*MM binder labels. 40 mm Full width   Note! This page is generated **automatically**. using the **variable definitions** made in the **front page** file!!*

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Issue 9812 Doc No. MM-82449-0101

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616054-020V

Issue 9812 Doc No. MM-82449-0101

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Issue 9812 Doc No. MM-82449-0101

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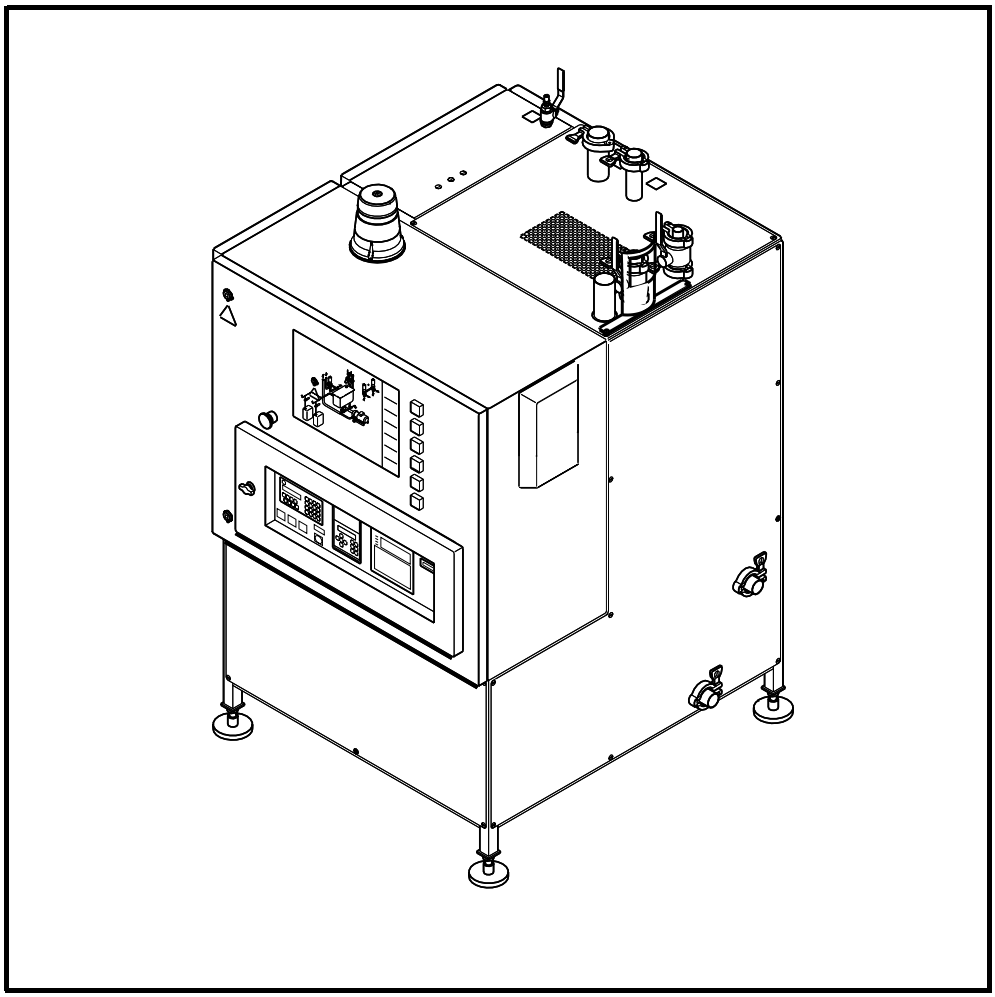
MM

Maintenance Manual

SCU/4



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Tetra Pak

Doc No. MM-82449-0101

This document is valid for:

Series No/ Machine No Sign.

Separate Cleaning Unit 606154-020V

Valid for machine series No.:

22248 (Italy)

Equipment included:

927231-0100
Flowmeter

927232-0100
Recorder

927233-0100
Two-machine installation

1348485-0100
Three-machine installation

2.282449011fro.fm

Issue 9812

Doc No. MM-82449-0101

Tetra Pak

Tetra Brik Packaging Systems

Introduction

Safety precautions

2.282449011TOC.fm

1 Machine body

2.28244901 1TOC.fm

2.282449011TOC.fm

2 Electrical equipment

3 Optional equipment

2.28244901 1TOC.fm

Introduction

To ensure maximum safety, always read the section **Safety precautions** before doing any work on the equipment or making any adjustments.

2.282449011int.fm

Equipment information

Intended use

The purpose of this Tetra Pak equipment is to automate the cleaning of one, two, or three filling machines.

Manufacturer

This Tetra Pak equipment has been manufactured by:

Tetra Brik Packaging Systems AB
Ruben Rausings gata
221 86 LUND
Sweden

or by:

Tetra Brik Packaging Systems S.p.A.
Via Delfini 1
411 00 MODENA
Italy

Service

Contact the nearest Tetra Pak service station.

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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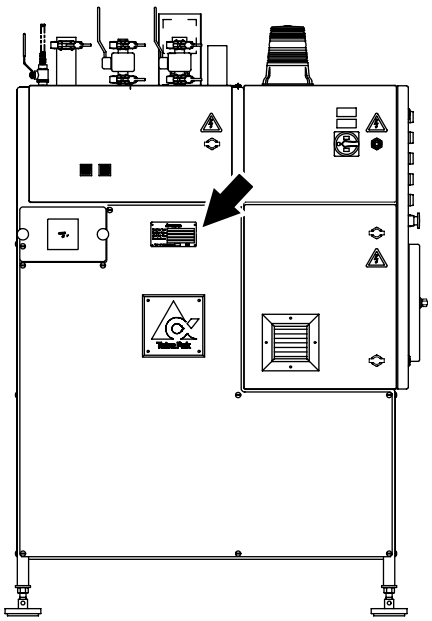

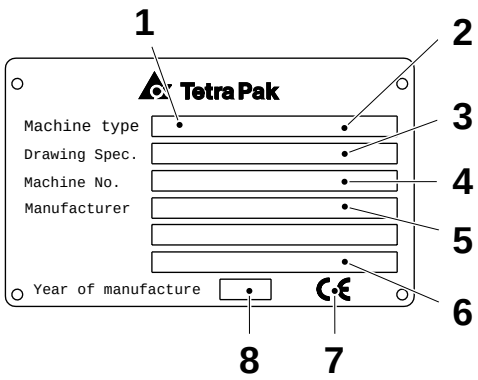

1 Machine type
2 Volume
3 Drawing specifications
4 Machine serial number
5 Manufacturer
6 (Designed by)
7 CE mark
8 Year of manufacture

Document information

Purpose of Installation Manual (IM)

The purpose of this Installation Manual is to provide service technicians with information on how to safely install this Tetra Pak equipment

It is important to:

- keep the manual for the life of the equipment
- pass the manual on to any subsequent holder or user of the equipment.

Design modifications

The instructions 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.

Number of pages

This document contains a total of *112* pages.

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Tetra Brik Packaging Systems

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Technical publications

- 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.

(Cont'd)

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(Cont'd)

Other documents

The following document are inside the crate:

- Packing list
- Declaration of EC conformity (for equipment delivered in EEA only)
- Installation manual (this manual)
- Machine Specification Document
- Final Inspection Report
- Machine Deviation Report (if relevant)
- Start Up Machine Quality Report (including Transport Damage Report)
- Feedback from MC
- System drawings.

Abbreviations used in this manual

LH	Left hand (side)
max	maximum
min	minimum
RH	Right hand (side
SCU	Separate cleaning unit
SPC	Spare Parts Catalogue
TPMS	Tetra Pak Maintenance System

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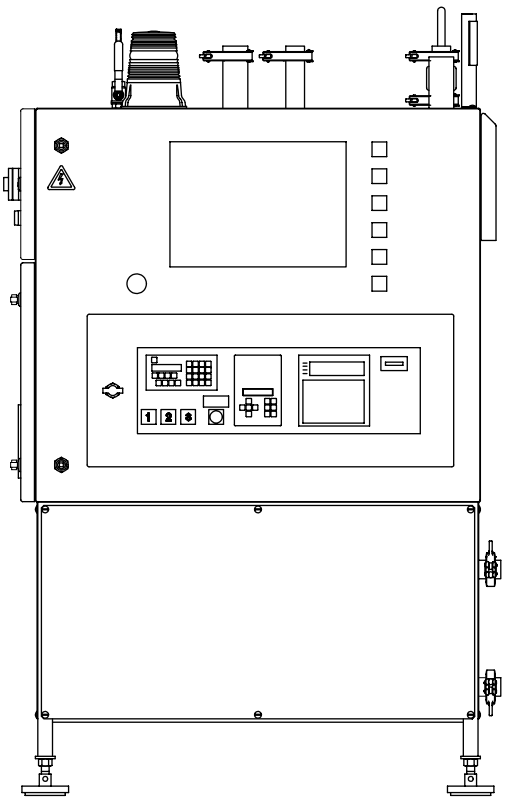
Machine orientation

A

LH side



RH side

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Safety precautions

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

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Hazard information

General

Failure to observe information marked “DANGER!” **puts your life in danger**.

Failure to observe information marked “WARNING!” can result in **personal injury and/or serious damage to or destruction of equipment**.

Caution! Failure to observe information marked “Caution!” can result in **damage to equipment**.

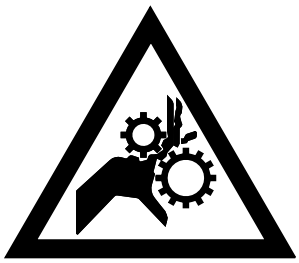
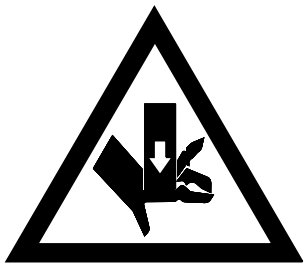
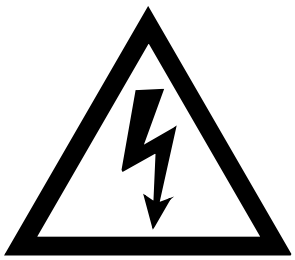
2.282449011sp.fm

Mandatory signs

 **Wear eye protection**	 **Wear hearing protection**
 **Wear head protection**	 **Wear protective gloves**
 **Disinfect hands/gloves**	

2.282449011sp.fm

Warning signs

 **Risk of entanglement!**	 **Risk of corrosion and acid burn!**
 **Risk of crushing!**	 **Risk of cutting/amputation!**
 **Risk of burns!**	 **Risk of electrocution!**

(Cont'd)

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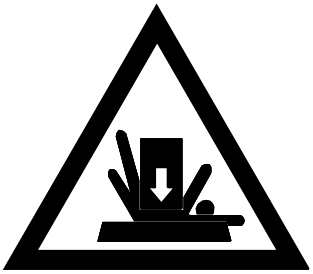
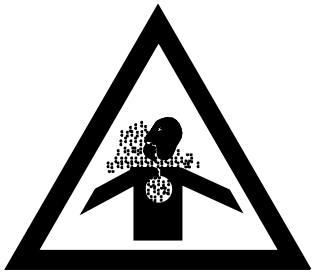
 **Risk of crushing!**	 **Risk of intoxication!**
 **Risk of falling!**	

2.282449011sp.fm

Personnel

Only skilled or instructed persons are allowed to work on the equipment.

The manufacturer declines all responsibility for injury or damage if the instructions in this manual are not followed.

Personnel are responsible for:

- the equipment and the work area around the equipment
- all personnel in the vicinity of the equipment
- making sure that all safety devices are fully operational

Personnel must regard all electrical equipment as live. In general switch the equipment off at the mains power and padlock the switch before carrying out maintenance or repair work.

Electricians should be certified according to local regulations and have experience of similar types of installations, proven skills in reading and working from drawings and cable lists, and knowledge of local safety regulations regarding power and automation. Work with the electrical equipment must be performed only by skilled or instructed technicians.

According to EN 60204-1, 3.30 an instructed person is:

– *An individual adequately advised or supervised by a skilled person to enable that individual to avoid hazards which electricity can create (e.g. operating and maintenance staff).*

According to EN 60204-1, 3.55 a skilled person is:

– *An individual with technical knowledge or sufficient experience to enable that individual to avoid hazards which electricity can create.*

2.282449011sp.fm

General safety precautions

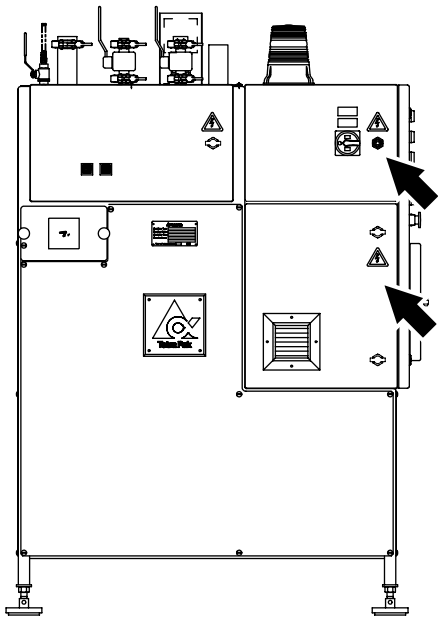
Wear hearing protection while the equipment is running.

Electrical cabinet

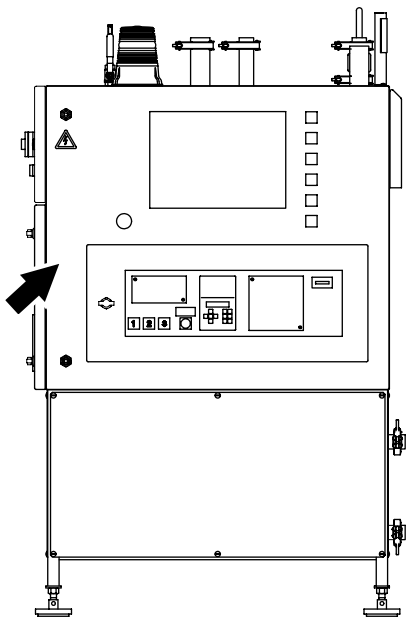
There is high voltage in the electrical cabinet (up to 400 V). In case of accident call for medical attention immediately.

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

Electrical cabinet doors locked with screws may be opened only by skilled or instructed persons.



LH side



Front side

2.282449011sp.fm

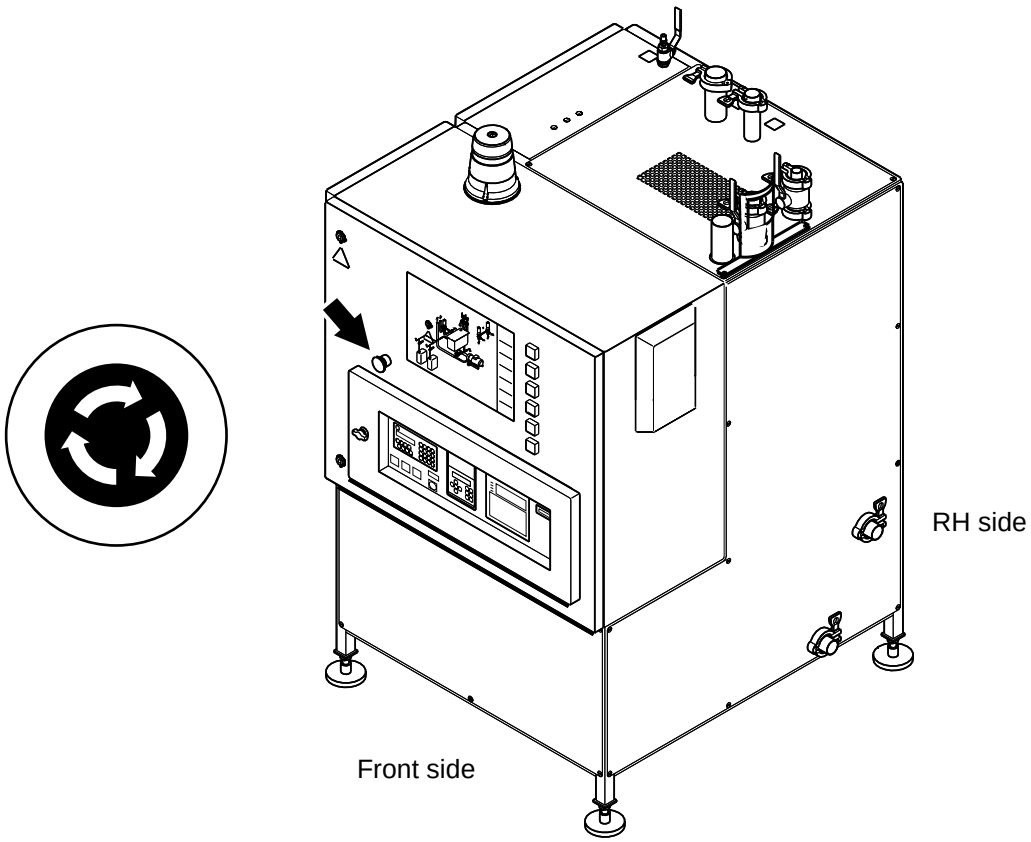
Machine safety devices

Emergency stop button

Learn the position of the **Emergency stop** button in order to stop the equipment immediately in case of danger to people or damage to the equipment.

The **Emergency stop** button does not switch off the power at the mains power switch.

Pushing the **Emergency stop** button will reset the equipment program to **Zero** position and deactivate all pneumatic cylinders.



2.282449011sp.fm

Doors, covers and guards

WARNING!

Make sure that all doors, covers and guards are in place and functioning.

Never remove covers or guards while the equipment is operating.

Some equipment parts protected by doors, covers and guards may be hot.

In case of accident, call for medical attention.

2.282449011sp.fm

Chemical products

WARNING!

Risk of personal injury!
Certain chemical products are toxic and/or inflammable. Carefully follow the instructions on the container label.

Follow the supplier's instructions for handling and disposal of the chemical products.

Personal protective equipment

- **Safety goggles**, TP No. 779130-102
- **Apron**, TP No. 90303-5
- **Shoes** made of PVC, PE plastic or rubber
- **Protective gloves** made of neoprene, TP No. 90303-4

Before starting work with any chemical products, make sure that:

- the showers work
- a portable, TP No. 90303-6, or wall-mounted eyewash device is available at or near each machine site
- there are additional washing facilities

General emergency procedures

If you accidentally **swallow** chemical products, drink large amounts of lukewarm water.

If you get splashes or vapour from chemical products in your **eyes**, wash your eyes thoroughly with lukewarm water for 15 minutes (keeping eyelids wide apart).

If chemical products come into contact with **skin** or **clothes**:

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

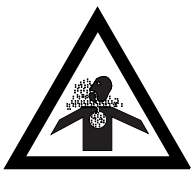
If you experience irritation or pain due to having **inhaled** chemical products vapour:

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

2.282449011sp.fm

Caustic soda

Risk of personal injury!
Slow corrosive action. May be harmful if inhaled. Can cause shortness of breath. Caustic soda may cause irritation or damage if it comes in contact with skin and eyes.



Handling of caustic soda

- Never mix caustic soda with nitric acid!
- Make sure that the areas used for handling of caustic soda are well ventilated.
- If caustic soda is spilt on the floor, soak it up with sand, turf dust or other suitable absorbent. Dispose of the absorbent appropriately.
- Rinse the floor with water afterwards.

Caustic soda container

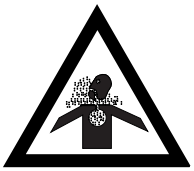
The container should be kept closed.

2.282449011sp.fm

Nitric acid

WARNING!

Risk of personal injury!
Quick corrosive action. Very harmful if inhaled. The fumes of nitric acid can cause serious damage to the lungs. Nitric acid may cause burns if it comes into contact with skin and eyes.



WARNING!

Handling of nitric acid

- Never mix caustic soda with nitric acid!
- Before starting any work with nitric acid, make sure that respiratory equipment is on hand for emergency situations.
- Make sure that the areas used for handling of nitric acid are well ventilated.
- If nitric acid is spilt on the floor, soak it up with sand, turf dust or other suitable absorbent. Dispose of the absorbent appropriately.
- Rinse the floor with water afterwards.

WARNING!

