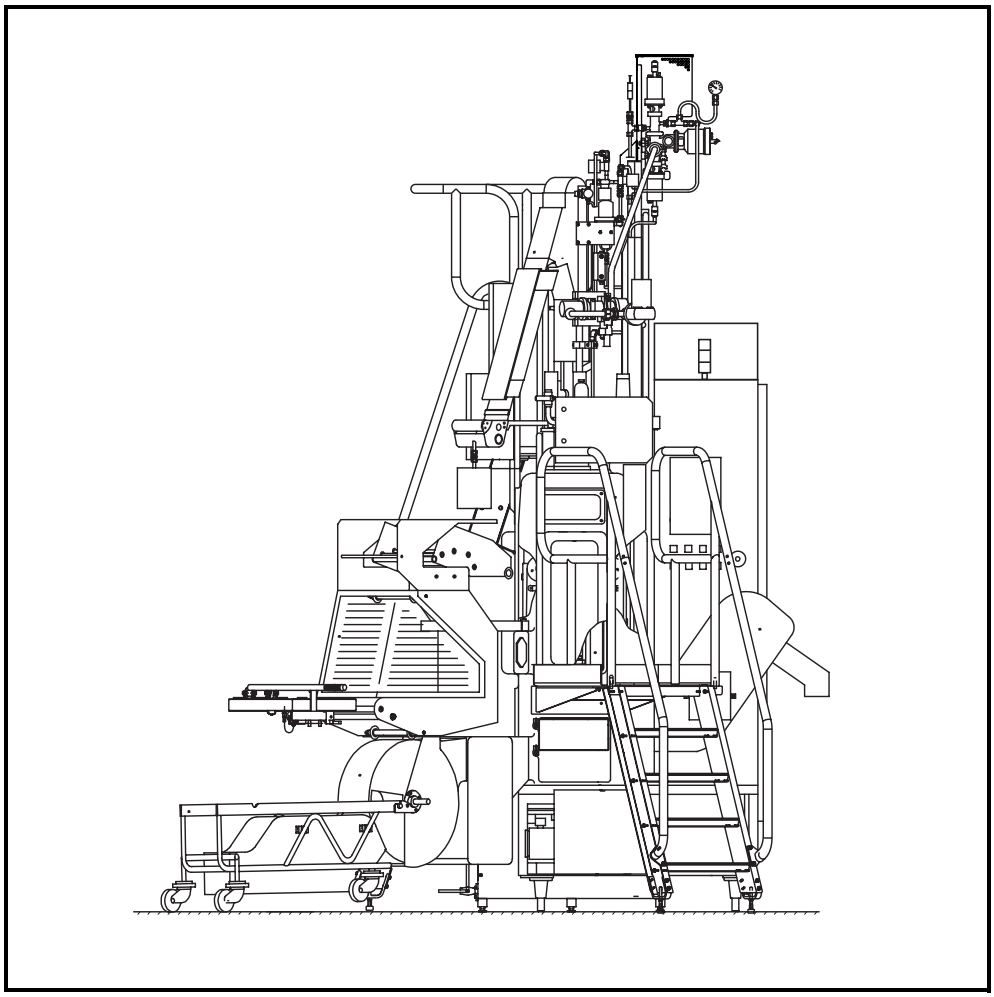
MM

Maintenance Manual

TCA/25

633013-0600



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Tetra Pak

Doc No. MM-85568-0104

This document is valid for:

Series No/ Machine No Sign.

TCA/25
633013-0600

MM2.2185568014fro.fm

Issue 2003-09-12

Doc No. MM-85568-0104

Tetra Pak

Tetra Pak Carton Ambient AB

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Introduction

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Equipment information

Purpose

The purpose of this Tetra Pak equipment is to package liquid food products.

Manufacturer

This Tetra Pak equipment has been manufactured by:

Tetra Pak Carton Ambient AB
Ruben Rausings gata
SE-221 86 LUND
Sweden

Service

Contact the nearest Tetra Pak service station.

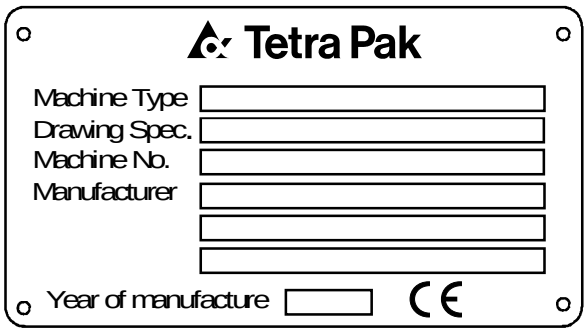
WARNING! To ensure maximum safety, always read the section **Safety precautions** before carrying out any work on the unit.

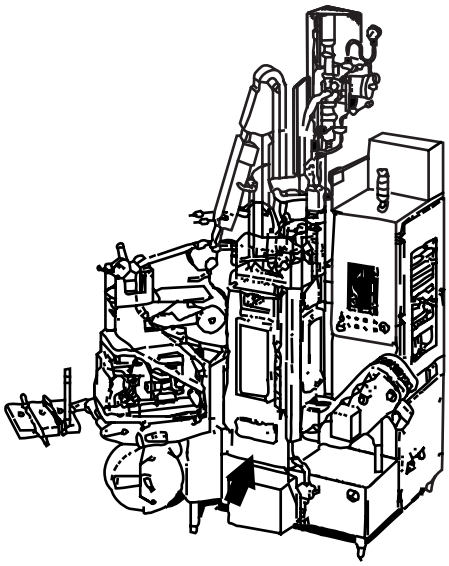
Identification

The figure shows an example of the equipment sign. The sign carries data needed when contacting Tetra Pak concerning this specific equipment.

CE marking

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





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Document information

Purpose of Maintenance Manual (MM)

The purpose of the Maintenance Manual is to provide the service technician with information on how to maintain the equipment.

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

Design modifications

The directives in this document are in accordance with the design and construction of the equipment at the time it was delivered from the Tetra Pak production plant.

Technical publications

The technical publications for this equipment are:

- Electrical Manual (EM)
- Installation Manual (IM)
- Maintenance Manual (MM)
- Operation Manual (OM)
- Spare Parts Catalogue (SPC)

Additional copies can be ordered from the nearest Tetra Pak service station.

When ordering technical publications, always quote the **document number** that can be found in the machine specification document.

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Number of pages

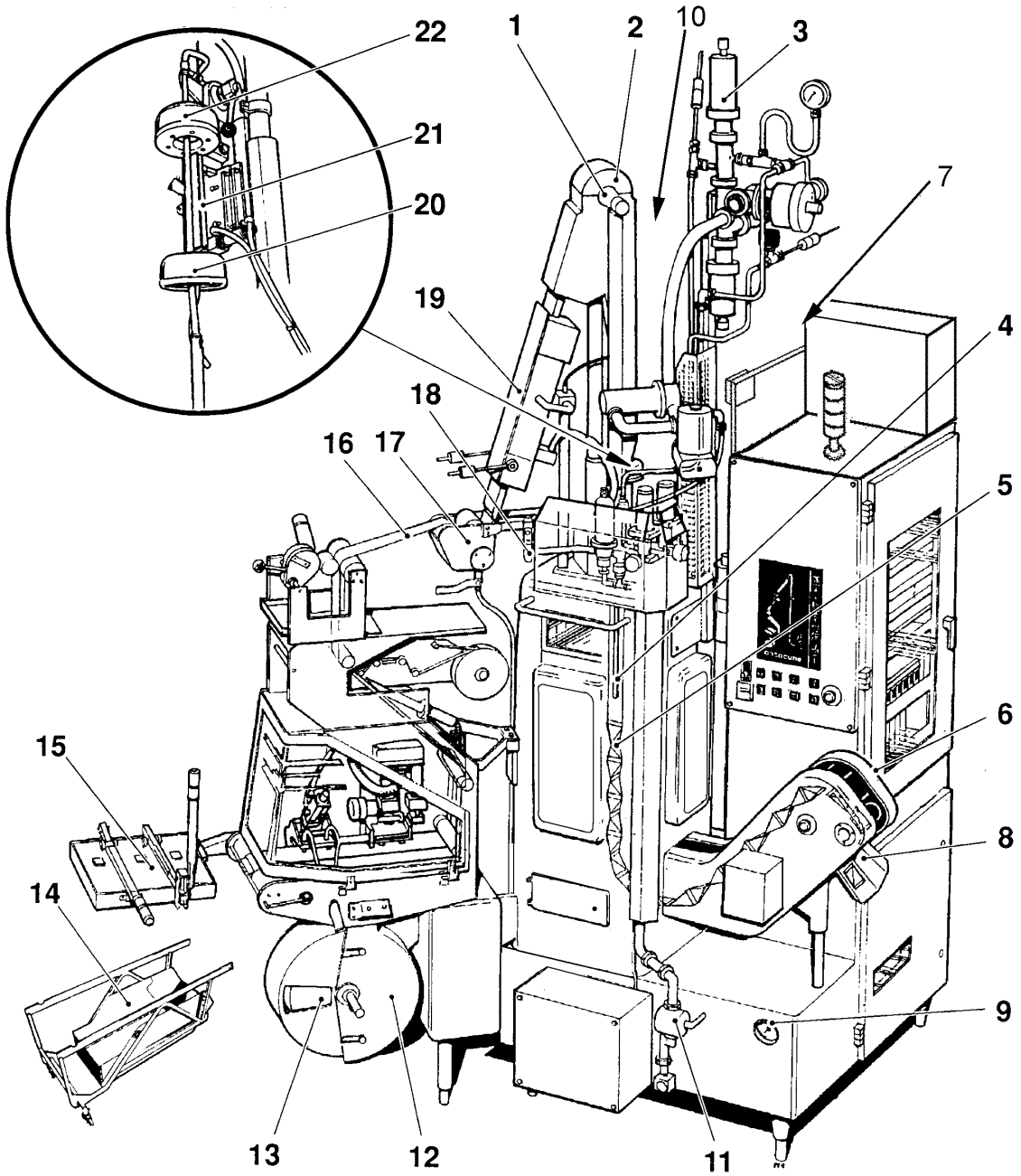
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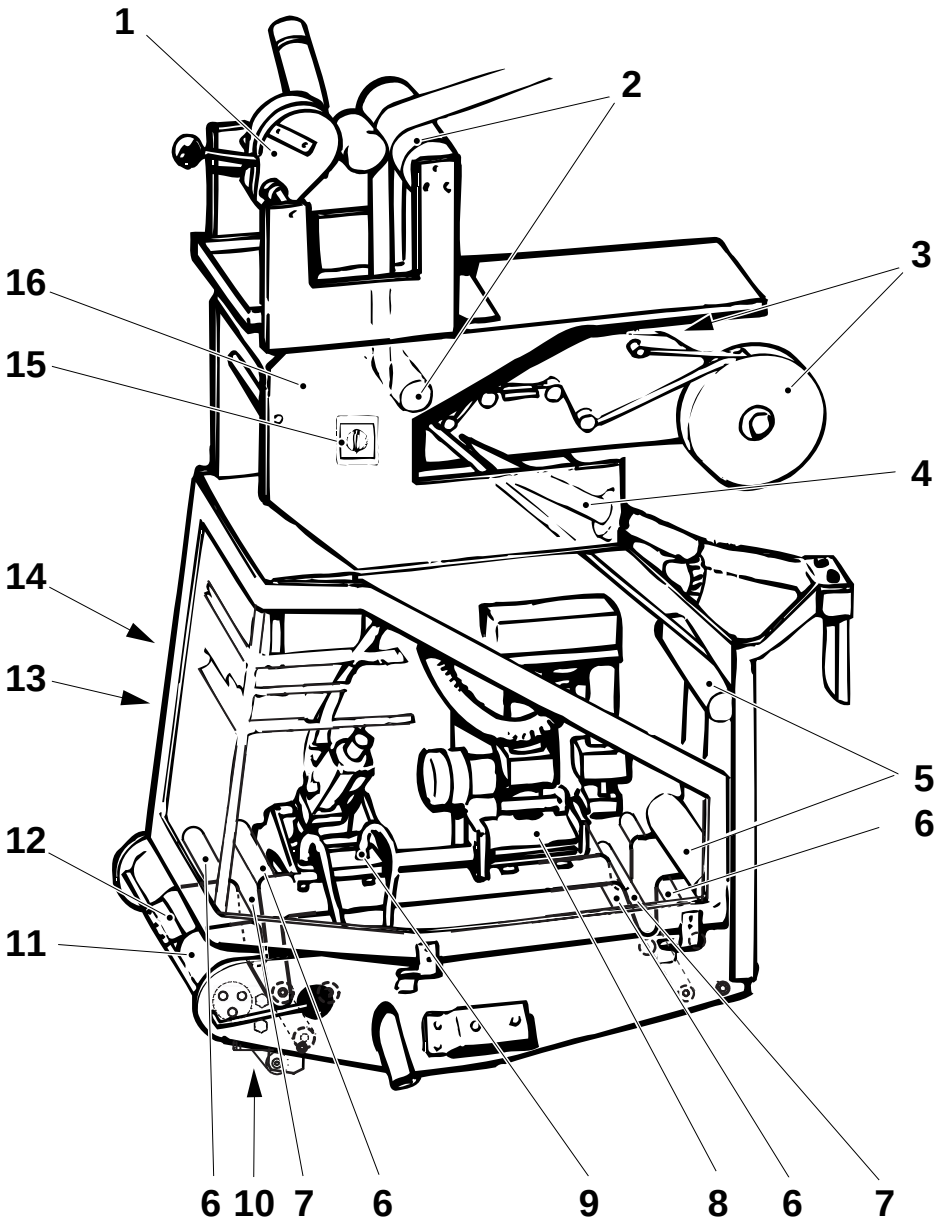
Machine terminology

Main parts



1 Upper bending roller
2 Aseptic chamber
3 Product valve/AP valve
4 Filling pipe
5 Transversal sealing (TS)
6 Cutting
7 Main switch
8 Tilting tray
9 Pressure regulator hydraulic pressure
10 Compressed air supply valve
11 3-way valve
12 Cassette
13 Material reel
14 Splicing trolley
15 Splicing table
16 Material web
17 Peroxide bath
18 Steam trap
19 Sterilization chamber
20 Lower forming ring
21 Longitudinal sealing (LS) element
22 Upper forming ring

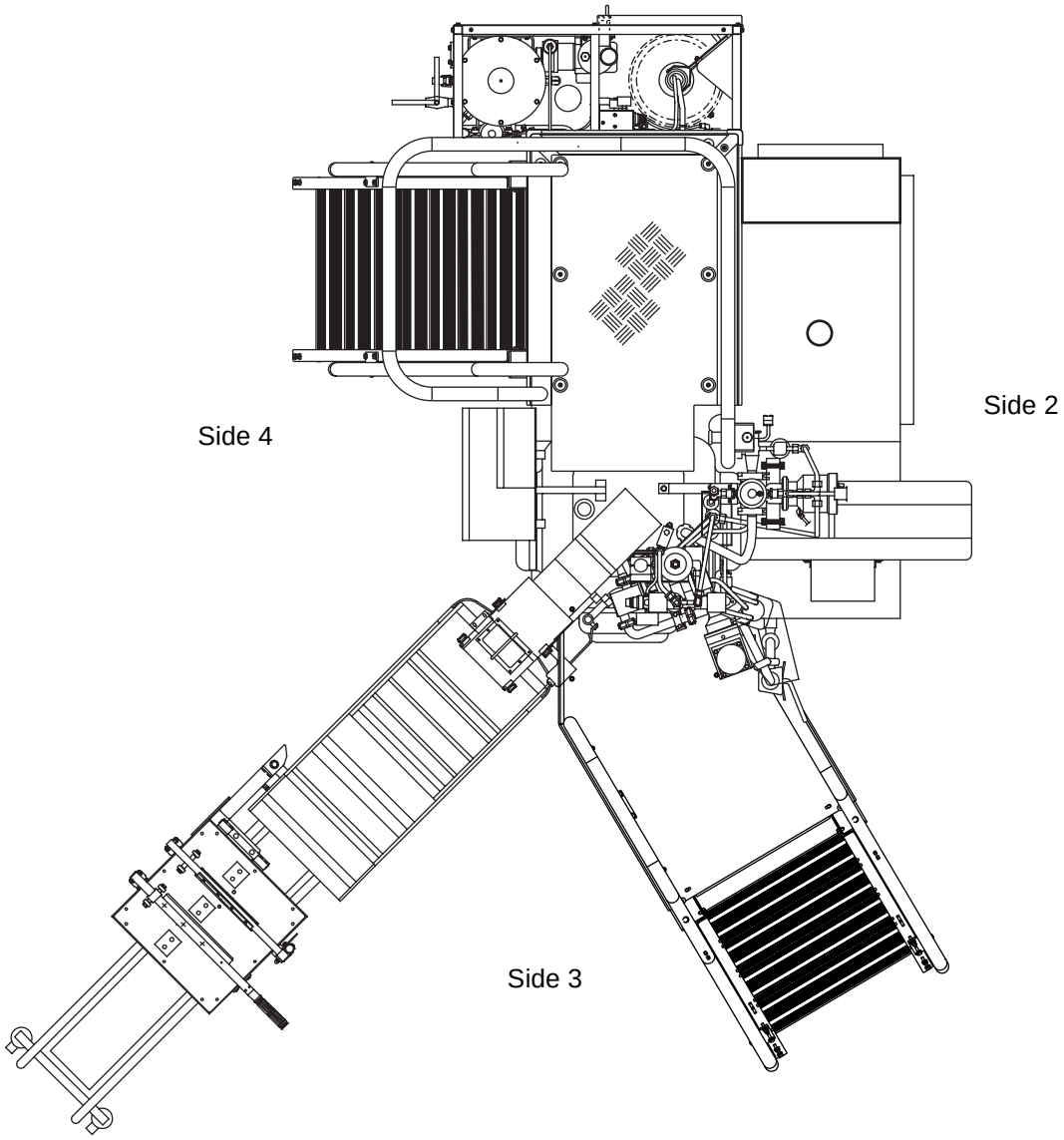
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1 Dating unit
2 Bending rollers
3 Longitudinal seal (LS) strip and inner sealing (IS) strip
4 Heating element
5 Bending rollers
6 Bending roller
7 Bending roller
8 Pulltab sealing unit
9 Hole punch unit
10 X-Roller
11 Bending roller
12 Material brake
13 Pressure gauge longitudinal sealing (LS) strip element
14 Pressure gauge inner sealing (IS) strip element
15 Hole punch On/Off switch Strip applicator
16 Strip applicator

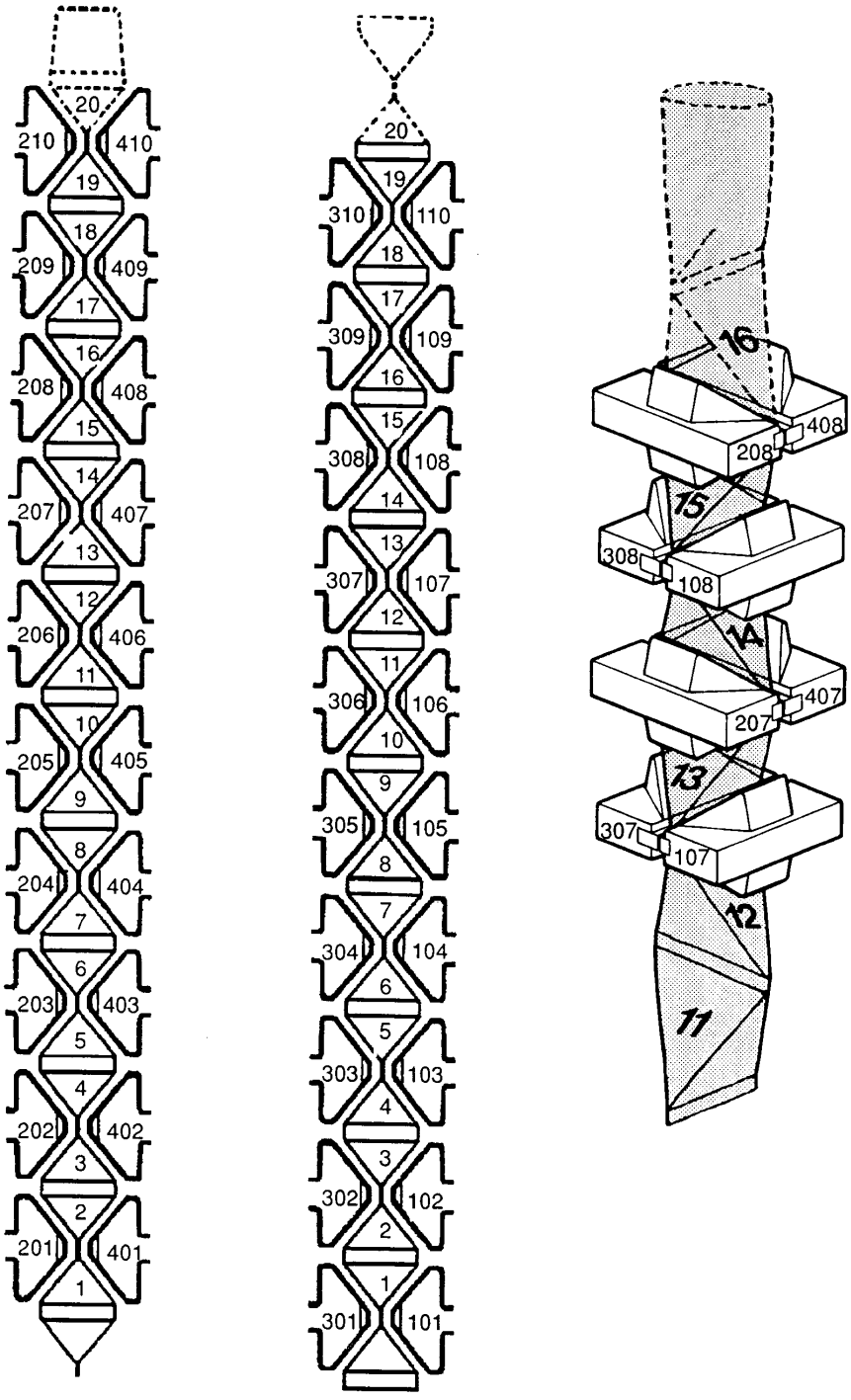
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Numbering of sides



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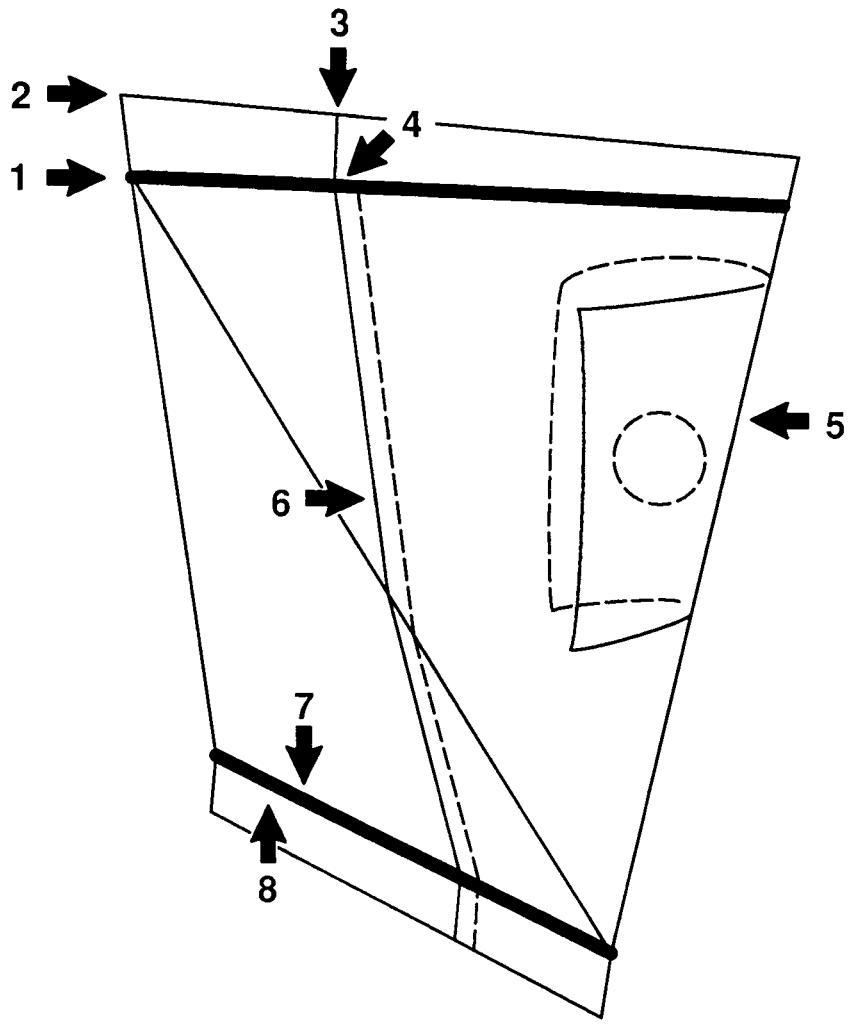
Numbering of jaws and packages



Side 2	Side 4	Side 3	Side 1
Heating jaws	Pressure jaws	Pressure jaws	Heating jaws
201-21	401-410	301-310	101-110

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Package terminology



1 Inner corner
2 Outer corner
3 Outer cross
4 Inner cross
5 Pull tab
6 Longitudinal seal (LS)
7 Inner transversal seal (TS)
8 Outer transversal seal (TS)

MM2.285568014int.fm

Safety precautions

MM2.285568014sp.fm

Use of hazard information

Safety precautions

To ensure maximum safety, always read this section carefully before doing any work on the machine or making any adjustments.

Hazard information in this document has the following significance:



DANGER! **Immediate danger to life!**
Failure to observe this information **will result in death or serious personal injury**!



WARNING! **Risk of serious personal injury!**
Failure to observe this information **could result in death or serious personal injury**!

Caution! **Risk of minor personal injury!**
Failure to observe this information **may result in minor personal injury**!

Important! **Risk of damage to equipment!**
Failure to observe this information **could result in damage to equipment**!

Note! Note is used to emphasize important information. A Note is not to be regarded as hazard information.

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Requirements on personnel

DANGER!

Risk of immediate danger to life!
Failure to obey the Safety precautions will put your life in danger.
All personnel must regard all electrical equipment as live.

The work is to be carried out in such a way that there is no risk of injury to personnel.

General

During maintenance or service work, the service technician and the electrician are responsible not only for the machine, but for the safety of the personnel in the vicinity of the machine as well!

It is also the responsibility of the service technician and the electrician to ensure that the machine safety devices are fully operational before he/she finishes the maintenance or service work.

Service technician

Only trained or instructed service technicians are allowed to work on the machine.

Service technicians may be:

- technicians employed by **Tetra Pak**

  Tetra Pak technicians are Tetra Pak employees who have completed training courses at the Tetra Pak Technical Training Centres or have equivalent knowledge.
- technicians employed by the **customer**

  Technicians employed by the customer must have the following skills:
  - capable of reading (English or native) technical information
  - able to understand technical drawings
  - basic knowledge of mechanics and electronics
  - basic knowledge of mathematics
  - capable of handling (special) tools

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Electrician

Electricians should:

- be certified according to local regulations
- have experience of similar types of installations
- have proven skills in reading and working from drawings and cable lists
- have knowledge of local safety regulations for power and automation

Work with the electrical equipment in the machine must be performed by **skilled persons only.**

According to EN 60204-1:1997 clause 3.52 a skilled person is:

– *a person with relevant education and experience to enable him or her to perceive risks and to avoid hazards which electricity can create.*

Machine operator

Only trained or instructed persons are allowed to operate the machine.

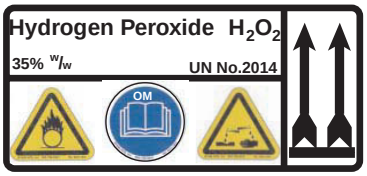
The machine operator is an individual that has enough training and/or knowledge to run the equipment in the correct way.

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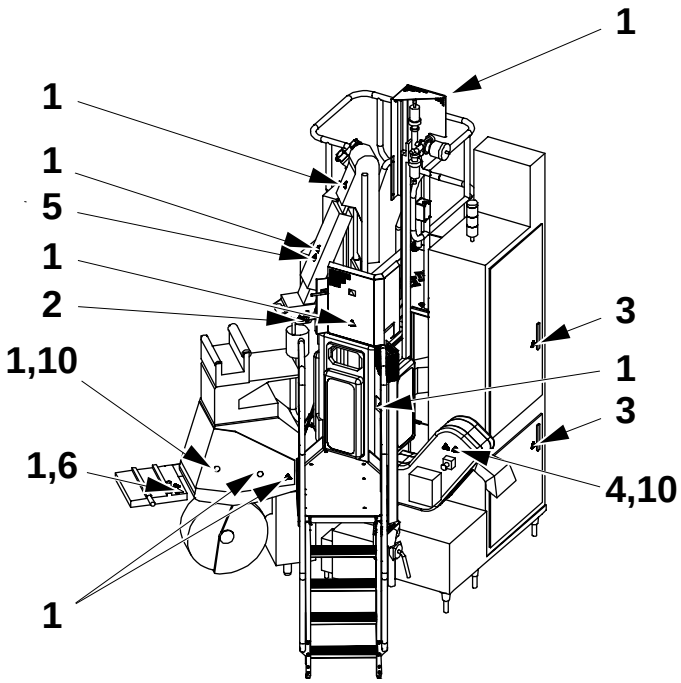
Warning signs

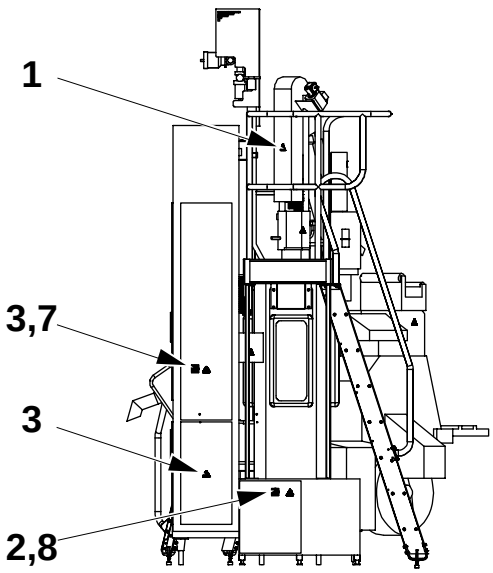
Sign	Risk definition	Position
	**Hot surface.** Do not touch. Follow lockout procedure before maintenance.	1
	**Chemical burn hazard.** Wear personal protective equipment.	2
	**Hazardous voltage.** Will shock, burn, or cause death. Follow lockout procedure before maintenance.	3
	Moving parts can crush and cut. Do not operate with guard removed. Follow lockout procedure before maintenance.	4
	**Harmful vapour.**	5
	Moving parts can crush and cut. Do not operate with guard removed. Follow lockout procedure before servicing.	6
	Read Operation Manual (OM) before using this equipment. Failure to do so could result in death or serious injury.	7
	**Risk of eye injury.** **Wear eye protection.**	8

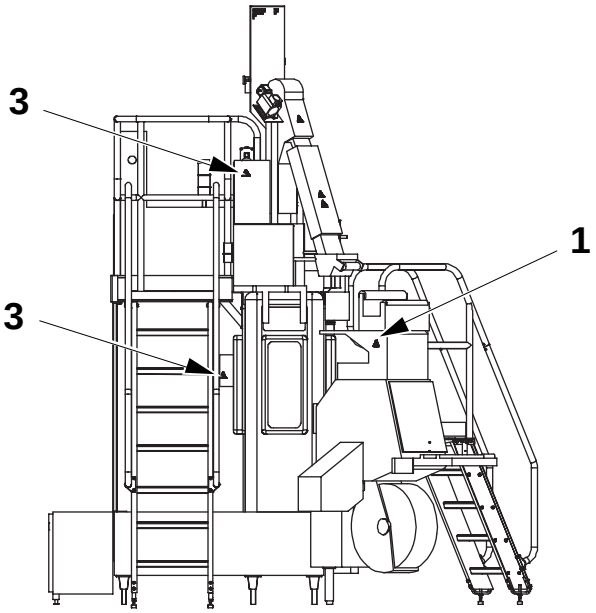
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	Hydrogen peroxide. Corrosive chemical. Can cause serious injury in both liquid and gas form. Hydrogen peroxide may cause irritation or damage if contact with skin, mucous membranes, eyes, or clothes. Wear personal protective.	Container H2O2

Warning signs - Location







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Machine safety devices

Emergency stop

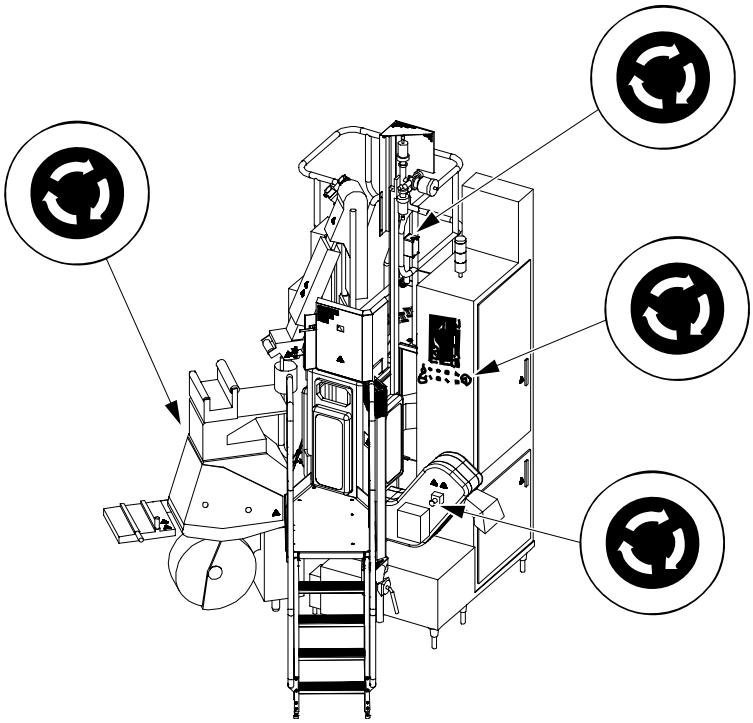
In case of danger to people or the machine, one of the emergency stop buttons must immediately be depressed.

You must know the exact location of the emergency stop buttons, so that you can stop the machine immediately in a situation involving risk of personal injury or damage to the machine.

Emergency stop must only be used in case of danger to people or the machine. To stop production in the normal way, see the ”Stop” section in the OM book.

Emergency stop buttons are located on the:

- Control panel
- Elevator.
- Hole punch
- Superstructure



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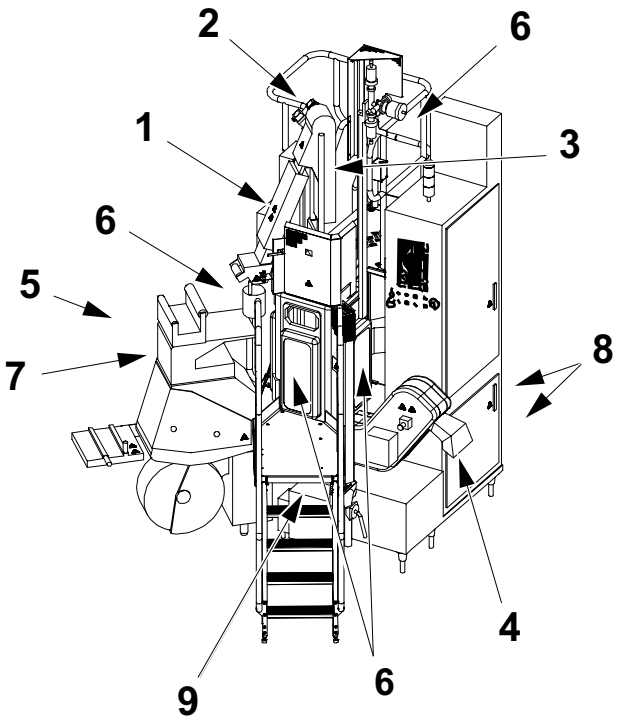
Doors, hatches, and safety covers

The doors and hatches shown in the picture are provided with safety switches. These switches form part of the safety system of the machine and **must under no circumstances be bridged or by-passed or otherwise made non-operational**.

DANGER! **Immediate danger to life!**
Failure to observe this information **will result in death or serious personal injury**!

After maintenance, check that all safety covers are fitted to the machine before it is inched or run.

Caution! **Risk of minor personal injury!**
Safety components must not be replaced by other components or types.



1 Sterilization chamber
2 Upper house
3 Aseptic chamber
4 Elevator
5 Motor cover (side 4)
6 Side doors (four doors)
7 Strip applicator (front, back)
8 Peroxide unit (side 1)
9 Drive unit door

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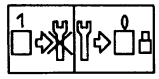
Electrical cabinet

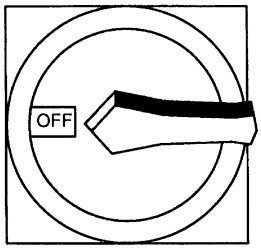
DANGER!

Risk of electroshock!
The voltage is 400 V inside the electrical cabinet and will shock, burn, or cause death.
In case of accident, immediately call for medical attention.

Work inside the electrical cabinet must be performed by skilled and instructed persons only.

When working on electrical equipment, the electrical power must be isolated by a main switch or by removal of fuses. To prevent the equipment from being unintentionally or inadvertently reactivated, the isolation arrangements should be locked or tagged.





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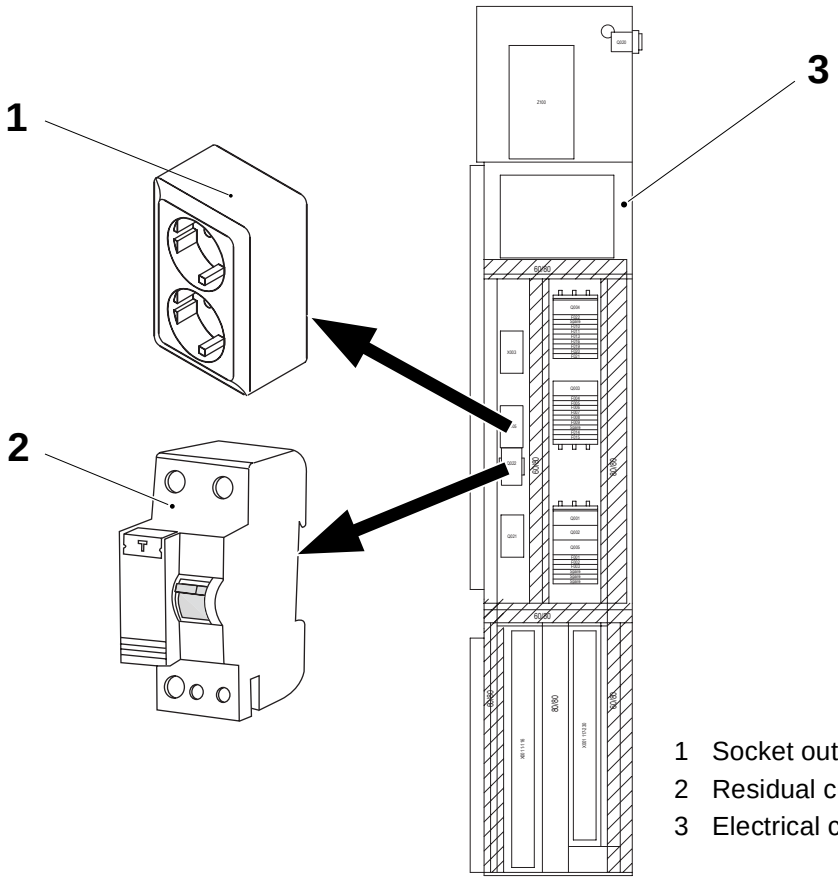
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(Cont'd)

Socket Outlet

WARNING! **Hazardous voltage.**
Read Maintenance Manual BEFORE using this socket outlet. Failure to follow maintenance instruction could result in death or serious injury.

The illustrations below show the socket outlet (1) and residual current device (2), and their locations in the electrical cabinet (3).

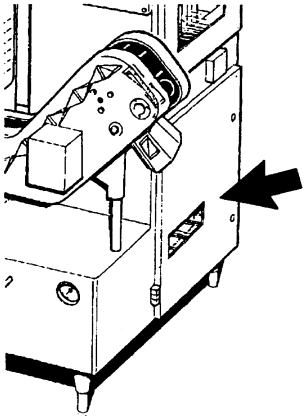


1 Socket outlet
2 Residual current device Q022
3 Electrical cabinet

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TPIH generator

Only authorised service personnel are permitted to carry out work on the TPIH generator.



DANGER!

Risk of electroshock!

Nobody - except a service technician with the right training - is allowed to open the generator.

The voltage inside the TPIH generator is 6000 V, which will shock, burn, or cause death.

In case of accident, immediately call for medical attention.

TPMC

Changes in the TPMC machine programme are only allowed to be made by authorised personnel, in consultation with Tetra Pak.

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Hazardous materials

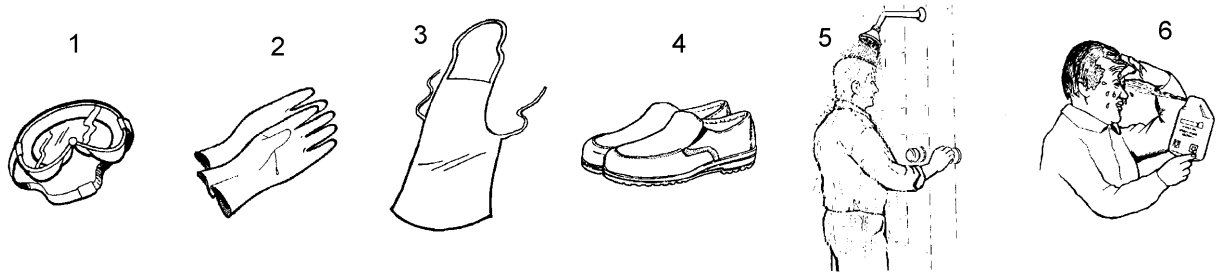
Handling of sterilisation liquid

The sterilisation liquid used for sterilising the packaging material consists of 35 % hydrogen peroxide (H_2O_2).

WARNING! **Risk of serious personal injury!**
In both liquid and gas form, hydrogen peroxide may cause irritation or damage if in contact with skin, mucous membranes, eyes, or clothes.

Whenever there is risk of contact with the sterilisation liquid, always wear:

- safety glasses (1)
- protective gloves (2)
- apron (3)
- shoes (4) made of PVC or PE plastic, or rubber

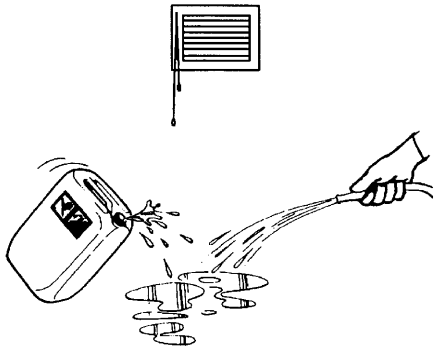


In case of accident involving hydrogen peroxide, the basic rule is to rinse as soon as possible with as much water as possible. For this reason, always make sure that the **showers** (5) work, that there are additional washing facilities, and that an **eyewash device** (6) is available at or near each machine site.

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Emergency precautions

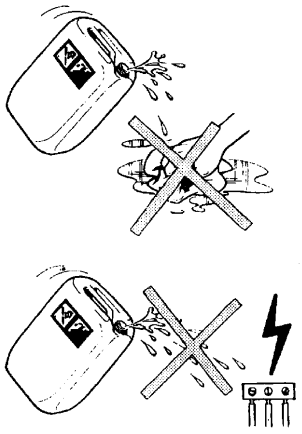
- If you get splashes or vapour from hydrogen peroxide in your eyes**,** wash the eyes thoroughly with lukewarm water for 15 minutes (keep eyelids wide open). Then seek medical attention immediately.
- If you happen to **swallow** hydrogen peroxide, drink large amounts of lukewarm water (in order to dilute the peroxide). Then seek medical attention immediately.
- If you experience irritation or pain due to having **inhaled** peroxide vapour, leave the affected area and breathe fresh air. If the symptoms get worse, seek medical advice.
- If hydrogen peroxide gets in **contact** with skin or clothes, immediately rinse with plenty of water. Thoroughly wash the clothes before they are worn again. If skin burns appear, seek medical advice immediately.
- If peroxide is **spilt** on the floor or any other surface, dilute it with large amounts of water and flush it into the drain.



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WARNING! **Risk of serious personal injury!**
Never wipe with combustible material, such as rags or paper, as these can self-ignite.

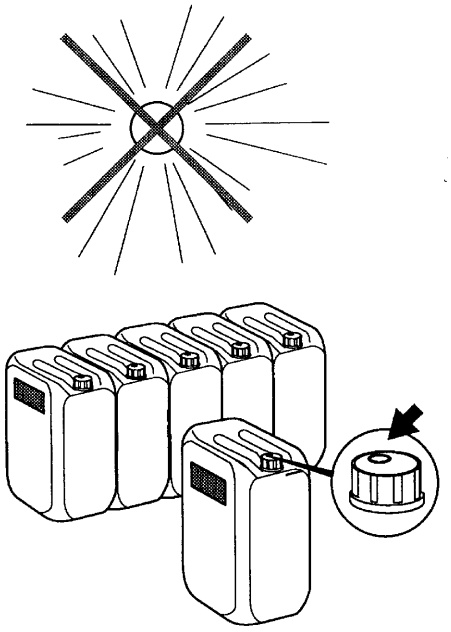
Important! **Risk of short-circuit!**
Do not allow hydrogen peroxide to get in contact with live electrical parts.



- Make sure that areas or rooms used for handling or storing hydrogen peroxide are well **ventilated**.
- In case of fire, cool the peroxide containers by **hosing** with large quantities of water.

Hydrogen peroxide storage

The hydrogen peroxide has been stabilised but may nevertheless decompose into oxygen and water, if exposed to heat, pollution, or strong sunlight. For this reason, it must be stored in a cool, clean, and well ventilated area or room, where it should be shielded from direct sunlight. Also, keep the room free from combustible materials.



WARNING! **Risk of serious personal injury!**
Avoid contamination of hydrogen peroxide. It may react to, or form explosive products with many organic substances (for instance acetone, cellulose, and ethanol).

Hydrogen peroxide must be stored only in the original container, as delivered by the supplier.

WARNING! **Risk of serious personal injury!**
Do not pour surplus hydrogen peroxide back into the original container. Risk of explosion. The container must be kept upright and must only be closed with a ventilation cap (arrow in picture), which allows oxygen to escape. If not, there may be an explosion if decomposition of the peroxide occurs violently.

Always make sure that the container is properly closed.

Pumps or other facilities, used for hydrogen peroxide, must be used for this purpose only.

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Hydrogen peroxide can

35% w/w Aqueous Solution UN No 2014.



WARNING! **Risk of serious personal injury!**
Corrosive. Oxidising. Causes burns.
Contact with combustible materials may cause fire.

- Keep in a cool place away from sources of heat.
- Avoid contamination.
- Wear suitable protective clothing, gloves, and eye/face protection.
- After contact with skin, wash immediately with plenty of water.
- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- In case of spillage or fire, drench with water.

Reference:
TP document No M 1751.80

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Ink

WARNING! **Risk of serious personal injury!**
Flammable and harmful.
Follow the instructions given by the supplier.
See the warning text on the bottle label.

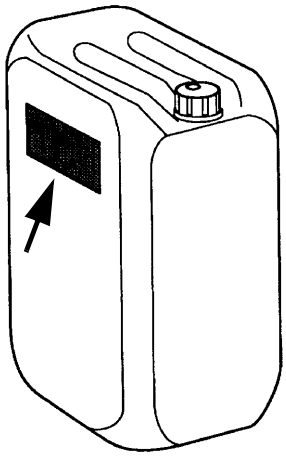
These safety precautions apply to the handling of larger quantities of ink than what a single bottle holds.

When using a bottle in the prescribed manner, no respiratory equipment is needed.
Nevertheless, gloves should be worn to avoid irritation of the skin.
Shake before use.
If ink is accidentally spilled, avoid inhalation; use respiratory masks and ventilate the area thoroughly.
Do not empty ink into drains.





Hydraulic oil, lubricants, acids, alkalis, and cleaning solutions



When handling hydraulic oil, lubricants, acids, alkalis, and cleaning solutions, carefully follow the directives in the material safety data sheets and warning texts on the container labels.

Always use the recommended personal protective equipment when handling these agents.

For disposal of agents, follow the instructions in the material safety data sheets.

WARNING! **Risk of serious personal injury!**
The agents can be flammable, oxidising, irritating, or otherwise hazardous to health. Always read the warning texts before handling the agents.

Noise

Caution! Use ear protectors to minimise the risk of impaired hearing



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Disposal

Follow local regulations and suppliers information regarding disposal of chemicals.

1 Cassette

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1.1 Paper reel holder

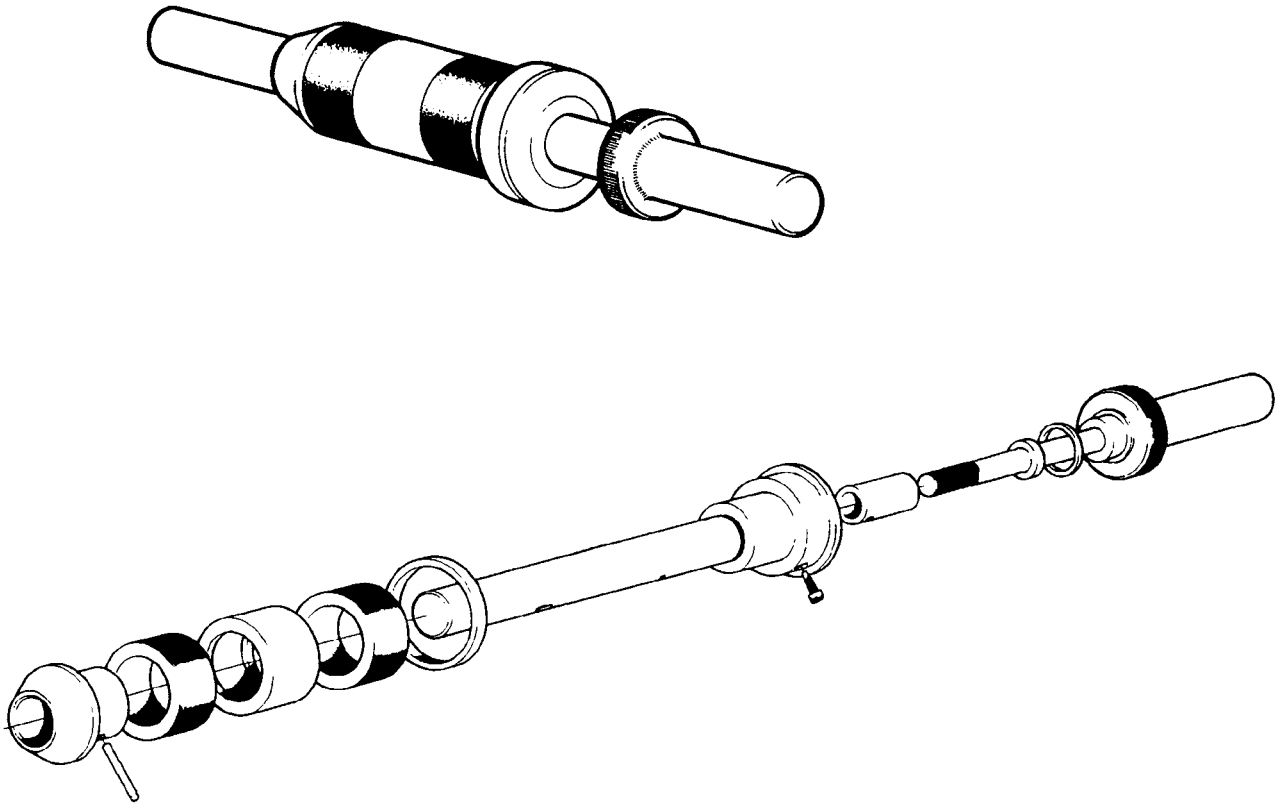
SPC reference	12453-0100

1.1-1 Paper reel holder - check

Machine status	Main Power OFF Air OFF
SPC reference	12453-0100

Check that the paper reel is held firmly on the holder and that the thread has not got stuck.

Check that the shaft is straight and that the parts, rotating in the cassette bearings, are not worn or damaged.



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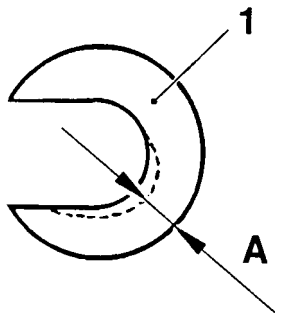
1.2 Cassette bearings

SPC reference	541108-0200

1.2-1 Cassette bearings - check

Machine status	Main Power OFF Air OFF
SPC reference	541108-0200

Check the bearings (1) for damage and wear (thickness A must not be less than 14 mm). Replace as required



A = min 14 mm

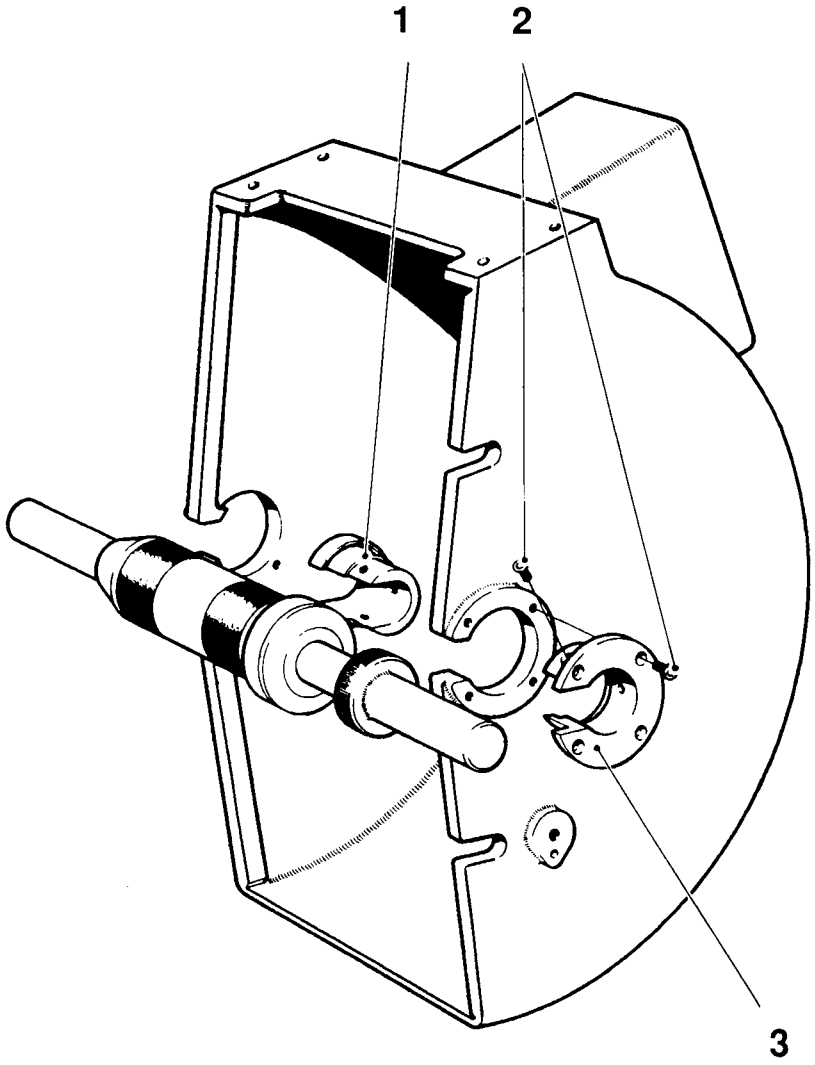
1 Bearing

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1.2-2 Cassette bearings - replace

Machine status	Main Power OFF Air OFF
SPC reference	541108-0200

Undo the screws (2), remove the holders (3), and press out the bearings (1).



1 Bearing
2 Screw
3 Holder

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1.3 Material supply monitor

SPC reference	541108-0200

1.3-1 Material supply monitor - check

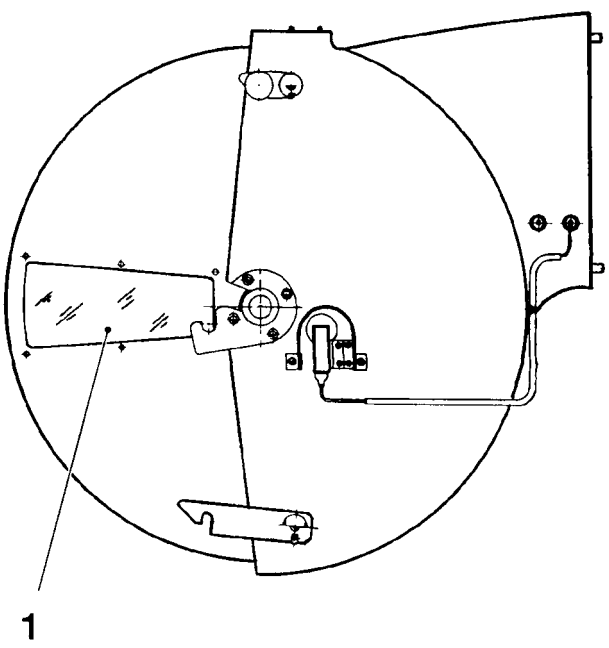
Machine status	Main Power OFF Air OFF
SPC reference	541108-0200

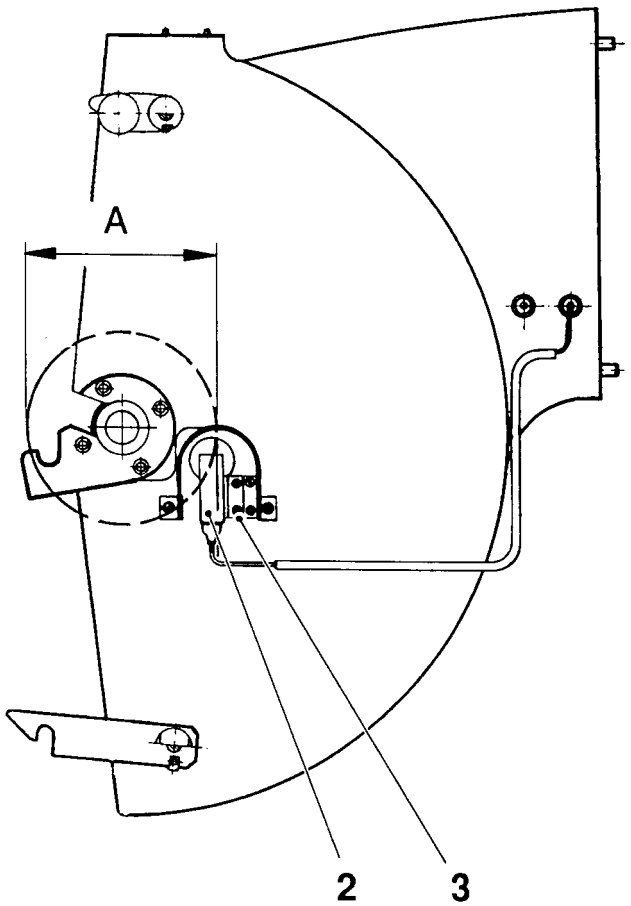
Check that the windows (1) are intact and clean.

Clean and check the lenses of the photocells (2).

Check that packaging material supply signal lamp, on the monitor panel, indicates an alarm when the reel diameter (A) has become smaller than 150 mm.
Adjust with the screws (3).

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1 Window
2 Photocell
3 Screw

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2 Superstructure

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2-0 Superstructure - description

Sterile system

Introduction

The sterile system sees to that the product is packed with a sterile packaging material and in a sterile environment. The sterile system is part of the filling machine and is found in all machines that produce aseptic packages.

The sterile system has three main functions.

- Machine sterilisation - the machine is sterilised by heat-sterilised air.
- Sterilisation of packaging material - the packaging material is sterilised by peroxide, before it touches with the product. The packaging material is covered on the inside with cold peroxide, but the sterilisation is not finished until after the heating of the tube heater.
- Maintain sterile surrounding - After the sterilisation heat-sterilised air maintains the sterile surrounding and the peroxide is vaporised.

Machine sterilisation

Before start of the production the machine has to be sterilised. The following describes the most important moments for machine sterilisation.

- At preheating the elements are warmed up to enable that the packaging material can be sealed.
- Since the chamber is open you cannot make it aseptic. By creating a tight tube, however, and blowing down sterile air into the tight tube, a sterile area is formed where the tube is to be filled with product.
- The pipes of the machine are sterilised with heat-sterilised air.
- The air and the machine are slightly cooled before the machine is ready for production.

Sterilisation of packaging material

Before the tube can be filled with product the packaging material will have to be sterilised. The packaging material will be sterilised when the applied peroxide is vaporised in the tube heater.

The peroxide bath is always filled and provided with peroxide from a can. Rubber rollers pull up cold peroxide from the bath and apply it on the inside of the packaging material. By adjusting the pressure between the rubber rollers you can set the amount of peroxide to be applied to the packaging material.

(Cont'd)

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(Cont'd)

The peroxide is mixed with a wetting agent, PSM, to enable that the peroxide covers the surface with a uniform film and does not split up because of surface tension.

It is also important that all peroxide is vaporised before the packaging material reaches the product. If not, residues of peroxide might get into the product.

A weakness for shallow baths is that all peroxide consumed by the machine will be vapour in the air. Therefore, an exhausting device above the machine is needed.

Maintain sterile surrounding

By blowing heat-sterilised air into the tube the machine is kept sterile and the residues of peroxide vaporises.

- An air heater will warm up the air to make it sterile.
- The heat-sterilised air is cooled in the cooler in order not to expose the packaging material and the product to too high temperatures.
- The water ring compressor soaks air from the chamber. The air is cooled in the water ring compressor or in a separate cooler by the mixture with water. Then the residues of peroxide vapour in the air will condense.
- A water separator will separate the water. As the water contains peroxide you cannot let it circulate.

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2.1 Peroxide bath

SPC reference	577906-0100

2.1-1 Peroxide bath - check

Machine status	Main power OFF Air OFF
SPC reference	577906-0100

WARNING! **Risk of personal injury caused by skin contact or inhalation.**
Residual sterilization liquid may be present in the peroxide bath.
Observe the safety precautions.

WARNING! **Danger of explosion.**
Oil in combination with hydrogen peroxide may form explosive compounds.
The components of the peroxide bath must not be lubricated.

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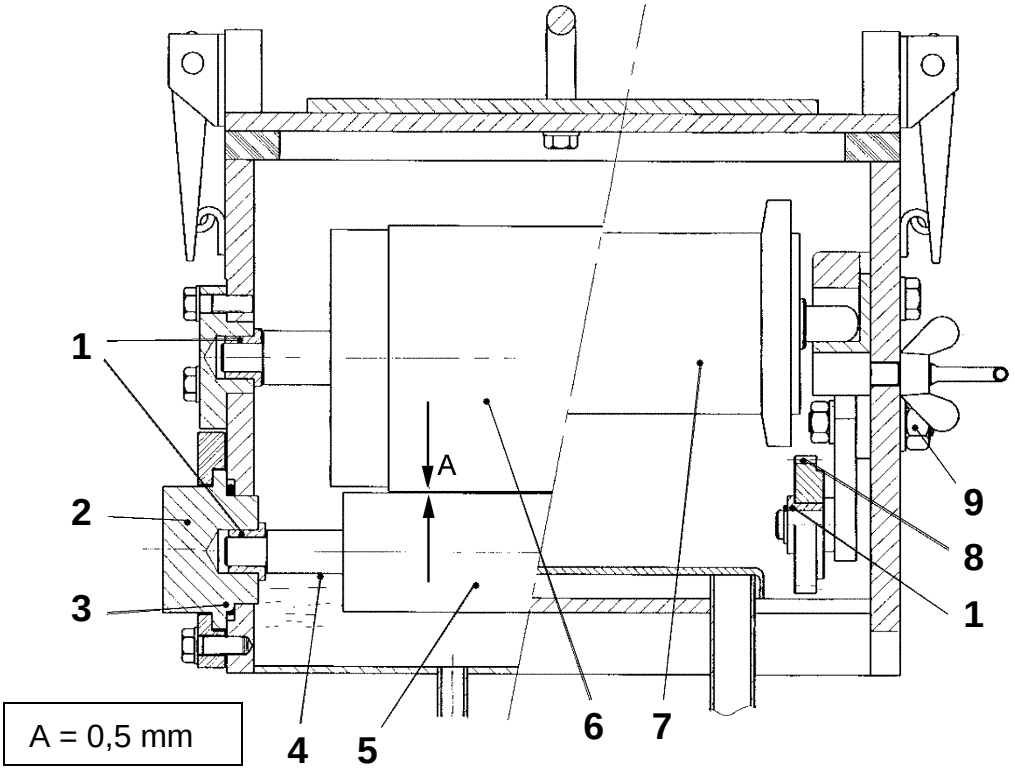
Check:

- that no sterilization liquid leaks through the eccentric bearing housings (2), replace the O-rings (3) if required.
- that the peroxide bath is clean.
- that the counter roller (6), wetting roller (5), bending roller (7), and sprocket (8) rotate freely.
- the five flanged bushings (1), replace as required.
- that gap A = 0,5 mm, adjust the gap by means of the eccentric bearing housings (2). The rollers (5) and (6) must be parallel.

Note! Loosen the nut (9) and shift the sprocket (8) before adjusting the gap.

- that peroxide bath low-level signal lamp, on the monitor panel, indicates an alarm when the sterilization liquid drops to its lowest level (4).
- the sterilization liquid in accordance with the OM book, ”Sterilization liquid”.

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1 Flanged Bushing
2 Eccentric bearing housing
3 O-ring
4 Lowest level
5 Wetting roller
6 Counter roller
7 Bending roller
8 Sprocket
9 Nut

(Cont'd)

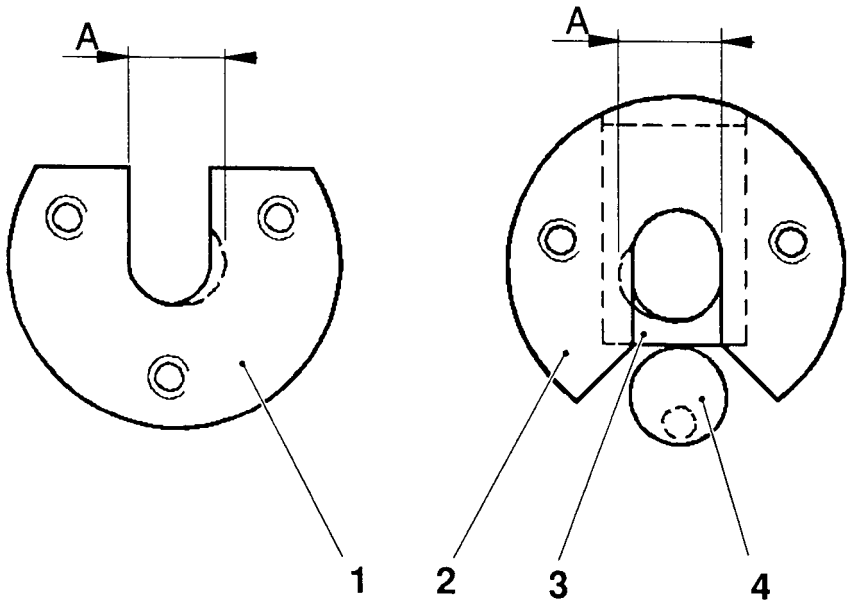
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Bearings

Check the bearing (1), the bearing holder (2), and the bearing box (3) for wear and cracks at the screw holes.

If there are cracks or if gap A exceeds 11 mm, replace the components.

