



BFH foam cleaning system

Version 1.1: Alkaline/foam disinfection



Operating instructions

Ecolab Engineering GmbH



Ecolab Engineering GmbH
Raiffeisenstrasse 7
D-83313 Siegsdorf
Telephone: +49 (0) 86 62 / 61 0
Fax: +49 (0) 86 62 / 61 235

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Ecolab Engineering GmbH
Email: documentation@ecolab.com
Internet: <http://www.ecolab-engineering.com>

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1 Project data

Model type: foam cleaning system
Project number: XXXX-XX-XXXXXX
Customer: Kunde
Chemicals:

Download of these project documentation



[↪ Download project documentation.](#)

2 General

Download this user manual



BFH foam cleaning system
Version 1.1 – 2 products: Alkaline and foam disinfection:
[↪ Download User Manual.](#)

2.1 Notes on the operating instructions



CAUTION

Read the instructions!

Prior to commencing any works and/or operating, appliances or machinery, these instructions must be read and understood as a strict necessity. In addition, always heed all the instructions relating to the product that are included with the product!

All instructions are also available for download if you have mislaid the original. Furthermore, you will always have the opportunity to get the latest version of the manuals.

The German-language manual is the **original operating manual**, which is legally relevant. **All other languages are translations.**

Particular attention should be paid to the following:

- Personnel must have carefully read and understood all instructions belonging to the product before starting any work. The basic premise for safe operation is observing all safety instructions and work instructions in this manual.
- Figures in this manual are provided for basic understanding and may deviate from the actual product.
- All manuals and guides must be placed at the disposal of the operating and maintenance personnel at all times. Therefore, please store all manuals and guides as a reference for operation and service.
- If the system is resold, this manual must always be supplied with it.
- The relevant sections of this operating manual must be read, understood and noted before installing the system, using it for the first time, and before carrying out any maintenance or repair work.



Note on graphical representations

The graphics shown in this manual are principle sketches, the actual situation may differ slightly. Generally, the graphics are structured in such a way that a principle is recognisable.

Symbols, highlights and bulleted lists

Safety instructions in this manual are identified by symbols and introduced by signal words expressing the extent of the hazard.



DANGER

Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.

**WARNING**

Indicates a potentially imminent danger that can lead to serious injuries or even death.

**CAUTION**

Indicates a potentially hazardous situation which may result in minor or slight injury.

**NOTICE**

Indicates a potentially dangerous situation that may result in property damage.

**Tips and recommendations**

This symbol highlights useful tips, recommendations and information for an efficient and trouble-free operation.

**ENVIRONMENT**

Indicates potential hazards to the environment and identifies environmental protection measures.

Safety instructions in the operating instructions

Safety instructions can refer to specific, individual operating instructions. These safety instructions are embedded in the operating instructions, so they do not interrupt the reading flow when executing the action. The signal words described above are used.

Example:

1. ➞ Loosen screw.

2. ➞

**CAUTION**

Risk of trapping on the cover!

Close the cover carefully.

3. ➞ Tighten screw.

Other markings

The following markings are used in these instructions to provide emphasis:

1., 2., 3. ... ➞ Step-by-step operating instructions

⇒ Results of the operating steps

🔗 References to sections of these instructions and related documents

■ Lists in no set order

[Button] Controls (e.g. button, switch), indicators (e.g. signal lights)

'Display' Screen elements (e.g. buttons, assignment of function keys)



Article numbers / EBS numbers

Both article numbers and EBS numbers may be given in these operating instructions. EBS numbers are internal numbers and are used within our corporate group.

Copyright

This manual is copyright protected. All rights belong to the manufacturer.

The transfer of this manual to third parties, reproductions in any kind and form, even in extracts, as well as the exploitation and/or communication of the content are not permitted without the written permission of Ecolab (hereinafter referred to as "manufacturer") except for internal purposes.

Any violations result in obligatory compensation for damages.

The manufacturer reserves the right to enforce additional claims.

2.2 Equipment marking – identification plate



Information on the type plate

Information on equipment marking and information on the rating plate can be found in chapter → Chapter 14 'Technical data' on page 253.

The correct specification of the name and type is important for all queries.

This is the only way of ensuring fast and accurate processing of your enquiry.

2.3 Warranty

The manufacturer provides a warranty for operational safety, reliability and performance only under the following conditions:

- Assembly, connection, set-up, maintenance and repair are carried out by qualified and authorised specialists.
- BFH Foamatic is used in accordance with the information provided in these operating instructions.
- Only original spare parts are used for repairs.
- Only approved Ecolab products are used.



Notes on the warranty

*Our products are built, tested and CE certified in accordance with current standards/guidelines. They are dispatched from the factory in a safe, faultless condition. To keep the equipment in this condition and to ensure risk-free operation, the user must observe the instructions/warnings, maintenance regulations, etc. contained in these operating instructions and, if applicable, affixed to the product. **The warranty conditions of the manufacturer apply.***

2.4 Service life

If maintenance is conducted properly (visual inspection, functional testing, replacement of parts, etc.), the life span of the Plant is approximately 10 years.

After this time, revision and, in some cases, a major overhaul by Ecolab is required.

2.5 Transportation



NOTICE

Material damage due to improper transportation.

Transport units can fall or tip over if improperly transported. This may result in material damage. During unloading, delivery or even during general shipping, proceed safely and pay attention to the symbols and the information on the packaging.

Transport inspection

Check delivery for completeness and transport damage and complain about any defect. Claims for damages can only be asserted within the complaint periods.

Procedure in case of externally visible transport damage

Do not accept the delivery or accept it only with reservations. Note the extent of the damage on the transport documents, the carrier's delivery note and make a complaint immediately.

Packaging for return shipment:

Keep the packaging (original packaging and original packaging material) for possible inspection by the carrier for transport damage or for return shipment!

- *If both are no longer available:*
Request a packaging company with specialist staff!
- Dimensions of the packaging and packaging weight see ➔ [Chapter 14 'Technical data' on page 253](#).
- If you have any questions regarding packaging and transport security, please contact the Ecolab!



DANGER

Risk of injury due to tilting of transport parts

Transport units can fall or tip over if improperly transported. This may result in material damage. During delivery, unloading and general transportation, proceed safely and pay attention to the symbols and information on the packaging.



WARNING

Danger due to putting into operation a piece of equipment which has been damaged during transport:

If damages are discovered during unpacking, do not install or put unit into operation, as otherwise unforeseeable hazards can occur. All parts must be checked for transport damage immediately after unpacking in order to rule out the risk of transport damage.

In order to prevent injury to personnel and/or damage to the system components, the following instructions must be observed:

- The PPE is mandatory to wear for the protection of the personnel!
- When transporting, observe the weight of the transport unit.
- Pay attention to the centre of gravity.
- The contact surface on the means of transport must be as large as possible (e.g. forks of the forklift truck must be moved far apart, pallets must be placed underneath, etc.) in order to prevent the transport piece from tipping over.
- If necessary, secure the transport unit with suitable slings or straps before transport.
- Secure the transport with a second person who can point out possible obstacles or danger spots.



WARNING

Off-centre centre of gravity

Risk of injury due to falling or tilting packages!

Packages can have an off-centre centre of gravity. If fastened incorrectly, the package may tip and fall. This can result in serious injuries.

- Observe markings and information on the packages.
- Fasten the hook when transporting with the crane so that it is above the package's centre of gravity.
- Lift the package carefully and see whether it tilts. If necessary, change the end stop.

Transporting pallets with a forklift or lift truck



CAUTION

Secure the load.

To avoid slipping, the transport unit must be firmly attached to the forklift with a transport strap (see Fig. b).

Transport units mounted on pallets can be transported using a forklift/lift truck under the following conditions:

- The forklift/lift truck must be designed to support the weight of the transport units. The operator must have the equipment checked regularly by an expert.
- The truck driver must have permission to drive industrial trucks with a driver's seat or driver's platform in line with local regulations.
- The transport unit must be securely fastened to the pallet.

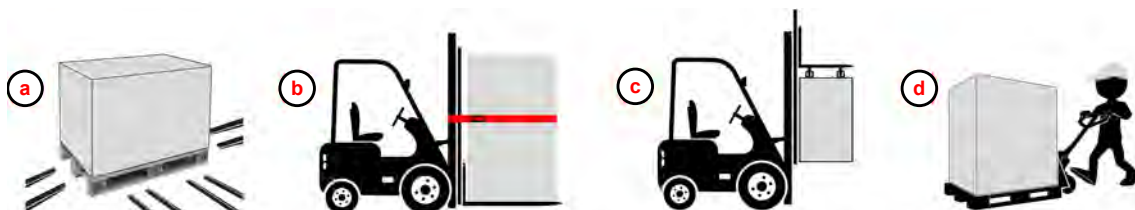


Fig. 1: Transport with a forklift and lift truck (schematics)

- a Forks of the lift truck/forklift under the load
- b Forks of the forklift under the load with transport protection (here: red belt)
- c Forks of the forklift above the load (transport unit suspended)
- d Transport by lift truck

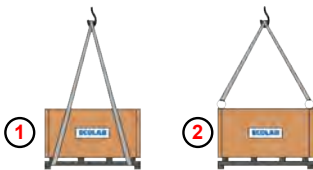
Transport by crane - suspended loads

**WARNING****Danger of injury due to suspended loads!**

There is a risk of injury when transporting and mounting or dismounting the device due to suspended loads.

- Never stand under or in the pivot range of suspended loads.
- Only use approved lifting equipment and suspension devices of sufficient load-bearing capacity.
- Do not use cracked or worn slings.
- Only use slow transport movements because of the partly heavy weight.
- Make sure that no people, objects or obstacles are in the pivot range of the transport unit during transportation.
- Only move loads under supervision.
- Deposit the load when leaving the workplace.
- Use personal protective equipment.

- Crane and lifting accessory must be designed to carry the weights.
The operator must have this checked regularly by an expert.
- The crane operator must be trained and authorised to operate the crane.
- During transportation, use any lifting eyes on the transport unit where available, and observe the transport instructions.
- Observing the suspension points, attach the transport unit to the crane and transport it with the appropriate lifting gear (e.g. crossbeam, belt, multiple-point suspension gear, ropes).
- Do not walk under suspended loads!



① Suspension points below the load
(only if the centre of gravity is at the centre).

② Transport using lifting eyes

2.6 Packaging

The individual packing items are packed to reflect the expected transport conditions. Only environmentally friendly materials were used for the packaging.

The packaging is designed to protect the individual components against shipping damage, corrosion and other damage up to the point of assembly.

Therefore, do not destroy the packaging and only remove it immediately prior to assembly.



ENVIRONMENT

Risk of environmental damage due to incorrect disposal

Incorrect disposal of packaging materials can be a threat to the environment. Packaging materials are valuable raw materials and can, in many cases, be used again or be usefully processed and recycled.

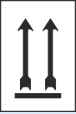
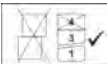
- Observe the locally applicable disposal regulations.
- Always dispose of packaging materials in an environmentally friendly way or call in a professional disposal company.



Follow the instructions for handling the packages.

There may be handling instructions on the packages (e.g. on top, fragile, protect from moisture, etc.). These must be complied with accordingly. Symbols shown below are examples only.

Tab. 1: Possible symbols on the packaging

	Top	The arrowheads mark the top of the package. They must always point upwards, otherwise the contents could be damaged.
	Fragile	Indicates packages with fragile or sensitive content. Handle the package with care, do not drop or knock.
	Keep this product dry	Protect packages from moisture and keep dry.
	Electronic components	Electronic components contained in the package.
	Cold	Protect packages from the cold (frost).
	Stacking	The package may be stacked with other similar packages until the specified maximum number is reached. Pay attention to the exact stacking number.
	IPPC symbol	International symbol: Handling status for wooden packaging ■ DE: Country code (e.g. Germany) ■ NW: Regional identification (e.g. NW for North Rhine Westphalia) ■ 49XXX: Registration number of the wood suppliers ■ HAT: Heat treatment ■ MB: Methyl bromide (gas-treated) ■ DB: Debarked

2.7 Unpacking the Plant



NOTICE

Open packaging correctly

Opening the packaging incorrectly may cause damage to the Plant or parts of it.

When opening packaging, do not penetrate the packaging with sharp objects in order to open it. Symbols and instructions on the packaging indicating correct opening must be observed in order to avoid damage to the goods.

Proceed as follows:

1. ➤ Remove the plastic wrapping as required.
2. ➤ Remove the upper and front panelling.
3. ➤ Remove the side panels.
4. ➤ Remove accessory boxes, manual and all other small parts.
5. ➤ Remove the screws securing the wooden transport blocks to the underside of the frame.
6. ➤ Unpack / take out the Plant.

7. ➤



NOTICE

Check the delivery for completeness and damage.

After unpacking the Plant, it must be checked immediately whether the delivery is complete and all parts are free of transport damage.

If parts are missing, a report must be made to the Ecolab.

The Ecolab is not liable for transport damage.

Transport damage must be reported to the carrier immediately upon detection.

8. ➤ Dispose of packaging materials.



ENVIRONMENT

Risk of environmental damage due to incorrect disposal

Incorrect disposal of packaging materials can be a threat to the environment. Packaging materials are valuable raw materials and can, in many cases, be used again or be usefully processed and recycled.

- Observe the locally applicable disposal regulations.
- Always dispose of packaging materials in an environmentally friendly way or call in a professional disposal company.

2.8 Storage



Observe the instructions for storing the packages.

In certain cases, storage instructions may be specified on the packages that go beyond the requirements specified here. These must be observed accordingly.

- Do not store outdoors.
- Store in a dry and dust-free place.
- Do not expose to aggressive media.
- Keep away from direct sunlight.
- Avoid mechanical vibrations.
- If stored for longer than three months, regularly check the condition of all parts and packaging. If necessary, refresh or renew the packaging.
- Storage must be frost-proof.
- Further information can be found in the chapter → [Chapter 14 'Technical data' on page 253](#)



NOTICE

Intermediate storage

- The packaging is designed for a storage period of three months.
- If the Plant is not operational for a period of longer than one week: fully empty and rinse tank with water.



CAUTION

Risk of damage to the Plant

Ingress of dirt and water can damage the Plant. Never clean the electrical equipment or the parts of the equipment with a steam cleaner or by spraying them with water.

2.9 Repairs/returns to Ecolab Engineering GmbH



DANGER

Conditions for returns

Before being returned, all parts must be completely free of all chemicals! We would point out that only clean, rinsed parts that are free of all chemicals can be accepted by our service!

This is the only way of excluding the possibility of the risk of injury to our staff due to residues of chemical products. The goods sent in must, where possible, also be packed in a suitable bag preventing any leakage of liquid residues into the surrounding packaging. Enclose a copy of the product data sheet for the chemical used so that our Service staff can be prepared to use the necessary personal protective equipment (PPE).



The return must be requested online

→ <https://www.ecolab-engineering.de/en/contact/returns>

Fill in all details and follow the further navigation.

You will receive the completed return form by email.

Packaging and shipping

If possible, use the original box to return the device.



General information for returns

- Ecolab assumes no liability for transport damage.
- Make sure that the original serial number label is on all products sent in.
- The return form must be affixed in a clearly visible position **on the outside** of the package using a delivery note pouch.

1. Print and sign the return form.
2. Pack the product to be returned without any accessories, unless they may be related to the fault.
3. Enclose the following documents with the consignment:
 - Signed return form
 - Copy of the order confirmation or delivery note
 - In the case of a warranty claim: Invoice copy with date of purchase
 - Safety data sheet for hazardous chemicals
4. Copy the return address with return number to the shipping label.

2.10 Contact

Manufacturer



Ecolab Engineering GmbH

Raiffeisenstrasse 7
D-83313 Siegsdorf

Telephone (+49) 86 62 / 61 0
Fax (+49) 86 62 / 61 166

↪ engineering-mailbox@ecolab.com
↪ <http://www.ecolab-engineering.com>

Before contacting the manufacturer, we always recommend that you contact your sales partner in the first instance.

Technical customer service



Ecolab Engineering GmbH

Raiffeisenstrasse 7
D-83313 Siegsdorf

Tel (+49) 86 62 / 61 234
Fax (+49) 86 62 / 61 166

↪ eursiefb-technicalservice@ecolab.com
↪ <http://www.ecolab-engineering.com>

Request returns online at:

↪ <https://www.ecolab-engineering.de/de/kontakt/ruecksendungen/>

When contacting us, have the model code of the machine ready (see nameplate).

3 Safety

Complete machine in the sense of the Machinery Directive 2006/42/EC



This Plant is delivered as a "complete machine" in accordance with the Machinery Directive 2006/42/EC.

Ecolab delivers the Plant as a stand-alone machine including all components and a customised control system.

The operator is responsible for all components to be connected to the Plant that are outside the boundaries of the machine and that are provided by the operator. This applies in particular if the Plant is integrated into an existing system.

The manufacturer provides an EC declaration of conformity (see → [Appendix A.2 'EC Declaration of Conformity' on page 303](#)).

Any subsequent change will result in a new evaluation procedure and CE certification.

Despite constructive safety measures, various residual risks remain which cannot be avoided. These residual risks are covered in the safety instructions of this manual and are a basic prerequisite for the safe operation of the Plant.

Obligation to carry out a risk analysis in the area of occupational safety



CAUTION

Risk of injury due to disregard for occupational safety

In order to ensure occupational safety in every phase of the system's life cycle, the following points must be analysed in advance on the basis of a risk analysis and adhered to. If the specified points are not observed, there is considerable danger for maintenance and service personnel!

Before work assignment for customer:

- Submit customer notification of the type, planned duration and number of persons for the planned work assignment.
- Carry out a risk analysis to plan the arrival of service personnel.
- Plan and provide the necessary personal protective equipment (PPE) at the place of work for all persons involved in the assignment in accordance with the safety data sheet specifications for the chemical(s) used.
- Plan and provide ALL necessary emergency equipment at the place of work for all persons involved in the assignment in accordance with the safety data sheet specifications for the chemical(s) used.

General safety advice



DANGER

Staying in the hazardous area

Staying in the hazardous area of the Plant can lead to life-threatening injuries.

- No access for unauthorised persons
- Switch off the Plant before working in the hazardous area
- Secure the Plant against restarting



DANGER

Danger to life due to blocked or inadequate escape and rescue routes

If escape and rescue routes are blocked or inadequate, danger zones cannot be evacuated quickly enough and emergency services may have difficulty reaching the scene of the accident.

- Keeping escape and rescue routes clear is an important part of safety in buildings.
- Escape routes, emergency exits and escape hatches must be kept clear at all times to ensure safe exit from buildings in the event of danger.
- It is important that escape routes, emergency exits and escape hatches as well as doors along escape routes are labelled.
- It may also be necessary to draw up an escape and rescue plan.
- **Always observe all locally applicable regulations!**



WARNING

Avoid residual risks by complying with all safety instructions

Despite constructive safety measures, various residual risks remain which cannot be avoided. These residual risks can be avoided by consulting all the safety instructions listed below.



WARNING

Generally recognised safety regulations

The generally recognised safety regulations apply to operation, in particular those relating to the handling of chemicals. Failure to observe these requirements may result in serious injury or property damage.

In the event of a conflict between the contents of this document and the internal regulations of the operator, the stricter regulations shall apply.

The operator of the is responsible for the safety of its personnel and must ensure compliance with all safety-related measures.

These include:

- Training/instruction of personnel with suitable record-keeping.
- All work involving exposure to chemicals must be carried out using the prescribed personal protective equipment.
- Safety devices such as showers and eye baths must be accessible and checked regularly to ensure that they are fully functional.
- Installation of all necessary safety devices (e.g. splash guard, protective hood or enclosed room).
- Perform all prescribed safety inspections and maintenance.



WARNING

Risk of injury from automatically starting components

With some components, an automatic start-up is already started as soon as the power supply is connected or restored after a power failure.

This is done without first actuating a switch or button and can lead to injuries.

- Ensure operational readiness before connecting the power supply
- Prevent automatic restart after power failure by suitable superordinate measures



WARNING

Components and hoses under pressure

Components and hoses under pressure can move in uncontrolled manner and cause injuries.

To ensure process safety:

- Close the shut-off valves of the pressurised media and, if possible, secure them with a lock against unauthorised opening.
- Switch the Plant to a depressurised state.
- Wait until the standstill position is reached.
- Release connections only when depressurised.
- Ensure that no liquids escape unintentionally.



WARNING

Risk of injury from lifting heavy, bulky components.

Risk of injury from lifting heavy, bulky components.

Two people should lift heavy, bulky components.



WARNING

Make sure there is adequate access for maintenance to be carried out!

Install the metering station as close as possible to where the lubricant is stored (canister, barrel, container, tank) to ensure that the suction tube is as short as possible.



CAUTION

Risk of injury from damaged or unsuitable tools

Injuries may result from the use of damaged or unsuitable tools.

- Use only undamaged tools.
- Use only the tool intended for the specific purpose (e.g. suitable drills).

Hazards caused by chemicals

Use of dosing fluids / responsibilities and warranty notice



- The Plant may be used only with products approved by Ecolab.
Use of non-approved products voids the warranty!
- Dosing fluids are procured by the operator.
- All safety regulations must be followed and the information contained in the safety datasheet / product datasheet must be observed.
- The owner will bear sole responsibility for correct handling and the associated risks.
- Hazard warnings and disposal instructions are monitored by the operator.
- The operator must pay attention to the use of the prescribed protective clothing (see safety datasheet) and train staff accordingly.

General information on the use of chemicals / dosing fluids



- The Plant may be used only with products approved by Ecolab.
Use of non-approved products voids the warranty!
- Chemicals / dosing fluids are procured by the operator.
- The owner will bear sole responsibility for correct handling and the associated risks.
- Hazard warnings and disposal instructions are provided by the operator.
- Suitable protective clothing (see safety datasheet) must be worn.
- All safety regulations must be followed and the information contained in the safety datasheet / product datasheet must be observed.

Risk of accident and environmental damage when chemical residues are mixed together



For operational reasons, residues remain in the chemical supply containers. These are completely normal and designed to be kept to a minimum. To avoid accidents caused by burns to operating personnel and damage to the environment caused by leaking chemicals, no residual stocks may be mixed together.



DANGER

Spilled chemicals can pose a biological hazard.

Be careful not to spill chemicals or allow them to leak; otherwise, a biological hazard cannot be ruled out. Make sure that suitable binding agents are provided at the filling point according to the safety data sheet for the metering chemicals.



DANGER

Flammable chemicals and toxic fumes hazards

The use of flammable materials is excluded unless explicitly approved by Ecolab in writing.

- The use of flammable chemicals can pose a risk to life and limb of staff as well as considerable damage to the Plant.
- If flammable chemicals are used, all locally required safety measures must be determined in advance and implemented before commissioning!
- Toxic fumes produced by burning chemicals that are harmful to health can cause very serious poisoning and injuries.
- **Have a suitable extinguishing agent ready in accordance with the safety datasheet of the chemical used.**
- **Have the safety datasheet of the chemical used available for the emergency services.**
- **All instructions prescribed and recommended from the safety datasheet must be strictly adhered to/implemented!**



WARNING

Injury from uncontrolled chemical spills

Uncontrolled chemical spills can cause serious injuries.

- **Read the enclosed safety data sheet carefully before using the chemical product.**
- Obey the safety regulations and wear the required protective clothing when working with chemicals.
- When working with chemicals, always adhere to the safety instructions and use the personal protective equipment (PPE) specified in the safety datasheet for the chemical products.
- Safety units such as showers and eye baths must be accessible and checked regularly to ensure that they are fully functional.
- Make sure that there is sufficient ventilation.
- Avoid skin and eye contact.
- Plant Check the regularly for tightness.
- Plant Do not use the in case of leakages.
- If leaks are detected, immediately activate the emergency stop function.

If there is an uncontrolled chemical leak, your own safety and that of all employees in the vicinity must come first!

What to do:

- Get out of the danger area as quickly as possible.
- Immediately ask employees to leave the danger area.
- Perform an emergency shutdown.
- Cordon off and secure the danger area (LoTo method).
- Have qualified personnel with appropriate training and using the prescribed PPE eliminate the cause of chemical leak.
- Plant Only operate again after the leaks have been repaired.



WARNING

Risk of slipping due to escaping chemicals

Chemicals leaking in the working and preparation area can cause slipping and injuries.

- Wear non-slip, chemically resistant shoes when working.
- Always have a suitable binding agent available (according to the chemical product safety data sheet).
- Seal off the area with the escaping chemical.
- Immediately collect chemicals that have leaked or spilled and dispose of them properly.
- If necessary, place the chemical container in a trough to collect any escaping chemicals.



CAUTION

Use of metering media:

- The Plant may be used only with products validated by Ecolab.
The use of unvalidated products will void the warranty!
- The metering media are procured by the operator.
- The owner will bear sole responsibility for correct handling and the associated risks.
- The hazard warnings and disposal instructions are provided by the operator.
- Wear suitable protective clothing (see safety data sheet).
- All safety regulations must be followed and the information contained in the safety data sheet/product data sheet must be observed.



ENVIRONMENT

Chemicals can harm the environment.

To prevent environmental pollution caused by chemicals, any escaping fluids must always be absorbed immediately by a suitable binding agent and disposed of properly. You will always find information on the absorption and disposal of chemicals in the relevant safety data sheet (→ [‘Safety data sheets’ on page 27](#)).



Depending on the application, incorrect concentrations of dosing media used can have a negative impact on processes and machine and system components.

Too low concentrations can:

- negatively influence the desired process,
- fail to guarantee the desired cleanliness/disinfection or lubrication.

Concentrations too high can:

- negatively influence the desired process,
- damage the process due to residues.
- lead to increased consumption of the dosing medium (economic efficiency, sustainability/storage).
- cause damage to sealing materials or favour faster wear (increased maintenance effort).
- negatively influence / jeopardise the health of employees.

To avoid the risks mentioned above, the correct dosage ratio should always be observed. In the event of doubts, for obtaining support or for optimising processes, we strongly recommend contacting an Ecolab representative (see also: → [Appendix A.1 ‘Ecolab representatives and service partners’ on page 301](#))

Safety regulations when handling peroxidic chemicals.

The use of peroxidic chemical products in the Plant creates special residual risks that cannot be avoided. These residual risks are addressed by the following specific safety instructions.



DANGER

General safety regulations for the handling of hazardous chemicals.

The generally recognised safety regulations apply to operation of the Plant, in particular those relating to the handling of hazardous chemicals. Non-observance of safety regulations can result in serious injury or damage to property. These regulations may vary depending on the operator. In the event of a conflict between these provisions, the stricter rules shall apply.



DANGER

Shutdown procedure when using peroxidic chemical products.

If the system goes out of operation due to an unintended standstill of the Plant (e.g. power failure), the control system must be prevented from powering up automatically.

To avoid injury, the shutdown procedures must be followed in all situations, including intentional shutdowns due to maintenance or repair work.



DANGER

Risk of explosion due to decomposition of peroxidic chemical products

Peroxidic chemicals tend to decompose under the formation of gas. When peroxidic chemical products are contaminated with special materials such as non-ferrous metal or lye, the decomposition speed increases and the contaminated solution heats up.

At a certain temperature (self-accelerating decomposition temperature, SADT) the decomposition becomes spontaneous and an explosion occurs, which can lead to life-threatening injuries.

It is essential to avoid contamination of the chemical product when connecting and disconnecting the peroxide container.



DANGER

Burns caused by peroxide chemical products

Peroxide chemical products in high concentrations cause severe burns if they come into contact with skin, eyes or mucous membranes.

- Always use a face shield in addition to the prescribed PPE in case of maintenance or repair
- Ensure that suitable emergency equipment is available in the vicinity of the operating area (e.g. eye shower)

Safety data sheets

The safety data sheet is intended to be consulted by users and enables them to take any steps necessary to safeguard their health and safety at work.



DANGER

Safety data sheets are always provided together with the supplied chemicals. Before using the chemicals, the safety data sheets must be read and understood, and all requirements must be implemented on site. Ideally, they should be displayed close to the workplace or to the supply containers so that the appropriate measures can be taken quickly in the event of an accident. The operator must provide the necessary protective equipment (PPE), as well as the described emergency equipment (eye bottle, etc.). Persons entrusted with operating the equipment must be instructed accordingly and trained.

Tab. 2: Download of safety data sheets



The latest safety data sheets are available online.
To download them, go to the following link or scan the QR code.
Then you can enter your required product and download the associated safety data sheet.

→ <https://www.ecolab.com/sds-search>

Personal protection equipment (PPE)



WARNING

The operator must wear the necessary personal protective equipment in accordance with local safety regulations and observe the safety symbols affixed to the dosing station!

Danger due to personal misconduct



NOTICE

Incorrect operation by unreliable personnel

Material damage due to incorrect operation.

Only persons who can be expected to carry out their work reliably can be approved as personnel. Individuals whose reactions are impaired, e.g. by drugs, alcohol, medicines, are not authorised.

- When selecting personnel, observe the valid age and occupation-specific regulations.
- Unauthorised persons must be kept away from the Plant.



DANGER

Risk of injury if personnel are inadequately qualified!

If unqualified personnel carry out work or are in the danger area, dangers may arise which can lead to serious injuries and considerable damage to property.

All the activities may only be performed by personnel that is qualified and suitably trained for this purpose.

Keep unqualified personnel away from hazard areas.



WARNING

Risk of injury from loose parts, components and tools placed on top of each other or left lying around

Loose parts, components and tools placed on top of each other or left lying around are sources of accidents that can lead to serious injury.

To avoid this, the workplace must be kept clean and tidy for all work is carried on the Plant



CAUTION

Hazards due to physical or mental impairments

If physically or mentally impaired persons work on the system, they may not have the required level of attention, which can lead to significant damage to the Plant and significant personal injury, including death.

The *Plant* must not be operated by persons who are drowsy, physically unwell, or under the influence of drugs/alcohol/medication, etc.

The owner of the Plant must ensure that no physically or mentally impaired persons can gain access.



CAUTION

Use personal protective equipment (PPE).

Unused protective clothing can cause serious injuries.

To avoid these dangers, the following points must be strictly adhered to!

- All personnel working on the Plant must use the required personal protective equipment in accordance with the locally applicable safety regulations.
- In addition, all safety pictograms on the Plant must be observed and used.
- All safety regulations and the prescribed protective clothing when handling chemicals must be observed.
- All instructions in the product data sheet of the dosing medium used must be observed!

ATEX-Hazards



DANGER

Explosion protection (ATEX)

Products in which explosive dust/air mixtures can arise may not be processed with this equipment. Please note that the equipment does not meet any ATEX prerequisites. It may not be installed in an ATEX zone.

Electrical hazards



DANGER

Troubleshooting faults in the electrical system

Danger to life through contact with live components.

Electrical hazards are identified using the symbol shown here.

- Check the existing power supply on site and compare it with the [Appendix A.4 'Circuit diagram' on page 307](#).
- Check that there is no voltage; earth and short-circuit the Plant if necessary.
- Cover and protect adjacent parts that are under voltage.
- Housings and all other electronic components may be opened only for start-up, maintenance and fault elimination purposes.
- Organise repairs immediately if there is any damage to the insulation.
- When replacing fuses, use replacements with the same rating.
- Do not expose live parts to moisture, as this may cause short-circuits.
- To de-energize the control cabinet, set the main switch and, if present, the UPS switch to the "0" position.

3.1 Intended use



DANGER

Only use chemicals for foam cleaning (alkaline, acidic)!

The Plant is intended exclusively for the processing of validated chemicals.

Operating the BFH Foamatic with any other chemicals can lead to personal injury and irreparably damage the Plant.

Components could break down (resistance of the sealing materials used) and the dosing medium escape suddenly, which can lead to serious personal injury.

As such, the Plant it is intended exclusively for foam disinfection and must not be operated with liquid disinfectants with peracetic acid content!

The BFH Foamatic:

- is used to produce a foamed cleaning solution for the automatic cleaning of filling and transport systems in the food and beverage industry. As an alternative to automatic cleaning, manual cleaning can be carried out with a spray lance.
- is used to produce a foamed cleaning solution for the automatic cleaning of filling and transport systems. As an alternative to automatic cleaning, manual cleaning can be carried out with a manual lance.
- is intended for use with Ecolab foam cleaning and disinfectants for food and beverage products. If any chemicals are to be used, please contact the manufacturer to obtain their approval.

Proper use and reasonable foreseeable misuse

Intended use:

- Use is restricted to commercial applications in an industrial environment; private use is excluded.
- Only chemicals approved by Ecolab may be processed.
- All operating and operating instructions provided by Ecolab, as well as all maintenance and repair conditions, must be followed.
- Only control systems approved by the manufacturer may be used to control the system, to ensure process reliability.
- The Plant must be operated only within the operating conditions permitted in accordance with [↪ Chapter 14 'Technical data' on page 253.](#)

Any other or additional use is considered improper.

Ecolab shall not be liable for any resulting damage to property or personal injury.

Reasonable foreseeable misuse

- Operation by untrained or unapproved personnel
- Use of incorrect design variants (e.g. incorrect sealing or pump head materials)
- Use of chemicals other than those defined or the chemicals used during commissioning. Approval must be obtained from Ecolab in such cases.
- Operation with incorrect supply voltage
- Unacceptable ambient temperatures or media temperatures
- Dosing of the chemicals above the tolerance range
- Too high back-pressures
- Viscosity too high
- Incorrect dosing lines, inadequate cable cross-sections
- Operation in potentially explosive atmospheres
- Incompatible accessories



CAUTION

If it can be assumed that safe operation is no longer possible, the Plant must be taken out of service immediately and secured against unintentional operation.

This is the case if at the Plant or a component:

- a leakage or overflow of metering media is detected
- has visible damage

Decommissioning must also take place if the Plant or a component:

- no longer functions
- has been stored for a long time under unfavorable conditions

Unauthorised modifications



CAUTION

Conversions or modifications

Conversions or modifications are not permitted without prior, written permission from Ecolab Engineering GmbH and shall result in the forfeiting of any and all warranty entitlements. Original spare parts and accessories approved by the manufacturer heighten the degree of safety. The use of other parts will exclude warranty for the resulting consequences.

Subsequent modifications will invalidate the CE conformity!

Under no circumstances should changes or modifications be made to the electrical circuits, hydraulic circuits or safety devices on the machine without prior written approval from Ecolab Engineering GmbH.

The warranty shall expire in the following situations:

- The warranty is limited to the original purchaser of the machine.
- The product/machine is not used/operated in accordance with the instructions.
- The conditions on site (area where the product is stored) do not comply with the recommended operating conditions of the machine.
- Installation/repair work is carried out by unauthorised persons or bodies.
- Changes of any kind are made to the electrical wiring or physical construction of the machine.
- Defects due to causes of force majeure such as lightning, voltage fluctuations or other acts of God or during transfer to the maintenance centre or to the operator's place of use.

3.2 Safety measures taken by the operator



NOTICE

Instruct/train staff

It is expressly up to the operator to train, monitor and instruct its operating and maintenance personnel so that they comply with all of the necessary safety measures.

The frequency of inspections and controls must be complied with and documented.



WARNING

Danger due to improperly installed system components

Improperly installed system components can result in personal injury and damage to the system.

To prevent damage and personal injury, all system components made available by the operator (e.g. pipe connections, flanges, connections) must be checked for proper assembly.

To ensure safe operation, a final leak test of all system components is essential during initial commissioning and this test must be documented (operator obligations).

If assembly was not carried out by Customer Support/Service, check that all system components are made of the correct materials (product is resistant to the dosing media used) and meet the applicable requirements.

Obligations of the operator



Valid guidelines

In the EEA (European Economic Area), national implementation of the Directive (89/391/EEC) and corresponding individual directives, in particular the Directive (2009/104/EC) concerning the minimum safety and health requirements for the use of work equipment by workers at work, as amended, are to be observed and adhered to. If you are outside the EEA, the local regulations always apply. However, it is important to make sure that the EEA rules do not apply to your area, due to special agreements.

The operator is responsible for checking the terms and conditions that affect you.

The operator must adhere to the local legal provisions for:

- The safety of personnel (within the Federal Republic of Germany, in particular the federal law and accident prevention regulations, workplace guidelines, e.g. operating instructions, also according to Section 20 Hazardous Substances Ordinance (GefStoffV), personal protective equipment (PPE), preventive investigations)
- The safety of work materials and tools (protective equipment, work instructions, procedural risks and maintenance)
- Product procurement (safety datasheets, list of hazardous substances)
- Disposal of products (Waste Act)
- Disposal of materials (decommissioning, Waste Act)
- Cleaning (detergents and disposal)
- and observe current environment protection regulations.

The owner is also required to:

- Provide personal protective equipment (PPE)
- Incorporate the measures into operating instructions and to instruct personnel accordingly
- For operating sites (from 1m above ground) To provide safe access
- The operator must provide lighting in workplaces in accordance with DIN EN 12464-1 (within the Federal Republic of Germany). Observe the local applicable regulations!
- To ensure that local regulations are complied with during installation and commissioning, if these procedures are conducted by the operator

3.3 Connections required on site

Before installation, the supply connections required by the customer and a drain for the drain valve must be available. For information on the supply connections required at the customer, see ➔ [Chapter 14 'Technical data' on page 253](#).



WARNING

Danger due to system components that have been improperly installed by the operator. Improperly installed system components can cause personal injury and damage to the system.

To prevent personal injury and damage to the system, it must be ensured that the system components provided (pipe connections, flanges) are correctly installed. We recommend expansion joints where the plastic pipes change to stainless steel pipes, in order to minimise the stresses during installation and operation. If the installation is not carried out by customer service/service, it must be ensured that all components are made of the correct materials and meet the requirements.

If the installation was not carried out by customer service/service, check whether all system components are made of the correct materials (product resistance to the metered media used!) and meet the requirements.

Before installation, the customer must ensure that the necessary supply connections and a drain for the drain valve are available. For information on the necessary supply connections, see → [Chapter 14 'Technical data' on page 253](#).

Pipelines that are provided / built by the operator of the Plant and through which concentrates or chemical solutions flow must fulfil the following requirements:

- Selection of materials taking into account resistance, pressure rating and mechanical/thermal load capacity.
- Compliance with the requirements of the Pressure Equipment Directive or similar local regulations.
- Compliance with the requirements of the WHG or similar local regulations.
- Inspection and approval of the pipework after the necessary tests have been carried out.
- Regular maintenance and visual inspections including reports.

A final leak test of all system components during initial operation is essential for safe operation and must be documented (operator obligations)!

3.4 Personnel requirements



DANGER

Only authorised, trained personnel are permitted to access the Plant!

Only persons who can be expected to perform their work reliably are permitted as personnel. Persons whose ability to react is influenced, e.g. by drugs, alcohol or medication, are not permitted. When selecting personnel, the age- and occupation-specific regulations applicable at the place of work must be observed.

Unauthorised persons who do not meet the requirements described here are not aware of the hazards in the work area. Therefore, there is a risk of injury to unauthorised persons.

Dealing with unauthorised persons:

- Interrupt work as long as unauthorised persons are in the danger and work area.
- If in doubt as to whether a person is unauthorised to be in the danger and work area, speak to the person and direct them out of the work area.
- **Be sure to keep unauthorised persons away!**

Obligations on the part of personnel

The personnel must:

- follow the applicable national laws and regulations, as well as the operator's regulations on occupational safety
- read and follow the instructions in this document before starting work
- not enter areas secured using protective measures or access restrictions without due authorisation
- in the event of faults that could jeopardise the safety of personnel or components, immediately switch off the Plant and report the fault to the responsible department or person
- wear the personal protective equipment (PPE) prescribed by the operator
- observe the applicable safety regulations and the manufacturer's safety data sheet when handling chemicals

Mechanic

The mechanic is trained for the particular range of tasks in which s/he operates and knows the relevant standards and regulations. S/he can perform work on pneumatic and hydraulic systems because of his/her specialized training and experience and can independently recognise and avoid potential dangers.

Operator

The operator has been instructed about the tasks assigned to him and possible dangers in case of improper behaviour. He may only carry out tasks that go beyond operation during normal operation if this is specified in these instructions or the owner has expressly authorised the operator to do so.

Qualified electrician

Qualified electricians are able to carry out the work on electrical systems because of their technical training, knowledge and experience, as well as awareness of the relevant standards and regulations; qualified electricians are capable of independently identifying and preventing potential risks. He is specially trained and knows the relevant standards and regulations.

Service personnel

Certain work may only be carried out by service personnel of the manufacturer or by service personnel authorised or specially trained by the manufacturer. If you have any questions, please contact Ecolab.

Specialist

A person with appropriate training, schooling and experience enabling him or her to identify risks and avert danger.



DANGER

Auxiliary personnel without special qualifications

Auxiliary personnel without special qualifications or without special training who do not meet the requirements described here are unaware of the dangers in the work area.

Therefore, there is a risk of injury to auxiliary personnel.

It is imperative that auxiliary personnel without specialist knowledge are familiarised with the use of personal protective equipment (PPE) for the activities to be performed, or are appropriately trained, and that these measures are monitored. These personnel may then only be deployed on activities for which intensive training has been given beforehand.

Danger due to personal misconduct

Only individuals who can be expected to perform their work reliably are authorised as personnel.



DANGER

Risk of injury if personnel are inadequately qualified!

If unqualified personnel carry out work or are in the danger area, dangers may arise which can lead to serious injuries and considerable damage to property.

All the activities may only be performed by personnel that is qualified and suitably trained for this purpose.

Keep unqualified personnel away from hazard areas.



CAUTION

Hazards due to physical or mental impairments

If physically or mentally impaired persons work on the system, they may not have the required level of attention, which can lead to significant damage to the Plant and significant personal injury, including death.

The *Plant* must not be operated by persons who are drowsy, physically unwell, or under the influence of drugs/alcohol/medication, etc.

The owner of the Plant must ensure that no physically or mentally impaired persons can gain access.

3.5 Symbols used on the Plant



WARNING

All safety signs on the equipment must be strictly observed to avoid injury to personnel.
The operator of the system is responsible for compliance.

Symbol	Obligation sign on the Plant
	Observe the instructions for use
	Use protective apron
	Wear protective work clothing
	Wear face protection
	Wear suitable protective gloves ■ Resistant to chemicals ■ Against mechanical hazards
	Wear safety shoes

Symbol	Other signs on the Plant
	QR code (example display) for the technical documentation of the system
	QR code (sample display) for authorised service personnel (documents are password-protected).

3.6 Location of the safety label

Safety marking(s)	Position - Plant
 Wear face protection  Wear safety gloves  Wear safety shoes  Wear an apron	protective covering
 Hot surfaces	Pump motor
 Risk of electric shock	Control cabinet

3.7 Changing containers



DANGER

Access to containers

Access to the product containers by unauthorised persons can lead to very serious injuries, depending on the chemical.

Unauthorised access to the product containers must be prevented and is reserved exclusively for personnel who have been trained in the handling of chemicals and are authorised to enter.

All relevant safety datasheets must be observed and adhered to (see also → [‘Safety data sheets’ on page 27](#)).

All the following safety instructions must be observed in order to prevent injury!



DANGER

Restarting the Plant after confirmed container change

The dosing fluid level sensors automatically stop the Plant if the dosing fluid runs out.

If the sensors detect the required minimum amount of dosing again and notify the control system, once the error message is acknowledged in the control system, the Plant starts up again automatically.



WARNING

Risk of slipping due to leaking liquids in the operation and provisioning area!

Depending on the floor conditions, accidental spillages can cause a significant risk of accidents due to slipping on the wet surface.

To avoid accidents caused by slipping:

- Wear non-slip, chemically resistant shoes
- Place the product container in a suitable sump
- When changing containers, ensure that suction tubes/suction lances are quickly removed from the container and placed in a suitable collection tray, as they could leak or drip.



CAUTION

Use personal protective equipment (PPE).

Unused protective clothing can cause serious injuries.
To avoid these dangers, the following points must be strictly adhered to!

- All personnel working on the Plant must use the required personal protective equipment in accordance with the locally applicable safety regulations.
- In addition, all safety pictograms on the Plant must be observed and used.
- All safety regulations and the prescribed protective clothing when handling chemicals must be observed.
- All instructions in the product data sheet of the dosing medium used must be observed!



CAUTION

Use of metering media:

- The Plant may be used only with products validated by Ecolab.
The use of unvalidated products will void the warranty!
- The metering media are procured by the operator.
- The owner will bear sole responsibility for correct handling and the associated risks.
- The hazard warnings and disposal instructions are provided by the operator.
- Wear suitable protective clothing (see safety data sheet).
- All safety regulations must be followed and the information contained in the safety data sheet/product data sheet must be observed.



CAUTION

Hazard from the use of incorrect chemicals

**When changing containers, there is a risk of confusion!
Swapping tanks can lead to very serious injuries.**

In the event of longer downtimes or inadvertent swapping of the chemical type, the corresponding injector can solidify. If this is the case, the injector must be removed, cleaned or even replaced, depending on the damage.

Mixing up the product containers not only causes potential damage to the containers, it can also cause serious injury to staff.

When using foam cleaning chemicals from Ecolab both the tanks and the suction hoses are colour-coded (blue tank / blue hose, red tank / red hose, etc.).

To prevent any kind of damage due to mixing up the product containers, always check the product sticker on it with the sticker of the empty container before opening a new container.
The products must ALWAYS match!



WARNING

Dangers of incorrect storage of chemicals and ignoring PPE

- All concentrated chemicals in storage must be stored properly and in accordance with the respective local regulations to prevent any kind of hazard.
- To avoid personal injury, it is essential that anyone who has access to the chemicals must comply with all safety regulations and use the provided safety equipment (PPE) in accordance with the respective local regulations and the chemical's safety data sheet.
- Suitable measures must be taken to prevent unauthorised persons from gaining access to stored chemicals.
- Storage rooms must be equipped with suitable ventilation systems.



CAUTION

Danger due to mixing of different chemicals

There is a risk of chemical burns and possibly uncontrollable chemical reactions if leftover stocks are poured together.

- Suction lances or suction pipes must be marked to indicate the chemical variant used, in order to avoid confusion here as well.
- **The container change is only to be carried out by trained personnel.**
Furthermore, it is essential to ensure that only the same chemicals are exchanged.

Different chemicals must never be mixed with each other.

This is only permissible if this is precisely the purpose of the Plant!

It must be checked beforehand which chemicals may be mixed and in which ratio.

Mixing must only be carried out by trained specialist personnel.

Safety instructions for chemical containers / chemical storage

- The operator is responsible for the correct installation of the chemical types and this is to be defined in consultation with the chemical supplier.
Incompatible chemical types must be separated from each other to prevent mixing in the event of leakage.
- Incompatible chemicals must be positioned and stored on separate collection trays so that they are on a flat and stable surface and cannot tip over.
- In addition, the containers are to be stored so far away from traffic and access routes that they cannot be accidentally damaged by operational activities .



WARNING

Injury from uncontrolled chemical spills

Uncontrolled chemical spills can cause serious injuries.

- **Read the enclosed safety data sheet carefully before using the chemical product.**
- Obey the safety regulations and wear the required protective clothing when working with chemicals.
- When working with chemicals, always adhere to the safety instructions and use the personal protective equipment (PPE) specified in the safety datasheet for the chemical products.
- Safety units such as showers and eye baths must be accessible and checked regularly to ensure that they are fully functional.
- Make sure that there is sufficient ventilation.
- Avoid skin and eye contact.
- Plant Check the regularly for tightness.
- Plant Do not use the in case of leakages.
- If leaks are detected, immediately activate the emergency stop function.

If there is an uncontrolled chemical leak, your own safety and that of all employees in the vicinity must come first!

What to do:

- Get out of the danger area as quickly as possible.
- Immediately ask employees to leave the danger area.
- Perform an emergency shutdown.
- Cordon off and secure the danger area (LoTo method).
- Have qualified personnel with appropriate training and using the prescribed PPE eliminate the cause of chemical leak.
- Plant Only operate again after the leaks have been repaired.



ENVIRONMENT

Chemicals can harm the environment.

Chemical products must never enter the environment undiluted:

- Only empty completely drained chemical containers.
- Flush out residual amounts in chemical canisters with large amounts of water.
- Immediately soak up any leaking liquids with a suitable binding agent and dispose of properly.

Information on retrieval and disposal can always be found in the safety data sheet associated with the chemical.

See also ➔ [‘Safety data sheets’ on page 27](#)

Safety regulations when handling peroxidic chemicals.

The use of peroxidic chemical products in the Plant creates special residual risks that cannot be avoided. These residual risks are addressed by the following specific safety instructions.



DANGER

General safety regulations for the handling of hazardous chemicals.

The generally recognised safety regulations apply to operation of the Plant, in particular those relating to the handling of hazardous chemicals. Non-observance of safety regulations can result in serious injury or damage to property. These regulations may vary depending on the operator. In the event of a conflict between these provisions, the stricter rules shall apply.

**DANGER****Shutdown procedure when using peroxidic chemical products.**

If the system goes out of operation due to an unintended standstill of the Plant (e.g. power failure), the control system must be prevented from powering up automatically.

To avoid injury, the shutdown procedures must be followed in all situations, including intentional shutdowns due to maintenance or repair work.

**DANGER****Risk of explosion due to decomposition of peroxidic chemical products**

Peroxidic chemicals tend to decompose under the formation of gas.

When peroxidic chemical products are contaminated with special materials such as non-ferrous metal or lye, the decomposition speed increases and the contaminated solution heats up.

At a certain temperature (self-accelerating decomposition temperature, SADT) the decomposition becomes spontaneous and an explosion occurs, which can lead to life-threatening injuries.

It is essential to avoid contamination of the chemical product when connecting and disconnecting the peroxide container.

**DANGER****Burns caused by peroxide chemical products**

Peroxide chemical products in high concentrations cause severe burns if they come into contact with skin, eyes or mucous membranes.

- Always use a face shield in addition to the prescribed PPE in case of maintenance or repair
- Ensure that suitable emergency equipment is available in the vicinity of the operating area (e.g. eye shower)

3.8 EMERGENCY STOP



The Plant is integrated into the safety circuit of the connected production machine. The emergency stop function is actuated and enabled via the corresponding safety devices on the connected production machine.

The control cabinet is not equipped with its own emergency stop button.

The BFH Foamatic is integrated into the emergency stop concept of the filling machine (conveyors) via safety relays. The emergency stop relay in the BFH Foamatic controller drops out if the emergency stop circuit (filler) is interrupted.

If the emergency stop circuit (filler) is closed again, the emergency stop relay is automatically reactivated. reactivated, i.e. the relay can be energised again after the input circuits are closed. energised again.

The resetting of an emergency stop button and the closing of the emergency stop circuit is performed by the filling machine. The emergency stop circuit (filler) is not interrupted by the safety switching relay (foam station); it only works in one direction. only works in one direction.

The emergency stop circuit (HC) has a two-channel design.

Summarised:

The emergency stop (filler) also switches off the foam cleaning. Conversely the safety switching relay (foam station) does not affect the emergency stop circuit (filler).

The emergency stop relay (HC) switches off the following components via hardware:

- Booster pump
- all valves,

- Nozzle system
- Air pressure relief

Tab. 3: Main switch with emergency stop function



The emergency stop switch is on the door of the control panel right under the UPS switch.

In the event of an emergency, the electrical power supply of the Plant must be interrupted.

In the image (left), the switch is in position "1" (switched on).

To switch off, turn the emergency stop switch anti-clockwise (90°) to the "0" position.

After activating the emergency stop switch, all drives and power supplies are switched off immediately.

3.9 Instructions for emergencies



DANGER

Emergency shutdown to prevent injury and material damage

In all emergencies, the power supply to all components involved must be disconnected immediately and secured against being switched on again.

Causes of leaks from storage containers

The most common causes of leaks in storage containers can be attributed to a number of factors:

- **Fatigue and corrosion of material:**

- Material fatigue:
Over time, materials can weaken and develop cracks due to repeated stress and ageing.
- Corrosion:
Chemical reactions between the container material and the stored substances or the environment can lead to corrosion, which weakens the material/

- **Mechanical damage:**

- Shocks and blows:
Accidents during transport or handling can lead to physical damage to the containers.
- Lack of or inadequate maintenance:
Regular inspections and maintenance are necessary in order to recognise and rectify minor damage at an early stage.

- **Production errors:**

- **Weld seams and seals:**
Manufacturing errors, especially in weld seams and seals, can lead to weak points.

- **Material defects:**

- Defects in the raw material can affect the integrity of the container.

- **Improper storage and handling:**

- Improper storage and handling can severely impair the reliability of containers.

- **Overfilling:**

- Overfilling containers can lead to excessive loads and ultimately to leaks.

- **Incorrect storage conditions:**

- Extreme temperatures or improper storage can weaken the material.

- **Chemical reactions:**

- Storing chemically incompatible substances can lead to reactions that attack and weaken the container material.



Compliance with inspection and maintenance intervals and storage conditions

Only regular inspections, proper maintenance and compliance with storage conditions can minimise many of the causes of leaks in storage tanks.

Measures to be taken in the event of leaks from storage containers

1. Personal safety first:

- Immediate alerting of the emergency team or the responsible safety authority.
- Immediately inform everyone in the danger area!
- Evacuate the affected area and ensure that there are no unauthorised persons in the vicinity.

2. Put on personal protective equipment (PPE):

- Wear appropriate PPE, including gloves, goggles, respirator, and suit, depending on the nature of the chemicals involved.

3. Perform an emergency shutdown:

- Disconnect the power supply to all components involved and secure against reconnection!

4. Identification of the chemical:

- Determine the type of chemical that has leaked and review the "Safety Data Sheet" for specific hazard and emergency response information.

5. Containment of the spread:

- Use appropriate materials (e.g. binding agents, sandbags) to prevent the chemical from spreading.
- Ensure that chemicals do not enter drains or watercourses.

6. Ensure air circulation:

- For volatile or toxic chemicals, open windows and doors to provide adequate ventilation, if safe to do so.

7. Cleaning and removal:

- Use appropriate procedures and materials to clean the affected area.
- Dispose of contaminated materials in accordance with current regulations on hazardous waste.

8. Mark leaking containers / repair (if possible):

- Leaking containers must be properly labelled.
- If possible (feasible), repair the containers and only put them back into operation after a leak test has been carried out.

9. Documentation:

- Keep detailed records of the incident, including the type of chemical, the quantity, the cause of the leak and the measures taken.

10. Debriefing:

- Organise a debriefing with the emergency response team to analyse the incident and identify improvements for future emergencies.

11. Training and prevention:

- Ensure that all employees receive regular training in emergency response procedures and the handling of chemical substances.

Measures to be taken in the event of a fire

Immediate measures:

1. **Personal safety first:**

- Immediate alerting of the emergency team and/or the fire brigade with information about the chemical that has caught fire.
- Immediately inform everyone in the danger area!
- Evacuate the affected area and ensure that there are no unauthorised persons in the vicinity.
- Alerting the relevant safety authority.

2. **Put on personal protective equipment (PPE):**

- Wear appropriate PPE, including gloves, goggles, respirator, and suit, depending on the nature of the chemicals involved.

3. **Perform an emergency shutdown:**

- Disconnect the power supply to all components involved and secure against reconnection!

4. **Containment and control:**

- Seal or minimise the leak if it is safe to do so.

5. **Have fire extinguished by emergency services:**

- Have the fire extinguished by a specially trained plant fire brigade, or if not available, by a professional fire brigade.
- Exclude all obstacles for the emergency services.

6. **Cleaning and removal:**

- Use appropriate procedures and materials to clean the affected area.
- Dispose of contaminated materials in accordance with current regulations on hazardous waste.

7. **Documentation:**

- Keep detailed records of the incident, including the type of chemical, the quantity, the cause of the leak and the measures taken.

8. **Debriefing:**

- Organise a debriefing with the emergency response team to analyse the incident and identify improvements for future emergencies.

9. **Inform authorities:**

- Report the incident to the relevant authorities and always comply with the legal reporting requirements.

10. **Training and prevention:**

- Ensure that all employees receive regular training in emergency response procedures and the handling of chemical substances.

3.9.1 First aid for accidents involving chemicals

1. ➤ Pay attention to your own safety.
2. ➤ As far as possible, rescue other people from the danger zone.
3. ➤ Make an emergency call.
4. ➤ Clear passages and paths so that the emergency services can reach the injured unhindered.
5. ➤ Accompany the ambulance crew on their way through the building to avoid unnecessary detours/ delays.
6. ➤ Report the accident immediately to your supervisor or their representative.



Local emergency phone numbers

Enter the locally valid numbers in the following table, print it out, ideally laminate it to protect the document from dirt and moisture, and attach it to the Plant, in sight of the operating personnel.

Telephone numbers for emergencies

Emergency services	Phone number:
Police:	
Fire Brigade	
Hospital	
Physician:	
Accidents involving poisoning:	
Plant fire brigade:	

3.10 Important safety instructions for the system components

Information from the component operating instructions



This section provides excerpts from the component instructions of the BFH Foamatic. Ecolab is not the author of these extracts, Ecolab cannot assume any liability for damages resulting from the use of the following information. The original texts can be found in the respective component operating instructions. See: ➔ [Appendix B 'Component operating manuals' on page 321.](#)

3.10.1 Centrifugal pump CRNE 5 [GRUNDFOS]

Electrical installation

If the power supply cable is damaged, it must be replaced by the manufacturer, the manufacturer's service partner or a similarly qualified person. The user or the installer is responsible for the installation of correct earthing and protection according to local regulations. All operations must be carried out by a qualified electrician.



DANGER

Electric shock

- Death or serious personal injury
- Switch off the power supply to the motor and to the signal relays.
- Wait at least 5 minutes before you make any connections in the terminal box.
- Make sure that the power supply cannot be accidentally switched on.
- Check that the supply voltage and frequency correspond to the values stated on the nameplate.
- Connect the motor to a protective earth and provide protection against indirect contact in accordance with local regulations.

Protective-earth conductors must always have a yellow/green (PE) or yellow/green/blue (PEN) colour marking.

Protection against mains voltage transients

The motor is protected against mains voltage transients in accordance with EN 61800-3.

Motor protection

The motor requires no external motor protection. The motor incorporates thermal protection against slow overloading and blocking.

3.10.2 EVOGUARD Butterfly valve [KRONES]

Explosive Environments

If valves are used in areas with an explosive atmosphere, compliance with the ATEX 94/ 9/EC standard is compulsory with regard to all ignition hazards.

- When doing work on an explosion-protected system, observe the applicable regulations for gasses and dusts.
- Ensure compliance with the guidelines 99/92/EC to protect the health and safety of the employees in an explosive atmosphere.
- Any work to be done is restricted to specially trained professionals.
- Use only valves with special identification in an explosive atmosphere

Pressure Equipment

Valves are pressure equipment (without safety function) in accordance with the Pressure Equipment Directives: Directive PED 97/23/EC.

Pumping Media

Only pumping media suitable for the use defined in the section "Technical Data" are permissible. Other pumping media may only be used following prior agreement.

Residual Hazards

The valves are state of the art and are safe to operate. In manufacturing the valves, as many safety risks as possible have been eliminated.

There are still the following residual hazards.

- Switching valves which are not installed. Do not reach into the pipe or valve mount. The fingers can be crushed or cut off.
- Sharp-edged housing stubs. It is imperative that you wear suitable protective gloves when transporting and assembling these parts.
- Drives are spring-loaded. Do not open the drives.



DANGER

Explosion hazard in potentially explosive atmospheres! Danger to life

Valves without EX marking must not be used in potentially explosive atmospheres.

3.10.3 Hybrid Foamatic MA-SA



WARNING

Do not use the water from the system for applications other than cleaning.

Do not change the settings made or recommended by the supplier of the detergents!

Only professional service personnel are allowed to carry out service and repairs on the unit. Only instructed personnel are allowed to operate the unit.

System safety

In case of error/defect or service on equipment

1. ➤ Close the water supply
2. ➤ Close the air supply
3. ➤ Turn of power supply

Closing valve for water supply

With this valve the unit can be isolated from the water supply. Further, a non-return valve is built in the unit to prevent backflow of water.

Closing valve for air supply

With this valve the unit can be isolated from the air supply. Two non-return valves for air are built in the unit to prevent backflow of air.



- The air pressure regulation/gauge only works when the supply valve is open.
- Wear glasses when using the unit.
- Wear gloves and suitable clothing when using the unit.



WARNING

The spray jets can be dangerous if subjected to misuse. The jets must not be directed at persons, live electrical equipment or the unit itself.

Do not use the unit within range of persons unless they wear protective clothing.

3.10.4 Manometer D40 - D63 [WIKA]

Pressure gauges may only be operated and maintained by trained and authorized by the plant operator personnel.

For hazardous media such as oxygen, acetylene, flammable or toxic substances, as well as refrigeration systems, compressors, etc., must the relevant regulations be observed.



WARNING

Before installation, commissioning and operation, make sure that the correct pressure gauge with regard to measuring range, design and due to the specific measuring conditions the suitable wetted material (corrosion) has been selected.

The load limits must be observed, to ensure the measuring accuracy and the durability of the product.

From pressure gauges that do not have a safety design according to EN 837 in the event of a component failure, under high pressure through the medium can escape through bursting sight glass. For gaseous and operating pressure > 25 bar according to EN 837-2 a pressure gauge with safety version S3 is recommended.

After an external fire especially at soft solder joints measuring material can escape. All devices must be inspected before the system is put back into operation and replaced if necessary.



WARNING

Failure to observe the relevant regulations can result in serious bodily injury and/or property damage.

4 Delivery



Prior to delivery, notification will be provided of the scope of the equipment.

The notification of the scope of the equipment contains details on :

- The delivery date
- The number, type and weights of the handling units

The BFH Foamatic is carefully checked and packaged prior to shipment. However, damage during transport cannot be ruled out.

Ecolab assumes no responsibility for shipping damage, see also chapter ➔ 2.5 'Transportation'.

Delivery (also for spare parts and replacement parts) and returns

Receiving inspection :

- Check the completeness using the delivery note.

In the event of damage :

- Check the items supplied for any damage (visual inspection).

In the event of complaints (e.g. shipping damage) :

- Immediately contact the most recent shipper.
- Preserve the packaging
(for the purpose of possible checking by the shipper or for return shipment).

Packaging for return shipment :

- Use if possible the original packaging and the original packaging material.
 - *In the event that neither of these are any longer available:*
Make use of a packaging company with specialist personnel.
 - Place the transport units on a pallet
(it must be designed to bear the weight).
 - Should any questions arise on the packaging and shipping insurance please check these out with the manufacturer.

Packaging for shipment by truck :

- When being shipped by truck the machinery or the items to be shipped are to be placed, supported and secured with lifting tackle.

