection
3 Volume flap
4 Cantilever
5 Screw
6 Support
7 Screw
8 Stop screw
9 Axle
10 Screw

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4-11 Jaw System - Set Cutting Alignment

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	648504-0500

Preliminary checking

a) Check that there are no active alarms on the TPOP.

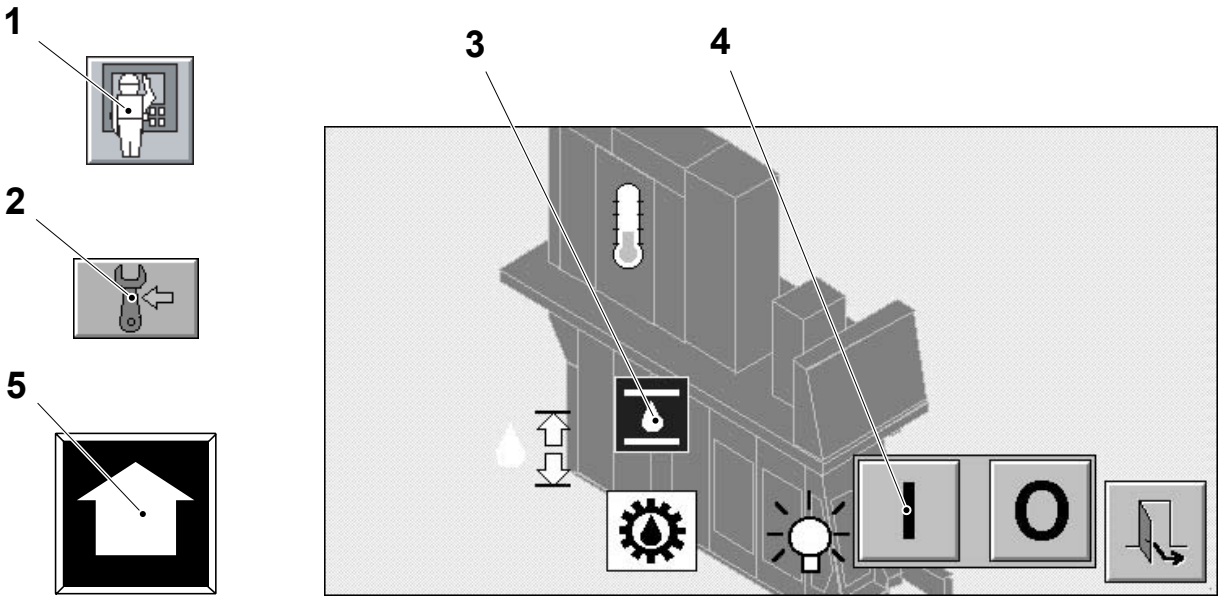
b) Touch the MANOEUVRE button (1) on the TPOP.

c) Touch the MAINTENANCE SERVICE UNIT LEFT button (2).

d) Touch the HYDRAULIC UNIT button (3).

e) Touch the START button (4) to enable the hydraulic system.

f) Press the PROGRAM UP button (5) when its flashing and check that the hydraulic unit has started.



1 MANOEUVRE button
2 MAINTENANCE SERVICE UNIT LEFT button
3 HYDRAULIC UNIT button
4 START button
5 PROGRAM UP button

(Cont'd)

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(Cont'd)

g) Crank the machine until the two jaw pairs are at the same level.

h) Attach two pieces of tape (6) to each IH bar, see **figure 1**.

i) Crank the jaws together and check that the knife cuts through the tapes (6).

j) Crank the jaws apart. Remove the upper right hand and the lower left hand pieces of tape.

k) Check that the cutting position is exactly horizontal, so that the knife does not cut into the inductor, see **figure 2**.

l) Proceed as above for the other jaws pair.

m) If the cutting is out of alignment, see **figure 3**, check the knife, see 4.3.1-2 Knife - Change Knife, and then proceed with the basic setting as indicated on the next page.

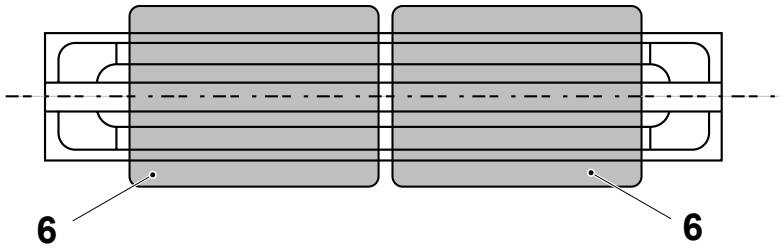


Fig. 1

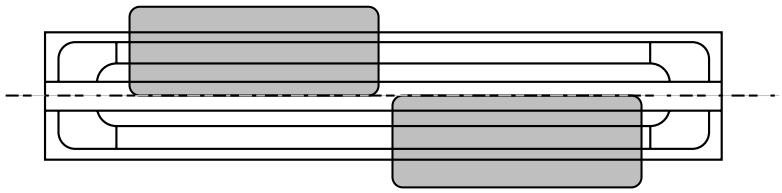


Fig. 2
(cutting pos. OK)

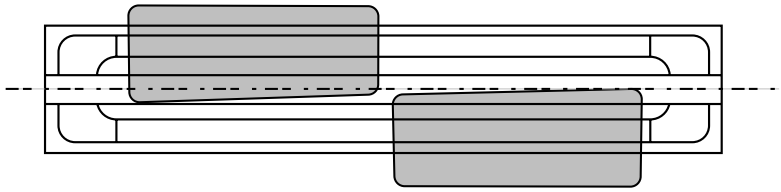


Fig. 3
(out of alignment)

6 Tape

(Cont'd)

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(Cont'd)

Basic setting

a) Crank the machine to 85 decimal degrees for the RH jaw.

b) For volumes equipped with the volume bulges (9). Remove the volume bulges (9) by means of the screws (10).

c) Check, with the aid of a ruler, that the bottom of the knife holder (8) is in level with the bottom of the inductor (7).

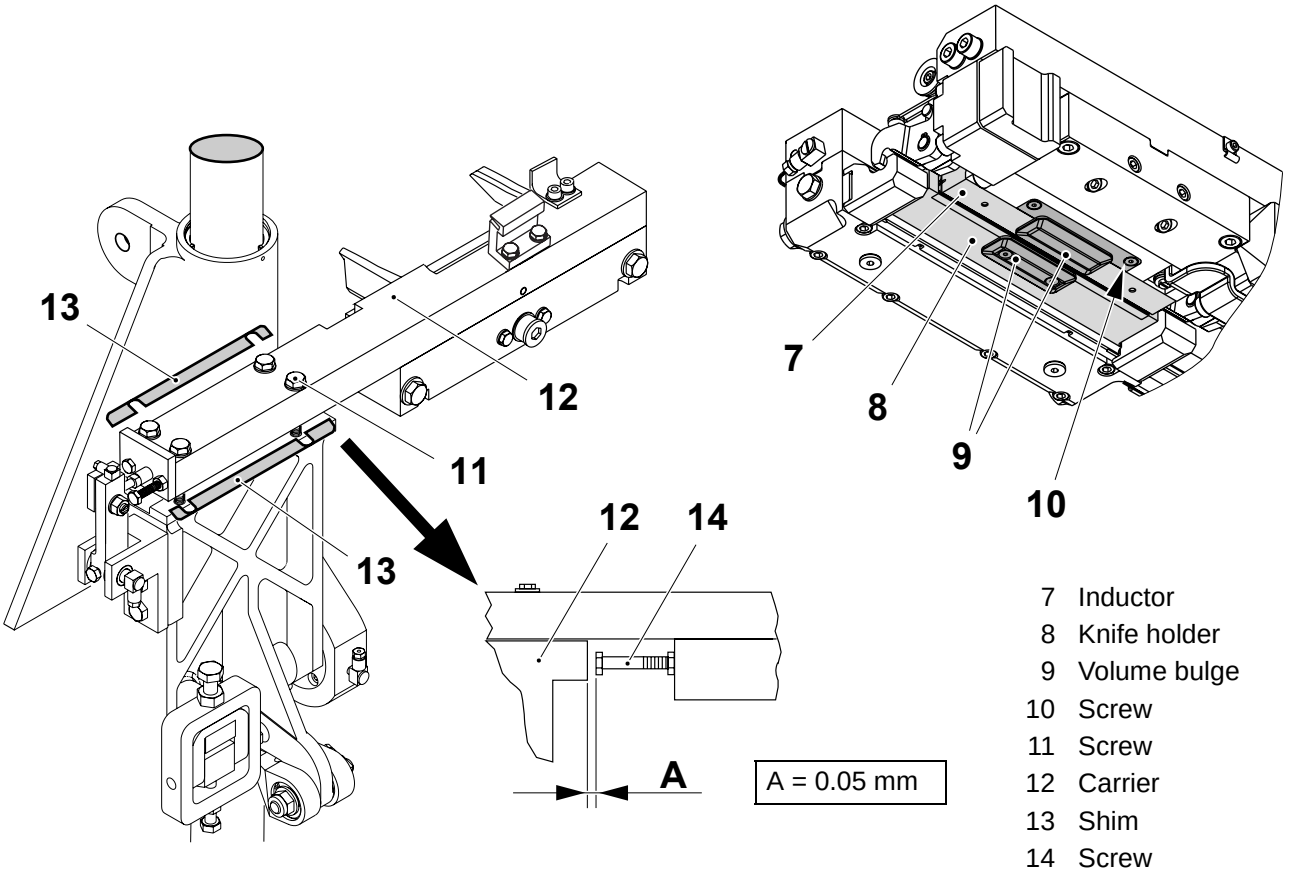
d) If the difference is bigger than **0.1 mm**, the cutting guide must be adjusted by means of shims.

- Loosen the screws (11) and lift the carrier (12) on the cutting side.
- Remove or add the same number of shims (13) on both sides.
- Check the distance **A** between the carrier (12) and the screw (14) and check also the T-gap, see 4-16 Jaw System - Check T-gap.

e) For volumes with the volume bulges (9). Fit the volume bulges (9) by means of the screws (10).

f) Crank the machine to 213 decimal degrees and proceed as above to set the LH jaw.

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7 Inductor
8 Knife holder
9 Volume bulge
10 Screw
11 Screw
12 Carrier
13 Shim
14 Screw

(Cont'd)

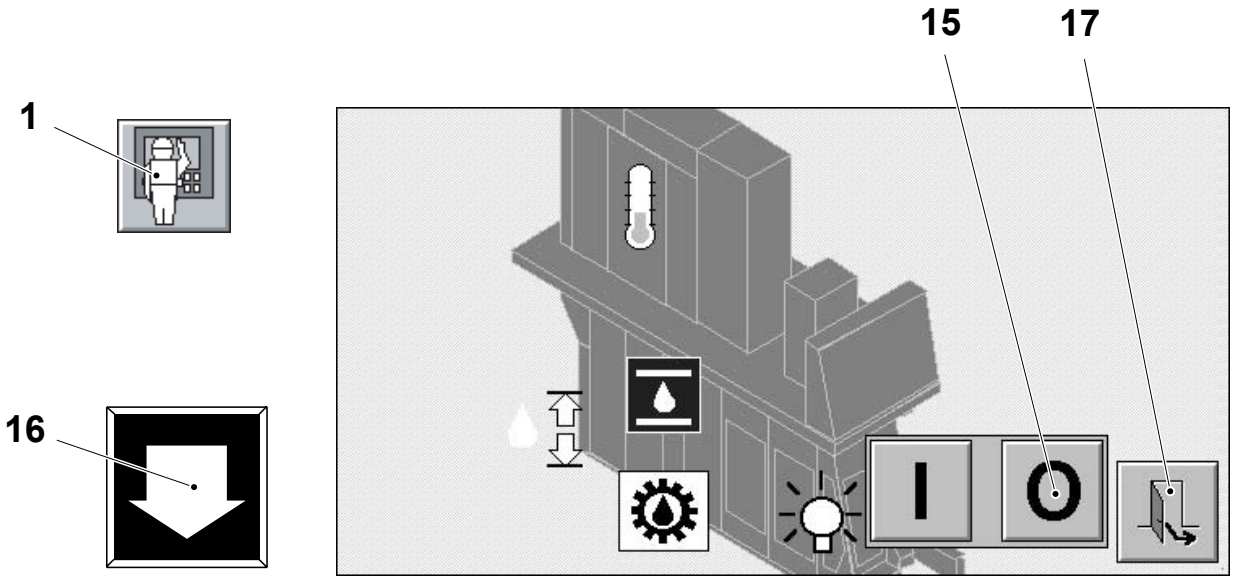
(Cont'd)

g) Stop the hydraulic unit by touching the STOP button (15).

h) Press the PROGRAM DOWN button (16) when it is flashing.

i) Touch the EXIT button (17).

j) Touch the MANOEUVRE button (1) to finish the setting sequence.



1 MANOEUVRE button
15 STOP button
16 PROGRAM DOWN push button
17 EXIT button

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4-12 Jaw System - Set Jaw Over Jaw

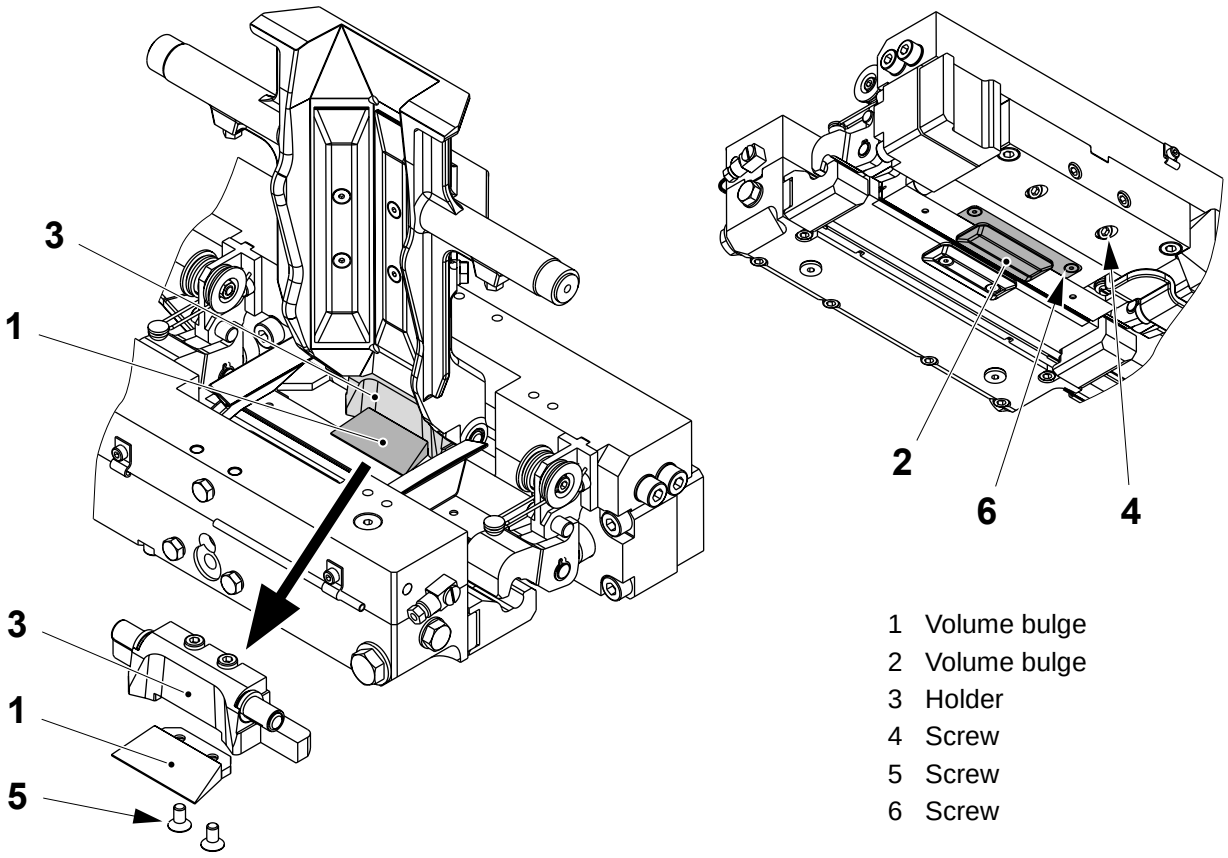
Machine Status	Mains Power OFF Air ON Steam ON Water OFF
Special Equipment	Micrometer TP No. 5289-0308
SPC Reference	648504-0500

a) Set the LH side yoke link, see 3.8-4 Yoke Link - Set Link

b) Remove the front volume flaps from both jaw pairs, see 4-10 Jaw System - Remove Front Volume Flaps.

c) For volumes with the volume bulges (1) and the (2).
   - Remove the volume bulge (1) from the holder (3) by means of the screws (4) and (5), see 4.2-2 Pressure Jaw - Remove.
   - Remove the volume bulge (2) by means of the screws (6).

d) Check the jaw gap, see 4-9 Jaw System - Set Jaw Gap.



1 Volume bulge
2 Volume bulge
3 Holder
4 Screw
5 Screw
6 Screw

(Cont'd)

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(Cont'd)

e) Crank the machine to 85 decimal degrees for the LH side.

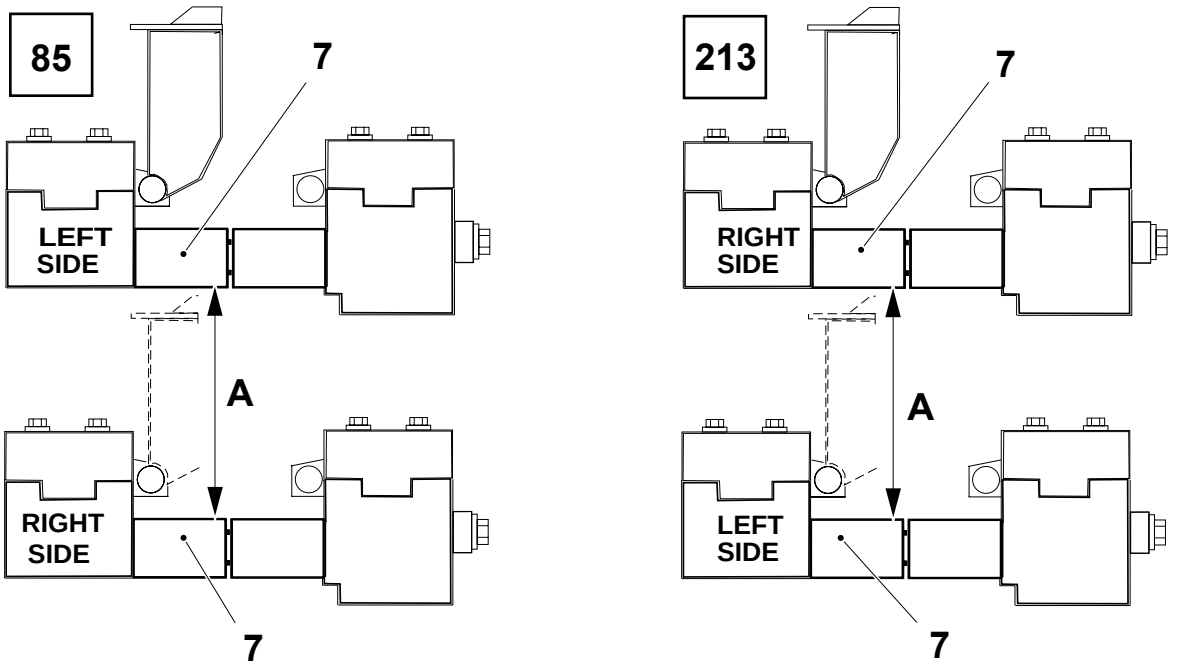
f) With the aid of a micrometer measure and record the distance **A**, between the two inductors (7), see table below.

g) Crank the machine to 213 decimal degrees for the RH side.

h) With the aid of a micrometer measure and record the distance **A**, between the two inductors (7), see table below.

Package	A (nominal value)	Package	A (nominal value)	Package	A (nominal value)
1000 B	170.60	200 B	85.70	1000 Sq	202.30
1000 S	200.10	TPA 1000 S	205.30	TPA 1000 Sq	232.70
200 S	121.90	250 S	134.4	TPA 500 Sq	154.5
1500 S	252.00	330 S	139.10	TPA 330 Sq	127.70
500 S	150.2	500 B	90.25	TPA 250 Sq	129.60
250 B	108.90				

Note! This table applies only for nominal stroke.



7 Inductor

(Cont'd)

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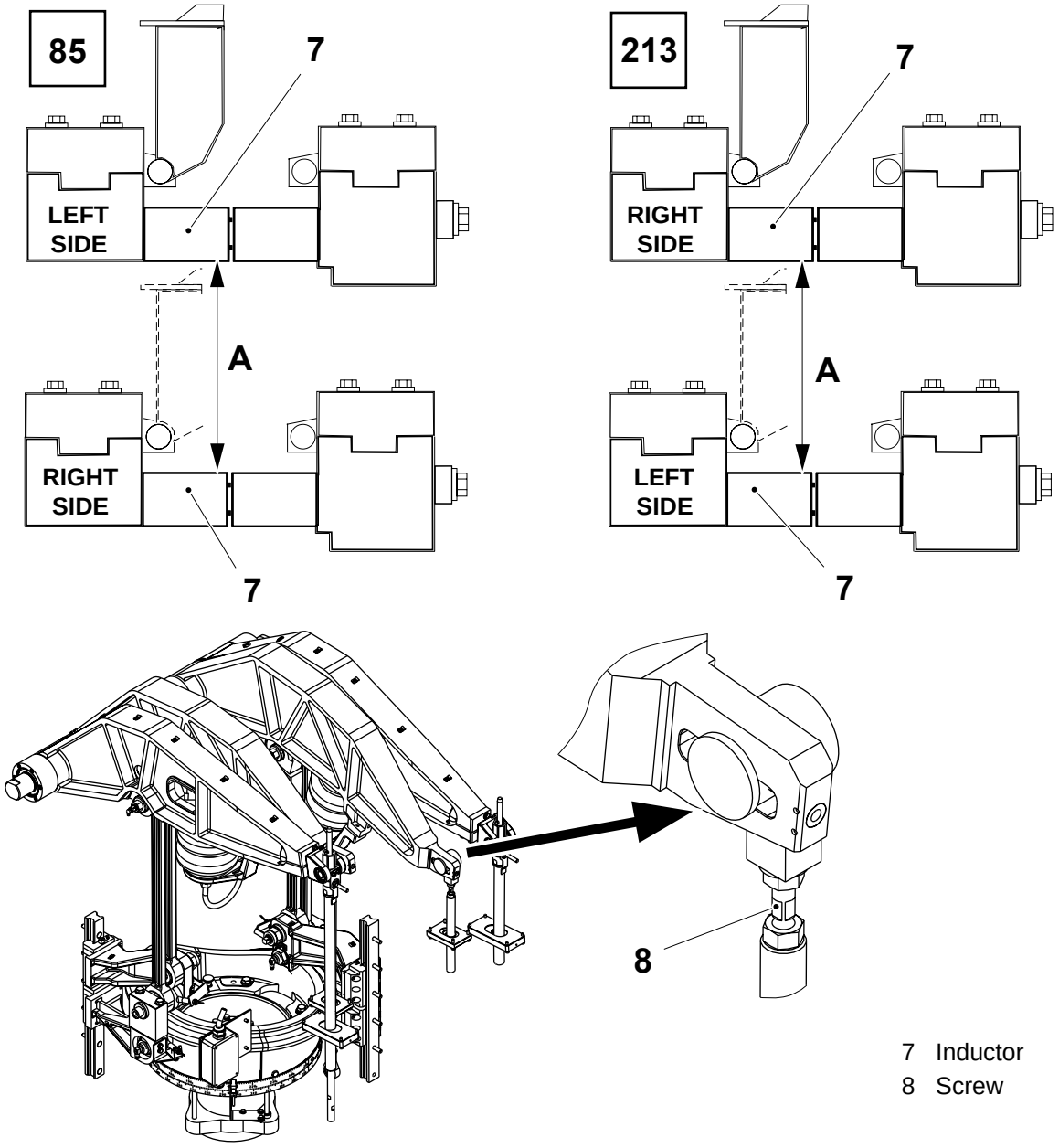
(Cont'd)

Note! The difference between the two distances **A** must not exceed **0.1 mm**.

i) In case of deviation adjust the difference by turning the screw (8) on the RH side yoke link.

Note! Check the jaw gap value, see 4-9 Jaw System - Set Jaw Gap, and the distance **A** once more after setting.

j) For volumes with the volume bulges, see item c). Fit the volume bulges.



7 Inductor
8 Screw

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4-13 Jaw System - Set Folding Flaps Mechanism

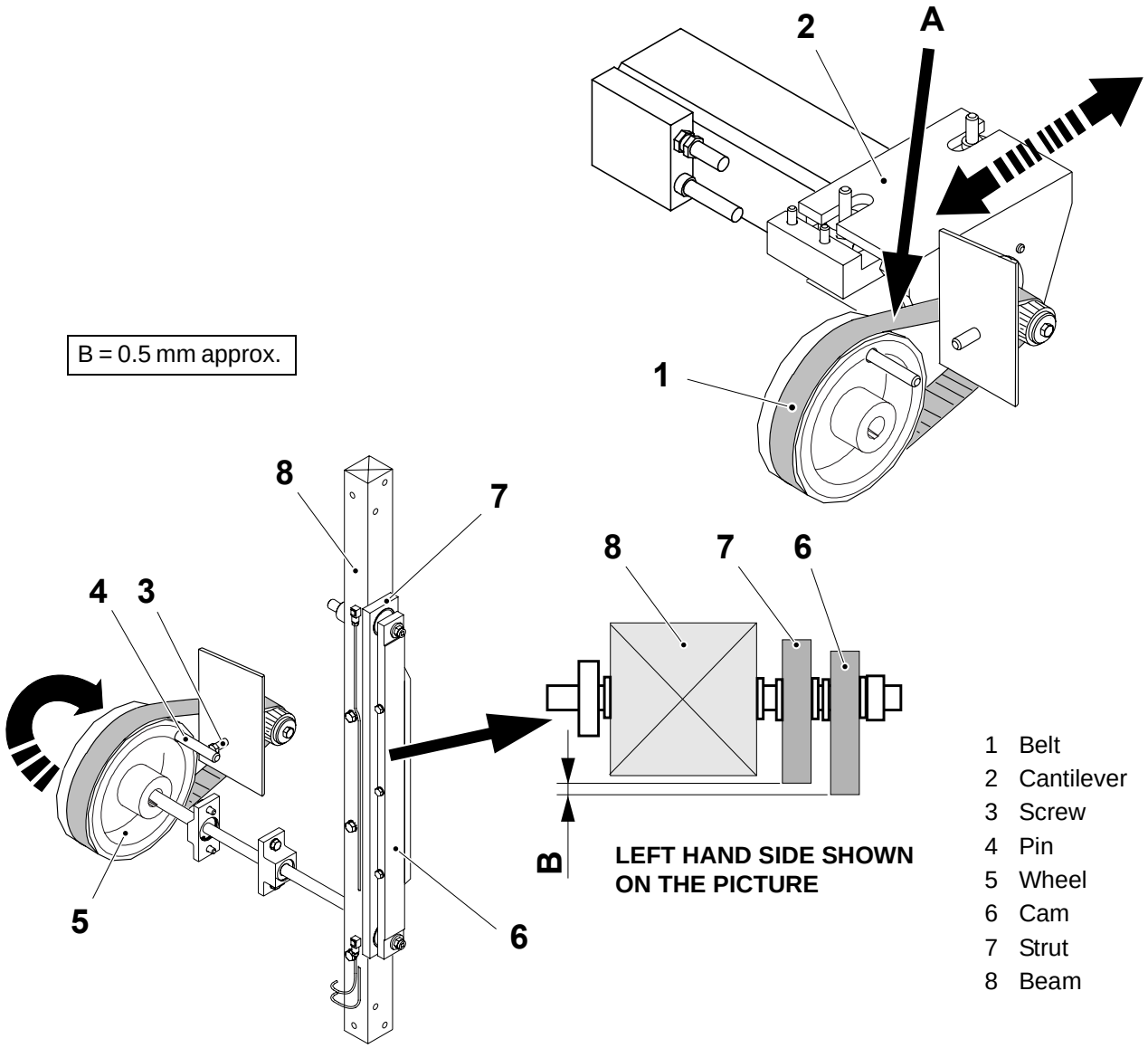
Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
Special Equipment	Dynamometer TP No. 74767-102
SPC Reference	648504-0500

a) Set the belt (1) by shifting the cantilever (2), so that it can be flexed by **5 ±1 mm** with a load force of **10 N** at point **A**.

b) Turn the wheel (5) and press the pin (4) against the screw (3).

c) Set the distance **B** between the folding flap cam (6) and the strut (7) by means of the screws (3).

Note! Set the distance **B** on the outer side of the beams (8).



1 Belt
2 Cantilever
3 Screw
4 Pin
5 Wheel
6 Cam
7 Strut
8 Beam

(Cont'd)

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(Cont'd)

Setting of the home position sensors

a) Step up the machine to PREPARATION before measuring the distance **C**.

b) Check that the servomotor is in home position.

Note! If **no** power is available fit a **5.5 mm** block (13) between the screw (3) and the pin (4).

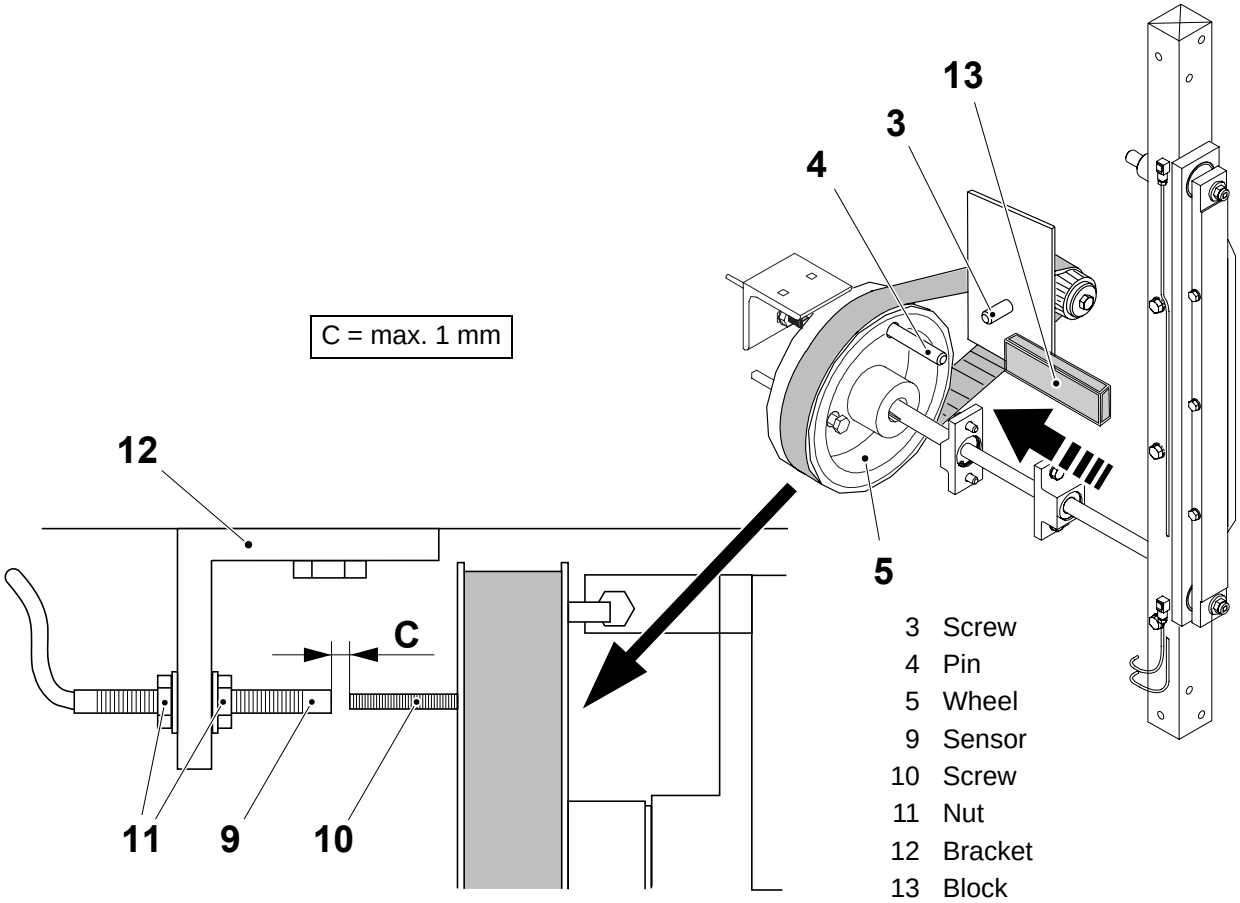
c) Adjust the distance **C** between the head of the sensor (9) and the detection screw (10) by means of the nuts (11).

d) Align the head of the sensor (9) with the detection screw (10) by means of the slot in the bracket (12).

e) Make sure that the LED sensor (9) lights up when the servomotor reaches its home position.

f) Repeat the items from a) to e) for the sensor on the other side.

Note! Check that the end of the detection screw (10) in the wheel (5) is flat so that the home position sensor (9) can read properly.



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4-14 Jaw System - Set Folding Flaps Mechanism on the Carriers

Machine Status	PREPARATION
Special Equipment	Dynamometer TP No. 74767-102
SPC Reference	648504-0500

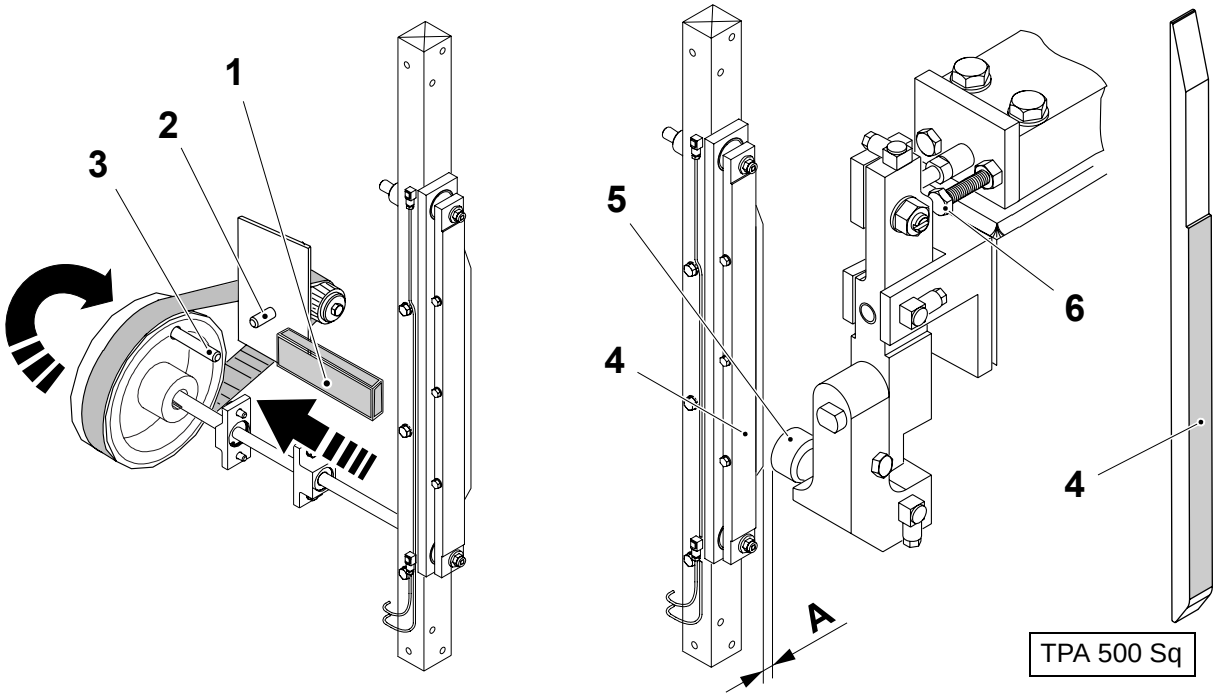
Basic setting

Note! If **no** power is available fit a **5.5 mm** block (1) between the screw (2) and the pin (3).

a) Set the distance **A**, between the folding flap cam (4) and the roller (5) by means of the screw (6). This will give the stop position for the rod.

Note! For TPA 500 Sq must the distance **A**, be measured on the lower part of the folding flap cam (4), grey marked.

Package	**A ±0.1 (mm)**
TPA 500 Sq	0.5
1000 B - 1000 S - 1000 Sq - 500 B - TPA 1000 S - 1500 S - TPA 1000 Sq - 200 B - 250 B - 200 S - 250 S - 330 S - 500 S - TPA 330 Sq - TPA 250 Sq	2.0



1 Block
2 Screw
3 Pin
4 Cam
5 Roller
6 Screw

(Cont'd)

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(Cont'd)

b) Check that there are no active alarms on the TPOP.

c) Touch the MANOEUVRE button (7) on the TPOP.

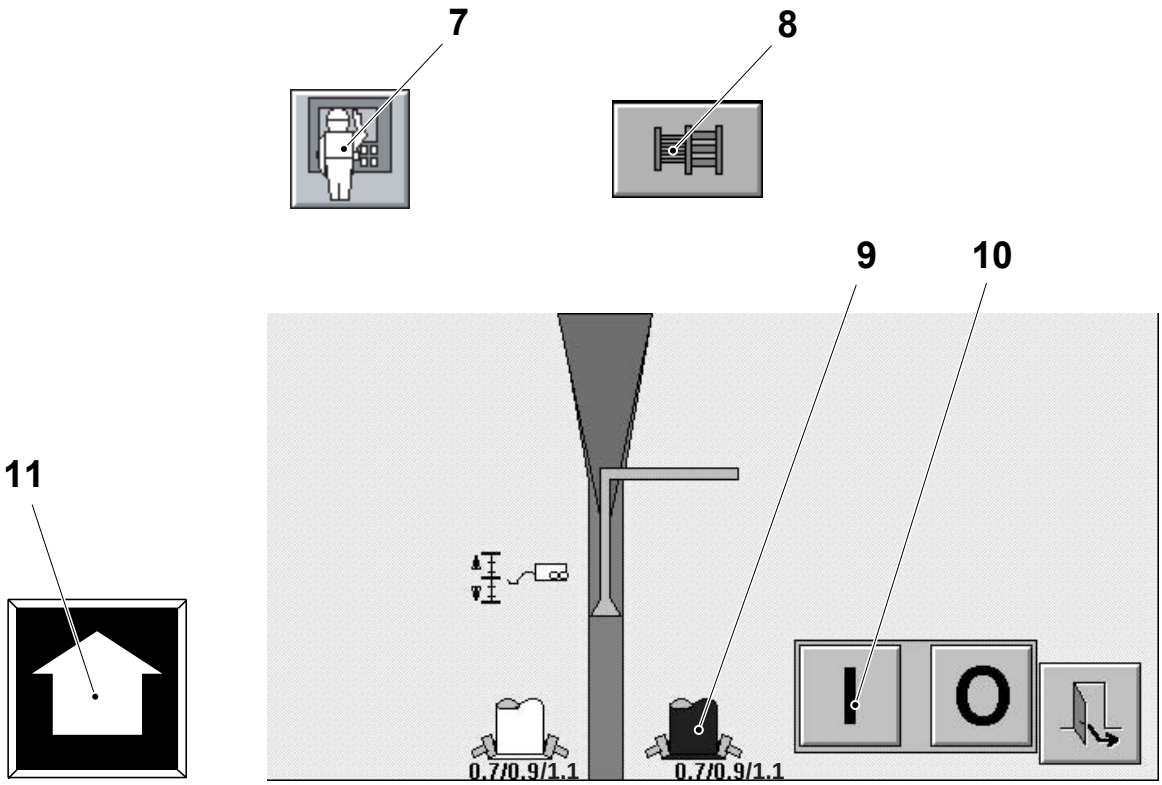
d) Touch the MAINTENANCE DESIGN CORRECTION button (8).

e) Touch the FOLDING FLAPS button (9), LH side or RH side.

f) Touch the START button (10) to enable the setting cycle.

g) Press the PROGRAM UP button (11) when it flashes.

h) Open the doors and check the **0.7 / 0.9 / 1.1** measurements on the folding flaps.



7 MANOEUVRE button
8 MAINTENANCE DESIGN CORRECTION button
9 FOLDING FLAPS button
10 START button
11 PROGRAM UP button

(Cont'd)

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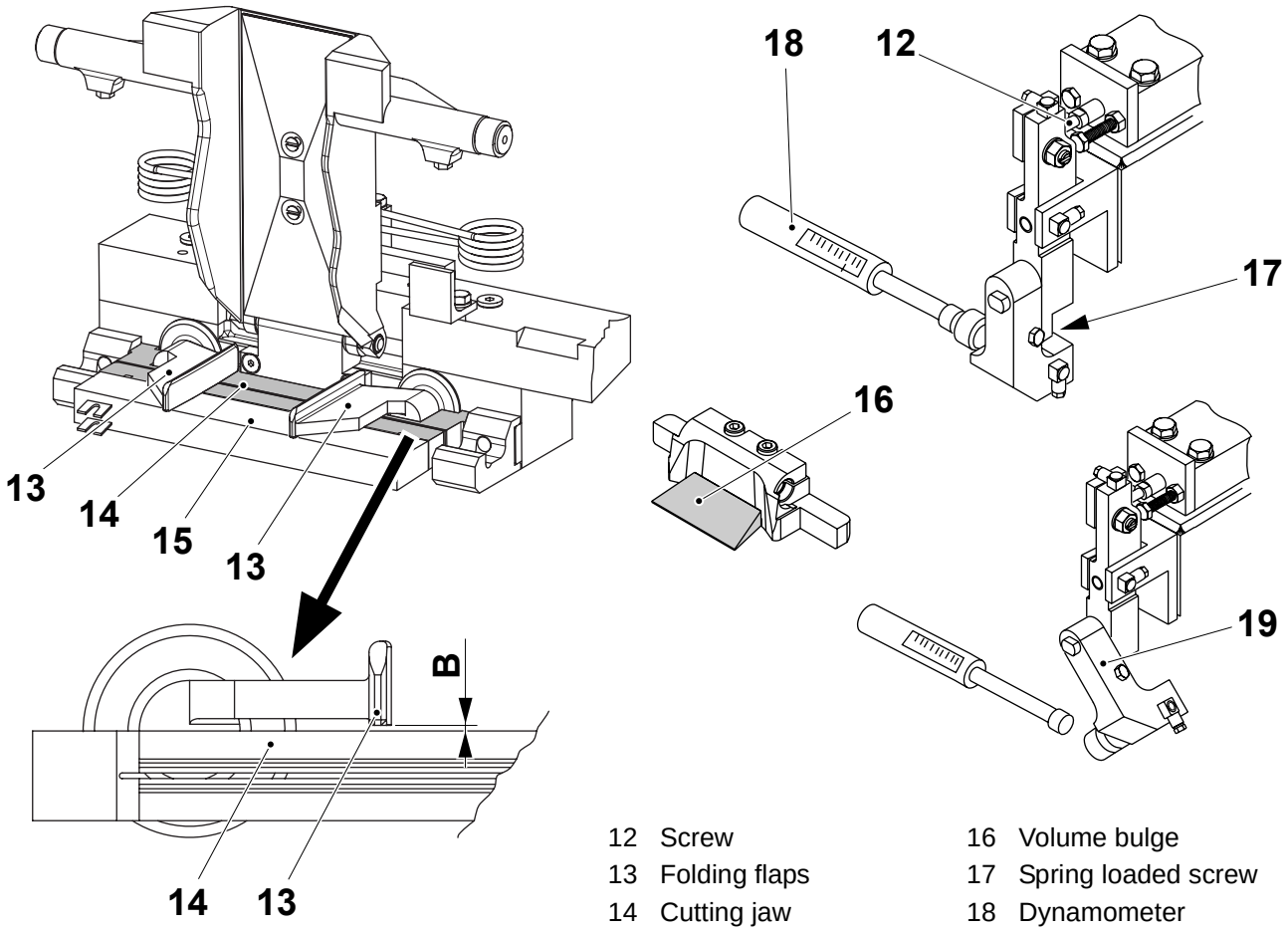
(Cont'd)

i) Adjust the screw (12) to set the distance **B** between the folding flaps (13) and both the cutting jaw (14) and the inductor (15) at the lowest position.

Note! For volumes with the volume bulge (16), remove the volume bulge (16) according to item c) in 4-12 Jaw System - Set Jaw Over Jaw.

j) Set the spring loaded screw (17), by means of a dynamometer (18), so that the joint (19) is released between **10** and **15 N**.

Package	B ±0.05 (mm)
1500 S - TPA 1000 Sq	1.1
1000 B - 1000 S - 1000 Sq - 500 B - TPA 1000 S - TPA 500 Sq	0.9
200 B - 250 B - 200 S - 250 S - 330 S - 500 S - TPA 330 Sq - TPA 250 Sq	0.7



12 Screw
13 Folding flaps
14 Cutting jaw
15 Inductor
16 Volume bulge
17 Spring loaded screw
18 Dynamometer
19 Joint

(Cont'd)

TechPub_2614345_0105 - 04_MM81534_11en.fm

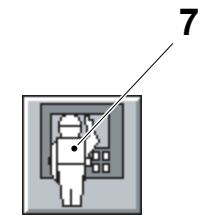
(Cont'd)

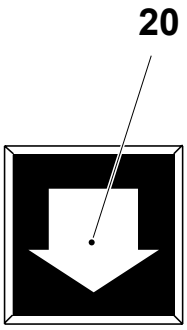
k) Close all the doors and touch the STOP button (20).

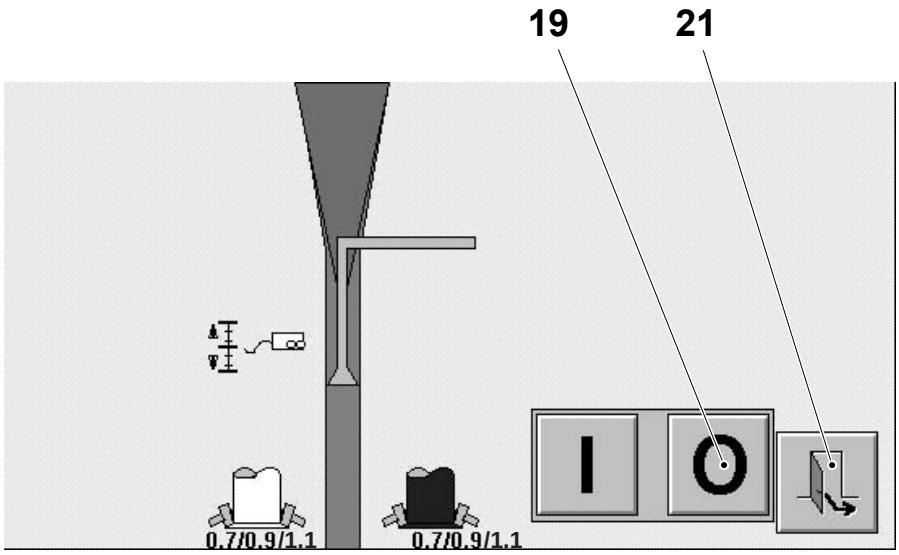
l) Press the PROGRAM DOWN button (21) when it flashes.

m) Touch the EXIT button (22).

n) Touch the MANOEUVRE button (7) to finish the setting sequence.







7 MANOEUVRE button
20 STOP button
21 PROGRAM DOWN button
22 EXIT button

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4-15 Jaw System - Assemble Front Volume Flaps

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	648504-0500

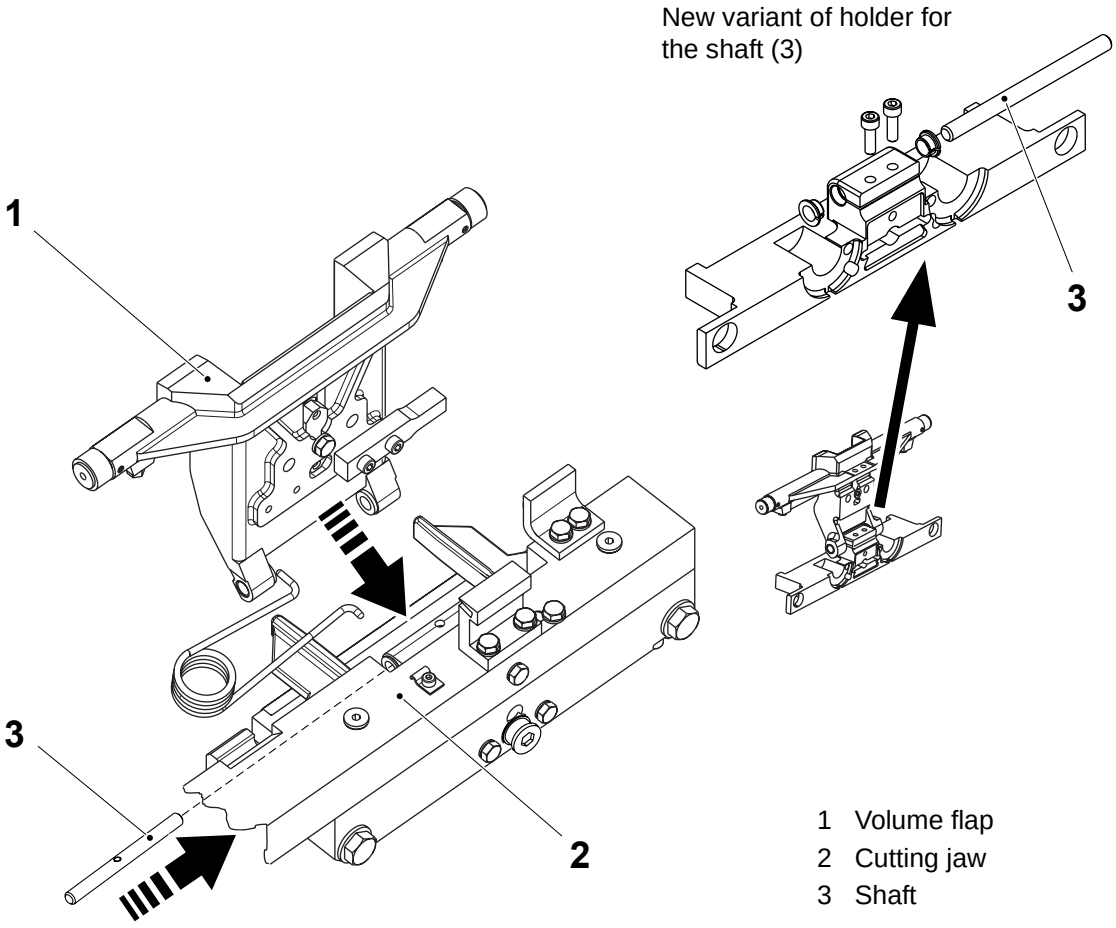
Note! For 1000 Sq only perform this instruction after 4-18 Jaw System - Assemble Volume Adjuster.

Not valid for 1000 Sq

a) Crank the machine to 21 decimal degrees for the LH side. For 1500 S only crank the machine to 246 decimal degrees for the LH side.

b) Fit the front volume flap (1) on the cutting jaw (2).

c) Fit the shaft (3) into the front volume flap (1) and into the cutting jaw (2).



1 Volume flap
2 Cutting jaw
3 Shaft

(Cont'd)

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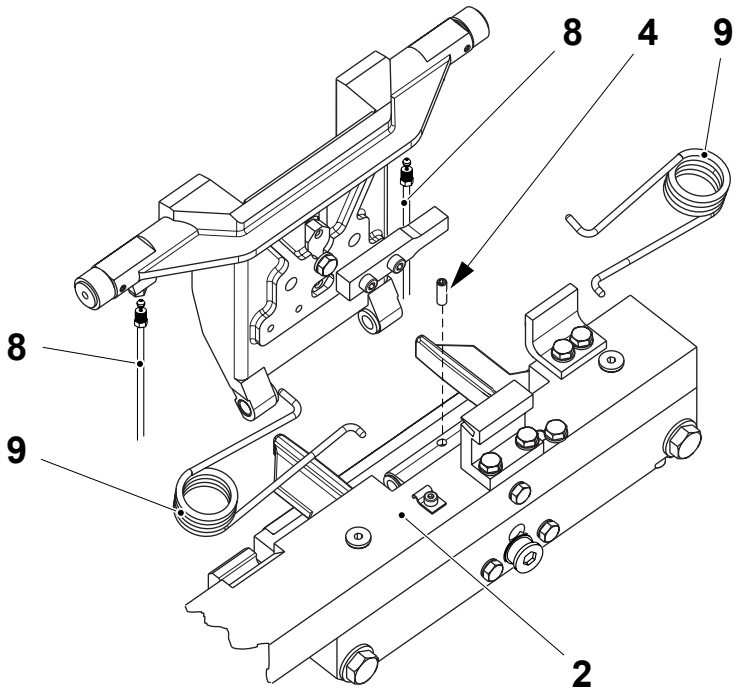
(Cont'd)

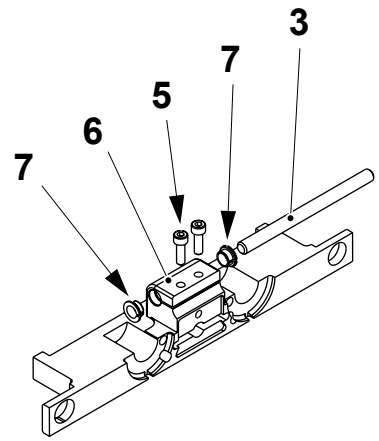
Note! For some volumes the shaft (3) is without the grub screw (4) which is replaced by the two screws (5). Make sure that the slots in the holder (6) and the slots in the bushings (7) are aligned before tightening the two screws (5) to **4.4 Nm** with an allen key.

d) With the aid of an allen key tighten carefully the grub screw (4), located on the cutting jaw (2).

e) Fit the oil connections (8) and the springs (9).

f) Crank the machine to 149 decimal degrees and proceed as above for the RH side. For 1500 S only crank the machine to 118 decimal degrees.





New variant of holder for the shaft (3)

2 Cutting jaw
3 Shaft
4 Grub screw
5 Screw
6 Holder
7 Bushing
8 Oil connection
9 Spring

(Cont'd)

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(Cont'd)

Valid for 1000 Sq only

a) Crank the machine to 13 decimal degrees for the LH side.

b) Fit the axle (9) into the front volume flap (3) and tighten carefully the stop screw (8).

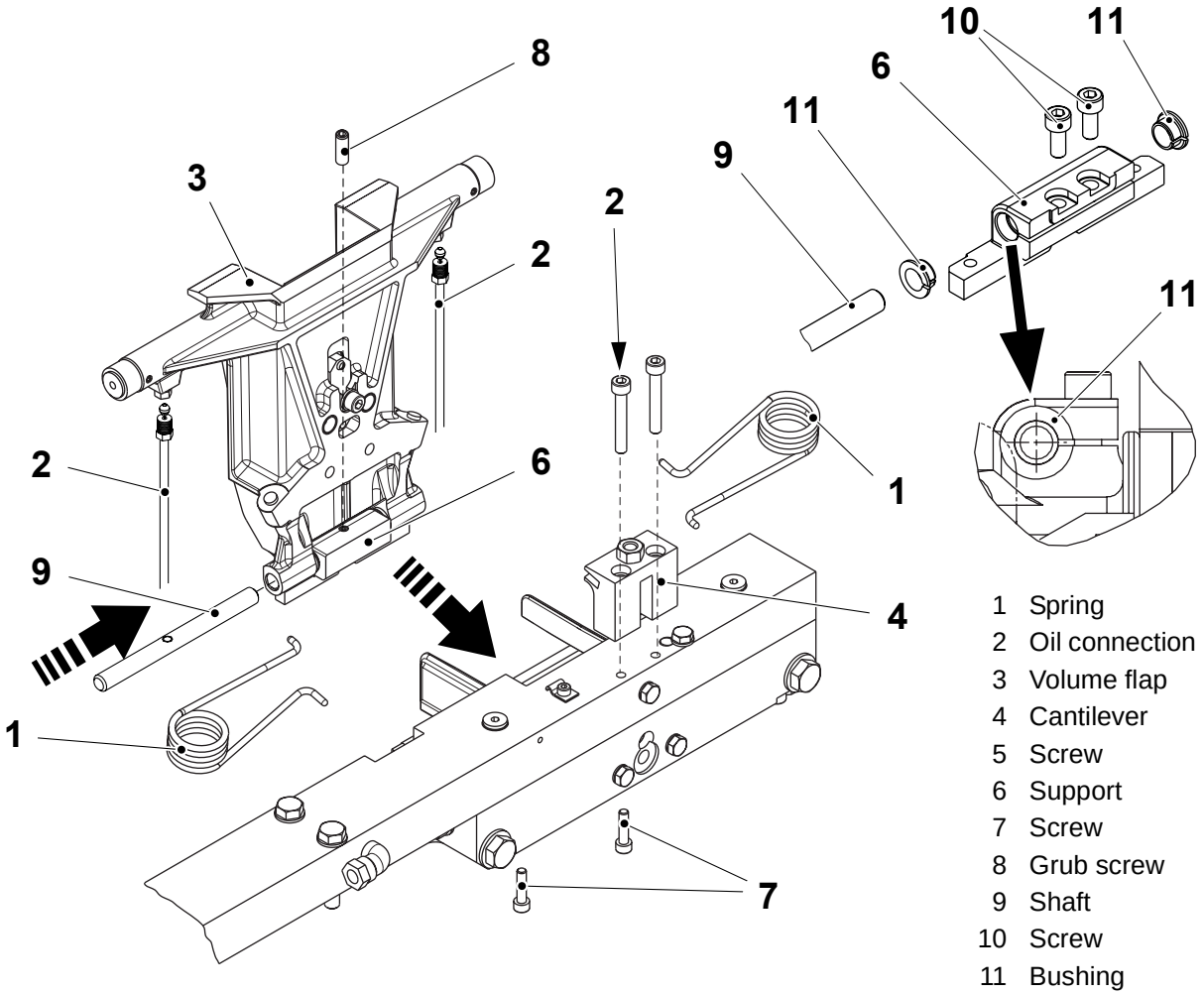
Note! For new machines or machines rebuilt with UK-2579606-0200 Volume flaps shaft is the shaft (9) without the grub screw (8) which is replaced by the two screws (10). Make sure that the slots in the holder (6) and the slots in the bushings (11) are aligned before tightening the two screws (10) to **4.4 Nm** with an allen key.

c) Fit the front volume flap (3) and its support (6) and tighten the screws (7).

d) Fit the cantilever (4) by means of the screws (5).

e) Fit the oil connections (2) and the springs (1).

f) Crank the machine to 141 decimal degrees and proceed as above for the RH side.



1 Spring
2 Oil connection
3 Volume flap
4 Cantilever
5 Screw
6 Support
7 Screw
8 Grub screw
9 Shaft
10 Screw
11 Bushing

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4-16 Jaw System - Check T-gap

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648504-0500

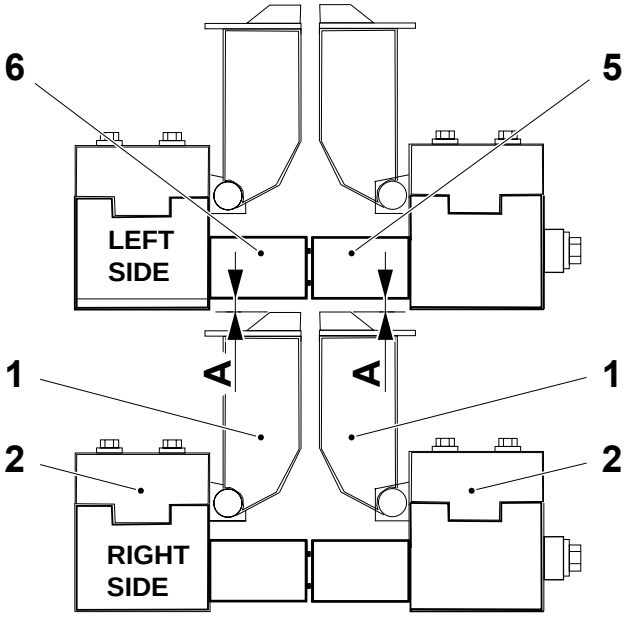
a) Crank the machine to 85 decimal degrees.

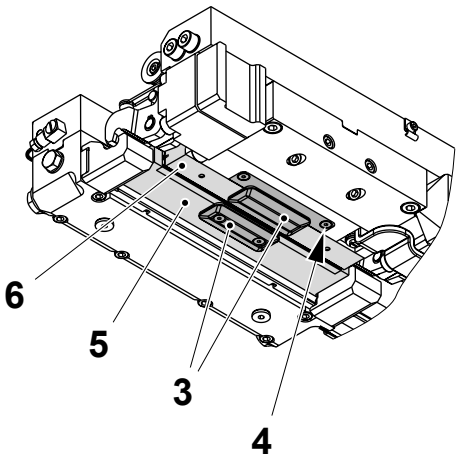
b) Check that the volume flaps (1) are exactly perpendicular to the carriers (2).

c) For volumes with the volume bulges (3). Remove the volume bulges (3) by means of the screws (4).

d) With the aid of a feeler gauge measure the distance **A** between the top of the volume flaps (1) and the bottom of the knife holder (5). Repeat the measurement between the top of the volume flaps (1) and the bottom of the inductor (6).

Package	**A (mm)**
1500 S	min. 2.5
250 S	min. 1.8
1000 B - 1000 S- 1000 Sq - TPA 1000 S - TPA 1000 Sq - 500 S - 500 B - TPA 500 Sq	min. 1.0
200 B - 250 B - 200 S - 330 S - TPA 330 Sq - TPA 250 Sq	min. 0.8





1 Volume flap
2 Carrier
3 Volume bulge
4 Screw
5 Knife holder
6 Inductor

(Cont'd)

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(Cont'd)

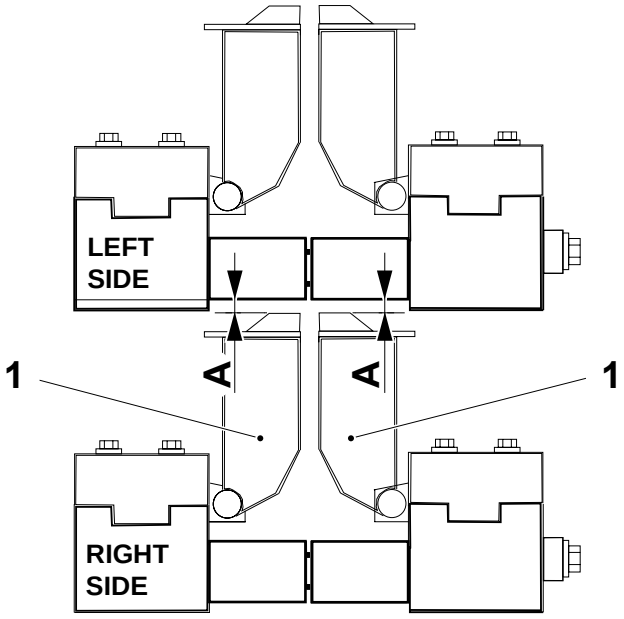
e) Crank the machine to 213 decimal degrees and repeat the checks.

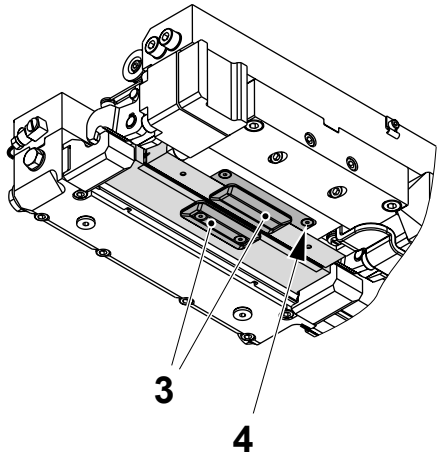
f) If the distances **A** (T-gap) are not correct repeat the basic setting, see 4-2 Jaw System - Setting Sequence.

g) For volumes with the volume bulges (3). Fit the volume bulges (3) by means of the screws (4).

Note! Always check the distance **A** (T-gap) on both the volume flaps (1) since the shims on the cutting jaw could cause a slight difference.

Package	A (mm)
1500 S	min. 2.5
250 S	min. 1.8
1000 B - 1000 S- 1000 Sq - TPA 1000 S - TPA 1000 Sq - 500 S - 500 B - TPA 500 Sq	min. 1.0
200 B - 250 B - 200 S - 330 S - TPA 330 Sq - TPA 250 Sq	min. 0.8





1 Volume flap
3 Volume bulge
4 Screw

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4-17 Jaw System - Set Safety Cam (TBA 1500 S and TPA 1000 Sq Only)

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1487345-0100

Note! Make sure that the shock absorbers have been set, see 4.2.4-1 Shock Absorber - Set Stop.

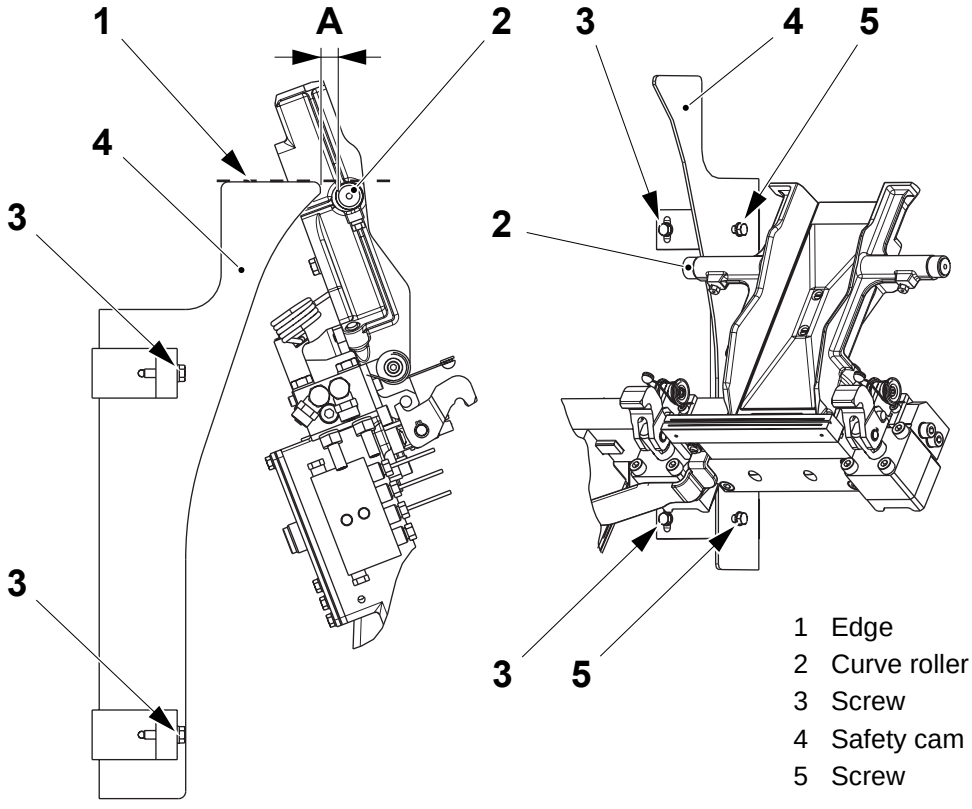
a) Crank the machine to:
   - 45 decimal degrees for 1500 S
   - 33 decimal degrees for TPA 1000 Sq.

b) Set the safety cam (4) vertical and with the edge (1) aligned to the curve roller (2) by means of the four screws (3) and (5).

c) Set the distance **A**, between the safety cam (4) and the curve roller (2) by means of the two screws (5).

d) Check again according to item b).

Package	**A (mm)**
1500 S	11.0
TPA 1000 Sq	5.0



1 Edge
2 Curve roller
3 Screw
4 Safety cam
5 Screw

(Cont'd)

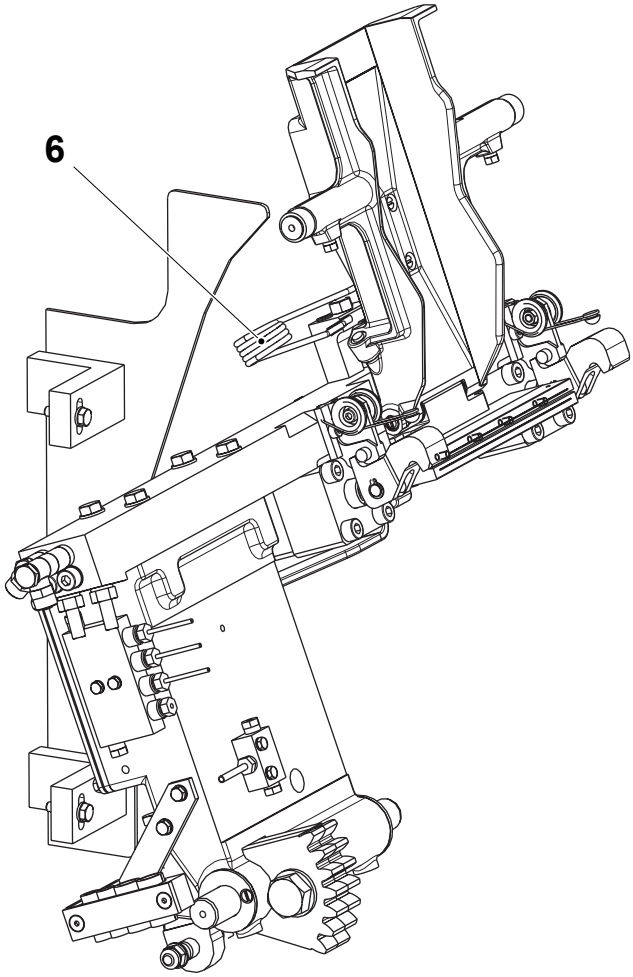
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(Cont'd)

e) Remove the four springs (6).

f) Crank the machine for 360° and make sure that no crashes occur in the jaw system.

g) Fit back the four springs (6).



6 Spring

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4-18 Jaw System - Assemble Volume Adjuster

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	648504-0500

a) Crank the machine to 160 decimal degrees LH side (32 decimal degrees RH side).

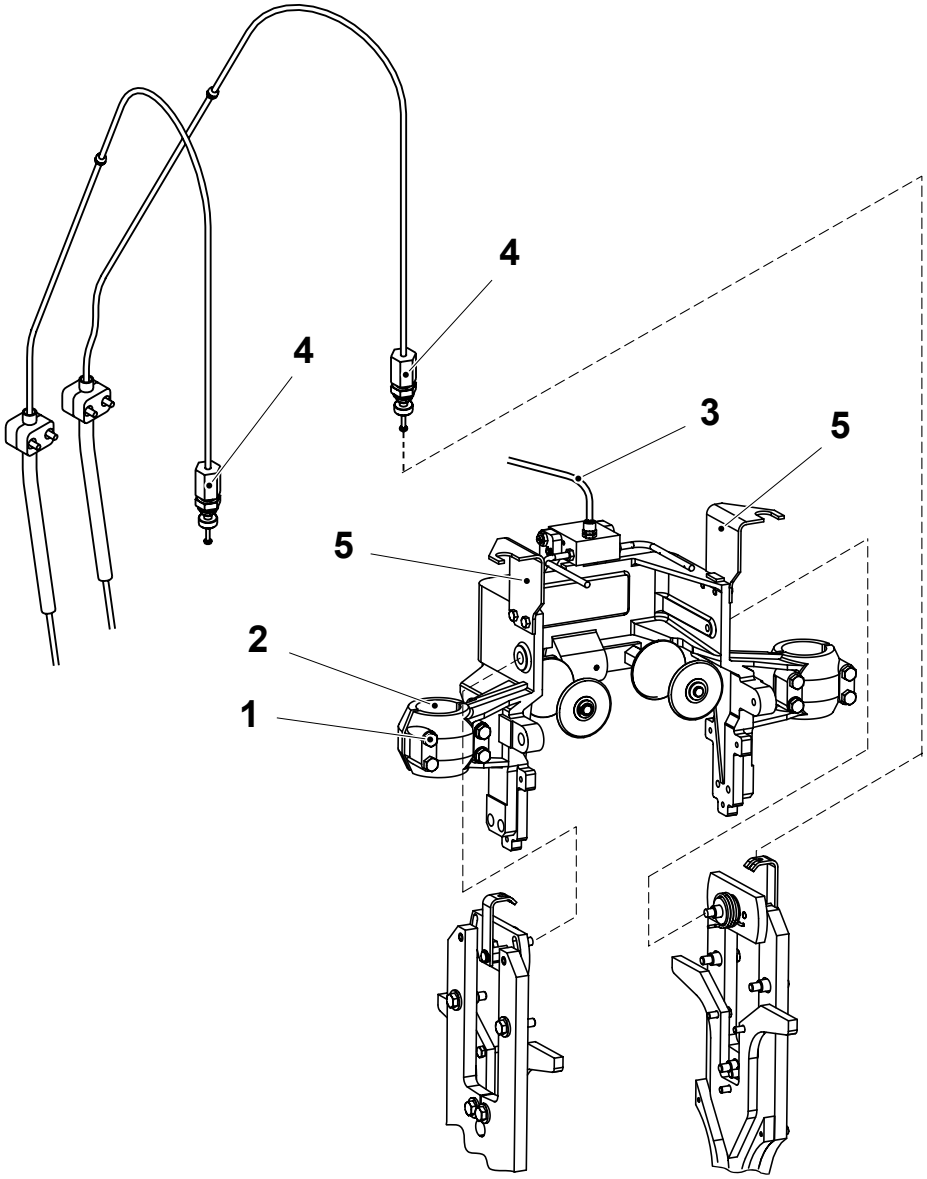
Note! For 1500 S and 1000 Sq only crank the machine to 166 decimal degrees LH side (38 decimal degrees RH side).

b) Place the volume adjuster assembly on the guides.

c) Tighten the screws (1) on the cantilever (2).

d) Fit the water hose (3) to the plug located on the machine frame.

e) Fit the sleeves (4) on the cantilever holders (5).



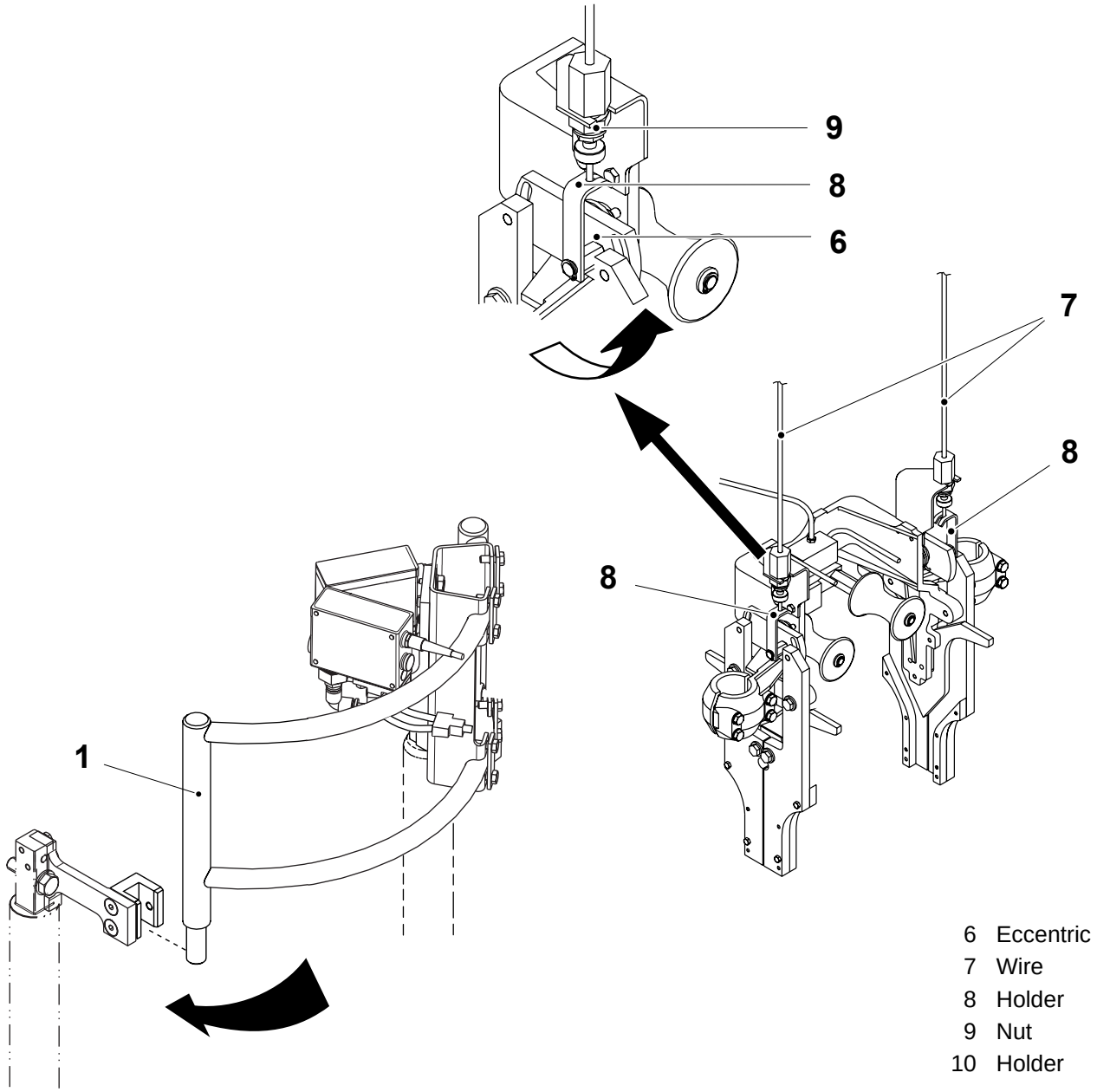
1 Screw
2 Cantilever
3 Water hose
4 Sleeve
5 Holder

(Cont'd)

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(Cont'd)

f) Pull the curve unit eccentrics (6) upwards.
g) Fit the wires (7) in the slot on the curve unit holders (8).
h) Tighten the nuts (9).
i) Move the photocell holder (10) to its normal position.
j) Set the cantilever, see 4-19 Jaw System - Set Cantilever Height.
k) Set the volume adjuster, see 4-20 Jaw System - Set Volume Adjuster.



6 Eccentric
7 Wire
8 Holder
9 Nut
10 Holder

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4-19 Jaw System - Set Cantilever Height

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	648504-0500

Note! For 1000 Sq only perform instruction 4-15 Jaw System - Assemble Front Volume Flaps before performing the following items.

a) Crank the machine, for the RH side, according to the table below.

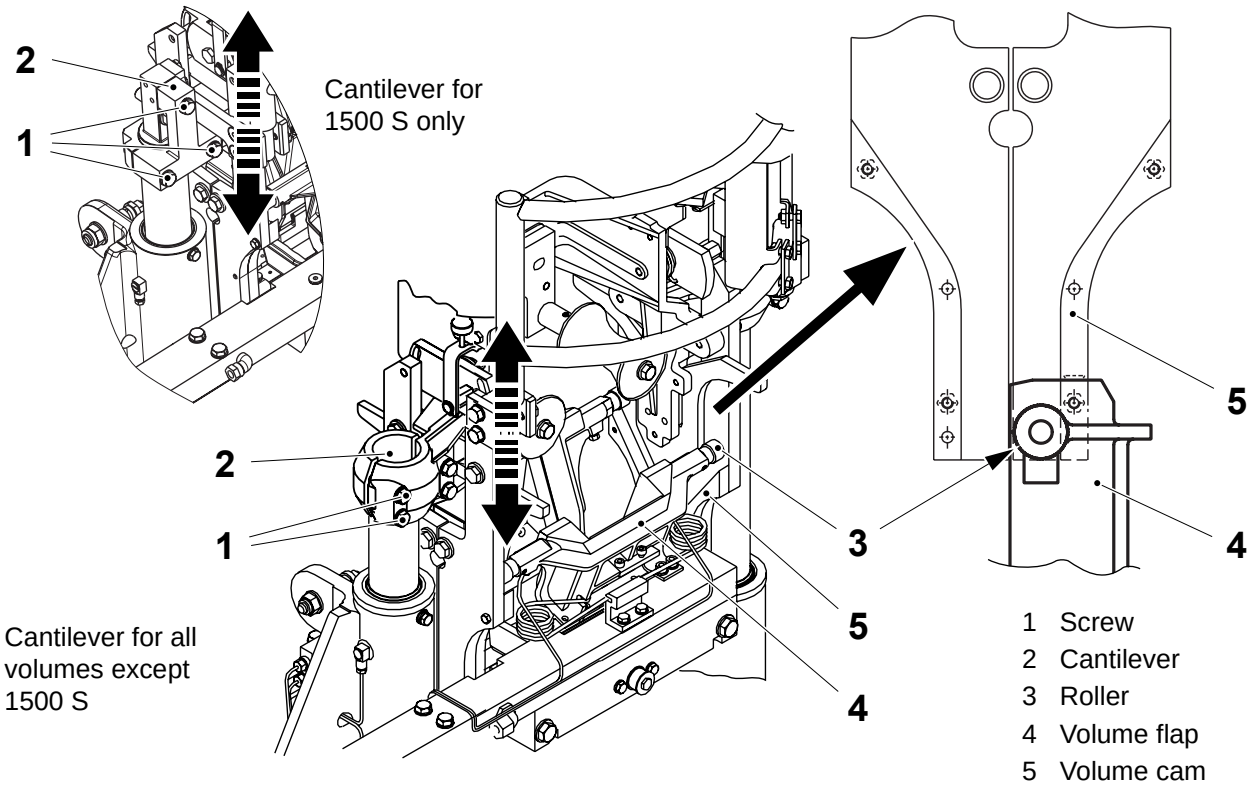
b) Loosen the screws (1) on both LH and RH side.

c) Shift the cantilever (2) up or down so that the bottom of the roller (3), on the volume flap (4), is aligned with the bottom of the volume cam (5), see figure.

d) Tighten the screws (1).

e) Check on the opposite side that the volume flaps movement is smooth and uniform.

Package	Decimal degrees	Package	Decimal degrees
500 B - TPA 330 Sq - TPA 250 Sq	83	200 S - 500 S - 330 S	82
1000 B - 1000 S - TPA 1000 S	80	TPA 1000 Sq	85
1500 S - 1000 Sq - 200 B - 250 B - TPA 500 Sq	81	250 S	91



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4-20 Jaw System - Set Volume Adjuster

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	648504-0500

a) Set the cantilever height position, see 4-19 Jaw System - Set Cantilever Height.

b) Loosen the lock nut (2) and turn the screw (1) anti-clockwise two turns on both sides.

Note! The movement of the screw (1) must be downwards.

c) Turn the shifter handle (4) clockwise to its end position.

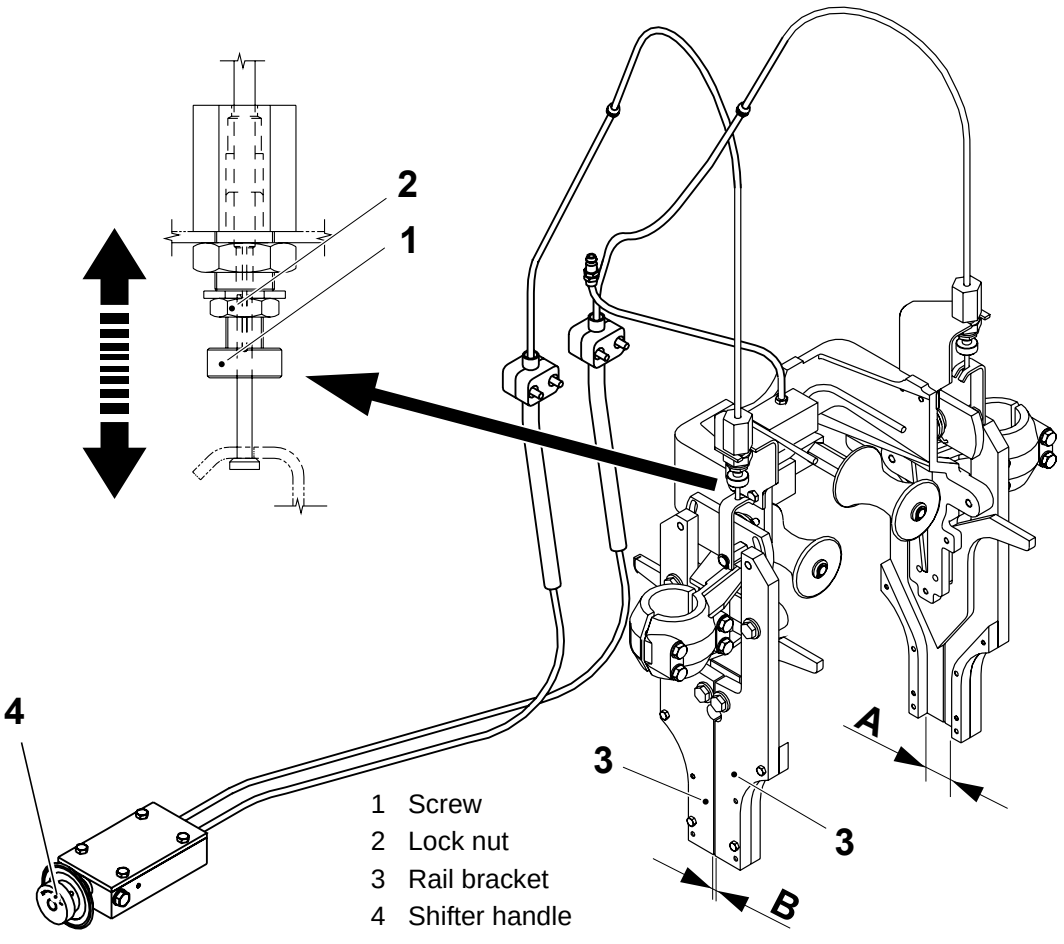
d) Turn back the shifter handle (4) half a turn as a safety margin.

e) Turn the screw (1) clockwise on both sides until the two rail brackets (3) touch each other.

Note! The movement of the screw (1) must be upwards.

f) Tighten the lock nut (2).

g) Turn the volume shifter handle (4) anti-clockwise to the measures **A** or **B** on the volume curves, see table next page.



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(Cont'd)

Package weight setting

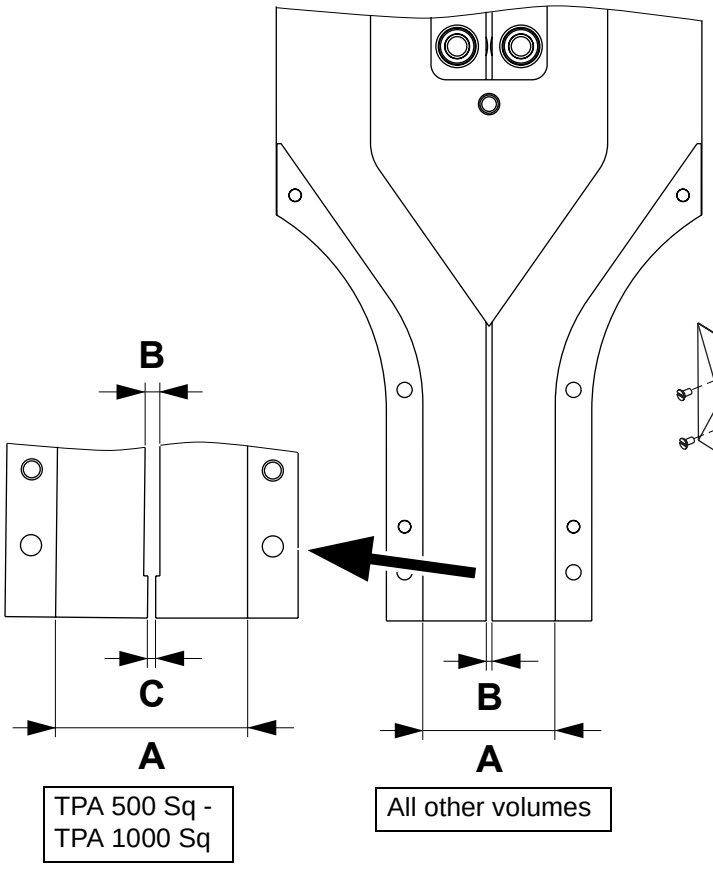
a) Set the distance **A**, by means of the of the volume shifter handle, see table.

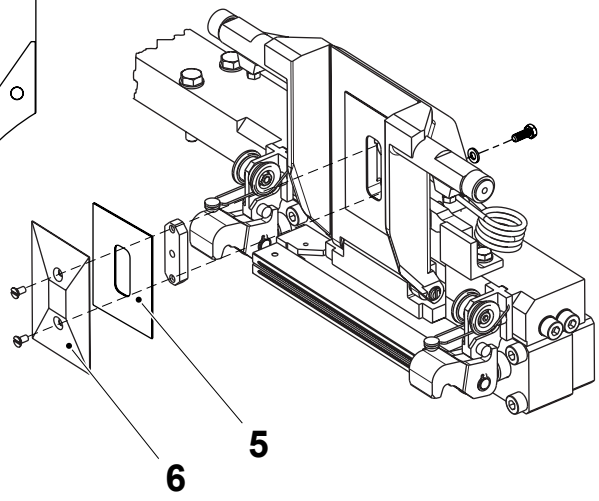
b) Set the weight by means of shims (5) under the volume bulge (6).

c) The total package weight can be set by means of the volume shifter handle. This can be done during step PRODUCTION.

d) Check the stop lug position, see 4.2.4-1 Shock Absorber - Set Stop.

Package	A ±0.1 (mm)	B ±0.1 (mm)	C (mm)	Package	A ±0.1 (mm)	B ±0.1 (mm)	C (mm)
1000 B - 1000 S - TPA 1000 S - 1500 S - 1000 Sq - 500 S	43.6	2.0	NA	200 S - 500 B - TPA 330 Sq	36.5	1.0	NA
TPA 1000 Sq - TPA 500 Sq	44.0	2.0	0	200 B	38.0	1.0	NA
TPA 250 Sq	36.2	1.0	NA	250 S	36.0	1.0	NA
250 B	38.5	1.0	NA	330 S	39.0	1.0	NA





5 Shim
6 Volume bulge

(Cont'd)

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(Cont'd)

Check for play between rail bracket and cantilever

Note! Only valid for new variants of the curve unit with washers (9) to the rail bracket (3).

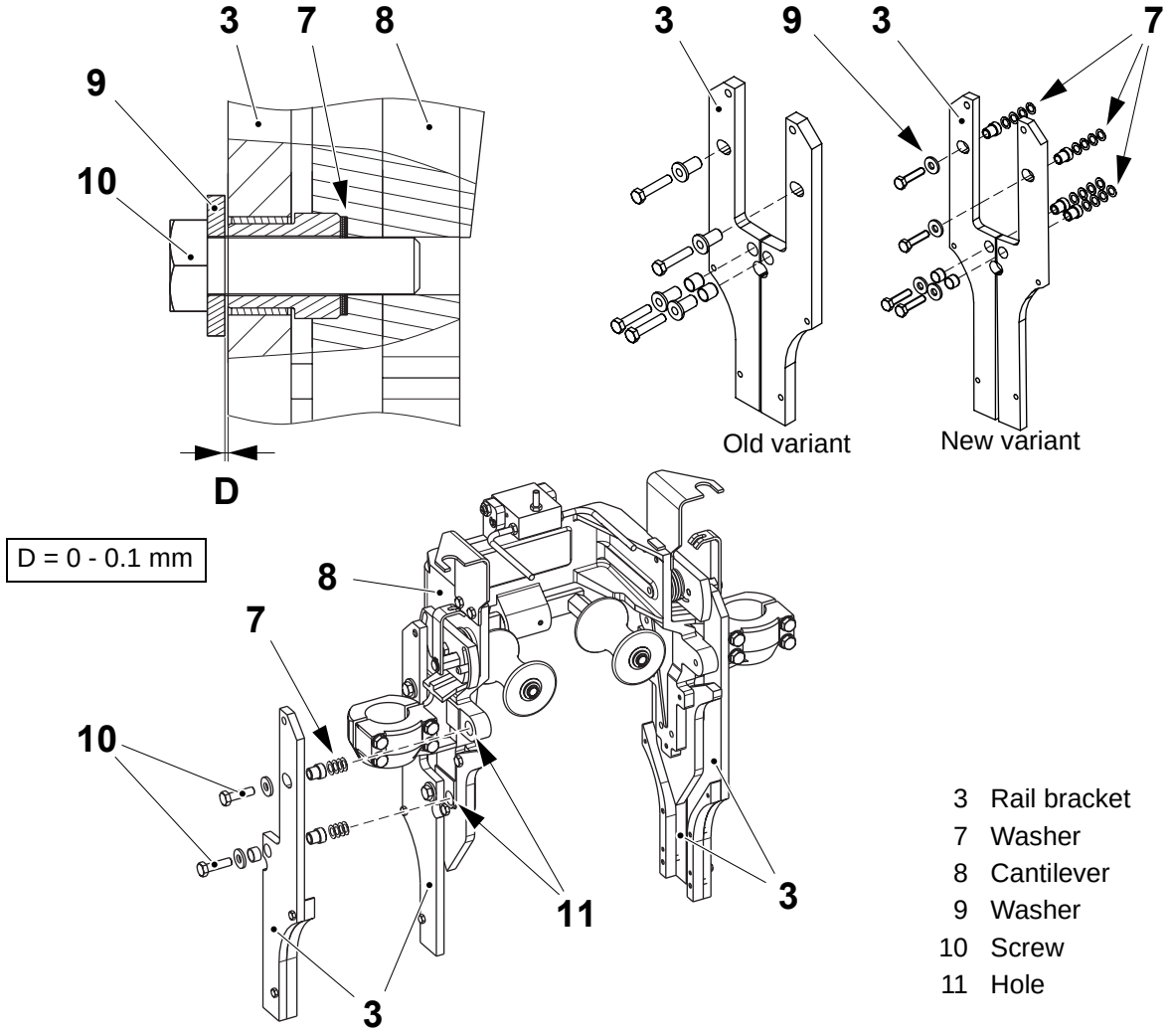
Check the distance **D** between the washers (9) and the rail brackets (3) with the aid of a feeler gauge. If required, set the distance **D** as shown below.

a) Loosen the screws (10) and remove the rail bracket (3).

b) Add or remove washers (7) in the holes (11) in the cantilever (8).

c) Fit the rail bracket (3) and tighten the screws (10).

d) Check the distance **D** and perform items a) to c) as required.



3 Rail bracket
7 Washer
8 Cantilever
9 Washer
10 Screw
11 Hole

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4.1 Yoke

SPC Reference	1348455-0200 1348460-0200

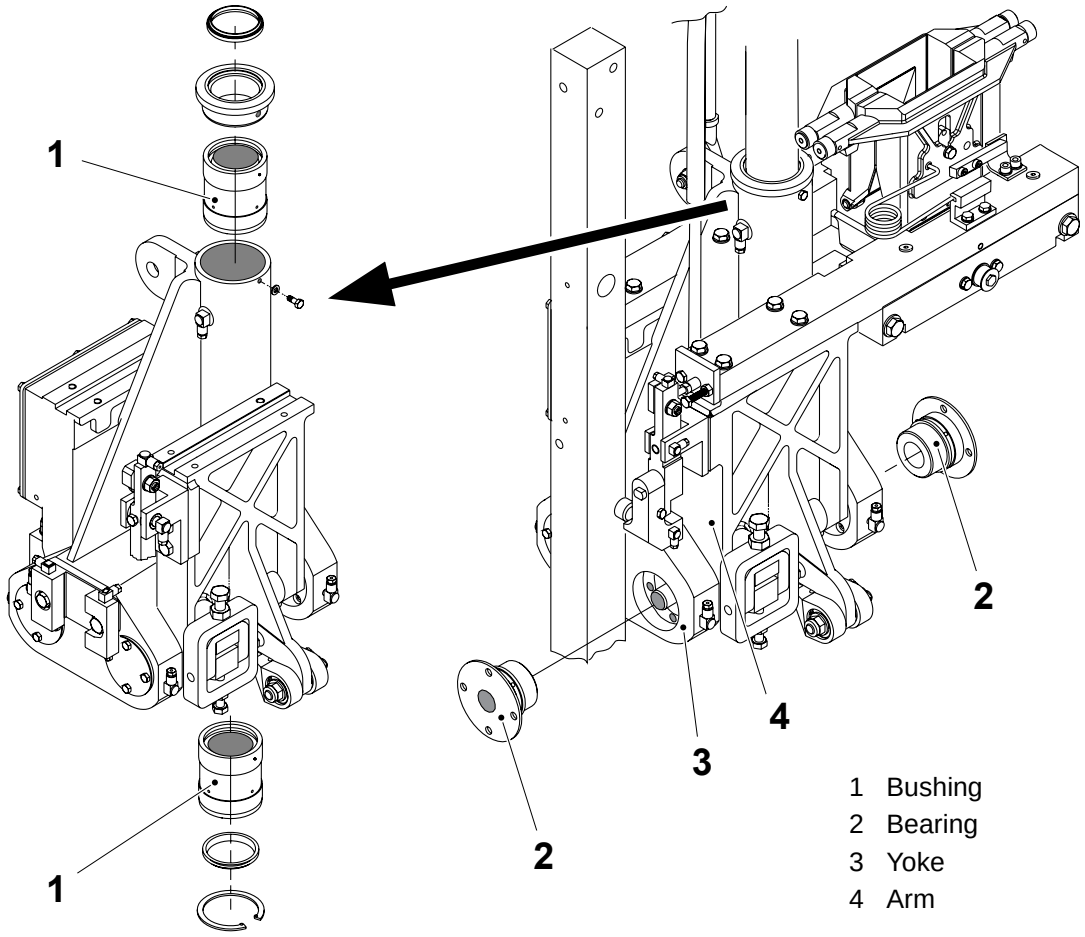
4.1-1 Yoke - Check Bearings and Bushings

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348455-0200 1348460-0200

Check the following parts for visual wear and/or damage:

- the bushings (1)
- the bearings (2)
  Check also for excessive play between the yoke (3) and the arms (4).
- the hydraulic oil hoses
  Check that there are no oil leakages.

Change as required.



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4.1-2 Yoke - Check Locating Piece and Plungers

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348455-0200 1348460-0200

Locating Piece

a) Crank the machine approx. to 6 decimal degrees LH side (134 decimal degrees RH side).

b) Remove the oil connection (1).

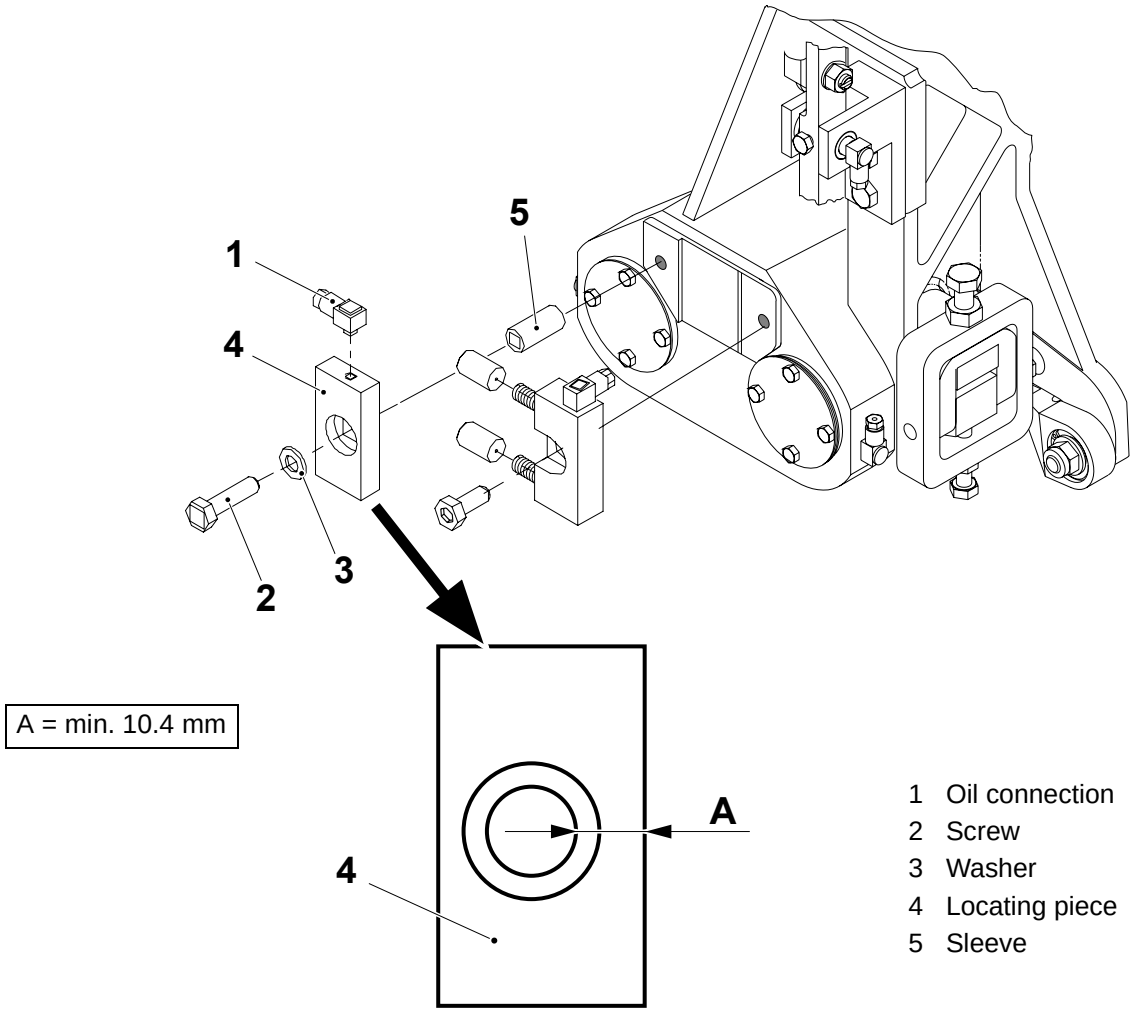
c) Remove the screw (2) and the washer (3).

d) Pull out the locating piece (4) and the sleeve (5).

e) Check the locating piece (4) for wear and/or damage, see distance **A**. Change as required.

f) Assemble in the reverse order.

Note! Make sure that during the assembly the locating piece (4) is pressed against its guide on the machine body beam.



A = min. 10.4 mm

1 Oil connection
2 Screw
3 Washer
4 Locating piece
5 Sleeve

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(Cont'd)

(Cont'd)

Plungers

g) Crank the machine until the screw (6) is aligned with the slot (7) in the machine body beam.

h) Loosen the lock nuts (8) and remove the cam (9) and the strut (10).

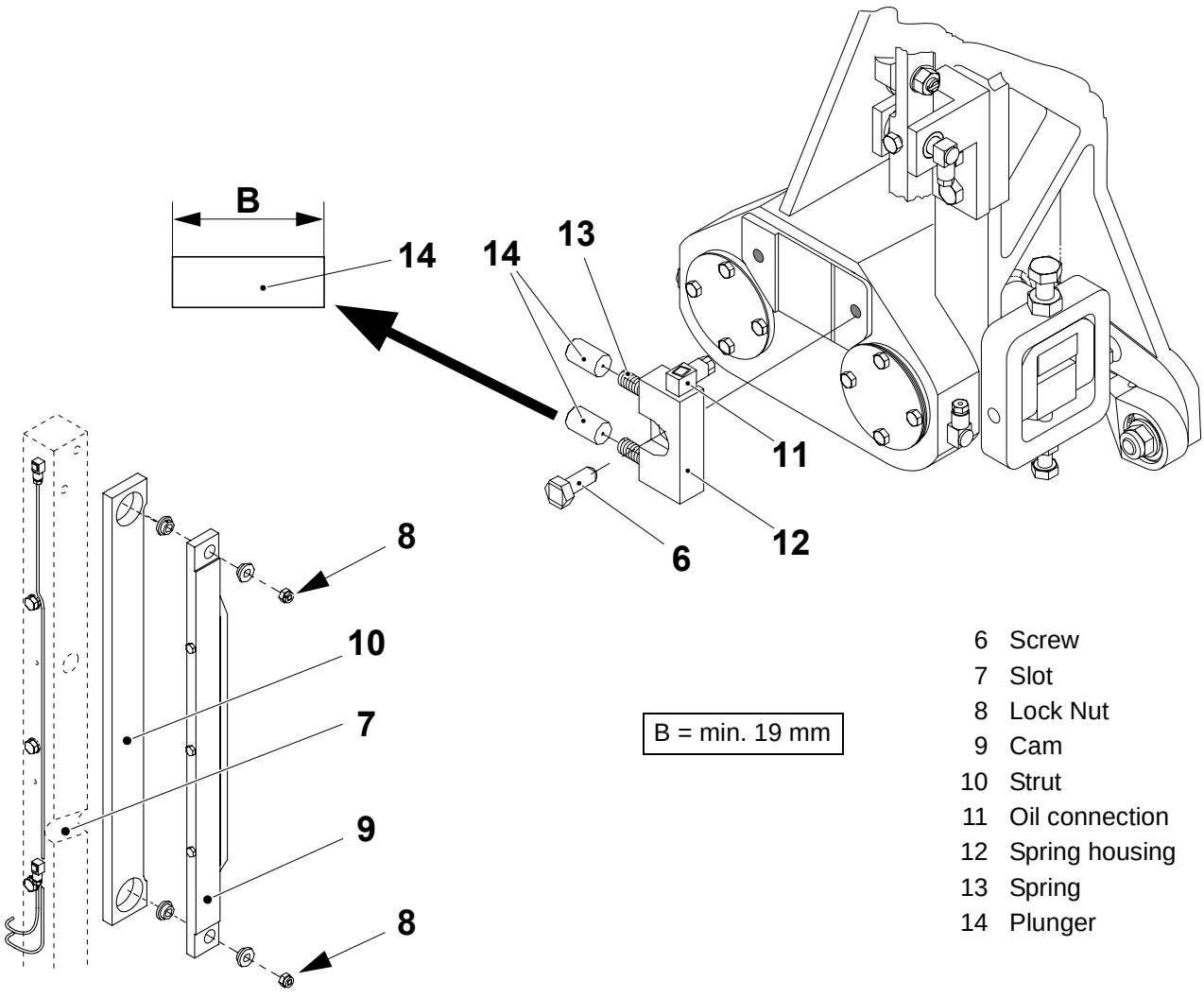
i) Remove the oil connection (11).

j) Remove the screw (6) and the spring housing (12).

k) Remove the springs (13) and check them for wear and/or damage. Change as required.

l) Check the plungers (14) for wear and/or damage, see distance **B**. Change as required.

m) Assemble in the reverse order.



B = min. 19 mm

6 Screw
7 Slot
8 Lock Nut
9 Cam
10 Strut
11 Oil connection
12 Spring housing
13 Spring
14 Plunger

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4.1-3 Yoke - Remove Guide and Yoke

Machine Status	Mains Power OFF, Air ON Steam ON, Water OFF
SPC Reference	1348455-0200 1348460-0200

WARNING

Risk of personal injury due to pinching or crushing.

The jaw unit weighs approximately 40 Kg.

a) Crank the machine until the yokes are at the same height.

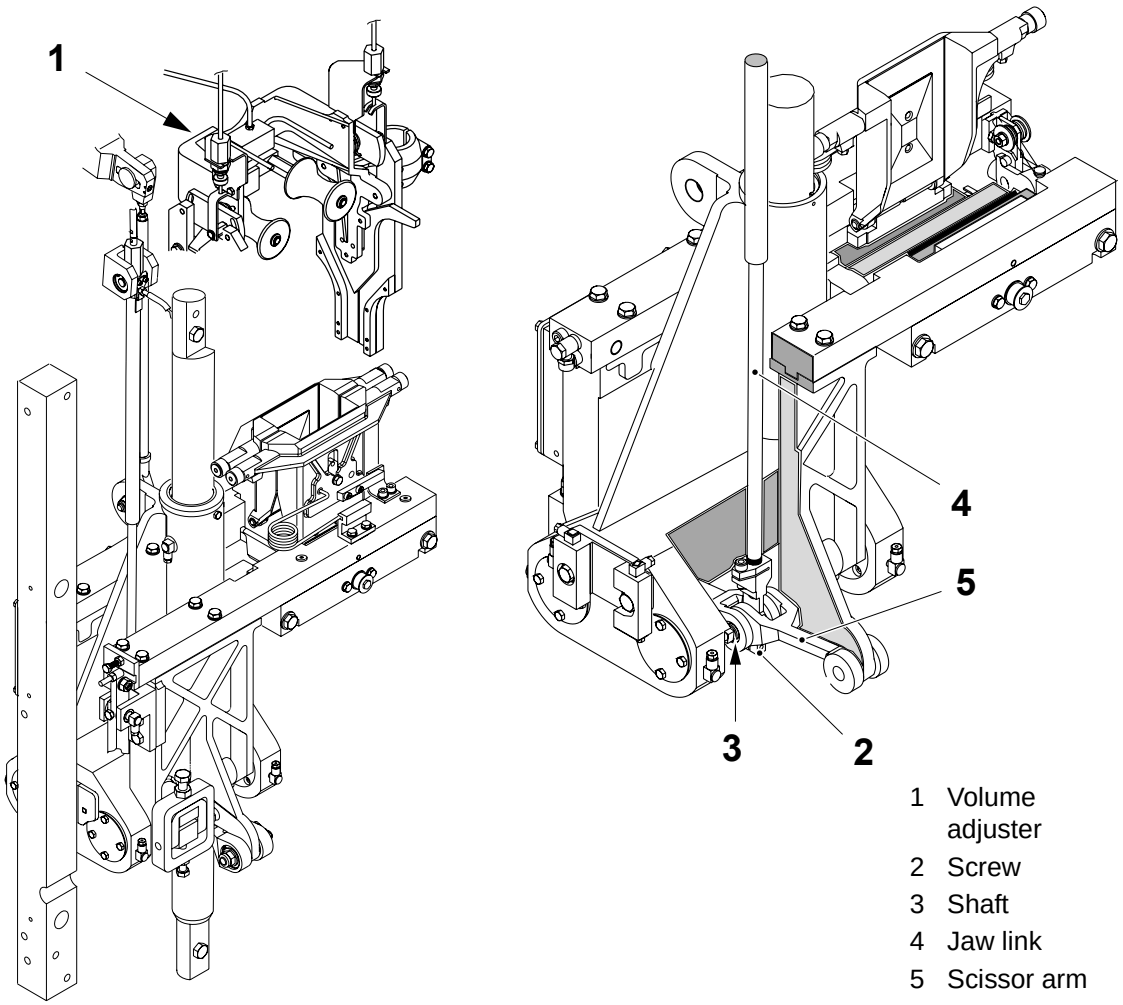
b) Remove the air, water, oil and hydraulic connections from the jaw pair.

c) Remove the volume adjuster (1), see 4.4-1 Volume Adjuster - Remove.

d) Crank the machine to the lower turning position.

e) Unscrew the screw (2) and remove the shaft (3).

f) Separate the jaw link (4) from the scissor arm (5), see 4.1.1-2 Scissor Arm - Change Shafts and Flange Bushings.



1 Volume adjuster
2 Screw
3 Shaft
4 Jaw link
5 Scissor arm

(Cont'd)

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(Cont'd)

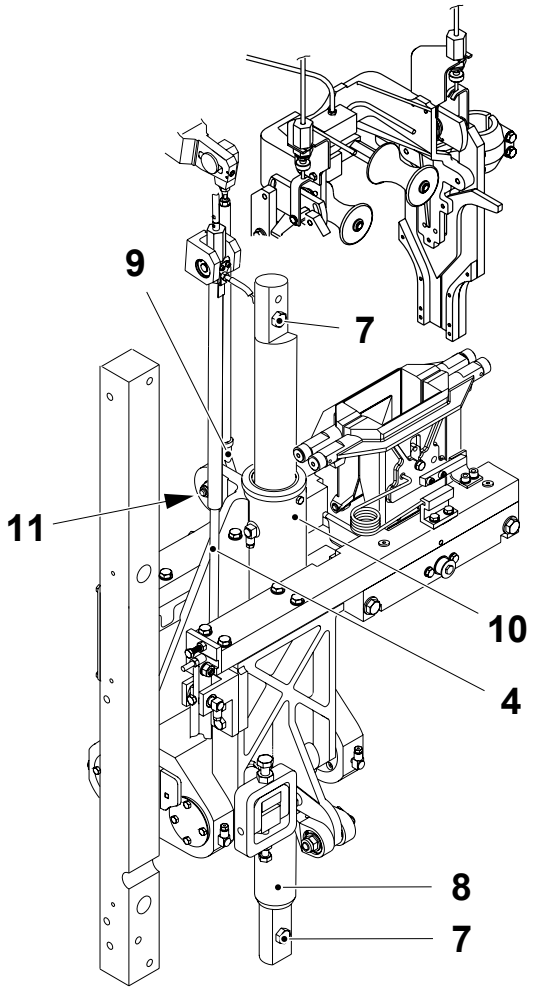
g) Remove the locating piece (6).

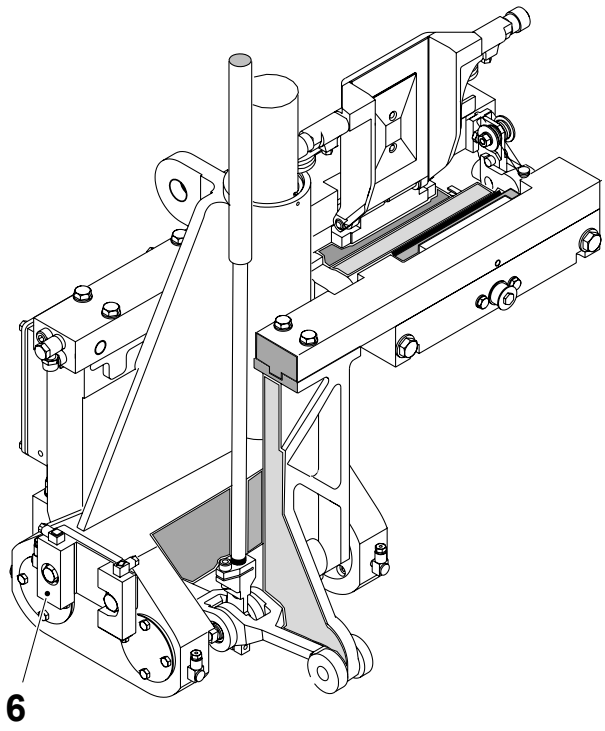
h) Unscrew the screws (7) on the guide (8).

i) Separate the lower link head (9) from the yoke (10) by removing the nut (11).

j) Remove the guide (8) and the yoke (10).

k) Assemble in the reverse order.





6 Locating piece
7 Screw
8 Guide
9 Link head
10 Yoke
11 Nut

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4.1-4 Yoke - Change Bushings and Scraper

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348455-0200 1348460-0200

a) Remove the guide and the yoke, see 4.1-3 Yoke - Remove Guide and Yoke.

b) Loosen the screw (1).

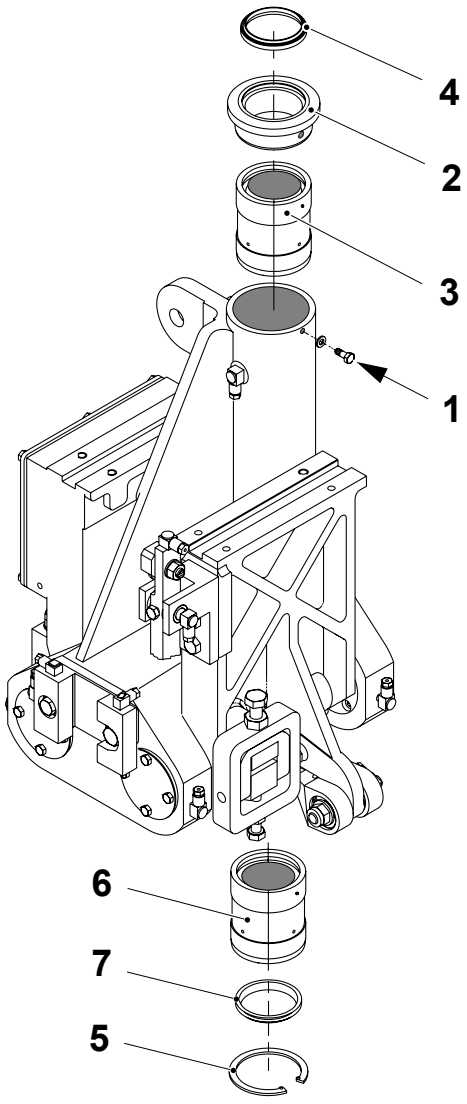
c) Lift up the lid (2).

d) Remove the bushing (3) and the scraper (4). Change them as required.

e) Remove the clip (5).

f) Remove the bushing (6) and the scraper (7). Change them as required.

g) Assemble in the reverse order.



1 Screw
2 Lid
3 Bushing
4 Scraper
5 Clip
6 Bushing
7 Scraper

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4.1-5 Yoke - Change Bearings

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348455-0200 1348460-0200

a) Remove the spring housing (1) and the locating piece (2), see 4.1-2 Yoke - Check Locating Piece and Plungers.

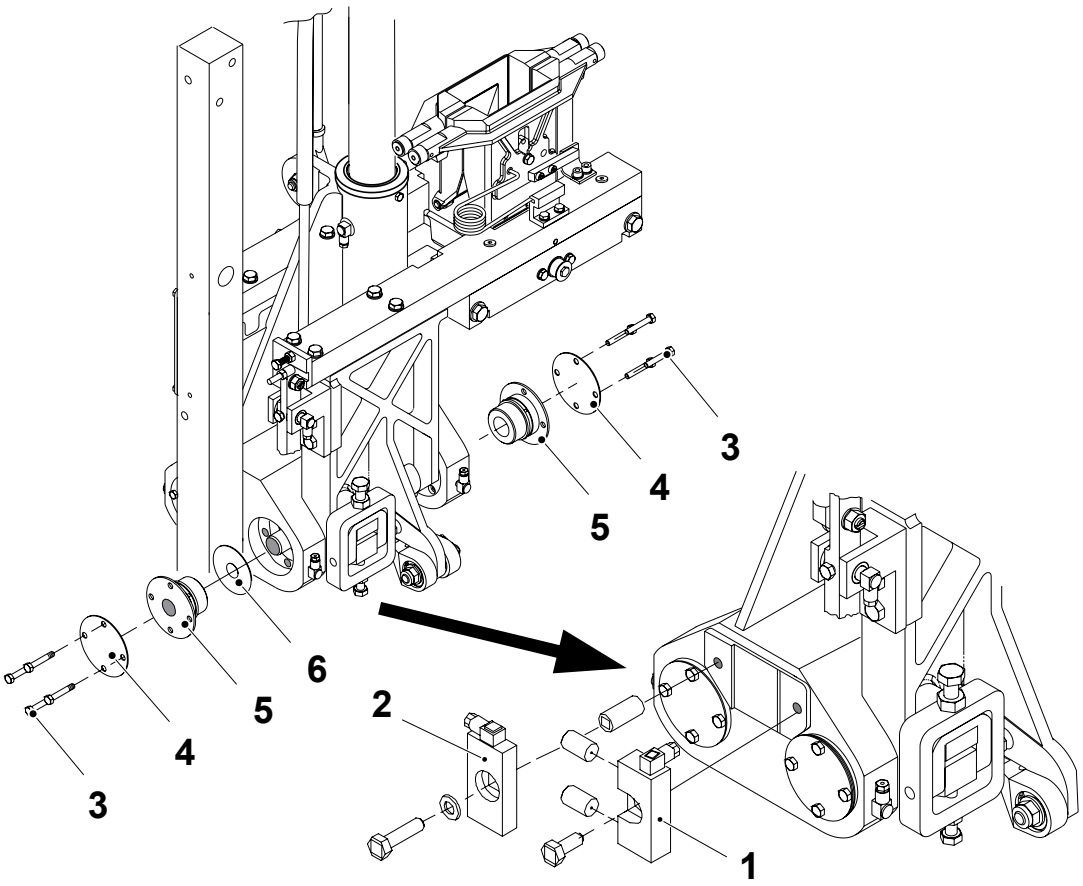
b) Unscrew the screws (3).

c) Remove the lids (4).

d) Remove the bearings (5), the laces (6) and change them.

e) Assemble in the reverse order.

Note! Make sure that the arrow marked on the bearings (5) is pointing upwards.



1 Spring housing
2 Locating piece
3 Screw
4 Lid
5 Bearing
6 Lace

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4.1.1 Scissor Arm

4.1.1-1 Scissor Arm - Check

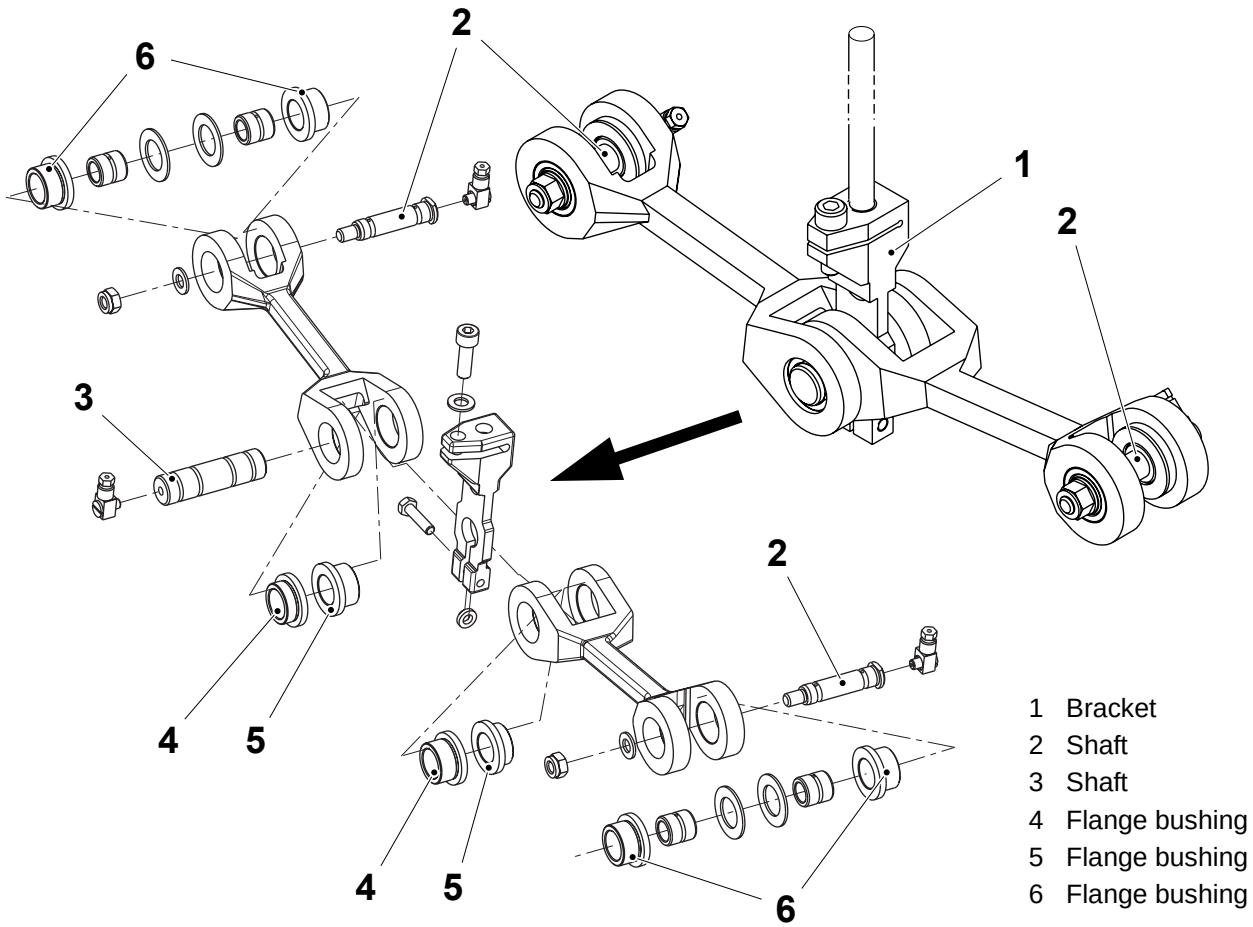
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348466-0100 1348467-0100

Note! Perform the following instruction on both the scissor arms.

Crank the machine to the lower turning position and check the following parts for visual wear and/or damage:

- the bracket (1)
- the shafts (2) and (3)
- the flange bushings (4), (5) and (6)
  With the aid of a feeler gauge check that the play between the shafts and the flange bushings does not exceed **0.1 mm**.

Change as required.



1 Bracket
2 Shaft
3 Shaft
4 Flange bushing
5 Flange bushing
6 Flange bushing

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4.1.1-2 Scissor Arm - Change Shafts and Flange Bushings

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348466-0100 1348467-0100

Note! Perform the following instructions on both the scissor arms.

a) Crank the machine to the lower turning position.

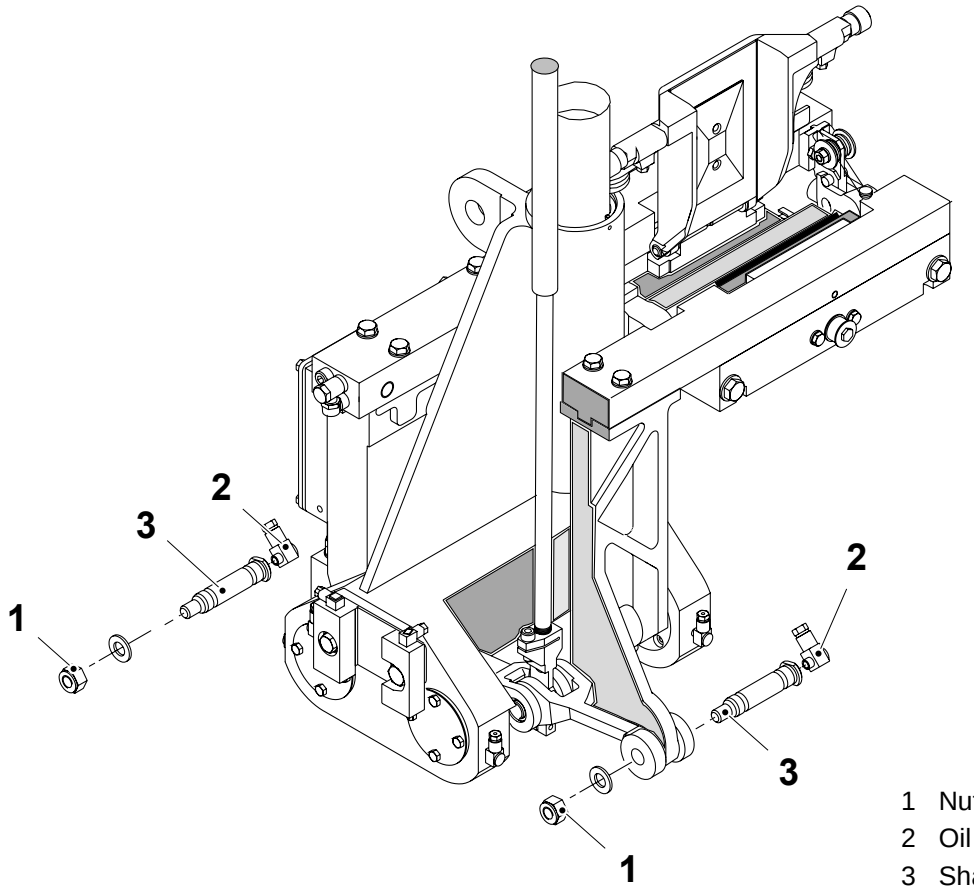
CAUTION
Risk of damage to the equipment.
Pay special attention in preventing collision in the jaw system.

b) Remove the nuts (1) on both sides.

c) Remove the oil connections (2) and the shafts (3) on both sides.

d) Remove the scissor arm from the yoke.

e) Change the shafts (3).



1 Nut
2 Oil connection
3 Shaft

(Cont'd)

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(Cont'd)

f) Remove the flange bushings (4), the sleeves (5) and change them.

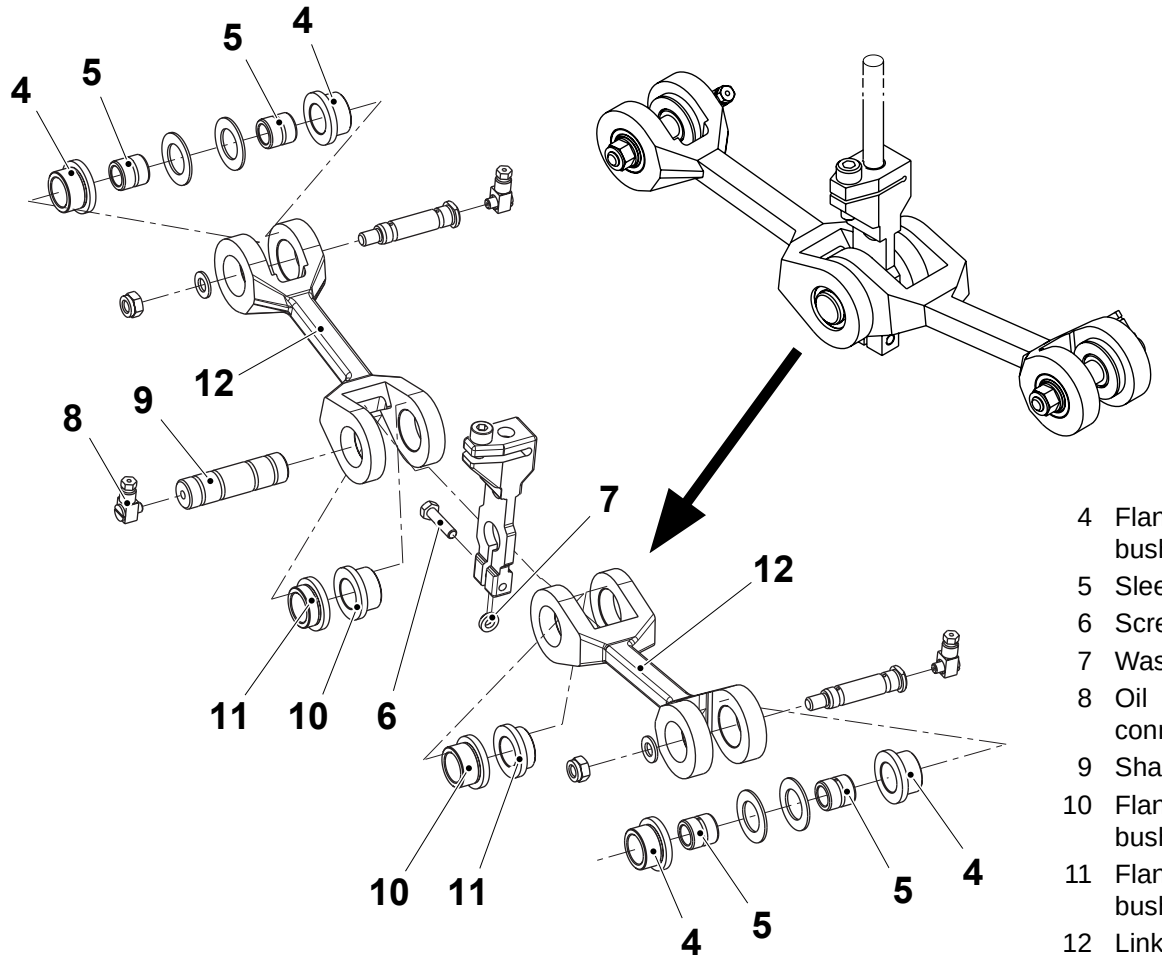
g) Loosen the screw (6) and remove the washer (7).

h) Remove the oil connection (8) and the shaft (9).
Change the shaft (9) as required.

i) Remove the flange bushings (10), (11) and change them.

j) Assemble in the reverse order.

Note! During the assembly make sure that the shaft (9) is centred in the middle of the links (12).



4 Flange bushing
5 Sleeve
6 Screw
7 Washer
8 Oil connection
9 Shaft
10 Flange bushing
11 Flange bushing
12 Link

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4.1.2 Pressure Arm

4.1.2-1 Pressure Arm - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348456-0200 1348461-0200

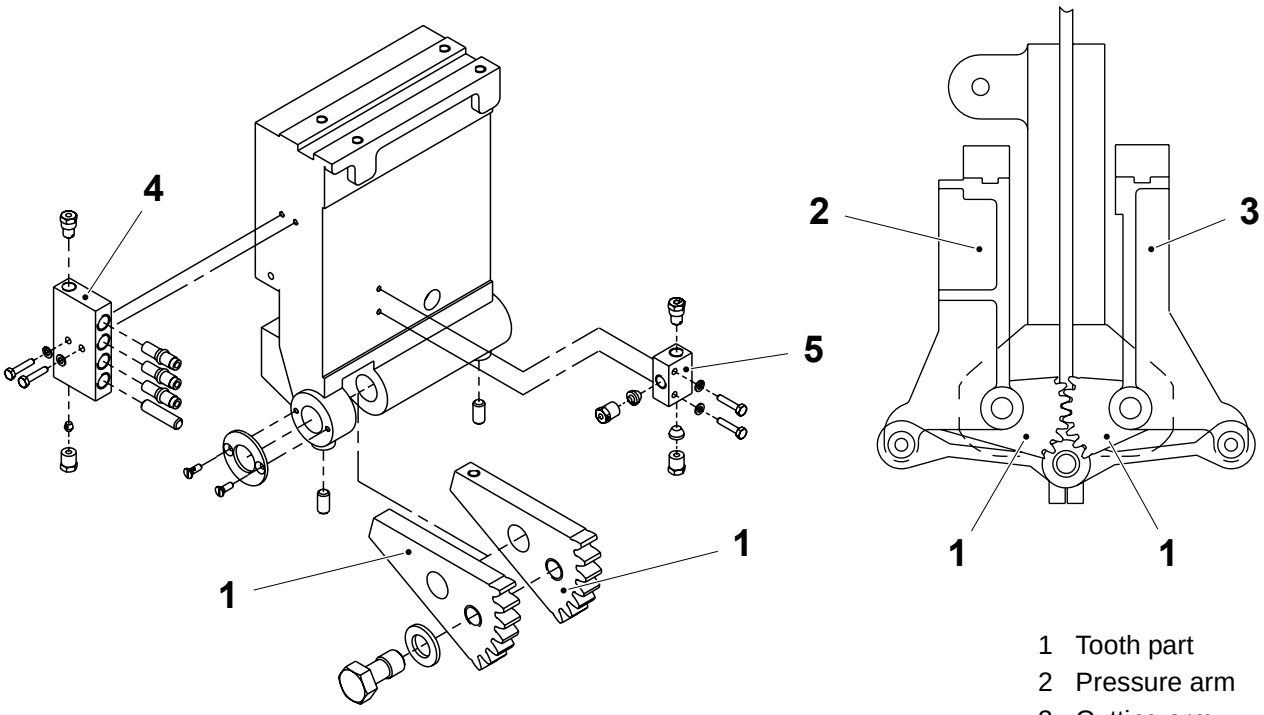
Note! Perform the following instructions on both the pressure arms.

a) Check the tooth parts (1) for visual wear and for cracks on the teeth.

b) Check for excessive play between the two tooth parts (1) on the pressure arm (2) and on the cutting arm (3). If excessive, adjust with the toothed parts (1), see 4.1.2-2 Pressure Arm - Set Play.

c) Check the oil block (4) and the junction block (5) for oil leakages.

d) Change as required.



1 Tooth part
2 Pressure arm
3 Cutting arm
4 Oil block
5 Junction block

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4.1.2-2 Pressure Arm - Set Play

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348456-0200 1348461-0200

Note! Perform the following instructions on both the pressure arms.

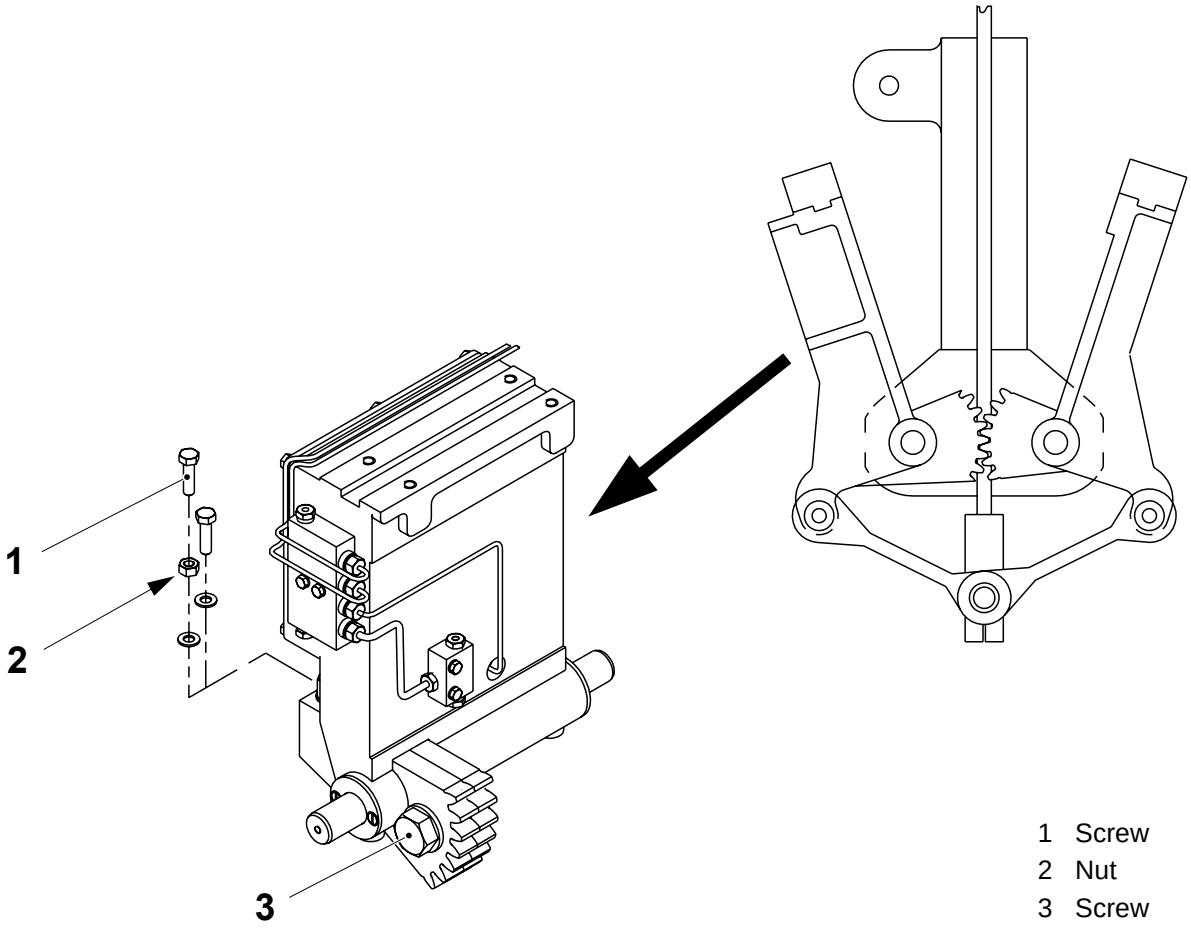
a) Remove the scissor arm, see 4.1.1-2 Scissor Arm - Change Shafts and Flange Bushings.

b) Adjust until the movement is easy and the teeth play is as limited as possible throughout the movement.

c) Loosen the nut (2) and the screw (3) and set the play by means of the setting screw (1).

d) Tighten the screw (3) and the nut (2).

e) After any changes check the jaw symmetry, see 4-6 Jaw System - Set Jaw Symmetry with Own Guide.



1 Screw
2 Nut
3 Screw

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4.1.3 Cutting Arm

4.1.3-1 Cutting Arm - Check

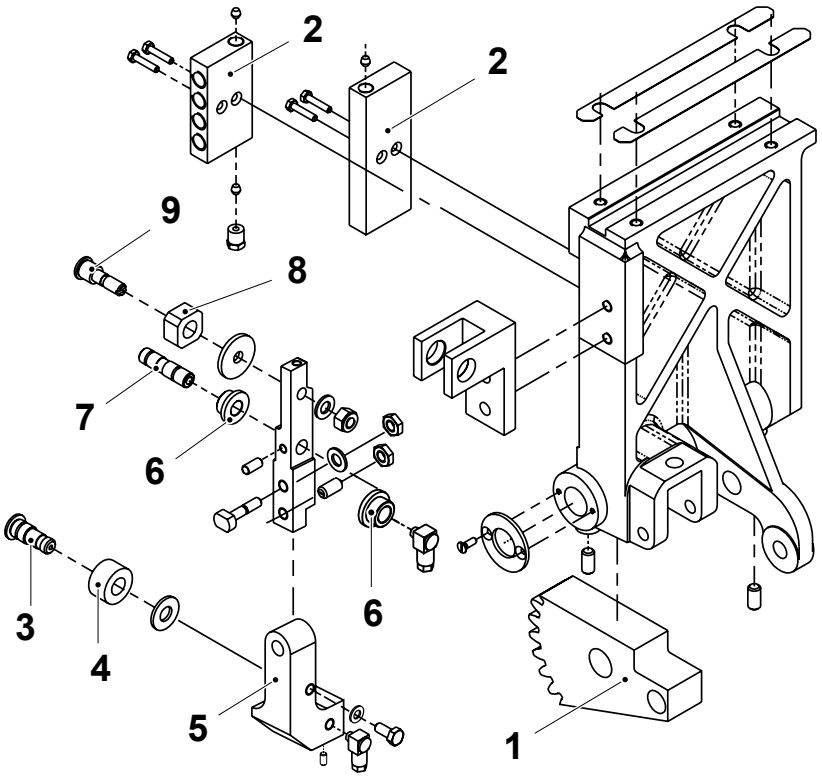
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348457-0200 1348462-0200

Note! Perform the following instructions on both the cutting arms.

Check the following parts for visual wear and/or damage:

- the toothed parts (1)
  Check for cracks on the teeth.
- the oil blocks (2)
  Check for any oil leakages.
- the shaft (3) and the roller (4)
- the joint (5)
  Check that it moves freely.
- the flanges (6) and the shaft (7)
- the piece (8) and the shaft (9)

Change as required.



1 Tooth part
2 Oil block
3 Shaft
4 Roller
5 Joint
6 Flange
7 Shaft
8 Piece
9 Shaft

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4.1.3-2 Cutting Arm - Change Bearings and Shaft

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348457-0200 1348462-0200

Note! Perform the following instructions on both the cutting arms.

a) Remove the spring housing (1), see 4.1-2 Yoke - Check Locating Piece and Plungers.

b) On both sides, remove the screws (2) and the lids (3).

c) Remove and change the bearings (4).

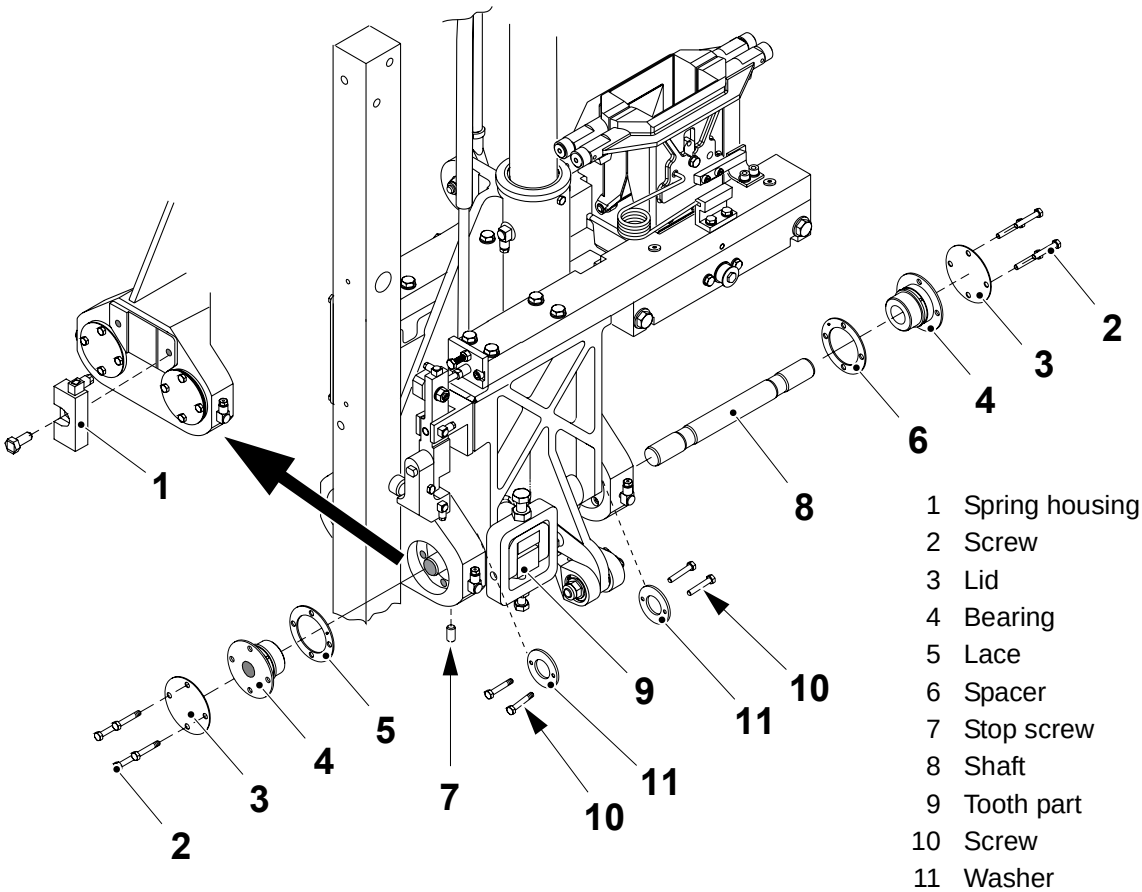
d) Remove the lace (5) and the spacer (6).

e) Remove the two stop screws (7).

f) Remove and change the shaft (8).

CAUTION
Risk of damage to the equipment.
The tooth part (9) could unexpectedly fall down.

g) Remove the screws (10) and the washers (11).



1 Spring housing
2 Screw
3 Lid
4 Bearing
5 Lace
6 Spacer
7 Stop screw
8 Shaft
9 Tooth part
10 Screw
11 Washer

(Cont'd)

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(Cont'd)

h) Assemble in the following order:

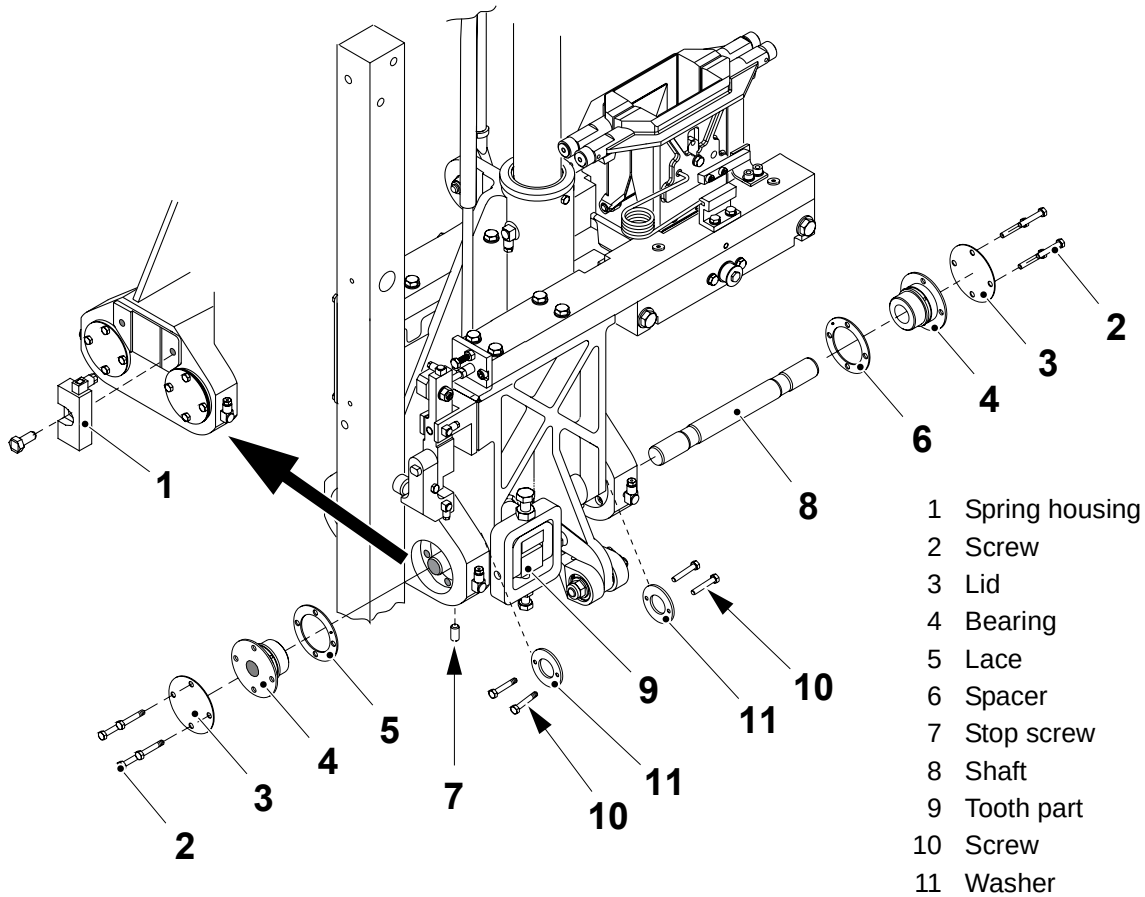
- the washers (11) and the screws (10)
- the lace (5)
- the spacer (6)
- the bearings (4)

Note! Make sure that the arrow marked on the bearings (4) is pointing upwards.

- the tooth part (9)
- the shaft (8)

Note! Make sure that the two grooves on the shaft (8) are in correspondence of the stop screws (7).

- the stop screws (7)
- the lids (3) and the screws (2)
- the spring housing (1).



1 Spring housing
2 Screw
3 Lid
4 Bearing
5 Lace
6 Spacer
7 Stop screw
8 Shaft
9 Tooth part
10 Screw
11 Washer

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4.1.3-3 Cutting Arm - Set Play

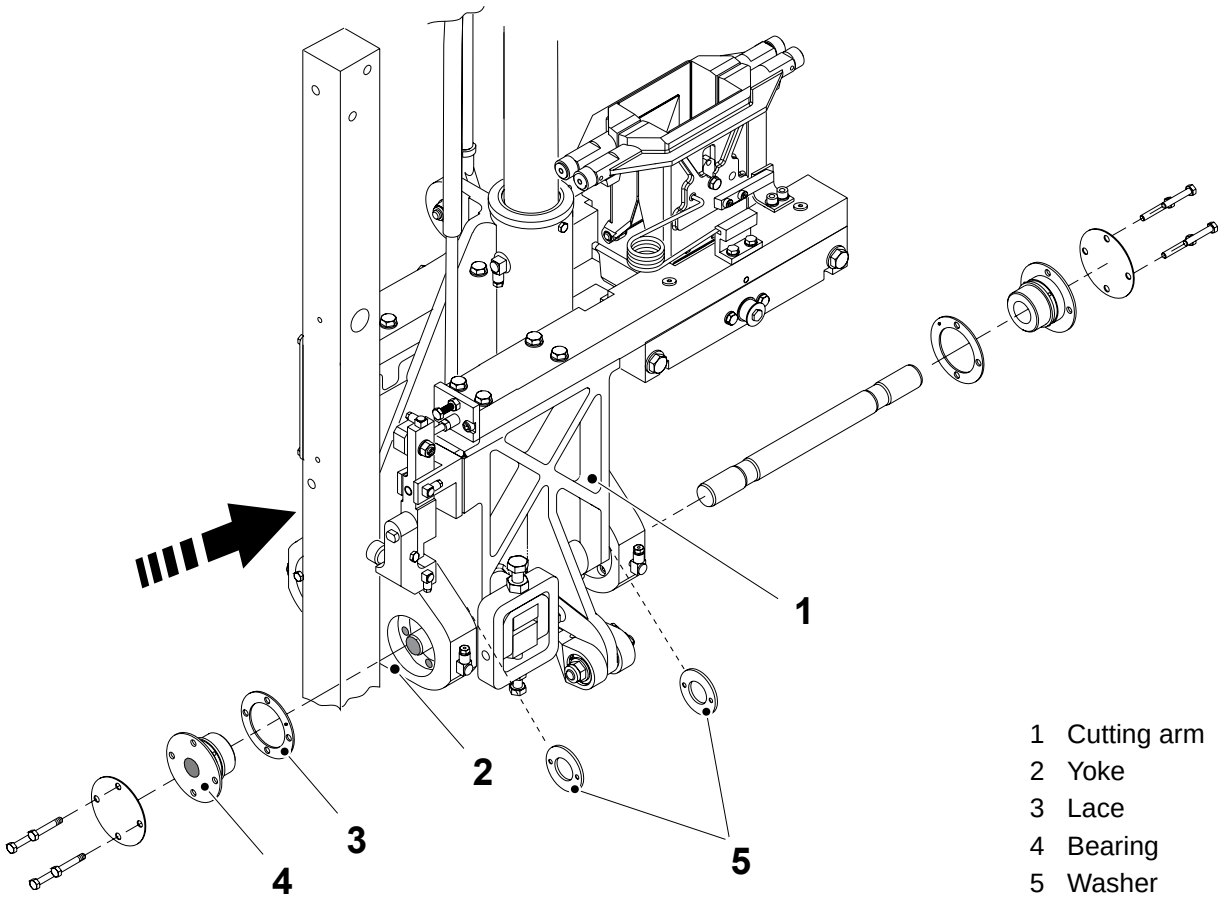
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348457-0200 1348462-0200

Note! Perform the following instructions on both the cutting arms.

a) Apply a light hand pressure to the cutting arm (1) in the direction of the arrow, see figure.

b) Measure the play between the yoke (2) and the cutting arm (1) by means of a feeler gauge.

c) Adjust the peelable lace (3) so that the play between the bearing (4) and the washer (5) is between **0.05** and **0.1 mm**.



1 Cutting arm
2 Yoke
3 Lace
4 Bearing
5 Washer

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4.1.3-5 Cutting Arm - Check Clearance

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348457-0200 1348462-0200

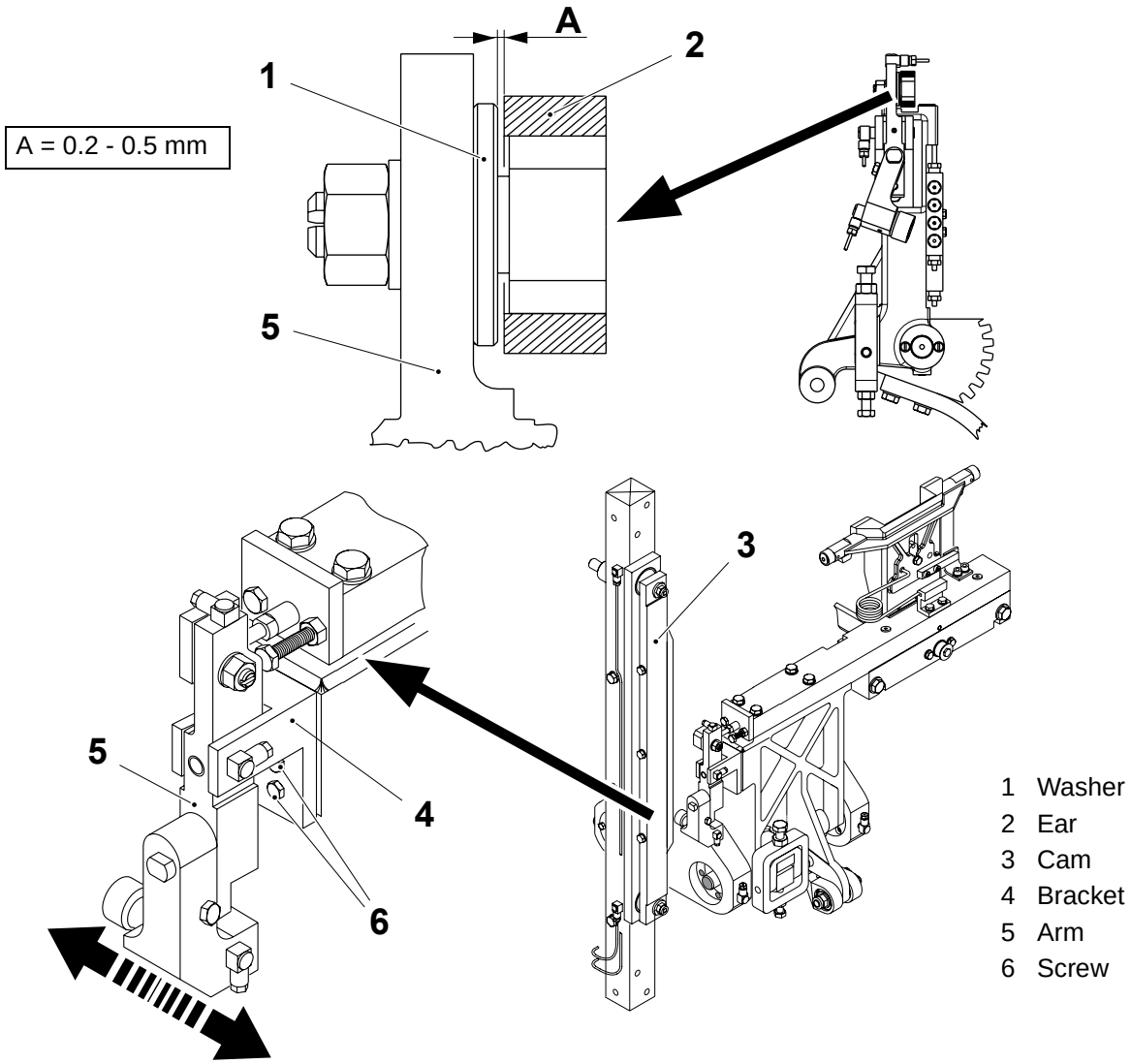
Note! Perform the following instructions on both the cutting arms.

a) With the aid of a feeler gauge check the distance **A** between the washer (1) and the cutting jaw ear (2).

b) Check that the bracket (4) and the arm (5) are aligned to the cam (3).

c) If required, adjust the bracket (4) position by means of the screws (6).

d) Check the distance **A** once more after the adjustment.



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4.2 Pressure Jaw

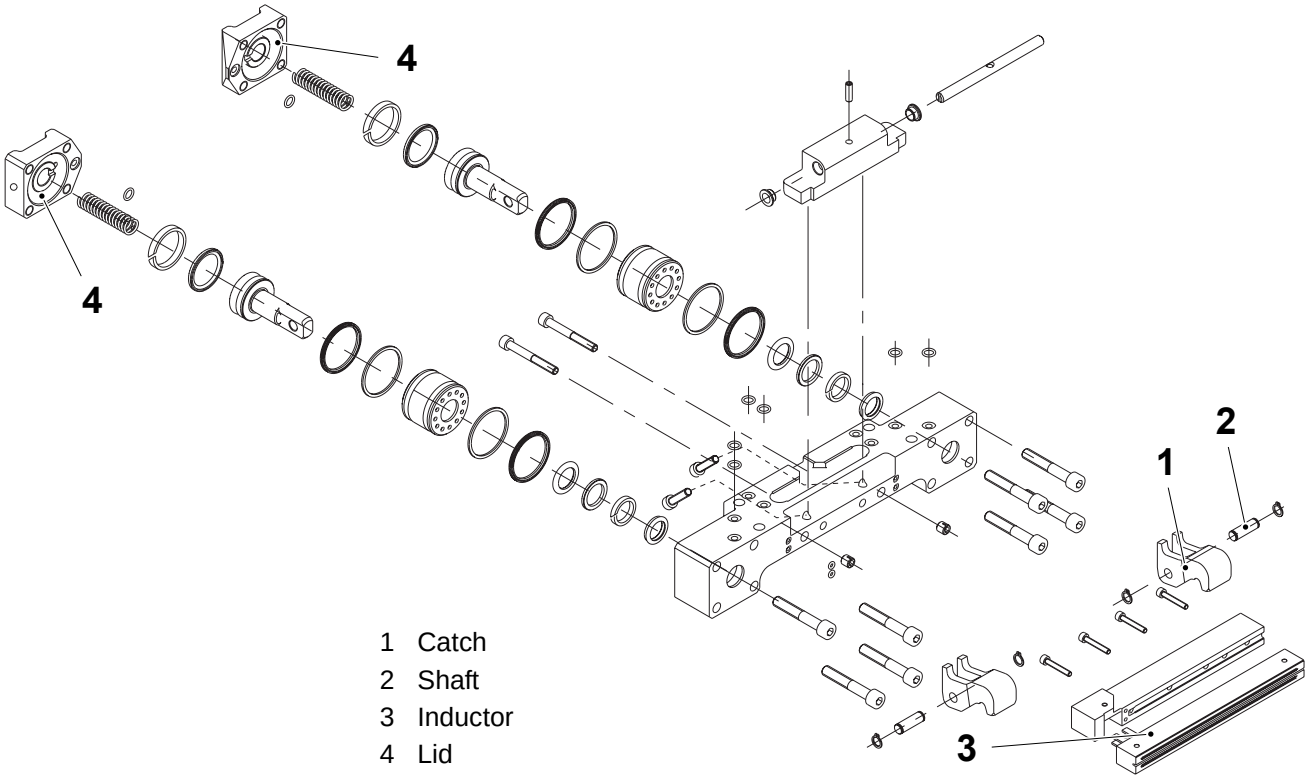
SPC Reference	1348458-0200 1348463-0200

4.2-1 Pressure Jaw - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348458-0200 1348463-0200

Check the following parts for visual wear or damage:

- the oil hoses and the oil connections and also for any oil leakage
- the cooling water hoses and connections and also for any leakage
- the catches (1) and also for any oil leakage
- the shafts (2)
- the inductor (3) for any marks on the surface of the inductor
- the lids (4) and also for any oil leakage.



1 Catch
2 Shaft
3 Inductor
4 Lid

(Cont'd)

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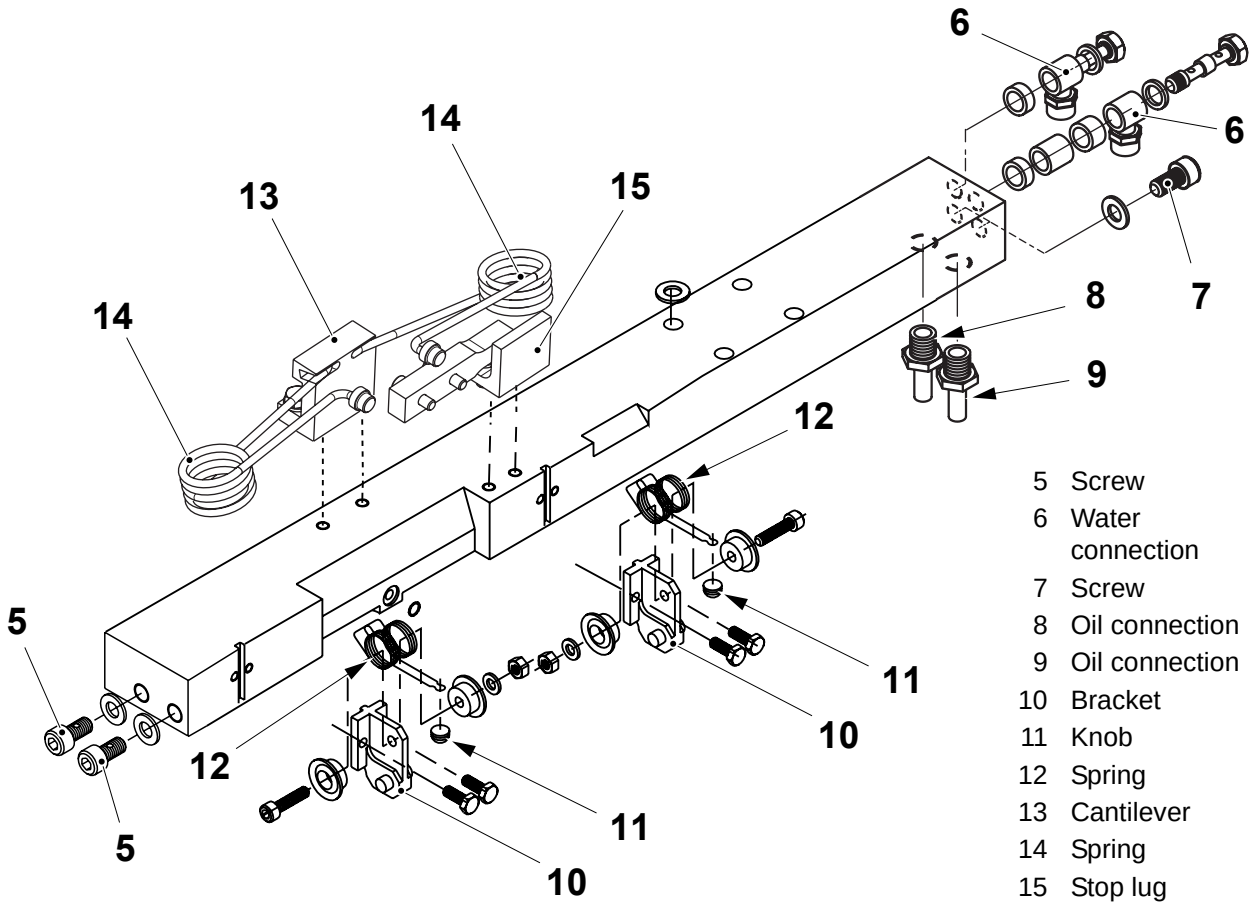
- the venting screws (5), the water connections (6), the screws (7) and the oil connections (8) and (9). Check carefully for oil and cooling water leakage
- the brackets (10)
- the knobs (11)
- the springs (12)
- the cantilever (13)
  Pay special attention to the springs (14).
- the stop lug (15).

Change as required.

Note! For the machines rebuilt with UK-2723137-0100 Bracket and Spring for Catches, Pressure Side see page 4-72 for the brackets (10), the knobs (11) and the springs (12).

Check the correct flows on the transversal sealing flowmeters S4309 and S4310, located in the service unit. Set as required, see 6.1.2-2 Flow Meter - Set Flows.

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5	Screw
6	Water connection
7	Screw
8	Oil connection
9	Oil connection
10	Bracket
11	Knob
12	Spring
13	Cantilever
14	Spring
15	Stop lug

(Cont'd)

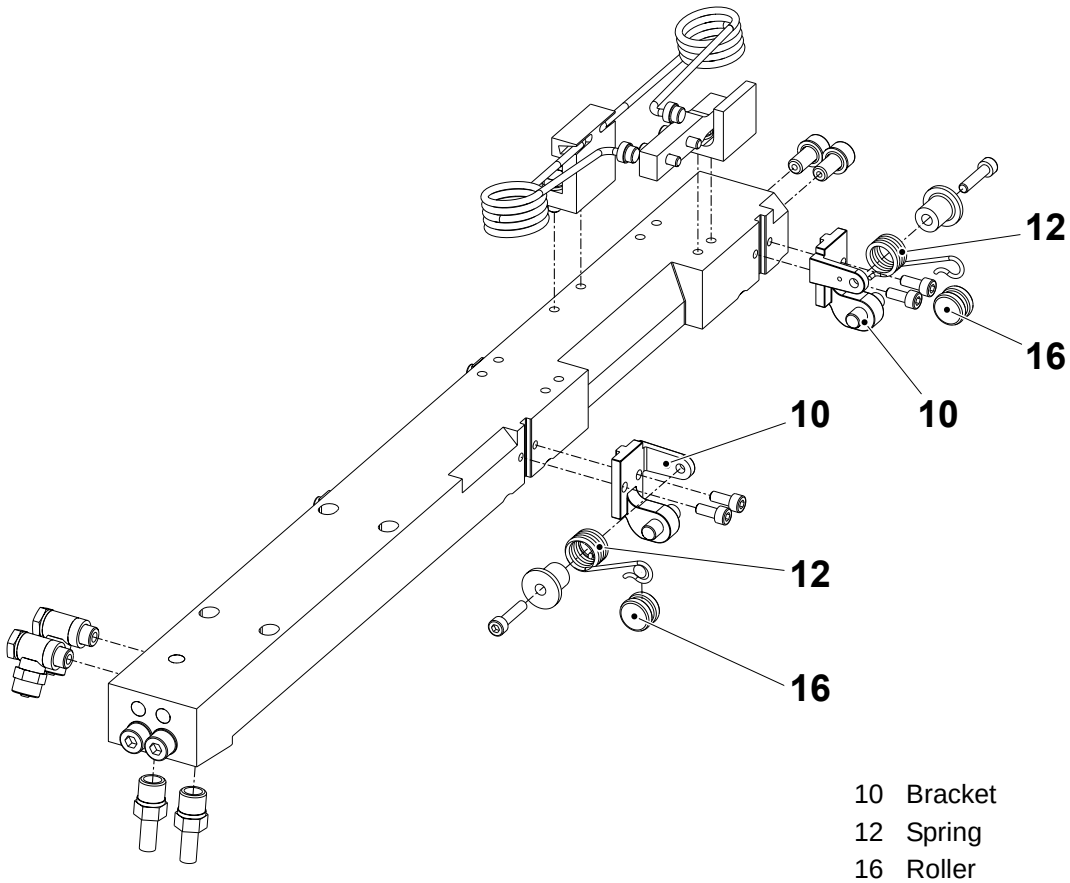
(Cont'd)

Note! Only valid for the machines rebuilt with UK-2723137-0100 Bracket and Spring for Catches, Pressure Side.

Check the following parts for visual wear and/or damage:

- the brackets (10)
- the springs (12)
- the rollers (16).

Change as required.



10 Bracket
12 Spring
16 Roller

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4.2-2 Pressure Jaw - Remove

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348458-0200 1348463-0200

WARNING

Risk of personal injury.

Wear protective gloves.

a) Remove the hydraulic hoses (1) by means of the nut (2) and remove the pipe connections (3).

b) Remove the cooling hoses (4) by means of the screws (5).

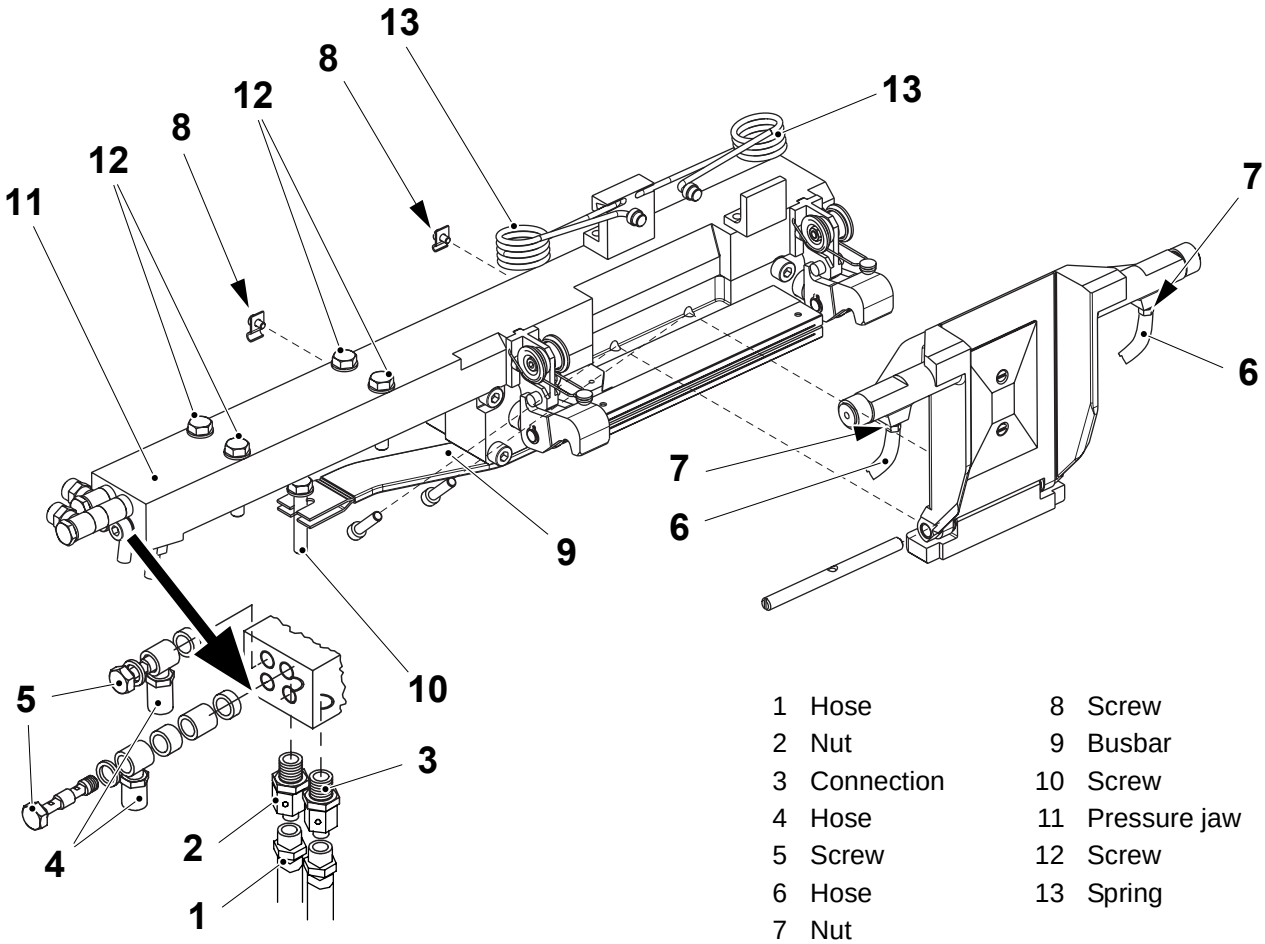
c) Remove the lubrication hoses (6) by means of the nuts (7) and the screws (8).

d) Remove the busbar (9) by means of the screw (10).

e) Remove the pressure jaw (11) group by means of the four screws (12).

f) Remove the springs (13).

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1	Hose	8	Screw
2	Nut	9	Busbar
3	Connection	10	Screw
4	Hose	11	Pressure jaw
5	Screw	12	Screw
6	Hose	13	Spring
7	Nut		

(Cont'd)

(Cont'd)

g) Remove the cantilever (14) by means of the screws (15).

h) Remove the stop (16) by means of the screws (17).

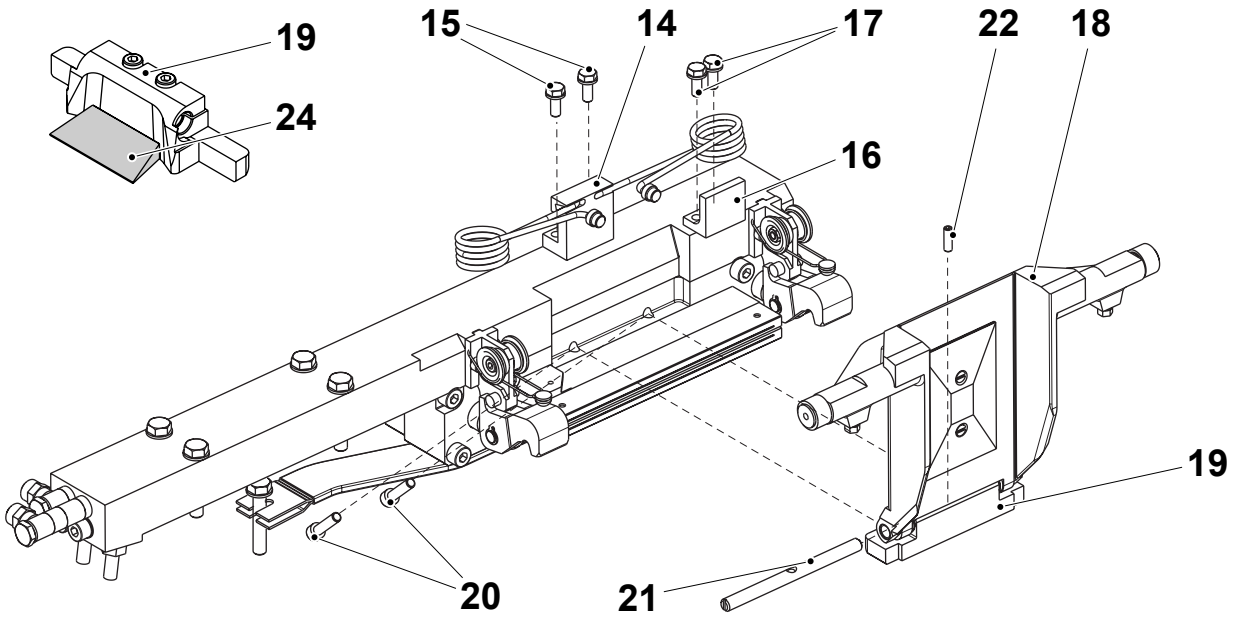
i) Remove the volume flap (18) and its holder (19) by means of the screws (20).

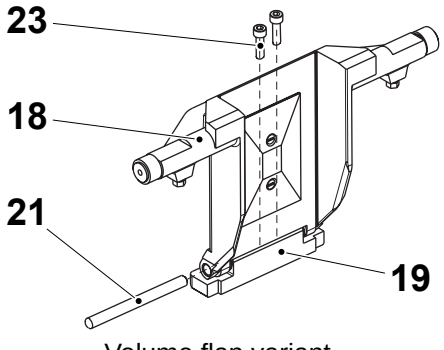
j) Remove the shaft (21) by means of the grub screw (22).

Note! For some volumes the shaft (21) is without the grub screw (22) which is replaced by the two screws (23).

k) Remove the volume flap (18).

Note! For some volumes there is a volume bulge (24) mounted on the holder (19).





Volume flap variant

14	Cantilever	20	Screw
15	Screw	21	Shaft
16	Stop	22	Grub screw
17	Screw	23	Screw
18	Volume flap	24	Volume bulge
19	Holder		

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4.2-3 Pressure Jaw - Assemble

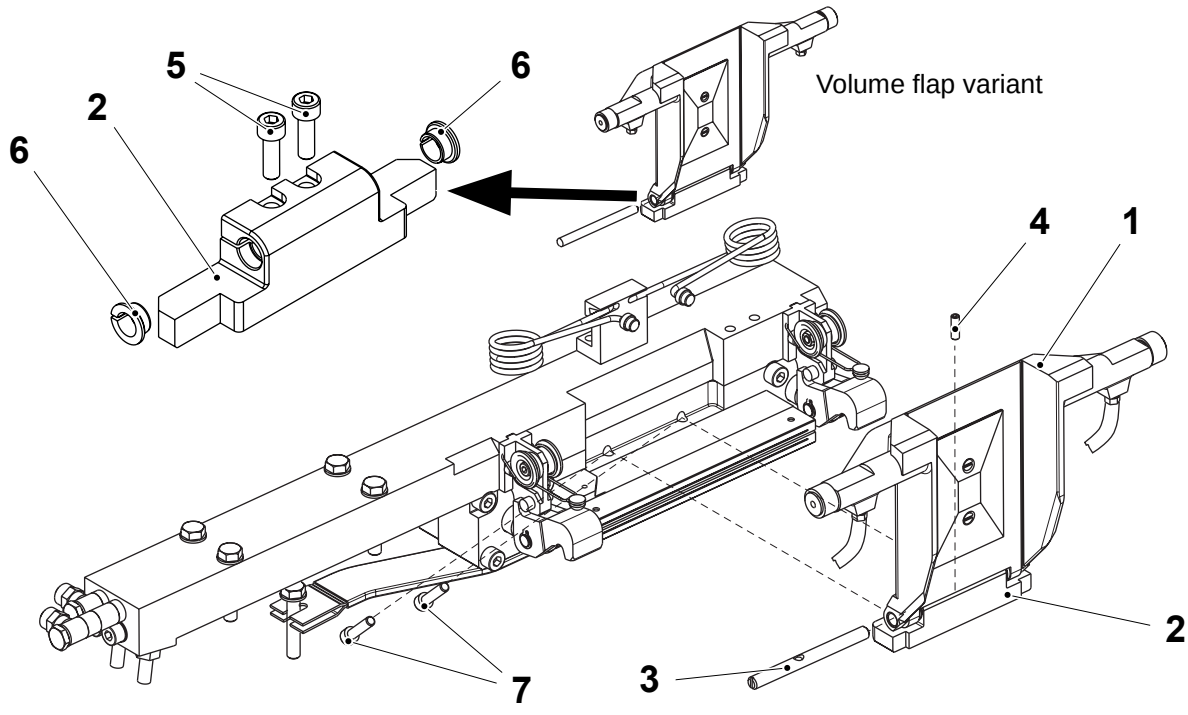
Machine Status	Mains Power OFF, Air OFF Steam ON ,Water OFF
SPC Reference	1348458-0200 1348463-0200

WARNING
Risk of personal injury.
Wear protective gloves.

a) Assemble the volume flap (1) and its holder (2):
- **the alternative with the grub screw (4)**
  by means of the shaft (3) and the grub screw (4)
- **the alternative with the two screws (5)**
  by means of the shaft (3) and the two screws (5). Make sure that the slots in the holder (2) and the slots in the bushings (6) are aligned before tightening the two screws (5) to **4.4 Nm** with an allen key.

Note! For some volumes the shaft (3) is without the grub screw (4) which is replaced by the two screws (5).

b) Fit the volume flap (1) group by means of the screws (7).



1 Volume flap
2 Holder
3 Shaft
4 Grub screw
5 Screw
6 Bushing
7 Screw

(Cont'd)

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(Cont'd)

c) Fit the stop (8) onto the pressure jaw (9) by means of the screws (10).

d) Fit the cantilever (11) onto the pressure jaw (9) group by means of the screws (12).

e) Fit the springs (13).

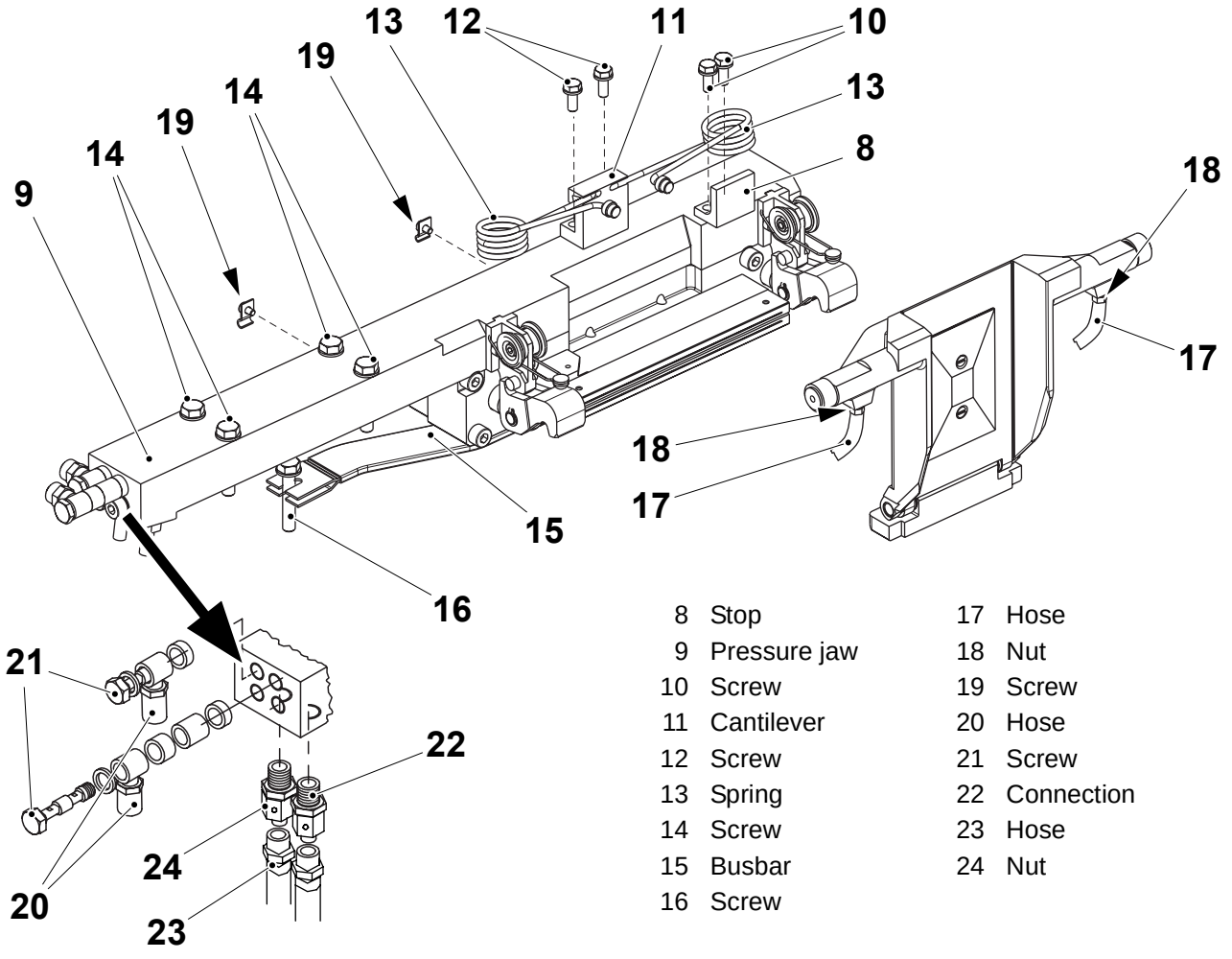
f) Fit the pressure jaw (9) group by means of the four screws (14).

g) Fit the busbar (15) by means of the screw (16).

h) Fit the lubrication hoses (17) by means of the nuts (18) and the screws (19).

i) Fit the cooling hoses (20) by means of the screws (21).

j) Screw in the pipe connections (22) and fit the hydraulic hoses (23) by means of the nuts (24).



8	Stop	17	Hose
9	Pressure jaw	18	Nut
10	Screw	19	Screw
11	Cantilever	20	Hose
12	Screw	21	Screw
13	Spring	22	Connection
14	Screw	23	Hose
15	Busbar	24	Nut
16	Screw		

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4.2-4 Pressure Jaw - Change Seals

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Torque wrench min. 20 Nm Assembly tool TP No. 90091-0378 / 90091-0387 Guide cone TP No. 90091-0378 / 90091-0387 Calibration tool TP No. 90091-0378 / 90091-0387
SPC Reference	1348458-0200 1348463-0200

WARNING
Risk of personal injury.
Wear protective gloves.

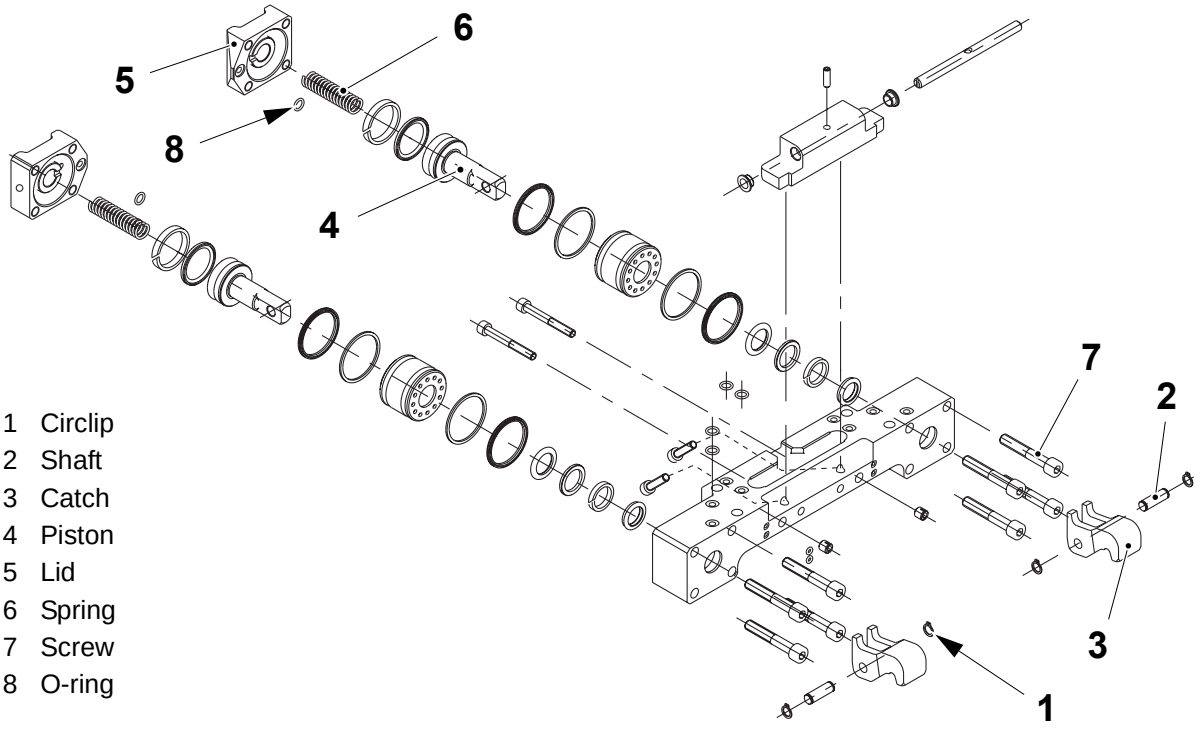
Note! For volume dependency templates and tools codes, see 10.2 Templates and Tools.

a) Remove the circlips (1) and pull out the shafts (2) from the catches (3).

b) Remove the catches (3) from the pistons (4).

c) Remove the lids (5) and the springs (6) by means of the screws (7).

d) Remove and change the O-rings (8).



1 Circlip
2 Shaft
3 Catch
4 Piston
5 Lid
6 Spring
7 Screw
8 O-ring

(Cont'd)

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(Cont'd)

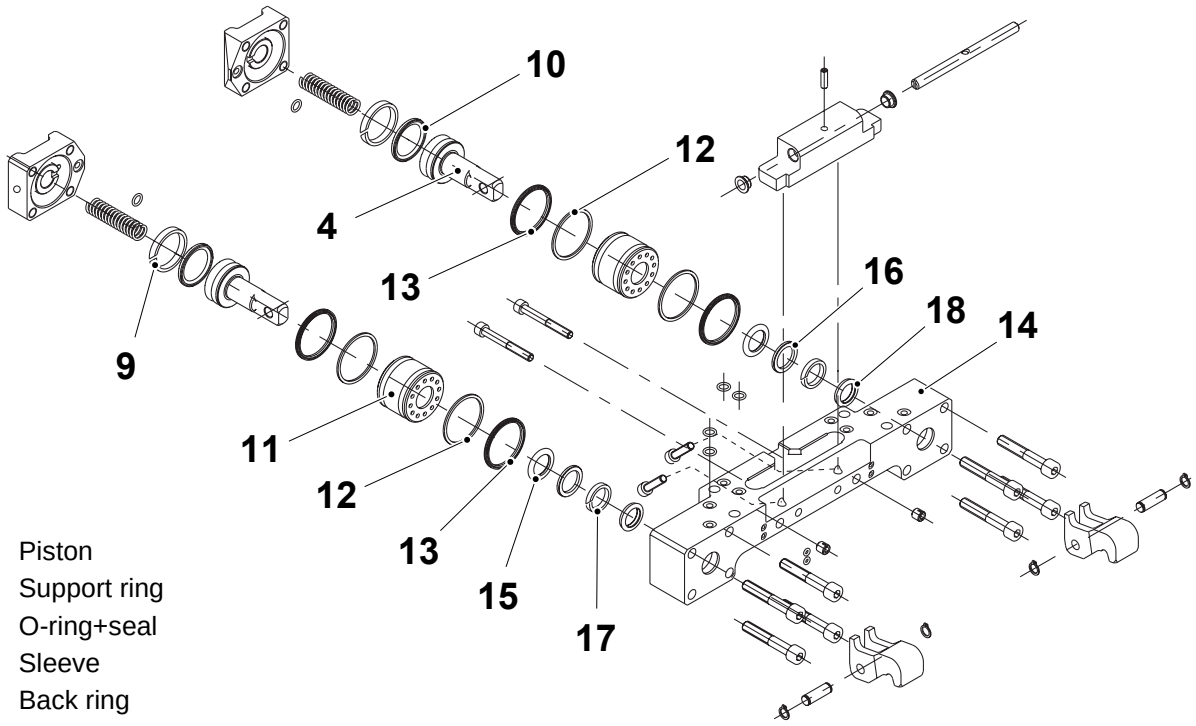
e) Remove the pistons (4).

f) Remove the support rings (9) and the seal plus the O-rings (10). Check the rings (9) and (10) and change them, see item m).

g) Remove the sleeves (11).

h) Remove and change the back rings (12) plus the seals (13).

i) From the bearing housing (14), remove and change the seals (15), the spacers (16), the support rings (17) and the seals (18).



4 Piston
9 Support ring
10 O-ring+seal
11 Sleeve
12 Back ring
13 Seal
14 Bearing housing
15 Seal
16 Spacer
17 Support ring
18 Seal

(Cont'd)

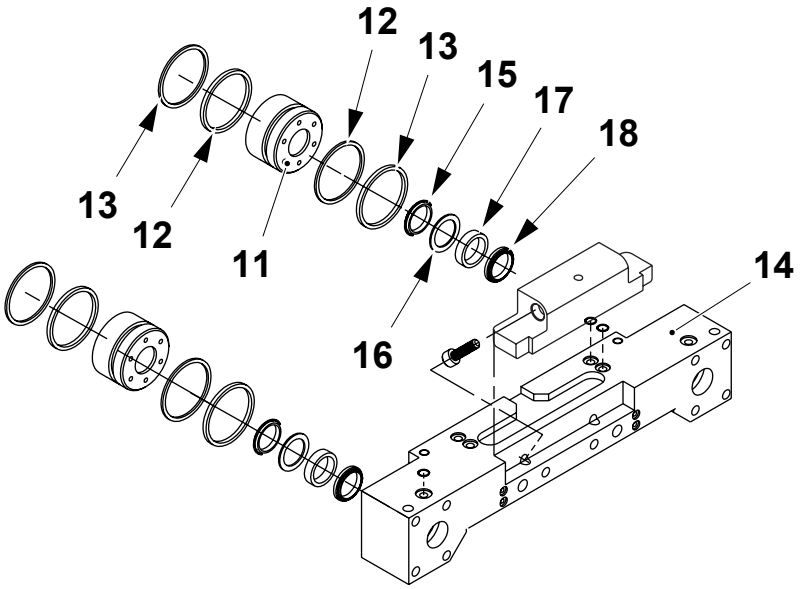
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(Cont'd)

j) Fit back into the bearing housing (14) the seals (18), the support rings (17), the spacers (16) and the seals (15) according to the **figure 1**.

k) Fit back into the sleeves (11), the back rings (12) plus the seals (13) according to the **figure 2**.

l) Fit back the sleeves (11) into the bearing housing (14).



11 Sleeve
12 Back ring
13 Seal
14 Bearing housing
15 Seal
16 Spacer
17 Support ring
18 Seal

Fig. 1

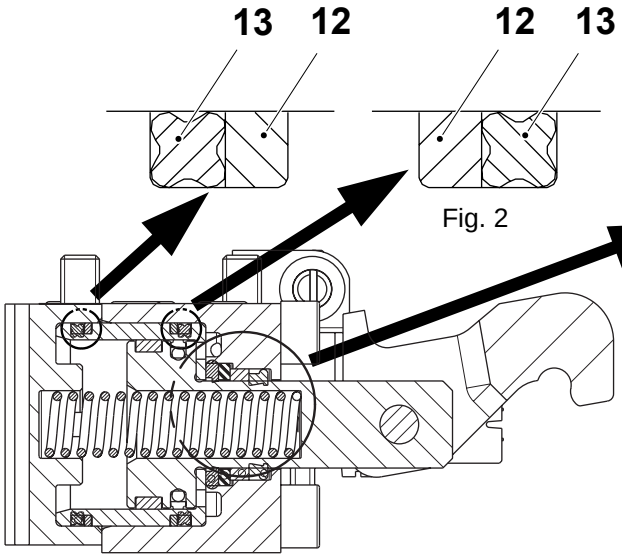
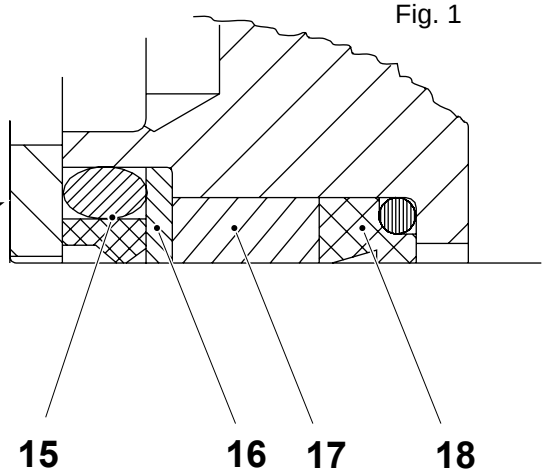


Fig. 2



(Cont'd)

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(Cont'd)

Seals assembly

m) Slide the guide cone tool (19) onto the pistons (4).

n) Slide the O-rings (10) over the cone tool (19). Move the O-rings (10) onto the piston groove with the aid of the assembly tool (20), see **figure 3**.

o) Slide the seal rings (10) over the cone tool (19). Move the seal rings (10) onto the piston groove with the aid of the assembly tool (20), see **figure 4**. The seal rings (10) **must** be heated with boiling water before shaping.

p) Calibrate the seal rings (10) by forcing the pistons (4) through the calibration tool (21).

q) Fit back the support rings (9) into their grooves, see **figure 5**. The support rings (9) shaping **must** be done with boiling water.

r) Fit the calibration tool (21) into the bearing housing (14). Put the pistons (4) through the calibration tool (21) and into the bearing housing (14), see **figure 5**.

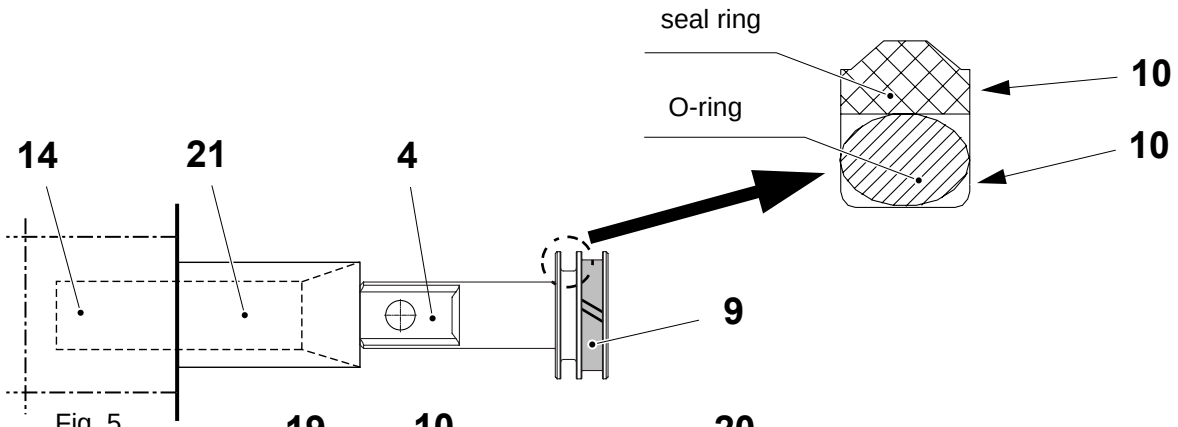


Fig. 5

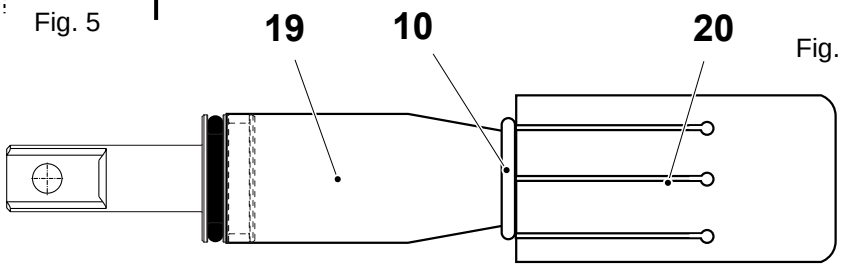


Fig. 4

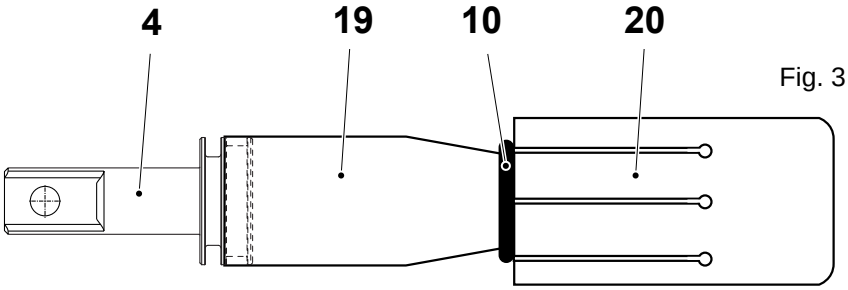


Fig. 3

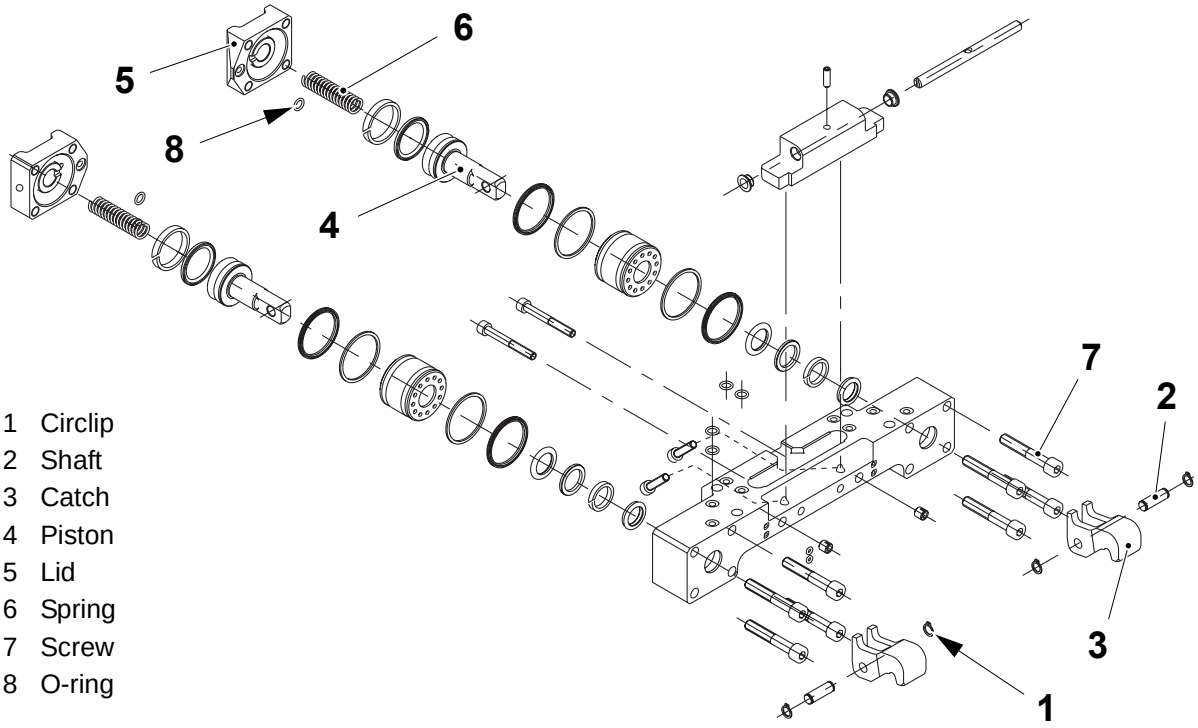
4	Piston
9	Support ring
10	O-ring+seal
14	Bearing housing
19	Tool
20	Tool
21	Tool

(Cont'd)

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(Cont'd)

s) Fit back the spring (6).
t) Fit back the O-rings (8).
u) Fit back the lids (5) and tighten the screws (7) with a torque of **20 Nm**.
v) Fit back the catches (3) on the pistons (4).
w) Pull the shafts (2) into the catches (3) and fit back the circlips (1).



1 Circlip
2 Shaft
3 Catch
4 Piston
5 Lid
6 Spring
7 Screw
8 O-ring

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4.2-5 Pressure Jaw - Change Transformer

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348458-0200 - 1348463-0200 1348457-0200 - 1348462-0200

Note! Perform the following instructions on both the cutting arms.

a) Disconnect the IH cable (1) from the transformer (2).

b) Loosen the screw (3) and remove the bus-bar (4) from the inductor (5).

c) Loosen the screws (6) and remove the spacers (7).

d) Remove the covering plate (8) and the gasket (9).

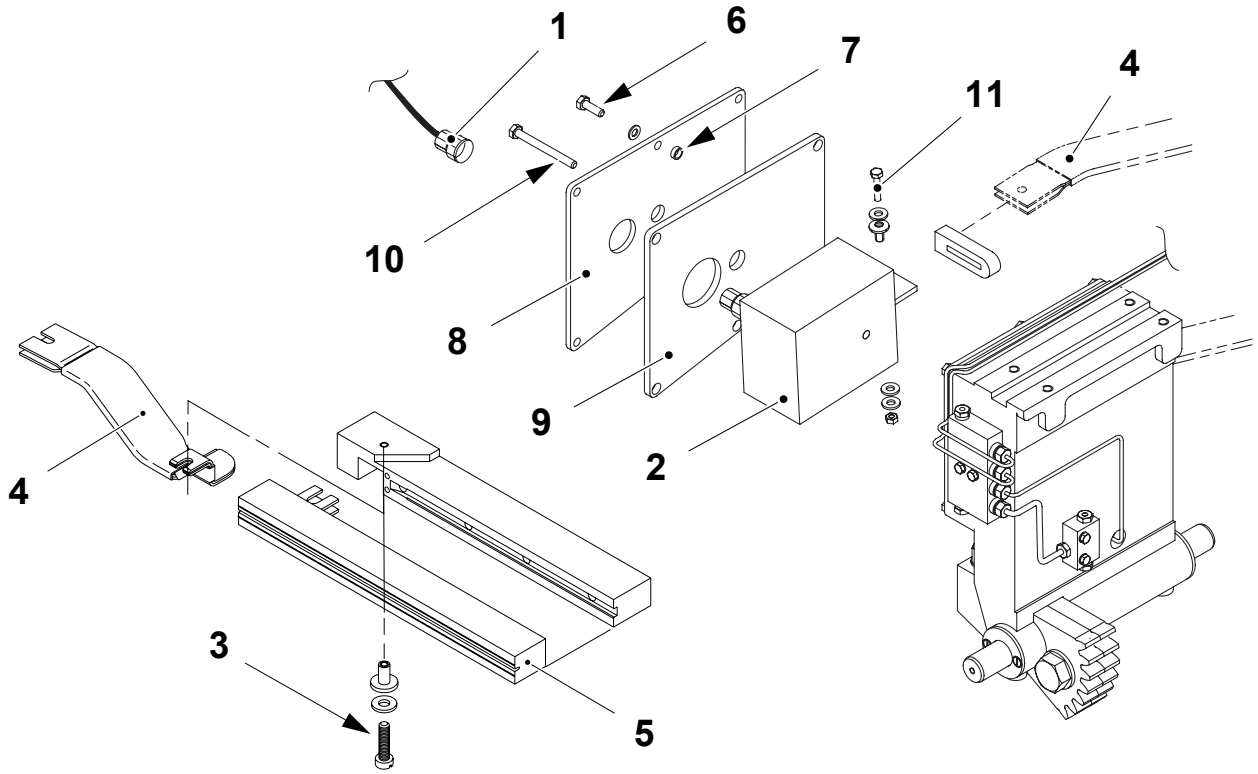
e) Loosen the screw (10).

f) Remove the transformer assembly from the cutting arm.

g) Loosen the screw (11) and disconnect the bus-bar (4) from the transformer (2).

h) Change the transformer (2).

i) Assemble in the reverse order.



1 IH cable
2 Transformer
3 Screw
4 Bus-bar
5 Inductor
6 Screw
7 Spacer
8 Covering plate
9 Gasket
10 Screw
11 Screw

TechPub_2614345_0105 - 04_MM81534_11en.fm

4.2.1 Inductor

4.2.1-1 Inductor - Check

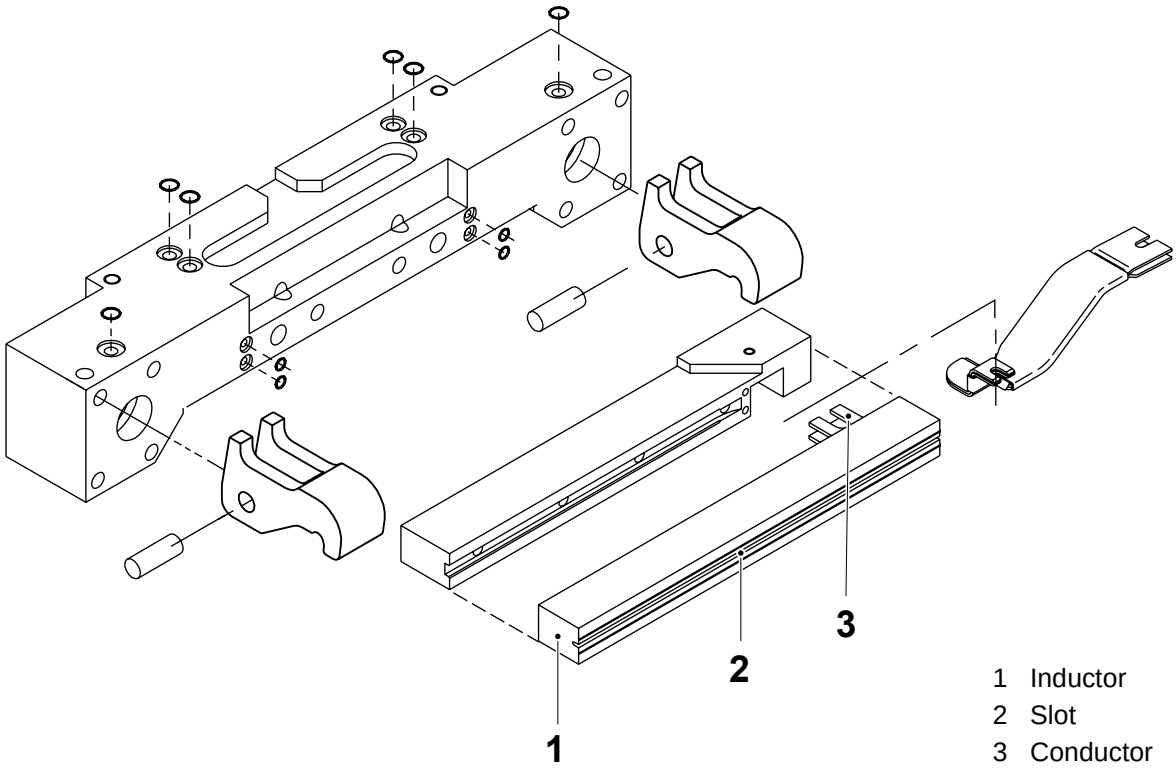
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348458-0200 1348463-0200

Check the following parts for wear and/or damage:

- the inductor (1)
  Check carefully that the slot (2) in the inductor (1) is not blocked and that the edges are not deformed.
  Clean the inductor (1) with a brass wire brush as required.
- the electrical conductors (3)
  Make sure that they are free from oxidation. Clean them with a brass wire brush as required.
- the flow through the cooling water pipes
  Make sure that they are not blocked by lime deposit and that there are no leakages.

Change as required.

Check the value of the two transversal sealing potentiometers on the process panel. Set as required, see 9.1.1-6 TPIH Generator - Set Sealings.



1 Inductor
2 Slot
3 Conductor

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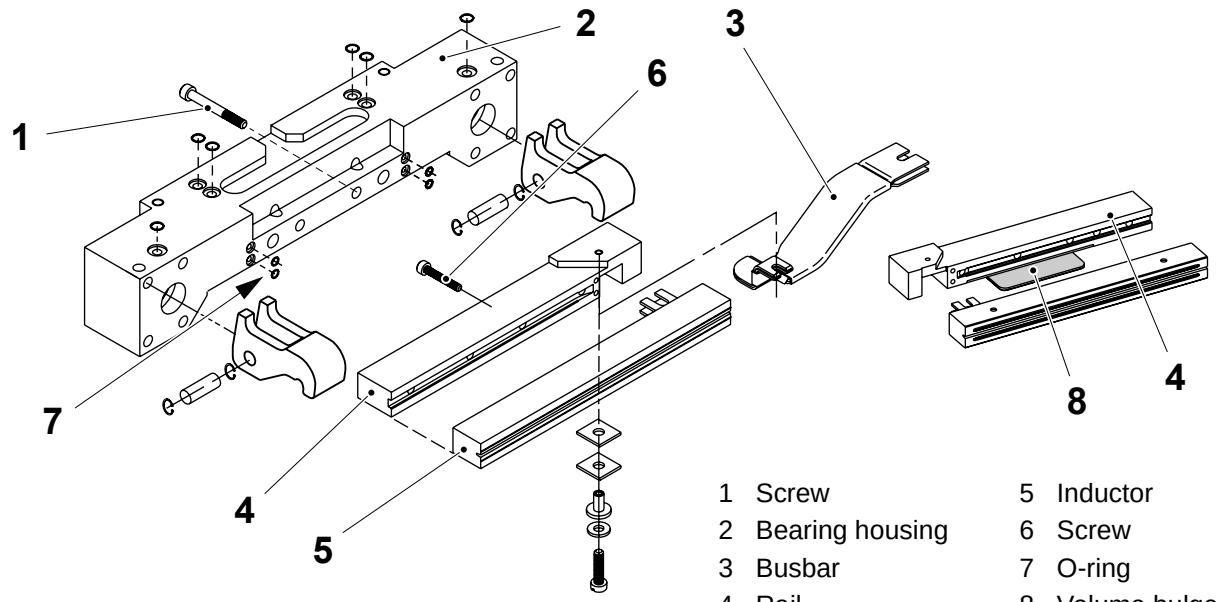
4.2.1-2 Inductor - Change O-rings

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348458-0200 1348463-0200

a) Remove the screws (1) from the bearing housing (2).
b) Disconnect the busbar (3) from the inductor (5).
c) Remove the rail (4) together with the inductor (5).
d) Remove the screws (6) on the rail (4).
e) Separate the rail (4) from the inductor (5).
f) Remove the inductor (5) and change it if damaged or worn out.
g) Change the O-rings (7).
h) Assemble in the reverse order.

Note! If the inductors have been changed, check the cutting alignment, see 4-11 Jaw System - Set Cutting Alignment.

Note! Some volumes are equipped with a volume bulge (8) on the rail (4).



1 Screw
2 Bearing housing
3 Busbar
4 Rail
5 Inductor
6 Screw
7 O-ring
8 Volume bulge

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4.2.2 Catches

4.2.2-1 Catches - Check and Clearance

Machine Status	Mains Power ON Air ON Steam ON Water ON
SPC Reference	1348458-0200 1348463-0200

Check that the engagements of the catches are not worn.

Check the catches for any hydraulic oil leakages.

Check the distance **A** (see next page) as follows:

a) Put a piece of double packaging material (0.7 - 1.1 mm) of the same width as the transversal sealing between the jaws. Cut the packaging material so that the folding flaps slip away.

b) Check that there are no active alarms on the TPOP.

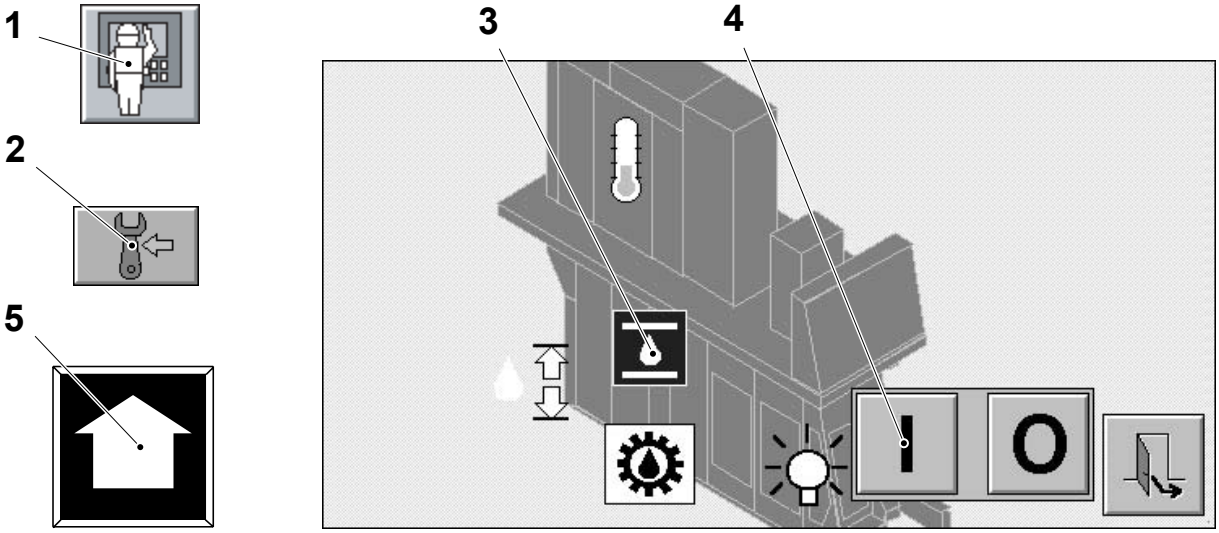
c) Touch the MANOEUVRE button (1) on the TPOP.

d) Touch the MAINTENANCE SERVICE UNIT LEFT button (2).

e) Touch the HYDRAULIC UNIT button (3).

f) Touch the START button (4) to enable the hydraulic unit.

g) Press the PROGRAM UP button (5) when it flashes and check that the hydraulic unit has started.



1 MANOEUVRE button
2 MAINTENANCE SERVICE UNIT LEFT button
3 HYDRAULIC UNIT button
4 START button
5 PROGRAM UP button

(Cont'd)

TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

h) Crank the machine to 205 decimal degrees LH side (77 decimal degrees RH side) and check the distance **A**.

Note! For 1000 Sq only crank the machine to 192 decimal degrees LH side (64 decimal degrees RH side) and check the distance **A**.

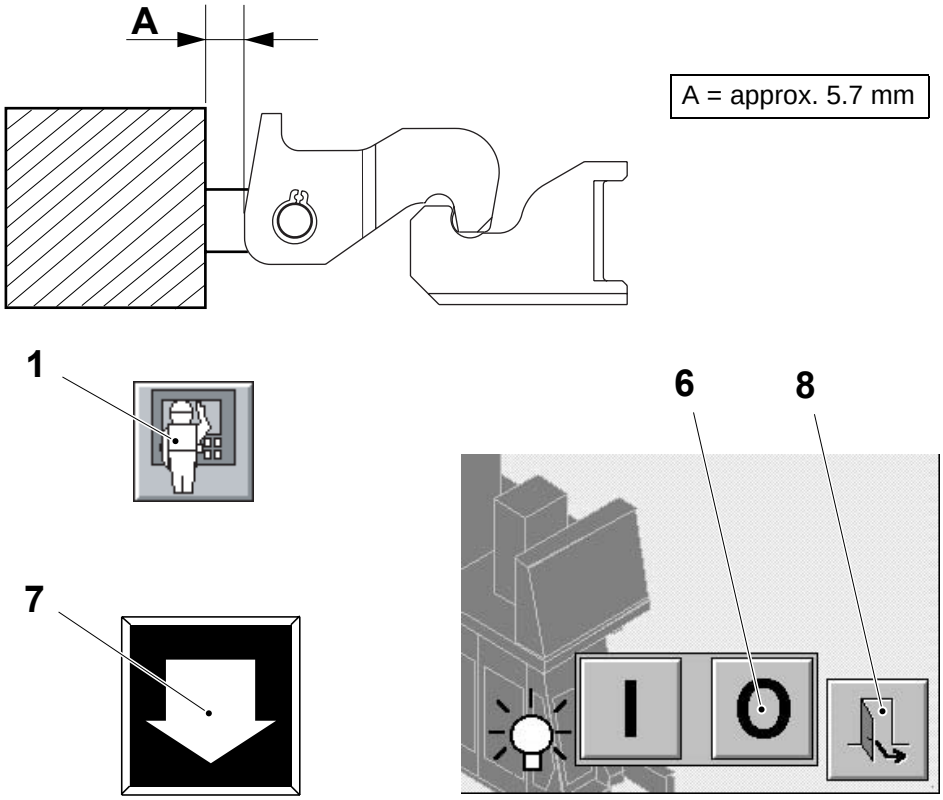
i) If the distance **A** is less than **5.4 mm** check and if required change the following parts:
   - the dollies
   - the inductors
   - the catches and the pistons.

j) Stop the hydraulic unit by touching the STOP button (6).

k) Press the PROGRAM DOWN button (7) when it flashes.

l) Touch the EXIT button (8).

m) Touch the MANOEUVRE button (1).



1 MANOEUVRE button
6 STOP button
7 PROGRAM DOWN button
8 EXIT button

(Cont'd)

TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

Catches clearance

Check the distances **B** and **C** (see next page) as follows:

a) Check that there are no active alarms on the TPOP.

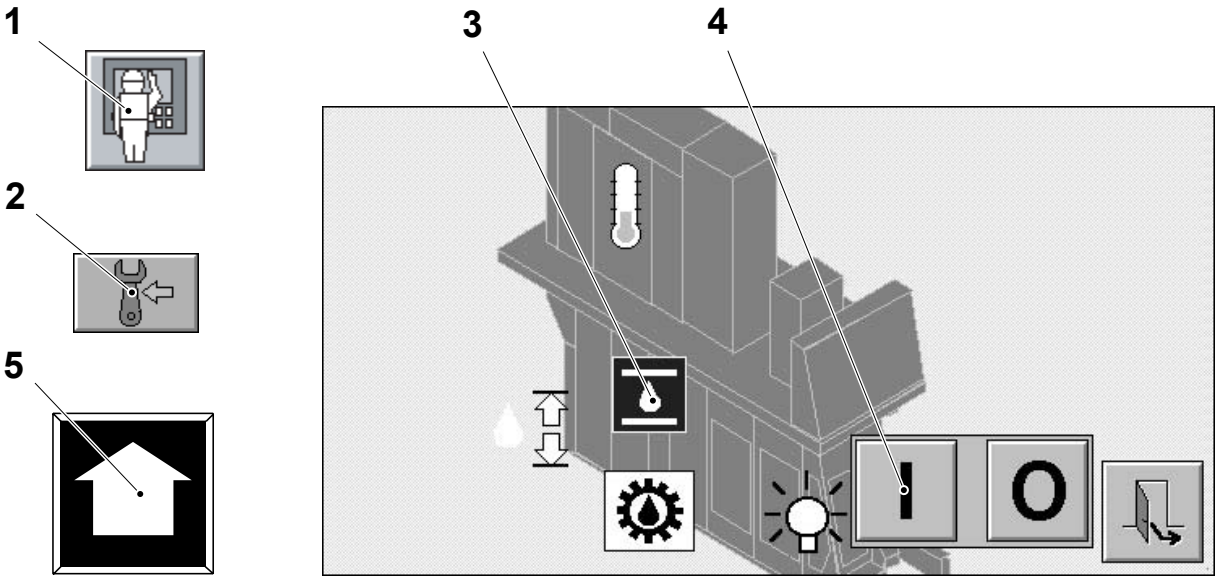
b) Touch the MANOEUVRE button (1) on the TPOP.

c) Touch the MAINTENANCE SERVICE UNIT LEFT button (2).

d) Touch the HYDRAULIC UNIT button (3).

e) Touch the START button (4) to enable the hydraulic unit.

f) Press the PROGRAM UP button (5) when it flashes and check that the hydraulic unit has started.



1 MANOEUVRE button
2 MAINTENANCE SERVICE UNIT LEFT button
3 HYDRAULIC UNIT button
4 START button
5 PROGRAM UP button

(Cont'd)

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(Cont'd)

g) Crank the machine to 231 decimal degrees LH side (103 decimal degrees RH side) and check the distance **B** between the catches during the disengagement movement.

h) Crank the machine to 17 decimal degrees LH side (145 decimal degrees RH side).

Note! For 1000 Sq only crank the machine to 12 decimal degrees LH side (140 decimal degrees RH side).

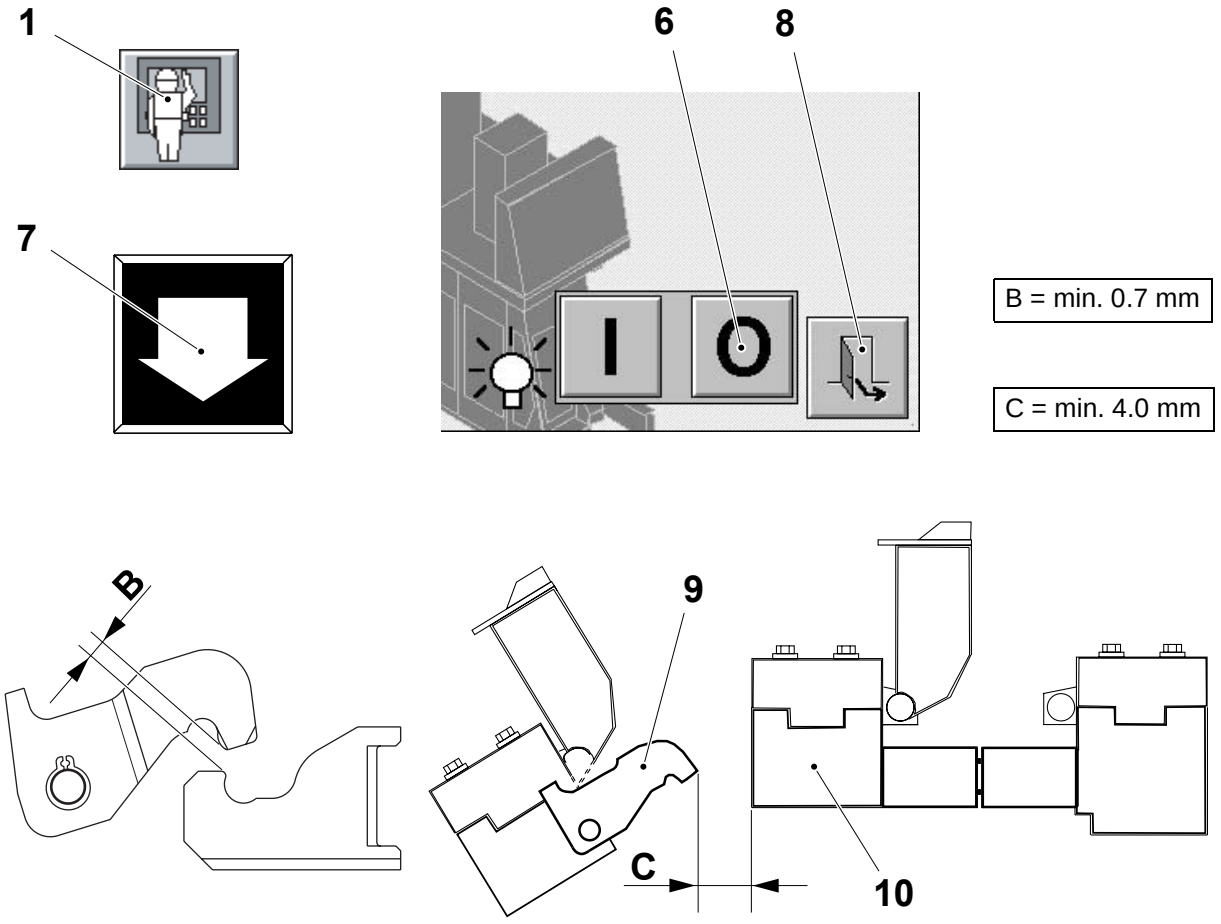
i) Check the distance **C** between the catches (9) and the pressure jaws (10).

j) Stop the hydraulic unit by touching the STOP button (6).

k) Press the PROGRAM DOWN button (7) when it flashes.

l) Touch the EXIT button (8).

m) Touch the MANOEUVRE button (1).



1 MANOEUVRE button
6 STOP button
7 PROGRAM DOWN button
8 EXIT DOOR button
9 Catch
10 Pressure jaw

TechPub_2614345_0105 - 04_MM81534_11en.fm

4.2.3 Volume Flaps

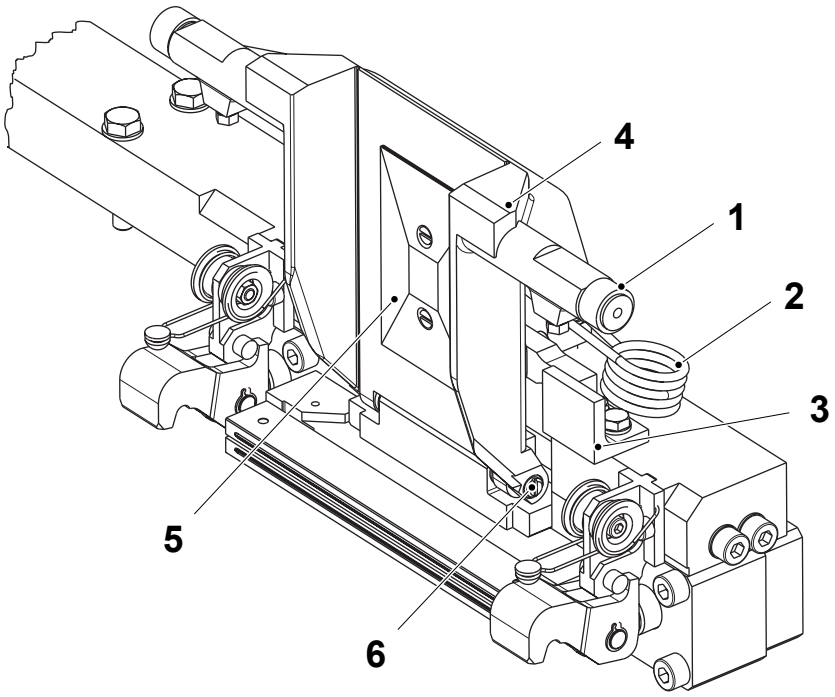
4.2.3-1 Volume Flaps - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1334633-0200 1334634-0200

Check the following parts for visual wear and/or damage:

- the curve roller (1)
  Check also that the radial play on the curve roller (1) does not exceed **0.5 mm**.
- the shock absorber (2) group
  Check the stop lug (3) for wearing or bending.
- the volume bulge (5)
- the bushings (6)
  Check also that the radial play on the bushing (6) does not exceed **0.5 mm**.

Change as required.



1 Curve roller
2 Shock absorber
3 Stop lug
4 Volume flap
5 Volume bulge
6 Bushing

TechPub_2614345_0105 - 04_MM81534_11en.fm

4.2.3-2 Volume Flaps - Change Bushings, Curve Roller and Volume Shims

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1334633-0200 1334634-0200

Bushings

a) Crank the machine to 21 decimal degrees LH side (149 decimal degrees RH side).

Note! For 1500 S only crank the machine to 246 decimal degrees LH side (118 decimal degrees RH side). For 1000 Sq only crank the machine to 13 decimal degrees LH side (141 decimal degrees RH side).

b) Remove the lubrication hoses (1) by means of the nuts (2).

c) Remove the springs (3).

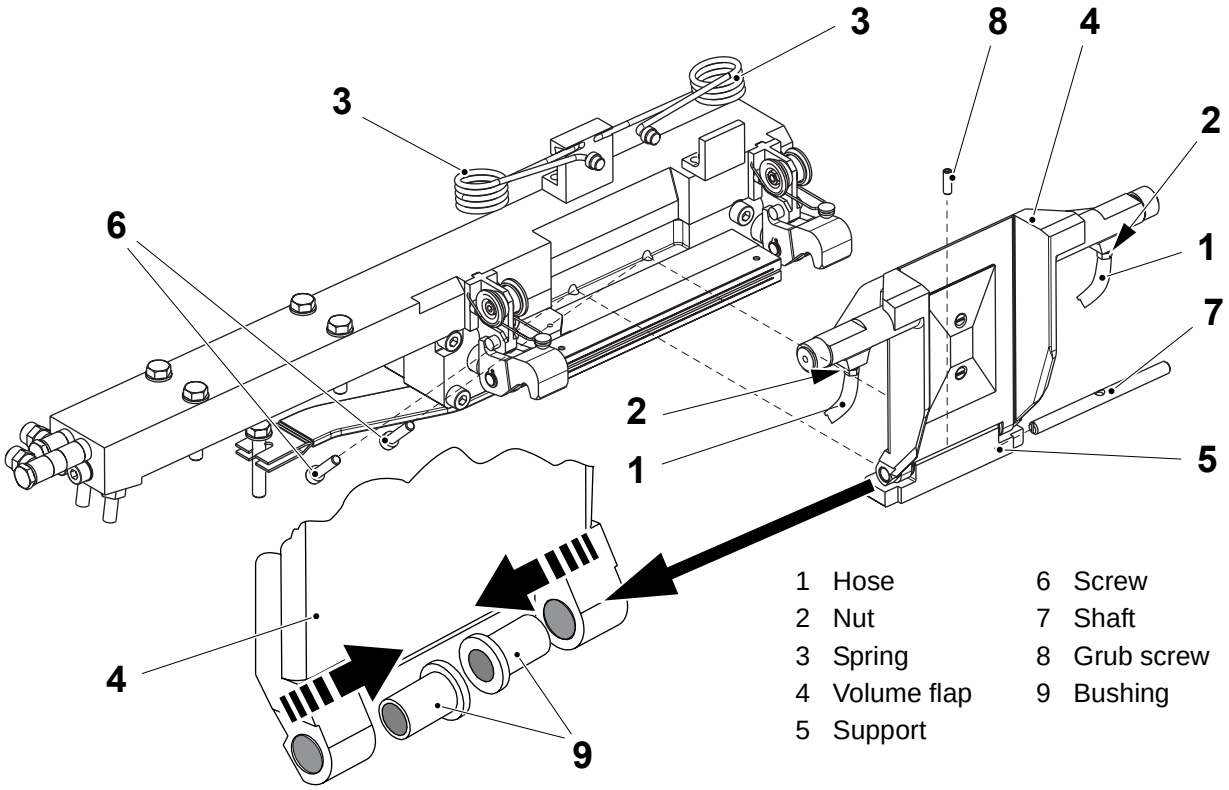
d) Remove the volume flap (4) and its support (5) by means of the screws (6).

e) Remove the shaft (7) by means of the grub screw (8).

f) Remove the volume flap (4).

g) Remove the bushings (9) and change them as required.

h) Assemble in the reverse order.



1 Hose
2 Nut
3 Spring
4 Volume flap
5 Support
6 Screw
7 Shaft
8 Grub screw
9 Bushing

(Cont'd)

TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

Curve Roller

a) Crank the machine to 21 decimal degrees LH side (149 decimal degrees RH side).

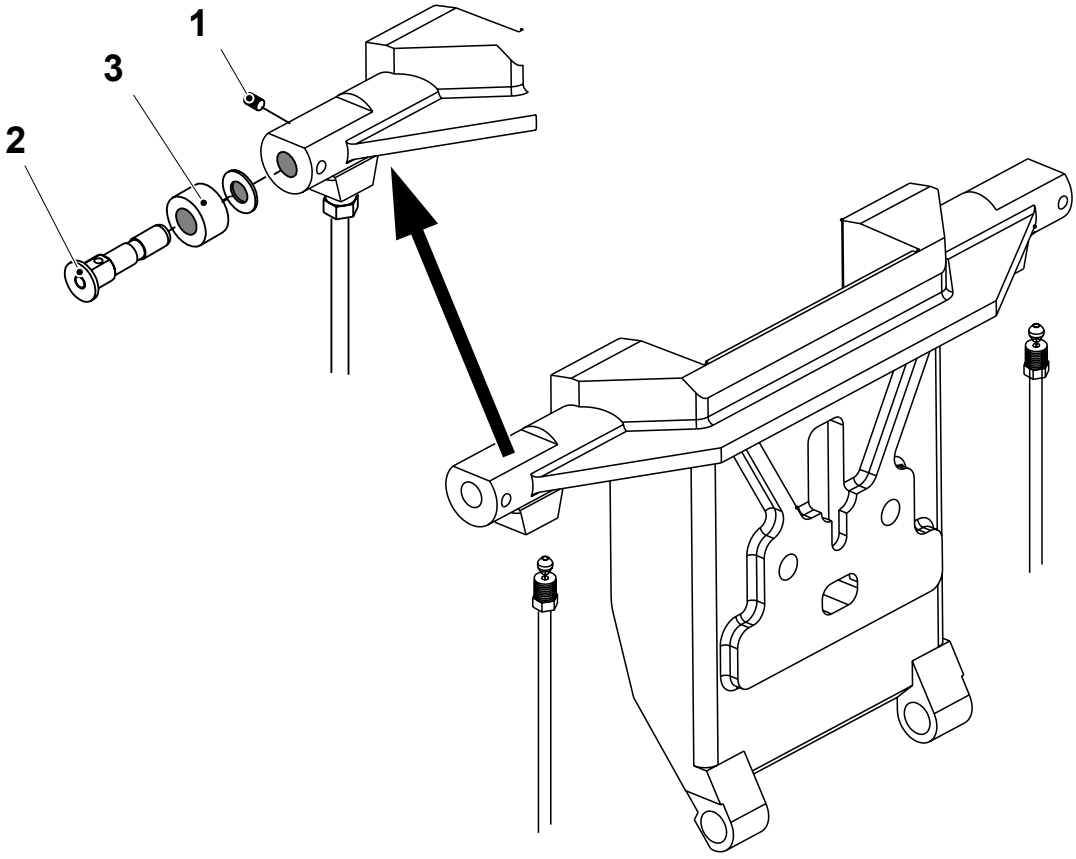
Note! For 1500 S only crank the machine to 246 decimal degrees LH side (118 decimal degrees RH side).

b) Unscrew the screw (1).

c) Remove the axle pin (2).

d) Remove the curve roller (3) and change if it is damaged or worn out.

e) Assemble in the reverse order.



1 Screw
2 Axle pin
3 Roller

(Cont'd)

TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

Volume Shims

a) Crank the machine to 21 decimal degrees LH side (149 decimal degrees RH side).

Note! For 1500 S only crank the machine to 246 decimal degrees LH side (118 decimal degrees RH side).

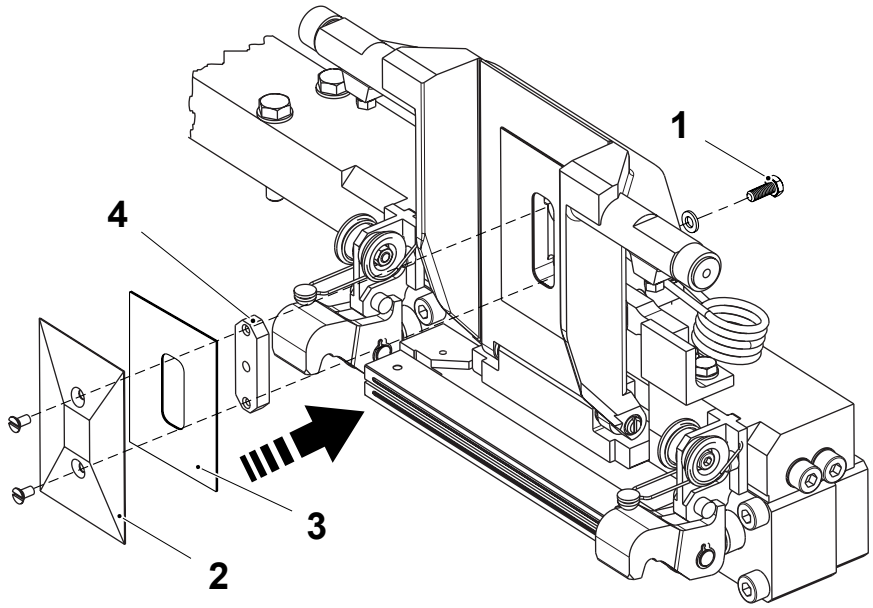
b) Loosen the screw (1).

c) Lift up and remove the volume bulge (2) together with the volume shims (3) and the wedge (4).

d) Unthread the volume shims (3).

e) Change the damaged or worn out parts.

f) Assemble in the reverse order.



1 Screw
2 Volume bulge
3 Volume shim
4 Wedge

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4.2.4 Shock Absorber

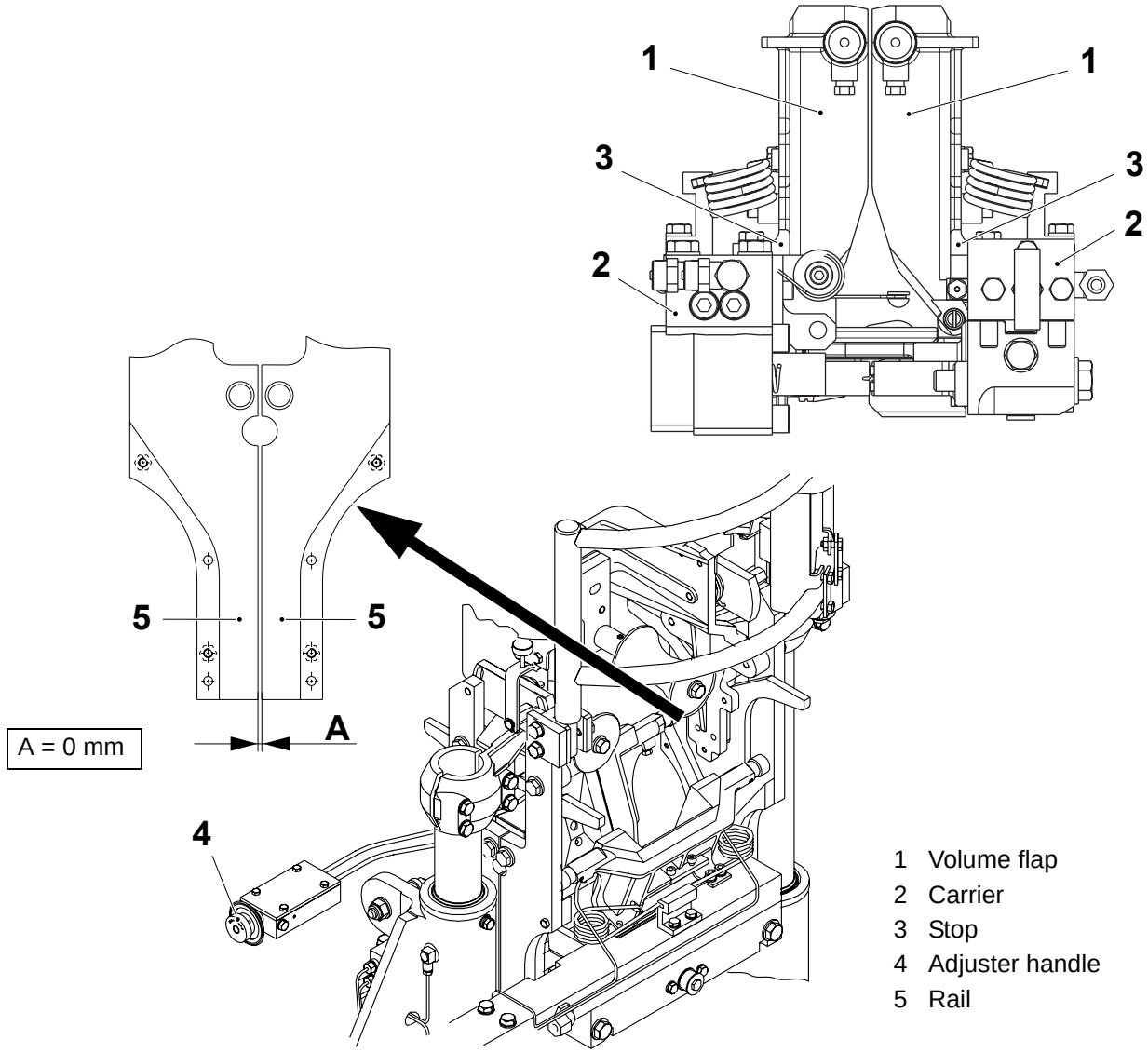
4.2.4-1 Shock Absorber - Set Stop

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1334635-0200, 1334636-0200

Note! For TPA 1000 Sq only, see page 4-97.

a) Set the volume flaps (1) so that they are approximately perpendicular to the cutting and pressure carriers (2) by adjusting the stop (3).

b) Turn the volume adjuster handle (4) until the two rails (5) are closed; this means that the distance **A** must be zero.



1 Volume flap
2 Carrier
3 Stop
4 Adjuster handle
5 Rail

(Cont'd)

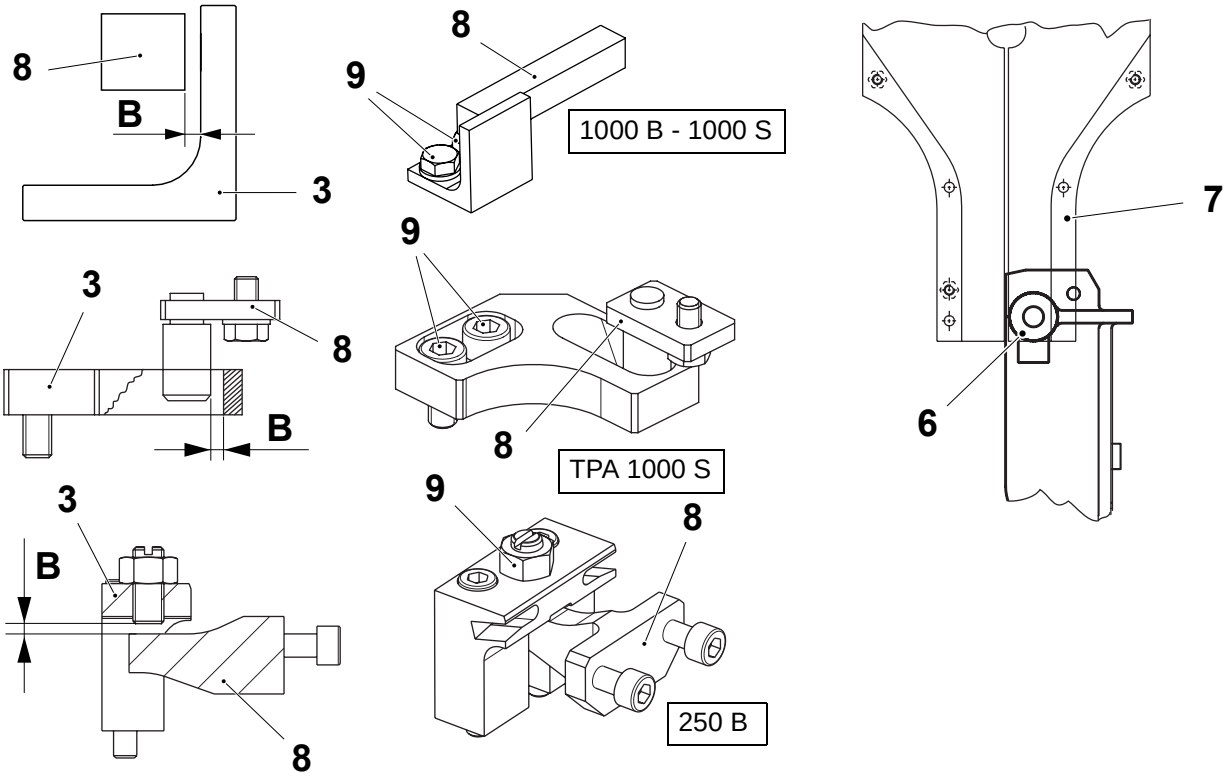
TechPub_2614345_0105 - 04_MM81534_11en.fm

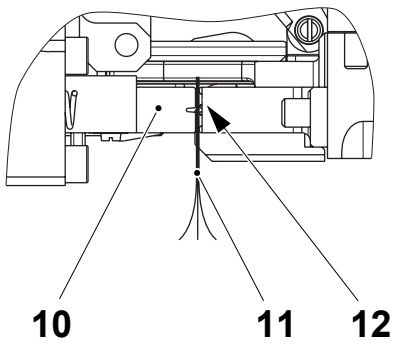
(Cont'd)

c) Fit three pieces of packaging material (11) between the rail (12) and the inductor (10). Crank the machine until the roller (6) is in the lower position of the volume cam (7).

d) Make sure that the roller (6) touches the volume cam (7) surface.

e) Shift the stop lug (3), by means of the screws (9), until the distance **B** between the catch (8) and the stop lug (3) is obtained. Adjust the volume cam (7), see 4-20 Jaw System - Set Volume Adjuster.





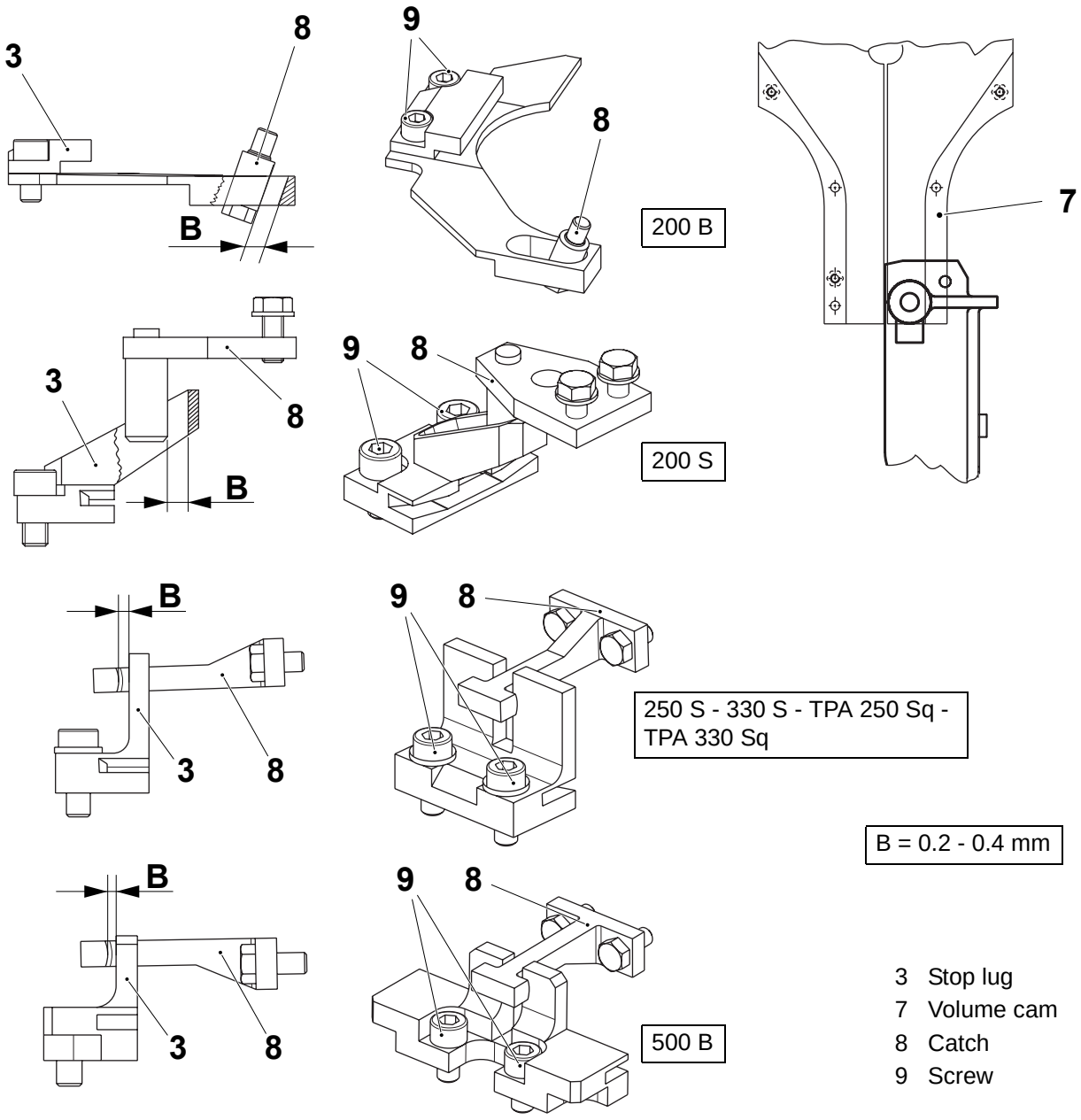
3 Stop lug
6 Roller
7 Volume cam
8 Catch
9 Screw
10 Inductor
11 Packaging material
12 Rail

(Cont'd)

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(Cont'd)

f) Shift the stop lug (3), by means of the screws (9), until the distance **B** between the catch (8) and the stop lug (3) is obtained. Adjust the volume cam (7), see 4-20 Jaw System - Set Volume Adjuster.

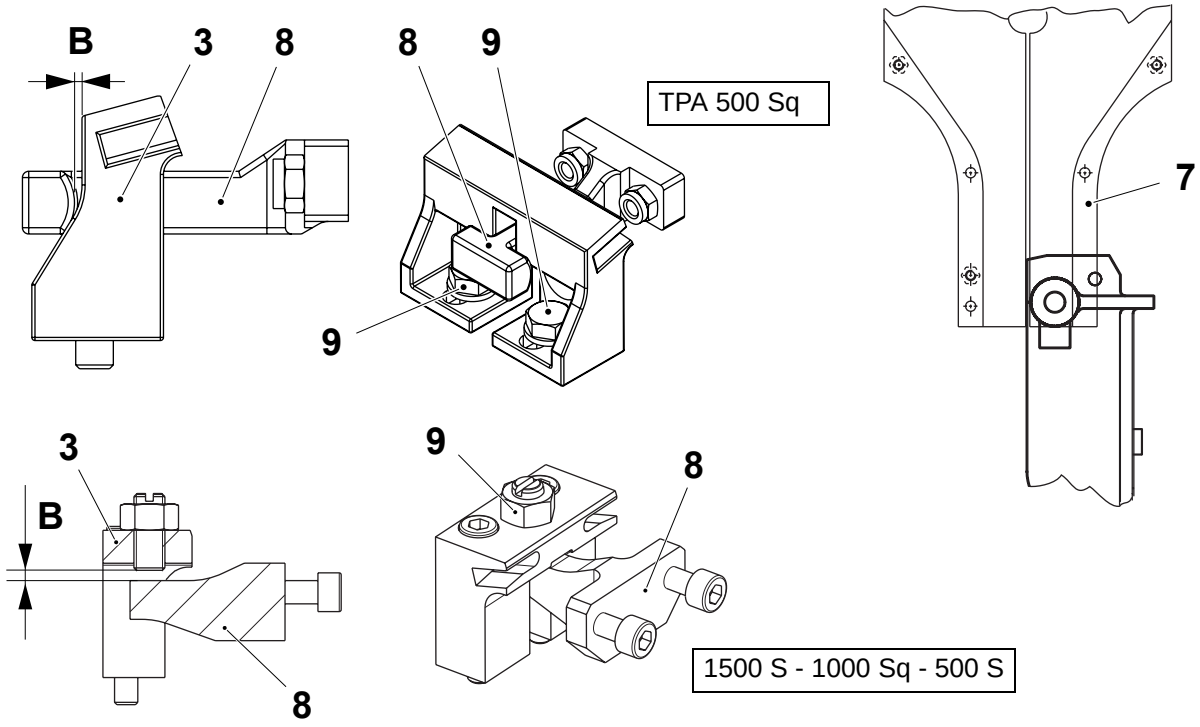


(Cont'd)

TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

g) Shift the stop lug (3), by means of the screws (9), until the distance **B** between the catch (8) and the stop lug (3) is obtained. Adjust the volume cam (7), see 4-20 Jaw System - Set Volume Adjuster.



3 Stop lug
7 Volume cam
8 Catch
9 Screw

(Cont'd)

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(Cont'd)

Set TPA 1000 Sq variant of shock absorber

Machine Status	Mains Power ON Air ON Steam ON Water ON
SPC Reference	1348458-0200 1348463-0200

a) Check that there are no active alarms on the TPOP.

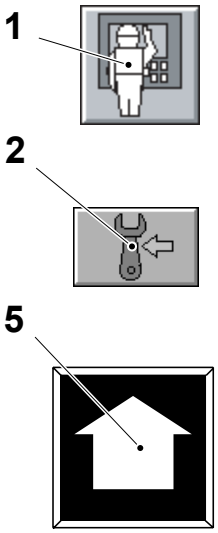
b) Touch the MANOEUVRE button (1) on the TPOP.

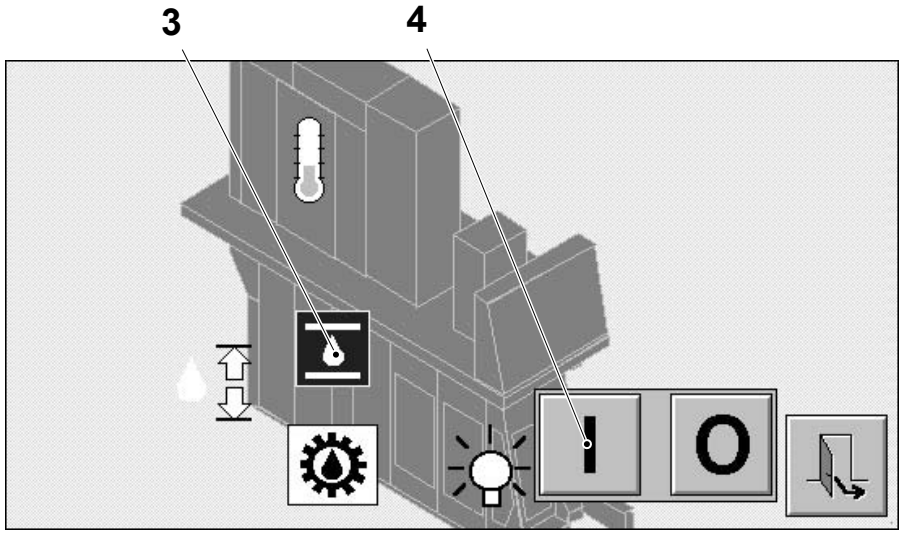
c) Touch the MAINTENANCE SERVICE UNIT LEFT button (2).

d) Touch the HYDRAULIC UNIT button (3).

e) Touch the START button (4) to enable the hydraulic unit.

f) Press the PROGRAM UP button (5) when it flashes and check that the hydraulic unit has started.





1 MANOEUVRE button
2 MAINTENANCE SERVICE UNIT LEFT button
3 HYDRAULIC UNIT button
4 START button
5 PROGRAM UP button

(Cont'd)

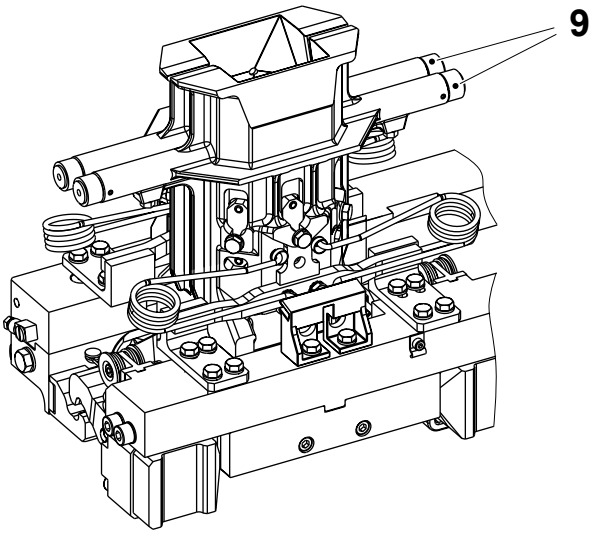
TechPub_2614345_0105 - 04_MM81534_11en.fm

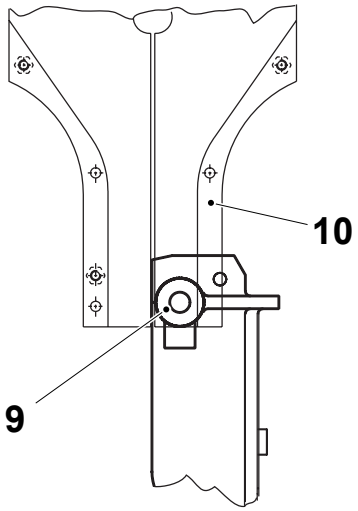
(Cont'd)

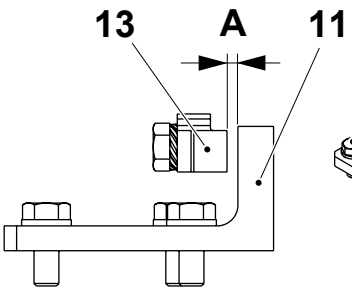
g) Fit three pieces of packaging material (6) between the rail (7) and the inductor (8). Crank the machine until the roller (9) is in the lower position of the volume cam (10).

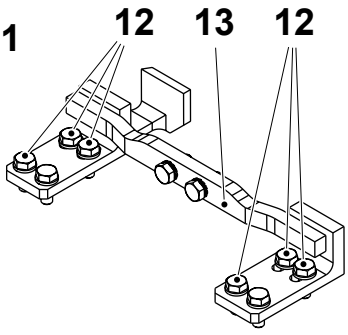
h) Make sure that the roller (9) touches the volume cam (10) surface.

i) Shift the two stop lugs (11), by means of the screws (12), until the distance **A** between the catch (13) and the stop lugs (11) is obtained.

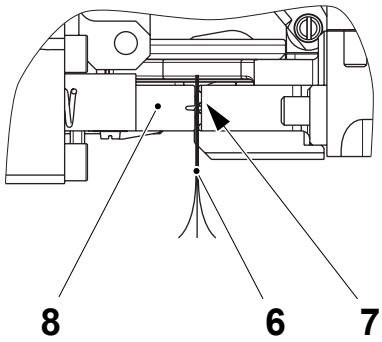








A = 0.2 - 0.3 mm



6 Packaging material
7 Rail
8 Inductor
9 Roller
10 Volume cam
11 Stop lug
12 Screw
13 Catch

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4.3 Cutting Jaw

SPC Reference	1348459-0200 1348464-0200

4.3-1 Cutting Jaw - Check

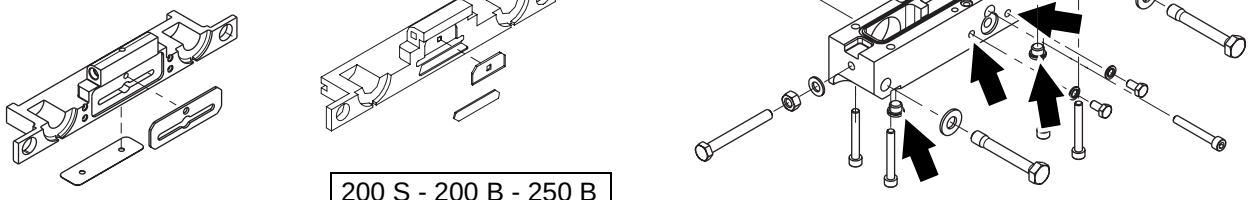
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348459-0200 1348464-0200

WARNING
Risk of personal injury.
Wear protective gloves.

Check the oil hoses and the oil connections for visual wear and/or damage. Check also for any oil leakages and make sure that oil does not leaks from the places marked with the arrows.

Change as required.

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500 B

200 S - 200 B - 250 B

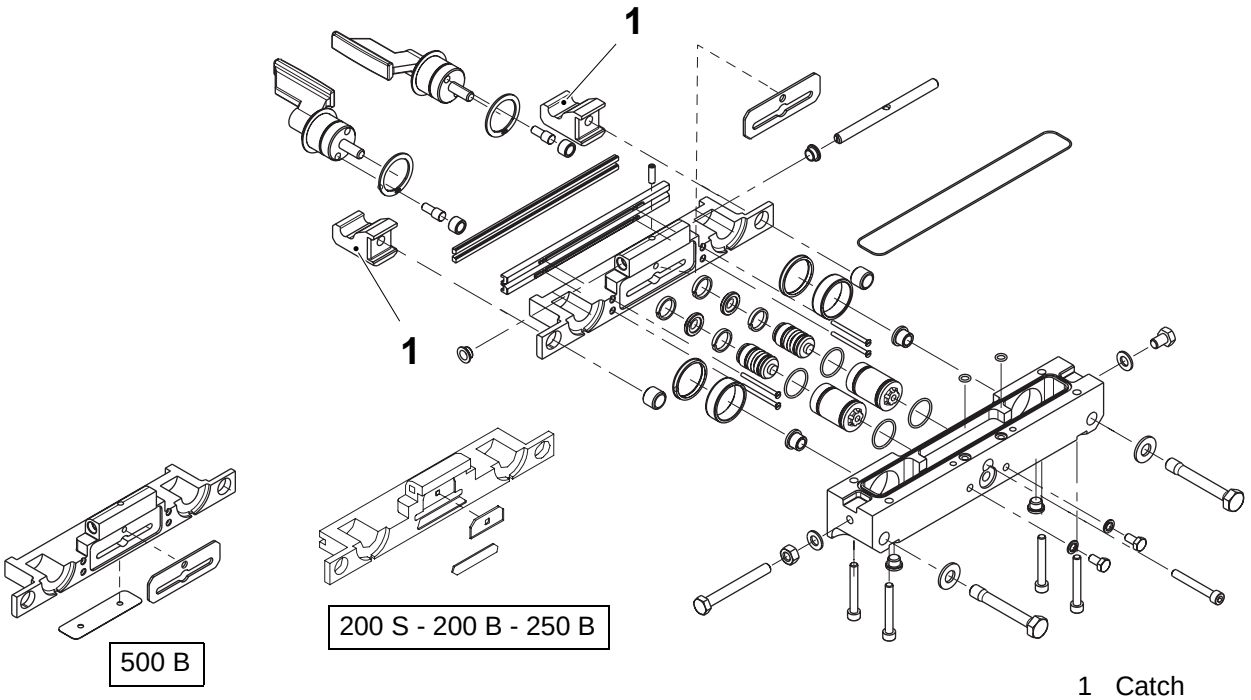
4.3-2 Cutting Jaw - Check Catches

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348459-0200 1348464-0200

WARNING
Risk of personal injury.
Wear protective gloves.