A = max 11 mm



1 Bearing
2 Bearing holder
3 Bearing box
4 Eccentric axle pin

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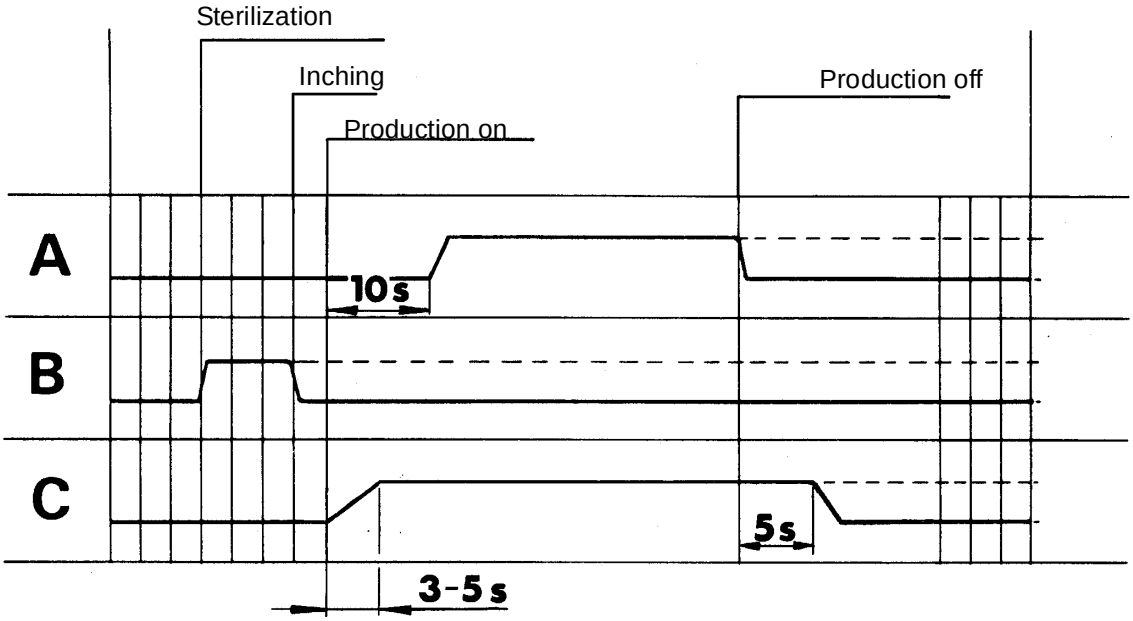
2.2 Product (AP) valve

SPC reference	560190-0300

2.2-1 Product (AP) valve - cylinder and sequence diagram

Machine status	Main power OFF Air OFF
SPC reference	560190-0300

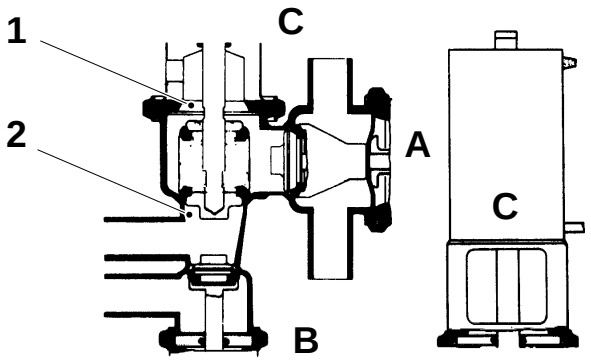
The synchronization of the cylinders must follow the diagram.



The delay of valve C is adjusted by means of the throttle valve on the pneumatic valve group.

All valves are shown in closed position. The cylinders are vented and springs are closing them.

Valve B is closed with both spring and compressed air.



A Product
B Steam sterilisation or cleaning
C Steam

1 Open position
2 Closed position

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2.2-2 Product (AP) valve - overhaul

Machine status	Main power OFF Air OFF
Tools: - tool - tool - dynamometric wrench (18 Nm) - vice with ”soft” jaws	 TP No 449969-101 TP No 566480-101
Consumables: - silicone grease	TP No 90269-09
SPC reference	560190-0300

WARNING! **Danger of burns.**
Risk of escaping steam which may cause burns.
Turn off the steam and the compressed air before commencing work.

The product valve and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

Caution! There must be no product in the product line.

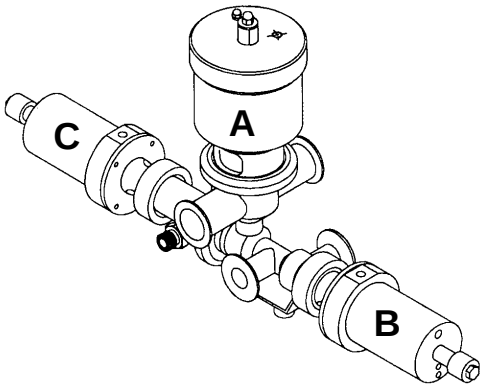
Replacement of seals and membranes

Turn off the steam and the compressed air.

Disconnect the steam and the air lines.

When working with parts which have surfaces in contact with the product, it is important not to scratch or damage these surfaces.
Such damage may provide cavities in which bacteria can grow, causing deterioration of the product.

In case work is done to the A, B, or C valve pneumatic cylinders, replace the O-rings and seal rings. Tools TP No 449969-101 and 566480-101 is used to relieve the spring force.



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(Cont'd)

Dismantling valve A

WARNING! **Risk of escaping steam which may cause burns.**
Turn off the steam and the compressed air before commencing work.
Relieve remaining steam pressure in the steam line.
The product valve and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

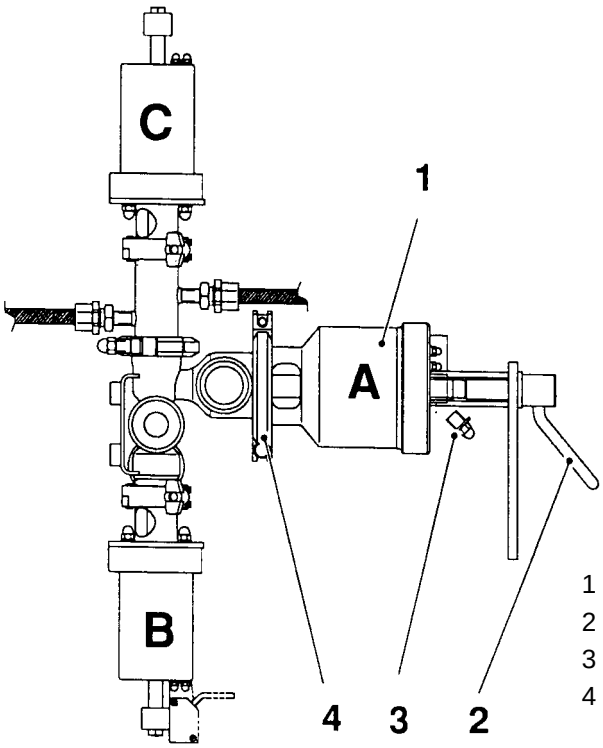
WARNING! **Danger of injury due to pinching or crushing.**
The valve spring is under pressure.

a) Close the steam supply valve.

b) Undo the screw (3).

c) Take the tension off the clamp ring (4) by compressing the valve spring by means of the tool (2) TP No 449969-101.

d) Undo the clamp ring and remove valve A.



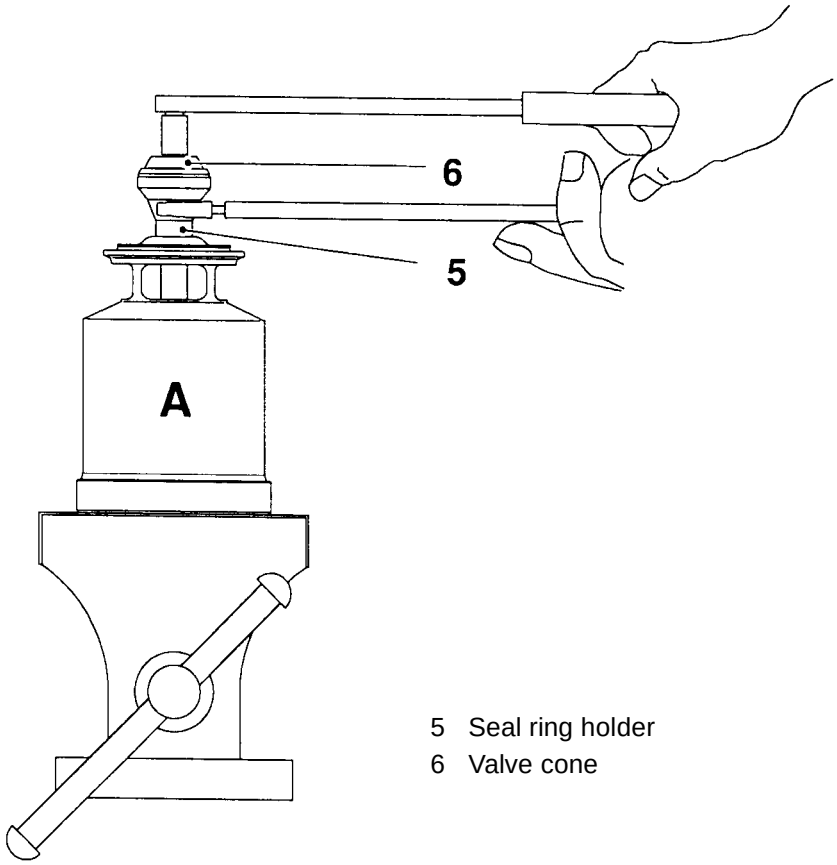
1 Valve A
2 Tool TP No 449969-101
3 Screw
4 Clamp ring

(Cont'd)

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e) Fit valve A in a vice (the jaws of the vice must be equipped with covers).
f) Keep a firm hold of the seal ring holder (5) with an open-ended spanner.
g) Unscrew the valve cone (6).
h) Unscrew the seal ring holder (5).



5 Seal ring holder
6 Valve cone

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Fitting valve A

WARNING! **Risk of skin irritation.**
Before handling lubricants, read the Safety precautions. Fit the seal ring holder (5) in a vice (the jaws of the vice must be equipped with covers).

i) Lubricate the threads of the seal ring holder with silicone grease TP No 90269-9

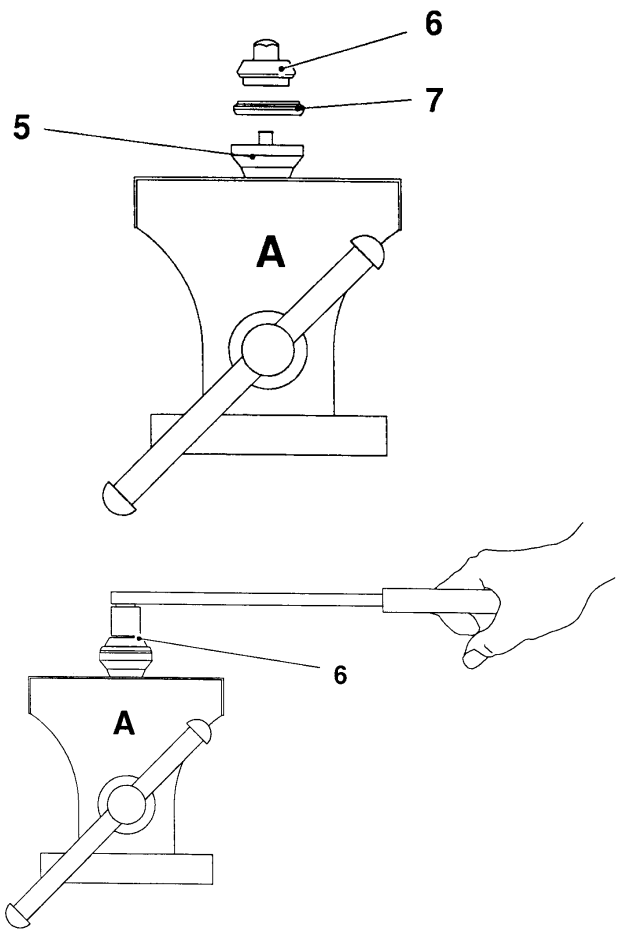
j) Replace the seal ring (7) and fit the valve cone (6).

k) Tighten the valve cone (6) **slowly** to a torque of 18 Nm with a dynamometric wrench.

l) Tighten the valve cone (6) **once more** to a torque of 18 Nm after 10 - 20 sec.
The valve cone must be tightened **several** times as the seal ring of teflon needs a certain time to ”float out” and fill the grooves.

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18 Nm



5 Seal ring holder
6 Valve cone
7 Seal ring

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WARNING! **Risk of skin irritation.**
Before handling lubricants, read the Safety precautions.

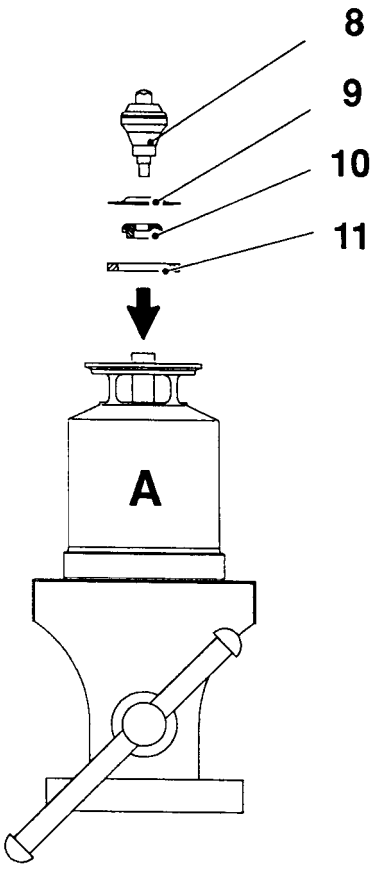
m) Fit valve A in a vice (the jaws of the vice must be equipped with covers).

n) Fit the ring (11) in the valve housing with the grooves facing upwards.

o) Fit the disc (10) on the piston rod with the grooves facing upwards.

p) Fit a new membrane (9) in the valve housing; the meantime bulge is to face upwards, as illustrated.

q) Lubricate the threads of the piston rod with silicone grease TP No 90269-9 and refit the complete valve cone and seal ring holder (8) on the piston rod.



8 Seal ring holder
9 Membrane
10 Disc
11 Ring

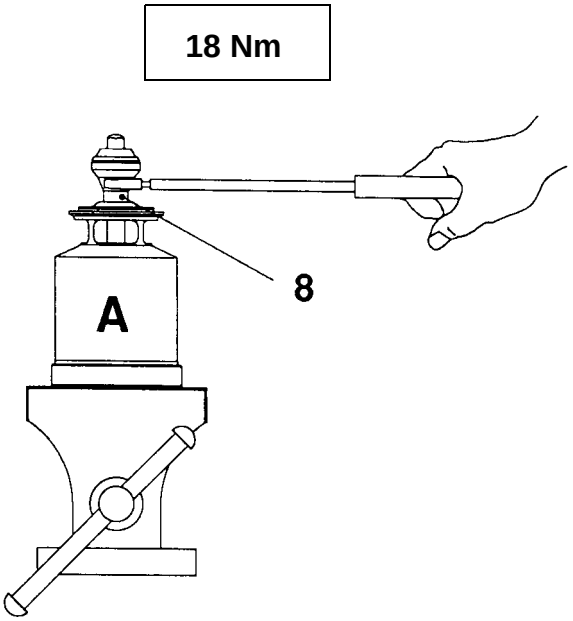
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r) Tighten the seal ring holder (8) **slowly** to a torque of 18 Nm with a dynamometric wrench.

s) Tighten the seal ring holder (8) **once more** to a torque of 18 Nm after 10 - 20 s.
The valve cone must be tightened **several** times as the seal ring of teflon needs a certain time to ”float out” and fill the grooves.



8 Seal ring holder

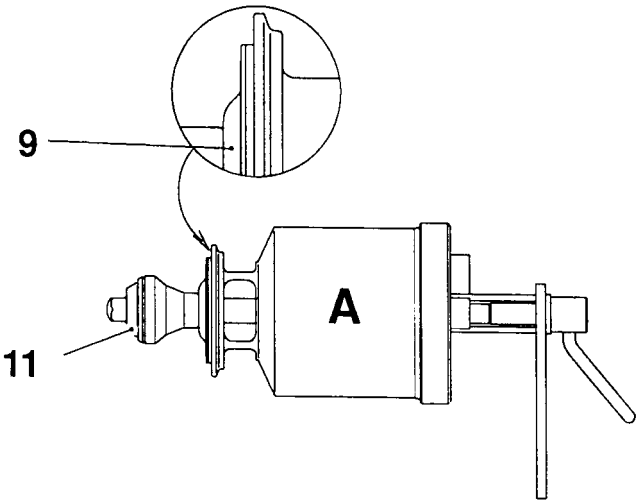
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t) Adjust by means of tool TP No 449969-101 so that the membrane (9) bears against the seal ring (11).

u) Refit valve A in the valve housing. If the seal ring (11) reaches its seat before the membrane (9), tighten the tool some more.

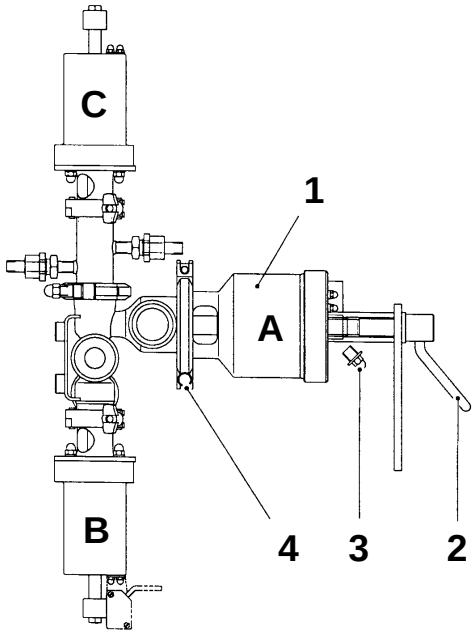


9 Membrane
11 Seal ring

v) Check that the compressed air connection is in its correct position and connect it.

w) Refit the clamp ring (4) and tighten the two screws crosswise.

x) Remove the tool and refit the screw (3).



1 Valve A
2 Tool TP No 449969-101
3 Screw
4 Clamp ring
5 Clamp ring

(Cont'd)

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(Cont'd)

Dismantling valve B

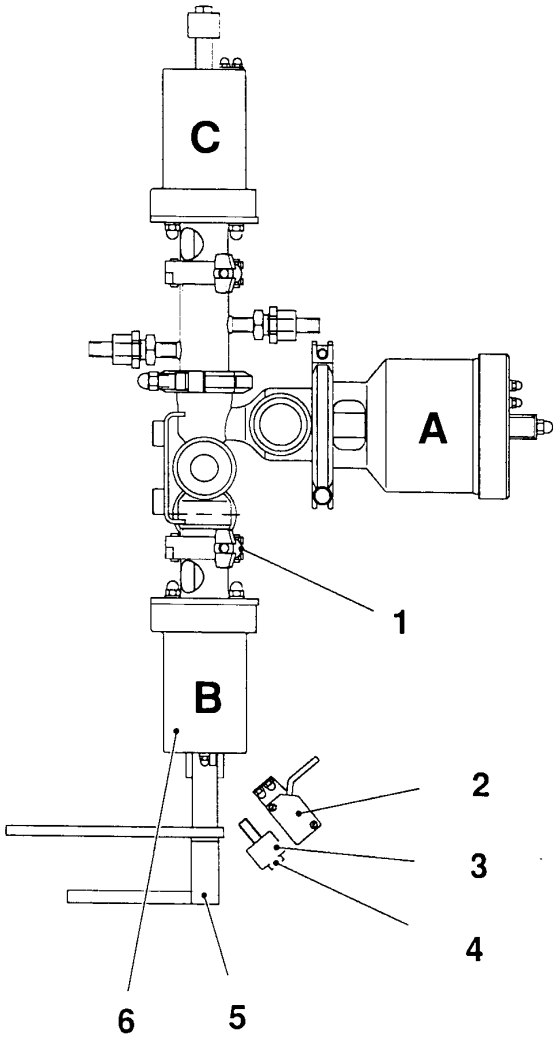
WARNING! **Risk of escaping steam which may cause burns.**
Turn off the steam and the compressed air before commencing work.
Relieve remaining steam pressure in the steam line.
The product valve and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Danger of injury due to pinching or crushing.**
The valve spring is under pressure.

a) Undo the screw (4), lug (3), and proximity switch (2).

b) Take the tension off the clamp ring (1) by compressing the valve spring with aid of the tool TP No 566480-101 (5).

c) Undo the clamp ring and remove valve B (6).



1 Clamp ring
2 Proximity switch
3 Lug
4 Screw
5 Tool TP No 566480-101
6 Valve B

(Cont'd)

MM2.21B56684B01en.fm

(Cont'd)

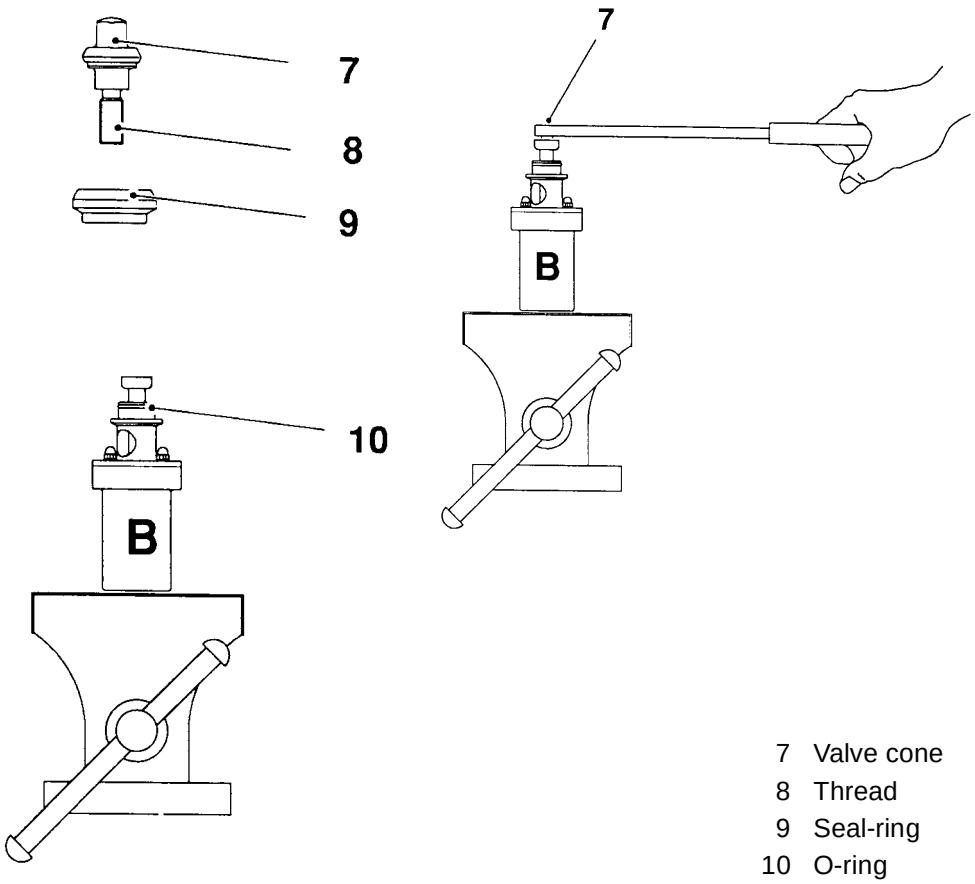
WARNING! **Risk of skin irritation.**
Before handling lubricants, read the Safety precautions.

d) Fit valve B in a vice (the jaws of the vice must be equipped with covers).

e) Unscrew the valve cone (7).

f) Remove the seal ring (9) and O-ring (10).

g) Lubricate the threads of the valve cone (7) with silicone grease TP No 90269-9



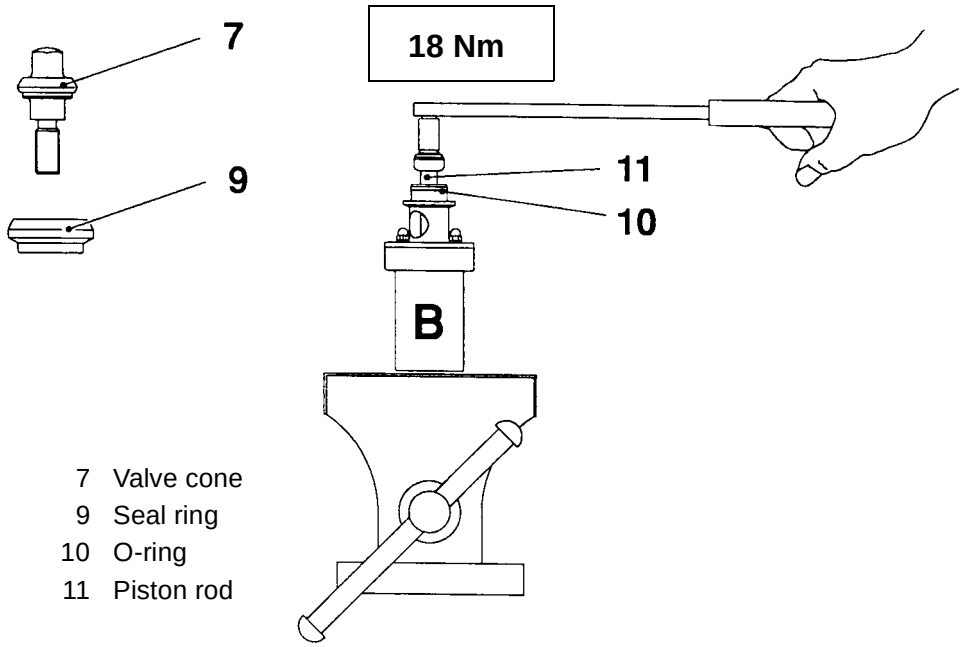
MM2.21B5684B01en.fm

7 Valve cone
8 Thread
9 Seal-ring
10 O-ring

(Cont'd)

(Cont'd)

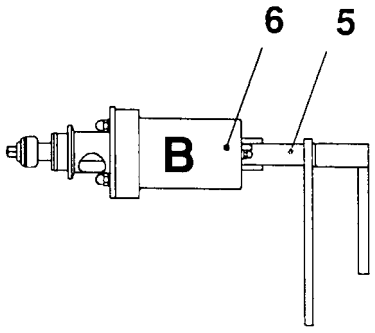
a) Replace the seal ring (9) and fit the valve cone (7) to the piston rod (11). Fit a new O-ring (10).



7 Valve cone
9 Seal ring
10 O-ring
11 Piston rod

b) Tighten the valve cone **slowly** to a torque of 18 Nm with a dynamometric wrench.

c) Tighten the valve cone **once more** to a torque of 18 Nm after 10 - 20 s. The valve cone must be tightened **several** times as the seal ring of teflon needs a certain time to ”float out” and fill the grooves.



5 Tool TP No 566480-101
6 Valve B

d) Compress the spring by means of tool TP No 566480-101 (5)

(Cont'd)

MM2.21B5684B01en.fm

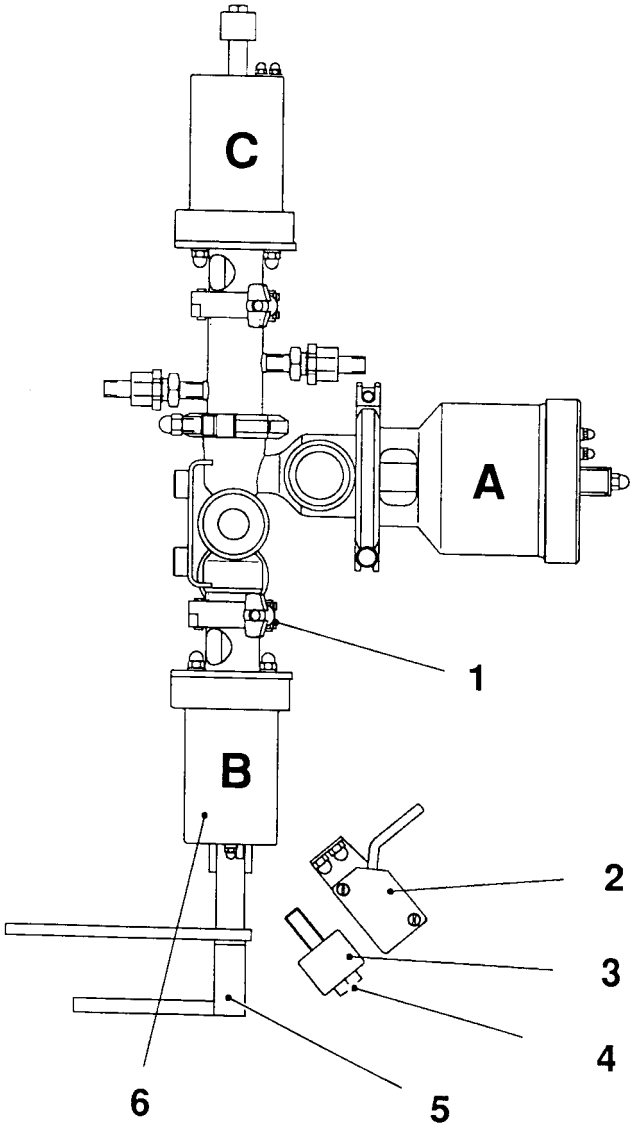
(Cont'd)

e) Refit valve B (6) in the valve housing.

f) Check that the compressed air connection is in its correct position and connect it.

g) Refit the clamp ring (1) and tighten the two screws crosswise.

h) Remove the tool and refit the lug (3), screw (4), and proximity switch (2).



1 Clamp ring
2 Proximity switch
3 Lug
4 Screw
5 Tool TP No 566480-101
6 Valve B

(Cont'd)

MM2.21B56684B01en.fm

(Cont'd)

Dismantling valve C

WARNING! **Risk of escaping steam which may cause burns.**
Turn off the steam and compressed air before commencing work. Let out remaining steam to zero the pressure in the steam line.
The product valve and adjacent components may be hot. If necessary, wear heat resistant protective gloves.

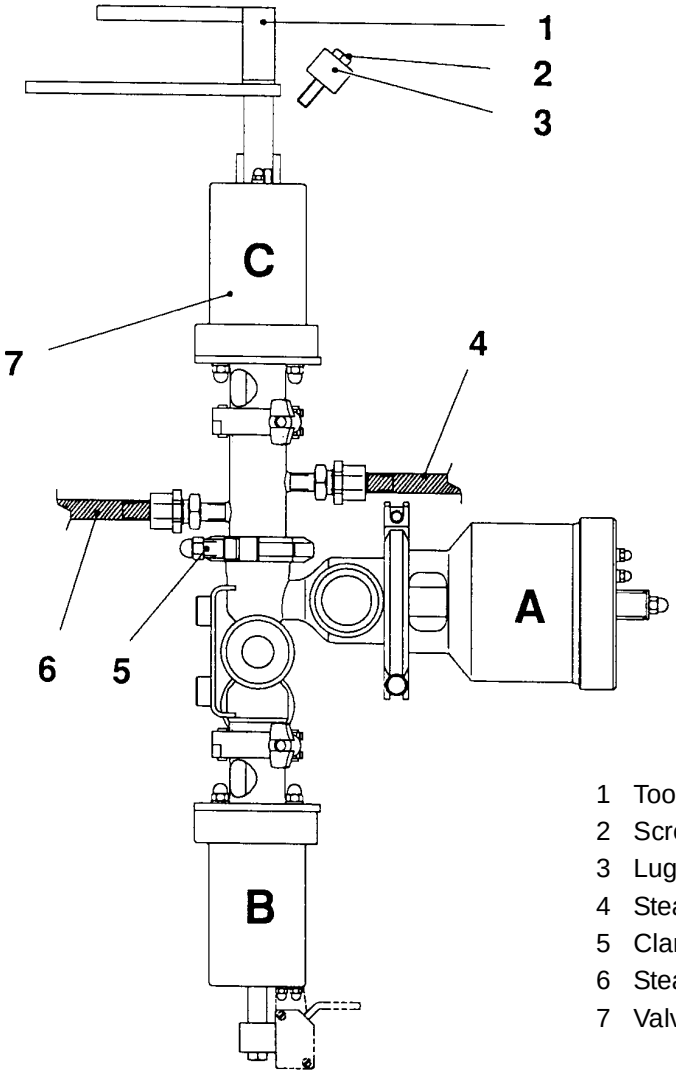
WARNING! **Danger of injury due to pinching or crushing.**
The valve spring is under pressure.

a) Undo the steam connections (4) and (6).

b) Undo the screw (2) and the lug (3).

c) Take the tension off the clamp ring (5) by compressing the valve spring by means of tool TP No 566480-101 (1).

d) Undo the clamp ring (5) and remove valve C/steam housing (7).



1 Tool TP No 566480-101
2 Screw
3 Lug
4 Steam connection
5 Clamp ring
6 Steam connection
7 Valve C/steam housing

(Cont'd)

MM2.21B56684B01en.fm

(Cont'd)

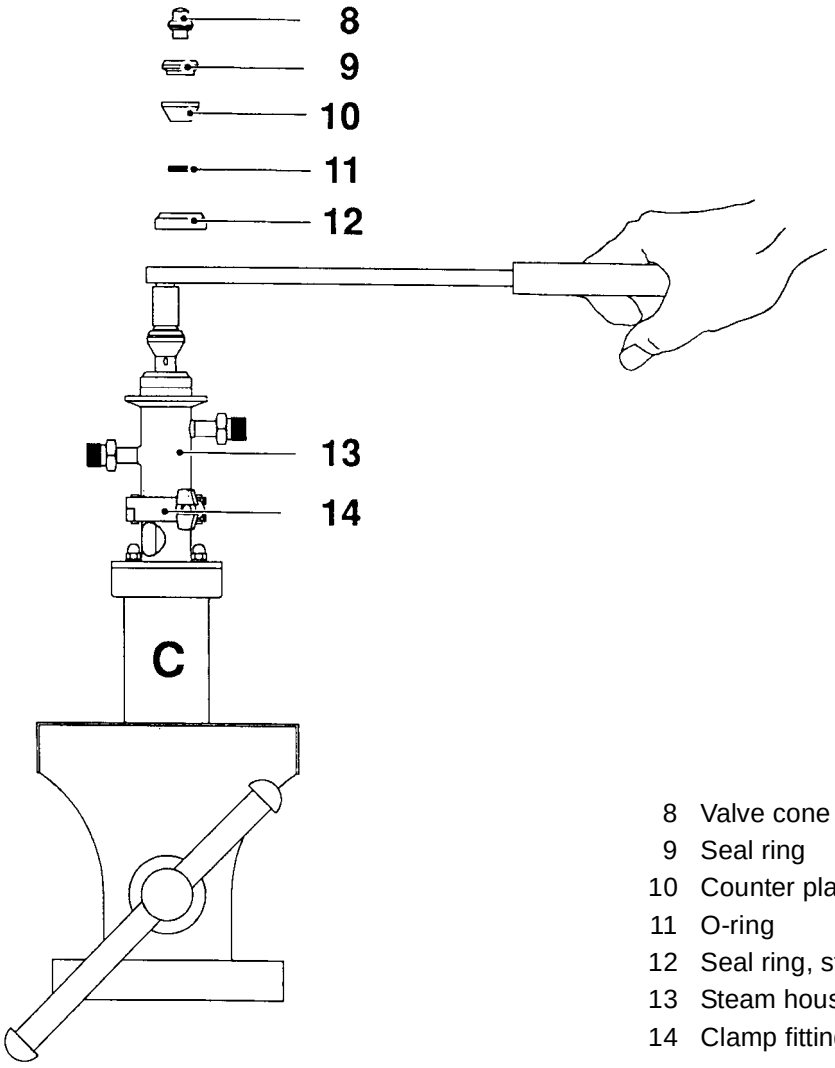
e) Fit valve C in a vice (the jaws of the vice must be equipped with covers)

f) Unscrew the valve cone (8).

g) Remove the seal ring (9) and the counter plate (10). Remove the O-ring (11).

h) Remove the seal ring/steam housing (12).

i) Remove the clamp fitting (14) and steam housing (13).



8 Valve cone
9 Seal ring
10 Counter plate
11 O-ring
12 Seal ring, steam housing
13 Steam housing
14 Clamp fitting

(Cont'd)

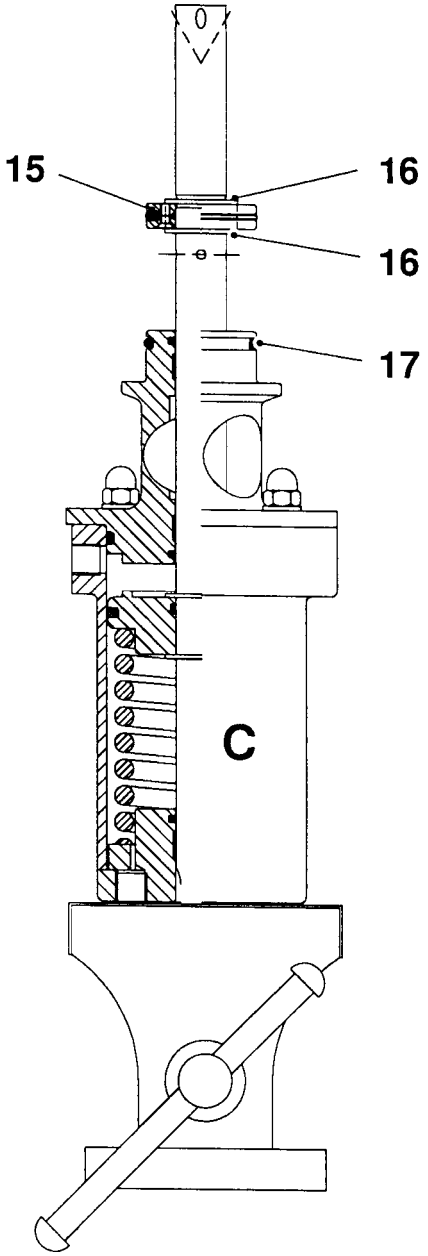
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(Cont'd)

j) Remove the two lock washers (16).

k) Remove the complete seal ring/steam housing (15).

l) Remove the O-ring (17).



15 Seal ring/steam housing
16 Lock washer
17 O-ring

(Cont'd)

MM2.21B5684B01en.fm

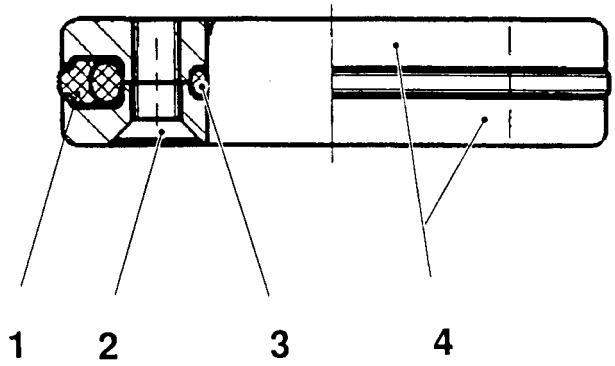
(Cont'd)

Overhaul - Seal ring/steam housing

a) Undo the four screws (2).

b) Separate the two valve discs (4). Replace the seal ring (1) and O-ring (3).

c) Reassemble in reverse order; lock the screws with Loctite 242, TP No 90157-16



1 Seal ring
2 Screw
3 O-ring
4 Valve disc

MM2.21B5684B01en.fm

(Cont'd)

(Cont'd)

WARNING! **Risk of skin irritation.**
Before handling lubricants, read the Safety precautions.

a) Fit a new O-ring (17).

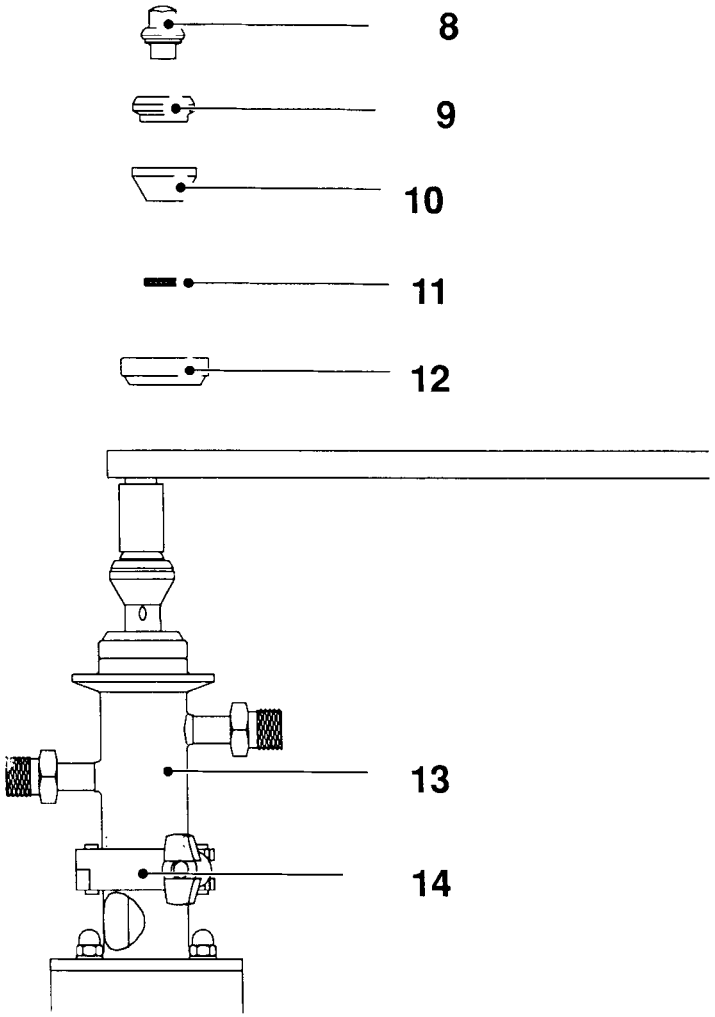
b) Fit the lower lock washer (16) and check the circlip; replace defective parts. If the seal ring (15) is incorrectly positioned unsterility may occur. Fit the upper lock washer (16).

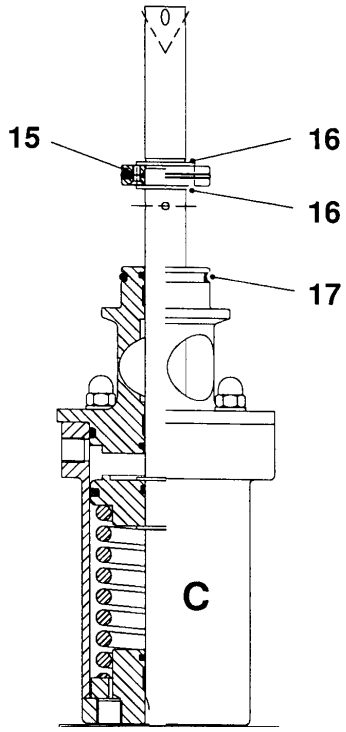
c) Refit the steam housing (13) and secure with the clamp (14).

d) Fit a new seal ring (12).

e) Fit a new O-ring (11); lubricate the threads on the piston rod with silicone grease TP No 90296-9.

f) Fit the counter plate (10) and a new seal ring (9). Fit the valve cone (8).





8 Valve cone
9 Seal ring
10 Counter plate
11 O-ring
12 Seal ring, steam housing
13 Steam housing
14 Clamp fitting
15 Seal ring/steam housing
16 Lock washer
17 O-ring

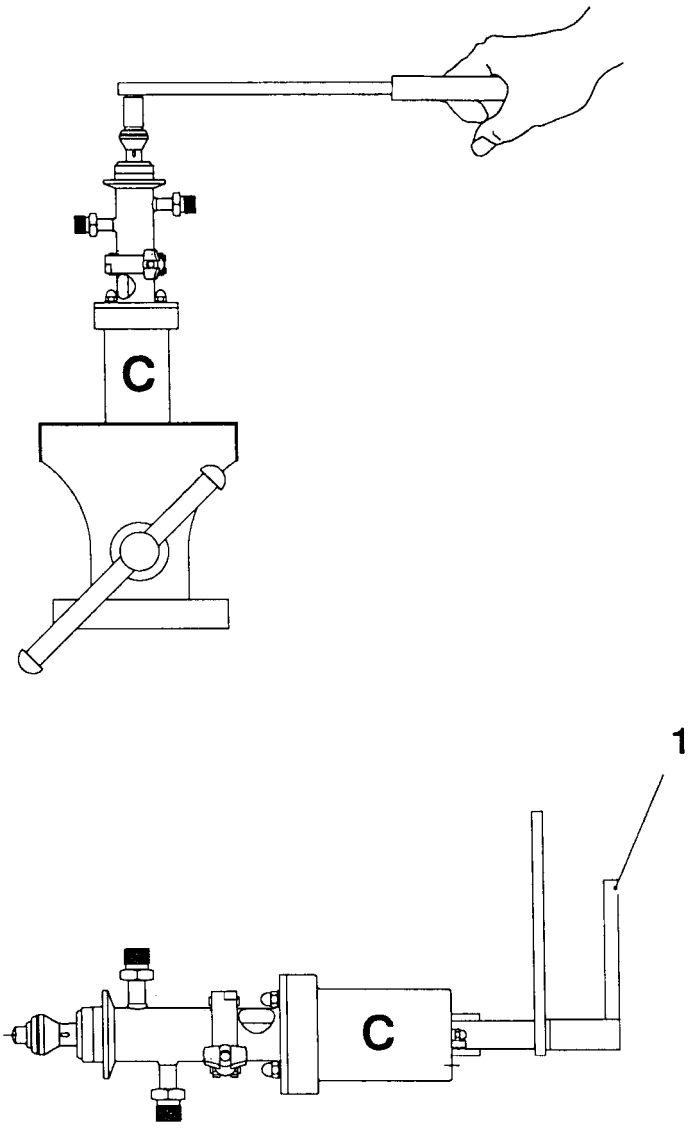
(Cont'd)

MM2.21B5684B01en.fm

(Cont'd)

g) Tighten the valve cone **slowly** to a torque of 18 Nm with a dynamometric wrench.

h) Tighten the valve cone **once more** to a torque of 18 Nm after 10 - 20 s. The valve cone must be tightened **several** times as the seal ring of teflon needs a certain time to ”float out” and fill the grooves.



1 Tool TP No 566480-101

i) Compress the spring by means of tool TP No 566480-101 (1)

(Cont'd)

MM2.21B5684B01en.fm

(Cont'd)

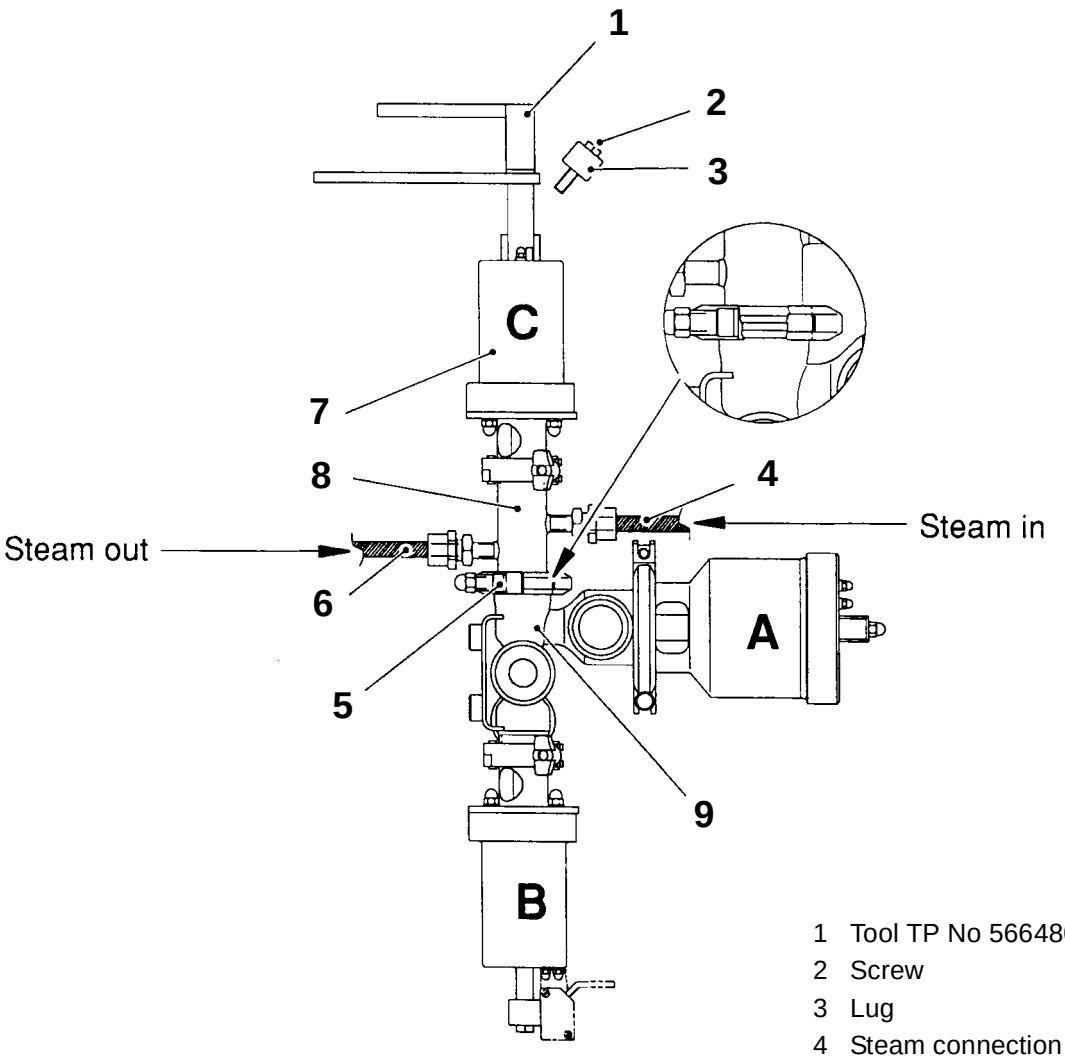
j) Refit valve C (7) in the valve housing.

k) Check that the compressed air connection is in its correct position and connect it.

l) Refit the clamp ring (5) and tighten the two screws crosswise so that the steam housing (13) bears against the valve housing (18), as illustrated.

m) Remove the tool (1) and refit the lug (3) and screw (2).

n) Refit the steam connections (4) and (6).



1 Tool TP No 566480-101
2 Screw
3 Lug
4 Steam connection
5 Clamp ring
6 Steam connection
7 Valve C
8 Steam housing
9 Valve housing

MM2.21B56B4B01en.fm

2.3 Sterilisation chamber

SPC reference	31330-0300

2.3-1 Sterilisation chamber - check

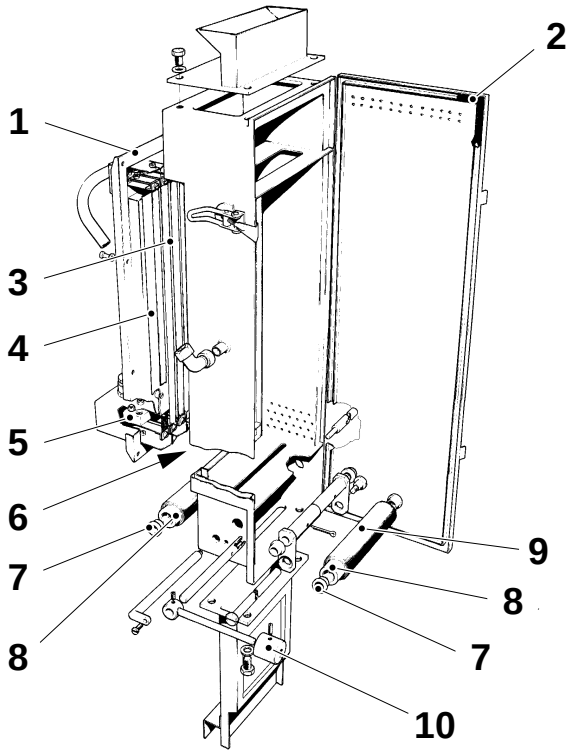
Machine status	Main power OFF Air OFF
SPC reference	31330-0300

DANGER! **Danger of electroshock.**
There is 230 V AC in the heating ribbons (4) and ribbon attachments (5). Turn off the main switch before commencing work.

WARNING! **Risk of personal injury caused by skin contact or inhalation.**
Residual sterilization liquid may be present in the sterilization chamber.Observe the Safety precautions.

WARNING! **Danger of burns.**
The heating ribbons (4) and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

a) Check the heating ribbons (4), connectors (6), spacing wires (3), and ribbon attachments (5).



1 Heating unit
2 Sealing strip
3 Spacing wire
4 Heating ribbon
5 Ribbon attachment
6 Connector
7 Bushing
8 Squee-gee roller
9 Rubber sleeving
10 Counterweight

(Cont'd)

MM2.21B5684B01en.fm

(Cont'd)

b) When checking the ribbon attachments and connectors, the sterilization chamber must be removed and the heating unit (1) lifted out.

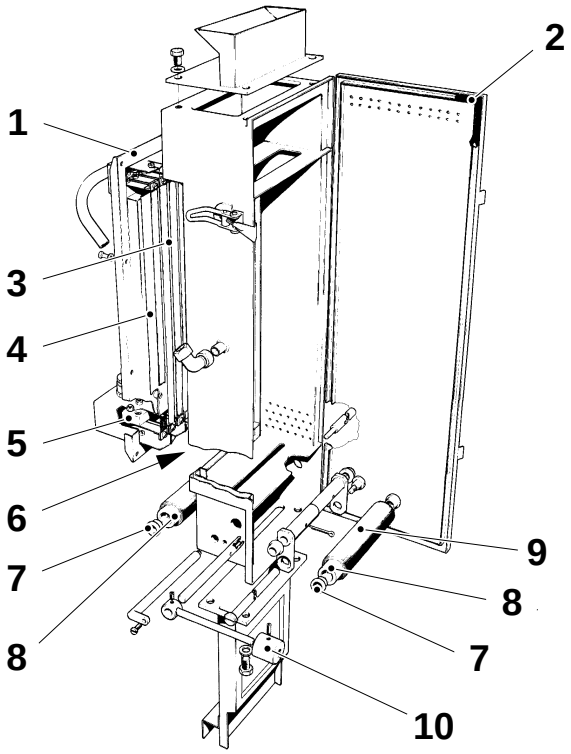
c) Check the bushings (7) of the two squee-gee rollers (8). If worn, replace them according to page 59

d) Check the rubber sleeving (9) of the squee-gee rollers. If worn, replace them according to page 59.

e) Check the sealing strips (2) of the door. Replace as required.

Peroxide consumption

Normal consumption should be 0.12 l/h. If required, adjust consumption with the two counterweights (10).



1 Heating unit
2 Sealing strip
3 Spacing wire
4 Heating ribbon
5 Ribbon attachment
6 Connector
7 Bushing
8 Squee-gee roller
9 Rubber sleeving
10 Counterweight

MM2.21B5684B01en.fm

2.3-2 Sterilisation chamber - overhaul

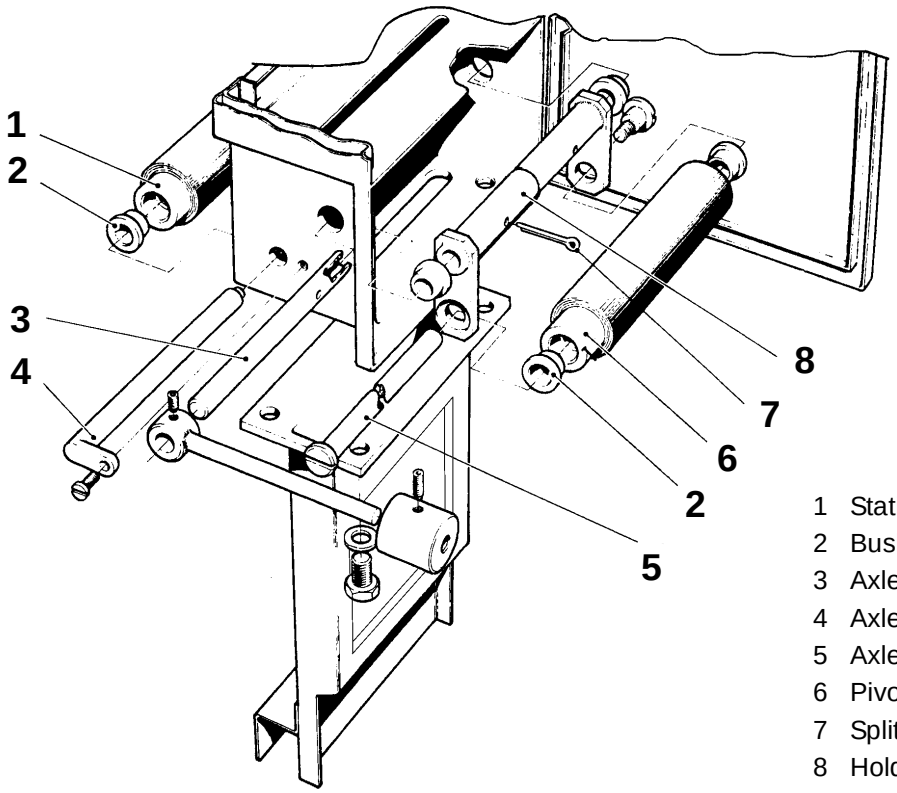
Machine status	Main power OFF Air OFF
SPC reference	31330-0300

DANGER! **Danger of electroshock.**
There is 230 V AC in the heating ribbons (4) and ribbon attachments (5). Turn off the main switch before commencing work.

WARNING! **Risk of personal injury caused by skin contact or inhalation.**
Residual sterilization liquid may be present in the sterilization chamber. Observe the safety precautions.

WARNING! **Danger of burns.**
The heating ribbons (4) and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

a) Remove the split pin (7) and pull out the axle (3) of the holder (8).
b) Pull out the axle (5) and remove the pivoting squee-gee roller.
c) Pull out the axle (4) and remove the stationary squee-gee roller (1).
d) Replace any damaged or worn bushings (2).



1 Stationary squee-gee roller
2 Bushing
3 Axle
4 Axle
5 Axle
6 Pivoting squee-gee roller
7 Split pin
8 Holder

MM2.21B5684B01en.fm

2.4 Squee-gee rollers

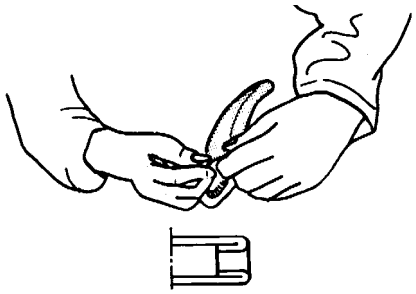
SPC reference	31330-0300

2.4-1 Squee-gee rollers - overhaul

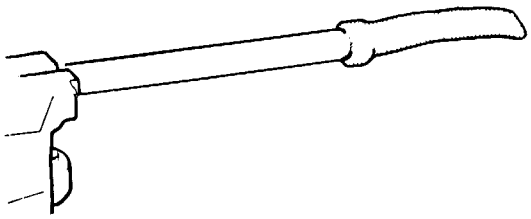
Machine status	Main power OFF Air OFF
SPC reference	31330-0300

Remove the old silicon rubber sleeving. The new sleeving is to be fitted turned inside out so that the smooth inside will be in contact with the material web. A simple way of fitting the sleeving and turning it inside out at the same time is described in the following:

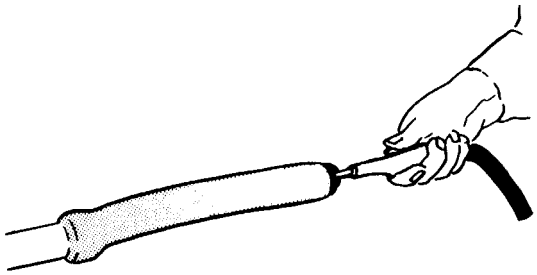
a) Fold in one end of the sleeving and apply talcum powder to its inside.



b) Slide the folded end of the sleeving over the squee-gee roller.



c) Wrap a piece of textile fabric around the nozzle of a compressed air gun and insert the latter into the open end of the sleeving.

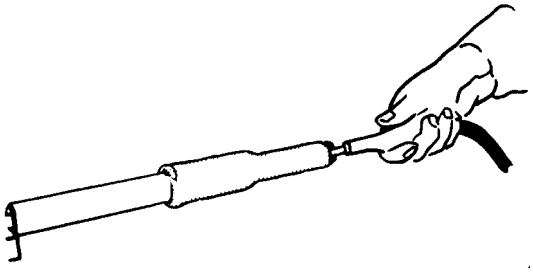


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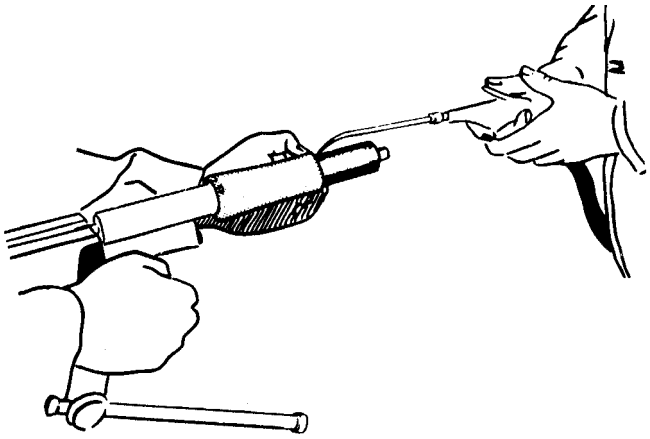
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(Cont'd)

d) Slide the sleeving as far as possible on to the squee-gee roller aided by the compressed air.



e) Remove the piece of fabric and continue to slide the sleeving over the squee-gee roller while blowing air into the sleeving.



f) Blow air between the sleeving and the squee-gee roller to make the sleeving hug the roller evenly.



g) Cut off the sleeving level with the roller ends.



MM2.21B56684B01en.fm

2.5 Aseptic chamber

SPC reference	265548-0300

2.5-1 Aseptic chamber - check/set

Machine status	Main power OFF Air OFF
SPC reference	265548-0300

WARNING! **Danger of burns.**
The aseptic chamber and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Risk of personal injury caused by skin contact or inhalation.**
Residual peroxide fumes may be present in the aseptic chamber. Observe the safety precautions.

(Cont'd)

MM2.21B5684B01en.fm

(Cont'd)

a) Check the seal rings (3) at the attachments of the guide rollers (2) and the seal ring (5) of the sterile air pipe. Replace the seal rings if dried or damaged.

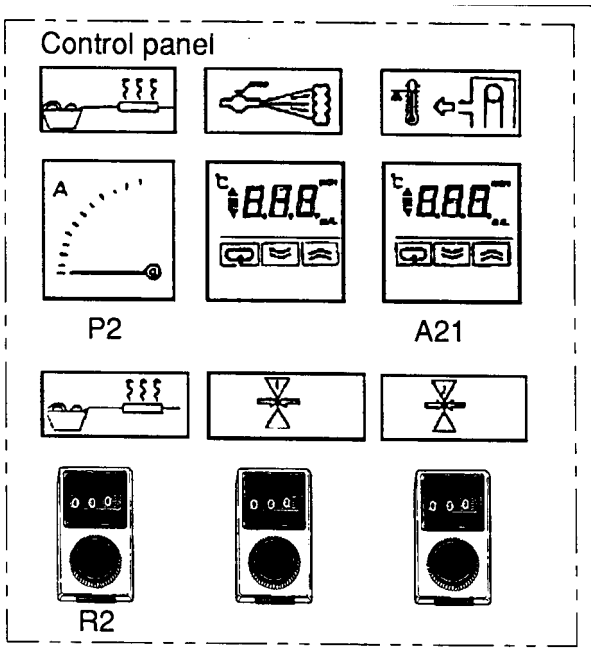
b) Check the sealing strips (1) of all hatches, replace as required.

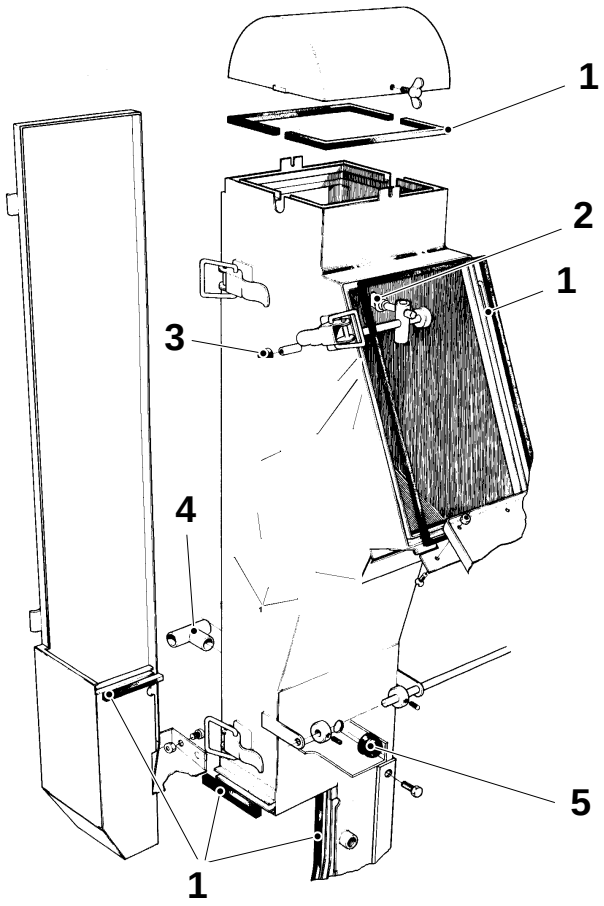
c) Clean the guide rollers (2) and sterile air intake pipe (4). If the guide rollers are damaged, replace them.

d) Check that the temperature is appr 60° C during production, as indicated by temperature monitor A21 on the control panel.

e) If the temperature rises too high, the material web may stick to the upper bending roller. Adjust the temperature by means of potentiometer R2. Basic setting is 6,0 A as indicated by ammeter P2.

Note! The aseptic chamber temperature must be checked during production according to the OM book.





1 Sealing strip
2 Guide roller
3 Seal ring
4 Pipe
5 Seal ring

MM2.21B5684B01en.fm

2.6 Upper bending roller

SPC reference	239794-0200

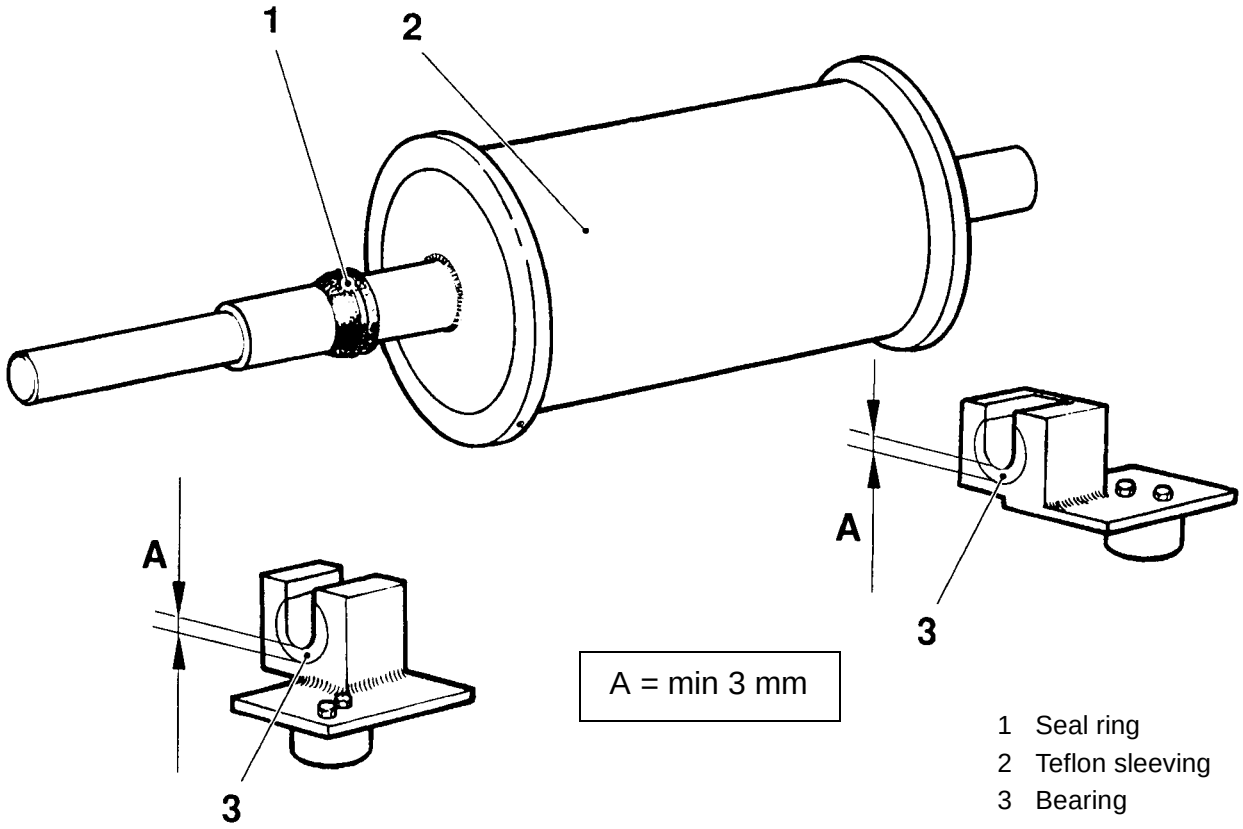
2.6-1 Upper bending roller - check/change

Machine status	Main power OFF Air OFF
SPC reference	239794-0200

Check:

- that the two bearings (3) are not damaged or worn; replace them if thickness A is less than 3 mm,
- that the teflon sleeving (2) is not worn or damaged; to facilitate the replacing of the teflon sleeving, put it in hot water beforehand,
- the seal rings (1); replace as required (the seal rings bear against the side walls of the aseptic chamber when the bending roller is fitted in place).