Version

The BFH foam cleaning system is supplied in the following version:

- BFH foam cleaning system Version 1.1
Standard version with 2 chemicals (products) / (alkaline / foam disinfection)

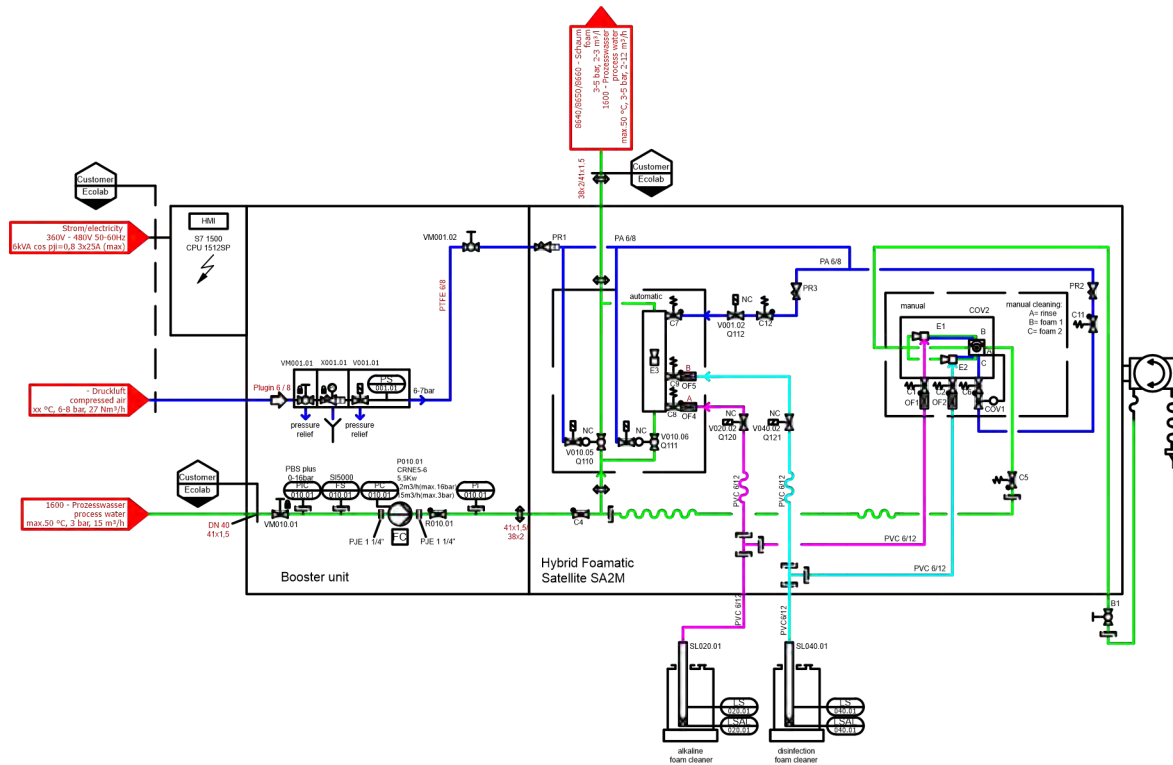


Fig. 2: BFH foam cleaning system Version 1.1

The system consists of the following components:



BFH Foamatic **Without** hose winder

Standard features:

- Water unit 12 m³/h
- Hybrid Foamatic satellite for two chemical products
- Compressed air maintenance unit
- Hose holder including a 25 m hose and spray gun
- Control with operating display

Technical documentation consisting of:

- User Manual BFH Foamatic
- CE declaration (project-related)
- P&ID flow diagram (project-related)
- Circuit diagram (project-related)
- Spare parts list (project-related)
- Documentation of the components (project-related)



BFH Foamatic **With** hose winder

Standard features:

- Water unit 12 m³/h
- Hybrid Foamatic satellite for two chemical products
- Compressed air maintenance unit
- Hose holder including a 25 m hose and spray gun
- Control with operating display

Technical documentation consisting of:

- User Manual BFH Foamatic
- CE declaration (project-related)
- P&ID flow diagram (project-related)
- Circuit diagram (project-related)
- Spare parts list (project-related)
- Documentation of the components (project-related)

4.1 Scope of the equipment for system components

Mechanical/hydraulic components



The mechanical and hydraulic components are summarised in the appendix using the associated operating instructions (see → [Appendix B 'Component operating manuals' on page 321](#)).

Electrical components



The electrical system components can be seen in the appendix using the parts list in the circuit diagram (see → [Appendix A.4 'Circuit diagram' on page 307](#)).

5 Function description



Note on graphical representations

The graphics shown in this manual are principle sketches, the actual situation may differ slightly. Generally, the graphics are structured in such a way that a principle is recognisable.

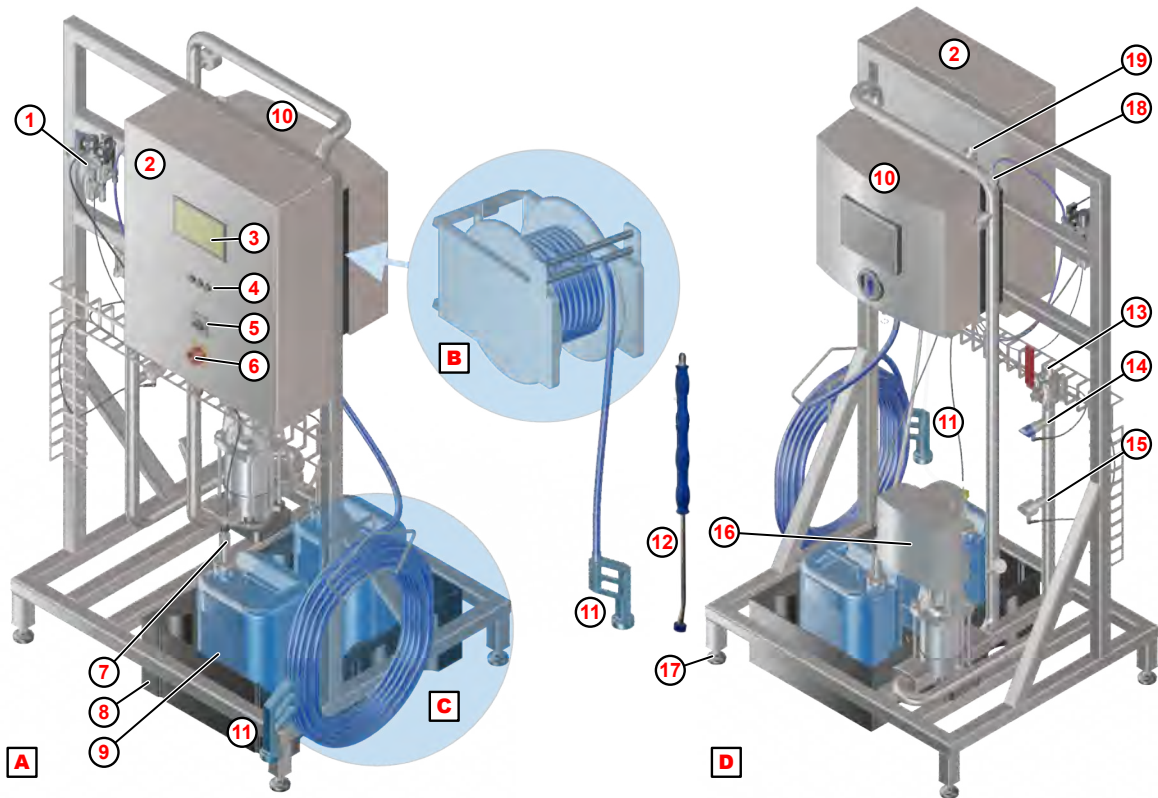


Fig. 3: BFH Foamatic Overview of checking

A For control cabinet

- ① Compressed air unit
- ② Control cabinet
- ③ Control with operating display
- ④ Operating buttons
- ⑤ UPS switch (uninterruptible power supply)
- ⑥ Master switch with emergency stop function
- ⑦ Suction lance
- ⑧ Drip tray
- ⑨ Chemical containers
- ⑩ Foamatic Hybrid Satellite

B Option: Hose reel

- ⑪ Spray gun
- ⑫ Spray lance

C Option: Hose holder

D For satellite

- ⑬ Connection of water supply
- ⑭ Diaphragm pressure switch PBS [SICK]
- ⑮ Flow sensor SI5000 [IFM]
- ⑯ Pressure booster pump CRNE5 [GRUNDFOS]
- ⑰ Adjustable feet for aligning the frame
- ⑱ Compressed air connection for satellite

The BFH Foamatic is a Plant for the fully automatic external cleaning of filling systems.

The cleaning solution is prepared according to the injector principle.

A control system ③ controls and monitors the Plant.

The cleaning programs are individually adapted depending on the cleaning interval, degree of dirt and size of the cleaning section.

The foam station also comes with a manual spray lance ⑫.

The BFH Foamatic is equipped with a frequency-controlled pressure booster pump (16). You can adjust the water pressure for rinsing and the working pressure during foam production on the touchpanel of the control unit (3). The foam products to be used in the tanks are provided in the drip tray (8) (accessory) below the station. The suction lances contained in the accessories (7) are connected to the Foamatic via suction hoses and placed in the chemical tank.

By mixing water, foam cleaning chemicals and compressed air, the BFH Foamatic creates a foam cleaning solution. For this purpose, the pressure booster pump (16) is used to increase the cleaning pressure of the water. In the Hybrid Foamatic Satellite (10), this pressurised water is then mixed in injector blocks with foam cleaning chemicals and foamed up with compressed air.

The foam solution is produced using two injector blocks:

- *Injector block 1:* Prepares the foam in Auto mode.
- *Injector block 2:* For manual foam cleaning.

This foamed foam cleaning solution is used for the automatic cleaning of filling and transport systems in the food and beverage industry.

Alternatively, manual cleaning can be carried out with a spray lance (12); simultaneous operation with automatic cleaning is possible to a limited extent, but the set pressures depend on automatic cleaning.

The Plant has a fluids inlet for clean water (13) and compressed air (18).

The cleaning agents are supplied using suction lances (7) from chemical containers (9) below the Foamatic satellite (10). Alkaline and acid foam products are used, as well as optional foam disinfection products. At the media outlet, the foamed cleaning solution is conveyed to the consumers via the branch line and the downstream nozzle system.

The Plant is monitored with pressure and flow sensors.

The automatic cleaning programs are usually remote controlled, i.e. the programs are selected from the filler touchpanel (3).

The program is then started via a signal exchange between the filler and foam station.

You can also run the Plant in Standalone mode. Select the programs from the control panel (3) of the foam station. The release signal comes from a potential-free contact.

Usually, the Plant is installed in the vicinity of the filler, near the filler valve manifold (pipe length to the first nozzle approx. 10 to max. 30 m).

5.1 Functional principle

BFH Version 1.1:

You can see the functional sequence in the P&ID flow diagram (see → [Appendix A.3 'P&ID flow diagram' on page 305](#)).

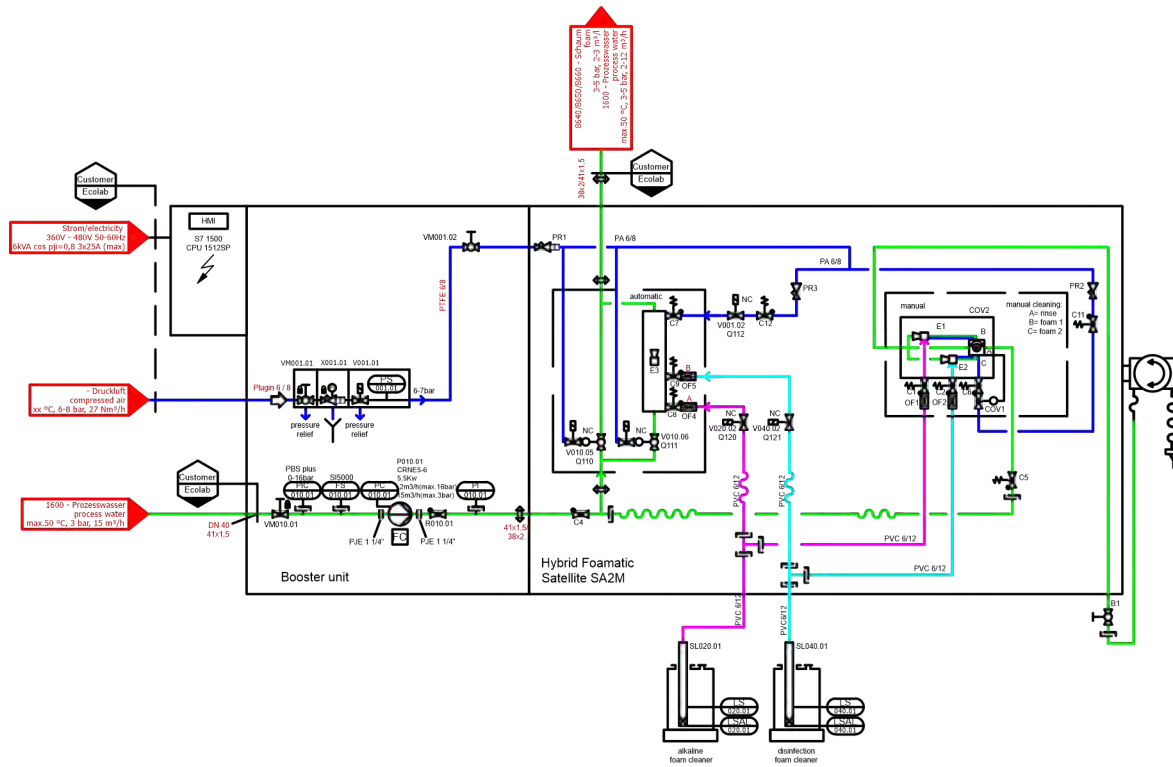


Fig. 4: Standard version with 2 products (alkaline and foam disinfection)

Line colour coding in operating principle:

- **Light green lines:** Water inlet pipes
- **Dark green lines:** Outlet pipes (foam/water)
- **Blue lines:** Air pipes
- **Pink line:** Pipes for detergent 1
- **Orange line:** Pipes for detergent 2
- **Red line:** Pipes for detergent 3

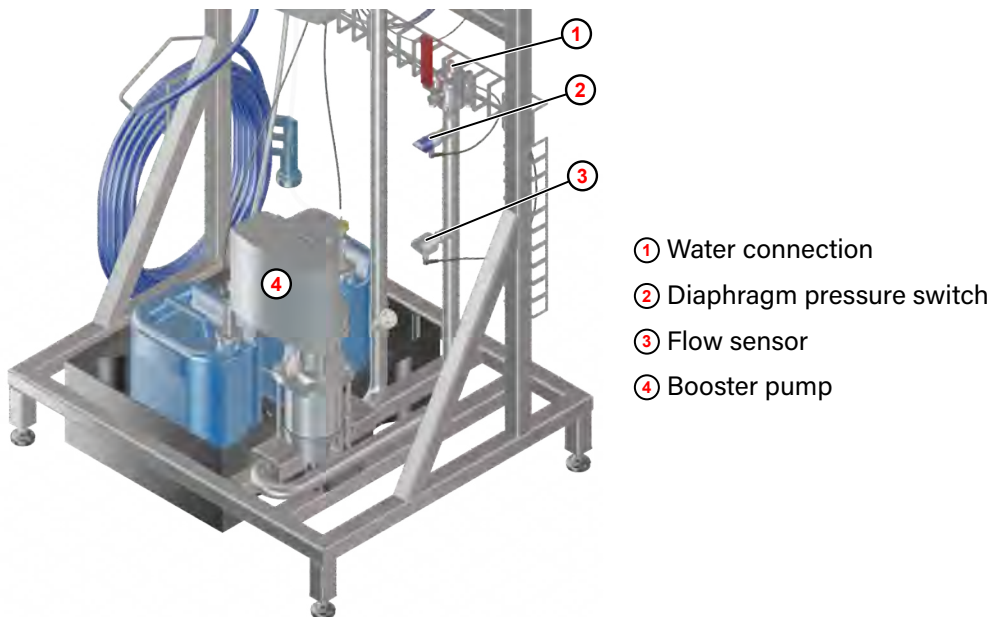
Cleaning programs (default)

The system has the following cleaning programs:

- **P1** Alkaline cleaning
- **P2** Acid cleaning
- **P3** Foam disinfection
- **P4** Cold water rinsing program
- **P5-P7** Combination program (alkaline + acid)

5.2 Function description of the assemblies

Water unit

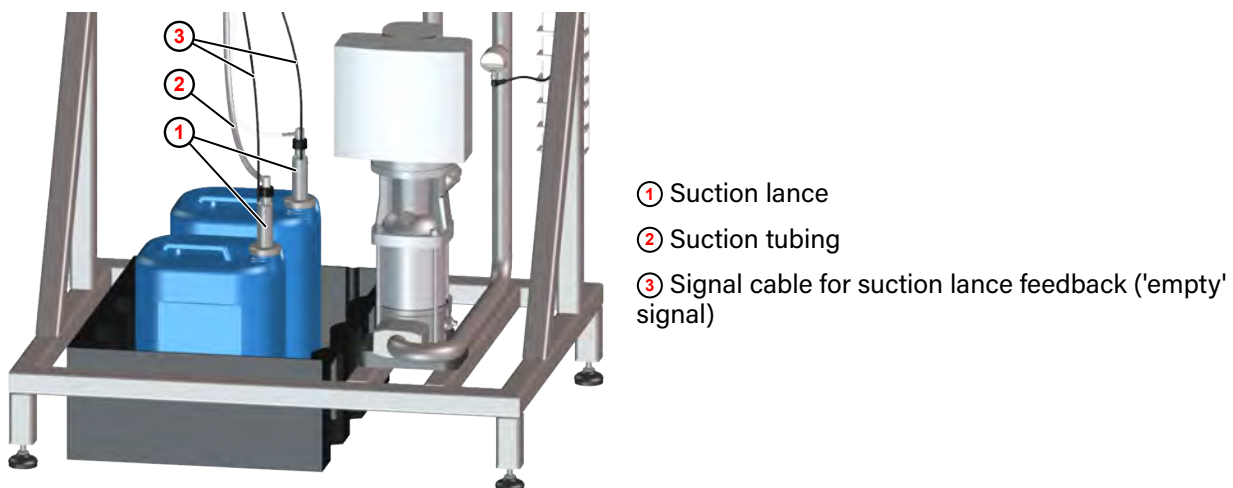


The water unit consists of a flow sensor ③, a diaphragm pressure switch ② and a pressure booster pump ④ with frequency converter.

The flow sensor ③ measures the flow of water at the inlet. The diaphragm pressure switch ② checks the water pressure at the inlet.

Depending on the setting, the frequency-controlled pressure booster pump ④ generates the preset water pressures. The pressure transmitter in the pump body forwards the actual values of the pressure booster pump to the control unit.

Suction lances



The suction lances ① feed the foam cleaning chemicals to the injector blocks via flexible PVC hoses ② for foam cleaning.

The suction lances are equipped with a check valve and with a 'pre-empty' and 'empty' signal.

Hybrid Foamatic satellite

Using the Hybrid Foamatic Satellite, the cleaning solution is mixed with foam cleaning chemicals using injector technology and foamed using compressed air. The compressed air is set via a pressure reducer with pressure indicator.

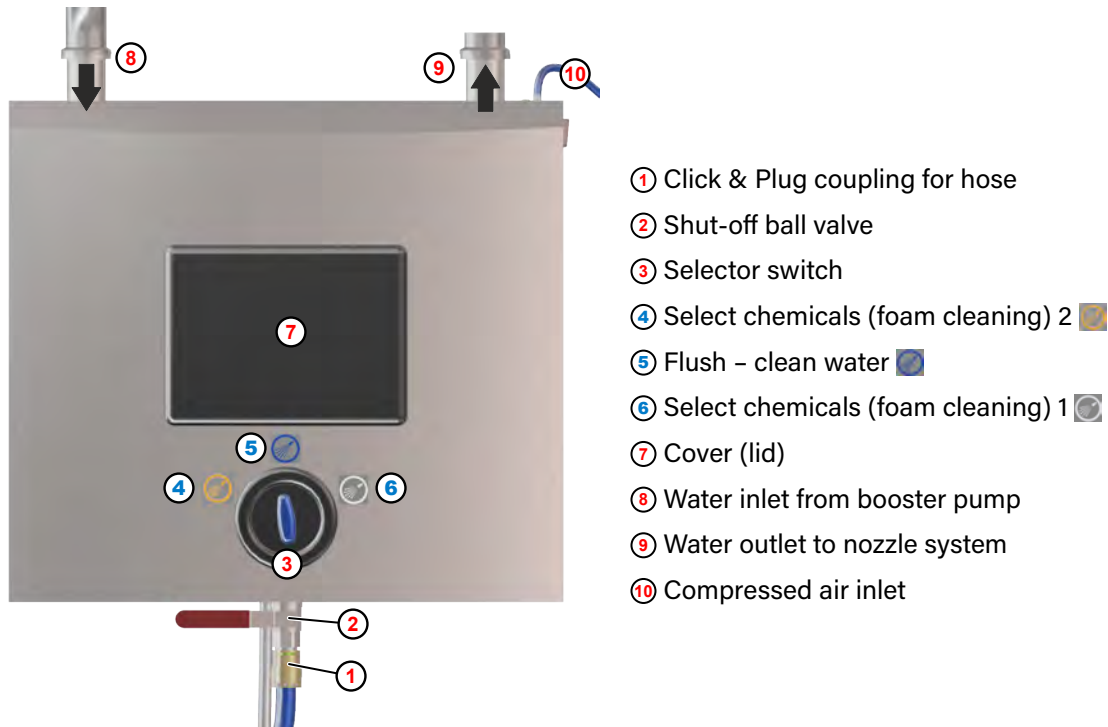
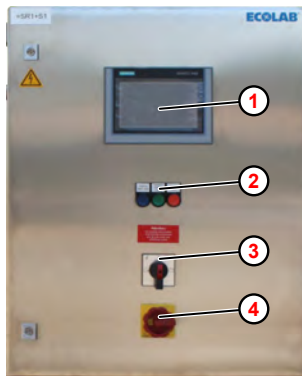


Fig. 5: Hybrid Foamatic satellite

The Hybrid Foamatic satellite has 2 outputs:

- A quick coupling ① for connecting a spray lance for manual cleaning.
 - Toggle between 'Rinse' ⑤, 'Foam 1' ⑥ and 'Foam 2' ④ manually using a control dial ③.
 - Connect the spray lance with spray gun using the quick coupling ① below the satellite.
 - There is a manual shut-off valve ② for closing and opening the manual output.
 - With the control dial ③ you can select 'Rinse' ⑤, 'Foam 1' ⑥ or 'Foam 2' ④.
- An outlet ⑨ for connecting a permanently installed nozzle system.
 - The system automatically switches between 'Rinse' and 'Foam' via switching valves, which are activated via the control system.
 - The chemical product is activated by means of a solenoid valve.
 - The compressed air is set via the installed pressure reducers.

Control cabinet with controls



- ① Operating display for the control unit
- ② Operating buttons
- ③ UPS switch
- ④ Master switch with emergency stop function

In addition to the main switch ④, the control cabinet also includes the control unit with operating display ① and the control buttons ②. Optionally, you can have a pneumatic valve block installed in the control cabinet to control the external valves of the nozzle system.

Spray gun with spray lance and nozzles



- ① Spray gun
- ② Spray lance for water
- ③ Tornado water nozzle
- ④ Disinfection nozzle
- ⑤ Foam nozzle

The spray gun ① can be fitted with different nozzles ③④⑤ for cleaning. In addition, instead of using a nozzle for water-cleaning, you can attach the spray lance ② to the spray gun ①.

Use the spray lance ② with hose for manual cleaning.

The nozzles: You attach the tornado water nozzle ③, disinfectant nozzle ④ or foam nozzle ⑤ to the spray gun, depending on the purpose.

5.3 Chemical processes when mixing peroxides

Mixing a peroxide solution (<2%) with a caustic solution concentrate:

Two cases can be distinguished for this:

A solution with pure peroxide (H₂O₂)

- In general, the mixing of pure peroxide and a lye is deemed a critical process, as a strong reaction may occur. In the following case, however, the reaction can be classified as 'small' due to two points:
First, the reaction is restricted because the amount of peroxide is very limited due to the solution.
Secondly, the high water content of the solution further weakens the reaction. The mixture of caustic solution with peroxide would be very strongly diluted and thus the reaction in relation to the volume would be small.

This is an acid-peroxide product solution (e.g. Oxonia Active 150)

- A mixture of an acid-based peroxide product with caustic solution is still to be considered non-critical, because:
 - 1) The acid content and the caustic solution neutralise each other in the first step.
 - 2) A reaction with the peroxide remaining/dissolved in the remaining solution can occur only with a high amount of caustic solution.
 - 3) Due to the Oxonia Active 150 solution, the water content is so high that the reaction is diminished. The mixture of caustic solution and peroxide is very strongly diluted, so the reaction is relatively low in relation to the total volume.

Conclusion:

In both cases, the reaction is non-critical.

Mixing a peroxide solution (<2%) with a chlorine-alkaline detergent (concentrate):

- In addition to the above mentioned points in ➔ *'Mixing a peroxide solution (<2%) with a caustic solution concentrate:' on page 58*, the chlorine content in the detergent does not pose an additional risk, as the peroxide and chlorine neutralise each other.
- At the end of the reaction, either chlorine or peroxide would remain as a stable compound. For conventional products, the ratio of alkalinity and chlorine content is in the non-critical range (no chlorine gas formation). Only when 1b is mixed with pure chlorine bleach products or products with very little alkalinity could certain mixtures result in a complete neutralisation of the alkalinity introduced by the chlorine products and a complete neutralisation of the peroxide compounds.
- Residual amounts of acid could then react with the remaining hypochlorite to form chlorine gas.

Conclusion:

Usually a non-critical situation – however, it can also be moderately critical under certain conditions.

Mixing a peroxide concentrate with an alkaline solution:

Two cases can be distinguished for this:

Pure peroxide (H₂O₂)

- A mixture is to be considered critical in this case, since even small amounts of a caustic solution will lead to an autocatalytic reaction of the peroxide. This means that, after an initially low reaction in the peroxide container, the reaction will continue to occur and increase exponentially (strong increase in heat and pressure within a few seconds).

Conclusion:

Critical situation!

Acid-peroxide product (e.g.: Oxonia Active 150)

- A mixture is not in itself very critical, as the caustic solution and acid of the two products are neutralised in the first step as described in point 1b).
The combination becomes critical when so much caustic solution is pressed into the acid-peroxide container that the acid is completely neutralised and the remaining peroxide reacts with the caustic solution.
Due to the solution, however, it can be assumed that the reactivity in the container has already been greatly reduced due to the high water content.

Conclusion:

Non-critical situation at low contamination – critical at high contamination.

Mixing an alkaline solution with a peroxide (concentrate):

- When peroxide is added to an alkaline solution, the oxygen is released. The speed at which this occurs depends on the temperature. The gas development depends on the amount of peroxide added. A critical situation is not expected with small amounts of added peroxide and open containers.

Conclusion:

The situation can become critical with large amounts of added peroxide.

Mixing a chlorine-alkaline detergent with an acid:

- It is imperative that a chlorine-alkaline detergent is not mixed with an acid (not combined with peroxide), as chlorine gas formation occurs even in small mixing ratios.
- A small amount of chlorine-alkaline agent in an acid immediately leads to the release of chlorine gas. Small amounts of acid in a chlorine-alkaline solution lead only to a (partial) neutralisation of the alkalinity when mixed.
- Chlorine gas is released only when the pH is completely neutralised and/or shifted to the acidic range.
- Without mixing (dripping into a standing solution), complete neutralisation and the release of chlorine gas can occur locally.

Conclusion:

Critical situation!

5.4 Description of the system components

Information from the component operating instructions



This section provides excerpts from the component instructions of the BFH Foamatic. Ecolab is not the author of these extracts, Ecolab cannot assume any liability for damages resulting from the use of the following information. The original texts can be found in the respective component operating instructions. See: [➔ Appendix B 'Component operating manuals' on page 321.](#)

5.4.1 Compressed air unit MSB4 [FESTO]



The compressed air unit supplies the system with compressed air. When the system is switched on, the electro-pneumatic shut-off cocks are activated by the switch-on valve. The pressure sensor reports the system pressure to the controller. When an emergency stop function is actuated, the on-off valve is switched off. All electro-pneumatic shut-off valves are closed. The supply to the pneumatic level sensors remains active during an emergency stop.

[➔ More information on: Compressed air unit MSB4 \[FESTO\]](#)

5.4.2 Centrifugal pump CRNE 5 [GRUNDFOS]



Grundfos E-pumps are fitted with frequency-controlled permanent-magnet motors for single-phase or three-phase mains connection.

The pumps are equipped with a PI controller and can be configured for an external sensor.

The pumps have been factory-set to constant-curve control mode. You can change the control mode with R100 or Grundfos GO Remote.

The pumps have a built-in PI controller and are set for a pressure sensor enabling the control of the outlet pressure. The pumps have been factory-set to constant-pressure control mode. The pumps are typically used to keep a constant pressure in variable-demand systems.

[➔ More information on: Centrifugal pump CRNE 5 \[GRUNDFOS\]](#)

5.4.3 Flow Monitors SI500x [IFM]



The unit monitors the flow of liquid and gaseous media.

➔ [More information on: Flow Monitors SI500x \[IFM\]](#)

5.4.4 Butterfly valve EVOGUARD [KRONES]



The valve is used for opening and fully or partially shutting off pipe system sections in the beverage and food industry. The valve is automatically actuated by a pneumatic cylinder or manually with a lever.

➔ [More information on: Butterfly valve EVOGUARD \[KRONES\]](#)

5.4.5 Hybrid Foamatic MA-SA



The mainstation in the Hybrid range is a completely functioning hygiene and pumping station that supplies pressurised water to both its integrated hygiene points (optional) and to several connected cleaning areas. Therefore the mainstation must be supplied with: water in sufficient quantity, power, compressed air, detergent(s), disinfectant. The station is then ready for hygiene duties. The mainstation is fitted with a frequency controlled pump which ensures a constant working pressure independent of usage pattern. Detergents are supplied via a User Pack system or from separate standard cans. Supply is also possible via piping systems.

The unit is approved for the use of detergents and disinfectants.



WARNING

Do not use the water from the system for applications other than cleaning.
Do not change the settings made or recommended by the supplier of the detergents!

➔ [More information on: Hybrid Foamatic MA-SA](#)

5.4.6 Inductive switch IMB12 [SICK]



These inductive proximity sensors are used to detect metallic targets in potentially explosive areas in zone 2 or zone 22.

➔ [More information on: Inductive switch IMB12 \[SICK\]](#)

5.4.7 Pressure switch PBS [SICK]



The PBS plus pressure switch is used to switch power circuits depending on the measured pressure. The pressure value can also be output to the respective evaluation units as a standardized signal. The switching conditions can be programmed directly on the pressure switch (switching and resetting points). Switching conditions and pressure values can be read off using the various display elements.

➔ [More information on: Pressure switch PBS \[SICK\]](#)

5.4.8 Manometer D40 - D63 [WIKA]



The pressure gauges are defined as "pressure-maintaining equipment"

➔ [More information on: Manometer D40 - D63 \[WIKA\]](#)

6 Installation and assembly

Personnel requirements

Personnel:

- Mechanic
- Qualified electrician
- Specialist
- Service personnel

Personal protection equipment (PPE)

Protective equipment:

- Protective work clothing
- Protective gloves
- Safety shoes

General safety notes on installation and assembly



CAUTION

Obligation to carry out a risk analysis in the area of occupational safety - risk of injury due to disregard for occupational safety

In order to ensure occupational safety in every phase of the system's life cycle, the following points must be analysed in advance on the basis of a risk analysis and adhered to. If the specified points are not observed, there is considerable danger for maintenance and service personnel!

Before starting work:

- Carry out a risk analysis for the upcoming work.
- Plan and provide the necessary personal protective equipment (PPE) at the place of work for all persons involved in the assignment in accordance with the safety data sheet specifications for the chemical(s) used.
- Plan and provide ALL necessary emergency equipment at the place of use for all persons required there for work-related reasons in accordance with the specifications from the safety data sheet of the chemical(s) used.
- Perform LoTo procedure ([↪ Chapter 11.1 'Define lockout/tagout procedures according to local conditions' on page 208](#)).
- foam cleaning system:
 - Cleaning ([↪ Chapter 12.2 'Cleaning' on page 230](#))
 - Draining ([↪ Chapter 12.3.3 'foam cleaning system drain' on page 236](#))
 - and Rinsing ([↪ Chapter 12.3.2 'Rinse the foam cleaning system' on page 235](#))



DANGER

Danger to life due to blocked or inadequate escape and rescue routes

If escape and rescue routes are blocked or inadequate, danger zones cannot be evacuated quickly enough and emergency services may have difficulty reaching the scene of the accident.

- Keeping escape and rescue routes clear is an important part of safety in buildings.
- Escape routes, emergency exits and escape hatches must be kept clear at all times to ensure safe exit from buildings in the event of danger.
- It is important that escape routes, emergency exits and escape hatches as well as doors along escape routes are labelled.
- It may also be necessary to draw up an escape and rescue plan.
- **Always observe all locally applicable regulations!**



DANGER

Danger to life due to suspended loads

Suspended loads can cause life-threatening injuries if the operating equipment does not meet the requirements.

- Only use approved lifting gear and slings with sufficient load-bearing capacity.
- Wear protective shoes and helmet.
- Keep transport area clear.
- Never step under or into the swinging range of suspended loads.
- Ensure that the centre of gravity of the transport piece is in the middle.



DANGER

Risk of injury due to tilting of the Plant and improper installation and assembly work

Tipping of the Plant can lead to life-threatening injuries.

Transport units can fall or tip over if improperly transported.

During delivery, unloading and general transportation, proceed safely and pay attention to the symbols and information on the packaging.

- Work must be carried out only by authorised and trained specialist personnel
- Ensure stable surface and steadiness
- If required, level the Plant using the adjustable feet



DANGER

Spilled chemicals can pose a biological hazard.

Be careful not to spill chemicals or allow them to leak; otherwise, a biological hazard cannot be ruled out. Make sure that suitable binding agents are provided at the filling point according to the safety data sheet for the metering chemicals.



DANGER

Danger to life due to electric current!

Contact with live components can be fatal.

Work on such components must be carried out:

- only by skilled staff who are duly trained and authorised
- only after all circuits have been switched off
- after the safe disconnection of the power supply and the procedure secured against re-switching (LoTo method: LockOut-TagOut).


WARNING
Burns caused by chemicals harmful to health

Leaks caused by transport damage to the Plant can allow corrosive chemicals to escape and cause serious injury.

- Check the Plant for transport damage.
- Do not put the Plant into operation if transport damage is present.


WARNING
Risk of injury due to unprofessional installation, maintenance and repair work

Improperly performed installation, maintenance and repair work can lead to serious injuries.

- If available, press one of the emergency stop buttons before starting work
- Observe the safety data sheet for the chemical product used
- Before starting work, separate the chemical supply and clean the Plant
- Use only approved original spare parts


WARNING
Danger due to putting into operation a piece of equipment which has been damaged during transport:

If damages are discovered during unpacking, do not install or put unit into operation, as otherwise unforeseeable hazards can occur. All parts must be checked for transport damage immediately after unpacking in order to rule out the risk of transport damage.


WARNING
Risk of injury from loose parts, components and tools placed on top of each other or left lying around

Loose parts, components and tools placed on top of each other or left lying around are sources of accidents that can lead to serious injury.

To avoid this, the workplace must be kept clean and tidy for all work is carried on the Plant


CAUTION
Risk of injury from damaged or unsuitable tools

Injuries may result from the use of damaged or unsuitable tools.

- Use only undamaged tools.
- Use only the tool intended for the specific purpose (e.g. suitable drills).


NOTICE
Material damage due to additional weight loads

Additional weight loads can cause material damage to the Plant.

- Do not load the Plant with additional weight
- Do not step upon the Plant or use it as a climbing aid
- Do not place heavy tools on the Plant.


NOTICE
Material damage by using incorrect tools!

Using the wrong tools can cause material damage.

Only use the correct tools for the intended purpose.



ENVIRONMENT

Chemicals can harm the environment

- Ensure that no chemicals leak or are spilled.
- Have a suitable binding agent available in accordance with the safety data sheet.
- Immediately collect chemicals that have leaked or spilled and dispose of them properly.

Transporting pallets with a forklift or lift truck



CAUTION

Secure the load.

To avoid slipping, the transport unit must be firmly attached to the forklift with a transport strap (see Fig. 6b).

Transport units mounted on pallets can be transported using a forklift/lift truck under the following conditions:

- The forklift/lift truck must be designed to support the weight of the transport units. The operator must have the equipment checked regularly by an expert.
- The truck driver must have permission to drive industrial trucks with a driver's seat or driver's platform in line with local regulations.
- The transport unit must be securely fastened to the pallet.

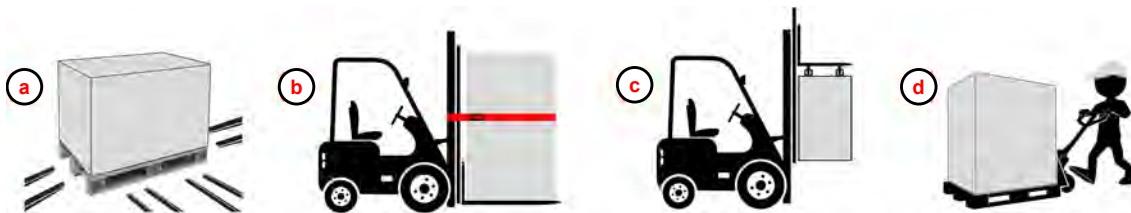


Fig. 6: Transport with a forklift and lift truck (schematics)

- a Forks of the lift truck/forklift under the load
- b Forks of the forklift under the load with transport protection (here: red belt)
- c Forks of the forklift above the load (transport unit suspended)
- d Transport by lift truck

Transport by crane - suspended loads



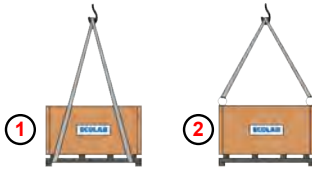
WARNING

Danger of injury due to suspended loads!

There is a risk of injury when transporting and mounting or dismounting the device due to suspended loads.

- Never stand under or in the pivot range of suspended loads.
- Only use approved lifting equipment and suspension devices of sufficient load-bearing capacity.
- Do not use cracked or worn slings.
- Only use slow transport movements because of the partly heavy weight.
- Make sure that no people, objects or obstacles are in the pivot range of the transport unit during transportation.
- Only move loads under supervision.
- Deposit the load when leaving the workplace.
- Use personal protective equipment.

- Crane and lifting accessory must be designed to carry the weights. The operator must have this checked regularly by an expert.
- The crane operator must be trained and authorised to operate the crane.
- During transportation, use any lifting eyes on the transport unit where available, and observe the transport instructions.
- Observing the suspension points, attach the transport unit to the crane and transport it with the appropriate lifting gear (e.g. crossbeam, belt, multiple-point suspension gear, ropes).
- Do not walk under suspended loads!



- ① Suspension points below the load
(only if the centre of gravity is at the centre).
- ② Transport using lifting eyes

6.1 Requirements for the installation site

Location

- Choose the installation site so that the pipeline from the machine to the nozzle system (branch line) is between 10 m and 30 m long. Where appropriate, lay the pipes so that the minimum length of 10 m is complied with.
- Usually, the Plant is installed in the vicinity of the filler, near the filler valve manifold (pipe length to the first nozzle approx. 10 to max. 30 m).
The cable length from the start to the first nozzle must be at least 10 metres.
- If the Plant has to be installed close to a machine to be cleaned (less than 10 metres away), make sure the pipe length is at least 10 metres. The line must be diverted in this case.

Condition of the base

- The floor must be even and resistant to the chemicals used.

Ambient conditions

- For information on environmental conditions, see → [Chapter 14 'Technical data' on page 253](#). Avoid direct sunlight, heating, cooling and similar environmental influences in the vicinity of the Plant.



CAUTION

Electromagnetic influence

Avoid interfering electrical installations in the vicinity of the Plant.

Space requirement

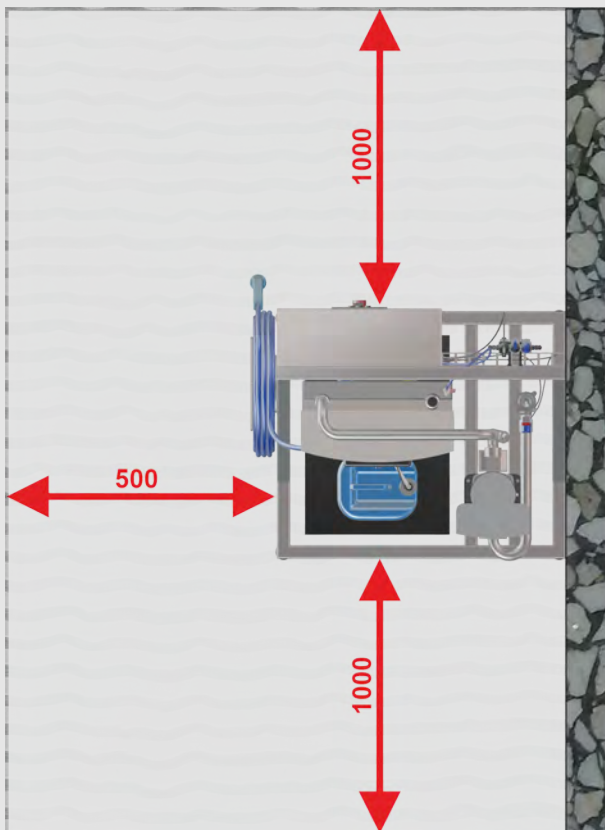
To ensure a trouble-free workflow during operation and maintenance work on the Plant, the minimum space required for the Plant must be taken into account.



Please note the accessibility from 3 sides of the system.

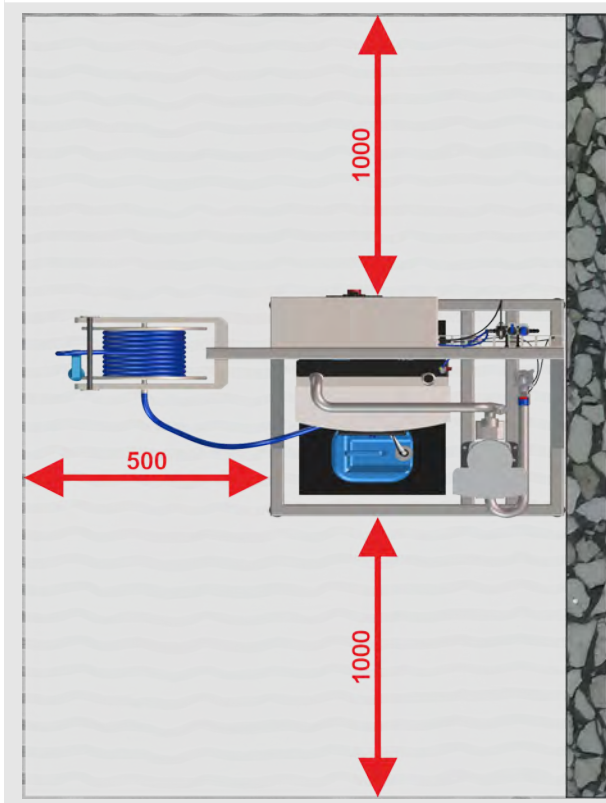
Accessibility must be ensured for:

- Operate the controls.
- Load the tanks, access and maintain the Foamatic.
- Using the spray lance.



Comply with the min. space requirements of the Plant.

- On the right side, the system can be placed against a wall, as no access is necessary here.
- To operate the Plant a side clearance of at least 500 mm (50 cm) and 1000 mm (1 m) at the operating elements (e.g. switching cabinet) is required around the system.
- The area around the *should be unobstructed for maintenance work*Plant.
- A space requirement of approximately 150 cm is recommended for service work on the electrical control cabinet.



Comply with the min. space requirements of the Plant.

- On the right side, the system can be placed against a wall, as no access is necessary here.
- To operate the Plant a side clearance of at least 500 mm (50 cm) and 1000 mm (1 m) at the operating elements (e.g. switching cabinet) is required around the system.
- The area around the *should be unobstructed for maintenance work*Plant.
- For service work on the electrical control cabinet, a clearance of approx. 1500 mm (1.5 m) is recommended.

Recommendation for the storage room

- **Wall conditions:** Concrete or other standard materials.
- **Flooring:** Resistant to all stored chemicals
- **Structural properties:** Actual load on surface of approx. 50,000 N/m²
- **Safety equipment (PPE):** Personal protective clothing for workers (boots, gloves, suit and goggles, face protection, gas mask).
- **Ventilation system:** Standard 1 gas change / h, Fault: 5 gas changes / h
- **Drainage system:** External operation and lockable, resistant to stored chemicals
- **Emergency shower:** In the chemical storage room

6.2 Preparatory measures in coordination with the operator

- All installation and assembly personnel must undergo an induction before starting the work. This is to be organised and carried out by the customer. All possible hazards must be identified and excluded.
- Obtain the work permits required to access and work at the installation site.
- Determine and confirm the escape routes and the procedure for evacuating the factory.
- Ensure that all preparatory tasks required for the work have been carried out.
- Ensure that the access and working areas are clear for the forklift truck.
- Set up a separate work area defined by the customer.
- Set up signs inside the building indicating that work is currently in progress to be provided by the installation site if necessary.
For example: "Men at work" / "Slippery floor" / "Hazardous chemicals".
- Use yellow/black adhesive tape as a hazard warning/barrier.

6.3 Connections required on site



WARNING

Danger due to improperly installed system components

Improperly installed system components can result in personal injury and damage to the system.

To prevent damage and personal injury, all system components made available by the operator (e.g. pipe connections, flanges, connections) must be checked for proper assembly.

To ensure safe operation, a final leak test of all system components is essential during initial commissioning and this test must be documented (operator obligations).

If assembly was not carried out by Customer Support/Service, check that all system components are made of the correct materials (product is resistant to the dosing media used) and meet the applicable requirements.



CAUTION

Before commissioning the Plant the local power supply must be checked against the circuit diagram (→ [Appendix A.4 'Circuit diagram' on page 307](#)).



NOTICE

Requirements for system components provided by the operator

To avoid personal injury and damage to the system, it must be ensured that the system components provided (pipe connections, flanges) have been correctly installed.

We recommend compensators for the transition from plastic to stainless steel pipes in order to minimise loads during installation and operation.

If the installation is not carried out by Ecolab Engineering GmbH Customer Support/Service, steps must be taken to ensure that all components consist of the correct materials and meet the applicable requirements.

Before installation, the supply connections required by the customer and a drain for the drain valve must be available. For information on the supply connections required at the customer, see → [Chapter 14 'Technical data' on page 253](#).



Recommendation for transitions from plastic to stainless steel pipes

At the transition from plastic to stainless steel pipes, the use of compensators is recommended in order to minimise mechanical stress during installation and operation.

Installation of piping

- Determine the route(s) for the pipes, which should run according to the floor plan drawing.
- Pipes must be installed using suitable welding methods – all stainless steel piping must be flushed with argon during welding and all welds cleaned from the outside

Important basic conditions [media]

Medium	Pressure [bar]	Flow rate [l/min]	Connection	Characteristics
Product water	3 [bar]	12.000	DN 40	Hardness < 4° dH, chloride < 20 ppm
CLO2 water	3 [bar]	12.000	DN 40	max. 0.4 ppm
Compressed air	6 [bar]	27.000	DN 8	DIN ISO 8573-1, class 2, water and oil-free
Solution CLO2	2 [bar]	100	DN 15	approx. 400 ppm CLO2

6

Required supply connections

Power connection

- Supply voltage: 380 - 480 V
- Frequency of supply voltage: 50/60 Hz
- Maximum output power: 6 kVA, cos phi=0,8
- Supply line fuse: max. 3 x 25 A

System air connection

- Min. pressure of system air supply: 0.6 MPa (6 bar)
- Max. pressure of system air supply: 1.0 MPa (1 bar)
- Required minimum volume flow (foams): 27 Nm³/h

Water connection



WARNING

Damage at the pressure switch due to pressure surges in the water pipe

Pressure surges in the onsite water pipe can damage the pressure switch. Pressure switches can withstand continuous loads up to max. 16 bar. The operator of the Plant is responsible for regulating pressure surges from the water pipe by appropriate means.

Data	Value	Unit
Pressure range:	0.2-0.3 (2-3)	MPa (bar)
Temperature range:	15 - 65	°C
Minimum volume flow:	200	l/min

6.4 Plant .



DANGER

Damaged components

Components damaged during transport can lead to life-threatening injuries.

- Check the Plant for transport damage.
- Do not put the Plant into operation if transport damage is present.



NOTICE

Open packaging correctly

Opening the packaging incorrectly may cause damage to the Plant or parts of it.

When opening packaging, do not penetrate the packaging with sharp objects in order to open it. Symbols and instructions on the packaging indicating correct opening must be observed in order to avoid damage to the goods.

Plant To unpack:

1.  Remove any plastic wrapping.
2.  Remove the upper and front panels, then remove the side panels.
3.  Remove the accessory boxes, instructions and all other items.
4.  Remove packaging materials.
5.  Plant Remove from the packaging.
6.  Plant is complete.

7. 



NOTICE

Check the delivery for completeness and damage.

After unpacking the Plant, it must be checked immediately whether the delivery is complete and all parts are free of transport damage.

If parts are missing, a report must be made to the Ecolab.

The Ecolab is not liable for transport damage.

Transport damage must be reported to the carrier immediately upon detection.

If transport damage has occurred, initiate a return. See:

[↪ 'Repairs/returns to Ecolab Engineering GmbH'](#)

8.  Dispose of the packaging materials.



ENVIRONMENT

Risk of environmental damage due to incorrect disposal

Incorrect disposal of packaging materials can be a threat to the environment. Packaging materials are valuable raw materials and can, in many cases, be used again or be usefully processed and recycled.

- Observe the locally applicable disposal regulations.
- Always dispose of packaging materials in an environmentally friendly way or call in a professional disposal company.

6.5 Plant Positioning



DANGER

Risk of injury due to tipping of the Plant

Tilting the Plant by lifting can lead to life-threatening injuries.

- Secure the Plant to the pallet truck or forklift with suitable means before lifting
- When lifting, pay attention to a central centre of gravity
- Ensure stable surface and steadiness

To ensure that the Plant is level, align the Plant by adjusting the levelling feet (see [Fig. 3](#), pos. ⑰).

Tool:

- Pallet truck
- Forklift incl. trained personnel (customer's side)
- Spirit level
- Set of wrenches

1. ➤ Plant Lift carefully with a forklift and secure against tipping.



CAUTION

Secure your cargo!

To prevent slipping, the transport item must be firmly connected to the forklift with a transport belt.

2. ➤ Mount the levelling elements on the Plant.
3. ➤ Loosen the locking nuts on the levelling elements.
4. ➤ Plant Place the machine carefully.
5. ➤ Plant Level the machine using the spirit level and the hex nuts.
6. ➤ Tighten the locking nuts to secure the hex nuts.

6.6 Assembly procedure

See the descriptions under:

1. ➤ ➤ [‘Preparing the suction lance connection’ on page 74](#)
2. ➤ ➤ [‘Installing the suction lances’ on page 75](#)
3. ➤ ➤ [‘Establish a water connection’ on page 76](#)
4. ➤ ➤ [‘Establishing compressed air connection’ on page 77](#)
5. ➤ ➤ [‘Connect to the nozzle system’ on page 78](#)
6. ➤ ➤ [‘Connect external manual cleaning satellites \(optional\)’ on page 80](#)
7. ➤ ➤ [‘Establishing the power connection’ on page 79](#)

Preparing the suction lance connection

Personal protection equipment (PPE)

Protective equipment:

- Protective gloves
- Protective eyewear
- Safety shoes



Fig. 7:

1. ➤ Cut off the hose with a straight cut ①.
2. ➤ Slide the hose clamp over the hose ①.
3. ➤ Slide the hose onto the connection nipple ②.
4. ➤ Tighten the screw of the hose clamp ③.
5. ➤ Insert the O-ring into the groove of the suction valve ④.



To be able to guarantee the chemical resistance of the parts in contact with the product, always ensure that all sealants are selected correctly according to the intended use.

Select the O-ring according to the chemical material resistance of the cleaning chemicals used!

6. ➤ Connect the suction lance adapter ⑤.
7. ➤ Attach the PVDF protective sleeve to the end of the suction lance ⑥.
8. ➤ Adjust the length of the suction lance to fit the existing tank ⑦.

Installing the suction lances

Personal protection equipment (PPE)

Protective equipment:

- Protective gloves
- Protective eyewear
- Safety shoes

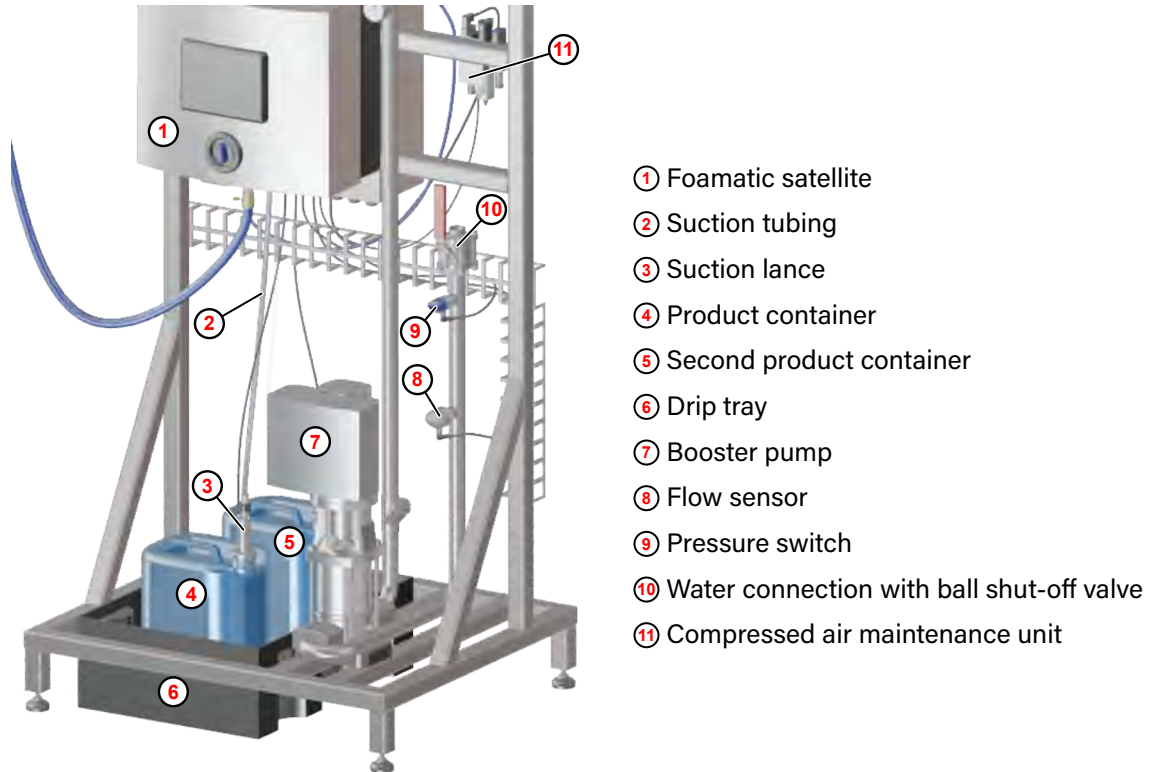


Fig. 8: Suction lance connection

To connect suction lances to the Foamatic satellite:

1. Check the filters of the suction lances for dirt.
2. To connect the suction line of (2) the suction lances (3) to the Foamatic satellites (1).
3. Insert the suction lance (3) into the product container (4).
The suction lance must be fully immersed in the product in the tank to prevent it from taking in air.
4. Attach the second product container (5) in the same way to the Foamatic satellite (1).

Establish a water connection

Requirements

- The supply line is rinsed and free of dirt.

Required water connection

- Pressure range: 0.2-0.3 MPa (2-3 bar)
- Temperature range: 1-60°C (33.8-140°F)
- Minimum volume flow: 200 l/min

Material:

- Suitable seals
- Suitable water pipe



WARNING

Damage at the pressure switch due to pressure surges in the water pipe

Pressure surges in the onsite water pipe can damage the pressure switch (see [Fig. 3](#), no. ⑭). Pressure switches can withstand a continuous load of up to max. 16 bar.

The operator of the Plant is responsible for regulating pressure surges from the water pipe by appropriate means.

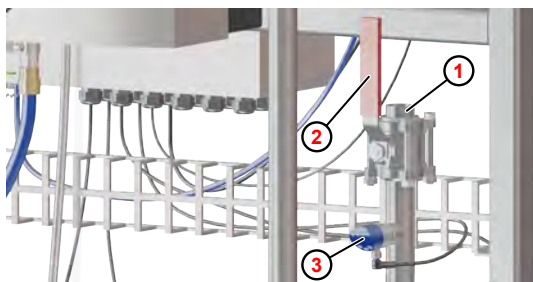


The connection to the water supply must be made in accordance with local regulations and in compliance with the legal precautions.

The operator is required to segregate systems adequately.

To prevent pressure loss in water pipes:

- No long supply lines
- No valves with high pressure loss
- Assemble low-pressure resistance valves



- ① Water connection
- ② Lock for water inlet
- ③ Pressure switch

Fig. 9: Establish a water connection

1. Set the "water inlet" lock ② to "OFF" (lever horizontal).
 - ➡ This creates space to carry out the installation at the water connection ①.
2. Remove the protective cap from the water connection ①.
3. Weld on the stainless steel water pipe.
4. Set the "water inlet" lock ② to "ON" (lever vertical).
5. Check the leak-tightness of connections.

Establishing compressed air connection

Requirements

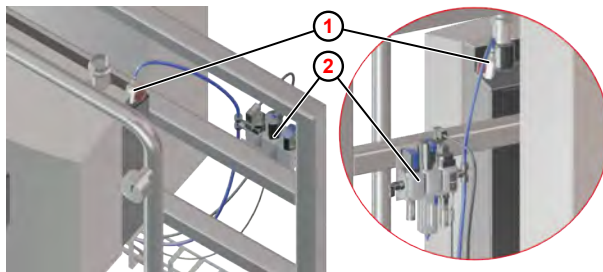
- An approved compressed air hose and a connection socket are provided.
- The valve on the compressed air supply is closed.
- The compressed air line to the Plant is blown out and free of dirt.

Required compressed air connection

- Min. pressure: 0.6 (6) MPa (bar)
- Max. pressure: 1.0 (10) MPa (bar)
- Minimum volume flow (foams): 27 Nm³/h

Material:

- Suitable seal
- Suitable connection socket



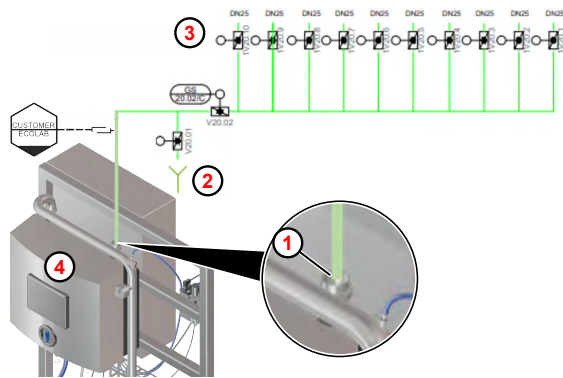
1 Shut-off valve for compressed air connection / satellite

2 Compressed air for maintenance unit

Fig. 10: Foamatic satellite compressed air connection

1. ➤ Connect the compressed air hose with the connection socket to the compressed air supply.
2. ➤ Attach the seal to the compressed air hose.
3. ➤ Connect the compressed air hose with the seal on the connector socket of the Plant.
4. ➤ Open the shut-off valve 1 of the pressure line between the Foamatic satellite and the compressed air maintenance unit 2.

Connect to the nozzle system



- ① Connection to the nozzle system
- ② Gully
- ③ Filler nozzle system
- ④ Hybrid Foamatic

Fig. 11: Connecting the nozzle system

Follow the instructions below to install the piping and nozzle system in filling machines, conveyors and other production machines.

Requirements

- The pipeline (DN40) is rinsed and is free of dirt

To install the piping and nozzle system in fillers, conveyors or other production machines:

1. Choose suitable, short supply routes.
2. Install the piping (DN40) between Plant and valve manifold (supply line).
3. Connect the drainage valve between the outlet of the Foamatic Satellite and the valve manifold, so you can drain the fluid in case of emergency or for maintenance purposes.
4. Fix the nozzles to the machine to be cleaned.
5. Check the tightness of the pipe connections.



ENVIRONMENT

Chemicals can harm the environment.

To prevent environmental pollution caused by chemicals, any escaping fluids must always be absorbed immediately by a suitable binding agent and disposed of properly. You will always find information on the absorption and disposal of chemicals in the relevant safety data sheet (→ [‘Safety data sheets’ on page 27](#)).

Establishing the power connection

Personnel requirements

Personnel:

- Qualified electrician



DANGER

Risk due to electrical voltage

Contact with electrical voltage can be fatal!

Components may be energised even when the main switch is switched off.

All electrical work must be carried out by trained and authorised specialist staff only, in accordance with relevant local regulations.

To power-off the control cabinet, set the main switch and UPS switch to "0".

Before commissioning the Plant the local power supply must be checked against the circuit diagram (→ [Appendix A.4 'Circuit diagram' on page 307](#)).

- Before starting work, switch off the power supply and ensure that it cannot be switched on again during the work!
- Check there is no voltage!

Required power connection

- Supply voltage: 380 - 480 V
- Frequency: 50/60 Hz
- Maximum output power: 6 kVA
- Supply line fuse: 3 x 25 A

Material:

- Circuit diagram of the Plant
- Suitable electrical cables, if required

1. → Plant Connect to the control cabinet according to the → [Appendix A.4 'Circuit diagram' on page 307](#).
2. → Connect the control cabinet to the power supply according to the → [Appendix A.4 'Circuit diagram' on page 307](#).
3. → Test the insulation, protective conductor and earth connection.

Connect external manual cleaning satellites (optional)

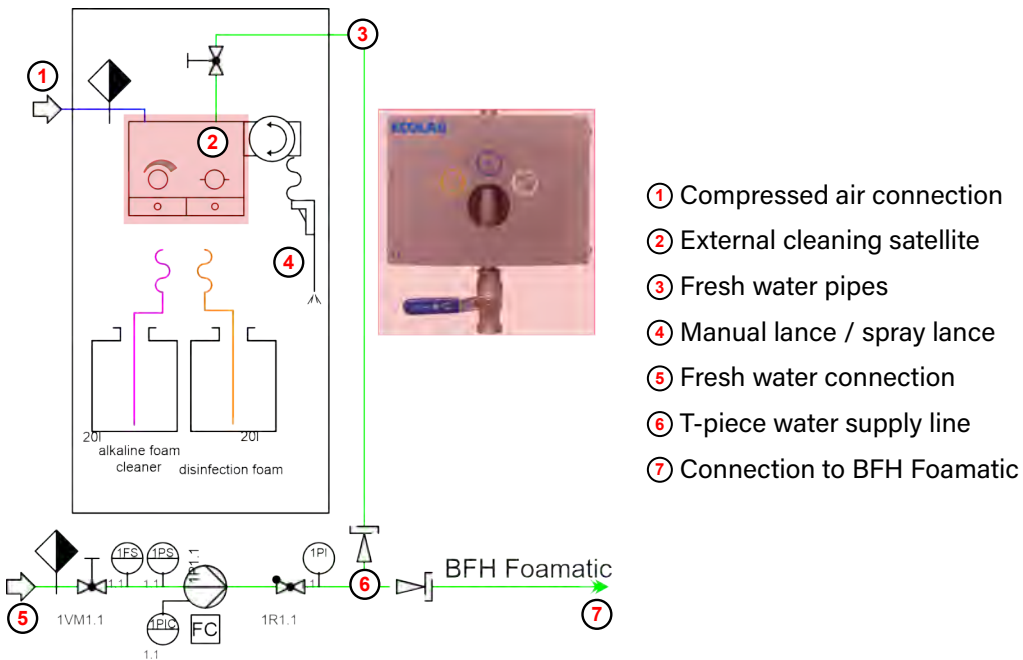
Optionally, you can connect additional external manual cleaning satellites ② to the pressure booster pump Plant.

Requirements

- The pipes are rinsed and free of dirt.

Material:

- Pipeline $\geq$ DN25



1. Install a T-piece ⑥ in the supply of the Foamatic satellite.
2. Connect the external cleaning satellite ② to the T-piece ⑥ in the feed of the Foamatic satellite ⑦.

7 Operating and display elements



Illustrations may differ from actual design

The illustrations in this chapter are for basic understanding and may differ from the actual design of the Plant.

Personnel requirements

Personnel:

- Specialist
- Service personnel

7.1 Operating elements on the switch cabinet

The control cabinet houses the complete control system, including all safety functions.



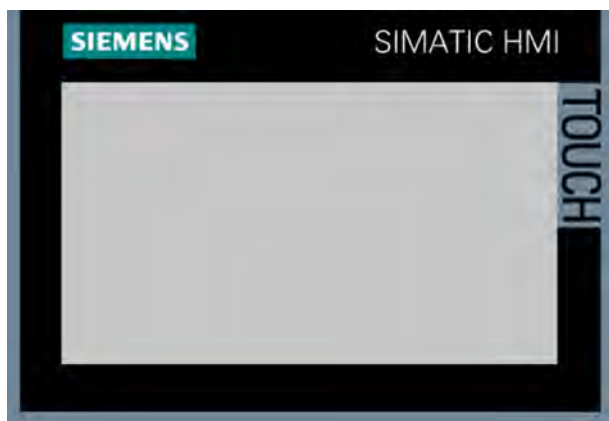
① → Control panel with operating display

② → control buttons

③ → UPS switch
uninterruptible power supply (optional)

④ → main switch with "emergency stop" function

SIMATIC HMI control panel with operating display



An HMI is a touch-sensitive screen (referred to as a touchscreen below). The buttons and input fields are touched directly on the screen using your finger.