Nitric acid container

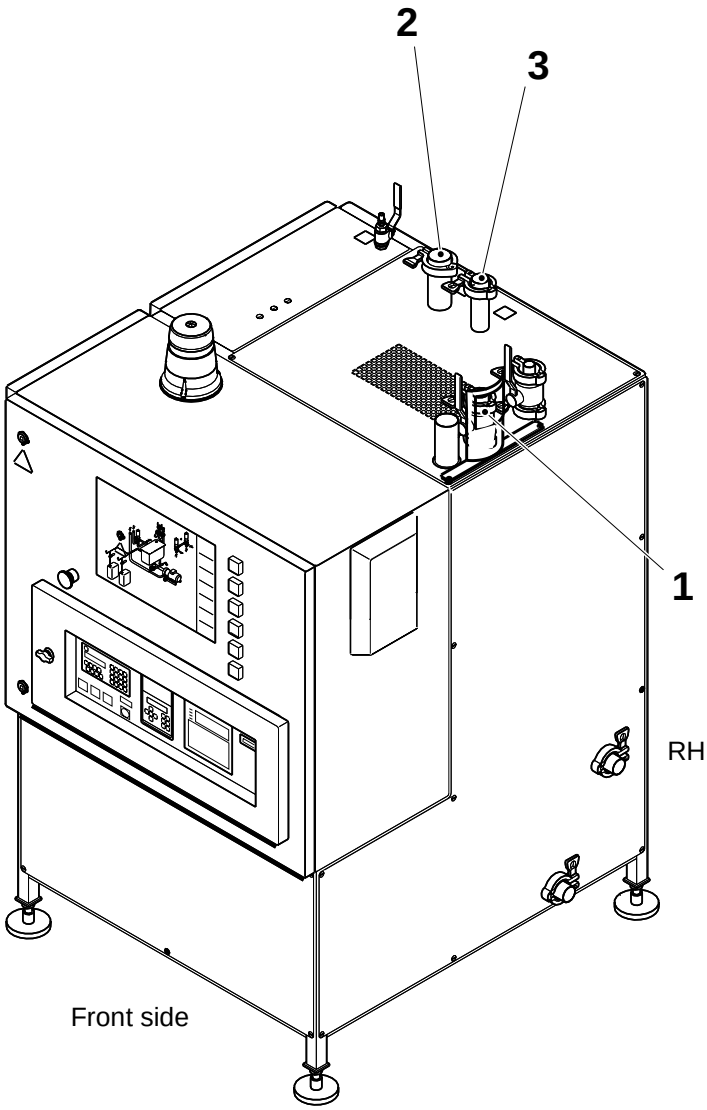
- The container should be kept closed.
- To prevent damage to the lungs, it is advisable to put on a gas mask with an filter suitable for fumes produced by nitric acid before opening the container.
- When moving the container ensure that the valves are closed and that the protection nuts and safety caps are securely fastened.
- Follow the supplier’s instructions and the local regulations for disposing of the empty containers.

2.282449011sp.fm

Hot parts

WARNING!

Risk of personal injury!
The steam connection (1), the outlet solution connection (2) and the inlet solution connection (3) reach temperatures above 60° C. Use a pair of protective gloves to prevent burns.



1 Steam connection
2 Outlet solution connection
3 Inlet solution connection

2.282449011sp.fm

Equipment for lifting and moving loads

WARNING!

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

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

Always engage the safety clip on lifting hooks to prevent the tackle from slipping off.

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

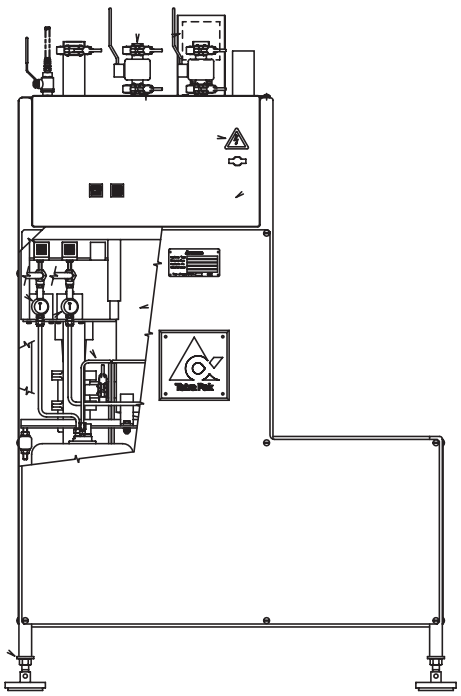
Make sure that the route and the destination are free from obstacles before moving a suspended load. It must be possible to lower the load to the floor quickly and safely in an emergency.

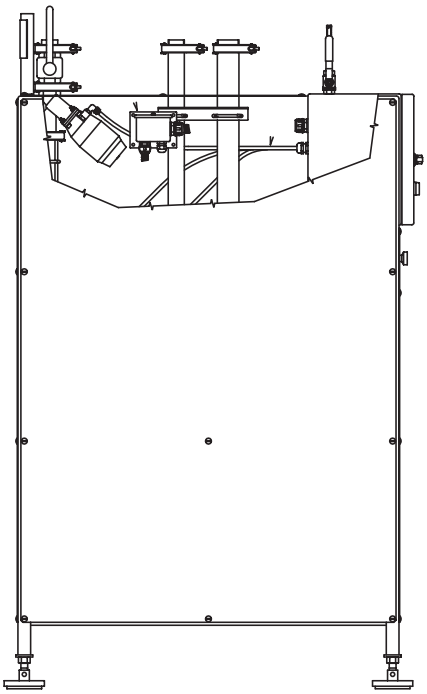
When depositing loads, keep the lifting equipment in place until the stability of the load has been checked.

2.282449011sp.fm

1 Machine body

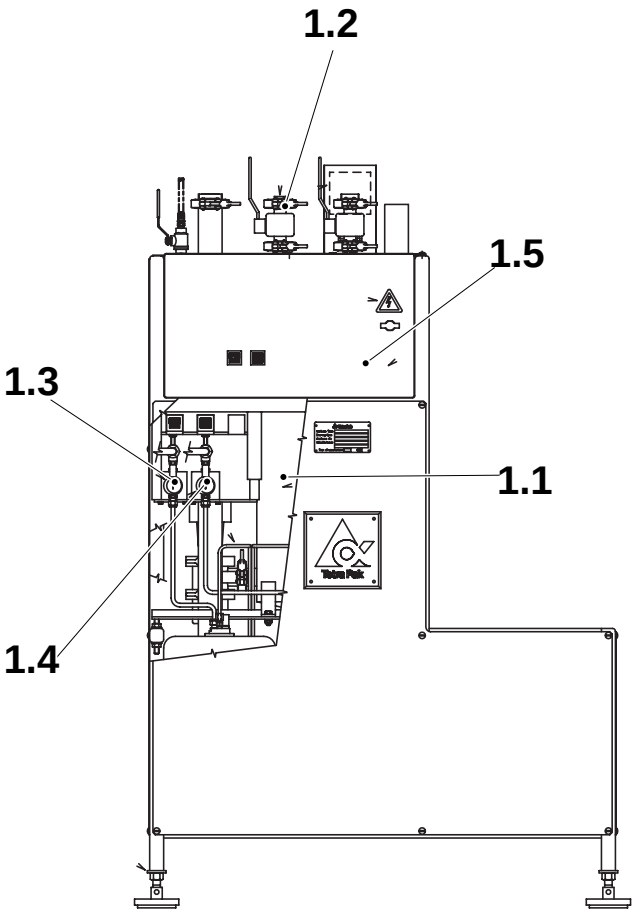
2.2c B4491B00en.fm

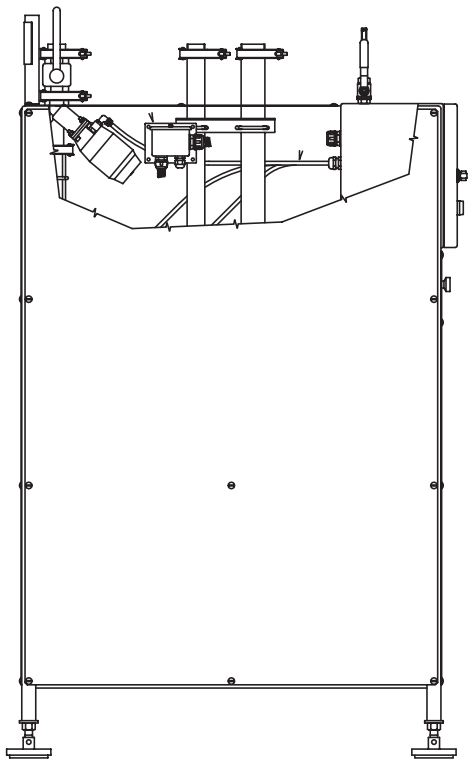




1-1 Machine body - description

SPC reference	616004-0200





2.2c B4491B00en.fm

1.1 Tank
1.2 Pipe-line
1.3 Alkali circuit
1.4 Acid circuit
1.5 Pneumatic cabinet

1.1 Tank

SPC reference	927285-0100

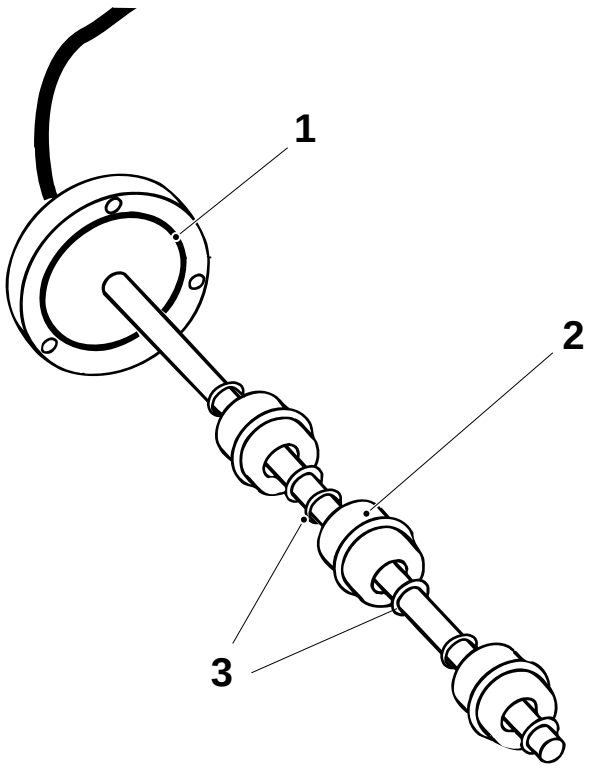
1.1-1 Tank - check floaters, O-ring, and circlips

SPC reference	927285-0100

Risk of burns!
The objects inside the tank can be hot. Touching these objects cause burns. Wear a pair of protective gloves when working inside the tank.

- Check that the O-ring (1) is not damaged.
- Check there are no holes in the floaters (2).
- Check that the floaters slide freely.
- Check that the circlips (3) are not damaged.

2.2c B4491B01en.fm



1 O-ring
2 Float
3 Circlip

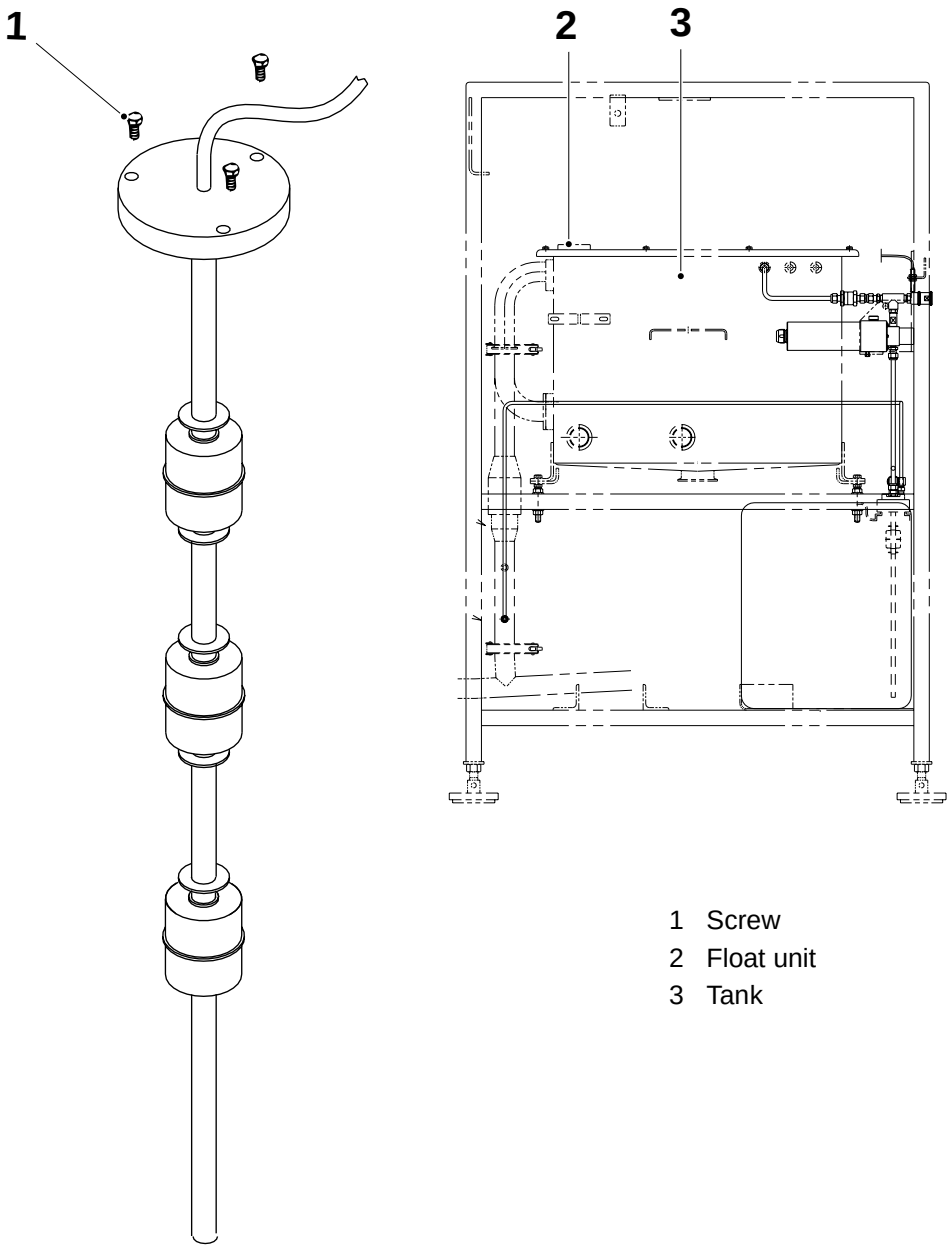
1.1-2 Tank - remove float unit

SPC reference	927285-0100

a) Disconnect the wire from the terminal block X1 (see EM page No 61423-07:01).

b) Remove the wire from the cable duct.

c) Undo the screws (1) and remove the float unit (2) from the tank (3).



1 Screw
2 Float unit
3 Tank

2.2c B4491B01en.fm

1.1-3 Tank - check floaters

SPC reference	927285-0100

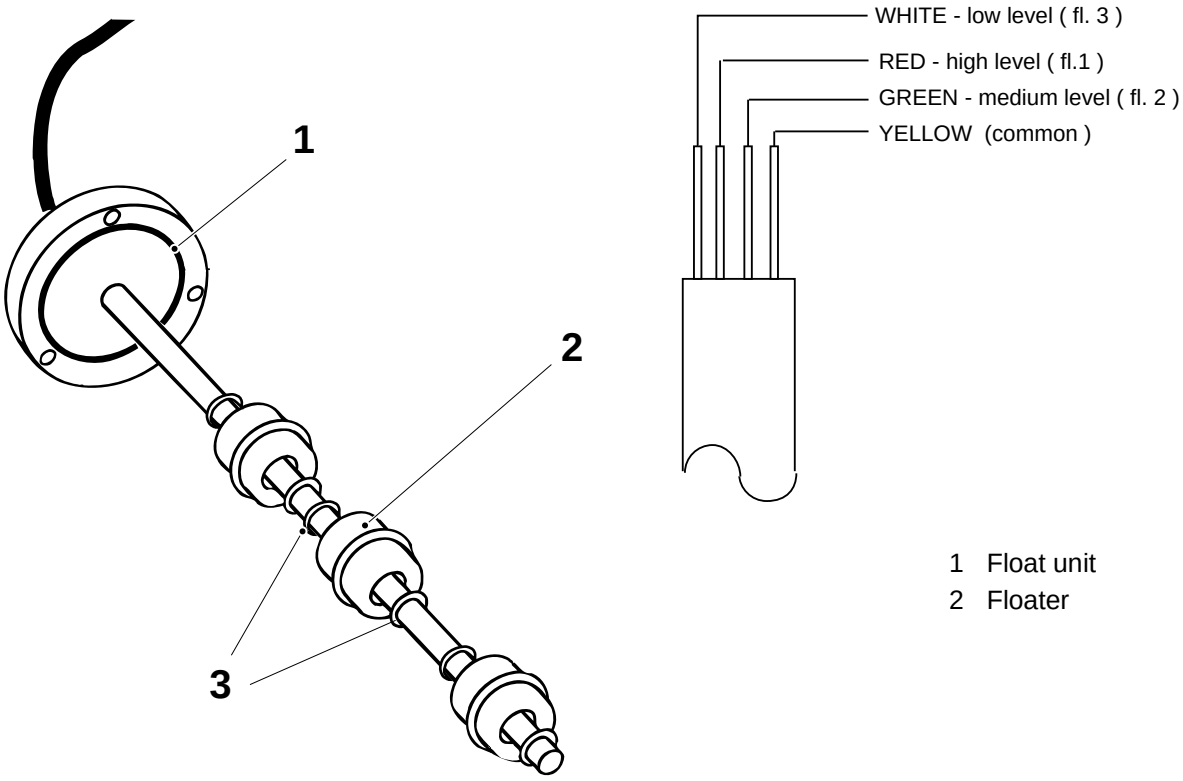
a) Remove the float unit. See .

b) Connect an ohmmeter between the yellow wire (common) and the white wire (connected to floater 3).

c) Move the floater up. The value on the display should become R=0.

d) Repeat the operation with floater 2 (yellow - green wire) and with floater 1 (yellow wire - red wire).

Note! If the value on the ohmmeter is different from 0, remove the floater, turn it upside down and repeat the check.



1 Float unit
2 Floater

2.2c B4491B01en.fm

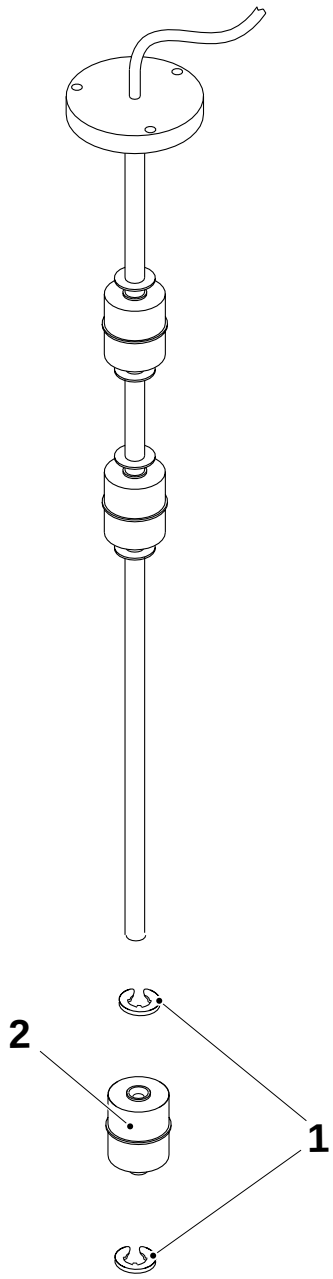
1.1-4 Tank - change floaters

SPC reference	927285-0100

a) Remove the float unit from the tank. See .

b) Remove the circlips (1) from their seats and remove the floaters (2).

c) Change the floaters (2) and fit in the reverse order.



1 Float unit
2 Circlip
3 Floater

2.2c B4491B01en.fm

1.2 Pipe-line

SPC reference	927286-0100

1.2-1 Pipe-line - check pipe (steam injector)

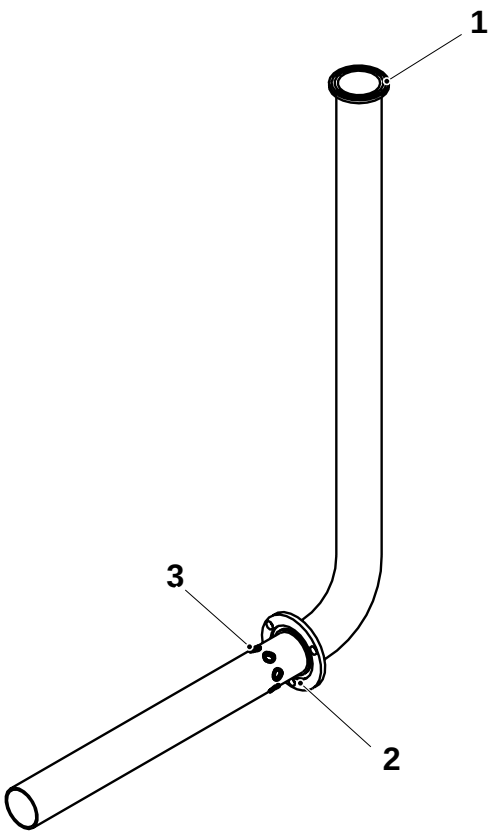
SPC reference	927286-0100

WARNING!