MM2.21B5684B01en.fm



A = min 3 mm

1 Seal ring
2 Teflon sleeving
3 Bearing

2.7 Connection

SPC reference	554253-0200

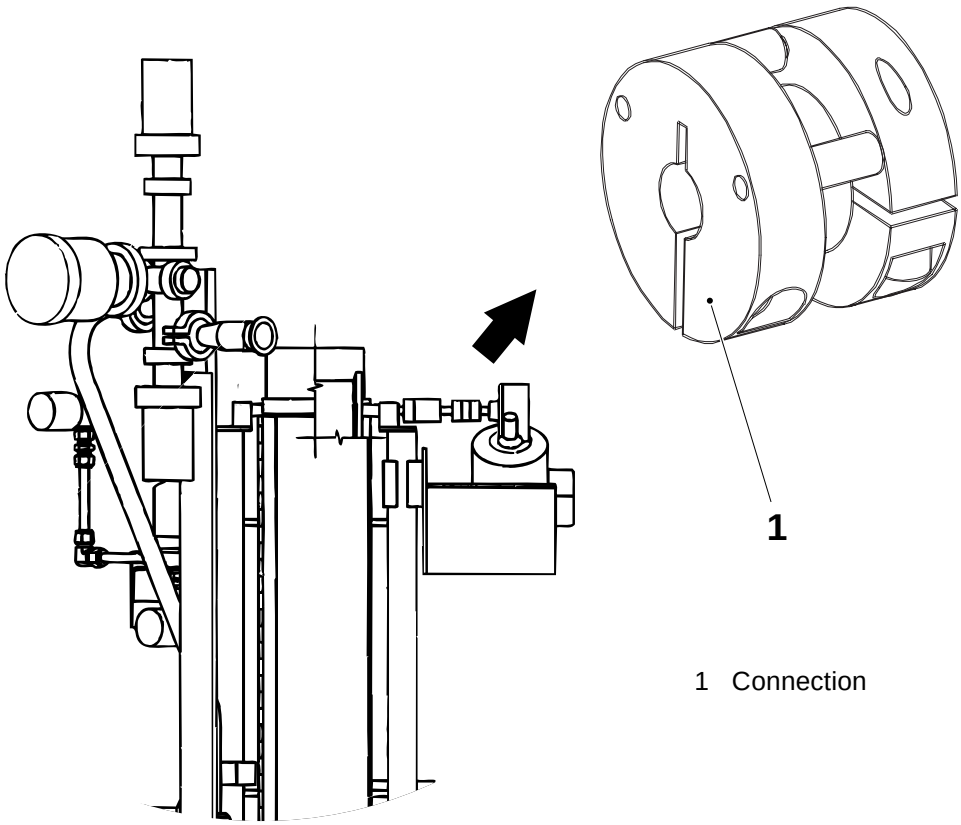
2.7-1 Connection - check

Machine status	Main power OFF Air OFF
SPC reference	554253-0200

a) Check the rubber cross of the connection (1). Replace as required.

b) Check the function of the connection (1).

Setting according to page 65.



1 Connection

MM2.21B5684B01en.fm

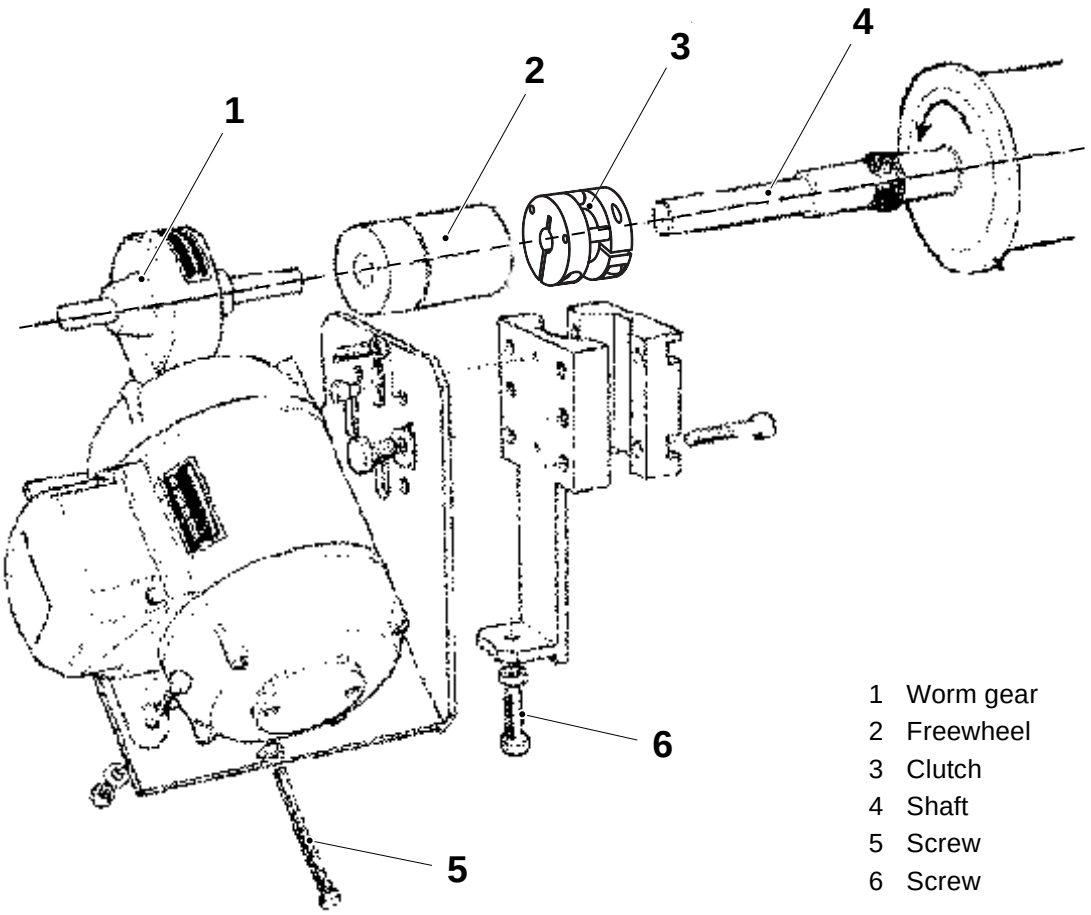
2.7-2 Connection - set

Machine status	Main power OFF Air OFF
SPC reference	27939-0300 554253-0200

WARNING! **Danger of injury due to pinching or crushing.**
The upper bending roller shaft (4), the clutch (3) and the free-wheel (2) are rotating.

a) Check that the worm gear (1), clutch (3), and shaft (4) are correctly aligned. If required, adjust by means of the screws (5) and (6).

b) Check that the freewheel (2) is fitted to function in the direction of feed of the material web in the machine.



1 Worm gear
2 Freewheel
3 Clutch
4 Shaft
5 Screw
6 Screw

MM2.21B5684B01en.fm

2.8 Longitudinal seal

SPC reference	246429-0300

2.8-1 Longitudinal seal - check

Machine status	Main power OFF Air OFF
SPC reference	246429-0300

WARNING! **Danger of burns.**
The LS element and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

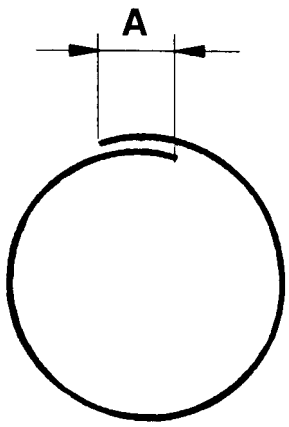
WARNING! **Danger of injury due to pinching or crushing.**
The forming rollers in the forming rings may be rotating.

The position of the longitudinal seal may be checked by comparing two consecutive packages.

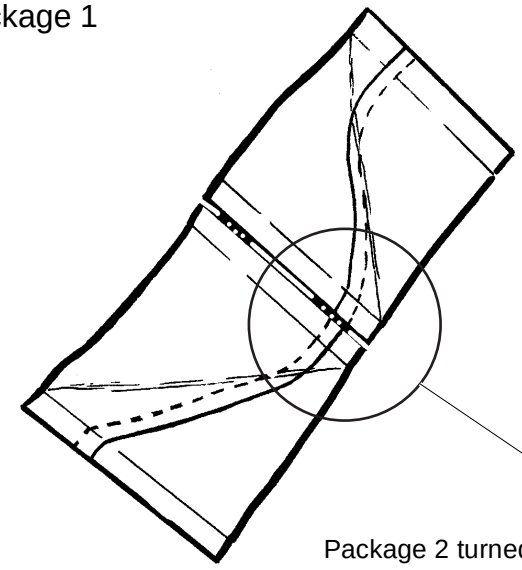
In case of deviation of the LS position (1), adjust by turning the upper forming ring and also as described on page 67, by means of the guide rollers for the tube.

MM2.21B5684B01en.fm

A = appr 5 mm



Package 1



Package 2 turned through 180°

Correct tube forming, with the material web filling the forming ring, is very important for the LS position.

Make sure that LS overlap A is appr 5 mm.

Note! LS overlap A given should only be regarded as a guide value.

2.9 Tube forming

SPC reference	265548-0300 19337-0300 246429-0300

2.9-1 Tube forming - set

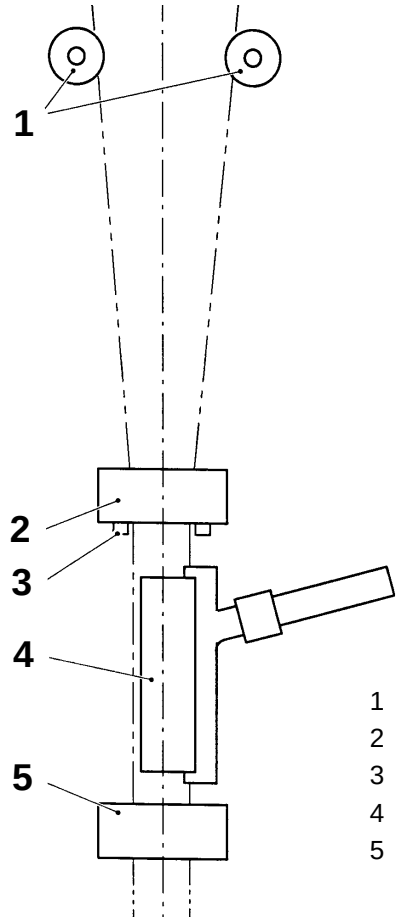
Machine status	Main power OFF Air OFF
SPC reference	265548-0300 19337-0300 246429-0300

WARNING! **Danger of burns.**
The LS element (4), the aseptic camber where the guide rollers (1) are located and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Risk of personal injury caused by skin contact or inhalation.**
Residual peroxide fumes may be present in the aseptic chamber where the guide rollers (1) are located. Observe the safety precautions.

WARNING! **Danger of injury due to pinching or crushing.**
The forming rollers in the forming rings may be rotating.

MM2.21B5684B01en.fm



1 Guide roller
2 Upper forming ring
3 Screw
4 LS element
5 Lower forming ring

Correct forming of the tube is a combined result of the settings of the guide rollers (1), upper forming ring (2), and LS element (4).

Starting with the basic setting, the guide rollers (1) are finally adjusted so that the packaging material web fills the two forming rings (2) and (5).

The upper forming ring (2) is adjusted so that there is no deviation of the LS position when comparing two consecutive packages according to page 66.

Adjust the forming ring by loosening the two screws (3) and turning the forming ring.

The LS element (4) is adjusted according to page 68.

The purpose of the setting is to achieve good tube forming, satisfactory longitudinal sealing, and correct positioning of the longitudinal seal.

2.10 LS element

SPC reference	246429-0300

2.10-1 LS element - check/clean

Machine status	Main power OFF Air OFF
SPC reference	246429-0300

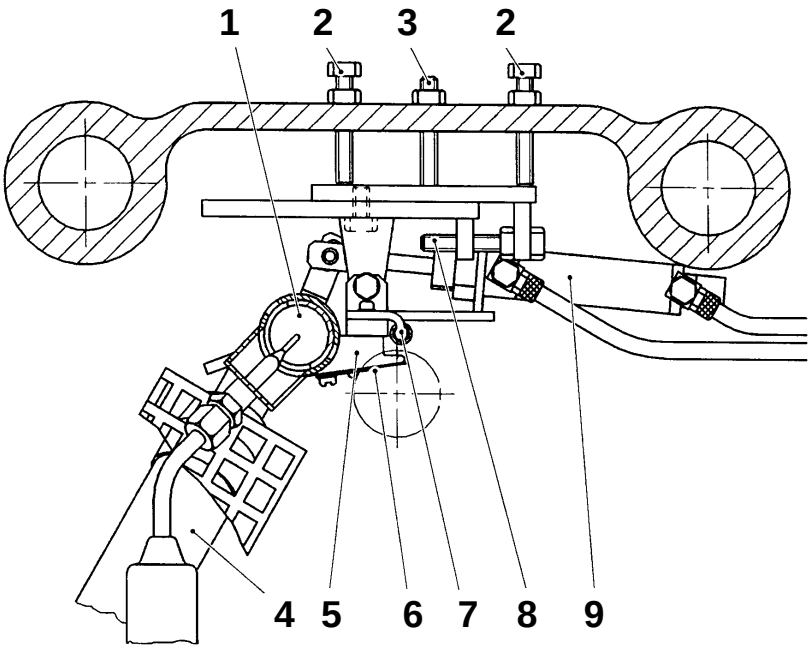
WARNING! **Danger of burns.**
The LS element and adjacent components may be hot. If necessary, wear heat-resistant gloves.

WARNING! **Danger of injury due to pinching or crushing.**
The cylinder (9) may move.

Check:

- that the slide rail (6) is clean and intact; if required, replace it,
- that the slide bar (7) is clean and intact,
- that the nozzle (5) is free from plastic deposits and that its air holes are open,
- that the cylinder (9) turns the air distributer (1) evenly and easily.

Setting according to page 69.



1 Air distributer
2 Setting screw
3 Mounting screw
4 Heating element
5 Nozzle
6 Slide rail
7 Slide bar
8 Setting screw
9 Cylinder

MM2.21B5684B01en.fm

2.10-2 LS element - set

Machine status	Main power OFF Air OFF
SPC reference	246429-0300

WARNING! **Danger of burns.**
The LS element and adjacent components may be hot. If necessary, wear heat-resistant gloves.

WARNING! **Danger of injury due to pinching or crushing.**
The cylinder (9) may move.

Setting must be performed while the machine is running.

Put packaging material in the machine. Inch the machine until the jaws grip the packaging material and a tube is being formed.

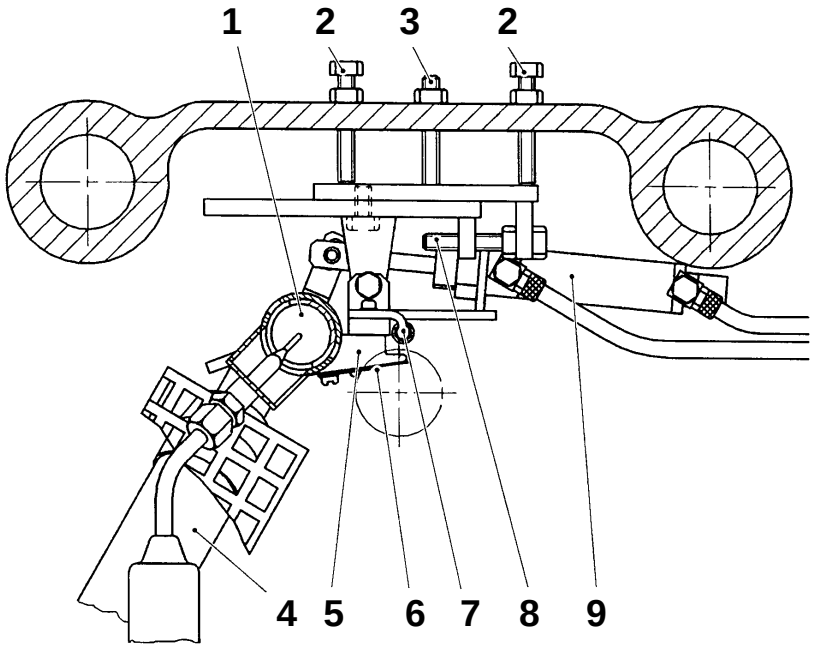
The sideways position of the LS element can be adjusted by means of the setting screw (8).

The lengthwise position of the LS element is adjusted by means of the two setting screws (2) after loosening the mounting screw (3).

Check that the LS element is not acting as guide for the tube.

Check that there are no plastic deposits on the nozzle (5).

MM2.21B56B4B01en.fm



1 Air distributer
2 Setting screw
3 Mounting screw
4 Heating element
5 Nozzle
6 Slide rail
7 Slide bar
8 Setting screw
9 Cylinder

2.11 Upper and lower forming rings

SPC reference	19337-0300 257796-0100

2.11-1 Upper and lower forming rings - check

Machine status	Main power OFF Air OFF
SPC reference	19337-0300 257796-0100

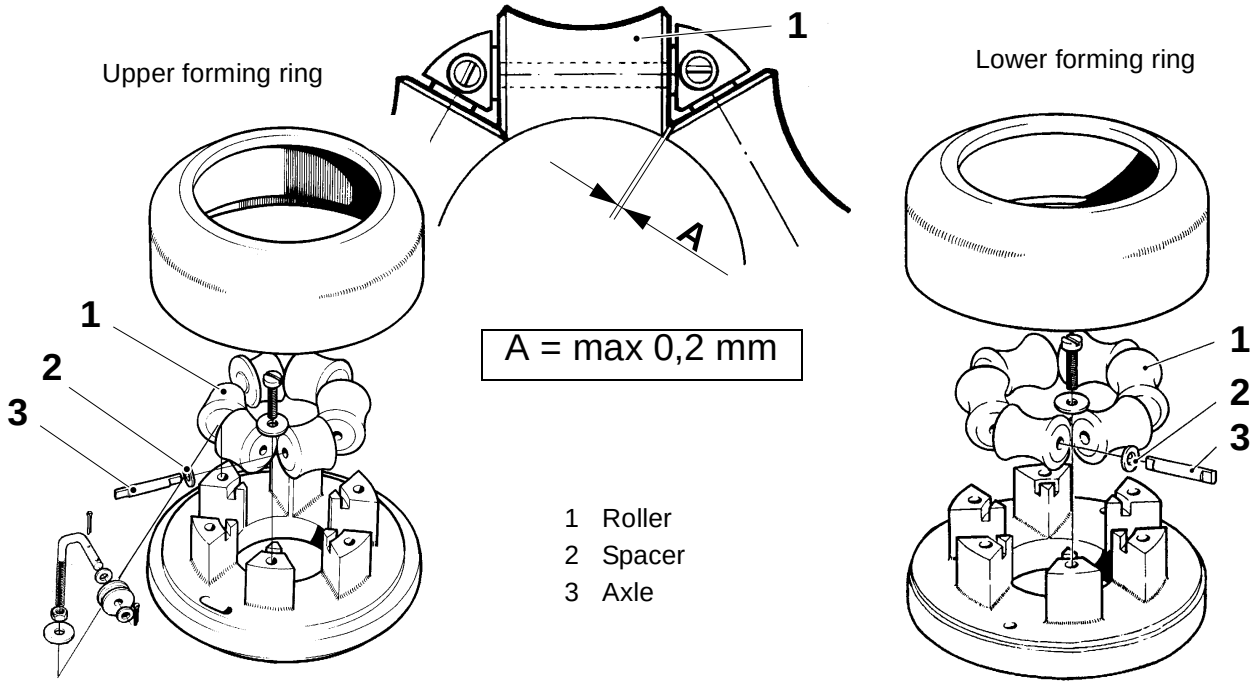
WARNING! **Danger of injury due to pinching or crushing.**
The rollers (1) may rotate.

WARNING! **Danger of burns.**
The forming rings and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

a) Check that all rollers (1) rotate freely and that the roller surfaces in contact with the material web and plastic strip are intact.

b) Check that play A between the rollers does not exceed 0,2 mm. If required, adjust by means of spacers according to page 71.

c) Clean the assembly and replace any worn rollers according to page 71



MM2.21B5684B01en.fm

2.11-2 Upper and lower forming rings - remove

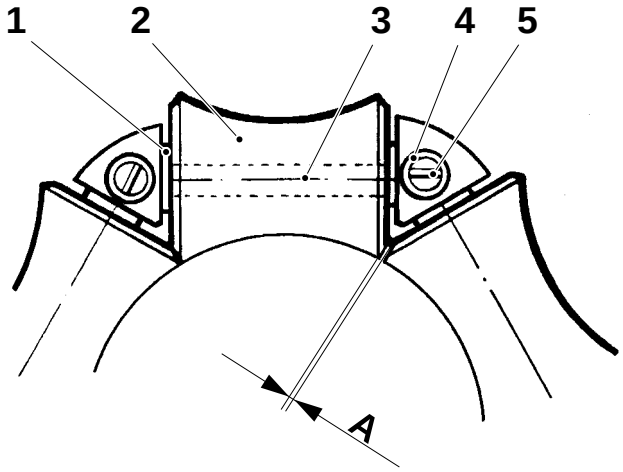
Machine status	Main power OFF Air OFF
SPC reference	19337-0300 257796-0100

a) Undo the screw (5) and remove the washer (4).

b) Remove the roller (2) with its axle (3).

c) On reassembly, distribute the play equally between the rollers (2) by means of spacers (1), TP No 2033-2 and 2033-3.

d) Gap A between the rollers must not exceed 0,2 mm.

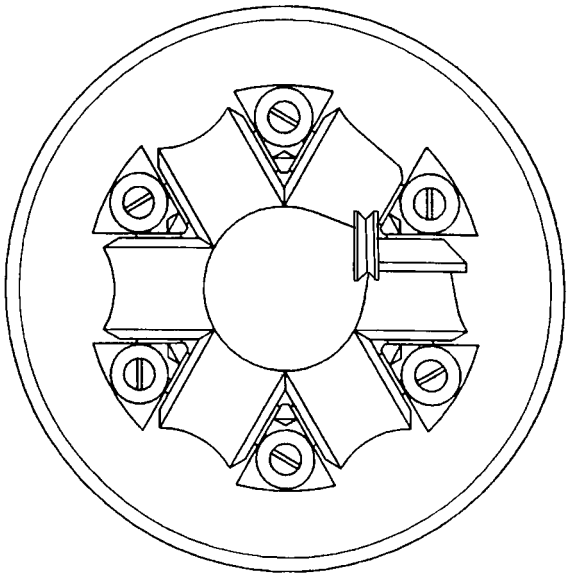


A = max 0,2 mm

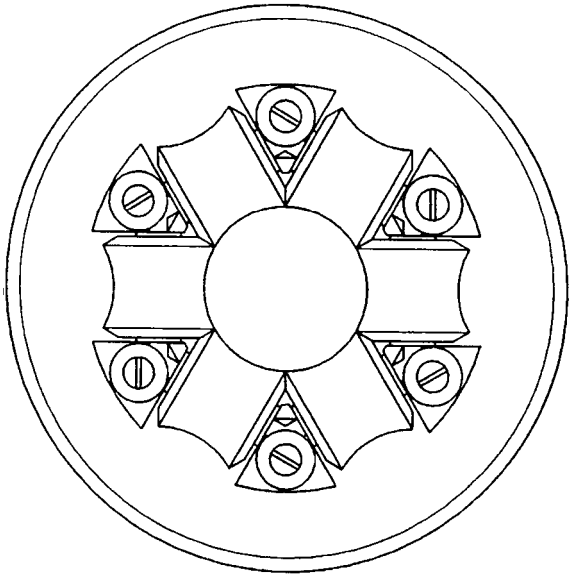
1 Spacer
2 Roller
3 Axle
4 Washer
5 Screw

MM2.21B5684B01en.fm

Upper forming ring



Lower forming ring



2.12 Filling system

SPC reference	560190-0300

2.12-1 Filling system - operating principle

Machine status	Main power OFF Air OFF
SPC reference	560190-0300

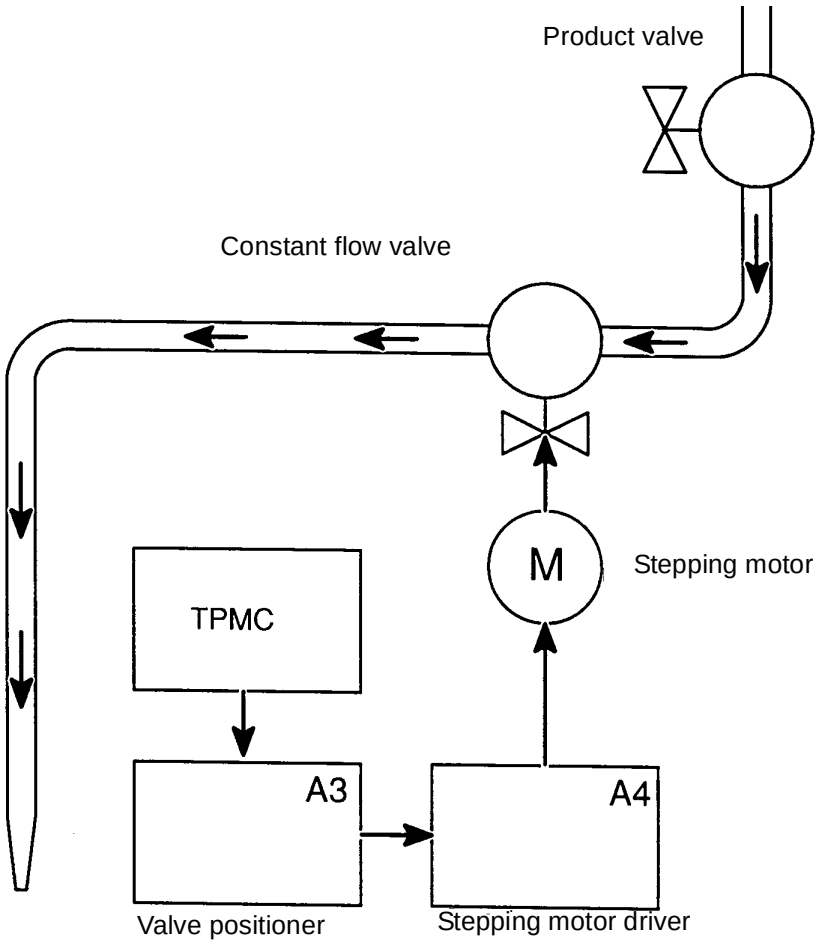
The filling system consists of a product valve (ON/OFF) and a constant-flow valve which regulates the nominal flow during production by means of a stepping motor.

Valve positioner card (A3)

Controls the position of the stepping motor.

Stepping motor driver card (A4)

Determines the position of the stepping motor movements.
Activated ENABLE - power to motor.



MM2.21B5684B01en.fm

(Cont'd)

(Cont'd)

Valve in operating mode

In order to maintain a constant pressure drop in the dosing valve body, the valve compensates for pressure fluctuations by modifying the outlet area in the control module by means of the regulating valve cone (2) (thus changing the pressure).

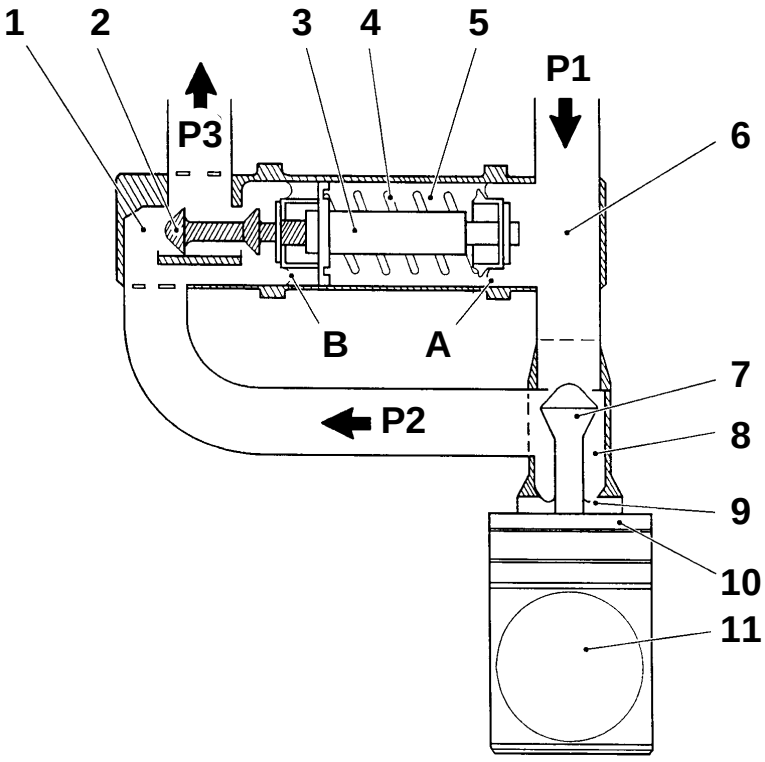
The position of the regulating valve cone is defined by the pressure difference between the two chambers of the valve (1) and (2), and by the spring (4).

The force caused by the pressure difference is transmitted to the regulating valve cone by the two membranes (A) and (B). Membrane A is actuated by the inlet pressure (P1) before the dosing valve cone and membrane B is actuated by the pressure (P2) after the dosing valve cone.

In the control module the pressure drop is created by a double cone (regulating valve cone) passing through two co-axial holes serving as a variable-area passage for the liquid.

The function of the spring is to compensate for the force created by the pressure difference in the lateral body and the control module.To balance the regulating valve, the same force must act in both directions.

MM2.21B5684B01en.fm



1 Control module
2 Regulating valve cone
3 Valve rod
4 Spring
5 Valve spring housing
6 Lateral body
7 Dosing valve cone
8 Dosing valve body
9 Membrane
10 Dosing valve
11 Stepping motor
P1 Inlet line pressure
P2 Pressure after dosing
P3 Outlet filling pressure

2.13 Product pressure gauge

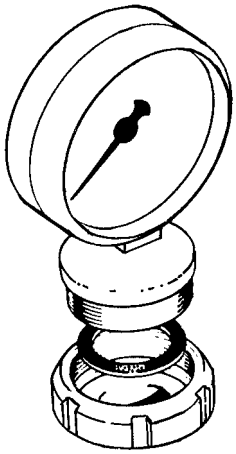
SPC reference	560190-0300

2.13-1 Product pressure gauge - check

Machine status	Main power OFF Air OFF
SPC reference	560190-0300

Check that the gauge indicates zero when there is no pressure in the system. Adjust zero with calibration screw at the rear. Check that the diaphragm is undamaged.

Replace the flange gasket (1).



1 Flange gasket

MM2.21B5684B01en.fm

2.14 Pressure roller

SPC reference	573300-0100

2.14-1 Pressure roller - check

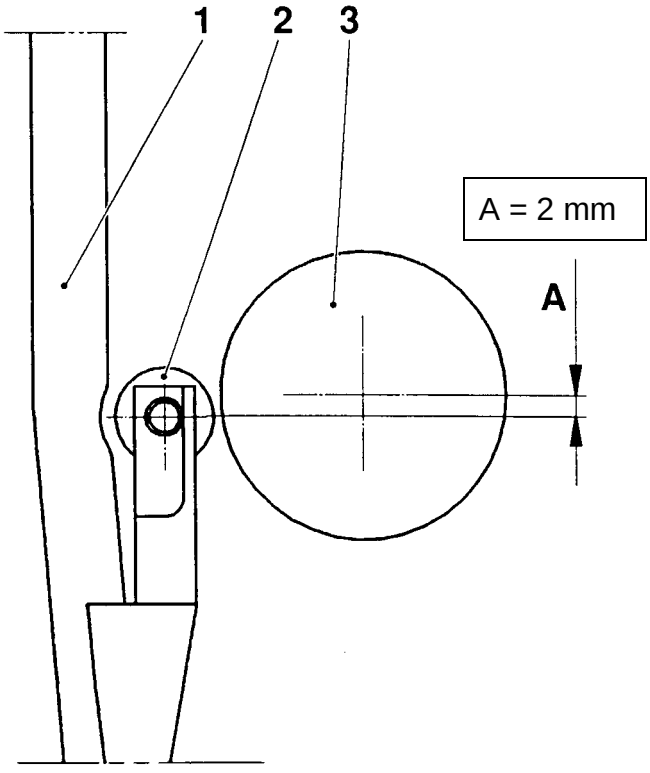
Machine status	Main power OFF Air OFF
SPC reference	573300-0100

WARNING! **Danger of burns.**
The filling pipe (1) and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

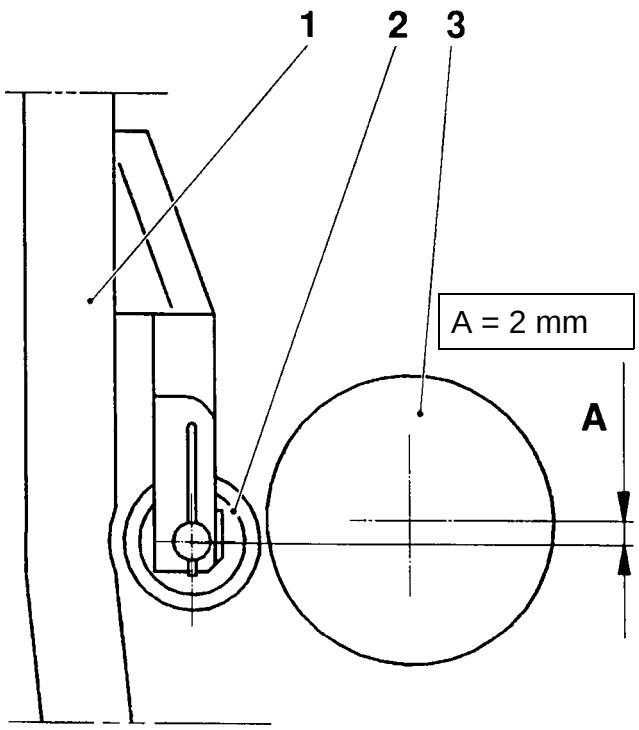
Check that the pressure roller (2) rotates freely, that its bearing play does not exceed 0,5 mm, and that the surfaces is not worn. Replace the roller as required.

Check that distance A is appr 2 mm. If required, adjust by raising or lowering the lower forming ring.

MM2.21B5684B01en.fm



Packaging material width 85 mm



Packaging material width 105 mm

1 Filling pipe
2 Pressure roller
3 Counter roller

2.15 Filling pipe

SPC reference	573300-0100

2.15-1 Filling pipe - check

Machine status	Main power OFF Air OFF
SPC reference	573300-0100

WARNING! **Danger of burns.**
The filling pipe (5) and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

a) Replace the O-rings (2) and (7) and the gasket (1).

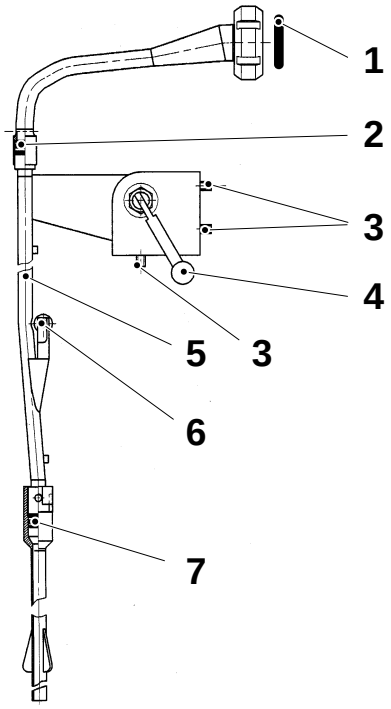
b) Check that the filling pipe is centred in the machine. If required, adjust with the setting screws (3).

Note! Sufficient pressure between the pressure roller (6) and the roller in the upper forming ring must be obtained.

c) Check that the lock handle (4) moves freely.

d) Check the pressure roller (6). Replace as required, according to page 75.

e) Check the position of the pressure roller relative the counter roller, according to page 75.



1 Gasket
2 O-ring
3 Setting screw
4 Lock handle
5 Filling pipe
6 Pressure roller
7 O-ring

MM2.21B5684B01en.fm

2.16 Constant flow valve group

SPC reference	736620-0200

2.16-1 Constant-flow valve group - remove

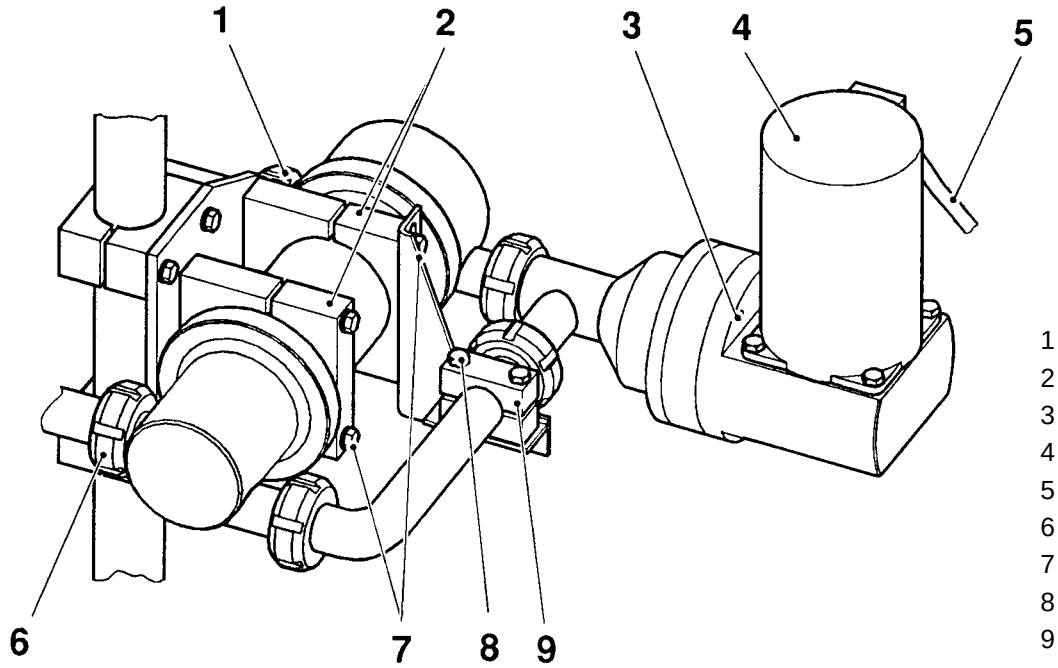
Machine status	Main power OFF Air OFF
SPC reference	736620-0200

WARNING! **Danger of burns.**
The constant-flow valve group and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Risk of personal injury.**
The constant-flow valve group is heavy. Make sure that you stand steadily when removing it.

a) Disconnect the electric cable (5) from the stepping motor (4).
b) Remove the two screws (8) and clamp (9).
c) Undo the nuts (1) and (6).
d) Remove the four screws (7) and clamps (2).
e) Lift the complete valve group.
f) Undo the screws (3) and remove the stepping motor.

MM2.21B5684B01en.fm



1 Nut
2 Clamp
3 Screw
4 Stepping motor
5 Electric cable
6 Nut
7 Screw
8 Screw
9 Clamp

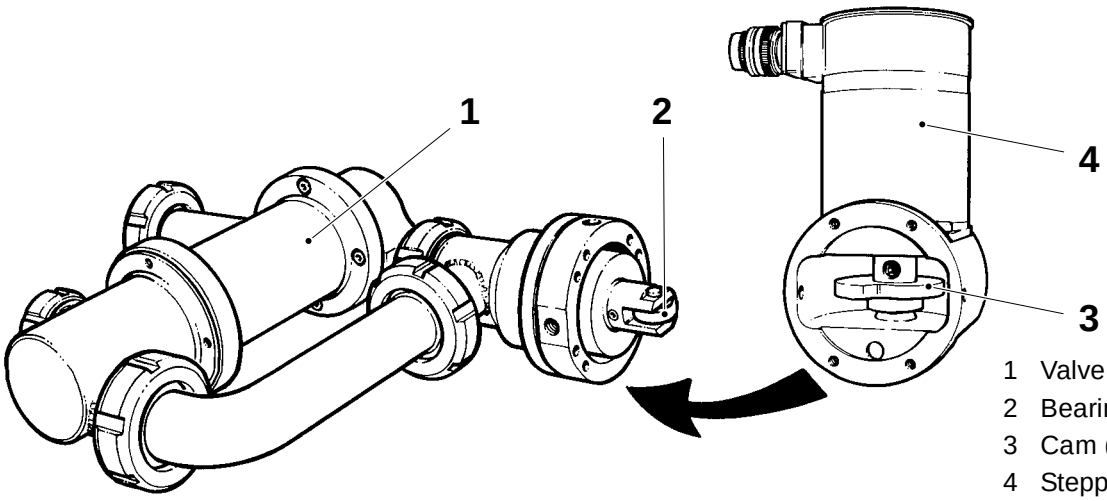
2.16-1 Constant-flow valve group - fit

Machine status	Main power OFF Air OFF
SPC reference	736620-0200

WARNING! **Risk of personal injury.**
The constant-flow valve group is heavy. Make sure that you stand steadily when removing it.

a) Fit the stepping motor (4) and valve group (1).

Note! The top of the cam (3) is to face the bearing roller (2).



1 Valve group
2 Bearing roller
3 Cam (top)
4 Stepping motor

MM2.21B5684B01en.fm

(Cont'd)

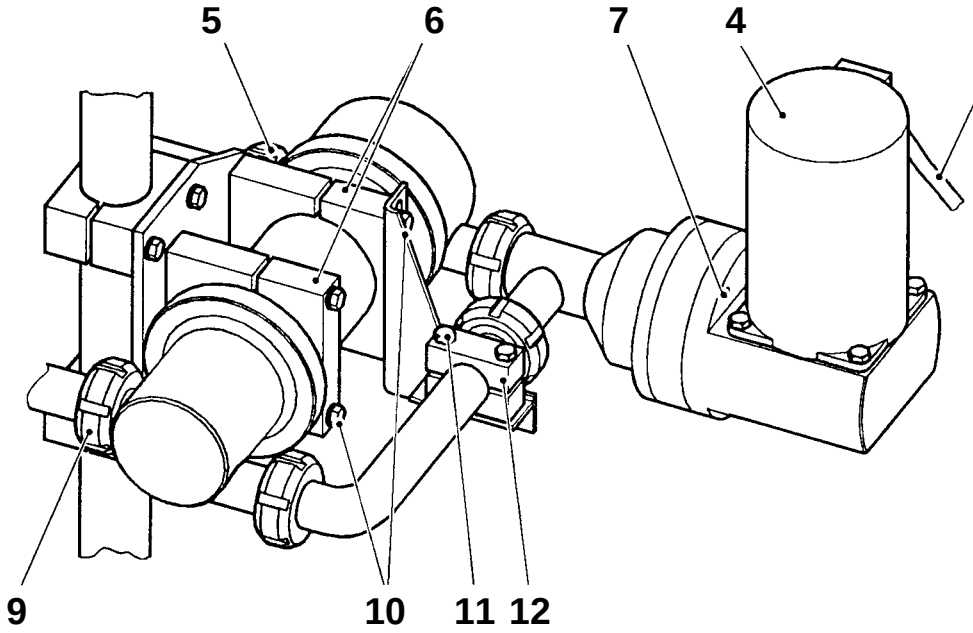
(Cont'd)

b) Put the assembly in place and fit the clamps (12) and screws (11) and tighten.

c) Fit the nuts (5) and (9).

d) Fit the clamp (6) and screws (10) and tighten.

e) Reconnect the electric cable (8) to the stepping motor.



5 Nut
6 Clamp
7 Screw
8 Electric cable
9 Nut
10 Screw
11 Screw
12 Clamp

MM2.21B5684B01en.fm

2.17 Constant flow valve

SPC reference	736620-0200

2.17-1 Constant flow valve - check

Machine status	Main power OFF Air OFF
SPC reference	736620-0200

Regulating valve

WARNING! **Risk of personal injury.**
The spring (8) is under compression.

Check the following components for wear or damage:

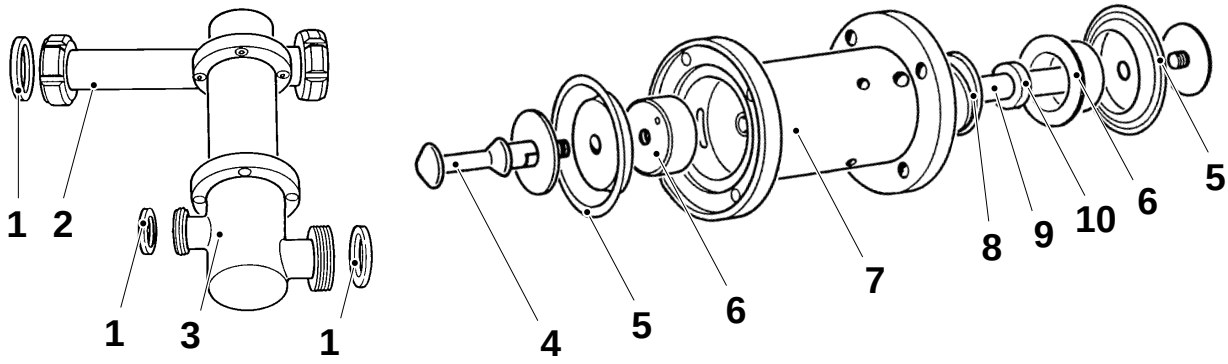
- two membranes (5),
- shock absorber (10),
- three seal rings (1),
- spring (8),
- disc (6),
- valve cone (4),
- valve rod (9),

bushings of the valve spring housing (7).

Insert the valve rod into the valve housing.

Make sure that it moves smoothly. Replace as required.

Note! If the valve housing bushings have to be replaced, the **entire** valve housing has to be replaced as well.



1 Seal ring
2 Lateral body
3 Control module
4 Valve cone
5 Membrane
6 Disc
7 Valve spring housing
8 Spring
9 Valve rod
10 Shock absorber

(Cont'd)

MM2.21B5684B01en.fm

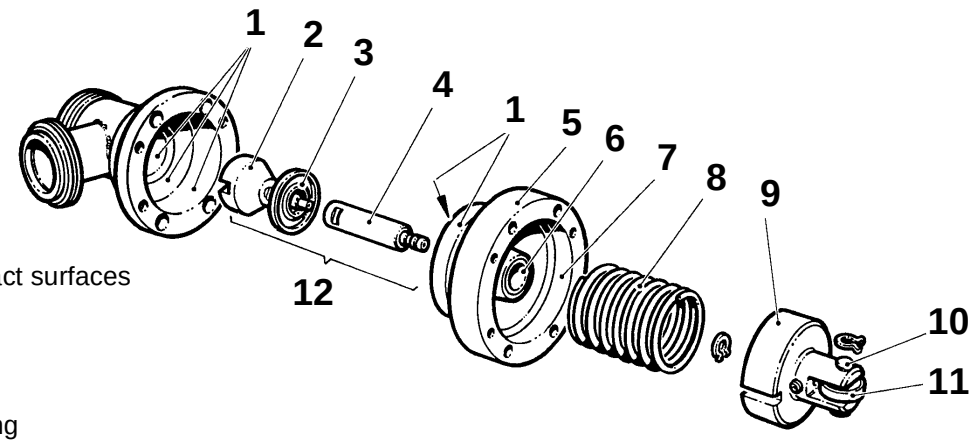
(Cont'd)

Dosing valve

WARNING! **Risk of personal injury.**
The spring (8) is under compression.

Check the following components for wear or damage:

- membrane (3),
- valve spring (8),
- rod section (4),
- contact surfaces (1) of the valve housing,
- contact surfaces (7) of the valve bearing housing,
- valve cone (2),
- bushings (6) of the valve bearing housing,
- axle pin (10) and bearing roller (11) in the plunger (9).



1 Valve housing, contact surfaces
2 Valve cone
3 Membrane
4 Rod section
5 Valve bearing housing
6 Bushing
7 Valve bearing housing, contact surfaces
8 Valve spring
9 Plunger
10 Axle pin
11 Bearing roller
12 Valve rod assembly

Check the movement of the valve rod assembly (11) and that the valve spring and rod section are not bent or otherwise damaged.

Replace as required.

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2.17-2 Constant flow valve - disassemble

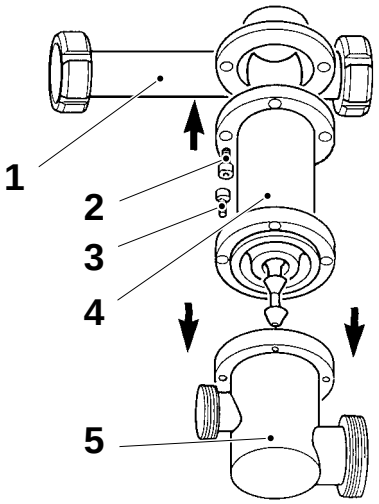
Machine status	Main power OFF Air OFF
SPC reference	736620-0200

Regulating valve

a) Undo the four screws (2) and remove the lateral body (1).

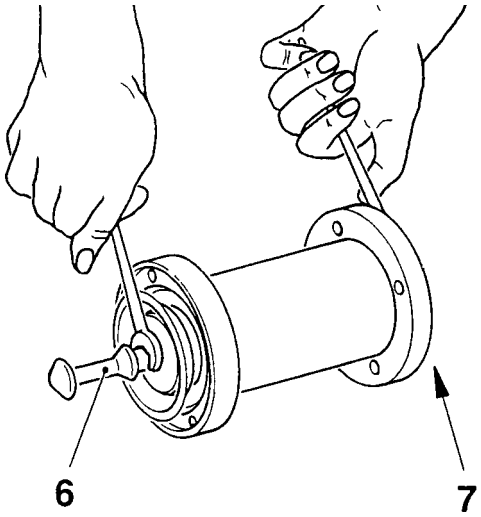
b) Undo the four screws (3) and remove the valve spring housing (4).

c) Lift off the control module (5).



1 Lateral body
2 Screw
3 Screw
4 Valve spring housing
5 Control module

d) Remove the valve cone (6) and undo the screw (7).



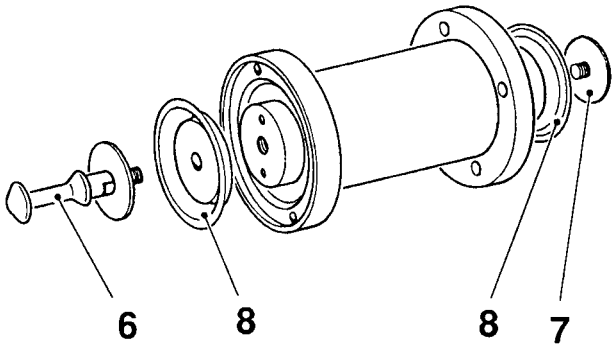
6 Valve cone
7 Screw

(Cont'd)

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(Cont'd)

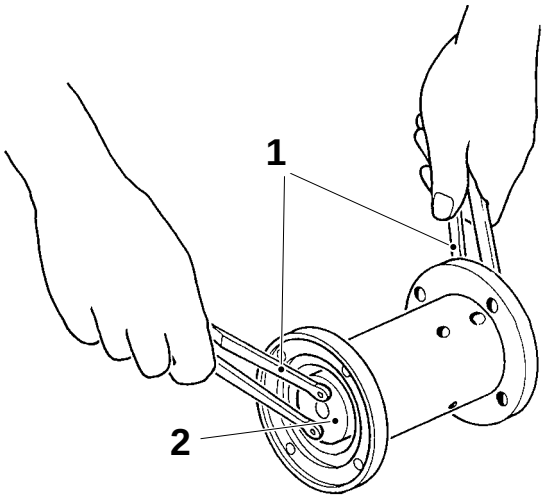
e) Remove the two membranes (8).



6 Valve cone
7 Screw
8 Membrane

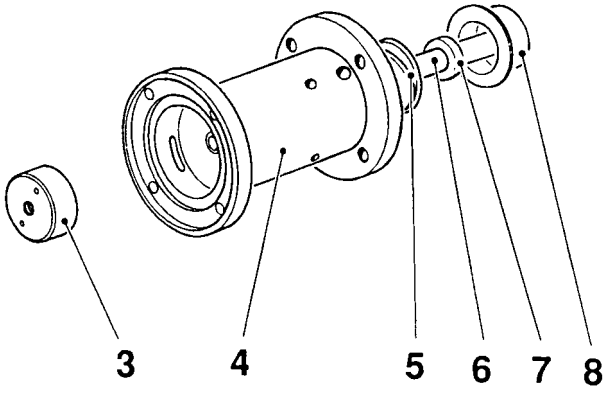
WARNING! **Risk of personal injury.**
The spring (5) is under compression.

f) Unscrew the threaded discs (2) with the aid of two pin spanners (1).



1 Pin spanner
2 Disc

g) Remove the shock absorber (7), spring (5), and valve rod (6).



3 Disc
4 Valve spring housing
5 Spring
6 Valve rod
7 Shock absorber
8 Disc

(Cont'd)

MM2.21B5684B01en.fm

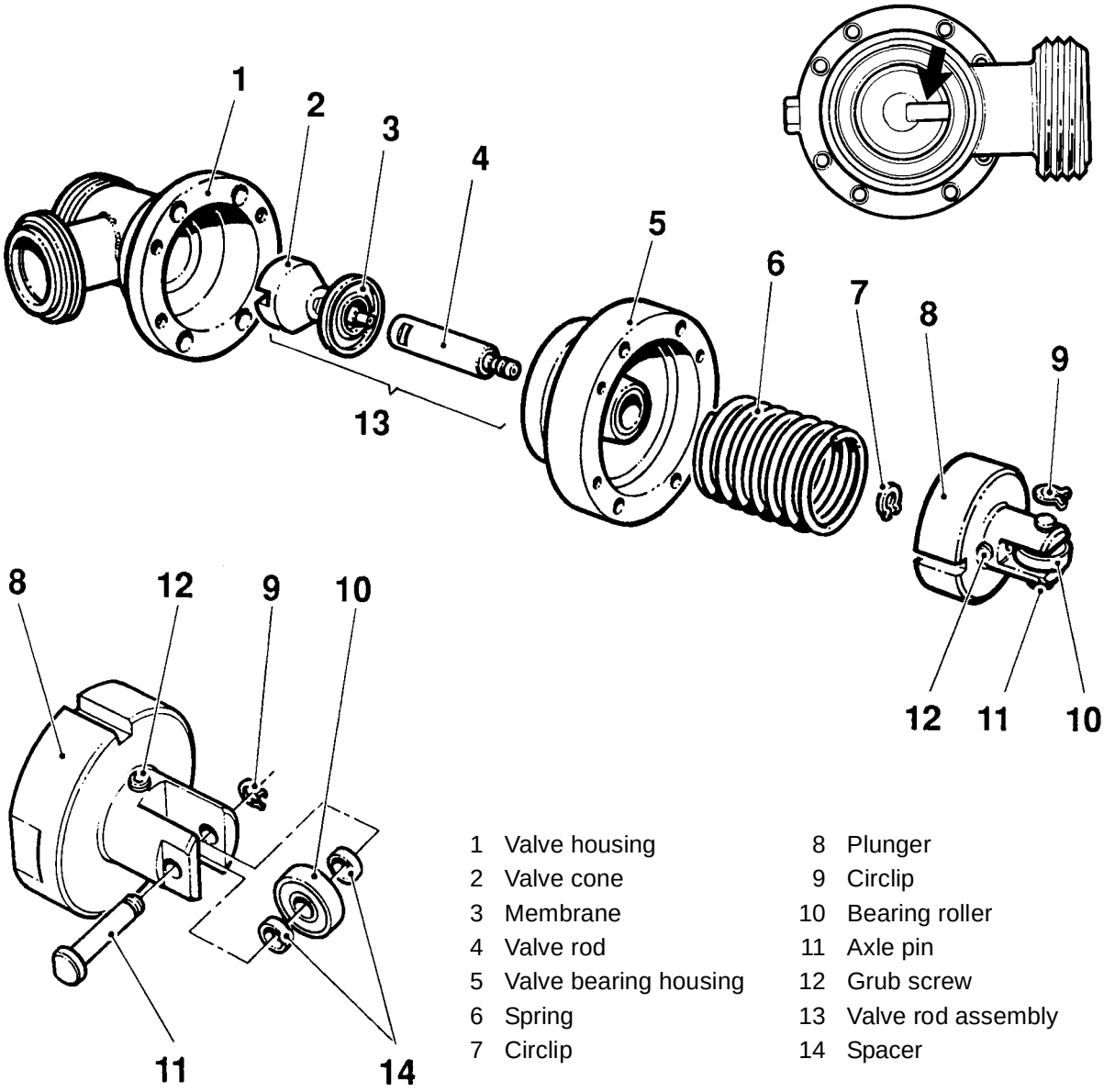
(Cont'd)

Dosing valve

Note! Note the correct location of the slit in the valve cone (arrow).

a) Remove the valve bearing housing (5) from the valve housing (1).

b) Remove the circlip (9), the two spacers (14), the bearing roller (10), and the axle pin (11) from the fork of the plunger (8).



MM2.21B5684B01en.fm

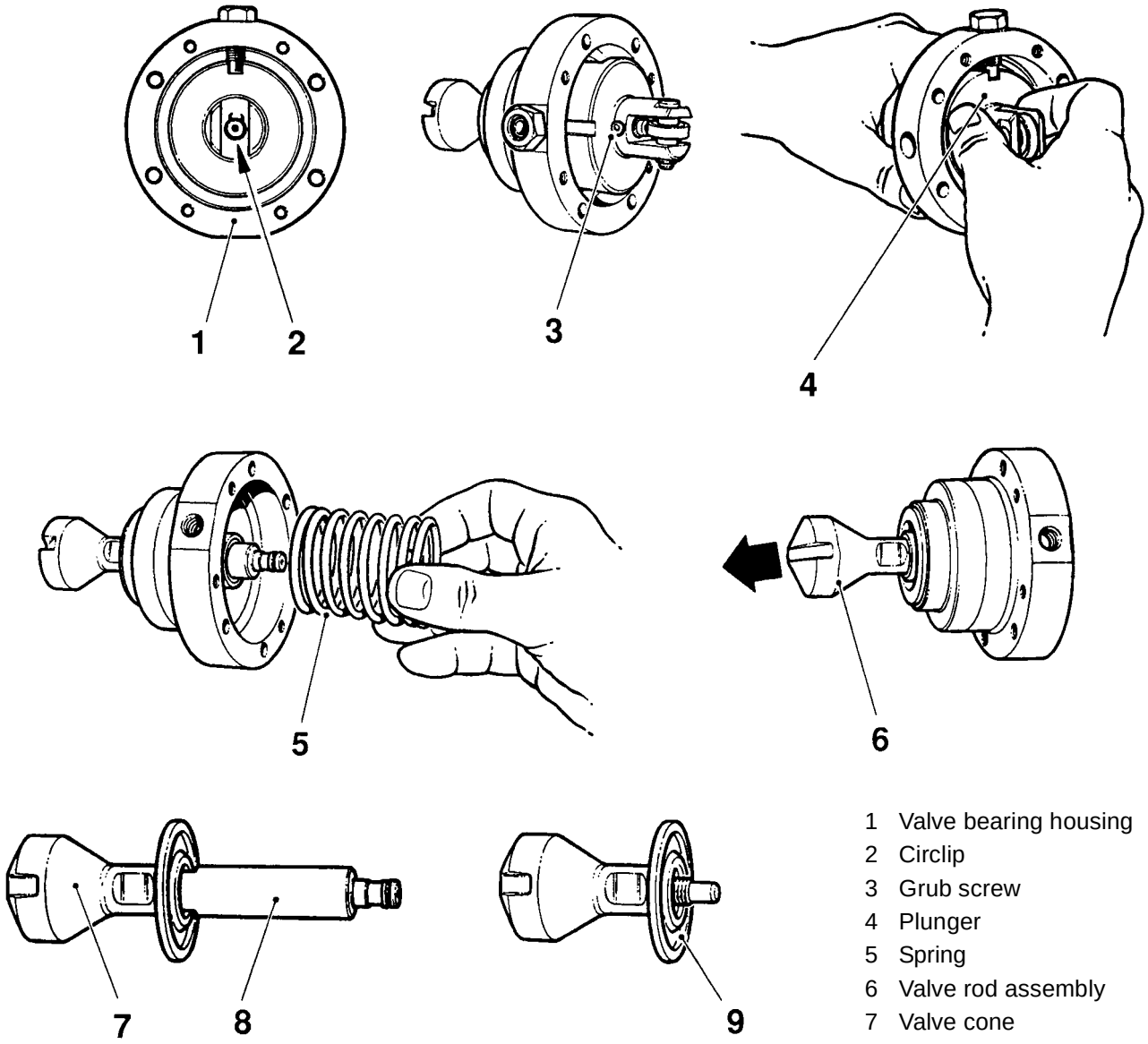
1	Valve housing	8	Plunger
2	Valve cone	9	Circlip
3	Membrane	10	Bearing roller
4	Valve rod	11	Axle pin
5	Valve bearing housing	12	Grub screw
6	Spring	13	Valve rod assembly
7	Circlip	14	Spacer

(Cont'd)

(Cont'd)

WARNING! **Risk of personal injury.**
The spring (5) is under compression.

c) Remove the circlip (2) and loosen the two grub screws (3). Remove the plunger (4).



1 Valve bearing housing
2 Circlip
3 Grub screw
4 Plunger
5 Spring
6 Valve rod assembly
7 Valve cone
8 Valve rod
9 Membrane

d) Remove the spring (5).

e) Pull out the valve rod assembly (6).

f) Twist off the valve cone (7) and remove the valve rod (8) and membrane (9).

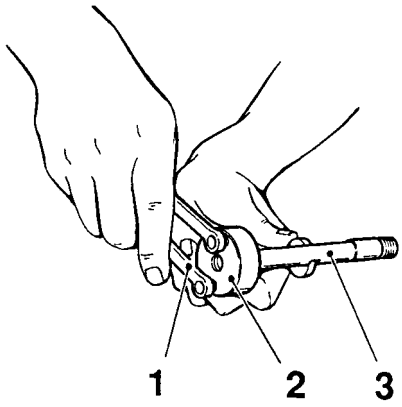
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2.17-3 Constant flow valve - assemble

Machine status	Main power OFF Air OFF
SPC reference	736620-0200

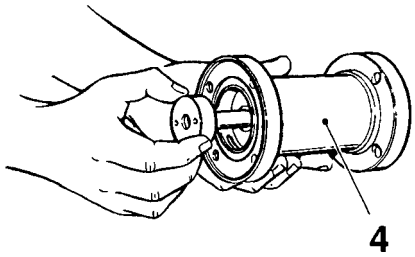
Regulating valve

a) Fit the disc (2) on the valve rod (3) with the aid of the pin spanner (1).



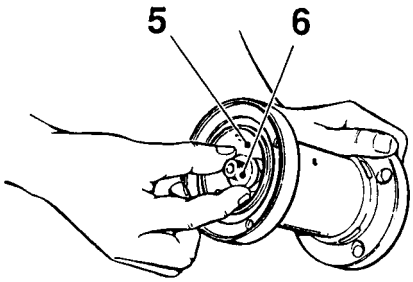
1 Pin spanner
2 Disc
3 Valve rod

b) Insert the assembly into the valve spring housing (4).



4 Valve spring housing

c) Refit the shock absorber (5) to the end of the valve rod (6).



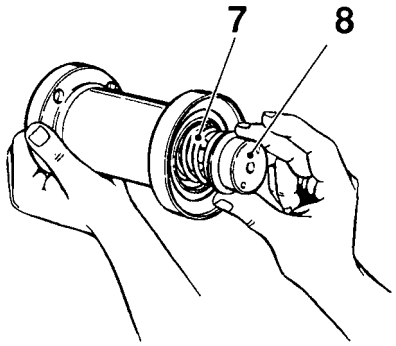
5 Shock absorber
6 Valve rod

(Cont'd)

MM2.21B5684B01en.fm

(Cont'd)

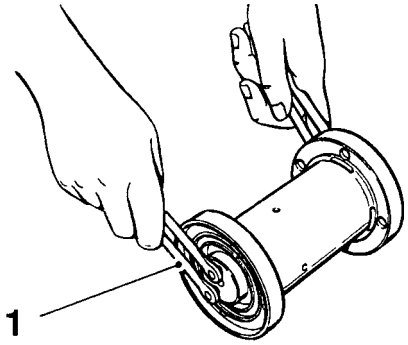
d) Insert the valve spring (7) and screw on the disc (8).



7 Valve spring
8 Disc

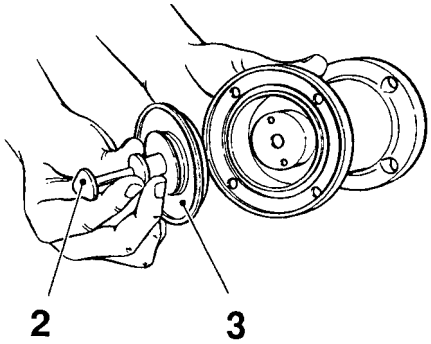
e) Tighten the discs with the pin spanners (1).

Note! Do not lubricate any components in the control valve.



1 Pin spanner

f) Fit together the membrane (3) and valve cone (2).



2 Valve cone
3 Membrane

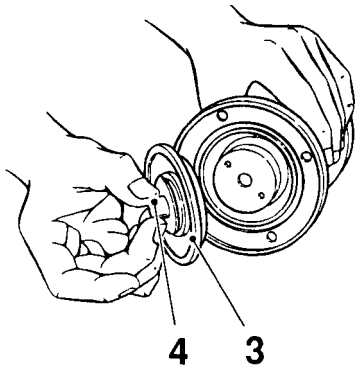
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MM2.21B5684B01en.fm

(Cont'd)

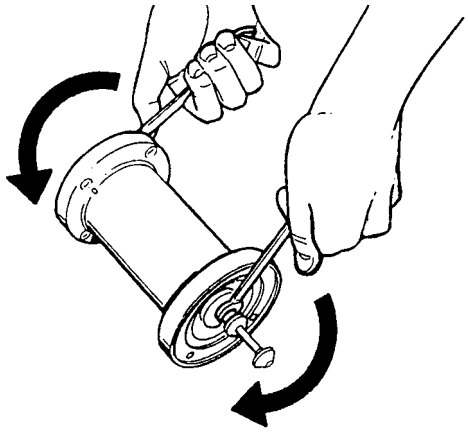
g) Fit together the membrane (3) and screw (4) on the other side of the control valve.

Note! Note the correct positioning of the membranes.

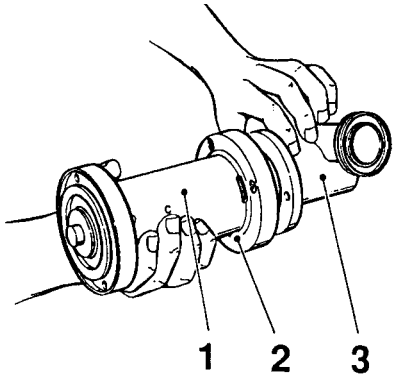


3 Membrane
4 Screw

h) Tighten the components.



i) Fit together the valve spring housing (1) and control module (3). Tighten the screws (2) alternately.



1 Valve spring housing
2 Screw
3 Control module

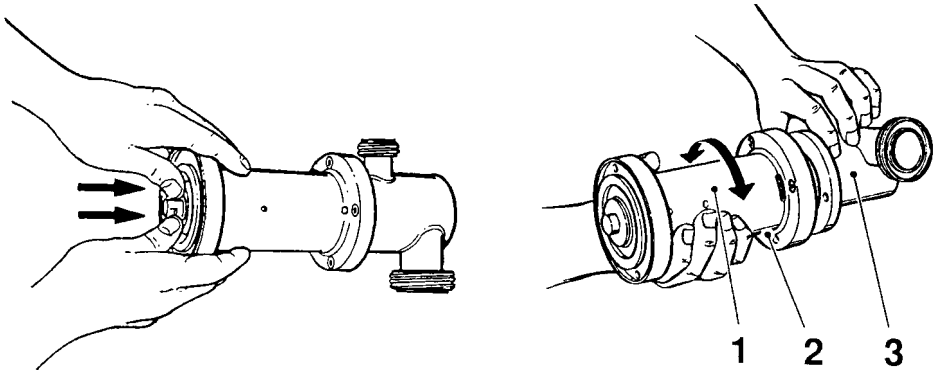
(Cont'd)

MM2.21B5684B01en.fm

(Cont'd)

j) Make sure that the valve has been assembled correctly by pushing at the threaded disc as illustrated. Check that the valve rod moves easily and without binding.

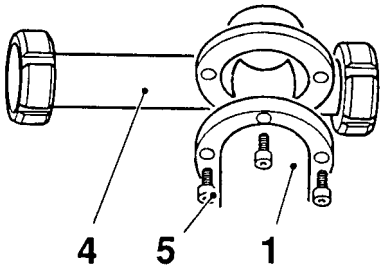
k) If not, detach the valve spring housing from the control module, turn them as illustrated, and refit them together. Tighten the screws alternately and check the movement of the valve rod once more.



1 Valve spring housing
2 Screw
3 Control module

l) Fit the lateral body (4) to the valve spring housing (1).

m) Tighten the screws (5) alternately.