You can also monitor the operating condition of the system and interact with the working process of the system by touching the buttons and input fields directly.

The control panel is designed as an operating display and serves as an input and output screen for the control software used by the Plant.

Operating buttons



Illuminated button ①:

Flashes to indicate a warning, lights up to indicate a fault.

Illuminated button ②:

Flashes during active cleaning in standby mode, lights up during manual cleaning with the suction lance.

Button ③:

Stops the automatic cleaning process. If the [Stop cleaning] button is pressed for more than 5 seconds during the active cleaning process or during maintenance, the Plant automatically turns off; the Fault/Cleaning button light turns off.

UPS switch (uninterruptible power supply) / Function



The UPS switch switches the Plant system management over to an uninterruptible power supply.

[1] Power supply switched over to mains

[2] 0-position (UPS OFF), lockable with a padlock.

[3] Power supply switched over to battery (UPS on).

Main switch



The main switch is red/yellow. Functions as an "EMERGENCY OFF/EMERGENCY STOP device" in accordance with IEC/EN 60204- 1, VDE 0113 Part 1.

The main switch turns the power supply of the Plant on and off. .

[0/OFF] Power supply switched off

[I/ON] Power supply switched on

7.2 Operating and display elements of the foam station

Hybrid Foamatic satellite

Using the Hybrid Foamatic Satellite, the cleaning solution is mixed with foam cleaning chemicals using injector technology and foamed using compressed air. The compressed air is set via a pressure reducer with pressure indicator.

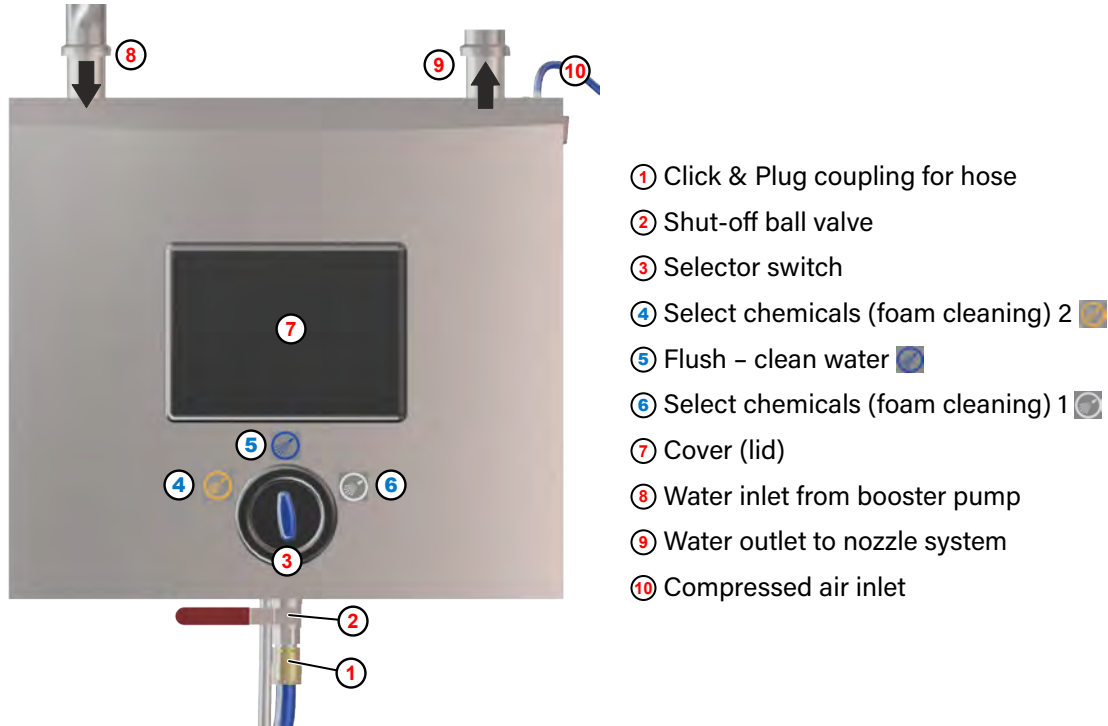


Fig. 12: Hybrid Foamatic satellite

The Hybrid Foamatic satellite has 2 outputs:

- A quick coupling ① for connecting a spray lance for manual cleaning.
 - Toggle between 'Rinse' ⑤, 'Foam 1' ⑥ and 'Foam 2' ④ manually using a control dial ③.
 - Connect the spray lance with spray gun using the quick coupling ① below the satellite.
 - There is a manual shut-off valve ② for closing and opening the manual output.
 - With the control dial ③ you can select 'Rinse' ⑤, 'Foam 1' ⑥ or 'Foam 2' ④.
- An outlet ⑨ for connecting a permanently installed nozzle system.
 - The system automatically switches between 'Rinse' and 'Foam' via switching valves, which are activated via the control system.
 - The chemical product is activated by means of a solenoid valve.
 - The compressed air is set via the installed pressure reducers.

8 Software description

Personnel requirements



DANGER

Only trained specialist staff can operate the controls.

Access to the control system is reserved exclusively for trained specialists and service personnel! Access by untrained persons can lead to personal injury and damage to the Plant.

To avoid personal injury and/or property damage, make sure no unauthorised persons can gain access.

We explicitly point out that after each operation, the appropriately logged in operator must secure the control system against unauthorised access, by logging out of the system.

The passing on of passwords, or the direct application of passwords to the control system is not permitted.

General notes



Software version

The software described here refers to Version **V21.0.xx** and later. You can check the installed version as described in [Chapter 8.16 '\[Information\]'](#) on page 163.

The following description assumes that the logged in [Operator] (see also [Chapter 8.15.2 '\[Settings\] - \[User accounts\]'](#) on page 153) has the appropriate access permissions.



WARNING

The touchscreen can be damaged if it is used incorrectly

The touchscreen is designed to be operated by finger.
Do NOT use any sharp objects (for instance, tools, pencils, pens).



Illustrations, action steps and password prompt

All values presented and described are only intended as an example and are not necessarily consistent with this BFH Foamatic. The correct values can be found in the commissioning checklist.

- **Illustrations:** Here to provide a basic understanding and may differ from the actual design of the Plant.
- **Password prompt:** Some functions may only be performed by authorised persons (e.g. administrator or service personnel).
The menu behind it is hidden from the operator.
A code word is required for activation.
Access to the software depends on user rights.
If a menu item with is selected by a user insufficient authorization, a login screen opens so you can enter the next-level login details.

Button functions of the system keyboard



If an input field is selected in the user interface, a system keyboard is automatically displayed for input.

Key functions



Enter button (Enter), confirms settings.
The system keyboard is then automatically hidden.



Leaves the setting of the field.

8.1 System start



Fig. 13: System start and [home screen]

When the BFH Foamatic system starts, the screen briefly shows notes about startup (1) and the manufacturer's logo (2). After that, the screen changes to the [home screen] (3) with the last set system overview (4).

8.2 Home screen

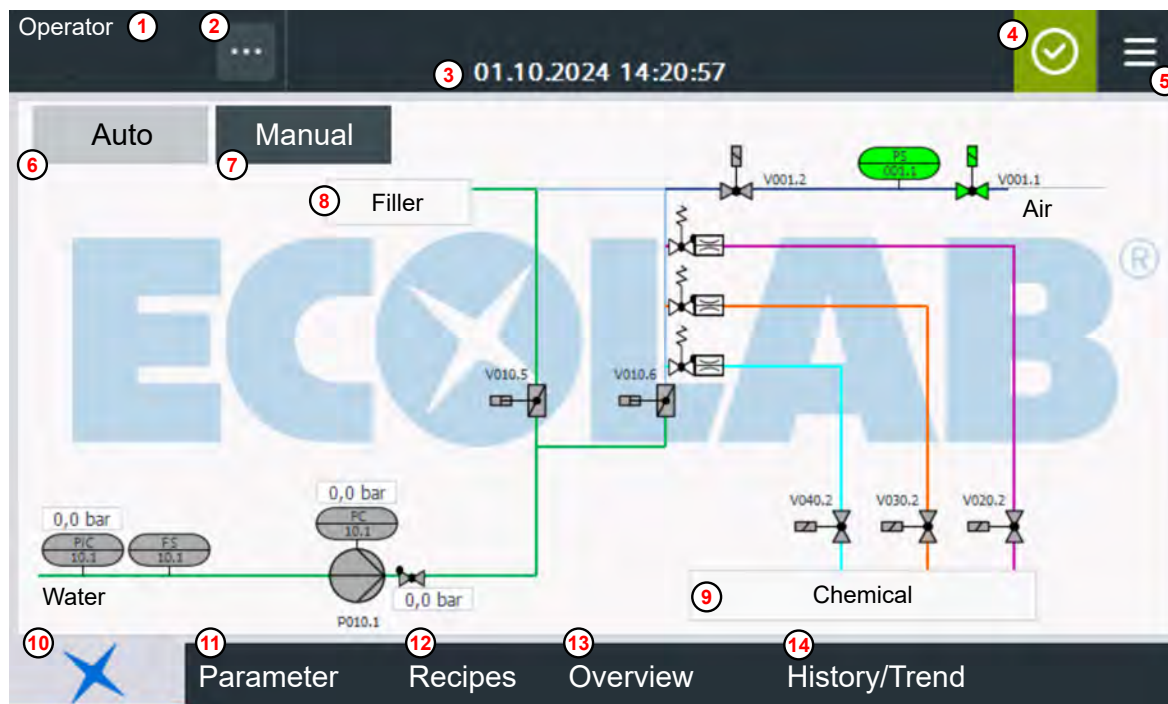


Fig. 14: [Main menu] home screen

- In the top left-hand corner you can see the current [Operator] ①.
If there is no [Operator], the field is empty.
- Use the switch  ② to log a [Operator] in or out of the system
(see also [Chapter 8.4 'Login / Logout' on page 89](#)).
- Date /Time ③ appears in the top centre.
Changes can be made as described in [' \[SettingsSet \] - \[Date /Time\]' on page 151](#).
- The system status (warnings / error messages) is checked in the background and, if there is none, this is indicated with the  symbol ④.
- Use the  switch ⑤ to go to the main menu [' \[Main menu\]' on page 88](#).
As long as you have the appropriate authorisations, you change the basic settings of the BFH Foamatic from this screen.
- Use [Auto] ⑥ or [Manual] ⑦ to set the control system mode, as long as you have the appropriate authorisations.
If [Auto] ⑥ is selected, the system takes over control.
If [Manual] ⑦ is selected, the current user ① can change the settings.
- In the middle of the screen is a function diagram (PID) of the BFH Foamatic including all switchable components (filler valves, air control valve, chemicals). In the mode [Manual] ⑦ [Chapter 8.5 '\[Manual operation\]' on page 91](#) you can select and manage each of these.
- Press the  switch ⑩, it changes colour  and the [home screen] appears.



Menu point colours: [Home page], [Parameter], [Recipes], [Overview], [History/Trend], always changes to light grey to indicate which selection is actively selected.

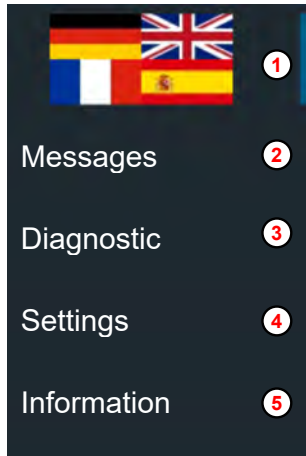
- Press the [Parameter] switch ⑪, it changes colour (grey background) and the [Parameter] level screen appears ([Chapter 8.7 '\[Parameter\]' on page 95](#)).
- Press the [Recipes] switch ⑫, it changes colour (grey background) and the [Recipes] level screen appears ([Chapter 8.8 '\[Recipes\]' on page 103](#)).
- Press the [Overview] switch ⑬, it changes colour (grey background) and the [Overview] level screen appears ([Chapter 8.9 '\[Overview\]' on page 116](#)).
- Press the [History/Trend] switch ⑭, it changes colour (grey background) and the [History/Trend] level screen appears ([Chapter 8.10 '\[History/Trend\]' on page 117](#)).

8.3 Menu structures

[Main menu]

Use the [Main menu] to go to the following screens:

Use the switch (Fig. 14, no. ⑤) to go to the main menu.



- ① Set language: Select using the flag symbol
→ Chapter 8.12 '[Set language]' on page 127.
- ② → Chapter 8.13 '[Messages]' on page 128.
- ③ → Chapter 8.14 '[Diagnostic]' on page 134
- ④ → Chapter 8.15 '[Settings]' on page 148
- ⑤ → Chapter 8.16 '[Information]' on page 163

Fig. 15: View [Main menu]

[Skirting board]

Use the [Skirting board] to go to the following screens:

The footer is always displayed at the bottom of the screen and does not have to be called up separately.

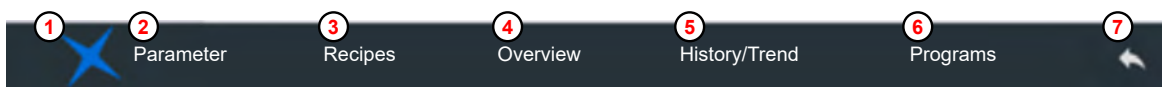


Fig. 16: Menu [Skirting board]

- ① Switch to → Chapter 8.2 '[Home screen]' on page 86.
- ② Go to → Chapter 8.7 '[Parameter]' on page 95.
- ③ Go to → Chapter 8.8 '[Recipes]' on page 103.
- ④ Go to → Chapter 8.9 '[Overview]' on page 116.
- ⑤ Go to → Chapter 8.10 '[History/Trend]' on page 117.
- ⑥ Go to → Chapter 8.11 '[Programs]' on page 125.

Navigation keys:

- Press the switch ①, it changes colour and the [home screen] appears (see → Chapter 8.2 '[Home screen]' on page 86).
- Press the key ⑦ to go back to the previous screen.

8.4 Login / Logout

When you press the  switch, a [Operator] can log into or out of the system.

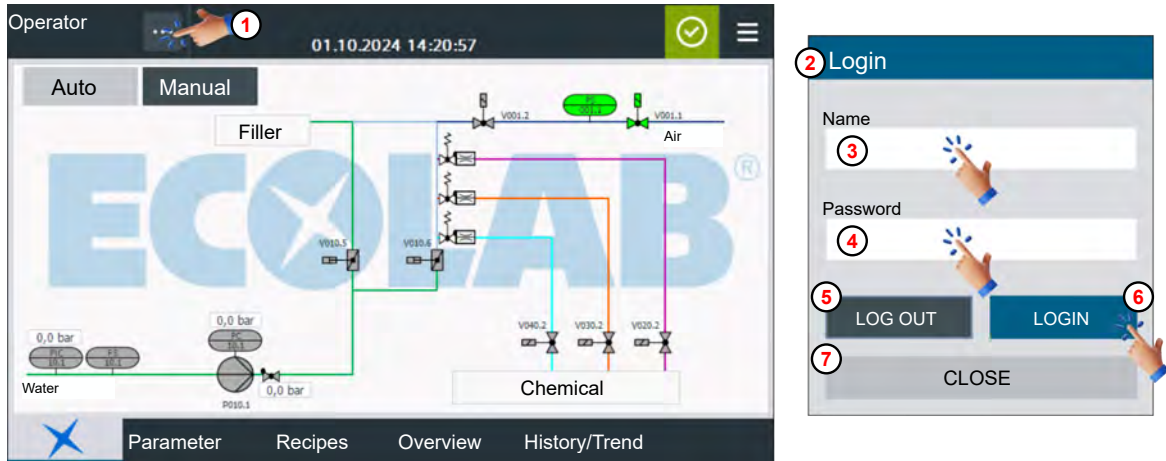


Fig. 17: Login / Logout

Operator [LOGIN]

1.  Press the key  ①.
 - ➔ The user login screen ② appears.
2.  Select the field [Name] ③.
 - ➔ The onscreen keyboard (see [➔ 'Button functions of the system keyboard' on page 86](#)) appears for you to enter text.
3.  Name ③ Enter and confirm with [ENTER].
 - ➔ The onscreen keyboard disappears.
4.  Select the field [Password] ④.
 - ➔ The onscreen keyboard appears for you to enter text.
5.  Password ④ Enter and confirm with [ENTER].
 - ➔ The onscreen keyboard disappears.
6.  Press the button [LOGIN] ⑥.
 - ➔ The Login screen ② closes.

 All subsequent settings can only be done with the appropriate authorisation.
To create Operator and change their user rights,
see [➔ Chapter 8.15.2 '\[Settings\] - \[User accounts\]' on page 153](#).

Operator [LOG OUT]



We strongly recommend that when not in use, the control system be brought into a safe state by logging off the operator, protecting the control system from accidental or unauthorised access.

1.  Press the key ①.
 - ➡ The user login screen ② appears.
2.  Press the button [LOG OUT] ⑤.
3.  Press the button [CLOSE] ⑦.
 - ➡ The screen ② closes.
 - ➡ The full [home screen] appears.
 - ➡ The control system is protected against accidental or unauthorised access.

8.5 [Manual operation]

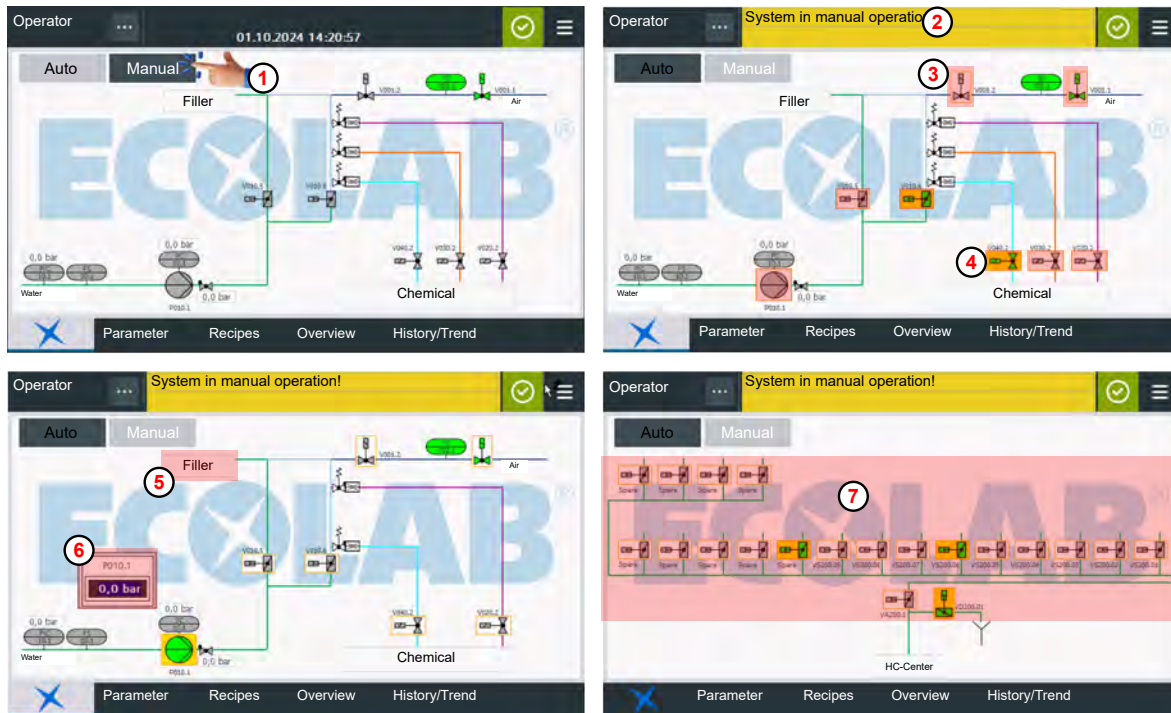


Fig. 18: Manual mode

Functions in the Manual operation

1. ManualPress the key ①.

- ➔ The view in the Manual operation appears.
- ➔ The status row ② turns yellow and shows 'System in manual operation!'.
- ➔



- Selectable components in the Manual operation are displayed in a yellow frame ③.
- If a component has been selected in the Manual operation, the yellow frame is also highlighted in yellow and the corresponding component is displayed in green ④.

2. FillerPress the key ⑤ to show the filler pressure.



- The Filler key ⑤ is greyed out if the Signal exchange is controlling the valves.
- Auto cleaning of the Filler in Manual operation cannot be started.
- Enter a set value ⑥ for the pump, otherwise it will not run.

3. Select and set the sectional valves ⑦.

Set sensor values

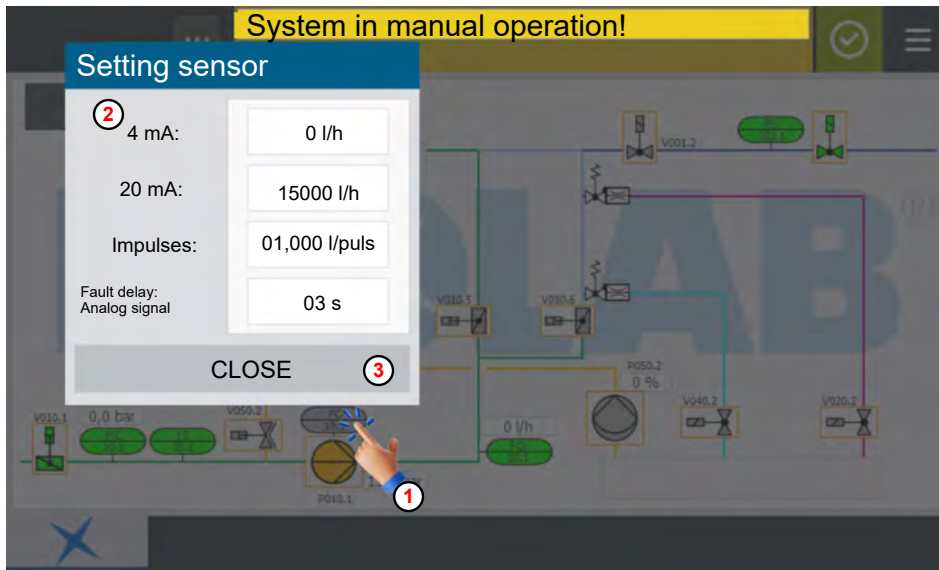


Fig. 19: [Manual operation] Set sensor value

1. Select sensor ①.
 - A pop-up window opens, giving you the option to change the sensor settings.
2. Enter the sensor value ②.
3. [CLOSE] Press the] key ③.
 - Your changes are saved.
 - The pop-up window is closed.



The P050.02 dosing pump is controlled by pulse signal.

Setting the flow sensor

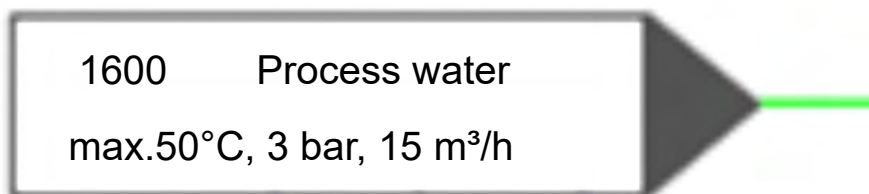


Fig. 20: [Manual operation] flow sensor

Adjust the flow sensor, observe the flow rate in the PID, default is 15m³/h

8.6 [Disturbance]

The colour of the status bar makes it easy to see either a warning message (yellow) or a fault with (red). The warning or fault is displayed in plain text and stored in the background in the control system's fault memory. To see the faults and warning messages, go to [Chapter 8.13 '\[Messages\]' on page 128](#).

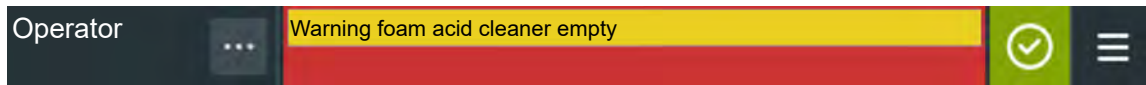


Fig. 21: Status row "Warning"



Fig. 22: Status row "Disturbance"

View [Disturbance] - filler valve

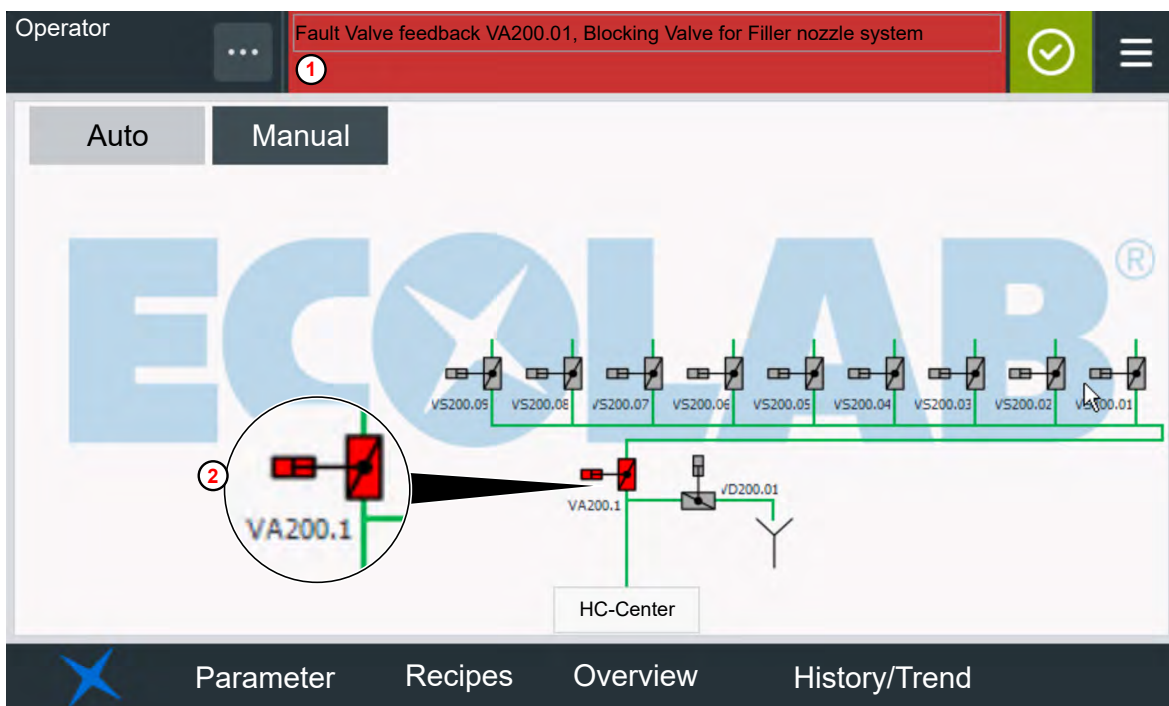


Fig. 23: [Disturbance] View if there is a fault with a filler valve

- The error message ① is shown as text in the top row.
- In this case, a filler valve has a fault ②, which is indicated in red.

View [Disturbance] - foam cleaner

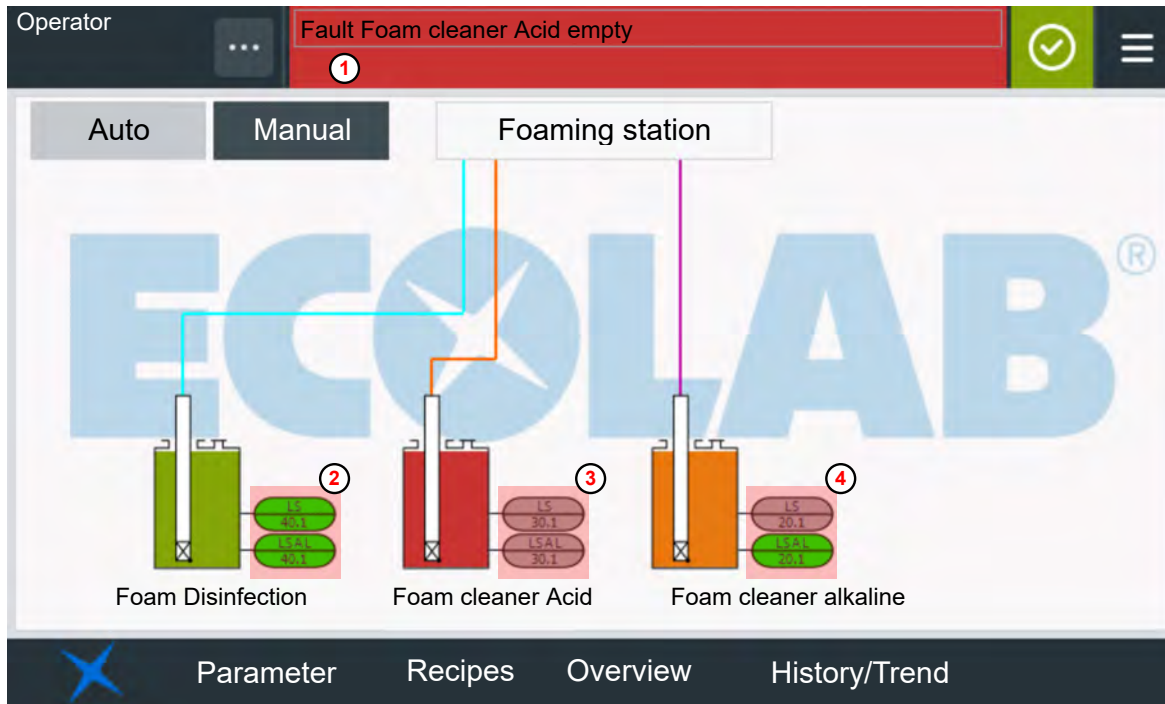


Fig. 24: [Disturbance] View if there is a foam cleaner fault

- The error message ① is shown as text in the top row.
- The container ② 'Foam Disinfection' is shown in green. This indicates a non-critical status.
- The container ③ 'Foam cleaner Acid' is shown in red. The status is critical and signals a fault. Cleaning stops after 5 seconds.
- The container ④ 'Foam cleaner Alkaline' is shown in orange. The status is issued as a warning. Cleaning continues.

8.7 [Parameter]

[Parameter] shows settings that affect the behaviour of the BFH Foamatic.

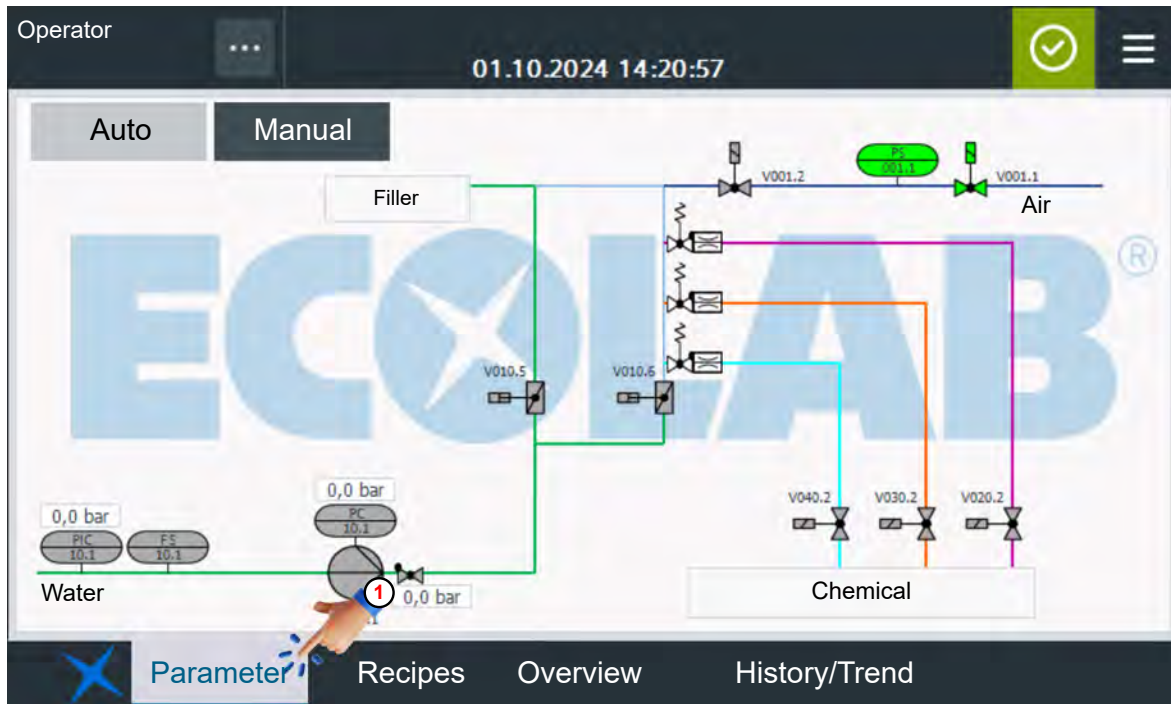


Fig. 25: [ParameterGo to]

[ParameterSelect]

➔ In the home screen, press the [Parameter] key ①.

➔ The [Parameter] screen appears.

Use the [Parameter] menu to go to the following screens:

- Setting range [General] see ➔ [Chapter 8.7.1 '\[Parameter\] -> \[General\]' on page 96.](#)
 - [Cleaning] see ➔ ['\[Parameter\] -> \[General\] -> \[Cleaning\]' on page 97.](#)
 - [flow rate monitoring] see ➔ ['\[Parameter\] -> \[General\] -> \[flow monitoring\]' on page 99.](#)
 - [Injector] see ➔ ['\[Parameter\] -> \[General\] -> \[Injector\]' on page 100.](#)
- [Manual lance] see ➔ [Chapter 8.7.2 '\[Parameter\] -> \[Manual lance\]' on page 102.](#)



Presentation of screenshots in the following section

For clarity, all the following screenshots in this section are reduced to the essentials. For example, the header and footer are omitted here.

8.7.1 [Parameter] -> [General]

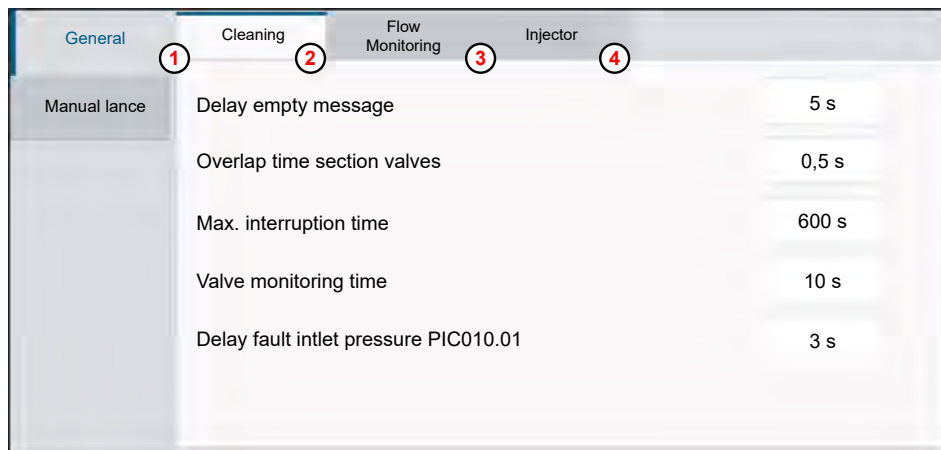


Fig. 26: Parameter No peroxide



Changing the view when using peroxide

If you are using peroxide as the dosing fluid, this screen now includes these menu items.

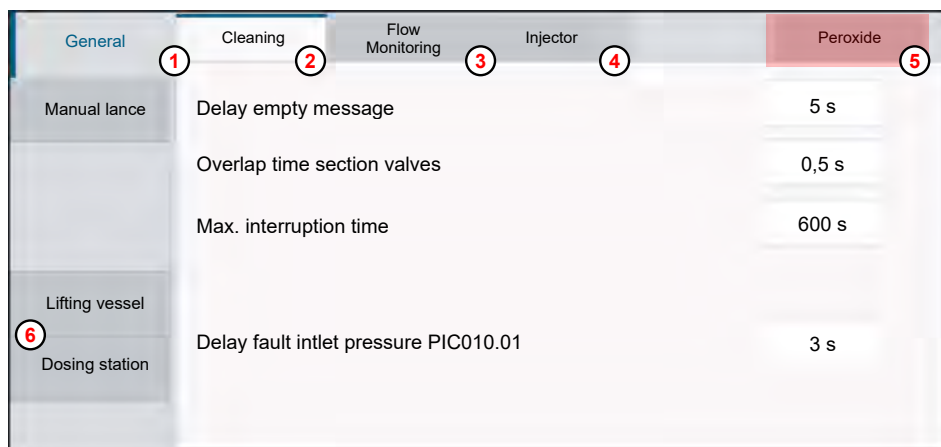


Fig. 27: Parameter With peroxide



Additional views when using peroxide

If you are using peroxide as a dosing fluid, this selection will be visible (5). Other areas may also appear (optional) (6), that may be relevant.

[ParameterSelect] -> [General]

➔ In the [home screen], select the switch [Parameter], (see Fig. 25).

➔ The screen [Parameter] - [General] - [Cleaning] appears, where you can make the following settings:

- (2) ➔ '[Parameter] -> [General] -> [Cleaning]' on page 97
- (3) ➔ '[Parameter] -> [General] -> [flow monitoring]' on page 99
- (4) ➔ '[Parameter] -> [General] -> [Injector]' on page 100
- (5) ➔ '[Parameter] -> [General] -> [Peroxide]' on page 101

[Parameter] -> [General] -> [Cleaning]

General	Cleaning	Flow Monitoring	Injector
Manual lance	Delay empty message 5 s ① Overlap time section valves 0,5 s ② Max. interruption time 600 s ③ Valve monitoring time 10 s ④ Delay fault inlet pressure PIC010.01 3 s ⑤		

Fig. 28: [Parameter] -> [General] -> [Cleaning]

Settings in [Parameter] -> [General] -> [Cleaning]:

Delay empty message

- ① Delay the trigger time for the 'empty' signal fault.
Default: 5 sec.

Overlap time section valves

- ② Set the overlap time for the sectional valves.
Default: 0.5 sec.

Max. interruption time

- ③ Stop cleaning when max. interruption time is exceeded.
The message "Program aborted", "No release to filler" appears.
Any fault stops the automatic cleaning process.
If the max. interruption time is exceeded, the cleaning program is interrupted.
Default: 600 sec.
No release to filler.
Fault and release can only be reset at the BFH.

Attention! Chemical residues may still be in the machine!

Valve monitoring time

- ④ Delay valve malfunction, end position not reached.
Default: 10 sec.

Delay fault inlet pressure PIC010.01

- ⑤ If the input water pressure falls below 1.25 bar, the selected active cleaning run is interrupted.
Default: 3 sec.

General	Cleaning	Flow Monitoring	Injector	Peroxide
Manual lance	Delay empty message			5 s ①
	Overlap time section valves			0,5 s ②
	Max. interruption time			600 s ③
Lifting vessel				
Dosing station	Delay fault inlet pressure PIC010.01			3 s ④

Fig. 29: [Parameter]->[Cleaning] if using peroxide

Settings in [Parameter] -> [General] -> [Cleaning] is using peroxide:

Delay empty message

- ① Delay the trigger time for the 'empty' signal fault.
Default: 5 sec.

Overlap time section valves

- ② Set the overlap time for the sectional valves.
Default: 0.5 sec.

Max. interruption time

- ③ Stop cleaning when max. interruption time is exceeded.
The message "Program aborted", "No release to filler" appears.
Any fault stops the automatic cleaning process.
If the max. interruption time is exceeded, the cleaning program is interrupted.
Default: 600 sec.
No release to filler.
Fault and release can only be reset at the BFH Foamatic.



DANGER

Danger from chemical residues in the BFH Foamatic

Chemical residues may still be in the BFH Foamatic when you reset it!

Delay fault inlet pressure PIC010.01

- ④ If the input water pressure falls below 1.25 bar, the selected active cleaning run is interrupted.
Default: 3 sec.

[Parameter] -> [General] -> [flow monitoring]

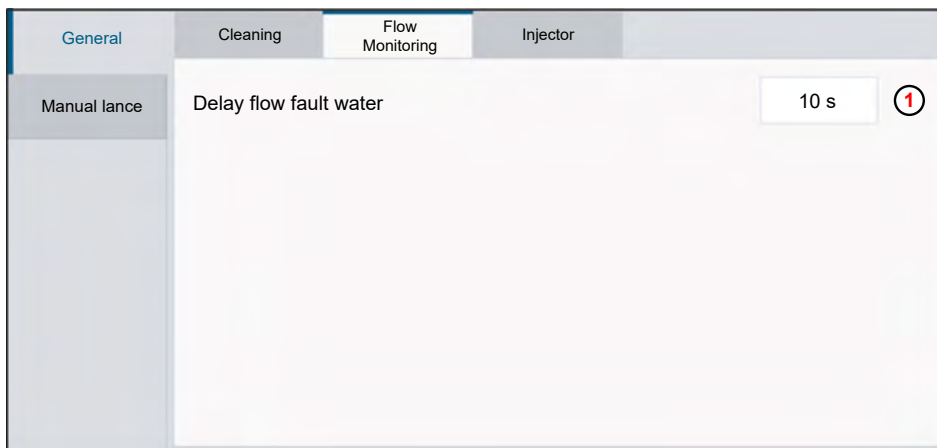


Fig. 30: Flow monitoring

Settings in [Parameter] - [General], selection [flow monitoring]:

Delay flow fault water

- ① Delay trigger time for the fault "no water flow for active cleaning".
Default: 10 sec.

[Parameter] -> [General] -> [Injector]

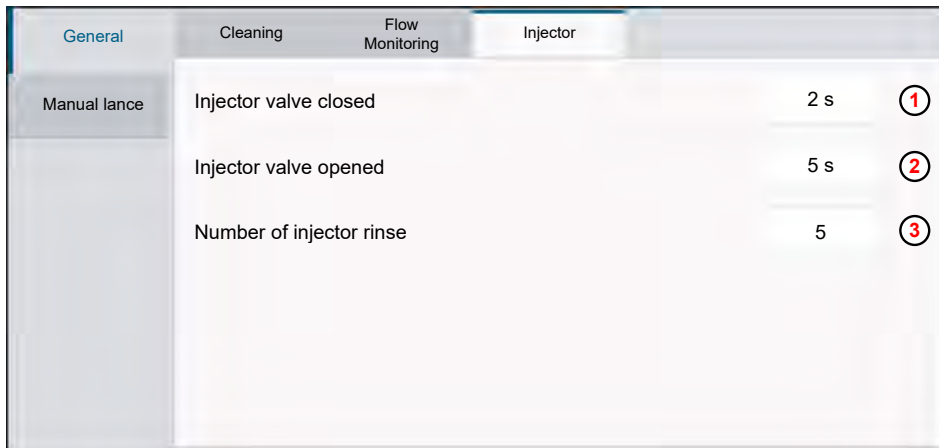


Fig. 31: [Parameter] -> [General] -> [Injector]

Settings in [Parameter] - [General], selection [Injector]:

Flush around the injector to the injector nozzles sticking or chemicals mixing (gas formation). This step is carried out automatically in advance with each cleaning program and cannot be deselected.

Injector valve closed

- ① Time the injector valve is closed. Default setting: 2 sec.

Injector valve opened

- ② Time the injector valve is open. Default setting: 5 sec.

Number of injector rinse

- ③ Number of rinse runs. Default setting: 5x



Necessary action before each cleaning process / product step

Before every cleaning program, the BFH Foamatic must be rinsed (Step 0) or after a product stop (chemicals) an injector rinse must be run. The valves [>V010.6<] = injector valve and [>V010.5<] = water valve are integrated into one assembly.

The valves interact, i.e. with each injector flush:

- Valve [>V010.6<] is closed while valve [>V010.5<] is open for 2 seconds.
- Valve [>V010.6<] is open while valve [>V010.5<] is closed for 5 seconds.

This process is repeated 5 times to prevent the chemicals from jamming the injector nozzles. The flushing process comes from the [>VD200.01<].

Normal state of the valves [>V010.5<] and V010.6<] is NC (normally closed).

[Parameter] -> [General] -> [Peroxide]

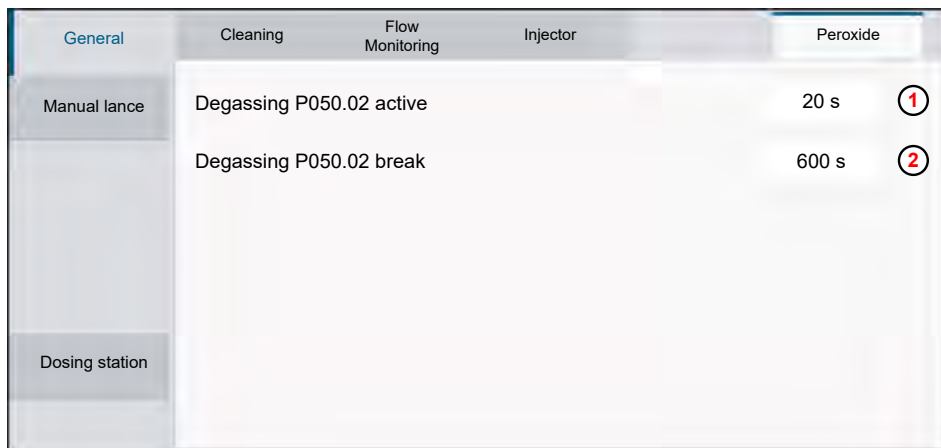


Fig. 32: [Parameter] - [Peroxide]

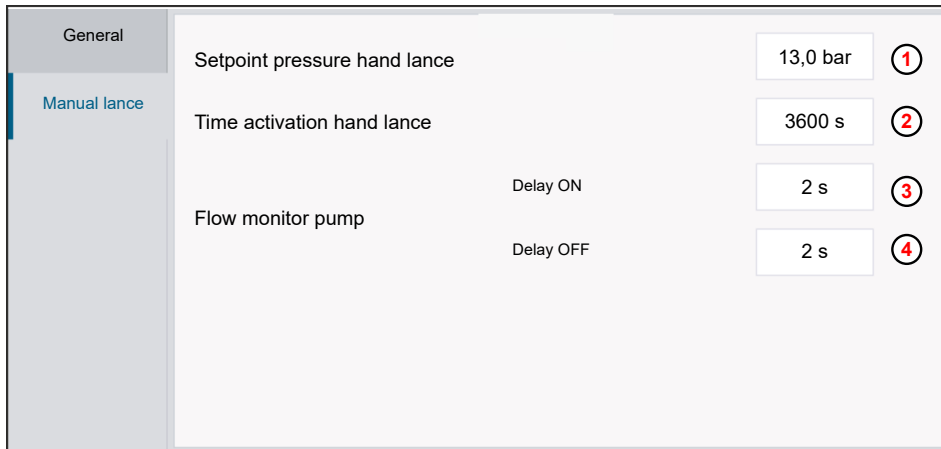
- ① Pump P050.02 is active every 10 minutes for 20 seconds.
- ② Degassing is inactive during automatic cleaning.

8.7.2 [Parameter] -> [Manual lance]

Select [Settings] - [manual lance]:

➔ Press the button [manual lance].

➔ The screen switches to the view [settings]-[manual lance]



Parameter	Value	Icon
Setpoint pressure hand lance	13,0 bar	1
Time activation hand lance	3600 s	2
Flow monitor pump Delay ON	2 s	3
Flow monitor pump Delay OFF	2 s	4

Fig. 33: Settings in [Parameter] - [Manual lance]

Settings in [settings] - [manual lance]:

Setpoint pressure hand lance

- 1 Pressure setting for the suction lance
Default: 13.0 bar.

Time activation hand lance

- **Requirement:**
Manual cleaning must be active. The button on the control cabinet door lights up green.
Manual cleaning is then active for 3600 sec. (60 min).
If manual cleaning is not deactivated again via the green control cabinet door button, this happens automatically after 60 min.
Active: If a flow is established by operating the manual lance, the pressure pump activates after 2 seconds. Water flow and increases the water pressure to 13 bar.
If the flow is interrupted at the manual lance, the pressure pump deactivates after 2 seconds.
- 2 Suction lance activation time.

Flow monitor pump, Delay ON

- 3 Delayed switch on of the pressure pump based on flow detection.
Default: 2 sec

Flow monitor pump, Delay OFF

- 4 Delayed shutdown of the pressure pump based on flow detection.
Default: 2 sec

8.8 [Recipes]

Functional description: Recipes / program steps / cleaning steps

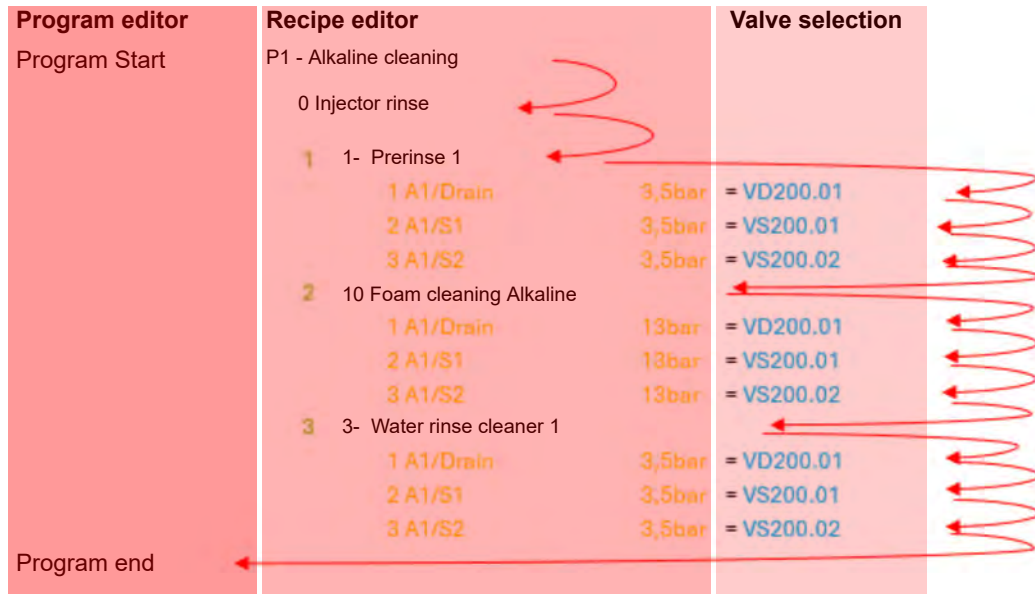


Fig. 34: [Recipes] structure example



Max. 10 cleaning programmes are possible.

In each cleaning program, you can select 29 program steps, i.e. if P1 is selected, the program steps that have been defined as a sequence are processed.

The following cleaning programs are available (max. 10):

Recipe structure

- P1 - Alkaline cleaning
- P2 - Acid cleansing
- P3 - Disinfection
- P4 Cold water rinsing
- P5 Alkaline + Desi. Cleaning
- P6 Hot water
- P7 - CLO2 Surge
- P8
- P9
- P10

P1 - Alkaline cleaning	
1.	1- Prerinse 1
2.	10- Foam cleaning Alkaline 1
3.	31- Waiting time 1
4.	35- Injector rinse
5.	3- Water rinse cleaner 1
6.	6- Cold water flush 1
7.	19- Blow out 1
8.	36- System draining
9.	
10.	
11.	

Fig. 35: [Recipes] program step numbers

In the Program Editor (see → [Chapter 8.8.3 '\[Recipes\] - \[Program editor\]' on page 110](#)) you can define a program step sequence.

Program steps / cleaning step

In each cleaning step, sectional valve times, pressure pump parameters and a valve step assignment are also stored and processed step by step.

- 0 - Injector flushing (not deselected) always active in the background
- 2- Prerinse 2
- 3- Water rinse cleaner 1
- 4- Water rinse cleaner 2
- 5- Water rinse cleaner 3
- 6- Cold water flush 1
- 7- Cold water flush 2
- 8- Cold water flush 3
- 9- CLO2 flush
- 10- Foam cleaning Alkaline 1
- 11- Foam cleaning Alkaline 2
- 12- Foam cleaning Acid 1
- 13- Foam cleaning Acid 2
- 14- Foam cleaning Disinfection 1
- 15- Foam cleaning Disinfection 2

Program steps / cleaning step

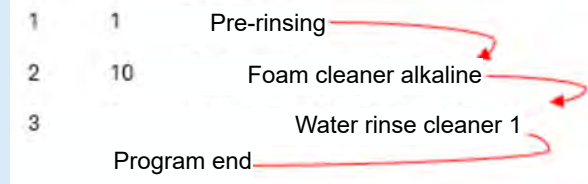


Fig. 36: [Recipes] program step diagram

You can make settings in the Recipe Editor (see [Chapter 8.8.2 '\[Recipes\] - \[Recipe editor\]' on page 106](#)). Assign sectional valves in the zone selection fields (see ['\[Recipe editor\]->\[zone selection\]' on page 107](#)).

8.8.1 [Recipes]

Under [Recipes] you can create cleaning programs and change their sequence.

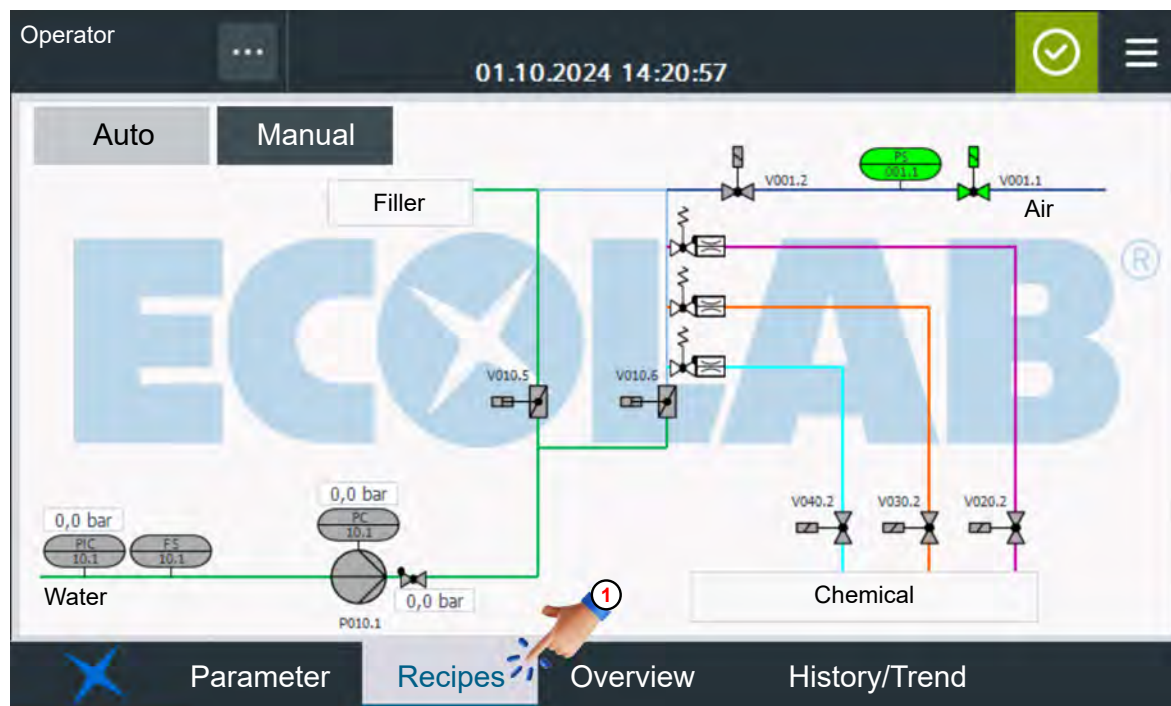


Fig. 37: Overview [Recipes]

[RecipesSelect]

➔ In the [home screen] press the [Recipes] ① switch.

➔ The [Recipes] screen appears:

Use the [Recipes] menu to go to the following screens:

- [Recipe editor] see ➔ [Chapter 8.8.2 '\[Recipes\] - \[Recipe editor\]'](#) on page 106
- [Program editor] see ➔ [Chapter 8.8.3 '\[Recipes\] - \[Program editor\]'](#) on page 110
- [Valve selection] see ➔ [Chapter 8.8.4 '\[Recipes\] - \[Valve selection\]'](#) on page 113
- [Copy] see ➔ [Chapter 8.8.5 '\[Recipes\] - \[Copy\]'](#) on page 115



Presentation of screenshots in the following section

For clarity, all the following screenshots in this section are reduced to the essentials. For example, the header and footer are omitted here.

8.8.2 [Recipes] - [Recipe editor]

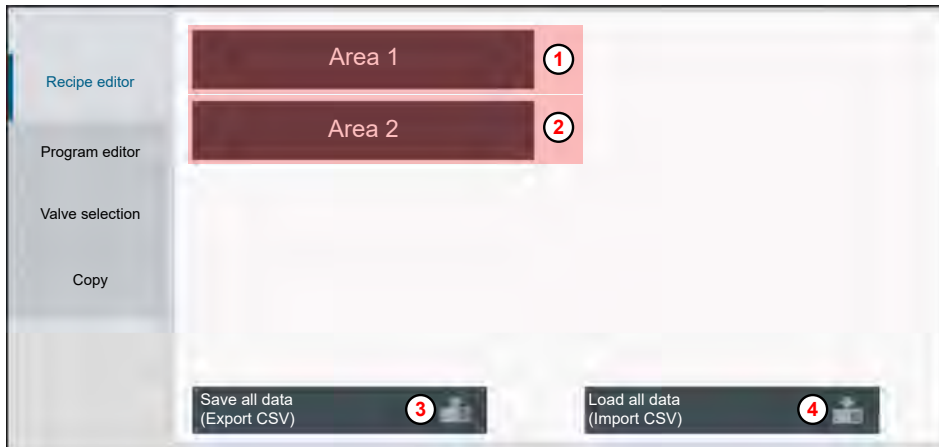


Fig. 38: [Recipe editor]



Zone selection

When you open the Recipes the [Recipe editor] appears, with the selection of Area 1 ① and Area 2 ②.

Select a zone to see all configured sectional valves with their section steps.

You must define the displayed zones beforehand, as shown in ➔ '[Recipe editor]->[zone selection]' on page 107.

[Recipe editor]->[zone selection]

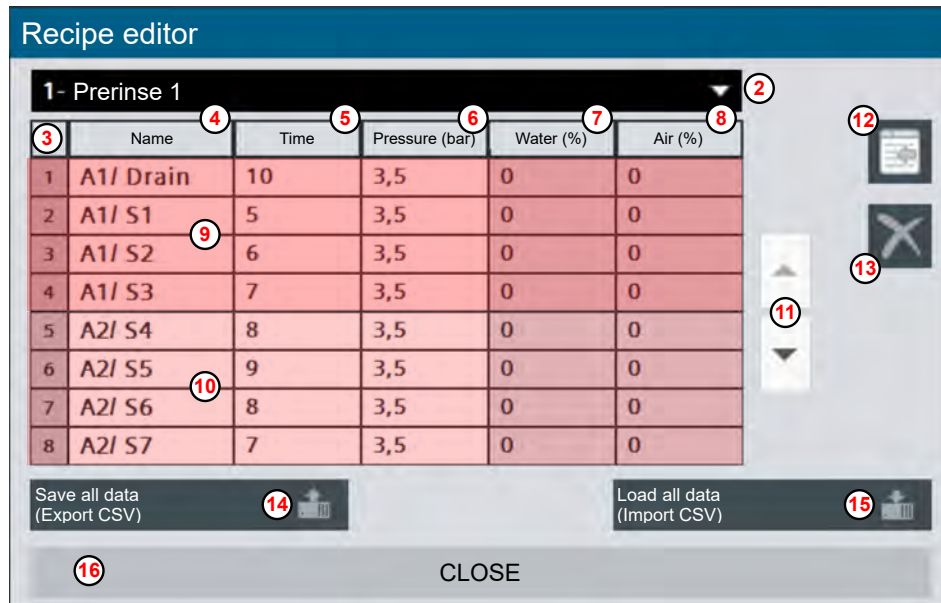


Fig. 39: [Recipe editor]->[zone selection]

- 2 Selection: Program steps
- 3 Columns
- 4 Zone/section step
- 5 Time factor
- 6 Pressure setting
- 7 Water content in %
- 8 Air content in %
- 9 Display [Zone 1]
- 10 Display [Zone 2]
- 11 Scroll up/down table values
- 12 Export table to Excel format
- 13 Cancel
- 14 Save recipe in CSV format (export)
- 15 Load recipe in CSV format (import)
- 16 Close window

- The table shows the zones in combination with the section steps.
- Use the dropdown menu (2) to retrieve program steps.
- The screen shows a table with all sectional valves with the corresponding section steps that are located in the Area 1 (9) and Area 2 (10).
- If the Area 2 key (see Fig. 38, no. (2)) is selected, the pop-up window opens at the beginning of the second zone (10) (in this case A2/S4 row 5).
- Column [Name] (4), for example, shows Zone A1/S1.
That means: A1/S1 = Zone 1 / Section step 2
- The [Time] column (5) defines the response time of the sectional valves in seconds.
That is, the time in which the valve is open. This [time] depends on the size of the section to be cleaned and must be adjusted individually.
- The [Pressure] column (6) defines the target pressure of the pump in bar.
Set pressure without product = 3.5 bar.
Set pressure with product = 13 bar.

You can chose the following program steps:

- 0 Injector rinse (not deselected)
always active in the background
- 1- Prerinse 1
- 2- Prerinse 2
- 3- Water rinse cleaner 1
- 4- Water rinse cleaner 2
- 5- Water rinse cleaner 3
- 6- Cold water flush 1
- 7- Cold water flush 2
- 8- Cold water flush 3
- 9- CLO2 flush
- 10- Foam cleaning Alkaline 1
- 11- Foam cleaning Alkaline 2
- 12- Foam cleaning Acid 1
- 13- Foam cleaning Acid 2
- 14- Foam cleaning Disinfection 1
- 15- Foam cleaning Disinfection 2
- 16- Liquid Disinfection 1
*Cleaning programs are specified in the
signal exchange.*
**Disinfection Edit parameters Without
foaming!**
- 17- Liquid Disinfection 2
- 18- Hot water flush
- 19- Blow out 1
- 20- Blow out 2
- 21- Blow out 3
- 31- Waiting time 1
- 32- Waiting time 2
- 33- Waiting time 3
- 34- Waiting time 4
- 35- Injector rinse
- 36- System draining
- 37- Hot water preparation
- 38- Hot water capper

	Name	Time	Pressure (bar)
1	A1/ Drain	10	3,5
2	A1/ S1	5	3,5
3	A1/ S2	6	3,5
4	A1/ S3	7	3,5
5	A2/ S4	8	3,5
6	A2/ S5	9	3,5
7	A2/ S6	8	3,5
8	A2/ S7	7	3,5

Fig. 40: Section steps

You can change individual section steps for each program step. To do this, select the field.
The keypad appears, enter the value and confirm with the Enter key.

[Recipes] Import / Export



Error on Import / Export

If an error occurs during import or export, the button will be displayed in red!
This is due to an incorrect or non-existent CSV file.

To troubleshoot, press the [Reset] button on the door of the control system and export all recipes in the Recipe Editor itself (see Fig. 38) Export all recipes (Fig. 38, no. ③.)

This will recreate all recipe data and overwrite all old values!

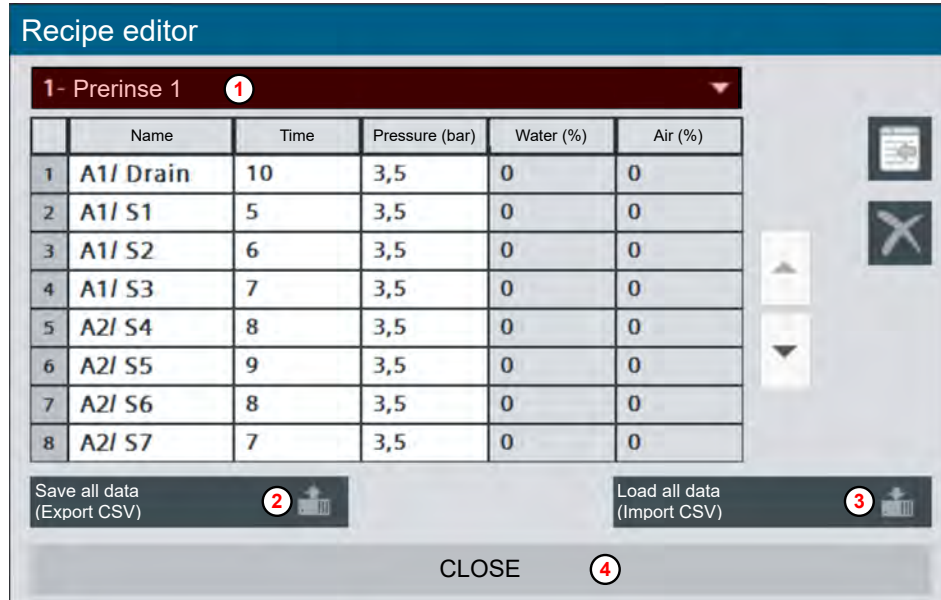


Fig. 41: [Recipes] Export/import recipes

[RecipesSave] (export CSV)

1. Select the program to export ①.



Data export

- All recipes can be exported in a format (CSV) that can be imported into MS Excel.
- The control system can also read CSV data.
- **Only the selected program step can be imported ③ or exported ② at a time!**

2. Press [Save All Data] button ②.
➔ The selected program step is exported to a CSV file.
3. If no further export operations follow, close the window again using the [CLOSE] key ④.