Check the catches (1) for visual wear and/or damage. Check that the engagements of the catches (1) are not worn. Check the clearance, see 4.2.2-1 Catches - Check and Clearance.

Change as required.



1 Catch

TechPub_2614345_0105 - 04_MM81534_11en.fm

4.3-3 Cutting Jaw - Check Folding Flaps

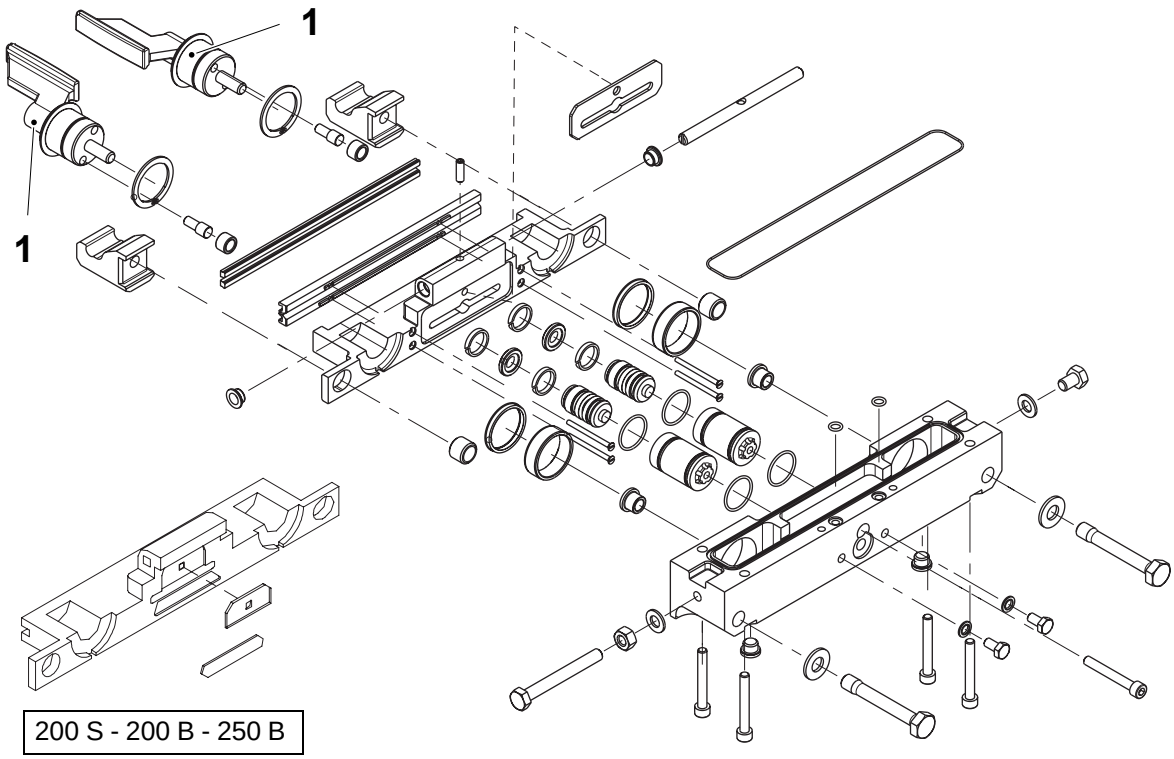
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348459-0200 1348464-0200

WARNING
Risk of personal injury.
Wear protective gloves.

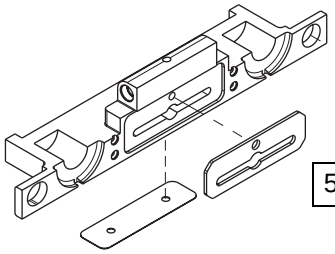
Check that the folding flaps (1) turn easily.

Check also the folding flaps (1) for excessive radial play and for any oil leakages.

Change as required.



200 S - 200 B - 250 B



500 B

1 Folding flap

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4.3-4 Cutting Jaw - Check Carrier

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348459-0200 1348464-0200

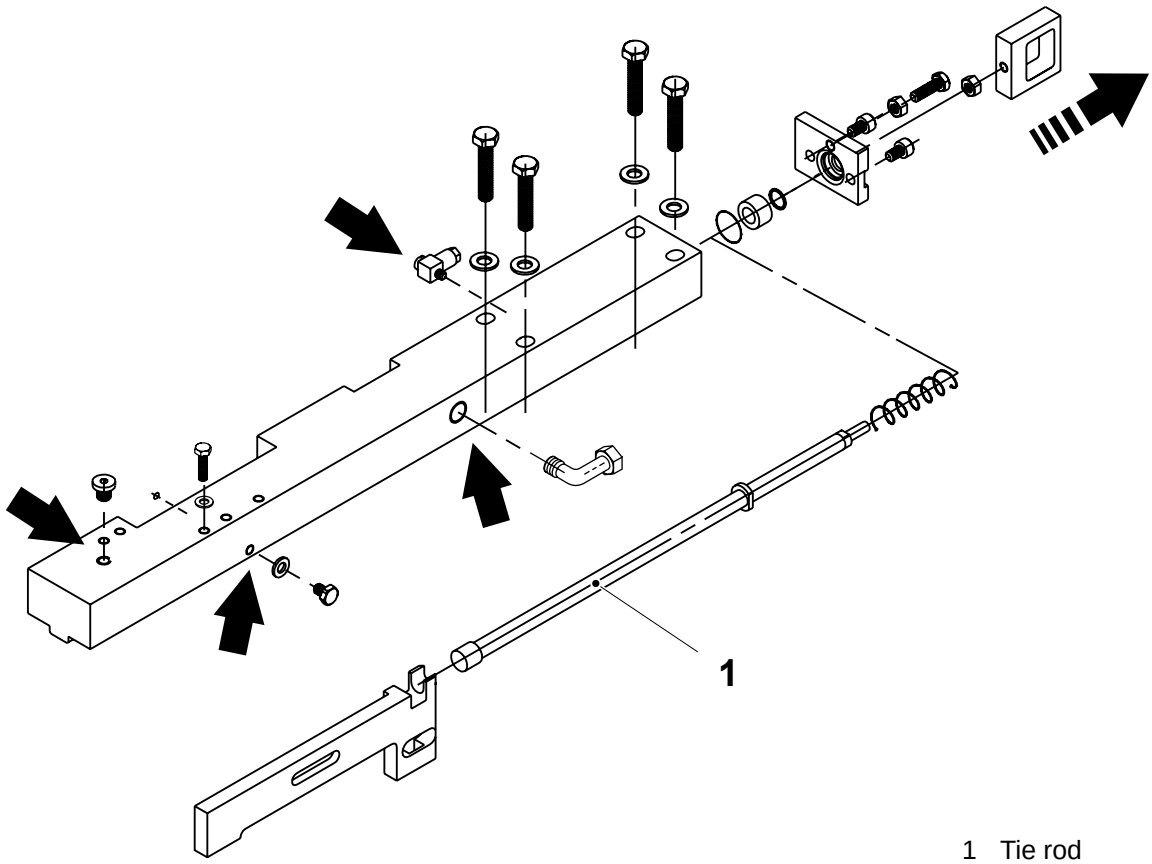
WARNING
Risk of personal injury.
Wear protective gloves.

Check carefully for any oil leakages at the points shows in the figure, see arrows.

Check that the folding flaps mechanism is working properly.

Pull the tie rod (1) and check that everything moves correctly.

Change as required.



1 Tie rod

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4.3-5 Cutting Jaw - Remove

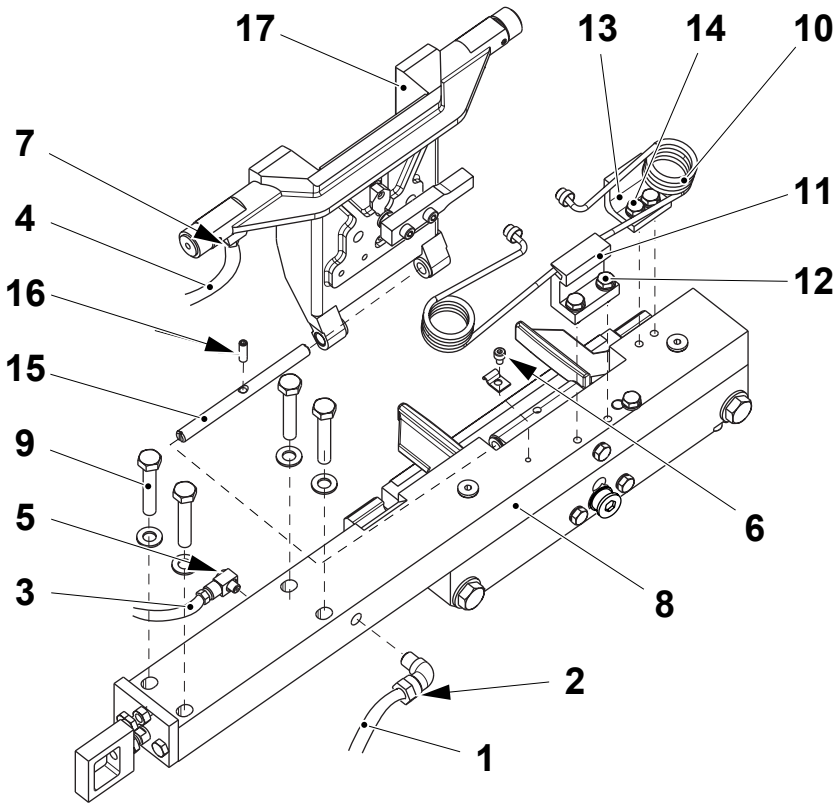
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348459-0200 1348464-0200

WARNING
Risk of personal injury.
Wear protective gloves.

a) Remove the hose (1) by means of the nut (2).
b) Remove the lubrication hoses (3) and (4) by means of the screws (5), (6) and the nuts (7).
c) Remove the cutting jaw (8) group by means of the four screws (9).
d) Remove the springs (10).
e) Remove the cantilever (11) by means of the screws (12).
f) Remove the stop (13) by means of the screws (14).
g) Remove the shaft (15) by means of the grub screw (16).

Note! For some volumes the shaft (15) is without the grub screw (16) which is replaced by two screws.

h) Remove the volume flap (17).



1 Hose
2 Nut
3 Hose
4 Hose
5 Screw
6 Screw
7 Nut
8 Cutting jaw
9 Screw
10 Spring
11 Cantilever
12 Screw
13 Stop
14 Screw
15 Shaft
16 Grub screw
17 Volume flap

(Cont'd)

TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

Valid for 1000 Sq only

WARNING
Risk of personal injury.
Wear protective gloves.

a) Remove the hose (1) by means of the nut (2).

b) Remove the lubrication hoses (3) and (4) by means of the screws (5), (6) and the nuts (7).

c) Remove the cutting jaw (8) group by means of the four screws (9).

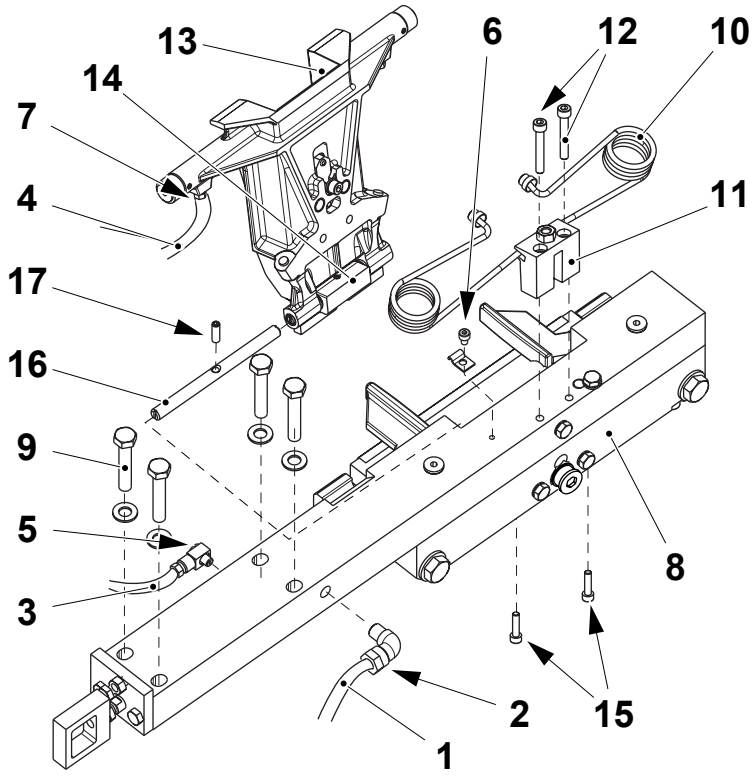
d) Remove the springs (10).

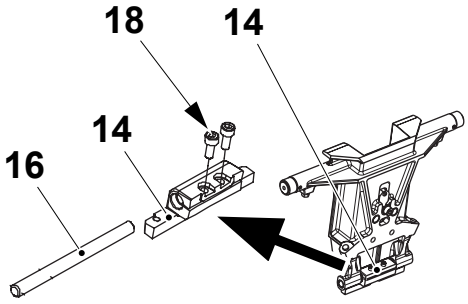
e) Remove the cantilever (11) by means of the screws (12).

f) Remove the volume flap (13) and its support (14) by means of the screws (15).

g) Remove the shaft (16) by means of the grub screw (17).

Note! For some machines with 1000 Sq, the holder (14) and the shaft (16) are different, the two screws (18) replaces the grub screw (17).





Volume flap variant

1	Hose	10	Spring
2	Nut	11	Cantilever
3	Hose	12	Screw
4	Hose	13	Volume flap
5	Screw	14	Support
6	Screw	15	Screw
7	Nut	16	Shaft
8	Cutting jaw	17	Grub screw
9	Screw	18	Screw

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4.3-6 Cutting Jaw - Assemble

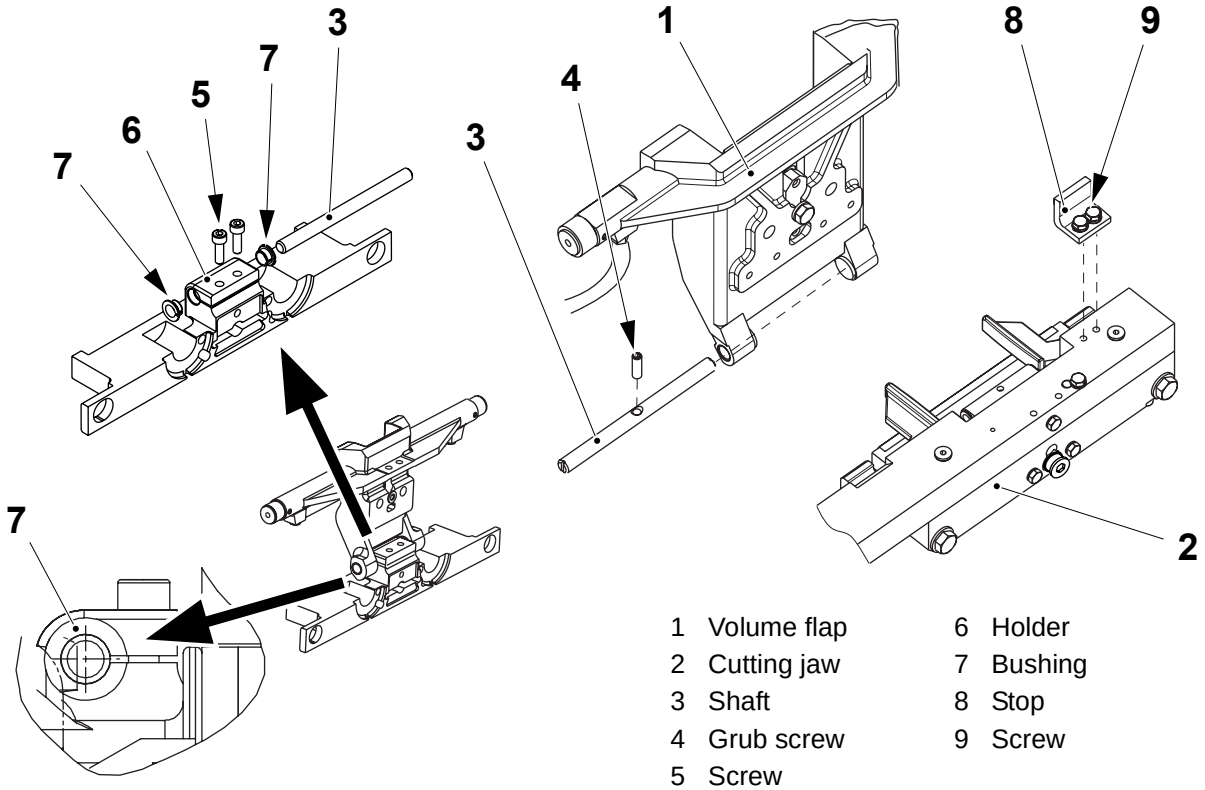
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1348459-0200 1348464-0200

WARNING
Risk of personal injury.
Wear protective gloves.

a) Assemble the volume flap (1) on the cutting jaw (2) group:
- **the alternative with the grub screw (4)**
  by means of the shaft (3) and the grub screw (4)
- **the alternative with the two screws (5)**
  by means of the shaft (3) and the two screws (5). Make sure that the slots in the holder (6) and the slots in the bushings (7) are aligned before tightening the two screws (5) to **4.4 Nm** with an allen key.

Note! For some volumes the shaft (3) is without the grub screw (4) which is replaced by the two screws (5).

b) Fit the stop (8) on the cutting jaw (2) group by means of the screws (9).



1 Volume flap
2 Cutting jaw
3 Shaft
4 Grub screw
5 Screw
6 Holder
7 Bushing
8 Stop
9 Screw

(Cont'd)

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(Cont'd)

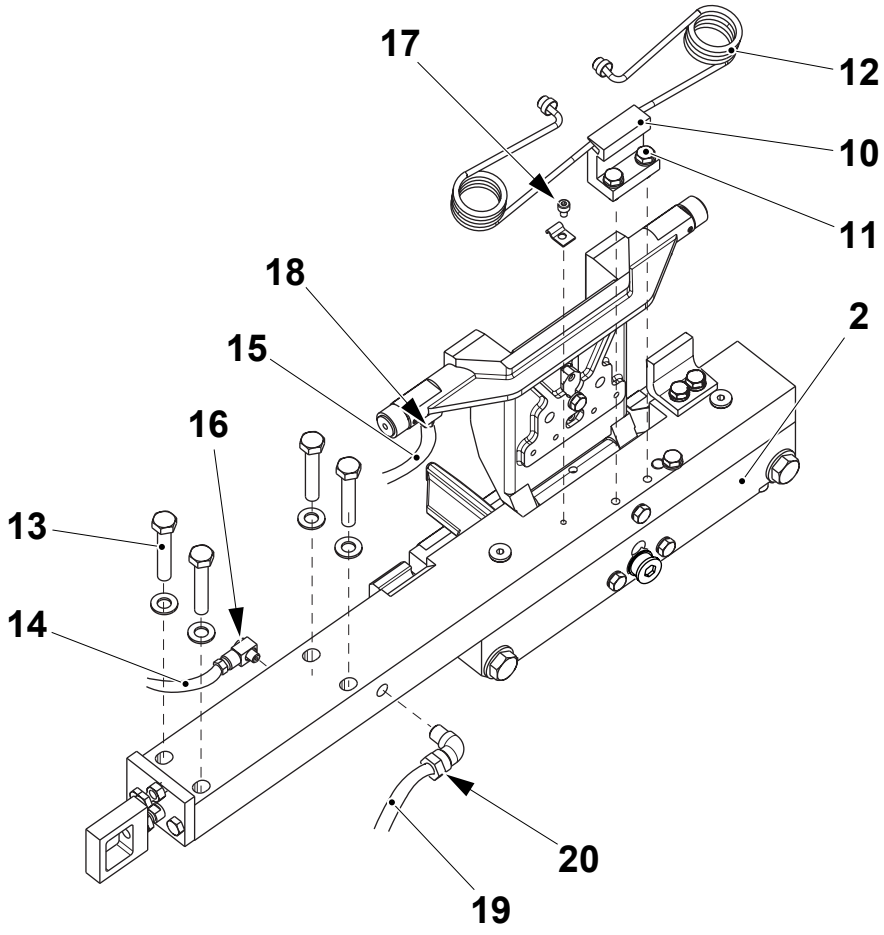
c) Fit the cantilever (10) on the cutting jaw (2) group by means of the screws (11).

d) Fit the springs (12).

e) Fit the cutting jaw (2) group by means of the four screws (13).

f) Fit the lubrication hoses (14) and (15) by means of the screws (16) and (17) and the nuts (18).

g) Fit the hose (19) by means of the nut (20).



2	Cutting jaw
10	Cantilever
11	Screw
12	Spring
13	Screw
14	Hose
15	Hose
16	Screw
17	Screw
18	Nut
19	Hose
20	Nut

TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

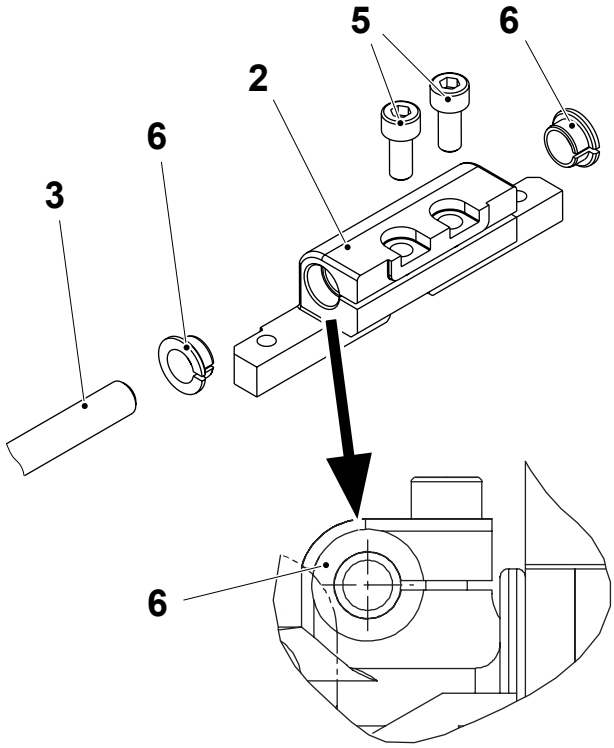
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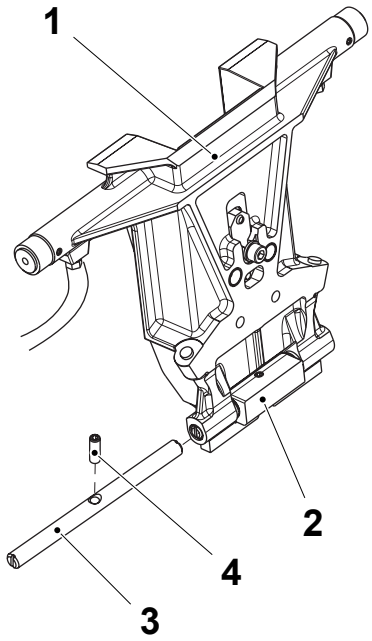
Valid for 1000 Sq only

WARNING
Risk of personal injury.
Wear protective gloves.

a) Fit the volume flap (1) on its holder (2):
   - **the alternative with the grub screw (4)**
     by means of the shaft (3) and the grub screw (4)
   - **the alternative with the two screws (5)**
     by means of the shaft (3) and the two screws (5). Make sure that the slots in the support (2) and the slots in the bushings (6) are aligned before tightening the two screws (5) to **4.4 Nm** with an allen key.

Note! For some volumes the shaft (3) is without the grub screw (4) which is replaced by the two screws (5).





1 Volume flap
2 Holder
3 Shaft
4 Grub screw
5 Screw
6 Bushing

(Cont'd)

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(Cont'd)

b) Fit the volume flap (1) and its holder (2) on the cutting jaw (7) group by means of the screws (8).

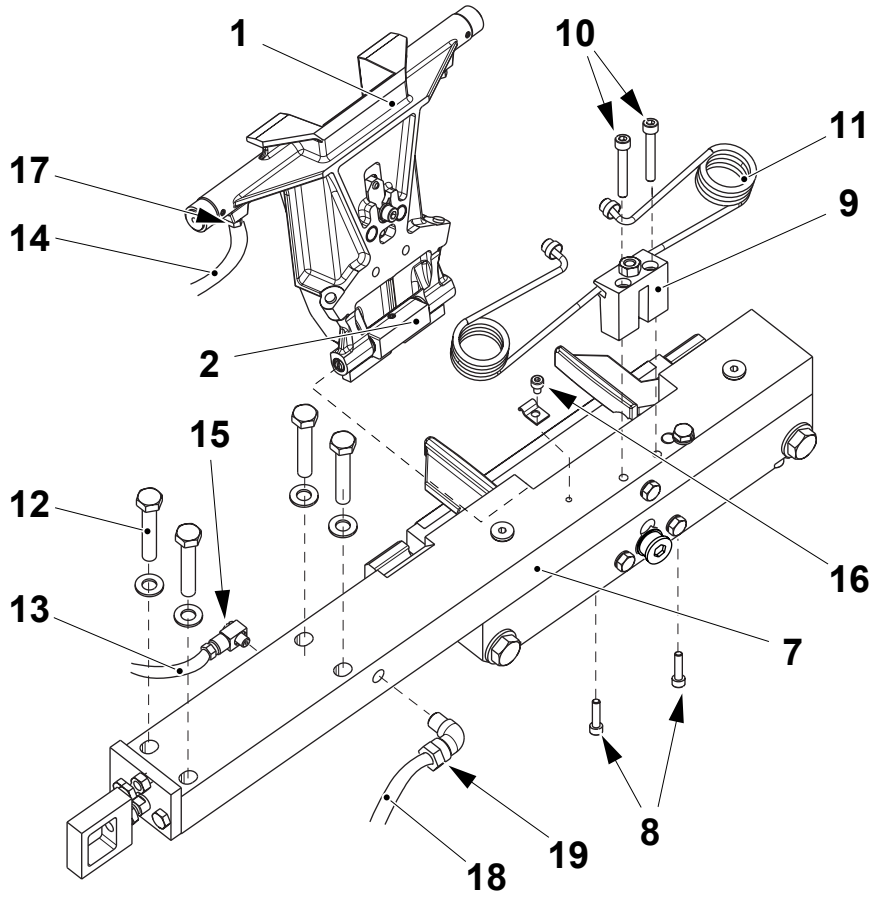
c) Fit the cantilever (9) on the cutting jaw (7) group by means of the screws (10).

d) Fit the springs (11).

e) Fit the cutting jaw (7) group by means of the four screws (12).

f) Fit the lubrication hoses (13) and (14) by means of the screws (15) and (16) and the nuts (17).

g) Fit the hose (18) by means of the nut (19).



1 Volume flap
2 Holder
7 Cutting jaw
8 Screw
9 Cantilever
10 Screw
11 Spring
12 Screw
13 Hose
14 Hose
15 Screw
16 Screw
17 Nut
18 Hose
19 Nut

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4.3-7 Cutting Jaw - Change Seals

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Special Equipment	Assembly tool TP No. 90091-0377 - TP No. 76131 - Assembly tool TP No. 76132 - TP No. 78801 Torque wrench min. 42 Nm
SPC Reference	1348459-0200 1348464-0200

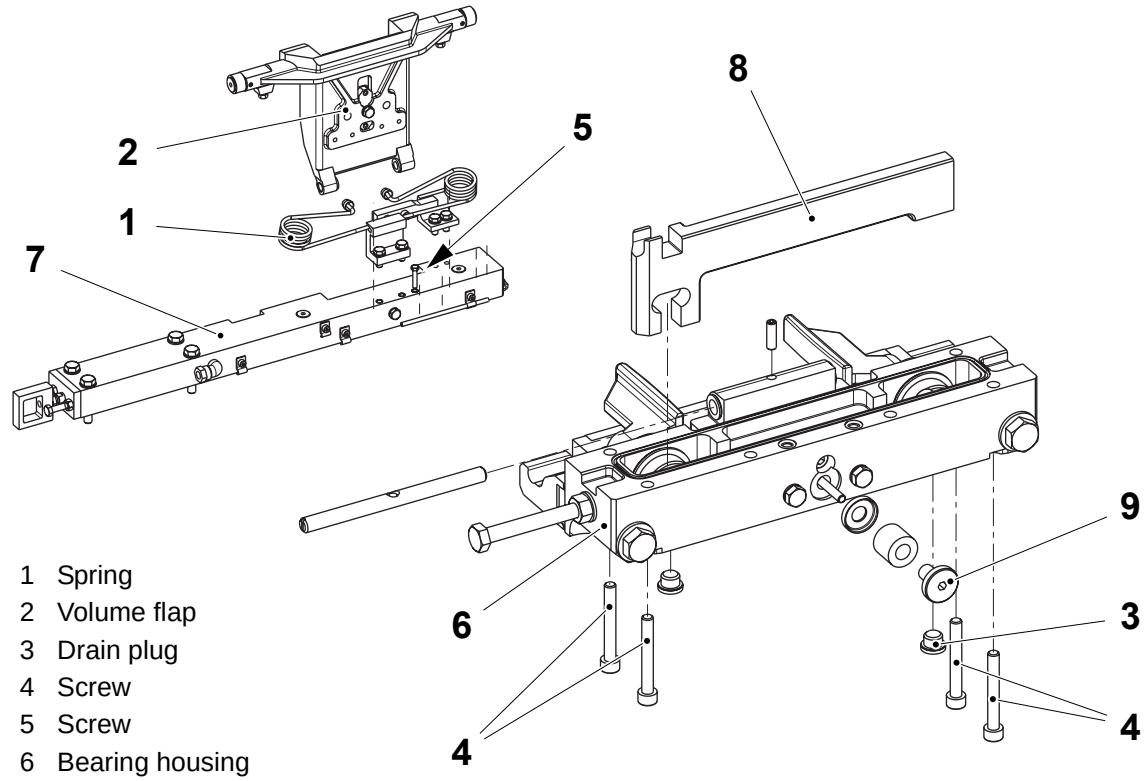
WARNING
Risk of personal injury.
Wear protective gloves.

a) Remove the springs (1) and the volume flaps (2) from the cutting jaws, follow the procedure in 4.3-5 Cutting Jaw - Remove.

b) Remove the two drain plugs (3) and loosen the screws (4) and (5) to drain the oil from the bearing housing (6).

c) Remove the four screws (4) and separate the bearing housing (6) from the carrier (7).

d) Remove the carrier ruler (8) and the washer (9).



1 Spring
2 Volume flap
3 Drain plug
4 Screw
5 Screw
6 Bearing housing
7 Carrier
8 Carrier ruler
9 Washer

(Cont'd)

TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

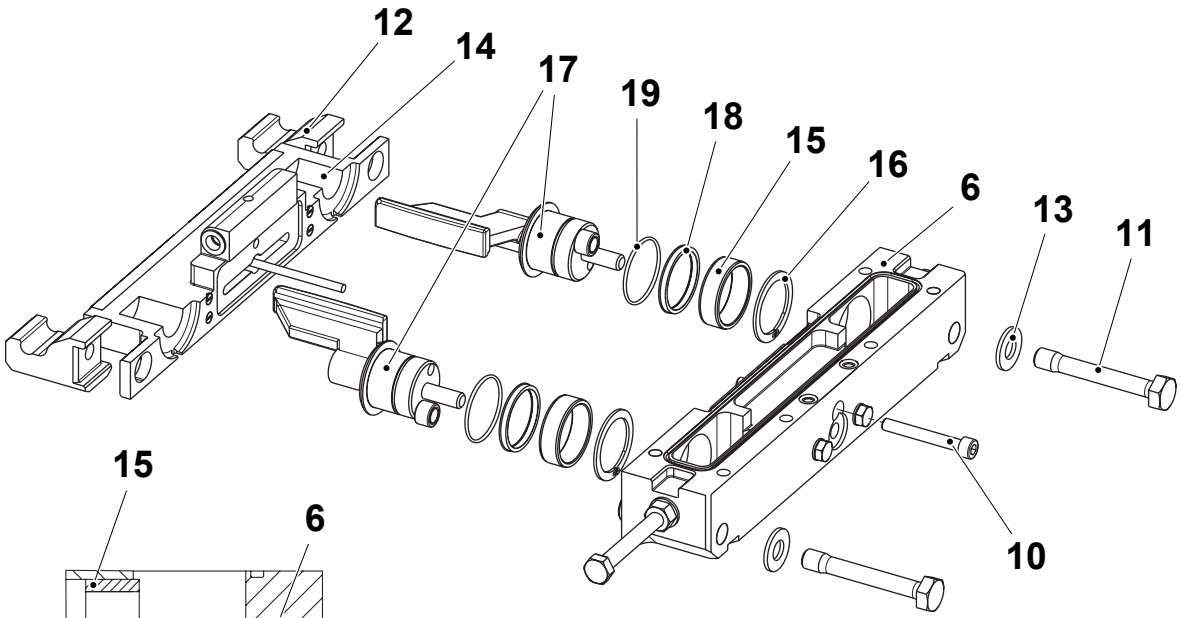
e) Remove the screw (10) and the two screws (11). Take care of the catches (12) and the washers (13) when removing the screws (11).

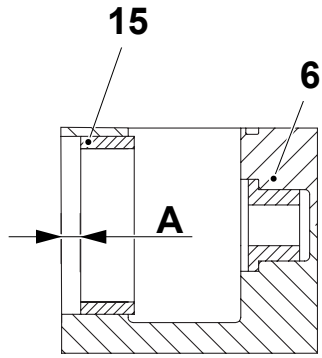
f) Separate the cutting jaw (14) from the bearing housing (6). Check the bearing housing (6) for visual wear and/or damage and change it as required.

Note! Check the distance **A** and make sure that the bushings (15) are correctly fitted in the bearing housing (6), see **figure 1**.

g) Remove the circlips (16), the folding flaps (17), the seals (18) and the O-rings (19).

h) Check the bushings (15), the seals (18) and the O-rings (19) for wear and/or damage. Change as required.





A = 3.7 0/+0.2 mm

Fig. 1

6	Bearing housing	15	Bushing
10	Screw	16	Circlip
11	Screw	17	Folding flap
12	Catch	18	Seal
13	Washer	19	O-ring
14	Cutting jaw		

(Cont'd)

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(Cont'd)

i) Remove the two screws (20). Take care of the washers (21).

j) Remove the sleeves (22) and the plungers (23) together.

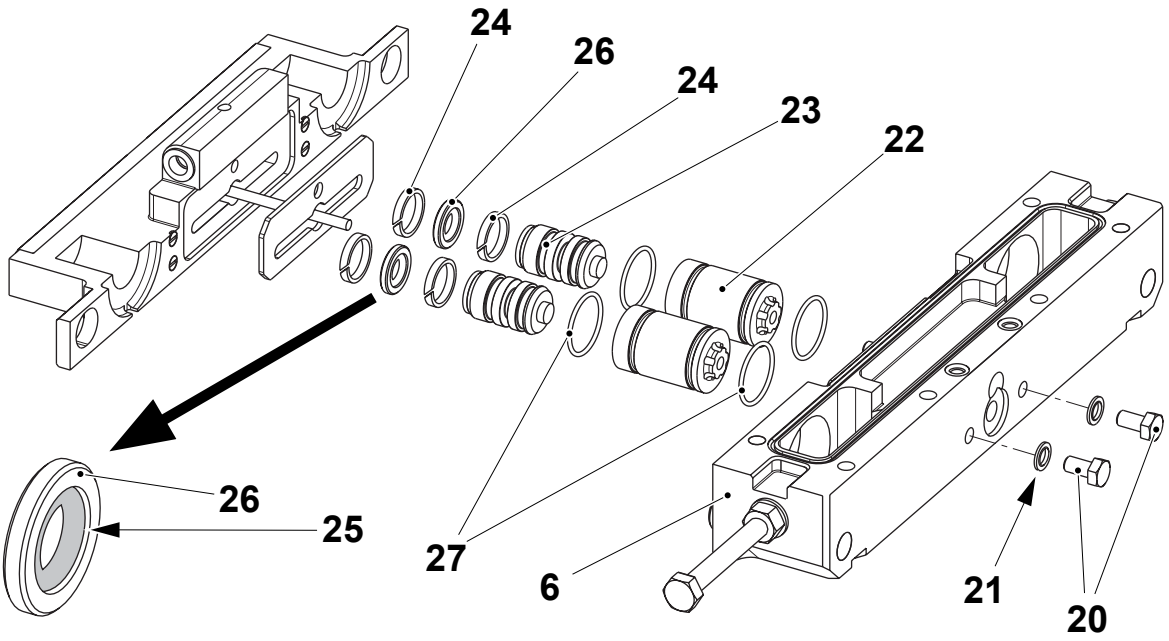
k) Pull out the plungers (23).

l) Remove and change the guide rings (24), the O-rings (25) and the seals (26).

Note! Be careful when removing the seals (26) and the O-rings (25) not to damage the groove of the plungers (23).

m) Remove the O-rings (27) and change them as required.

n) Fit back the sleeves (22) together with the plungers (23) into the bearing housing (6).



6	Bearing housing	23	Plunger
20	Screw	24	Guide ring
21	Washer	25	O-ring
22	Sleeve	26	Seal
		27	O-ring

(Cont'd)

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(Cont'd)

Seals Assembly

o) Slide the guide cone tool (28) onto the plungers (23).

p) Slide the O-rings (25) over the cone tool (28). Move the O-rings (25) onto the plungers groove with the aid of the assembly tool (29), see **figure 2**.

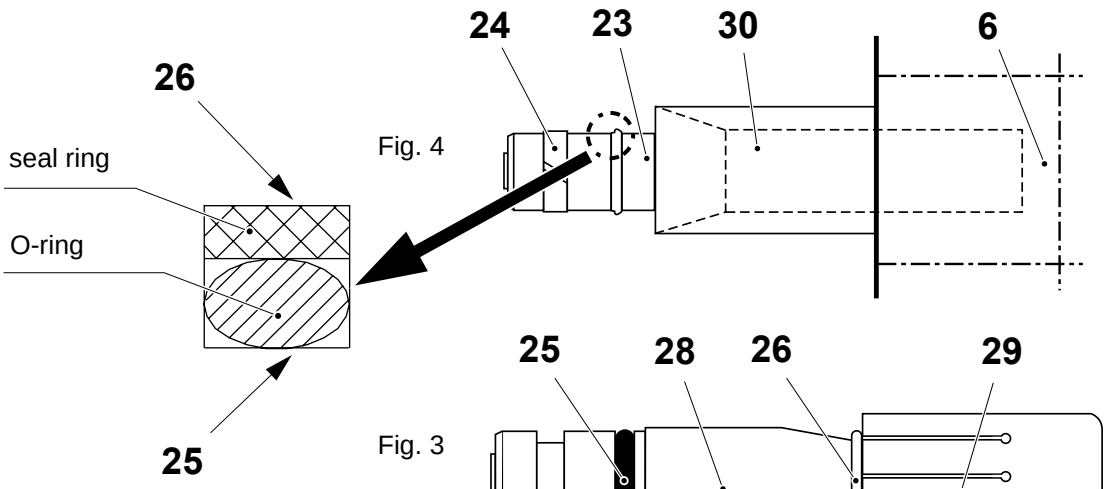
q) Slide the seals (26) over the cone tool (28). Move the seals (26) onto the plungers groove with the aid of the assembly tool (29), see **figure 3**. The seals (26) shaping **must** be done with boiling water.

r) Calibrate the seals (26) by forcing the plungers (23) through the calibration tool (30).

s) Fit back the guide rings (24) into their grooves, see **figure 4**. The guide rings (24) shaping **must** be done with boiling water.

t) Fit the calibration tool (30) into the bearing housing (6). Put the plungers (23) through the calibration tool (30) and into the bearing housing (6), see **figure 4**.

Package	**Tools (24) (25) (26)**
1000 B - 1000 S - 1500 S - TPA 1000 S - 1000 Sq - 500 S - 500 B - TPA 1000 Sq - TPA 500 Sq	TP No. 90091-0377
200 B - 250 B - 200 S - 250 S - TPA 330 Sq - TPA 250 Sq - 330 S	TP No. 76131 - 76132 - 78801



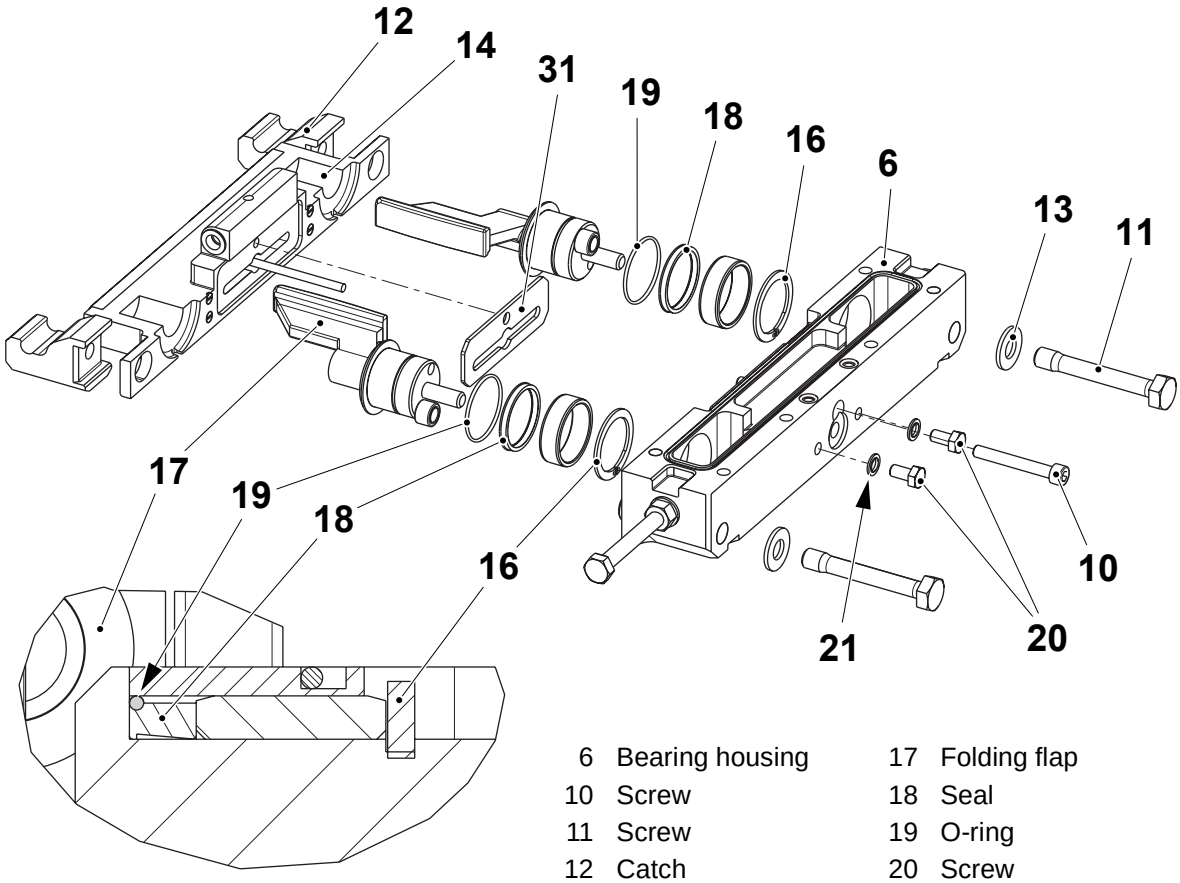
6 Bearing housing
23 Plunger
24 Guide ring
25 O-ring
26 Seal
28 Tool
29 Tool
30 Tool

(Cont'd)

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(Cont'd)

u) Fit the washers (21) and tighten the two screws (20).
v) Check that the plate (31) is fully home on its base.
w) Fit the O-ring (19) and the seal (18) on the folding flaps (17).
x) Fit the folding flaps (17) with the circlips (16).
y) Fit back the cutting jaw (14) onto the bearing housing (6).
z) Tighten the screw (10).
aa) Fit the catches (12), washers (13) and screws (11).
ab) Tighten the two screws (11) to a torque of **42 Nm**.



6	Bearing housing	17	Folding flap
10	Screw	18	Seal
11	Screw	19	O-ring
12	Catch	20	Screw
13	Washer	21	Washer
14	Cutting jaw	31	Plate
16	Circlip		

(Cont'd)

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(Cont'd)

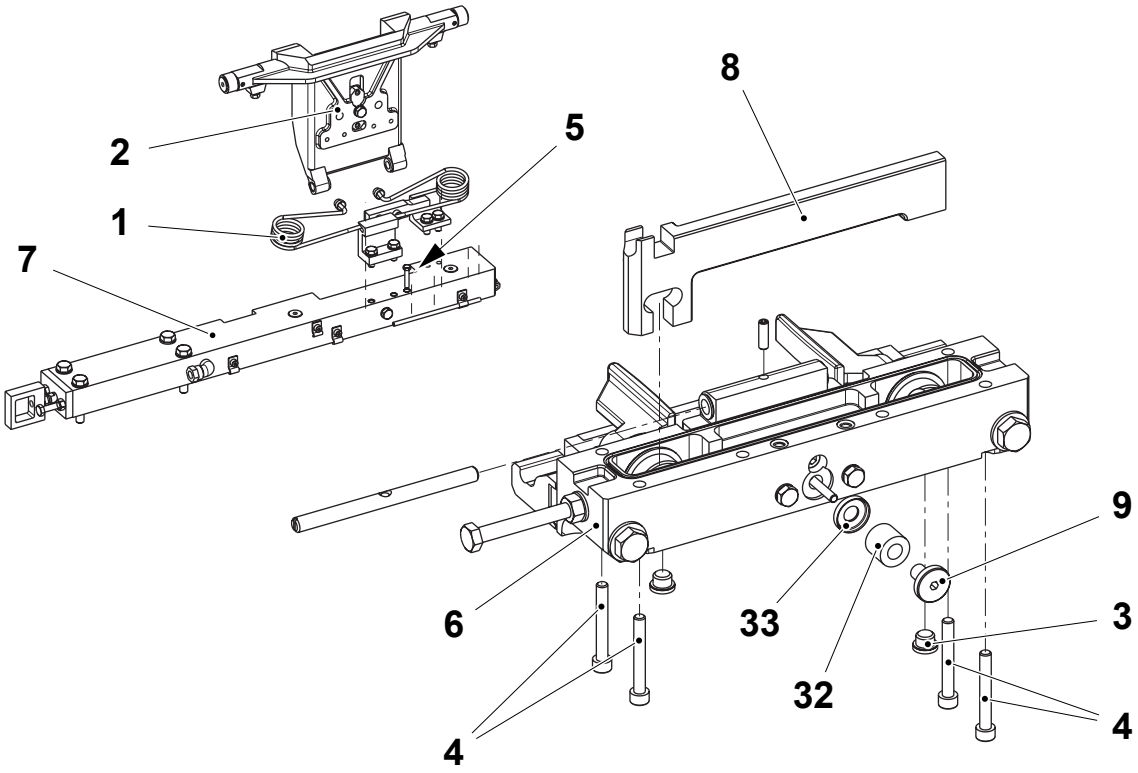
ac) Fit the carrier ruler (8).

ad) Fit the washer (9), the spring (32) and the washer (33).

ae) Fit back the bearing housing (6) onto the carrier (7) and tighten all the screws (4) and (5).

af) Fit back the volume flaps (2) to the cutting jaws and the springs (1), follow the procedure in 4.3-6 Cutting Jaw - Assemble.

ag) Fit the two drain plugs (3) and fill the bearing housing (6) with oil, follow the procedure in 4.3-8 Cutting Jaw - Change Oil.



1	Spring	7	Carrier
2	Volume flap	8	Carrier ruler
3	Drain plug	9	Washer
4	Screw	32	Spring
5	Screw	33	Washer
6	Bearing housing		

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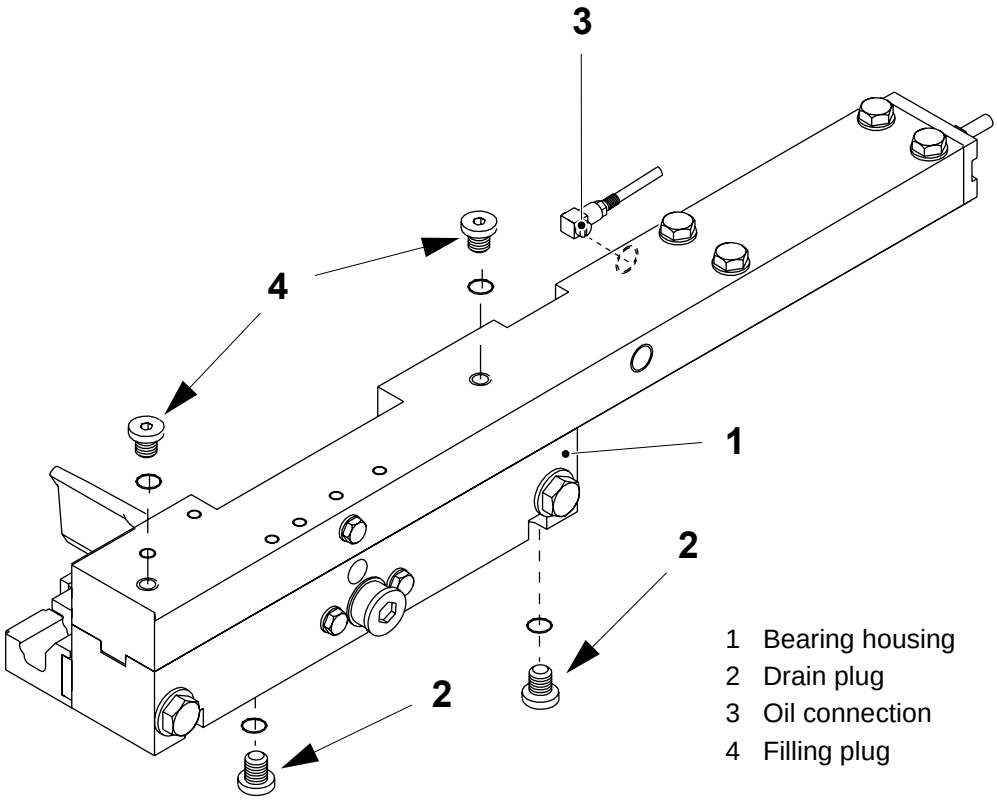
4.3-8 Cutting Jaw - Change Oil

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
Consumables	Lubricant code H
SPC Reference	1348459-0200 1348464-0200

WARNING
Risk of personal injury.
Wear protective gloves.

Perform the following work on both the cutting jaws.

a) Crank a jaw pair to the lower horizontal position.
b) Drain the oil from the bearing housing (1) by removing the drain plugs (2) and the filling plugs (4).
c) Fit and tighten the drain plugs (2).
d) Fill up with oil, see 10.3-1 Lubricants.
e) Fit and tighten the filling plugs (4).
f) Crank the jaw pair slightly to access and loosen the screw to remove the oil pipe connection (3).



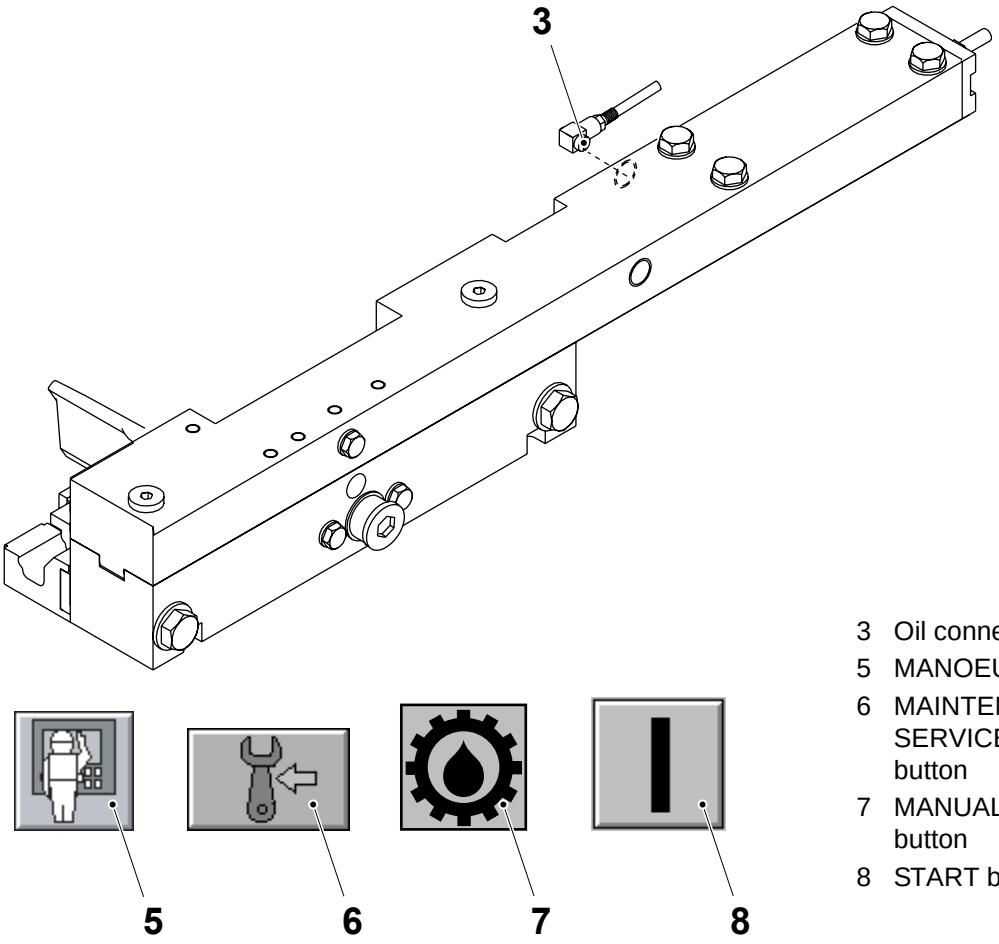
1 Bearing housing
2 Drain plug
3 Oil connection
4 Filling plug

(Cont'd)

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(Cont'd)

g) Touch the MANOEUVRE button (5) on the TPOP.
h) Touch the MAINTENANCE SERVICE UNIT LEFT Button (6).
i) Touch the MANUAL LUBRICATION button (7).
j) Touch the START button (8) to enable the lubricating system.
k) Check that oil comes out from the oil pipe connection (3).
l) Fit back the oil pipe connection (3).



3 Oil connection
5 MANOEUVRE button
6 MAINTENANCE SERVICE UNIT LEFT button
7 MANUAL LUBRICATION button
8 START button

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4.3-9 Cutting Jaw - Change Cutting Rails

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Torque wrench min. 42 Nm
SPC Reference	1348459-0200 1348464-0200

WARNING

Risk of cutting injury.

The knife is sharp and may be hot. Use gloves to avoid injuries.

Perform the following work on both the cutting jaws.

a) Crank a jaw pair to open position.

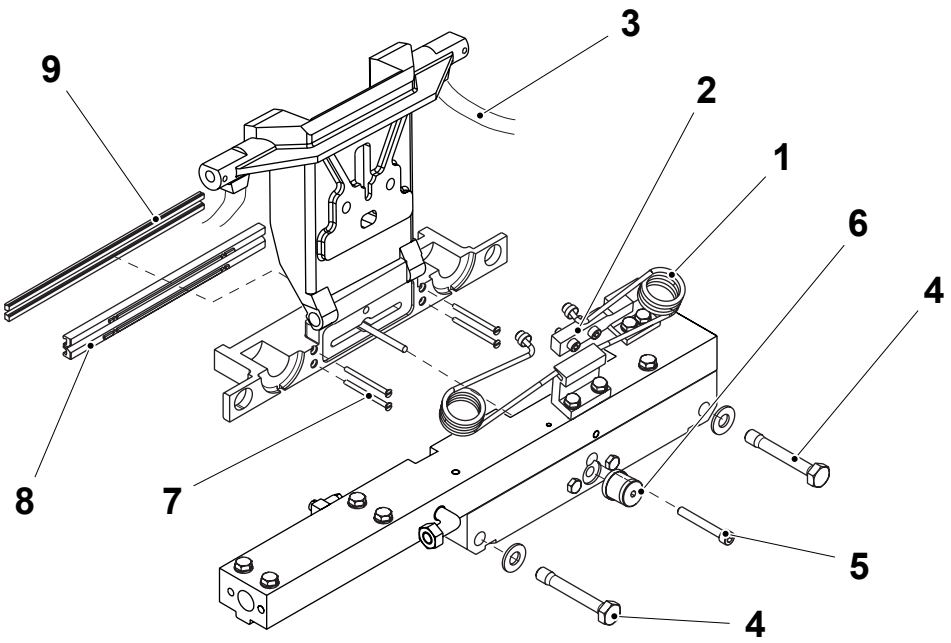
b) Remove the springs (1) the catch (2) and the hoses (3) from the volume flap, see 4.3-5 Cutting Jaw - Remove.

c) Remove the screws (4) and (5) and the washer (6).

Note! The screws (4) must be tightened with a torque of **42 Nm**.

d) Remove the screws (7)

e) Pull off the two cutting rails (8) and the dollies (9).



1 Spring
2 Catch
3 Hose
4 Screw
5 Screw
6 Washer
7 Screw
8 Rail
9 Dolly

(Cont'd)

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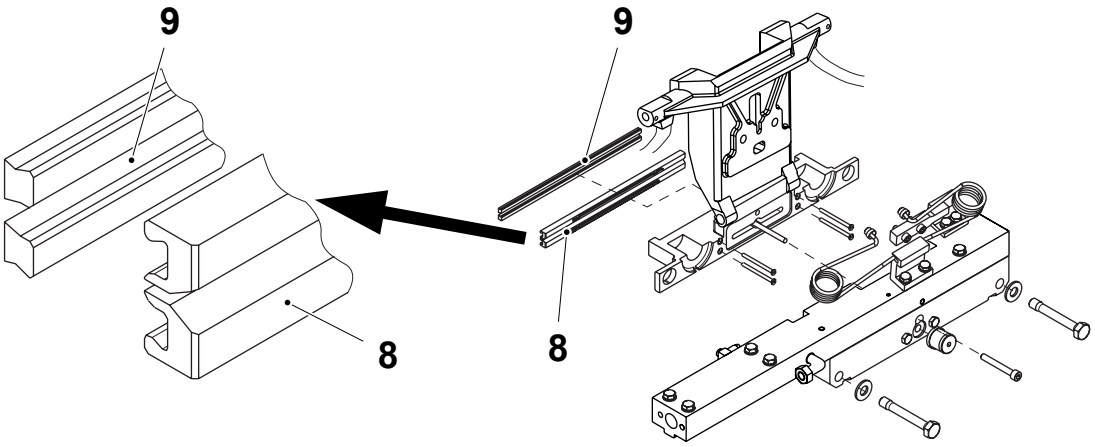
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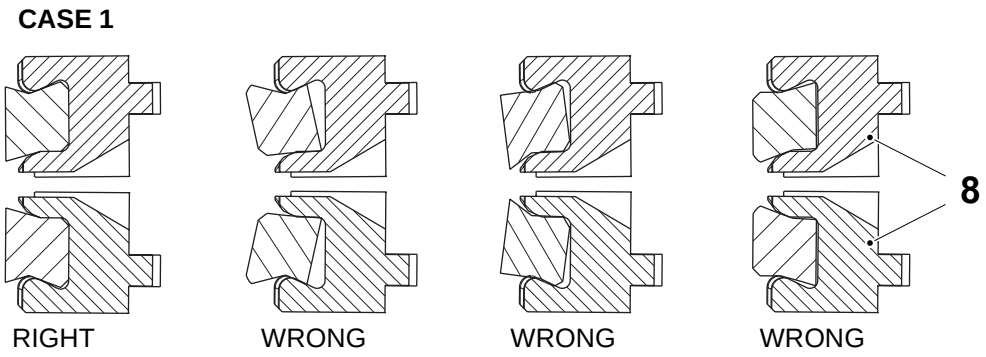
f) Clean the parts, and inspect the cutting rails (8) and the dollies (9).

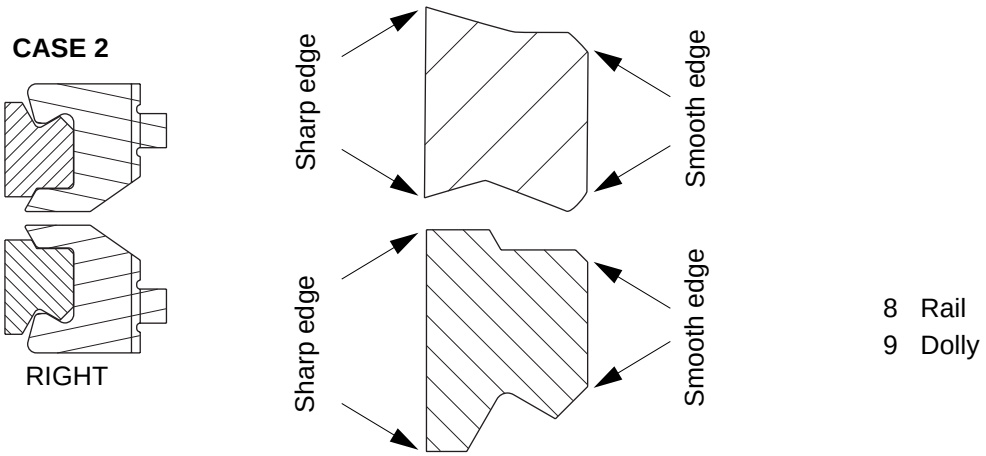
g) Change them if damaged or worn out.

h) Assemble in the reverse order.

Note! Take care to position the profiles correctly when fitting the cutting rails (8) and the dollies (9), see figure. The two sharp edges of the dollies (9) must be facing outwards from the rail (8), see figure.







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4.3.1 Knife

4.3.1-1 Knife - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Silicon grease code L
SPC Reference	1478768-0100

WARNING

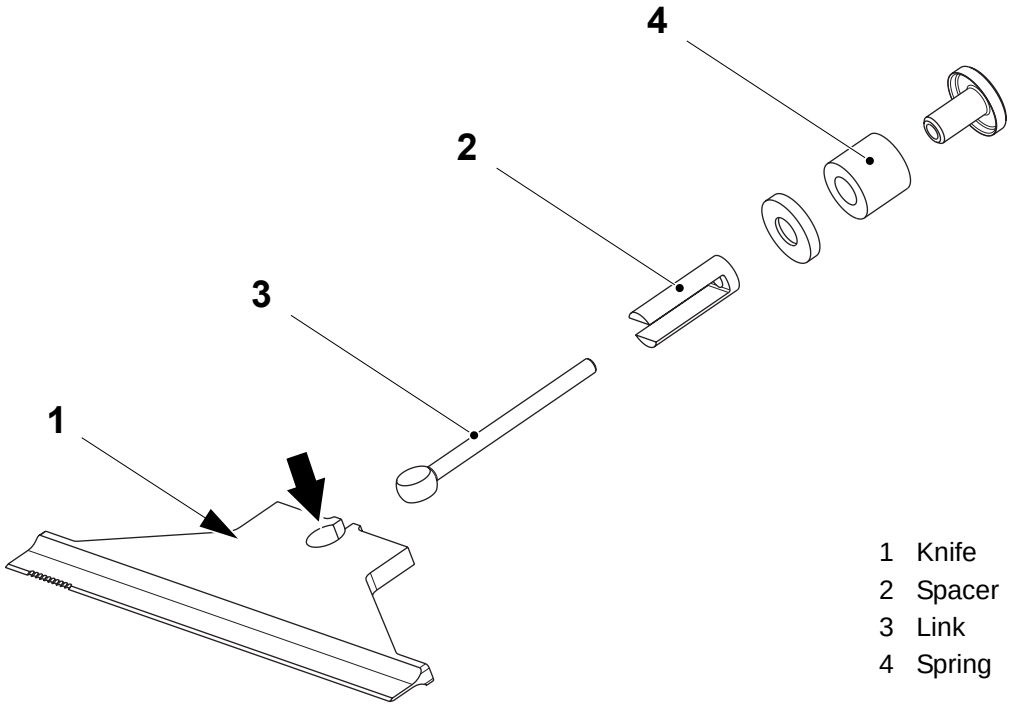
Risk of cutting injury.

The knife (1) is sharp and may be hot. Use gloves to avoid injuries.

Check for visual wear and/or damage:

- the knife (1)
  Change the knife as required, see 4.3.1-2 Knife - Change Knife.
  Lubricate the holder with silicon grease, code L, before assembling.
- the spacer (2)
- the link (3)
- the spring (4).

Change as required.



1 Knife
2 Spacer
3 Link
4 Spring

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4.3.1-2 Knife - Change Knife

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Pliers Brass brush Torque wrench min. 42 Nm
SPC Reference	1478768-0100

WARNING

Risk of cutting injury.

The knife is sharp and may be hot. Use gloves to avoid injuries.

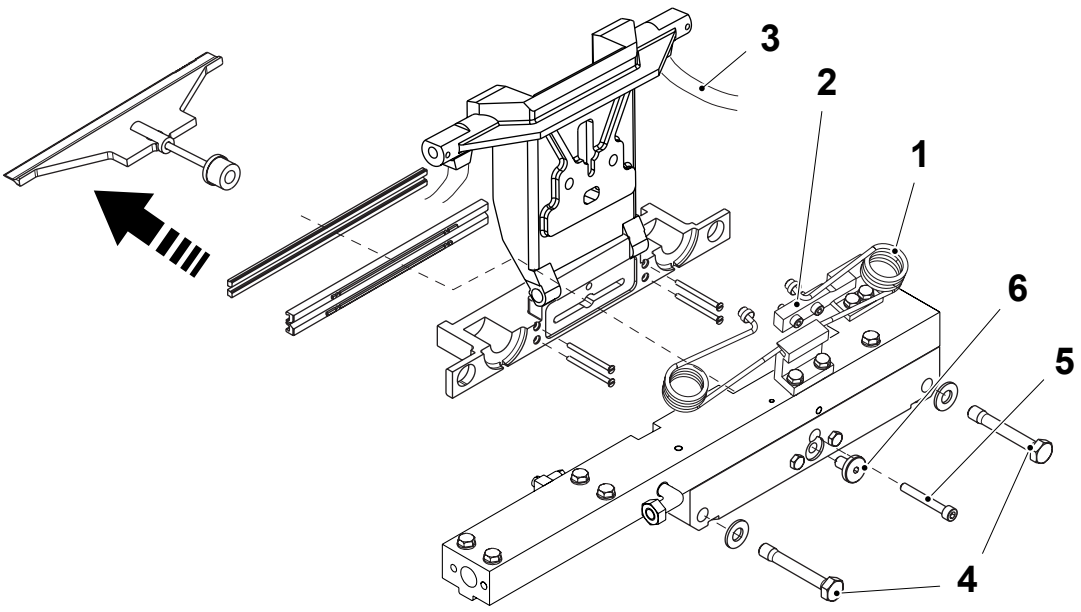
Perform the following work on both the cutting jaws.

a) Crank a jaw pair into an open position.

b) Remove the springs (1) the catch (2) and the hoses (3) from the volume flap, see 4.3-5 Cutting Jaw - Remove.

c) Remove the screws (4) and (5) and the washer (6).

Note! The screws (4) must be tightened with a torque of **42 Nm**.



1 Spring
2 Catch
3 Hose
4 Screw
5 Screw
6 Washer

(Cont'd)

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(Cont'd)

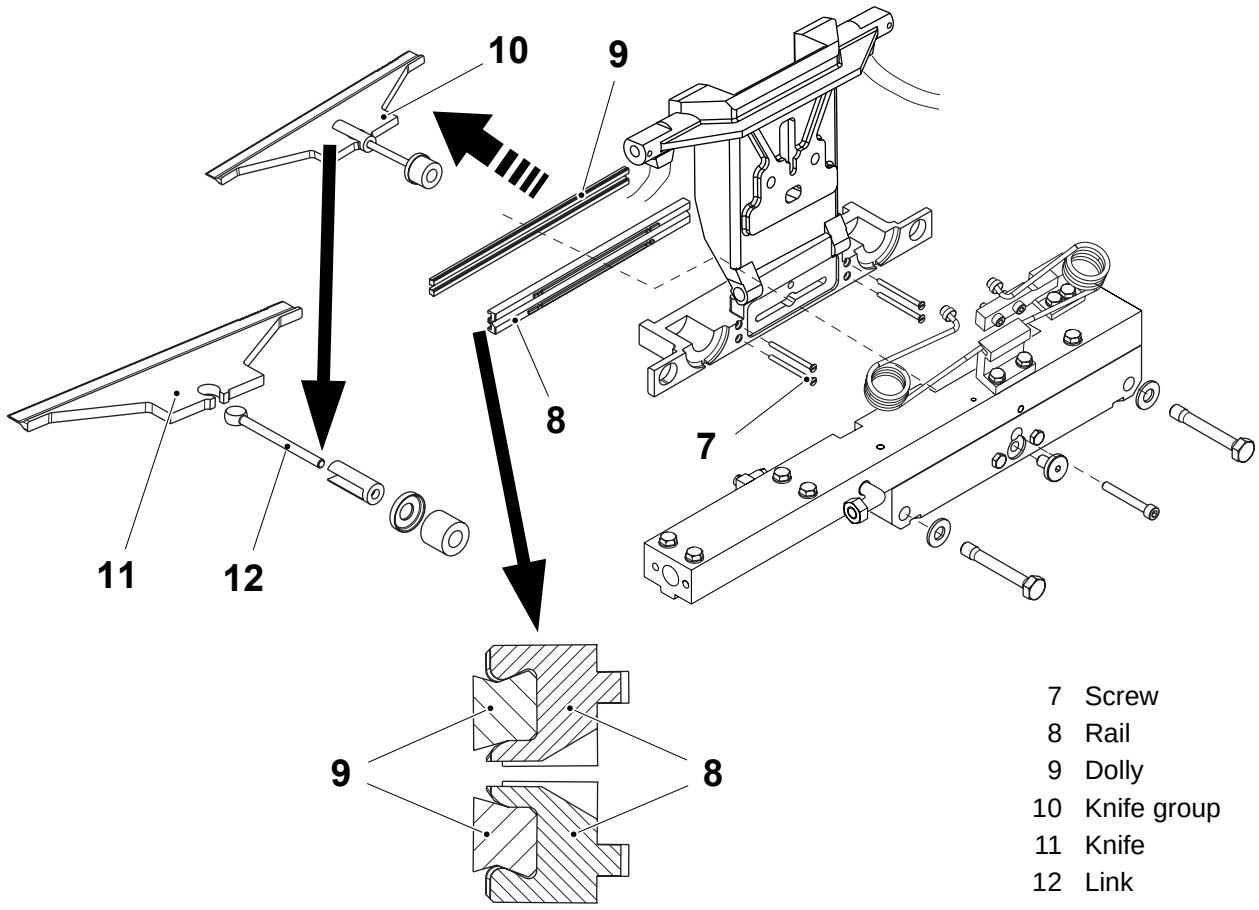
d) Remove the screws (7)

e) Pull off the two cutting rails (8) and the dollies (9).

f) Pull off the knife group (10) and remove the knife (11) from the link (12).

g) Assemble in the reverse order.

Note! Take care to position the profiles correctly when fitting the cutting rails (8) and the dollies (9), see figure below.



7 Screw
8 Rail
9 Dolly
10 Knife group
11 Knife
12 Link

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4.4 Volume Adjuster

SPC Reference	1035134-0400

4.4-1 Volume Adjuster - Remove

SPC Reference	1035134-0400

Follow the procedure described in 4-3 Jaw System - Remove Volume Adjuster.

4.4-2 Volume Adjuster - Assemble

SPC Reference	1035134-0400

Follow the procedure described in 4-18 Jaw System - Assemble Volume Adjuster.

4.4-3 Volume Adjuster - Set

SPC Reference	1035134-0400

Follow the procedure described in 4-20 Jaw System - Set Volume Adjuster.

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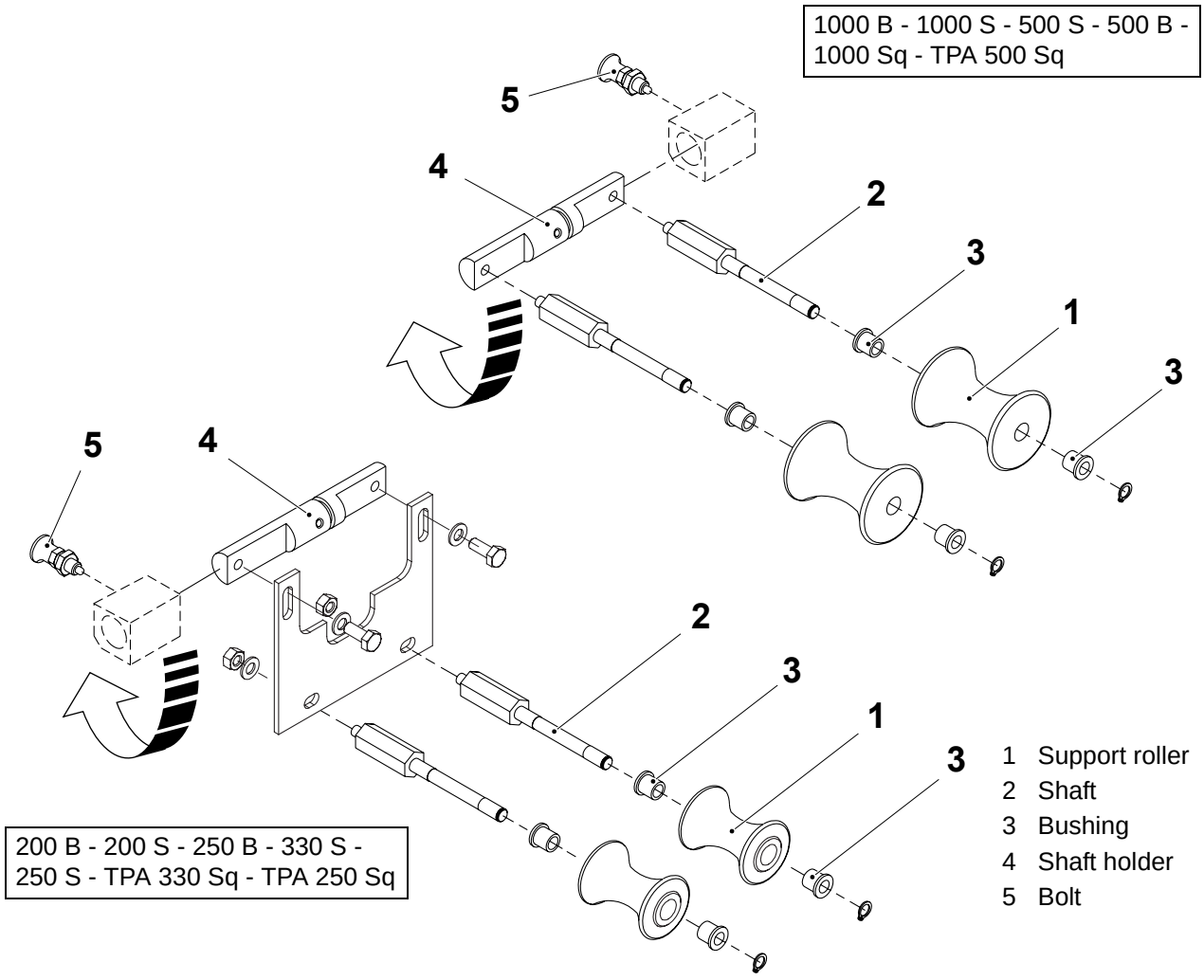
4.4.1 Cantilever

4.4.1-1 Cantilever - Check

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1484127-0100 1035120-0400

Check the following parts for visual wear and/or damage:

- the support rollers (1)
  Check that they turn easily. If not clean them as required.
- the shafts (2)
  Check that they are not bent.
- the bushings (3)
  Check that the play of the bushings (3) is not excessive.
- the shaft holder (4)
  Check that it moves easily downwards when pulling the adjustment bolt (5).



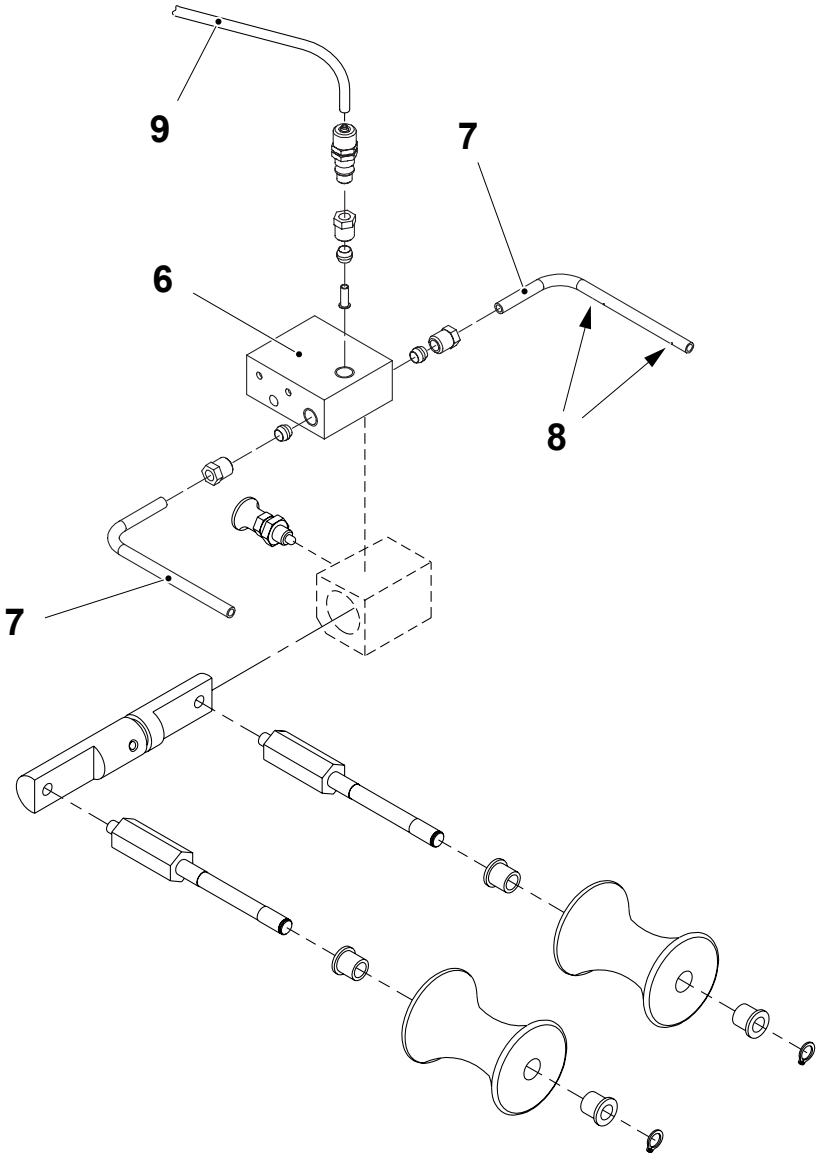
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(Cont'd)

- the pipe connection (6)
  Check that it moves freely.
- the tube flushing devices (7)
  Check that water comes out from the two holes (8) inside.
- the hose (9)
  Check for any water leakages.

Change as required.



6 Pipe connection
7 Flushing device
8 Hole
9 Hose

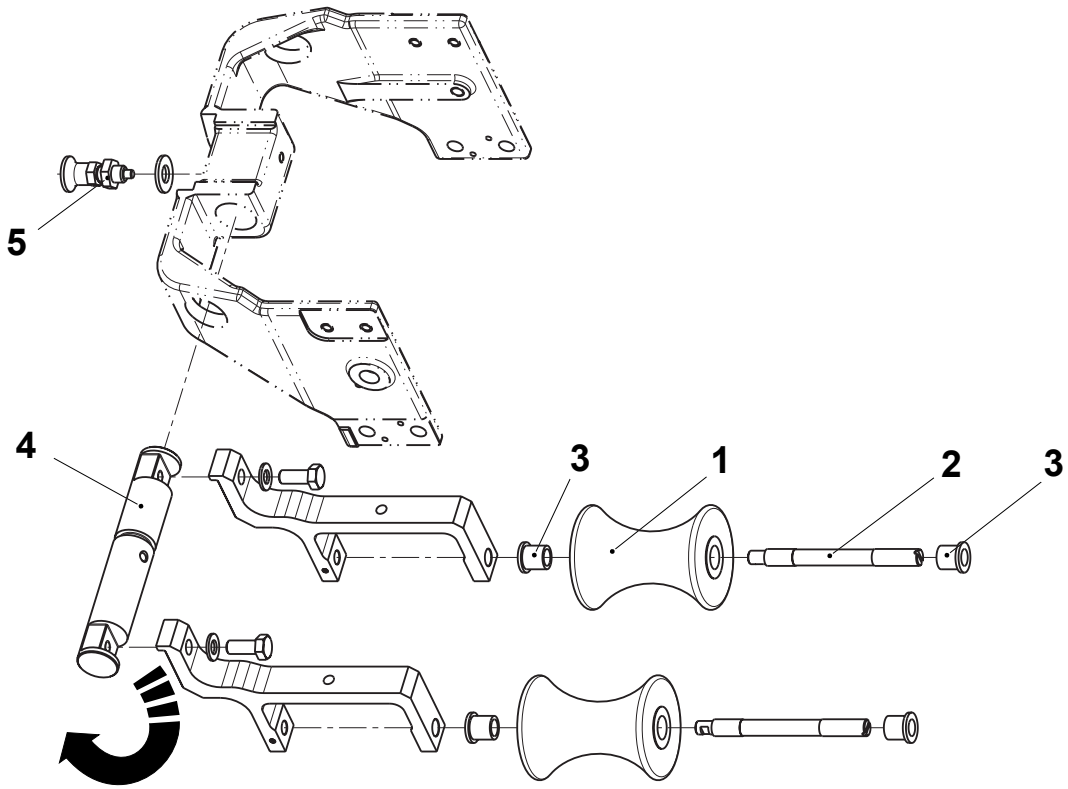
TechPub_2614345_0105 - 04_MM81534_11en.fm

4.4.1-2 Cantilever - Check (TBA 1500 S and TPA 1000 Sq only)

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1484127-0100 1035120-0400

Check the following parts for visual wear and/or damage:

- the support rollers (1)
  Check that they turn easily. If not clean them as required.
- the shafts (2)
  Check that they are not bent.
- the bushings (3)
  Check that the play of the bushings (3) is not excessive.
- the shaft holder (4)
  Check that it moves easily downwards when pulling the adjustment bolt (5).



1 Support roller
2 Shaft
3 Bushing
4 Shaft holder
5 Bolt

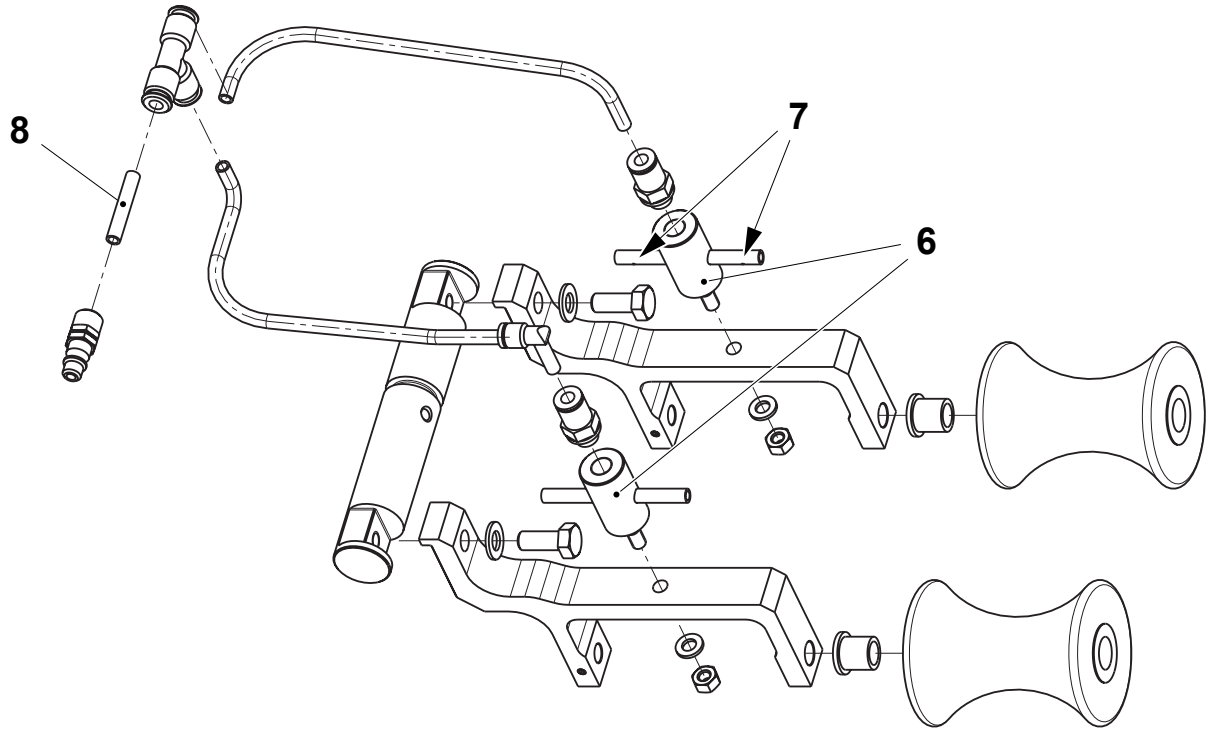
(Cont'd)

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(Cont'd)

- the tube flushing devices (6)
  Check that water comes out from the two holes (7) inside.
- the hose (8)
  Check for any water leakages.

Change as required.



6 Flushing device
7 Hole
8 Hose

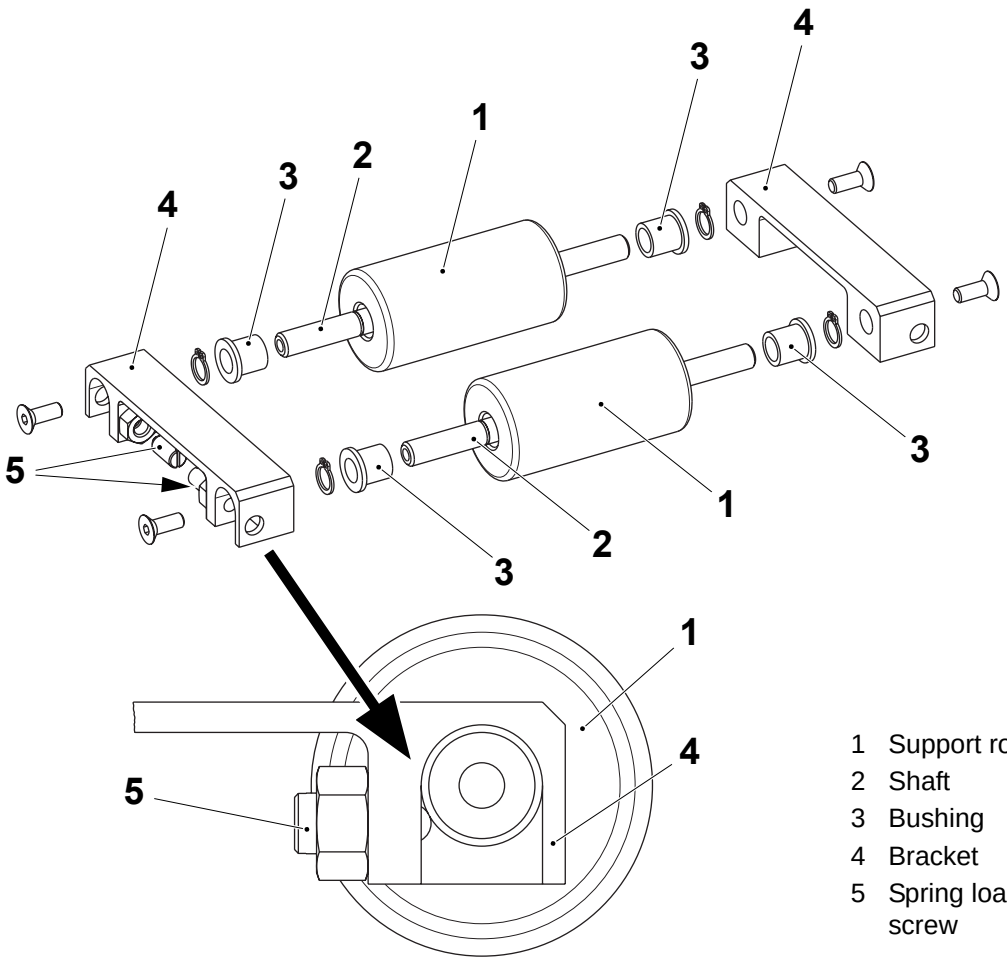
TechPub_2614345_0105 - 04_MM81534_11en.fm

4.4.1-3 Cantilever - Check (TPA 1000 S only)

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035120-0400

Check the following parts for visual wear and/or damage:

- the support rollers (1)
  Check that they turn easily. If not clean them as required.
- the shafts (2)
  Check that they are not bent.
- the bushings (3)
  Check that the play of the bushings (3) is not excessive.
- the bracket (4)
  Check that it is kept in position by the spring loaded screws (5) and that it moves easily upwards when pulled. Adjust as required by means of the spring loaded screws (5).



1 Support roller
2 Shaft
3 Bushing
4 Bracket
5 Spring loaded screw

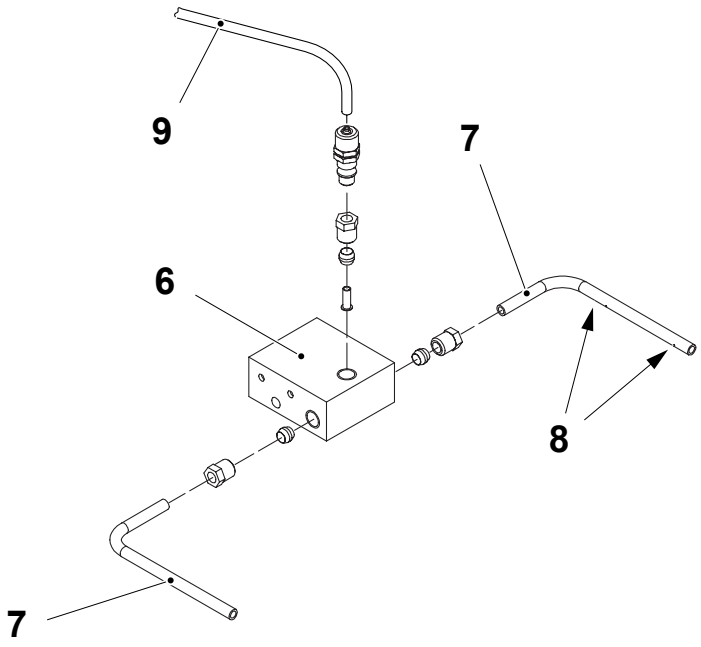
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(Cont'd)

- the pipe connection (6)
  Check that it moves freely.
- the tube flushing devices (7)
  Check that water comes out from the two holes (8) inside.
- the hose (9)
  Check for any water leakages.

Change as required.



6 Pipe connection
7 Flushing device
8 Hole
9 Hose

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4.4.1-4 Cantilever - Set Height

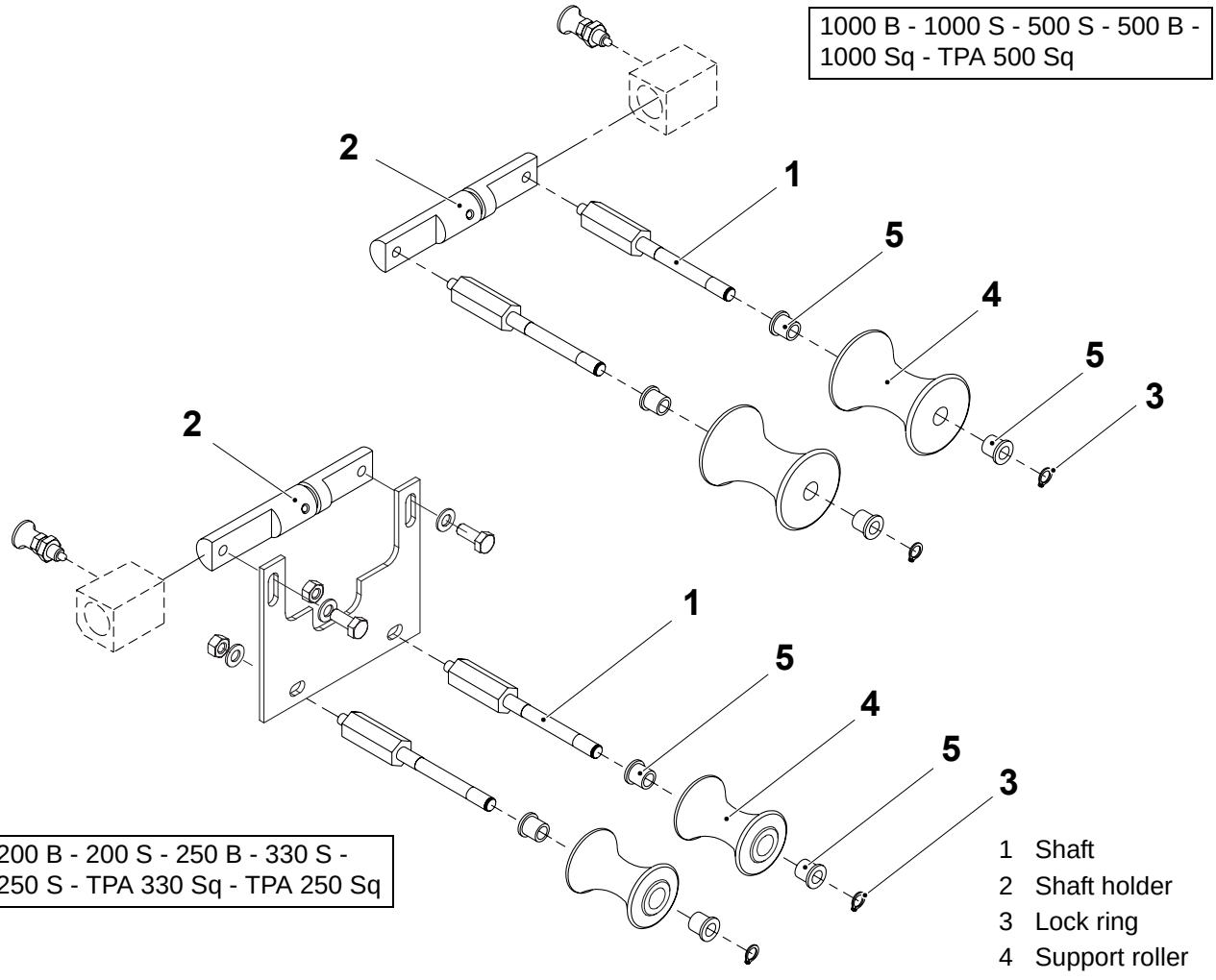
SPC Reference	1484127-0100 1035120-0400

Follow the procedure described in 4-19 Jaw System - Set Cantilever Height.

4.4.1-5 Cantilever - Change Flange Bushings

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1484127-0100 1035120-0400

a) Remove the two shafts (1) from the shaft holder (2).
b) Remove the lock rings (3).
c) Remove the support rollers (4).
d) Remove the flange bushings (5) and change them.
e) Assemble in the reverse order.



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4.4.1-6 Cantilever - Change Flange Bushings (TBA 1500 S and TPA 1000 Sq only)

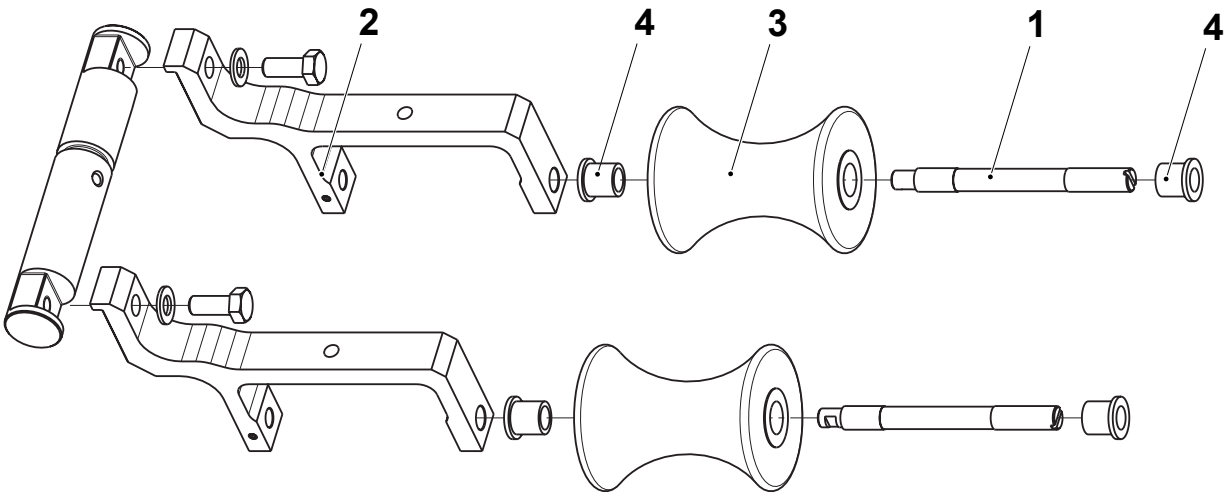
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1484127-0100 1035120-0400

a) Remove the two shafts (1) from the shaft holder (2).

b) Remove the support rollers (3).

c) Remove the flange bushings (4) and change them.

d) Assemble in the reverse order.



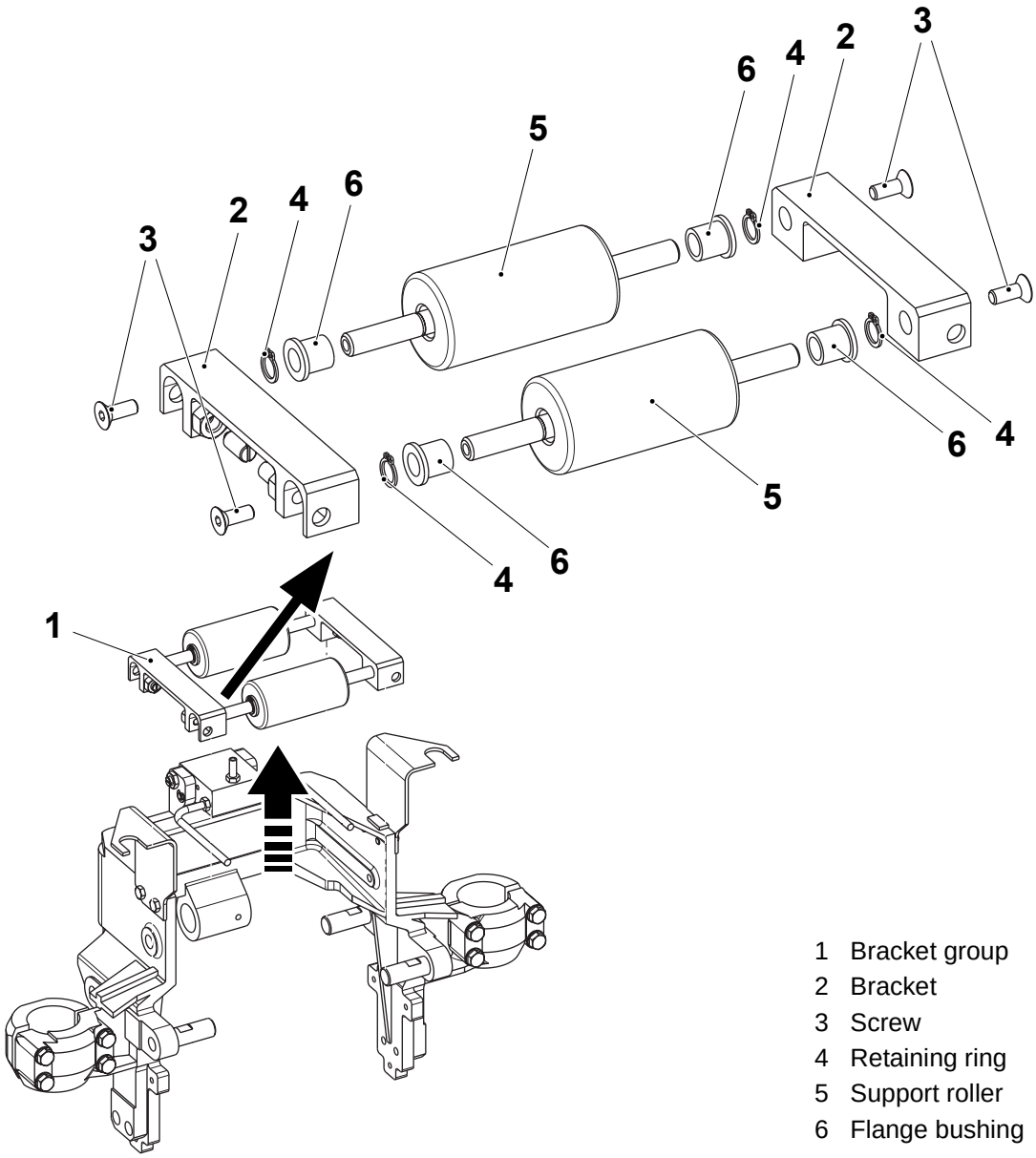
1 Shaft
2 Shaft holder
3 Support roller
4 Flange bushing

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4.4.1-7 Cantilever - Change Flange Bushings (TPA 1000 S only)

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1035120-0400

a) Pull out the bracket group (1).
b) Remove the bracket (2) by means of the screws (3).
c) Remove the retaining rings (4).
d) Unthread the support rollers (5).
e) Remove the flange bushings (6) and change them.
f) Assemble in the reverse order and fit back the bracket group (1).



1 Bracket group
2 Bracket
3 Screw
4 Retaining ring
5 Support roller
6 Flange bushing

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4.4.1-8 Cantilever - Set Support Rollers

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Special Equipment	Jaw setting tool TP No.1095956
SPC Reference	1035120-0400

Note! For 200 B, 250 B, 200 S, 250 S, 330 S, TPA 250 Sq and TPA 330 Sq only

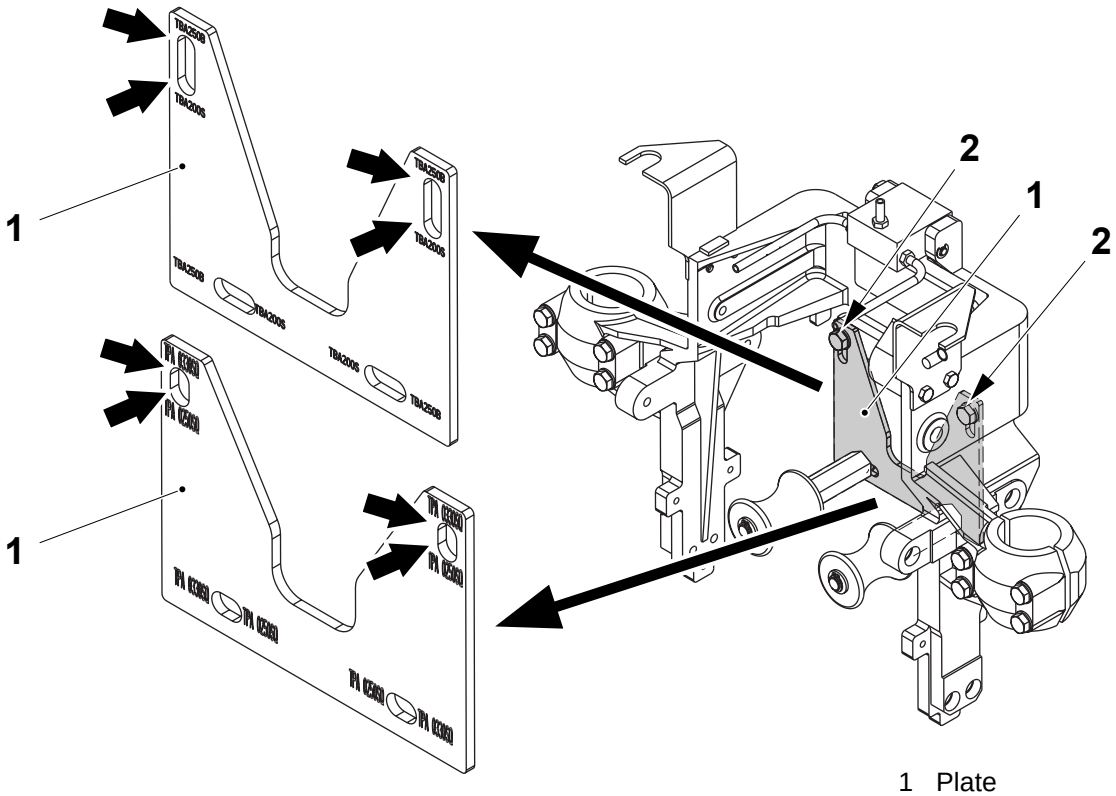
Note! For volume dependency templates and tools codes, see 10.2 Templates and Tools.

a) For 250 B, 200 S, TPA 250 Sq and TPA 330 Sq only. Check that the plate (1) has been fit in the proper position according to the running volume.

Note! TBA 330 S is placed in the same position as TBA 250 B on the plate (1).

b) Adjust the plate (1) as required by means of the nuts (2).

c) Crank the machine to 16 decimal degrees.



1 Plate
2 Nut

(Cont'd)

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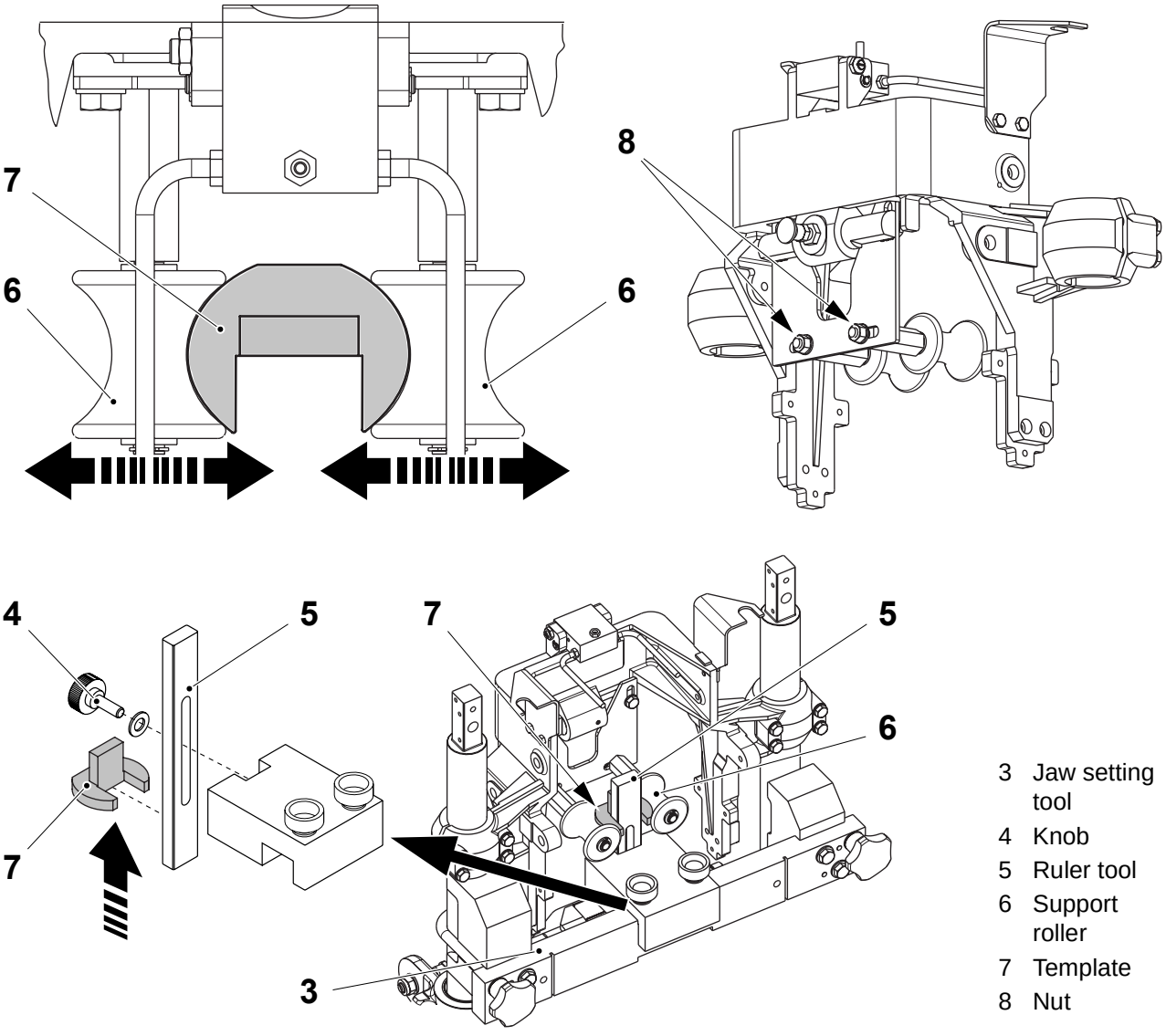
(Cont'd)

d) Fit the jaw setting tool (3).

e) Loosen the knob (4) and adjust the ruler tool (5) until it moves upwards between the support rollers (6). Tighten the knob (4).

f) Place the template (7) on the ruler tool (5) and slide it between the support rollers (6).

g) Make sure that the support rollers (6) are centred in respect to the template (7). Adjust as required by loosening the nuts (8) and moving sideways the support rollers (6).



3 Jaw setting tool
4 Knob
5 Ruler tool
6 Support roller
7 Template
8 Nut

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4.4.2 Curve Unit

4.4.2-1 Curve Unit - Check

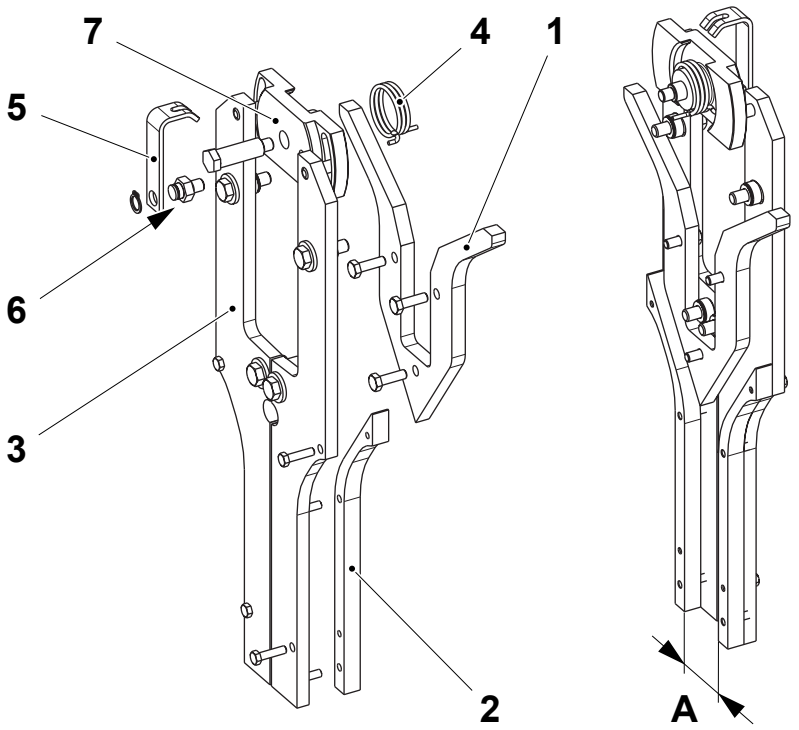
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035121-0400

Check the following parts for visual wear and/or damage:

- the curves (1) surface
- the volume cams (2) surface
- the rail brackets (3)
  Check that they move easily.
- the torsion springs (4)
  Check that the spring function is working.
- the fastening bracket (5) and the shaft (6)
- the eccentric (7)
  Check that it turns easily.

Change as required.

Check the distance **A** between the two volume cams and set as required, see 4-20 Jaw System - Set Volume Adjuster.



1 Curve
2 Volume cam
3 Rail bracket
4 Spring
5 Bracket
6 Shaft
7 Eccentric

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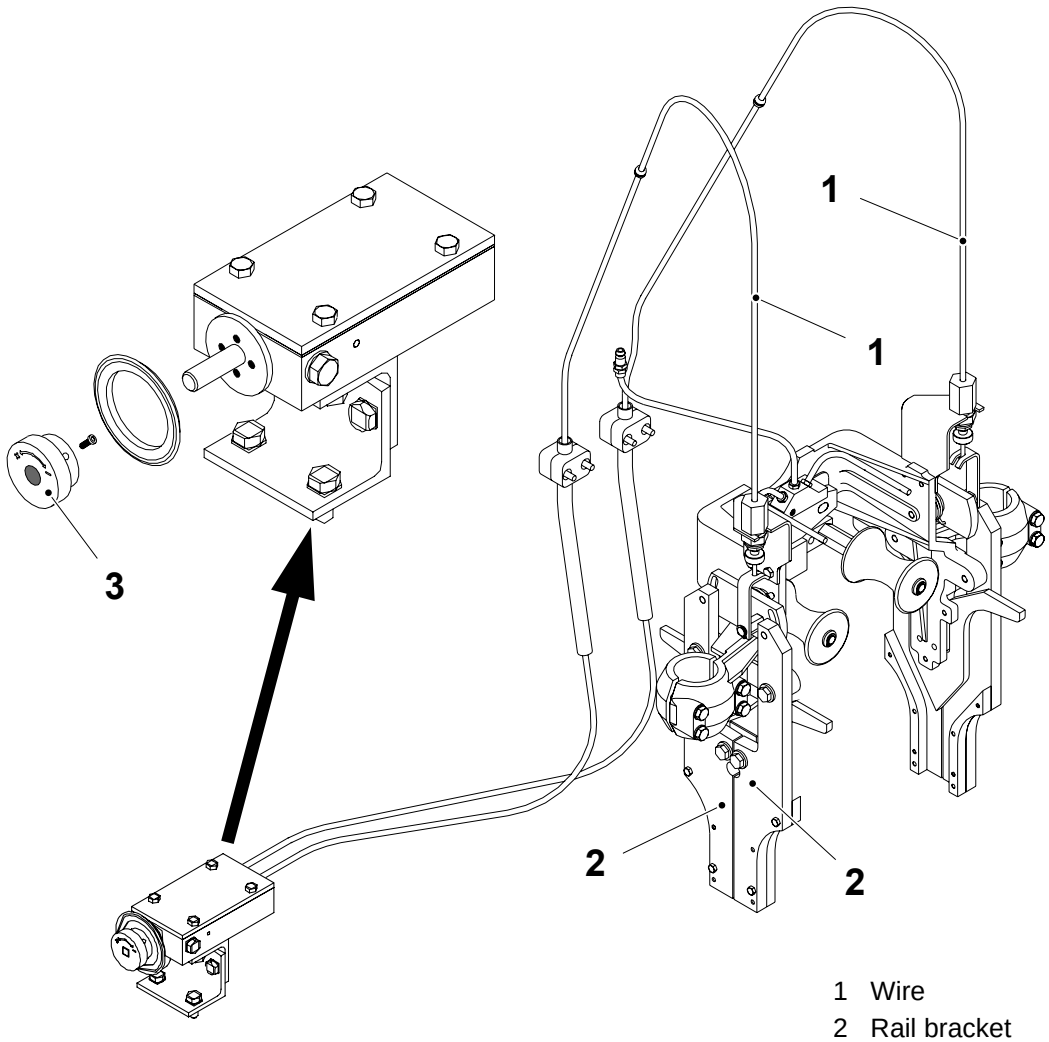
4.4.3 Control Mechanism

4.4.3-1 Control Mechanism- Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035489-0200

Check that the wires (1) move up and down. Turn the shifter handle (3) to check that the rail brackets (2) open and close.

Change as required.



1 Wire
2 Rail bracket
3 Shifter handle

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4.4.3-2 Control Mechanism - Lubricate

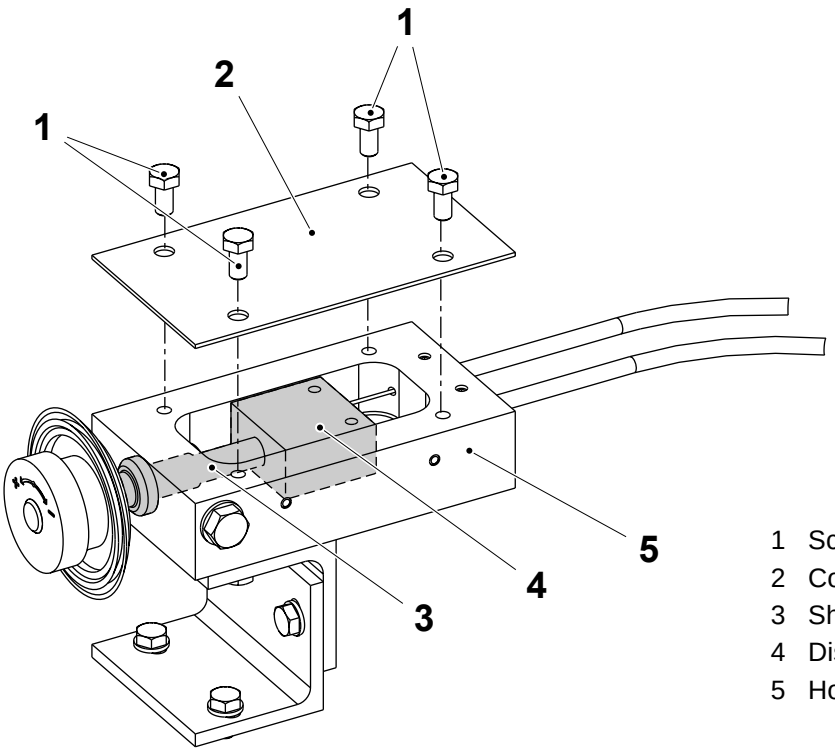
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Grease code F
SPC Reference	1035489-0200

a) Unscrew the screws (1) and remove the cover (2).

b) Apply plenty of grease, code F, see 10.3-1 Lubricants, to the shaft (3) and to the distributor (4) inside the housing (5).

c) Fit back the cover (2).

d) Tighten the screws (1).



1 Screw
2 Cover
3 Shaft
4 Distributor
5 Housing

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4.4.3-3 Control Mechanism - Set

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035489-0200

a) Set the shifter handle (1) as shown in **Figure 1**. Make sure that the shaft (2) engages the ball (3).

b) Set the distance **A** between the screw head (4) and the nut (5) by turning the adjustment screw (6), see **Figure 2**.

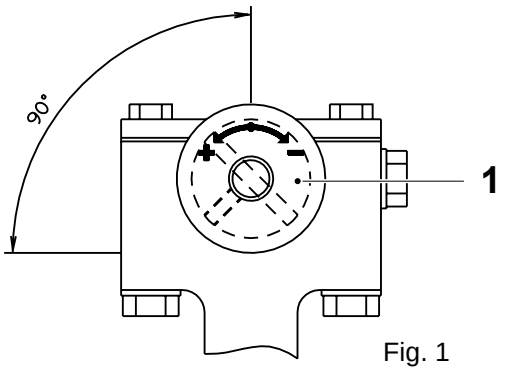


Fig. 1

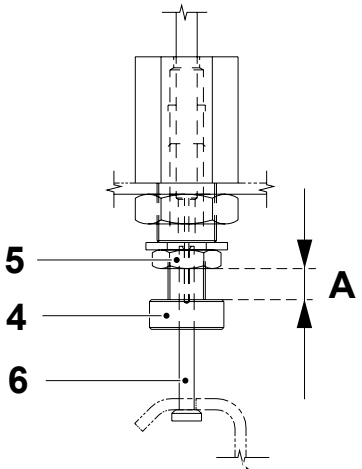
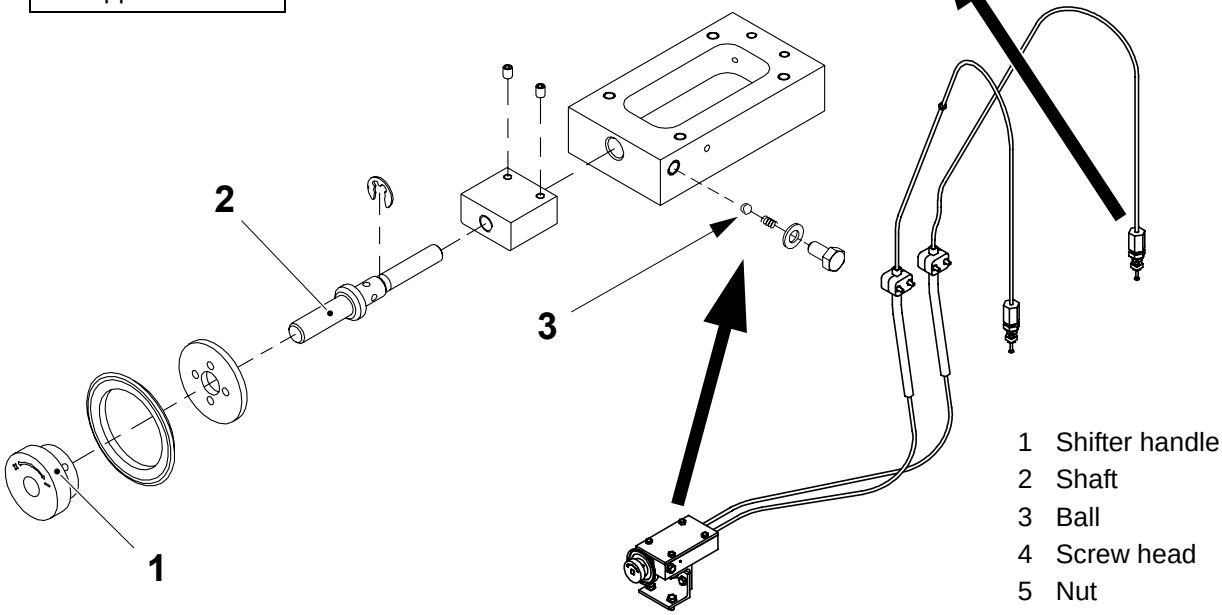


Fig. 2

A = approx. 10 mm



1 Shifter handle
2 Shaft
3 Ball
4 Screw head
5 Nut
6 Adjustment screw

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4.5 Design Correction

SPC Reference	1317966-0300

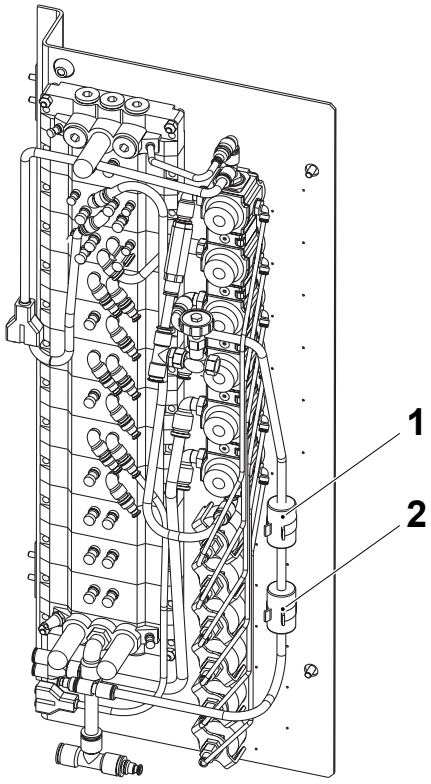
4.5.1 Photocell Unit

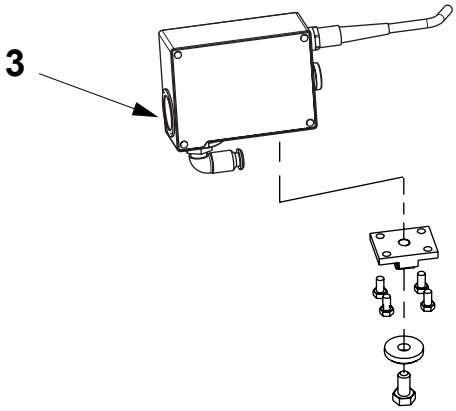
4.5.1-1 Photocell Unit - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1361925-0100 2528964-0100

Check the following parts for wear and/or damage:

- the filter (1).
  If it is **red**, it must be changed.
- the filter (2).
  If it is **pink**, it must be changed.
- the photocell lenses (3)
  Check that they are intact and clean. If required, clean the lenses with a proper cleaning solution.





1 Filter
2 Filter
3 Lens

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4.5.1-2 Photocell Unit - Set

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1361925-0100 2528964-0100

Photocells Position

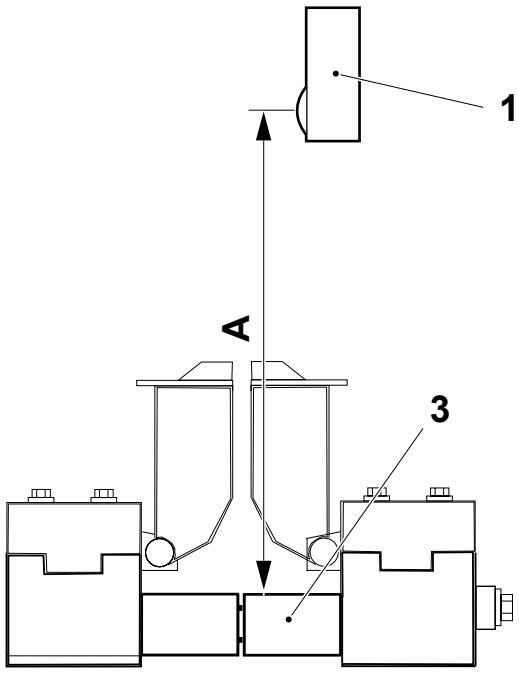
a) Make sure that the two photocells (1) are level.

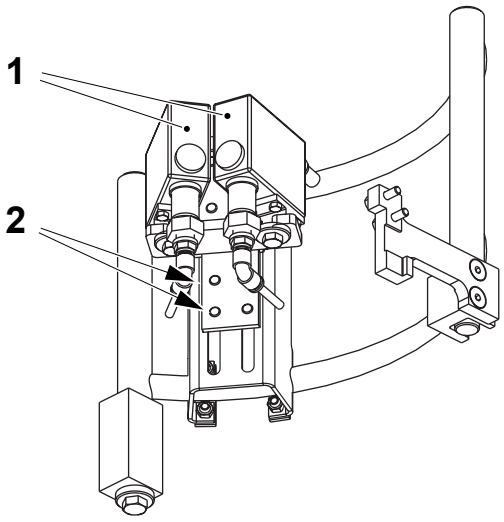
b) Crank the machine to 85 decimal degrees.

c) Loosen the screws (2) and set the distance **A** between the centre of the photocell (1) lens and the surface of the cutting jaw (3).

d) Tighten the screws (2).

Package	A ±1 (mm)	Package	A ±1 (mm)
1000 B	599	200 B	605
1000 S	422	250 B	570
TPA 1000 S	417	200 S	604
1000 Sq	568	500 S	530
1500 S	510	500 B	581
TPA 330 Sq	473	TPA 1000 Sq	520
TPA 250 Sq	555	250 S	650
330 S	485	TPA 500 Sq	552





1 Photocell
2 Screw
3 Cutting jaw

(Cont'd)

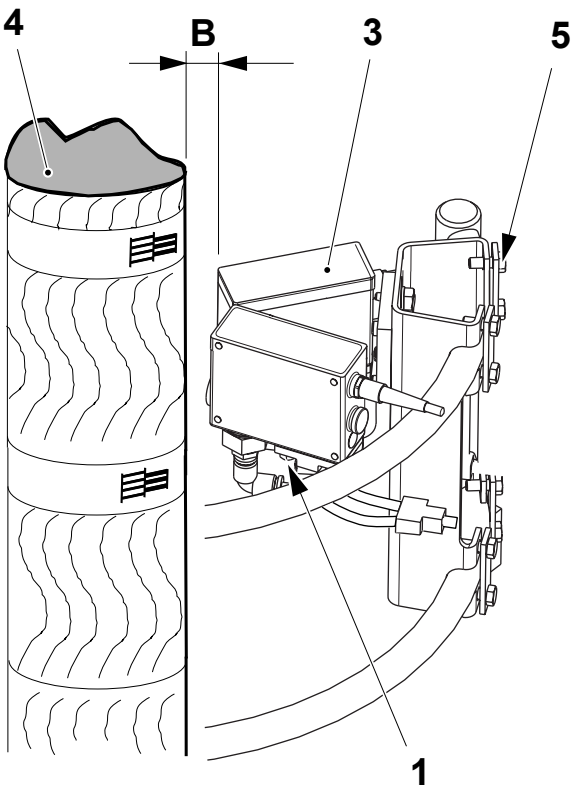
TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

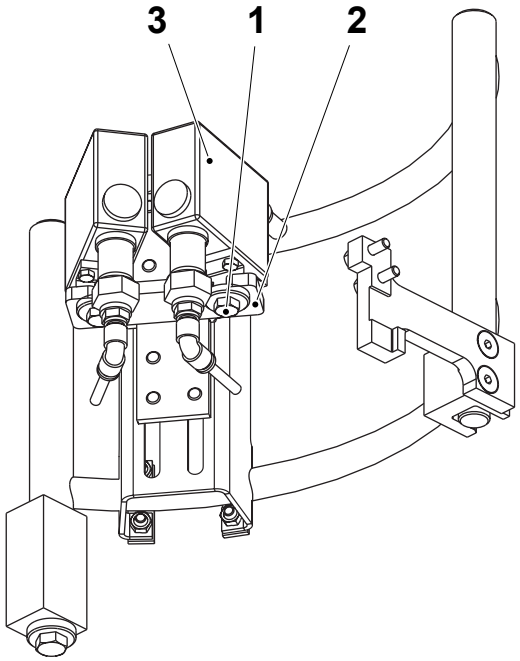
Photocells Trigger Marks Reading

a) Loosen the screws (1) on the photocells holder (2) and set the distance **B** between the photocells (3) and the sealed tube (4).

b) Use the screws (5) to set the photocell so that the spotlights are centred on the photocell trigger marks which are on the tube (4).



B = 11.5 ±1 mm



1 Screw
2 Holder
3 Photocell
4 Tube
5 Screw

TechPub_2614345_0105 - 04_MM81534_11en.fm

(Cont'd)

(Cont'd)

Design Correction Position Fine Setting

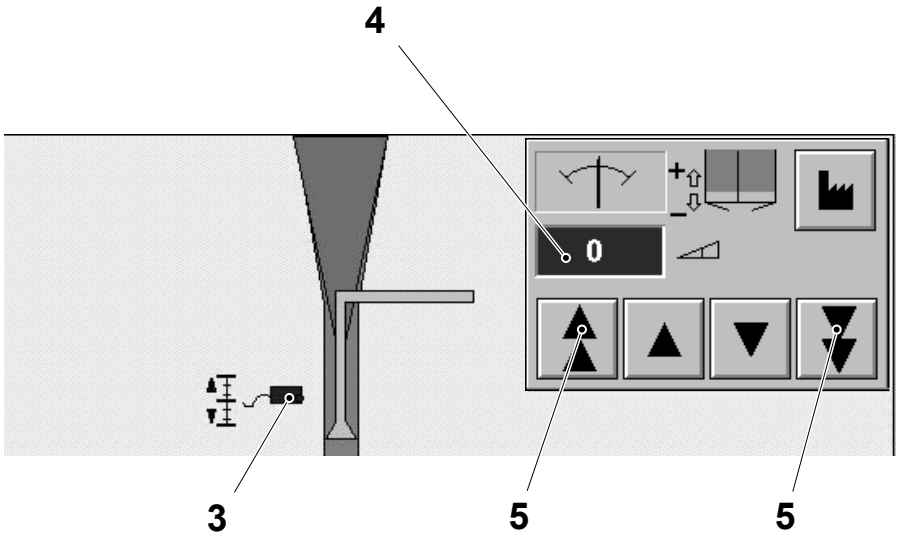
a) Touch the MANOEUVRE button (1) on the TPOP.

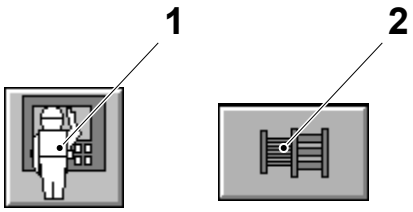
b) Touch the MAINTENANCE DESIGN CORRECTION button (2).

c) Touch the DESIGN CORRECTION PHOTOCELLS button (3).

d) Set the **Photocells value** (4) to **0** by means of the buttons (5).

e) Check that the bottom creases are correctly positioned on the packages.





1 MANOEUVRE button
2 MAINTENANCE DESIGN CORRECTION button
3 DESIGN CORRECTION PHOTOCELLS button
4 Photocells value
5 Button

(Cont'd)

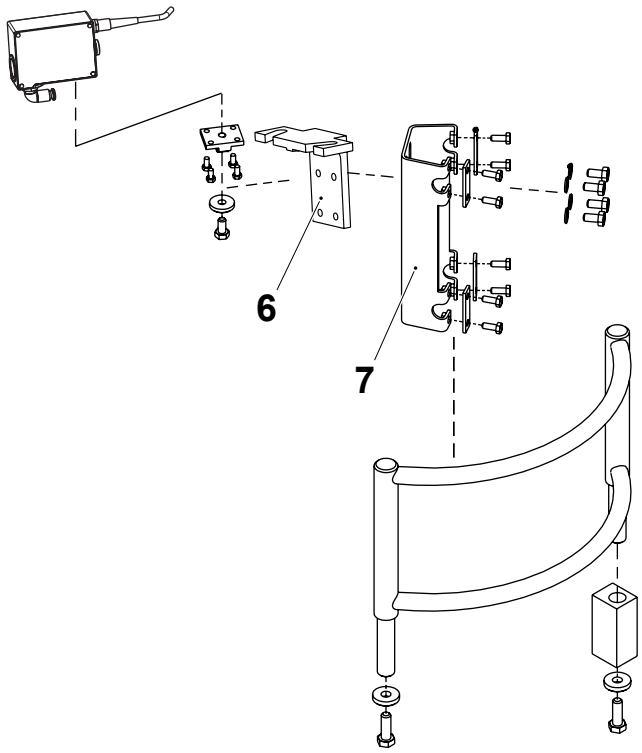
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(Cont'd)

f) Finely adjust by shifting the photocells holder (6) up or down in the bracket (7).

g) While setting, make sure that the photocells are correctly levelled.

Note! For the volumes 500 S, 330 S, 200 B and 250 B the photocell holder (6) must be turned 180 degrees.



6 Photocell holder
7 Bracket

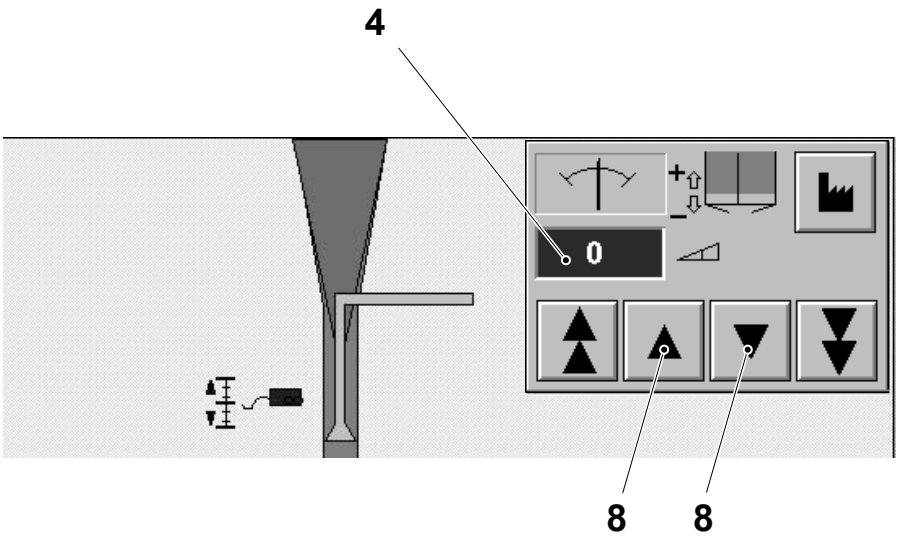
TechPub_2614345_0105 - 04_MM81534_11en.fm

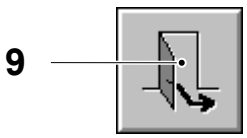
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h) Use the buttons (8) to fine set the **Photocells value** (4).

i) Touch the EXIT button (9) to finish the setting.





4 Photocells value
8 Button
9 EXIT button

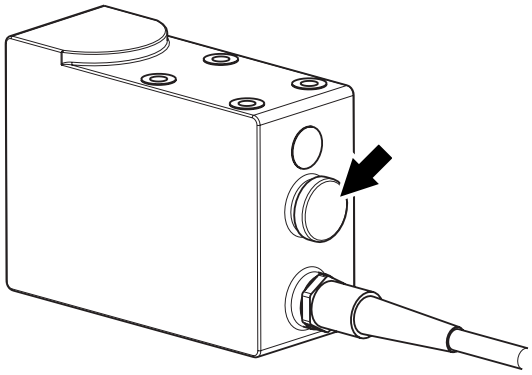
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(Cont'd)

Photocell Sensitivity

For more detailed information refer to 9.2.1-5 TMCC Controller - Set Photocells.



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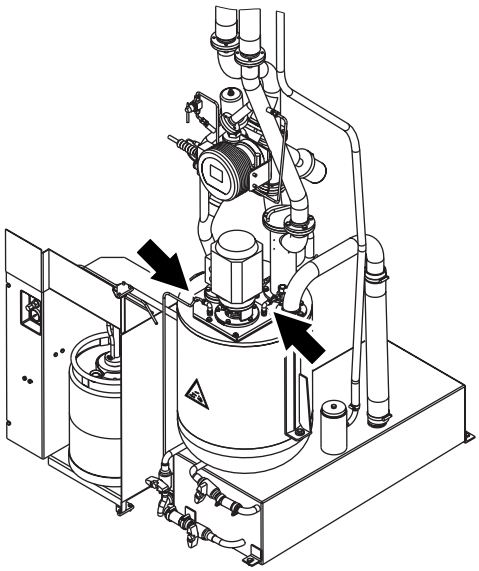
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Photocells Air Pressure Setting

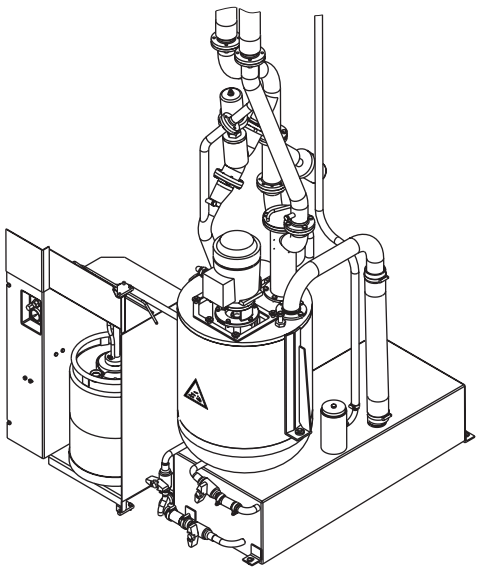
Set the design correction air pressure by means of the pressure regulator (1) on the machine body pneumatic air panel (2).

Note! The air that is used to ventilate the peroxide fumes from the new peroxide pump is taken from the same air valve as the air to the design correction photocells.

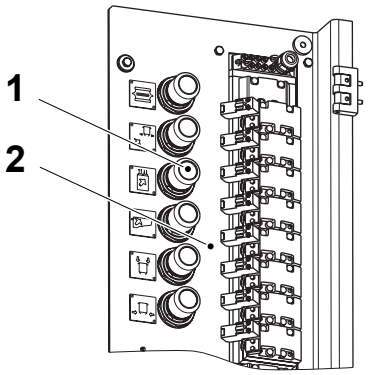
Variant	Pressure (bar)
New peroxide pump, TP No. 996388-0500	0.6
Old peroxide pump, TP No. 996388-0400	0.2



New peroxide pump,
TP No. 996388-0500



Old peroxide pump,
TP No. 996388-0400



1 Pressure regulator
2 Air panel

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4.5.1-3 Photocell Unit - Change Photocell

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1361925-0100 2528964-0100

Note! The following instruction applies to both photocells.

a) Disconnect the cable (2) from the bulkhead above the jaw system. Remove the plug (1) and store the plug (1) in a safe place for later use.

b) Disconnect the air hose (8) at the T-piece (7). Store the air hose (8) in a safe place for later use.

c) Remove the screw (6).

d) Remove the photocell (3) from the fastening plate (4) by means of the screws (5). Discard the photocell (3).

e) Cut the new photocell cable (2) to the right length and fit the plug (1).

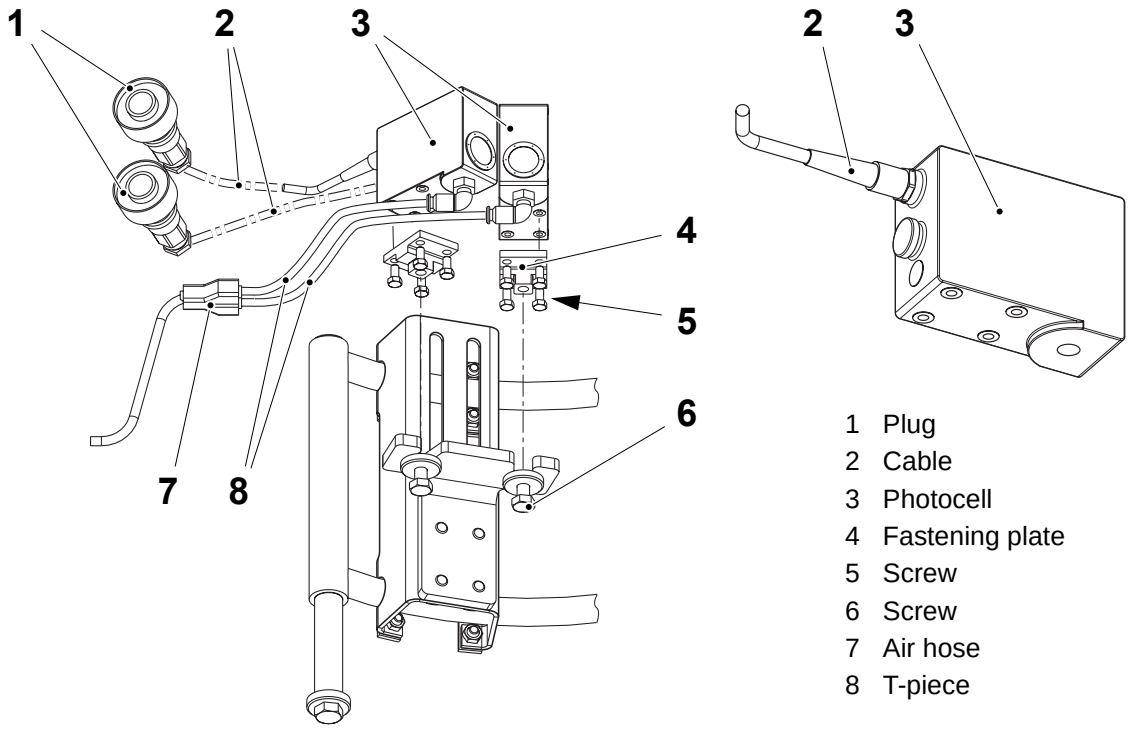
f) Fit the new photocell (3) to the fastening plate (4) by means of the screws (5).

g) Fit the new photocell (3) by means of the screw (6).

h) Fit the air hose (8) in the T-piece (7).

i) Connect the plug (1) to the bulkhead above the jaw system.

j) Set the photocell, see 4.5.1-2 Photocell Unit - Set.



1 Plug
2 Cable
3 Photocell
4 Fastening plate
5 Screw
6 Screw
7 Air hose
8 T-piece

TechPub_2614345_0105 - 04_MM81534_11en.fm

4.5.2 Drive Unit

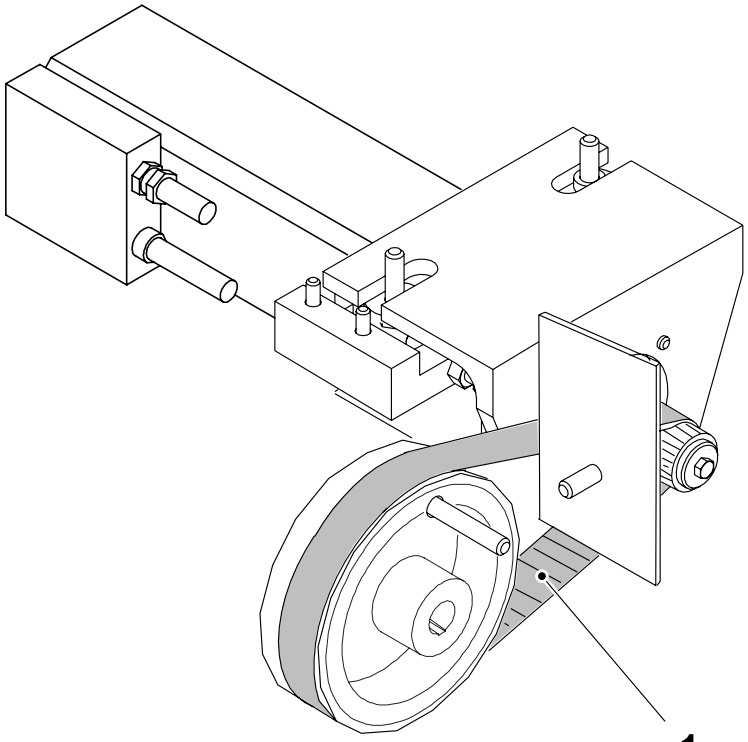
4.5.2-1 Drive Unit - Check Belt

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1317967-0100 1317968-0100

Check the following parts for visual wear and/or damage:

- the timing belt (1)
  Check also the belts tension. Set as required, see 4.5.2-4 Drive Unit - Set.

Change as required, see 4.5.2-2 Drive Unit - Change Timing Belt.



1 Timing belt

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4.5.2-2 Drive Unit - Change Timing Belt

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1317967-0100 1317968-0100

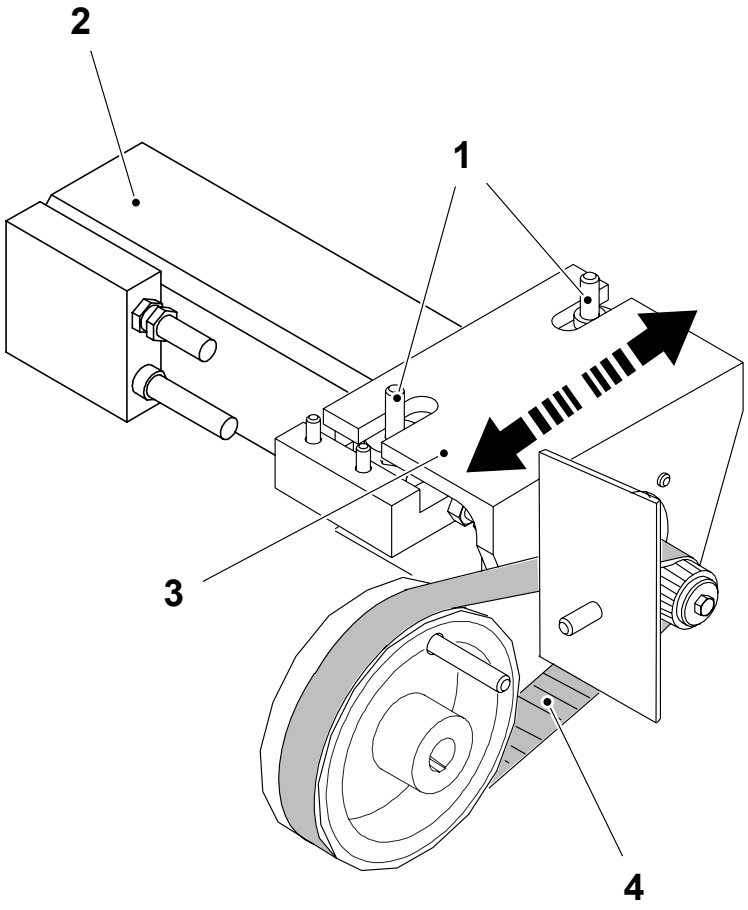
a) Loosen the screws (1) on the drive unit (2).

b) Shift the cantilever (3) on any of the directions shown with the arrows, see figure.

c) Remove the timing belt (4) and change it if worn out or damaged.

d) Assemble in the reverse order.

e) Set the timing belt (4) tension, see 4.5.2-4 Drive Unit - Set.



1 Screw
2 Drive unit
3 Cantilever
4 Timing belt

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4.5.2-3 Drive Unit - Change Bearings and Seal Ring

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1317967-0100 1317968-0100

Bearing

a) Remove the timing belt (1), see 4.5.2-2 Drive Unit - Change Timing Belt.

b) Remove the lock nut (2) and the washer.

c) Remove the toothed pulley (3).

d) Unscrew the screws (4).

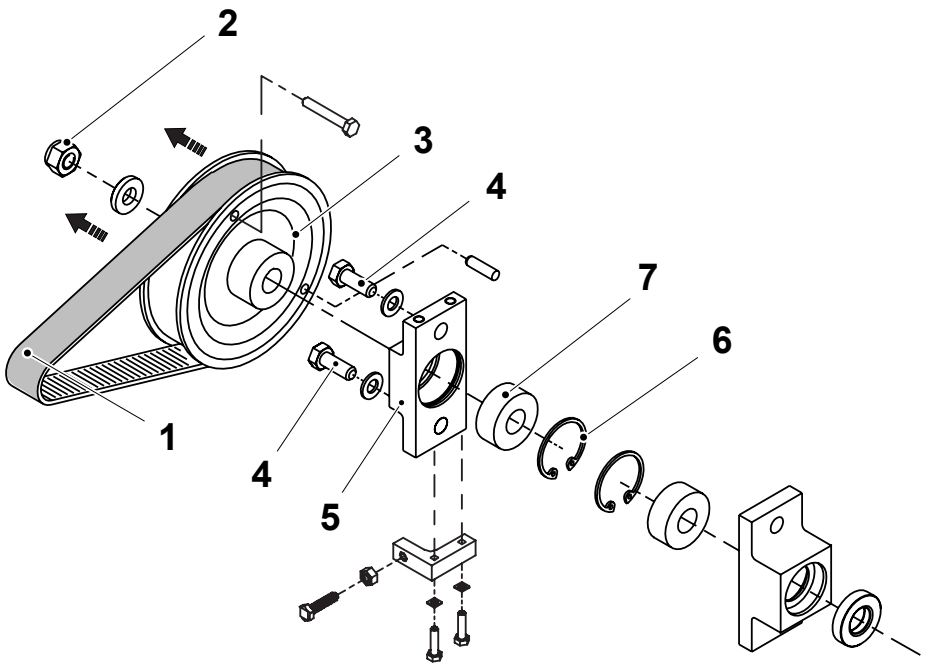
e) Remove the bearing housing (5).

f) Remove the circlip (6).

g) Remove the bearing (7) and change it.

h) Assemble in the reverse order.

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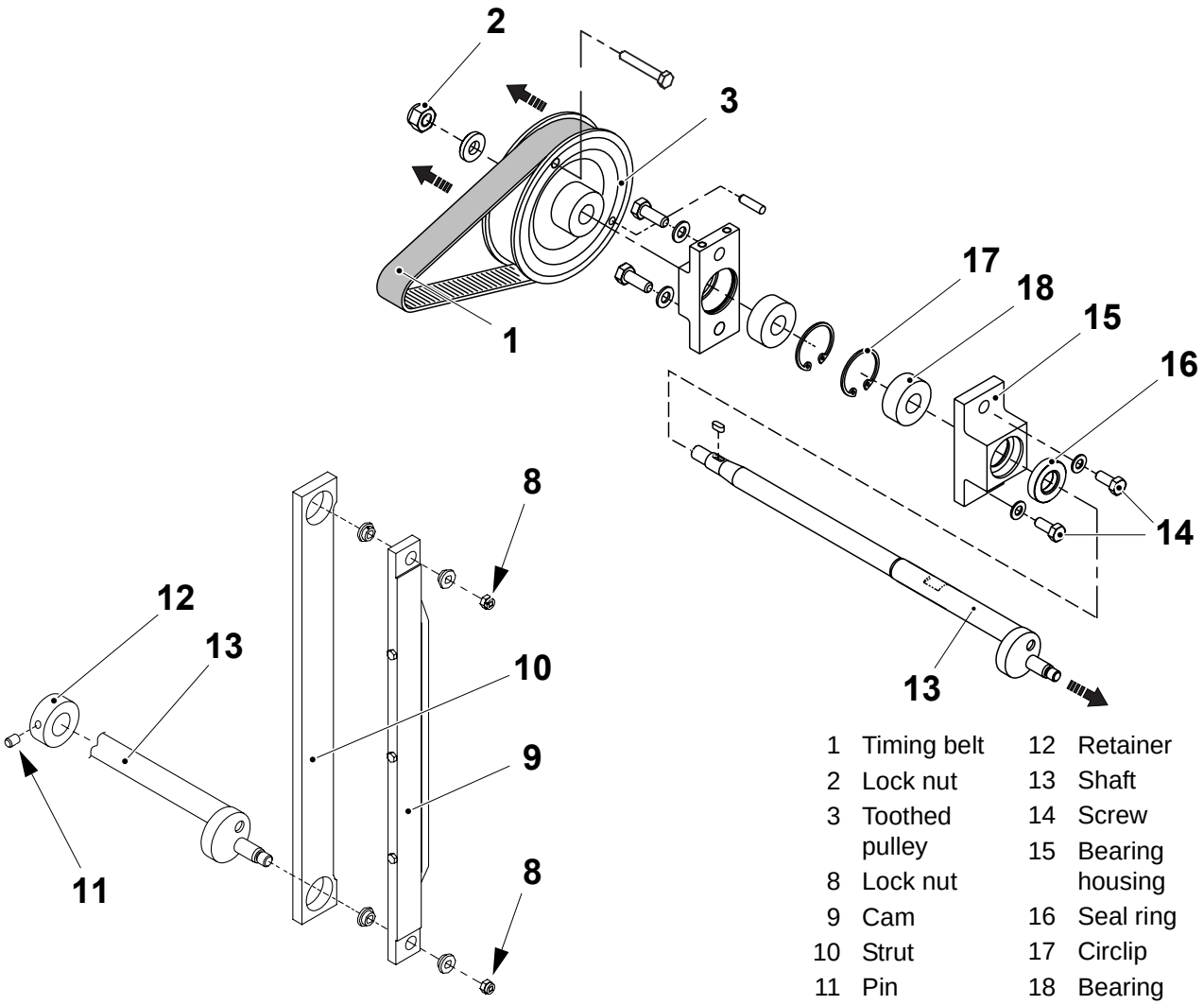
1 Timing belt
2 Lock nut
3 Toothed pulley
4 Screw
5 Bearing housing
6 Circlip
7 Bearing

(Cont'd)

(Cont'd)

Seal Ring and Bearing

a) Remove the timing belt (1), the lock nut (2) and the washer.
b) Remove the toothed pulley (3).
c) Remove the two lock nuts (8).
d) Remove the folding flap cam (9) and the strut (10).
e) Unscrew the pin (11) and remove the retainer (12).
f) Remove the eccentric shaft (13) as shown in the figure.
g) Unscrew the two screws (14) and the bearing housing (15).
h) Remove the seal ring (16) and change it.
i) Remove the circlip (17), the bearing (18) and change it.
j) Assemble in the reverse order.



1	Timing belt	12	Retainer
2	Lock nut	13	Shaft
3	Toothed pulley	14	Screw
8	Lock nut	15	Bearing housing
9	Cam	16	Seal ring
10	Strut	17	Circlip
11	Pin	18	Bearing

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4.5.2-4 Drive Unit - Set

SPC Reference	1317967-0100 1317968-0100

Follow the procedure described in 4-13 Jaw System - Set Folding Flaps Mechanism and the procedures described in 4-14 Jaw System - Set Folding Flaps Mechanism on the Carriers.

4.5.2-5 Drive Unit - Set Drive Motor Card

SPC Reference	1317967-0100 1317968-0100

Follow the procedure described in 9.2.1-2 TMCC Controller - Set Control Cards.

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4.5.3 Design Correction Device

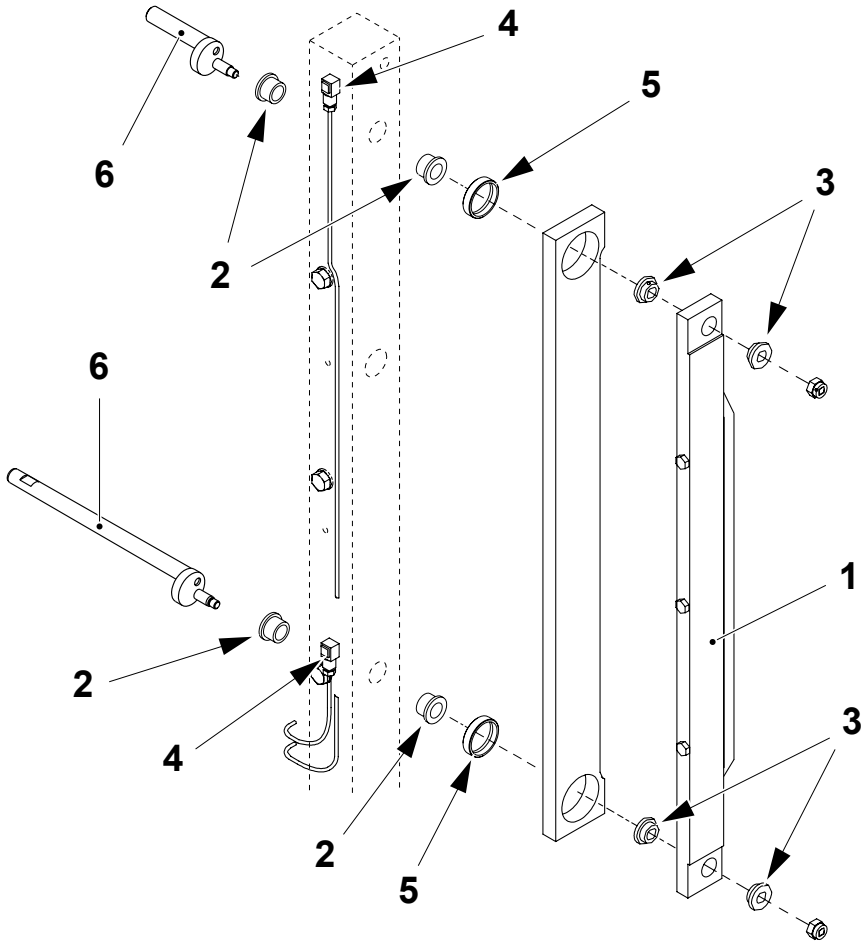
4.5.3-1 Design Correction Device - Check

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1317969-0300 1317970-0300

Check the following details for visual wear and/or damage:

- the folding flap cam (1)
  Check the cam (1) surface for marks and that the cam (1) moves easily.
- the flange bushings (2) and (3)
  Check also for excessive play on the flange bushings (2) and (3).
- the oil connections (4)
  Check for oil leakages.
- the plain bearings (5)
- the eccentric shafts (6)
  Check also that they are not bent or cracked and that they turn freely.

Change as required.



1 Cam
2 Flange bushing
3 Flange bushing
4 Oil connection
5 Plain bearing
6 Eccentric shaft

TechPub_2614345_0105 - 04_MM81534_11en.fm

4.5.3-2 Design Correction Device - Change Plain Bearings

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1317969-0300 1317970-0300

a) Remove the two oil connections (1).

b) Remove the nuts (2).

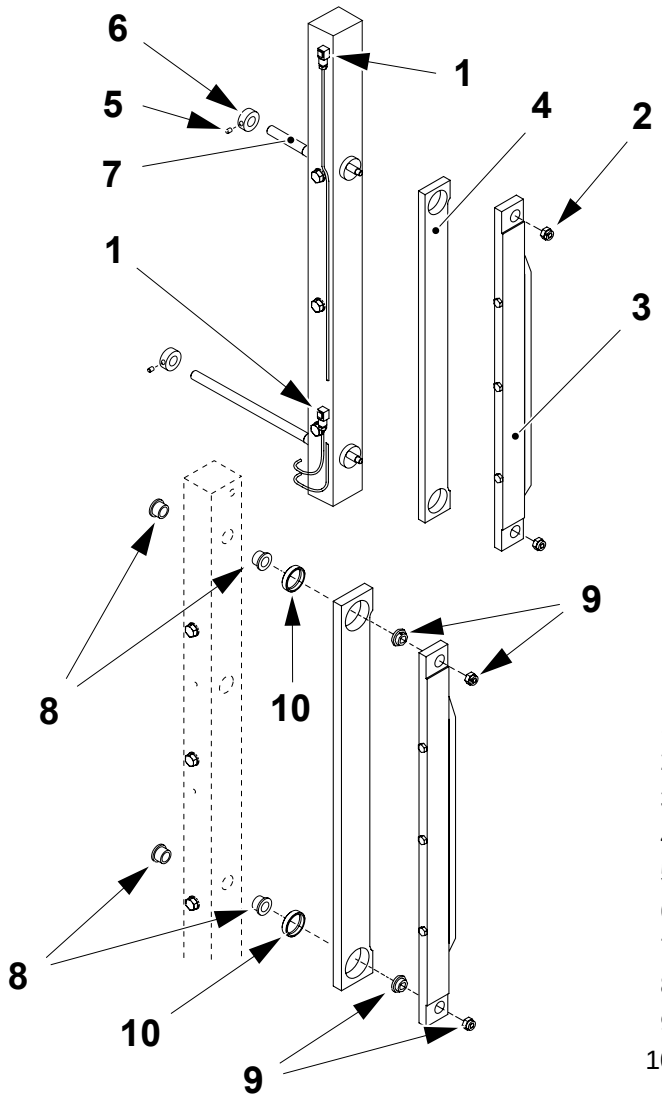
c) Remove the folding flap cam (3) and the strut (4).

d) Remove the pins (5) and remove the retainers (6).

e) Remove the eccentric shafts (7).

f) Remove the flange bushings (8), (9), the plain bearings (10) and change them as required.

g) Assemble in the reverse order.



1 Oil connection
2 Nut
3 Folding flap cam
4 Strut
5 Pin
6 Retainer
7 Eccentric shaft
8 Flange bushing
9 Flange bushing
10 Plain bearing

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4.6 Cables and Hoses

SPC Reference	1035138-0300

4.6-1 Cables and Hoses - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1035138-0300

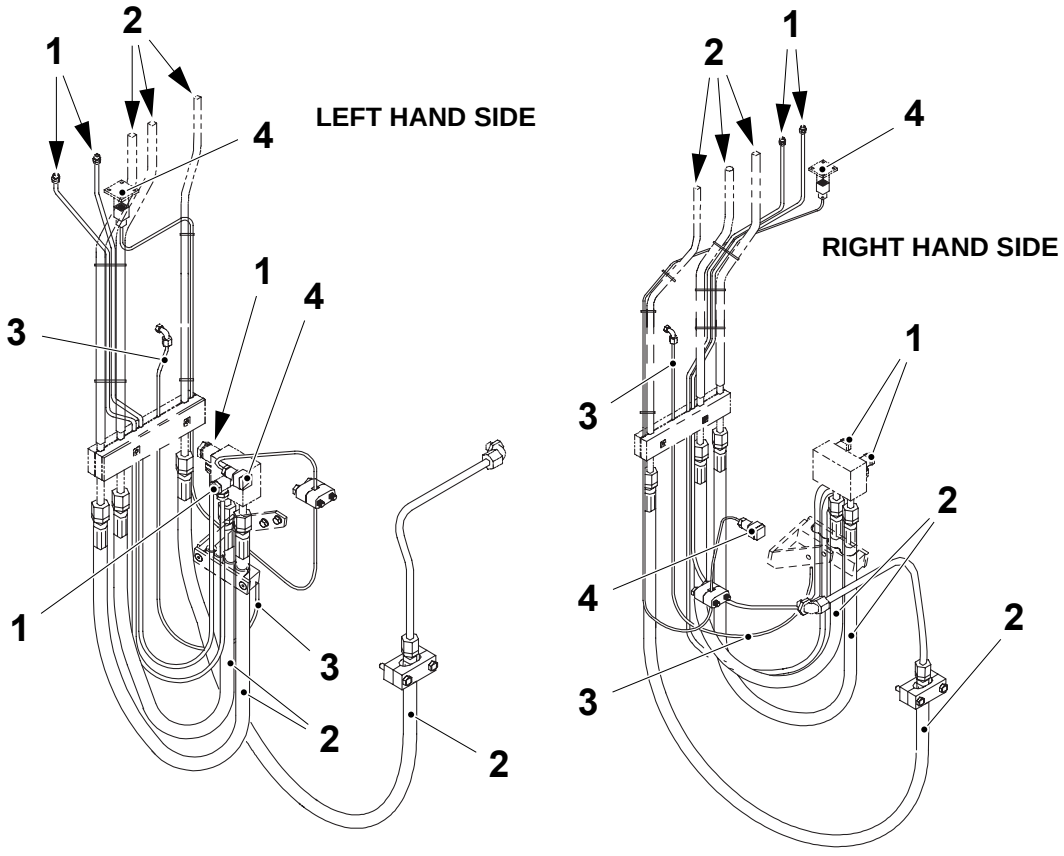
WARNING
Risk of personal injury.
Wear protective gloves.

a) Check that the water coolant hoses (1), the hydraulic oil hoses (2) and the central lubrication pipes (3) do not leak, and that they are intact and that their connections are tight.

b) Check that all the hoses and cables are properly clamped.

c) Check that the insulation of the electrical cables (4) and their connections are not damaged, and that the electrical conductors are not oxidized. If required clean them with a brass wire brush.

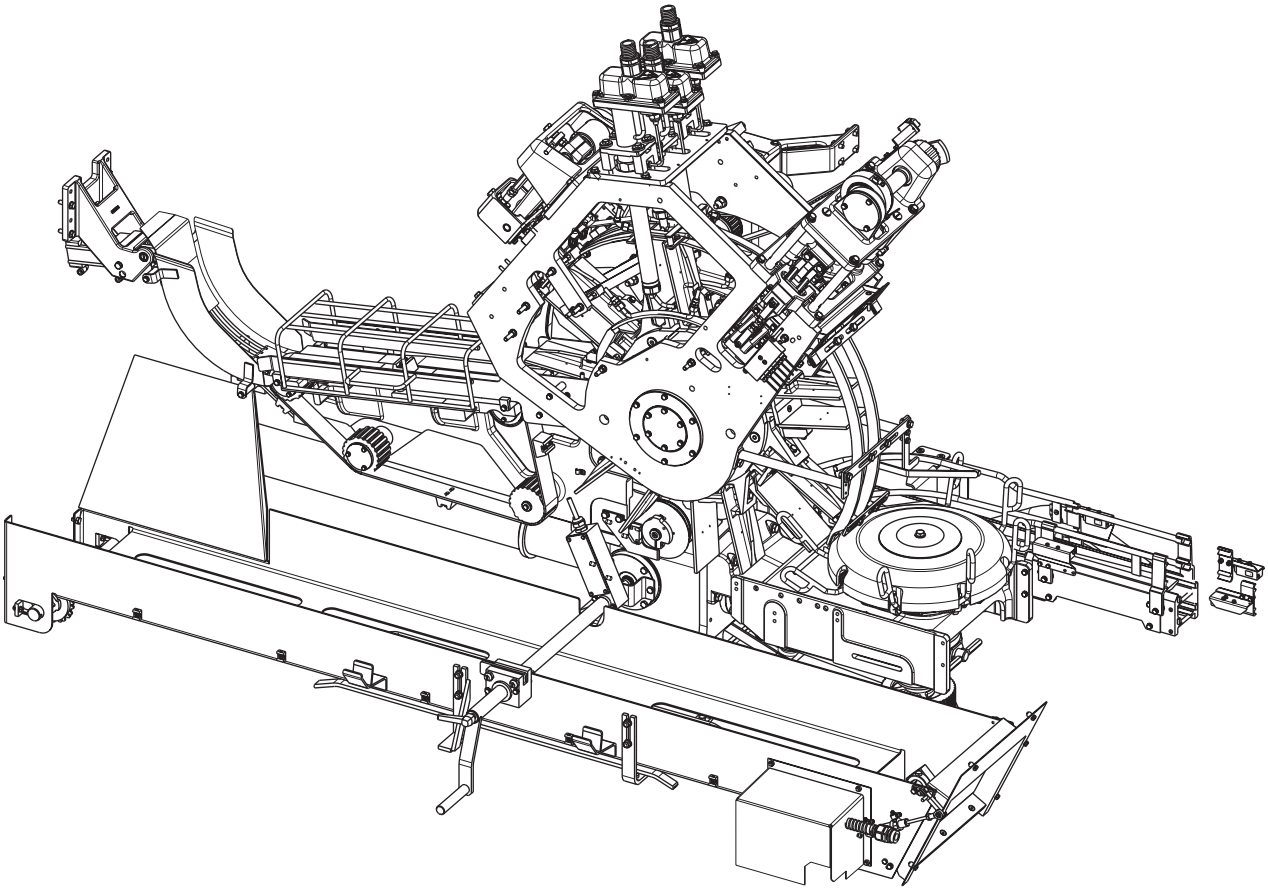
d) Change as required.



1 Water hose
2 Hydraulic oil hose
3 Lubrication pipe
4 Electrical cable

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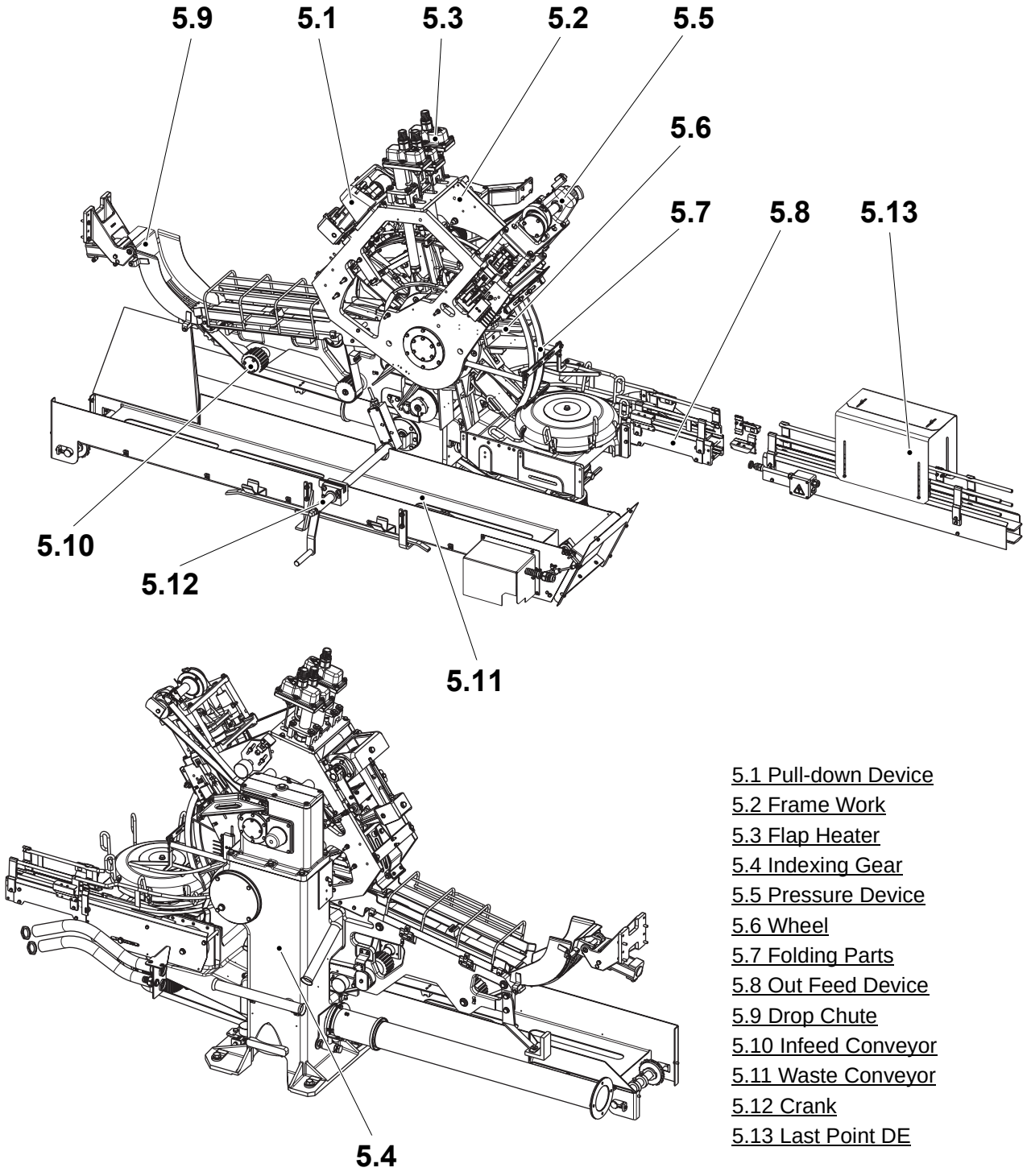
5 Final Folder



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Final Folder - Description

SPC Reference	648515-0200



5.1 Pull-down Device
5.2 Frame Work
5.3 Flap Heater
5.4 Indexing Gear
5.5 Pressure Device
5.6 Wheel
5.7 Folding Parts
5.8 Out Feed Device
5.9 Drop Chute
5.10 Infeed Conveyor
5.11 Waste Conveyor
5.12 Crank
5.13 Last Point DE

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5 Final Folder . . . . . 5 - 7

5-2 Final Folder - Setting Sequence . . . . . 5 - 7

5-3 Final Folder - Synchronise Wheel to the Gear Box . . . . . 5 - 8

5-4 Final Folder - Set Drop Chute Position . . . . . 5 - 10

5-5 Final Folder - Synchronise Infeed Conveyor . . . . . 5 - 12

5-6 Final Folder - Synchronise Pull-down Device . . . . . 5 - 14

5-7 Final Folder - Set Pull-down Device Parallelism . . . . . 5 - 16

5-8 Final Folder - Set Pull-down Device Position . . . . . 5 - 17

5-9 Final Folder - Set Pull-down Device Lower Turning Position . . . . . 5 - 19

5-10 Final Folder - Set Folding Part Roof . . . . . 5 - 20

5-11 Final Folder - Set Folding Part Guides . . . . . 5 - 21

5-12 Final Folder - Set Folding Part Guide Rails . . . 5 - 26

5-13 Final Folder - Set Flap Heater Nozzles . . . . . 5 - 28

5-14 Final Folder - Set Pressure Device Lower Turning Position . . . . . 5 - 30

5-15 Final Folder - Set Pressure Device Pushers . . . 5 - 31

5-16 Final Folder - Set Package Out Feed Holder . . 5 - 36

5-17 Final Folder - Set Package Out Feed Rail . . . . . 5 - 37

5-18 Final Folder - Synchronise Package Out Feed . . . . . 5 - 39

5-19 Final Folder - Synchronise Overload Switches . . . . . 5 - 40

5-20 Final Folder - Set Home Position Indexing Gear . . . . . 5 - 42

5-21 Final Folder - Set Package Out Feed Counting Photocells . . . . . 5 - 43

5.1 Pull-down Device . . . . . 5 - 44

5.1-1 Pull-down Device - Set Parallelism . . . . . 5 - 44

5.1-2 Pull-down Device - Synchronisation . . . . . 5 - 44

5.1-3 Pull-down Device - Set Lower Turning Position . . . . . 5 - 44

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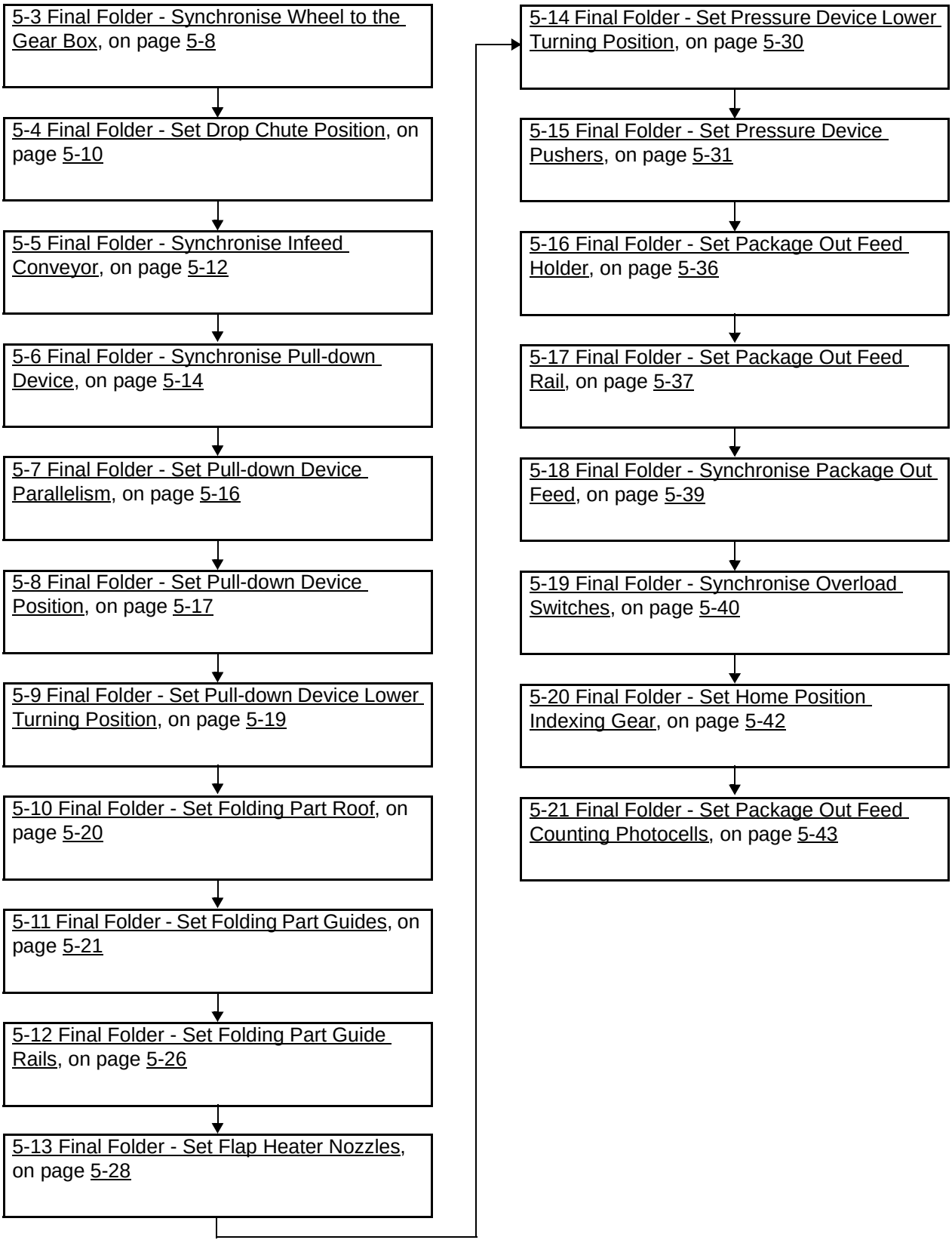
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5 Final Folder

5-2 Final Folder - Setting Sequence



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5-3 Final Folder - Synchronise Wheel to the Gear Box

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Template pin TP No. 1350498 Template TP No. 1350497
SPC Reference	648515-0200

a) Crank the final folder to 0°.

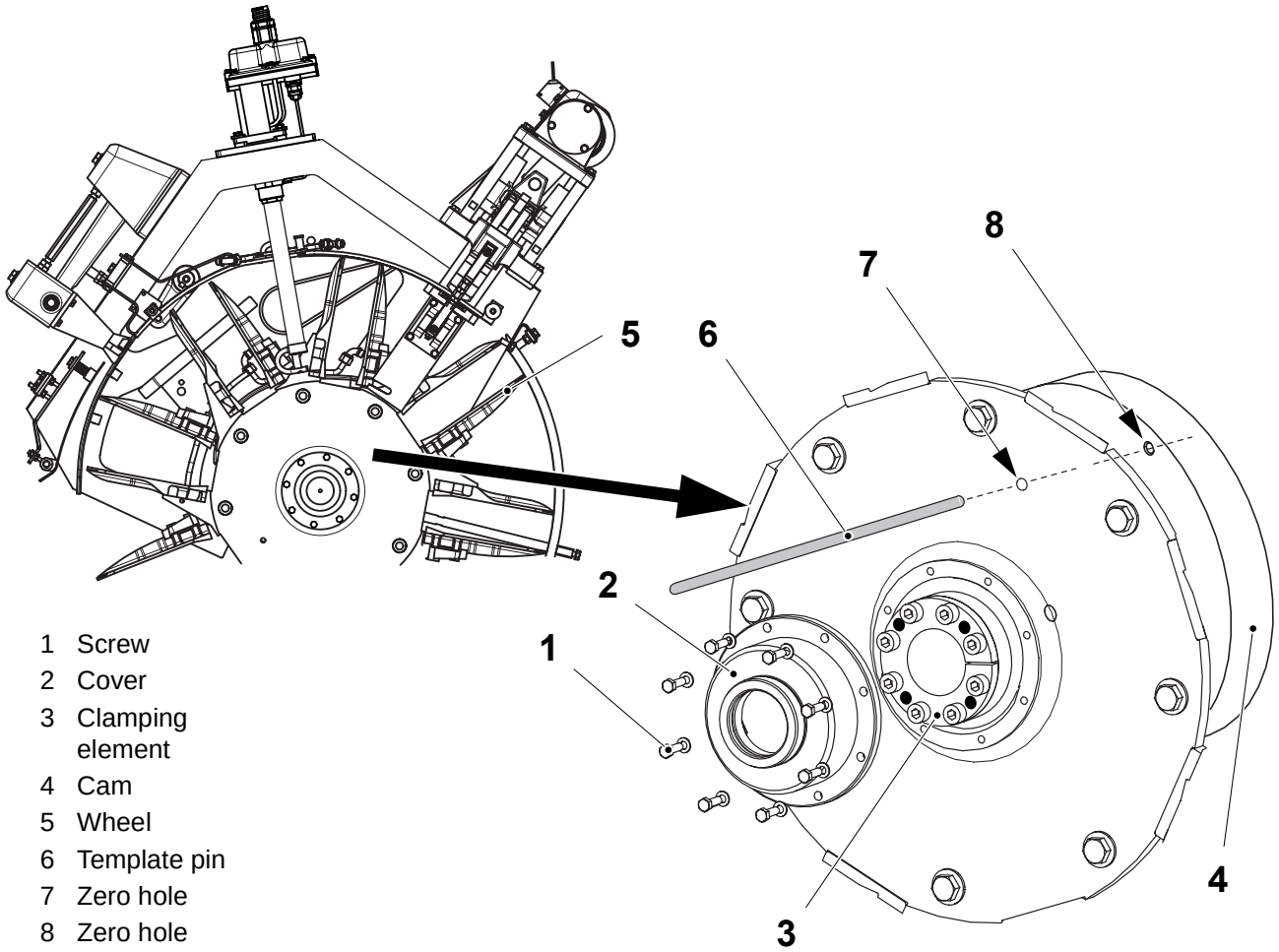
b) Remove the external frame, see 5.6-1 Wheel - Change.

c) Remove the screws (1) and the cover (2).

d) Loosen the clamping element (3), see 5.6.1-1 Clamping Element - Remove.

e) Turn the wheel (5) by hand and align the zero hole (7) in the wheel to the zero hole (8) in the cam (4).

f) Fit the template pin (6) through the two zero holes.



1 Screw
2 Cover
3 Clamping element
4 Cam
5 Wheel
6 Template pin
7 Zero hole
8 Zero hole

(Cont'd)

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g) Fit the template (9) onto the shaft of the indexing gear and tighten the screw (10).

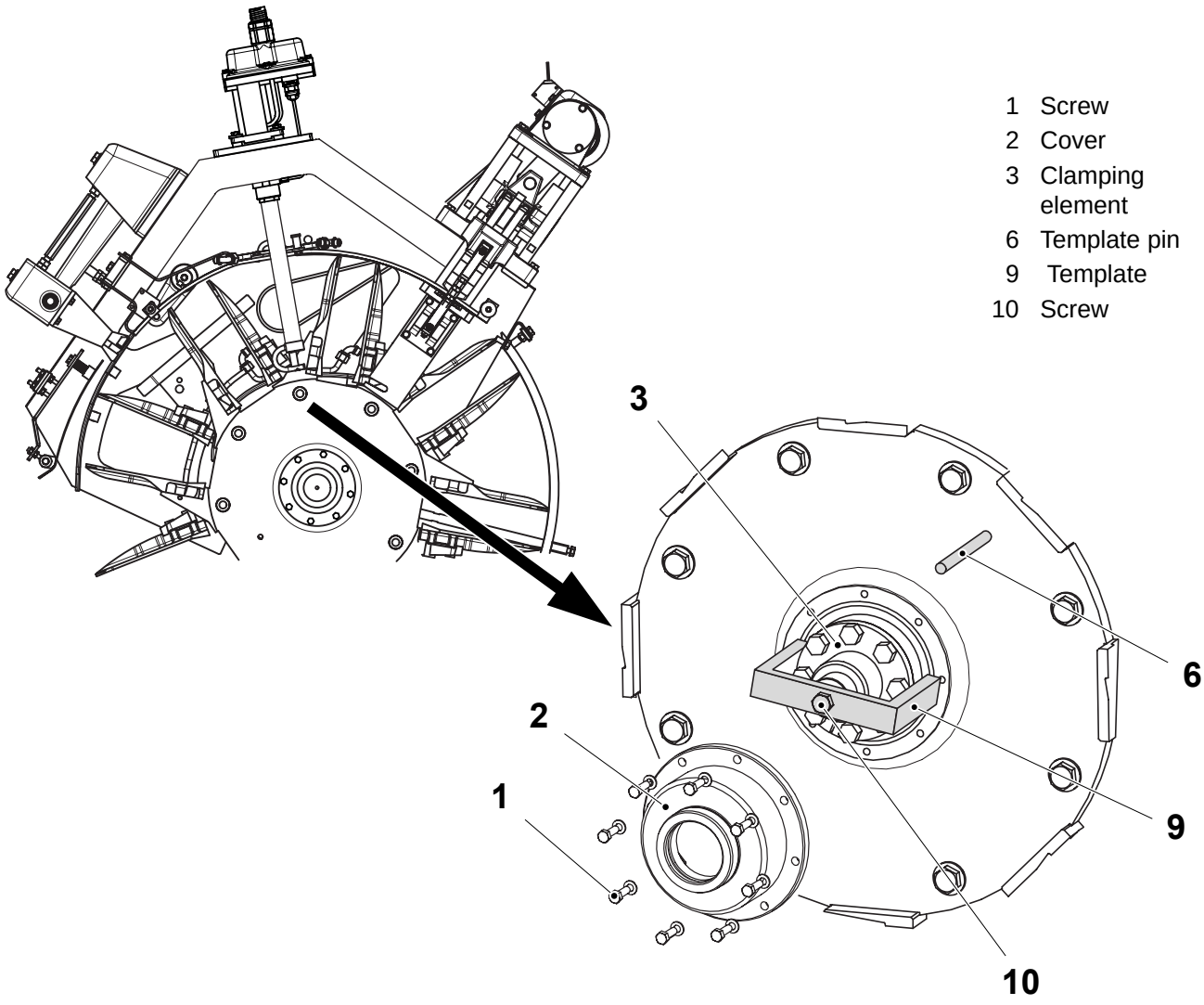
h) Tighten the clamping element (3), see 5.6.1-2 Clamping Element - Assemble.

i) Remove the template pin (6).

j) Remove the screw (10) and the template (9).

k) Fit the cover (2) and tighten the screws (1).

l) Fit the external frame, see 5.6-1 Wheel - Change.



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5-4 Final Folder - Set Drop Chute Position

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	648515-0200

WARNING

Risk of personal injury due to pinching or crushing.
Be careful to keep your fingers safe because the cradle (1) may move unexpectedly.

Only Valid for TPA 1000 Sq

a) Activate the valve **Y5501**.

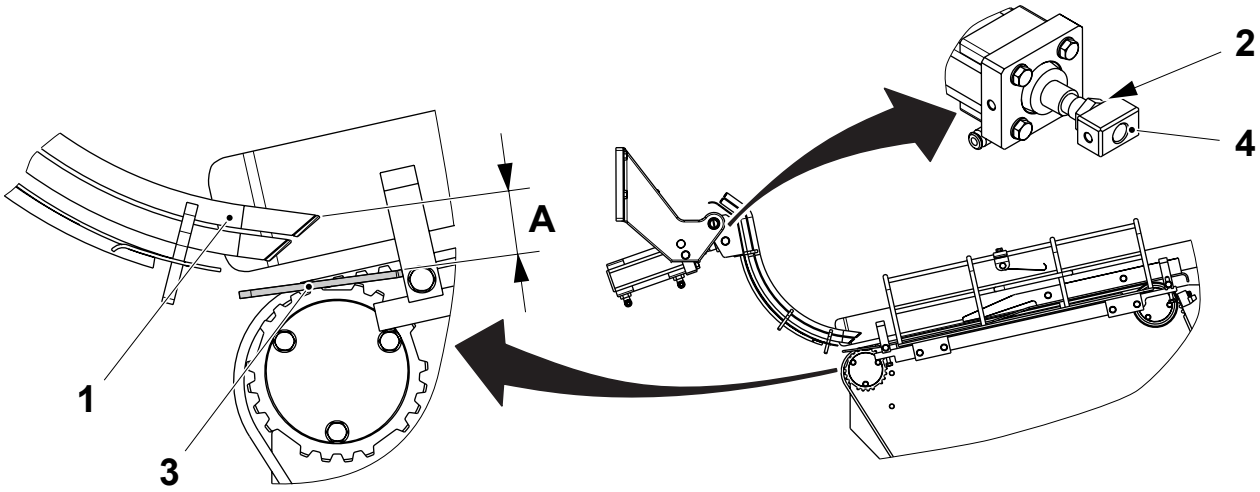
b) Loosen the nut (2).

c) Set the distance **A** between the cradle (1) and the package guide (3) by means of the cylinder piston head (4).

d) Tighten the nut (2).

e) Deactivate the valve **Y5501**.

Package	A ±0.5 (mm)
TPA 1000 Sq	26.0



1 Cradle
2 Nut
3 Package guide
4 Piston head

(Cont'd)

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(Cont'd)

WARNING

Risk of personal injury due to pinching or crushing.

Be careful to keep your fingers safe because the cradle (3) may move unexpectedly.

Not Valid for TPA 1000 Sq

a) Activate the valve **Y5501**.

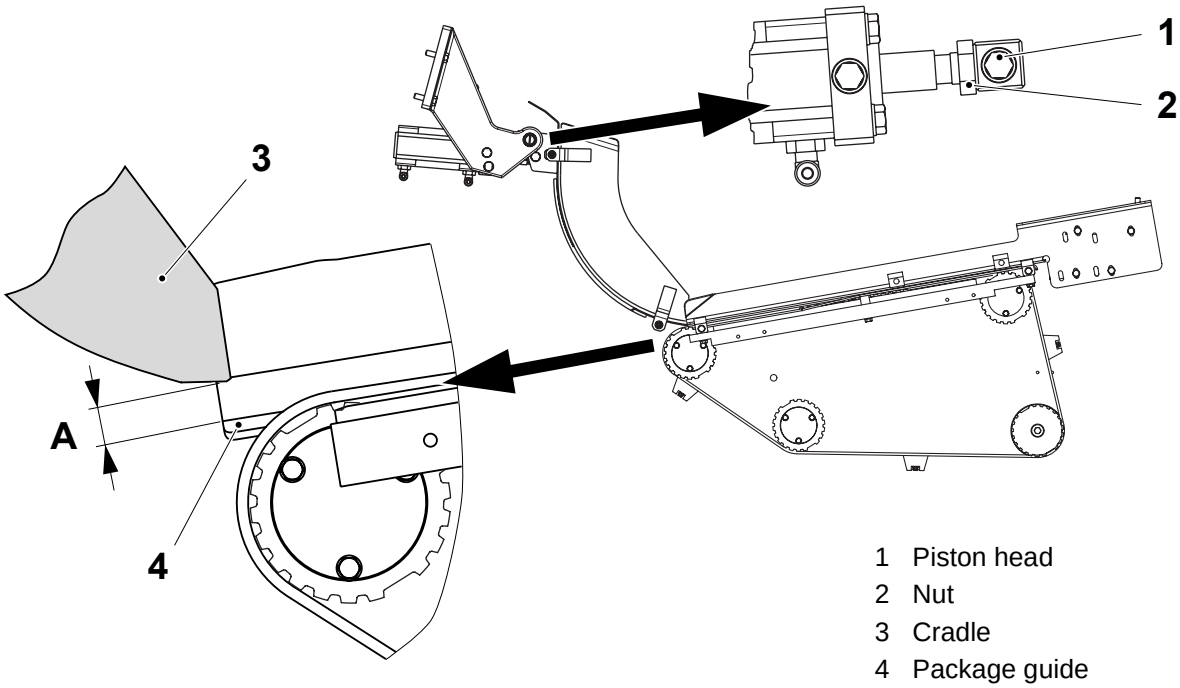
b) Loosen the nut (2).

c) Set the distance **A** between the cradle (3) and the package guides (4) by means of the cylinder piston head (1).

d) Tighten the nut (2).

e) Deactivate the valve **Y5501**.

Package	A ±0.5 (mm)
1000 B - 1000 S - 1000 Sq - TPA 1000 S - 1500 S - 500 S - 500 B - TPA 330 Sq - TPA 500 Sq - 250 B - 200 B - 200 S - 250 S - 330 S	9.0
TPA 250 Sq	13.0



1 Piston head
2 Nut
3 Cradle
4 Package guide

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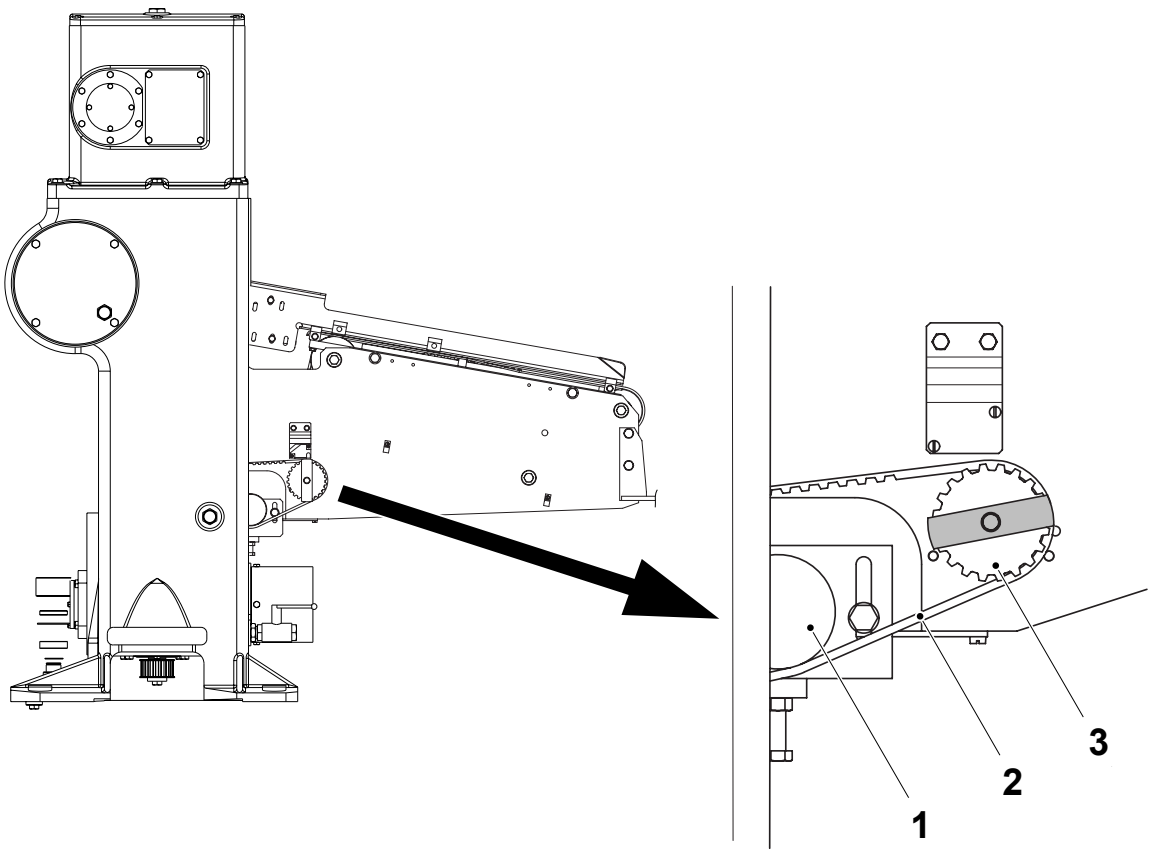
5-5 Final Folder - Synchronise Infeed Conveyor

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648515-0200

a) Crank the final folder to 0°.

b) Loosen the belt (2) tension by means of the roller (1).

c) Remove the belt (2) from the toothed pulley (3).



1 Roller
2 Belt
3 Toothed pulley

(Cont'd)

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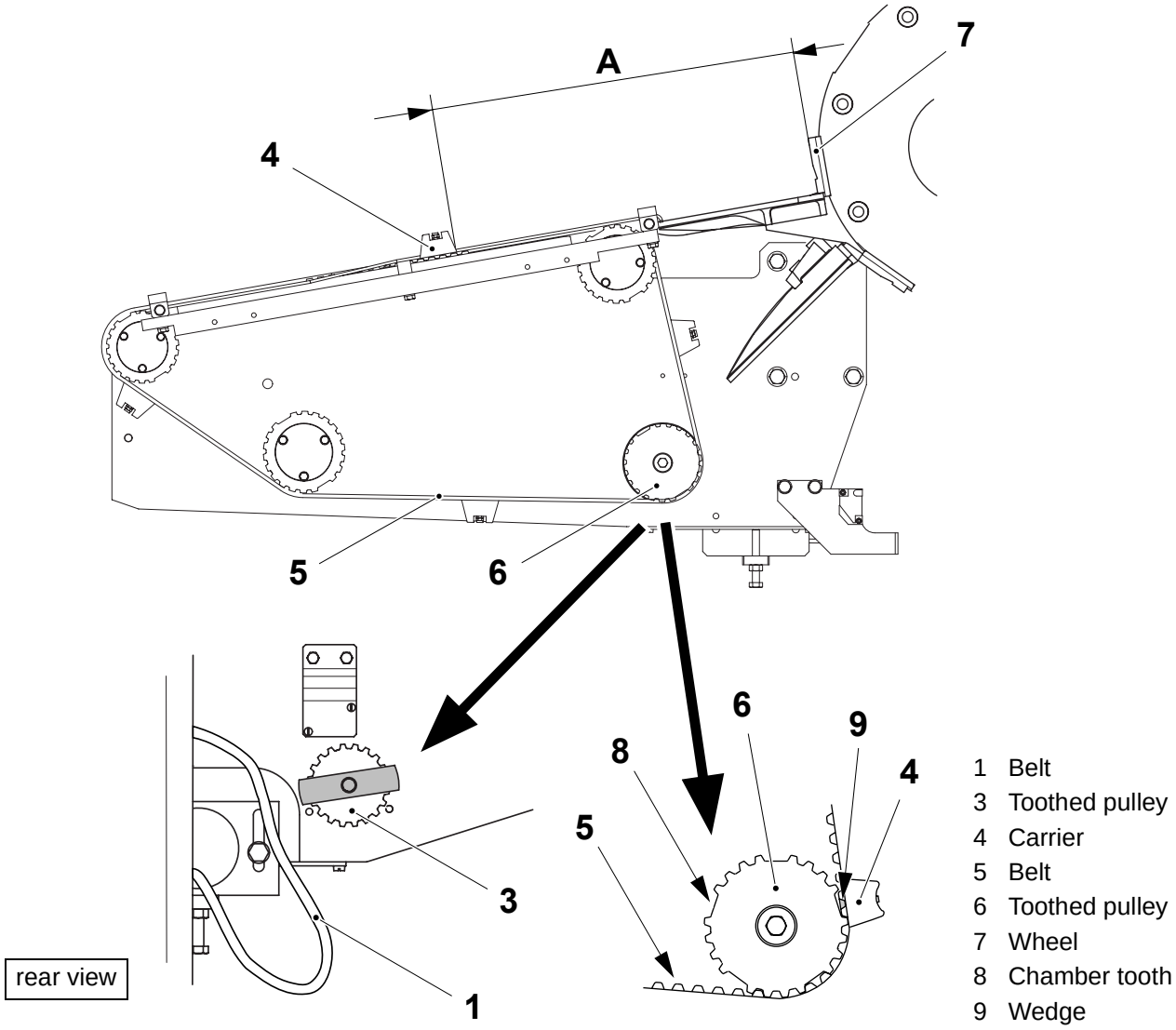
(Cont'd)

Note! Make sure that the wedge (9) underneath the carrier (4) on the belt (5) is positioned on a chamber tooth (8) in the toothed pulley (6).

d) Set the distance **A** between the carrier (4) and the bottom of the wheel (7) by turning the toothed pulley (3).

e) Fit the belt (1) and set as required, see 5.10-2 Infeed Conveyor - Set Belts.

Package	A ±5.0 (mm)	Package	A ±5.0 (mm)	Package	A ±5.0 (mm)
1000 S - TPA 1000 S	602.0	1000 B	519.0	200 B	390.0
200 S - 250 B	435.0	1000 Sq	590.0	500 B	507.0
TPA 330 Sq	456.0	TPA 1000 Sq	700.0	500 S	470.0
TPA 250 Sq	510.0	1500 S	752.0	330 S	503.0
TPA 500 Sq	520.0	250 S	460.0		



1 Belt
3 Toothed pulley
4 Carrier
5 Belt
6 Toothed pulley
7 Wheel
8 Chamber tooth
9 Wedge

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5-6 Final Folder - Synchronise Pull-down Device

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Special Equipment	Torque wrench min. 4 Nm
SPC Reference	648515-0200

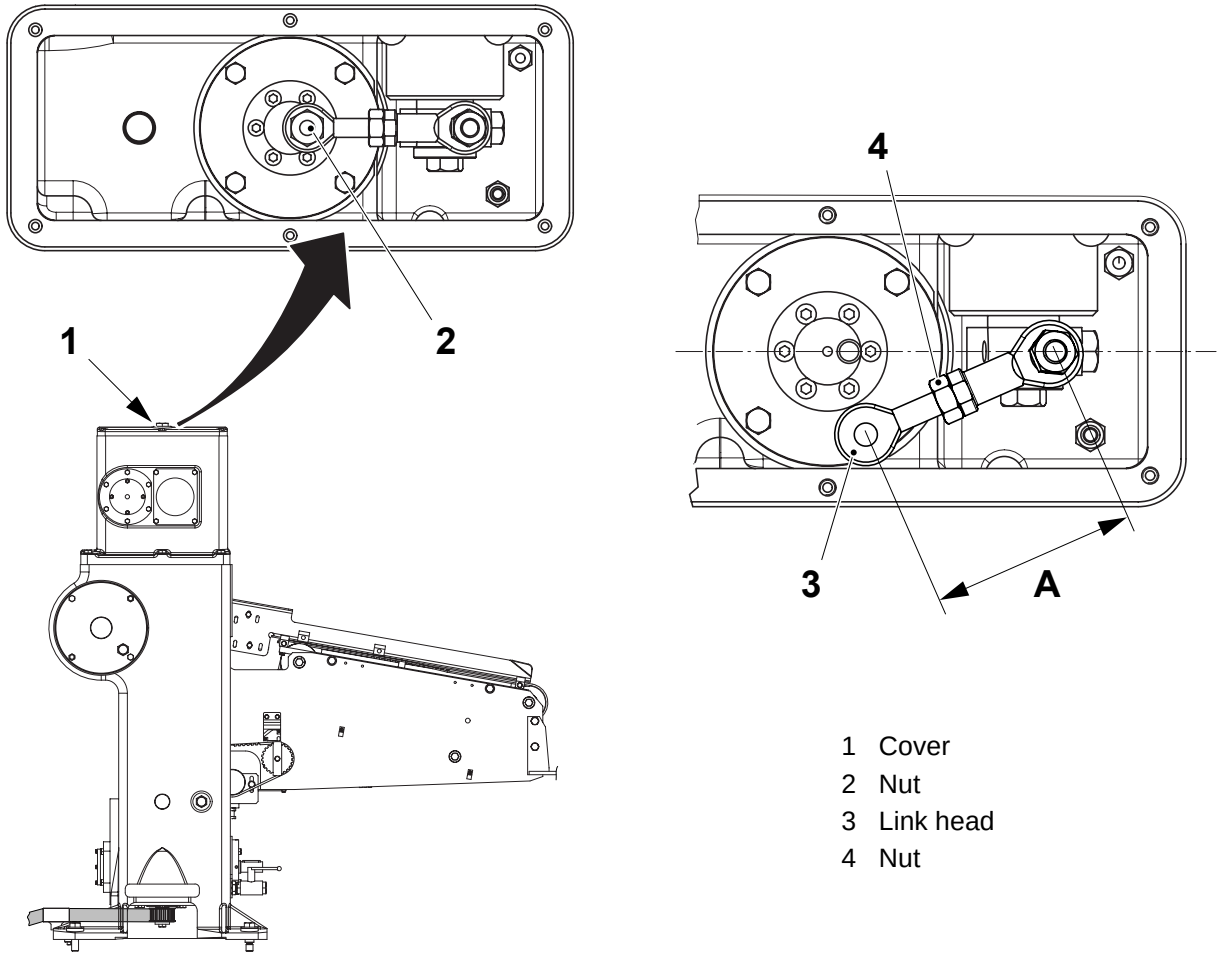
a) Crank the final folder to 310°.

b) Remove the cover (1) of the indexing gear.

c) Remove the nut (2) and disconnect the link head (3).

d) Check the distance **A**. If required,
- loosen the nut (4)
- set distance **A** by turning the link head (3)
- tighten the nut (4).

Variant	**A ±1 (mm)**
New indexing gear	88
Old indexing gear	82



1 Cover
2 Nut
3 Link head
4 Nut

(Cont'd)

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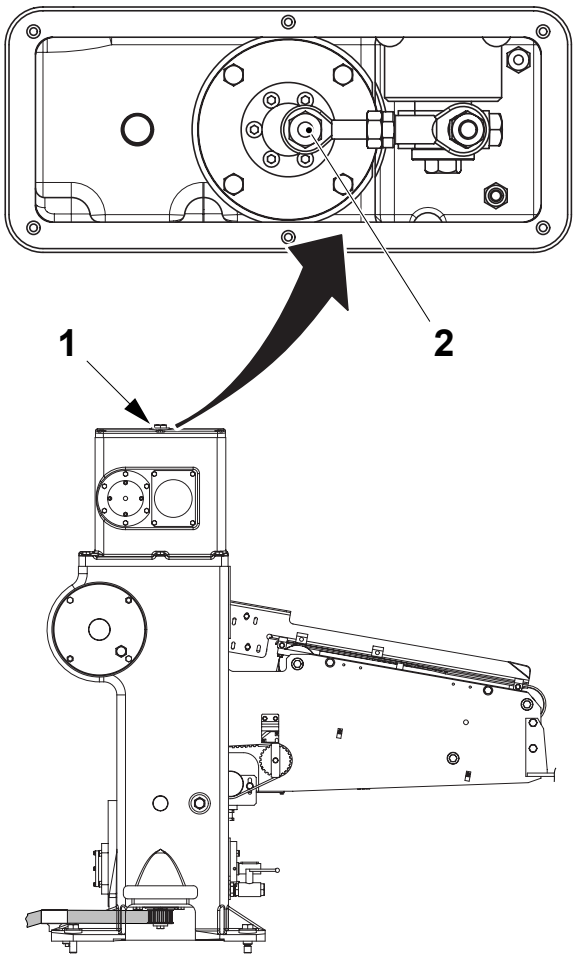
e) Loosen the clamping element (5) and turn the eccentric until the pin (6) is at the position nearest the link end as shown in the figure.

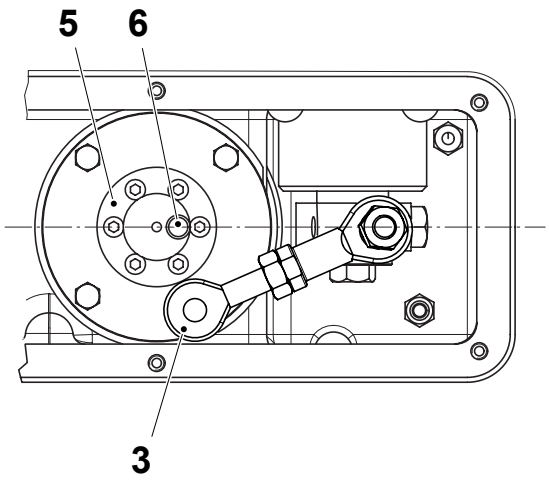
f) Tighten the screws of the clamping element with a torque of **4 Nm** with the aid of the torque wrench.

g) Fit the link head (3) on the pin (6) with the nut (2).

h) Fit the cover (1).

i) Set the lower turning position, see 5-9 Final Folder - Set Pull-down Device Lower Turning Position.





1 Cover
2 Nut
3 Link head
5 Clamping element
6 Pin

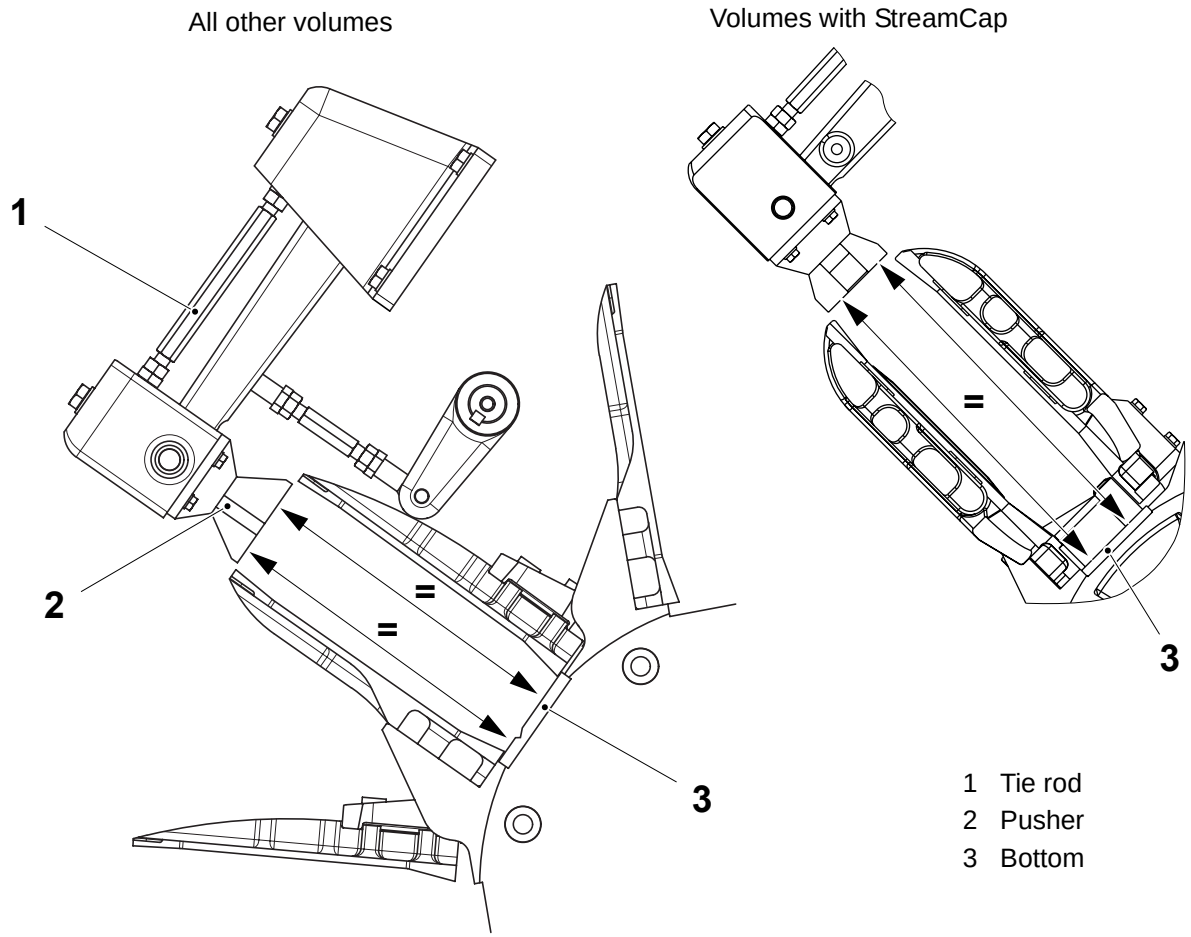
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5-7 Final Folder - Set Pull-down Device Parallelism

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648515-0200

Crank the final folder to 310° and set the pusher (2) parallel to the bottom (3) of the wheel by means of the tie rod (1).

Note! Make sure to measure against the right bottom (3) of the wheel.



1 Tie rod
2 Pusher
3 Bottom

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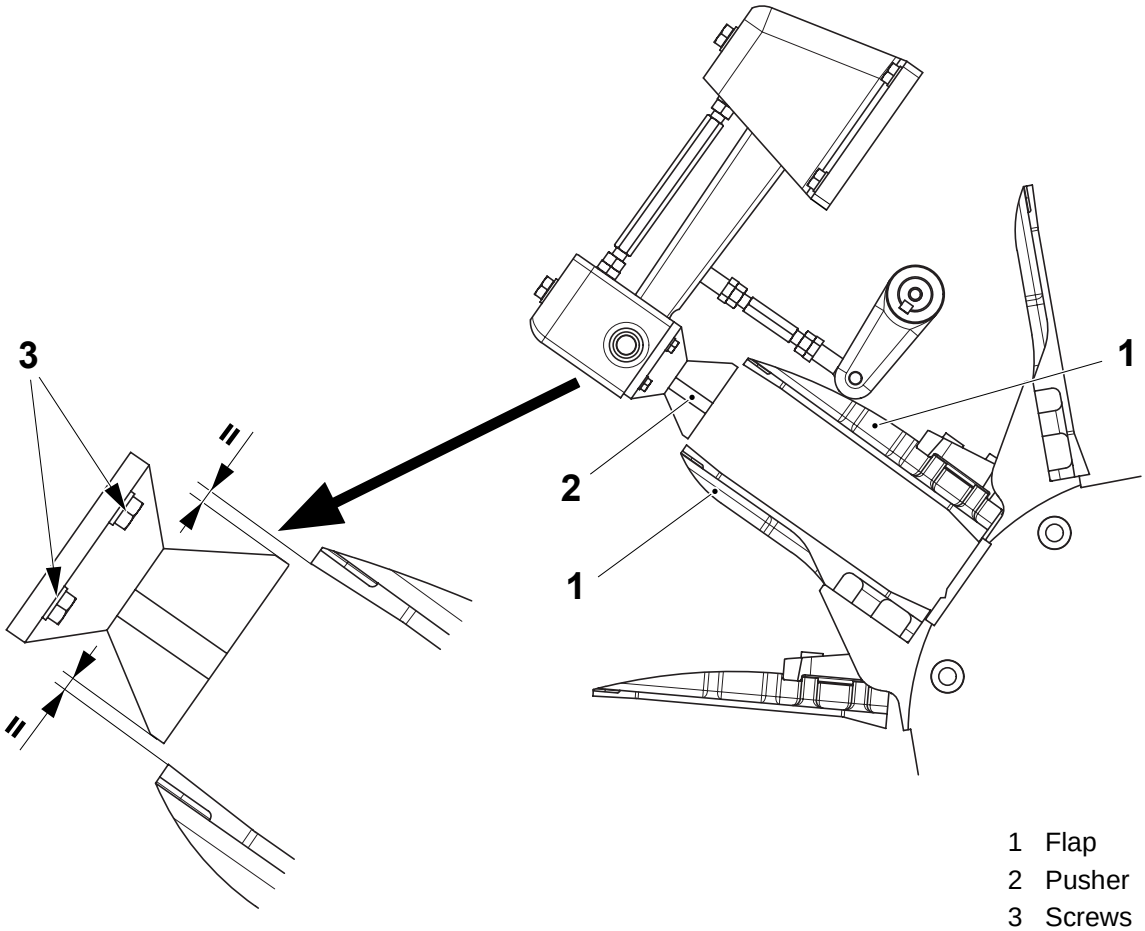
5-8 Final Folder - Set Pull-down Device Position

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648515-0200

a) Set the lower turning position, see 5-9 Final Folder - Set Pull-down Device Lower Turning Position.

b) Crank the final folder to the lower turning position, approximately 310°.

c) Centre the pusher (2) in relation to the flaps (1) by means of the screws (3).



1 Flap
2 Pusher
3 Screws

(Cont'd)

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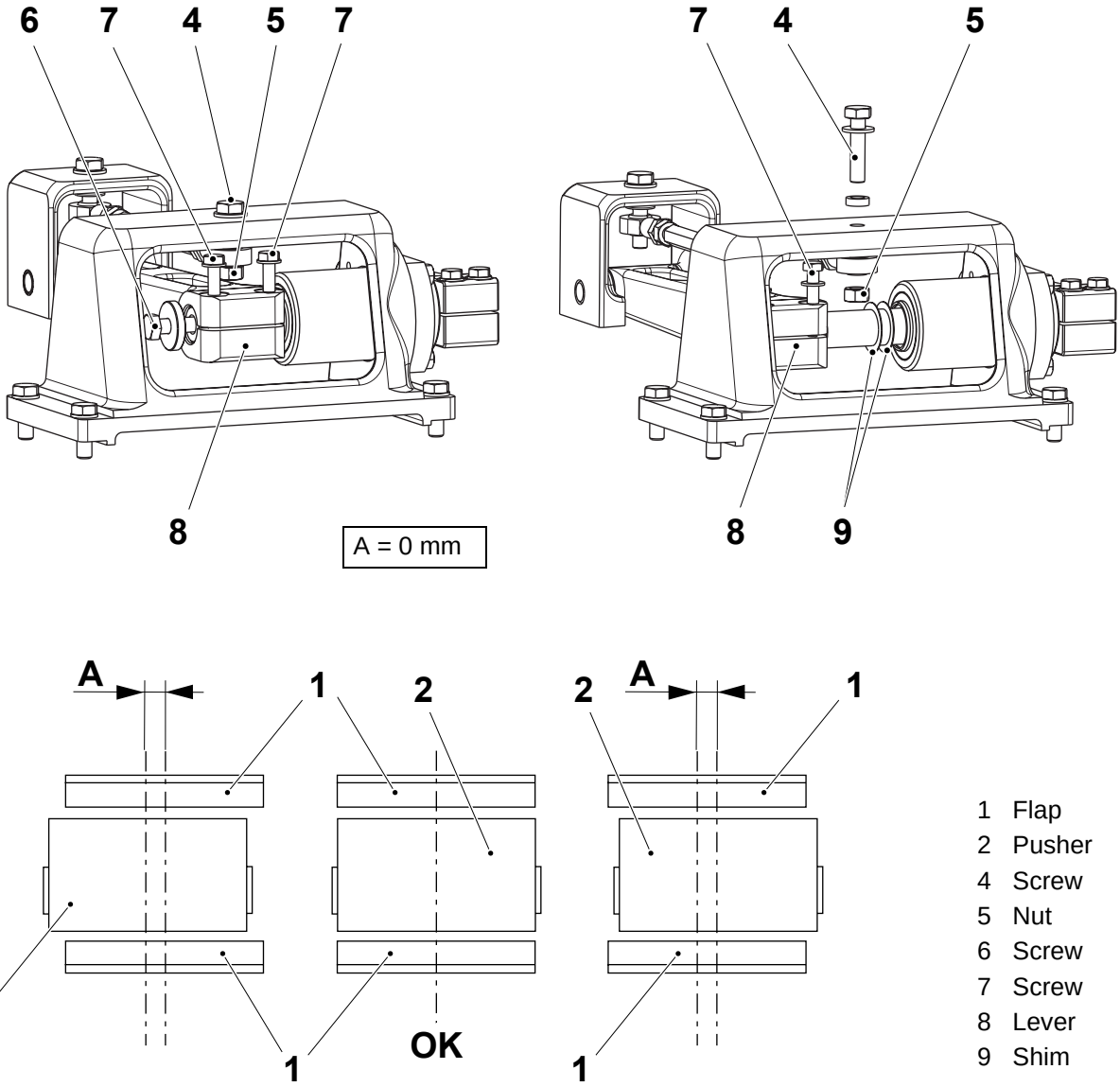
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d) Remove the screw (4) by means of the nut (5).

e) Remove the screw (6) and loosen the screws (7).

f) Shift sideways the lever (8) and centre the pusher (2) (distance **A**), transversely in relation to the flaps (1) by adding or removing the shims (9).

g) Assemble in the reverse order.



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5-9 Final Folder - Set Pull-down Device Lower Turning Position

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	648515-0200

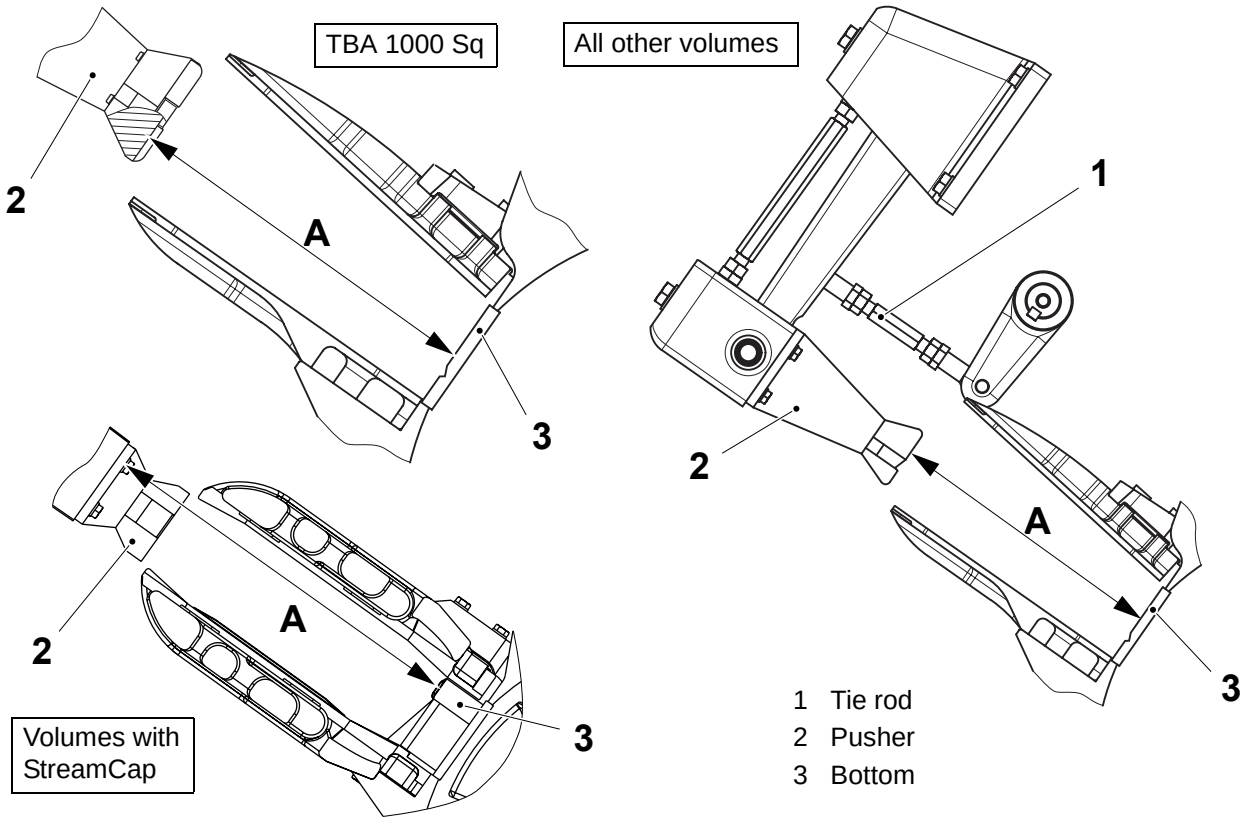
a) Crank the final folder to the lower turning position, approximately 310°.

Note! For TPA 1000 Sq only crank the final folder to approximately 290°.

b) Set the distance **A** between the pusher (2) and the bottom (3) of the wheel by means of the tie rod (1).

Note! TPA 500 Sq is only in the StreamCap version (no ReCap version).

Package	A ±0.5 (mm)	Package	A ±0.5 (mm)	Package	A ±0.5 (mm)
1000 B	165.0	500 S	147.0	TPA 1000 Sq ReCap	229.0
1000 S	194.0	200 S	117.0		
TPA 1000 S	200.0	200 B	82.0	TPA 1000 Sq StreamCap	277.5
1500 S	247.0	250 B	105.0		
TPA 330 Sq	123.0	1000 Sq	202.5	TPA 500 Sq StreamCap	268.0
TPA 250 Sq	126.5	500 B	88.5		
330 S	137.0	250 S	132.5		



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5-10 Final Folder - Set Folding Part Roof

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648515-0200

a) Crank the final folder to the lower turning position, approximately 310°.

b) Set the pusher in the pull down device, see 5-8 Final Folder - Set Pull-down Device Position.

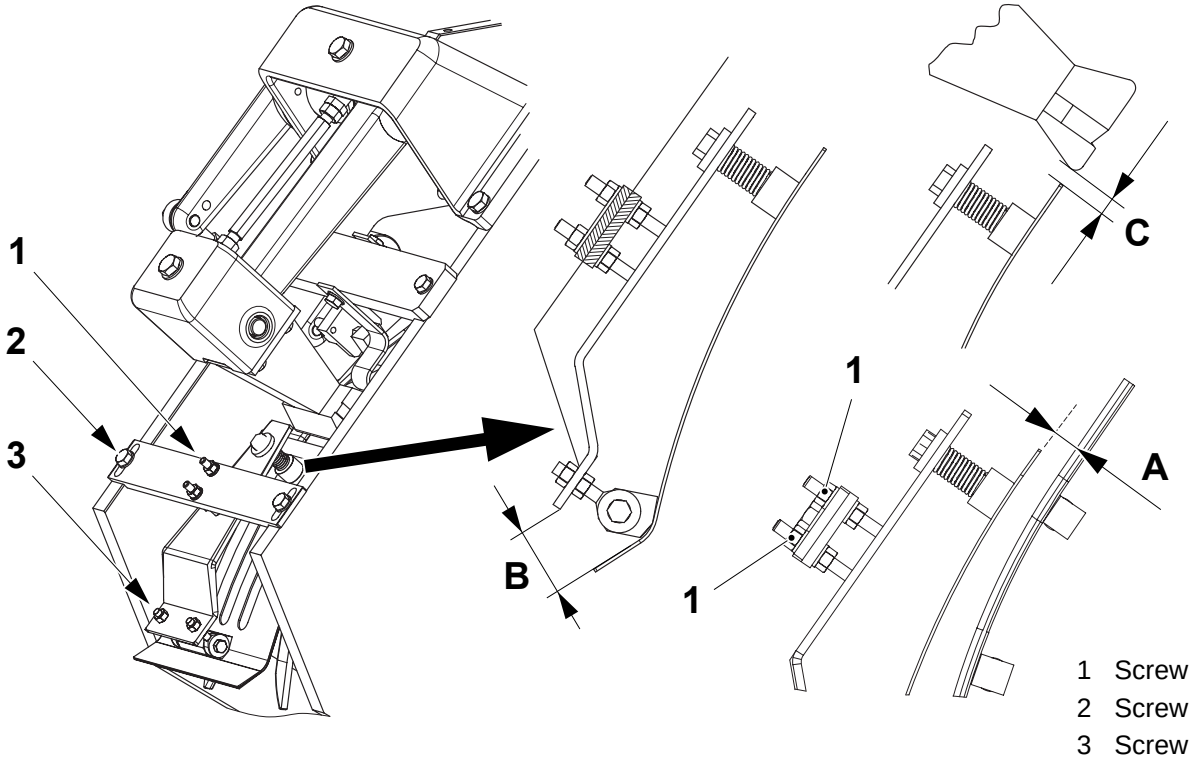
c) Set the distance **C** by means of the screws (2).

d) Set the distance **A** by means of the screws (1).

e) Set the distance **B** by means of the screws (3).

Note! Adjust the screws (1) symmetrically.

Package	A ±0.5 (mm)	B ±1.0 (mm)	C ±1.0 (mm)	Package	A ±0.5 (mm)	B ±1.0 (mm)	C ±1.0 (mm)
1000 B - 1000 S	4.0	36.0	3.0	1500 S	6.0	35.0	2.5
1000 Sq - TPA 1000 S	4.0	36.0	3.0	500 S	4.0	28.0	2.0
200 B - 250 B - 200 S - 250 S	2.0	44.0	3.0	500 B	4.0	35.0	3.0
TPA 330 Sq	5.0	44.0	2.0	TPA 250 Sq	5.0	42.0	3.0
TPA 1000 Sq	4.0	30.0	3.0	330 S	2.5	44.0	3.0
TPA 500 Sq	4.0	38.0	2.0				



1 Screw
2 Screw
3 Screw

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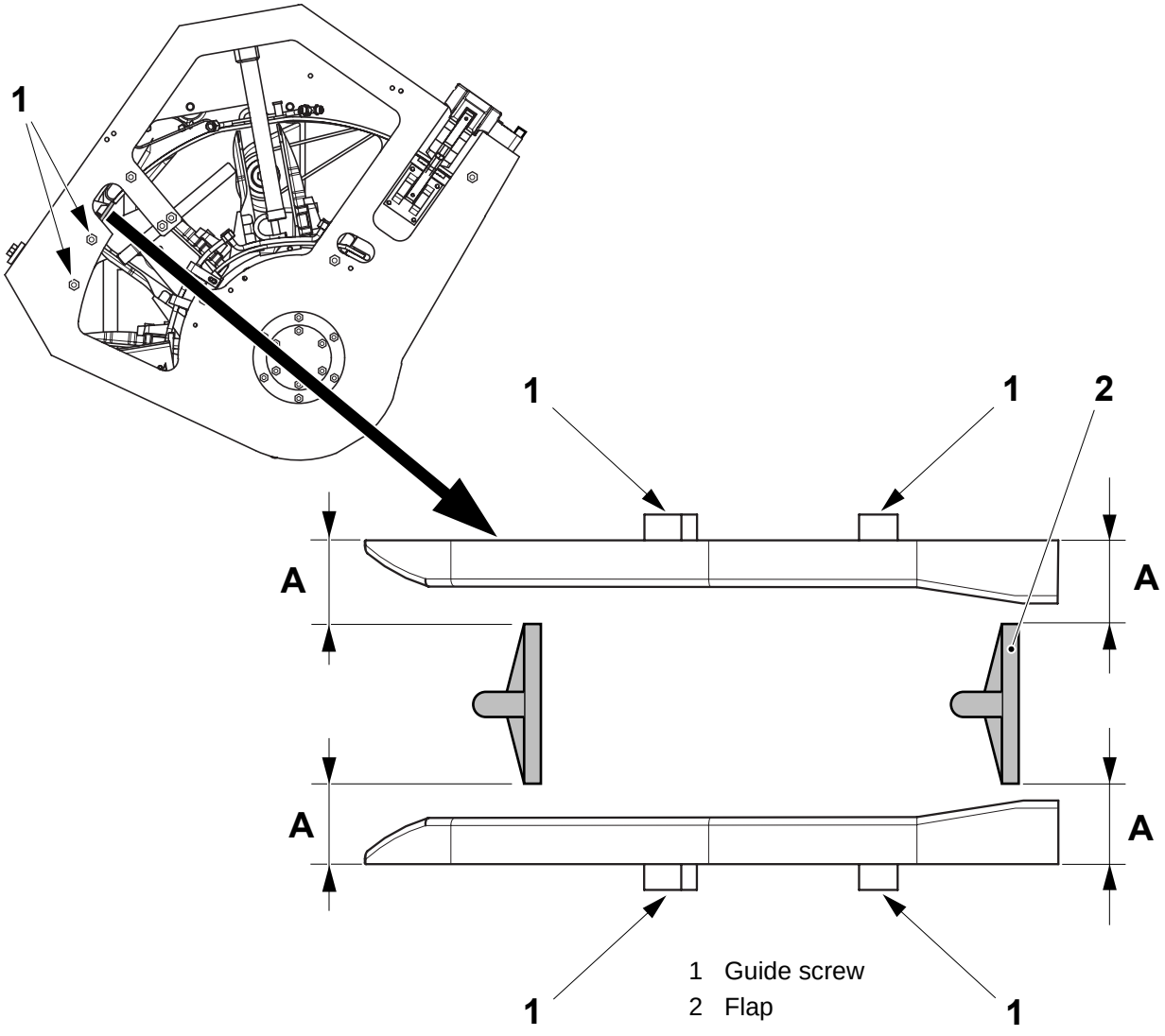
5-11 Final Folder - Set Folding Part Guides

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	648515-0200

Note! Make sure that the corresponding (left and right) folding parts are at the same height.

a) Set the distance **A** between the flap (2) and the folding parts by means of the guide screws (1).

Package	**A ±0.5 (mm)**
1000 Sq - TPA 1000 S - TPA 1000 Sq - TPA 250 Sq - 1500 S - 500 S - 500 B - 330 S - TPA 330 Sq - TPA 500 Sq	N.A.
1000 B - 1000 S	26.0
250 B - 200 B - 200 S - 250 S	22.0



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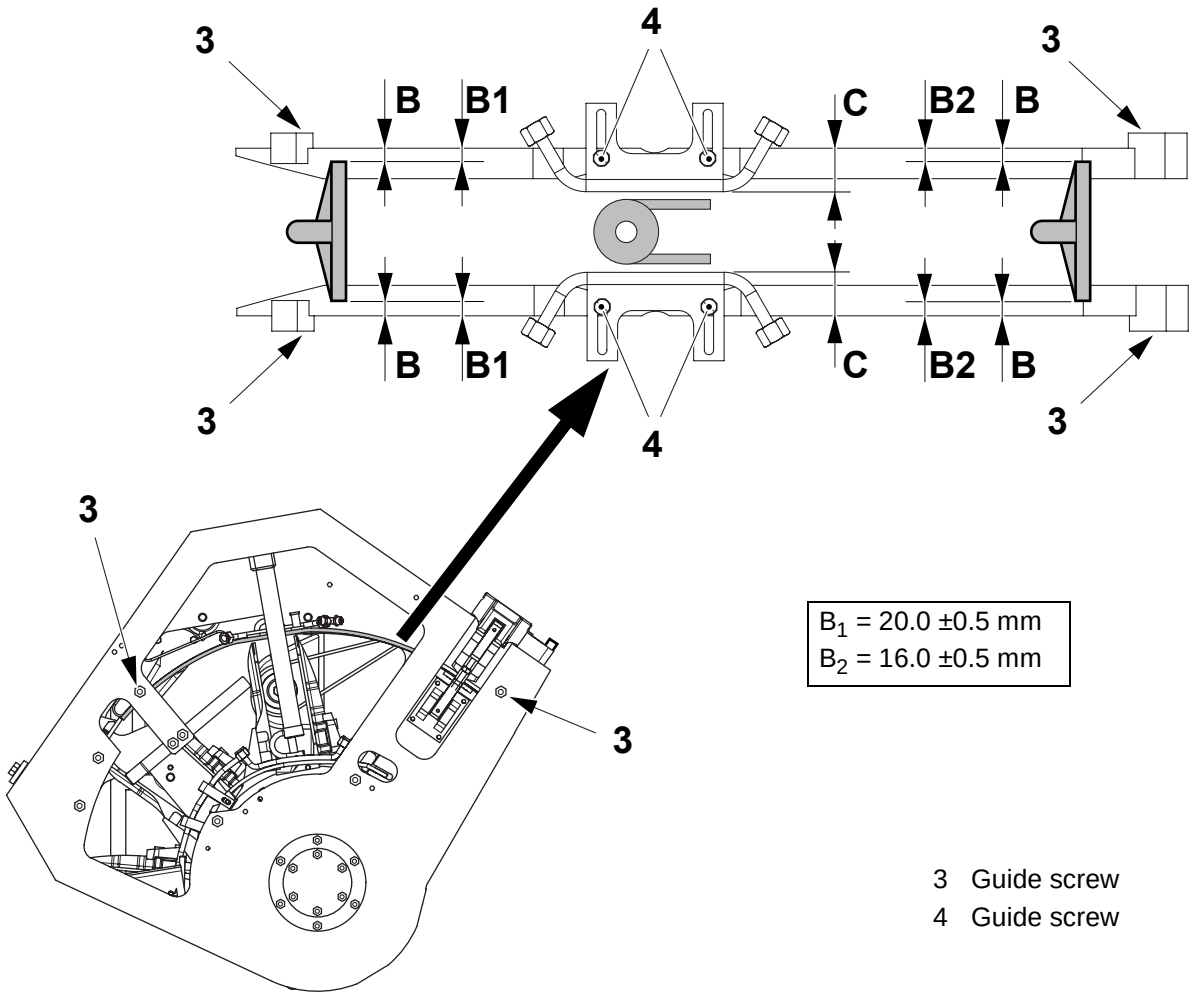
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b) Set the distance **B** by means of the guide screws (3).

c) Set the distance **C** by means of the guide screws (4).

Note! For TPA 500 Sq only the distance **B** vary between the front and rear part of the guides.

Package	B ±0.5 (mm)	C ±0.5 (mm)	Package	B ±0.5 (mm)	C ±0.5 (mm)
1000 B	13.0	25.5	250 B - 200 B	15.0	23.0
1000 S	13.0	22.0	TPA 1000 S	N.A.	22.0
1500 S	N.A.	29.0	TPA 330 Sq	N.A.	24.0
200 S	15.0	24.0	TPA 1000 Sq	N.A.	20.0
500 S	N.A.	21.0	TPA 250 Sq	N.A.	25.0
500 B	N.A.	25.5	330 S	N.A.	23.0
250 S	15.0	35.0	TPA 500 Sq	B_1 & B_2	22.0
1000 Sq	N.A.	24.5			



B_1 = 20.0 ±0.5 mm
B_2 = 16.0 ±0.5 mm

3 Guide screw
4 Guide screw

(Cont'd)

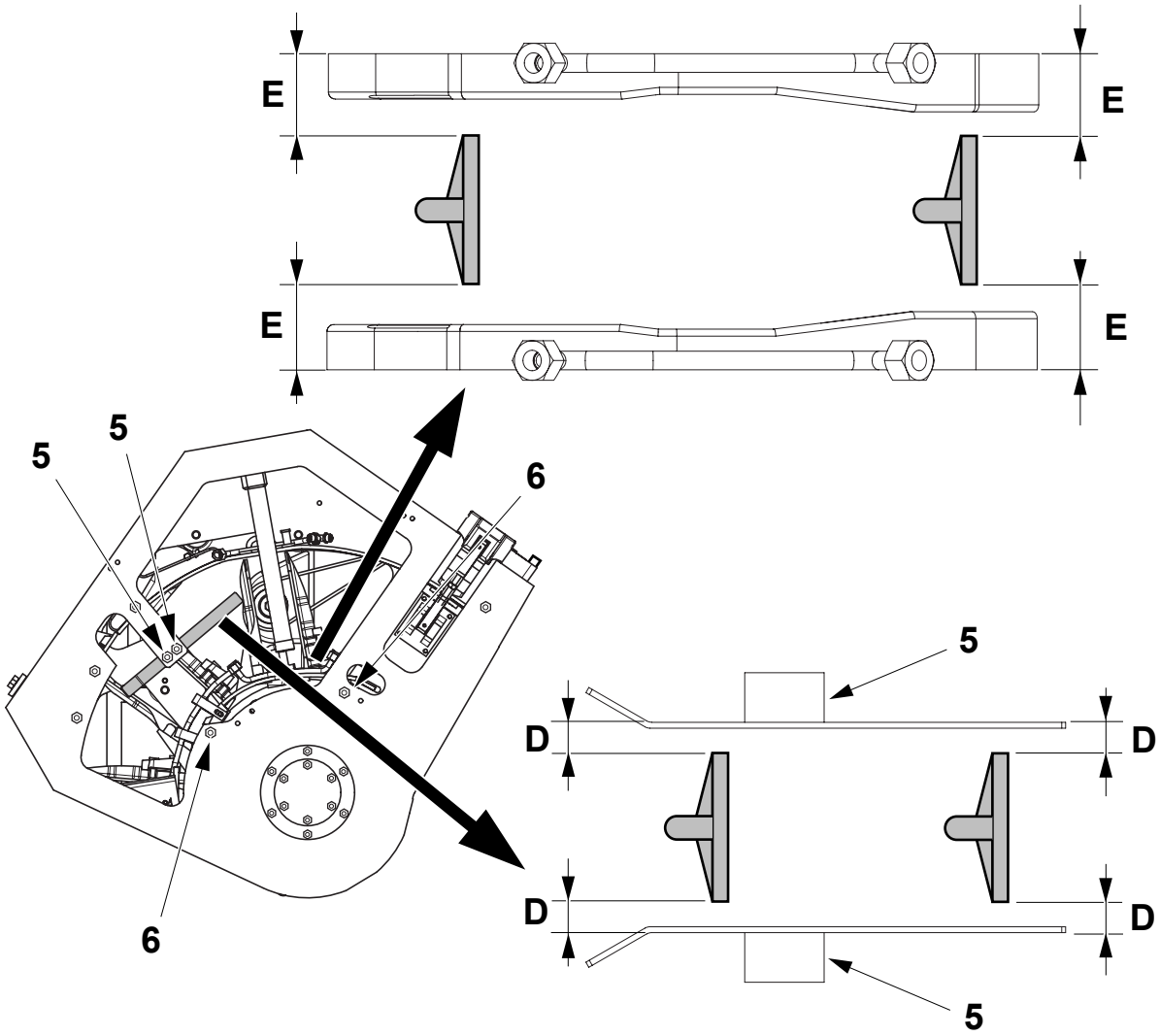
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d) Set the distance **D** by means of the guide screws (5).

e) Set the distance **E** by means of the guide screws (6).

Package	D ±0.2 (mm)	E ±0.5 (mm)
1000 Sq - TPA 1000 S - TPA 1000 Sq - TPA 250 Sq - 1500 S - 500 S - 330 S - TPA 330 Sq - TPA 500 Sq	N.A.	N.A.
1000 B - 1000 S - 500 B	4.0	30.5
250 B - 200 B - 200 S	5.0	25.5
250 S	1.5	12.0



5 Guide screw
6 Guide screw

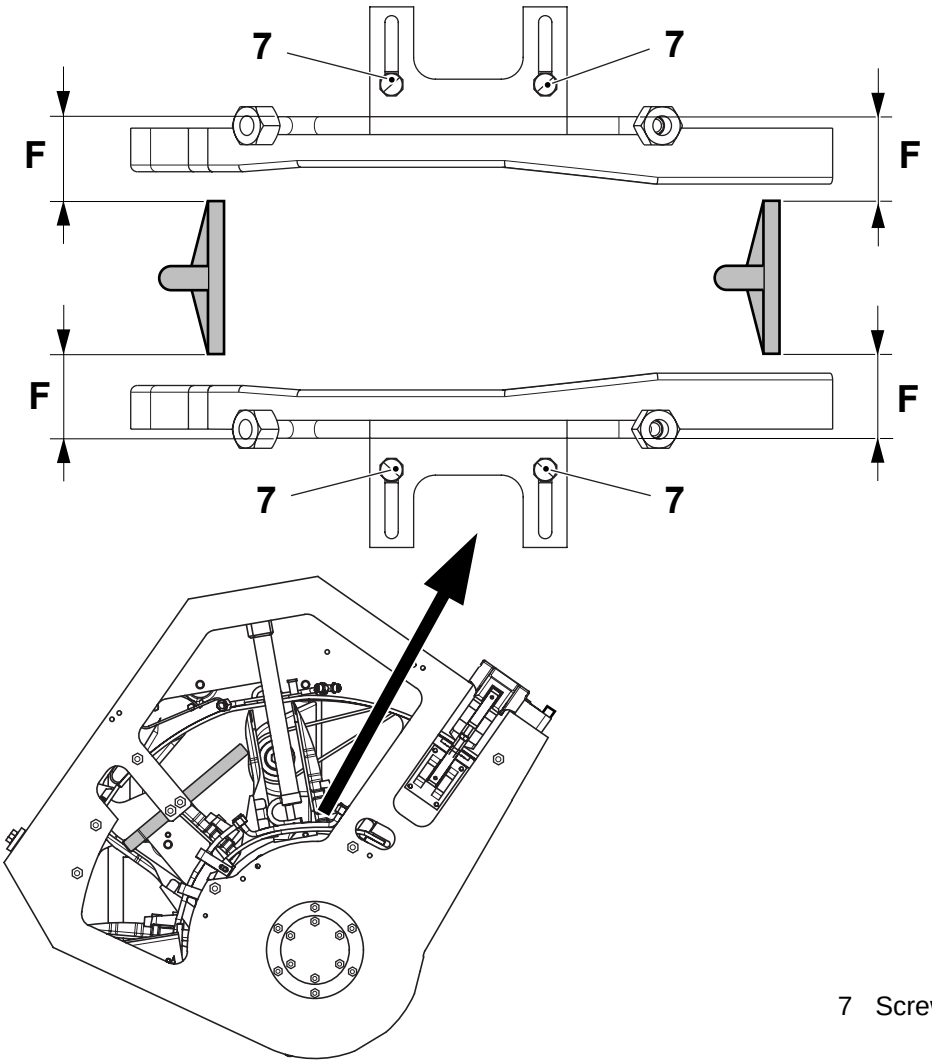
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(Cont'd)

f) Set the distances **F** means of the guide screws (7).

Package	F ±0.5 (mm)
1000 B - 1000 S - 1000 Sq - TPA 1000 S - TPA 1000 Sq - TPA 250 Sq - 1500 S - 500 S - 500 B - 250 S - 330 S - TPA 330 Sq - TPA 500 Sq	N.A.
250 B - 200 B	21.0
200 S	17.0



7 Screw

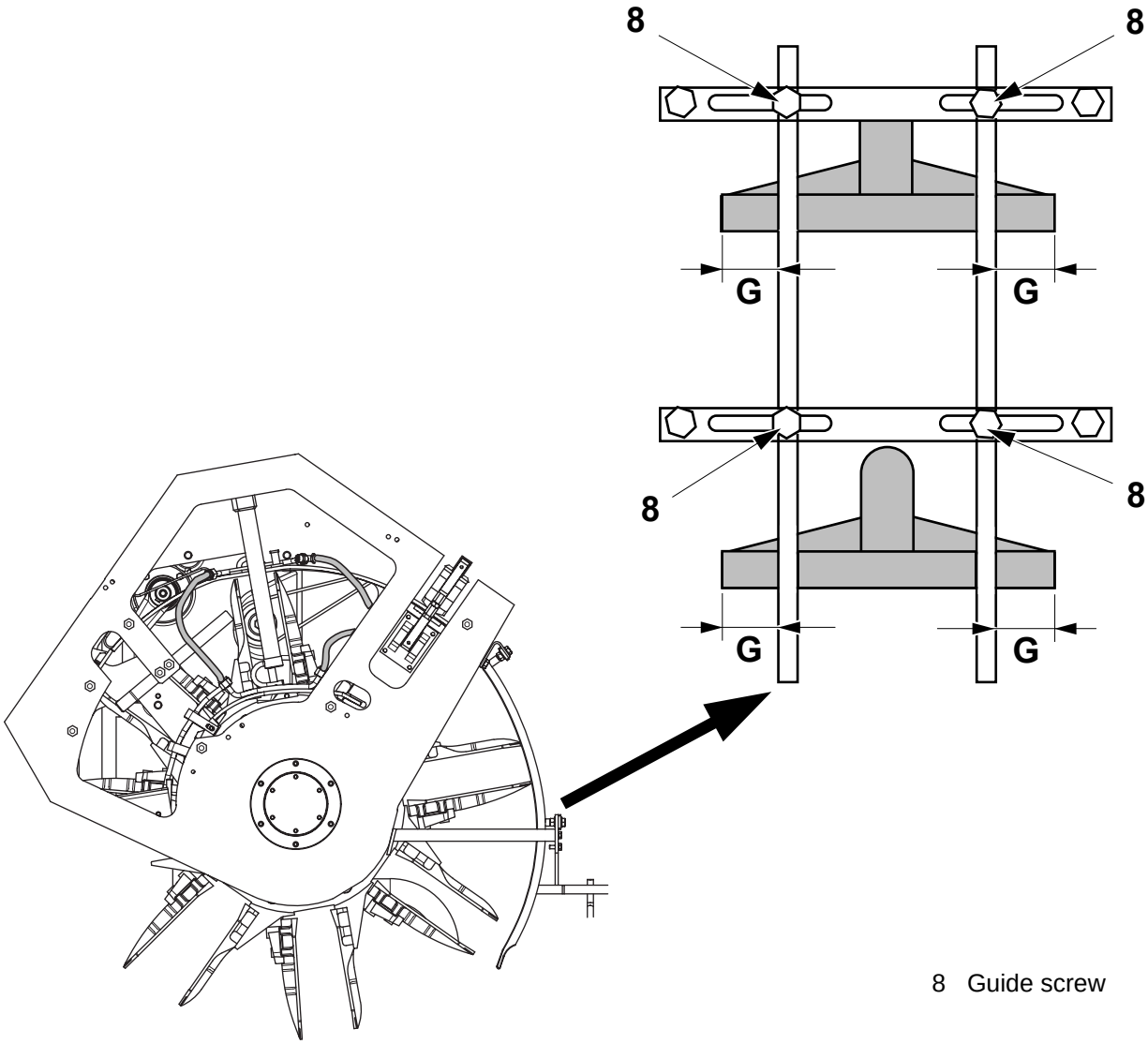
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(Cont'd)

g) Set the distance **G** by means of the guide screws (8).

Package	**G ±0.5 (mm)**
1000 Sq - TPA 1000 S - 1500 S - 500 S - TPA 330 Sq	N.A.
500 B	16.0
1000 B - 1000 S	10.0
250 B - 200 B - 200 S - 250 S - 330 S - TPA 1000 Sq - TPA 500 Sq	5.0
TPA 250 Sq	4.0



8 Guide screw

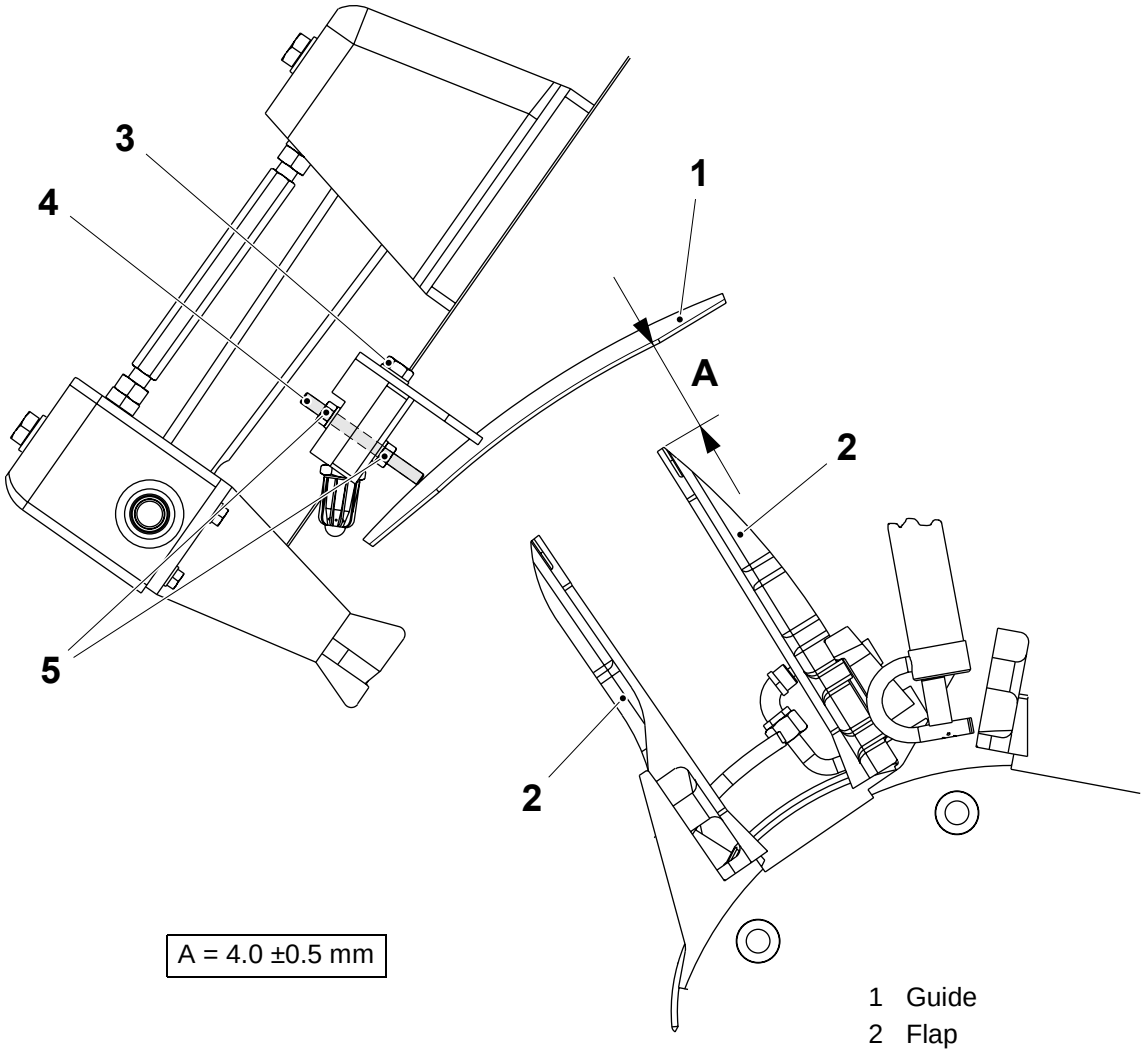
TechPub_2614345_0105 - 05_MM81534_11en.fm

5-12 Final Folder - Set Folding Part Guide Rails

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	648515-0200

Only Valid for TPA 1000 Sq

Set the distance **A** between the end of the guide (1) and the flaps (2) by means of the screw (3) and the pin (4) with the nuts (5).



A = 4.0 ±0.5 mm

1 Guide
2 Flap
3 Screw
4 Pin
5 Nut

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(Cont'd)

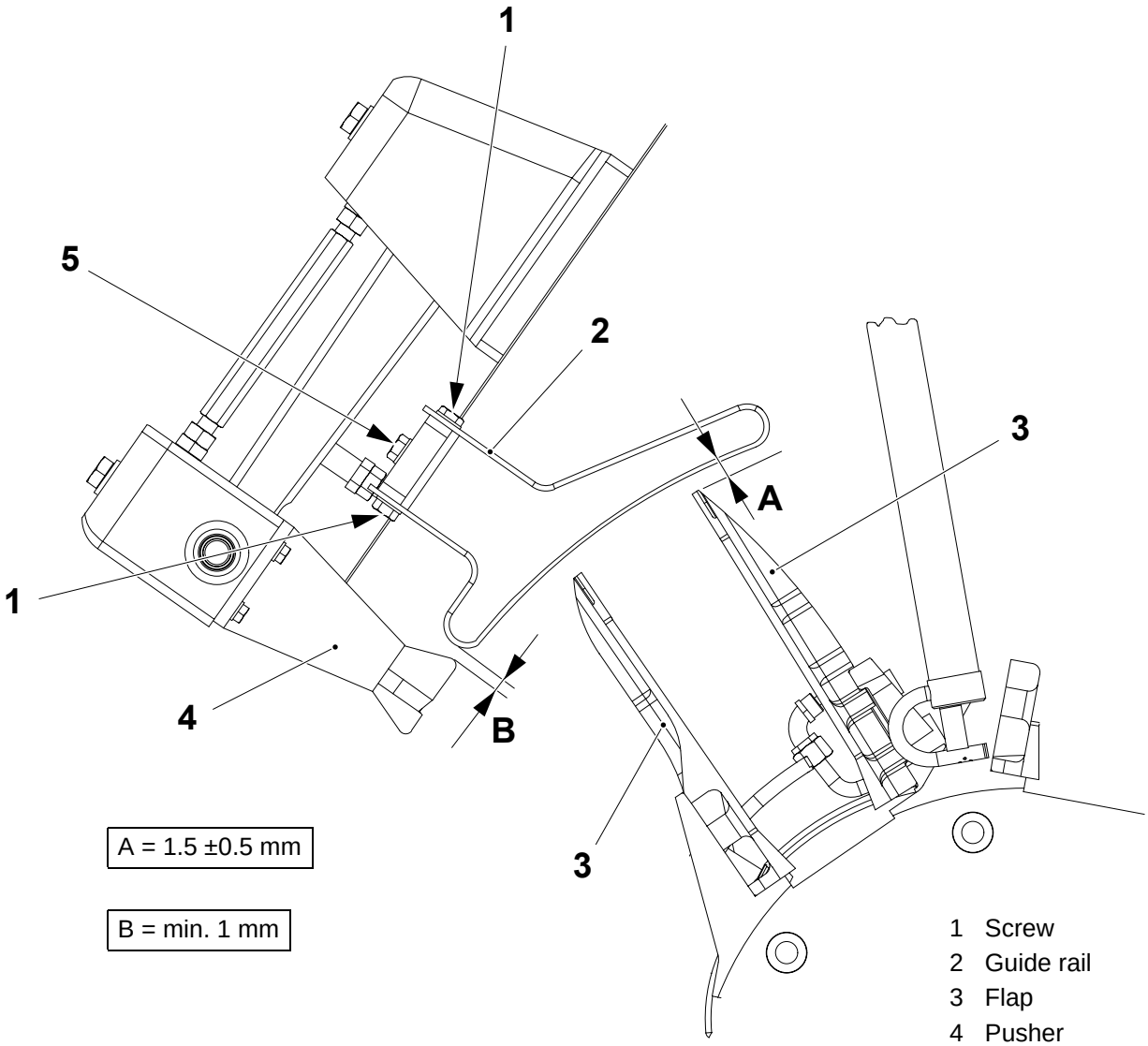
(Cont'd)

Not Valid for TPA 1000 Sq

Note! For TBA 1000 Sq rebuilt with RK-1558714-0100 TBA 1000 Sq improvement the guide rail (2) is removed.

a) Set the distance **A** between the guide rails (2) and the flaps (3) by means of the screws (1).

b) Set the distance **B** between the guide rails (2) and the pusher (4) by means of the screws (5).



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5-13 Final Folder - Set Flap Heater Nozzles

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	648515-0200

WARNING

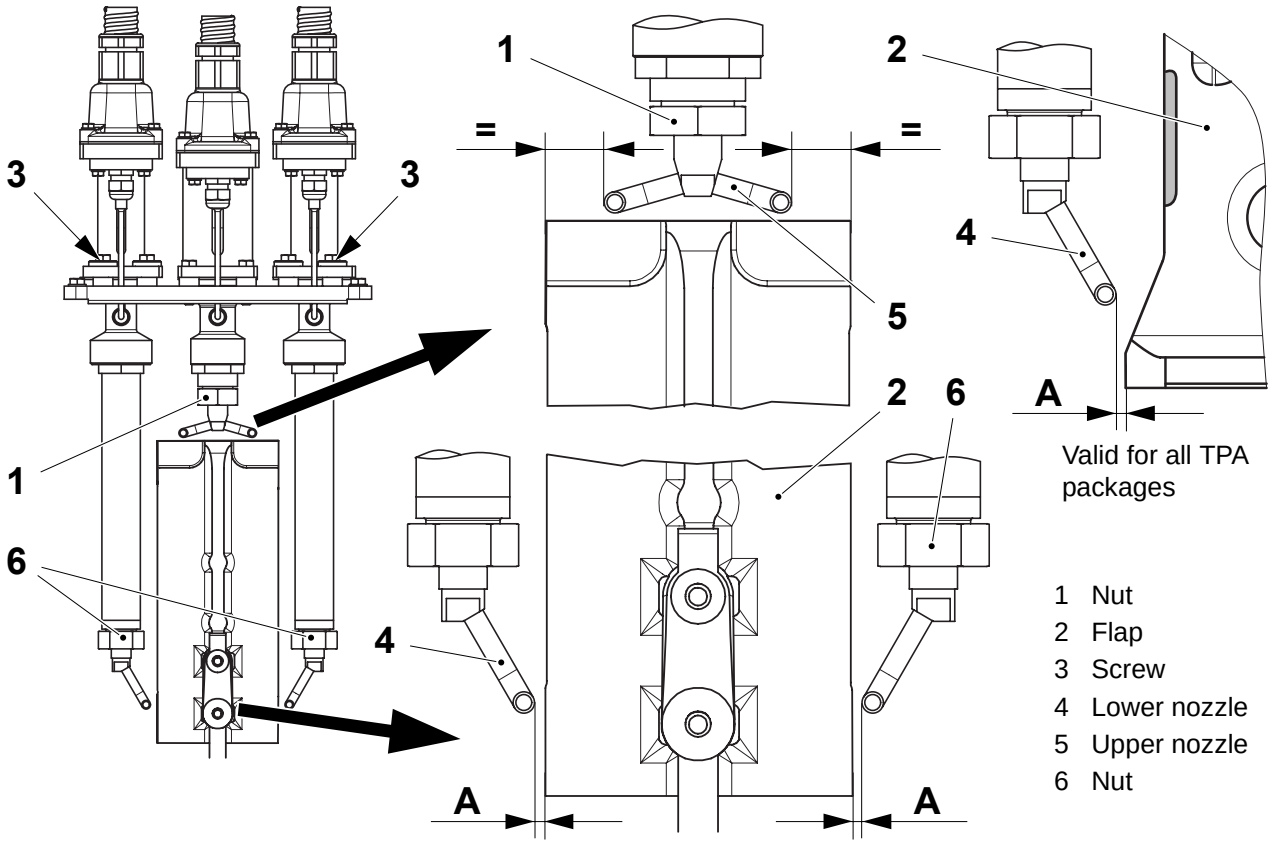
Risk of personal injury.

The nozzles and other parts nearby may be hot.

a) Centre the upper nozzle (5) in relation to the wheel flaps by means of the nut (1).

b) Set the distance **A** between the flap (2) and the lower nozzles (4) by means of the screws (3) and/or the nuts (6).

Package	A ±0.5 (mm)	Package	A ±0.5 (mm)
TPA 500 Sq	6.5	1000 B - 1000 S - 500 B	4.0
TPA 330 Sq	6.0	500 S	3.5
TPA 1000 S	5.5	250 B - 200 B - 200 S - 250 S	2.5
1000 Sq - TPA 250 Sq	5.0	330 S	1.5
1500 S	4.5	TPA 1000 Sq	1.0



Valid for all TPA packages

1 Nut
2 Flap
3 Screw
4 Lower nozzle
5 Upper nozzle
6 Nut

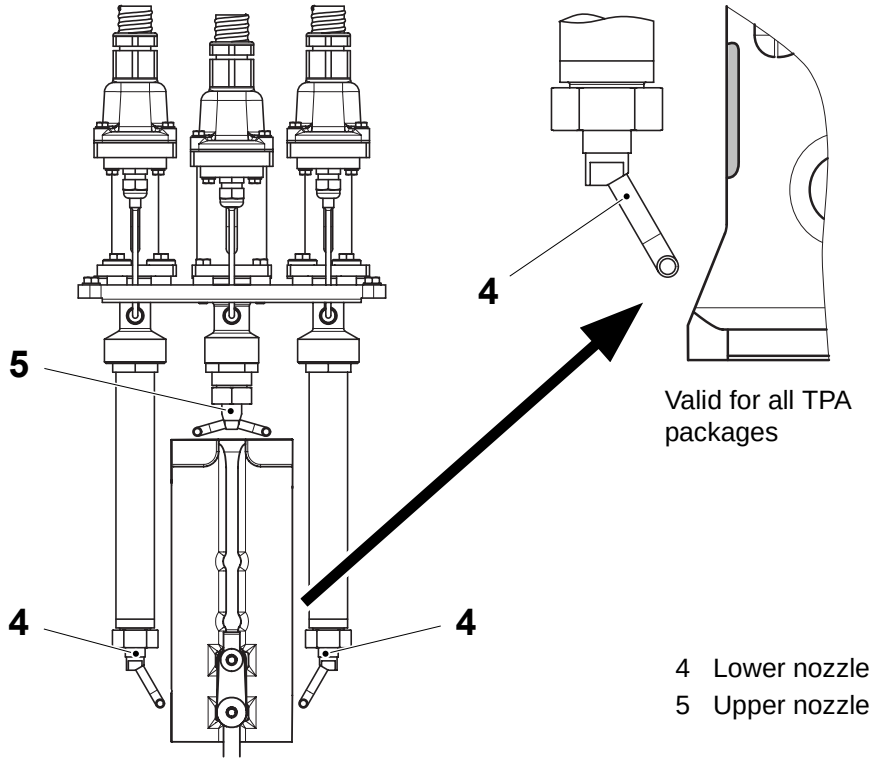
(Cont'd)

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(Cont'd)

c) Set the flap heater temperature regulators, see the TPOP panel, in order to have the right temperature on the upper nozzle (5) and the lower nozzles (4), see table below.