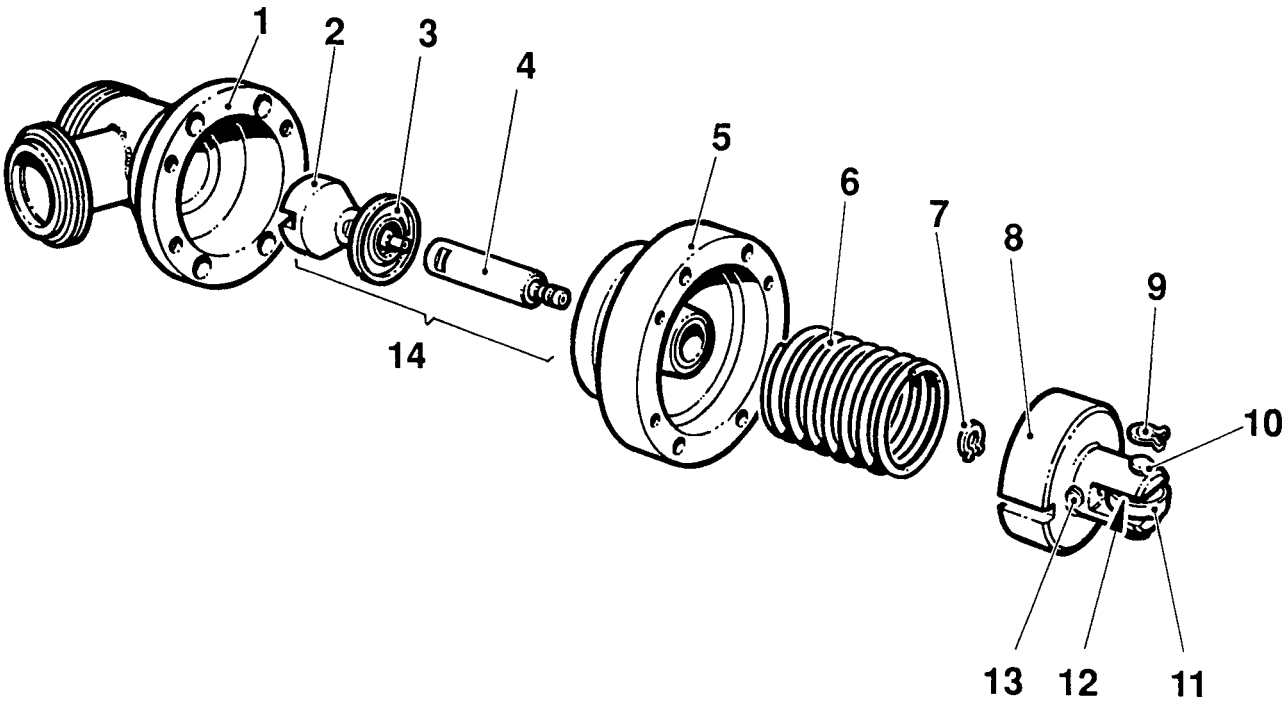
1 Valve spring housing
4 Lateral body
5 Screw

(Cont'd)

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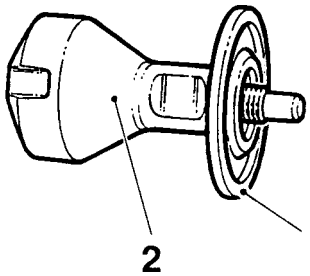
(Cont'd)

Dosing valve



1	Valve housing	8	Plunger
2	Valve cone	9	Circlip
3	Membrane	10	Axle pin
4	Valve rod	11	Bearing roller
5	Valve bearing housing	12	Spacer
6	Spring	13	Grub screw
7	Circlip	14	Valve rod assembly

MM2.21B5684B01en.fm

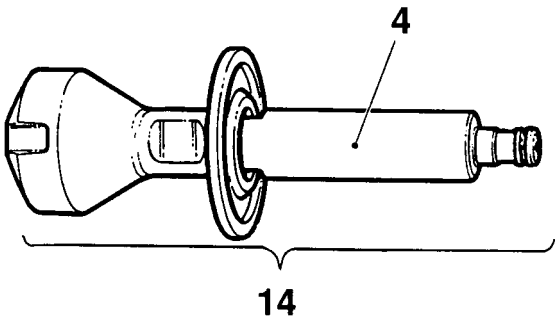


2 Valve cone
3 Membrane

a) Fit the membrane (3) on the valve cone (2) (lip facing **away** from the cone).

(Cont'd)

(Cont'd)

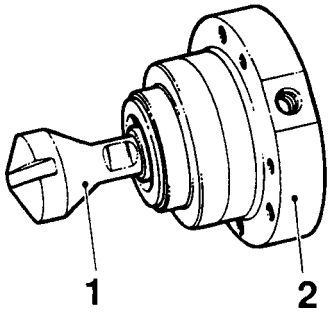


4 Valve rod
14 Valve rod assembly

b) Fit the valve cone with membrane to the valve rod (4) tighten.

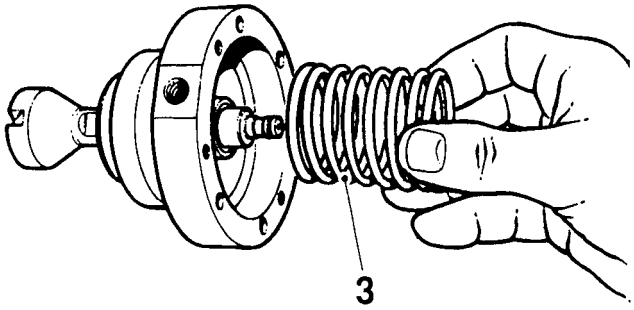
c) Insert the valve rod assembly (1) into the valve bearing housing (2).

Note! Make sure the lip of the membrane enters the groove.



1 Valve rod assembly
2 Valve bearing housing

d) Insert the spring (3) into the valve bearing housing.



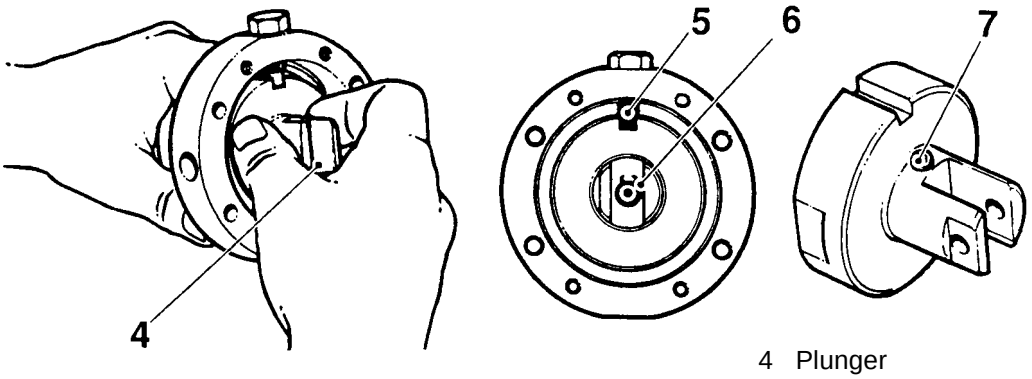
3 Spring

(Cont'd)

MM2.21B5684B01en.fm

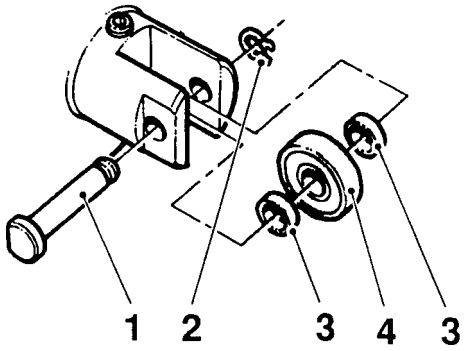
(Cont'd)

e) Slide the plunger (4) on to the valve rod and lock it with the two grub screws (7) and the circlip (6).



4 Plunger
5 Guide lug
6 Circlip
7 Grub screw

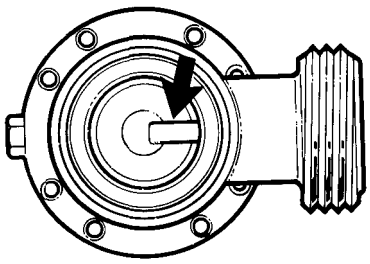
Note! Make sure the guide lug (5) enters the cut-out in the plunger.



1 Axle pin
2 Circlip
3 Spacer
4 Bearing roller

MM2.21B5684B01en.fm

f) Refit the axle pin (1), spacers (3) bearing roller (4), and circlip (2) to the fork of the control module.



g) Check that the slit (arrow) are correctly positioned relative the connection, as illustrated.

2.18 Sterilisation system, steam

SPC reference	560190-0300

2.18-1 Sterilisation system, steam - check

Machine status	Main power OFF Air OFF
SPC reference	560190-0300

WARNING! **Danger of burns.**
The three-way valve and the steam trap may be hot. If necessary, wear heat-resistant gloves.

WARNING! **Risk of escaping steam which may cause burns.**

a) Check all hoses and hose clips. Replace as required.

b) Replace all gaskets in the pipe-lines.

c) Check that steam temperature monitor A20, A26 on the control panel, is set at 130° C, according to page 209.

d) Clean the steam trap and check its function.

e) Check the perforated safety shields for damage; replace as required.

MM2.21B5684B01en.fm

2.19 Steam valves

SPC reference	560190-0300

2.19-1 Steam valve - overhaul

Machine status	Main power OFF Air OFF
SPC reference	560190-0300

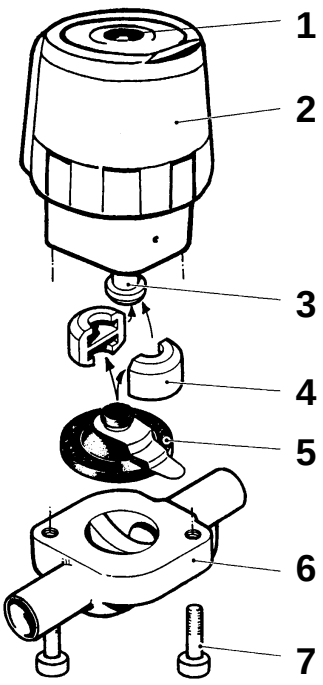
WARNING! **Risk of escaping steam which may cause burns.**
Turn off the steam before commencing work.

WARNING! **Risk of personal injury.**
The spring is under compression.

a) Undo the two screws (7).

b) Remove the diaphragm (5) from the compressor (4).

c) On replacing the diaphragm:
   - turn on the switch on the pneumatic panel, check the pneumatic diagram for the correct valve,
   - tighten the screws finger-tight,
   - turn off the switch,
   - tighten the screws fully with a spanner.



1 Indicator
2 Cap / actuator
3 Spindle
4 Compressor (two pieces)
5 Diaphragm
6 Body
7 Screw

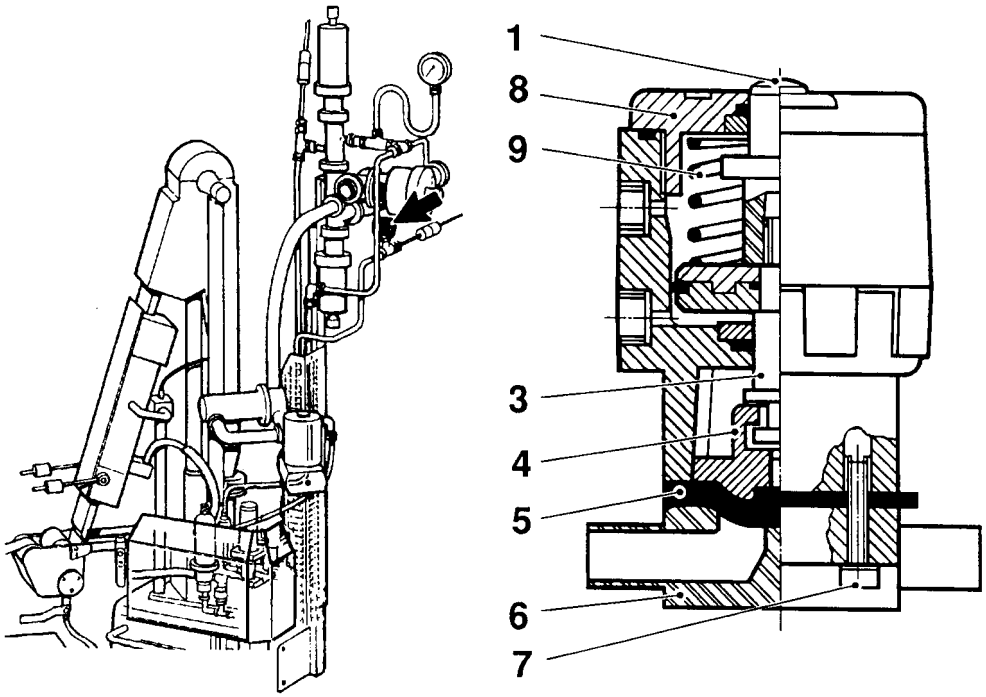
(Cont'd)

MM2.21B5684B01en.fm

(Cont'd)

d) Unscrew the cover (8) of the steam valve and check the spring (9). Replace it, if necessary.

e) After cleaning, or if grease is needed, the sealing surfaces must be regreased (code ”M” grease, see the lubricant recommendations, page 210).



1 Indicator
3 Spindle
4 Compressor (two pieces)
5 Diaphragm
6 Body
7 Screw
8 Cover
9 Spring

MM2.21B5684B01en.fm

2.20 Steam regulator

SPC reference	560190-0300

2.20-1 Steam regulator - check/set

Machine status	Preheating
SPC reference	560190-0300

WARNING! **Danger of burns.**
The steam regulator (2) and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

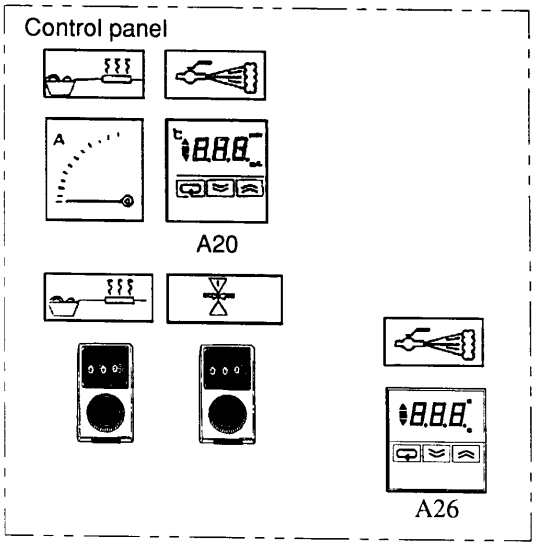
a) Check that the steam temperature is appr 130° C during preheating, sterilization I, as indicated by steam temperature monitor A20 and A26 on the control panel.

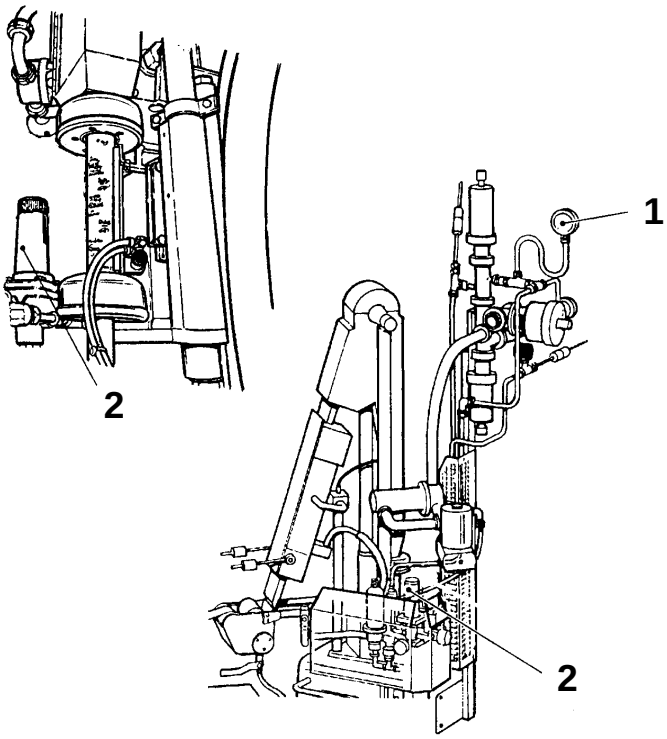
b) Check that the high steam pressure is appr 170 kPa (1,7 bar) as indicated on the steam pressure gauge (1).

c) Adjust the steam pressure by means of the high steam pressure regulator (2).
Turn in to + increases the high steam pressure.
Turn in to - decreases the high steam pressure.

Note! The steam temperature/pressure must be checked during preheating, sterilization I, in accordance with the OM book.

1 Steam pressure gauge
2 Steam regulator, high steam pressure





MM2.21B5684B01en.fm

2.21 Pneumatic unit

SPC reference	580159-0200

2.21-1 Pneumatic unit - check

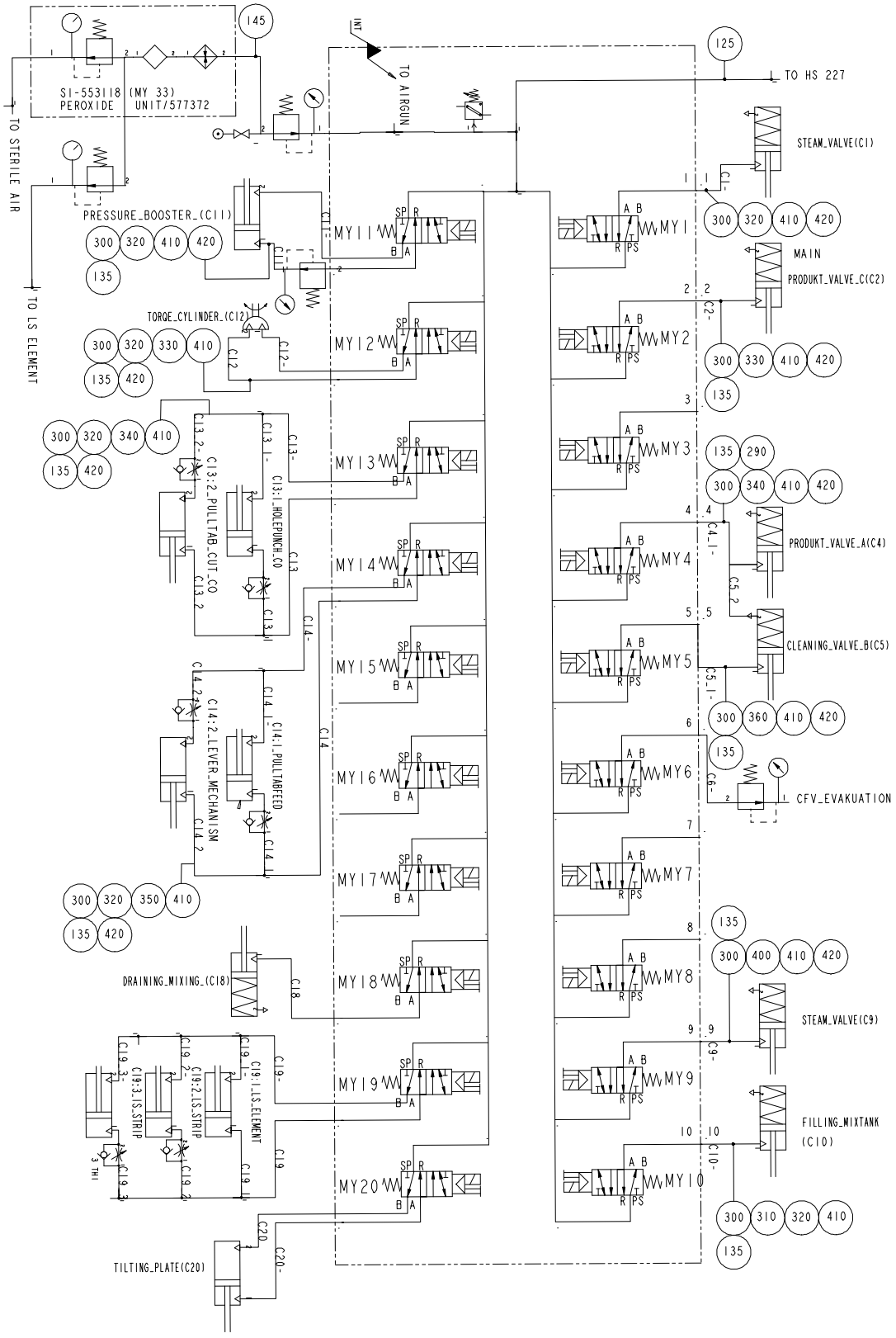
Machine status	Machine power OFF Air OFF
SPC reference	580159-0200

Check the hoses and the air connections to make sure that there is no leakage.

(Cont'd)

MM2.21B5684B01en.fm

(Cont'd)



MM2.21B5684B01en.fm

3 Sides

MM2.21B5684C01en.fm

3.1 Side frames

SPC reference	633007-0100 633010-0100 633006-0100 633011-0100

3.1-1 Side frames - check/set

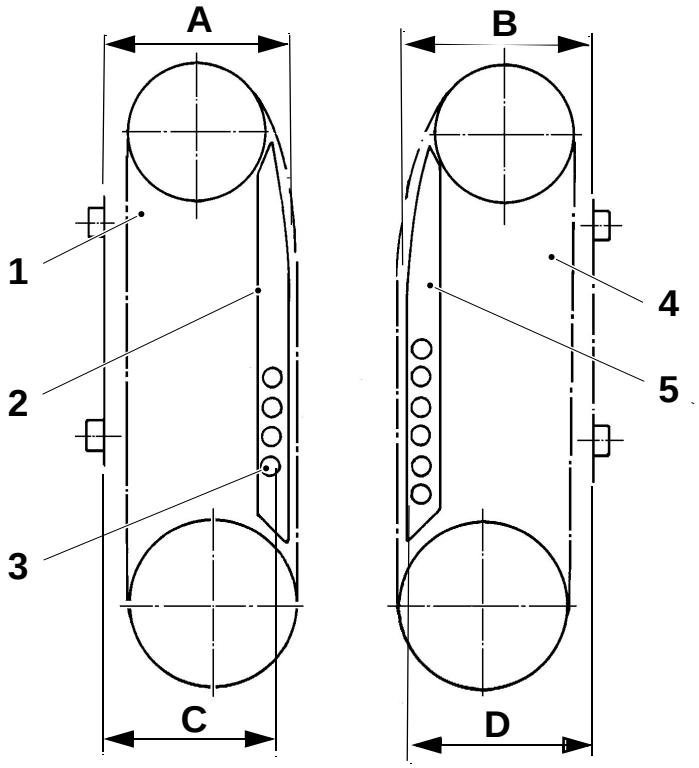
Machine status	Main power OFF Air OFF
Tools	TP No 517480
SPC reference	633007-0100 633010-0100 633006-0100 633011-0100

a) Remove the sides according to page 102.

b) Remove the twin chains, according to page 115.

c) Check distances A, B, C, and D by means of the tool.
   - The chain rails on the heating side are fixed.
   - The chain rails on the pressure side are adjustable.

d) Distances A and B can be adjusted by means of shims underneath the pressure bearing holder of the heating side.



A = 135,1 ±0,1 mm
B = 135,3 ±0,1 mm
C = 130,8 ±0,1 mm
D= 130,0 ±0,1 mm

1 Heating side
2 Chain rail, heating side
3 Pressure bearing holder
4 Pressure side
5 Chain rail, pressure side

MM2.21B5684C01en.fm

(Cont'd)

(Cont'd)

e) Fit tool TP 517480 (5) on the heating or pressure side.

f) Fit the upper part of the tool by means of the lower part of the tool, i. e. its legs (1), as illustrated.

g) Check that the plate with the measuring points (3) for the chain rails is placed against the chain rails.

h) Check the distance settings of the chain rails by means of an 0,40 mm feeler gauge.

i) Distance A = heating side

j) Distance B = pressure side

k) Unscrew the handles (2) on the tool and turn the plate with its measuring points (4) towards the pressure bearing holders. Fit the handles.

l) Check the distance settings of the pressure bearing holders by means of an 0,40 mm feeler gauge.

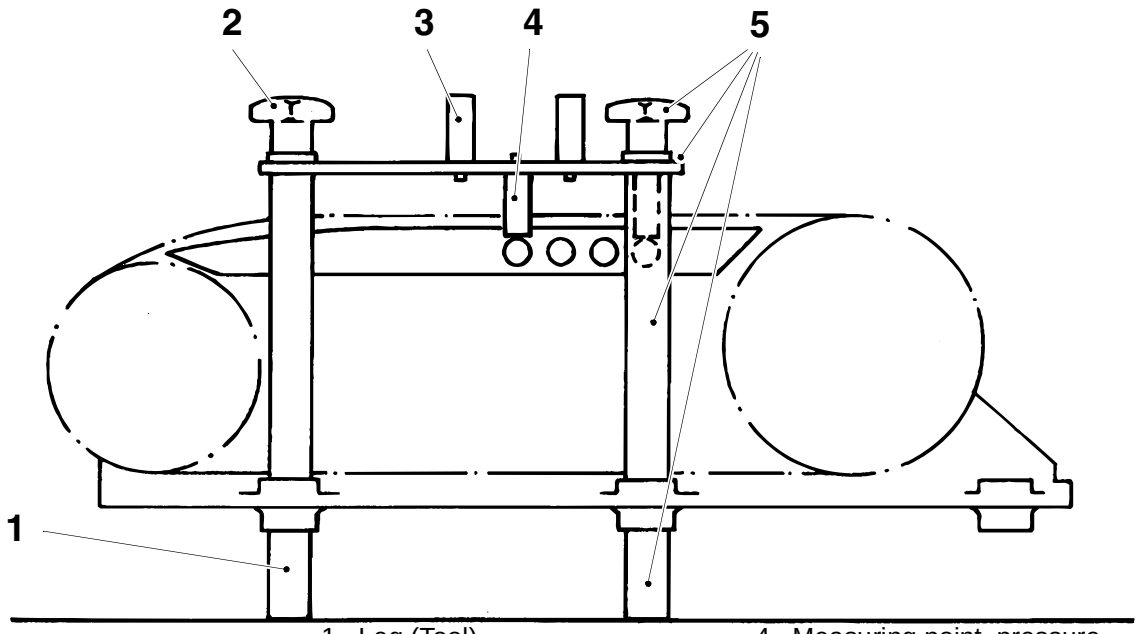
m) Distance C = heating side

n) Distance D= pressure side

o) Fit the twin chains according to page 115.

p) Fit the sides according to page 102.

MM2.21B5684C01en.fm



1 Leg (Tool)
2 Handle
3 Measuring point, chain rail
4 Measuring point, pressure bearing holder
5 Tool TP 517480

Note! Note that the illustration shows the tool positioned on the **heating side** to check the pressure bearing holder.

3.1-2 Side frames - remove/fit

Machine status	Main power OFF Air Off
SPC reference	633007-0100 633010-0100 633006-0100 633011-0100

WARNING! Danger of injury due to pinching or crushing. The jaws may move. Turn off the main switch before commencing work. The sides are heavy.

For synchronization purposes, one jaw in each side and the side frame itself are provided with rivets.

a) Run the machine so that the rivet (2) in the jaw is level with the rivet (1) in the side frame.

b) Check that the yokes (4) on the lower sprockets of all the sides are positioned in such a way that the setting screws (3) are accessible from the outside.

c) Disconnect the flexible cable to the heating side at the terminal on the machine body.

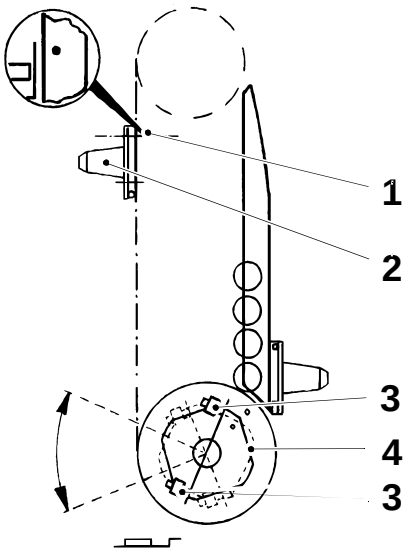
d) Undo the mounting screws (5) and lower the side on to the shelf.

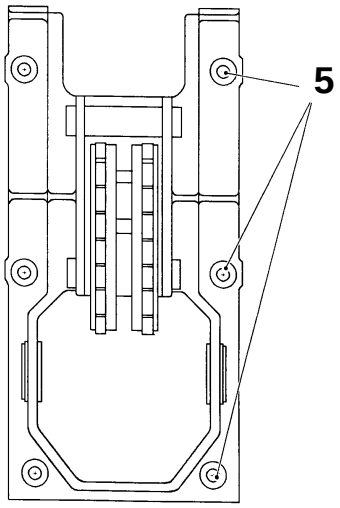
e) Disconnect the lubrication oil pipe and the hydraulic oil pipe of the pressure side.

f) On fitting the side, make sure the jaws and yoke are positioned as described above.

g) If the yoke is incorrectly positioned when the rivets are level, the side frame must be lowered once more and the chain moved forward by complete revolutions until both the jaw with the rivet and the yoke are correctly positioned.

MM2.21B5684C01en.fm





1 Rivet in the side frame
2 Rivet in the jaw
3 Setting screw
4 Yoke
5 Screw

3.2 Pressure side

SPC reference	633007-0100 633006-0100

3.2-1 Pressure side - check

Machine status	Main power OFF Air Off
SPC reference	633007-0100 633006-0100

WARNING! Danger of injury due to pinching or crushing. The jaws may move.

Remove the sides, according to page 102.

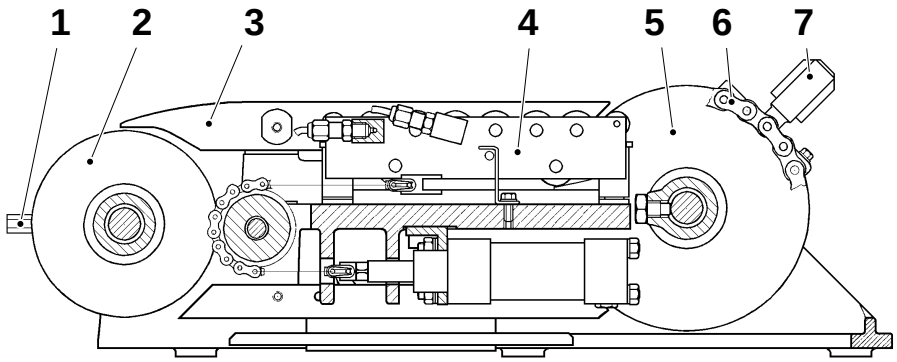
Remove the twin chain (6), according to page 115.

Check:

- the bearing holder (4) according to 105,
- the bearings in the upper idler sprocket (2) and the lower sprocket unit (5); in case of bearing play, dismantle and replace, according to page 111 and 112,
- that the chain rails (3) are not worn, according to page 104,
- the condition of the twin chain (6), according to page 114,
- the roller bars and pressure rubbers of the pressure jaws (7), according to page 120.
  Fit the twin chain (6), according to page 115.

Check that the chain tensioners (1) apply correct tension to the twin chain according to page 116.

Fit the sides, according to page 102.



1 Chain tensioner
2 Upper idle sprocket
3 Chain rail
4 Pressure bearing holder
5 Lower sprocket
6 Twin chain
7 Pressure jaw

MM2.21B5684C01en.fm

3.3 Chain rails, pressure side

SPC reference	259606-0200 2565757-0100

3.3-1 Chain rails, pressure side - check/set

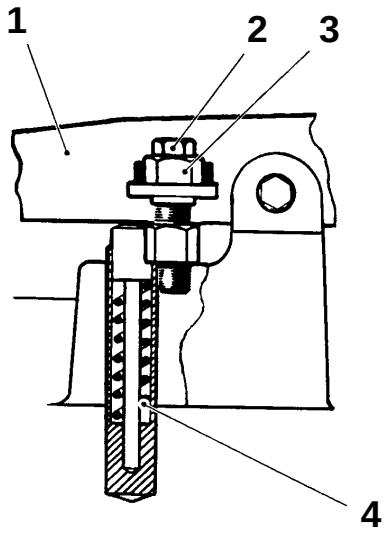
Machine status	Main power OFF Air Off
SPC reference	259606-0200 2565757-0100

WARNING! Danger of injury due to cutting.
The chain rail may have sharp edges.

Check the spring suspension of the chain rails by depressing them by hand. Replace the springs (4) as required.

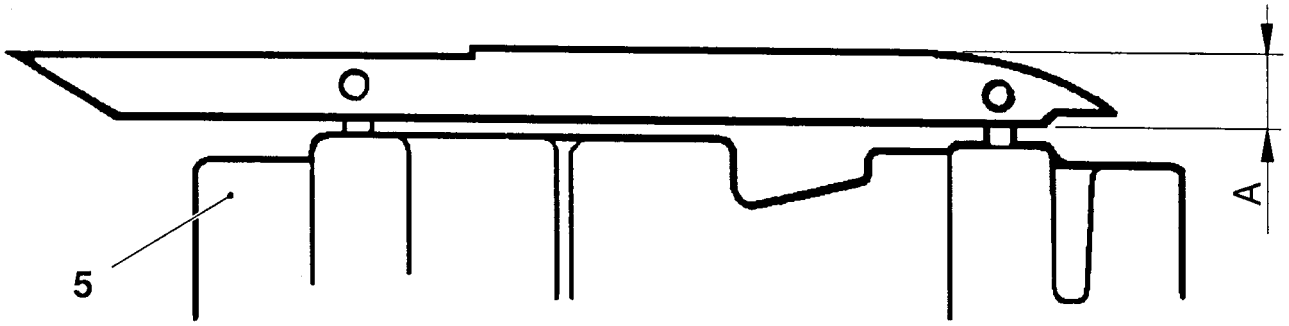
Check the chain rails (1) for wear. Thickness A of the chain rails must not be less than 29,7 mm. Replace as required.

Adjust the height of the chain rail by means of the adjustment screw (3) and secure with the lock screw (2), according to page 100.



1 Chain rail
2 Lock screw
3 Adjustment screw
4 Spring
5 Pressure side

A = min 29,7 mm



MM2.21B5684C01en.fm

3.4 Pressure bearing holder, pressure side

SPC reference	23524-0100

3.4-1 Pressure bearing holder, pressure side - check/overhaul

Machine status	Main power OFF Air Off
SPC reference	23524-0100

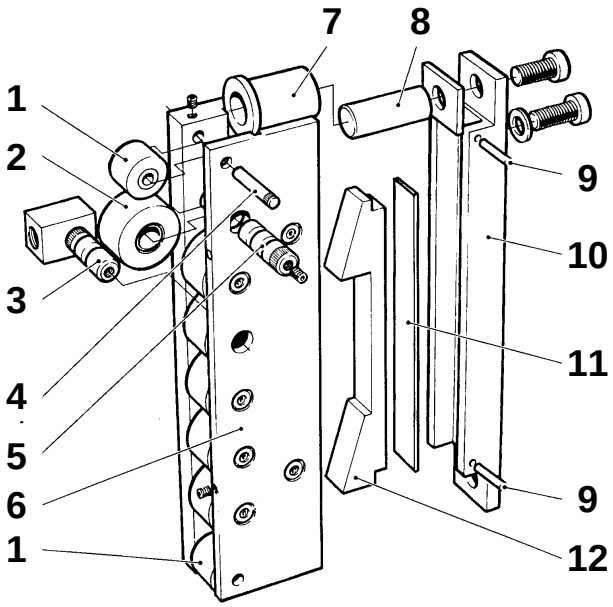
Remove the pressure bearing holder from the pressure side.

Check:

- the bearings (2),
- the bearings (1),
- the axle pins (3), (4), and (5),
- the sleeve (7),
- the axle pin (8).

Measure the various diameters and check them against the dimensions listed below. Replace as required.
Lift the yoke (12) and check the slide plate (11). Replace as required.
Check that the yoke (12) moves freely.
Clean the support (10).

MM2.21B5684C01en.fm



Pos	nom diam mm	min diam mm
2	24	23,8
1	16	15,8
5	8	7,9
3	8	7,9
4	5	4,9

1 Bearing
2 Bearing
3 Axle
4 Axle pin
5 Axle
6 Holder
7 Sleeve
8 Axle pin
9 Pin
10 Support
11 Slide plate
12 Yoke

3.5 Heating side, IH

SPC reference	2565799-0100 23523-0300

3.5-1 Heating side, IH - check

Machine status	Main power OFF Air Off
SPC reference	2565799-0100 23523-0300

WARNING! Danger of injury due to pinching or crushing. The jaws may move.

Remove the sides, according to page 102.

Remove the twin chain (5), according to page 115.

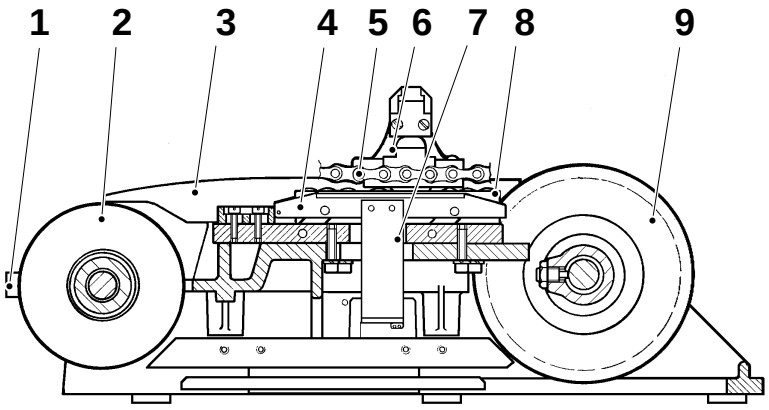
Check:

- the bearing holder (8), according to page 105,
- the contact unit (4), according to page 108,
- bearings in the upper idler sprocket (2) and the lower sprocket unit (9); in case of bearing play, dismantle and replace, according to page 111 and page 112
- that the chain rails (3) are not worn, according to page 107,
- the condition of the twin chain (5), according to page 114,
- the roller bars and inductors of the heating jaws (6), according to page 121.

Fit the twin chain (5), according to page 115.

Check that the chain tensioners (1) apply correct tension to the twin chain, according to page 116.

Fit the sides, according to page 102.



1 Chain tensioner
2 Upper idler sprocket
3 Chain rail
4 Contact rail
5 Twin chain
6 Heating jaw
7 Flexible cable
8 Pressure bearing holder
9 Lower sprocket

MM2.21B5684C01en.fm

3.6 Chain rails, heating side

SPC reference	2565799-0100 23523-0300

3.6-1 Chain rails, heating side check

Machine status	Main power OFF Air Off
SPC reference	2565799-0100 23523-0300

WARNING! Danger of injury due to cutting. The chain rail may have sharp edges.

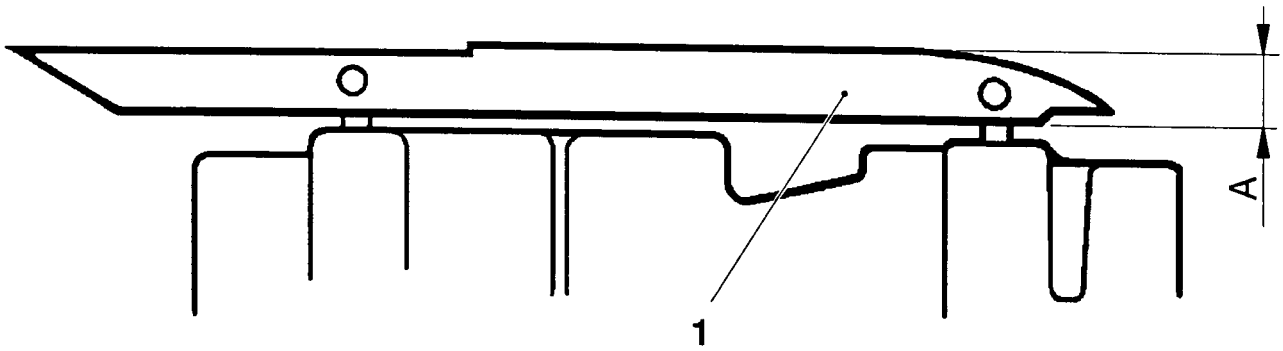
Check the chain rails (1) for wear.

Chain rail thickness **A** must not be less than 28,7 mm.

The chain rails on the heating side are fixed.

A = min 28,7 mm

MM2.21B5684C01en.fm



1 Chain rail

3.7 Contact unit

SPC reference	259857-0200

3.7-1 Contact unit - check

Machine status	Main power OFF Air Off
SPC reference	259857-0200

WARNING! Danger of injury due to cutting. The contact surface (4) may have sharp edges.

a) Undo the screws (9) and remove the contact unit.

b) Undo the screw (6) and disconnect the cable (12). Check that the insulation is intact. Minor damage to the insulation may be repaired with teflon tape, TP No 90144-10. If required, replace the cable.

c) Check the contact rails (3) and their contact surfaces (4). Replace as required.

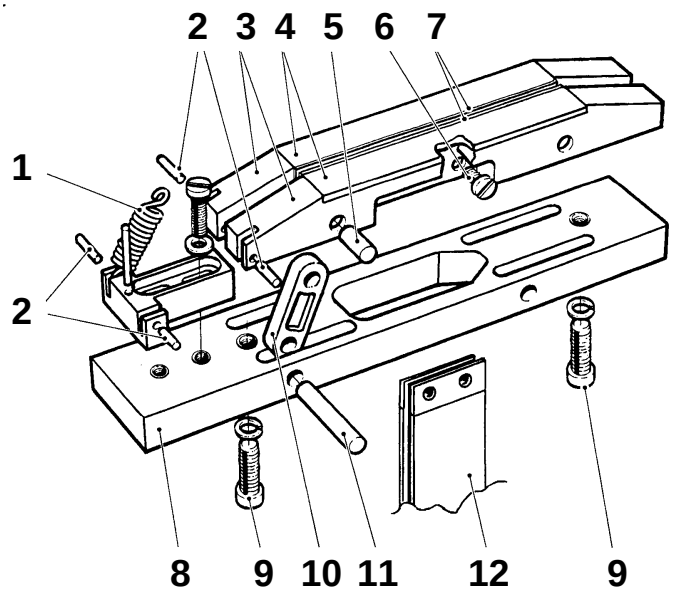
d) Force out the cylindrical pins (2) and remove the springs (1). Remove the contact rails (3) by forcing out the pins (11). Force out the pins (5) and remove the link arms (10).

e) Check that the link arms are intact and without cracking.

f) Check that the holder (8) is not bent or cracked.

g) Reassemble in reverse order.

MM2.21B5684C01en.fm



1 Spring
2 Pin
3 Contact rail
4 Contact surface
5 Pin
6 Screw
7 Intermediate plate
8 Holder
9 Screw
10 Link arm
11 Pin
12 Flexible cable

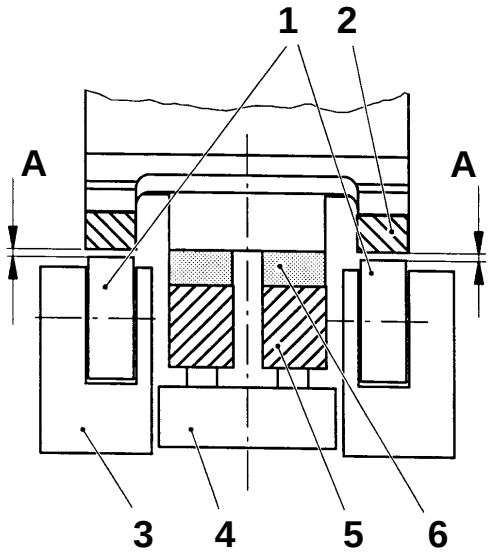
3.7-2 Contact unit - set

Machine status	Main power OFF Air Off
SPC reference	259857-0200

WARNING! Danger of injury due to cutting. The contact surface (4) may have sharp edges.

Remove the heating side and the twin chain according to page 102 and 115.

Check that gap A between the pressure rollers (1) and the jaw rail (2) is 1,2 mm.



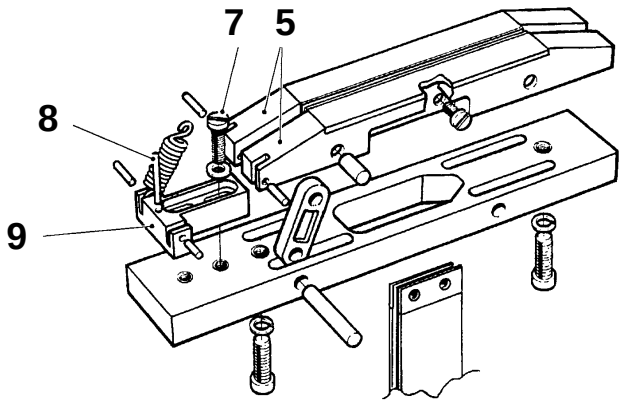
A = 1,2 mm

1 Pressure roller
2 Jaw rail
3 Pressure roller holder
4 Holder
5 Contact rail
6 Carbon brush

If not, adjust by loosening the screw (7) and shifting the spring holder (9):

- towards the contact rails: gap A decreases,
- away from the contact rails: gap A increases.

When gap A is correct, drill a hole in the holder (4) and fix the spring holder (9) with a pin (8).



5 Contact rail
7 Screw
8 Pin
9 Spring holder

MM2.21B5684C01en.fm

3.8 Pressure bearing holder, heating side

SPC reference	23534-0100

3.8-1 Pressure bearing holder, heating side - check /overhaul

Machine status	Main power OFF Air Off
SPC reference	23534-0100

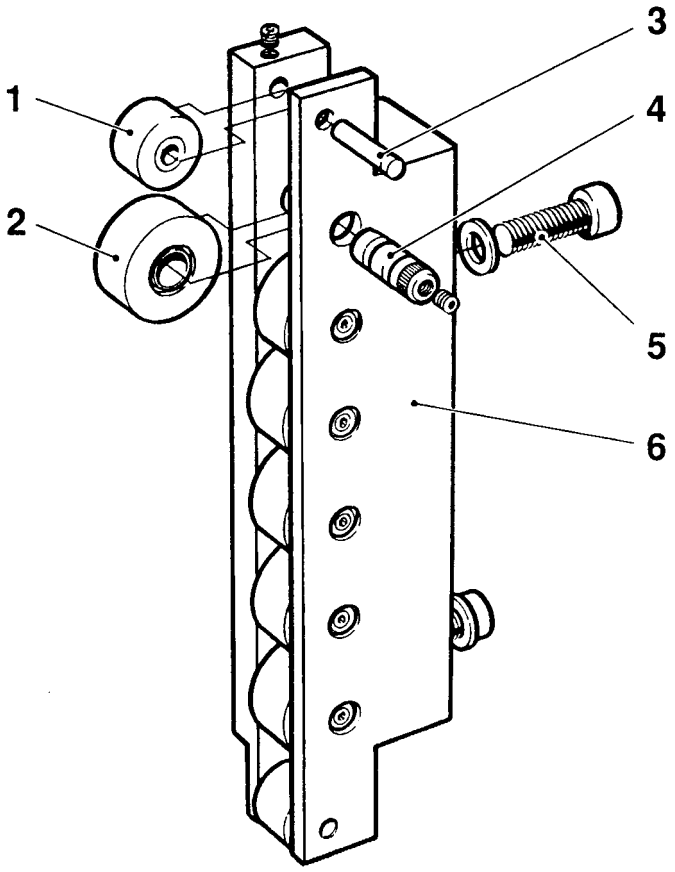
Undo the screws (5). Remove the pressure roller holder from the heating side.

Check:

- the bearings (2),
- the bearings (1),
- the axles (4) and axle pins (3).

Measure the various diameters and check them against the dimensions listed on the right, replace as required.

MM2.21B5684C01en.fm



	nominal diameter mm	minimum diameter mm
Bearing (2)	22	21,8
Bearing (1)	16	15,8
Axle (4)	8	7,9
Axle pin (3)	5	4,9

1 Bearing
2 Bearing
3 Axle pin
4 Axle
5 Screw
6 Holder

3.9 Upper idle sprocket

SPC reference	23523-0200 2565799-0100

3.9-1 Upper idle sprocket - overhaul

Machine status	Main power OFF Air Off
SPC reference	23523-0200 2565799-0100

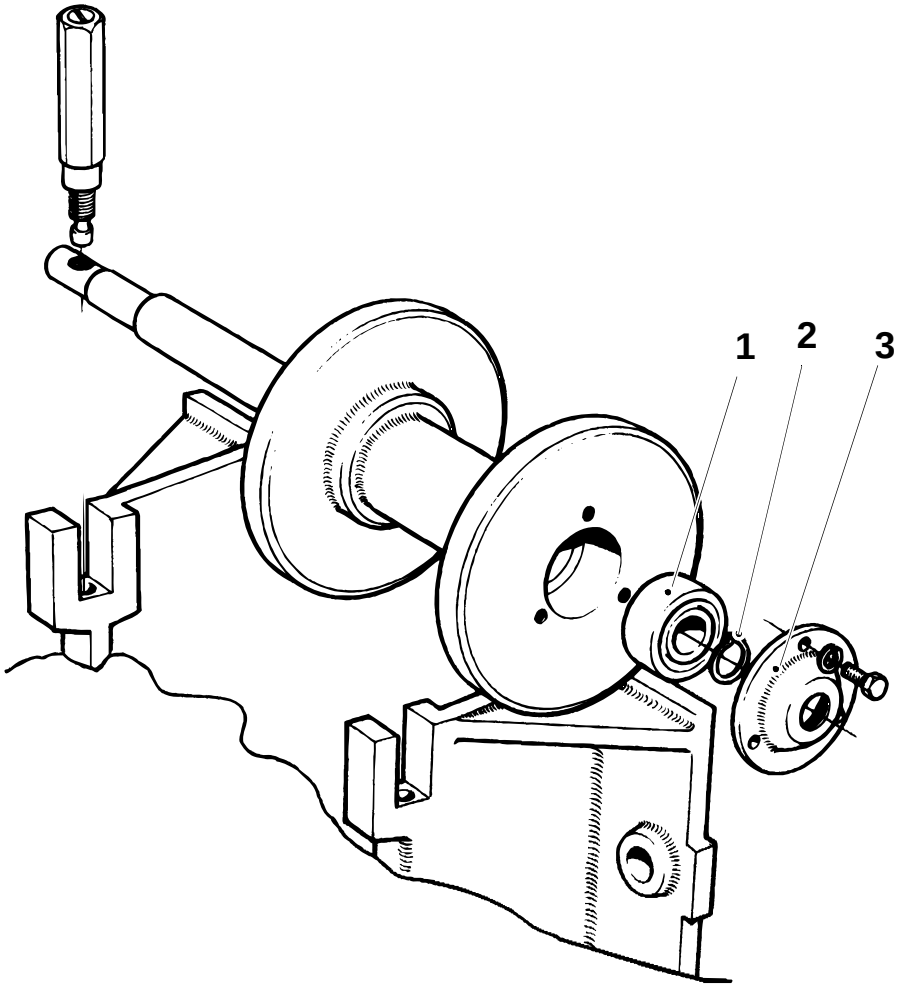
WARNING! **Risk of skin irritation.**
Before handling oil, read the safety precautions in chapter 1.

a) Remove the bearing covers (3) and check for play or wear of the sprockets. Replace as required.

b) Remove the circlip (2) and extract the bearings (1). Fill with grease, code O in the Lubricant Recommendation, see page 210.

c) Reassemble in reverse order.

MM2.21B5684C01en.fm



1 Bearing
2 Circlip
3 Bearing cover

3.10 Lower sprocket assembly

SPC reference	23523-0300 2565799-0100

3.10- 1 Lower sprocket assembly - overhaul

Machine status	Main power OFF Air Off
SPC reference	23523-0300 2565799-0100

WARNING! Danger of injury due to pinching or crushing. The sprocket (9) may rotate. The sprocket (9) is heavy.

Check the bearings (3) and replace as required.

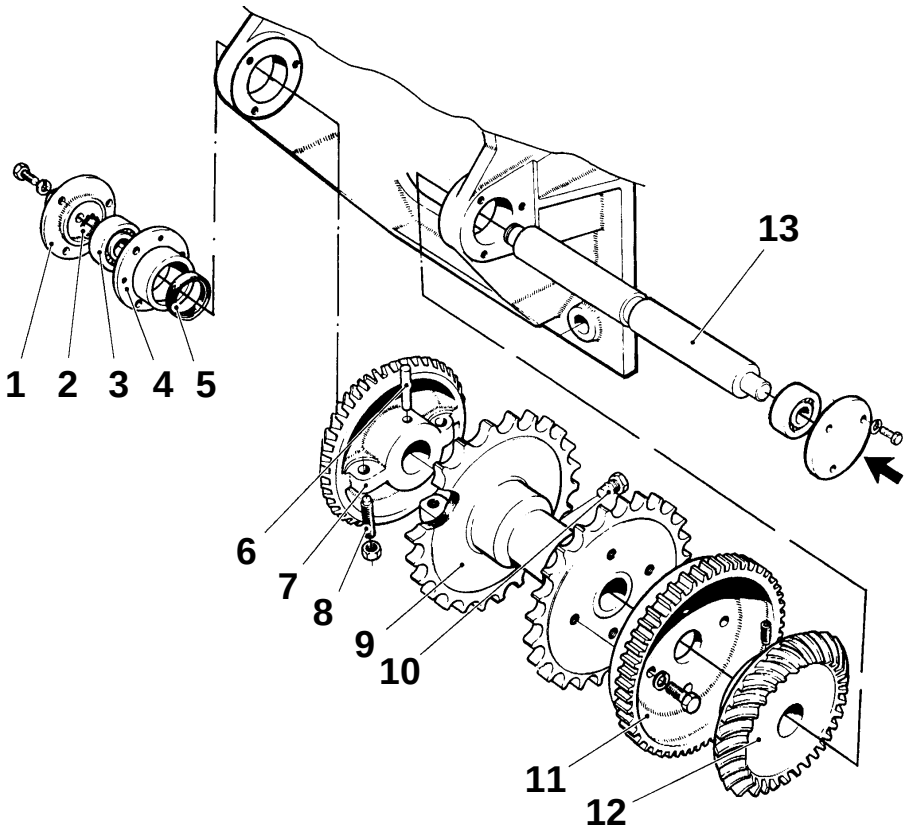
Replacement

a) Remove the bearing cover (1) and circlip (2).

b) Utilize the mounting screws on the cover to remove the bearing housing (4) by means of the puller holes.

c) Extract the bearing (3) from the bearing race.

d) Replace the seal ring (5).



1 Bearing cover
2 Circlip
3 Bearing
4 Bearing housing
5 Seal ring
6 Pin
7 Yoke
8 Adjustment screw
9 Sprocket
10 Guide screw
11 Gear, drive side
12 Sprocket
13 Shaft

MM2.21B5684C01en.fm

Dismantling of sprocket assembly

a) Remove the bearings as described above.

b) Loosen one of the adjustment screws (8) in the yoke (7) and undo the guide screw (10).

c) Tap out the pin (6).

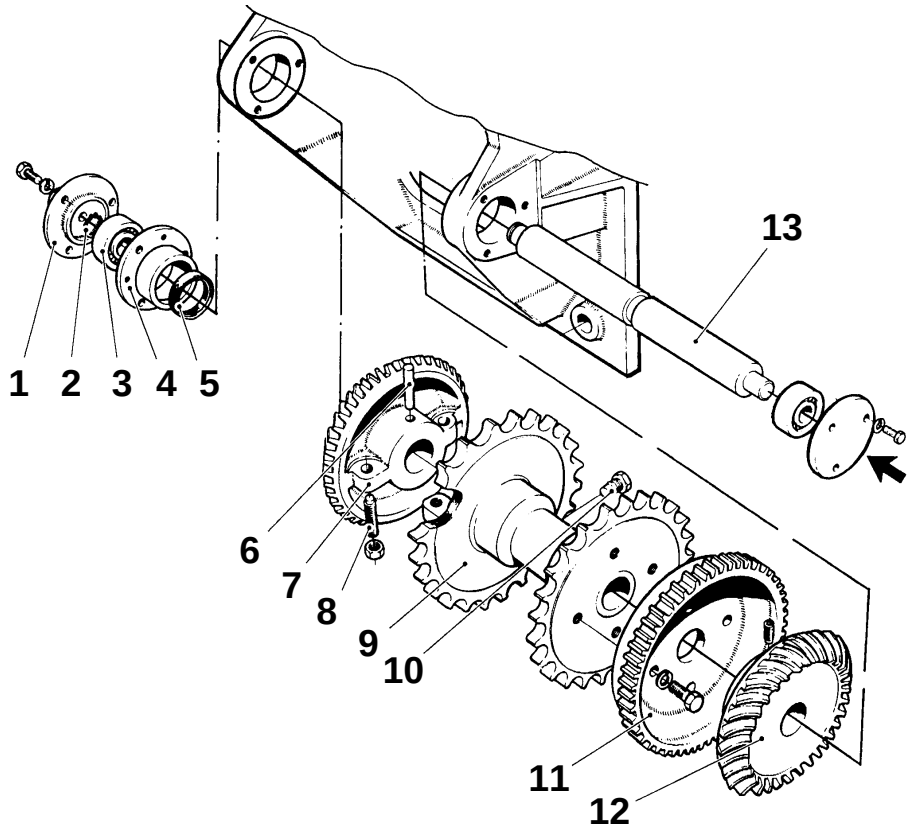
d) On the drive side, the pin in the left hand sprocket (yoke side) must be tapped out first.

e) Thereafter, slide the sprocket (9) to the left so that the pin in the right hand sprocket (12) becomes accessible and can be tapped out.

f) Force the shaft (13) in the direction of the arrow.

g) Replace damaged or worn parts.

h) Reassemble in reverse order.



1 Bearing cover
2 Circlip
3 Bearing
4 Bearing housing
5 Seal ring
6 Pin
7 Yoke
8 Adjustment screw
9 Sprocket
10 Guide screw
11 Gear, drive side
12 Sprocket
13 Shaft

MM2.21B5684C01en.fm

3.11 Twin chain

SPC reference	12563-0100

3.11-1 Twin chain - check

Machine status	Main power OFF Air Off
SPC reference	12563-0100

a) Check the holes in the round axles (3) and in the flat axles (2). If hole diameter A is bigger than 4,2 mm, replace the axles.

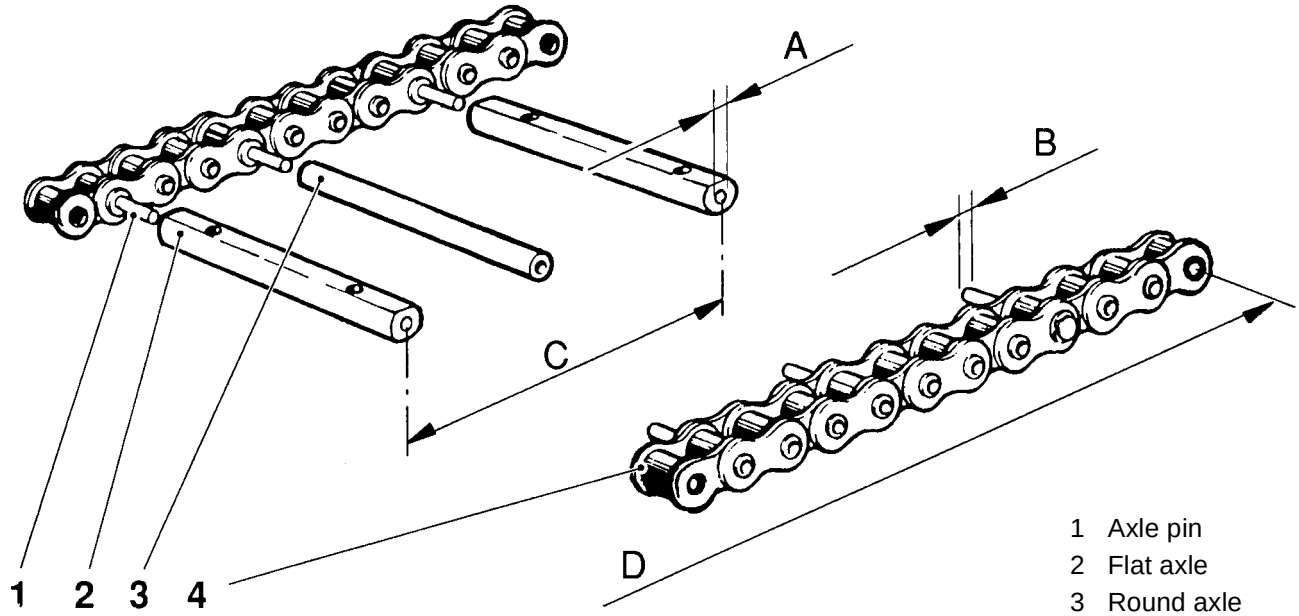
b) Check the diameter of the axle pins (1). If diameter B is smaller than 3,8 mm, replace the chain.

c) Check centre-to-centre distance C between two flat axles. If distance C is longer than 112,8 mm, replace the chain.

d) Place the chain on the floor and measure length D between the centre lines of the two outermost chain rollers, not counting the jointing link. If chain length D is longer than 1112 mm, replace the chain.

Note! All four twin chains must be replaced together as a set.

A = max 4,2 mm
B = min 3,8 mm
C = max 112,8 mm
D = max 1112 mm



1 Axle pin
2 Flat axle
3 Round axle
4 Twin chain

MM2.21B5684C01en.fm

3.11-2 Twin chain - remove/fit

Machine status	Main power OFF Air Off
SPC reference	259606-0200 23523-0300 2565757-0100 2565799-0100

WARNING! Danger of injury due to pinching or crushing. The jaws may move.

Removal

Slacken the chain tensioners (1).

Remove the chain locks (3) and pull out the chains.

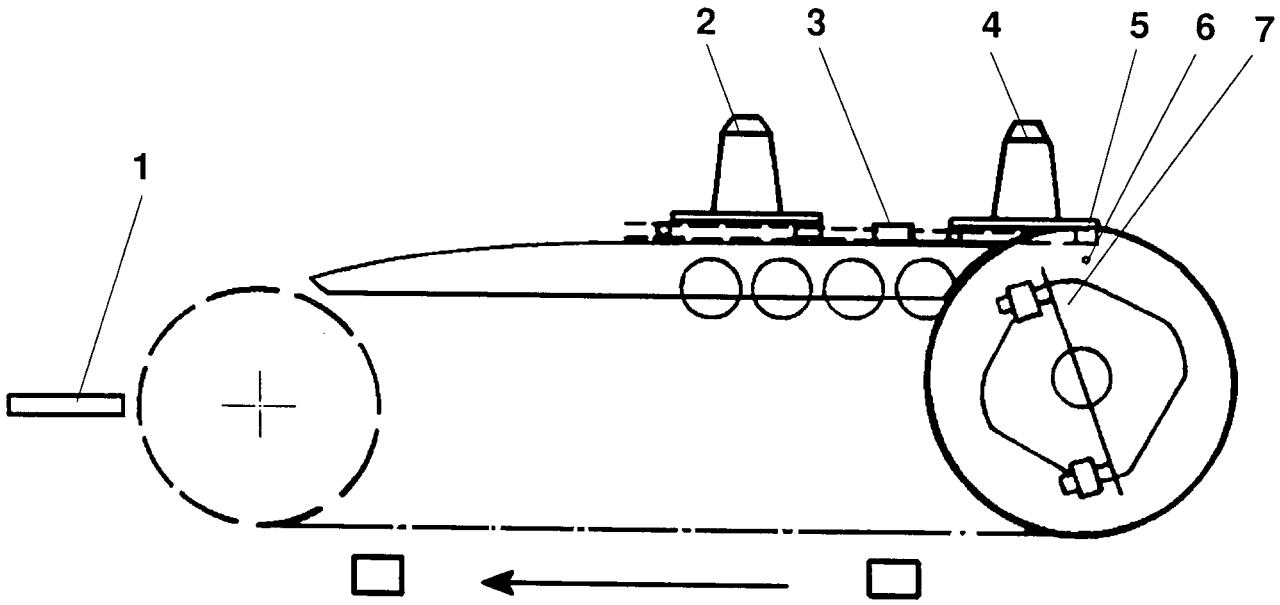
Fitting

Check that the twin chain is correctly fitted.

Make sure that the flat axle (5) for jaw No 10 (4) is positioned opposite the alignment hole (6) in the sprocket.

Tension the chain with the chain tensioners (1).

MM2.21B5684C01en.fm



1 Chain tensioner
2 Jaw No 1
3 Chain lock
4 Jaw No 10
5 Flat axle
6 Alignment hole
7 Yoke

3.12 Chain tension, twin chain

SPC reference	1988-0200

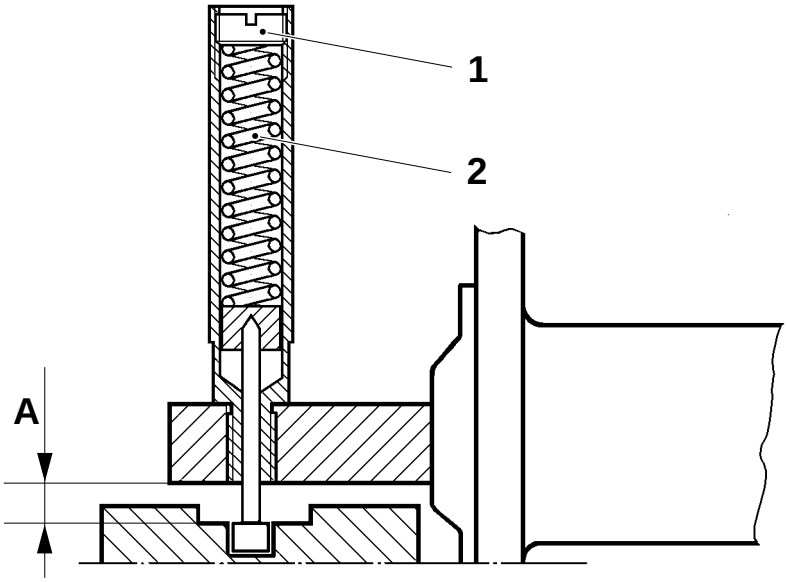
3.12-1 Chain tension, twin chain - check

Machine status	Main power OFF Air Off
SPC reference	1988-0200

Check that gap A is the same for both chain tensioners on each side.

Gap A should be 10 mm when the twin chains are new, but an increase up to 13 mm is tolerated when the chains are worn. If required, adjust with the setting screw (1).

If gap A exceeds the figures given, overhaul the chain tensioners, according to page 117.



1 Setting screw
2 Spring

MM2.21B5684C01en.fm

3.12-2 Chain tension, twin chain - overhaul

Machine status	Main power OFF Air Off
SPC reference	1988-0200

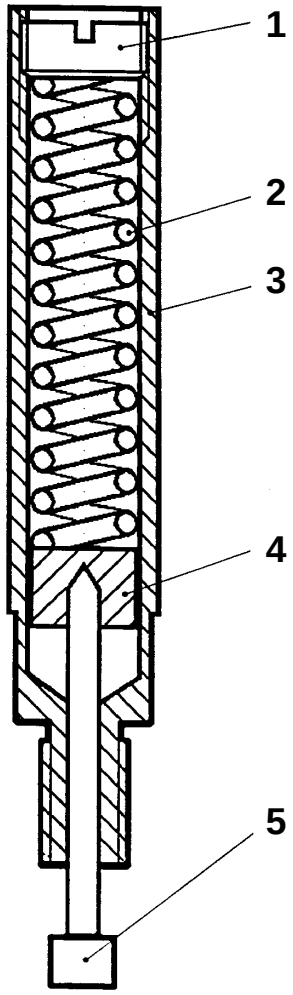
WARNING! **Risk of skin irritation.**
Before handling oil, read the Safety precautions in chapter 1.

a) Remove and clean all components.

b) Replace the spring (2) and grease the components liberally using grease code F in the Lubricant Recommendations, see page 210.

c) Turn in the setting screw (1) so that the absorber (4) is fully home in the spring cartridge (3); then turn out the screw one turn.

d) Setting according to page 116.



1 Setting screw
2 Spring
3 Spring cartridge
4 Absorber
5 Pressure pin

MM2.21B5684C01en.fm

3.13 Jaws

SPC reference	259575-0100 259856-0200

3.13-1 Jaws - check vertical position

Machine status	Main power OFF Air Off
SPC reference	259575-0100 259856-0200

WARNING! Danger of injury due to pinching or crushing. The jaws are moving when the machine is run. Close the side doors before running the machine.

a) Attach a piece of adhesive tape (6) to the pressure rubber (5) of one of the jaws for the purpose of checking that the heating and pressure jaws are aligned exactly opposite each other.