[RecipesLoad] (import CSV)

1. Select the program to import ①.
2. The selected program step is imported from the CSV file into the control system.
➔ The CSV recipe files are located on the CPU's SD card in the Recipes folder
3. If no further import operations follow, close the window again using the [CLOSE] key ④.

8.8.3 [Recipes] - [Program editor]

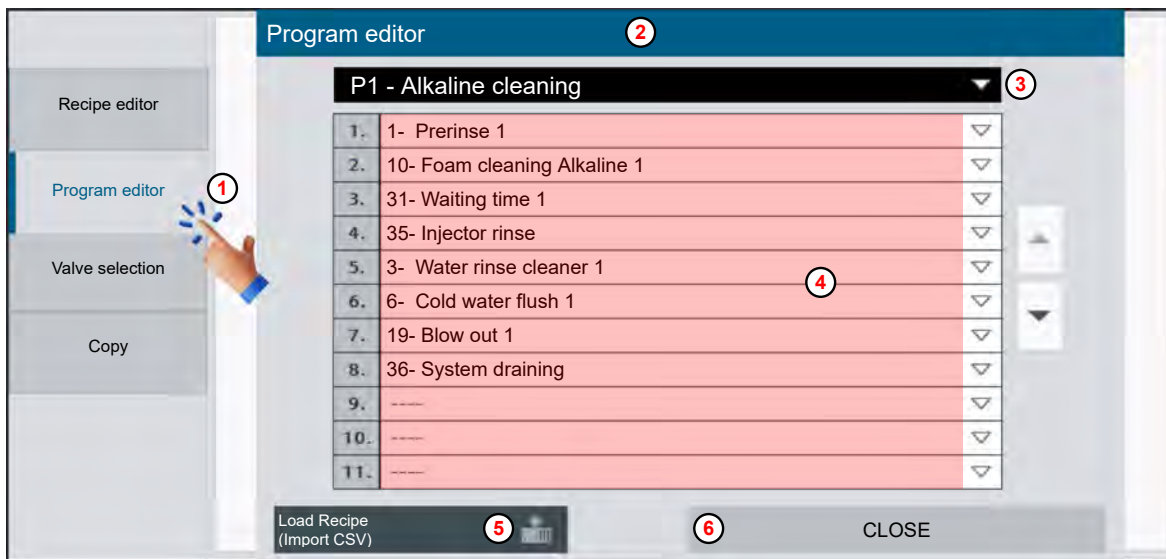


Fig. 42:

1.  [Program editor] Press the **[]** key (1).
 - The [Program editor] opens in a pop-up window (2).
 - Choose from 10 cleaning programs (3).
You can change the names of the programs under ➔ *'[Settings] - [Setup] - [Program names]'* on page 155.
 - For every cleaning program you can choose 1 to 29 program steps (4) in any sequence.
2.  Press the [Load recipe] key (5) to import recipes.
3.  Use the [CLOSE] key (6) to close the pop-up window [Program editor] again.

Changing a cleaning program

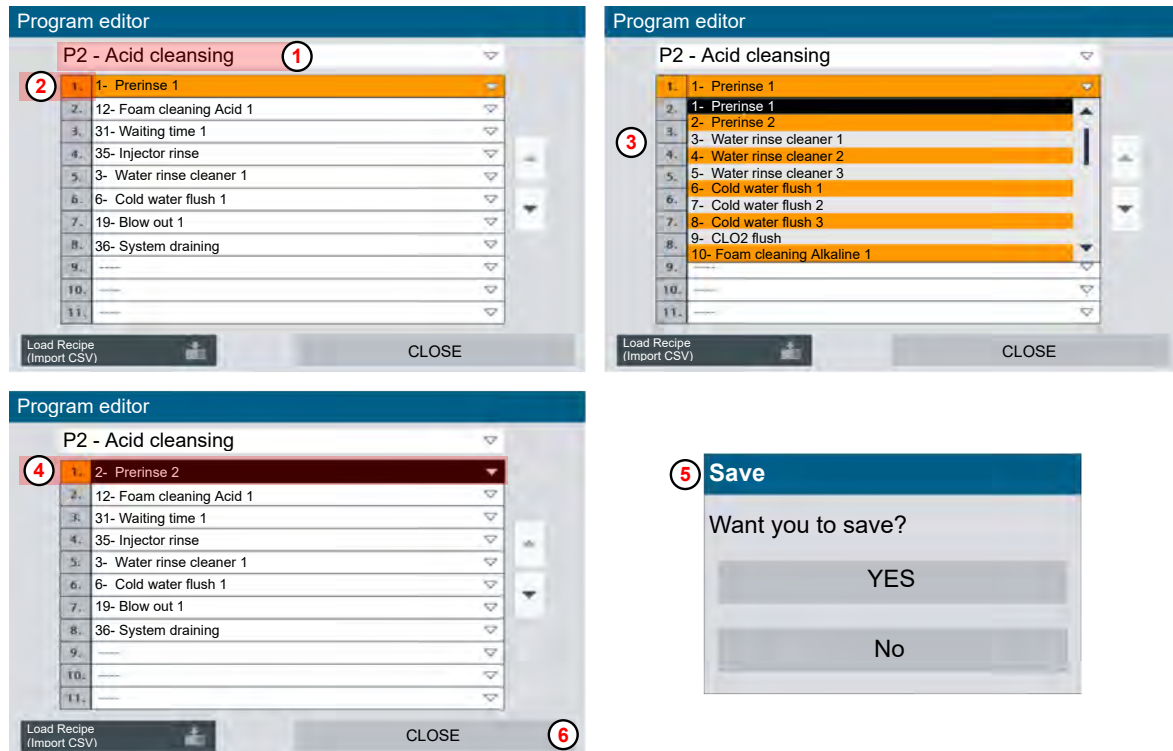


Fig. 43: [Program editor] Change cleaning program



**Info Before each cleaning run, an injector flush is always active!
This cannot be changed, for security reasons!**

Step 0 (mixing of products gas formation).

1. Select program ①.
2. Select the row ② of the cleaning step you want to change.
➔ The drop-down menu can now be opened.
3. Select new program steps ③.



**Step 0 is always an "injector flush before each cleaning"!
This cannot be changed, for security reasons!**

Steps 1-29 are free.

After each step where a product is used, an Injector Flush 35 must be inserted!

4. The selected row ④ was changed.
5. [CLOSE] Press the] key ⑥.
➔ A prompt appears asking if you want to save these changes.
6. Press the [Yes] key to overwrite all CSV files.

[Program editor] Disinfection



**For the "Disinfection" program, the program step must be changed to "liquid disinfection"!
"Liquid disinfection" is not a "foam product"!**

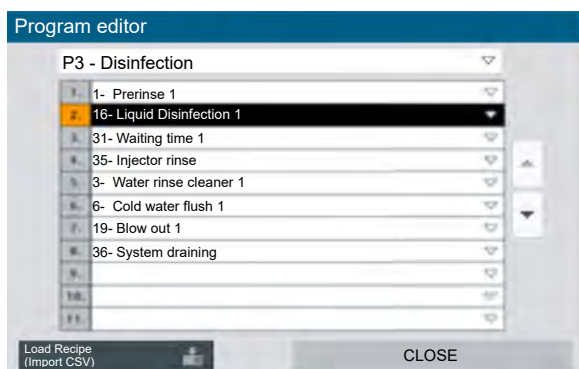
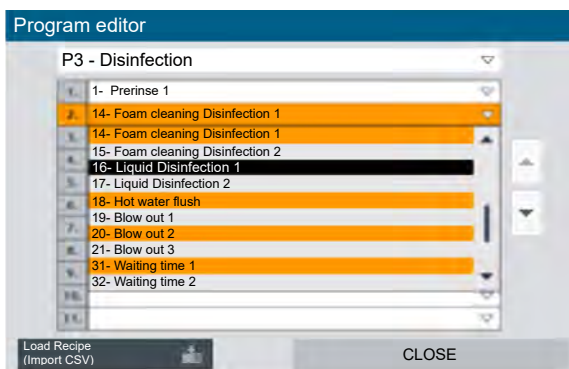
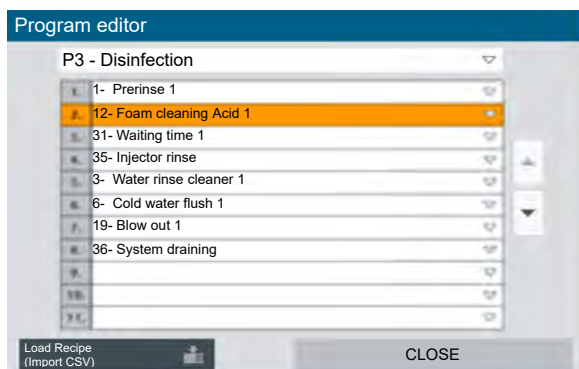


Fig. 44: [Program editor] Disinfection

8.8.4 [Recipes] - [Valve selection]



Fig. 45: [Valve selection]

➔ [Valve selection] Press the] key ①.

- ➔ The valve selection appears, with the steps.
- ➔ There are several tabs available for the corresponding valves:
[1-24], [25-48], [49-72], [73-96] and [97-120].

Valve assignment and steps

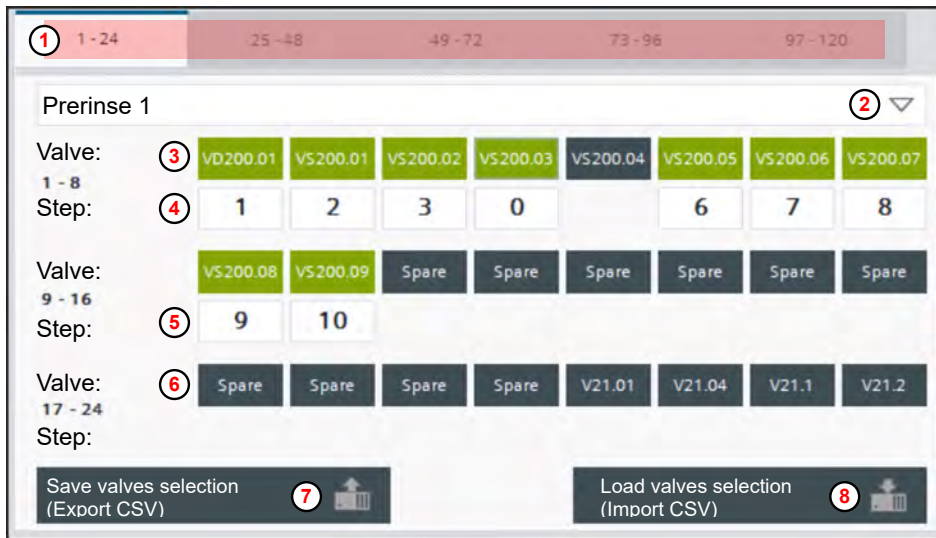


Fig. 46: Valve assignment and steps

The available valves are grouped together and can be selected via the tabs ① at the top. Select the tab of the valve you want to set ① [1-24], [25-48], [49-72], [73-96] and [97-120].

A separate valve assignment can be created for each program step ② (in this case e.g. Prerinse 1).

If a valve is present, it is displayed with its identification ③.

Tap to select the valve

.How the valve name appears and its assignment to a zone can only be set in the CSV file. This is preset by Ecolab.

The selection (highlighted in green) is saved in the CSV Valve Assignment program step.

Below the valves, a step ④ or ⑤ to the higher-level valve can be defined. Multiple valves can also be controlled in one step at the same time. The setting is also made for the related program step (in this case, Prerinse 1) in the corresponding CSV file.

Unused valves are shown as [Spare] ⑥.

Save Export ⑦

By pressing the [Save valve selection] key ⑦, you can save the set valve selection including the steps for the selected program step (in this case Prerinse 1) (exported) to a CSV file on the SD card.

Load Import CSV ⑧

By pressing the [Load valve selection] key ⑧, you can save a valve selection previously saved on the SD card, in a CSV file, including the corresponding steps (imported) (in this case Prerinse 1) for the set program step.

8.8.5 [Recipes] - [Copy]

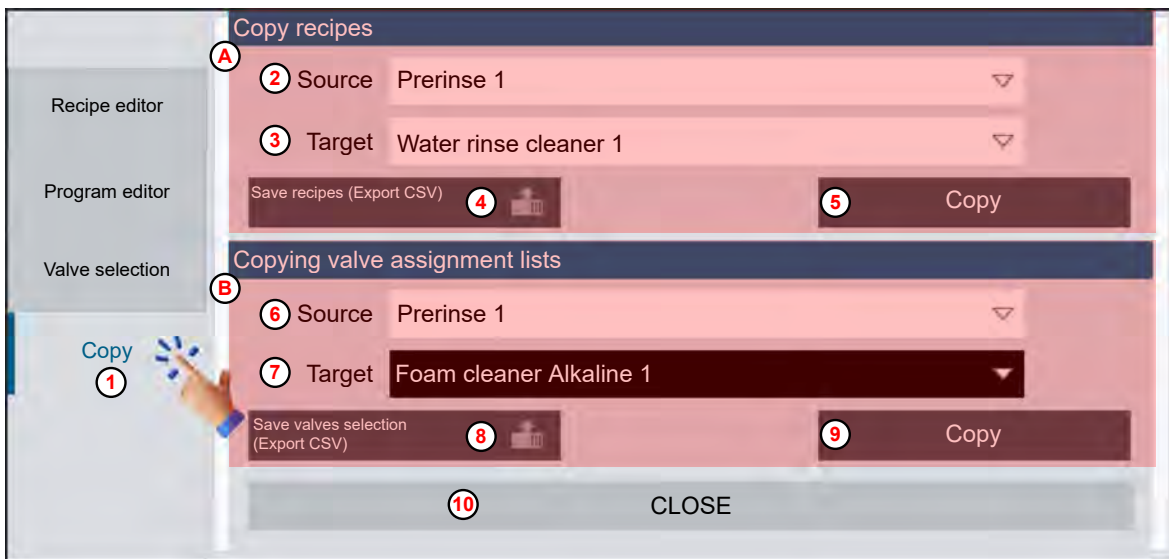


Fig. 47: [Copy function]

1. ➔ [Copy] Press the [] key (1).
➔ A pop-up window appears with the copy areas 'Recipes' (A) and 'valve assignment lists' (B).
2. ➔ **Copy program steps to other program steps:**
In the zone Copy recipes (A):
select the source of the parameters to be copied (2).
3. ➔ Select the target program step (3).
4. ➔ First Copy (5) then save the Recipes (Export CSV) (4).
This overwrites the existing CSV with the updated data.



To quickly create a program, created valve assignments can be copied to others.

5. ➔ **To copy valve assignments:**
In the zone 'Copying valve assignment lists' (B):
Select the source of the valve assignment to be copied (6).
6. ➔ Select the target (7).
7. ➔ First Copy (9) then save the Recipes (Export CSV) (8).
This overwrites the existing CSV with the updated data.
8. ➔ To close the pop-up window, press the [CLOSE] key (10).

8.9 [Overview]

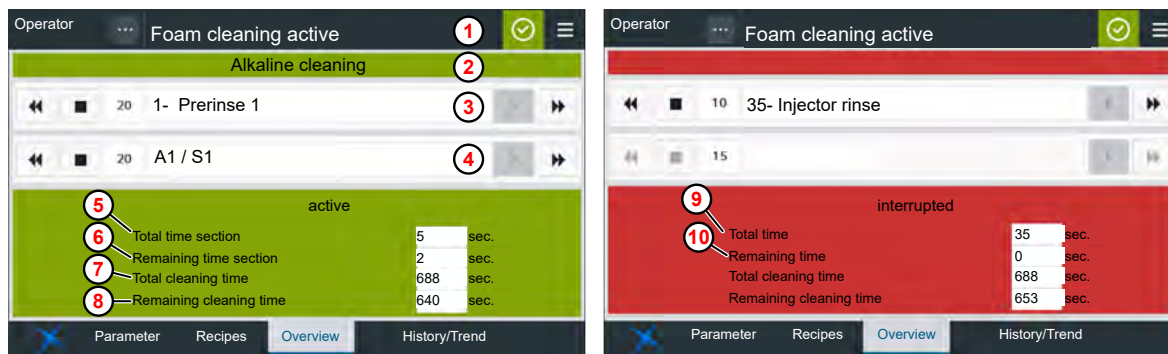


Fig. 48: [Overview]

■ Image in operation is green:

Cleaning is active (no faults).

The screen shows this:

- ① Status bar showing the active program.
- ② Selected active cleaning program.
- ③ Program step.
- ④ Valve section step.
- ⑤ Total time section.
- ⑥ Remaining time section.
- ⑦ Total cleaning time.
- ⑧ Remaining cleaning time.

■ Display of the image in red:

Stop cleaning due to a fault.

See status bar ① or under ➔ [Chapter 8.13 \[Messages\]](#) on page 128.

If the signal exchange and the release (Hardwire or Ethernet) fails during cleaning, active cleaning is interrupted.

Cleaning is started again automatically as soon as a release is available again.

The screen shows the following:

- Status bar showing the active program.
- Selected active cleaning program.
- Program step.
- Valve section step is greyed out
- ⑨ Total time
- ⑩ Remaining time
- Total cleaning time
- Remaining cleaning time



Stopping or cancelling the program

You can stop or cancel the program only by using the stop button on the BFH.

8.10 [History/Trend]

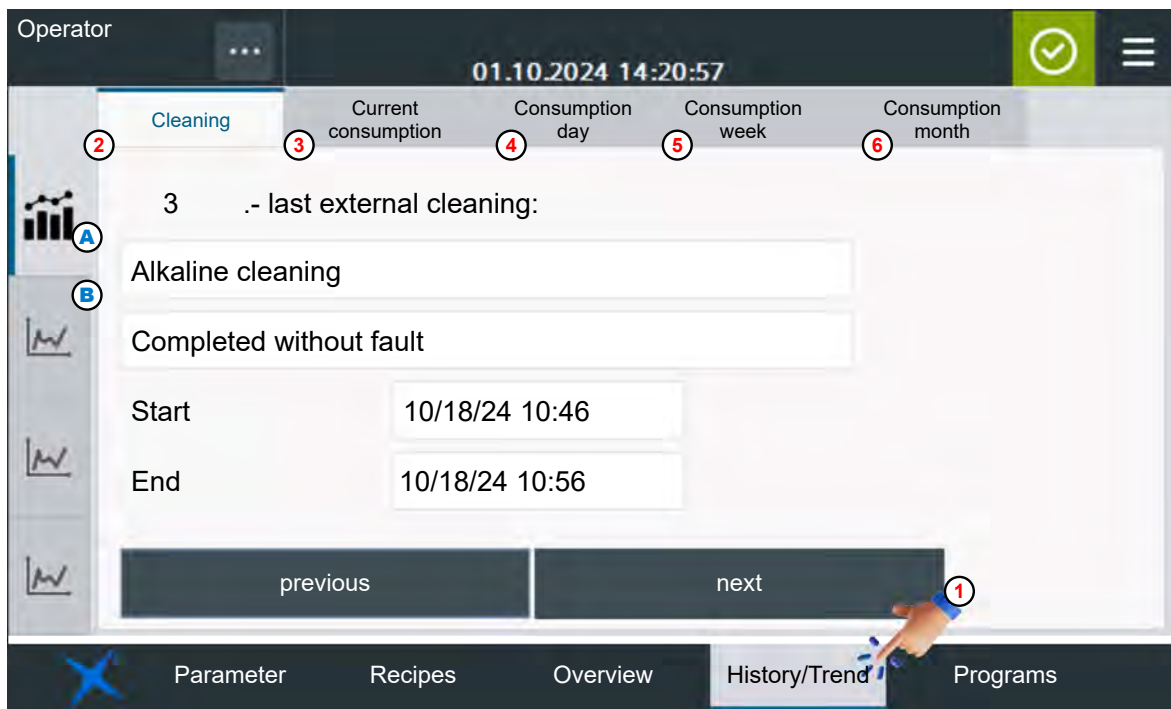


Fig. 49: [History/Trend]

[History/TrendSelect]

➔ In the [home screen] press the [History/Trend] ① switch.

➔ The [History/Trend] screen appears and shows the view [Cleaning].

Use the [History/Trend] menu to go to the following screens:

Consumption readings, periodic overviews

- ② [Cleaning], see ➔ '[History/Trend] -> [Cleaning]' on page 118
- ③ [Current consumption], see ➔ '[History/Trend] -> [current consumption]' on page 119
- ④ [Daily consumption], see ➔ '[History/Trend] -> [daily consumption]' on page 119
- ⑤ [Weekly consumption], see ➔ '[History/Trend] -> [weekly consumption]' on page 120
- ⑥ [Monthly consumption], see ➔ '[History/Trend] -> [monthly consumption]' on page 120

Consumption reading selection by meter

- ➔ '[History/Trend] Current consumption reading by meter' on page 122
- ➔ '[History/Trend] Archived consumption reading by meter' on page 123
- ➔ '[History/Trend] Archived files on consumption reading by meter' on page 124



Presentation of screenshots in the following section

For clarity, all the following screenshots in this section are reduced to the essentials.
For example, the header and footer are omitted here.

8.10.1 [History/Trend] overviews

When you open the view History/Trend], the screen automatically goes to the , where you can select the view by timeframe [History/Trend].

Views by timeframe are:

- [Cleaning] see ➔ ['\[History/Trend\]' -> \[Cleaning\]' on page 118](#)
- [Current consumption], see ➔ ['\[History/Trend\]' -> \[current consumption\]' on page 119](#)
- [Daily consumption] see ➔ ['\[History/Trend\]' -> \[daily consumption\]' on page 119](#)
- [Weekly consumption] see ➔ ['\[History/Trend\]' -> \[weekly consumption\]' on page 120](#)
- [Monthly consumption] see ➔ ['\[History/Trend\]' -> \[monthly consumption\]' on page 120](#)

[History/Trend] -> [Cleaning]

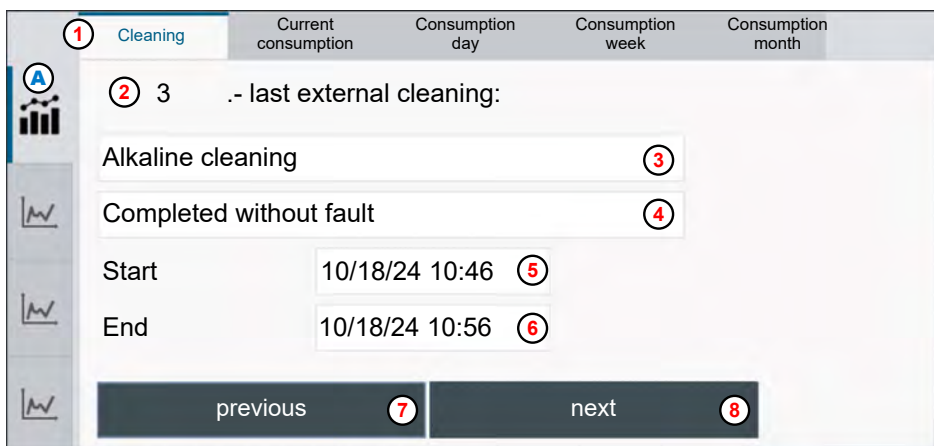


Fig. 50: [History/Trend] -> [Cleaning]

In the consumption reading selection overview, various tabs are available for further specification.

1. ➔ The tab [Cleaning] ① is already preselected.
 - ➔ The screen displays the last cleaning function performed ②.
 - ➔ The cleaning method ③ is shown.
 - ➔ The status is shown ④.
 - ➔ The start date ⑤ and the end date ⑥ of the view appear.
2. ➔ Press the [Previous] key ⑦ to show a previous timeframe.
3. ➔ Press the [Next] key ⑧ to show a future one.



Here you can show the views of the last 50 cleaning runs.

[History/Trend] -> [current consumption]

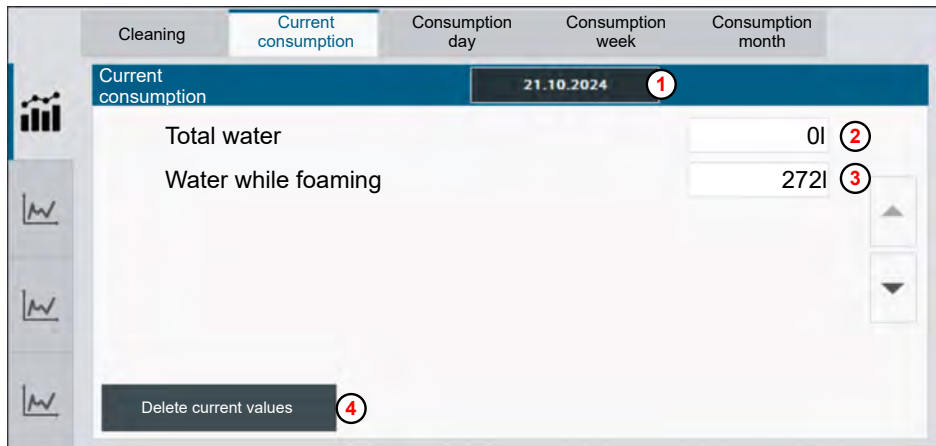
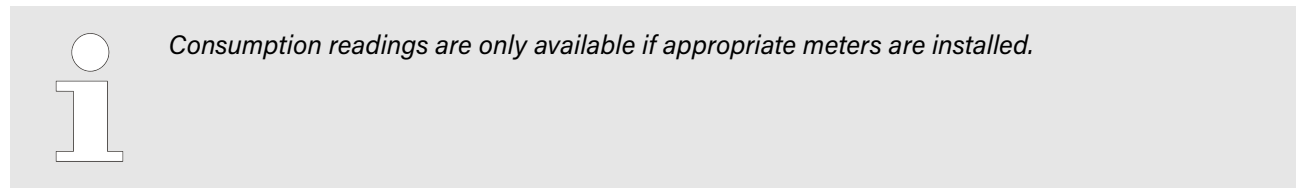


Fig. 51: [History/Trend] -> [current consumption]

The following values are displayed:

- ① Date of consumption display
- ② Total amount of water consumed [l]
- ③ Total amount of water consumed during foaming [l]

➔ Press the [Delete current values] key ④ to reset all values.

[History/Trend] -> [daily consumption]

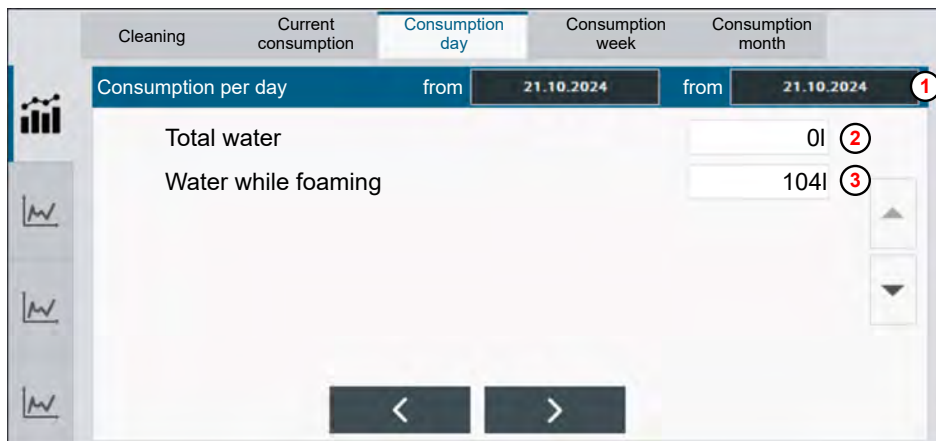


Fig. 52: [History/Trend] -> [daily consumption]

The following values are displayed:

- ① Date of consumption display.
- ② Total amount of water consumed [l].
- ③ Total amount of water consumed during foaming [l].

➔ Press the [<] or [>] key to show other periodic views.

[History/Trend] -> [weekly consumption]

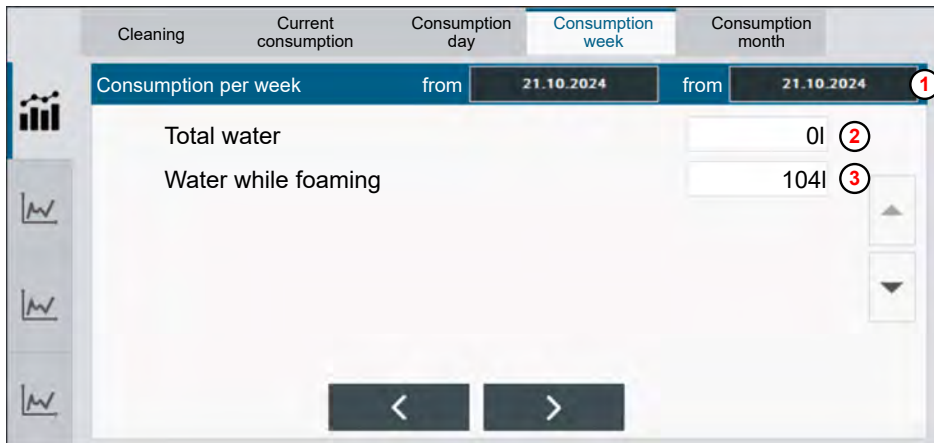


Fig. 53: [History/Trend] -> [weekly consumption]

The following values are displayed:

- ① Date of consumption display.
 - ② Total amount of water consumed [l].
 - ③ Total amount of water consumed during foaming [l].
- Press the [<] or [>] key to show other periodic views.

[History/Trend] -> [monthly consumption]

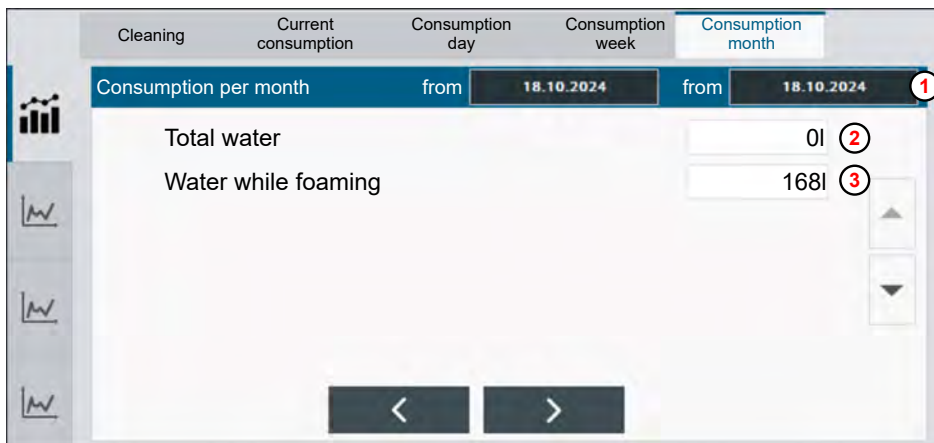


Fig. 54: [History/Trend] -> [monthly consumption]

The following values are displayed:

- ① Date of consumption display.
 - ② Total amount of water consumed [l].
 - ③ Total amount of water consumed during foaming [l].
- Press the [<] or [>] key to show other periodic views.

8.10.2 [History/Trend] Consumption reading by meter

When you open the view History/Trend], the screen automatically goes to the , where you can select consumption readings by meter.

The views are:

- ➔ ['\[History/Trend\] Current consumption reading by meter' on page 122](#)
- ➔ ['\[History/Trend\] Archived consumption reading by meter' on page 123](#)
- ➔ ['\[History/Trend\] Archived files on consumption reading by meter' on page 124](#)

[History/Trend] Current consumption reading by meter

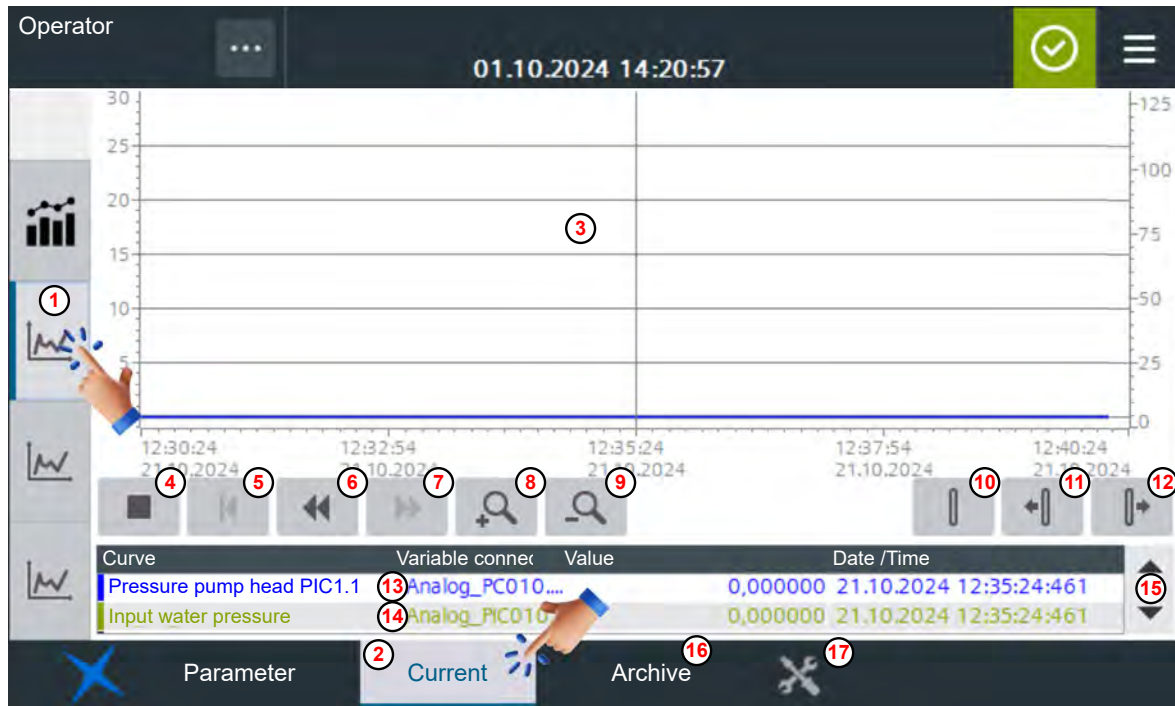


Fig. 55: [History/Trend] Display: Pump head pressure

- In the views for each meter, you can call up the readings [Current] ② or from the [Archive] ⑯.
- Readings are displayed using a live graphic (line chart) ③.
- You can also save, retrieve and reset readings as an archived file ⑰.

➔ Select [consumption meter]:

Select the zone (e.g. ⑬ or ⑭).



All available meters (devices) that are integrated and activated in the control system can be called up and analysed here.

➔ You can make the following adjustments to the view on the screen:

- ④ Stop the running procedure in the line chart.
- ⑤ Go to the beginning of the line chart.
- ⑥ Continue to move forward in the line chart.
- ⑦ Go further back in the line chart.
- ⑧ Zoom in on line chart.
- ⑨ Zoom out on line chart.
- ⑩ Plot the current value as the centre of the line chart.
- ⑪ Go to the beginning of the line chart.
- ⑫ Go to the end of the line chart.
- ⑬ Select the pump head meter (pressure readings).
- ⑭ Select the inlet water pressure meter (pressure readings).
- ⑮ Scroll up or down on the meter selection
- ⑯ Switch to archive view
- ⑰ Archive file selection

[History/Trend] Archived consumption reading by meter

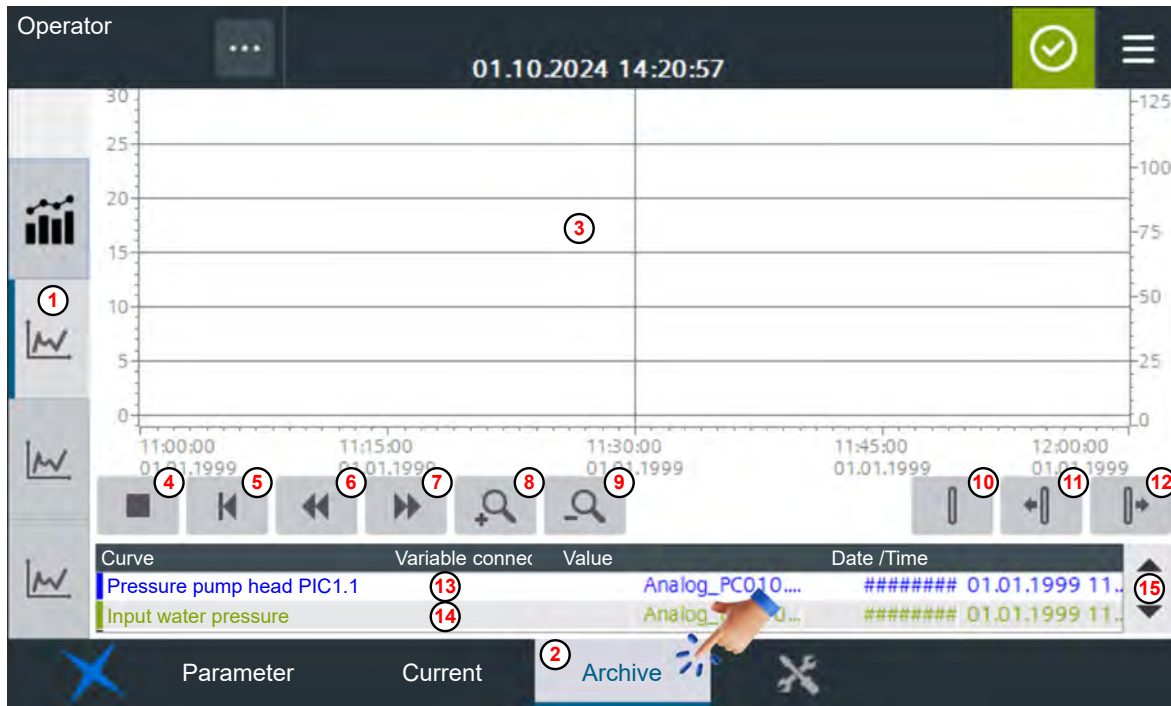


Fig. 56: [History/Trend] Archived consumption reading by meter

- In the views for each meter, you can call up the readings in the [Archive] .
- The readings are shown in the middle of the screen as a live graphic (line chart).

➔ **Select [consumption meter]:**

Select the zone (e.g. or .



All available meters (devices) that are integrated and activated in the control system can be called up and analysed here.

➔ You can make the following adjustments to the view on the screen:

- Stop the running procedure in the line chart.
- Go to the beginning of the line chart.
- Continue to move forward in the line chart.
- Go further back in the line chart.
- Zoom in on line chart.
- Zoom out on line chart.
- Plot the current value as the centre of the line chart.
- Go to the beginning of the line chart.
- Go to the end of the line chart.
- Select the pump head meter (pressure readings).
- Select the inlet water pressure meter (pressure readings).
- Scroll up or down on the meter selection

[History/Trend] Archived files on consumption reading by meter

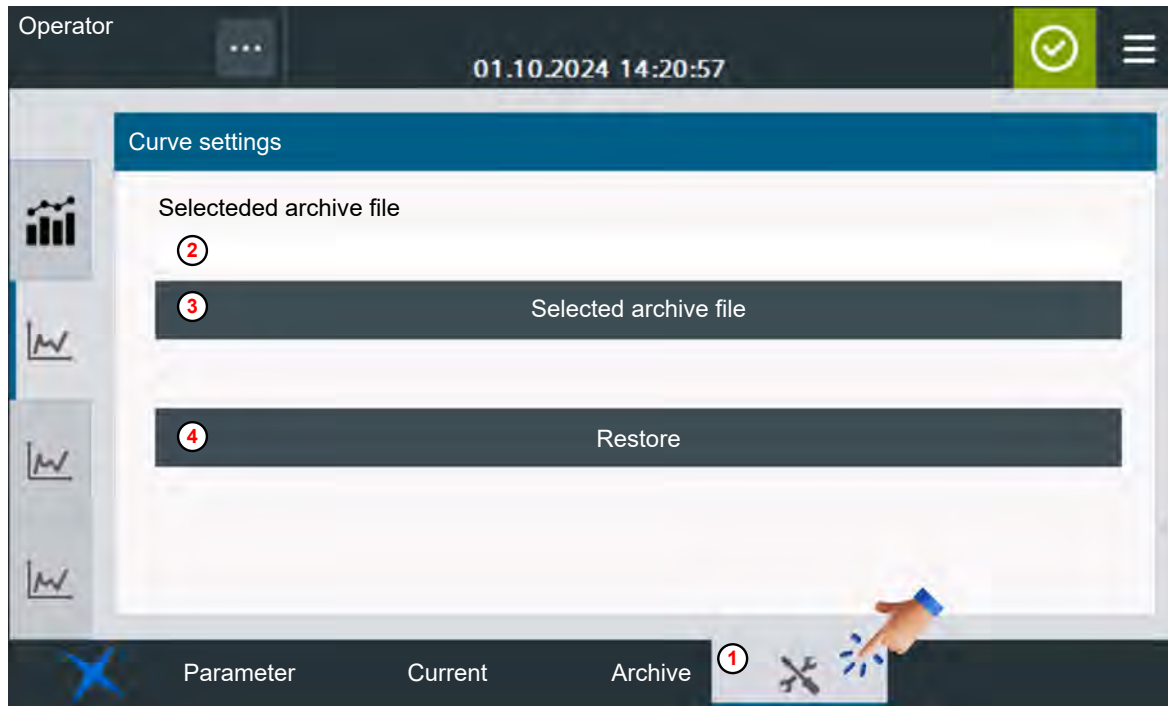


Fig. 57: [History/Trend] Archived file

- ① Go to archived file selection
- ② Show the selected archived file
- ③ Archived file selection button
- ④ Calling

1. Press the key ① to open the window to select the ③ and reset ④ the archived file.
2. Press the [Selected archive file] key ③ to open the 'File Explorer'.



Fig. 58: 'File Explorer'

3. In File Explorer, you can search for and select the archived file from the control system's files.
 - ➡ The file is loaded and the archived file is displayed.
4. Press the [Restore] key ④ to reset your selection.

8.11 [Programs]

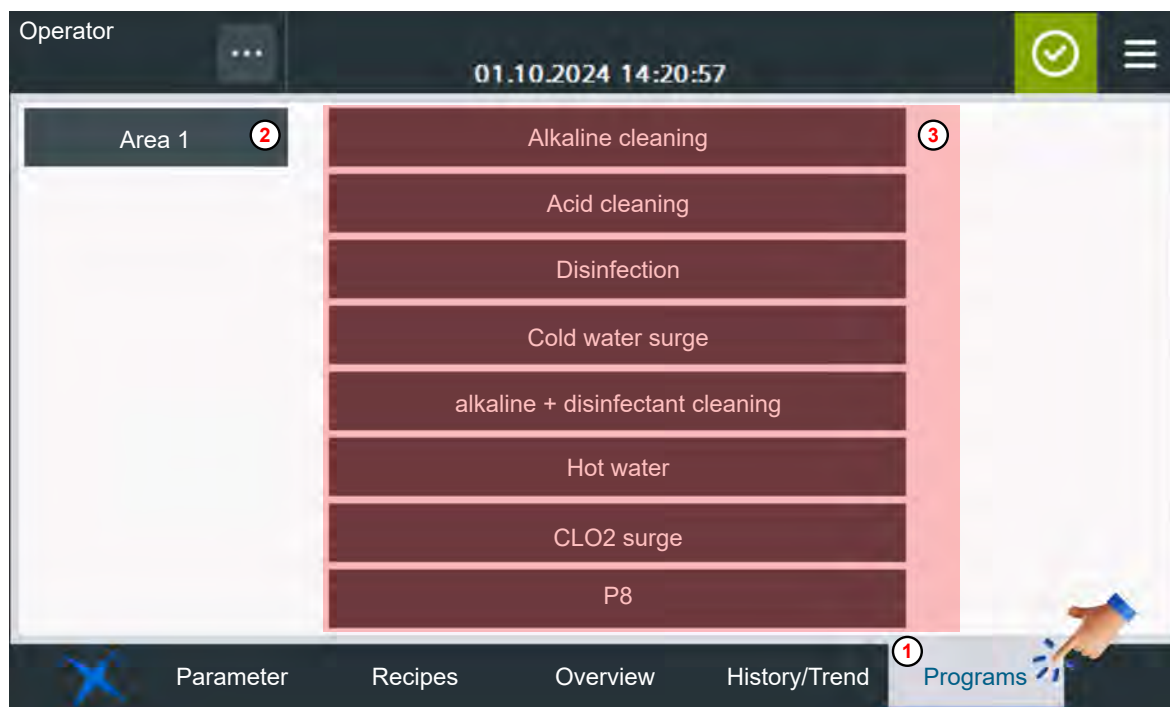


Fig. 59: [Programs]

- ➔ Press the [Programs] key ① to open the program overview.
- ➔ The zone ② and its programs ③ appear.



All cleaning programs are shown as described under ➔ '[Settings] - [Setup] - [Program names]' on page 155 and set.

[Programs] external release



You start the program only if the machine is cleared for cleaning.
If there is an external release, it will be shown in the status bar ②.
If there is no external release option, automatic cleaning cannot start.

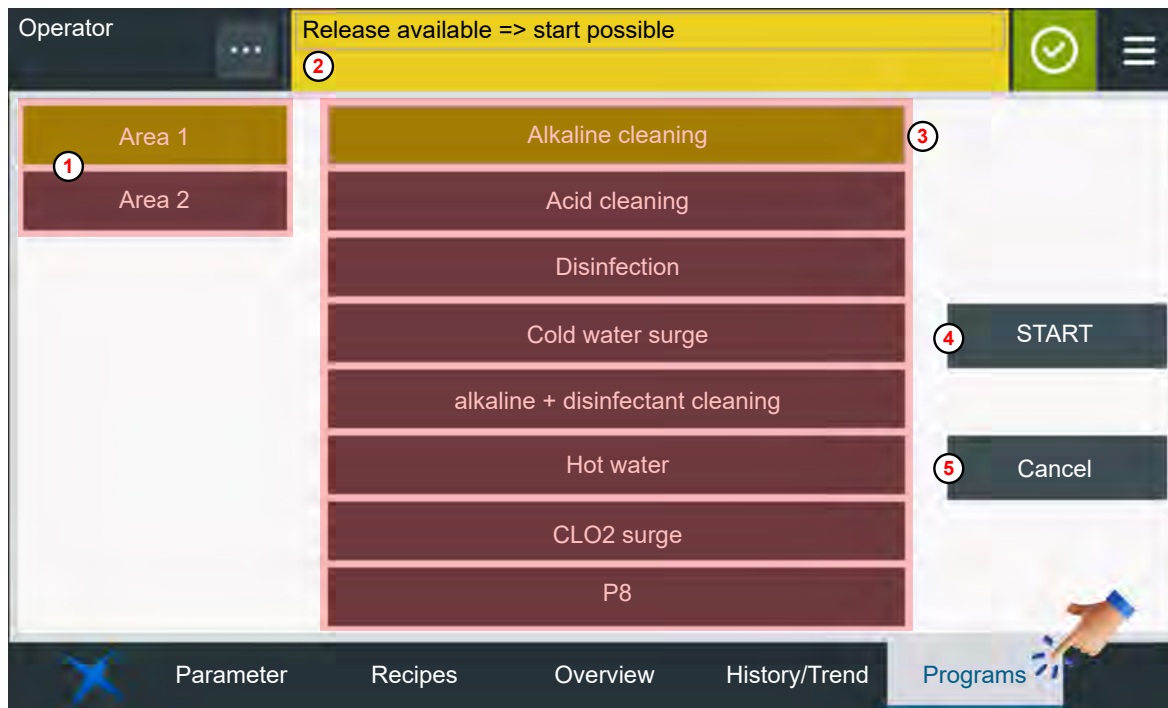


Fig. 60: View [Programs], when something is enabled

1. Select the zone ①.
2. Select the program ③.
 - The selected program is displayed with a "green" background.
 - The keys [START] ④ and [Cancel] ⑤ are available to select.
3. Press the [START] key ④.
 - The cleaning program starts and the buttons [START] ④ and [Cancel] ⑤ are greyed out.
4. Press the [Cancel] key ⑤ to interrupt the process.
 - The preselected zones and cleaning programs are reset (no longer green).
 - You can make another selection.

8.12 [Set language]



Fig. 61: Select [main menu] [Set language]

1. ➤ Press the  switch ① to go to the main menu.
 - ➔ The main menu is shown on the right-hand side.
2. ➤ To open the language selector, select the flag icon ②.
 - ➔ The language selection window appears:

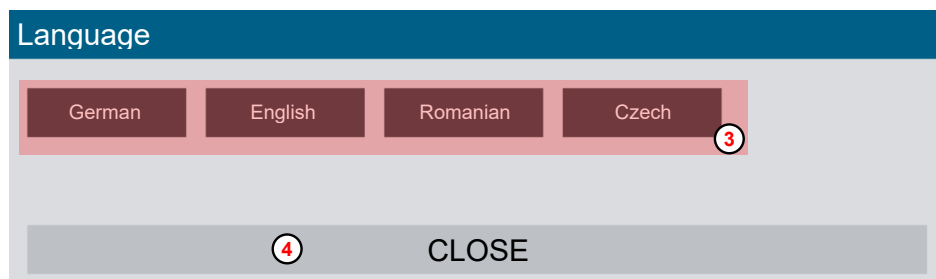


Fig. 62: [Set language] Language selection window



The language selection shown above is for guidance only.

If more languages are available in the controls, they will all be displayed and available for selection

3. ➤ Select the language ③.
 - ➔ The language of all screens will be set to the selected language.
4. ➤ [CLOSE] Press the  key ④.
 - ➔ The language selection window closes.
 - ➔ The language of the controls is changed to the new language.

8.13 [Messages]



Fig. 63: [Messages] Current faults and warnings

1. ➤ Press the switch ① to go to the main menu.
 - The main menu is shown on the right-hand side.
2. ➤ [Messages] Press the] key ②.
 - The [Messages] screen appears.
 - You can see the following views under [Messages]:
 - ➤ [\[Messages\] -> \[current messages\]' on page 129](#)
 - ➤ [\[Messages\] -> \[archived messages\]' on page 130](#)
 - ➤ [\[Messages\] -> \[archived faults\]' on page 131](#)
 - ➤ [\[Messages\] -> \[archived warnings\]' on page 132](#)
 - ➤ [\[Messages\] -> \[archive system\]' on page 133](#)

[Messages] -> [current messages]

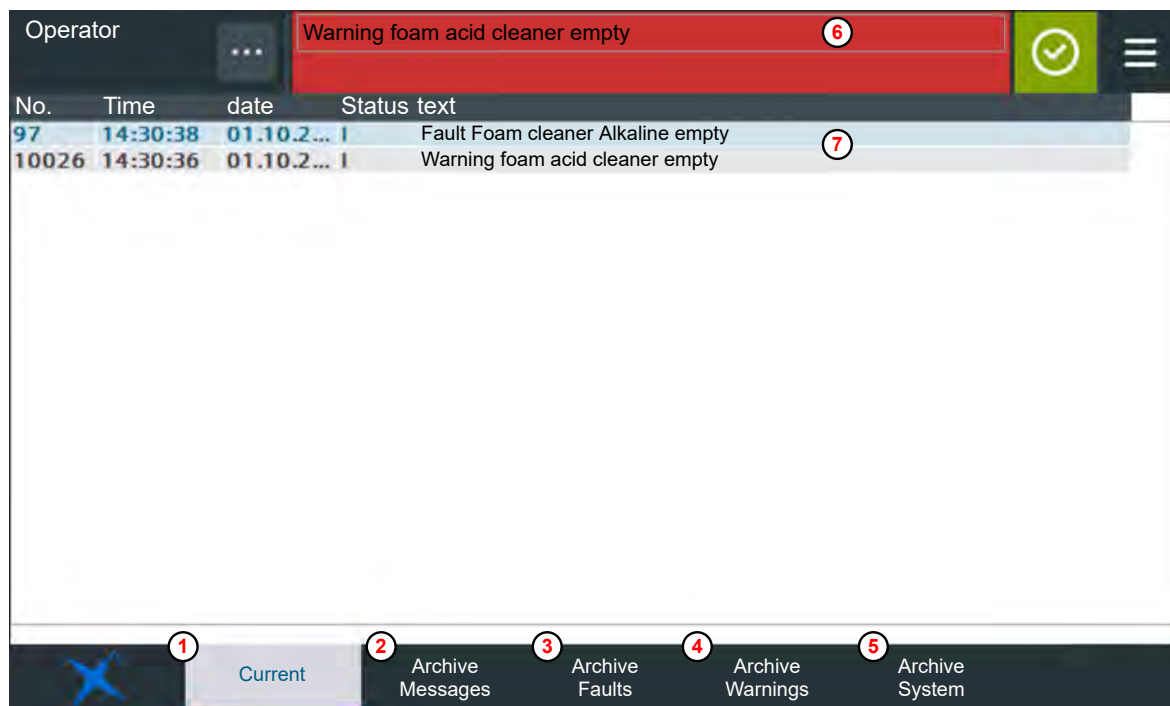


Fig. 64: [Messages] -> [current messages]

The following contents are shown:

- View [Messages] -> [current] key ① (preselected).
- [Archived messages] key ② to switch to the view of archived [Messages].
- [Archive faults] key ③ to switch to the view of archived [Disturbance].
- [Archived warnings] key ④ to switch to the view of archived [warnings].
- [Archived system] key ⑤ to switch to the view of archived [system] messages.
- Current warning message in the status bar ⑥
- Current faults / warnings ⑦

[Messages] -> [archived messages]

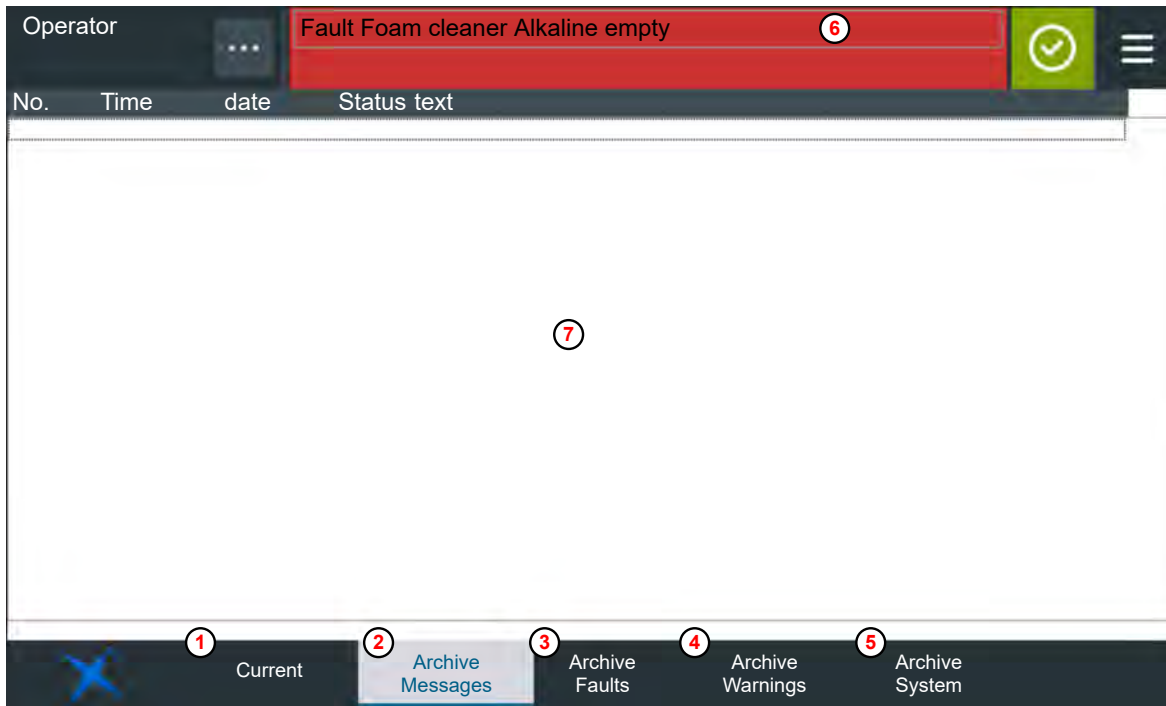


Fig. 65: [Messages] archived messages

The following contents are shown:

- View [Messages] -> [current] key ① (preselected).
- [Archived messages] key ② to switch to the view of archived [Messages].
- [Archive faults] key ③ to switch to the view of archived [Disturbance].
- [Archived warnings] key ④ to switch to the view of archived [warnings].
- [Archived system] key ⑤ to switch to the view of archived [system] messages.
- Current warning message in the status bar ⑥
- Current faults / warnings ⑦

[Messages] -> [archived faults]

Operator		Fault Foam cleaner Alkaline empty ⑥		✓	☰
No.	Time	date	Status text		
97	14:30:38	01.10.20...	I		
113	14:25:33	01.10.20...	IAO		
113	14:24:20	01.10.20...	IA		
98	14:24:20	01.10.20...	IAO		
98	14:24:20	01.10.20...	IA		
113	14:24:03	01.10.20...	I		
98	14:23:02	01.10.20...	I		
2	14:20:38	01.10.20...	IOA		
10	14:20:38	01.10.20...	IAO		
16	14:20:38	01.10.20...	IOA		
15	14:20:38	01.10.20...	IOA		
14	14:20:38	01.10.20...	IOA		
10	14:20:38	01.10.20...	IA		
113	14:20:38	01.10.20...	IAO		
113	14:20:38	01.10.20...	IA		
49	14:20:38	01.10.20...	IAO		
49	14:20:38	01.10.20...	IA		
39	14:20:38	01.10.20...	IOA		
33	14:20:38	01.10.20...	IOA		
				①	②
				③	④
				⑤	⑦

Fig. 66: [Messages] archived faults

The following contents are shown:

- View [Messages] -> [current] key ① (preselected).
- [Archived messages] key ② to switch to the view of archived [Messages].
- [Archive faults] key ③ to switch to the view of archived [Disturbance].
- [Archived warnings] key ④ to switch to the view of archived [warnings].
- [Archived system] key ⑤ to switch to the view of archived [system] messages.
- Current warning message in the status bar ⑥
- Current faults / warnings ⑦

[Messages] -> [archived warnings]

No.	Time	date	Status text
10025	14:30:38	01.10.20...	IO
10026	14:30:36	01.10.20...	I
10025	14:30:34	01.10.20...	I
10002	14:30:19	01.10.20...	IO
10002	14:25:55	01.10.20...	I
10025	14:23:50	01.10.20...	IO
10026	14:23:02	01.10.20...	IO
10026	14:22:58	01.10.20...	I
10025	14:22:35	01.10.20...	I
10031	14:22:33	01.10.20...	IO
10031	14:22:13	01.10.20...	I
10031	14:19:37	01.10.20...	IO
10043	14:08:25	01.10.20...	IO
10043	14:08:14	01.10.20...	I
10027	13:37:37	01.10.20...	IO
10026	13:37:37	01.10.20...	IO
10025	13:37:37	01.10.20...	IO
10027	13:37:35	01.10.20...	I
10026	13:37:35	01.10.20...	I

Fig. 67: [Messages] archived warnings

The following contents are shown:

- View [Messages] -> [current] key ① (preselected).
- [Archived messages] key ② to switch to the view of archived [Messages].
- [Archive faults] key ③ to switch to the view of archived [Disturbance].
- [Archived warnings] key ④ to switch to the view of archived [warnings].
- [Archived system] key ⑤ to switch to the view of archived [system] messages.
- Current warning message in the status bar ⑥
- Current faults / warnings ⑦

[Messages] -> [archive system]

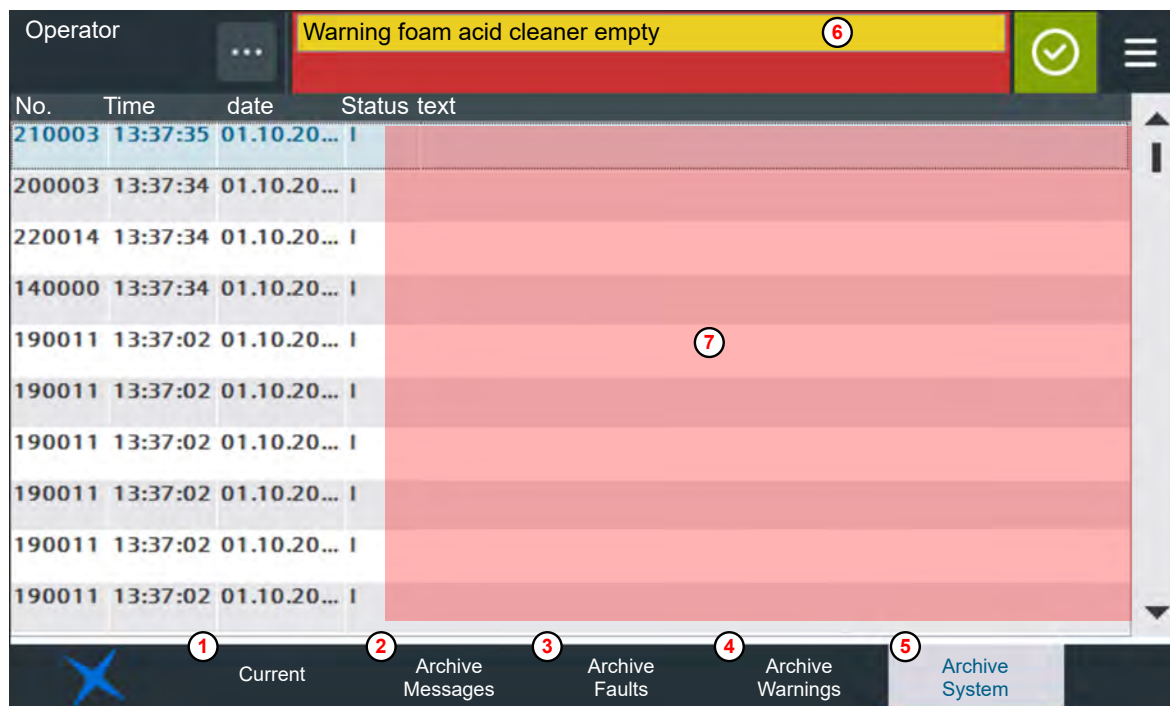


Fig. 68: [Messages] archive system

The following contents are shown:

- View [Messages] -> [current] key ① (preselected).
- [Archived messages] key ② to switch to the view of archived [Messages].
- [Archive faults] key ③ to switch to the view of archived [Disturbance].
- [Archived warnings] key ④ to switch to the view of archived [warnings].
- [Archived system] key ⑤ to switch to the view of archived [system] messages.
- Current warning message in the status bar ⑥
 - Faults are shown in RED.
 - Warnings are shown in YELLOW.
- Current faults / warnings ⑦

8.14 [Diagnostic]

[DiagnosticSelect]

Information for service personnel



The following information is intended exclusively for employees and authorised service specialists of the manufacturer!

Access to the content presented below is only accessible with appropriate authorization.

It is strictly forbidden to allow unauthorised persons to access these areas by passing on your passwords.