Risk of burns!
The steam that flows through the pipe reaches temperatures of approximately 130°. Steam at this temperature can cause burns. Wear a pair of protective gloves.

- Check that there are no leakages around the gasket (1). Replace the gasket if damaged or worn.
- Loosen the bolt and remove the pipe.
- Check the O-ring (2). Replace it if damaged or worn.
- Check the holes (3) are not clogged. Use a brush to clean them.

2.2c B4491B02en.fm



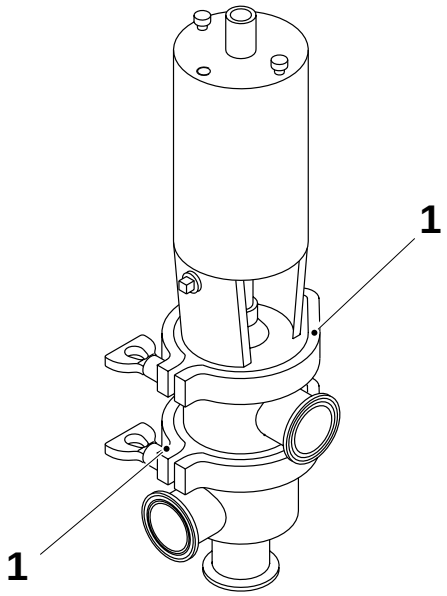
1 Gasket
2 O - ring
3 Holes

(Cont'd)

1.2-2 Pipe-line - check change-over valve clamp fittings

SPC reference	927286-010

Check that there are no leakages at the clamp fittings (1).



1 Clamp

2.2c B4491B02en.fm

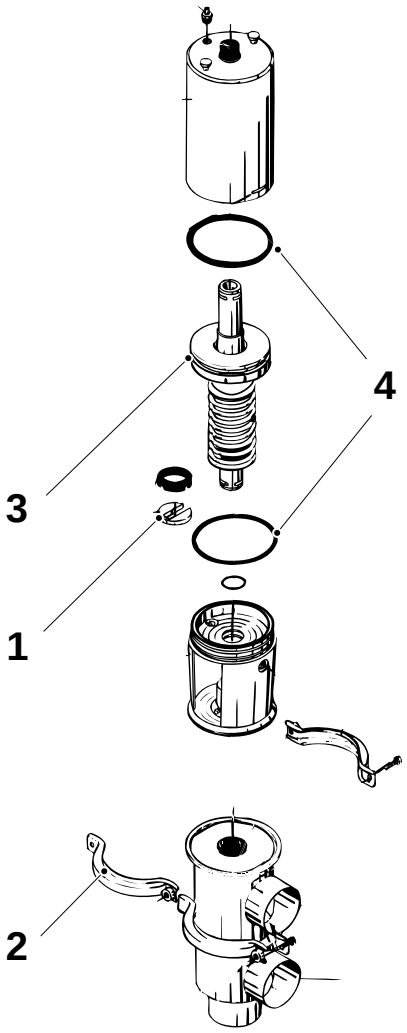
1.2-3 Pipe-line - overhaul change-over valve

SPC reference	927286-0100

a) Remove the clip (1). Push down the piston rod slightly with compressed air.

b) Remove the upper clamp (2) and lift off the actuator (3).

c) Replace the seals (4) in the actuator if they are worn.



1 Clip
2 Upper clamp
3 Actuator
4 Seals

(Cont'd)

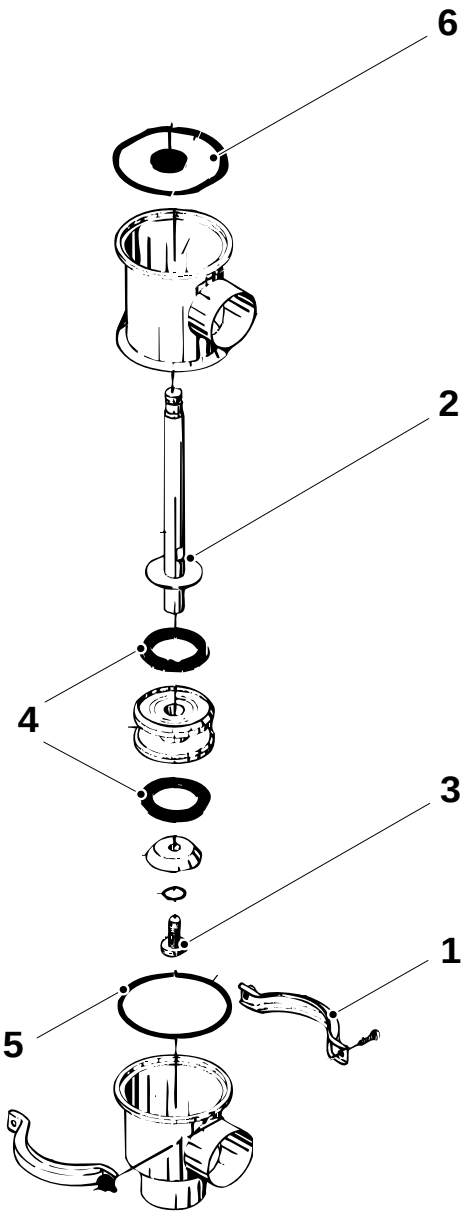
2.2c B4491B02en.fm

(Cont'd)

d) Remove the lower clamp (1) and pull out the valve plug and lip seal.

e) Dismantle the plug (2) by unscrewing the screw (3) at the bottom of the plug. Replace packings (4) and O-ring (5) if they are worn or damaged.

f) Replace the lip seal (6) if it is worn and leaks.



1 Lower clamp
2 Plug
3 Screw
4 Packing
5 O-ring
6 Lip seal

2.2c B4491B02en.fm

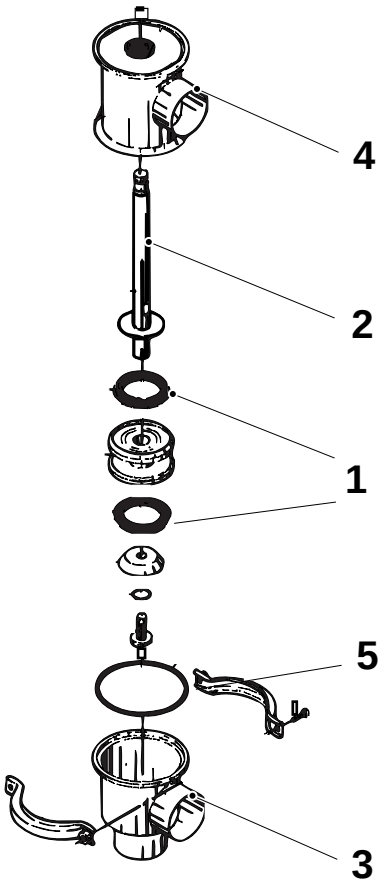
(Cont'd)

(Cont'd)

Note! Before assembling the valve plug, apply a thin layer of silicone grease TP No 55322-30 to the rubber seals (other types of oil will damage EPDM rubber). When assembling remember to tighten the screw so that there is metal to metal contact between the parts (Necessary torque 35 - 40 Nm). Wipe off excess oil from the free rubber surface after assembly. Lock the screw with locking fluid on the thread.

a) Place the valve body packing (1) and the valve plug (2) in the lower valve body (3).

b) Fit the lower valve body (3) and the upper valve body (4) by means of the lower clamp (5).



1 Body packing
2 Valve plug
3 Lower valve body
4 Upper valve body
5 Lower clamp

(Cont'd)

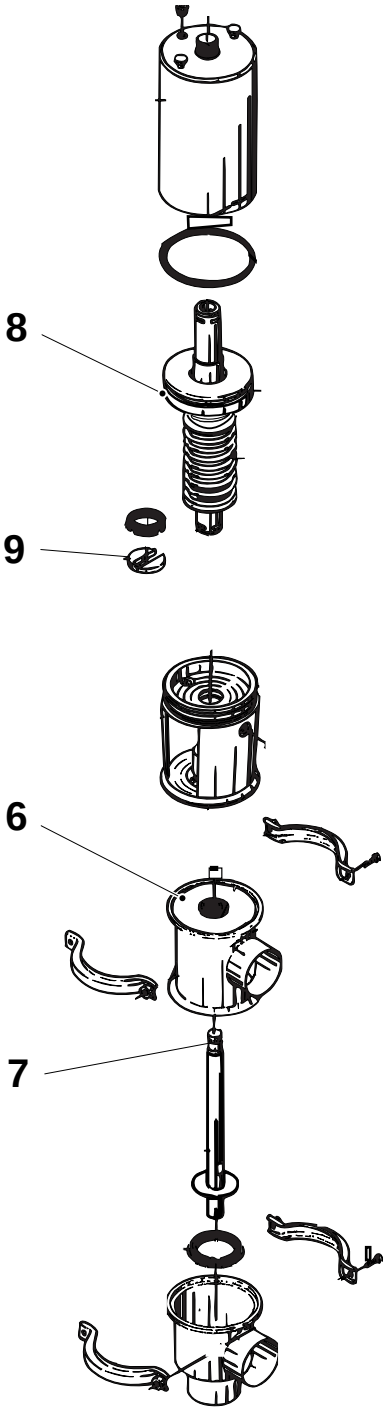
2.2c B4491B02en.fm

(Cont'd)

c) Fit the lip seal (6) on the plug stem (7).

d) Place the actuator (8) on the valve body so that the plug stem fits in the guide in the body

e) Fit the upper clamp and the ring for position indication (if used) and the clip (9).



6 Lip seal
7 Plug stem
8 Actuator
9 Clip

2.2c B4491B02en.fm

(Cont'd)

(Cont'd)

f) Lift the plug by means of compressed air.

g) Fit the air tubing and the position indication if it has been removed.

h) Check that the flat spring (micro switch unit only) enters into the recess in the ring on the plug stem and that the ring runs smoothly along the unit.

2.2c B4491B02en.fm

1.2-4 Pipe-line - check valve for leakages

SPC reference	927286-0100

WARNING!

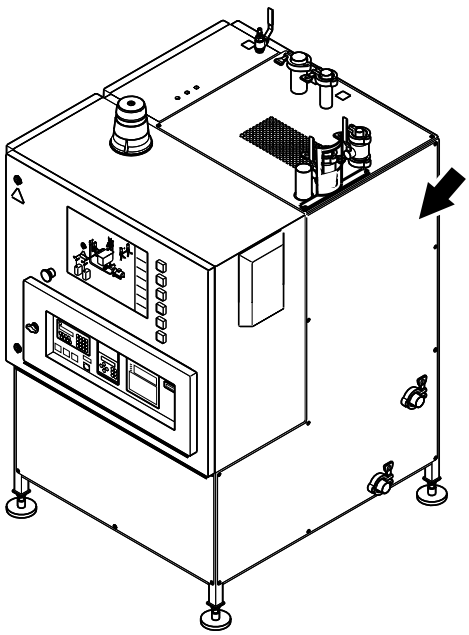
Risk of burns!
Surfaces around the valve can be hot. Touching these hot surfaces can cause burns. Wear a pair of protective gloves when you remove the valve.

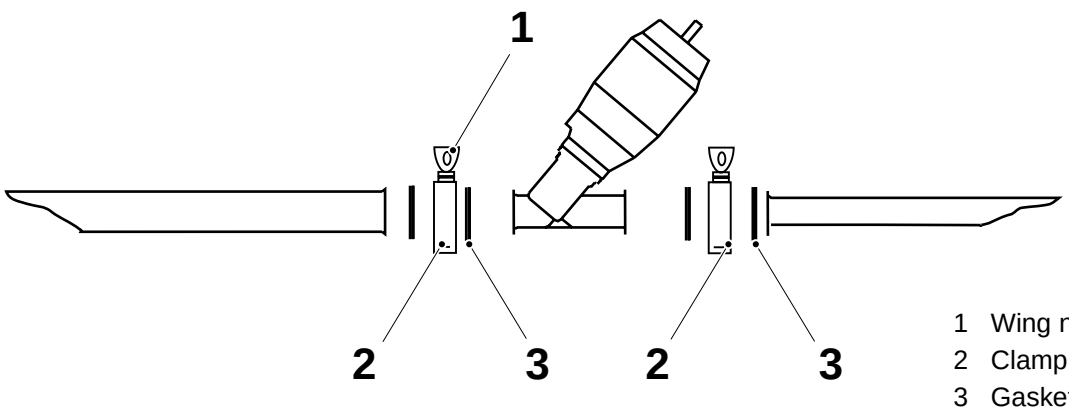
a) Remove the right panel of the machine.

b) Check there are no leakages around the clamp fittings.

c) Loosen the wing nut (1) and remove the clamp saddle (2).

d) Replace the gaskets (3) if damaged or worn.





1 Wing nut
2 Clamp saddle
3 Gasket

2.2c B4491B02en.fm

1.2-5 Pipe-line - check conductivity cell (probe)

SPC reference	927286-0100

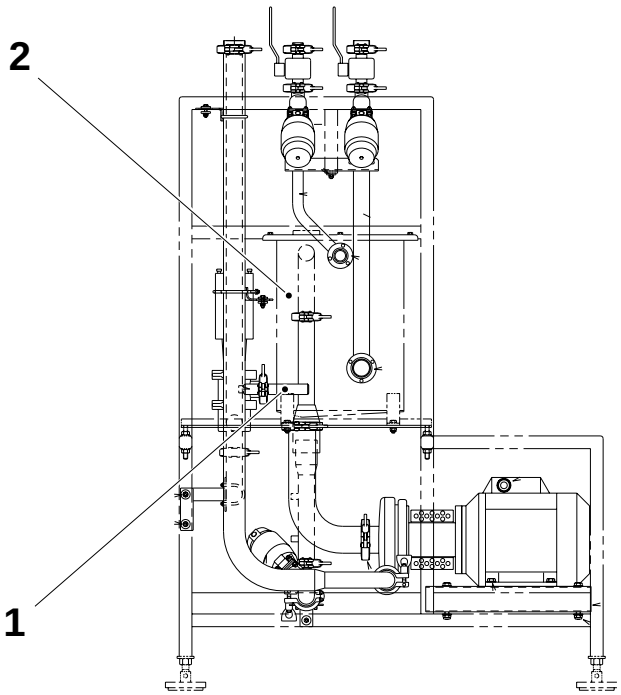
WARNING!

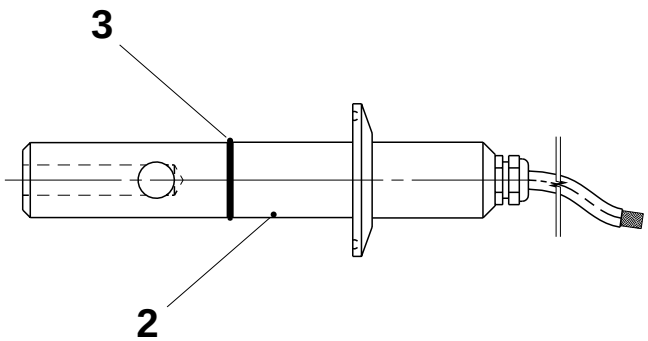
Risk of burns!
The tank and the surfaces around the tank could be hot. Touching these hot surfaces can cause burns. Use a pair of protective gloves when you remove the probe.

a) Remove the probe (2) from the tank (1).

b) Check that the probe (2) is clean as required otherwise clean it. Do not use an abrasive brush to clean it.

c) Check the O-ring (3) for leakages. Replace it if it is damaged or worn.





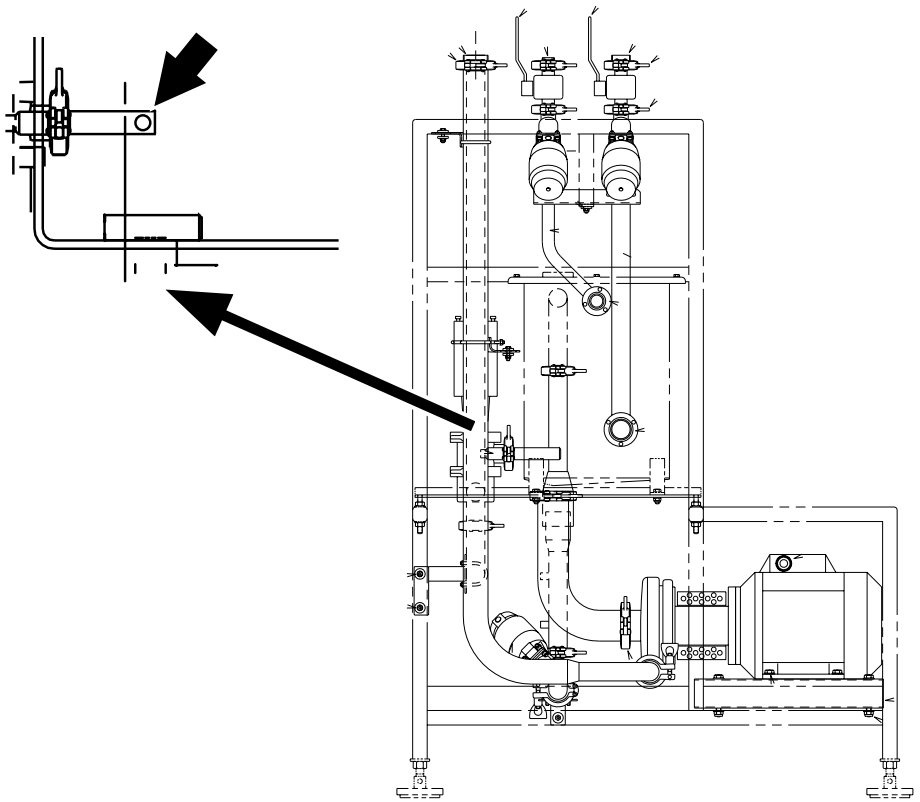
1 Tank
2 Probe
3 O-ring

(Cont'd)

2.2c B4491B02en.fm

(Cont'd)

d) The hole in the cell must be in line with the water outlet.



2.2c B4491B02en.fm

1.2-6 Pipe-line - check pump rotation direction

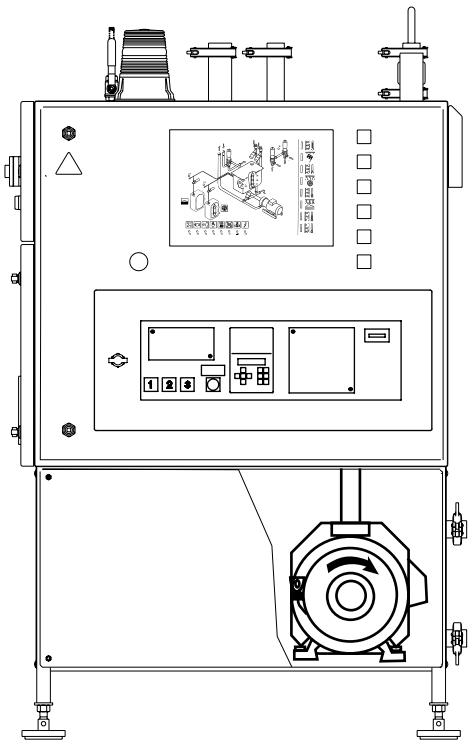
SPC reference	927286-0100

Caution! Do not run the pump with an incorrect direction of rotation. The pump can be damaged.

a) Remove the lower front panel of the machine.

b) Following the instructions in the OM, start the cleaning cycle.

c) After the motor starts (motor will not start until the tank fills), press the stand-by push-button to stop the motor. Check that the fan rotates in a clockwise direction.

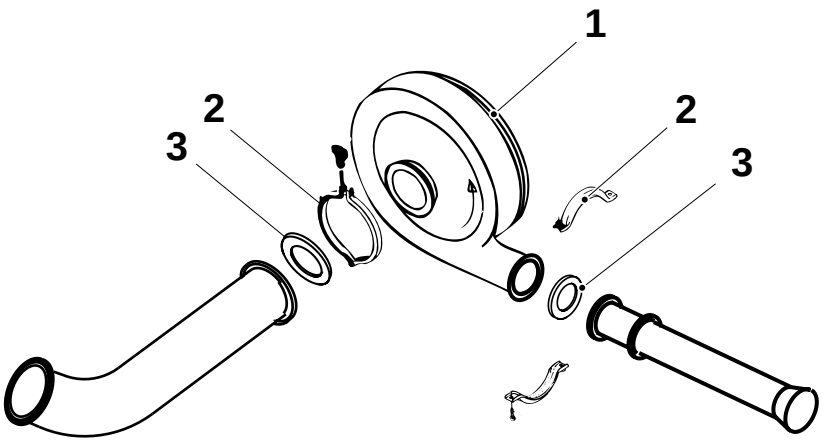


2.2c B4491B02en.fm

1.2-7 Pipe-line - check pump for leakages

SPC reference	927286-0100

Check that there are no leakages around the pump housing (1) and the clamps (2). If necessary replace the gaskets (3).