Package	**Upper nozzle (°C)**	**Lower nozzle (°C)**
1000 B - 1000 S - 500 B - TPA 1000 S - 1500 S - 1000 Sq - 250 B - 200 B - 200 S - 250 S - 500 S - 330 S- TPA 330 Sq - TPA 250 Sq - TPA 500 Sq	530 ±20	420 ±20
TPA 1000 Sq	530 ±20	480 ±20



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5-14 Final Folder - Set Pressure Device Lower Turning Position

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648515-0200

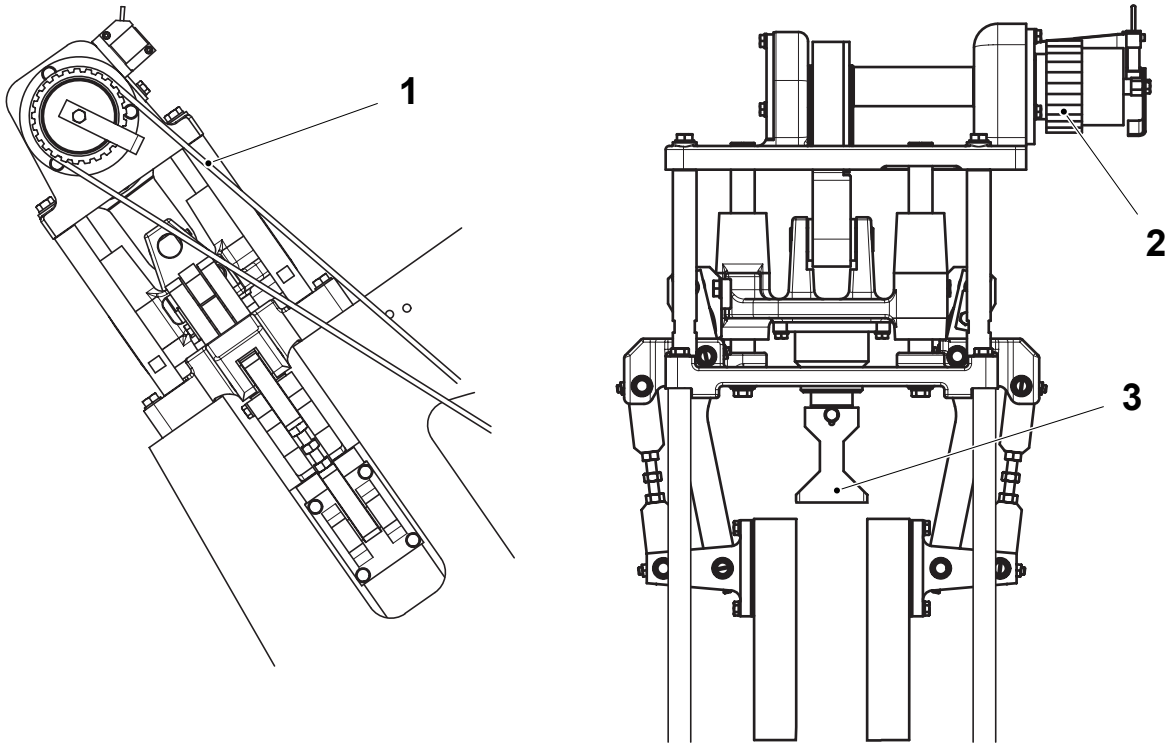
a) Crank the final folder to 250°.

Note! For TBA 1000 Sq only crank the final folder to 280°.

b) Loosen the belt (1) tension and remove the belt from the toothed pulley (2).

c) Turn the toothed pulley (2) until the plate (3) is in the lowest position.

d) Fit and set the belt (1), see 5.5-3 Pressure Device - Set Belt.



1 Belt
2 Toothed pulley
3 Plate

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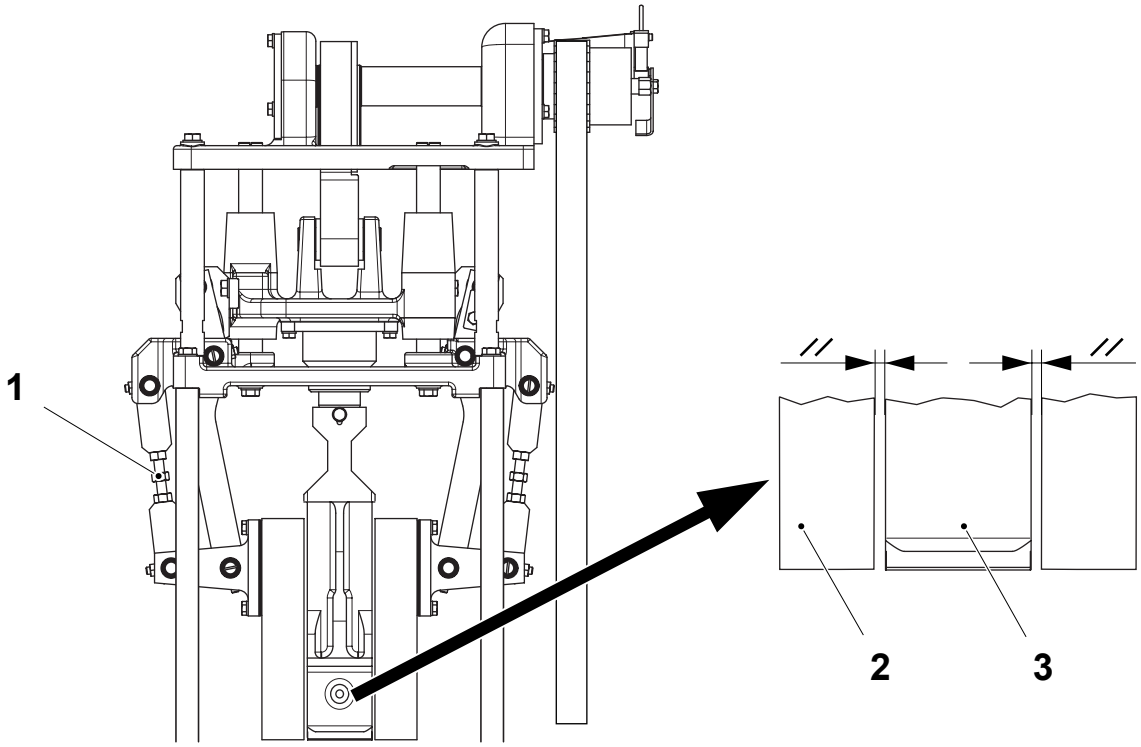
5-15 Final Folder - Set Pressure Device Pushers

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648515-0200

a) Crank the final folder to the lower turning position, approximately 250°.

Note! For TBA 1000 Sq only perform items from e) to f) instead of items from b) to d).

b) Set the pushers (2) parallel to the flaps (3) by means of the adjusting screws (1).



1 Adjusting screw
2 Pusher
3 Flap

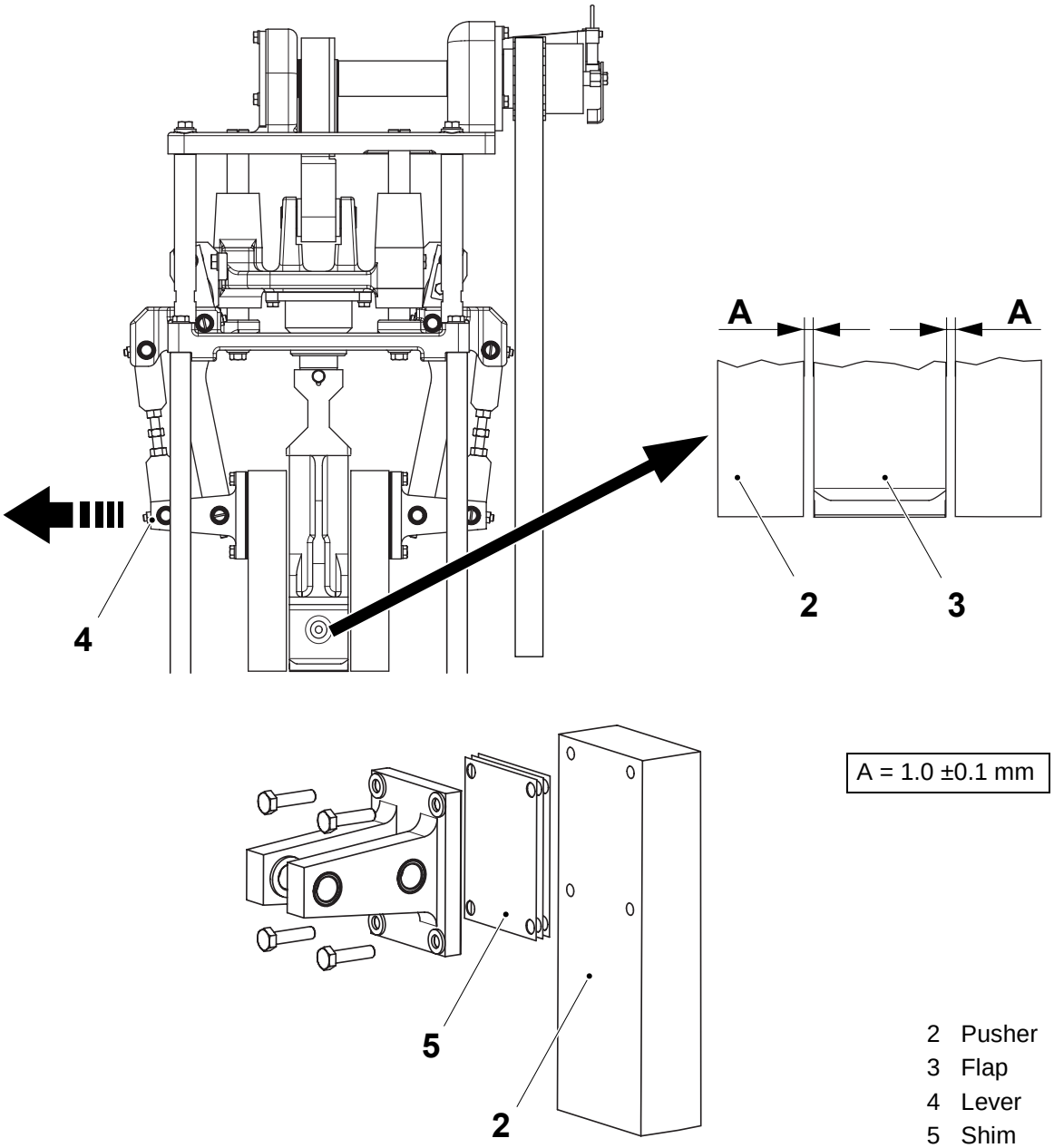
(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

c) Pull the pusher levers (4) outwards and check distance **A** between the pushers (2) and the flaps (3).

d) If required, set the distance **A** by means of shims (5) underneath the pushers (2).



2 Pusher
3 Flap
4 Lever
5 Shim

(Cont'd)

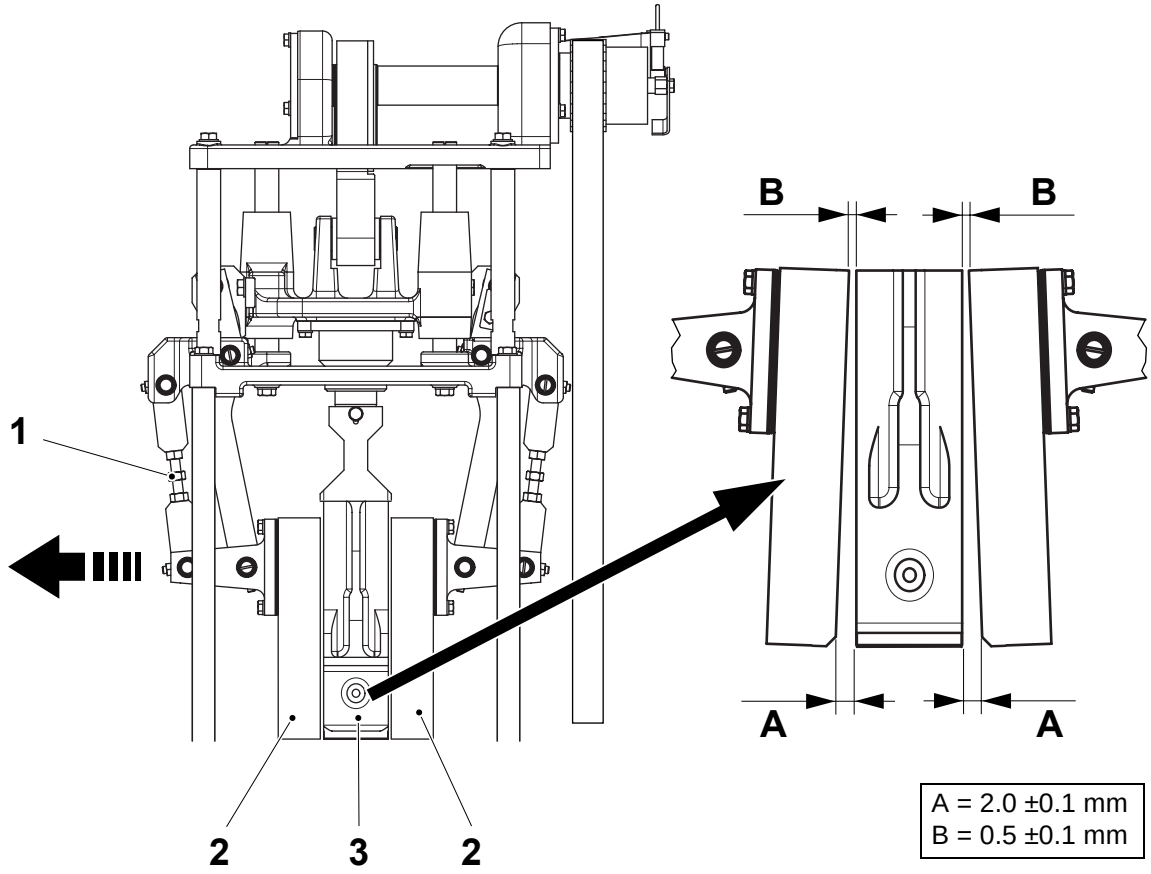
TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

Note! The items from e) to f) are valid for TBA 1000 Sq only.

e) Set the internal package pressure according to 5.5-9 Pressure Device - Check Package Pressure.

f) Set the distances **A** and **B** between the pushers (2) and the flaps (3) by means of the adjusting screws (1).



1 Adjusting screw
2 Pusher
3 Flap

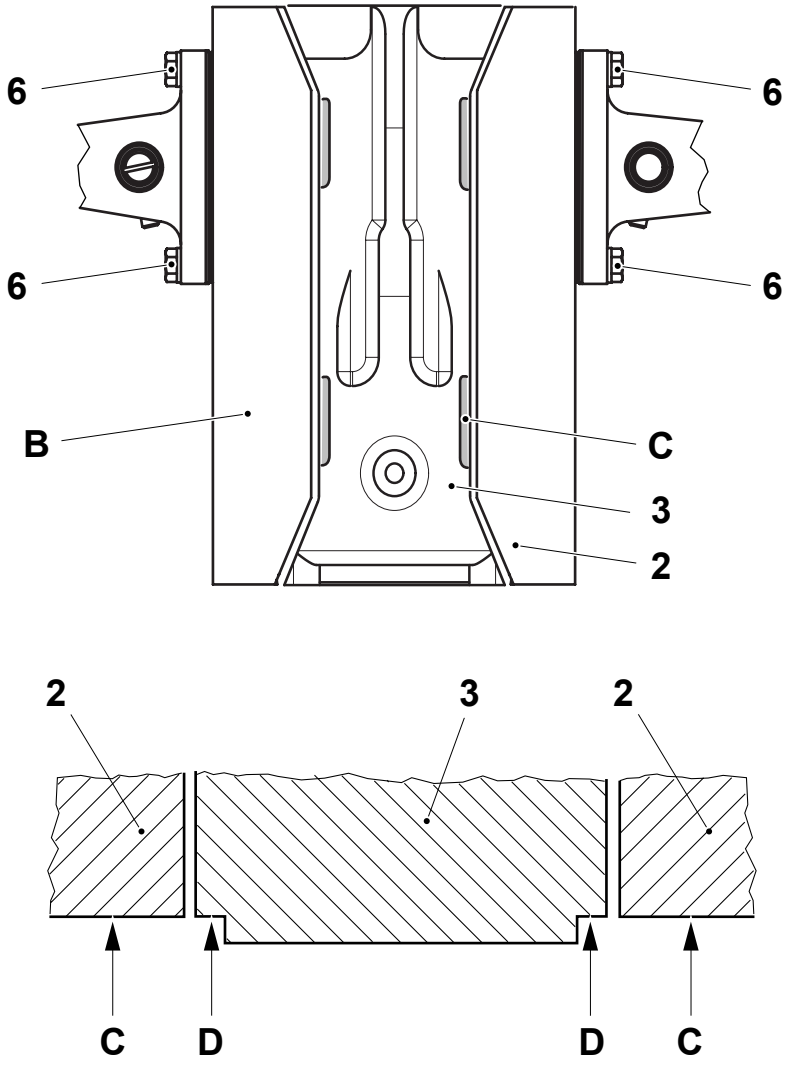
(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

Note! The item below is valid for the package TPA 1000 S only.

g) Loosen the screws (6) and move the pusher (2) so that the pusher surface (**C**) is aligned with the flap groove (**D**).



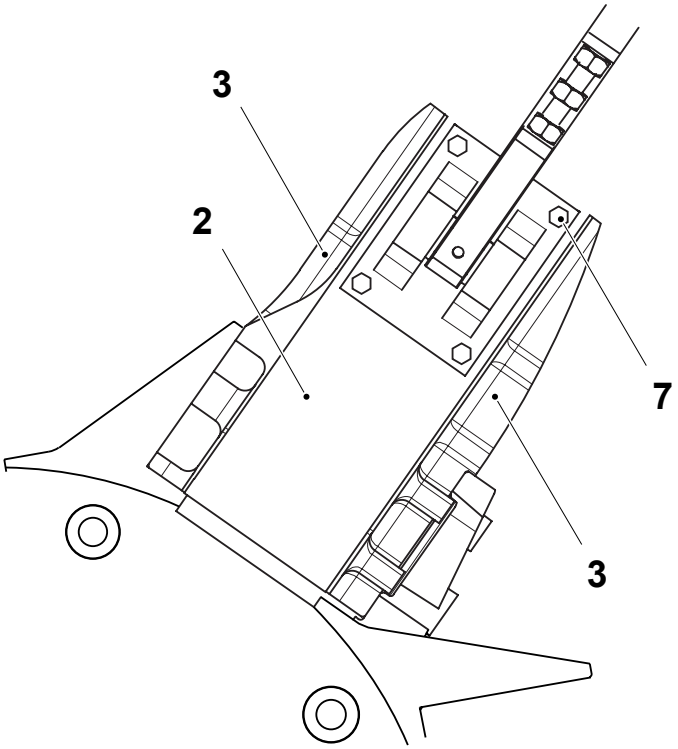
2 Pusher
3 Flap
6 Screw

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

h) Set the pushers (2) centred to the flaps (3) by means of the screws (7).



2 Pusher
3 Flap
7 Screw

Note! Do not perform the following item for TBA 1000 Sq.

i) Set the internal package pressure according to 5.5-9 Pressure Device - Check Package Pressure.

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5-16 Final Folder - Set Package Out Feed Holder

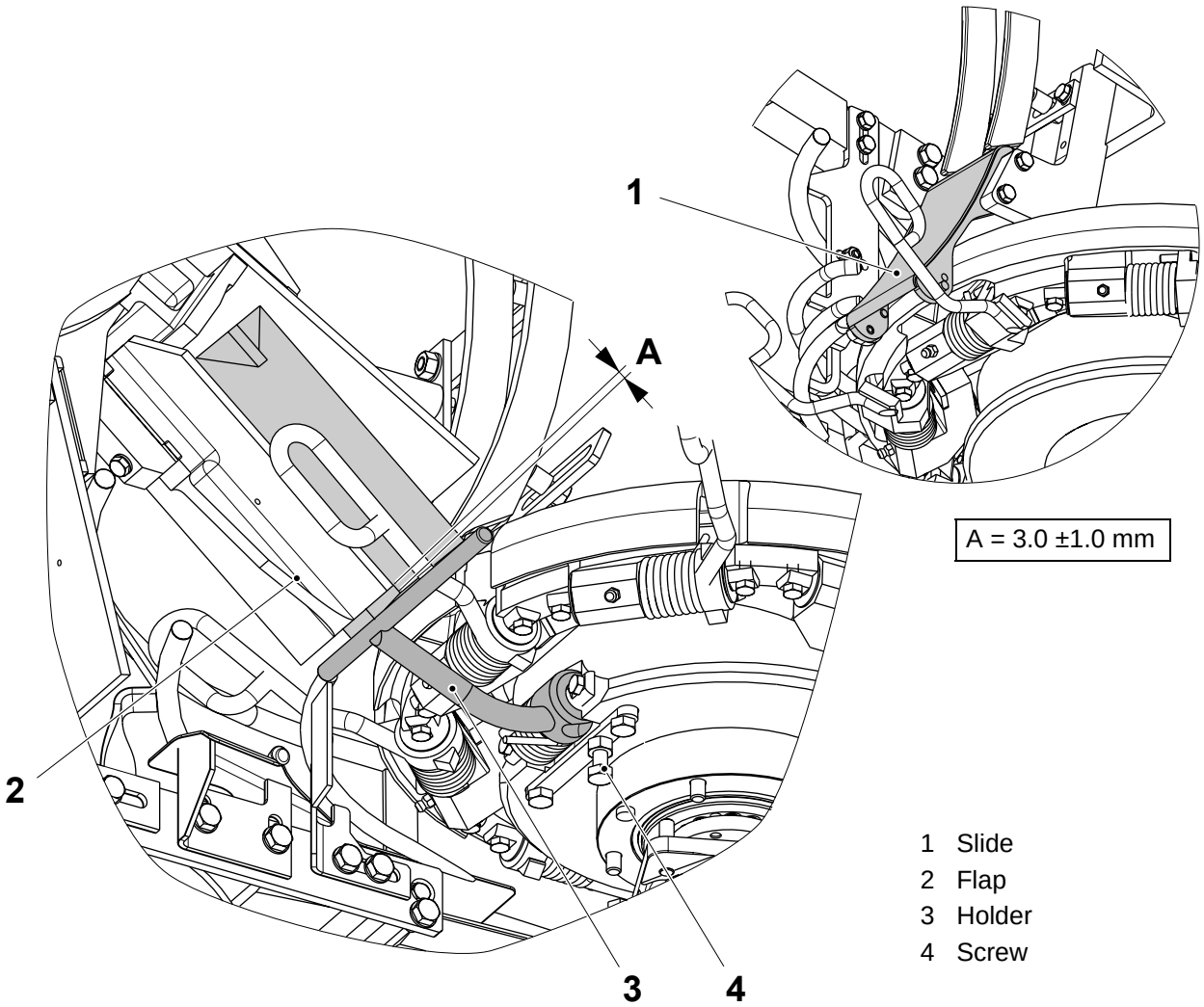
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648515-0200

Note! This instruction is not applicable for the machines with the slide (1) instead of the holder (3).

a) Crank the final folder to 140°.

b) Adjust the position of the holder (3) by means of the screw (4) until the distance **A** is obtained between the wheel flap (2) and the bottom of the package.

Note! The bottom of the package must be below the flap (2).



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5-17 Final Folder - Set Package Out Feed Rail

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648515-0200

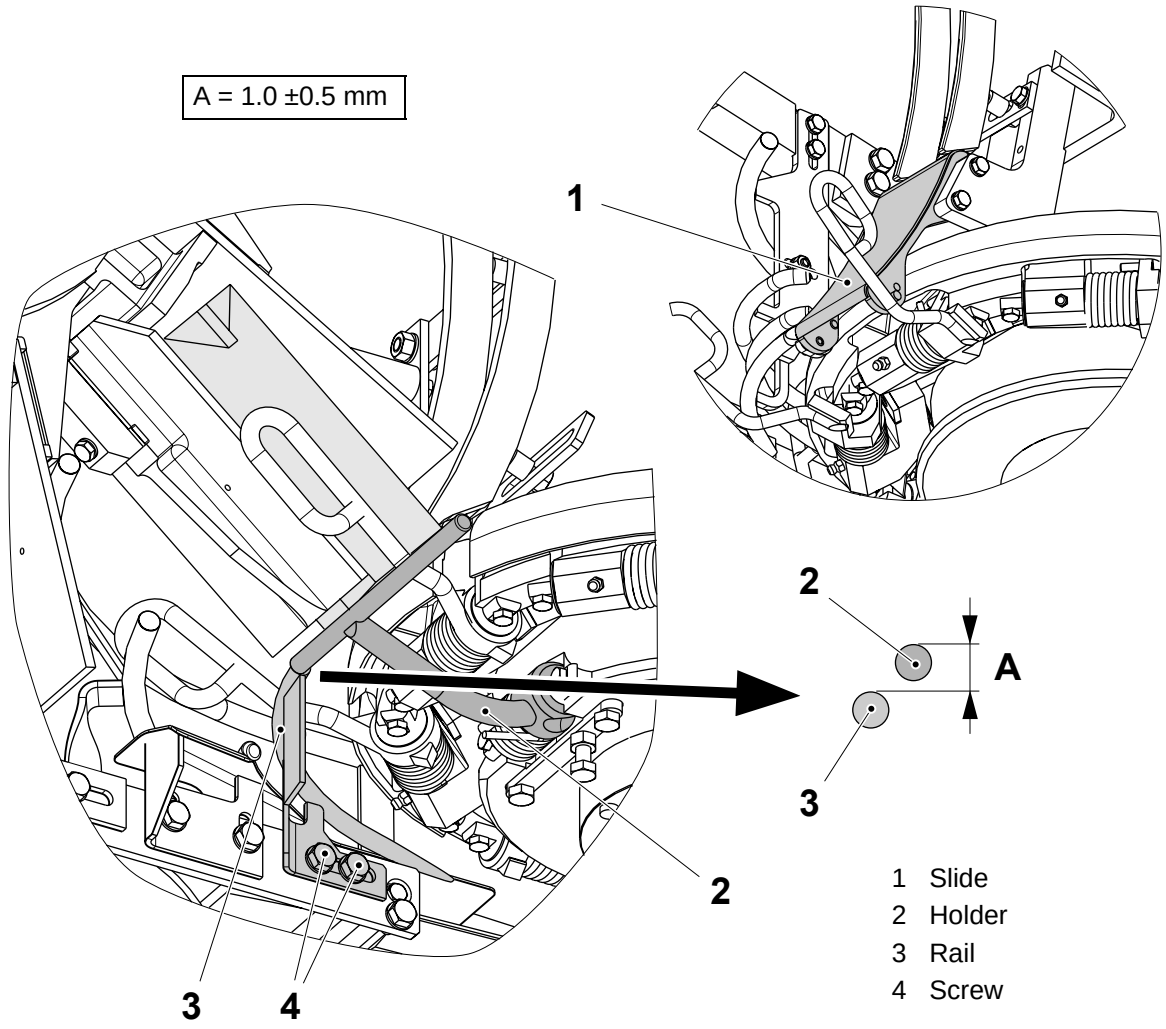
Note! This instruction is not applicable for the machines with the slide (1) instead of the holder (2).

a) Loosen the two screws (4) on the rail (3).

b) Adjust the position of the rail (3) until the distance **A** is obtained between the rail (3) and the holder (2).

c) Tighten the two screws (4).

Note! The rail (3) must be below the holder (2).



(Cont'd)

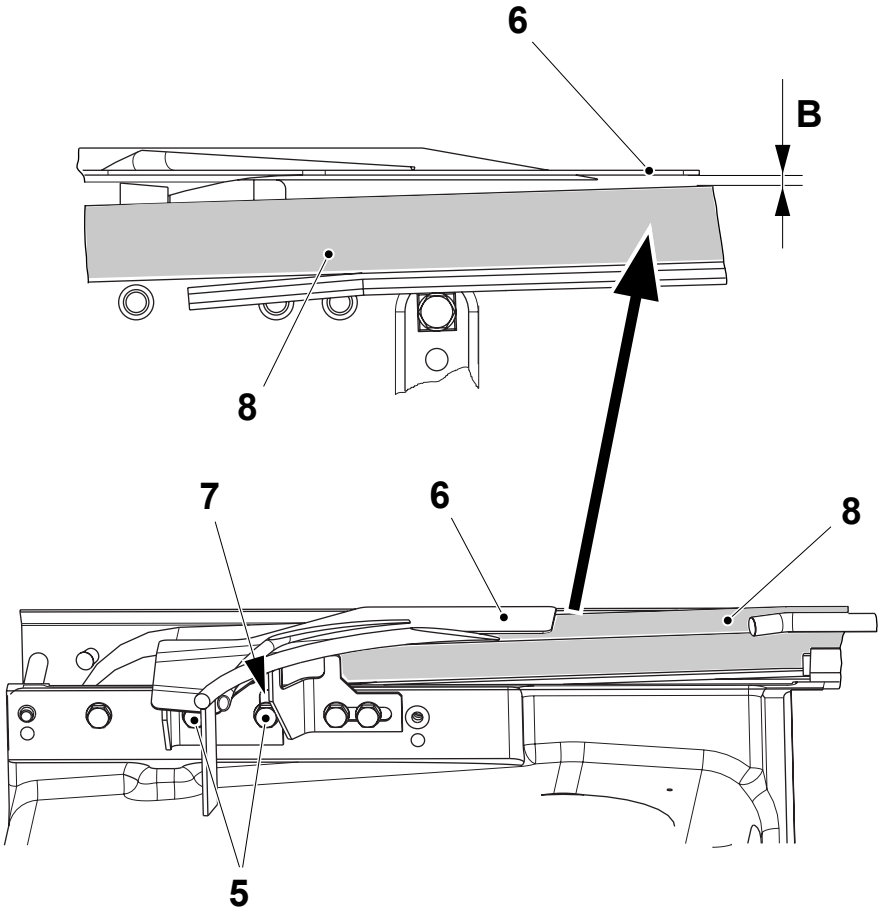
TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

d) Loosen the two screws (5) on the guide plate (6).

e) By means of the slots (7) on the guide plate (6) adjust the position of the guide plate (6) until the distance **B** is obtained between the surface of the conveyor (8) and the guide plate (6).

f) Tighten the two screws (5) on the guide plate (6).



B = 1.0 ±0.2 mm

5 Screw
6 Guide plate
7 Slot
8 Conveyor

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5-18 Final Folder - Synchronise Package Out Feed

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648515-0200

a) Crank the final folder to 140°.

b) Unload the belt (4) tension by loosening the screws (5) and (6) and remove the belt (4) from the teeth roller (3).

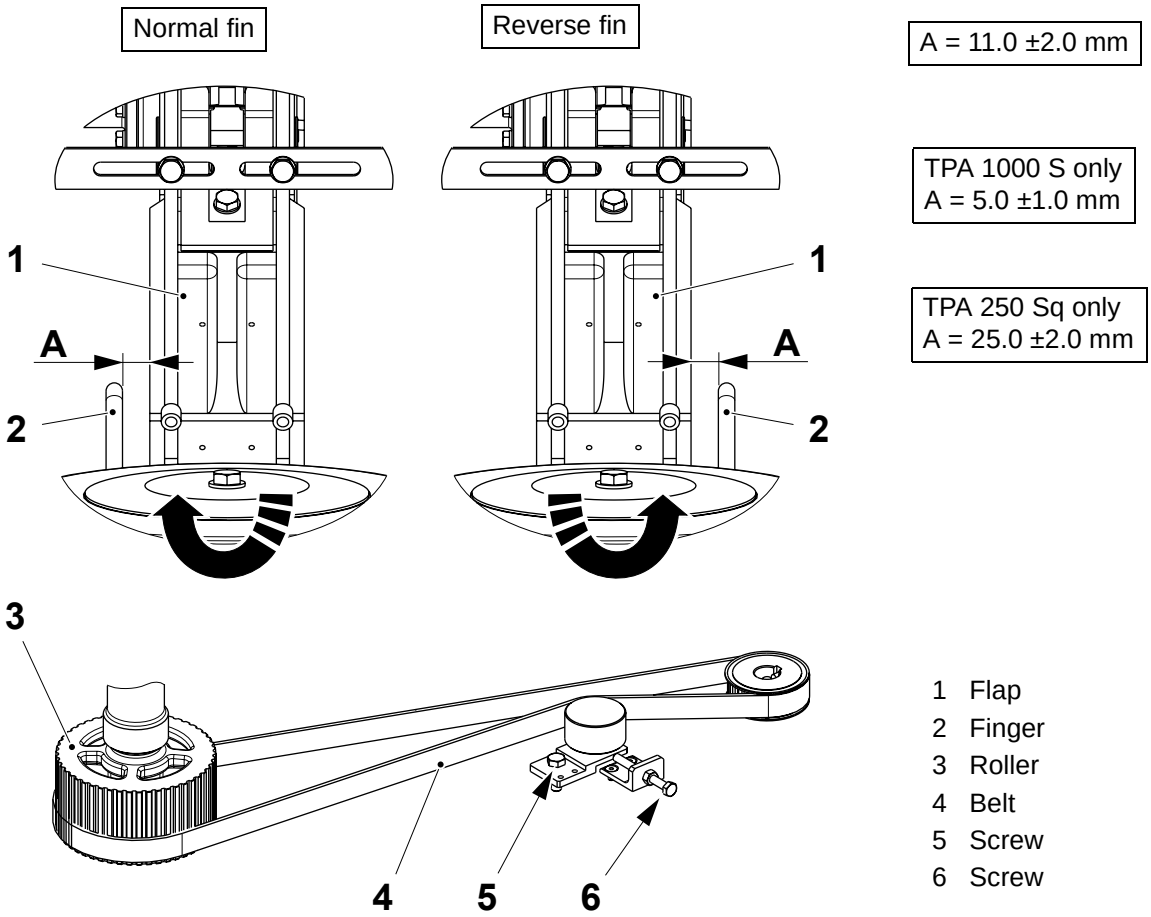
c) Turn by hand the teeth roller (3) until the distance **A** is obtained between the side of the wheel flap (1) and the finger (2).

d) Turn the out feed wheel **clockwise** to recover the play, see arrow.

Note! For packages with reverse fin turn the out feed **anticlockwise**.

e) Fit and tension the belt (4) by tightening the screws (5) and (6), see 5.8-11 Out Feed Device - Set Belt Tension.

f) Check the distance **A** once more after the synchronisation.



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5-19 Final Folder - Synchronise Overload Switches

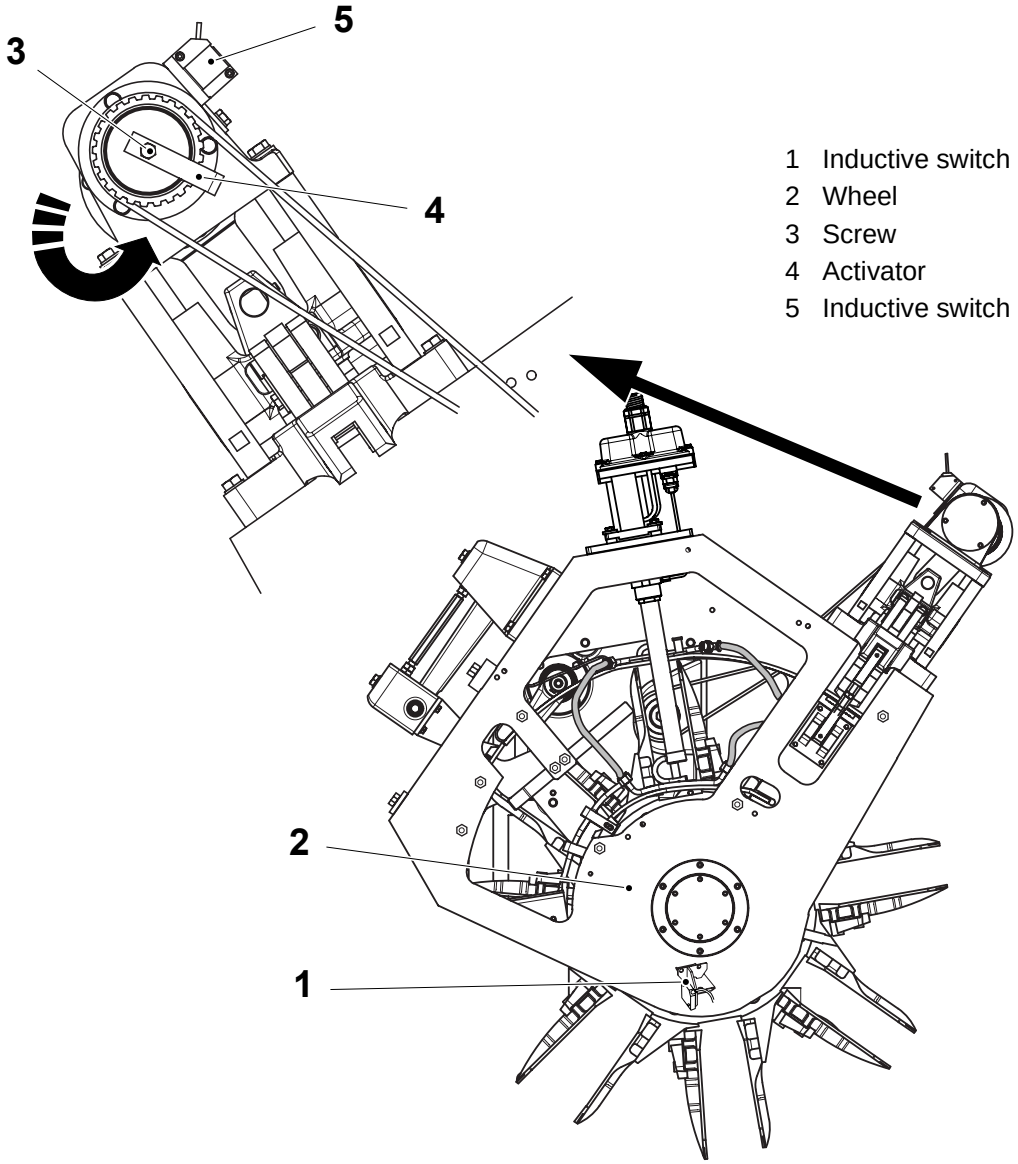
Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	648515-0200

a) Crank the final folder until the overload inductive switch (1) LED of the wheel (2) lights up.

b) Loosen the screw (3) on the pressure device.

c) Turn the activator (4) anti-clockwise until the overload inductive switch (5) LED lights up.

d) Tighten the screw (3) on the pressure device.



1 Inductive switch
2 Wheel
3 Screw
4 Activator
5 Inductive switch

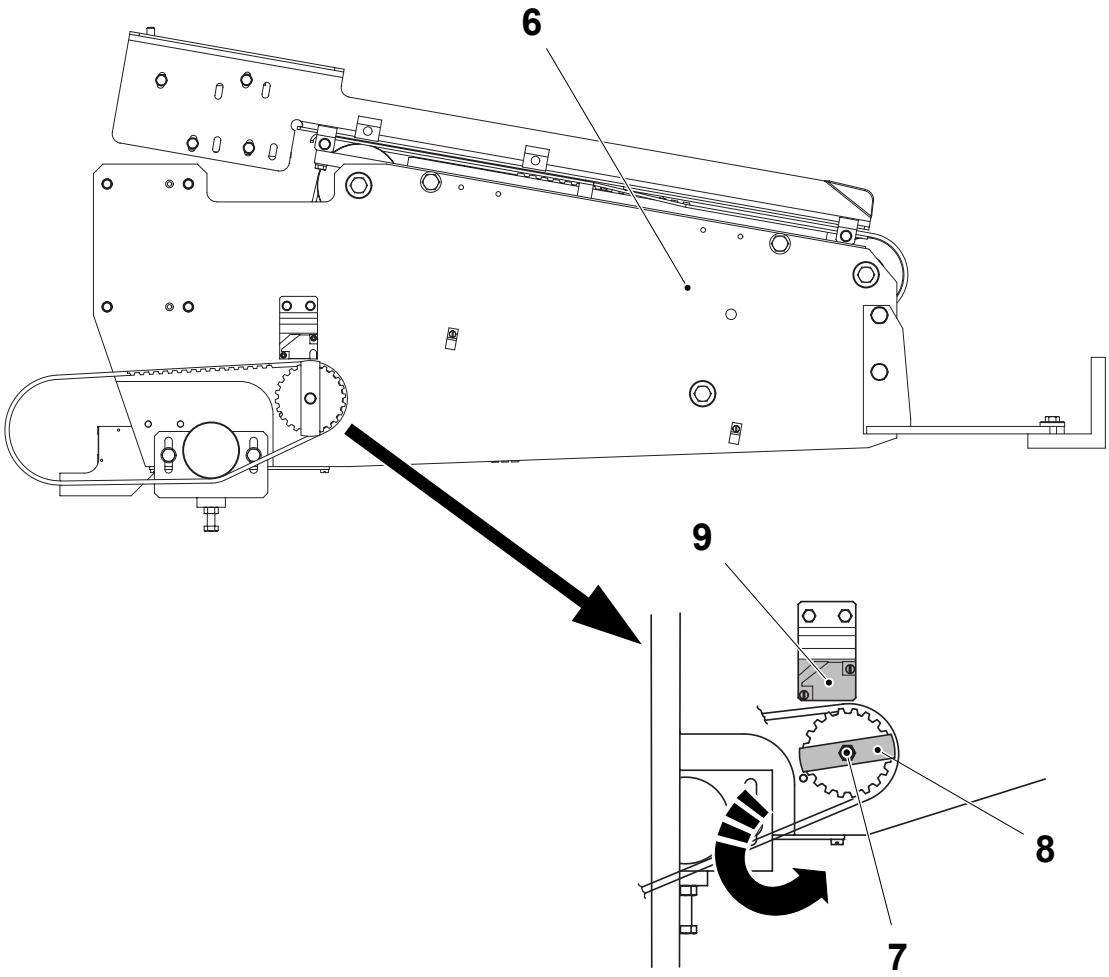
TechPub_2614345_0105 - 05_MM81534_11en.fm

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(Cont'd)

e) On the infeed conveyor (6), loosen the screw (7) and turn anti-clockwise the activator (8) until the inductive switch (9) LED lights up.

f) Tighten the screw (7).



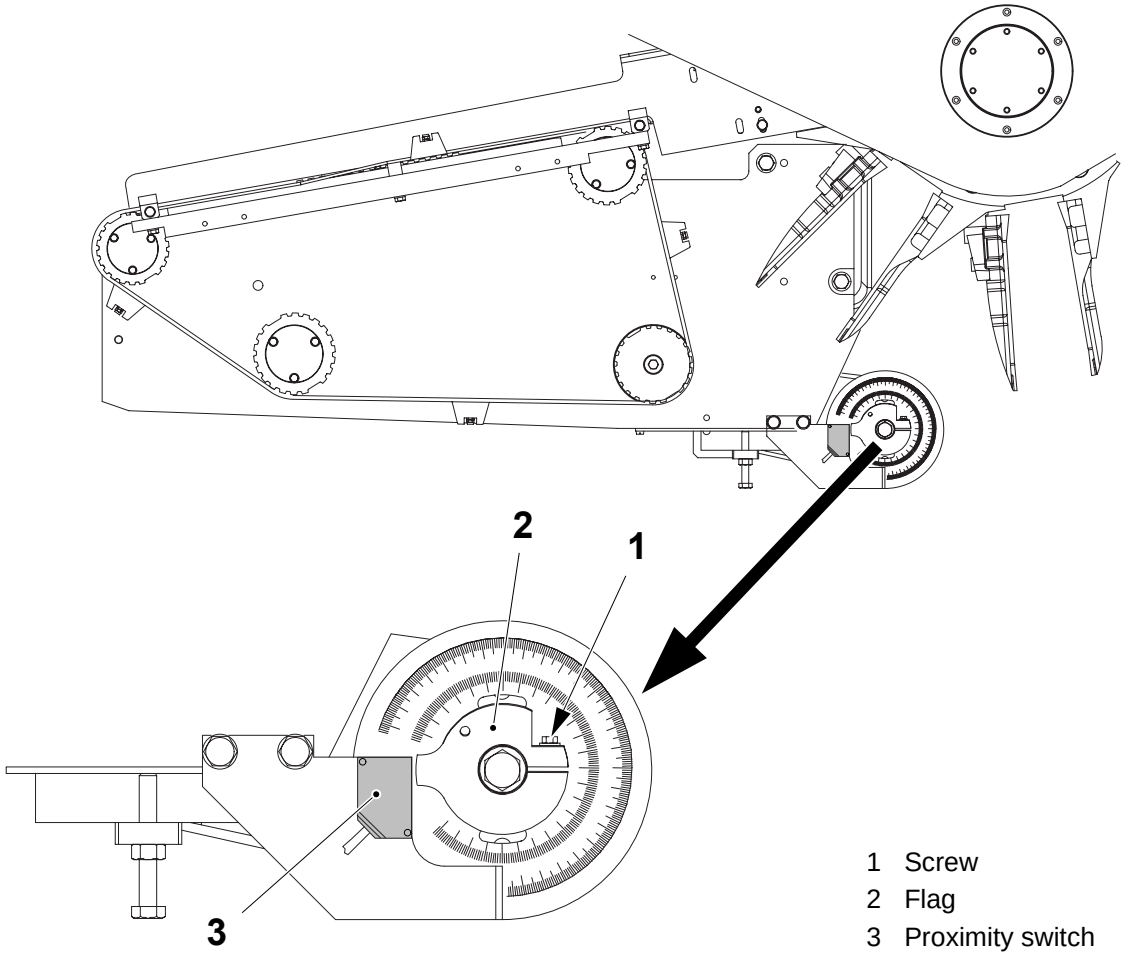
6 Infeed conveyor
7 Screw
8 Activator
9 Inductive switch

TechPub_2614345_0105 - 05_MM81534_11en.fm

5-20 Final Folder - Set Home Position Indexing Gear

Machine Status	Mains Power ON Air OFF Steam ON Water OFF

a) Crank the final folder to 70° degrees.
b) Loosen the screw (1) on the flag (2).
c) Turn the flag (2) clockwise until the proximity switch (3) LED lights up.
d) Tighten the screw (1) on the flag (2).



1 Screw
2 Flag
3 Proximity switch

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5-21 Final Folder - Set Package Out Feed Counting Photocells

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	648515-0200

a) The photocells are composed of one transmitter (1) and one receiver (2) and they must be positioned in front of each other.

b) Open the cover (3) on the receiver photocell (2).

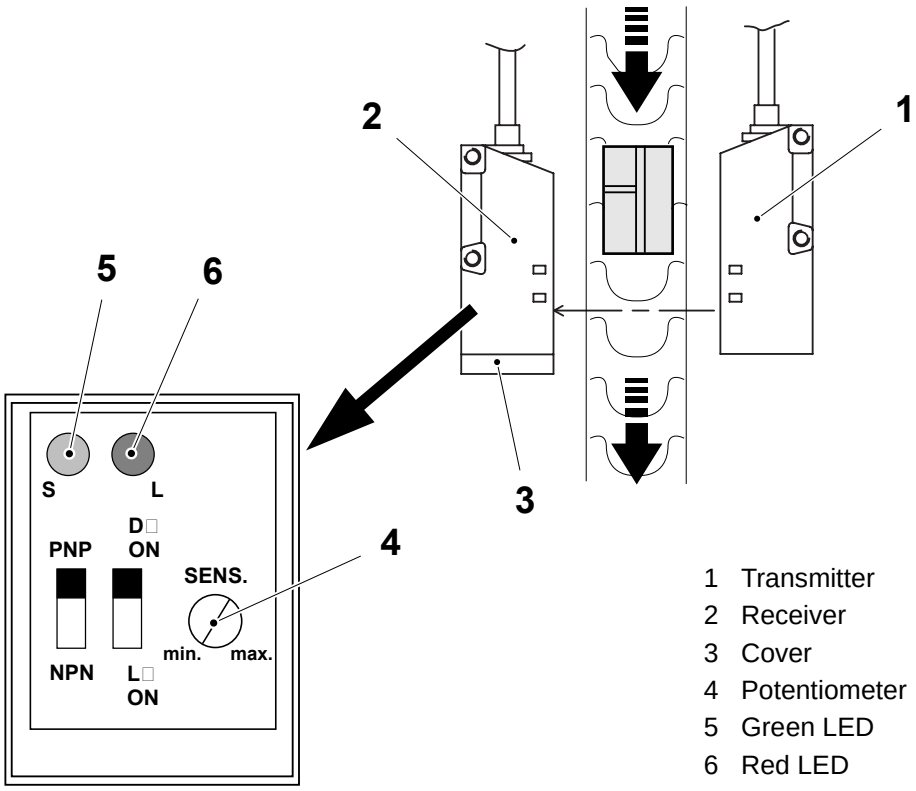
c) Make sure that the receiver photocell (2) is set to **PNP** (positive logic) and **D-ON** (the signal will be sent when the object is detected between the photocells), see figure.

d) Check the transmitter and receiver photocells position, see figure.

e) Begin without any object to be detected.
Turn the sensitivity potentiometer (4) anti-clockwise (toward **min.**) and then clockwise until both the green LED (5) and the red LED (6) light up. To secure the setting turn clockwise the sensitivity potentiometer (4) just a little bit more.

f) Place the package to be detected between the photocells. Check that the green LED (5) is lit and the red LED (6) light goes out.

g) Close the cover (3) on the receiver photocell (2).



1 Transmitter
2 Receiver
3 Cover
4 Potentiometer
5 Green LED
6 Red LED

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.1 Pull-down Device

SPC Reference	1144329-0200

5.1-1 Pull-down Device - Set Parallelism

SPC Reference	1144329-0200

Follow the procedure described in 5-7 Final Folder - Set Pull-down Device Parallelism.

5.1-2 Pull-down Device - Synchronisation

SPC Reference	1144329-0200

Follow the procedure described in 5-6 Final Folder - Synchronise Pull-down Device.

5.1-3 Pull-down Device - Set Lower Turning Position

SPC Reference	1144329-0200

Follow the procedure described in 5-9 Final Folder - Set Pull-down Device Lower Turning Position.

5.1-4 Pull-down Device - Set Position

SPC Reference	1144329-0200

Follow the procedure described in 5-8 Final Folder - Set Pull-down Device Position.

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5.1-5 Pull-down Device - Change Bushings

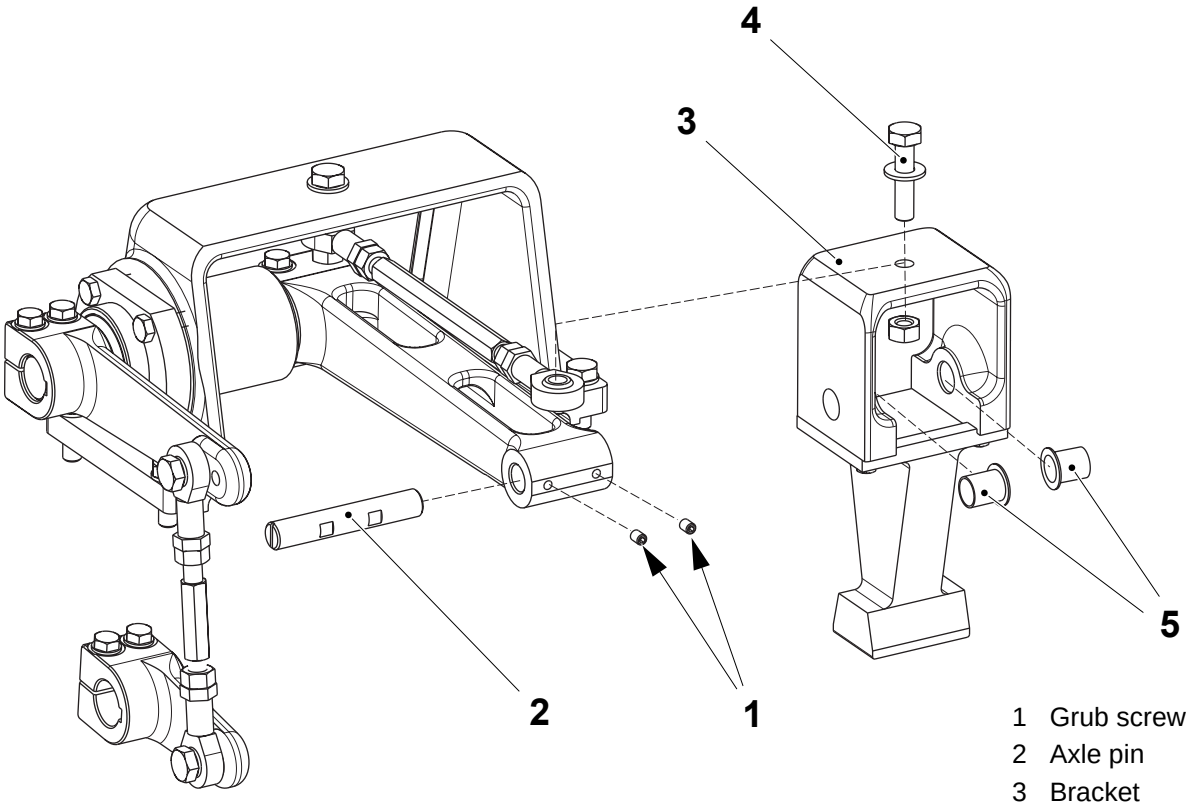
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1144329-0200

a) Remove the grub screws (1) and push out the axle pin (2).

b) Remove the bracket (3) group by means of the screw (4).

c) Push out and change the bushings (5).

d) Assemble in the reverse order and set the pusher as required, see 5-6 Final Folder - Synchronise Pull-down Device.



1 Grub screw
2 Axle pin
3 Bracket
4 Screw
5 Bushing

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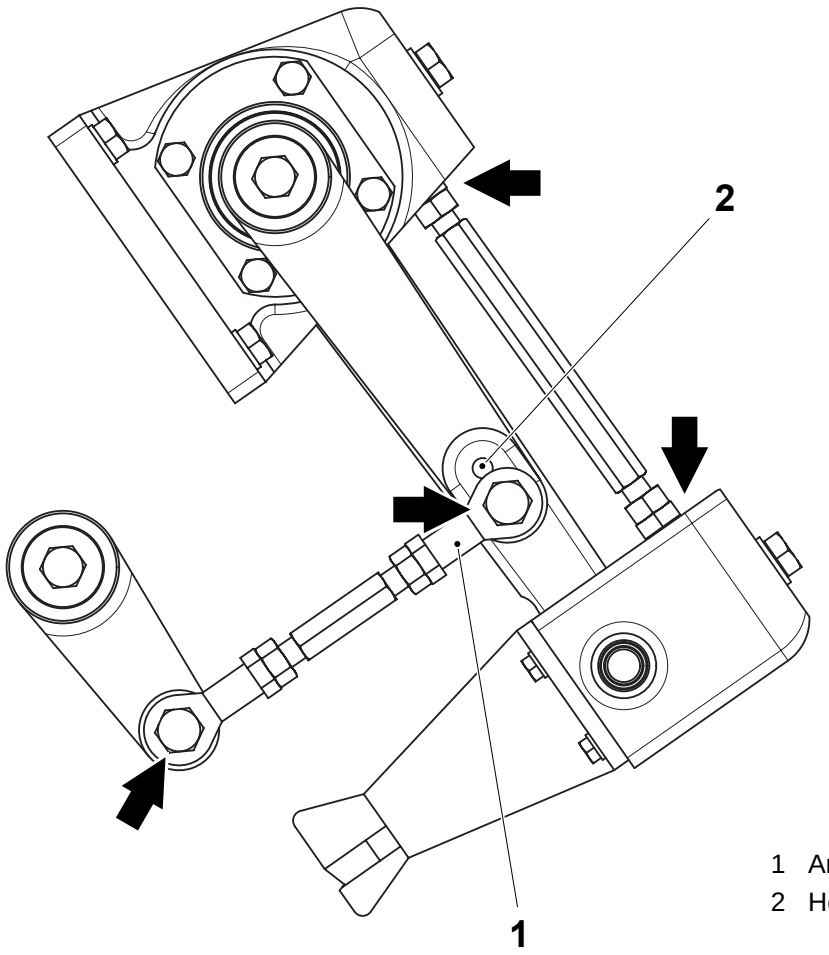
5.1-6 Pull-down Device - Check Link Heads

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1144329-0200

Check the play in the link heads, see arrows on the figure.

Note! For the packages 1000 Sq, TPA 1000 S, TPA 1000 Sq, TPA 250 Sq, TPA 500 Sq and TPA 330 Sq only check that the arm (1) is positioned in the hole (2).

Change the link heads as required and set as required, see 5.1-2 Pull-down Device - Synchronisation and 5.1-3 Pull-down Device - Set Lower Turning Position.



1 Arm
2 Hole

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.1-7 Pull-down Device - Check Folding Fin Device

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1144329-0200

Note! Only valid for TPA 1000 S, TPA 1000 Sq, TPA 330 Sq, TPA 250 Sq, TPA 500 Sq and 1000 Sq.

a) Remove the nuts (1) and the screws (3).

b) Remove the tie rods (2) from the reverse top fin kit assembly.

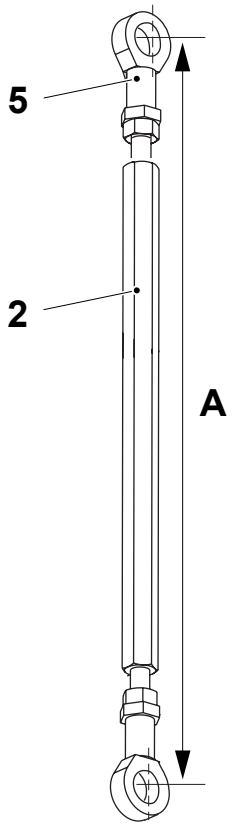
c) Place the tie rods (2) on a bench and align the two eye-bolts (5) with each other.

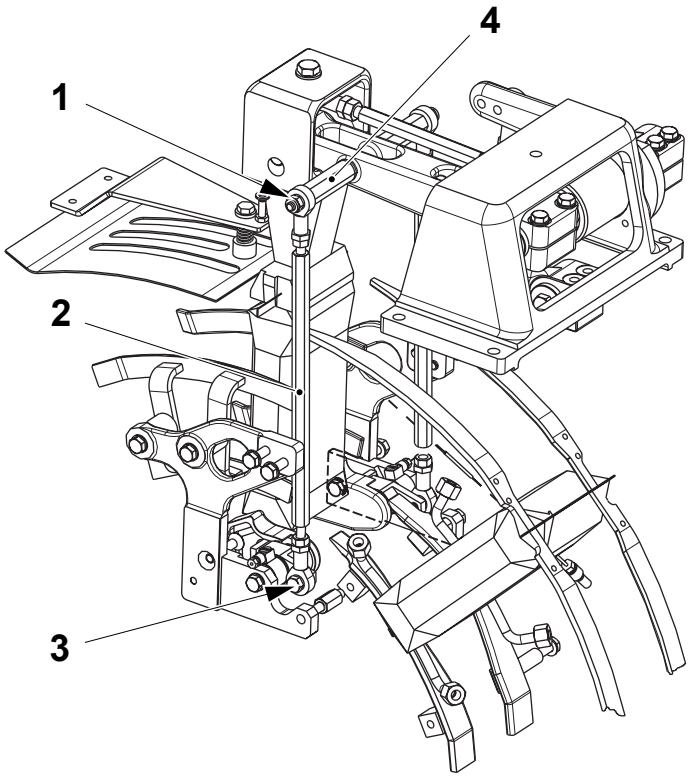
d) Fit the tie rods (2) on the screws (4).

e) Check and, if necessary set the distance **A** between the centre of the axis of the two eye-bolts by turning the eye-bolts (5).

Note! TPA 500 Sq is only in the StreamCap version (no ReCap version).

Package	**A ±0.5 (mm)**		**Package**	**A ±0.5 (mm)**
1000 Sq - TPA 1000 S	367.0		TPA 1000 Sq Normal	332.0
TPA 330 Sq - TPA 250 Sq	293.0		TPA 1000 Sq StreamCap	360.0
TPA 500 Sq StreamCap	343.0			





1 Nut
2 Tie rod
3 Screw
4 Screw
5 Eye-bolt

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.1-8 Pull-down Device - Set Cam Position Folding Fin Device

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1144329-0200

Note! Only valid for TPA 1000 S, TPA 1000 Sq and 1000 Sq.

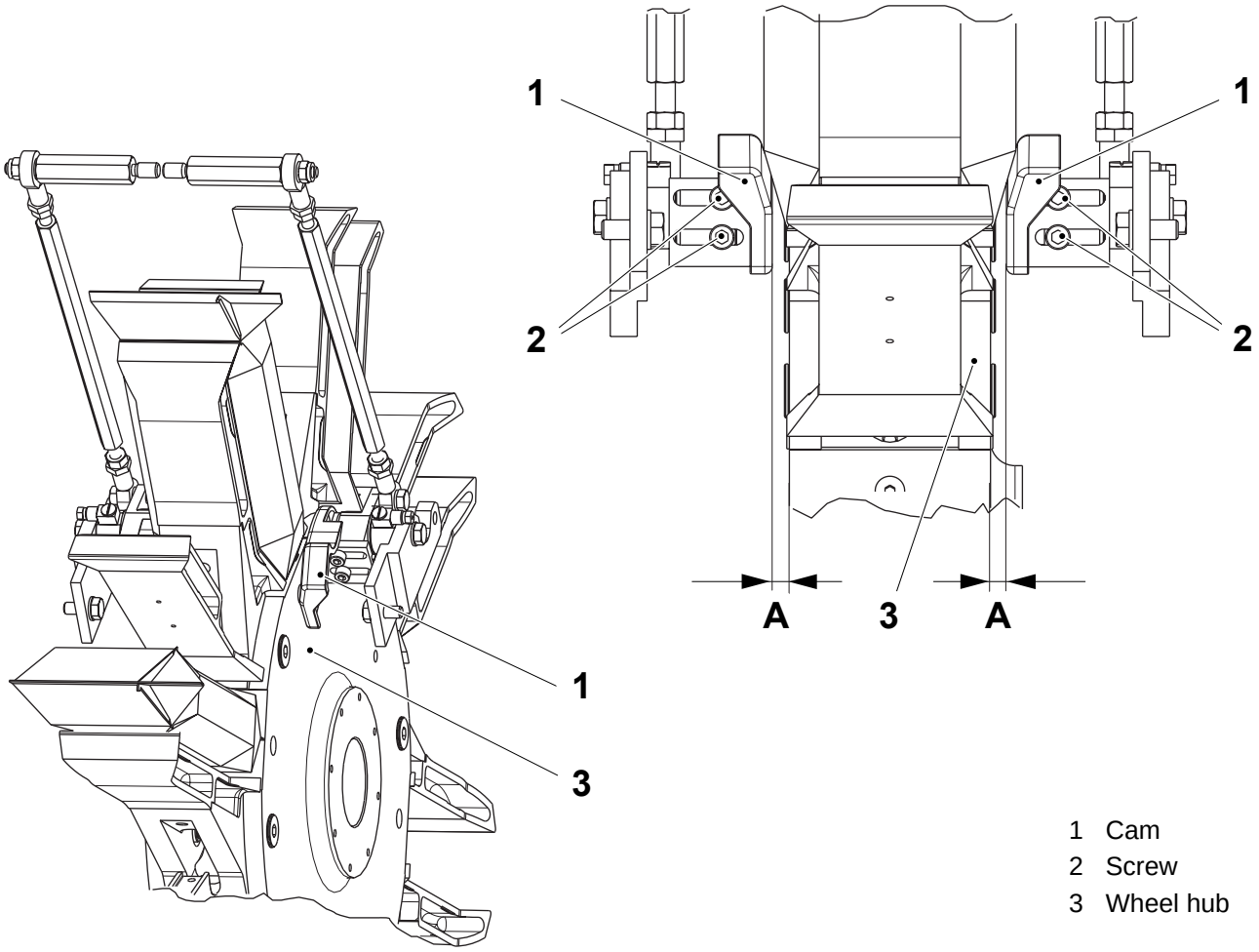
a) Crank the final folder to 180°.

b) Loosen the screws (2).

c) Set the distance **A** between the wheel hub (3) surface and the reverse fin cam (1).

d) Tighten the screws (2).

Package	A ±0.5 (mm)
TPA 1000 S	7
TPA 1000 Sq	1
1000 Sq	5



1 Cam
2 Screw
3 Wheel hub

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5.1-9 Pull-down Device - Set Cam Position Folding Fin Device

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1144329-0200

Note! Only valid for TPA 500 Sq, TPA 250 Sq and TPA 330 Sq.

a) Crank the final folder to 180°.

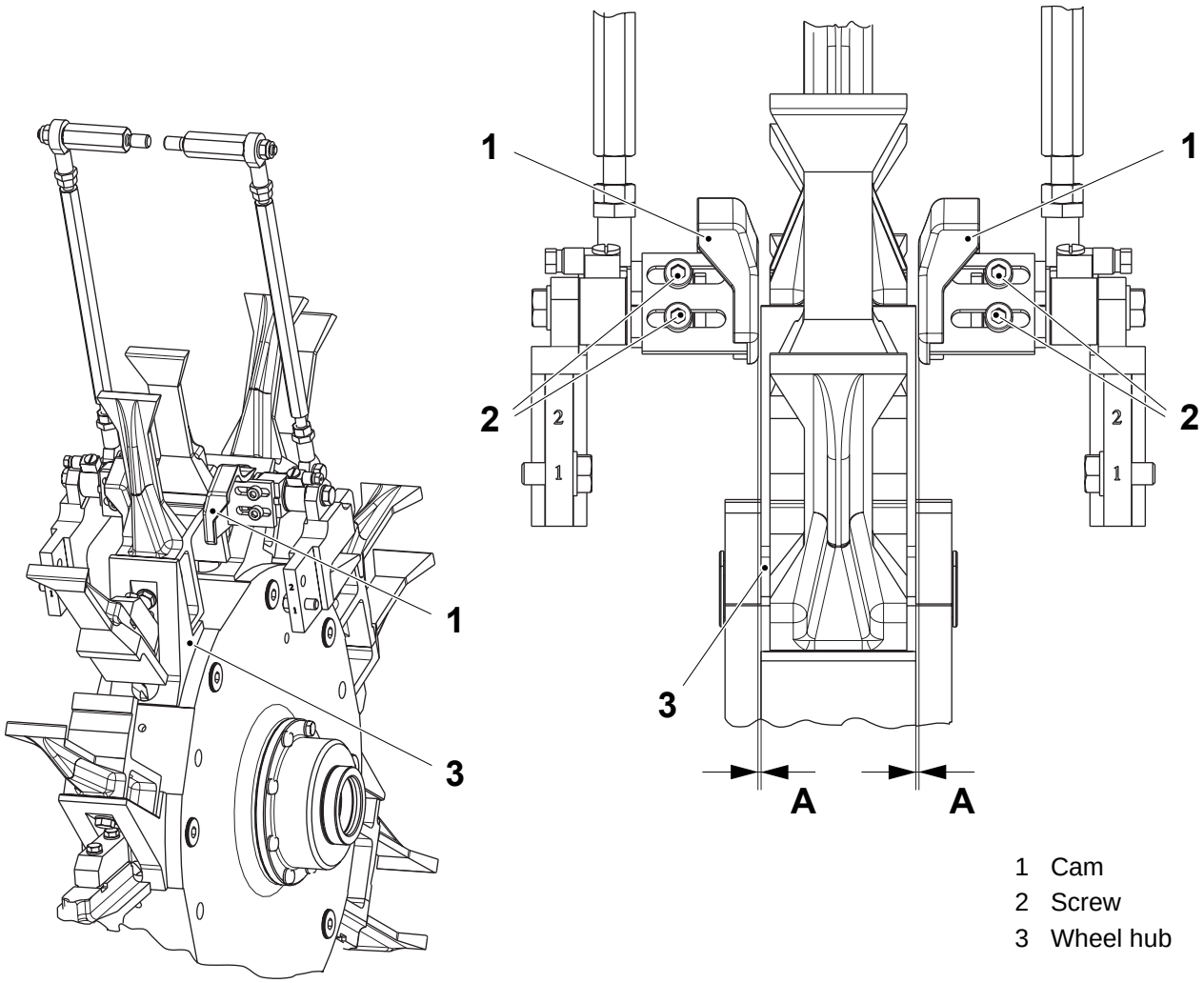
b) Loosen the screws (2).

c) Set the distance **A** between the wheel hub (3) surface and the reverse fin cam (1).

d) Tighten the screws (2).

Package	A ±0.5 (mm)
TPA 330 Sq	2
TPA 250 Sq	5
TPA 500 Sq	4

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1 Cam
2 Screw
3 Wheel hub

5.2 Frame Work

SPC Reference	1144324-0200

5.2-1 Frame Work - Overhaul

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Grease code F
SPC Reference	1144324-0200

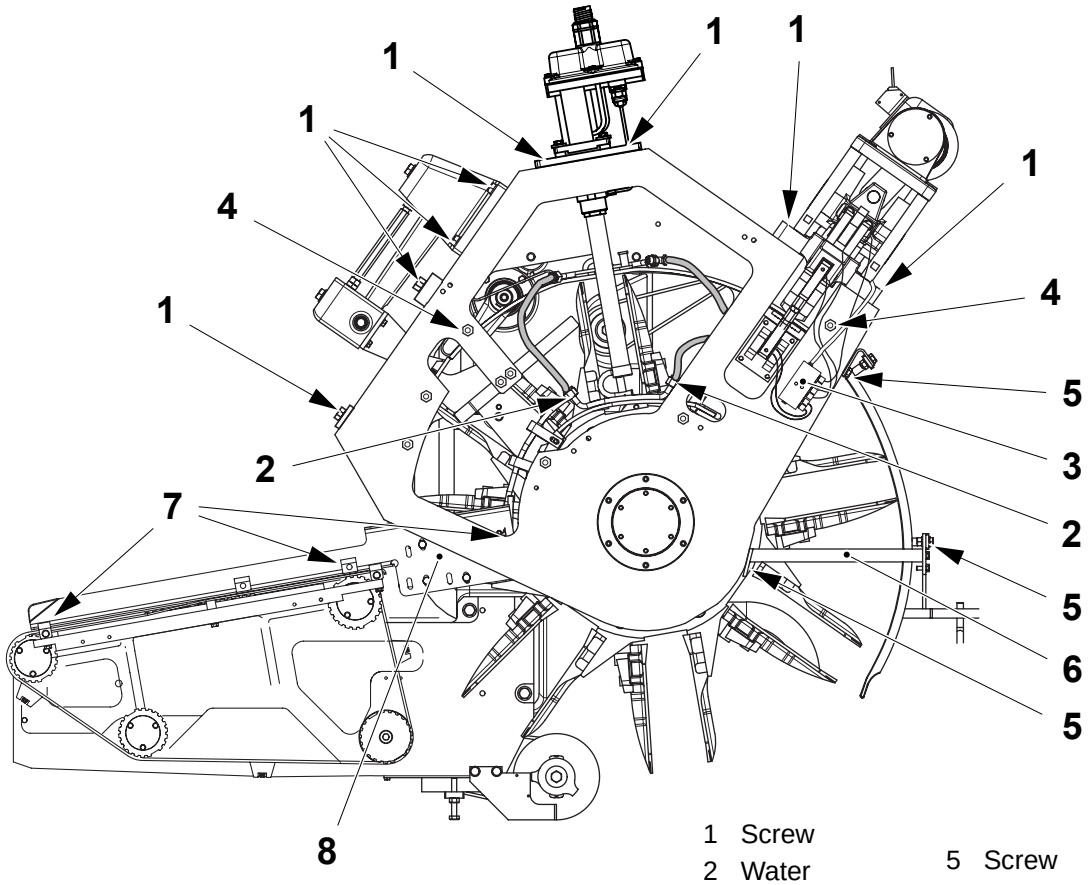
a) Crank the final folder to 0°.

b) Remove the screws (1) in the external frame.

c) Detach the water connections (2) and remove the oil block (3).

d) Remove the nuts (4), the screws (5) and the bracket (6).

e) Unscrew the three screws (7) and remove the LH side of the infeed guide (8).



1 Screw
2 Water connection
3 Oil block
4 Nut
5 Screw
6 Bracket
7 Screw
8 Infeed guide

(Cont'd)

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(Cont'd)

f) Remove the screws (10) and the flange (11).

g) Change the O-ring (12).

h) Remove the screw (13) and the washer (14).

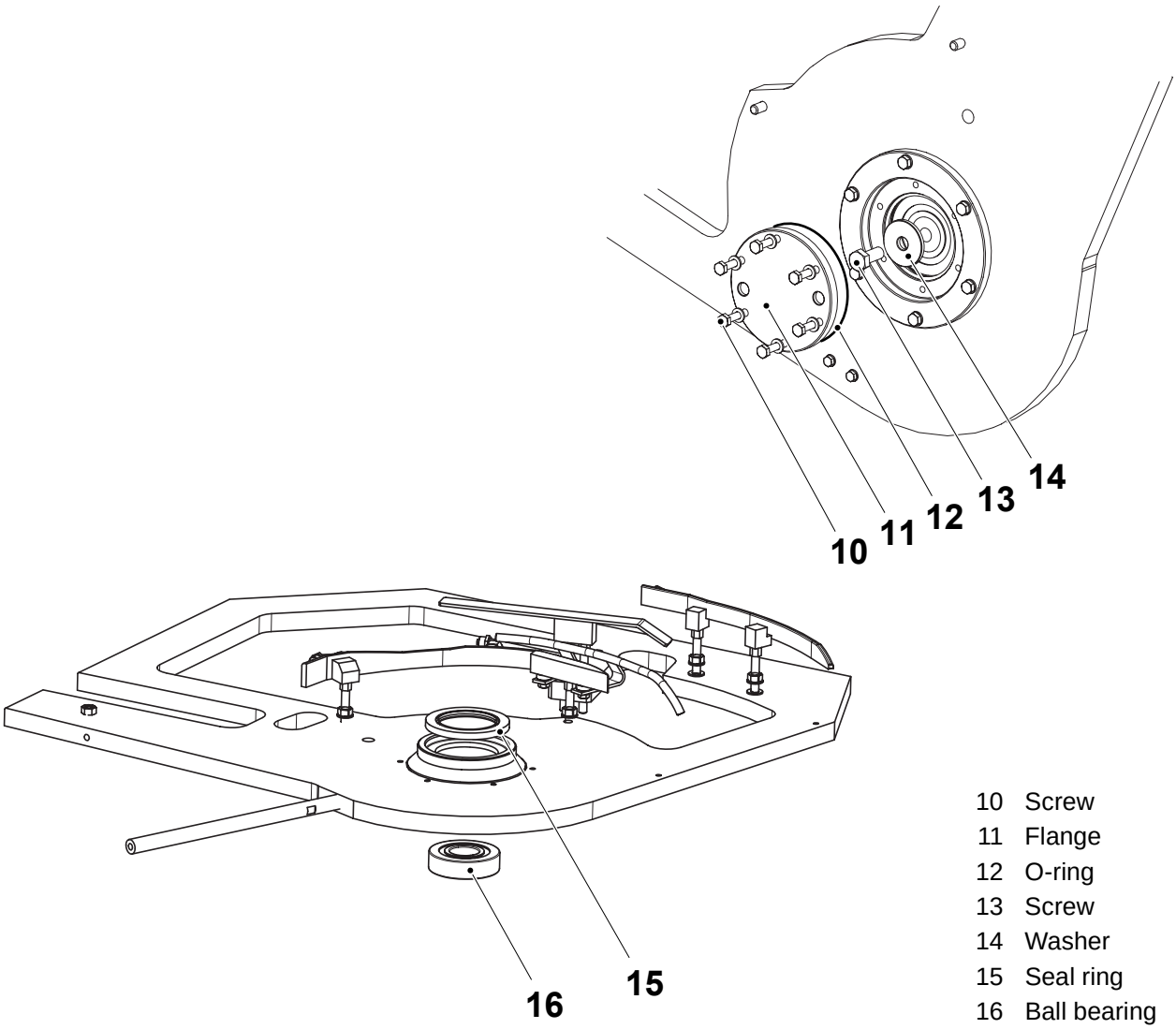
WARNING

Risk of hand crushing.
Follow the safety precautions.

i) Pull out the external frame.

j) Change the seal ring (15) and the ball bearing (16).

Note! Apply a layer of grease (TP No. 90296-68) on the seal ring (15) when assembling.



10 Screw
11 Flange
12 O-ring
13 Screw
14 Washer
15 Seal ring
16 Ball bearing

(Cont'd)

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(Cont'd)

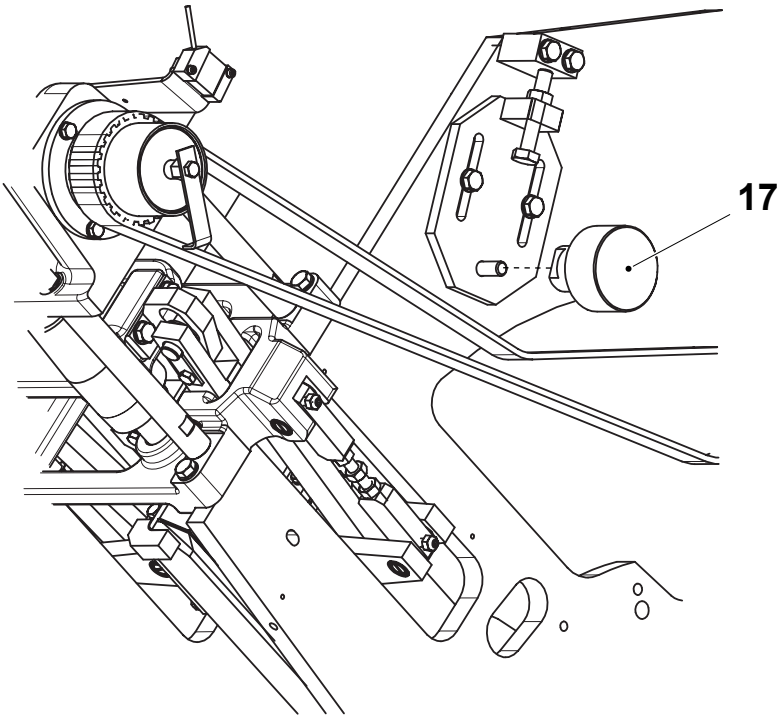
k) Remove the belt tensioner (17).

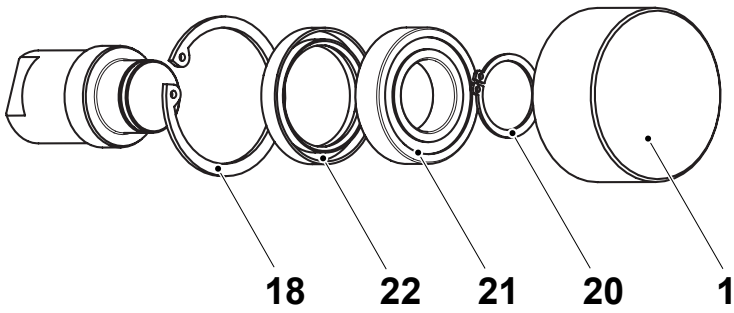
l) Remove the circlip (18) and the roller (19).

m) Remove the circlip (20) and change the ball bearing (21) and the seal ring (22).

n) Assemble in the reverse order.

Note! Apply a layer of grease (TP No. 90296-68) on the seal ring (22) when assembling.





17 Belt tensioner
18 Circlip
19 Roller
20 Circlip
21 Ball bearing
22 Seal ring

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5.2.1 Central Lubrication

5.2.1-1 Central Lubrication - Check

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1144324-0200

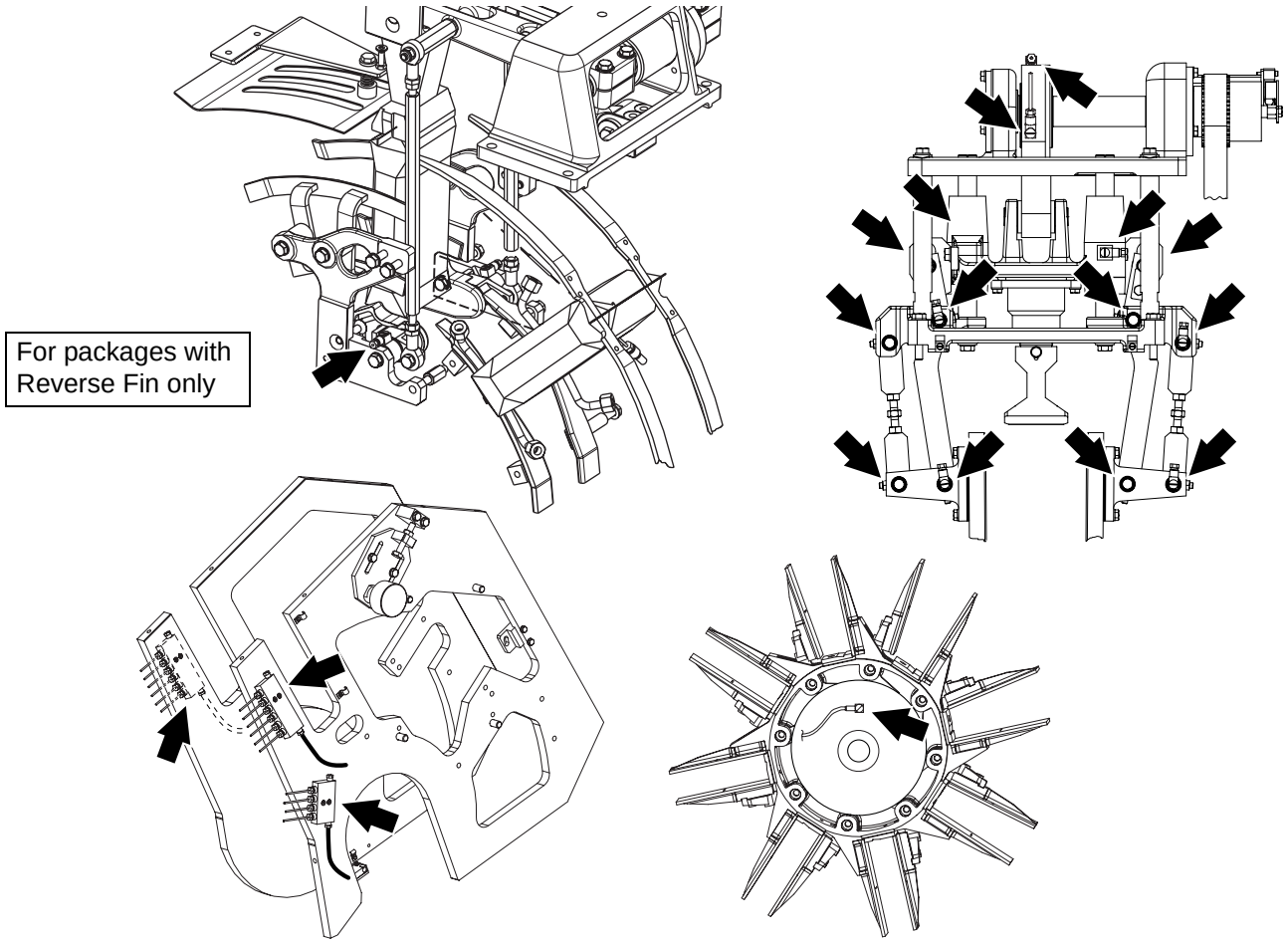
WARNING
Risk of personal injury.
Wear protective gloves.

a) Start the **Manual lubrication** sequence, see items from c), *to* f), in 2.1.1-1 Central Lubrication - Check.

b) Make sure that oil reaches the places marked with arrows in the final folder, see figure. Check carefully for any oil leakages.

Note! When checking these parts also look for air bubbles in the oil hoses. This means that there is a leak somewhere in the lubrication system.

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5.2.1-2 Central Lubrication - Bleed

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1144324-0200

WARNING
Risk of personal injury.
Wear protective gloves.

a) Loosen one bleeding point (4) at a time, see figure.

b) If required remove the valves (1) from the oil blocks (2)

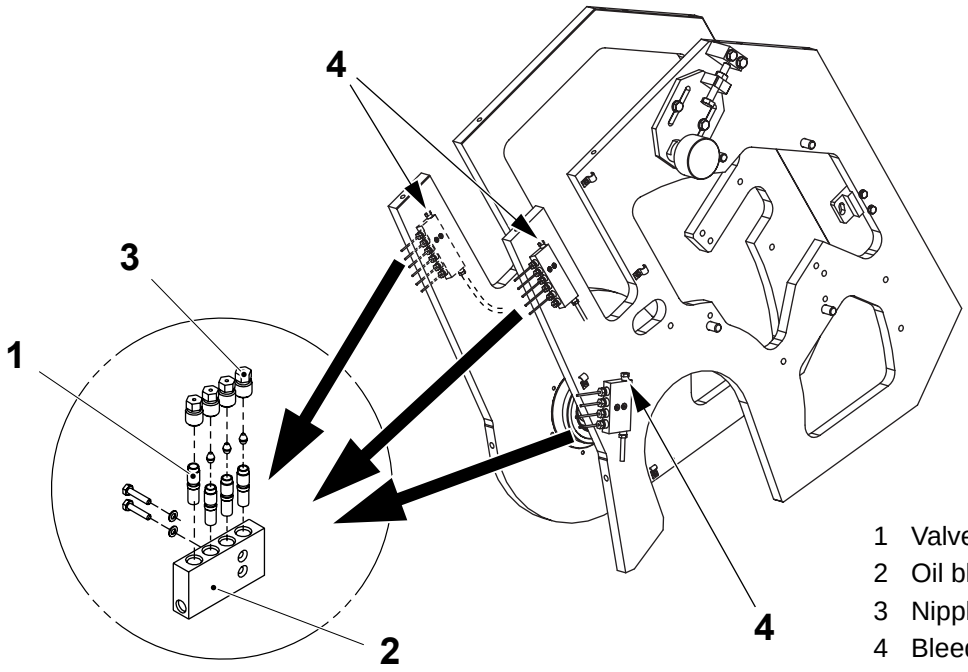
c) Start the **Manual lubrication** sequence, see items from c), *to* f), in 2.1.1-1 Central Lubrication - Check at five minutes intervals until air free oil is bled out.

d) Tighten the bleeding point (4).

e) If required fit back the valves (1) on the oil blocks (2) and tighten the nipples (3).

f) Start the **Manual lubrication** sequence, see items from c), *to* f), in 2.1.1-1 Central Lubrication - Check once more to get pressure in the system.

Note! Always bleed the system whenever one of the main lines between the pump and the metering valve has been disconnected.



1 Valve
2 Oil block
3 Nipple
4 Bleeding point

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5.3 Flap Heater

SPC Reference	1487927-0200 1487158-0100

5.3-1 Flap Heater - Change Heating Elements

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1487927-0200 1487158-0100

WARNING

Risk of personal injury.

The heating element and other parts nearby may be hot.

a) Remove the screws (1) and lift up the cover (2).

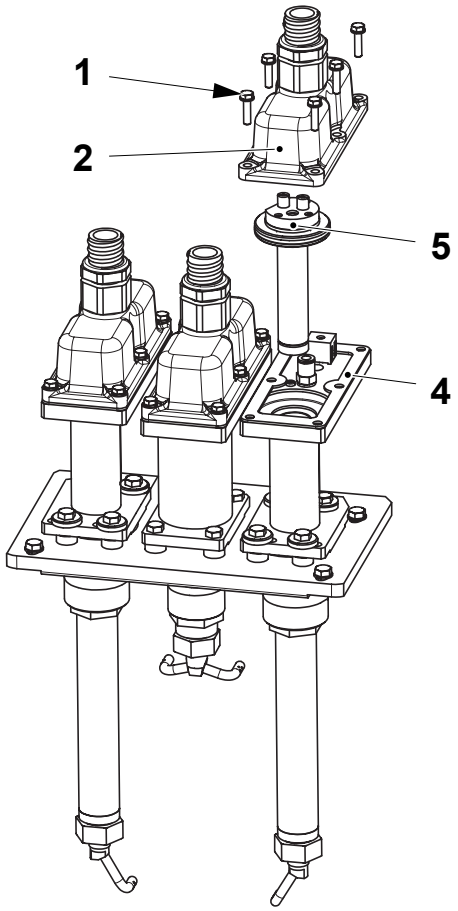
b) Pull out the heating element (3).

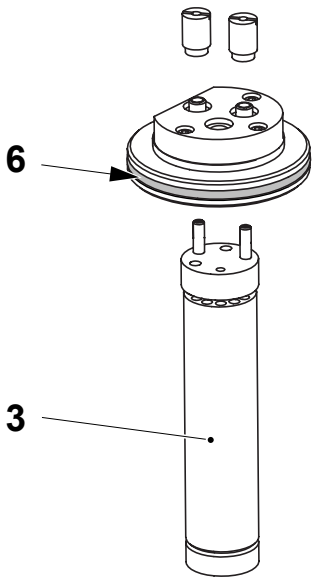
c) Check the gasket (4). Change as required.

d) Remove the contact unit (5) and change the element (3).

e) Check the O-rings (6) for damages. Change as required.

f) Assemble in the reverse order.





1 Screw
2 Cover
3 Element
4 Gasket
5 Contact unit
6 O-ring

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5.3-2 Flap Heater - Set Nozzles

SPC Reference	1487927-0200 1487158-0100

Follow the procedure described in 5-13 Final Folder - Set Flap Heater Nozzles.

5.3-3 Flap Heater - Set Pressures

Machine Status	Mains Power OFF, Air ON Steam ON, Water OFF
SPC Reference	1487927-0200 1487158-0100

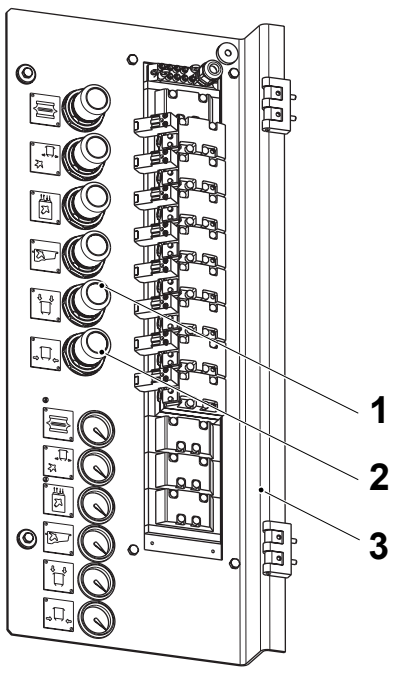
WARNING

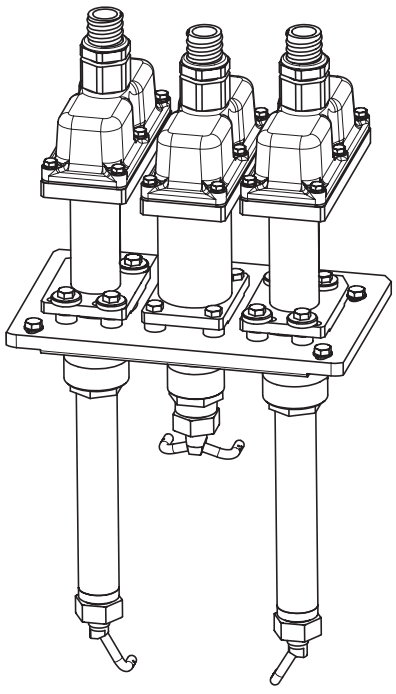
Risk of personal injury.

The nozzles and other parts nearby may be hot.

a) Set the top flap sealing air pressure according to 10.1 Technical Data, by means of the pressure regulator (1), located on the machine body pneumatic air panel (3).

b) Set the bottom flap sealing air pressure according to 10.1 Technical Data, by means of the pressure regulator (2), located on the machine body pneumatic air panel (3).





1 Pressure regulator
2 Pressure regulator
3 Air panel

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5.4 Indexing Gear

SPC Reference	1144320-0300

5.4-1 Indexing Gear - Check Oil Level

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Lubricant code B
SPC Reference	1144320-0300

WARNING
Risk of personal injury.
Wear protective gloves.

CAUTION
Risk of damage to the equipment.
Inch the final folder for at least two minutes before checking the oil level.
Add small amounts of oil at a time. Do **not** overfill!

(Cont'd)

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(Cont'd)

Note! The **top** level glass (1) is always half full after the final folder has been run for the first time.

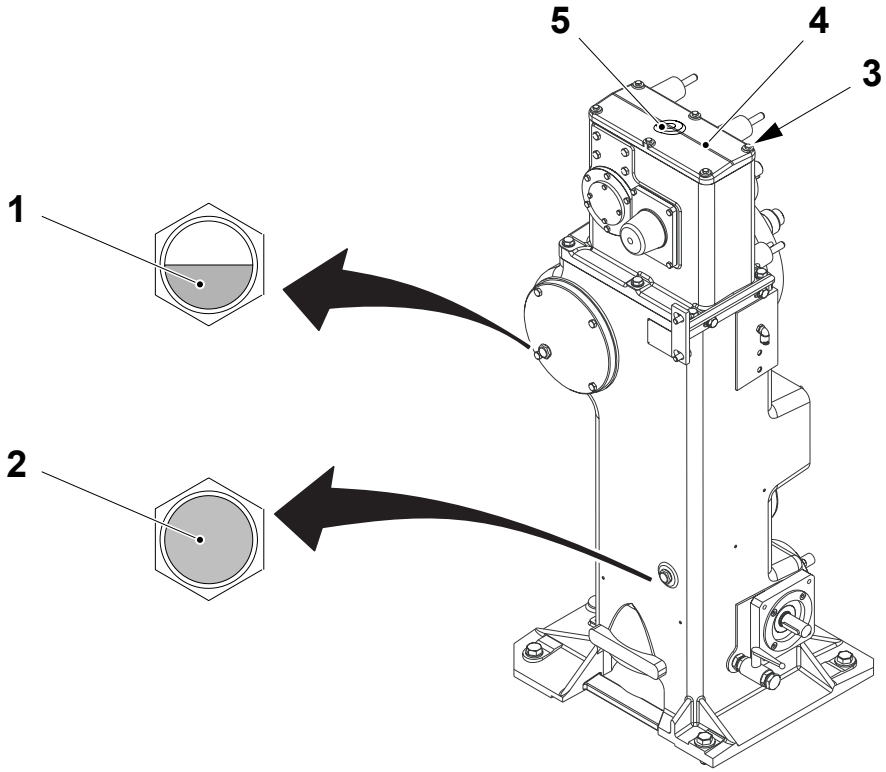
a) Inch the final folder for at least 2 minutes.

b) Check the oil level. The **bottom** level glass (2) must be completely full.

c) If required:

- remove the screws (3) and the lid (4)
- **slowly** add oil (code B, see 10.3-1 Lubricants) through the top of the indexing unit until the bottom level glass (2) is just full. Do **not** overfill.
- fit the lid (4) by means of the screws (3).

Note! Some indexing gear units have a filling plug (5), that can be removed instead of the lid (4), to add oil to the indexing gear unit.



1 Top level glass
2 Bottom level glass
3 Screw
4 Lid
5 Plug

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5.4-2 Indexing Gear - Change Oil

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lubricant code B
SPC Reference	1144320-0300

WARNING

Risk of personal injury.

Wear protective gloves.

a) Remove the screws (1) and the lid (2).

b) Fit a hose to the valve (2), located at the bottom of the indexing gear.

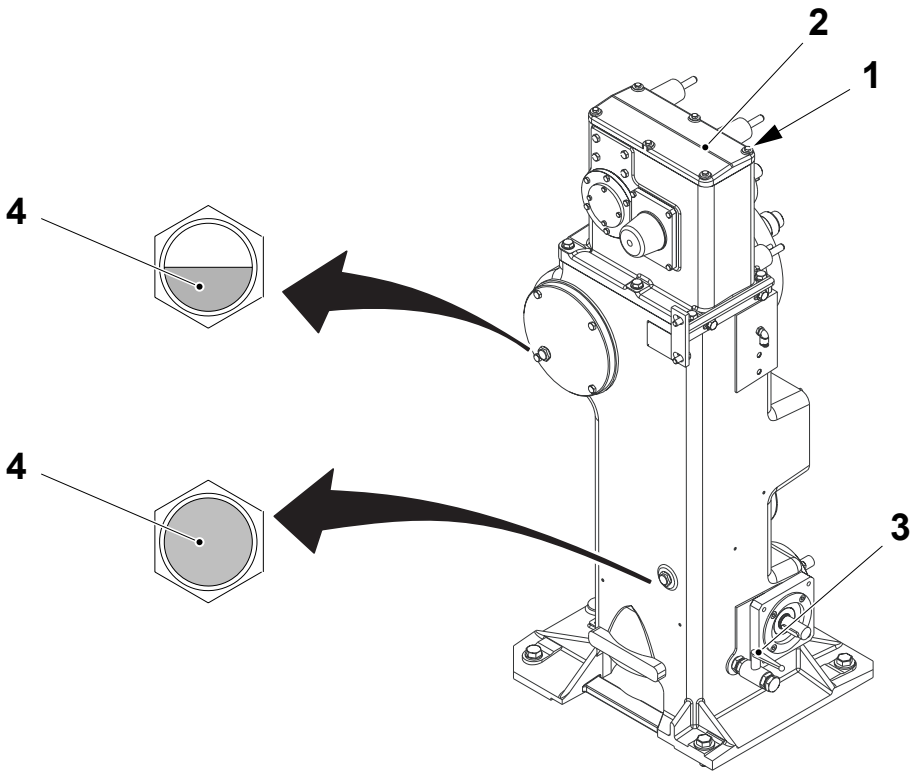
c) Open the valve (3) and drain the oil into a container.

d) When the oil is drained, close the valve (3) and remove the hose.

e) Fill up with oil (code B, see 10.3-1 Lubricants) approximately **14 litres**, through the top of the indexing unit.

f) Fit the lid (2) by means of the screws (1).

g) Check the oil level in the level glasses (3), see 5.4-1 Indexing Gear - Check Oil Level.



1 Screw
2 Lid
3 Valve
4 Level glass

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5.4-3 Indexing Gear - Clean Filter

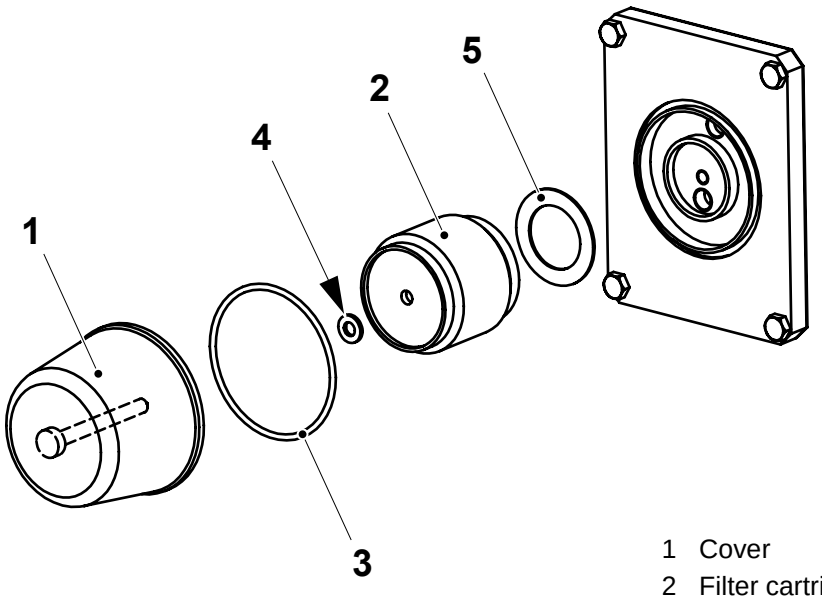
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Paraffin oil
SPC Reference	1144320-0300

a) Unscrew the cover (1).

b) Pull out and clean the filter cartridge (2) first with paraffin oil and after by blowing with compressed air.

c) Check the O-ring (3) and the seals (4) and (5) for damage. Change as required.

d) Assemble in the reverse order.



1 Cover
2 Filter cartridge
3 O-ring
4 Seal
5 Seal

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5.4-4 Indexing Gear - Check Protractor

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Adhesive tape
SPC Reference	1144320-0300

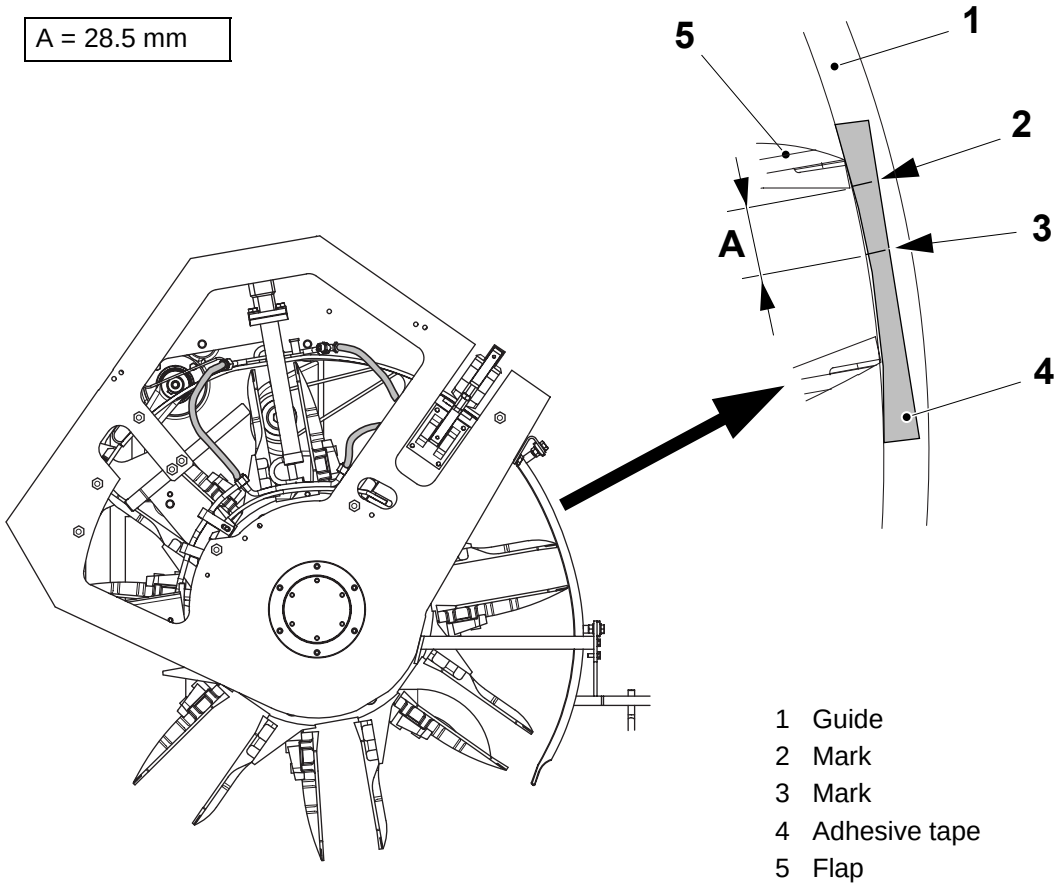
a) Crank the final folder until the wheel stops moving.

b) Place a piece of adhesive tape (4) on the guides (1) as shown.

c) Make an accurate mark (2) on the tape at the position of the **fixed** flap (5).

d) Measure the distance **A** along the inside edge of the guide (1) in the direction of wheel rotation. Make a second mark (3) at this position.

A = 28.5 mm



1 Guide
2 Mark
3 Mark
4 Adhesive tape
5 Flap

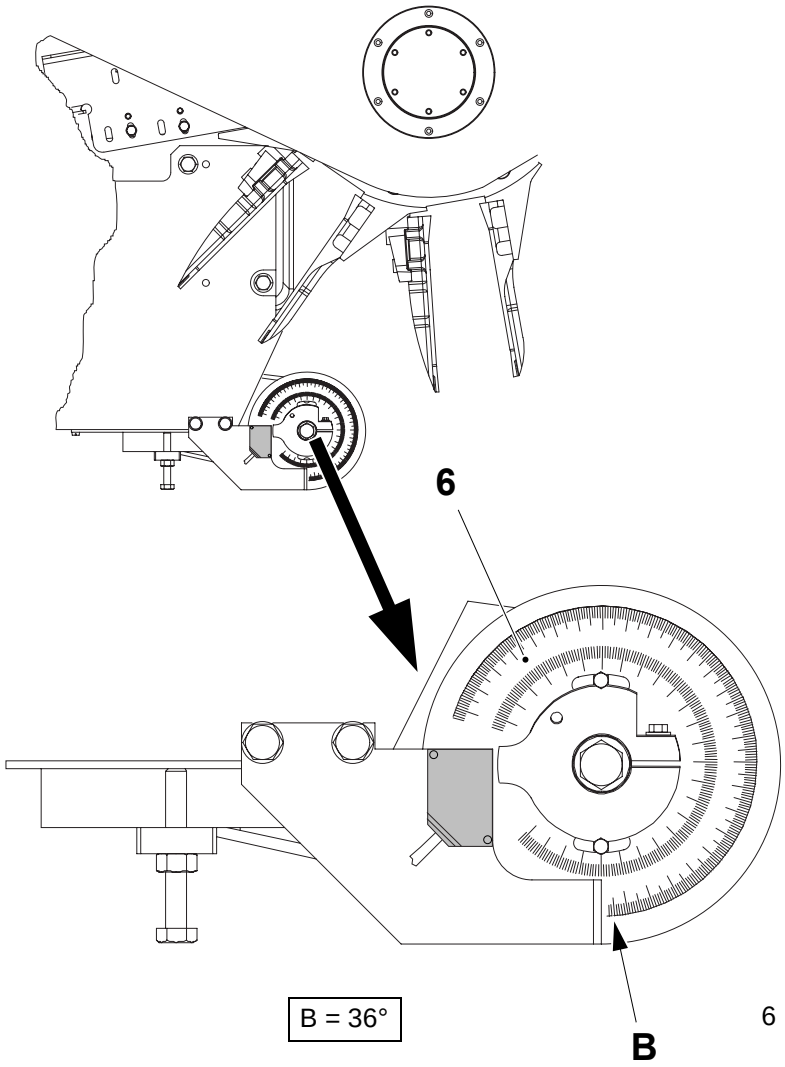
(Cont'd)

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(Cont'd)

e) Crank slowly until the fixed flap aligns with the second mark.

f) Check the angle **B** on the **outer** scale of the protractor (6).



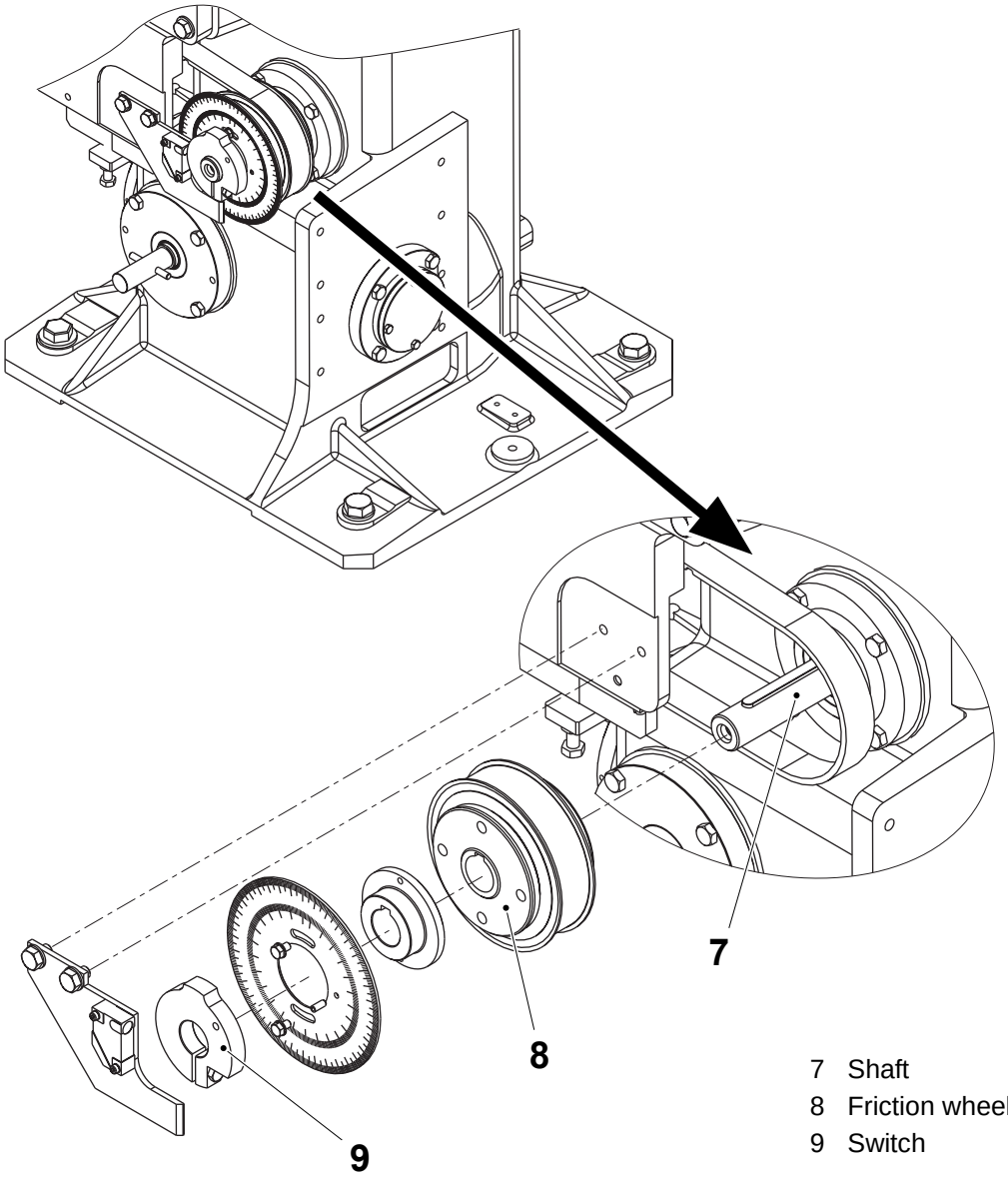
6 Protractor

(Cont'd)

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(Cont'd)

g) Make sure that the friction wheel (8) is fixed in position and unable to slide on the shaft (7) by means of the switch (9).



7 Shaft
8 Friction wheel
9 Switch

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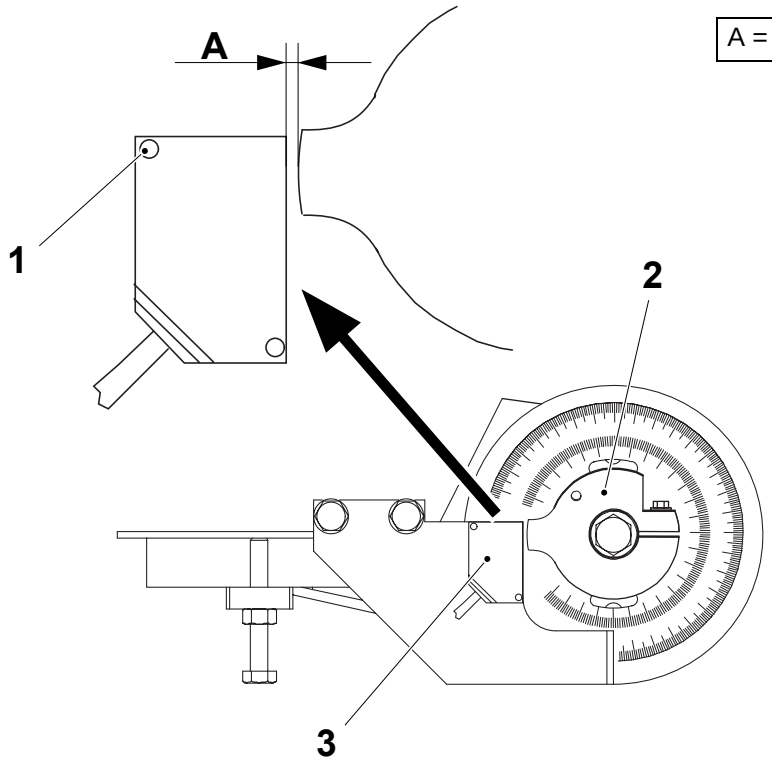
5.4-5 Indexing Gear - Set Inductive Switch

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1144320-0300

a) Crank the final folder until the activator (2) flag is in front of the inductive switch (3).

b) Loosen the screw (1) and set distance **A** between the inductive switch (3) and the activator (2).

c) Tighten the screw (1).



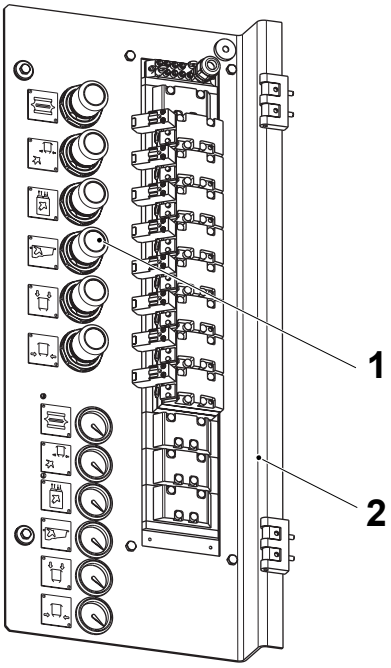
1 Screw
2 Activator
3 Inductive switch

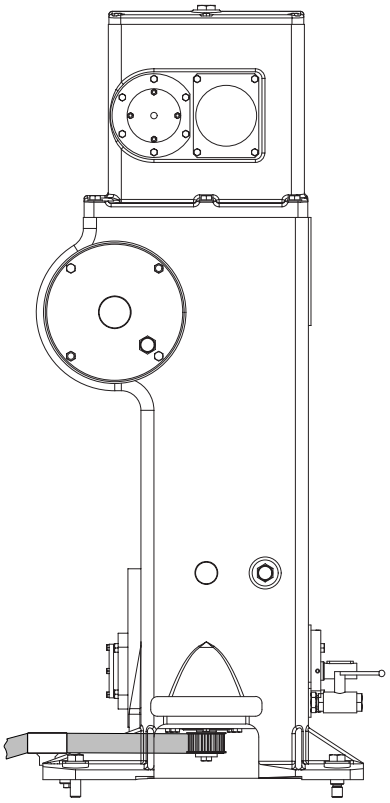
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5.4-6 Indexing Gear - Set Pressure

Machine Status	Mains Power OFF Air ON Steam ON Water OFF
SPC Reference	1144320-0300

Set the overpressure for the indexing gear according to 10.1 Technical Data, by means of the pressure regulator (1) on the machine body air panel (2).





1 Pressure regulator
2 Air panel

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5.4-7 Indexing Gear - Set Home Position

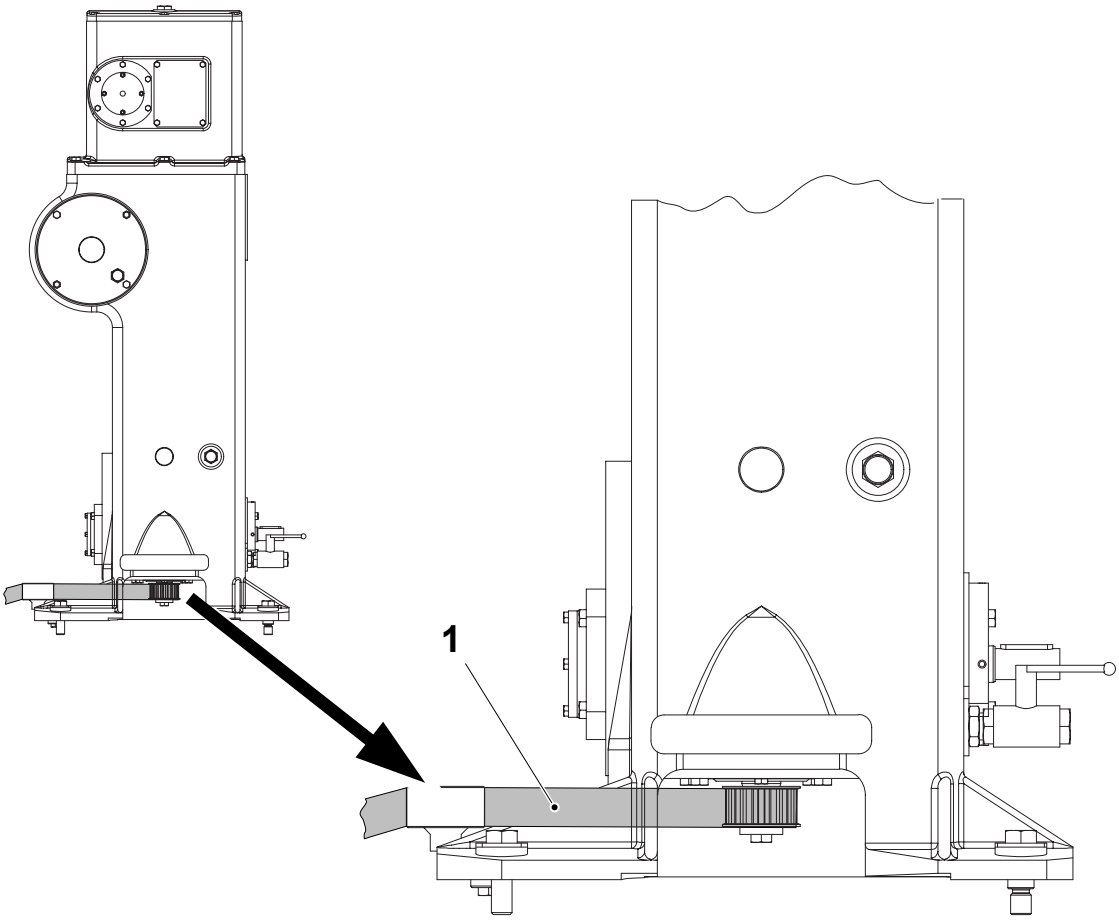
SPC Reference	1144320-0300

Follow the procedure described in 5-20 Final Folder - Set Home Position Indexing Gear.

5.4-8 Indexing Gear - Check Belt

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1144320-0300

Check the belt (1) for wear and/or damage. Also check the tension of the belt (1) and set it as required, see 5.8-11 Out Feed Device - Set Belt Tension.



1 Belt

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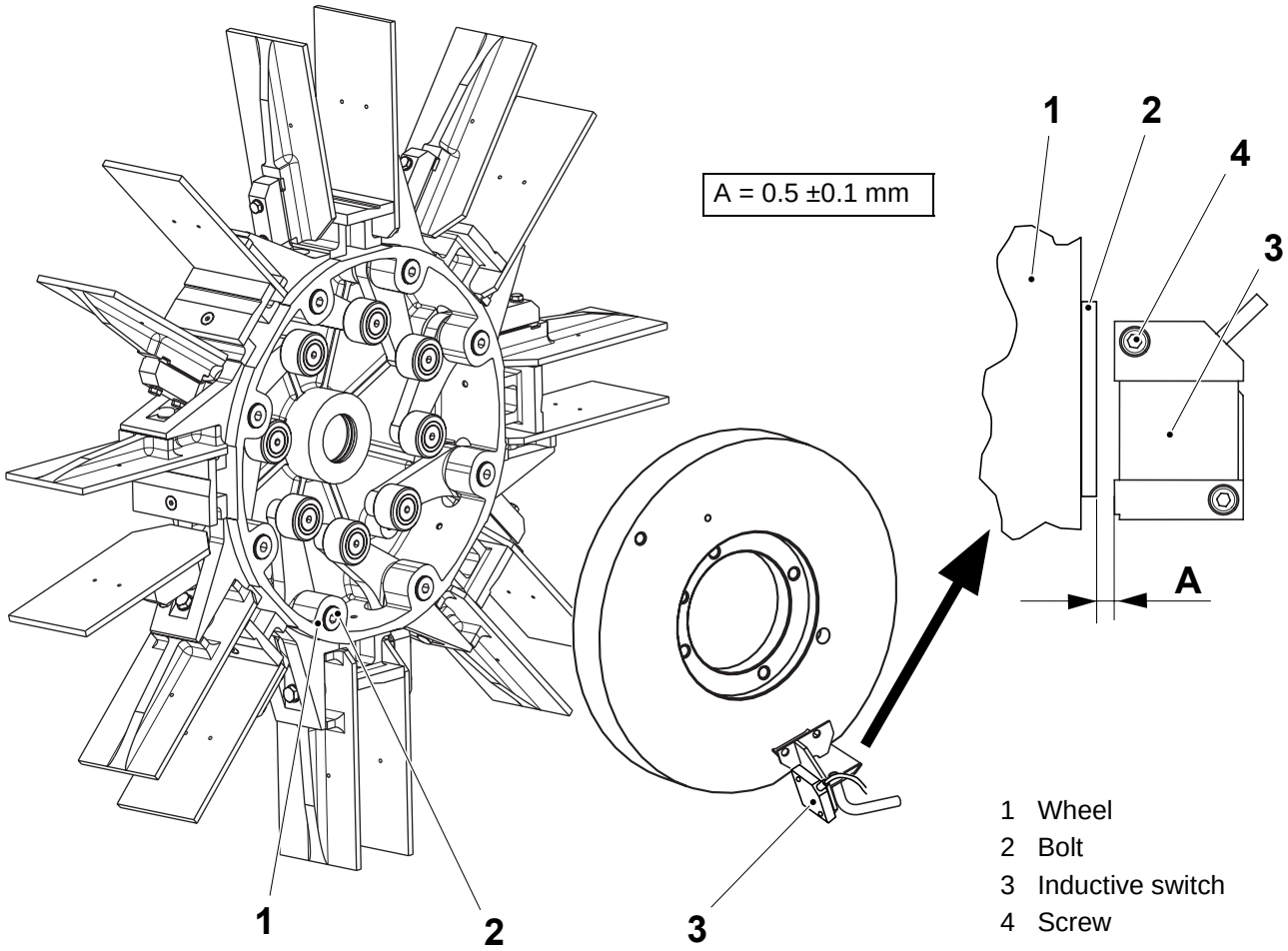
5.4-9 Indexing Gear - Set Inductive Switch

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1144320-0300

a) Crank the final folder until a wheel bolt (2) is in front of the inductive switch (3).

b) Loosen the screws (4) and set the distance **A** between the bolt (2) and the inductive switch (3) by moving the inductive switch (3).

c) Tighten the screws (4).



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5.4-10 Indexing Gear - Overhaul

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC reference	1144320-0300 2680390-0000

Remove Station Wheel

Special Equipment	Puller TP No. 1361547-0000 Lifting equipment TP No. 599816-1 Lifting kit TP No. 1361558-1
SPC Reference	1361918-0200

WARNING

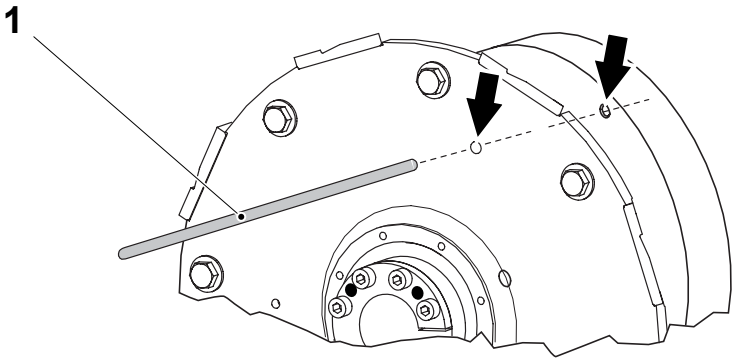
Risk of personal injury.

The lifting equipment can lift max 200 kg. Do not use it for other purpose.

a) Remove the touch guards at the RH and LH sides and the top of the frame work.

b) Crank the final folder until the holes for the zero pin (1) are correctly positioned, see arrows.

c) Insert the zero pin (1) into the zero holes.



1 Zero pin

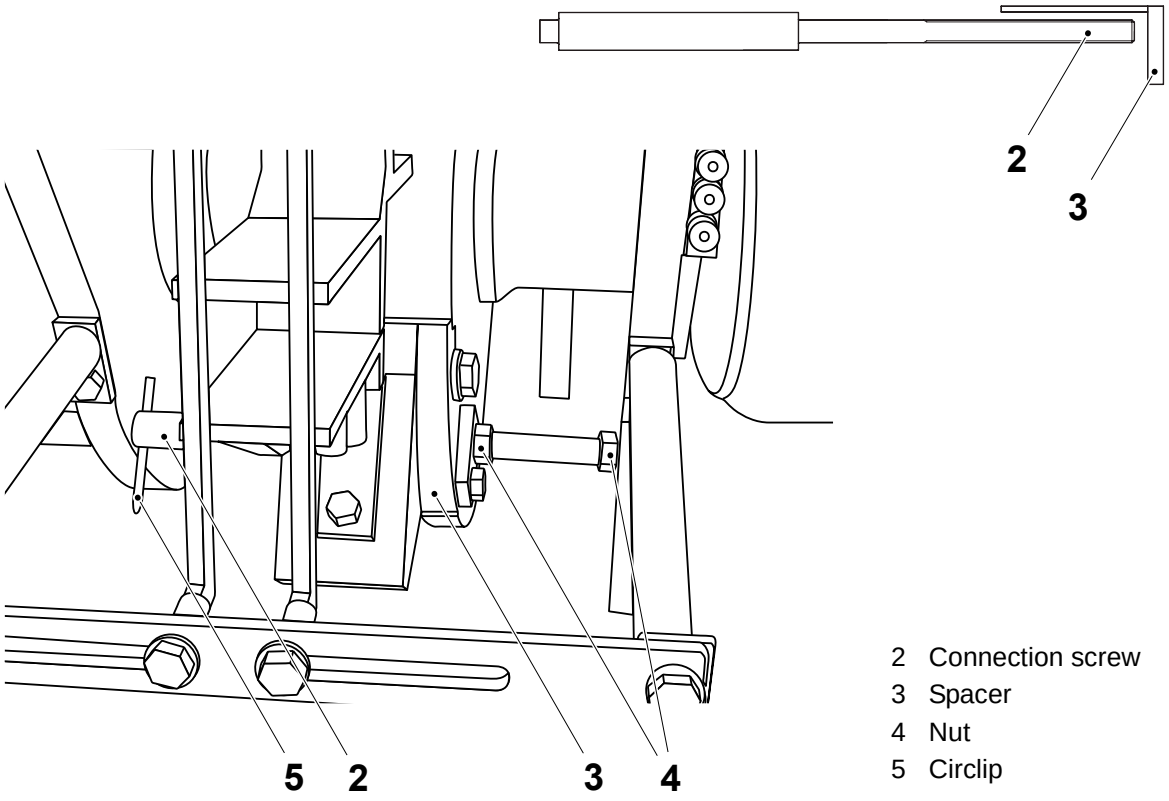
(Cont'd)

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(Cont'd)

d) Fit the connection screw (2) with the spacer (3), the nut (4) and the circlip (5) into the holes.

Note! Do not tighten the connection screws too tightly. The LH/RH plates might become bended.



2 Connection screw
3 Spacer
4 Nut
5 Circlip

(Cont'd)

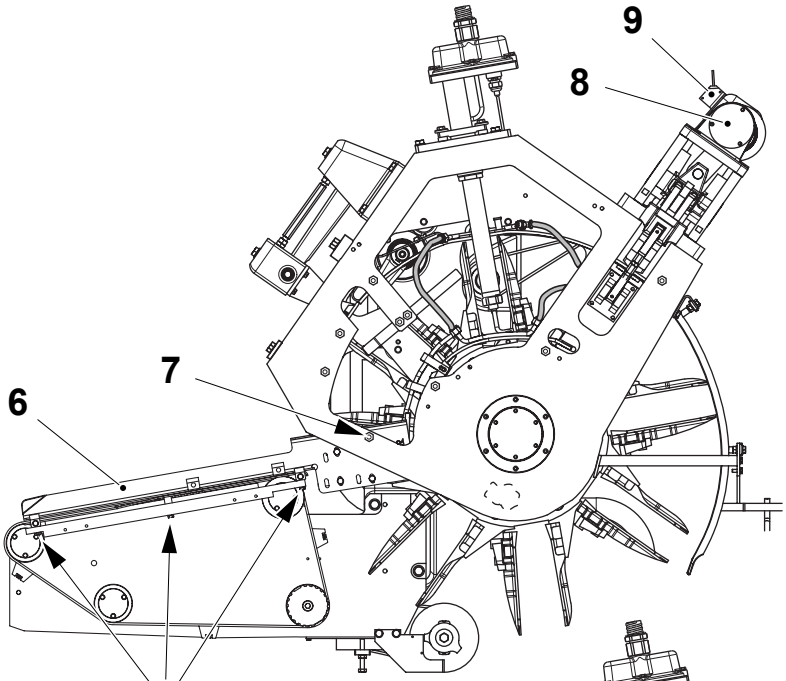
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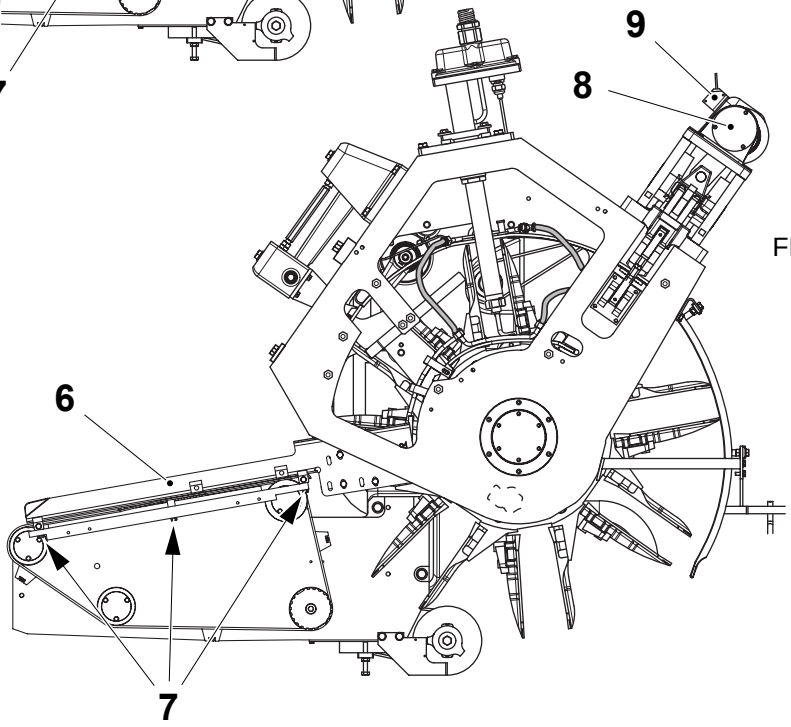
e) Remove the infeed guides (6) by means of the screws (7). Place the infeed guides (6) together with the spacers and the screws on the stand.

f) Loosen the belt tensioner and remove the belt for the pressure device (8) according to Remove Pressure Device Belt on page 5-78.

g) Remove the sensor (9) with its bracket for overload protection of the pressure device (8).



FFU for 1500 S



FFU for all other volumes

6 Infeed guide
7 Screw
8 Pressure device
9 Sensor

(Cont'd)

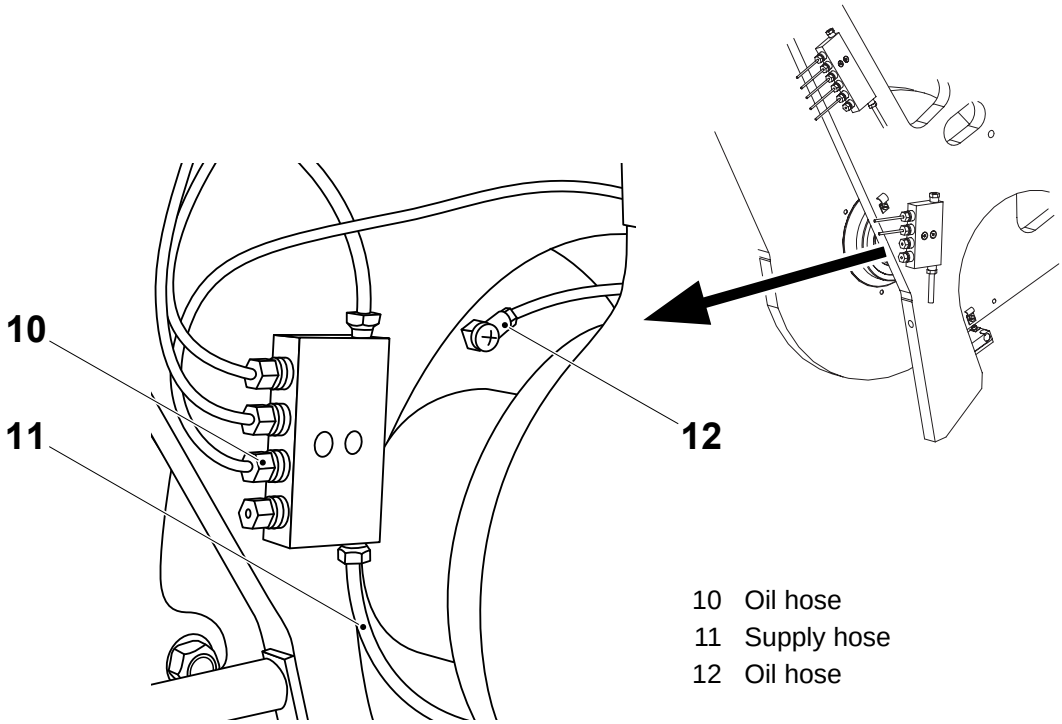
TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

h) Disconnect the oil hose (10) for cam lubrication from the distribution block.

i) Disconnect the oil supply hose (11) for pressure device lubrication from the distribution block.

j) Disconnect the oil hose (12).



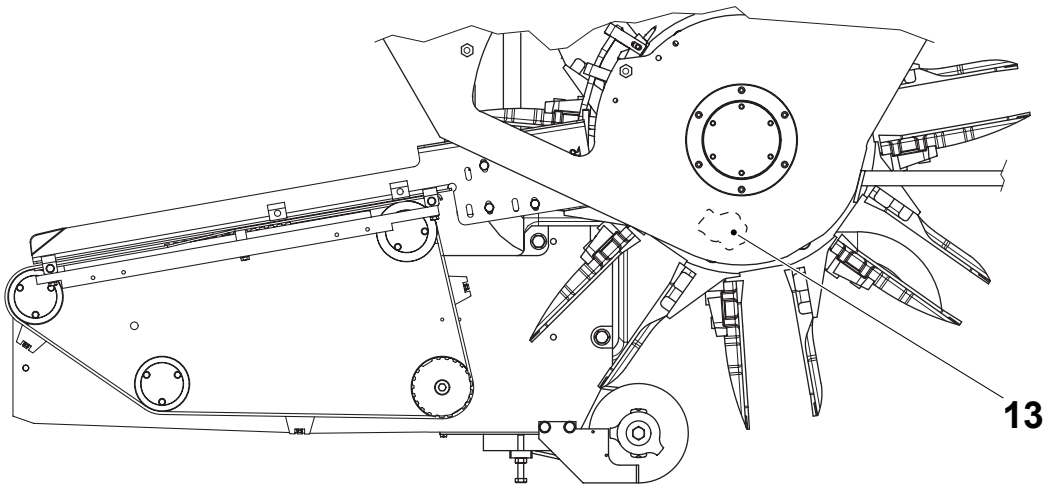
10 Oil hose
11 Supply hose
12 Oil hose

(Cont'd)

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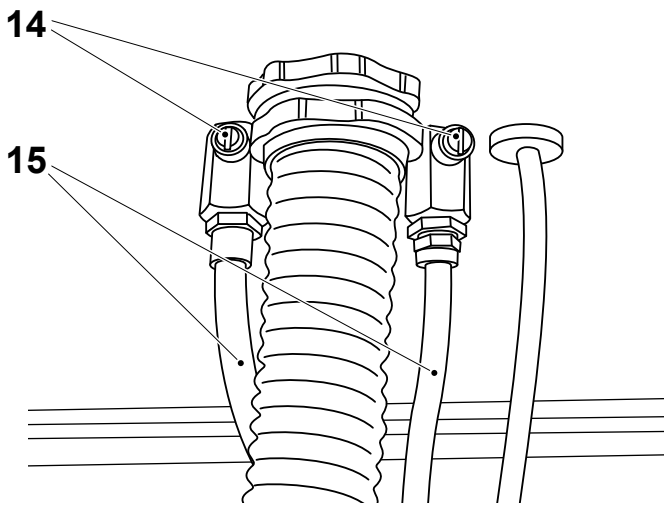
(Cont'd)

k) Remove the sensor (13) with its bracket for wheel overload protection.



13 Sensor

l) Close the incoming cooling water valves (14) and remove the cooling water hoses (15) from the folding bars.



14 Water valves
15 Cooling water hoses

(Cont'd)

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(Cont'd)

m) Disconnect the air hose from the flap blowing (16).

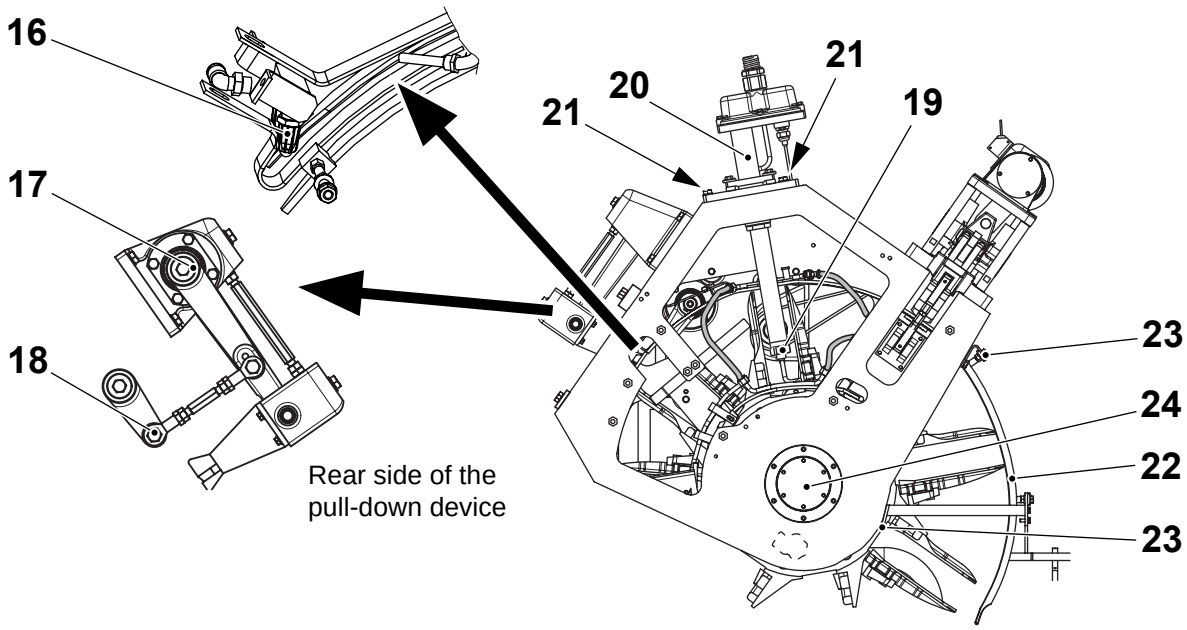
n) Disconnect the link arm of the pull-down device (17) at the lower connection (18).

o) Turn the air nozzles (19) on LH and RH side in order to make the removal of the flap heating unit (20) possible.

p) Remove the flap heating unit (20) by means of the screws (21).

q) Remove the guides (22) by means of the screws (23).

r) Remove the bearing cover (24).



16 Flap blowing
17 Pull-down device
18 Lower connection
19 Air nozzle/
LH top flap heater nozzle
20 Flap heating unit
21 Screw
22 Guide
23 Screw
24 Bearing cover

(Cont'd)

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(Cont'd)

s) Fit the brackets (25) to the rail (26) by means of the four screws (27).

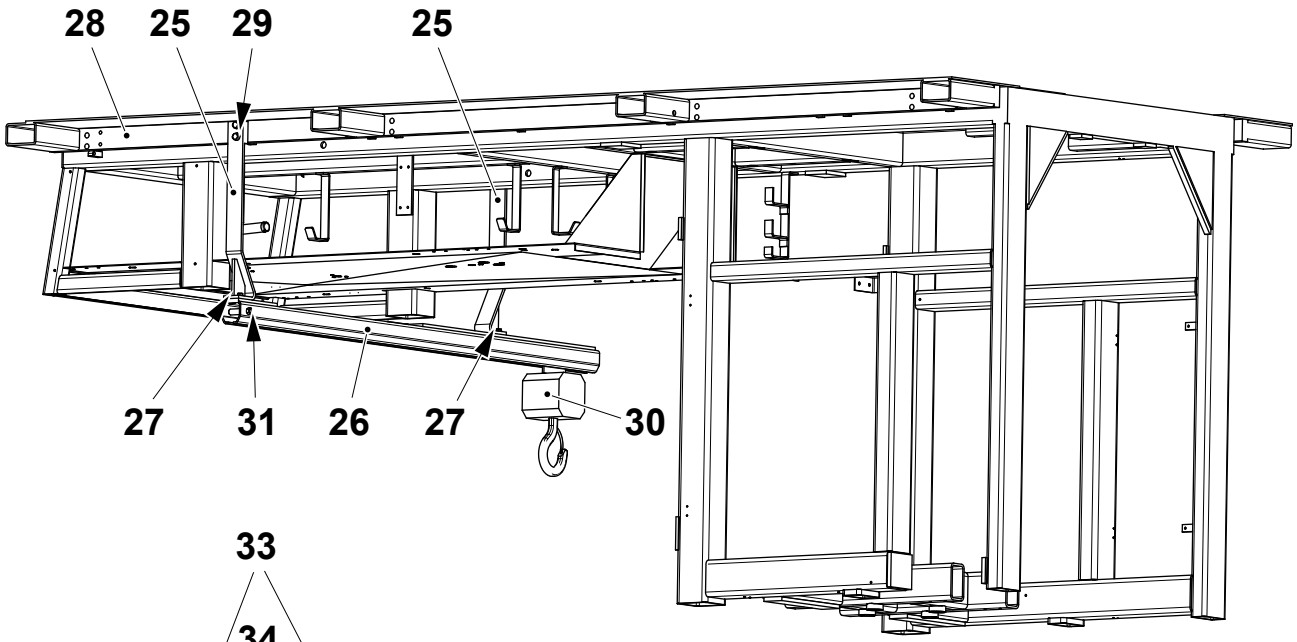
t) Fit the brackets (25) to the frame (28) by means of the four screws (29).

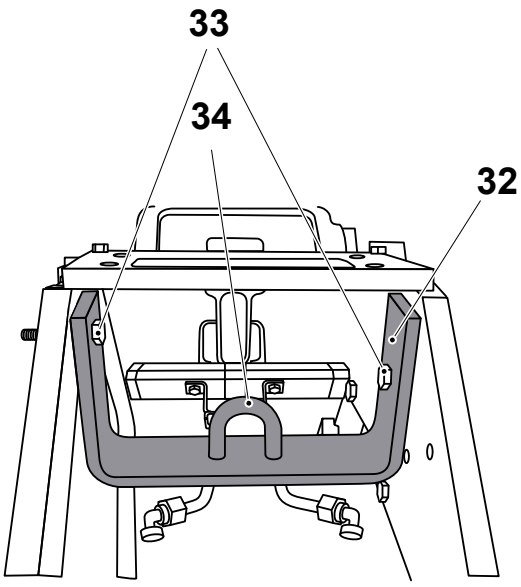
u) Insert the lifting hook (30) into the rail (26) and tighten the screw (31).

v) Fit the lifting bracket (32) to the station wheel by means of the two screws (33) and the nuts.

w) Suspend the hook (30) of the tackle from the hook (34) of the lifting bracket (32).

x) Make the chain of the tackle tight.





25 Bracket
26 Rail
27 Screw
28 Frame
29 Screw
30 Lifting hook
31 Screw
32 Bracket
33 Screw
34 Hook

(Cont'd)

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(Cont'd)

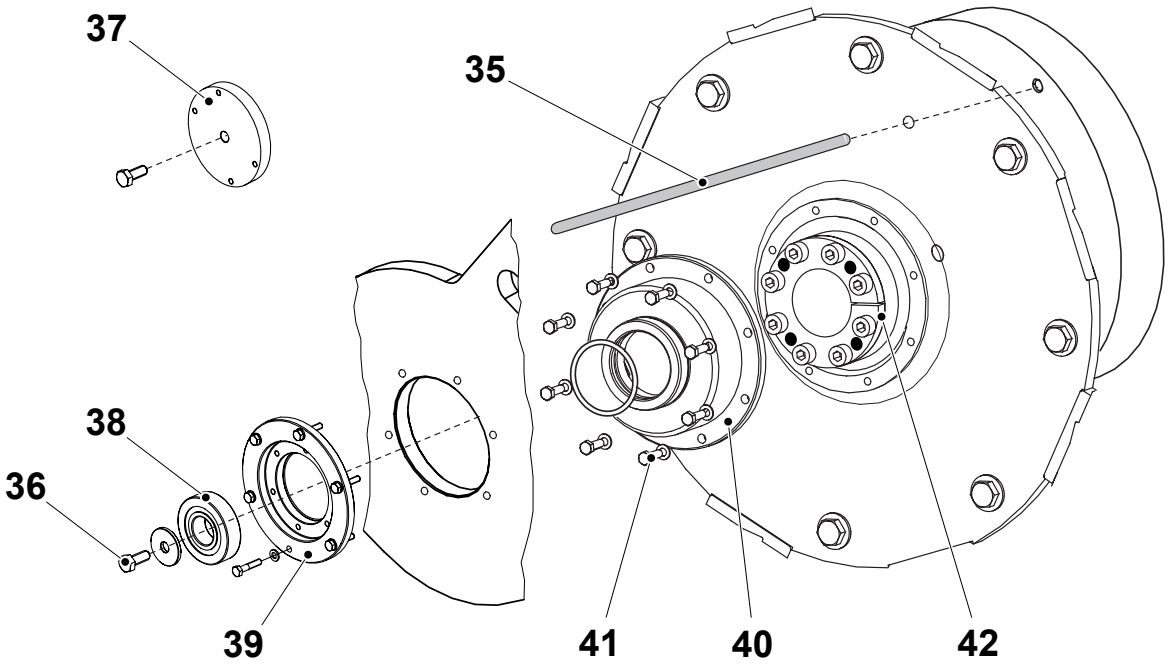
y) Remove the zero pin (35).

z) Remove the screw (36) (use this screw (36) for the puller (37)).

aa) Remove the bearing (38) together with the flange (39) by means of the puller (37).

ab) Remove the clamping cover (40) by means of the screws (41).

ac) Remove the clamping element (42) according to 5.6.1-1 Clamping Element - Remove on page 5-153.



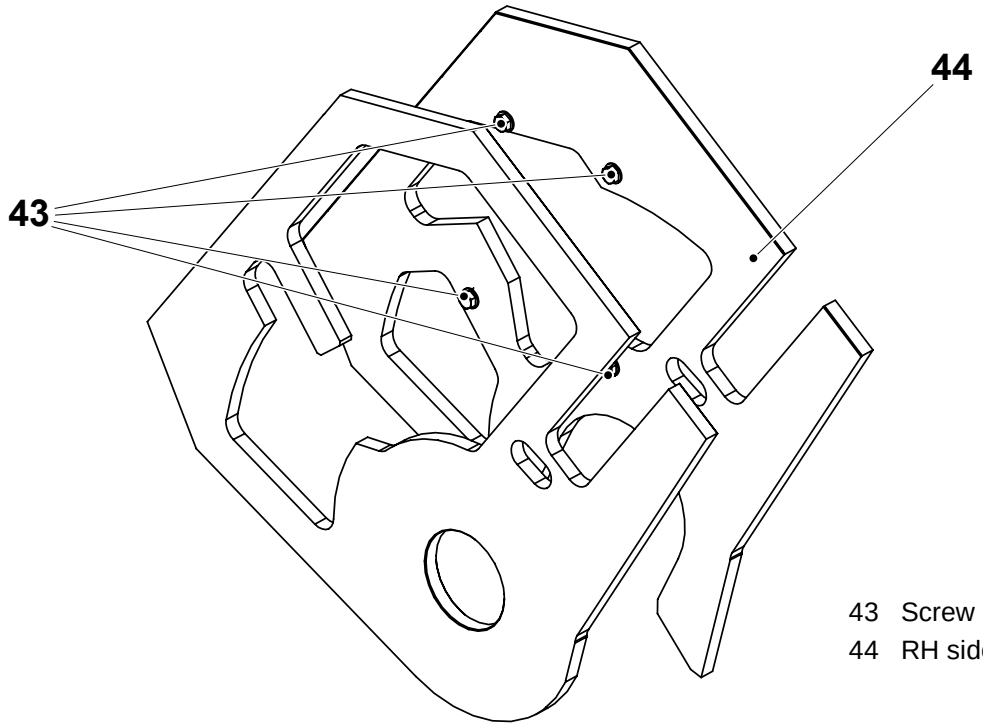
35 Zero pin
36 Screw
37 Puller
38 Bearing
39 Flange
40 Clamping cover
41 Screw
42 Clamping element

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

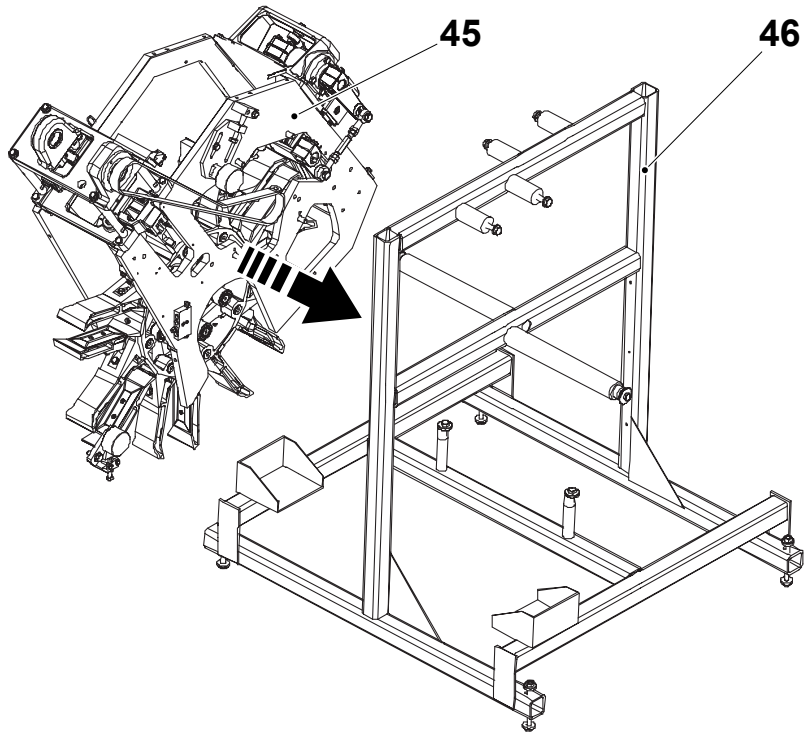
(Cont'd)

ad) Remove the four screws (43) holding the RH side plate (44) to the gear box.



43 Screw
44 RH side plate

ae) Lift out the station wheel together with the framework (45) and fit it on the stand (46) with the clamping element, bearing and cover.



45 Station wheel with framework
46 Stand

(Cont'd)

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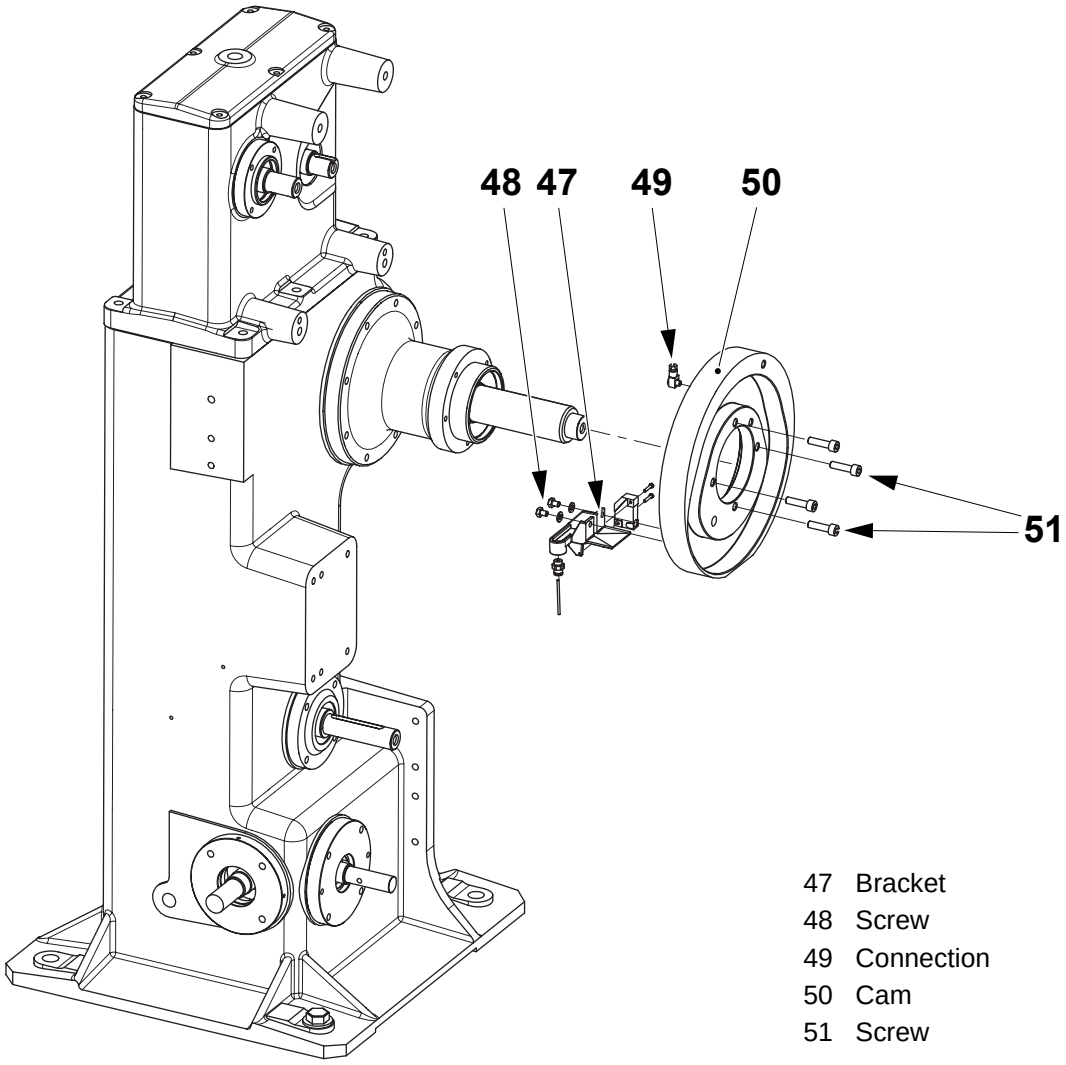
(Cont'd)

Note! For TPA 250 Sq and TPA 1000 Sq only, perform items from af) to ah).

af) Remove the bracket (47) by means of the two screws (48).

ag) Remove the connection (49).

ah) Remove the cam (50) by means of the four screws (51).



47 Bracket
48 Screw
49 Connection
50 Cam
51 Screw

(Cont'd)

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(Cont'd)

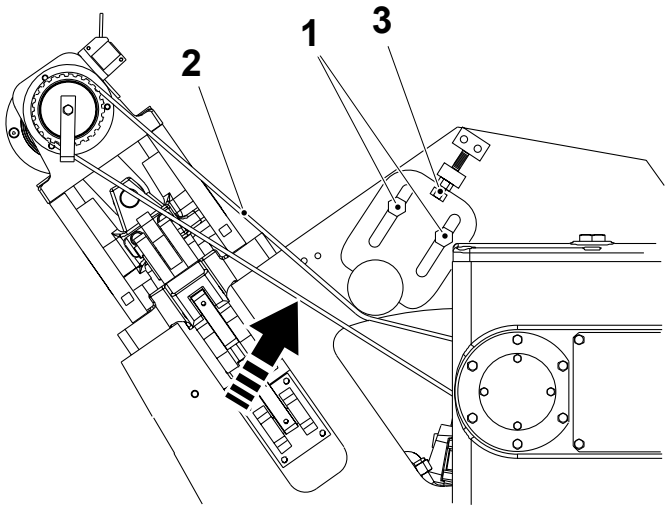
Remove Pressure Device Belt

SPC Reference	1144331-0200

a) Loosen the screws (1) so that the belt tensioner does not tension the belt (2)

b) Remove the belt (2).

c) Assemble in the reverse order.



1 Screw
2 Belt
3 Screw

(Cont'd)

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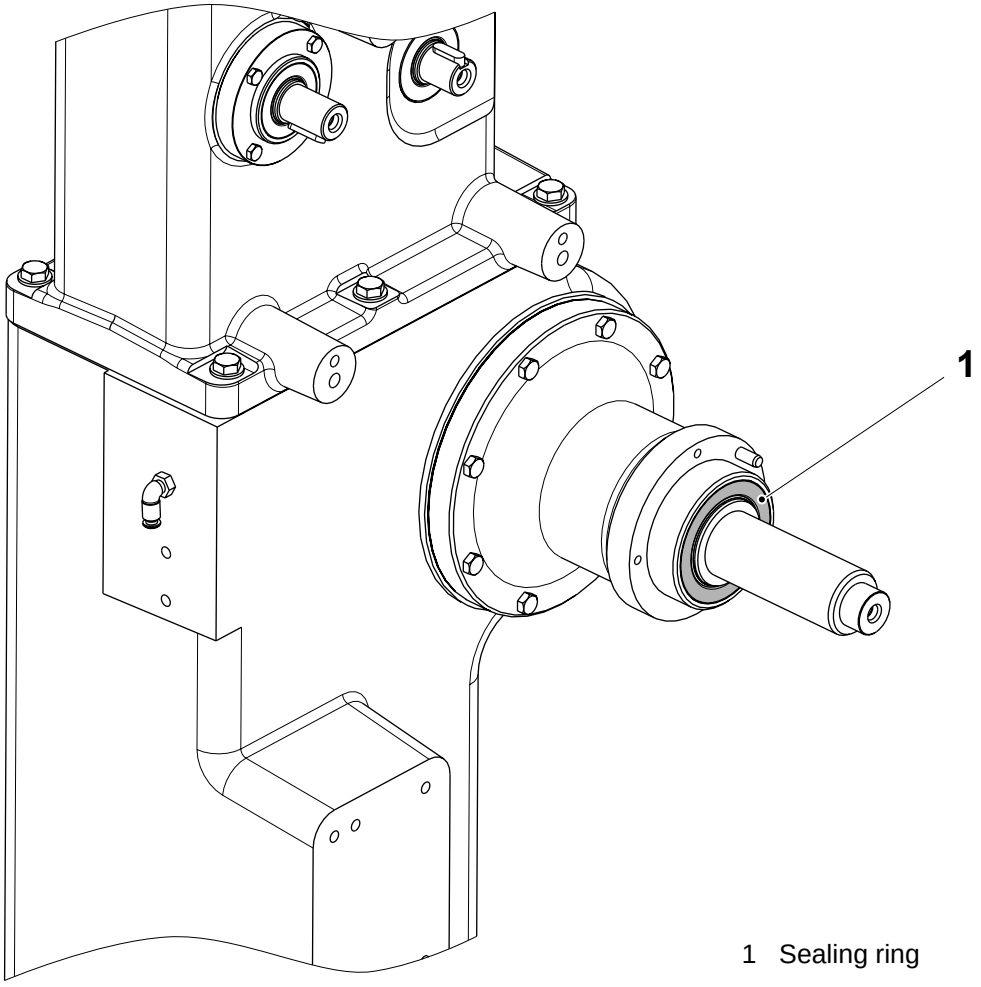
(Cont'd)

Change Cam Shaft Sealing Ring

Consumables	Radial Seal TP No. 90459-4588
SPC reference	1144320-0300 2680390-0000

Note! There may be a small amount of lubricant oil released from the indexing unit when the sealing ring (1) is removed.

Change the sealing ring (1).



1 Sealing ring

(Cont'd)

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(Cont'd)

Change Cam Shaft O-Ring

Consumables	O-ring TP No. 315202-0225
SPC reference	1144320-0300 2680390-0000

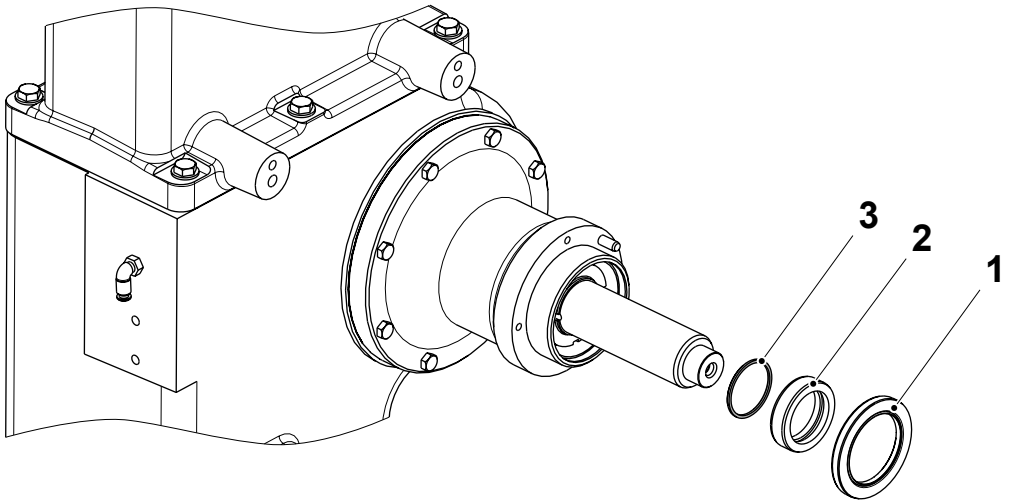
Note! There may be a small amount of lubricant oil released from the indexing unit when the sealing ring (1) is removed.

a) Remove the sealing ring (1).

b) Remove the spacer (2).

c) Change the O-ring (3).

d) Assemble in the reverse order.



1 Sealing ring
2 Spacer
3 O-ring

(Cont'd)

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(Cont'd)

Change Cam Shaft Round Nut and Lock Washer

Consumables	Round Nut TP No. 312805-0110 Lock Washer TP No. 2687111-0000
SPC reference	1144320-0300 2680390-0000

Note! There may be a small amount of lubricant oil released from the indexing unit when the sealing ring (1) is removed.

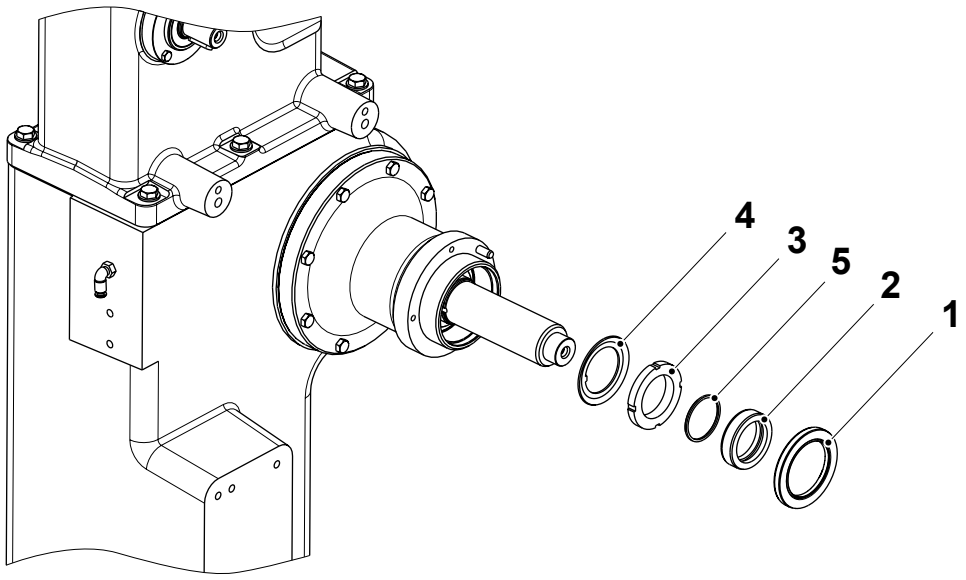
a) Remove the sealing ring (1) and the spacer (2).

b) Change the round nut (3) and the lock washer (4).

c) Change the O-ring (5).

d) Fit the spacer (2).

e) Fit the sealing ring (1).



1 Sealing ring
2 Spacer
3 Round nut
4 Lock washer
5 O-ring

(Cont'd)

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(Cont'd)

Change Cam Shaft Flange O-Ring

Consumables	O-ring TP No. 90459-4580
SPC reference	1144320-0300 2680390-0000

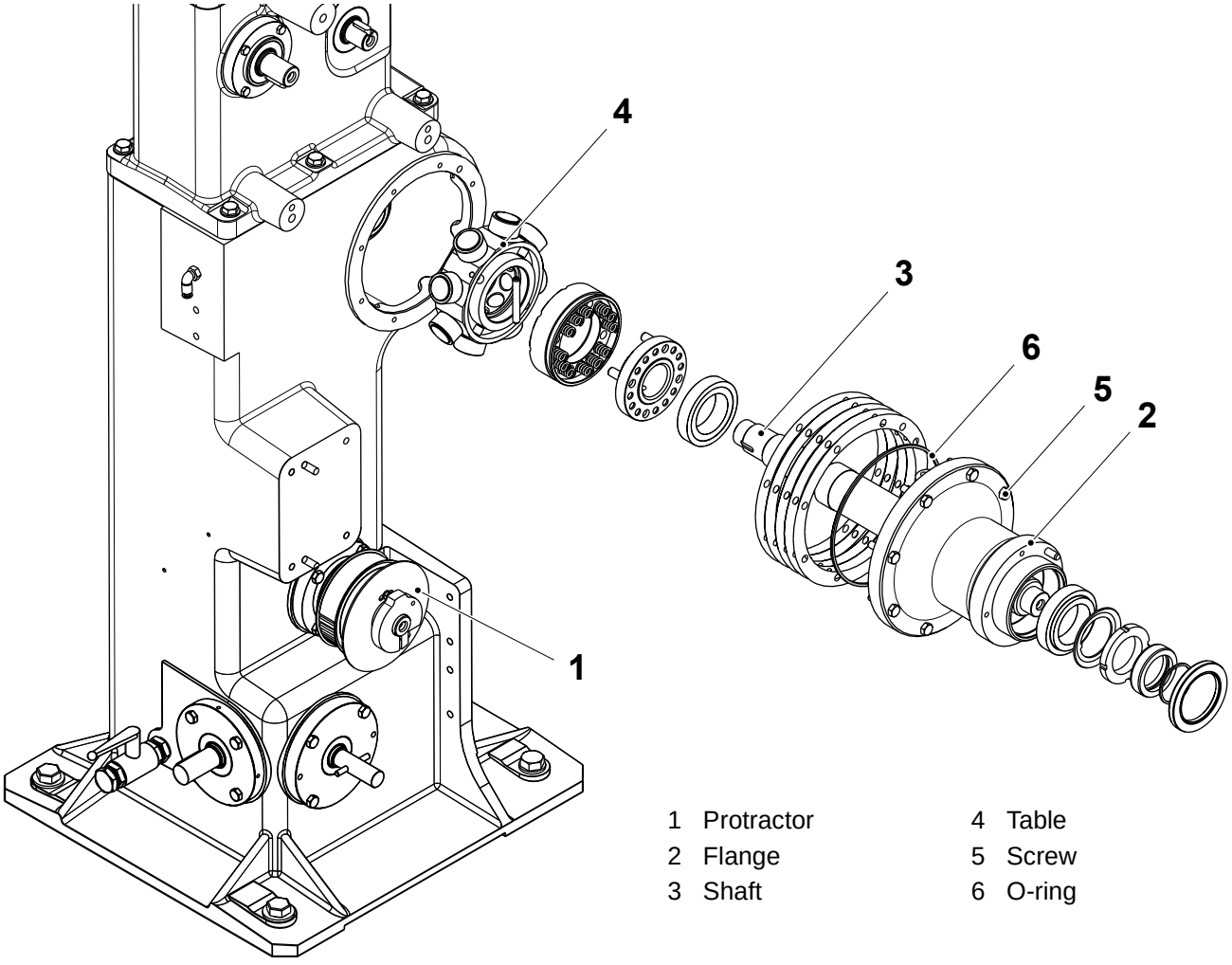
a) Crank the final folder to 260° degrees. Check the degrees on the protractor (1).

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (2) is removed.

b) Remove the flange (2) together with the shaft (3) and the table (4) by means of the screws (5).

c) Change the O-ring (6).

d) Fit the flange (2) together with the shaft (3) and the table (4) by means of the screws (5).



1 Protractor
2 Flange
3 Shaft
4 Table
5 Screw
6 O-ring

(Cont'd)

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(Cont'd)

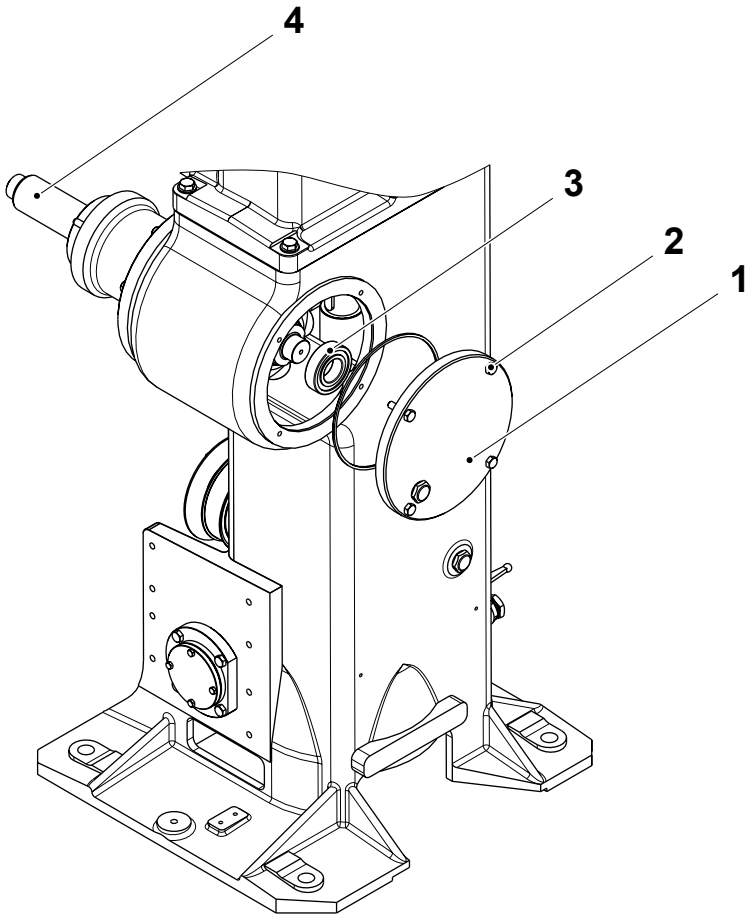
Change Cam Shaft Springs

Consumables	Spring TP No. 1498929-0000
SPC reference	1144320-0300 2680390-0000

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (1) is removed.

a) Remove the flange (1) by means of the screws (2).

b) Make sure the bearing (3) is still fitted on the flange (1). If necessary, remove the bearing (3) from the shaft (4) and fit it in the flange (1).



1 Flange
2 Screw
3 Bearing
4 Shaft

(Cont'd)

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(Cont'd)

c) Mark the relative positions of the pin housing (5) and the spring housing (6).

d) Block the table (7) with two clamps, making impossible its axial movement. Eventually use the support of the internal wall of the box to contrast the spring thrust.

e) Mark the relative position of the round nut (8) with respect to the shaft (4).

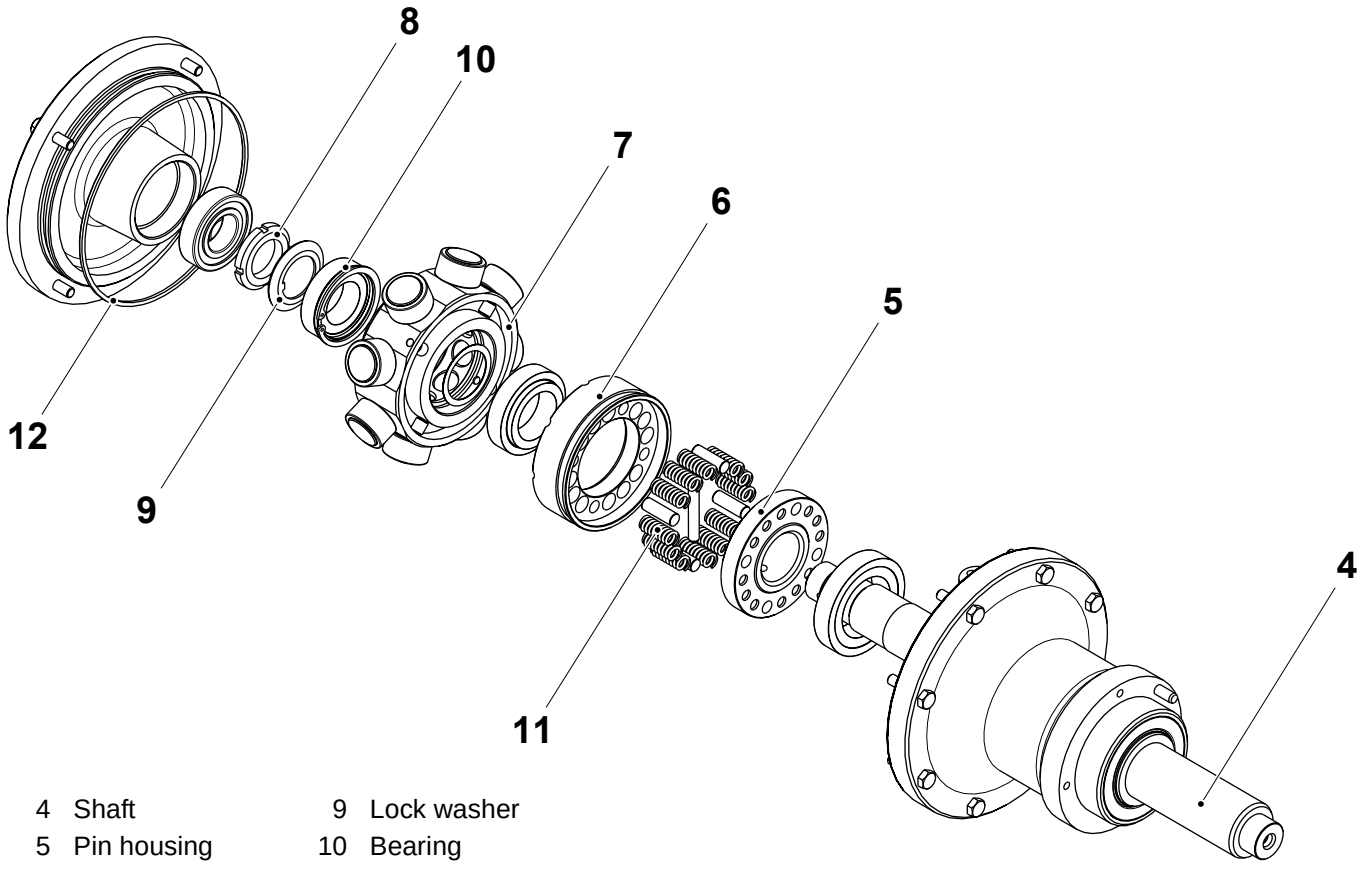
f) Mark the relative position of the lock washer (9) with respect to the round nut (8).

g) Remove the round nut (8), the lock washer (9) and the bearing (10).

h) Remove the table (7) from the shaft (4), removing slowly the clamping realised in the item d).

i) Remove the spring housing (6) from the pin housing (5).

j) Change the springs (11) and the O-ring (12).



4 Shaft
5 Pin housing
6 Spring housing
7 Table
8 Round nut
9 Lock washer
10 Bearing
11 Spring
12 O-ring

(Cont'd)

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(Cont'd)

k) Fit the pin housing (5) by means of the references made in the disassembly phase.

l) Fit the table (7). Make sure that the rollers (13) are coincident with the holes on the spring housing (6).

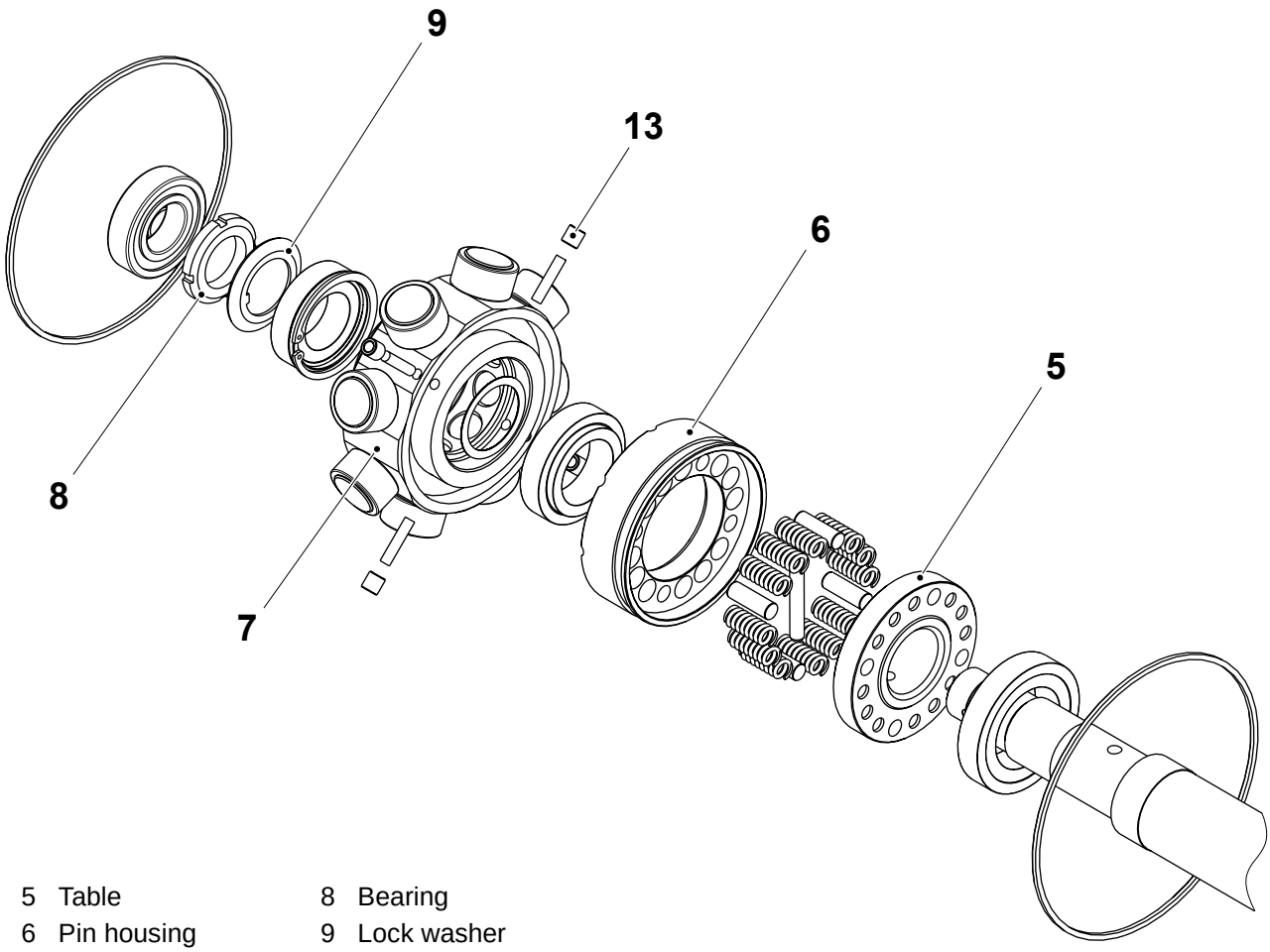
m) Fit the bearing (10).

n) Fit and tighten the round nut (8).

o) Block the table (7) with two clamps, making impossible its axial movement. Eventually use the support of the internal wall of the box to contrast the spring thrust.

p) Remove the round nut (8).

q) Fit the lock washer (9) and the round nut (8).



5	Table	8	Bearing
6	Pin housing	9	Lock washer
7	Spring housing	13	Roller

(Cont'd)

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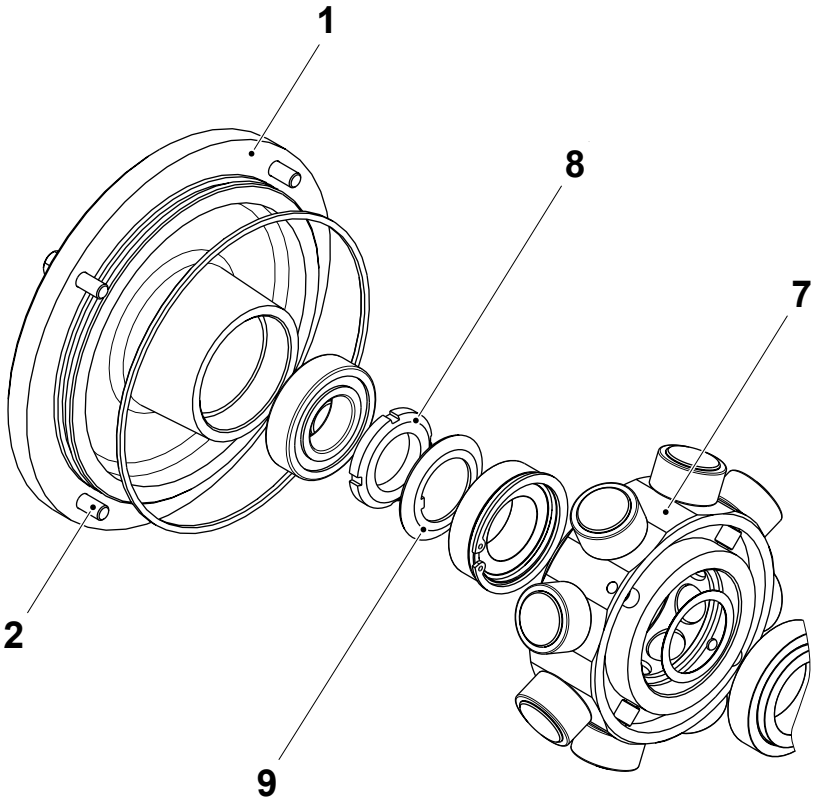
(Cont'd)

r) Tighten the round nut (8). Make sure the references realised at the item e) are coincident.

s) Block the round nut (8) bending the little tooth of the lock washer (9), using the references realised at the item f).

t) Remove the clamps that block the table (7).

u) Fit the flange (1) by means of the screws (2).



1 Flange
2 Screw
7 Table
8 Round nut
9 Lock washer

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(Cont'd)

(Cont'd)

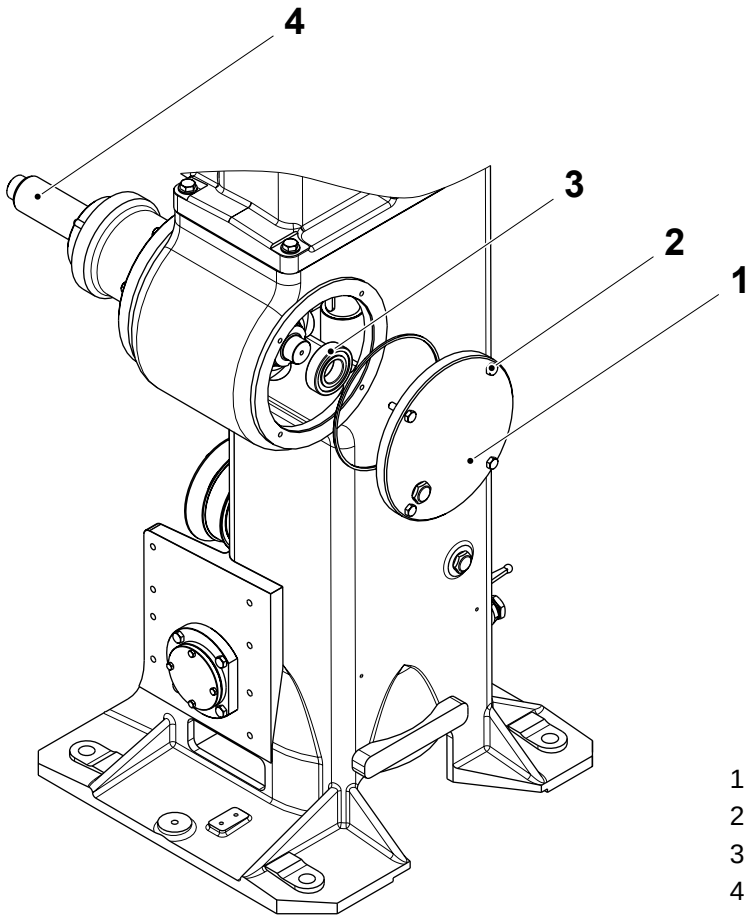
Change Cam Shaft Round Nut and Lock Washer

Consumables	Lock Washer TP No. 2687110-0000 Round Nut TP No. 312805-0107 O-ring TP No. 90459-4580
SPC reference	1144320-0300 2680390-0000

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (1) is removed.

a) Remove the flange (1) by means of the screws (2).

b) Make sure the bearing (3) is still fitted on the flange (1). If necessary, remove the bearing (3) from the shaft (4) and fit it in the flange (1).



1 Flange
2 Screw
3 Bearing
4 Shaft

(Cont'd)

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(Cont'd)

c) Mark the relative positions of the pin housing (5) and the spring housing (6).

d) Block the table (7) with two clamps, making impossible its axial movement. Eventually use the support of the internal wall of the box to contrast the spring thrust.

e) Remove the lock washer (8) and the round nut (9).

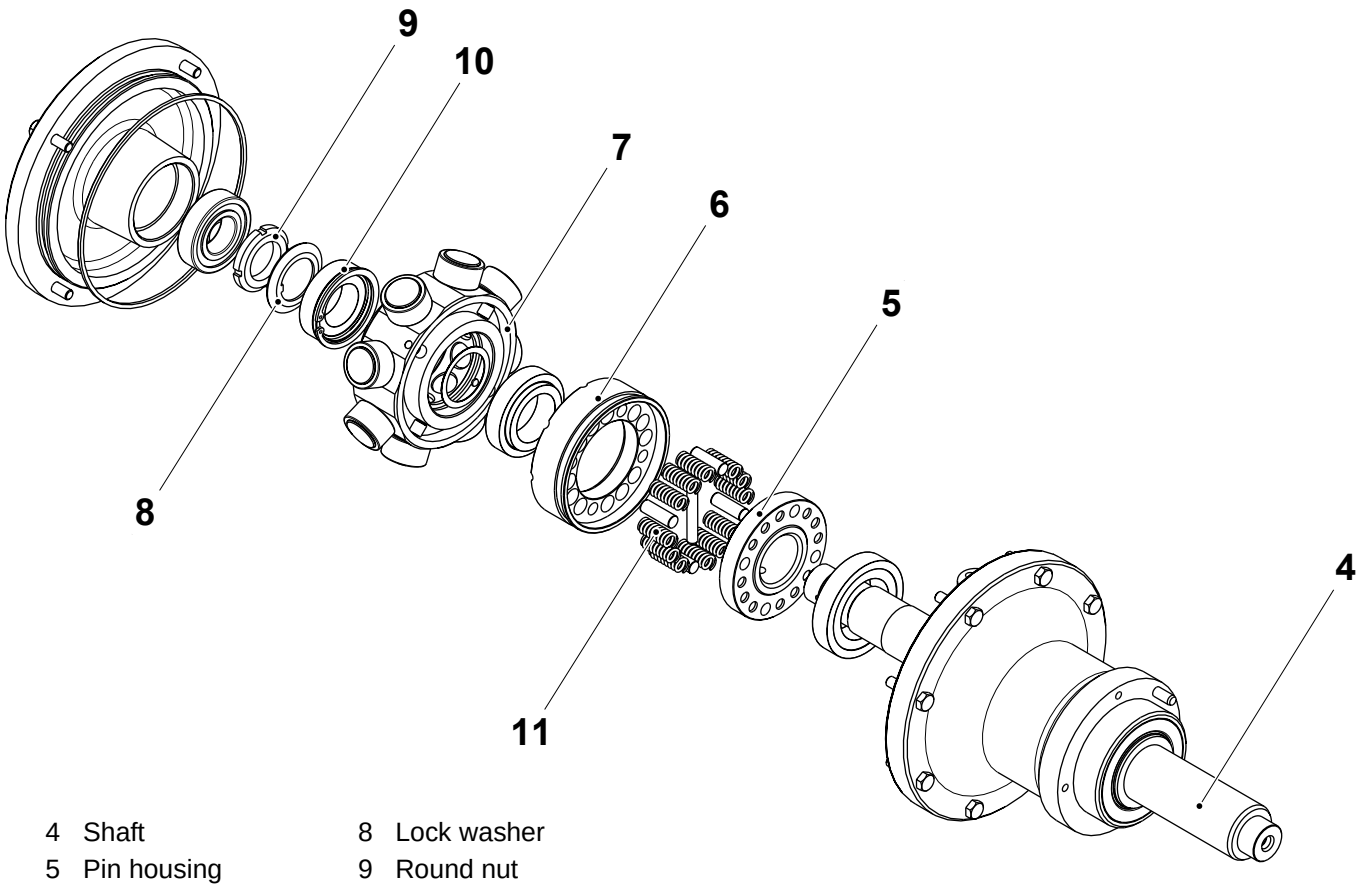
f) Remove the bearing (10).

g) Remove the table (7) from the shaft (4), removing slowly the clamping realised in the item d).

h) Remove the spring housing (6) from the pin housing (5).

i) Remove the springs (11).

j) Fit the pin housing (5) by means of the references made in the disassembly phase.



4	Shaft	8	Lock washer
5	Pin housing	9	Round nut
6	Spring housing	10	Bearing
7	Table	11	Spring

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

k) Fit the table (7). Make sure that the rollers (12) are coincident with the holes on the spring housing (6).

l) Fit the bearing (10) and the lock washer (8).

m) Tighten the round nut (9) to guarantee an axial load of 0.02/0.03 mm.

n) Mark the position of the round nut (9) with respect to the shaft (4).

o) Remove the round nut (9), the lock washer (8) and the bearing (10).

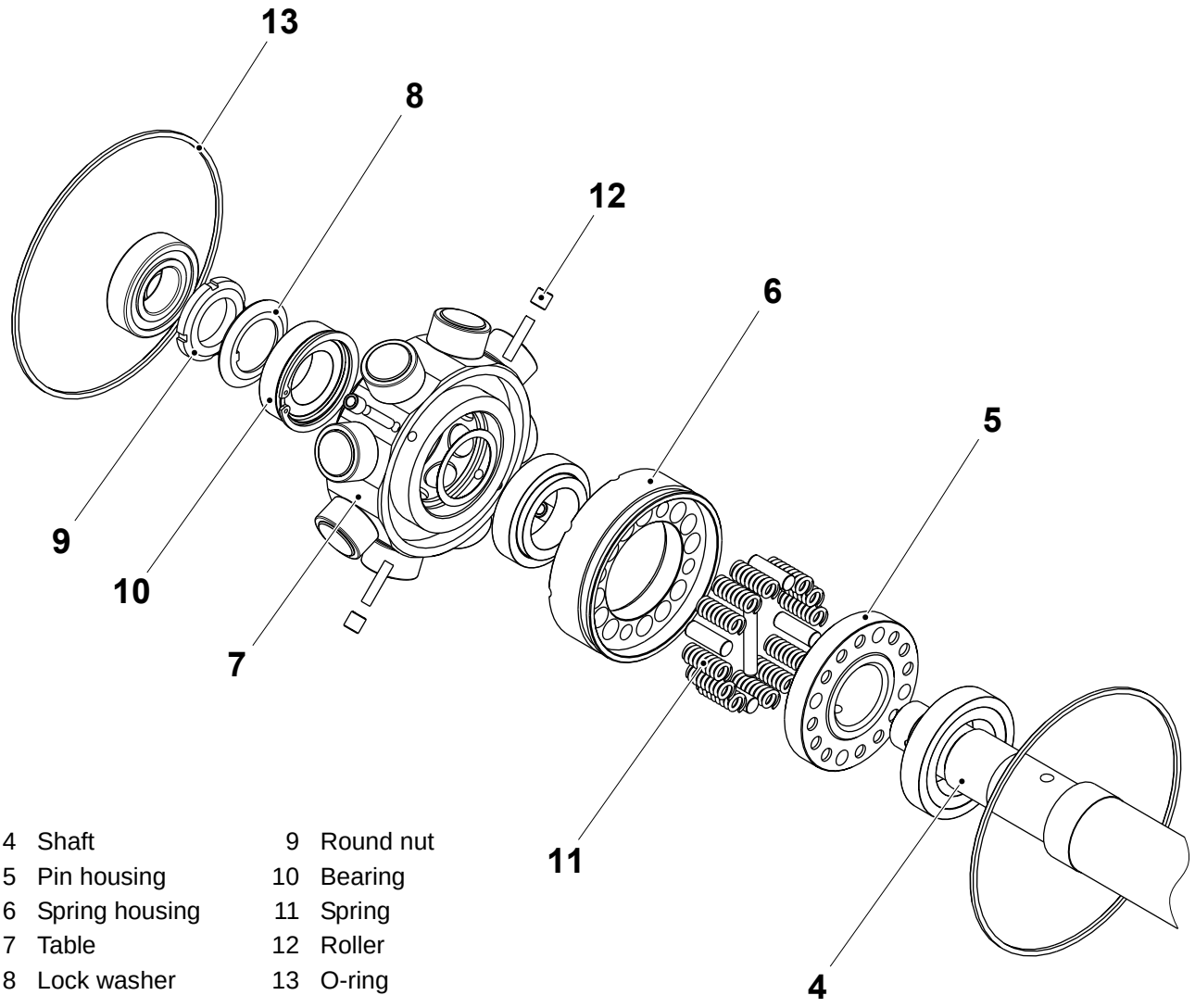
p) Remove the table (7) from the shaft (4).

q) Remove the spring housing (6) from the pin housing (5).

r) Fit the springs (11).

s) Change the o-ring (13).

t) Fit the pin housing (5) by means of the references made in the disassembly phase.



4	Shaft	9	Round nut
5	Pin housing	10	Bearing
6	Spring housing	11	Spring
7	Table	12	Roller
8	Lock washer	13	O-ring

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

u) Fit the table (7). Make sure that the rollers (12) are coincident with the holes on the spring housing (6).

v) Fit the bearing (10).

w) Fit and tighten the round nut (9).

x) Block the table (7) with two clamps, making impossible its axial movement. Eventually use the support of the internal wall of the box to contrast the spring thrust.

y) Remove the round nut (9).

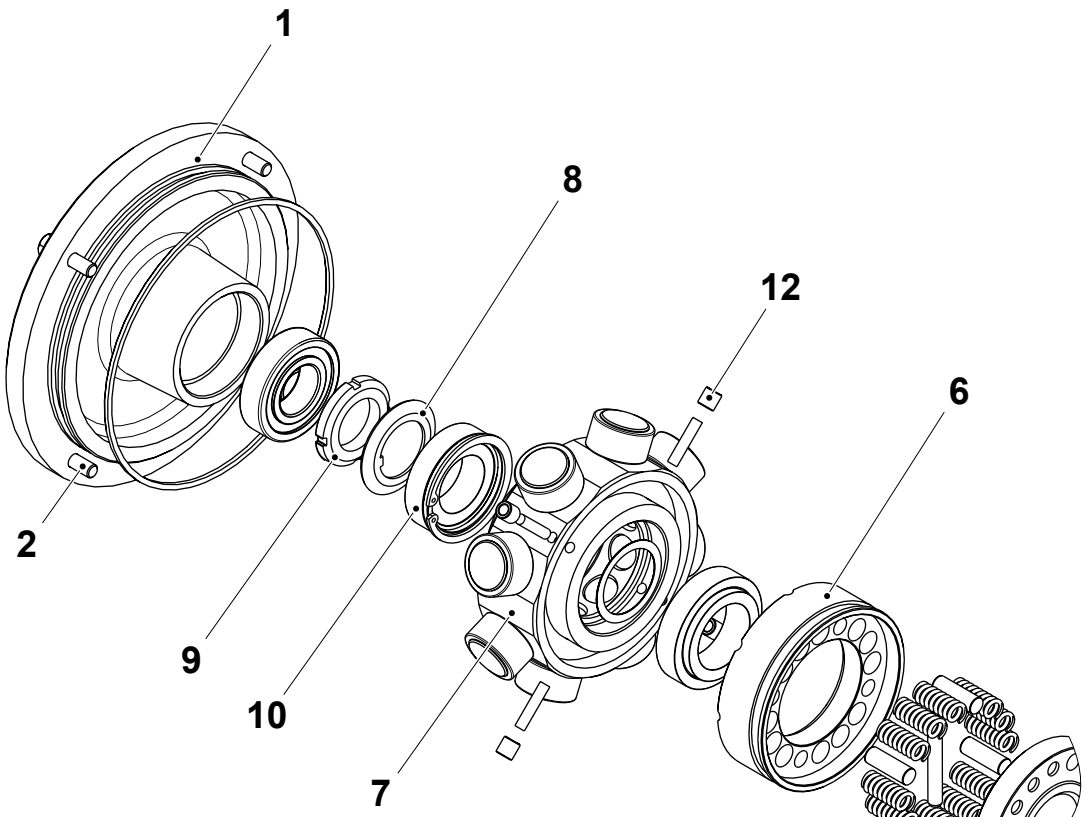
z) Fit the lock washer (8) and the round nut (9).

aa) Tighten the round nut (9). Make sure the references realised at the item n) are coincident.

ab) Block the round nut (9) bending the little tooth of the lock washer (8).

ac) Remove the clamps that block the table (7).

ad) Fit the flange (1) by means of the screws (2).



1	Flange	8	Lock washer
2	Screw	9	Round nut
6	Spring housing	10	Bearing
7	Table	12	Roller

(Cont'd)

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(Cont'd)

Change Cam Shaft Blind Side O-Ring

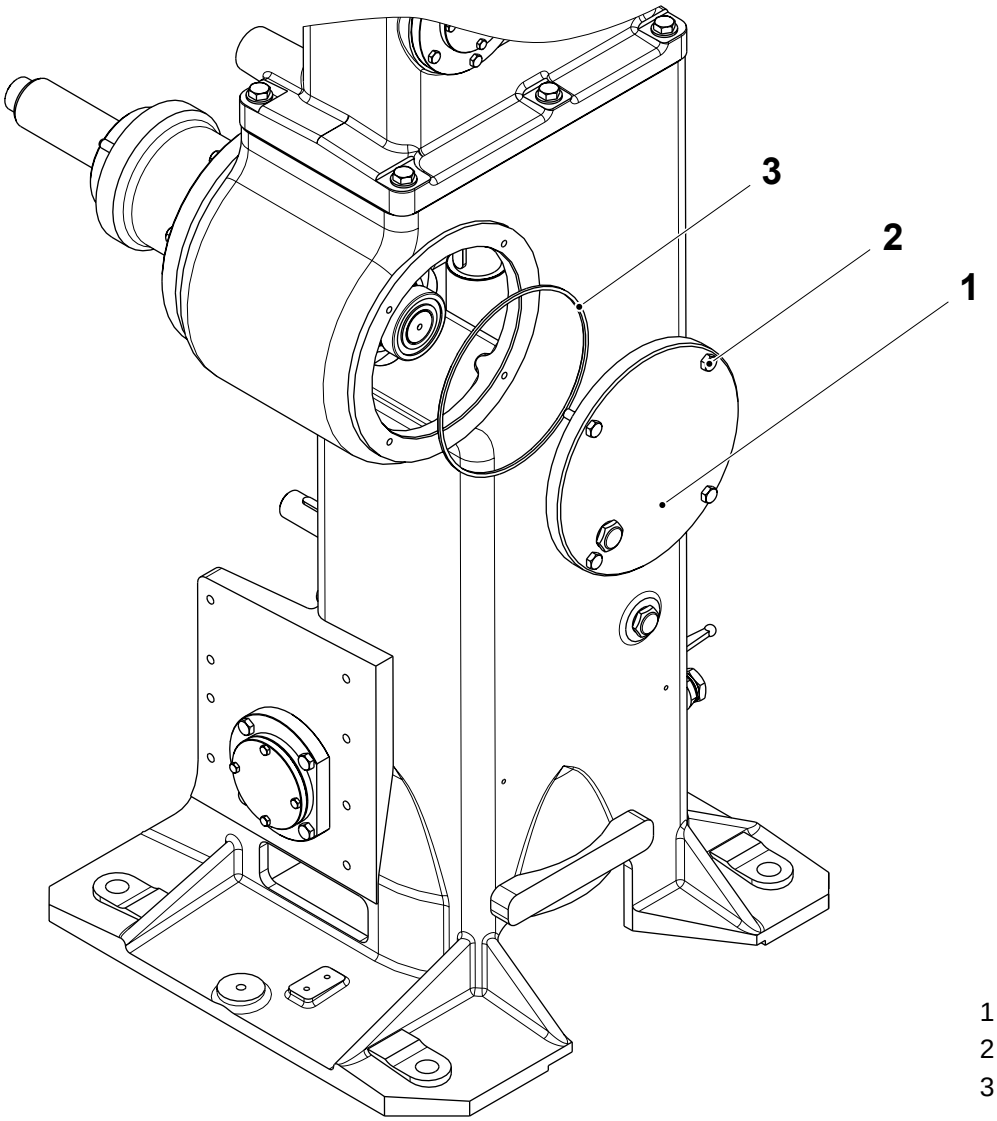
Consumables	O-ring TP No. 90459-4580
SPC reference	1144320-0300 2680390-0000

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (1) is removed.

a) Remove the flange (1) by means of the screws (2).

b) Change the O-ring (3).

c) Fit the flange (1) by means of the screws (2).



1 Flange
2 Screw
3 O-ring

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

Change Protractor Shaft O-Ring

Consumables	O-ring TP No. 90459-4578
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (3) is removed.

c) Remove the flange (3) by means of the screws (4).

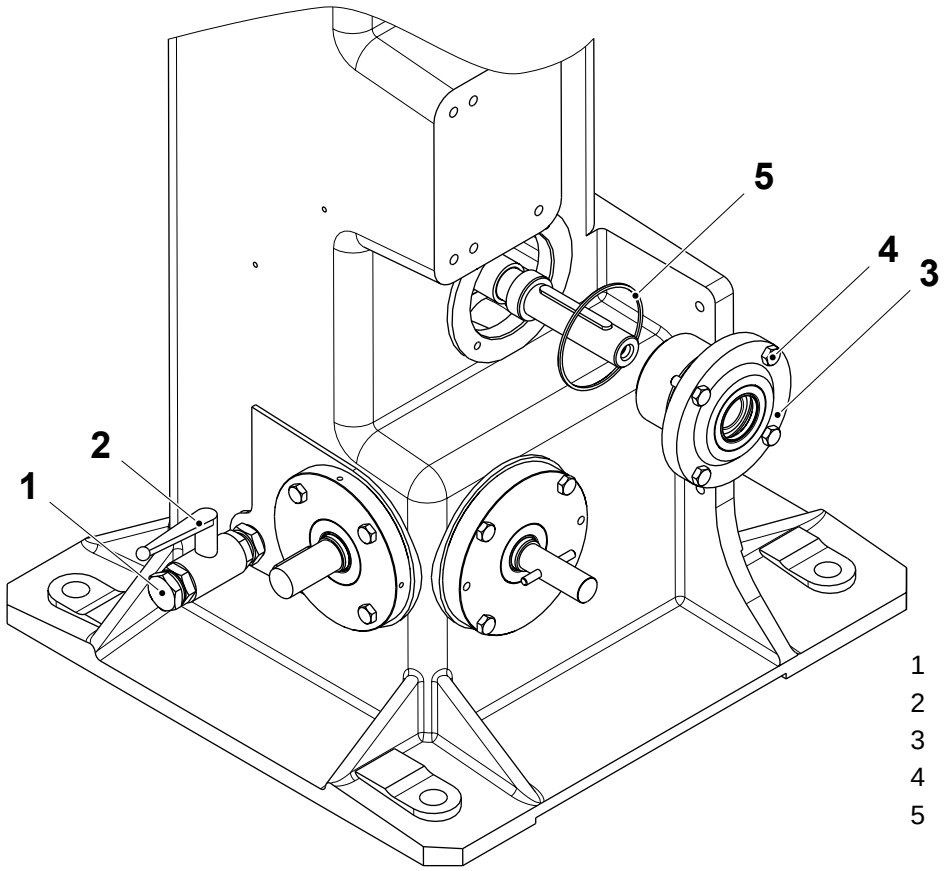
d) Change the O-ring (5).

e) Fit the flange (3) by means of the screws (4).

f) Remove the hose from the valve (2).

g) Close the valve (2) and fit the nut (1).

h) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1 Nut
2 Valve
3 Flange
4 Screw
5 O-ring

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(Cont'd)

(Cont'd)

Change Protractor Shaft Sealing Ring

Consumables	Radial Seal TP No. 90459-4587
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

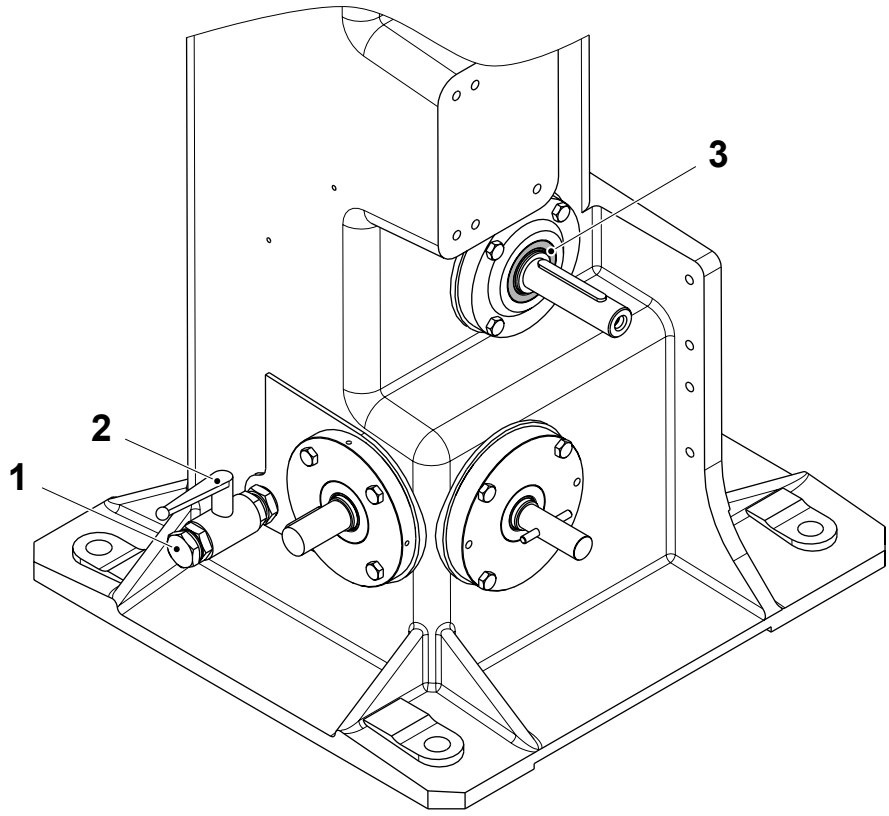
Note! There may be a small amount of lubricant oil released from the indexing unit when the sealing ring (3) is removed.

c) Change the sealing ring (3).

d) Remove the hose from the valve (2).

e) Close the valve (2) and fit the nut (1).

f) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1 Nut
2 Valve
3 Sealing ring

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

Change Low Shaft O-Ring

Consumables	O-ring TP No. 90459-4579
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (3) is removed.

c) Remove the flange (3) together with the shaft (4) by means of the screws (5).

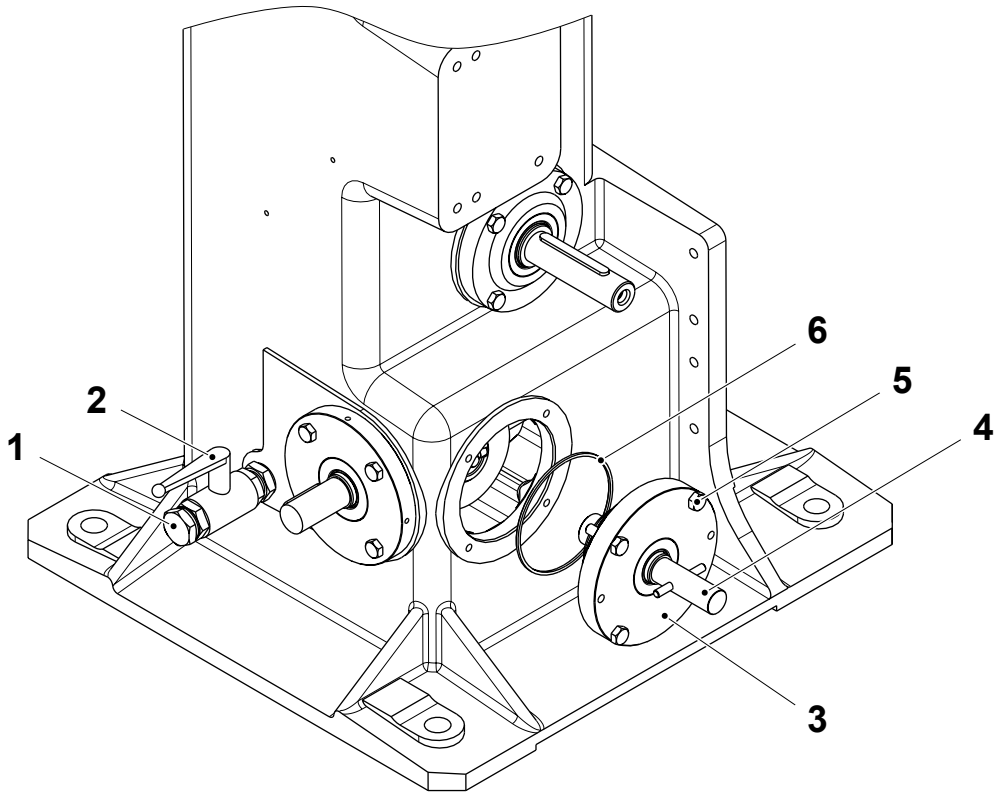
d) Change the O-ring (6).

e) Fit the flange (3) together with the shaft (4) by means of the screws (5).

f) Remove the hose from the valve (2).

g) Close the valve (2) and fit the nut (1).

h) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1 Nut
2 Valve
3 Flange
4 Shaft
5 Screw
6 O-ring

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

Change Low Shaft Sealing Ring

Consumables	Radial Seal TP No. 90091-0148
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

Note! There may be a small amount of lubricant oil released from the indexing unit when the sealing ring (4) is removed.

c) Remove the pin (3).

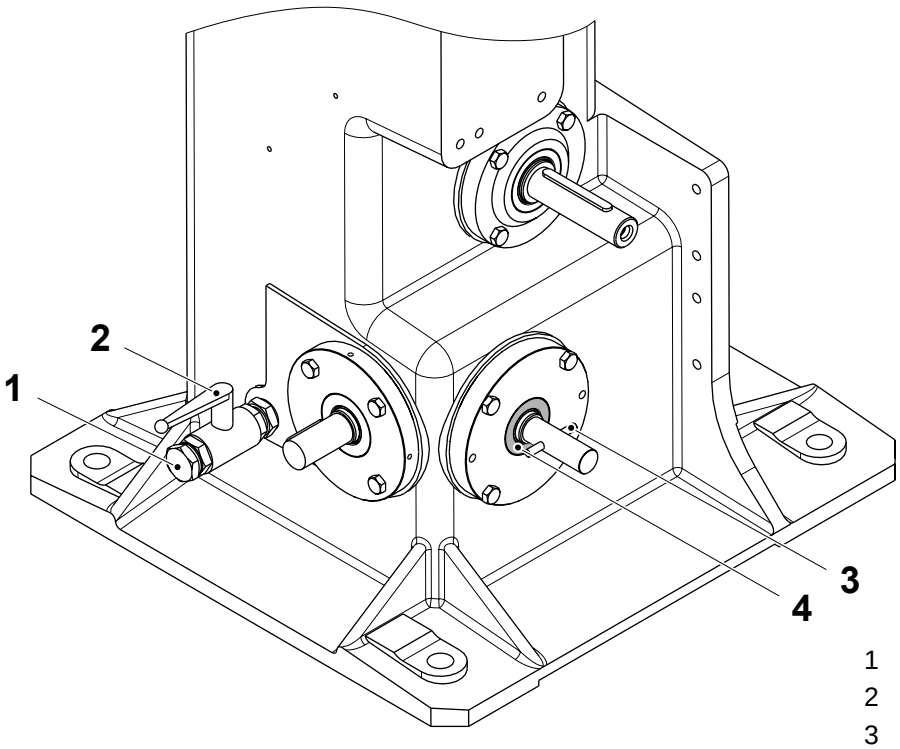
d) Change the sealing ring (4).

e) Fit the pin (3).

f) Remove the hose from the valve (2).

g) Close the valve (2) and fit the nut (1).

h) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1 Nut
2 Valve
3 Pin
4 Sealing ring

(Cont'd)

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(Cont'd)

Change Low Shaft Spring

Consumables	Radial Seal TP No. 90091-0148 Spring TP No. 2680401-0000
SPC reference	1144320-0300 2680390-0000

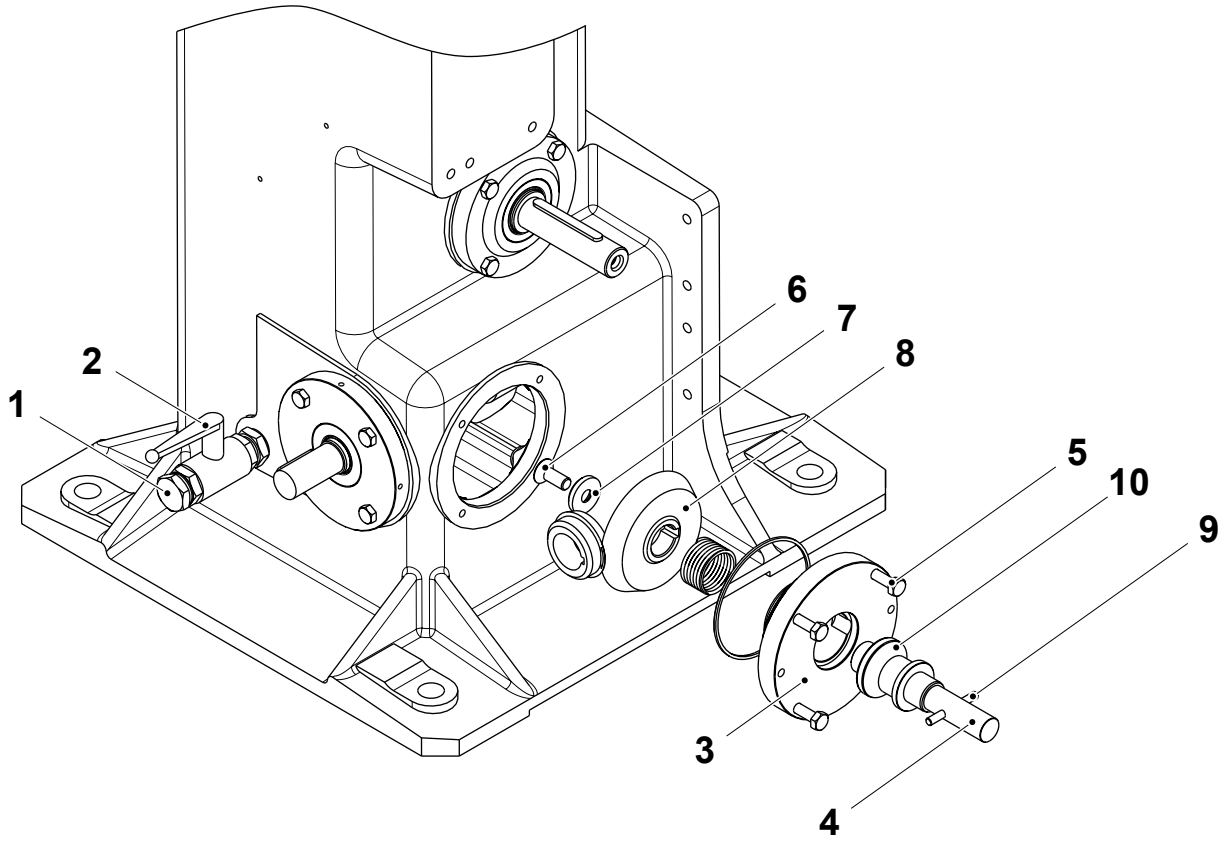
a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (3) is removed.

c) Remove the flange (3) together with the shaft (4) by means of the screws (5).

d) Remove the screw (6), the washer (7), the gear (8), the pin (9) and the sealing ring (10).



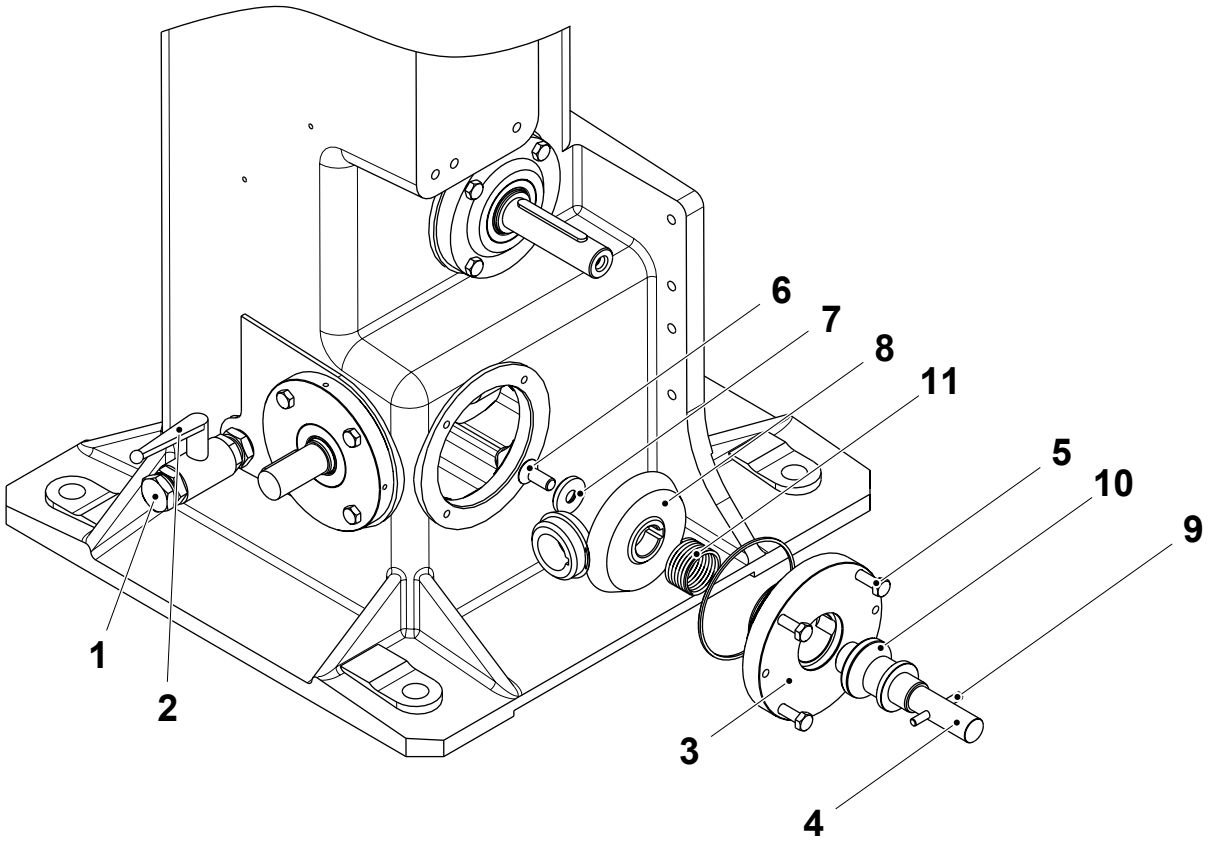
1	Nut	6	Screw
2	Valve	7	Washer
3	Flange	8	Gear
4	Shaft	9	Pin
5	Screw	10	Sealing ring

(Cont'd)

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(Cont'd)

e) Remove the shaft (4) from the flange (3).
f) Change the spring (11).
g) Fit the shaft (4) on the flange (3).
h) Change the sealing ring (10).
i) Fit the pin (9) and the gear (8).
j) Fit the washer (7) and the screw (6); tighten the screw (6).
k) Fit the flange (3) together with the shaft (4) by means of the screws (5).
l) Remove the hose from the valve (2).
m) Close the valve (2) and fit the nut (1).
n) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1	Nut	7	Washer
2	Valve	8	Gear
3	Flange	9	Pin
4	Shaft	10	Sealing ring
5	Screw	11	Spring
6	Screw		

(Cont'd)

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(Cont'd)

Change Vertical Shaft Sealing Ring

Consumables	Radial Seal TP No. 90091-0306
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

Note! There may be a small amount of lubricant oil released from the indexing unit when the sealing ring (4) is removed.

c) Remove the key (3).

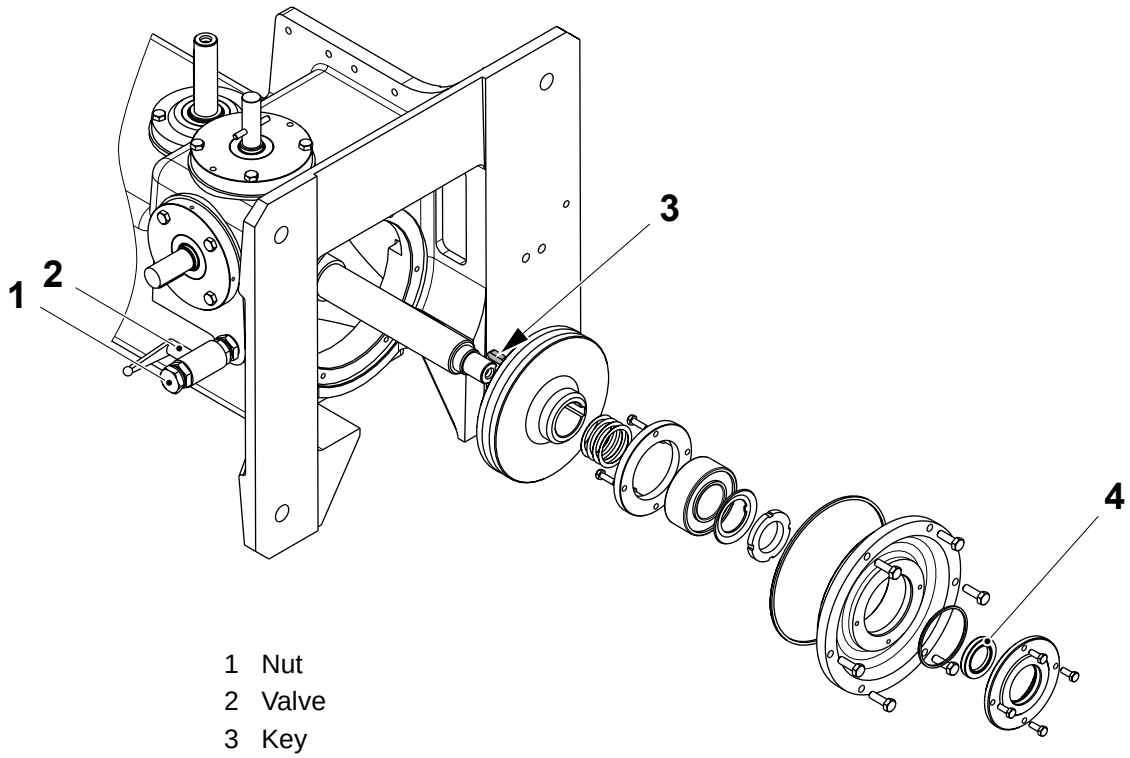
d) Change the sealing ring (4).

e) Fit the key (3).

f) Remove the hose from the valve (2).

g) Close the valve (2) and fit the nut (1).

h) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1 Nut
2 Valve
3 Key
4 Sealing ring

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(Cont'd)

(Cont'd)

Change Vertical Shaft O-Ring

Consumables	Radial Seal TP No. 90091-0306 O-ring TP No. 90459-4577
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

c) Remove the key (3).

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (4) is removed.

d) Remove the flange (4) by means of the screws (5).

e) Change the O-ring (6).

f) Remove the sealing ring (7).

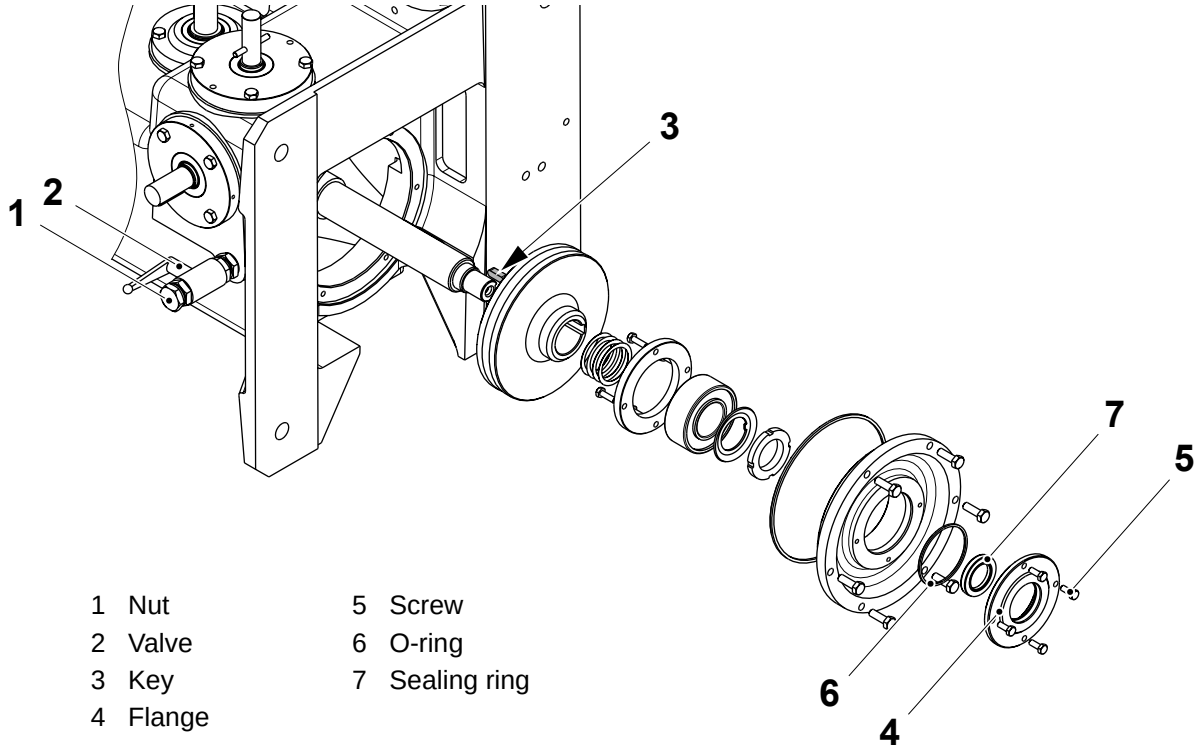
g) Fit the flange (4) by means of the screws (5).

h) Fit the sealing ring (7) and the key (3).

i) Remove the hose from the valve (2).

j) Close the valve (2) and fit the nut (1).

k) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1 Nut
2 Valve
3 Key
4 Flange
5 Screw
6 O-ring
7 Sealing ring

(Cont'd)

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(Cont'd)

Change Vertical Shaft Flange O-Ring

Consumables	Radial Seal TP No. 90091-0306 O-ring TP No. 90459-4577 O-ring TP No. 90459-4580
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

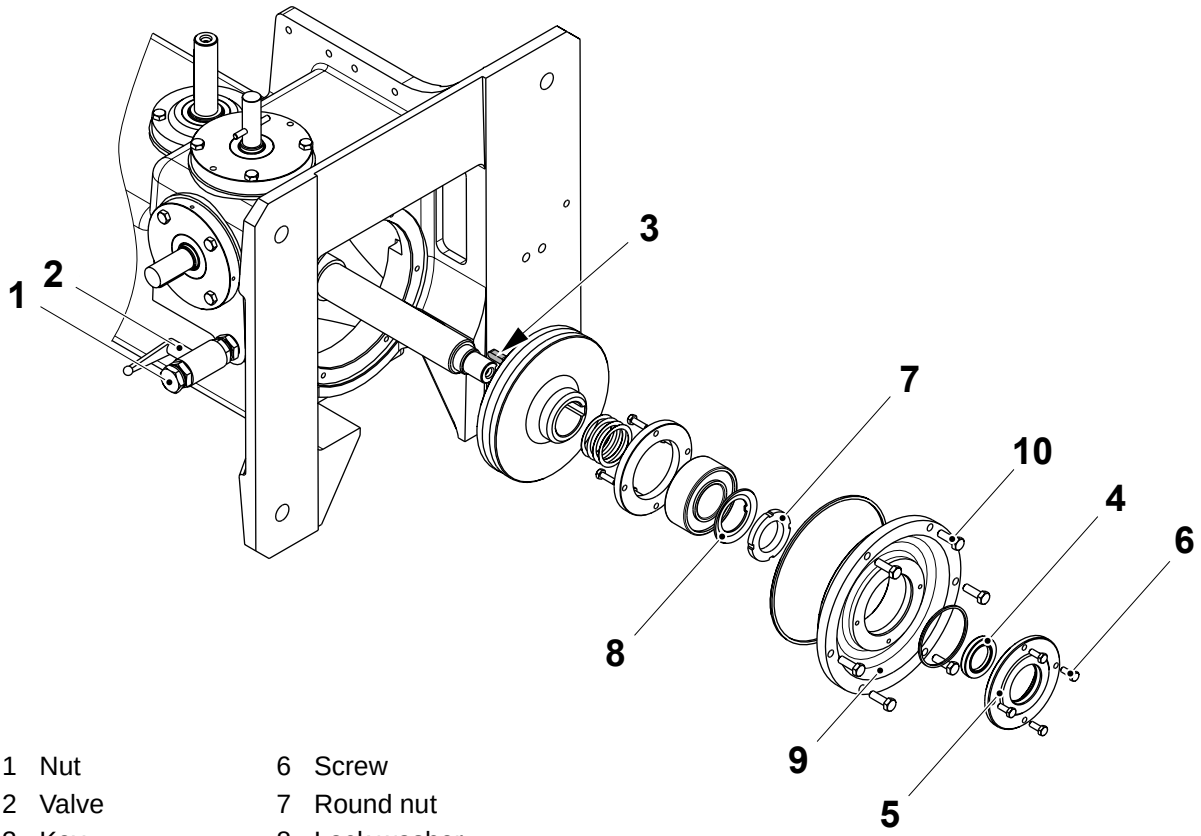
Note! There may be a small amount of lubricant oil released from the indexing unit when the sealing ring (4) is removed.

c) Remove the key (3) and the sealing ring (4).

d) Remove the flange (5) by means of the screws (6).

e) Remove the round nut (7) and the lock washer (8).

f) Remove the flange (9) by means of the screws (10).



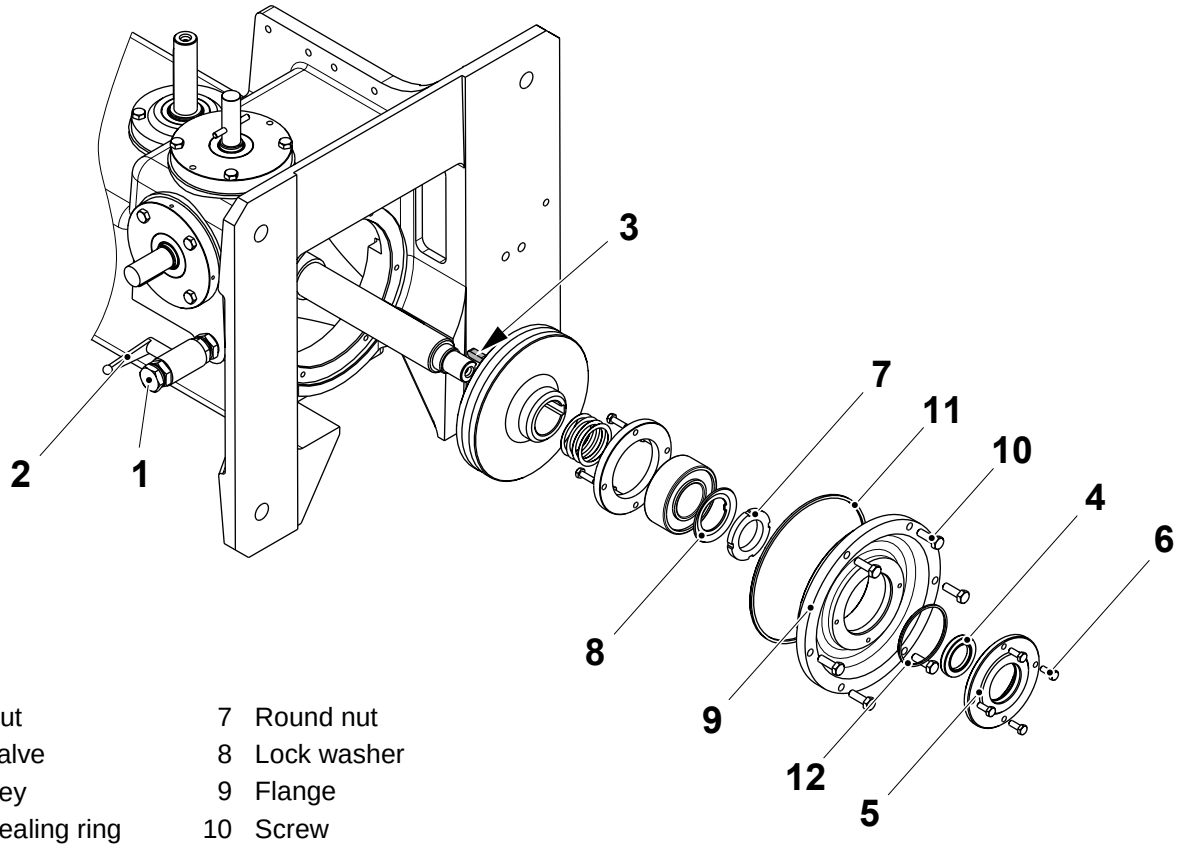
1	Nut	6	Screw
2	Valve	7	Round nut
3	Key	8	Lock washer
4	Sealing ring	9	Flange
5	Flange	10	Screw

(Cont'd)

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(Cont'd)

g) Change the O-ring (11).
h) Fit the flange (9) by means of the screws (10).
i) Fit the round nut (7) and the lock washer (8).
j) Change the O-ring (12).
k) Fit the flange (5) by means of the screws (6).
l) Fit the sealing ring (4) and the key (3).
m) Remove the hose from the valve (2).
n) Close the valve (2) and fit the nut (1).
o) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.
p) Crank the index gear one revolution to verify the correct operation.



1	Nut	7	Round nut
2	Valve	8	Lock washer
3	Key	9	Flange
4	Sealing ring	10	Screw
5	Flange	11	O-ring
6	Screw	12	O-ring

(Cont'd)

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(Cont'd)

Change Motor Shaft O-Ring

Consumables	O-ring TP No. 90459-4578 O-ring TP No. 90459-4580
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

c) Remove the key (3).

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (4) is removed.

d) Remove the flange (4) by means of the screws (5).

e) Remove the sealing ring (6).

f) Change the O-ring (7).

g) Fit the flange (4) by means of the screws (5).

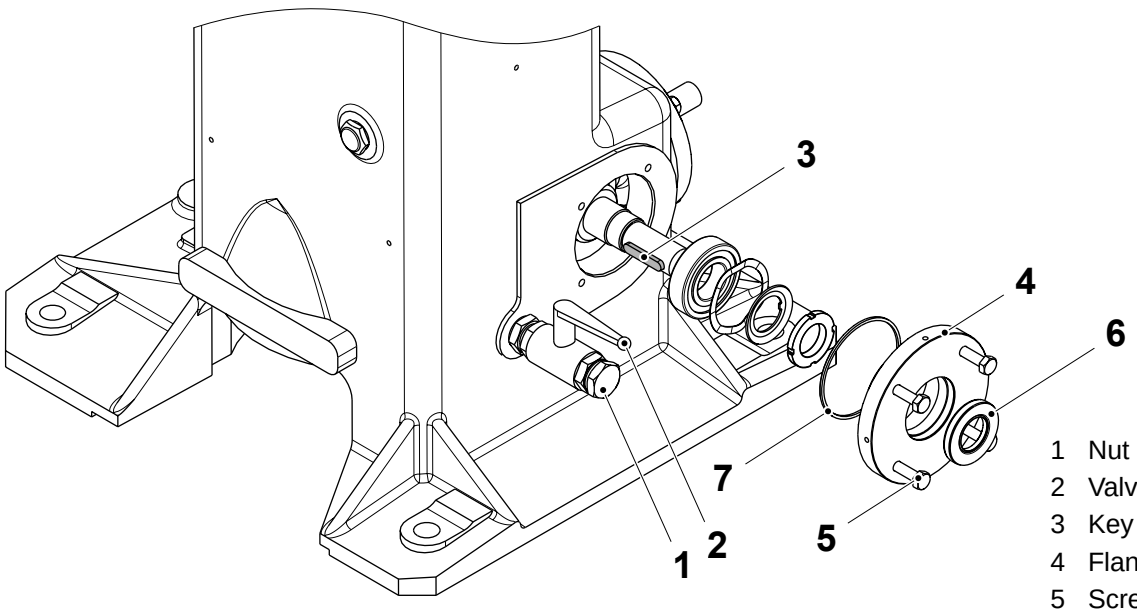
h) Change the sealing ring (6).

i) Fit the key (3).

j) Remove the hose from the valve (2).

k) Close the valve (2) and fit the nut (1).

l) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1 Nut
2 Valve
3 Key
4 Flange
5 Screw
6 Sealing ring
7 O-ring

(Cont'd)

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(Cont'd)

Change Motor Shaft Sealing Ring

Consumables	Radial Seal TP No. 90459-4585
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

c) Remove the key (3).

Note! There may be a small amount of lubricant oil released from the indexing unit when the sealing ring(4) is removed.

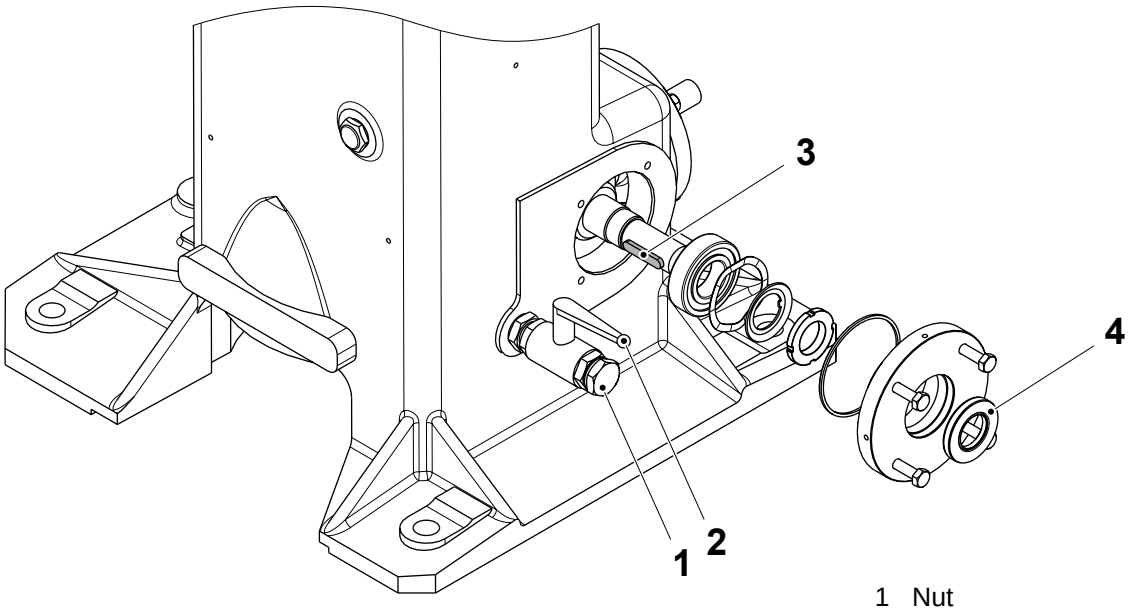
d) Change the sealing ring (4).

e) Fit the key (3).

f) Remove the hose from the valve (2).

g) Close the valve (2) and fit the nut (1).

h) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1 Nut
2 Valve
3 Key
4 Sealing ring

(Cont'd)

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(Cont'd)

Motor Shaft Blind Side O-Ring

Consumables	O-ring TP No. 315202-0302
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (3) is removed.

c) Remove the flange (3) by means of the screws (4).

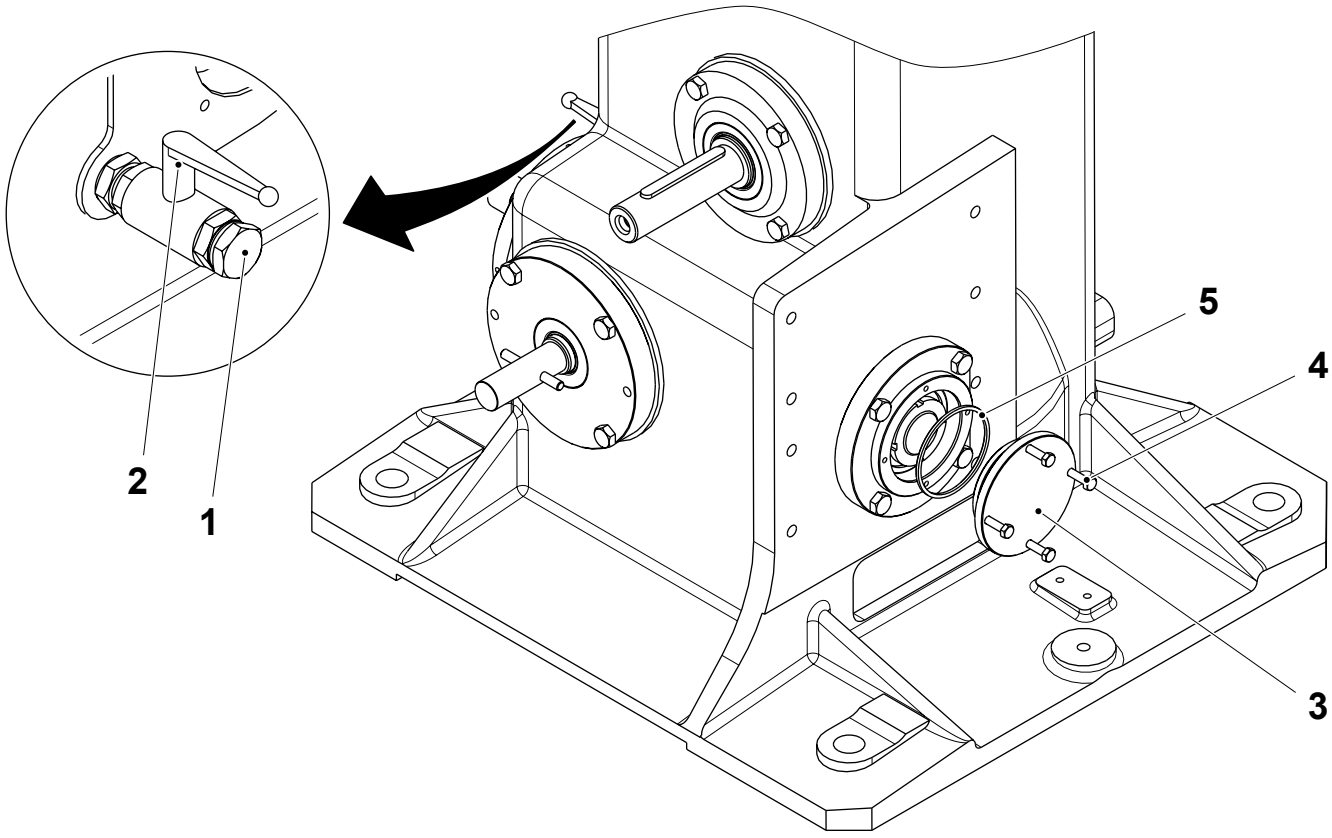
d) Change the O-ring (5).

e) Fit the flange (3) by means of the screws (4).

f) Remove the hose from the valve (2).

g) Close the valve (2) and fit the nut (1).

h) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1 Nut
2 Valve
3 Flange
4 Screw
5 O-ring

(Cont'd)

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(Cont'd)

Change Motor Shaft Blind Side Screw Flange O-Ring

Consumables	O-ring TP No. 315202-0302
SPC reference	1144320-0300 2680390-0000

a) Remove the nut (1).

b) Fit a hose to the valve (2) and open the valve (2) to drain the oil.

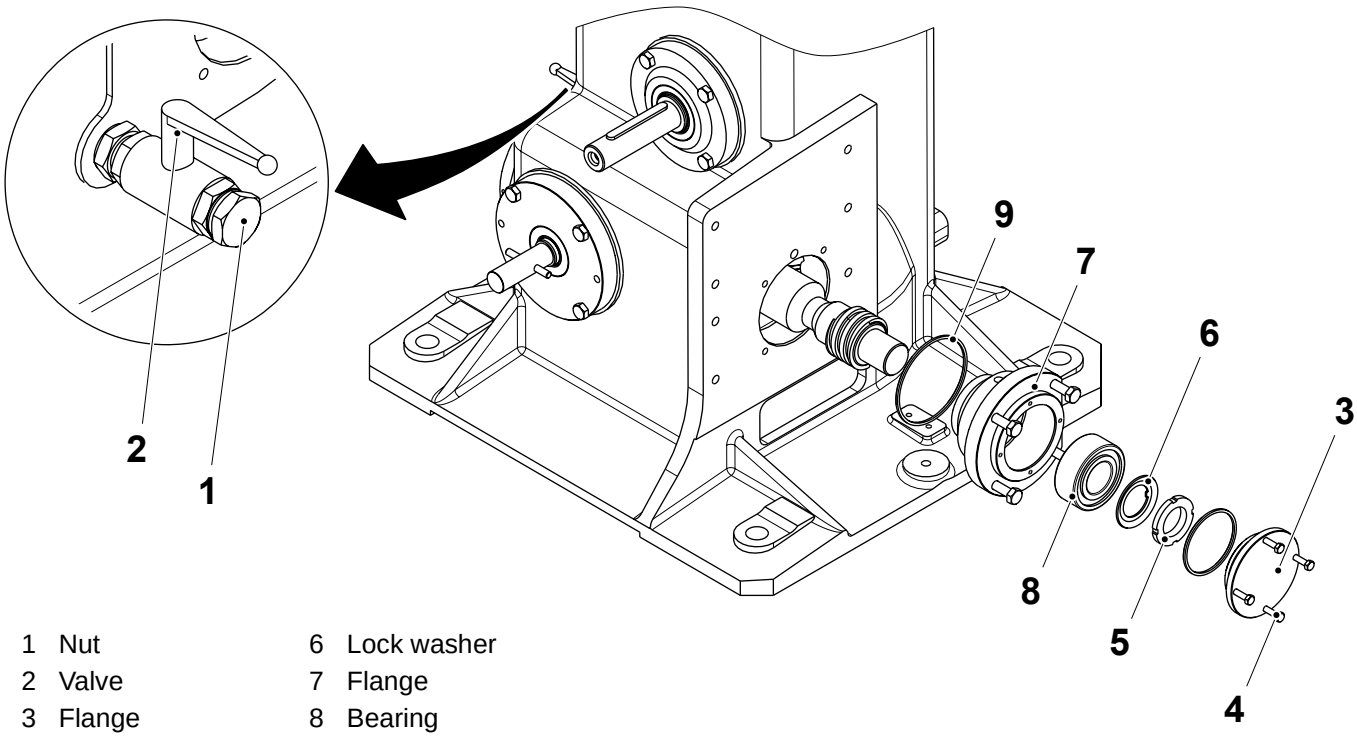
Note! There may be a small amount of lubricant oil released from the indexing unit when the flange (3) is removed.

c) Remove the flange (3) by means of the screws (4).

d) Remove the round nut (5) and the lock washer (6).

e) Remove the flange (7) together with the bearing (8).

f) Change the O-ring (9).



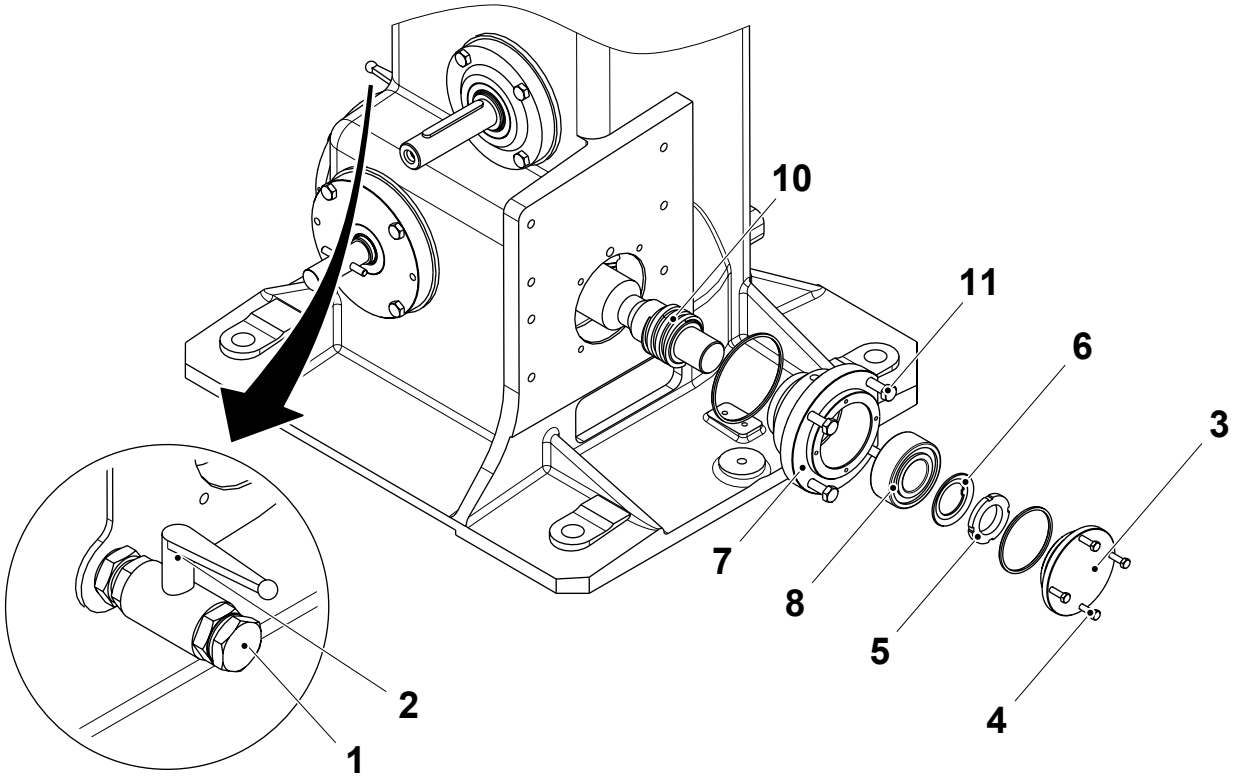
1 Nut
2 Valve
3 Flange
4 Screw
5 Round nut
6 Lock washer
7 Flange
8 Bearing
9 O-ring

(Cont'd)

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(Cont'd)

g) Fit the pump (10) if it is been removed during the previous operations.
h) Fit the bearing (8) in the flange (7).
i) Fit the flange (7) by means of the screws (11).
j) Fit the lock washer (6) and the round nut (5).
k) Fit the flange (3) by means of the screws (4).
l) Remove the hose from the valve (2).
m) Close the valve (2) and fit the nut (1).
n) If the overhaul of the lower part of the indexing gear is done then fill up with oil according to 5.4-2 Indexing Gear - Change Oil.



1	Nut	6	Lock washer
2	Valve	7	Flange
3	Flange	8	Bearing
4	Screw	10	Pump
5	Round nut	11	Screw

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(Cont'd)

Change Head Box

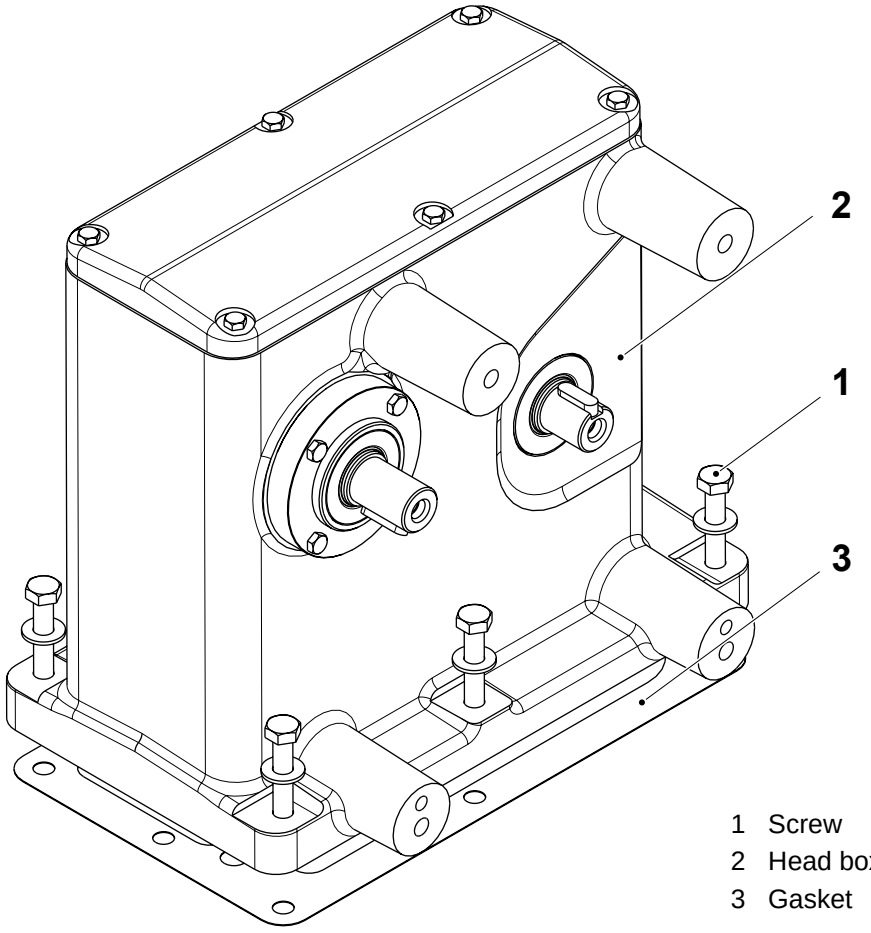
Consumables	Head TP No. 2680391-0000
SPC reference	1144320-0300 2680390-0000

Note! There may be a small amount of lubricant oil released from the indexing unit when the head box (2) is removed.

a) Remove the screws (1).

b) Change the head box (2) together with the gasket (3).

c) Fit the screws (1).



1 Screw
2 Head box
3 Gasket

(Cont'd)

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(Cont'd)

Change Head Box Inferior Gasket

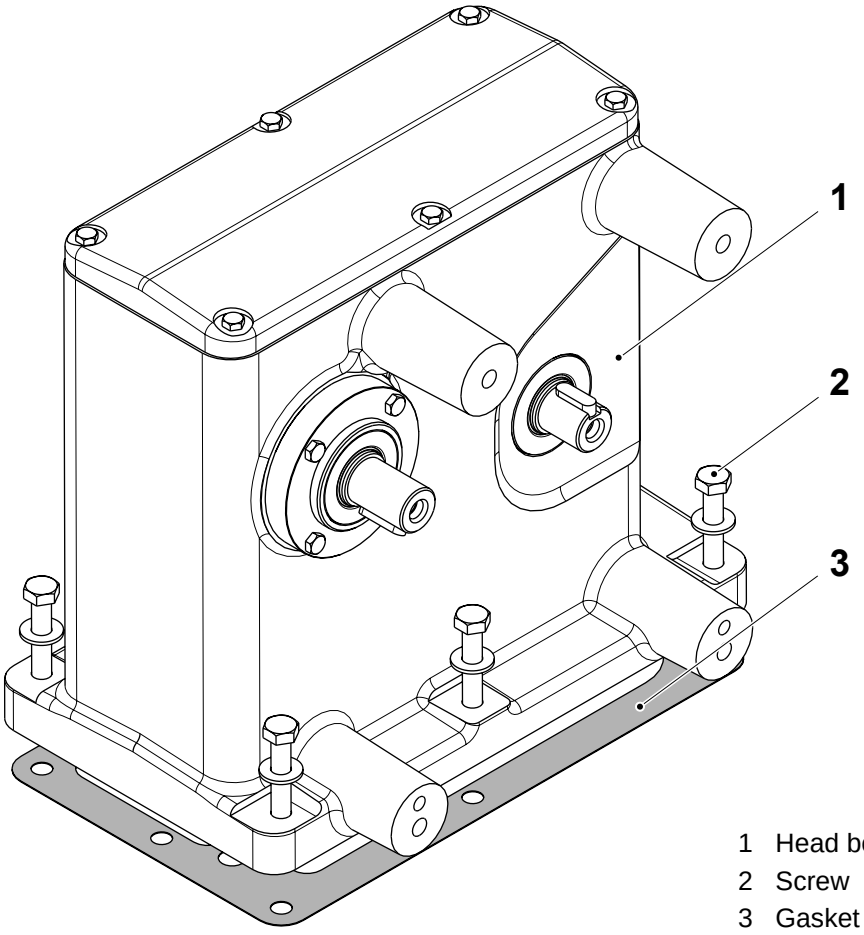
Consumables	Gasket TP No. 2680394-0000
SPC reference	1144320-0300 2680390-0000 2680391-0000

Note! There may be a small amount of lubricant oil released from the indexing unit when the head box (1) is removed.

a) Remove the head box (1) by means of the screws (2).

b) Change the gasket (3).

c) Fit the head box (1) by means of the screws (2).



1 Head box
2 Screw
3 Gasket

(Cont'd)

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(Cont'd)

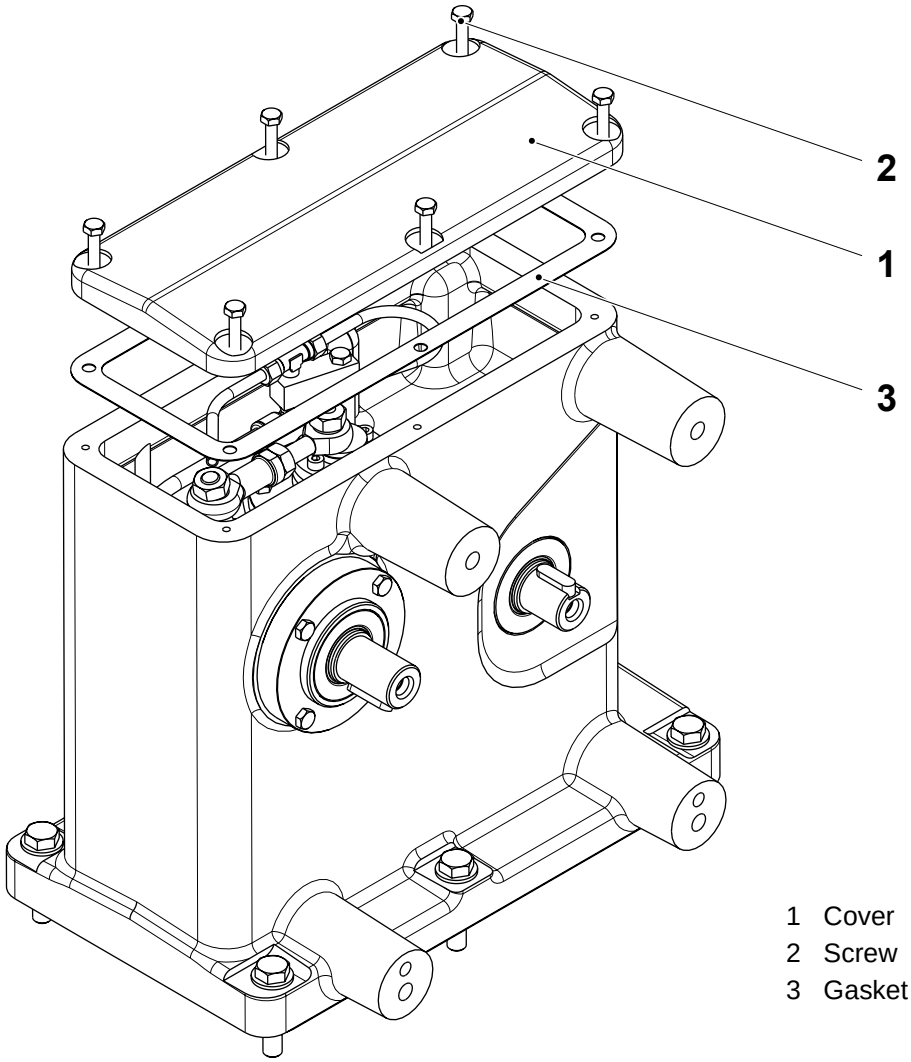
Change Head Box Superior Gasket

Consumables	Gasket TP No. 1350042-0000
SPC reference	1144320-0300 2680390-0000 2680391-0000

a) Remove the cover (1) by means of the screws (2).

b) Change the gasket (3).

c) Fit the cover (1) by means of the screws (2).



1 Cover
2 Screw
3 Gasket

(Cont'd)

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(Cont'd)

Change Head Box Coupling

Consumables	Gasket TP No. 2680394-0000 Coupling TP No. 2687109-0000
SPC reference	1144320-0300 2680390-0000 2680391-0000

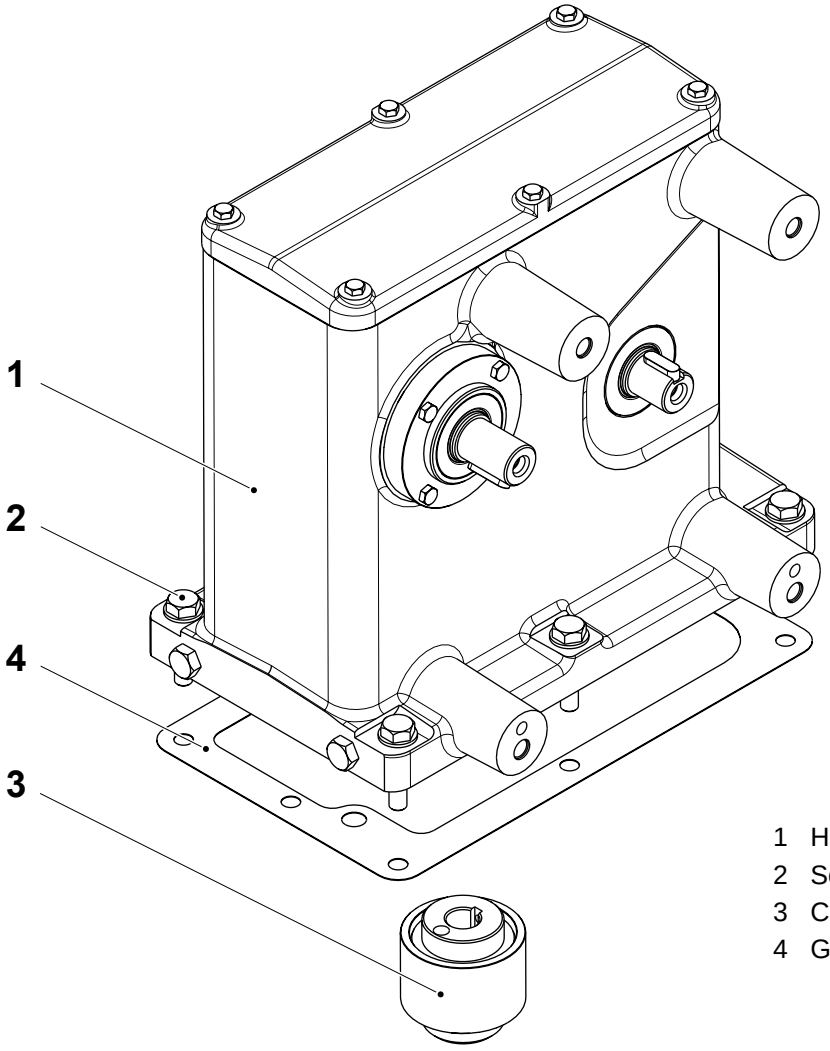
Note! There may be a small amount of lubricant oil released from the indexing unit when the head box (1) is removed.

a) Remove the head box (1) by means of the screws (2).

b) Change the coupling (3).

c) Change the gasket (4).

d) Fit the head box (1) by means of the screws (2).