Fig. 69: [DiagnosticSelect]

1. Press the switch ① to go to the main menu.
 - The main menu is shown on the right-hand side.
2. [Diagnostic] Press the key ②.
 - The [Diagnostic] screen appears.
 - You can see the following views under [Messages]:
 - [↪ '\[Diagnostic\]' -> \[PLC\]' on page 135](#)
 - [↪ '\[Diagnostic\]' -> \[PLC-Web\]' on page 135](#)
 - [↪ '\[Diagnostic\]' -> \[HMI-Web\]' on page 136](#)
 - [↪ '\[Diagnostic\]' -> \[I/O's\]' on page 136](#)
 - [↪ '\[Diagnostic\]' -> \[Signals\]' on page 141](#)

[Diagnostic] -> [PLC]

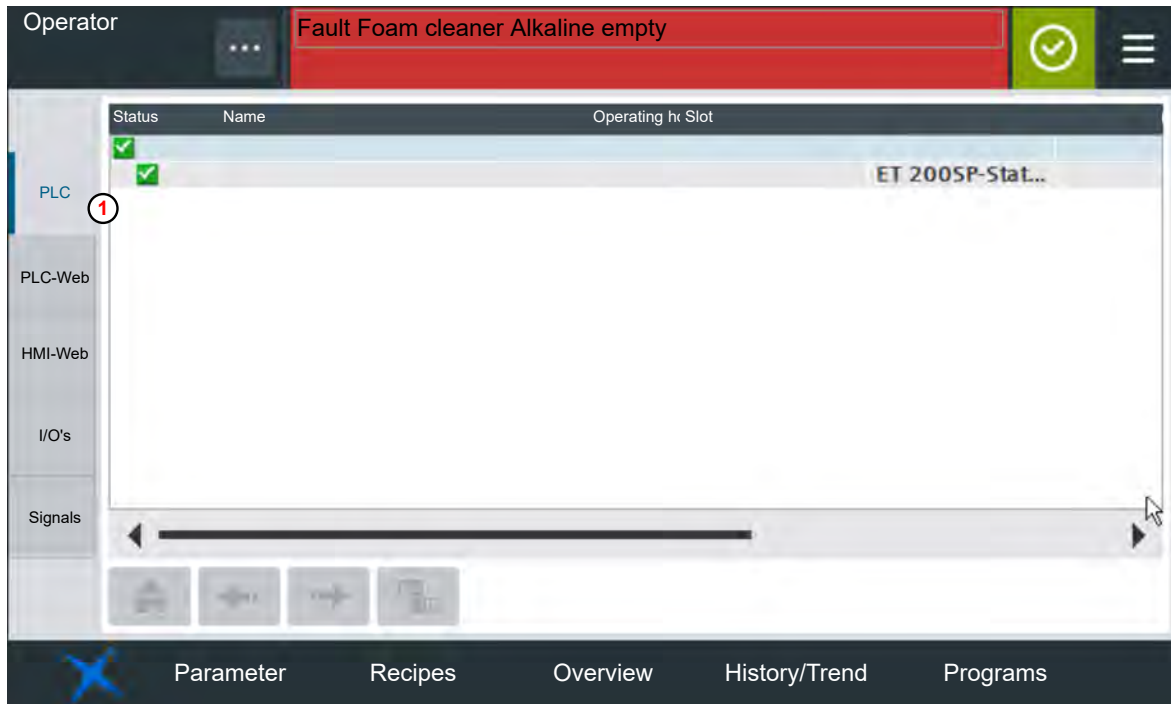


Fig. 70: [Diagnostic] -> [PLC]

The view [PLC] ① is already selected when you select [Diagnostic] function (see → '[DiagnosticSelect]' on page 134) and shows the diagnosis data of the [PLC].

[Diagnostic] -> [PLC-Web]

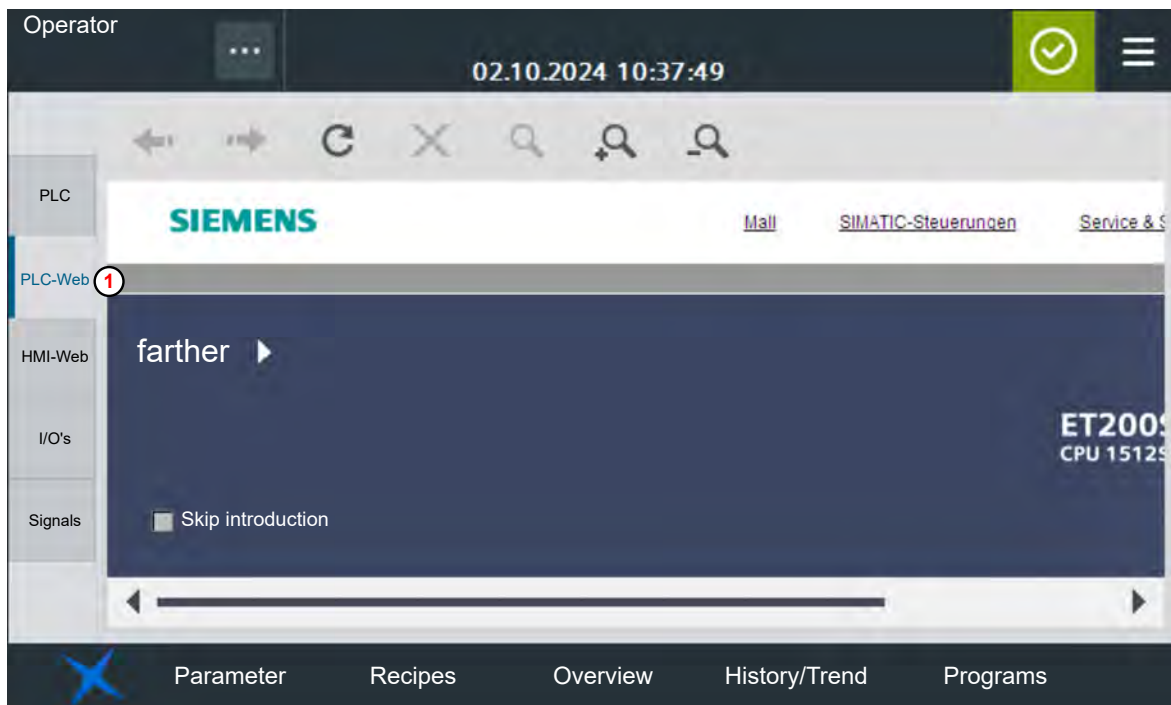


Fig. 71: [Diagnostic] -> [PLC-Web]

→ [PLC-Web] Press the] key ①.

➔ The diagnostic data of the [PLC-Web] appears.

[Diagnostic] -> [HMI-Web]

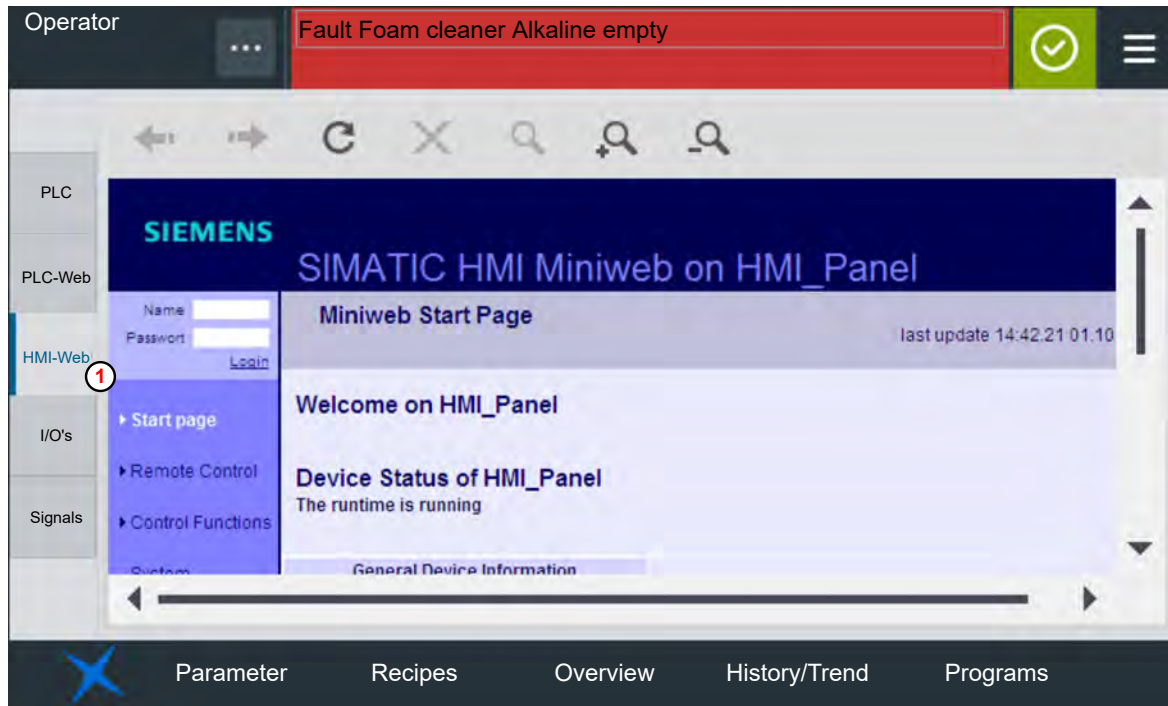


Fig. 72: [Diagnostic] -> [HMI-Web]

→ [HMI-Web] Press the] key ①.

- ➡ The diagnostic data of the [HMI-Web] appears.

[Diagnostic] -> [I/O's]

You can see the following views under [I/O's]:

- ➡ 'View [Diagnostic] -> [I/O's] -> [Inputs 1]' on page 137
- ➡ 'View [Diagnostic] -> [I/O's] -> [Inputs 2]' on page 138
- ➡ 'View [Diagnostic] -> [I/O's] -> [Outputs 1]' on page 139
- ➡ 'View [Diagnostic] -> [I/O's] -> [Outputs 2]' on page 140
- ➡ 'View [Diagnostic] -> [I/O's] -> [Analog]' on page 141

View [Diagnostic] -> [I/O's] -> [Inputs 1]

Operator		Warning foam acid cleaner empty									
		Inputs		Inputs		Outputs		Outputs		Analogous	
PLC		E0.0	E1.0	E2.0	E3.0	E4.0	E5.0	E6.0	E7.0	E8.0	E9.0
PLC-Web		E0.1	E1.1	E2.1	E3.1	E4.1	E5.1	E6.1	E7.1	E8.1	E9.1
HMI-Web		E0.2	E1.2	E2.2	E3.2	E4.2	E5.2	E6.2	E7.2	E8.2	E9.2
I/O's		E0.3	E1.3	E2.3	E3.3	E4.3	E5.3	E6.3	E7.3	E8.3	E9.3
		E0.4	E1.4	E2.4	E3.4	E4.4	E5.4	E6.4	E7.4	E8.4	E9.4
		E0.5	E1.5	E2.5	E3.5	E4.5	E5.5	E6.5	E7.5	E8.5	E9.5
Signals		E0.6	E1.6	E2.6	E3.6	E4.6	E5.6	E6.6	E7.6	E8.6	E9.6
		E0.7	E1.7	E2.7	E3.7	E4.7	E5.7	E6.7	E7.7	E8.7	E9.7

Fig. 73: [Diagnostic] -> [I/O's] -> [Inputs 1]

[Diagnostic] -> [I/O's] -> [Inputs 1]

→ [I/O's] Press the] key ①.

➔ The diagnostic data of the [I/O's] appears, with the selection [Inputs 1] ②.

View [Diagnostic] -> [I/O's] -> [Inputs 2]

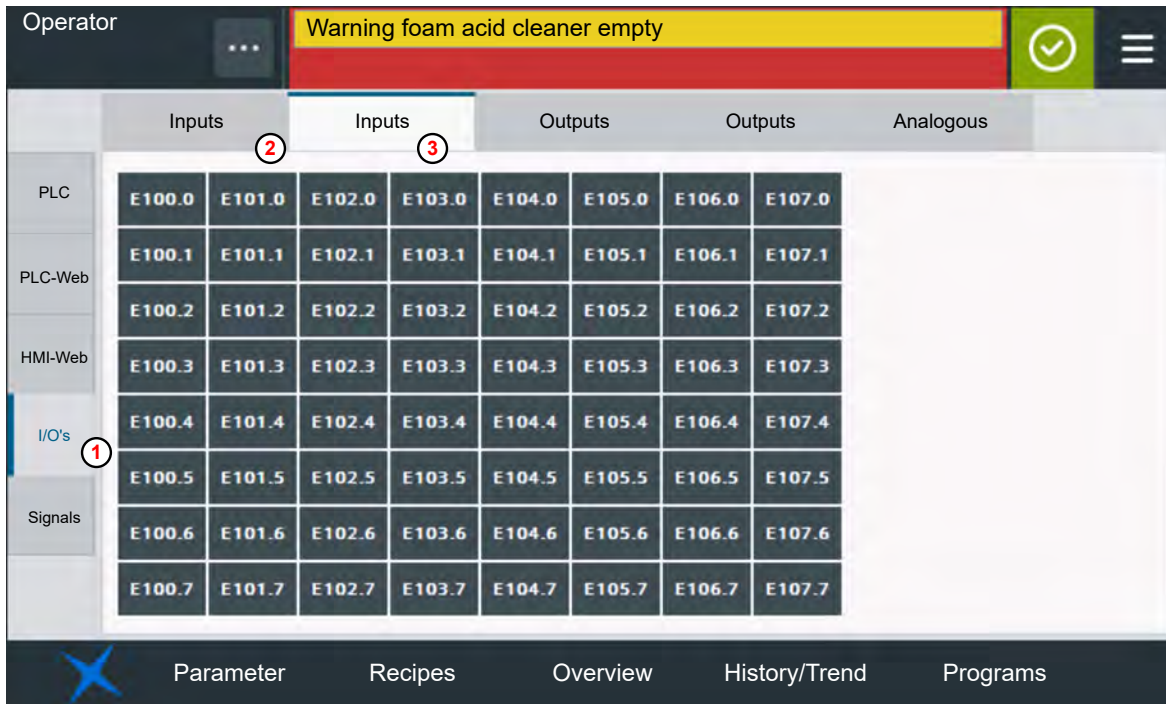


Fig. 74: [Diagnostic] -> [I/O's] -> [Inputs 2]

[Diagnostic] -> [I/O's] -> [Inputs 2]

1. Press the] key ①.
 - ➡ The diagnostic data of the [I/O's] appears, with the selection [Inputs 1] ②.
2. Press the second [Inputs] key ③.
 - ➡ The diagnosis data [I/O's] -> [Inputs 2] appears.

View [Diagnostic] -> [I/O's] -> [Outputs 1]

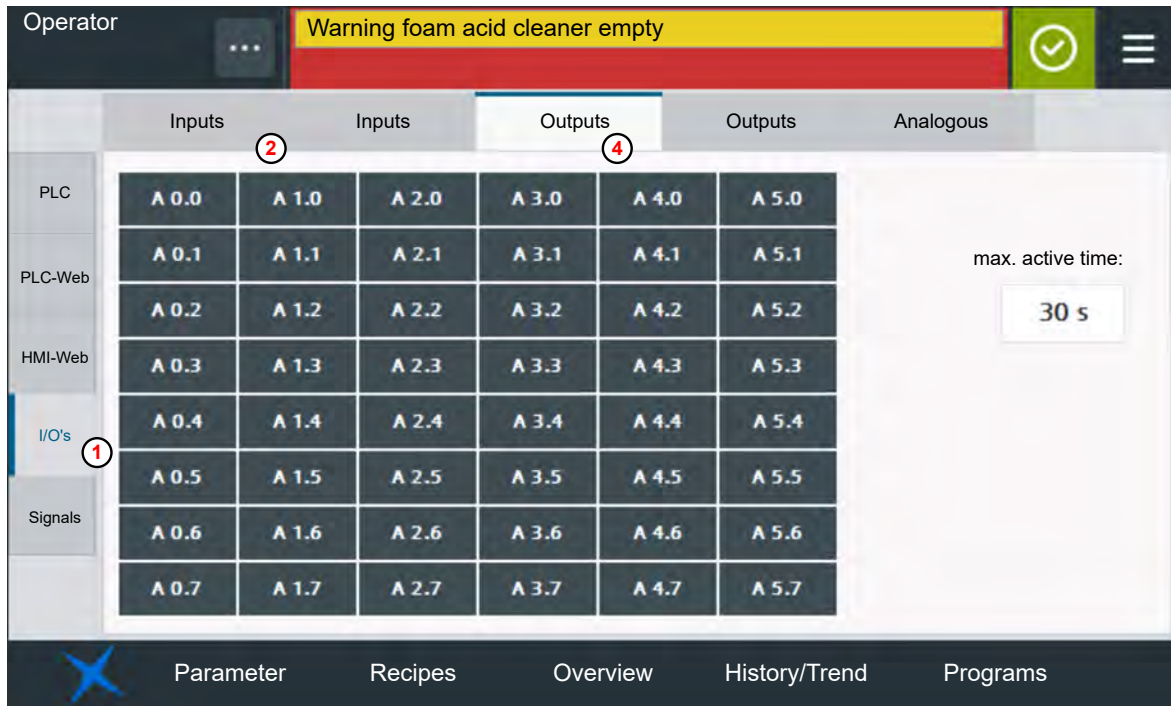


Fig. 75: [Diagnostic] -> [I/O's] -> [Outputs 1]

[Diagnostic] -> [I/O's] -> [Outputs 1]

1. ➤ [I/O's] Press the] key ①.
 - ➔ The diagnostic data of the [I/O's] appears, with the selection [Inputs 1] ②.
2. ➤ [Outputs] Press the] key ④.
 - ➔ The diagnosis data [I/O's] -> [Outputs 1] appears.

View [Diagnostic] -> [I/O's] -> [Outputs 2]



Fig. 76: [Diagnostic] -> [I/O's] -> [Outputs 2]

[Diagnostic] -> [I/O's] -> [Outputs 2]

1. Press the] key (1).
 - ➔ The diagnostic data of the [I/O's] appears, with the selection [Inputs 1] (2).
2. Press the second [Outputs] key (5).
 - ➔ The diagnosis data [I/O's] -> [Outputs 2] appears.

View [Diagnostic] -> [I/O's] -> [Analog]

	Inputs	Inputs	Outputs	Outputs	Analogous
PLC	Analog inputs				
PLC-Web	EW 10	+0	4,00mA	0,00 bar	AW 10
	EW 12	+0	4,00mA	0,00 bar	AW 12
HMI-Web	EW 14	+0	0,00mA	0,0 °C	AW 14
	EW 16	+0	0,00mA	0 l/h	AW 16
I/O's	EW 18	+0	0,00mA	0 %	AW 18
	EW 20	+0	0,00mA	0 %	AW 20
Signals	EW 22	+0	0,00mA	0,0	AW 22
	EW 24	+0	0,00mA	0,0	AW 24
	EW 26	+0	0,00mA	0,0	AW 26

Fig. 77: [Diagnostic] -> [I/O's] -> [Analog]

[Diagnostic] -> [I/O's] -> [Analog]

1. ➔ [I/O's] Press the] key ①.
 - ➔ The diagnostic data of the [I/O's] appears, with the selection [Inputs 1] ②.
2. ➔ [Analog] Press the] key ⑥.
 - ➔ The diagnosis data [I/O's] -> [Analog] to view signal exchanges appears.

[Diagnostic] -> [Signals]

You can see the following views under [Signals]:

- ➔ 'View [Diagnostic] -> [Signals] -> signal exchange [to Ecolab 1]' on page 142
- ➔ 'View [Diagnostic] -> [Signals] -> signal exchange [to Ecolab 2]' on page 143
- ➔ 'View [Diagnostic] -> [Signals] -> signal exchange [to Ecolab 3]' on page 144
- ➔ 'View [Diagnostic] -> [Signals] -> signal exchange [from Ecolab 1]' on page 145
- ➔ 'View [Diagnostic] -> [Signals] -> signal exchange [from Ecolab 2]' on page 146
- ➔ 'View [Diagnostic] -> [Signals] -> signal exchange [from Ecolab 3]' on page 147

View [Diagnostic] -> [Signals] -> signal exchange [to Ecolab 1]

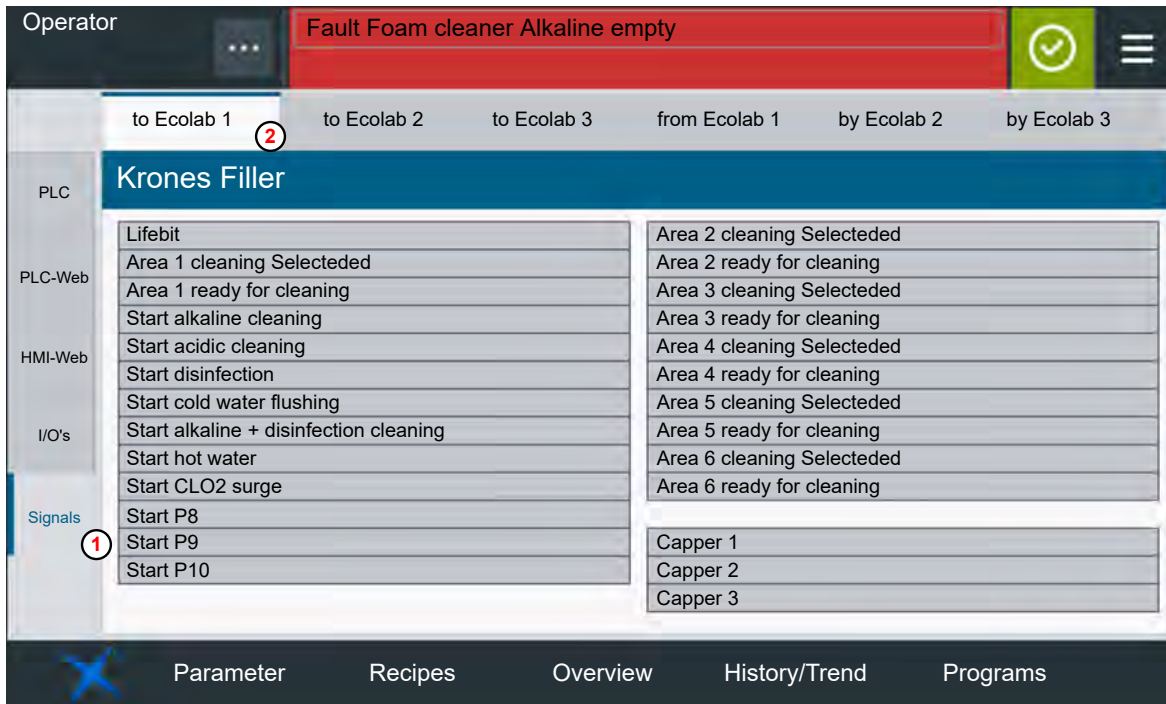


Fig. 78: [Diagnostic] -> [Signals] -> signal exchange [to Ecolab 1]

[Diagnostic] -> [Signals] -> signal exchange [to Ecolab 1]

→ [Signals] Press the] key (1).

- ➡ The diagnosis data [Signals] -> signal exchange [to Ecolab 1] (2) appears.

View [Diagnostic] -> [Signals] -> signal exchange [to Ecolab 2]

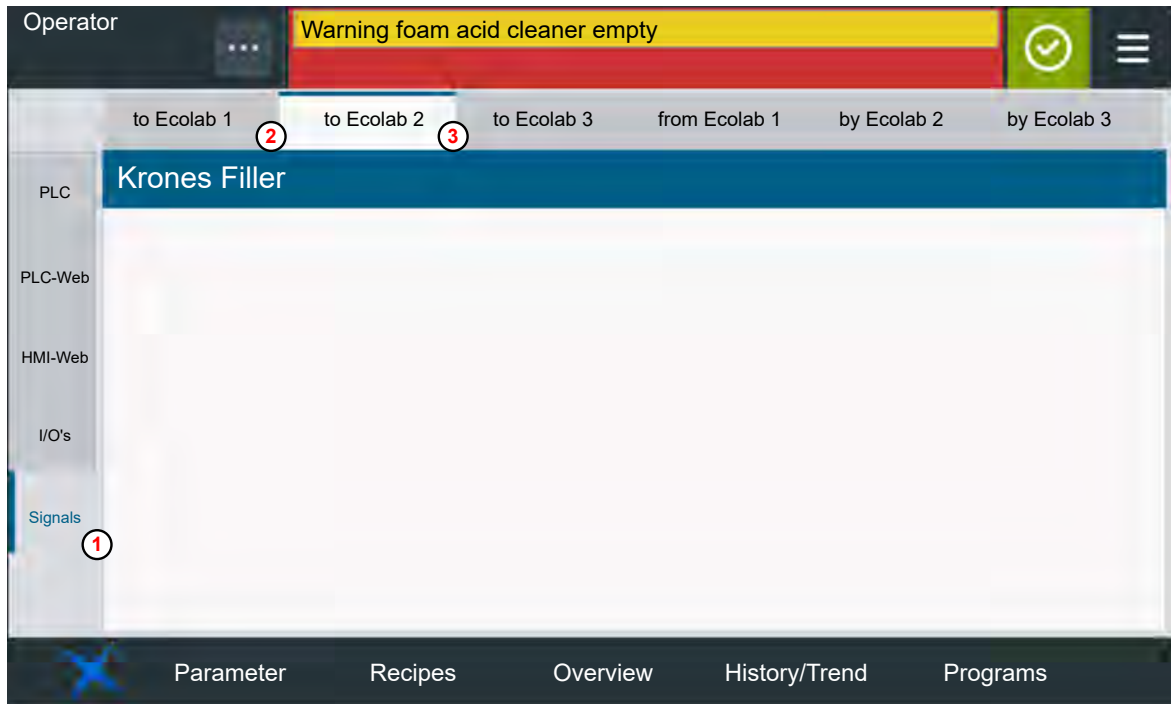


Fig. 79: [Diagnostic] -> [Signals] -> signal exchange [to Ecolab 2]

[Diagnostic] -> [Signals] -> signal exchange [to Ecolab 2]

1. ➤ [Signals] Press the] key ①.
 - ➔ The diagnosis data [Signals] -> signal exchange [to Ecolab 1] ② appears.
2. ➤ Press the [to Ecolab 2] key ③.
 - ➔ The diagnosis data [Signals] -> [to Ecolab 2] appears.

View [Diagnostic] -> [Signals] -> signal exchange [to Ecolab 3]

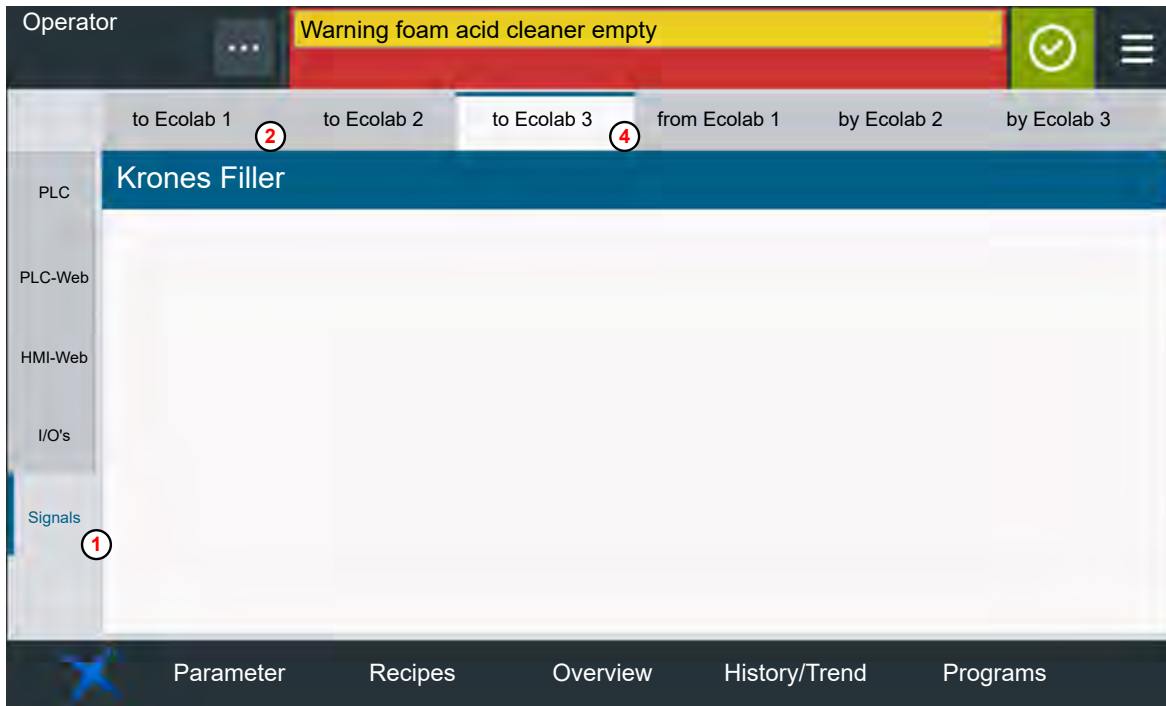


Fig. 80: [Diagnostic] -> [Signals] -> signal exchange [to Ecolab 3]

[Diagnostic] -> [Signals] -> signal exchange [to Ecolab 3]

1. [Signals] Press the] key ①.
 - ➡ The diagnosis data [Signals] -> signal exchange [to Ecolab 1] ② appears.
2. Press the [to Ecolab 3] key ④.
 - ➡ The diagnosis data [Signals] -> [to Ecolab 3] appears.

View [Diagnostic] -> [Signals] -> signal exchange [from Ecolab 1]

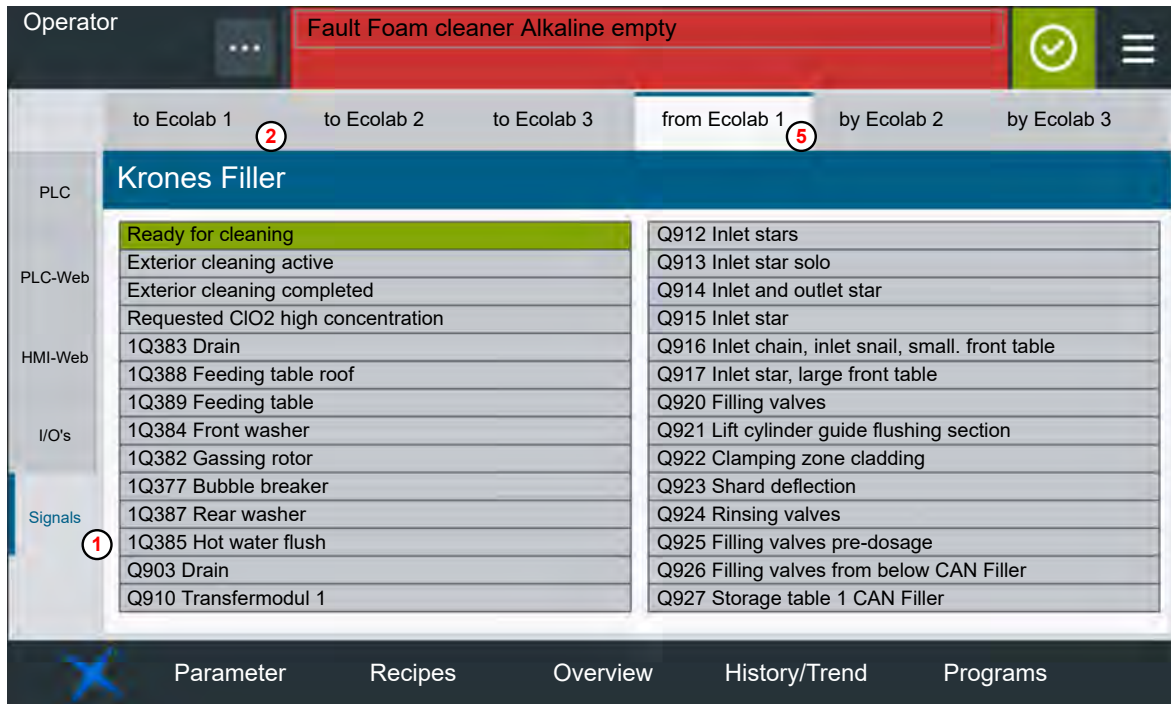


Fig. 81: [Diagnostic] -> [Signals] -> Signal exchange [from Ecolab 1]

[Diagnostic] -> [Signals] -> Signal exchange [from Ecolab 1]

1. ➤ [Signals] Press the [] key ①.
 - ➔ The diagnosis data [Signals] -> signal exchange [to Ecolab 1] ② appears.
2. ➤ Press the [from Ecolab 1] key ⑤.
 - ➔ The diagnosis data [Signals] -> [from Ecolab 1] appears.

View [Diagnostic] -> [Signals] -> signal exchange [from Ecolab 2]

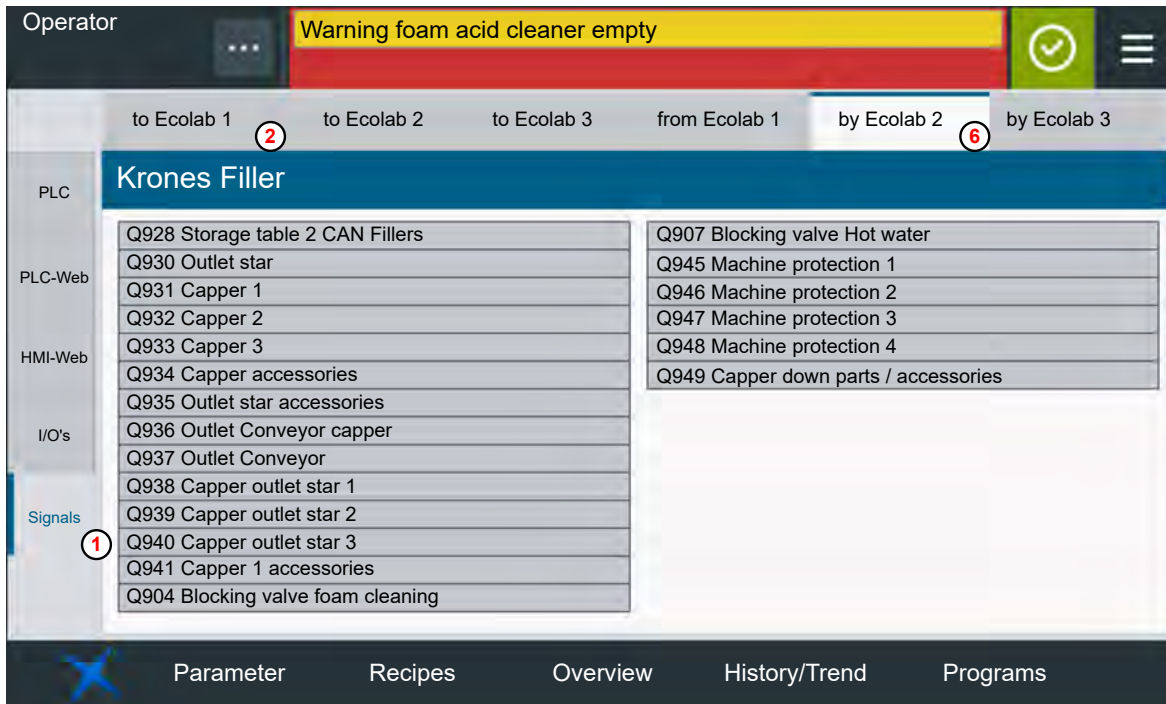


Fig. 82: [Diagnostic] -> [Signals] -> Signal exchange [from Ecolab 2]

[Diagnostic] -> [Signals] -> Signal exchange [from Ecolab 2]

1. [Signals] Press the [] key ①.
 - ➔ The diagnosis data [Signals] -> signal exchange [to Ecolab 1] ② appears.
2. Press the [from Ecolab 2] key ⑥.
 - ➔ The diagnosis data [Signals] -> [from Ecolab 2] appears.

View [Diagnostic] -> [Signals] -> signal exchange [from Ecolab 3]

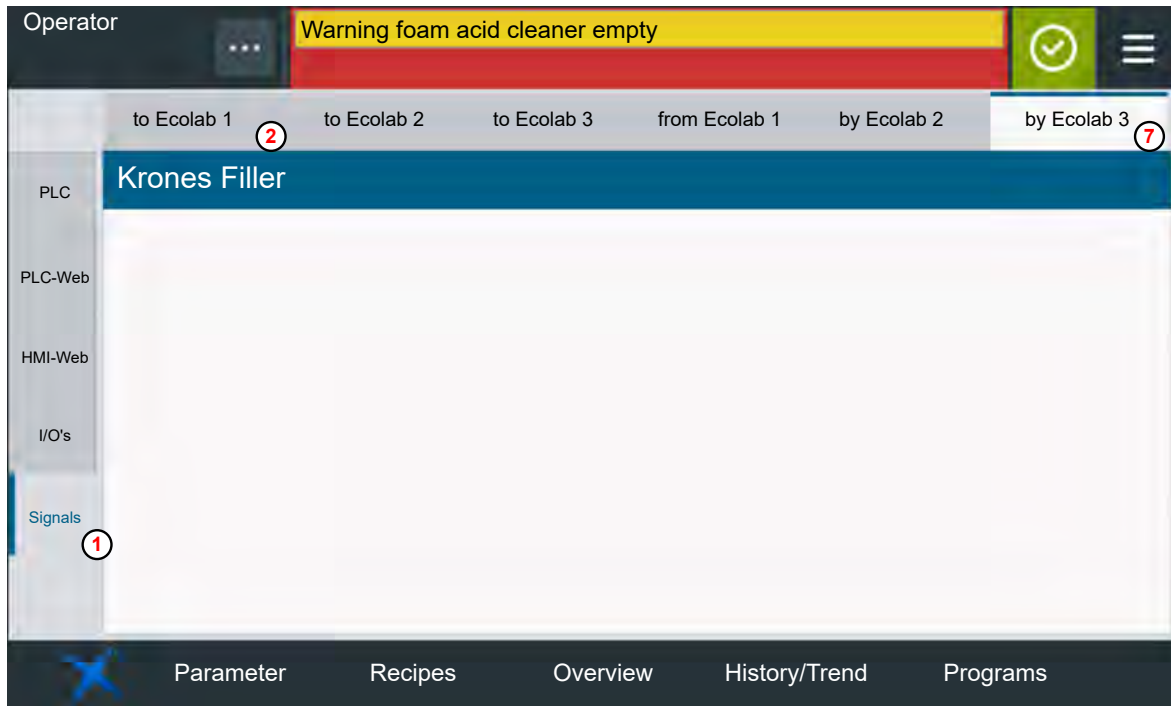


Fig. 83: [Diagnostic] -> [Signals] -> Signal exchange [from Ecolab 3]

[Diagnostic] -> [Signals] -> Signal exchange [from Ecolab 3]

1. ➤ [Signals] Press the] key (1).
 - ➡ The diagnosis data [Signals] -> signal exchange [to Ecolab 1] (2) appears.
2. ➤ Press the [from Ecolab 3] key (7).
 - ➡ The diagnosis data [Signals] -> [from Ecolab 3] appears.

8.15 [Settings]

[SettingsGo to]



Fig. 84: [SettingsGo to]

1. Press the  switch ① to go to the main menu.
 - ➔ The main menu is shown on the right-hand side.

2. [SettingsPress the] key ②.
 - ➔ The [Settings] screen appears.

The following [Settings] are available:

- ➔ [Chapter 8.15.1 '\[Settings\] - \[Display\]' on page 149](#)
 - ➔ ['\[SettingsSet the \] - \[Display\] - \[Brightness\]' on page 149](#)
 - ➔ ['\[Settings\] - \[Cleaning screen\] \(clean screen\)' on page 150](#)
 - ➔ ['\[Settings\] - screen \[Calibration\]' on page 151](#)
 - ➔ ['\[SettingsSet \] - \[Date /Time\]' on page 151](#)
- ➔ [Chapter 8.15.2 '\[Settings\] - \[User accounts\]' on page 153](#)
- ➔ [Chapter 8.15.3 '\[Settings\] - \[Setup\]' on page 154](#)
 - ➔ ['\[Settings\] - \[Setup\] - \[Program names\]' on page 155](#)
 - ➔ ['\[Settings\] - \[Setup\] - \[Cleaning products\]' on page 156](#)
 - ➔ ['\[Settings\] - \[Setup\] - \[Cleaning products\] -> Special machine Liquid Disinfection \(PAA\)' on page 158](#)
 - ➔ ['\[Settings\] - \[Setup\] - \[Areas\]' on page 159](#)
 - ➔ ['\[Settings\] - \[Setup\] - \[Signal exchange\]' on page 161](#)
- ➔ [Chapter 8.15.4 '\[Settings\] - \[Service\]' on page 162](#)

8.15.1 [Settings] - [Display]

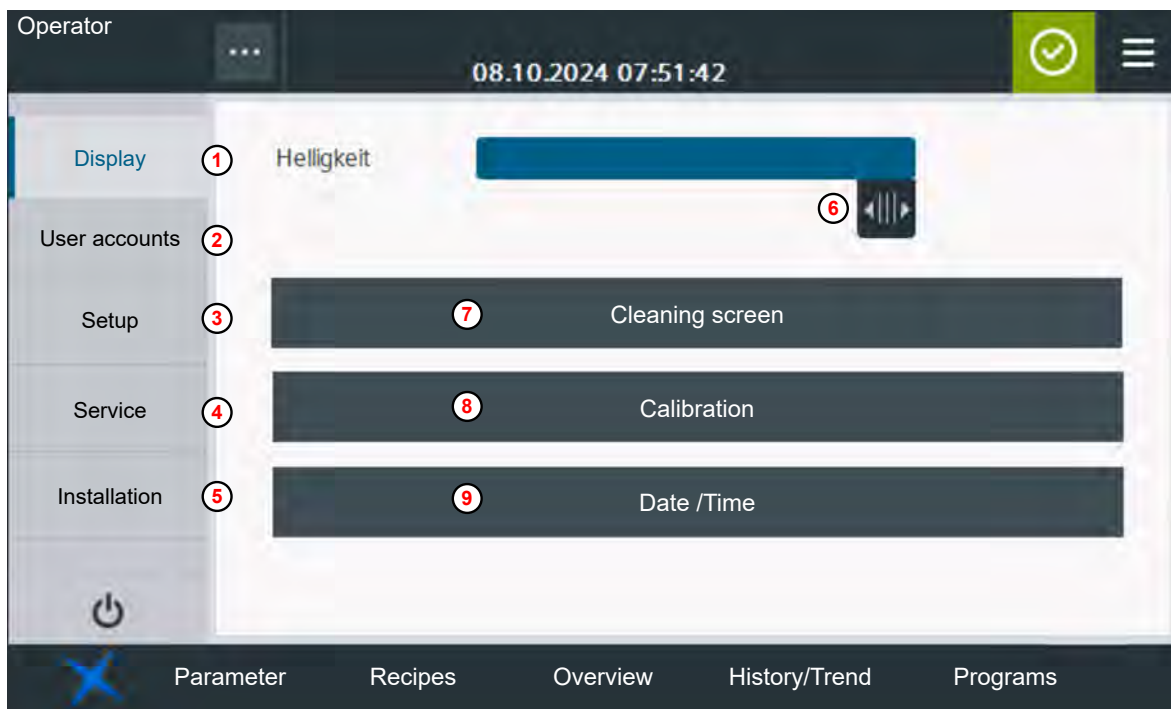


Fig. 85: [Display]

- | | |
|----------------------|-------------------------------|
| ① [Display] Settings | ⑥ Display brightness buttons |
| ② [User accounts] | ⑦ Go to the [cleaning status] |
| ③ [Setup] | ⑧ [Calibration] of the screen |
| ④ [Service] Settings | ⑨ Set the [date/time] |
| ⑤ [Installation] | |

■ The following [Settings] are available:

- ① → Chapter 8.15.1 '[Settings] - [Display]' on page 149
- ② → Chapter 8.15.2 '[Settings] - [User accounts]' on page 153
- ③ → Chapter 8.15.3 '[Settings] - [Setup]' on page 154
- ④ → Chapter 8.15.4 '[Settings] - [Service]' on page 162
- ⑤ → Chapter 8.15.4 '[Settings] - [Service]' on page 162

[Settings] - [Display] - [Brightness]

1. → [Display] Press the [] key (see Fig. 85, no. ①)
 - ➔ The settings for the Brightness, Cleaning screen, Calibration and Date /Time appear.
2. → Move the slider (see Fig. 85, no. ⑥) left or right.
 - ➔ This makes the display brighter (turn right) or darker (turn left).

[Settings] - [Cleaning screen] (clean screen)



CAUTION

Cleaning the touch-sensitive control panel (touchscreen)

To clean the touch-sensitive control panel, it is recommended to use a microfibre cloth.

- To avoid damaging the surface of the control panel, do not use any unsuitable cleaning agents.
- When cleaning, do not apply too much pressure to the control panel in order to avoid damaging the pressure sensor.
- Never clean the control panel by spitting on it and then rubbing it.
This will cause a smeared film to form on the control panel, which will have to be cleaned again.
- Never use aggressive or scouring techniques or detergents.
- Never use products which contain ammonia.
Ammonia can damage the control panel.
- Do not spray liquids or water directly onto the control panel.
Otherwise, there is a risk of ingress and damage inside the device.
Spray the liquid onto the microfibre cloth instead and squeeze it out in order to remove all excess liquid before it is used for cleaning.
- Never use paper towels or tissue paper.
They contain wood fibres which can scratch the plastic surface.
Scratches may not be visible initially, but the surface will appear matt and blurred over time.

[Cleaning screen] (screen cleaning)

1. [DisplayPress the] key (see [Fig. 85](#), no. ①)
 ➡ The settings for the Brightness, Cleaning screen, Calibration and Date /Time appear.
2. [Cleaning screenPress the] key (see [Fig. 85](#), no. ⑦).
 ➡ All setting options are disabled in the screen.
 ➡ The Cleaning screen appears:

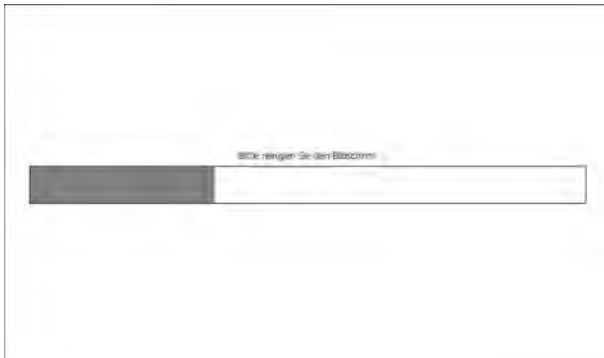


Fig. 86: Cleaning screen

- ➡ A "running bar" shows the amount of time in which the screen can be cleaned without adjusting anything.
3. Clean the screen as long as the Cleaning screen is displayed.
 4. If the cleaning is not complete, but the Cleaning screen is already hidden, repeat the process if necessary until the screen is completely cleaned.

[Settings] - screen [Calibration]

1. ➤ [Display] Press the [] key (see [Fig. 85](#), no. ①)
 - ➔ The settings for the Brightness, Cleaning screen, Calibration and Date /Time appear.
2. ➤ [Calibration] Press the [] key (see [Fig. 85](#), no. ⑧).
 - ➔ All setting options are disabled in the screen.
 - ➔ The screen for Calibration appears:

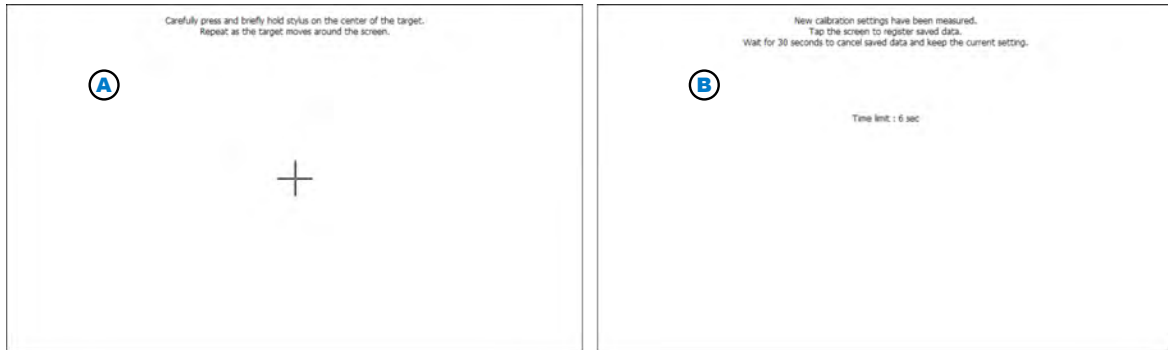


Fig. 87: Calibration screen

- ➔ The following note appears (always in English): ①
Carefully press and briefly hold stylus on the centre of the target.
Repeat as the target moves around the screen.
3. ➤ Carefully press and briefly hold stylus on the centre of the target.
Repeat as the target moves around the screen.
 - ➔ Once all required actions have been performed, a "Completion message" is displayed.
 - ➔ The following note appears (always in English) ②:
New calibration settings have been measured.
Tap the screen to register saved data.
Wait for 30 seconds to cancel saved data and keep the current settings.
 - ➔ New calibration settings have been measured.
 4. ➤ Tap the screen to register the stored data.
 5. ➤ If the calibration is not applied:
Wait for 30 seconds to cancel saved data and keep the current settings.

[SettingsSet] - [Date /Time]

1. ➤ [Display] Press the [] key (see [Fig. 85](#), no. ①)
 - ➔ The settings for the Brightness, Cleaning screen, Calibration and Date /Time appear.
2. ➤ [Date /Time] Press the [] key (see [Fig. 85](#), no. ⑨).
 - ➔ The system settings appear:

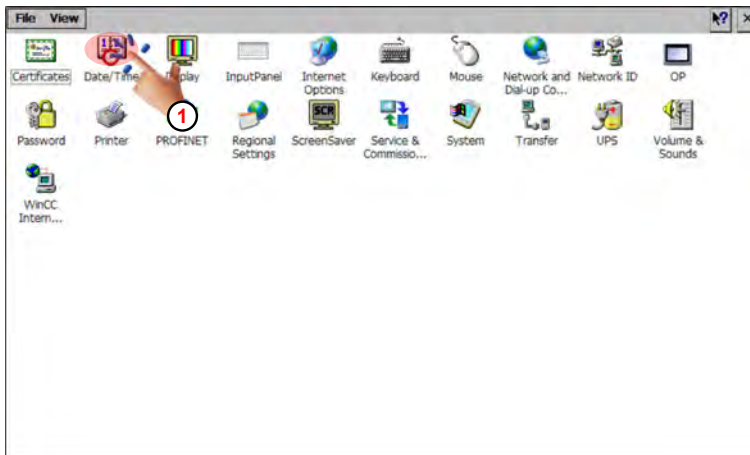


Fig. 88: Control panel (Windows CE)

3. Date /Time Double-click.

- ➔ The selection window for Date /Time and the time zone opens:

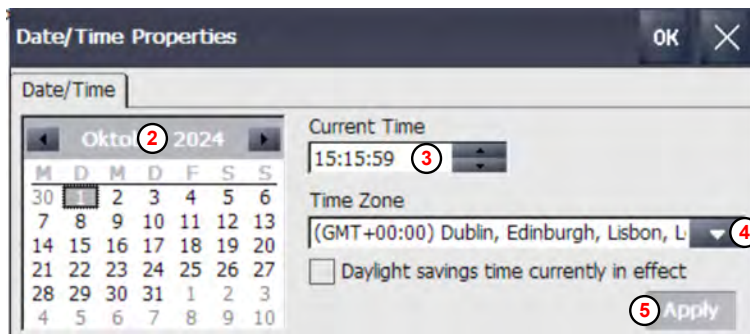


Fig. 89: Select Date /Time and the time zone

4. Select [Date] ②.

5. Select [Time] ③. Do not change the "Time Zone" ④ GMT +00:00
Selection field: Do not change "Daylight savings time currently in effect", otherwise the HMI and CPU will not be able to communicate!

6. Press the [Apply] key ⑤.

- ➔ Your settings are saved and applied in the system.

8.15.2 [Settings] - [User accounts]

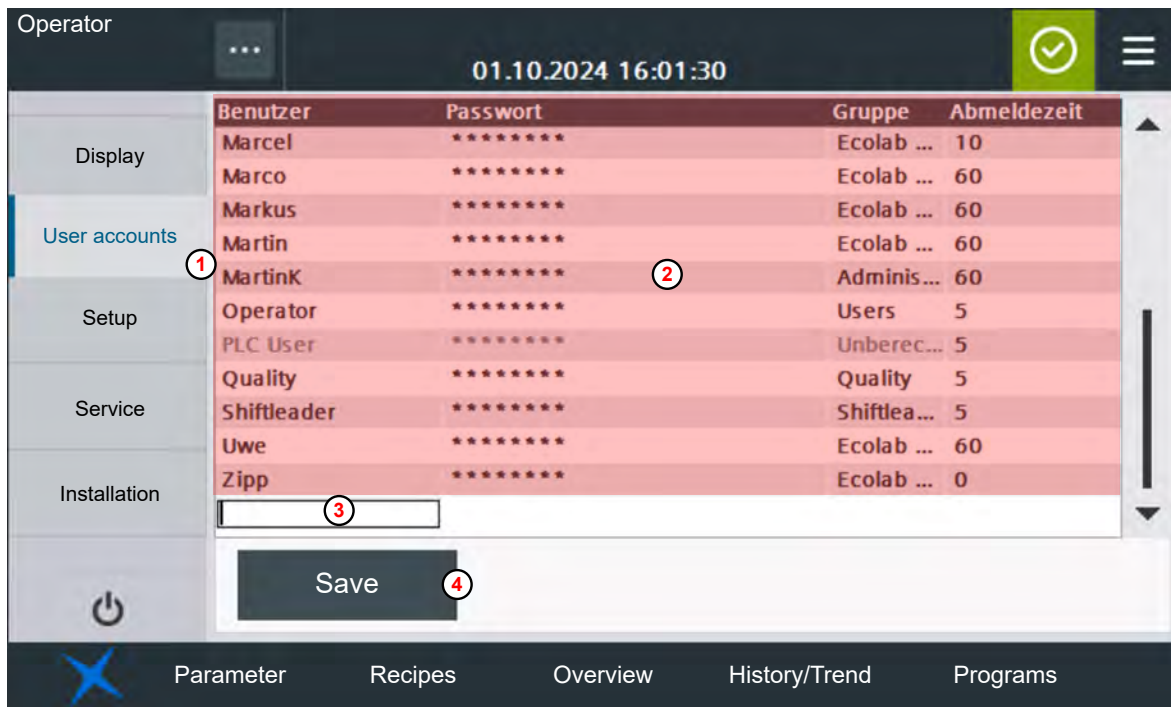


Fig. 90: [User accounts]

1. ➤ [User accounts] Press the [] key ①.
 - ➔ The User accounts ② overview appears.
2. ➤ Below the existing User accounts ③ one, enter the new user.

Administrator rights are required for this process!

 - ➔ The keyboard to enter the name appears.
3. ➤ Then enter the new password of the new user (2-fold entry).
4. ➤ Select User Group / Permission Level.
5. ➤ Specify the length of the possible sign-in time.
6. ➤ Press the [Save] key ④.
 - ➔ The new user is logged in and can make settings on the control system according to their user rights.

8.15.3 [Settings] - [Setup]

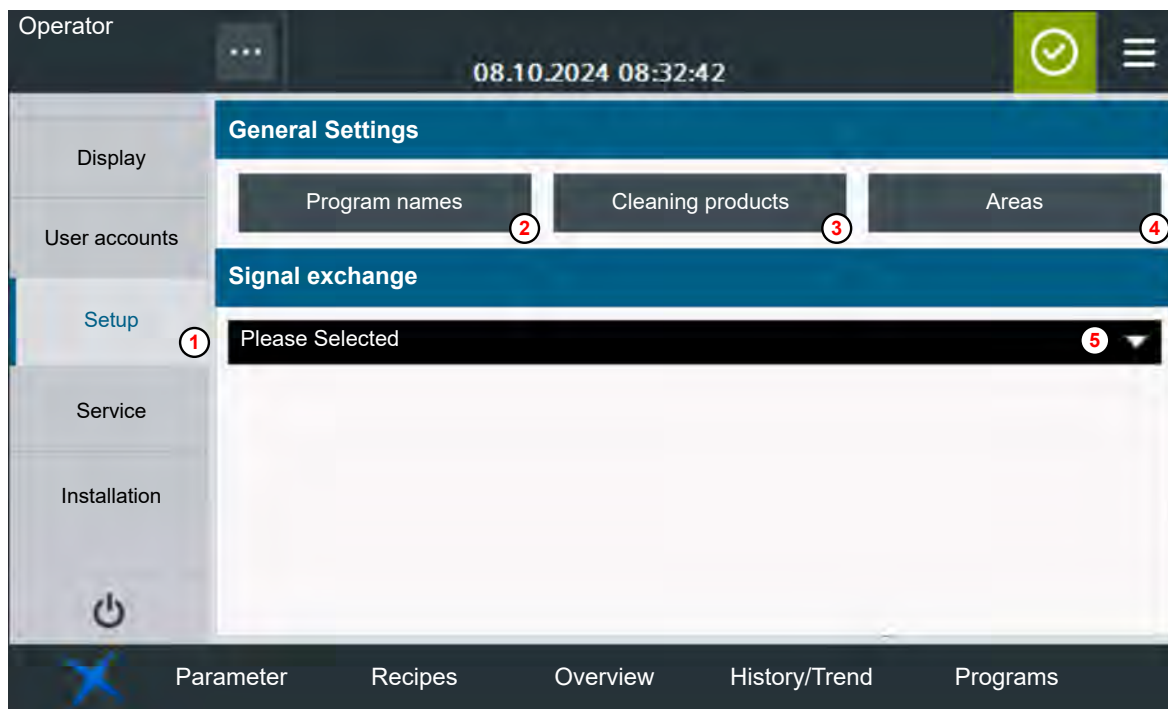


Fig. 91: [Setup] overview

→ [Setup] Press the **[]** key **(1)**.

➔ The Setup overview appears.

The following [Settings] are available:

- **(2)** ➔ '[Settings] - [Setup] - [Program names]' on page 155
- **(3)** ➔ '[Settings] - [Setup] - [Cleaning products]' on page 156
- ➔ '[Settings] - [Setup] - [Cleaning products] -> Special machine Liquid Disinfection (PAA)' on page 158
- **(4)** ➔ '[Settings] - [Setup] - [Areas]' on page 159
- **(5)** ➔ '[Settings] - [Setup] - [Signal exchange]' on page 161

[Settings] - [Setup] - [Program names]

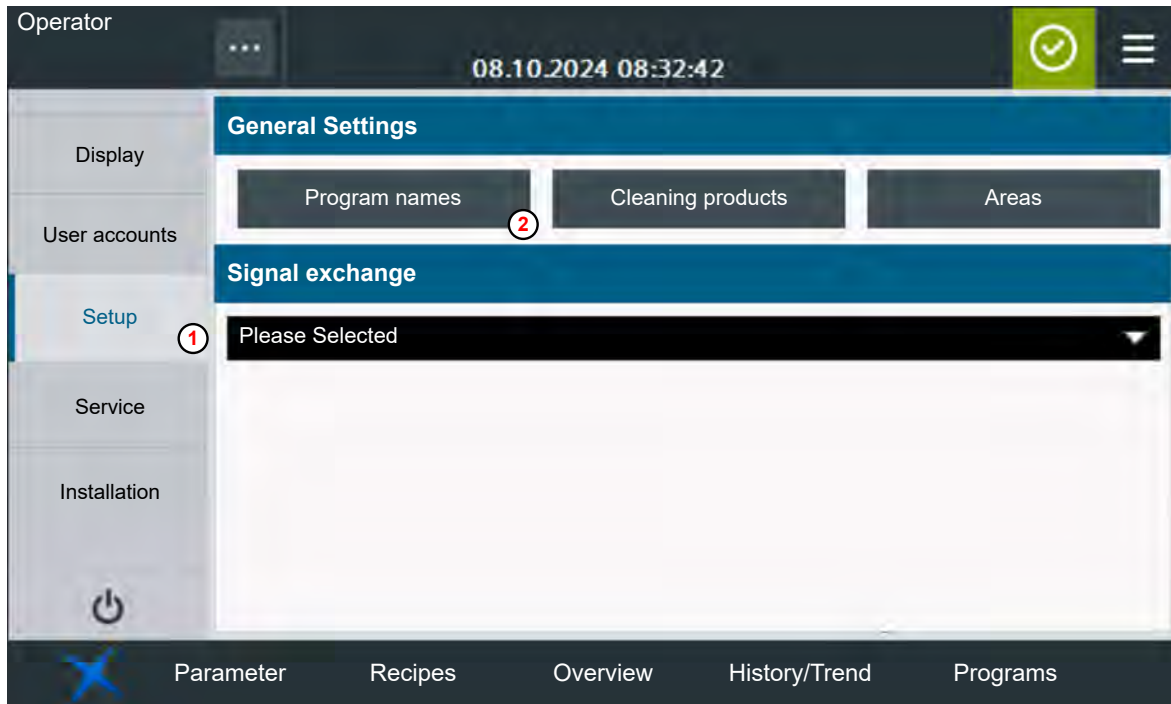


Fig. 92: [SetupSelect] - [Program names]

1. ➤ [Setup] Press the [] key ①.
➔ The Setup overview appears.
2. ➤ [Program names] Press the [] key ②.
➔ A pop-up window appears for you to enter Program names.

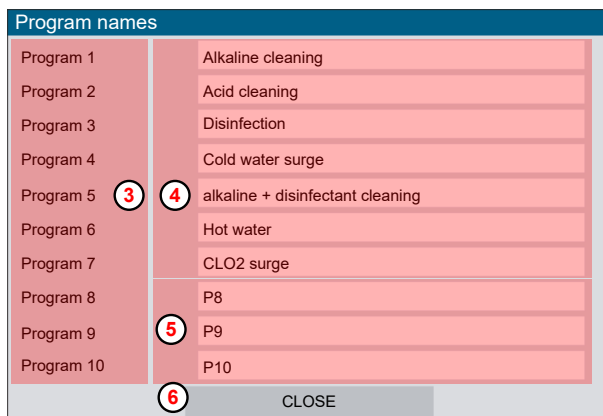


Fig. 93: [Setup] program overview

- ➔ There are 10 Program names ③ to choose from.
All the program names ④ can be changed.
Max. 40 characters for each name!
If a name is not yet given ⑤, you see P1 to P10 instead.
3. ➤ Select the Program names to change/edit.
➔ A keyboard to enter the Program names appears.
 4. ➤ After entering the name on the onscreen keyboard, press the [Enter] key.
➔ The name is saved and added to the name list ④.
 5. ➤ [CLOSE] Press the [] key ⑥.
➔ All your changes are saved and the pop-up window closes.

[Settings] - [Setup] - [Cleaning products]

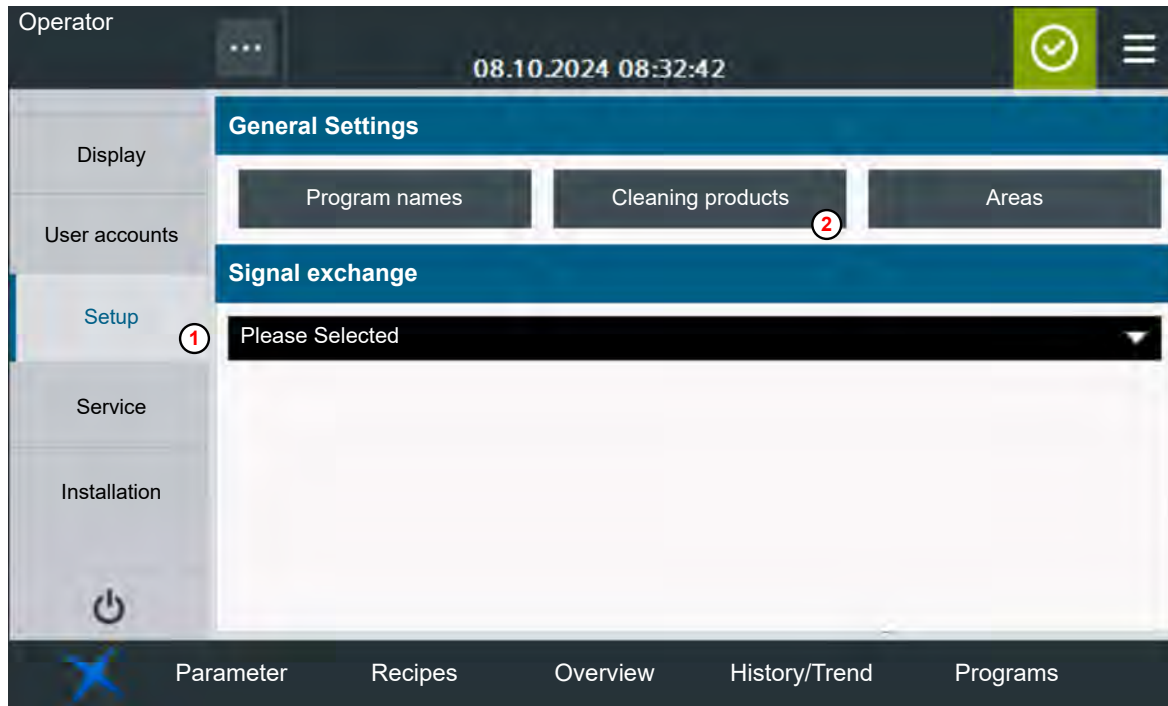


Fig. 94: [SetupSelect] - [Cleaning products]

1. [SetupPress the] key ①.
 ➡ The Setup overview appears.
2. [Cleaning productsPress the] key ②.