2.2c B4491B02en.fm

1 Pump housing
2 Clamp
3 Gasket

1.2-8 Pipe-line - overhaul pump

SPC reference	927286-0100

a) Turn the wing nut (1) on the clamp assembly until tension on the clamp saddle is relieved.

b) Open the saddle (2) and remove the casing (3).

c) Push down the retainer (4) with a screwdriver. Remove the impeller (5) and the retainer.

d) Remove the backplate (6) and the casing gasket (7). Replace the casing gasket if damaged or worn.

e) Loosen the screws (8) and remove the adapter (9) with the seal guard (10).

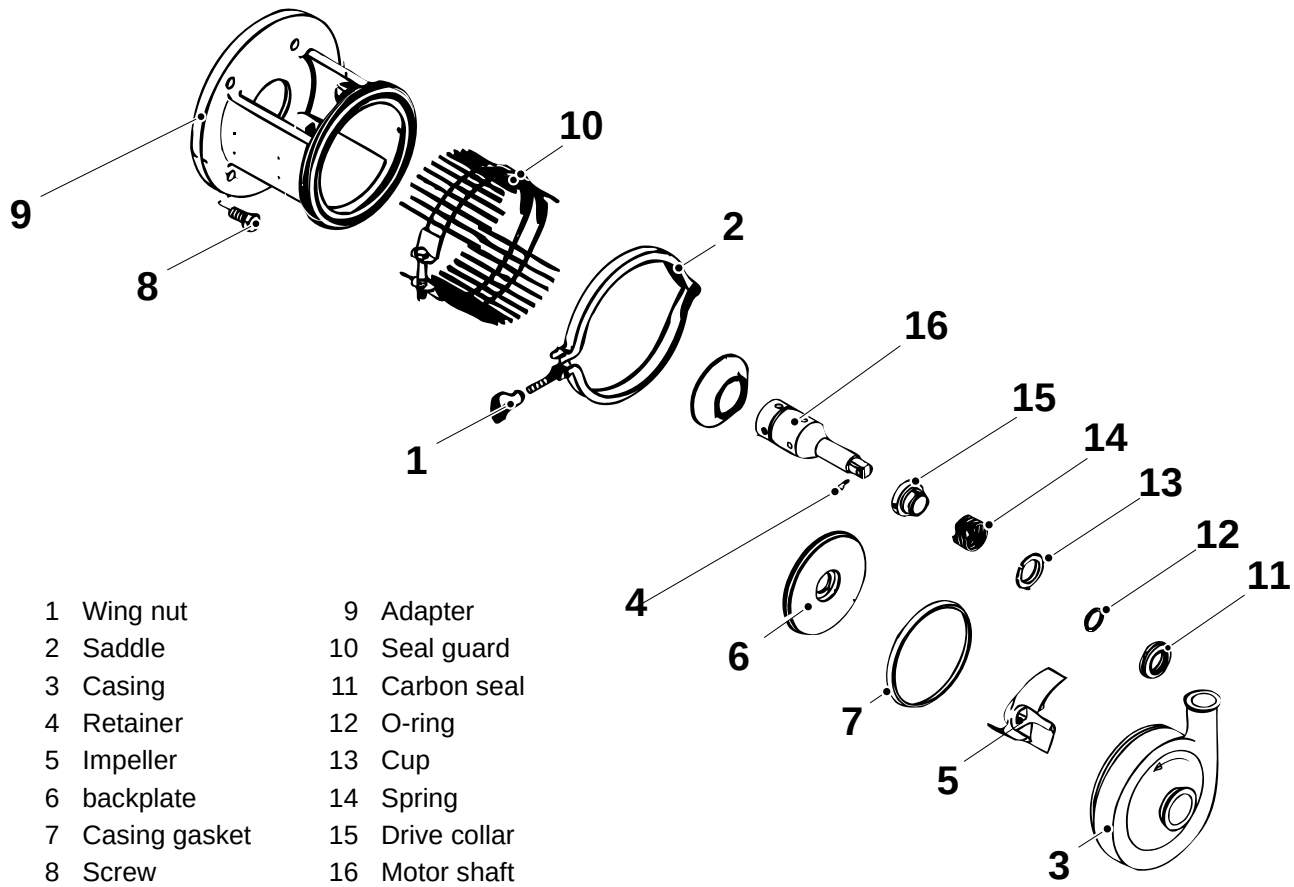
f) Remove the carbon seal (11), the O-ring (12), the cup (13) and the spring (14). Replace the carbon seal and the O-ring if damaged or worn.

g) Remove the drive collar (15).

Note! Lubricate the motor shaft (16) before fitting it.

Note! Fit the retainer (4) to the motor shaft (16) before fitting the impeller (5).

2.2c B4491B02en.fm



1	Wing nut	9	Adapter
2	Saddle	10	Seal guard
3	Casing	11	Carbon seal
4	Retainer	12	O-ring
5	Impeller	13	Cup
6	backplate	14	Spring
7	Casing gasket	15	Drive collar
8	Screw	16	Motor shaft

h) Assemble in the reverse order.

1.3 Alkali circuit

Tools - Safety kit	TP No. 929014-1000
SPC reference	927287-0100

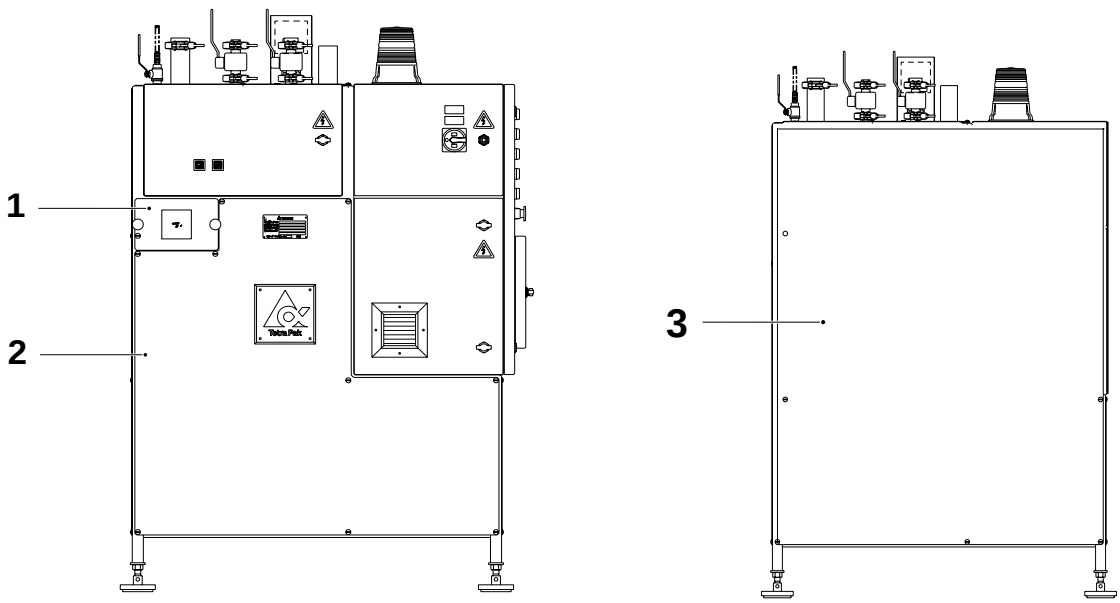
1.3-1 Alkali circuit - drain

SPC reference	927287-0100

Caustic soda!
Read the *Safety precautions*.

Nitric acid!
The acid circuit can be drained at the same time the alkali circuit is drained. Read the *Safety precautions*.

a) Turn the main switch **Off**.
b) Remove the LH side panel (2).
c) Remove the autoload connection cover (1).
d) Remove the rear panel (3) of the machine.



1 Autoload cover
2 LH side panel
3 Rear panel

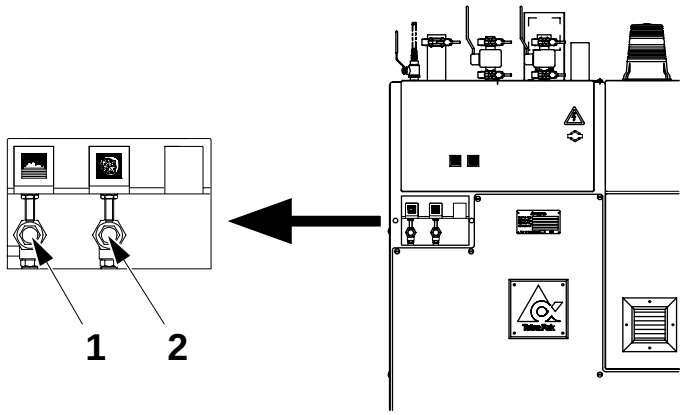
2.2c B4491B03en.fm

(Cont'd)

(Cont'd)

Note! The drain hose is made from the parts provided in the Safety kit.

e) Connect the drain hose to the appropriate connection (1 or 2).



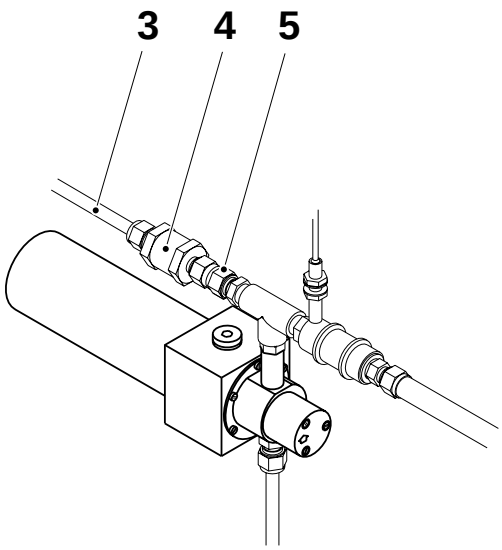
1 Alkali connection
2 Acid connection

f) Connect the other end of the hose to the factory water circuit. Open the water tap and let the water flow for almost 20 sec. (pressure range 1/2 bar; 15/30 psi) in order to flush the upper part of the circuit.

g) Close the water supply.

h) If parts will be removed for maintenance or repair, continue to the next step. Otherwise proceed directly to step *o)*.

i) Remove the pipe (3), the non-return valve (4) and the nut (5).



3 Pipe
4 Non-return valve
5 Nut

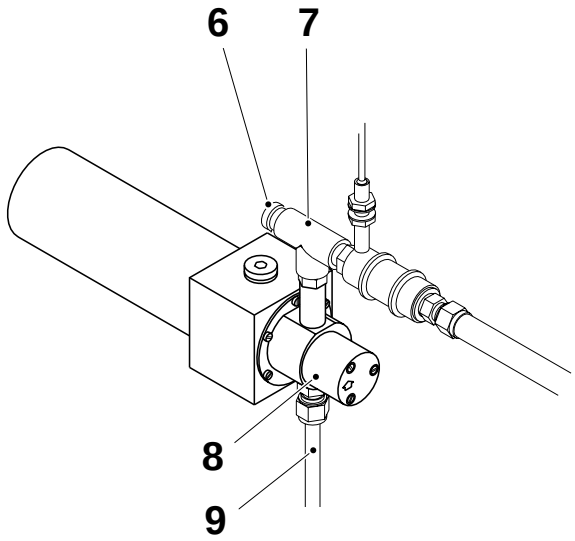
(Cont'd)

(Cont'd)

j) Fit the plug (6) on the T-connection (7).

k) Open the water supply in order to flush the pump (8) and the pipe (9).

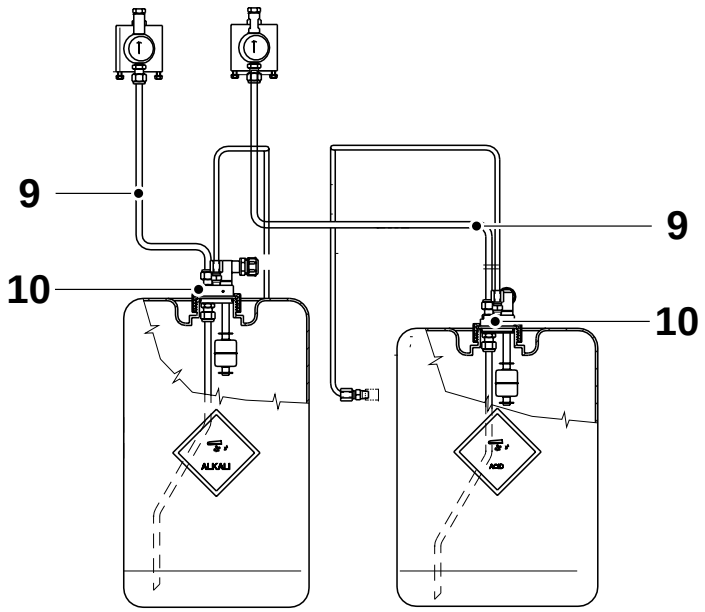
Note! Let the water flow for 5sec. only because the water flows into the tank and dilutes the chemical solution in the tank.



6 Plug
7 T-connection
8 Pump
9 Pipe

l) Disconnect the pipe (9) from the tank housing (10) and swing the pipe away from the machine.

m) Open the water supply and let the water flow for almost 20 sec. to completely drain of the lower part of the circuit.



9 Pipe
10 Tank housing

(Cont'd)

2.2c B4491B03en.fm

(Cont'd)

n) Reconnect the parts disconnected in steps *i)* and *l)*.

o) Disconnect the drain hose.

p) Fit all covers and panels.

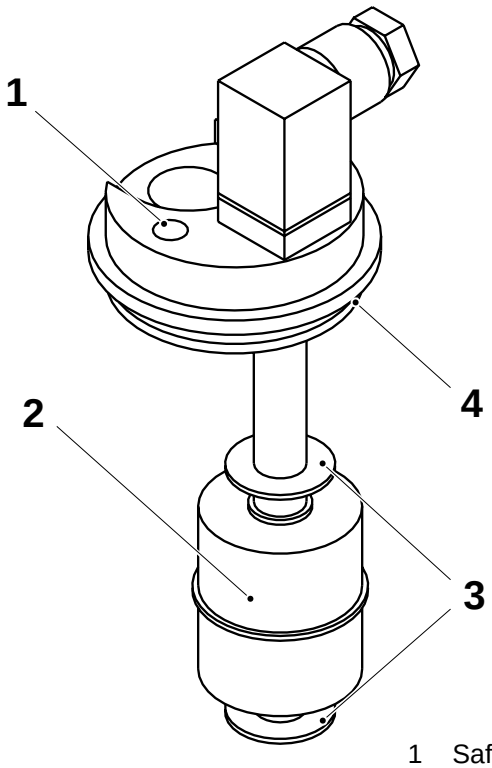
2.2c B4491B03en.fm

1.3-2 Alkali circuit - check float (level monitor)

SPC reference	927287-0100

Caustic soda!
Read the *Safety precautions*.

- Check that the safety - hole (1) is not blocked.
- Check there are no holes in the float (2) and its movement is smoothly free.
- Check the circlips (3) are correctly installed and are not damaged.
- Check the O-ring (4) is not damaged.



1 Safety-hole
2 Float
3 Circlip
4 O-ring

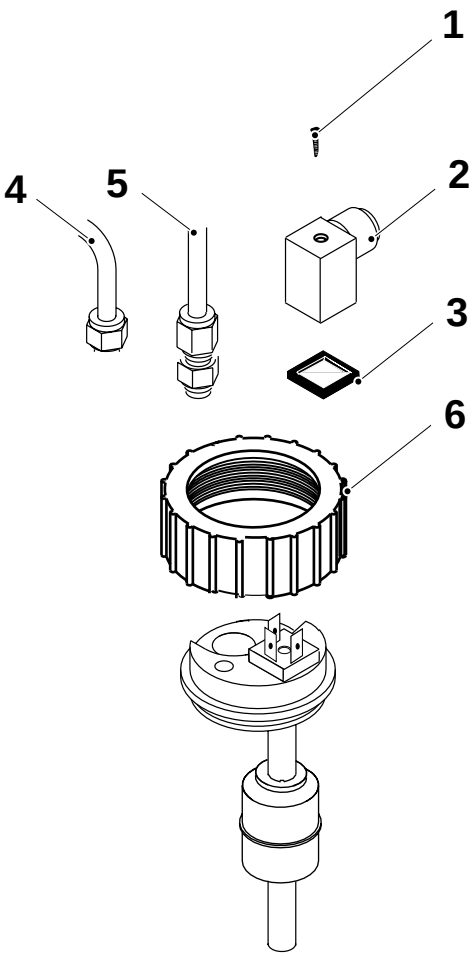
2.2c B4491B03en.fm

1.3-3 Alkali circuit - change float (level monitor) gasket and O-ring

SPC reference	927287-0100

Caustic soda!
Read the *Safety precautions*.

a) Undo the screw (1) and remove the connector (2).
b) Check the gasket (3) and replace it if damaged or worn.
c) Disconnect the pipe (4).
d) Disconnect the safety-pipe (5).
e) Remove the level monitor housing (6).



1 Screw
2 Connector
3 Gasket
4 Pipe
5 Safety-pipe
6 Monitor housing

(Cont'd)

2.2c B4491B03en.fm

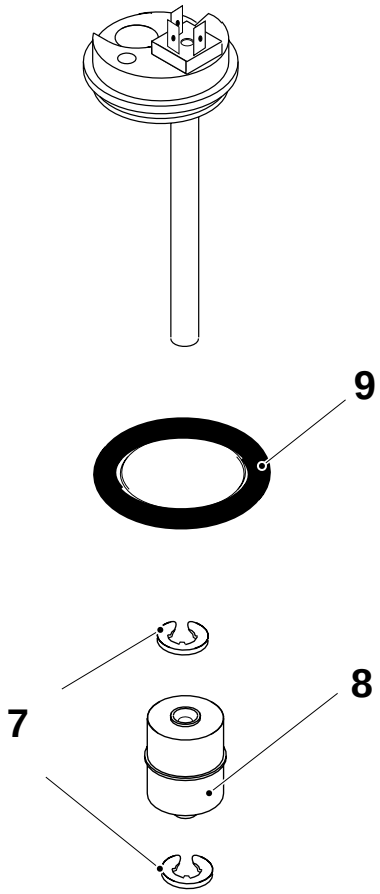
(Cont'd)

f) Remove the level monitor from the tank.

g) Wash it with plenty water.

h) Remove the circlip (7) and the floater (8).

i) Check the O-ring (9) and replace it if damaged or worn.



7 Circlips
8 Floater
9 O-ring

2.2c B4491B03en.fm

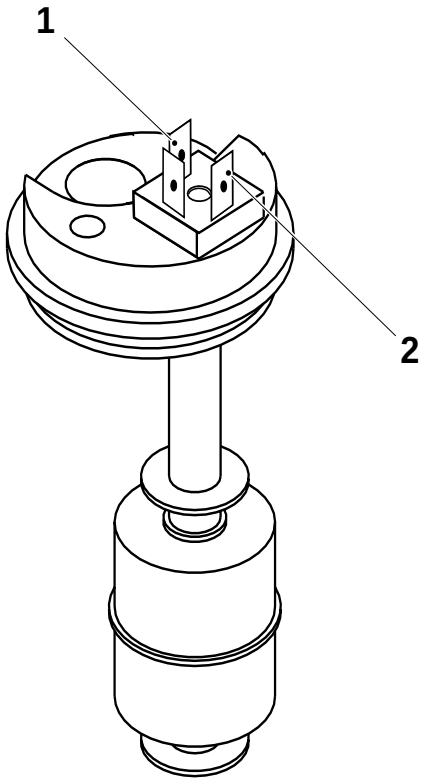
1.3-4 Alkali circuit - check float (level monitor) function

SPC reference	927287-0100

Caustic soda!
Read the *Safety precautions*.

- Connect an Ohmmeter between the connectors (1) and (2), the value must be R=0.
- Move the floater up. The value on the display should become R=0.

Note! If the value on the Ohmmeter is different from 0, remove the float, turn it upside down and repeat the check.



1 Connector
2 Connector

2.2c B4491B03en.fm

1.3-5 Alkali circuit - check pipe (autoload pipeline)

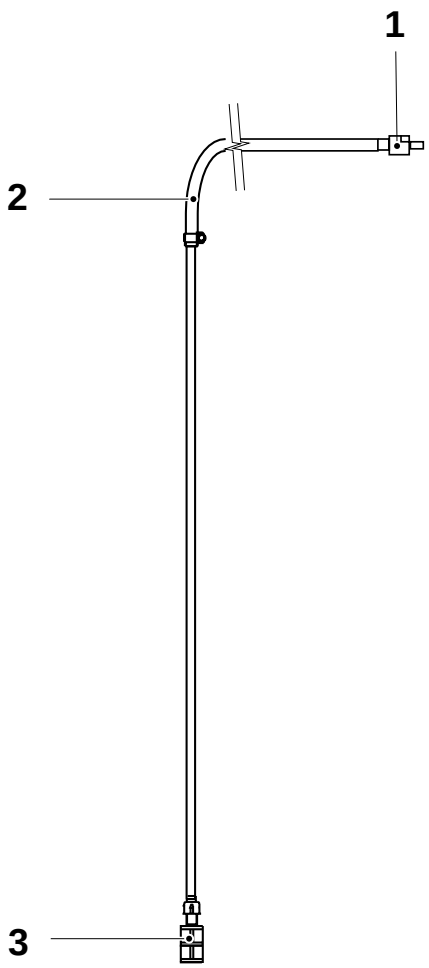
SPC reference	927287-0100

Caustic soda!
Read the *Safety precautions*.