1 Head box
2 Screw
3 Coupling
4 Gasket

(Cont'd)

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(Cont'd)

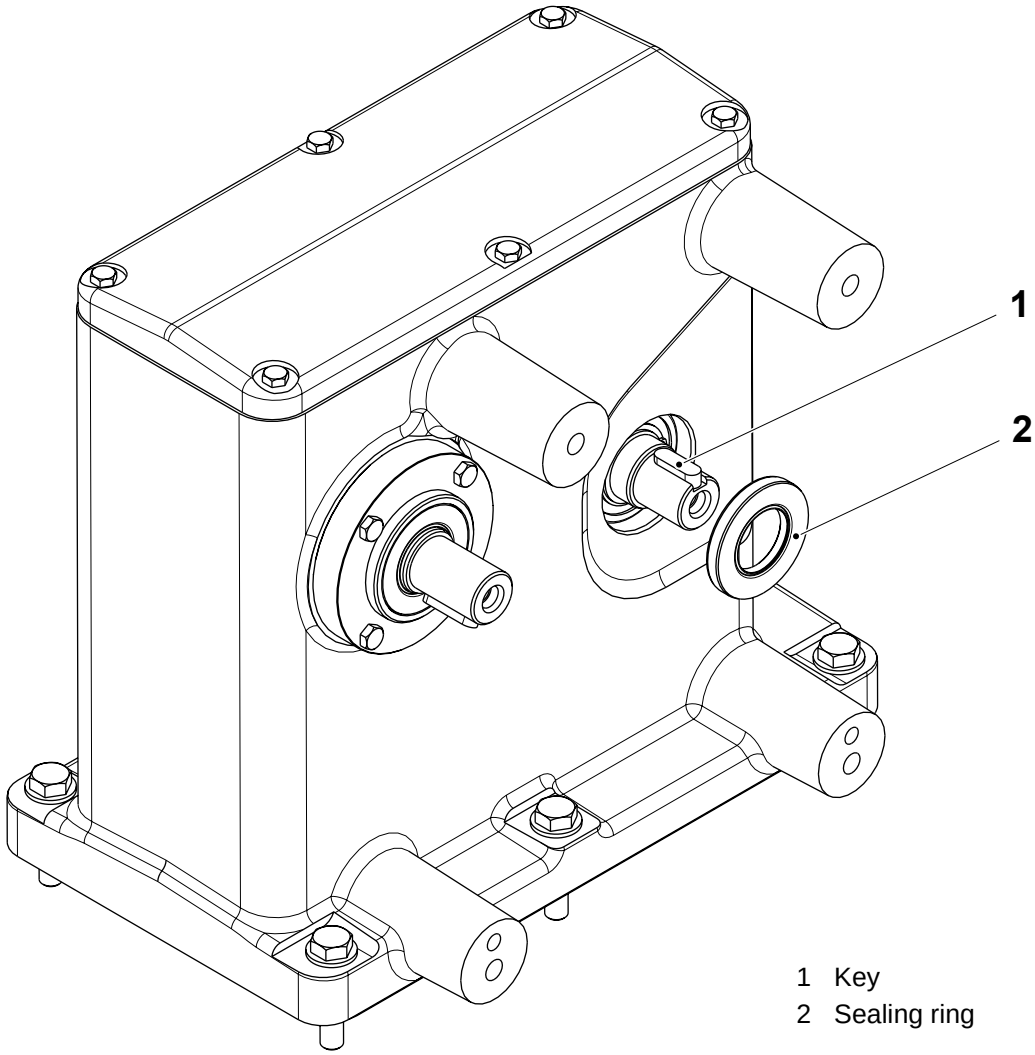
Change Head Box Pulley Shaft Sealing Ring

Consumables	Radial Seal TP No. 90459-4586
SPC reference	1144320-0300 2680390-0000 2680391-0000

a) Remove the key (1).

b) Change the sealing ring (2).

c) Fit the key (1).



1 Key
2 Sealing ring

(Cont'd)

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(Cont'd)

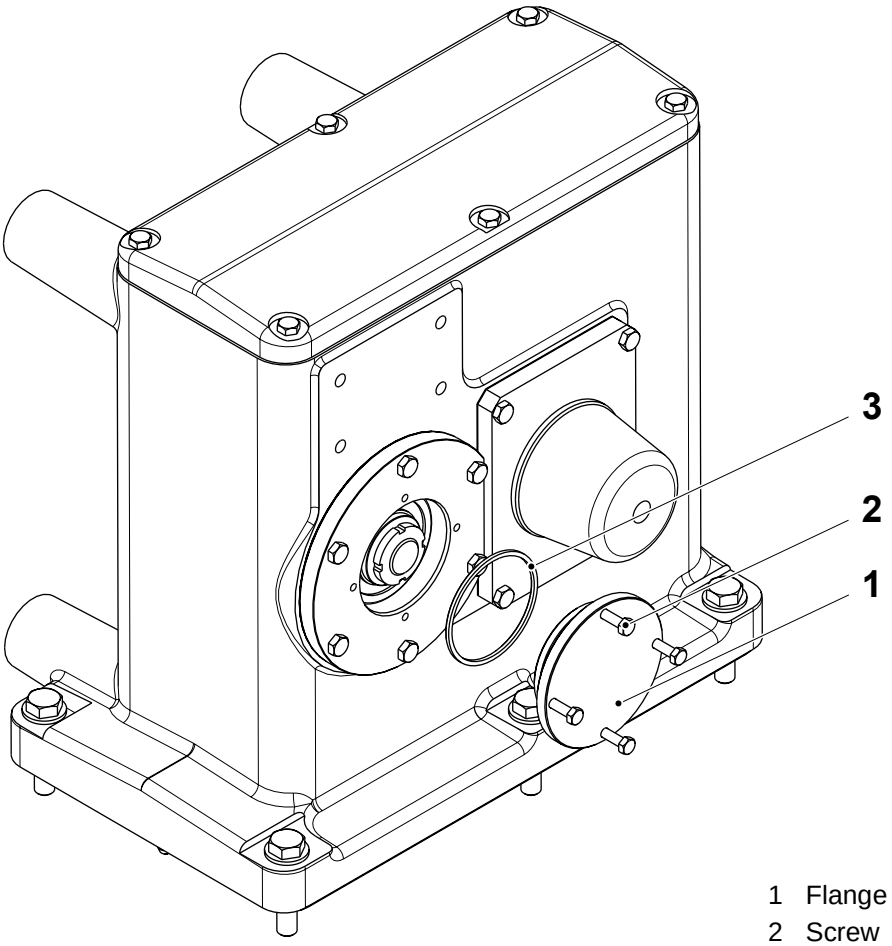
Change Head Box Pulley Shaft O-Ring

Consumables	O-ring TP No. 90459-4576
SPC reference	1144320-0300 2680390-0000 2680391-0000

a) Remove the flange (1) by means of the screws (2).

b) Change the O-ring (3).

c) Fit the flange (1) by means of the screws (2).



1 Flange
2 Screw
3 O-ring

(Cont'd)

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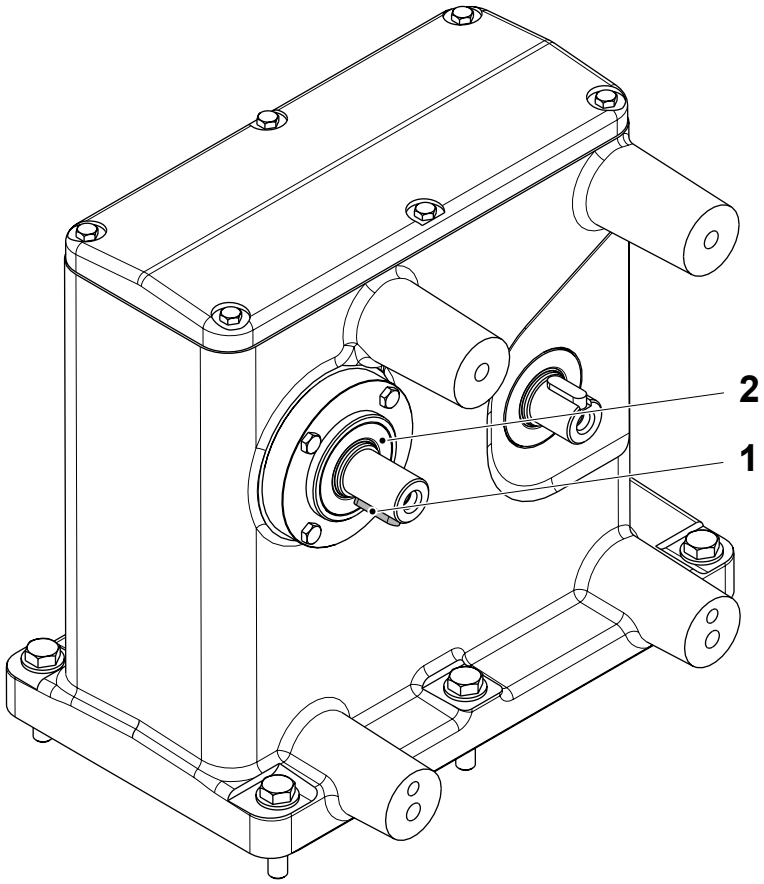
Change Head Box Connecting Rod Shaft Sealing Ring

Consumables	Radial Seal TP No. 90091-0299
SPC reference	1144320-0300 2680390-0000 2680391-0000

a) Remove the key (1).

b) Change the sealing ring (2).

c) Fit the key (1).



1 Key
2 Sealing ring

(Cont'd)

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(Cont'd)

Change Head Box Connecting Rod Shaft O-Ring

Consumables	O-ring TP No. 90242-0281
SPC reference	1144320-0300 2680390-0000 2680391-0000

a) Remove the cover (1) by means of the screws (2).

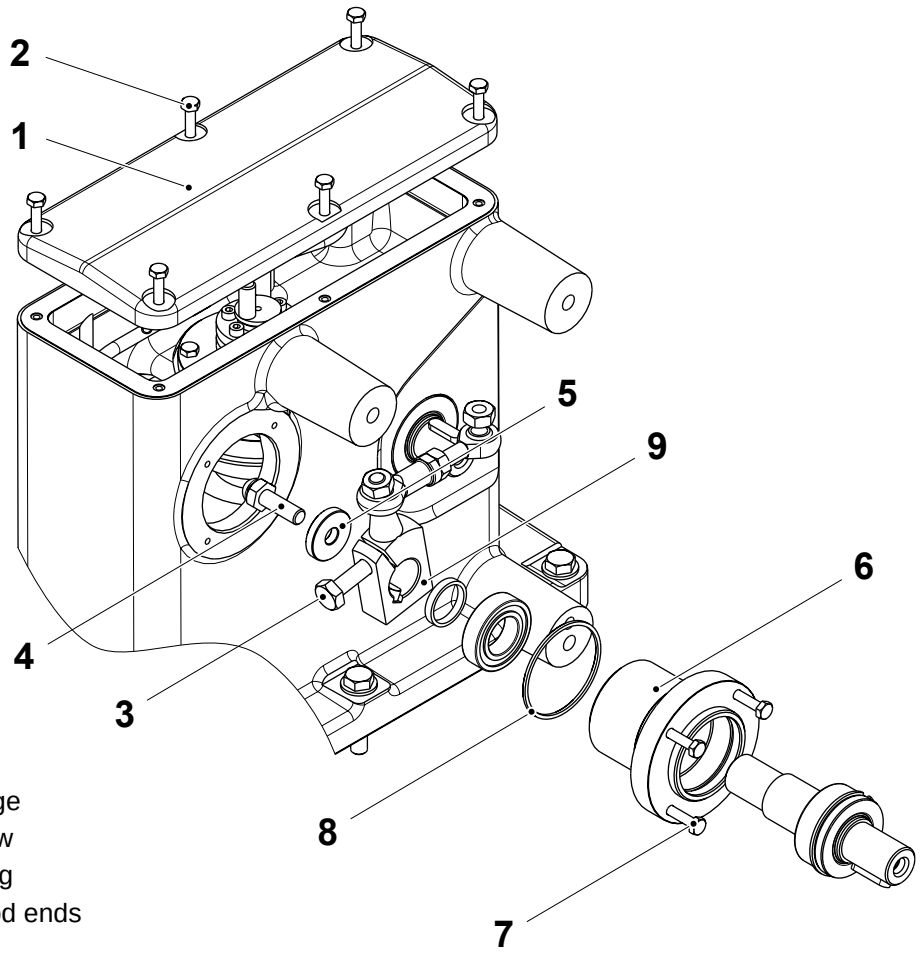
b) Loosen the screw (3).

c) Remove the screw (4) and the washer (5).

d) Remove the flange (6) by means of the screws (7).

e) Change the O-ring (8).

f) Fit the flange (6) by means of the screws (7). Make sure to insert the kit rod ends (9).



1 Cover
2 Screw
3 Screw
4 Screw
5 Washer
6 Flange
7 Screw
8 O-ring
9 Kit rod ends

(Cont'd)

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(Cont'd)

g) Make sure the spacer (10) is fitted between the bearing (11) and the kit rod ends (9).

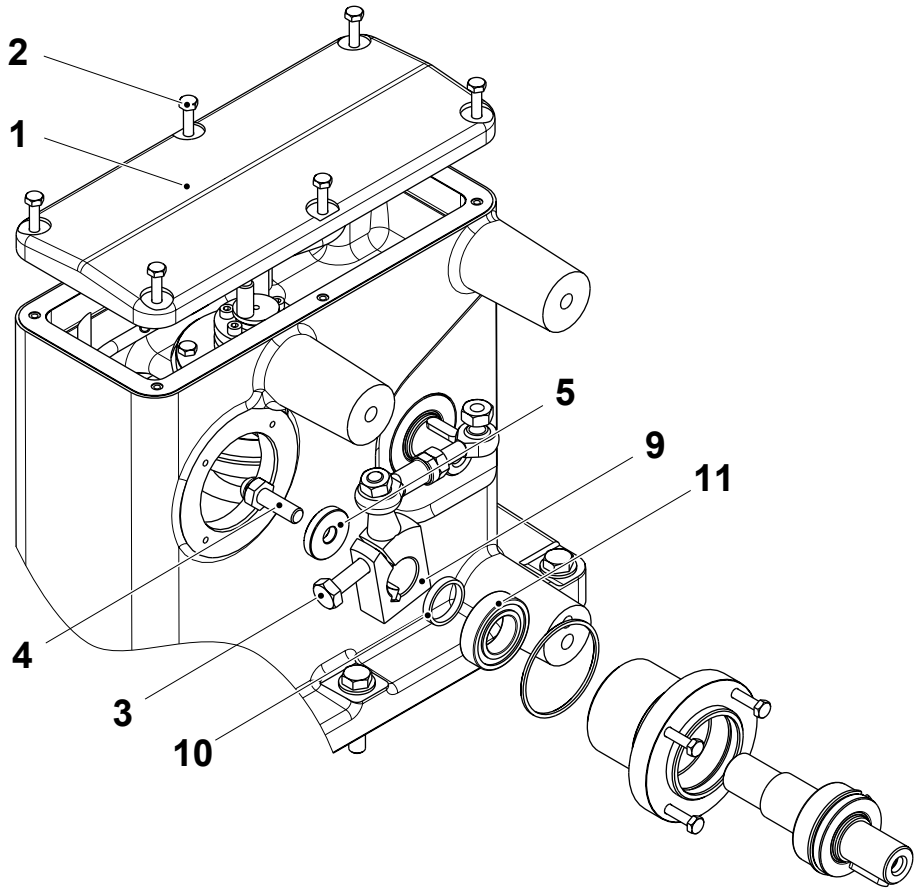
h) Fit the washer (5) and the screw (4).

i) Loosen the screw (4).

j) Tighten the screw (3).

k) Tighten the screw (4).

l) Fit the cover (1) by means the screws (2).



1	Cover	5	Washer
2	Screw	9	Kit rod ends
3	Screw	10	Spacer
4	Screw	11	Bearing

(Cont'd)

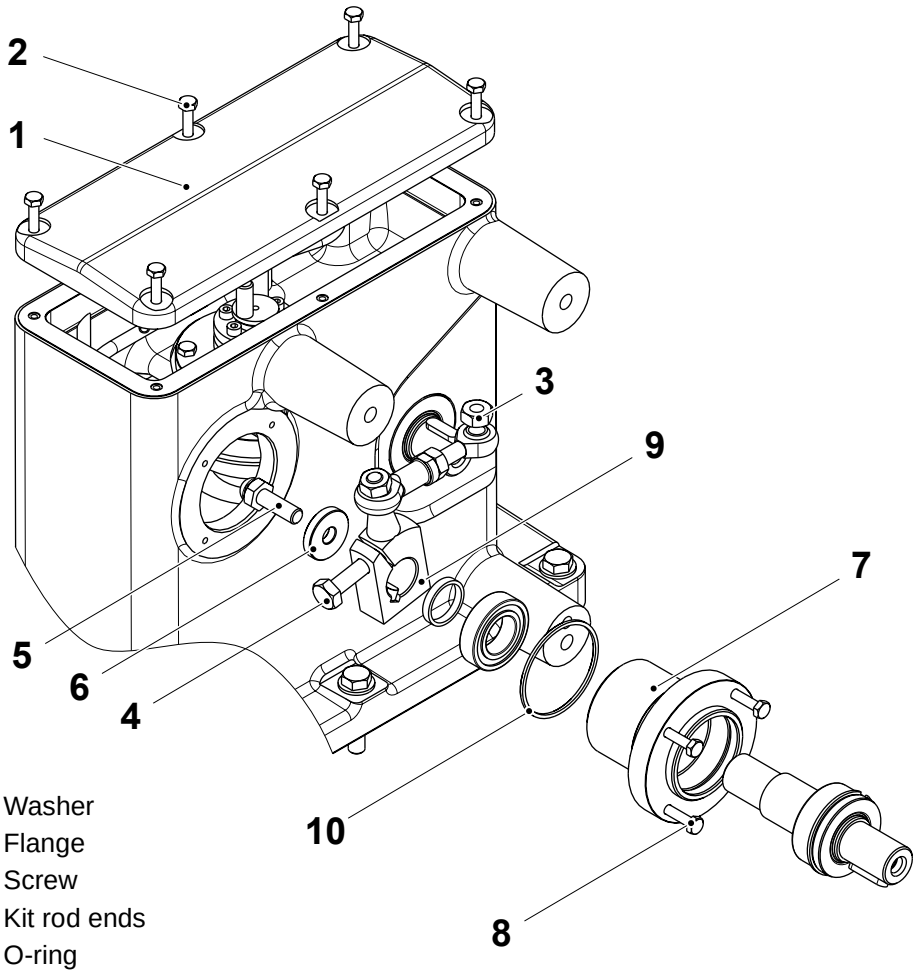
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(Cont'd)

Change Head Box Connecting Rod Shaft Kit Rod Ends

Consumables	Lever TP No. 2680393-0000 O-ring TP No. 90242-0281
SPC reference	1144320-0300 2680390-0000 2680391-0000

a) Remove the cover (1) by means of the screws (2).
b) Remove the nut (3).
c) Loosen the screw (4).
d) Remove the screw (5) and the washer (6).
e) Remove the flange (7) by means of the screws (8).
f) Change the kit rod ends (9) and the O-ring (10).



1 Cover
2 Screw
3 Nut
4 Screw
5 Screw
6 Washer
7 Flange
8 Screw
9 Kit rod ends
10 O-ring

(Cont'd)

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(Cont'd)

g) Fit the flange (7) by means of the screws (8). Make sure to insert the kit rod ends (9).

h) Make sure the spacer (11) is fitted between the bearing (12) and the kit rod ends (9).

i) Fit the washer (6) and the screw (5).

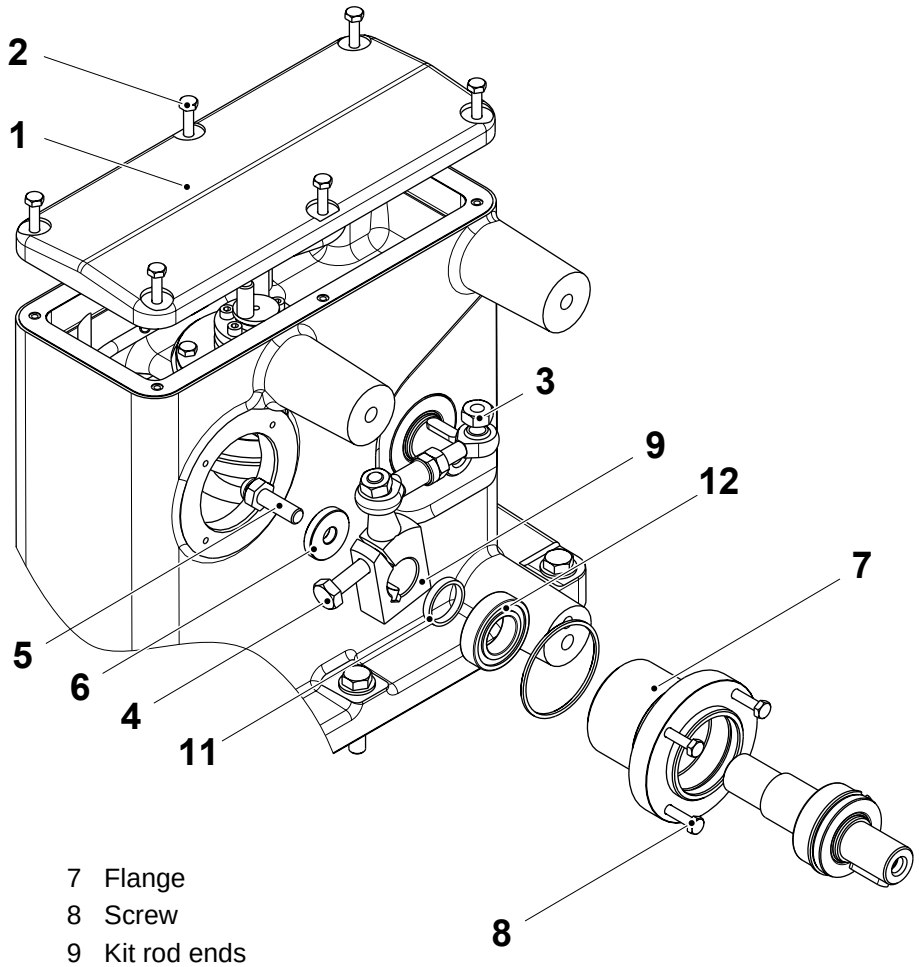
j) Loosen the screw (5).

k) Tighten the screw (4).

l) Tighten the screw (5).

m) Fit and tighten the nut (3).

n) Fit the cover (1) by means of the screws (2).



1 Cover
2 Screw
3 Nut
4 Screw
5 Screw
6 Washer
7 Flange
8 Screw
9 Kit rod ends
11 Spacer
12 Bearing

(Cont'd)

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(Cont'd)

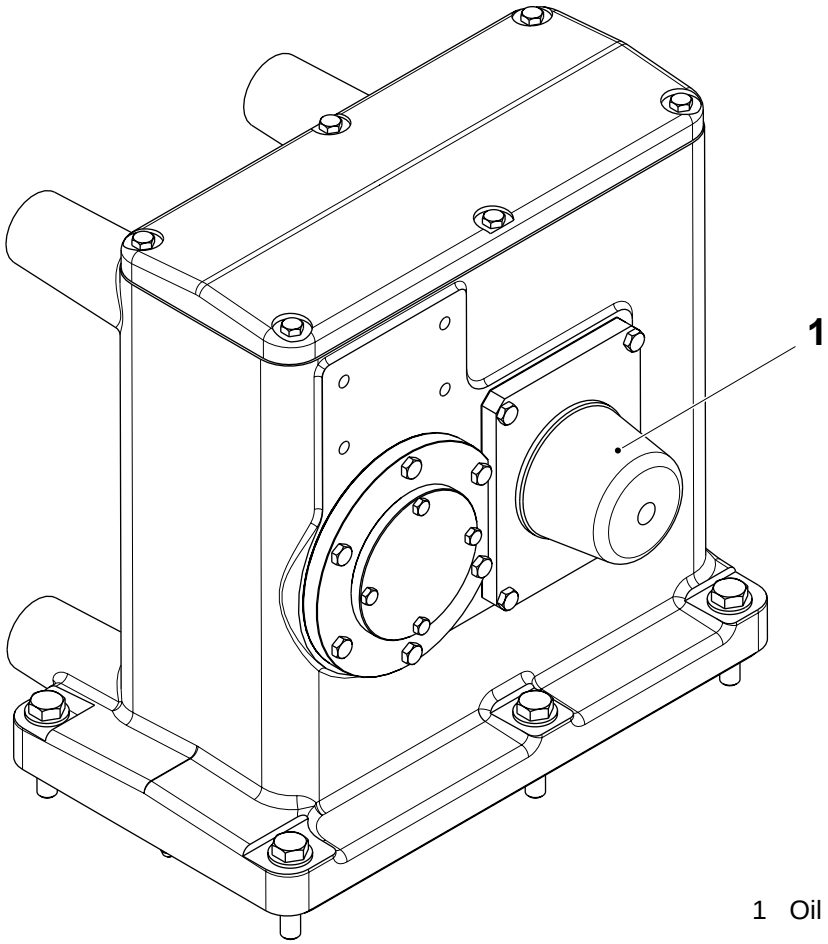
Change Oil Filter

Consumables	Filter TP No. 2680392-0000
SPC reference	1144320-0300 2680390-0000 2680391-0000

Note! There may be a small amount of lubricant oil released from the indexing unit when the head box (1) is removed.

a) Loosen and change the oil filter (1).

b) Tighten the oil filter (1).



1 Oil filter

(Cont'd)

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(Cont'd)

Assemble Station Wheel

Special Equipment	Puller TP No. 1361547 Lifting equipment TP No. 599816-1 Lifting kit TP No. 1361558-1 Zero pin TP No. 1350498 Template TP No. 1350497
SPC Reference	1361918-0200

WARNING

Risk of personal injury.

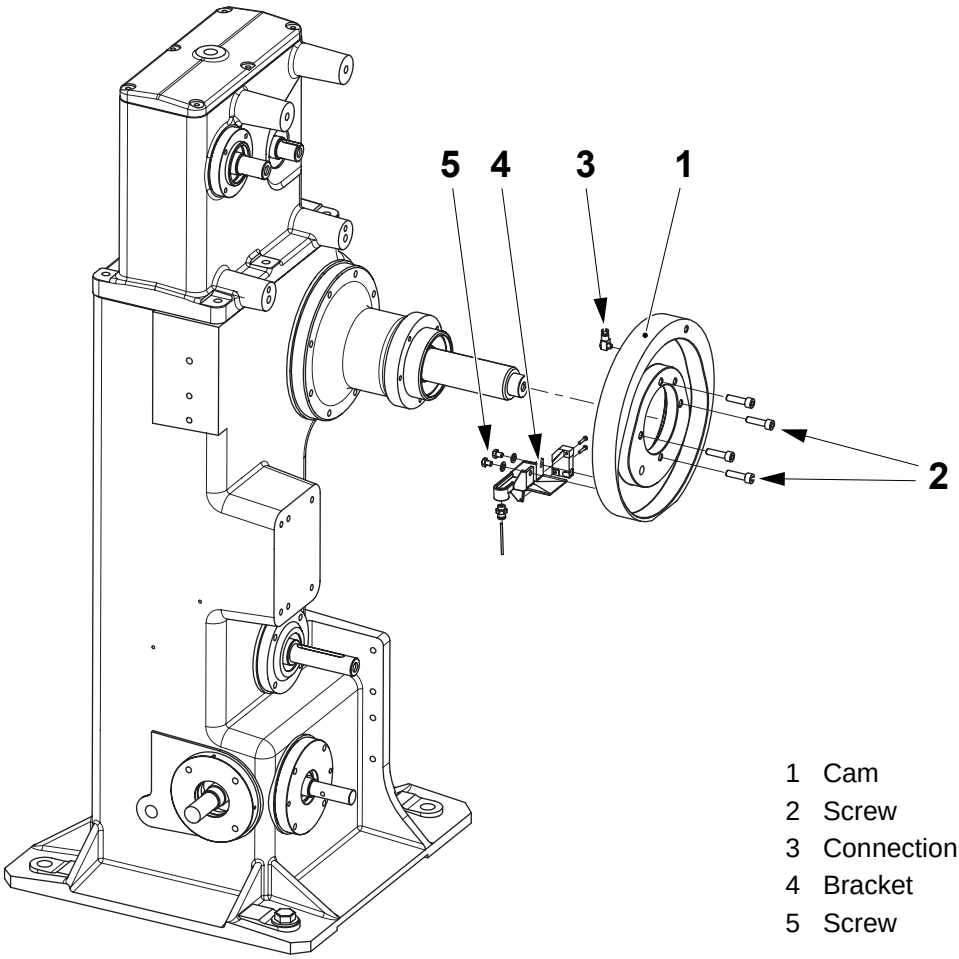
The lifting equipment can lift max 200 kg. Do not use it for other purpose.

Note! For TPA 250 Sq and TPA 1000 Sq only, perform items from a) to c).

a) Fit the cam (1) by means of the four screws (2).

b) Fit the connection (3).

c) Fit the bracket (4) by means of the two screws (5).



1 Cam
2 Screw
3 Connection
4 Bracket
5 Screw

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

d) Fit the brackets (6) to the rail (7) by means of the four screws (8).

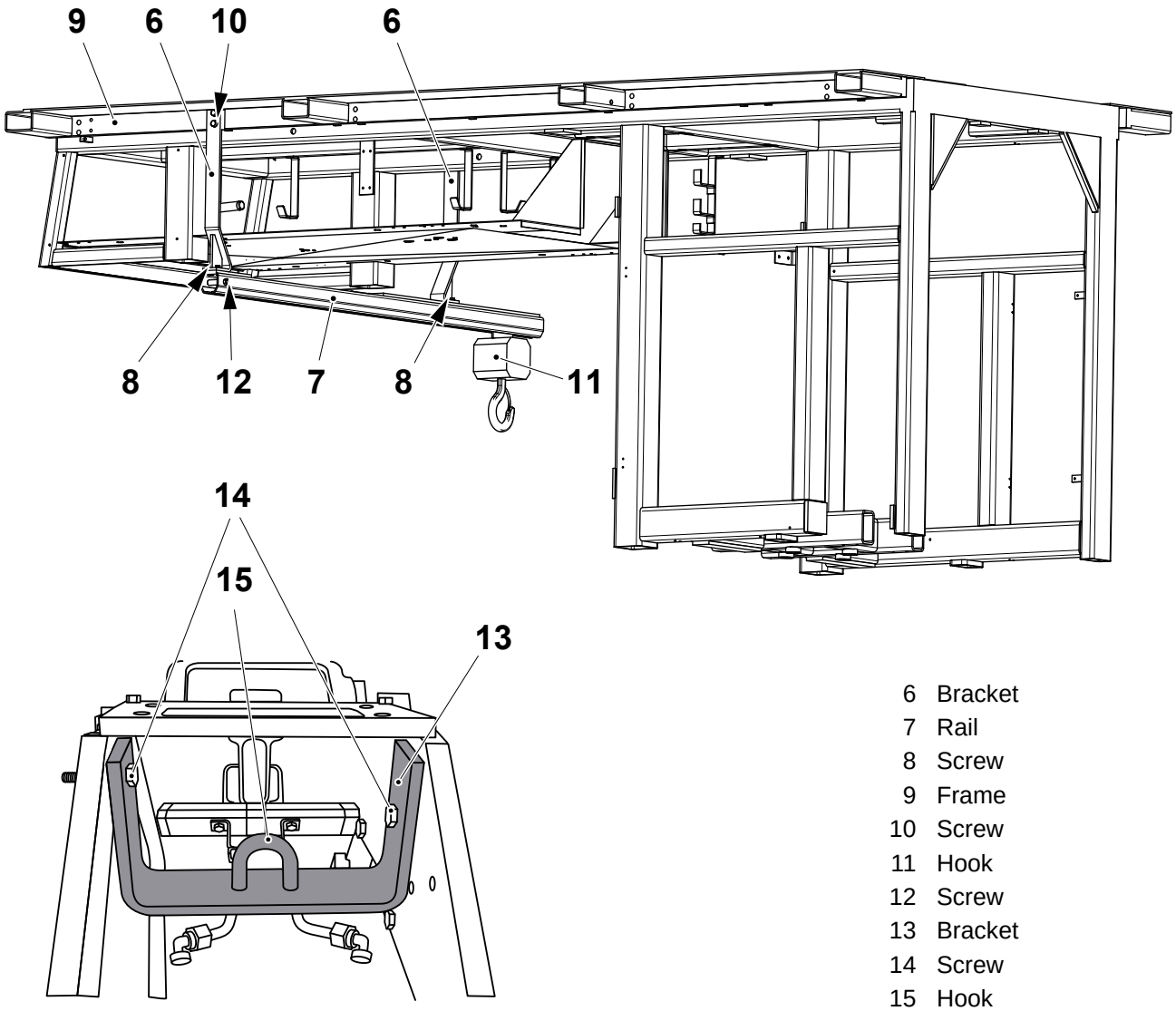
e) Fit the brackets (6) to the frame (9) by means of the four screws (10).

f) Insert the lifting hook (11) into the rail (7) and tighten the screw (12).

g) Fit the lifting bracket (13) to the station wheel by means of the two screws (14) and the nuts.

h) Suspend the hook (11) of the tackle from the hook (15) of the lifting bracket (13).

i) Make the chain of the tackle tight.



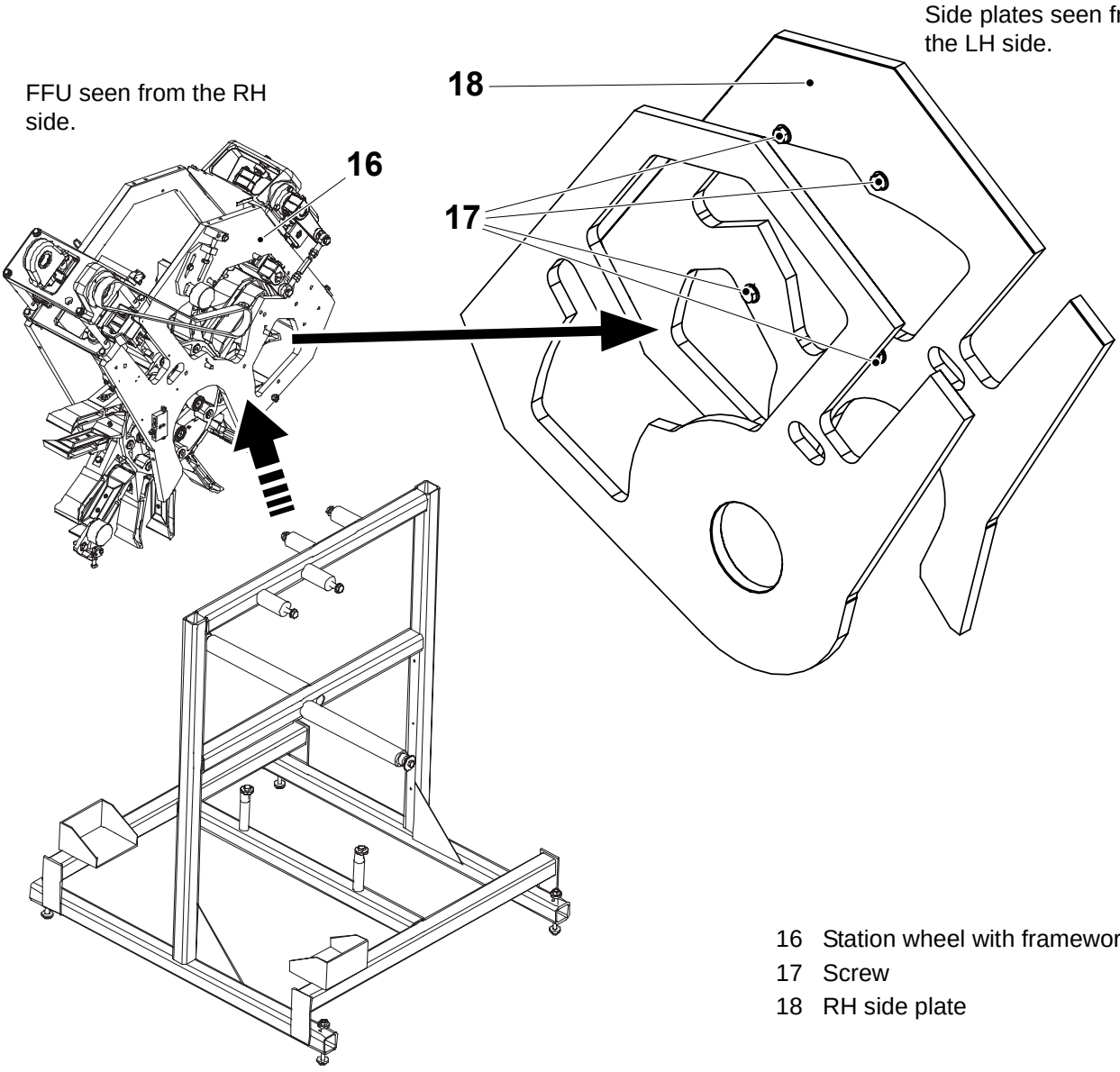
6 Bracket
7 Rail
8 Screw
9 Frame
10 Screw
11 Hook
12 Screw
13 Bracket
14 Screw
15 Hook

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

j) Lift the new station wheel with framework (16) into the machine and fit the four screws (17) into the RH side plate (18).



16 Station wheel with framework
17 Screw
18 RH side plate

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

k) Fit the zero pin (19).

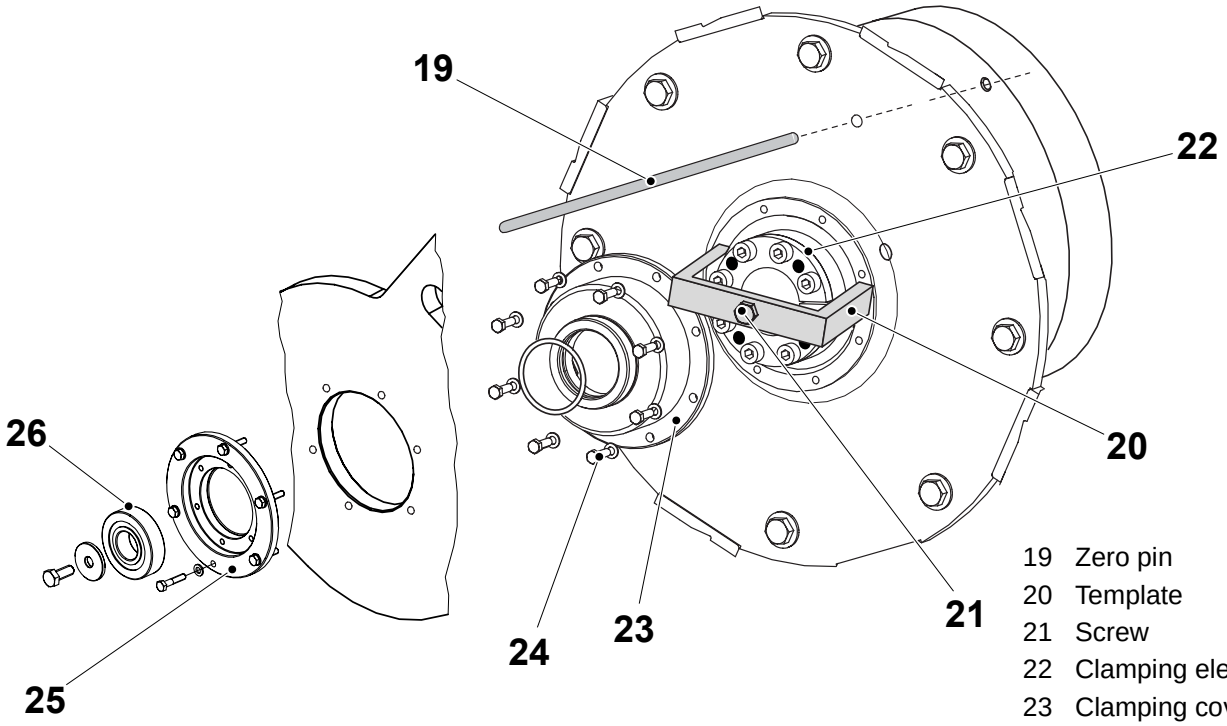
l) Fit the template (20) on the shaft of the indexing gear and tighten the screw (21).

m) Assemble the clamping element (22) according to 5.6.1-2 Clamping Element - Assemble on page 5-154.

n) Remove the screw (21) and the template (20).

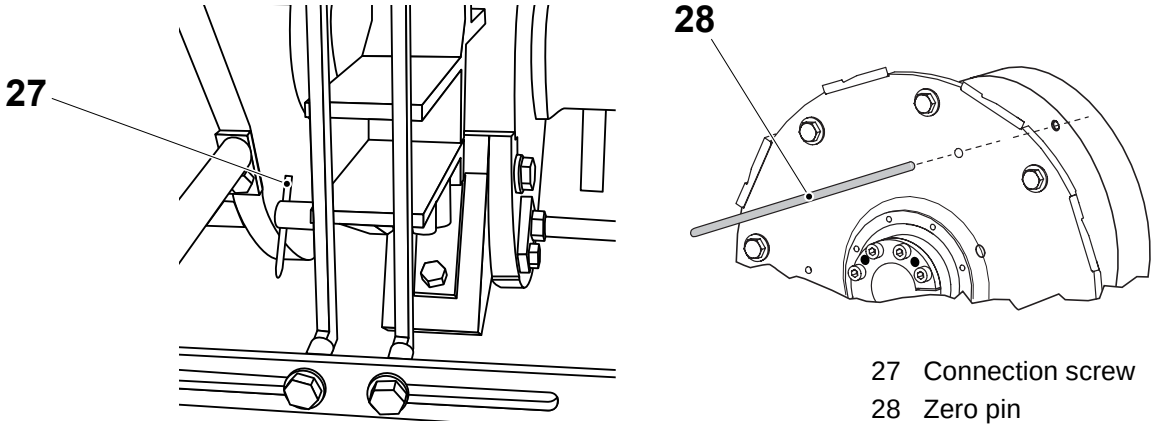
o) Fit the clamping cover (23) and tighten the screws (24).

p) Fit the flange (25) together with the bearing (26).



19 Zero pin
20 Template
21 Screw
22 Clamping element
23 Clamping cover
24 Screw
25 Flange
26 Bearing

q) Remove the connection screws (27) and the zero pin (28).



27 Connection screw
28 Zero pin

(Cont'd)

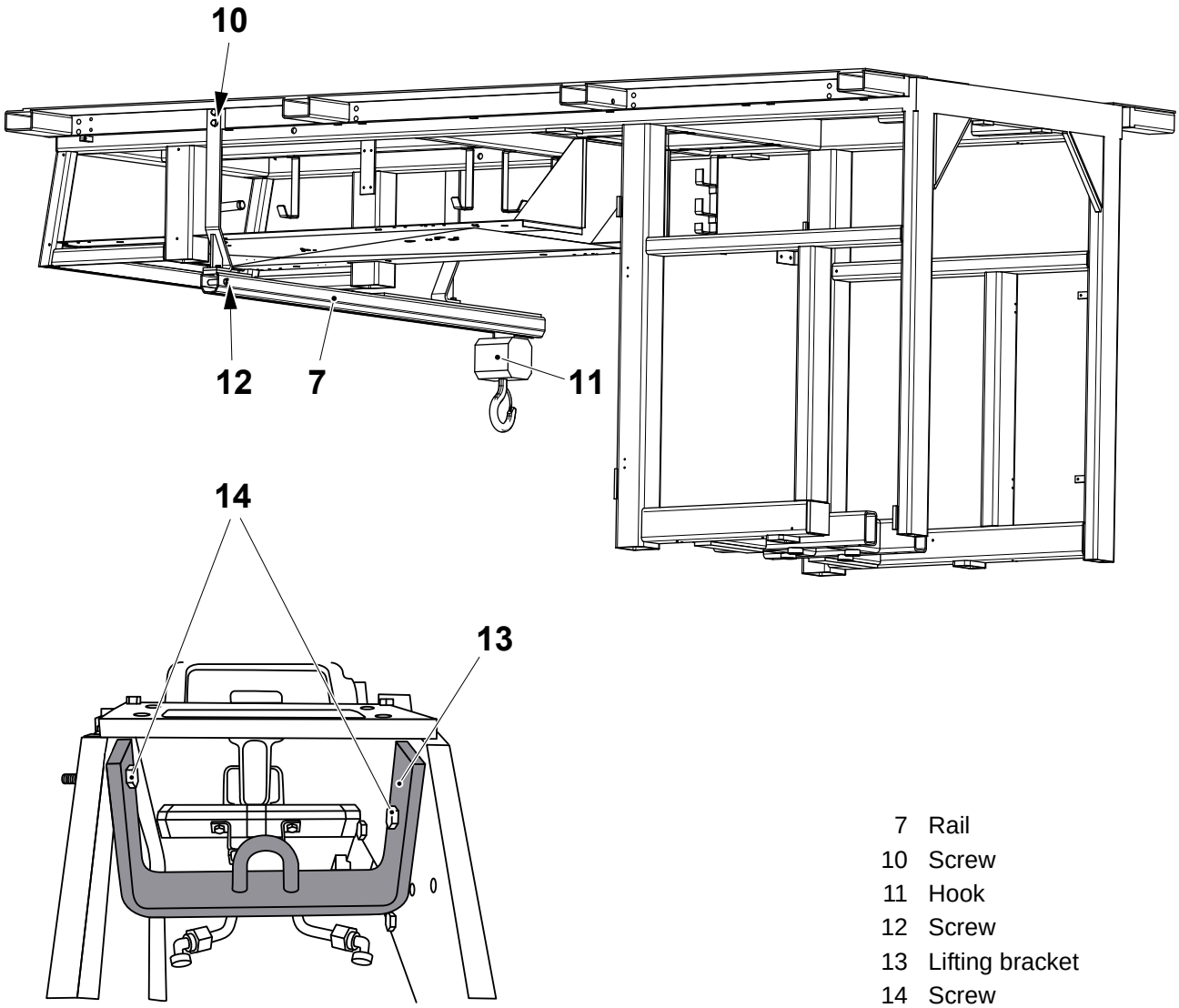
TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

r) Loosen the screws (12) and remove the hook (11) from the rail (7).

s) Loosen the screws (10) and remove the lifting device.

t) Remove the lifting bracket (13) from the station wheel by means of the screws (14).



7 Rail
10 Screw
11 Hook
12 Screw
13 Lifting bracket
14 Screw

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

u) Fit the bearing cover (29).

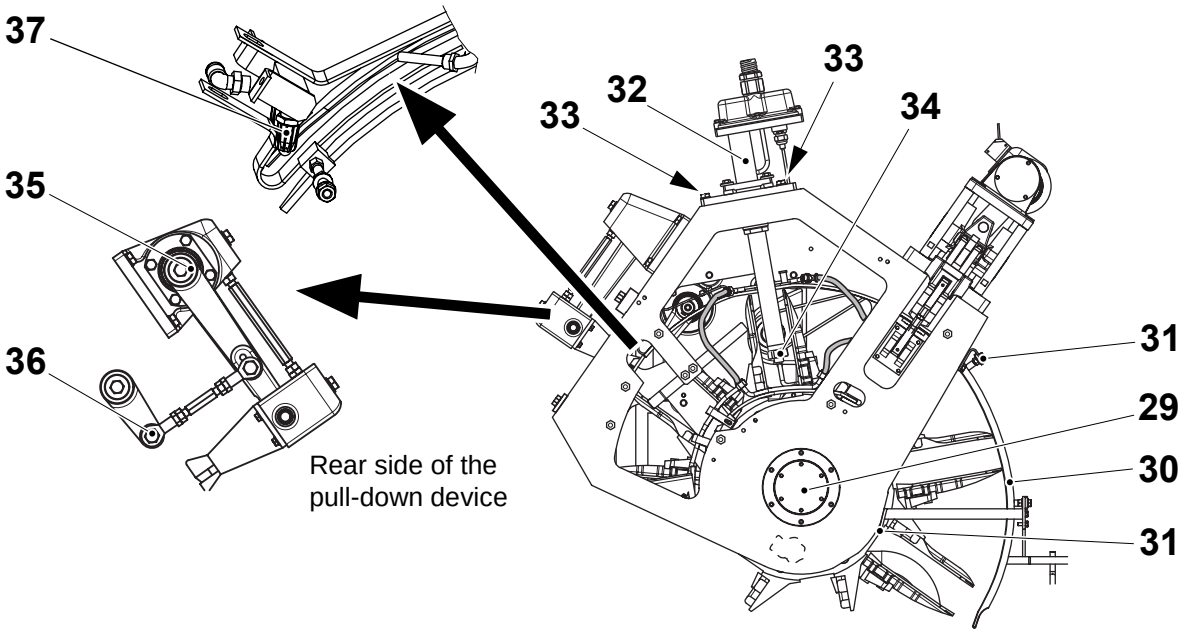
v) Fit the guides (30) and tighten the screws (31).

w) Fit the flap heating unit (32) and tighten the screws (33).

x) Turn back the air nozzles (34) on LH and RH side into the position for production.

y) Connect the link arm for the pull-down device (35) at the lower connection (36).

z) Connect the air hose for the flap blowing (37).



29 Bearing cover
30 Guide
31 Screw
32 Flap heating unit
33 Screw
34 Air nozzle/
LH top flap heater nozzle
35 Pull-down device
36 Lower connection
37 Flap blowing

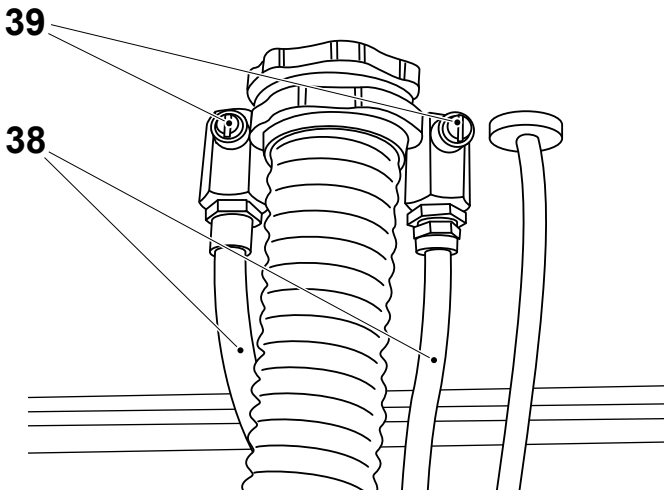
(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

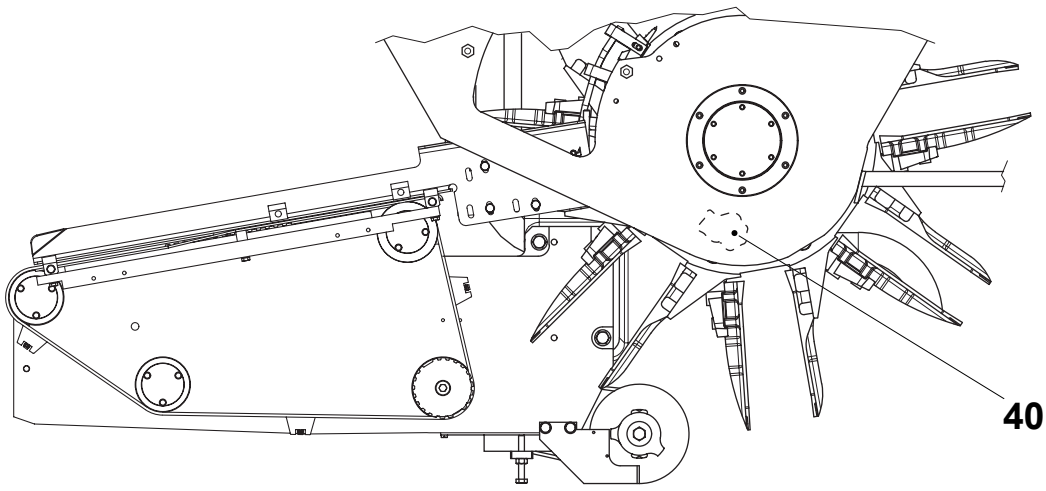
aa) Connect the cooling water hoses (38) and open the incoming cooling water valves (39).

ab) Assemble the touch guards at the RH and LH sides and the top of the frame work.



38 Cooling water hoses
39 Water valves

ac) Fit the sensor (40) with its bracket for wheel overload protection.



40 Sensor

(Cont'd)

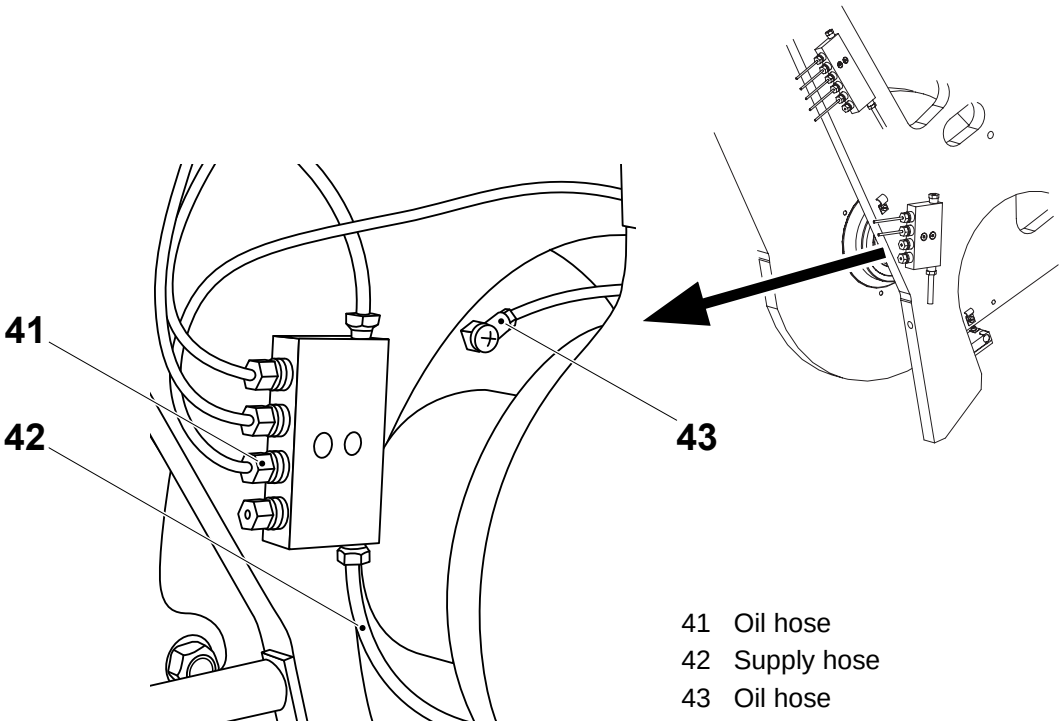
TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

ad) Connect the oil hose (41) for the cam lubrication to the distribution block.

ae) Connect the oil supply hose (42) for pressure device lubrication to the distribution block.

af) Connect the oil hose (43).



41 Oil hose
42 Supply hose
43 Oil hose

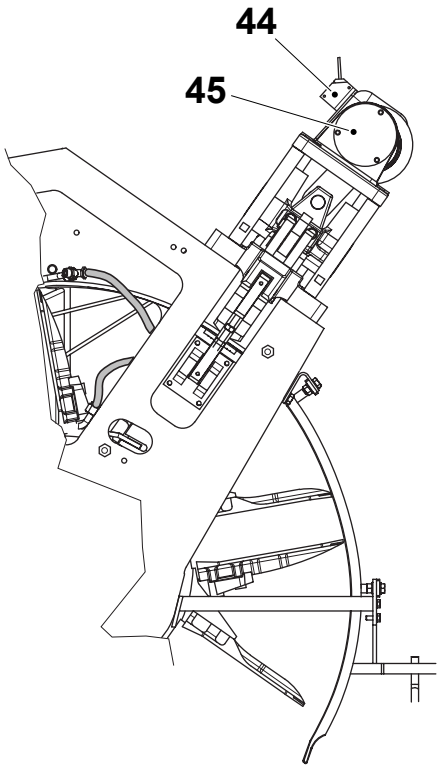
(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

ag) Fit the sensor (44) with its bracket for the overload protection of the pressure device (45).

ah) Fit the belt for the pressure device (45) and tighten it by means of the belt tensioner according to the 5.5-3 Pressure Device - Set Belt on page 5-129.



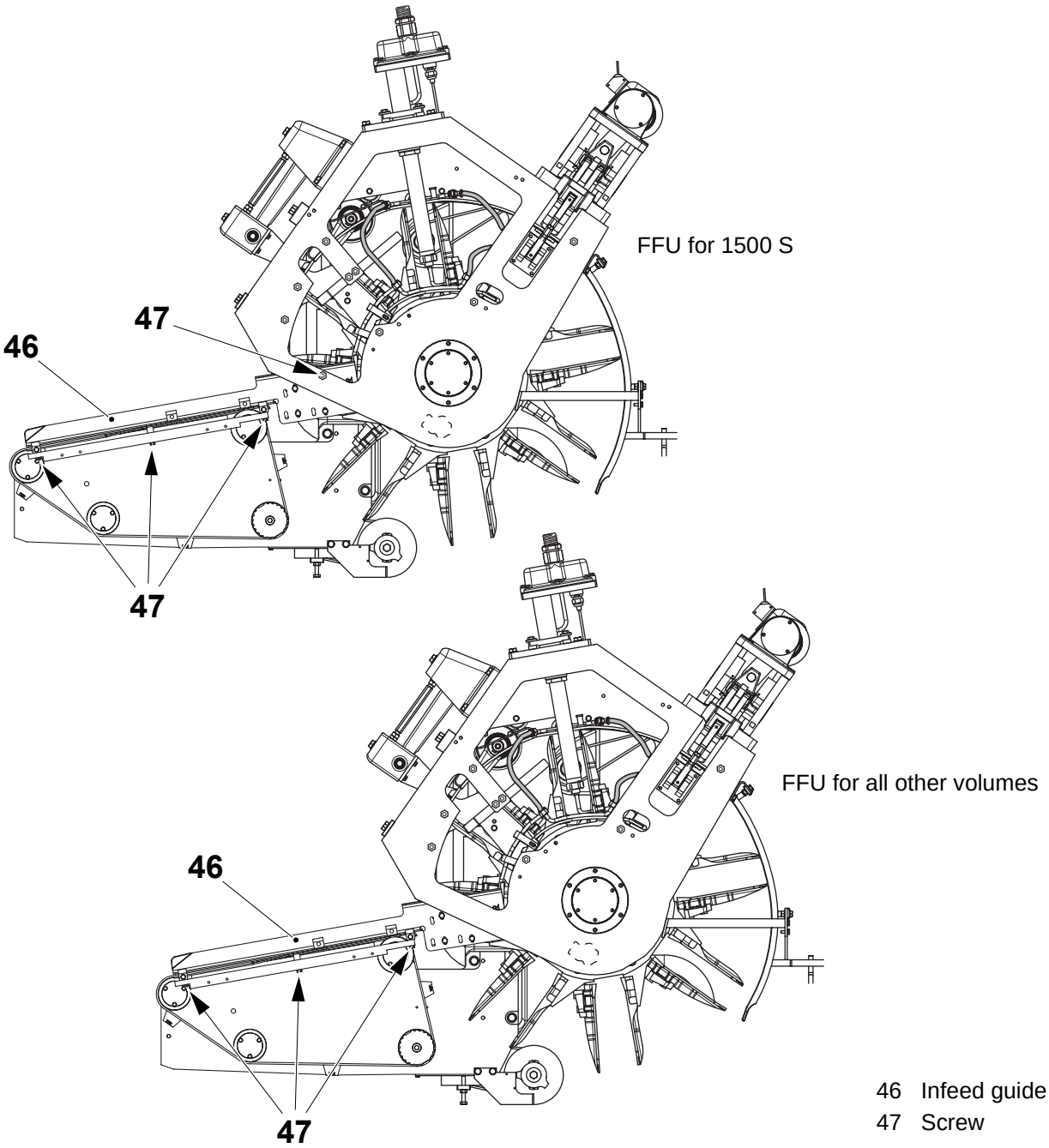
44 Sensor
45 Pressure device

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

ai) Fit the new infeed guides (46) by means of the screws (47).



46 Infeed guide
47 Screw

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.5 Pressure Device

SPC Reference	1144331-0200

5.5-1 Pressure Device - Set Lower Turning Position

SPC Reference	1144331-0200

Follow the procedure described in 5-14 Final Folder - Set Pressure Device Lower Turning Position.

5.5-2 Pressure Device - Set Pushers

SPC Reference	1144331-0200

Follow the procedure described in 5-15 Final Folder - Set Pressure Device Pushers.

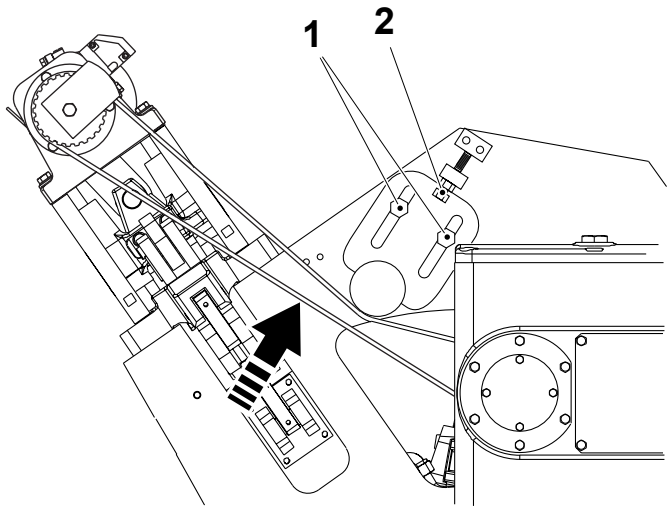
5.5-3 Pressure Device - Set Belt

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Dynamometer TP No. 74767-102
SPC Reference	1144331-0200

a) Loosen the screws (1).

b) With the aid of a dynamometer, set the belt tension to **40 N** with a deflection of **10 mm**, by means of the screw (2).

c) Tighten the screws (1).



1 Screw
2 Screw

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.5-4 Pressure Device - Change

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1144331-0200

a) Crank the final folder to 65°.

b) Remove all the oil connections.

c) Remove the bracket (1) together with the inductive switch (2).

d) Loosen the belt (3) tension and remove the belt (3) from the toothed pulley (4).

e) Remove the screws (5) and pull out the pressure device.

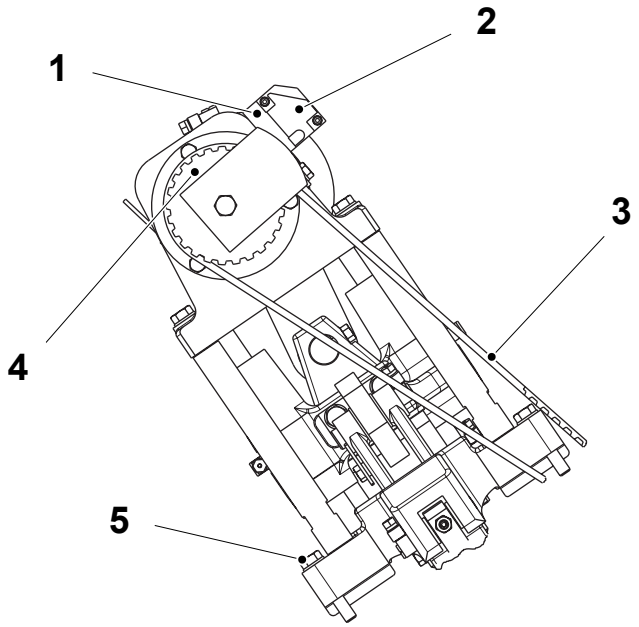
f) Change the pressure device.

g) Assemble in the reverse order.

h) Set the pressure device, see 5.5-1 Pressure Device - Set Lower Turning Position.

i) Set the belt tension, see 5.5-3 Pressure Device - Set Belt.

j) Set the inductive switch (4), see 5.5-7 Pressure Device - Set Inductive Switch and 5-19 Final Folder - Synchronise Overload Switches.



1 Bracket
2 Switch
3 Belt
4 Toothed pulley
5 Screw

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5.5-5 Pressure Device - Overhaul

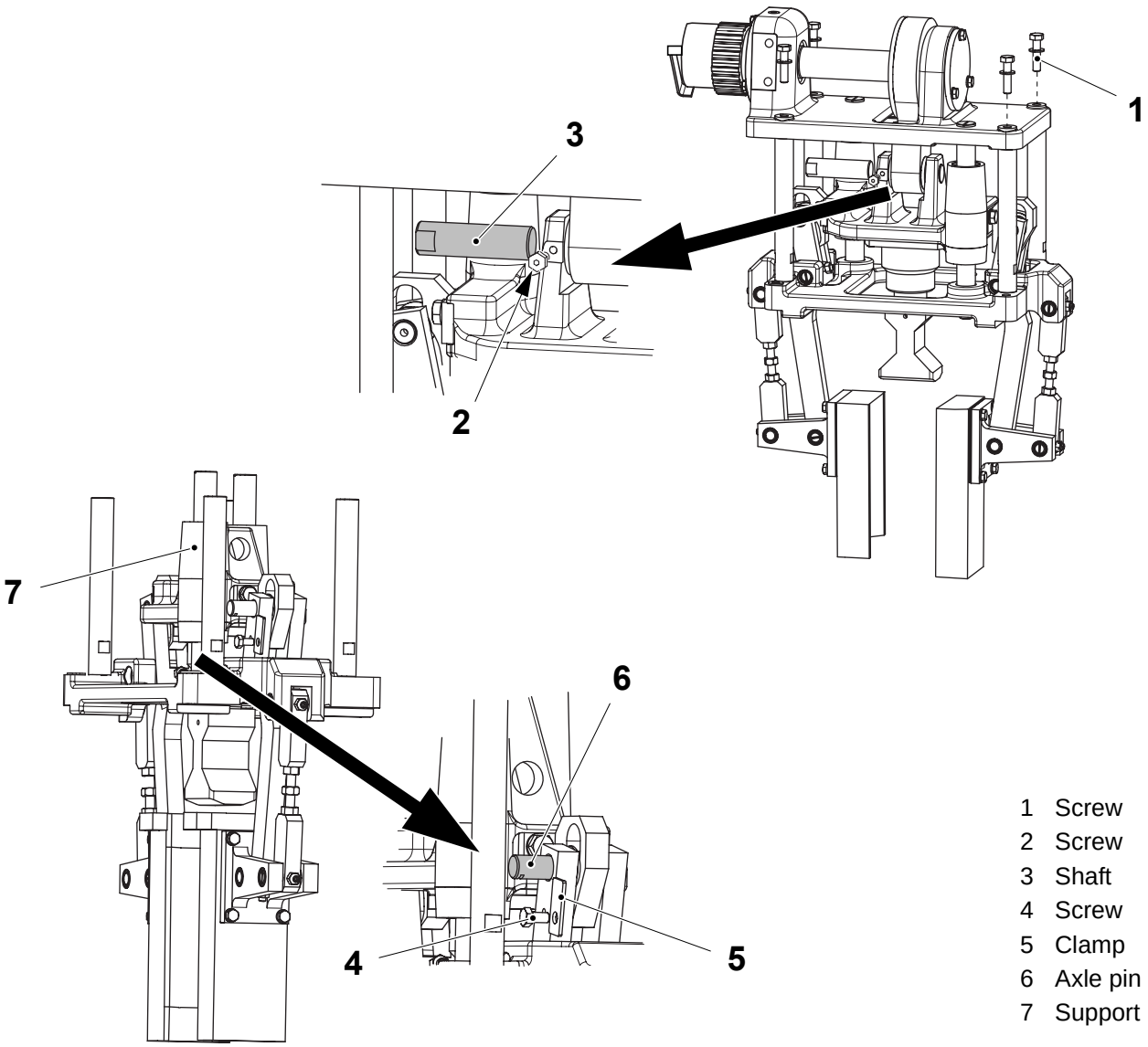
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Lithium grease code F
Special Equipment	Wrench min. 17 Nm
SPC Reference	1144331-0200

a) Remove the screws (1).

b) Remove the screw (2), push out the shaft (3) and lift out the upper part of the pressure device.

c) Remove the screws (4), the clamps (5) and pull out the axle pin (6) in both cams.

d) Lift off the support (7).



1 Screw
2 Screw
3 Shaft
4 Screw
5 Clamp
6 Axle pin
7 Support

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

e) Remove the rings (8) and pull out the inserts (9) and the bushings (10).

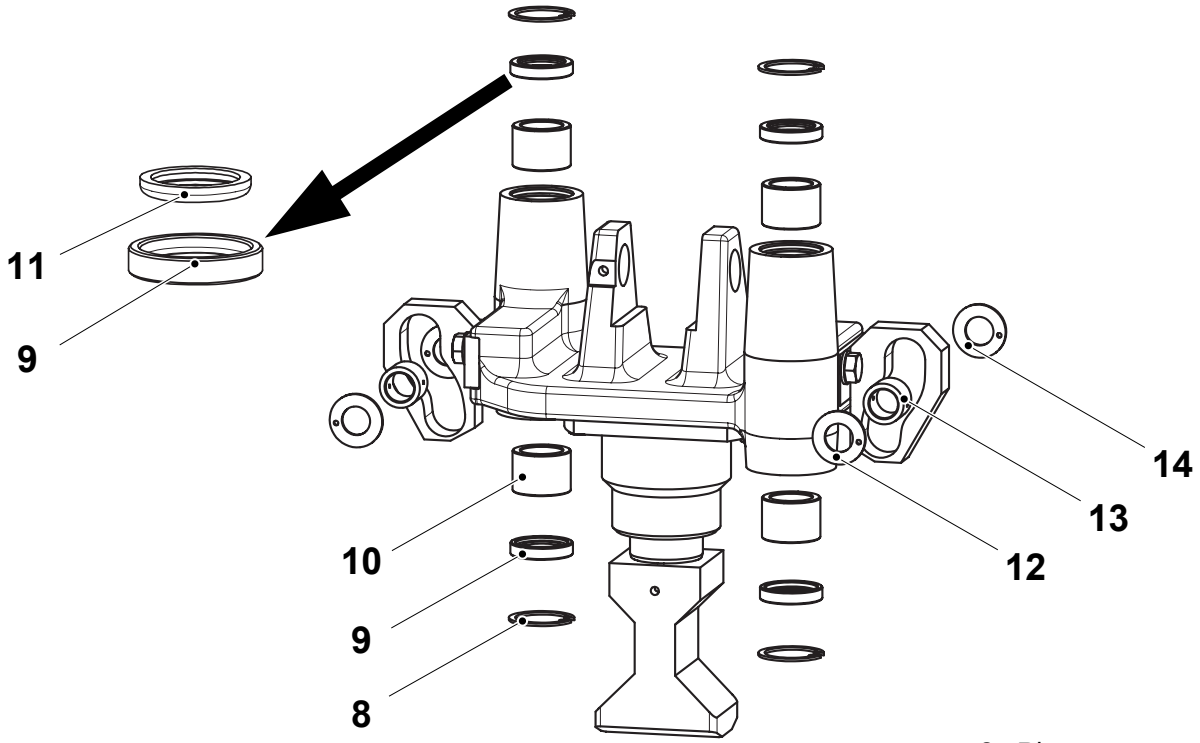
f) Change the bushings (10).

g) Remove the scrapers (11) from the inserts (9).

h) Change the inserts (9) and the scrapers (11).

i) Change the thrust washers (12) and (14). Make sure that the **teflon** side of the washers faces the cams.

j) Change the rollers (13).



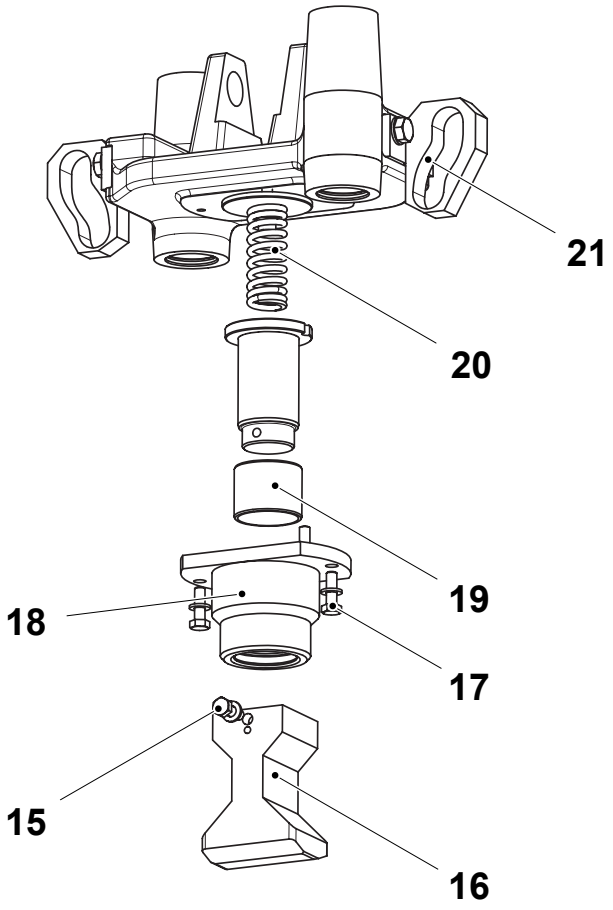
8 Ring
9 Insert
10 Bushing
11 Scraper
12 Thrust washer
13 Roller
14 Thrust washer

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

k) Remove the screw (15) and the plate (16).
l) Remove the screws (17) and the flange (18).
m) Change the bushing (19).
n) Check the spring (20) for damage. Change as required.
o) Check the cams (21) for damage. Change as required.



15 Screw
16 Plate
17 Screw
18 Flange
19 Bushing
20 Spring
21 Cam

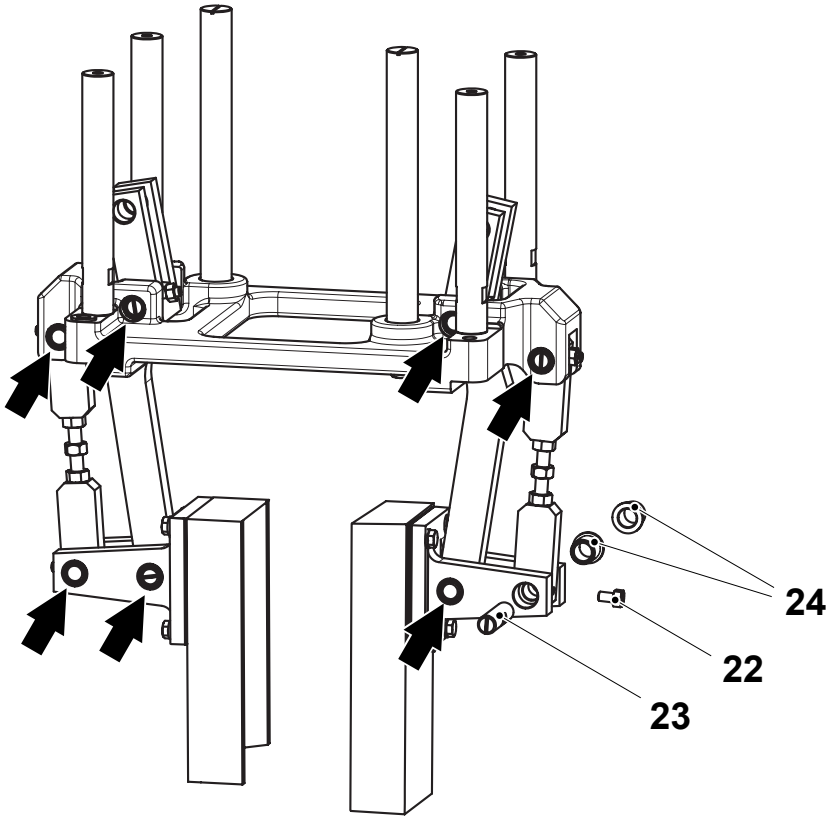
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TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

p) Remove the stop screws (22).

q) Press out and change the shafts (23) and the bushings (24) in all the positions marked by arrows.



22 Stop screw
23 Shaft
24 Bushing

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

r) Remove the screws (25) and the flange (26).

s) Change the O-ring (27).

t) Remove the screw (28) and the washer.

Note! The belt wheel is fixed to the shaft (29) by a clamping element inside the outer cover. If the wheel must be changed, torque the clamping screws to **17 Nm** during the assembly.

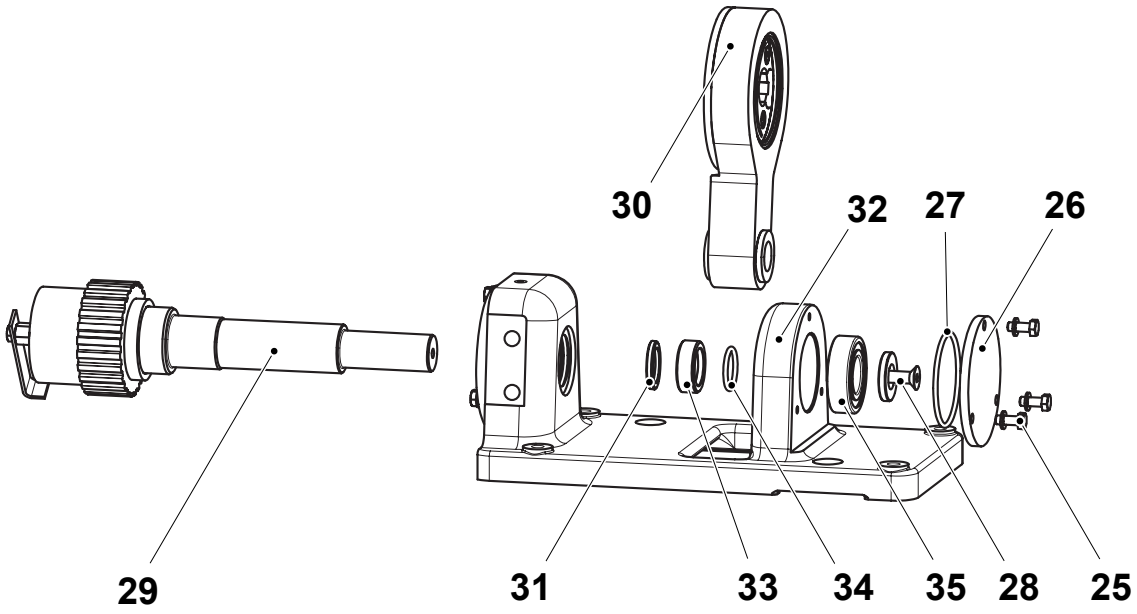
u) Pull out the shaft (29) and the connecting rod (30).

v) Change the seal ring (31). Fit the new seal (31) about 6 mm inside the holder (32).

w) Pull out the spacer (33) and change the O-ring (34).

Note! Apply a layer of grease (TP No. 90296-68) on the spacer (33) when assembling.

x) Change the ball bearing (35).



		30	Connecting rod
25	Screw	31	Seal ring
26	Flange	32	Holder
27	O-ring	33	Spacer
28	Screw	34	O-ring
29	Shaft	35	Ball bearing

(Cont'd)

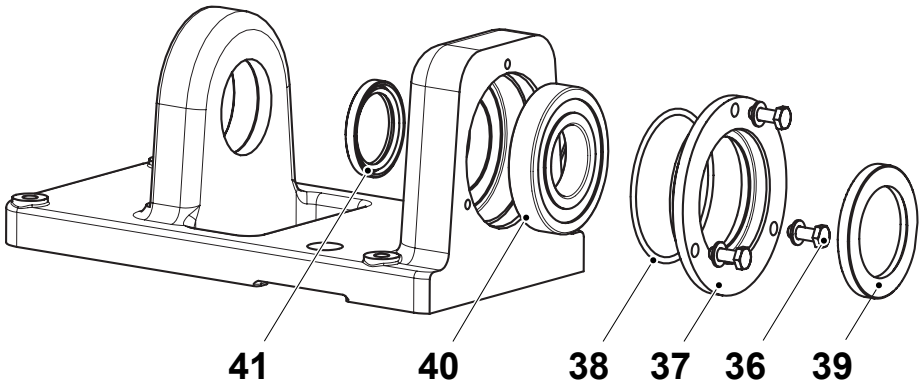
TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

y) Remove the screws (36) and the flange (37)

z) Change the O-ring (38),the seal ring (39), the ball bearing (40) and the seal ring (41).

Note! Apply a layer of grease (TP No. 90296-68) on the seal rings (39) and (41) when assembling.



36 Screw
37 Flange
38 O-ring
39 Seal ring
40 Ball bearing
41 Seal ring

aa) Pull out and change the bushings (42).

ab) Remove the screws (43) and the flange (44).

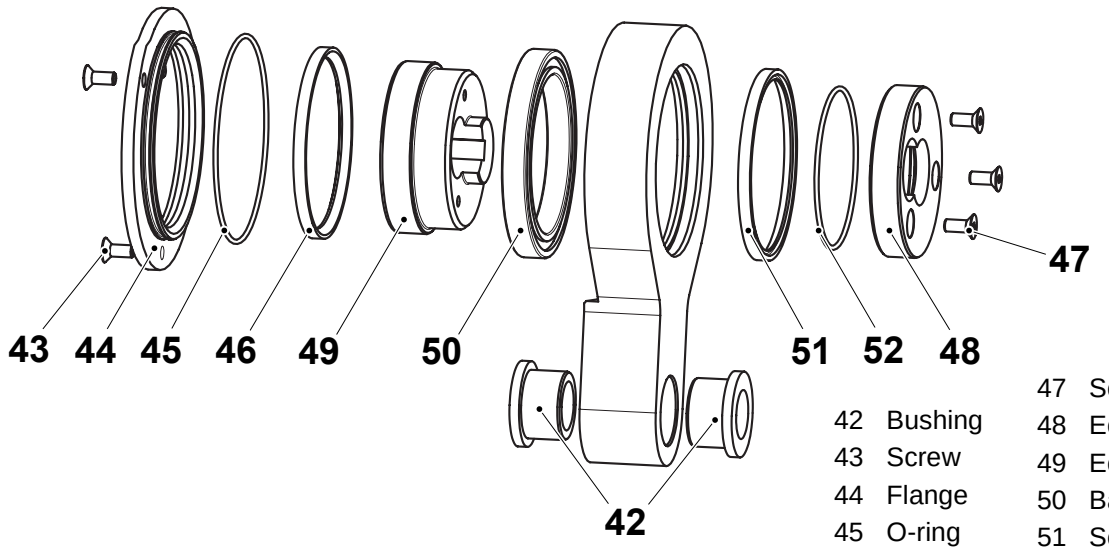
ac) Change the O-ring (45) and the seal ring (46).

ad) Remove the screws (47) and take the eccentrics (48) and (49) apart.

ae) Change the ball bearing (50), the seal ring (51) and the O-ring (52).

af) Assemble the pressure device in the reverse order.

Note! Apply a layer of grease (TP No. 90296-68) on the bearing (50) when assembling.



42 Bushing
43 Screw
44 Flange
45 O-ring
46 Seal ring

47 Screw
48 Eccentric
49 Eccentric
50 Ball bearing
51 Seal ring
52 O-ring

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.5-6 Pressure Device - Change Lever Bushings

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1144331-0200

a) Remove the pressure device, see 5.5-4 Pressure Device - Change.

b) Remove the stop screws (1).

c) Pull out the shafts (2) and the bushings (3).

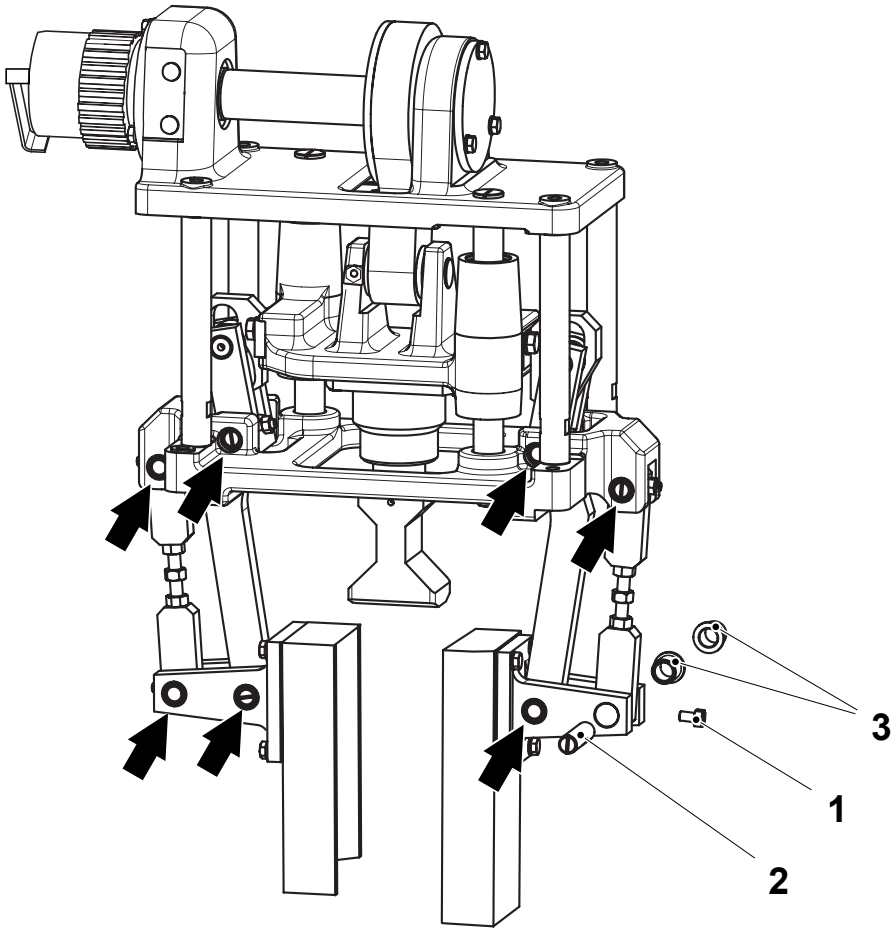
d) Change the bushings (3).

e) Assemble in the reverse order.

f) Repeat the sequence in all the positions marked by arrows.

g) Fit the pressure device and set it, see 5.5-1 Pressure Device - Set Lower Turning Position.

h) Set the belt tension, see 5.5-3 Pressure Device - Set Belt.



1 Stop screw
2 Shaft
3 Bushing

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.5-7 Pressure Device - Set Inductive Switch

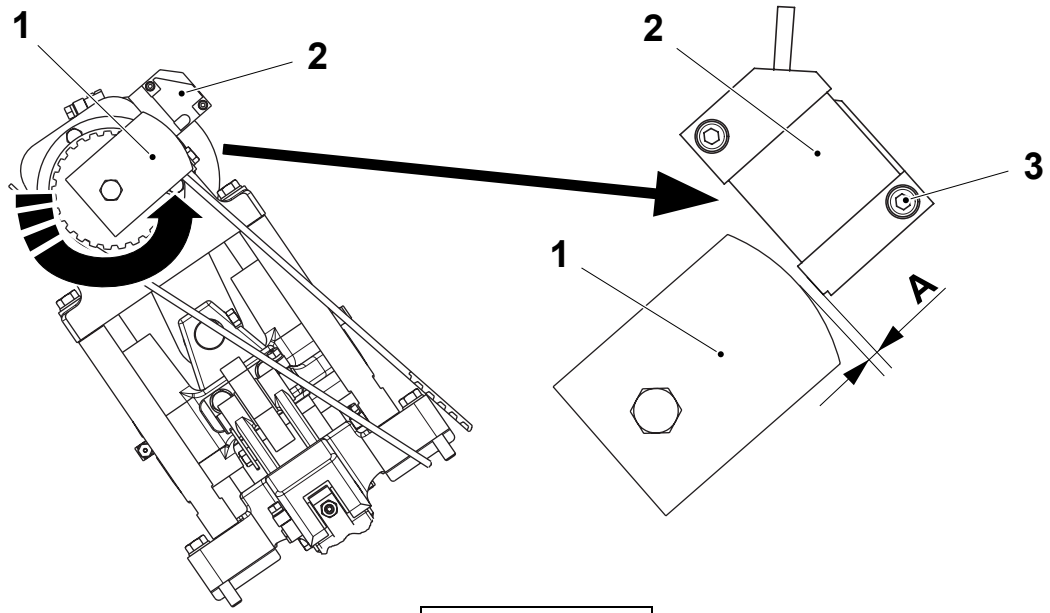
Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1144331-0200

a) Crank the final folder until the flag (1) is in front of the inductive switch (2).

b) Loosen the screw (3) and set the distance **A** between the flag (1) and the inductive switch (2) by moving the inductive switch (2).

c) Make sure that the inductive switch (2) is activated.

d) Tighten the screw (3).



A = 0.5 ±0.1 mm

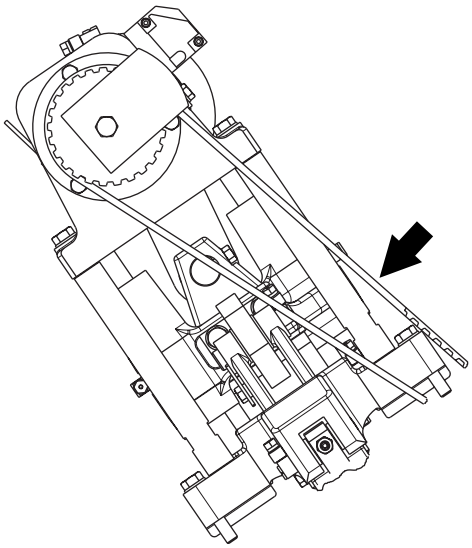
1 Flag
2 Inductive switch
3 Screw

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.5-8 Pressure Device - Check Belt

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1144331-0200

Check the belt (1) for wear and/or damage. Change and set as required, see 5.5-3 Pressure Device - Set Belt.



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5.5-9 Pressure Device - Check Package Pressure

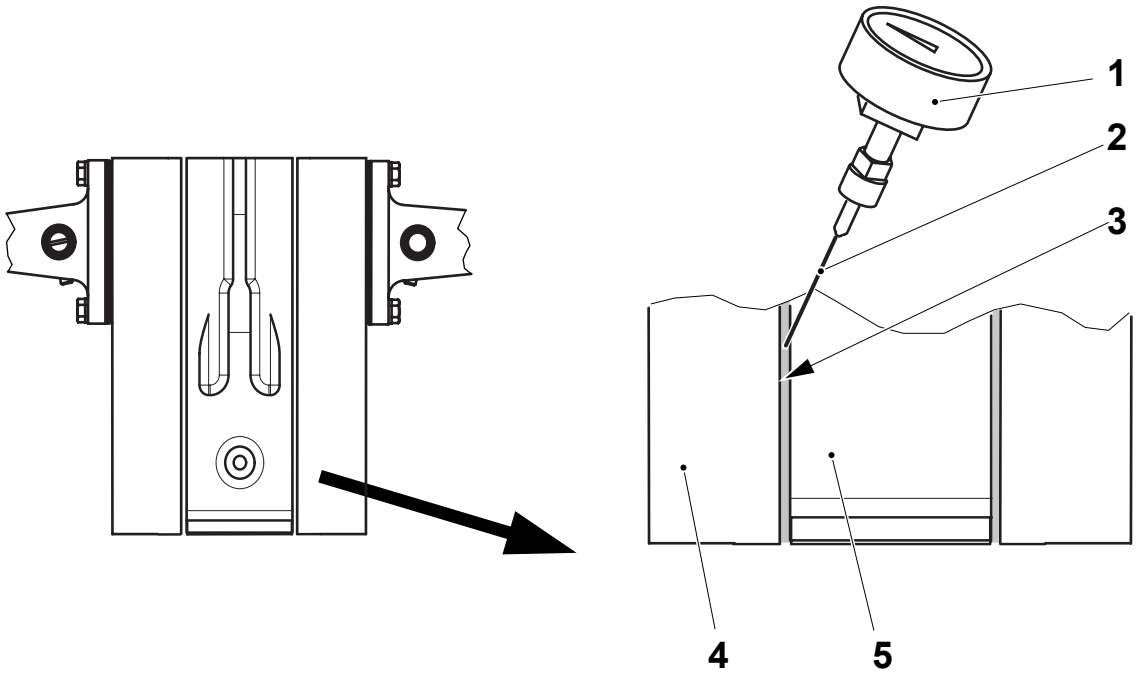
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Needle pressure gauge TP No. 1478583-0100
SPC Reference	1144331-0200

a) Place a filled package on the infeed conveyor.

Note! The package must be well shaped and must have the correct weight.

b) Crank the final folder until the package (3) reaches the pressure device at the lower turning position (250°).

c) Insert the needle (2) of the pressure gauge (1) in the space between the pusher (4) and the flap (5) of the pressure device so that the needle (2) enters the package.



1 Pressure gauge
2 Needle
3 Package
4 Pusher
5 Flap

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

d) Check the pressure on the pressure gauge. The pressure package must be between **0.7** and **1.0 bar**. For TPA 1000 Sq with HI the pressure must be between **1.0** and **1.3 bar**.

If the pressure is low:

- Remove the pusher (8) and the support (7) by means of the screws (6)
- Add peelable shims (9) between the pusher (8) and the support (7) until the correct pressure is reached (add the same number of shims (9) on both sides of the pusher (8))
- Assemble in the reverse order.

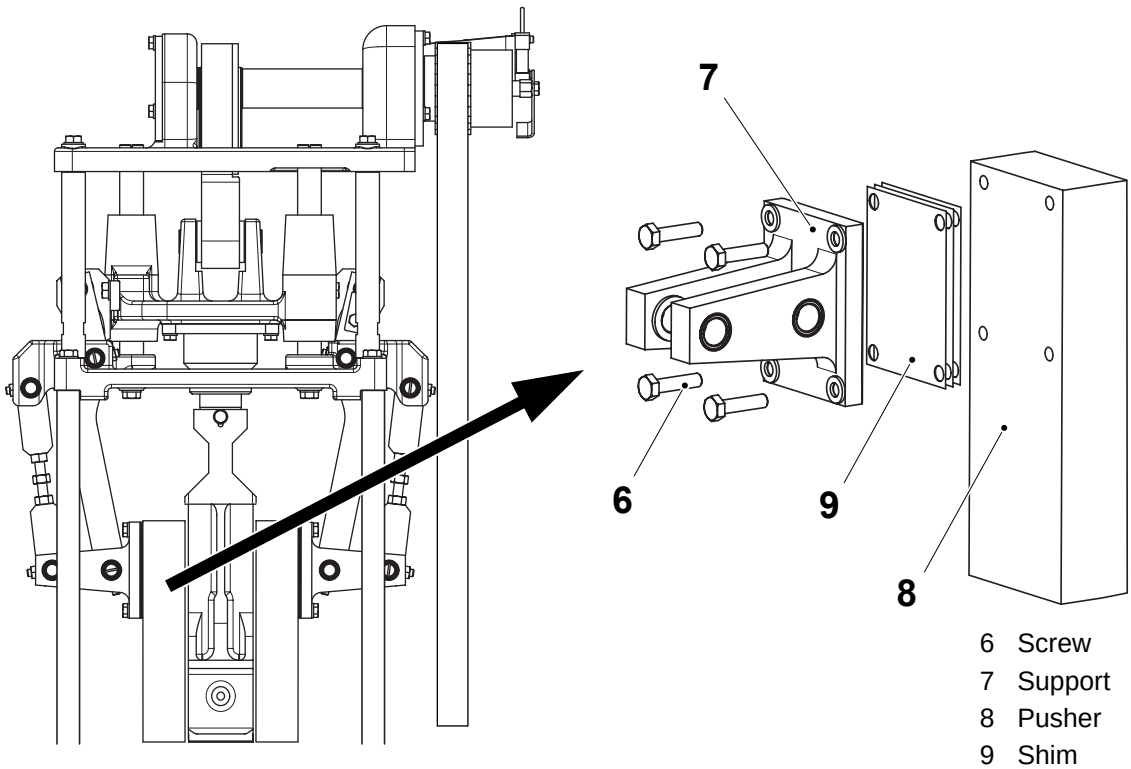
If the pressure is high:

- Remove the pusher (8) and the support (7) by means of the screws (6)
- Remove peelable shims (9) between the pusher (8) and the support (7) until the correct pressure is reached (remove the same number of shims (9) on both sides of the pusher (8))
- Assemble in the reverse order.

CAUTION

Risk of damage to the equipment.

Too much pressure can cause serious damage to the pressure device and the final folder clutch.



6 Screw
7 Support
8 Pusher
9 Shim

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5.6 Wheel

SPC Reference	1361918-0200

5.6-1 Wheel - Change

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Template TP No. 1350497 Template pin TP No. 1350498
SPC Reference	1361918-0200

Remove

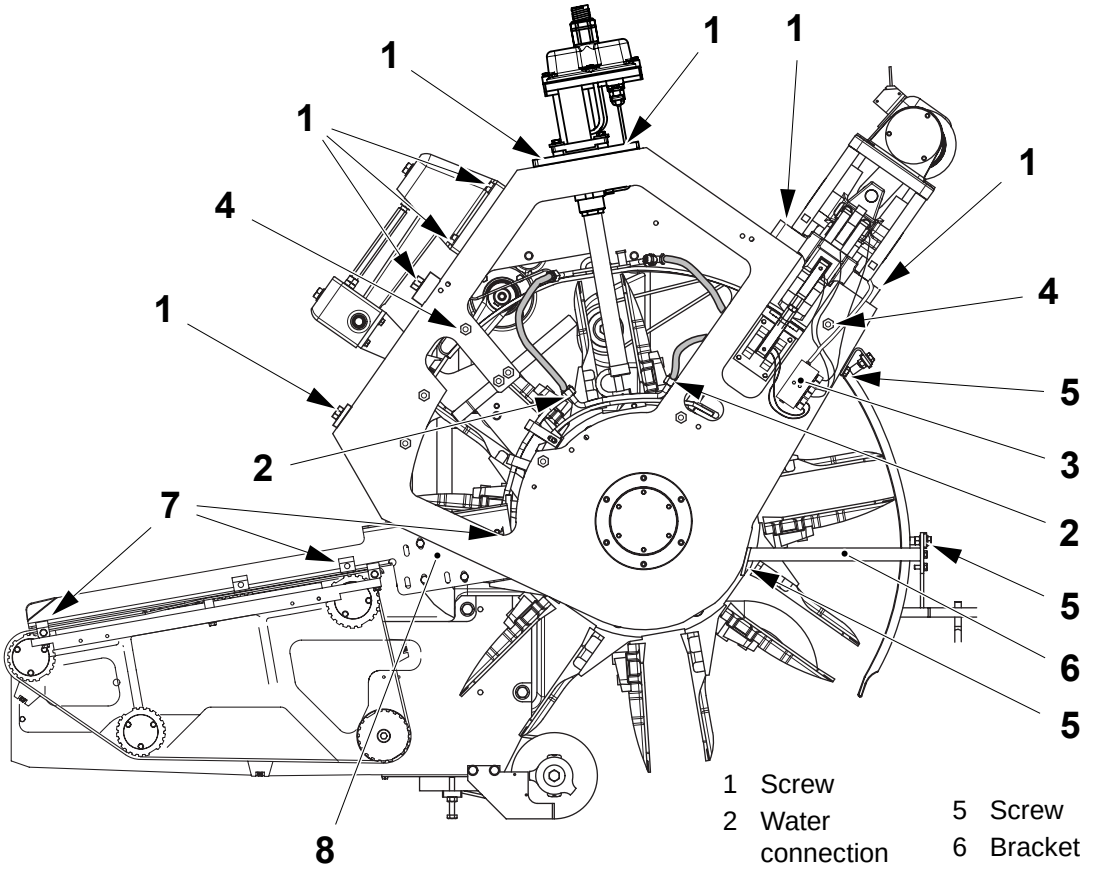
a) Crank the final folder to 0°.

b) Remove the screws (1) in the external frame.

c) Detach the water connections (2) and the oil block (3).

d) Remove the nuts (4), the screws (5) and the bracket (6).

e) Remove the LH side of the infeed guide (8) by removing the screws (7).



1 Screw
2 Water connection
3 Oil block
4 Nut
5 Screw
6 Bracket
7 Screw
8 Infeed guide

(Cont'd)

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(Cont'd)

f) Remove the screws (10), the flange (11) and change the O-ring (12).

g) Remove the screw (13) and the washer (14).

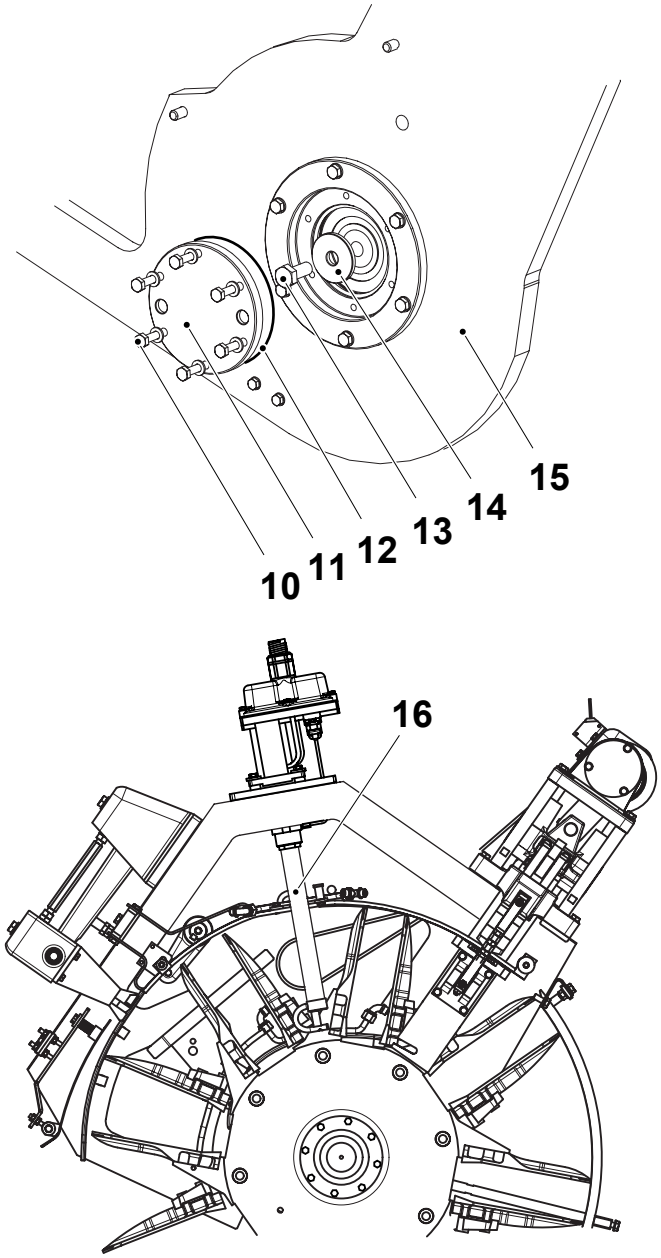
h) Pull out the external frame (15).

WARNING

Risk of personal injury.

The external frame (15) is heavy.

i) Remove the nozzle (16) on the flap heating.



10 Screw
11 Flange
12 O-ring
13 Screw
14 Washer
15 Frame
16 Nozzle

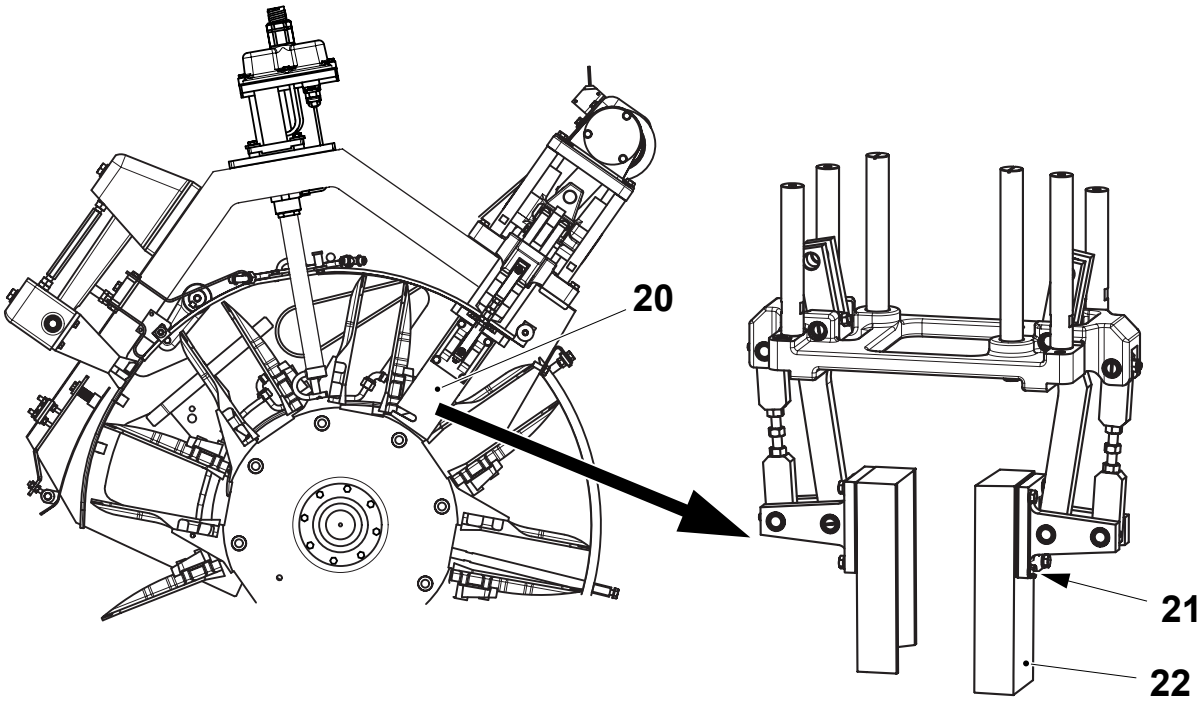
(Cont'd)

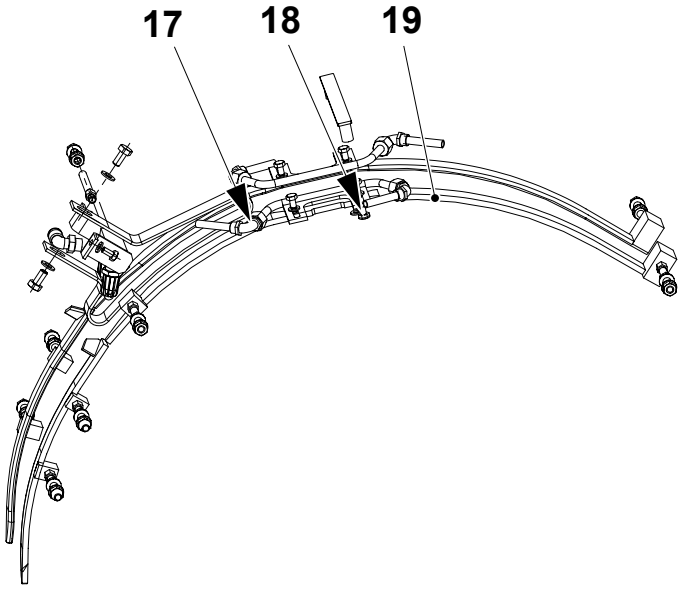
TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

j) Disconnect the water hose connection (17). Unscrew the screw (18) and remove the LH folding bar (19).

k) On the LH side of the pressure device (20), remove the four screws (21) and pull out the pusher (22).





17 Connection
18 Screw
19 Folding bar
20 Pressure device
21 Screw
22 Pusher

(Cont'd)

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(Cont'd)

l) Remove the screws (23) and the cover (24).

m) Change the O-ring (25) as required.

n) Loosen the clamping element by unscrewing the screws (26) a couple of turns.

o) Put four screws into the puller holes (27). Tighten these screws crosswise, in small steps, until the outer sleeve comes off the inner one.

p) Remove the clamping element.

WARNING

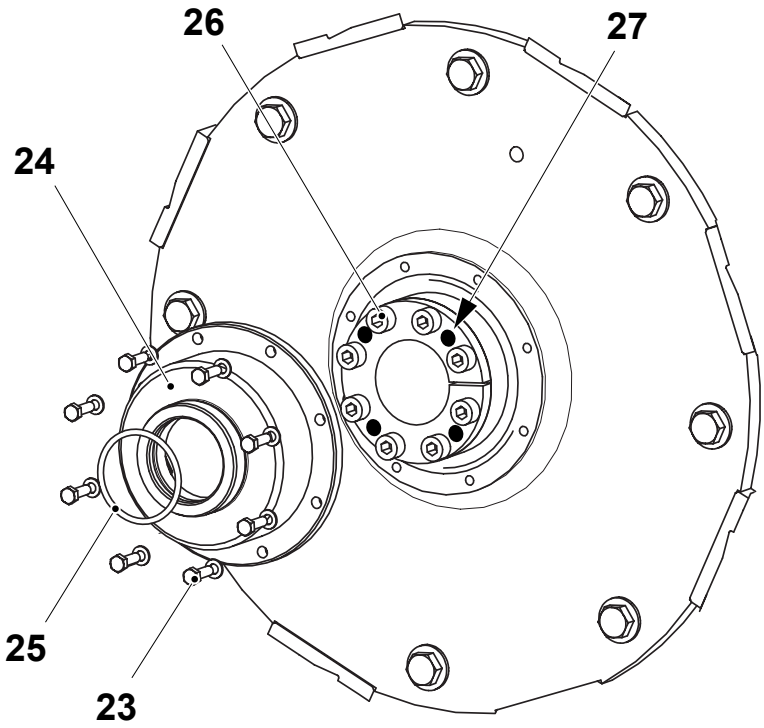
Risk of personal injury.

The wheel weighs about 30 Kg.

Two persons are needed to perform this operation.

q) Pull out the wheel.

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23 Screw
24 Cover
25 O-ring
26 Screw
27 Puller hole

(Cont'd)

(Cont'd)

Assemble

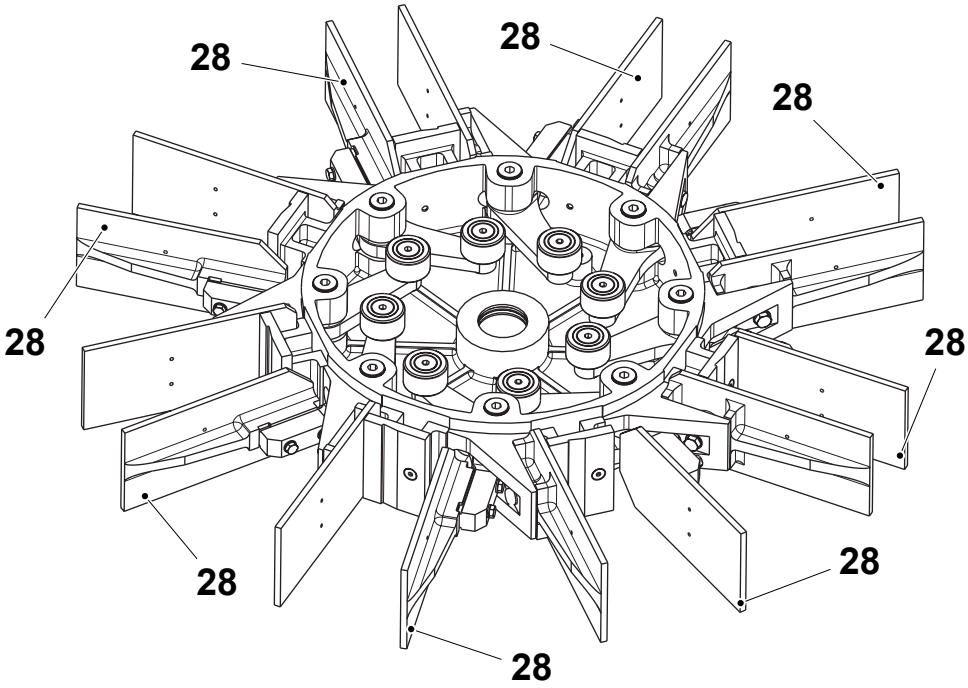
a) Crank the final folder to 0°.

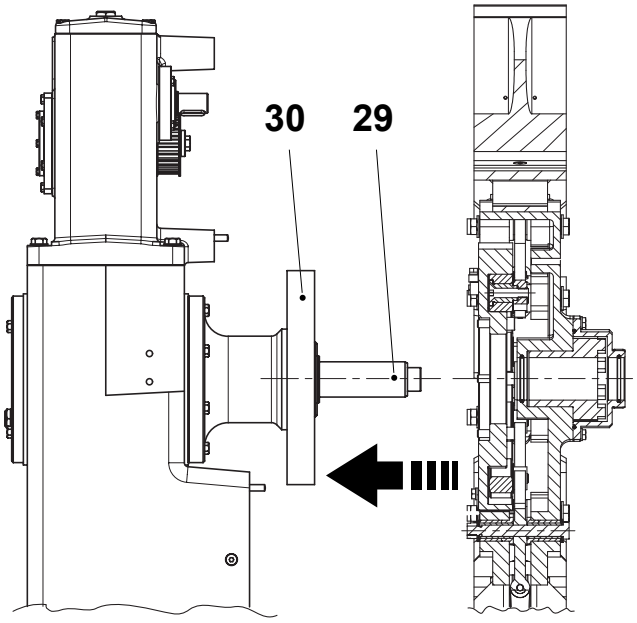
b) Set all the movable flaps (28) into a closed position.

c) Fit the wheel on the shaft (29) of the indexing unit. Push the wheel into contact with the cam (30).

d) Set all the movable flaps (28) into an open position.

e) Push the wheel firmly against the cam (30). The wheel must move about **30 mm** inwards.





28 Movable flaps
29 Shaft
30 Cam

(Cont'd)

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(Cont'd)

f) Fit the clamping element (36) without tightening the screws.

g) Turn the wheel by hand and align the zero hole (31) in the wheel to the zero hole (32) in the cam (30).

h) Fit the template pin (33) through the two zero holes.

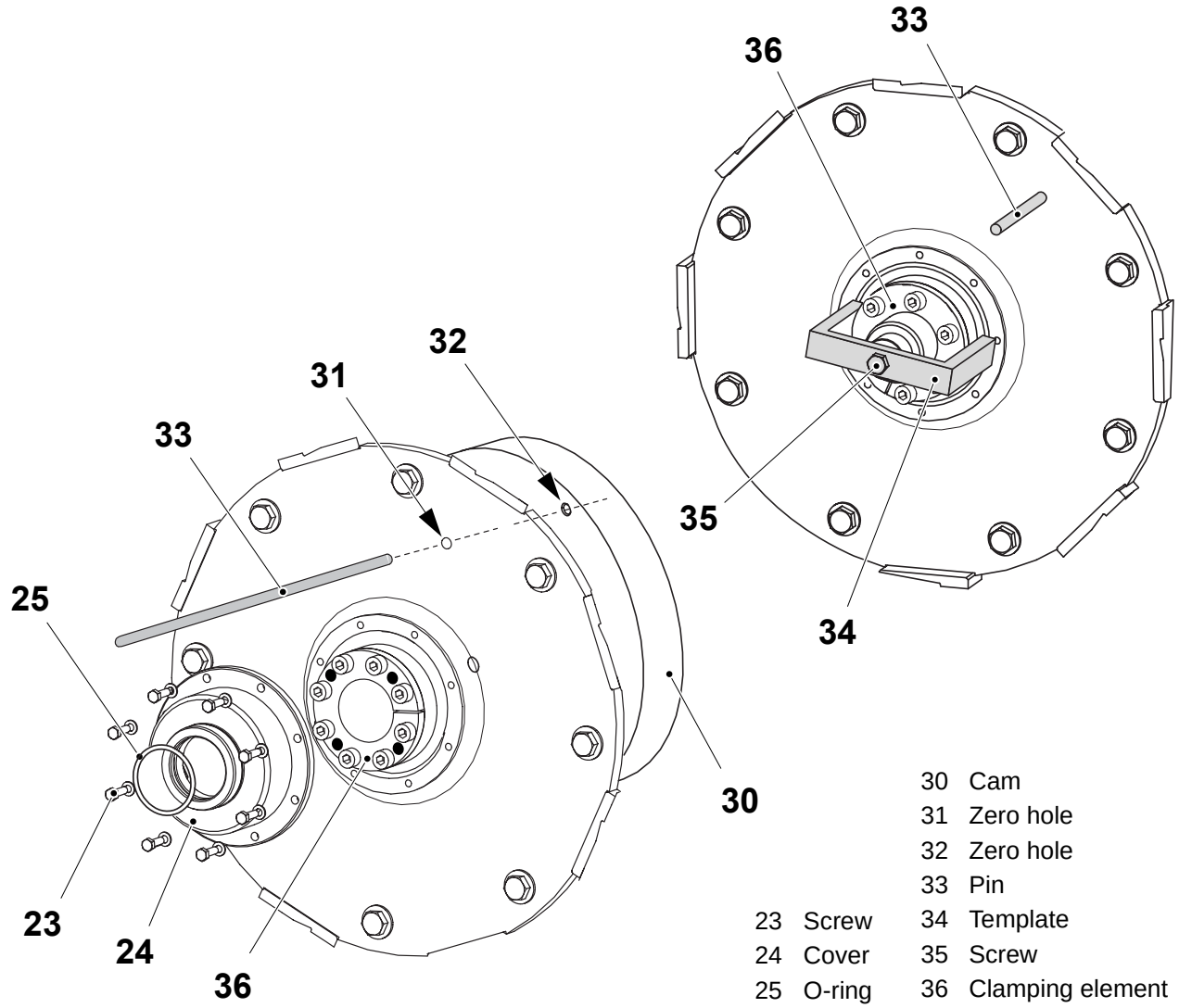
i) Fit the template (34) on the shaft of the indexing gear and tighten the screw (35).

j) Tighten the clamping element (36), see 5.6.1-2 Clamping Element - Assemble.

k) Remove the template pin (33).

l) Remove the screw (35) and the template (34).

m) Fit the O-ring (25), the cover (24) and tighten the screws (23).



		30	Cam
		31	Zero hole
		32	Zero hole
		33	Pin
23	Screw	34	Template
24	Cover	35	Screw
25	O-ring	36	Clamping element

(Cont'd)

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(Cont'd)

n) Fit the pusher (22) on the LH side of the pressure device (20) and tighten the four screws (21).

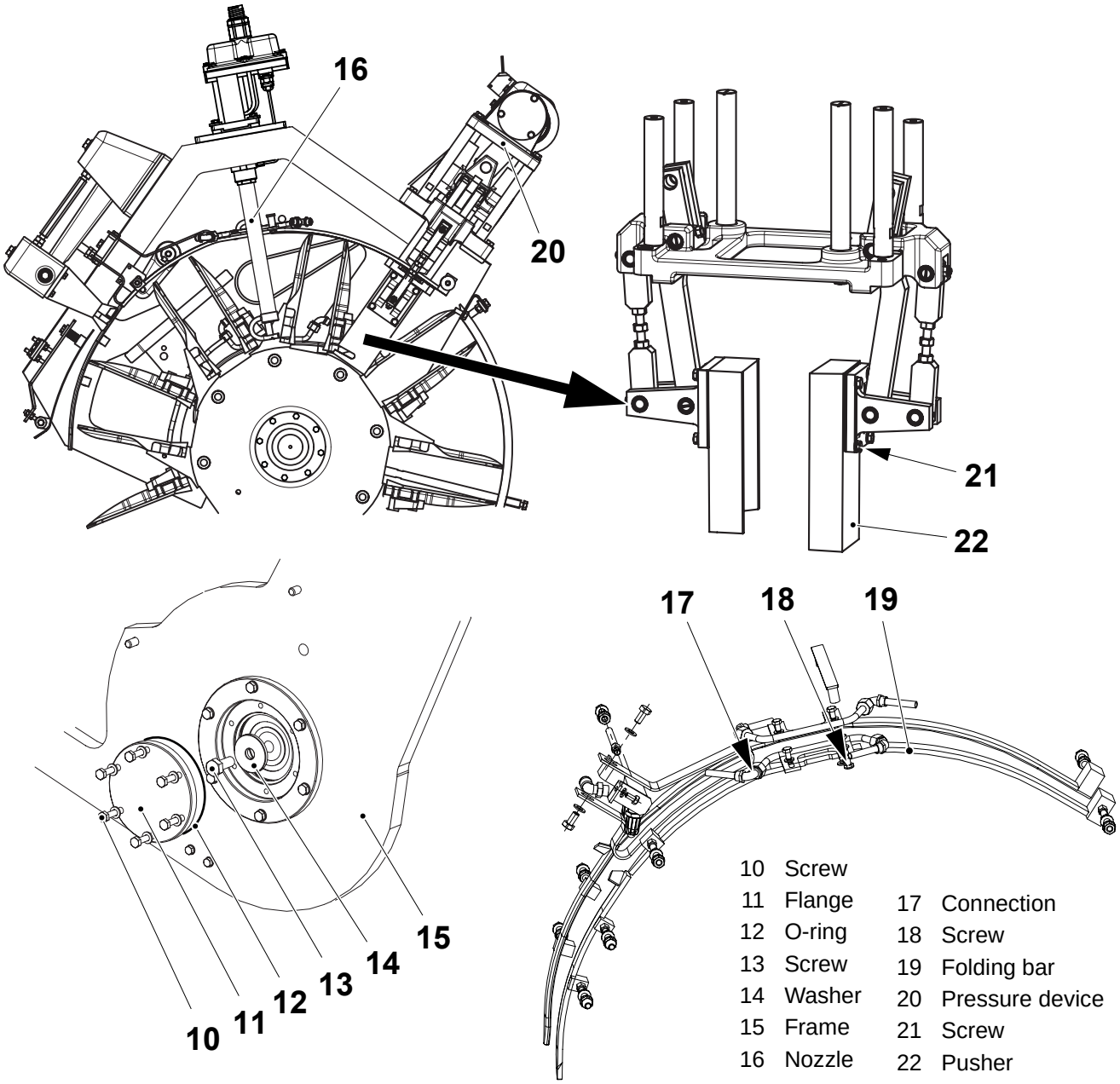
o) Fit the LH folding bar (19) and tighten the screws (18). Connect the water hose connection (17).

p) Fit the nozzle (16) on the flap heating.

q) Fit the external frame (15) on the wheel.

r) Fit the washer (14) and tighten the screw (13).

s) Fit the O-ring (12), the flange (11) and tighten the screw (10).



10	Screw	17	Connection
11	Flange	18	Screw
12	O-ring	19	Folding bar
13	Screw	20	Pressure device
14	Washer	21	Screw
15	Frame	22	Pusher
16	Nozzle		

(Cont'd)

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(Cont'd)

t) Fit the LH side of the infeed guide (8) and tighten the screws (7).

u) Tighten the nuts (4).

v) Fit the bracket (6) and tighten the screws (5).

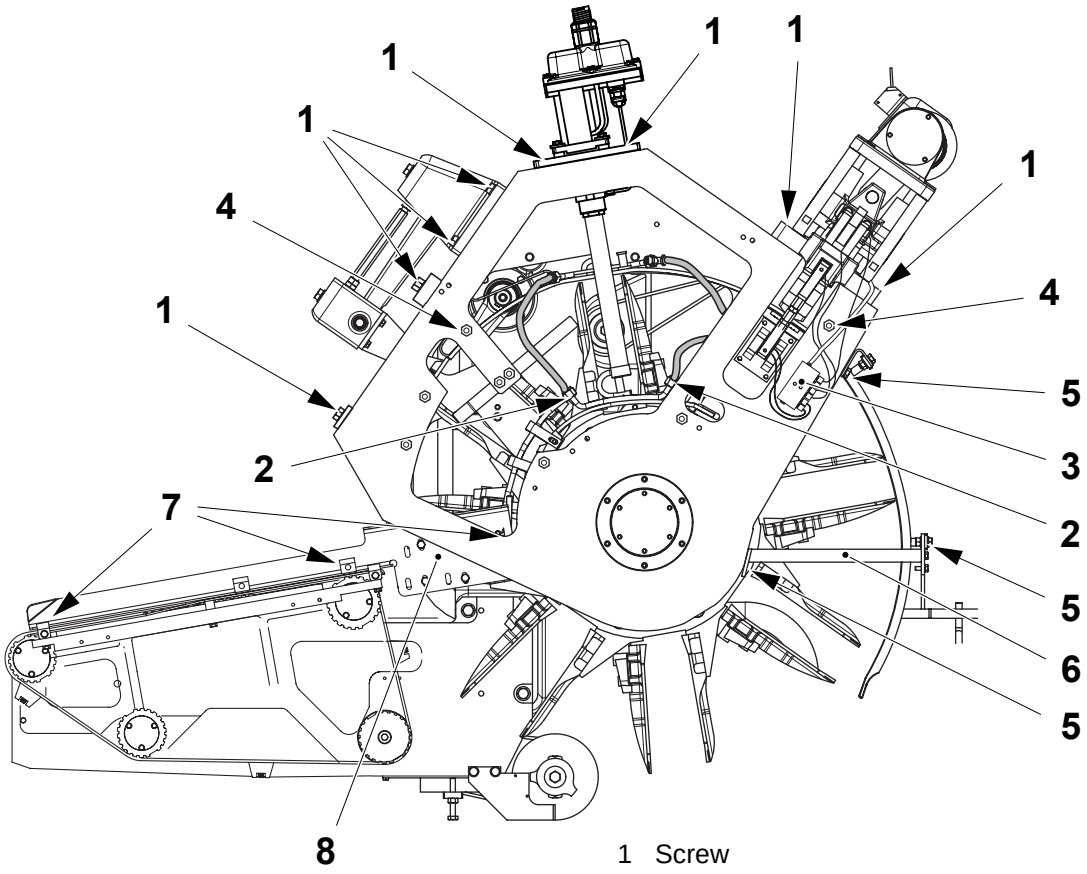
w) Fit the water connections (2) and the oil block (3).

x) Tighten the screws (1) in the external frame.

y) Set the nozzle as required, see 5-13 Final Folder - Set Flap Heater Nozzles.

z) Set the pusher as required, see 5-15 Final Folder - Set Pressure Device Pushers.

aa) Set the guides as required, see 5-10 Final Folder - Set Folding Part Roof and 5-11 Final Folder - Set Folding Part Guides.



1	Screw		
2	Water connection	5	Screw
3	Oil block	6	Bracket
4	Nut	7	Screw
		8	Infeed guide

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.6-2 Wheel - Change Bushings

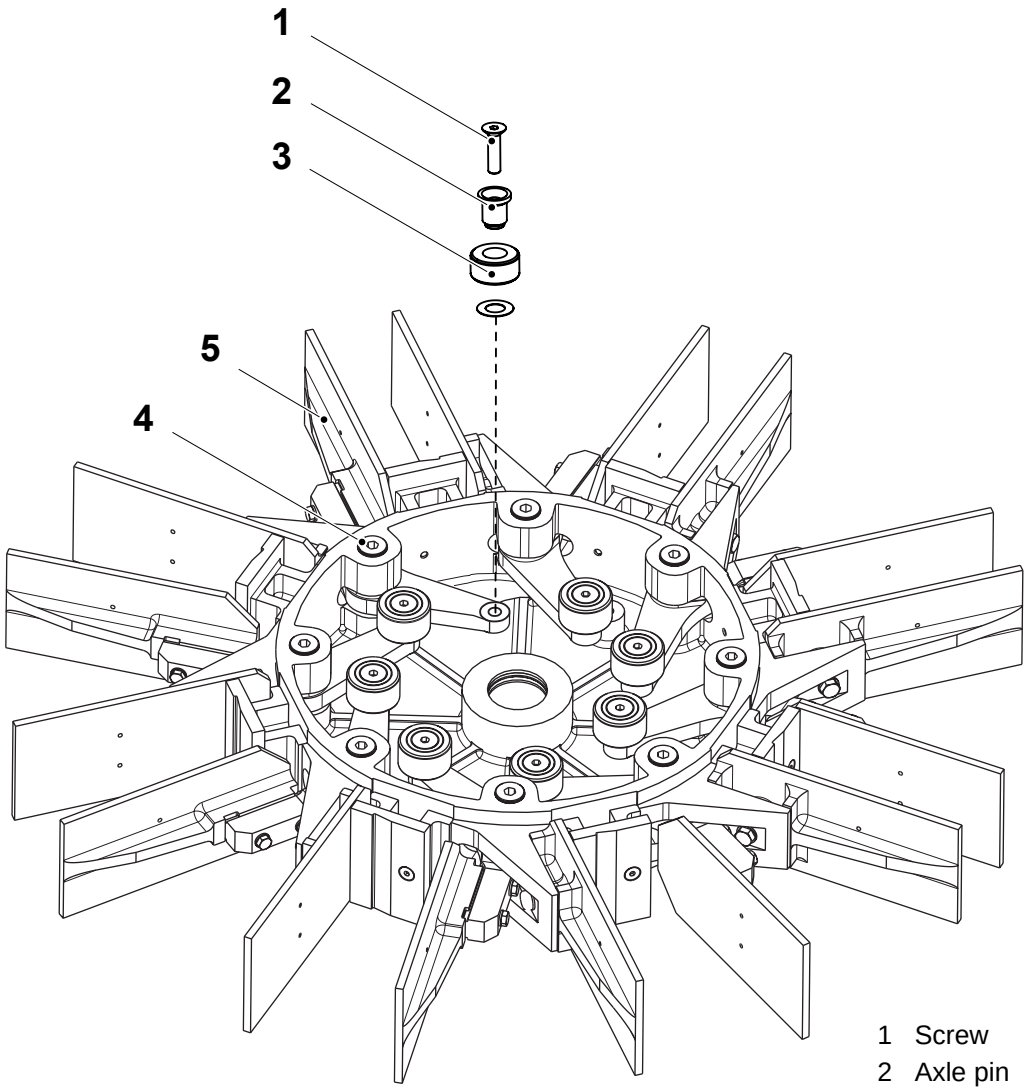
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1361918-0200

a) Remove the wheel, see 5.6-1 Wheel - Change.

b) Remove the screw (1) and change the axle pin (2) and the roller (3).

c) Remove the screw (4).

d) Pull out the flap (5) together with the arm.



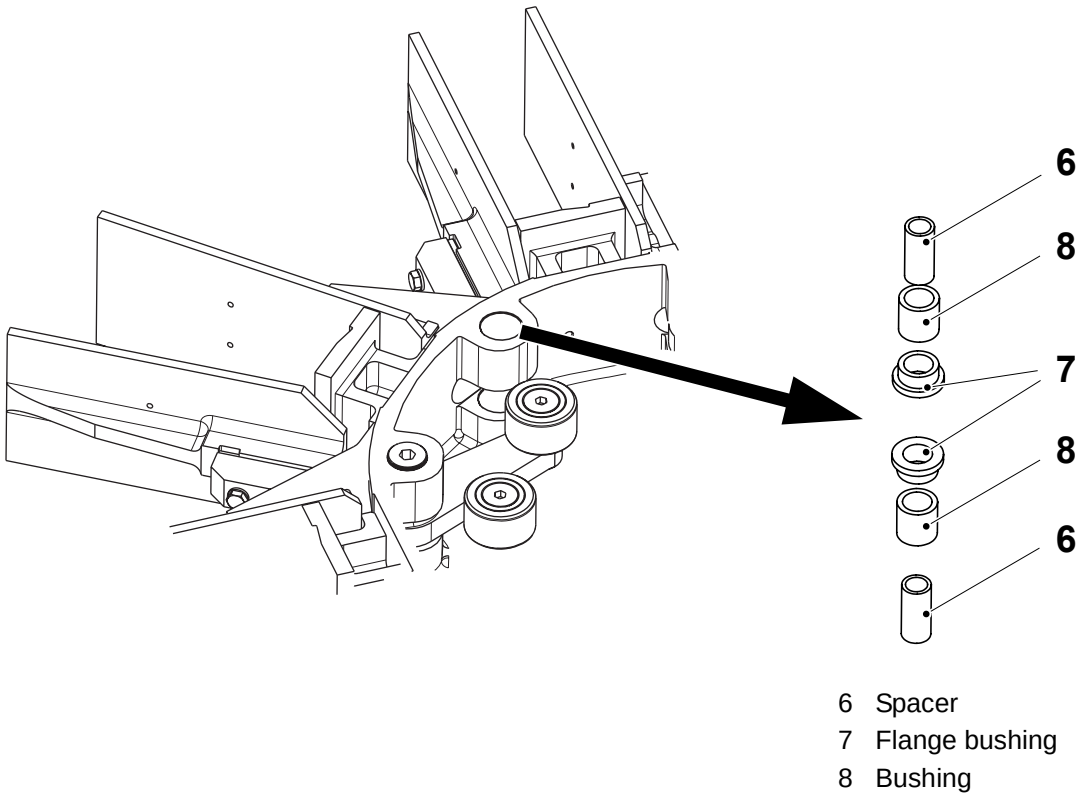
1 Screw
2 Axle pin
3 Roller
4 Screw
5 Flap

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

e) Remove the spacers (6).
f) Press out and change the flange bushings (7) and the bushings (8).
g) Assemble in the reverse order and repeat on the other arms.
h) Fit back the wheel, see 5.6-1 Wheel - Change.



6 Spacer
7 Flange bushing
8 Bushing

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5.6-3 Wheel - Change Rollers

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1361918-0200

a) Remove the wheel, see 5.6-1 Wheel - Change.

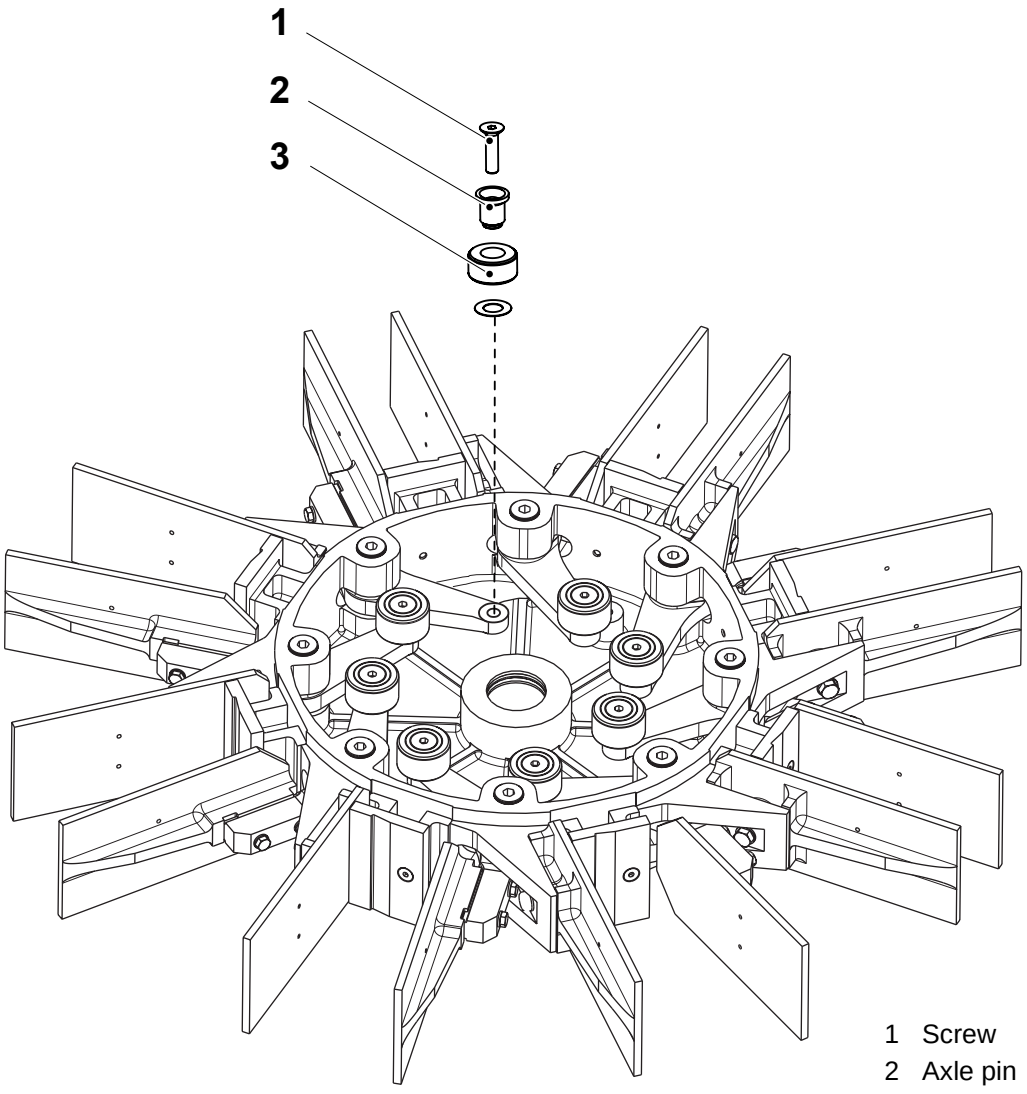
b) Remove the screw (1).

c) Remove and check the axle pin (2) for wear, change as required.

d) Change the roller (3).

e) Repeat on the other arms.

f) Assemble in the reverse order and fit the wheel, see 5.6-1 Wheel - Change.



1 Screw
2 Axle pin
3 Roller

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5.6.1 Clamping Element

5.6.1-1 Clamping Element - Remove

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1361918-0200 90208-0087

a) Unscrew the screw (1) and remove the cover (2).

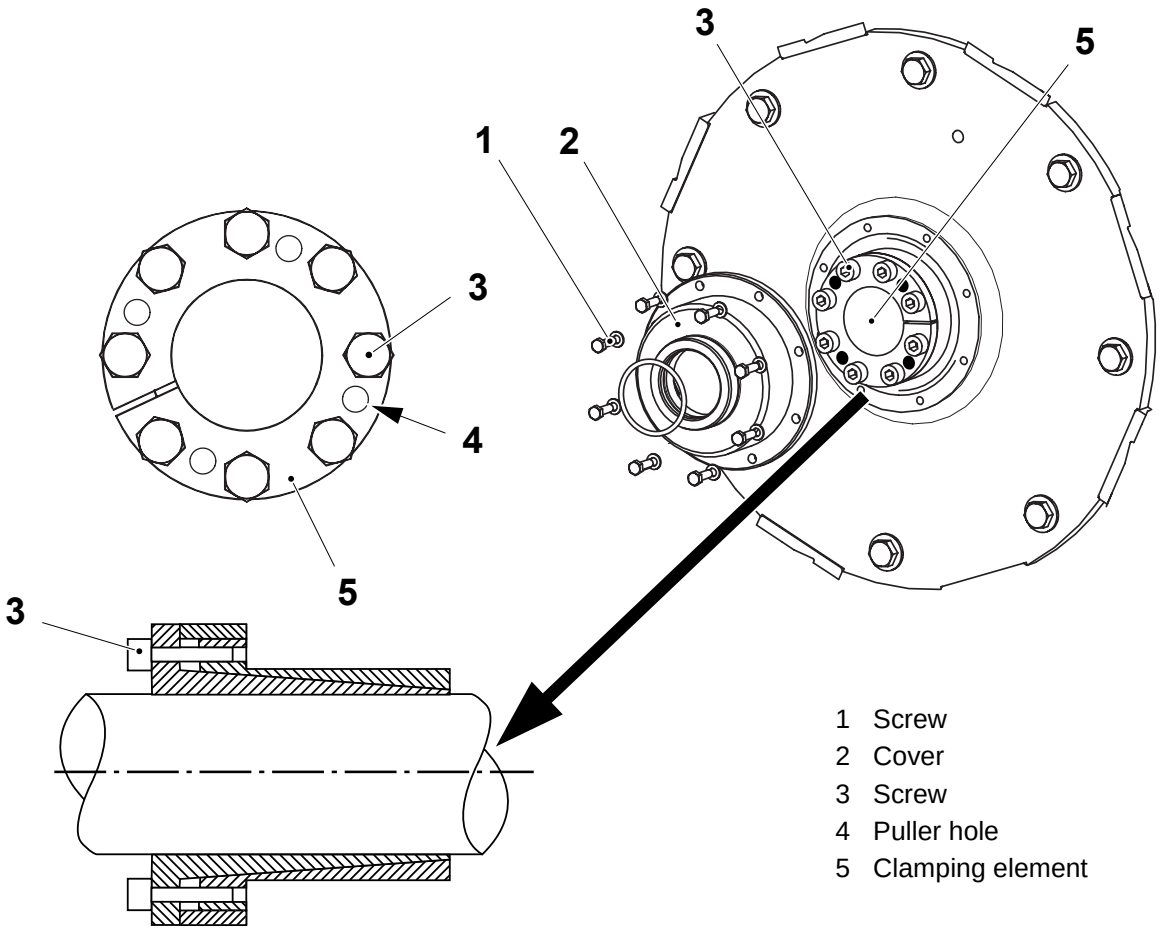
b) Loosen the screws (3).

c) Fit four screws into the puller holes (4).

d) Tighten these screws crosswise until the clamping element (5) comes off.

e) Remove the clamping element (5) and change it if damaged or worn out.

f) Assemble in the reverse order, see 5.6.1-2 Clamping Element - Assemble.



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5.6.1-2 Clamping Element - Assemble

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Lubricant code E Torque wrench min. 35 Nm
SPC Reference	1361918-0200 90208-0087

WARNING

Risk of major damage to the equipment.

Never adjust the tightening torque after locking by loosening the screws (1). The result may be that the screws (1) shake loose.

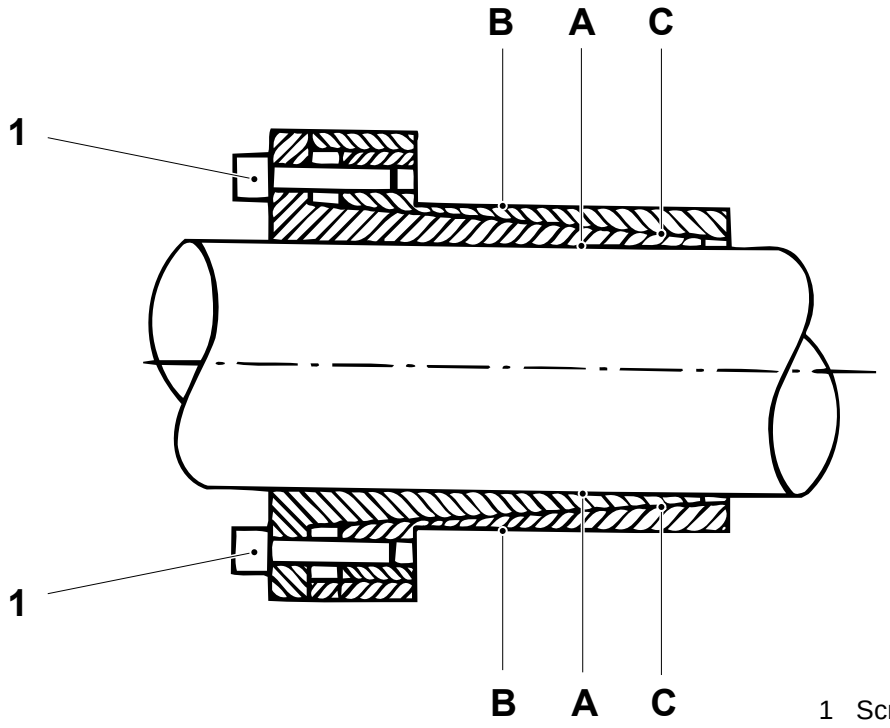
Note! The inner surface **A** and the outer surface **B** of the clamping element must be cleaned before assembling.

Note! Lubricate the screws (1) and apply oil (TP No. 90296-0002) **only** onto the clamp inner surface **C**.

a) Put the clamping element in place and tighten the screws (1) crosswise, first by hand and then to **20 ±2 Nm** with the aid of a torque wrench.

b) Tighten further crosswise to **35 ±2 Nm** with the aid of a torque wrench.

c) Tighten the screws (1) several times, with full tightening torque, until it is not possible tighten them further.



1 Screw

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.7 Folding Parts

SPC Reference	1285012-0200

5.7-1 Folding Parts - Set

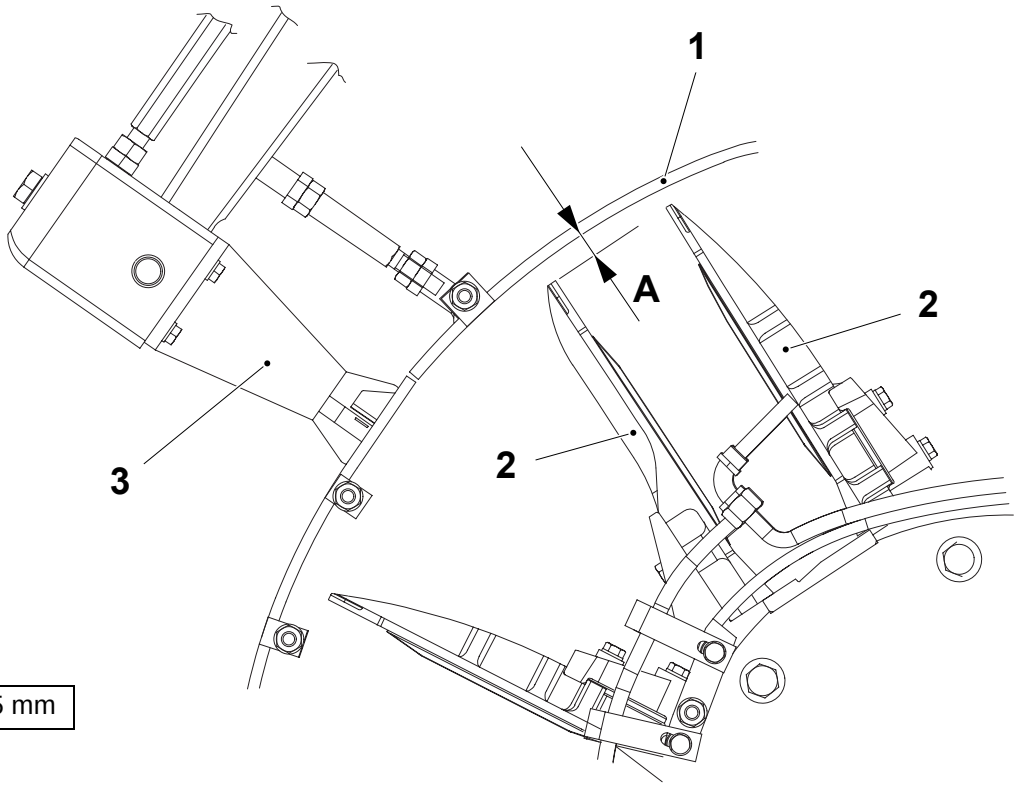
SPC Reference	1285012-0200

Follow the procedure described in 5-10 Final Folder - Set Folding Part Roof and the procedure described in 5-11 Final Folder - Set Folding Part Guides.

5.7-2 Folding Parts - Check Upper Guide

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1285012-0200

a) Crank the final folder until the flap (2) is approximately after the pull-down device (3). Check the distance **A** between the upper guide (1) and the top of the flap (2).



A = 5.0 ±0.5 mm

1 Upper guide
2 Flap
3 Pull-down device

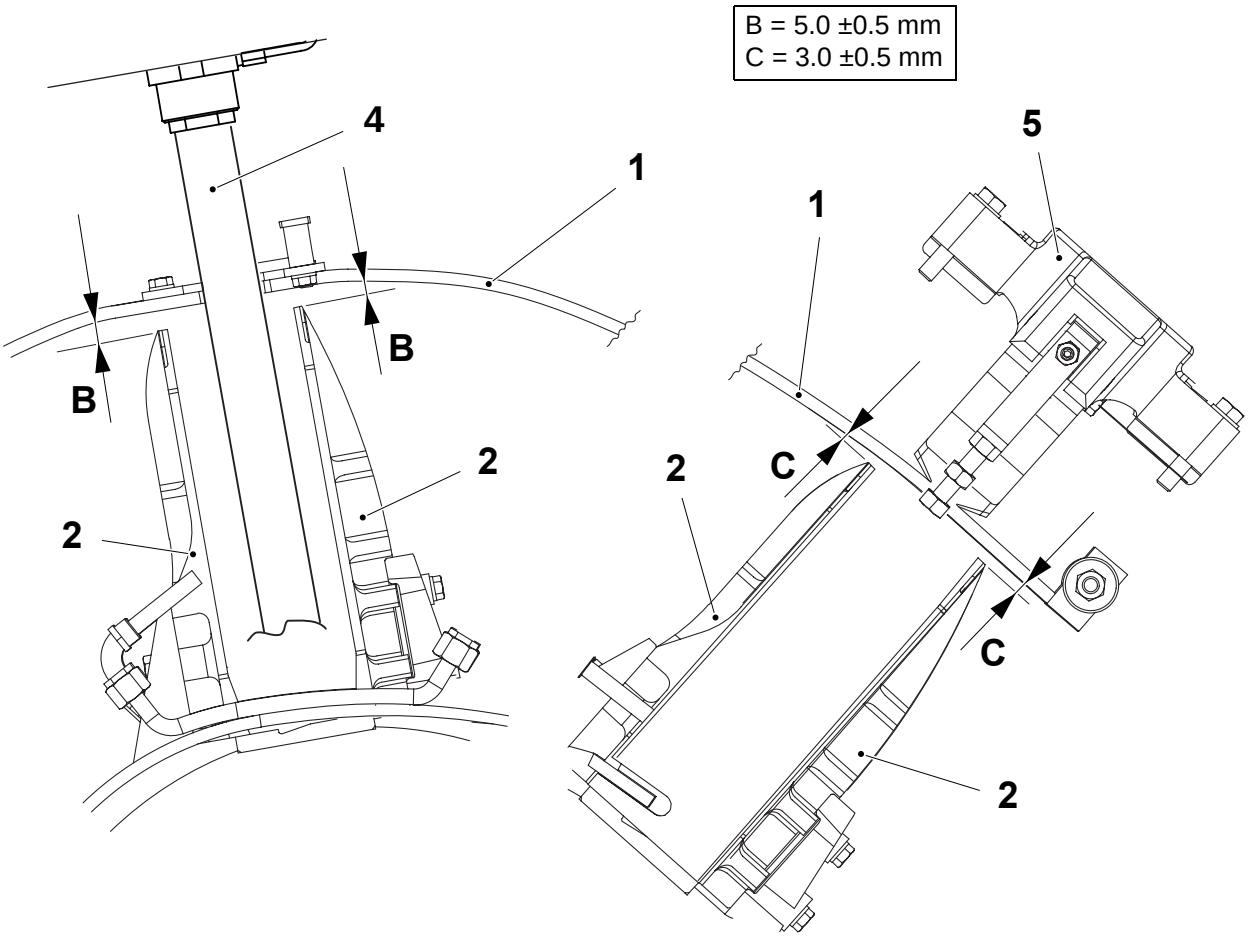
(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

b) Crank the final folder further until the flap (2) is approximately below the heater chamber (4). Check the distance **B** between the upper guide (1) and the top of the flap (2).

c) Crank the final folder further until the flap (2) is approximately below the pressure device (5). Check the distance **C** between the upper guide (1) and the top of the flap (2).



1 Upper guide
2 Flap
4 Heater chamber
5 Pressure device

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5.7-3 Folding Parts - Set Guide Rails

SPC Reference	1285012-0200

Follow the procedure described in 5-11 Final Folder - Set Folding Part Guides.

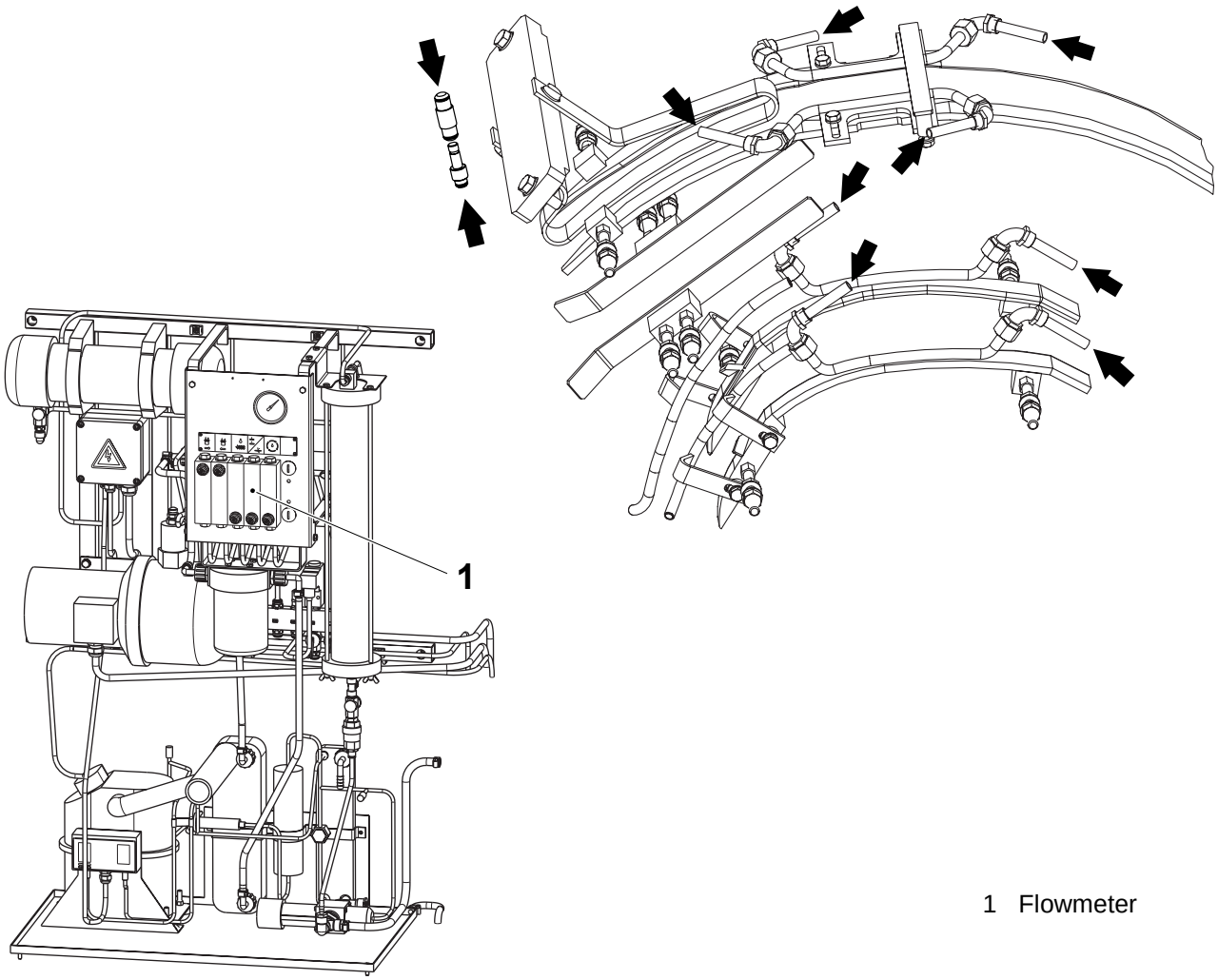
5.7-4 Folding Parts - Check Water Leaks

Machine Status	PREPARATION
SPC Reference	1285012-0200

Check that the cooling water reaches the places marked with arrows in the wheel, see figure. Check carefully for any water leaks.

Check the correct flow in the flowmeter (1), located in the service unit.

Set as required, see 6.1.2-2 Flow Meter - Set Flows.



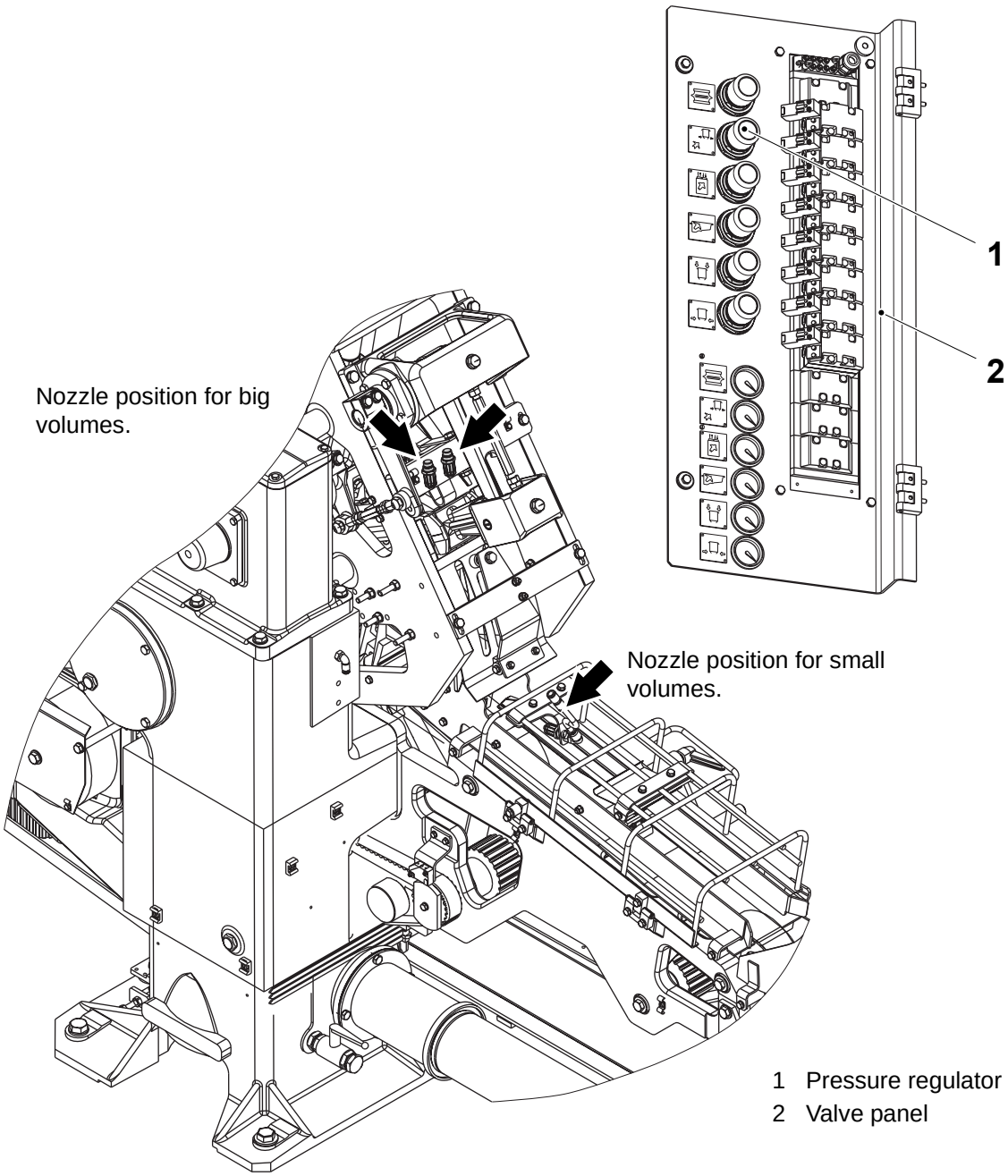
1 Flowmeter

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.7-5 Folding Parts - Set Flap Blowing Pressure

Machine Status	Mains Power OFF Air ON Steam ON Water OFF

Set the flap blowing air pressure according to 10.1 Technical Data, by means of the pressure regulator (1), located on the machine body pneumatic air valve panel (2).



1 Pressure regulator
2 Valve panel

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5.8 Out Feed Device

SPC Reference	1285260-0200

5.8-1 Out Feed Device - Set Stop Position Carrier

SPC Reference	1285260-0200

Follow the procedure described in 5-16 Final Folder - Set Package Out Feed Holder.

5.8-2 Out Feed Device - Set Bottom Guides

SPC Reference	1285260-0200

Follow the procedure described in 5-17 Final Folder - Set Package Out Feed Rail.

5.8-4 Out Feed Device - Synchronisation

SPC Reference	1285260-0200

Follow the procedure described in 5-18 Final Folder - Synchronise Package Out Feed.

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5.8-5 Out Feed Device - Set Overload Micro Switch

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1285260-0200

a) Loosen the two screws (1) and pull out completely the micro switch bracket (2) from the out feed wheel (3).

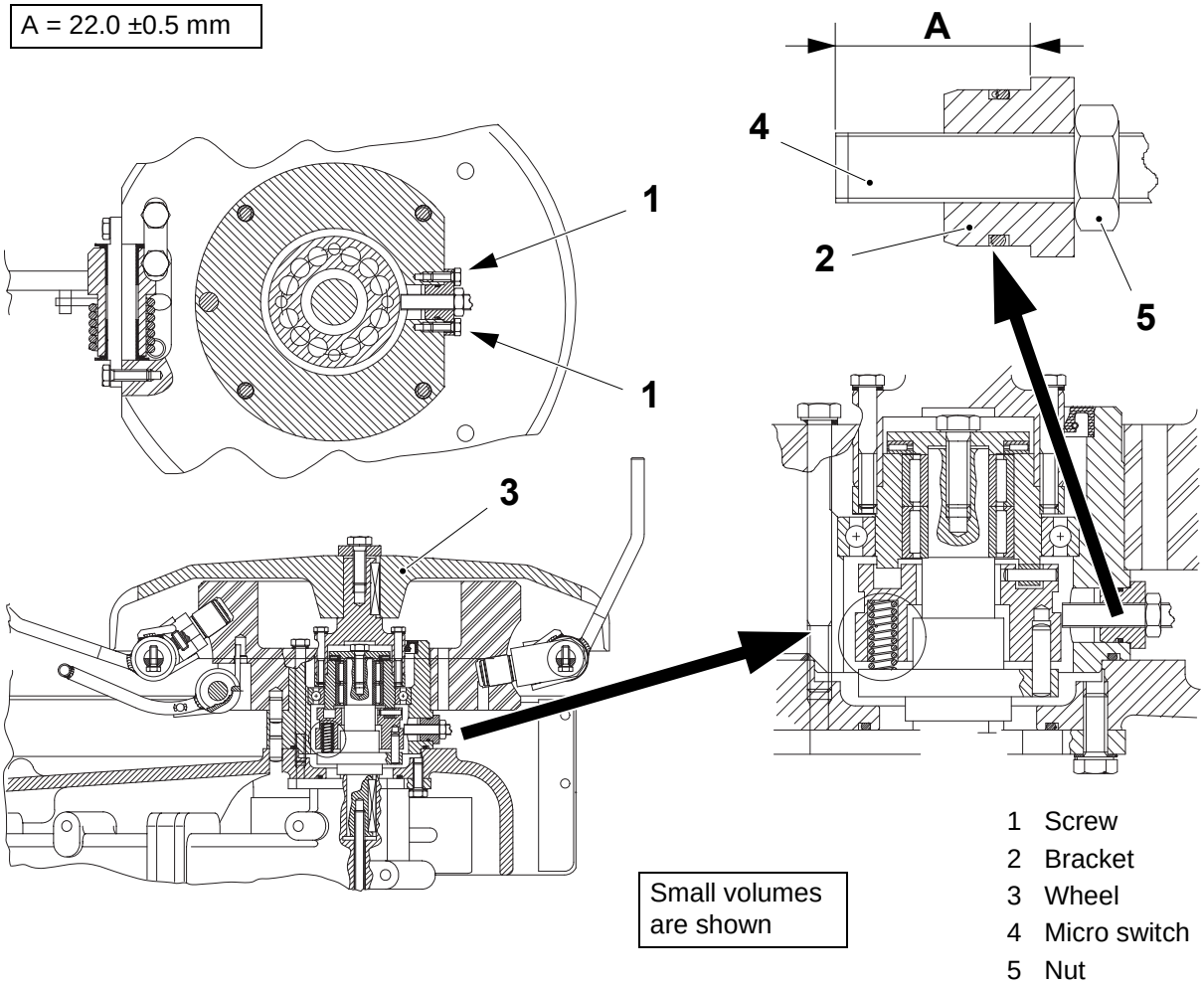
b) Check the distance **A** between the bracket (2) reference point and the micro switch (4) head.

c) If not correct, loosen the nut (5) and adjust the micro switch (4) screw thread until the distance **A** is obtained.

d) Tighten the nut (5).

e) Fit back the micro switch bracket (2) and tighten the screws (1).

Note! The micro switch (4) LED is always lit up. It goes off only when there is an overload on the out feed device.



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5.8-6 Out Feed Device - Set Counting Photocells

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1285260-0200

To set the photocells, see 5-21 Final Folder - Set Package Out Feed Counting Photocells.

5.8-7 Out Feed Device - Set Queue Photocells

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1285260-0200

a) The photocells are composed of one transmitter (1) and one receiver (2) and they must be positioned in front of each other.

b) Open the cover (3) on the receiver photocell (2).

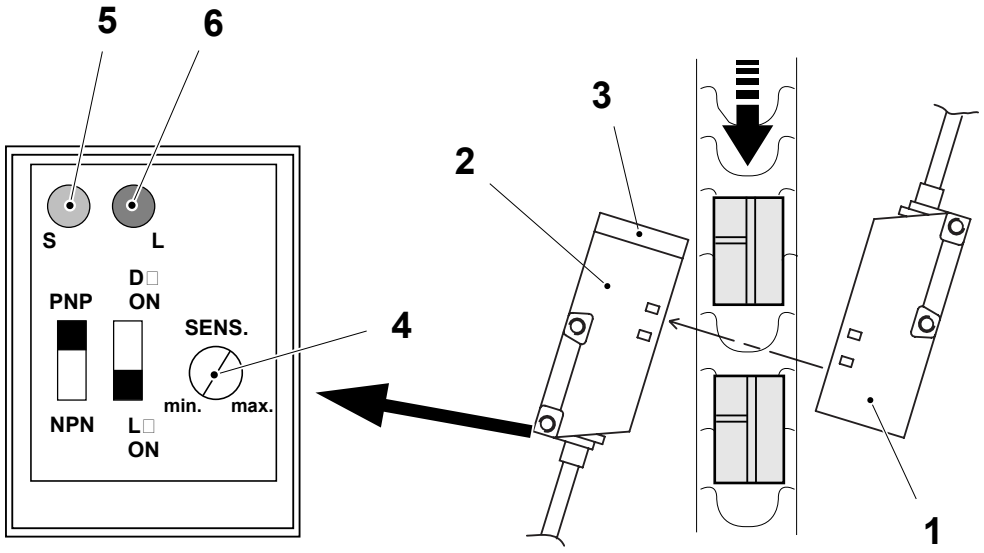
c) Make sure that the receiver photocell (2) is set to **PNP** (positive logic) and **L-ON** (the signal will be sent when **NO** object is detected between the photocells), see figure.

d) Check the transmitter (1) and receiver (2) photocells position, see figure.

e) Begin without any object to be detected.
Turn the sensitivity potentiometer (4) anti-clockwise (toward **min.**) and then clockwise until both the green LED (5) and the red LED (6) light up. To secure the setting turn clockwise the sensitivity potentiometer (4) just a little bit more.

f) Place the package to be detected between the photocells. Check that the green LED (5) is lit and the red LED (6) light goes out.

g) Close the cover (3) on the receiver photocell (2).



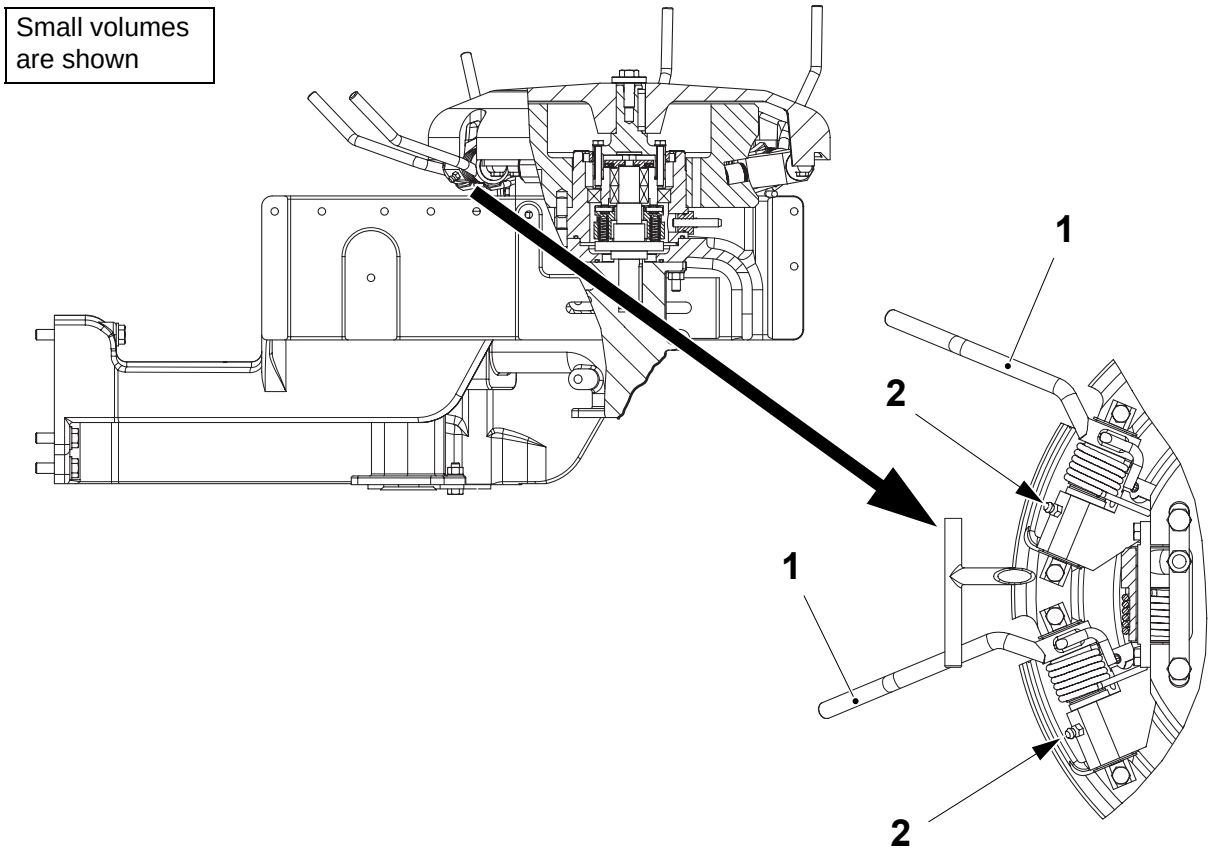
1 Transmitter
2 Receiver
3 Cover
4 Potentiometer
5 Green LED
6 Red LED

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.8-8 Out Feed Device - Lubricate Carriers

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Grease code F
SPC Reference	1285260-0200

Grease all the carriers (1) of the out feed wheel through the nipple (2). Use grease code F, see 10.3-1 Lubricants.



1 Carrier
2 Nipple

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.8-9 Out Feed Device - Check Clutch Function

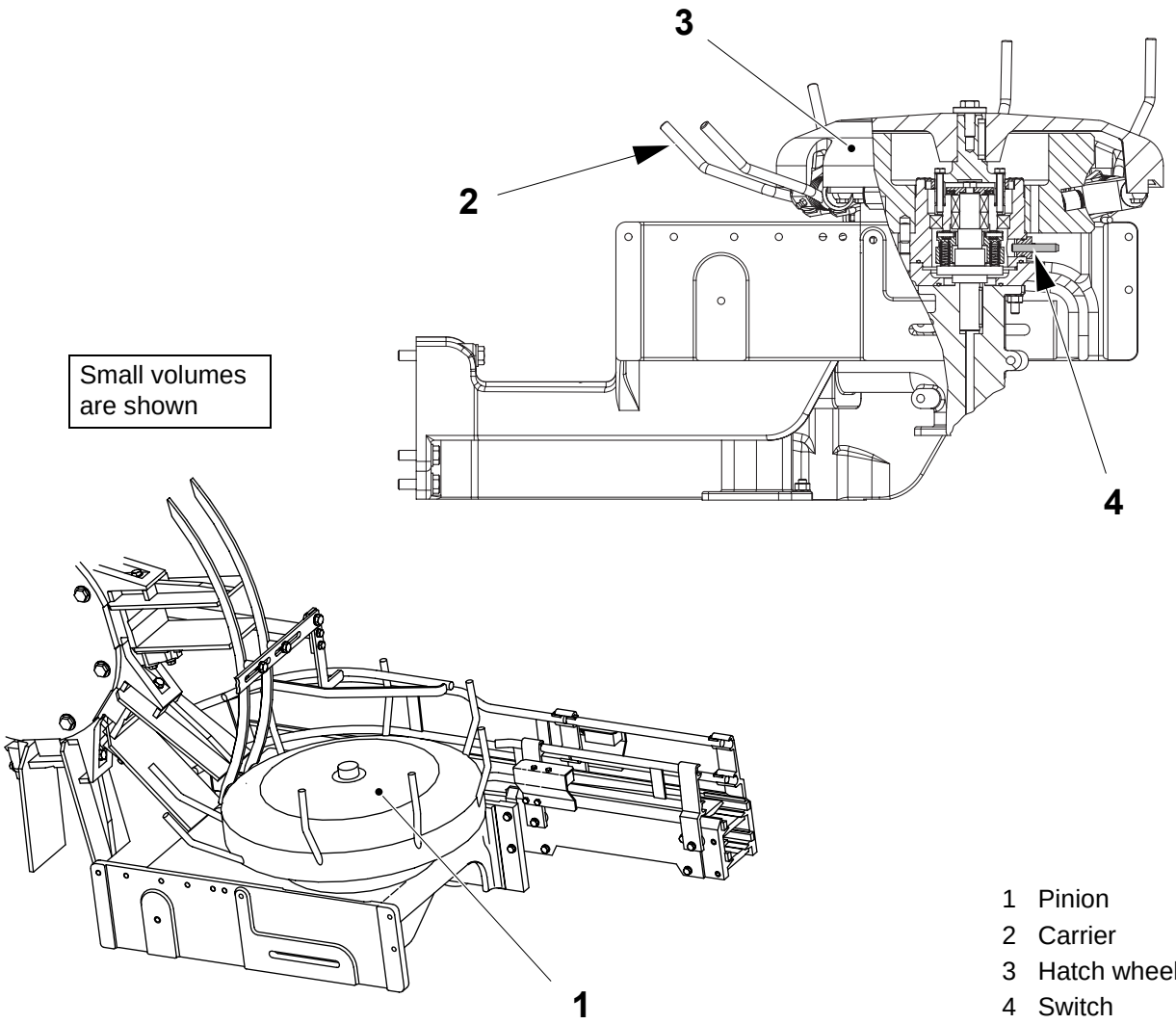
Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1285260-0200

a) Make sure that the LED of the switch (4) under the package out feed is lit up.

b) Grip the carriers (2) and pull the hatch wheel (3) in the direction **opposite** to normal rotation and until the large pinion (1) turns. Make sure that the clutch disengages at a reasonable force.

c) Make sure that the LED of the switch (4) under the package out feed goes off.

d) Grip the carriers (2) and pull the hatch wheel (3) in the direction of **normal** rotation until the clutch re-engages.



1 Pinion
2 Carrier
3 Hatch wheel
4 Switch

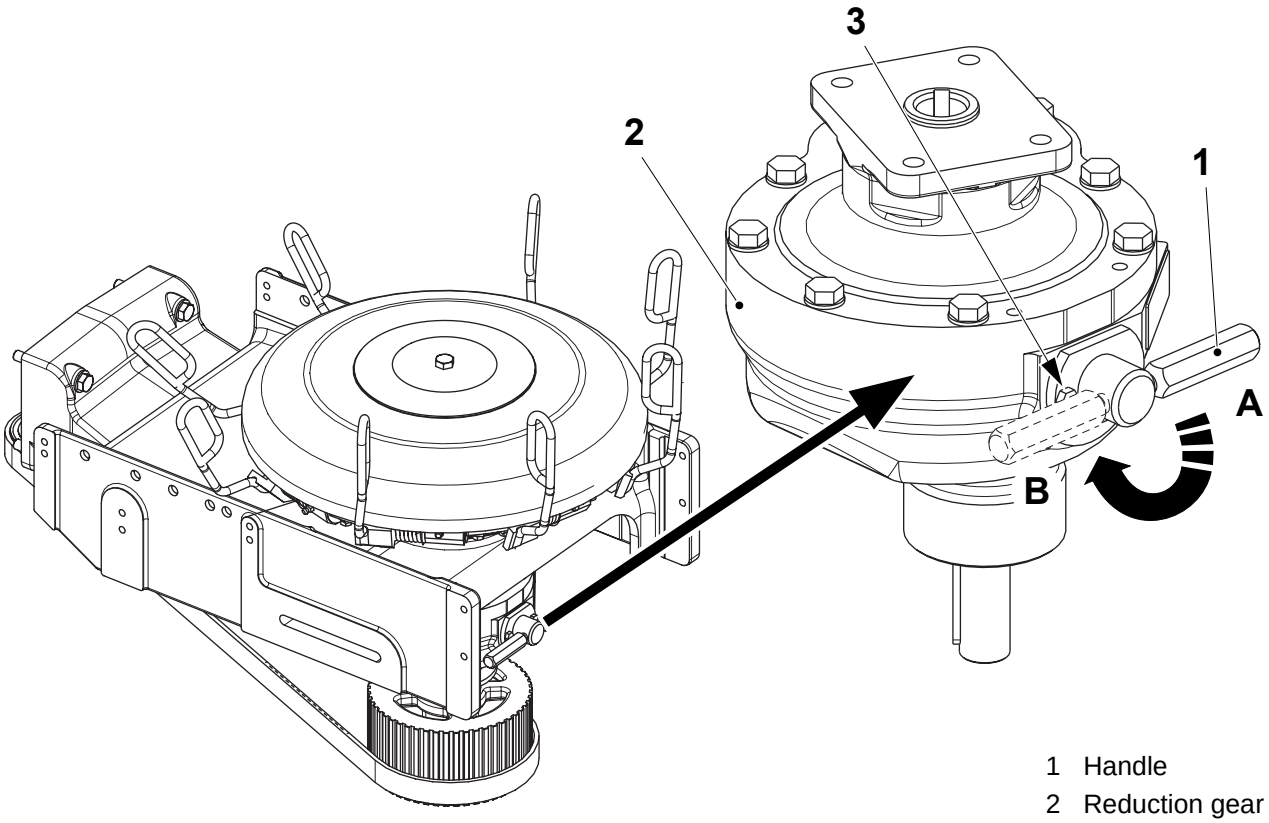
TechPub_2614345_0105 - 05_MM81534_11en.fm

5.8-10 Out Feed Device - Check Reduction Gear

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1285260-0200

Make sure that handle (1) of the reduction gear (2) is set according to the running volume, see below. Set if required by means of the screw (3).

Package	Position	Fin type
TPA 1000 S - TPA 1000 Sq - TPA 330 Sq - TPA 250 Sq - TPA 500 Sq - 1000 Sq	A	Reverse Fin (RF)
1000 B - 1000 S - 1500 S - 500 S - 200 S - 250 B - 200 B - 250 S - 330 S - 500 B	B	Normal Fin (NF)



1 Handle
2 Reduction gear
3 Screw

TechPub_2614345_0105 - 05_MM81534_11en.fm

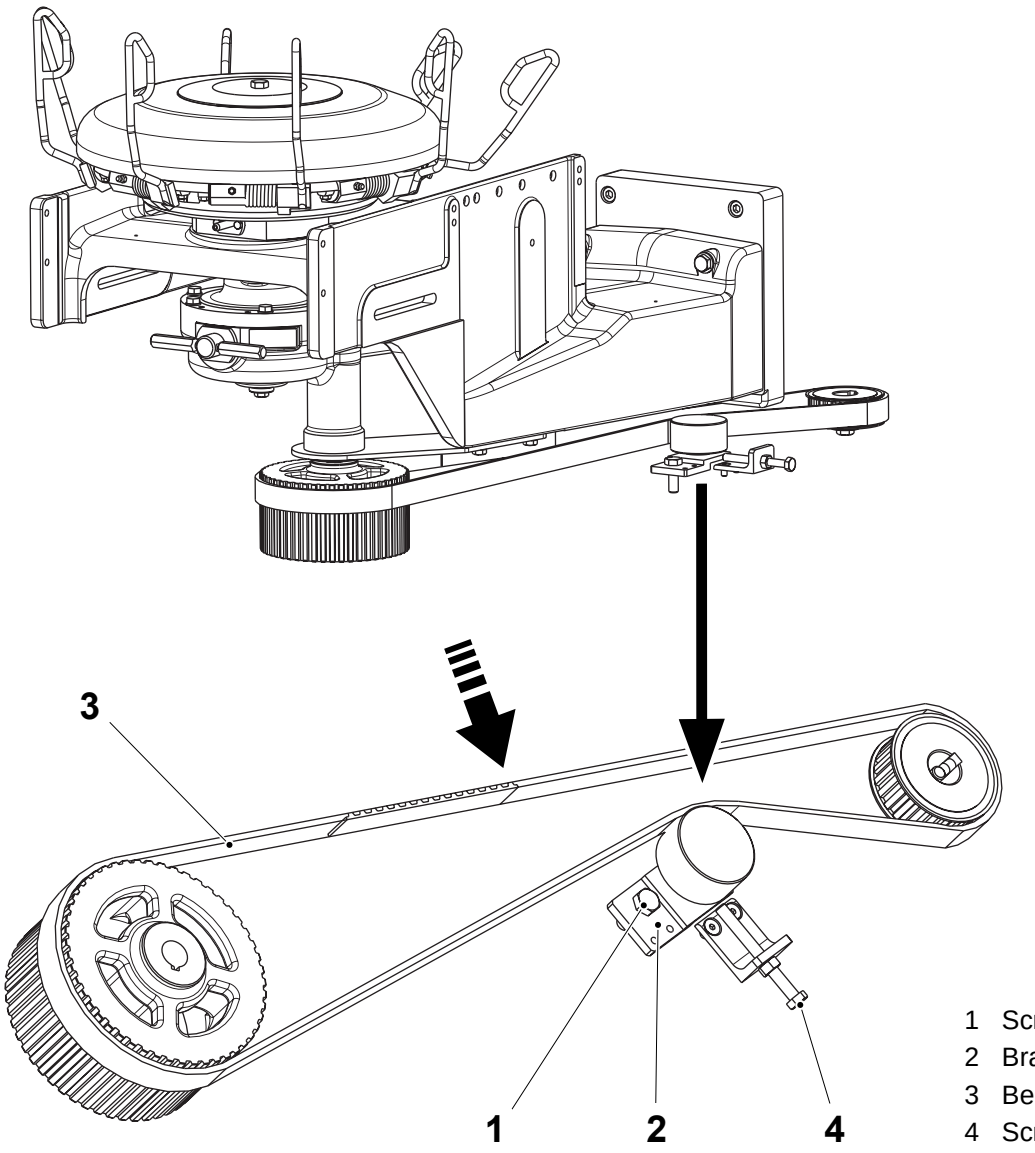
5.8-11 Out Feed Device - Set Belt Tension

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Dynamometer TP No. 74767-102
SPC Reference	1285260-0200

a) Loosen the screw (1) on the bracket (2).

b) With the aid of a dynamometer set the belt (3) tension to **40 N** with a deflection of **8 mm** by means of the screw pin (4).

c) Tighten the screw (1) on the bracket (2).



1 Screw
2 Bracket
3 Belt
4 Screw pin

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.8-12 Out Feed Device - Overhaul Gear Box

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1285260-0200 1484210-0200 1490085-0000

Remove Gear Box

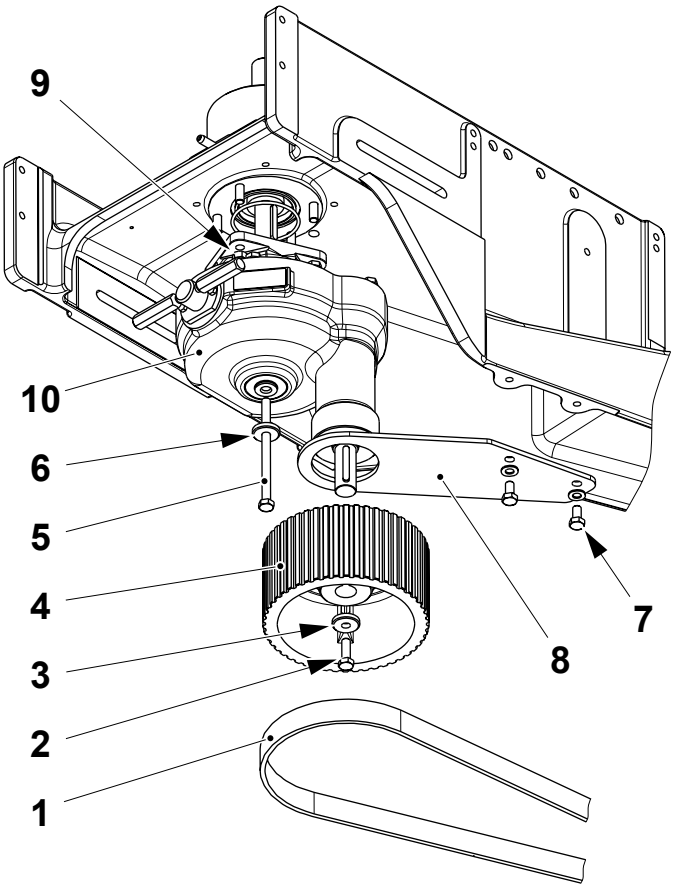
a) Remove the belt (1), follow the procedure in 5.8-11 Out Feed Device - Set Belt Tension.

b) Remove the screw (2), the washer (3) and the pulley (4).

c) Remove the screw (5) and the washer (6).

d) Remove the screws (7) and the bracket (8).

e) Remove the four nuts (9) and the gear box (10).



1 Belt
2 Screw
3 Washer
4 Pulley
5 Screw
6 Washer
7 Screw
8 Bracket
9 Nut
10 Gear box

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

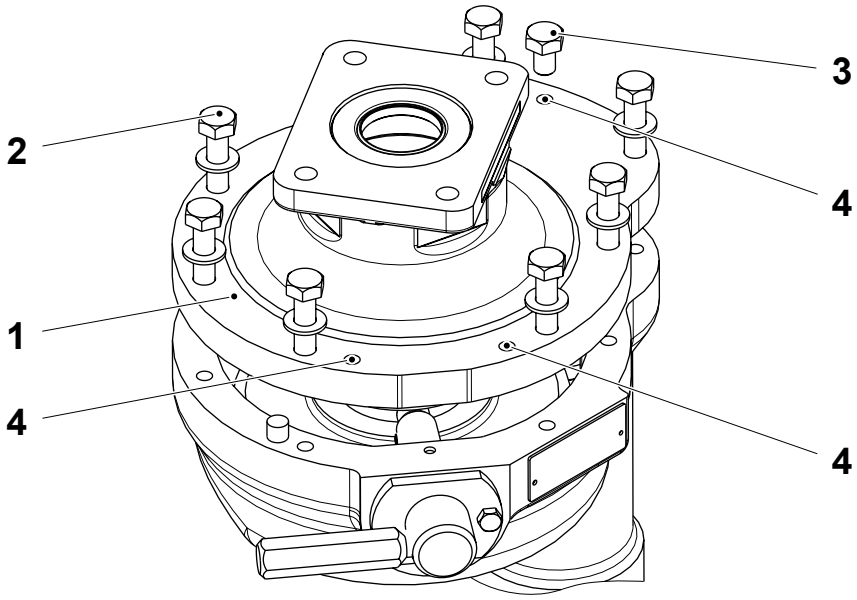
(Cont'd)

Change O-Ring

Consumables	O-ring TP No. 315202-0217 Radial Seal TP No. 90091-0299 Oil (Gear Box) - see table on page 10-21
SPC reference	1285260-0200 1484210-0200 1490085-0000

Note! No holes are available for the discharge or the filling of the lubricant oil. Before disassemble the cover (1), equip an area for the collection of the oil.

a) Remove the cover (1) by means of the screws (2). To facilitate the disassembly of the cover (1):
   - remove the screw (3)
   - in the threaded holes (4) fit three screws (2) and block them until the cover (1) is disassembled
   - remove the screws (2) from the threaded holes (4).



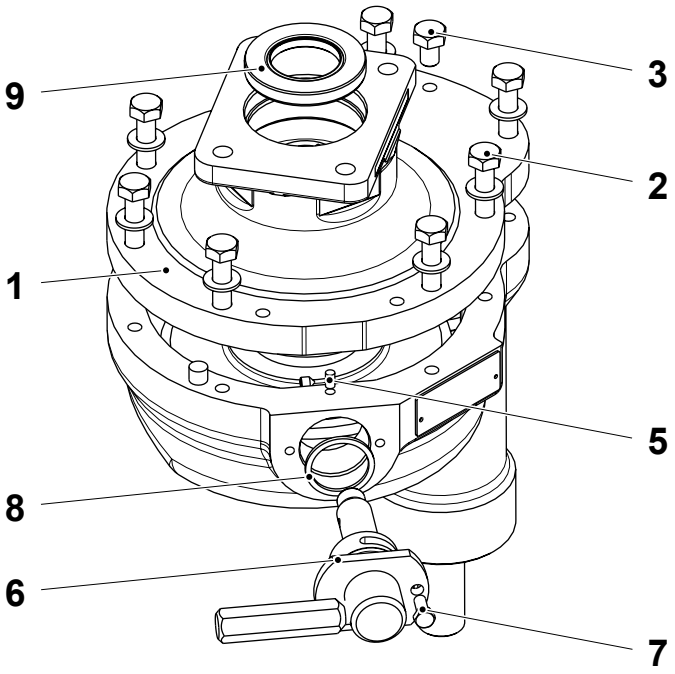
1 Cover
2 Screw
3 Screw
4 Threaded hole

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

b) Remove the oil.
c) Remove the pin (5).
d) Remove the crank group (6) by means of the screw (7).
e) Change the O-ring (8).
f) Fit the crank group (6) by means of the screw (7).
g) Fit the pin (5).
h) Remove the sealing ring (9).
i) Restore the oil, approx. 0.6 litre.
j) Fit the cover (1) by means of the screws (2).
k) Change the sealing ring (9).
l) Fit the screw (3).



1	Cover	6	Crank group
2	Screw	7	Screw
3	Screw	8	O-ring
5	Pin	9	Sealing ring

(Cont'd)

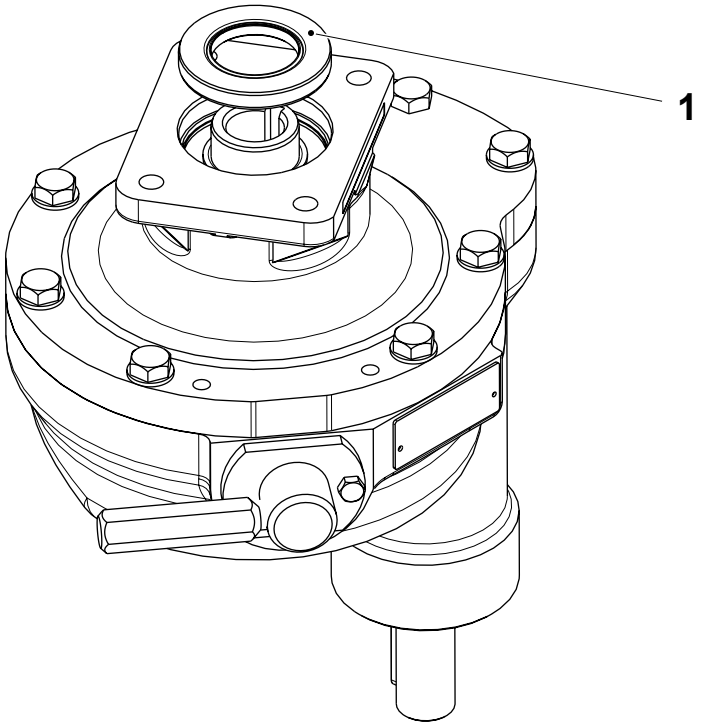
TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

Change Exit Sealing Ring

Consumables	Radial Seal TP No. 90091-0299
SPC reference	1285260-0200 1484210-0200 1490085-0000

Change the sealing ring (1).



1 Sealing ring

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

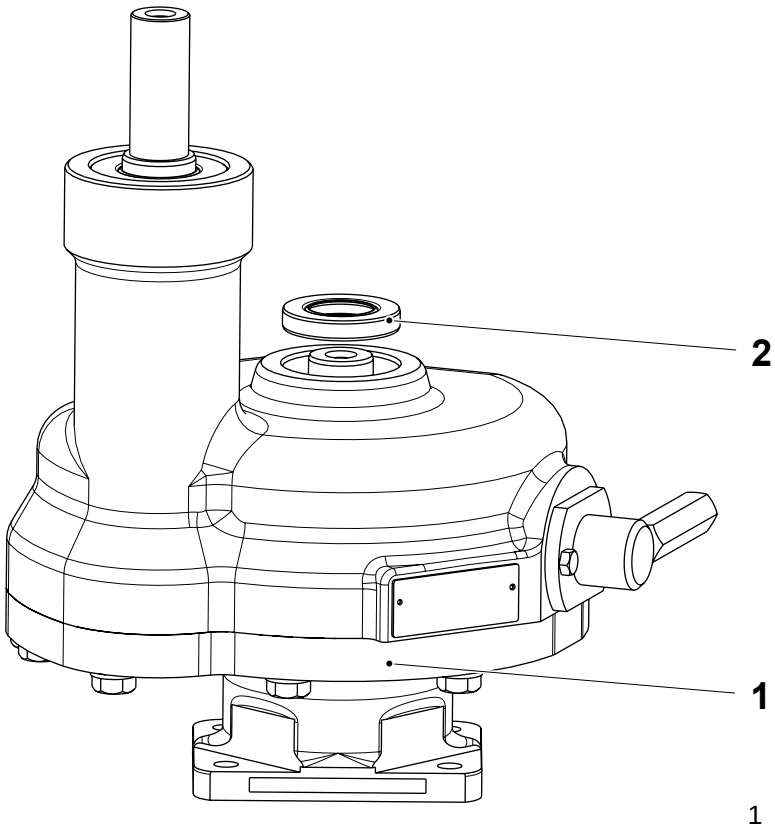
(Cont'd)

Change Inferior Sealing Ring

Consumables	Radial Seal TP No. 90091-0404
SPC reference	1285260-0200 1484210-0200 1490085-0000

a) Place the gear box on the cover (1) with the sealing ring (2) turned upward.

b) Change the sealing ring (2).



1 Cover
2 Sealing ring

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

Change Entrance Sealing Ring

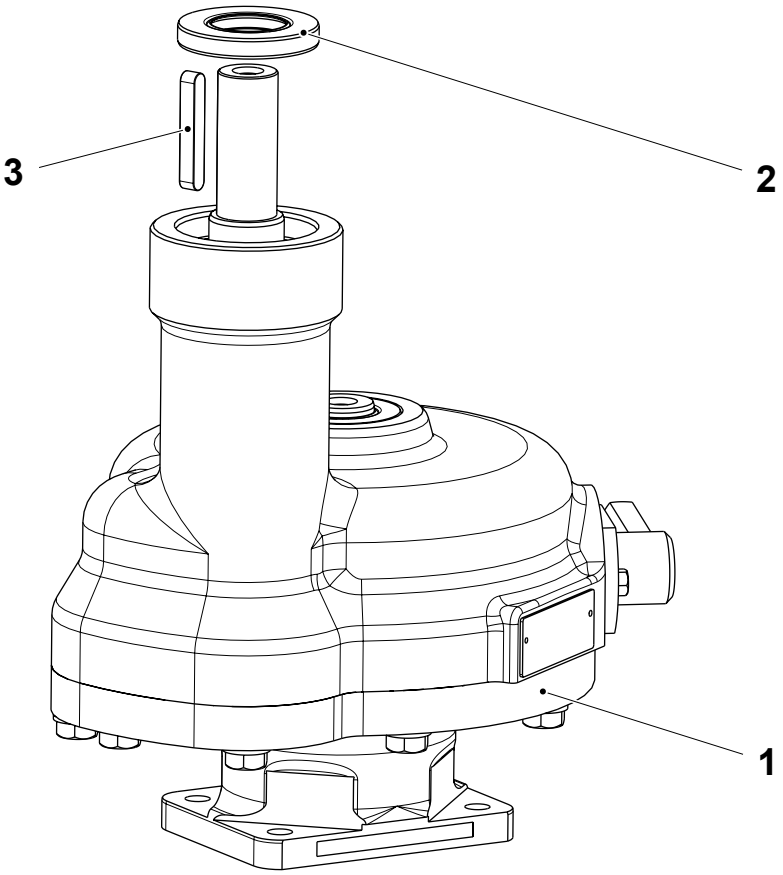
Consumables	Radial Seal TP No. 90091-0148
SPC reference	1285260-0200 1484210-0200 1490085-0000

a) Place the gear box on the cover (1) with the sealing ring (2) turned upward.

b) Remove the key (3).

c) Change the sealing ring (2).

d) Fit the key (3).



1 Cover
2 Sealing ring
3 Key

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

Fit Gear Box

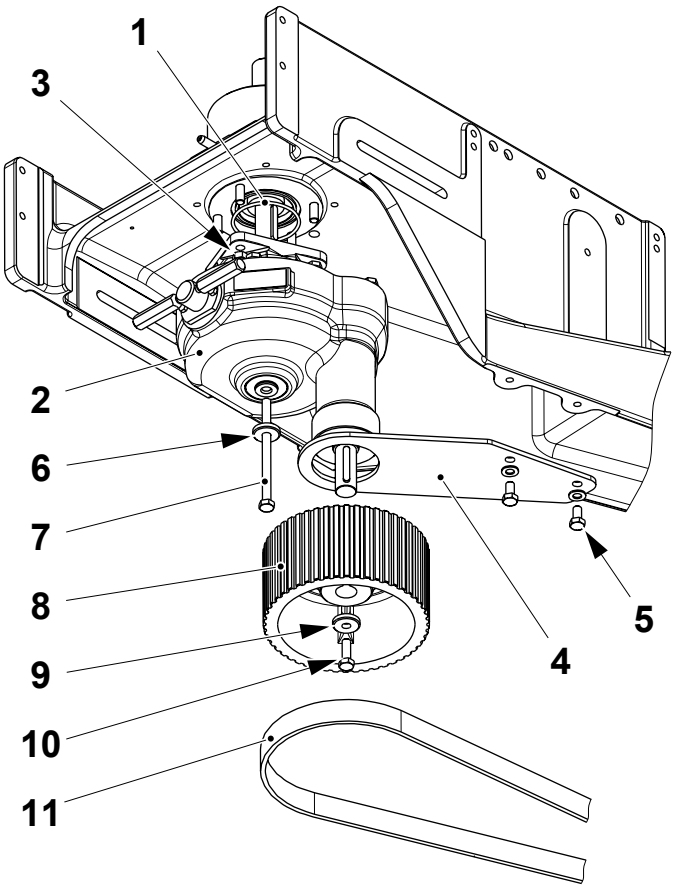
a) Fit the O-ring (1) and the gear box (2) by means of the four nuts (3).

b) Fit the bracket (4) by means of the screws (5).

c) Fit the washer (6) and the screw (7).

d) Fit the pulley (8) by means of the washer (9) and the screw (10).

e) Fit the belt (11) and set the belt (11) tension, see 5.8-11 Out Feed Device - Set Belt Tension.



1 O-ring
2 Gear box
3 Nut
4 Bracket
5 Screw
6 Washer
7 Screw
8 Pulley
9 Washer
10 Screw
11 Belt

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.9 Drop Chute

SPC Reference	1517321-0100 - 1361922-0200

5.9-1 Drop Chute - Check

Machine Status	Mains Power ON, Air ON Steam ON, Water OFF
SPC Reference	1517321-0100 - 1361922-0200

WARNING

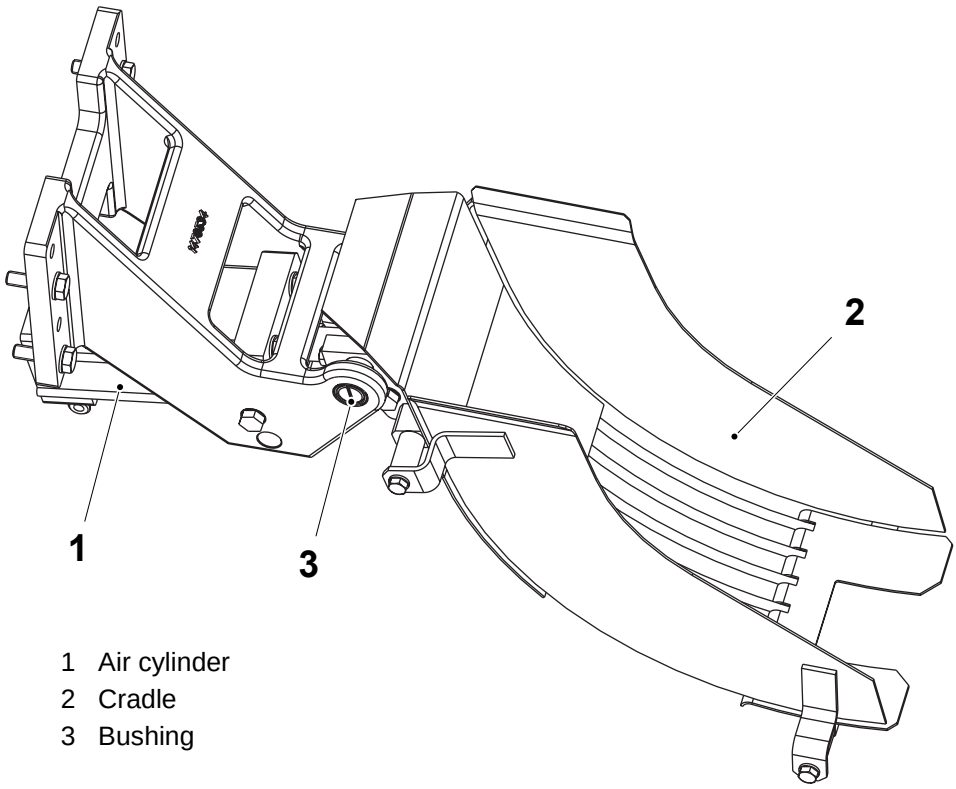
Risk of injury due to pinching or crushing.

Be careful to keep your fingers out of the way since the cradle (2) may move unexpectedly.

a) Activate the valve **Y5501**, located on the RH side valve panel.

b) Check that the air cylinder (1) moves easily and smoothly. Check also that the cradle (2) moves to the infeed conveyor in the correct position.

c) If not, change the bushings (3) and/or the air cylinder (1) as required.



1 Air cylinder
2 Cradle
3 Bushing

5.9-2 Drop Chute - Set

SPC Reference	1517321-0100 - 1361922-0200

Follow the procedure described in 5-4 Final Folder - Set Drop Chute Position.

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.10 Infeed Conveyor

SPC Reference	1517298-0100 1361923-0200

5.10-1 Infeed Conveyor - Synchronisation

SPC Reference	1517298-0100 1361923-0200

Follow the procedure described in 5-5 Final Folder - Synchronise Infeed Conveyor.

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.10-2 Infeed Conveyor - Set Belts

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Special Equipment	Dynamometer TP No. 74767-102
SPC Reference	1517298-0100 1361923-0200

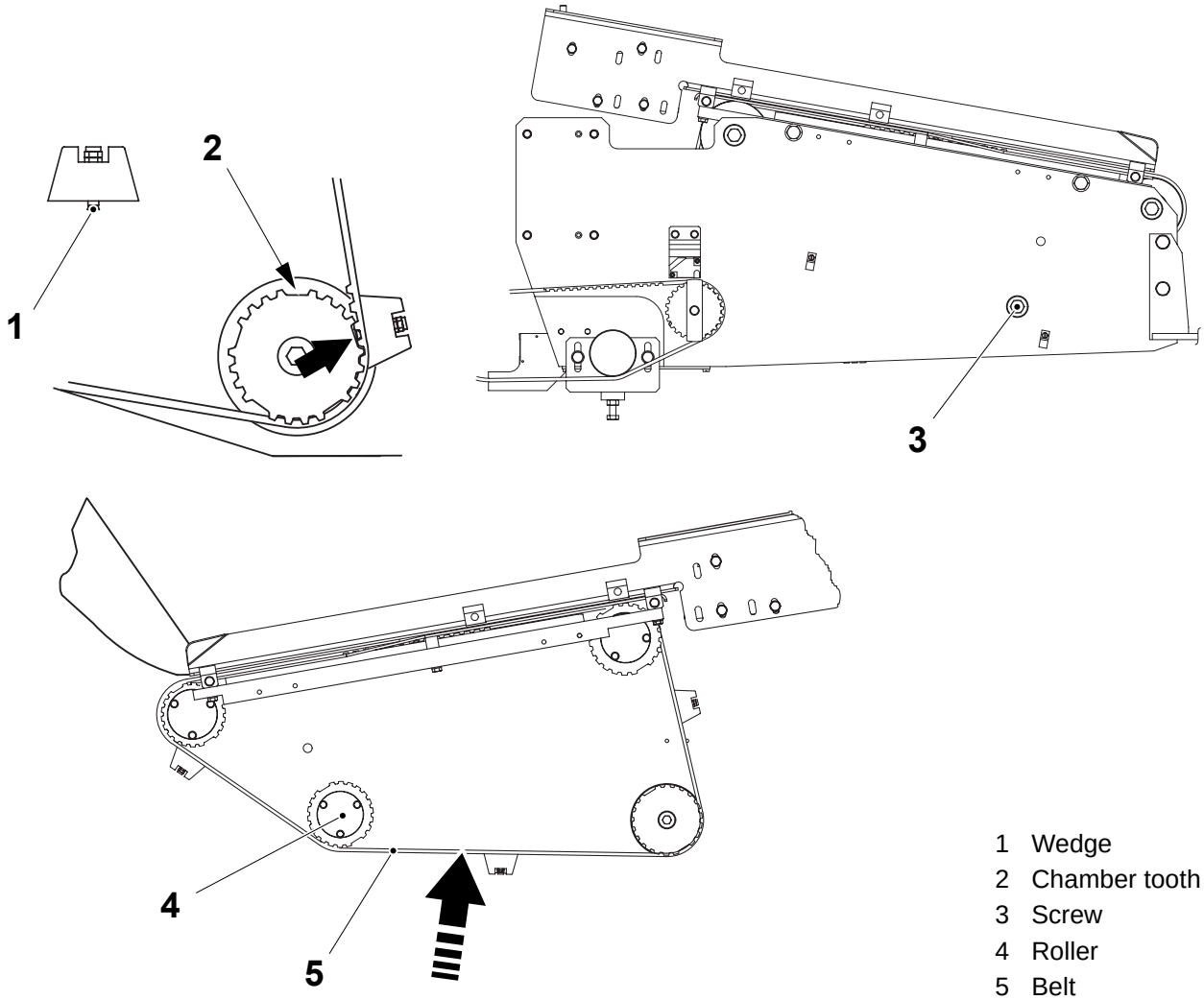
Note! Make sure that the wedge (1) on the toothed belt (5) is positioned on the chamber tooth (2).

Note! Measure the belt tension with the aid of a dynamometer.

a) Loosen the screw (3).

b) Set the belt (5) tension to **50 N** with a deflection of **4 mm**, by rotating the eccentric roller (4).

c) Tighten the screw (3).



1 Wedge
2 Chamber tooth
3 Screw
4 Roller
5 Belt

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

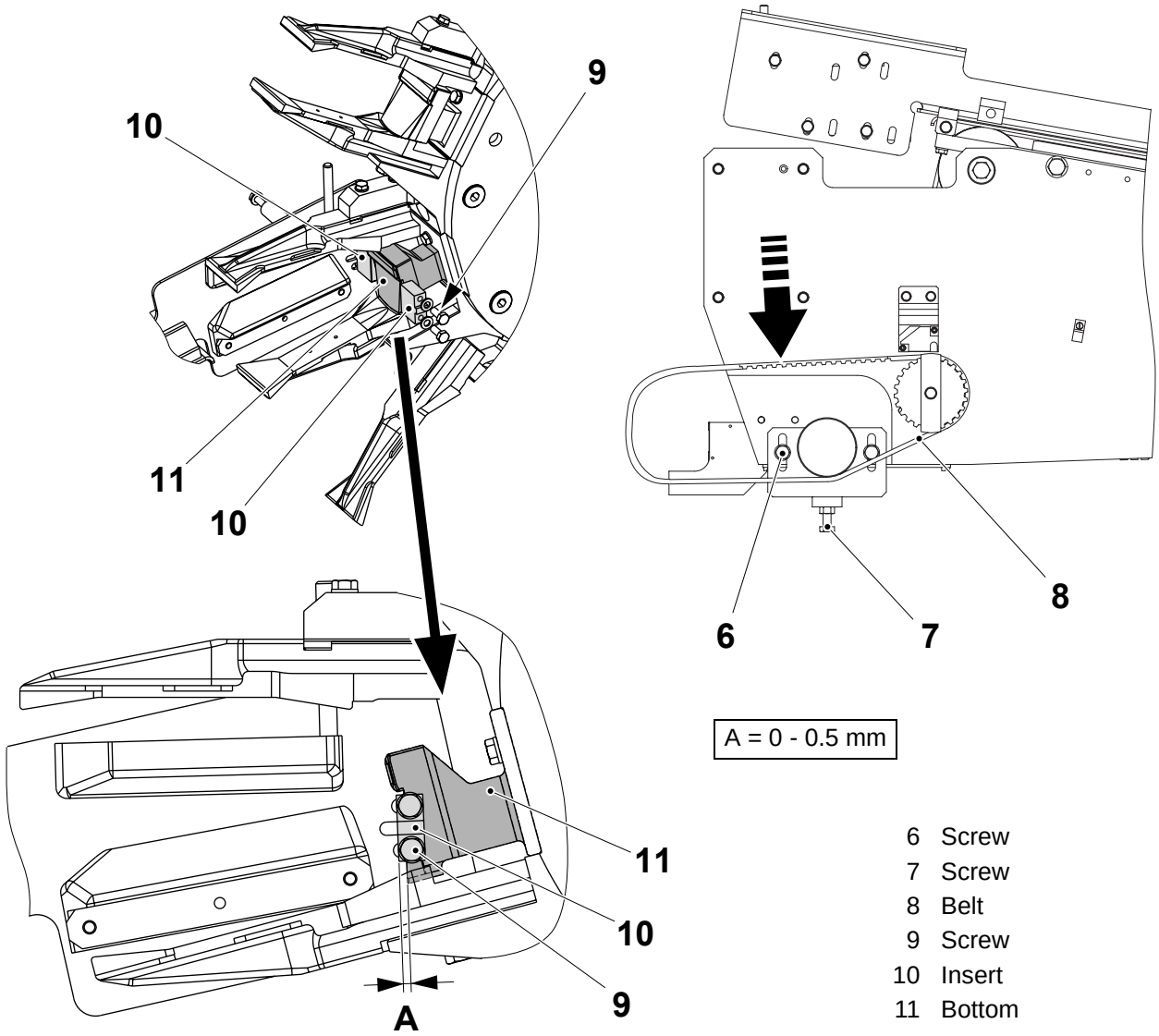
(Cont'd)

d) Loosen the screws (6) and unlock the screw (7).

e) Set the belt (8) tension to **30 N** with a deflection of **4 mm**, by means of the screw (7).

f) Lock the screw (7) and tighten the screws (6).

g) For **TPA 500 Sq** only:
   - loosen the screws (9) on both sides of the infeed conveyor
   - set the distance **A** between the two inserts (10) and the bottom (11)
   - tighten the screws (9).



A = 0 - 0.5 mm

6 Screw
7 Screw
8 Belt
9 Screw
10 Insert
11 Bottom

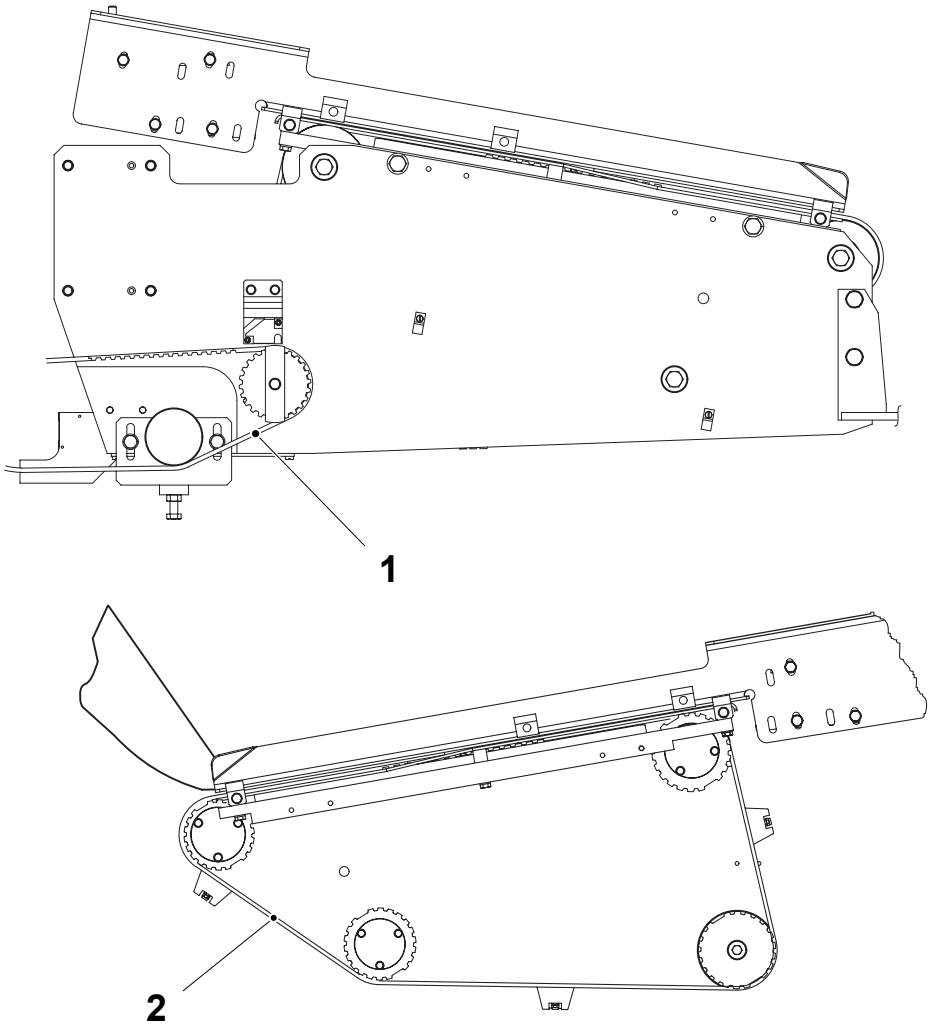
TechPub_2614345_0105 - 05_MM81534_11en.fm

5.10-3 Infeed Conveyor - Check Belts

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1517298-0100 1361923-0200

a) Check the belts (1) and (2) for wear and/or damage.

b) Change the belts (1) and (2) as required, see 5.10-4 Infeed Conveyor - Change Belts.



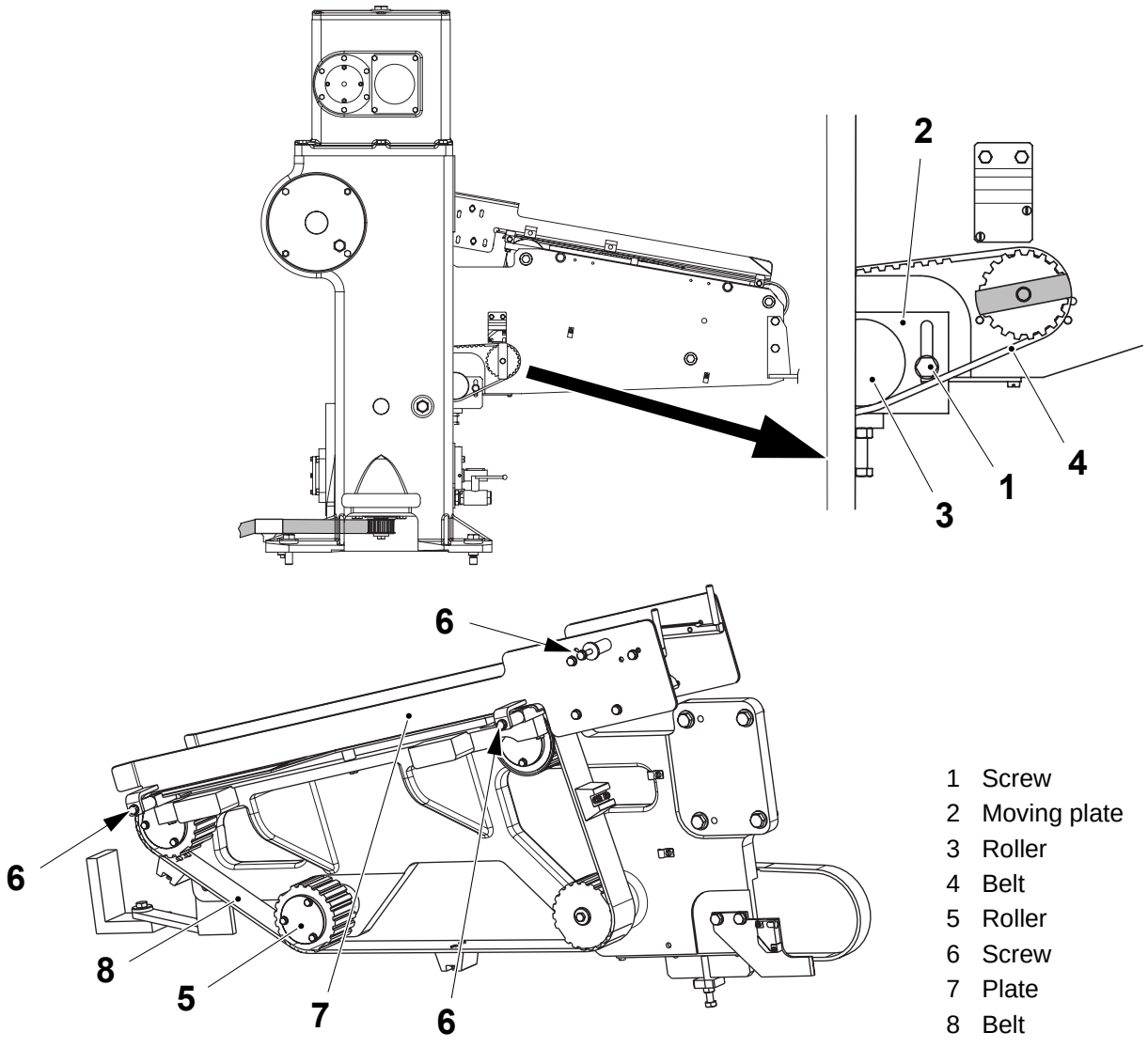
1 Belt
2 Belt

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.10-4 Infeed Conveyor - Change Belts

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1517298-0100 - 1361923-0200

a) Loosen the screws (1) on the moving plate (2).
b) Loosen the roller (3) tension by means of the moving plate (2).
c) Remove and change the belt (4).
d) Loosen the roller (5) tension by means of the eccentric underneath.
e) Remove the screws (6) and the plate (7).
f) Remove and change the belt (8).
g) Assemble in the reverse order.
h) Set the belt tensions, see 5.10-2 Infeed Conveyor - Set Belts.
i) Set the infeed conveyor, see 5.10-1 Infeed Conveyor - Synchronisation.



1 Screw
2 Moving plate
3 Roller
4 Belt
5 Roller
6 Screw
7 Plate
8 Belt

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.10-5 Infeed Conveyor - Overhaul

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Grease code F
SPC Reference	1517298-0100 1361923-0200

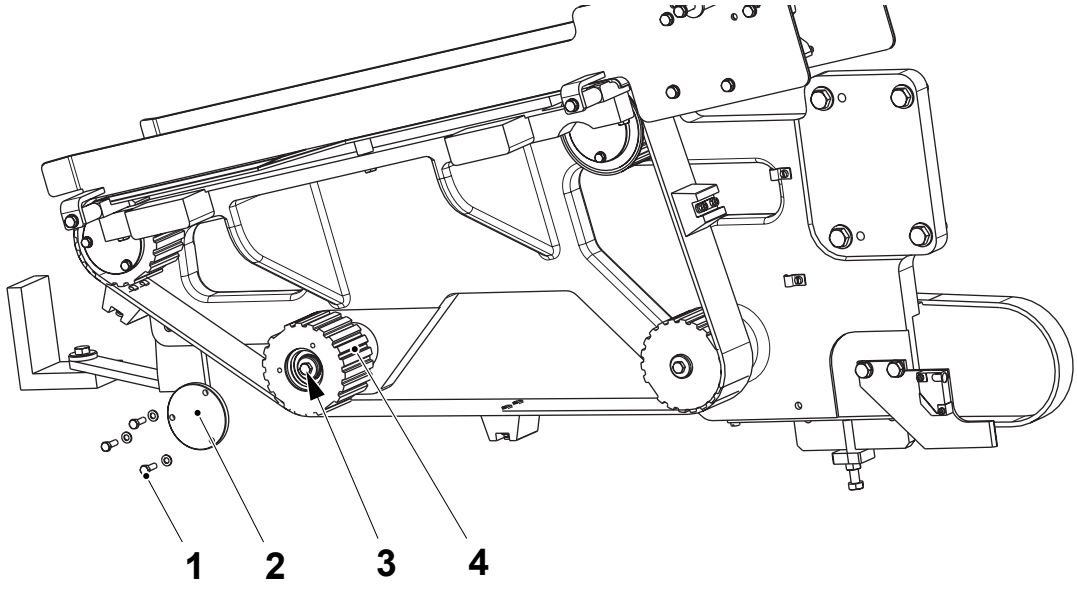
a) Loosen the tension of the belt, see 5.10-4 Infeed Conveyor - Change Belts.

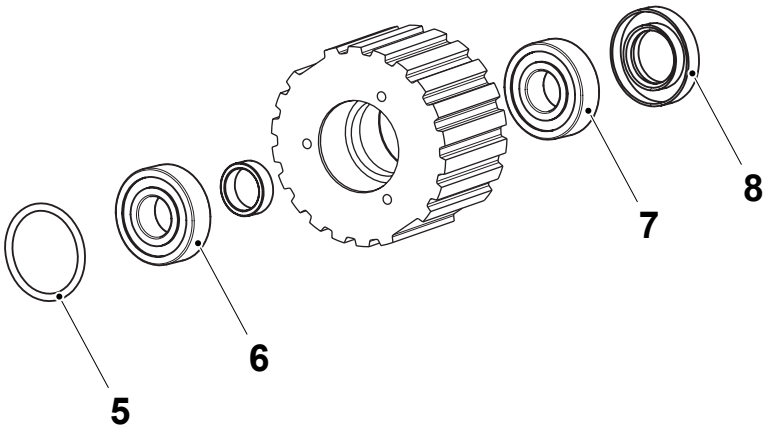
b) Remove the screws (1) and the cover (2).

c) Remove the screw (3) with the washer and pull out the toothed pulley (4).

d) Change the O-ring (5), the ball bearings (6) and (7) and the seal ring (8).

Note! Apply a layer of grease (TP No. 90296-68) on the seal ring (8) when assembling.





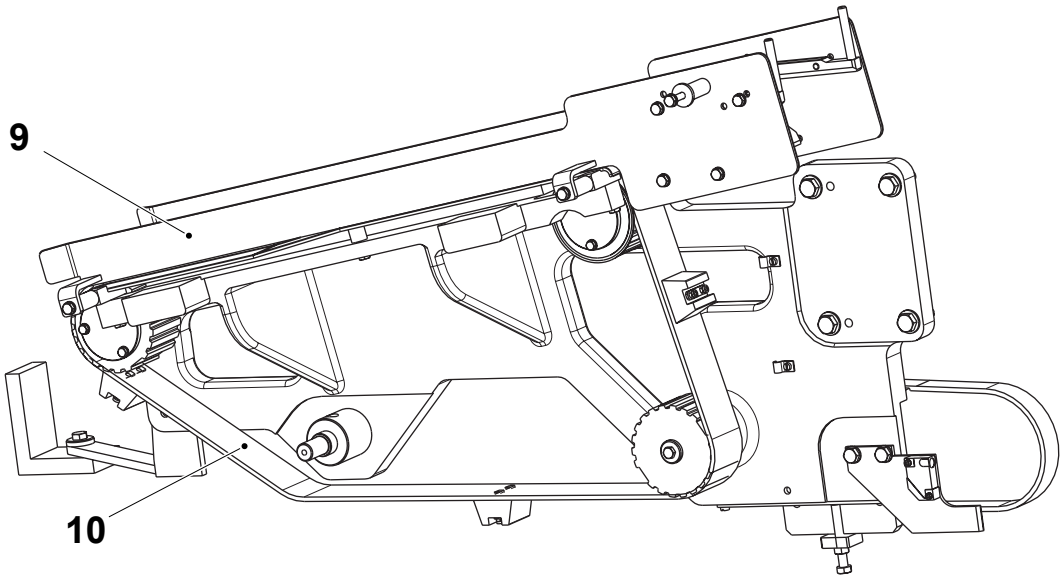
1 Screw
2 Cover
3 Screw
4 Toothed pulley
5 O-ring
6 Ball bearing
7 Ball bearing
8 Seal ring

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

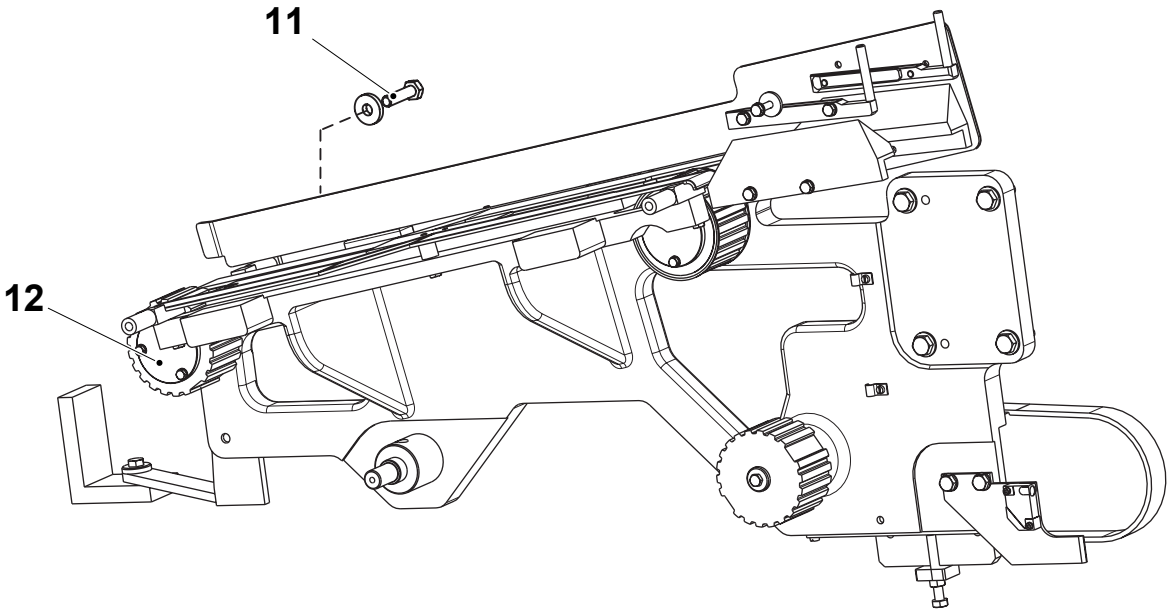
(Cont'd)

e) Remove the plate (9) and the belt (10).



9 Plate
10 Belt

f) Remove the screw (11) and pull out the toothed pulley (12).



11 Screw
12 Toothed pulley

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

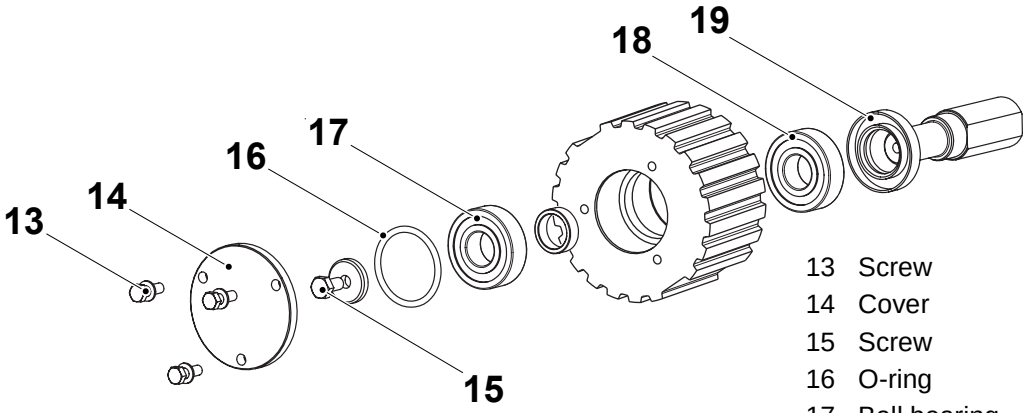
(Cont'd)

g) Remove the screws (13) and the cover (14).

h) Remove the screw (15) and the washer.

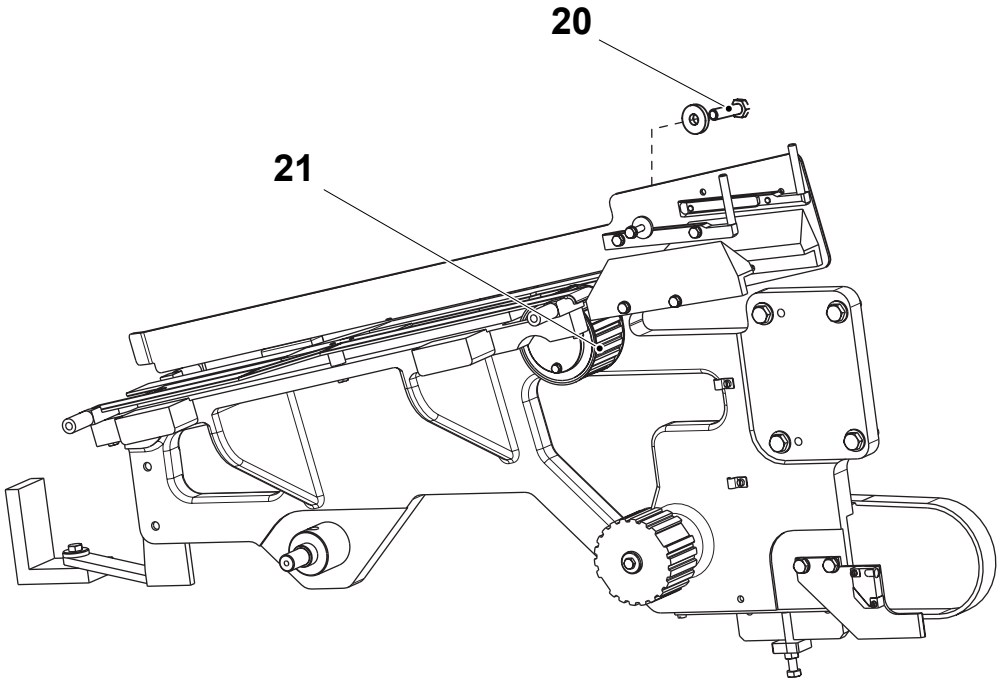
i) Change the O-ring (16), the ball bearings (17) and (18) and the seal ring (19).

Note! Apply a layer of grease (TP No. 90296-68) on the seal ring (19) when assembling.



13 Screw
14 Cover
15 Screw
16 O-ring
17 Ball bearing
18 Ball bearing
19 Seal ring

j) Remove the screw (20) and pull out the toothed pulley (21).



20 Screw
21 Toothed pulley

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

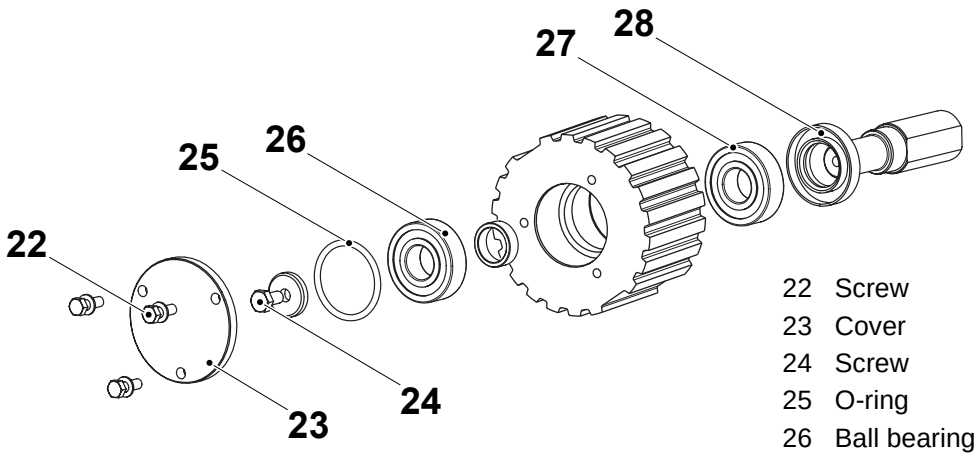
(Cont'd)

k) Remove the screws (22) and the cover (23).

l) Remove the screw (24) and the washer.

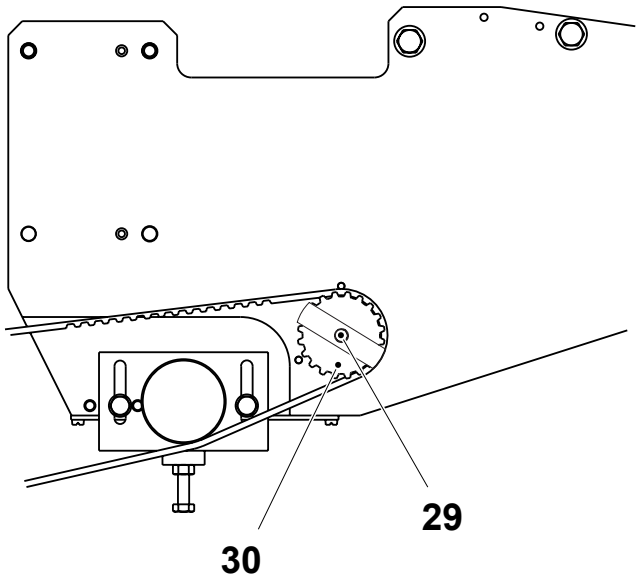
m) Change the O-ring (25), the ball bearings (26) and (27) and the seal ring (28).

Note! Apply a layer of grease (TP No. 90296-68) on the seal ring (28) when assembling.



22 Screw
23 Cover
24 Screw
25 O-ring
26 Ball bearing
27 Ball bearing
28 Seal ring

n) Remove the screw (29), the washer, the flag and the toothed pulley (30).



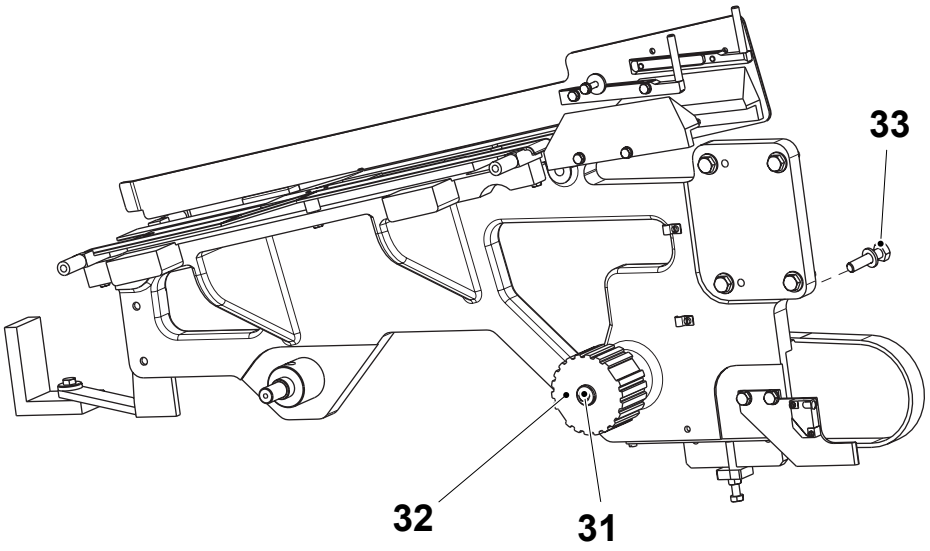
29 Screw
30 Toothed pulley

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

o) Remove the screws (31) and (33) and pull out the toothed pulley (32) group together with the shaft.



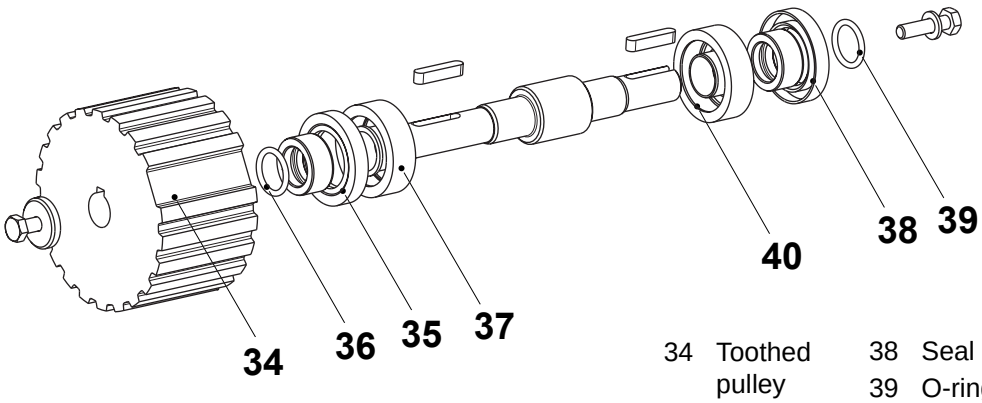
31 Screw
32 Toothed pulley
33 Screw

p) Remove the toothed pulley (34).

q) Change the seal ring (35), the O-ring (36), the ball bearing (37).

r) Change the seal ring (38), the O-ring (39), the ball bearing (40).

Note! Apply a layer of grease (TP No. 90296-68) on the seal rings (35) and (38) when assembling.



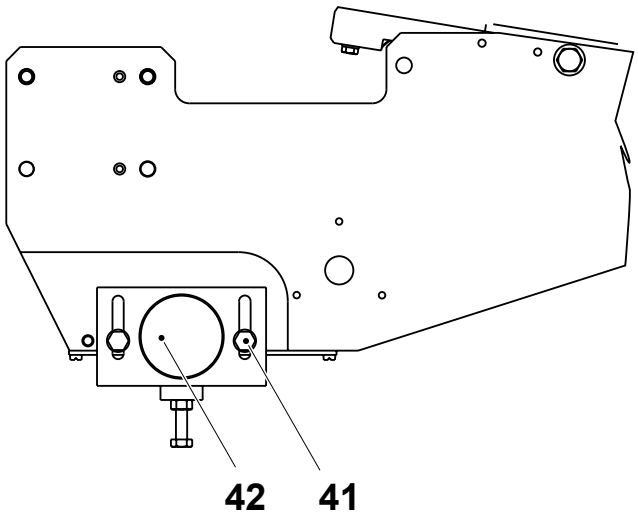
34 Toothed pulley
35 Seal ring
36 O-ring
37 Ball bearing
38 Seal ring
39 O-ring
40 Ball bearing

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

s) Remove the screws (41) and pull out the roller (42) group.



41 Screw
42 Roller

t) Remove the screw (43), the retaining ring (44) and the roller (45).

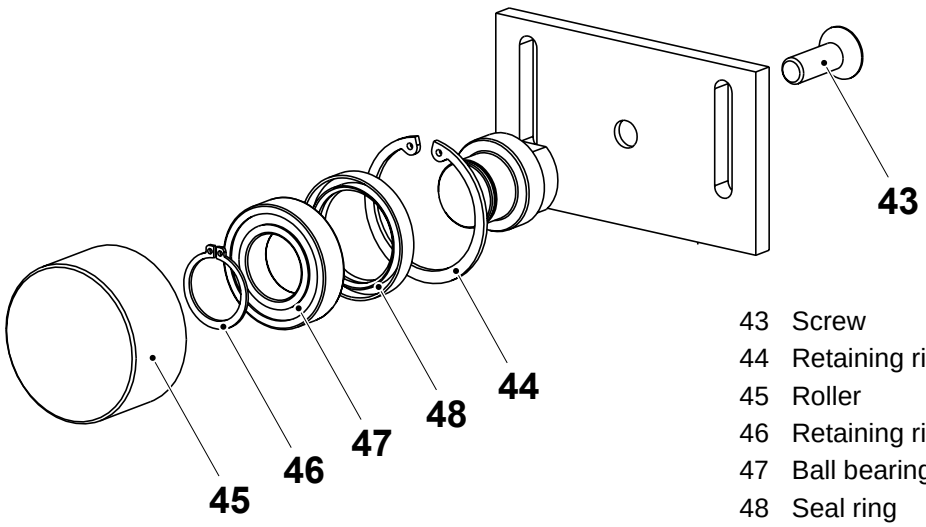
u) Remove the retaining ring (46) and change the ball bearing (47) and the seal ring (48).

Note! Apply a layer of grease (TP No. 90296-68) on the seal ring (48) when assembling.

v) Assemble in the reverse order.

w) Set the belt tension, see 5.10-2 Infeed Conveyor - Set Belts.

x) Set the infeed conveyor, see 5.10-1 Infeed Conveyor - Synchronisation.



43 Screw
44 Retaining ring
45 Roller
46 Retaining ring
47 Ball bearing
48 Seal ring

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.10.1 Protective Cover

SPC Reference	1144645-0200

5.10.1-1 Protective Cover - Set

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1144645-0200

Note! Not valid for: 200 S, 200 B, 250 B, 250 S and TPA 250 Sq.

Note! Only valid for protective covers equipped with the spring (1).

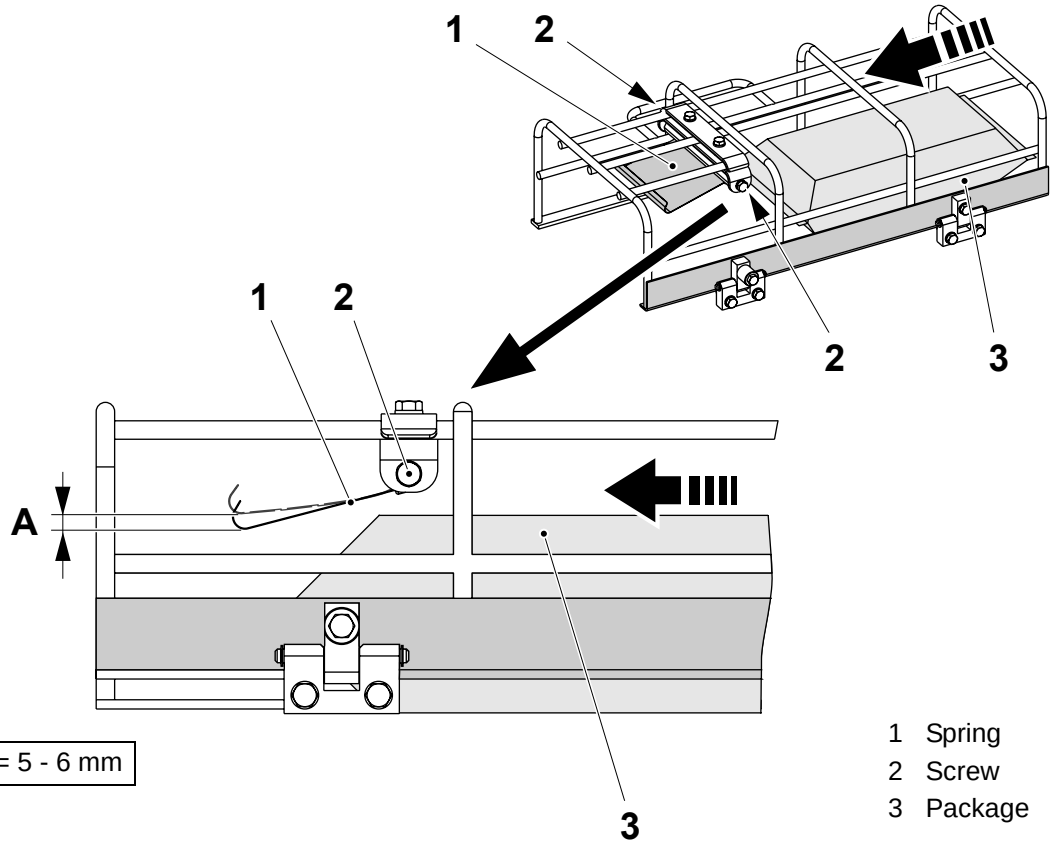
Check that the spring (1) deflect the distance **A** when a package (3) pass the spring (1). If required, set the spring (1) as follows:

a) Loosen the two screws (2).

b) Adjust the position of the spring (1).

c) Tighten the two screws (2).

d) Check the distance **A** with a package (3). If required, perform items from a) to c).



A = 5 - 6 mm

1 Spring
2 Screw
3 Package

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.11 Waste Conveyor

SPC Reference	1350182-0300

5.11-1 Waste Conveyor - Check

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1350182-0300

a) Check that the air cylinder (6) moves easily to its end position.

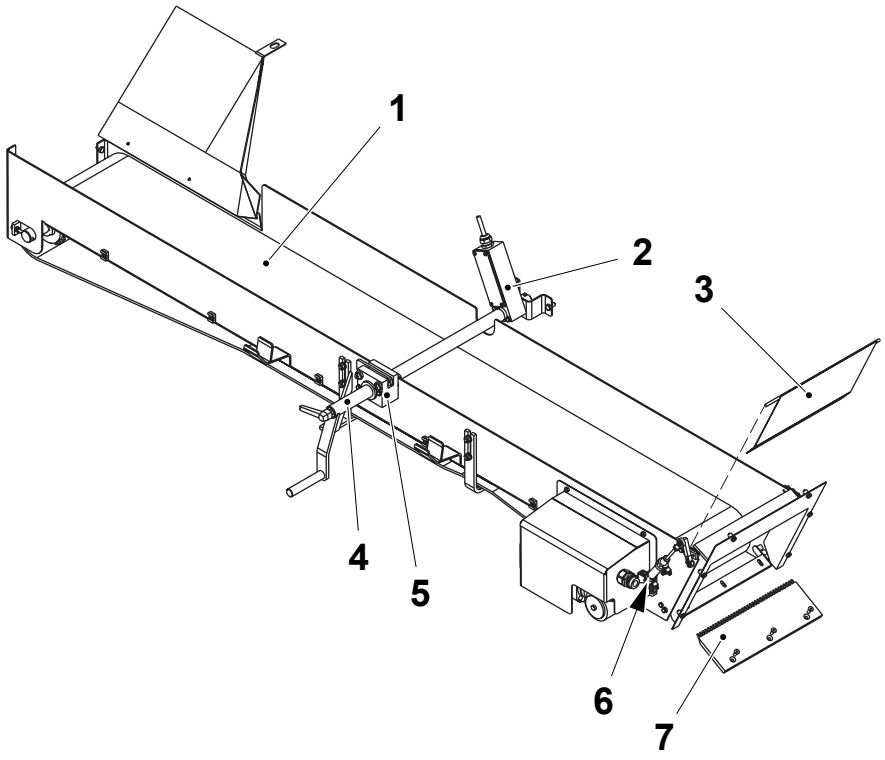
b) Check that the hatch (3) moves easily.

c) Check the guard plate (7) for wear on the teeth edge.

d) Check that it is possible to fit the crank (4) easily into the crank holder (5).

e) Check the function of the crank guard (2) by inserting the crank (4) in the crank holder (5) and checking that the corresponding alarm is showed on the TPOP panel.

f) Check that the conveyor belt (1) is not damaged. Change it as required, see 5.11-2 Waste Conveyor - Change Conveyor Belt.



1 Conveyor belt
2 Crank guard
3 Hatch
4 Crank
5 Crank holder
6 Air cylinder
7 Guard plate

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5.11-2 Waste Conveyor - Change Conveyor Belt

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Pliers
SPC Reference	1350182-0300

a) Loosen the two screws (1) and the nuts (2).

b) Move the shaft (3) inwards, in order to release the conveyor belt (4) tension, see arrow.

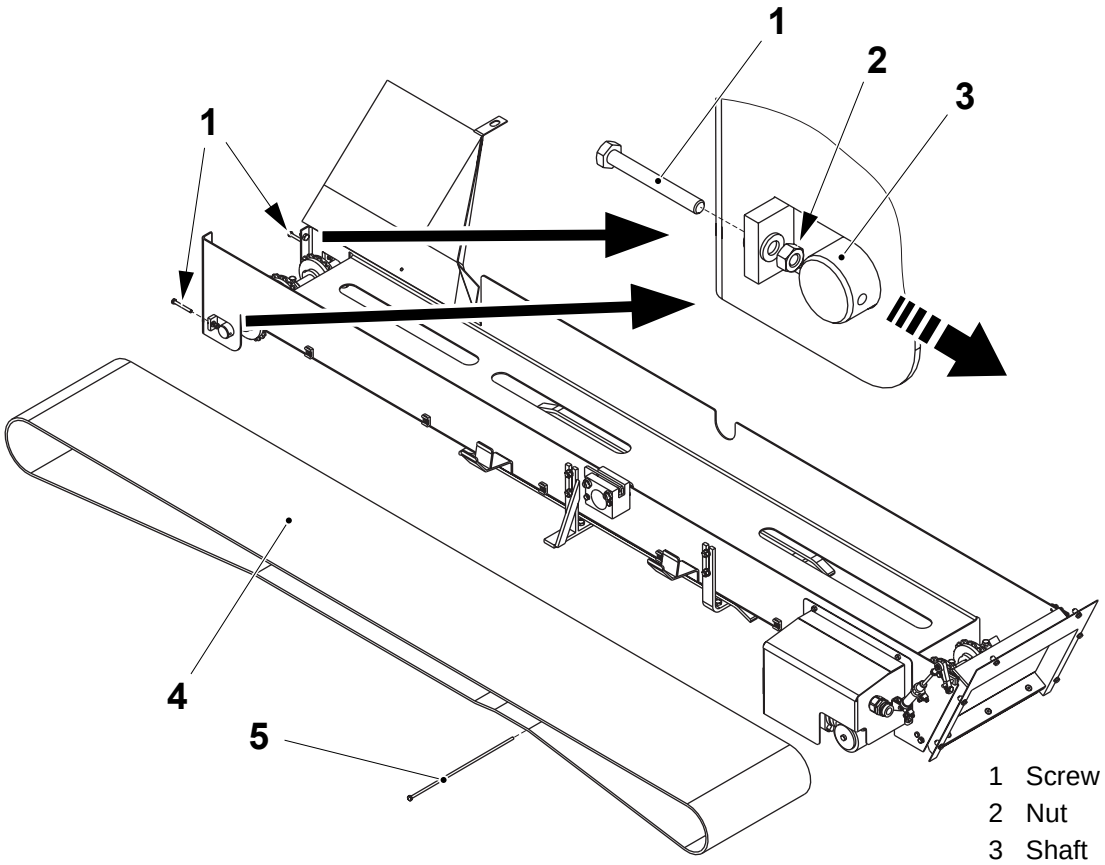
c) With the aid of pliers pull out the connecting pin (5) from its site.

d) Separate the two edges of the conveyor belt (4).

e) Remove the conveyor belt (4) and change it as required.

f) Assemble in the reverse order.

Note! Tension the conveyor belt (4) by means of the two screws (1) and tighten the two nuts (2).



1 Screw
2 Nut
3 Shaft
4 Conveyor belt
5 Connecting pin

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.11-3 Waste Conveyor - Set

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Pliers Feeler gauge
SPC Reference	1350182-0300

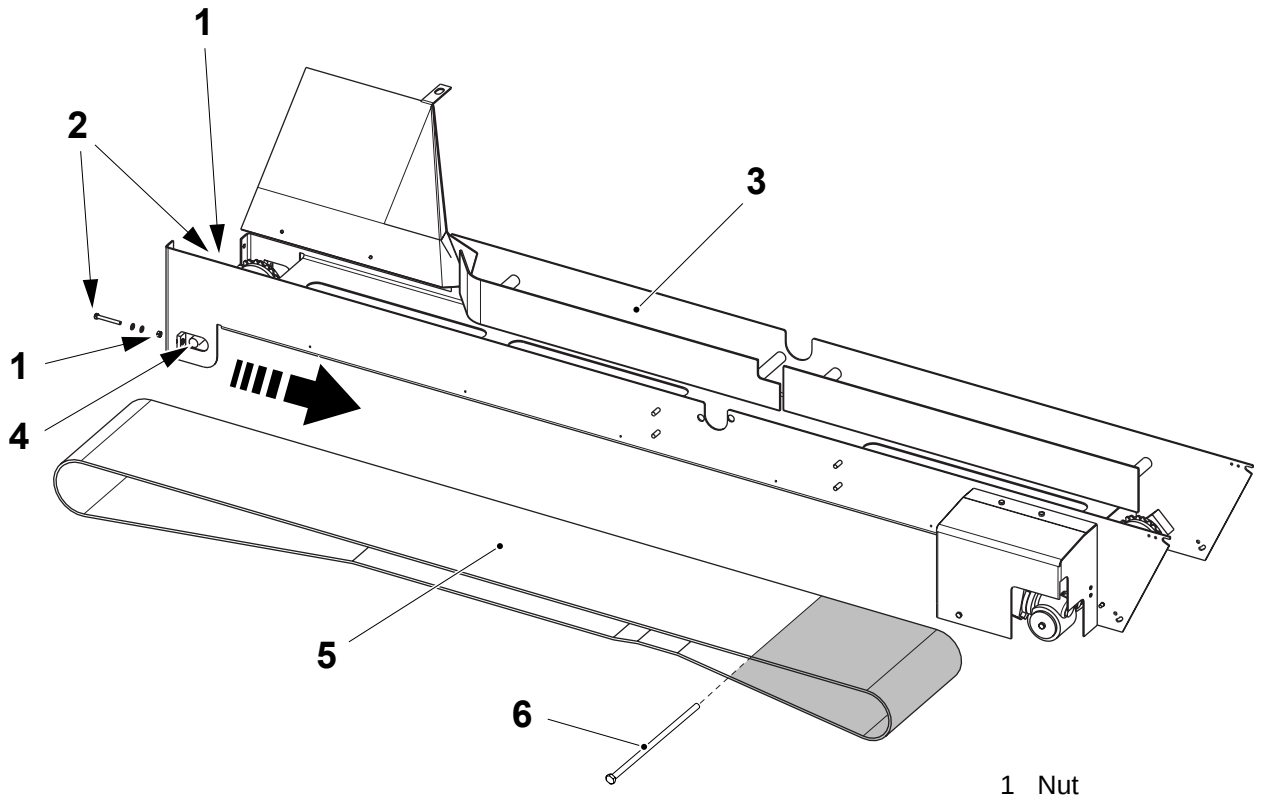
a) Loosen the two nuts (1) and the screws (2) on the waste chute (3).

b) Move the shaft (4) inwards, in order to release the conveyor belt (5) tension, see the arrow in the figure.

c) With the aid of pliers pull out the connecting pin (6) from its site.

d) Separate the two edges of the conveyor belt (5).

e) Remove the front part of the conveyor belt (5) in order to easily access the front waste chute (3).



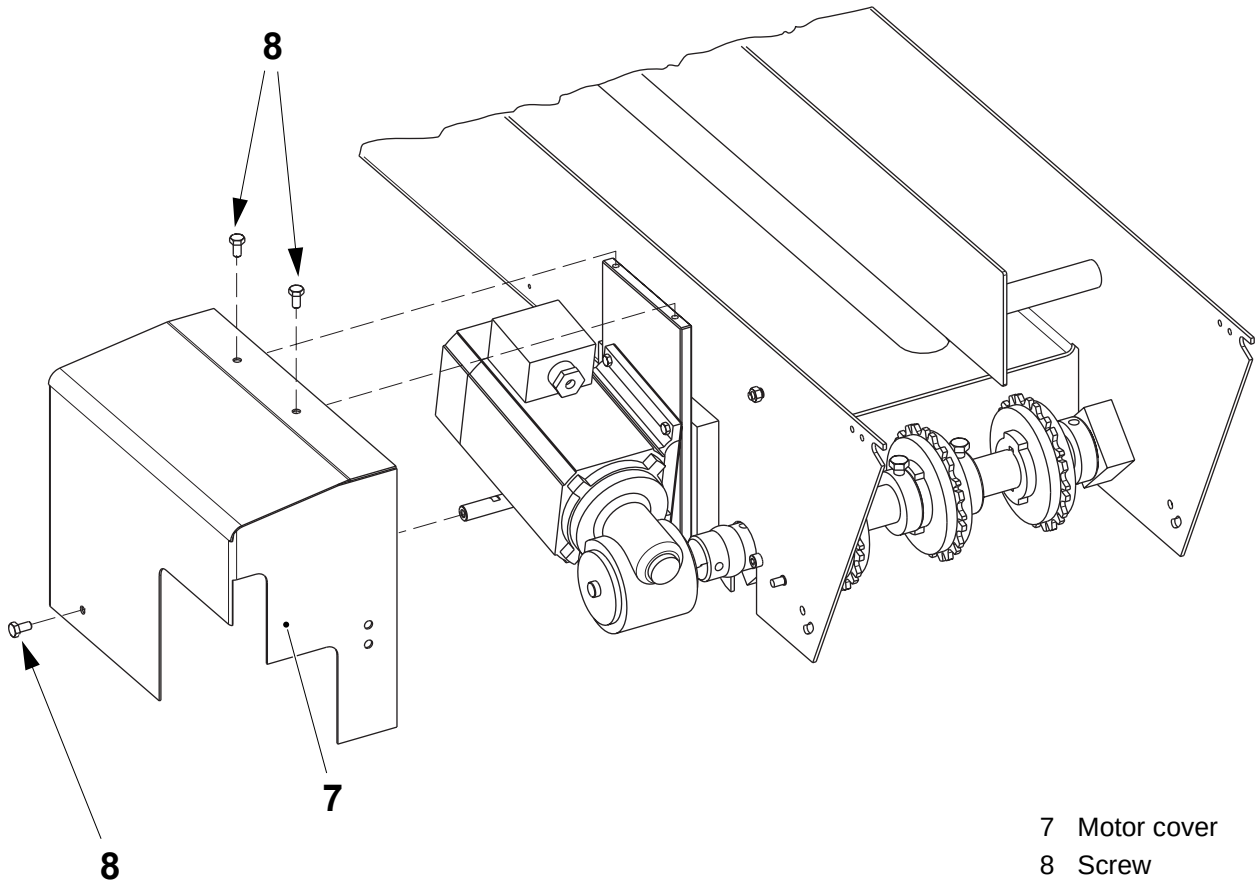
1 Nut
2 Screw
3 Waste chute
4 Shaft
5 Conveyor belt
6 Connecting pin

(Cont'd)

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(Cont'd)

f) Remove the motor cover (7) by means of the screws (8).



7 Motor cover
8 Screw

(Cont'd)

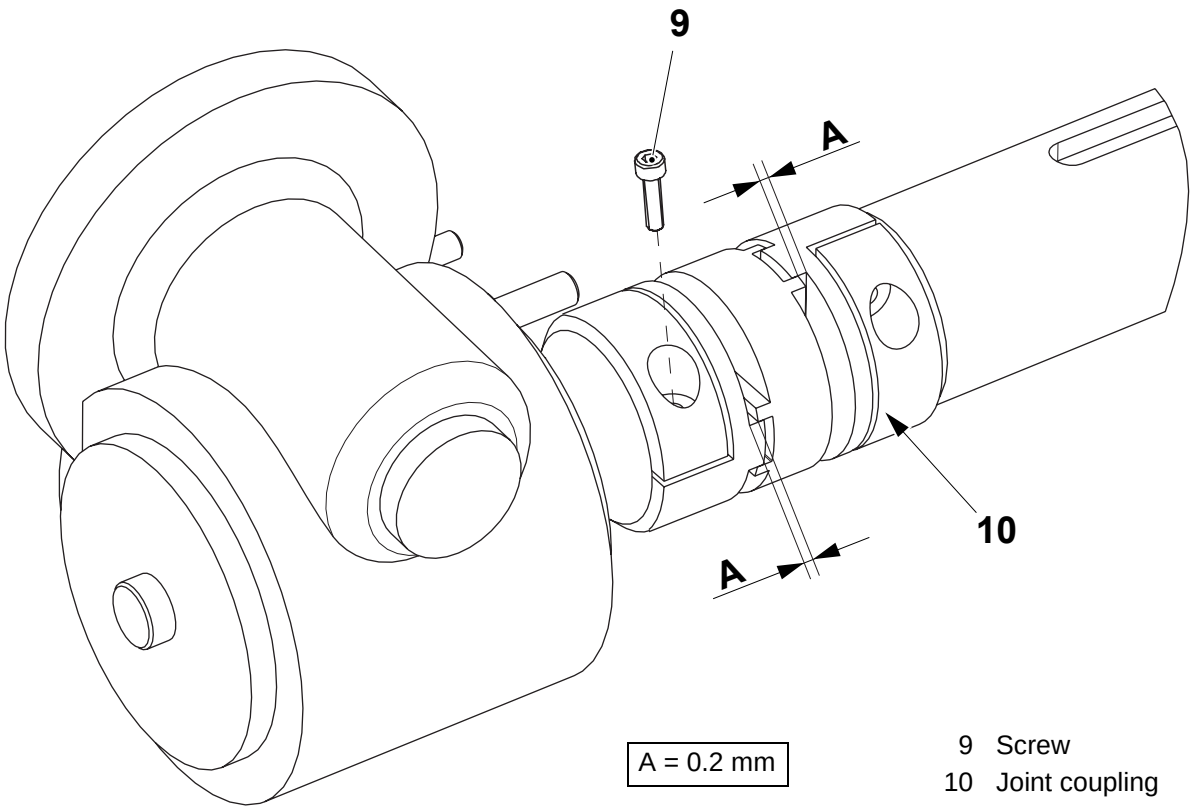
TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

g) Remove the screw (9).

h) With the aid of a feeler gauge, set the distance **A** between the plastic part of the joint coupling (10) and its hub as shown in the figure.

i) Tighten the screw (9) to the joint coupling (10).



A = 0.2 mm

9 Screw
10 Joint coupling

(Cont'd)

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(Cont'd)

j) Loosen the screws (13) and (17).

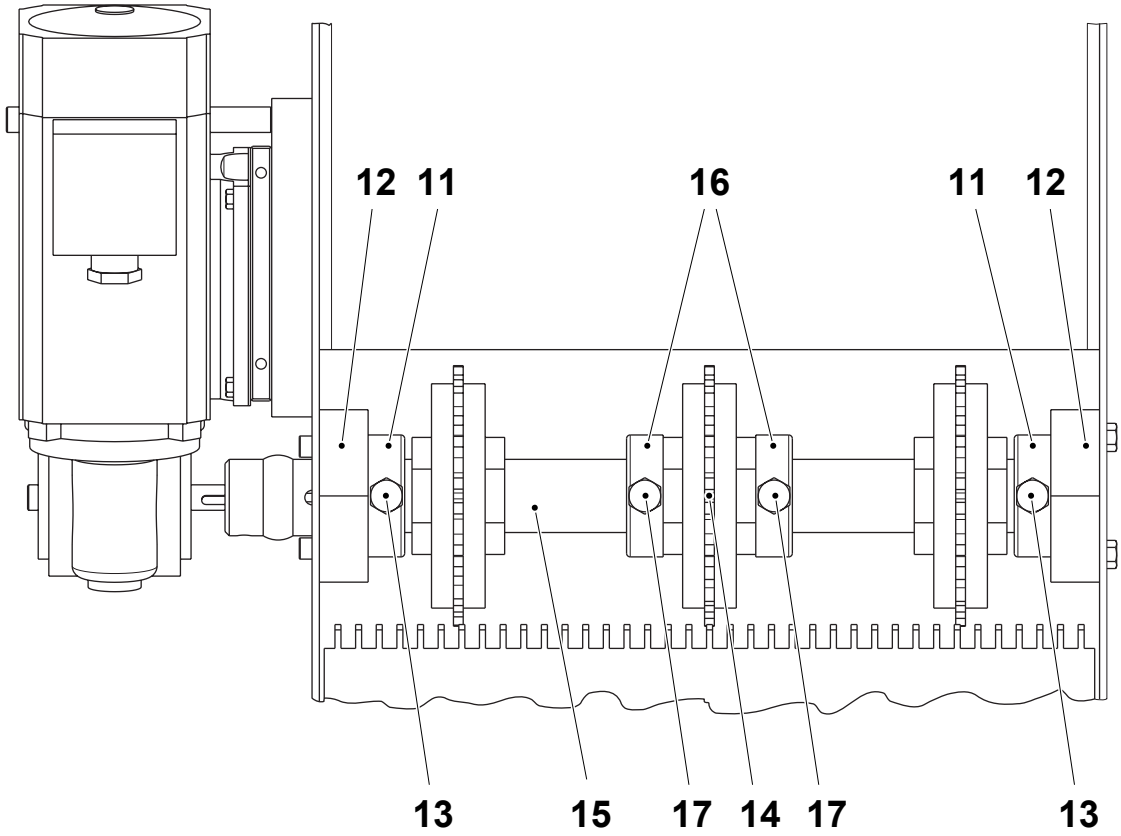
k) Move the two external retaining rings (11) against the two plastic bearing (12).

l) Tighten the two screws (13).

m) Move the middle toothed wheel (14) to the centre of the drive shaft (15).

n) Move the two central retaining rings (16) against the middle toothed wheel (14).

o) Tighten the two screws (17).