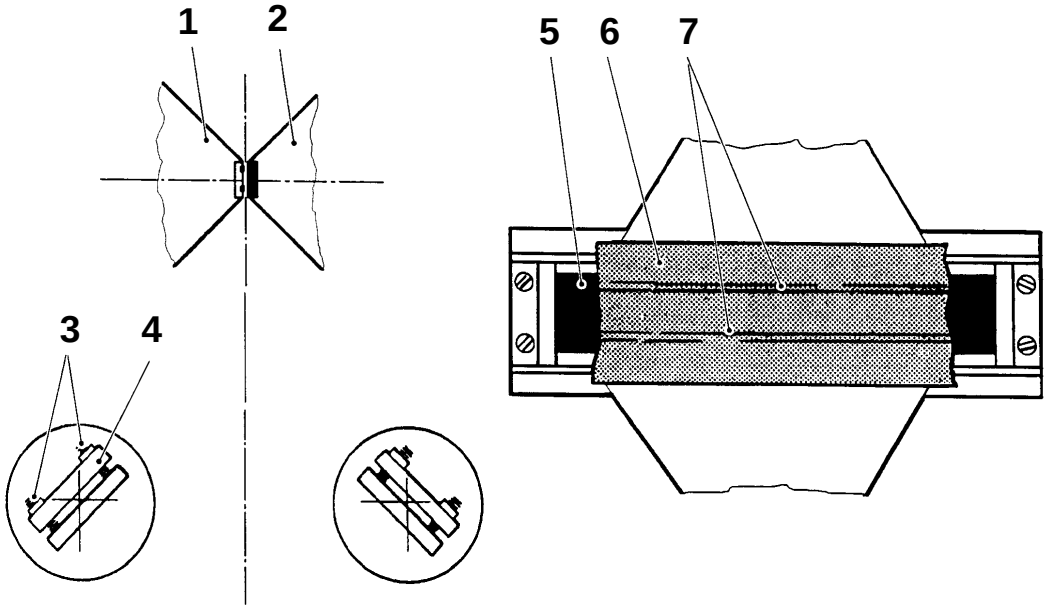
b) Run the machine until the jaw with the tape comes around a second time.

c) Check that the impression on the pressure rubber is symmetrical.

d) If required, adjust with the screws on the yoke.

Note! Adjustment may result in every second package produced by the 20 jaw pairs being lighter than the rest of the packages, although each series of 10 consecutive packages will weigh the same as the next series of 10.

e) Adjust the individual package weights according to page 126.



1 Heating jaw
2 Sealing jaw
3 Screw
4 Yoke
5 Pressure rubber
6 Tape
7 Impression by inductor

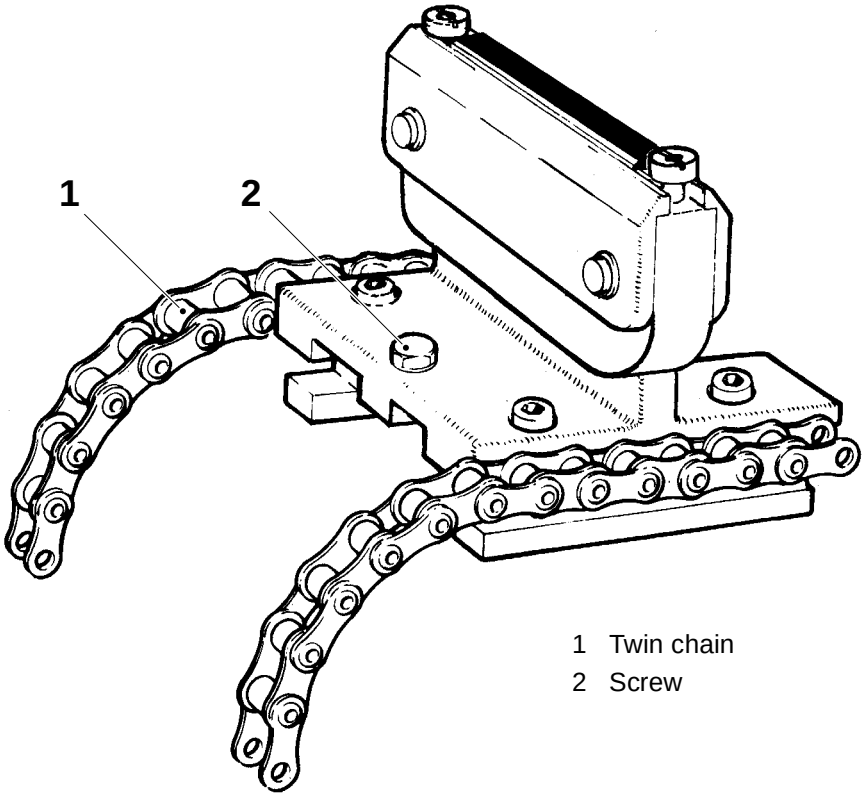
MM2.21B5684C01en.fm

3.13-2 Jaws - remove

Machine status	Main power OFF Air Off
SPC reference	259575-0100 259856-0200

a) Undo the screw (2).

b) Tip the jaw upwards and release it from the chain (1).



1 Twin chain
2 Screw

MM2.21B5684C01en.fm

3.14 Pressure jaw

SPC reference	259575-0100

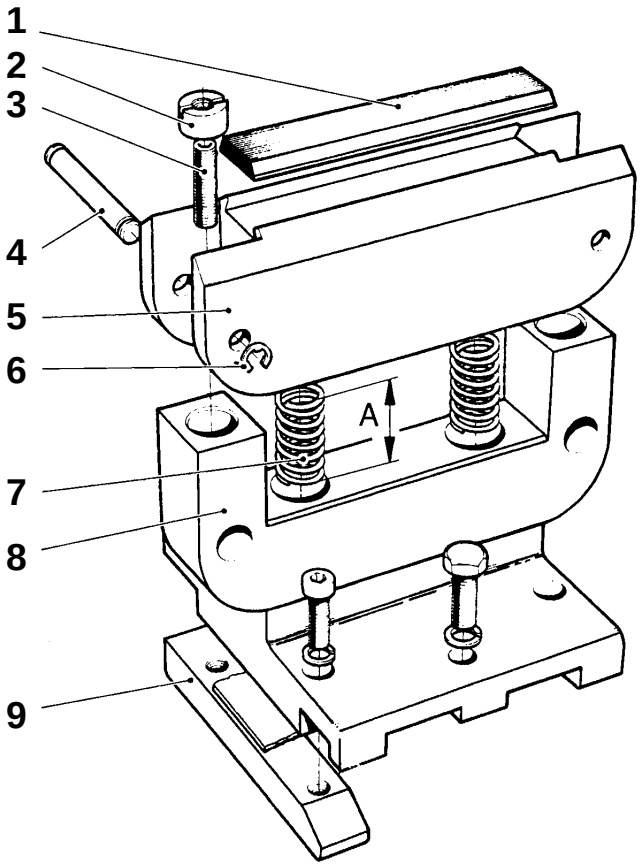
3.14-1 Pressure jaw - check

Machine status	Main power OFF Air Off
SPC reference	259575-0100

a) Dismantle the pressure jaw and clean all components.

b) Remove the circlips (6) and the two axle pins (4). Check that the axle pins are straight. Replace as required.

c) Check the pressure rubber (1) and replace as required.



A = min 24 mm

1 Pressure rubber
2 Bushing
3 Adjustment screw
4 Axle pin
5 Pressure rubber holder
6 Circlip
7 Spring
8 Jaw body
9 Jaw rail

d) Clean the pressure rubber holder (5) and the jaw body (8).

e) Check the jaw rails (9). Replace as required.

f) Check that springs (7) length A is not less then 24 mm. Replace as required.

Note! Check the height of the jaw according to 122.

MM2.21B5684C01en.fm

3.15 Sealing jaw

SPC reference	259856-0200

3.15-1 Sealing jaw - check

Machine status	Main power OFF Air Off
SPC reference	259856-0200

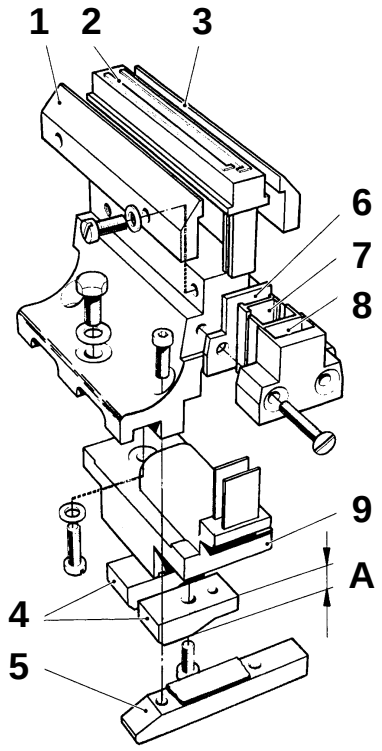
a) Dismantle the sealing jaw and clean all its components.

b) Check the surface of the inductor (2). Replace the inductor if it is cracked or damaged.

c) Replace the bars (1) and (3) if they are damaged or deformed.

d) Replace any damaged insulators (6), (7), and (8).

e) Check and clean the contact surfaces for the carbon brushes (4) on the insulators (9) and their tabs for connecting them to the inductor.



A = min 7 mm

1 Bar
2 Inductor
3 Bar
4 Carbon brush
5 Jaw rail
6 Insulator
7 Insulator
8 Insulator
9 Insulator

f) Check the carbon brushes (4) for wear. Thickness A must not be less then 7 mm. If damaged or worn, replace the carbon brushes.

g) Check the jaw rails (5) for wear. Replace as required.

Note! Always replace the jaw rails in pairs.

h) Check the height of the jaw according to 122.

MM2.21B5684C01en.fm

3.16 Pressure and sealing jaw

SPC reference	259575-0100 259856-0200

3.16-1 Pressure and sealing jaw - set

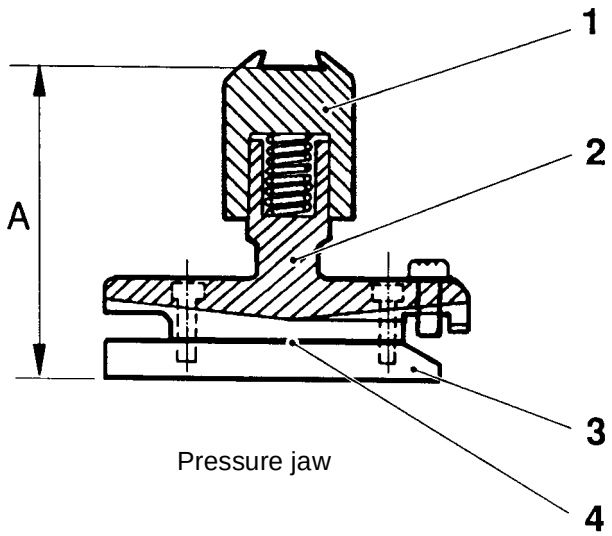
Machine status	Main power OFF Air Off
SPC reference	259575-0100 259856-0200

a) If the heights of the pressure jaws (A = 65,00 mm) and sealing jaws (B = 58,95 mm) differ by more than ±0,05 mm from these figures, the jaw heights must be adjusted by placing shims (4) between the jaw (2) or (5) and the jaw rail (3).

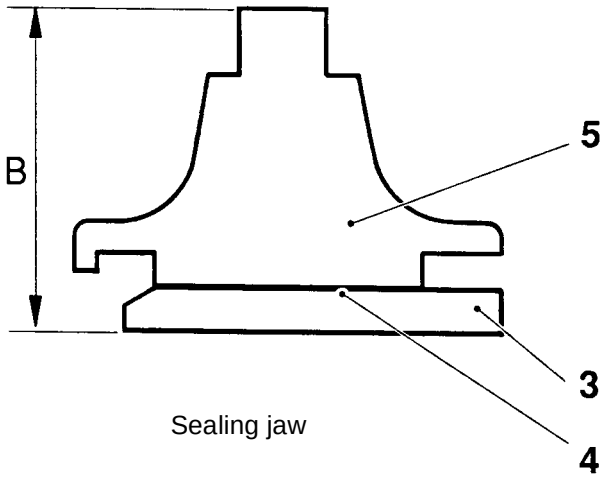
b) Make sure that maximum parallellity on each pressure and heating jaw is obtained.

c) The specified height of the pressure jaw applies to jaws fully screwed home, i e the holder (1) rests against the pressure jaw (2).

A = 65,00 +- 0,05 mm
B = 58,95 +- 0,05 mm



Pressure jaw



Sealing jaw

1 Holder
2 Pressure jaw
3 Jaw rail
4 Shim TP No 230786-1 (0,10 mm)
Shim TP No 230786-2 (0,05 mm)
5 Sealing jaw

MM2.21B5684C01en.fm

3.17 Central lubrication

SPC reference	20970-0300 27026-0100 27027-0100

3.17-1 Central lubrication - check

Machine status	Main power OFF Air Off
SPC reference	20970-0300 27026-0100 27027-0100

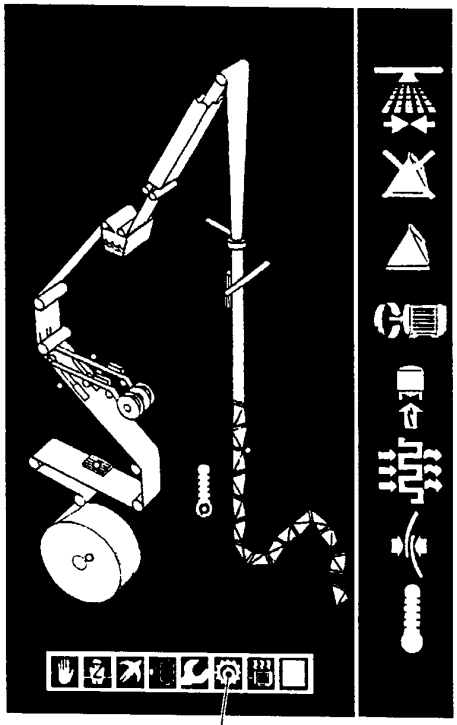
WARNING! **Risk of skin irritation.**
Before handling oil, read the safety precautions in chapter 1.

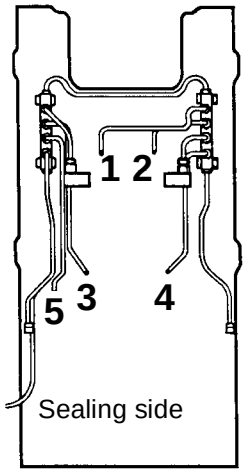
a) If the oil runs out or if any hose has come off its metering valve, make sure that the warning beacon and signal lamp, PH26 Low lubrication oil pressure, on the monitor panel flash to indicate this fact.

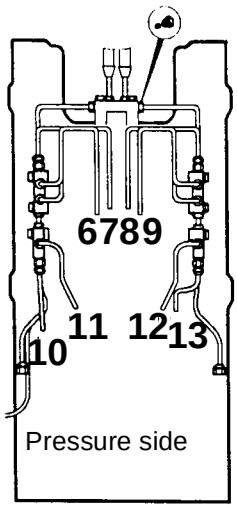
b) Check that oil is delivered to all lubrication points. If required, replace any clogged metering valves.

c) Check all piping, connections, and hoses. Replace as required.

MM2.21B5684C01en.fm







1 Pressure roller holder, sealing side
2 Pressure roller holder, sealing side
3 Twin chain
4 Twin chain
5 Bevel gear
6 Pressure roller holder, pressure side
7 Roller bearing
8 Roller bearing
9 Pressure roller holder, pressure side
10 Twin chain
11 Twin chain
12 Double chain
13 Bevel gear

3.18 Side frame

SPC reference	633006-0100 633007-0100 633010-0100 633011-0100

3.18-1 Package length adjustment - check

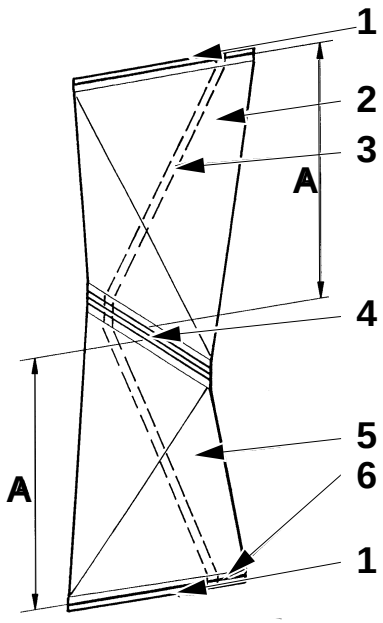
Machine status	Main power OFF Air Off
SPC reference	633006-0100 633007-0100 633010-0100 633011-0100

WARNING! **Risk of injury due to pinching or crushing!**
The jaws are moving when the machine is operating. Close the side doors before operating the machine.

After an overhaul of the side frames, it may happen that half the number of packages produced by the 20 jaw pairs, i e every other package of a total of 20 packages, are shorter than the other 10, while the packages in each series of 10 have the same length.
Compare two consecutive packages. The marking (6) of the inductor on the fin must be at the same distance. Compare the upper and the lower fins.

Measurement A, between the markings of the inductor on the fins shall be equal on the two packages.

Setting according to page 125



1 TS made by sides 1 and 3
2 Package, upper TS made between sides 1 and 3
3 Longitudinal seal, hidden from view
4 TS made by sides 2 and 4
5 Package, upper TS made between sides 2 and 4
6 Marking by inductor on fin

MM2.21B5684C01en.fm

3.18-2 Package length adjustment - set

Machine status	Main power OFF Air Off
SPC reference	633006-0100 633007-0100 633010-0100 633011-0100

WARNING! **Risk of injury due to pinching or crushing!**
The jaws are moving when the machine is operating. Close the side doors before operating the machine.

Compare two consecutive packages. The marking (6) of the inductor on the fin must be at the same distance. Compare the upper and the lower fins.

Measurement A, between the markings of the inductor on the fins shall be equal on the two packages.

Adjustment is carried out on sides 2 and 4.

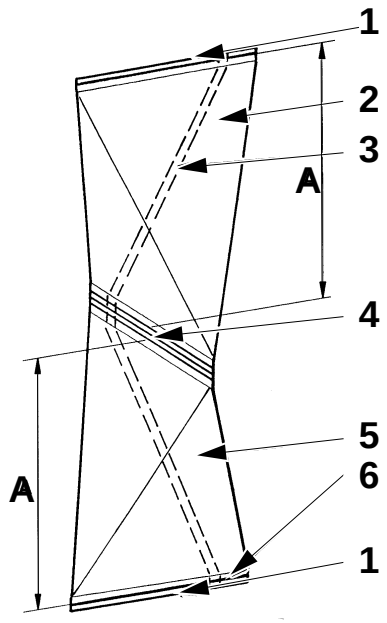
The package (2) is too short.
Loosen the upper setting screws (8) on the yokes (9) and tighten the lower setting screw (7)).

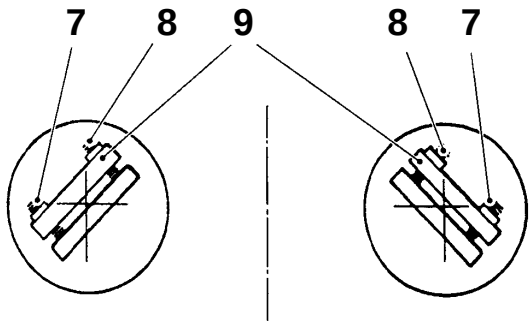
The package (5) is too short.
Loosen the lower setting screw (7) on the yokes (9) and tighten the upper setting screw (8).

Note! After adjustment synchronization of the angle transmitter and frame side must be carried out according to page 205.

Individual adjustment of package weight, see page 126.

MM2.21B5684C01en.fm



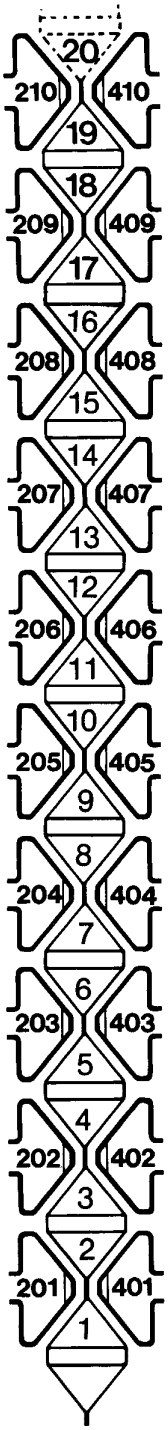


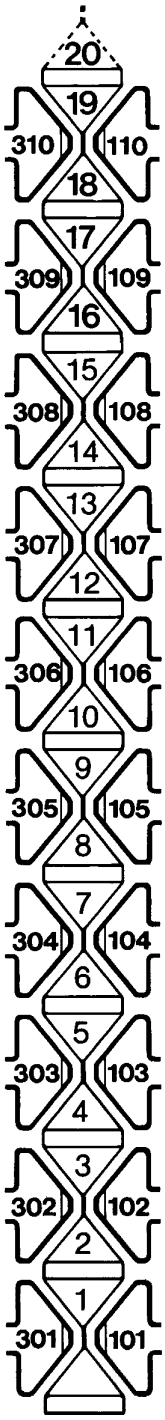
1 TS made by sides 1 and 3
2 Package, upper TS made between sides 1 and 3
3 Longitudinal seal, hidden from view
4 TS made by sides 2 and 4
5 Package, upper TS made between sides 2 and 4
6 Marking by inductor on fin
7 Lower setting screw
8 Upper setting screw
9 Lower sprocket yoke

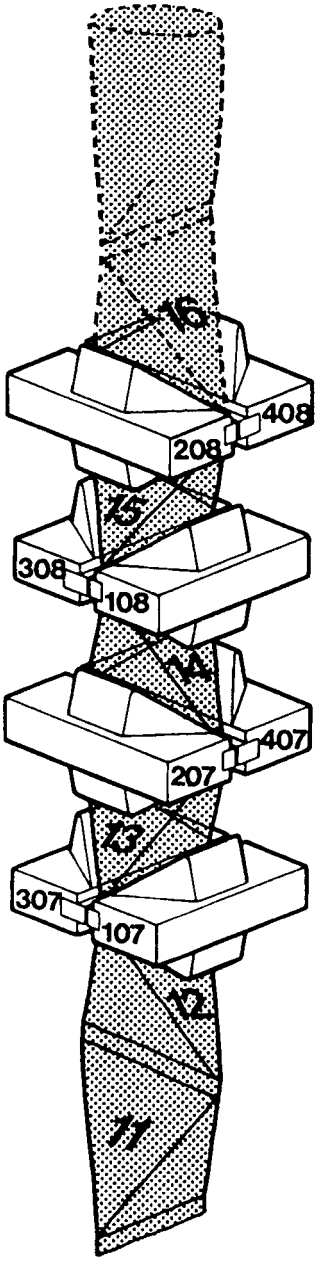
3.18-3 Package weight - set

Machine status	Main power OFF Air Off
SPC reference	633006-0100 633007-0100 633010-0100 633011-0100

Numbering of jaws and packages.







Side II	Side IV	Side III	Side I
Heating jaws	Pressure jaws	Pressure jaws	Heating jaws
201-210	**401-410**	**301-310**	**101-110**

(Cont'd)

MM2.21B5684C01en.fm

(Cont'd)

WARNING! Danger of injury due to pinching or crushing. The jaws are moving when the machine is run. Close the side doors before running the machine.

a) Run the machine according to the OM book.

b) Remove 20 consecutive packages from the chute before they reach the cutting unit. Cut the packages apart by hand and keep them the order they were made.

c) Check the weight of the packages. Record all weight deviations on the record sheet, according to page 129. Enter the weight deviation of each package against the correct package number in the ”Deviation weighed” column.

d) The volume is adjusted by means of the pressure jaws.

e) Basic setting of pressure jaw:

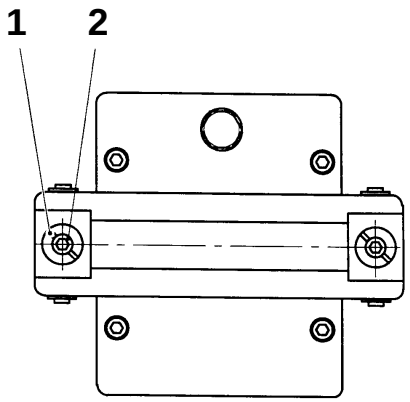
f) Loosen the bushing (2) by means of a wrench, tool TP 568177. Keep the wrench in place. Screw the adjustment screw (1) fully home, then turn it back one turn.

g) Moving the pressure jaw outwards (towards the material tube) reduces the volume in the package below it and increases the volume in the package above it. In the same way, moving the jaw inwards (away from the material tube) increases the volume in the package below the jaw and reduces the volume in the package above it.

h) 1/4 turn on the adjustment screw (1) ≈ 0,5 g.

i) Start with package No 1. Adjust by means of jaw 401 above package No 1. Do not adjust jaw 301.

j) Complete the entire record sheet. When all the adjustments have been entered, produce a second series of 20 packages and check their weight. Readjust one or more times as required.



1 Adjustment screw
2 Bushing

MM2.21B5684C01en.fm

Example

Package No 1

- Deviation weighed = +0,5 g.
- Adjust by means of jaw 401 above package No 1. Do not adjust jaw 301.
- Turn out the adjustment screw 1/4 turn, counter-clockwise, which corresponds to a weight change of -0,5 g.
- On the record sheet, enter against jaw 401, in the ”Adjustment” column, ”out 1/4”. After adjustment, the deviation of package No 1 is appr 0.
- Deviation weighed = +0,5 g
  +0,5-0,5 = 0.
  Enter this in the ”Expected deviation after final adjustment” column.
- The adjustment of jaw 401 affects the weight of package No 2, adding appr +0,5 g to it. The expected deviation of package No 2 will be appr -0,3 g.

  Deviation weighed = -0,8g
  -0,8+0,5 = -0,3.
  Enter this against package No 2, in the ”Expected deviation after adjustment of lower jaw” column.

Package No 2

- Expected deviation = -0,3 g.
- Adjust by means of jaw 302 above package No 2.
- Turn in the adjustment screw 1/8 turn, clockwise, which corresponds to a weight change of +0,3 g.
- On the record sheet, enter against jaw 302, in the ”Adjustment” column, ”in 1/8”. After adjustment, the deviation of package No 2 is appr 0.
- Expected weighed = -0,3 g
  -0,3+0,3 = 0.
  Enter this in the ”Expected deviation after final adjustment” column.
- The adjustment of jaw 302 affects the weight of package 3, reducing it by appr -0,3 g. The expected deviation of package No 3 will be appr -0,5 g.

  Deviation weighed = -0,2 g
  -0,2-0,3 = -0,5.
  Enter this against package No 3, in the ”Expected deviation after adjustment of lower jaw” column.

(Cont'd)

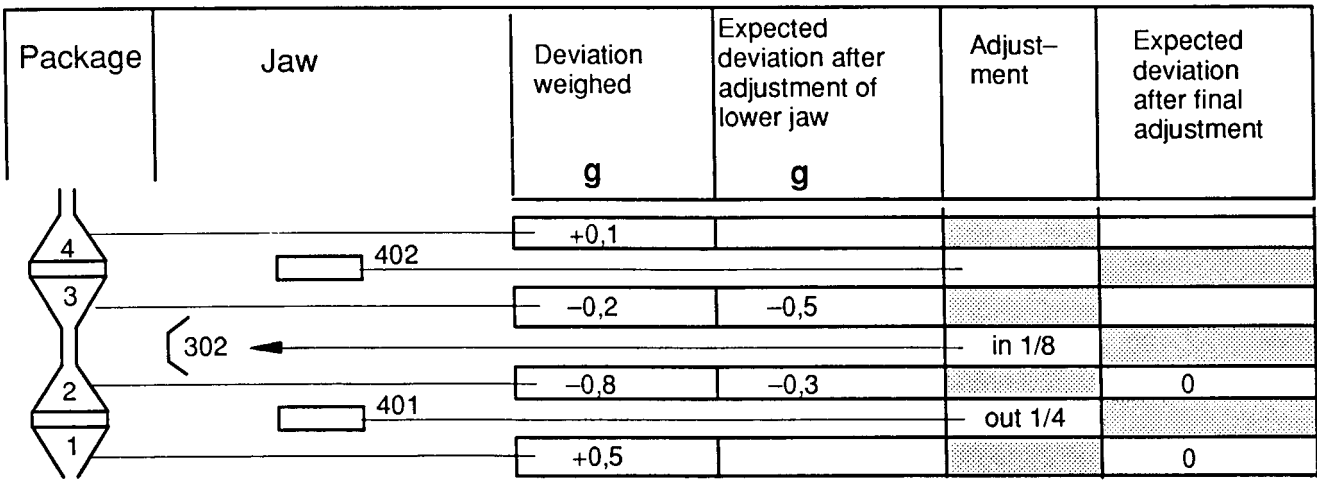
MM2.21B5684C01en.fm

(Cont'd)

Package No 3

- Expected deviation = -0,5 g.
- Adjust by means of jaw 402 in the same way as described above.
- Complete the entire record sheet in the same way.

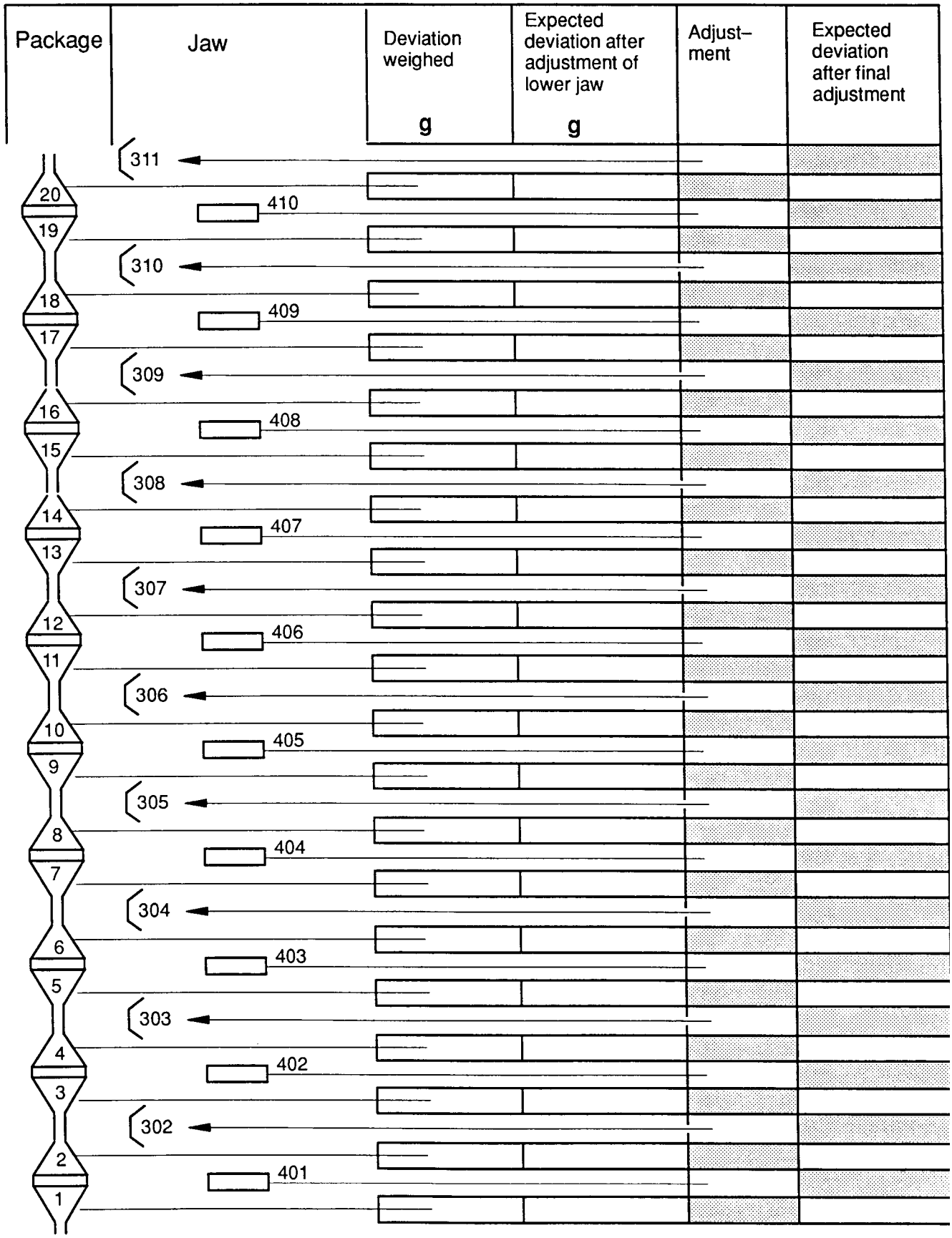
Record sheet



(Cont'd)

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(Cont'd)



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4 Machine body

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4.1 Intermediary shaft

SPC reference	19393-0700

4.1-1 Intermediary shaft - check/set

Machine status	Main power OFF Air Off
SPC reference	19393-0700

WARNING! Risk of injury due to pinching or crushing. The gear wheels may rotate.

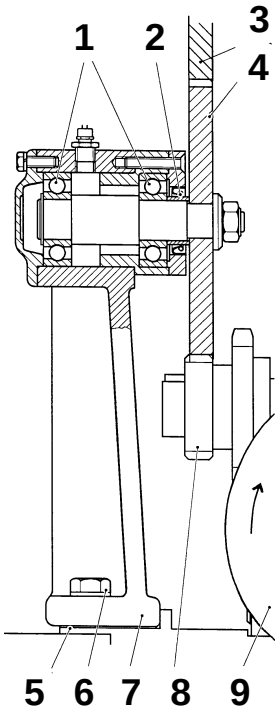
a) Check the play in the two bearings (1).

b) Check the seal ring (2). Replace if whenever required or at the same time as the bearing is being replaced.

Note! The position of the seal ring (2) is to be as illustrated.

c) Check the play between the gear wheels (3) and (4). Adjust by means of shim (5) under the bearing bracket (7) so that the smallest possible play is obtained between the gear wheels.

d) Turn the upper drive wheel (9) clockwise, as illustrated, and check that there is play throughout a full revolution by the gear wheels. If required, tear a layer off the shim (5) to make it thinner.



1 Bearing
2 Seal ring
3 Gear wheel
4 Gear wheel
5 Shim TP No 560193
6 Screw
7 Bearing bracket
8 Gear wheel
9 Upper drive wheel

MM2.21B5684D01en.fm

4.2 Drive motor assembly and gearbox

SPC reference	19393-0700

4.2-1 Drive motor assembly and gearbox - check/set

Machine status	Main power OFF Air Off
SPC reference	19393-0700

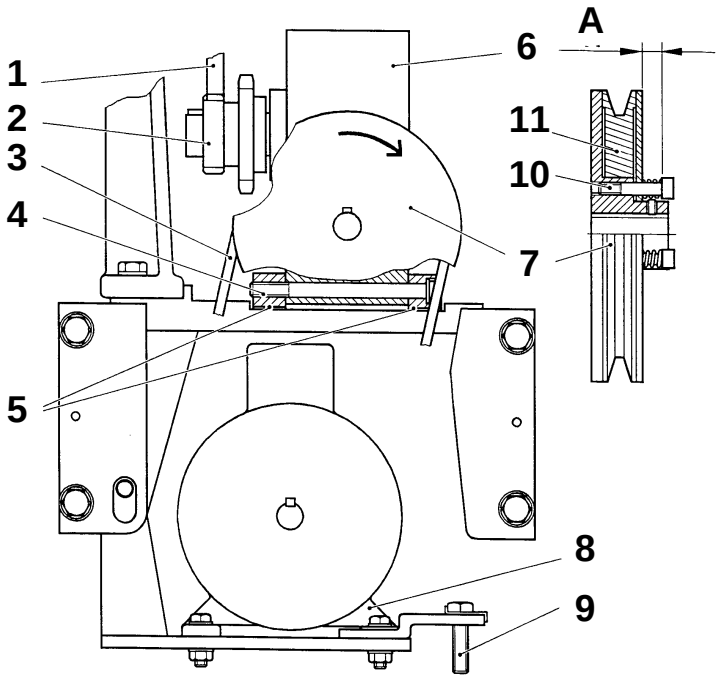
WARNING! **Risk of injury due to pinching or crushing.**
The movable parts may rotate.

a) Check the slip disc (7). Remove and clean it. Set the slip disc so that gap A = 10,5 mm, by means of the screws (10).

b) Check the Vee-belt (3) for wear or slippage. Replace as required.

c) Check the play between the gear wheels (1) and (2). Adjust by means of shim (5) under the worm gear (6) so that the smallest possible play is obtained between the gear wheels. Turn the upper drive wheel (7) clockwise as illustrated, and check that there is play throughout a full revolution by the gear wheels. If required, tear a layer off the shim to make it thinner.

MM2.21B5684D01en.fm



A = 10,5 mm

1 Gear wheel
2 Gear wheel
3 Vee-belt
4 Screw
5 Shim TP No 560193
6 Worm gear
7 Slip disc
8 Motor
9 Setting screw
10 Screw
11 Belt pulley

4.3 Hydraulic system

SPC reference	28422-0300

4.3-1 Hydraulic system - check

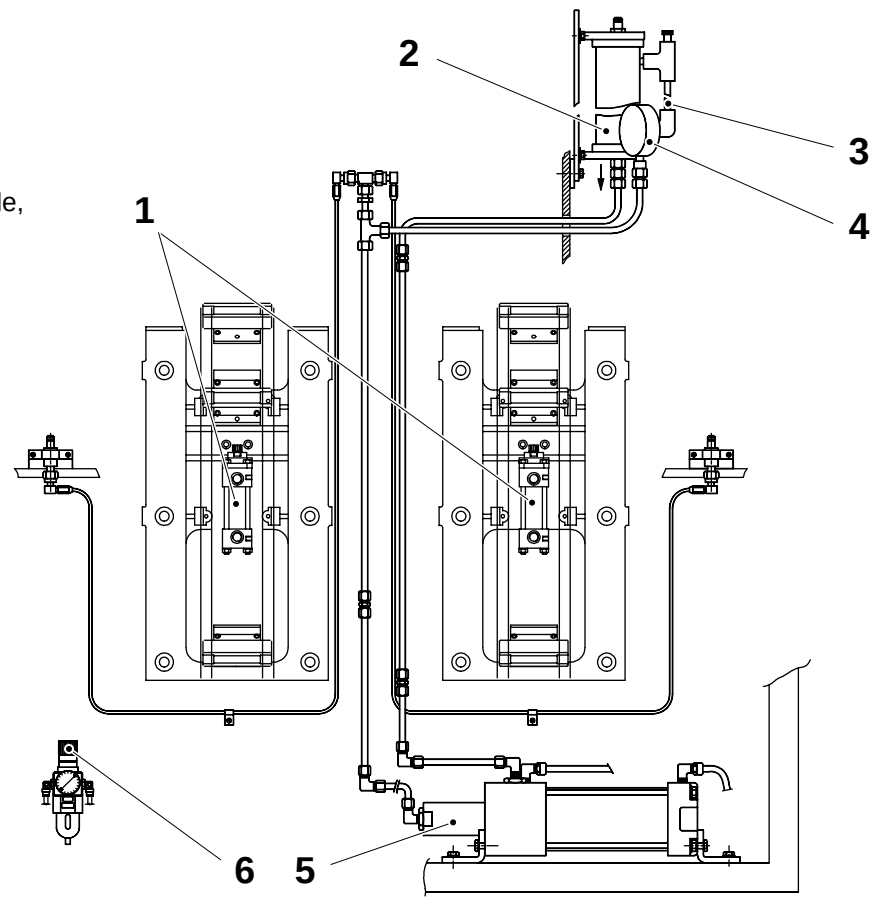
Machine status	Main power OFF Air Off
SPC reference	28422-0300

WARNING! **Risk of skin irritation!**
Before handling oil, read the safety precautions in chapter 1.

Check:

- that there is no oil leakage in the main cylinder (5) and the cylinders (1),
- that the oil level is in the middle of the sight glass scale,
- that all pipe, hose, and cylinder connections are tight.

1 Cylinder
2 Oil tank
3 Level tube
4 Pressure gauge
5 Main cylinder
6 Adjustment handle, oil pressure



MM2.21B56684D01en.fm

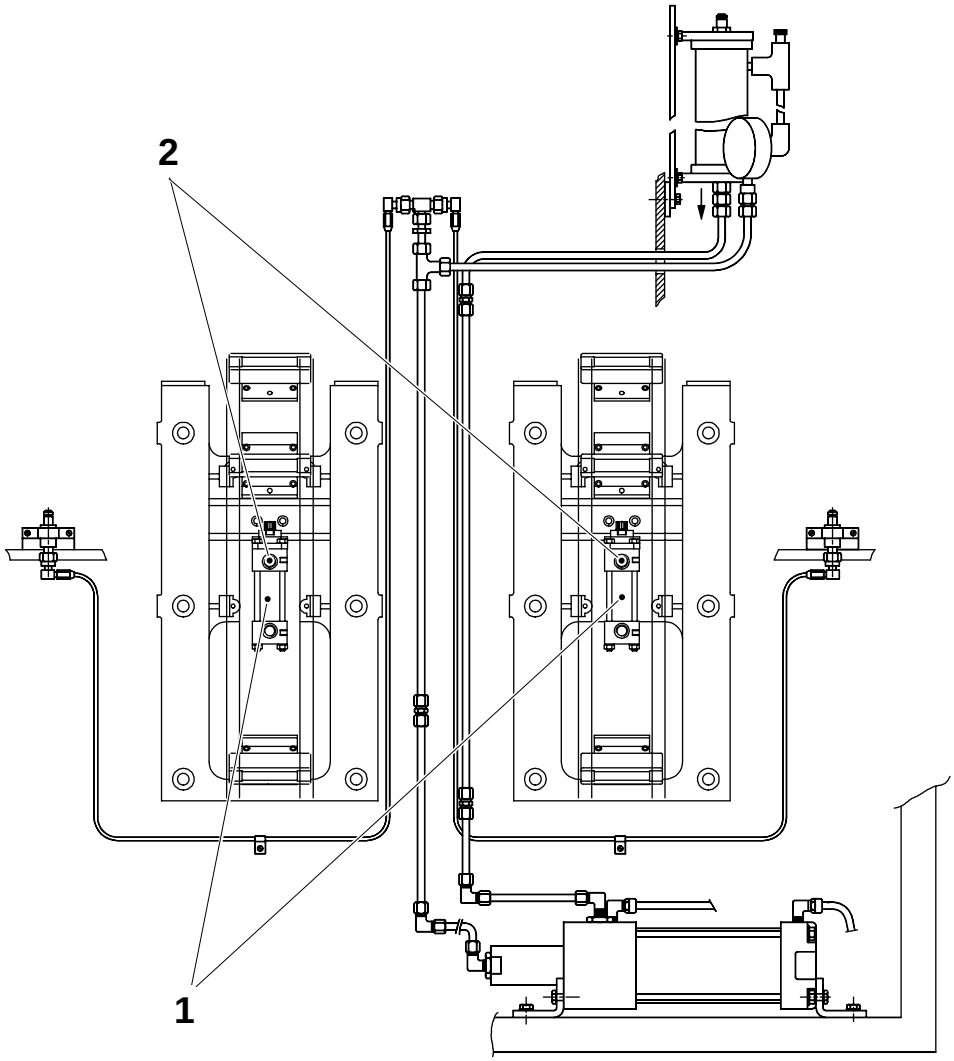
If no leakage is found, but the pressure drops, turn the adjustment handle (6) counter-clockwise as far as it goes. Blow compressed air into the top of the oil tank. Then check the pressure gauge and make sure that the hydraulic system pressure is 1.0 MPa (10 bar) according to section ”Technical Data”.

4.3-2 Hydraulic system - bleed

Machine status	Main power OFF Air Off
SPC reference	28422-0300

WARNING! **Risk of skin irritation!**
Before handling oil, read the safety precautions in chapter 1.

Loosen the screws (2) to bleed the cylinders (1).



1 Cylinder
2 Screw

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5 Cutting unit

MM2.21B5684E01en.fm

5-1 Setting sequence

SPC reference	633005-1500

Note! To be followed when performing the basic settings of the machine.

3.18-2 Package length adjustment - set 125

⇓

5-6 Cutting unit - set package guide 145

⇓

5-5 Cutting unit - set 144

⇓

5-4 Cutting unit - fit 142

⇓

5.5-2 Knife shaft - set 152

MM2.21B5684E01en.fm

5-2 Cutting unit - check

Machine status	Main power OFF Air OFF
SPC reference	633005-1500

WARNING! **Risk of injury due to pinching or crushing.**
The cutting wheel (2) and knife shaft (3) may rotate. Turn off the main switch and the compressed air supply before commencing work.

WARNING! **Risk of injury due to cutting.**
The scissors on the cutting wheel (2) and the knives on the knife shaft (3) are sharp.

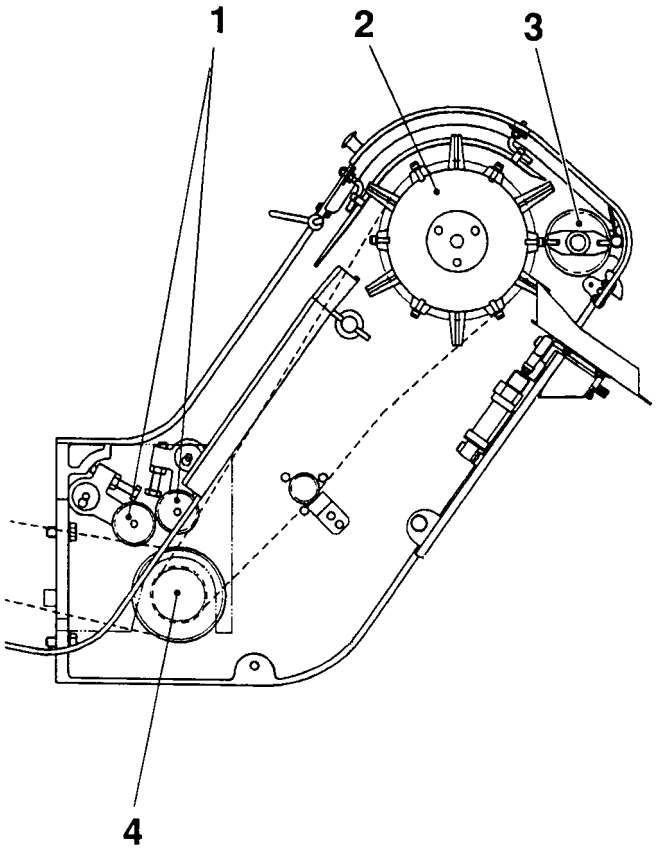
Remove the chains and the outer side section according to page 140.

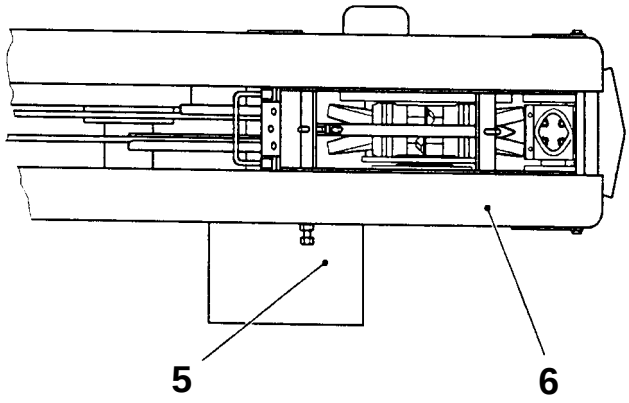
Clean and check the following components:

- chain tensioner (1) according to page 146, and 147,
- triple sprocket (4) according to page 148.
- cutting wheel (2) according to page 150,
- knife shaft (3) according to page 151,
- angle encoder (5) according to page 153,

Synchronization, see page 205.

MM2.21B5684E01en.fm





1 Chain tensioner
2 Cutting wheel
3 Knife shaft
4 Triple sprocket
5 Angle encoder
6 Outer side section

5-3 Cutting unit - remove

Machine status	Main power OFF Air OFF
SPC reference	633005-1500

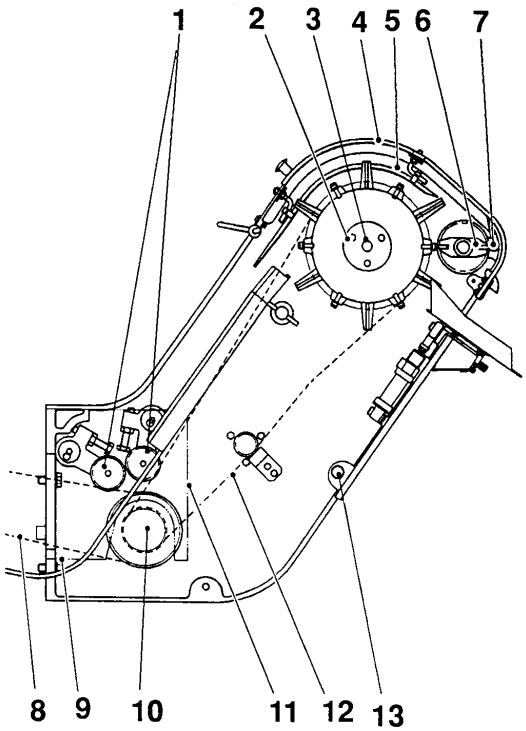
WARNING! **Risk of injury due to pinching or crushing.**
The cutting wheel (2) and knife shaft (3) may rotate. Turn off the main switch and the compressed air supply before commencing work.

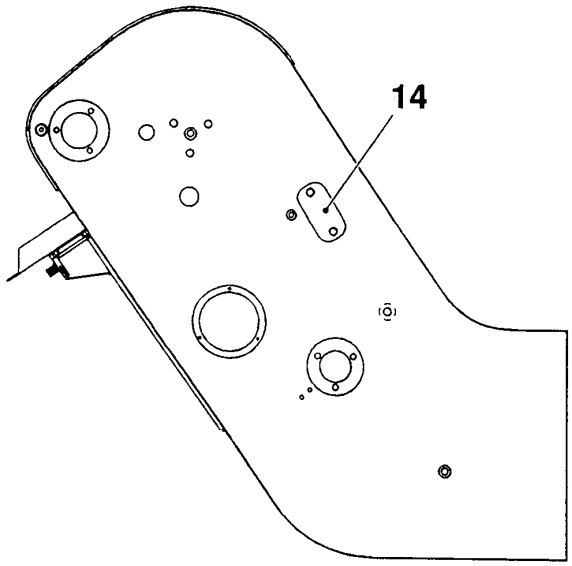
WARNING! **Risk of injury due to cutting.**
The scissors on the cutting wheel (2) and the knives on the knife shaft (3) are sharp.

a) Remove the plastic cover (4) and the chain cover (11).

b) Open the door to the drive unit. Turn the upper drive wheel clockwise, so that the chain lock on the cutting wheel chain (12) can be removed. This is to be done through the hole (14).

c) Mark the position on the cutting wheel and the positions of the cutting and knife shaft sprockets prior to removal.





1 Chain tensioner
2 Mounting screw (cam)
3 Screw (cutting wheel)
4 Plastic cover
5 Package guide
6 Screw (knife shaft)
7 Screw (spacer)
8 Drive chain
9 Mounting screw
10 Triple sprocket
11 Chain cover
12 Cutting wheel chain
13 Mounting screw
14 Hole

(Cont'd)

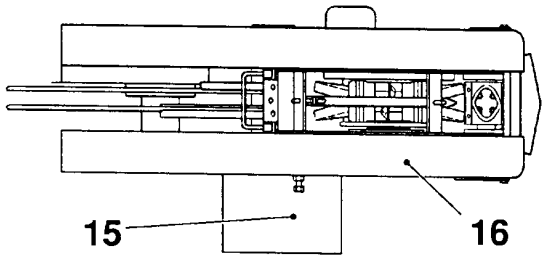
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(Cont'd)

d) Slacken the chain tensioner (1) and remove the chain (12). Remove the angle encoder (15).

Note! Do not disconnect the air and oil pipes or the electric cables.

e) Undo the screws (3), (2), and (6) on the inside of the outer side section (16) and (7). Support inner side section on a block of wood and undo the screws (9) and (13).



15 Angle encoder
16 Outer side section

f) Remove the outer side section and the package guide (5).

MM2.21B5684E01en.fm

5-4 Cutting unit - fit

Machine status	Main power OFF Air OFF
SPC reference	633005-1500

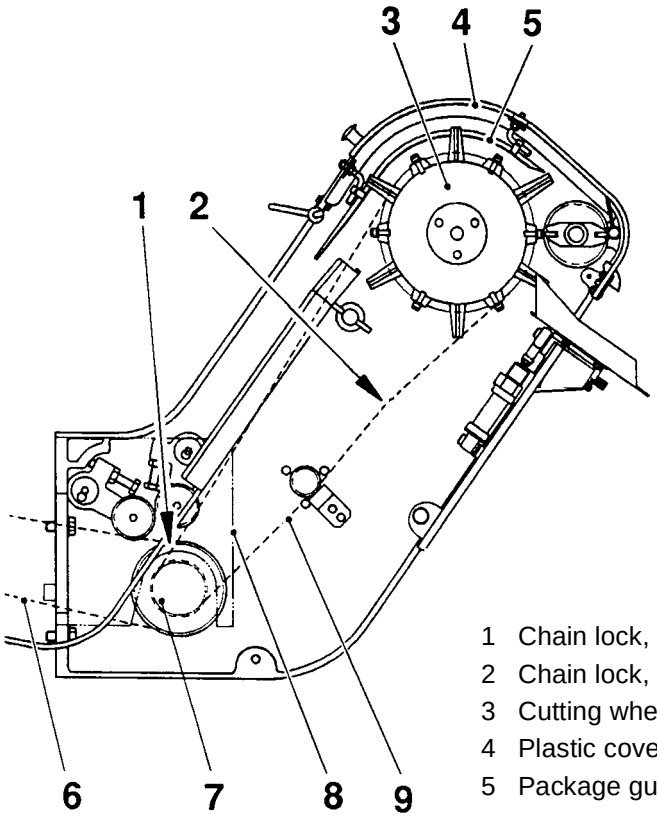
WARNING! **Risk of injury due to pinching or crushing.**
The cutting wheel (2) and knife shaft (3) may rotate. Turn off the main switch and the compressed air supply before commencing work.

WARNING! **Risk of injury due to cutting.**
The scissors on the cutting wheel (2) and the knives on the knife shaft (3) are sharp.

a) Check that the pitch between the pairs of scissors and the counter rails is the same everywhere, according to page 149.

b) Place the cutting chain (9) around the cutting wheel sprocket and the triple sprocket (7). The cutting wheel, the cutting and knife shaft sprockets must be in the same position as before removal.

c) Tension the chain lightly. Refit the package guide (5). Fit the outer side section.



1 Chain lock, location
2 Chain lock, location
3 Cutting wheel
4 Plastic cover
5 Package guide
6 Drive chain
7 Triple sprocket
8 Chain guard
9 Cutting chain

MM2.21B5684E01en.fm

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(Cont'd)

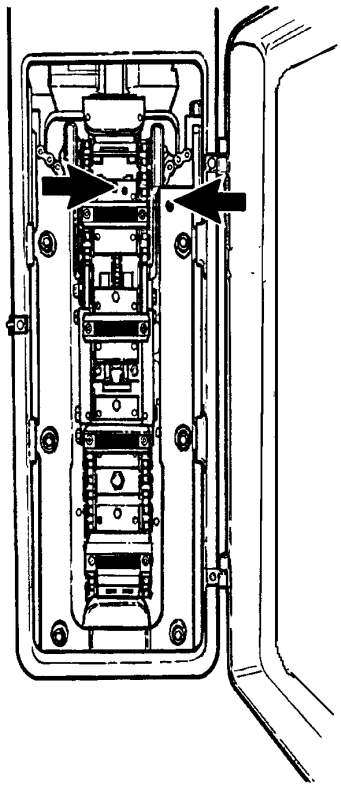
d) Refit the angle encoder.

e) Tension the chains and secure the adjustment screws. Adjust the play between the gear wheels on the cutting wheel and on the knife shaft according to page 144. Check the cutting length according to page 152.

f) Refit the plastic cover (4) and chain cover (7).

g) Check the position of the angle encoder according to page 206**.**

h) Check that the cutting wheel is positioned with one pair of scissors vertically when the pins are in level on side 1.



MM2.21B5684E01en.fm

5-5 Cutting unit - set

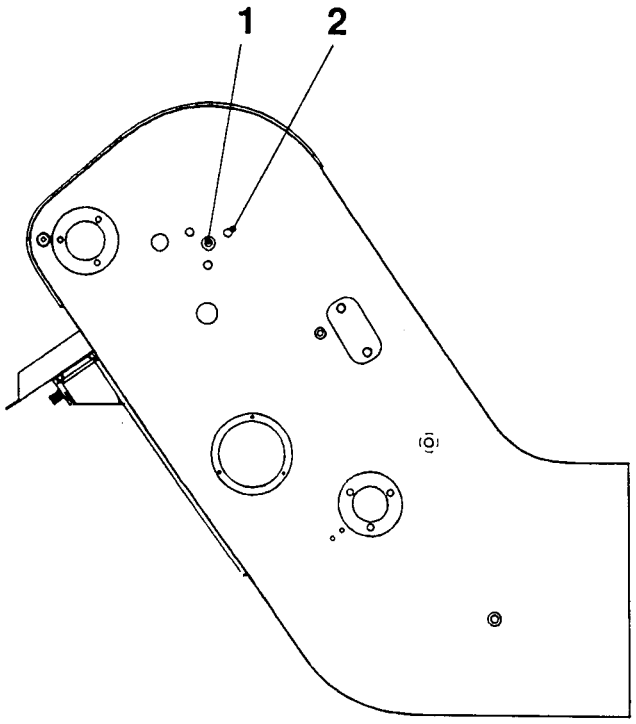
Machine status	Main power OFF Air OFF
SPC reference	633005-1500

WARNING! **Risk of injury due to pinching or crushing.**
The cutting wheel (2) and knife shaft (3) may rotate. Turn off the main switch and the compressed air supply before commencing work.

WARNING! **Risk of injury due to cutting.**
The scissors on the cutting wheel (2) and the knives on the knife shaft (3) are sharp.

a) To adjust gear play between the cutting wheel and knife shaft, loosen the screws (2).

b) Replace the mounting screws (1) with two long screws that reach the bottom in the eccentric cutting wheel shaft. Turn the eccentric cutting wheel shaft by means of the screws until there is no gear play.



1 Mounting screw
2 Cam screw

c) Tighten the cam screws (2). Remove the adjustment screws and fit the shaft mounting screws (1).

MM2.21B56684E01en.fm

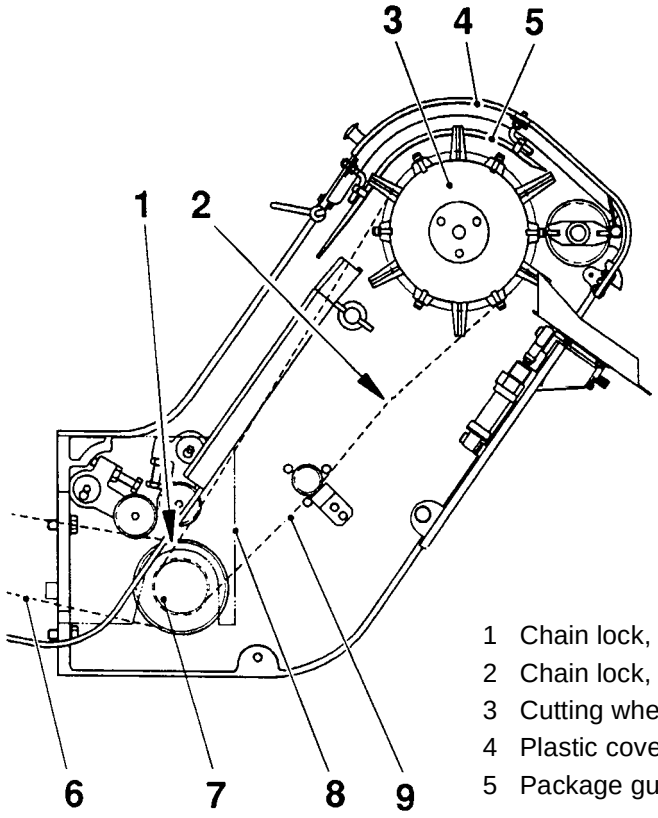
5-6 Cutting unit - set package guide

Machine status	Main power OFF Air OFF
SPC reference	633005-1500

WARNING! **Risk of injury due to pinching or crushing.**
The cutting wheel (2) and knife shaft (3) may rotate. Turn off the main switch and the compressed air supply before commencing work.

WARNING! **Risk of injury due to cutting.**
The scissors on the cutting wheel (2) and the knives on the knife shaft (3) are sharp.

a) Adjust the package guide (5) to support the package without damage it.



1 Chain lock, location
2 Chain lock, location
3 Cutting wheel
4 Plastic cover
5 Package guide
6 Drive chain
7 Triple sprocket
8 Chain guard
9 Cutting chain

MM2.21B5684E01en.fm

5.1 Chain tensioner, drive chain

SPC reference	10582-0200

5.1-1 Chain tensioner, drive chain - overhaul

Machine status	Main power OFF Air OFF
SPC reference	10582-0200

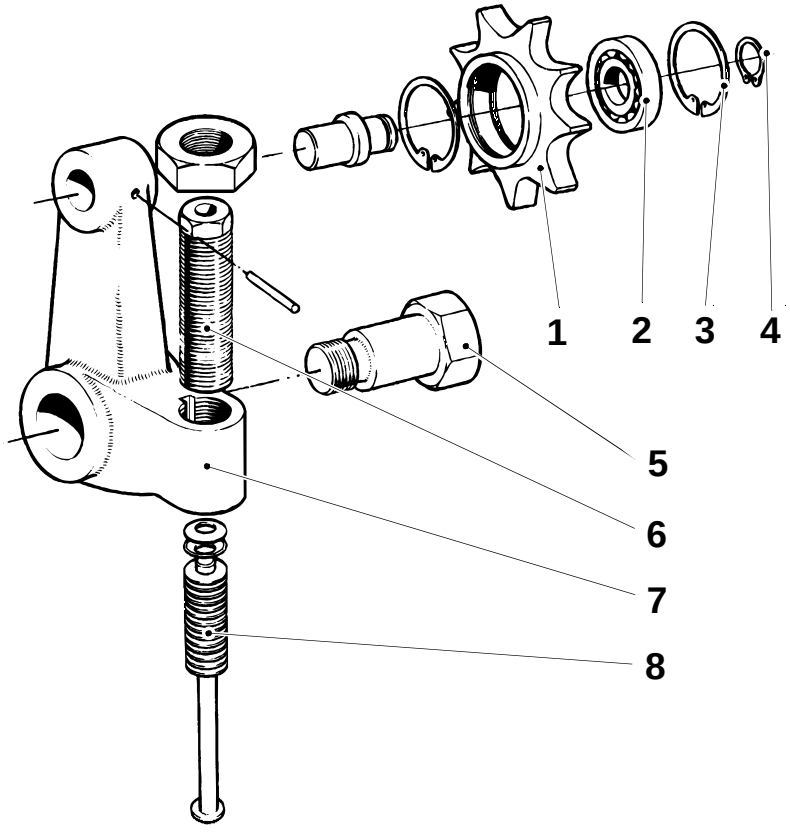
WARNING! **Risk of injury due to cutting.**
The sprocket may have sharp edges.

a) Slacken the chain tension by means of the screw (6).

b) Remove the fitting bolt (5) and the tensioner arm (7). Remove the circlip (4) and pull off the sprocket (1).

c) Remove the circlip (3). Check the bearing (2). Replace as required.

d) Remove the cup springs (8). Clean them and replace as required.



MM2.21B5684E01en.fm

1 Sprocket
2 Bearing
3 Circlip
4 Circlip
5 Fitting bolt
6 Screw
7 Tensioner arm
8 Cup spring

Note! There are to be 30 cup springs.

5.2 Chain tensioner 1, cutting wheel chain

SPC reference	10587-0300

5.2-1 Chain tensioner 1, cutting wheel chain - overhaul

Machine status	Main power OFF Air OFF
SPC reference	10587-0300

WARNING! **Risk of injury due to cutting.**
The sprocket may have sharp edges.

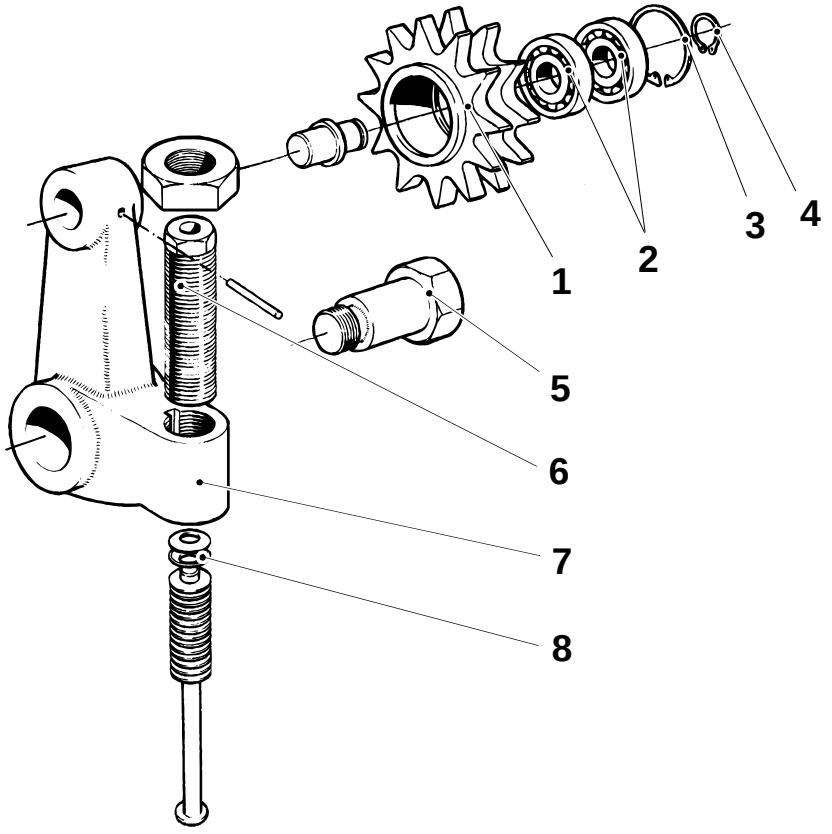
a) Slacken the chain tension by means of the screw (6).

b) Remove the fitting bolt (5) and the tensioner arm (7). Remove the circlip (4) and pull off the double sprocket (1).

c) Remove the circlip (3). Check the bearings (2). Replace as required.

d) Remove the cup springs (8). Clean them and replace as required.

MM2.21B5684E01en.fm



1 Double sprocket
2 Bearing
3 Circlip
4 Circlip
5 Fitting bolt
6 Screw
7 Tensioner arm
8 Cup spring

Note! There are to be 30 cup springs.

5.3 Triple sprocket

SPC reference	19258-0100

5.3-1 Triple sprocket - overhaul

Machine status	Main power OFF Air OFF
SPC reference	19258-0100

WARNING! **Risk of injury due to cutting.**
The sprocket may have sharp edges.

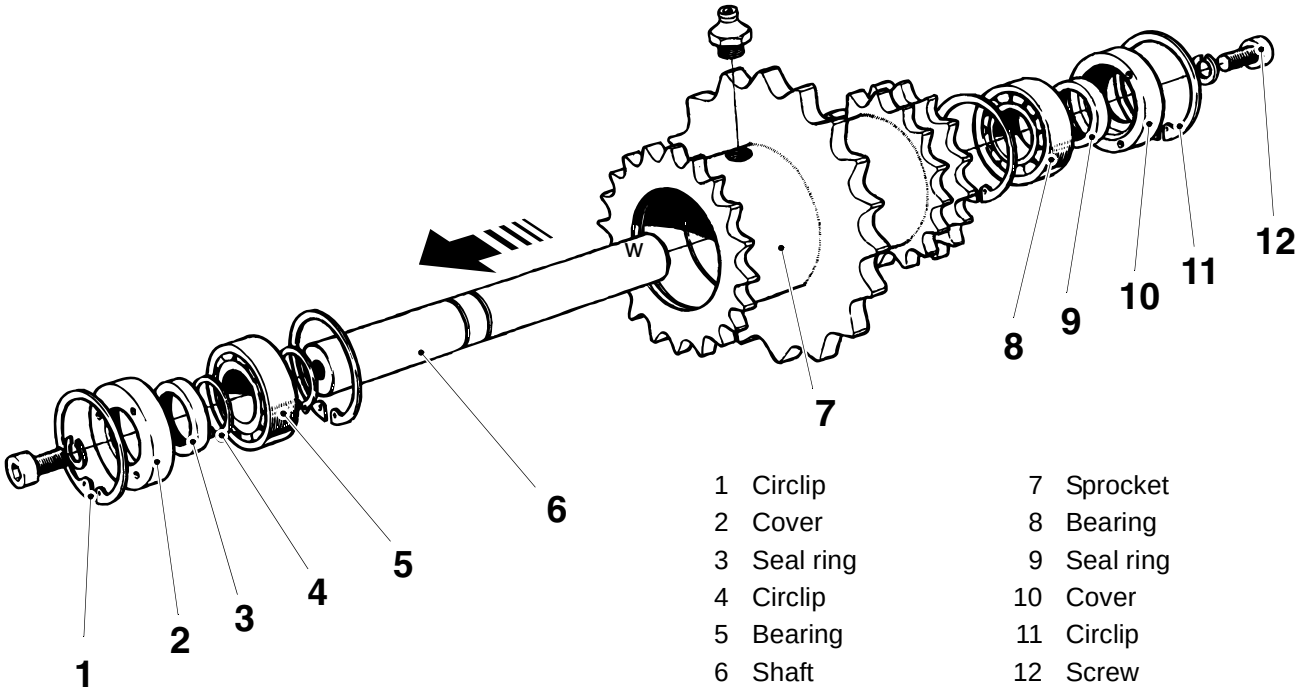
a) Undo the screw (12) and remove the shaft (6) with the sprocket (7). Remove the circlip (1), cover (2), and seal ring (3). Force out the shaft (6) in the direction of the arrow.

b) Remove the circlip (11), cover (10), and seal ring (9).

c) Check the two bearings (5) and (8). Replace as required.

d) Check the two seal rings (3) and (9). Replace as required.

e) Reassemble in reverse order.