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

- Autoload plug (1)
- Autoload pipeline (2)
- Filter (3)

Replace as required.



1 Autoload plug
2 Autoload pipeline
3 Filter

2.2c B4491B03en.fm

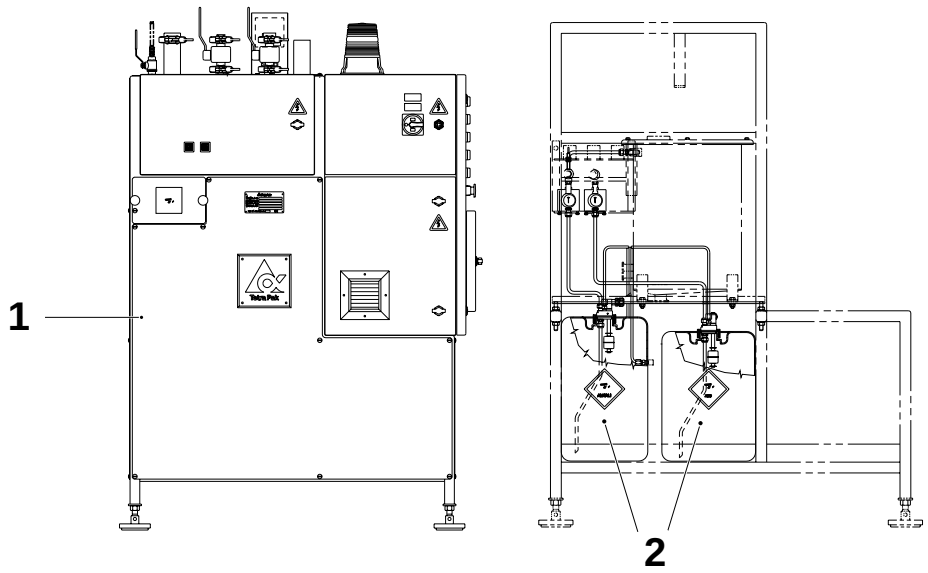
1.3-6 Alkali circuit - check can for leakages

SPC reference	927287-0100

Caustic soda!
Read the *Safety precautions*.

DANGER!

- Remove the panel (1) on the left side of the machine.
- Check there are no leakages around the alkali tank (2).



1 Panel
2 Alkali tank
3 Acid tank

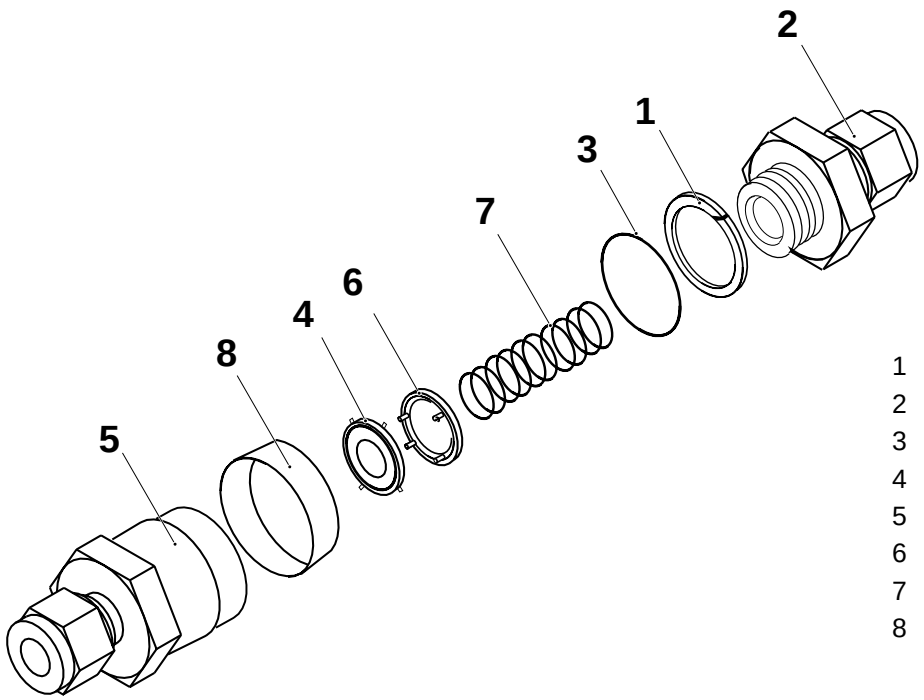
2.2c B4491B03en.fm

1.3-7 Alkali circuit - overhaul non-return valve

SPC reference	927287-0100

Caustic soda!
Read the *Safety precautions*.

a) Disassemble the valve.
b) Assemble the open split back up ring (1) to the male body (2) behind the threads.
c) Replace the O-ring (3) and slide it over the threads of the male body until it stops against the body ring.
d) Replace the poppet (4) and insert it into the female body (5) with the bonded side towards.
e) Insert the poppet stop (6) with the prongs against the poppet.
f) Insert the spring (7).
g) Slide the spring label (8) on.
h) Lubricate the male body (2) and assemble it to the female body (5).
i) Check if the spring is aligned with the valve body observing through the outlet port.



1 Back-up ring
2 Male body
3 O-ring
4 Poppet
5 Female body
6 Poppet stop
7 Spring
8 Spring label

2.2c B4491B03en.fm

1.3-8 Alkali circuit - set proximity switch

SPC reference	927287-0100

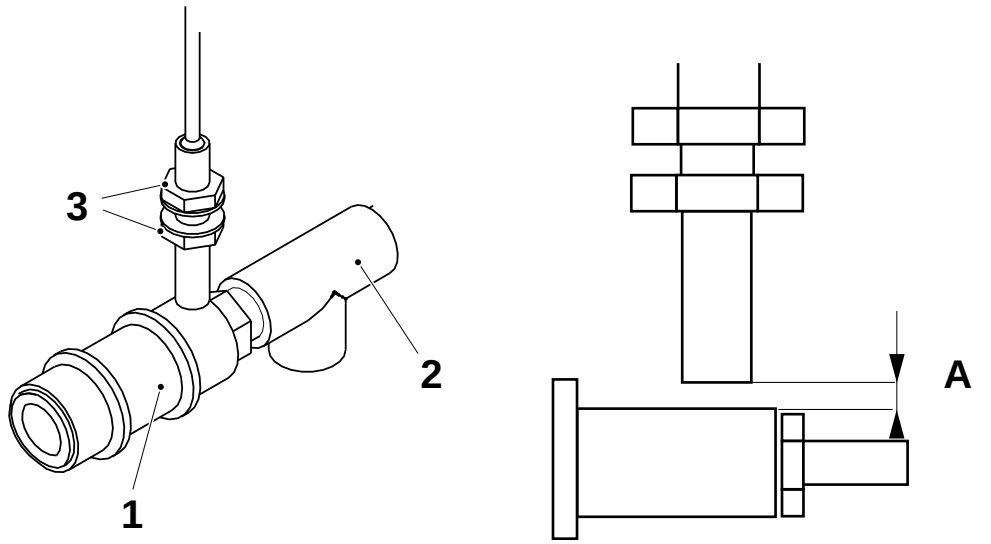
Caustic soda!
Read the *Safety precautions*.

a) Insert the plug (1) of the external tank into the autoload proper connection (2).

b) Loosen the nuts (3) and set the distance A between the sensor and the plug to 0.3 mm.

c) Turn the main switch **On**. Press the **Start** push-button and the machine switches to **Setting** mode.

d) Check that the led of the sensor lights up.



A=0.3 mm

1 Plug
2 Autoload connection
3 Nut

2.2c B4491B03en.fm

1.3.1 Pump

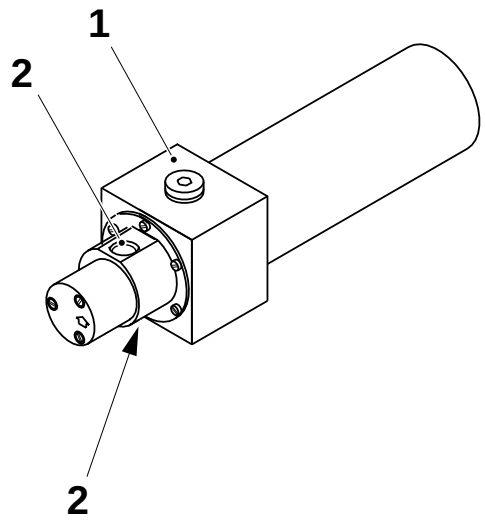
1.3.1-1 Pump - check for leakages

SPC reference	927244-0100

Caustic soda!
Read the *Safety precautions*.

DANGER!

Check for leakages around the adaptor (1) and pipe connection (2).



1 Adaptor
2 Pipe connection

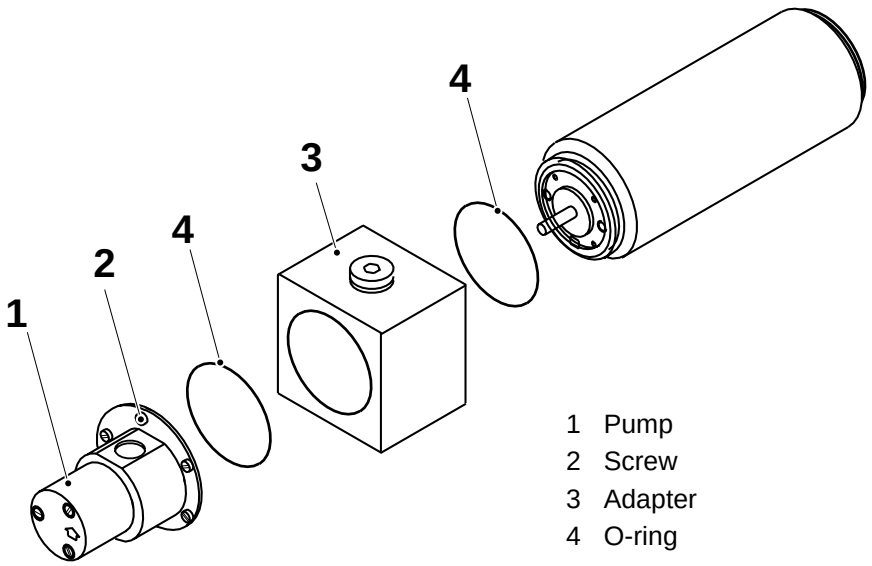
2.2c B4491B03en.fm

1.3.1-2 Pump - change O-rings

SPC reference	927244-0100

Caustic soda!
Read the *Safety precautions*.

a) Disconnect the main cable.
b) Remove the pump from the circuit.
c) Loosen the screws (2) and remove the pump (1).
d) Remove the adapter (3).
e) Replace the O-rings (4) if worn or damaged.
f) Fit in the reverse order.



1 Pump
2 Screw
3 Adapter
4 O-ring

2.2c B4491B03en.fm

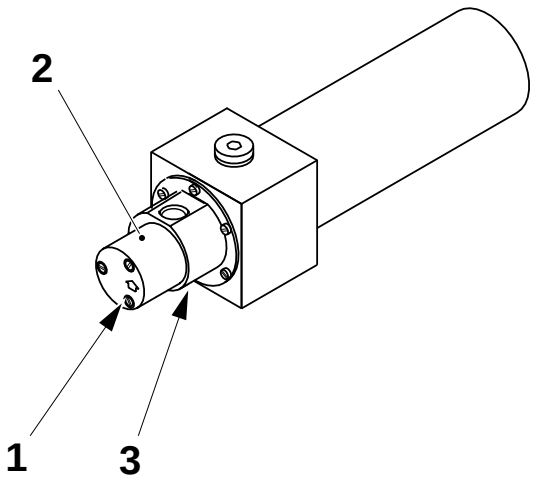
1.3.1-3 Pump - check pump

SPC reference	927244-0100

Caustic soda!
Read the *Safety precautions*.

DANGER!

a) Remove the screws (1) and the cover (2).
b) Check if the gears (3) are worn or damaged.



1 Screw
2 Cover
3 Gear

2.2c B4491B03en.fm

1.4 Acid circuit

Tools - Safety kit	TP No. 929015-1000
SPC reference	927287-0100

1.4-1 Acid circuit - drain

SPC reference	927287-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3-1 Alkali circuit - drain*.

2.2c B4491B04en.fm

1.4-2 Acid circuit - check float (level monitor)

SPC reference	927287-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3-2 Alkali circuit - check float (level monitor)*.

1.4-3 Acid circuit - change float (level monitor) gasket and O-ring

SPC reference	927287-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3-3 Alkali circuit - change float (level monitor) gasket and O-ring*.

1.4-4 Acid circuit - check float (level monitor) function

SPC reference	927287-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3-4 Alkali circuit - check float (level monitor) function*.

2.2c B4491B04en.fm

1.4-5 Acid circuit - check pipe (autoload pipeline)

SPC reference	927287-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3-5 Alkali circuit - check pipe (autoload pipeline)*.

2.2c B4491B04en.fm

1.4-6 Acid circuit - check can for leakages

SPC reference	927287-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3-6 Alkali circuit - check can for leakages*.

1.4-7 Acid circuit - overhaul non-return valve

SPC reference	927287-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3-7 Alkali circuit - overhaul non-return valve*.

1.4-8 Acid circuit - set proximity switch

SPC reference	927287-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3-8 Alkali circuit - set proximity switch*.

2.2c B4491B04en.fm

1.4.1 Pump

1.4.1-1 Pump - check for leakages

SPC reference	927244-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3.1-1 Pump - check for leakages*.

2.2c B4491B04en.fm

1.4.1-2 Pump - change O-rings

SPC reference	927244-0100

Nitric acid!
Read the *Safety precautions*.

a) Disconnect the main cable.
b) Remove the pump from the circuit.

1.4.1-3 Pump - check pump

SPC reference	927244-0100

Nitric acid!
Read the *Safety precautions*.

Follow the procedure described in *1.3.1-3 Pump - check pump*.

2.2c B4491B04en.fm

1.5 Pneumatic cabinet

SPC reference	927289-0200

1.5-1 Valve panel - set pressure switch

Risk of electrocution!
Voltage inside the electrical cabinet is 400 V. Always follow the safety precaution before start working inside the valve cabinet.

a) Open the cover (1) on the left side of the machine.

b) Remove the rubber cover on the pressure switch (2) and loosen the screw (3).

c) Open the air tap (4) completely. The pressure reaches a value of 6 bar.

d) Close the tap (4) until the pressure reaches a value of 3.5-4 bar.

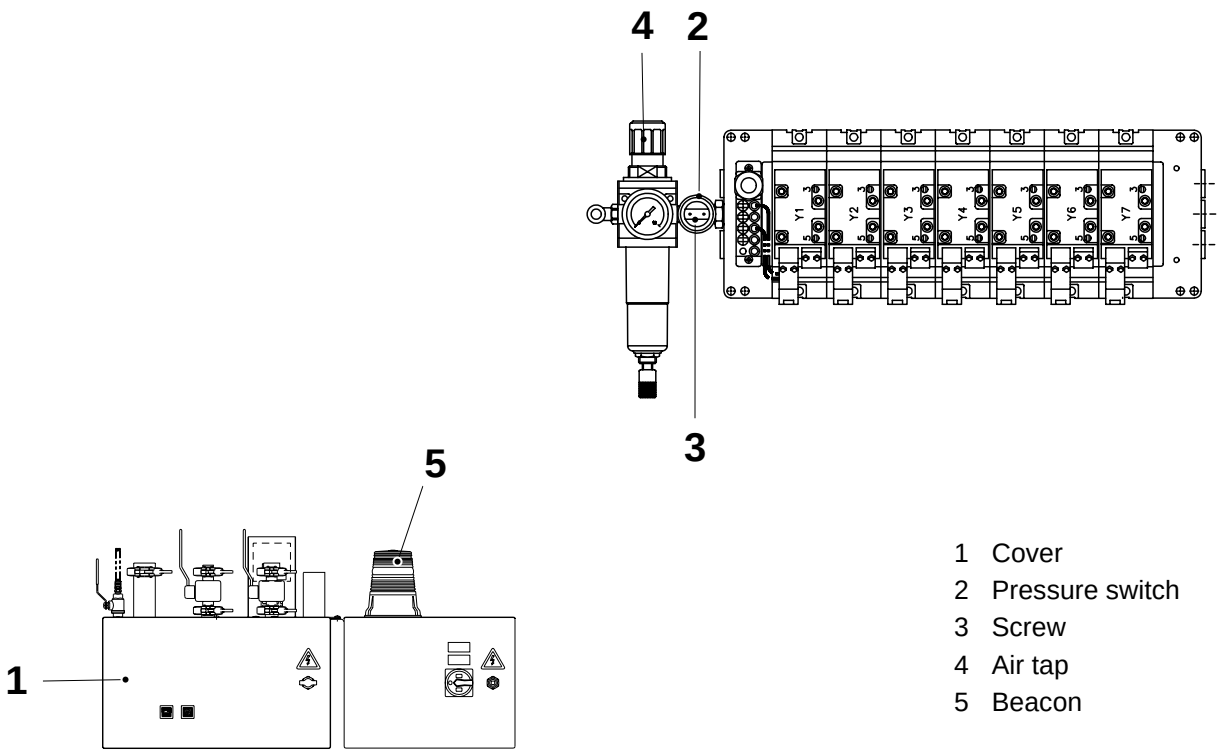
e) Tighten the screw (3) until the beacon (5) starts to flash.

f) Push **Alarm reset** push-button.

g) Open the air tap (4) slowly until the beacon (5) stops flashing.

h) Repeat step *d)* and check that the pressure value at which the beacon starts to flash is 3.5-4 bar. If the value is over 4 bar, tighten the screw (3) half a turn; if the value is under 3.5 loosen the screw (3) half a turn.