All Cleaning products ③ are assigned to the suction lances or ports on the control system and the product valves and cannot be changed.

Assignment of product > machines (see PID):

- Alkaline = [>LS020.1<] + [>V020.2<]
- Acid = [>LS030.1<] + [>V030.2<]
- Disinfection = [>LS040.1<] + [>V040.2<]

➡ A pop-up window to select the detergent appears.

3. Select the cleaning product.

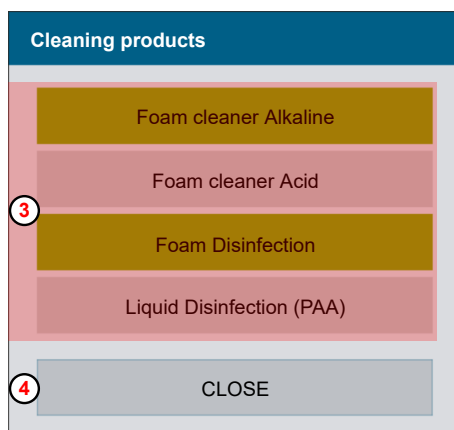


Fig. 95: Selection Cleaning products

➡ The selected product ③ is shown in green.



*Spray disinfection (PES) is not included as standard!
Spray disinfection (PES) is available for special systems only.
See: ➔ '[Settings] - [Setup] - [Cleaning products] -> Special machine Liquid Disinfection (PAA)' on page 158*

4. ➔ [CLOSE] Press the] key

- ➔ All your changes are saved and the pop-up window closes.
- ➔ After the selection has been made, the view changes in the PID:

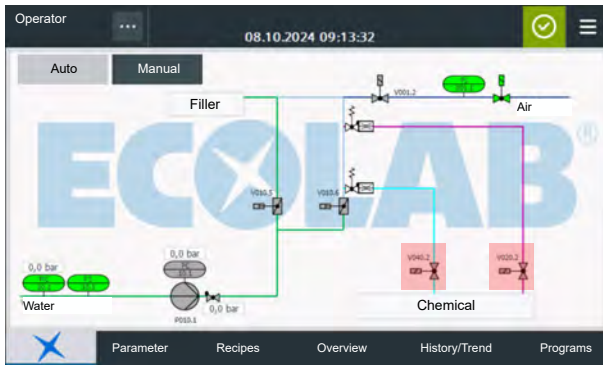


Fig. 96: PID view after customising your cleaning products

PID view effect on the valves:

- [>V010.01<] stop cock
- [>V010.02<] Satellite valve (only if FAT Satellites selected at installation)
- [>FQI 010.01<] water flow
- [>V050.02<] PES dosing valve NC
- [>V050.03<] PES degassing NO
- [>P050.02<] PES dosing pump

➔ This selection affects the display in the Chemical zone on the containers:

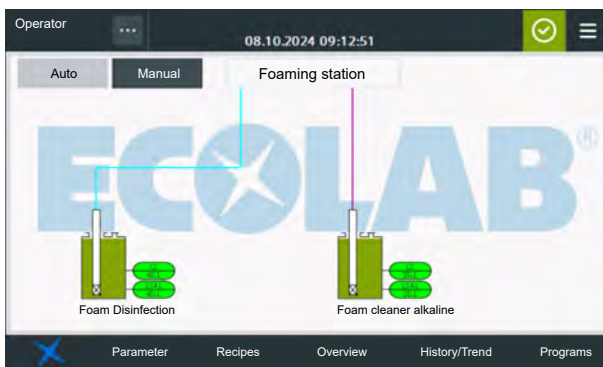


Fig. 97: View Chemical after customising your cleaning products

Effects of the Chemical view:

- [>LS050.1 1<] = empty signal
- [>V001.3<] valve for container lift

[Settings] - [Setup] - [Cleaning products] -> Special machine Liquid Disinfection (PAA)

1. ➤ [Setup] Press the] key as described under ➔ '[Settings] - [Setup] - [Cleaning products]' on page 156, (see Fig. 94, no. ①).
➡ The Setup overview appears.
2. ➤ [Cleaning products] Press the] key as under ➔ '[Settings] - [Setup] - [Cleaning products]' on page 156, (see Fig. 94, no. ②).



All Cleaning products ③ are assigned to the suction lances or ports on the control system and the product valves and cannot be changed.

Assignment of product > machines (see PID):

- Alkaline = [>LS020.1<] + [>V020.2<]
- Acid = [>LS030.1<] + [>V030.2<]
- Disinfection = [>LS040.1<] + [>V040.2<]

- ➡ A pop-up window to select the detergent appears.

3. ➤ Liquid Disinfection (PAA) manually.

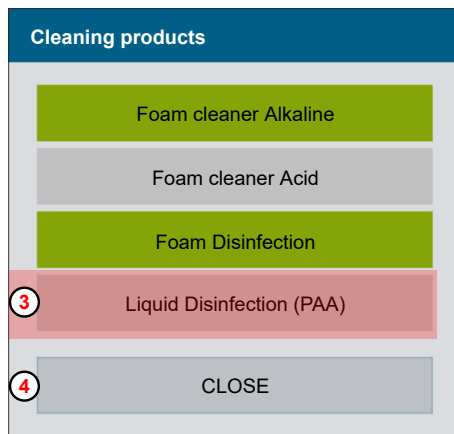


Fig. 98: Cleaning products

- ➡ The selected product ③ (Liquid Disinfection (PAA)) is shown in green.
4. ➤ [CLOSE] Press the] key ④.
➡ All your changes are saved and the pop-up window closes.

[Settings] - [Setup] - [Areas]

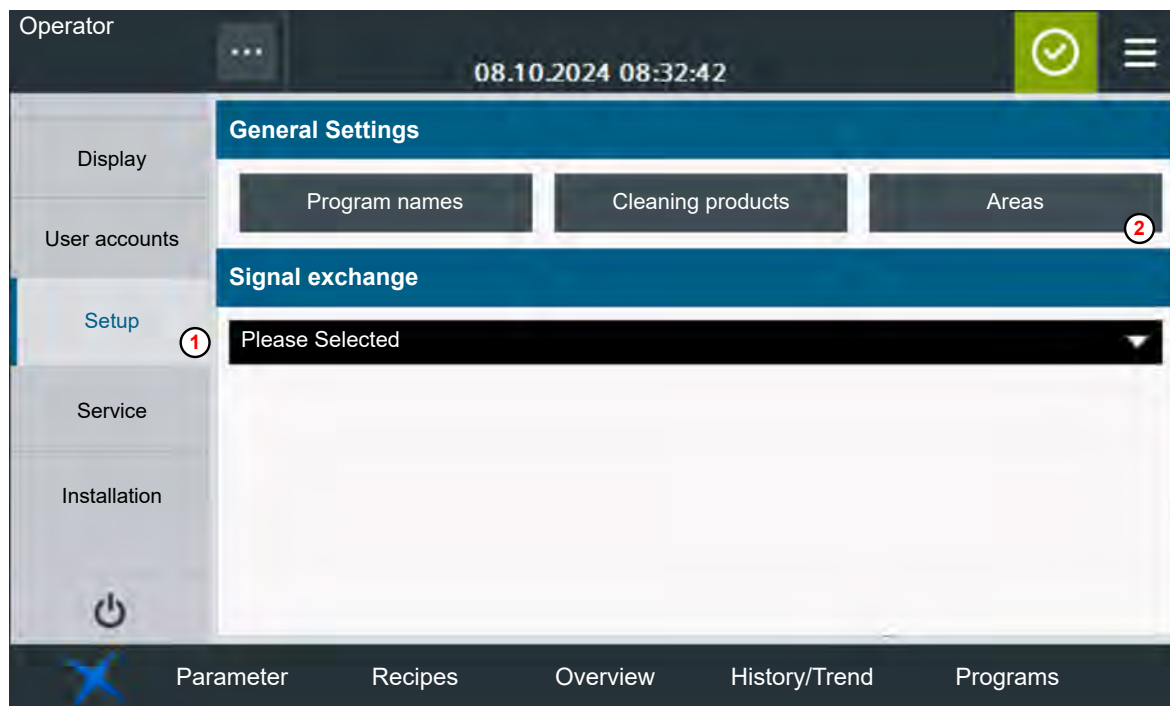


Fig. 99: [SetupSelect] - [Areas]

1. → [SetupPress the] key ①.
➔ The Setup overview appears.
2. → [AreasPress the] key ②.
➔ A pop-up window appears to configure the Areas:

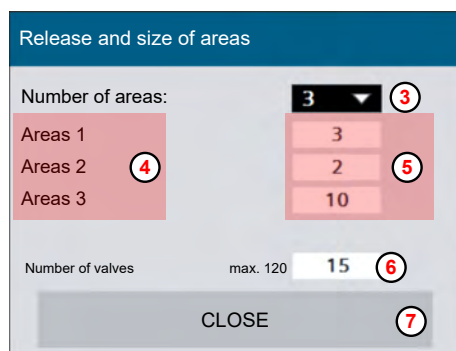


Fig. 100: [Areas] zone overview

3. ➤ Select the required Areas 1 to 10 ③.

- The number of selected Areas ④ and sectional valves for each zone ⑤ area and the total number of sectional valves ⑥ are displayed.
- The settings affect the display of the valves in the PID.



Fig. 101: [Areas] PID view

4. ➤ [CLOSEPress the] key ⑦.

- All your changes are saved and the pop-up window closes.

[Settings] - [Setup] - [Signal exchange]

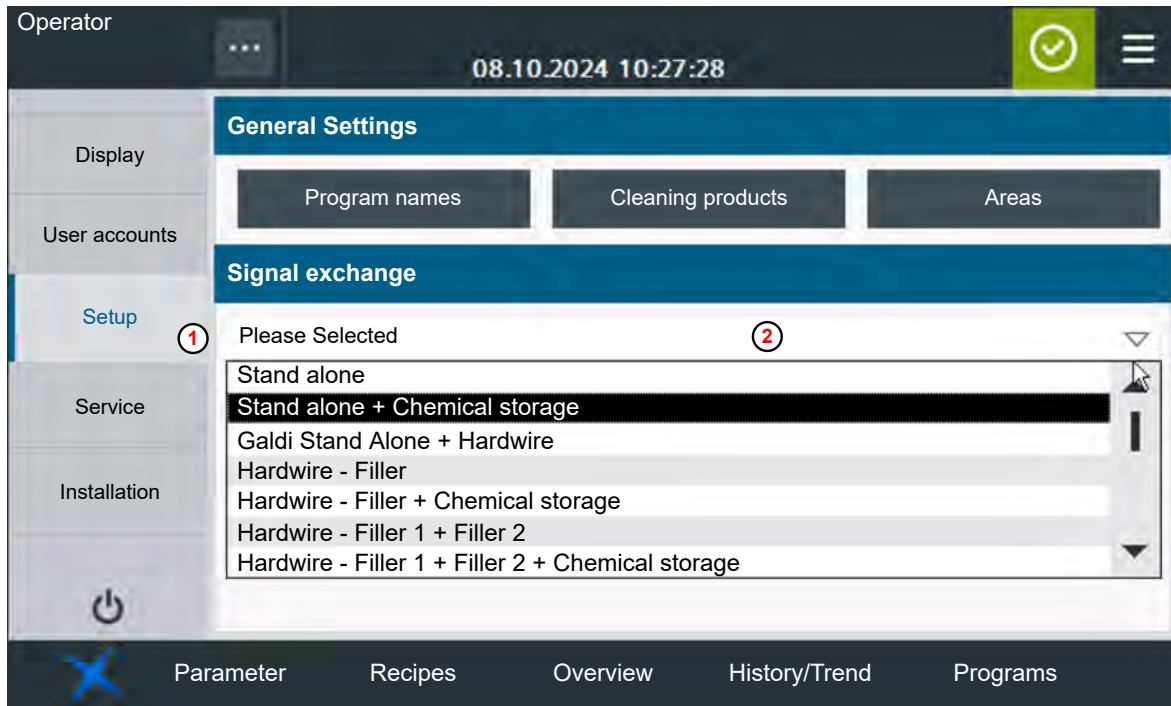


Fig. 102: [Signal exchangeSelect]

1. ➤ [SetupPress the] key ①.

➔ The Setup overview appears.

2. ➤ With [Signal exchange] ② open the dropdown menu.

➔ Here you can now select the required Signal exchange, i.e. the type of connection between the system to be cleaned and the BFH foam cleaning system.

Signal exchange options (excerpts):

- Stand Alone
In this mode, the sectional valves are controlled via a valve terminal in the control system on the HC. A release signal from the machine to be cleaned is requested by Ecolab. This is done via a hardwire signal through direct wiring. A "[Programs]" key also appears in the menu bar at the bottom.
- Hardwire filler
In this mode, a valve terminal is installed in the control system on the HC. Program selection via Hardwire signal exchange. To start a cleaning run, a hardwire release is required.

8.15.4 [Settings] - [Service]

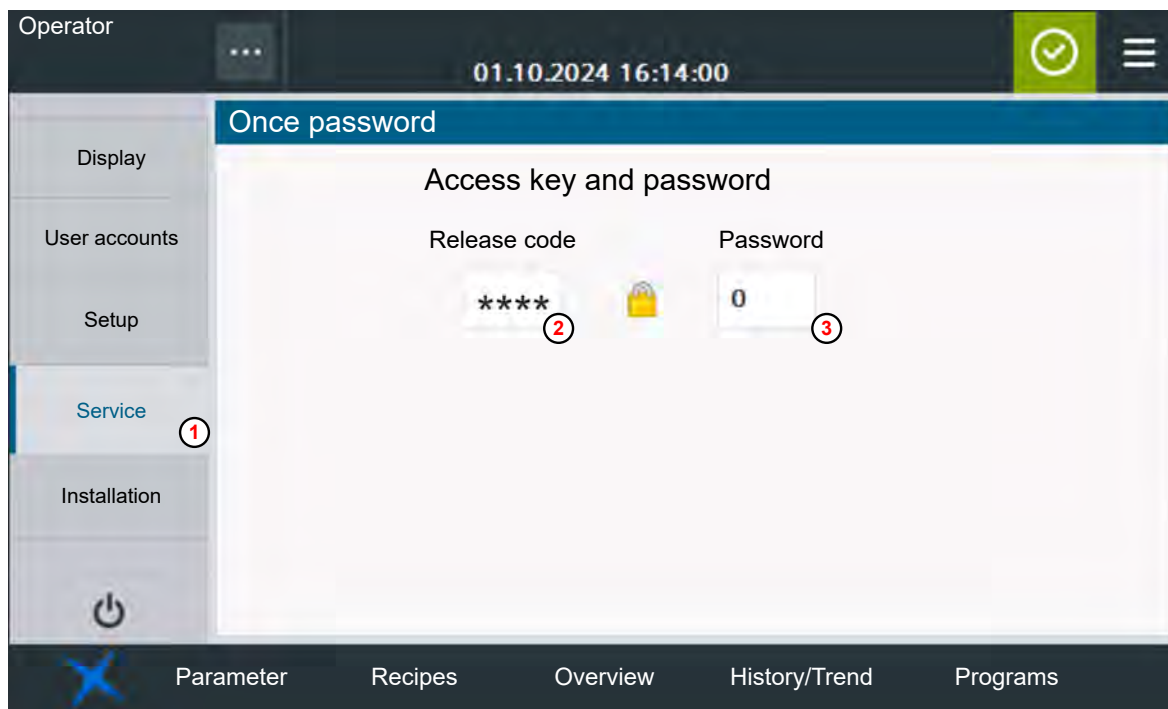


Fig. 103: [Service]

1. ➤ [ServicePress the] key ①.
➡ The entry fields for the "One-time Password" appear.
2. ➤ Request the access code from customer services.
3. ➤ Enter the code you are given in the field: [release code] ②.





The access time (release code validity) is max. 5 min.

4. ➤ Contact the service technician for the release code.
➡ The service technician will then provide a password.
5. ➤ Enter the assigned password in the field: Enter [Password] ③.
➡ The control system can now be configured.

8.16 [Information]



Fig. 104: [InformationGo to]

1. ➤ Press the  switch ① to go to the main menu.
➔ The main menu is shown on the right-hand side.
2. ➤ [Information] Press the] key ②.
➔ The [Information] screen appears.

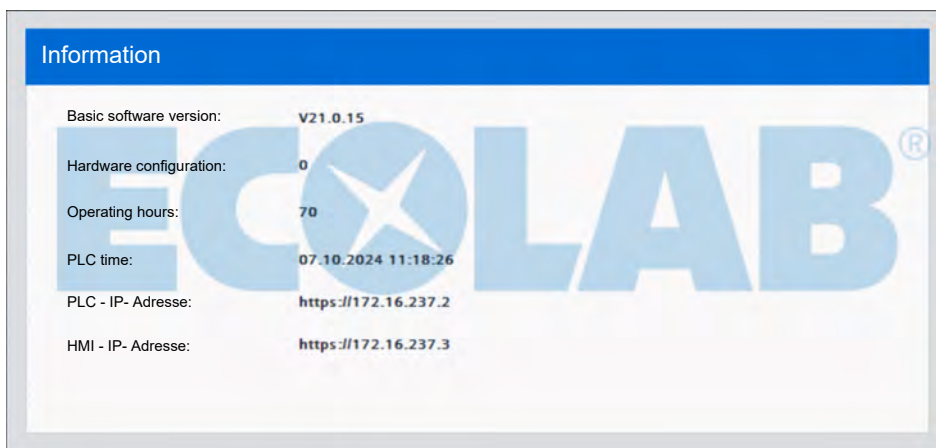


Fig. 105: [Information]

The following information is displayed:

- Software version
- Hardware configuration
- Hours in operation
- PLC time
- PLC IP address
- HMI IP address

9 Start-up

Personnel requirements

Personnel:

- Specialist
- Service personnel

Personal protection equipment (PPE)

Protective equipment:

- Chemical-resistant protective gloves
- Protective work clothing
- Protective goggles
- Face protection



Position information with reference to the PID (flow chart)

Where the following refers to the positions of components in the PID, these are presented as follows: [**>....<**]



WARNING

Risk of injury due to improper commissioning work

Improper commissioning work can lead to serious injury.

- Work may be carried out only by authorised and trained specialist personnel.
- Before starting work, switch off the Plant and secure it against being switched back on.
- Observe the safety data sheet for the chemical product used



WARNING

Risk of slipping due to escaping chemicals

Chemicals leaking in the working and preparation area can cause slipping and injuries.

- Wear non-slip, chemically resistant shoes when working.
- Always have a suitable binding agent available (according to the chemical product safety data sheet).
- Seal off the area with the escaping chemical.
- Immediately collect chemicals that have leaked or spilled and dispose of them properly.
- If necessary, place the chemical container in a trough to collect any escaping chemicals.



WARNING

Risk of injury from automatically starting components

With some components, an automatic start-up is already started as soon as the power supply is connected or restored after a power failure.

This is done without first actuating a switch or button and can lead to injuries.

- Ensure operational readiness before connecting the power supply
- Prevent automatic restart after power failure by suitable superordinate measures



WARNING

Burns caused by harmful chemicals

Leaks on the Plant can allow corrosive chemicals to escape and cause serious injury.

- Read the enclosed safety data sheet carefully before using chemicals.
- The safety regulations and the required protective clothing for working with chemicals must be complied with.
- Safety devices such as showers and eye flushing must be accessible and checked regularly to ensure that they are fully functional.
- Ensure adequate ventilation and extraction.
- Avoid skin and eye contact.
- Check the Plant regularly for tightness.
- Do not put the Plant into operation if leaks occur.
- If leaks are identified, trigger the emergency stop function immediately.
- Do not operate the Plant again until the leaks have been repaired.



CAUTION

Risk of injury from damaged or unsuitable tools

Injuries may result from the use of damaged or unsuitable tools.

- Use only undamaged tools.
- Use only the tool intended for the specific purpose (e.g. suitable drills).

Handling peroxide



DANGER

Pay attention to safety when handling peroxides.

The main risks associated with the use of peroxide are:

- If peroxide comes into contact with skin or mucous membranes, it causes severe burns.

For first-aid measures, see the instructions on the safety data sheet.

- **Personal protective equipment must be worn for all work on the unit: Safety glasses and gloves.**
- **A face shield must also be worn when performing maintenance or repair work.**



DANGER

Burns caused by peroxide chemical products

Peroxide chemical products in high concentrations cause severe burns if they come into contact with skin, eyes or mucous membranes.

- Always use a face shield in addition to the prescribed PPE in case of maintenance or repair
- Ensure that suitable emergency equipment is available in the vicinity of the operating area (e.g. eye shower)



CAUTION

Avoid reactive processes.

H₂O₂ decomposes constantly (depending on the temperature).

The decomposition leads to high gas development and thus to an increasing pressure in the system. If the pressure exceeds the maximum system pressure, the metering system may fail.

If H₂O₂ is contaminated with metal ions (copper, zinc, iron) or corrosive / organic substances, the decomposition speed increases.

At a certain product temperature, the reaction proceeds spontaneously and uncontrollably.

9.1 Check the safety devices of the Plant

To ensure safety, it is mandatory to check the safety equipment prior to start-up.

- 1.** ➤ Check the proper installation and connection of all components.
- 2.** ➤ Visual inspection for leaks on the Plant.
- 3.** ➤ Carry out a function test of the EMERGENCY STOP button.
- 4.** ➤ Wear the prescribed PPE.
- 5.** ➤ Check that all safety equipment is provided according to the safety data sheet of the chemicals used (e.g. eye wash)

9.2 Start-up steps

Prepare for commissioning

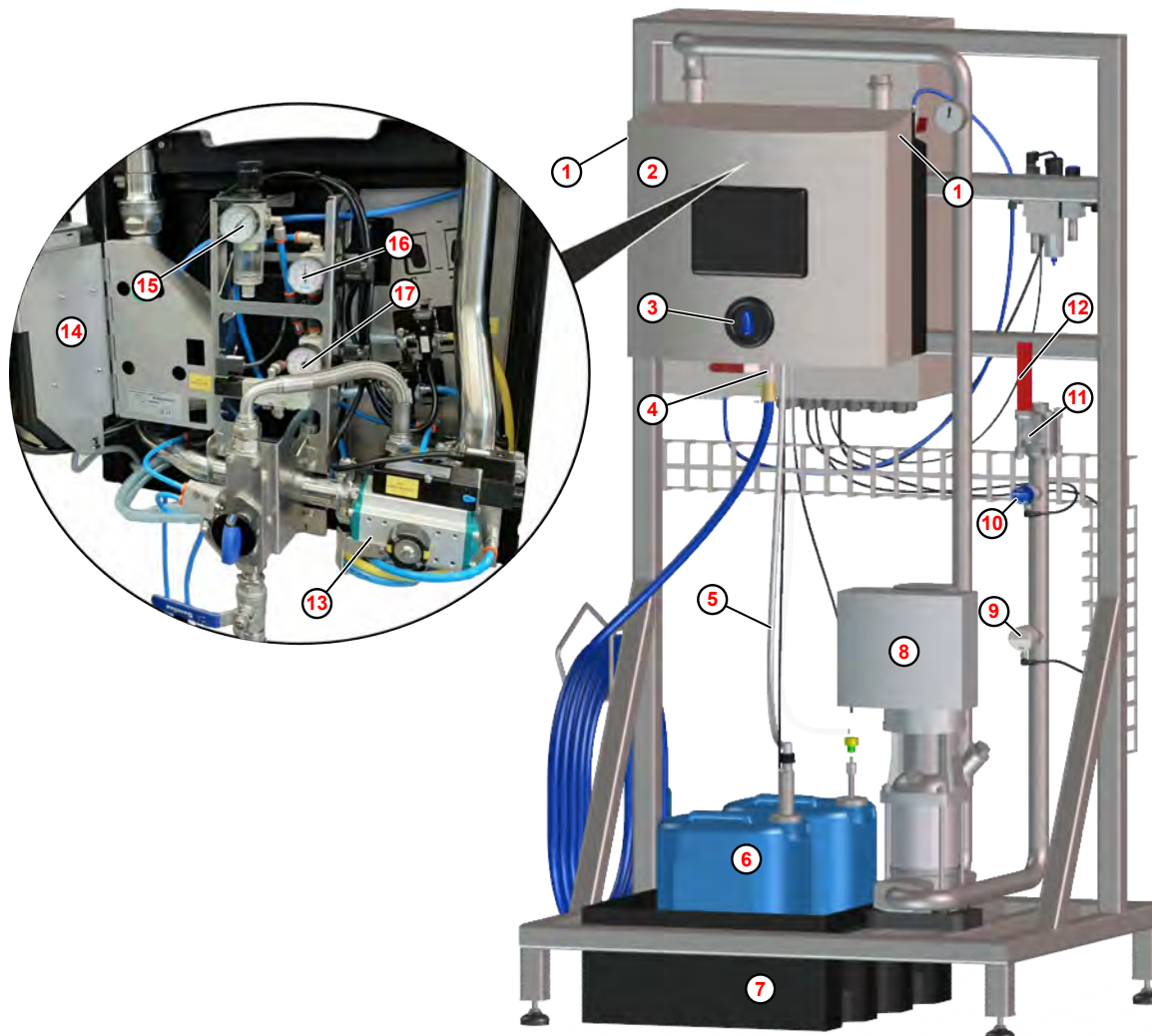


Fig. 106: Foamatic satellite with connections and compressed air supply

- | | |
|--------------------------------------|--|
| ① Torx screw | ⑩ Pressure switch |
| ② Foamatic satellite cover | ⑪ Shut-off valve |
| ③ Selector switch | ⑫ Water shutoff valve |
| ④ Valve under the Foamatic satellite | ⑬ Injector block |
| ⑤ Suction hose / suction lance | ⑭ Plastic cover of the control unit housing |
| ⑥ Tank | ⑮ Pressure reducer compressed air supply |
| ⑦ Drip tray | ⑯ Pressure reducer automatic cleaning |
| ⑧ Booster pump | ⑰ Pressure reducer for manual cleaning (spray lance) |
| ⑨ Flow meter | |

To ensure safety, it is mandatory to check the safety equipment prior to start-up.

1. ➤ Check the proper installation and connection of all components.
2. ➤ Visual inspection for leaks on the Plant.
3. ➤ Carry out a function test of the EMERGENCY STOP.
4. ➤ Wear the prescribed PPE.
5. ➤ Check that all safety equipment is complete according to the safety datasheet of the chemicals used (e.g. eye wash)
6. ➤ Check that all safety devices (safety doors, hoods, etc.) are working.

Other tests:

1. ➤ Check all connections, pump unit, and connections for damage.
2. ➤ Open the shut-off valve of the water supply ⑫ (position[ON]).
3. ➤ Open the plastic cover of the regulator housing ⑭ and adjust the air pressure on the pressure reducer ⑮ to 6 bar.

Carry out commissioning

Requirements

- Installation work has been completed.
- Control unit of the complete machine is connected according to the operator's specifications.
- Media (water, compressed air, foam cleaning chemicals) are available.

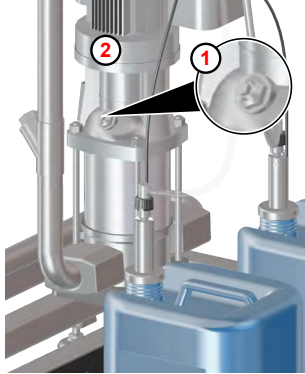
Check the safety features:

1. ➤ Perform a function test of the main switch.
 2. ➤ Perform a lamp function test .
1. ➤ ➡ *'Prepare for commissioning'*
 2. ➤ ➡ *Aerate the pressure booster pump*
 3. ➤ ➡ *Carry out a leak test on the Plant*
 4. ➤ ➡ *PlantSwitch on.*
 5. ➤ ➡ *Rinse connected components*
 6. ➤ ➡ *Put the spray lance into operation*
 7. ➤ ➡ *Check the supply of the foam cleaning chemicals for leaks*
 8. ➤ ➡ *Set up the foam cleaning chemicals supply*
 9. ➤ ➡ *Set up the foam cleaning chemicals supply*
 10. ➤ ➡ *Adjust the spray lance foam quality*
 11. ➤ ➡ *Set up and start Auto mode*

9.2.1 Aerating the pressure booster pump

Requirements

- Pump is switched off.
- The water supply is open.



- ① Bleed screw
- ② Rear side of the booster pump

Fig. 107: Aerating the pressure booster pump

1. ➤ Open the main valve block (water pipe).
2. ➤ At the back of the booster pump, slowly loosen ② the relief screw ① with a suitable tool by 1-2 turns.
 - The air trapped in the pump head escapes.
3. ➤ As soon as the air has escaped and water escapes, tighten the vent screw again.
4. ➤ Close the main valve block.

9.2.2 Carry out leakage test

1. ➤ Check media connections, pump unit and piping connections for leaks.
2. ➤ Remove the Torx screws, see Fig. 106 ① on the cover ② of the Foamatic satellite and remove the cover.
3. ➤ Check Foamatic satellites for leaks.
4. ➤ If there are leaks, close the shut-off valve ④ of the water supply (position **[OFF]** / horizontal).
5. ➤ Fix existing leaks.
 - Remove leakage residues carefully, following in the safety datasheet.
6. ➤ Replace the Foamatic satellite cover properly

9.2.3 Plant Switch on

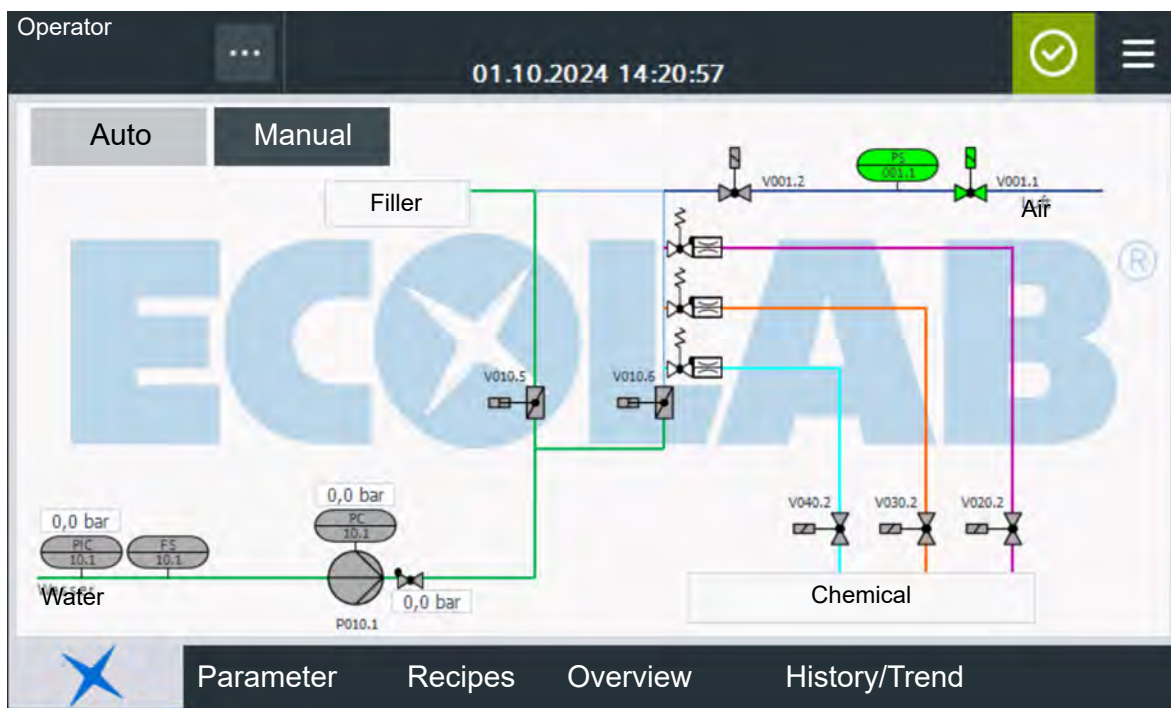
Requirements

- Keep unauthorised persons away from the machine.
- Perform a visual inspection of the complete machine.
- Check fill levels and chemical ratios.
- Unlock all EMERGENCY STOP systems.
- Check for external "EMERGENCY STOP functions" and make sure they are all in the OFF position.
- All media (water, compressed air, foam cleaning chemicals) are available.

1. Turn the main switch  on the switching cabinet of the Plant to no. [I / ON].
(see [Chapter 71 'Operating elements on the switch cabinet' on page 81](#))

➔ The control system of the Plant starts up.

2. Wait until the user interface opens on the operating display.



➔ The main menu appears.

➔ The Plant is in Automatic mode

3. Starting the air and water supply:

➔ ■ Ensure that the air and water supply is started at the required pressure and volume.

4. Detergent:

➔ ■ Provide the detergent.

■ Select the cleaning agents required via the PLC.

5. Select the required processes via the PLC:

➔ ■ Select the process, such as "Pre-rinse", "Clean with acid/alkaline solution", "Rinse with water" or "Empty" on the PLC.

9.2.4 Rinse connected components



Before commissioning the Plant you need to flush out any impurities such as chips or particles from the pipelines.

Rinse the branch line to the nozzle system

1. ➤ Switch to manual mode (see ➔ [Chapter 8.5 '\[Manual operation\]' on page 91](#)).
2. ➤ If available, open the main valve or safety valve on the valve manifold of the nozzle system.



Ecolab recommends that the drainage valve be a NO valve (normally open) and installed in the flow direction in front of the main valve or safety valve.

3. ➤ Under: ➔ ['View \[Diagnostic\] -> \[I/O's\] -> \[Outputs 1\]' on page 139](#), or ➔ ['View \[Diagnostic\] -> \[I/O's\] -> \[Outputs 2\]' on page 140](#)
On the control panel in the field 'Max. runtime' enter '60'.
 - After the set 60 seconds, all the valves will close automatically.
4. ➤ To start the rinsing process via the open drainage valve, open the valve [>1V1.1<] by pressing the corresponding button.



*The number of valves and what they do depends on the system.
See the ➔ [Appendix A.4 'Circuit diagram' on page 307](#) for the assignment specifications.*

5. ➤ Rinse the branch line thoroughly through the open drainage valve.
6. ➤ To close the valve [>1V1.1<], press the corresponding button.

Rinse the nozzle system

Requirements

- The drainage valve is closed.
- There are no rotary nozzles mounted on the nozzle system.

1. ➤ Switch to manual mode (see ➔ [Chapter 8.5 '\[Manual operation\]' on page 91](#)).
2. ➤ Under: ➔ ['View \[Diagnostic\] -> \[I/O's\] -> \[Outputs 1\]' on page 139](#), or ➔ ['View \[Diagnostic\] -> \[I/O's\] -> \[Outputs 2\]' on page 140](#)
On the control panel in the field 'Max. runtime' enter '600'.
➔ After the set 600 seconds, all the valves will close automatically.
3. ➤ To start the rinsing process, open the valve [>1V1.1<] by pressing the corresponding button.
4. ➤ Close the drainage valve [>1V20.01<] and open the main valve [>1V20.02<] by pressing the corresponding button.

One after the other, open all sectional valves by pressing the corresponding buttons and rinse the cleaning sections thoroughly.



*The number of valves and what they do depends on the system.
See the ➔ [Appendix A.4 'Circuit diagram' on page 307](#) for the assignment specifications.*

5. ➤ To close the valve [>1V1.1(Q110)<], press the corresponding button.

9.2.5 Start up the spray lance

Requirement

- The switch point is set on the flow sensor of the spray lance.

Material:

- Water nozzle

1. ➤ To release the spray lance, press the green button  **[Activate manual lance]**.
➔ The green control button  flashes.
2. ➤ Open the valve under the Foamatic satellite.
3. ➤ To activate the spray lance, press the lever of the spray lance.
➔ The LEDs on the flow sensor light.
➔ The pressure booster pump starts automatically.
➔ The green control button  lights up.

Set the max. water flow

Requirement

- The pressure booster pump is switched off.

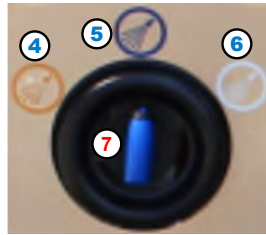
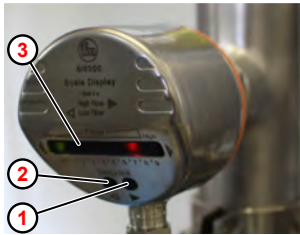


Fig. 108: Flow sensor / selector switch for Foamatic satellite

- ① Setup button on right
- ② Setup button on left
- ③ LED strip (position 09)
- ④ Position [Foam Disinfection 1]
- ⑤ Position [Water]
- ⑥ Position [Alkaline Foams]
- ⑦ Selector switch on Foamatic satellite

1. Attach the blue water nozzle to the spray lance .



*When putting on the nozzle, always make sure that the O-ring seal is present in the spray gun.
If this is not the case, pressure will not build up.*

2. Turn the selector switch ⑦ on the Plant to **[Water]**  ⑥.
3. Open the valve under the Foamatic satellite.
4. To activate the spray lance, press the lever of the spray lance.
5. Press and hold the Setup button ① on the flow sensor for approx. 3 seconds.
 - ➡ The LED at Position 9 ③ flashes.
6. Release the right setup button ①.
7. To disable the spray lance, release the lever of the spray lance.
8. To control the water flow, reactivate the spray lance.
 - ➡ At least 8 LEDs light on the flow sensor (Position 0-9) ③.
9. Close the valve.

Setting the switching point of the pressure booster pump

Requirement

- The maximum water flow is set.
- The selector switch on the Foamatic Satellite [Fig. 108](#) ⑦ is set to **[Alkaline foam]** ⑤.



- ① Setup button on right
- ② Setup button on left
- ③ LED strip (position 09)

Fig. 109: Setting the switching point

1. Attach the white foam nozzle to the spray lance .



*When putting on the nozzle, always make sure that the O-ring seal is present in the spray gun.
If this is not the case, pressure will not build up.*

2. Open the valve under the Foamatic satellite.
3. To activate the spray lance, press the lever of the spray lance.
4. Set the switching point: Press the right adjustment button ① on the flow sensor.
 - ➡ The red LED flashes.
5. Set the switching point by pressing the setup buttons ② or ②, set the red LED to Position 4 or 5.
 - ➡ The red LED on flashes.
 - ➡ After 2 seconds, the new switching point is applied.
6. To deactivate the spray lance, release the lever.
7. Close the valve.

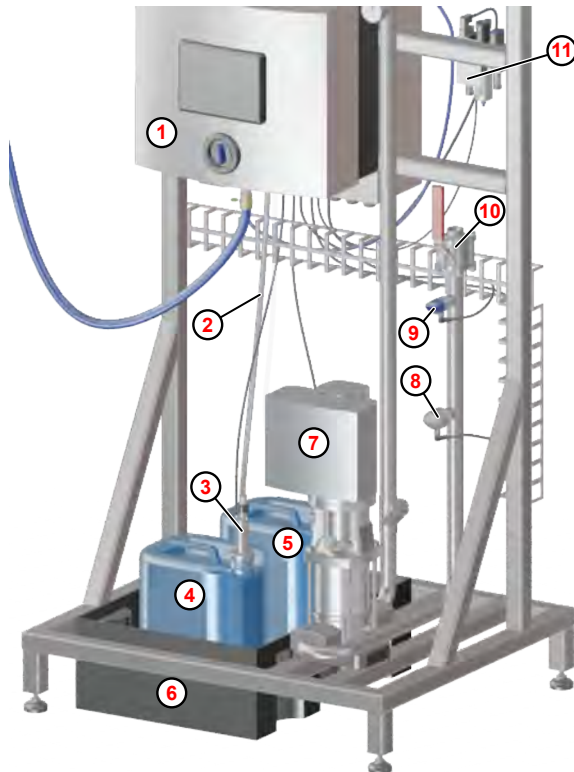
9.2.6 Check the foam cleaning chemicals supply for leaks

Requirements

- The suction filter at the lower end of the suction lance is free of contaminations.

Material:

- 2 full water tanks
- Foam nozzle



- ① Foamatic satellite
- ② Suction tubing
- ③ Suction lance
- ④ Product container
- ⑤ Second product container
- ⑥ Drip tray
- ⑦ Booster pump
- ⑧ Flow sensor
- ⑨ Pressure switch
- ⑩ Water connection with ball shut-off valve
- ⑪ Compressed air maintenance unit

1. Place the water tank in the drip tray ⑥ and open it.
2. Insert the suction lance [>SL2.1<] ③ into the first water tank and submerge.
3. Insert the suction lance [>SL3.1<] ③ into a water tank and submerge.
4. Attach the white foam nozzle to the spray lance.
5. Turn the ① on the Plant to **[Alkaline foam]**.
6. Open the ball valve ⑩.
7. To activate the spray lance, press the lever of the spray lance.
8. Check that the suction lance [>SL2.1<] ③ is taking in water.
9. Check the suction hoses ② for leaks.
10. In case of leaks, close the shut-off valve for the ⑩ water supply.
11. Fix existing leaks.
12. To deactivate the spray lance, release the lever.
13. Switch the dial ① on the Plant to **[foam disinfection]**.
14. Repeat leak test with suction lance [>SL3.1<] ③.

9.2.7 Set the foam cleaning solution concentration

Requirements

Before connecting the suction lances to the injector block, you must adjust the foam cleaning solution concentration to the reducing nozzles included in the package.

The following reducing nozzles are available:

- Reducing nozzle **1.0-1.2** is for a **concentration of approx. 3%**.
- Reducing nozzle **0.8-0.9** is for a **concentration of approx. 2.5%**.

Material:

- Reducing nozzles

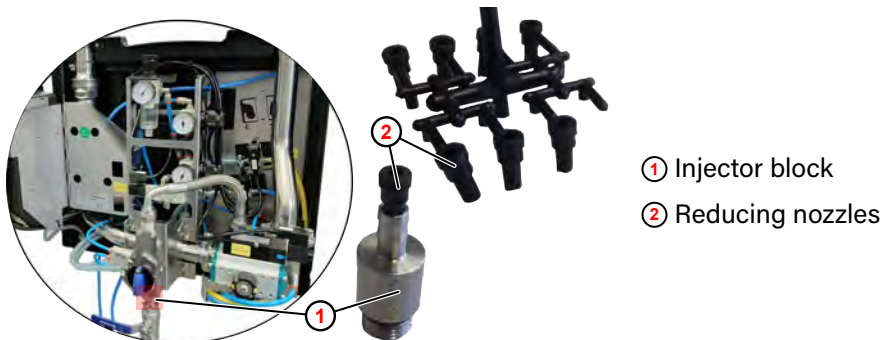


Fig. 110: Injector block with reducing nozzles

1. ➔ At the injector block ①, plug the reducing nozzle ② into the connection Chemical A / Chemical B.
2. ➔ Attach the suction lance hose to the connection Chemical A / Chemical B and secure it with a hose clamp.

9.2.8 Ensure the foam cleaning chemicals supply



WARNING

Burns caused by harmful chemical products

Contact with hazardous chemical products can cause severe burns.

- Read the enclosed safety data sheet carefully before using the chemical product.
- The safety regulations and the required protective clothing for working with chemicals must be complied with.
- Safety devices such as showers and eye flushing must be accessible and checked regularly to ensure that they are fully functional.
- Ensure adequate ventilation and extraction.
- Avoid skin and eye contact.



NOTICE

Material damage due to leaking fluids

Leaking liquids can cause damage to the Plant.

- Plant into operation in case of leakages
- Plant regularly for tightness.
- If leakages are identified, immediately press EMERGENCY STOP button
- Plant again only after the leakages have been repaired.

**ENVIRONMENT****Chemicals can harm the environment.**

To prevent environmental pollution caused by chemicals, any escaping fluids must always be absorbed immediately by a suitable binding agent and disposed of properly. You will always find information on the absorption and disposal of chemicals in the relevant safety data sheet (→ [‘Safety data sheets’ on page 198](#)).

Requirements

- The suction filter at the lower end of the suction lance is free of contaminations.
- A full tank with alkaline foam cleaning chemicals (blue) is ready.
- A full tank of acid foam cleaning chemicals (red) or foam disinfectant (yellow) is ready.
- The foam cleaning chemicals supply has been tested for leaks.
- Existing leaks have been fixed.

The colour coding of the tanks (blue/red/yellow) applies only to Ecolab chemical products.

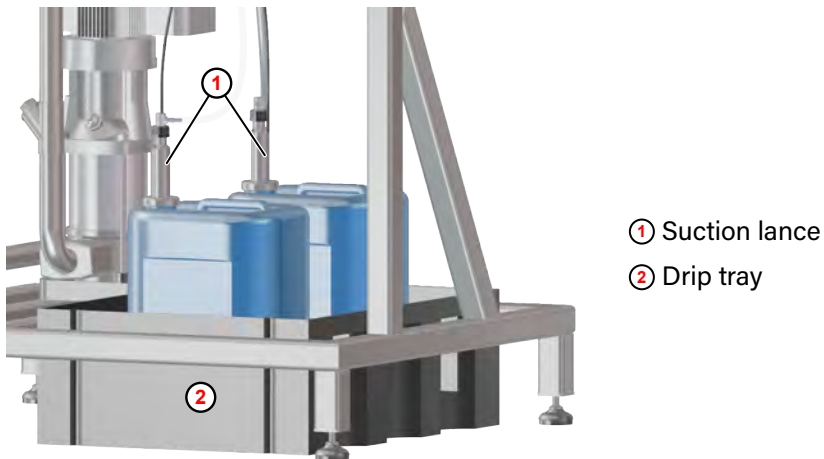


Fig. 111: Suction

1. Place the tank in the drip tray ②.
2. Open the tank with alkaline foam cleaning chemicals.
3. Insert the suction lance [SL2.1] ① into the tank with alkaline chemicals and submerge.
 - ➡ Make sure that the suction lance [SL2.1] cannot draw in air.
4. Open the tank with acid foam cleaning chemicals or foam disinfectant.
5. Insert the suction lance [SL3.1] ① into the tank with acid chemicals or foam disinfectant and submerge.
 - ➡ Make sure that the suction lance [SL2.1] cannot draw in air.

9.2.9 Adjust foam quality for the spray lance



WARNING

Burns caused by harmful chemical products

Contact with hazardous chemical products can cause severe burns.

- Read the enclosed safety data sheet carefully before using the chemical product.
- The safety regulations and the required protective clothing for working with chemicals must be complied with.
- Safety devices such as showers and eye flushing must be accessible and checked regularly to ensure that they are fully functional.
- Ensure adequate ventilation and extraction.
- Avoid skin and eye contact.



NOTICE

Material damage due to leaking fluids

Leaking liquids can cause damage to the Plant.

- Plant into operation in case of leakages
- Plant regularly for tightness.
- If leakages are identified, immediately press EMERGENCY STOP button
- Plant again only after the leakages have been repaired.



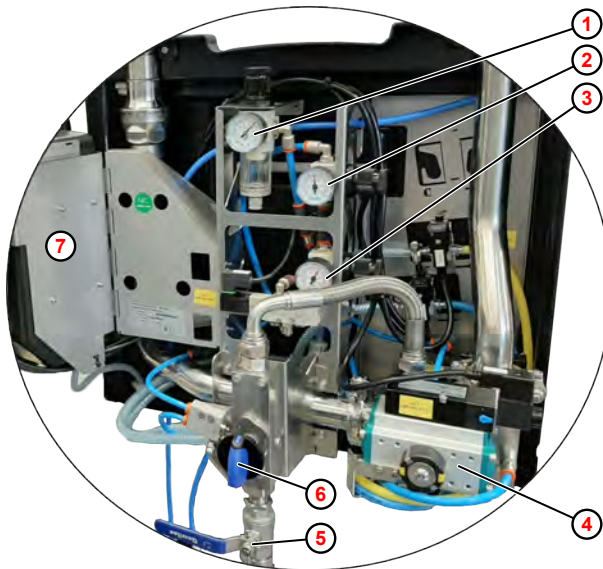
ENVIRONMENT

Chemicals can harm the environment.

To prevent environmental pollution caused by chemicals, any escaping fluids must always be absorbed immediately by a suitable binding agent and disposed of properly. You will always find information on the absorption and disposal of chemicals in the relevant safety data sheet (→ *'Safety data sheets' on page 198*).

Requirement

- foam cleaning chemicals supply is ensured.



- ① Pressure reducer compressed air supply
- ② Pressure reducer automatic cleaning
- ③ Pressure reducer for manual cleaning (spray lance)
- ④ Injector block
- ⑤ Valve under the Foamatic satellite
- ⑥ Foamatic satellite selector switch
- ⑦ Plastic cover of the control unit housing

Fig. 112: Compressed air supply

1. ➤ Open the valve ⑤ under the Foamatic satellite.
2. ➤ To activate the spray lance, press the lever of the spray lance.
3. ➤ Open the compressed air supply and adjust the air pressure at the pressure reducer ① to approx. 4 bar.
 ➤ To achieve the best foam application, adjust the air pressure on the pressure reducer ①.
4. ➤ To deactivate the spray lance, release the lever.
5. ➤ Close the ball valve ⑤ under the Foamatic satellite.

9.2.10 Setting up and starting Auto mode

1. ➤ To start manual mode, see: ➔ [Chapter 8.5 '\[Manual operation\]' on page 91](#).
2. ➤ Open the [Recipe Editor] (see ➔ [Chapter 8.8.1 '\[Recipes\]' on page 105](#)) and set the contact times of the nozzles for the different cleaning steps.
3. ➤ Open [Settings] (see ➔ [Chapter 8.7 '\[Parameter\]' on page 95](#)) and set the parameters for each zone in the different sections.
4. ➤ Set the compressed air at the pressure reducer [Fig. 112](#) ① to approx. 4 bar.
5. ➤ Start the cleaning programme on the operator panel of the machine control unit of the entire machine.
6. ➤ Check the spray pattern of the nozzle system and adjust the nozzles if necessary.
7. ➤ Check the foam application on the nozzle system and, if necessary, adjust the air pressure or water pressure on the Plant.
8. ➤ Check the safety features (e.g. safety door).

9.3 Commissioning after emergency shut-off

**NOTICE**

The control system has an integrated safety mechanism that prevents an unauthorised restart after power is restored.

This generates various faults/errors that must be actively confirmed on the operating display.

Faults that occur are:

EMERGENCY STOP, leak sensors, valve position

Re-commissioning

1. ➤ Unlock the EMERGENCY STOP function.
2. ➤ Restore power.
3. ➤ Restore the water supply.
4. ➤ Restore the air supply.
5. ➤ Acknowledge error messages / faults on the operating display.

10 Operation

Personnel requirements

Personnel:

- Operator
- Specialist
- Service personnel

Personal protection equipment (PPE)

Protective equipment:

- Chemical-resistant protective gloves
- Protective work clothing
- Protective goggles
- Face protection



DANGER

Risk of injury due to failure to observe the safety instructions

Failure to observe safety instructions can result in serious injuries to operating staff.

All instructions for use shown under → [Chapter 3.5 'Symbols used on the Plant' on page 35](#) must be observed to avoid injury.



DANGER

Only use chemicals for foam cleaning (alkaline, acidic)!

The Plant is intended exclusively for the processing of validated chemicals.

Operating the BFH Foamatic with any other chemicals can lead to personal injury and irreparably damage the Plant.

Components could break down (resistance of the sealing materials used) and the dosing medium escape suddenly, which can lead to serious personal injury.

As such, the Plant it is intended exclusively for foam disinfection and must not be operated with liquid disinfectants with peracetic acid content!



WARNING

Burns caused by harmful chemical products

Contact with hazardous chemical products can cause severe burns.

- Read the enclosed safety data sheet carefully before using the chemical product.
- The safety regulations and the required protective clothing for working with chemicals must be complied with.
- Safety devices such as showers and eye flushing must be accessible and checked regularly to ensure that they are fully functional.
- Ensure adequate ventilation and extraction.
- Avoid skin and eye contact.



WARNING

Risk of injury caused by chemicals harmful to health

Corrosive chemicals can escape from tipped over chemical canisters causing serious injuries from burns, and from falls on wet floors.

- Fit supplied canister brackets below the Plant on the wall.
- Always place chemical canisters in a canister holder to prevent them from tipping over.
- Place a safety receptacle under the chemical canister to catch any chemicals that may escape.



WARNING

Risk of burns due to improper connection of the chemical containers

Improper connection of the chemical containers to the Click&Plug coupling can cause chemicals to escape and cause severe burns.

- Only connect the coupling if the size and colour of the connecting piece on the chemical container match the coupling used.
- Never open the chemical container at the nozzle
- Never open the sealing cap on the chemical container secured with cable ties
- Never attach the coupling to the connecting piece with great force
- Replace coupling immediately if deformed or damaged



WARNING

Risk of corrosives due to unintentional start-up of the Plant

Unintentional start-up of the Plant can lead to chemical products leaking and causing severe chemical burns.

- Plant Turn off after cleaning is complete
- Plant Disconnect from the power supply after completing cleaning work
- Plant Turn off before maintenance



WARNING

All safety signs used on the Plant must be strictly observed to avoid injury to personnel (see [Chapter 3.5 'Symbols used on the Plant' on page 35](#)).

The operator of the Plant is responsible for compliance!



CAUTION

Operation is permitted only by trained personnel

- *Plant* must be operated only by trained personnel using PPE.
- Suitable measures must be taken to prevent access by unauthorised personnel to the Plant.



CAUTION

Components and hoses under pressure

Flow noise in valves and pipes under pressure can impair the perception of other noises at the workplace. Components and hoses under pressure can fail, causing components and chemicals from the Plant to be ejected forcefully:



ENVIRONMENT

Chemicals can harm the environment

- Ensure that no chemicals leak or are spilled.
- Have a suitable binding agent available in accordance with the safety data sheet.
- Immediately collect chemicals that have leaked or spilled and dispose of them properly.



When putting on the nozzle, always make sure that the O-ring seal is present in the spray gun. If this is not the case, pressure will not build up.



Position information with reference to the PID (flow chart)

Where the following refers to the positions of components in the PID, these are presented as follows: [>....<]

Handling peroxide



DANGER

Pay attention to safety when handling peroxides.

The main risks associated with the use of peroxide are:

- If peroxide comes into contact with skin or mucous membranes, it causes severe burns.

For first-aid measures, see the instructions on the safety data sheet.

- **Personal protective equipment must be worn for all work on the unit: Safety glasses and gloves.**
- **A face shield must also be worn when performing maintenance or repair work.**



DANGER

Burns caused by peroxide chemical products

Peroxide chemical products in high concentrations cause severe burns if they come into contact with skin, eyes or mucous membranes.

- Always use a face shield in addition to the prescribed PPE in case of maintenance or repair
- Ensure that suitable emergency equipment is available in the vicinity of the operating area (e.g. eye shower)



CAUTION

Avoid reactive processes.

H₂O₂ decomposes constantly (depending on the temperature).

The decomposition leads to high gas development and thus to an increasing pressure in the system. If the pressure exceeds the maximum system pressure, the metering system may fail.

If H₂O₂ is contaminated with metal ions (copper, zinc, iron) or corrosive / organic substances, the decomposition speed increases.

At a certain product temperature, the reaction proceeds spontaneously and uncontrollably.

10.1 Plant Switch on

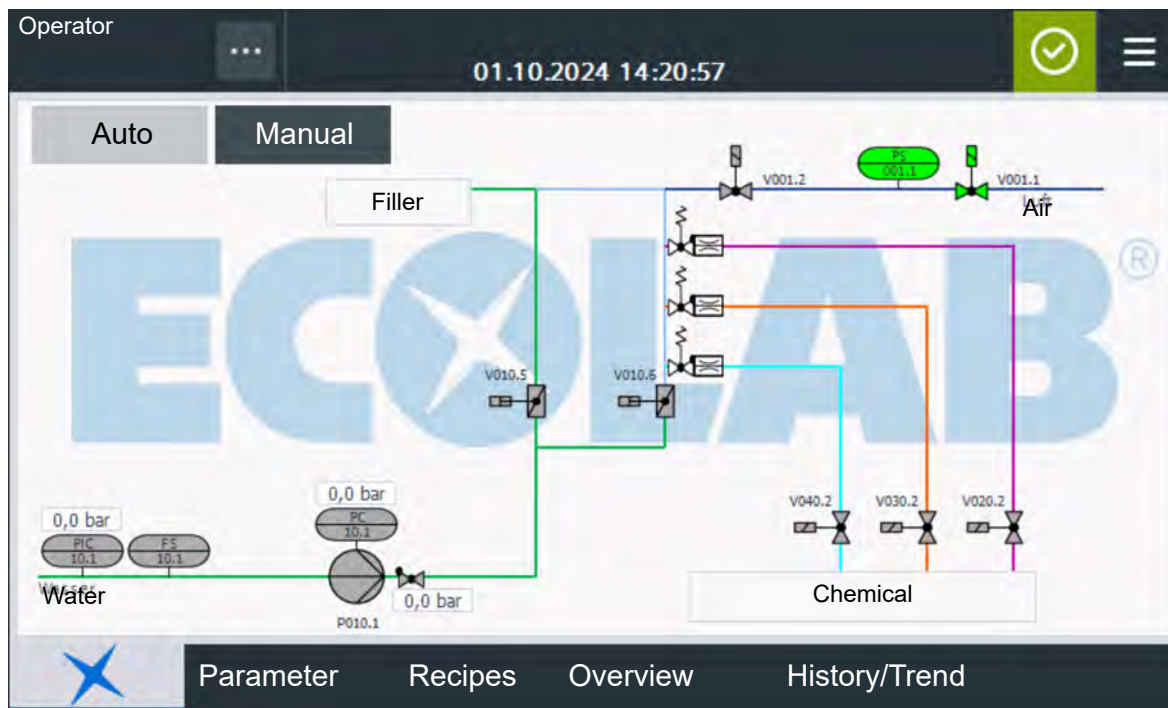
Requirements

- Keep unauthorised persons away from the machine.
- Perform a visual inspection of the complete machine.
- Check fill levels and chemical ratios.
- Unlock all EMERGENCY STOP systems.
- Check for external "EMERGENCY STOP functions" and make sure they are all in the OFF position.
- All media (water, compressed air, foam cleaning chemicals) are available.

1. Turn the main switch  on the switching cabinet of the Plant to no. [I / ON].
(see [Chapter 7.1 'Operating elements on the switch cabinet' on page 81](#))

➡ The control system of the Plant starts up.

2. Wait until the user interface opens on the operating display.



- ➡ The main menu appears.
- ➡ The Plant is in Automatic mode

3. *Starting the air and water supply:*

- ➡ ■ Ensure that the air and water supply is started at the required pressure and volume.

4. *Detergent:*

- ➡ ■ Provide the detergent.
- Select the cleaning agents required via the PLC.

5. *Select the required processes via the PLC:*

- ➡ ■ Select the process, such as "Pre-rinse", "Clean with acid/alkaline solution", "Rinse with water" or "Empty" on the PLC.

10.2 Cleaning program

The system has the following cleaning programs:

- **P1** Alkaline cleaning
- **P2** Acid cleaning
- **P3** Foam disinfection
- **P4** Cold water rinsing program
- **P5-P7** Combination program (alkaline + acid)

10.3 Setting up and performing cleaning functions

There are 3 cleaning functions:

- ➔ *'Acid-based foam / disinfectant' on page 188*
- ➔ *'Alkaline foam cleaning' on page 189*
- ➔ *'Rinsing' on page 190*

Acid-based foam / disinfectant

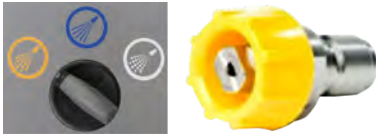


Fig. 113: Setting the select switch / nozzle to be used

1. ➤ Set the selector switch to "acid/disinfectant" .
2. ➤ Mount the yellow spray nozzle  on the spray lance.



*When putting on the nozzle, always make sure that the O-ring seal is present in the spray gun.
If this is not the case, pressure will not build up.*

3. ➤ Connect the flexible hose of the spray lance to the valve.



Fig. 114: Quick coupling on the ball valve

4. ➤ Open the valve under the Foamatic satellite.
5. ➤ Press the green button  to activate the manual lance.
 - Manual mode is released for 3600 seconds.
6. ➤ Activate the spray gun.
 - The pressure booster pump is activated.
 - You can change the foam intensity on the pressure reducer for manual cleaning (spray lance) .

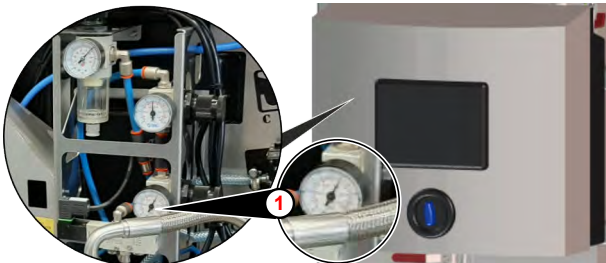


Fig. 115: Pressure reducer for manual cleaning (spray lance)

7. ➤ Press the green button  to activate the manual lance.
 - Manual mode is released for 3600 seconds.
8. ➤ Release the button on the spray gun.
 - Acid foam stopped.
 - At the end of the overrun time, the pressure booster pump stops.
9. ➤ Close the valve.
10. ➤ **Important for pressure relief!** Press the spray gun briefly.
 - Pressure relief in the flexible hose.
11. ➤ Disconnect the spray gun quick coupling.
12. ➤ Winding the hose.

Alkaline foam cleaning



Fig. 116: Setting the select switch / nozzle to be used

1. ➤ Set the selector switch to "Alkaline foam cleaning" .
2. ➤ Mount the white spray nozzle  on the spray lance.



*When putting on the nozzle, always make sure that the O-ring seal is present in the spray gun.
If this is not the case, pressure will not build up.*

3. ➤ Connect the flexible hose of the spray lance to the valve.



Fig. 117: Quick coupling on the ball valve

4. ➤ Open the valve under the Foamatic satellite.
5. ➤ Press the green button  to activate the manual lance.
 - ➔ Manual mode is released for 3600 seconds.
6. ➤ Activate the spray gun.
 - ➔ The pressure booster pump is activated.
 - ➔ You can change the foam intensity on the pressure reducer for manual cleaning (spray lance) ①.

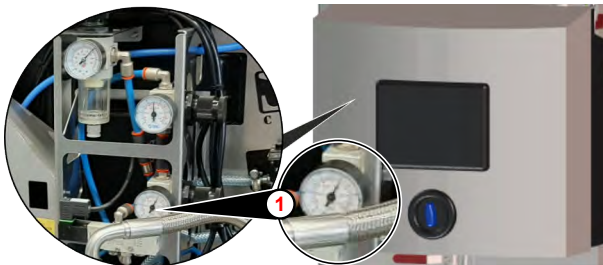


Fig. 118: Pressure reducer for manual cleaning (spray lance)

7. ➤ Press the green button  to activate the manual lance.
 - ➔ Manual mode is released for 3600 seconds.
8. ➤ Release the button on the spray gun.
 - ➔ Acid foam stopped.
 - ➔ At the end of the overrun time, the pressure booster pump stops.
9. ➤ Close the valve.
10. ➤ **Important for pressure relief!** Press the spray gun briefly.
 - ➔ Pressure relief in the flexible hose.
11. ➤ Disconnect the spray gun quick coupling.
12. ➤ Winding the hose.

Rinsing



Fig. 119: Setting the select switch / nozzle to be used

1. Set the selector switch to "rinse" .
2. Mount the blue spray nozzle on the spray lance.



*When putting on the nozzle, always make sure that the O-ring seal is present in the spray gun.
If this is not the case, pressure will not build up.*

3. Increase the rinsing pressure with the pressure booster pump; this function uses high pressure.
4. Connect the flexible hose of the spray lance to the valve.