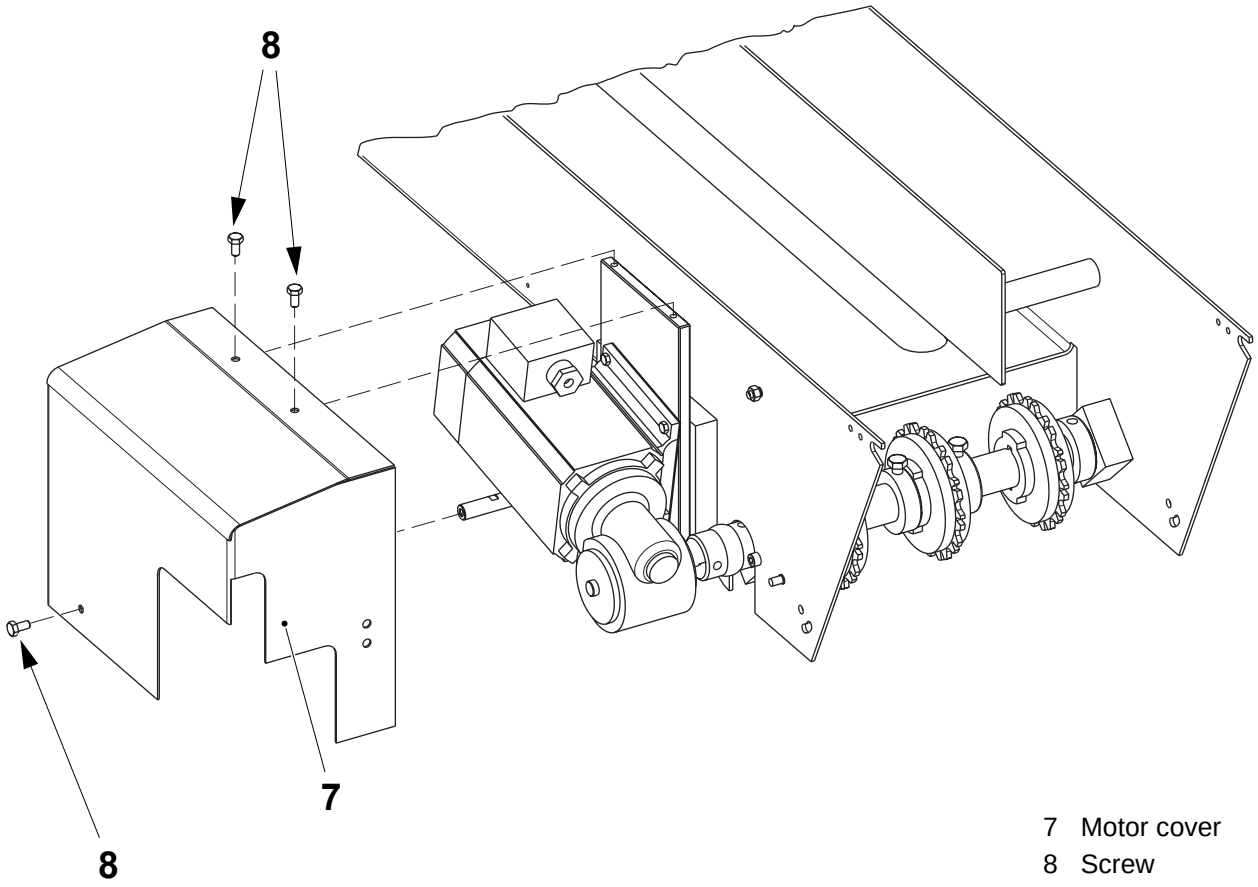
11	Retaining ring	15	Drive shaft
12	Bearing	16	Retaining ring
13	Screw	17	Screw
14	Toothed wheel		

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

(Cont'd)

p) Fit back the motor cover (7) by means of the screws (8).



7 Motor cover
8 Screw

(Cont'd)

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(Cont'd)

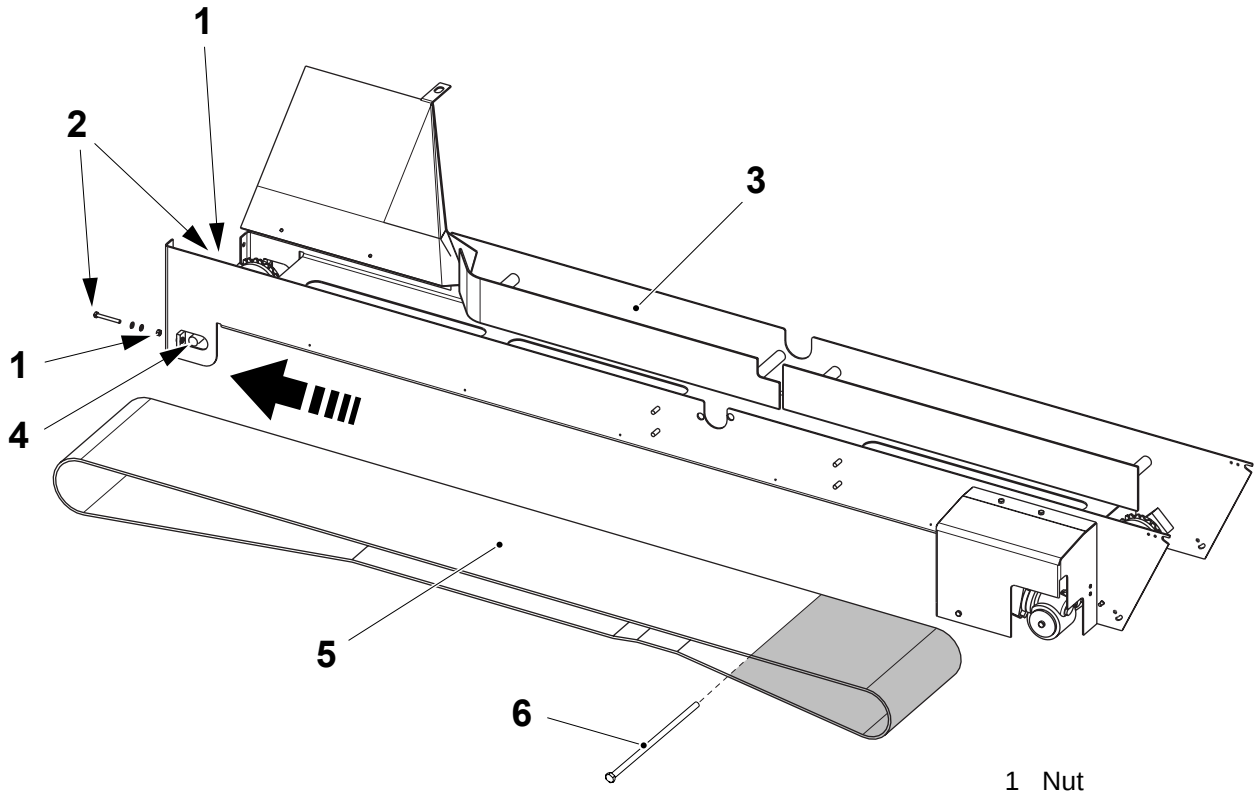
q) Fit back the front part of the conveyor belt (5).

r) Join the two edges of the conveyor belt (5) by means of the connecting pin (6).

s) Move the shaft (4) outwards, see the arrow in the figure.

t) Tension the conveyor belt (5) by means of the two screws (2).

u) Tighten the two nuts (1) on the waste chute (3).



1 Nut
2 Screw
3 Waste chute
4 Shaft
5 Conveyor belt
6 Connecting pin

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5.12 Crank

SPC Reference	1260883-0200

5.12-1 Crank - Set Position

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1260883-0200

a) Fit the crank (1) into the holder (2).

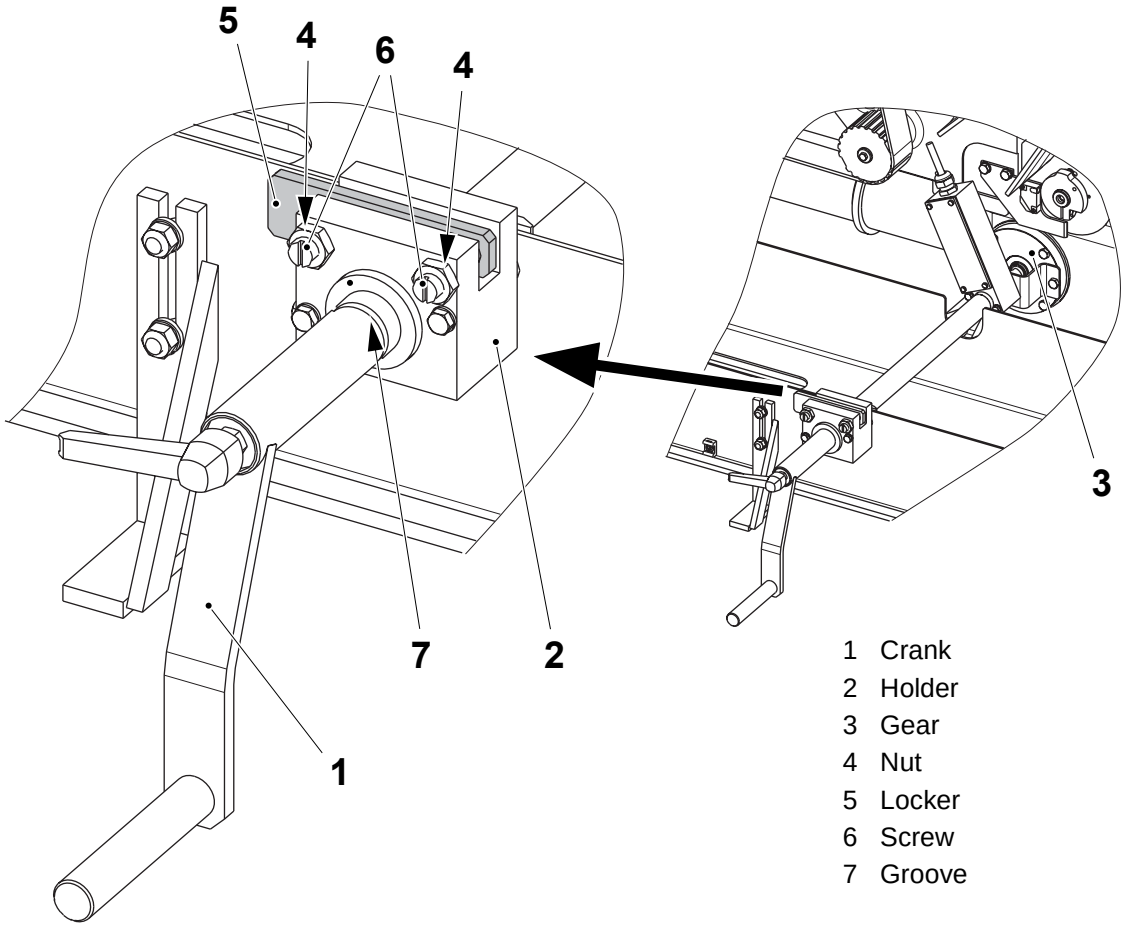
b) Make sure that the crank (1) has been completely fitted into the indexing gear (3).

c) Loosen the two nuts (4) on the holder (2).

d) Adjust the locker (5) position by means of the screws (6) until the locker (5) fits into the crank groove (7).

e) Tighten the two nuts (4) on the holder (2).

f) Lift the locker (5) and remove the crank (1).



1 Crank
2 Holder
3 Gear
4 Nut
5 Locker
6 Screw
7 Groove

TechPub_2614345_0105 - 05_MM81534_11en.fm

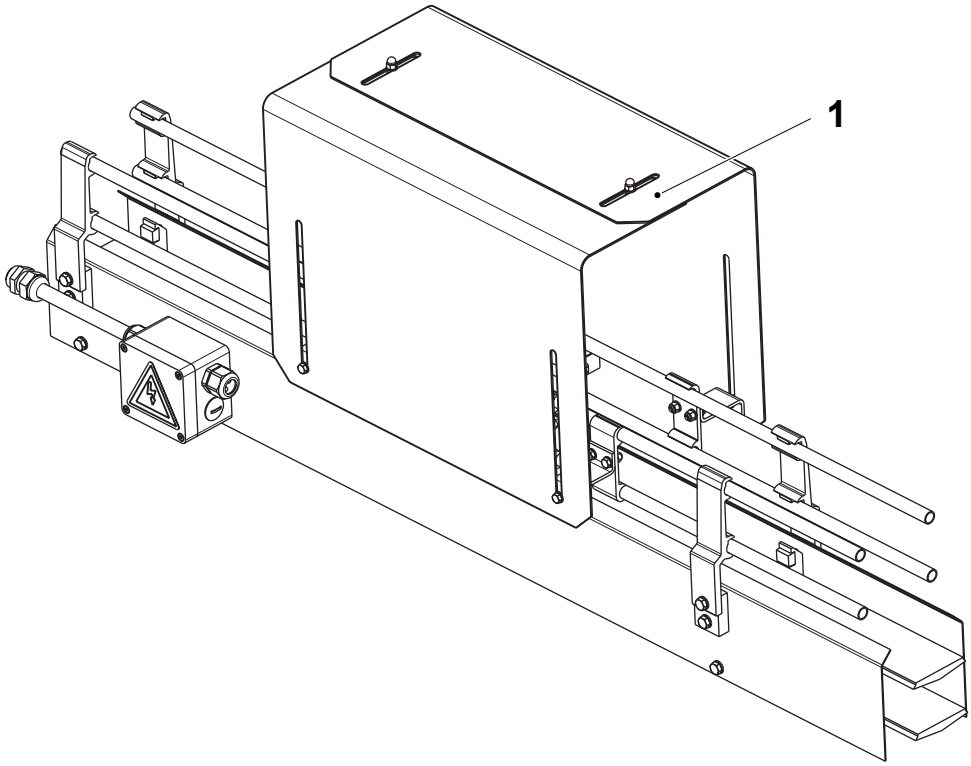
5.13 Last Point DE

SPC Reference	1484198-0100

5.13-1 Last Point DE - Set Photocells

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1484198-0100

Set the photocells position, see 5-21 Final Folder - Set Package Out Feed Counting Photocells.



1 Last point DE

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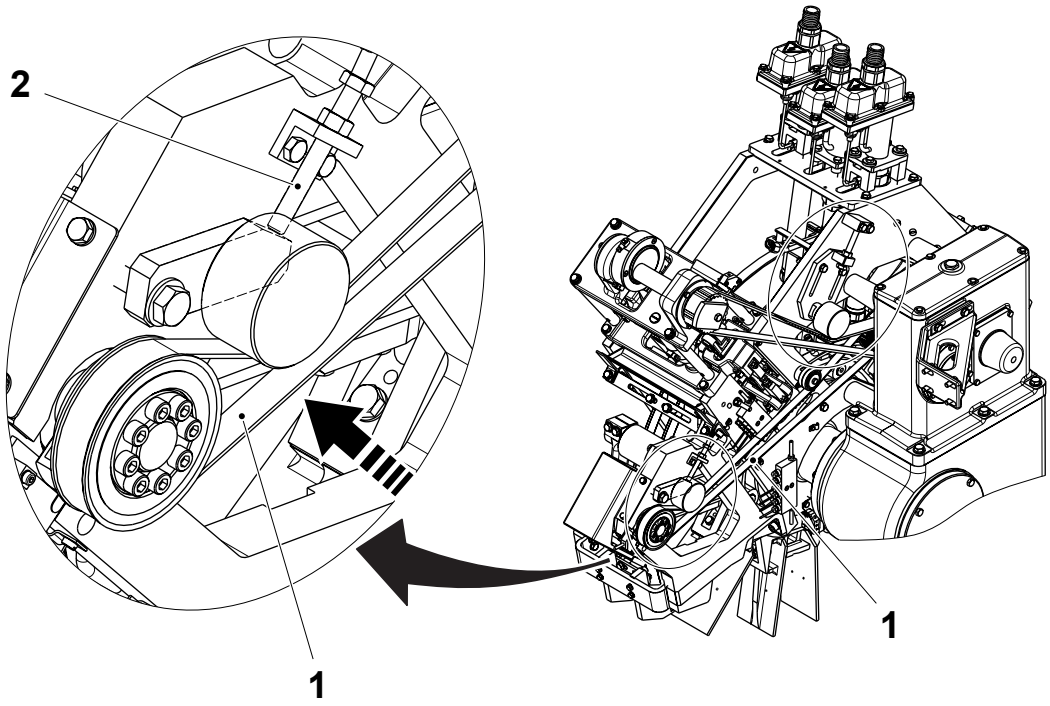
5.14 Pull Down 4th Station

Note! Valid only for TPA 500 Sq and for the machines rebuilt with UK-2721043-0100 Final Folder - 4th Station.

5.14-1 Pull Down 4th Station - Set Belt Tension

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Dynamometer TP No. 74767-102
RK Reference	2639105-0100
SPC Reference	648515-0200

With the aid of a dynamometer, set the belt (1) tension to **40 N** with a deflection of **10 mm** by means of the screw (2).



1 Belt
2 Screw

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.14-2 Pull Down 4th Station - Set Buffer

MachineStatus	Mains Power OFF Air OFF Steam ON Water OFF
RK Reference	2639105-0100
SPC Reference	648515-0200

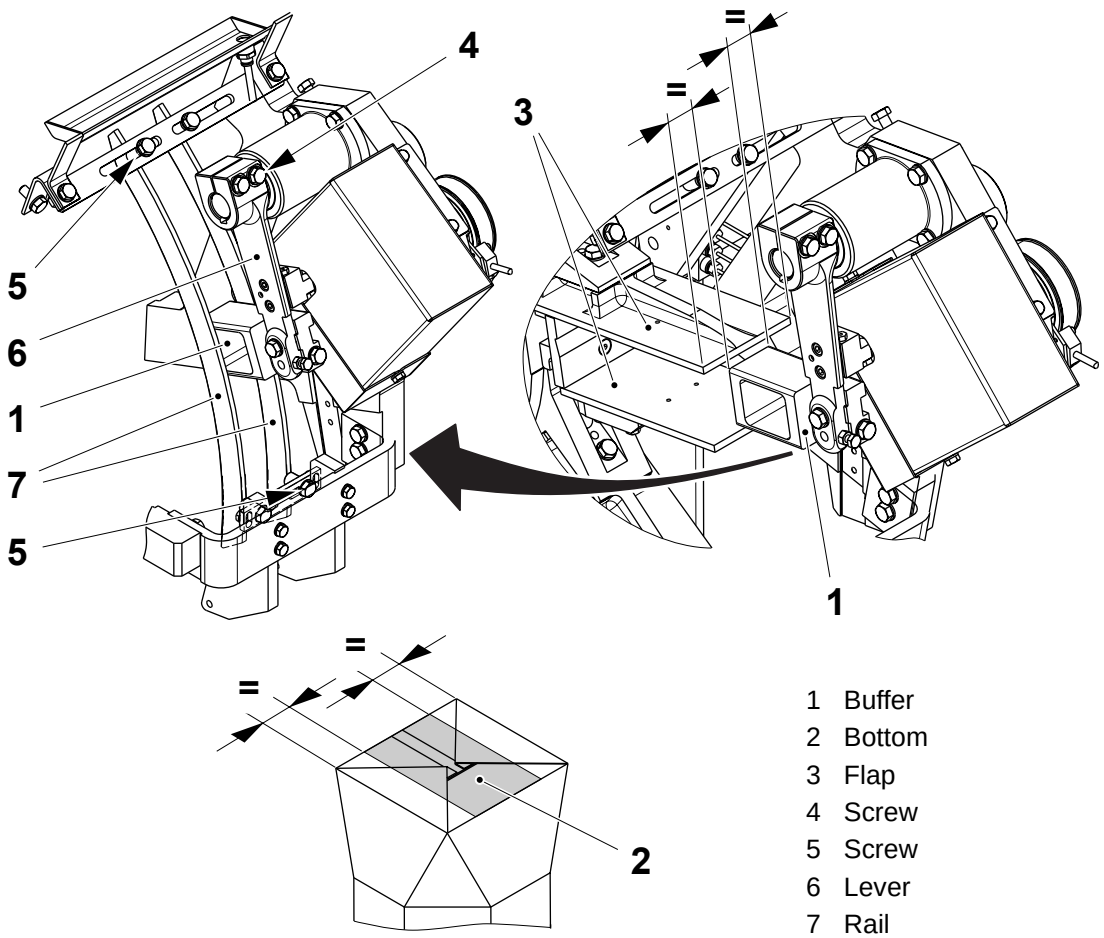
Check that the buffer (1) is positioned so that it is aligned with the package bottom (2), grey marked. If no packages are available, check the buffer (1) position against the volume flaps (3).

a) Loosen the screws (4) and (5).

b) Move the lever (6) with the buffer (1) sideways until the buffer (1) is aligned with the package bottom (2) or is aligned with one of the volume flaps (3).

c) Tighten the screws (4) to **16 Nm**.

d) Adjust the rails (7) and tighten the screws (5).



1 Buffer
2 Bottom
3 Flap
4 Screw
5 Screw
6 Lever
7 Rail

(Cont'd)

TechPub_2614345_0105 - 05_MM81534_11en.fm

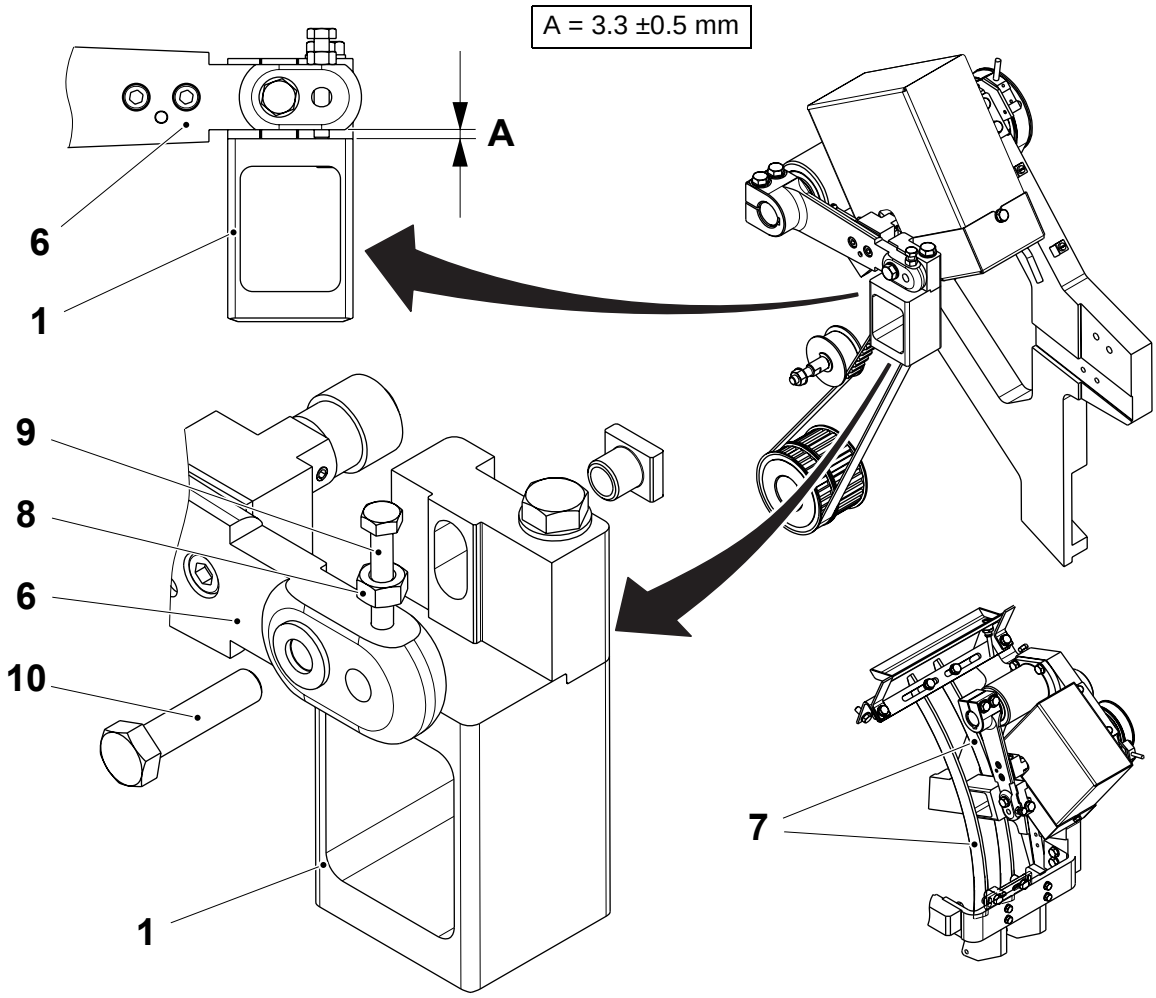
(Cont'd)

e) Loosen the nut (8) and the screws (9) and (10).

f) Set the distance **A** between the buffer (1) and the lever (6) by means of the screw (9).

g) Tighten the nut (8) and the screw (10).

h) Crank the machine to make sure that the pull down 4th station do not interfere with the movement of the final folder wheel and that the buffer (1) is outside the rails (7) when the final folder wheel is indexed.



1 Buffer
6 Lever
7 Rail
8 Nut
9 Screw
10 Screw

(Cont'd)

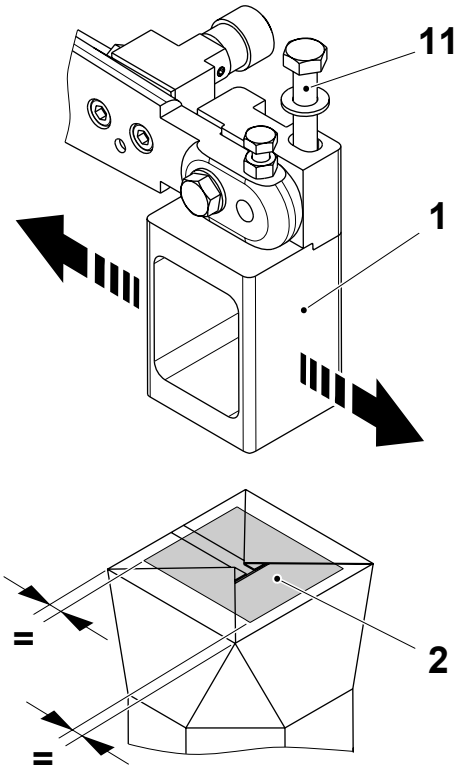
TechPub_2614345_0105 - 05_MM81534_11en.fm

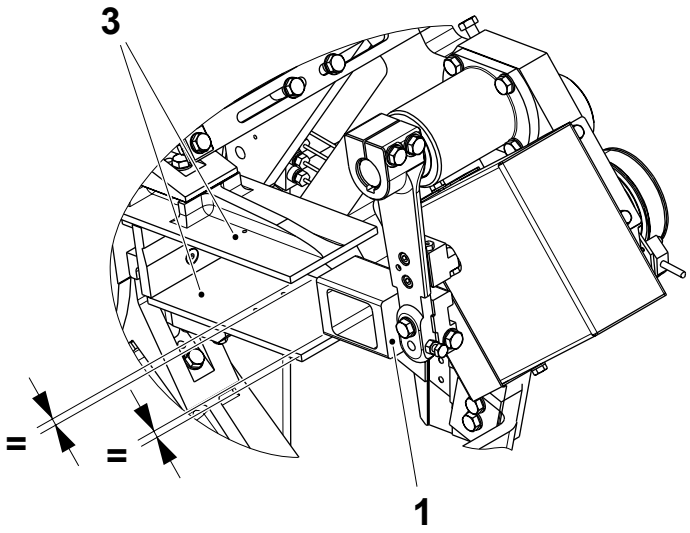
(Cont'd)

i) Loosen the screw (11).

j) Move the the buffer (1) sideways until the buffer (1) is aligned with the package bottom (2) or is aligned between two of the volume flaps (3).

k) Tighten the screw (11).





1 Buffer
2 Bottom
3 Flap
11 Screw

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5.14-3 Pull Down 4th Station - Set Lower Turning Position

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
RK Reference	2639105-0100
SPC Reference	648515-0200

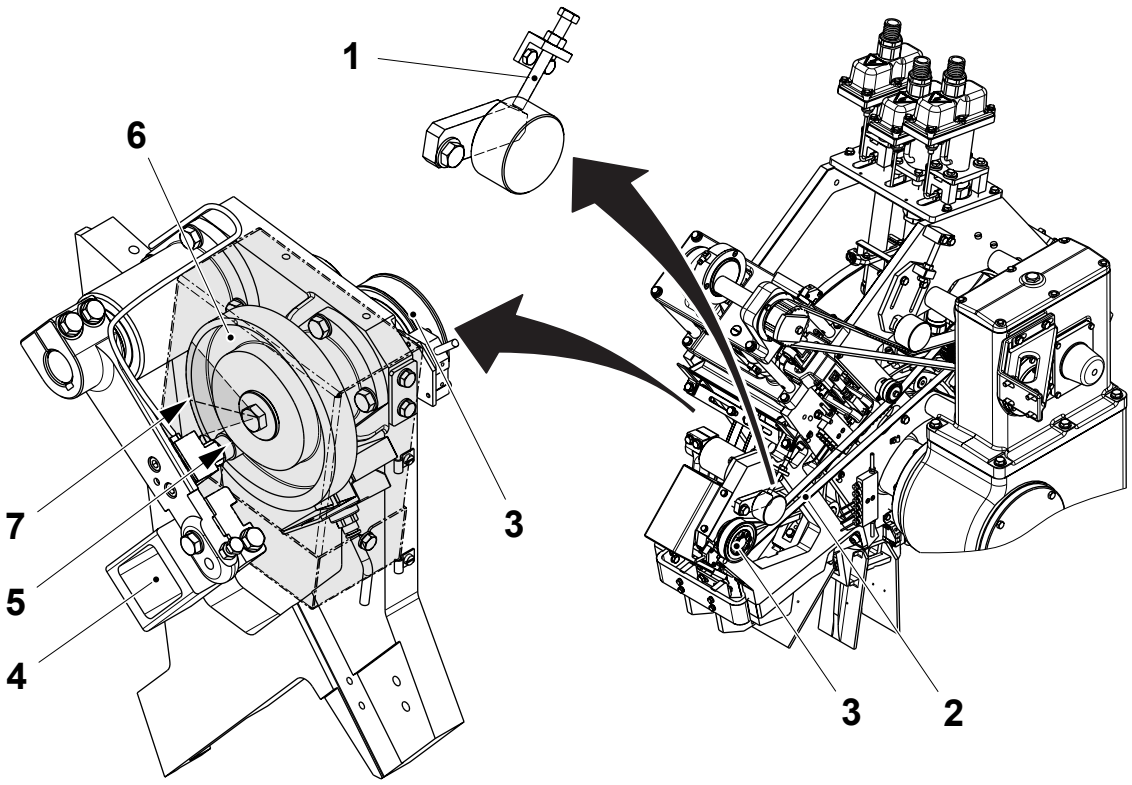
a) Crank the final folder to 250°.

b) Loosen the screw (1) and remove the belt (2) from the toothed pulley (3).

c) Turn the toothed pulley (3) until the buffer (4) is in the lowest position. Make sure that the roller (5), inside the cam (6), is in the middle of lower range, position (7), there the buffer (4) is in the lowest position.

d) Fit the belt (2) on the toothed pulley (3).

e) Tighten the screw (1).



1 Screw
2 Belt
3 Pulley
4 Buffer
5 Roller
6 Cam
7 Middle position

(Cont'd)

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(Cont'd)

f) Crank the machine until all the final folder switches are activated except the pressure device proximity switch B5302 (8). The proximity switch (8) is connected in series with the proximity switch (9).

g) Mark the position of the shaft (10) against the plate (11) to get a reference point.

h) Loosen the clamp (12) and the screw (1).

i) Remove the belt (2).

j) Turn the toothed pulley (3) until the proximity switch (9) is activated by the flag (13).

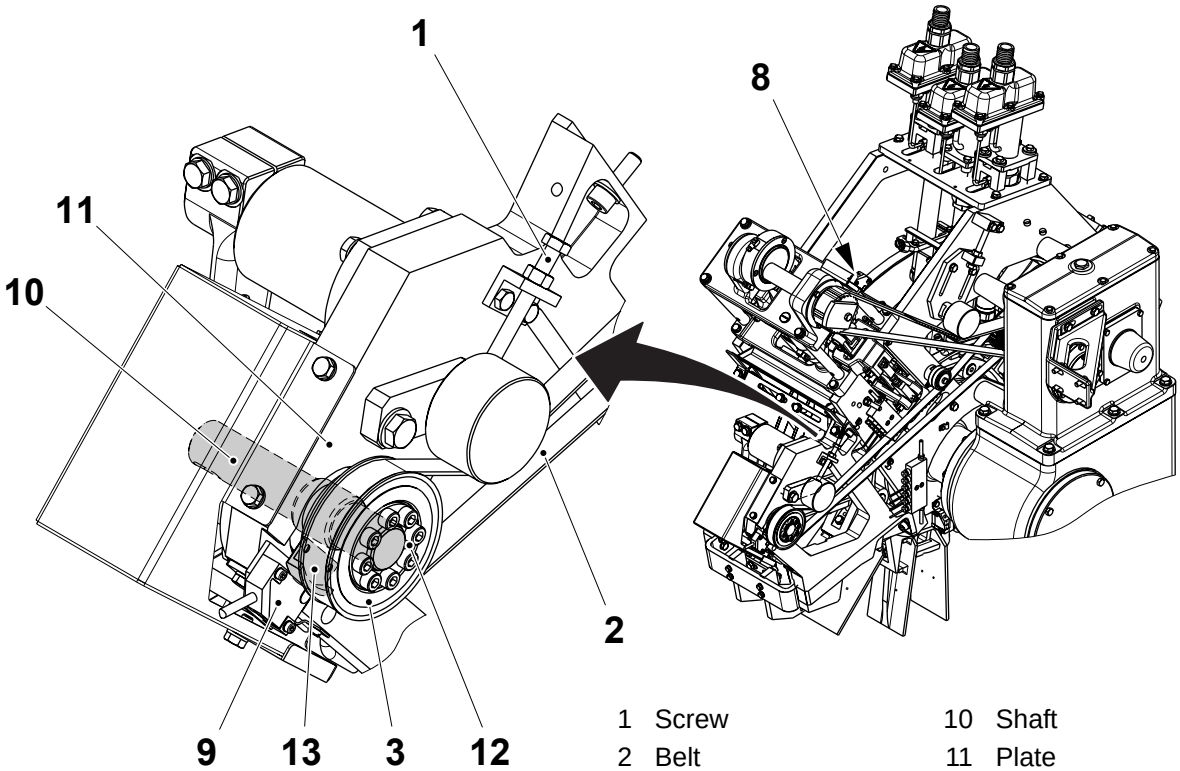
k) Make sure that the shaft (10) is aligned, see item g).

l) Tighten the clamp (12).

m) Fit the belt (2) and tighten the screw (1). Set the belt tension, see 5.14-1 Pull Down 4th Station - Set Belt Tension.

n) Crank the machine to make sure that the pull down 4th station do not interfere with the movement of the final folder wheel. Make sure that the proximity switch (9) is activated at the same time as all the other final folder switches.

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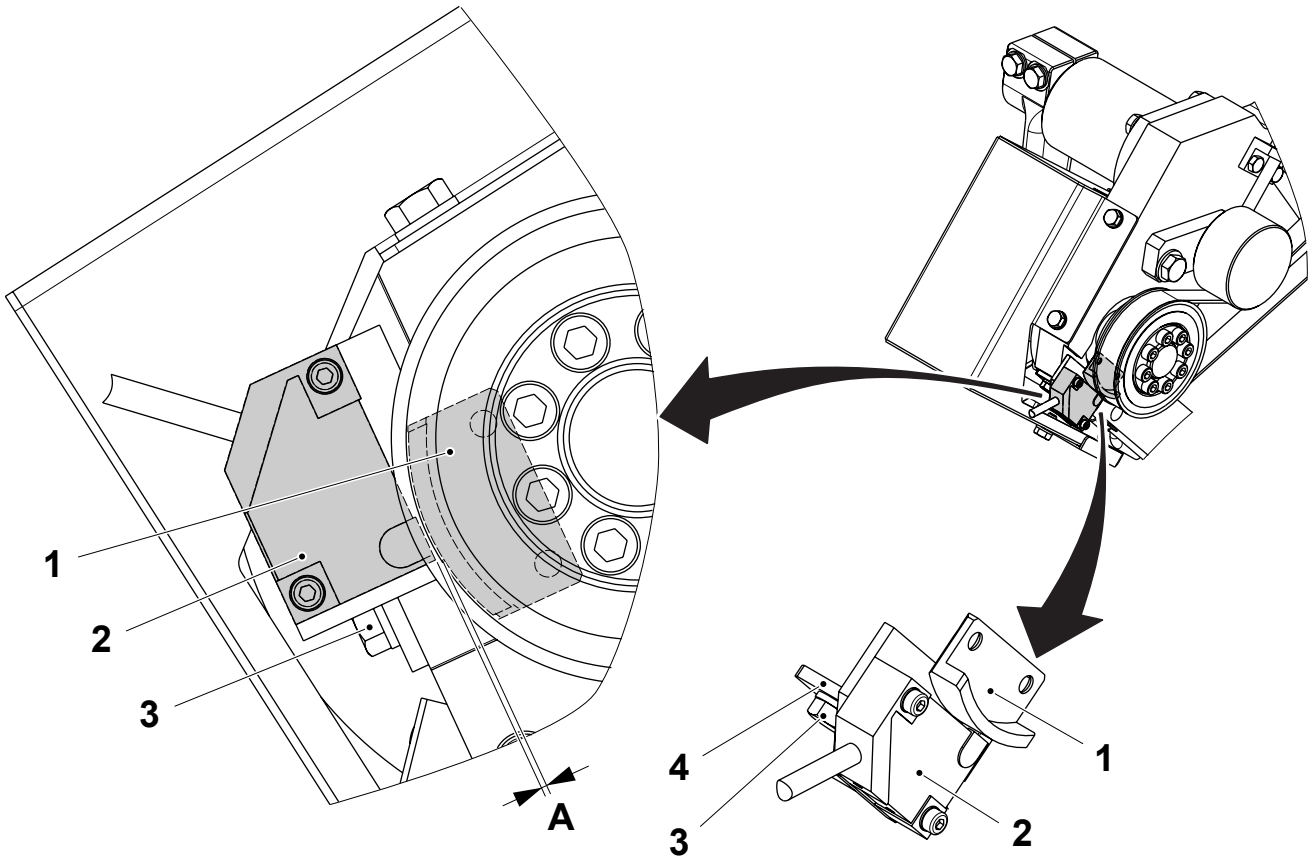
1	Screw	10	Shaft
2	Belt	11	Plate
3	Pulley	12	Clamp
8	Proximity switch	13	Flag
9	Proximity switch		

5.14-4 Pull Down 4th Station - Set Proximity Switch

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
RK Reference	2639105-0100
SPC Reference	648515-0200

a) Crank the final folder until the flag (1) is in front of the inductive switch (2).

b) Check the distance **A** and set it as required.
   - Remove the screws (3)
   - set the distance **A** between the flag (1) and the proximity switch (2) by moving the proximity switch (2) (add shims under the bracket (4))
   - fit the screws (3).



A = 0.5 ±0.1 mm

1 Flag
2 Switch
3 Screw
4 Bracket

TechPub_2614345_0105 - 05_MM81534_11en.fm

5.14-5 Pull Down 4th Station - Check/Change Pull Down Device

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
RK Reference	2639105-0100
SPC Reference	648515-0200

a) Check the condition of the roller, the ball bearings and the radial seals, see the arrows. Change if required.

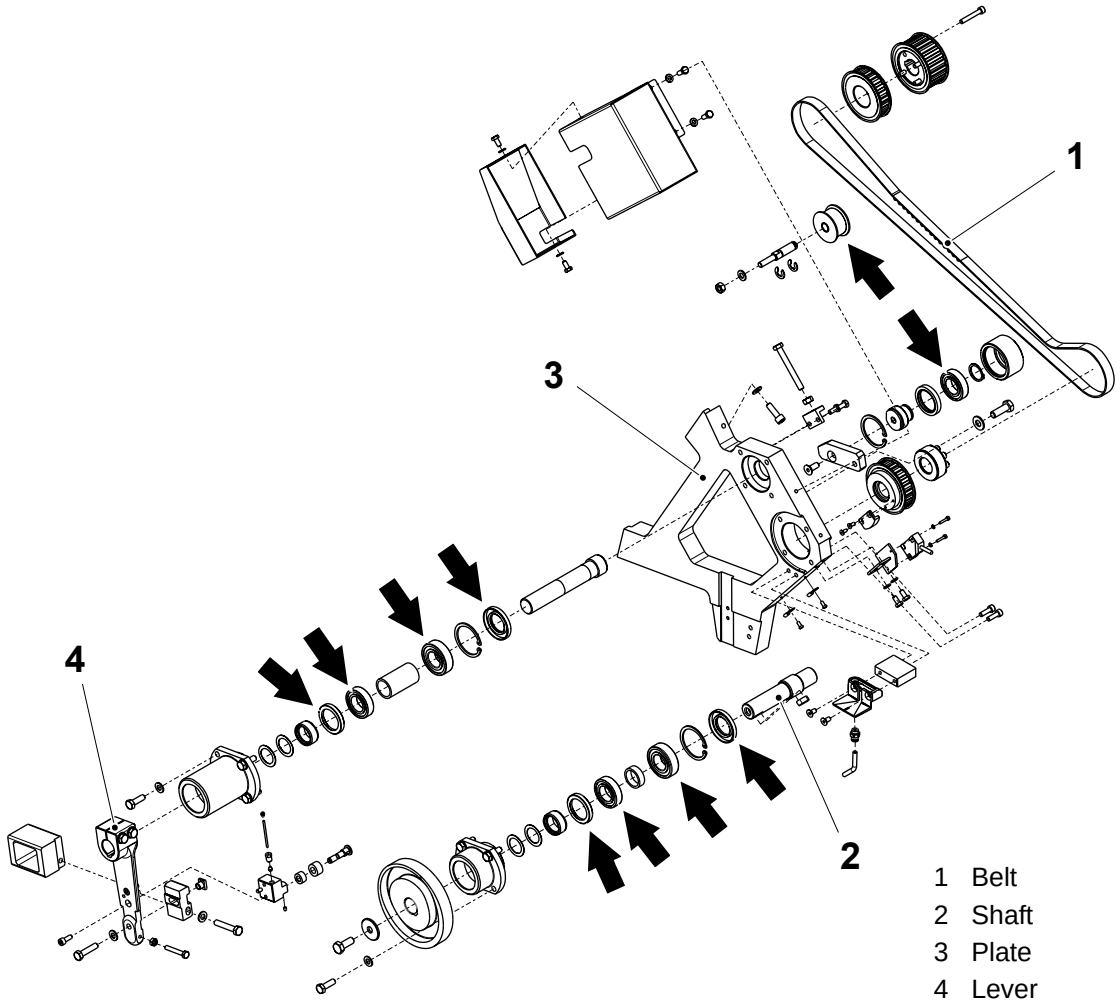
b) If a ball bearing must be changed, change also its relative retaining rings, screws and washers.

Note! If the belt (1) must be removed, mark the relative position of the shaft (2) with respect to the plate (3).

Note! If the lever (4) must be removed, check the setting after the reassembly, see 5.14-2 Pull Down 4th Station - Set Buffer.

Note! If the belt (1) must be changed, set it after the reassembly, see 5.14-1 Pull Down 4th Station - Set Belt Tension.

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1 Belt
2 Shaft
3 Plate
4 Lever

5.14-6 Pull Down 4th Station - Check Belt and Curve Roller

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
RK Reference	2639105-0100
SPC Reference	648515-0200

Belt

Check the belt (1) for wear and/or damage. If required, change the belt (1).

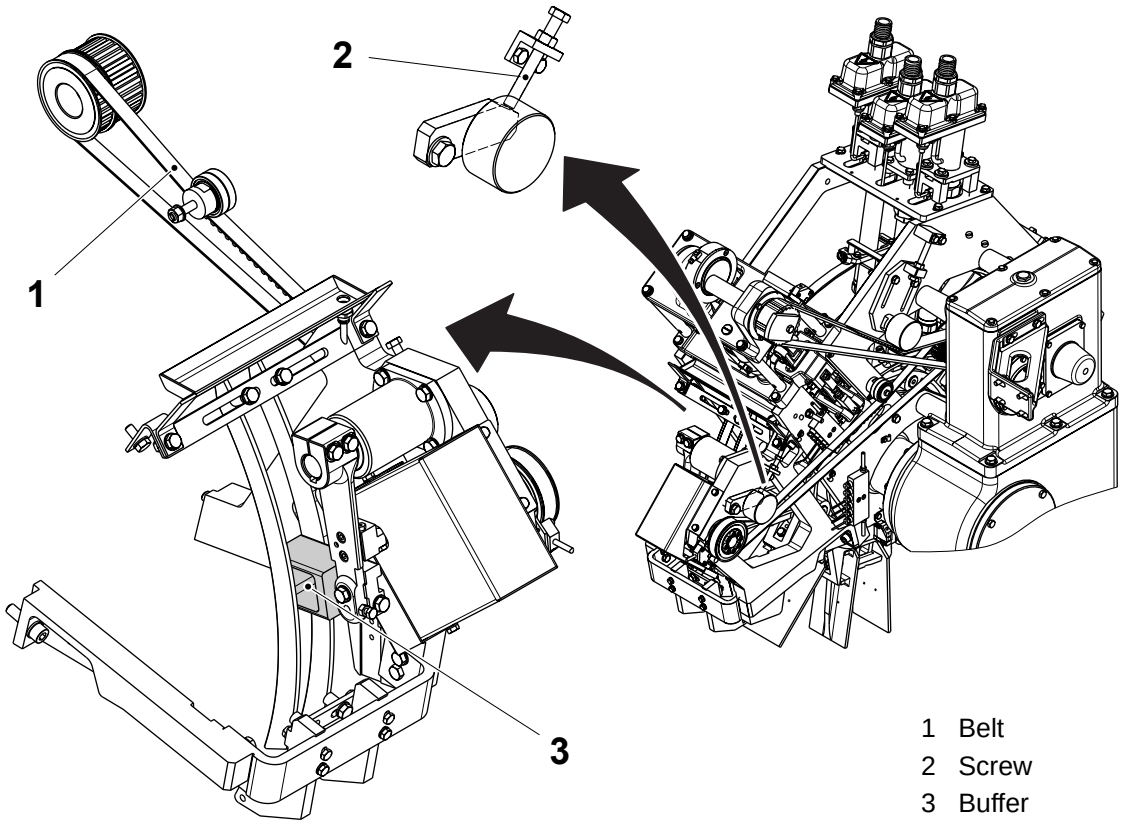
a) Crank the final folder to 250°.

b) Loosen the screw (2) and change the belt (1).

c) Tighten the screw (2).

d) Set the lower position of the buffer (3), see 5.14-3 Pull Down 4th Station - Set Lower Turning Position.

e) Set the belt (1) tension, see 5.14-1 Pull Down 4th Station - Set Belt Tension.



1 Belt
2 Screw
3 Buffer

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(Cont'd)

Curve Roller

Check the curve roller (1) for wear and/or damage. If required, change the curve roller (1).

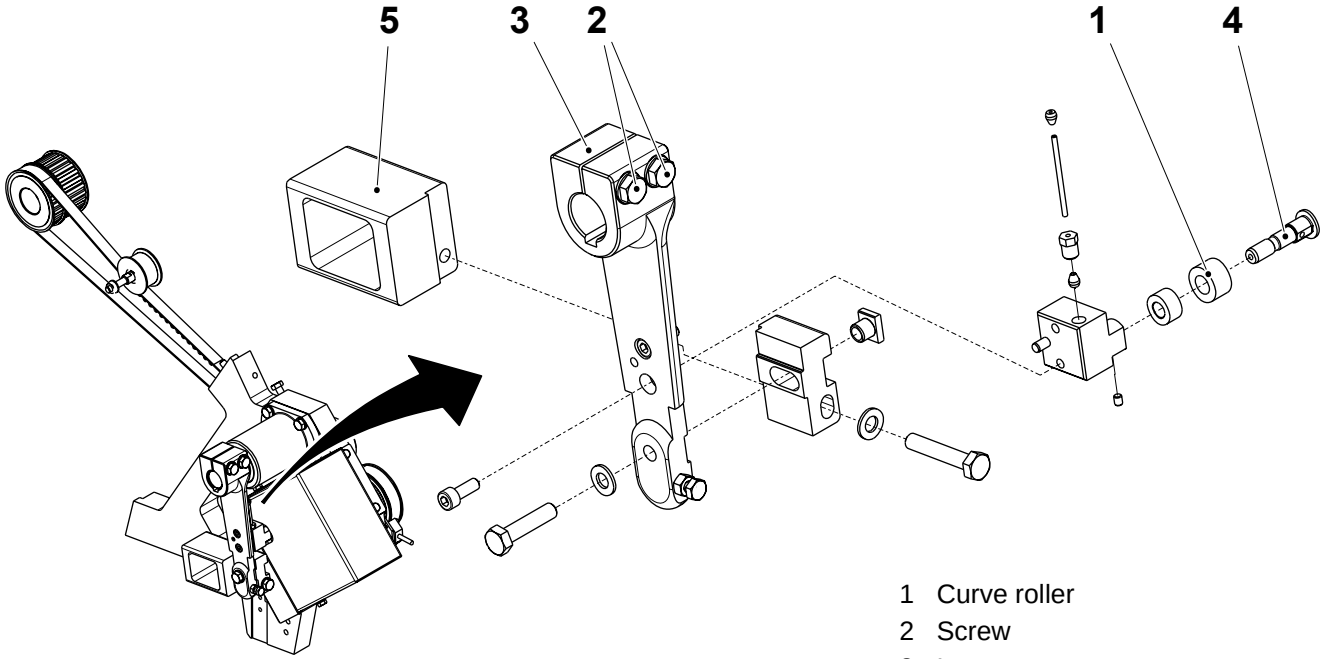
a) Remove the screws (2).

b) Remove the lever (3).

c) Check the curve roller (1) and the axle pin (4) for wear or damages. Change if required.

d) Assemble in the reverse order.

e) Set the buffer (5), see 5.14-2 Pull Down 4th Station - Set Buffer.



1 Curve roller
2 Screw
3 Lever
4 Axle pin
5 Buffer

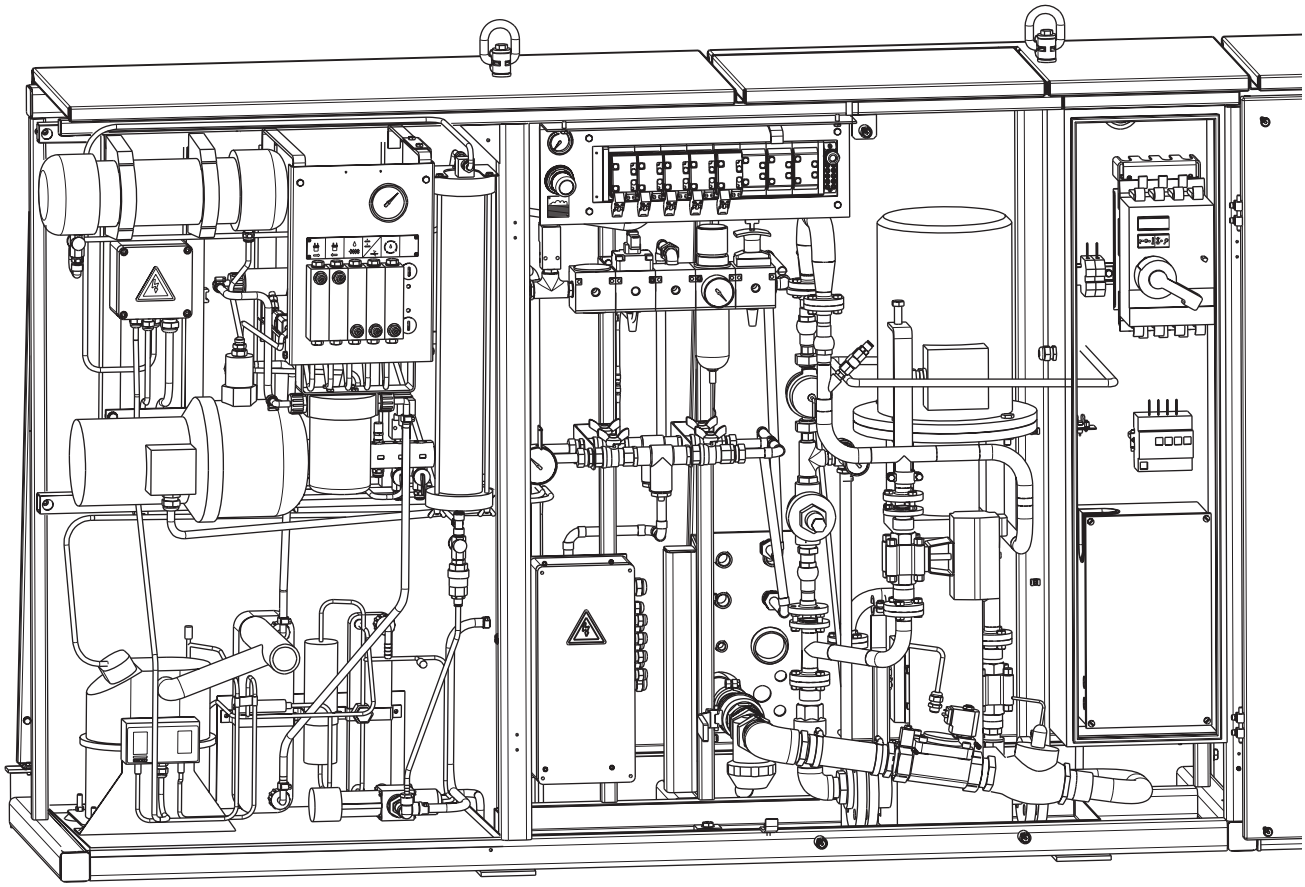
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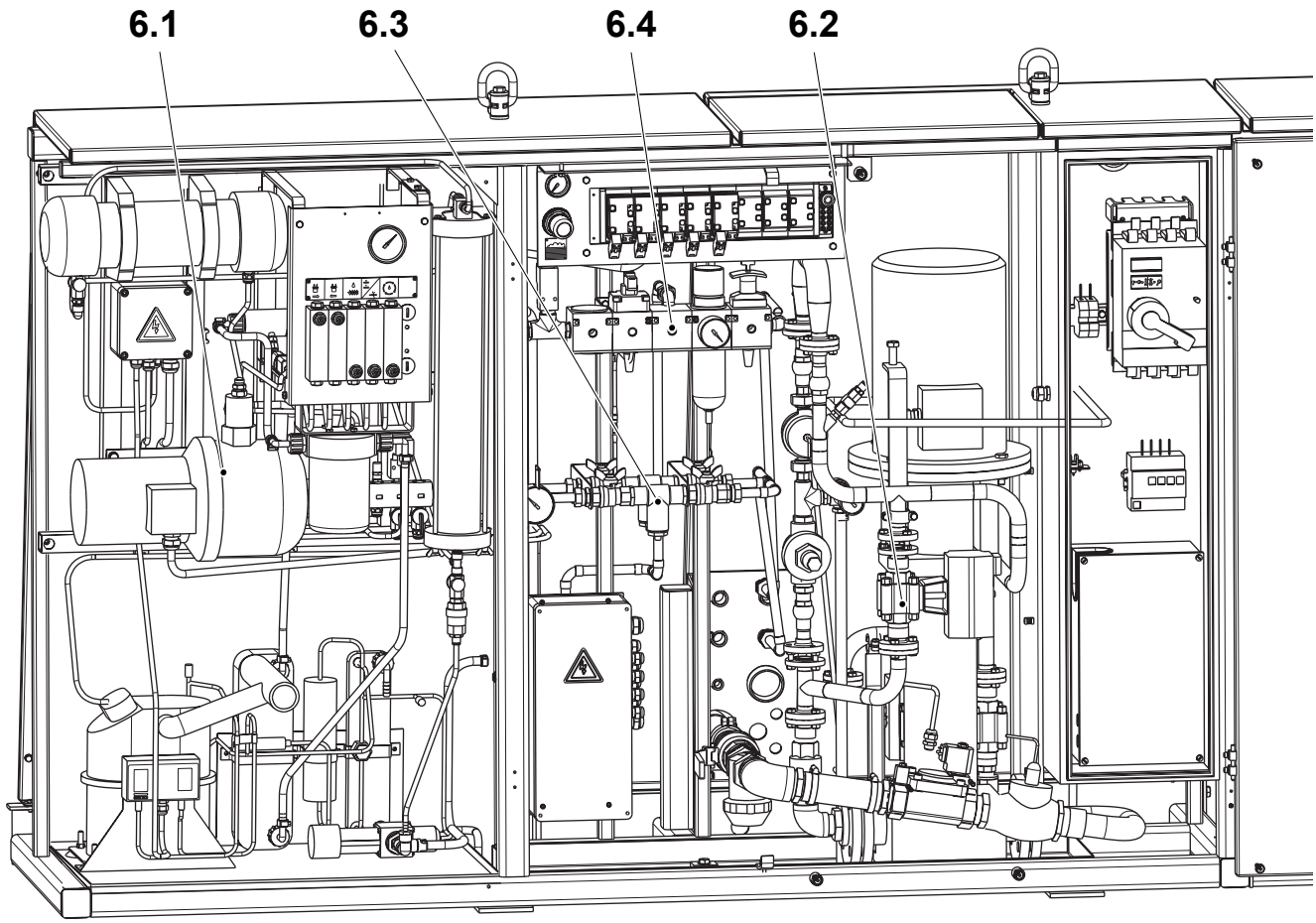
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6 Service Unit



Service Unit - Description

SPC Reference	648506-0400



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6.1 Cooling water system
6.2 Foam Cleaning Unit
6.3 Water Panel
6.4 Supply System

6.1 Cooling water system . . . . . 6 - 5

6.1-1 Cooling Water System - Check . . . . . 6 - 5

6.1-2 Cooling Water System - Fill . . . . . 6 - 7

6.1.1 Compressor Unit . . . . . 6 - 9

6.1.1-1 Compressor Unit - Check Sight Glass . . . . . 6 - 9

6.1.1-2 Compressor Unit - Check . . . . . 6 - 10

6.1.2 Flow Meter . . . . . 6 - 11

6.1.2-1 Flow Meter - Change Deionizer Cartridge . . . . 6 - 11

6.1.2-2 Flow Meter - Set Flows . . . . . 6 - 13

6.1.2-3 Flow Meter - Change Filter Insert . . . . . 6 - 14

6.1.2-4 Flow Meter - Change Filter . . . . . 6 - 17

6.2 Foam Cleaning Unit . . . . . 6 - 19

6.2.1 Cleaning Pump . . . . . 6 - 19

6.2.1-1 Cleaning Pump - Check Connections . . . . . 6 - 19

6.2.1-2 Cleaning Pump - Set Pressure . . . . . 6 - 20

6.3 Water Panel . . . . . 6 - 21

6.3-1 Water Panel - Check Pressure Switch . . . . . 6 - 21

6.3-2 Water Panel - Clean Filters . . . . . 6 - 22

6.3-3 Water Panel - Set Tube Flushing Device . . . . . 6 - 24

6.4 Supply System . . . . . 6 - 25

6.4.1 Pneumatic Unit . . . . . 6 - 25

6.4.1-1 Pneumatic Unit - Check . . . . . 6 - 25

6.4.1-2 Pneumatic Unit - Set Pressure . . . . . 6 - 26

6.4.1-3 Pneumatic Unit - Set Pressure Switch . . . . . 6 - 26

6.4.1-4 Pneumatic Unit - Clean Filter Insert . . . . . 6 - 27

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6.1 Cooling water system

SPC Reference	1095612-0300

6.1-1 Cooling Water System - Check

Machine Status	PRODUCTION
SPC Reference	1095612-0300

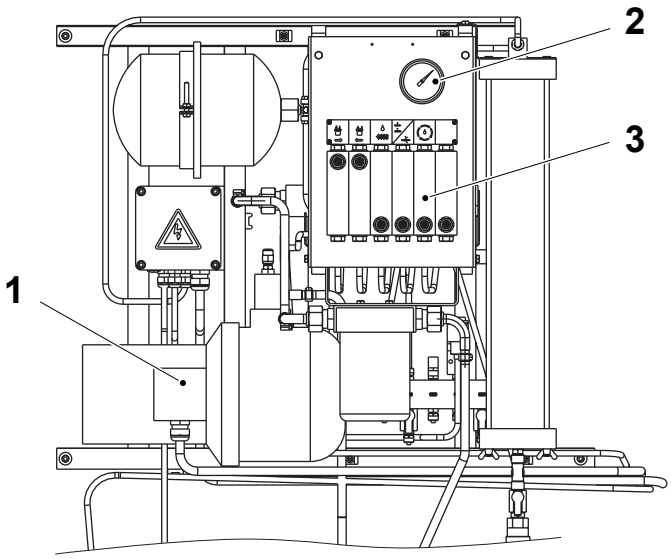
WARNING

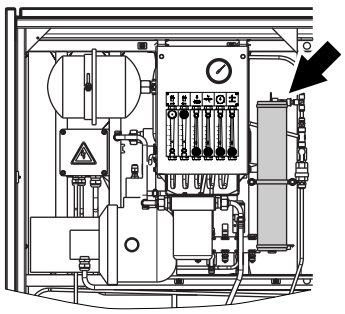
Refrigerant gas.
Cooling media R134A, follow the Safety Precautions.

Updated Cooling Circuit or Machines Rebuilt with UK-1549382-0100 Cooling Circuit
Check that:

- there are no water leaks at the connections
- the pump (1) runs smoothly without excessive noise or vibrations
- the water pressure gauge (2) shows the correct water pressure in the circuit, see 10.1 Technical Data
- the values of the flow meters (3) are correct. Set the flows if necessary, see 6.1.2-2 Flow Meter - Set Flows.

Note! Machines rebuilt with UK-2826557-0100 New Water Filter have a new water filter instead of the old deionizer filter, see arrow.





New water filter

1 Pump
2 Pressure gauge
3 Flow meter

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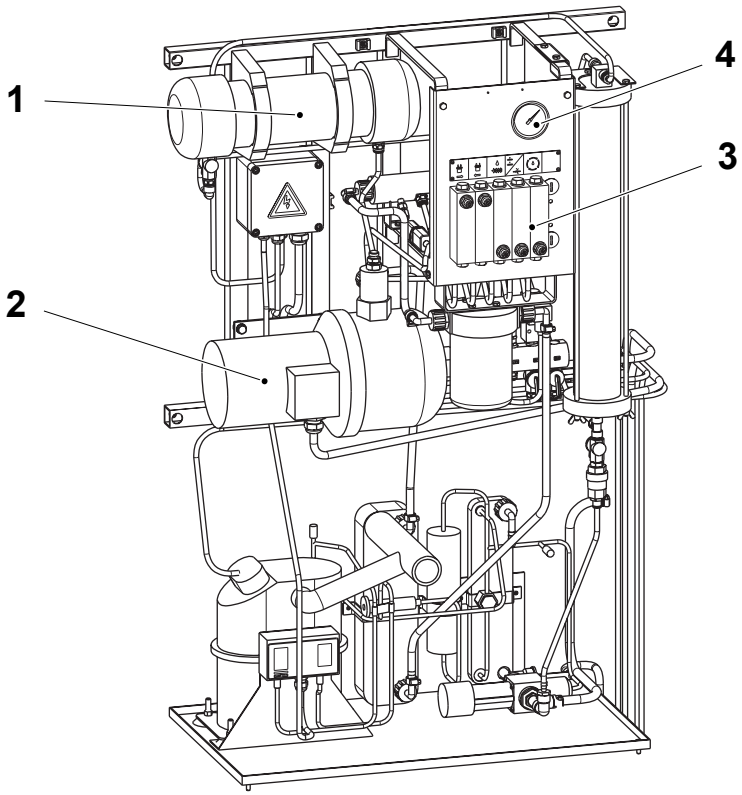
WARNING
Refrigerant gas.
Cooling media R134A, follow the Safety Precautions.

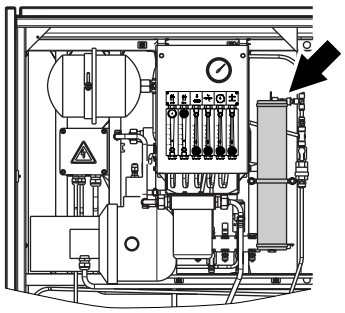
Not Updated Cooling Circuit

Check that:

- there are no water leaks at the connections
- the expansion vessel (1) is half full. Fill it if necessary, see 6.1-2 Cooling Water System - Fill.
- the pump (2) runs smoothly without excessive noise or vibrations
- the flow meter (3) and the pressure gauge (4) values, see 10.1 Technical Data. Set the flows if necessary, see 6.1.2-2 Flow Meter - Set Flows.

Note! Machines rebuilt with UK-2826557-0100 New Water Filter have a new water filter instead of the old deionizer filter, see arrow.





New water filter.

1 Expansion vessel
2 Pump
3 Flow meters
4 Pressure gauge

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6.1-2 Cooling Water System - Fill

Machine Status	Mains Power ON Air ON Steam ON Water ON
SPC Reference	1095612-0300

WARNING

Refrigerant gas.

Cooling media R134A, follow the Safety Precautions.

Updated Cooling Circuit or Machines Rebuilt with UK-1549382-0100 Cooling Circuit

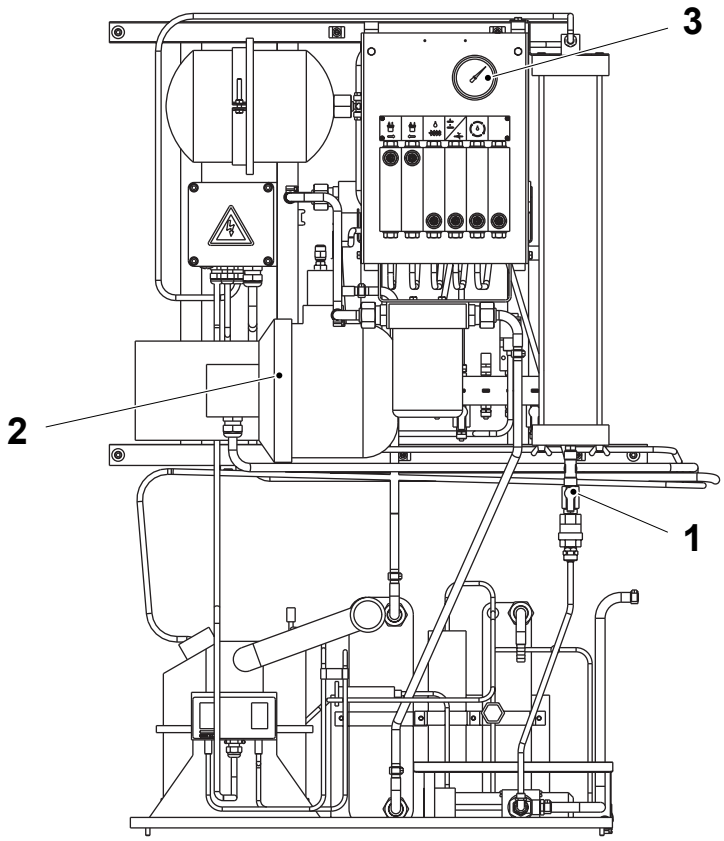
a) Open the valve (1) to fill the cooling water circuit.

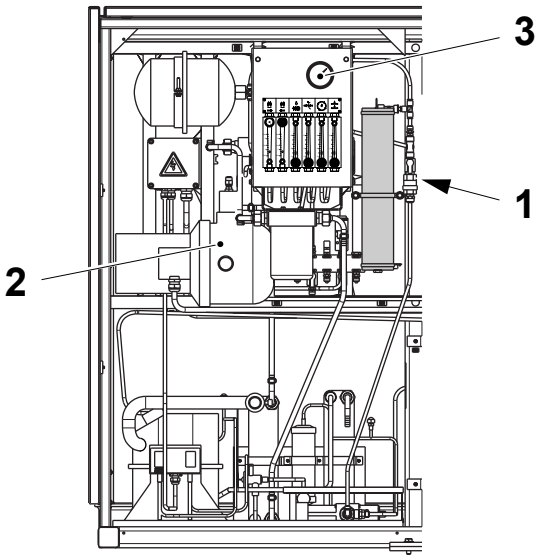
Note! Make sure that the circuit is correctly connected and that the valves located in the final folder chamber are open.

b) Leave the pump (2) running for approximately one minute.

c) When the water pressure gauge (3) reaches **200 kPa (2 bar)**, close the valve (1).

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Machines rebuilt with UK-2826557-0100 New Water Filter

1 Valve
2 Pump
3 Pressure gauge

(Cont'd)

(Cont'd)

WARNING

Refrigerant gas.

Cooling media R134A, follow the Safety Precautions.

Not Updated Cooling Circuit

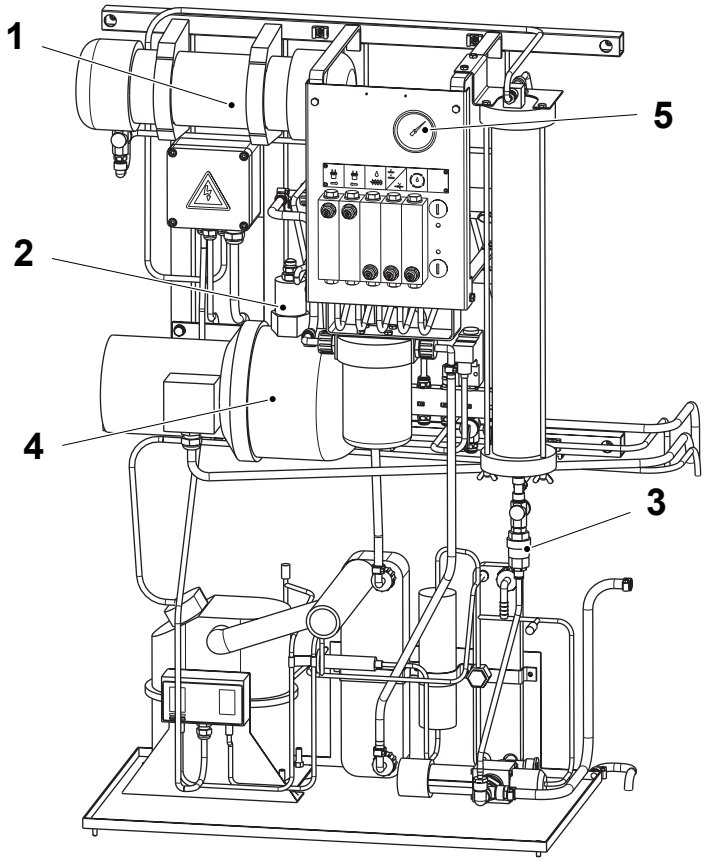
a) Open the valve (3) to fill the expansion vessel (1) with water. At the same time, bleed the air out of the system by means of the valve (2).

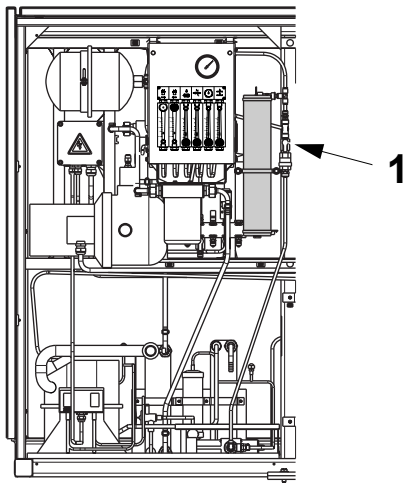
Note! Make sure that the circuit is correctly connected and that the valves, located in the final folder chamber, to supply the final folder and the jaw unit are open.

b) Leave the pump (4) running for approximately one minute and then repeat item a).

c) When the water pressure gauge (5) reaches **200 kPa (2 bar)**, close the valve (3).

d) Check that the expansion vessel (1) is approximately half full.





Machines rebuilt with UK-2826557-0100 New Water Filter

1 Expansion vessel
2 Valve
3 Valve
4 Pump
5 Pressure gauge

TechPub_2614345_0105 - 06_MM81534_11en.fm

6.1.1 Compressor Unit

6.1.1-1 Compressor Unit - Check Sight Glass

Machine Status	Mains Power ON Air ON Steam ON Water ON
SPC Reference	1095710-0300

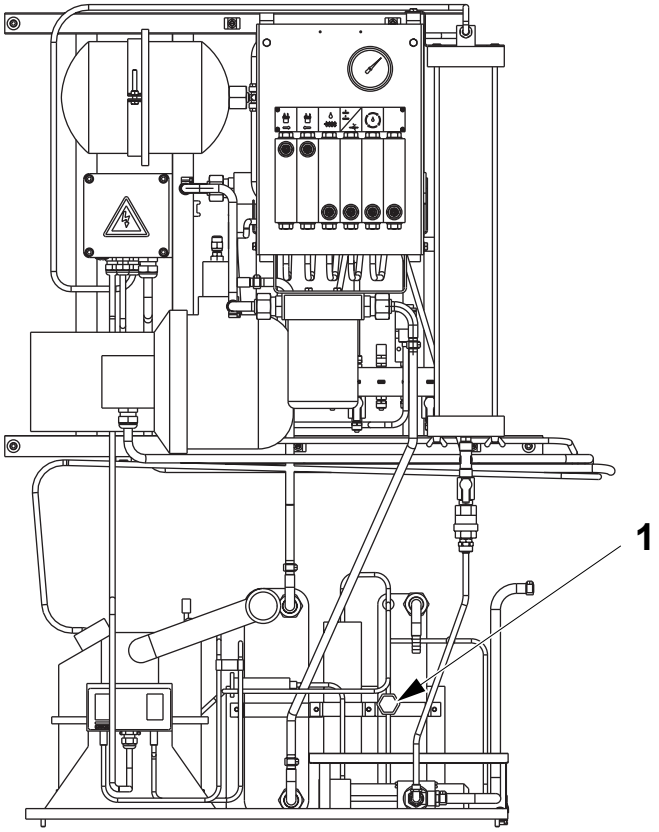
WARNING

Refrigerant gas.

Cooling media R134A, follow the Safety Precautions.

Check that there are not gas bubbles in the sight glass (1). If air bubbles are present call the local Tetra Pak Service.

Check that the pin inside the sight glass (1) is **green**. If the pin is **yellow** call a local authorized service for refrigerating units.



1 Sight glass

Figure show the cooling circuit updated with the UK-1549382-0100 Cooling circuit.

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6.1.1-2 Compressor Unit - Check

Machine Status	PRODUCTION
Special Equipment	Thermometer min. 40°C
SPC Reference	1095710-0300

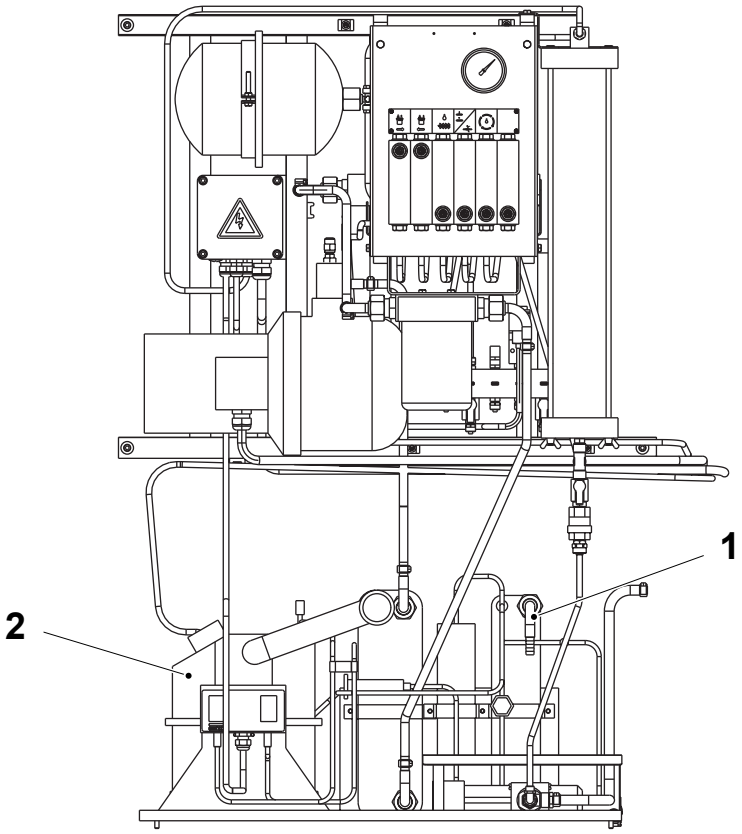
WARNING

Refrigerant gas.

Cooling media R134A, follow the Safety Precautions.

Use a thermometer to check the temperature of the water from the hose (1). The temperature must be between **30 °C** and **35 °C** when the compressor (2) is running.

If not, call the local Tetra Pak Service.



1 Hose
2 Compressor

Figure show the cooling circuit updated with the UK-1549382-0100 Cooling circuit.

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6.1.2 Flow Meter

6.1.2-1 Flow Meter - Change Deionizer Cartridge

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095705-0300

Note! For machines rebuilt with UK-2826557-0100 New Water Filter, see 6.1.2-4 Flow Meter - Change Filter.

WARNING

Refrigerant gas.
Cooling media R134A, follow the Safety Precautions.

Updated Cooling Circuit or Machines Rebuilt with UK-1549382-0100 Cooling Circuit

a) Close the DI-circuit flow meter (1) by means of the screw (2).

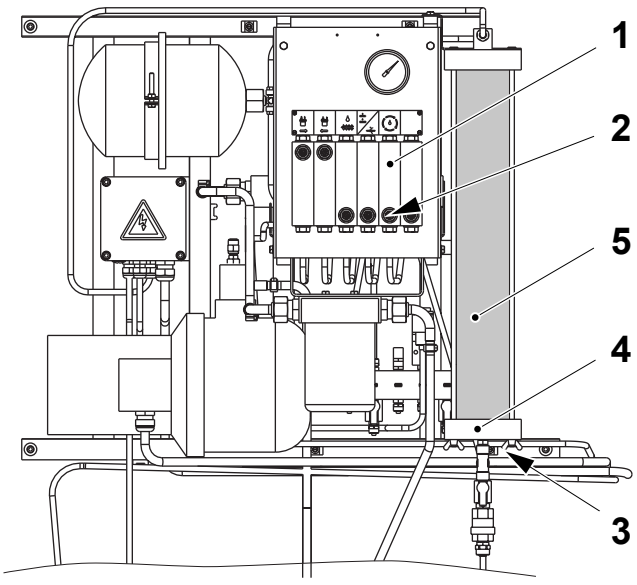
b) Remove the wing nuts (3), lower the flange (4) and remove the deionizer cartridge (5).

c) Change the deionizer cartridge (5) and make sure that the rubber seals located at the top and bottom of the flanges (4), are correctly positioned.

d) Change the rubber seals if damaged.

e) Fit the flange (4) and tighten the wing nuts (3).

f) Open the DI-circuit flow meter (1) by means of the screw (2).



1 Flow meter
2 Screw
3 Wing nut
4 Flange
5 Cartridge

(Cont'd)

TechPub_2614345_0105 - 06_MM81534_11en.fm

(Cont'd)

WARNING

Refrigerant gas.

Cooling media R134A, follow the Safety Precautions.

Not Updated Cooling Circuit

a) Close the DI-circuit flow meter (1) by means of the screw (2).

b) With the aid of a screwdriver close the valve (3).

c) Remove the wing nuts (4) and lower the flange (5) so that the deionizer cartridge (6) can be removed.

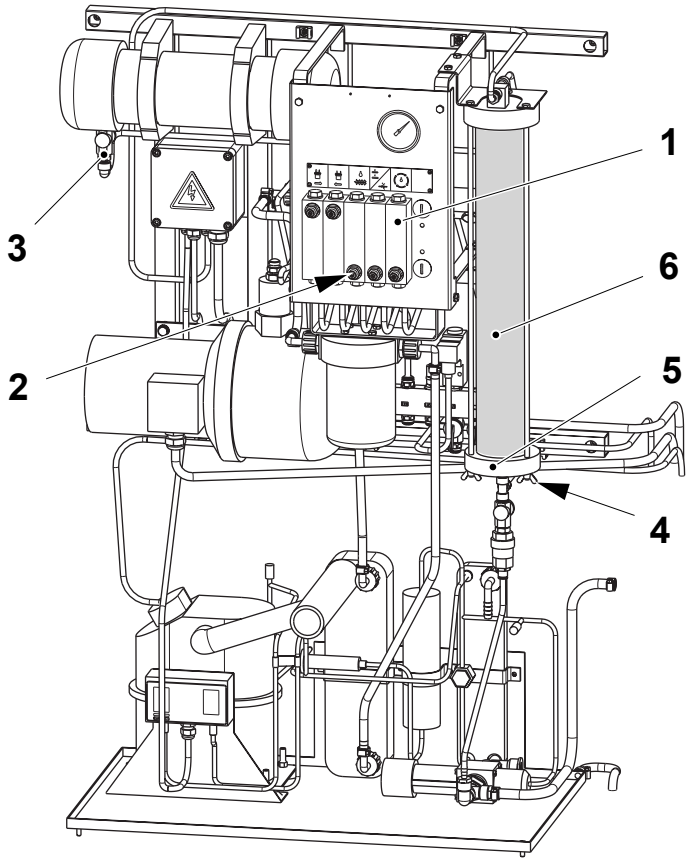
d) Change the deionizer cartridge (6) and make sure that the rubber seals, located at the top and on the bottom flanges (5), are correctly positioned.

e) Change the rubber seals if damaged.

f) Fit the flange (5) and tighten the wing nuts (4).

g) Open the valve (3).

h) Open the DI-circuit flow meter (1) by means of the screw (2).



1 Flow meter
2 Screw
3 Valve
4 Wing nut
5 Flange
6 Cartridge

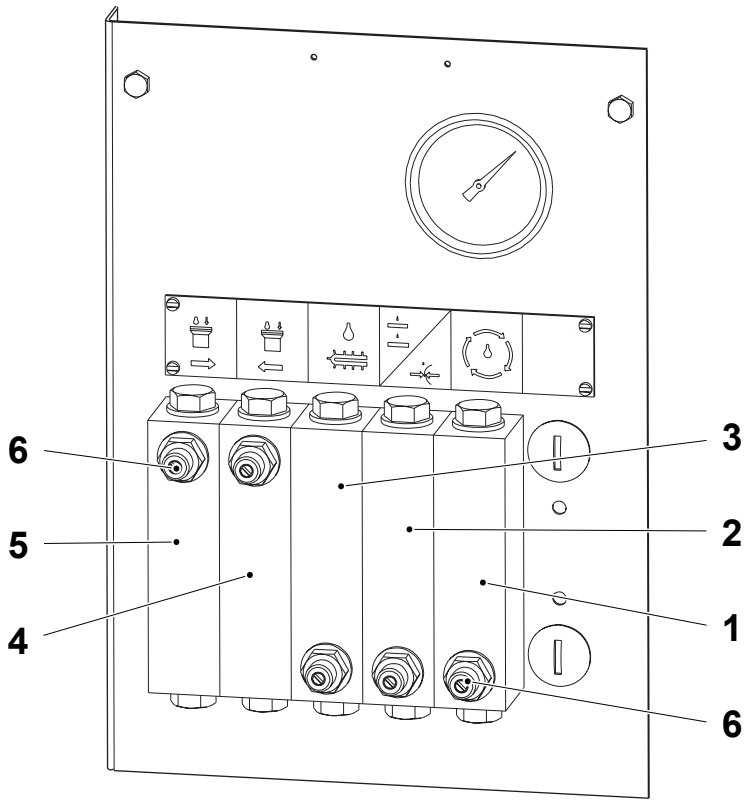
TechPub_2614345_0105 - 06_MM81534_11en.fm

6.1.2-2 Flow Meter - Set Flows

Machine Status	PRODUCTION
SPC Reference	1095705-0300

Set the flows by turning the setting screws (6) for the flow meters (1), (2), (3), (4) and (5) as indicated on the following table:

Flow meters	**(l/min.)**
Deionizer (DI) circuit	See 10.1 Technical Data
Hydraulic system / IH transformer and LS sealing	See 10.1 Technical Data
Final folder	See 10.1 Technical Data
TS left and TS right (Jaw system)	See 10.1 Technical Data



1 Flow meter DI-circuit
2 Flow meter Hydraulic system and IH-LS transformer
3 Flow meter Final folder
4 Flow meter TS left (jaw system)
5 Flow meter TS right (jaw system)
6 Setting screw

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6.1.2-3 Flow Meter - Change Filter Insert

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095705-0300

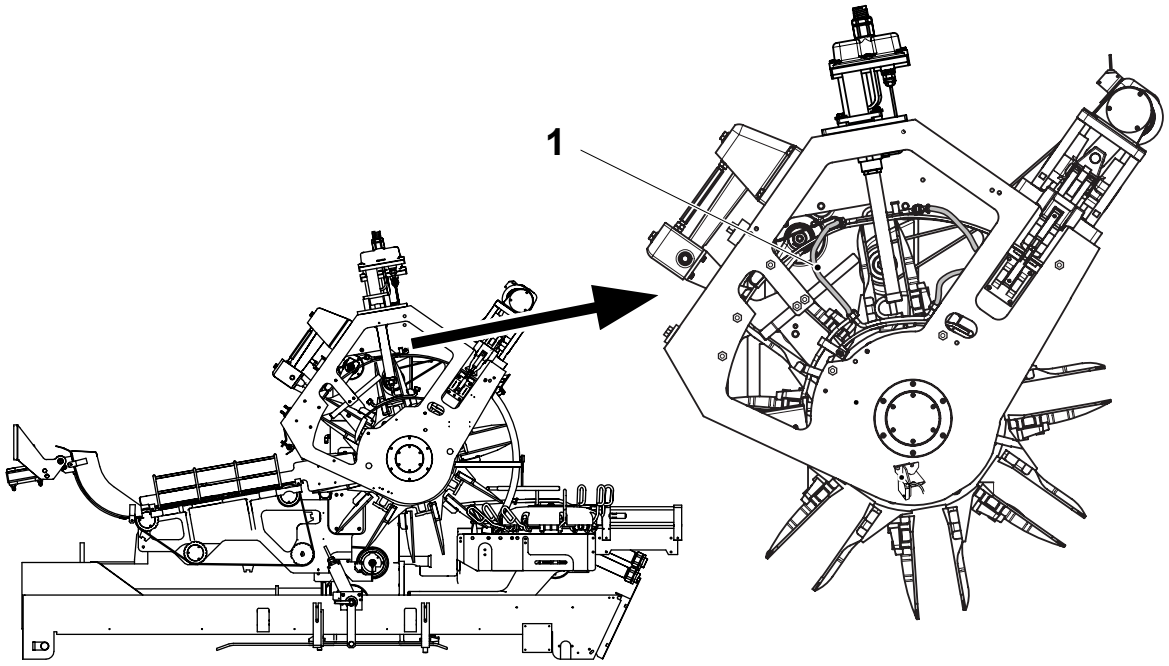
WARNING

Refrigerant gas.

Cooling media R134A, follow the Safety Precautions.

Updated Cooling Circuit or Machines Rebuilt with UK-1549382-0100 Cooling circuit

a) Drain the water from the circuit by disconnecting the hose (1) in the final folder unit. Approximately one litre of water must be discarded.



1 Hose

(Cont'd)

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(Cont'd)

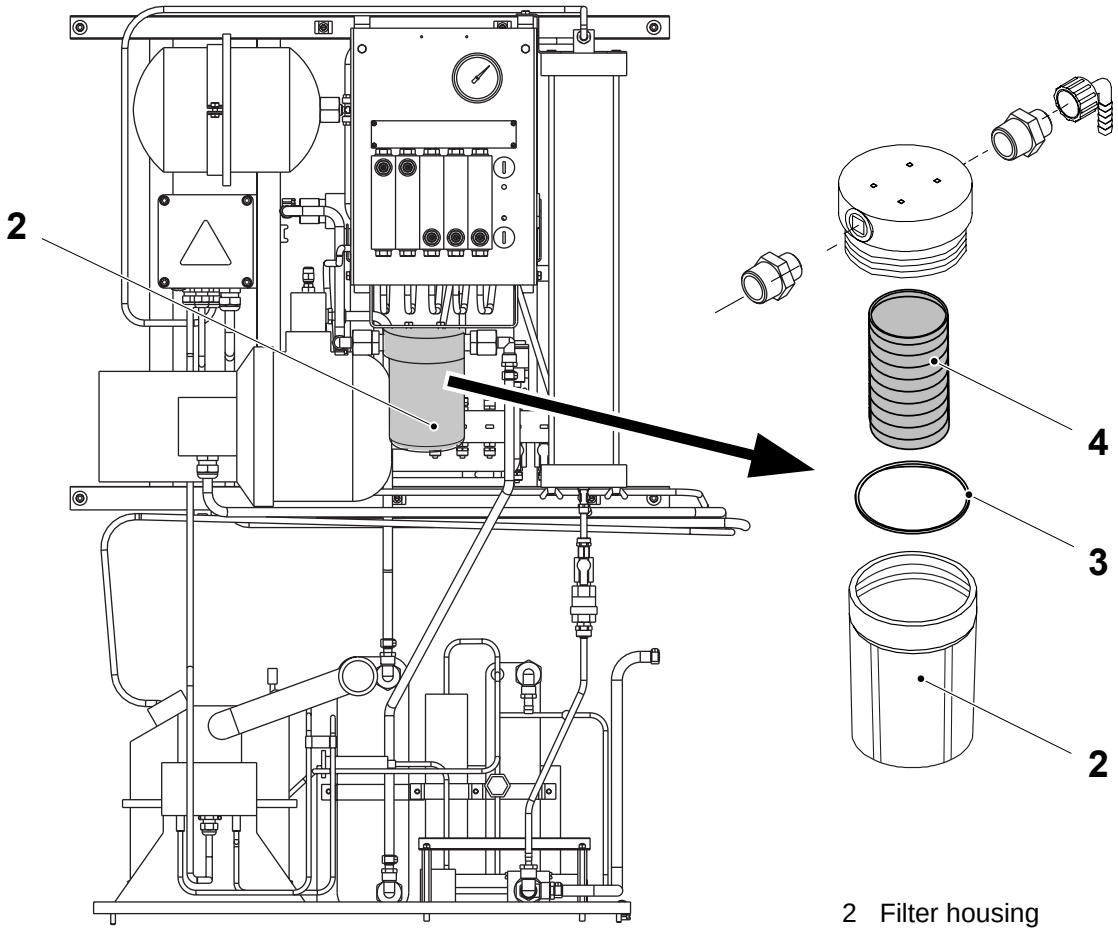
b) Screw out the filter housing (2) and remove the filter insert (4). Clean the filter insert with compressed air or change as required.

c) Check the O-ring (3) for damage. Change as required.

d) Fit the filter insert (4), the O-ring (3) and the filter housing (2).

e) Fill the system, see 6.1-2 Cooling Water System - Fill.

Note! Check during PRODUCTION that there are no leaks.



2 Filter housing
3 O-ring
4 Filter insert

(Cont'd)

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(Cont'd)

WARNING

Refrigerant gas.

Cooling media R134A, follow the Safety Precautions.

Not Updated Cooling Circuit

a) Open the valve (1) to release the systems pressure. Approximately one litre of water must be discarded.

b) When the pressure gauge (2) shows **0 bar** close the valve (1).

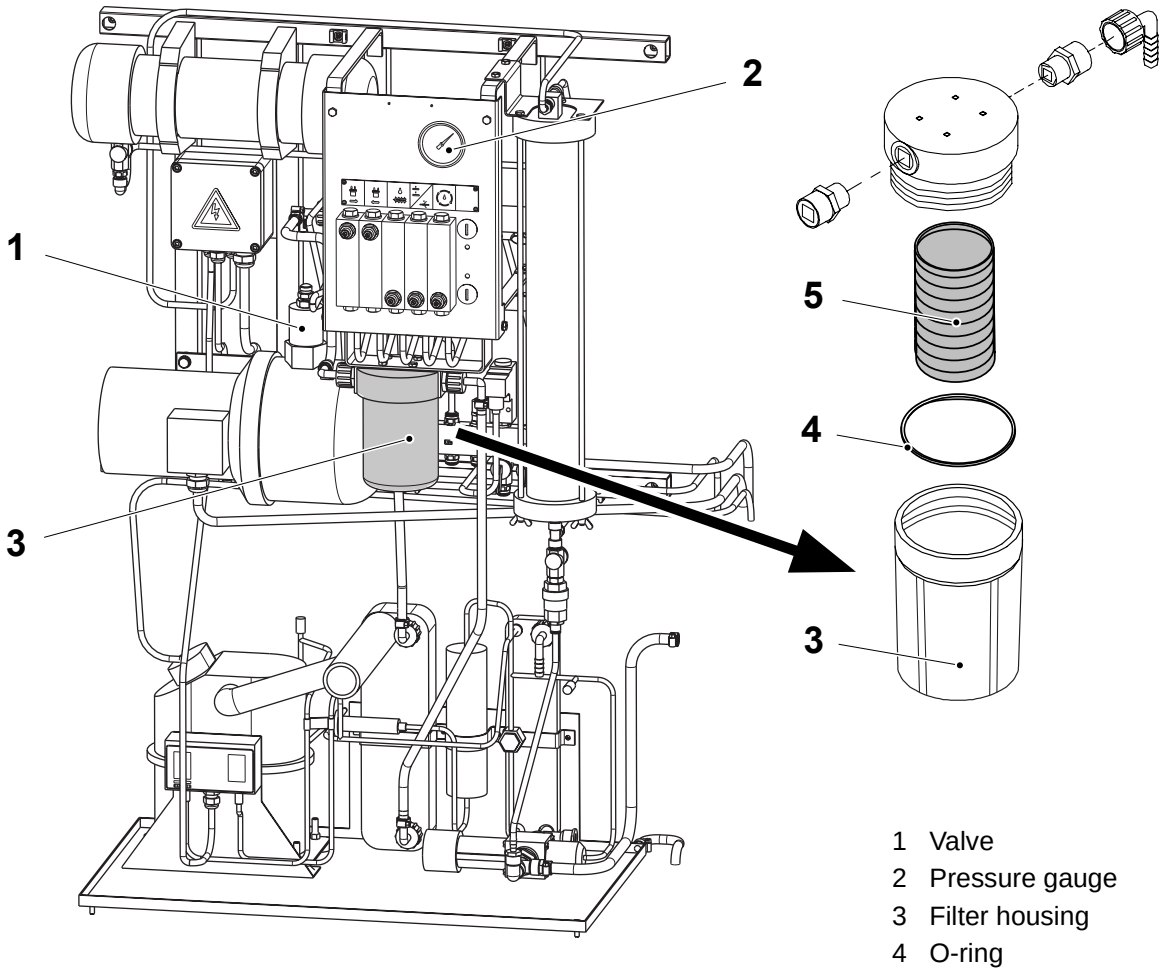
c) Screw out the filter housing (3) and pull out the filter insert (5). Clean the filter insert with compressed air or change as required.

d) Check the O-ring (4) for damage. Change as required.

e) Fit the filter insert (5), the O-ring (4) and the filter housing (3).

f) Fill the system, see 6.1-2 Cooling Water System - Fill.

Note! Check during PRODUCTION that the new filter does not leak.



1 Valve
2 Pressure gauge
3 Filter housing
4 O-ring
5 Filter insert

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6.1.2-4 Flow Meter - Change Filter

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095705-0300 2552113-0100

Note! For machines with deionizer cartridge, see 6.1.2-1 Flow Meter - Change Deionizer Cartridge.

WARNING

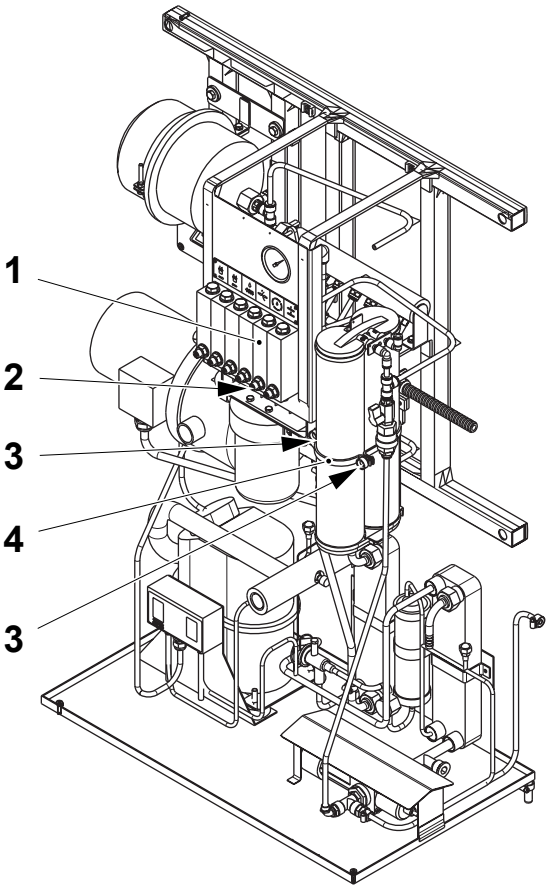
Refrigerant gas.

Cooling media R134A, follow the Safety Precautions.

Only Valid for Machines Rebuilt with UK-2826557-0100 New Water Filter

a) Close the circuit flow meter (1) by means of the screw (2).

b) Remove the two knobs (3) to release the support (4).



1 Flow meter
2 Screw
3 Knob
4 Support

(Cont'd)

TechPub_2614345_0105 - 06_MM81534_11en.fm

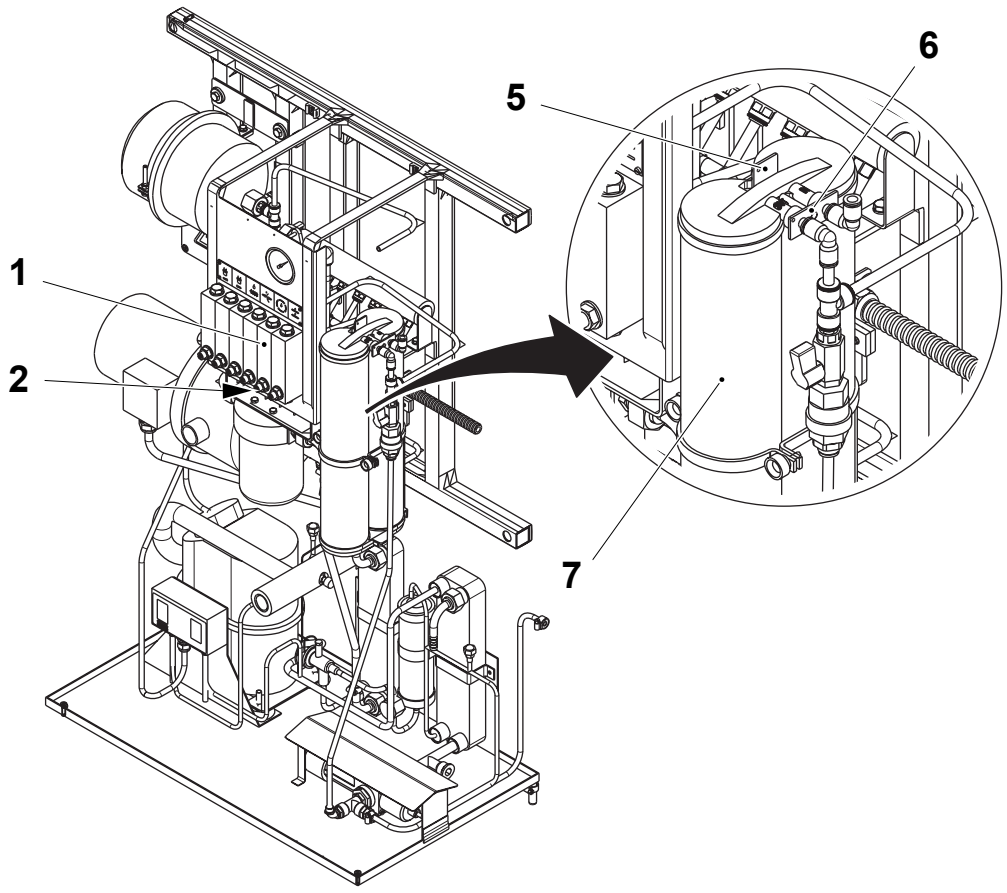
(Cont'd)

c) Remove the fastening plate (5) and pull out the connection block (6).

d) Remove the filter cartridge (7).

e) Fit the new filter cartridge and assemble in the reverse order.

f) Open the circuit flow meter (1) by means of the screw (2).



1 Flow meter
2 Screw
5 Fastening plate
6 Connection block
7 Filter cartridge

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6.2 Foam Cleaning Unit

SPC Reference	1095627-0300

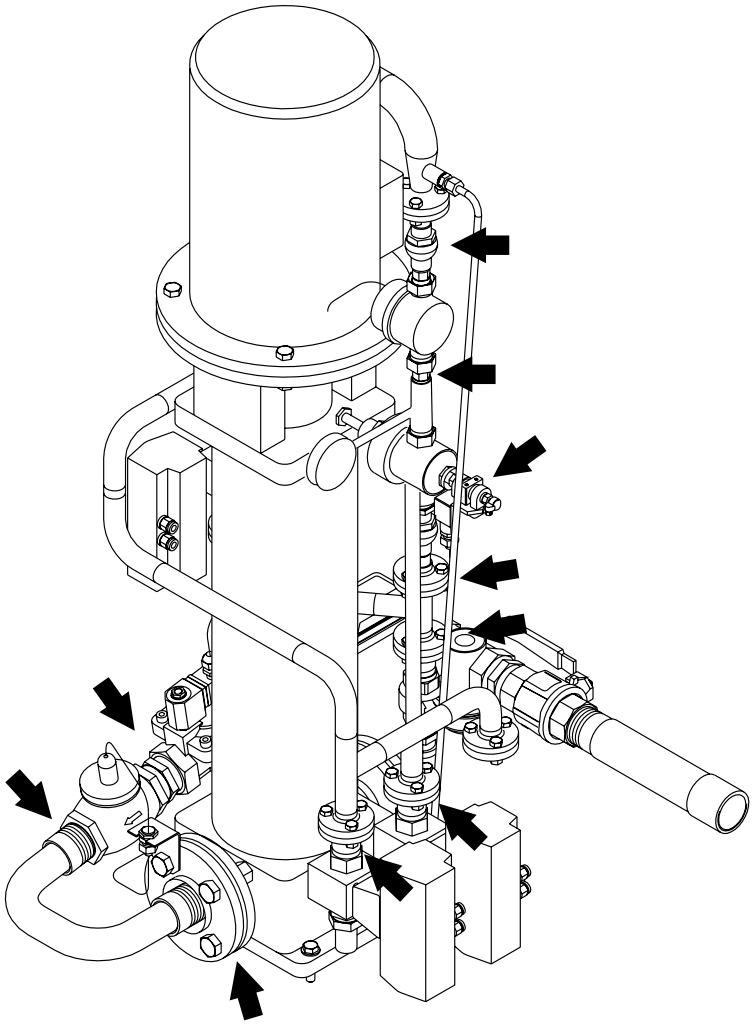
6.2.1 Cleaning Pump

6.2.1-1 Cleaning Pump - Check Connections

Machine Status	EXTERNAL CLEANING
SPC Reference	1095676-0100

a) Check for leakages in the pipe connections, see arrows. Change the seals as required.

b) Check for leakages in the cleaning pump connections, see arrows. Change the seals as required.



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6.2.1-2 Cleaning Pump - Set Pressure

Machine Status	Mains Power ON Air ON Steam ON Water ON
Special Equipment	Pressure gauge TP No.90043-86
SPC Reference	1095676-0100

Cleaning Pressure

a) Remove the plug from the T-connection and connect alternatively the pressure gauge (4).

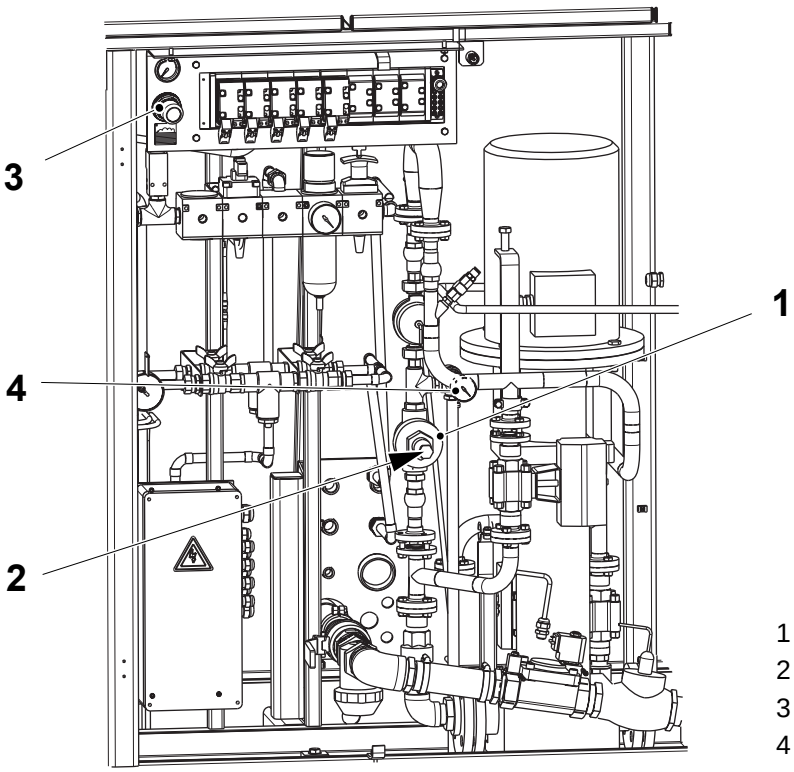
b) Step up the machine to step EXTERNAL CLEANING.

c) Set the cleaning pressure according to 10.1 Technical Data, by means of the adjustment screw (2) on the pressure regulator (1).

d) Disconnect the pressure gauge (4) and fit the plug.

Foam Pressure

Set the foam pressure according to 10.1 Technical Data, by means of the pressure regulator (3).



1 Pressure regulator
2 Adjustment screw
3 Pressure regulator
4 Pressure gauge

TechPub_2614345_0105 - 06_MM81534_11en.fm

6.3 Water Panel

SPC Reference	1095608-0100

6.3-1 Water Panel - Check Pressure Switch

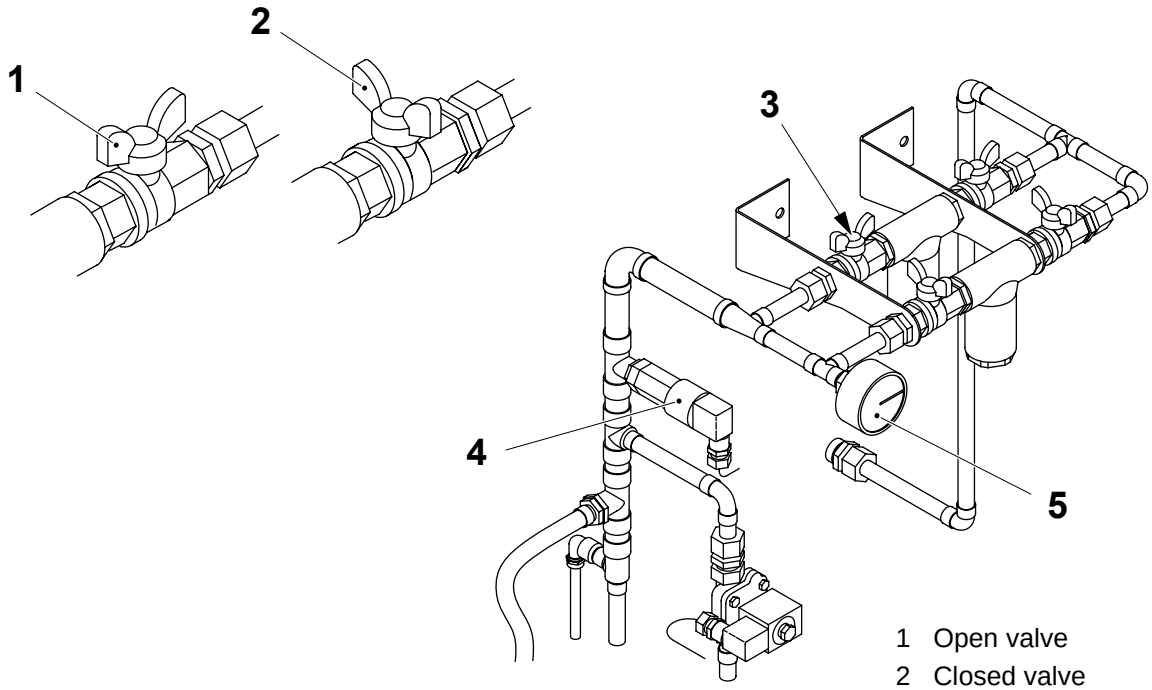
Machine Status	Mains Power ON Air ON Steam ON Water ON
SPC Reference	1095608-0100

a) Slowly close the valve (3) in the open line and check that the **water supply** alarm on the TPOP panel lights up when the pressure gauge (5) drops below **2 bar**.

Note! The valve (1) is shown in open position and the valve (2) is shown in closed position.

b) If not, change the pressure switch (4).

c) Open the valve (3).



1 Open valve
2 Closed valve
3 Valve
4 Pressure switch
5 Pressure gauge

TechPub_2614345_0105 - 06_MM81534_11en.fm

6.3-2 Water Panel - Clean Filters

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095608-0100

Cold Water

Note! During PRODUCTION only one filtering line should be open at a time.

a) Close the four valves.

b) Remove the plug (5) or the filter housing (6) and remove the filter insert (3). Clean the filter insert (3) with compressed air or change as required.

c) Check the O-ring (4) for damage. Change as required.

d) Fit the filter insert (3), the O-ring (4) and the plug (5) or the filter housing (6).

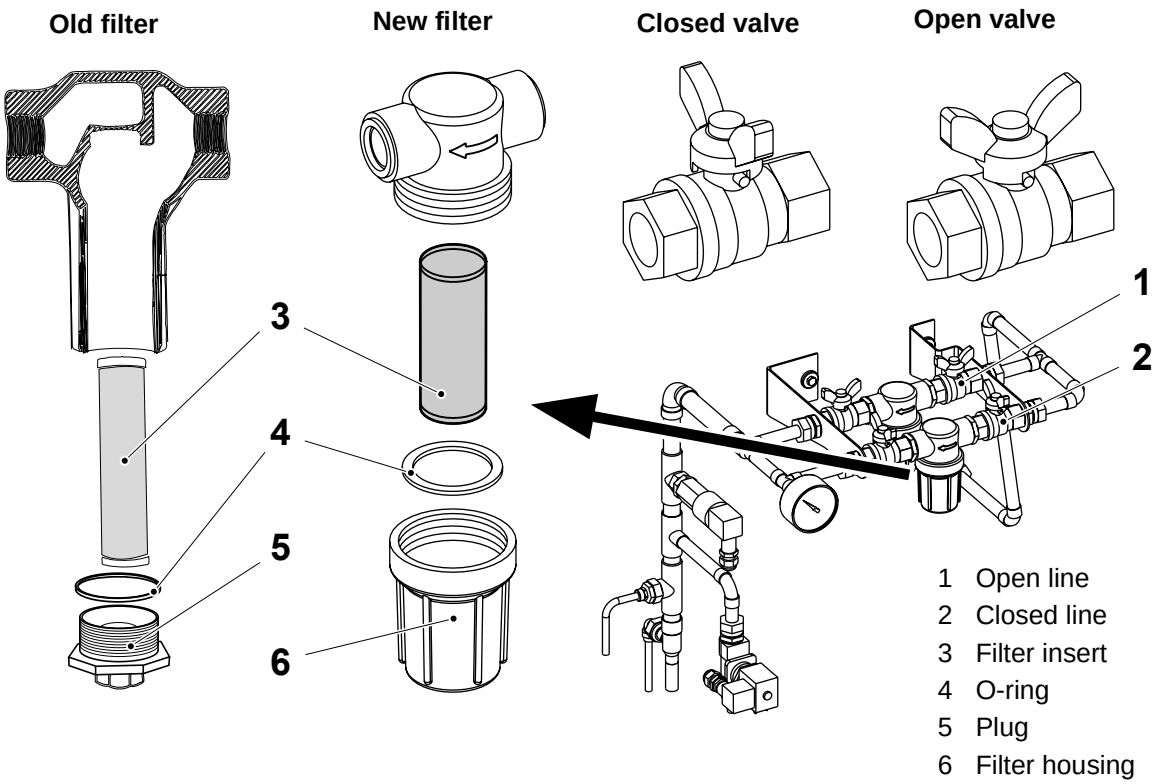
e) Repeat for the other filter, items b) to d).

f) Open two valves in one filtering line.

g) Check during PRODUCTION that there are no leakages from the plugs (5) or the filter housings (6).

Production

Clean the filter in the closed line (2), then open the line and close the other line. Clean the other filter.



1 Open line
2 Closed line
3 Filter insert
4 O-ring
5 Plug
6 Filter housing

(Cont'd)

TechPub_2614345_0105 - 06_MM81534_11en.fm

(Cont'd)

Hot Water

a) Close the valve (1).

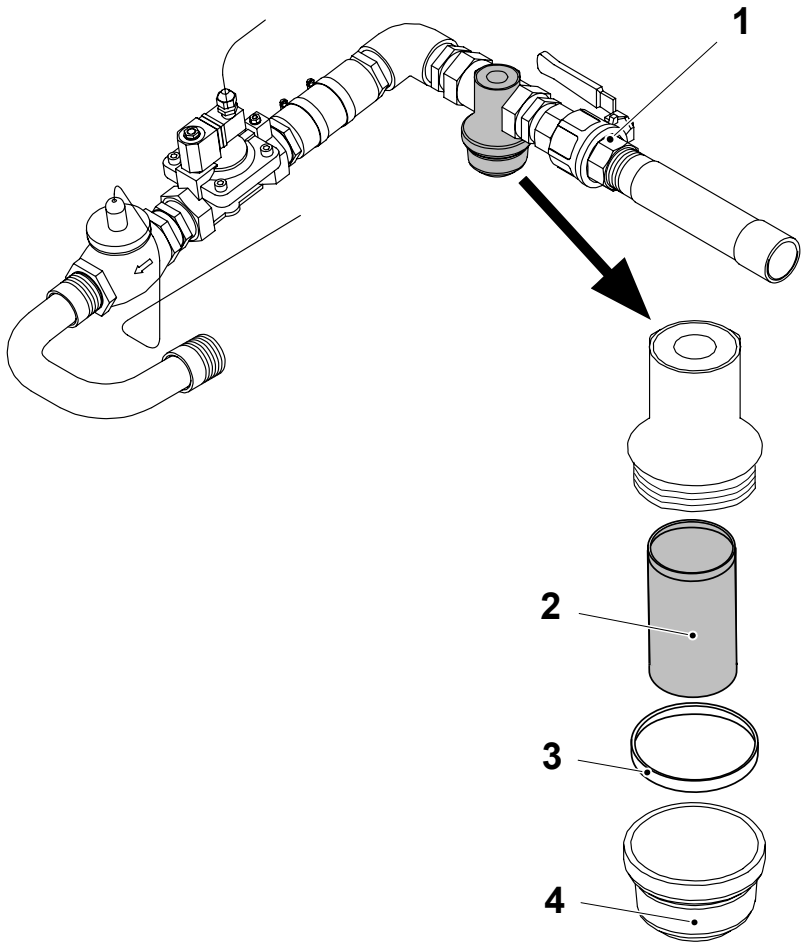
b) Remove the plug (4) and pull out the filter insert (2). Clean the filter insert (2) with compressed air or change as required.

c) Check the O-ring (3) for damage. Change as required.

d) Fit the filter insert (2), the O-ring (3) and the plug (4).

e) Open the valve (1).

f) Check during PRODUCTION that there are no leakages in the plug (4).



1 Valve
2 Filter insert
3 O-ring
4 Plug

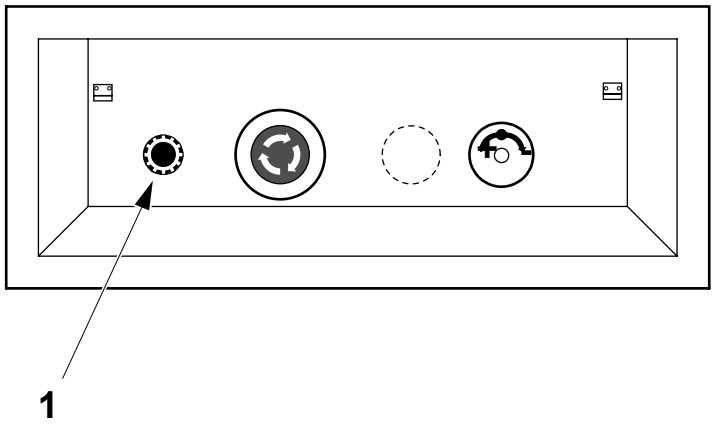
TechPub_2614345_0105 - 06_MM81534_11en.fm

6.3-3 Water Panel - Set Tube Flushing Device

Machine Status	PRODUCTION
SPC Reference	1095608-0100

Set the water pressure to the tube flushing device by means of the valve (1), located on the process panel.

Set the tube flushing device in such a way that the water reaches the packaging material tube without splashing.



1 Valve

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6.4 Supply System

SPC Reference	1095714-0300

6.4.1 Pneumatic Unit

6.4.1-1 Pneumatic Unit - Check

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1095609-0200

a) Make sure that there are no leaks at the pneumatic unit.

b) Record the pressure on the pressure gauge (4).

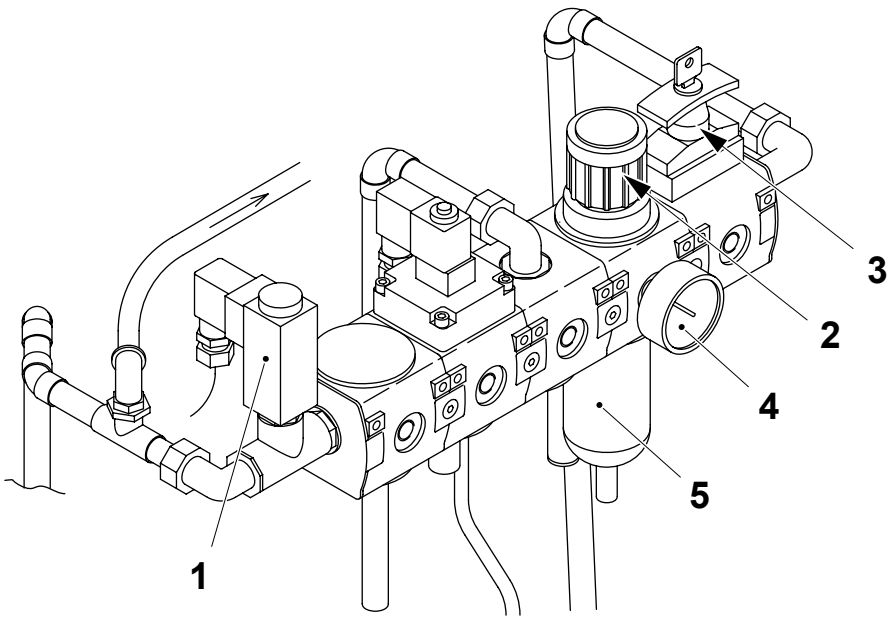
c) Lower the pressure to **5.4 bar** by means of the pressure regulator (2) and check that the air supply alarm starts flashing on the TPOP panel. If not, set the pressure switch (1), see 6.4.1-3 Pneumatic Unit - Set Pressure Switch.

d) Set the pressure to the previously recorded value.

e) Close the shut-off valve (3) and check that the pressure gauge (4) indicates zero. If not change the shut-off valve (3) or the pressure gauge (4) as required.

f) Open the shut-off valve (3).

g) Check the filter insert (5). If the pressure is too low, clean or change it, see 6.4.1-4 Pneumatic Unit - Clean Filter Insert.



1 Pressure switch
2 Pressure regulator
3 Shut-off valve
4 Pressure gauge
5 Filter insert

TechPub_2614345_0105 - 06_MM81534_11en.fm

6.4.1-2 Pneumatic Unit - Set Pressure

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1095609-0200

Set the pressure regulator (3) so that the pressure gauge (4) shows the air pressure according to 10.1 Technical Data.

6.4.1-3 Pneumatic Unit - Set Pressure Switch

Machine Status	Mains Power ON Air ON Steam ON Water OFF
SPC Reference	1095609-0200

a) Turn the adjuster screw (1) on the top of the pressure switch (2) fully anti-clockwise.

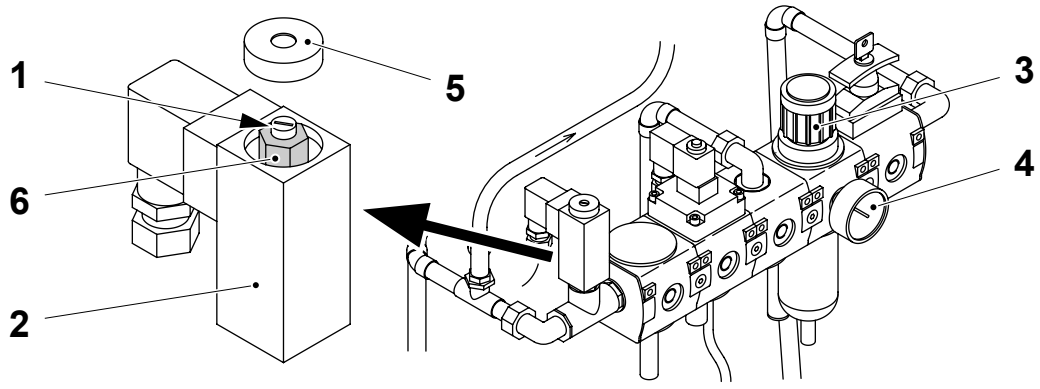
b) By means of the pressure regulator (3) set the main input air pressure so that the pressure gauge (4) shows **5.4 bar**.

c) Slowly turn the adjuster screw (1) clockwise until the filling machines main air supply alarm starts flashing on the TPOP panel.

d) Remove the cover (5) and turn the nut (6) fully anti-clockwise.

e) Check that the main air supply alarm starts flashing on the TPOP panel below **5.4 bar** and that the machine can run again at **6.0 bar** (or above) by means of the pressure regulator (3).

f) By means of the pressure regulator (3) reset the main input air pressure so that the pressure gauge (4) shows the air pressure according to 10.1 Technical Data.



1 Adjuster screw
2 Pressure switch
3 Pressure regulator
4 Pressure gauge
5 Cover
6 Nut

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6.4.1-4 Pneumatic Unit - Clean Filter Insert

Machine Status	Mains Power ON Air ON Steam ON Water OFF
Consumables	Soap
SPC Reference	1095609-0200

a) Turn off the main air supply by means of the shut-off valve (1).

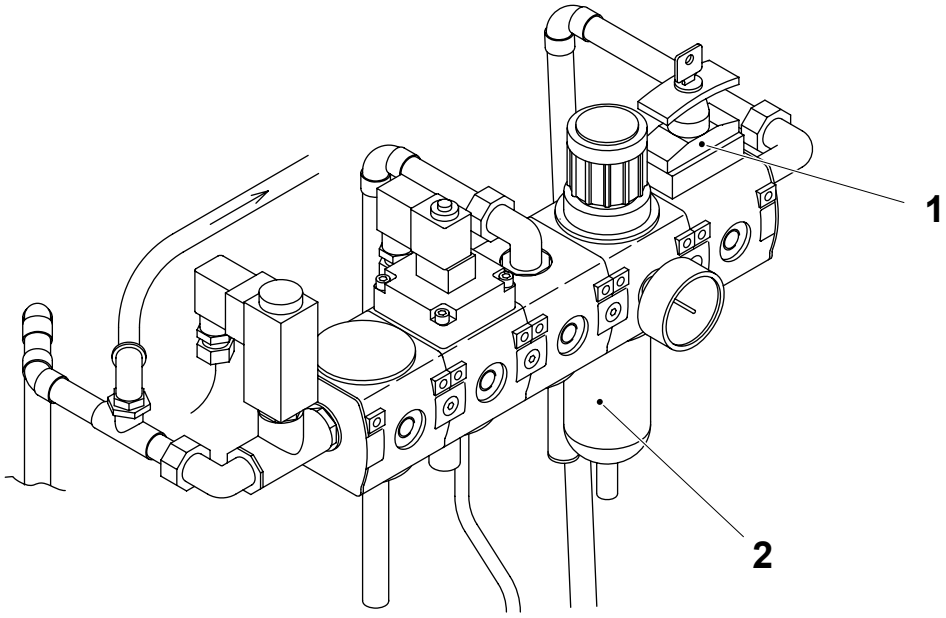
b) Remove the reservoir (2) and change the O-ring as required.

c) Clean the reservoir (2) with soapy water and rinse with plenty of clean water.

d) Remove and clean the filter insert inside the reservoir (2). Change as required.

e) Fit back the reservoir (2) and make sure that the O-ring is correctly fitted.

f) Open the air inlet valve and check for leakages in the reservoir (2).



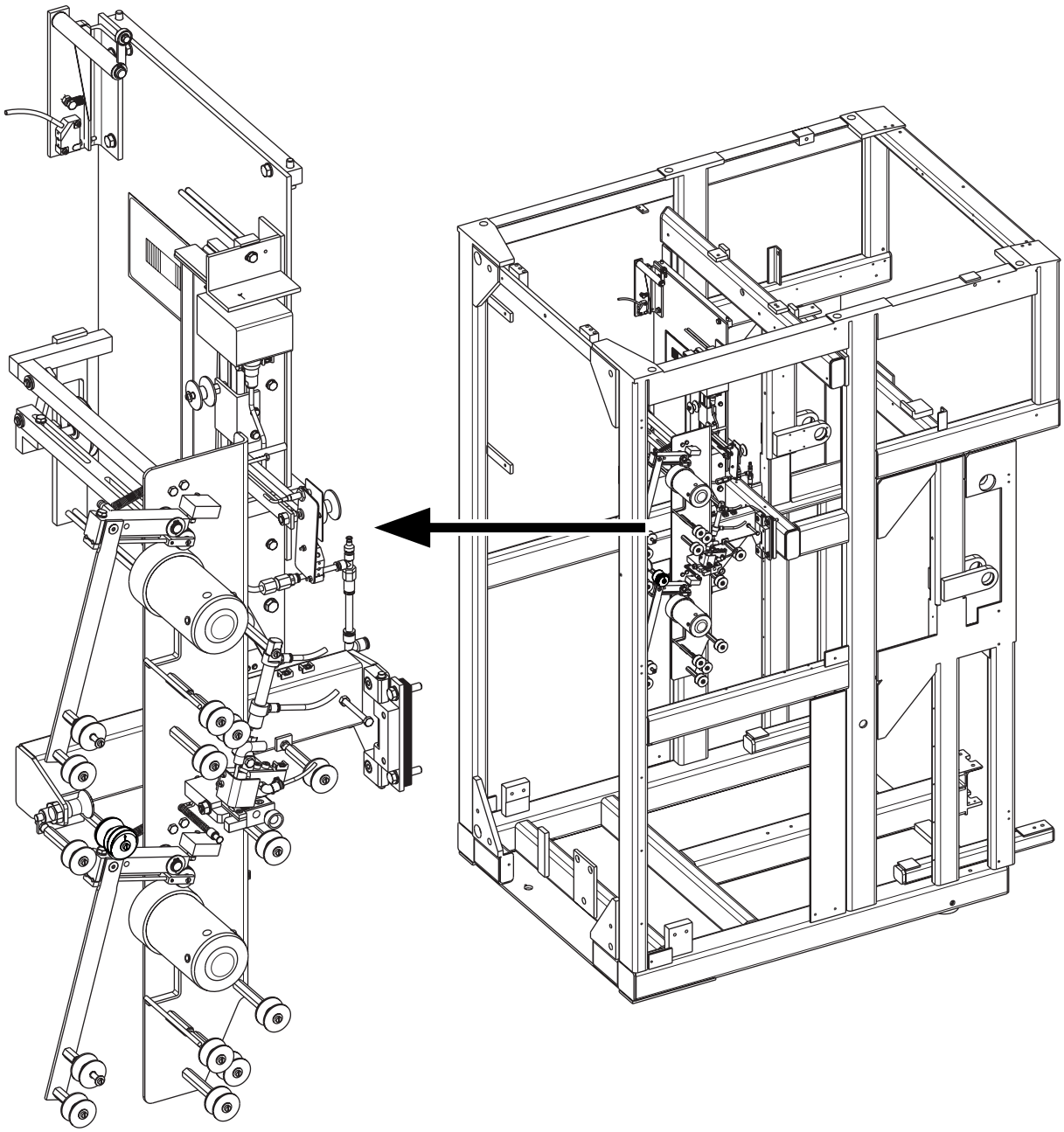
1 Shut-off valve
2 Reservoir

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TechPub_2614345_0105 - 06_MM81534_11en.fm

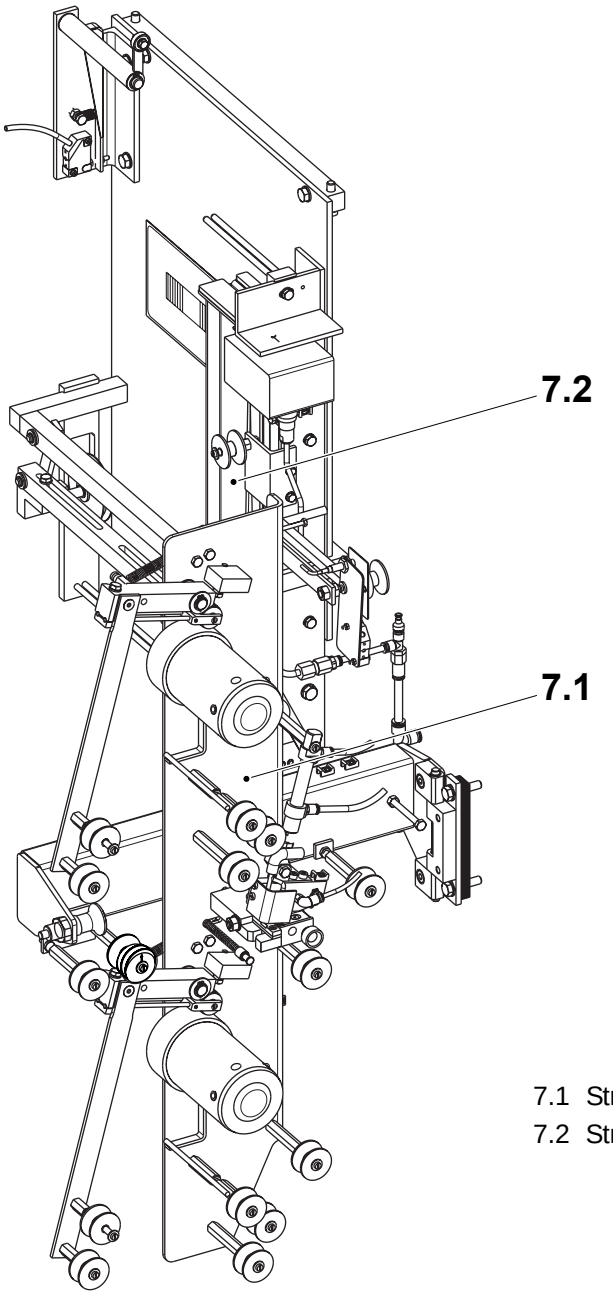
7 Strip Applicator



TechPub_2614345_0105 - 07_MM81534_11en.fm

Strip Applicator - Description

SPC Reference	648507-0400



7.1 Strip magazine
7.2 Strip applicator

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7.2.4-2 Strip Guide - Set Position . . . . . 7 - 32

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7.1 Strip Magazine

SPC Reference	1195500-0200

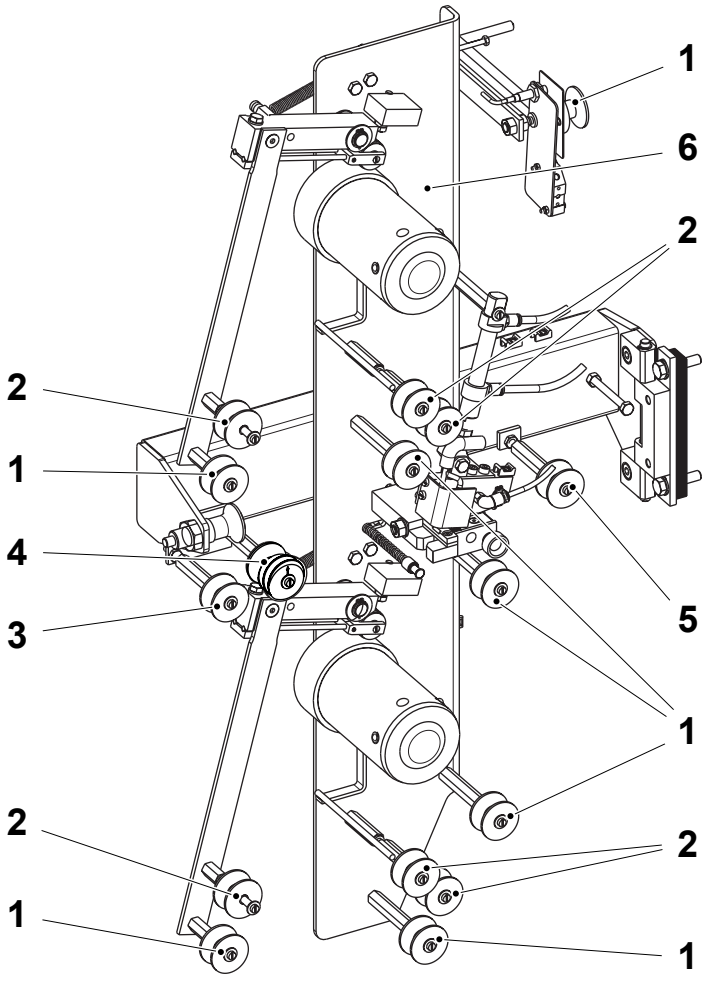
7.1-1 Strip Magazine - Check Rollers

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1195500-0200

Make sure that:

- all rollers are intact
- the rollers (1), (3), (4) and (5) rotate freely
- the rollers (2) rotate and slide freely
- the shafts for the rollers (3), (4) and (5) are perpendicular to the mounting plate (6) and are not bent.

Clean or change all the rollers as required.



1 Roller
2 Roller
3 Roller
4 Roller
5 Roller
6 Mounting plate

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.1.1 Brake Arm

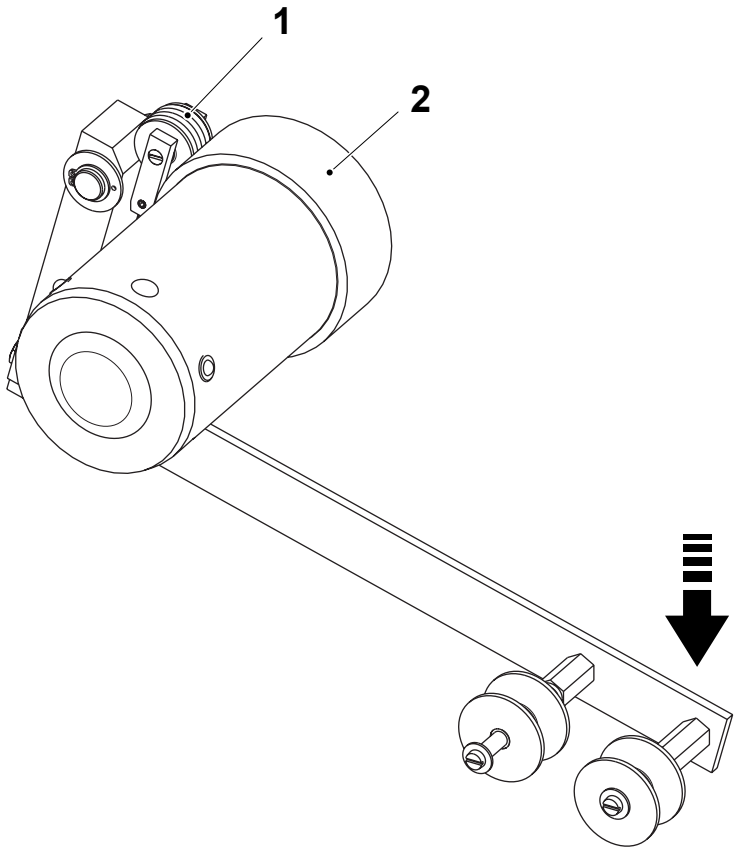
7.1.1-1 Brake Arm - Check Function

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095816-0100

On both the brake arms check that:

- the O-rings (1) prevent the hub (2) from rotating when the arm is lowered
- the arm follows the strip tension.

If not, see 7.1.1-2 Brake Arm - Check and 7.1.1-3 Brake Arm - Set.



1 O-ring
2 Hub

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7.1.1-2 Brake Arm - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095816-0100

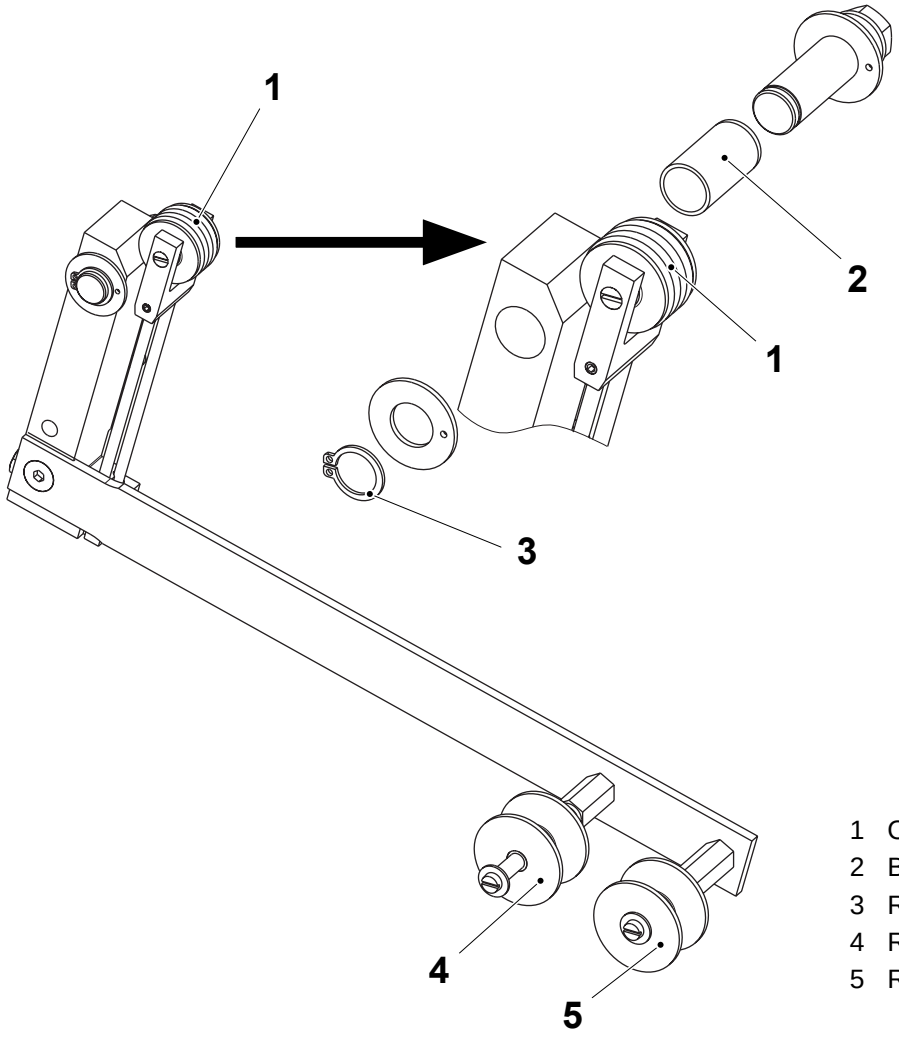
On both the brake arms check that:

- the O-rings (1) are intact
- the roller (4) is intact, rotates and slides freely
- the roller (5) is intact and rotates freely.

Change or clean as required.

Check that the brake arm turns easily. If not:

- remove the retaining ring (3) and the washer
- remove the brake arm and press out the bushing (2) from the brake arm
- change the bushing (2) and assemble in the reverse order.



1 O-ring
2 Bushing
3 Retaining ring
4 Roller
5 Roller

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7.1.1-3 Brake Arm - Set

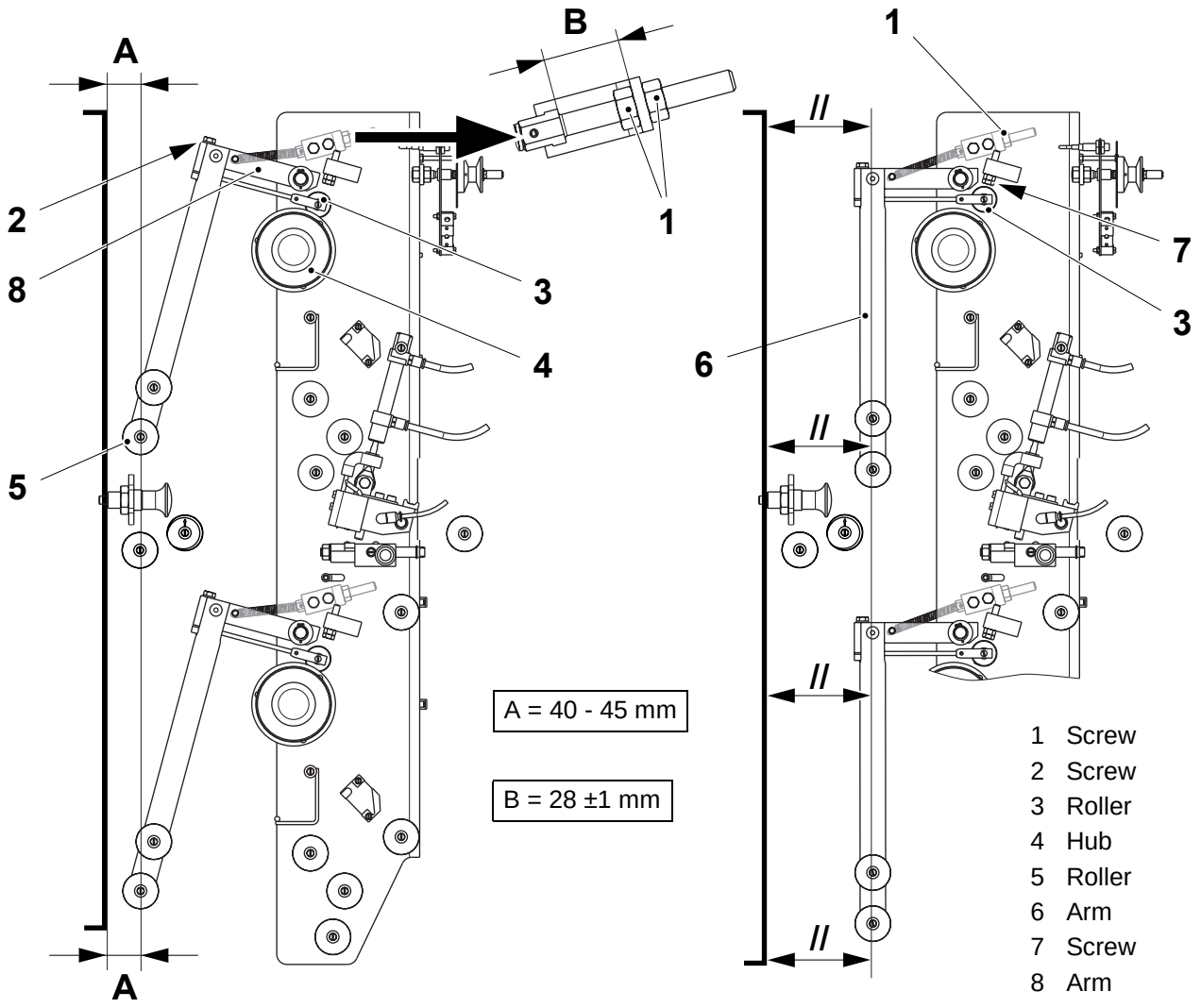
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095816-0100

a) Position the roller (5) at the distance **A** to the machine body. Loosen the screw (2) and set the roller (3) so that it touches the hub (4) and the arm (8). Tighten the screw (2) and repeat on the other arm (6).

b) Set the distances **B** by means of the screws (1). Repeat on the other arm (6).

c) Place the arm (6) parallel to the machine body and adjust the screw (7) in contact with the roller (3). Repeat on the other arm (6).

d) Check during the path and the splice that the strip is slightly tensioned.



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7.1.2 Cutting Table

7.1.2-1 Cutting Table - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Locking fluid TP No. 90157-16
SPC Reference	1347260-0100

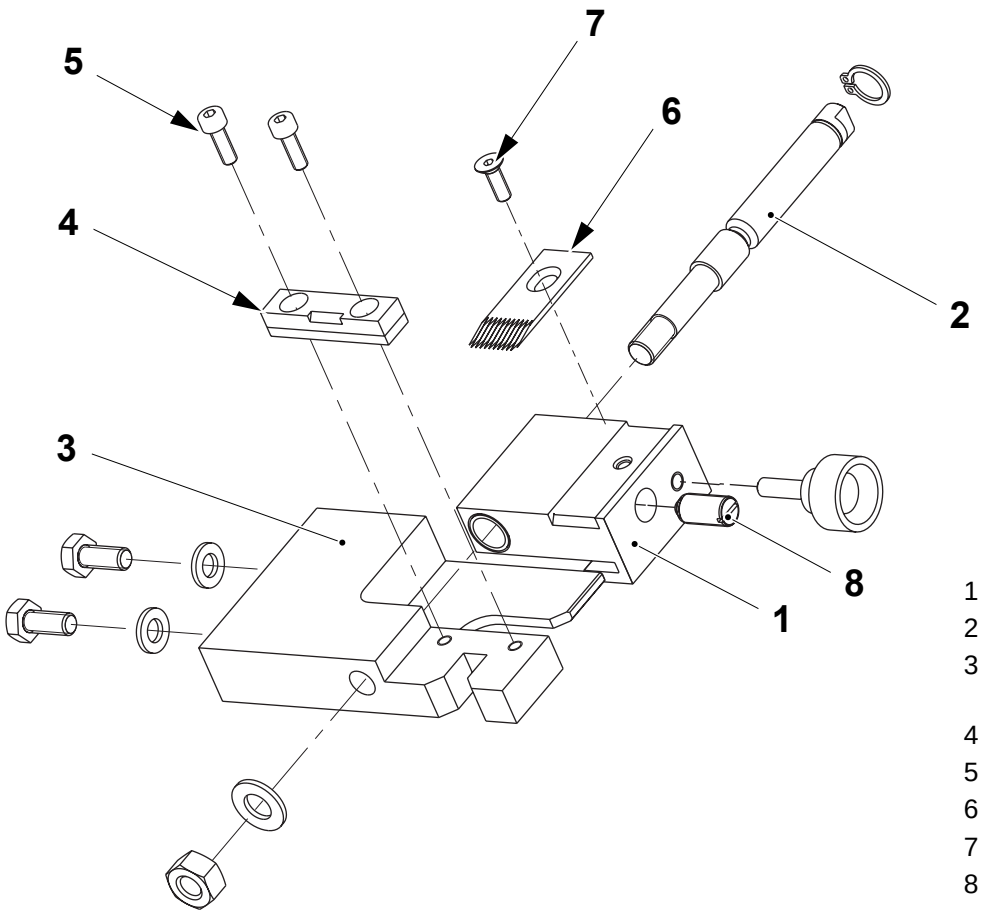
a) Check that the slide (1) move freely on the shaft (2) and on the splicing table (3). Clean as required.

b) Check that the pad (4) is not damaged. Change as required by means of the screws (5).

c) Check that the knife (6) is not damaged. Change as required by means of the screws (7).

d) Check that when the slide (1) is matching the pad (4) the spring loaded screw (8) locks correctly the slide (1). If not, adjust the spring force by turning the screw (8). Lock the screw (8) by means of locking fluid.

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1 Slide
2 Shaft
3 Splicing table
4 Pad
5 Screw
6 Knife
7 Screw
8 Screw

7.1.2-2 Cutting Table - Set Knife

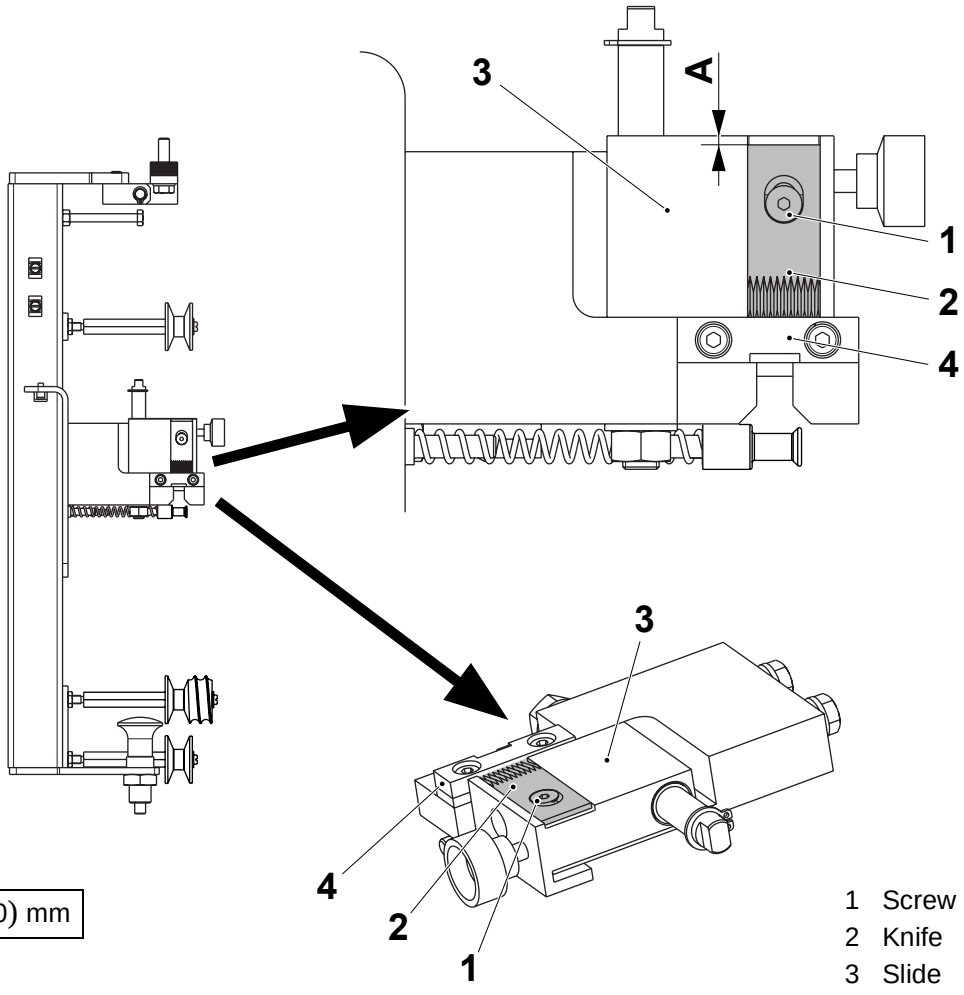
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1347260-0100

a) Loosen the screw (1).

b) Set the distance **A** between the knife (2) and the slide (3) by means of the slot in the knife (2).

c) Tighten the screw (1).

Note! After the setting place a piece of strip between the knife (2) and the pad (4). Move the slide (3) against the pad (4). Make sure that the piece of strip stays in position and is not completely cut.



A = 2 (+0.5 - 0) mm

1 Screw
2 Knife
3 Slide
4 Pad

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7.1.3 Heating Device

7.1.3-1 Heating Device - Check

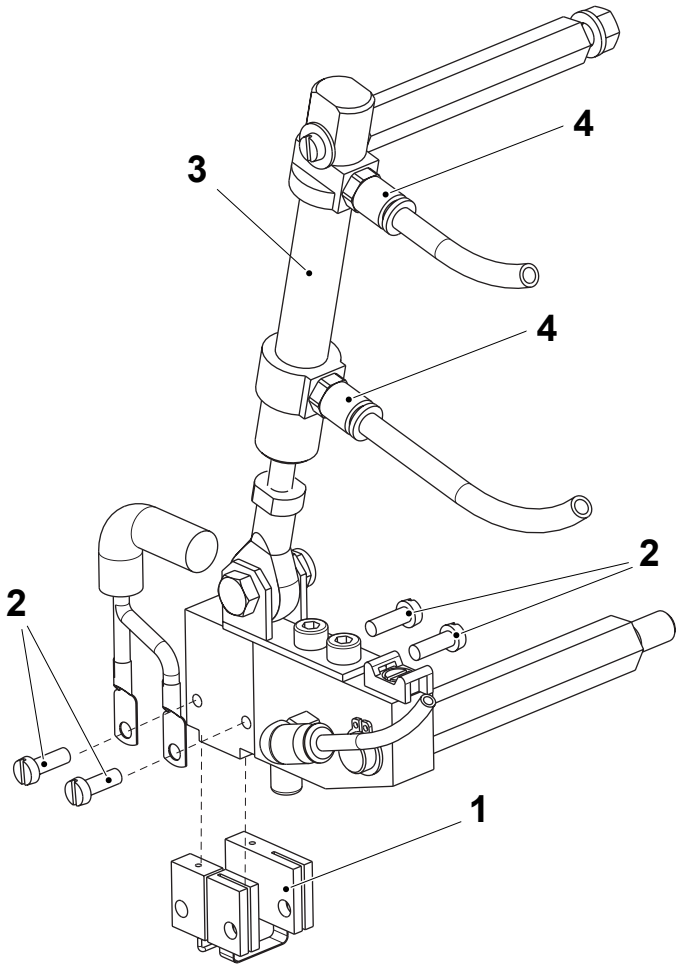
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1490806-0100

a) Check that the sealing block (1) is intact. Remove the screws (2) and change the sealing block (1) as required.

Note! When fitting back the sealing block (1) make sure to fully tighten the four screws (2) to ensure a good electrical connection.

b) Check that the cylinder piston (3) moves freely and smoothly.

c) Check that there are no air leaks in the air connections (4).



1 Sealing block
2 Screw
3 Cylinder piston
4 Air connection

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.1.3-2 Heating Device - Set Position

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1490806-0100

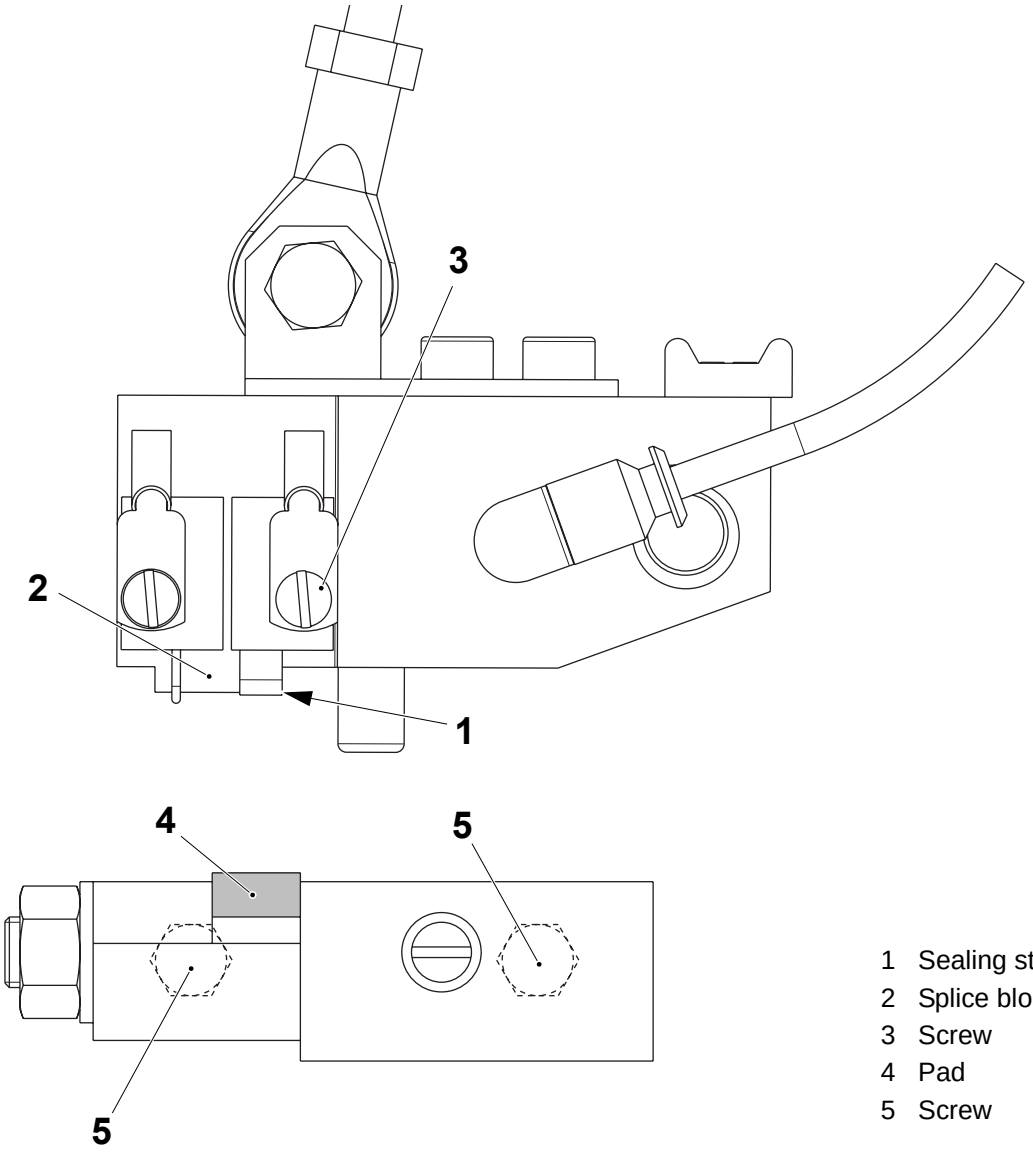
WARNING

Risk of burns.

Follow the Safety precautions.

a) Set the position of the sealing strip (1) so that it matches the bottom of the splice block (2) by means of the screws (3), (one on each side).

b) Set the parallelism between the splice block (2) and the pad (4) by means of the screws (5).



1 Sealing strip
2 Splice block
3 Screw
4 Pad
5 Screw

(Cont'd)

TechPub_2614345_0105 - 07_MM81534_11en.fm

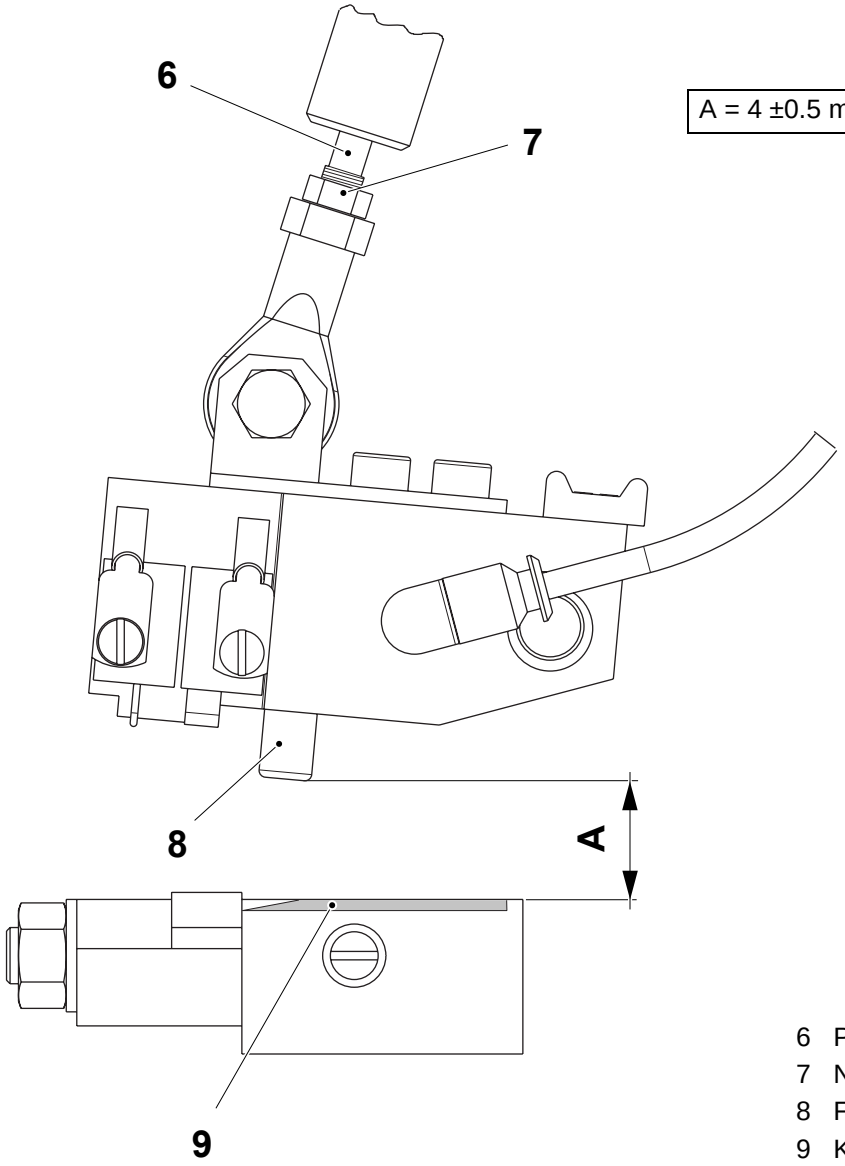
(Cont'd)

c) Move the piston (6) by hand until it is fully in.

d) Loosen the nut (7).

e) Set the distance **A** between the finger (8) and the knife (9) by turning the piston (6).

f) Tighten the nut (7).



6 Piston
7 Nut
8 Finger
9 Knife

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7.1.4 Hub

7.1.4-1 Hub - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095815-0100

Release the paper brake arm and check that the hubs (3) rotate freely.

Check that the play in the ball bearings (4) must not exceed **0.5 mm**. If required change the ball bearings (4) as follow:

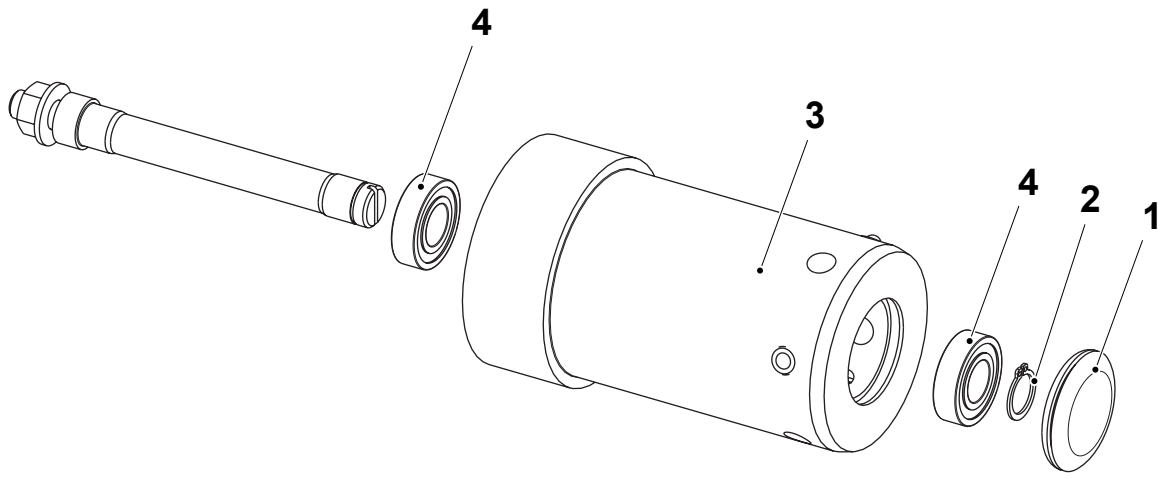
a) Remove the rubber plug (1).

b) Remove the retaining ring (2).

c) Remove the hub (3).

d) Press out and change the ball bearings (4) from the hub.

e) Assemble in the reverse order.



1 Rubber plug
2 Retaining ring
3 Hub
4 Ball bearing

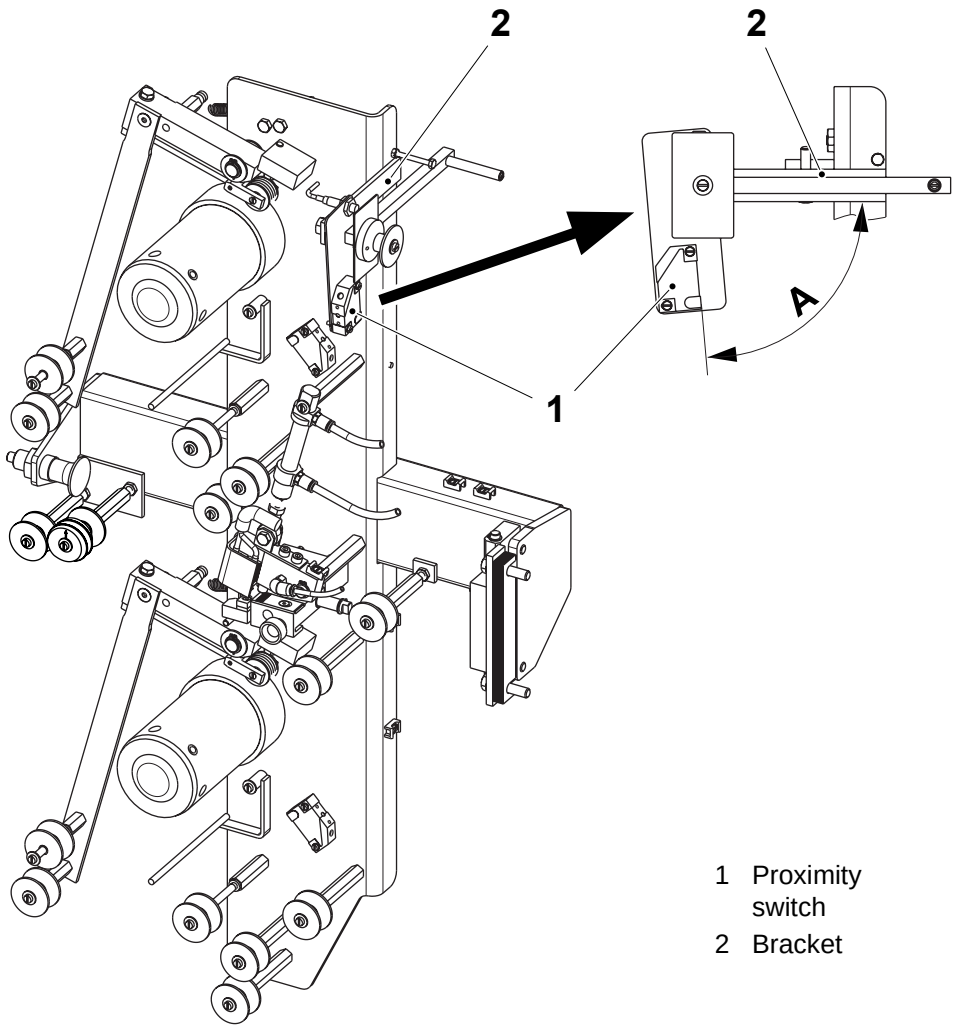
TechPub_2614345_0105 - 07_MM81534_11en.fm

7.1.5 Mounting Sheet

7.1.5-1 Mounting Sheet - Set Proximity Switch

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1195501-0200

Set the proximity switch (1) so that the LED lights up when there is an angle of **85°** between the proximity switch (1) and the bracket (2), see angle **A** on the figure below.



1 Proximity switch
2 Bracket

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.1.5-2 Mounting Sheet - Set Rotation Monitor Proximity Switch

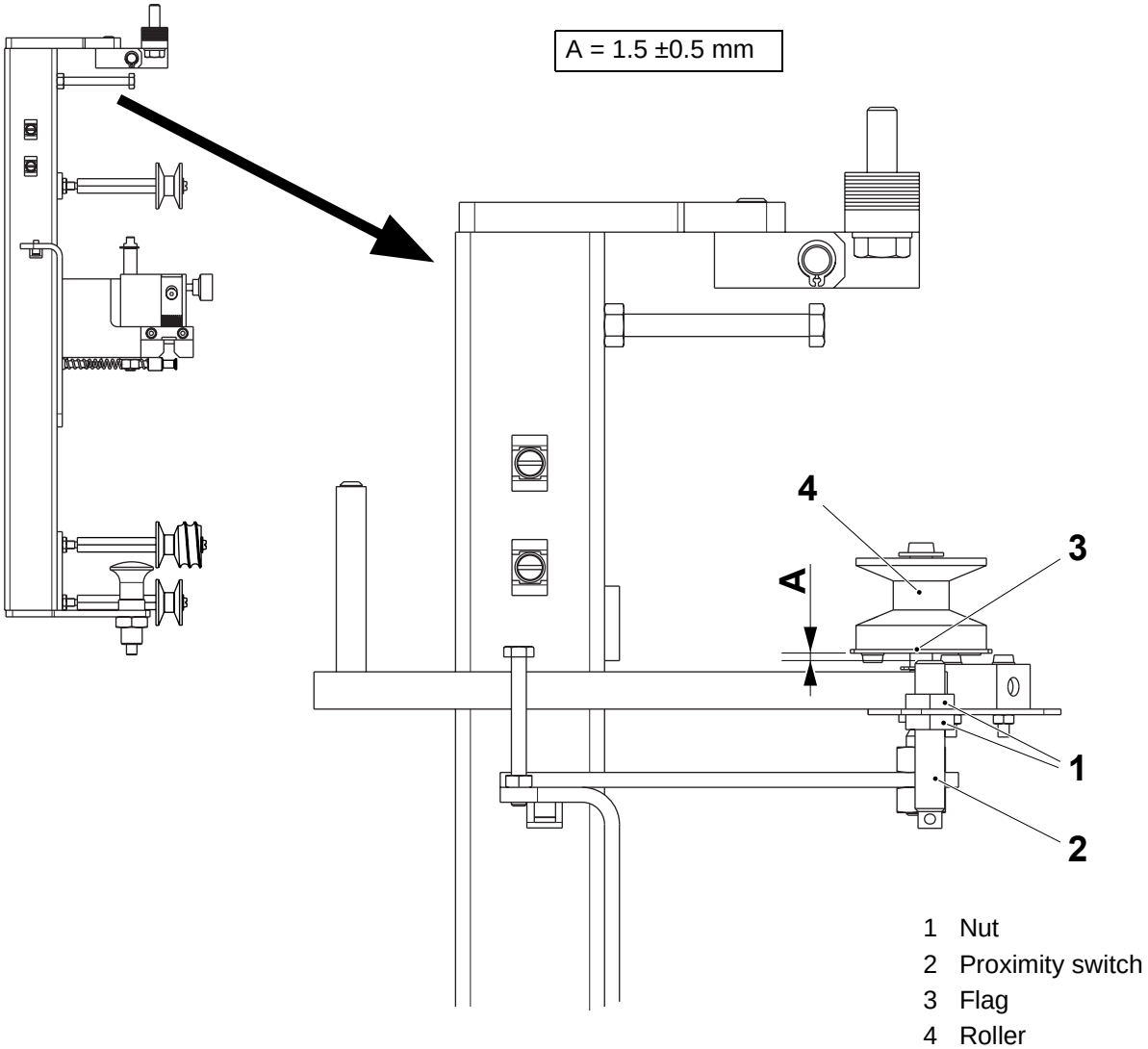
Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1195501-0200

a) Loosen the nuts (1).

b) Set the distance **A** between the head of the proximity switch (2) and the flag (3) by shifting the proximity switch (2).

c) Tighten the nut (1).

Note! Make sure that the LED on the proximity switch (2) is still lit when manually moving sideways the roller (4).



1 Nut
2 Proximity switch
3 Flag
4 Roller

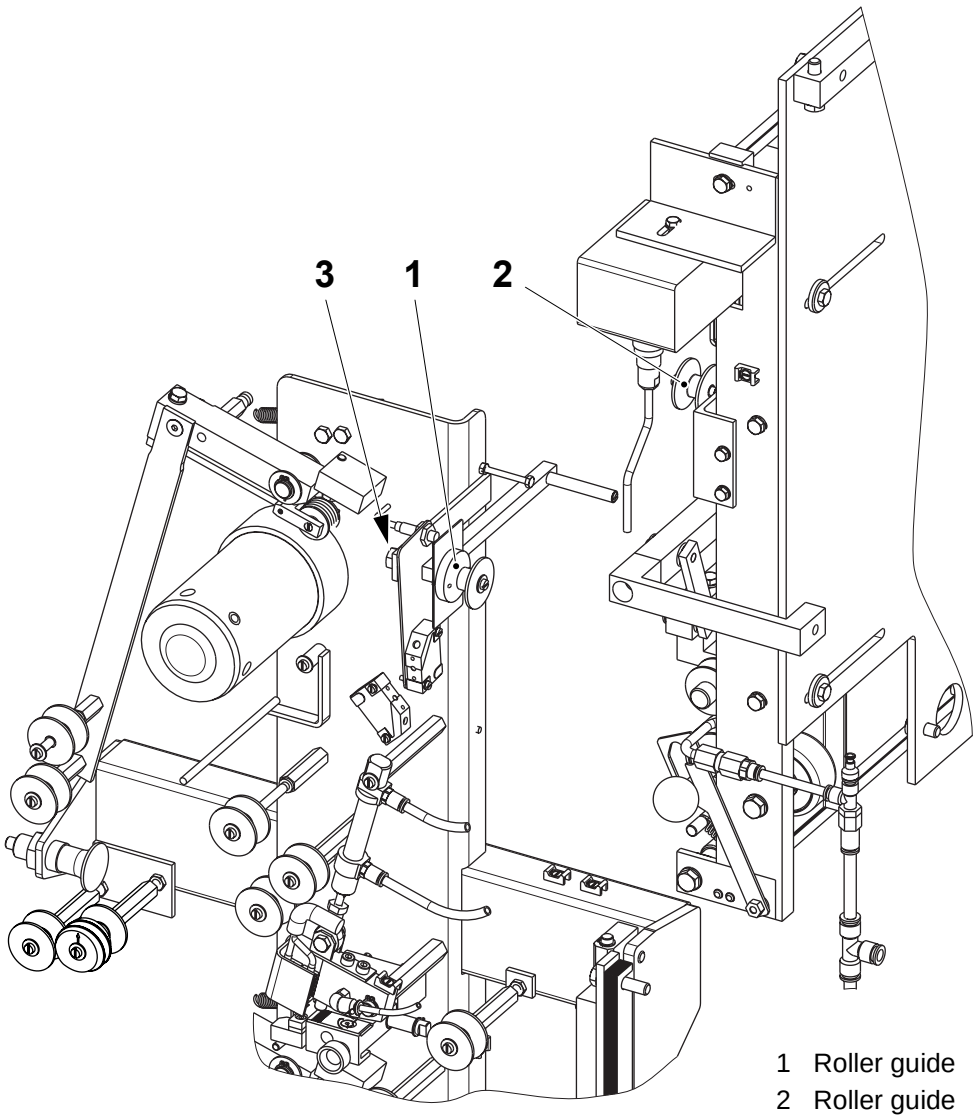
TechPub_2614345_0105 - 07_MM81534_11en.fm

7.1.5-3 Mounting Sheet - Set Roller Guides

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1195501-0200

a) Set the roller guides (1) and (2) so that they are on the same line.

b) Adjust the roller guide (1) by means of the setting nuts (3).



1 Roller guide
2 Roller guide
3 Setting nut

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.1.5-4 Mounting Sheet - Set Stop Screws

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1195501-0200

a) Loosen the nut (1).

b) Set the distance **A** between the head of the screw (2) and the mounting plate (3).

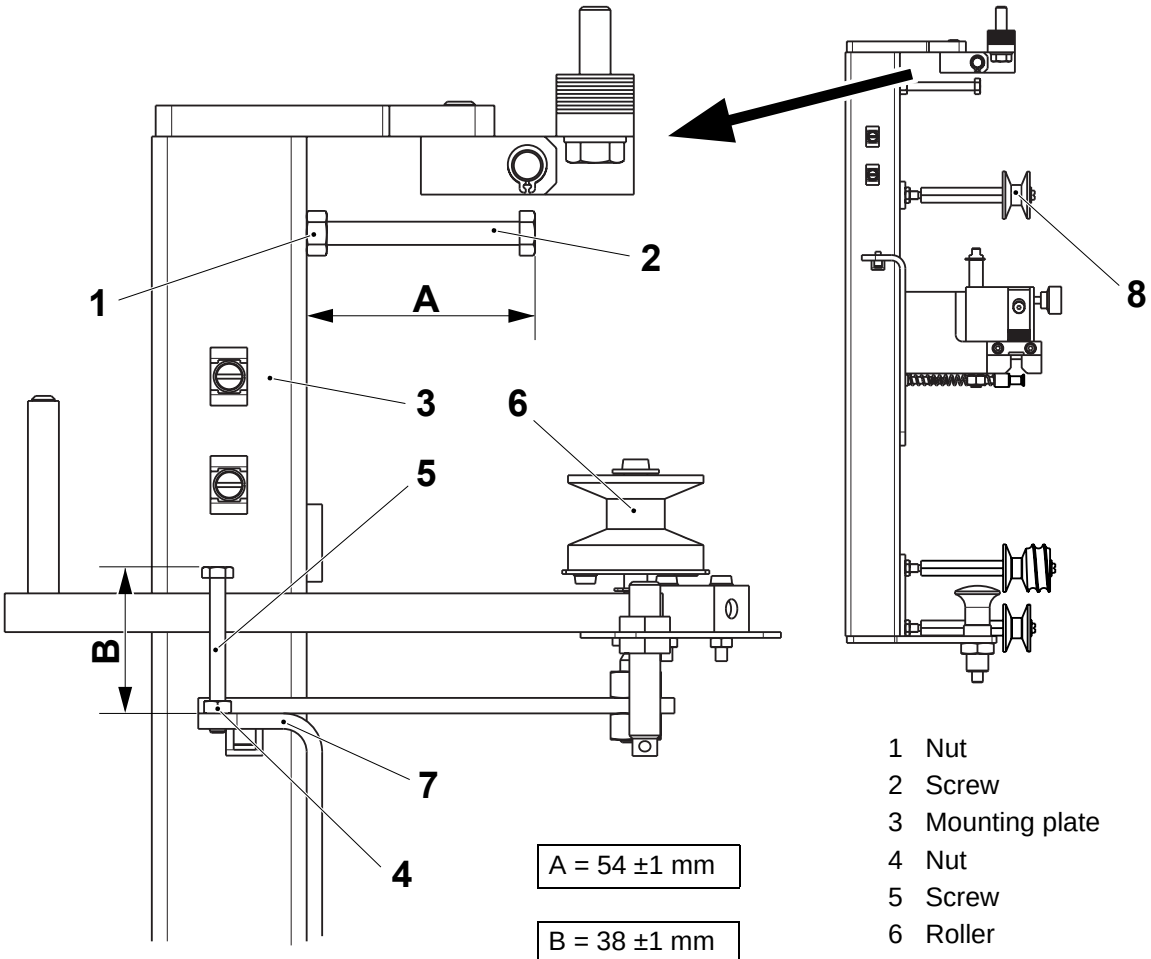
c) Tighten the nut (1).

d) Loosen the nut (4).

e) Set the distance **B** between the head of the screw (5) and the mounting plate (7)

f) Tighten the nut (4).

Note! Make sure that when the mounting sheet is opened, the screw (2) avoids the roller (8) from hitting the ASU frame.



A = 54 ±1 mm

B = 38 ±1 mm

1 Nut
2 Screw
3 Mounting plate
4 Nut
5 Screw
6 Roller
7 Mounting plate
8 Roller

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.1.5-5 Mounting Sheet - Set Rollers Position

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1195501-0200

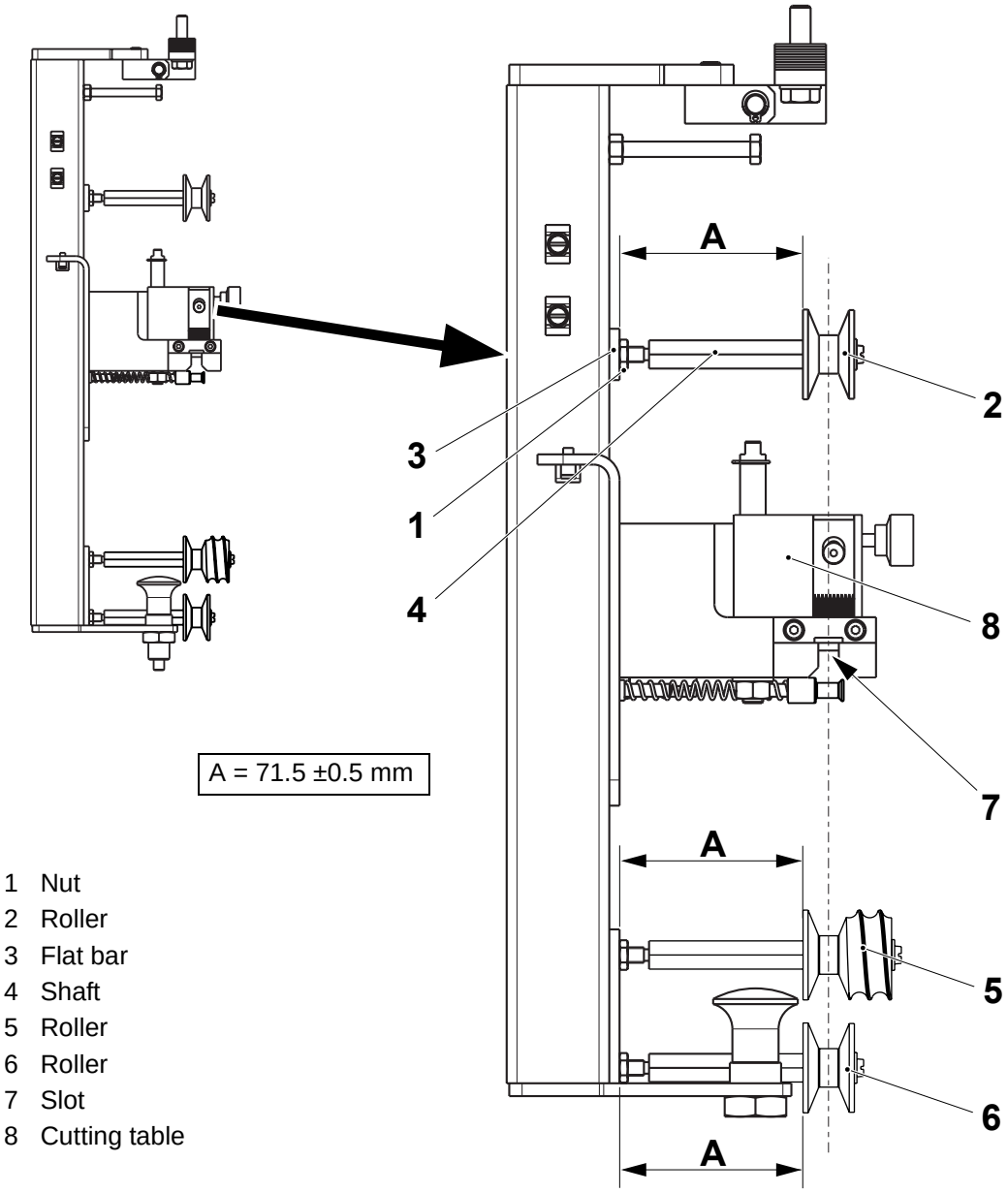
a) Loosen the nut (1).

b) Set the distance **A** between the roller (2) and the flat bar (3), welded on the mounting sheet, by means of the shaft (4).

c) Tighten the nut (1).

d) Repeat the items a), b) and c) for the rollers (5) and (6).

e) With the aid of a steel ruler check that the rollers (2), (5) and (6) are aligned with the slot (7) on the cutting table (8).



1 Nut
2 Roller
3 Flat bar
4 Shaft
5 Roller
6 Roller
7 Slot
8 Cutting table

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.2 Strip Applicator

SPC Reference	1195505-0200

7.2-1 Strip Applicator - Set Inductor Position

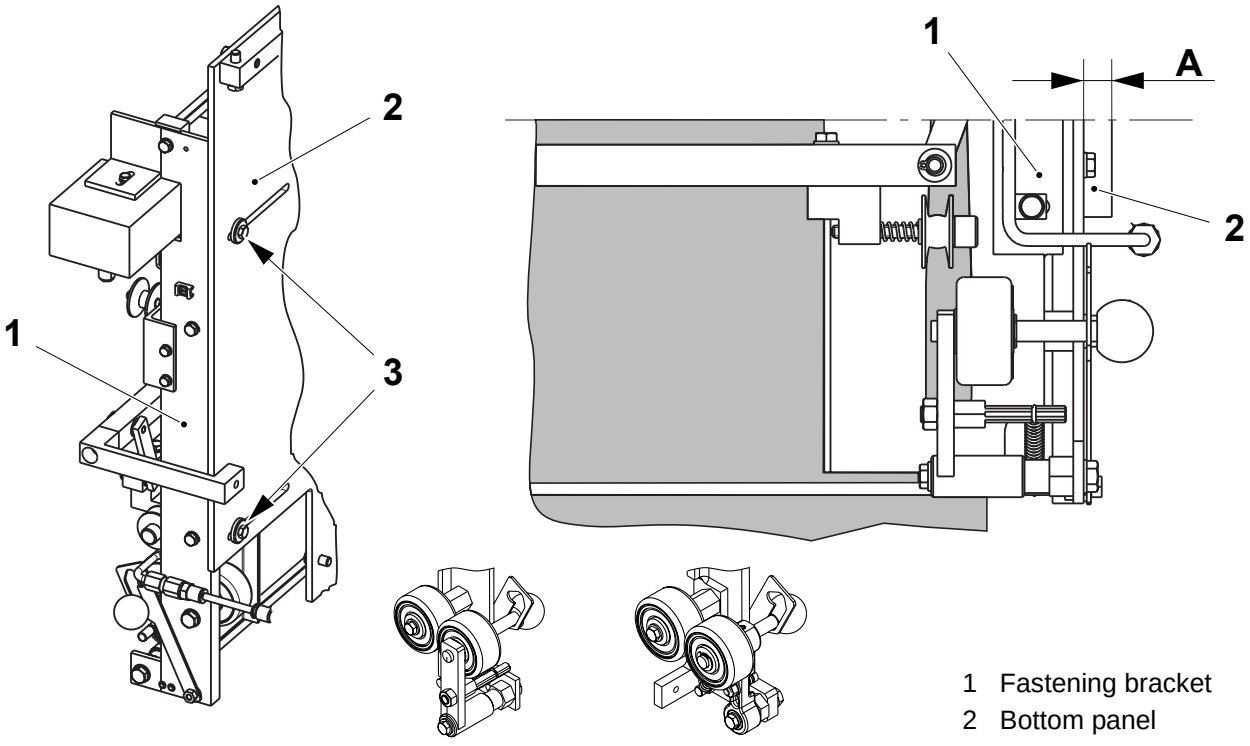
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF Packaging material **threaded**
SPC Reference	1195505-0200, 1195505-0300

Valid for Old Pressure Roller, 1255305-0200

a) Check the distance **A**, see table below, between the edge of the fastening bracket (1) and the edge of the bottom panel (2).

b) If required, set the distance **A** by means of the screws (3), located in the bottom panel (2).

Package	A ±0.5 (mm)	Package	A ±0.5 (mm)
1500 S - 1000 B - 500 B	5	TPA 1000 S	26
250 B - 200 B - 330 S	59	500 S	42
1000 S	13.5	200 S - TPA 250 Sq	79
1000 Sq	21	TPA 330 Sq	67
TPA 1000 Sq	35	250 S	74
TPA 500 Sq	51		



Pressure roller, 1255305-0200

Pressure roller, 1255305-0300

1 Fastening bracket
2 Bottom panel
3 Screw

(Cont'd)

TechPub_2614345_0105 - 07_MM81534_11en.fm

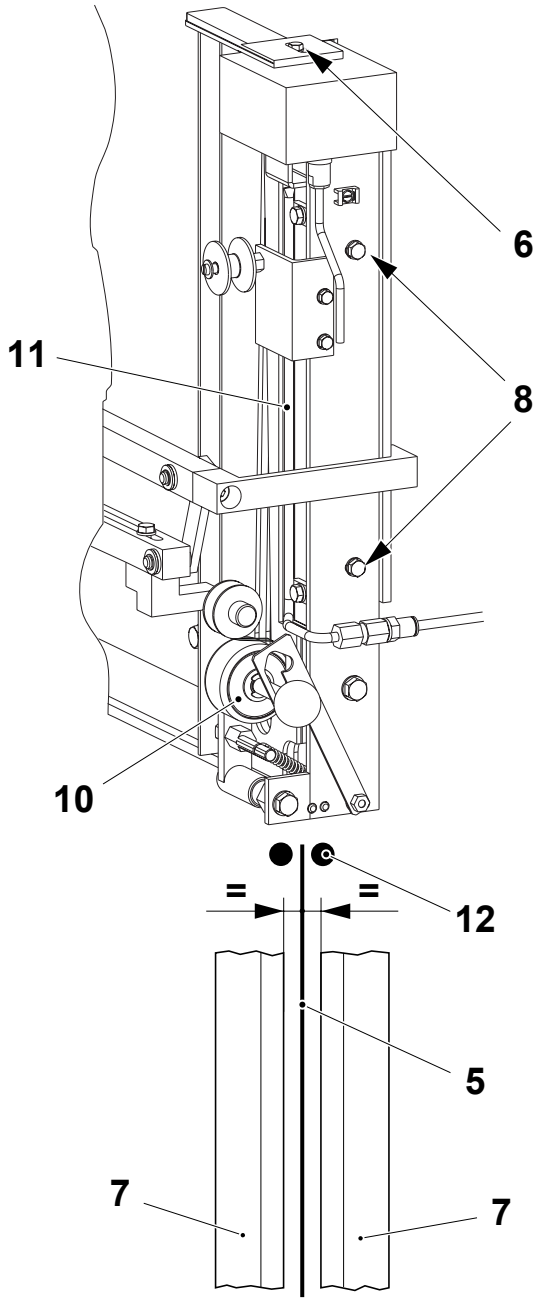
(Cont'd)

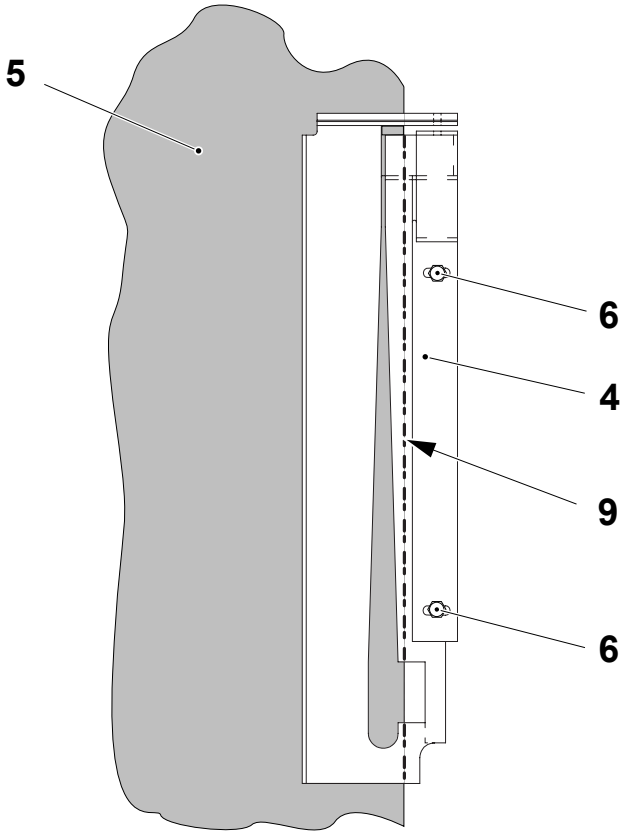
c) Lift and lock the roller (10).

d) Align the packaging material web (5) edge with the mark (9) on the inductor (4) by means of the screws (6). Make sure that the cooling pipe (11) does not touch the inductor alifoil (7).

e) Set the inductor (4) by means of the screws (8) so that the packaging material web (5) is approximately in the middle of the two inductor alifoils (7) and the web guides (12).

f) Release the roller (10).





4 Inductor
5 Packaging material
6 Screw
7 Alifoil
8 Screw
9 Mark
10 Roller
11 Cooling pipe
12 Web guide

(Cont'd)

TechPub_2614345_0105 - 07_MM81534_11en.fm

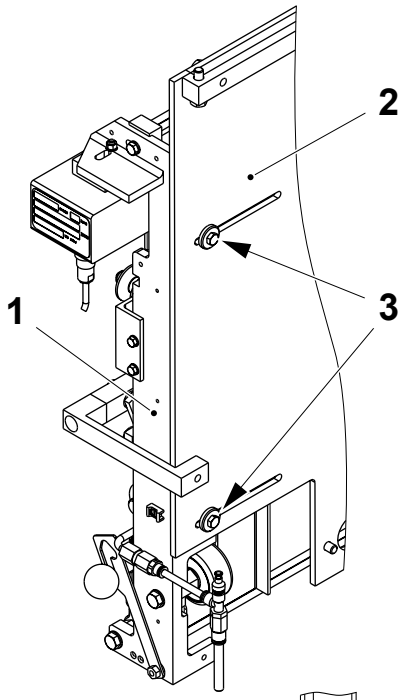
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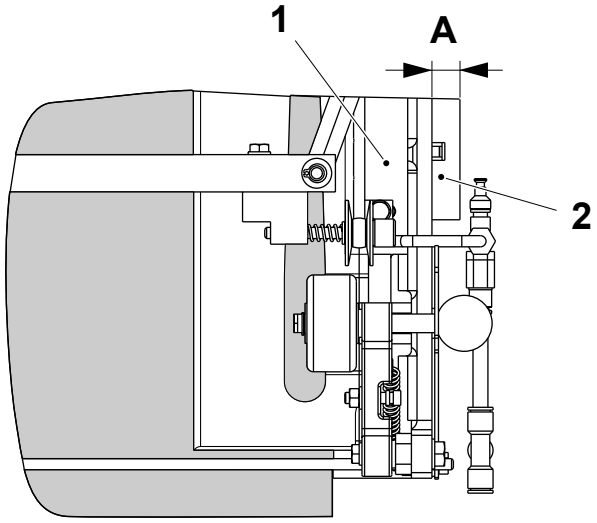
Valid for New Pressure Roller, 1255305-0300

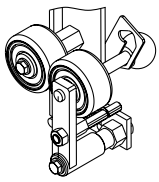
a) Check the distance **A**, see table below, between the edge of the fastening bracket (1) and the edge of the bottom panel (2).

b) If required, set the distance **A** by means of the screws (3), located in the bottom panel (2).

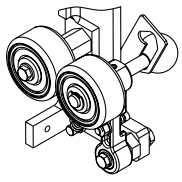
Package	A ±0.5 (mm)		Package	A ±0.5 (mm)
1500 S - 1000 B - 500 B	0		TPA 1000 S	20
250 B - 200 B - 330 S	53		500 S	36
1000 S	7.5		200 S - TPA 250 Sq	73
1000 Sq	15		TPA 330 Sq	61
TPA 1000 Sq	29		250 S	68
TPA 500 Sq	45			







Pressure roller, 1255305-0200



Pressure roller, 1255305-0300

1 Fastening bracket
2 Bottom panel
3 Screw

TechPub_2614345_0105 - 07_MM81534_11en.fm

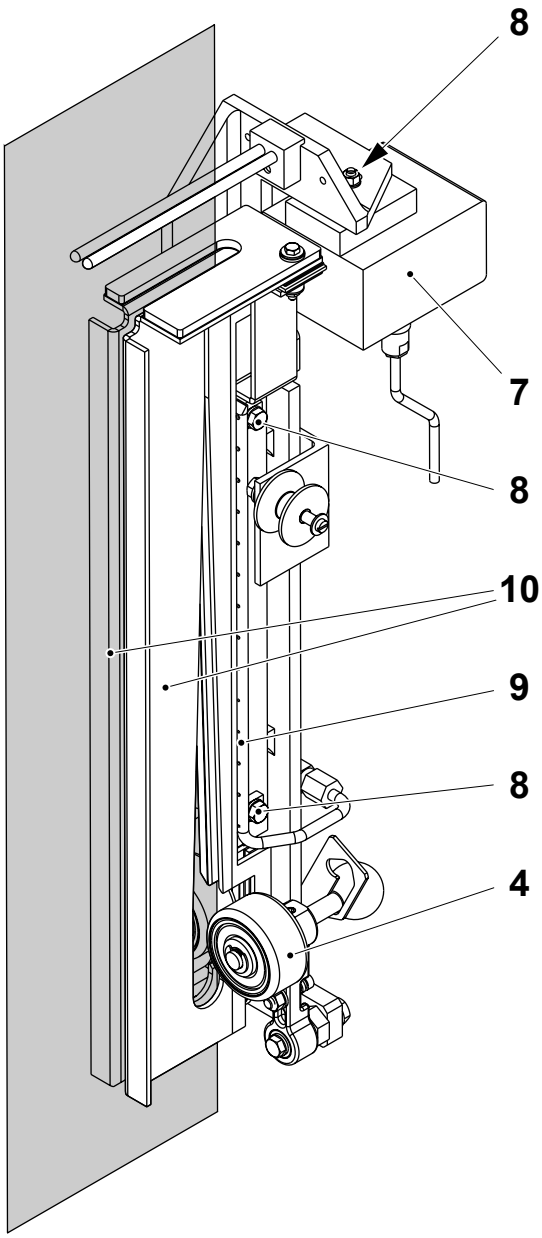
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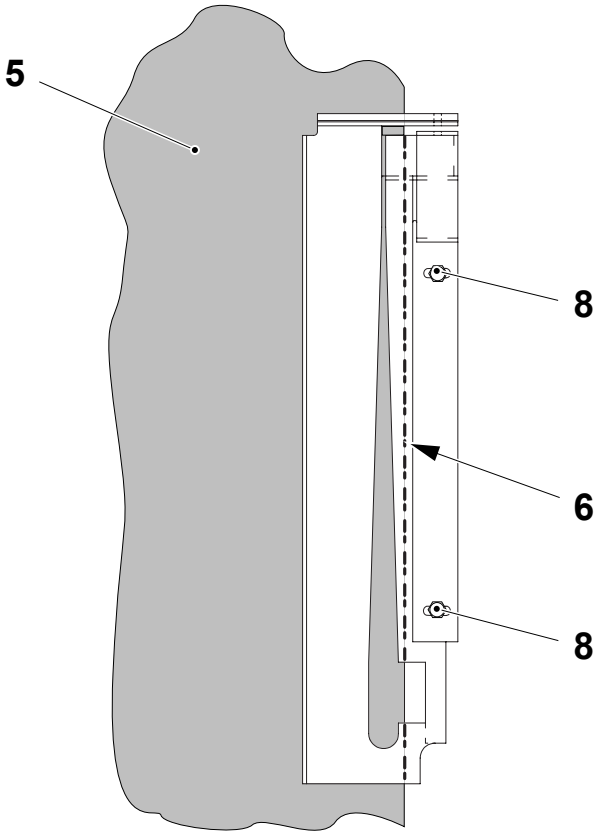
(Cont'd)

c) Lift and lock the roller (4).

d) Align the packaging material web (5) edge with the mark (6) on the inductor (7) by means of the screws (8). Make sure that the cooling pipe (9) does not touch the inductor alifoil (10).

e) Release the roller (4).





4 Roller
5 Packaging material
6 Mark
7 Inductor
8 Screw
9 Cooling pipe
10 Alifoil

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7.2.1 Pressure Roller

7.2.1-1 Pressure Roller - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1255305-0200 1255305-0300

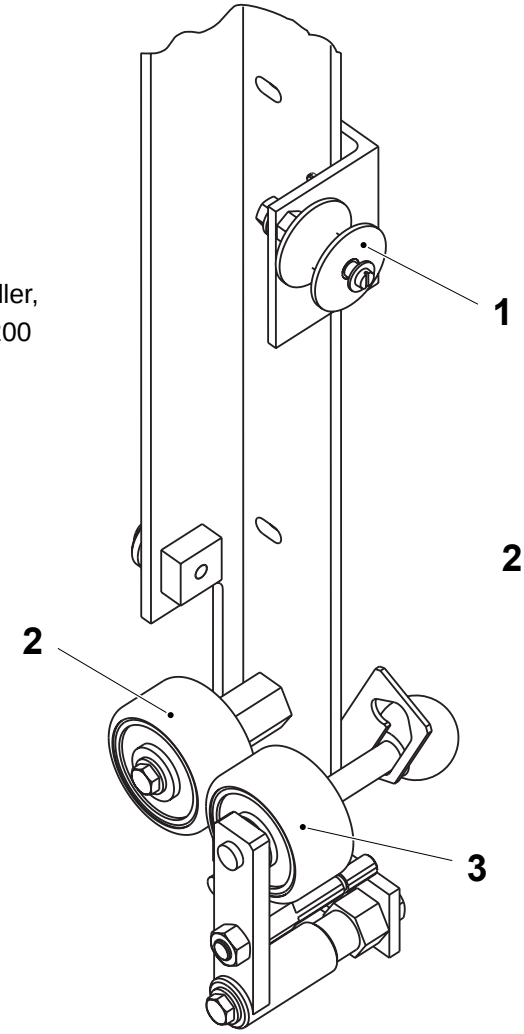
a) Check that the wheel (1) rotates and slides freely.

b) Check that the surface of the wheel (1) is intact.

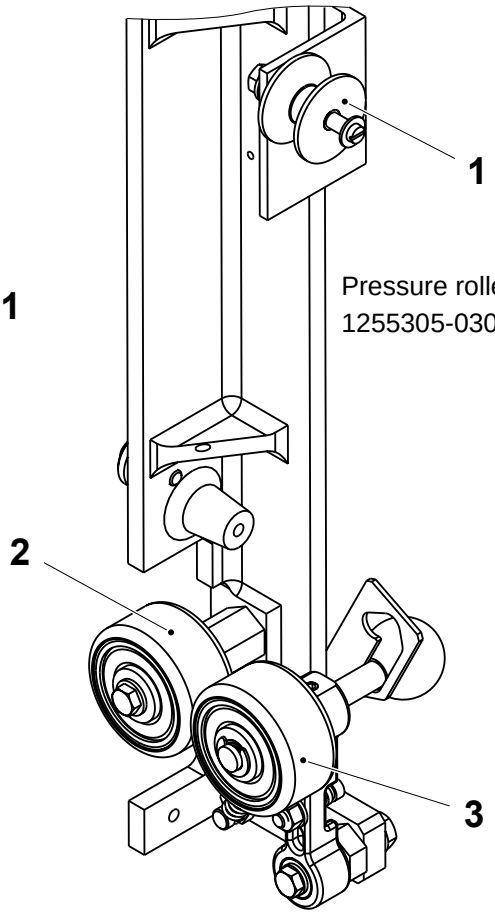
c) Check the rollers (2) and (3) for excessive wear. The maximum allowable radial play is **0.3 mm**.

d) Check that the rollers (2) and (3) rotate freely without play and are intact and also that the teflon layer on the roller surface is intact. Change the rollers as required, see 7.2.1-2 Pressure Roller - Change Rollers.

Pressure roller, 1255305-0200



Pressure roller, 1255305-0300



1 Wheel
2 Roller
3 Roller

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.2.1-2 Pressure Roller - Change Rollers

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1255305-0200 1255305-0300

Valid for new pressure roller, 1255305-0300

Note! The rollers (3) and (7) must be fitted with the magnetic parts (8), blue side, facing away from the handle ball (1).

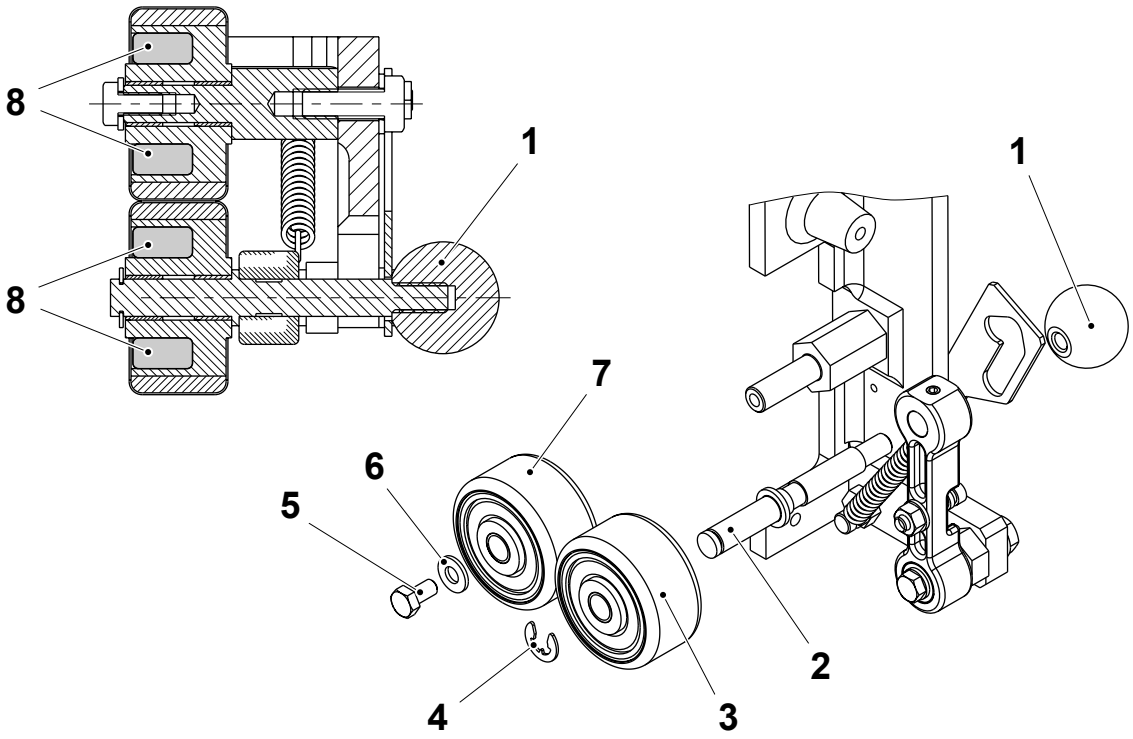
a) Remove the handle ball (1) to be able to loosen the shaft (2), the roller (3) and the retaining ring (4).

b) Change the roller (3).

c) Remove the screw (5), the washer (6) and the roller (7).

d) Change the roller (7).

e) Assemble in the reverse order.



1 Handle ball
2 Shaft
3 Roller
4 Retaining ring
5 Screw
6 Washer
7 Roller

(Cont'd)

TechPub_2614345_0105 - 07_MM81534_11en.fm

(Cont'd)

Valid For Old Pressure Roller, 1255305-0200

Note! The rollers (3) and (5) must be fitted with the magnetic (blue) side (6) facing towards the machine inside.

a) Release the roller (3) if required.

b) Remove the spring (9), the handle ball (1) and the locking washer (2).

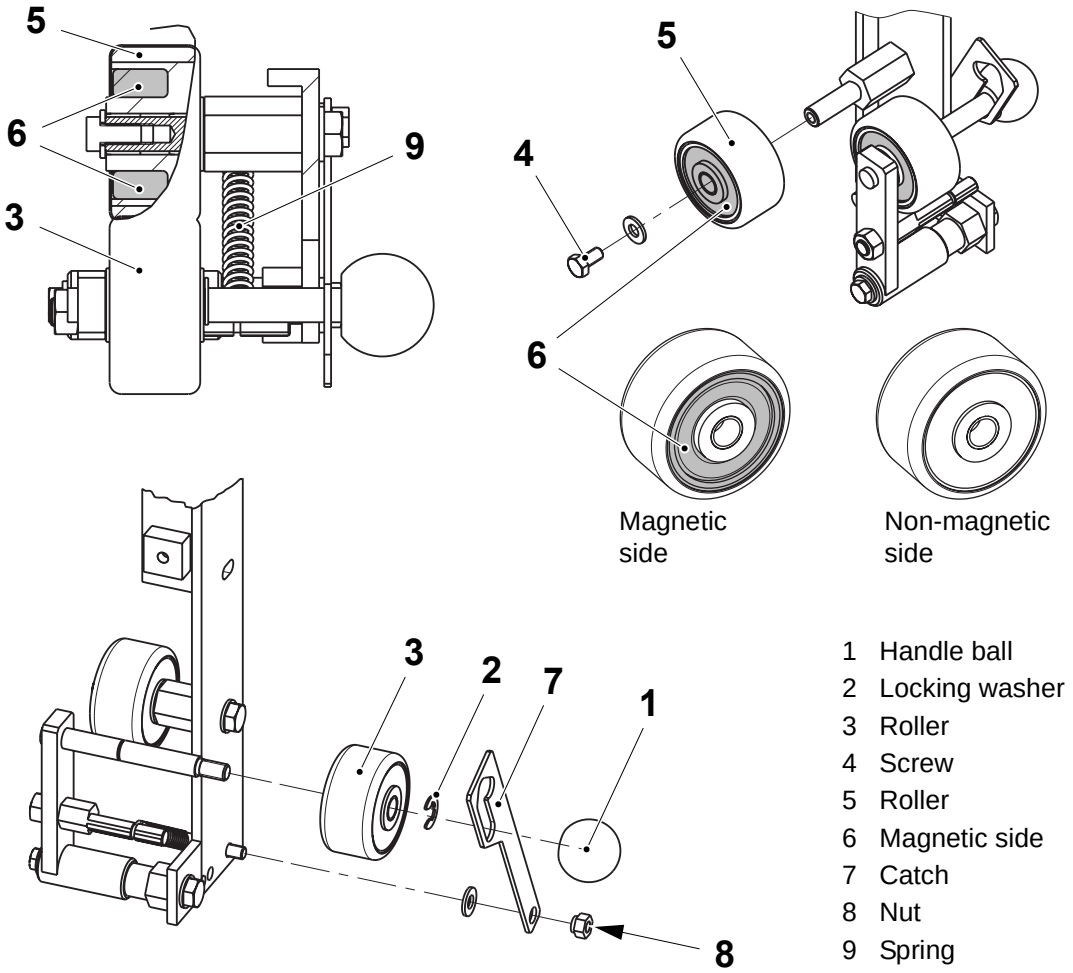
c) Remove the nut (8), the catch (7) and the roller (3).

d) Change the roller (3) as required.

e) Remove the screw (4), the washer and the roller (5).

f) Change the roller (5) as required.

g) Assemble in the reverse order.



1 Handle ball
2 Locking washer
3 Roller
4 Screw
5 Roller
6 Magnetic side
7 Catch
8 Nut
9 Spring

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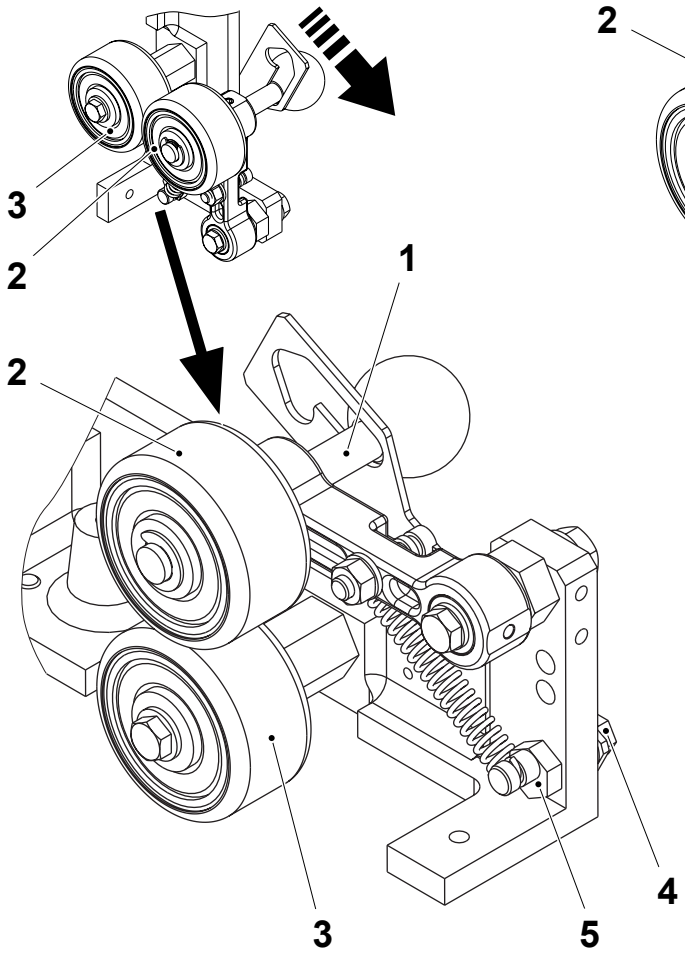
7.2.1-3 Pressure Roller - Set Spring Force

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Dynamometer TP No. 74767-102
SPC Reference	1255305-0200 1255305-0300

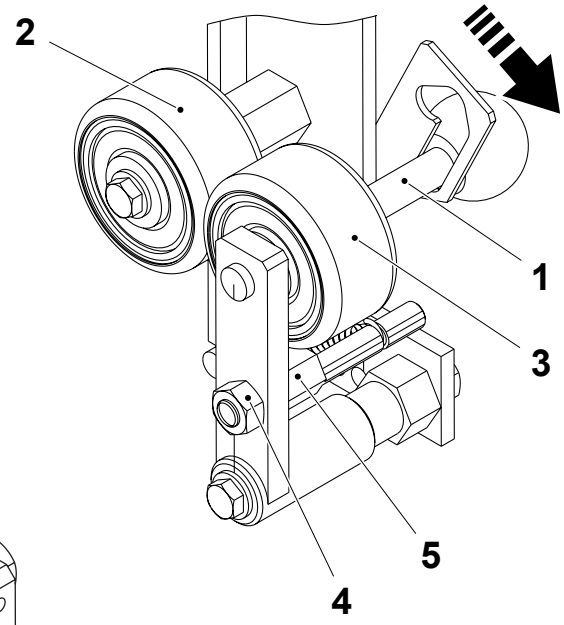
a) Attach a dynamometer to the holder (1) and measure the spring force.

b) Spring force must be measured when the roller (2) raises from the counter roller (3) and it must be between **20 N** and **22 N**. If required:
   - set the spring force by loosening the nut (4) and turning the eccentric (5)
   - tighten the nut (4) when the spring force value is obtained.

Pressure roller, 1255305-0300



Pressure roller, 1255305-0200



1 Holder
2 Roller
3 Counter roller
4 Nut
5 Eccentric

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.2.2 Splice Detector

7.2.2-1 Splice Detector - Check

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1095798-0100

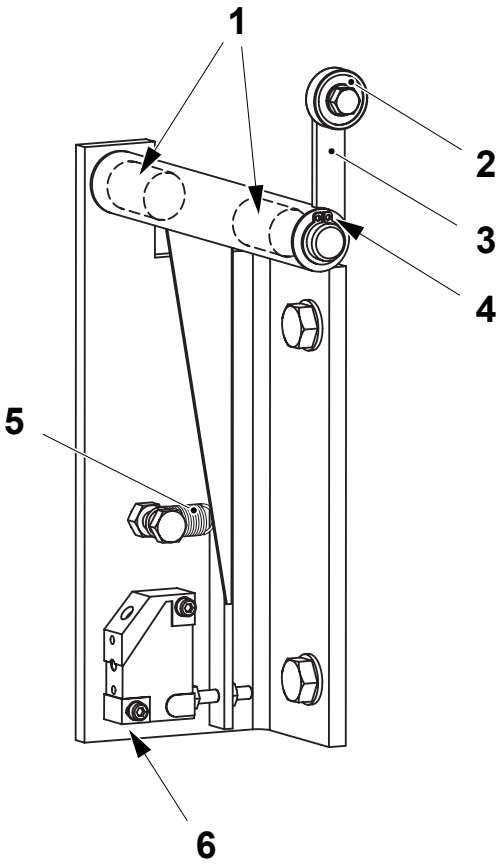
a) Check that the ball bearing (2) rotates easily. Change as required.

b) Check that the spring (5) is intact. Change as required.

c) Check that the bracket (3) is easy to turn. If not, remove the retaining ring (4), the spring (5) and pull out the bracket. Clean the bushings (1) and assemble in the reverse order.

d) Place a piece of packaging material under the ball bearing (2) and check that the LED (6) in the proximity switch is **On**.

e) Place a piece of double packaging material underneath the ball bearing (2) and check that the LED (6) goes out. If not, set the splice detector, see 7.2.2-2 Splice detector - set.



1 Bushing
2 Ball bearing
3 Bracket
4 Retaining ring
5 Spring
6 LED

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.2.2-2 Splice detector - set

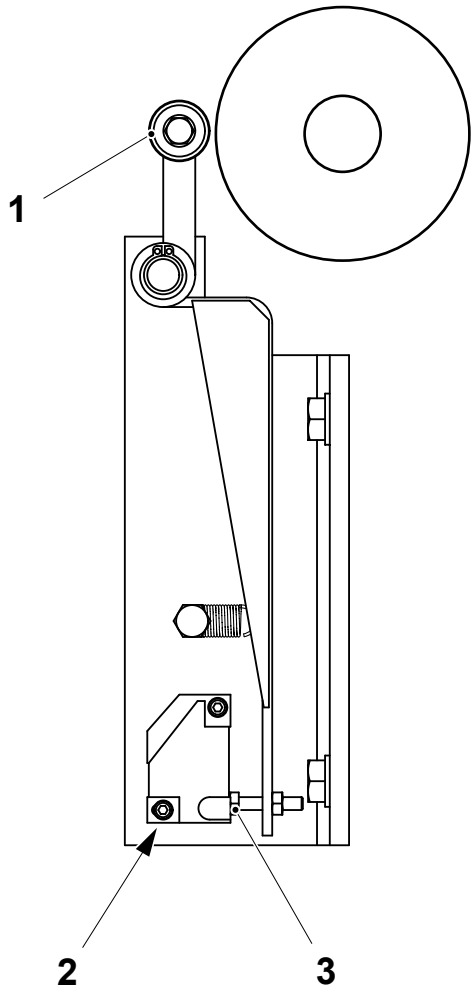
Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1095798-0100

a) Set the screw (3) so that it touches the proximity switch and that the LED (2) lights up.

b) Place a piece of double packaging material under the ball bearing (1).

c) Screw in the screw (3) until the LED (2) goes out.

d) Check with a single piece of packaging material that the LED lights up and with a double piece of packaging material it goes out.



1 Ball bearing
2 LED
3 Screw

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7.2.3 Inductor

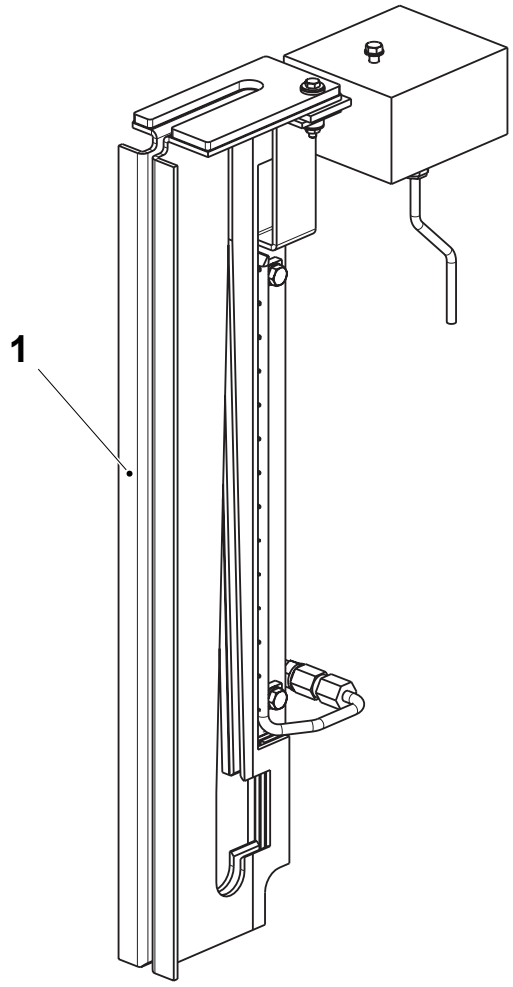
7.2.3-1 Inductor - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1195506-0200

a) Check for visual wear and/or damage on the inductor (1).

b) If required, clean the inductor (1) from plastic residue.

c) Change the inductor (1) as required.



1 Inductor

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7.2.4 Strip Guide

7.2.4-1 Strip Guide - Check

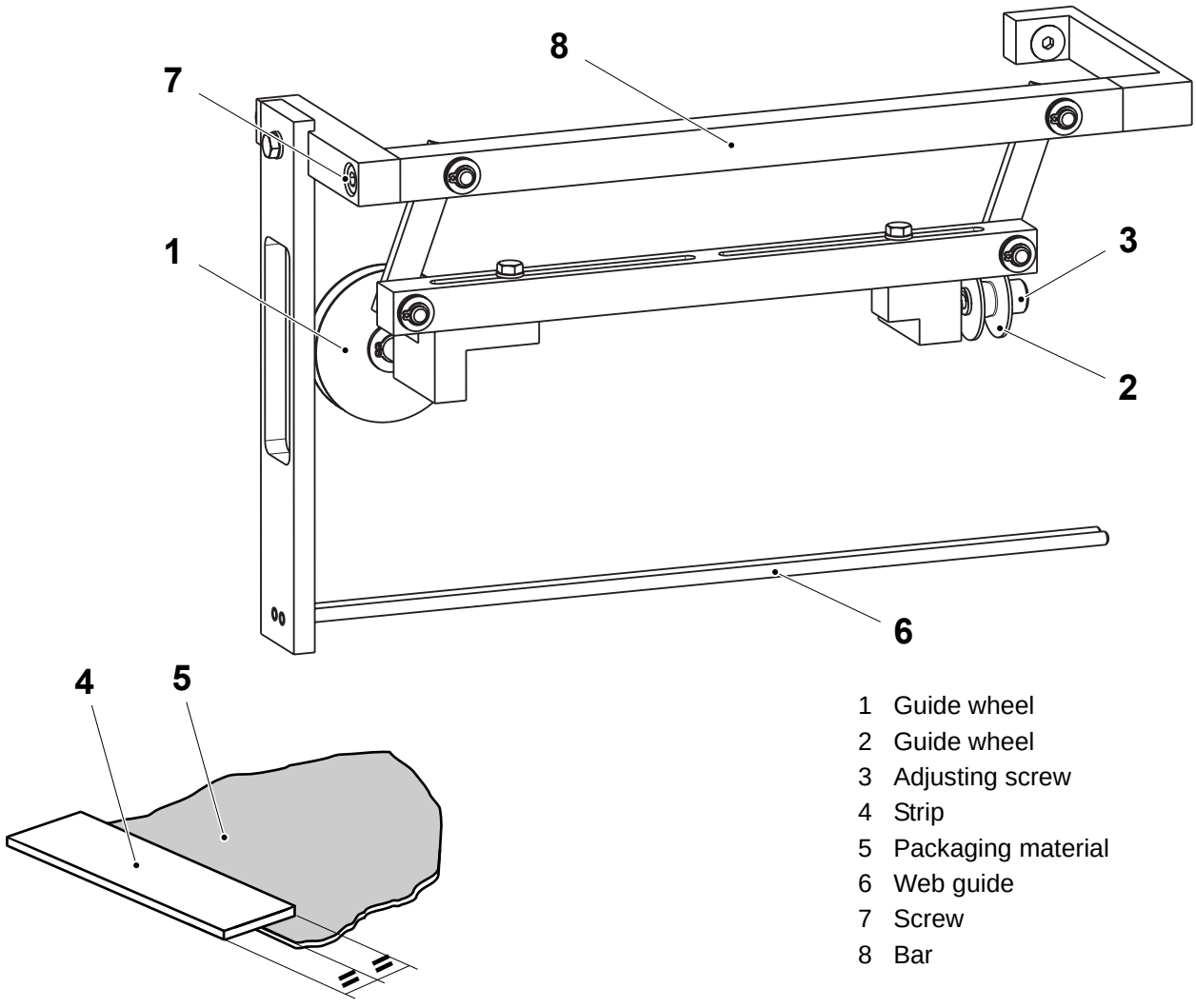
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1334220-0200

a) Check that the guide wheels (1) and (2) rotate freely. The guide wheel (2) must have maximum **1.0 mm** radial play and maximum **0.5 mm** axial play. Change as required.

b) Check that the surface of the guide wheels (1) and (2) are intact.

c) Check during PRODUCTION that the strip (4) is positioned symmetrically over the edge of the packaging material (5). Adjust the strip position by means of the adjusting screw (3) as required.

d) Check that the wheel (1) is aligned to the web guide (6). If required, adjust by loosening the screws (7) and turning the bar (8).



1 Guide wheel
2 Guide wheel
3 Adjusting screw
4 Strip
5 Packaging material
6 Web guide
7 Screw
8 Bar

TechPub_2614345_0105 - 07_MM81534_11en.fm

7.2.4-2 Strip Guide - Set Position

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF Packaging material **threaded**
SPC Reference	1334220-0200

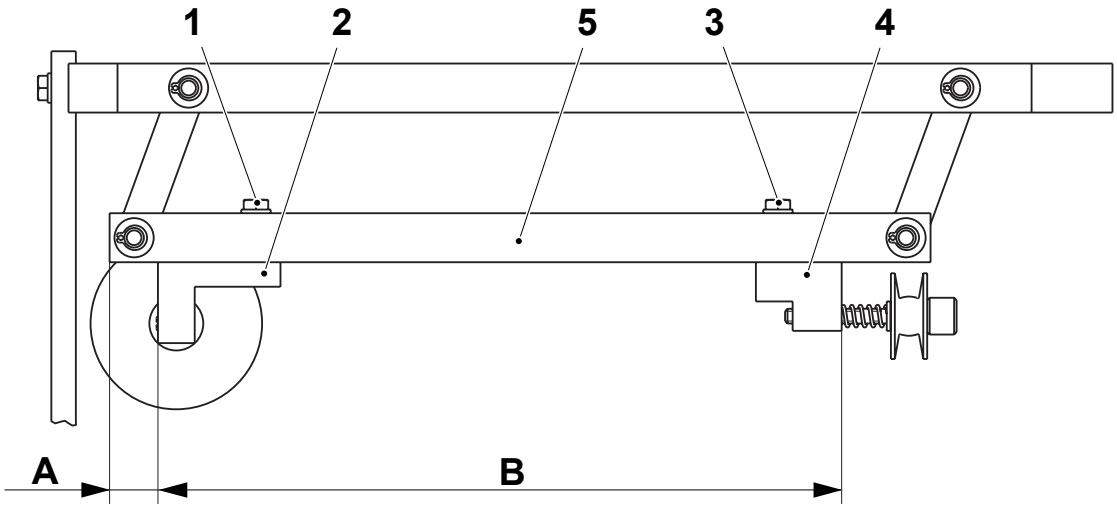
a) Loosen the screws (1) and (3).

b) Set the distance **A** between the bracket (2) and the lower rod (5) by shifting the bracket (2).

c) Tighten the screw (1).

d) Set the distance **B** between the bracket (2) and the bracket (4) by shifting the bracket (4).

Package	A ±0.5 (mm)	B ±0.5 (mm)	Package	A ±0.5 (mm)	B ±0.5 (mm)
1500 S - 1000 B - 500 B	- 1.8	322	1000 S	6.7	305
250 B - 200 B - 330 S	52.2	214	1000 Sq	21	292
200 S - TPA 250 Sq	72.2	174	500 S	39	252
TPA 1000 S	19.7	279	250 S	62	189
TPA 1000 Sq	32	260	TPA 330 Sq	68.5	198
TPA 500 Sq	48	227			



1 Screw
2 Bracket
3 Screw
4 Bracket
5 Lower rod

(Cont'd)

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(Cont'd)

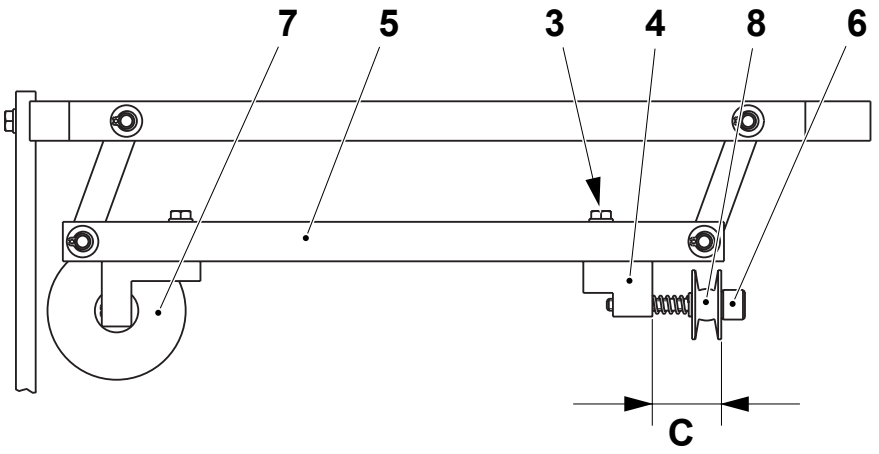
e) Tighten the screw (3).

f) Shift the lower rod (5) until the packaging material side fits completely into the guide wheel (7) groove.

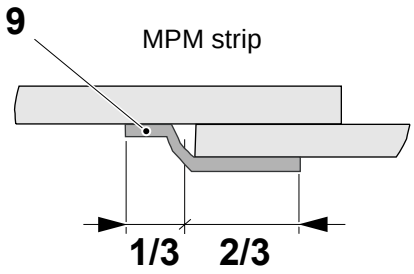
g) Set the distance **C** between the bracket (4) and the guide wheel (8) by means of the adjusting screw (6).

h) During PRODUCTION adjust the strips position by means of the adjusting screw (6) as required.

- For the MPM strip type, the strip (9) must be positioned 2/3 on the strip applicator side and 1/3 on the longitudinal sealing side.
- For all other strip types, the strip (9) must be symmetrically positioned on one package. The strip (9) sealed on the strip applicator side (excluding the air gap) must be less than half the width of the strip.

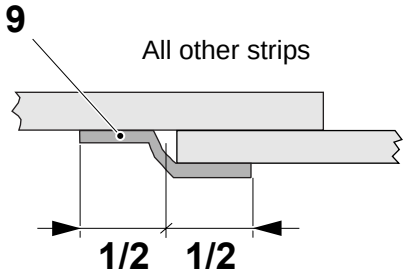


C = 34.9 ±0.5 mm



Longitudinal Sealing, LS, side

Strip Applicator, SA, side



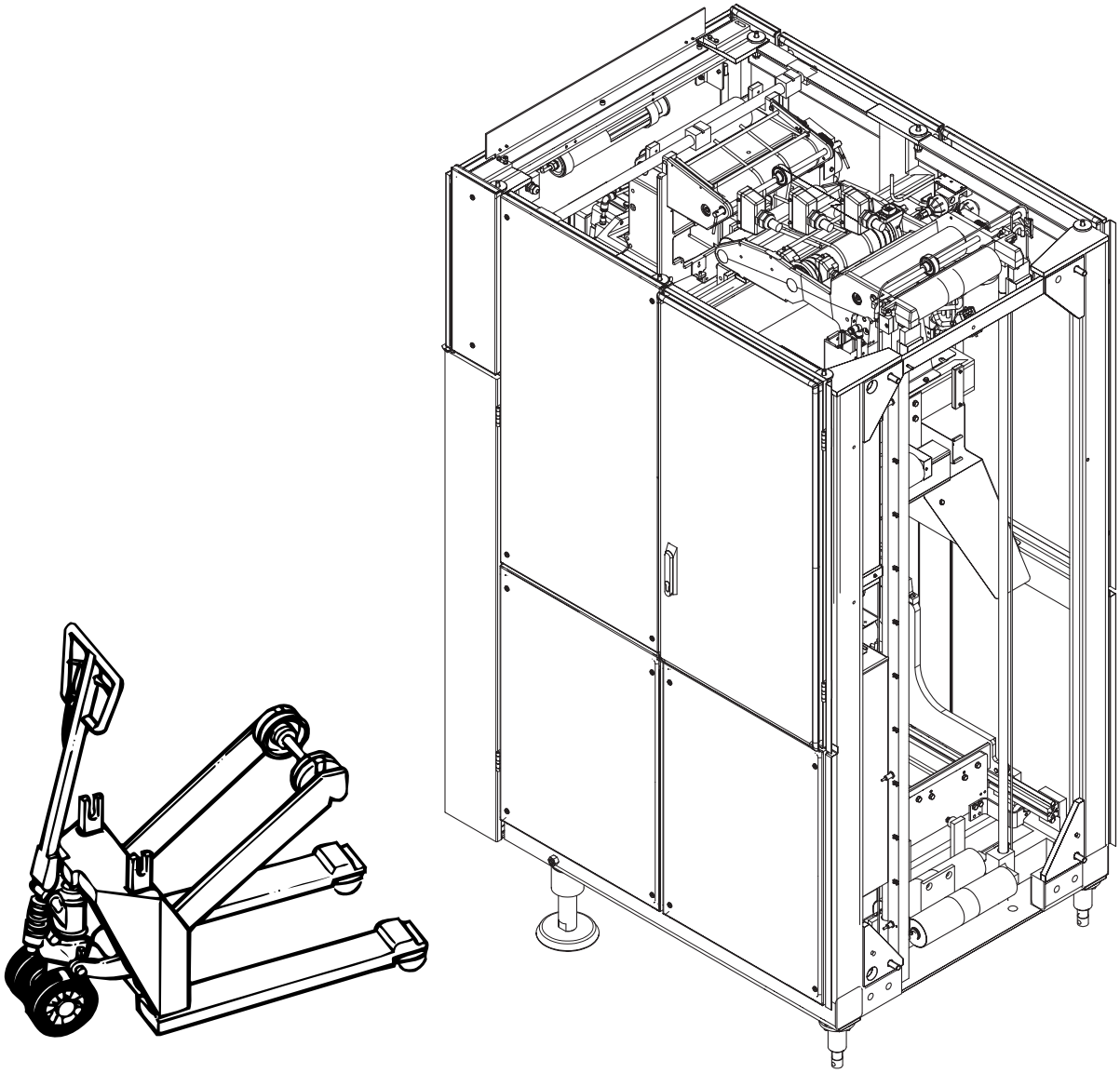
3 Screw
4 Bracket
5 Lower rod
6 Adjusting screw
7 Guide wheel
8 Guide wheel
9 Strip

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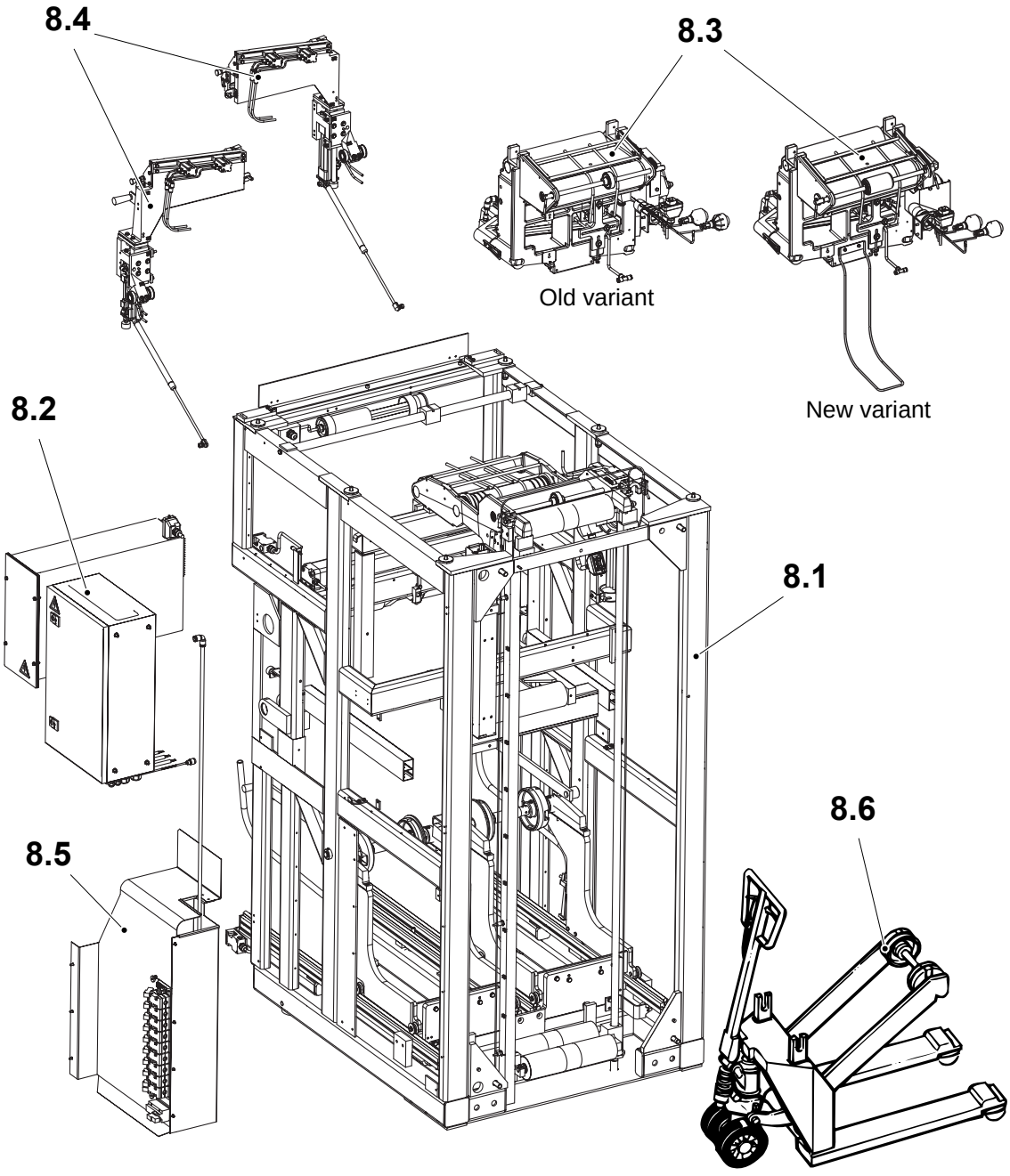
8 Automatic Splicing Unit



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Automatic Splicing Unit - Description

SPC Reference	648513-0400



8.1 Machine Body
8.2 Electrical Cabinet
8.3 Splicing Device
8.4 Material Holder Line 1 and Line 2
8.5 Valve Panel
8.6 Reel Trolley

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8.4 Material Holder Line 1 and Line 2 . . . . . 8 - 51

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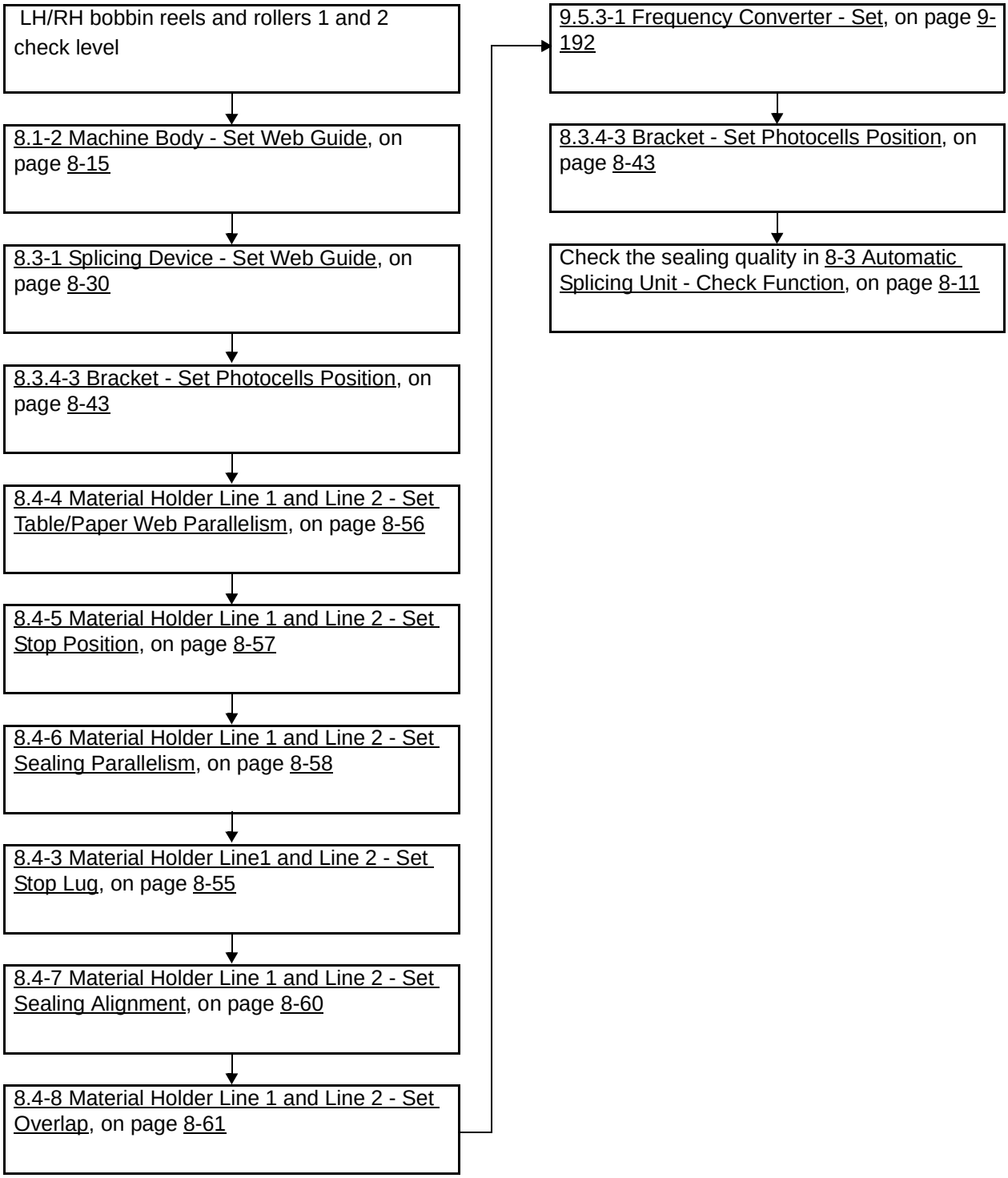
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8 Automatic Splicing Unit

8-1 Automatic Splicing Unit - Setting Sequence

SPC Reference	648513-0400



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8-3 Automatic Splicing Unit - Check Function

Machine Status	PREPARATION
SPC Reference	648513-0400

Lower the empty material holder and thread the packaging material through the cutting table. Push the MATERIAL LOCKING button and check that the packaging material is correctly locked.
If not, see 8.4-2 Material Holder Line 1 and Line 2 - Check.

Perform a manual splice for each reel of packaging material and check the following items:

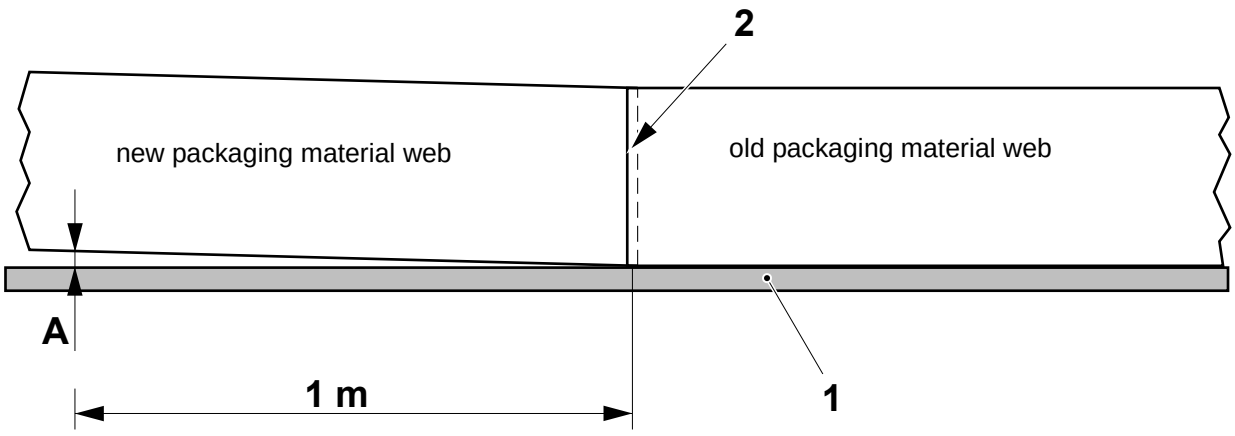
- Sealing parallelism
- Sealing alignment
- Overlap
- Spliced package length
- Cutting
- Sealing.

Sealing Parallelism (Angle Alignment)

Check the parallelism, distance **A**, between the new and the old packaging material web.

With the aid of a straight edge (1) check that the **new** packaging material web does not diverge more than the distance **A** in **1 meter** from the splice (2).

Set the sealing parallelism as required, see 8.4-6 Material Holder Line 1 and Line 2 - Set Sealing Parallelism.



A = max. 1 mm

1 Edge
2 Splice

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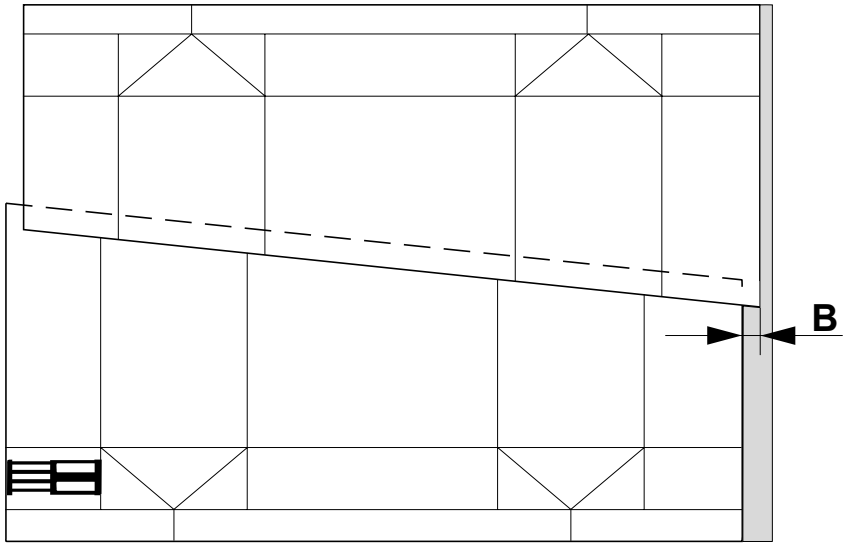
Sealing Alignment (Sideways Alignment)

Check the alignment, distance **B**, between the new and the old packaging material webs spliced on the two packages.

Note! Distance **B** must be measured on the strip side.

Set the sealing alignment as required, see:

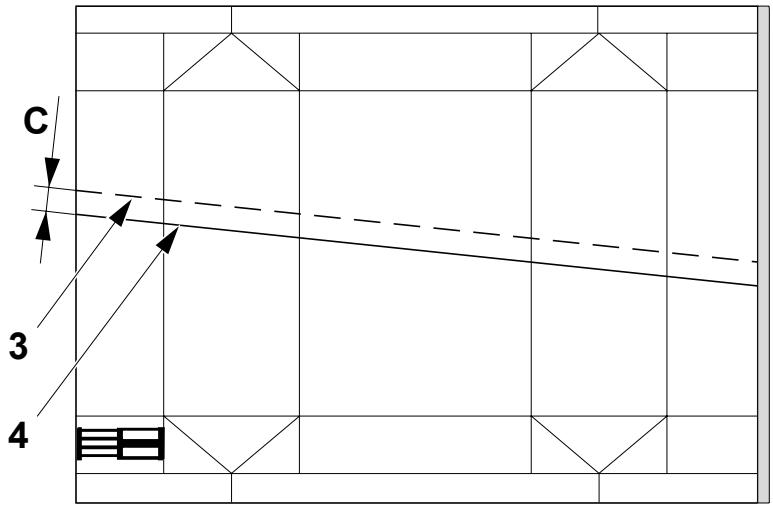
- 8.3-1 Splicing Device - Set Web Guide
- 8.4-7 Material Holder Line 1 and Line 2 - Set Sealing Alignment.



B = 0 ±0.5 mm

Overlap

Check the overlap, distance **C**, between the manual cutting (3) and the splicing device cutting (4). Set the material holder position as required, see 8.4-8 Material Holder Line 1 and Line 2 - Set Overlap.



C = 11.0 ±1.0 mm

3 Manual cutting
4 Splicing device cutting

(Cont'd)

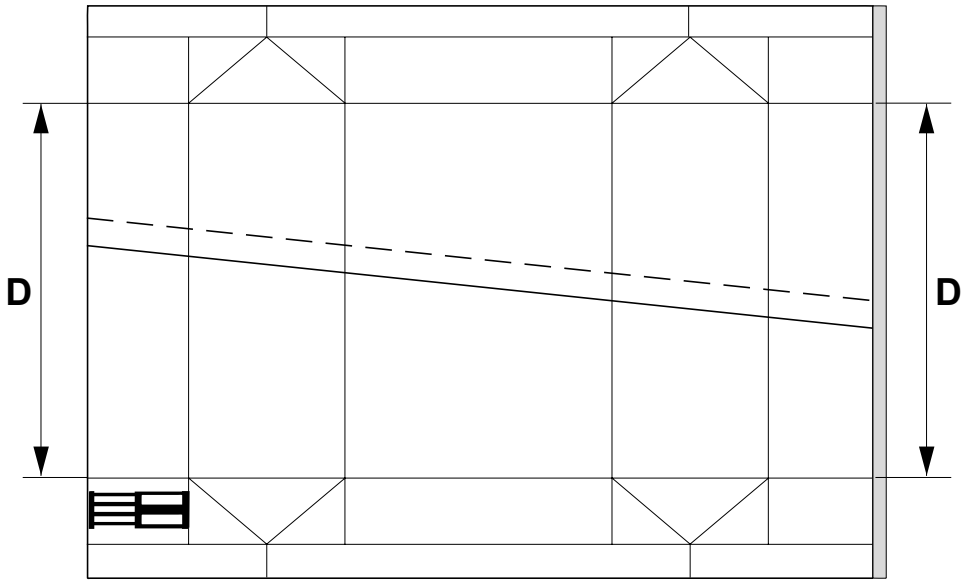
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Spliced Package Length

Measure the distance **D**, between the top and the bottom creases of the package spliced by the ASU and compare it with a normal package.

If the distance **D** diverges by **0.5 mm** from the normal package length, set the photocells, see 8.3.4-3 Bracket - Set Photocells Position.



Cutting

Check that the manual cutting is straight. If not, change the material holder knife, see 8.4-1 Material Holder Line 1 and Line 2 - Check Knife and Guide.

Check that the splicing device cutting is straight. If not, change the splicing device knife, see 8.3.1-1 Pressure Jaw - Change Knife.

(Cont'd)

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(Cont'd)

Sealing

Pull apart and examine the sealing (5).

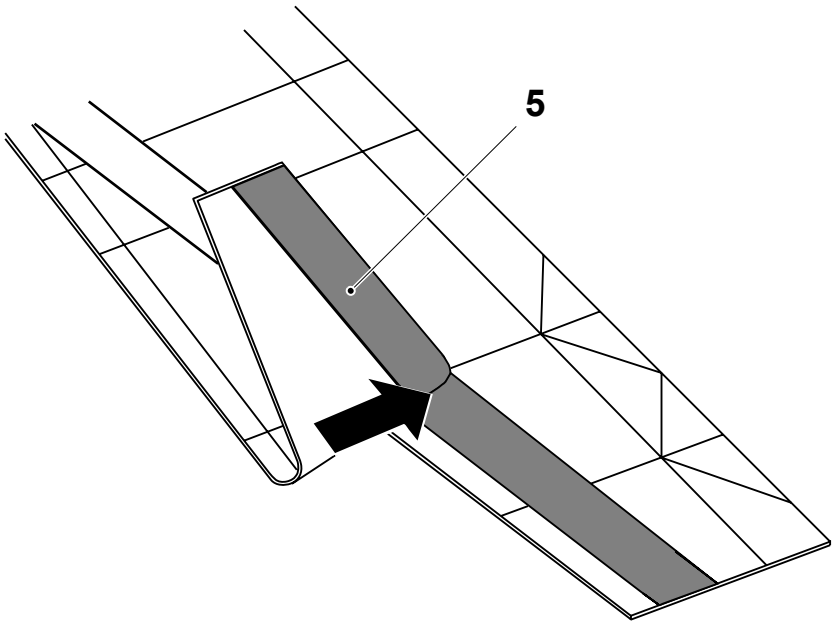
The sealing is acceptable if it remains intact and:

- a delamination between the two inner coating takes place
- a rupture takes place in the printed paper board layer.

The sealing is defective if:

- the seal is so weak that the two plastic layers separate without rupturing.

If the seal is defective, check the inductor, see 8.3.3-1 Sealing Unit - Check Inductor, and/or set the TS power, see 8.2-1 Electrical Cabinet - Set Sealing.



5 Sealing

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8-4 Automatic Splicing Unit - Check Bending Rollers

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648513-0400

Check that the roller surfaces are intact and clean.

Check that the rollers are not damaged and rotate freely.

Change as required, see:

- 8.3 Splicing Device
- 8.1-1 Machine Body - Overhaul Bending Rollers
- 8.1.2-1 Web Magazine - Overhaul Dancer Roller.

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8-5 Automatic Splicing Unit - Check Web Guides

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	648513-0400

Check that the roller surfaces are not damaged.

Check that the rollers rotate freely.

If not:

a) Remove the nuts (1), the washers and the retaining rings (2).

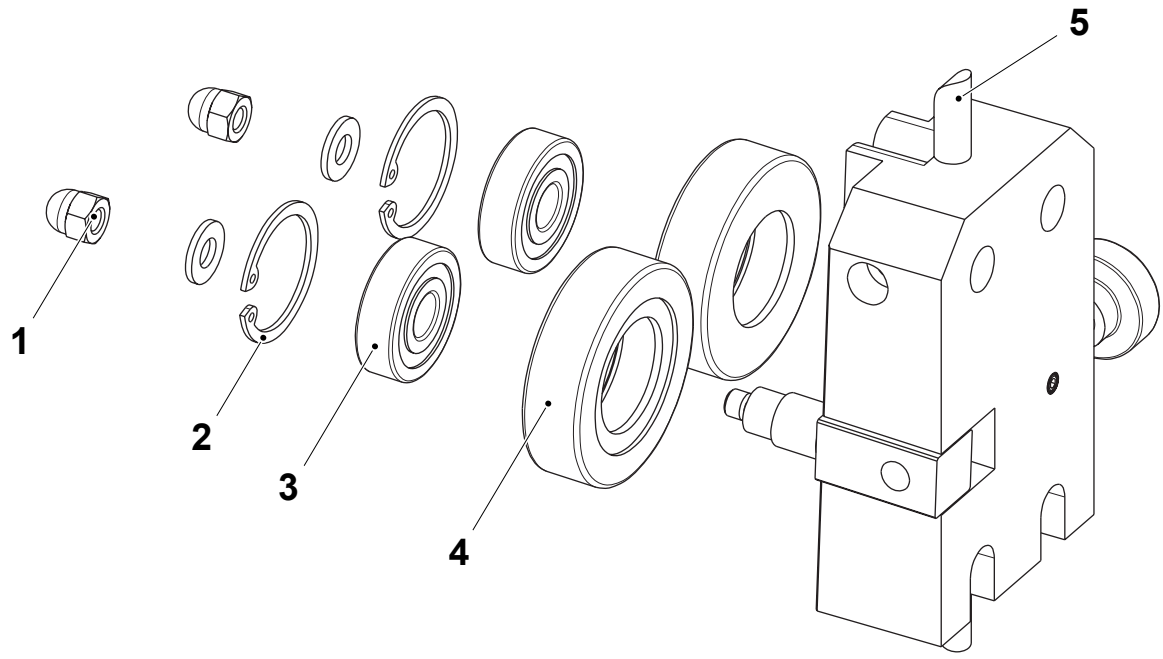
b) Change the ball bearings (3) and/or the rollers (4) as required.

c) Check that the guide (5) is clean, pull out and clean the guide as required.

Note! The rubber roller must be fitted on the printed side of the packaging material web.

d) Assemble in the reverse order.

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1 Nut
2 Retaining ring
3 Ball bearing
4 Roller
5 Guide

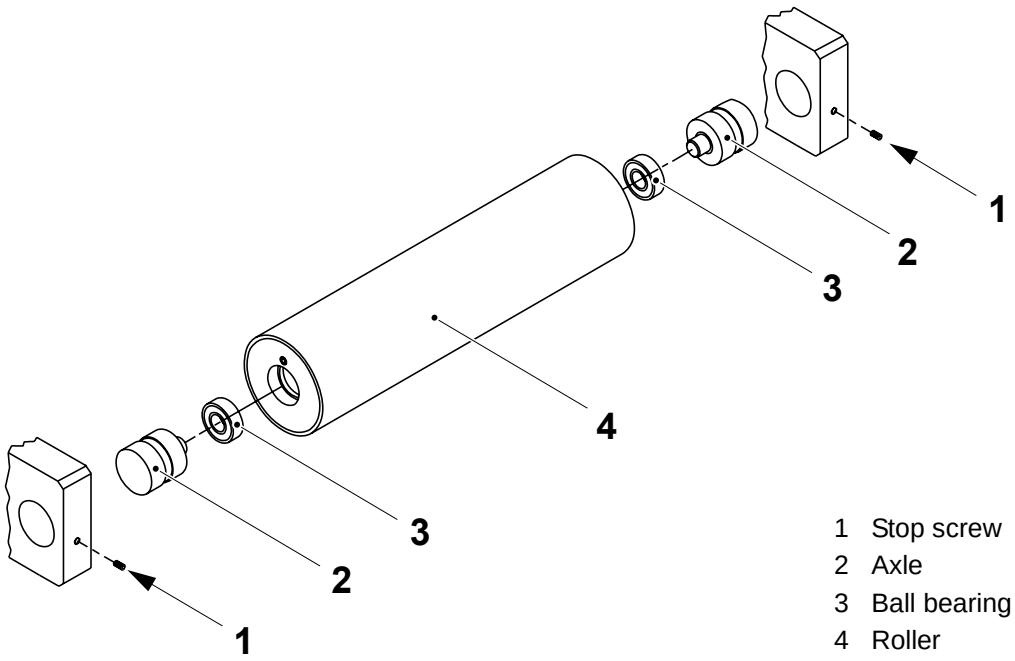
8.1 Machine Body

SPC Reference	590490-0200

8.1-1 Machine Body - Overhaul Bending Rollers

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	590490-0200

a) Remove the stop screws (1).
b) Push the roller (4) group completely sideways.
c) Pull out the axles (2).
d) Change the ball bearings (3) and/or the roller (4) as required.
e) Assemble in the reverse order.



1 Stop screw
2 Axle
3 Ball bearing
4 Roller

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8.1-2 Machine Body - Set Web Guide

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	590490-0200

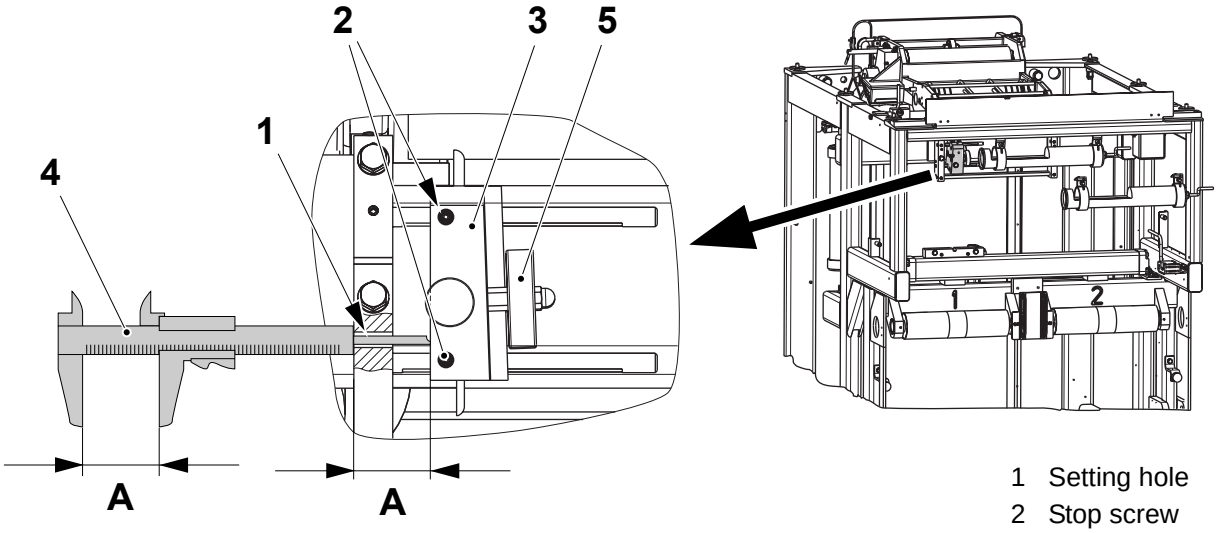
Note! The rubber roller (5) must be mounted on the printed web side.

a) Loosen the stop screws (2).

b) With the aid of a calliper (4) in the setting hole (1) set the distance **A** between the web guide (3) and the surface by shifting the web guide (3).

c) Tighten the stop screws (2).

Package	Web width (mm)	A ±0.5 (mm)
1500 S - 1000 B - 500 B	322	26.5
1000 S	305	35.0
1000 Sq	292	41.5
TPA 1000 S	279	48.0
TPA 1000 Sq	260	58.0
500 S	252	61.5
TPA 500 Sq	227	78.0
250 B - 200 B - 330 S	214	80.5
TPA 330 Sq	202	85.0
250 S	188	92.5
200 S - TPA 250 Sq	174	100.5



1 Setting hole
2 Stop screw
3 Web guide
4 Calliper
5 Roller

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8.1-3 Machine Body - Set Photocell Position and Sensitivity

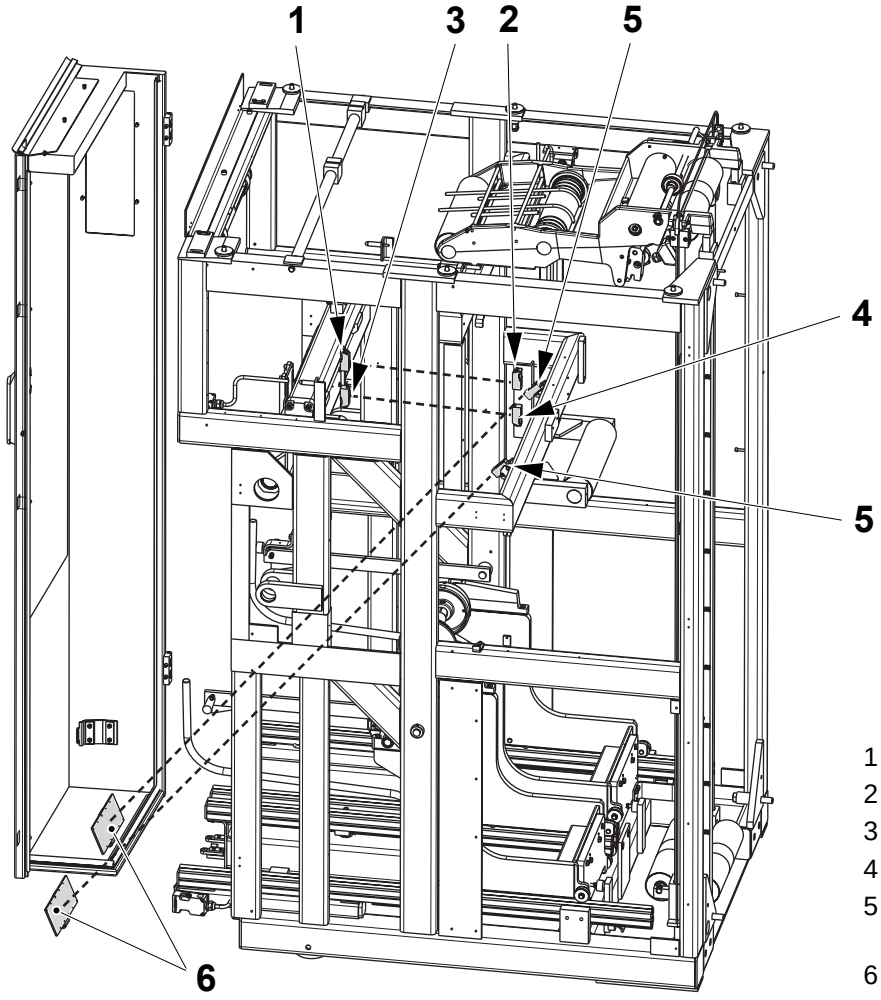
Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	590490-0200

There are two types of photocells. Those with transmitters and receivers working in pairs (1) with (2), (3) with (4), and those with a transmitter-receiver (5) that work in conjunction with a reflector (6).