2.2c B4491B05en.fm



1 Cover
2 Pressure switch
3 Screw
4 Air tap
5 Beacon

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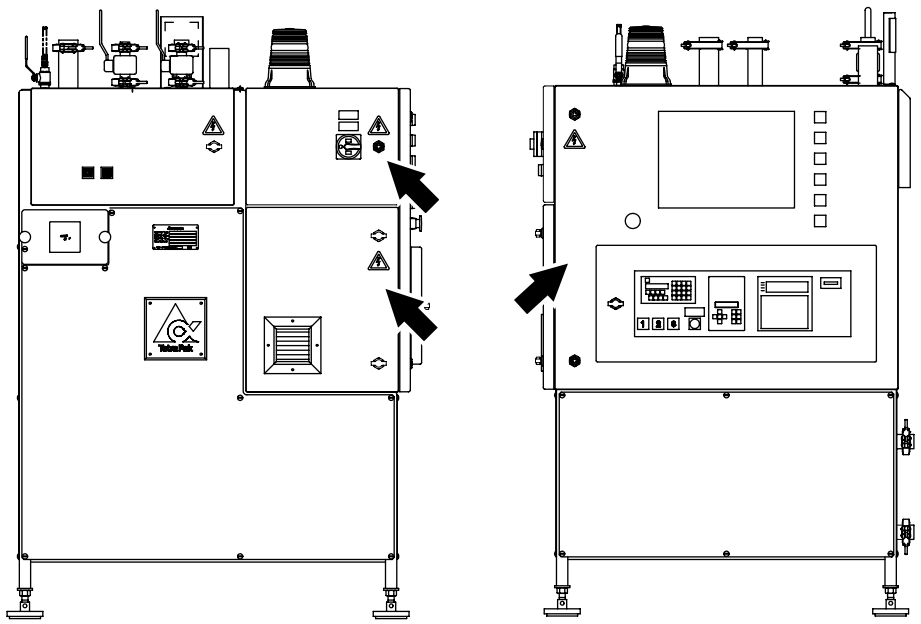
2.2c B4491B05en.fm

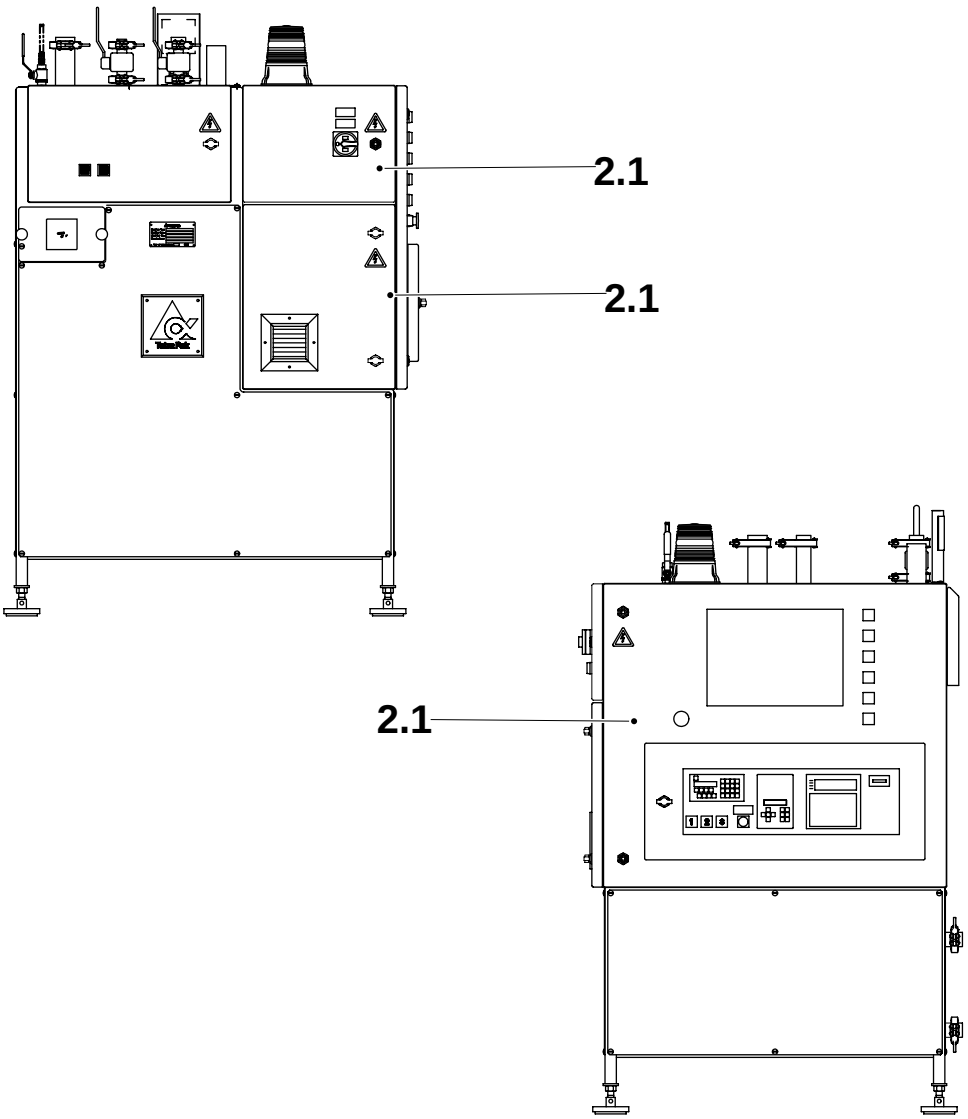
2 Electrical equipment

2.2c B4491H00en.fm



2-1 Electrical equipment - description

SPC reference	649444-0200



2.1 Electrical cabinet

2.2c B4491H00en.fm

2.1 Electrical cabinet

SPC reference	42221-0200

2.1-1 Electrical cabinet - set conductivity meter

SPC reference	42221-0200

a) Turn the main switch **Off.**

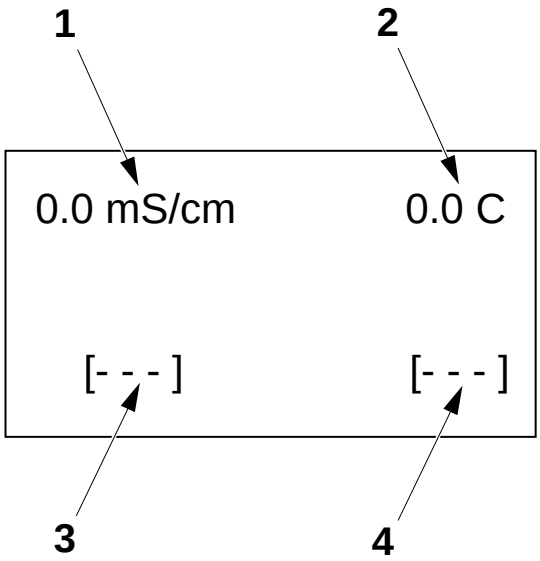
b) Check the main tank is empty and the supplies are closed.

c) Disconnect the conductivity probe; clean and dry it.

d) Turn the main switch **On**.

e) Push the **Start** button. The program is now in **Setting** mode.

2.2c B4491H01en.fm



Legend	
RE 1	Conductivity value of clean water
RE 2	Conductivity value of alkali
RE 3	Conductivity value of nitric acid
RE 4	Temperature value of nitric acid
RE 5	Temperature value of alkali
RE 6	Temperature value of disinfection
ATC 1	Temperature correction factor
ATC 2	Temperature correction factor
ATC 3	Temperature correction factor
RE 1	Conductivity value of clean water

1 Conductivity value
2 Temperature value
3 Conductivity conditions RE1, RE2, RE3 (black rectangle means that the present valve has been reached).
4 Temperature conditions RE4, RE5, RE6 (black rectangle means that the preset value has been reached).

(Cont'd)

(Cont'd)

STEP	PUSH	DISPLAY	INPUT	PUSH
1.a	Prog	Password?		If no password is needed go to step 2
1.b	<	Password?		
1.c	prog	Password OK		
2	Status	Status control		
3	Prog	Prog. control		
4	Next	mA1 Start Value 0.00 mA	4.00 mA	Up or Down
5	Next	mA1 Stop Value 20.00 mA	20.00 mA	Up or Down
6	Next	mA1 Start At 0.00 mS/cm	00.00 mA	Up or Down
7	Next	mA1 Stop At 100.00 mS/cm	100.00 mA	Up or Down
8.a	Next	RE.1 Function on/off	On/Off	Up or Down
8.b	Next	RE.1 Set Point 0.00 mS/cm	1.30mS/cm	Up or Down
8.c	Next	RE.1 Polarity norm.	norm.	Up or Down
9.a	Next	RE.2 Function on/off	on/off	Up or Down
9.b	Next	RE.2 Set Point 00.00 mS/cm	62.00 mS/cm	Up or Down
9.c	Next	RE.2 Polarity norm.	norm.	Up or Down
10.a	Next	RE.3 Function on/off	On/Off	Up or Down
10.b	Next	RE.3 Set Point 0.00 mS/cm	44.00 mS/cm	up or Down
10.c	Next	RE.3 Polarity norm.	norm.	Up or Down
11	Next	RE.4 SetPoint 0.00 °C	58.00	Up or Down
12	Next	RE.5 Set Point 0.00 C	78.00	Up or Down
13	Next	RE.6 Set Point 0.00 C	88.00	Up or Down
14	Next	End control list Push RUN to exit		
15	Run	x.xxx mS, x.x C C. [---], T [---]		

(Cont'd)

2.2c B4491H01en.fm

(Cont'd)

A.T.C. Checking

- Check the conductivity C1 of inlet water, dipping the conductivity probe into a previously cleaned water tank.
- Fill another tank with water heated to more than 25°C, check that the conductivity C2 is the same asC1. If not, the ATC value must be changed according to the instructions in A.T.C. Setting section.
- Repeat the same operations for acid and alkali solutions.

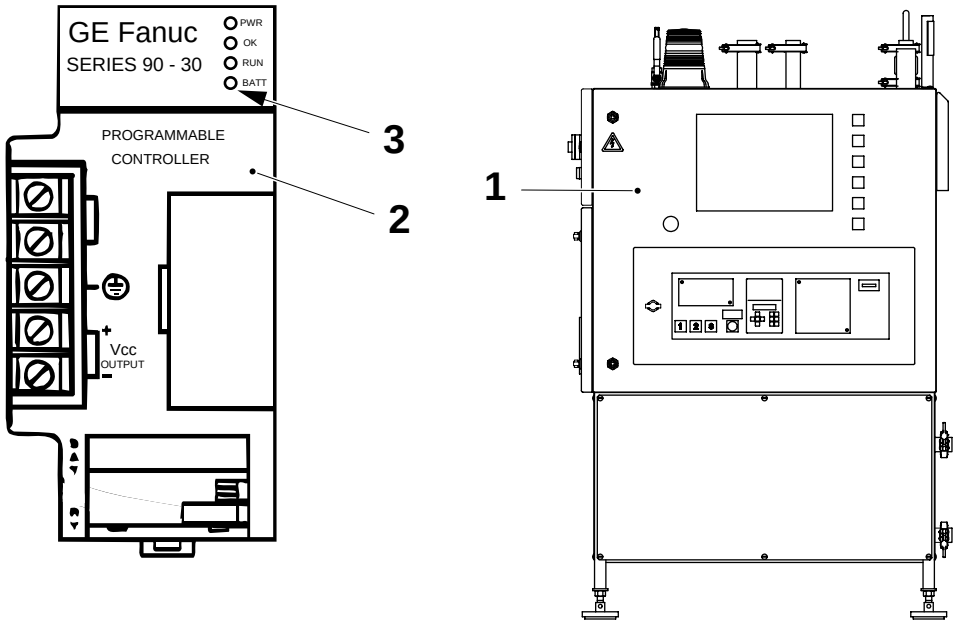
A.T.C. Setting

STEP	PUSH	DISPLAY	IINPUT	PUSH
16	Status	Status Control		
17	Select	Stat.Cal. Cond		
18	Select	Status Install		
19	Prog	Prog. Install		
20.a	Next	ATC 1 2.10% / C	new value	Up and Down
20.b	Next	ATC 2 = 1.70% / C	new value	Up and Down
20.c	Next	ATC 3 = 1.35% / C	new value	Up and Down
21	Next	End control list push RUN to exit		
22	Run	x.xxx C, x.x T C. [---], T. [---]		

2.1-2 Electrical cabinet - check PLC battery

SPC reference	42221-0200

Open the front door (1) of the machine and check the power supply unit (2). If the battery signal lamp (3) lights up, the battery must be replaced.



1 Front door
2 Power supply unit
3 Battery signal lamp

2.2c B4491H01en.fm

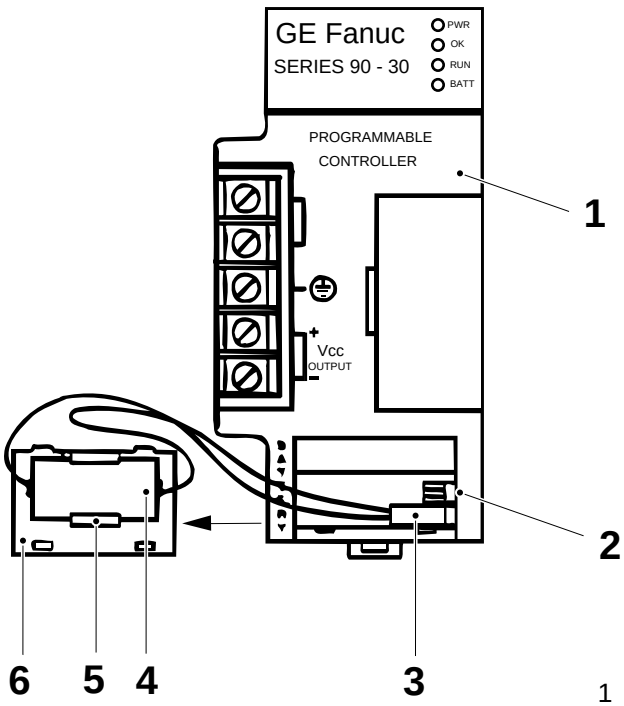
2.1-3 Electrical cabinet - change PLC battery

Machine status	**Off**
SPC reference	42221-0200

Risk of electrocution!
The voltage inside the electrical cabinet is 400V. Always follow the safety precaution before start working inside the electrical cabinet.

a) Turn the main switch **Off.**
b) Remove the battery cover (6) at the bottom of the faceplate (1).
c) Insert the cable of the replacement battery into the free side of the cable connector (2).
d) Remove the old battery cable (3) and discard the battery pack (4) from the mounting clip (5).
e) Firmly insert the new battery into the mounting clip.
f) Fit the cover.

2.2c B4491H01en.fm



1 Faceplate
2 Cable connector
3 Battery cable
4 Battery pack
5 Mounting clip
6 Battery cover

2.1-4 Electrical cabinet - set parameters of soft start unit

SPC reference	42221-0200

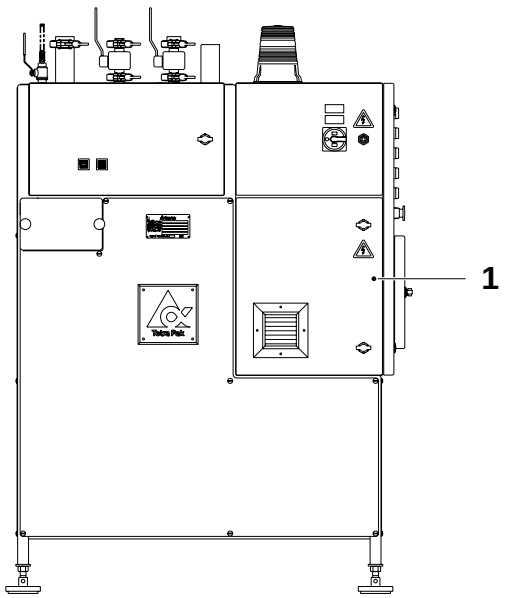
Risk of electrocution!
The voltage inside the electrical cabinet is 400V. Always follow the safety precaution before start working inside the electrical cabinet.

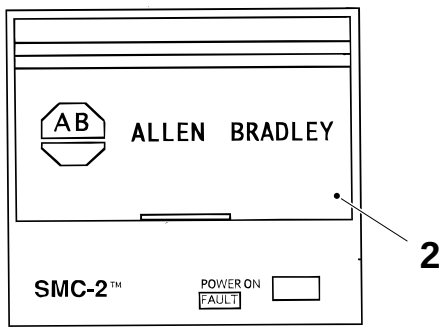
DANGER!

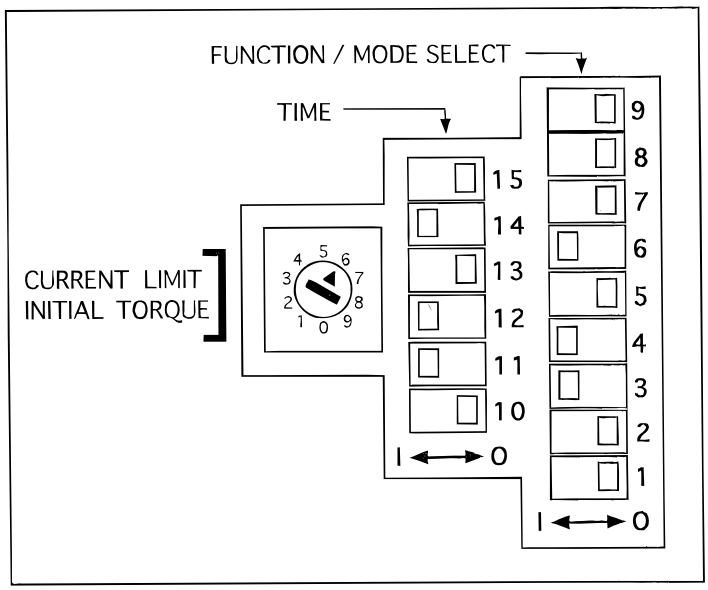
a) Turn the main switch **Off**.
b) Open the electrical cabinet door (1) on the left side of the machine.
c) Lift up the front cover (2) of the soft start unit.
d) Set the switches as shown in the picture

Note! Change the position of the switch No 6 if the machine is supplied with a 60 Hz frequency.

e) Turn the main switch **On**.







1 Electrical cabinet door
2 Front cover

2.2c B4491H01en.fm

2.1.1 Alarm multiplexer

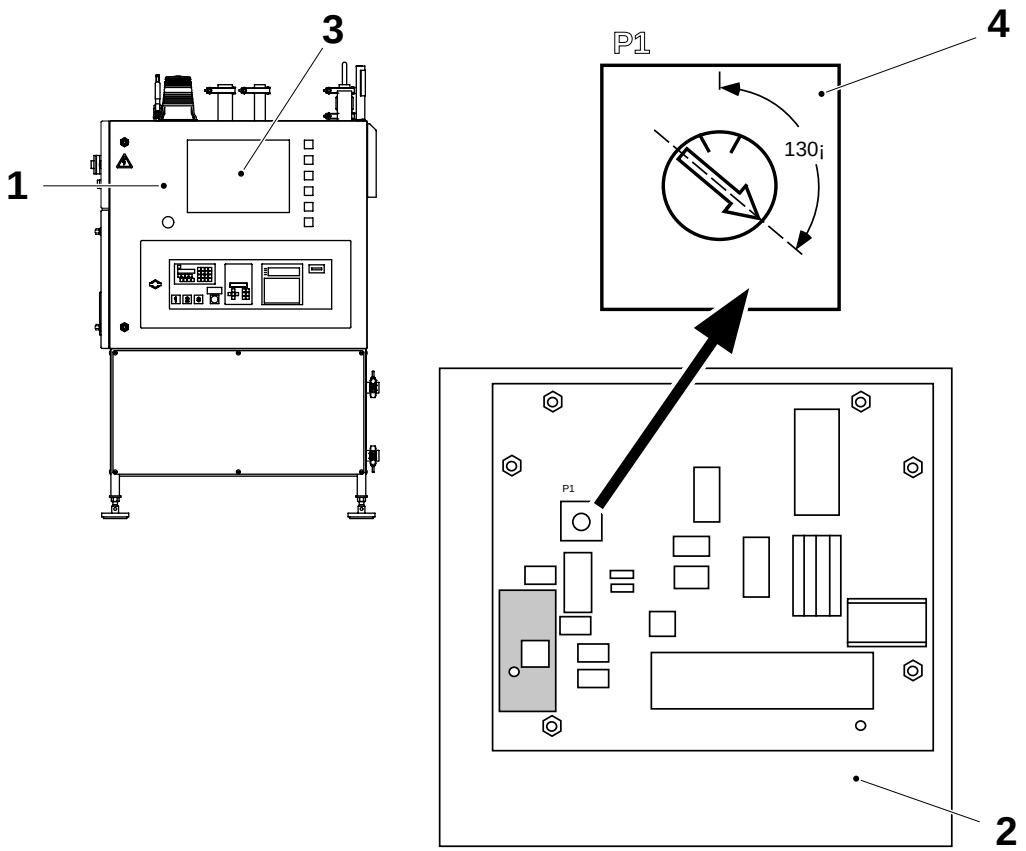
2.1.1-1 Alarm multiplexer - set parameter

SPC reference	42221-0200

a) Open the front panel (1) of the machine.

b) Set the Alarm multiplexer board (2) placed on the back of the synoptic panel (3), moving the trimmer (4) 130° clockwise.

Note! The 0 position is with the arrow pointing upwards.