MM2.21B5684E01en.fm

1	Circlip	7	Sprocket
2	Cover	8	Bearing
3	Seal ring	9	Seal ring
4	Circlip	10	Cover
5	Bearing	11	Circlip
6	Shaft	12	Screw

5.4 Cutting wheel

SPC reference	12473-0300

5.4-1 Cutting wheel - overhaul

Machine status	Main power OFF Air OFF
SPC reference	12473-0300

WARNING! **Risk of injury due to cutting.**
The scissor blades are sharp. If the cam rotates, the scissors will cut.

a) Remove the cam (1). Undo the screws (3) and pull off the end section (4) with the scissor pairs.

b) Check that there is no pitting in the counter rails (5) and that the rubber layers (6) in the counter rails are intact. Replace as required.

c) Force out the axle (15) and the bearings (13). Remove the axle pin (12), roller (11), and washer (10). Replace the bearings and rollers and any damaged or worn parts.

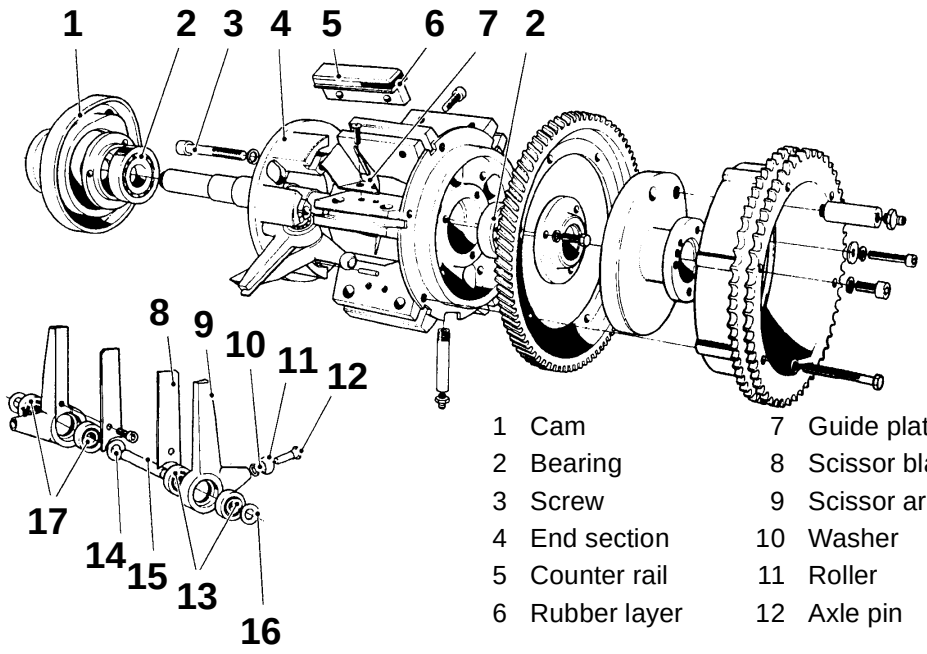
d) Make sure the scissor blades (8) are sharp. Replace as required.

e) Reassemble in reverse order.

f) Setting according to page 150.

Note! Make sure that the washer (14) between the scissor arms (9) is 0,5 - 0,6 mm thick, and that the outer washer (16) is 1,3 - 1,4 mm thick. Check that the scissor blades yield 0,8 - 1,0 mm under pressure.

MM2.21B5684E01en.fm



1	Cam	7	Guide plate	13	Bearing
2	Bearing	8	Scissor blade	14	Washer
3	Screw	9	Scissor arm	15	Axle
4	End section	10	Washer	16	Outer washer
5	Counter rail	11	Roller		
6	Rubber layer	12	Axle pin		

5.4-2 Cutting wheel - set

Machine status	Main power OFF Air OFF
SPC reference	12473-0300

WARNING! **Risk of injury due to cutting.**
The scissors are sharp.

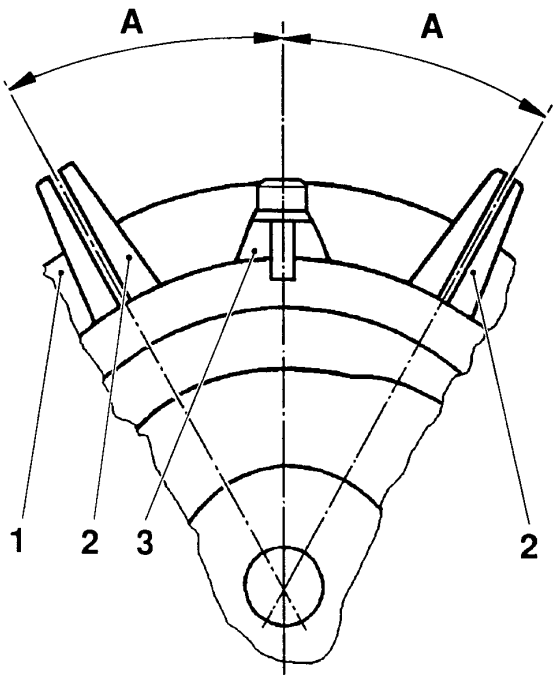
a) When fitting the cutting wheel end section (1), carefully check that the pitch between the centre-line of the two pairs of scissors (2) and the centre-line of the counter rail (3) between them is symmetrical, distance A.

b) After setting the cutting wheel, set the cutting length according to 152.

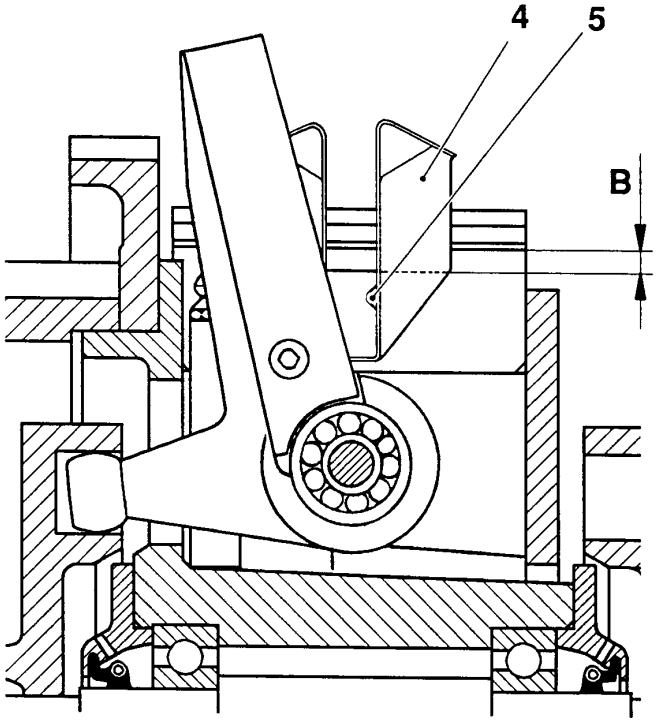
c) Adjust the position of the guide plates (4) by means of the two screws. Basic setting, distance B = 8,5 mm.

d) Fit packaging material in the machine according to the OM book. Check that the cut between two packages is straight.

e) Adjust the guide tabs on the knife shaft according to 152.



B = 8,5 mm
(Basic setting)



1 Cutting wheel end section
2 Pair os scissor
3 Counter rail
4 Guide plate
5 Screw

MM2.21B5684E01en.fm

5.5 Knife shaft

SPC reference	12550-0200

5.5-1 Knife shaft - overhaul

Machine status	Main power OFF Air OFF
SPC reference	12550-0200

WARNING! **Risk of injury due to cutting.**
The knives are sharp.

a) Undo the screws (1). Remove the bearing cover (2) and pull out the knife shaft (5).

b) Check the ball bearings (3), (9), and (10) and the seal rings (4) and (8). Replace as required.

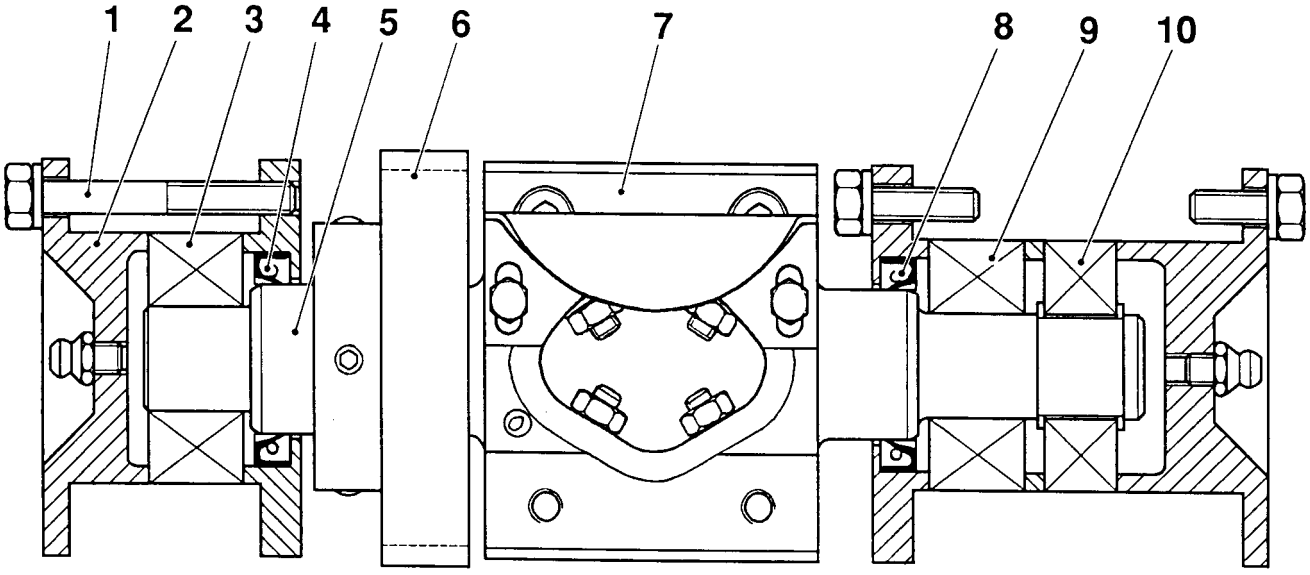
Note! Do not remove the gear wheel (6) unless it is deformed or damaged.

c) Make sure that the knives (7) are sharp. Replace as required.

d) Reassemble in reverse order.

e) Setting according to 150.

MM2.21B5684E01en.fm



1 Screw
2 Bearing cover
3 Bearing
4 Seal ring
5 Knife shaft
6 Gear wheel
7 Knife
8 Seal ring
9 Bearing
10 Bearing

5.5-2 Knife shaft - set

Machine status	Main power OFF Air OFF
SPC reference	12550-0200

WARNING! **Risk of injury due to cutting.**
The knives are sharp.

a) Adjust the position of the knives (3) by means of the screws (6) so that the knives are parallel with the counter rail (2).

b) Check that they are parallel by viewing against a strong light held behind each knife and counter rail, or by test-cutting through a single layer of packaging material.

c) The gap should be equally wide all along the counter rail. Adjust both knives.

Note! When adjusting parallelity, make sure that the cutting length remains correct.

d) Check cutting length A.
If the rubber layer (1) is black, cutting length A is to be 8,5 ±0,5 mm. If it is transparent, cutting length A is to be 5,5 ±0,5 mm.

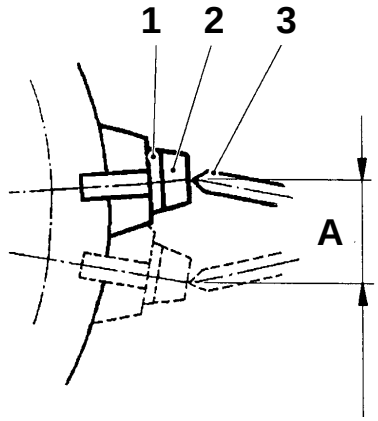
e) Secure the screws (6) with the nuts (5).

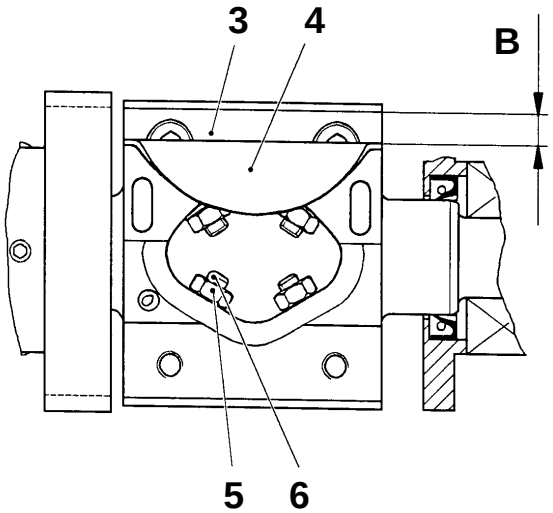
f) After setting of the cutting length, adjust the guide plates according to page 150.

g) Adjust the position of the guide tabs (4) by means of the two screws. Basic setting, distance B = 8,5 mm.

h) Run the machine with packaging material, according to the OM book. Check that the cut is half-way between the transversal seals.

A = 8,5 ± 0,5 mm
(Black rubber layer)
A = 5,5 ± 0,5 mm
(Transparent rubber layer)
B = 8,5 mm (Basic setting)





1 Rubber layer
2 Counter rail
3 Knife
4 Guide tab
5 Nut
6 Screw

MM2.21B5684E01en.fm

5.6 Angle encoder

SPC reference	553234-0100

5.6-1 Angle encoder - check

Machine status	Main power OFF Air OFF
SPC reference	553234-0100

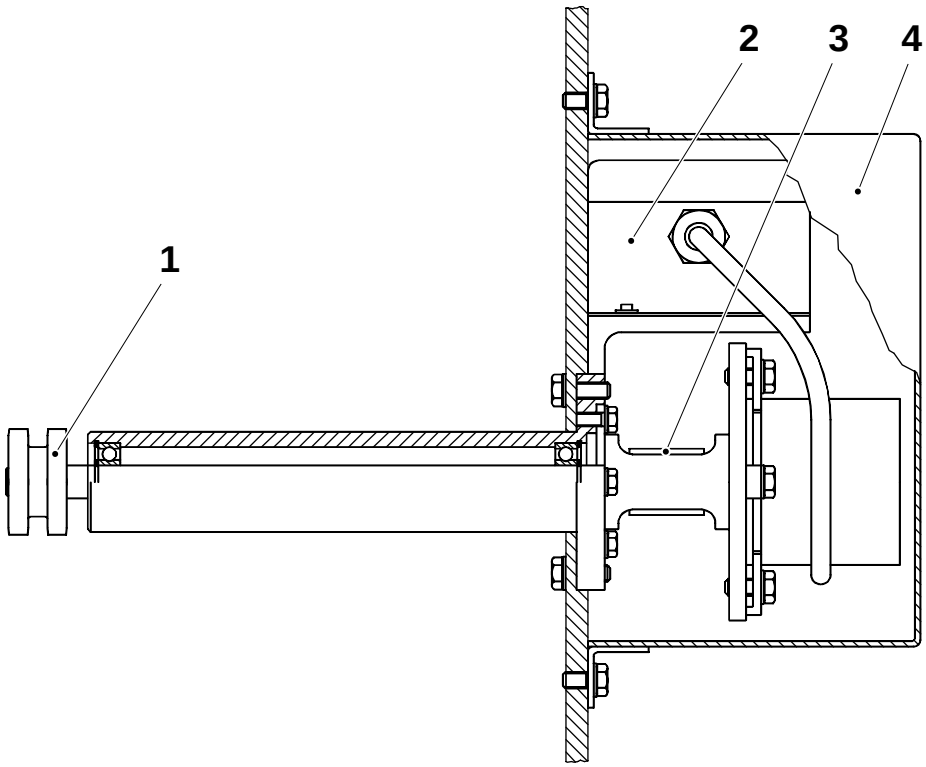
Remove the cover (4) from the angle encoder.

Check that the coupling (3) is intact by turning it. The display in the terminal box (2) changes ± 1 degree (NB! octal degrees).

If not , check if the sprocket (1) is moving when the coupling (3) is being turned.

- If the sprocket (1) is turning: Adjust by moving the block so that the chain bears against the sprocket (1).
- If the sprocket is not turning: Check that the coupling (3) is secured with the screws. Replace the coupling (3).

MM2.21B5684E01en.fm



1 Sprocket
2 Terminal box
3 Coupling
4 Cover

5.7 Central lubrication

SPC reference	265865-0100

5.7-1 Central lubrication - check

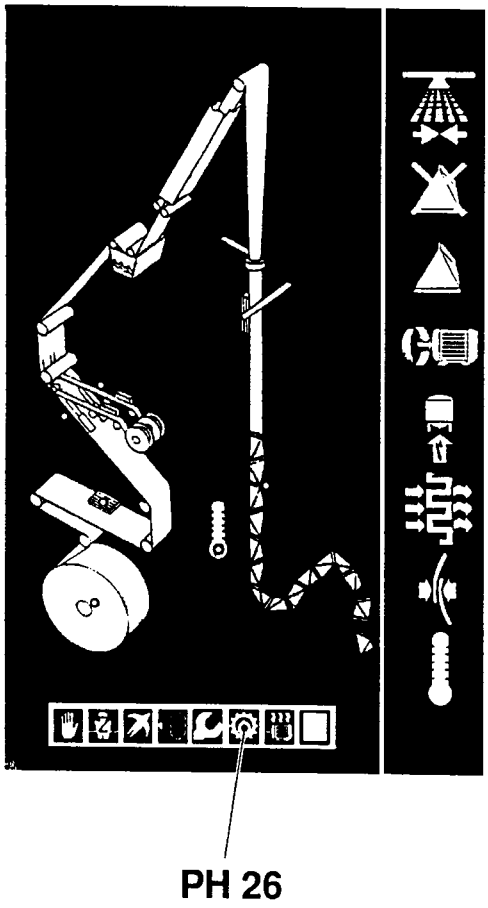
Machine status	Main power OFF Air OFF
SPC reference	2265865-0100

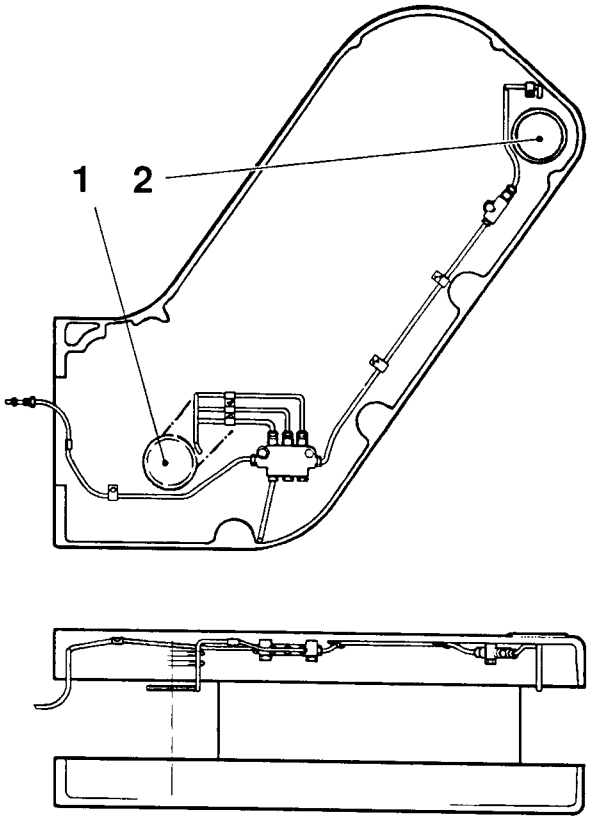
WARNING! **Risk of skin irritation.**
Before handling oil, read the safety precautions in chapter 1.

If the oil runs out or if any hose has come off its metering valve, make sure that the warning beacon and signal lamp PH26 Low lubrication oil pressure on the monitor panel flash indicating this fact.

Check that oil is delivered to all lubrication points. If required, replace any clogged metering valves.

Check all piping, connections, and hoses. Replace as required.





1 Triple sprocket
2 Rotating knife wheel

MM2.21B5684E01en.fm

6 Lower section

MM2.21B5684F01en.fm

6.1 Pneumatic system

SPC reference	553118-0300

6.1-1 Pneumatic system - check/clean

Machine status	Main power OFF
SPC reference	553118-0300

DANGER! **Risk of electroshock.**
Turn off the Main Switch before commencing work.

WARNING! **Risk of burns.**
The air heater and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Risk of eye injury.**
Wear protective safety eye glasses or eye shield when using compressed air.

a) Remove the cover to gain access to the pneumatic system.

b) Check the function of the pressure switch. Reduce the sterile air pressure by means of the regulator. The pressure switch is to trigger an alarm.

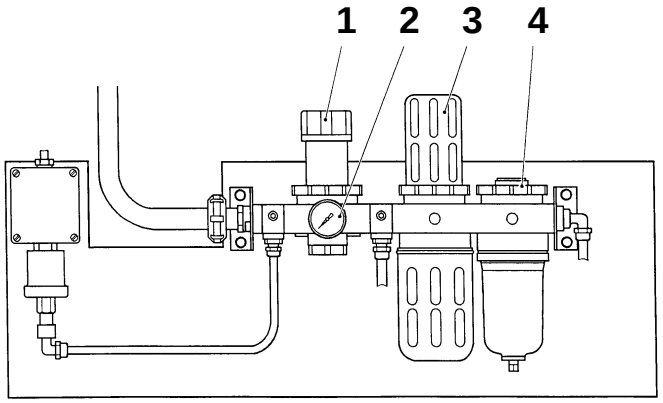
c) Check that the sterile air pressure is 30 kPa (0.3 bar).

d) Adjust the air pressure by means of the regulator (1).

e) Remove the lid. Take apart and clean the sintered filter (4) with detergent and blow it dry with compressed air.

f) Remove the lid. Take apart and clean the sintred filter (3) with detergent and blow it dry with compressed air. Replace the foam rubber filter element.

g) Tighten all unions in the pipe-line. Check the pipes and the connections to make sure that there is no leakage.



1 Regulator
2 Pressure gauge
3 Filter
4 Filter

MM2.21B5684F01en.fm

6.2 Air heater

SPC reference	19268-0300

6.2-1 Air heater - overhaul

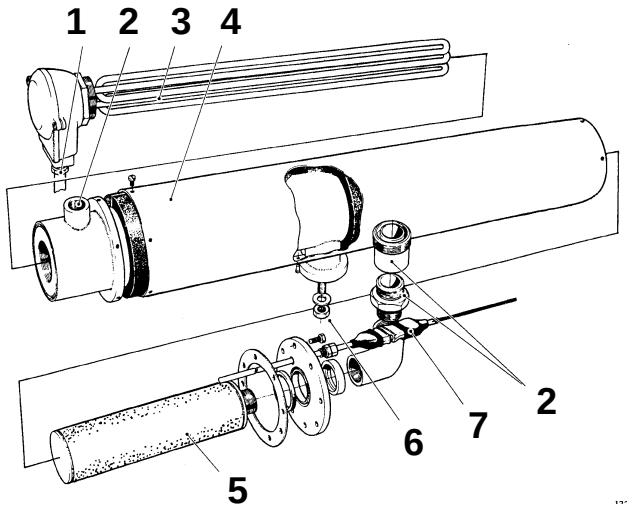
Machine status	Main power OFF Air OFF
SPC reference	19268-0300

DANGER! **Risk of electroshock.**
Turn off the Main Switch before commencing work.

WARNING! **Risk of burns.**
The air heater and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Risk of eye injury.**
Wear protective safety eye glasses or eye shield when using compressed air.

a) Undo the air connections (2) and electrical connection (1).
b) Unscrew the mounting nut (6) of the air heater.
c) Remove the complete air heater from the machine.
d) Remove the element (3) and filter (5) from the housing (4).
e) Check the element for corrosion and other damage.
f) Check the electric connection (1) for corrosion and scorching.
g) Replace the electrical connection and the element, if required.
h) Clean the filter (5) with detergent and blow it dry with compressed air.
i) Check and clean the thermocouple (7). Replace as required.



1 Electrical connection
2 Air connection
3 Element
4 Housing
5 Filter
6 Nut
7 Thermocouple

MM2.21B5684F01en.fm

6.3 Lubrication pump and container

SPC reference	230177-0300

6.3-1 Lubrication pump and container - remove

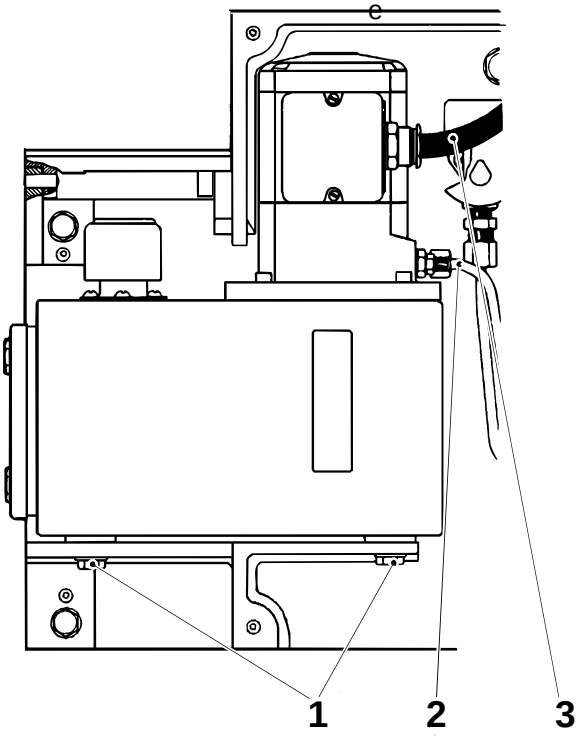
Machine status	Main power OFF Air OFF
SPC reference	230177-0300

DANGER! **Risk of electroshock.**
Turn off the Main Switch before commencing work.

WARNING! **Risk of eye injury.**
Wear protective safety eye glasses or eye shield when using compressed air.

WARNING! **Risk of skin irritation.**
Residual oil may be present in the oil pipe. Observe the Safety Precautions in chapter 1.

a) Disconnect the cable (3) and oil pipe (2).
b) Undo the screws (1).
c) Lift out the lubrication oil pump and the container.
d) Fit the cleaned unit in reverse order.
e) Check the setting of the unit according to page 164.



1 Screw
2 Oil pipe
3 Cable

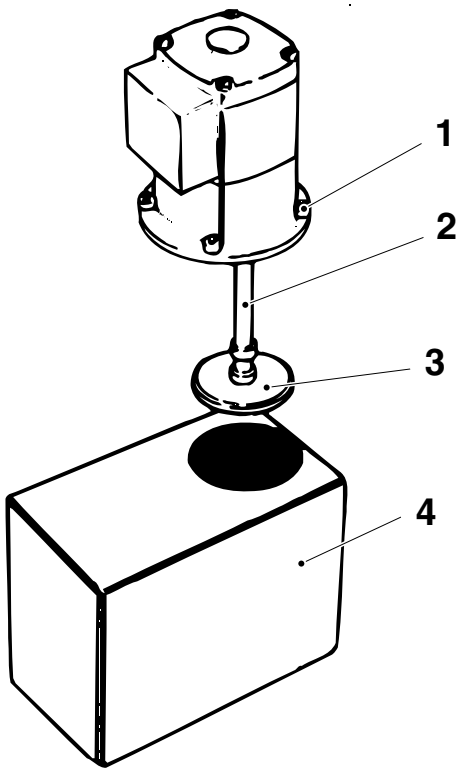
MM2.21B5684F01en.fm

6.3-2 Lubrication pump and container - clean

Machine status	Main power OFF Air OFF
SPC reference	230177-0300

WARNING! **Risk of skin irritation.**
Residual oil may be present in the oil pipe. Observe the Safety Precautions.

a) Detach the pump motor from the oil container (4) by undoing the four screws (1).
b) Disconnect the suction pipe (2) from the pump. Clean the strainer (3).
c) Reconnect the suction pipe.
d) Clean the oil container.
e) Fill the container with code B oil, according to section ”Lubrication”.
f) Fit the pump and container.



1 Screw
2 Suction pipe
3 Strainer
4 Oil container

MM2.21B5684F01en.fm

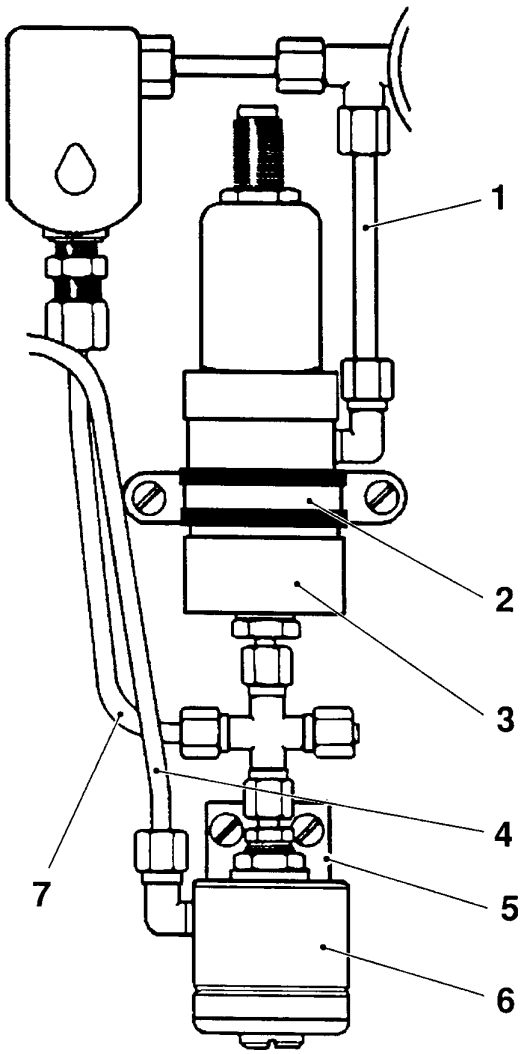
6.4 Accumulator with filter

Machine status	Main power OFF Air OFF
SPC reference	230177-0300

6.4-1 Accumulator with filter - change

WARNING! **Risk of skin irritation.**
Residual oil may be present in the oil pipe. Observe the Safety Precautions in chapter 1.

a) Disconnect the oil pipes (1), (4), and (7).
b) Remove the clamp (2) and bracket (5).
c) Lift out the accumulator (3) together with the filter (6).
d) Assemble in reverse order.



1 Oil pipe
2 Clamp
3 Accumulator
4 Oil pipe
5 Bracket
6 Filter
7 Oil pipe

MM2.21B5684F01en.fm

6.5 Central lubrication, filter

SPC reference	230177-0300

6.5-1 Central lubrication, filter - clean

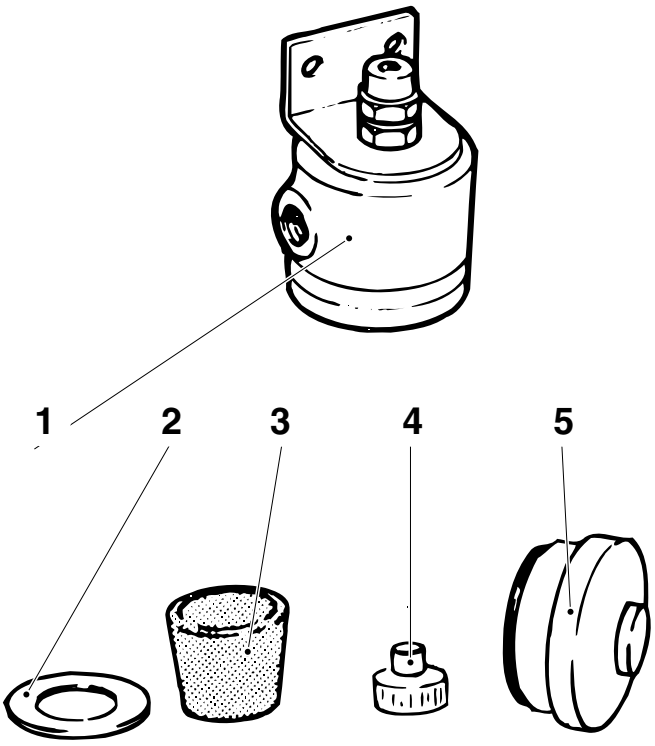
Machine status	Main power OFF Air OFF
SPC reference	230177-0300

a) Unscrew the cap (5) and nut (4) and remove the filter charge (3).

b) Clean the filter housing (1). Replace the filter insert (3).

c) Check the seal ring (2); replace as required.

d) Reassemble the filter charge (3), nut (4), and cap (5).



1 Lubrication oil filter
2 Seal
3 Filter insert TP No 90415-302
4 Nut
5 Cap

MM2.21B5684F01en.fm

6.6 Accumulator

SPC reference	230177-0300

6.6-1 Accumulator - set

Machine status	Main power OFF Air OFF
SPC reference	230177-0300

a) The movement of the adjustment screw (3) is limited by the piston assembly (1).

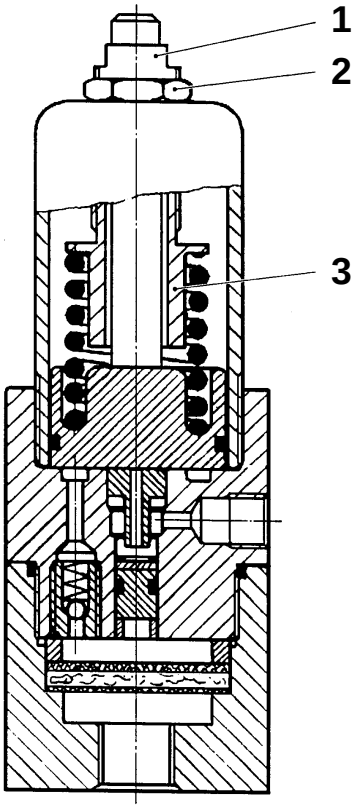
b) Each revolution on the piston assembly (1) corresponds to 1 ml oil.

c) Normal setting of the accumulator should give 5 ml of oil per stroke.

d) To adjust setting, release the lock nut (2), screw the piston assembly (1) fully home and then unscrew it 3 - 5 revolutions.

e) Retighten the lock nut.

f) The adjustment range is 1-16 ml per stroke.



1 Piston assembly
2 Lock nut
3 Adjustment screw

MM2.21B5684F01en.fm

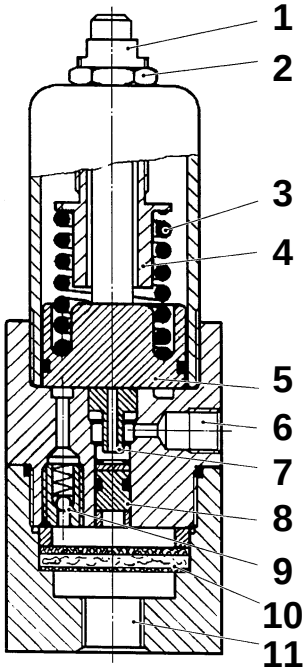
6.6-2 Accumulator - check function

Machine status	Main power OFF Air OFF
SPC reference	230177-0300

The accumulator delivers, independent of temperature, viscosity and to some extent also pressure, a small pre- determined amount of oil to the lubrication system at fixed intervals.

- At a pressure of 1,5 MPa (Max 1,75 - min 0,88 MPa), the oil is forced through the inlet (11).
- As the oil passes the filter (10), the piston (8) is forced up and closes against the seat (7).
- The non-return valve (9) opens and the oil level rises and moves the piston (5) up until it bears against the limit screw (4).
- The accumulator remains in this position as long as there is oil pressure at the inlet.
- When the pump motor stops and the inlet pressure is reduced, the piston (5) is under a 0,5 MPa spring pressure by means of the spring (3).
- The non-return valve (9) closes and the piston (8) is moved away from the seat (7). The oil is forced out through the outlet to the different lubrication points.
- During production, this cycle is repeated every 12 minutes (10 minutes at 60 Hz).

MM2.21B5684F01en.fm



1 Piston assembly
2 Lock nut
3 Spring
4 Limit screw
5 Piston
6 Outlet
7 Seat
8 Piston
9 Non-return valve
10 Filter
11 Inlet

6.7 Central lubrication

SPC reference	230177-0300

6.7-1 Central lubrication - set pressure

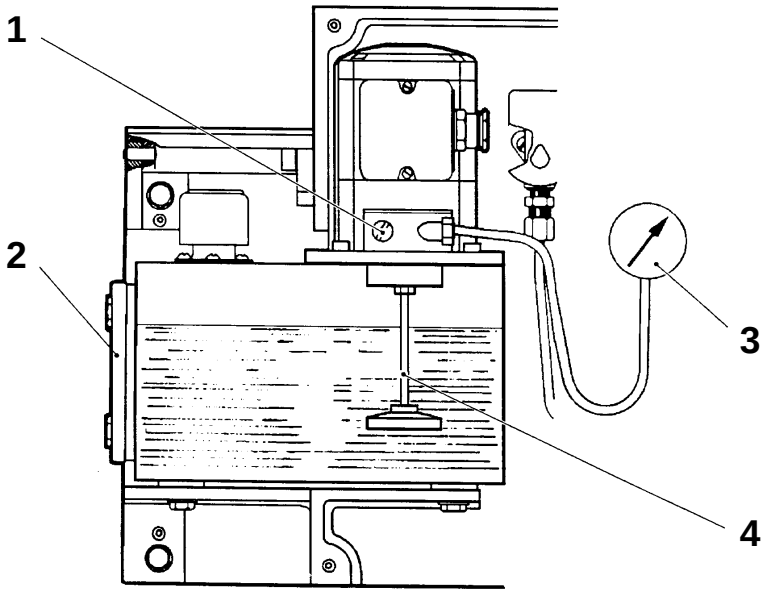
Machine status	Main power OFF Air OFF
SPC reference	230177-0300

a) Press **Programme up** on the control panel.

b) Check that the pressure in the lubrication system rises to 1,5 MPa (15 bar) while the motor is running.

c) If required, adjust by means of the setting screw (1); turn clockwise to increase pressure. After setting, secure the screw with the lock nut.

d) When the motor has stopped, check that the accumulator gives 0,3 - 0,4 MPa during appr. 10 s.



1 Setting screw (overflow valve)
2 Level glass
3 Pressure gauge
4 Suction pipe

MM2.21B5684F01en.fm

Fault-finding

If no pressure is built up in the lubrication system when **Operating power on** is pushed, check:

- in the level glass (2), that there is oil in the tank,
- that all hoses and connections are tight,
- that the fuse has not blown,
- if the safety switch has cut out.

6.8 Pressure switch

SPC reference	230177-0300

6.8-1 Pressure switch - check

Machine status	Main power OFF Air OFF
SPC reference	230177-0300

The pressure switch ensures that the pre-set oil pressure is maintained in the system.

The pressure is measured in one of the most remote blocks.

If the pressure drops under the pre-set value, an alarm is triggered on the monitor panel (PH 26 Low lubrication oil pressure). The current production run may be completed, but if the machine for any reason is stopped, it cannot be restarted until appropriate action has been taken.

Possible reasons for pressure loss:

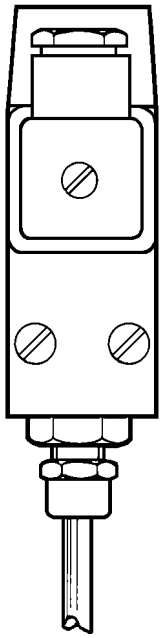
a) Oil container empty

b) Clogged filters

c) Incorrect adjustment of pressure switch

d) Leaking pipes

e) Missing metering valve



MM2.21B5684F01en.fm

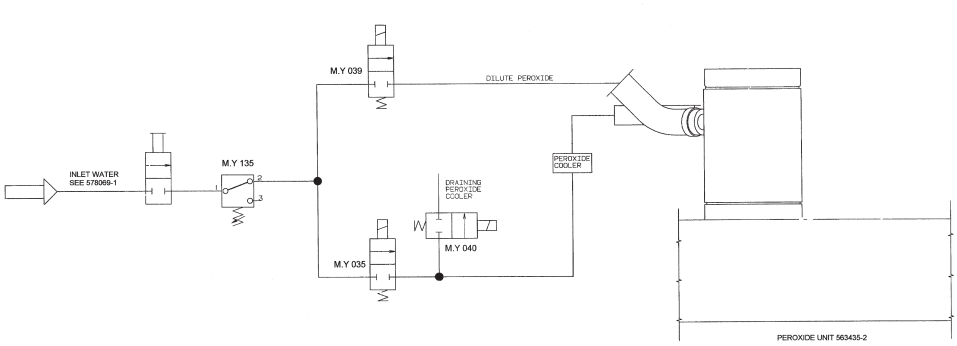
6.9 Air Pipe-line

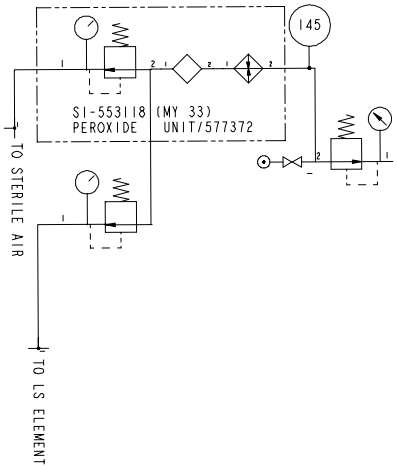
SPC reference	577372-0200

6.9-1 Air Pipe-line - check

Machine status	Main power OFF Air OFF
SPC reference	577372-0200

Check the hoses and the air connections to make sure that there is no leakage.





MM2.21B5684F01en.fm

6.10 Peroxide system

SPC reference	563435-0100

6.10-1 Peroxide system - check tightness

Machine status	Main power OFF Air OFF
SPC reference	563435-0100

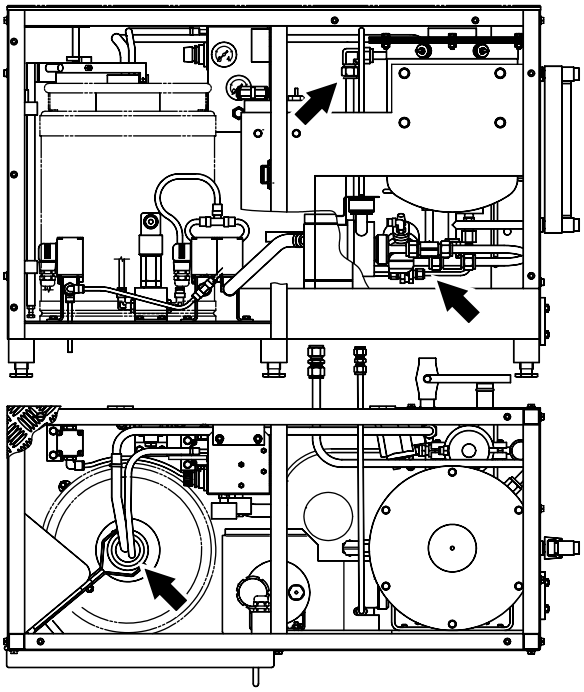
DANGER! **Danger of explosion!**
Oil in combination with hydrogen peroxide may form explosive compounds. The components of the peroxide bath must not be lubricated.

DANGER! **Danger of injury due to pinching and crushing!**
The jaws are moving when the machine is running. Close the side doors before running the machine. The machine must under no circumstances be bridged or by-passed.

WARNING! **Risk of personal injury by skin contact or inhalation!**
Before handling sterilization liquid observe the Safety precautions.

Run the machine acc to the OM book.

Check, when peroxide is being pumped through the system, that components, pipe connections and pipes do not leak.



MM2.21B5684F01en.fm

6.10-2 Peroxide system - clean peroxide filter

Machine status	Main power OFF Air OFF
SPC reference	566149-0100

DANGER! **Danger of explosion!**
Oil in combination with hydrogen peroxide may form explosive compounds. The components of the filter unit must not be lubricated.

DANGER! **Danger of eye injury!**
Wear protective safety eye glasses or eye shield when using compressed air.

WARNING! **Risk of personal injury by skin contact or inhalation!**
Before handling sterilization liquid observe the “Safety precautions”.

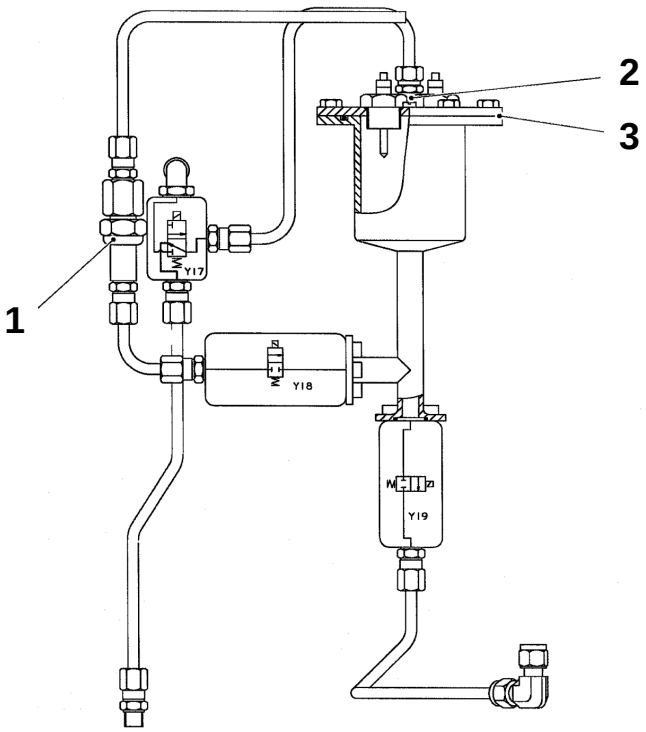
Dismantle the filter unit (1) and clean the filter insert with compressed air.

If the filter insert is badly clogged, replace it.

Dismantle the filter (2) and clean it with compressed air.

If the filter is badly clogged, replace it.

Before removing the lid (3), mark its position. Make sure the lid is fitted correctly.



1 Filter unit
2 Filter
3 Lid

MM2.21B5684F01en.fm

6.10-3 Peroxide system - clean wetting agent filter

Machine status	Main power OFF Air OFF
SPC reference	566143-0100

DANGER! **Danger of explosion!**
Oil in combination with hydrogen peroxide may form explosive compounds. The components of the filter unit must not be lubricated.

DANGER! **Danger of eye injury!**
Wear protective safety eye glasses or eye shield when using compressed air.

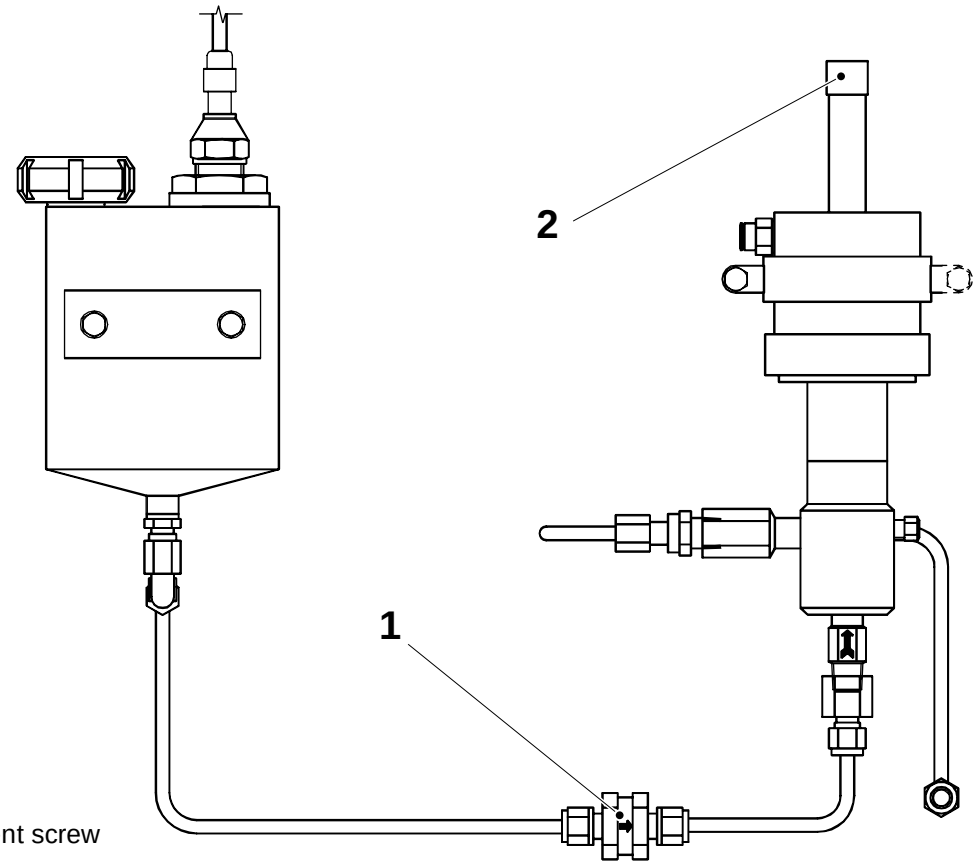
WARNING! **Risk of personal injury by skin contact or inhalation!**
Before handling sterilization liquid observe the “Safety precautions”.

Dismantle the filter unit (1) and clean the filter insert with compressed air.

If the filter insert is badly clogged, replace it.

Set the stroke length of the wetting agent pump at 25 mm, which gives the correct concentration of wetting agent/peroxide.

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1 Filter unit
2 Stroke length adjustment screw

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MM2.21B5684F01en.fm

7 Hole punch device

MM2.21B5684G01en.fm

7-1 Setting sequence

SPC reference	610323-0500

Note! To be followed when performing the basic settings of the machine.

7.6-2 Carriage - set 188
⇓
7.7-1 Pull tab feed - check 189
⇓
7.5-2 Pull tab sealing unit - overhaul 182
⇓
7.5-3 Pull tab sealing unit - set 183
⇓
7.4-3 Punch unit - set 180
⇓
7.3-2 Pull tab unit - set 177
⇓
7.12-1 Paper guide - check 196
⇓
7.10-2 Element group - set 194
⇓
7.9-2 Mounting plate, LS and IS strips - set 192
⇓
7.11-1 Air supply unit - check 195

MM2.21B5684G01en.fm

7.1 Bending rollers and bearings

SPC reference	265768-0500

7.1-1 Bending rollers and bearings - check

Machine status	Main power OFF Air OFF
SPC reference	265768-0500

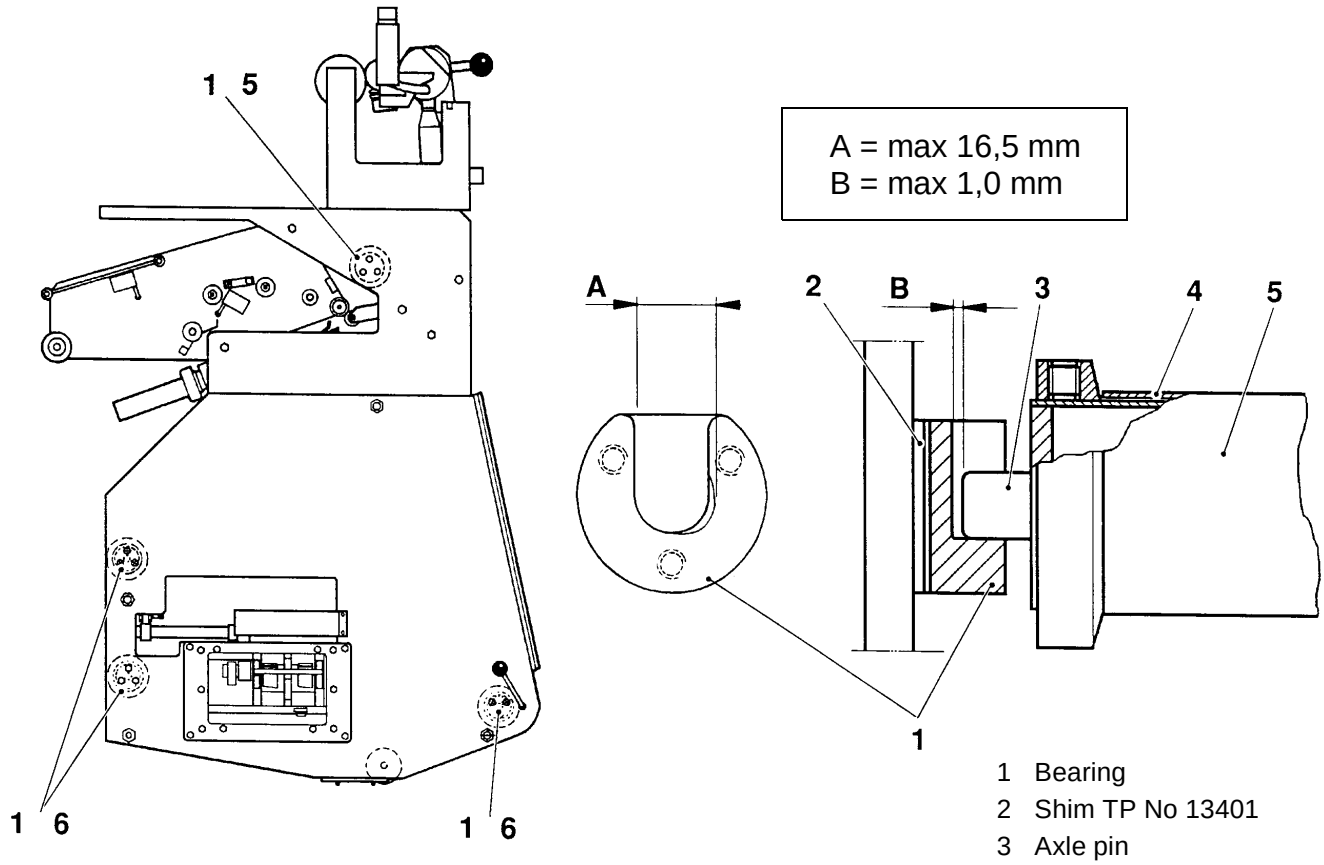
a) Check the bearings (1). Measurement A must not exceed 16,5 mm. Replace as required.

b) Check axial play B of the rollers. Maximum permitted play is 1 mm. If required, adjust by means of shims (2).

c) Check that the teflon sleeve (4) on the bending roller (5) is intact. Replace as required according to 174.

d) Check that the bending rollers (5) rotate freely, and that their axle pins (3) are not damaged.

MM2.21B5684G01en.fm



1 Bearing
2 Shim TP No 13401
3 Axle pin
4 Teflon sleeve
5 Bending roller
6 Bending roller

7.2 Pressure roller and bending roller

SPC reference	239793-0100

7.2-1 Pressure roller and bending roller - overhaul

Machine status	Main power OFF Air OFF
SPC reference	239793-0100

WARNING! **Danger of burns.**
The air from the hot air gun is hot. If necessary, wear heat-resistant protective gloves.

a) Use a hot-air gun (or oven) (1). Temperature 260 - 400° C.

b) Clean the roller (2) from grease or other deposits. Sandpaper the surface by hand to get a somewhat rougher surface.

c) Put the roller on a shaft where it can be rotated, preferably a lathe.

d) Cut off a suitable length of the shrink hose (3) (roller width +5 mm).

e) If required, clean the inside of hose with a lint-free cloth.

f) Slide the hose on to the roller and rotate the roller at fairly even speed.

g) Aim the hot-air gun at the middle part of the roller at a distance of 50 - 80 mm. Heat this area until the hose shrinks evenly against the roller (fig 1). When the hose shrinks firmly against the roller, reduce the distance to about 25 mm, then move the air gun towards the ends and make sure that the free ends (fig 2) of the hose are shrunk to its minimum diameter.

h) After shrinking-on, clean with sharp knife, leaving about 1 mm extending outside the roller edges.

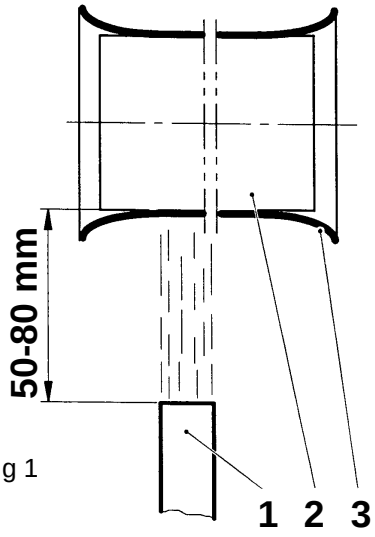


Fig 1

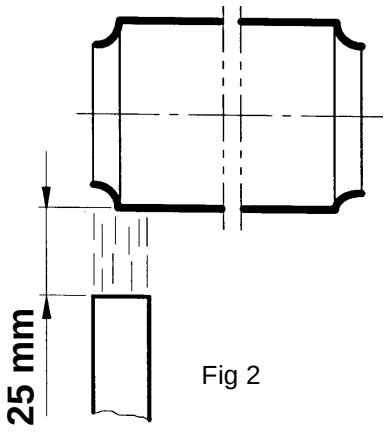


Fig 2

1 Air gun
2 Roller
3 Shrink hose

MM2.21B5684G01en.fm

7.3 Opening arrangement

SPC reference	19519-0400

7.3-1 Pull tab unit - overhaul

Machine status	Main power OFF Air OFF
SPC reference	19519-0400

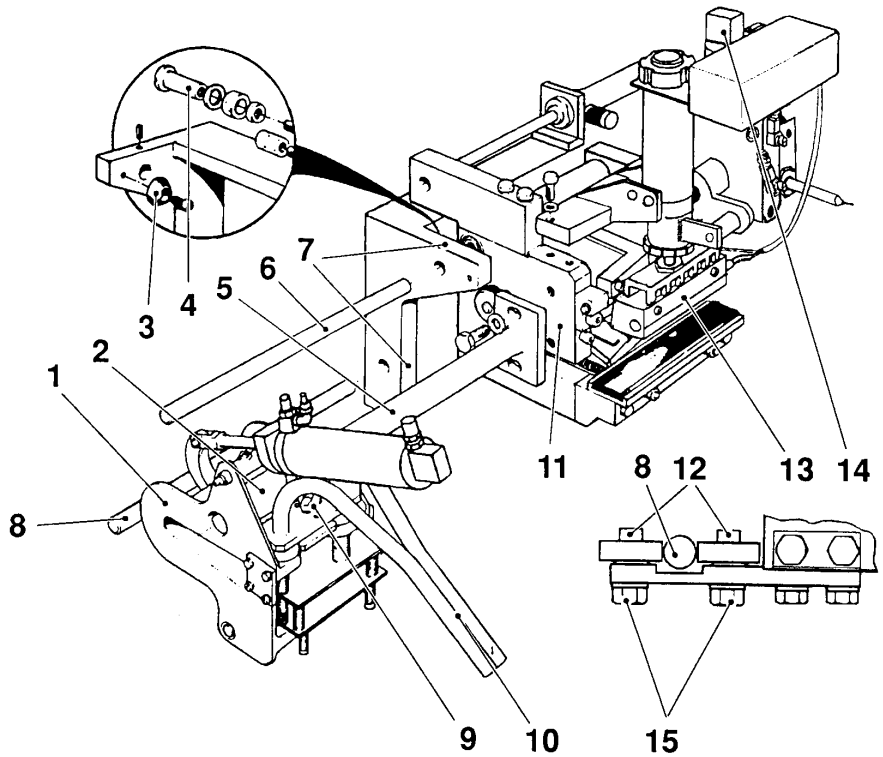
WARNING! **Danger of injury due to pinching or crushing.**
The carriage may move.
Turn off the compressed air supply before commencing work.

DANGER! **Danger of electroshock.**
There is 230 V AC in the pull tab sealing unit. Turn off the Main Switch before commencing work.

WARNING! **Danger of burns.**
The pull tab sealing unit and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Danger of injury due to cutting.**
The knives on the pull tab sealing unit are sharp.

a) Loosen the grub screws (7). Undo the screw (4), push out the bars (6) and (8), and remove the entire unit.



1 Punch unit
2 Clamp union
3 Rubber buffer
4 Screw
5 Mounting bar
6 Bar
7 Grub screw
8 Bar
9 Screw
10 Pipe
11 Carriage
12 Eccentric axle pin
13 Pull tab sealing unit
14 Pull tab feed
15 Ball bearing

(Cont'd)

MM2.21B5684G01en.fm

(Cont'd)

b) Undo the screw (9) and remove the pipe (10) for punched-out paper discs.

c) Check the pipe for wear and deformation.

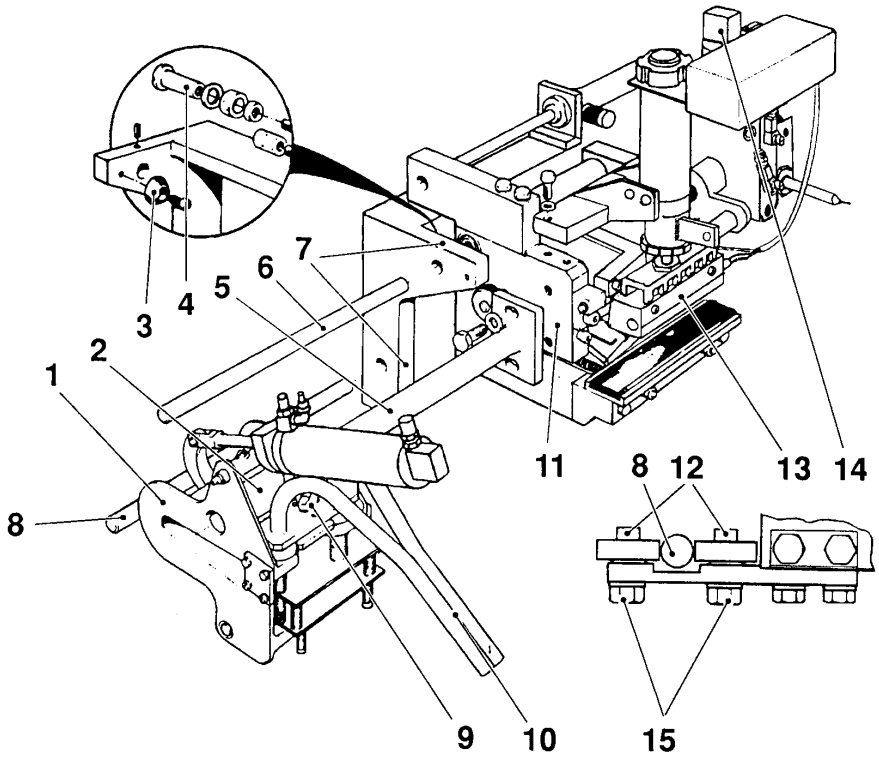
d) Mark the position of the punch unit (1) on the mounting bar (5). Loosen the clamp union (2) and pull off the punch unit.

e) Check and overhaul:
   - punch unit (1) according to page 178,
   - pull tab sealing unit (13) according to page 181,
   - carriage (11) according to page 186,
   - pull tab feed (14) according to page 189.

f) Replace the rubber buffer (3).

g) On assembly, turn the bar (6) one quarter of a turn. If the ball bearings have worn grooves along the bar, replace as required.

h) Set the eccentric axle pins (12) so that the ball bearings (15) rotate easily against the bar (8), but without play.



1 Punch unit
2 Clamp union
3 Rubber buffer
4 Screw
5 Mounting bar
6 Bar
7 Grub screw
8 Bar
9 Screw
10 Pipe
11 Carriage
12 Eccentric axle pin
13 Pull tab sealing unit
14 Pull tab feed
15 Ball bearing

MM2.21B5684G01en.fm

7.3-2 Pull tab unit - set

Machine status	Main power OFF Air OFF
SPC reference	19519-0400

WARNING! **Danger of injury due to pinching or crushing.**
The carriage may move.
Turn off the compressed air supply before commencing work.

DANGER! **Danger of electroshock.**
There is 230 V AC in the pull tab sealing unit. Turn off the Main Switch before commencing work.

WARNING! **Danger of burns.**
The pull tab sealing unit and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

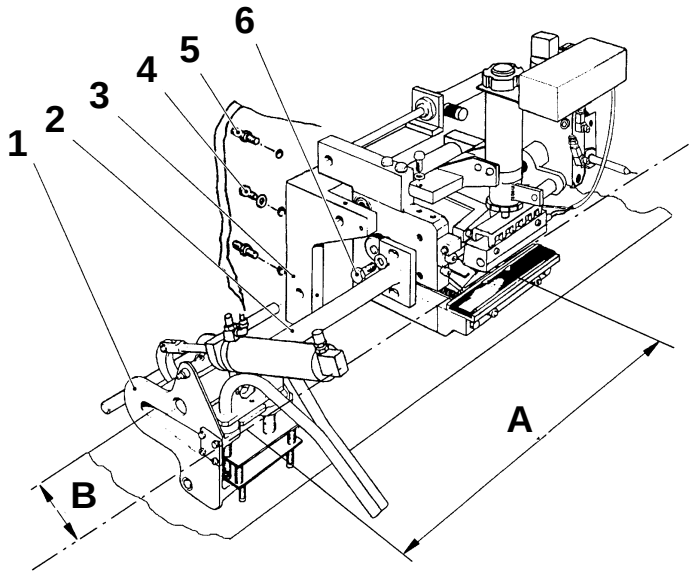
WARNING! **Danger of injury due to cutting.**
The knives on the pull tab sealing unit are sharp

a) Measurements **A** and **B**, illustrated and listed in the table, specify the basic setting of the pull tab unit for different material widths.

b) Final adjustment is to be carried out on test-running. Measurement A is altered by shifting the hole punch unit (1) along the mounting bar (2).

c) Measurement B is altered by shifting the entire pull tab unit sideways. Loosen the mounting screws (4) and set the frame (3) by means of the adjustment screws (5).

d) Centre of punch hole is to be aligned with centre of pull tab. Adjust with screw (6).



Paper width	Volume	A	B
85	8-12	127,5	32
105	12-18	127,5	40

1 Hole punch unit
2 Mounting bar
3 Frame
4 Mounting screw
5 Adjustment screw
6 Adjustment screw

MM2.21B5684G01en.fm

7.4 Punch unit

SPC reference	265823-0300

7.4-1 Punch unit - check

Machine status	Main power OFF Air OFF
SPC reference	265823-0300

WARNING! **Danger of injury due to pinching or crushing.**
The cylinder may move. Turn off the compressed air supply before commencing work.

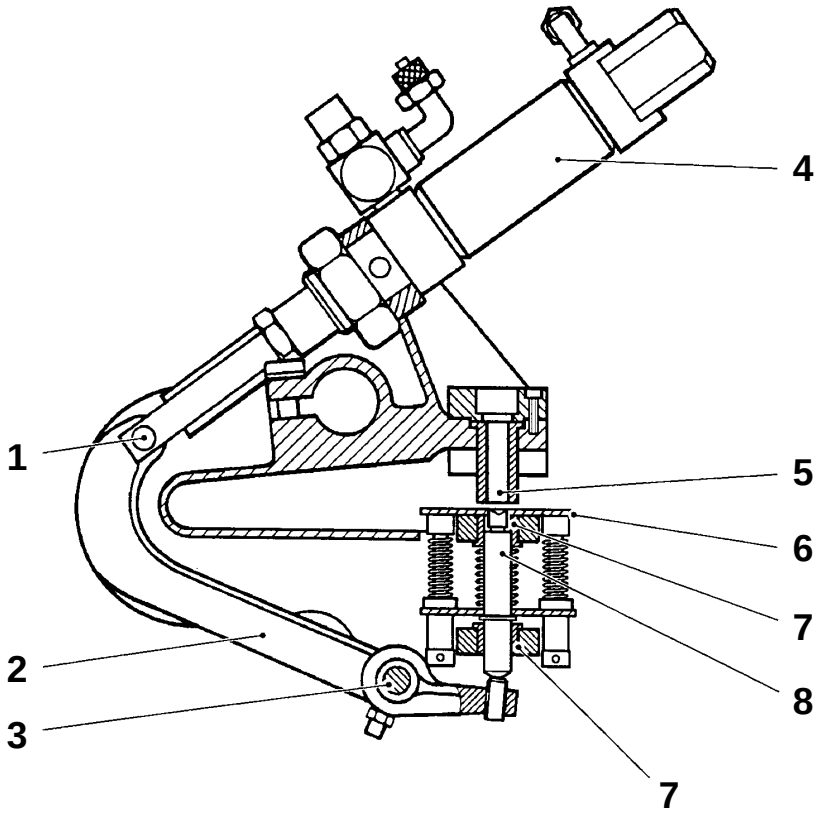
a) Remove the axle pin (3) of the arm (2).

b) Check that the punches (8) move easily without play in their bushings (7). In case of play, replace the bushings.

c) Check that the pressure plate (6) is not deformed.

d) Check the cylinder (4) for play and leakage. Replace as required.

e) Put a piece of packaging material in the punches and check their function manually. If the holes are not clean-cut, replace the punches (8) and the dies (5).