Set Position

a) Make sure that there is no packaging material between transmitters and receivers.

b) Adjust the photocells position by means of the respective brackets so that the eyes of the photocells are pointing toward each other, and that the transmitter-receivers (5) point toward the reflectors (6).



1 Transmitter
2 Receiver
3 Transmitter
4 Receiver
5 Transmitter-receiver
6 Reflector

(Cont'd)

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(Cont'd)

Note! The ASU doors must be closed.

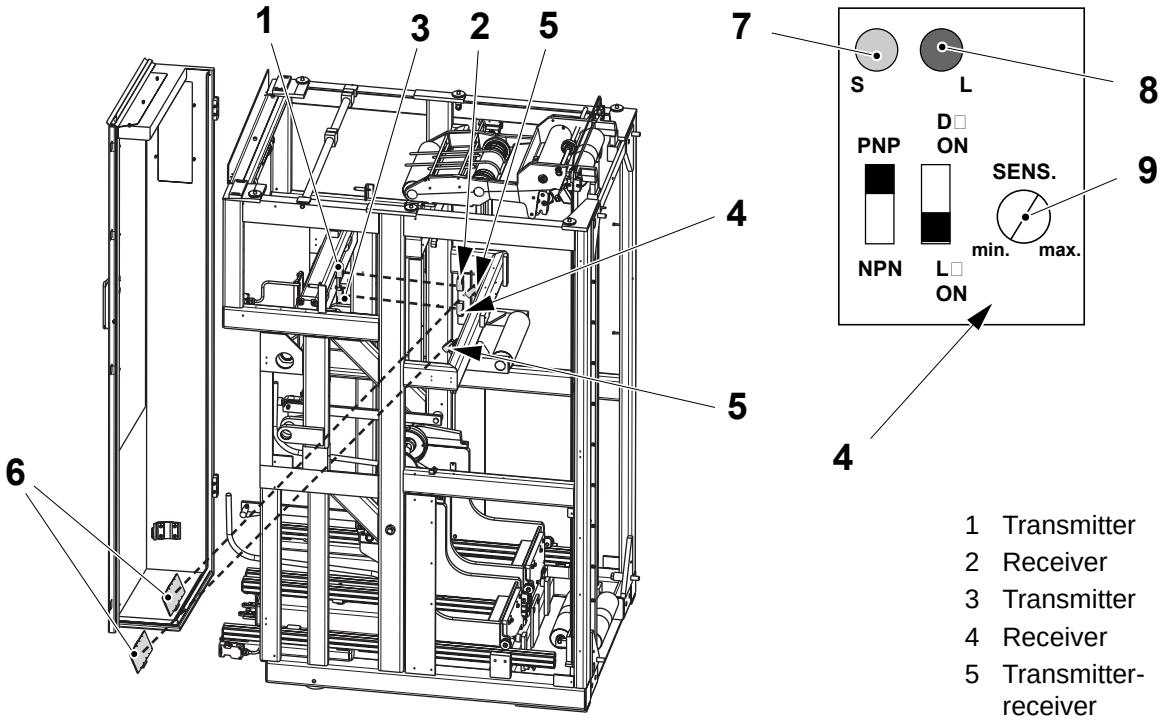
c) Check that only with the power supply **ON** the green LEDs (7) of the receiver (2), (4), (5) photocells light up.

d) When the correct position is found both the green and the red LEDs (8) of the receiver (2), (4), (5) photocells light up; this means that the photocells are correctly aligned.

Set Sensitivity

a) Open the cover on the receiver photocells (2), (4), and (5).

b) For the receiver photocell (4) make sure that is set to **PNP** and **L-ON**, see figure.



1 Transmitter
2 Receiver
3 Transmitter
4 Receiver
5 Transmitter-receiver
6 Reflector
7 Green LED
8 Red LED
9 Potentiometer

(Cont'd)

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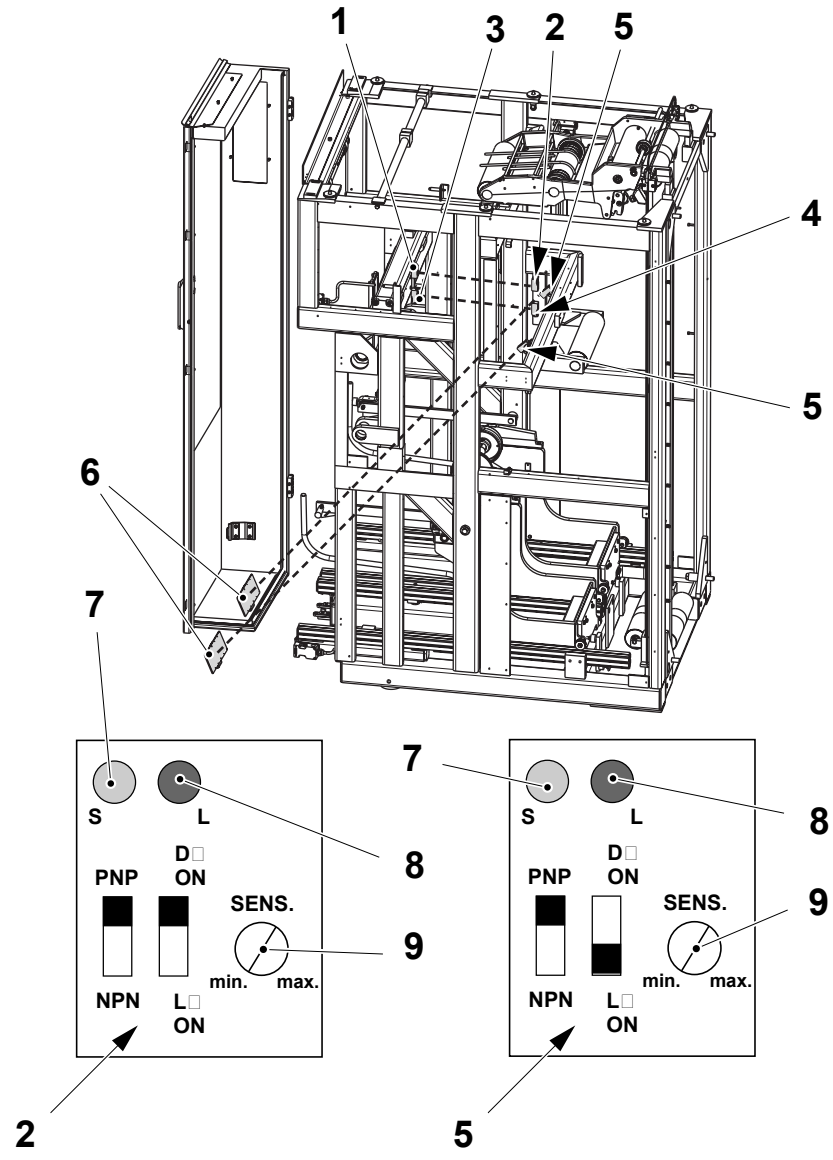
c) For the receiver photocell (2) make sure that it is set to **PNP** and **D-ON**, see figure.

d) For the transmitter-receivers (5) make sure that they are set to **PNP** and **L-ON**, see figure.

e) Then turn the potentiometers (9) fully clockwise (towards **max.**), on the receiver photocells (2), (4), and (5), then turn it backward about 60° degrees.

f) Close the cover on the receiver photocells (2), (4), and (5).

g) At the end of the setting, when the packaging material is threaded in the automatic splicing unit, check that on all the receiver photocells the red LEDs (8) goes out.



1 Transmitter
2 Receiver
3 Transmitter
4 Receiver
5 Transmitter-receiver
6 Reflector
7 Green LED
8 Red LED
9 Potentiometer

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8.1-4 Machine Body - Set Proximity Switches

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	590490-0200

WARNING

Risk of crushing.

The splicing device bracket (3) could unexpectedly move by itself.

a) Loosen the nuts (1) on the proximity switch (2).

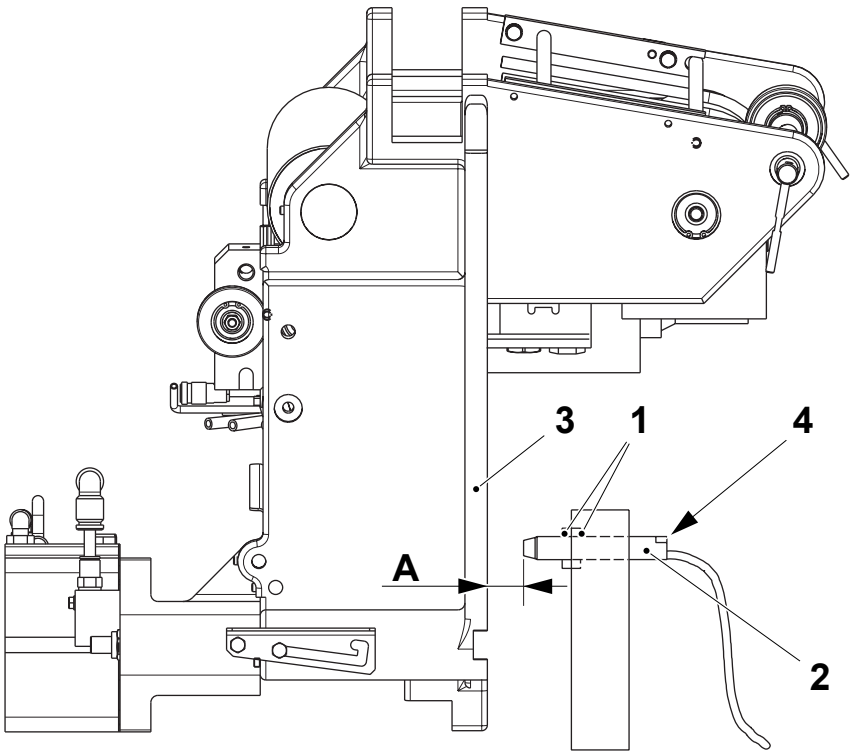
b) Set the distance **A** between the proximity switch (2) head and the splicing device bracket (3) by turning the proximity switch (2).

c) Tighten the nuts (1) on the proximity switch (2).

d) Step up the machine to step PREPARATION.

e) Perform a manual splice and check that the proximity switch LED (4) lights up.

f) Repeat the same sequence for the proximity switch on the other side of the ASU frame.



A = 1 ±0.5 mm

1 Nut
2 Proximity switch
3 Bracket
4 LED

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8.1.1 Drive Unit Front

8.1.1-1 Drive Unit Front - Check

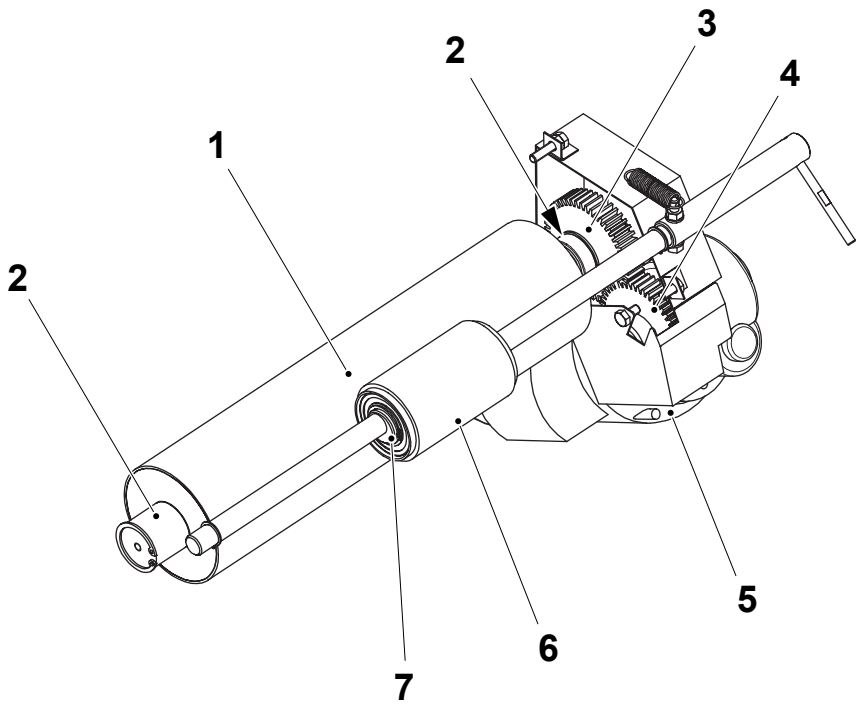
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1347753-0100

Check the following parts for visual wear and/or damage:

- the roller (1) and counter roller (6)
  Check also that they rotate freely.
- the electrical motor (5)
- the gear wheels (3) and (4)
  Check especially for cracks in the teeth.
- the ball bearings (2) and the eccentric bushing (7)
  Check also for excessive radial play.

Note! The eccentric bushing (7) must be mounted with the eccentricity upwards.

Change as required.



1 Bending roller
2 Ball bearing
3 Gear wheel (plastic)
4 Gear wheel (steel)
5 Electric motor
6 Counter roller
7 Eccentric bushing

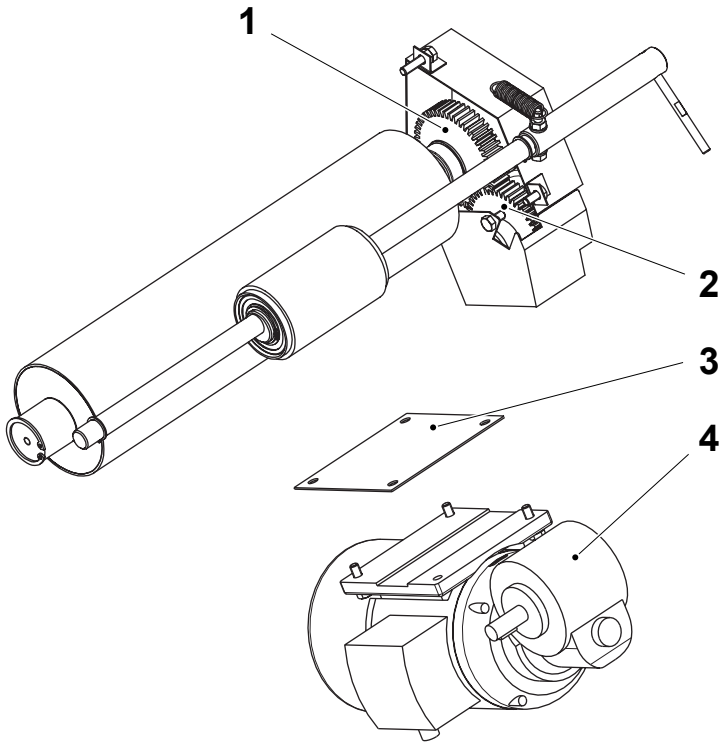
TechPub_2614345_0105 - 08_MM81534_11en.fm

8.1.1-2 Drive Unit Front - Set Gear Wheel

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1347753-0100

Set the radial play (**+0.3 / +0.5 mm**) between the gear wheels (1) and (2) by adding or removing shims (3) under the motor bracket (4).

Note! It is very important to have radial play all around the full turn of the roller.



1 Gear wheel (plastic)
2 Gear wheel (steel)
3 Shim
4 Motor bracket

8.1.1-3 Drive Unit Front - Set Bending Roller Speed

SPC Reference	1347753-0100

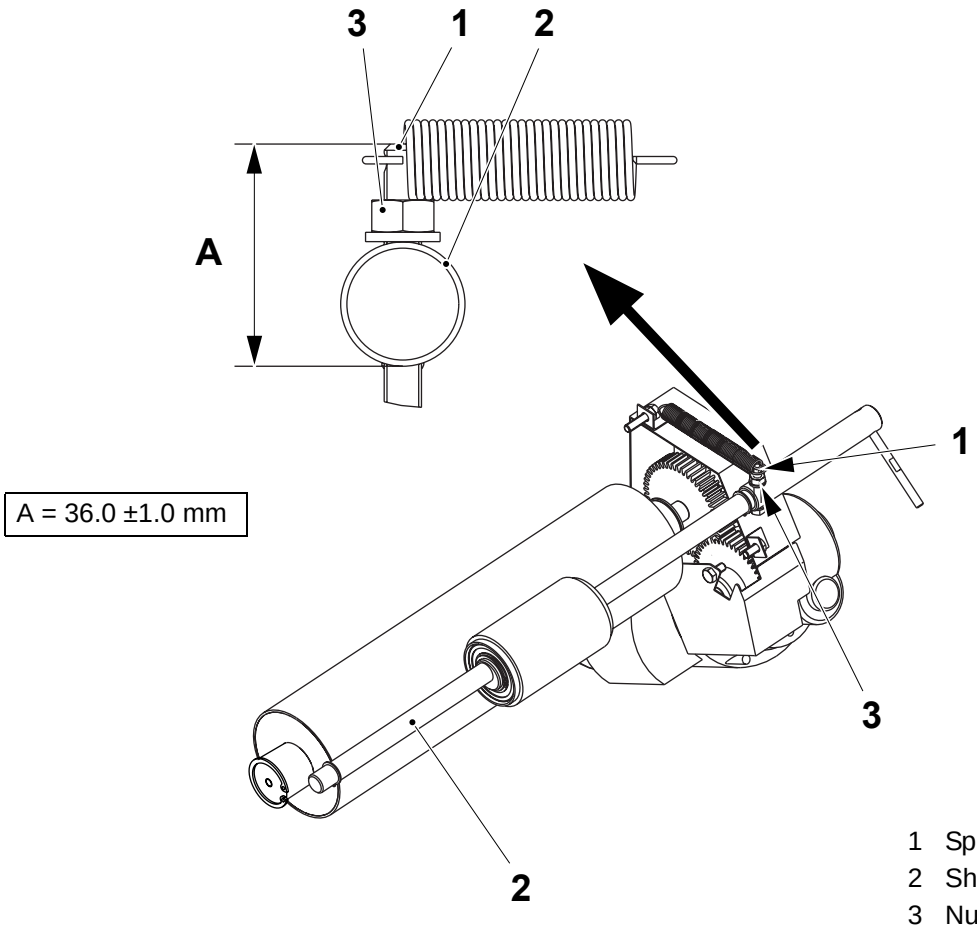
Follow the procedure described in 9.5.3-1 Frequency Converter - Set.

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8.1.1-4 Drive Unit Front - Set Spring Bracket

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1347753-0100

Set the distance **A** between the spring bracket (1) and the shaft (2) by means of the nut (3).



A = 36.0 ±1.0 mm

1 Spring bracket
2 Shaft
3 Nut

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8.1.2 Web Magazine

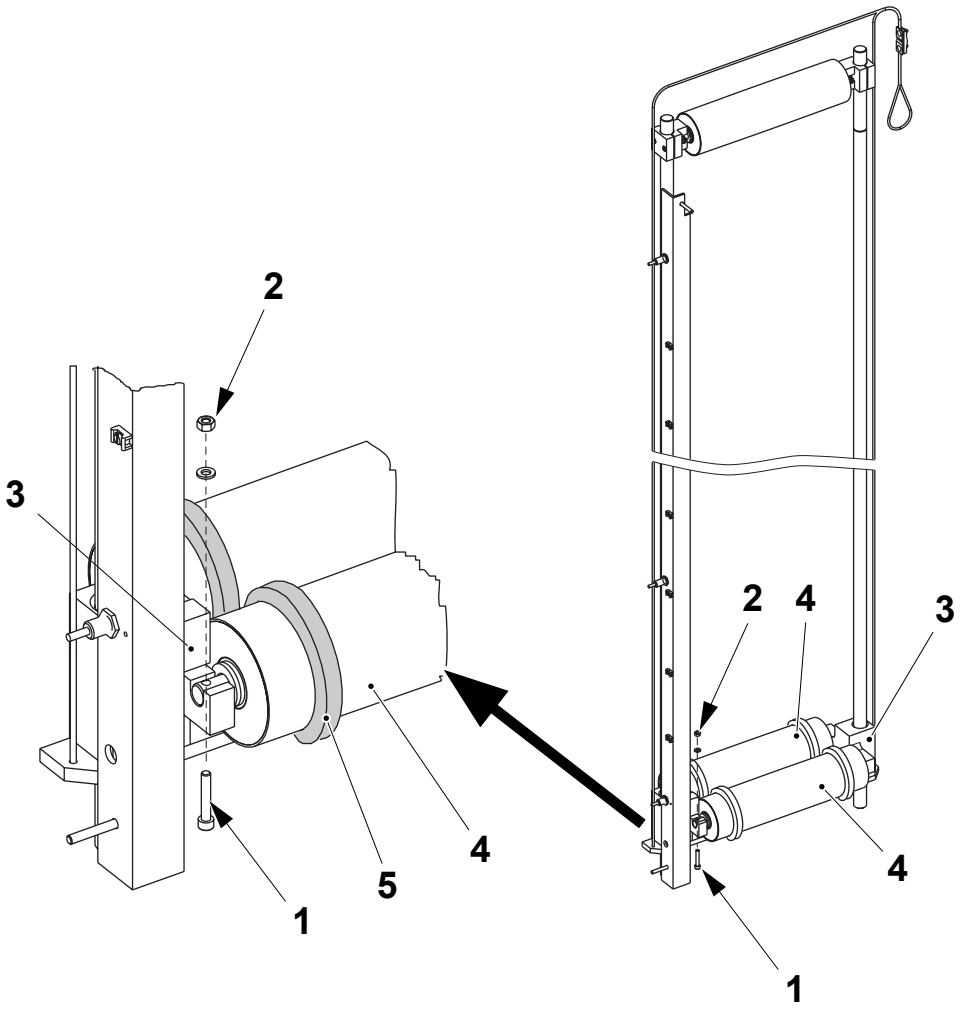
8.1.2-1 Web Magazine - Overhaul Dancer Roller

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1347738-0100

a) Remove the screws (1) and the nut (2) on both rollers (4).

b) Pull out the dancer rollers (4) assembly from the sliders (3).

Note! TPA 1000 Sq has flanges (5) mounted on the dancer rollers (4).



1 Screw
2 Nut
3 Slider
4 Dancer roller
5 Flange

(Cont'd)

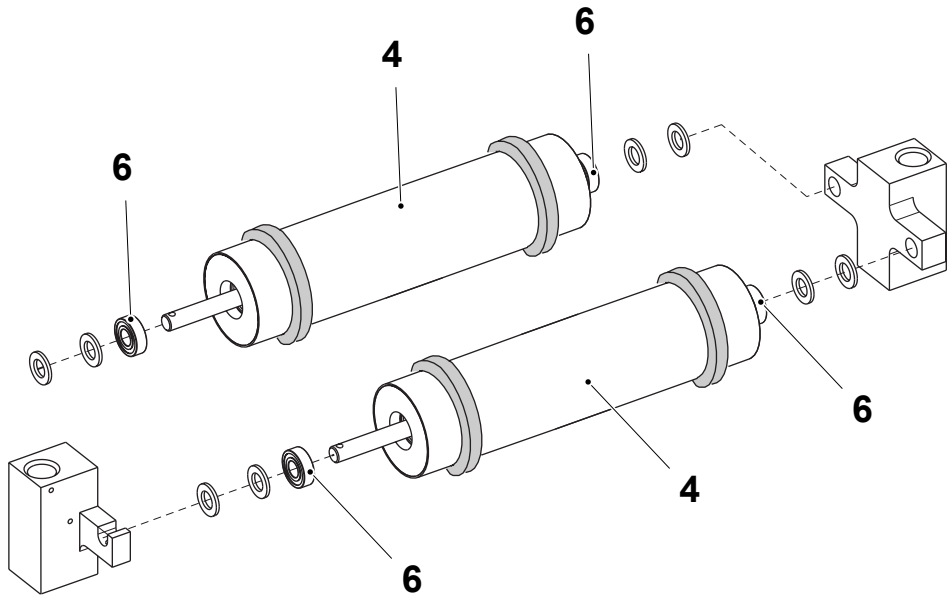
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(Cont'd)

c) Change the dancer roller (4) as required.

d) Remove and change the ball bearings (6) as required.

e) Assemble in the reverse order.



4 Dancer roller
6 Ball bearing

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8.1.2-2 Web Magazine - Set Proximity Switches

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1347738-0100

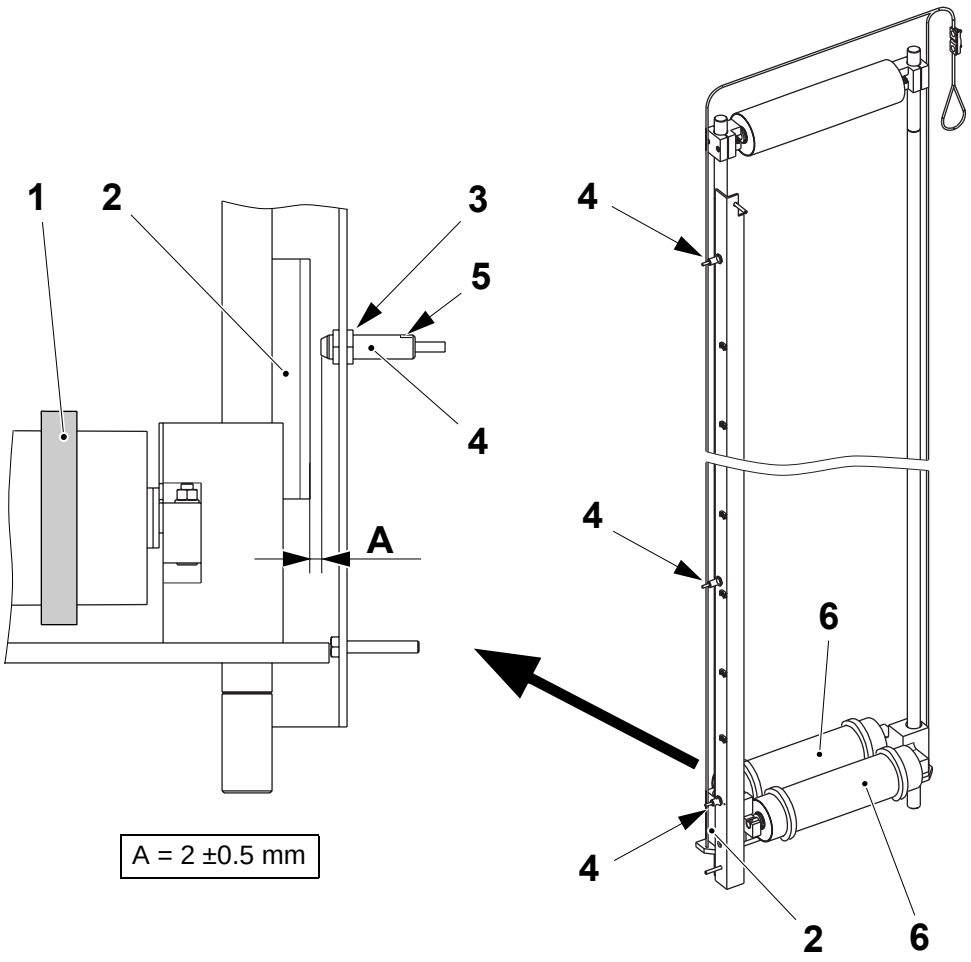
a) Loosen the nuts (3) on the proximity switches (4).

b) Set the distance **A** between the proximity switches (4) head and the block (2) by turning the proximity switch (4).

c) Tighten the nuts (3) on the proximity switches (4).

d) Position the dancer rollers (6) in front of each proximity switch (4) and check that the proximity switch LED (5) lights up.

Note! TPA 1000 Sq has flanges (1) mounted on the dancer rollers (6).



1 Flange
2 Block
3 Nut
4 Proximity switch
5 LED
6 Dancer roller

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8.1.3 Bracket

8.1.3-1 Bracket - Set Proximity Switch

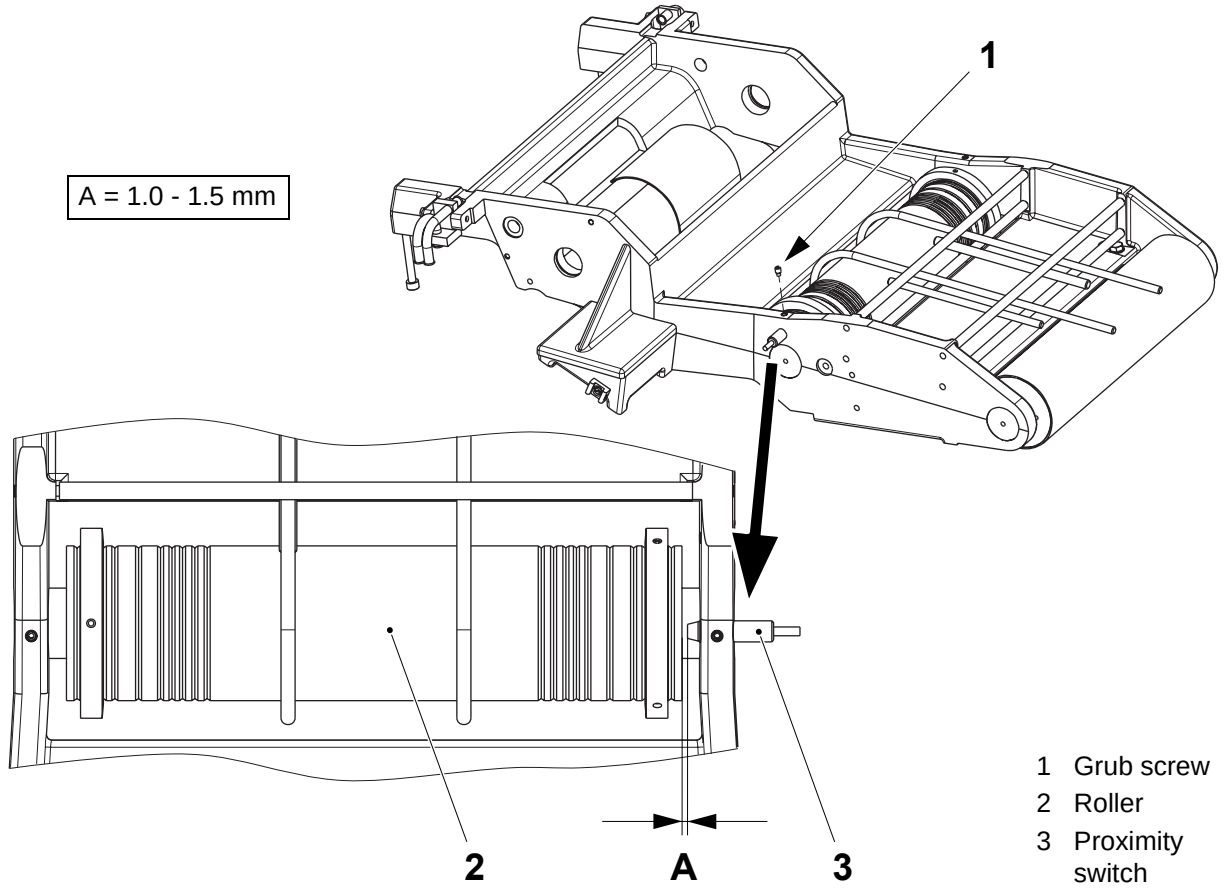
Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1348437-0100

a) Loosen the grub screw (1).

b) Set the distance **A** between the proximity switch (3) and the bending roller (2) by turning the proximity switch (3).

c) Check that the proximity switch LED's lights up.

d) Tighten the grub screw (1) gently.



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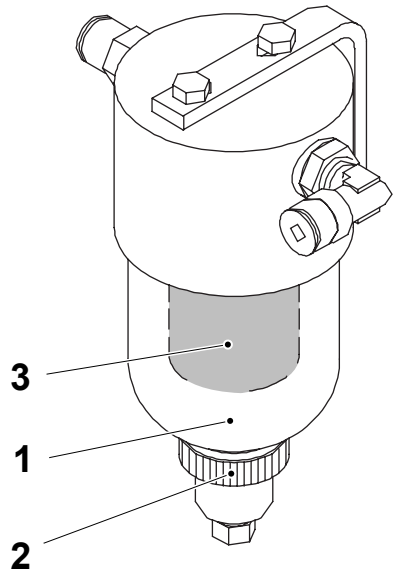
8.1.4 Protective Cover

8.1.4-1 Protective Cover - Check Air Filter

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1255304-0200

a) Check the level of the condensate in the filter reservoir (1). If required, remove the screw cap (2) and drain the water.

b) Check the filter cartridge (3) and change it as required, see 8.1.4-2 Protective Cover - Change Air Filter.



1 Reservoir
2 Screw cap
3 Cartridge

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8.1.4-2 Protective Cover - Change Air Filter

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1255304-0200

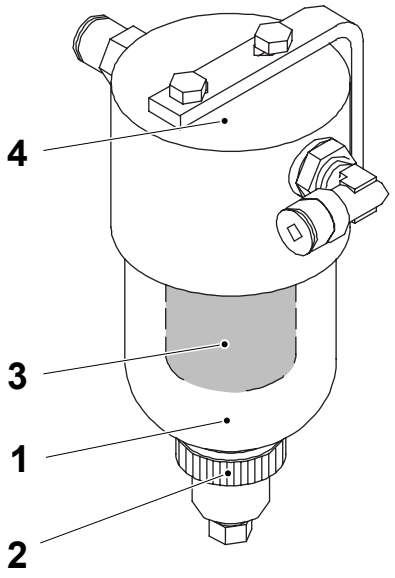
a) Remove the screw cap (2).

b) Remove the reservoir (1).

c) Remove the filter cartridge (3) and change it.

d) Assemble in the reverse order.

Note! Check that the flow of the air is in accordance to the arrows on the cap (4).



1 Reservoir
2 Screw cap
3 Cartridge
4 Cap

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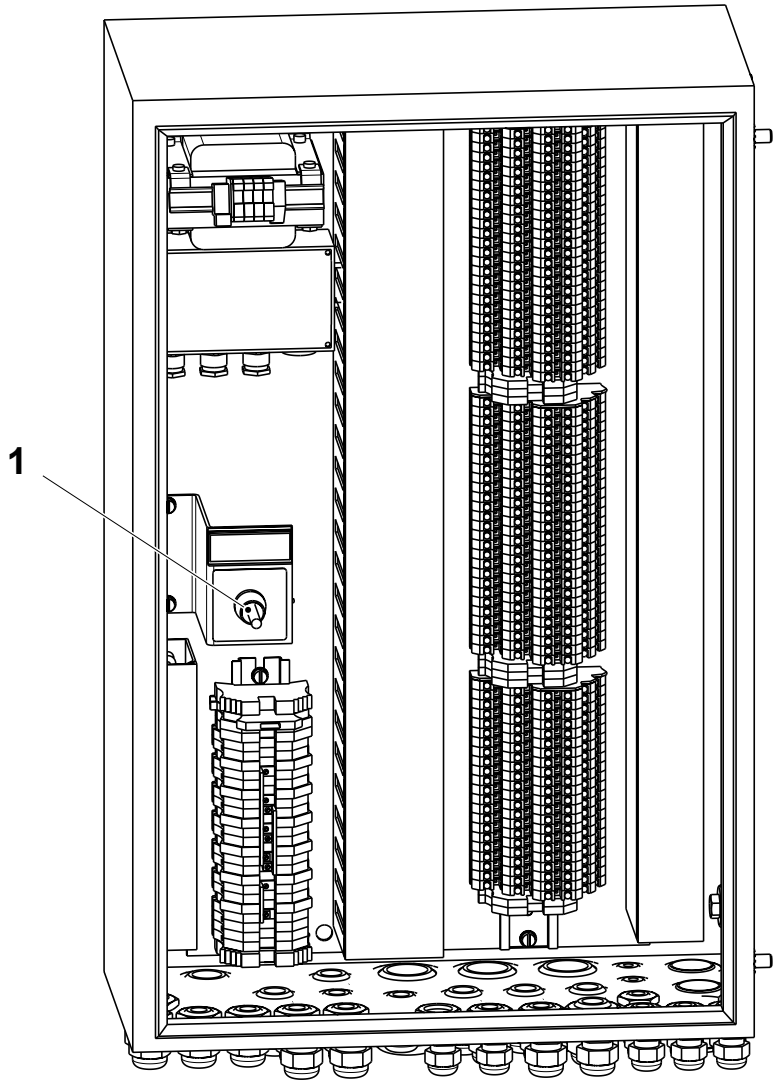
8.2 Electrical Cabinet

SPC Reference	1095775-0100

8.2-1 Electrical Cabinet - Set Sealing

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095775-0100

Set the potentiometer (1), located behind the ASU valve panel, for the ASU splice sealing at the value **0 ±10%**.



1 Potentiometer

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8.3 Splicing Device

SPC Reference	1348436-0100

8.3-1 Splicing Device - Set Web Guide

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348436-0100

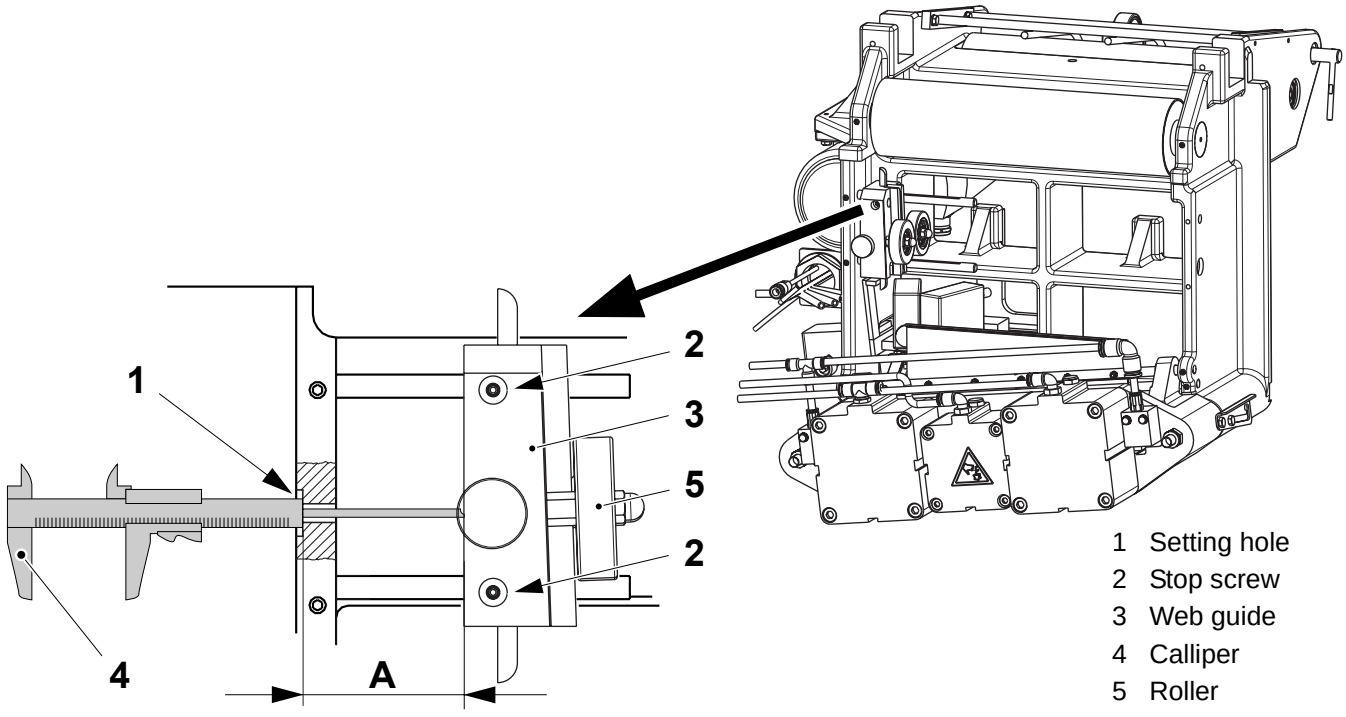
Note! The rubber roller (5) must be mounted at the printed web side.

a) Loosen the stop screws (2).

b) With the aid of a calliper (4) set the distance **A** between the web guide (3) and the machined surface in the setting hole (1) by shifting the web guide.

c) Tighten the stop screws (2).

Package	Web width (mm)	A ±0.5 (mm)	Package	Web width (mm)	A ±0.5 (mm)
1500 S - 1000 B - 500 B	322	31	TPA 500 Sq	227	80
1000 S	305	39.5	250 B - 200 B - 330 S	214	85
1000 Sq	292	46	TPA 330 Sq	202	89.5
TPA 1000 S	279	52.5	250 S	188	100.5
TPA 1000 Sq	260	62.5	200 S - TPA 250 Sq	174	105
500 S	252	66			



1 Setting hole
2 Stop screw
3 Web guide
4 Calliper
5 Roller

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8.3.1 Pressure Jaw

8.3.1-1 Pressure Jaw - Change Knife

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095761-0100

WARNING

Risk of cutting/amputation.

The pressure jaw knife is sharp.

a) Loosen the nuts (1) and remove the screws (2).

b) Disconnect all the pneumatic hoses from the cylinders.

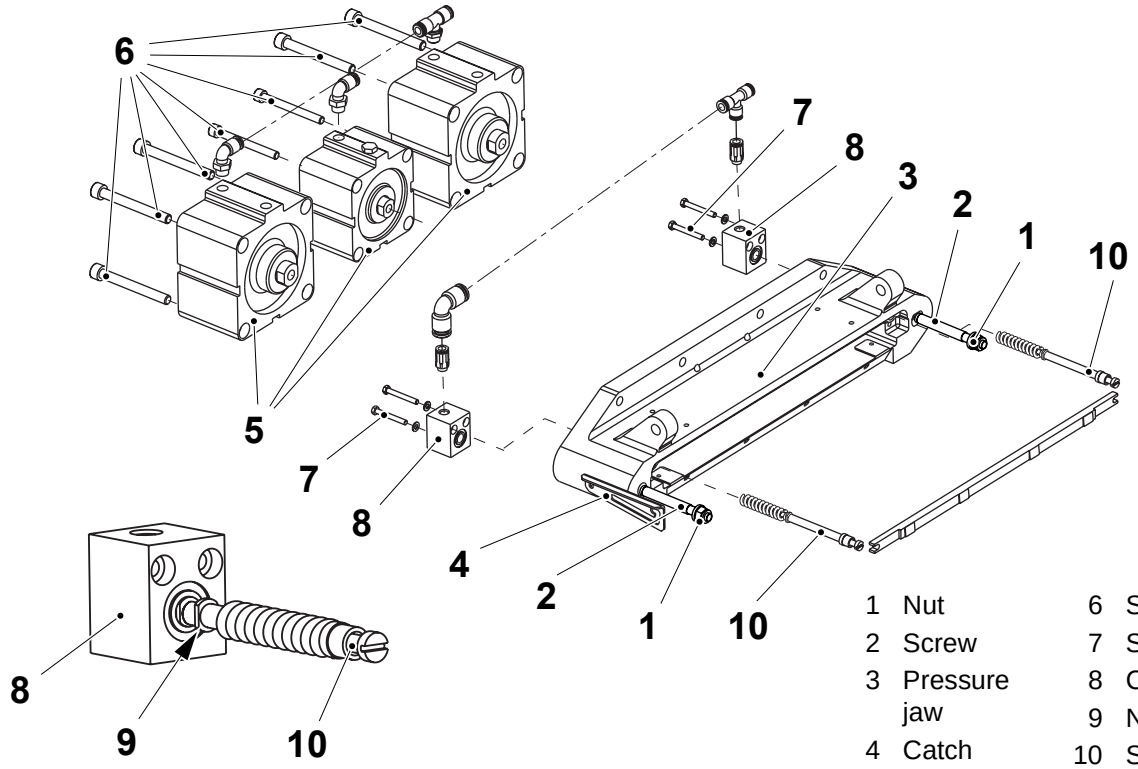
c) Open the pressure jaw (3) and lock it in position by means of the catch (4).

d) Remove the pneumatic cylinders (5) by means of the screws (6).

e) Remove the screws (7).

f) Remove the cylinders (8) by holding the nuts (9) and loosening the screws (10).

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1 Nut
2 Screw
3 Pressure jaw
4 Catch
5 Cylinder
6 Screw
7 Screw
8 Cylinder
9 Nut
10 Screw

(Cont'd)

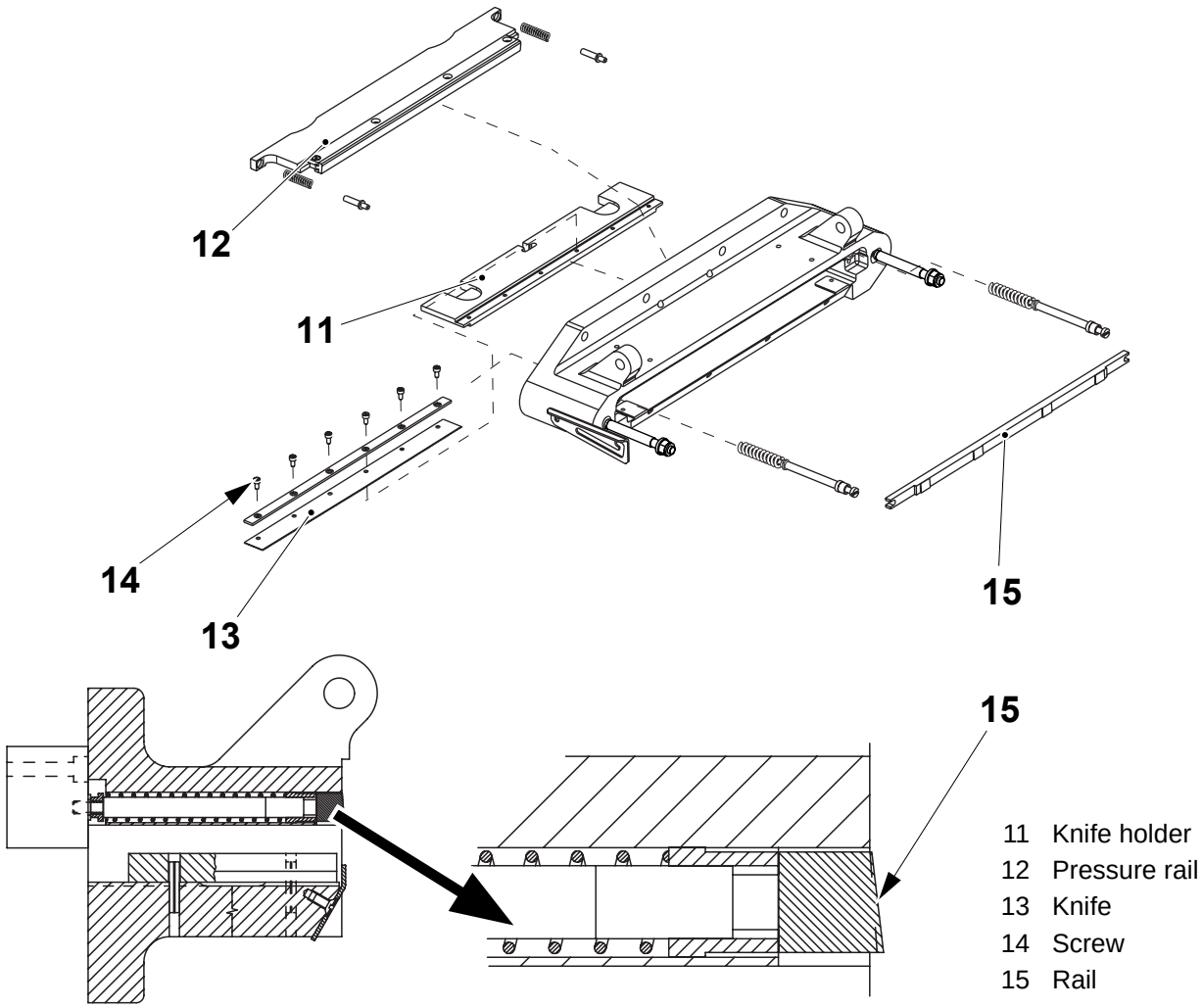
(Cont'd)

g) Pull out the knife holder (11) together with the pressure rail (12).

h) Remove the knife (13) by means of the screws (14). Change the knife.

i) Assemble in the reverse order.

Note! When assembling, make sure that the rail (15) is mounted with the inclined plane facing outwards, see figure.



11 Knife holder
12 Pressure rail
13 Knife
14 Screw
15 Rail

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8.3.1-2 Pressure Jaw - Change Cylinders

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Locking fluid TP No. 90157-16
SPC Reference	1095761-0100

WARNING

Risk of cutting/amputation.

The pressure jaw knife is sharp.

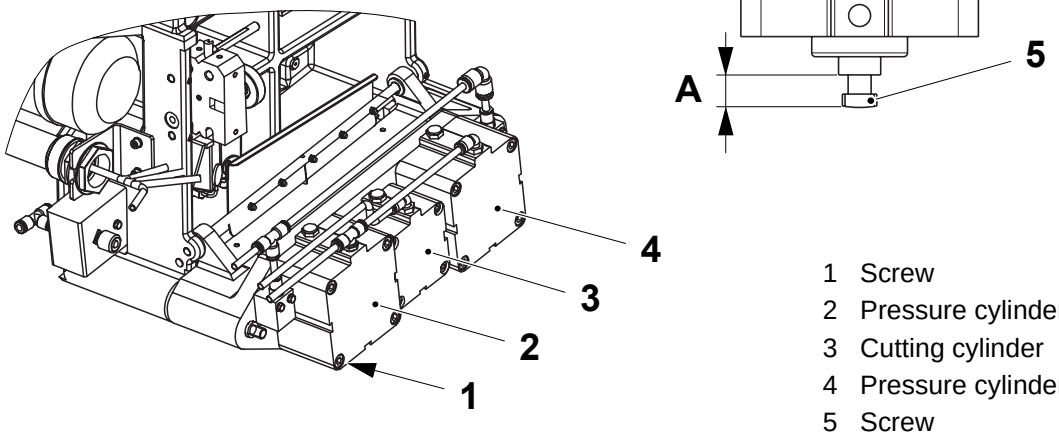
a) Disconnect the air hoses from the cylinders (2), (3) and (4).

b) Remove the screws (1) and change the pressure cylinders (2) and (4).

c) Unlock and change the cutting cylinder (3).

d) Set the distance **A** on the pressure cylinders (2) and (4) by turning the screw (5).

Pressure cylinder (2) and (4)	A ±0.5 (mm)	Note
TP No. 90450-0156	17.0	Old cylinder
TP No. 90459-1111	15.0	New cylinder



1 Screw
2 Pressure cylinder
3 Cutting cylinder
4 Pressure cylinder
5 Screw

(Cont'd)

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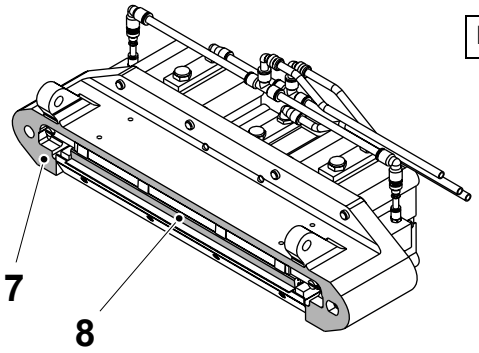
(Cont'd)

e) The surface (7) and the surface of the dolly (8) should be aligned when the pressure cylinders (2) and (4) are extended. The difference between the **LH** and **RH** side of the dolly (8) should be within **0.2 mm**.

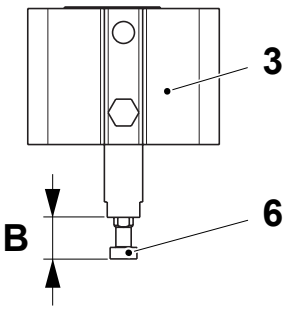
f) Set the distance **B** on the cutting cylinder (3) by turning the screw (6).

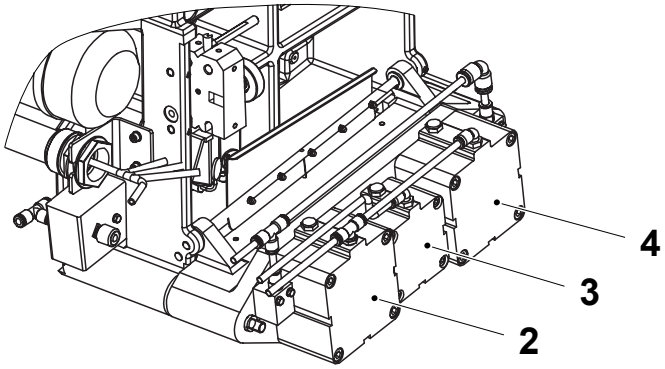
g) Lock the screws (5) and (6) with locking fluid.

h) Assemble in the reverse order.



B = 21.7 ±0.1 mm





2 Pressure cylinder
3 Cutting cylinder
4 Pressure cylinder
5 Screw
6 Screw
7 Surface
8 Dolly

TechPub_2614345_0105 - 08_MM81534_11en.fm

8.3.1-3 Pressure Jaw - Change Dolly

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095761-0100

WARNING

Risk of cutting/amputation.

The pressure jaw knife is sharp.

a) Loosen the nuts (1) and remove the screws (2).

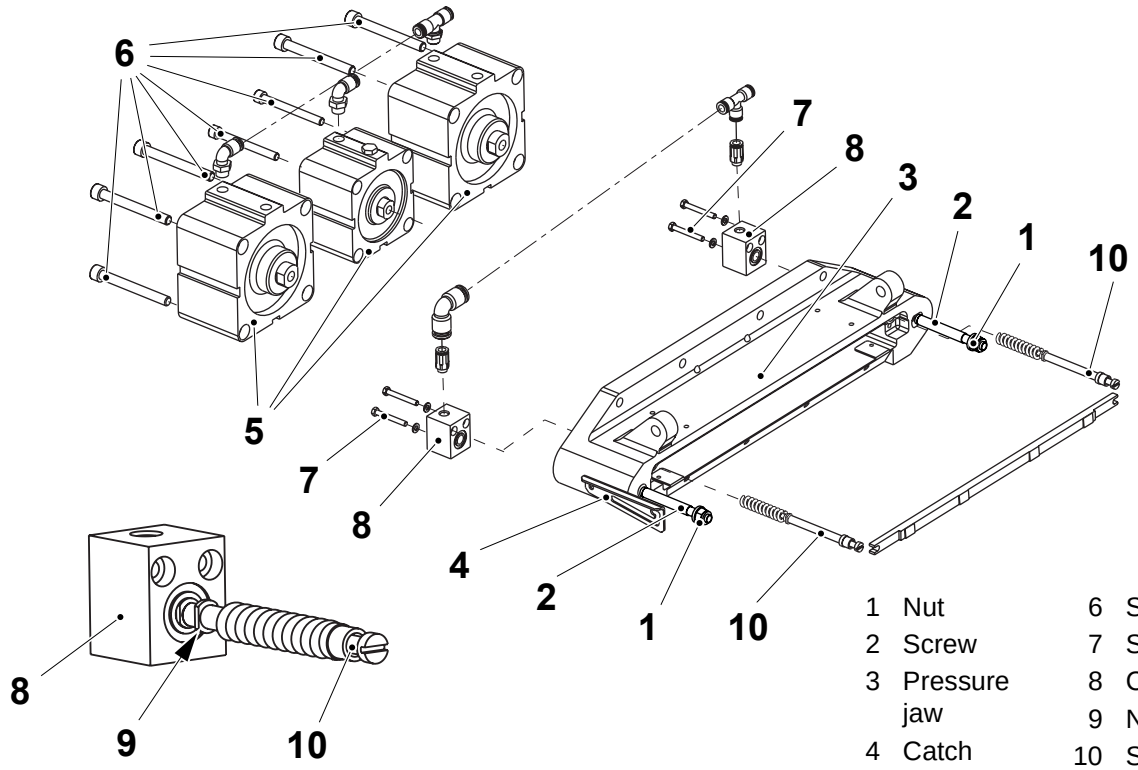
b) Disconnect all the pneumatic hoses from the cylinders.

c) Open the pressure jaw (3) and lock it in position by means of the catch (4).

d) Remove the pneumatic cylinders (5) by means of the screws (6).

e) Remove the screws (7).

f) Remove the cylinders (8) by holding the nuts (9) and loosening the screws (10).



1 Nut
2 Screw
3 Pressure jaw
4 Catch
5 Cylinder
6 Screw
7 Screw
8 Cylinder
9 Nut
10 Screw

(Cont'd)

TechPub_2614345_0105 - 08_MM81534_11en.fm

(Cont'd)

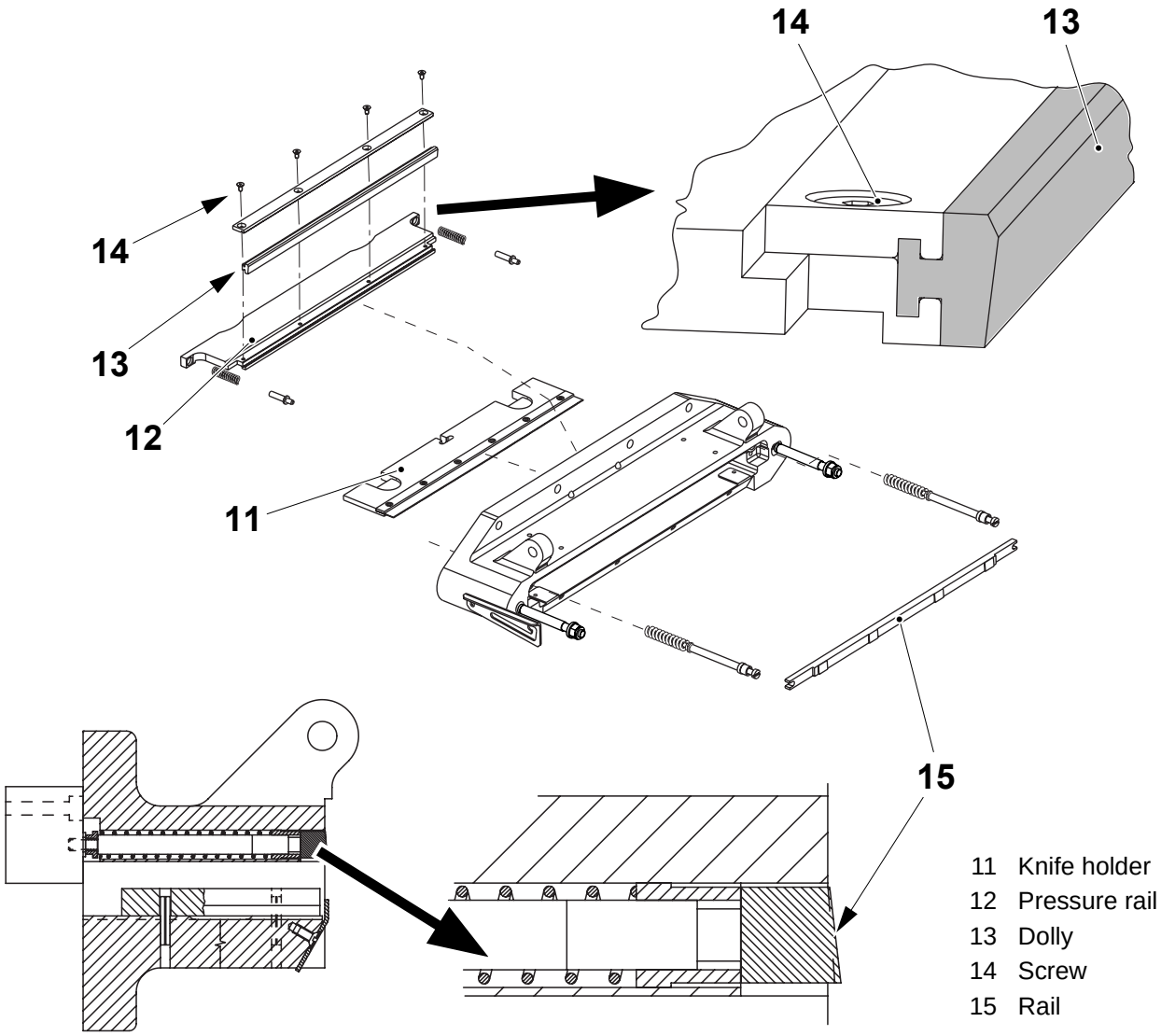
g) Pull out the knife holder (11) together with the pressure rail (12).

h) Change the dolly (13) by means of the screws (14).

Note! Make sure to place the dolly (13) with the right orientation, see figure.

i) Assemble in the reverse order.

Note! When assembling, make sure that the rail (15) is mounted with the inclined plane facing outwards, see figure below.



11 Knife holder
12 Pressure rail
13 Dolly
14 Screw
15 Rail

TechPub_2614345_0105 - 08_MM81534_11en.fm

8.3.2 Drive Unit Rear

8.3.2-1 Drive Unit Rear - Check

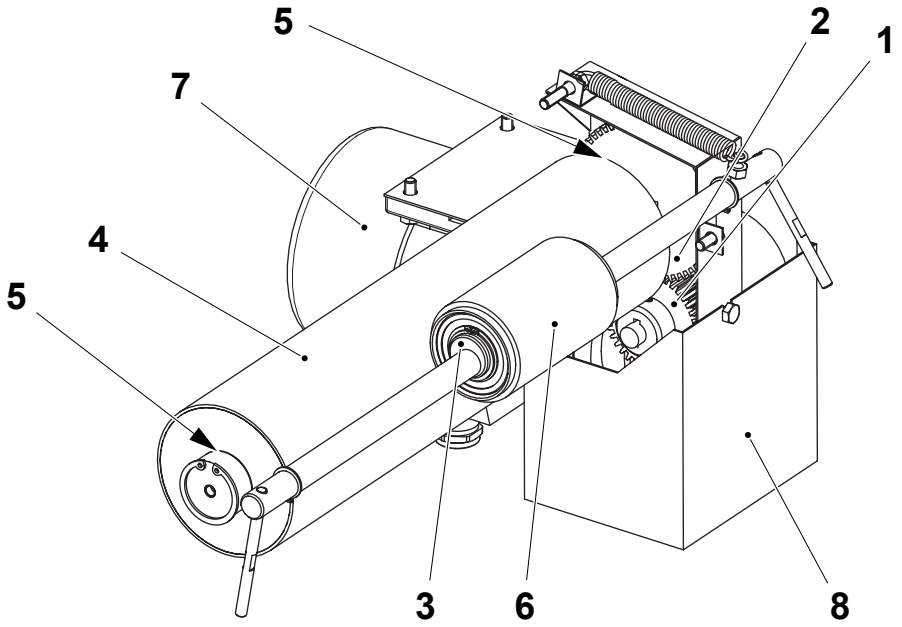
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348431-0100

Check the following parts for visual wear and/or damage:

- the gear wheels (1) and (2)
  Check especially for cracks in the teeth.
- the bending roller (4) and the counter roller (6)
  Check also that they rotate freely.
- the electrical motor (7)
- the ball bearings (5) and the eccentric bushing (3)
  Check also for excessive radial play.
- check for oil in the cover (8)
  Empty as required.

Note! The eccentric bushing (3) must be mounted with the eccentricity upwards.

Change as required.



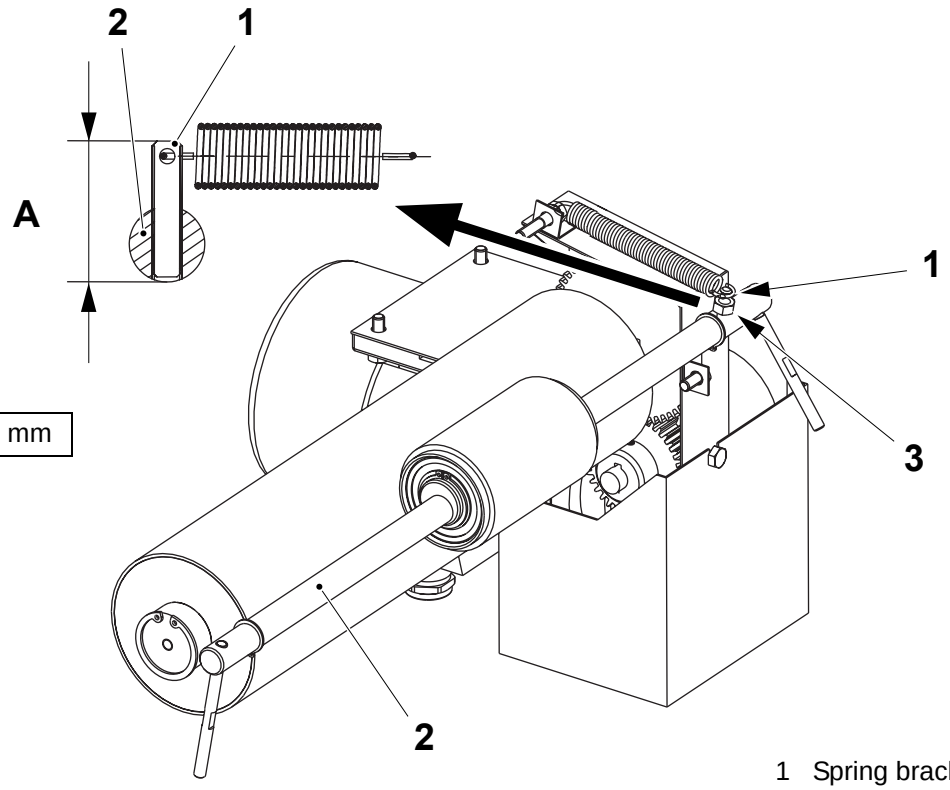
1 Gear wheel (steel)
2 Gear wheel (plastic)
3 Eccentric bushing
4 Bending roller
5 Ball bearing
6 Counter roller
7 Electrical motor
8 Cover

TechPub_2614345_0105 - 08_MM81534_11en.fm

8.3.2-2 Drive Unit Rear - Set Spring Bracket

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348431-0100

Set the distance **A** between the spring bracket (1) and the shaft (2) by means of the nut (3).



A = 28.0 ±1.0 mm

1 Spring bracket
2 Shaft
3 Nut

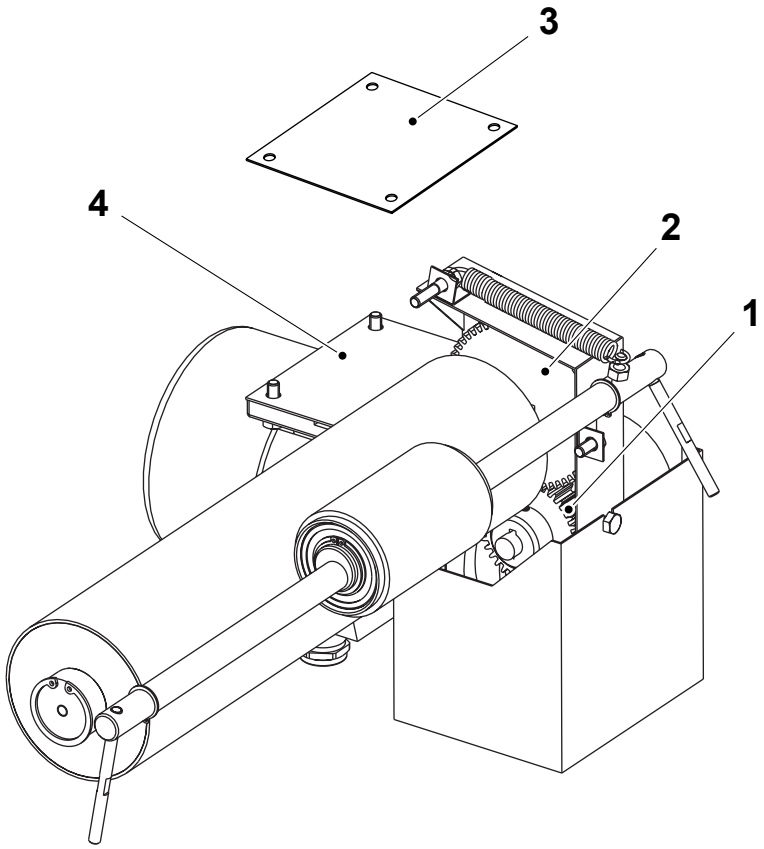
TechPub_2614345_0105 - 08_MM81534_11en.fm

8.3.2-3 Drive Unit Rear - Set Gear Wheel

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1348431-0100

Set the radial play (**+0.3 / +0.5 mm**) between the gear wheels (1) and (2) by adding or removing shims (3) under the motor bracket (4).

Note! It is very important to have radial play all around the full turn of the roller.



1 Gear wheel (steel)
2 Gear wheel (plastic)
3 Shim
4 Motor bracket

8.3.2-4 Drive Unit Rear - Set Bending Roller Speed

SPC Reference	1348431-0100

Set the bending roller speed acceleration according to 9.5.3-1 Frequency Converter - Set.

TechPub_2614345_0105 - 08_MM81534_11en.fm

8.3.3 Sealing Unit

8.3.3-1 Sealing Unit - Check Inductor

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095763-0100

a) Loosen the nuts (1) and remove the screws (2).

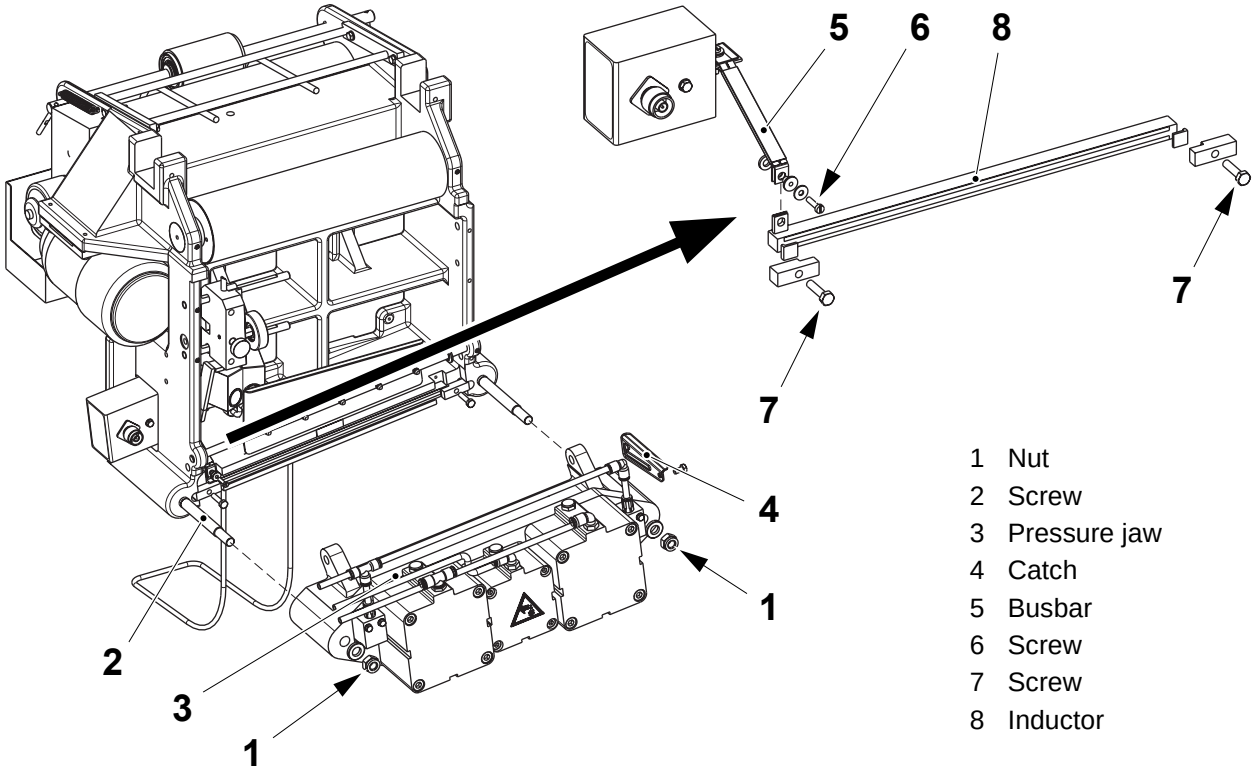
b) Open the pressure jaw (3) and lock it in that position with the catch (4).

c) Disconnect the busbar (5) by means of the screws (6).

d) Remove the screws (7) and pull out the inductor (8).

e) Check the inductor (8) for wear and/or damage. Change the inductor (8) as required.

f) Assemble in the reverse order.



1 Nut
2 Screw
3 Pressure jaw
4 Catch
5 Busbar
6 Screw
7 Screw
8 Inductor

TechPub_2614345_0105 - 08_MM81534_11en.fm

8.3.4 Bracket

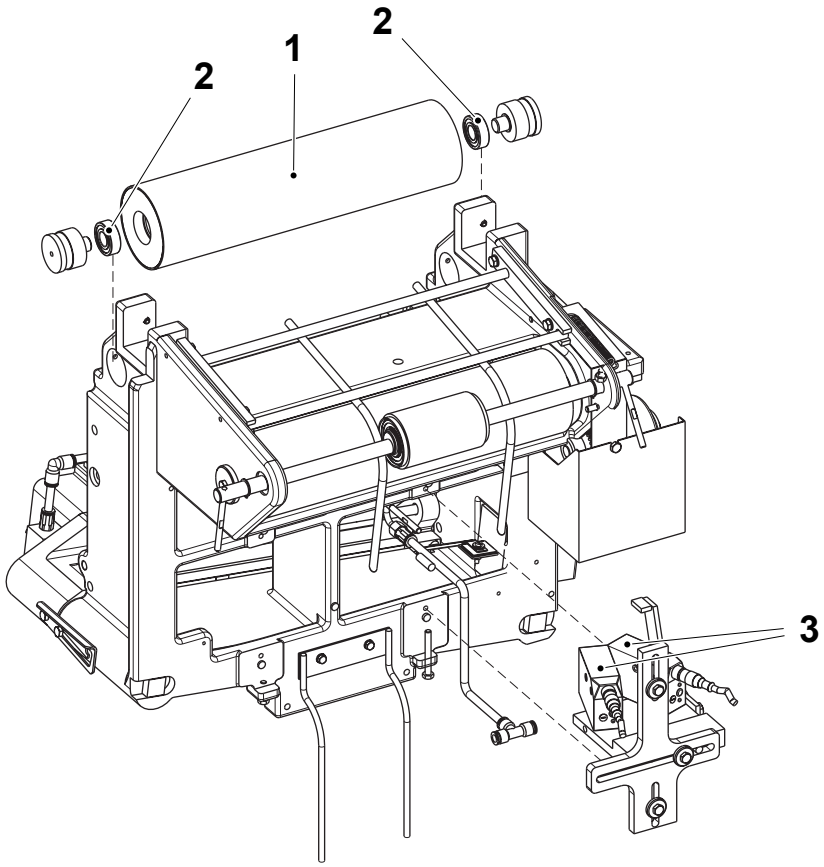
8.3.4-1 Bracket - Check Roller And Photocells

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Cleaning solution
SPC Reference	1095765-0200 1095765-0300

Check that:

- the roller (1) rotates easily and freely
- the radial play of the ball bearings (2) are not excessive
  If excessive, change them, see 8.1-1 Machine Body - Overhaul Bending Rollers.
- the photocell (3) lenses are clean and intact
  If required, clean the lenses with a proper cleaning solution and a clean dry cloth.

TechPub_2614345_0105 - 08_MM81534_11en.fm



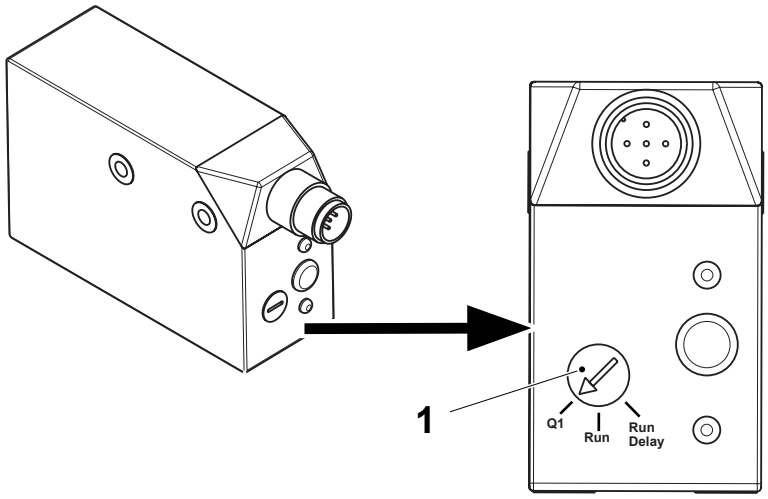
1 Roller
2 Bearing
3 Photocell

8.3.4-2 Bracket - Set Photocell Sensitivity

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1095765-0200 1095765-0300

For more detailed information refer to 9.2.1-5 TMCC Controller - Set Photocells.

Note! Make sure that the switch (1) is set to the position **Q1**.



1 Switch

TechPub_2614345_0105 - 08_MM81534_11en.fm

8.3.4-3 Bracket - Set Photocells Position

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095765-0200 1095765-0300

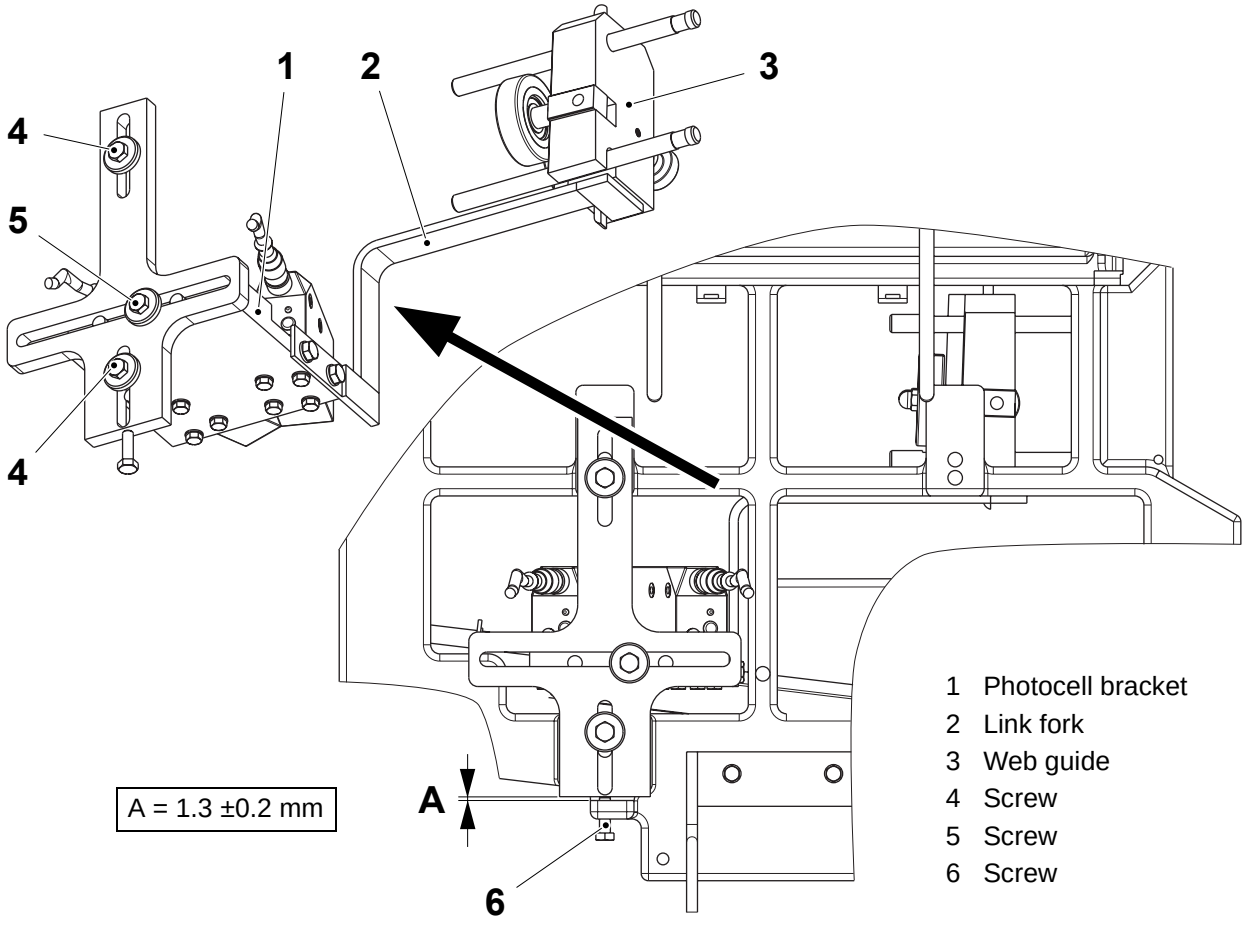
Only for package 200 B and 250 B

a) Loosen the screws (4) and set the distance **A** by means of the screw (6). Tighten the screws (4).

b) The new alternative setting with the link fork (2):
   - Loosen the screw (5)
   - Move the photocell bracket (1) until the link fork (2) is in contact with the web guide (3)
   - Tighten the screw (5).

Package	**Link fork (2)**
200 B - 3 B	TP No. 1348264-0000

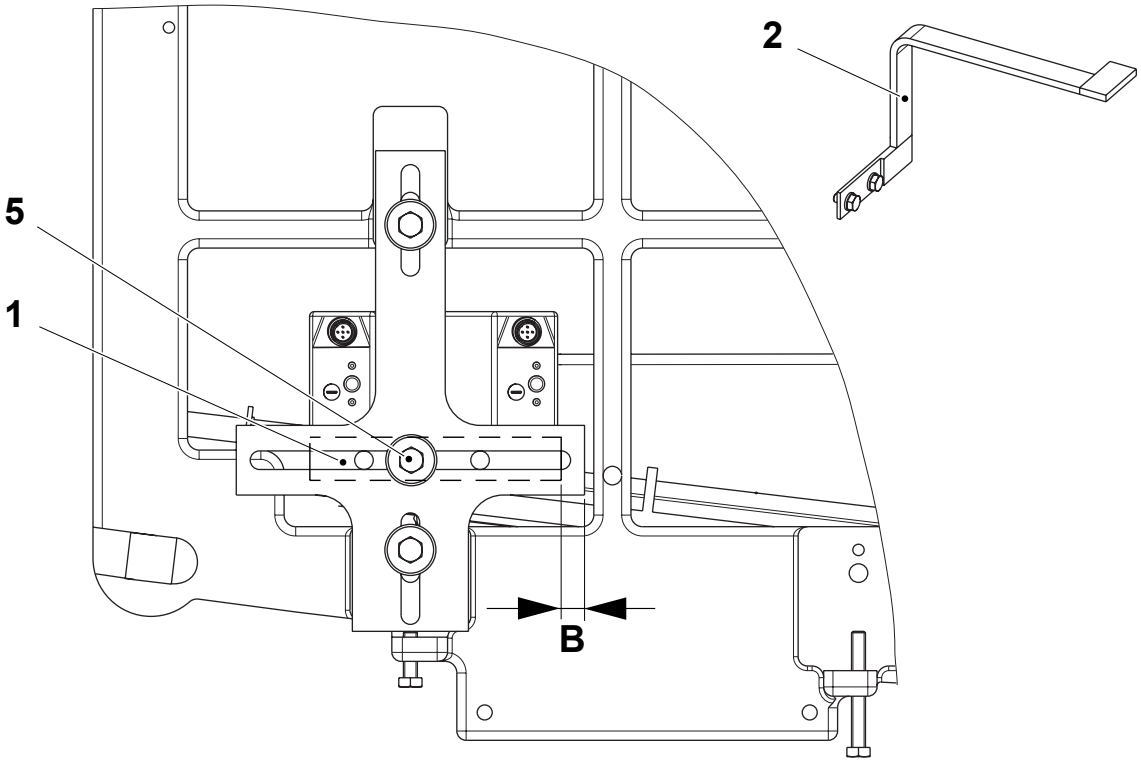
TechPub_2614345_0105 - 08_MM81534_11en.fm



(Cont'd)

(Cont'd)

c) The old alternative setting without the link fork (2):
- Loosen the screw (5)
- Set the distance **B** by moving sideways the photocell bracket (1)
- Tighten the screw (5).



B = 6.5 ±0.2 mm

1 Photocell bracket
2 Link fork
5 Screw

TechPub_2614345_0105 - 08_MM81534_11en.fm

(Cont'd)

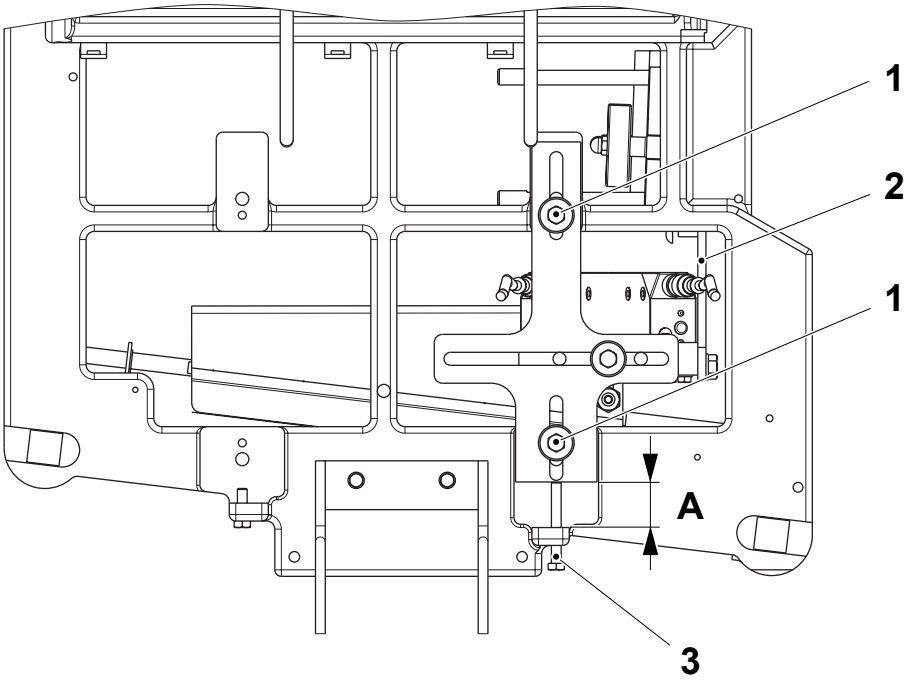
(Cont'd)

Not valid for package 200 B and 250 B

a) Loosen the screws (1) and set the distance **A** by means of the screw (3). Tighten the screws (1).

Note! The horizontal setting of the photocells is done by means of the link fork (2).

Package	A ±0.2 (mm)		Package	A ±0.2 (mm)
1000 B - 500 B	28.0		500 S	19.2
1000 S	25.65		TPA 330 Sq	16.6
200 S	13.35		TPA 1000 S	26.0
1500 S	29.0		TPA 1000 Sq	24.0
1000 Sq	36.8		TPA 250 Sq	11.0
250 S	15.0		TPA 500 Sq	9.7
330 S	9.0			



1 Screw
2 Link fork
3 Screw

(Cont'd)

TechPub_2614345_0105 - 08_MM81534_11en.fm

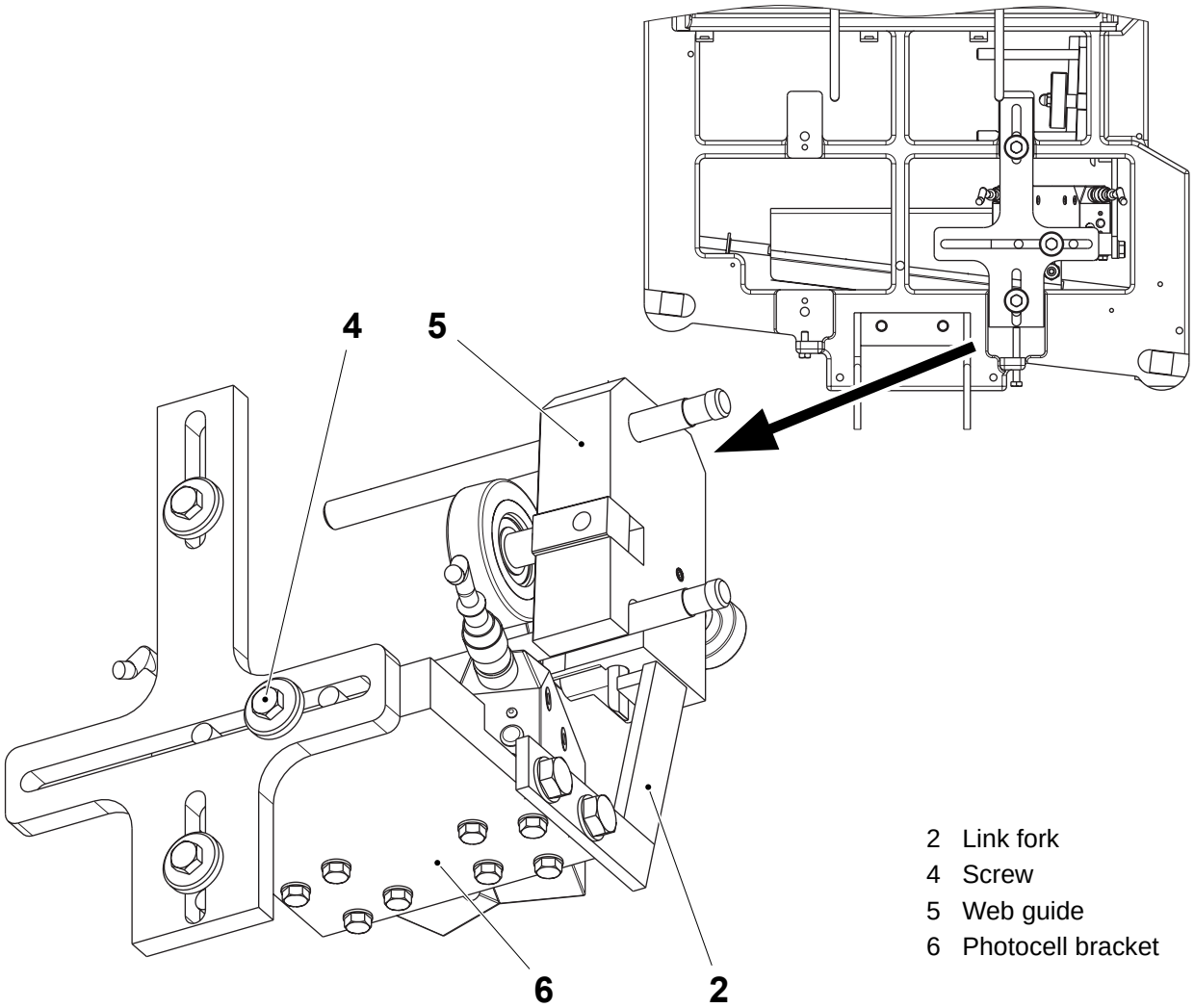
(Cont'd)

b) Loosen the screw (4).

c) Move the photocell bracket (6) until the link fork (2) is in contact with the web guide (5).

d) Tighten the screw (4).

Package	Link fork (2)		Package	Link fork (2)
1000 B - 500 B	TP No. 1346084-0000		1500 S	TP No. 1490186-0000
TPA 1000 S	TP No. 1349331-0000		1000 S	TP No. 1349330-0000
TPA 1000 Sq - 1000 Sq	TP No. 1498926-0000		500 S	TP No. 1499580-0000
250 S - TPA 330 Sq	TP No. 1538645-0000		330 S	TP No. 1348264-0000
200 S - TPA 250 Sq	TP No. 1334084-0000		TPA 500 Sq	TP No. 2563951-0000



2 Link fork
4 Screw
5 Web guide
6 Photocell bracket

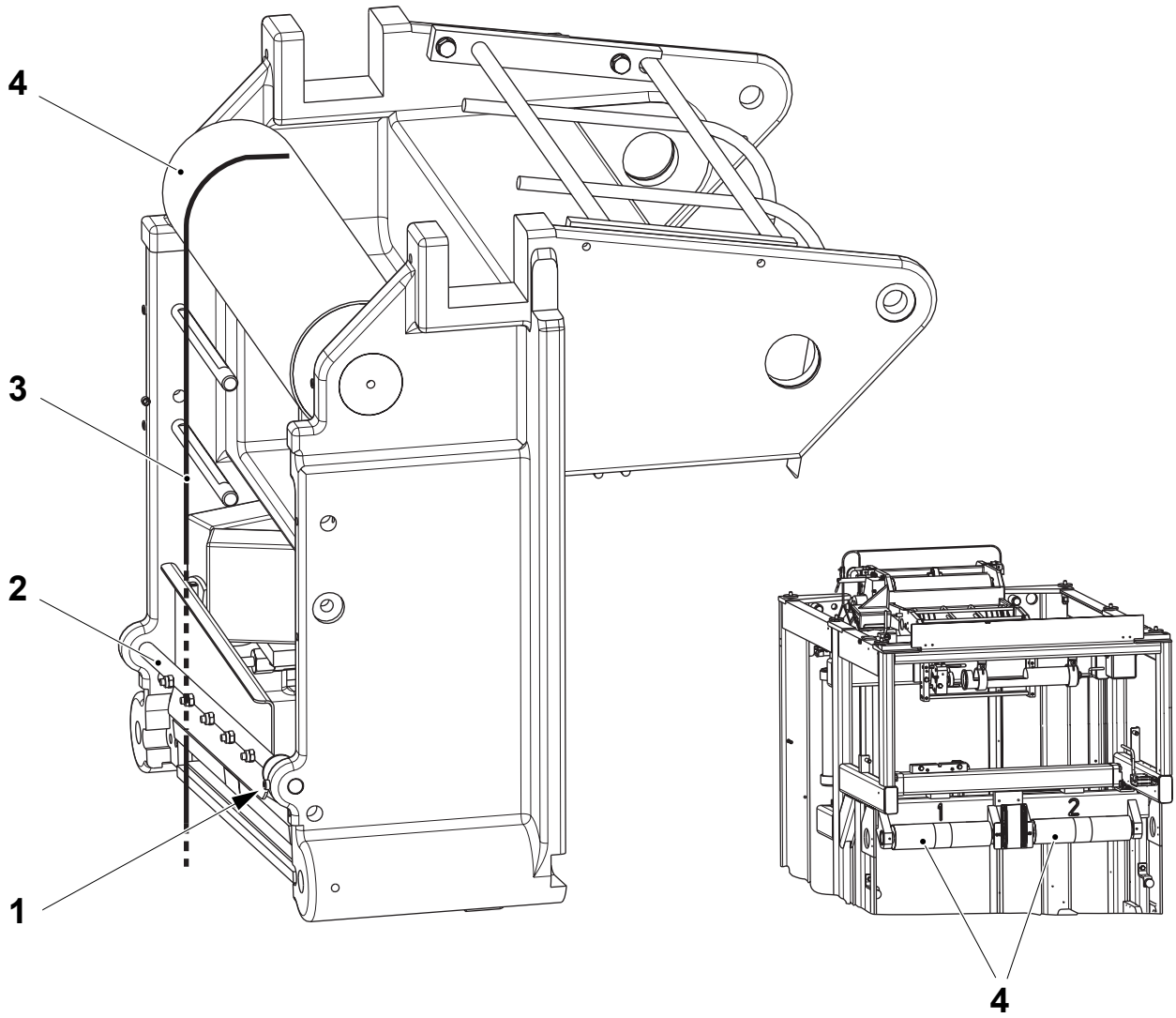
TechPub_2614345_0105 - 08_MM81534_11en.fm

8.3.4-4 Bracket - Set Guide Pin and Guide Plate

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095765-0200 1095765-0300

a) Loosen the stop screw (1) on the rod (2).

b) Attach a lead wire (3) to the rollers (4).



1 Stop screw
2 Rod
3 Lead wire
4 Roller

(Cont'd)

TechPub_2614345_0105 - 08_MM81534_11en.fm

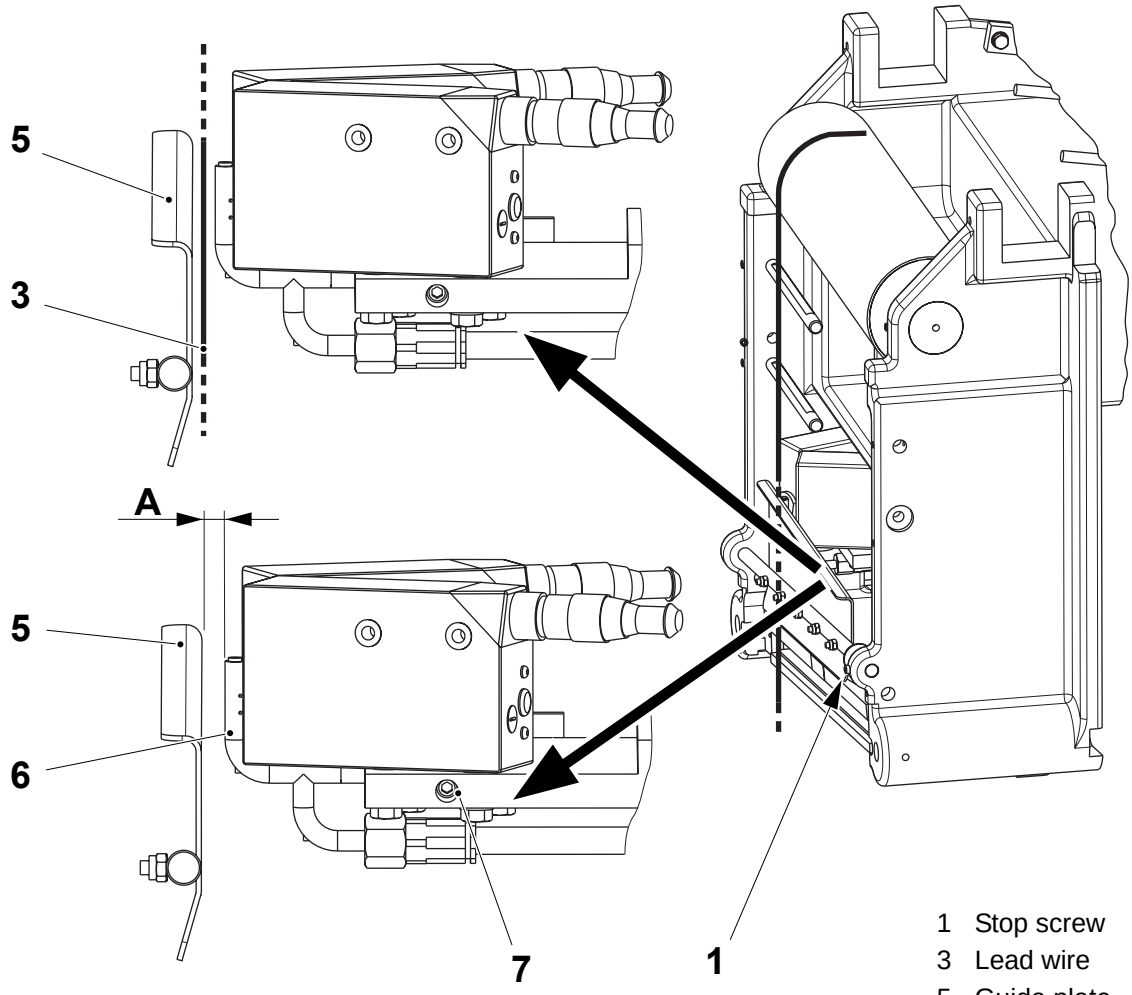
(Cont'd)

c) Adjust the guide plate (5) so that it is parallel to the lead wire (3) and set at a distance of approximately **1 mm** from the lead wire (3).

d) Tighten the stop screw (1).

e) Remove the lead wire (3).

f) Set the distance **A** between the guide plate (5) and the guide pin (6) by means of the grub screw (7).



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8.3.4-5 Bracket - Change Photocell

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095765-0200 1095765-0300

Note! The following instruction applies to both photocells (10).

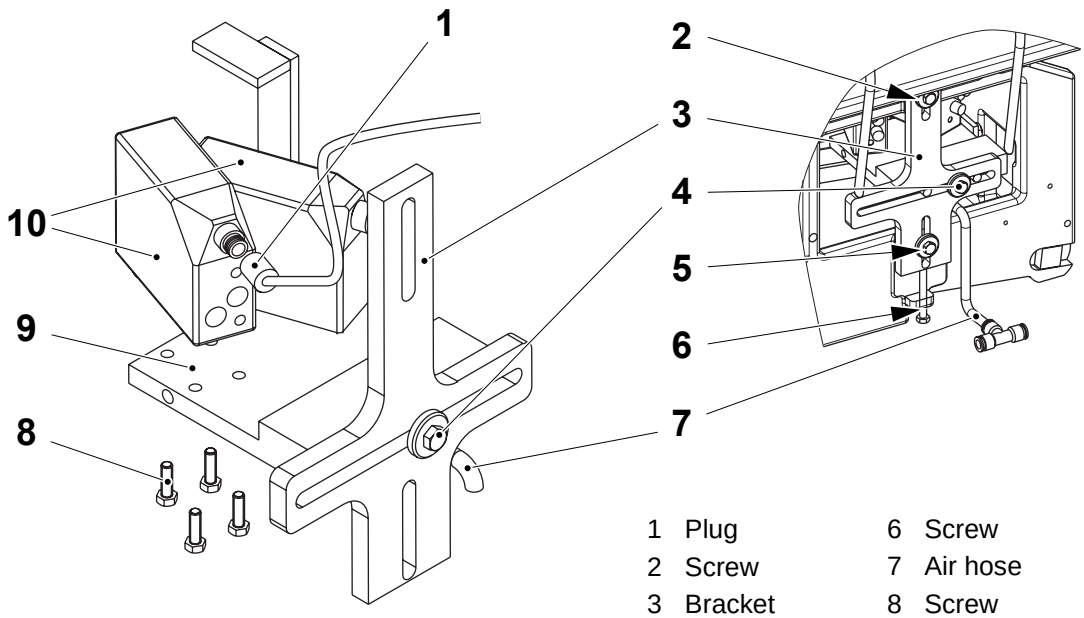
Note! Do not loosen the screws (4) and (6) or the factory setting of the bracket (3) will be lost.

a) Disconnect the plug (1) from the photocell (10).

b) Disconnect the air hose (7) from the bottom of the photocell bracket (9).

c) Remove the screws (2) and (5) and remove the cross shaped bracket (3) together with the photocell bracket (9).

d) Remove the screws (8) securing the photocell (10) to the bracket (9).



1	Plug	6	Screw
2	Screw	7	Air hose
3	Bracket	8	Screw
4	Screw	9	Bracket
5	Screw	10	Photocell

(Cont'd)

TechPub_2614345_0105 - 08_MM81534_11en.fm

(Cont'd)

e) Remove the photocell (10) and discard it.

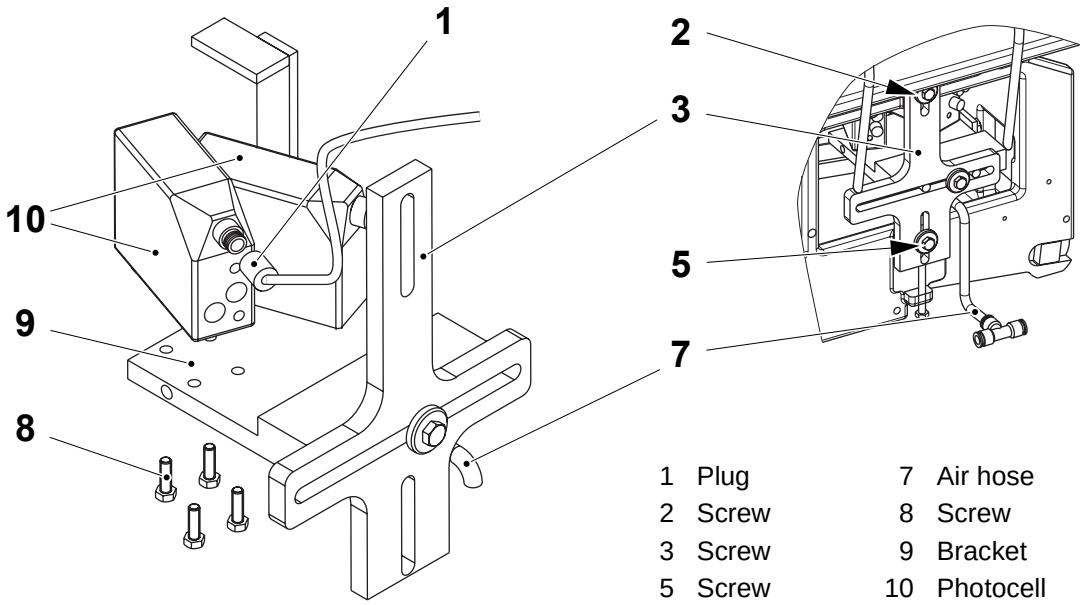
f) Fit the new photocell (10) on the bracket (9) and secure it into position with the screws (8).

g) Fit the bracket (3) and the screws (2) and (5). Do not tighten the screws (2) and (5).

h) Set the position of the bracket (9), see 8.3.4-3 Bracket - Set Photocells Position.

i) Connect the plug (1) to the photocell (10).

j) Connect the air hose (7) to the bottom of the bracket (9).



1	Plug	7	Air hose
2	Screw	8	Screw
3	Screw	9	Bracket
5	Screw	10	Photocell

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8.4 Material Holder Line 1 and Line 2

SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

8.4-1 Material Holder Line 1 and Line 2 - Check Knife and Guide

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

Old Material Holder

WARNING

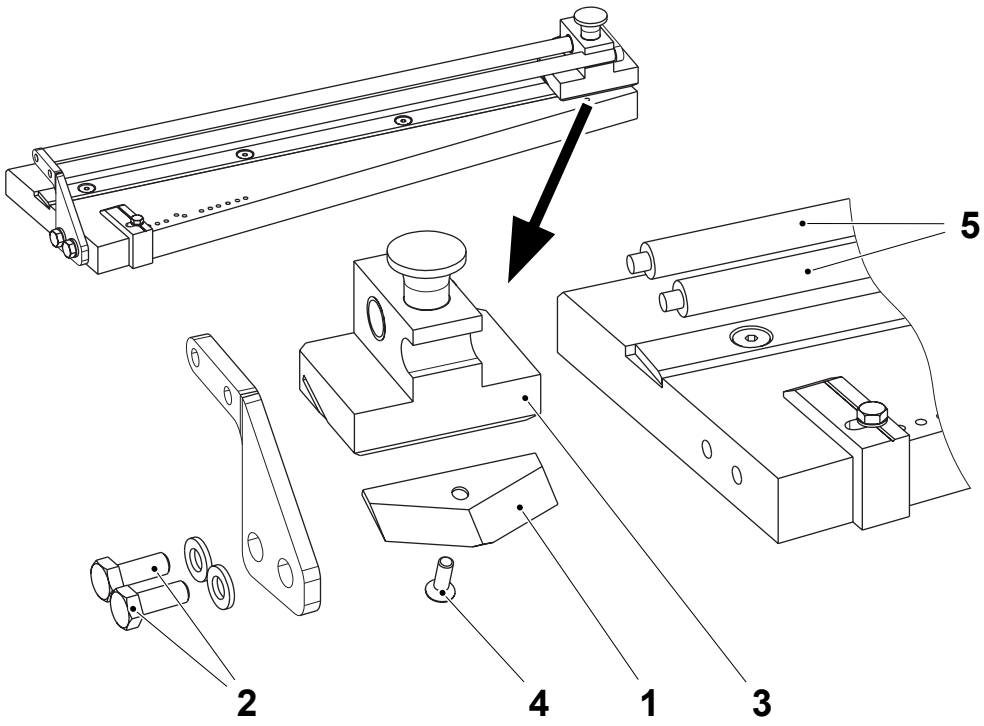
Risk of cutting/amputation.

The knife (1) is sharp.

Check the cutting of the knife (1). Change the knife (1) as required by removing the screws (2), sliding the guide (3) and removing the screw (4).

Check that the guide (3) slides easily. Clean the guide and the shafts (5) as required.

Set the knife as required, see 8.4-9 Material Holder Line 1 and Line 2 - Set Knife Holder.



1 Knife
2 Screw
3 Guide
4 Screw
5 Shaft

(Cont'd)

TechPub_2614345_0105 - 08_MM81534_11en.fm

(Cont'd)

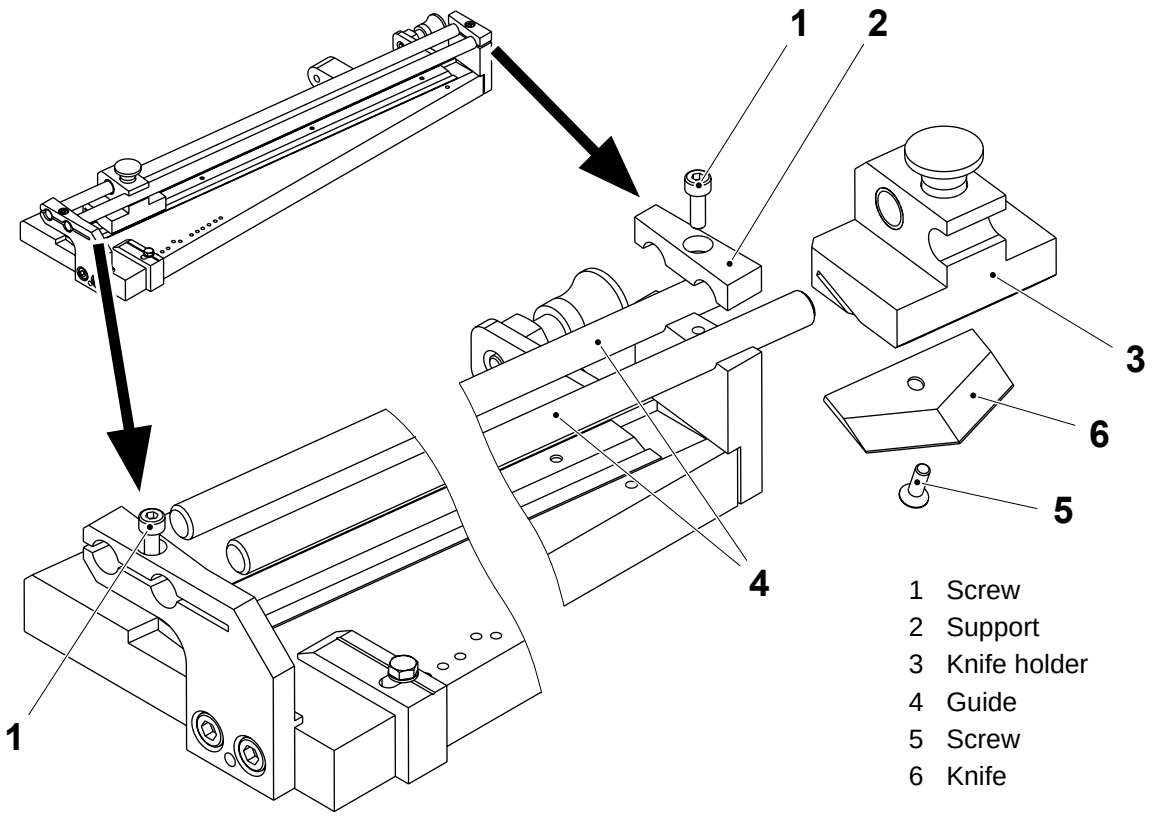
New Material Holder or Machines Rebuilt with UK-2564340-0100 Material Holder Improvement

WARNING
Risk of cutting/amputation.
The knife (6) is sharp.

a) Check the cutting action of the knife (6). Change the knife (6) as required by:
   – loosen the two screws (1)
   – remove the upper part of the support (2)
   – slide the knife holder (3) from the guides (4)
   – remove the screw (5) and change the knife (6)
   – assemble in the reverse order.

b) Check that the knife holder (3) slides easily. Clean the knife holder (3) and the guides (4) as required.

c) Set the knife (6) as required, see 8.4-9 Material Holder Line 1 and Line 2 - Set Knife Holder.



1 Screw
2 Support
3 Knife holder
4 Guide
5 Screw
6 Knife

TechPub_2614345_0105 - 08_MM81534_11en.fm

8.4-2 Material Holder Line 1 and Line 2 - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

Old Material Holder

a) Remove the screws (1).

b) Check that the cylinder (2) piston slides freely.

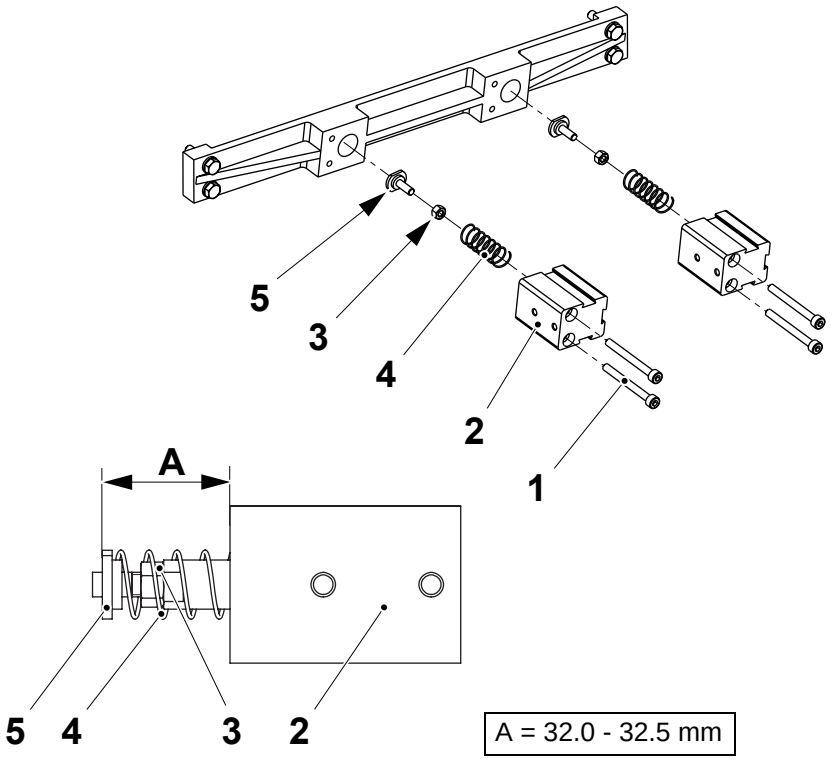
c) Check that the springs (4) are not damaged.

d) Check that the lock studs (5) are not damaged.

e) Change as required and assemble in the reverse order the cylinder group.

f) Set the distance **A** between the lock stud (5) and the cylinder (2) by means of the nut (3).

g) Fit the cylinder group by means of the screws (1).



A = 32.0 - 32.5 mm

1 Screw
2 Cylinder
3 Nut
4 Spring
5 Lock stud

(Cont'd)

TechPub_2614345_0105 - 08_MM81534_11en.fm

(Cont'd)

New Material Holder

a) Remove the screws (1).

b) Remove the screws (2) and (3).

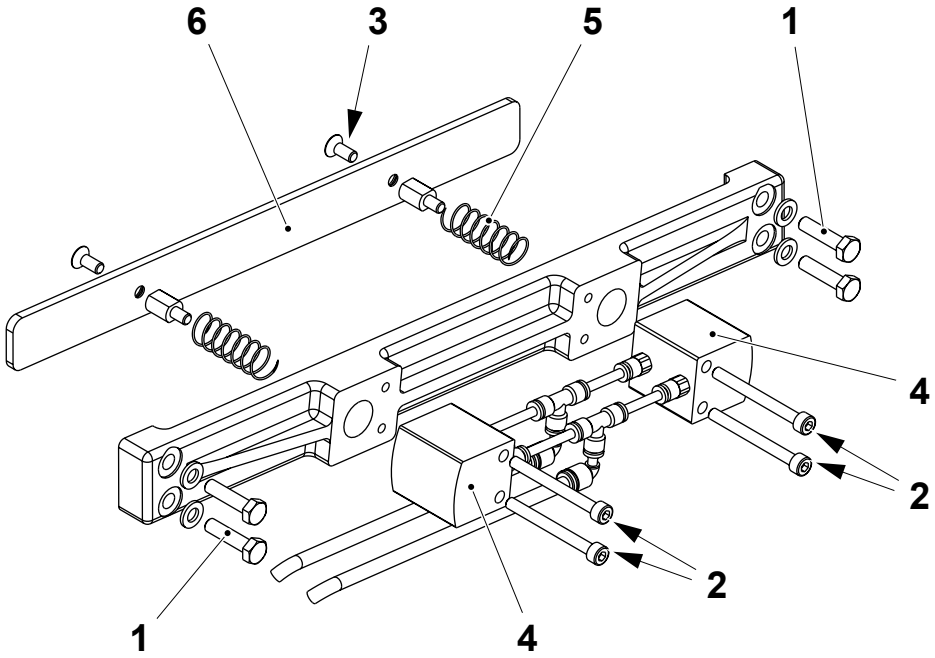
c) Check that
   - the cylinder (4) pistons slides freely
   - the springs (5) are not damaged
   - the plate (6) is not damaged.

   Change as required.

d) Fit the cylinders (4) by means of the screws (2).

e) Fit the springs (5) and the plate (6) by means of the screws (3).

f) Fit the cylinder group by means of the screws (1).



1 Screw
2 Screw
3 Screw
4 Cylinder
5 Spring
6 Plate

TechPub_2614345_0105 - 08_MM81534_11en.fm

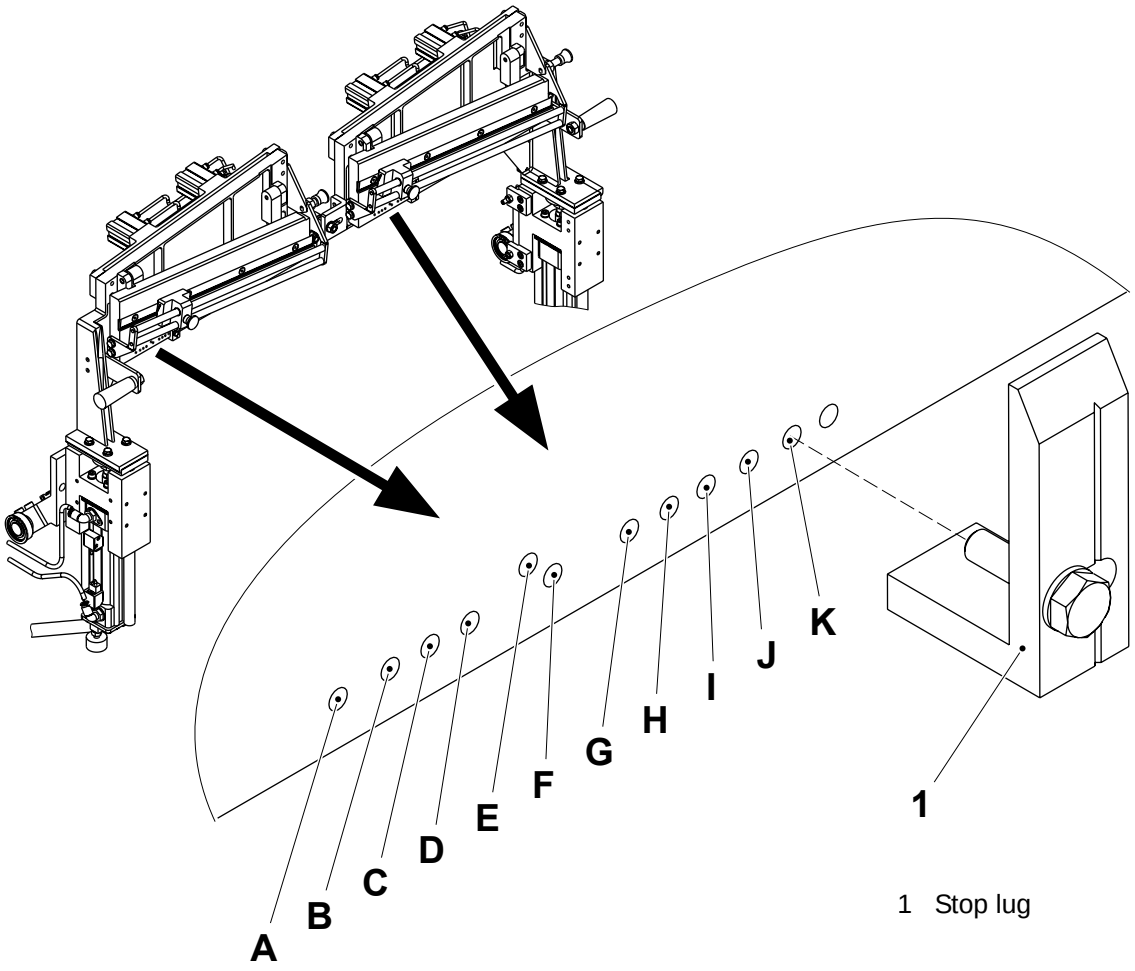
8.4-3 Material Holder Line1 and Line 2 - Set Stop Lug

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

Set the position of the stop lugs (1) on the two material holders, see table below.

Note! The TPA 1000 Sq has a different stop lug (1).

Package	Stop lug (1) position	Package	Stop lug (1) position
1500 S - 1000 B - 500 B	A	TPA 500 Sq	G
1000 S	B	250 B - 200 B - 330 S	H
1000 Sq	C	TPA 330 Sq	I
TPA 1000 S	D	250 S	J
TPA 1000 Sq	E	200 S - TPA 250 Sq	K
500 S	F		



1 Stop lug

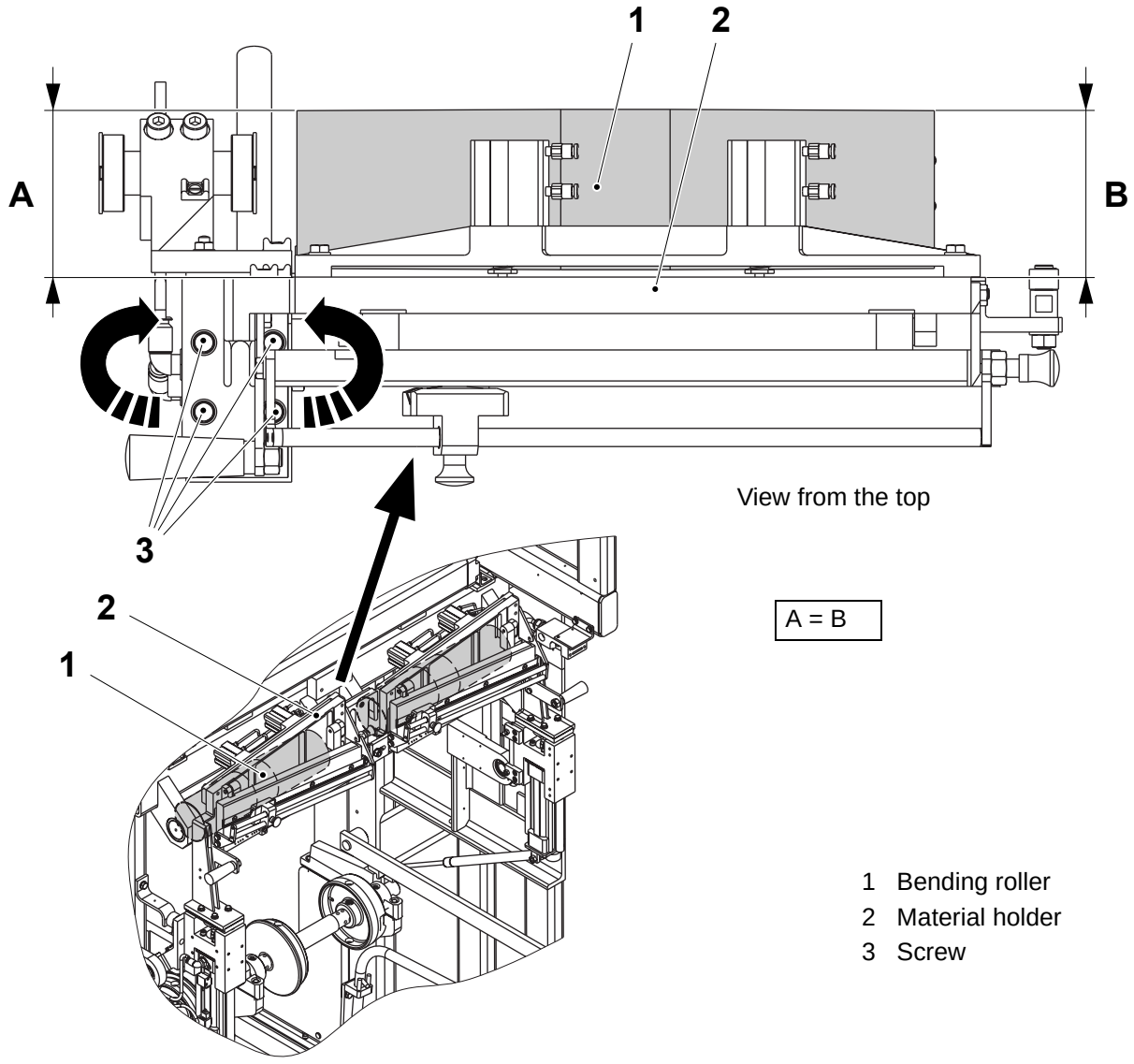
TechPub_2614345_0105 - 08_MM81534_11en.fm

8.4-4 Material Holder Line 1 and Line 2 - Set Table/Paper Web Parallelism

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

a) Set the material holder (2) parallel to the bending roller (1) by loosening the screws (3) and turning the splicing table (2).

b) Tighten the screws (3).



1 Bending roller
2 Material holder
3 Screw

TechPub_2614345_0105 - 08_MM81534_11en.fm

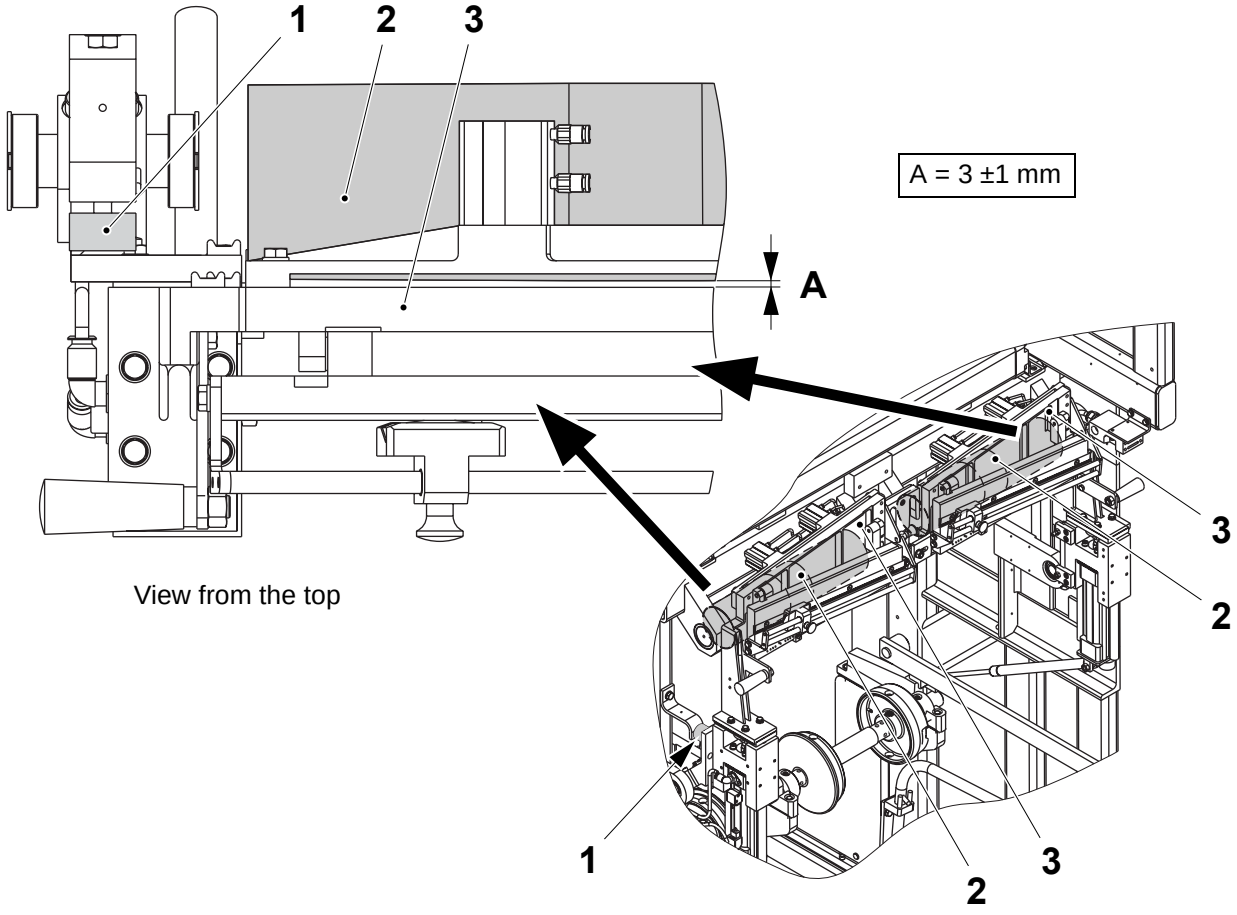
8.4-5 Material Holder Line 1 and Line 2 - Set Stop Position

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

a) Set the material holder splicing table, see 8.4-4 Material Holder Line 1 and Line 2 - Set Table/Paper Web Parallelism.

b) Set the distance **A** between the material holder (3) and the bending roller (2) by means of the damper (1).

Note! Distance **A** must be measured approximately in the centre of the roller (2).



1 Damper
2 Bending roller
3 Material holder

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8.4-6 Material Holder Line 1 and Line 2 - Set Sealing Parallelism

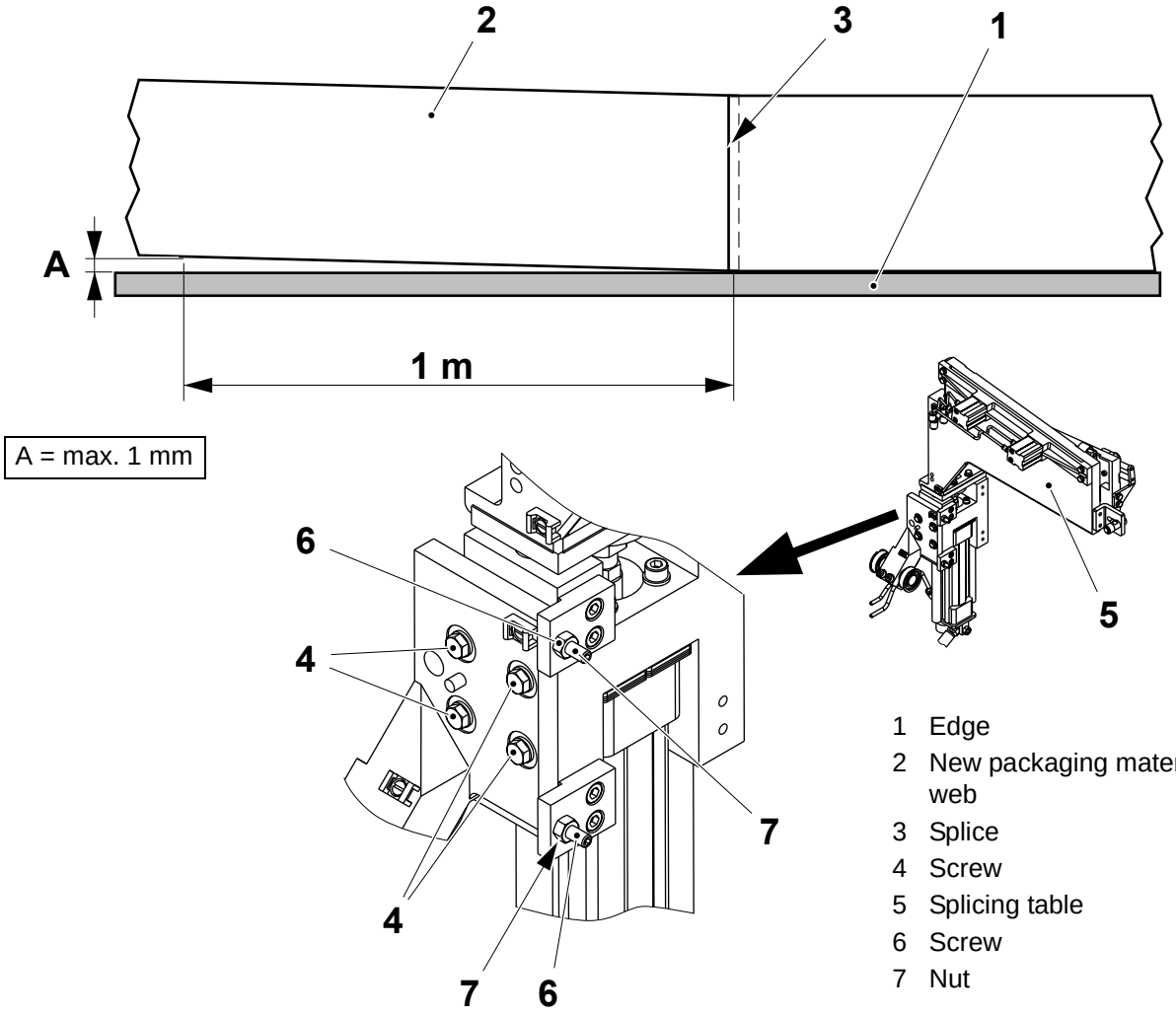
Machine Status	Air OFF, Mains Power OFF Steam ON, Water OFF Packaging material **threaded**
SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

a) Perform a manual splice.

b) Cut the packaging material web approx. one meter before and one meter after the splice.

c) With the aid of a straight edge (1) check that the **new** packaging material web (2) is within the distance **A** in **1 meter** from the splice (3), see figure below. If required:

- lower the material holder and loosen the screws (4) and the nuts (7)
- set the splicing table (5) by means of the screws (6)
- tighten the screws (4) and repeat from item a).



1 Edge
2 New packaging material web
3 Splice
4 Screw
5 Splicing table
6 Screw
7 Nut

(Cont'd)

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(Cont'd)

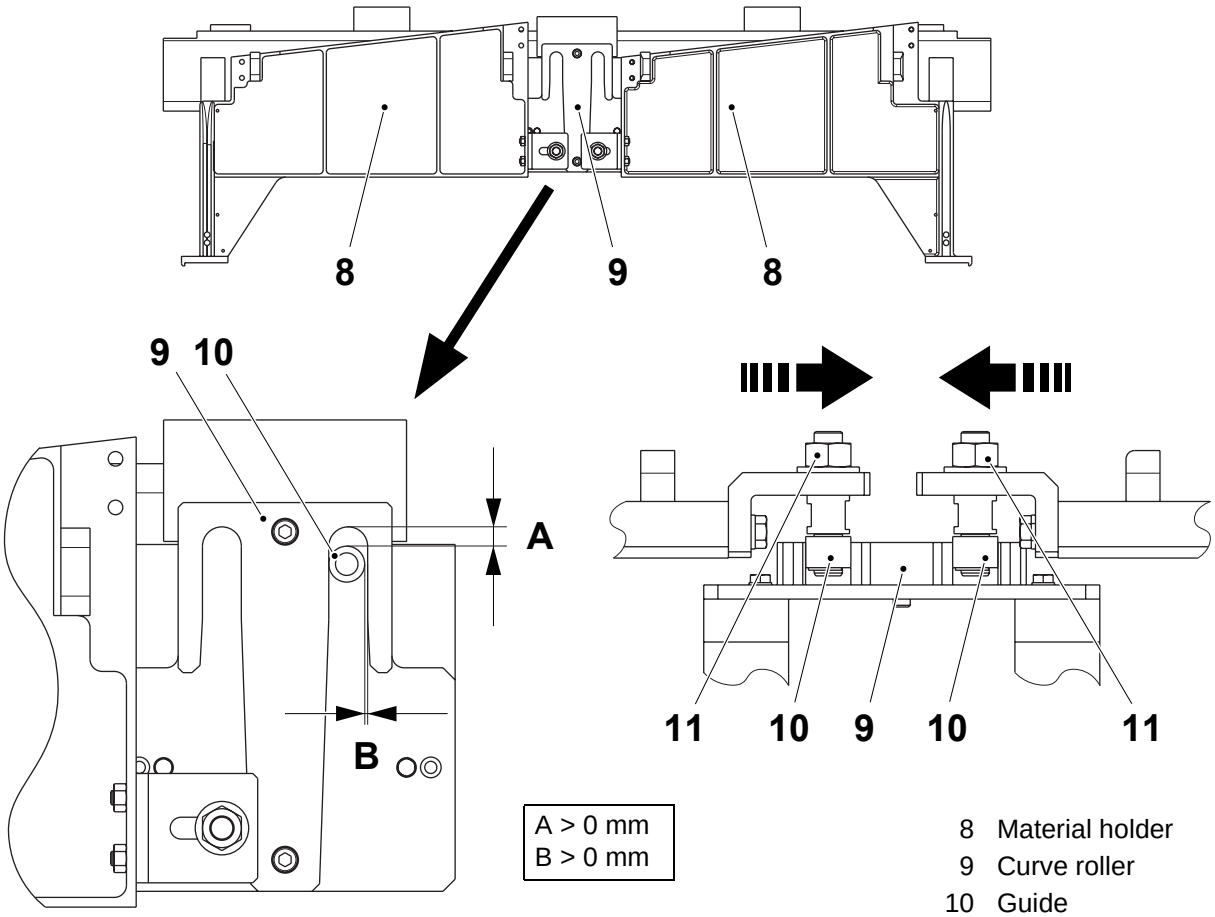
d) Lift one of the material holders (8) to its **top** position.

e) Check the distance **A** and the distance **B** between the curve roller (9) and the guide (10). The distance **A** and the distance **B** are only to ensure that you have play.

If required, loosen the nut (11) and press the curve roller (9) against the centre of the guide (10). Tighten the nut (11).

f) Make sure that the material holder line (8) goes to its lower position by itself when released.

g) Perform items d) to f) for the other material holder.



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8.4-7 Material Holder Line 1 and Line 2 - Set Sealing Alignment

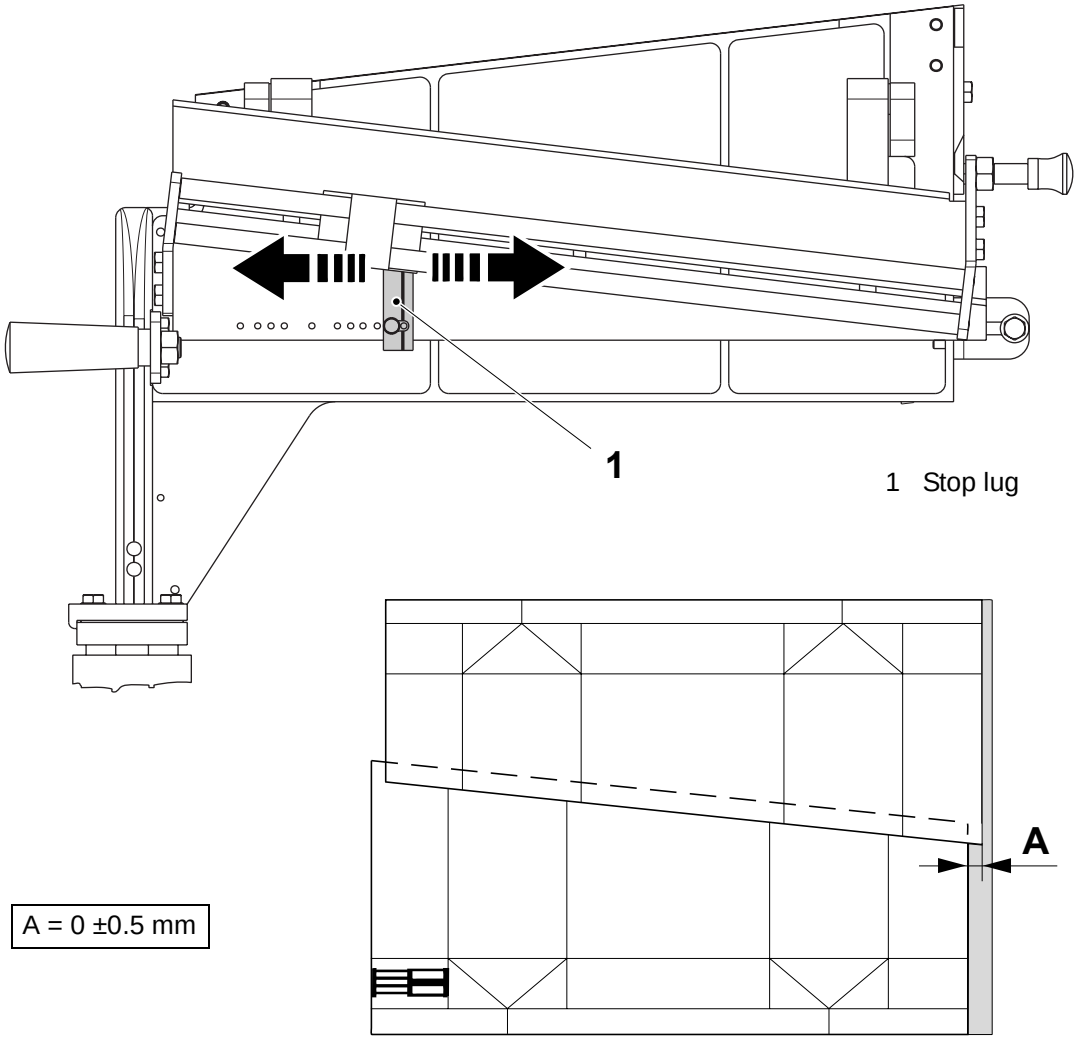
Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Special Equipment	Template TP No. 1260622
SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

a) Set the parallelism on the material holders, see 8.4-6 Material Holder Line 1 and Line 2 - Set Sealing Parallelism.

b) Set the web guide position, see 8.3-1 Splicing Device - Set Web Guide.

c) Fit the stop lug according to the running volume, see 8.4-3 Material Holder Line1 and Line 2 - Set Stop Lug.

d) Perform a manual splice and adjust the stop lug (1) position until the distance **A** is obtained.



1 Stop lug

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8.4-8 Material Holder Line 1 and Line 2 - Set Overlap

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF Packaging material **threaded**
SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

a) Set the photocell position according to 8.3.4-3 Bracket - Set Photocells Position.

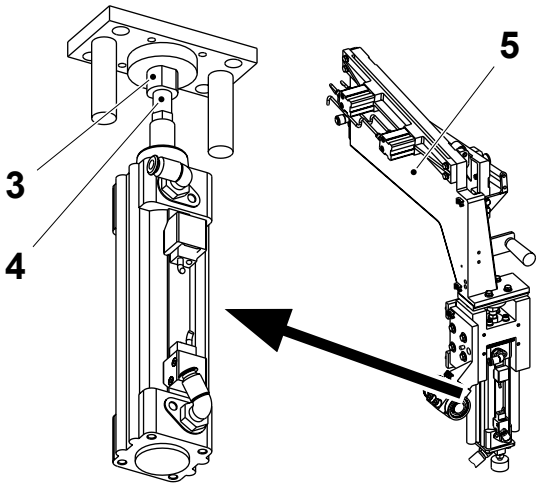
b) Perform a manual splice.

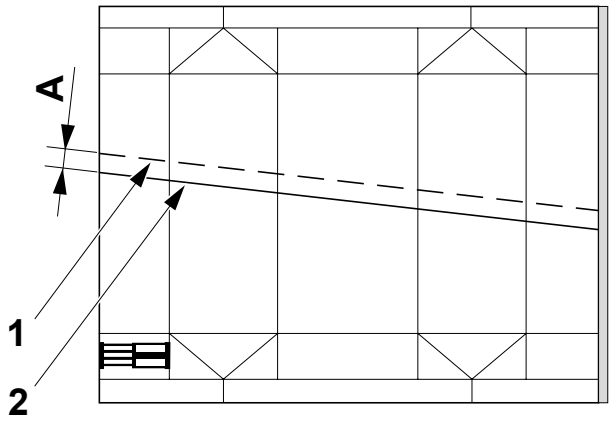
c) Set the distance **A** between the manual cutting (1) and the splicing device cutting (2) by loosening the nut (3) and turning the piston rod (4). Tighten the nut (3).

Note! To increase the distance **A** move the material holder upwards. One turn of the piston rod moves the material holder **1.25 mm**.

d) Repeat on the other material holder (5).

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A = 11.0 ±1 mm

1 Manual cutting
2 Splicing device cutting
3 Nut
4 Piston rod
5 Material holder

8.4-9 Material Holder Line 1 and Line 2 - Set Knife Holder

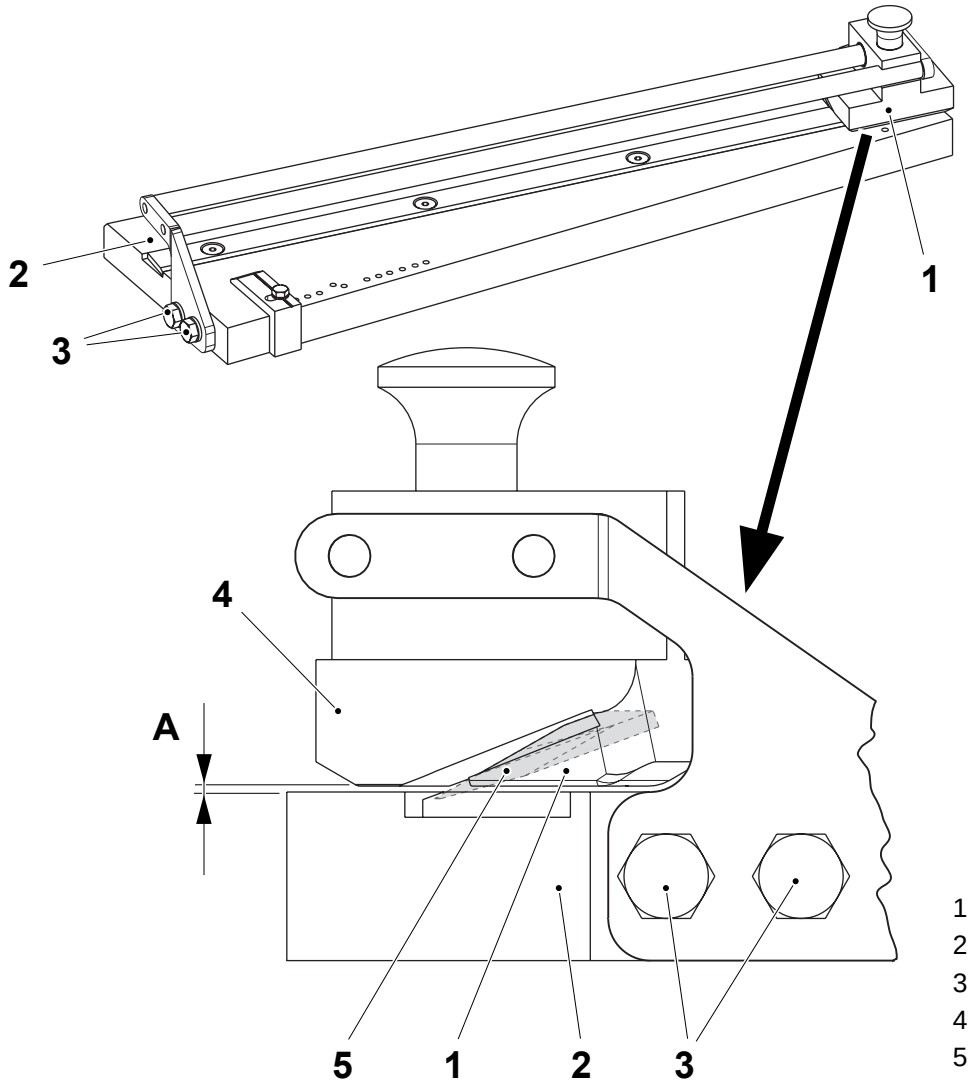
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1255867-0100, 1255869-0100 1255867-0200, 1255869-0200

Old Material Holder

Set the distance **A** from the guide (1) to the cutting table (2) by means of the screws (3) on both sides of the cutting table.

Note! To set the distance **A** use a feeler gauge slightly thicker than the thickness of the packaging material.

Check the knife (5) cutting by means of a piece of packaging material.



1 Guide
2 Cutting table
3 Screw
4 Knife holder
5 Knife

(Cont'd)

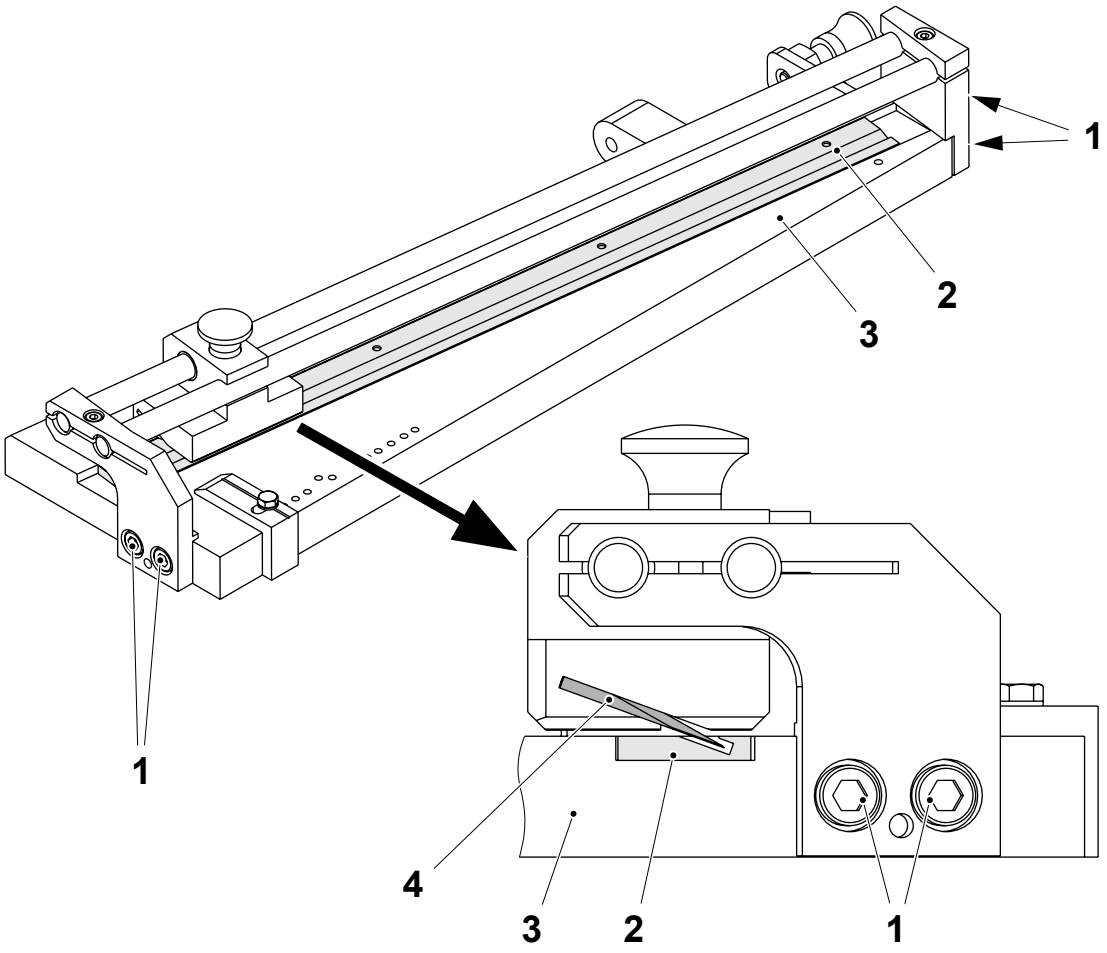
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(Cont'd)

New Material Holder or Machines Rebuilt with UK-2564340-0100 Material Holder Improvement

Check that the knife (4) is positioned in the middle of the groove in the ruler (2), on both sides of the cutting table (3). If required, set the knife (4) by means of the screws (1) on both sides of the cutting table (3).

Check the knife (4) cutting by means of a piece of packaging material.



1 Screw
2 Ruler
3 Cutting table
4 Knife

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8.5 Valve Panel

SPC Reference	1260235-0200

8.5-1 Valve Panel - Set Valve Pressure

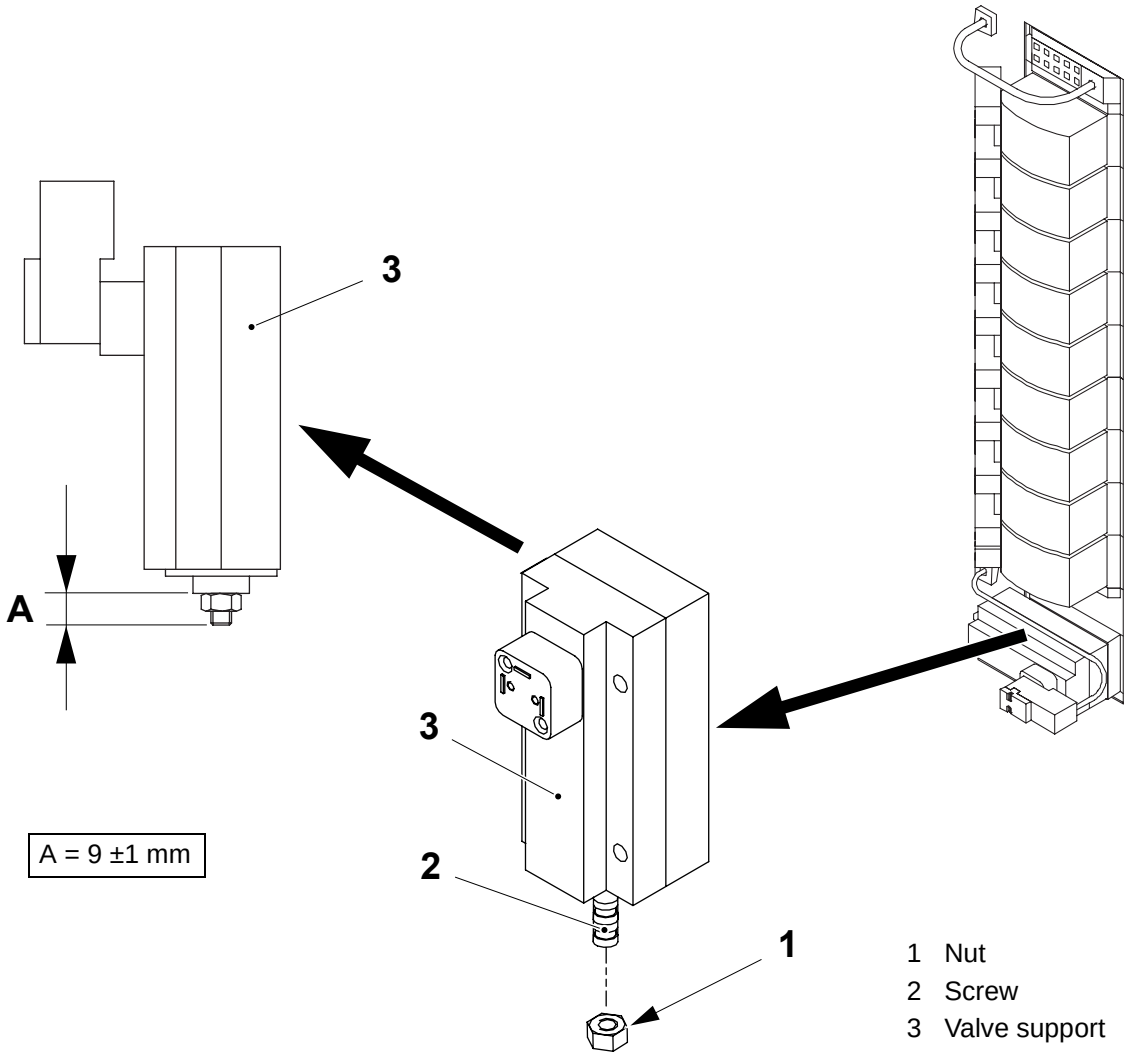
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1260235-0200

a) Remove the nut (1) from the screw (2).

b) Loosen or tighten the screw (2) to obtain the distance **A** between the end of the screws thread and the valve support (3).

c) Fit back the nut (1) onto the screw (2).

Note! By tightening the screw (2) you delay the pressurizing time of the ASU.



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8.6 Reel Trolley

SPC Reference	1282762-0100

8.6-1 Reel Trolley - Check

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1282762-0100

a) Press the brake handle (1) and check that the brake releases. If not, see 8.6-8 Reel Trolley - Set Brake.

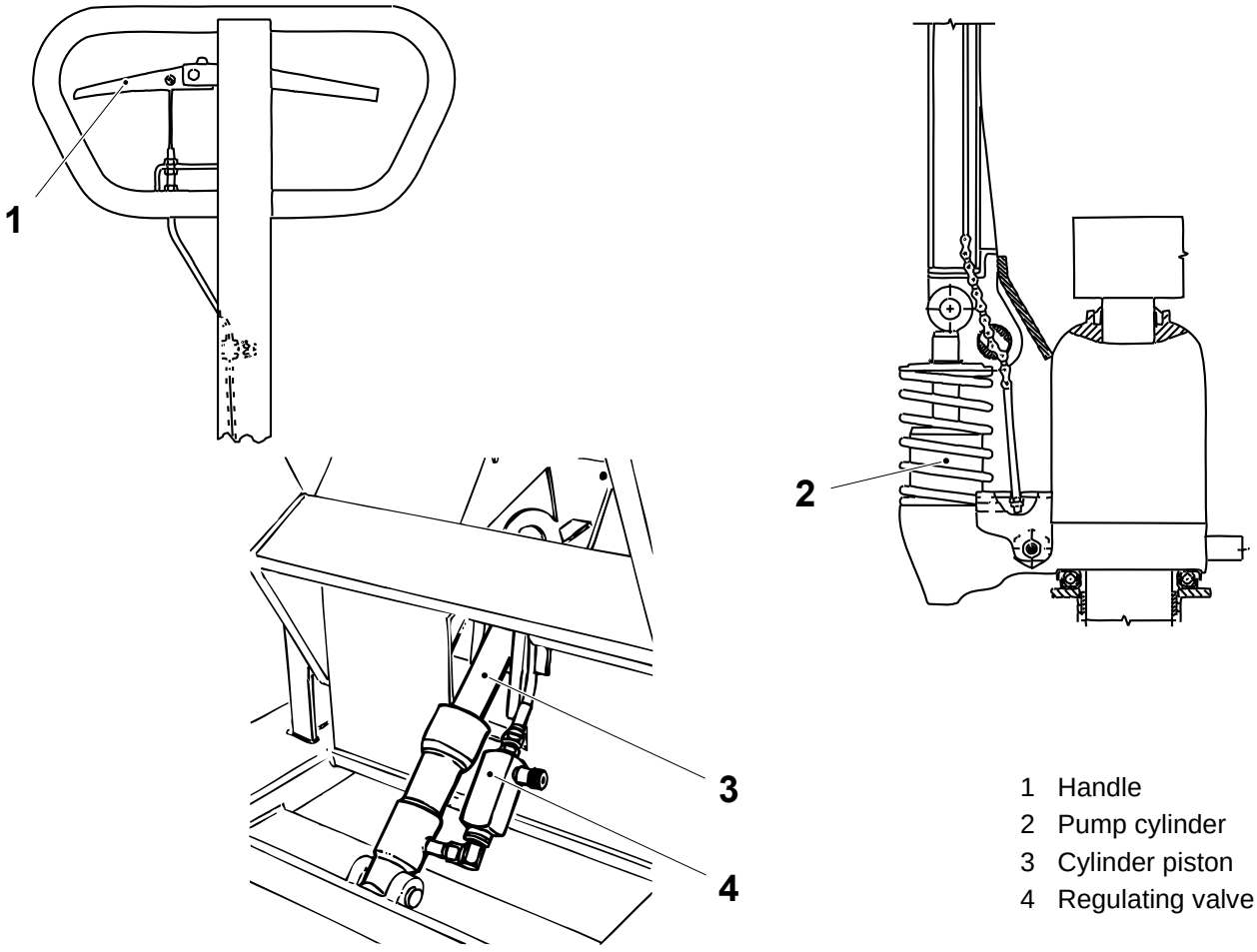
b) Check that all connections are oil free. Clean as required.

c) Pump up the lift arms to their highest position and check that the cylinder piston (3) is dry. Clean as required.

d) Put a packaging material reel in the trolley and pump until the reel lifts from the floor. Wait for 10 minutes. Make sure that the reel does not sink. Sinking can be caused by a broken pump cylinder (2). Change as required, see 8.6-2 Reel Trolley - Change Pump Cylinder.

e) Pump up again until the reel lifts from the floor and let it down. If the lifts go down very fast, set the regulating valve (4), see 8.6-3 Reel Trolley - Set Regulating Valve.

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1 Handle
2 Pump cylinder
3 Cylinder piston
4 Regulating valve

8.6-2 Reel Trolley - Change Pump Cylinder

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lubricant code C
SPC Reference	1282762-0100

Tie Rod

a) Release the chain (1) from the valve arm (2).

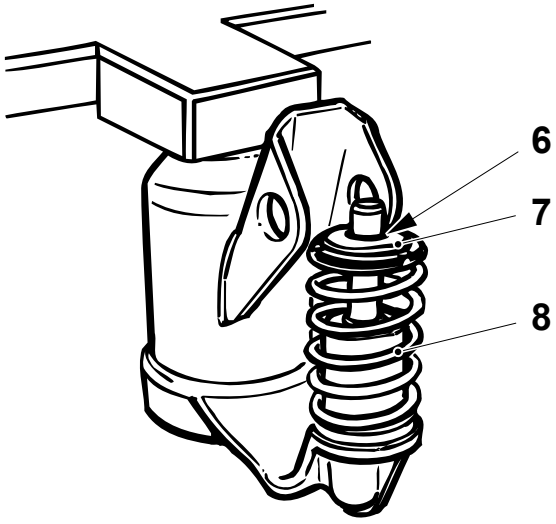
b) Unscrew the screw (3) to the axle pin (4).

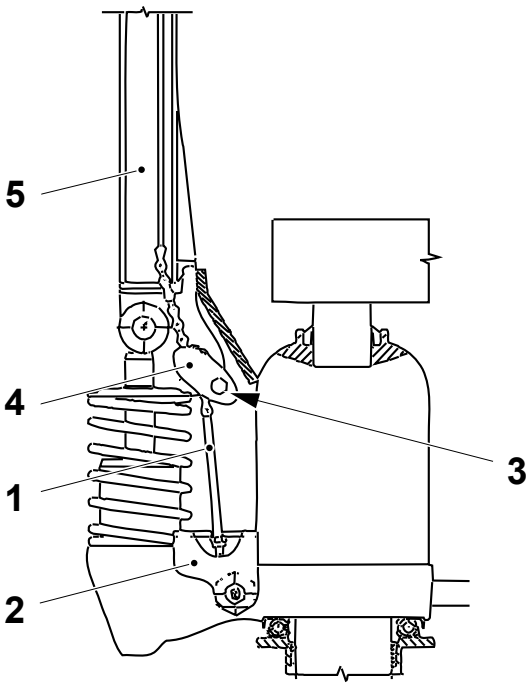
c) Turn the axle pin (4) clockwise a bit and pull out the chain (1).

d) Pull out the axle pin (4) and remove the tie rod (5).

Pump Cylinder

a) Remove the retaining ring (6), the washer (7) and the spring (8).





1 Chain
2 Valve arm
3 Screw
4 Axle pin
5 Tie rod
6 Retaining ring
7 Washer
8 Spring

(Cont'd)

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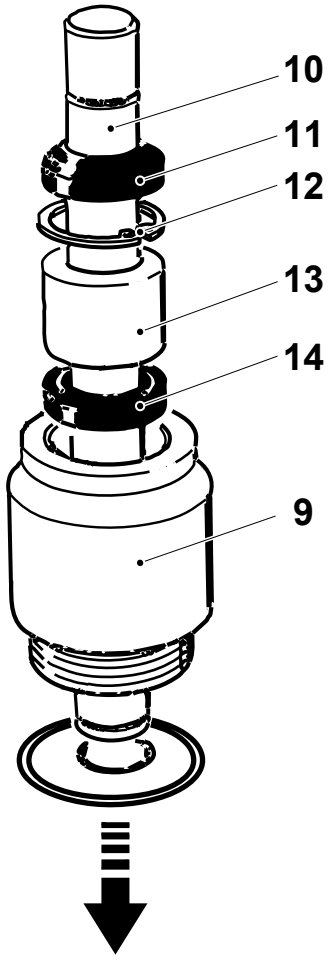
b) Unscrew the cylinder (9) and pull the axle (10) in the arrow direction.

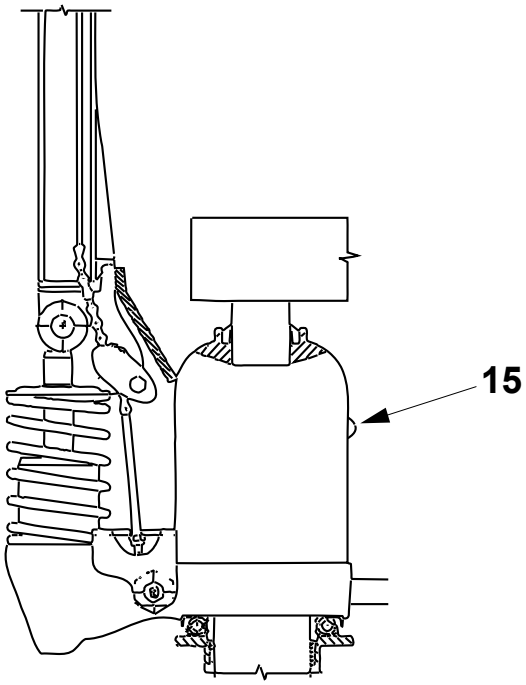
c) Remove the oil seal (11), the retaining ring (12), the spacer (13) and the seal (14).

d) Change the oil seal (11) and the seal (14).

e) Assemble in the reverse order. Put the lifting arms in the lowered position. If required undo the plug (15) and fill up with oil, code C, see 10.3-1 Lubricants.

f) Fill up until oil starts to flow out of the hole.





9 Cylinder
10 Axle
11 Oil seal
12 Retaining ring
13 Spacer
14 Seal
15 Oil plug

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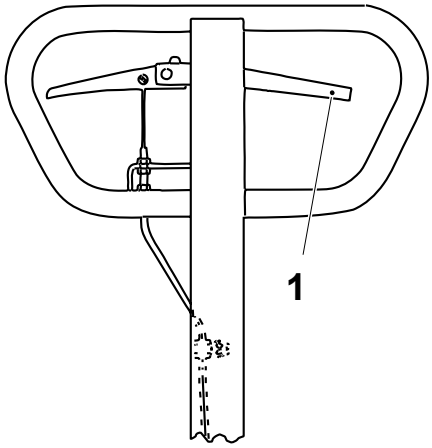
8.6-3 Reel Trolley - Set Regulating Valve

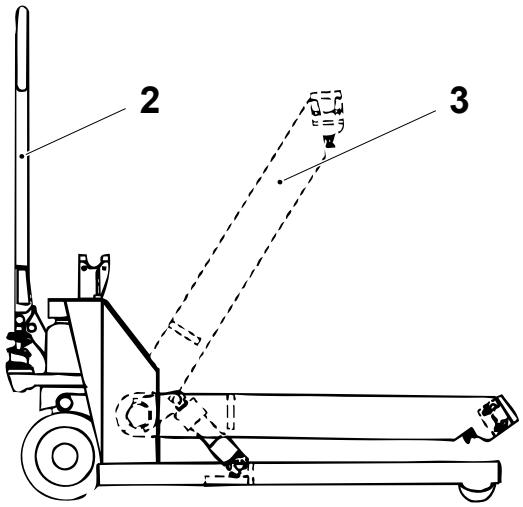
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1282762-0100

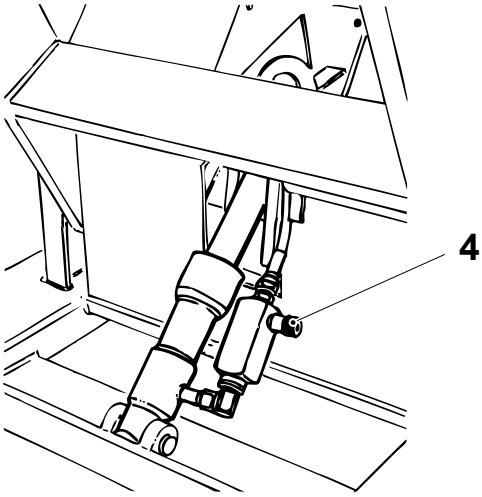
a) Pump with the handle (2) until the lift arms (3) are at their highest position.

b) Press in the sink handle (1) to sink the lift arms (3). Set the knob (4) so that the lift arms reach the lowest position in **8 - 9 seconds**.

c) If it is not possible to set the lift arms sink time, change the sink valve, see 8.6-4 Reel Trolley - Change Sink Valve.







1 Sink handle
2 Handle
3 Lift arms
4 Knob

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8.6-4 Reel Trolley - Change Sink Valve

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Consumables	Lubricant code C
SPC Reference	1282762-0100

a) Release the chain (1) and drive out the slotted pin (2). Remove the valve arm (3).

b) Unscrew the sink valve (4).

c) Change the O-rings (5), the copper washer (6) and the teflon washer (7).

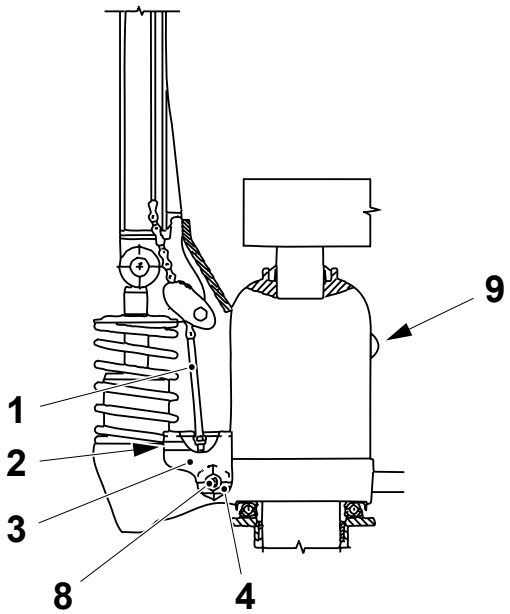
d) Assemble in the reverse order.

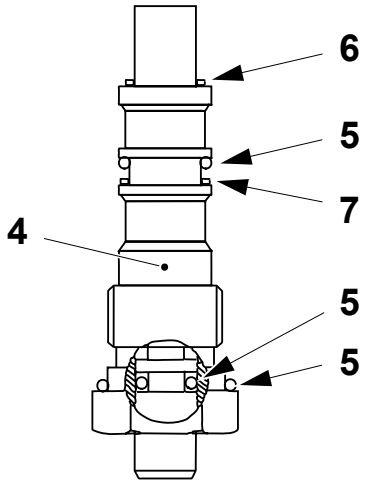
e) Pump up the lifter arms to their highest position.

f) Unscrew the setting screw (8) in the valve arm. Press in the handle and at the same time screw in the screw (8) until the lifting arms start to sink, secure the screw with the lock nut.

g) Put the lifting arms in the lower position. If required undo the plug (9) and fill up with oil, code C, see 10.3-1 Lubricants. Fill up until oil starts to flow out of the hole.

h) Set the sink time, see 8.6-3 Reel Trolley - Set Regulating Valve.





1 Chain
2 Slotted pin
3 Valve arm
4 Sink valve
5 O-ring
6 Copper washer
7 Teflon washer
8 Setting screw
9 Oil plug

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8.6-5 Reel Trolley - Overhaul Lifting Cylinder

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
Consumables	Lubricant code C
SPC Reference	1282762-0100

a) Remove the oil connection (1).

b) Drive in the slotted pins (2) until they stop.

c) Drive out the axles (3).

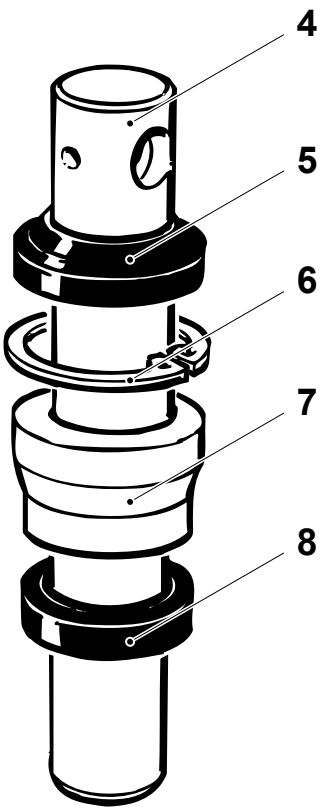
d) Pull out the cylinder piston (4).

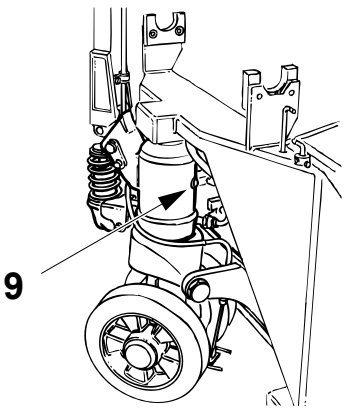
e) Change the seal (5).

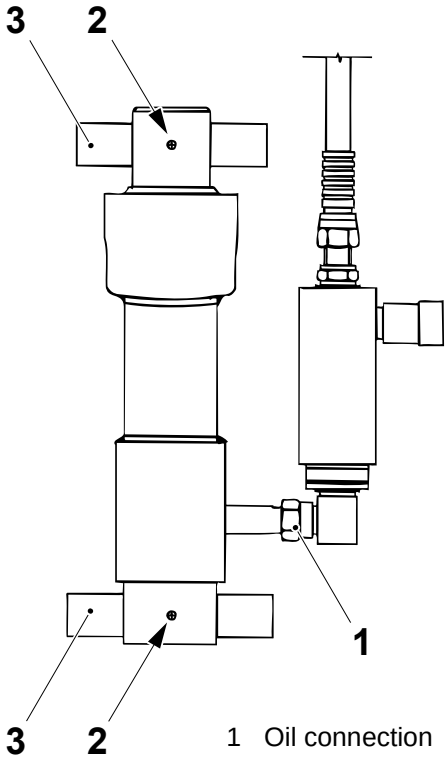
f) Remove the retaining ring (6) and the spacer (7).

g) Change the seal (8).

h) Assemble in the reverse order and fill up through the plug (9) with oil, code C, see <u>10.3-1 Lubricants</u>.







1 Oil connection
2 Slotted pin
3 Axle
4 Cylinder piston
5 Seal
6 Retaining ring
7 Spacer
8 Seal
9 Oil plug

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8.6-6 Reel Trolley - Remove Fork Wheel

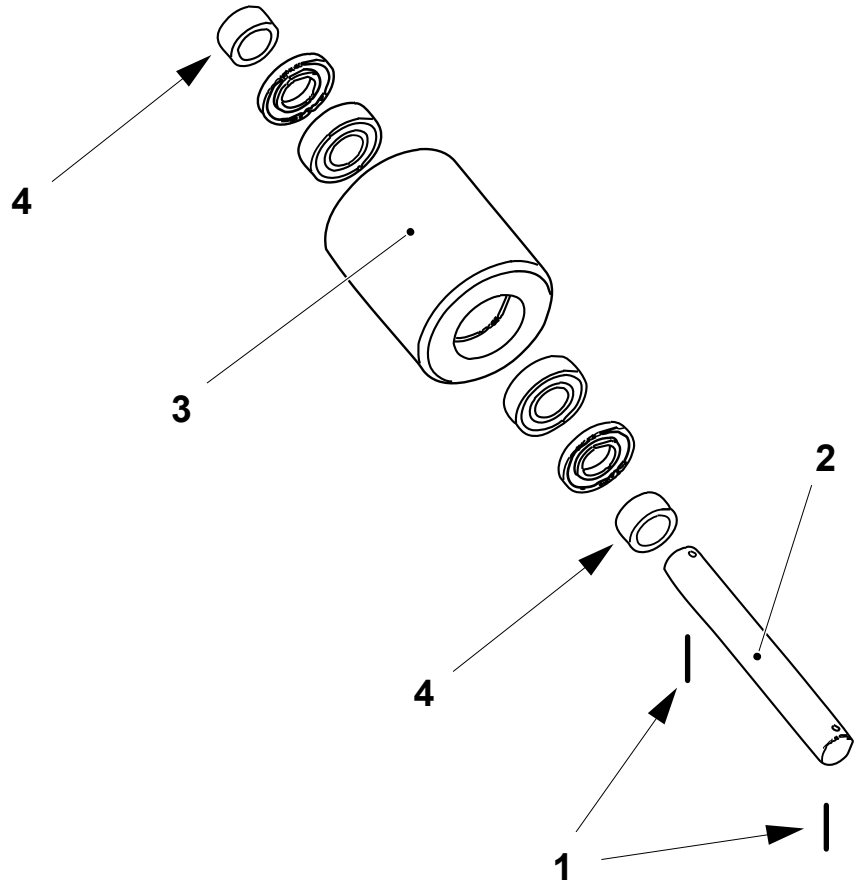
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1282762-0100

a) Put the trolley on its side.

b) Drive the pins (1) in to the axle (2) and pull out the axle.

c) Remove the wheel (3) and the sleeves (4).

d) Assemble in the reverse order.



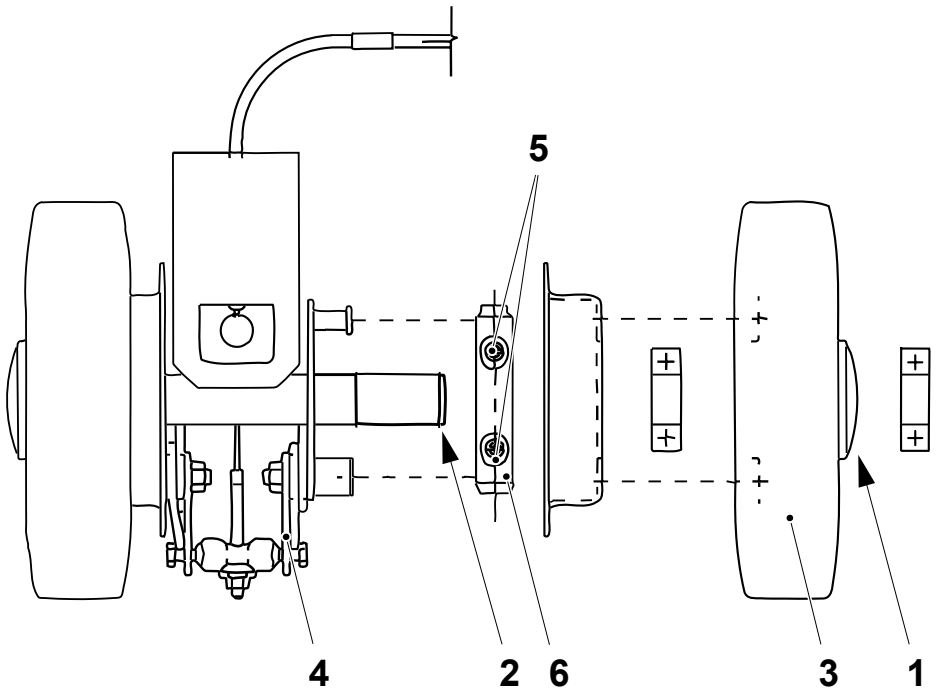
1 Pin
2 Axle
3 Wheel
4 Sleeve

TechPub_2614345_0105 - 08_MM81534_11en.fm

8.6-7 Reel Trolley - Remove Guide Wheel

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1282762-0100

a) Put the trolley on its side.
b) Remove the plastic plug (1), the retaining ring (2) and the wheel (3).
c) Release the torsion spring (4).
d) Remove the springs (5) holding the two break linings (6) together.
e) Assemble in the reverse order.



1 Plastic plug
2 Retaining ring
3 Wheel
4 Torsion spring
5 Spring
6 Brake lining

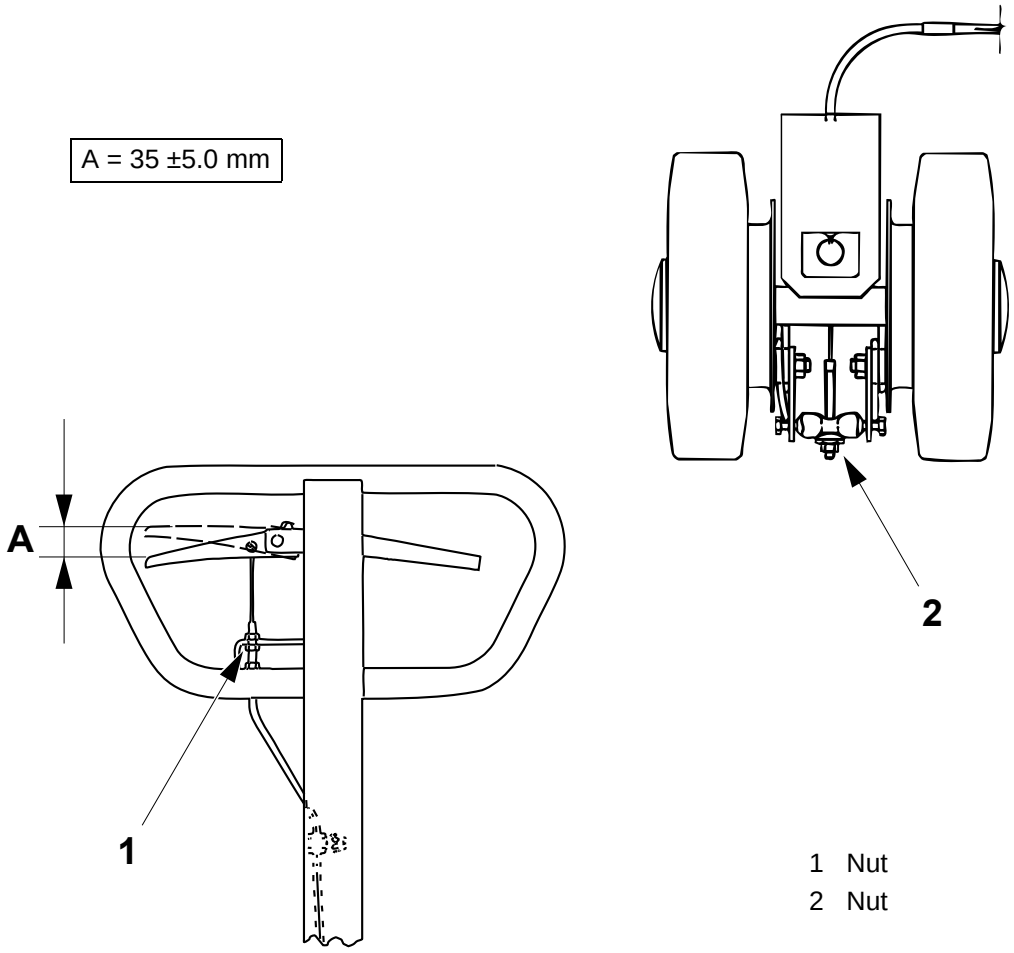
TechPub_2614345_0105 - 08_MM81534_11en.fm

8.6-8 Reel Trolley - Set Brake

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1282762-0100

a) Press in the brake handle to distance **A**.

b) Adjust the nuts (1) and (2) until the brake releases.



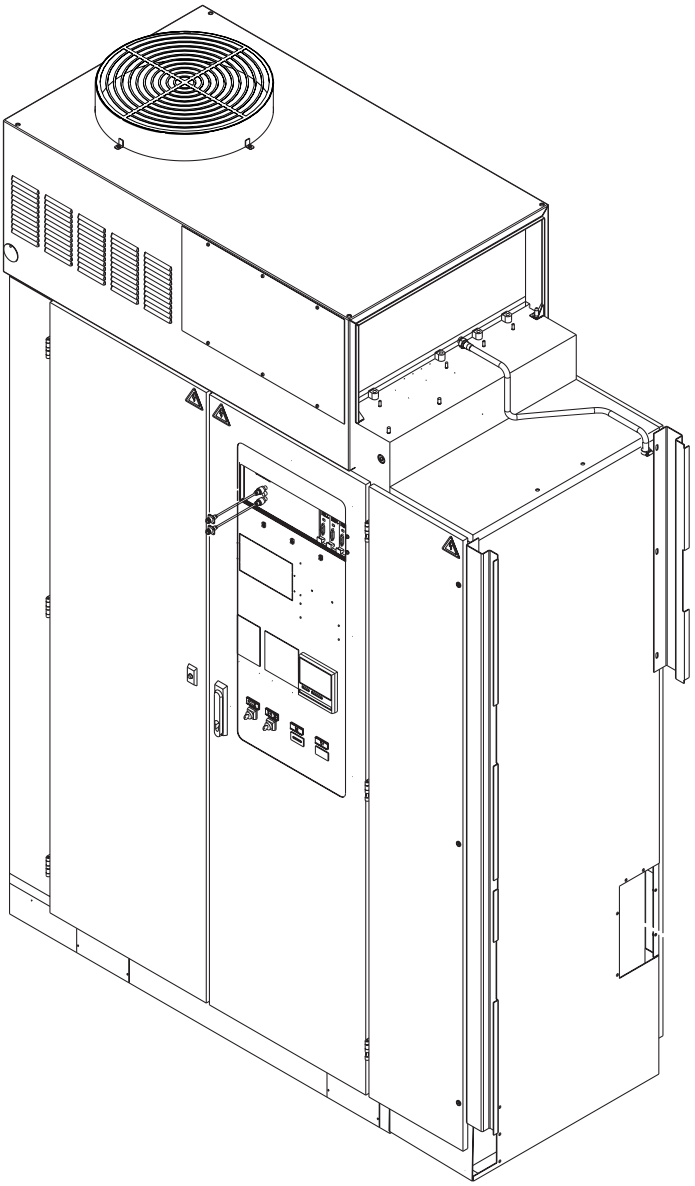
1 Nut
2 Nut

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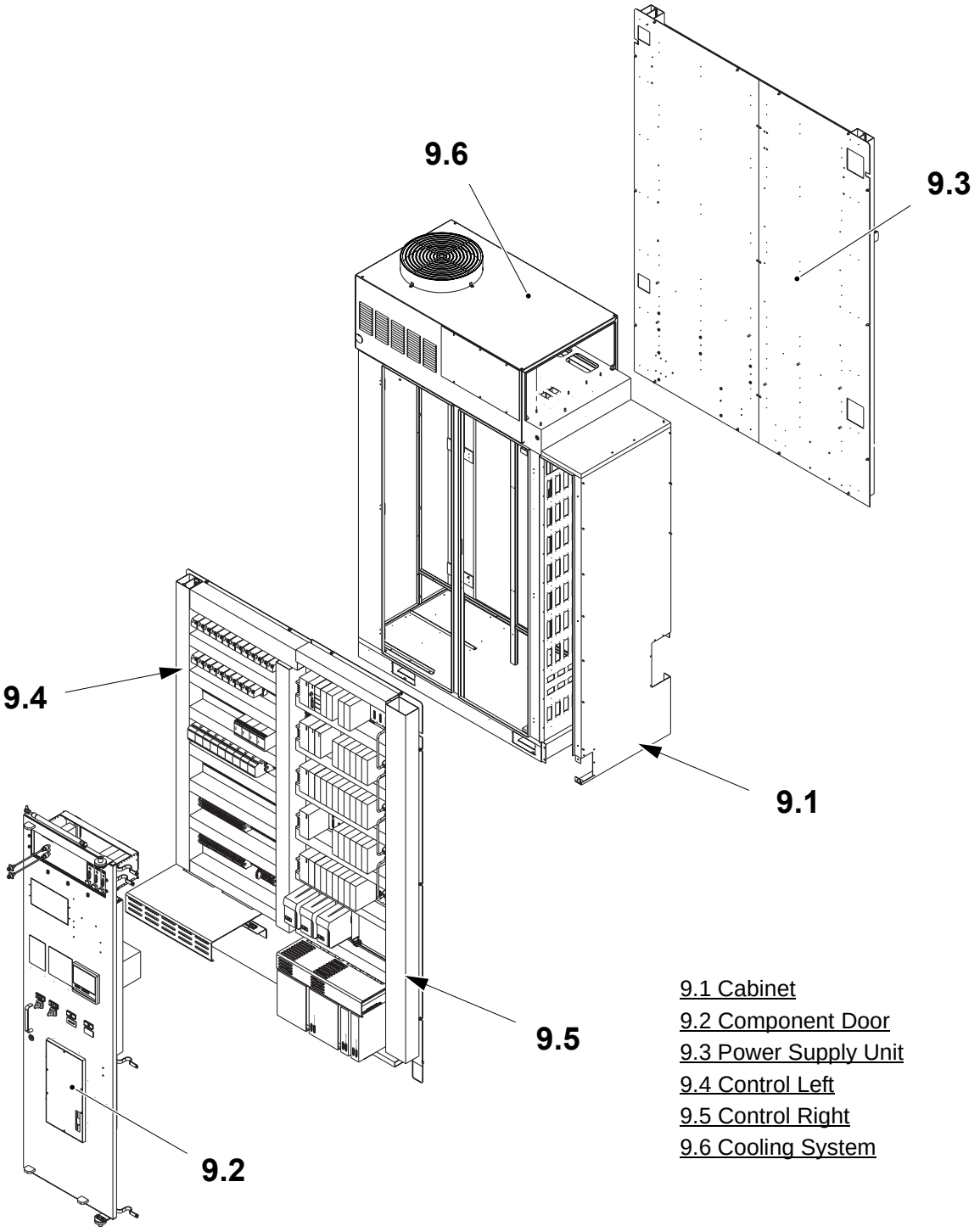
9 Electrical Cabinet



TechPub_2614345_0105 - 09_MM81534_11en.fm

Electrical Cabinet - Description

SPC Reference	648517-0500



9.1 Cabinet
9.2 Component Door
9.3 Power Supply Unit
9.4 Control Left
9.5 Control Right
9.6 Cooling System

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9.1 Cabinet

SPC Reference	1317247-0200

9.1.1 TPIH Generator

9.1.1-1 TPIH Generator - Function Description

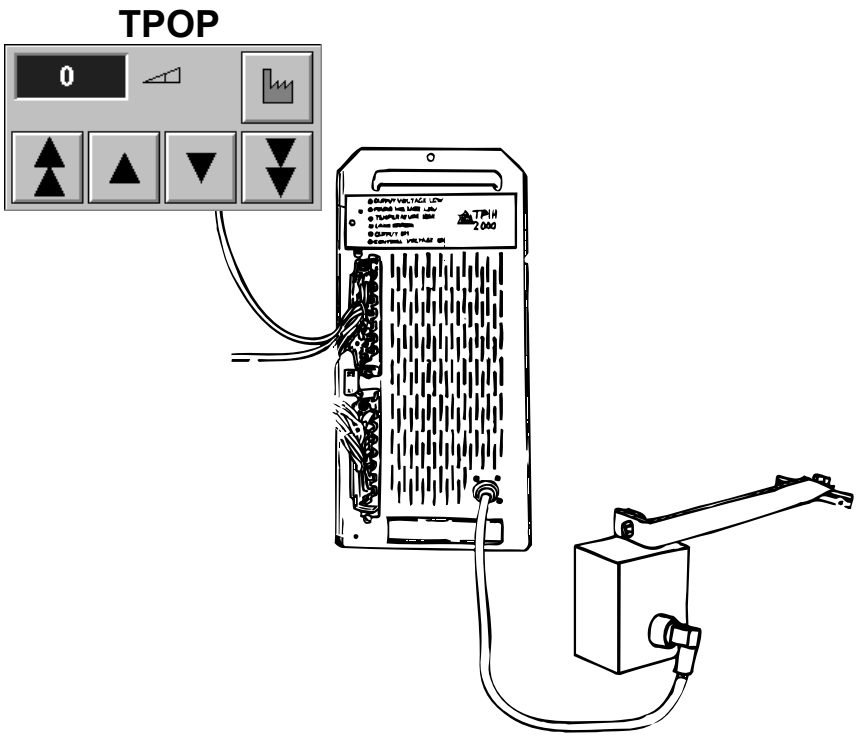
SPC Reference	1317247-0200

TPIH-Generators are used for:

- transversal sealing (A 502)
- longitudinal sealing (A 501)
- strip applicator (A 7417)
- automatic splicing unit (A 7417).

A complete TPIH-system contains: a software potentiometer for the power setting, generator, coaxial cable, impedance transformer, flexible cable or current rail, inductor and IH-Switch (for Transversal sealing).

The pulses duration is controlled by the PLC program. The power level is set by means of the TPOP panel. Three phases 400/230V, single phase 230V, and 24V DC, are needed for the generator.



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9.1.1-2 TPIH Generator - Check Function

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1317247-0200

Output Voltage Low

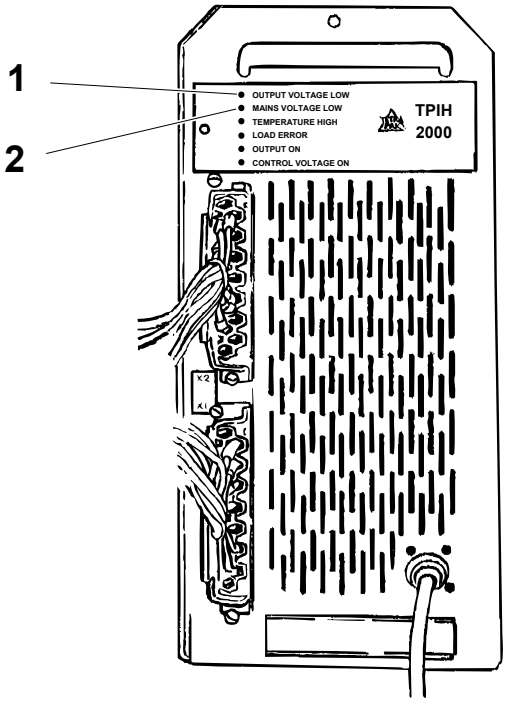
If only the LED (1) has lit up:

- the potentiometer setting is below the minimum value, or
- the +10V DC to the potentiometer is missing, or
- the analog output is broken (the output voltage from the analog output does not follow the setting on the TPOP, or
- the generator is faulty and must be changed.

Mains Voltage Low

If the LED (2) has lit up, at least one of the three phases is below 85% of nominal value and, as a consequence, the generator is not able to deliver the proper output power.

Check the mains supply for any possible open fuse. If all three fuses are intact, the problem will disappear when the voltage rises above 85% again.



1 Output voltage low LED
2 Mains voltage low LED

(Cont'd)

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(Cont'd)

Temperature High

If the LED (3) has lit up, the temperature of the TPIH generator is too high due to:

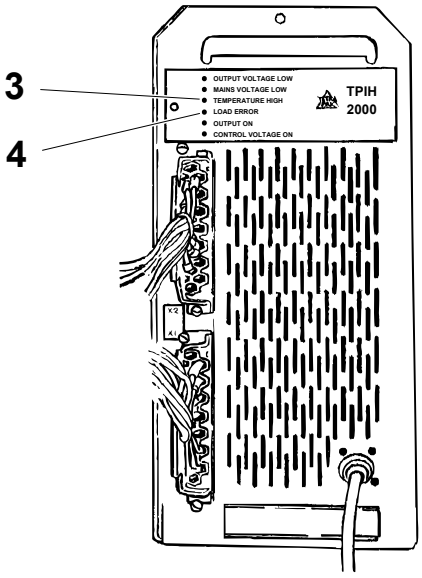
- the cooling fan, inside the generator, not working
- the ambient temperature is above 50°C.

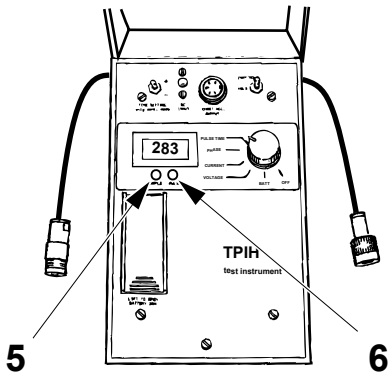
Change the generator if the fan does not operate, see on 9.1.1-5 TPIH Generator - Change Generator.

Load error

If the LED (4) has lit up, the generator is unable to transmit a pulse due to faulty load caused by:

- short circuit in coaxial cable, busbar, inductor or impedance transformer
- open circuit in coaxial cable, busbar, inductor or impedance transformer
- no pressure applied to the inductor
- wrong type of impedance transformer installed
- wrong type of inductor installed.





3 Temperature high LED
4 Load error LED
5 Pulse LED
6 Sample LED

The origin of the load error may be located with the aid of test instrument TP No. 68462-0101

With a load problem only very short pulses are delivered by the generator. During the entire pulse the sample LED (6) lights up, while the pulse LED (5) is off.

Working in normal conditions the sample LED (6) flashes in the middle of the pulse when the measurement of V*I*cos$f$ is made.

(Cont'd)

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(Cont'd)

In order to check the TS, (Transversal Sealing), proceed as follows:

a) Make a SHORT STOP.

b) Connect the test instrument in between the coaxial cable (7) and the left out coaxial connector (8) of the IH switch.

c) Step up the machine to step PRODUCTION.

d) Measure the values of voltage, current, phase angle and pulse time within the same pulse; (use the switch (9) to select).

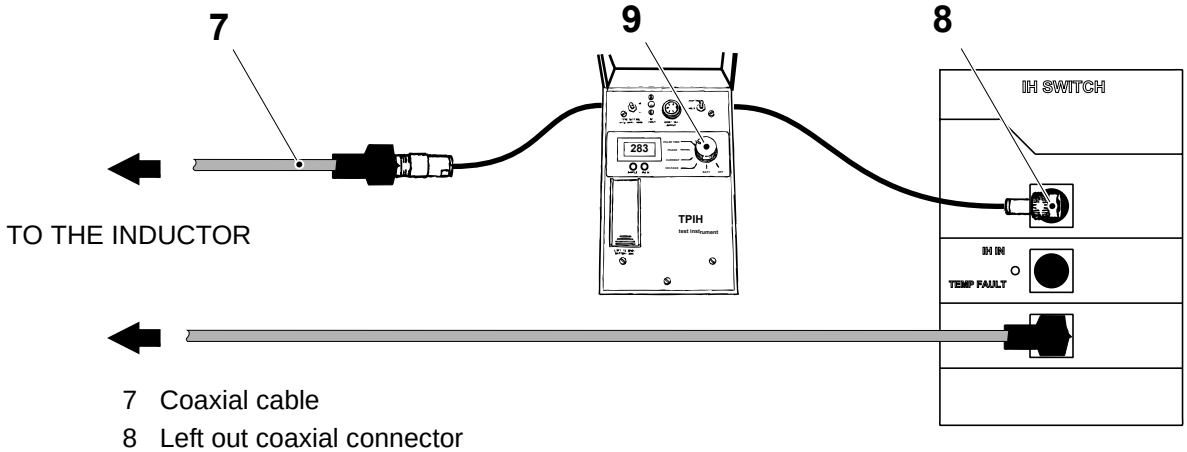
e) Compare with the values shown in the table below.

Load examples	**Phase angle**	**Voltage/Current**
Optimal load	0°	50 Ω
Normal load	±15°	40 - 65 Ω
Short circuit in coaxial cable, contacts or primary of the IH transformer	pos (3)	1 - 10 Ω (1)
Open circuit in coaxial cable, contacts or primary of the IH transformer	neg (3)	200 - 2000 Ω (2)
Short circuit in inductor, current rail or secondary of the IH transformer	pos	10 - 20 Ω
Open circuit in inductor, current rail or secondary of the IH transformer	neg	2 - 5 Ω
No packaging material on the inductor	neg	5 - 15 Ω

1) Greater value = greater distance between problem and instrument.

2) Greater value = shorter distance between problem and instrument.

3) Greater phase difference = greater distance between problem and instrument.



7 Coaxial cable
8 Left out coaxial connector
9 Selector switch

(Cont'd)

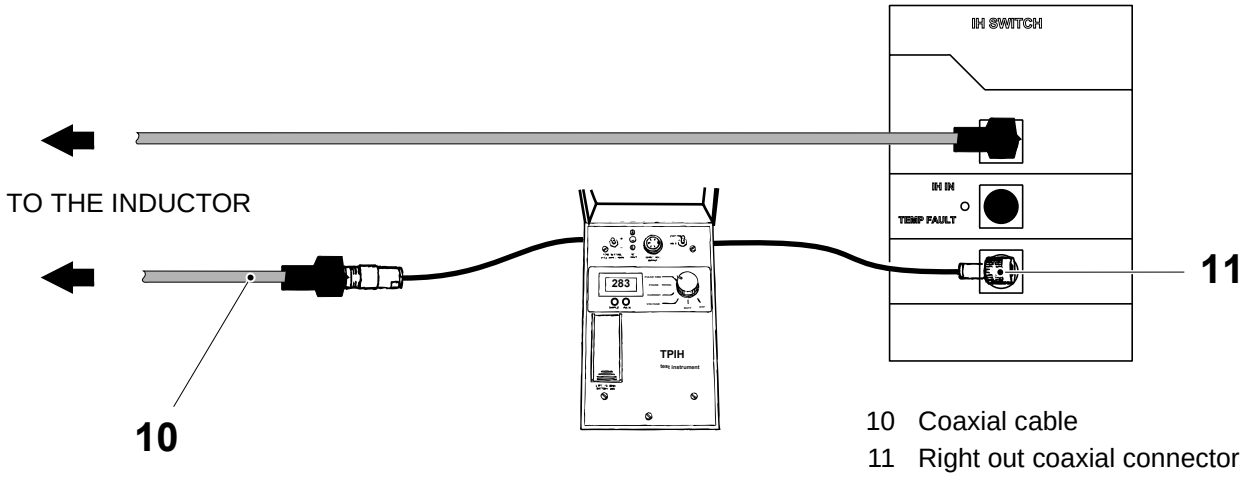
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(Cont'd)

f) Make a SHORT STOP.

g) Connect the test instrument between the coaxial cable (10) and the right out coaxial connector (11) of the IH switch.

h) Step up the machine to step PRODUCTION and repeat item d).

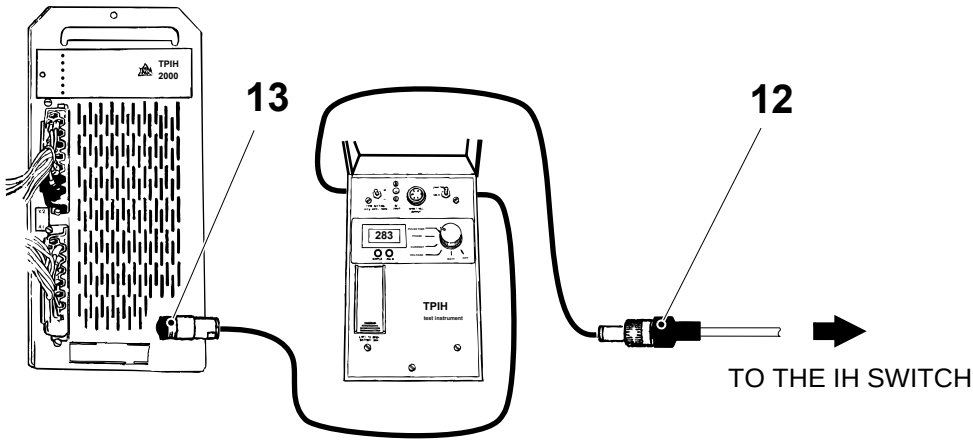


10 Coaxial cable
11 Right out coaxial connector

i) Make a SHORT STOP.

j) Connect the test instrument between the coaxial cable (12) and the coaxial connector (13) of the TPIH generator.

k) Step up the machine to step PRODUCTION and repeat item d).



12 Coaxial cable
13 Coaxial connector

(Cont'd)

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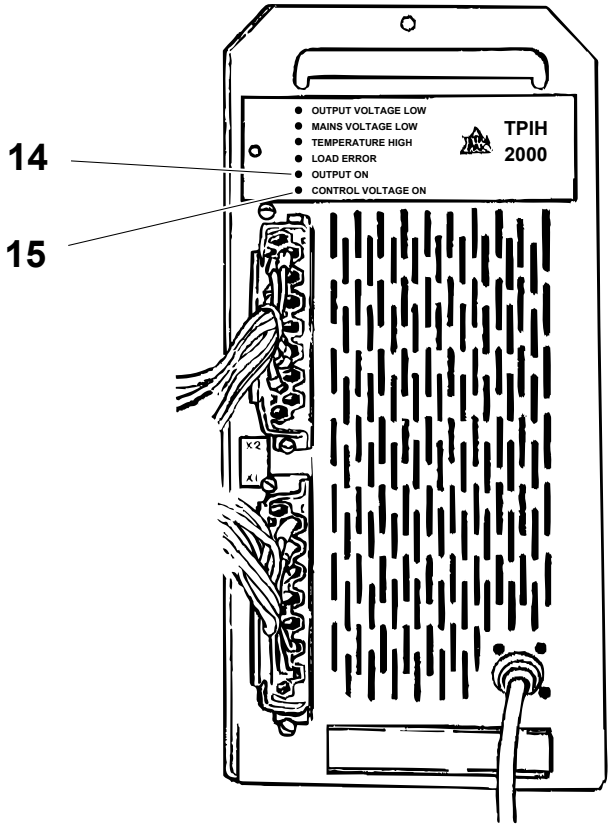
Output On

When the LED (14) lights up, a pulse is transmitted from the generator into a correct load. The entire generator system is operating perfectly.

Control voltage on

When the LED (15) lights up, 230V is connected to the generator. Alarms are enabled.

Note! This does not check 400/230V the three phase power supply.



14 Output on LED
15 Control voltage on LED

(Cont'd)

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(Cont'd)

Test Instrument TP No. 68462-0101

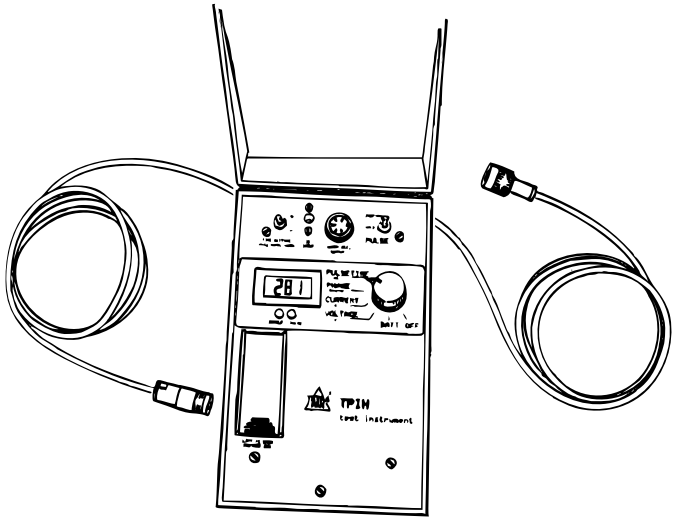
The TPIH test instrument is used to check the available output power from the IH generator as well as the condition of the coaxial cable, the impedance transformer, the current rail and the inductor. The test instrument is connected in series with the coaxial cable from the generator.

Note! Use the Short stop procedure to prevent the generator from pulsing when the instrument must be connected or disconnected.

The instrument can be used for measurement of the following parameters:

- HF voltage
- HF current
- phase shift voltage/current
- pulse duration.

The results of these measurements can be used to calculate the available HF power. The instrument should simplify work when trying to locate the origin of a problem. One 9V battery is used for the instrument and an automatic power-off function is used to minimize battery consumption. A test outlet allows connection of a printer, such as a Gould recorder. Print-out of the HF voltage, HF current and the phase shift as a function of time are possible. The instrument kit contains complete operating instructions as well as a printer cable and a battery eliminator (mains adapter).



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Test Instrument TP No. 68466

The test equipment is used at a service centre to check the performance of sealed IH units to verify if the units are operational or if they must be sent to a service-shop for repair. It is also possible to check if an impedance transformer is operational.

WARNING

Hazardous voltage.

The test equipment must never be connected to an open TPIH generator. The incoming 400V leads are accessible inside the generator and contact with them can be hazardous.

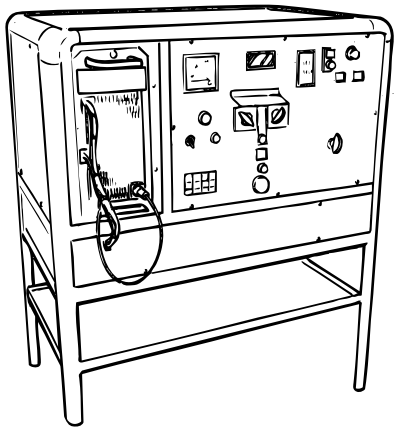
Note! Please observe that if an IH generator is faulty, it must be sent to an approved service-shop.

The test equipment can be used to:

- check that the max output power from the generator is more than 2000 W
- check that the output power is unaffected by mains voltage variations between 85% and 110% of the nominal value
- check that the generator detects an open or a shorted load
- check if a problem is caused by the generator, the impedance transformer, the inductor or the interconnecting cables.

The test procedure includes:

- low power test
- test of **Output voltage low** indication
- test of normal operation
- measurement of maximum available output power
- test of **Mains voltage low** indication
- test of **Load error** indication
- test of the complete system.



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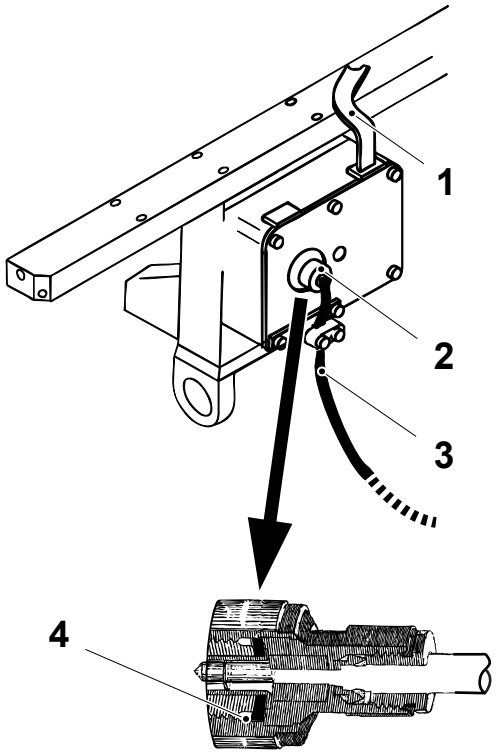
9.1.1-3 TPIH Generator - Check Cables

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1317247-0200

Check for wear and damage that can affect machine efficiency:

- the coaxial connectors (2)
  Make sure that there is no moisture between the male connector and the female connector.
- the rubber gasket (4) in the male connectors
  Make sure that it seals properly (it should not be possible to turn the male connector easily).
- the coaxial cables (3)
  Make sure that the cables are flexible and that there are no cracks where they bend.
- the busbar (1)
  Check the rubber seal and the flat seal. Make sure that there are no signs of damage.
- check for water/product residue inside the impedance transformer.

Clean or change as required.



1 Busbar
2 Coaxial connector
3 Coaxial cable
4 Rubber gasket

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9.1.1-4 TPIH Generator - Check Transformers and Inductors

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1317247-0200

a) Remove the clamp (1).

b) Remove the coaxial cable from the impedance transformer.

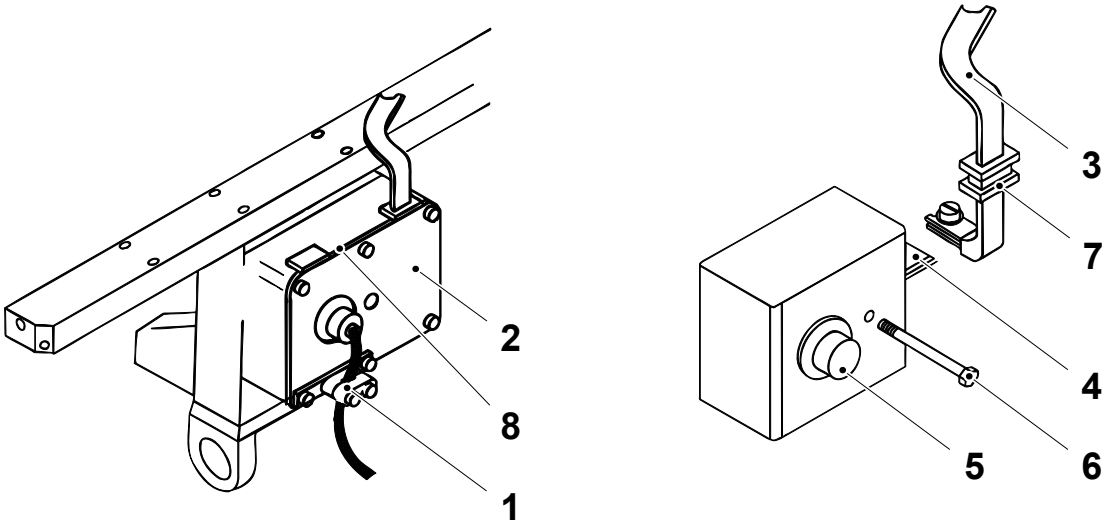
c) Remove the screws and the plate (2). Check the flat seal (8). Change it if required.

d) Remove the busbar (3). Check the rubber seal (7). Change if required.

e) Check that the impedance transformer is intact and clean. Pay particular attention to the coil (4) and the coaxial connector (5). Clean or change the impedance transformer as required.

f) Remove the screw (6) and the impedance transformer.

g) Assemble in the reverse order.



1 Clamp
2 Plate
3 Busbar
4 Coil
5 Coaxial connector
6 Screw
7 Rubber seal
8 Flat seal

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9.1.1-5 TPIH Generator - Change Generator

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1317247-0200

WARNING

Hazardous voltage.
Do not open the generator.

Remove the generator as follows:

a) Make sure that the main power switch is **Off** and that it has been padlocked.

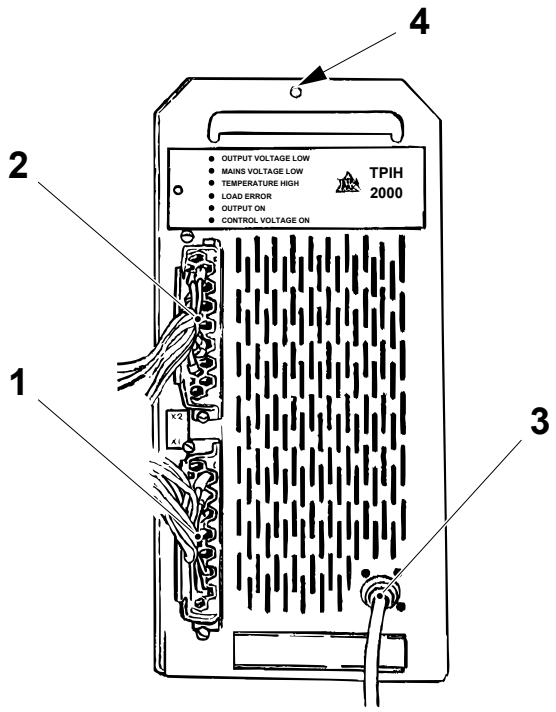
b) Remove the connectors X1 (1) and X2 (2).

c) Remove the coaxial connector (3).

d) Unscrew the screw (4) and pull out the generator.

e) Change the generator and assemble in the reverse order.

Note! Send the generator to the nearest Tetra Pak service station for cleaning or service.



1 Connector X1
2 Connector X2
3 Coaxial connector
4 Screw

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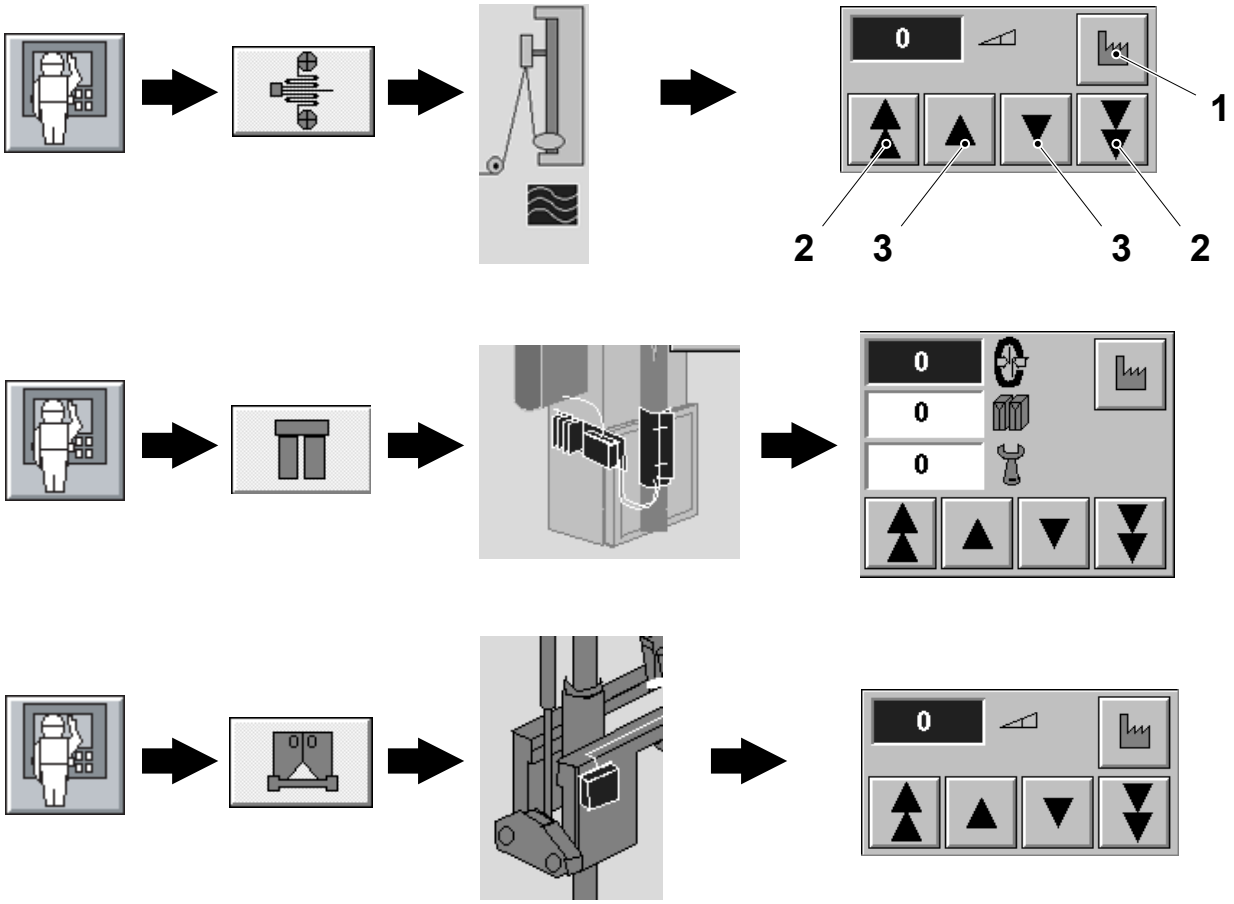
9.1.1-6 TPIH Generator - Set Sealings

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1317247-0200

The sealing power values for the SA, LS and TS (RH and LH side) are stored in the TPOP and are already factory set.

In step PRODUCTION evaluate SA, LS, and TS seals; see the *OM*, section Package checks.

If required, change the current values by means of the buttons (2) and (3), or reset to the factory values by means of the button (1).



1 Button (factory setting)
2 Button (big steps)
3 Button (small steps)

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9.2 Component Door

SPC Reference	1350702-0200

9.2.1 TMCC Controller

9.2.1-1 TMCC Controller - Function Description

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

The Tetra Pak Multi-Purpose Compact Controllers (TMCC) in the electrical cabinet are used to control and monitor photocells that are part of the packaging material positioning system.

TMCC card A418 (Design Control System)
The TMCC card A418 is a microprocessor card that has the following functions:

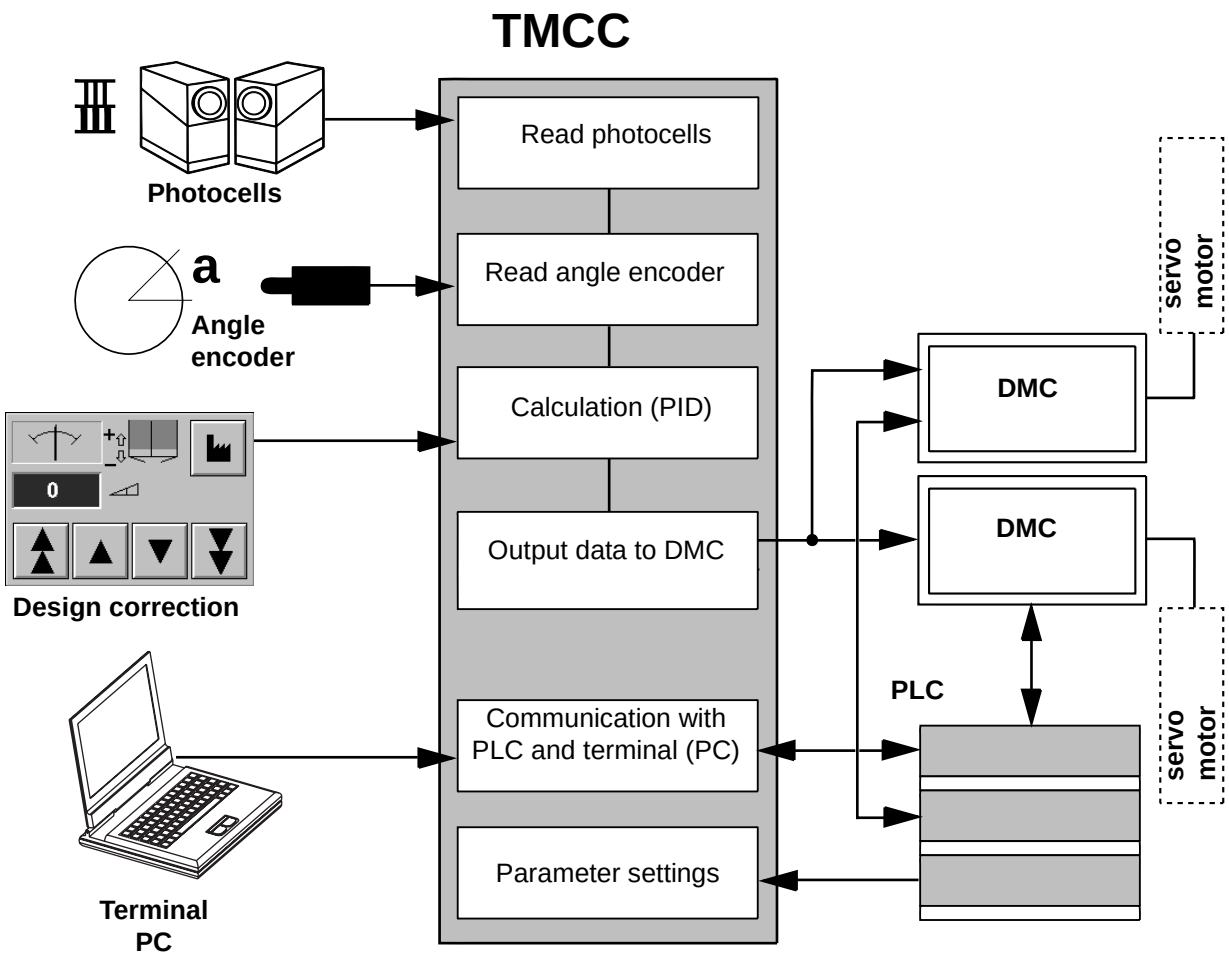
- decoding the signals from the photocells and converting them into a readable signal
- decoding the angle values utilised in the design control
- calculating the stroke of the folding flaps with design deviation by means of a PID algorithm
- sending data to the DMC for the folding flaps positioning

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- communication with PLC and terminal (PC)
- storing volume-dependent parameters (values) retrieved by the TMCC from the PLC.



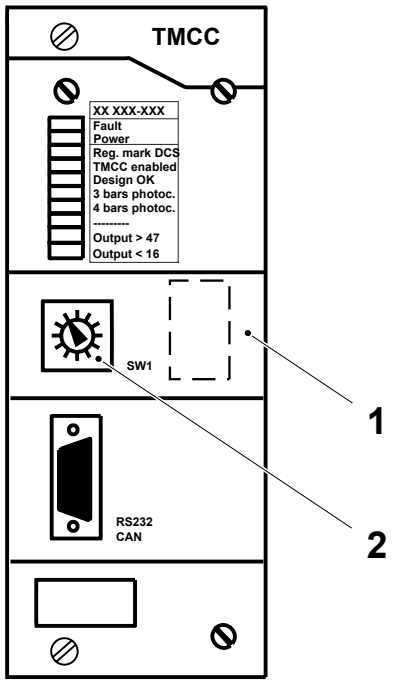
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TMCC (DCS) Front Panel Switch 1

The switch **SW1** (2) located on the front panel of the TMCC (DCS) (1) is used to select one of the variables so that it can be monitored for diagnostics.



1 TMCC DCS (A418)
2 Switch SW1

The following table shows the variables that can be monitored.

SW1 position	Function
0	With the switch in this position it is possible to download the DCS program into the TMCC
1 - 7	Not used
8	Design error of current package (*)
9	Design error of current package (*)
A	Filtered design error (“90% old + 10% new algorithm) (*)
B	Output signal to servo driver
C	Filtered output signal
D	Design adjustment signal
E - F	Used for teaching procedure
(*) 0.....10V on this output is equivalent to -5 to +5 mm	

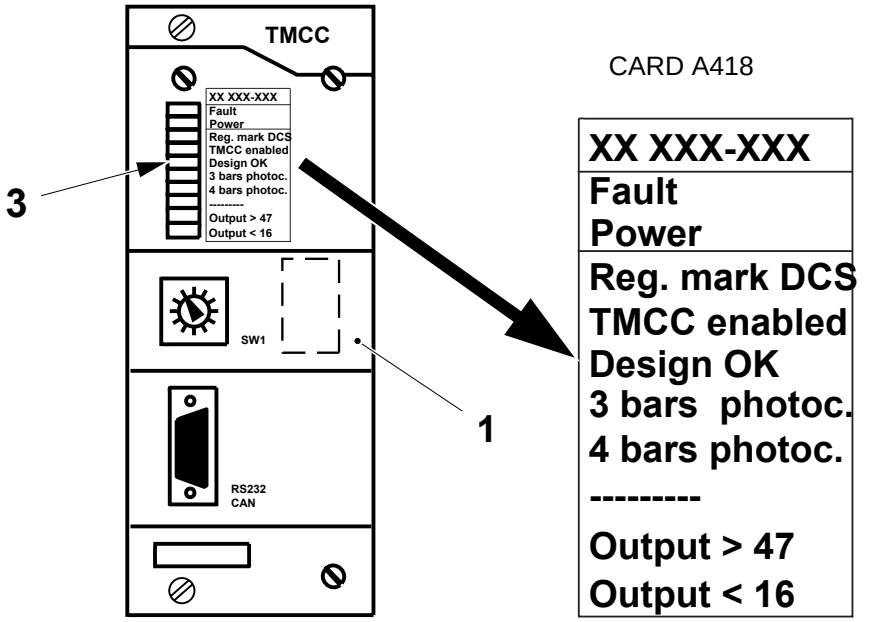
Note! In normal PRODUCTION mode, SW1 should be set to position **8**.

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Also on the front panel of the TMCC (DCS) (1) there are the LEDs (3).



1 TMCC DCS (A418)
3 LEDs

The LEDs provide the following information when the machine is in the normal PRODUCTION mode.

Card A418		
LED	**Colour**	**Function**
Fault	Red	During the download of the program
Power	Green	Power supply OK
Reg. mark DCS	Yellow (S1)	The register code is being decoded
TMCC enabled	Yellow (S2)	Volume dependent parameters have been transferred from PLC
Design OK	Yellow (S3)	Acceptable packages are being produced
3 bars photocell	Yellow (S4)	Failure of the '3 bars' photocell
4 bars photocell	Yellow (S5)	Failure of the '4 bars' photocell
-	Yellow (S6)	Not used
Output > 47	Yellow (S7)	The design control works in the upper part of the regulation range, steps 49 - 63
Output < 16	Yellow (S8)	The design control works in the lower part of the regulation range, steps 1 - 15

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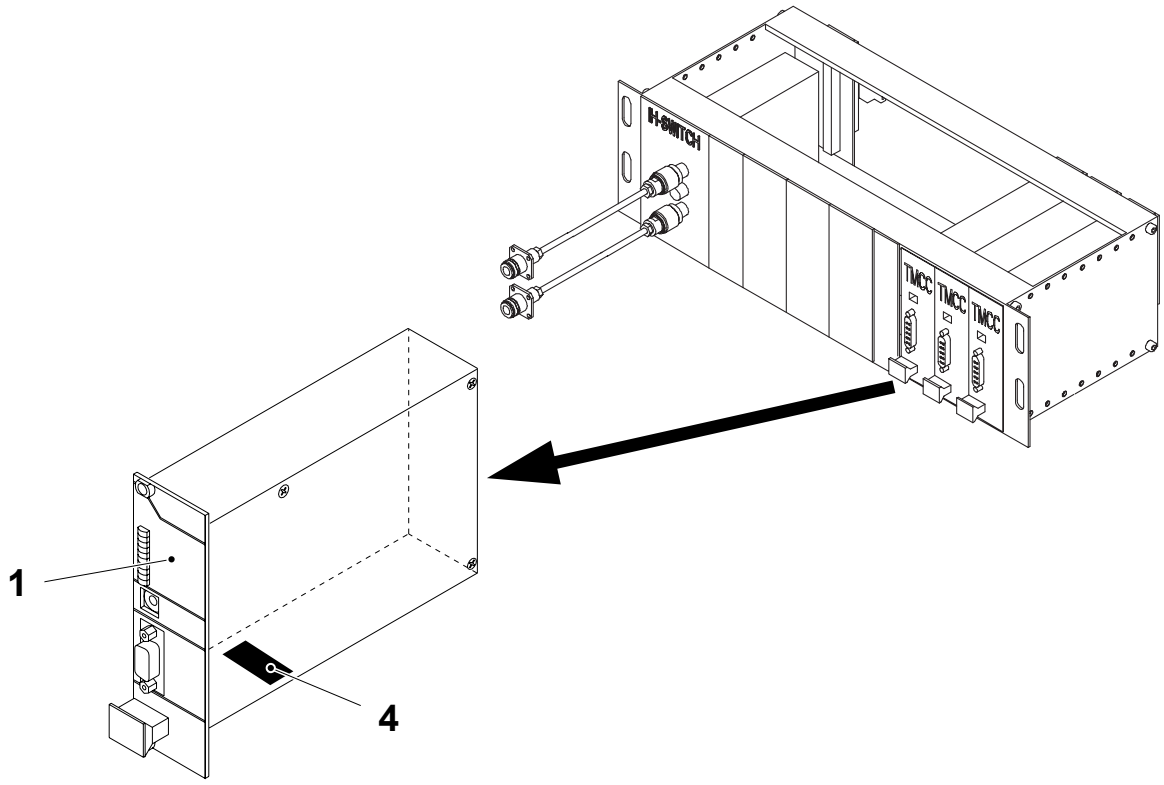
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TMCC (DCS) Switch 2

The switch **SW2** (4) located at the bottom of the TMCC (DCS) (1) is used to set the photocells so that they function with a particular bar code colour, see 9.2.1-5 TMCC Controller - Set Photocells.

TMCC (DCS) System Data

Commands and parameters are entered in the DCS21 program and data can be read from the TMCC by using a PC, see 9.2.1-6 TMCC Controller - Display Report.



1 TMCC DCS (A418)
4 Switch SW2

(Cont'd)

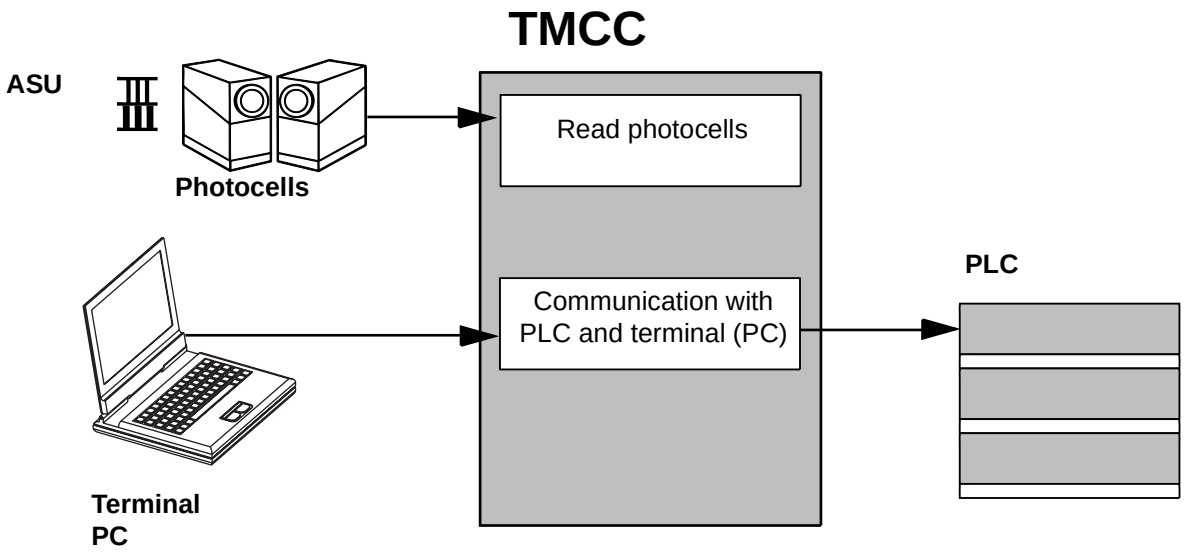
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(Cont'd)

TMCC Card A419 (ASU)

The TMCC card A419 is a microprocessor card that has the following functions:

- decoding the signals from the ASU photocells and converting them into a readable signal
- communication with PLC and terminal (PC).



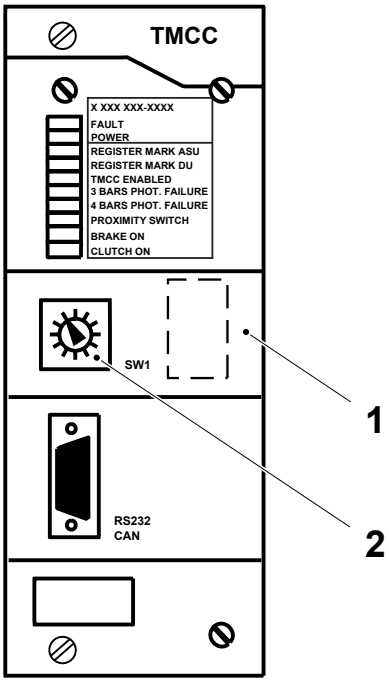
(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

TMCC (ASU) Front Panel Switch 1

The switch **SW1** (2) located on the front panel of the TMCC (ASU) (1) is used to select one of the two functions described below.



1 TMCC ASU (A419)
2 Switch SW1

The following table shows the variables that can be monitored.

SW1 Position	Function
0	With the switch in this position it is possible to download the ASU program into the TMCC
1 - 7	Not used
8	Normal production mode
9	Not used
A - D	Not used
E - F	Used for teaching procedure

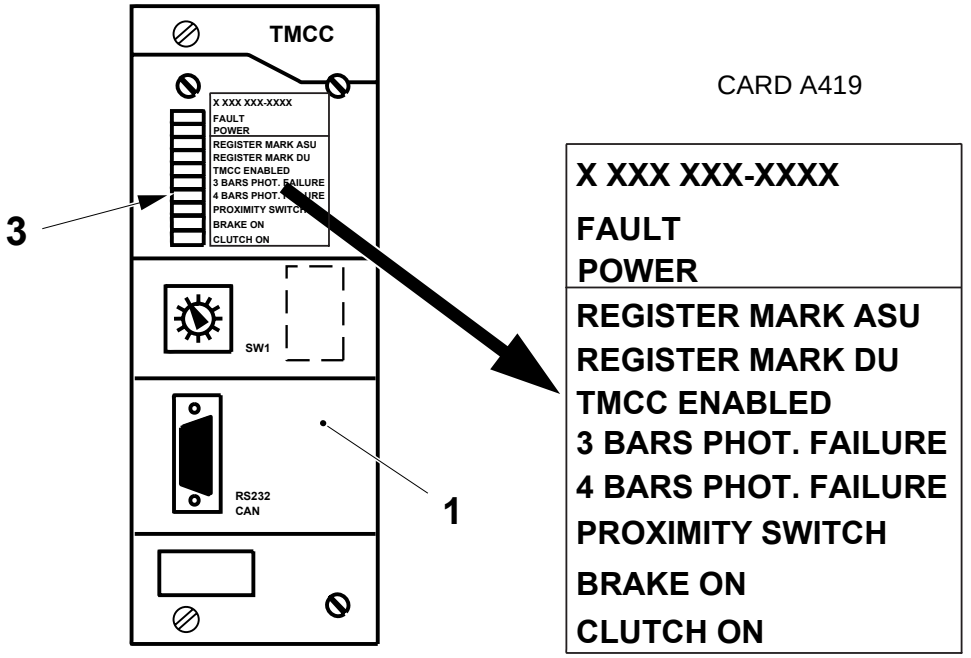
Note! In normal PRODUCTION mode, SW1 should be set to position **8**.

(Cont'd)

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(Cont'd)

Also on the front panel of the TMCC (ASU) (1) there are LEDs (3).



1 TMCC ASU (A419)
3 LEDs

The LEDs provide the following information when the machine is in the normal PRODUCTION mode.

Card A419		
LED	**Colour**	**Function**
Fault	Red	During the download of the program
Power	Green	Power supply OK
Register mark ASU	Yellow (S1)	ASU register mark signal, the flash is approx. 40 ms
Register mark DU	Yellow (S2)	Not used
TMCC enabled	Yellow (S3)	Volume dependent parameters have been transferred from PLC
3 bars photocell failure	Yellow (S4)	Failure of the ASU ‘3 bars’ photocell
4 bars photocell failure	Yellow (S5)	Failure of the ASU ‘4 bars’ photocell
Proximity switch	Yellow (S6)	Not used
Brake on	Yellow (S7)	Not used
Clutch on	Yellow (S8)	Not used

(Cont'd)

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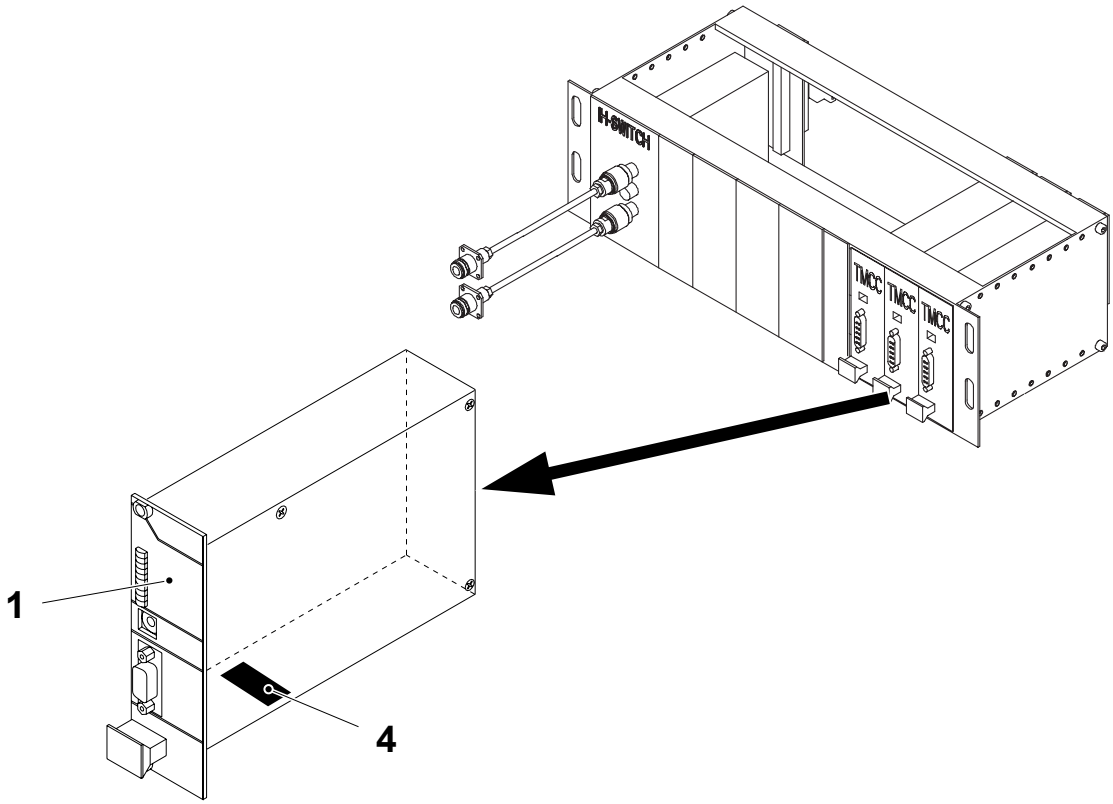
(Cont'd)

TMCC (ASU) Switch 2

The switch **SW2** (4) located at the bottom of the TMCC (ASU) (1) is used to set the photocells so that they function with a particular coloured bar code, see 9.2.1-5 TMCC Controller - Set Photocells.

TMCC (ASU) System Data

Commands and parameters are entered in the ASU21 program and data can be read from the TMCC by using a PC, see 9.2.1-6 TMCC Controller - Display Report.



1 TMCC ASU (A419)
4 Switch SW2

(Cont'd)

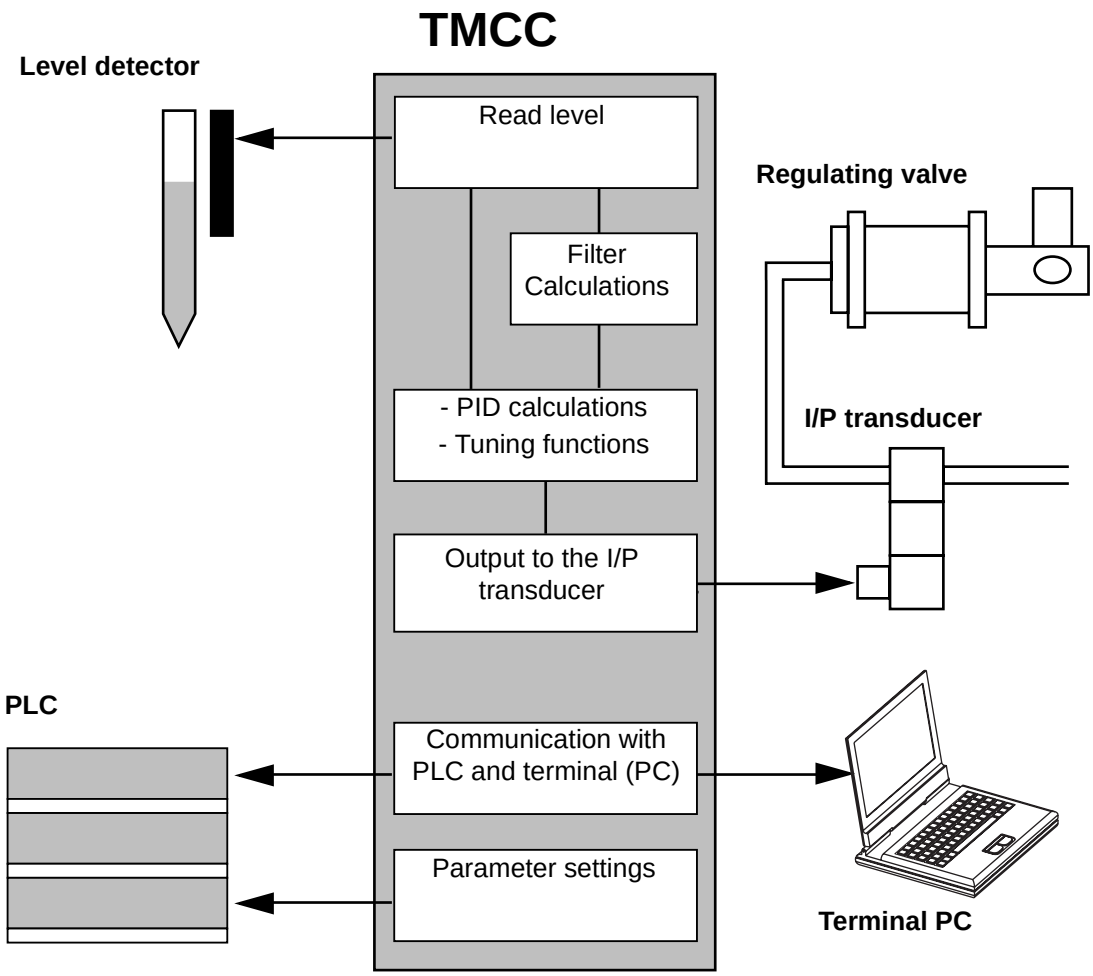
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(Cont'd)

TMCC Card A420 (Filling System)

The TMCC card A420 is a microprocessor card that has the following functions:

- read the product level from the level sonde sensor and calculate by means of the PID the analog output that controls the IP transducer
- communication with PLC and terminal (PC)
- store volume-dependent parameters (values) retrieved by the TMCC from the PLC.



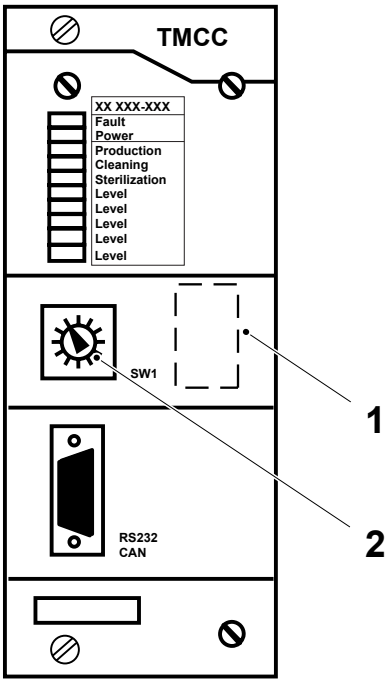
(Cont'd)

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(Cont'd)

TMCC (Filling System) Front Panel Switch 1

The switch **SW1** (2) located on the front panel of the TMCC (Filling System) (1) is used to select one of the three functions described below.



1 TMCC Filling System (A420)
2 Switch SW1

The following table shows the variables that can be monitored.

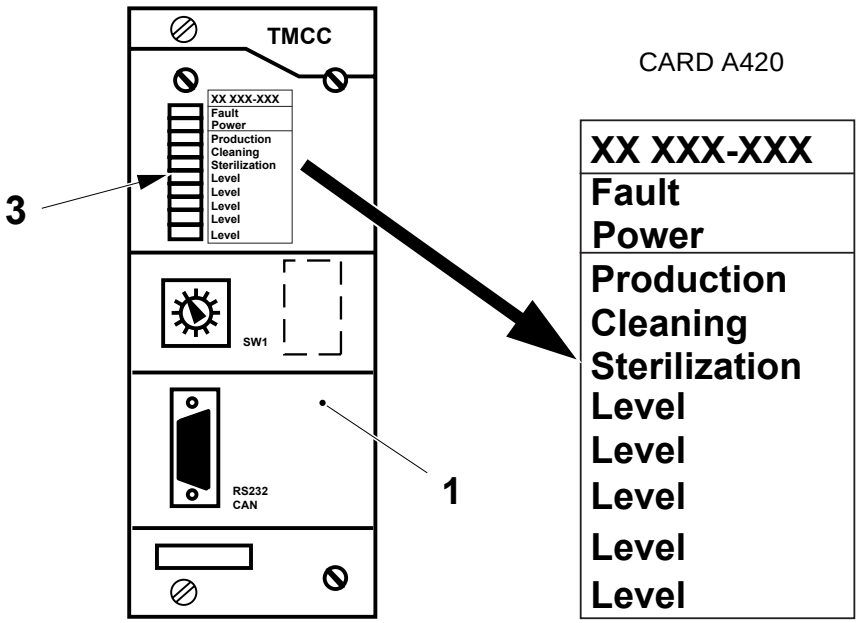
SW1 Position	Function
0	With the switch in this position it is possible to download the FCS program, see 9.2.1-4 TMCC Controller - Load Program
1 - 3	Not used
4	Working mode: in this position the FCS starts all its functions. **Position 4** is for the floater filling system only.
5 - 7	Not used
8	Working mode: in this position the FCS starts all its functions. **Position 8** is for the level probe filling system only.
9	Not used
A - F	Not used

(Cont'd)

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(Cont'd)

Also on the front panel of the TMCC (Filling System) (1) there are LEDs (3).



1 TMCC Filling System (A420)
3 LEDs

The LEDs provide the following information when the machine is in the normal PRODUCTION mode.

Card A420		
LED	**Colour**	**Function**
Fault	Red	Not used
Power	Green	The power supply to the TMCC is correct
Production	Yellow (S1)	Flashes during normal production or pre-filling starts. Always **On** during PRODUCTION.
Cleaning	Yellow (S2)	Always **On** during CLEANING.
Sterilization	Yellow (S3)	Always **On** during STERILIZATION.
Level	Yellow (S4)	Flashes if a high level alarm occurs. Turns **On** if the level is bigger than the 83%.
Level	Yellow (S5)	Turns **On** if the level is bigger than the 66%.
Level	Yellow (S6)	Turns **On** if the level is bigger than the 50%.
Level	Yellow (S7)	Turns **On** if the level is bigger than the 33%.
Level	Yellow (S8)	Flashes if an low level alarm occurred. Turns **On** if the level is bigger than the 16%.

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9.2.1-2 TMCC Controller - Set Control Cards

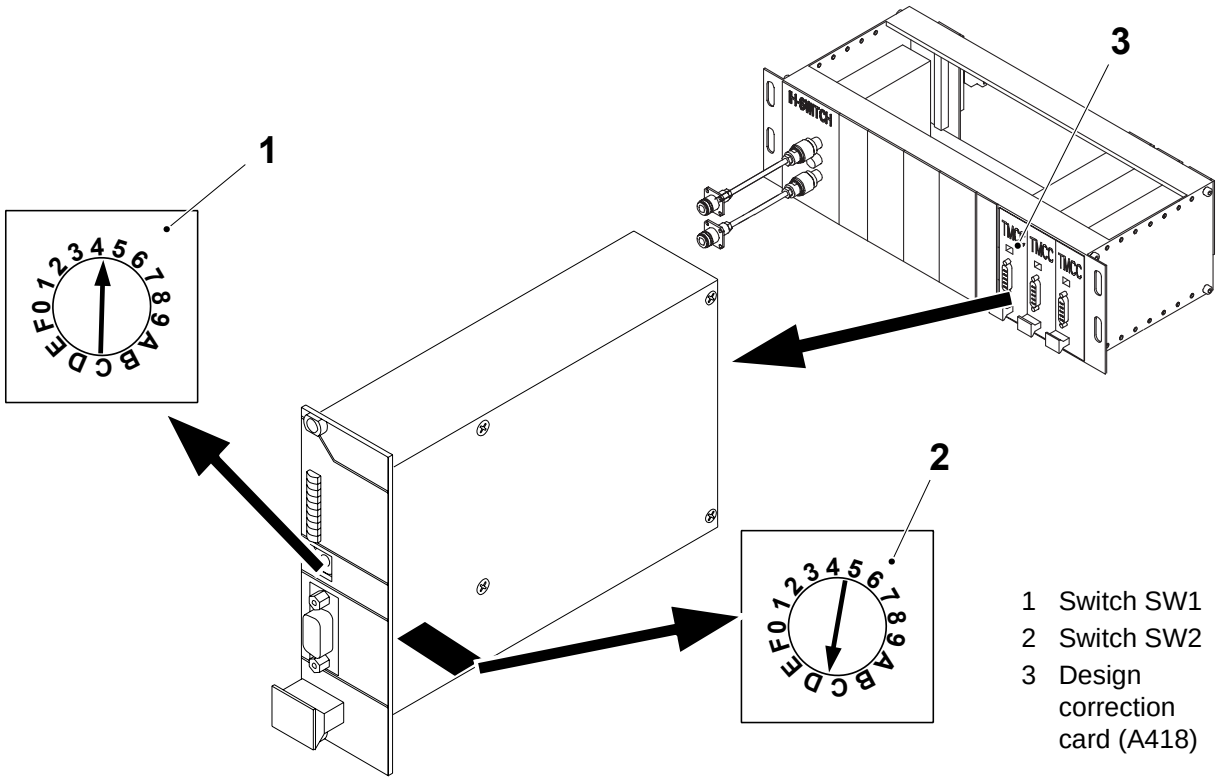
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

CAUTION
Risk of damage to the equipment.
Do not swap TMCC cards A418, A419 and A420 because they contain different programs.

All the TMCC have a switch on the front panel **SW1** (1) and one at the bottom **SW2** (2).

Design Correction Control Card (3)
SW1 (1) on the TMCC (DCS) must be set to position **"8"** except when loading the TMCC DSC21 program, see 9.2.1-4 TMCC Controller - Load Program. For the diagnostic mode, see on page 9-21.

SW2 (2) should be set to the position where the photocells function correctly, see 9.2.1-5 TMCC Controller - Set Photocells.



1 Switch SW1
2 Switch SW2
3 Design correction card (A418)

(Cont'd)

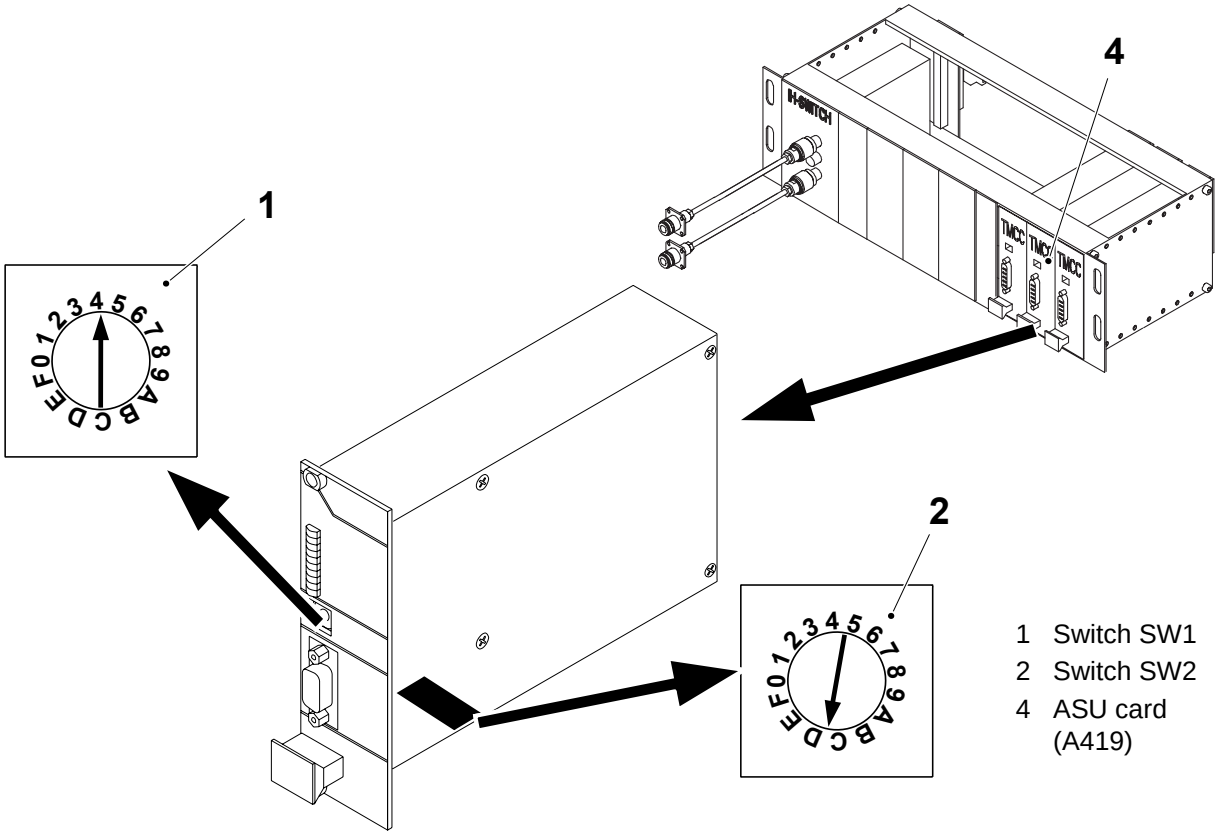
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(Cont'd)

ASU Control Card (4)

SW1 (1) on the TMCC (ASU) must be set to position **"8"** except when loading the TMCC ASU21 program, see 9.2.1-4 TMCC Controller - Load Program.

SW2 (2) should be set to the position where the photocells function correctly, see 9.2.1-5 TMCC Controller - Set Photocells.



1 Switch SW1
2 Switch SW2
4 ASU card (A419)

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(Cont'd)

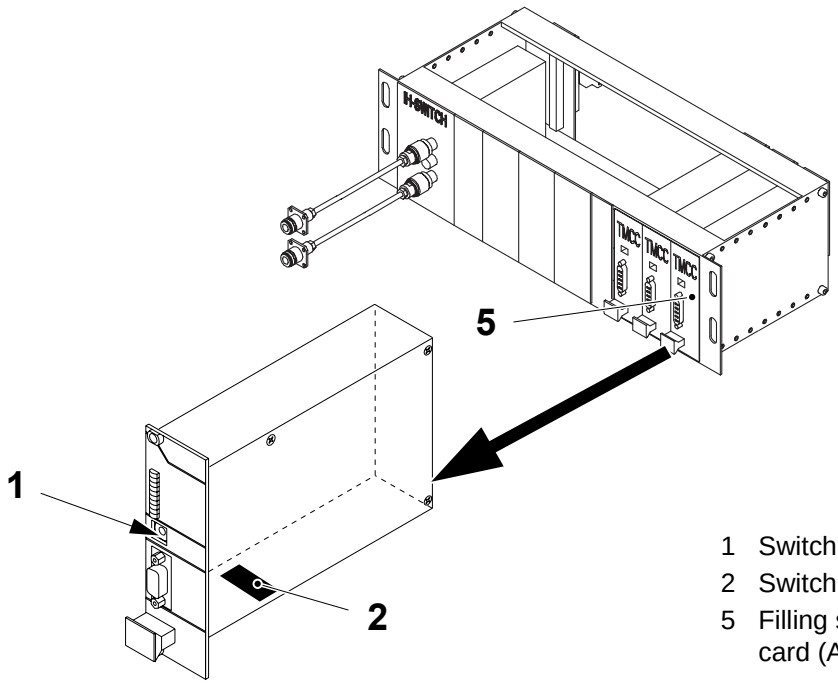
(Cont'd)

Filling System Control Card (5)

SW1 (1) on the TMCC (Filling System) must be set to position **“8” for level probe** and to position **“4” for floater,** except when loading the TMCC DSC21 program, see 9.2.1-4 TMCC Controller - Load Program.

SW2 (2) (board edge switch) on the TMCC (Filling System) must be set according to the table below. The switch **SW2** is used to set the amplitude of the **Filling OK** window. It’s possible to change the value in steps by 5% around the set point.

Switch SW2	Function
0	This position is not allowed because the filling OK window will not be set.
1 to E	The window amplitude is the value of the switch multiplied by 5%. E.g. if the position of the switch is 3 the window is set at ±15% around the set point value. **Suggested position** for floater filling system is **8** (±40%). **Suggested position** for level probe filling system is **6** (±30%).



1 Switch (SW1)
2 Switch (SW2)
5 Filling system card (A420)

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9.2.1-3 TMCC Controller - Set Communication

Machine Status	PRODUCTION
Special Equipment	Communication cable RS 232-C AT compatible PC with diskette station
SPC Reference	1350702-0200

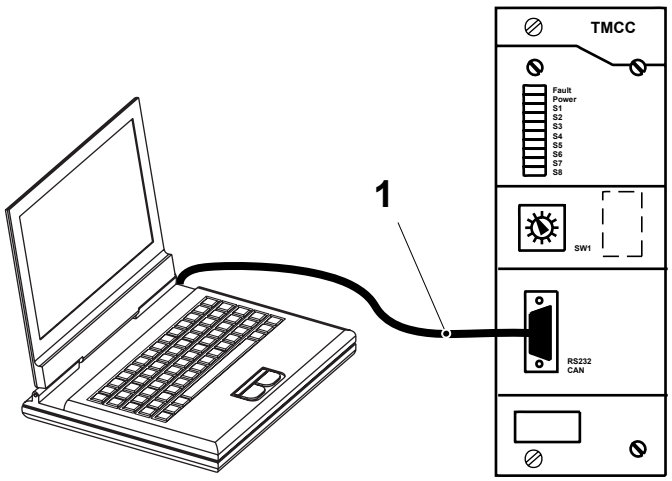
Note! The following procedure should be used to communicate with a TMCC card.

a) Connect the TMCC to a PC with the connection cable (1).

b) The connections required are:

PC 9-pin female	TMCC 9-pin male
2	3
3	2
5	5

c) Open the program file **TMCC2trm.exe**.



1 Connection cable

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9.2.1-4 TMCC Controller - Load Program

Machine Status	PREPARATION
Special Equipment	Communication cable RS 232-C AT compatible PC with diskette station
SPC Reference	1350702-0200

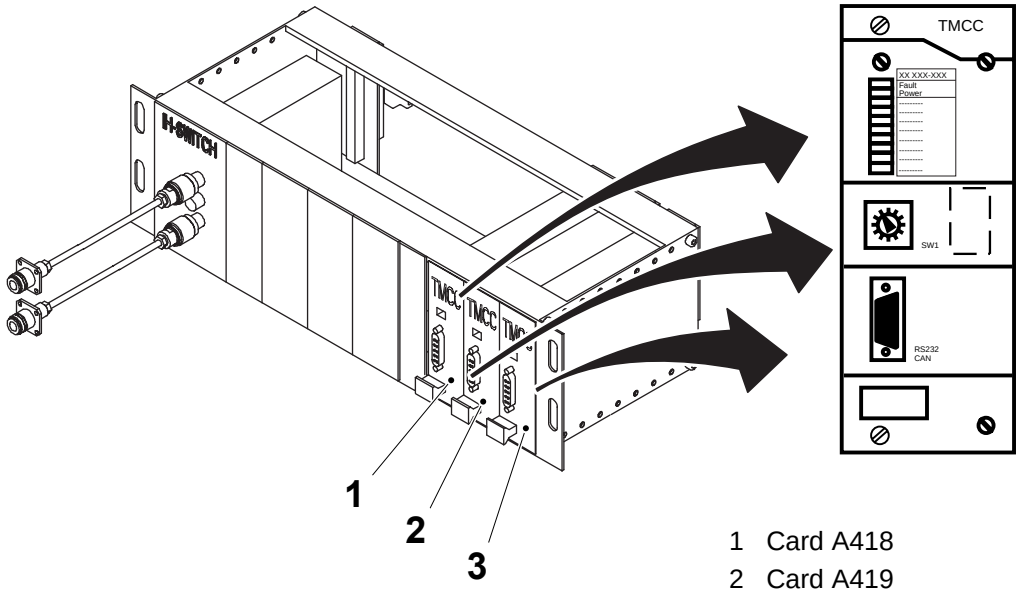
CAUTION
Risk of damage to the equipment.
Do not swap the TMCC cards A418, A419 and A420 because they contain different programs!

a) Locate the appropriate TMCC in the electrical cabinet. The card A418 (1) is for the design correction photocells in the jaw and final folder system. The card A419 (2) is for the bar code reader in the ASU. The card A420 (3) is for the filling system.

b) For the card **A418**, insert the program diskette marked **"DSC21NP"** into the PC diskette station.

c) For the card **A419**, insert the program diskette marked **"AF21NP"** into the PC diskette station.

d) For the card **A420**, insert the program diskette marked **"FSC21"** into the PC diskette station.



1 Card A418
2 Card A419
3 Card A420

(Cont'd)

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e) Connect the communication cable between the PC and the TMCC front panel connector (4), see 9.2.1-3 TMCC Controller - Set Communication.

f) Open the program file **TMCC2trm.exe** (valid for all TMCC cards).

g) Set the front panel switch **SW1** (5) to position **0**.

h) Select the DOWNLOAD button.

i) Select the program in **A:drive**.

j) Select the DOWNLOAD button, the downloading progress can be monitored. When the message “DOWNLOAD COMPLETE” appears, select the CLOSE button.

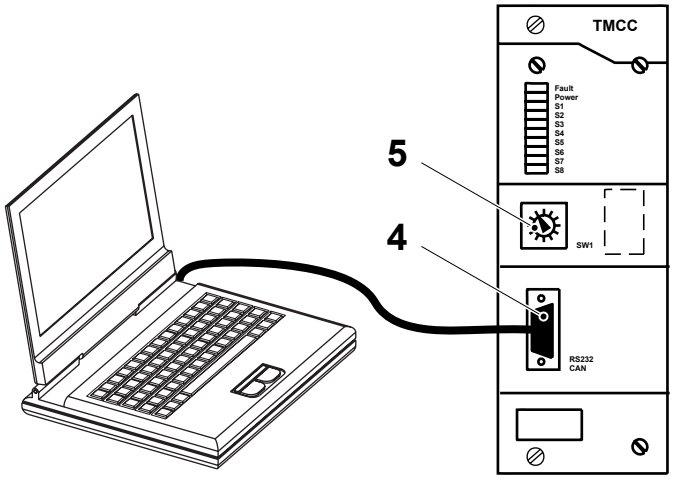
k) For all the cards reset the TMCC front panel switch **SW1** and the switch **SW2**, see 9.2.1-2 TMCC Controller - Set Control Cards.

l) Remove and fit back all the TMCC cards.

m) Fix the label (with the program number and LED functions) to the TMCC front panel, aligned with the row of LEDs.

n) Press the **S** key to verify the downloaded programs status.

o) Select the EXIT button to exit the **TMCC2trm.exe** download program.