1 Front panel
2 Alarm multiplexer board
3 Synoptic panel
4 Trimmer

2.2c B4491H01en.fm

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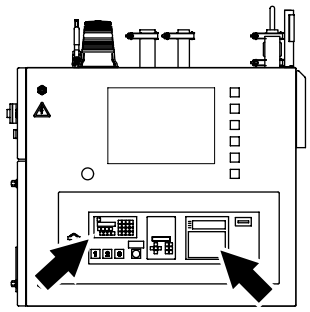
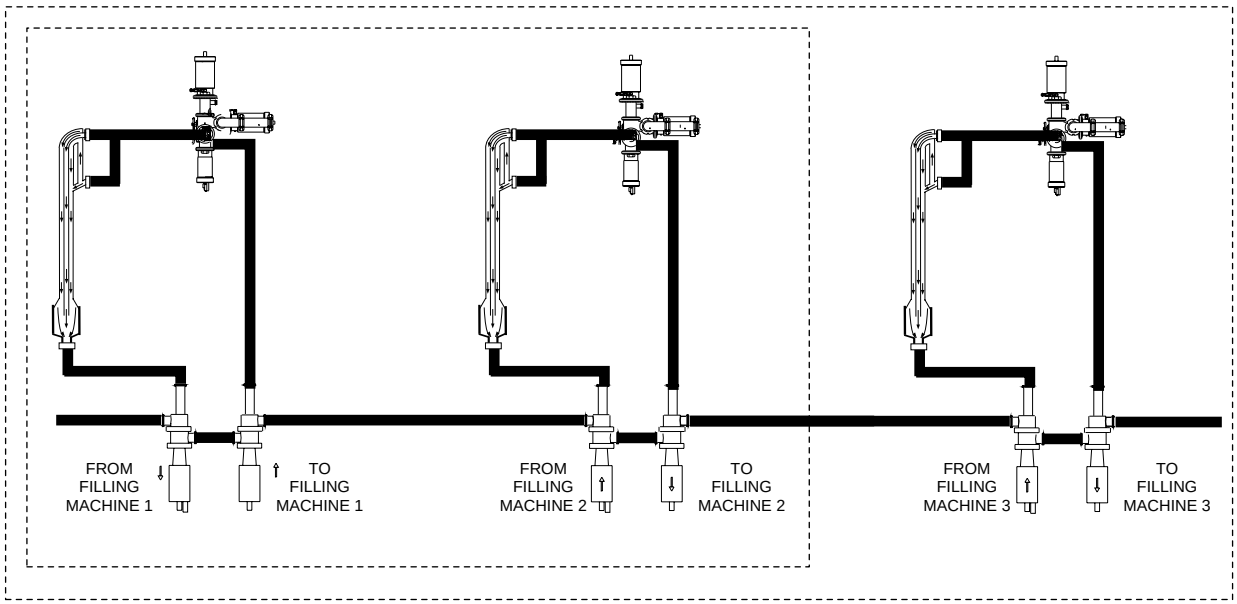
2.2c B4491H01en.fm

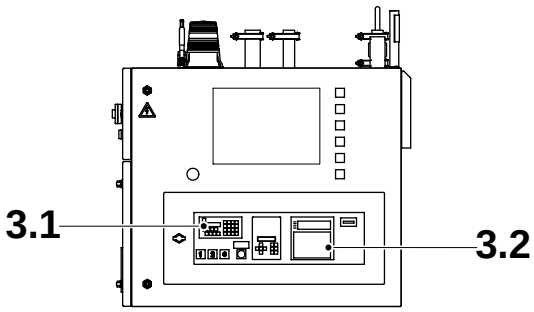
3 Optional equipment

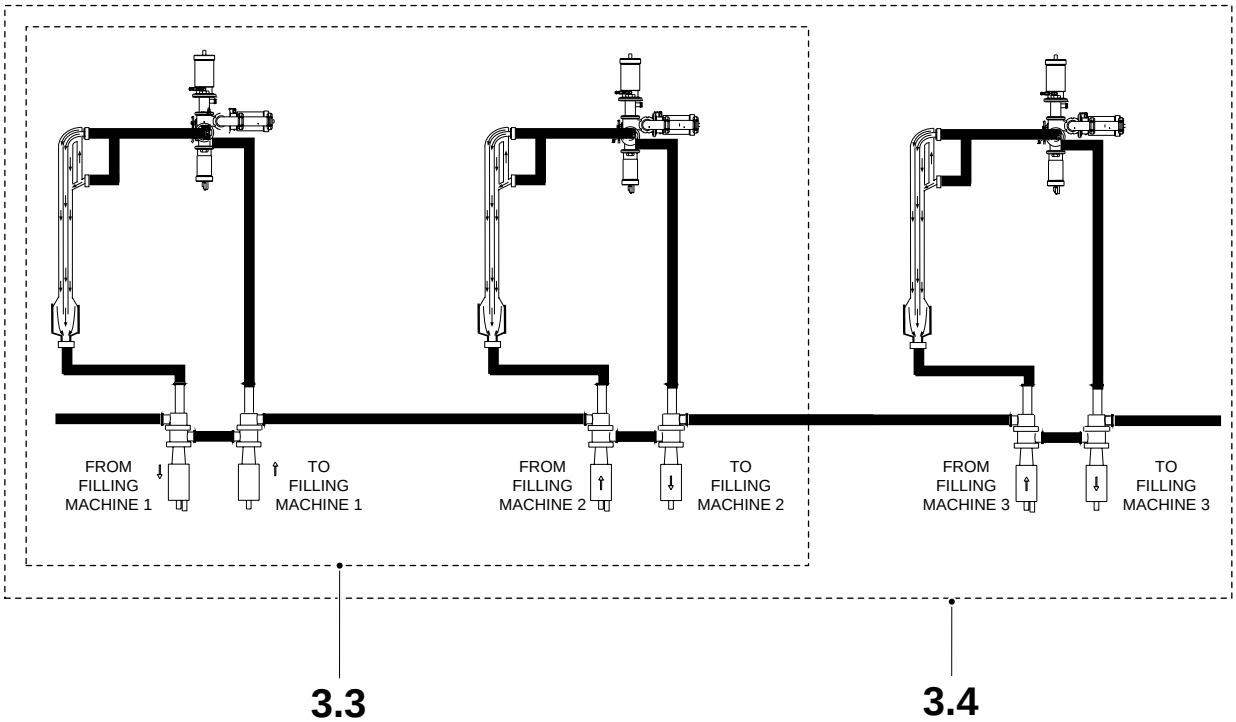




3-1 Optional equipment - description

SPC reference	927232-0100





2.2c B449100en.fm

3.1 Flowmeter
3.2 Recorder
3.3 Two machine installation
3.4 Three machine installation

3.1 Flowmeter

SPC reference	927231-0100

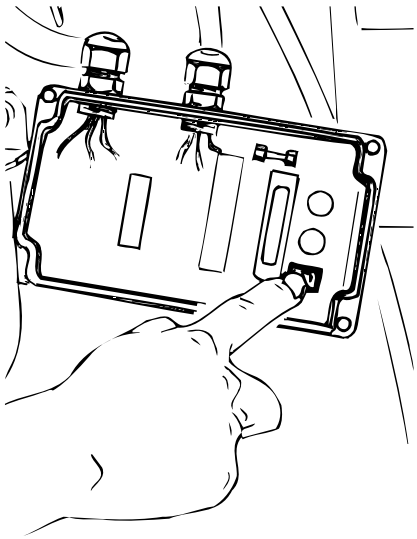
3.1-1 Flowmeter - set parameters

SPC reference	927231-0100

a) Turn the main switch **Off**.

b) Open the cover of the flowmeter.

c) Set the **Program Enable** switch **On**.



d) Turn the main switch **On**.

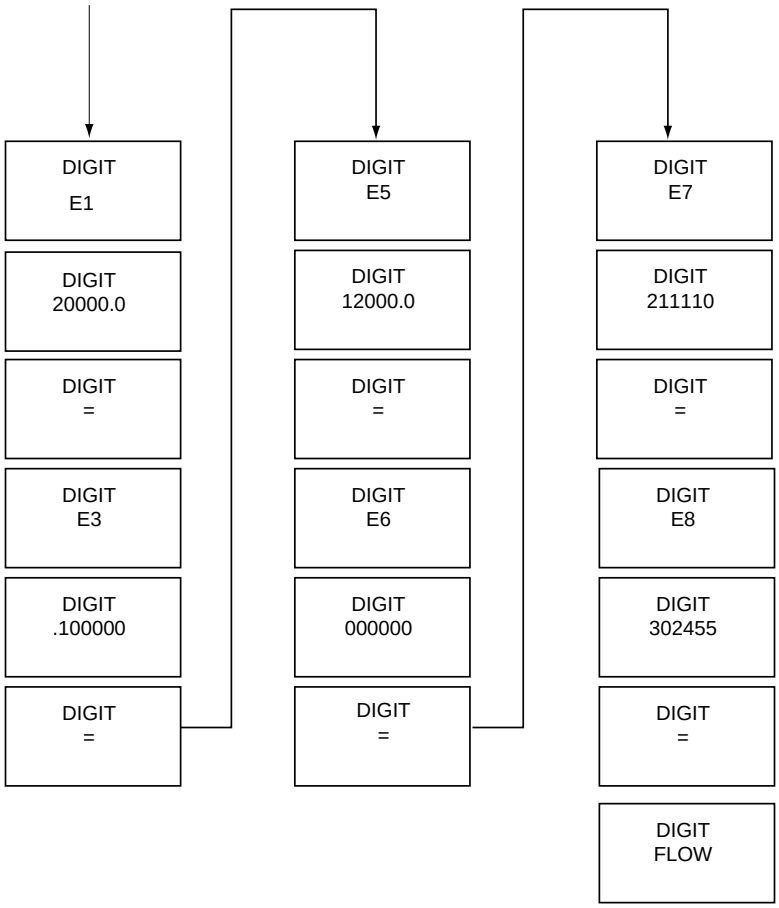
e) Push the **Start** button. The machine steps to **Setting** position mode.

(Cont'd)

2.2c B4491I01en.fm

(Cont'd)

f) Program the flowmeter by the following operations:



2.2c B449101en.fm

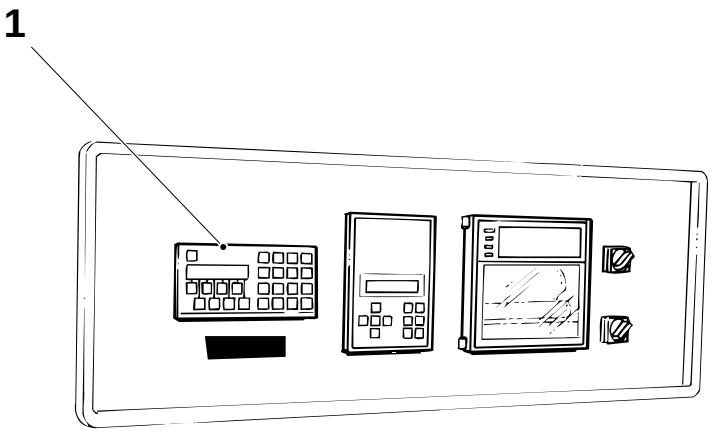
g) Push **Flow** button on the flowmeter display (1). The message **P-Fail** on the display will disappear.

h) Push the **Down** button. The machine steps to **Zero** mode.

i) Turn the main switch **Off**.

j) Set the **Enable program** switch on **Off** position.

k) Fit the cover of the flowmeter probe.



1 Display

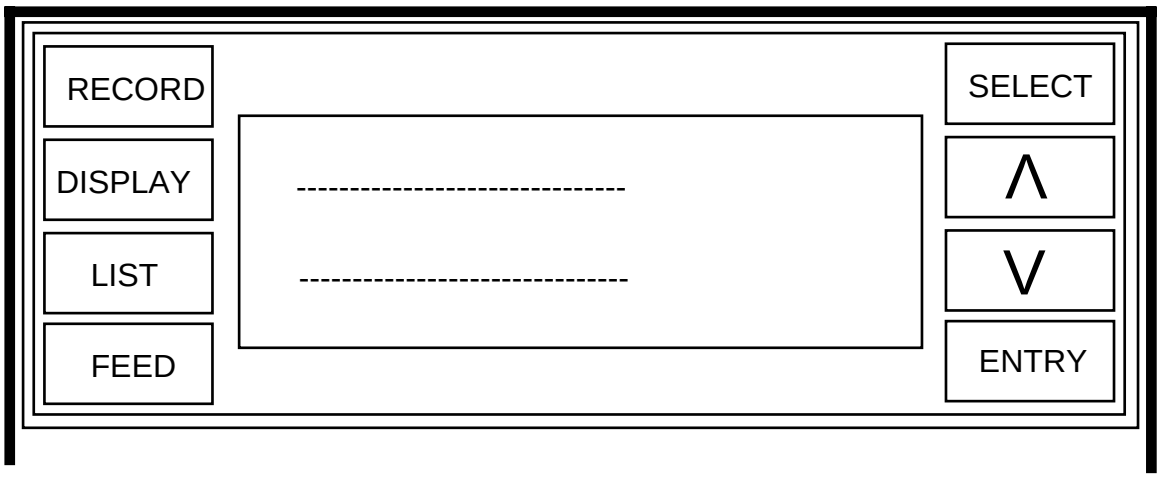
3.2 Recorder

SPC reference	927232-0100

Note! This is an optional equipment. It can be ordered separate from the cleaning unit.

3.2-1 Recorder - description of control panel

SPC reference	927232-0100



2.2c B4491I02en.fm

BUTTON	EFFECT
Record	Start - Stop of data printing. During printing, “Record ON “appears on the display
Display	Selects the various display modes. Default values shown are: channel No. instant value, measure unit and if enabled, Record On.
List	Starts the data printing of instant values. Stops the chart printing.
Feed	Quick feeding of chart paper.
Select	Selects the main setting menu.
< >	Up or Down.
Entry	Memorizes the data inputs.

3.2-2 Recorder - set parameters

SPC reference	927232-0100

a) Turn the main switch **Off**.

b) Open the front door.

c) Turn the display to the right.

d) Remove the paper rack.

e) Loosen the fixing screw of the internal rack.

f) Remove the rack.

g) Set the bridges.

h) Turn the main switch **On**.

i) Check that the internal switch of the recorder is in position **On**.

j) Press **Start** push-button.The machine switches to **Setting** mode (recorder supplied).

k) If **Record on** appears on the display, push the red button on the display (Record); the instrument will read but it won't print.

STEP	PUSH	DISPLAY	INPUT	PUSH
1	Display			
2	Select (13 times)	Date Clock '00 00/00 00:01		
2.a	Up or Down		Year Data	Entry
2.b	Up or Down		Month Data	Entry
2.c	Up or Down		Day Data	Entry
2.d	Up or Down		Hour Data	Entry
2.e	Up or Down		Minute Data	Entry
3	Select	Ink Monit.Clear ---		Feed and Select
4	Select (3 times)	Unit: A=1 B=10 --------		
5	Up or Down		A=1	Entry
5.a	Up or down		m	Entry
5.b	Up or Down		S	Entry
5.c	Up or Down		/	Entry
5.d	Up or Down		c	Entry
5.e	Up or Down		m	Entry

(Cont'd)

2.2c B4491I02en.fm

(Cont'd)

STEP	PUSH	DISPLAY	INSERT	PUSH
5.f	Entry (several times)	A=1 starts to flash		
6	Display			
7	Select	Main Chart Speed --- mm/h		
7.a	Up or Down		360	Entry
8		Sub Chart Speed --- mm/h		
8.a	Up or Down		360	Entry
9		Alarm ch-LL=OFF --------		Select
10		Record Mode ----------		
10.a	Up or Down		Trend	Entry
11		Per.Pv List = --- Scale Print = ---		
11.a	Up or down		Per.Pv List= Off	Entry
11.b	Up or Down		Scale Print= On	Entry
12		Record Format ----------		
12.a	Up or Down		Normal	Entry
13	Select (2 times)			

2.2c B4491I02en.fm

(Cont'd)

(Cont'd)

Note! The following Operations are specifics for Channel 1

If the el. bridge setting has been done, skip step 14.c

STEP	PUSH	DISPLAY	INSERT	PUSH
14		ch - -- - Filter T= -sec		
14.a	Up or Down		ch 1	Entry
14.b	Up or Down		500 mV	Entry
14.c		Jump Setting OK?		Entry
14.d	Up or Down		T = 0 sec	Entry
15		ch 1 = Scaling ---		
15.a	up or Down		ON	Entry
16		ch1 Measure. Range - 500.0÷500.0 mV		
16.a	Up or Down		40.0	Entry
16.b	Up or Down		200.00	Entry (2 times)
ignore the menù "Square Root"				
17		ch1 Scale. Range 0÷0		
17.a	Up or Down		0	Entry
17.b	Up or Down		12000	Entry
17.c	Up or Down		12000.	Entry
18		ch1 Unit _____ Code: A=_ B=_		
18.a	Up or Down		A=3	Entry
18.b	Up or Down		B=7	Entry
19		ch1 Unit l/h		Entry
ignore the menù "Substraction"				

(Cont'd)

2.2c B4491I02en.fm

(Cont'd)

Note! For Channel 2 repeat the steps from 14 to 20 with the following variations:

- Step 14.a: ch2
- Step 14.d: T = 3 sec
- Step 16.a: set 0
- Step 16.b: set 200.0
- Step 17: set 0
- Step 17.b: set 100
- Step 17.c: set 100.
- Step 18.a: set A=1
- Step 18.b: set B=1
- Step 20: the °C value is displayed.

For Channel 3 repeat the steps from 14 to 20 with the following variations:

- Step 14.a: ch3
- Step 14.d: T = 3 sec
- Step 16.a: set 40
- Step 16.b: set 200.0
- Step 17: set 0
- Step 17.b: set 100
- Step 17.c: set 100.
- Step 18.a: set A=1
- Step 18.b: set B=10
- Step 20: the mS / cm is displayed.

(Cont'd)

2.2c B4491I02en.fm

(Cont'd)

STEP	PUSH	DISPLAY	INSERT	PUSH
20	Display			
21	Select (5 times)	ch- Range ------ 0.÷ 0.		
21.a	Up or Down		ch1	Entry
21.b	Up or Down		0.	Entry
21.c	Up or Down		12000.	Entry
22	Up or Down		ch2	Entry
22.a	Up or Down		0.	Entry
22.b	Up or Down		100.	Entry
23	Up or Down		ch3	Entry
23.a	Up or Down		0.	Entry
23.b	Up or Down		100.	Entry
24	Select (2 times)	ch- Tag No. ----------		
24.a	Up or Down		ch1	Entry
25	Up or Down		F	Entry

Repeat Step 25 until **Flow** appears on the display.

26	Select (2 times)	ch- Tag No. ----------		
26.a	Up or Down		ch2	Entry
27	Up or Down		T	Entry
28	Entry	ch- Tag No. ----------		
28.a	Up or Down		ch3	Entry
29	Up or Down		C	Entry

Repeat Step 29 until **Conduct.** appears on the display.

(Cont'd)

2.2c B4491I02en.fm

(Cont'd)

30	Select	Ink Monit. Clear		
	(7 times)	------		
30.a	Up or Down		Yes	Entry
31	Display			

- The Setting is now completed. The menus that are not included are not used for SCU4. Do not modify them from the manufacturer's default settings.
- Push Record, **Record on** appears on the display.

2.2c B4491I02en.fm

3.2-3 Recorder - check parameters

SPC reference	927232-0100

The following instructions must be done to check if the recorder has been set up correctly:

STEP	PUSH	DISPLAY	INSERT	PUSH
1	Select (9 times)	List = 1 Parameter List		Entry
2	Up or Down		3	
2.a		List = 3 Test Pattern		Entry

The recorder prints the main parameters of your setting. Compare them with those on the default printing (supplied).

The recorder prints the printing test and the fonts test. Check the quality of the printing. Repeat step 2.a if not satisfactory.

3	Display
4	Record

The printing of values starts

Check that the values on the display correspond to the values of the others displays (ch1 for the flowmeter, ch2 and ch3 conductivity meter)

Note! If the flowmeter is not installed, -2990 l/h appears on ch1. In this case perform the following:

(Cont'd)

2.2c B44911I02en.fm

(Cont'd)

STEP	PUSH	DISPLAY	INSERT	PUSH
1	Select	ch- -- - Filter T = - sec		
2	Up or Down		1	Entry
3	Up or Down		Skip	Entry

Channel 1 will be disabled.

If the values of ch1 and ch3 on the display of the recorder are very different from those on the displays of the flowmeter and conductivity meter, use the following procedure:

a) Check there is no flow into the circuit (flowmeter display value = 0)

b) Ch1: push Display to stop on ch1

1* ----- l/h

FLOW

c) Measure the value V' of the voltage between the connectors l11 and l12.

d) Find V" value with the equation:

$$V" = 5V'$$

e) Push **Selec**t until Step 14 of Setting Section.

f) Push **Entry** until Step 16.

g) Step 16.a: insert V' and push Entry.

h) Step 16.b: insert V" and push Entry.

i) Push **Display** and check the correction as shown above.

Note! Change V' if necessary. Note that the maximum range is 12000 l/h. The minimum step is more or less 3 - 6 l/h.

j) For channel 3 use the same procedure. At Step 14 insert ch3 using for the measurement the terminals l31 and l32.

2.2c B4491I02en.fm

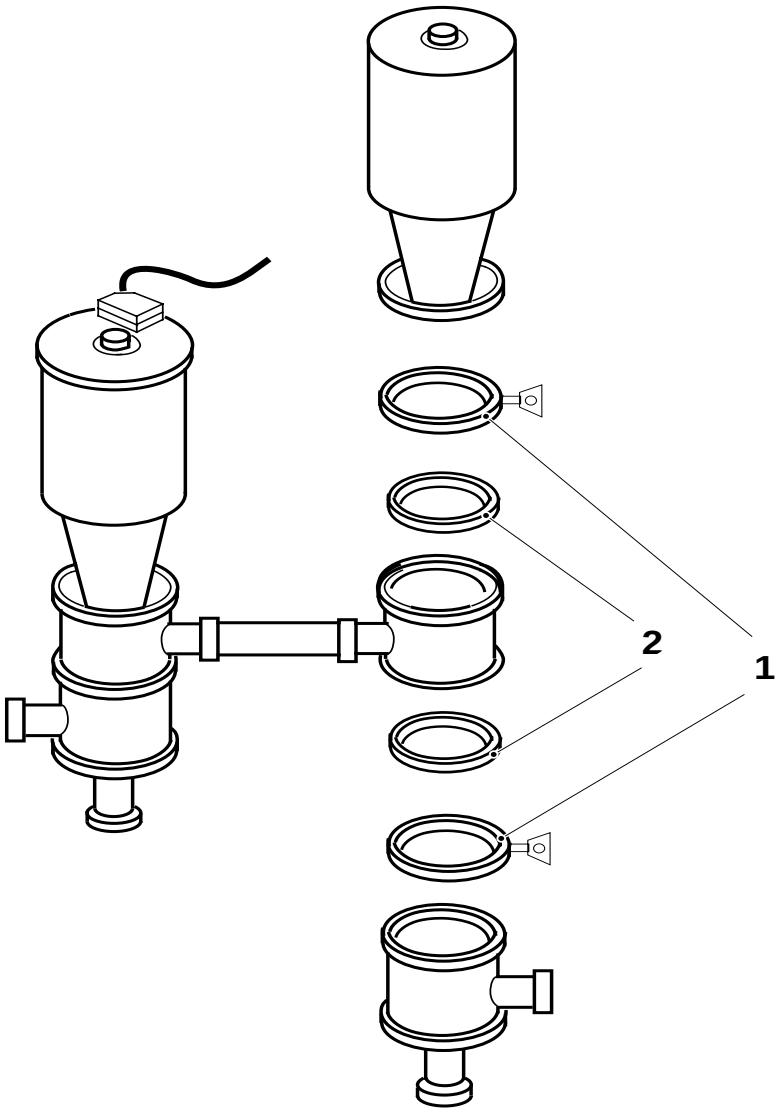
3.3 Two machine

SPC reference	927233-0100

3.3-1 Two machine - check installation

SPC reference	927233-0100

Check there are no leakages around the clamp fittings (1). Replace the gaskets (2) if necessary.