Fig. 120: Quick coupling on the ball valve

5. Open the valve under the Foamatic satellite.
6. Press the green button to activate the manual lance.
 - ➡ Manual mode is released for 3600 seconds.
7. Activate the spray gun.
 - ➡ The pressure booster pump is activated and increases the pressure.
 - ➡ The spray lance is ready for rinsing.



CAUTION
High water pressure at the nozzle outlet!

8. Press the green button to activate the manual lance.
 - ➡ Manual mode is released for 3600 seconds.
9. Release the button on the spray gun.
 - ➡ Acid foam stopped.
 - ➡ At the end of the overrun time, the pressure booster pump stops.
10. Close the valve.
11. **Important for pressure relief!** Press the spray gun briefly.
 - ➡ Pressure relief in the flexible hose.
12. Disconnect the spray gun quick coupling.
13. Winding the hose.

10.4 Area and foam selection

**Access via the control system::**

Programs and zone selection, see → [Chapter 8.11 '\[Programs\]' on page 125](#)

- Always connect the left-hand pipeline to the alkaline chemical container.
- Always connect the right-hand pipeline to the acid or disinfection chemical container.

1. ➤ Select a area (e.g. Area 1 and Area 2 are switched ON in the image above).
2. ➤ Select the cleaning agent you need.
3. ➤ Select the cleaning time.

10.5 Perform cleaning

10.5.1 Cleaning in manual mode

Requirements

- The Plant is ready for use and **not** in Auto mode.
- The matching nozzle is mounted on the spray gun, see → [Chapter 9 'Start-up' on page 165](#).

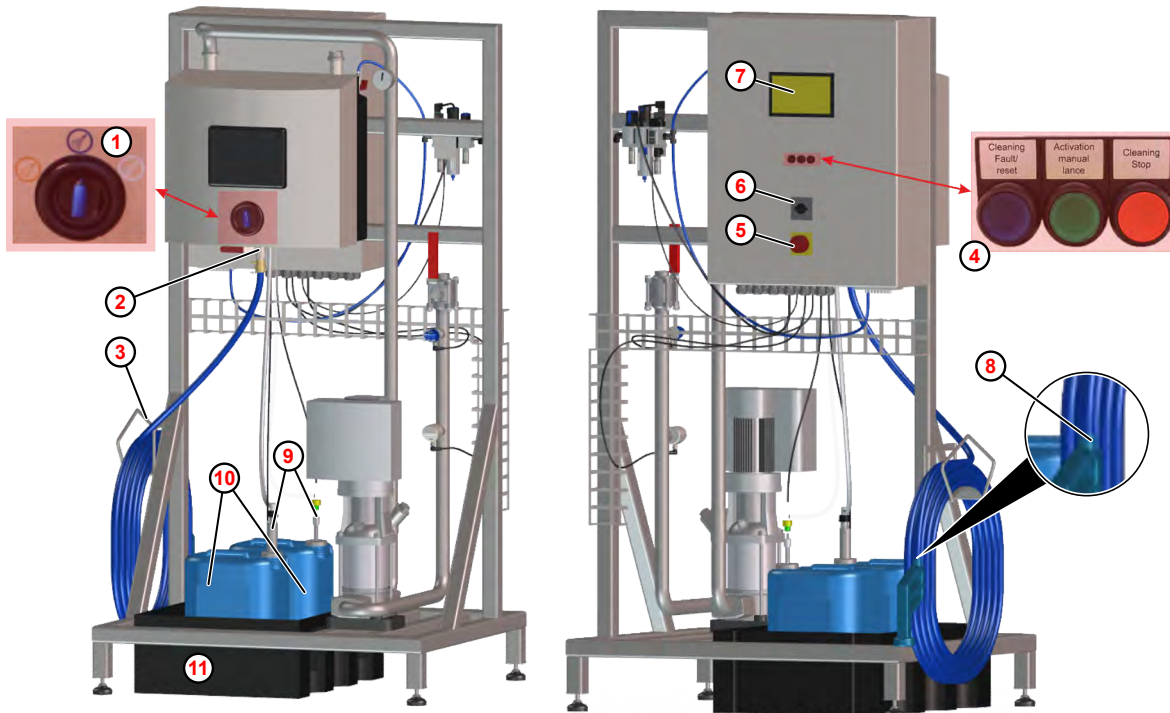


Fig. 121: BFH Foamatic With hose holder

- | | |
|--------------------------------------|---------------------------------|
| ① Foamatic satellite selector switch | ⑦ Control field with display |
| ② Foamatic satellite shut-off valve | ⑧ Spray gun connection coupling |
| ③ Hose holder | ⑨ Suction lance |
| ④ Operating buttons | ⑩ Tank |
| ⑤ Main switch | ⑪ Drip tray |
| ⑥ Uninterruptible power supply | |

1. To activate the spray gun, press the green button ④ on the control cabinet.
 - ➔ The spray gun is enabled for a preset time.
 - ➔ The enable time limit is set to 60 minutes by default.
2. Set the cleaning program on the selector switch ①.
3. Open the valve ② under the Foamatic satellite.
4. Clean the area with the spray gun.
5. If necessary, change the cleaning program at the selector switch ① and install the appropriate nozzle.
6. After the cleaning work is done, close the valve ② under the Foamatic satellite.
7. Stow the hose and spray gun properly on the hose holder ③.

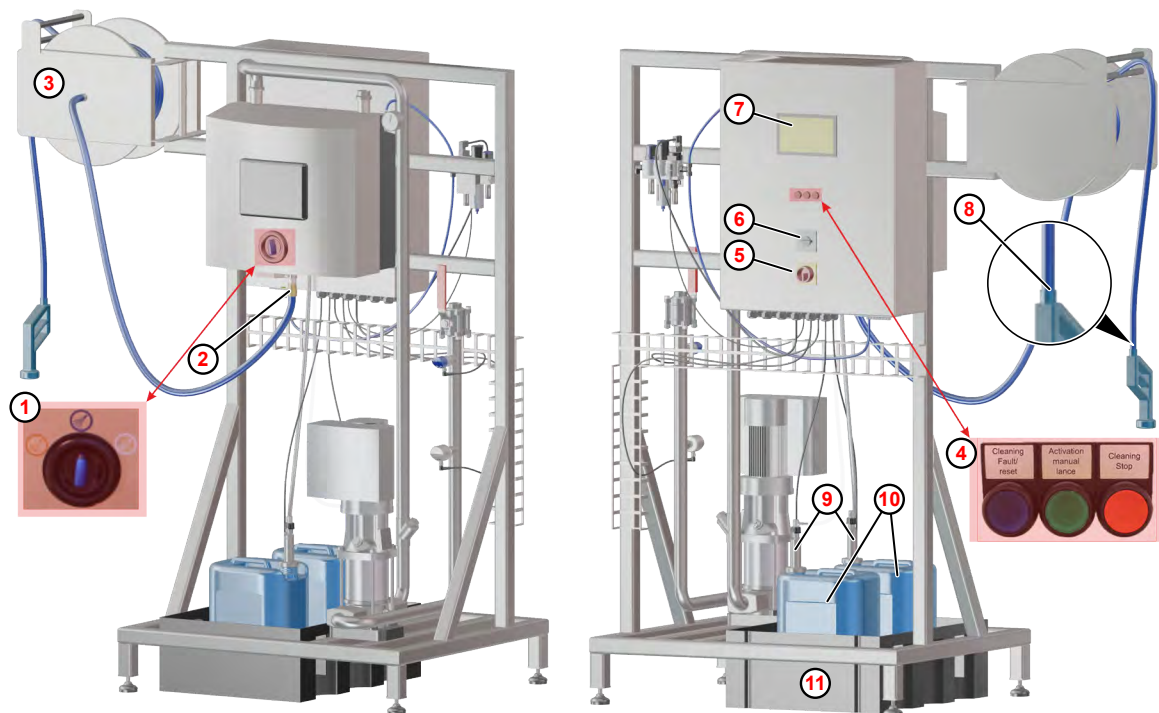


Fig. 122: BFH Foamatic with hose reel

- | | |
|--------------------------------------|---------------------------------|
| ① Foamatic satellite selector switch | ⑦ Control field with display |
| ② Foamatic satellite shut-off valve | ⑧ Spray gun connection coupling |
| ③ Hose reel | ⑨ Suction lance |
| ④ Operating buttons | ⑩ Tank |
| ⑤ Main switch | ⑪ Drip tray |
| ⑥ Uninterruptible power supply | |

1. To activate the spray gun, press the green button  ④ on the control cabinet.
 - ➔ The spray gun is enabled for a preset time.
 - ➔ The enable time limit is set to 60 minutes by default.
2. Set the cleaning program on the selector switch  ①.
3. Open the valve ② under the Foamatic satellite.
4. Clean the area with the spray gun.
5. If necessary, change the cleaning program at the selector switch  ① and install the appropriate nozzle.
6. After the cleaning work is done, close the valve ② under the Foamatic satellite.
7. Stow the hose and spray gun properly with the hose reel ③.

10.5.2 Cleaning in automatic mode

Requirements

- The Plant is ready for use.

1. On the control panel, go to [Fig. 121](#) ⑦ the submenu 'Select Program and Zone' and select the cleaning program and zone.
2. On the control panel, go to [Fig. 122](#) ⑦ the submenu 'Select Program and Zone' and select the cleaning program and zone.
3. To confirm your entry, press 'Enter'.
 - ➔ The Plant runs the cleaning program automatically.

10.6 Changing containers

Personnel requirements

Personnel:

- Operator
- Specialist
- Service personnel

Personal protection equipment (PPE)

Protective equipment:

- Protective work clothing
- Face protection
- Protective eyewear
- Chemical-resistant protective gloves
- Protective gloves, mechanical hazards
- Chemical resistant protective apron
- Safety shoes



DANGER

Access to containers

Access to the product containers by unauthorised persons can lead to very serious injuries, depending on the chemical.

Unauthorised access to the product containers must be prevented and is reserved exclusively for personnel who have been trained in the handling of chemicals and are authorised to enter.

All relevant safety datasheets must be observed and adhered to (see also → [‘Safety data sheets’ on page 198](#)).

All the following safety instructions must be observed in order to prevent injury!



DANGER

Restarting the Plant after confirmed container change

The dosing fluid level sensors automatically stop the Plant if the dosing fluid runs out.

If the sensors detect the required minimum amount of dosing again and notify the control system, once the error message is acknowledged in the control system, the Plant starts up again automatically.



CAUTION

Use personal protective equipment (PPE).

Unused protective clothing can cause serious injuries.

To avoid these dangers, the following points must be strictly adhered to!

- All personnel working on the Plant must use the required personal protective equipment in accordance with the locally applicable safety regulations.
- In addition, all safety pictograms on the Plant must be observed and used.
- All safety regulations and the prescribed protective clothing when handling chemicals must be observed.
- All instructions in the product data sheet of the dosing medium used must be observed!



WARNING

Risk of slipping due to leaking liquids in the operation and provisioning area!

Depending on the floor conditions, accidental spillages can cause a significant risk of accidents due to slipping on the wet surface.

To avoid accidents caused by slipping:

- Wear non-slip, chemically resistant shoes
- Place the product container in a suitable sump
- When changing containers, ensure that suction tubes/suction lances are quickly removed from the container and placed in a suitable collection tray, as they could leak or drip.



CAUTION

Use of metering media:

- The Plant may be used only with products validated by Ecolab.
The use of unvalidated products will void the warranty!
- The metering media are procured by the operator.
- The owner will bear sole responsibility for correct handling and the associated risks.
- The hazard warnings and disposal instructions are provided by the operator.
- Wear suitable protective clothing (see safety data sheet).
- All safety regulations must be followed and the information contained in the safety data sheet/product data sheet must be observed.



CAUTION

Hazard from the use of incorrect chemicals

**When changing containers, there is a risk of confusion!
Swapping tanks can lead to very serious injuries.**

In the event of longer downtimes or inadvertent swapping of the chemical type, the corresponding injector can solidify. If this is the case, the injector must be removed, cleaned or even replaced, depending on the damage.

Mixing up the product containers not only causes potential damage to the containers, it can also cause serious injury to staff.

When using foam cleaning chemicals from Ecolab both the tanks and the suction hoses are colour-coded (blue tank / blue hose, red tank / red hose, etc.).

To prevent any kind of damage due to mixing up the product containers, always check the product sticker on it with the sticker of the empty container before opening a new container.
The products must ALWAYS match!



WARNING

Dangers of incorrect storage of chemicals and ignoring PPE

- All concentrated chemicals in storage must be stored properly and in accordance with the respective local regulations to prevent any kind of hazard.
- To avoid personal injury, it is essential that anyone who has access to the chemicals must comply with all safety regulations and use the provided safety equipment (PPE) in accordance with the respective local regulations and the chemical's safety data sheet.
- Suitable measures must be taken to prevent unauthorised persons from gaining access to stored chemicals.
- Storage rooms must be equipped with suitable ventilation systems.



CAUTION

Danger due to mixing of different chemicals

There is a risk of chemical burns and possibly uncontrollable chemical reactions if leftover stocks are poured together.

- Suction lances or suction pipes must be marked to indicate the chemical variant used, in order to avoid confusion here as well.
- **The container change is only to be carried out by trained personnel.**
Furthermore, it is essential to ensure that only the same chemicals are exchanged.

Different chemicals must never be mixed with each other.

This is only permissible if this is precisely the purpose of the Plant!

It must be checked beforehand which chemicals may be mixed and in which ratio.

Mixing must only be carried out by trained specialist personnel.

Safety instructions for chemical containers / chemical storage

- The operator is responsible for the correct installation of the chemical types and this is to be defined in consultation with the chemical supplier.
Incompatible chemical types must be separated from each other to prevent mixing in the event of leakage.
- Incompatible chemicals must be positioned and stored on separate collection trays so that they are on a flat and stable surface and cannot tip over.
- In addition, the containers are to be stored so far away from traffic and access routes that they cannot be accidentally damaged by operational activities .



WARNING

Injury from uncontrolled chemical spills

Uncontrolled chemical spills can cause serious injuries.

- **Read the enclosed safety data sheet carefully before using the chemical product.**
- Obey the safety regulations and wear the required protective clothing when working with chemicals.
- When working with chemicals, always adhere to the safety instructions and use the personal protective equipment (PPE) specified in the safety datasheet for the chemical products.
- Safety units such as showers and eye baths must be accessible and checked regularly to ensure that they are fully functional.
- Make sure that there is sufficient ventilation.
- Avoid skin and eye contact.
- Plant Check the regularly for tightness.
- Plant Do not use the in case of leakages.
- If leaks are detected, immediately activate the emergency stop function.

If there is an uncontrolled chemical leak, your own safety and that of all employees in the vicinity must come first!

What to do:

- Get out of the danger area as quickly as possible.
- Immediately ask employees to leave the danger area.
- Perform an emergency shutdown.
- Cordon off and secure the danger area (LoTo method).
- Have qualified personnel with appropriate training and using the prescribed PPE eliminate the cause of chemical leak.
- Plant Only operate again after the leaks have been repaired.



ENVIRONMENT

Chemicals can harm the environment.

Chemical products must never enter the environment undiluted:

- Only empty completely drained chemical containers.
- Flush out residual amounts in chemical canisters with large amounts of water.
- Immediately soak up any leaking liquids with a suitable binding agent and dispose of properly.

Information on retrieval and disposal can always be found in the safety data sheet associated with the chemical.

See also ➔ [‘Safety data sheets’ on page 198](#)

Safety regulations when handling peroxidic chemicals.

The use of peroxidic chemical products in the Plant creates special residual risks that cannot be avoided. These residual risks are addressed by the following specific safety instructions.



DANGER

General safety regulations for the handling of hazardous chemicals.

The generally recognised safety regulations apply to operation of the Plant, in particular those relating to the handling of hazardous chemicals. Non-observance of safety regulations can result in serious injury or damage to property. These regulations may vary depending on the operator. In the event of a conflict between these provisions, the stricter rules shall apply.



DANGER

Shutdown procedure when using peroxidic chemical products.

If the system goes out of operation due to an unintended standstill of the Plant (e.g. power failure), the control system must be prevented from powering up automatically.

To avoid injury, the shutdown procedures must be followed in all situations, including intentional shutdowns due to maintenance or repair work.



DANGER

Risk of explosion due to decomposition of peroxidic chemical products

Peroxidic chemicals tend to decompose under the formation of gas. When peroxidic chemical products are contaminated with special materials such as non-ferrous metal or lye, the decomposition speed increases and the contaminated solution heats up.

At a certain temperature (self-accelerating decomposition temperature, SADT) the decomposition becomes spontaneous and an explosion occurs, which can lead to life-threatening injuries.

It is essential to avoid contamination of the chemical product when connecting and disconnecting the peroxide container.



DANGER

Burns caused by peroxide chemical products

Peroxide chemical products in high concentrations cause severe burns if they come into contact with skin, eyes or mucous membranes.

- Always use a face shield in addition to the prescribed PPE in case of maintenance or repair
- Ensure that suitable emergency equipment is available in the vicinity of the operating area (e.g. eye shower)

Safety data sheets

The safety data sheet is intended to be consulted by users and enables them to take any steps necessary to safeguard their health and safety at work.



DANGER

Safety data sheets are always provided together with the supplied chemicals. Before using the chemicals, the safety data sheets must be read and understood, and all requirements must be implemented on site. Ideally, they should be displayed close to the workplace or to the supply containers so that the appropriate measures can be taken quickly in the event of an accident. The operator must provide the necessary protective equipment (PPE), as well as the described emergency equipment (eye bottle, etc.). Persons entrusted with operating the equipment must be instructed accordingly and trained.

Tab. 4: Download of safety data sheets



The latest safety data sheets are available online.
To download them, go to the following link or scan the QR code.
Then you can enter your required product and download the associated safety data sheet.

➔ <https://www.ecolab.com/sds-search>

Requirements

- The control unit shows a message when the tank is almost empty.
- The blue button [**Cleaning Fault/reset**]  flashes on the control cabinet.
- The cleaning cycle is done.
- A full foam cleaning chemical tank is ready for use.

10.6.1 If using the suction lance / suction pipe

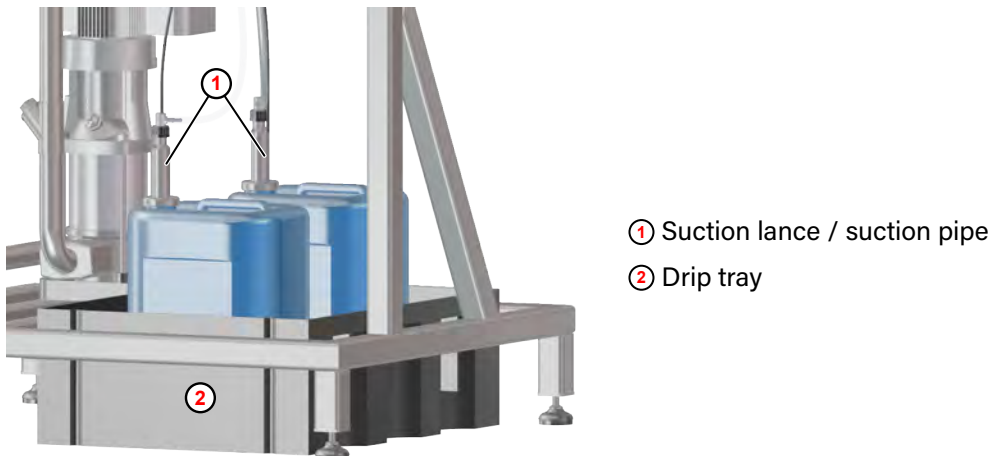


Fig. 123: Suction

If the delivery container is empty, an 'empty' message is displayed at the control cabinet on the control system display, with a warning light.

The system is stopped until the container has been changed.

1. ➤ Put on personal safety equipment.
2. ➤ Get a new container ready.
3. ➤ Pull the suction lance / suction pipe ① quickly out of the adapter closure of the tank.



CAUTION

Risk of leaking chemicals

If the suction lance / suction pipe ① is put down, the check valve becomes ineffective and the dosing fluid runs out of the suction lance.

- Always place the suction lance / suction pipe ① upright.
- During the container change, place the suction lance / suction pipe ① in a collection container.

4. ➤ Get a new container ready
5. ➤ Close the old container with a sealed lid without holes and put it aside for disposal.
6. ➤ Screw on / place the adapter closure of the empty container onto the full container.
7. ➤ Insert the suction lance / suction pipe ① through the adapter closure of the full tank.
8. ➤ You can acknowledge the error message by pressing the LED button on the control unit.
 - ➔ The message text on the control panel disappears.
 - ➔ The system starts working again as soon as an external release is available.

10.6.2 When using 'Click&Plug' couplings (IBC containers)



CAUTION

Handling the Click&Plug system (coupler)

Never apply force or excessive strain as this can damage the coupling.

Improper connection of the chemical containers to the Click&Plug coupling can also cause chemicals to escape and cause severe burns.

Should there be damage to the coupling (e.g. deformations, cracks, breaks), the relevant Ecolab representative must be informed for an immediate replacement!

- Only connect the coupling if the size and colour of the connecting piece on the chemical container match the coupling used.
- Never open the chemical container at the nozzle
- Never open the sealing cap on the chemical container secured with cable ties
- Never attach the coupling to the connecting piece with great force
- Replace coupling immediately if deformed or damaged



CAUTION

Leakage of chemicals and vapours when disconnecting the connection coupling!

When unlocking the connection coupling, the valve in the integrated suction lance may not close immediately.

This allows chemicals and vapours to escape from the valve.

A clicking sound can be heard when the integrated suction lance is closed.

Only when the noise is first heard may the connection coupling be detached from the barrel adapter - to avoid personal injury.

If the delivery container is empty, an 'empty' message is displayed at the control cabinet on the control system display, with a warning light.

The system is stopped until the container has been changed.

1. ➔ Put on personal safety equipment.

2. ➔



Compare the product labels on the old and new chemical containers.

3. ➔ Use a full chemical container so you can remove the opening (white cover cap) with the 'Click & Plug' coupling.

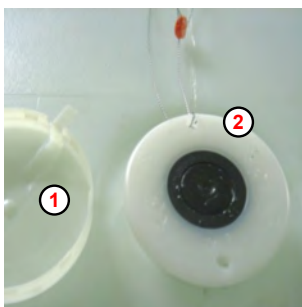


Fig. 124: 'Click & Plug' - connection coupling

4. ➔ Remove the white cap from the full chemical container and expose the barrel adaptor.



Fig. 125: Unlocking the Click & Plug connection coupling

5. ➔ Press the unlocking lever and pull the handle of the connection coupling upwards
6. ➔ Fold the safety bracket away from the barrel adaptor.



Fig. 126: Disconnect the connection coupling

7. ➔



CAUTION

Leakage of chemicals and vapours when disconnecting the connection coupling!

When unlocking the connection coupling, the valve in the integrated suction lance may not close immediately. A clicking sound can be heard when the integrated suction lance is closed.

- **Only then disconnect the connection coupling from the barrel adaptor!**

Remove the connection coupling from the barrel adaptor of the empty chemical container in the direction of the arrow.



The barrel adapter must be completely closed.



Fig. 127: Slide on the connection coupling

8. ➤ Push the connection coupling completely onto the barrel adaptor of the full chemical container in the direction of the arrow.
9. ➤ Fold the safety bracket downwards.



Fig. 128: Lock the connection coupling

10. ➤ Tighten unlocking lever . Press the handle of the connection coupling downwards and lock it.
 - The connection coupling is connected, the connection is ready for removal.
11. ➤ Attach the white cap to the empty chemical container and dispose of the container in accordance with local regulations.
12. ➤ You can acknowledge the error message by pressing the LED button on the control unit.
 - The message text on the control panel disappears.
 - The system starts working again as soon as an external release is available.

10.7 Plant Switch off

Requirements

- The cleaning program is complete.

1. ➤ Turn the main switch  on the switching cabinet of the Plant to **[0/OFF]**.
 - The control unit Plant shuts down.
2. ➤ Plant to ensure that it cannot be switched back on inadvertently.
 - Attach the lock to the main switch.

10.8 Restart after an emergency shutdown

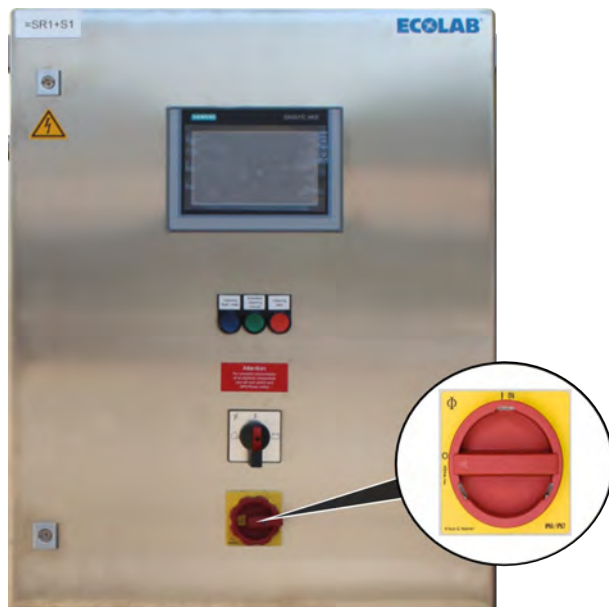


CAUTION

Please keep the following important points in mind when switching on the machine after an emergency.

- Check again that all risks are eliminated.
- Acknowledge any errors.
- Rotate the start release clockwise (90°).
- You can now continue using the system as normal.

Tab. 5: Main switch with emergency stop function



The main switch with emergency stop function is on the door of the control cabinet directly below the UPS selector switch.

In the event of an emergency, the electrical power supply of the Plant must be interrupted.

In the image (left), the switch is in position "0" (switched off).

Once all the faults are eliminated, turn the main switch anti-clockwise (90°) to "I" to turn on the system.

The Plant is switched on.

To restart the system:

1. ➤ Turn the switch to position "I" ON.
2. ➤ Acknowledging the EMERGENCY STOP on the control panel.
3. ➤ Eliminate and acknowledge all pending error messages on the control unit.

11 Fault rectification

Personnel requirements

Personnel:

- Operator
- Specialist
- Service personnel

Personal protection equipment (PPE)

Protective equipment:

- Chemical-resistant protective gloves
- Protective work clothing
- Protective goggles
- Face protection



Position information with reference to the PID (flow chart)

Where the following refers to the positions of components in the PID, these are presented as follows: [>....<]



DANGER

De-energise the Plant before performing any work

Performing set-up, maintenance or repair work on the Plant while energised presents a RISK OF DEATH for personnel!

Before starting any work, the Plant must be switched off by an electrician and must be secured against being switched on again unintentionally.



DANGER

Troubleshooting faults in the electrical system

Danger to life through contact with live components.

Electrical hazards are identified using the symbol shown here.

- Check the existing power supply on site and compare it with the ➔ [Appendix A.4 'Circuit diagram' on page 307](#).
- Check that there is no voltage; earth and short-circuit the Plant if necessary.
- Cover and protect adjacent parts that are under voltage.
- Housings and all other electronic components may be opened only for start-up, maintenance and fault elimination purposes.
- Organise repairs immediately if there is any damage to the insulation.
- When replacing fuses, use replacements with the same rating.
- Do not expose live parts to moisture, as this may cause short-circuits.
- To de-energize the control cabinet, set the main switch and, if present, the UPS switch to the "0" position.



CAUTION

- All troubleshooting work must be carried out only by qualified, trained and authorised specialists and in compliance with the safety instructions.
- Before carrying out, always rinse the Plant with a suitable solution.
- Follow all safety guidelines and always observe all accident prevention regulations in force locally.
- For safety reasons and emergencies, at least one other person should be present.
- All safety features set out in the safety data sheet of the chemicals used (e.g. eye wash) must be provided before work starts and their function must be checked!
- Compliance with the PPE set out in the safety data sheet of the chemicals used must be strictly adhered to.
- Secure the Plant and prevent any unintentional, unauthorised restart of the Plant.



CAUTION

- Repairs and installations on the electrical system must be carried out only by electricians.
- When opening covers or removing parts, live parts may become exposed. Connection points may also be live.
- For any troubleshooting work, if it has to be opened, the Plant must be disconnected fully from the power supply and secured against a restart.
Be sure to attach a lock to the main switch of the Plant.



WARNING

Risk of injury from loose parts, components and tools placed on top of each other or left lying around

Loose parts, components and tools placed on top of each other or left lying around are sources of accidents that can lead to serious injury.

To avoid this, the workplace must be kept clean and tidy for all work is carried on the Plant

Handling peroxide



DANGER

Pay attention to safety when handling peroxides.

The main risks associated with the use of peroxide are:

- If peroxide comes into contact with skin or mucous membranes, it causes severe burns.

For first-aid measures, see the instructions on the safety data sheet.

- **Personal protective equipment must be worn for all work on the unit: Safety glasses and gloves.**
- **A face shield must also be worn when performing maintenance or repair work.**



DANGER

Burns caused by peroxide chemical products

Peroxide chemical products in high concentrations cause severe burns if they come into contact with skin, eyes or mucous membranes.

- Always use a face shield in addition to the prescribed PPE in case of maintenance or repair
- Ensure that suitable emergency equipment is available in the vicinity of the operating area (e.g. eye shower)



CAUTION

Avoid reactive processes.

H₂O₂ decomposes constantly (depending on the temperature).

The decomposition leads to high gas development and thus to an increasing pressure in the system. If the pressure exceeds the maximum system pressure, the metering system may fail.

If H₂O₂ is contaminated with metal ions (copper, zinc, iron) or corrosive / organic substances, the decomposition speed increases.

At a certain product temperature, the reaction proceeds spontaneously and uncontrollably.

11.1 Define lockout/tagout procedures according to local conditions

Lockout/Tagout process

- **Purpose:** To protect authorised personnel from unexpected or unplanned activation of the BFH Foamatic or power while the BFH Foamatic is being maintained.
- **Scope:** Use this procedure for any scheduled shutdowns for preventive maintenance, for any other maintenance tasks where the BFH Foamatic may cause bodily injury, or if you need to leave the area while the BFH Foamatic is in operation.
- **Enforcement:** If the correct lockout/tagout procedure is not followed, corrective action may need to be taken.



DANGER

Safe shutdown (LoTo = Lockout/Tagout)

Decommissioning of the station is permitted only by trained specialist personnel / service technicians.

The following measures are essential to protect personnel and the station from damage:

- Notify the affected personnel.
- Switch off the machine properly.
- Isolate all energy sources.
- Apply locking devices, padlocks and signs.
- Check complete shutdown of all energy sources.



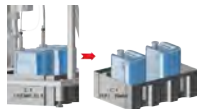
DANGER

It is essential that the personal protective equipment (PPE) described on the product data sheet (safety data sheet) for the metering medium is used.

SHUTDOWN, LOCK, TAG AND TEST SEQUENCE		
#	Step	Description
1	<i>Notify employees</i>	Notify all affected employees that service or maintenance work is required on the BFH Foamatic and that it must be switched off and locked in order for service or maintenance to be carried out.
2	<i>Check the lockout procedure</i>	The authorised employee must refer to the company policy to determine the type and magnitude of the energy used on the BFH Foamatic. They must understand the dangers associated with energy and be familiar with the methods of controlling the power.
3	<i>Perform a machine stop</i>	If the BFH Foamatic is working, turn it off by a normal shut-off procedure (by pressing the stop button, opening the switch, closing the valve, etc.). Refer to the machine operating procedure for a normal shutdown.
4	<i>Shut off the power</i>	Follow the illustrated lockout/tagout procedure from start to finish to disable the power isolation devices so the BFH Foamatic is isolated from the power sources. INFORMATION: It may be necessary to dissipate the power of the non-blockable energy sources before isolating blockable energy sources.
5	<i>Blocking power</i>	Use lockout/tagout devices such as assigned locks and tags to shut off and label the devices to disconnect the power supply. If one or more locks need to be transferred to another employee, observe the company guidelines for transferring to an authorised employee.
6	<i>Reducing energy</i>	Stored or residual energy (e.g. in capacitors, springs, ramped-up machine elements, rotating flywheels, hydraulic systems, as well as air, gas, steam or water pressure, etc.) must be degraded or controlled by methods such as grounding, repositioning, blocking, draining, etc.
7	<i>Attempting a restart</i>	Make sure that all devices are disconnected from the power sources by first checking for people in the vicinity, then ensuring that the device is isolated by operating normal controls or by performing a test to ensure that the devices cannot be put into operation. CAUTION: After verifying the device is without power, return the controls to the neutral or off position.

RE-COMMISSIONING SEQUENCE		
#	Step	Description
1	Check the machine	Check the BFH Foamatic and the area around the BFH Foamatic, to ensure that non-critical objects have been removed and that the area is operational BFH Foamatic.
2	Check the area	Check the workspace to ensure that all employees are in a safe position or have moved out of the area.
3	Verify the machine	Check that the controls are in the neutral position.
4	Remove the lock	Remove the barriers, markings and blocking devices and resupply power to the BFH Foamatic. In reverse order, follow all the steps of the visual lockout/tagout procedure. Note: When blockages are removed, energy may need to be supplied to BFH Foamatic before they can be safely removed.
5	Notify employees	Notify the affected employees that the service or maintenance work has been completed and that the BFH Foamatic it is ready for operation.

Tab. 6: Locking steps (Lockout/Tagout)

Step no.	Action	Select information	Checking
1	Chemical supply C-1 The C-1 shutdown unit is the supply hoses in the chemical container. The supply hoses must be routed into water tanks and the system must be run empty for at least 30 seconds. See → Chapter 12.3.2 'Rinse the foam cleaning system' on page 235		When the manual foaming of all existing chemical products is activated, only pure water escapes.
2	Electricity supply E-1 The E-1 is located on the cover of the control cabinet. Use a lock to secure the switch in the "OFF" position.		Try to start up at all control panels.
3	Water supply W-1 The stopcock W-1 is located above the booster pump in the suction line. Put the tap "horizontal" in the "CLOSED" position and lock.		Make sure the pressure has been released.
4	Compressed air supply D-1 The D-1 compressed air supply is located on the frame of the BFH Foamatic. Use a lock.		Make sure the pressure has been released. Pressure gauge at 0 bar.

Remove the locks

1. ➤ Remove all tools and objects.
2. ➤ Confirm that all employees are in a safe place.
3. ➤ Check that all controls are in the neutral position.
4. ➤ Remove locking devices.
5. ➤ Reconnect power to the BFH Foamatic.
6. ➤ Inform all employees that the BFH Foamatic is ready for use.

11.2 General faults

Behaviour in the event of a fault

1. ➤ **Plant Switch off immediately.**
2. ➤ **Plant Secure against being switched on again.**
3. ➤ Identify and immediately resolve errors that occur.
4. ➤ After troubleshooting, put the Plant back into operation.



faults due to longer downtimes or swapping the chemical type

In the event of longer downtimes or inadvertent swapping of the chemical type, the corresponding injector can solidify. If this is the case, the injector must be removed, cleaned or even replaced, depending on the damage.



faults due to high temperature differences

In case of high temperature differences, in winter/summer or tropical areas, it may be necessary to recalibrate the flow sensor. Under these conditions, the flow sensor cannot correctly evaluate the nominal water flow, so it does not release the booster pump.

Find the cause of the problem in the list of causes below, and then proceed with the possible workarounds. If the problem persists, we advise contacting the Ecolab service team.

Fault description	Cause	Remedy
Plant Won't turn on:	Master switch in "0" position	Turn the main switch to "I"
	Won't activate with the controls:	Check the control panel. Check the signal exchange. Check for error messages.
	Blown fuse in the control cabinet:	Find the fault locally. Replace the fuse.
	No water and air supply:	Find and resolve any faults in the water and air connection.
Cannot START ON:	EMERGENCY STOP switch in position 0:	Determine why the EMERGENCY STOP was triggered. Eliminate risk. Unlock the EMERGENCY STOP.
	Error in the controls:	Inform customer services. Consult specialists.

Fault description	Cause	Remedy
Cannot turn on control panel:	No mains voltage:	Determine why there is no mains voltage. Re-establish the mains voltage.
	Motor-protective circuit breaker or fuse tripped:	Determine the cause.
	Motor defective:	Resolve the fault. Switch on the motor-protective circuit breaker or motor fuse.
	Error in the controls:	Inform customer services. Consult specialists.
Plant Cannot start in Auto mode:	Control panel not on:	Switch on the control panel
	Start not activated:	Turn on the startup release.
	Plant Not in Auto mode:	Tank empty. Not enough water and air supply. Check remote control: (Ecolab → Customer (Customer → Ecolab)
Pump is showing NO pressure:	Pump rotating in the wrong direction:	Change the direction of rotation according to the direction indicator (arrow) on the pump housing.
	Defective flow switch:	Check and recalibrate the flow or pressure switch.
	Defective pressure switch:	Replace flow or pressure switches.
	Inadequate water supply:	Ensure adequate water supply (water inlet 12000 l/h at 2 bar).
Insufficient foam formation:	Insufficient air supply:	Ensure adequate air supply (air inlet 27000 l/h at 5-6 bar)
	Pressure in the injector too high or too low:	Change compressed air settings (4 bar for foaming).
	Wrong nozzle installed, no air supply, test valve blocked:	Replace nozzle, ensure air supply, clean or replace test valve.
	Unsuitable detergent type:	Use suitable detergent.
No foam formation:	Blocked injection valve:	Clean or replace the injection valve.
	Water consumption too high:	Check the water connection.
	Filter/suction blocked:	Clean filter/intake inlet.
	Blocked injector nozzle:	Clean injector nozzle.
	Inadequate detergent supply:	Establish the detergent supply.

Fault description	Cause	Remedy
Plant Interrupts ongoing operation:	Surge protection has responded:	Request a specialist for troubleshooting! Inform customer services. Consult specialists.
Industrial accident:	Improper operation/handling:	Immediately switch off power supply!
	Non-compliance with prescribed safety measures:	Immediately switch off power supply!
	Failure to wear personal protective equipment (PPE):	Immediately switch off power supply!
Other faults	Faults in general	Call for expert help from manufacturer!

11.3 Error codes from the control unit

The user can find the control system error codes and their meaning in the following table. These error codes are displayed on the control screen when a fault occurs in the control system. These error codes are used to troubleshoot a bug or communicate a bug with the help of Ecolab.

Warning messages

No.	Fault description	Cause	Remedy
1000 2	XXXXXX LAMP TEST XXXXXX	Appears when the lamp test has been selected in the system.	Automatically extinguishes after a preset time on the system.
1001 7	Communication fault with filler 1		
1001 8	Communication fault with filler 2		
1001 9	Communication fault with conveyor		
1002 0	Communication fault with filler		
1002 5	Select zone		
1002 6	External release of Zone 1 missing		
1002 7	External release of Zone 2 missing		
1002 8	External release of Zone 3 missing		
1002 9	External release of Zone 4 missing		
1003 0	External release of Zone 5 missing		

No.	Fault description	Cause	Remedy
1003 1	External release of Zone 6 missing		
1003 7	Enable is ON => Start possible		
1003 8	Cleaning can only start after the program and zone are preselected		
1004 0	Automatic cleaning interrupted by STOP button		
1004 2	Warning FI circuit breaker has tripped		
1004 3	Motor protection transformer 460V/230VAC		
1004 5	Fault with the pressure switch 1PS1.1 Water supply		
1004 7	Fault with the IE switch		
1004 9	Safety circuit doors operated		
1005 0	Zone 3 Safety circuit doors operated		
1005 7	Warning alkaline detergent empty		
1005 8	Warning acid detergent empty		
1005 9	Disinfectant low warning		
1006 0	Warning PES empty		
1006 5	Empty signal for alkaline detergent fault		
1006 6	Empty signal for acid detergent fault		
1006 7	Disinfectant empty warning fault		

No.	Fault description	Cause	Remedy
17	Emergency stop actuated	The emergency stop function has been triggered	
18	Motor protection booster pump 1P1.1 is triggered!		
19	Motor protection UPS system is triggered!		
20	Safety circuit doors operated		
23	Surge protection fault		
24	Automatic circuit breaker digital outputs		
25	Empty signal for alkaline detergent fault		
26	Empty signal for acid detergent fault		
27	Disinfectant empty warning fault		
28	Circuit breaker socket control cabinet		
29	Fault with the autom. Cleaning => no water flow pressure pump		
30	circuit breaker power supply 230V		
31	Zone 3 emergency stop actuated		
32	Zone 3 Safety circuit doors operated		
33	Fault FU for pressure pump 1P1.1		
34	UPS mains power is missing		
35	UPS battery is empty		
36	Main switch OFF		
37	PES empty signal fault		
39	PLC restart required !!!		
40	CIP machine water circulation not ready		
41	Repair switch off pump 1VP2.1, alkaline cleaner		
42	Repair switch off pump 1VP3.1, acid cleaner		
43	Repair switch off pump 1VP3.1, disinfectant		
44	Fault with air supply PS0.1		

No.	Fault description	Cause	Remedy
45	CIP machine water circulation not ready		
47	Fault with analogue signal TIC20.1 hot water temperature sensor		
48	Fault with analogue signal 1PIC1.1 water pressure sensor		
50	Fault with valve sensor V20.01, Gully 1 filler		
51	Fault with valve sensor V20.02, filler shut-off valve nozzle system		
52	Fault on valve sensor V20.03, filler inlet		
53	Fault with valve sensor V20.04, Gully 2 filler		
54	Fault with valve sensor V20.1, Section 1 filler		
55	Fault with valve sensor V20.2, Section 2 filler		
56	Fault with valve sensor V20.3, Section 3 filler		
57	Fault with valve sensor V20.4, Section 4 filler		
58	Fault with valve sensor V20.5, Section 5 filler		
59	Fault with valve sensor V20.6, Section 6 filler		
60	Fault with valve sensor V20.7, Section 7 filler		
61	Fault with valve sensor V20.8, Section 8 filler		
62	Fault with valve sensor V20.9, Section 9 filler		
63	Fault with valve sensor V20.10, Section 10 filler		
64	Fault with valve sensor V20.11, Section 11 filler		
65	Fault with valve sensor V20.12, Section 12 filler		
66	Fault with valve sensor V20.13, Section 13 filler		
67	Fault with valve sensor V20.14, Section 14 filler		

No.	Fault description	Cause	Remedy
68	Fault with valve sensor V20.15, Section 15 filler		
69	Fault with valve sensor V20.16, Section 16 filler		
80	Fault with valve sensor V22.01, hot water gully		
81	Fault with valve sensor V22.02, hot water inlet		
82	Fault with valve sensor V22.03, hot water supply		
83	Fault with valve sensor V22.1, hot water Section 1		
84	Fault with valve sensor V22.2, hot water Section 2		
85	Fault with valve sensor V22.3, hot water Section 3		

11.4 Troubleshooting in the event of malfunctions in purchased parts

Information from the component operating instructions



This section provides excerpts from the component instructions of the BFH Foamatic. Ecolab is not the author of these extracts, Ecolab cannot assume any liability for damages resulting from the use of the following information. The original texts can be found in the respective component operating instructions. See: ➔ [Appendix B 'Component operating manuals' on page 321.](#)

11.4.1 Compressed air unit MSB4 [FESTO]

Troubleshooting on pressure sensor SDE5

Fault description	Cause	Remedy
No LED display	Pressure $p <$ switching pressure (SP)	No error ↪ 'Betriebsanleitung Drucksensor SDE5' on page 386
	Operating voltage missing or invalid operating voltage	Switch on the operating voltage / observe the operating voltage range
	Connections reversed (reverse polarity)	Perform wiring for SDE5 according to the connection diagram ↪ 'Betriebsanleitung Drucksensor SDE5' on page 386
	Pressure failure	Eliminate pressure failure
	SDE5 defective	Replace the pressure sensor
LED display or relay output does not behave according to the settings	Short circuit or overload at the output	Eliminate short-circuit/overload
	Wrong setpoint taught	Repeat the teaching process ↪ 'Betriebsanleitung Drucksensor SDE5' on page 386
	SDE5 defective	Replace the pressure sensor

11.4.2 Flow Monitors SI500x [IFM]

Fault description	Cause	Remedy
Error during adjustment	Error during installation	Read chapter 3 Installation. Check whether all requirements have been met.
	The difference between maximum flow and minimum flow is too small	Increase the flow difference and carry out the adjustment once again
	The sequence high flow /low flow adjustment was not adhered to	Carry out the two adjustment operations again in the right sequence

11.4.3 EVOGUARD Butterfly valve [KRONES]



Observe the following during malfunctions:

- If the valve malfunctions, stop it immediately and secure it to prevent turning ON.
- Troubleshoot the malfunctions immediately.
- Malfunctions must be eliminated only by trained professionals while observing the safety instructions.
- Should malfunctions occur which are not listed in the following table, or which cannot be traced back to the specified source, contact the manufacturer.

Fault description	Cause	Remedy
Actuator not operating	The air hoses are clogged or leaking	Clean or replace the air hoses
	The control pressure is too low	Increase the control pressure
	The disk is blocked	Remove the blockage
No check-back signal	The proximity switch is misaligned	Adjust the proximity switch
	The proximity switch is not connected correctly	Correctly connect the proximity switch
	The proximity switch is faulty	Replace the proximity switch
Leakage	The disk seal is faulty	Replace the disk seal
	The flange seal is faulty	Replace the flange seal
	The screw fitting seal is faulty	Replace the screw fitting seal

11.4.4 Hybrid Foamatic MA-SA

Fault description	Cause	Remedy
The unit does not start	Is there supply voltage to the unit	Reconnect voltage and ensure 3 x 400 V supply
	Error message in display	Read error and act accordingly
	Flow switch out of adjustment	Try to readjust flow switch
No pressure / too low pressure	Unzureichende Wasserversorgung am Gerät	Insufficient water supply at unit
	Is the filter clogged	Clean the filter
	Is the pump leaking or making jarring sounds	Call technician
	Rinsing nozzle not installed	Place rinsing nozzle
	Defect in mainstation unit	Consult direction for use of mainstation
	No water supply	Ensure water supply
Insufficient foam creation	No supply of diluted products	Consult directions for use of dosing unit
	Product not suitable	Choose suitable product
	Insufficient air supply at unit	Provide sufficient air supply
	Air pressure in mixing chamber too high	Adjust air pressure setting
	Defect non-return valve for air	Replace non-return valve for air
	Incorrect nozzle	Place foam nozzle 50/200
	Leaking or blocked chemical non-return valve	Clean or replace chemical non-return valve
	System needs deliming	Delime the unit according to paragraph 9.5

Fault description	Cause	Remedy
No foam creation	No supply of diluted products	Consult directions for use of dosing un
	Product not suitable	Choose suitable product
	Air pressure in mixing chamber too high	Adjust air pressure setting
	Defect non-return valve for air	Replace non-return valve for air
	No air supply at unit	Ensure air supply
	Non-return valve blocked	Clean or replace non-return valve
	Nozzle of mixing chamber blocked	Clean nozzle
	Leaking or blocked chemical non-return valve	Clean or replace chemical non-return valve
	System needs deliming	Delime the unit according to paragraph 9.5
No spray sanitising	No supply of diluted products	Consult directions for use of dosing uni
	Non-return valve blocked	Clean or replace non-return valve
	Nozzle of mixing chamber blocked	Clean nozzle
	Leaking or blocked chemical non-return valve	Clean or replace chemical non-return valve
	System needs deliming	Delime the unit according to paragraph 9.5

11.4.5 Inductive switch IMB12 [SICK]

In the event of a fault or malfunctions, replace the inductive switch completely.

11.4.6 Pressure switch PBS [SICK]

Fault description	Cause	Remedy
No output signal	Line break	Check passage
	No/Incorrect auxiliary energy	Correct auxiliary energy
No/Incorrect output signal	Wiring error or switchover of switching logic/analog signal	Observe pin assignment Check output configuration
Constant output signal during change in pressure	Mechanical overload due to excessive pressure	Exchange device; consult with the manufacture in the event of repeated failure
Deviating zero point signal	Overload pressure limit exceeded	Permissible overload pressure limit upheld
Signal range too small	Mechanical overload due to excessive pressure	Exchange device; consult with the manufacture in the event of repeated failure
	Auxiliary voltage too high/low	Correct auxiliary energy
Signal range falls	Moisture has entered the device	Mount cable correctly
Signal range falls/too small	Membrane damage, e.g. caused by abrasive/ aggressive media, corrosion to membrane/process connection	Contact manufacturer and exchange device

11.5 Start up Plant after fault-related shutdown

To start up the Plant after eliminating faults, check the following control points:

- Check all supply connections.
- Check the product level in the spare containers.
- Check the settings of the system components against the [operating instructions for the system components](#).
- Open the water inlet valve and air supply.
- Switch ON the Plant.
- Carry out the automatic and manual cleaning process as needed.

11.6 Commissioning after emergency shut-off



NOTICE

The control system has an integrated safety mechanism that prevents an unauthorised restart after power is restored.

This generates various faults/errors that must be actively confirmed on the operating display.

Faults that occur are:

EMERGENCY STOP, leak sensors, valve position

Re-commissioning

- 1.** ➤ Unlock the EMERGENCY STOP function.
- 2.** ➤ Restore power.
- 3.** ➤ Restore the water supply.
- 4.** ➤ Restore the air supply.
- 5.** ➤ Acknowledge error messages / faults on the operating display.

12 Maintenance

Personnel requirements

Personnel:

- Specialist
- Mechanic
- Service personnel

Personal protection equipment (PPE)

Protective equipment:

- Safety shoes
- Chemical-resistant protective gloves
- Protective gloves
- Protective work clothing
- Protective goggles
- Face protection



Position information with reference to the PID (flow chart)

Where the following refers to the positions of components in the PID, these are presented as follows: [**>....<**]



DANGER

De-energise the Plant before performing any work

Performing set-up, maintenance or repair work on the Plant while energised presents a RISK OF DEATH for personnel!

Before starting any work, the Plant must be switched off by an electrician and must be secured against being switched on again unintentionally.



DANGER

Troubleshooting faults in the electrical system

Danger to life through contact with live components.

Electrical hazards are identified using the symbol shown here.

- Check the existing power supply on site and compare it with the ➔ [Appendix A.4 'Circuit diagram' on page 307](#).
- Check that there is no voltage; earth and short-circuit the Plant if necessary.
- Cover and protect adjacent parts that are under voltage.
- Housings and all other electronic components may be opened only for start-up, maintenance and fault elimination purposes.
- Organise repairs immediately if there is any damage to the insulation.
- When replacing fuses, use replacements with the same rating.
- Do not expose live parts to moisture, as this may cause short-circuits.
- To de-energize the control cabinet, set the main switch and, if present, the UPS switch to the "0" position.

**WARNING****Burns caused by worn or damaged piping, hoses and seals**

Corrosive chemicals can escape from worn or damaged pipes, hoses and seals and cause serious injuries.

- Check pipes, hoses and seals regularly for damage
- Rectify leaks immediately
- Replace pipes, hoses and gaskets within the specified time

**WARNING****Burns caused by harmful chemical products**

Contact with hazardous chemical products can cause severe burns.

- Read the enclosed safety data sheet carefully before using the chemical product.
- The safety regulations and the required protective clothing for working with chemicals must be complied with.
- Safety devices such as showers and eye flushing must be accessible and checked regularly to ensure that they are fully functional.
- Ensure adequate ventilation and extraction.
- Avoid skin and eye contact.

**WARNING****Risk of slipping due to escaping chemicals**

Chemicals leaking in the working and preparation area can cause slipping and injuries.

- Wear non-slip, chemically resistant shoes when working.
- Always have a suitable binding agent available (according to the chemical product safety data sheet).
- Seal off the area with the escaping chemical.
- Immediately collect chemicals that have leaked or spilled and dispose of them properly.
- If necessary, place the chemical container in a trough to collect any escaping chemicals.

**WARNING****Danger of burns from hot surfaces**

Hot surfaces can cause severe burns on contact.

- Before working on the Plant, allow the Plant and all components to cool to 35 °C.
- Wear protective gloves

**WARNING****Risk of injury from loose parts, components and tools placed on top of each other or left lying around**

Loose parts, components and tools placed on top of each other or left lying around are sources of accidents that can lead to serious injury.

To avoid this, the workplace must be kept clean and tidy for all work is carried on the Plant



CAUTION

Risk of injury from damaged or unsuitable tools

Injuries may result from the use of damaged or unsuitable tools.

- Use only undamaged tools.
- Use only the tool intended for the specific purpose (e.g. suitable drills).



NOTICE

Material damage due to additional weight loads

Additional weight loads can cause material damage to the Plant.

- Do not load the Plant with additional weight
- Do not step upon the Plant or use it as a climbing aid
- Do not place heavy tools on the Plant.



ENVIRONMENT

Chemicals can harm the environment

- Ensure that no chemicals leak or are spilled.
- Have a suitable binding agent available in accordance with the safety data sheet.
- Immediately collect chemicals that have leaked or spilled and dispose of them properly.



Obligation to create and maintain a maintenance log

The owner of the Plant is obliged to provide a maintenance log and keep it at the Plant.

All maintenance work, defects, faults or damage must be recorded in the maintenance log and their rectification measures recorded accordingly!



When ordering maintenance-related spare parts (electrical modules, in particular), make sure that they are pre-configured at the factory for use in the system.

Please therefore notify our Customer Service team of the exact location and purpose of the metering system.

Handling peroxide



DANGER

Pay attention to safety when handling peroxides.

The main risks associated with the use of peroxide are:

- If peroxide comes into contact with skin or mucous membranes, it causes severe burns.

For first-aid measures, see the instructions on the safety data sheet.

- **Personal protective equipment must be worn for all work on the unit: Safety glasses and gloves.**
- **A face shield must also be worn when performing maintenance or repair work.**



DANGER

Burns caused by peroxide chemical products

Peroxide chemical products in high concentrations cause severe burns if they come into contact with skin, eyes or mucous membranes.

- Always use a face shield in addition to the prescribed PPE in case of maintenance or repair
- Ensure that suitable emergency equipment is available in the vicinity of the operating area (e.g. eye shower)



CAUTION

Avoid reactive processes.

H₂O₂ decomposes constantly (depending on the temperature).

The decomposition leads to high gas development and thus to an increasing pressure in the system. If the pressure exceeds the maximum system pressure, the metering system may fail.

If H₂O₂ is contaminated with metal ions (copper, zinc, iron) or corrosive / organic substances, the decomposition speed increases.

At a certain product temperature, the reaction proceeds spontaneously and uncontrollably.

Wearing parts and spare parts

Please note that correct functionality of the Plant is guaranteed only if original spare parts from Ecolab are used. This applies in particular to the electrical components in yourPlant. All spare parts can be obtained from your responsible ECOLAB representative
[➔ Appendix A.1 'Ecolab representatives and service partners' on page 301.](#)

Through careful maintenance and inspection, errors are found and corrected early on. This helps maintain the value of the Plant, prevent failures and improve the reliability of the Plant.

The Plant must be maintained at least once a year by an authorised service technician, depending on wear and according to the maintenance schedule for taking preventive measures against defects and malfunctions.

Any person who, due to their skills and experience, has sufficient knowledge of the system and who is familiar with the applicable occupational safety regulations, accident prevention regulations, directives and recognised technical guidelines, is considered an authorised maintenance technician.

Maintenance includes the following periodic work:

- **Servicing** see ➔ [Chapter 12.1 'Inspections' on page 229](#)
Inspection consists of a daily inspection of the Plant and the elimination of possible causes of wear.
- **Cleaning** see ➔ [Chapter 12.2 'Cleaning' on page 230](#)
Cleaning includes the regular removal of visible dirt on the Plant.
- **Maintenance** see ➔ [Chapter 12.3 'Maintenance' on page 230](#)
Maintenance includes regular maintenance to prevent personal injury or damage to the Plant.
- **Recalibration**
Recalibration consists of the regular monitoring and adjustment of the settings of the Plant according to operator specifications.
- **Repairs**
Repair consists of reconditioning and replacing damaged components to prevent personal injury or damage to the Plant.

12.1 Inspections

Inspections are of fundamental importance to detect faults and errors on the Plant at an early stage and to avoid more serious damage (consequential damage).

Complete inspections on the Plant should be carried out in the form of visual inspections (e.g. for leaks) before any work begins.

12.2 Cleaning

Requirements

- The Plant is prepared for maintenance and switched off.



NOTICE

Damage to property due to moisture, wetness and dirt

Moisture, wetness and dirt will damage the Plant.

- Never clean electrical components using a steam jet or water spray
- Place desiccant in the electrical and control cabinets, if required
- Plant Protect from moisture, wetness and dirt

1. ➤ Clean freely accessible system components from the outside using a sponge or cloth dampened with water.



WARNING

Destruction of sensitive components by cleaning with increased water pressure

Cleaning certain parts of the system with increased water pressure (e.g. with pressure cleaners) can destroy system parts.

The pressure booster pump must not be cleaned with a high-pressure cleaner under any circumstances. Water could enter the electronics of the frequency converter and destroy it.

2. ➤ Clean the housing of the Foamatic satellite inside and out with a damp sponge or cloth. If necessary, use a mild detergent.
3. ➤ In the control system, open the 'Clean Screen' menu and press the 'Clean Screen' button.
 - ➡ The control panel switches off for 45 seconds.
4. ➤ Wipe the control panel dry with a microfibre cloth.

12.3 Maintenance

To ensure the safety of service personnel during maintenance, the following steps must be taken to prepare the Plant beforehand:

1. ➤ ➡ [Chapter 12.3.1 'Define lockout/tagout procedures according to local conditions' on page 231.](#)
2. ➤ ➡ [Chapter 12.3.2 'Rinse the foam cleaning system' on page 235.](#)
3. ➤ ➡ [Chapter 12.3.3 'foam cleaning system drain' on page 236.](#)
4. ➤ ➡ [Chapter 12.3.4 'Plant Switch off' on page 236.](#)

12.3.1 Define lockout/tagout procedures according to local conditions

Lockout/Tagout process

- **Purpose:** To protect authorised personnel from unexpected or unplanned activation of the BFH Foamatic or power while the BFH Foamatic is being maintained.
- **Scope:** Use this procedure for any scheduled shutdowns for preventive maintenance, for any other maintenance tasks where the BFH Foamatic may cause bodily injury, or if you need to leave the area while the BFH Foamatic is in operation.
- **Enforcement:** If the correct lockout/tagout procedure is not followed, corrective action may need to be taken.



DANGER

Safe shutdown (LoTo = Lockout/Tagout)

Decommissioning of the station is permitted only by trained specialist personnel / service technicians.

The following measures are essential to protect personnel and the station from damage:

- Notify the affected personnel.
- Switch off the machine properly.
- Isolate all energy sources.
- Apply locking devices, padlocks and signs.
- Check complete shutdown of all energy sources.



DANGER

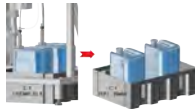
It is essential that the personal protective equipment (PPE) described on the product data sheet (safety data sheet) for the metering medium is used.

SHUTDOWN, LOCK, TAG AND TEST SEQUENCE

#	Step	Description
1	<i>Notify employees</i>	Notify all affected employees that service or maintenance work is required on the BFH Foamatic and that it must be switched off and locked in order for service or maintenance to be carried out.
2	<i>Check the lockout procedure</i>	The authorised employee must refer to the company policy to determine the type and magnitude of the energy used on the BFH Foamatic. They must understand the dangers associated with energy and be familiar with the methods of controlling the power.
3	<i>Perform a machine stop</i>	If the BFH Foamatic is working, turn it off by a normal shut-off procedure (by pressing the stop button, opening the switch, closing the valve, etc.). Refer to the machine operating procedure for a normal shutdown.
4	<i>Shut off the power</i>	Follow the illustrated lockout/tagout procedure from start to finish to disable the power isolation devices so the BFH Foamatic is isolated from the power sources. INFORMATION: It may be necessary to dissipate the power of the non-blockable energy sources before isolating blockable energy sources.
5	<i>Blocking power</i>	Use lockout/tagout devices such as assigned locks and tags to shut off and label the devices to disconnect the power supply. If one or more locks need to be transferred to another employee, observe the company guidelines for transferring to an authorised employee.
6	<i>Reducing energy</i>	Stored or residual energy (e.g. in capacitors, springs, ramped-up machine elements, rotating flywheels, hydraulic systems, as well as air, gas, steam or water pressure, etc.) must be degraded or controlled by methods such as grounding, repositioning, blocking, draining, etc.
7	<i>Attempting a restart</i>	Make sure that all devices are disconnected from the power sources by first checking for people in the vicinity, then ensuring that the device is isolated by operating normal controls or by performing a test to ensure that the devices cannot be put into operation. CAUTION: After verifying the device is without power, return the controls to the neutral or off position.

RE-COMMISSIONING SEQUENCE		
#	Step	Description
1	Check the machine	Check the BFH Foamatic and the area around the BFH Foamatic, to ensure that non-critical objects have been removed and that the area is operational BFH Foamatic.
2	Check the area	Check the workspace to ensure that all employees are in a safe position or have moved out of the area.
3	Verify the machine	Check that the controls are in the neutral position.
4	Remove the lock	Remove the barriers, markings and blocking devices and resupply power to the BFH Foamatic. In reverse order, follow all the steps of the visual lockout/tagout procedure. Note: When blockages are removed, energy may need to be supplied to BFH Foamatic before they can be safely removed.
5	Notify employees	Notify the affected employees that the service or maintenance work has been completed and that the BFH Foamatic it is ready for operation.

Tab. 7: Locking steps (Lockout/Tagout)

Step no.	Action	Select information	Checking
1	Chemical supply C-1 The C-1 shutdown unit is the supply hoses in the chemical container. The supply hoses must be routed into water tanks and the system must be run empty for at least 30 seconds. See → Chapter 12.3.2 'Rinse the foam cleaning system' on page 235		When the manual foaming of all existing chemical products is activated, only pure water escapes.
2	Electricity supply E-1 The E-1 is located on the cover of the control cabinet. Use a lock to secure the switch in the "OFF" position.		Try to start up at all control panels.
3	Water supply W-1 The stopcock W-1 is located above the booster pump in the suction line. Put the tap "horizontal" in the "CLOSED" position and lock.		Make sure the pressure has been released.
4	Compressed air supply D-1 The D-1 compressed air supply is located on the frame of the BFH Foamatic. Use a lock.		Make sure the pressure has been released. Pressure gauge at 0 bar.

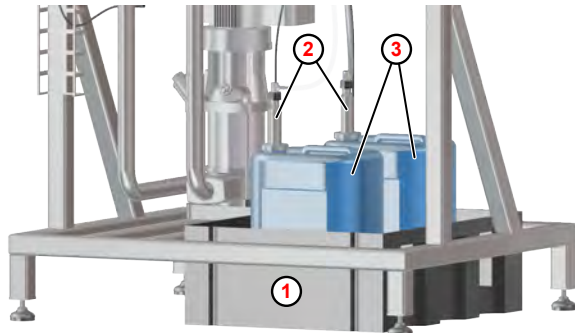
Remove the locks

1. ➤ Remove all tools and objects.
2. ➤ Confirm that all employees are in a safe place.
3. ➤ Check that all controls are in the neutral position.
4. ➤ Remove locking devices.
5. ➤ Reconnect power to the BFH Foamatic.
6. ➤ Inform all employees that the BFH Foamatic is ready for use.

12.3.2 Rinse the foam cleaning system

Requirement

- The cleaning cycle of the complete machine is completed.
- The outlet line of the Plant is connected to the gully.



- ① Drip tray
- ② Suction lances
- ③ Tank

Fig. 129: Tank with suction lance and drip pan

Material:

- Two tanks of clean water

1. ➤ Remove both tanks with the suction lances ② from the drop tray ① and place to the side.



ENVIRONMENT

Chemicals can harm the environment

- Ensure that no chemicals leak or are spilled.
- Have a suitable binding agent available in accordance with the safety data sheet.
- Immediately collect chemicals that have leaked or spilled and dispose of them properly.