1 Piston rod head
2 Arm
3 Axle pin
4 Cylinder
5 Die
6 Pressure plate
7 Bushing
8 Punch

MM2.21B5684G01en.fm

7.4-2 Punch unit - overhaul

Machine status	Main power OFF Air OFF
SPC reference	265823-0300

WARNING! **Danger of injury due to pinching or crushing.**
The cylinder may move. Turn off the compressed air supply before commencing work.

a) Undo the screws (1) and remove the holders (2) and dies (3).

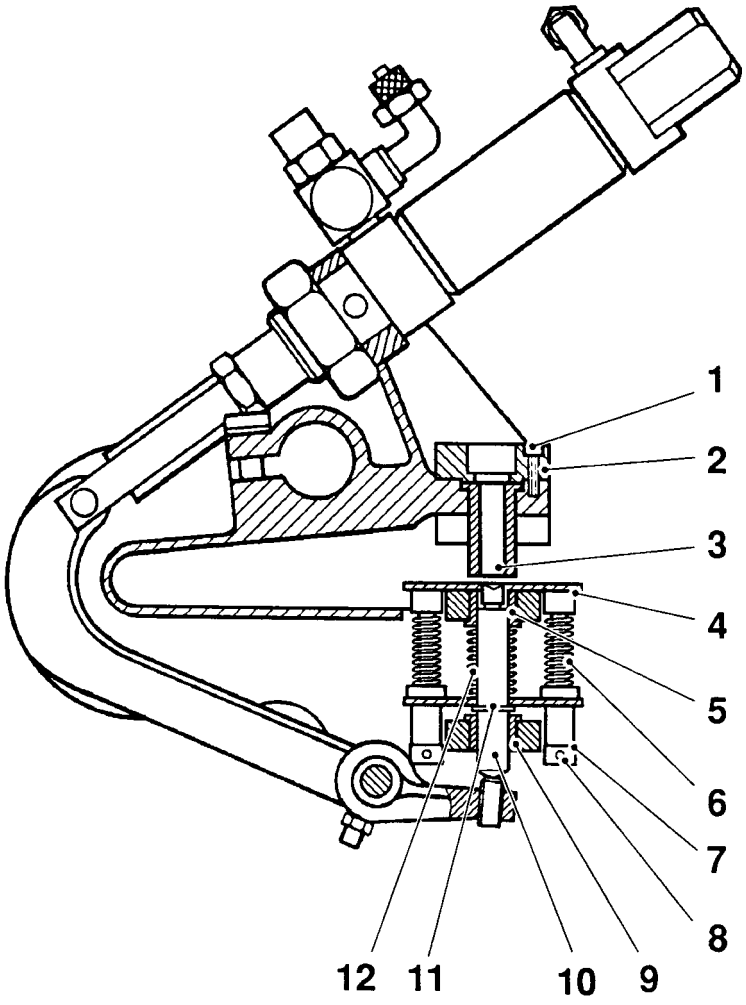
b) Remove the circlip (11) and lift out the punches (10).

c) Remove the locking wire (8) and loosen the screws (7). Remove the pressure plate (4).

d) Check the springs (6) and (12). Replace as required.

e) Clean the components and remove plastic deposits.

f) Replace the punches (10), dies (3), and bushings (5) and (9).



1 Screw
2 Holder
3 Die
4 Pressure plate
5 Bushing
6 Spring
7 Screw
8 Locking wire
9 Bushing
10 Punch
11 Circlip
12 Spring

MM2.21B5684G01en.fm

7.4-3 Punch unit - set

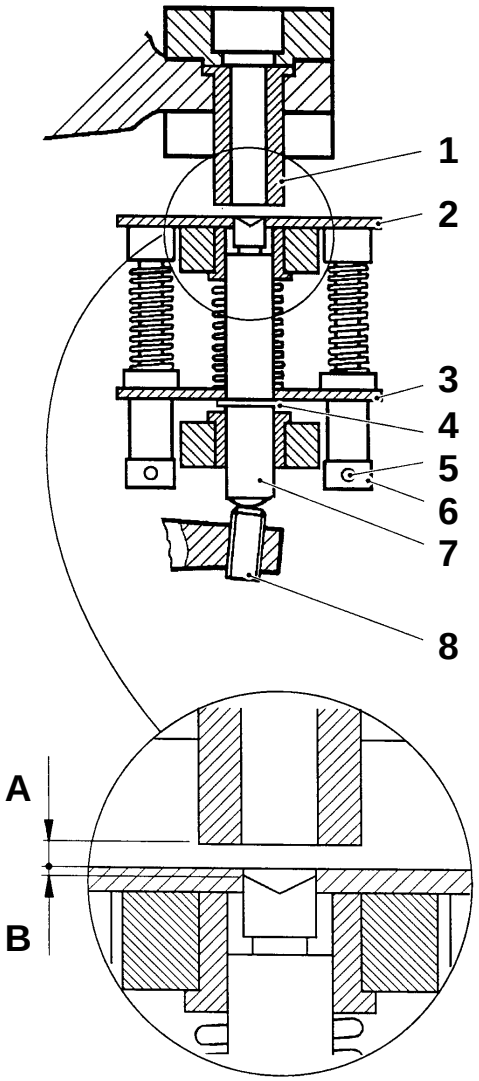
Machine status	Main power OFF Air OFF
SPC reference	265823-0300

Adjust the position of the pressure plate (2) by means of the screws (6) so that a gap A is 1 + 0,2 / - 0 mm.

Carry out coarse setting of the punches (7) at the piston rod head and final adjustments by means of the setting screws (8) so that the punches are approximately 0,2 mm below the pressure plate, measurement B, with a penetration of max. 0,5 mm into the dies (1).

Note! The circlip (4) must lie against the plate (3) to make the punch unit function correctly.

Secure the screws (6) with the locking wire (5).



A = 1,0 + 0,2/ - 0 mm
B = appr 0,2 mm

1 Die
2 Pressure plate
3 Plate
4 Circlip
5 Locking wire
6 Screw
7 Punch
8 Setting screw

MM2.21B5684G01en.fm

7.5 Pull tab sealing unit

SPC reference	263886-0400

7.5-1 Pull tab sealing unit - check

Machine status	Main power OFF Air OFF
SPC reference	263886-0400

WARNING! **Danger of injury due to pinching or crushing.**
The carriage may move.
Turn of the compressed air supply before commencing work.

DANGER! **Danger off electroshock.**
There is 230 V AC in the pull tab sealing unit. Turn off the Main Switch before commencing work.

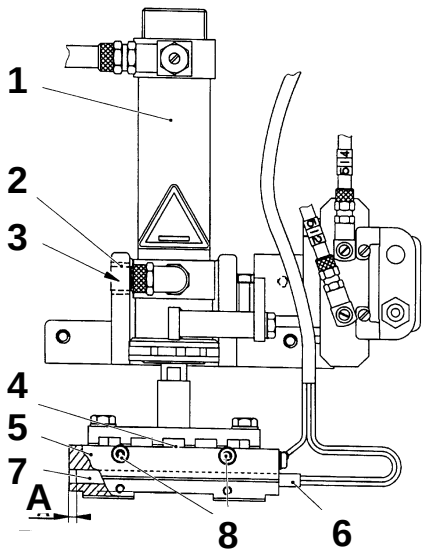
WARNING! **Danger of burns.**
The pull tab sealing unit and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Danger of injury due to cutting.**
The knives on the pull tab sealing unit are sharp.

a) Check the cylinder mounting (3) for wear. In case of play, replace the bushings (2).

b) Clean and check the heating block (5), heating cartridge connections (6), and insulation plates (4).

c) Check that the heating cartridge (7) is 5 mm from the edge of the heating block (5), measurement A. To adjust, loosen the screws (8).



1 Cylinder
2 Bushing
3 Mounting
4 Insulation plate
5 Heating block
6 Heating cartridge connection
7 Heating cartridge
8 Screw

MM2.21B5684G01en.fm

7.5-2 Pull tab sealing unit - overhaul

Machine status	Main power OFF Air OFF
SPC reference	263886-0400

WARNING! **Danger of injury due to pinching or crushing.**
The carriage may move.
Turn off the compressed air supply before commencing work.

DANGER! **Danger of electroshock.**
There is 230 V AC in the pull tab sealing unit. Turn off the Main Switch before commencing work.

WARNING! **Danger of burns.**
The pull tab sealing unit and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Danger of injury due to cutting.**
The knives on the pull tab sealing unit are sharp.

If the knife is blunt and cuts badly, replace all the knives as follows:

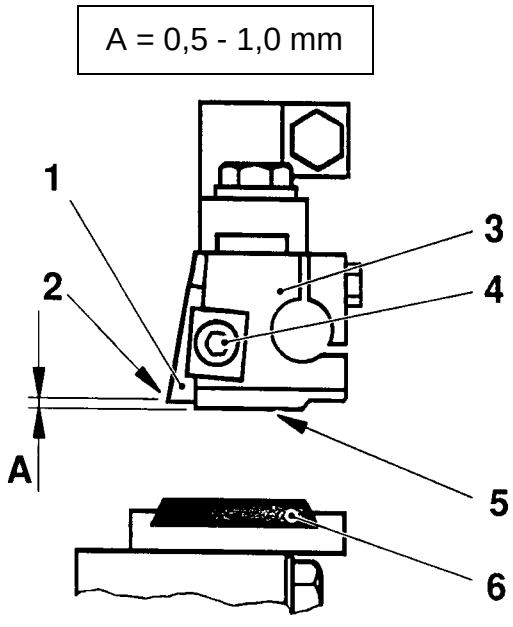
a) Loosen the mounting screws (4) and remove the moving knives.

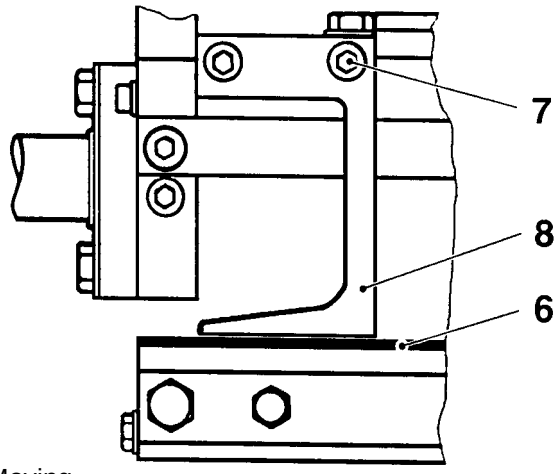
b) Fit the moving knives (1) to the heating block (3). Make sure that their edges (2) are 0,5 - 1,0 mm above the sealing surface (5), measurement A.

c) Undo the mounting screws (7) and remove the fixed knives (8).

d) Fit the fixed knives (8) and make sure their lower edges are parallel with the rubber die (6).

MM2.21B5684G01en.fm





1 Moving knife
2 Knife edge
3 Heating block
4 Mounting screw
5 Sealing surface
6 Rubber die
7 Mounting screw
8 Fixed knife

7.5-3 Pull tab sealing unit - set

Machine status	Main power OFF Air OFF
SPC reference	263886-0400

WARNING! **Danger of injury due to pinching or crushing.**
The carriage may move.
Turn off the compressed air supply before commencing work.

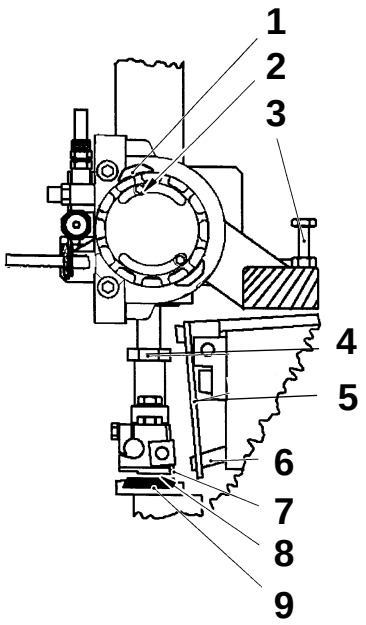
DANGER! **Danger of electroshock.**
There is 230 V AC in the pull tab sealing unit. Turn off the main switch before commencing work.

WARNING! **Danger of burns.**
The pull tab sealing unit and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Danger of injury due to cutting.**
The knives on the pull tab sealing unit are sharp.

Note! Before any adjustments are done, make sure that the nut (4) is tightened and the sealing unit head is straight. A loose sealing unit head can cause problem.

a) Loosen the adjustment screws (3) so that the fixed knifes (5) can be moved in a little bit underneath the pull tab strip guides (6). Basic setting of the fixed knife (5) is vertical and parallel with the sealing unit head.



1 Trip cam of stop position (pull tab unit in sealing/cutting position)
2 Adjustment screw of stop position (pull tab unit in sealing/cutting position)
3 Adjustment screw, fixed knifes
4 Locking nut, heating/cutting block
5 Fixed knife
6 Pull tab strip guide
7 Moving knifes
8 Sealing surface
9 Rubber die

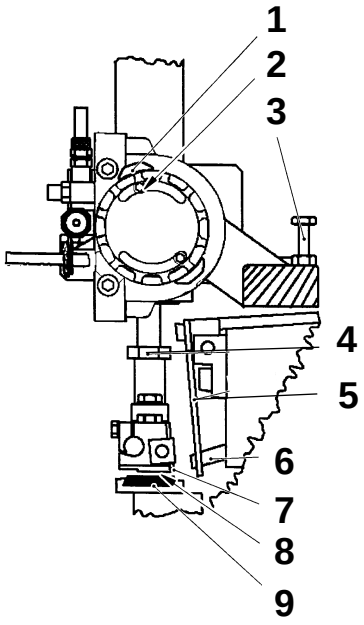
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MM2.21B5684G01en.fm

(Cont'd)

b) It is important that the fixed knives (5) do not bear against the moving knives (7) while setting is in progress.

c) Loosen the locking nut (4) and lower the pull tab sealing unit against the rubber die (9) and make sure the sealing surface (8) is symmetrical relative the rubber die (9).



1 Trip cam of stop position (pull tab unit in sealing/cutting position)
2 Adjustment screw of stop position (pull tab unit in sealing/cutting position)
3 Adjustment screw, fixed knifes
4 Locking nut, heating/cutting block
5 Fixed knife
6 Pull tab strip guide
7 Moving knifes
8 Sealing surface
9 Rubber die

d) Check that the pull tab sealing unit and the rubber die are parallel.

e) Adjust the heating/cutting block and lock it by tighten the locking nut (4).

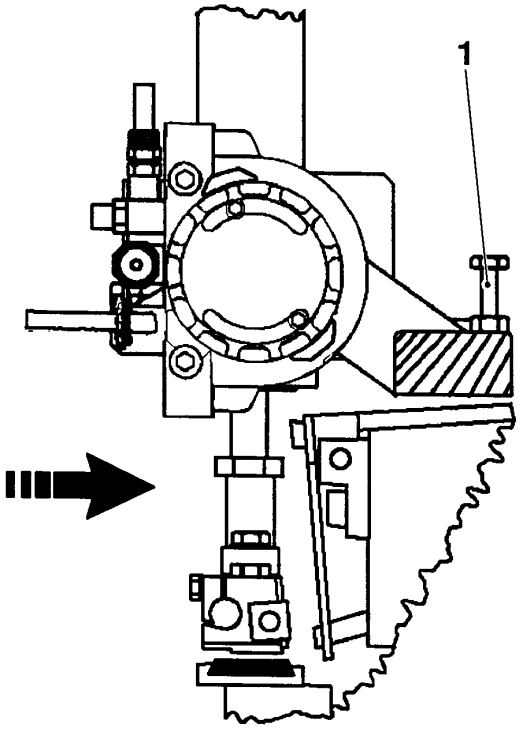
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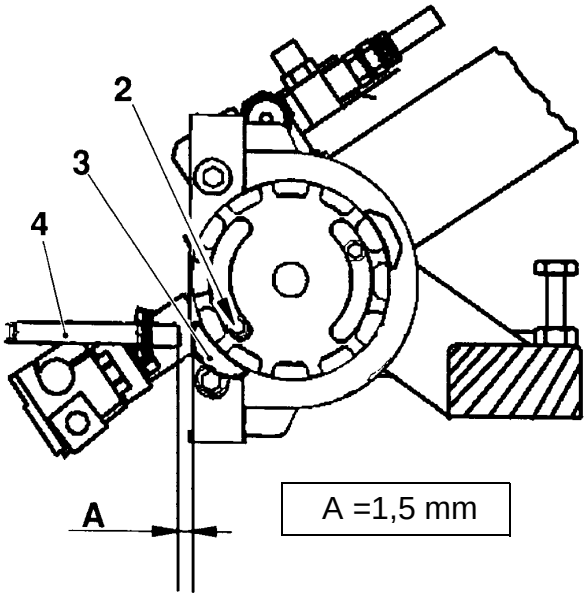
MM2.21B5684G01en.fm

(Cont'd)

f) Set the stop position of the pull tab sealing/cutting unit by pushing trip cam (1) to stop position and lock it with screw (2) in stop position.

g) Do not interfere with the previously achieved setting.





1 Adjustment screw, fixed knifes
2 Adjustment screw of stop position (pull tab unit non-sealing/cutting position)
3 Trip cam os stop position (pull tab unit non-sealing/cutting position)
4 Sensor of non-sealing/cutting position

h) Adjust the contact between the fixed knives and the moving knives with the screw (1). The contact is to be very light and must not result in the sealing unit being shifted out of position.

Caution! Do not interfere with the previously achieved setting

i) Push the pull tab sealing/cutting unit gently into stop position and make a manually test cutting with pull tab.

j) Put the pull tab sealing/cutting unit in non-sealing position. Push the trip cam (3) to stop position and lock it with adjustment screw (2).

k) Set the A measurement of the sensor (4) to 1,5mm.

MM2.21B5684G01en.fm

7.6 Carriage

SPC reference	19521-0200

7.6-1 Carriage - overhaul

Machine status	Main power OFF Air OFF
SPC reference	19521-0200

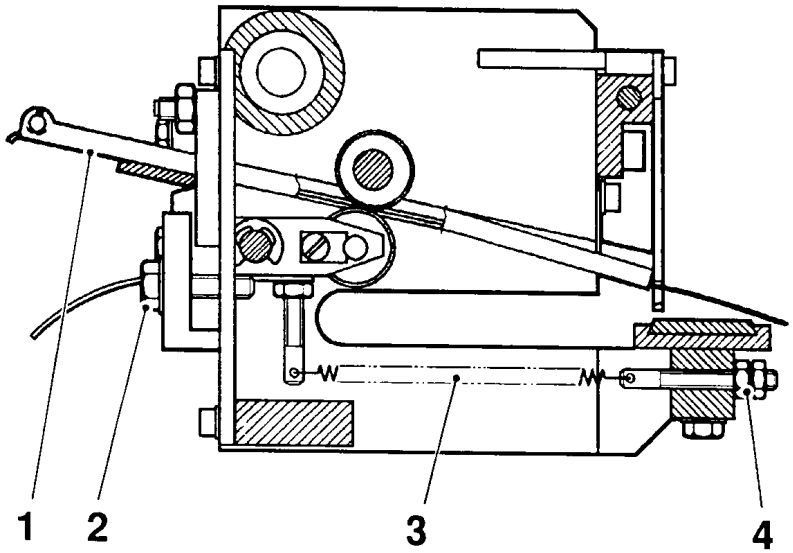
WARNING! **Danger of injury due to pinching or crushing.**
The carriage may move. Turn off the compressed air supply and the Main Switch before commencing work.

WARNING! **Danger of injury due to cutting.**
The knives (9) are sharp.

a) Replace the pressure rubber (8).

b) Undo the screw (2). Remove and clean the pull tab guides (1).

c) Check that the springs (3) are intact and that their adjustment nuts (4) are secured.



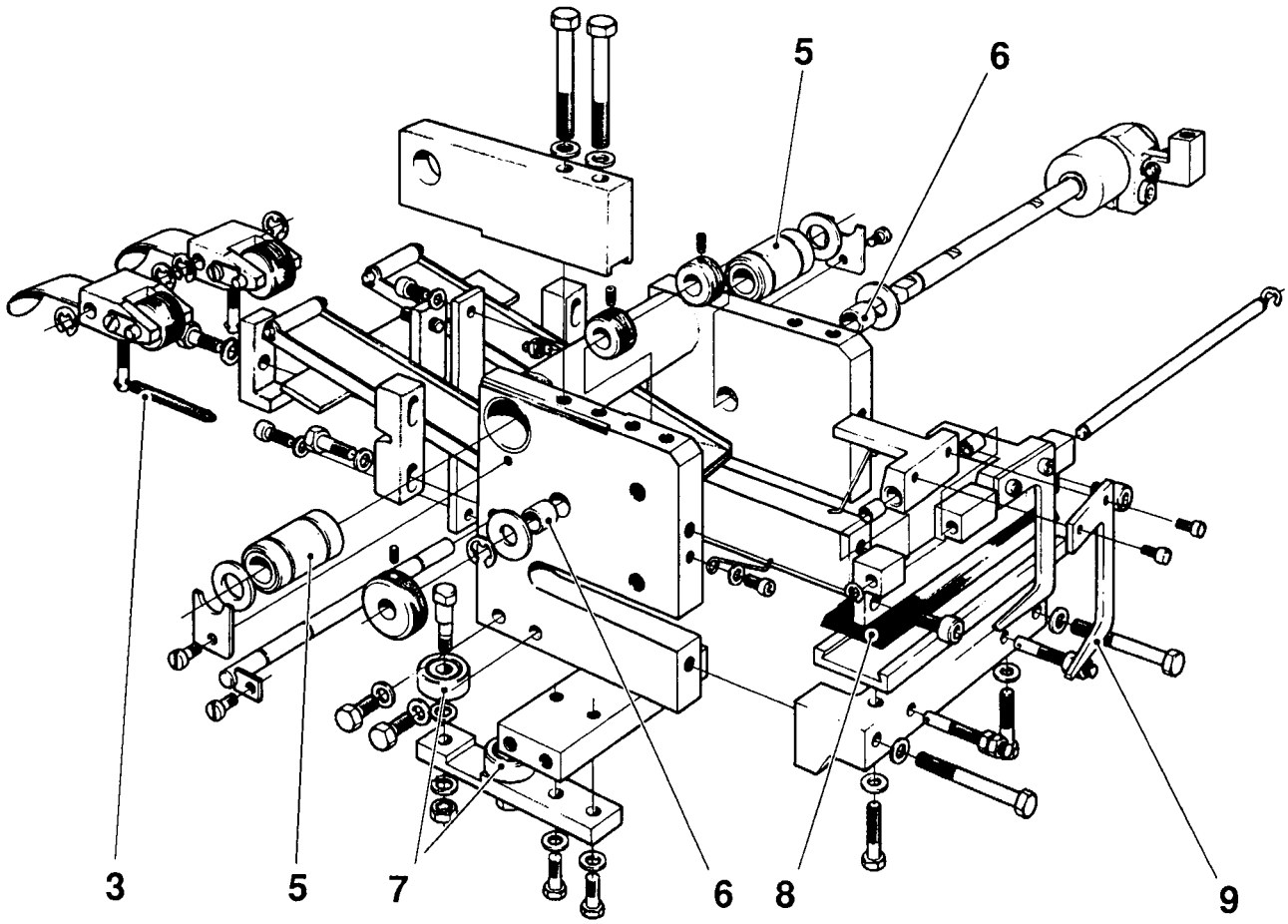
1 Pull tab guide
2 Screw
3 Spring
4 Adjustment nut

MM2.21B5684G01en.fm

(Cont'd)

(Cont'd)

d) Replace the ball bearings (7), ball bushings (5), and friction bearings (6).



5 Ball bushing
6 Friction bearing
7 Ball bearing
8 Pressure rubber
9 Knife

MM2.21B5684G01en.fm

7.6-2 Carriage - set

Machine status	Main power OFF Air OFF
SPC reference	19521-0200

WARNING! **Danger of injury due to pinching or crushing.**
The carriage may move. Turn off the compressed air supply and the **Main Switch** before commencing work.

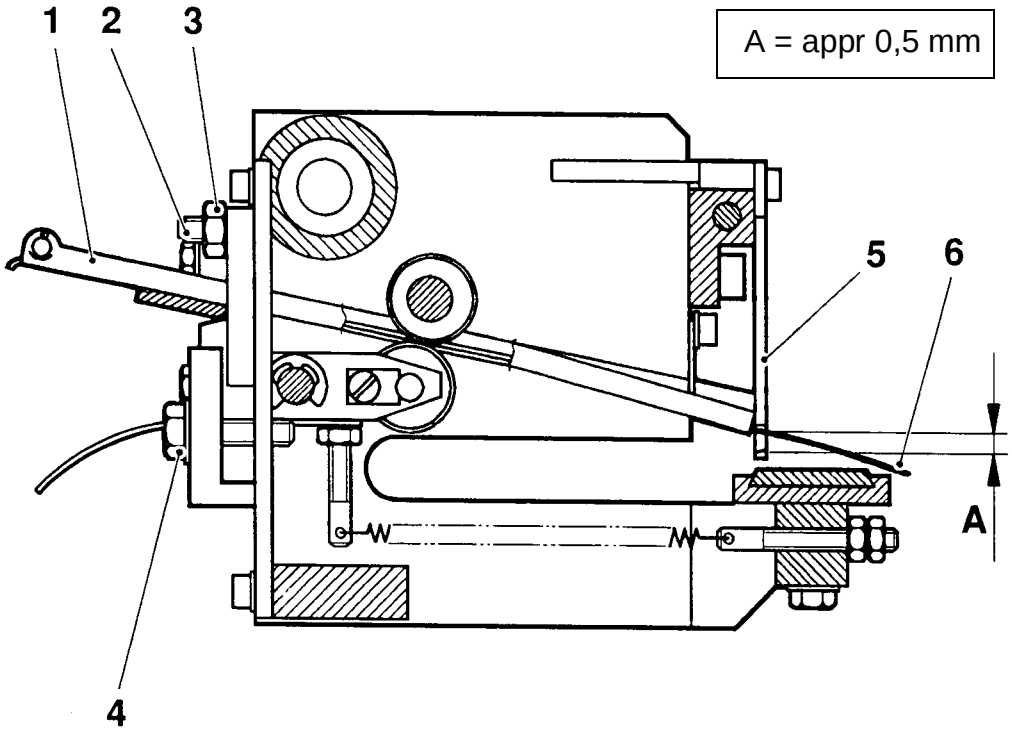
WARNING! **Danger of injury due to cutting**.
The knives (5) are sharp.

a) Loosen the screw (4) and nut (3). Adjust the pull tab guide (1) with the setting screw (2) so that the pull tab (6) is fed out as close to the edge of the fixed knife (5) as possible, appr 0,5 mm above the edge, measurement A.

b) Secure the setting screw (2) with the nut (3).

c) Tighten the screw (4).

d) Check the setting.



1 Pull tab guide
2 Screw
3 Nut
4 Screw
5 Fixed knife
6 Pull tab

MM2.21B5684G01en.fm

7.7 Pull tab feed

SPC reference	486705-0200

7.7-1 Pull tab feed - check

Machine status	Main power OFF Air OFF
SPC reference	486705-0200 19523-0100

WARNING! **Danger of injury due to pinching or crushing.**
The cylinder may move. Turn off the compressed air supply before commencing work.

a) Check that the free-wheel clutch (4) does not fail during feeding. If required, replace the clutch.

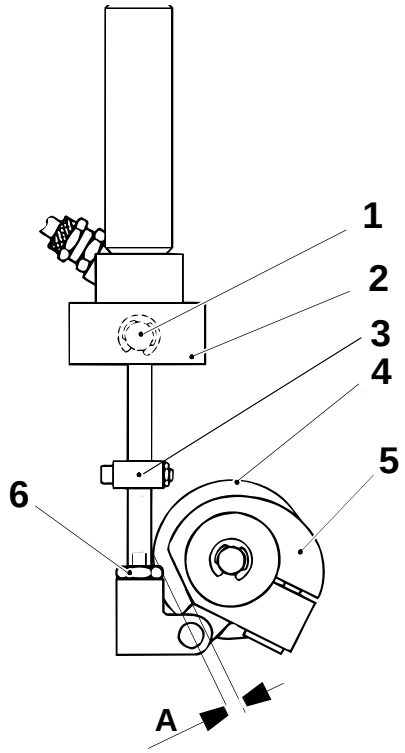
b) Check that the stop lug (3) is correctly fitted to the piston rod.

c) To reduce the length of the pull tabs, shift the lug upwards.

d) Check that there is a gap A of appr 2 mm between the clutch clamp union (5) and the nut (6) on the piston rod, when it is in its outer position. Adjust as required.

e) Check that the cylinder is fitted securely and that all hoses and connections are tight.

A = appr 2 mm



1 Axle
2 Bracket
3 Stop lug
4 Free-wheel clutch
5 Clutch clamp union
6 Nut

MM2.21B5684G01en.fm

7.8 Pneumatic system

SPC reference	265768-0500

7.8-1 Pneumatic system - check

Machine status	Main power OFF Air OFF
SPC reference	265768-0500

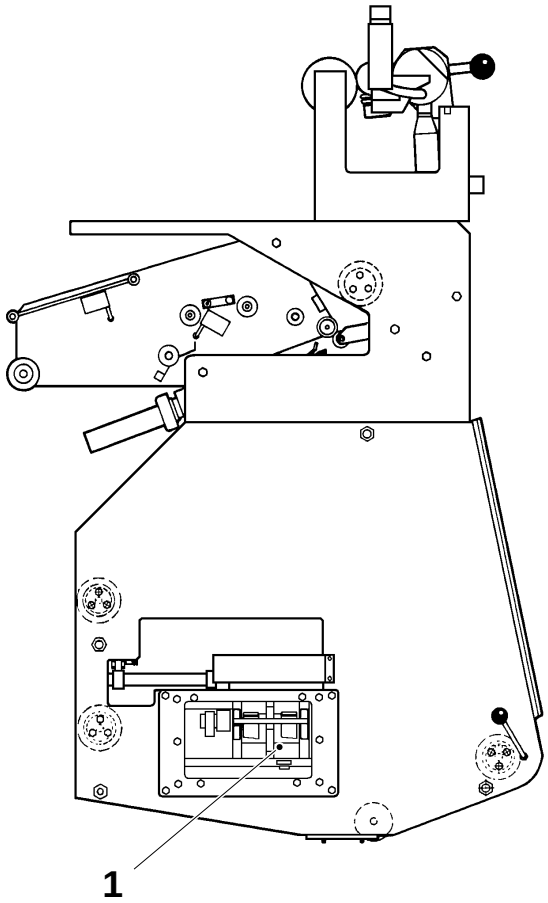
WARNING! **Danger of injury due to pinching or crushing.**
The carriage may move. Turn off the compressed air supply before commencing work.

a) Bleed the hole punch. Move the carriage (1) to its end position. Check the operating levers.

b) Check that hoses and piping are intact, that all connections are tight, and that there is no air leakage.

c) Check that there is no air leakage through the air cylinders.

d) Test the function of the hole punch unit. Follow the pneumatic diagram.



1 Carriage

MM2.21B5684G01en.fm

7.9 Fastening plate, LS and IS strips

SPC reference	293483-0100

7.9-1 Fastening plate, LS and IS strips - check

Machine status	Main power OFF Air OFF
SPC reference	293483-0100

WARNING! **Danger of injury due to pinching or crushing.**
The heating elements may move. Turn off the compressed air supply before commencing work.

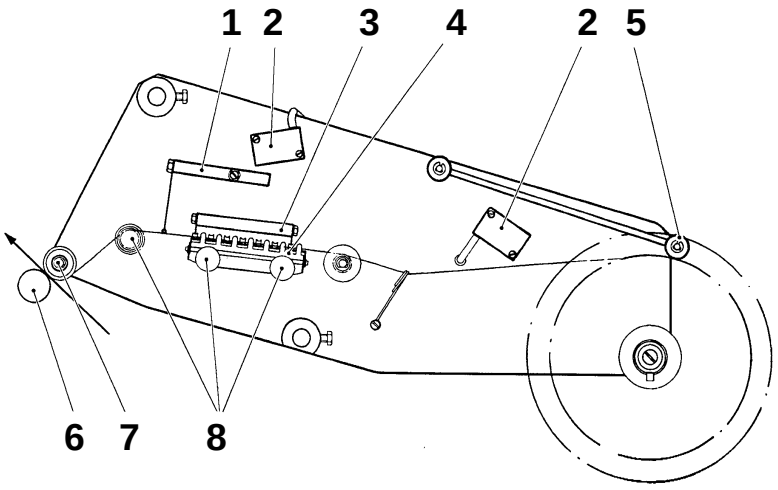
WARNING! **Danger of burns.**
The heating elements and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

Check:

- all the rollers and replace them in case of damage or wear,
- the rubber surface of the pressure roller (6), and counter roller of the IS,
- the counter roller (7) and pressure roller of the LS; remove any plastic deposits,
- that all the setting screws (8) turn easily and that there is a setting margin in both directions,
- the function of the proximity switches (2).

The supply monitor (5) is to indicate an alarm when the thickness of the strip layers on the bobbin has gone down to appr 10 mm. The broken-strip monitor (1) is to indicate an alarm if the strip is depressed with the fingers.

Check and clean the strip brake (4). If required, adjust the brake action by shifting the counterweight (3).



1 Broken-strip monitor
2 Proximity switch
3 Counterweight
4 Strip brake
5 Supply monitor
6 Pressure roller
7 Counter roller
8 Setting screw

MM2.21B5684G01en.fm

7.9-2 Mounting plate, LS and IS strips - set

Machine status	Main power OFF Air OFF
SPC reference	293483-0100

WARNING! **Danger of injury due to pinching or crushing.**
The nozzles may move.

WARNING! **Danger of burns.**
The nozzles and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

a) Carry out coarse adjustment by loosening the screws (1) and shifting the entire strip applicator mounting plate.

b) Carry out fine adjustment with the setting screws (6).

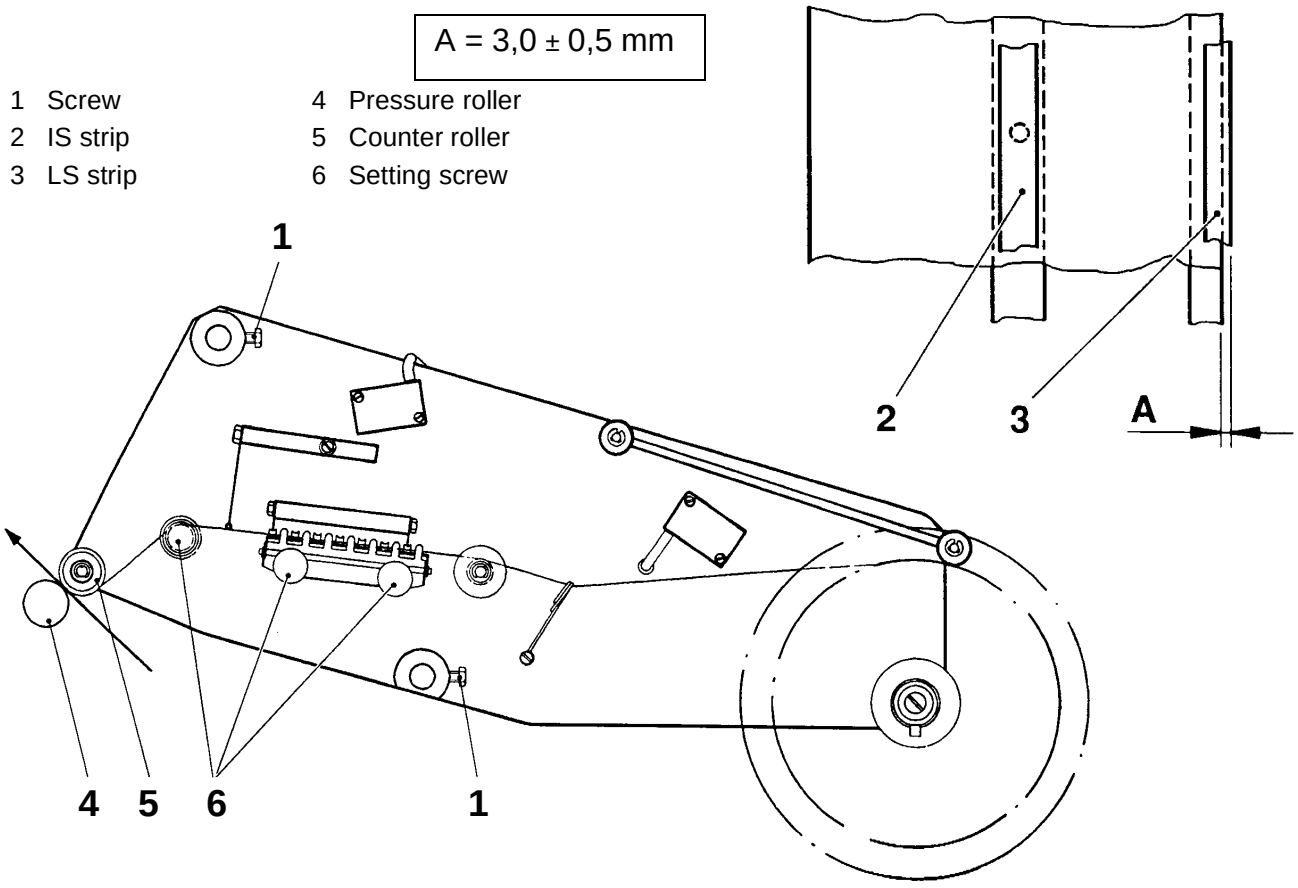
c) Check that the counter roller (5) are aligned above the pressure roller (4).

d) The IS strip (2) is to be aligned symmetrically over the holes.

e) The LS strip (3) is to protrude 3,0 ±0,5 mm beyond the material edge, measurement A.

A = 3,0 ± 0,5 mm

1 Screw
2 IS strip
3 LS strip
4 Pressure roller
5 Counter roller
6 Setting screw



MM2.21B5684G01en.fm

7.10 Element group

SPC reference	294112-0300

7.10-1 Element group - check

Machine status	Main power OFF Air OFF
SPC reference	294112-0300

WARNING! **Danger of injury due to pinching or crushing.**
The nozzles may move. Turn off the compressed air supply before commencing work.

WARNING! **Danger of burns.**
The nozzles and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

DANGER! **Danger of electroshock.**
There are 230 V AC in the heating elements.

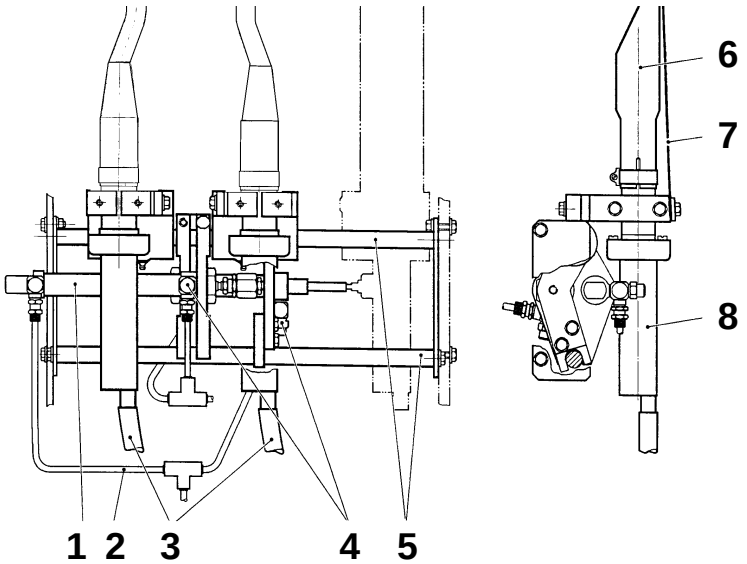
a) Turn off the compressed air supply. Move the heating elements (8) by hand to make sure they slide freely on their guides (5).

b) Check the air hoses (2) and (3).

c) Make sure the holes of the nozzles (6) are not blocked. Scrape off any plastic deposits.

d) Check the heat shield (7) and replace as required.

e) Turn on the compressed air supply and check the movements of the cylinders (1). Adjust the throttles (4) to obtain smooth movements.



1 Cylinder
2 Air hose
3 Air hose
4 Throttle
5 Guide
6 Nozzle
7 Heat shield
8 Heating element

MM2.21B5684G01en.fm

7.10-2 Element group - set

Machine status	Main power OFF Air OFF
SPC reference	294112-0300

WARNING! **Danger of injury due to pinching or crushing.**
The nozzles may move. Turn off the compressed air supply before commencing work.

WARNING! **Danger of burns.**
The nozzles and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

DANGER! **Danger of electroshock.**
There are 230 V AC in the heating elements.

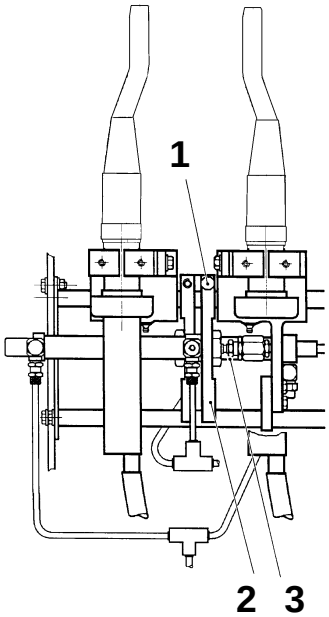
a) Carry out coarse setting of the heating element position sideways by loosening the screw (1) and shifting the yoke (2).

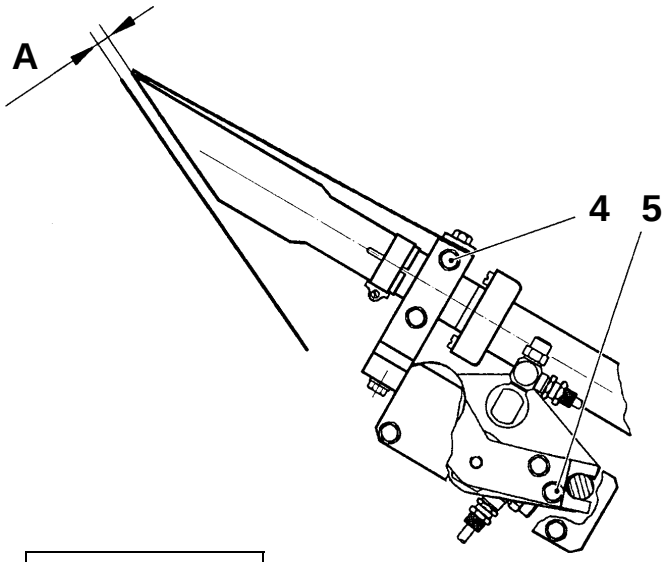
b) Carry out fine adjustment by means of the nut (3).

c) The heating element for the IS strip is to be aligned above the holes made in the material web.

d) The heating element for the LS strip is to be positioned in such a way that the outer row of holes is in line with the material edge.

e) After loosening the screws (4), gap A between the element and the material web can be adjusted. By loosening the screws (5), the heating element can be set parallel with the material web.
   – Gap A should be appr 2 mm.





A = appr 2mm

1 Screw
2 Yoke
3 Nut
4 Screw
5 Screw

MM2.21B5684G01en.fm

7.11 Air supply unit

SPC reference	265768-0500

7.11-1 Air supply unit - check

Machine status	Main power ON Air ON
SPC reference	265768-0500

Note! This is checked during production.

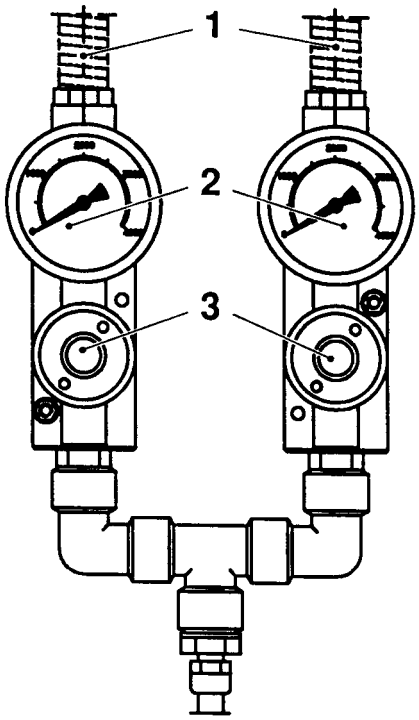
WARNING! **Danger of injury due to pinching or crushing!**
Danger of burns!
If necessary, wear heat-resistant protective gloves.

a) Run the machine according to the OM book.

b) Check that the pressure gauges (2) work and indicate the recommended air pressure. If required, adjust the air pressures by means of the throttle valves (3).

c) Air pressure according to page 209**,** ”Technical data”.

d) Check that the air hoses (1) to the elements are intact.



1 Air hose
2 Pressure gauge
3 Throttle valve

MM2.21B5684G01en.fm

7.12 Paper guide

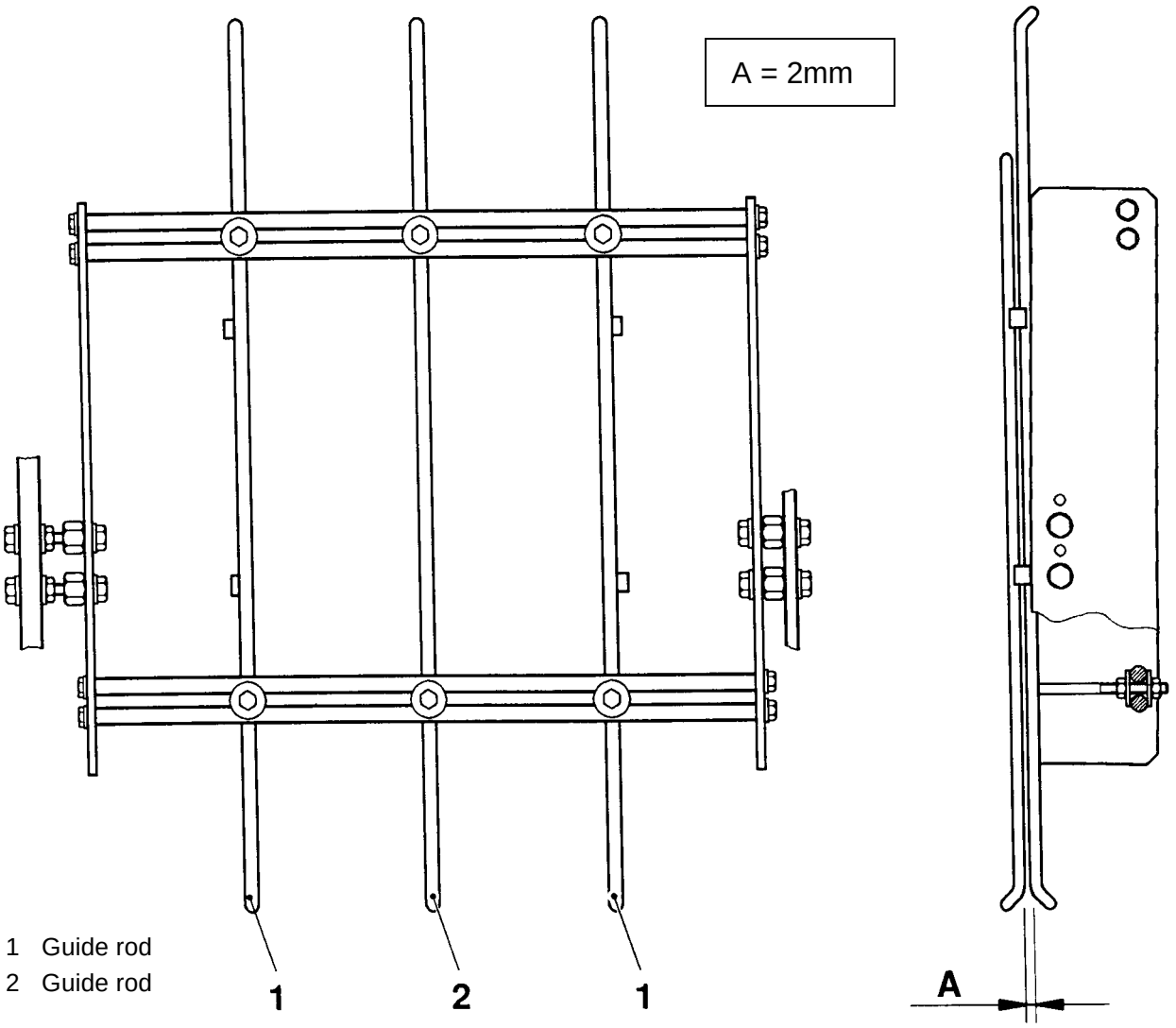
SPC reference	450343-0200

7.12-1 Paper guide - check

Machine status	Main power OFF Air OFF
SPC reference	450343-0200

Check that the guide rods (1) and (2) are fitted securely. Scrape off any plastic deposits and check that the rods are not uneven, scratched, or burred, which may cause damage to the plastic coating of the packaging material. If required, polish the guide rods with fine emery cloth.

Check that the gap (A) between the double guide rods (1) is 2 mm.



1 Guide rod
2 Guide rod

MM2.21B5684G01en.fm

7.13 Dating unit holder

SPC reference	37460-0100

7.13-1 Dating unit holder - check

Machine status	Main power OFF Air OFF
SPC reference	37460-0100

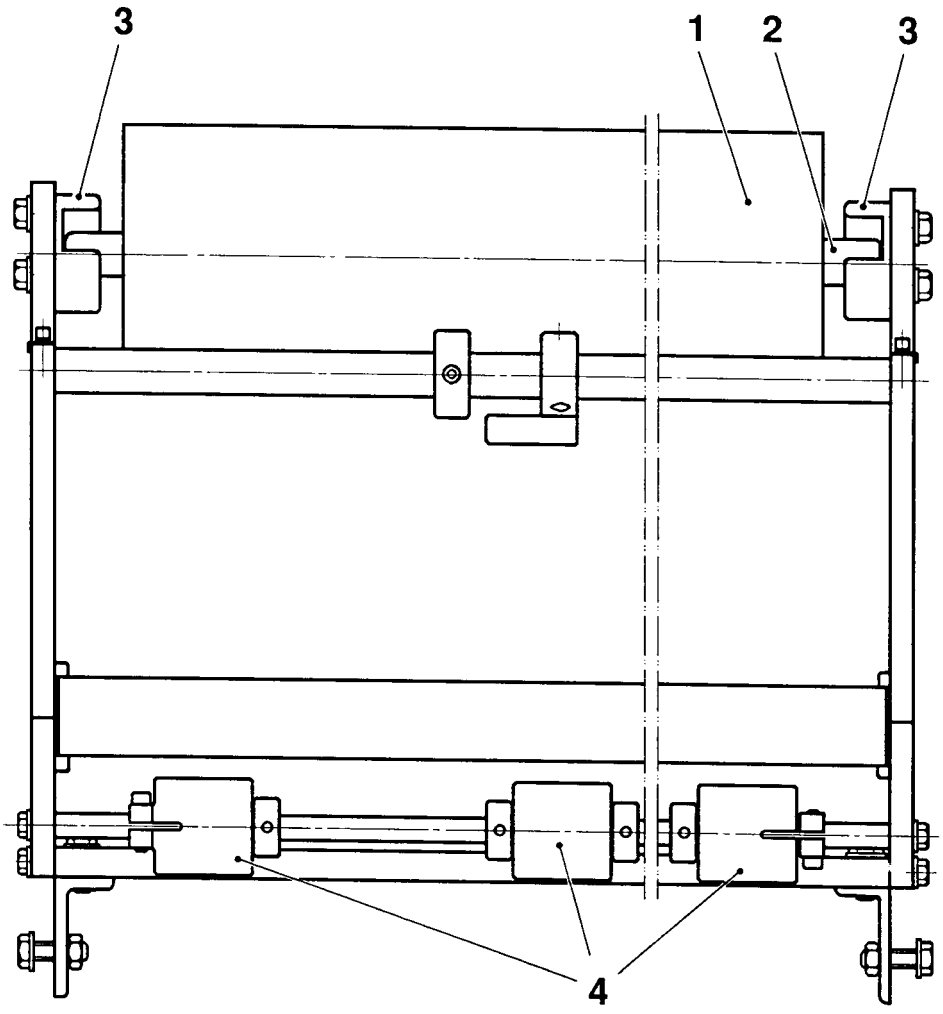
WARNING! **Risk of personal injury caused by skin contact or inhalation.**
Before handling ink, read the safety precautions in chapter 1.

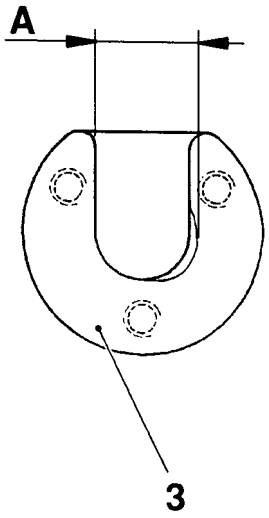
a) Check that the bending roller (1) rotates freely in its bearings, that its shaft ends (2) are intact, and that there are no defects on the bending roller that might damage the paper web.

b) Check the bearings (3). Measurement A must not exceed 16,5 mm. Replace damaged or worn bearings.

c) Check that the rollers (4) rotate freely and replace them, if required.

MM2.21B5684G01en.fm





A = 16,5 mm

1 Bending roller
2 Shaft end
3 Bearing
4 Roller

7.14 Dating unit DV6

SPC reference	37459-0100

7.14-1 Dating unit DV6 - overhaul/clean

Machine status	Main power OFF Air OFF
SPC reference	37459-0100

WARNING! **Risk of personal injury caused by skin contact or inhalation.**
Before handling ink, read the safety precautions in chapter 1.

a) Dismantle the ink unit.

b) Clean the components in industrial alcohol, rinse in water, and leave to dry in the air.

c) Check the shafts (1) and (2), axial play 0,2 - 0,3 mm.

d) Check the O-rings (4) of the distributor roller, and the O-rings (6) of the dating wheels. Replace if required.

e) On assembly do not oil the shafts and bushings.

f) Check that the ink roller (3) is positioned right opposite the distributor roller (5).
Adjust by means of a washer under the flange of the eccentric shaft (2).

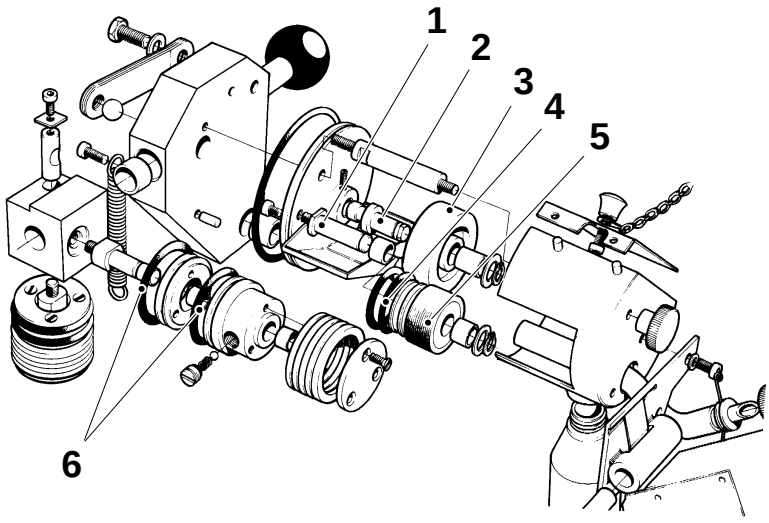
g) Adjust the eccentric shaft of the ink roller (turn clockwise for increased pressure) until the rollers do not slip against each other.

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Ink

The ink is supplied by Tetra Pak, pre-mixed in bottles as spare part No. 90299-13.

Note! No other ink should be used. Some other inks have proved to react with the hydrogen agent in the sterile bath thereby jeopardizing the wetting.



1 Shaft of distributor roller
2 Eccentric shaft of ink roller
3 Ink roller
4 O-ring
5 Distributor roller
6 O-ring

7.14-2 Dating unit DV6 - set

Machine status	Main power OFF Air OFF
SPC reference	37460-0100

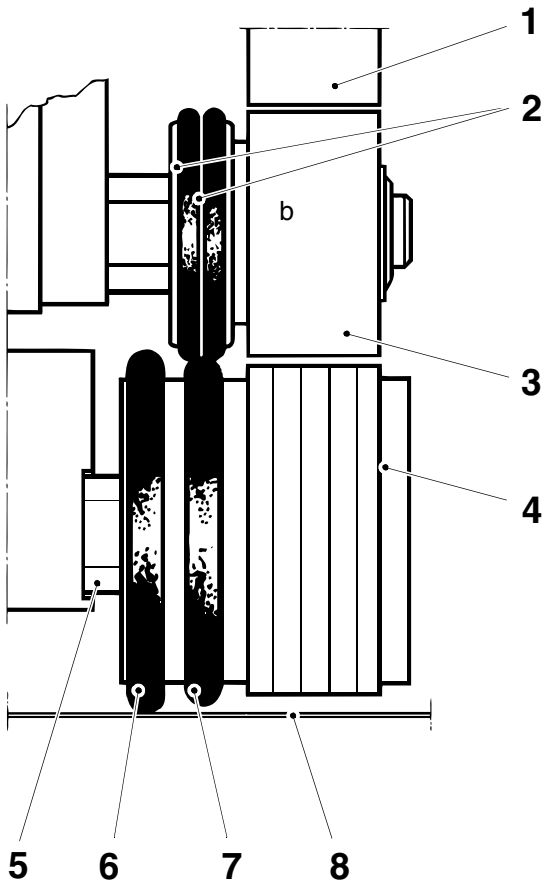
WARNING! **Risk of personal injury caused by skin contact or inhalation.**
Before handling ink, read the safety precautions in chapter 1.

a) Check that the inner O-ring (7) is positioned exactly in the middle between the O-rings (2).
If required, adjust with washers under the flange of the roller shafts (5).

b) When the gap between the distributor roller (3) and dating wheel (4) is set correctly, the distributor roller (3) will be driven by the inner O-ring (7), which will be driven by the material web (8) via the outer O-ring (6).
If required, adjust with the eccentric shaft for the ink roller (1) to obtain correct ink transfer.

c) Ink transfer may be reduced by turning the eccentric shaft of the ink roller counter-clockwise. Turning it clockwise increases the amount of ink transferred.

MM2.21B5684G01en.fm



1 Ink roller
2 O-ring
3 Distributor roller
4 Dating wheel
5 Roller shaft
6 O-ring, outer
7 O-ring, inner
8 Material web

7.15 Splicing table

SPC reference	554717-0100

7.15-1 Splicing table - check

Machine status	Main power OFF Air OFF
SPC reference	554717-0100

WARNING! **Danger of burns.**
The sealing jaw (4) and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

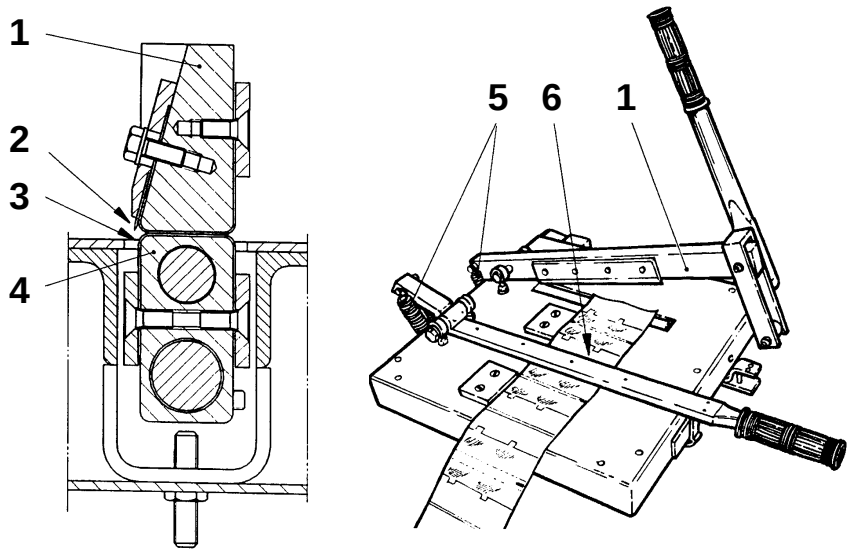
WARNING! **Danger of injury due to cutting.**
The tear-off blades (2) and (6) have sharp edges.

DANGER! **Danger of electroshock.**
There is 230 V AC in the splicing element.

Clean the splicing table.

Check:

- the tear-off blades (2) and (6); replace as required,
- the teflon cloth of the counter bar (1) and the sealing jaw (4); replace as required; setting according to page 201,
- that the springs (5) are undamaged,
- the electrical connections,
- the function of the splicing device by depressing the counter bar (1) for appr 10 s; make sure that a good splice is achieved; setting according to page 202.



1 Counter bar
2 Tear-off cloth
3 Teflon cloth
4 Sealing jaw
5 Spring
6 Tear-off blade

MM2.21B5684G01en.fm

7.15-2 Splicing table - set

Machine status	Main power OFF Air OFF
SPC reference	554717-0100

WARNING! **Danger of burns.**
The sealing jaw (4) and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

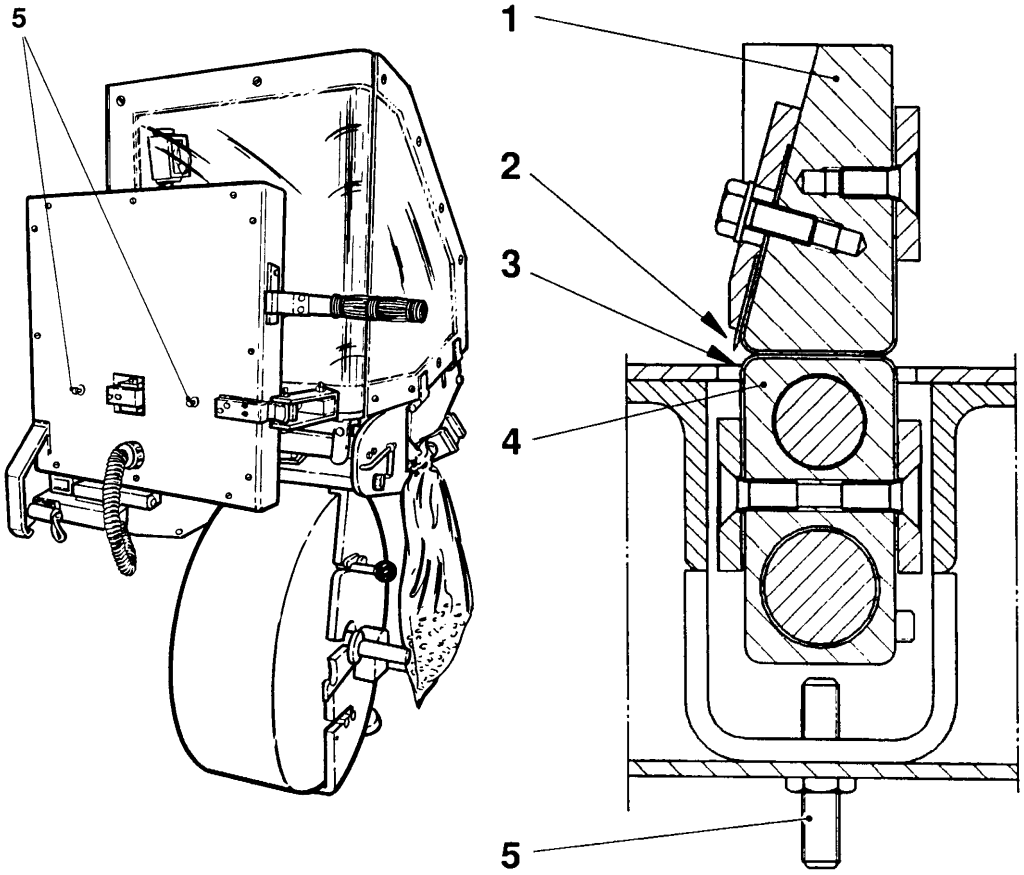
WARNING! **Danger of injury due to cutting.**
The tear-off blades have sharp edges.

DANGER! **Danger of electroshock.**
There is 230 V AC in the splicing element. Turn off the main switch before commencing work.

a) Loosen the screws (5) and set the sealing jaw (4) parallel with the counter bar (1).

b) There must be a clearance between the sealing jaw (4) and the screws (5).

MM2.21B5684G01en.fm



1 Counter bar
2 Tear-off
3 Teflon cloth
4 Sealing jaw
5 Screw

7.16 Splicing temperature

SPC reference	554717-0100

7.16-1 Splicing temperature - set

Machine status	Main power OFF Air OFF
SPC reference	554717-0100

WARNING! **Danger of burns.**
The sealing jaw (4) and adjacent components may be hot. If necessary, wear heat-resistant protective gloves.

WARNING! **Danger of injury due to cutting.**
The tear-off blades (2) and (6) have sharp edges.

DANGER! **Danger of electroshock.**
There is 230 V AC in the splicing element.

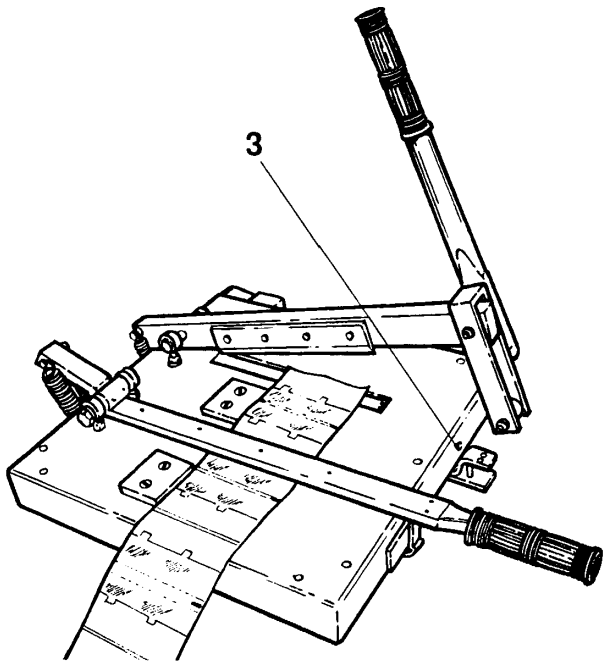
a) Loosen the locking screw (2), accessible through the hole (3). Adjust the splicing temperature by turning the adjustment screw (1).

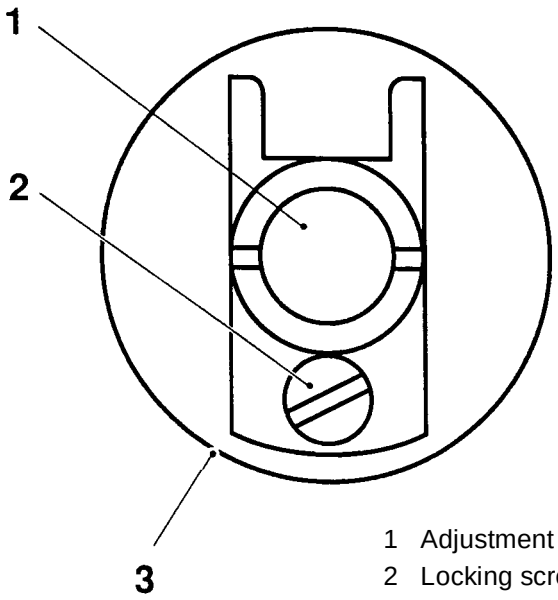
b) Turn clockwise to decrease the temperature, and vice versa. One full turn off the screw alters the temperature by 35°C.

c) Recommended splicing temperature 180°C.

d) When the correct temperature has been obtained, lock the adjustment screw by means of the locking screw.