4 TMCC connector
5 Front panel switch SW1

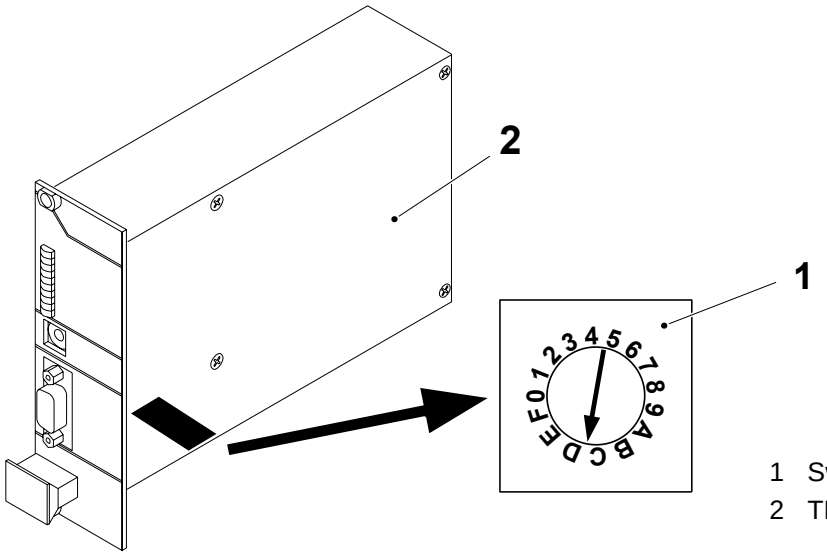
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9.2.1-5 TMCC Controller - Set Photocells

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

Automatic setting

By default, the switch **SW2** (1), located at the bottom of the TMCC (2), is set to position **0** so that the photocell produces a green light spot. For most packaging materials this is the correct setting and no further adjustment will be required.



1 Switch SW2
2 TMCC

If a packaging material is used and bar code reading errors occur, the colour of the light spot can be changed to match the foreground colour of the bar code. This is done by changing the position of **SW2** (1) as shown in the following table.

Bar code foreground colour	**SW2 position**	**Light spot colour**
Black	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A or B	Green, Red or Blue
Blue	0, 1, 3, 4, 6, 7, 9 or A	Green or Red
Light blue/Cyan	1 or 4	Red
Green	1, 2, 4 or 5	Red or Blue
Yellow	2 or 5	Blue
Red	0, 2, 3 or 5	Green or Blue
Magenta	0 or 3	Green

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- The positions **0** to **B** for the **SW2** switch.
  Twelve basic settings are provided by means of three different light spot colours and four sensibility levels.
  - 40h is the highest sensibility level and is used for light coloured bar code on the paper.
  - 60h is used for light coloured bar code on the paper.
  - 80h is used for black bar code on white paper.
  - A0h is the lowest sensibility level.
- The positions **C** and **D** for the **SW2** switch.
  Used for manual setting of the photocells. For the manual setting procedure of the switch SW2 on a TMCC, see Manual Setting on page 9-39.
- The position **E** for the **SW2** switch.
  Used only for sevice purpose to force the photocell light spot to be **On** without any time limit.

SW2 Position	Photocell setting		SW2 Position	Photocell setting
0	Light spot = Green Dynamic threshold = 40h Teach button = Disabled		8	Light spot = Blue Dynamic threshold = 80h Teach button = Disabled
1	Light spot = Red Dynamic threshold = 40h Teach button = Disabled		9	Light spot = Green Dynamic threshold = A0h Teach button = Disabled
2	Light spot = Blue Dynamic threshold = 40h Teach button = Disabled		A	Light spot = Red Dynamic threshold = A0h Teach button = Disabled
3	Light spot = Green Dynamic threshold = 60h Teach button = Disabled		B	Light spot = Blue Dynamic threshold = A0h Teach button = Disabled
4	Light spot = Red Dynamic threshold = 60h Teach button = Disabled		C	Last setting acquired in Teaching mode Teach button = Disabled
5	Light spot = Blue Dynamic threshold = 60h Teach button = Disabled		D	Teaching mode Teach button = Enabled
6	Light spot = Green Dynamic threshold = 80h Teach button = Disabled		E	Service mode Light spot = Red Dynamic threshold = 20h
7	Light spot = Red Dynamic threshold = 80h Teach button = Disabled		F	Not used

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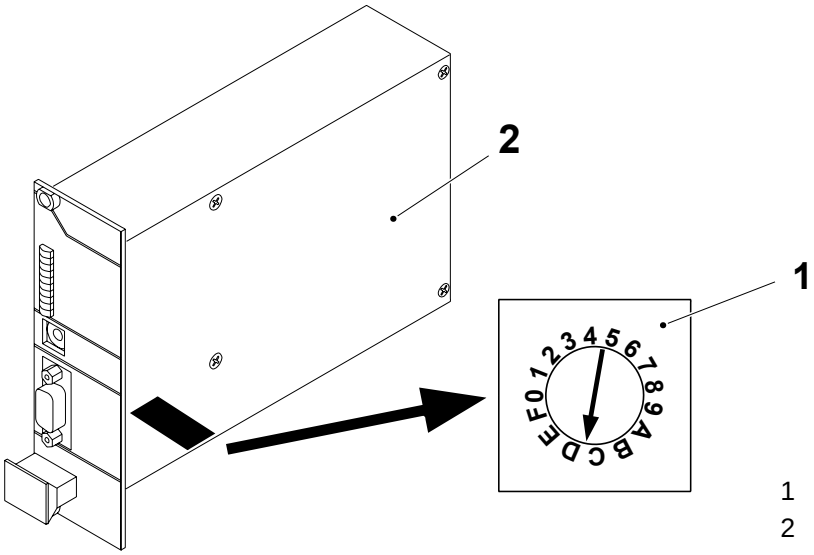
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Manual Setting

By default, the switch **SW2** (1), located at the bottom of the TMCC (2), is set to position **0** so that the photocell produces a green light spot. If, with the switch set in this position, bar code reading errors occur, change the position of the switch **SW2** (1) so that the colour of the light spot matches the foreground colour of the bar code, see Automatic setting on page 9-37.

If, after the automatic setting, errors continue to occur, set the photocells manually using the method described on the following pages.



1 Switch SW2
2 TMCC

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DCS Photocells

a) Set the switch **SW1** (1) to position **E** and the switch **SW2** (2) at the bottom of the TMCC (3) to position **D** with the machine stationary.

b) Move the packaging material until the photocell light spot is focused on a white part of the packaging material. The light spot colours is a mix of red, green and blue, RGB.

c) Push and hold the **Teach** button (4).

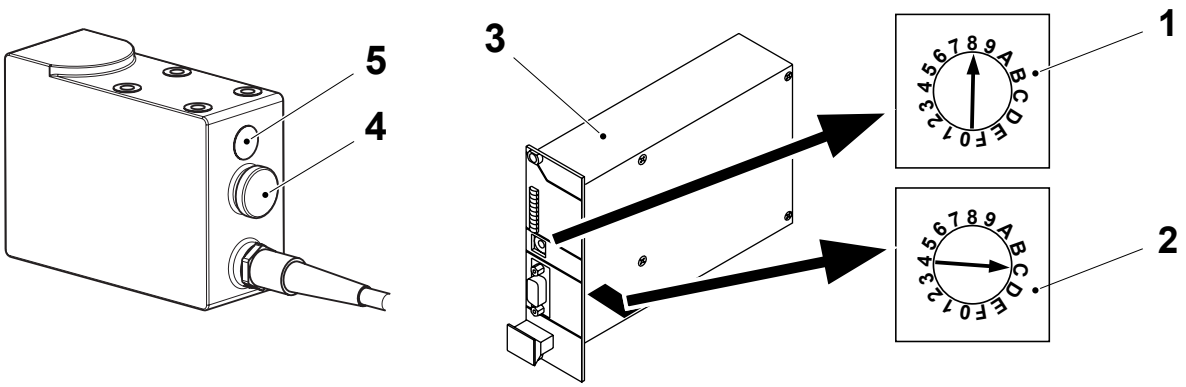
d) Move the packaging material until the complete bar code has passed in front of the photocell and then release the **Teach** button (4). The cell automatically calibrates itself.

Note! The LED (5) is lit when the photocell light spot is focused on a dark area of the packaging material.

e) Repeat the items b), c) and d) for the other photocell.

f) Turn the switch **SW1** (1) to position **F** and wait at least 5 seconds (do not disconnect the TMCC card from the rack).

g) Turn the switch **SW1** (1) to position **8** and the switch **SW2** (2) at the bottom of the TMCC (3) to position **C**.



1 Switch SW1
2 Switch SW2
3 TMCC
4 Teach button
5 LED

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(Cont'd)

ASU Photocells

a) Set the switch **SW1** (1) to position **E** and the switch **SW2** (2) at the bottom of the TMCC (3) to position **D** with the machine stationary.

b) Make sure that the switch (4) is set to the position **Q1**.

c) Move the packaging material until the photocell light spot is focused on a white part of the packaging material. The light spot colours is a mix of red, green and blue, RGB.

Note! The **ON** LED (5) is lit when power is supplied to the photocell.

d) Push and hold the **Teach** button (6).

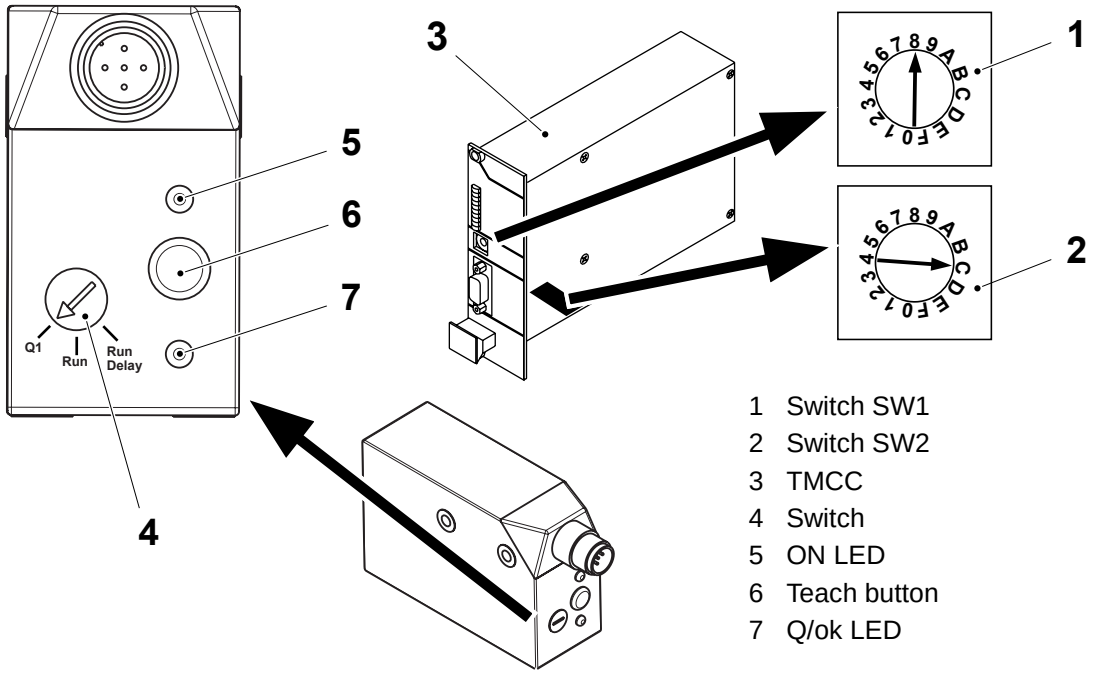
e) Move the packaging material until the complete bar code has passed in front of the photocell and then release the **Teach** button (6). The cell automatically calibrates itself.

Note! The the **Q/ok** LED (7) is lit when the photocell light spot is focused on a dark area of the packaging material.

f) Repeat the items from b) to e) for the other photocell.

g) Turn the switch **SW1** (1) to position **F** and wait at least 5 seconds (do not disconnect the TMCC card from the rack).

h) Turn the switch **SW1** (1) to position **8** and the switch **SW2** (2) at the bottom of the TMCC (3) to position **C**.



1 Switch SW1
2 Switch SW2
3 TMCC
4 Switch
5 ON LED
6 Teach button
7 Q/ok LED

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9.2.1-6 TMCC Controller - Display Report

Machine Status	PRODUCTION
Special Equipment	AT compatible PC TMCC connection cable
SPC Reference	1350702-0200

TMCC (ASU)

a) Configure a PC to be used as a TIT or Windows terminal and connect it to the TMCC (ASU), see 9.2.1-3 TMCC Controller - Set Communication.

b) Enter the commands and parameters into the ASU21 program via the keyboard and execute them by pressing the **<RETURN>** key.
(The commands and parameters are not replicated on the terminal).
The functions described below are available:

B Activate the photocell alignment function. This function is useful to check that the photocells are well aligned. Once this function is activated while the filling machine is running, as soon as a bar code is decoded, a photocells misalignment degree is displayed. This function is deactivated as soon as the photocells misalignment degree is displayed.

The photocells are well aligned when the photocells misalignment is between **-10% and 10%**.

If the photocells misalignment is **less than -10%**, means that the clock signal is too high. Adjust by means of increasing the photocells data signal or decreasing the photocells clock signal.

If the photocells misalignment is **more than 10%**, means that the data signal is too high. Adjust by means of increasing the photocells clock signal or decreasing the photocells data signal.

H Help Menu: displays the commands available.

(Cont'd)

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(Cont'd)

L Description of the function of the LEDs on the front panel.

S Shows the program version and if there is a failure of the photocells.

X <Password> Formats the TMCC EEPROM:

– Restores to default values the photocell parameters (the values acquired during last **teach** procedure are lost!),

– Resets the values of:

- Commands Ok,
- Command Errors,
- Bar code decoded.

Y Displays a detailed status of the photocells for test and service purposes:

Commands OK: Commands failed:	Total number of commands executed by the photocells
Bar code decoded:	Total number of bar codes decoded by the TMCC
Dynamic Threshold:	Photocell threshold
Light spot:	Colour of the light spot used by the photocells
Output:	Logic of the photocell outputs (Light/Dark switching)
Photoswitch Working Hours	Number of hours that every LED of the photocell has been working
Photocell Software ver. / S.N.:	Software version of the photocell firmware and serial number

(Cont'd)

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(Cont'd)

TMCC (DCS)

a) Configure a PC to be used as a TIT or Windows terminal and connect it to the TMCC (DSC), see 9.2.1-3 TMCC Controller - Set Communication.

b) Enter the commands and parameters into the DSC21 program via the keyboard and execute them by pressing the **<RETURN>** key. (The commands and parameters are not replicated on the terminal). The functions described below are available:

Annn **Angle nnn**. The Production Angle (=machine angle) may be set with this command. **nnn is the new angle value**, ranging from 0 to 255 decimal degrees. Normally the Production Angle is set from the PLC, but this command overrides the PLC setting. It may be used for test purpose to find the correct nominal Production Angle, which will later be set from the PLC. Note that the Design Adjustment Value set by the potentiometer is added to this value. For example: A72 sets the Production Angle to 72 degrees.

B Activate the photocell alignment function. This function is useful to check that the photocells are well aligned. Once this function is activated while the filling machine is running, as soon as a bar code is decoded, a photocells misalignment degree is displayed. This function is deactivated as soon as the photocells misalignment degree is displayed.

The photocells are well aligned when the photocells misalignment is between **-10% and 10%**.

If the photocells misalignment is **less than -10%**, means that the clock signal is too high. Adjust by means of increasing the photocells data signal or decreasing the photocells clock signal.

If the photocells misalignment is **more than 10%**, means that the data signal is too high. Adjust by means of increasing the photocells clock signal or decreasing the photocells data signal.

Dddd D-constant: Sets the **D parameter** with in the PID controller algorithm, in 1/100 units. The original value will be restored after the TMCC reset.

E Displays the current Encoder value, first the hexadecimal Gray code, then converted to decimal.

(Cont'd)

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(Cont'd)

Fooo **Force ooo**. This command forces the analog output signal to a certain value which is (ooo). F0 resets the forcing:

F0 Reset (disable) output force.

F1 Force to precorrection (step 0).

F2 Force to output = 1 (step 1).

...

F64 Force to output = 63 (step 63).

Iiii **I-constan**t: Sets the **I parameter** in the PID controller algorithm, in 1/100 units. The original value will be restored after the TMCC reset.

Pppp **P-constant**: Sets the **P parameter** in the PID controller algorithm, in 1/100 units. The original value will be restored after the TMCC reset.

Rn **Reporting ON/OFF**. This command enables and disables the automatic reporting of a design error and output value for every package.

R0 Disable reporting.

R1 Enable reporting.

S Status: This command displays a list of parameters that may be of interest for test and service purposes:

Output status:	Show if the output is “Forced” or ready for “Production”
DesignError, mean:	A filtered* value in mm
Output, mean:	A filtered* value (0-255)
Machine Speed, p/h:	In packages per hour
Servo start angle:	The folding flaps Start Angle
Repeat length, mm:	The repeat length of the packaging material transferred from PLC
Prod Angle, const:	The Production Angle set from the PLC
Servo stop angle	The folding flaps Stop Angle
Pot:	A value 0-255 depending on the DesignAdjustment Pot position
Pc=, Ic=, Dc=:	The constants for the PID controller algorithm
Photocell Status:	Show if there is a failure of the photocells
* = Filter algorithm: 90%(old values) + 10%(new values)	

(Cont'd)

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(Cont'd)

H Help Menu: displays the commands available

L Description of the function of the LEDs on the front panel.

X <password> Formats the TMCC EEPROM:

- Restore to default values the photocell parameters (the values acquired during last teach procedure are lost!)

- Reset the values of:

• Commands Ok
• Commands failed
• Bar code decoded
• Bar code errors

Y Displays a detailed status of the photocells for test and service purposes:

Commands OK: Commands failed:	Total number of commands executed by the photocells
Bar code decoded:	Total number of bar codes decoded by the TMCC
Bar code errors:	Total number of bar codes missed by the TMCC
Dynamic Threshold:	Photocell threshold
Light spot:	Colour of the light spot used by the photocells
Output:	Logic of the photocell outputs (Light/Dark switching)
Photoswitch Working Hours	Number of hours that every LED of the photocell has been working
Photocell Software ver. / S.N.:	Software version of the photocell firmware and serial number

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9.2.2 Recorder

Note! For the machines with the Honeywell recorders, see 9.2.5 Recorders.

9.2.2-1 Recorder - Recorder Description

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

Note! For the machines with the Honeywell recorders, see 9.2.5-1 Recorders - Process Recorder Description or 9.2.5-2 Recorders - CIP Recorder Description.

Parameters

The recorder registers the following parameters:

Record type	Channel No.	Type	Colour	Description
Process record	AN1	Analog	Blue	**Hydrogen peroxide temperature** If the temperature of the sterile bath drops below its limit (70 °C), the machine stops. The temperature range for this channel is 0 - 100 °C, corresponding to the full paper range.
Process record	AN2	Analog	Brown	**Top aseptic chamber temperature** If the temperature of the top aseptic chamber drops below 95 °C during PRODUCTION, the machine stops. The temperature range for this channel is 0 - 200 °C, corresponding to the full paper range.
Process record	AN3	Analog	Black	**Sterile air temperature** If the temperature of the air super heater drops below its limit, the machine shuts down. The temperature range for this channel is 0 - 400 °C, corresponding to the full paper range.
CIP record	AN4	Analog	Blue	**Cleaning solution conductivity** It measures the conductivity of the cleaning solution during CIP. The signal is sent from the conductivity meter. The conductivity range for this channel is 0 - 100 mS full scale, corresponding to the full paper range.
CIP record	AN5	Analog	Brown	**Cleaning solution flow** It measures the flow of the cleaning solution during CIP. The signal comes from the flow meter. The flow range for this channel is 0 - 15 m^3/h full scale, corresponding to the full paper range.
CIP record	AN6	Analog	Black	**Cleaning solution temperature** It measures the temperature of the cleaning solution during CIP. The signal comes from the conductivity meter. The temperature range for this channel is 0 - 100 °C full scale, corresponding to the full paper range.

(Cont'd)

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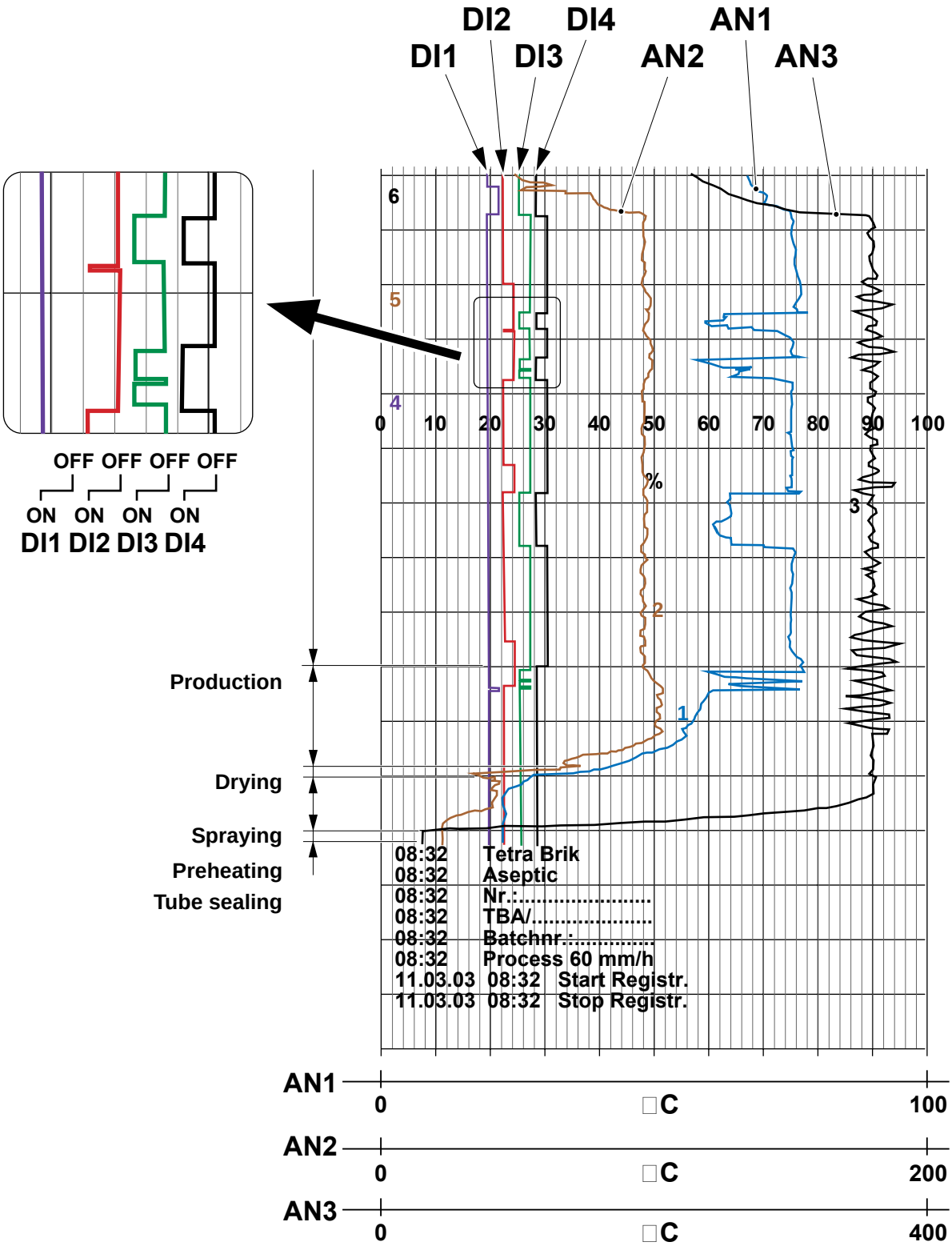
Record type	Channel No.	Type	Colour	Description
Process record	DI1	Digital	Purple	**Sterile parameter** Sterile parameter caused a machine shutdown (see Supervision, ...). Re-sterilisation is required. The process recorder records line 22 (100 unit paper) as long as the machine is sterile. The normal position of this signal is line 20 (100 unit paper).
Process record	DI2	Digital	Red	**Operation parameter** An operation parameter has caused the machine to stop (see Supervision, ...). The process recorder records line 25 (100 unit paper) for 5 minutes after the stop. This channel also records internal cleaning (Ready for CIP + Signal from CIP valve on). The normal position of this signal is line 23 (100 unit paper).
Process record	DI3	Digital	Green	**Drive motor operating** When the main motor is On, the process recorder records line 28 (100 unit paper). When the main motor is Off, it records line 26 (100 unit paper).
Process record	DI4	Digital	Black	**Filling machine in production** When the filling machine is producing filled packages, the process recorder records line 31 (100 unit paper). When the machine is not in production, it records line 29 (100 unit paper).

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(Cont'd)

The figure below shows a sample from a printout of the process.

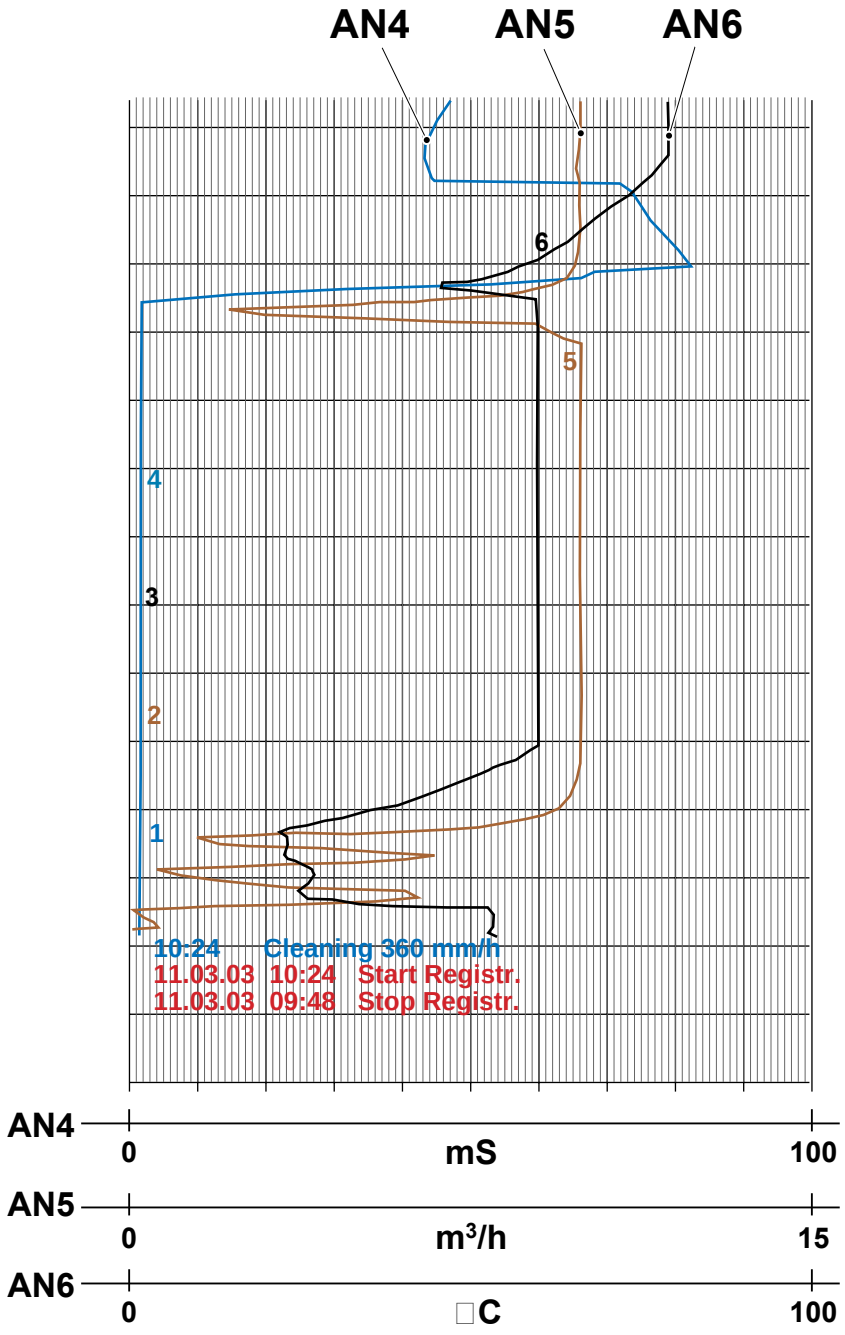


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(Cont'd)

The figure below shows a sample from a printout of the CIP.



(Cont'd)

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(Cont'd)

The paper cassette autonomy is about **10 days** (paper length **16 metre**).

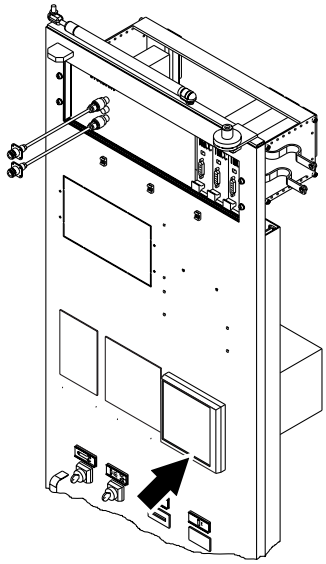
The print head autonomy is about **5 months** at optimum conditions (with the recorder running 24 hours a day).

Passwords

The process recorder has two passwords, for different access privileges:

- Password #1 gives full access to the configuration of parameters
- Password #2 - is not used.





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9.2.2-2 Recorder - Set Recorder

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

Note! For the machines with the Honeywell recorders, see 9.2.5-3 Recorders - Set CIP Recorder or 9.2.5-4 Recorders - Set Date and Time.

Note! For further information, see the JUMO operator manual.

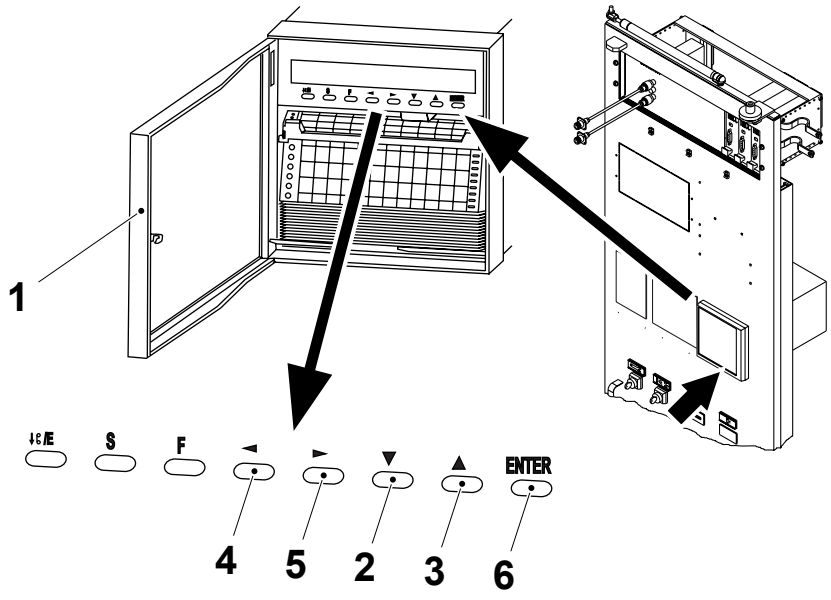
Set Language

a) Open the front door (1) of the recorder.

b) Press both the ARROW DOWN button (2) and the ARROW UP button (3), at the same time, **twice**.

c) Enter the code password #1, four digits, by using the ARROW buttons (2), (3), (4) and (5).

d) Press the ENTER button (6). The message **P-LEVEL** appears on the display.



1 Door
2 ARROW DOWN button
3 ARROW UP button
4 ARROW LEFT button
5 ARROW RIGHT button
6 ENTER button

(Cont'd)

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(Cont'd)

e) Press the ARROW UP button (3).

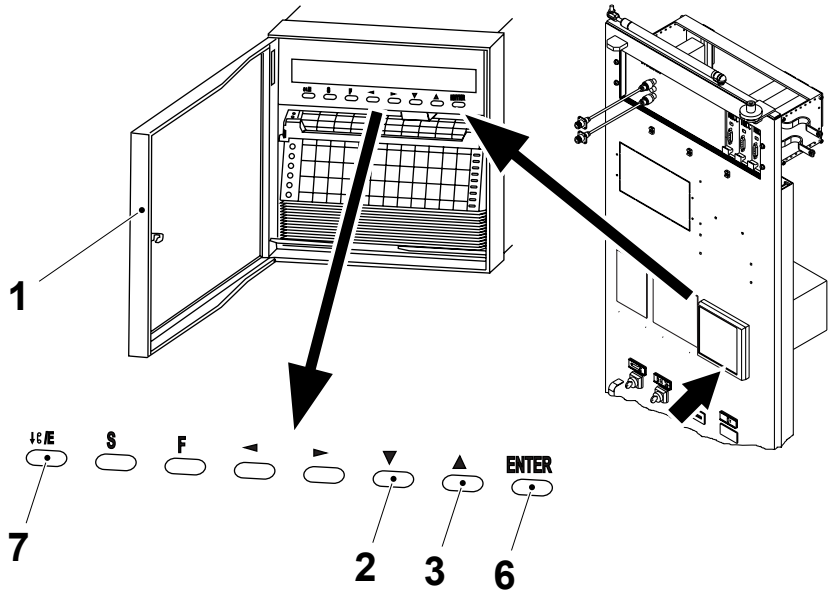
f) Press the ENTER button (6). Set the language by using the ARROW buttons (2) and (3).

g) Press the ENTER button (6) and then the EXIT button (7).

Note! In the parameter level the FAST FEED button works as the EXIT button (7).

h) Close the front door (1) and wait until the recorder is ready.

Note! As long as the display is flashing the recorder is initialized with the new data.



1 Door
2 ARROW DOWN button
3 ARROW UP button
6 ENTER button
7 EXIT button

(Cont'd)

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(Cont'd)

Set Date and Time

a) Open the front door (1) of the recorder.

b) Press both the ARROW DOWN button (2) and the ARROW UP button (3), at the same time, **twice**.

c) Enter the code password #1, four digits, by using the **ARROW** buttons (2), (3), (4) and (5).

d) Press the ENTER button (6). The message **P-LEVEL** appears on the display.

e) Press the ARROW UP button (3) twice.

f) Press the ENTER button (6). Set the date by using the ARROW buttons (2), (3), (4) and (5), (day - month - year).

g) Press the ENTER button (6). Set the weekday by using the ARROW buttons (2) and (3).

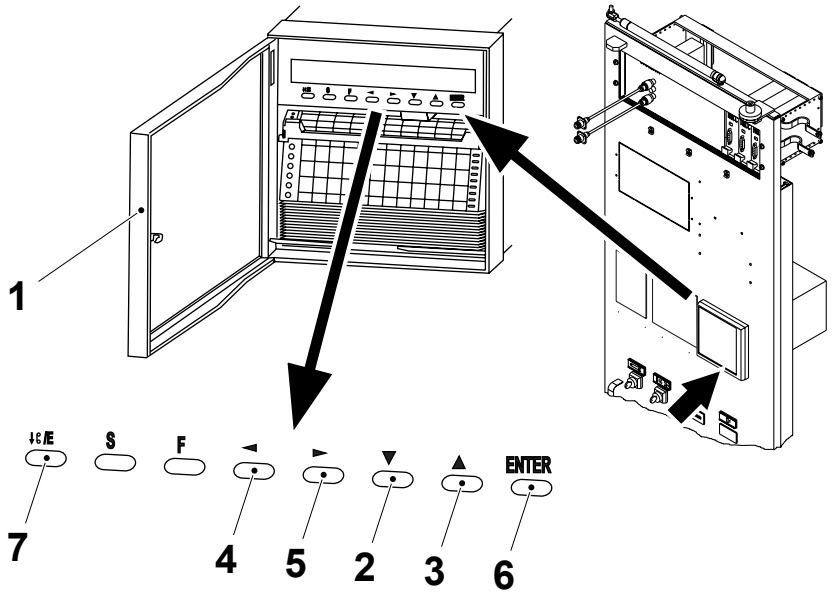
h) Press the ENTER button (6). Set the time by using the ARROW buttons (2), (3), (4) and (5), (hours - minutes).

i) Press the ENTER button (6) and then the EXIT button (7).

Note! In the parameter level the FAST FEED button works as the EXIT button (7).

j) Close the front door (1) and wait until the recorder is ready.

Note! As long as the display is flashing the recorder is initialized with the new data.



1 Door
2 ARROW DOWN button
3 ARROW UP button
4 ARROW LEFT button
5 ARROW RIGHT button
6 ENTER button
7 EXIT button

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9.2.2-3 Recorder - Clean Chart Carriage

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

Note! For the machines with the Honeywell recorders, see 9.2.5-5 Recorders - Clean Chart Carriage.

a) Open the front door (1) of the recorder and push the button (2) downwards.

b) Pull out the chart cassette (3) and open the paper guides (4) and (5).

c) Remove the chart paper (6).

d) Clean the guide rods of the cassette (3) with a dry cotton cloth.

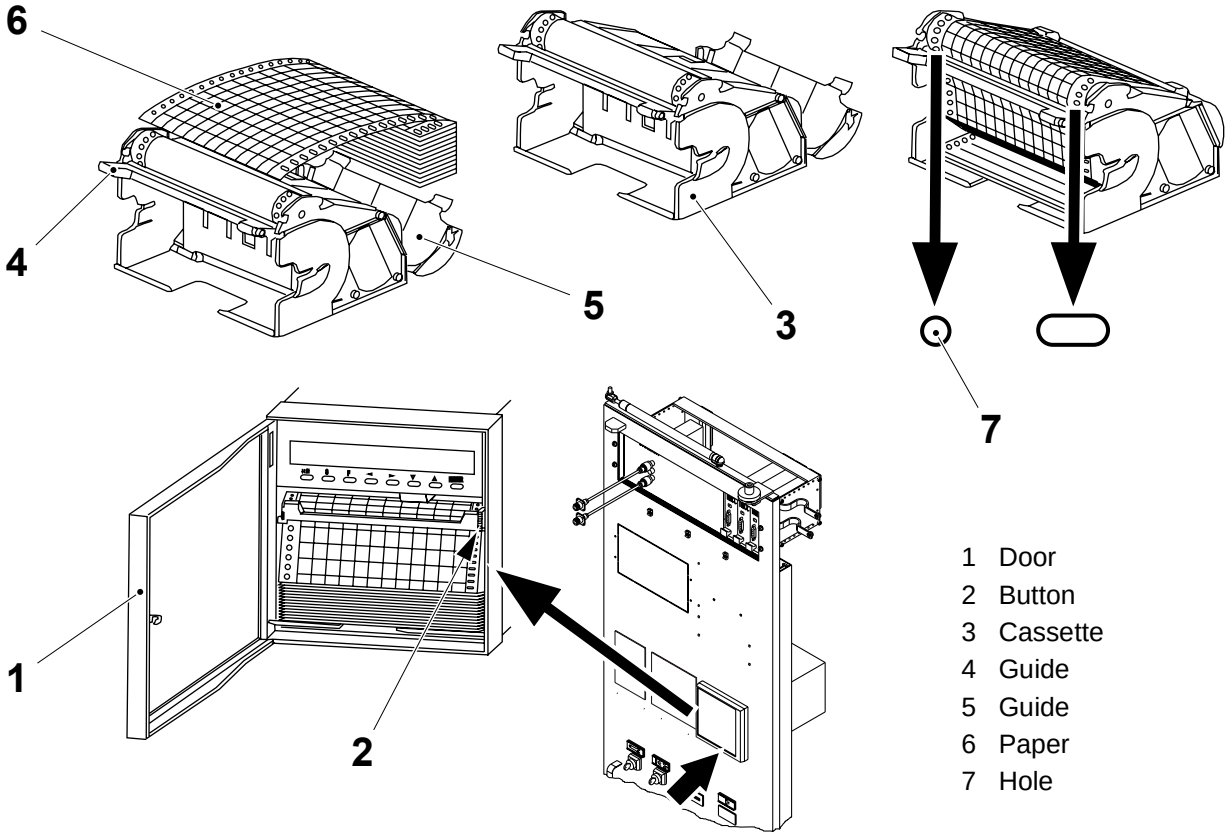
e) Clean the cassette (3) with a damp cloth.

Note! Do **not** lubricate!

f) Fit the chart paper (6) with the round holes (7) on the LH side.

g) Close the paper guides (4) and (5).

h) Fit the cassette (3) and close the front door (1).



1 Door
2 Button
3 Cassette
4 Guide
5 Guide
6 Paper
7 Hole

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9.2.2-4 Recorder - Calibrate

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Calibrator FLUKE 714 - TP No. 90458-914 Thermocouple Cable (FLUKE 714) - TP No. 90458-915 Calibrator Micromite II - TP No. 90410-338 Thermocouple Cable (Micromite II) - TP No. 90326-308
SPC Reference	1350702-0200

Valid for Micromite II Calibrator

Note! For the FLUKE 714 Calibrator, see Valid for FLUKE 714 Calibrator on page 9-58.

Note! Make sure that the Micromite II is switched OFF before disconnecting the AC-adapter or removing the batteries. Failure to do so will cause the instrument to lose the set-up information.

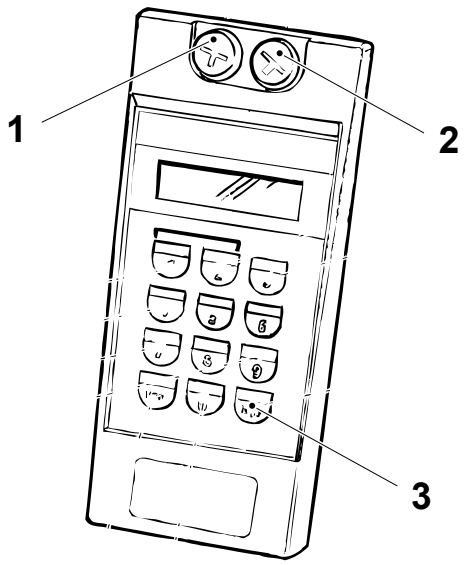
Note! Only the process recorder channels can be calibrated.

Set the calibrator as follows:

a) Make sure that the mains power has been ON at least 15 minute before making the setting.

b) Connect the thermocouple cable to the + input (1) (yellow lead) and the - input (2) (red lead).

c) Push the ON/OFF key (3) to turn the instrument ON.



1 Input (+)
2 Input (-)
3 On/Off key

(Cont'd)

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(Cont'd)

d) Push the F/C key (4) to select “centigrade”.

e) Push the SELECT key (5) and the SENSOR key (6).

f) Select the thermocouple type. Move the flashing cursor to the right or to the left by pushing the UP (7) or DOWN (8) keys.

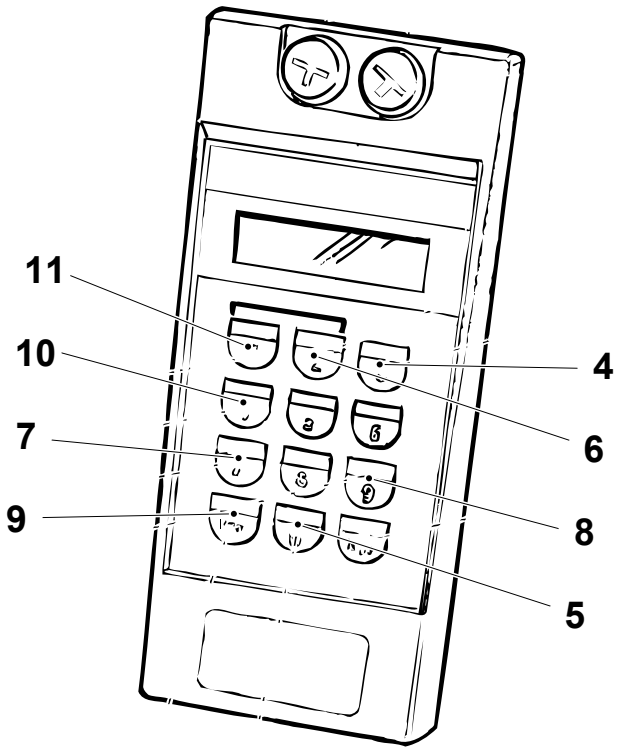
g) Push ENTER (9) when the cursor indicates TYPE K.

h) Push the SELECT key (5) and the OUTPUT 1 key (10) to set the output temperature. Use the numeric keys to type in the temperature to:

   – 100 °C for channel 1
   – 200 °C for channel 2
   – 400 °C for channel 3.

   Push ENTER (9). To clear an output value, simultaneously push the INPUT key (11) and the SENSOR key (6).

i) Continue with section Measure Channel on page 9-60.



4 F/C key
5 Select key
6 Sensor key
7 Up key
8 Down key
9 Enter key
10 Output 1 key
11 Input key

(Cont'd)

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(Cont'd)

Valid for FLUKE 714 Calibrator

Note! For the Micromite II Calibrator, see Valid for Micromite II Calibrator on page 9-56.

WARNING

Risk of electric shock or personal injury.
Follow the safety information in the “Instruction Sheet” delivered with the calibrator.

Note! Only the process recorder channels can be calibrated.

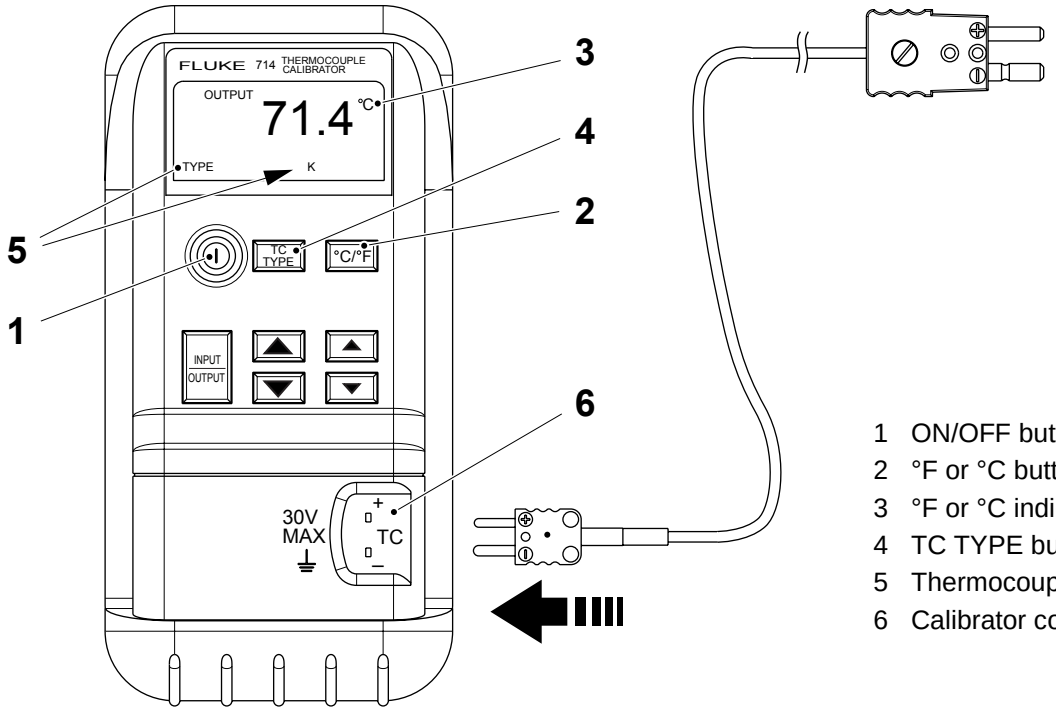
a) Make sure that the mains power has been ON at least 15 minute before making the setting.

b) Press the ON/OFF button (1) to switch on the calibrator.

c) Press the button (2) to toggle °C or °F on the display (3).

d) Press the TC TYPE button (4) to show the thermocouple TYPE K (5).

e) Connect the type K thermocouple to the calibrator connection (6).



1 ON/OFF button
2 °F or °C button
3 °F or °C indicator
4 TC TYPE button
5 Thermocouple type
6 Calibrator connection

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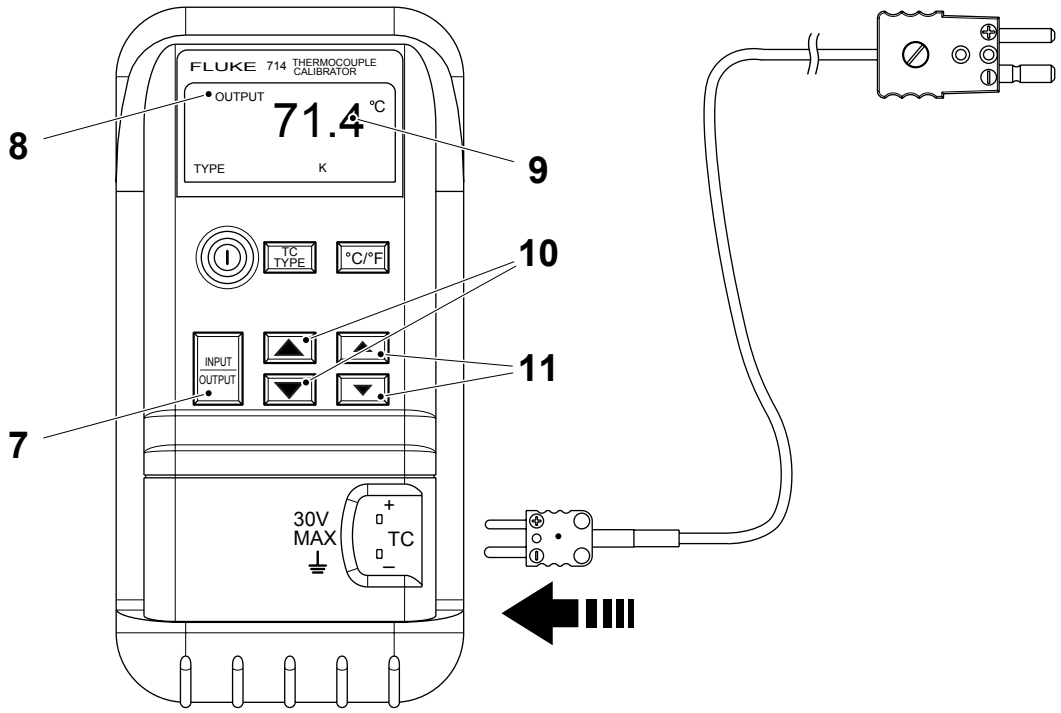
(Cont'd)

(Cont'd)

f) Press the INPUT-OUTPUT button (7) to show OUTPUT (8) on the display. Set the temperature (9), with the buttons (10), and (11), to
   - 100 °C for the first measurement on page 9-60
   - 200 °C for the second measurement on page 9-60
   - 400 °C for the third measurement on page 9-60.

   For further information on the calibrator, see the “Instruction Sheet” delivered with the calibrator.

g) Continue with section Measure Channel on page 9-60.



7 INPUT-OUTPUT button
8 INPUT-OUTPUT indicator
9 Temperature indicator
10 STEP UP/DOWN buttons 50° steps
11 STEP UP/DOWN buttons 0.1° steps

(Cont'd)

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(Cont'd)

Measure Channel

a) Connect the calibrator instrument as a replacement of a temperature sensor by means of the thermocouple cable to channel 1.
   - remove the yellow cable from the channel connector (3) and fit the + input (1) (yellow lead) from the thermocouple cable
   - remove the red cable from the channel connector (3) and fit the - input (2) (red lead) from the thermocouple cable.

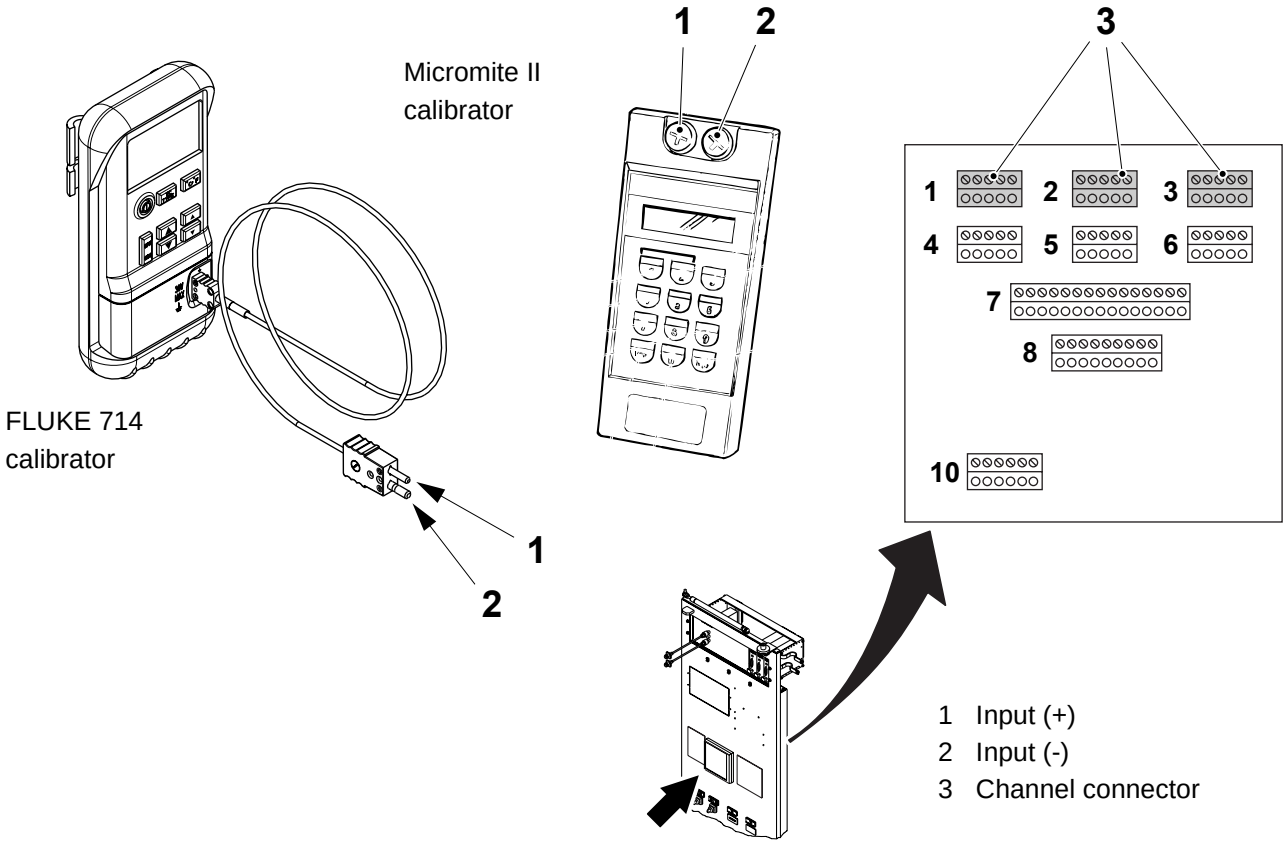
Note! Measure the channel 1 (100 °C), the channel 2 (200 °C) and the channel 3 (400 °C) one at the time.

b) Check that the value on the recorder display is correct for that channel. When the value is not correct, note the value for that channel.

c) Check the channels 2 and 3 according to item a) and b).

d) Disconnect the calibrator instrument and connect all of the yellow and red cables to the recorder. Check that all connections to the recorder are correct according to the EM.

e) When necessary, calibrate the channels 1, 2 and 3, see section Calibrate Channel on page 9-61.



(Cont'd)

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(Cont'd)

Calibrate Channel

a) Open the front door (1) of the recorder.

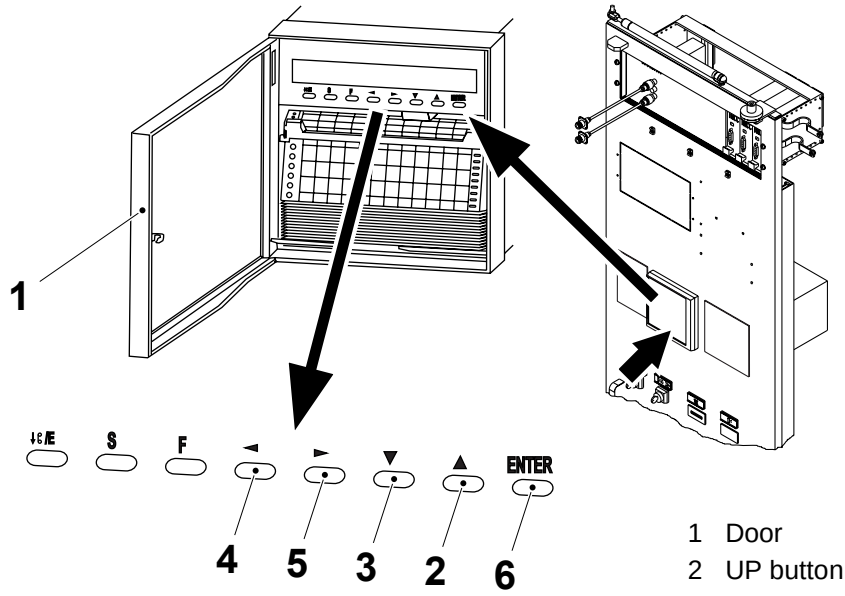
b) Press the UP and the DOWN buttons (2) and (3) simultaneously, twice.

c) Enter the four digits of code password #1 by using the ARROW buttons (2), (3), (4) and (5).

d) Press ENTER (6). The message P-LEVEL appears on the display.

e) Press the UP and the DOWN buttons (2) and (3) simultaneously, three times. The message C3 appears on the display.

f) Press the DOWN button (3) until the message P appears on the display. Press ENTER (6).



1 Door
2 UP button
3 DOWN button
4 LEFT button
5 RIGHT button
6 Enter button

(Cont'd)

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(Cont'd)

g) Select the analog channel 01 P, 02 P or 03 P by using the LEFT and RIGHT buttons (4) and (5).

h) Press ENTER (6) and calibrate the channel by using the UP and DOWN buttons (2) and (3).

- +2.000 when the recorder displayed 98 °C (the calibration value is 100 °C)
- -2.000 when the recorder displayed 102 °C (the calibration value is 100 °C).

Press ENTER (6).

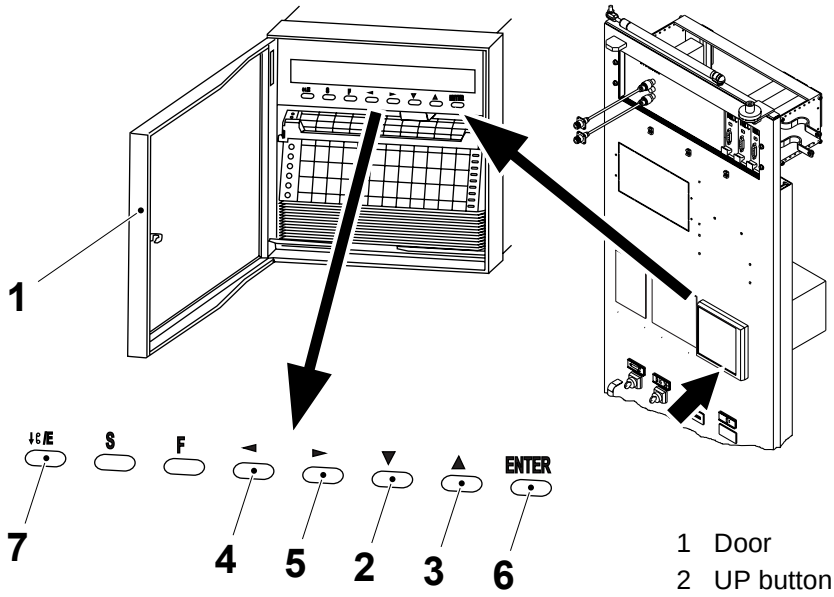
i) Repeat items g) to h) until the analog channels are calibrated

j) Press ENTER (6) and then EXIT (7) several times.

Note! The FAST FEED button works in the same way as the EXIT button (7) when not in the basic status.

k) Close the front door (1) and wait until the recorder is ready.

Note! As long as the display is flashing the recorder is initialized with the new data.



1 Door
2 UP button
3 DOWN button
4 LEFT button
5 RIGHT button
6 Enter button
7 Exit button

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9.2.2-5 Recorder - Set Paper Record Alarm (Optional)

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

Note! According to the US Food and Drug Administration (FDA), when packaging a low-acid food within the USA or for import into the USA, any production not accompanied by a correspondent processing record represents a **deviation from the scheduled process**. All packages produced without a corresponding processing record must be placed on hold for subsequent evaluation by a Process Authority.

All the machines equipped with the JUMO recorder has the paper alarm for when the recorder run out of paper (yellow alarm in the TPOP panel appear). This alarm causes a machine stop that is mandatory according to the US FDA requirements. **The alarm should only be disabled at the request from the customer.**

Modify the PLC program parts indicated with the arrow.

- **ALW_OFF** to **ALW_ON**
- **%008** to **%007**

Enabled alarm - normal case



Disabled alarm - at the request from customer



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9.2.3 Conductivity Meter

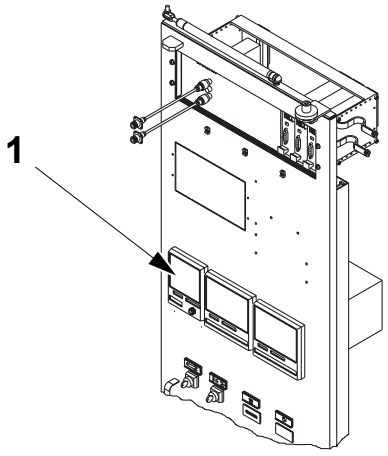
SPC Reference	1350702-0200

9.2.3-1 Conductivity Meter- Description

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

The conductivity is calculated by the current flowing through the measuring fluid at a known reference voltage. The signal is converted to digital information and thereafter processed according to temperature and calibration values.

The conductivity meter (1) is connected to the PLC by means of three digital signals: 2 conductivity threshold and 1 temperature threshold.



1 Conductivity meter

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9.2.3-2 Conductivity Meter- Set

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

The table below shows the setting values and the procedure to set up the conductivity meter.

Step	Push	Display	Input	Push
1.a	Prog	Password?		If no password is needed go to step 2
1.b	<	Password?		
1.c	Prog	Password OK		
2	Status	Status control		
3	Prog	Prog.control		
4	Next	mA1 Start Value 0.00mA	00.00mA	Up or down
5	Next	mA1 Stop Value 20.00mA	20.00mA	Up or down
6	Next	mA1 Start at 0.00mS/cm	00.00mA	Up or down
7	Next	MA1 Stop at 100.00mS/cm	100.00mA	Up or down
8.a	Next	RE.1Function on/off	On/off	Up or down
8.b	Next	RE.1 setpoint 0.00 mS/cm	1.30mS/cm	Up or down
8.c	Next	RE.1 polarity norm.	Norm.	Up or down
9.a	Next	RE.2Function on/off	On/off	Up or down
9.b	Next	RE.2 setpoint 0.00 mS/cm	62.00mS/cm	Up or down
9.c	Next	RE.2 polarity norm.	Norm.	Up or down
10.a	Next	RE.3Function on/off	On/off	Up or down
10.b	Next	RE.3 setpoint 0.00 mS/cm	44.00mS/cm	Up or down
10.c	Next	RE.3 polarity norm.	Norm.	Up or down
11	Next	RE.4 setpoint 0.00 °C	58.00	Up or down
12	Next	RE.5 setpoint 0.00 °C	78.00	Up or down
13	Next	RE.6 setpoint 0.00 °C	88.00	Up or down
14	Next	End control list push Run to exit		Up or down
15	Run	x.xxxmS, x.x C C.[---], T[---]		

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9.2.3-3 Conductivity Meter- Check A.T.C.

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

As the temperature has a great influence on the conductivity value, Contronic 90 is equipped with Automatic Temperature Compensation (A.T.C.).

The table bellow shows the procedure to check the temperature compensation:

Step	Push	Display	Input	Push
16	Status	Status control		
17	Select	Stat.cal.cond.		
18	Select	Status install		
19	Prog	Prog.install		
20.a	Next	ATC 1 2.10%/C	New value	Up or down
20.b	Next	ATC 2 1.70%/C	New value	Up or down
20.c	Next	ATC 3 1.35%/C	New value	Up or down
21	Next	End control list Push run to exit		
22	Next	x.xxxmS, x.x C C.[---], T[---]		

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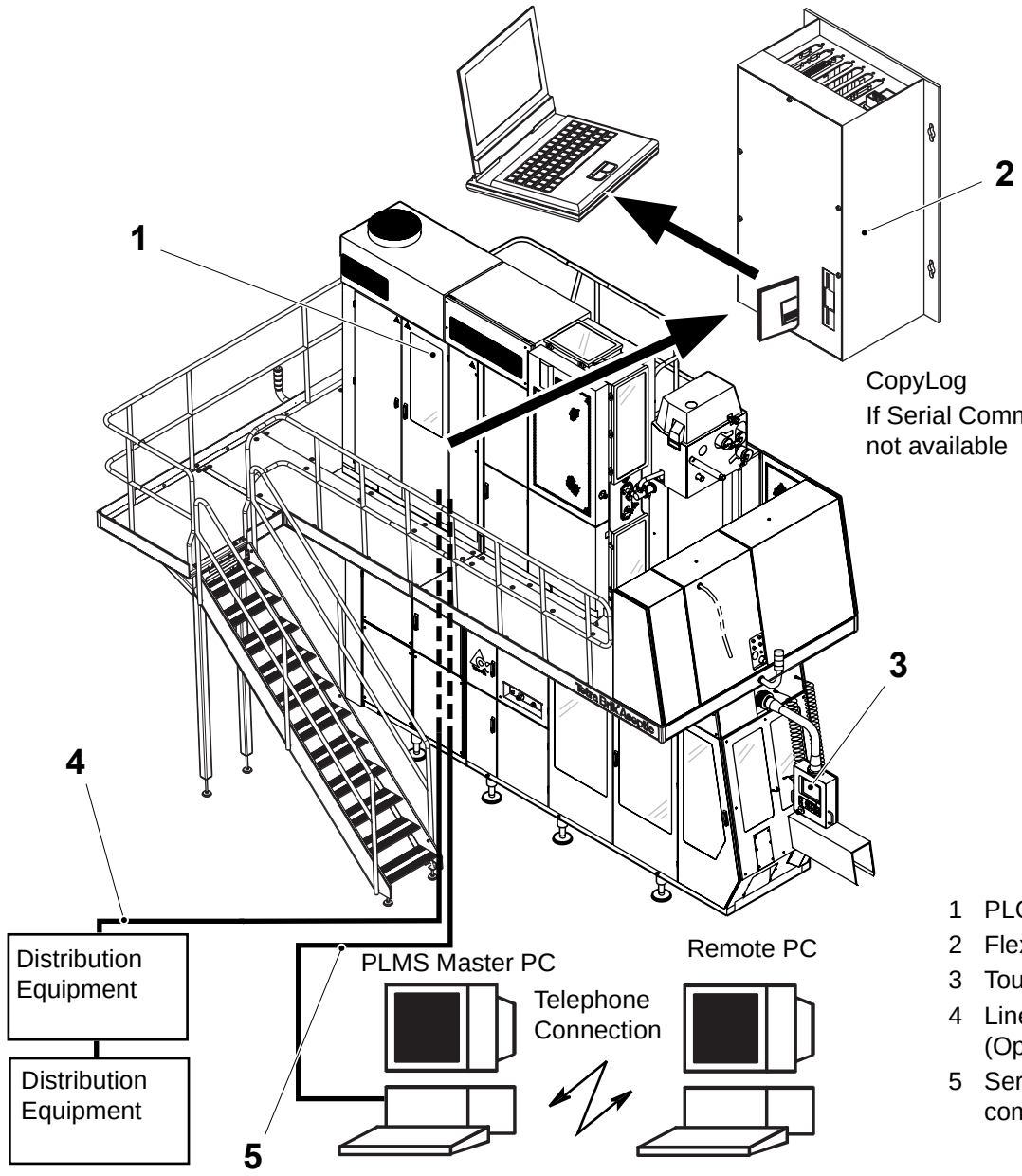
9.2.4 TPOP

SPC Reference	1363288-0300

9.2.4-1 TPOP - Function Description PLMS

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1363288-0300

PLMS (Packaging Line Monitoring System) is a system for collecting data from Filling Machines and Production Lines.



1 PLC
2 Flexbox
3 Touch screen
4 Line supervision (Optional kit)
5 Serial communication

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9.2.4-2 TPOP - Copy Data PLMS

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1363288-0300

Description

To analyse the data collected by the system, the data must be copied onto an office PC. There are two possible ways:

- direct communication between the filling machine and an office PC by means of the Serial Communication kit (if installed). See the *PLMS Send and Receive User Manual* for the copying procedures
- manual copying by means of a floppy disk.

Note! This section only describes how to manually copy the data.

The copied data can be analysed in the office PC utilising the PLMS Off-Line Analysis program. For more information, see *PLMS Off-Line Analysis User Manual*.

It is possible to copy different kinds of data for different purposes:

- data files in DBF format. Collected events to be analysed with the PLMS Off-Line Analysis program or any program with the possibility to read database files in DB4 format
- data files in BIN format. Collected events to be analysed with the PLMS Off-Line Analysis program
- PLMS Config. files with the configuration of the filling machine for all available languages.

(Cont'd)

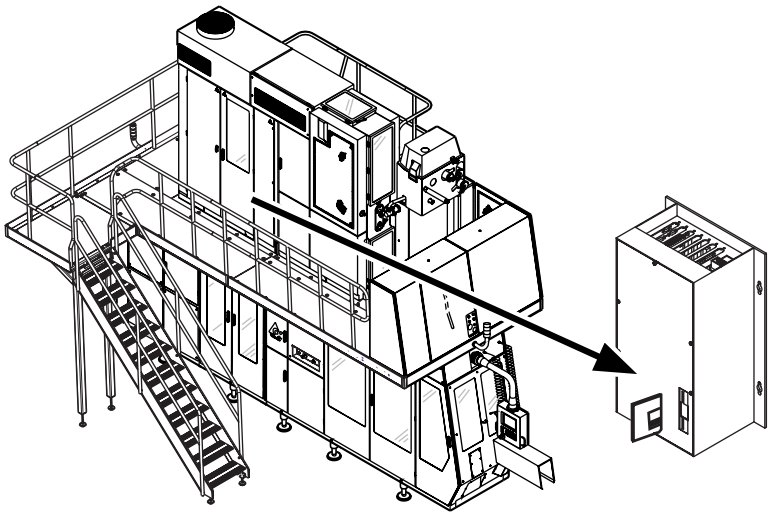
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

Copy DBF Files

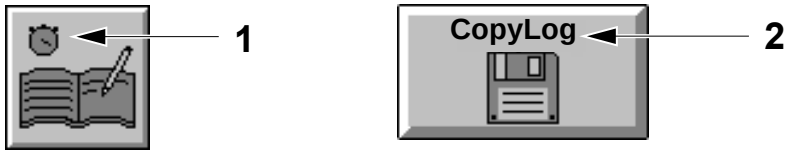
a) Open the bottom right electrical cabinet door and insert a 1.44 Mb formatted floppy disk in the floppy disk drive.

Note! Make sure that the disk is empty and not write protected.



b) Touch the COLLECT SYSTEM button (1).

c) Touch the COPY LOG button (2).



1 COLLECT SYSTEM button
2 COPY LOG button

(Cont'd)

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(Cont'd)

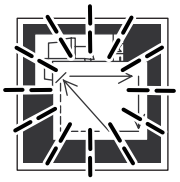
Note! The COPYLOG STARTING DATE button (3) is set by default to the last down-loading date.
The COPYLOG ENDING DATE button (4) is set by default to the date of yesterday.

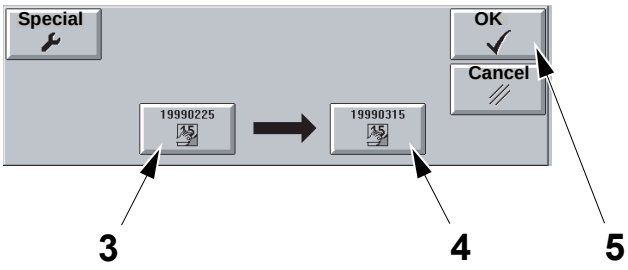
d) Touch the OK button (5) to down-load the following files:

- evntcode.dbf
- plmsdata.dbf
- TBA21.p00 - PLMS config. in English
- (TBA21.p** - PLMS Config. file of the selected language if different than English).

Note! Do **not** press the TPOP RESET button on the control panel during the copying procedure, if flashing!

Note! The starting date is automatically updated every time the data log is copied.





3 COPYLOG STARTING DATE button
4 COPYLOG ENDING DATE button
5 OK button

(Cont'd)

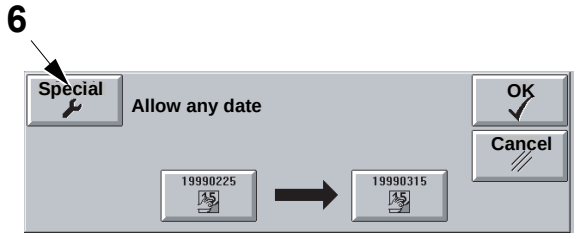
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

Change The Copylog Start/end Date

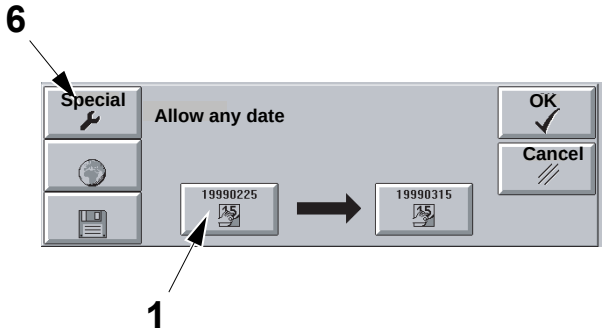
To down-load the data files from a different period of time follow the instructions below.

e) Touch the SPECIAL button (6).



6 SPECIAL button

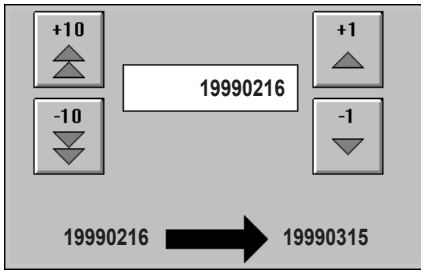
f) Touch the COPYLOG STARTING DATE button (1).

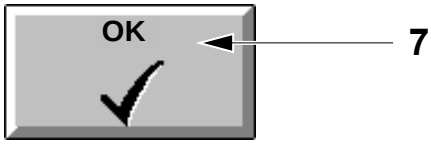


1 COPYLOG STARTING DATE button
6 SPECIAL button

g) Enter the starting date by using the ARROW keys.

h) Touch the OK button (7).





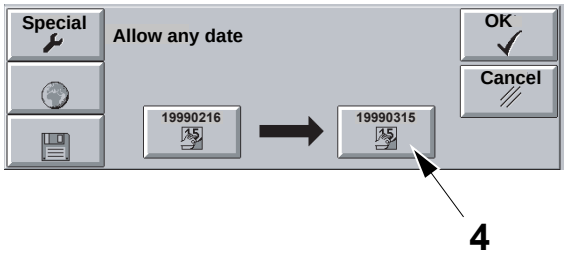
7 OK button

(Cont'd)

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(Cont'd)

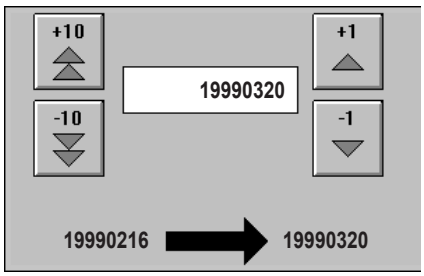
i) Touch the COPYLOG ENDING DATE button (4).

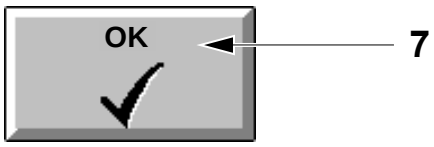


4 COPYLOG ENDING DATE button

j) Choose the correct ending date by using the ARROW keys.

k) Touch the OK button.

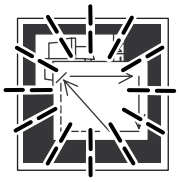




7 OK button

l) Touch the OK button (7) to start copying.

Note! Do **not** press the TPOP RESET button on the control panel during the copying procedure, if flashing!

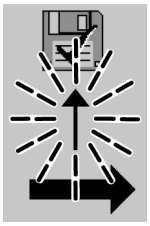


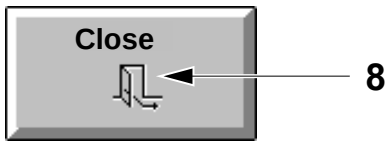
(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

The following icons will be displayed on the screen. Perform a suitable action.

Icon	Meaning	Action
	The flashing arrow indicates that the copying procedure is in progress.	Wait
	Successful copy procedure.	Touch the CLOSE button (8) and remove the floppy disk.
	Failed copy procedure Check that the floppy disk is: -inside the floppy disk drive -correctly formatted -not write protected -not full.	Touch the CLOSE button (8) and repeat the procedure.
	Failed copy procedure Check that not to many days are selected (to many days could cause a data overflow on the floppy disk).	Touch the CLOSE button (8) and repeat the procedure with fewer days as a period of time.



8 Close button

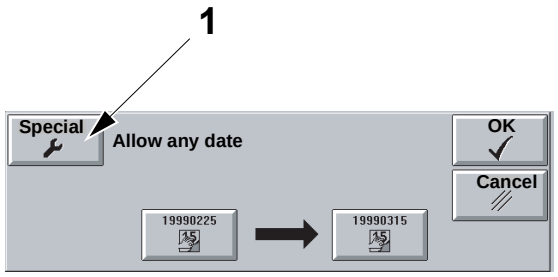
(Cont'd)

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(Cont'd)

Copy BIN Files

a) Touch the SPECIAL button (1).



1 SPECIAL button

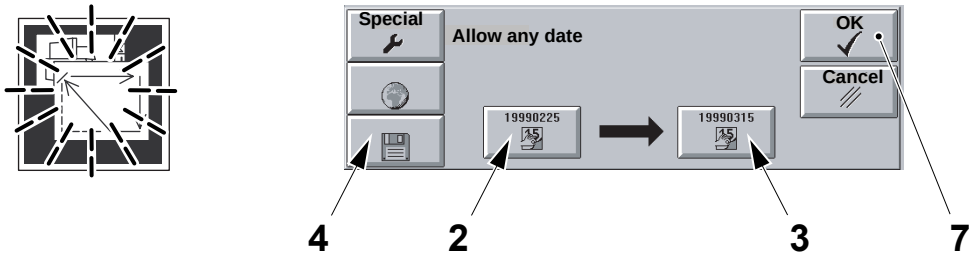
Note! The COPYLOG STARTING DATE button (2) is set by default to the last down-loading date.
The COPYLOG ENDING DATE button (3) is set by default to the date of yesterday.

b) Touch the BIN FILES button (4) to down-load the following files:

- TBA21.p00
- (TBA21.p** - PLMS Config. file of the selected language if different than English).
- the files *bin for the selected period of time.

Note! Do **not** press the TPOP RESET button on the control panel during the copying procedure, if flashing!

Note! The starting date is automatically updated every time the data log is copied.



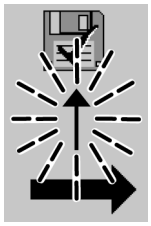
2 COPYLOG STARTING DATE button
3 COPYLOG ENDING DATE button
4 BIN FILES button
7 OK button

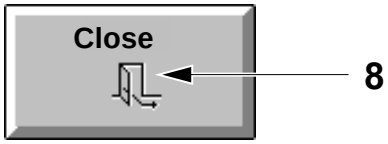
(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

The following icons will be displayed on the screen. Perform a suitable action.

Icon	Meaning	Action
	The flashing arrow indicates that the copying procedure is in progress.	Wait
	Successful copy procedure.	Touch the CLOSE button (8) and remove the floppy disk.
	Failed copy procedure Check that the floppy disk is: -inside the floppy disk drive -correctly formatted -not write protected -not full.	Touch the CLOSE button (8) and repeat the procedure.
	Failed copy procedure Check that not to many days are selected (to many days could cause a data overflow on the floppy disk).	Touch the CLOSE button (8) and repeat the procedure with fewer days as a period of time.



8 CLOSE button

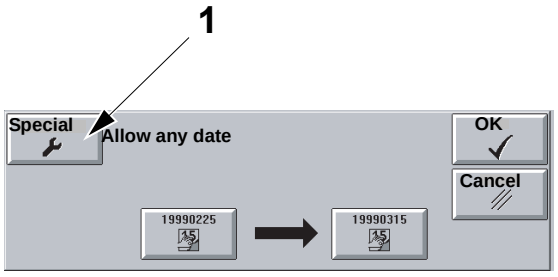
(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

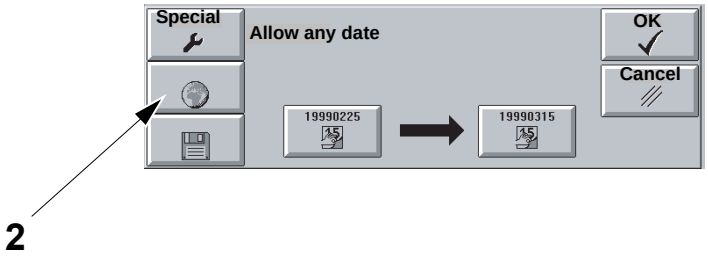
Copy PLMS Config. Files

a) Touch the SPECIAL button (1).



1 SPECIAL button

b) Touch the WORLD button (2) to copy all the PLMS config. files TBA21.p** for all available languages.



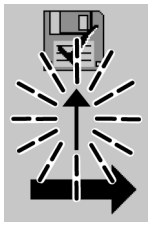
2 WORLD button

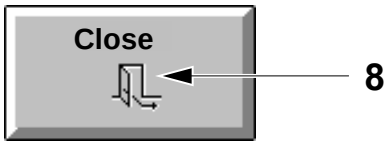
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

(Cont'd)

The following icons will be displayed on the screen. Perform a suitable action.

Icon	Meaning	Action
	The flashing arrow indicates that the copying procedure is in progress.	Wait
	Successful copy procedure	Touch the CLOSE button (8) and remove the floppy disk
	Failed copy procedure Check that the floppy disk is: -inside the floppy disk drive -correctly formatted -not write protected -not full.	Touch the CLOSE button (8) and repeat the procedure



8 CLOSE button

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9.2.4-3 TPOP - Set Date and Time PLMS

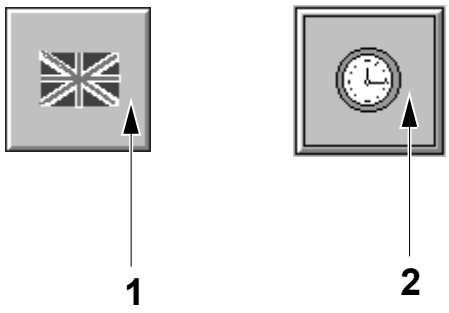
Machine Status	STEP ZERO
SPC Reference	1363288-0300

Time can be set only in STEP ZERO when PREPARATION and PRODUCTION phases are closed.

Note! Setting a past time or date may cause data loss

a) Touch the SYSTEM SETTING button (1).

b) Touch the CLOCK button (2).

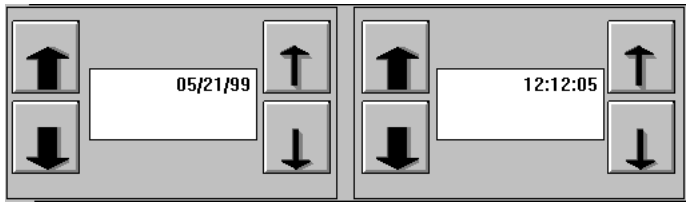


1 SYSTEM SETTING button
2 CLOCK button

c) Set the time to 12:12 by means of the arrow buttons to set the date. The date box appears also in the left window.

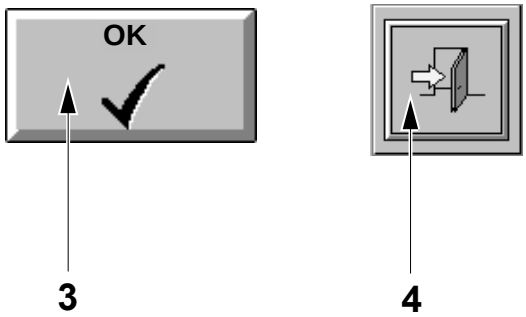
d) Set the current date in the left window.

e) Set the current time in the right window (left arrows for hours and right for minutes).



f) Touch the OK button (3).

g) Touch the EXIT button (4).



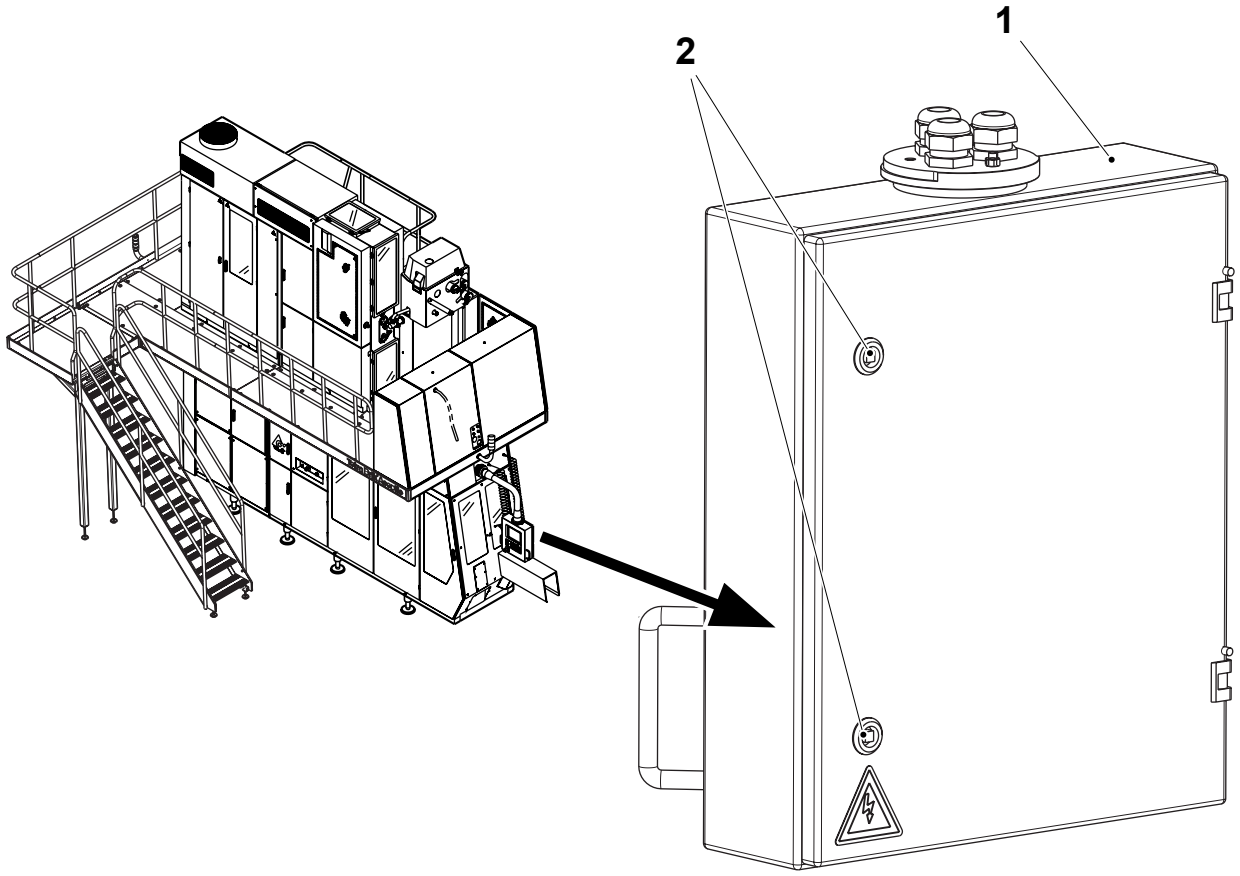
3 OK button
4 EXIT bottom

TechPub_2614345_0105 - 09_MM81534_11en.fm

9.2.4-4 TPOP - Change Display Unit

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1363288-0300 1349772-0100

a) Open the door at the rear of the touch screen (1) by means of a key in the keyholes (2).



1 Touch screen
2 Keyhole

(Cont'd)

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(Cont'd)

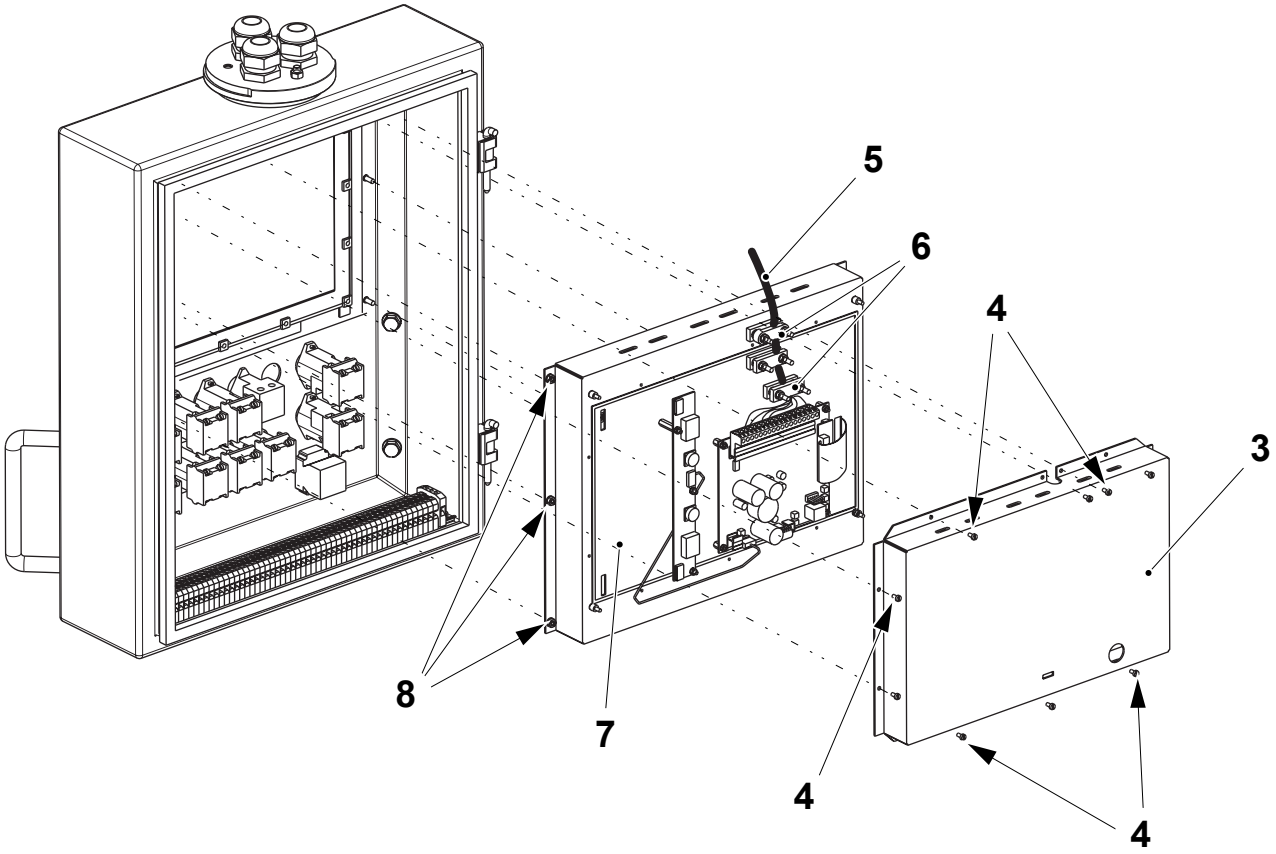
b) Remove the cover (3) by means of the screws (4).

c) Remove the connection wires (5) by means of the clamps (6).

d) Remove the display unit (7) by means of the nuts (8).

e) Fit the new display unit (7) and assemble in the reverse order.

f) Calibrate the touch screen as required, see 9.2.4-5 TPOP - Calibrate Touch Screen.



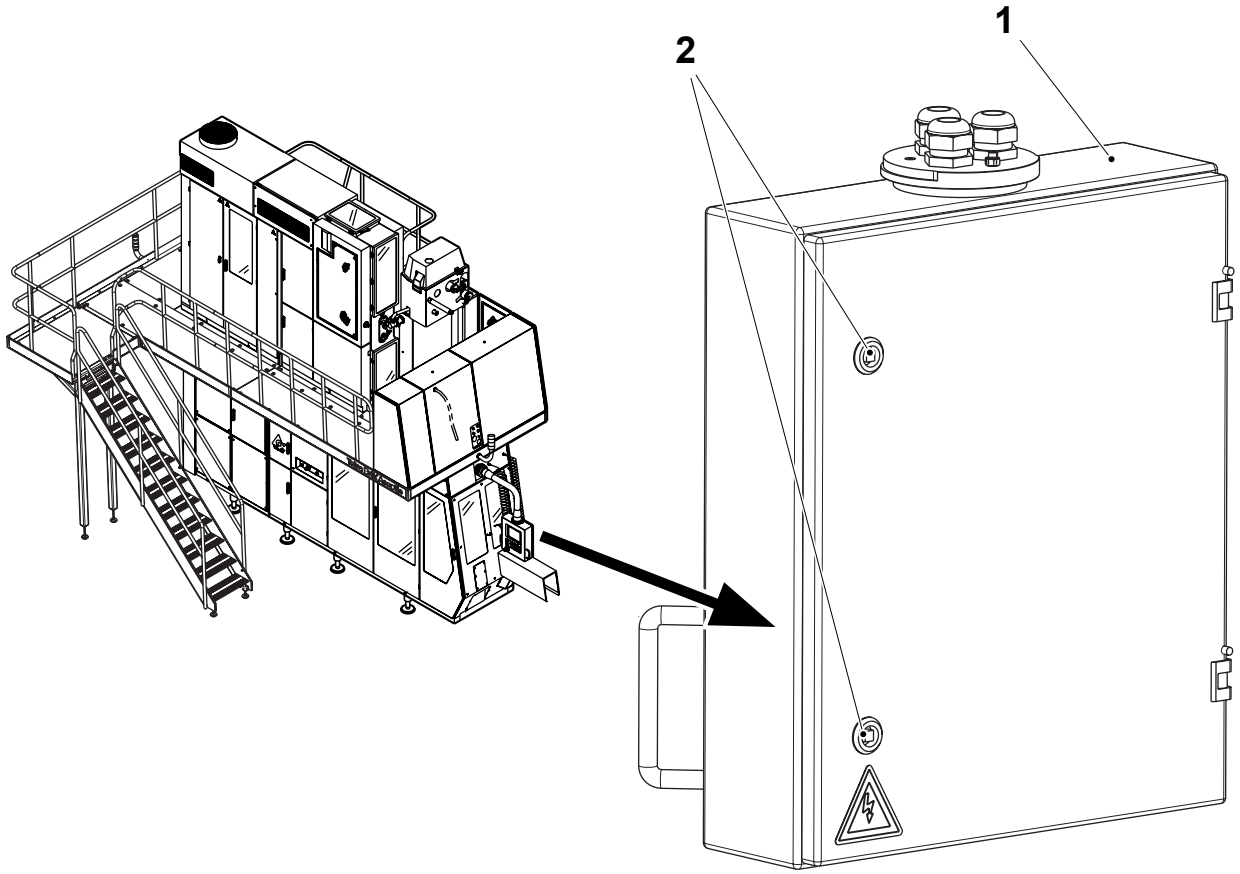
3 Cover
4 Screw
5 Connection wire
6 Clamp
7 Display unit
8 Nut

TechPub_2614345_0105 - 09_MM81534_11en.fm

9.2.4-5 TPOP - Calibrate Touch Screen

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Keyboard with PS/2 connector
SPC Reference	1363288-0300 1349772-0100

a) Open the door at the rear of the touch screen (1) by means of a key in the keyholes (2).



1 Touch screen
2 Keyhole

(Cont'd)

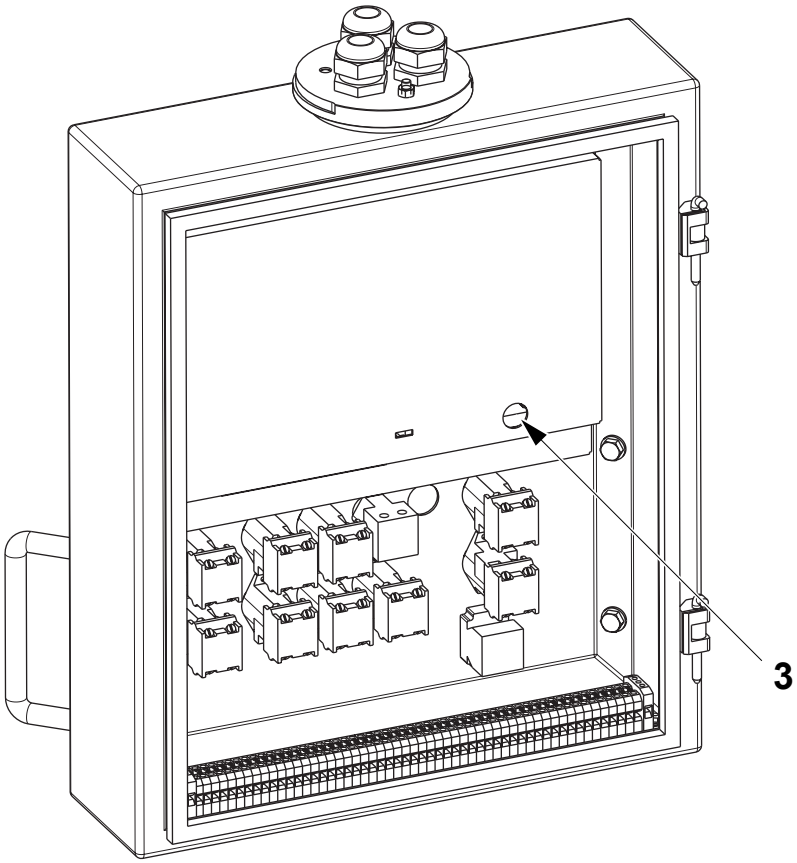
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

b) Connect a keyboard to the port (3) at the rear of the touch screen

c) Switch **On** the main power.

d) When, during the boot sequence, the message “Starting MS-DOS...” appears, press H to start window 3.11.



3 Port

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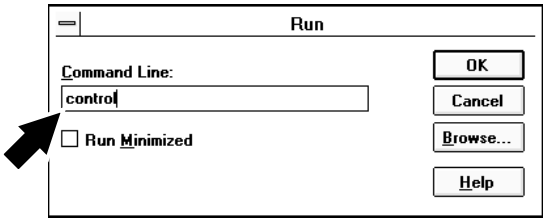
(Cont'd)

(Cont'd)

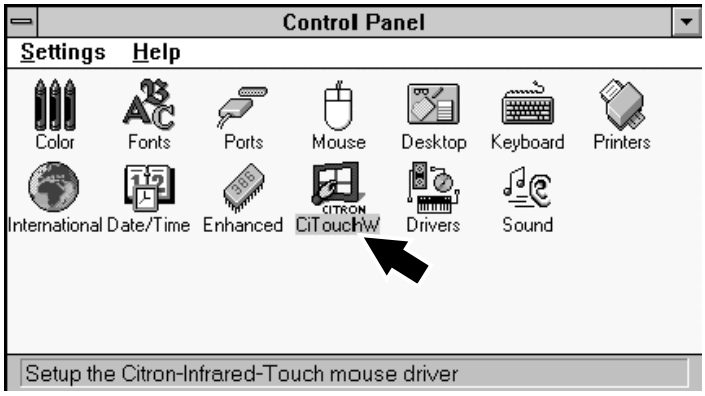
e) Press ALT and then press ENTER.

f) From the **File** menu select **Run** with the down arrow, and then press ENTER.

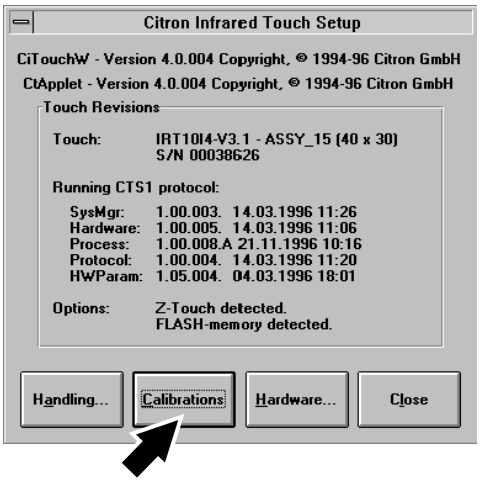
g) Type **control**, and then press ENTER.



h) Select **CiTouchW**, and then press ENTER.



i) Press ALT + C (Calibrations).

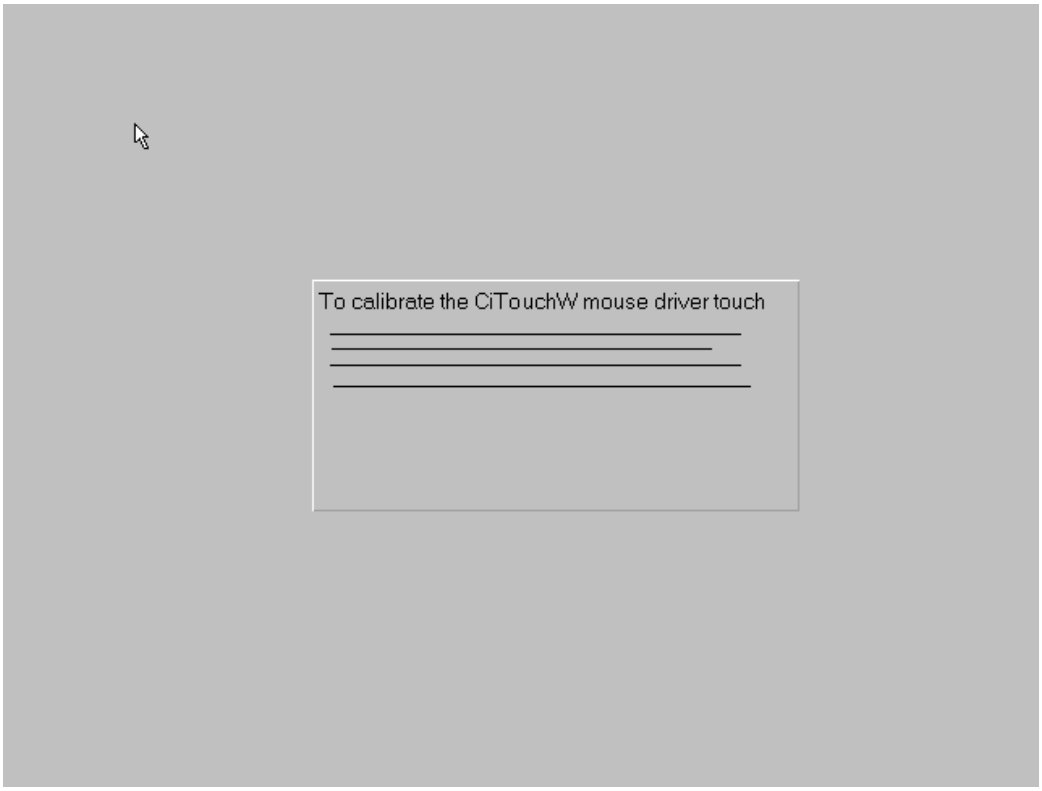


(Cont'd)

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(Cont'd)

j) Touch with a finger the pointers (white arrows) that appear in sequence.



k) When the calibration is finished, the **Citron Infrared Touch Setup** window appears. Press ALT + L (**Close**) to save the setting and exit.

l) Remove the keyboard and close the rear door.

TechPub_2614345_0105 - 09_MM81534_11en.fm

9.2.4-6 TPOP - Change Flexbox Hard Disk

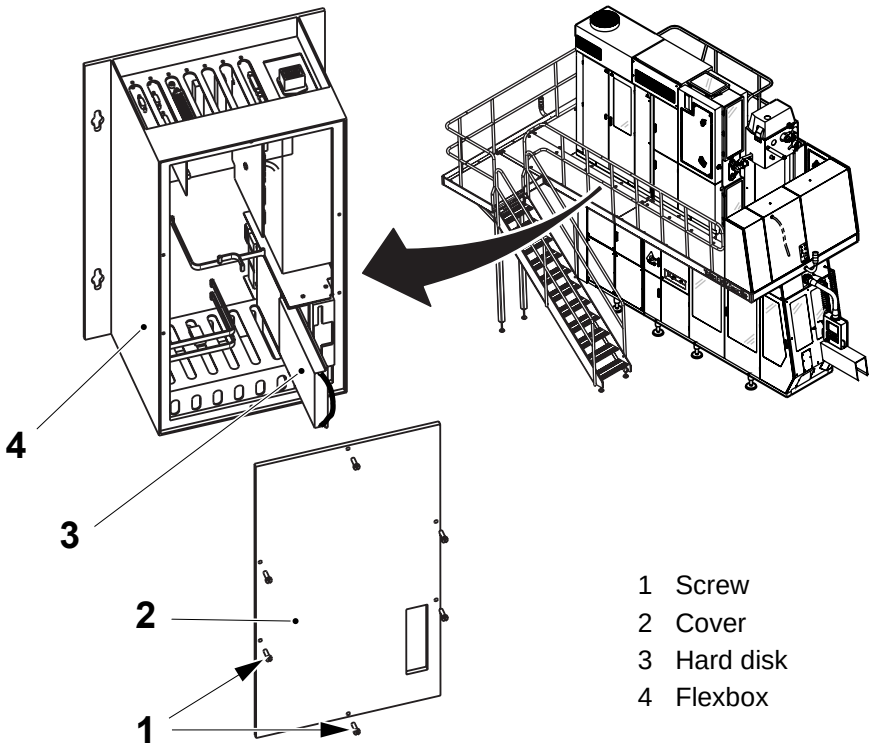
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Hard Disk Copy Tool TP No. 90459-6473
SPC Reference	1363288-0300

a) Open the door of the electrical cabinet and disconnect the 24 V DC power connector to the flexbox.

b) Remove the six screws (1) and the cover (2).

c) Pull out the hard disk (3) from the flexbox (4).

- If the hard disk is broken, continue with item l) to n) to fit the new hard disk and then follow the instructions in section 9.2.4-7 TPOP - Install Software
- If the hard disk is being changed as part of the machine's TPMS schedule, continue with item d).



1 Screw
2 Cover
3 Hard disk
4 Flexbox

(Cont'd)

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(Cont'd)

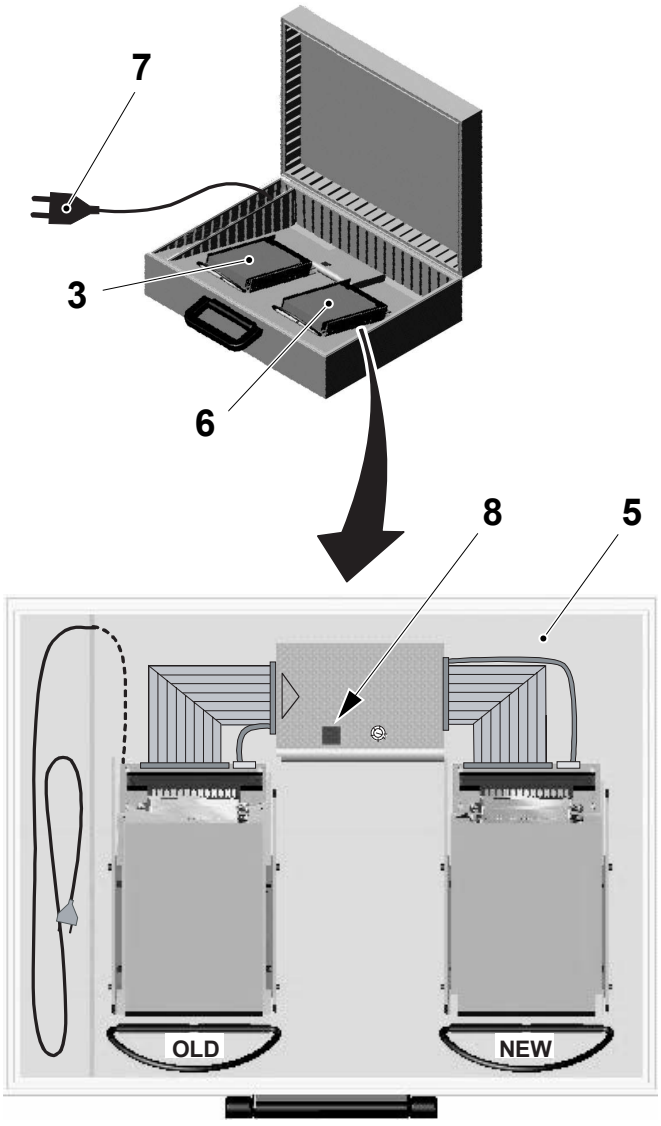
Note! The new hard disk must be equal to or greater in capacity to the existing hard disk.

d) Connect the hard disk (3) to the bay in the hard disk copy tool (5) marked OLD.

e) If not already connected, connect the new hard disk (6) to the bay in the hard disk copy tool (5) marked NEW.

f) Connect the hard disk copy tool power cable (7) to a suitable power supply outlet.

g) Press the BLUE button (8) firmly to apply power to the two hard disks.



3 Hard disk
5 Hard disk copy tool
6 New hard disk
7 Power cable
8 Blue button

(Cont'd)

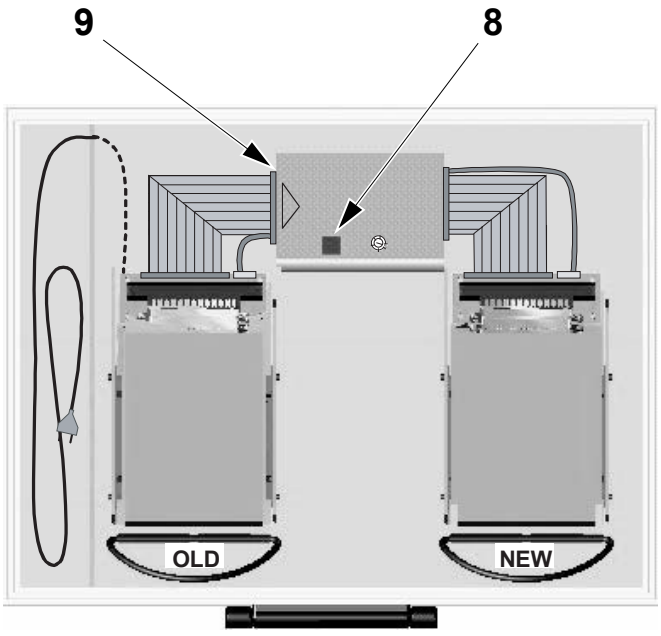
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(Cont'd)

Note! If the POWER LED (9) turns from green to red when the BLUE button is pressed, this indicates a hard disk error and the hard disk copy tool cannot be used, see Hard Disk Copy Tool - Error Handling for more information. Fit the new hard disk to the flexbox and follow the instructions in 9.2.4-7 TPOP - Install Software to continue the installation.

h) After approximately 15 seconds the POWER LED (9) turns green. Press the BLUE button (8) once again to start the disk-to-disk copy, the approximate copy time is stated in the table below:

ISIC S/N as Printed on the TPOP Hard Disk	Hard Disk Capacity	Copy Time
HD0300…	5 GB	6 minutes
HD0400...	10,5 GB	11 minutes
HD0500...	20 GB	12 minutes
HD0600...	30 GB	15 minutes



8 Blue button
9 Power LED

(Cont'd)

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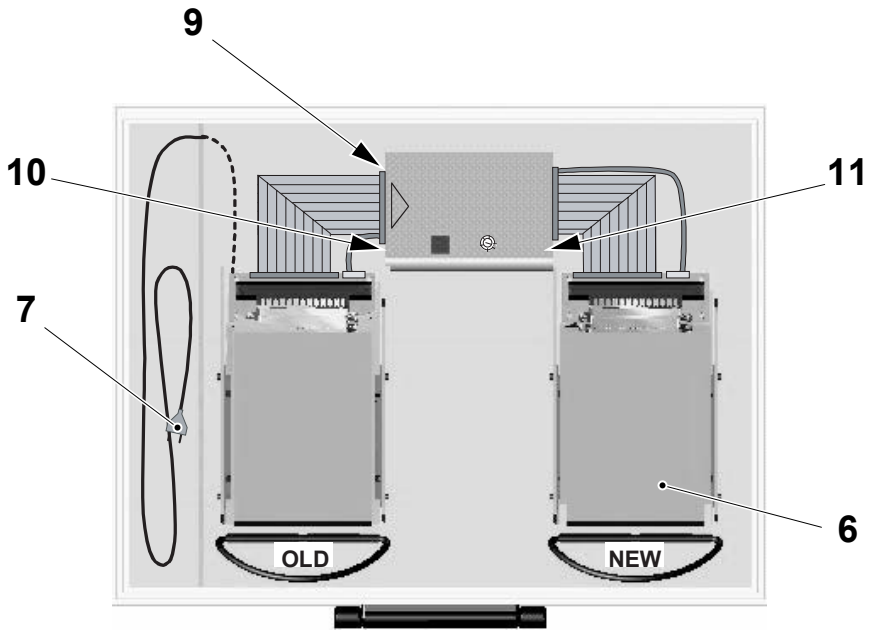
(Cont'd)

Note! If the POWER LED (9) turns from green to red during the copy process, this indicates a hard disk error and the hard disk copy tool cannot be used, see Hard Disk Copy Tool - Error Handling for more information. Fit the new hard disk to the flexbox and follow the instructions in 9.2.4-7 TPOP - Install Software to continue the installation.

i) During the copying process the POWER LED (9) flashes green and the two hard disk connection LED's (10) and (11) have a fixed red light.

j) An audible signal indicates when the copy process is completed and the POWER LED (9) changes to a fixed green light. Approximately 3 seconds after the copy has been completed, the power to the two hard disks is automatically switched off and the POWER LED (9) fixed green light goes out.

k) Disconnect the power cable (7) and remove the new hard disk (6).



6 New hard disk
7 Power cable
9 Power LED
10 Hard disk LED
11 Hard disk LED

(Cont'd)

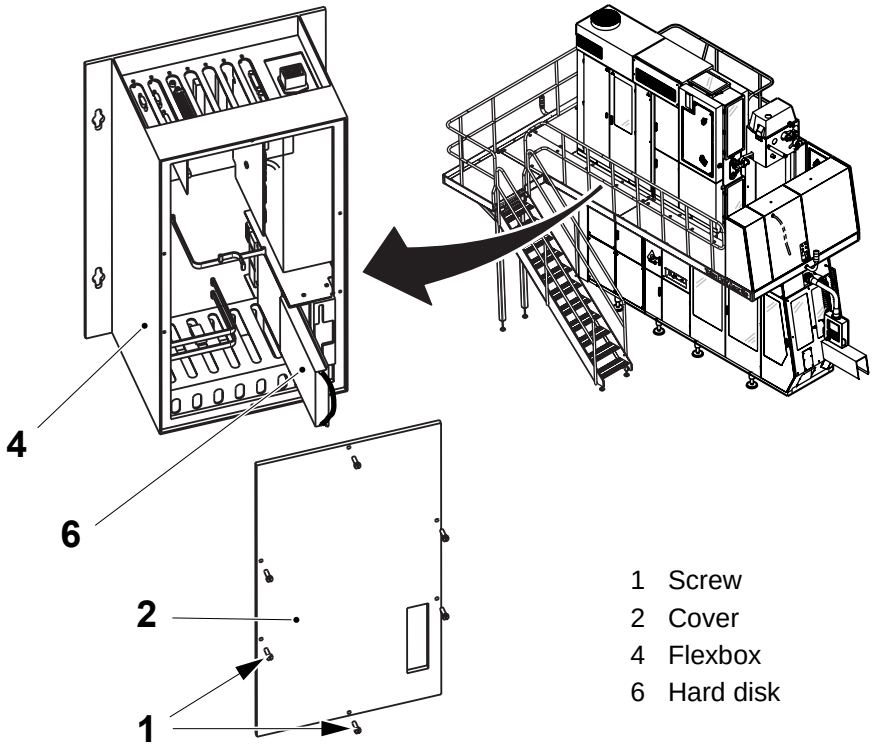
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(Cont'd)

l) Fit the new hard disk (6) into the flexbox (4).

m) Fit the six screws (1) and the cover (2).

n) Open the door of the electrical cabinet and connect the 24 V DC power connector to the flexbox.



1 Screw
2 Cover
4 Flexbox
6 Hard disk

(Cont'd)

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(Cont'd)

Hard Disk Copy Tool - Error Handling

Note! To power off the hard disks at any moment, press the blue button for approximately 10 seconds.

The hard disk copy tool is used to copy the complete contents including configuration data of an existing TPOP hard disk to a new hard disk. The hard disk copy tool does not manage bad sectors when copying, therefore if a problem reading a sector of the existing hard disk occurs, the copy process is aborted and an error is reported by both a visual (LED) and audible (beep) error signal.

The hard disk copy tool has the following audible error signals:

- A series of long beeps indicates that there is a problem with the old hard disk, for example; a bad connector or disk error
- A series of short beeps indicates that there is a problem with the new hard disk, for example; a bad connector or disk error
- A combination of two short and one long beeps indicates that there is a problem with both the old hard disk and the new hard disk, for example; a bad connector or disk error. This may also indicate that the new hard disk capacity is smaller than the capacity of the old hard disk.

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9.2.4-7 TPOP - Install Software

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Keyboard with PS/2 connector
SPC Reference	1363288-0300 1095912-0500

WARNING

Hazardous voltage.

There is high voltage in the electrical cabinet (up to 560 V). In case of an accident call for medical attention immediately.

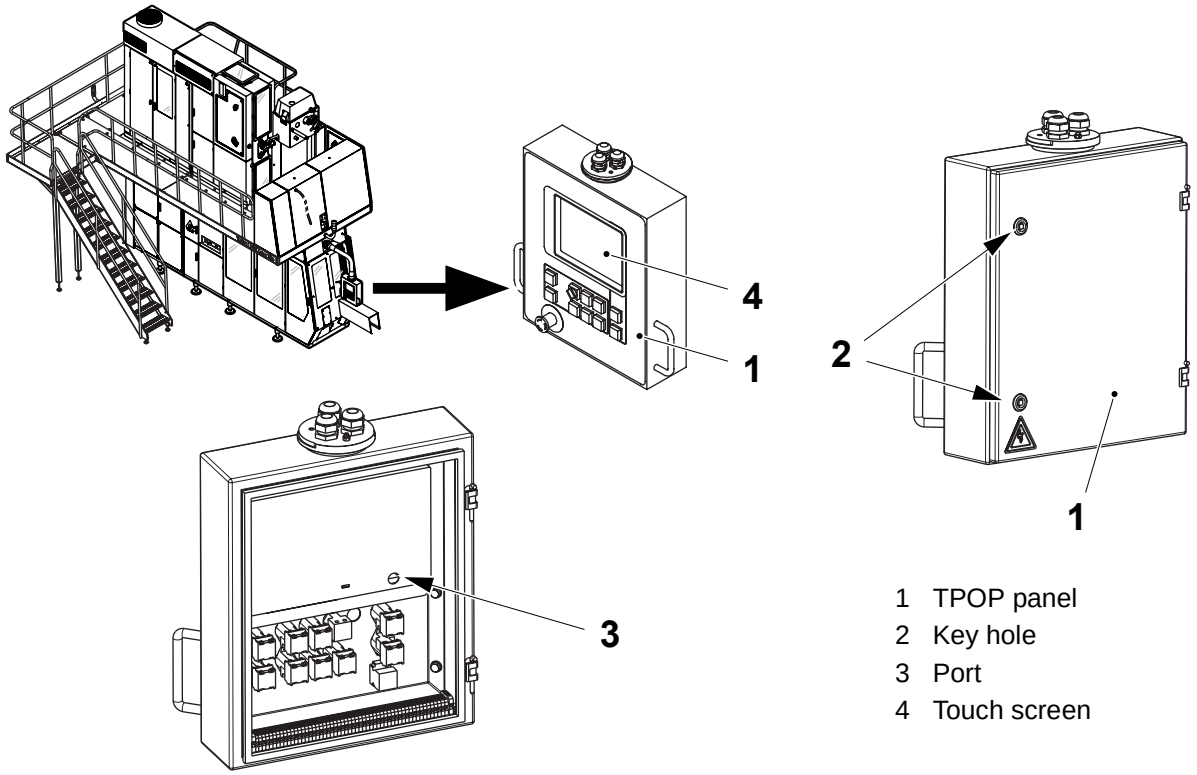
Fit Keyboard

a) Open the door at the rear of the TPOP panel (1) by means of a key in the keyholes (2).

b) Connect a keyboard to the port (3) at the rear of the touch screen (4).

c) Switch **On** the main power.

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1 TPOP panel
2 Key hole
3 Port
4 Touch screen

(Cont'd)

(Cont'd)

Updating Previous Installed Programs

If updating one or more programs on a previous installation then jump directly to the specific software sections following the order shown below.

- Installation or Updating of MS-DOS 6.22 on page 9-92
- TPOP Basic on page 9-94
- Installation or updating of Windows 3.11 on page 9-94
- InTouch 5.6b on page 9-94
- PLMS DDE on page 9-96
- HMI on page 9-97
- PLMS DDE Config on page 9-98
- PLMS Send System on page 9-106.

CAUTION

Risk of damage to the equipment.

For correct installation of the software onto an empty hard disk, follow exactly the order of instructions below.

Installation or Updating of MS-DOS 6.22

Note! By removing the MS-DOS, all the data logged and the software installed are deleted.

a) Insert the disk **DOS disk 1 - Setup** in drive A.

b) Reboot the system and press the **DELETE** key to enter the **BIOS** Setup program.

c) Select **AUTO CONFIGURATION WITH POWER-ON DEFAULTS**, and then press **ENTER.** At the dialog box press **Y,** and then press **ENTER.** This sets the disk boot sequence to “A, C”.

(Cont'd)

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(Cont'd)

d) Select **WRITE TO CMOS AND EXIT**, and then press **ENTER**. At the dialog box press **Y**, and then press **ENTER**. The parameters previously set are written in the CMOS memory and the system boots from drive A.

e) The MS-DOS 6.22 Setup starts. Press **ENTER**.

- Installation of MS-DOS 6.22:
  Select **Configure unallocated disk space (recommended)**, and press **ENTER** twice. The system reboots formatting drive C.
- Updating of MS-DOS 6.22:
  Select **Continue Setup and replace your current version of DOS** and press **ENTER**.

f) Accept or set the **Date/Time**, the **Country** to United States and the **Keyboard Layout** to United States. Select **The settings are correct** and press **ENTER**.

g) Accept the default path for MS-DOS C:\DOS and then press **ENTER**.

h) When the installation is finished, remove the disk and press **ENTER** twice.

i) The system reboots. Press the **DELETE** key to enter the BIOS Setup program.

j) Select **AUTO CONFIGURATION WITH BIOS DEFAULTS**, and then press **ENTER**. At the dialog box press **Y**, and then press **ENTER**. This sets the disk boot sequence to “C, A”.

k) Select **WRITE TO CMOS AND EXIT**, and then press **ENTER**. At the dialog box press **Y**, and then press **ENTER**. The parameters previously set are written in the CMOS memory and the system boots from drive C.

(Cont'd)

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(Cont'd)

TPOP Basic

a) Reboot the system.
   - Installation of TPOP:
     Wait until the MS-DOS prompt appears.
   - Updating of TPOP:
     When, during the boot sequence, the message **"Starting MS-DOS..."** appears, press **D** to stop the procedure.

b) Insert the disk **TPOP basic disk 1** in drive A.

c) At the MS-DOS prompt type **A:\install** and then press **ENTER**.

d) Press any key to continue.

Installation or updating of Windows 3.11

a) Reboot the system.
   When, during the boot sequence, the message **"Starting MS-DOS..."** appears, press **D** to stop the procedure.

b) At the MS-DOS prompt type **C:\utility\setuptpw** and then press **ENTER**.
   This starts the TPOP Setup script.

c) Insert the disk Windows Disk 1 - Setup in drive A and press any key to continue.

d) The Windows 3.11 Setup starts. Press **ENTER** to accept the default hardware configuration.

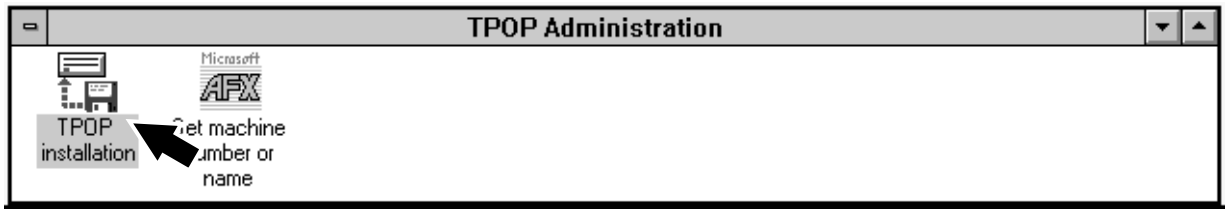
e) Follow the instructions on the screen, and change disk when required.

InTouch 5.6b

a) Reboot the system.
   When, during the boot sequence, the message **"Starting MS-DOS..."** appears, press **H** to start Windows 3.11.

b) Insert the disk **InTouch Runtime disk 1** in drive A.

c) In the TPOP Administrator window select the TPOP installation icon, and then press **ENTER**.

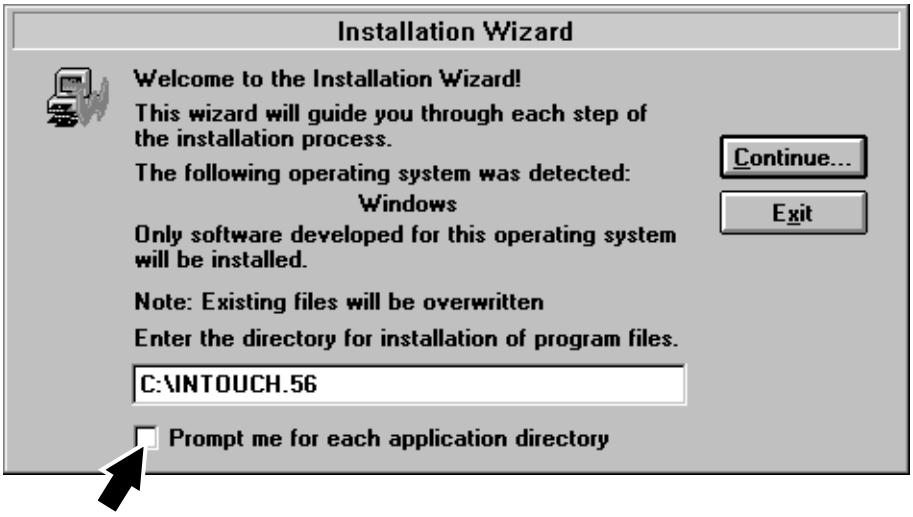


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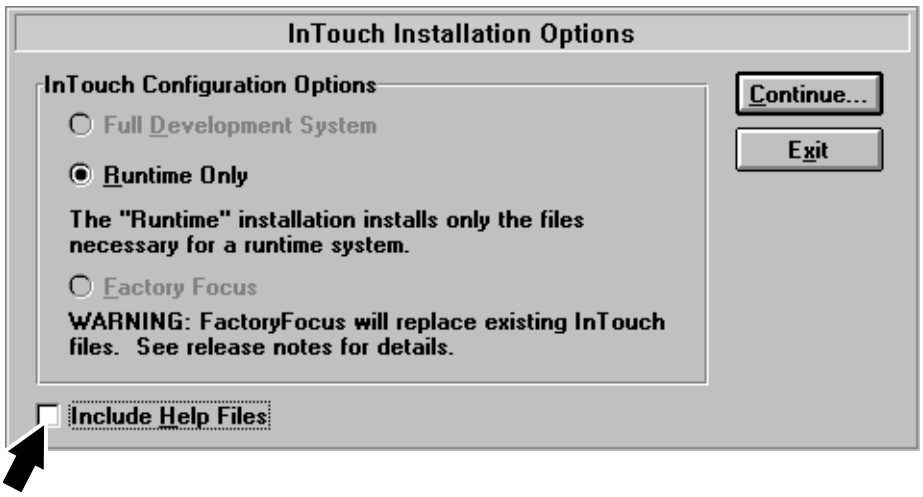
(Cont'd)

d) In the **Installation Wizard** window change the installation directory to C:\INTOUCH.56 and make sure that the check-box **Prompt me for each application directory** is **not** selected. Press **ENTER**.



e) Un-select the **Include Help Files** check-box, and then press **ENTER**.

f) Follow the instructions on the screen, and change disk when required.



(Cont'd)

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(Cont'd)

Note! The following software (PLMS DDE, HMI, PLMS DDE config, PLMS Send) could also be installed separately.

PLMS DDE

a) If the **TPOP Administration** window is available on the screen it is possible to continue installing the software. Continue with b) below.

If not, and you want to install more software, reboot the system as follows:

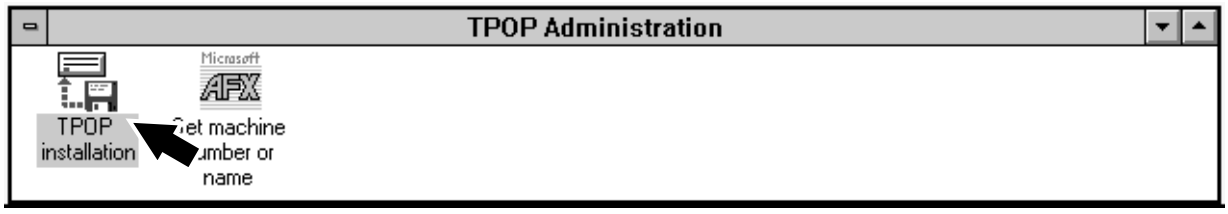
– Press **ALT-F4** until **Exit Windows** appears. Press **OK**.

– On the keyboard, press **CTRL-ALT-DEL**.

During the boot sequence, the message **"Starting MS-DOS..."** appears, press **H** to start Windows 3.11.

b) Insert the disk marked **"PLMSDDE disk 1"** in drive A.

c) In the **TPOP Administration** window select the **TPOP installation** icon, and then press **ENTER**.



d) Follow the instructions on the screen, and then press **ENTER** to accept the default values.

e) Remove the installation disk from the drive.

If required to **install more software**, continue with the appropriate instruction below.

If installing new software has been finished, exit from Windows by pressing **ALT-F4**. Press **OK** in the **Exit Window** appearing. Press **CTRL-ALT-DEL** on the keyboard. The TPOP system will start up. Remove the keyboard and close the rear door.

(Cont'd)

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(Cont'd)

HMI

a) If the **TPOP Administration** window is available on the screen it is possible to continue installing the software. Continue with b) below.

If not, and you want to install more software, reboot the system as follows:

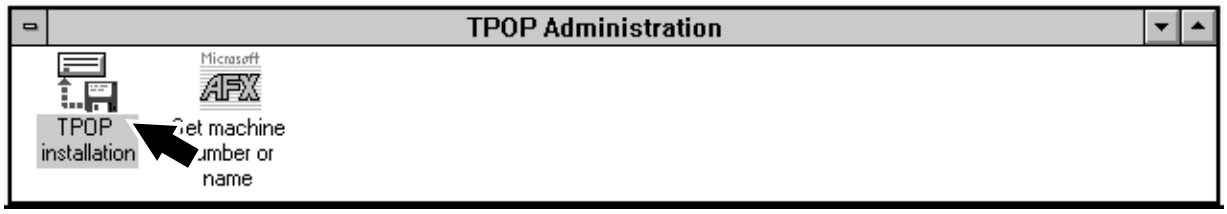
– Press **ALT-F4** until **Exit Windows** appears. Press **OK**.

– On the keyboard, press **CTRL-ALT-DEL**.

During the boot sequence, the message **"Starting MS-DOS..."** appears, press **H** to start Windows 3.11.

b) Insert the disk marked **"TPOPHMI21 disk 1"** in drive A.

c) In the **TPOP Administration** window select the **TPOP installation** icon, and press **ENTER.**



d) Follow the instructions on the screen, and press **ENTER** to accept the default values.

e) Remove the installation disk from the drive.

If required to **install more software**, continue with the appropriate instruction below.

If installing new software has been finished, exit from Windows by pressing **ALT-F4**. Press **OK** in the **Exit Window** appearing. Press **CTRL-ALT-DEL** on the keyboard. The TPOP system will start up. Remove the keyboard and close the rear door.

(Cont'd)

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(Cont'd)

PLMS DDE Config

a) If the **TPOP Administration** window is available on the screen it is possible to continue installing the software. Continue with b) below.

If not, and you want to install more software, reboot the system as follows:

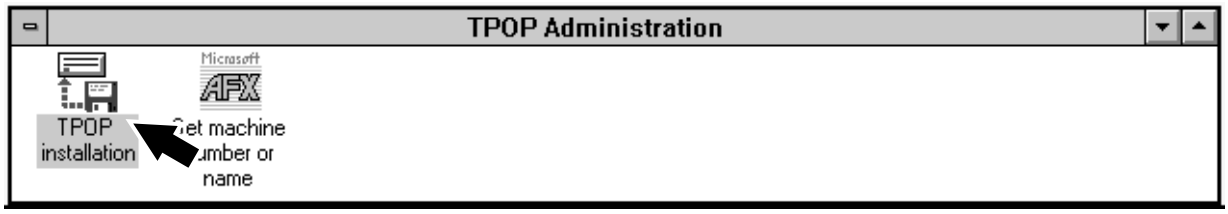
– Press **ALT-F4** until **Exit Windows** appears. Press **OK**.

– On the keyboard, press **CTRL-ALT-DEL**.

During the boot sequence, the message **"Starting MS-DOS..."** appears, press **H** to start Windows 3.11.

b) Insert the disk marked **"PLMSDC21 disk 1"** in drive A.

c) In the **TPOP Administration** window select the **TPOP installation** icon, and then press **ENTER**.



d) Press **ENTER**, click on **YES**, and then click on **OK**.

Note! If the software already is installed another window will appear with the text "C:\PLMS\DATA already exists! Continue?".
Select "Yes" to continue the installation.
The old installation will be overwritten.

(Cont'd)

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(Cont'd)

e) **Valid for machine number before 15011/00189**
In the PLMS install window touch the machine identification field (2) and enter the machine serial number (e.g.: 15000/00100).

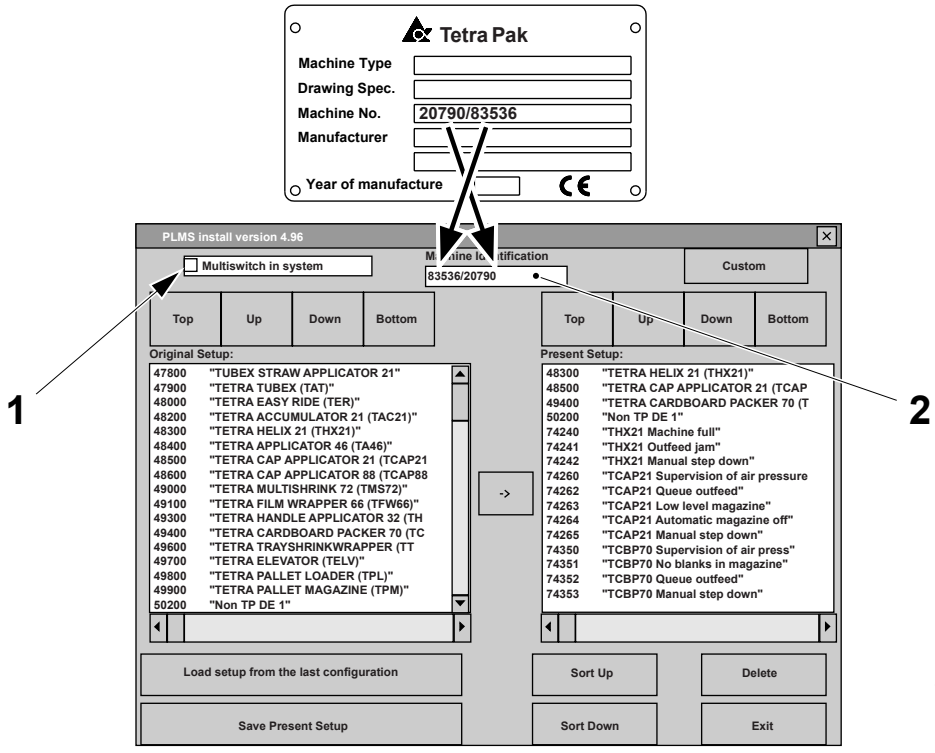
Valid for machine number from 15011/00189
In the PLMS install window you set the machine serial number. Touch the machine identification field (2) for activating it, then use the keyboard to type the **last** five digits of the machine number followed by "/" and then the **first** five digits.

If the machine identity is set in a previous installation, this serial number will be suggested.

Note! The machine serial number is found on the LH side of the machine below the Control Panel on the identification sign.

f) If the filling machine is connected to more than one packaging line chosen according to the need, check the **Multiswitch in system** box (1).

Note! When a multi switch is used, DE stop reasons can't be automatically assigned to the filling machine conveyor congestion stop. Checking the **Multiswitch in system** box (1) disables automatic "DE stops catch" functionality.



1 Multiswitch in system box
2 Machine identification field

(Cont'd)

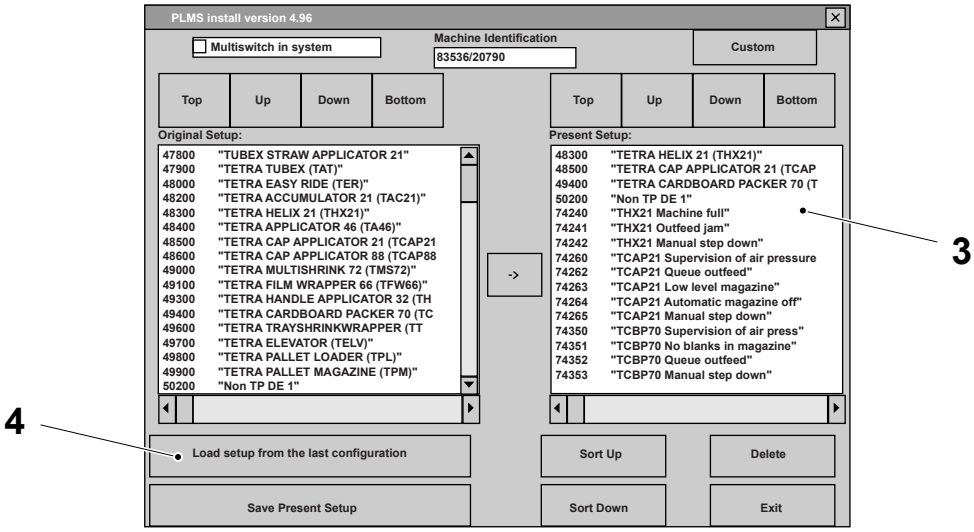
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(Cont'd)

Note! Pages 9-100 to 9-102 describes the **Packaging line configuration** in the **PLMS DDE config** section.

g) In the **PLMS install** window you can also configure the PLMS operator list, the **Present Setup** (3) list, in order to include only the DE equipment present in the packaging line.

After a new installation, the LOAD SETUP FROM THE LAST CONFIGURATION button (4) is displayed and you can touch it to load the old setup into the **Present Setup** (3) list.



3 Present Setup

4 LOAD SETUP FROM THE LAST CONFIGURATION button

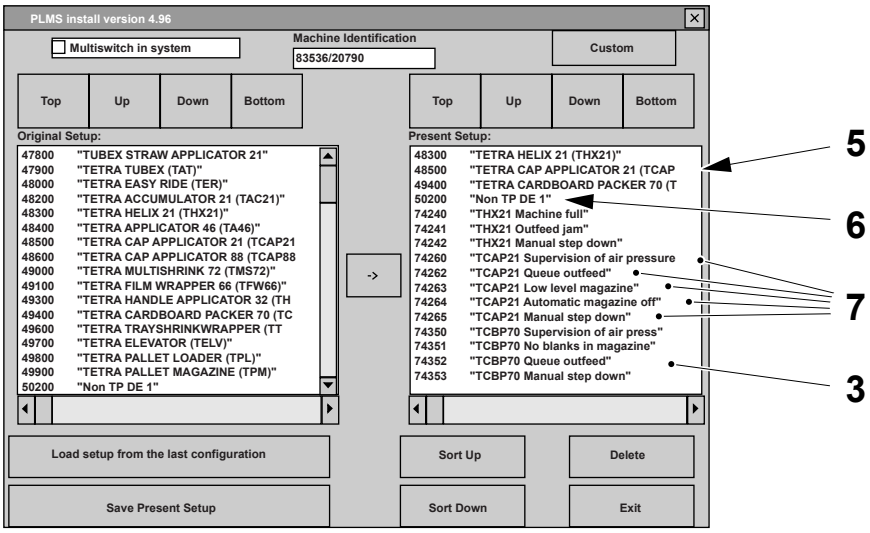
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(Cont'd)

The configuration shown in the **Present Setup** (3) list must fulfil the following demands:

- Each TP DE you have in the packaging line must be present in the **Present Setup** (3) list through several text rows:
  - One text (preceded by 4xxxx code) stating the DE name (5).
  - One or more text rows (preceded by 74xxx codes) stating the DE acronym followed by an event description (7).
- Each NON TP DE you have in the packaging line must be present in the **Present Setup** (3) list through one text row that will look as the following:
  - "NON TP DE N" (preceded by 50xxx code) where N is a progressive number from 1 to 3 (6).
- The 4xxxx and 50xxx must be sorted in the same order as the DE's are placed in the line (you do not need to sort 74xxx codes).



3 Present Setup
5 DE name
6 Non TP DE
7 DE acronym followed by an event description

(Cont'd)

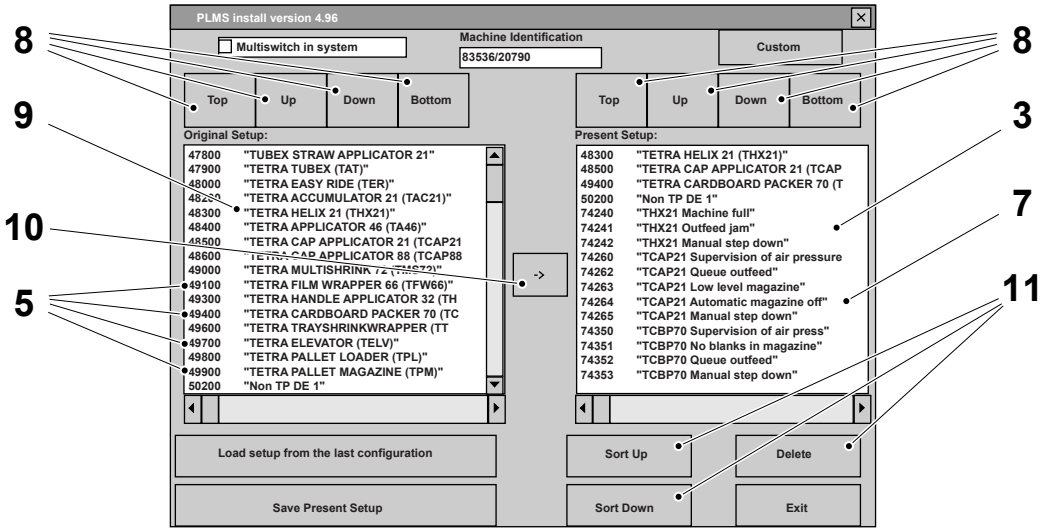
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(Cont'd)

If needed arrange the **Present Setup** (3) list:

- Use the SCROLL buttons (8) to scroll the list and to mark the desired item. Touch the COMMAND buttons (11) below the **Present Setup** (3) list to sort or to delete it.
- If an item is missing in the **Present Setup** (3) list you can pick it from the **Original Setup** (9) list. Use the SCROLL buttons (8) to scroll the list and to mark the desired item. Touch the MOVE button (10) to move it to the **Present Setup** (3) list. The **Original Setup** (9) list includes all possible DE names (5) and their related event descriptions (7).

Note! If you pick 4xxxx code from the **Original Setup** (9) list you **must** also pick all related 74xxx codes. If you delete a 4xxxx code from the **Present Setup** (3) list **you must delete** all related 74xxx



3 Present Setup
5 DE name
7 DE acronym followed by an event description
8 SCROLL button
9 Original Setup
10 MOVE button
11 COMMAND button

(Cont'd)

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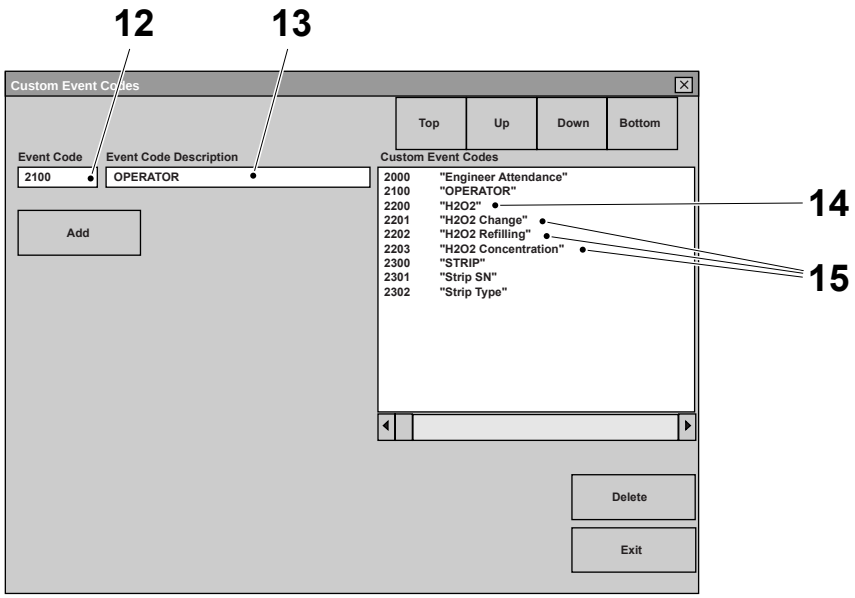
(Cont'd)

Note! Pages 9-103 to 9-104 describes the **Customized event code setting** in the **PLMS DDE config** section.

In the PLMS install window it is possible to configure the **PLMS Customized Operator list**. This is a list of customer defined events that can be recorded in the PLMS log files at any time, with extra alphanumeric text input by the operator.

The Custom Operator list is composed of **Event Code Description** (13), associated to an **Event Code** (12) between 2100 and 2599. The list must be structured in groups (14) and details (15). A group (14) has a code ending with “00” (ex 2300). Details (15) codes are assigned to a group of 99 numbers (e.g. 2301 - 2399).

A special Event Code is 2000. When it is added to the list, the Engineer Attendance recording function is enabled. This allows the operator, at every machine stop, to log the stop with the extra information “Engineer Attendance” by checking the box in the PLMS display.



12 Event code
13 Event code description
14 Group
15 Detail

(Cont'd)

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(Cont'd)

a) Touch the CUSTOM button (16).

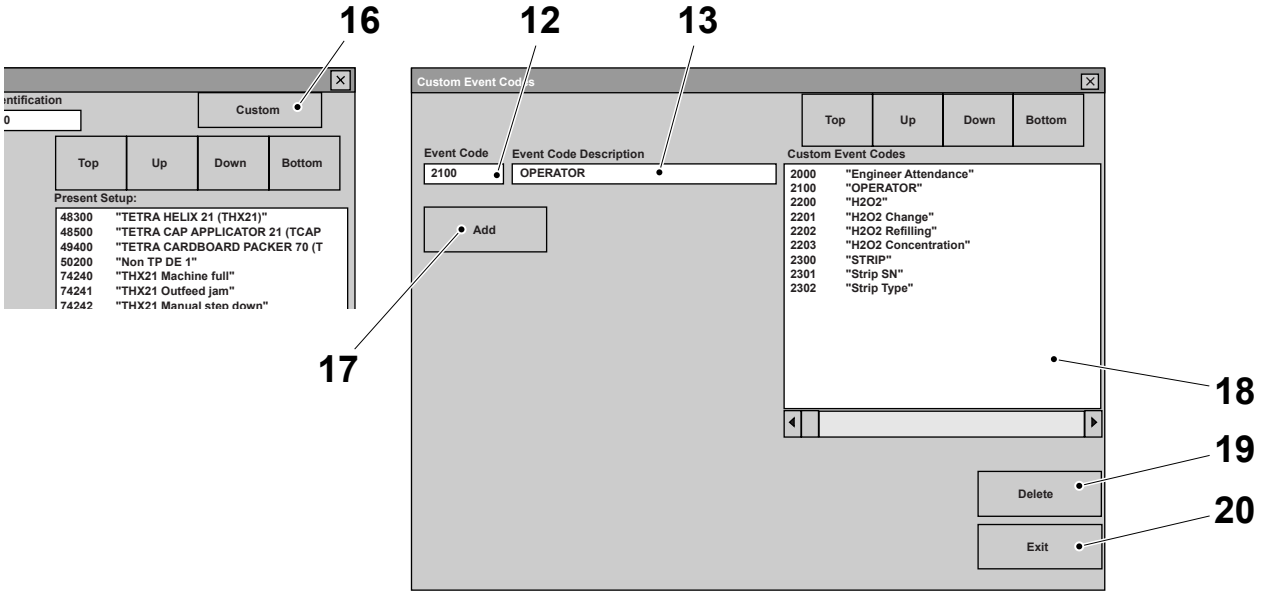
b) Enter the group code or the detail code in the **Event Code** field (12) by using an external keyboard. Enter the event description in the **Event Code Description** field (13).

c) Touch the ADD button (17) to add the event to the **Custom Event Codes** list (18).

d) If required, an event may be deleted by touching the DELETE button (19).

e) Repeat items b) to d) until all the **Custom event codes** have been created.

f) Touch the EXIT button (20).



12 Event code
13 Event code description
16 CUSTOM button
17 ADD button
18 Custom event codes
19 DELETE button
20 EXIT button

(Cont'd)

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(Cont'd)

Note! This page describes the **Saving of all configurations and settings** in the **PLMS DDE config** section.

a) If you have loaded the last configuration or if you have modified the **Present Setup** (3) list or the **Custom Event Codes** list, touch SAVE PRESENT SETUP button (21) to save the configuration.

Note! This could take several minutes.

b) Touch EXIT button (22). This will also save the **machine identification** and the **Multiswitch in system** information.

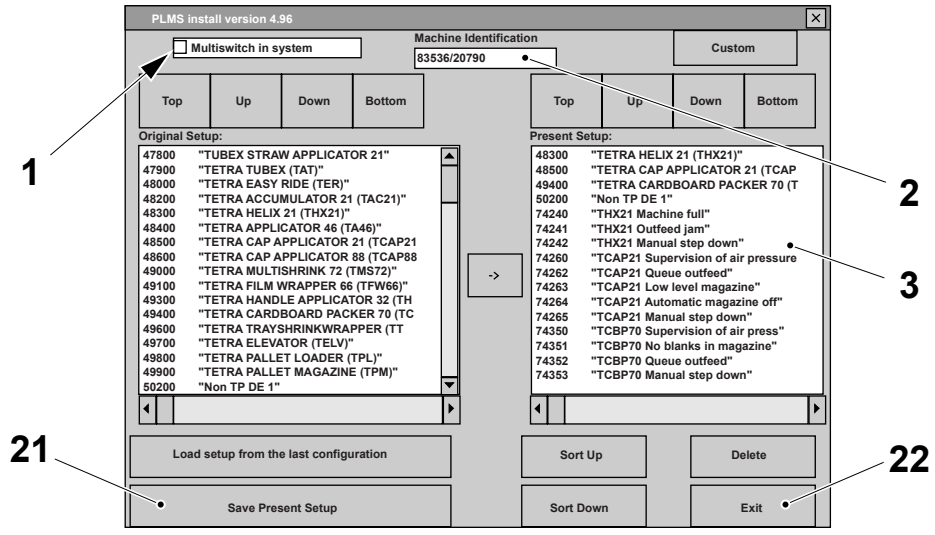
Note! If you have loaded the last configuration or if you have changed the **Present Setup** (3) or the **Custom Event Codes** list and you exit without touching the SAVE PRESENT SETUP button (21), all changes will be lost.

Note! If you have only changed the **machine identification** field (2) or the **Multiswitch in system** box (1), then you do not need to touch the SAVE PRESENT SETUP button (21).

c) Press **OK** to acknowledge, and remove the installation disk from the drive.

If required to **install more software**, continue with the appropriate instruction below.

If installing new software has been finished, exit from Windows by pressing **ALT-F4**. Press **OK** in the **Exit Window** appearing. Press **CTRL-ALT-DEL** on the keyboard. The TPOP system will start up. Remove the keyboard and close the rear door.



1 Multiswitch in system box
2 Machine identification field
3 Present Setup
21 SAVE PRESENT SETUP button
22 EXIT button

(Cont'd)

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(Cont'd)

PLMS Send System

a) Reboot the system as follows, without starting the TPOP programs:
   - Press **ALT-F4** until **Exit Windows** appears. Press **OK**.
   - On the keyboard, press **CTRL-ALT-DEL**.

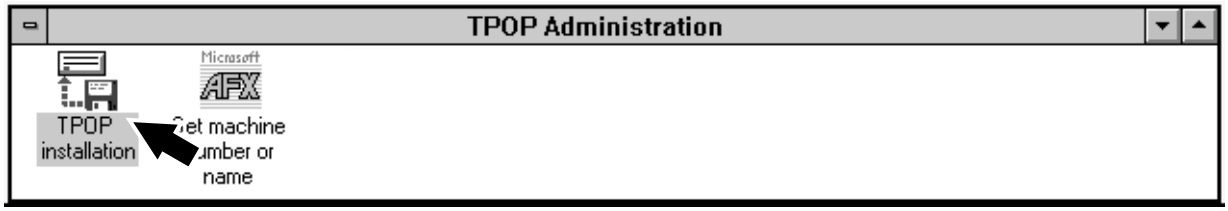
   When the text **"Starting MS-DOS..."** appears during the rebooting sequence, press **H** to start Windows 3.11.

b) Insert the disk marked "**PLMSS**" in drive **A**.

c) In the **TPOP Administration** window, select the **TPOP installation** icon, and press **ENTER**. The installation starts.

d) Follow the instructions on the screen. Press **ENTER** to accept the default values.

e) Remove the installation disk from the drive.



If installing new software has been finished, exit from Windows by pressing **ALT-F4**. Press **OK** in the **Exit Window** appearing. Press **CTRL-ALT-DEL** on the keyboard. The TPOP system will start up. Remove the keyboard and close the rear door.

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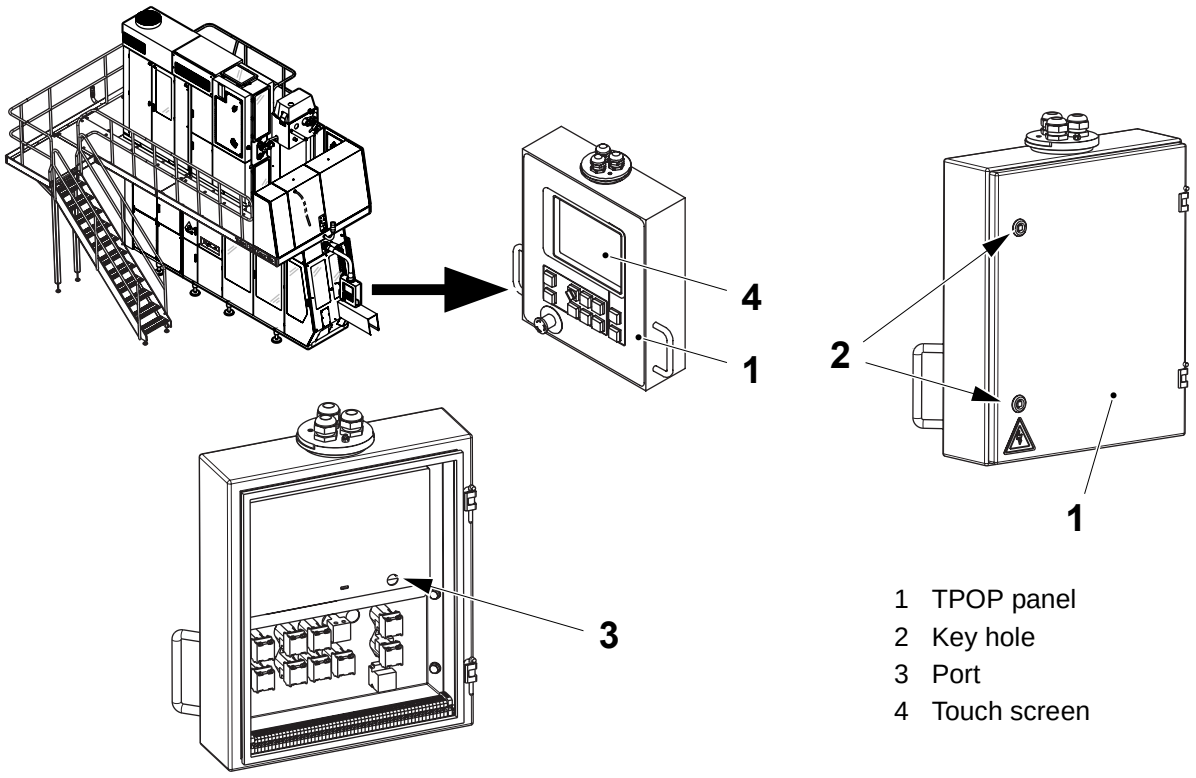
9.2.4-8 TPOP - Change PLMS Configuration

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Keyboard with PS/2 connector
SPC Reference	1363288-0300 1095912-0500

a) Open the door at the rear of the TPOP panel (1) by means of a key in the keyholes (2).

b) Connect a keyboard to the port (3) at the rear of the touch screen (4).

c) Switch **On** the main power.



1 TPOP panel
2 Key hole
3 Port
4 Touch screen

(Cont'd)

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(Cont'd)

In the Windows software, from the **TPOP Administration** window, it is possible to change machine identification, the multiswitch in the system information, packaging line configuration and the customized event codes directly. Do as follows:

a) If the **TPOP Administration** window is available on the screen it is possible to continue directly. See b) below

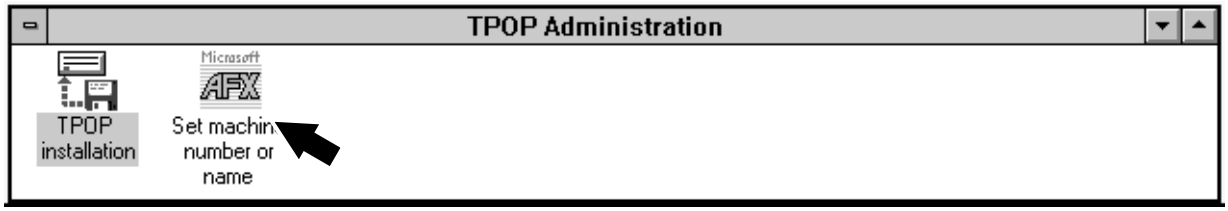
   If not, reboot the system as follows:

   – Press **ALT-F4** until **Exit Windows** appears. Press **OK**.

   – On the keyboard, press **CTRL-ALT-DEL**.

   During the boot sequence, the message **"Starting MS-DOS..."** appears, press **H** to start Windows 3.11.

b) In the **TPOP Administration** window, select **Set machine number or name**. Press **ENTER**.



c) To set the machine identification or the multiswitch in the system information, follow the procedure in PLMS DDE Config on page 9-99.

d) To set the packaging line configuration, follow the procedure in PLMS DDE Config on page 9-100 in item g).

e) To set the customized event codes, follow the procedure in PLMS DDE Config on page 9-104.

f) Reboot the system as follows:

   – Press **ALT-F4** until **Exit Windows** appears. Press **OK**.

   – On the keyboard, press **CTRL-ALT-DEL**.

g) Remove the keyboard and close the rear door.

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9.2.4-9 TPOP - Configure and Check PLMS Line Supervision

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Keyboard with PS/2 connector
SPC Reference	1363288-0300 1095912-0500

PLMS line supervision allows the PLMS to automatically collect data from the Distribution Equipment, DE, through a communication cable.

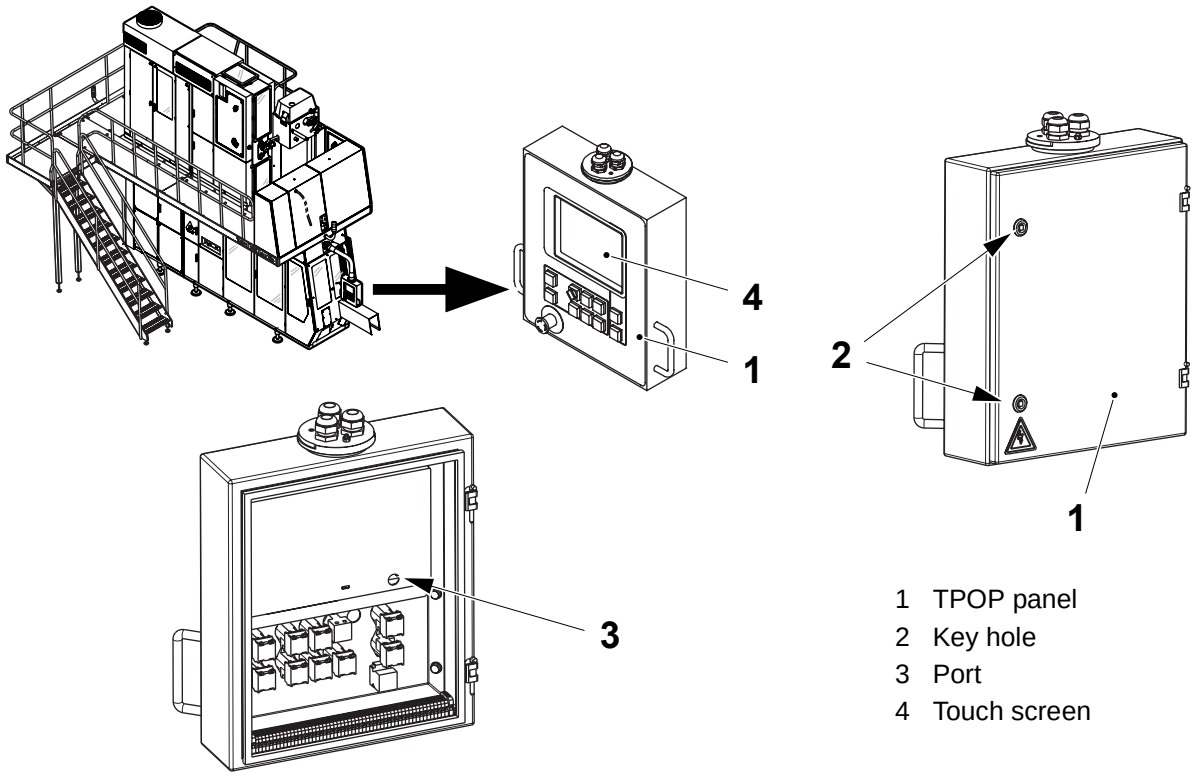
Note! The Line Supervision option is available when the filling machine is connected to the downstream equipment with a communication cable. Order the *OK-1350697-0100 Line supervision* if the cable was not delivered with the machine.

Configure and check the PLMS line supervision as follows:

a) Open the door at the rear of the TPOP panel (1) by means of a key in the keyholes (2).

b) Connect a keyboard to the port (3) at the rear of the touch screen (4).

c) Switch **On** the main power.



1 TPOP panel
2 Key hole
3 Port
4 Touch screen

(Cont'd)

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(Cont'd)

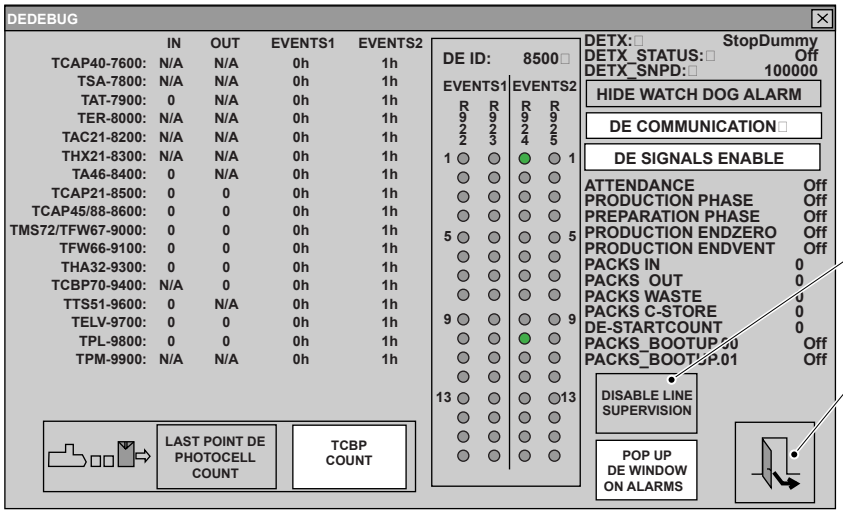
d) Touch the screen to activate it, then press the **F5** key. The **DEDEBUG** window appears.

e) Check if the Line supervision communication cable is present.

– If the Line supervision communication cable is not present. Touch the DISABLE LINE SUPERVISION button (5) for a few seconds to disable it. The button will turn white.

– If the Line supervision communication cable is present. Touch the DISABLE LINE SUPERVISION button (5) for a few seconds to activate the Line Supervision option. The button will be grey.

If the line supervision option is disabled then no further checks are needed. Touch the EXIT button (6) and skip the following items f) to n).



5 DISABLE LINE SUPERVISION button

6 EXIT button

(Cont'd)

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(Cont'd)

f) Temporarily disconnect the PLC cable from flexbox port COM3, see EM.

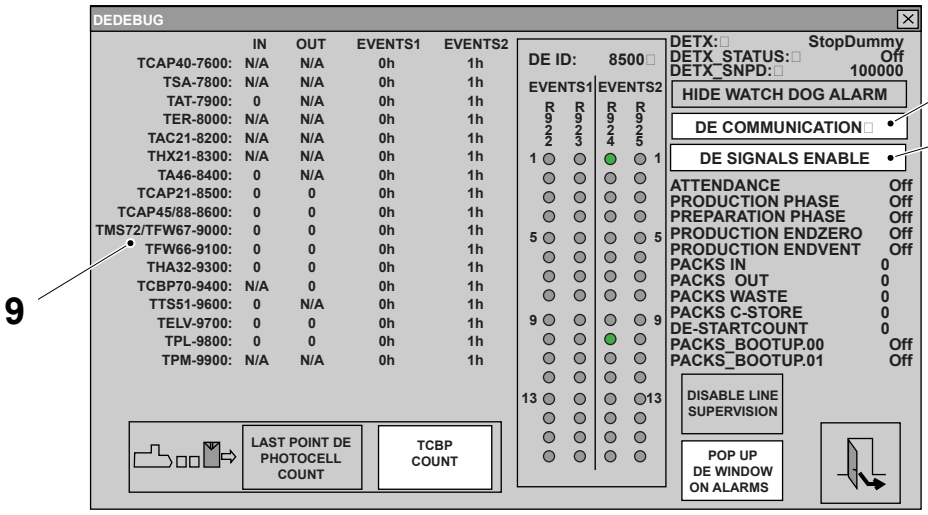
g) Touch the DE COMMUNICATIO**N** button (7) to start detecting the DE present on the packaging line. The button will turn green.

Note! Supported DE are listed in the left column of the **DEDEBUG** window.

h) The debugging starts and the analysis of the DE begins in numeric order. The Debug window activates as follows:

- the first column from the left (9) displays the **Identification Numbers** of the DE available for TBA/21 in bold. The numbers turn green when the corresponding DE is detected by the system
- **DETX** field = displays Identification Number of the DE which is being analysed or **Stop Dummy** when the search is completed
- **DETX_STATUS** field = displays ON as soon as the system analyses a DE, then turns to OFF if the DE is **NOT** found
- **DETX_SNPID** field = displays 100000 as default; displays a DE Identification Number as soon as the DE is found, then turns to 100000 again until another DE is found.

i) Wait two minutes, then touch the DE SIGNALS ENABLE button (8) to enable Event collection from the DE present on the packaging line (only if the packaging line is working).



7 DE COMMUNICATION button
8 DE SIGNALS ENABLE button
9 DE Identification Numbers

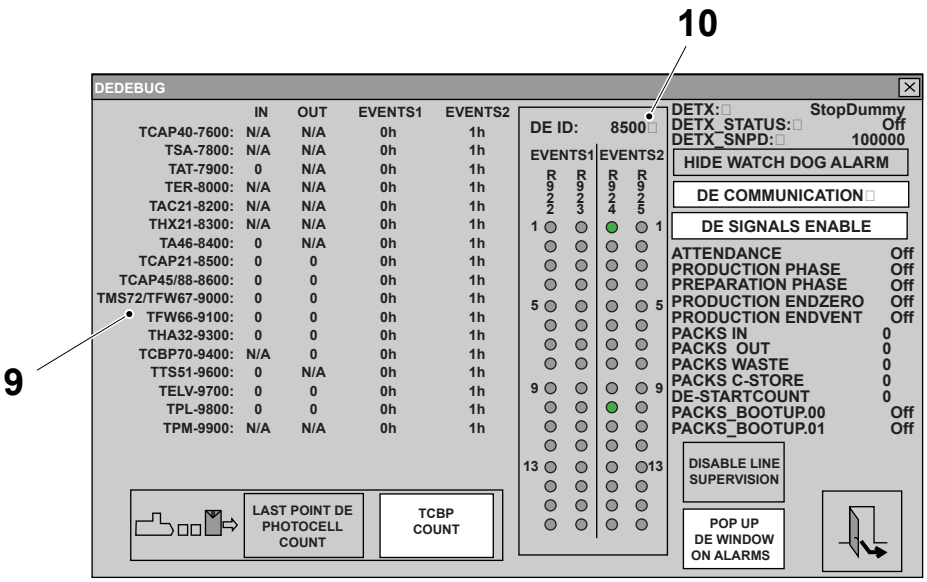
(Cont'd)

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(Cont'd)

If the packaging line is working, the Debug window displays the following supplementary data:

- column **IN** = Number of packages going into each DE
- column **OUT** = Number of packages coming out of each DE
- column **EVENTS1** = A register for 32 bit word1 in each DE for an event collection in hexadecimal format
- column **EVENTS2** = A register for 32 bit word2 in each DE for an event collection in hexadecimal format
- columns **R922, R923, R924, R925** = An event binary code relative to the DE displayed in box (10). It is activated by touching a DE identification number in column (9).
- **PACKS IN** field = Number of packages going into the filling machine
- **PACKS OUT** field = Number of packages coming out from the filling machine
- **PACKS WASTE** field = Number of packages wasted by the filling machine.



9 DE Identification Numbers
10 Binary code

(Cont'd)

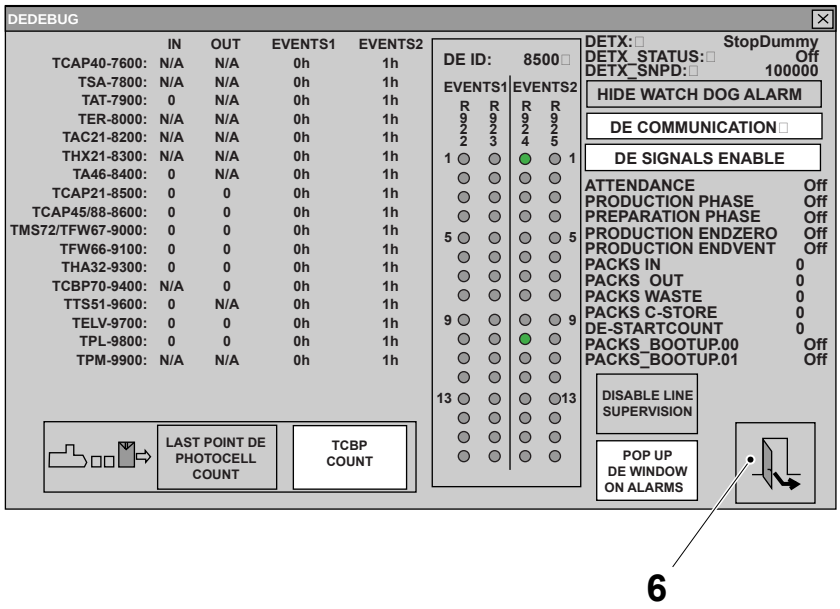
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(Cont'd)

j) When debugging is completed, touch the EXIT button (6) to Exit and return to the main HMI window.
If the program has not found some Distribution Equipment, carry out the following checks:

- check Line Supervision connections to TPOP flexbox, refer to the Electrical Manual
- check Line Supervision connectors, see *OK-1350697-0100 Line supervision* or the Electrical Manual
- check that the DE Identification Numbers have been properly programmed and that the DE hardware and software support Line Supervision
- repeat the Communication test.

k) Connect the PLC cable to flexbox port COM3, see EM.



6 EXIT button

(Cont'd)

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(Cont'd)

l) In the DEDEBUG window the source can be selected for the count of the number of packages coming out from the packaging line to the cold storage. This selection is not possible if **DE COMMUNICATION** is **ON**, (white button).

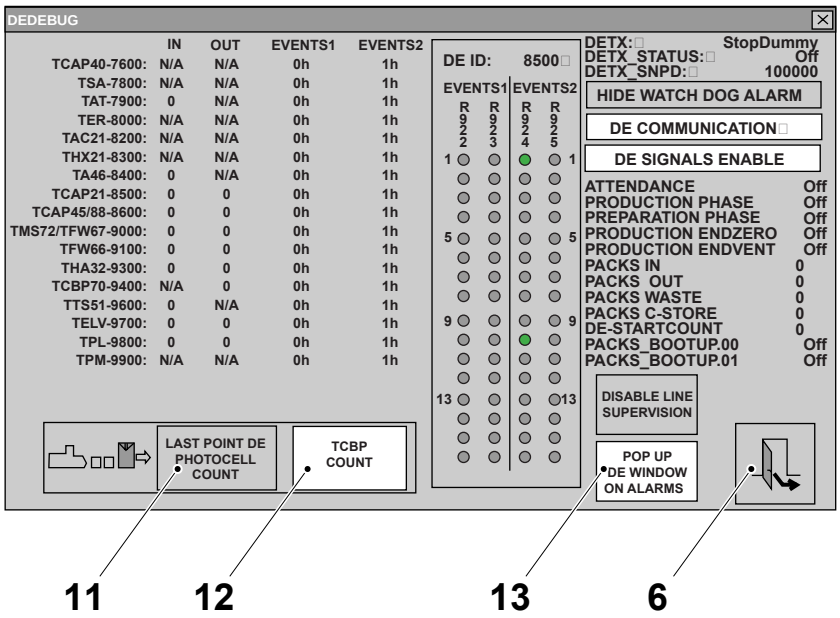
– Touch and hold the LAST POINT DE PHOTOCELL COUNT button (11) until it lights up to force the use of the counting photocell at the end of the line.

– Touch and hold the TCBP COUNT button (12) until it lights up to enable the use of the cardboard packer, TCBP, internal packages out counter.

Note! The first time the machine is started, the TCBP COUNT button (12) is selected by default, even if a cardboard packer is not configured on the line. The Tetra Cardboard Packer will be the actual source of the count only if it has been configured in the line 9.2.4-8 TPOP - Change PLMS Configuration, if line supervision is enabled and if the communication between the filling machine and the Tetra Cardboard Packer is not broken. In the other case the last point distribution equipment photocells will be the source of the count even if the TCBP COUNT button (12) is lit up. If the photocells are not installed then no counting of packages will be performed.

m) Touch and hold the POP UP DE WINDOW ON ALARMS button (13) until it lights up to enable the automatic pop up of the line overview window, that shows the distribution equipment status, see filling machine OM.

n) Touch the EXIT button (6)



6 EXIT button
11 LAST POINT DE PHOTOCELL COUNT button
12 TCBP COUNT button
13 POP UP DE WINDOW ON ALARMS button

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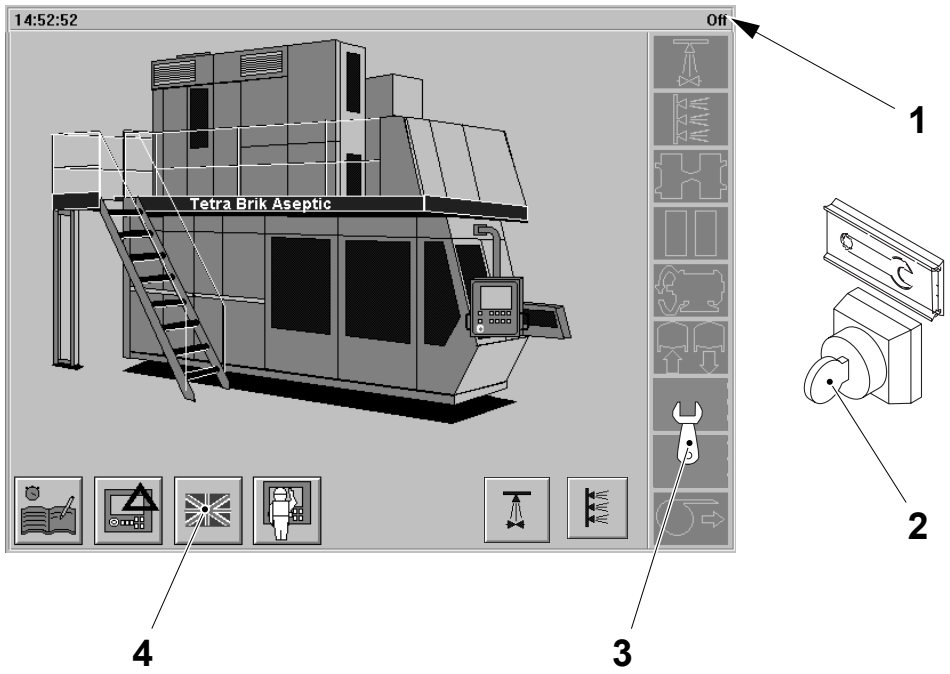
9.2.4-10 TPOP - Activate or Deactivate Kit Option

Machine Status	Mains Power ON Air ON Steam ON Water ON
SPC Reference	1364345-0300 1095912-0500

a) Make sure that the machine is in program Step ZERO (1).

b) Turn the service key (2), in the electrical cabinet, to the SERVICE position. Check that the **Service key** symbol (3) is shown on the TPOP panel.

c) Touch the SYSTEM SETTING button (4).



1 Step ZERO
2 Service key
3 Service key symbol
4 SYSTEM SETTING button

(Cont'd)

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(Cont'd)

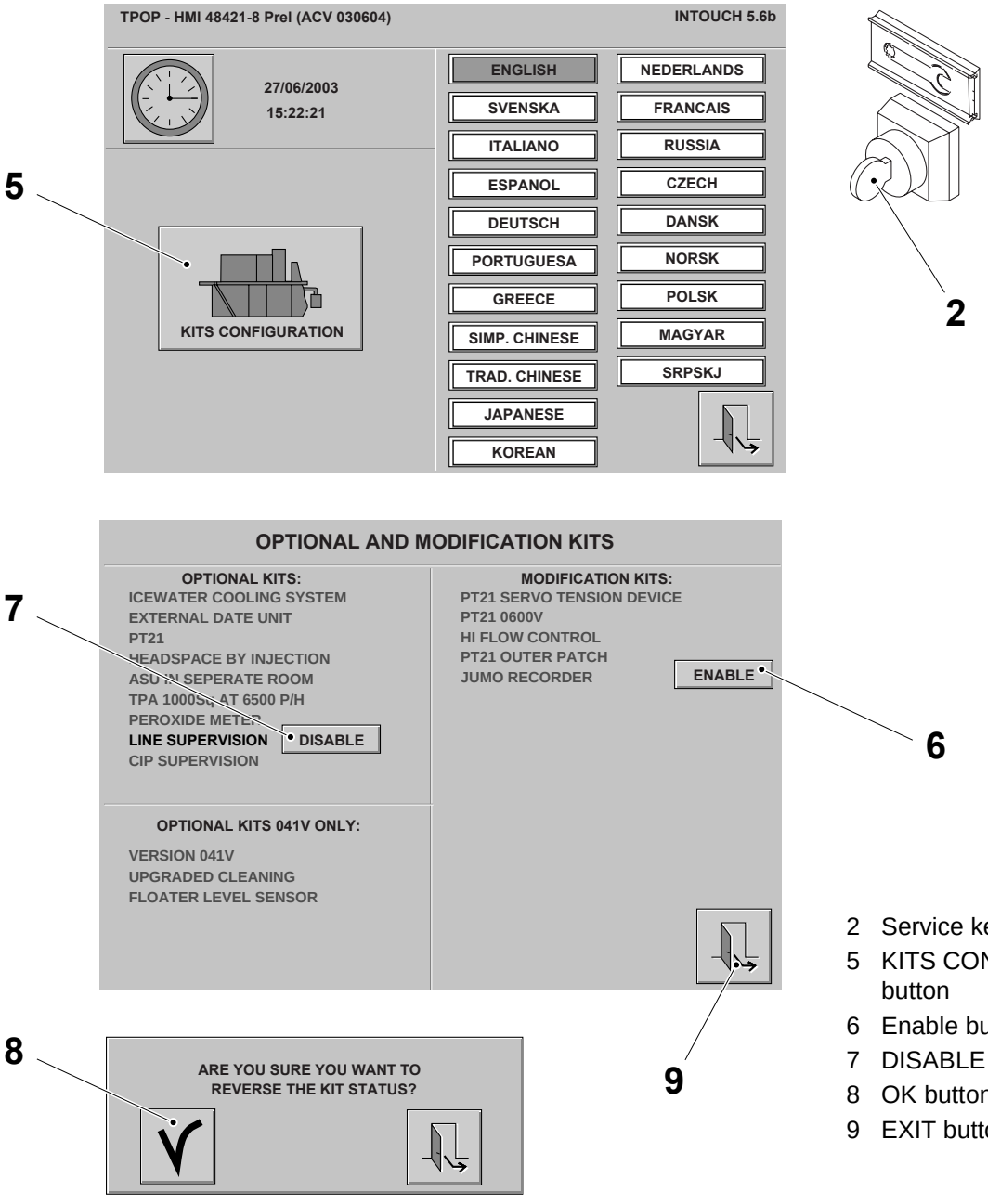
d) Touch the KITS CONFIGURATION button (5).

e) Touch the ENABLE button (6), or the DISABLE button (7), for three seconds.

f) Touch the OK button (8).

g) Touch the EXIT button (9) to exit the menu.

h) Turn the service key (2), in the electrical cabinet, to exit the SERVICE mode.



2 Service key
5 KITS CONFIGURATION button
6 Enable button
7 DISABLE button
8 OK button
9 EXIT button

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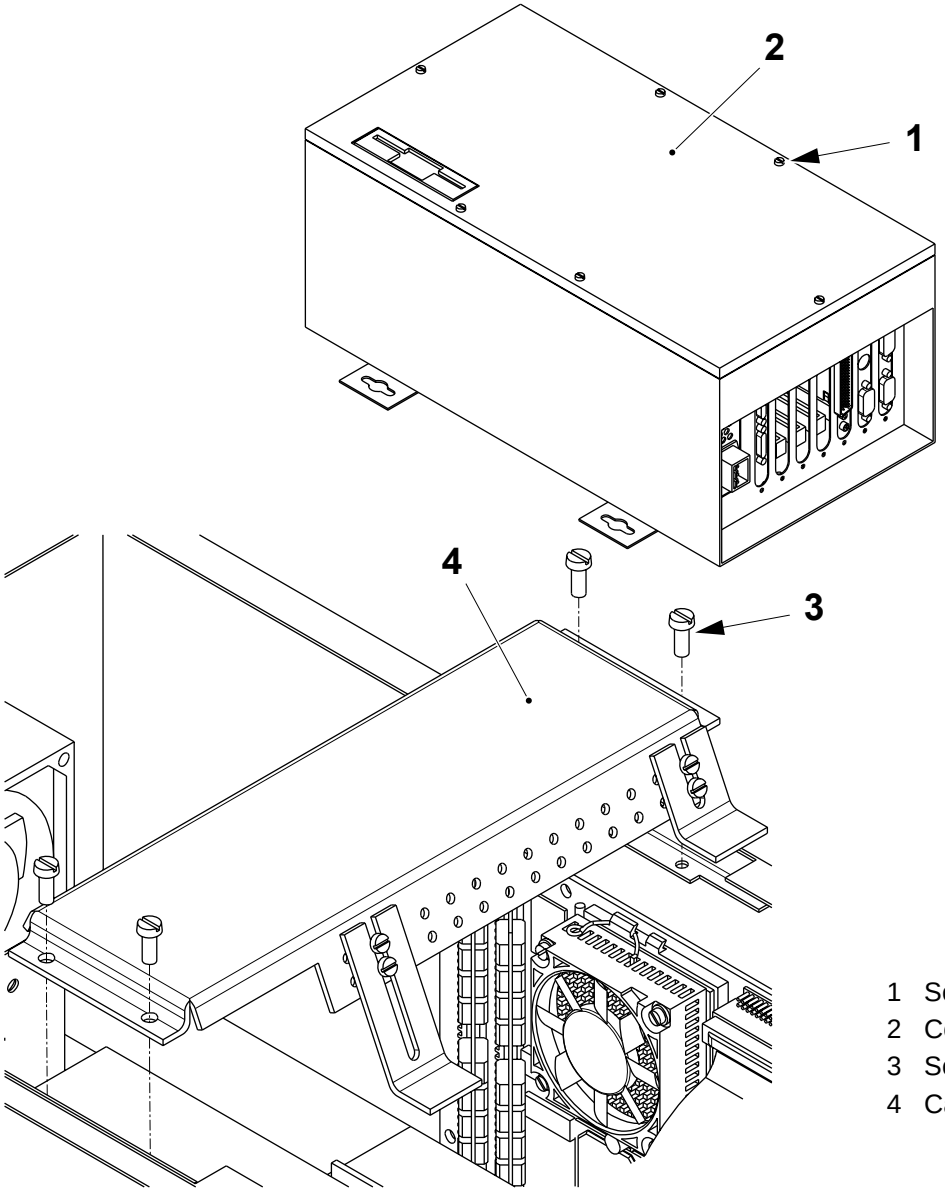
9.2.4-11 TPOP - Check Flexbox Processor Fan

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1363288-0300

a) Open the door of the electrical cabinet and disconnect the 24 V DC power connector to the flexbox.

b) Remove the six screws (1) and the cover (2).

c) Remove the four screws (3) and the card holder (4).



1 Screw
2 Cover
3 Screw
4 Card holder

(Cont'd)

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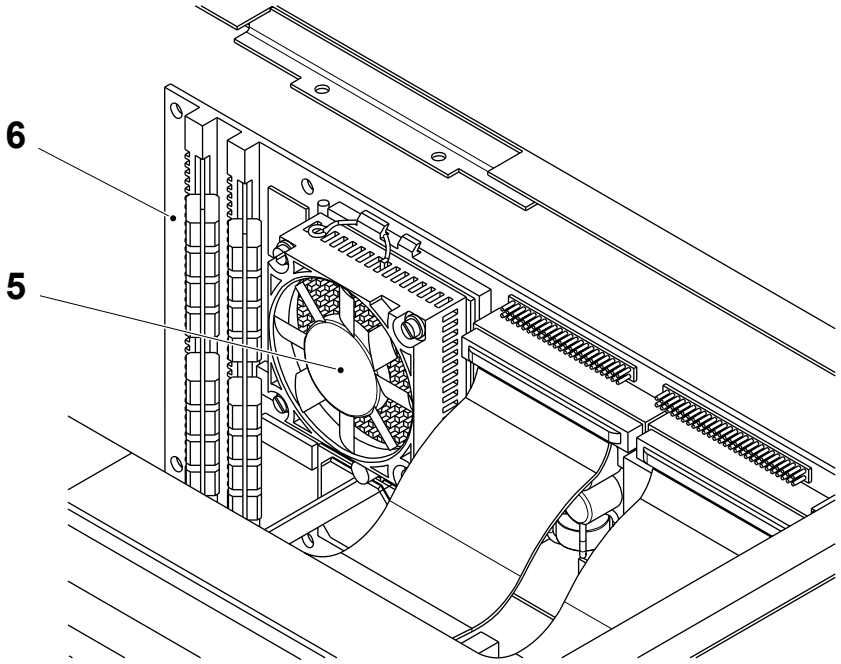
(Cont'd)

d) Locate the fan (5) on the upper part of the processor board (6).

e) Connect the 24 V DC power connector to the flexbox and check that the fan is rotating and is not abnormally noisy.

f) Change the fan if necessary, see 9.2.4-12 TPOP - Change Flexbox Processor Fan.

g) Disconnect the 24 V DC power connector to the flexbox and assemble in the reverse order.



5 Fan
6 Processor board

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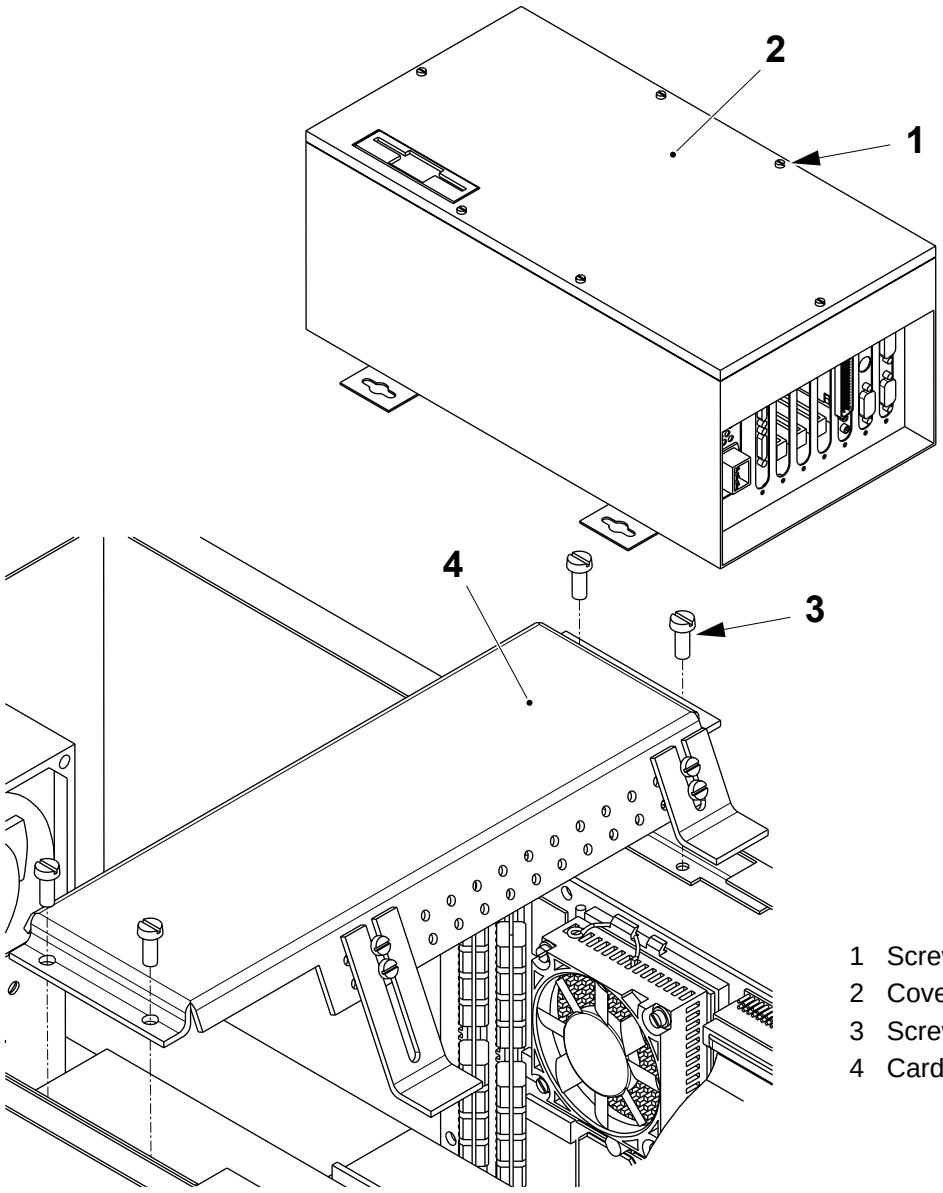
9.2.4-12 TPOP - Change Flexbox Processor Fan

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1363288-0300

a) Open the door of the electrical cabinet and disconnect the 24 V DC power connector to the flexbox.

b) Remove the six screws (1) and the cover (2).

c) Remove the four screws (3) and the card holder (4).



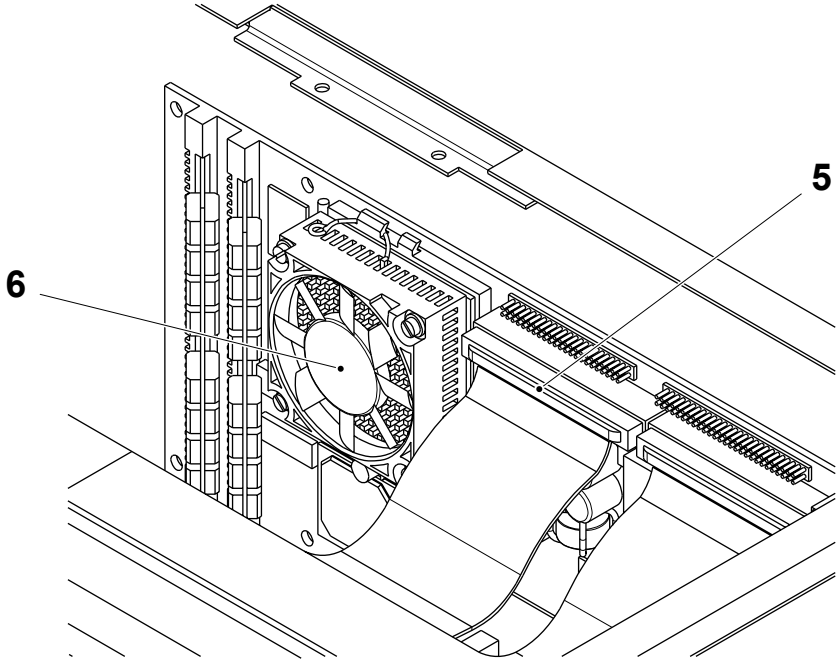
1 Screw
2 Cover
3 Screw
4 Card holder

(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

d) Remove the hard disk cable (5) to allow better access to the fan (6).



5 Hard disk cable
6 Fan

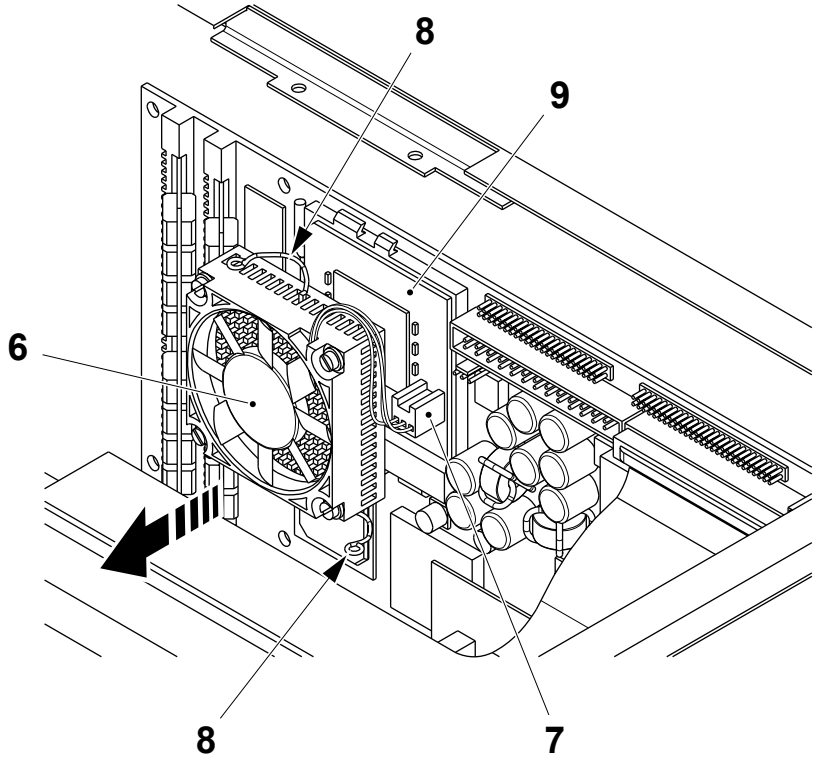
(Cont'd)

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(Cont'd)

e) Remove the fan power supply connector (7).

f) Release the two clips (8) securing the fan (6) to the processor (9) and remove the fan (6).



6 Fan
7 Power supply connector
8 Clip
9 Processor

(Cont'd)

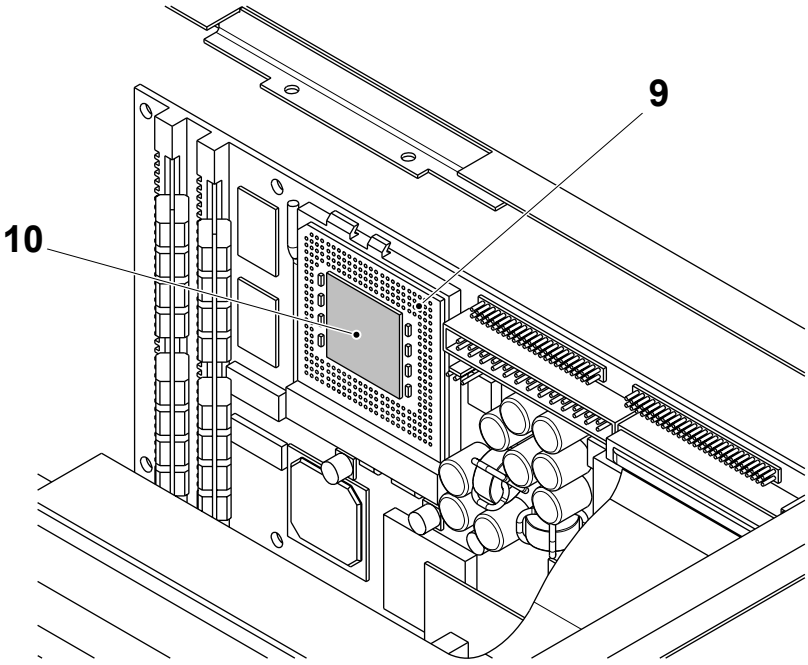
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(Cont'd)

Note! It is only necessary to clean and apply heat compound to the surface (10) (shaded in the illustration) which is in direct contact with the fan.

g) Remove the layer of white heat compound from the shaded surface (10) in the centre of the processor (9).

h) Apply a small amount of new heat compound to the shaded surface (10) and spread the compound gently over the surface (10).



9 Processor
10 Surface

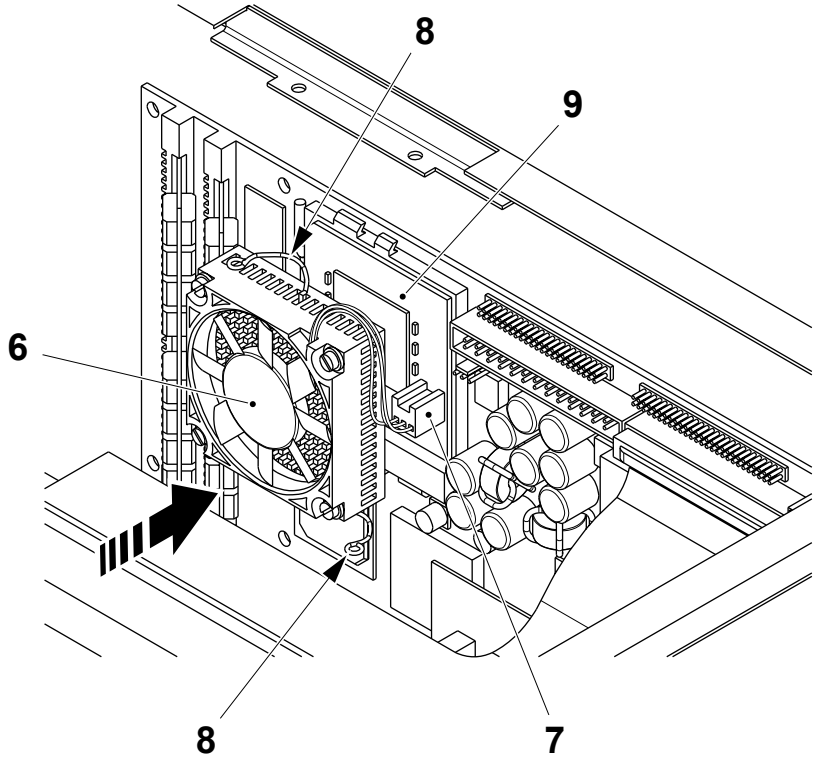
(Cont'd)

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(Cont'd)

i) Fit the new fan (6) to the processor (9) and secure by means of the two clips (8).

j) Fit the fan power supply connector (7).



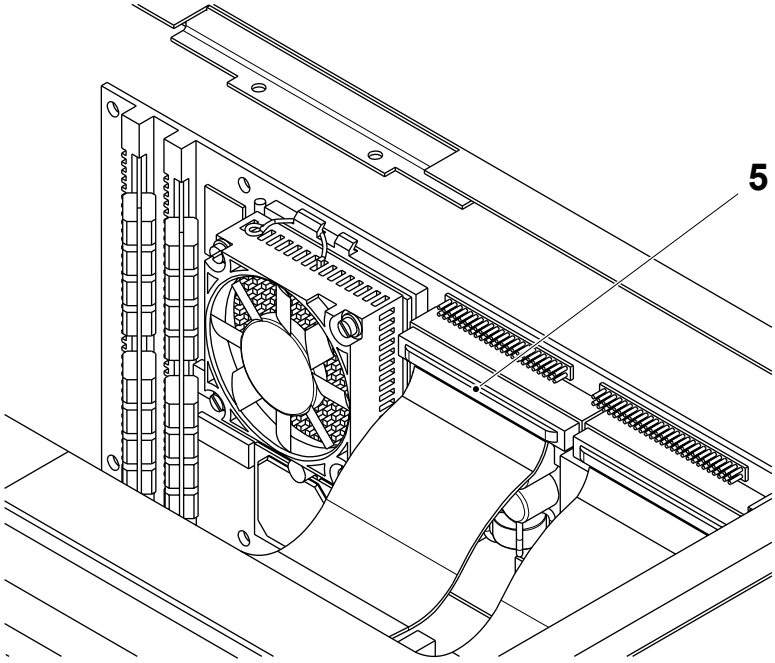
6 Fan
7 Power supply connector
8 Clip
9 Processor

(Cont'd)

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(Cont'd)

k) Fit the hard disk cable (5).



5 Hard disk cable

(Cont'd)

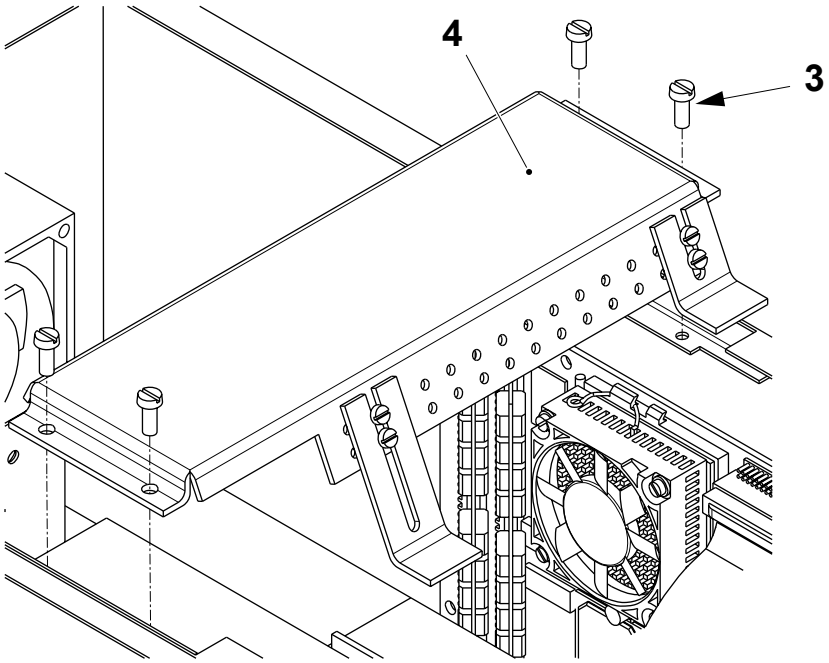
TechPub_2614345_0105 - 09_MM81534_11en.fm

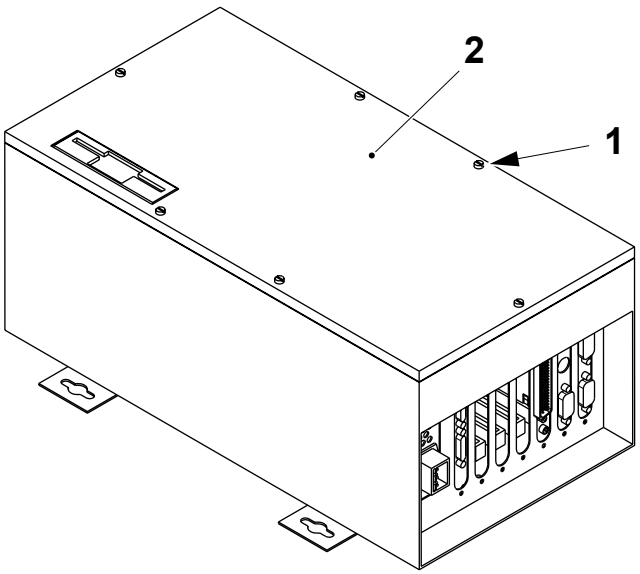
(Cont'd)

l) Connect the 24 V DC power connector to the flexbox and check that the fan is working and that the hard disk is spinning up.

m) Fit the card holder (4) by means of the four screws (3).

n) Fit the cover (2) by means of the screws (1).





1 Screw
2 Cover
3 Screw
4 Card holder

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9.2.4-13 TPOP - Change Backlight

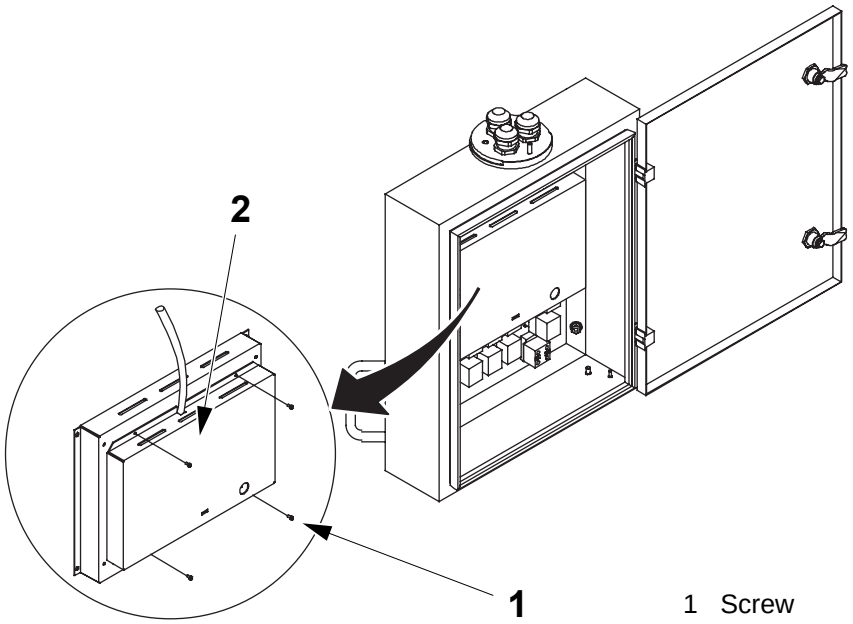
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Allen key no: 2 Socket set with sockets size 5.5 and 7 mm Socket set extension piece Precision Phillips screwdriver
SPC Reference	1363288-0300

Note! The operators daily check includes checking the display picture brightness. Change the backlight only if the display brightness is low.

Remove Display Unit

o) Disconnect the 24V DC power connector from the flexbox in the control cabinet.

p) Open the control panel back door and remove the four screws (1) securing the display unit rear cover (2).



1 Screw
2 Cover

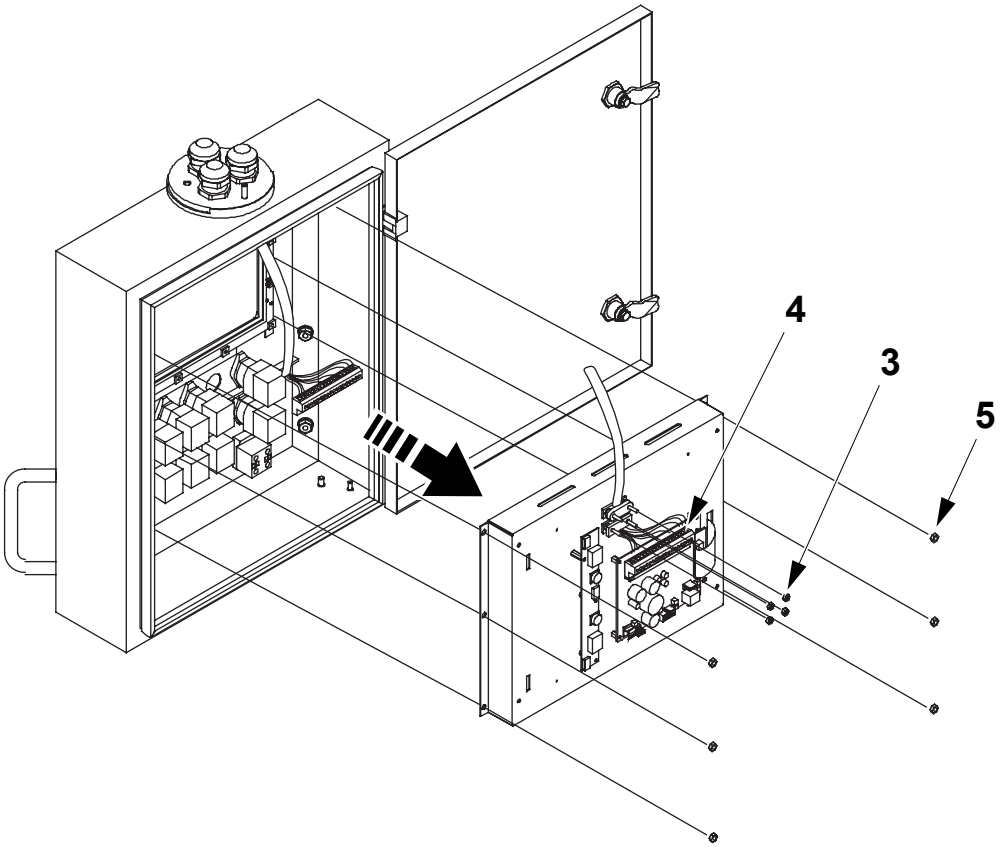
(Cont'd)

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(Cont'd)

q) Remove the four nuts (3) and the two pressure plates securing the LVDS cable. Disconnect the 18-pol connector (4) from the circuit board.

r) Remove the six nuts (5) securing the display unit to the control panel and pull the unit out of the panel.



3 Nut
4 Connector
5 Nut

(Cont'd)

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(Cont'd)

Access Display

a) Disconnect the IR touch flat cable connector (6) from the circuit board.

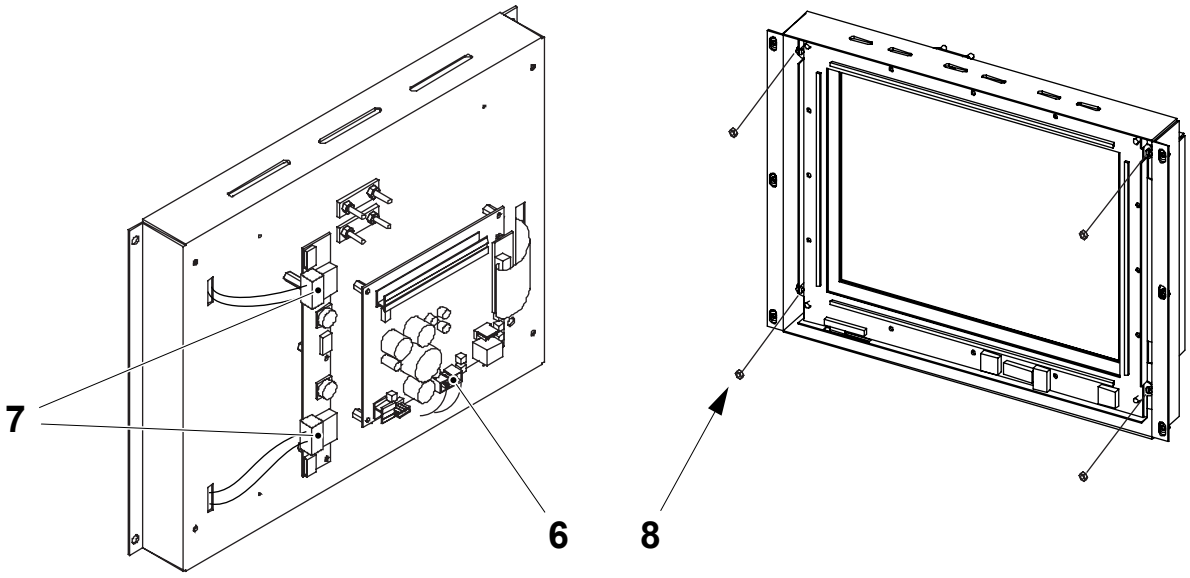
b) Disconnect the two backlight cables (7) from the small circuit board.

c) Put the display unit on a table with the display facing upward.

CAUTION
Risk of damage to dampers.
Be careful to not damage the dampers when loosening the nuts (8).

d) Remove the four nut (8) securing the mounting frame to the display unit cover and pull out the frame with IR touch pcb and display mounted on it.

e) Disconnect the display cable when pulling out the frame. Check the two backligh power cables when pulling out the frame, the connector can be difficult to pull through the cover hole.



6 Connector
7 Cable
8 Nut

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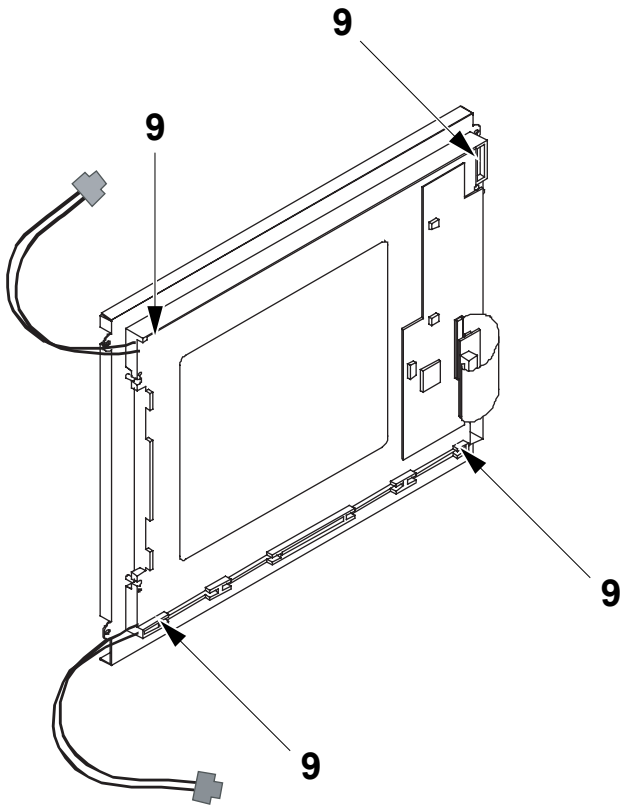
(Cont'd)

(Cont'd)

Change Two Backlight Units

a) Unscrew the four screws (9), two on each backlight, and carefully remove the old backlight units. Note the position of top and bottom unit as they are not identical.

b) Mount the new backlight units in the display and secure with the new screws, that came with the new backlight units.



9 Screw

(Cont'd)

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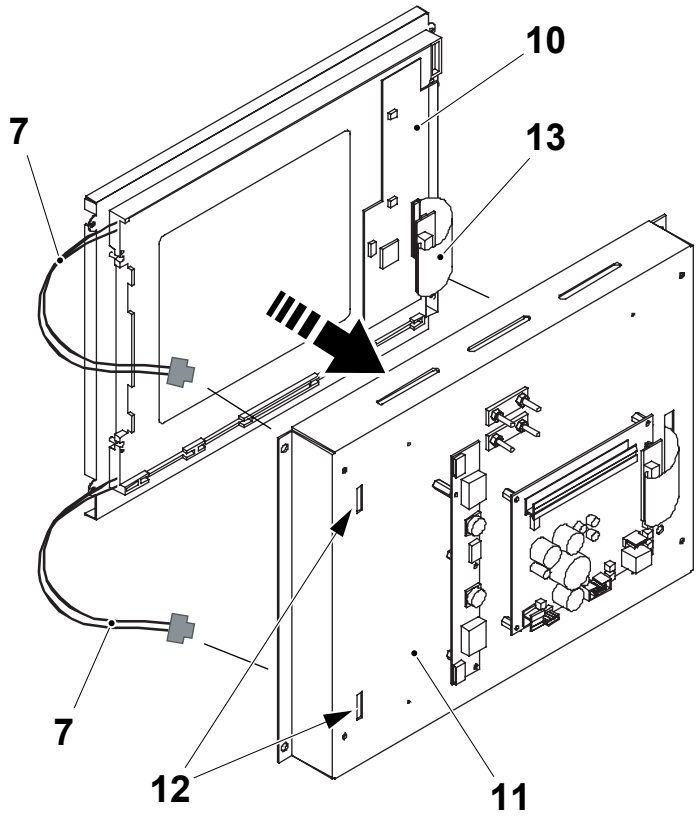
(Cont'd)

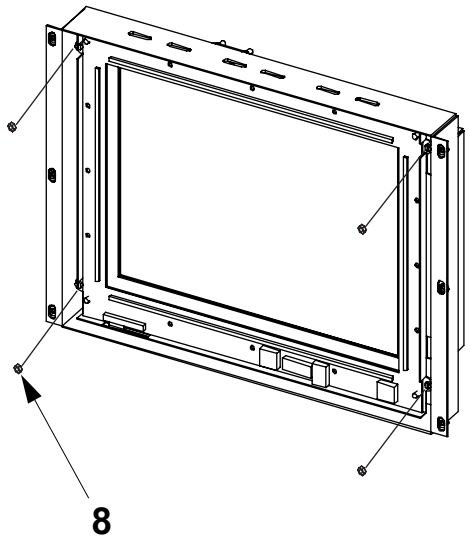
Assemble Display Unit

a) Mount the frame (10), with IR Touch pcb and display attached, to the display unit (11). Pass the backlight cables (7) through the display unit holes (12) and connect the display flat cable (13) to the display before securing the frame (10).

CAUTION
Risk of damage to dampers.
Be careful to not damage the damper by applying a too high torque on the nuts (8).

b) Be careful when positioning the frame (10) in the display unit (11) as the dampers may break under pressure. Secure the frame (10) to the display unit (11) with the four screws (8).





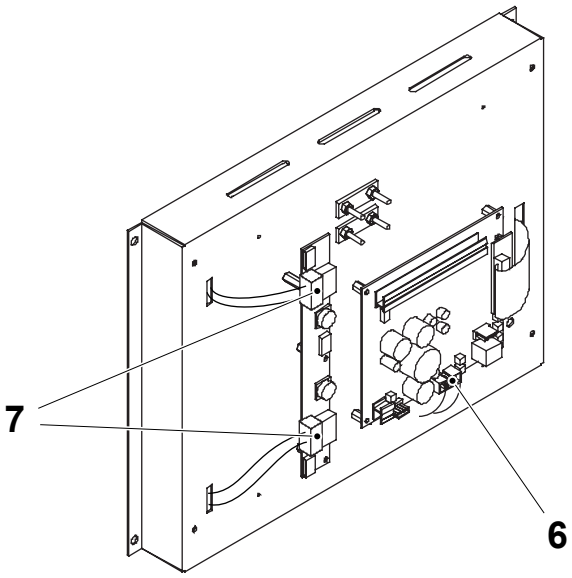
7 Cable
8 Nut
10 Frame
11 Display unit
12 Hole
13 Cable

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(Cont'd)

(Cont'd)

c) Connect the two backlight cables (7) to the small circuit board and the IR touch flat cable connector (6) to the horizontal connector on the larger circuit board.



6 Connector
7 Cable

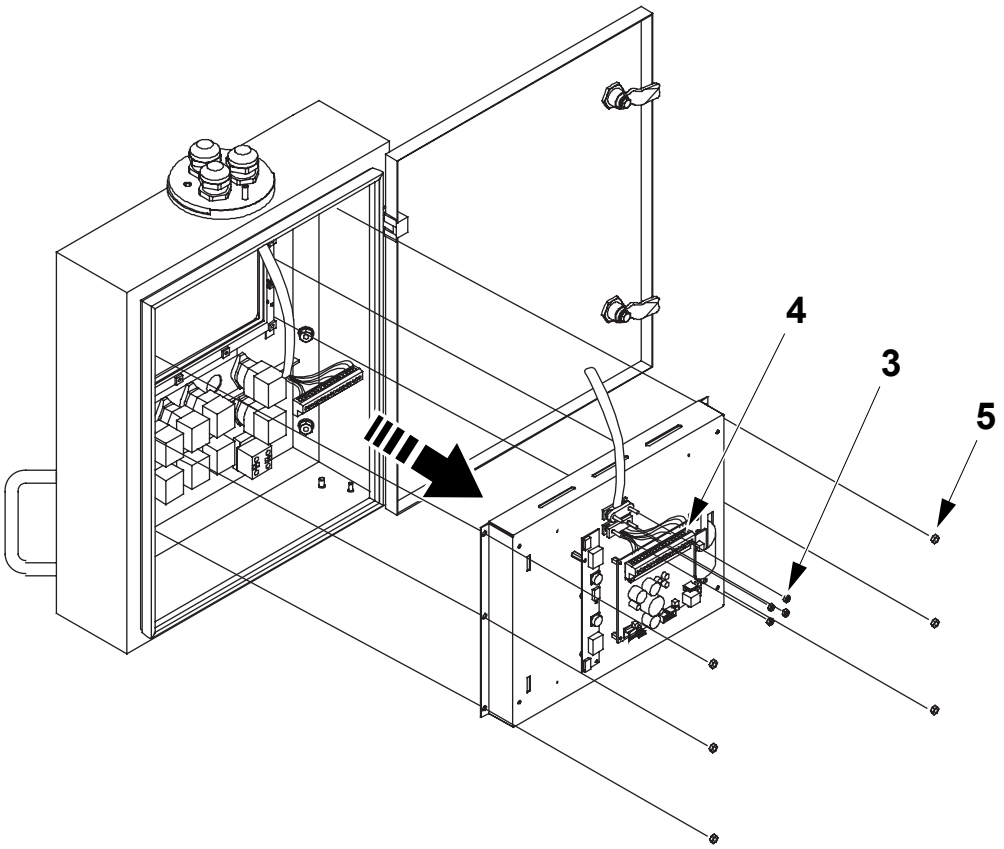
(Cont'd)

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(Cont'd)

d) Mount the display unit (11) in the control panel on the six welded bolts situated on either side of the panel bezel. Make sure the mounting frame in the display unit (11) does not catch on the side of the bezel, this can be checked by looking from the panel front. The display opening must be mounted symmetrically round the bezel. Secure the display unit (11) with the six nuts (5).

e) Connect the 18-pol LVDS connector (4) to the larger circuit board. Press the LVDS cable between the four securing bolts, mount the white plastic pressure plate on the two upper bolts and the metal pressure plate on the lower two bolts and secure with the four nuts (5).



3 Nut
4 Connector
5 Nut

(Cont'd)

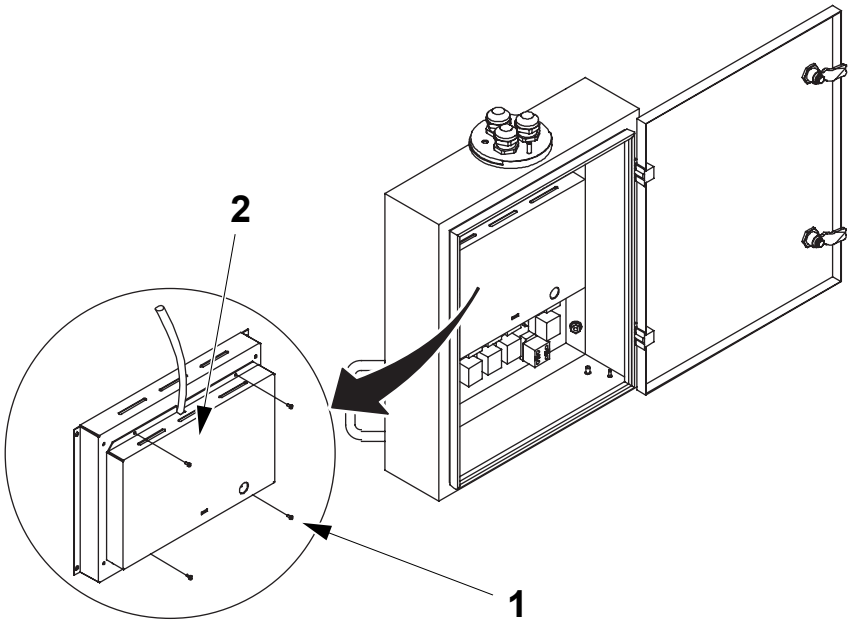
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(Cont'd)

f) Mount the display unit rear cover (2) and secure with the four nuts (1).

g) Close the control panel rear door and re-connect the 24V DC connector to the flexbox in the control cabinet.

h) Turn on the mains power and check if the panel picture is OK.



1 Screw
2 Cover

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9.2.5 Recorders

Note! For the machines with the JUMO recorder, see 9.2.2 Recorder.

9.2.5-1 Recorders - Process Recorder Description

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1350702-0200

Note! For the machines with the JUMO recorder, see 9.2.2-1 Recorder - Recorder Description.

Parameters

The process recorder registers the following parameters:

Channel No.	Type	Colour	Description
AN1	Analog	Blue	Hydrogen peroxide temperature. If the temperature of the sterile bath drops below its limit (70 °C), the machine stops. The temperature range for this channel is 0 °C - 100 °C, corresponding to the full paper range.
AN2	Analog	Brown	Top aseptic chamber temperature. If the temperature of the top aseptic chamber drops below 95 °C during PRODUCTION, the machine stops. The temperature range for this channel is 0 °C - 200 °C, corresponding to the full paper range.
AN3	Analog	Black	Sterile air temperature. If the temperature of the air super heater drops below its limit, the machine shuts down. The temperature range for this channel is 0 °C - 400 °C, corresponding to the full paper range.
AN4	Analog	Not defined	Not used
AN5	Analog	Not defined	Not used
AN6	Analog	Not defined	Not used
DI1	Digital	Purple	Sterile parameter caused machine shutdown (see Supervision, ...). Re-sterilisation is required. The process recorder records line 3 (from the zero reference) for 5 minutes after the stop. The normal position of this signal is line 5 (first thick line from the zero reference). On completion of filling machine sterilisation (drying finished), the process recorder records line 3 (status: on) for 30 seconds; see no. 1 on chart. The process recorder prints a supplementary batch text in conjunction with this signal. The batch text comprises five lines as follows: *Tetra Brik* *Aseptic* nr. ..... TBA/..... Batch (id No.) date - time (See no. 2 on chart) The operator can write the serial number and type of the filling machine on the dotted line.

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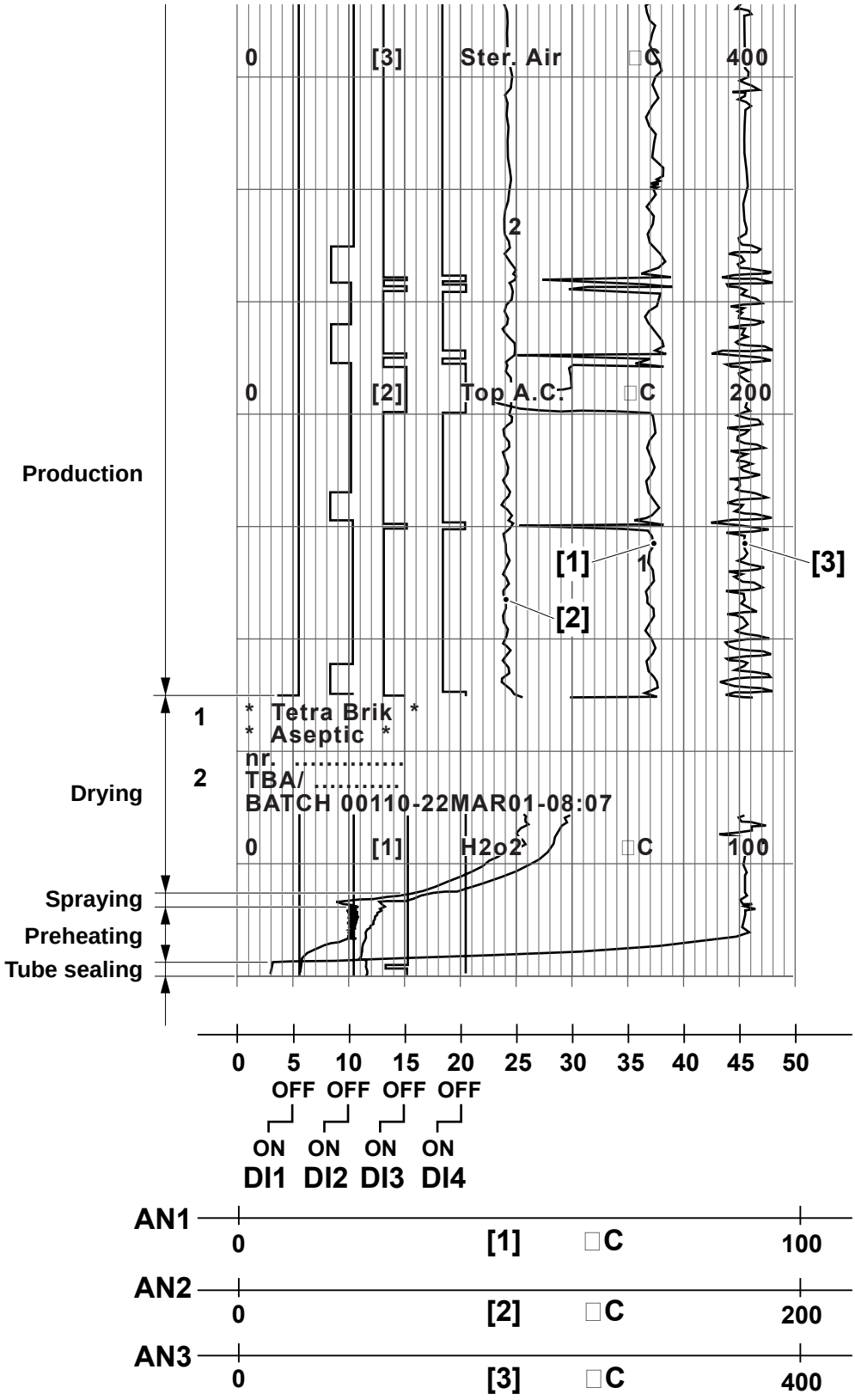
DI2	Digital	Red	An operation parameter has caused the machine to stop (see Supervision, ...). The process recorder records line 8 (from the zero reference) for 5 minutes after the stop. This channel also records internal cleaning (Ready for CIP + Signal from CIP valve on). The normal position of this signal is line 10 (second thick line from the zero reference).
DI3	Digital	Green	Drive motor operating. When the main motor is **On**, the process recorder records line 13. When the motor is **Off**, it records line 15 (third thick line from the zero reference).
DI4	Digital	Black	Filling machine in production. When the filling machine is producing filled packages, the process recorder records line 18. When the machine is not in production, it records line 20 (forth thick line from the zero reference).

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(Cont'd)

The figure below shows a sample process recorder printout.



(Cont'd)

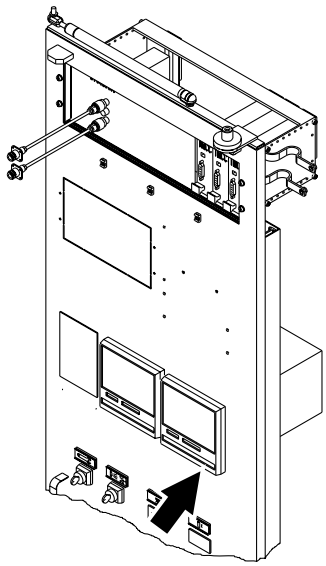
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(Cont'd)

The power supply to the recorder is **On** continuously and is not related to any filling machine status.

The paper cassette autonomy is about 12 days. Pen autonomy is about 170 days (with the process recorder running 24h a day).





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Passwords

The process recorder has two passwords, for different access privileges:

- Password #1 gives limited access to the configuration
- Password #2 gives full access.

9.2.5-2 Recorders - CIP Recorder Description

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1350702-0200

Note! For the machines with the JUMO recorder, see 9.2.2-1 Recorder - Recorder Description.

Note! The CIP recorder is optional equipment.

Parameters

The CIP recorder registers the following parameters:

Channel No.	Type	Colour	Description
AN1	Analog	Not defined	Not used
AN2	Analog	Not defined	Not used
AN3	Analog	Not defined	Not used
AN4	Analog	Blue	It measures the concentration of the cleaning liquid during CIP. The signal is sent from the conductivity meter. The concentration range is 0-100 mS full scale.
AN5	Analog	Brown	It measures the flow of the cleaning liquid during CIP. The signal comes from the flow meter. The flow range is 0-15 m^3/h full scale.
AN6	Analog	Black	It measures the temperature of the cleaning liquid during CIP. The signal comes from the conductivity meter. The temperature range is 0-100 °C full scale.

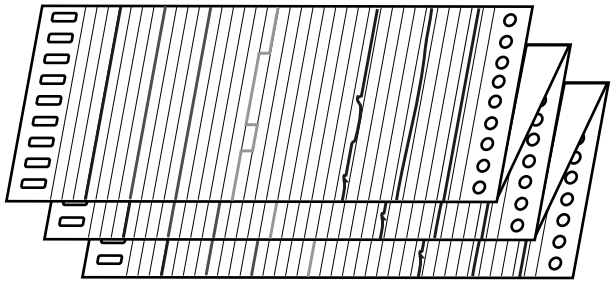
(Cont'd)

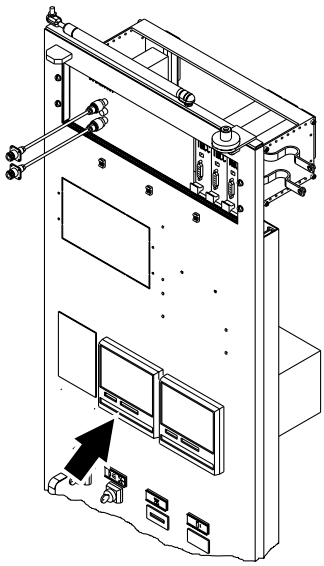
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

The power supply to the recorder is **On** continuously and is not related to any filling machine status.

The paper cassette autonomy is about 12 days. Pen autonomy is about 170 days (with the process recorder running 24h a day).





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Passwords

The CIP recorder has two passwords, for different access privileges:

- Password #1 gives limited access to the configuration
- Password #2 gives full access.

9.2.5-3 Recorders - Set CIP Recorder

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

Note! The CIP recorder is optional equipment.

Note! Below are listed the parameters to be set in the recorder. If these parameters are not utilised, the Honeywell recorder will work as a Process Recorder.

For further information, see the next page (Navigation mode), or the Honeywell manual.

Parameter Selection

a) The use of the ◀ ▶ keys allows selection for the parameter to read/write.

b) The use of the ▲ ▼ keys allows selection for the channel to read/write the parameter.

c) Press ENTER to confirm the selection or press SET UP to return to main function.

d) If required, the recorder stops measuring and printing during configuration access. In this case the message “CONFIRM” will be displayed.

e) Press ENTER to confirm or press SET UP to escape.

Value of Parameter

If a key is left for few seconds, the recorder will display alternatively the name and the current value.

Parameter Modification

a) Press ENTER to begin the modification of a parameter.

b) The current value blinks.

c) Some parameters require text selection while others require numerical values.

d) The use of the ▲ and ▼ keys permit, if required, the selection of desired text or increase/decrease the numerical value.

e) The ◀ and ▶ keys can be used to shift the position of the digit to be changed.

f) Press ENTER to confirm the change.

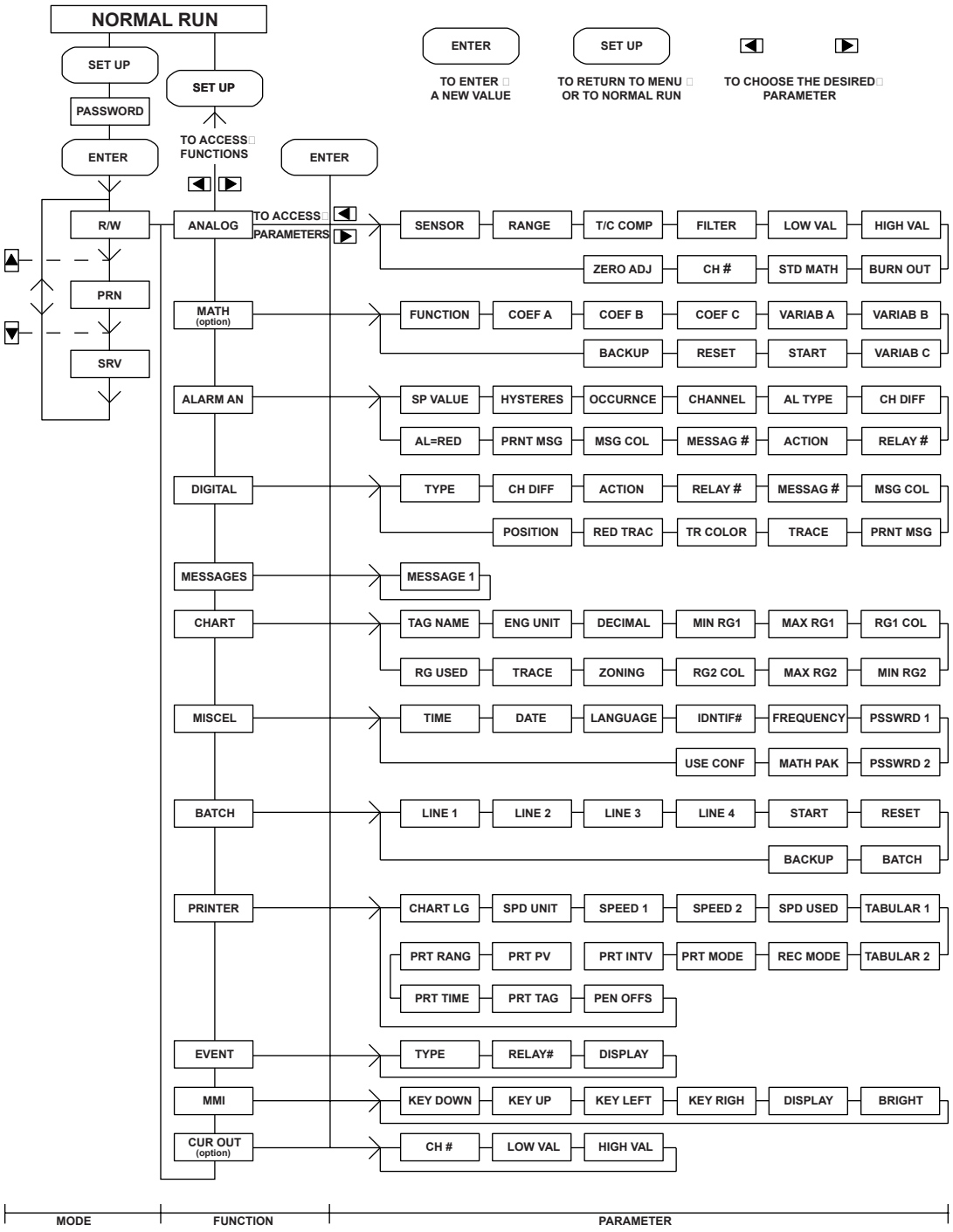
g) Press SET UP to come back to the parameter selection.

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(Cont'd)

Navigation Mode



(Cont'd)

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CONFIGURATION FILE NAME - P003

Analog Inputs

Factory config uration	Therm-couple	J -50/150°C	None	0	-50	+150	No burnout	No	No	0
CH #	SENSOR	RANGE	T/C COMP	FILTER	LOW VAL	HIGH VAL	BURNOUT	OPT MATH	CH #	ZERO ADJUST
1	No entry									
2	No entry									
3	No entry									
4	Tr linear	Lin 0/20 mA	Analog 4	0.000	0.000	100.000	No B.out	No opt math	Analog 4	0.000
5	Tr linear	Lin 0/20 mA	Analog 5	0.000	0.000	10.000	No B.out	No opt math	Analog 5	0.000
6	Tr linear	Lin 0/20 mA	Analog 6	0.000	0.000	100.000	No B.out	No opt math	Analog 6	0.000

Analog Alarms

Factory configuration	0	0	0	1	None	1	No Relay	None	# 1	Red	No	No
CH #	SP VALUE	HYST-ERES	OCCU-RNCE	CHAN-NEL	AL TYPE	CH DIFF	RELAY #	ACTION	MESSAG #	MSG COL	PRNT MSG	AL = RED
1	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
2	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
3	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
4	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
5	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
6	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
7	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
8	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
9	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
10	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
11	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No
12	0.000	0.000	0	Analog 1	None	Analog 1	No relay	No action	Message #12	Red	No message	No

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Math

Factory configuration	No	2.000	2.000	2.000	CH 1	CH 2	CH 3	Logic 1 closed	Logic 2 opened	Enable
CH #	FUNCTION	COEF A	COEF B	COEF C	VAR A	VAR B	VAR C	START	RESET	BACKUP
1	No function	2.000	2.000	2.000	Analog 1	Analog 2	Analog 3	Log 1 closed	Logic 1 open	Enable
2	No function	2.000	2.000	2.000	Analog 1	Analog 2	Analog 3	Log 1 closed	Logic 1 open	Enable
3	No function	2.000	2.000	2.000	Analog 1	Analog 2	Analog 3	Log 1 closed	Logic 1 open	Enable
4	No function	2.000	2.000	2.000	Analog 1	Analog 2	Analog 3	Log 1 closed	Logic 1 open	Enable
5	No function	2.000	2.000	2.000	Analog 1	Analog 2	Analog 3	Log 1 closed	Logic 1 open	Enable
6	No function	2.000	2.000	2.000	Analog 1	Analog 2	Analog 3	Log 1 closed	Logic 1 open	Enable

Digital inputs

Factory config uration	0	0	0	1	None	1	No Relay	None	# 1	0	0
CH #	TYPE	CH DIFF	ACTION	RELAY #	MESSAG #	MSG COL	PRNT MSG	TR COLOR	RED TRAC	TRACE	LOG CH POSITION
1	Dig closed	Digital 1	No action	No relay	Messa-ge #1	Purple	No std msg	Purple	No	Disable	7
2	Dig closed	Digital 2	No action	No relay	Messa-ge #2	Red	No std msg	Red	No	Disable	17
3	Dig closed	Digital 3	No action	No relay	Messa-ge #3	Green	No std msg	Green	No	Disable	27
4	Dig closed	Digital 4	No action	No relay	Messa-ge #4	Black	No std msg	Black	No	Disable	38

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Messages

Factory configuration	No message
	MESSAGE #
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Chart

Factory config-uration	No tag	No Eng.U.		-50	+150	*	-50	+150	**	0 to 100%	Analog input #	With RG1
CH #	TAG NAME	ENG UNIT	DECI-MAL	MIN RG1	MAX RG1	RG1 COL	MIN RG2	MAX RG2	RG2 COL	ZONING	TRACE	RG USED
1			XXX.X	0.00000	100.00000	Blue	-50.00000	150.00000	Purple	0..100% PAP	No trace	With R1
2			XXX.X	0.00000	200.00000	Brown	-50.00000	150.00000	Red	0..100% PAP	No trace	With R1
3			XXX.X	0.00000	400.00000	Black	-50.00000	150.00000	Black	0..100% PAP	No trace	With R1
4	Cond. ty	mS/cm	XX.XX	0.00000	100.00000	Blue	-50.00000	150.00000	Red	0..100% PAP	Analog 4	With R1
5	Flow	m3/h	XX.XX	0.00000	15.000	Brown	-50.00000	150.00000	Red	0..100% PAP	Analog 5	With R1
6	Temper.	1/2C	XXX.X	0.00000	100.00000	Black	-50.00000	150.00000	Red	0..100% PAP	Analog 6	With R1

Miscellaneous

Factory config uration	*	*	**	1	+50	None	None	None	Conf 1
	TIME	DATE	LANGUAGE	IDNTIF #	FREQUENCY	PSSWRD 1	PSSWRD 2	MATH PAK	USE CONF
			English		50 Hz				

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Batch

Factory configuration	None	No Reset	Enable	1	No	No	No	No
	START	RESET	BACKUP	BATCH #	LINE 1	LINE 2	LINE 3	LINE 4
	Log 1 closed	No reset	13	0	TBA/.....	nr.....	*Aseptic*	*Tetra Brik*

Printer

Factory configuration	Roll = 24000 Fanfold =18000	mm/h	60	120	SPD1			Print	Trend	120 mm	Enable	Enable	Enable	Disable	Disable
	CHART LG	SPD UNIT	SPEED 1	SPEED 2	SPD USED	TABULAR 1	TABULAR 2	REC MODE	PRT MODE	PRT INTV	PRT PV	PRT RANG	PRT TIME	PRT TAG	PEN OFF
	18000.00	Unit= mm/h	60.000	360.000	Speed 2 used			Print	Trend	60 mm	Disable	Enable	Enable	Disable	

Event

Factory configuration		No relay	Enable
	TYPE	RELAY #	DISPLAY
1	Cassette out	Relay 1	Enable
2	End Paper	Relay 1	Enable
3	Battery	Relay 1	Enable
4	Alarm	No relay	Disable
5	Bumout	No relay	Disable
6	Shed time	No relay	Disable
7		No relay	Disable
8		No relay	Disable

Mmi

Factory configuration	Enable	Enable	Enable	Disable	True	80%
	KEY DOWN	KEY UP	KEY LEFT	KEY RIGHT	DISPLAY	BRIGHT
	Enable	Disable	Enable	Disable	Trace & tag	>> (80%)

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Communication

Factory configuration											
	PROTOCOL	CONNECT	ADDRESS	BAUDS	BITS	PARITY	STOP	SCHEDTIME	PHONE ID	PHONE #	AUTODIAL
	Ascii	RS232	5	9600	10	None	1 Stop bit	3000	123456789012	1234567	No call

Report

Factory configuration			
	START AT	PARAGRAPH	FREQUNCY
	12.00	1/4 hours	Never

Current output

Factory configuration			
OUTPUT	CH #	LOW VAL	HIGH VAL
1	None	0.00000	100.00000
2	None	0.00000	100.00000
3	None	0.00000	100.00000
4	None	0.00000	100.00000
5	None	0.00000	100.00000
6	None	0.00000	100.00000

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9.2.5-4 Recorders - Set Date and Time

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

Note! For the machines with the JUMO recorder, see 9.2.2-2 Recorder - Set Recorder.

Note! For further information, see the Honeywell operator manual (Ref. EN1I-6136).

a) Open the front cover. Press the SETUP key (1).

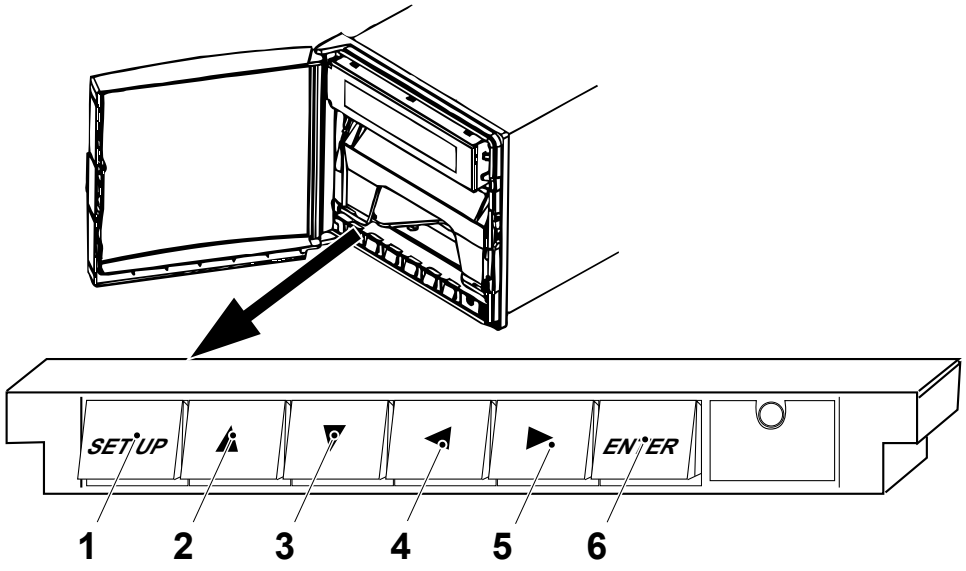
b) Press the arrow key (5) five times. The message **R/W MISCEL** appears on the display.

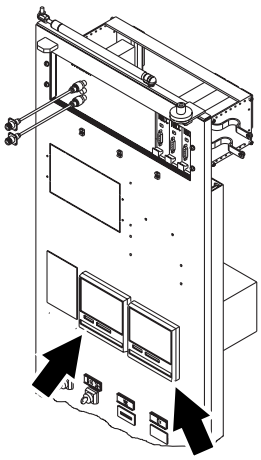
c) Press the ENTER key (6). The message **MI1 TIME** appears on the display.

d) Press the ENTER key twice to confirm. The time flashes on the display.

e) Use the ARROW keys (2), (3), (4) and (5) to set the current time. Press the ENTER key to move from hours to minutes.

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1 SETUP key
2 Arrow key UP
3 Arrow key DOWN
4 Arrow key LEFT
5 Arrow key RIGHT
6 ENTER key

(Cont'd)

(Cont'd)

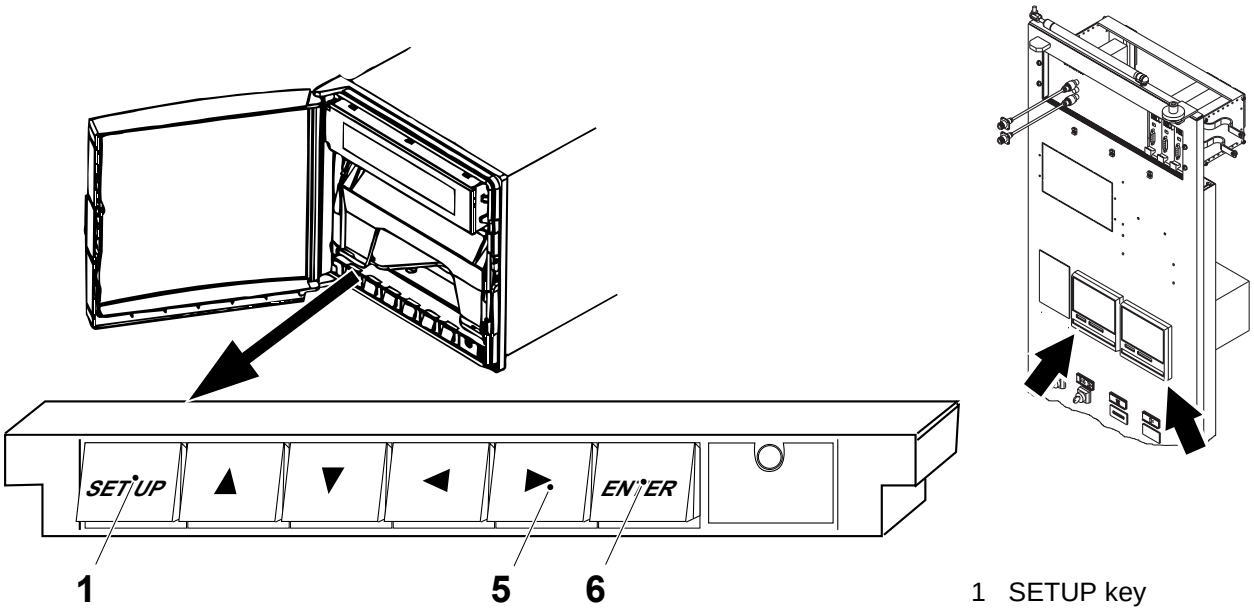
f) Press the ENTER key (6) again to confirm.

g) Press the arrow key (5). The message **MI1 DATE** appears on the display.

h) Press the ENTER key (6) to set the date.

i) Repeat items e) and f) to set the date.

j) Press the SETUP key (1) twice to return to normal operation. Close the front cover.



1 SETUP key
5 Arrow key RIGHT
6 ENTER key

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9.2.5-5 Recorders - Clean Chart Carriage

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

Note! For the machines with the JUMO recorder, see 9.2.2-3 Recorder - Clean Chart Carriage.

a) Open the front cover of the process recorder and pull out the chart cassette.

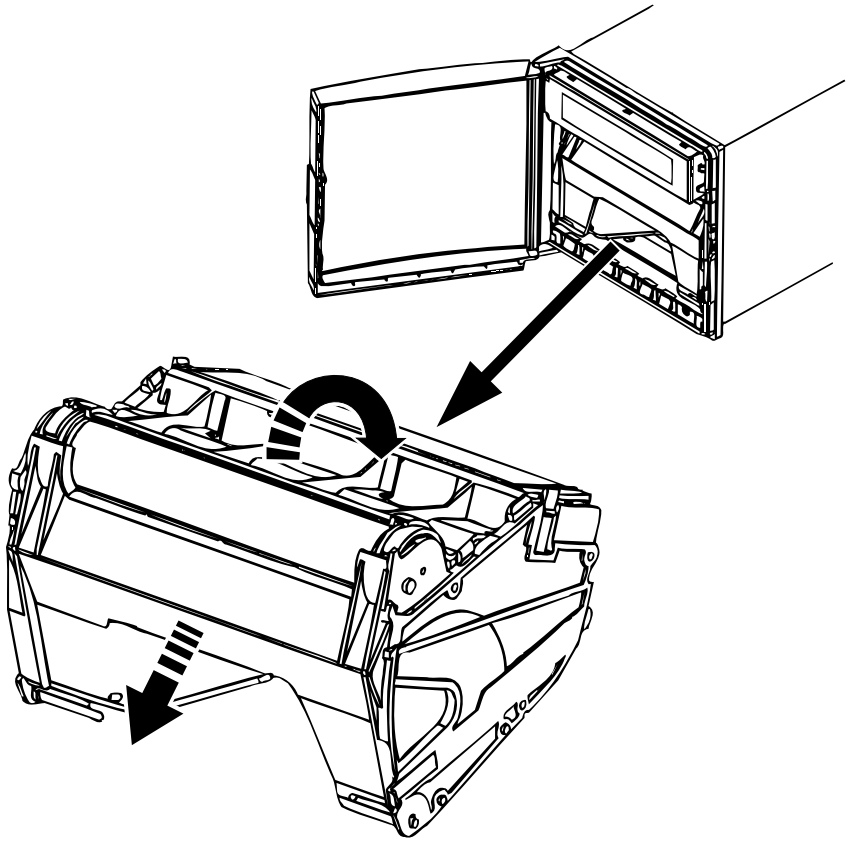
b) Open the cassette and remove the chart paper.

c) Clean the guide rods of the cassette with a dry cotton cloth.

d) Clean the cassette with a damp cloth.

Note! Do **not** lubricate!

e) Fit the chart paper. Close the cassette and fit it. Close the front cover of the recorder.



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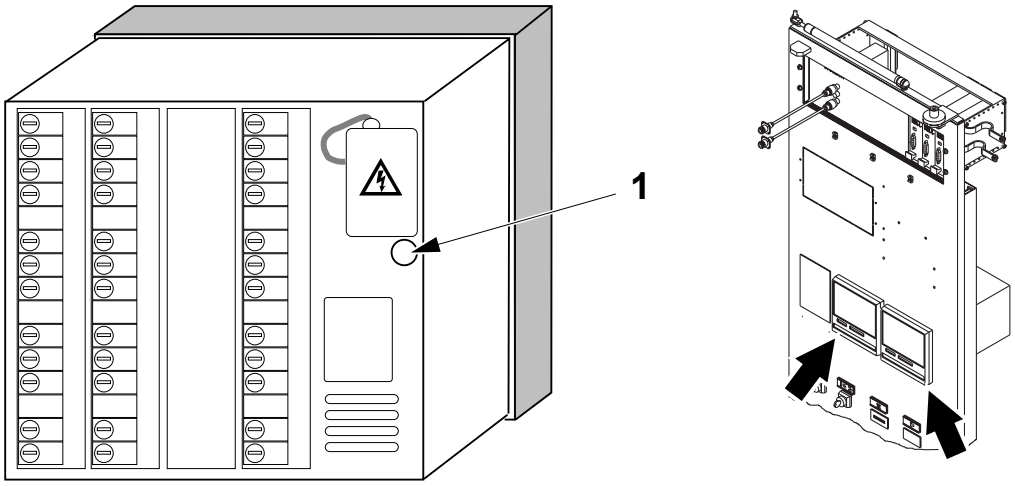
9.2.5-6 Recorders - Change Fuse

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1350702-0200

a) Swing out the panel of the electrical cabinet.

b) Change the fuse (1) at the rear of the process recorder.

c) Close the panel.



1 Fuse

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9.3 Power Supply Unit

SPC Reference	1095643-0400

9.3.1 Fuse Board 1

9.3.1-1 Fuse Board 1 - Set Overload Protection

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095777-0300

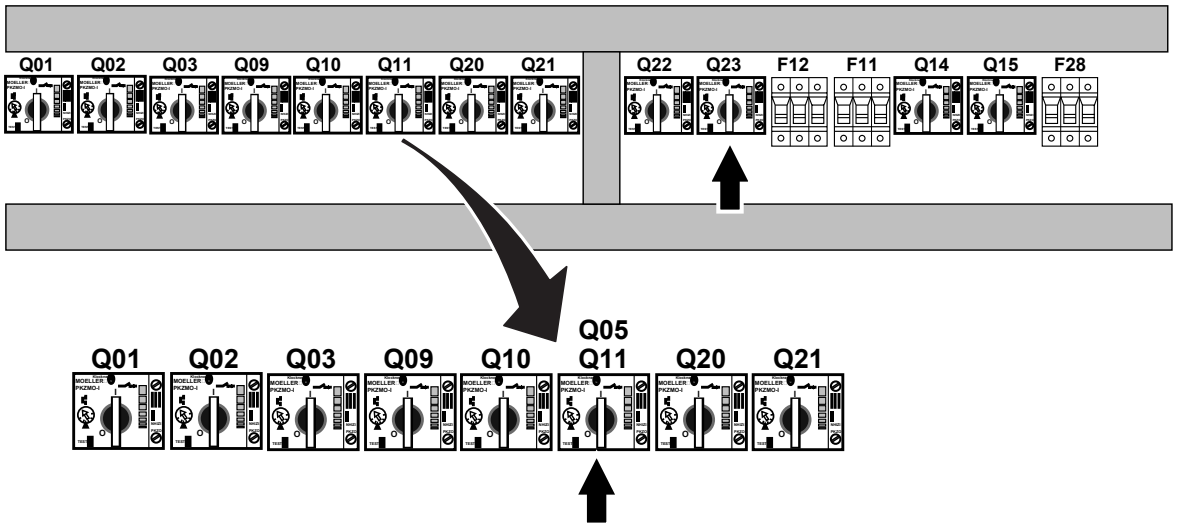
Set the overload protection, **Q05** or **Q11**, following the table below:

Fuse	Size	Notes
Q11	2.0 A	Cooling system - TP No. 1095954-0200
Q05	2.7 A	Rebuilt with UK-2603238-0200 Cooling Unit Replacement. Cooling system - TP No. 1095954-0300

Set the overload protection, **Q23**, following the table below:

Fuse	Size	Notes
Q23	1.65 A	Overload protection for old compressor
	2.1 A	Overload protection for new compressor, TP No. 90459-6802, at 50 Hz
	2.3 A	Overload protection for new compressor, TP No. 90459-6802, at 60 Hz

Set the other overload protections following the table on next page.



Q05: Circulation cooling media electrical cabinet
Q11: Circulation cooling media electrical cabinet
Q23: Cooling media pump

(Cont'd)

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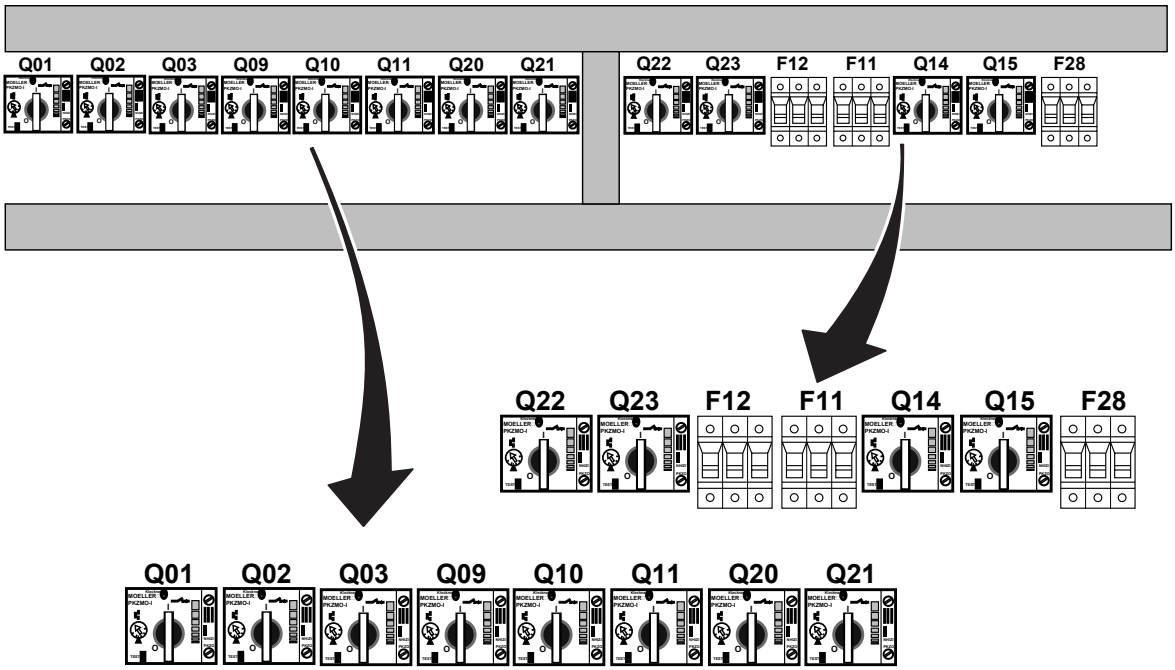
(Cont'd)

Set the overload protections following the table below:

Note! For the volume TPA 1000 Sq only **Q09** is **0.85 A**.
For waste conveyors with the old worm gear motor, TP No. 90069-0257, the **Q09** is **0.28 A**.
For waste conveyors with the new worm gear motor, TP No. 2531993-0000, the **Q09** is **0.85 A**.

Q01	Q02	Q03	Q09	Q10	Q14	Q15	Q20
0.9 A	1.4 A	15.0 A	0.28 A	1.3 A	0.7 A	1.3 A	8.8 A

Q21	Q22	F11	F12	F28
2.9 A	1.6 A	10 A	10 A	6 A



Q01: Circulation water
Q02: Circulation peroxide
Q03: Cleaning pump
Q09: Transport of waste
Q10: External conveyor 1
Q14: Peroxide Heating exchange circulation water
Q15: External conveyor 2 or belt brake
Q20: Compressor
Q21: Hydraulic unit
Q22: Cooling water pump
F11: Peroxide tank heater 1
F12: Peroxide tank heater 2
F28: Power supply

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9.3.2 Fuse Board 2

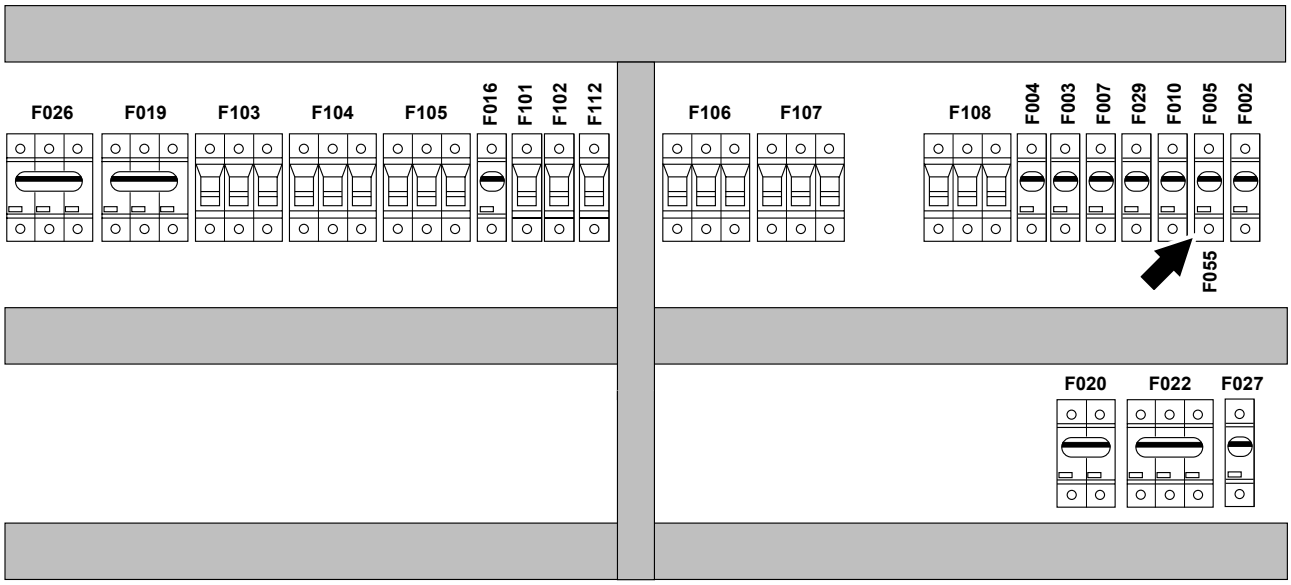
9.3.2-1 Fuse Board 2 - Set Fuse

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095780-0400

Set the fuse protection, **F005** or **F055**, following the table below:

Fuse	Size	Notes
F005	10 A	Cooling system - TP No. 1095954-0200
F055	2 A	Rebuilt with UK-2603238-0200 Cooling Unit Replacement. Cooling system - TP No. 1095954-0300

Set the other fuse protections following the table on next page.