1 Clamp fitting
2 Gasket

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3.4 Three machine

SPC reference	1348485-0100

3.4-1 Three machine - check installation

SPC reference	1348485-0100

Follow the procedure described in *3.4-1 Three machine - check installation*.

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4 Cleaning program

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4-1 Cleaning program-description

With the cleaning program it is possible to clean 1, 2 or 3 machines. When more than one filling machine is cleaned, the cleaning sequence prevents product residue from passing between filling machines.

There are two cleaning cycles: Daily cleaning and weekly cleaning.

The program for daily cleaning includes these parts:

- Pre-rinsing
- Warm rinsing
- Alkali cleaning
- Alkali rinsing

Two additional parts are added for weekly cleaning:

- Acid cleaning
- Acid rinsing

Note! A separate cycle called disinfection rinsing is also available.

Waiting for start (Zero position)

The machine switches to this position when you press **Emergency stop**. If the machine is in stand-by position, the machine will also switch to this position when you press **Program down** for at least three seconds.

In this position there is electrical power to the main circuit, part of the PLC, control panel and mimic display. The flowmeter, conductivity meter, and recorder do not have power.

Most functions, but not all functions, are disabled. (For example the functions required to start the machine are not disabled). Electric valves, and actuators are disabled.

Setting and maintenance position

Press **Program up** to go from **Waiting for start** to **Setting and maintenance**.

In this position, all control parts have power. These functions are available:

- All program selections
- If necessary, changes can be made to the settings of the recorder, flowmeter, and conductivity meter.
- Filling of the alkali and acid tanks using the Autoload push-buttons.

To stop the alkali/acid filling process before the end of the filling cycle, press **Stand-by**.

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4.1-1 One-machine cleaning cycle-description

Note! A graphic representation of the cleaning program for one machine can be found in the Electrical Manual of the machine.

These abbreviations are used in the discussions that follow.

		Abbreviation
Valves	Water (NC)	M.Y1
	Steam (NC)	M.Y2
	Change-over (NO)	M.Y3
	Draining (N0)	M.Y4
Motors	Cleaning pump	M.M001
	Alkali pump	M.M002
	Acid pump	M.M003

Note! The M.Y3 valve controls the flow from the CIP line. Normally air is not supplied to the valve (OFF) and the valve is open to the waste pipe. When air is supplied to the valve, the valve is ON and the flow from the CIP line is directed to the tank.

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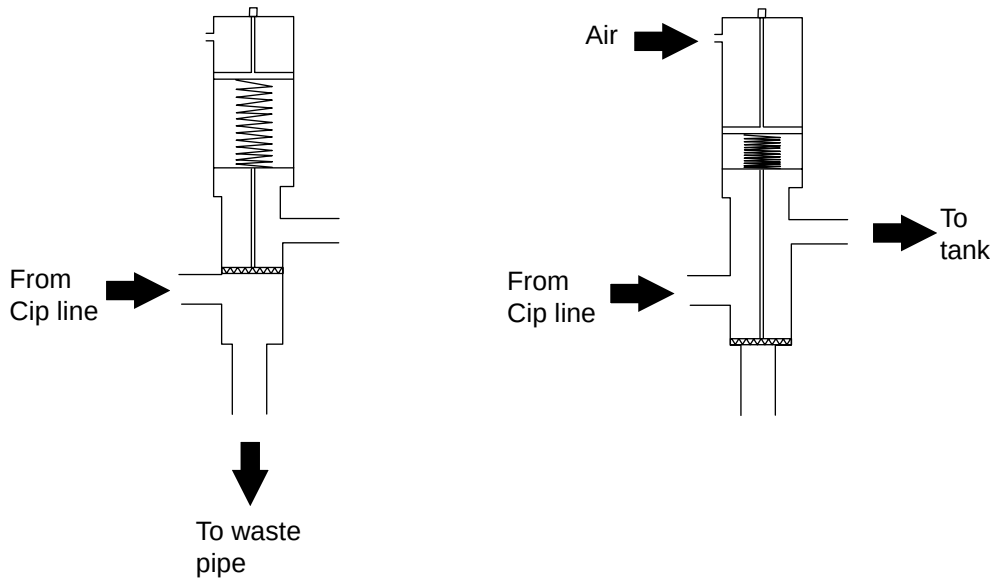

Pre-rinsing

In this part of the cleaning cold water is circulated through the filling machine. At the factory, pre-rinsing is set for two complete cycles.

Note! It is possible to modify the number of cycles (subroutine **Setting**, rung 003) using the constant Move-int.

The description of one cycle is given in the chart here:

	Valves			**Motors**
	M.Y1	M.Y3	M.Y4	M.M001
Start	Opened	On	Closed	
Maximum level in tank reached	Closed	Opened (to waste)		Pump starts
Water drains from tank				
Tank is empty				Pump stops

Warm rinsing

In this part of the cleaning warm water (60°) is circulated through the filling machine for a set number of minutes. At the factory, this time is set to 10 minutes.

Note! It is possible to modify number of minutes (subroutine **Setting**, rung 004) using the constant Move-int.

The description of a complete cycle is given in the chart here:

	Valves			**Motors**
	M.Y1	M.Y2	M.Y3	M.M001
Start	Opened		On	
Medium level in tank is reached	Closed	Opened		Pump starts
Temperature reaches 60°		Closed		
Counter for recycling time starts				
After 10 minutes			Off	
Water drains from tank				
Tank empty				Pump stops

Note! If the temperature drops below 60° the counter stops. M.Y2 opens and stays open until the temperature again reaches 60°. If the machine goes to **Stand-by position**, the counter for recycling time resets to 0.

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Alkali cleaning

Alkali cleaning is a part of both daily cleaning and weekly cleaning.

In this part of the cleaning the alkali solution is circulated through the filling machine. At the factory, the recycling time is set to 12 minutes.

Note! It is possible to modify the recyling time (subroutine **Setting**, rung 005) using the constant Move-int. See *2.1-1 Electrical cabinet - set conductivity meter* to change the values of temperature and conductivity.

The description of the cycle is given in the chart here:

	Valves			**Motors**	
	M.Y1	M.Y2	M.Y3	M.M001	M.M002
Start	Opened		On		
Medium level in tank reached	Closed	Opened		Pump starts	Pump starts
Temperature reaches 80° and Conductivity reaches 64mS/cm		Closed			Pump stops
Counter for cleaning time starts					
After 12 minutes			Off		
Cleaning solution drains from tank					
Tank empty				Pump stops	

Note! If the temperature drops below 80°, or the conductivity drops below 64mS/cm, the counter stops. If the machine goes to **Stand-by position**, the counter for cleaning time resets to 0.

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Alkali rinsing

Alkali rinsing is a part of both daily cleaning and weekly cleaning.

In this part of the cleaning cold water is circulated through the filling machine until the conductivity value is at or below the value for clean water. The description of the cycle up to the conductivity value check is given in the chart here:

	Valves			Motors
	M.Y1	M.Y2	M.Y3	M.M001
Start	Opened		On	
Maximum level in tank reached	Closed		Off	Pump starts
Tank empty				Pump stops
Maximum level in tank is reached	Closed		Off	Pump starts
Water drains from the tank				
Tank empty				Pump stops
Tank is filled	Opened		On	
Closed circuit (for 60 seconds)			By-pass position	Pump starts
Conductivity value check				

The conductivity value is checked 40 seconds into the cycle. The check continues for the next 20 seconds. The maximum number of times the check will be made is 4 times. The description of the check is given in the chart here:

Conductivity value check		Valves			Motors
Okay	Not okay	M.Y1	M.Y2	M.Y3	M.M001
	Tank empty				Pump stops
	Tank is filled	Opened			
	Closed circuit			On	Pump starts
	Value still too high			Opened	
	Water drains from the tank				

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Acid cleaning

Acid cleaning is enabled for weekly cleaning.

In this part of the cleaning the acid solution is circulated through the filling machine. At the factory, the recycling time is set to 10 minutes.

Note! It is possible to change the recycling time (subroutine **Setting**, rung 006) using the constant Move-int. See *2.1-1 Electrical cabinet - set conductivity meter* to change the values of temperature and conductivity.

The description of the cycle is given in the chart here:

	Valves			Motors	
	M.Y1	M.Y2	M.Y3	M.M001	M.M003
Start	Opened		On		
Medium level in tank reached	Closed	Opened		Pump starts	Pump starts
Temperature reaches 60° and Conductivity reaches 55mS/cm		Closed			Pump stops
Counter for cleaning time starts					
After 10 minutes			Off		
Cleaning solution drains from tank					
Tank empty				Pump stops	

Note! If the temperature drops below 60°, or the conductivity drops below 55mS/cm, the counter stops. If the machine goes to **Stand-by position**, the counter for cleaning time resets to 0.

Acid rinsing

Acid rinsing is enabled for weekly cleaning.

The cycle is the same as for Alkali rinsing except that at the end the machine always switches to **Selected Cleaning Complete** position.

Selected Cleaning Complete

Start conditions are the same as in the **Setting and Maintenance** position. The filling machines receives the signal Cleaning Complete. To stop this step push **Program down** for at least three seconds. The machine switches to **Waiting to start** position (Zero position).

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Disinfection Rinsing

Is it possible to select this step only in Selected Cleaning Complete position and only for filling machines that have been cleaned previously.

The step is activated by the key selector on the front panel of the machine. The disinfection rinsing is not necessary on a TBA machine. It is an option applicable if requested from the responsible.

	Valves				**Motors**	
	M.Y1	M.Y2	M.Y3	M.Y4	M.M001	M.M002
Start	Opened		On	Closed		
Medium level in tank reached		Opened			Pump starts	
Temperature reaches 90°						
After 15 minutes			Opened			
Cleaning solution drains from tank						
Tank empty					Pump stops	

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4.1-2 Two or Three-machine cleaning cycle-description

Note! A graphic representation of the cleaning program for two or three machines can be found in the Electrical Manual of the machine.

The cleaning program always starts with pre-rinsing on the first selected machine. When pre-rinsing has been completed on all machines selected, the next part of the cleaning cycle (warm rinsing) starts. Each part of the cleaning cycle must be completed on all machines selected before the next part can start.

The description of how the program switches from one valve group to the next valve group according to what machines have been selected is given in the chart here:

Machines selected	**Machine being cleaned**	**Valve groups**		
		M.Y5 (Machine 1)	M.Y6 (Machine 2)	M.Y7 (Machine 3)
1, 2, 3				
	1	On	Off	Off
	2	Off	On	Off
	3	Off	Off	On
1, 2				
	1	On	Off	Off
	2	Off	On	Off
1, 3				
	1	On	Off	Off
	3	Off	Off	On
2,3				
	2	Off	On	Off
	3	Off	Off	On

The machine that is considered the “start machine” changes according to what machines are selected to be cleaned.

Filling machines to be cleaned	Valve groups selected	Start machine
1, 2, 3	M.Y5, M.Y6, M.Y7	1
1, 2	M.Y5, M.Y6	1
1, 3	M.Y5, M.Y7	1
2, 3	M.Y6, M.Y7	2

Note! If a machine goes to stand-by position, use S7 on the selector panel to continue cleaning the remaining machines.

(Cont’d)

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(Cont'd)

Most parts of the cleaning cycle are identical to the cleaning cycle described for one machine in *4.1-1 One-machine cleaning cycle-description*. The differences/special considerations are given in the chart here:

Cleaning part	**Differences/special considerations compared with cleaning only one machine**
Alkali cleaning Acid cleaning Disinfection rinsing	The solution passes to the next machine to be cleaned instead of draining from each of the tanks. The solution only drains from the tank of the last machine selected.
Alkali cleaning	If temperature or conductivity values decline between machines the values are automatically restored.
Alkali rinsing	When daily cleaning has been selected, the signal of cleaning completed must be received from all of the machines selected before disinfection rinsing can start.
Acid rinsing	When weekly cleaning has been selected, the signal of cleaning completed must be received from all of the machines selected before disinfection rinsing can start.

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5 Titration instructions

2.2c B4491T00en.fm

5-1 Titration instructions-description

General Description

Equipment needed

- Beaker
- Titration burette
- Pipette (10 ml)
- Phenolpthalein solution 5% (alcohol based)
- HCl (hydrochloric acid) 0.1 moles/l (0.1 N)
- HCl (Hydrochloric Acid) 1 moles/l (1 N)

NaOH (sodium hydroxide, common name is caustic soda)
0.1 moles/l (0.1 N)

Titration of NaOH (alkaline agent)

a) Put 10 ml of cleaning solution into a beaker.

b) Add 3 - 5 drops of phenolpthalein solution (the colourless solution will turn to pink in presence of alkali as NaOH).

c) Agitate the solution.

d) Slowly add the HCl solution until the colour turn from pink to colourless.

e) Write down the amount of acid used to change the colour and apply the following calculation:

   – NaOH concentration =X / 25
   (X = volume (ml) of 0.1 moles / 1 HCl (0.1 N) used to titrate 10 ml of NaOH solution)

   – NaOH concentration = Y / 2.5
   (Y = volume (ml) of 1 moles / 1 HCl (1 N) used to titrate 10 ml of NaOH solution)

(Cont'd)

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(Cont'd)

Titration of HNO_3 (acid agent)

a) Put 10 ml of cleaning solution into a beaker.

b) Add 3 - 5 drops of phenolpthalein solution (colourless solution).

c) Swirl the solution.

d) Slowly add the titration solution.

e) Write down the amount of soda used to change the colour and apply the following calculation:

   – HNO_3 concentration =Z / 15.9
   (Z = volume (ml) of 0.1 mole / 1 HCl (0.1 N) used to titrate 10 ml of NaOH solution)

- HNO_3 concentration =W / 2.5
  (W = volume (ml) of 1 mole / 1 HCl (1 N) used to titrate 10 ml of NaOH solution)

Example: 10 ml of NaOH solution is titrate with 1mole / 1 (n) HCL. To obtain a colour change from pink to colourless, 3.5 ml HCl solution is used. The calculated NaOH concentration is:

3.5 / 2.5 = 1.4% NaOH

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6 General

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6-1 Technical data

Machine	Separate Cleaning Unit	Type SCU/4
Capacity	On machine or two machine cleaning cycle	
Weight	kg	350
Electricity	Electrical connection; (V AC+3P+N+PE,Hz) Recommended main fuse; (A) Consumption (kW)	400/230;50/60 16 4.5
Compressed air	Connection pressure; (MPa/bar) One machine daily cycle; (Nlt/cycle) One machine weekly cycle; (Nlt/cycle) Two machines daily cycle; (Nlt/cycle) Two machine weekly cycle; (Nlt/cycle) Three machines daily cycle; (Nlt/cycle) Three machine weekly cycle; (Nlt/cycle)	0.6-0.7/6-7 approx. 19 approx. 27 approx. 43 approx. 49 approx. 68 approx. 71
Steam	Connection pressure; (MPa/bar) One machine alkali cleaning; (kg) Two machines alkali cleaning; (kg) One machine alkali-acid cleaning; (kg) Two machines alkali-acid cleaning; (kg)	0.3-0.5/3-5 approx. 7 approx. 12.5 approx. 10 approx.15.5
Water	Connection pressure; (MPa/bar) One machine alkali cleaning; (kg) Two machines alkali cleaning; (kg) One machine alkali-acid cleaning; (kg) Two machines alkali-acid cleaning; (kg)	0.3-0.4/3-4 approx. 400 approx. 750 approx. 600 approx. 1150
Alkali 35%	Consumption; (lt/cycle)	approx. 2.4
Acid 55%	Consumption; (lt/cycle)	approx. 1.01

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6-2 Cleaning cycle

Machine status	**Zero** position

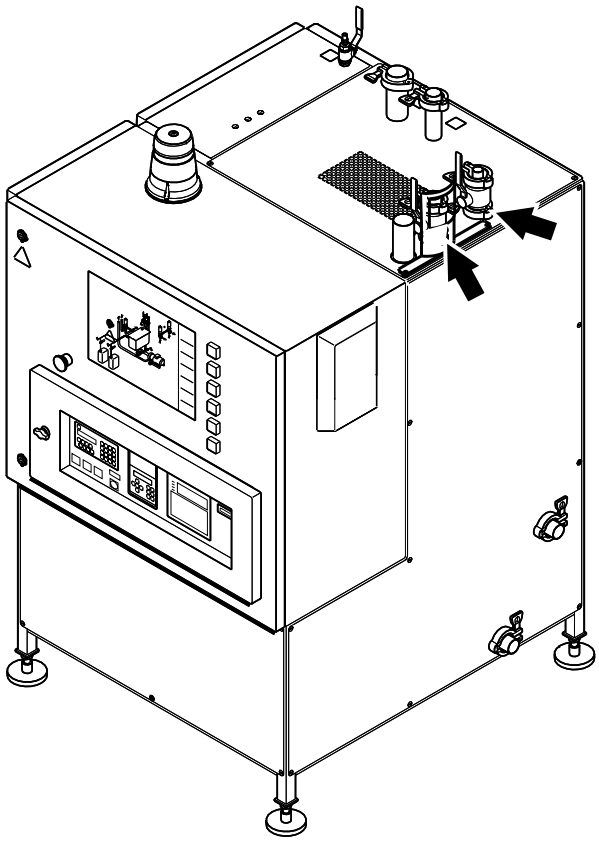
6-2.1 Cleaning cycle-check connections

Machine status	**Zero** position

WARNING!

Risk of burns!
The steam has pressure and reaches temperatures of approximately 70°. Steam at this temperature can cause burns. Wear a pair of protective gloves.

Check that the connections for the steam and water are well tightened to the main lines.



6-2.2 Cleaning cycle-check for leakages

Machine status	**Cleaning** position

Caution! Do not perform any operation on the concentrated circuits before they are empty.

Check for leakages all around the SCU/4 and the filling machine(s). If necessary see *1.2 Pipe-line*, *1.3 Alkali circuit*, or *1.4 Acid circuit*.

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7 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:

- **MM code**-shows where you can find more information about the check point.
- **Text**-name of unit and type of activity. For further information, see MM code.
- **Interval**-how often 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.

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, modification 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.

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MM code	Text	Interval h
	Pre-Maintenance Checks	
MM	WARNING! Before starting any service work, read the safety precautions in the corresponding Maintenance Manual; Doc No 82449-0101 - Check	10
	Machine body	
1.1-1	Tank - check floaters, O-ring, and circlips	50
1.2-1	Pipe-line - check pipe (steam injector)	150
1.2-2	Pipe-line - check change-over valve clamp fittings	150
1.2-3	Pipe-line - overhaul change-over valve	300
1.2-4	Pipe-line - check valve for leakages	150
1.2-5	Pipe-line - check conductivity cell (probe)	10
1.2-7	Pipe-line - check pump for leakages	150
1.2-8	Pipe-line - overhaul pump	600
1.3-1	Alkali circuit - drain	30
1.3-2	Alkali circuit - check float (level monitor)	50
1.3-5	Alkali circuit - check pipe (autoload pipeline)	10
1.3-6	Alkali circuit - check can for leakages	150
1.3-7	Alkali circuit - overhaul non-return valve	150
1.4-1	Acid circuit - drain	30
1.4-2	Acid circuit - check float (level monitor)	50
1.4-5	Acid circuit - check pipe (autoload pipeline)	10
1.4-6	Acid circuit - check can for leakages	150
1.4-7	Acid circuit - overhaul non-return valve	150
	Electrical equipment	
2.1-1	Electrical cabinet - set conductivity meter	10
2.1-3	Electrical cabinet - change PLC battery	300

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