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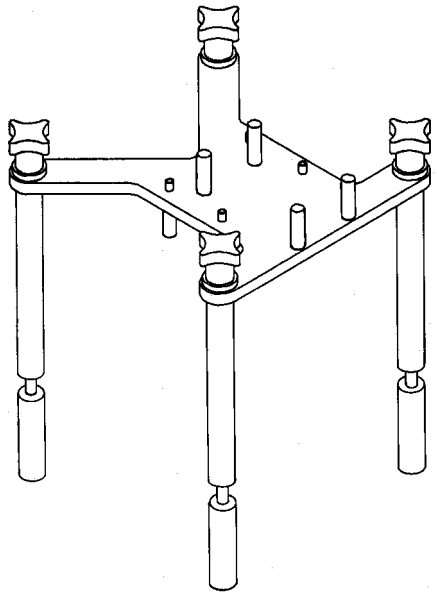
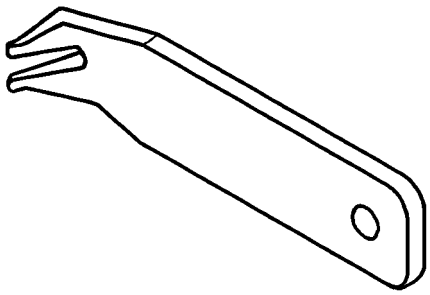
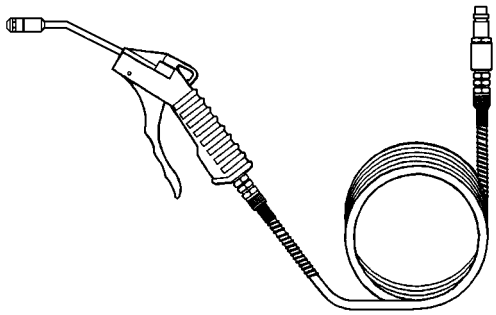
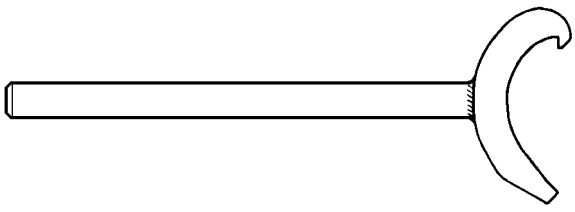


1 Adjustment screw
2 Locking screw
3 Hole

8 Templates, tools

MM2.21B5684H01en.fm

8.1 Templates, tools

Intended for	MM section	Order No	Fig
Side frames - setting		571480	
Pressure jaw - setting		568177	
Air jet gun **WARNING!** Danger of eye injury! Wear safety goggles or eye shield when cleaning by means of compressed air.		567111-1	
Tightening/undoing pipe unions		72947	

MM2.21B5684H01en.fm

9 Synchronization, data and lubricants

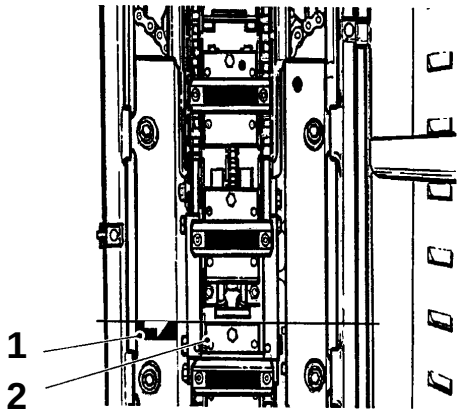
MM2.21B5684I01en.fm

9.1 Angle transmitter and side frame

9.1-1 Synchronization

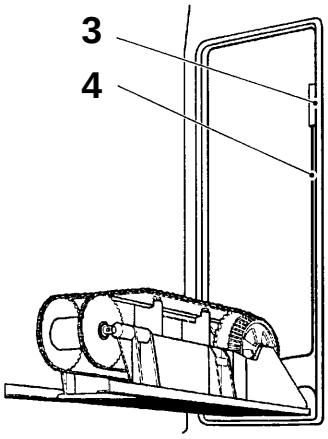
There are two ways to synchronize the angle transmitter.

- On side 1 there is a half arrow (1). Open the door to the drive unit. Turn the upper drive wheel clockwise until the top of a jaw (2) on side one is aligned with the half arrow, according to illustration.



1 Half arrow
2 Jaw

- If there is no half arrow on side 1, disconnect the cables (4) on heating side 1. Connect a buzzer to the contacts of the sealing pulse (3) (white connectors).
  Open the door to the drive unit. Turn the upper drive wheel clockwise until the carbon brushes of one of the heating jaws touches the contact rails (10). The buzzer sounds.
  Inch the jaw further 15 mm to the sealing point (9).



3 Cable connection
4 Cable

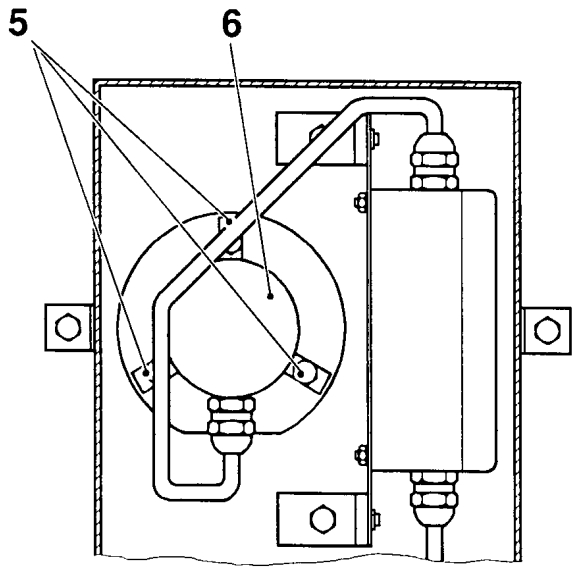
(Cont'd)

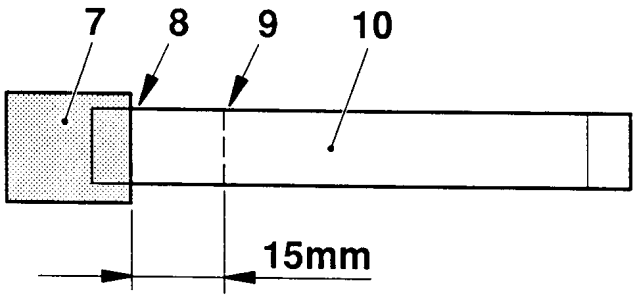
MM2.21B5684I01en.fm

(Cont'd)

Check that the display in the connection box shows 0°. If not, adjust by loosening the screws (5) of the angle transmitter and rotating until the display shows 0°.

Tighten the screws (5) and check that the angle reading has not changed.





5 Screw
6 Angle transmitter
7 Carbon brush (heating jaw)
8 Contact point (buzzer sounds)
9 Sealing point (sealing starts
10 Contact rail

MM2.21B5684I01en.fm

9.2 Cutting position

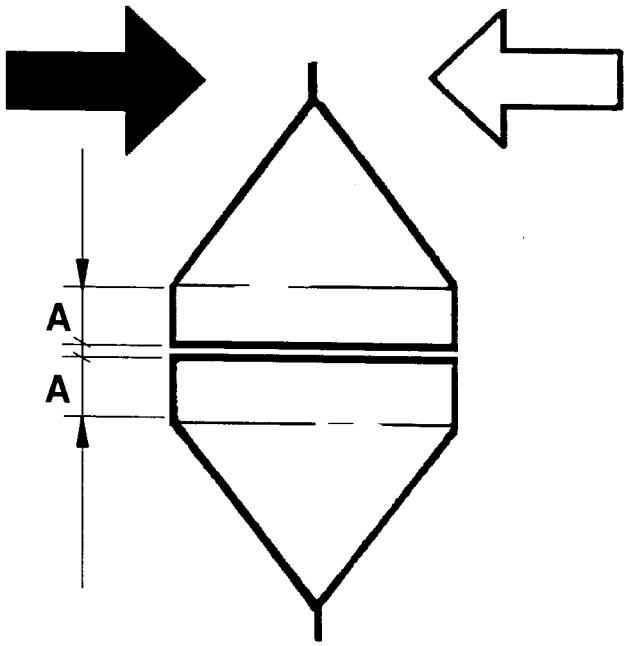
9.2-1 Cutting position - set

a) The packages are to be cut apart in the middle between the transversal seals so that the fins of both packages are equally long.

b) Operate the machine with water, according to the OS book. Check the cutting of the packages and that the package pitch, i e the length of material web in each package, is identical for all following packages.

c) The cutting of the packages is affected by how the ”daisy chain” of packages is guided into the cutting wheel.

d) Adjustment is achieved by means of the package guide in the plastic casing of the cutting mechanism, the guide plates in the cutting wheel, and, to a certain extent, also the package guide before the cutting wheel.



MM2.21B5684I01en.fm

9.3 Technical data

It may be necessary to select settings that differ from the following basic settings in order to match variations in material, machines, products, and environment.

Temperature controllers

R40	TS setting, side 1	540 units
R41	TS setting, side 2	540 units
A20	Steam	130° C
A21	Aseptic chamber	60° C
A22	Air heater	270° C
A23	LS element	270° C
A24	Pull tab element	270° C
A26	B-valve steam temperature	130 °C

Pressure gauges

Hydraulic system, pressure	1,0 MPa (10 bar)
Compressed air supply:	
To the machine	600 kPa (6 bar)
During production	500 kPa (5 bar)
Steam	170 kPa (1,7 bar)
Product	60 - 120 kPa (0,6 - 1,2 bar)
Sterile air	30 kPa (0,3 bar)
LS element air, during production	2 kPa (20 mbar)
Central lubrication:	
Manual	1,5 MPa (15 bar)
Automatic	0,3 MPa (3 bar)
Cooling water	0,3 MPa (3 bar)

Heating elements

LS strip	5 - 6 scale units
IS strip	5 - 6 scale units

Ammeter - sterilization chamber heating element	6 A
Under-current relay P006	4.5 A
Valve positioner - guide value	190 scale units
Estimated sterilization liquid consumption	0,12 l/h

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9.4 Consumables

9.4-1 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.

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 (2002-10)
A Motor oil	90 296-28	BP Esso Statoil Mobil Shell Caltex/Texaco Optimol	Vanellus FE 10W-30 Essolube XD-3 10W-30 PowerWay D2 10W-30 Delvac 1400 Super 10W-30 Myrina TX 10W-30 Ursa LA 10W-30 Non Plus Ultra 10W-40
B High-pressure oil	90 296-73 90 296-78	BP Esso Statoil Mobil Shell Caltex/Texaco Imperial Kluber Optimol	Energol GR-XP 220 Spartan EP 220 LoadWay EP 220 Mobilgear 630 Omala oil 220 Meropa Lubricant 220 Tribol ET 280-220 Lamora 220 Optigear 5150 VG 220
	90 296-72 For use in production plant with start temperature below 5° C.	BP Esso Statoil Mobil Shell Caltex/Texaco Imperial Kluber Optimol	Energol GR-XP 150 Spartan EP 150 LoadWay EP 150 Mobilgear 629 Omala oil 150 Meropa Lubricant 150 Tribol ET 280-150 Lamora 150 Optigear 5120 VG 150

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Lubricant Code	Part No. (used when ordering from Tetra Pak)	Example	
		Supplier	Product Designation (2002-10)
C Hydraulic oil	90 296-53	BP Esso Statoil Mobil Shell	Bartran HV 32 Univis N 32 HydraWay HV 32 DTE Oil 13 Tellus Oil T 32
D Mist lubrication oil	90 296-80	BP Esso Statoil Mobil Shell Caltex/Texaco	Autran GM-MP ATF Dextron TransWay DX II ATF 220 ATF Dextron II Texamatic fluid (DEXTRON II)
E Compounded cylinder oil	90 296-77 90 296-2	BP Esso Statoil Mobil Shell Caltex/Texaco	Energol AC-C460 Cylesso TK 460 CylWay FZ 460 600W Super Cylinder Oil Valvata Oil J460 Vanguard Cylinder Oil
F Lithium grease, EP type	90 296-68	BP Esso Statoil Mobil Shell Kluber Optimol	Energrease LS EP 2 Esso MP Grease/Beacon EP 2 UniWay EP 2 N Mobillux EP 2 Grease 1344 LiEP 2 Centoplex 2 EP Longtime PD 2

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Lubricant Code	Part No. (used when ordering from Tetra Pak)	Example	
		Supplier	Product Designation (2002-10)
H High-pressure oil	90 296-75 90 296-76	BP Esso Statoil Mobil Shell Caltex/Texaco Imperial Kluber Optimol	Energol GR-XP 320 Spartan EP 320 LoadWay EP 320 Mobilgear 632 Omala oil 320 Meropa Lubricant 320 Tribol ET 280-320 Lamora 320 Optigear 5180 VG 320
	90 296-73 90 296-78 For use in production plant with start temperature below 5° C.	BP Esso Statoil Mobil Shell Caltex/Texaco Imperial Kluber Optimol	Energol GR-XP 220 Spartan EP 220 LoadWay EP 220 Mobilgear 630 Omala oil 220 Meropa Lubricant 220 Tribol ET 280-220 Lamora 220 Optigear 5150 VG 220
K Circulation oil	90 296-15	BP Esso Statoil Mobil Shell Caltex/Texaco Imperial Kluber	Energol CS 100 Turbesso 100 TurbWay 100 DTE Oil Heavy Tellu Oil 100 Regal Oil R & O 100 Tribol 775 Crucolan 100
L Silicon grease	90 296-9	Dow Kluber	Dow Corning 7 Compound Unisilikon L 250L
M Lithium grease, EP type	90 296-70	BP Esso Statoil Mobil Kluber Optimol	Energrease LS EP 1 Beacon EP 1 UniWay EP 1 Mobillux EP 1 Centoplex 1 EP Longtime PD 1
N PTFE grease	90 296-91	Sikema	Fluolub 210
O Lithium complex grease	90 296-61	BP Esso Statoil Imperial	Energrease LS 3 Unirex N3 UniWay HT-63 Molub-Alloy ET 860-220

MM2.21B5684I01en.fm

Lubricant Code	Part No. (used when ordering from Tetra Pak)	Example	
		Supplier	Product Designation (2002-10)
P Synthetic compressor oil	90 296-54	BP Esso Statoil Mobil Shell Caltex/Texaco	Energol RC-R68 Compressor Oil 68 CompWay 68 Rarus 427 Corena Oil H68 Compressor Oil VDL 68
Q Low friction assembly paste	90 296-12	Dow Kluber	Molykote G-N Plus Unimoly Plus
R Synthetic grease	90 459-246	Kluber	Klubersynth UH1 14-1600
S Synthetic hydrocarbon grease	90 296-10	Mecman Mobil	435-1 Mobilgrease 28
T Synthetic lubricating grease	90 459-0340	Shell	Cassida HDS2
U Hydraulic fluid	90 459-1310	Shell	Cassida Fluid HF32
V	90296-0104	Molykote	Molykote Foodslip EP Gear Oil 220
X	90296-0105	Klüber Lubrication	Klüberoil 4 UH1-220

MM2.21B5684I01en.fm

9.4-2 Cleaning and disinfecting agents

WARNING! **Risk of explosion!**
Do **not** use alcohol based compounds (such as disinfectant code G and cleaning agent code J) when cleaning or disinfecting parts that can come into contact with hydrogen peroxide.

IMPORTANT! **Risk of hydrogen peroxide decomposition!**
Do **not** use chlorine or iodine based cleaning agents or disinfectants when cleaning or disinfecting parts that can come into contact with hydrogen peroxide.

Comparable qualities from other suppliers may be selected in compliance with the technical requirements listed in the table.

All cleaning agents/disinfectants 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° dH.

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Cleaning/Disinfection	Code (0101)		Example			
			Type of Product	Pure Chemicals	Formulated Products	
					Henkel	Diversey-Lever
CIP	**A**		Alkali	NaOH 1.5%	P3-mip RC P3-mip CIP	Diverflow VC13 (Soft water) Diverflow VC7 (Hard water)
	B	**1**	Acid	HNO_3 1%	-	Diverflow VA5
		2	Acid	H_3PO_4 1%	P3-horolith CIP P3-horolith USP	Diverflow VA3
		3	Acid	HNO_3+H_3PO_4	P3-horolith FL P3-horolith V	Diverflow VA4
External cleaning	**C**	**1**	Alkali foam	-	P3-topax 12	Diverclean VF9
		2	Acid foam	-	P3-topax 56	Diverclean VF12
		3	Disinfection foam	-	P3-topax 99	Divoscan VT1
		4	Alkali solution	-	P3-mip FPC	Diverclean VK12
Manual cleaning, wiping	**D**		Alkali solution/ foam	-	P3-mip FPC P3-topax 12	Diverclean VK12
	E		Acid solution/ foam	-	P3-topax 56 P3-topax 58	Diverflow VA5 Diverflow VA3

Cleaning/Disinfection	Code (0101)		Example			
			Type of Product	Pure Chemicals	Formulated Products	
					Henkel	Diversey-Lever
Manual disinfection, immersion	**F**	**1**	Disinfection foam	-	P3-topax 99	Divosan VS1
		2	Disinfection solution	-	P3-steril BG	Divosan VT1
Manual disinfection	**G**	**1**	Alcohol solution	Isopropanol 70%	-	Divosan VT10
		2	Alcohol solution	Ethanol 70%	P3-alkodes	-
Hand disinfection	**H**		-	-	P3-manodes	Leverline Med H5
Manual cleaning	**J**		Alcohol solution	Isopropanol/ Ethanol 95%	-	-
Deliming	**K**		Citric acid solution	-	-	

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10 Electrical equipment

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10.1 Central unit TPMC, battery

SPC reference	558199-0600

10.1-1 Central unit TPMC, battery - check/change

Machine status	Main power OFF Air OFF
SPC reference	558199-0600

Check

The battery (1) is to take over the power supply in case of mains power failure in order to prevent the data in the memory from being erased.

The RED BATTERY LED (3) lights up when the battery has run down and is to be replaced.

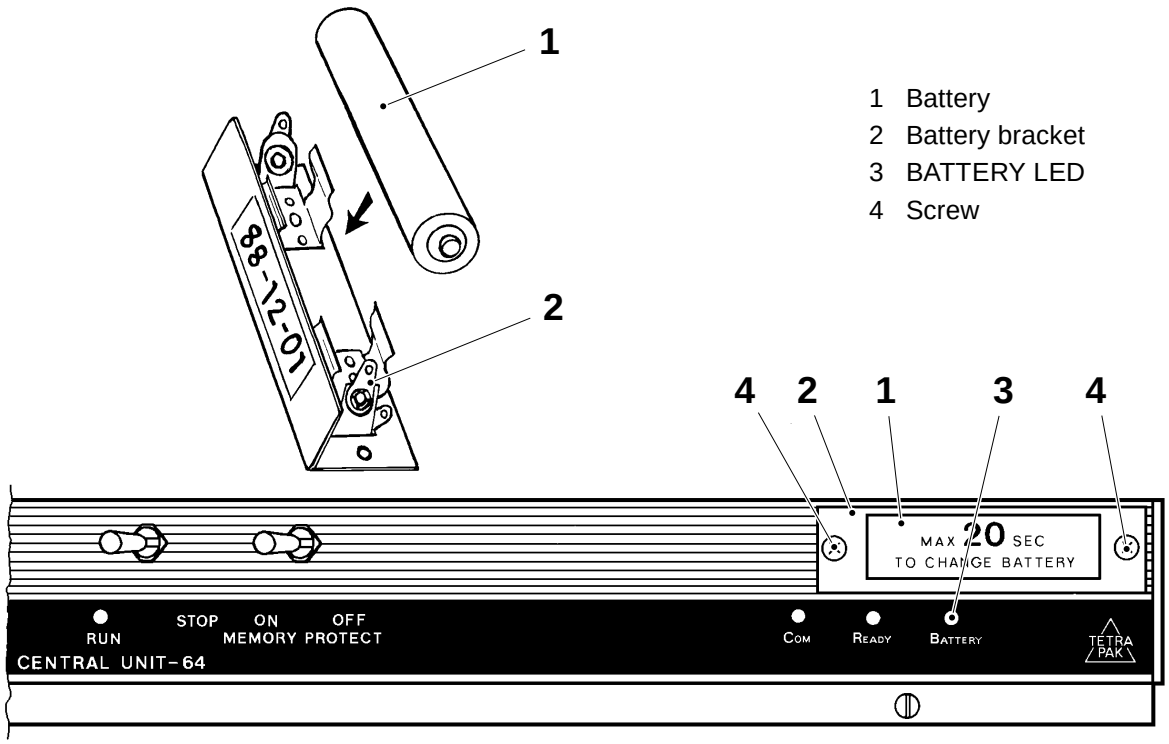
Note! Check the date mark of the battery. It must not be older than one year.

Change

Undo the two screws and pull out the battery bracket (2). Replace the battery (TP No 90334-6, ”AA”, 3,8 V). Secure the battery bracket again.

Caution! The replacement of the battery must not take more than 20 seconds. TPMC loses power after 20 seconds.

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1 Battery
2 Battery bracket
3 BATTERY LED
4 Screw

10.2 Hole punch correction unit A1

SPC reference	558199-0600

10.2-1 Hole punch correction unit A1 - check

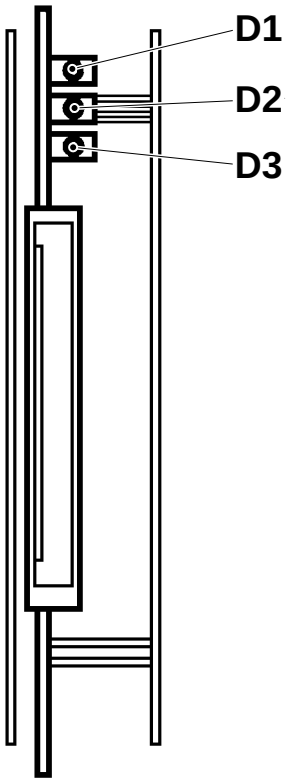
Machine status	Main power OFF Air OFF
SPC reference	558199-0600

- LED D1 = angle transmitter signal
- LED D2 = production
- LED D3 = no function

LED D2 is lighting constantly when the machine is in operation. LED D1 is flashing when the hole punch correction unit board receives a signal from the angle transmitter.

The signal from the TPMC can be delayed by using A2 Hole punch correction unit, on the control panel. This makes it possible to fine adjust the hole position.

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10.3 Valve positioner A3

SPC reference	558199-0600

10.3-1 Valve positioner - check

Machine status	Main power OFF Air OFF
SPC reference	558199-0600

Basic settings:

- Sw 3 closed (current signal; 0 - 20 mA)
- Sw 4 Position Int TW (RH)

Sw 3 and Sw 4 are attached to the circuit board, visible from the side.

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10.3-2 Valve positioner - set

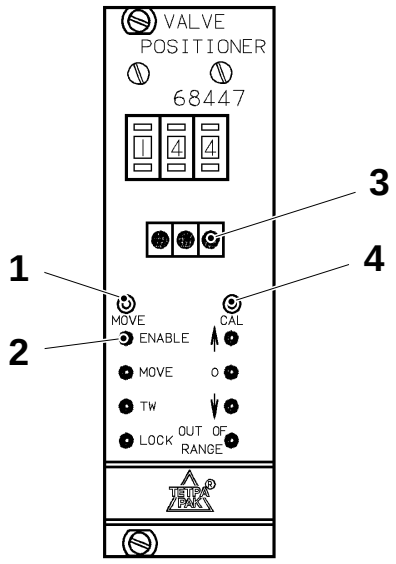
Machine status	Main power OFF Air OFF
SPC reference	558199-0600

a) Loosen the nut (7) and undo the screw (8) at the rear side of the dosing valve.

b) Check that the cable (5) is connected and that the LED, ENABLE, (2) is lit up.

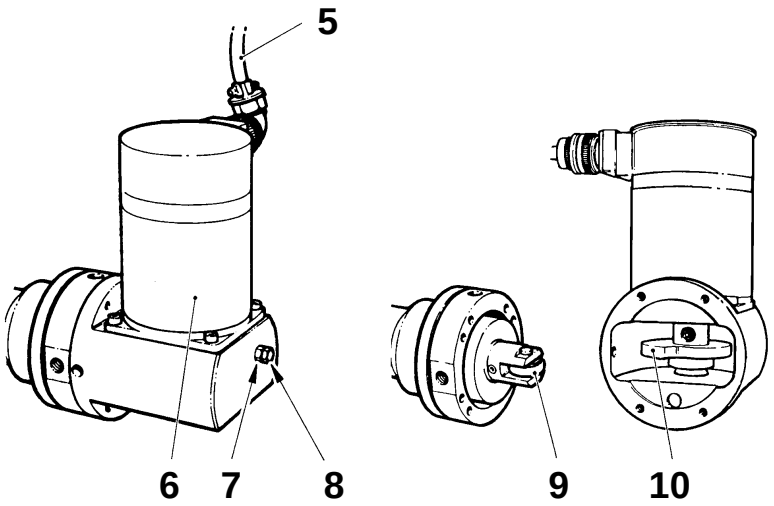
c) Press the CAL push button (4) on the Valve positioner board (A3).

d) Press the MOVE push button (1) until the stepping motor (6) closes the dosing valve. The angle indicator (3) should show appr. 20.



1 Push button, MOVE
2 LED, ENABLE
3 Angle indicator
4 Push button, CAL

e) Fit and turn in the screw (8) until it touches the cam (10). Release the screw **two full** revolutions and lock with the nut (7).



5 Cable
6 Stepping motor
7 Nut
8 Screw
9 Bearing roller
10 Cam

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10.4 Stepping motor driver board A4

SPC reference	558199-0600

10.4-1 Stepping motor driver board A4 - check

Machine status	Main power OFF Air OFF
SPC reference	558199-0600

Basic settings:

- Sw 1-7 not in use
- Sw 8 closed (right, external clock)
- Sw 9-12 not in use
- Sw 13 0 (current setting)
- Sw 14 closed (analog input signal current)

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10.5 OMRON temperature controller

SPC reference	558199-0600

10.5-1 OMRON temperature controller - general

Machine status	Main power OFF Air OFF
SPC reference	558199-0600

Working mode

The display has three working modes: Actual value, Setpoint (SP), and Alarm value. The working mode is altered with the MODE key (1). Each time MODE key is pushed, the working mode changes as illustrated in the flow chart below.

Setpoint

To set the Setpoint, push the MODE key until the SP indicator (2) lights up. Use the TEMPERATURE UP (7) or TEMPERATURE DOWN (8) key to set the desired value.



1 Error indicator
2 Indicator SP, setpoint setting mode
3 Indicator AL, Alarm value setting mode
4 MODE key
5 Control signal (LS element)
6 Alarm signal
7 TEMPERATURE UP
8 TEMPERATURE DOWN

(Cont'd)

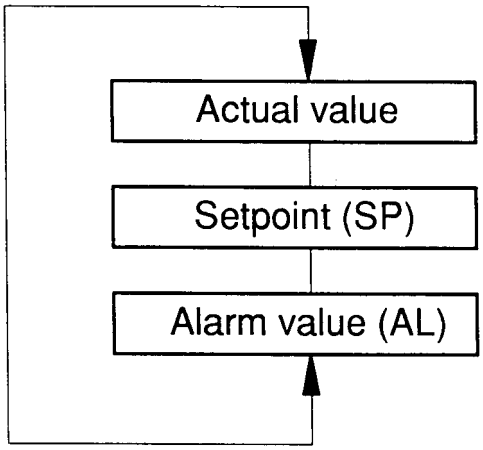
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(Cont'd)

Alarm value

To set the Alarm value (maximum divergence from setpoint without alarm), push the MODE key until the AL indicator (3) lights up and set the desired Alarm value.

During production, the alarm (6) lights up when the Actual value is outside the range of Setpoint ± Alarm value.



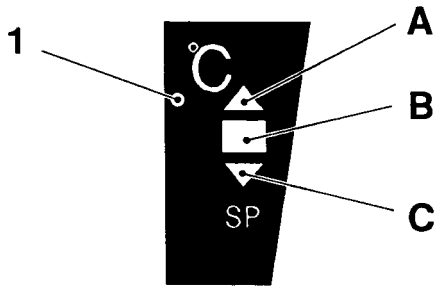
Error indicator (1)

The ERROR indicator has three positions:

A Actual value above setpoint.

B Actual value is setpoint ±1 %.

C Actual value below setpoint.



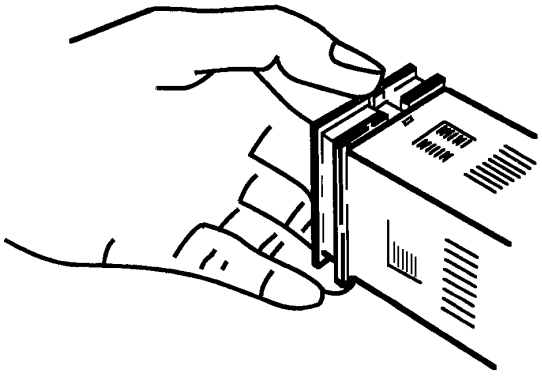
1 Error indicator

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10.5-2 OMRON temperature controller - set

Machine status	Main power OFF Air OFF
SPC reference	558199-0600

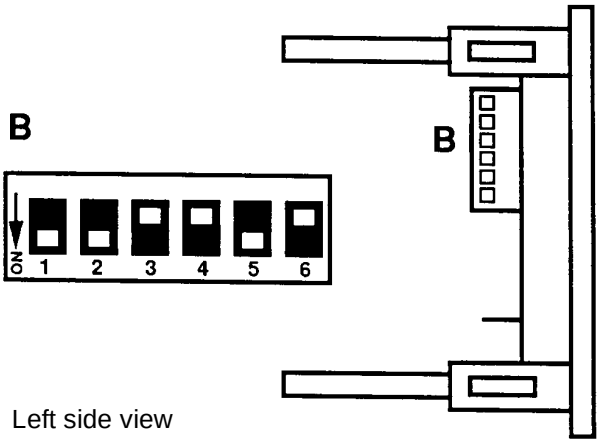
The function of the OMRON temperature controller is determined by the position of the switches on the internal circuit boards. To gain access to these switches, press the tab at the top the front and pull the instrument out of the control panel (A).



Control mode selector (B)

Set the switches of the Control mode selector as illustrated.

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Left side view

1	PID	ON
2	Proportional period	ON
3	Control input	OFF
4	Input shift	OFF
5	Temperature sensor standard	ON
6	Scale indication	OFF

(Cont'd)

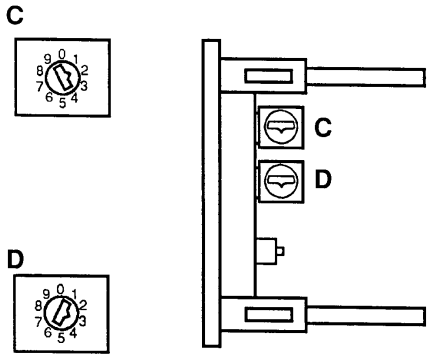
(Cont'd)

Temperature range selector (C)

Set the Temperature range selector in position 2 (range 0 - 400° C) as illustrated.

Alarm mode selector (D)

Set the Alarm mode selector in position 3 (lower limit alarm) as illustrated.



Right side view

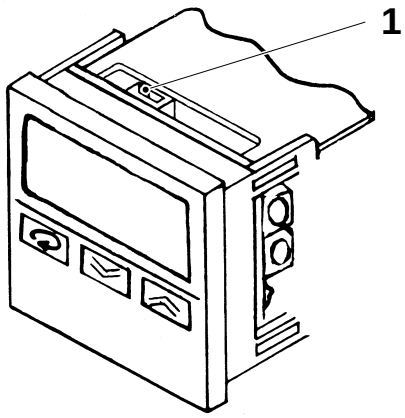
PID

Turn the switch (1) to the left and put the instrument back into the control panel.

Set the PID as follows:

- Step up the machine programme to step 2, ”Preheating”.
- Press the **Mode key**. Set the ”SP” value to 5.
- Press the **Mode key**. Set the ”AL” value to 4.
- Press the **Mode key**. Set the ”H” value to 4.
- Press the **Mode key**.

Wait for appr 4 seconds. Pull the instrument out of the control panel and turn the switch (1) back to the right. Put the instrument back into the control panel.



1 Switch

(Cont'd)

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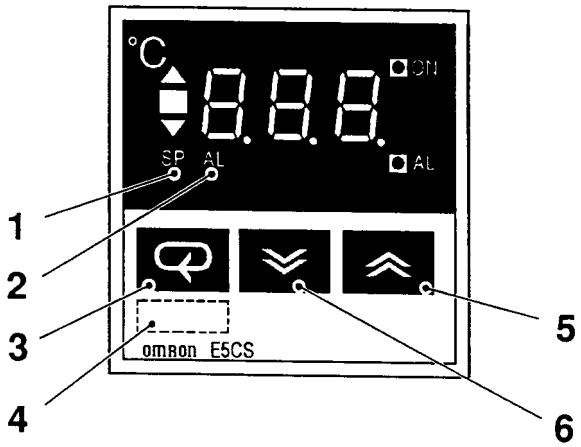
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Temperature and Alarm value

Push the **Mode key** (3) until the SP (1) indicator lights up. Set the desired temperature according to table.

Push the **Mode key** until the AL (2) indicator lights up. Set the desired alarm value according to table.

Check that the temperature is stable around the Set point value. It may take some time for the temperature to stabilize.



1 Indicator SP, Setpoint setting mode
2 Indicator AL, Alarm value setting mode
3 MODE key
4 “Hidden key”
5 Temperature up
6 Temperature down
7 Locking switch

Temperature controller	Temperature °C	Alarm value °C
A20, A26 Temp monitor - steam	130	10
A21 Temp monitor - aseptic chamber	80	20
A22 Temp control - air heater	270	10
A23 Temp control - LS element	270	10
A24 Temp control - pull tab element	270	10

(Cont'd)

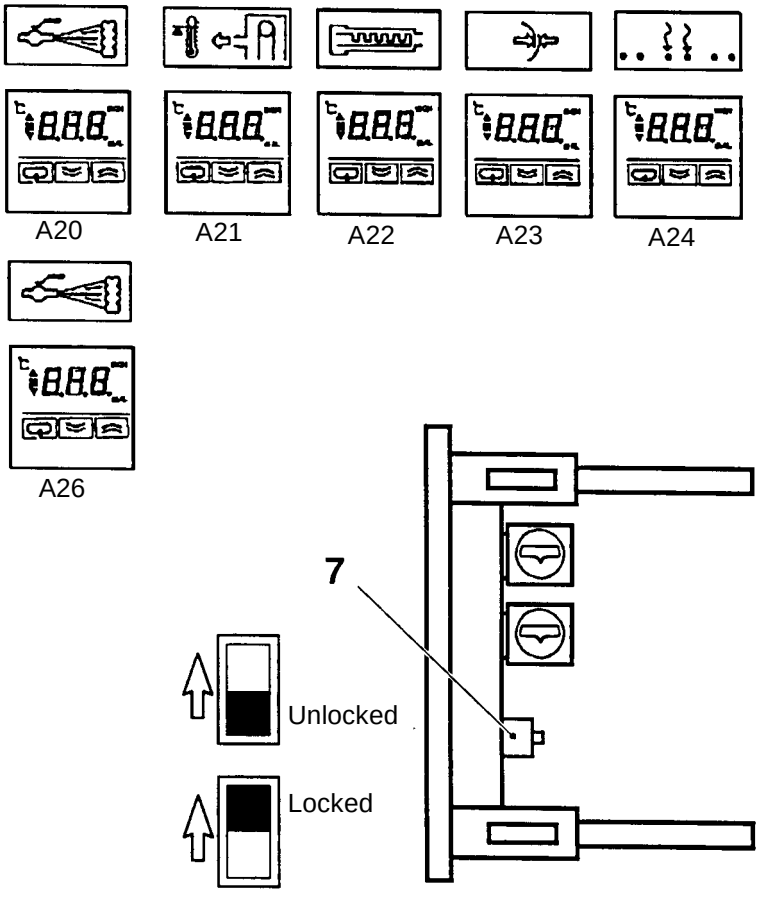
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After setting of temperature and alarm value the
A20, A26 Temp monitor - steam
A21 Temp monitor - aseptic chamber
A22 Temp control - air heater are to be locked.

- Pull the instrument out of the control panel.
- Lock the locking switch (in the arrow direction) as illustrated.
- Put the instrument back into the control panel.

To be able to change the set and locked temperature and alarm value, there is a ”hidden key” on front of the temperature controller. Press the ”hidden key” and keep it depressed, while the temperature and the alarm value are changed.



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10.6 Paper web element supervision

10.6-1 Paper web element supervision - set

Machine Status	Main Power ON
SPC reference	90459-0690

a) Use a screwdriver to set as follows:

b) Switch “I value” (1) to **10**.

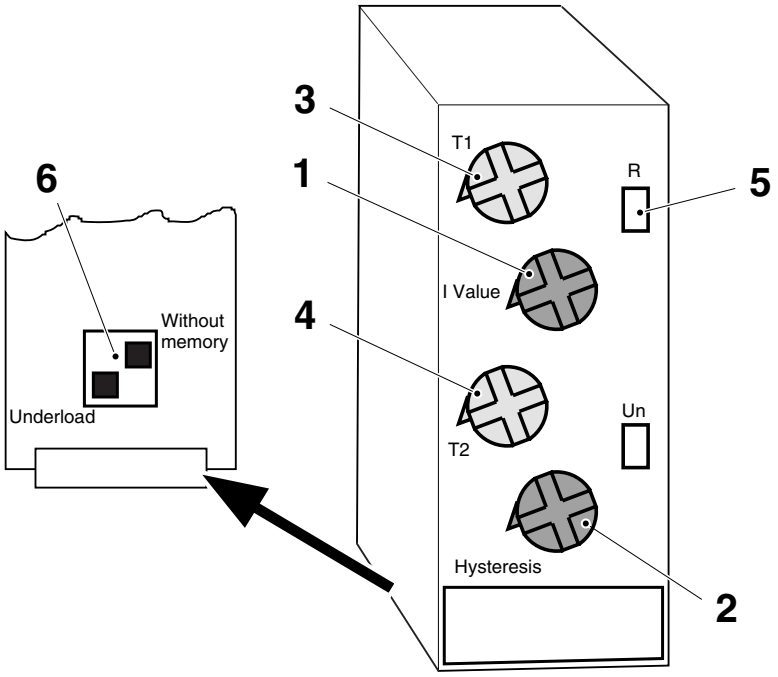
c) Switch “Hysterisis” (2) to **0** (fully anti clockwise).

d) Potentiometers T1 (3) to **0** (fully anti clockwise).

e) Potentiometers T2 (4) to **0** (fully anti clockwise).

Note! The LED R (5) switches **off** if a malfunction occurs during production.

f) Set the selectors (6) on the bottom of the element as shown below.



1 Switch “I Value”
2 Switch “Hysterisis”
3 Potentiometer T1
4 Potentiometer T2
5 LED R
6 Selector

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10.7 Residual current device

10.7-1 Residual current device - check

Machine Status	Main Power ON
SPC reference	90111-0172

The residual current device (2) must always be tested before using the socket outlet (1).

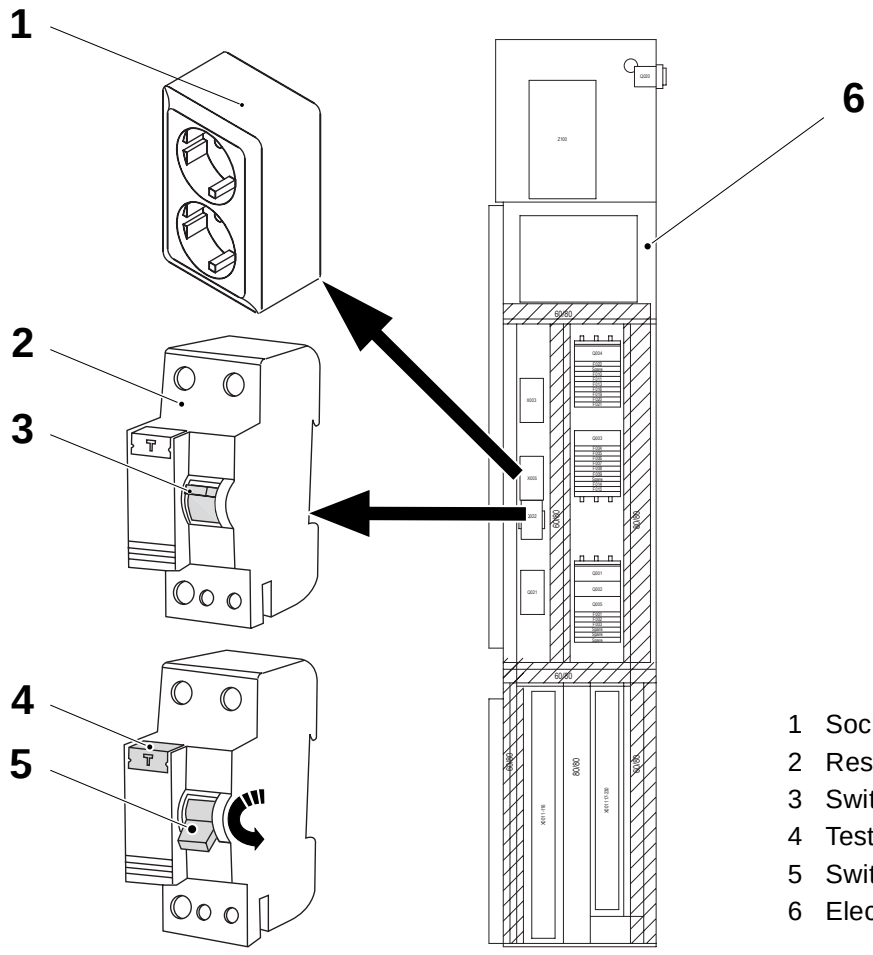
a) Make sure that the switch is **ON**, position (3).

b) Press the test button (4).

c) The residual current device (2) must trip immediately: The switch jumps to **OFF**, position (5).

WARNING! **Hazardous voltage.**
Electric shock will cause death or serious injury.
Change the **residual current device** (2) if it does not trip immediately.

d) Put back the switch to position (3).



1 Socket outlet
2 Residual current device
3 Switch (ON)
4 Test button
5 Switch (OFF)
6 Electrical cabinet

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11 Induction heating

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11-1 Safety precautions

DANGER!

Danger of electroshock.
If a generator is to be replaced, make sure that the three-phase 400/230 V and the 230 V voltage are disconnected from the TPIH generator!
Nobody - except a service technician with the required training - is allowed to open the generator.

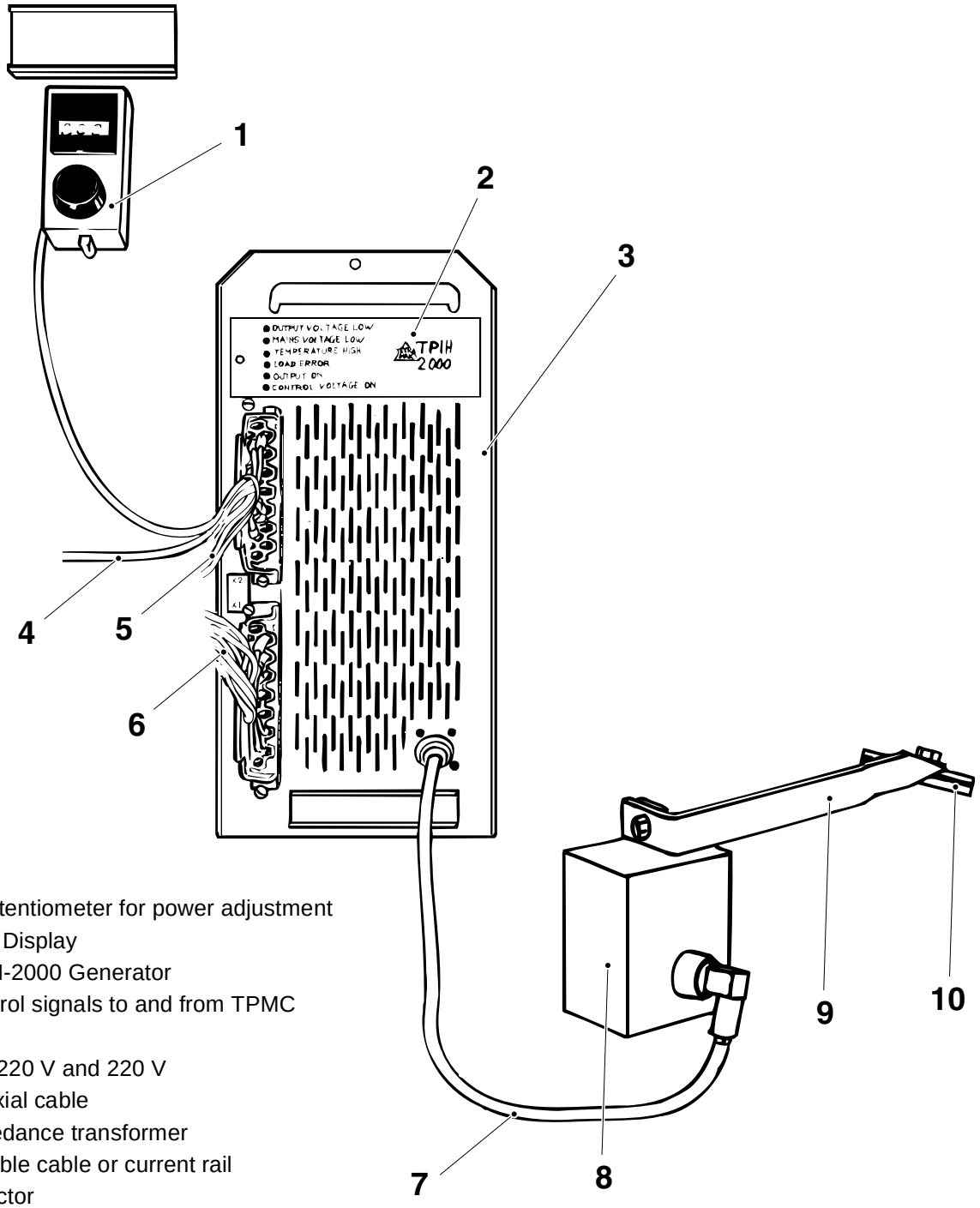
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11.1 TPIH-2000 generator system

SPC reference	558199-0600

11.1-1 TPIH-2000 generator system - general

Machine status	Main power OFF Air OFF
SPC reference	558199-0600



1 Potentiometer for power adjustment
2 LED Display
3 TPIH-2000 Generator
4 Control signals to and from TPMC
5 24 V
6 380/220 V and 220 V
7 Coaxial cable
8 Impedance transformer
9 Flexible cable or current rail
10 Inductor

(Cont'd)

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(Cont'd)

TPIH-2000 generators can be used for:

- TS (Transversal Sealing), (two generators needed),

A complete TPIH-2000 system contains:

- one generator,
- one impedance transformer (8),
- one inductor (10),
- one coaxial cable (7),
- one flexible cable (9),
- one potentiometer (1) for power adjustment.

The pulse duration is controlled by the TPMC programme.

The power level is adjustable by means of an external potentiometer. (This is the only adjustment there is.)

Three-phase 400/230 V, single-phase 230 V, and 24 V DC are needed for the generator.

Instruments and tools

The TPIH Test Instrument (68462) is described on page 238.

The TPIH Test Instrument (68466) is described on page 239.

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11.2 Fault-finding

SPC reference	558199-0600

The LED (light-emitting diode) display on the front panel simplifies fault-finding trouble shooting.

Green LED ”CONTROL VOLTAGE ON”,
i.e. the 220 V is connected and the alarms are enabled. Note that this circuit does not check the three-phase 380/220 V to the power supply!

Green LED ”OUTPUT ON”
lights up only when a pulse is being transmitted from the generator into a proper load, i.e. the entire generator system is operating perfectly.

Red LED ”LOAD ERROR”.
The generator is unable to transmit a pulse because the load is faulty. Possible problems are a shortcircuit or open circuit in the coaxial or flexible cable, impedance transformer or, inductor; no pressure applied to the inductor; the paper web broken or folded at the inductor; the wrong type of impedance transformer or inductor installed.

Red LED ”TEMPERATURE HIGH”
indicates that the cooling fan inside the generator is not operating or the ambient temperature is above 50 °C. The generator must be replaced if the fan is not operating.

Red LED ”MAINS VOLTAGE LOW”,
i.e. at least one of the three phases is below 85 % of nominal voltage and as a consequence the generator is not able to deliver the proper output power. Check the mains power supply for an open fuse. If all three fuses are intact, the problem will disappear when the voltage rises above 85 % again.

Red LED ”OUTPUT VOLTAGE LOW”:
if this is the only red LED that has lit up, the generator is faulty and must be replaced, **or** the +10 V DC to the potentiometer is missing, or the potentiometer setting is near the minimum value, **or** the potentiometer is detective.

Before replacing the generator, check the potentiometer setting and the presence of 10 V DC across the potentiometer. Also establish that the output voltage from the potentiometer follows the movement of the slider.

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11.3 Measurement

SPC reference	558199-0600

Since the pulse duration is determined by the TPMC programme, the only necessary adjustment is the power setting. If, however, there is a reason for checking the actual pulse duration, this can be done with the TP 102 Pulse Time Counter. Connect the instrument to the secondary side of the impedance transformer. (Refer to the illustration on page 233.)

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11.4 Power adjustment

SPC reference	558199-0600

The output power level is not affected by mains voltage fluctuations between 85 and 110 %. Use the TPIH Test Instrument (68462) to check the HF voltage as described on page 238.

An external potentiometer is used to adjust the power level. A DC voltage is applied to the generator via the potentiometer. The IH voltage from the generator directly follows the potentiometer setting. A setting of 500 corresponds to 50 % of the maximum IH voltage, 900 to 90 %, etc. Settings below 320 trigger an **Output voltage low alarm.**

The power can be adjusted at any time. Note that this is the only adjustment for the IH generator system!

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11.5 TPIH test instrument 68462

SPC reference	558199-0600

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, impedance transformer, current rail and inductor.

The 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 is to be connected or disconnected.

The instrument can be used for direct measurement of the following parameters:

- HF voltage
- HF current
- Phase shift voltage/current
- Pulse duration

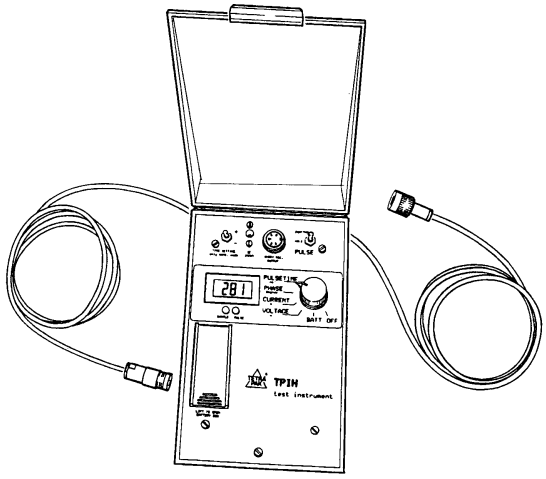
The results of these measurements can be used to compute the available HF power.

The instrument should simplify the work of, tracing the cause of a problem.

One 9 V battery is used for the instrument and an automatic power-off function is used to reduce battery consumption.

A test outlet permits connection of a printer, such as a Brush recorder. Print-outs 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.



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11.6 TPIH test instrument 68466

SPC reference	558199-0600

The test equipment is used at the service stations to check the performance of a sealed IH unit to verify if the unit is operational or if it has to be sent to a service shop for repair. It is also possible to verify if an impedance transformer is operational or not.

WARNING! The test equipment must never be connected to an open IH-generator. The input 400 V leads are accessible inside the generator and contact with them is dangerous!

Please observe that if an IH generator is faulty, it must be sent to an approved service shop. The generator does not contain any ”Do-it-yourself” parts!

The test equipment can be used to:

- verify that the maximum output power from the generator is not less than 2000 W,
- verify 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 short-circuit load,
- check if a problem is caused by the generator, impedance transformer, inductor or interconnecting cables,
- make operation tests,
- show the operation of the IH system.

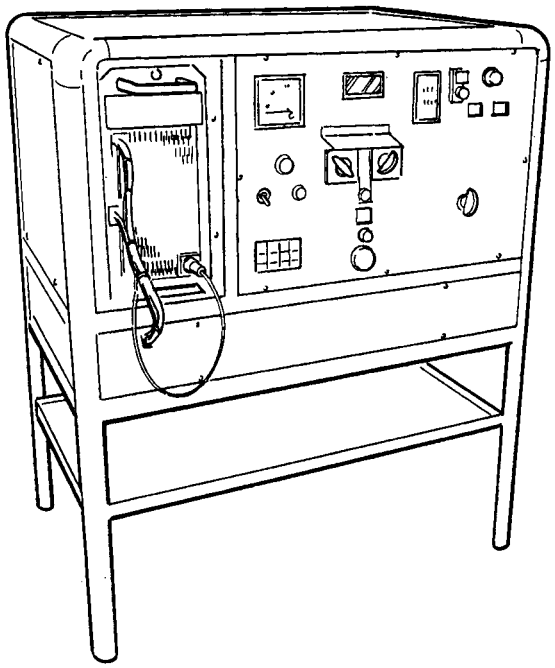
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The test procedure includes:

- 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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11.7 Generator

SPC reference	558199-0600

11.7-1 Generator - remove, clean and service

Machine status	Main power OFF Air OFF
SPC reference	558199-0600

DANGER!

Danger of electroshock.
Before removing a generator, make sure that the three-phase 400/ 230 V and the 230 V voltage are disconnected from the TPIH generator!
Nobody - except a service technician with the required training - is allowed to open the generator.

a) Remove connectors X1 and X2.

b) Remove the coaxial cable connector.

c) Loosen the screw at the top, securing the generator.

d) Pull out the generator.

DO NOT OPEN THE GENERATOR!
Send it to the nearest service centre for cleaning or service.

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11.8 Coaxial and flexible cables

SPC reference	558199-0600

11.8-1 Coaxial and flexible cables - check

Machine status	Main power OFF Air OFF
SPC reference	558199-0600

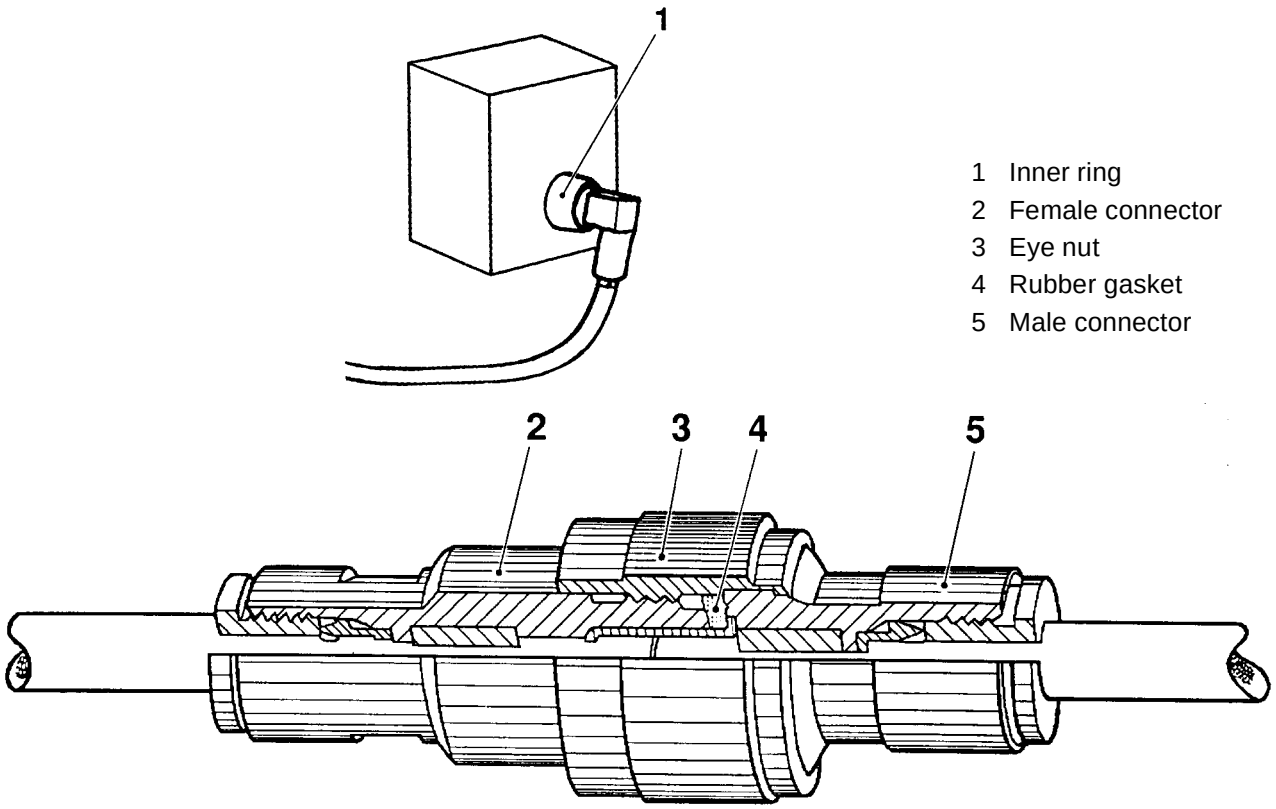
a) The coaxial cables might be affected by acids, H_2O_2, etc., which will impair their flexibility. Hence, a coaxial cable which is stiff should be replaced.

b) The coaxial cable connectors should be checked for wear and moisture.

c) Contact rails or flexible cables should be checked for signs of deterioration or mechanical wear. Worn shrinkable tubing can be replaced.

d) To remove the coaxial cable from the impedance transformer, turn the inner ring (1) of the connector clockwise.

e) Tighten the eye nut (3) finger-tight, so that the rubber gasket (4) in the male contact seals between the two coupling halves. Make sure that it is not possible to turn the halves (2) and (5) easily relative one another. If the halves can be turned, the gasket does not seal properly.



1 Inner ring
2 Female connector
3 Eye nut
4 Rubber gasket
5 Male connector

MM2.21B5684K01en.fm

11.9 Impedance transformers and inductors

SPC reference	558199-0600

11.9-1 Impedance transformers and inductors - check

Machine status	Main power OFF Air OFF
SPC reference	558199-0600

The impedance transformer has been custom-made for the inductor type in use and is volume dependent.

For this reason, if an inductor or an impedance transformer is replaced, **make absolutely sure** the replacement is equivalent to the removed unit! If the transformer/inductor combination is not correct, the generator cannot operate and the front panel LED will display ”LOAD ERROR”.

The connectors on the impedance transformers should be checked for signs of wear and moisture.

The inductors must not show any signs of excessive wear.

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11.10 Machine position and generator operation

SPC reference	558199-0600

Programme step 0 ”Zero”

- Control voltage (230 V) off
- Power supply off
- No sealing pulses

Programme step 3 ”Preheating on”

- Control voltage (230 V) on
- Power supply on
- No sealing pulses
- Alarm enabled

Programme step 7 ”Drive motor on”and step 8 ”Production on”

- Control voltage (230 V) on
- Power supply on
- Sealing pulses on
- Alarm enabled

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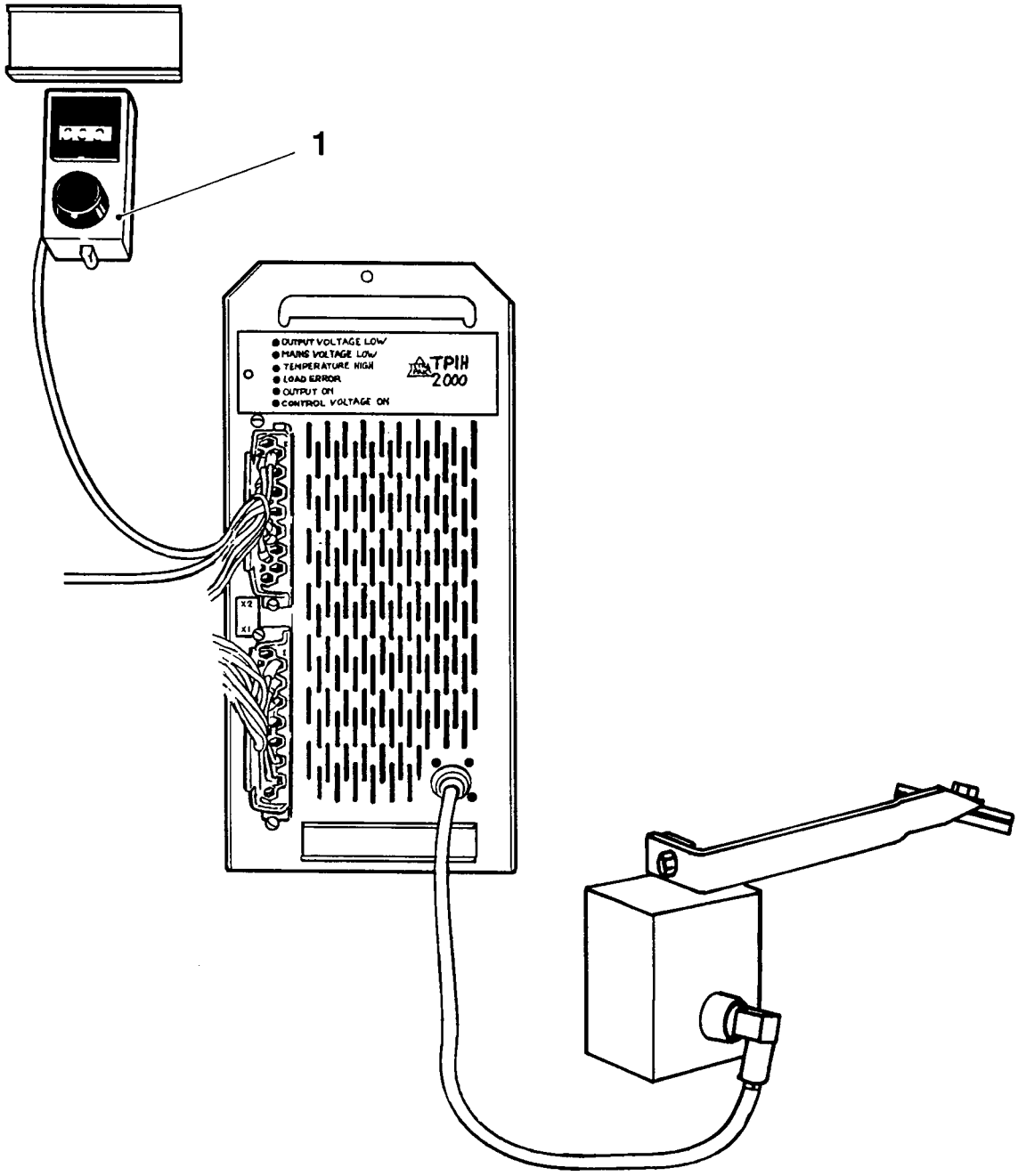
11.11 Induction heating

SPC reference	558199-0600

11.11-1 Induction heating - set

Machine status	Main power OFF Air OFF
SPC reference	558199-0600

The power for the TS sealing unit is set with a potentiometer (1). The value is to be 540.



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12 Checklist overview

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Checklist overview - description

This section of the MM, **is intended for customers who do NOT use the Tetra Pak Maintenance System (TPMS).** The checklist overview contains all the check points for a specified machine type or equipment which are needed in order to keep the equipment in good condition. The following items can be found in the checklist:

- **Document Reference**– shows where you can find more information about the check point.
- **Section/Description** – name of unit and type of activity. For further information, see MM code.
- **Interval** – how often the check item should be performed in production hours.

Note! The checklist overview in this manual **may differ from the TPMS checklists** delivered by your local service station, due to the fact that TPMS checklists are continuously updated and adapted to local demands.

TPMS - description

The maintenance system used for equipment from Tetra Pak is called the **Tetra Pak Maintenance System (TPMS)**. If you are using TPMS, the checklists will be delivered directly from your local Tetra Pak service station.

The TPMS checklists are designed to match and keep pace with the ongoing development of new and existing equipment from Tetra Pak, and to meet the demands set by our customers for even higher efficiency and better economy.

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Some of the advantages of TPMS are:

- TPMS maintains complete production lines.
- TPMS reduces down-time to a minimum each time maintenance is carried out.
- Updates of the maintenance schedule based on experience gained, improvements, modifications and specific customer requirements are issued.
- Recommendations regarding spare parts, rotation units, tools and templates, etc. are included.

The service life of each item in the equipment is predicted and all items are checked before they affect the efficiency of the equipment. This leads to different maintenance intervals for each item and the check list is unique for each maintenance occasion.

The results of the maintenance are sent back to the Tetra Pak service station. Statistics are evaluated regularly, giving a continuously updated maintenance system.

If you require further information regarding TPMS, please do not hesitate to contact your local Tetra Pak office

Checklist overview

Document Reference	Section/Description	Activity	Interval (h)
	Pre-Maintenance Checks		
MM 85568-03	WARNING! Before starting any service work, read the safety precaution in the corresponding Maintenance Manual. Doc No:	Check	1000
MM 2.18-1	LS-overlap	Check	1000
MM2.18-1	LS Position of Longitudinal sealing	Check	1000
	Hole punch; Strip Position	Check	1000
	Package; Quality of Seals	Check	1000
	Cassette		
MM 1.1-1	Paper reel holder; Condition	Check	1000
MM 1.2-1	Cassette; Bearing	Check	1000
MM 1.2-2	Cassette; Bearing	Change	3000
MM 1.3-1	Material supply monitor	Check	250
MM 7.15-1	Splicing table	Check	1000
MM 7.13-1	Dating unit Holder	Check	1000
MM 7.14-1	Dating unit	Overhaul	3000
	Superstructure		
MM 2.1-1	Peroxide bath	Check	1000
MM 6.10-1	Peroxide system - Tightness	Check	1000
MM 6.10-2	Peroxide system - Peroxide Filter	Change	3000
MM 6.10-3	Peroxide system - Wetting agent Filter	Clean	1000
MM 2.4-1	Squee-gee roller	Overhaul	3000
MM 2.6-1	Upper bending roller	Check	1000
MM 2.7-1	Connection	Check	1000
MM 2.11-1	Forming rings	Check	1000
MM 2.8-1	Position of Longitudinal sealing	Check	1000
MM 3.18-3	Package weight	Check	1000
MM 3.18-1	Package Length	Check	1000
MM 2.14-1	Pressure roller	Check	1000
MM 2.10-1	LS-element	Check	3000
MM 2.3-1	Heating element	Check	3000
MM 2.15-1	Filling pipe	Check	1000
MM 2.5-1	Aseptic chamber	Check	1000
MM 2.3-1	Sterilisation chamber	Check	1000
MM 2.3-2	Sterilisation chamber	Overhaul	3000
MM 2.18-1	Sterilisation system - Steam	Change	1000
MM 2.19-1	Steam valve	Overhaul	3000
MM 2.20-1	Steam Regulator	Check	1000
MM 2.13-1	Product Pressure gauge	Check	1000

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12 Checklist overview

Document Reference	Section/Description	Activity	Interval (h)
MM 2.2-2	AP - Valve;	Overhaul	3000
MM 2.17-1	Constant flow valve; Regulating valve	Check	3000
MM 2.17-1	Constant flow valve; Dosing valve	Check	3000
MM 2.21-1	Pneumatic unit	Check	3000
	Side Frame		
MM 3.13-1	Cutting and pressure jaws	Check	1000
MM 3.1-1	Sides	Check	1000
MM 3.2-1	Pressure Side	Check	3000
MM 3.5-1	Heating Side	Check	3000
MM 3.17-1	Central lubrication	Check	1000
	Machine body		
MM 4.1-1	Intermediary shaft	Check	3000
MM 4.2-1	Drive motor Gear box	Check	3000
MM 4.3-1	Hydraulic system	Check	1000
	Cutting device		
MM 5.7-1	Central lubrication system	Check	1000
MM 5-2 MM 5-3 MM 5-4	Cutting unit	Check	1000
MM 5-5	Cutting unit	Change	6000
	Lower section		
MM 6.1-1	Pneumatic system	Check	1000
MM 6.2-1	Air Heater	Overhaul	3000
MM 6.6-2	Accumulator	Check	1000
MM 6.4-1	Accumulator Filter	Change	3000
MM 6.3-2	Lubrication Pump	Clean	3000
MM 6.5-1	Central lubrication Filter	Check	3000
MM 6.8-1	Pressure switch	Check	1000
MM 6.9-1	Compressed air system	Check	1000
	Hole punch device		
MM 7.1-1	Bending roller and Bearing	Check	1000
MM 7.3-1	Opening arrangement	Overhaul	3000
MM 7.4-1	Punch unit	Check	1000
MM 7.4-2	Punch unit	Overhaul	3000
MM 10.2-1	Hole punch correction unit A1	Check	3000
MM 7.5-1	Pull tab sealing unit	Check	1000
MM 7.5-2	Pull tab sealing unit	Overhaul	3000
MM 7.6-1	Carriage	Overhaul	3000
MM 7.8-1	Pneumatic system	Check	1000
MM 7.11-1	Air supply Unit	Check	1000
MM 7.10-1	Element Group	Check	1000
MM 7.12-1	Paper guide	Check	1000

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Document Reference	Section/Description	Activity	Interval (h)
MM 7.9-1	Fastening Plate; LS and Impeller Screw Strip	Check	1000
	Electrical Equipment		
MM 10.1-1	Central unit TPMC - Battery	Check	3000
MM 10.3-1	Valve positioner	Check	1000
MM 10.4-1	Stepmotor	Check	3000
	Induction heating		0
MM 11.8-1	Coaxial cable	Check	1000
MM 11.9-1	Impedance transformer and Inductor	Check	1000
	Miscellaneous		0
MM 9.1-1	Cutting unit and Side Frame - Synchronization	Check	1000
MM 9.2-1	Final cutting position	Set	1000
MM 9.1-1	Angle encoder - Synchronization	Check	1000
OM	Lubrication	Check	1000
	After-Maintenance Checks		
	Package; Volume	Check	1000
	Tube; Centering	Check	1000
MM 2.8	LS-overlap	Check	1000
	LS nozzle; Setting	Check	1000
	Strip applicator; Nozzle-Setting	Check	1000
	Sterilization Bath; Web position	Check	1000
OM	Package; Sealing-Quality	Check	1000
	Shape	Check	1000
	Jaw-Position	Check	250
MM 3.18-1	Package-Length	Check	250
	Cutting and pressure jaws-Position	Check	1000
	Strip applicator; Web guide-Clean-Setting	Check	1000
MM3.18-3	Package weight; Adjust	Check	1000

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Tetra Pak

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Kalle Hämäläinen Kalle.Hämäläinen@abb.com

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