F005: cooler electr. cabinet
F055: cooler electr. cabinet

(Cont'd)

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(Cont'd)

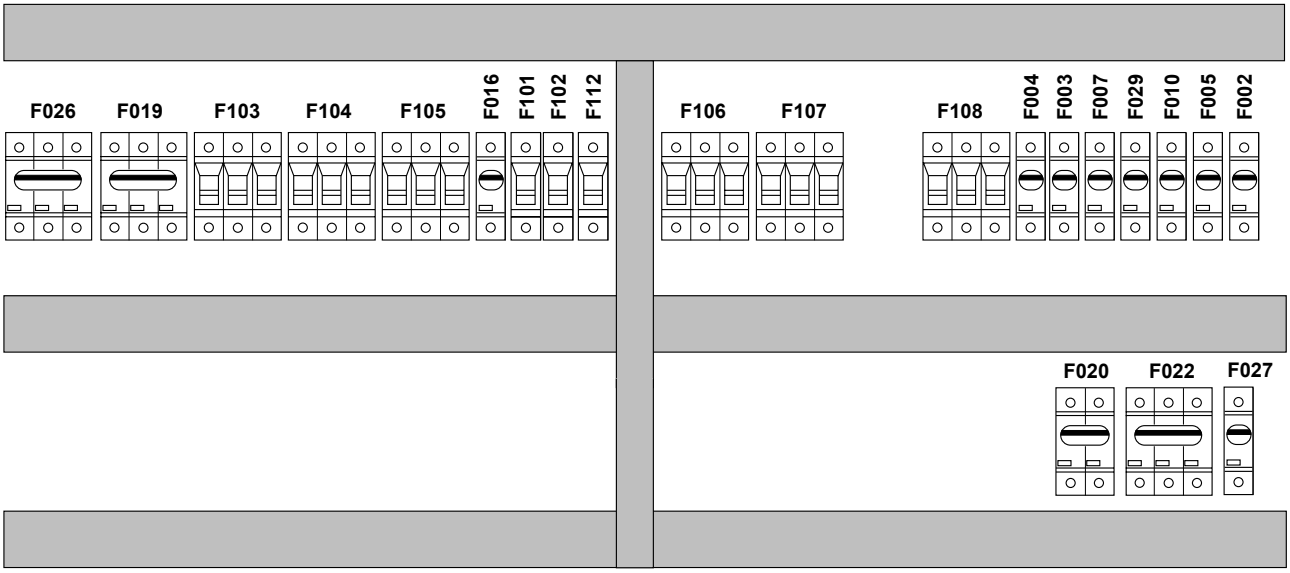
Set the fuse protections following the table below:

Note! For the old machines not rebuilt with UK-2539549-0100 EPLAN 21 Electrical Manual for TBA/21 050V or UK-2515239-0100 Machine adaptation for TPA 1000 Sq - **F101** is **10 A**.

F002	**F003**	**F004**	**F007**	**F010**	**F016**	**F019**
6 A	10 A	10 A	10 A	10 A	6 A	25 A

F020	**F022**	**F026**	**F027**	**F029**	**F101**	**F102**
10 A	10 A	16 A	16 A	25 A	16 A	16 A

F103	**F104**	**F105**	**F106**	**F107**	**F108**	**F112**
25 A	10 A	10 A	10 A	10 A	10 A	10 A



F002: 230 VAC lines L51-L52
F003: lightning
F004: feed pack. material
F007: drive roller 3 and 7
F010: time recorder + cooling fan
F016: flow meter
F019: servo amplifiers
F020: 24 VDC lines L14-L15
F022: 24 VDC lines L11-L12-L13
F026: main power PT21
F027: PT21 DC supply
F029: wall socket
F101: flap heating top RH and LH
F102: flap heating bottom RH and LH
F103: air super heater
F104: heating water 1
F105: heating water 2
F106: TPIH long. sealing
F107: TPIH transv. sealing
F108: TPIH ASU + SA
F112: splicing head ASSU

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9.3.2-2 Fuse Board 2 - Check Earth Fault Breaker

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1361330-0200

WARNING

Hazardous voltage.

Electric shock will cause death or serious injury. Change the earth fault breaker (2) if it does not trip immediately.

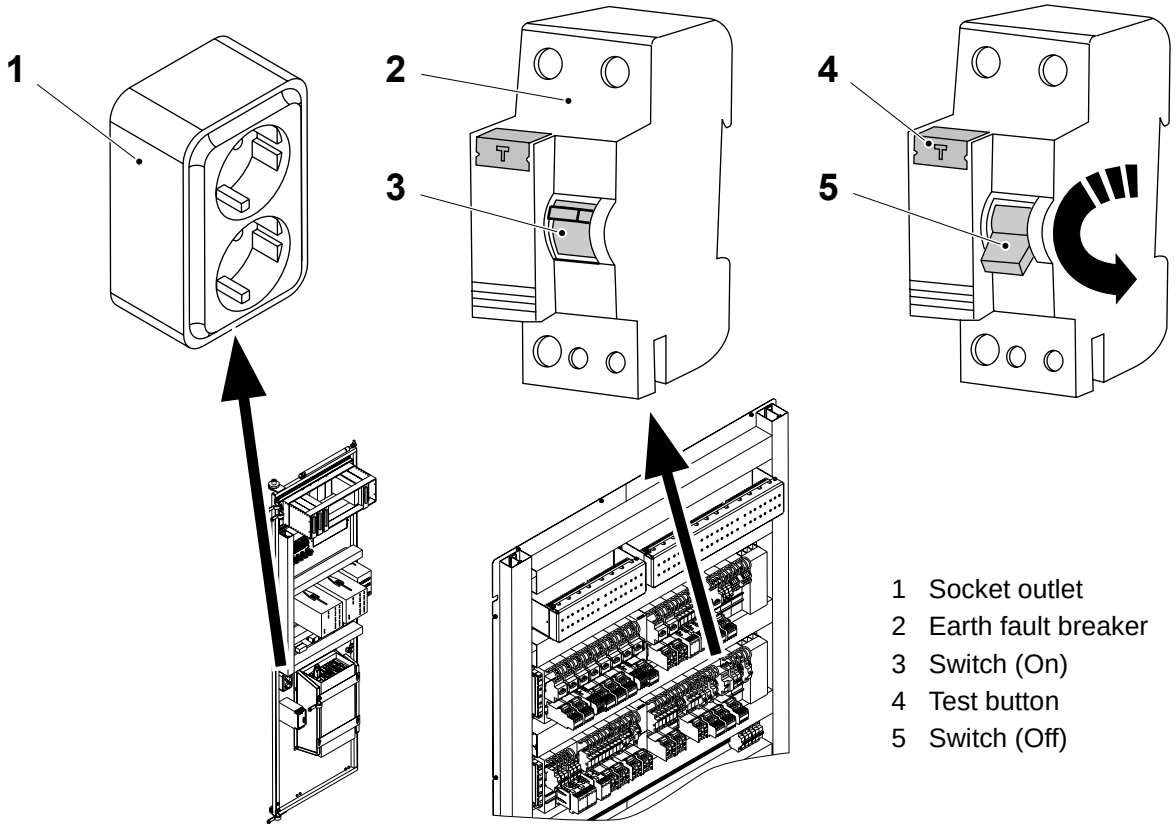
Note! F029 is the earth fault breaker (2), also called RCD (Residual Current Device). The earth fault breaker (2) must always be tested before using the socket outlet (1).

a) Make sure that the switch is in the **On** position (3).

b) Press the test button (4).

c) The earth fault breaker must trip immediately and the switch jumps to the **Off** position (5). If the circuit breaker does not trip immediately then change it.

d) Set the switch to the **On** position (3).



1 Socket outlet
2 Earth fault breaker
3 Switch (On)
4 Test button
5 Switch (Off)

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9.4 Control Left

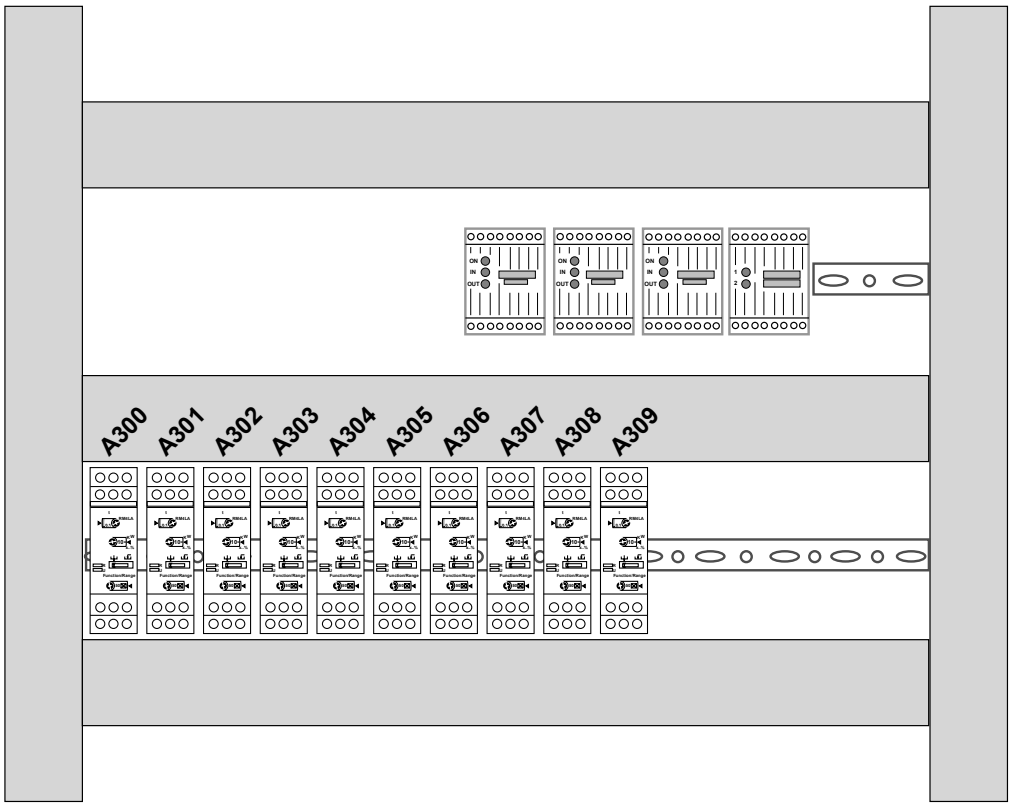
SPC Reference	1095641-0400

9.4.1 Level Relays (New)

9.4.1-1 Level Relays (New) - Description

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095641-0400 90458-2580

Note! For the machines with the old level relays, see 9.4.3-1 Level Relays (Old) - Description.



A 300: Hydrogen peroxide spray tank
A 301: Hydrogen peroxide bath
A 302: Water separator
A 303: Water bath
A 304: Cooling water
A 305: Membrane leakage
A 306: Level peroxide tank preheating
A 307: Safety level peroxide tank
A 308: Level peroxide tank production
A 309: HI level peroxide spray tank

(Cont'd)

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The level regulator relay (RM4-LA) monitors the product level by measuring the change in resistance of immersed and non immersed electrodes. The relay sensitivity must be set according to the conductivity of the product.

The level regulator parameters are set using the potentiometer and selectors shown in the illustration below:

a) The selector (3) sets the relay functionality.
   - In the **A** function is the output relay activated when the high level electrode is immersed and deactivated when the low level electrode is "dry".
   - In the **B** function is the output relay activated when the low level electrode is "dry" and deactivated when the high level electrode is immersed.

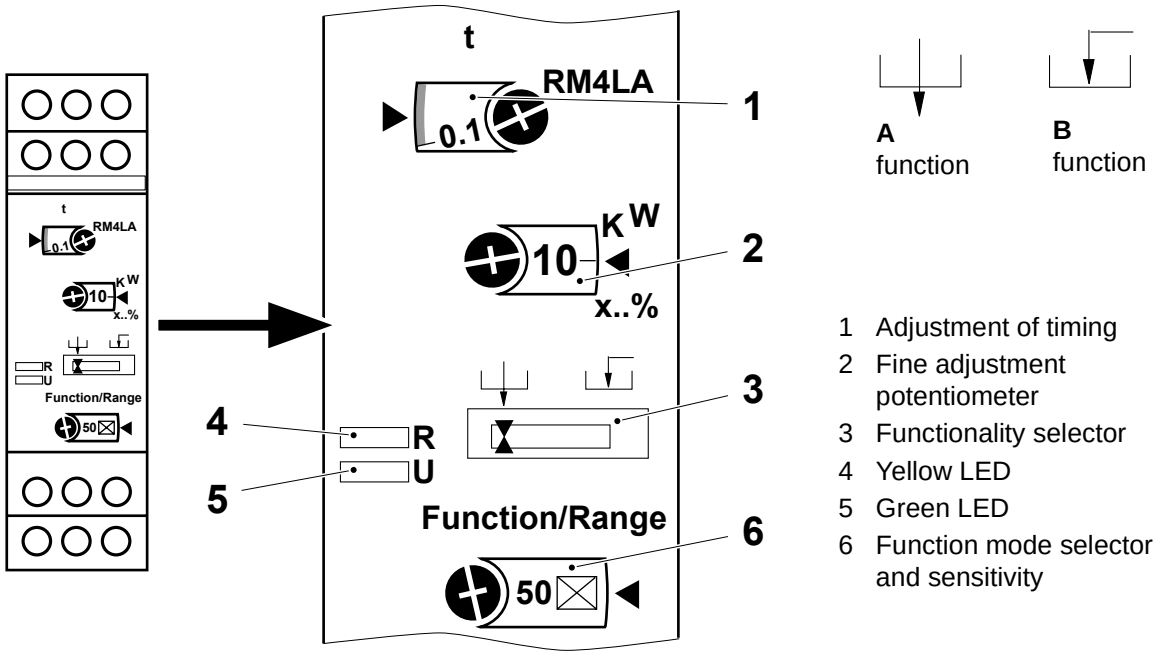
b) The potentiometer (2) fine adjusts the sensitivity as % of the sensitivity range (6).

c) The potentiometer (1) sets the delay.

d) The selector (6) sets **On** the level status of the relay and the sensitivity range.

e) The yellow LED (4) lights up when the relay is **closed**.

f) The green LED (5) lights up when the power is **On**.



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9.4.1-2 Level Relays (New) - Set

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1095641-0400 90458-2580

Note! For the machines with the old level relays, see 9.4.3-2 Level Relays (Old) - Set.

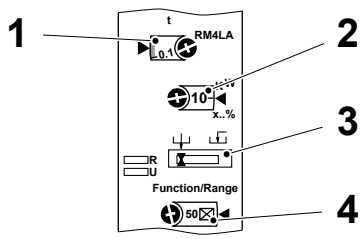
Set the display functions, see table below, with a screwdriver:

Description		Time value (1)	R-value (2)	Functionality sector(3)	Function/ range (4)
Hydrogen peroxide spray tank	A300	0	20		50
Hydrogen peroxide bath	A301	0	12		50
Water separator	A302	0	12		50
Water bath	A303	0	10		50
Cooling water	A304	0	20		500
Membrane leakage	A305	0	60		500
Level peroxide tank preheating	A306	0	10		50
Safety level peroxide tank	A307	0	10		50
Level peroxide tank, production	A308	0	10		50
HI level peroxide spray tank	A309	0	20		50

Note! The functionality selector (3) is recommended to always be set according to the table to avoid problems.

If required, fine adjust by means of the potentiometer (2).

Make sure that the yellow LED lights up when the level is obtained.



1 Adjustment of timing
2 Fine adjustment potentiometer
3 Functionality selector
4 Function mode selector and sensitivity

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9.4.2 Safety Relays

9.4.2-1 Safety Relays - Functional Description

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095641-0400

A600, A601

The A600 is a two-channel relay with a supervised reset controlling the emergency stops.

The A601 is a two-channel relay with a supervised reset controlling the safety switches of the doors, except the ones in the ASU.

The two-channel relays A600 and A601 (see Fig. 1) are supplied with **24V** between A1 and A2. All the emergency stops/safety switches are connected together and their two contacts are used to build up two separate circuits connected between S13 and S14 and between S23 and S24.

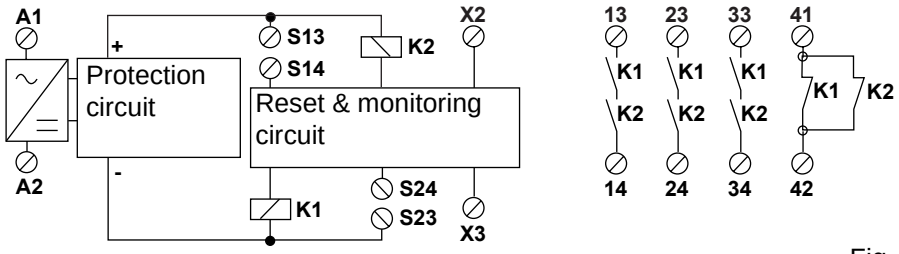


Fig. 1

The auxiliary contacts of the contactors that get power from the relay's output and the reset relay (K118) for the safety relays are connected in a chain between S13 and X2.

If one of the contacts in the emergency stops/safety switches open, the relay will turn off the outputs and the LEDs 'In' and 'Out', located on the safety relays.

As soon as both emergency stop / safety switches circuits are closed the LED 'In' will light up again. This doesn't mean that the relay has accepted the circuits as OK. For the acceptance both circuits must be opened and closed at the same time.

To enable the outputs, the reset circuit between S13 and X2 must be closed and opened. To get a closed circuit relay K118 is used connected in serial with all the auxiliary contacts of the contactors that are controlled by the safety relay. This is to make sure that all the contactors are functioning properly.

(Cont'd)

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(Cont'd)

A602

The A602 is a two-channel relay without a supervised reset controlling the safety switches of the doors in the ASU.

The two-channel relay A602 (see Fig. 2) is supplied with **24V** between A1 and A2. All the safety switches in the ASU are connected together and their two contacts are used to build up two separate circuits connected between S13 and S14 and between S23 and S24.

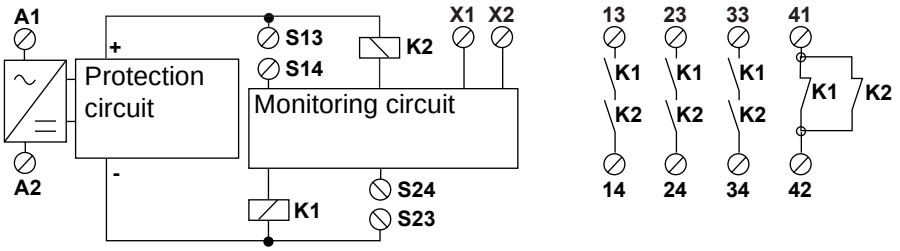


Fig. 2

This means that if one of the contacts in the safety switches open, the relay will turn off the outputs and the LEDs 'In' and 'Out', located on the safety relay.

As soon as both safety switches circuits are closed the LED 'In' will light up again. This doesn't mean that the relay has accepted the circuits as OK. For the acceptance both circuits must be opened and closed at the same time.

This relay is automatically reset when the circuits are OK, a reset signal is not needed.

(Cont'd)

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A603

The A603 is a two-channel expansion relay used to delay (0.5 seconds) the power off, for the main motor, to enable a controlled stop.

The two-channel timer relay A603 (see Fig. 3) is used in the TBA/21 application as a one-channel relay and therefore both channels are supplied using the same circuit. This circuit is connected in serial with the crank guards for the final folder and the drive unit.

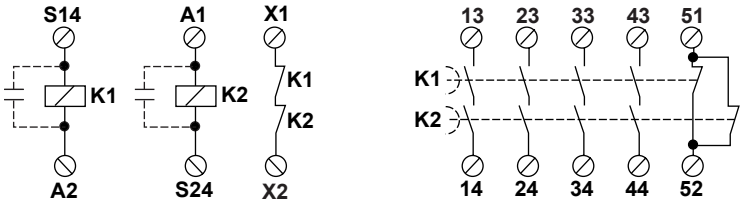


Fig. 3

This means that if one of the crank guards open, the relay will turn off the outputs after 0.5 second and the LED '1' and '2', on the safety relay, will be turned off. During this time the servo drive has time to stop the main motor in a controlled way.

This relay is automatically reset when the circuits are OK, a reset signal is not needed.

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9.4.2-2 Safety Relays - Check Function

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1095641-0400

Note! Check the relays in case of a safety relay alarm in the TPOP panel.

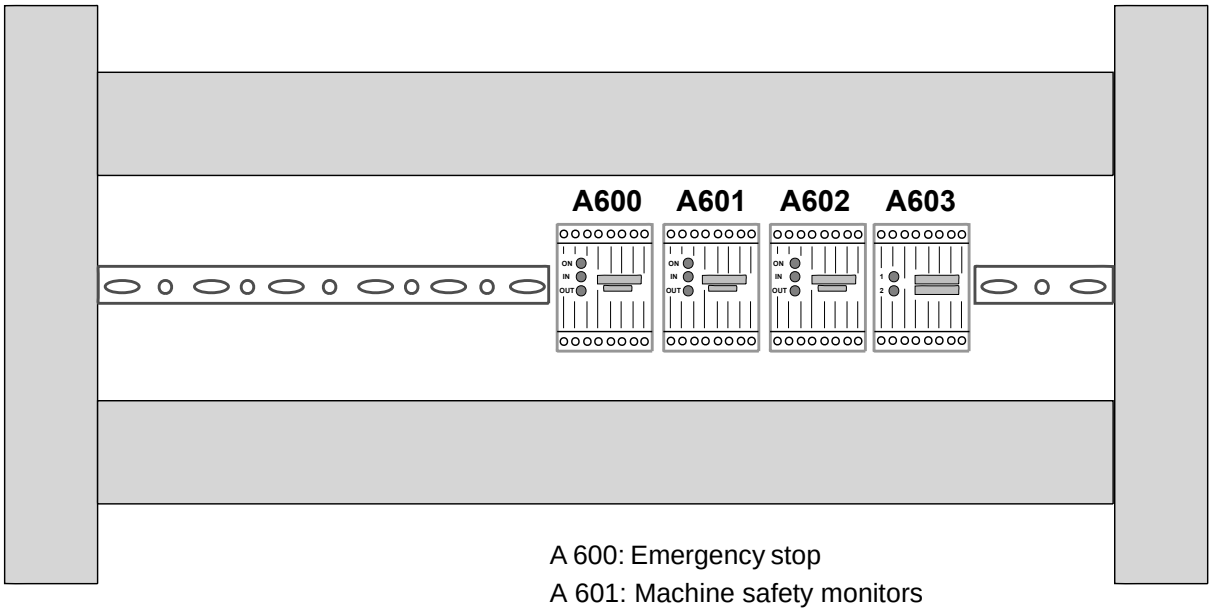
Check that all the LEDs in the safety relays are activated. If one or more LEDs of the following relays are not lit up:

Safety relay A600
Make sure that the all emergency stop push buttons are deactivated and the alarms are reset.

Safety relay A601
Make sure that all the doors in the Final folder unit and in the Drive unit are closed. Check that the alarms are reset.

Safety relay A602
Make sure that all the doors in the back of the ASU module are closed.

Safety relay A603
Make sure that the crank guard of the Drive unit and Final folder are deactivated. Check that the alarms are reset and that the three LEDs of the relay **A601** are lit up.



A 600: Emergency stop
A 601: Machine safety monitors
A 602: ASU safety monitors
A 603: Time relay main motor emergency stop

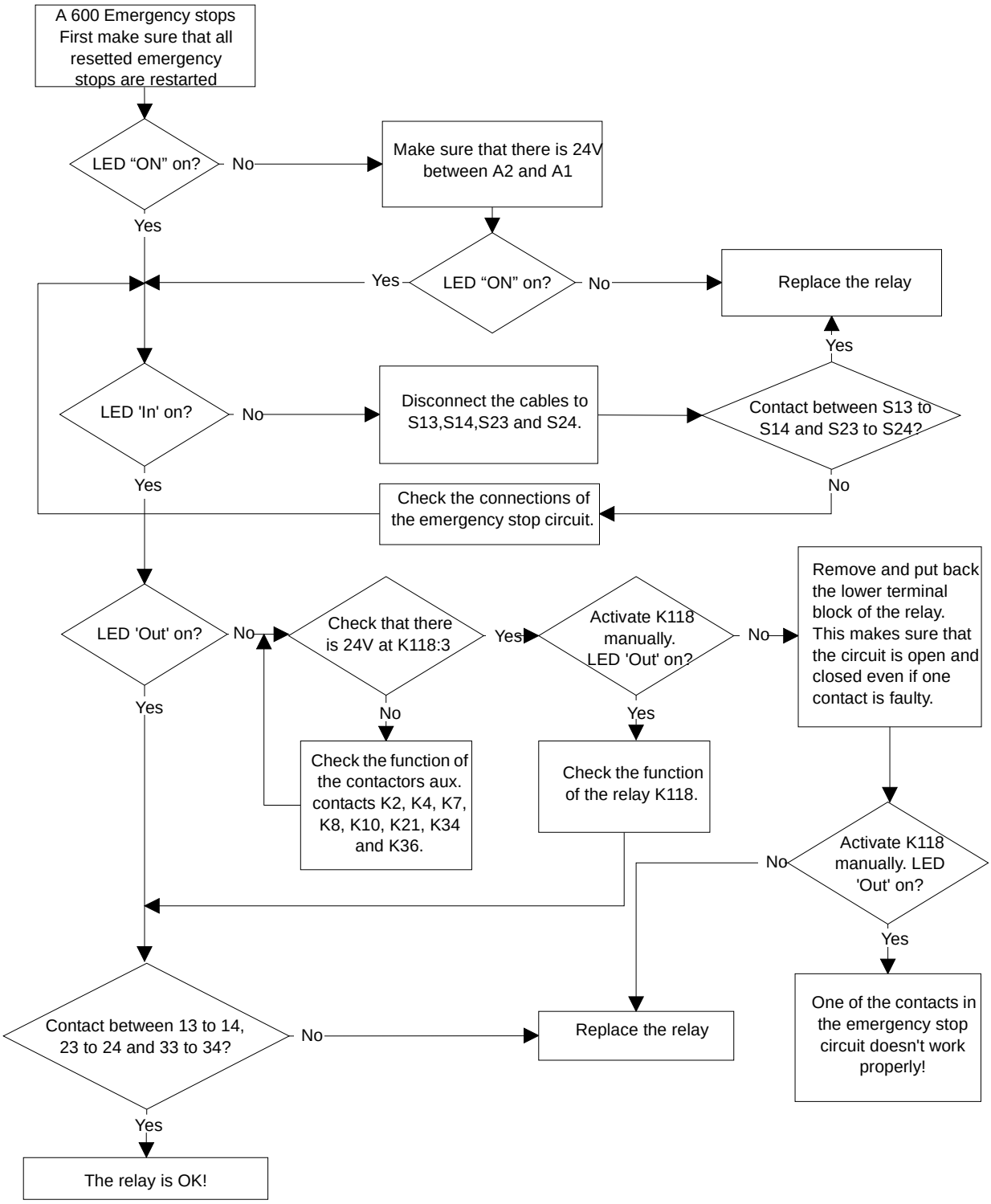
TechPub_2614345_0105 - 09_MM81534_11en.fm

9.4.2-3 Safety Relays - Troubleshoot

SPC Reference	1095641-0400

As the relays are connected in a serial circuit to each other they must be checked in a specific order, first A600 and then A601 and then A602 and finally A603.

Troubleshooting flowchart relay A600

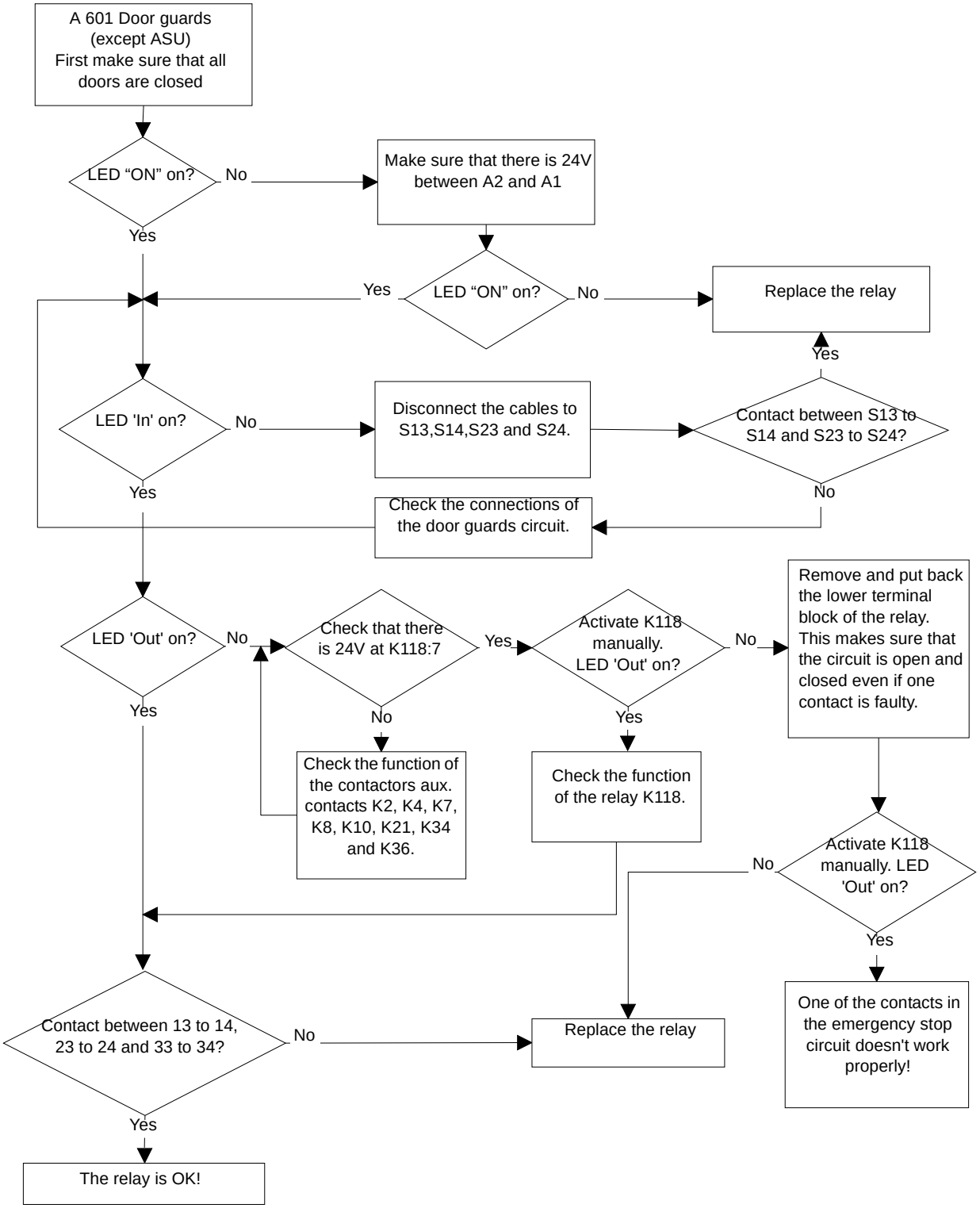


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Troubleshooting flowchart relay A601

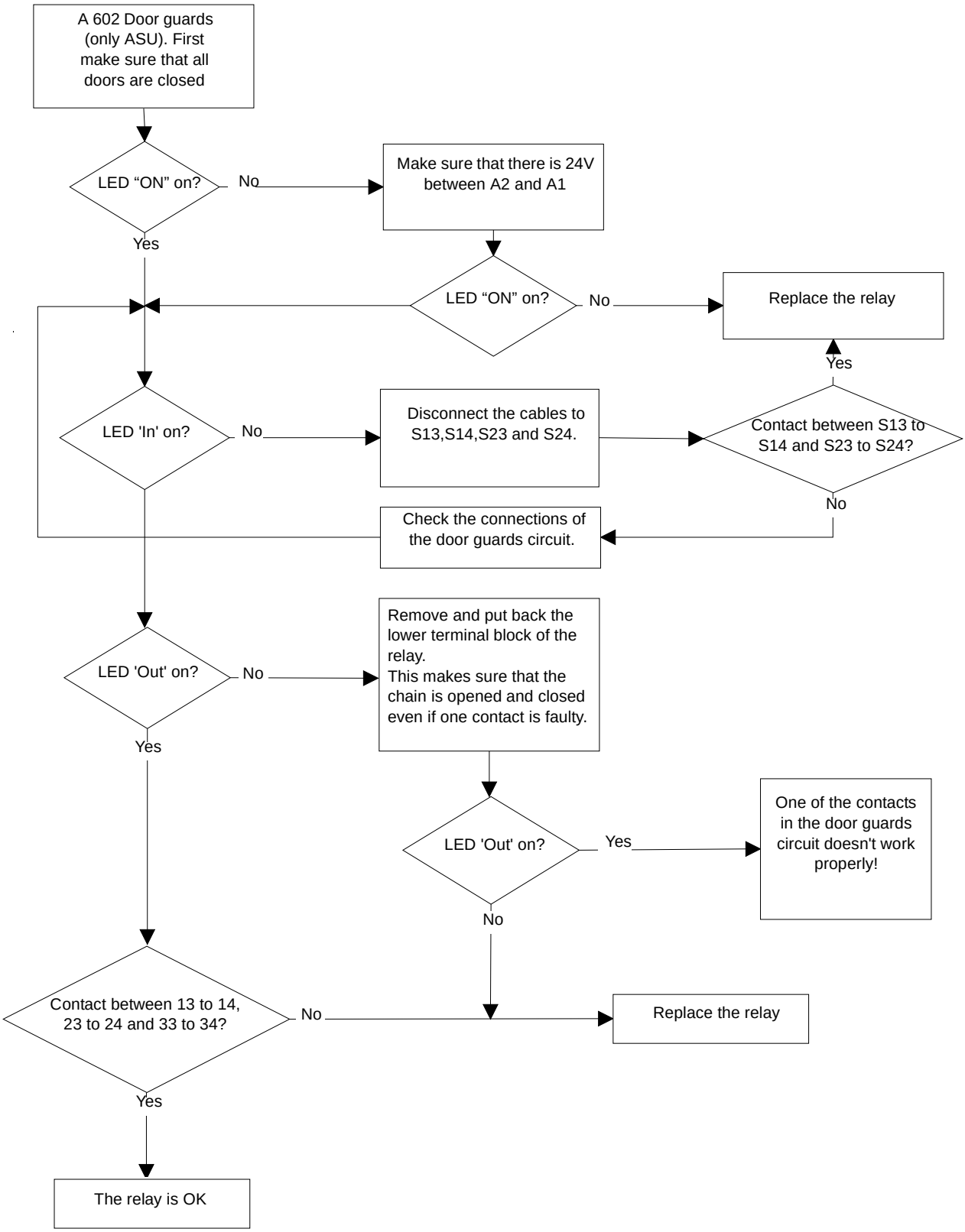


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Troubleshooting flowchart relay A602

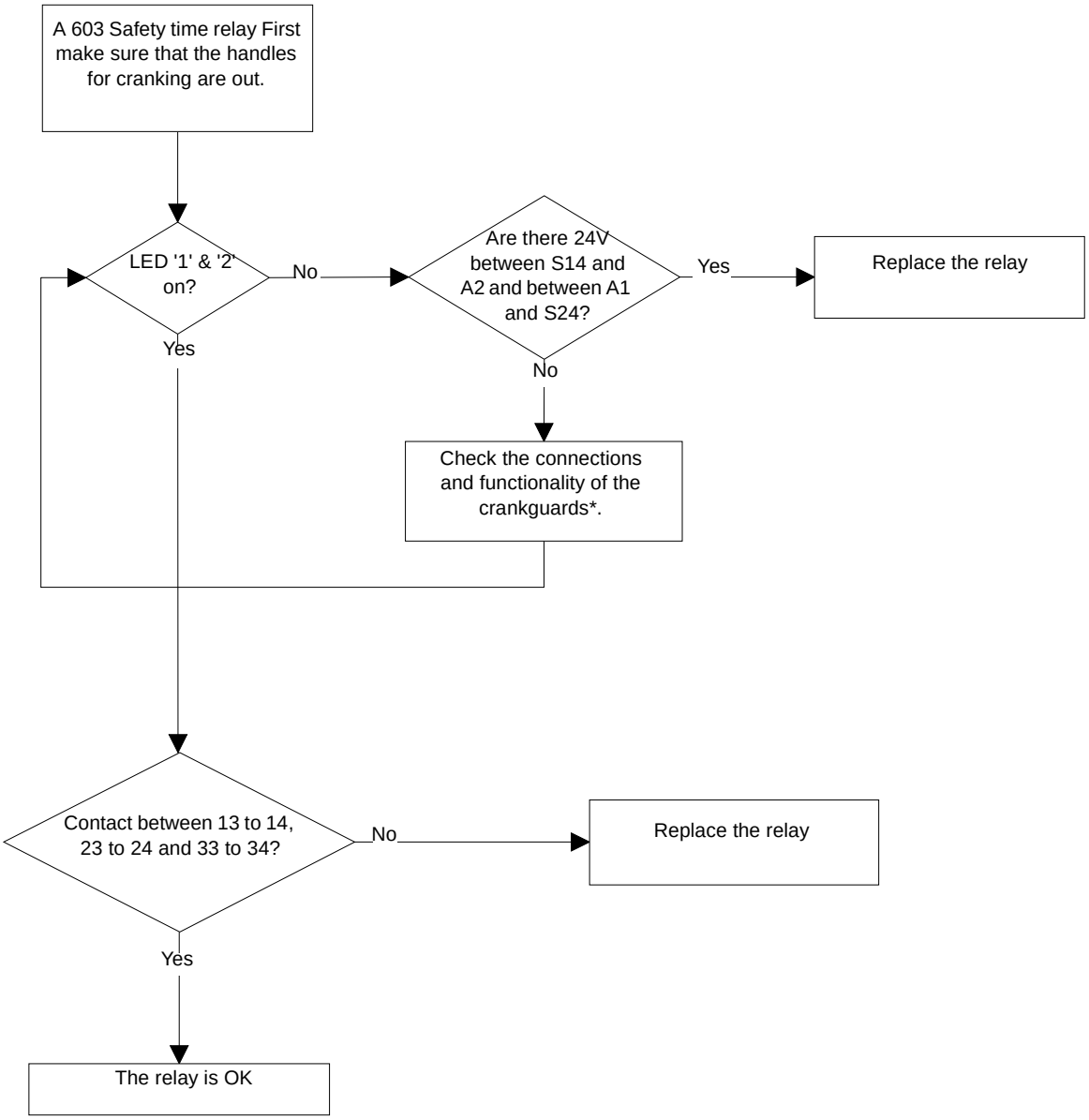


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Troubleshooting flowchart relay A603



Note! * This circuit is fed through the relay A600 and A601 and therefore these relays must be reset before this measurement is done!

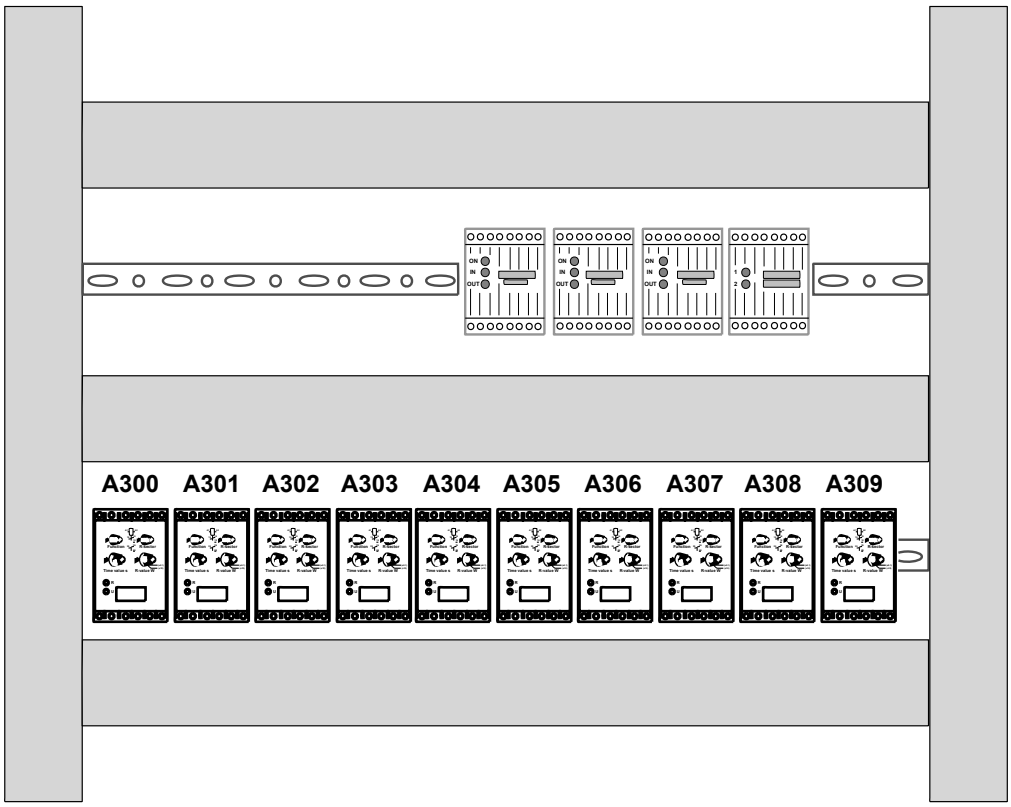
TechPub_2614345_0105 - 09_MM81534_11en.fm

9.4.3 Level Relays (Old)

9.4.3-1 Level Relays (Old) - Description

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095641-0400

Note! For the machines with the new level relays, see 9.4.1-1 Level Relays (New) - Description.



A 300: Hydrogen peroxide spray tank
A 301: Hydrogen peroxide bath
A 302: Water separator
A 303: Water bath
A 304: Cooling water
A 305: Membrane leakage
A 306: Level peroxide tank preheating
A 307: Safety level peroxide tank
A 308: Level peroxide tank production
A 309: HI level peroxide spray tank

The level regulator relay (RM3 LA1) monitors the filling level of conducting liquids.

(Cont'd)

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(Cont'd)

The level regulator parameters are set by means of the potentiometers and selectors:

a) the selector (1) sets the scale

b) the potentiometer (2) fine adjust the sensitivity

c) the potentiometer (6) sets the delay

d) the selector (7) sets the **On** level status of the relay:

– closed 

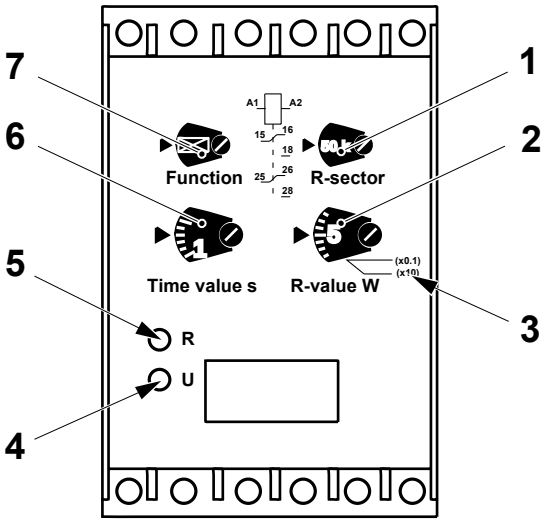
– open 

e) The yellow LED (5) lights up when the relay is **closed**.

f) The green LED (4) lights up when the power is **On**.

The scale (3) indicates the correction factor to use according to the R-sector in order to define the intermediate values. The displayed value on the potentiometer (2) shall be multiplied by the value in the table below, depending on the potentiometer (1) setting.

Potentiometer (1) setting	Multiply display (2) value by
5 k	0.1
500 k	10
50 k	1



1 R-sector
2 R-value
3 Scale
4 Green LED power On
5 Yellow LED output relay
6 Time value
7 Function

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9.4.3-2 Level Relays (Old) - Set

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1095641-0400

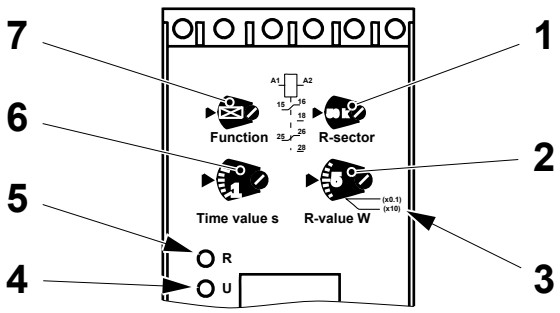
Note! For the machines with the new level relays, see 9.4.1-2 Level Relays (New) - Set.

Set the display functions, see table below, with a screwdriver:

Description		Function (7)	Time value (6)	R-value (2)	R-sector (1)
Hydrogen peroxide spray tank	A300	☒	0	10	50 k
Hydrogen peroxide bath	A301	☒	0	6	50 k
Water separator	A302	☒	0	6	50 k
Water bath	A303	☒	0	6	50 k
Cooling water	A304	☒	0	10	500 k
Membrane leakage	A305	☒	0	30	500 k
Level peroxide tank preheating	A306	☒	0	6	50 k
Safety level peroxide tank	A307	☒	0	6	50 k
Level peroxide tank, production	A308	☒	0	6	50 k
HI level peroxide spray tank	A309	☒	0	10	50 k

If required, fine adjust by means of the potentiometer (2).

Make sure that the yellow LED lights up when the level is obtained.



1 R-sector
2 R-value
3 Scale
4 Green LED power On
5 Yellow LED output relay
6 Time value
7 Function

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9.5 Control Right

SPC Reference	1350699-0200

9.5.1 PLC

9.5.1-1 PLC - Change Battery

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
Special Equipment	Needle nose pliers
Consumables	Battery TP No.90031-301
SPC Reference	1350699-0200

Alternative With One Cable Connector

Note! For alternative with two cable connectors (1), see the Alternative With Two Cable Connectors section.

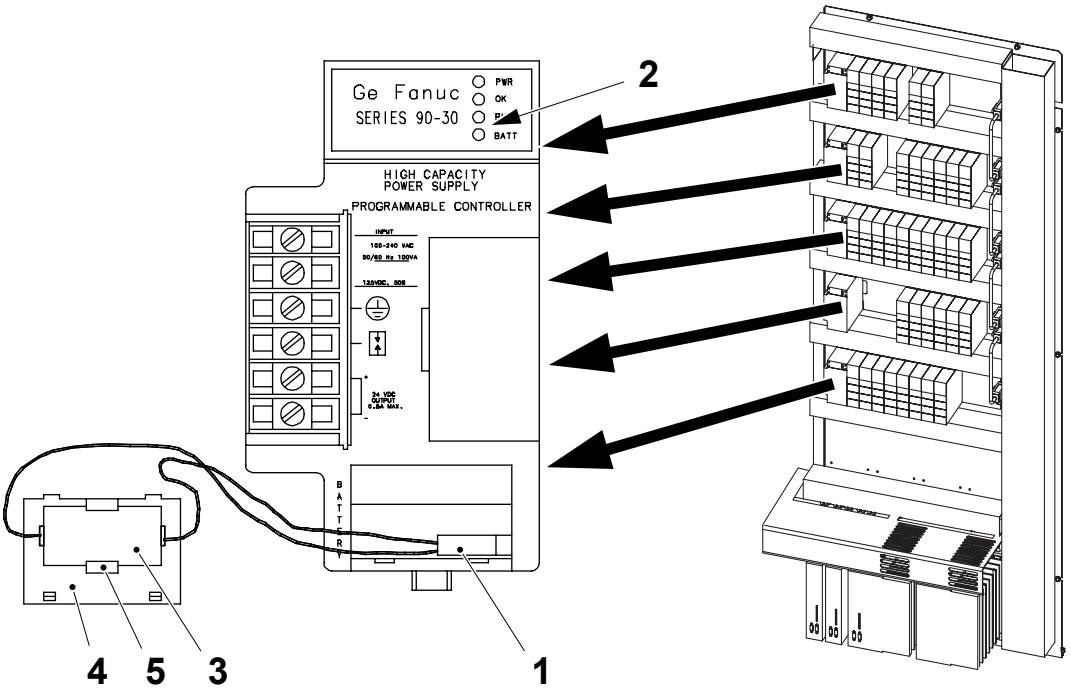
When the battery signal lamp (2) lights up, the battery (3) must be changed.

a) Remove the battery cover (4).

Note! The battery replacement must be completed within 20 minutes or else the RAM memory might be erased.

b) Remove the battery (3) from the mounting clips (5).

c) Firmly attach the clips to the new battery (3).



1 Cable connector
2 Lamp
3 Battery
4 Battery cover
5 Mounting clip

(Cont'd)

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(Cont'd)

CAUTION

Risk of personal injury.

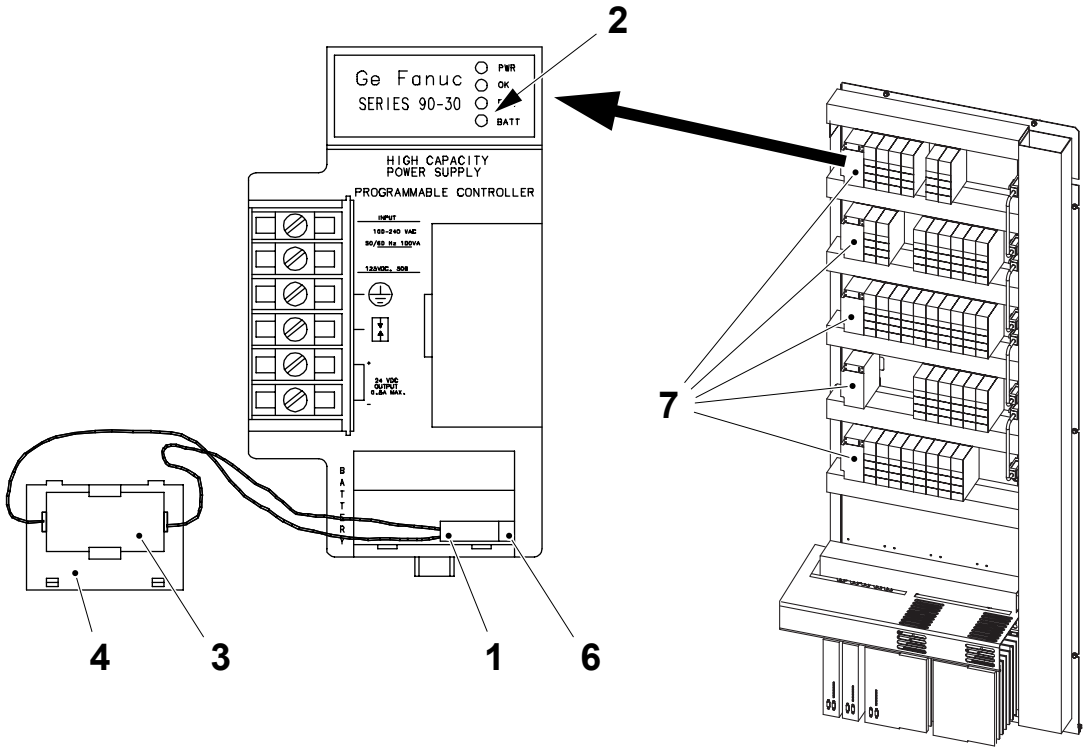
Handle the old battery in a safe way! The battery contains harmful substances and must not be thrown away in nature. Hand it in to the nearest recycle centre. Do not burn lithium batteries. Do not try to recharge lithium batteries.

d) Disconnect the cable connector (1) of the old battery and discard the battery.

e) Carefully insert the cable connector (1) of the new battery (3) into the contact (6) with the aid of needle nose pliers.

f) Fit the battery cover (4).

g) Repeat items from a) to f) for the other power supply units (7).



1 Cable connector
3 Battery
4 Battery cover
6 Contact
7 PLC power supply unit

(Cont'd)

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(Cont'd)

Alternative With Two Cable Connectors

Note! For alternative with one cable connector (1), see the Alternative With One Cable Connector section.

When the battery signal lamp (2) lights up, the battery (3) must be changed.

a) Remove the battery cover (4).

b) **First** fit the cable of the new battery (3) on the unused cable connector (1) with the aid of needle nose pliers.

CAUTION

Risk of personal injury.

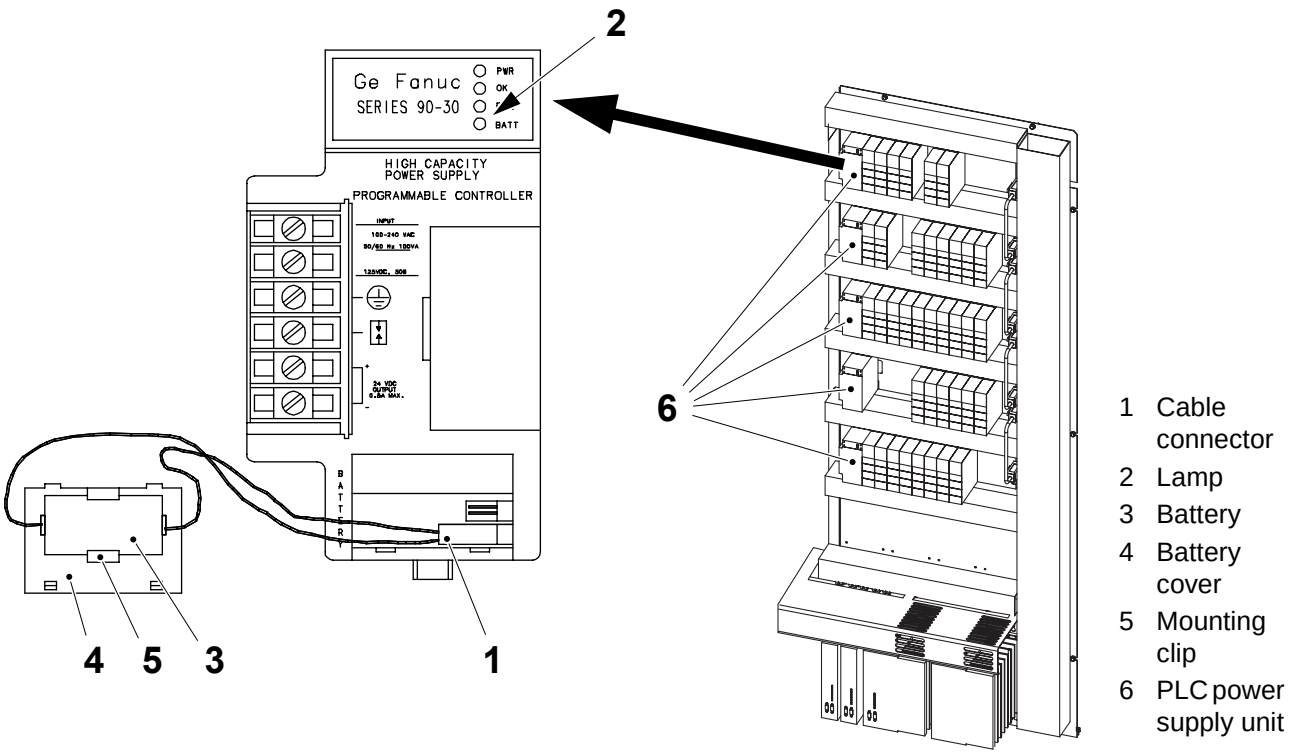
Handle the old battery in a safe way! The battery contains harmful substances and must not be thrown away in nature. Hand it in to the nearest recycle centre. Do not burn lithium batteries. Do not try to recharge lithium batteries.

c) **Secondly** remove the old battery cable and remove the battery from its mounting clip (5). Discard the old battery.

d) Firmly insert the new battery (3) into the mounting clip.

e) Fit the battery cover.

f) Repeat items from a) to e) for the other PLC power supply units (6).



1 Cable connector
2 Lamp
3 Battery
4 Battery cover
5 Mounting clip
6 PLC power supply unit

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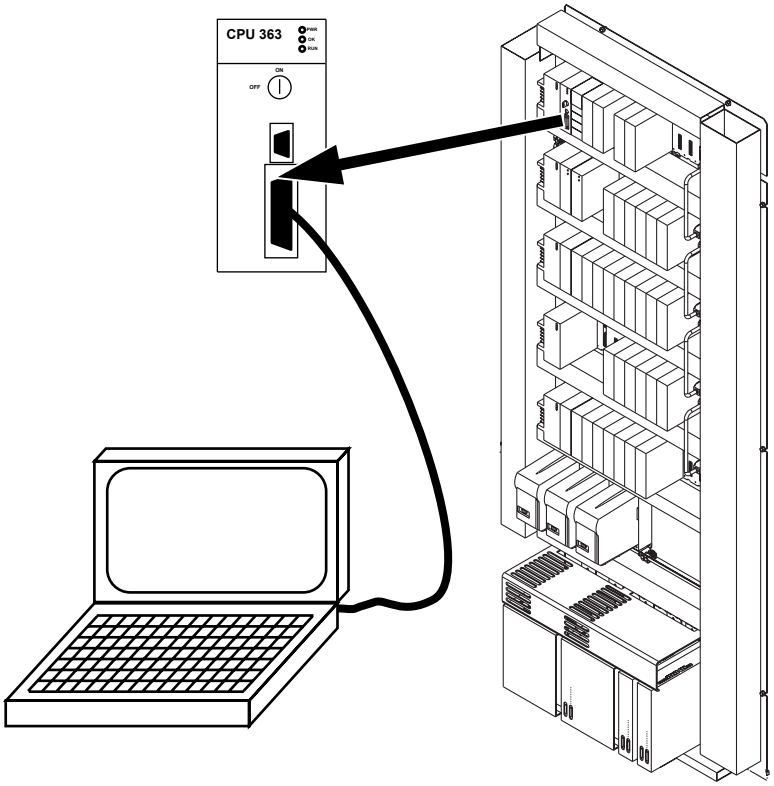
9.5.1-2 PLC - Load Program

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
Special Equipment	Communication cable RS 232 C AT compatible PC with diskette station
SPC Reference	1350699-0200

Note! This instruction describes one way to load the PLC program from a diskette.

a) Remove the label and insert the memory protection key on the CPU. Turn the key into position **OFF no-protect**.

b) Connect the communication cable between the PC and the PLC.



c) Start **LM90** to enter the GE Fanuc PLC (Logicmaster 90).

d) Insert the program diskette in drive **A**.

e) From the **Main menu**, press **F1... Logicmaster 90 Programmer Package**.

f) The **SELECT OR CREATE A PROGRAM FOLDER** menu will be displayed.

g) Type **A:** and press <**ENTER**>.

(Cont'd)

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(Cont'd)

h) With the **Arrow** keys, select the program to be loaded (1) into the PLC (YYY is an example).

i) Press **<ENTER>**.

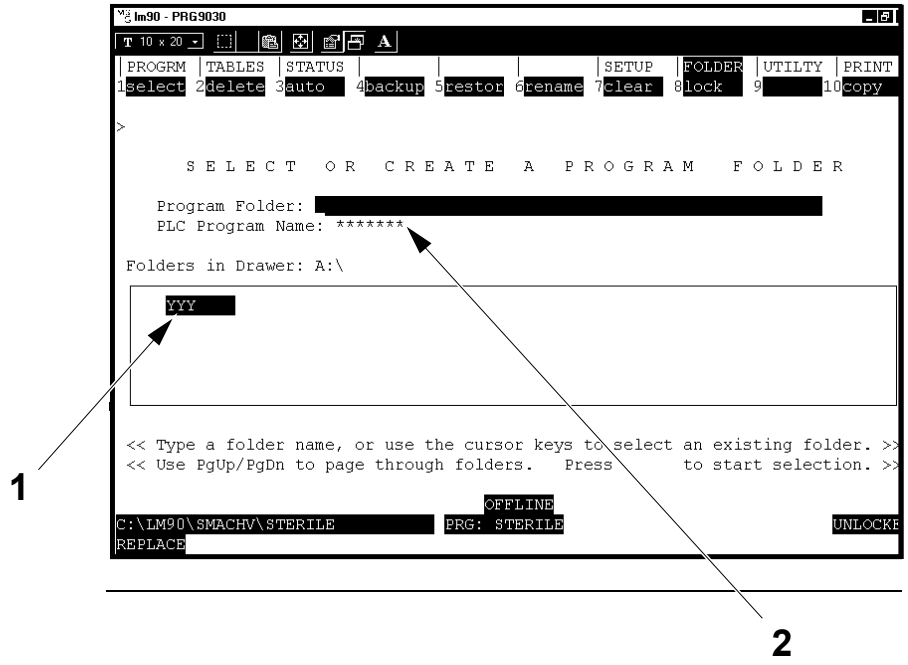
Note! If a program has been installed previously, the program name will appear in the **PLC program name** field (2).

j) Type **N** to answer “Folder found: back up its contents? (Y/N)”.

k) The **SERIES 90-30/90-20 PROGRAMMING SOFTWARE** menu will now be displayed.

l) Press **F9...** **Utility: Load/Store/etc**.

m) The **PROGRAM UTILITY FUNCTIONS** menu is displayed.



1 Program to be loaded (example)
2 PLC Program name field

(Cont'd)

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(Cont'd)

n) Check that the status line (LM communication) shows **ONLINE** (7). If not, press **Alt + M** until the status line shows **ONLINE**.

o) Check that the status line (PLC status) shows **STOP** (6). If not, press **Alt + R** until the status line shows **STOP**.

p) Check that the status line shows **LOGIC NOT EQ** (8).

Note! If the status line shows **LOGIC EQUAL**, there is no need to load the program.

q) Press **F2... Store from Programmer to PLC**.

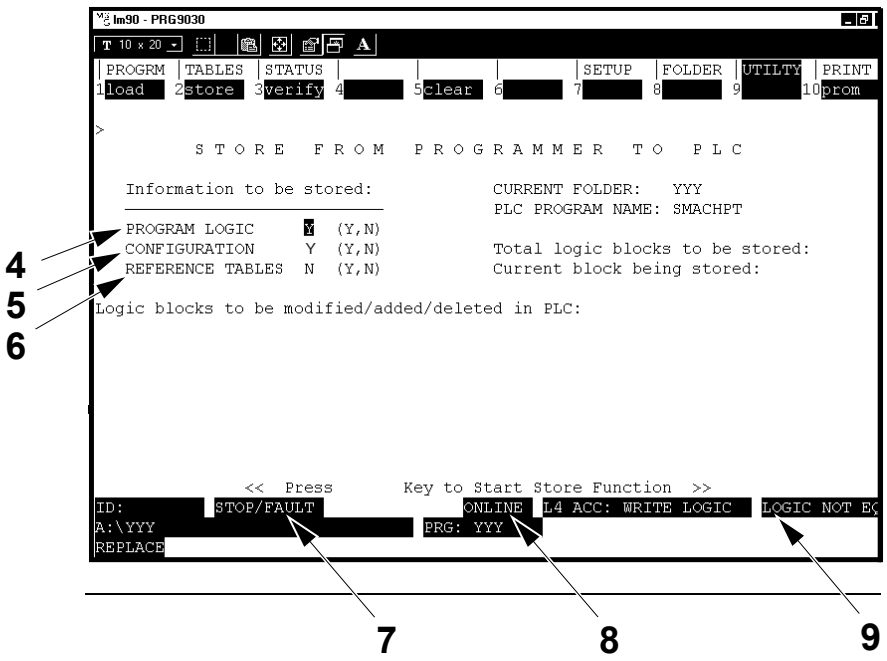
r) Select Y/N for the information to be stored (normal case).

s) Program logic (3), Y.

t) Configuration (4), Y.

u) Reference tables (5), N.

v) Press **<ENTER>** to store.



3 Program logic
4 Configuration
5 Reference tables
6 CPU status (STOP)
7 Connection mode status (ONLINE)
8 Program logic status (LOGIC NOT)

(Cont'd)

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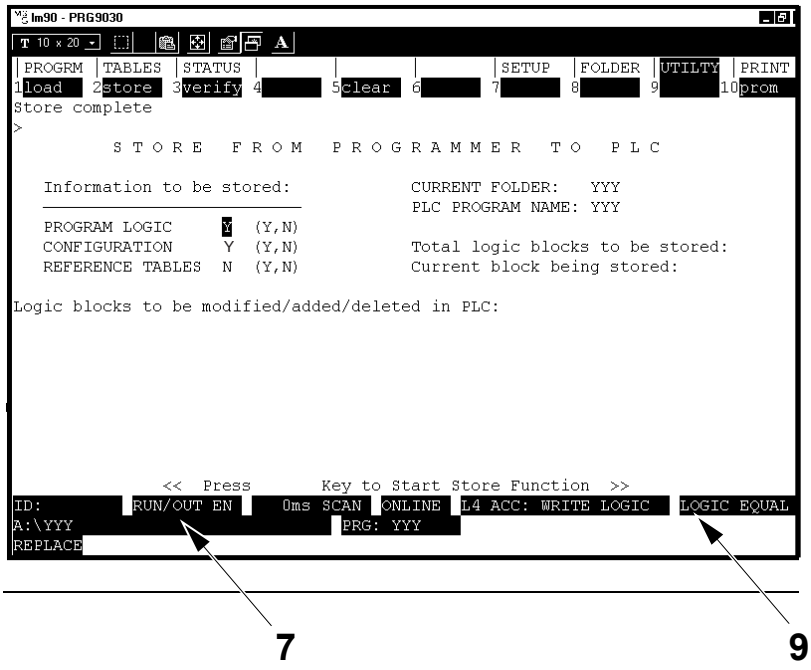
(Cont'd)

w) Type **Y** to answer “Program name in PLC does not match program name in folder; continue? (Y/N)”.

x) Type **Y** to answer “Selected items will be over-written; continue store in PLC? (Y/N)”. (Any other key will be taken as N).

y) When **Store complete** is displayed, the status line (8) should state **LOGIC EQUAL**.

z) Press **Alt + R** until the status line shows **RUN** (6).



6 CPU status (RUN)

8 Program logic status (LOGIC EQ)

aa) Press **<ESC>** and type **Y** to answer “Exit Logicmaster 90 Programmer Package? (Y/N)”.

ab) The program load is ready.

ac) Remove the memory protection key from the CPU and place a new label.

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9.5.1-3 PLC - Print Program

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1350699-0200

The following setup will give a printout in portrait and compressed text. Be very careful when typing in the leading and trailing statements. It is very important to use upper and lower case correct.

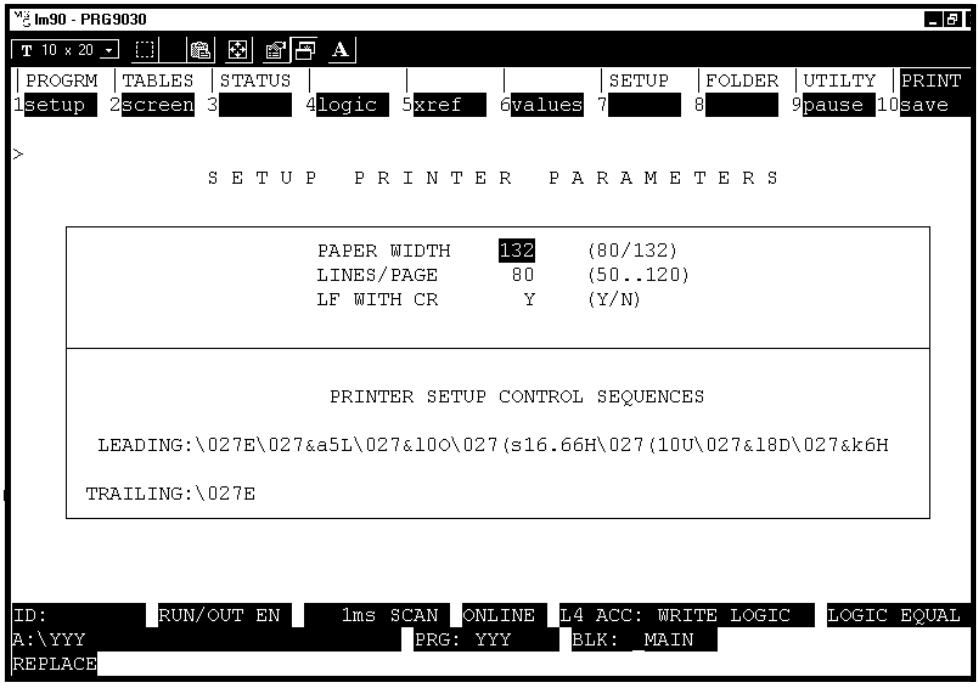
The setting is valid for HP Laser Jet III but it might work on other printers, if not see your printer manual for the right printer codes.

a) Press **F1** for the Programming Package.

b) Press **F10** for the Print Functions.

c) Press **F1** for Setup Printer Parameters.

d) Select the parameters as follows.



Description of printer codes	
\027E	Reset printer
\027&a5L	Left margin, # of columns (5)
\027&l5C	Vertical Motion Index, # of 1/48 Inch increments (5)
\027(10U	Primary Symbol Set, (PC-8)
\027(s20H	Primary Pitch, # of Characters / Inch (20)
\027(s4102T	Typelace Family, Letter Gothic

(Cont'd)

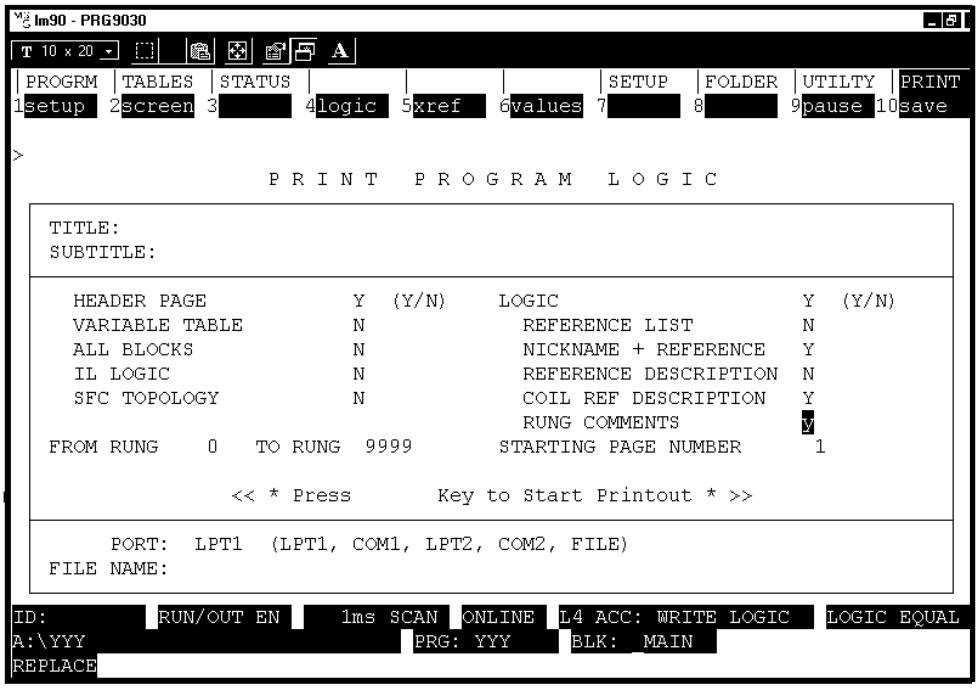
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(Cont'd)

e) Press **<ESC>** button to come back to LH90 main menu.

f) Press **F4** for Print Program Logic.

g) Select the options as follows.



h) Press **<ENTER>** to start print out.

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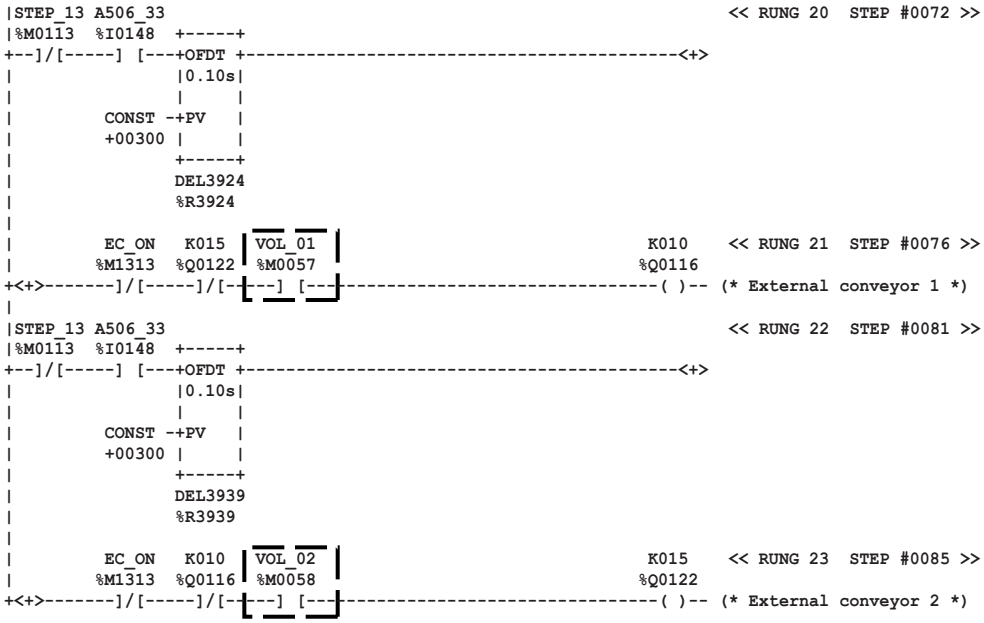
9.5.1-4 PLC - Set External Conveyor

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
Special Equipment	Communication cable RS 232 C AT compatible PC with diskette station LM90 software
SPC Reference	1350699-0200

Note! Only valid from machine number 15011/00189 for machines from production in Italy. Only valid from machine number 21201/00002 for machines from production in Sweden.

The program can control a second external conveyor. The program must be changed properly (BLK_33, rungs 21 and 23) to select a conveyor for the volume(s) being produced. If required to set the external conveyor, see 9.5.1-2 PLC - Load Program.

Note! In this example, the conveyor 1 is chosen to run with volume 1000 B (VOL_01), while conveyor 2 is chosen to run with volume 200 S (VOL_02):



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9.5.2 DMC2 Card (New DMC Card)

9.5.2-1 DMC2 Card - Function Description

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	1350699-0200

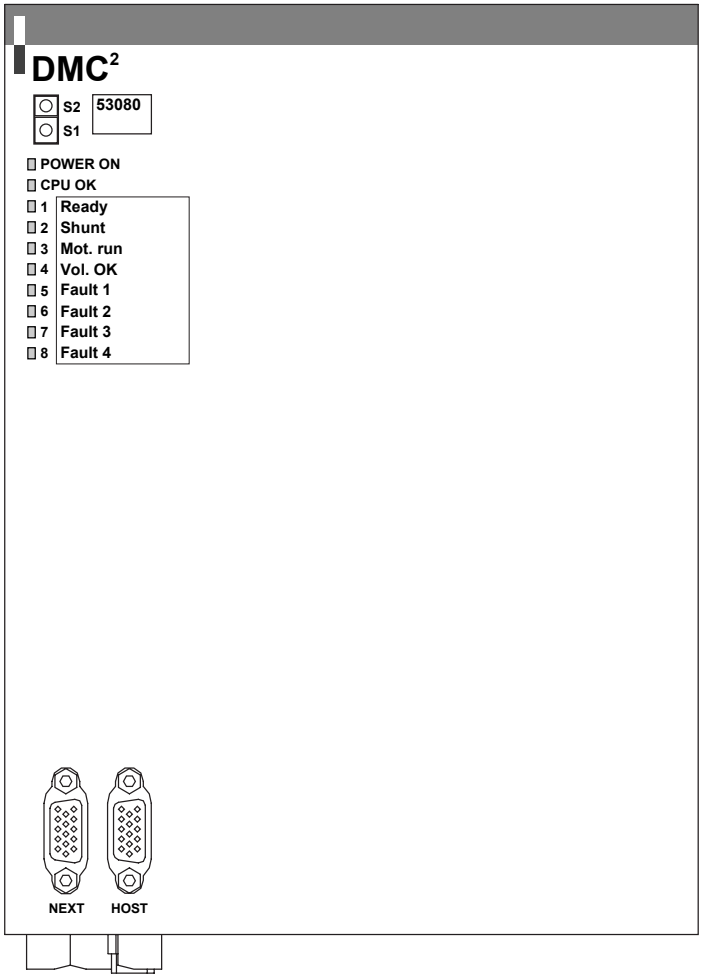
New DMC Cards

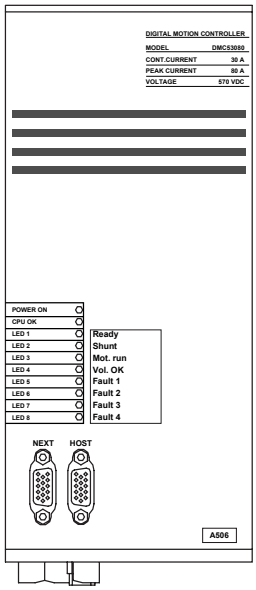
Note! For the machines with the old DMC cards, see 9.5.7-1 DMC Card - Function Description.

Main Motor Card A506

The DMC2 card A506 is used to move and control the speed of the main cam, located within the Drive unit.

The DMC2 controls the speed of the main cam in order to optimize the average value of the of the main motor torque according to the running volume.





Old DMC card.

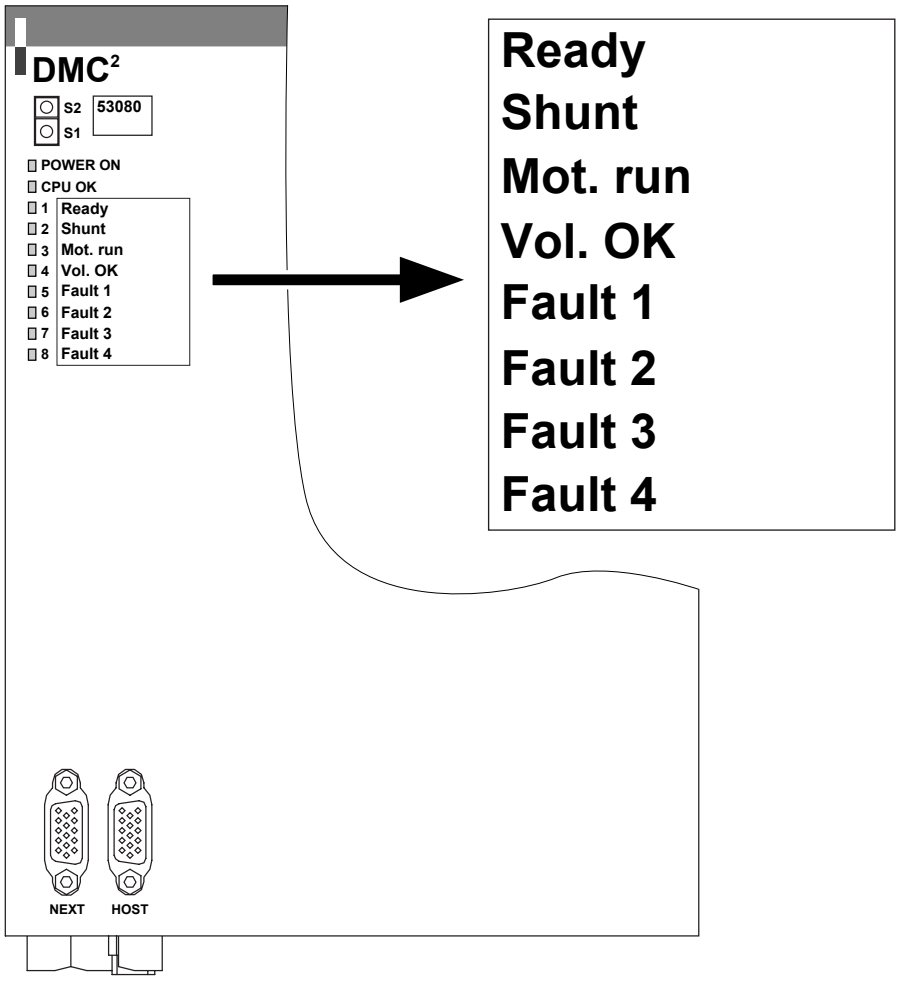
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DMC Front Panel LEDs

DMC card A506		
LED	**Colour**	**Function**
Ready	Green - (LD1)	The servo system is initialized
Shunt	Yellow - (LD2)	Shunt regulator active. The negative torque is dissipated by the shunt resistor
Mot. run	Yellow - (LD3)	The main motor is running
Vol. OK	Yellow - (LD4)	Volume transfer OK. All the volume parameters are transferred by the PLC
Fault 1	Red - (LD5)	See list next page
Fault 2	Red - (LD6)	See list next page
Fault 3	Red - (LD7)	See list next page
Fault 4	Red - (LD8)	See list next page

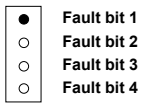
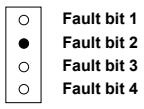
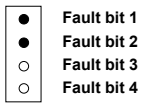
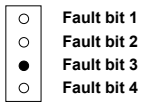
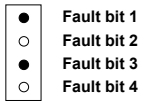
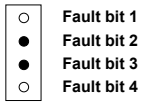
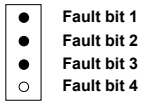
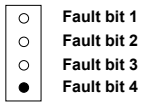
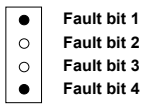


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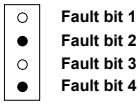
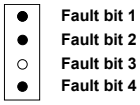
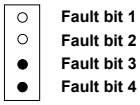
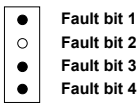
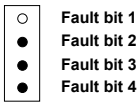
Main Motor Card A506 Fault List

	**Hardware disabled** The hardware enable signal from the PLC is low. This is normally not an alarm. But if it happens in an abnormal situation check the connection to the DMC's hardware enable input.
	**Internal hardware fault** Try to restart, if the problem persists or comes back soon again change DMC driver.
	**Position error fault** The allowed error between the calculated position and the actual position of the axis of the motor is exceeded. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**Control C interrupt** Ctrl-C has been pressed on a terminal connected to the drive. 1. Restart.
	**Internal system fault** Try to restart, if problem persists or comes back soon again change DMC driver.
	**Temperature fault** 1. In case of the motor check if the movement is too hard. 2. In case of the drive check the cooling system of the electrical cabinet
	**Software disabled** The software enable signal from the PLC is low. This is normally not an alarm. But if it seems to be a problem check the connection between the PLC's output and the DMC's software enable input.
	**Torque limit exceed** The maximum current limit is exceeded. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**Cyclical timer** This alarm is triggered by internal faults in the drive, and is not an alarm if software and hardware enable is low. 1. Close the doors. 2. Check connections to the DMC's hardware and software enable.

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	**Volume data fault** Volume data does not exist or data bus error. 1. Check that the volume data registers in the PLC have the correct values. 2. Check that the data request output on the DMC driver is high also check that the corresponding input on the PLC is high. 3. Check that the connections for the data transfer between the DMC and PLC is correct.
	**Resolver fault** Problem with the resolver (the resolver sends information from the motor to the drive from where the drive can calculate the position of the axis). 1. Check the connections for the resolver cable. 2. Change drive or motor
	**Home position fault** When stopping the FFU the home position sensor couldn't be found. Check sensor and connections to the DMC drive
	**Bleeder fault** Too much excess energy is sent to the bleeder (shunt) resistor. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**FFU synchronisation fault** Position value of JUM sent from PLC is out of range. 1. Check functionality of angle encoder for the JUM. 2. Check that the register containing the encoder value in the PLC has the correct value. 3. Check that the connections for the data transfer between the DMC and PLC is correct.

(Cont'd)

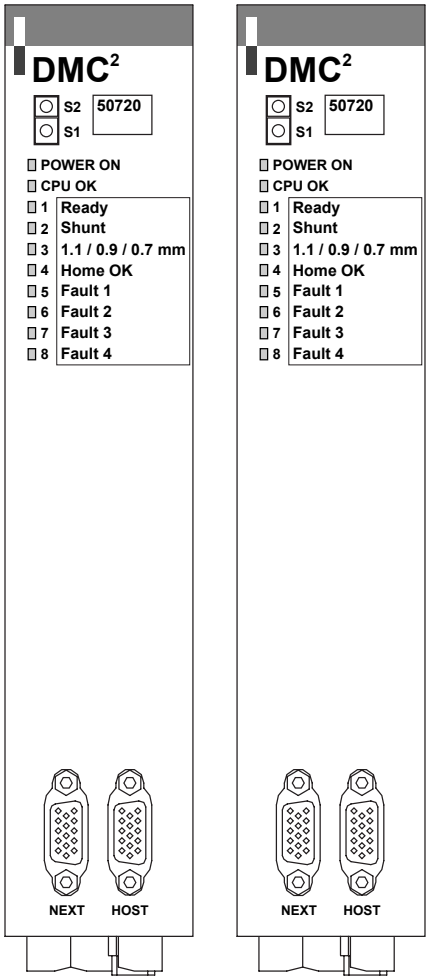
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Design Control System Cards A507 - A508

The DMC2 cards A507 and A508 are used to control the position and the movement of the folding flaps.

The DMC2 system receives the information for the new position of the folding flaps calculated in relation to the design correction error.



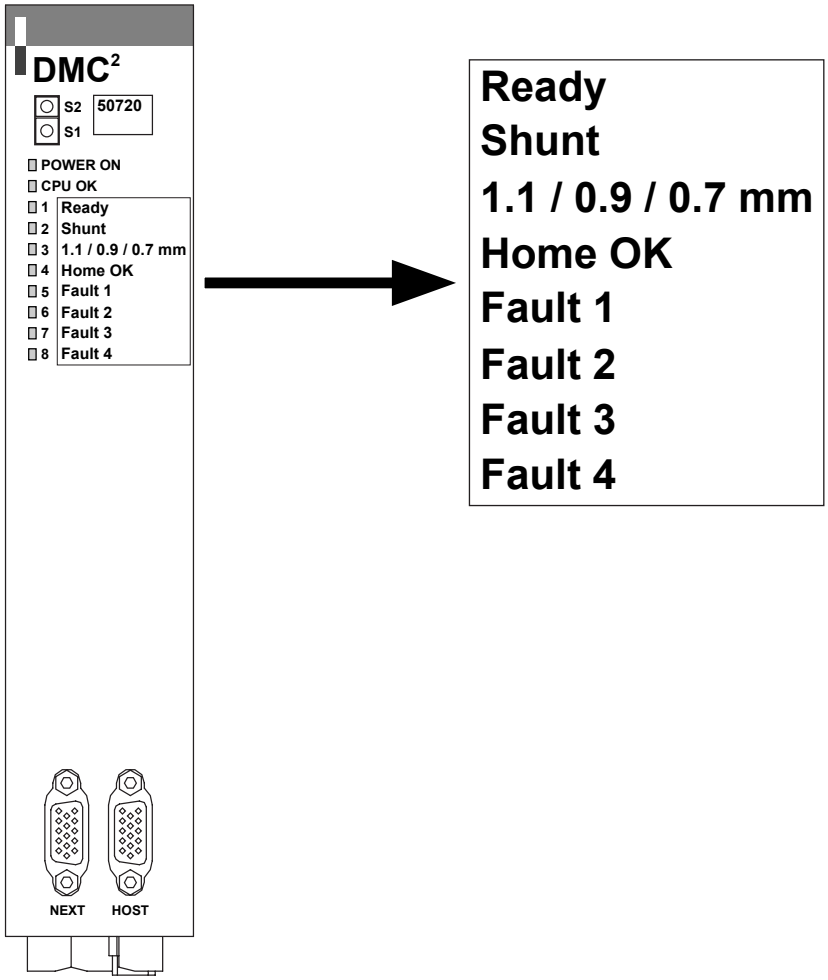
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DMC Front Panel LEDs

DMC card A507 - A508		
LED	**Colour**	**Function**
Ready	Green - (LD1)	The servo system is initialized
Shunt	Yellow - (LD2)	Shunt regulator active. The negative torque is dissipated by the shunt resistor
1.1 / 0.9 / 0.7 mm	Yellow - (LD3)	The 1.1 / 0.9 / 0.7 mm setting of the folding flaps is in progress
Home OK	Yellow - (LD4)	Home position found. The servo system has found its home position
Fault 1	Red - (LD5)	See list next page
Fault 2	Red - (LD6)	See list next page
Fault 3	Red - (LD7)	See list next page
Fault 4	Red - (LD8)	See list next page

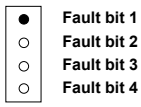
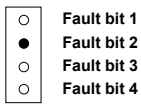
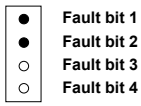
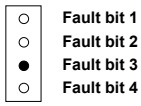
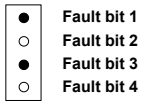
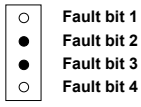
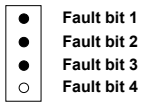
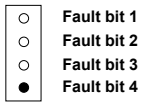
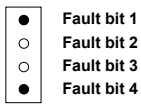


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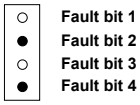
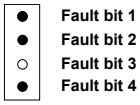
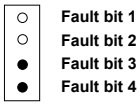
Design Control System Cards A507 - A508 Fault List

	**Hardware disabled** The hardware enable signal from the PLC is low. This is normally not an alarm. But if it happens in an abnormal situation check the connection to the DMC's hardware enable input.
	**Internal hardware fault** Try to restart, if the problem persists or comes back soon again change DMC driver.
	**Position error fault** The allowed error between the calculated position and the actual position of the axis of the motor is exceeded. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**Control C interrupt** Ctrl-C has been pressed on a terminal connected to the drive. 1. Restart.
	**Internal system fault** Try to restart, if problem persists or comes back soon again change DMC driver.
	**Temperature fault** 1. In case of the motor check if the movement is too hard. 2. In case of the drive check the cooling system of the electrical cabinet
	**Software disabled** The software enable signal from the PLC is low. This is normally not an alarm. But if it seems to be a problem check the connection between the PLC's output and the DMC's software enable input.
	**Torque limit exceed** The maximum current limit is exceeded. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**Cyclical timer** This alarm is triggered by internal faults in the drive, and is not an alarm if software and hardware enable is low. 1. Close the doors. 2. Check connections to the DMC's hardware and software enable.

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	**Volume data fault** Volume data does not exist or data bus error. 1. Check that the volume data registers in the PLC have the correct values. 2. Check that the data request output on the DMC driver is high also check that the corresponding input on the PLC is high. 3. Check that the connections for the data transfer between the DMC and PLC is correct.
	**Resolver fault** Problem with the resolver (the resolver sends information from the motor to the drive from where the drive can calculate the position of the axis). 1. Check the connections for the resolver cable. 2. Change drive or motor
	**Home position fault** The mechanical stop is not found within the specified time. Check the belt drive and that the mechanics for the design correction is moving correctly. Home position fault - continued

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9.5.2-2 DMC2 Card - Set Basic

Machine Status	PRODUCTION
Special Equipment	Communication cable RS 232-C AT compatible PC with diskette station
SPC Reference	1350699-0200

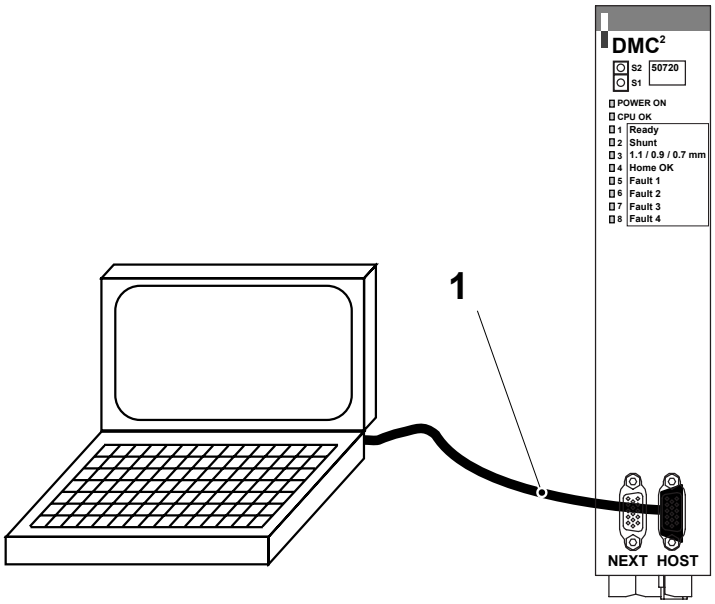
New DMC Cards

Note! For the machines with the old DMC cards, see 9.5.7-2 DMC Card - Set Basic.

Connect the DMC to the PC terminal with the cable (1). Necessary connections are:

PC 9-pin female	DMC 15-pin high density male
2	3
3	2
5	7
	1 (*)

Note! (*) = shield connection



1 RS232 connection cable

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Configure the program to use, for example TIT or Windows terminal, as follows:

Baud rate	9600
Parity	None
Bits	8
Stop bits	1
Flow control	None

PC terminal communication (only for DCS)

A PC with a terminal program can be used for test and service purposes. At start up through the serial interface it is possible to see the program version (R255). For the design correction DMC three values are displayed every package.

Value number	No. display	Function
Value 1	R51	Regulating position 0 - 63 step transferred from the TMCC card
Value 2	R50	Calculated correction position
Value 3	/	Position error

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PC terminal communication (for both DCS and MM)

A PC with a terminal program can be used for test and service purposes. At start up through the serial interface it is possible to see the program number (R255). For positioning trouble-shooting it is also possible to see different data by on line changing of the register **R120** value.

R120	Register No.	Register name	Function
R120 = 0	No display	No display	Default state
R120 = 10 (for DCS)	Ana.Out1 Ana.Out2	Ana.Out1 Ana.Out2	Connect the Ana.Out1 to resolver position Connect the Ana.Out2 to torque
R120 = 10 (for MM)	Ana.Out1 Ana.Out2	Ana.Out1 Ana.Out2	Connect the Ana.Out1 to torque Connect the Ana.Out2 to PosErr

For better performance of the system, keep **R120** = 0 when there is no need of displaying data.

9.5.2-3 DMC2 Card - Load Program

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
Special Equipment	Communication cable RS 232-C AT compatible PC with diskette station ECT program (by Danahere Motion)
SPC Reference	1350699-0200

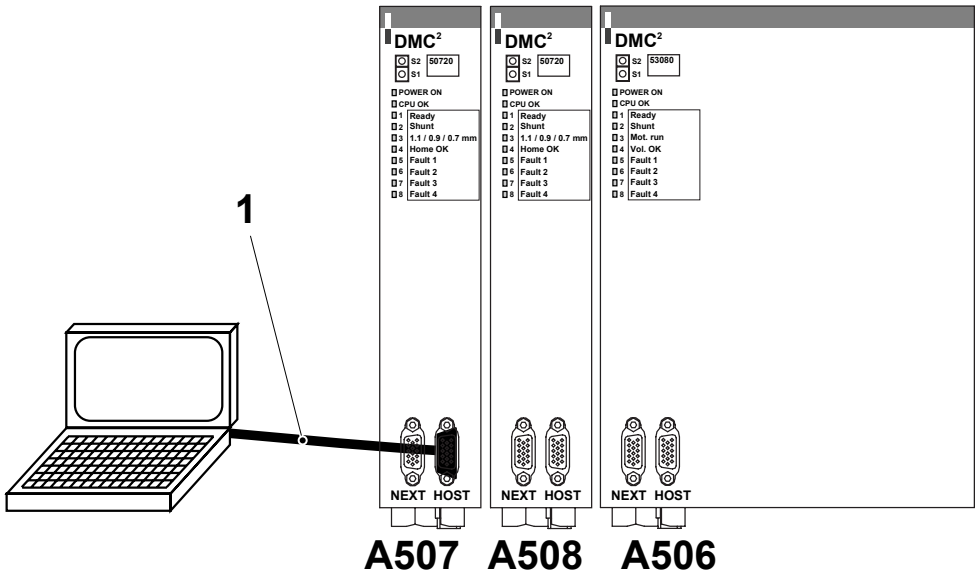
CAUTION
Risk of damage to the equipment.
Do not swap the DMC2 cards A506, A507 and A508 because they are of a different model and contain different programs!

a) Locate the appropriate DMC2 card in the electrical cabinet.
   – The card A506 is for the main motor program.
   – The card A507 and A508 are for the design control program.

b) Connect the communication cable (1) between the PC and the DMC2 card **HOST** front panel connector.

c) For the card **A506**, insert the MASTER diskette marked with the current revision number into the PC diskette station, **A:drive**.

d) For the cards **A507** and **A508**, insert the MASTER diskette marked with the current revision number into the PC diskette station, **A:drive**.



1 RS232 communication cable

(Cont'd)

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e) Make sure that the green LED “POWER ON” is lit on the DMC2 card.

f) Start the **SW: ECT** program.

g) Select **TERMINAL** program from the **WINDOW** menu.

h) Select **STOP** from the **CONTROLLER** menu. If the program does not stop, indicated by a warning message, then retry to stop the program until in the bottom of the **ECT** window it is written “Program has stopped”.

i) Write at the prompt: **> NEW** (to cancel the program) and press ENTER.

j) Write at the prompt: **> LIST** (to check the program list) and press ENTER.

k) Select **DOWNLOAD** from the **CONTROLLER** menu.

l) Select path and file name for the program file on the MASTER diskette in the **A:drive**. Press **OK** to start downloading.

m) Check on the bottom of the TERMINAL window if it is written “FILE IS DOWN LOADED”.

n) Write at the prompt: **> FSTORE** and press ENTER.

o) Write at the prompt: **> RUN** and press ENTER.

p) Close the **TERMINAL** and **ECT** programs.

q) Remove the communication cable between the PC and the DMC2 card.

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9.5.3 Frequency Converter

9.5.3-1 Frequency Converter - Set

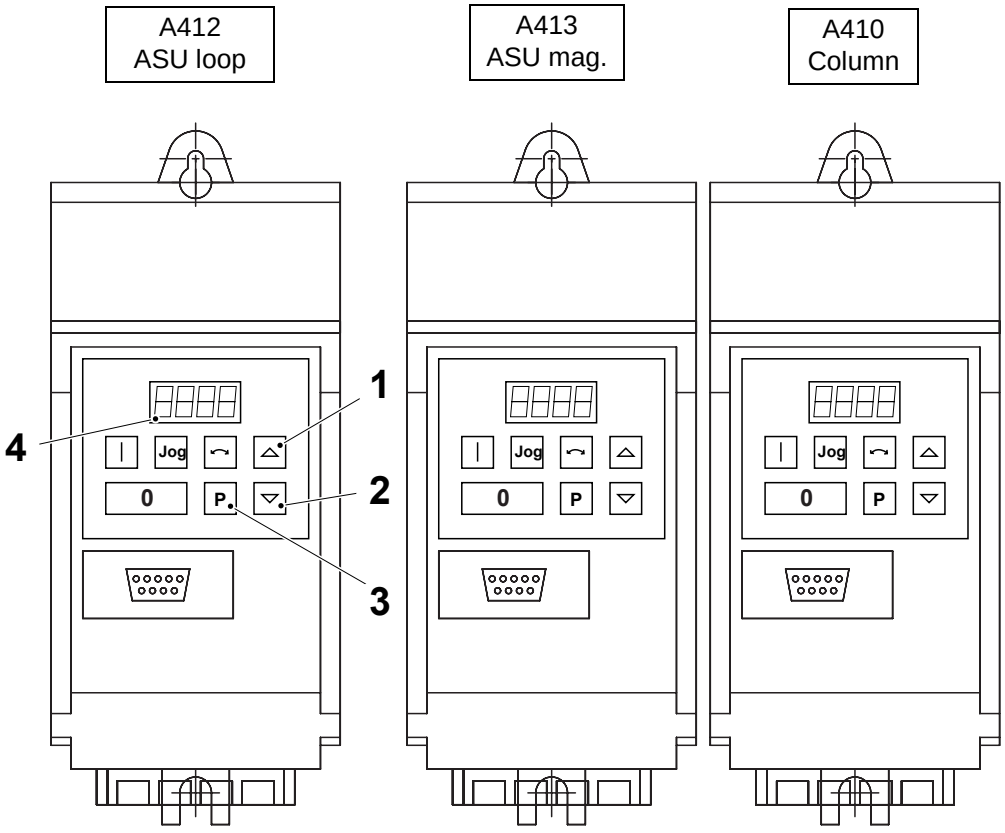
Machine Status	Mains Power ON Air OFF Steam ON Water OFF
SPC Reference	90430-0070

a) Press the PARAMETER button (3). The display (4) shows P000.

b) Select the parameter to set (see table below for all three inverters) by means of the INCREASE VALUE button (1) and the DECREASE VALUE button (2).

c) Press the PARAMETER button (3) to view the value of the parameter currently selected.

d) Press the INCREASE VALUE button (1) or the DECREASE VALUE button (2) to change the value of the parameter.



1 UP button
2 DOWN button
3 PARAMETER button
4 Display

(Cont'd)

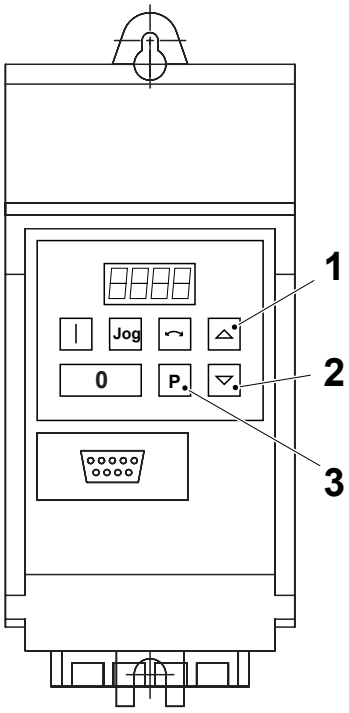
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(Cont'd)

e) Set the inverter values for all the parameters, see the table below.

f) When the setting is finished, go to P000 position and then press the PARAMETER button (3).

Note! To increase the resolution to 0.01, keep the PARAMETER button (3) pressed until the display changes to '**--.n0**' (n = the current tenths value, for example if the parameter value = 055.8 then n=8). Press the buttons (1) or (2) to change the value and then press (3) twice to return to the parameter display.



1 UP button
2 DOWN button
3 PARAMETER button

(Cont'd)

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Table For Customized Inverters Values

Note! For parameters not included in the table, choose the default value. See chapter 5 of the enclosed “Siemens” manual for details.

Parameter	Description	Default	ASU Loop	ASU Mag.	Column
P001	Control display	0			
P002	Ramp up seconds 0 - Max(P013)	10	0.1	5	0.1
P003	Ramp down seconds Max - 0	10	0.1	0.0	1
P004	Smoothing	0			
P005	Digital set-point (Hz)	5			
P006	Speed source (1=analog)	0	1	1	1
P007	Keypad (0=disabled)	1	0	0	0
P008	NOT EXISTING				
P009	Parameter protection (3-no protect)	0	3	3	3
P010	Display scaling	1			
P011	Set-point memory	0			
P012	Minimum frequency	0			
P013	Maximum frequency	50	60	60	60
P014	Skip frequency	0			
P015	Auto start	0			
P016	Start on the fly	0			
P017	Smoothing type	1			
P018	Auto restart after start	0			
P019	Skip frequency bandwidth	2			
P020	NOT EXISTING				
P021	Min. frequency, analog input	0			
P022	Max. frequency, analog input		60	60	60
P023	Analog input 1 - type	0			
P024	Analog set-point addition	0			
P025	Analog output 1 scaling	0			
P026	Analog output 2 scaling	0			
P027	Skip frequency 2	0			
P028	Skip frequency 3	0			
P029	Skip frequency 4	0			

(Cont'd)

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(Cont'd)

Parameter	Description	Default	ASU Loop	ASU Mag.	Column
P030	NOT EXISTING				
P031	Jog frequency right	5			
P032	Jog frequency left	5			
P033	Jog ramp-up time	10			
P034	Jog ramp-down time	10			
P035	NOT EXISTING				
P036	NOT EXISTING				
P037	NOT EXISTING				
P038	NOT EXISTING				
P039	NOT EXISTING				
P040	NOT EXISTING				
P041	Fixed frequency 1	5			
P042	Fixed frequency 2	10			
P043	Fixed frequency 3	15			
P044	Fixed frequency 4	20			
P045	Directions for set-points 1-4	0			
P046	Fixed frequency 5	25			
P047	Fixed frequency 6	30			
P048	Fixed frequency 7	35			
P049	Fixed frequency 8	40			
P050	Directions for set-points 5-8	0			
P051	Selection control function DIN1	1			
P052	Selection control function DIN2	2			
P053	Selection control function DIN3	6			
P054	Selection control function DIN4	6			
P055	Selection control function DIN5	6			
P056	Digital input debounce time	0			
P057	Digital input watchdog trip	1			
P058	NOT EXISTING				
P059	NOT EXISTING				
P060	NOT EXISTING				

(Cont'd)

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(Cont'd)

Parameter	Description	Default	ASU Loop	ASU Mag.	Column
P061	Selection relay output 1 function	6			
P062	Selection relay output 2 function	8			
P063	External brake release delay	1			
P064	External brake stopping time	1			
P065	Current threshold for relay	1			
P066	Compound braking	0			
P067	NOT EXISTING				
P068	NOT EXISTING				
P069	NOT EXISTING				
P070	Braking resistor duty cycle	0			
P071	Slip compensation	0			
P072	Slip limit (%)	250			
P073	DC injection braking (%)	0			
P074	I2T motor de-rating	1	0	0	0
P075	Braking chopper enable	0			
P076	Pulse frequency	0			
P077	Control mode	1			
P078	Continuous boost (%)	100			
P079	Starting boost (%)	0			
P080	Nom. rating motor power factor (cos φ)				
P081	Nominal rating motor frequency	50	50	50	50
P082	Nominal rating motor speed		2800	2800	2850
P083	Nominal rating motor current		1.2	1.2	2.1
P084	Nominal rating motor voltage		230	230	230
P085	Nominal rating motor power (kW)		0.25	0.25	0.55

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Parameter	Description	Default	ASU Loop	ASU Mag.	Column
P086	Motor current limit (%)	150			
P087	Motor PTC enable	0			
P088*	Automatic calibration				
P089**	Stator resistance (about 25.0 in 0.25 and 17 in 0.55kW)				
P090	NOT EXISTING				
P091	Serial link slave address	0			
P092	Serial link baud rate	6			
P093	Serial line time-out	0			
P094	Serial link nominal system set-point	50			
P095	USS compatibility	0			
P096	NOT EXISTING				
P097	NOT EXISTING				
P098	NOT EXISTING				
P099	Option module type	0			
P100	NOT EXISTING				
P101	Operate in Europe or USA	0			
P102	NOT EXISTING				
P103	NOT EXISTING				
P104	NOT EXISTING				
P105	NOT EXISTING				
P106	NOT EXISTING				
P107	NOT EXISTING				
P108	NOT EXISTING				
P109	NOT EXISTING				
P110	NOT EXISTING				

* Set P088 to 1 and press the run button, then the stator resistance is automatically calculated and putted in P089.

** P007 must be 1 when doing this.

(Cont'd)

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(Cont'd)

Parameter	Description	Default	ASU Loop	ASU Mag.	Column
P111	Inverter power rating	Read only			
P112	Inverter type	Read only			
P113	Drive model	Read only			
P114	NOT EXISTING				
P115	NOT EXISTING				
P116	NOT EXISTING				
P117	NOT EXISTING				
P118	NOT EXISTING				
P119	NOT EXISTING				
P120	NOT EXISTING				
P121	Enable/disable RUN button	1			
P122	Enable/disable FORW/REV button	1			
P123	Enable/disable JOG button	1			
P124	Enable/disable INC/DEC button	1			
P125	Reverse direction inhibit	1			
P126	NOT EXISTING				
P127	NOT EXISTING				
P128	Fan switch off delay time	120			
P129	NOT EXISTING				
P130	NOT EXISTING				
P131	Frequency set-point	Read only			
P132	Motor current	Read only			
P133	Motor torque (% of nominal)	Read only			
P134	DC link voltage	Read only			
P135	Motor rpm	Read only			

(Cont'd)

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(Cont'd)

Parameter	Description	Default	ASU Loop	ASU Mag.	Column
P136	NOT EXISTING				
P137	Output voltage	Read only			
P138	Instantaneous rotor/shaft frequency	Read only			
P139	NOT EXISTING				
P140	Most recent fault code	Read only			
P141	Most recent fault code -1	Read only			
P142	Most recent fault code -2	Read only			
P143	Most recent fault code -3	Read only			
P144	NOT EXISTING				
P185	NOT EXISTING				
P186	Motor instantaneous current limit (%)	200			
P201-P220	PID LOOP				
P321-P323	Analog input 2				
P356	Selection control function DIN6	6			
P386	Sensorless vector speed loop gain	1			
P700-P971	Miscellaneous				
P721	Analog input 1 voltage	Read only			
P725	Analog input 2 voltage	Read only			
P922	Software version	Read only			
P931	Most recent warning type	Read only			
P944	Reset to factory default settings	*			

* Set to 1 and then press P to reset all parameters.

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9.5.4 Calibrator

9.5.4-1 Calibrator - Set (Micromite II)

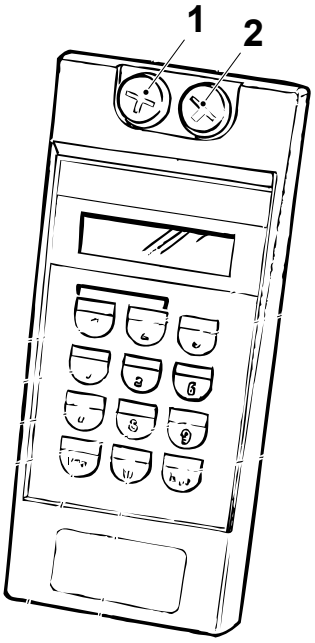
Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Calibrator (Micromite II) TP No. 90410-0338

Note! Make sure that the Micromite II is switched OFF before disconnecting the AC-adapter or removing the batteries. Failure to do so will cause the instrument to lose the set-up information.

Thermocouple Type and Measuring Unit

a) Turn ON the mains power (at least 15 minutes before setting).

b) Connect the type K thermocouple to the + input (1) (yellow lead) and to the - input (2) (red lead).



1 Input (+)
2 Input (-)

(Cont'd)

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c) Press the ON/OFF key (6) to switch ON the instrument.

d) Press the F/C key (4) to select “centigrade”.

e) Press the SELECT key (5) and the SENSOR key (3).

f) Select the thermocouple type. Move the flashing cursor to the right or to the left by pressing the UP (9) or DOWN (7) keys.

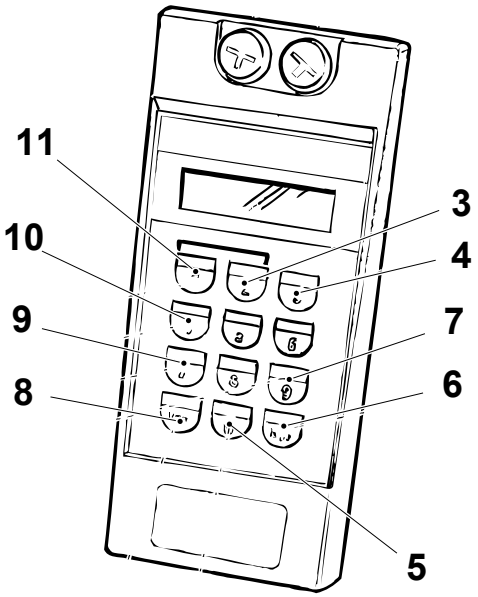
g) Press the ENTER key (8) when the cursor is indicating TYPE K.

Temperature Output Value

a) Press the SELECT key (5) and the OUTPUT 1 key (10) to set the output temperature.

b) Use the numeric keys to type in the temperature value and press the ENTER key (8).

c) To clear an output value, simultaneously press the INPUT key (11) and the SENSOR key (3).



3 Sensor key
4 F/C key
5 Select key
6 On/Off key
7 Down key
8 Enter key
9 Up key
10 Output 1 key
11 Input key

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9.5.4-2 Calibrator - Set (FLUKE)

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
Special Equipment	Calibrator (FLUKE 714) - TP No. 90458-0914

DANGER

Hazardous voltage.

Follow the safety information in the “Instruction Sheet” delivered with the calibrator.

Note! Turn ON mains power at least 15 minutes before setting.

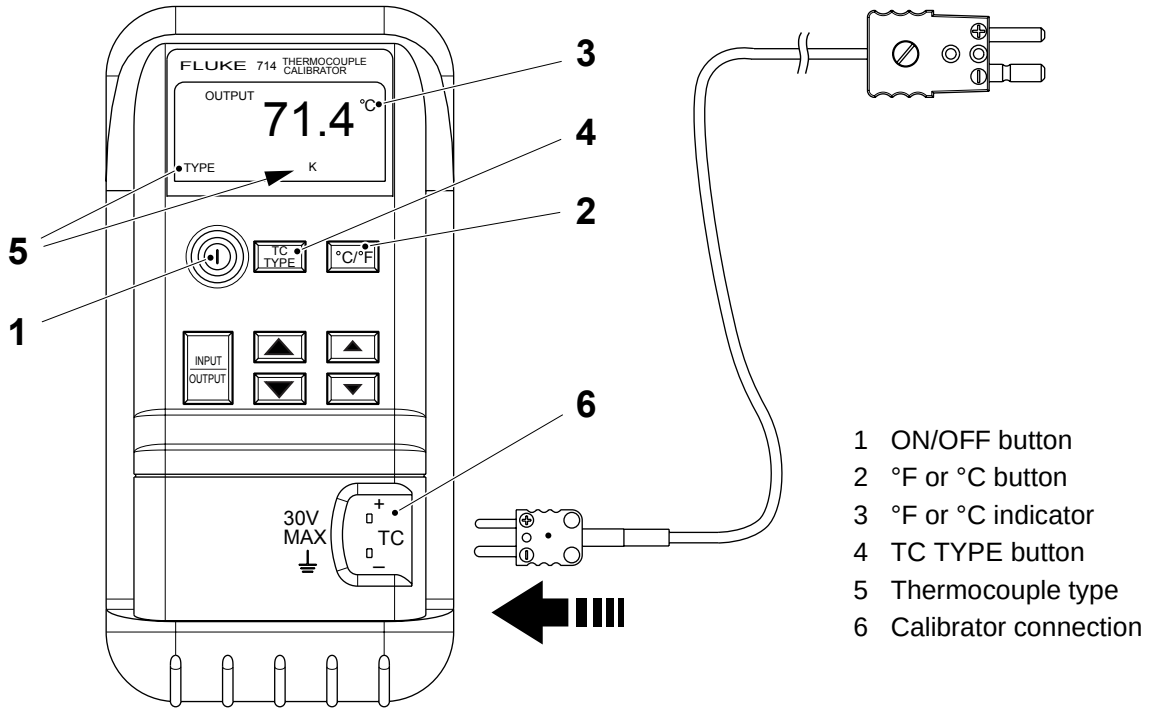
Set the calibrator as follows:

a) Press the ON/OFF button (1) to switch on the calibrator.

b) Press the button (2) to toggle °C or °F on the display (3).

c) Press the TC TYPE button (4) to show the thermocouple TYPE K (5).

d) Connect the type K thermocouple to the calibrator connection (6).



1 ON/OFF button
2 °F or °C button
3 °F or °C indicator
4 TC TYPE button
5 Thermocouple type
6 Calibrator connection

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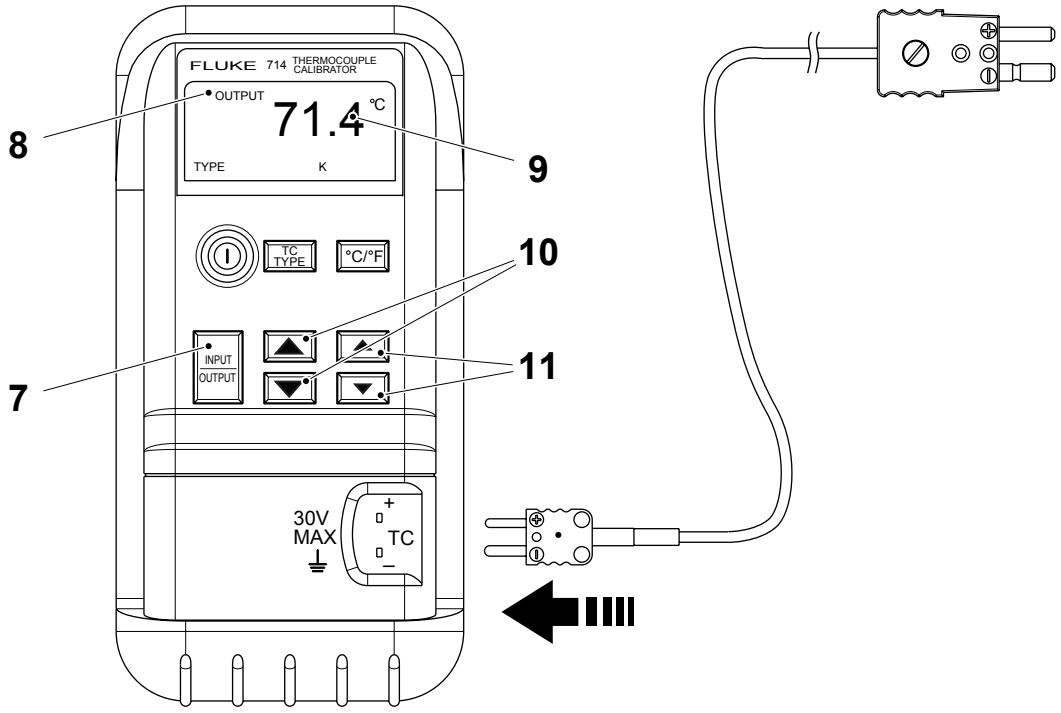
Thermocouple value

e) Press the INPUT-OUTPUT button (7) to show INPUT (8) on the display. Actual temperature (9) is shown.

Temperature output value

f) Press the INPUT-OUTPUT button (7) to show OUTPUT (8) on the display. Set the temperature (9) with the buttons (10), and (11).

For further information on the calibrator, see the “Instruction Sheet” delivered with the calibrator.



7 INPUT-OUTPUT button
8 INPUT-OUTPUT indicator
9 Temperature indicator
10 STEP UP/DOWN buttons 50° steps
11 STEP UP/DOWN buttons 0.1° steps

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9.5.5 Thermocouples

9.5.5-1 Thermocouples - Check

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
Special Equipment	Calibration Oven - TP No. 90410-337 Extension Wire - TP No. 90326-309
SPC Reference	90031-0065 557793-0100

Note! This check must be done when a temperature regulator is changed or at least once a year.

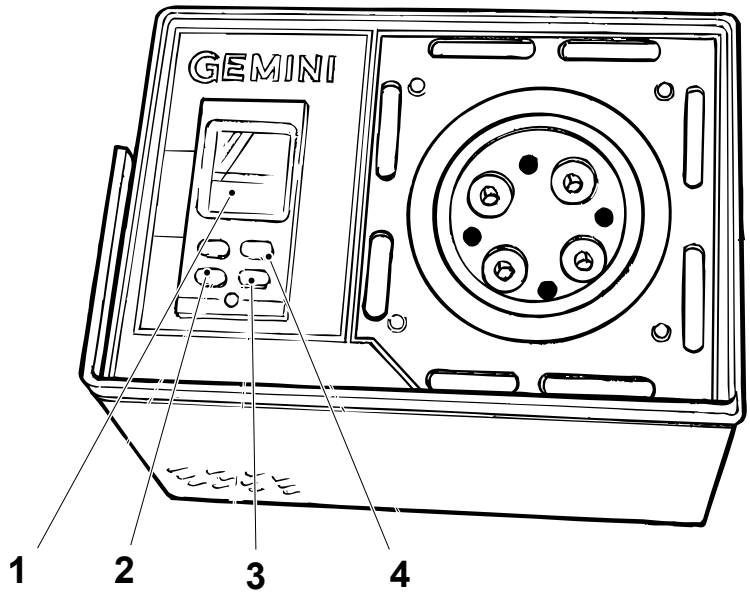
a) Turn ON the oven by connecting the mains plug.

b) Press the FUNC key (2) to select the Set-up mode, indicated by a flashing SP on the calibrator display (1).

c) Use the UP (3) or DOWN (4) keys to set the temperature value at 100°C.

Note! Pressing the key once changes the value by 0.1°C.
Pressing the key for at least two seconds makes the temperature value change more quickly.

d) Press the FUNC key (2) again to select RUN MODE.
The oven is now ready for measuring operations.



1 Display
2 Func key
3 Up key
4 Down key

(Cont'd)

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e) Detach the machine thermocouple and place it in one of the cavities (5) in the oven.

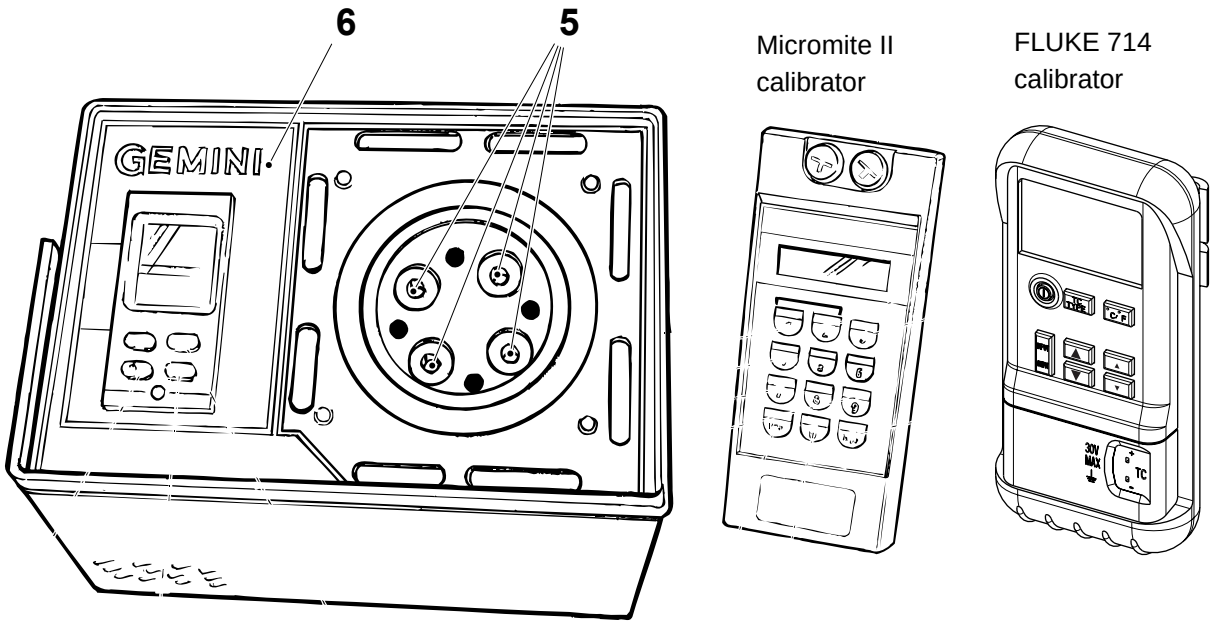
f) Place the calibrated thermocouple (to be found in the calibration kit) in an adjacent cavity of the oven (6). Make sure that the two thermocouples are inserted to an equal depth in the oven.

Note! Before calibration, be sure that the calibrator already is set, see 9.5.4-1 Calibrator - Set (Micromite II) or 9.5.4-2 Calibrator - Set (FLUKE).

g) Use the extension wire to connect the calibrator to the thermocouple from the machine. Note the temperature reading on the display.

h) Connect the calibrator to the calibrated thermocouple. Note the temperature reading on the calibrator display.

i) Obtain the correction value for the calibrated thermocouple
   - thermocouple fault plus Micromite II fault (from the Pentronic Calibration Certificate)
   - thermocouple fault plus FLUKE 714 fault.



5 Cavity
6 Oven

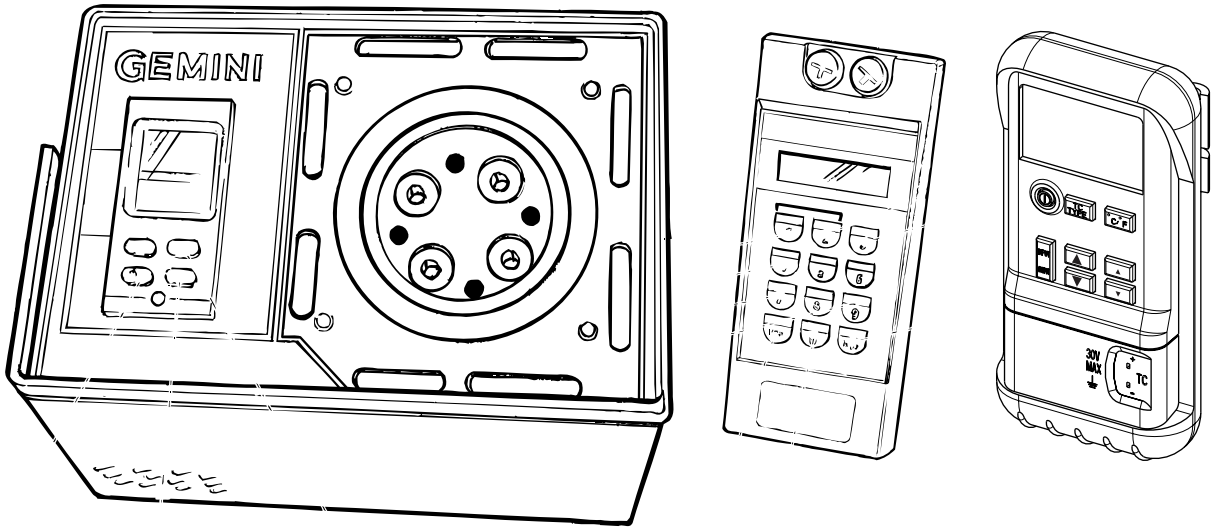
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(Cont'd)

j) When the value of the machine thermocouple deviates by more than ±1.1°C from the value of the calibrated thermocouple, change the machine thermocouple.

k) On completion of the measurement, leave the oven on and allow it cool by setting the temperature value to 0. This cools the oven more quickly.



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9.5.6 Temperature Regulator

9.5.6-1 Temperature Regulator- Calibrate with MS-DOS Based Program

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
Special Equipment	PC with Diskette Station Serial Communication Cable Disc Calibration Kit - TP No. 90031-312 Calibrator FLUKE 714 - TP No. 90458-914 Thermocouple Cable (FLUKE 714) - TP No. 90458-915 Calibrator Micromite II - TP No. 90410-338 Thermocouple Cable (Micromite II) - TP No. 90326-308 Adhesive Label - TP No. 90194-131
SPC Reference	90031-0065

Note! Before calibration, make sure that the calibrator has already been set, see 9.5.4-1 Calibrator - Set (Micromite II) or 9.5.4-2 Calibrator - Set (FLUKE).

Note! For Windows based calibration, see 9.5.6-2 Temperature Regulator - Calibrate with Windows Based Program on page 9-217.

Calibration must be performed when a thermocouple PLC module is changed or at least once a year.

(Cont'd)

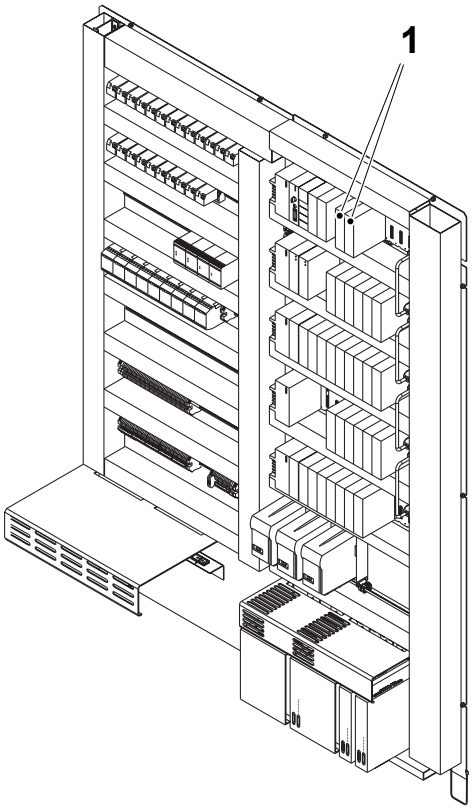
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

a) Connect the calibrator instrument, Micromite II or FLUKE 714, as a replacement of a temperature sensor by means of the extension wire.

b) Open the cover of the temperature control input modules (1) named “thermocouple input”.

c) Connect the serial communication cable from the PC to the temperature control input modules (1).



1 Temperature control input module

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(Cont'd)

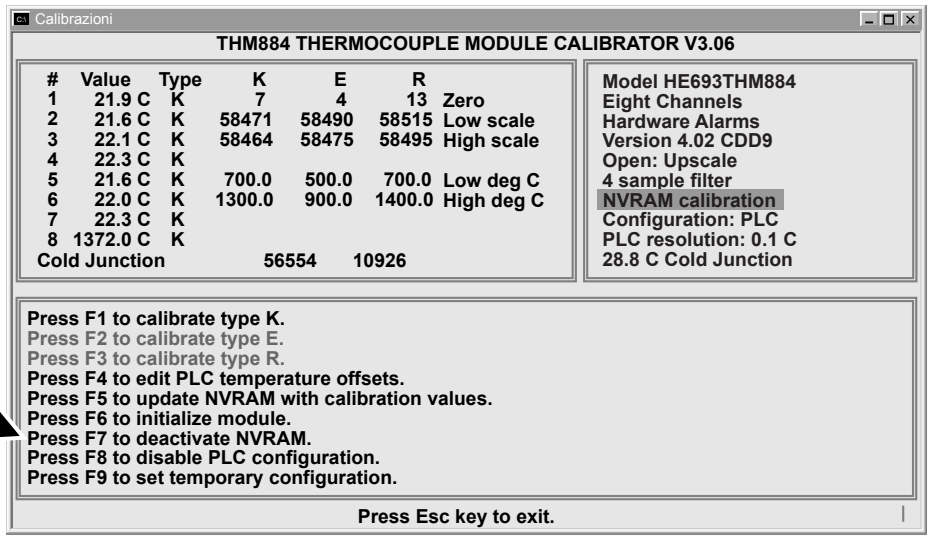
(Cont'd)

Perform the following instructions from the PC.

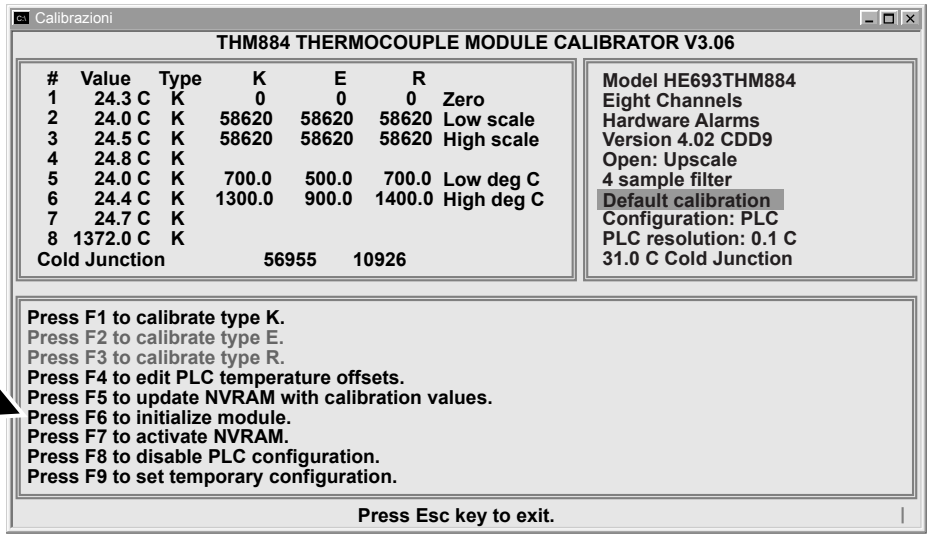
Note! Energise the module at least 30 minutes before calibration.

d) Run the program: THM 884_K.bat. The window shown below will appear.

e) Press F7 to deactivate NVRAM.



f) Press F6 to initialise the temperature control module.

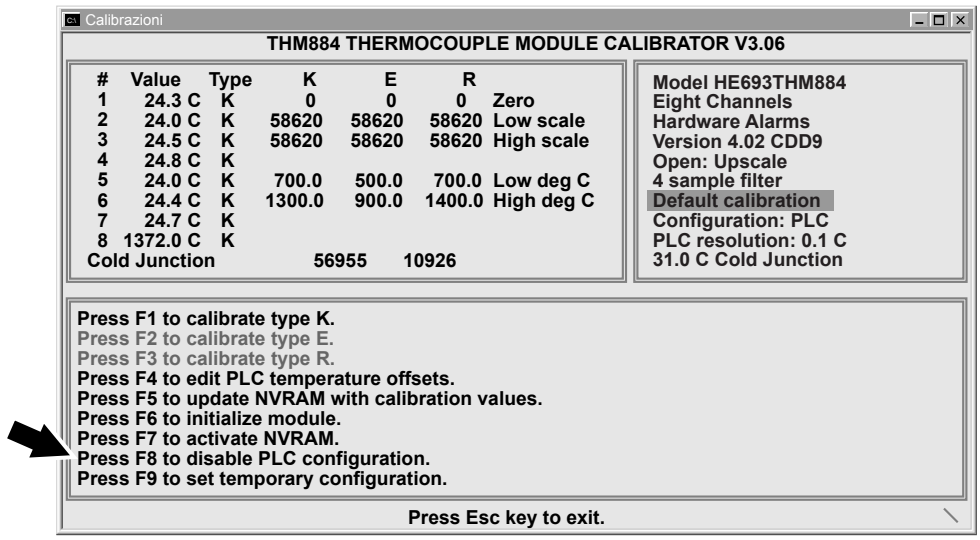


(Cont'd)

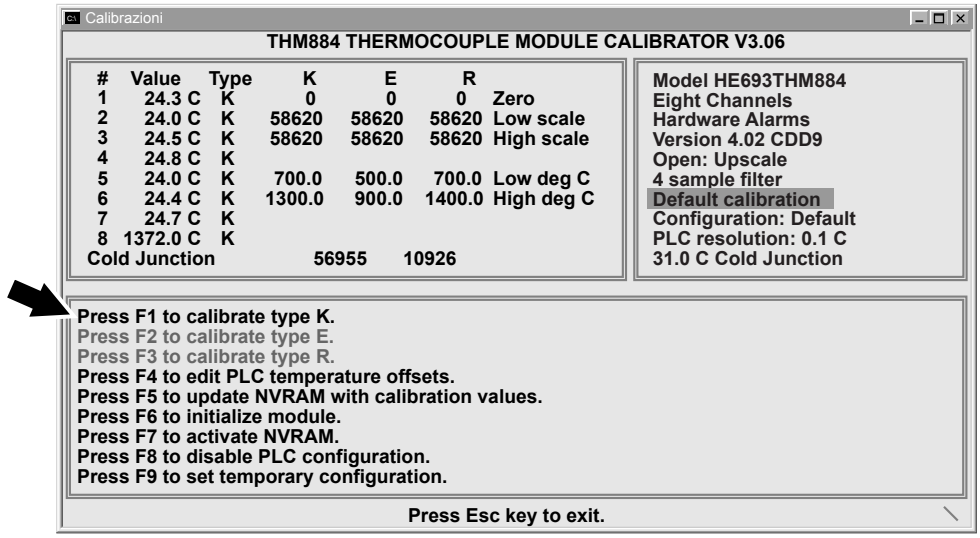
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

g) Press F8 to disable the PLC configuration.



h) Press F1 to perform the calibration and perform the following steps according to the software prompts.

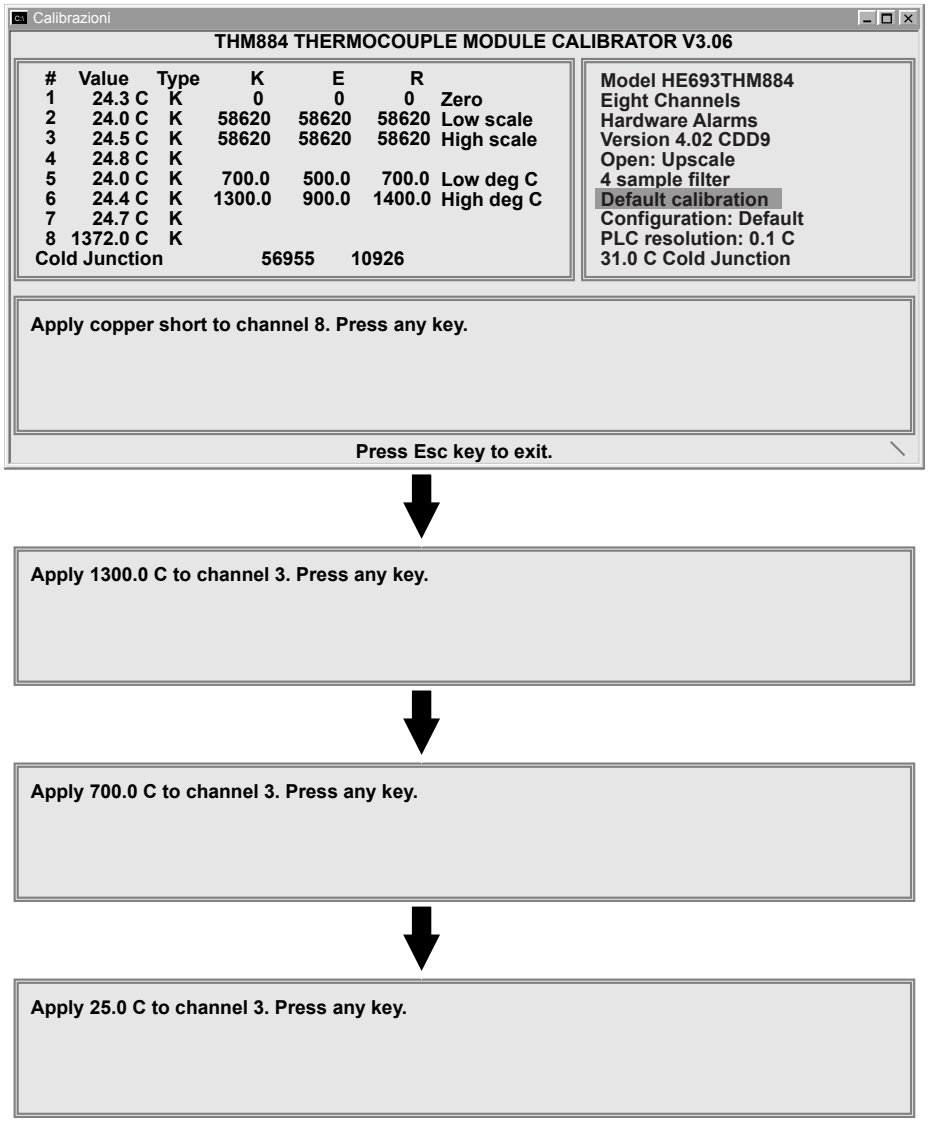


(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

i) The first prompt given by the software is to place a bridge in channel 8 between 16^{-} and 18^{+}.

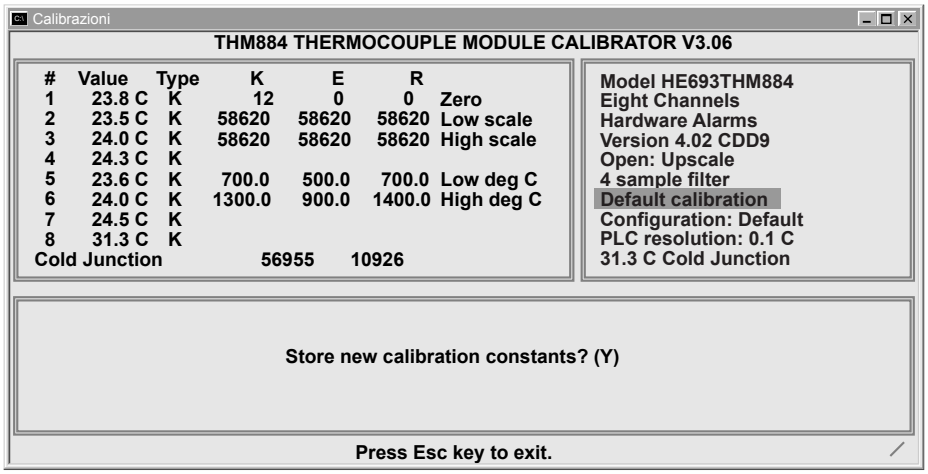


(Cont'd)

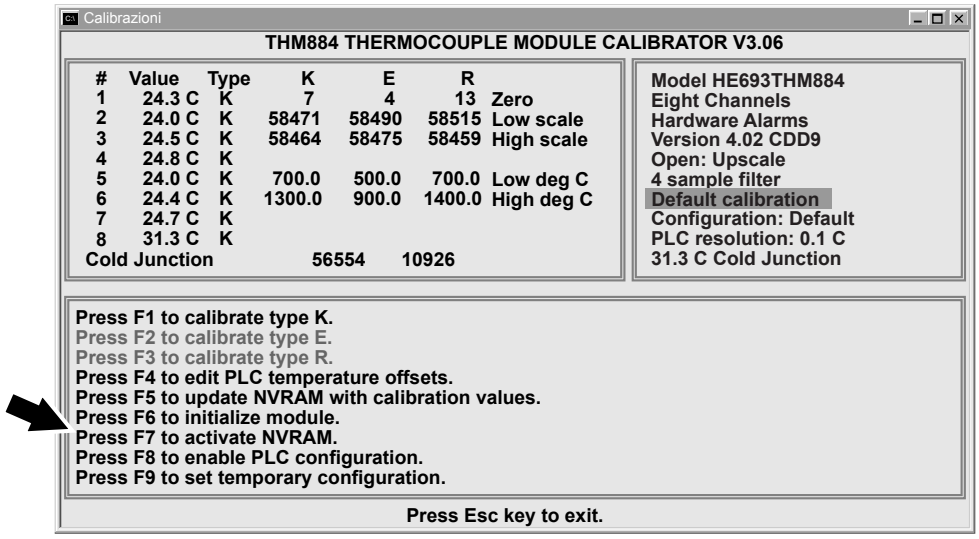
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

j) After having followed all the prompts given by the software press F5 to update NVRAM and choose YES.



k) Press F7 to activate NVRAM.



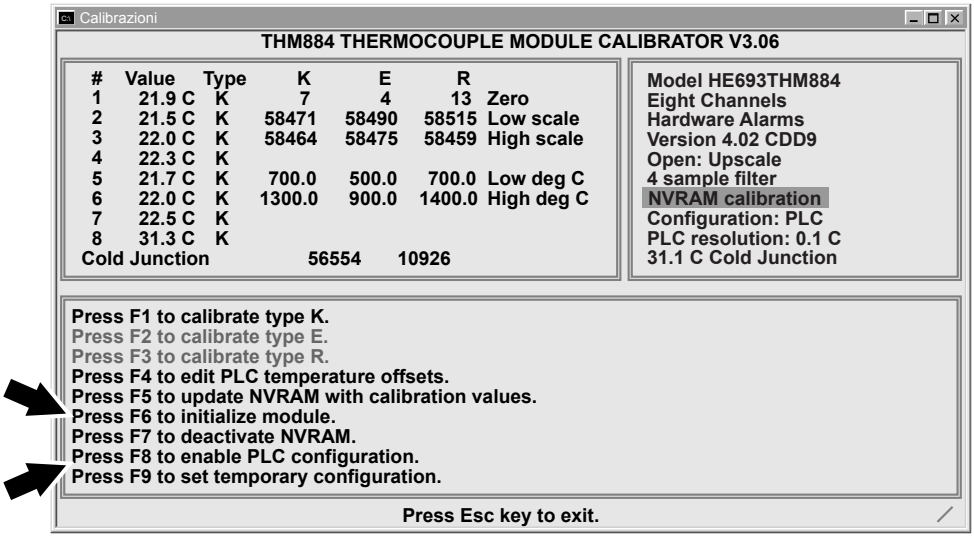
(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

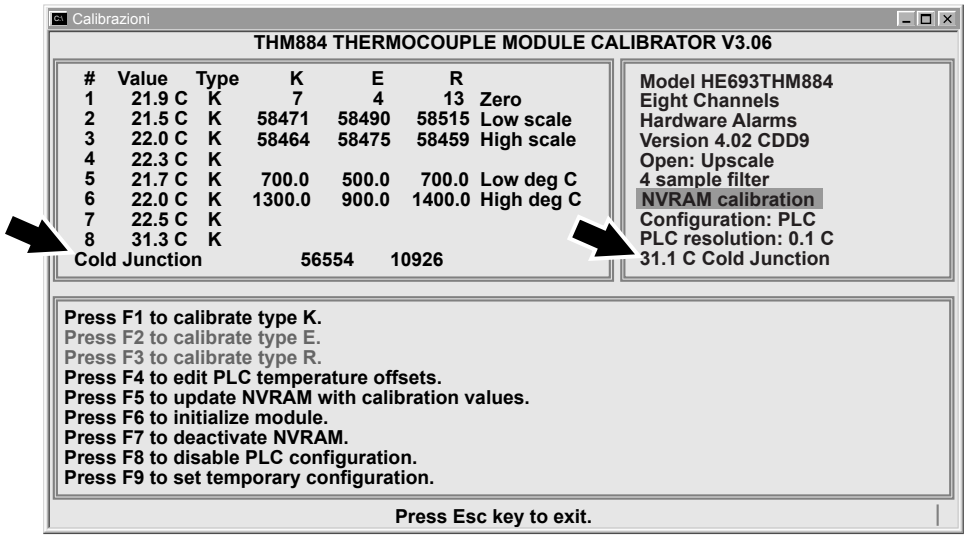
(Cont'd)

l) Press F6 to initialise the temperature control module.

m) Press F8 to enable PLC configuration.



n) Check that the temperature is stable and equal to “Cold Junction”.



Note! The tolerance is 0.3° C, when the difference is a higher value repeat the sequence from item e). When the difference is still too high replace the module.

o) Remove the bridge in channel 8.

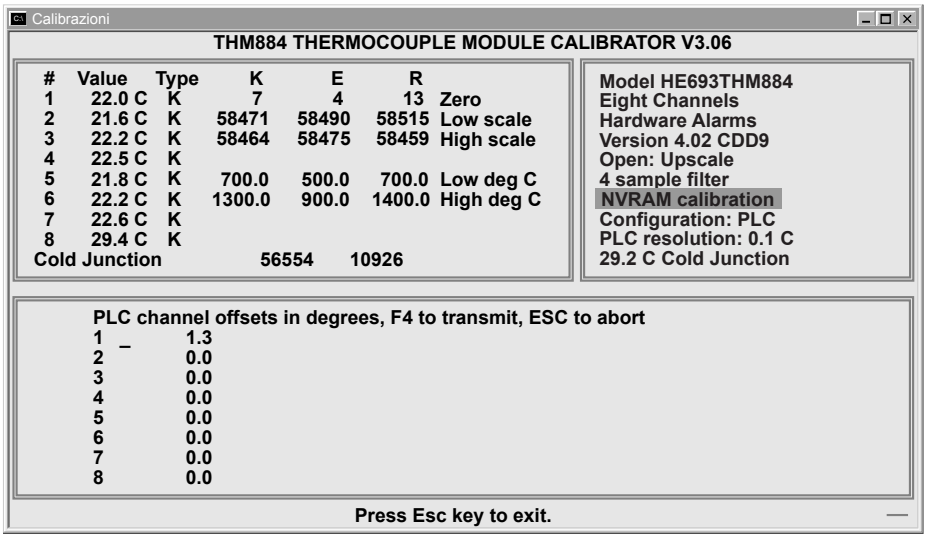
(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

p) Press F4. The following window will appear.

q) Compare the preset temperature with the one shown on the screen then type the right offsets correction value and press ENTER (e.g. channel 1 offset: 1.3° C of difference).

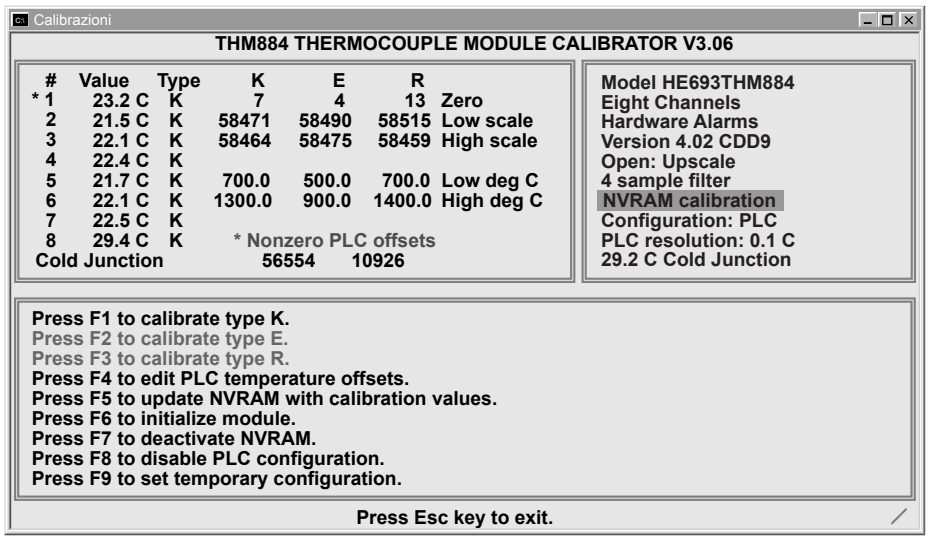


(Cont'd)

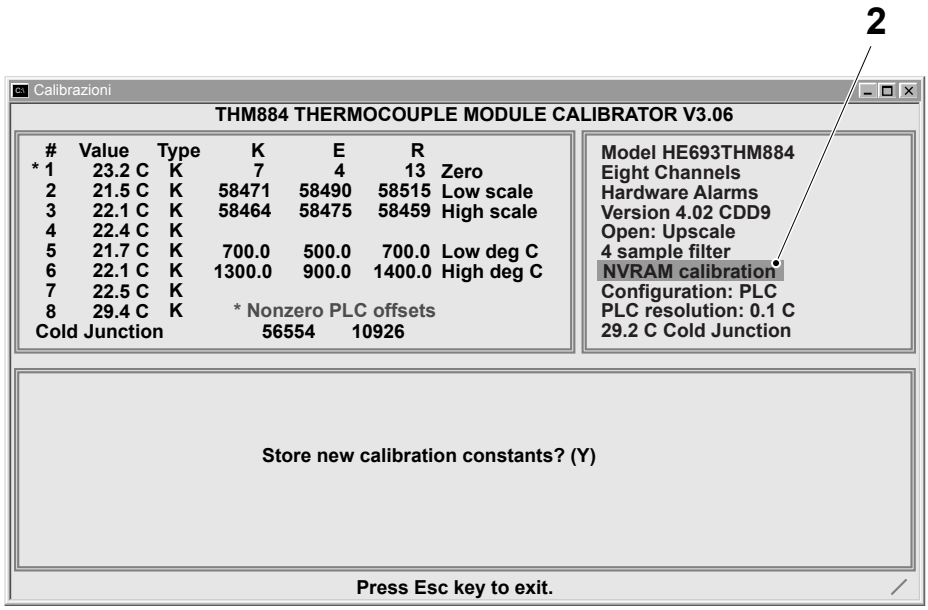
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

r) Press F4. The window shown below will appear.



s) Press F5. The window shown below will appear.



2 Field

t) Press Y to confirm the value introduced.

u) Make sure that the field (2) is green. If not, repeat the calibration.

v) Press ENTER and then press ESC to exit from the program.

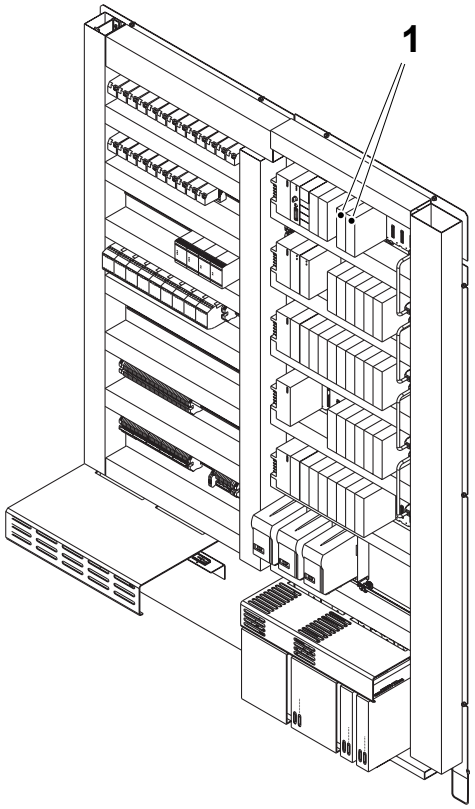
(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

w) Repeat the procedure for the other thermocouple channels.

x) Apply the new label on the cover of the temperature control input modules (1) named “thermocouple input”.



1 Temperature control input module

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9.5.6-2 Temperature Regulator - Calibrate with Windows Based Program

Machine Status	Mains Power ON Air OFF Steam ON Water OFF
Special Equipment	PC with Diskette Station Serial Communication Cable Disc Calibration Kit - TP No. 90031-312 Calibrator FLUKE 714 - TP No. 90458-914 Thermocouple Cable (FLUKE 714) - TP No. 90458-915 Calibrator Micromite II - TP No. 90410-338 Thermocouple Cable (Micromite II) - TP No. 90326-308 Adhesive Label - TP No. 90194-131
SPC Reference	90031-0065

Note! Before calibration, make sure that the calibrator has already been set, see 9.5.4-1 Calibrator - Set (Micromite II) or 9.5.4-2 Calibrator - Set (FLUKE).

Note! For MS-DOS based calibration, see 9.5.6-1 Temperature Regulator- Calibrate with MS-DOS Based Program on page 9-207.

Calibration must be performed when a thermocouple PLC module is changed or at least once a year.

(Cont'd)

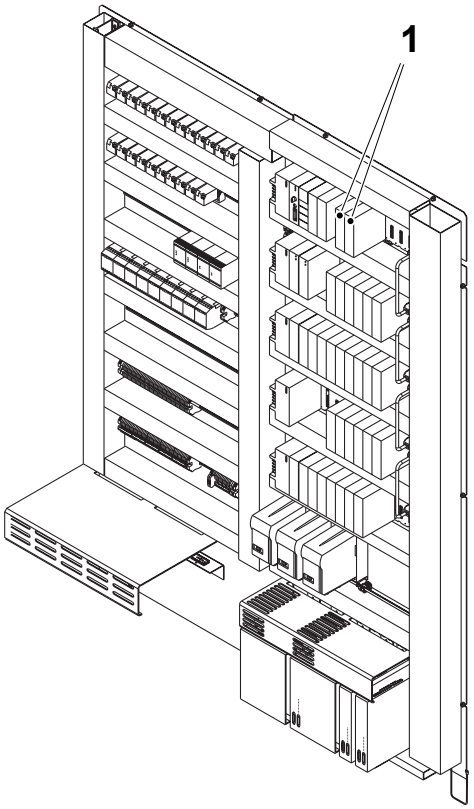
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

a) Connect the calibrator instrument, Micromite II or FLUKE 714, as a replacement of a temperature sensor by means of the extension wire.

b) Open the cover of the temperature control input modules (1) named “thermocouple input”.

c) Connect the serial communication cable from the PC to the temperature control input modules (1).



1 Temperature control input module

(Cont'd)

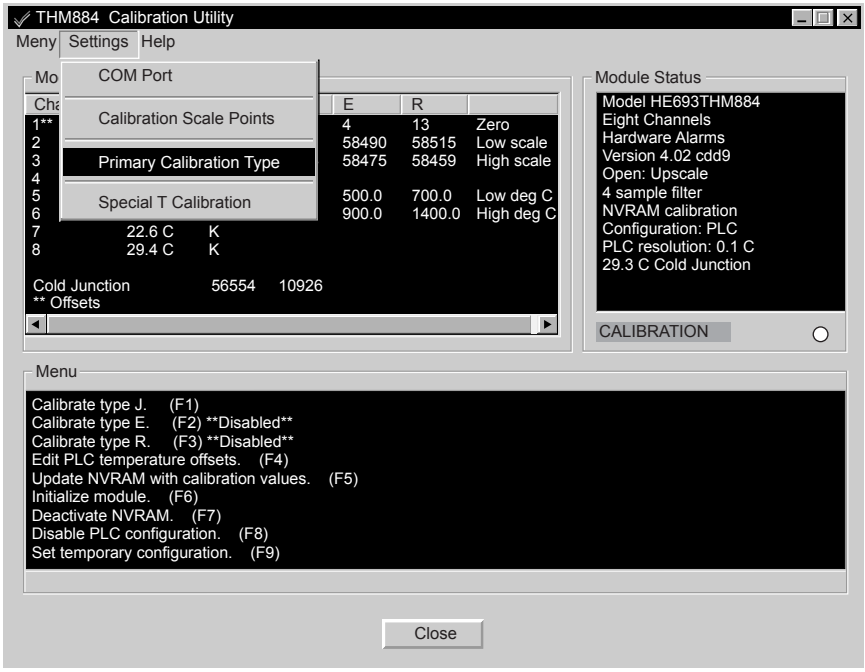
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

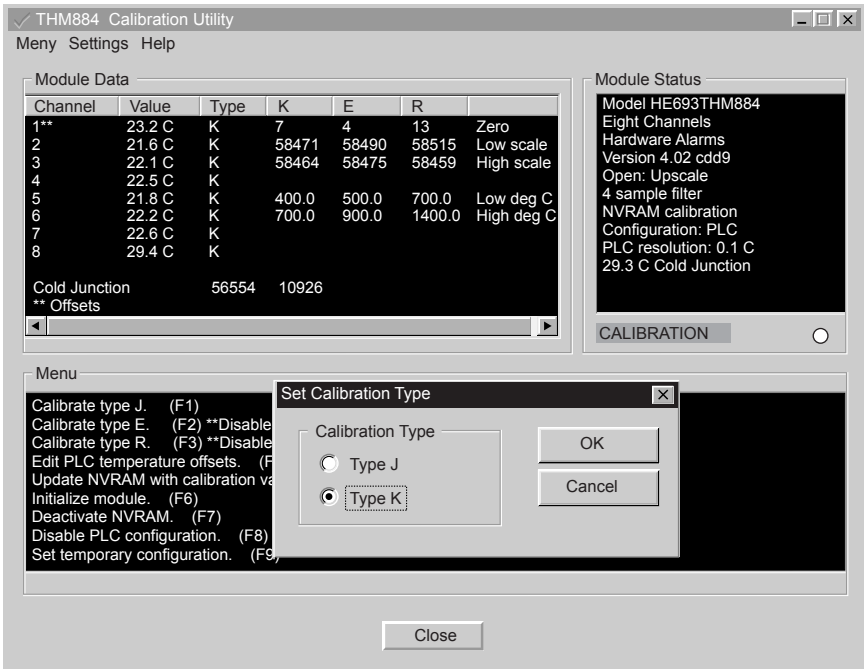
Perform the following instructions from the PC.

Note! Energise the module at least 30 minutes before calibration.

d) Run the program THM884cal. The window below will appear.



e) Select the calibration type K and select OK.

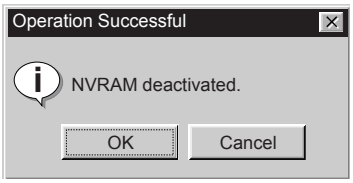


(Cont'd)

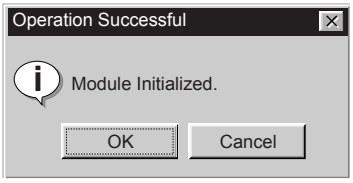
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

f) Press F7 and select OK to deactivate NVRAM.

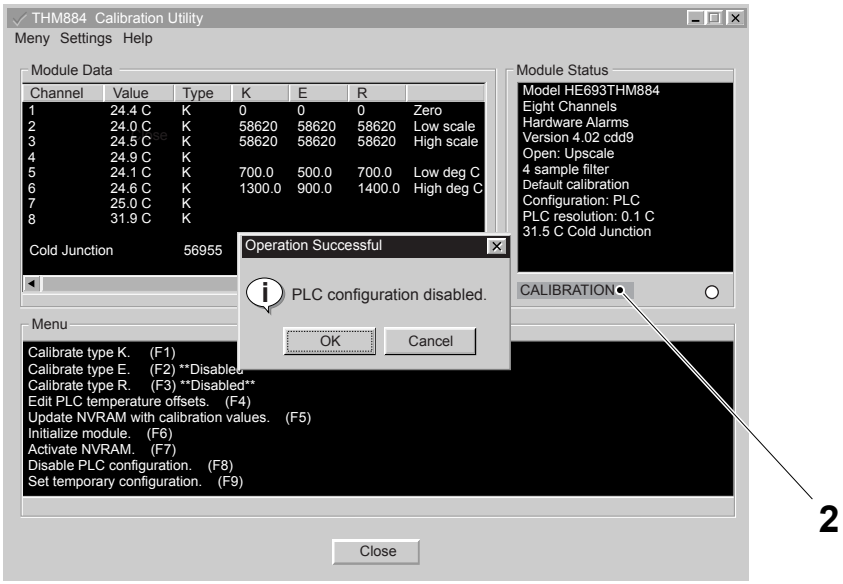


g) Press F6 and select OK to initialise the temperature control module.



Note! The field (2) turns red and turns back to green after the calibration constants have been successfully stored in item y) on page 9-226.

h) Press F8 and select OK to disable the PLC configuration.



2 Field

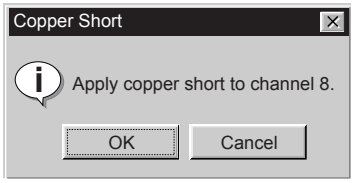
(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

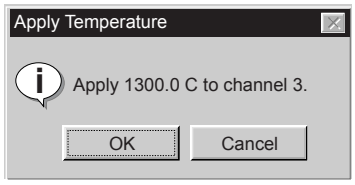
(Cont'd)

i) Press F1 to start the calibration and perform the following steps according to the software prompts.

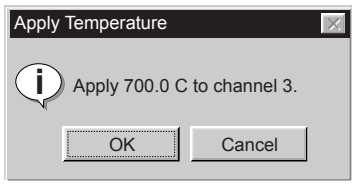
j) The first prompt given by the software is to place a bridge in channel 8 between 16^{-} and 18^{+}.



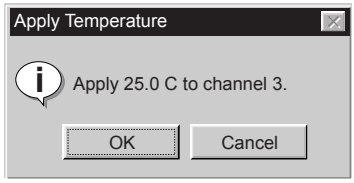
k) The next prompt is to apply 1300.0 °C to channel 3.



l) The next prompt is to apply 700.0 °C to channel 3.



m) The next prompt is to apply 25.0 °C to channel 3.

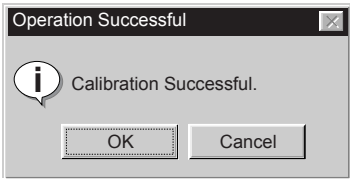


(Cont'd)

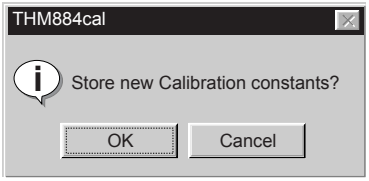
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

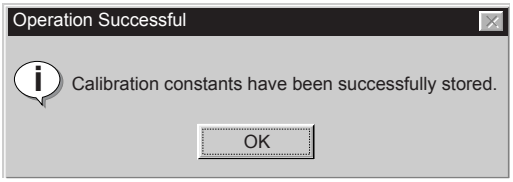
n) The following window appears to confirm the calibration, select OK to continue.



o) The following window appears, select OK to store the calibration.



p) Press F5 to update the NVRAM and select OK.



(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

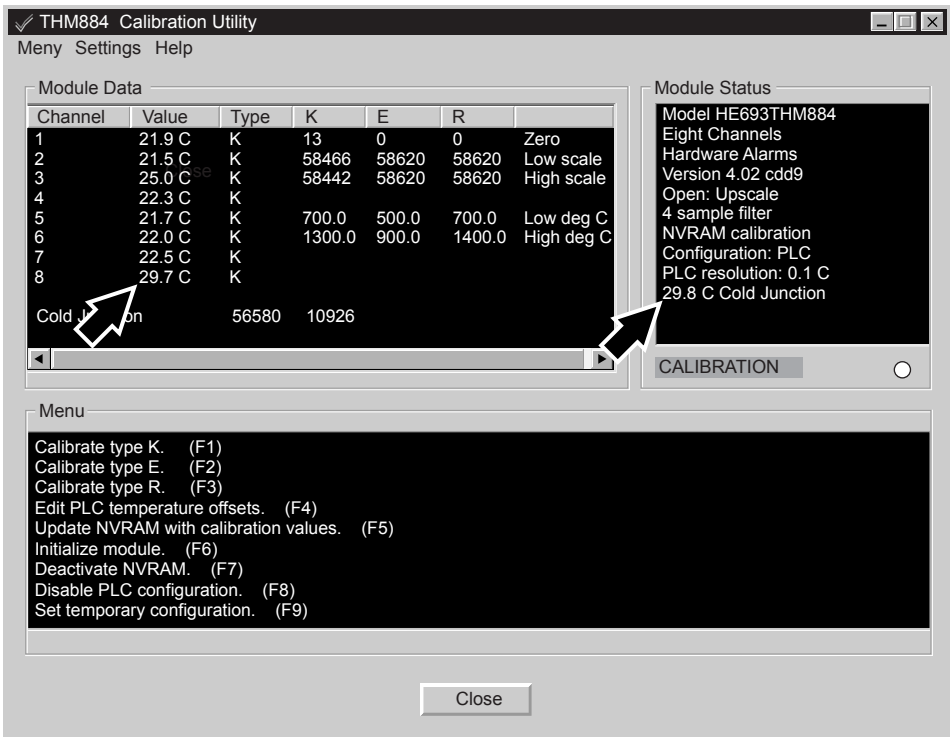
Note! The tolerance is 0.3° C. If the difference is a higher value repeat the sequence from item e). If the difference is still too high replace the module.

q) Press F7 to activate NVRAM.

r) Press F6 to initialise the temperature control module.

s) Press F8 to enable PLC configuration.

t) Check that the temperature is stable and equal to “Cold Junction”.



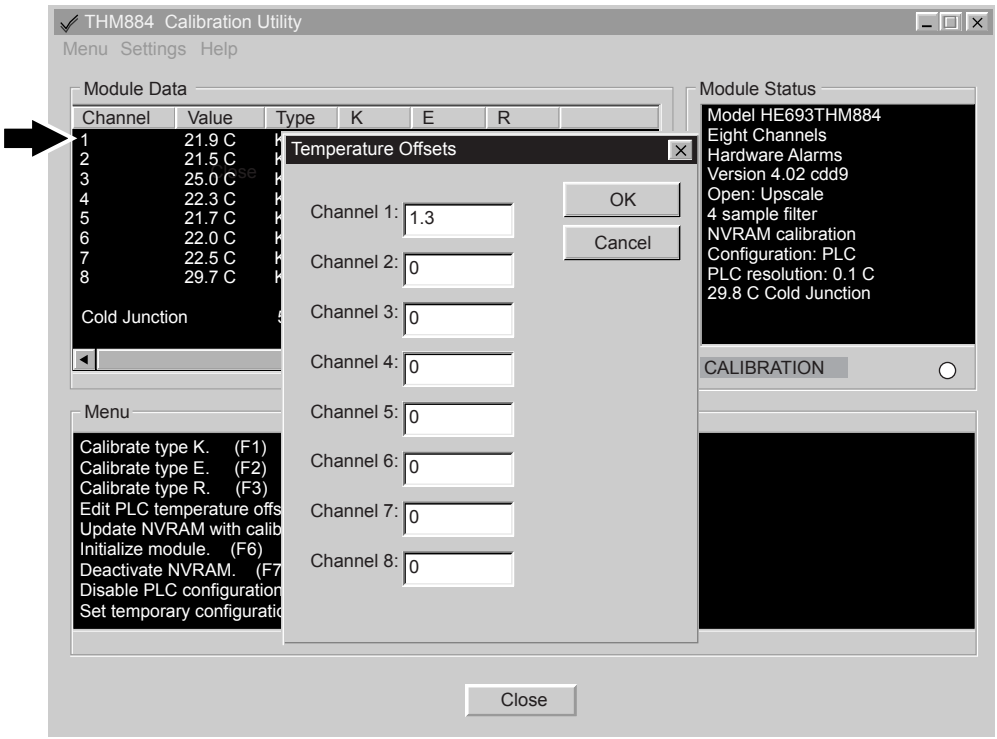
(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

u) Remove the bridge in channel 8.

v) Press F4 and the window below will appear. Compare the preset temperature with the one shown on the screen, then type the right offsets correction value and select OK (e.g. channel 1 offset: 1.3 °C of difference).

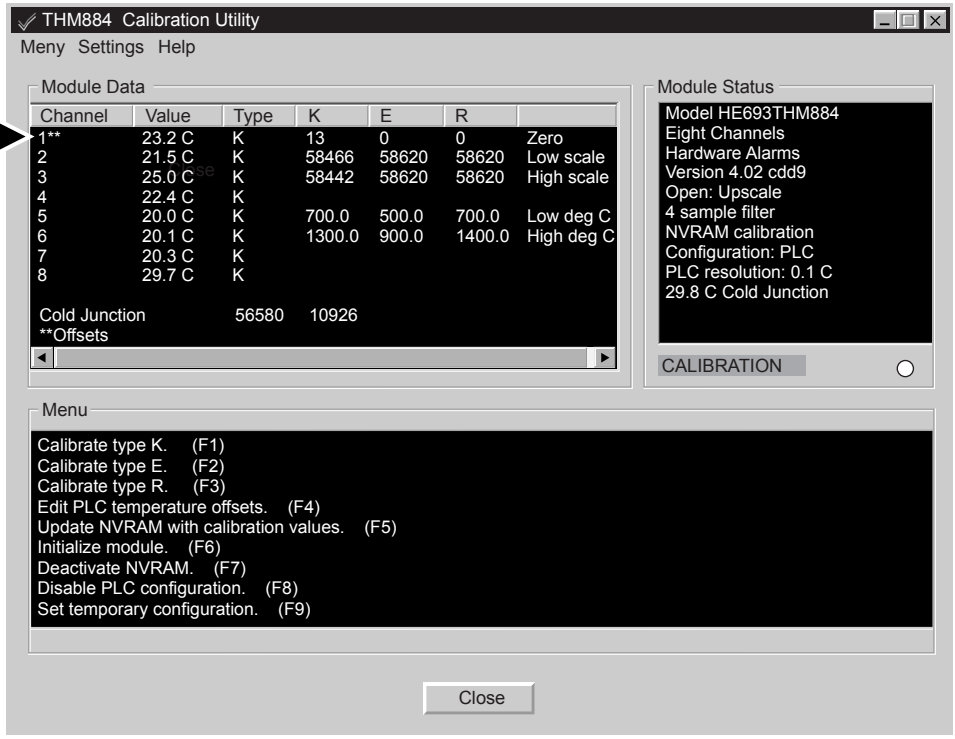


(Cont'd)

TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

w) Press F4 and the window below will appear.



(Cont'd)

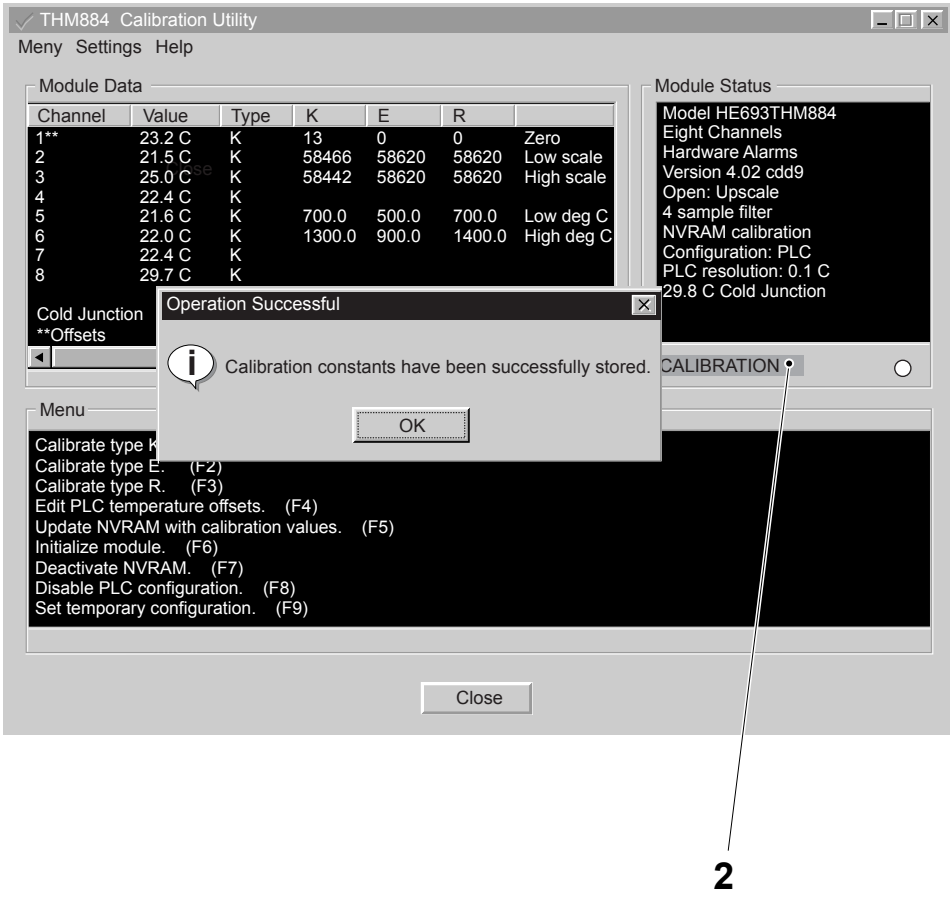
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

x) Press F5 and select OK to store the calibration constants.



y) The window below will appear, select OK. Make sure that the field (2) is green. If not, repeat the calibration.



2 Field

(Cont'd)

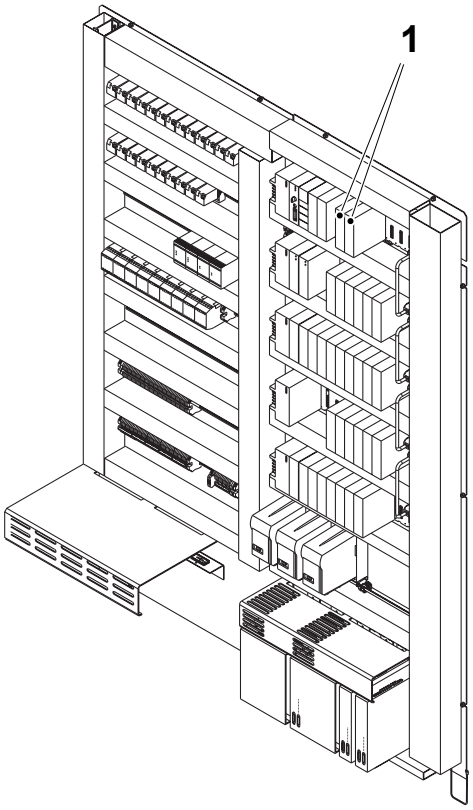
TechPub_2614345_0105 - 09_MM81534_11en.fm

(Cont'd)

z) Exit from the program.

aa) Repeat the procedure for the other thermocouple channels.

ab) Apply the new label on the cover of the temperature control input modules (1) named “thermocouple input”.



1 Temperature control input module

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9.5.7 DMC Card (Old DMC Card)

9.5.7-1 DMC Card - Function Description

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1350699-0200

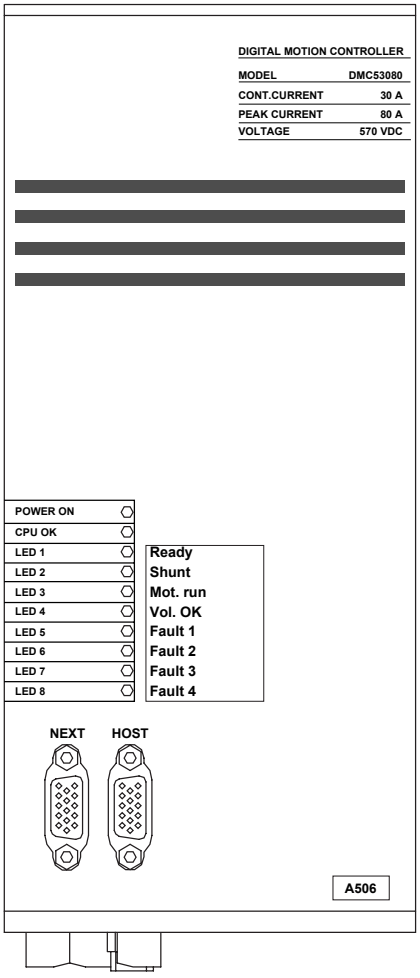
Old DMC Cards

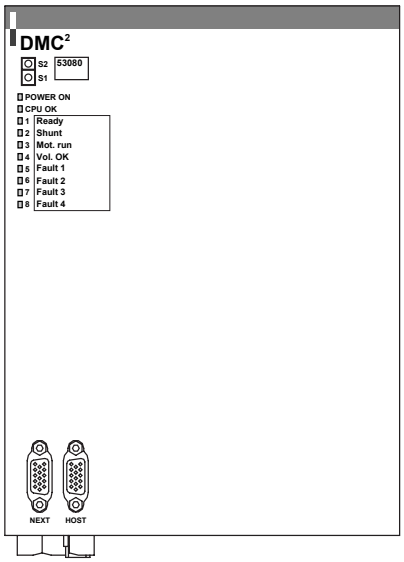
Note! For the machines with the new DMC2 cards, see 9.5.2-1 DMC2 Card - Function Description.

Main Motor Card A506

The DMC card A506 is used to move and control the speed of the main cam, located in the Drive unit.

The DMC controls the speed of the main cam in order to optimise the average value of the of the main motor torque according to the running volume.





New DMC2 card.

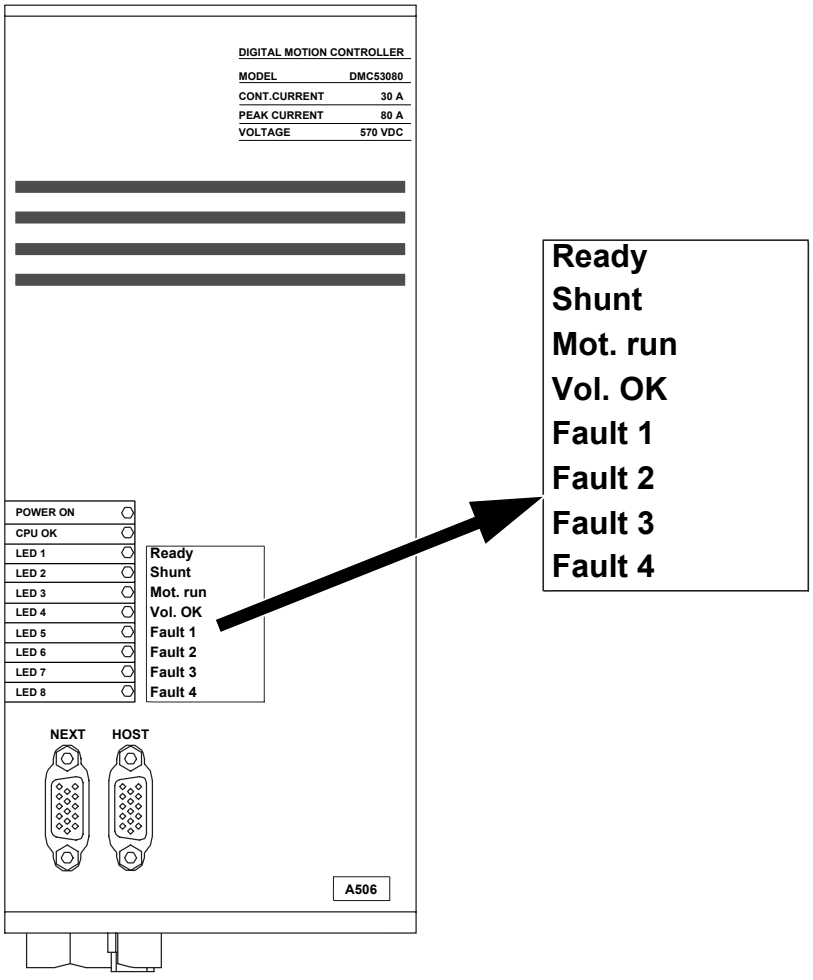
(Cont'd)

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(Cont'd)

DMC Front Panel LEDs

DMC card A506		
LED	**Colour**	**Function**
Ready	Green - (LD1)	The servo system is initialized
Shunt	Yellow - (LD2)	Shunt regulator active. The negative torque is dissipated by the shunt resistor
Mot. run	Yellow - (LD3)	The main motor is running
Vol. OK	Yellow - (LD4)	Volume transfer OK. All the volume parameters are transferred by the PLC
Fault 1	Red - (LD5)	See list next page
Fault 2	Red - (LD6)	See list next page
Fault 3	Red - (LD7)	See list next page
Fault 4	Red - (LD8)	See list next page

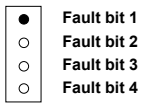
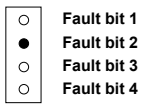
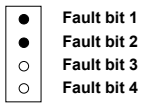
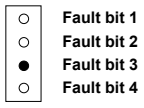
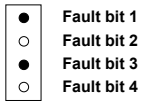
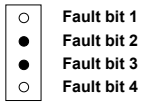
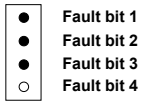
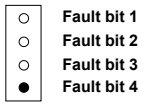
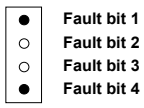


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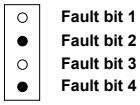
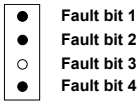
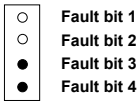
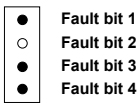
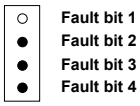
Main Motor Card A506 Fault List

	**Hardware disabled** The hardware enable signal from the PLC is low. This is normally not an alarm. But if it happens in an abnormal situation check the connection to the DMC's hardware enable input.
	**Internal hardware fault** Try to restart, if the problem persists or comes back soon again change DMC driver.
	**Position error fault** The allowed error between the calculated position and the actual position of the axis of the motor is exceeded. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**Control C interrupt** Ctrl-C has been pressed on a terminal connected to the drive. 1. Restart.
	**Internal system fault** Try to restart, if problem persists or comes back soon again change DMC driver.
	**Temperature fault** 1. In case of the motor check if the movement is too hard. 2. In case of the drive check the cooling system of the electrical cabinet
	**Software disabled** The software enable signal from the PLC is low. This is normally not an alarm. But if it seems to be a problem check the connection between the PLC's output and the DMC's software enable input.
	**Torque limit exceed** The maximum current limit is exceeded. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**Cyclical timer** This alarm is triggered by internal faults in the drive, and is not an alarm if software and hardware enable is low. 1. Close the doors. 2. Check connections to the DMC's hardware and software enable.

(Cont'd)

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	**Volume data fault** Volume data does not exist or data bus error. 1. Check that the volume data registers in the PLC have the correct values. 2. Check that the data request output on the DMC driver is high also check that the corresponding input on the PLC is high. 3. Check that the connections for the data transfer between the DMC and PLC is correct.
	**Resolver fault** Problem with the resolver (the resolver sends information from the motor to the drive from where the drive can calculate the position of the axis). 1. Check the connections for the resolver cable. 2. Change drive or motor
	**Home position fault** When stopping the FFU the home position sensor couldn't be found. Check sensor and connections to the DMC drive
	**Bleeder fault** Too much excess energy is sent to the bleeder (shunt) resistor. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**FFU synchronisation fault** Position value of JUM sent from PLC is out of range. 1. Check functionality of angle encoder for the JUM. 2. Check that the register containing the encoder value in the PLC has the correct value. 3. Check that the connections for the data transfer between the DMC and PLC is correct.

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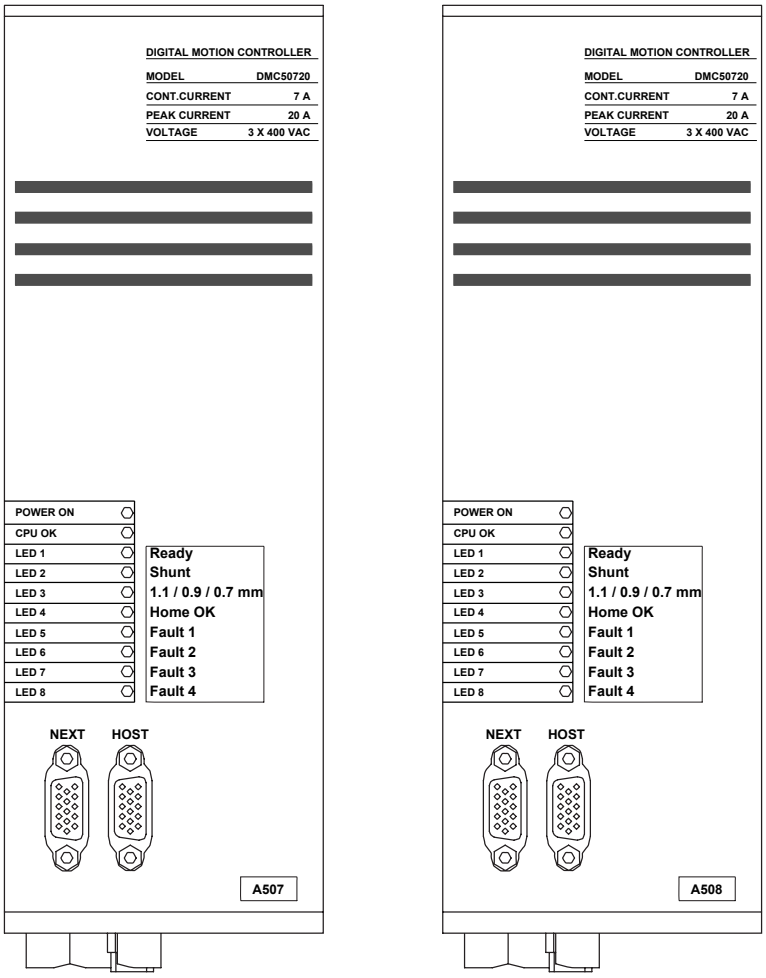
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Design Control System Cards A507 - A508

The DMC cards A507 and A508 are used to control the position and the movement of the folding flaps.

The DMC systems receives the information for the new position of the folding flaps calculated in relation to the design correction error.



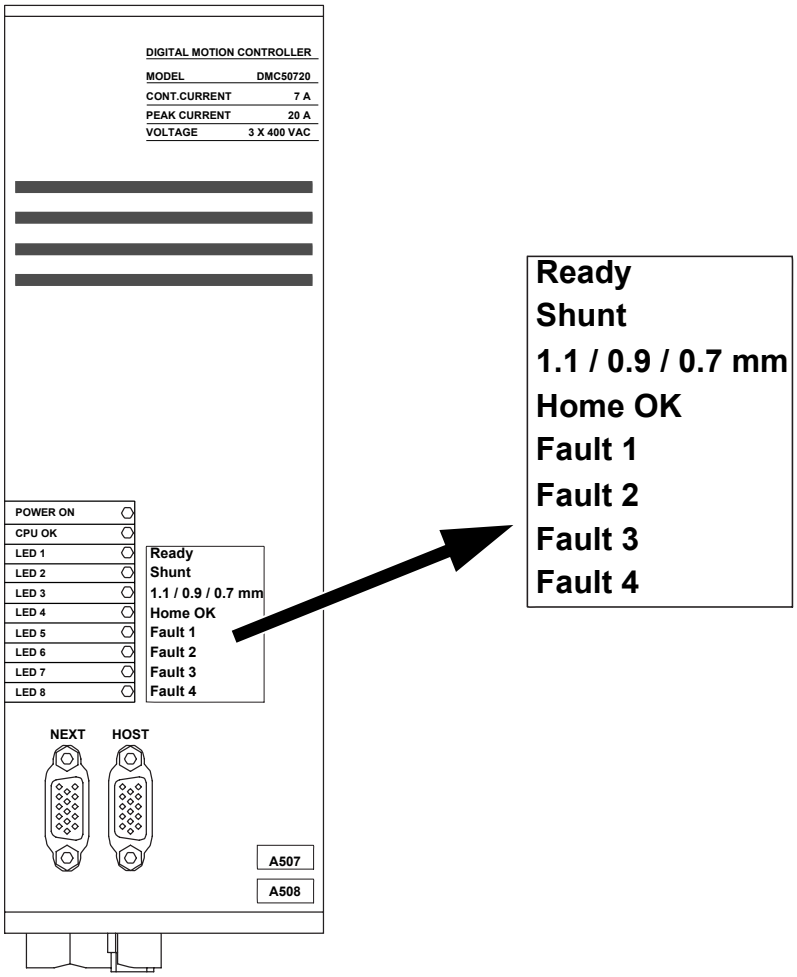
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DMC Front Panel LEDs

DMC card A507 - A508		
LED	**Colour**	**Function**
Ready	Green - (LD1)	The servo system is initialized
Shunt	Yellow - (LD2)	Shunt regulator active. The negative torque is dissipated by the shunt resistor
1.1 / 0.9 / 0.7 mm	Yellow - (LD3)	The 1.1 / 0.9 / 0.7 mm setting of the folding flaps is in progress
Home OK	Yellow - (LD4)	Home position found. The servo system has found its home position
Fault 1	Red - (LD5)	See list next page
Fault 2	Red - (LD6)	See list next page
Fault 3	Red - (LD7)	See list next page
Fault 4	Red - (LD8)	See list next page

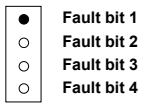
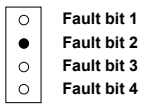
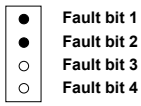
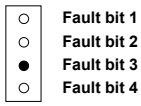
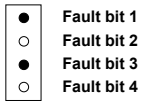
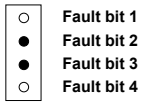
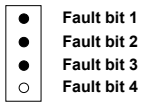
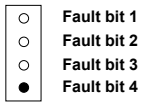
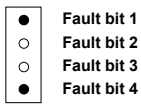


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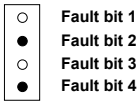
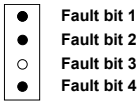
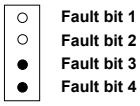
Design Control System Cards A507 - A508 Fault List

	**Hardware disabled** The hardware enable signal from the PLC is low. This is normally not an alarm. But if it happens in an abnormal situation check the connection to the DMC's hardware enable input.
	**Internal hardware fault** Try to restart, if the problem persists or comes back soon again change DMC driver.
	**Position error fault** The allowed error between the calculated position and the actual position of the axis of the motor is exceeded. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**Control C interrupt** Ctrl-C has been pressed on a terminal connected to the drive. 1. Restart.
	**Internal system fault** Try to restart, if problem persists or comes back soon again change DMC driver.
	**Temperature fault** 1. In case of the motor check if the movement is too hard. 2. In case of the drive check the cooling system of the electrical cabinet
	**Software disabled** The software enable signal from the PLC is low. This is normally not an alarm. But if it seems to be a problem check the connection between the PLC's output and the DMC's software enable input.
	**Torque limit exceed** The maximum current limit is exceeded. Check for mechanical faults that can stop the motor from turning correctly such as bad bearings, lack of lubrication…
	**Cyclical timer** This alarm is triggered by internal faults in the drive, and is not an alarm if software and hardware enable is low. 1. Close the doors. 2. Check connections to the DMC's hardware and software enable.

(Cont'd)

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	**Volume data fault** Volume data does not exist or data bus error. 1. Check that the volume data registers in the PLC have the correct values. 2. Check that the data request output on the DMC driver is high also check that the corresponding input on the PLC is high. 3. Check that the connections for the data transfer between the DMC and PLC is correct.
	**Resolver fault** Problem with the resolver (the resolver sends information from the motor to the drive from where the drive can calculate the position of the axis). 1. Check the connections for the resolver cable. 2. Change drive or motor
	**Home position fault** The mechanical stop is not found within the specified time. Check the belt drive and that the mechanics for the design correction is moving correctly. Home position fault - continued

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9.5.7-2 DMC Card - Set Basic

Machine Status	PRODUCTION
Special Equipment	Communication cable RS 232-C AT compatible PC with diskette station
SPC Reference	1350699-0200

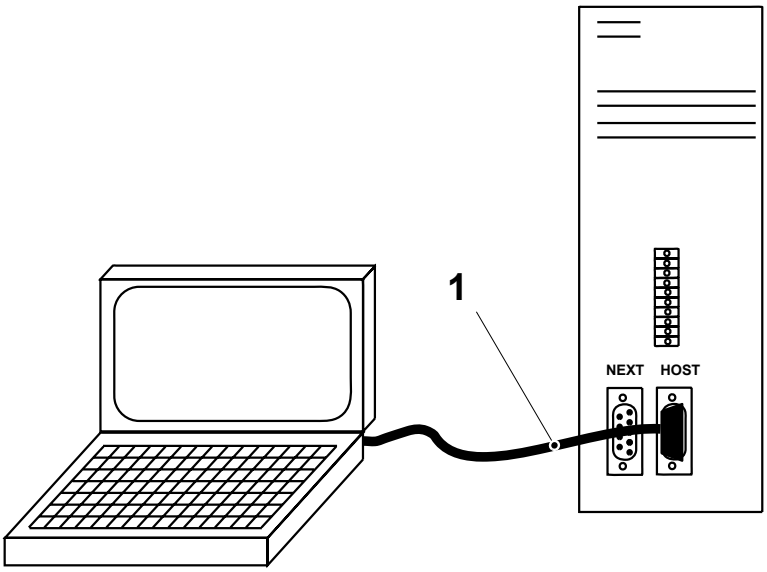
Old DMC Cards

Note! For the machines with the new DMC2 cards, see 9.5.2-2 DMC2 Card - Set Basic.

Connect the DMC to the PC terminal with the cable (1). Necessary connections are:

PC 9-pin female	**DMC 15-pin high density male**
2	3
3	2
5	7
	1 (*)

Note! (*) = shield connection



1 RS232 connection cable

(Cont'd)

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(Cont'd)

Configure the program to use, for example TIT or Windows terminal, as follows:

Baud rate	9600
Parity	None
Bits	8
Stop bits	1
Flow control	None

PC Terminal Communication (only for DCS)

A PC with a terminal program can be used for test and service purposes. At start up through the serial interface it is possible to see the program version (R255). For the design correction DMC three values are displayed every package.

Value number	No. display	Function
Value 1	R51	Regulating position 0 - 63 step transferred from the TMCC card
Value 2	R50	Calculated correction position
Value 3	/	Position error

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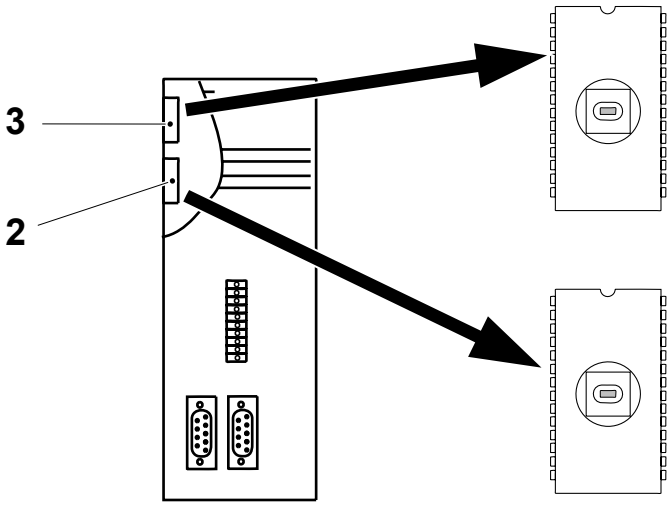
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PC Terminal Communication (for both DCS and MM)

A PC with a terminal program can be used for test and service purposes. At start up through the serial interface it is possible to see the program number (R255). For positioning trouble-shooting it is also possible to see different data by on line changing of the register **R120** value.

R120	Register No.	Register name	Function
R120 = 0	No display	No display	Default state
R120 = 10 (for DCS)	Ana.Out1 Ana.Out2	Ana.Out1 Ana.Out2	Connect the Ana.Out1 to resolver position Connect the Ana.Out2 to torque
R120 = 10 (for MM)	Ana.Out1 Ana.Out2	Ana.Out1 Ana.Out2	Connect the Ana.Out1 to torque Connect the Ana.Out2 to PosErr

For better performance of the system, keep **R120** = 0 when there is no need of displaying data. The MCMM21 and MCDCS21 programs are resident on an EPROM (2). This should be programmed and assembled during machine production.



2 Eprom
3 Firmware Eprom

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9.6 Cooling System

SPC Reference	1095954-0200 1095954-0300

9.6.1 Cooler

9.6.1-1 Cooler - Check Air Flow

Machine Status	Mains Power ON, Air OFF Steam ON, Water OFF
SPC Reference	1095954-0200

WARNING

Hazardous voltage.

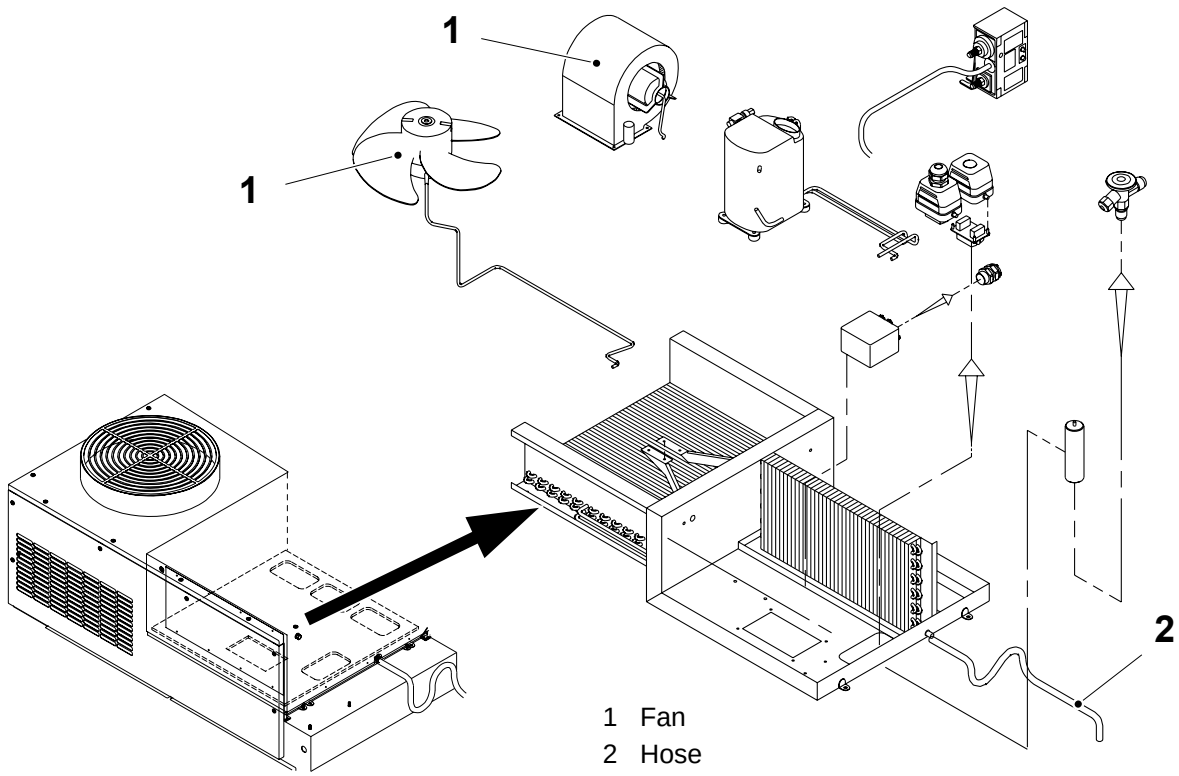
There is high voltage in the electrical cabinet (up to 560 V). In case of an accident call for medical attention immediately.

a) Open the electrical cabinet doors and check that the cooler air flow is working.

b) Check also that the fan (1) is not worn or damaged. Change as required.

c) Check also that the hose (2) for the discharging of the condensed water is in the correct position and not clogged. Clean as required.

d) Check the electrical cabinet temperature regulator in order to have the right temperature on the TPOP panel.



1 Fan
2 Hose

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9.6.1-2 Cooler - Check Sight Glass

SPC Reference	1095954-0200

WARNING
Cooling media R134A.
Follow the Safety precautions.

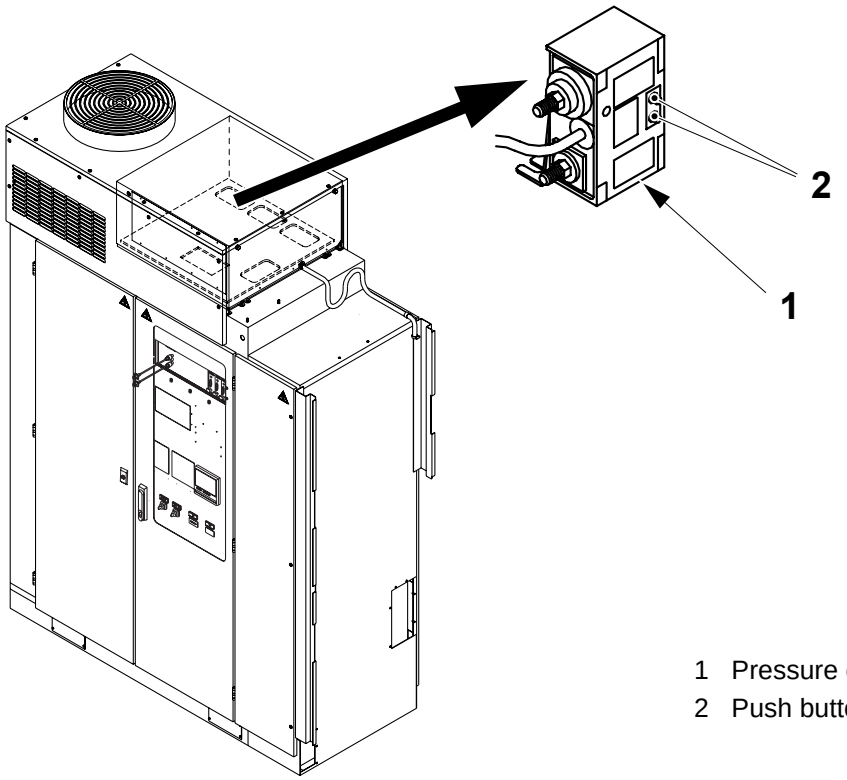
Follow the procedure described in 6.1.1-1 Compressor Unit - Check Sight Glass.

9.6.1-3 Cooler - Reset Pressure Guard

Machine Status	Mains Power OFF, Air OFF Steam ON, Water OFF
SPC Reference	1095954-0200

WARNING
Risk of damage to the equipment.
This reset must be performed only by instructed or skilled personnel.

a) Open the right power side door of the electrical cabinet.
b) Press both the push buttons (2) in the pressure guard (1) through the hole indicated by the arrow.
c) Close the electrical cabinet door.



1 Pressure guard
2 Push buttons

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9.6.2 Cooler

Note! For the machines rebuilt with UK-2603238-0200 Cooling Unit Replacement.

9.6.2-1 Cooler - Check Filter

Machine Status	Mains Power OFF Air OFF Steam ON Water OFF
SPC Reference	1095954-0300

WARNING

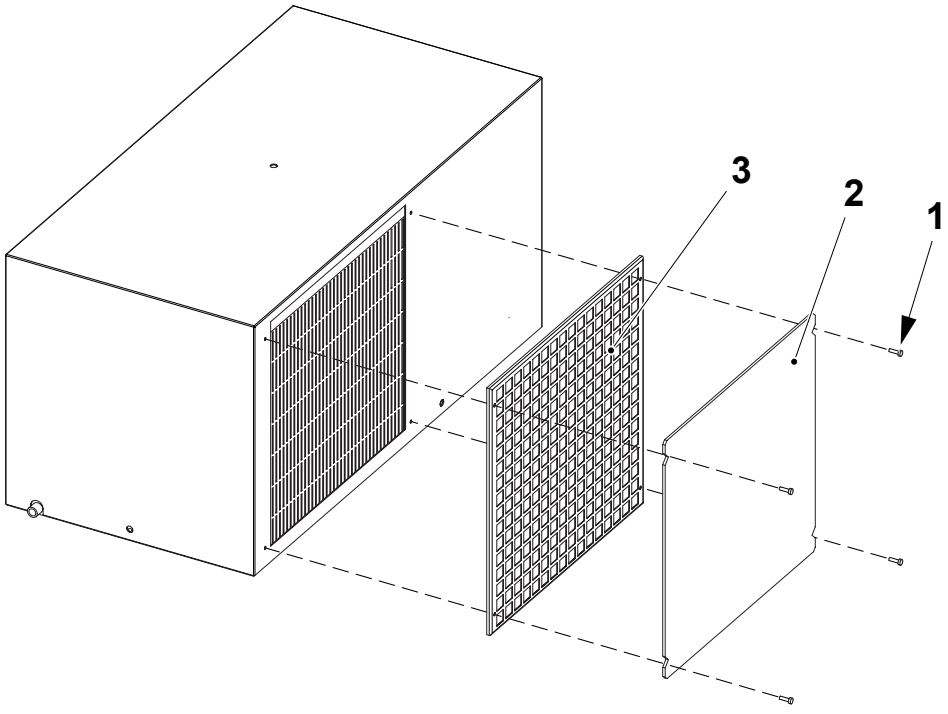
Refrigerant gas.

Cooling media R134A. Follow the Safety Precautions.

a) Loosen the screws (1).

b) Remove the cover (2) and the filter (3).

c) Check the filter (3). If necessary, clean it or change it.



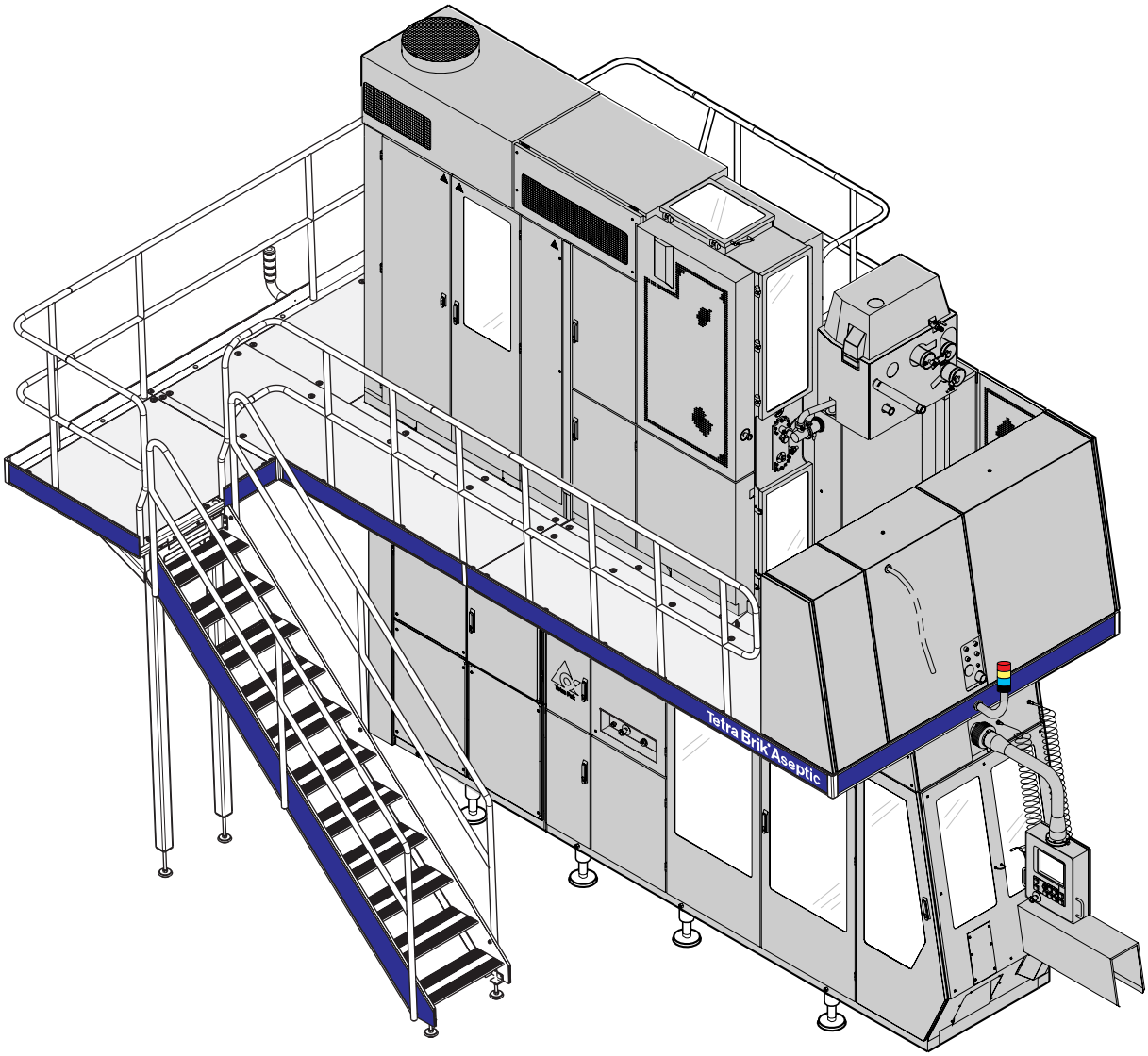
1 Screw
2 Cover
3 Filter

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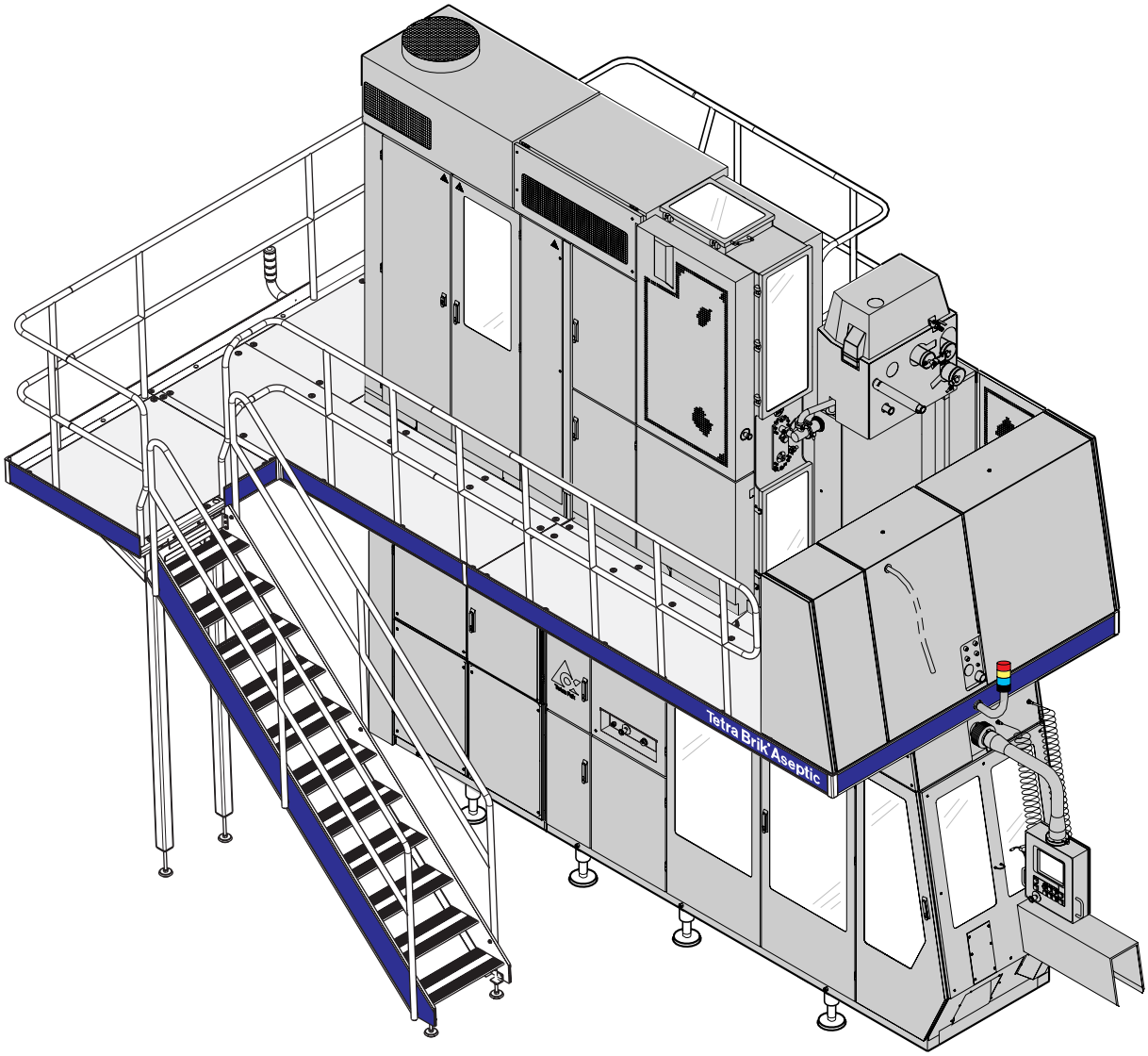
10 General



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General - Description

SPC Reference	648570-0500



10.1 Technical Data
10.2 Templates and Tools
10.3 Consumables
10.4 Conversion Table, Octal Degrees
10.5 Safety Functions

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10.1 Technical Data . . . . . 10 - 5

10.2 Templates and Tools . . . . . 10 - 8

10.3 Consumables . . . . . 10 - 19

10.3-1 Lubricants . . . . . 10 - 19

10.3-2 Cleaning compounds . . . . . 10 - 22

10.4 Conversion Table, Octal Degrees. . . . . 10 - 23

10.5 Safety Functions . . . . . 10 - 24

10.5-1 Safety Functions - Check . . . . . 10 - 24

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10.1 Technical Data

Pressures	Unit	Value
Central lubrication oil	Bar	30
Hydraulic unit, jaw pressure	Bar	100
Hydraulic unit, cutting pressure	Bar	85
Bellows	Bar	see page 3-71
Top flap sealing	Bar	1.0 - 1.5
Top flap sealing (only for TPA 1000 Sq)	Bar	1.8 - 2.0
Bottom flap sealing	Bar	1.0 - 1.5
Flap blowing	Bar	2.0 - 3.0
Overpressure final folder (indexing gear)	Bar	0.1 - 0.2
Air-spray container	Bar	2.0
Peroxide tank filling	Bar	0.2
Photocells, design correction, air blast	Bar	see page 4-145
Pendulum roller	Bar	see page 1-61
Calender roller	Bar	see page 1-79
Cooling water system	Bar	2.0
Sterile air system (water separator)	Bar	0.32 - 0.35
Foam	Bar	5.0
Cleaning pump	Bar	4.0
Water circulation (peroxide)	Bar	2.0 - 2.5
Air	Bar	6 - 7
Warm water	Bar	3 - 4.5
Cold water	Bar	3 - 4.5
Steam	Bar	1.7 ±0.3
Tab folder	Bar	3 - 3.5
Regulating valve overpressure	Bar	0.6
Product pressure, permitted variation during PRODUCTION	Bar	0.7 - 2.5 ±0.1

Pressure switches	Unit	Value
Incoming air	Bar	5.4
Incoming cooling water	Bar	1.0 - 2.0
Sterile air	Bar	0.14
Incoming water alarm	Bar	2.0

(Cont'd)

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(Cont'd)

Induction heating	Unit	Value
Induction heating, transversal sealing (left / right) * depending on packaging material type		See page 9-18
Induction heating, longitudinal sealing * depending on packaging material type		See page 9-18
Induction heating, strip applicator		See page 9-18
Induction heating, automatic splicing unit * depending on packaging material type		0

Temperature	Unit	Value
Heat sterilization	°C	280
Peroxide bath	°C	73
Water bath	°C	63
Peroxide tank	°C	73
Top aseptic chamber	°C	95
Cooling water (compressor)	°C	10 - 12
Electrical cabinet	°C	30
Flap sealing air nozzles (top)	°C	See page 5-28
Flap sealing air nozzles (bottom)	°C	See page 5-28
Steam	°C	125
Air superheater	°C	360
Cooling water	°C	2 - 5
Warm water	°C	55 - 60

Incoming media	Unit	Value
Electric voltage	V	400 - 230 ±10%
Electric frequency	Hz	50 - 60 ±2%

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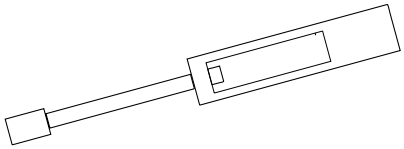
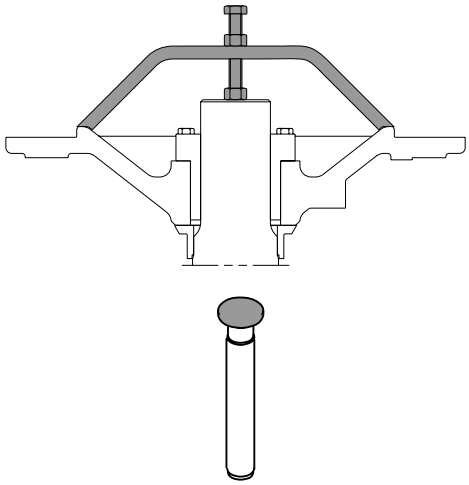
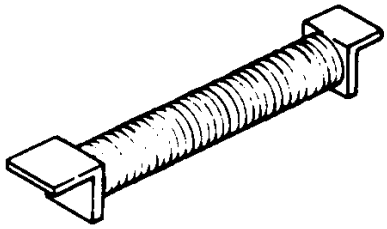
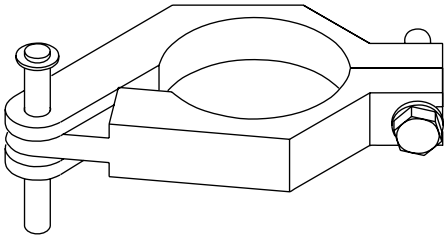
Flows	**Unit**	**Value**
Cooling water, RH jaw pair	l/min.	0.8
Cooling water, LH jaw pair	l/min.	0.8
Cooling water, final folder	l/min.	2.0
Cooling water, hydraulic system	l/min.	2.5
Cooling water, DI circuit	l/min.	1.5
Cooling water, main flow	l/min.	12 - 13

Miscellaneous	**Unit**	**Value**
Hydrogen peroxide	% w/w	35
Leak detection fluid (red ink)	TP No.	90298-26
Noise declaration	dB	see IM manual

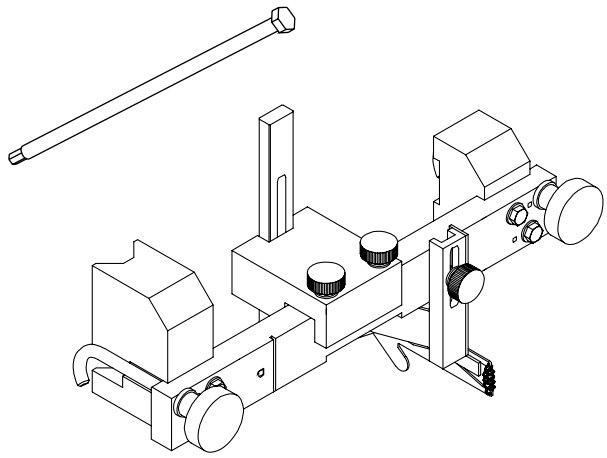
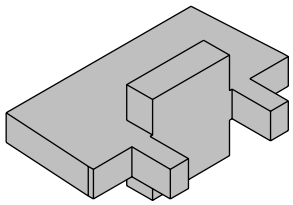
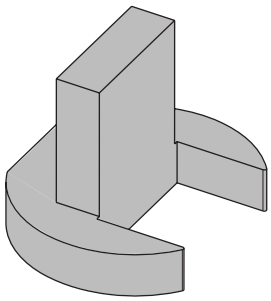
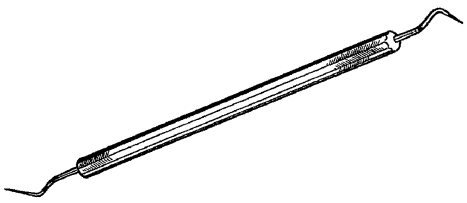
Consumption	**Unit**	**Value**
Steam	Kg/h	2.4
Hydrogen peroxide (% w/w 35)	l/h	1.5 - 2.0
Detergent, external cleaning	l/cycle	1.2 - 1.8 (alkali)

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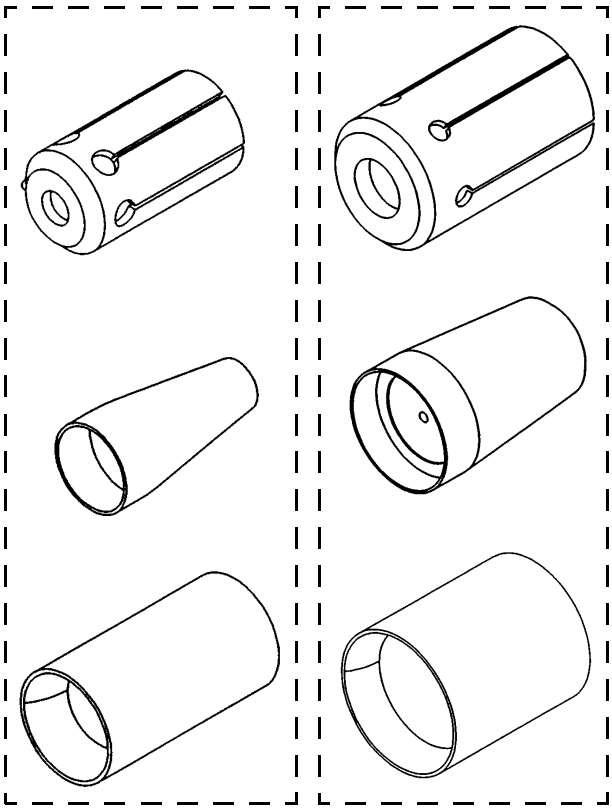
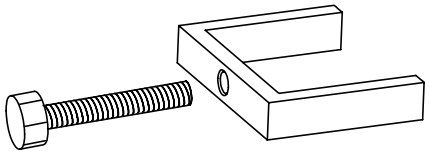
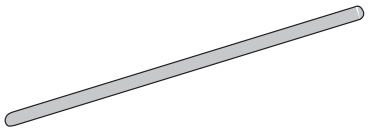
10.2 Templates and Tools

Fig.	Description
	**Dynamometer** TP No. 74767-0102 1.3.4-3 Filling Pipe - Set Pressure Roller 3.2-2 Crank Unit - Set 3.3-4 Drive Unit - Set Belt Tension 4-13 Jaw System - Set Folding Flaps Mechanism 4-14 Jaw System - Set Folding Flaps Mechanism on the Carriers 5.5-3 Pressure Device - Set Belt 5.8-11 Out Feed Device - Set Belt Tension 5.10-2 Infeed Conveyor - Set Belts 7.2.1-3 Pressure Roller - Set Spring Force
	**Assembly tool** TP No. 1254023-0100 3.4-3 Curve - Assemble Plate and Curve
	**Compression spring** TP No. 72846-0101 4-6 Jaw System - Set Jaw Symmetry with Own Guide 4-8 Jaw System - Set Jaw Gap Non Parallelism in Movement 4-9 Jaw System - Set Jaw Gap
	**Measuring clamp** TP No. 1035362-0101 4-4 Jaw System - Set Stroke

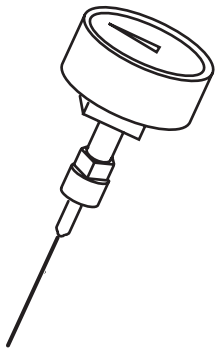
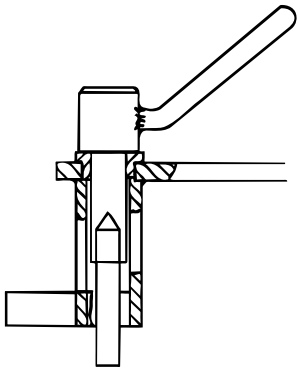
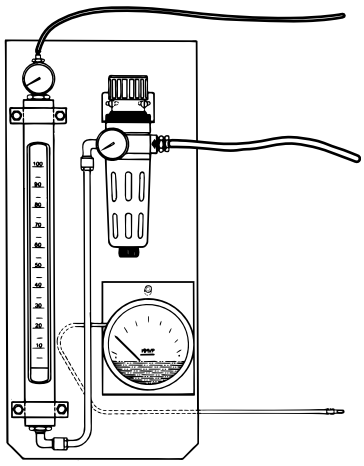
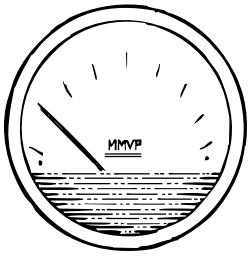
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Fig.	Description
  	**Template** TP No. 1095956-0201 - (for 200 B) including: TP No. 1095956-0202 - (for 200 S) including: TP No. 1095956-0203 - (for 1000 B) including: TP No. 1095956-0204 - (for 1000 S) including: TP No. 1095956-0205 - (for 1000 Sq) including: TP No. 1095956-0206 - (for 250 B) including: TP No. 1095956-0207 - (for TPA 1000 S) including: TP No. 1095956-0208 - (for TBA 1500 S) including: TP No. 1095956-0209 - (for TBA 500 S) including: TP No. 1095956-0210 - (for TBA 500 B) including: TP No. 1095956-0211 - (for TPA 330 Sq) including: TP No. 1095956-0212 - (for TPA 250 Sq) including: TP No. 1095956-0213 - (for TPA 1000 Sq) including: TP No. 1095956-0214 - (for TBA 250 S) including: TP No. 1095956-0215 - (for TBA 330 S) including: TP No. 1095956-0218 - (for TPA 500 Sq) including: * TP No. 1317230 - (for TPA 1000 S) * TP No. 1140268 - (for 1000 B and 500 B) * TP No. 1140283 - (for 200 S) * TP No. 1523091 - (for 200 B, 250 B and 330 S) * TP No. 1140320 - (for 1000 S) * TP No. 1478190 - (for 1500 S) * TP No. 1498117 - (for 1000 Sq) * TP No. 1532998 - (for 500 S) * TP No. 1539892 - (for TPA 330 Sq) * TP No. 1539893 - (for TPA 250 Sq) * TP No. 2503694 - (for TPA 1000 Sq and TPA 1000 Sq StreamCap) * TP No. 574455 - (for 250 S) * TP No. 2503692 - (for TPA 500 Sq) * TP No. 76176 - (for 200 S) * TP No. 75936 - (for 200 B, 250 B and 330 S) * TP No. 2534809 - (for TPA 330 Sq) * TP No. 2534810 - (for TPA 250 Sq) * TP No. 574454 - (for 250 S) * Volume depending parts only 4-6 Jaw System - Set Jaw Symmetry with Own Guide 4-7 Jaw System - Set Volume Flaps Centring 4-9 Jaw System - Set Jaw Gap 4.4.1-8 Cantilever - Set Support Rollers
	**Tool** TP No. 90243-0146 For dismounting of O-rings (not used in new design) 4 Jaw System

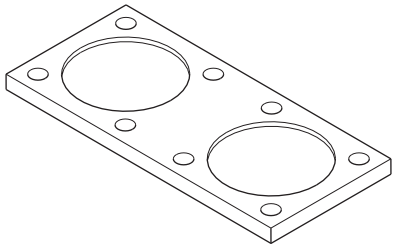
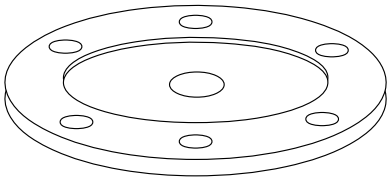
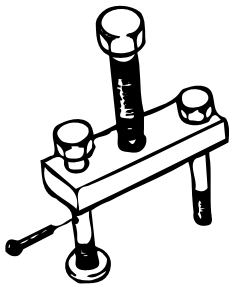
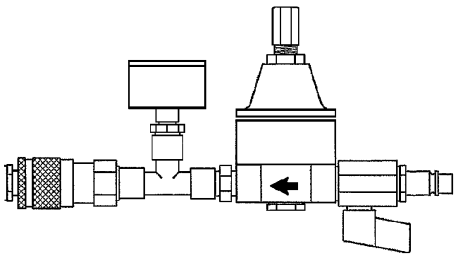
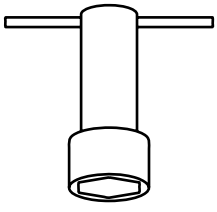
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Fig.	Description
	**Tool** TP No. 1095884-0101 - (for TBA 1000 B) TP No. 1095884-0102 - (for TBA 1000 S) TP No. 1095884-0103 - (for TPA 1000 S) TP No. 1095884-0104 - (for TBA 200 B) TP No. 1095884-0105 - (for TBA 200 S) TP No. 1095884-0106 - (for TBA 250 B) TP No. 1095884-0107 - (for TBA 1000 Sq) TP No. 1095884-0108 - (for TBA 1500 S) TP No. 1095884-0109 - (for TBA 500 S) TP No. 1095884-0110 - (for TPA 330 Sq) TP No. 1095884-0111 - (for TBA 500 B) TP No. 1095884-0112 - (for TPA 250 Sq) TP No. 1095884-0113 - (for TPA 1000 Sq) TP No. 1095884-0114 - (for TBA 250 S) TP No. 1095884-0115 - (for TBA 330 S) TP No. 1095884-0116 - (for TPA 500 Sq) Including all parts 4.2-4 Pressure Jaw - Change Seals
	**Template** TP No. 1350497 5-3 Final Folder - Synchronise Wheel to the Gear Box 5.6-1 Wheel - Change
	**Tool** TP No. 1350498 5-3 Final Folder - Synchronise Wheel to the Gear Box 5.6-1 Wheel - Change

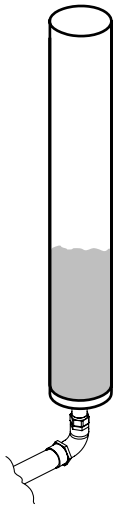
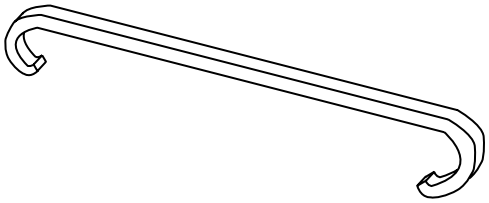
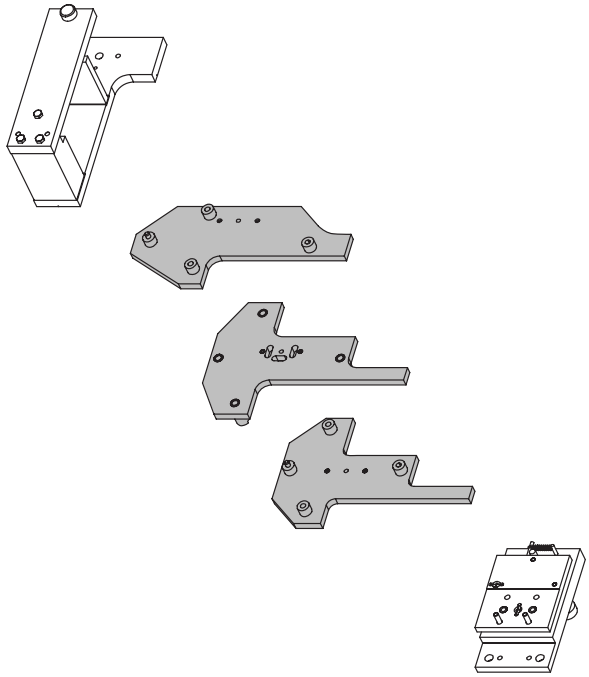
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Fig.	Description
	**Needle pressure gauge** TP No. 1478583-0100 5.5-9 Pressure Device - Check Package Pressure
	**Tool** TP No. 449969-0101 1.3.1-1 Product Valve Group - Remove Pneumatic Cylinders, AP-valve 1.3.1-2 Product Valve Group - Change Seals and Membranes, AP-valve 1.3.1-3 Product Valve Group - Change O-rings, AP-valve
	**Test equipment** TP No. 533014-0101 1.1-9 Aseptic Chamber - Leakage Detection
	**Pressure gauge** TP No. 90243-0137 1.1-8 Aseptic Chamber - Check Overpressure 1.1-9 Aseptic Chamber - Leakage Detection

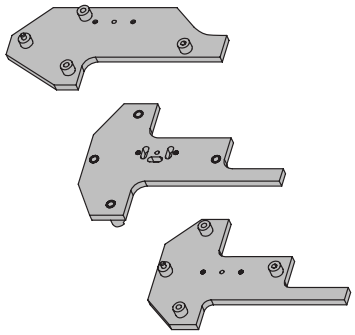
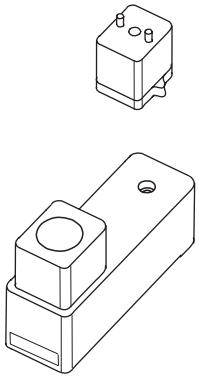
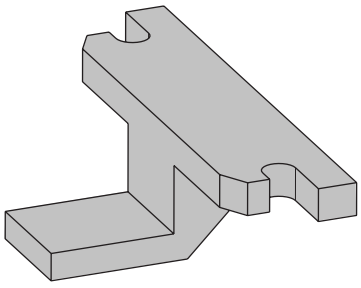
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Fig.	Description
	**Heat exchanger bottom flange** TP No. 1348263 1.2.1-2 Air Super Heater - Check Heat Exchanger Air Tightness
	**Heat exchanger top flange** TP No. 979951 1.2.1-2 Air Super Heater - Check Heat Exchanger Air Tightness
	**Extractor** TP No. 74305-0101 1.2.2-3 Compressor - Change Seals
	**Hydrostatic test instrument** TP No. 565536-0101 1.2.1-2 Air Super Heater - Check Heat Exchanger Air Tightness
	**Socket wrench** TP No. 90206-330 1.4.1-2 Bath - Change Heating Elements 1.4.2-1 Heating Unit - Change Heating Element

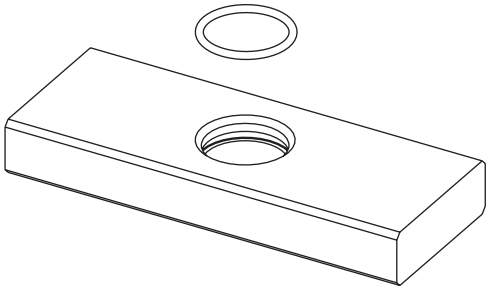
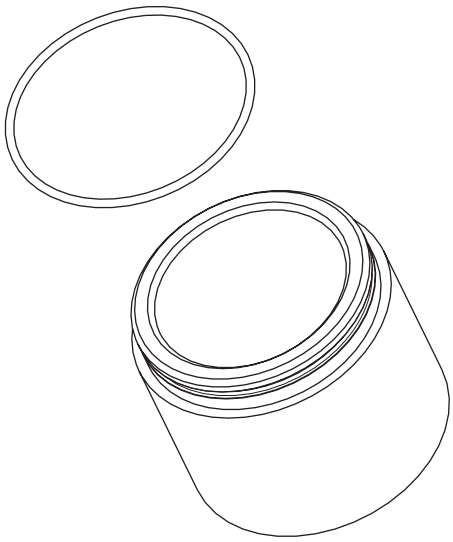
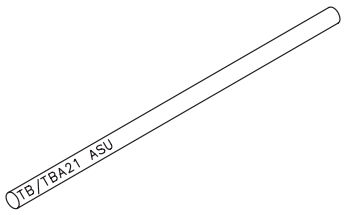
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Fig.	Description
	**Template** TP No. 1254449-1 1.3.4-4 Filling Pipe - Set Level Probe
	**Coupling wrench** TP No. 777200-101 1.3.2-1 Flow Regulator - Overhaul Regulating Valve 1.3.2-2 Flow Regulator - Change Diaphragms
	**Template** TP No. 1512327-0101 - (for TBA 1000 B) TP No. 1512327-0102 - (for TBA 1000 S) TP No. 1512327-0103 - (for TBA 1000 Sq) TP No. 1512327-0104 - (for TBA 200 B) TP No. 1512327-0105 - (for TBA 250 B) TP No. 1512327-0106 - (for TBA 200 S) TP No. 1512327-0107 - (for TPA 1000 S) TP No. 1512327-0108 - (for TBA 1500 S) TP No. 1512327-0109 - (for TBA 500 S) TP No. 1512327-0110 - (for TBA 500 B) TP No. 1512327-0111 - (for TPA 330 Sq) TP No. 1512327-0112 - (for TPA 250 Sq) TP No. 1512327-0113 - (for TPA 1000 Sq) TP No. 1512327-0114 - (for TBA 250 S) TP No. 1512327-0115 - (for TBA 330 S) TP No. 1512327-0116 - (for TPA 500 Sq) 1.1-6 Aseptic Chamber - Align Forming Rings

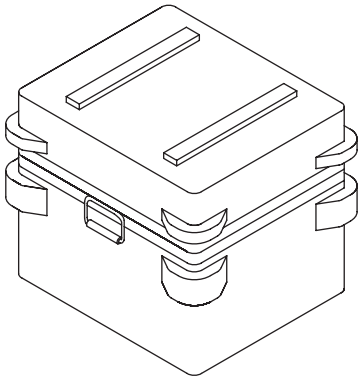
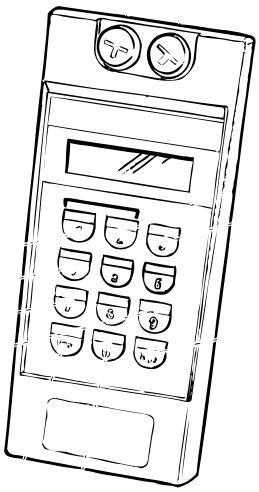
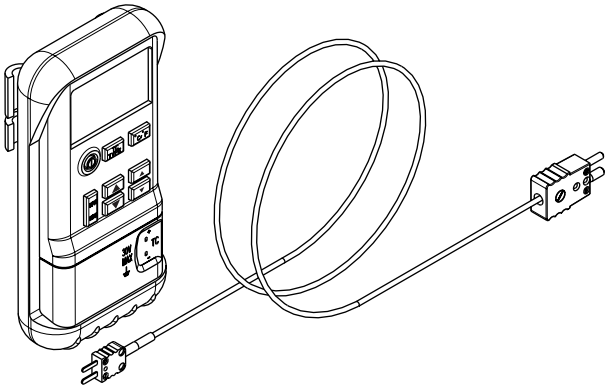
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Fig.	Description
	**Template** TP No. 1095519-0101 - (for TBA 1000 B) TP No. 1095519-0102 - (for TBA 1000 S) TP No. 1095519-0103 - (for TBA 1000 Sq) TP No. 1095519-0104 - (for TBA 200 B) TP No. 1095519-0105 - (for TBA 250 B) TP No. 1095519-0106 - (for TBA 200 S) TP No. 1095519-0107 - (for TPA 1000 S) TP No. 1095519-0108 - (for TBA 1500 S) TP No. 1095519-0109 - (for TBA 500 S) TP No. 1095519-0110 - (for TBA 500 B) TP No. 1095519-0111 - (for TPA 330 Sq) TP No. 1095519-0112 - (for TPA 250 Sq) TP No. 1095519-0113 - (for TPA 1000 Sq) TP No. 1095519-0114 - (for TBA 250 S) TP No. 1095519-0115 - (for TBA 330 S) TP No. 1095519-0116 - (for TPA 500 Sq) 1.1-6 Aseptic Chamber - Align Forming Rings
	**Laser equipment** TP No. 90243-0446 - (for 110V) TP No. 90243-0447 - (for 230V) 1.1-6 Aseptic Chamber - Align Forming Rings
	**Template** TP No. 1334987 - (for TBA 1000 S) TP No. 1334986 - (for TBA 1000 B, 500 B, 1500 S) TP No. 1539721 - (for TBA 200 B, 250 B, 330 S) TP No. 1539722 - (for TBA 200 S, 250 S, TPA 250 Sq) TP No. 1539761 - (for TBA 1000 Sq) TP No. 1539765 - (for TBA 500 S, TPA 1000 S) TP No. 2564543 - (for TPA 500 Sq, TPA 1000 Sq and TPA 1000 Sq StreamCap) TP No. 2611700 - (for TPA 330 Sq) 1.1.1-2 Lower Forming Ring - Set Position

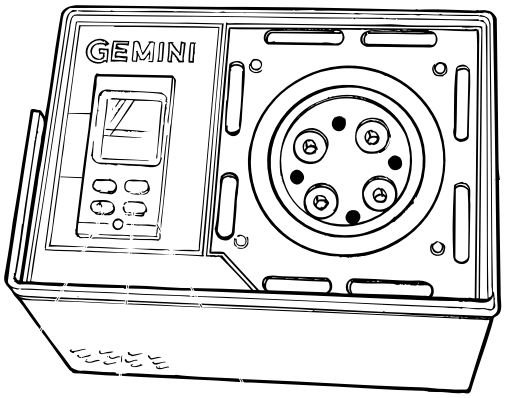
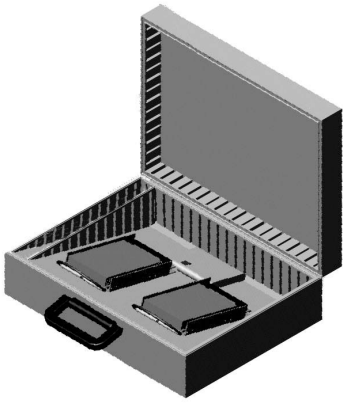
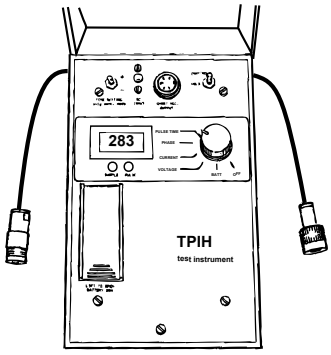
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Fig.	Description
	**Template** TP No. 1558732 - (for TPA 1000 S) **O-ring** TP No. 315202-0722 - (for TPA 1000 S) 1.3.4-2 Filling Pipe - Set Position
	**Template** TP No. 1498151 - (for TBA 1000 S) TP No. 1517987 - (for TBA 1000 Sq) TP No. 1524840 - (for TBA 500 S) TP No. 1532299 - (for TPA 330 Sq) TP No. 1558304 - (for TPA 250 Sq, TBA 200 S, TBA 250 S) TP No. 1498149 - (for TBA 200 B, TBA 250 B, TBA 330 S) TP No. 1524841 - (for TPA 1000 Sq) TP No. 2545352 - (for TPA 500 Sq) TP No. 1498150 (for TBA 500 B, TBA 1000 B, TBA 1500 S) **O-ring** TP No. 315202-0302 - (for TPA 500 Sq) TP No. 315202-0303 - (for TBA 500 S, TPA 1000 Sq) TP No. 315202-0307 - (for TBA 1000 S) TP No. 315202-0305 - (for TBA 1000 Sq) TP No. 315202-0214 - (for TPA 250 Sq, TBA 200 S, TBA 250 S) TP No. 315202-0217 - (for TBA 200 B, TBA 250 B, TBA 330 S, TPA 330 Sq) TP No. 315202-0308 - (for TBA 500 B, TBA 1000 B, TBA 1500 S) **This templates are only for filling pipes equipped with floaters.** 1.3.4-2 Filling Pipe - Set Position
	**Tool** TP No. 1038734 For centering of the splicing table 8 Automatic Splicing Unit

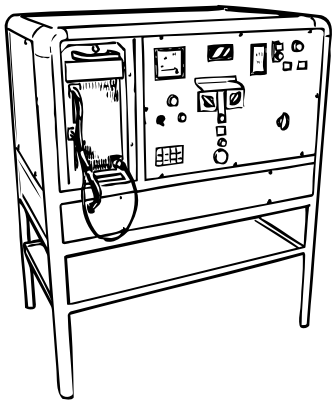
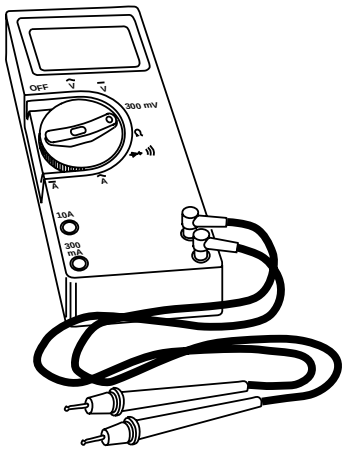
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Fig.	Description
	**Calibration equipment** TP No. 567732-0101 The box contains the calibration equipment for the thermocouples 9.5.4-1 Calibrator - Set (Micromite II) 9.5.5-1 Thermocouples - Check 9.5.6-1 Temperature Regulator- Calibrate with MS-DOS Based Program 9.5.6-2 Temperature Regulator - Calibrate with Windows Based Program
	**Calibration equipment** Temperature calibrator (Micromite instrument) TP No. 90410-0338 Extension wire male 5m. (temp.controller) TP No. 90326-0308 Extension wire female 1m. (oven) TP No. 90326-0309 Label TP No. 90194-0113 9.2.2-4 Recorder - Calibrate 9.5.4-1 Calibrator - Set (Micromite II) 9.5.5-1 Thermocouples - Check 9.5.6-1 Temperature Regulator- Calibrate with MS-DOS Based Program 9.5.6-2 Temperature Regulator - Calibrate with Windows Based Program
	**Calibration equipment** Temperature Calibrator (FLUKE 714) TP No. 90458-914 Thermocouple Cable Male TP No. 90458-915 9.2.2-4 Recorder - Calibrate 9.5.4-2 Calibrator - Set (FLUKE) 9.5.5-1 Thermocouples - Check 9.5.6-1 Temperature Regulator- Calibrate with MS-DOS Based Program 9.5.6-2 Temperature Regulator - Calibrate with Windows Based Program

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Fig.	Description
	**Calibration equipment** Temperature calibrator oven (Gemini) TP No. 90410-0337 Calibrated thermocouple type K TP No. 90326-0310 9.5.5-1 Thermocouples - Check
	**Hard Disk Copy Tool** TP No. 90459-6473 9.2.4-6 TPOP - Change Flexbox Hard Disk
	**Tools** Socket set with sockets size 5.5 and 7 mm Socket set extension piece Allen key no: 2 (without the “ball” in the end) 9.2.4-13 TPOP - Change Backlight
	Precision Phillips screwdriver 9.2.4-13 TPOP - Change Backlight
	**Test instrument** TP No. 68462-0101 9.1.1-2 TPIH Generator - Check Function

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Fig.	Description
	**Test instrument** TP No. 68466 9.1.1-2 TPIH Generator - Check Function
	**Digital/analog multi meter** TP No. 90243-099 9 Electrical Cabinet

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10.3 Consumables

10.3-1 Lubricants

WARNING

Risk of personal injury.

Certain lubricants can cause injury if they come into contact with the eyes, skin, mucous membranes, or clothing. Always follow the manufacturer's instructions for handling chemical products.

The table below lists only a selection of lubricants with their respective designations.
Comparable lubricants from other suppliers may be selected with the aid of the lubricant specifications (document No in the table).

Lubricant specifications may be ordered from:
Tetra Pak Global Technical Support AB, Ruben Rausings gata, SE-221 86 LUND, Sweden.

Lubricant Code	**Part No. (used when ordering from Tetra Pak)**	**Example**	
		Supplier	**Product Designation** (2004-06)
A Motor oil	90 296-28	Statoil	PowerWay D2 10W-30
B High-pressure oil	90 296-73 90 296-78	BP Esso Statoil Mobil Shell	Energol GR-XP 220 Spartan EP 220 LoadWay EP 220 Mobilgear 630 Omala oil 220
	90 296-72 For use in production plant with start temperature below 5° C.	BP Esso Statoil Mobil Shell	Energol GR-XP 150 Spartan EP 150 LoadWay EP 150 Mobilgear 629 Omala oil 150
C Hydraulic oil	90 296-53	BP Esso Statoil Mobil Shell	Bartran HV 32 Univis N 32 HydraWay HVX 32 DTE Oil 13 Tellus Oil T 32
D Mist lubrication oil	90 296-80	BP Esso Statoil Mobil Shell	Autran DX ATF Dextron II TransWay DX II ATF 220 ATF Dextron II
E Compounded cylinder oil	90 296-77 90 296-2	BP Esso Statoil Mobil Shell	Energol AC-C460 Cylesso TK 460 CylWay FZ 460 600W Super Cylinder Oil Valvata Oil J460

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Lubricant Code	Part No. (used when ordering from Tetra Pak)	Example	
		Supplier	Product Designation (2004-06)
F Lithium grease, EP type	90 296-68	BP Esso Statoil Mobil Shell Shell	Energrease LS EP 2 / XRB2 EP Esso MP Grease/Beacon EP 2 UniWay LI 62 Mobillux EP 2 Grease 1344 LiEP 2 Calithia EP Grease T2
H High-pressure oil	90 296-75 90 296-76	BP Esso Statoil Mobil Shell	Energol GR-XP 320 Spartan EP 320 / Mobilgear 632 (mineral) 320 LoadWay EP 320 Mobilgear 632 Omala oil 320
	90 296-73 90 296-78 For use in production plant with start temperature below 5° C.	BP Esso Statoil Mobil Shell	Energol GR-XP 220 Spartan EP 220 LoadWay EP 220 Mobilgear 630 Omala oil 220
K Circulation oil	90 296-15	BP Esso Statoil Mobil Shell	Energol CS 100 Teresso 100 TurbWay 100 DTE Oil Heavy Tellus Oil 100
L Silicon grease	90 296-9		Grease 55322-30 ACC to M 1255.322 TUBE 100 GR
M Lithium grease, EP type	90 296-70	BP Esso Statoil Mobil	Energrease LS EP 1 Beacon EP 1 UniWay LI 61 Mobillux EP 1
N PTFE grease	90 296-91	Sikema	
O Lithium complex grease	90 296-61	BP Esso Statoil	Energrease LS 3 Unirex N3 UniWay HT-63
P Synthetic compressor oil	90 296-54	BP Esso Statoil Mobil Shell	Energol RC 68 Compressor Oil 68 CompWay 68 Rarus 427 Corena Oil H68
Q Low friction assembly paste	90 296-12	Dow Kluber	Molykote G-N Plus Unimoly Plus

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Lubricant Code	Part No. (used when ordering from Tetra Pak)	Example	
		Supplier	Product Designation (2004-06)
R Synthetic grease	90 459-246	Kluber	Klubersynth UH1 14-1600
S Synthetic hydrocarbon grease	90 296-10	Mecman	435-1
T Synthetic lubricating grease	90 459-0340	Shell	Cassida HDS2
U Hydraulic fluid	90 459-1310	Shell	Cassida Fluid HF32
V Oil	90 296-104	Molykote	Molykote Foodslip EP Gear Oil 220
W Hydraulic fluid	90 458-1427	Shell	Hydraulic Oil 46 Shell Tellus T 46
X Oil	90 296-105	Kluber Lubrication	Kluberoil 4 UH1-220
Y Lubrication oil	90 458-2735	Mobil	Mobil SHC 634
Lubricant (Worm gear)	90459-3876	Kluber	Syntheso D 460 EP
Grease (Worm gear)	90459-1052	Shell	Albida HLS2
	90459-1063	Mobil	Mobilith SHC 460
Oil (Gear box)		AGIP BP Shell Mobil Kluber	Blasia S 320 Energol SG 220 (ISO 220) Tivela WC Glygoyle 30 (ISO 220) Syntheso D EP 320

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10.3-2 Cleaning compounds

Note! Use only Tetra Pak recommended cleaning compounds when cleaning parts which may come into contact with hydrogen peroxide. Cleaning with non recommended compounds may cause an explosion!

Comparable qualities from other suppliers may be selected in compliance with the technical requirements listed in the table.

All cleaning compounds must comply with local legal requirements. The supplier recommendations for concentration and temperature should be followed. When dosing the products automatically, their concentrations should be checked. Hard water > 5 fH° (French degree of hardness).

Cleaning	Code		Example (2004-05)			
			Type of Product	Pure Chemicals	Formulated Products	
					Henkel	JohnsonDiversey
Cleaning CIP	**A**		Alkali	NaOH 1.5%	P3-mip RC P3-N 421	VC13 (Soft water) VC7 (Hard water)
	B	**1**	Acid	HNO_3 1%	P3-Horolith L31	VA5
		2	Acid	H_3PO_4 1%	P3-Horolith FPC P3-Horolith MSW	VA3
		3	Acid	$HNO_3 + H_3PO_4$		VA4
External cleaning (Automatic)	**C**	**1**	Alkali foam TBA/21, TBA/22, A3/Flex and A3/Speed		P3-Topax 12	VF9
		2	Alkali Solution TBA/8, TBA/19		P3-mip FPC P3-FPC	VK12
Manual cleaning (Wiping)	**D**	**1**	Alkali solution		P3-mip FPC P3-FPC	VK12
	E	**1**	Acid solution	HNO_3 0.5%		VA5 (1%)
		2	Acid solution	H_3PO_4 0.5%		VA3 (1%)
		3	Acid solution	Acetic Acid 0.5%		VF12
Manual disinfection (Immersion)	**F**	**1**	Low alkali foam		P3-Topax 99	VS1
		2	Low alkali solution		P3-Steril BG *KL-HC 34 UKES*	VT1
		3	Acid Solution	Hydrogen peroxide Peracetic acid	Oxonia Aktiv 30	VT6
Manual disinfection (Spray)	**G**	**1**	Alcoholic solution	Isopropanol 70%	Al-des Alcodes	VT10
		2	Alcoholic solution	Ethanol 70%		
		3	Acid Solution	Hydrogen peroxide Peracetic acid	Oxonia Aktiv 30	VT6
Hand disinfection	H				Spitacid	H4 H5

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10.4 Conversion Table, Octal Degrees

Oct	Dec	Mech	Oct	Dec	Mech	Oct	Dec	Mech	Oct	Dec	Mech
0	0	0.0	100	64	90.0	200	128	180.0	300	192	270.0
1	1	1.4	101	65	91.4	201	129	181.4	301	193	271.4
2	2	2.8	102	66	92.8	202	130	182.8	302	194	272.8
3	3	4.2	103	67	94.2	203	131	184.2	303	195	274.2
4	4	5.6	104	68	95.6	204	132	185.6	304	196	275.6
5	5	7.0	105	69	97.0	205	133	187.0	305	197	277.0
6	6	8.4	106	70	98.4	206	134	188.4	306	198	278.4
7	7	9.8	107	71	99.8	207	135	189.8	307	199	279.8
10	8	11.3	110	72	101.3	210	136	191.3	310	200	281.3
11	9	12.7	111	73	102.7	211	137	192.7	311	201	282.7
12	10	14.1	112	74	104.1	212	138	194.1	312	202	284.1
13	11	15.5	113	75	105.5	213	139	195.5	313	203	285.5
14	12	16.9	114	76	106.9	214	140	196.9	314	204	286.9
15	13	18.3	115	77	108.3	215	141	198.3	315	205	288.3
16	14	19.7	116	78	109.7	216	142	199.7	316	206	289.7
17	15	21.1	117	79	111.1	217	143	201.1	317	207	291.1
20	16	22.5	120	80	112.5	220	144	202.5	320	208	292.5
21	17	23.9	121	81	113.9	221	145	203.9	321	209	293.9
22	18	25.3	122	82	115.3	222	146	205.3	322	210	295.3
23	19	26.7	123	83	116.7	223	147	206.7	323	211	296.7
24	20	28.1	124	84	118.1	224	148	208.1	324	212	298.1
25	21	29.5	125	85	119.5	225	149	209.5	325	213	299.5
26	22	30.9	126	86	120.9	226	150	210.9	326	214	300.9
27	23	32.3	127	87	122.3	227	151	212.3	327	215	302.3
30	24	33.8	130	88	123.8	230	152	213.8	330	216	303.8
31	25	35.2	131	89	125.2	231	153	215.2	331	217	305.2
32	26	36.6	132	90	126.6	232	154	216.6	332	218	306.6
33	27	38.0	133	91	128.0	233	155	218.0	333	219	308.0
34	28	39.4	134	92	129.4	234	156	219.4	334	220	309.4
35	29	40.8	135	93	130.8	235	157	220.8	335	221	310.8
36	30	42.2	136	94	132.2	236	158	222.2	336	222	312.2
37	31	43.6	137	95	133.6	237	159	223.6	337	223	313.6
40	32	45.0	140	96	135.0	240	160	225.0	340	224	315.0
41	33	46.4	141	97	136.4	241	161	226.4	341	225	316.4
42	34	47.8	142	98	137.8	242	162	227.8	342	226	317.8
43	35	49.2	143	99	139.2	243	163	229.2	343	227	319.2
44	36	50.6	144	100	140.6	244	164	230.6	344	228	320.6
45	37	52.0	145	101	142.0	245	165	232.0	345	229	322.0
46	38	53.4	146	102	143.4	246	166	233.4	346	230	323.4
47	39	54.8	147	103	144.8	247	167	234.8	347	231	324.8
50	40	56.3	150	104	146.3	250	168	236.3	350	232	326.3
51	41	57.7	151	105	147.7	251	169	237.7	351	233	327.7
52	42	59.1	152	106	149.1	252	170	239.1	352	234	329.1
53	43	60.5	153	107	150.5	253	171	240.5	353	235	330.5
54	44	61.9	154	108	151.9	254	172	241.9	354	236	331.9
55	45	63.3	155	109	153.3	255	173	243.3	355	237	333.3
56	46	64.7	156	110	154.7	256	174	244.7	356	238	334.7
57	47	66.1	157	111	156.1	257	175	246.1	357	239	336.1
60	48	67.5	160	112	157.5	260	176	247.5	360	240	337.5
61	49	68.9	161	113	158.9	261	177	248.9	361	241	338.9
62	50	70.3	162	114	160.3	262	178	250.3	362	242	340.3
63	51	71.7	163	115	161.7	263	179	251.7	363	243	341.7
64	52	73.1	164	116	163.1	264	180	253.1	364	244	343.1
65	53	74.5	165	117	164.5	265	181	254.5	365	245	344.5
66	54	75.9	166	118	165.9	266	182	255.9	366	246	345.9
67	55	77.3	167	119	167.3	267	183	257.3	367	247	347.3
70	56	78.8	170	120	168.8	270	184	258.8	370	248	348.8
71	57	80.2	171	121	170.2	271	185	260.2	371	249	350.2
72	58	81.6	172	122	171.6	272	186	261.6	372	250	351.6
73	59	83.0	173	123	173.0	273	187	263.0	373	251	353.0
74	60	84.4	174	124	174.4	274	188	264.4	374	252	354.4
75	61	85.8	175	125	175.8	275	189	265.8	375	253	355.8
76	62	87.2	176	126	177.2	276	190	267.2	376	254	357.2
77	63	88.6	177	127	178.6	277	191	268.6	377	255	358.6

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10.5 Safety Functions

SPC Reference	1317247-0200

10.5-1 Safety Functions - Check

Machine Status	PREPARATION
SPC Reference	1317247-0200

a) Make sure that the machine can not be inched if:
   - any of the doors or covers are open
   - any EMERGENCY STOP is pushed
   - any crank is in the cranking position.

   For the location of safety components, see the sections Safeguards and Emergency Stop in the ii Safety Precautions chapter.

b) Make sure that when any EMERGENCY STOP is pushed the machine resets to STEP ZERO.

c) Check that the warning sign labels are present and readable. Replace any missing and/or illegible signs, see the section Locations of Safety Signs in the ii Safety Precautions chapter.

d) If relevant, see also the Optional Equipment MMs.

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A

Air Super Heater - Check . . . . . 1 - 100

Air Super Heater - Check Heat Exchanger Air Tightness . . . . . 1 - 101

Air Valve - Check Silencer . . . . . 1 - 119

Air Valve - Overhaul . . . . . 1 - 115

Air Valve - Set Proximity Switch . . . . . 1 - 118

Aseptic Chamber - Align Forming Rings . . . . 1 - 15

Aseptic Chamber - Change Forming Ring Bushings . . . . . 1 - 11

Aseptic Chamber - Check Bending Rollers . . 1 - 31

Aseptic Chamber - Check Forming Rings . . . 1 - 10

Aseptic Chamber - Check Overpressure . . . . 1 - 32

Aseptic Chamber - Leakage Detection . . . . . 1 - 33

Aseptic Chamber - Set Forming Ring Position . . . . . 1 - 12, 1 - 13, 1 - 14

Automatic Splicing Unit - Check Bending Rollers . . . . . 8 - 12

Automatic Splicing Unit - Check Function . . . . 8 - 8

Automatic Splicing Unit - Check Web Guides . . . . . 8 - 13

Automatic Splicing Unit - Setting Sequence . . 8 - 7

B

Bath - Change Heating Elements . . . . . 1 - 210

Bath - Change Roller Bushings . . . . . 1 - 211

Bath - Check Roller . . . . . 1 - 209

Bellows - Change Bellows . . . . . 3 - 68

Bellows - Check Bellows and Pneumatic System . . . . . 3 - 67

Bellows - Set Bellows Pressure . . . . . 3 - 71

Bending Roller - Change . . . . . 1 - 97

Bending Roller - Check . . . . . 1 - 218

Bending Roller - Check Splice Detector . . . . 1 - 220

Bending Roller - Set Position . . . . . 1 - 219

Bending Roller - Set Splice Detector . . . . . 1 - 221

Bracket - Change Photocell . . . . . 8 - 49

Bracket - Check Roller And Photocells . . . . . 8 - 41

Bracket - Set Guide Pin and Guide Plate . . . . 8 - 47

Bracket - Set Photocell Sensitivity . . . . . 8 - 42

Bracket - Set Photocells Position . . . . . 8 - 43

Bracket - Set Proximity Switch . . . . . 8 - 26

Brake Arm - Check . . . . . 7 - 7

Brake Arm - Check Function . . . . . 7 - 6

Brake Arm - Set . . . . . 7 - 8

Butterfly Valve - Change Bushings . . . . . 1 - 138

Butterfly Valve - Change Cylinder . . . . . 1 - 135

Butterfly Valve - Check Sensors . . . . . 1 - 137

Butterfly Valve - Set Position . . . . . 1 - 139

Butterfly Valve - Set Sensors . . . . . 1 - 140

C

C.I.P. Switch (OE) - Check Gaskets . . . . . 1 - 200

C.I.P. Switch (OE) - Set . . . . . 1 - 199

Cabinet - Change Gasket and Non Return Valve . . . . . 2 - 59

Cabinet - Check . . . . . 2 - 58

Cabinet - Clean Filter . . . . . 2 - 60

Cables and Hoses - Check . . . . . 4 - 154

Calender Roller - Change Bushings and Ball Bearings . . . . . 1 - 80

Calender Roller - Check . . . . . 1 - 78

Calender Roller - Set Distance . . . . . 1 - 82

Calender Roller - Set Pressure . . . . . 1 - 79

Calender Roller - Set Proximity Switch . . . . . 1 - 83

Calibrator - Set (FLUKE) . . . . . 9 - 202

Calibrator - Set (Micromite II) . . . . . 9 - 200

Cantilever - Change Flange Bushings . . . . . 4 - 129

Cantilever - Change Flange Bushings (TBA 1500 S and TPA 1000 Sq only) . . . . . 4 - 130

Cantilever - Change Flange Bushings (TPA 1000 S only) . . . . . 4 - 131

Cantilever - Check . . . . . 4 - 123

Cantilever - Check (TBA 1500 S and TPA 1000 Sq only) . . . . . 4 - 125

Cantilever - Check (TPA 1000 S only) . . . . . 4 - 127

Cantilever - Set Height . . . . . 4 - 129

Cantilever - Set Support Rollers . . . . . 4 - 132

Catches - Check and Clearance . . . . . 4 - 85

Central Lubrication - Bleed . . . . . 2 - 11, 5 - 54

Central Lubrication - Change Filter Insert . . . . 2 - 13

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