2. ➤ Close the open tank properly.
3. ➤ Place full tanks of clean water in the drip tray ① and open.
4. ➤ Insert the suction lances ② into the clean water tank and submerge.
 - ➡ The suction lances should be immersed so far that they cannot take in air.
5. ➤ Open the outlet valve.
6. ➤ Switch the control unit to manual mode.
7. ➤ Start the foam cleaning programs (all product variants; Product 1/2/3).
8. ➤ During the rinsing process, carry out a visual check of the escaping foam.
 - ➡ When no more foam escapes, the rinsing process is finished and another program can be started for rinsing.
9. ➤ If there is no longer any rinsing to be carried out on an applicable program and no more foam has escaped, the rinsing process can be completed.
10. ➤ Remove the suction lances ② from the clean water tanks.
11. ➤ Remove the clean water tank from the drip pan.
12. ➤ Place the product tank in the drip pan in the correct order.
13. ➤ Insert the suction lances ② into the correct product tanks.
 - ➡ Immerse and draw the suction lances as much as possible.
14. ➤ After cleaning the suction pipes, the system is completely cleaned again by a surge of water into the gully.

12.3.3 foam cleaning system drain

**NOTICE****Material damage due to nucleation**

Germes can develop in components filled with water.
Germ formation can lead to operational failures or property damage.
Plant Always empty after use!

Requirements

- Cleaning cycle of the complete machine is completed.
- The machine is flushed (see → [Chapter 12.3.2 'Rinse the foam cleaning system' on page 235](#)).

→ Start the **[Free Drain]** program.

- ➡ The Plant is automatically rinsed and blown out.

12.3.4 Plant Switch off

Requirements

- Cleaning program is finished.
- Plant has been rinsed.
- Plant has been emptied.

**WARNING****Risk of corrosives due to unintentional start-up of the Plant**

Unintentional start-up of the Plant can lead to chemical products leaking and causing severe chemical burns.

- Plant Turn off after cleaning is complete
- Plant Disconnect from the power supply after completing cleaning work
- Plant Turn off before maintenance

See also: → ['Define lockout/tagout procedures according to local conditions'](#).

1. → Turn the main switch on the housing of the Plant to 0/OFF.

- ➡ The control unit Plant shuts down.

2. → Secure the Plant to ensure it cannot be switched back on inadvertently.

12.3.5 Maintenance intervals

Interval	Maintenance work	Personnel
Daily	Plant: ■ Check that dosing is correct. ■ Check the general condition. ■ Check pipes for leak-free connections. ■ Check components for leaks. ■ Check the suction and pressure valve for dirt and a tight fit. ■ Inspect cables for damage. ■ Check for unusual noises. ■ Check pipes and connections of the compressed air connection for leaks. ■ Check all inputs according to specification.	Operator

Interval	Maintenance work	Personnel
Every month	Cabling: ■ Check the connections, cables and wiring on the outside of the machine for damage and a tight fit.	Operator Service personnel

Interval	Maintenance work	Personnel
Half-yearly	Plant: ■ Check connections for a tight fit. ■ Inspect welding joints for damage.	Operator Service personnel
	PVC hoses: ■ Check for yellowing/discolouration and replace if necessary. ■ Checks the flexibility, if the hose is rigid, it should be replaced.	Operator Service personnel
	Pneumatics: ■ Check hoses for tight fit and damage.	Operator Service personnel
	Pneumatics maintenance unit: ■ Check the function of the maintenance unit. ■ Remove any collected water. ■ Aerate the maintenance unit.	Operator Service personnel
	Suction lances: ■ Check the function of the level sensor. ■ Check the intake pipe for damage and dirt.	Operator Service personnel
	Seals on the pressure side: ■ Check elastomer seals made of EPDM and FPM. ■ Check seals made of Kalrez®®, Simriz®® and Isolast®®. ■ Check the elastomer diaphragm. ■ Check the PTFE diaphragm on the manual valve. ■ Check the PTFE diaphragm on the pneumatics valve.	Operator Mechanic Service personnel

Interval	Maintenance work	Personnel
Every year	Plant:	Service personnel
	Maintenance of all components of the entire Plant by authorised service personnel.	
	Check the check valves in the intake blocks, replace if necessary.	Service personnel
	Suction lance:	Operator
	- Check the function of the level sensor. - Check the intake pipe for damage and dirt.	Service personnel
	Seals on the pressure side:	Operator
	- Replace elastomer seals made of EPDM and FPM. - Replace the elastomer diaphragm. - Replace the PTFE diaphragm on the pneumatics valve.	Mechanic
		Service personnel

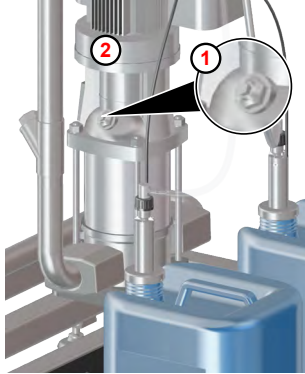
Interval	Maintenance work	Personnel
Every two years	Suction lance:	Operator
	Replace the suction pipe..	Service personnel
	Seals on the pressure side:	Operator
	- Replace the seals made of Kalrez®®, Simriz®® and Isolast®®. - Replace the PTFE membrane on the manual valve.	Mechanic
		Service personnel

Interval	Maintenance work	Personnel
Every 6 years	Pneumatics:	Service personnel
	Replace hoses.	

12.3.6 Aerating the pressure booster pump

Requirements

- Pump is switched off.
- The water supply is open.



- ① Bleed screw
- ② Rear side of the booster pump

Fig. 130: Aerating the pressure booster pump

1. Open the main valve block (water pipe).
2. At the back of the booster pump, slowly loosen ② the relief screw ① with a suitable tool by 1-2 turns.
 - ➡ The air trapped in the pump head escapes.
3. As soon as the air has escaped and water escapes, tighten the vent screw again.
4. Close the main valve block.

12.4 Maintenance of system components

Information from the component operating instructions



This section provides excerpts from the component instructions of the BFH Foamatic. Ecolab is not the author of these extracts, Ecolab cannot assume any liability for damages resulting from the use of the following information. The original texts can be found in the respective component operating instructions. See: ➔ [Appendix B 'Component operating manuals' on page 321.](#)



CAUTION

Use personal protective equipment (PPE).

Unused protective clothing can cause serious injuries.
To avoid these dangers, the following points must be strictly adhered to!

- All personnel working on the Plant must use the required personal protective equipment in accordance with the locally applicable safety regulations.
- In addition, all safety pictograms on the Plant must be observed and used.
- All safety regulations and the prescribed protective clothing when handling chemicals must be observed.
- All instructions in the product data sheet of the dosing medium used must be observed!



WARNING

Risk of injury due to failure to observe the safety instructions

To prevent injury to maintenance personnel and damage to the system or its components, all safety instructions from → [Chapter 3 'Safety' on page 21](#), especially those specified in → [Chapter 12 'Maintenance' on page 225](#), must be observed before servicing the system components.

12.4.1 Centrifugal pump CRNE 5 [GRUNDFOS]

Servicing the product



DANGER

Electric shock

- Death or serious personal injury
- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before starting any work on the motor. Make sure that the power supply cannot be accidentally switched on.



DANGER

Magnetic field

Death or serious personal injury

- Do not handle the motor or rotor if you have a pacemaker.

Motor

If service is needed on the product, please contact Grundfos Service.

Pump

Service documentation is available in Grundfos Product Center (<http://product-selection.grundfos.com/>).

If you have any questions, please contact the nearest Grundfos company or service workshop.

12.4.2 Flow Monitors SI500x [IFM]



- Check the sensor tip for build-up from time to time.
- Clean it using a soft cloth. Stubborn build-up (e.g. lime) can be removed using a common vinegar cleaning agent.

12.4.3 EVOGUARD Butterfly valve [KRONES]



Observe the following during maintenance:

- Valves must only be assembled and removed by authorised professionals.
- Trained service engineers are available for assembly and repair work.
- Provide certification for the conveyed media if required (DIN safety data sheet).
- When performing maintenance or preventive maintenance work, turn OFF the power supply and secure it to prevent it from being turned ON.
- Turn OFF the compressed air before performing any maintenance work.

Maintenance Intervals



To guarantee the highest operational reliability of the valves, all of the wear parts must be replaced after longer intervals. Practice-oriented maintenance intervals can only be calculated together with the user as they are dependent on the application conditions, e.g.:

- Duration of use per day
- Switching rate
- Type and temperature of the product
- Type and temperature of the cleaning agent
- Application conditions

Media temperatures	Maintenance interval (recommendation)
60 °C to 130 °C	Every 3 months
<60°C	Every 12 months

Maintenance Work



The valves must be regularly monitored for leakage and proper operation in between the maintenance deadlines.



DANGER

Hazardous media! Risk of poisoning and other injury

Use protective gear when working with hazardous media.

Overhauling Work

Observe the following safety instructions when doing work on the valve.



DANGER

Danger to life from electric shock

Have work on electrical components done only by specialist electrical engineers.



DANGER

Hazardous and/or hot media! Risk of poisoning and other injury

- Use protective gear when working on the valve.
- Allow the valve to cool down before doing any work.
- Make sure that the pipe system is not pressurised.
- Empty the pipe system, safely collect the medium and dispose of it in an environmentally-friendly manner.



DANGER

Pressurised pipes! Risk of injury

- Empty all of the pipe system elements leading to the valve and, if necessary, clean or rinse them.
- Block the control air, depressurise and lock it to prevent it from being turned ON again.
- Interrupt the power supply.
- Make sure that no processes are in progress in the affected pipe system section.



DANGER

Spring force of 2.4 kN! Danger to life caused by opening actuated valves

- Never open pneumatic actuators.
- Dispose of inactive actuators only.



DANGER

Switching valves!

- Never reach into the pipe.
- Do not reach into the valve mount of pneumatic actuators.

12.4.4 Hybrid Foamatic MA-SA



CAUTION

The system must only be serviced when there is no voltage or pressure on the system.

- Turn off the main switch.
- Open a water outlet to depressurise the system.



CAUTION

The system might be hot. Ensure sufficient cooling time.



- Wear glasses
- Wear gloves and be aware of chemicals.



WARNING

To ensure machine safety, use only original and approved spare parts.

Preventive maintenance

Service may only be carried out by authorized and qualified personnel.

Depending on usage, maintenance should be undertaken by an authorised service engineer at least once a year in order to prevent defects and failure of operation. Authorised engineers are persons who due to their skills and experience have sufficient knowledge of the Hygiene Systems and are confident with the state work safety regulations, accident preventing regulations, lines and generally acknowledged technical regulations such as DIN-norms and VDE-provisions. For your safety, this cleaning unit has been manufactured according to all relevant regulations valid in the EU and therefore it has been supplied with the CE-marking. For further information, please refer to the service department.

Rinsing the chemical supply/injector system



The chemical supply must always be rinsed thoroughly after use.

Remains of detergents or disinfectants can clog the injector so it needs to be rinsed or replaced. The following procedure will clean the chemical supply for detergents and/or remains of disinfectants.

1. ➞ Remove User Pack, if any.
2. ➞ Hold the rinsing bottle with clean water tightly against the suction opening (with User Pack) or against the hose (without User Pack). Alternatively, you can place a User Pack with clean water in the holder or – without User Pack – place the hose in a bucket of clean water.
3. ➞ Activate the hose handle until clean water comes out of the nozzle (approx. 30 seconds).



This procedure should be followed both on the detergent and the disinfectant side (if this is installed).

Change of injector

1. ➤ Turn off power supply.
2. ➤ Turn off water and air supply.
3. ➤ Depressurise the system.
4. ➤ Unscrew and change injector. Beware of chemical residue.
5. ➤ Reconnect water, air supply and power supply.



WARNING

Risk of chemical residue. Wear protective clothing.



CAUTION

The unit might be hot. Ensure sufficient cooling time.

Deliming

Manual block

1. The interval of the deliming procedure depends on the water hardness. Please see table in the end of this section.
2. Make sure the water and the power to the unit is disconnected.
3. Remove the cover from the unit.
4. Depressurise the system.
5. Dismount the injector block, product non-return valve, air valve and air non-return valve including the air fittings.
6. Rinse the injector block in the clean water.
7. Place the injector block and product non-return valves in a deliming bath - make sure the selector knob is over the surface.
8. Wait for 60 minutes.
9. Rinse the injector block in clean water.
10. Mount the air valve, air non-return valve and product non-return valve on the injector block and mount the injector block in the unit.
11. Reconnect water to the unit.
12. Test the unit in foam position make sure the vacuum is sufficient, it is recommended to be between 14,8-20,7 inHg/-0,05-0,07MPa.
13. Test that the unit can start and stop in both foam and rinse position.
14. Reinstall the cover on the unit.

Automatic block

1. A dedicated deliming program is needed for the following process:
2. Remove the cover from the unit.
3. Place the chemical supply hoses in clean water and activate the foaming function on all chemical valves for 1 minute.
4. Place the chemical hoses in deliming fluid and activate the foaming function for all chemical valves for 1 minute.
5. Wait 60 minutes.
6. Place the chemical hoses in clean water and activate the foaming function on all chemical valves for 5 minutes.
7. Activated the rinsing function for 1 minute.
8. Test foaming function and make sure the vacuum is sufficient, it is recommended to be between 14,8-20,7 inHg/-0,05-0,07MPa.
9. Reinstall the cover on the unit

°dH	ppm	Zeit zwischen Entkalken
0-5	18-90	12 months
5-10	90-180	6 bis 12 months
10-15	180-270	3 bis 6 months
15-20	270-360	3 bis 6 months
>20	>360	1 bis 3 months

Coupling

It is recommended to lubricate all coupling parts regularly (approx. once a week) with waterproof grease to prevent leaks and damage of o-ring. If the unit is equipped with a spray gun the o-ring of the gun should also be lubricated. In leaking quick couplings the o-rings should be replaced.

Internal cleaning of the units

Depending on the environment where the unit is installed, internal cleaning of the unit might be required. We recommend opening and cleaning the unit inside once a year. Do not spray inside the unit. Chemical hoses; it is recommended to check all chemical hoses regularly, approx. once every 3rd month.

12.4.5 Inductive switch IMB12 [SICK]

The inductive switch is maintenance-free

12.4.6 Manometer D40 - D63 [WIKA]

The devices are maintenance-free.

The measurement accuracy should be ensured by regular checks.

Testing or recalibration may only be performed by qualified personnel with suitable equipment.

When disassembling, close the vent valve (if present).



WARNING

Residual media in dismantled pressure gauges can endanger personnel, the environment and equipment.

Take adequate precautions.

12.5 Recommissioning after malfunctions or maintenance work

Prerequisite

- The malfunction has been corrected properly.
- The maintenance work has been completed.

Check:

1. ➤ All supply connections are seated and connected correctly (leak tight).
2. ➤ The product level in the supply containers.
3. ➤ The settings for the system components according to the respective operating instructions (see ➔ [Appendix B 'Component operating manuals' on page 321](#)).

Perform the following steps:

1. ➤ Restore power.
2. ➤ Restore the water supply.
3. ➤ Restore the air supply.
4. ➤ Acknowledge error messages / faults on the operating display.



NOTICE

The control system has an integrated safety mechanism that prevents an unauthorised restart after power is restored. This generates various faults/errors that must be actively confirmed on the operating display.

Faults that occur are:

Emergency stop, leak sensors, valve position fault

Refer also to ➔ [Chapter 9 'Start-up' on page 165](#).

12.6 Completing maintenance

To ensure proper operation of the Plant, maintenance work must be completed properly.

1. ➤ Check all screw connections for tightness.
2. ➤ Check Plant for tightness.
3. ➤ Recommission the Plant, see ➔ [Chapter 12.5 'Recommissioning after malfunctions or maintenance work' on page 248](#).
4. ➤ Remove all tools and objects.
5. ➤ Make sure that all employees are safe.
6. ➤ Check that controls are in a neutral position.
7. ➤ Remove locking devices and switch the system back on.
8. ➤ Notify the affected personnel that the maintenance work is complete.

13 Spare parts list / accessories



CAUTION

Unauthorised modification and manufacture of replacement parts may result in serious injury to operators and damage to the Plant.

Changes or modifications to the equipment are not permitted without the prior and written consent of Ecolab.

Under no circumstances should changes or modifications be made to the machine's electrical circuits, pneumatics or safety devices without prior and written approval.

Only spare parts and accessories approved by Ecolab are used to maintain safety.

The use of non-original or Ecolab-approved components excludes the warranty for the resulting consequences.



All wear and spare parts listed here in this chapter refer to standard components.

For project-specific systems, there is a separate chapter in the appendix of these instructions in which all spare parts are listed accordingly (see [Appendix A.5 'Spare parts' on page 309](#)).

Wearing parts and spare parts

Please note that correct functionality of the Plant is guaranteed only if original spare parts from Ecolab are used. This applies in particular to the electrical components in your Plant. All spare parts can be obtained from your responsible ECOLAB representative

➔ [Appendix A.1 'Ecolab representatives and service partners' on page 301](#).



Ordering spare parts - observe delivery times

*A standard delivery time of 2 weeks applies to all spare parts.
In exceptional cases, this will be indicated accordingly.*

13.1 Spare parts - Standard

Article No.	Piece	Description	No. PID
38340309	1	2-ways ball cock (DN 40)	VM1.1
415703259	1	Flow sensor SI5000	FS1.1
415502440	1	Diaphragm pressure switch , PBS-RB016SG1SSFNMA0Z (max. 16 bar)	PS1.1
417501808	1	Centrifugal pump , CRNE5-6 JX-P-GI-E-HQQE (3 x 380-500 V)	P1.1
415503488	1	Non-return valve , stainless steel/FKM, DN 40	R1.1
415502568	1	Manometer D63 with glyzerine filling, 1/4", 0,25 bar	PI1.1
417016185	2	Sealing ring G, DN 32, EPDM	PI1.1
417403840		Foamatic Hybrid Satellite SA2M	
1000000015523	1	Foamatic Hybrid Satellite SA3M	
417403854	1	Injector set 450L Hybrid Foamatic	
417403560	1	Spray pistol kit (accessories kit)	
417403422	1	Rinsing lance with tornado nozzle (25/30 75 mm)	
SR6011-LPD	1	Hose reel typ EHS 2625	
SE3053		Sealing for rotary feedthrough 1/2" 884 (for hose reel)	
417403911	1	Hose 1/2" x 1,5m Hybrid Purflex grey	
418283058	1	Inductive switch	
102404-11	2	Suction lance	
417400123	10	Hose	
102404-87	1	C-air pressure unit MSB4	VM01; X01; VS01; PS01
415101528	1	Insertscrew connector straight	
415101537	1	Arc connector	
415101549	1	Insertscrew connector straight	
417704388	1	Valve cluster, VTUG-10-MSDR-S8-B1T-25V20-Q8B-UB-QH6SU-6VK+M1TVSC	
415101548	1	Insertion plug, 1/8"-6/8	

13.2 Accessories

The following parts can be optionally ordered/used as accessories:

- Upgrade to hose reel instead of hose holder
- Collecting tray for canister goods (chemical products)
- Suction lances
- Valve feedback incl. cable for main valve nozzle system
- Reducing inserts for adjusting the concentration
- Nozzle inserts for concentration adjustment
- Adjustable leveling feet
- Upgrade for third foam product
- Connection for external satellite
- Stub line to the nozzle system
- Pneumatic hoses for controlling the valves
- Flushing lance with Tornado nozzle 25/30 750M
- Nozzle kit (water/foam/disinfection)
- PTFE air hoses (4/6)
- Inductive switch V2A PNP M12 x 1 including cable

14 Technical data



Nameplate

The rating plate contains project-specific data and the most important technical information about the Plant. The information on the nameplate is required for all queries to Ecolab.

Type: ①	
Project-No: ①	
Dos.rate: ⑤	Operating volt: ②
Perm. System ⑤	Power input: ②
Pressure: ⑤	Max. pre-fuse: ②
Customer: ④	Control volt: ②
	Message volt: ②
	 Year of man. ③
	
Ecolab Engineering GmbH 83313 Siegsdorf Raiffeisenstraße 7 Tel.: 08662/61-0 Fax: 08662/61-235	

- ① Project-specific information
- ② Electrical specifications
- ③ Year of production
- ④ Information about the customer
- ⑤ Technical details

Fig. 131: Sample for rating plate

14.1 Connections required on site



WARNING

Danger due to improperly installed system components

Improperly installed system components can result in personal injury and damage to the system.

To prevent damage and personal injury, all system components made available by the operator (e.g. pipe connections, flanges, connections) must be checked for proper assembly.

To ensure safe operation, a final leak test of all system components is essential during initial commissioning and this test must be documented (operator obligations).

If assembly was not carried out by Customer Support/Service, check that all system components are made of the correct materials (product is resistant to the dosing media used) and meet the applicable requirements.



CAUTION

Before commissioning the Plant the local power supply must be checked against the circuit diagram (→ [Appendix A.4 'Circuit diagram' on page 307](#)).



NOTICE

Requirements for system components provided by the operator

To avoid personal injury and damage to the system, it must be ensured that the system components provided (pipe connections, flanges) have been correctly installed.

We recommend compensators for the transition from plastic to stainless steel pipes in order to minimise loads during installation and operation.

If the installation is not carried out by Ecolab Engineering GmbH Customer Support/Service, steps must be taken to ensure that all components consist of the correct materials and meet the applicable requirements.

Before installation, the supply connections required by the customer and a drain for the drain valve must be available. For information on the supply connections required at the customer, see [Chapter 14 'Technical data' on page 253](#).



Recommendation for transitions from plastic to stainless steel pipes

At the transition from plastic to stainless steel pipes, the use of compensators is recommended in order to minimise mechanical stress during installation and operation.

Installation of piping

- Determine the route(s) for the pipes, which should run according to the floor plan drawing.
- Pipes must be installed using suitable welding methods – all stainless steel piping must be flushed with argon during welding and all welds cleaned from the outside

Important basic conditions [media]

Medium	Pressure [bar]	Flow rate [l/min]	Connection	Characteristics
Product water	3 [bar]	12.000	DN 40	Hardness < 4° dH, chloride < 20 ppm
CLO2 water	3 [bar]	12.000	DN 40	max. 0.4 ppm
Compressed air	6 [bar]	27.000	DN 8	DIN ISO 8573-1, class 2, water and oil-free
Solution CLO2	2 [bar]	100	DN 15	approx. 400 ppm CLO2

Required supply connections

Power connection

- Supply voltage: 380 - 480 V
- Frequency of supply voltage: 50/60 Hz
- Maximum output power: 6 kVA, cos phi=0,8
- Supply line fuse: max. 3 x 25 A

System air connection

- Min. pressure of system air supply: 0.6 MPa (6 bar)
- Max. pressure of system air supply: 1.0 MPa (1 bar)
- Required minimum volume flow (foams): 27 Nm³/h

Water connection



WARNING

Damage at the pressure switch due to pressure surges in the water pipe

Pressure surges in the onsite water pipe can damage the pressure switch. Pressure switches can withstand continuous loads up to max. 16 bar. The operator of the Plant is responsible for regulating pressure surges from the water pipe by appropriate means.

Data	Value	Unit
Pressure range:	0.2-0.3 (2-3)	MPa (bar)
Temperature range:	15 - 65	°C
Minimum volume flow:	200	l/min

14.2 General

General data

Data	Value	Unit
Dimensions (LxHxD)	1100 x 2140 x 1010	mm
Limits of the machine / space requirement (LxHxD)	2100 x 2140 x 3010	mm
Weight		kg

Important basic conditions [media]

Medium	Pressure [bar]	Flow rate [l/min]	Connection	Characteristics
Product water	3 [bar]	12.000	DN 40	Hardness < 4° dH, chloride < 20 ppm
CLO2 water				max. 0.4 ppm
Compressed air	6 [bar]	27.000	DN 8	DIN ISO 8573-1, class 2, water and oil-free
Solution CLO2	2 [bar]	100	DN 15	approx. 400 ppm CLO2

Required supply connections

Power connection



CAUTION

Before commissioning the Plant the local power supply must be checked against the circuit diagram (→ [Appendix A.4 'Circuit diagram' on page 307](#)).

Data	Value	Unit
Supply voltage	380 - 480	V
Frequency of supply voltage	50/60	Hz
Max. output power	6	kVA
Supply line fuses	3x25	A

Electrical data

Data	Value	Unit
Voltage	380 to 480	V AC
Frequency	50/60	Hz
Control voltage	24	V DC
Max. apparent power	6	kVA
Maximum pre-fusing	25	R
Output (cos phi=0.8)	6	kVA
Supply line fuse	3 x 25	R
Type of protection	IP54/ICC	

Water connection



Recommendation for transitions from plastic to stainless steel pipes

At the transition from plastic to stainless steel pipes, the use of compensators is recommended in order to minimise mechanical stress during installation and operation.

Data	Value	Unit
Pressure area	0.2-0.3	MPa(2-3 Bar)
Process pressure	2	bar
Min. volume flow	200	l/min
Process volume flow	12000	l/h
Temperature area	10-70	°C
Min. temperature	10	°C
Maximum temperature	70	°C
Maximum water hardness	0 to 4	°dH
Nominal diameter of supply connection	DN40	

Purity of the water supply in accordance with operator specifications.

Compressed air

Data	Value	Unit
Min. pressure of system air supply	0.6	MPa(6 Bar)
Max. pressure of system air supply	1.0	MPa(1 Bar)
Minimum volume flow	27000	l/h
Outer diameter of connection	1 ¼	Inches

Purity of the compressed air supply in accordance with operator specifications.

Detergent

Approved cleaning concentrates:

Obtain the approval of products from your ➔ [Appendix A.1 'Ecolab representatives and service partners'](#) on page 301.

14.3 Ambient conditions

Transport, storage and operation – environmental conditions

Storage / location:

- Observe transportation instructions on packaging, do not drop, translate free of vibrations, if possible



faults due to longer downtimes or swapping the chemical type

In the event of longer downtimes or inadvertent swapping of the chemical type, the corresponding injector can solidify. If this is the case, the injector must be removed, cleaned or even replaced, depending on the damage.

Operation:

- Dust-free, even and solid surface.



faults due to high temperature differences

In case of high temperature differences, in winter/summer or tropical areas, it may be necessary to recalibrate the flow sensor. Under these conditions, the flow sensor cannot correctly evaluate the nominal water flow, so it does not release the booster pump.

Data	Value	Unit
Temperature	+5 to +40	°C
Humidity (relative humidity, non-condensing)	< 95%	

Data	Value	Unit
Environmental impact: Noise	< 70	dB(A)

14.4 Technical data from the system components

Information from the component operating instructions



This section provides excerpts from the component instructions of the BFH Foamatic. Ecolab is not the author of these extracts, Ecolab cannot assume any liability for damages resulting from the use of the following information.

The original texts can be found in the respective component operating instructions.

See: → [Appendix B 'Component operating manuals' on page 321.](#)

14.4.1 Valve terminal VTUG-M / VTUG-V [FESTO]

Tab. 8: General technical data

	Valve width [mm]		
	10	14	18
Wall mounting	Any		
H-rail mounting	Horizontal		
Ambient temperature [°C]	-5 - +60 (VTUG-...-M)		
	-5 - +50 (VTUG-...-V)		
Storage temperature [°C]	-20 - +60		-10 - +60
Degree of protection	IP40/IP65/IP671)		
Materials	AL, PA, POM, NBR, PU, PC		

Tab. 9: Pneumatic properties

	Valve width [mm]		
	10	10	18
Number of valve positions	4 - 24		
Operating and pilot medium	Compressed air to ISO 8573-1:2010 [7:4:4]		
Operating pressure with external pilot air (IC = ID code)			
5/3; 5/2; 2x 3/2; 3/2-way valves (IC: B, E, G; J, A, M, P; VH, VK, VN, VX, VW) [bar]	-0,9 - +10		
2x 3/2-way valves (IC: H, K, N) [bar]	1,5 - 10		
Pilot pressure with external pilot air1) (IC = ID code)			
5/3-way, 5/2-way valves (IC: B, E, G, A) [bar]	3 - 8		
5/2-way valve (impulse) (IC: J) [bar]	1,5 - 8		
5/2-way; 3/2-way valve (IC: M, P, VX, VW) [bar]	2,5 - 8		
2x 3/2-way valve (IC: VH, VK, VN) [bar]	2 - 8		
2x 3/2-way valve with pneumatic spring (IC: H, K, N) [bar]	1,5 - 8		
Operating and pilot pressure with internal pilot exhaust air1)2) (IC = ID code)			

	Valve width [mm]	
5/3-way; 5/2-way valves (IC: B, E, G; A) [bar]	3 - 8	
5/2-way valves (impulse) (IC: J) [bar]	1,5 - 8	
5/2-way; 3/2-way valves (IC: M, P, VX, VW) [bar]	2,5 - 8	3,5 - 8
2x 3/2-way valve (IC: VH, VK, VN) [bar]	2 - 8	
2x 3/2-way valve with pneumatic spring (IC: H, K, D) [bar]	1,5 - 8	

Tab. 10: Electrical Characteristics

	Valve width [mm]		
	10	14	18
Control voltage (reverse polarity protected) [V DC]	24 ± 10 %		
Current consumption per solenoid coil at 24 V DC			
Pick-up current: 0 ... 20 ms [mA]	47		-
Holding current: > 20 ms [mA]	15,5		-
Intrinsic current consumption			
Valves [mA]	30		
Electronics [mA]	30		

Tab. 11: Tightening Torques

	Valve width [mm]		
	10	14	18
Electrical interface [Nm]	0,7 ± 20 %		
Bus node CTEU-... on VTUG -...- V [Nm]	0,7 ± 0,10		
Valve on terminal strip [Nm]	0,3 ± 50 %	0,55 ± 20 %	0,7 ± 20 %
Selector [Nm]	1,5 - 30 %		5 - 20 %
Earthing screw [Nm]	1 ± 20 %		

➔ [More information on: Valve terminal VTUG-M / VTUG-V \[FESTO\]](#)

14.4.2 Centrifugal pump CRNE 5 [GRUNDFOS]

Ambient temperature during storage and transportation

Data	Value	Unit
Min. temperature	-30	°C
Max temperature	60	°C

Tab. 12: Ambient temperature during operation

	3 x 200-240 V	3 x 380-500 V
Minimum	-20 °C	-20 °C
Maximum	40 °C	50 °C

Humidity

Data	Value	Unit
Max. humidity	95	%

Single-phase motors

Data	Value	Unit
Supply voltage	1 x 200-240	V

Tab. 13: Recommended fuse size

Motor size [kW]	Min. [A]	Max. [A]
0,25 - 0,75	6	10
1,1 - 1,5	10	16

Data	Value	Unit
Earth leakage current	<3,5	mA
Earth leakage current	<10	mA

Three-phase motors

Tab. 14: ERecommended fuse size 3 x 380-500 V

Motor size [kW]	Min. [A]	Max. [A]
0,25 - 1,1	6	6
1,5	6	10
2,2	6	16
3	10	16
4	13	16
5,5	16	32
7,5	20	32
11	32	32

Tab. 15: Recommended fuse size 3 x 200-240 V

Motor size [kW]	Min. [A]	Max. [A]
1,1	10	20
1,5	10	20
2,2	13	35
3	16	35

4	25	35
5,5	32	35

Tab. 16: Leakage current

Speed [U/min]	Power [kW]	Mains voltage [V]	Leakage current [mA]
1400-2000 1450-2200	0,25 - 1,5	≤ 400	<3,5
		> 400	<5
	2,2 - 4	≤ 400	<3,5
		> 400	<3,5
	5,5 - 7,5	≤ 400	<3,5
		> 400	<5
2900-4000	0,25 - 2,2	≤ 400	<3,5
		> 400	<5
	3 - 5,5	≤ 400	<3,5
		> 400	<3,5
	7,5 - 11	≤ 400	<3,5
		> 400	<5
4000-5900	0,25 - 2,2	≤ 400	<3,5
		> 400	<5
	3 - 5,5	≤ 400	<3,5
		> 400	<3,5
	7,5 - 11	≤ 400	<3,5
		> 400	<5

Tab. 17: Sound pressure level

Motor [kW]	Maximum speed stated on nameplate [U/min]	Speed [U/min]	Sound pressure level ISO 3743 [dB(A)]	
			1-phase motors	3-phase motors
0,25 - 0,75	2000	1500	37	37
		2000	43	43
	4000	3000	50	50
		4000	60	60
	5900	4000	58	58
		5900	68	68
1,1	2000	1500		37
		2000		43
	4000	3000	50	50
		4000	60	60
	5900	4000	58	58
		5900	68	68
1,5	2000	1500		42
		2000	57	47
	4000	3000	64	57
		4000	58	64
	5900	4000	68	58
		5900		68
2,2	2000	1500		48
		2000		55
	4000	3000		57
		4000		64
	5900	4000		58
		5900		68
3	2000	1500		48
		2000		55
	4000	3000		60
		4000		69
	5900	4000		64

		5900		74
4	2000	1500		48
		2000		55
	4000	3000		61
		4000		69
	5900	4000		64
		5900		74
5,5	2000	1500		58
		2000		61
	4000	3000		61
		4000		69
	5900	4000		64
		5900		74
7,5	2000	1500		58
		2000		61
	4000	3000		66
		4000		73
	5900	4000		69
		5900		79
11	4000	3000		66
		4000		73
	5900	4000		69
		5900		79

➔ [More information on: Centrifugal pump CRNE 5 \[GRUNDFOS\]](#)

14.4.3 Flow Monitors SI500x [IFM]



Installation, electrical connection, set-up, operation and maintenance of the unit must only be carried out by qualified personnel authorised by the machine operator. The sensor conforms to the standard EN 61000-6-2.

Data	Value	Unit
Application area	Liquids and gases	
Operating voltage	19 - 36 DC	V
Current rating	250	mA
Voltage drop	<2,5	V
Current consumption	<60	mA
Power-on delay time	10, optically indicated	s

➔ [More information on: Flow Monitors SI500x \[IFM\]](#)

14.4.4 Butterfly valve EVOGUARD [KRONES]

Size	DN 25 bis DN 150
Ambient temperature valve	0°C to 45°C

Product pressure

Maximum product pressure, valve closed (pressure against disk)	10 bar [145 psi]
Vacuum	-0,95 bar [-13,8 psi]

Material Data

Stainless steels, in contact with product	1.4404 (AISI 316 L) optional: 1.4435 (AISI 316 L)
Stainless steels, not in contact with product	1.4301 (AISI 304) / 1.4307 (AISI 304 L)
Surfaces, in contact with product	Ra ≤ 0.8 µm optional: e-polished
Surfaces, not in contact with product	bare metal, Ra ≤ 1.6 µm

Seal materials

	EPDM	HNBR	FPM	VMQ
Continuous-use temperature in air	-40 to +130 °C	-25 to +130 °C	-20 to +200 °C	-50 to +200 °C
Resistant to hot water	to 100 °C	to 100 °C	to 80 °C	to 100 °C
Resistant to steam, continuous use	to 130 °C	to 130 °C	–	–
Resistant to steam, short term	to 150 °C	to 150 °C	–	–



The application parameters for the seals are depending on:

- Duration of use per day
- Switching rate
- Type and temperature of the product
- Type and temperature of the cleaning agent
- Application conditions

Weights

Flange	Actuator	DN25	DN40	DN50	DN65	DN80	DN100	DN125	DN150
GS	Manual actuator	1,6 kg	2,1 kg	2,4 kg	2,9 kg	3,6 kg	4,3 kg	8,9 kg	11,4 kg
	Pneumatic NC/NO	5,2 kg	5,7 kg	6,0 kg	6,5 kg	7,2 k	8,0 kg	13,5 kg	16,1 kg
	Pneumatic AA	3,8 kg	4,2 kg	4,6 kg	5,1 kg	5,7 kg	6,5 kg	11,0 kg	13,6 kg
ZFA	Manual actuator	2,5 kg	3,2 kg	3,6 kg	4,5 kg	5,2 kg	6,4 kg	11,3 kg	13,0 kg
	Pneumatic NC/NO	6,1 kg	6,8 kg	7,2 kg	8,1 kg	8,8 kg	10,0 kg	16,0 kg	17,7 kg
	Pneumatic AA	4,6 kg	5,4 kg	5,8 kg	6,7 kg	7,3 kg	8,6 kg	13,5 kg	15,2 kg

Permissible Processing and Operating Materials, Permissible Operating Limits

	Unit	Water
Appearance		/Colourless/clear
pH value		5,5–9,2
Chlorides (Cl-)	ppm	≤40
Overall hardness		Keep the valves free of deposits

Cleaning Agents/Disinfectants for Interior/Exterior Cleaning

Commonly used concentrates from leading manufacturers for the beverage and food industry. Suitable for stainless steels (V2A and V4A) and seals made of NBR or EPDM.

	Maximum concentration	Maximum reaction time	Maximum temperature
Cleaning agent, caustic soda NaOH	3 %	45 Min.	90 °C
Hydrogen peroxide products (H ₂ O ₂) as intensifier for NaOH with 1-2% concentration (permanent injection and/or as single caustic batch)	0,5 %	30 Min.	80 °C
Acidic cleaning agents based on phosphoric acid H ₃ PO ₄	3 %	30 Min.	40 °C
Acidic cleaning agents based on nitric acid HNO ₃	1,5 %	30 Min.	30 °C
Acidic cleaning agents based on the mixture of phosphoric and nitric acids	1,5 %	30 Min.	30 °C [
Acidic disinfectants based on peracetic acid, concentration approx. 5 %	1,0 %	20 Min.	25 °C
Acidic disinfectants based on peracetic acid, concentration up to 15 %	0,5 %	20 Min.	25 °C
Acidic disinfectants based on halogenated carboxylic/ phosphoric acids, or halogenated carboxylic/nitric acids	1,0 %	20 Min.	25 °C
Neutral disinfectants based on hydrogen peroxide H ₂ O ₂	1,0 %	30 Min.	25 °C
	0,5 %	60 Min.	25 °C
Chlorinated alkaline cleaning agents/ disinfectants (pH value > 11)	1,5 %	20 Min.	40 °C
Ozonised cold water for rinsing	3mg/l	60 Min.	25 °C



Instructions for foam and gel cleaning

For foam and gel cleaning, observe the following:

- It is imperative to observe the operating manual of each machine or unit to be cleaned. Be careful with electrical components, finished surfaces, aluminium etc..
- For cleaning the systems with foam/gel use the products of leading manufacturers, who produce cleaning chemicals for the food and beverage industry.
- Use foam/gel cleaners which are suitable for the exterior cleaning of systems in the food and beverage industry in accordance with the recommended application (product data sheet, manufacturer's adviser). Strictly follow the concentration of use indicated in the product data sheet.
- Use foam/gel cleaners always cold or at room temperature. The application must not exceed 30 minutes.
- If different cleaning steps are used in succession, and after the treatment, rinse thoroughly with fresh water, without leaving any trace.

➔ [More information on: Butterfly valve EVOGUARD \[KRONES\]](#)

14.4.5 Hybrid Foamatic MA-SA

Water

Data	Value	Unit
Max.outlet pressure.	1,5 (15)*	MPa (bar)
Consumption during rinsing (manual)	30	L/min
Consumption during foaming (manual)	8	L/min
Consumption during rinsing max. (automatic)	200	L/min
Consumption during foaming (automatic)	8/16/24 Min	L/min
Min. supply pressure	0,2 (2)	MPa (bar)
Max. supply pressure	0,8 (8)	MPa (bar)
Min. water supply	200	L/min
Max. water temperature	70	C°
Pipe dimension inlet/outlet	Ø 38	mm
Clamp connection type/size (Ferrole)	Ø 50,4	mm

Compressed air

Data	Value	Unit
Compressed air	0,5-1,0 (5-10)	MPa (bar)
Compressed air consumption	200-450	NL/min
Pipe dimension inlet	Ø 6	mm

Electricity

Data	Value	Unit
Supply voltage	3/PE 400	V AC $\pm 10\%$
Frequency, 48-0%..62+0%	50/60	Hz
Motor load	5.5	kW
Nominal current	14.2	A
Fuse	20	A
Internal fuse 5x20 mm	400	V
L1, L2, L3, PE	2 2.5	mm

General

Data	Value	Unit
Sound level ISO 11202	Unter 70	dB
Dimensions HxWxD	1260x560x400	mm
Weight	96	kg
IP class	55	

➔ [More information on: Hybrid Foamatic MA-SA](#)

14.4.6 Inductive switch IMB12 [SICK]

Data	Value	Unit
Design	Metric design	
Housing design	Standard	
Thread size	M12 x 1	
Diameter	Ø 12	mm
Switching distance	Sn 4	mm
Safe switching distance	Sa 3.24	mm
Installation in metal	Flush	
Switching frequency	2.000	Hz
Connection type, 4-pin ¹⁾	Connector M12	
Switching output	PNP	
Output function	Antivalent	
Electrical version, 4-wire	DC	
Type of protection	IP 68 ²⁾ , IP 69K ³⁾	

Special features:

Resistant to coolants and lubricants.

Capable of communication via IO-Link 1.0

1) With gold-plated contacts.

2) According to EN 60529.

3) According to ISO 20653:2013-03.

Mechanical/Electrical

Data	Value	Unit
Supply voltage	10 ... 30	V DC
Residual ripple	≤ 10	%
Voltage drop	≤ 2 ¹⁾	V

1) At I^a max.

2) Without load.

3) Ub and Ta constant.

4) From Sr.

5) When using tooted side of nut.

6) Rated voltage 50 V DC

Data	Value	Unit
Power consumption ²⁾	≤ 10	mA
Hysteresis	3 ... 20	%
Reproducibility	≤ 2 ^{3) 4)}	%
Temperature drift (from Sr)	± 10	%
EMC	According to EN 60947-5-2	
Continuous current I _a	≤ 200	mA
Short circuit protection	✓	
Reverse polarity protection	✓	
Power-on pulse suppression	✓	
Operational ambient temperature	-40 ... +100	°C
Housing material stainless steel	V2A (1.4305)	
Material, active surface	Plastic, LCP	
Housing length	65	mm
Usable thread length	48	mm
Max. tightening torque typ. ⁵⁾	32	Nm
Protection class ⁶⁾	II	
UL file no.	E181493	

Shock and vibration resistance:

- 100 g / 2 ms / 500 cycles;
- 150 g / 1 million cycles;
- 10 Hz ... 55 Hz / 1 mm;
- 55 Hz ... 500 Hz / 60 g

1) At I_a max.

2) Without load.

3) U_b and T_a constant.

4) From Sr.

5) When using toothed side of nut.

6) Rated voltage 50 V DC.

Reduction factors

Data	Value
Stainless steel (V2A)	Approx. 0.65
Aluminium (Al)	Approx. 0.35
Copper (Cu)	Approx. 0.24
Brass (Ms)	Approx. 0.38

Note: The values are used as a guide and may vary

➔ [More information on: Inductive switch IMB12 \[SICK\]](#)

14.4.7 Pressure switch PBS [SICK]

Measuring range (vacuum-tight): see type label

Digital display:

Type: 14-Segment LED, red, 4-digit, character height 9 mm (0.35 in)
Display can be rotated electrically by 180°

Output signal

Data	Value	Unit
Output signal	See type label	
Load resistance	4 - 20/≤ 500	mA/Ω
Load resistance	0 - 10/Max. output voltage/1	DC/V/mA
IO-Link (Option)	Version 1.1	
Zero point adjustment	max. 3 %	range
Analog output/Switching output attenuation	Can be configured from 0 - 65	ms
Power-up delay	1	s
Switching thresholds	Switching point 1 and switching point 2 can each be adjusted individually	
Switching functions	Normally open, normally closed, window, hysteresis (freely adjustable)	
Switching voltage	Auxiliary energy - 1	V
Switching current	max. 250	mA
Setting timer/ Response time	Analog signal: ≤ 5/ Switching output: ≤ 5	ms

Data	Value	Unit
Service life	100 millionen	switching changes

Voltage supply

Data	Value	Unit
Auxiliary energy	15 - 35	V
Power consumption without 4 - 20 mA output signal	max. 45	mA
Power consumption with 4c - 20 mA output signal	max. 70	mA
Total power consumption	max. 600 (including switching current)	mA

Accuracy information

Data	Value	Unit
Accuracy, analog signal	$\leq \pm 0,5 \%$ (Inclusive of non-linearity, hysteresis, zero point and full-scale error)	range (IEC 61298-2)
Non-repeatability, analog signal	$\leq 0,1 \%$	range (IEC 61298-2)
Long-term drift, analog signal	$\leq \pm 0,1 \%$ / $\leq \pm 0,2 \%$ for measuring ranges ≤ 0.6 bar (9 psi), flush-mounted process connection, increased overload protection	range (IEC 61298-2)
Turndown, Analogsignal	In the range of max. 5:1, the analog output signal can be freely scaled. If a turn down is set, proportionally increased measurement deviations and temperature errors apply.	
Accuracy, signal output	$\leq \pm 0,5 \%$	range
Temperature error in nominal temperature range	maximal: $\leq \pm 1,5 \%$ / maximal: $\leq \pm 2,5 \%$ for increased overload protection and flush-mounted versions	range
Temperature coefficients in nominal temperature range	Average TC zero point / $\leq \pm 0,16 \%$	range/10 K
Temperature coefficients in nominal temperature range	Average TC range / $\leq \pm 0,16 \%$	range/10 K

Reference conditions (as per IEC 61298-1)

Data	Value	Unit
Ambient temperature	15 - 25	°C
Air pressure	860 - 1.060	mbar
Air humidity	45 - 75	%
Auxiliary energy	245	V
Installation position	Calibrated with vertical installation with the process connection pointing downwards	

Tab. 18: Application conditions

Permitted Temperature ranges	Measuring materia	-20 - +85 °C
	Environment:	-20 - +80 °C
	Storage:	-20 - +70 °C
	Nominal temperature	0 - 80 °C

Data	Value	Unit
Enclosure rating	IP65 and IP67	
Installation position	Flexible	
relative air humidity	≤ 45 - 75	%

Electrical connection

Data	Value	Unit
Plug connector	round connector M12 x 1 (4-pin or 5-pin)	
Short-circuit resistance	S+ / SP1 / SP2 to U	
Reverse polarity protection	U+ to U	
Insulation voltage	500	V
Over voltage protection	40	V

➔ [More information on: Pressure switch PBS \[SICK\]](#)

15 Decommissioning, dismantling, environmental protection

Personnel requirements

Personnel:

- Mechanic
- Service personnel
- Qualified electrician

Personal protection equipment (PPE)

Protective equipment:

- Chemical-resistant protective gloves
- Protective gloves
- Protective work clothing
- Protective goggles
- Face protection



NOTICE

If you have any questions about dismantling, disposal or environmental protection, consult the [↗ 'Manufacturer'](#).



DANGER

Risk of injury if personnel are inadequately qualified!

If unqualified personnel carry out work or are in the danger area, dangers may arise which can lead to serious injuries and considerable damage to property.

All the activities may only be performed by personnel that is qualified and suitably trained for this purpose.

Keep unqualified personnel away from hazard areas.



DANGER

Risk of injury due to the disregard of the specified personal protective equipment (PPE)!

For all disassembly work, please respect the use of the PSA which is specified on the product data sheet.



DANGER

Contact with live components can be fatal

Before commencing dismantling, ensure that the device has been fully isolated from the power supply. Activated electrical components can make uncontrolled movements and lead to serious injury.



CAUTION

Risk of injury from residual energies

Stored residual energies can seriously injure bystanders.

The decommissioning must be carried out only by qualified personnel using the appropriate PPE. Only qualified personnel have the necessary knowledge to discharge any residual energy that may be present.



WARNING

Risk of injury from loose parts, components and tools placed on top of each other or left lying around

Loose parts, components and tools placed on top of each other or left lying around are sources of accidents that can lead to serious injury.

To avoid this, the workplace must be kept clean and tidy for all work is carried on the Plant



WARNING

Burns caused by harmful chemical products

Contact with hazardous chemical products can cause severe burns.

- Read the enclosed safety data sheet carefully before using the chemical product.
- The safety regulations and the required protective clothing for working with chemicals must be complied with.
- Safety devices such as showers and eye flushing must be accessible and checked regularly to ensure that they are fully functional.
- Ensure adequate ventilation and extraction.
- Avoid skin and eye contact.



WARNING

Serious injury from chemicals under pressure

Harmful chemicals under pressure cause serious injuries.

- Prevent skin contact
- Wear suitable protective clothing, protective gloves, face protection and safety goggles
- Observe the manufacturers' safety data sheets



WARNING

Risk of slipping due to escaping chemicals

Chemicals leaking in the working and preparation area can cause slipping and injuries.

- Wear non-slip, chemically resistant shoes when working.
- Always have a suitable binding agent available (according to the chemical product safety data sheet).
- Seal off the area with the escaping chemical.
- Immediately collect chemicals that have leaked or spilled and dispose of them properly.
- If necessary, place the chemical container in a trough to collect any escaping chemicals.



CAUTION

Risk of injury from damaged or unsuitable tools

Injuries may result from the use of damaged or unsuitable tools.

- Use only undamaged tools.
- Use only the tool intended for the specific purpose (e.g. suitable drills).



NOTICE

Material damage due to using incorrect tools

Use of the wrong tool can cause material damage.

Use only the appropriate tool.



ENVIRONMENT

Chemicals can harm the environment

- Ensure that no chemicals leak or are spilled.
- Have a suitable binding agent available in accordance with the safety data sheet.
- Immediately collect chemicals that have leaked or spilled and dispose of them properly.

Requirements

- Separate the Plant from the chemical supply.
- The Plant is rinsed.
- The Plant is physically isolated from all power sources and secured against being switched back on.

Handling peroxide



DANGER

Pay attention to safety when handling peroxides.

The main risks associated with the use of peroxide are:

- If peroxide comes into contact with skin or mucous membranes, it causes severe burns.

For first-aid measures, see the instructions on the safety data sheet.

- **Personal protective equipment must be worn for all work on the unit: Safety glasses and gloves.**
- **A face shield must also be worn when performing maintenance or repair work.**



DANGER

Burns caused by peroxide chemical products

Peroxide chemical products in high concentrations cause severe burns if they come into contact with skin, eyes or mucous membranes.

- Always use a face shield in addition to the prescribed PPE in case of maintenance or repair
- Ensure that suitable emergency equipment is available in the vicinity of the operating area (e.g. eye shower)



CAUTION

Avoid reactive processes.

H₂O₂ decomposes constantly (depending on the temperature).

The decomposition leads to high gas development and thus to an increasing pressure in the system. If the pressure exceeds the maximum system pressure, the metering system may fail.

If H₂O₂ is contaminated with metal ions (copper, zinc, iron) or corrosive / organic substances, the decomposition speed increases.

At a certain product temperature, the reaction proceeds spontaneously and uncontrollably.

15.1 Define lockout/tagout procedures according to local conditions

Lockout/Tagout process

- **Purpose:** To protect authorised personnel from unexpected or unplanned activation of the BFH Foamatic or power while the BFH Foamatic is being maintained.
- **Scope:** Use this procedure for any scheduled shutdowns for preventive maintenance, for any other maintenance tasks where the BFH Foamatic may cause bodily injury, or if you need to leave the area while the BFH Foamatic is in operation.
- **Enforcement:** If the correct lockout/tagout procedure is not followed, corrective action may need to be taken.



DANGER

Safe shutdown (LoTo = Lockout/Tagout)

Decommissioning of the station is permitted only by trained specialist personnel / service technicians.

The following measures are essential to protect personnel and the station from damage:

- Notify the affected personnel.
- Switch off the machine properly.
- Isolate all energy sources.
- Apply locking devices, padlocks and signs.
- Check complete shutdown of all energy sources.



DANGER

It is essential that the personal protective equipment (PPE) described on the product data sheet (safety data sheet) for the metering medium is used.

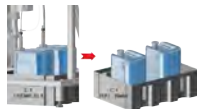
SHUTDOWN, LOCK, TAG AND TEST SEQUENCE

#	Step	Description
1	<i>Notify employees</i>	Notify all affected employees that service or maintenance work is required on the BFH Foamatic and that it must be switched off and locked in order for service or maintenance to be carried out.
2	<i>Check the lockout procedure</i>	The authorised employee must refer to the company policy to determine the type and magnitude of the energy used on the BFH Foamatic. They must understand the dangers associated with energy and be familiar with the methods of controlling the power.
3	<i>Perform a machine stop</i>	If the BFH Foamatic is working, turn it off by a normal shut-off procedure (by pressing the stop button, opening the switch, closing the valve, etc.). Refer to the machine operating procedure for a normal shutdown.
4	<i>Shut off the power</i>	Follow the illustrated lockout/tagout procedure from start to finish to disable the power isolation devices so the BFH Foamatic is isolated from the power sources. INFORMATION: It may be necessary to dissipate the power of the non-blockable energy sources before isolating blockable energy sources.
5	<i>Blocking power</i>	Use lockout/tagout devices such as assigned locks and tags to shut off and label the devices to disconnect the power supply. If one or more locks need to be transferred to another employee, observe the company guidelines for transferring to an authorised employee.
6	<i>Reducing energy</i>	Stored or residual energy (e.g. in capacitors, springs, ramped-up machine elements, rotating flywheels, hydraulic systems, as well as air, gas, steam or water pressure, etc.) must be degraded or controlled by methods such as grounding, repositioning, blocking, draining, etc.
7	<i>Attempting a restart</i>	Make sure that all devices are disconnected from the power sources by first checking for people in the vicinity, then ensuring that the device is isolated by operating normal controls or by performing a test to ensure that the devices cannot be put into operation. CAUTION: After verifying the device is without power, return the controls to the neutral or off position.

RE-COMMISSIONING SEQUENCE

#	Step	Description
1	Check the machine	Check the BFH Foamatic and the area around the BFH Foamatic, to ensure that non-critical objects have been removed and that the area is operational BFH Foamatic.
2	Check the area	Check the workspace to ensure that all employees are in a safe position or have moved out of the area.
3	Verify the machine	Check that the controls are in the neutral position.
4	Remove the lock	Remove the barriers, markings and blocking devices and resupply power to the BFH Foamatic. In reverse order, follow all the steps of the visual lockout/tagout procedure. Note: When blockages are removed, energy may need to be supplied to BFH Foamatic before they can be safely removed.
5	Notify employees	Notify the affected employees that the service or maintenance work has been completed and that the BFH Foamatic it is ready for operation.

Tab. 19: Locking steps (Lockout/Tagout)

Step no.	Action	Select information	Checking
1	Chemical supply C-1 The C-1 shutdown unit is the supply hoses in the chemical container. The supply hoses must be routed into water tanks and the system must be run empty for at least 30 seconds. See → Chapter 12.3.2 'Rinse the foam cleaning system' on page 235		When the manual foaming of all existing chemical products is activated, only pure water escapes.
2	Electricity supply E-1 The E-1 is located on the cover of the control cabinet. Use a lock to secure the switch in the "OFF" position.		Try to start up at all control panels.
3	Water supply W-1 The stopcock W-1 is located above the booster pump in the suction line. Put the tap "horizontal" in the "CLOSED" position and lock.		Make sure the pressure has been released.
4	Compressed air supply D-1 The D-1 compressed air supply is located on the frame of the BFH Foamatic. Use a lock.		Make sure the pressure has been released. Pressure gauge at 0 bar.

Remove the locks

1. ➤ Remove all tools and objects.
2. ➤ Confirm that all employees are in a safe place.
3. ➤ Check that all controls are in the neutral position.
4. ➤ Remove locking devices.
5. ➤ Reconnect power to the BFH Foamatic.
6. ➤ Inform all employees that the BFH Foamatic is ready for use.

15.2 Disassembly/disposal and environmental protection

The procedure for dismantling is as follows:

1. ➤ Make sure you have sufficient space before starting all tasks.
2. ➤ Drain operating fluids and consumables and remove the remaining processing materials; dispose of them in an environmentally friendly way.
3. ➤ Then clean assemblies and components correctly, and dismantle them under observance of prevailing local health and safety and environmental protection regulations.
4. ➤ Handle open, sharp-edged components with care.
Suitable protective gloves must be worn.
1. ➤ If present, disconnect the power supply.
2. ➤ Depressurise the system and pressure tube.
3. ➤ Disassemble the components properly.
4. ➤ Remove connections to the peripheral devices.
5. ➤ Be aware of the heavy weight of some components.
If required, use lifting gear.
6. ➤ Support the components to avoid them falling or tipping.

Disposal and environmental protection

All components are to be disposed of in accordance with prevailing local environmental regulations. Dispose of them accordingly, depending on the condition, existing regulations and with due regard for current provisions and criteria.

Recycle the dismantled components:

- Scrap all metals.
- Electrical waste and electronic components must be recycled.
- Recycle all plastic parts.
- Dispose of all other components in line with their material characteristics.
- Hand in batteries at communal collection points or dispose of them through a specialist.

**ENVIRONMENT****Risk of environmental damage from incorrect disposal!****Incorrect disposal can be a threat to the environment.**

- Electrical scrap, electronic components, lubricants and other operating fluids must be disposed of by approved waste disposal service providers
- If in doubt, contact your local authority, or an approved waste disposal service provider, for information on correct disposal.

Prior to disposal, all parts which are in contact with media must be decontaminated. Oils, solvents, detergents and contaminated cleaning tools (brushes, cloths, etc.) must be disposed of in compliance with local requirements, in accordance with the prevailing waste code and with due attention to the notes contained in the manufacturers' safety data sheets.

**ENVIRONMENT****Reduction or avoidance of waste from reusable raw materials**

Do not dispose of any components in the domestic waste. Take them instead to the appropriate collection points for recycling.

Please follow the Directive on Waste Electrical and Electronic Equipment 2012/19/EU, the aim and purpose of which is the reduction or prevention of waste from recyclable raw materials. This directive requires member states of the EU to increase the collection rate of electronic waste so that it can be recycled.

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Technical documentation of the manufacturer of the foam cleaning system

In this section you will find all relevant documents from the manufacturer: Ecolab

A.1 Ecolab representatives and service partners

Addresses outside Europa																																																					
USA	Ecolab Center 370 N. Wabasha Street St. Paul, Minnesota 55102-2233 📞 (001) 651 293 2233 📠 (001) 651 293 2092																																																				
Addresses in Europe																																																					
Germany	Ecolab Deutschland GmbH	Greece	Ecolab S.A.	Spain	Ecolab Hispano-Portuguesa, S.L.																																																
	Ecolab-Allee 1 D-40789 Monheim am Rhein 📞 +49 2173 5991900 📠 +49 (0)2173 599-89173		280 Kifisias Av. and 2 Idras Str. 15232 Halandri, Athen 📞 (0030) 210 6873700 📠 (0030) 210 6840325		Avenida Del Baix Llobregat 3-5 08970 Sant Joan Despi (Barcelona) 📞 (0034) 93 475 89 00 📠 (0034) 93 477 00 75				Netherlands	Ecolab BV Iepenhoeve 7a +7b NL-3438 MR Nieuwegein 📞 (0031) 30 60 82 222 📠 (0031) 30 60 82 228	United Kingdom	Ecolab UK Ltd. David Murray John Building, Swindon, Wiltshire SN1 1 ND 📞 (0044) 1 793 54 87 80 📠 (0044) 1 793 54 88 92	Slovenia	Ecolab d.o.o. Maribor Vajngerlova 4 Postfach 1007 SLO-2001 Maribor 📞 (0038) 2 42 93 100 📠 (0038) 2 42 93 152										Austria	Ecolab Austria Rivergate D1/4OG, Handelskai 92 A-1200 Vienna 📞 (0043) 810 312586 📠 (0043) 1 7152550-2852	Norway	Ecolab a.s. Stålverksvägen 1, Postboks 6440 - Etterstad N-0605 Oslo 📞 (0047) 22 68 18 00 📠 (0047) 36 15 85 99	Bulgaria	Ecolab EOOD Tsarigradsko chaussee Blv. 115A BG-1784 Sofia 📞 (00359) 29 76 80 30 📠 2 976 80 50										Finland	OY Ecolab Ab Mäkelänkatu 54 A FIN-00241 Helsinki 📞 (00358) 207561400 📠 (00358) 9 39 65 53 05	Hungary	Henkel Ecolab Kft. David Ferenc. u. 6 H-1519 Budapest, Pf. 429 📞 (0036) 1 372 55 76 📞 (0036) 1 372 55 73 📠 (0036) 1 209 15 44 📠 (0036) 1 372 55 46	Croatia	Ecolab d.o.o. Zavrtnica 17 10000 Zagreb 📞 (00385) 1 6321 600 📞 (00385) 1 880 5771 📠 (00385) 1 6321 633									
	280 Kifisias Av. and 2 Idras Str. 15232 Halandri, Athen 📞 (0030) 210 6873700 📠 (0030) 210 6840325		Avenida Del Baix Llobregat 3-5 08970 Sant Joan Despi (Barcelona) 📞 (0034) 93 475 89 00 📠 (0034) 93 477 00 75																																																		
Netherlands	Ecolab BV Iepenhoeve 7a +7b NL-3438 MR Nieuwegein 📞 (0031) 30 60 82 222 📠 (0031) 30 60 82 228	United Kingdom	Ecolab UK Ltd. David Murray John Building, Swindon, Wiltshire SN1 1 ND 📞 (0044) 1 793 54 87 80 📠 (0044) 1 793 54 88 92	Slovenia	Ecolab d.o.o. Maribor Vajngerlova 4 Postfach 1007 SLO-2001 Maribor 📞 (0038) 2 42 93 100 📠 (0038) 2 42 93 152																																																
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Finland	OY Ecolab Ab Mäkelänkatu 54 A FIN-00241 Helsinki 📞 (00358) 207561400 📠 (00358) 9 39 65 53 05	Hungary	Henkel Ecolab Kft. David Ferenc. u. 6 H-1519 Budapest, Pf. 429 📞 (0036) 1 372 55 76 📞 (0036) 1 372 55 73 📠 (0036) 1 209 15 44 📠 (0036) 1 372 55 46	Croatia	Ecolab d.o.o. Zavrtnica 17 10000 Zagreb 📞 (00385) 1 6321 600 📞 (00385) 1 880 5771 📠 (00385) 1 6321 633																																																

Belgium	Ecolab BVBA Noordkustlaan 16C B-1702 Groot Bijgaarden ☎ (0032) 24675111 ✉ (0032) 24675100	Poland	Henkel Ecolab sp.z o.o. ul. ul. Opolska 114 PL-31-323 Kraków ☎ (0048) 12 2616 100 ✉ (0048) 12 2616 101	Turkey	Ecolab Turkey Vizyon Bulvar No: 13 Kat: 1 No: 65 Esentepe Mah. Cevizli-Esentepe E-5 Yanyol Cad. Kartal, ISTANBUL TR 34870 ☎ (0090) 216 458 6900 ✉ (0090) 216 458 6904
France	Ecolab SNC 23 Avenue Aristide Briand, CS 70107 F-94112 Arcueil CEDEX ☎ (0033) 1 49 69 65 00	Ireland	Ecolab Ireland Forest Park, Mullingar Industrial Estate, Mullingar Co. Westmeath, Ireland ☎ (0035) 1 276 3500 ✉ (0035) 1 286 9298	Switzerland	Ecolab AG Kriegackerstrasse 91 CH-4132 Muttentz ☎ (0041) 61 46 69 408 ✉ (0041) 61 46 69 455
Czech Republic	Ecolab s.r.o. Vocetářova 2449/5 CZ-180 00 Praha 8 ☎ (00420) 296 114 040 ✉ (00420) 54 22 11 227	Portugal	Ecolab Hispano- Portuguesa TagusPark, Avenida Prof. Doutor Cavaco Silva Edifício Qualidade, B1-1B 2740-122 Porto Salvo ☎ (0035) 1 214 48 0750 ✉ (0035) 1 214 48 0787	Russia	CJSC Ecolab Letnikovskaya str., 10, bld. 4, 6th floor 115114 Moscow ☎ (007) 495 9807060
Sweden	Ecolab AB Götalandsvägen 230, Hus 23 S-125 24 Älvsjö ☎ (0046) 8 6032 200	Italy	Ecolab S.r.l. Via Trento, 26 20871Vimercate - MB ☎ (0039) 039 60501 ✉ (0039) 039 6050300	Ukraine	Ecolab LLC Geroiv Kosmosu Street 4, Floor 8. Office 805 03148 Kiev ☎ (0038) 0 4449431-20 ✉ (0038) 0 4449422-56
Denmark	Ecolab ApS Høffdingsvej 36 2500 Valby ☎ (0045) 36 15 85 85 ✉ (0045) 36 15 85 48	Slovakia	Ecolab s.r.o. Cajakova 18 SK-811 05 Bratislava ☎ (00421) 2 572049-15 ✉ (00421) 2 572049-28	Romania	Ecolab SRL Șoseaua Păcurari 138 700545 Iași ☎ (0040) 232 222 210 ☎ (0040) 232 222 250

A.2 EC Declaration of Conformity

Name	Data
Designation	BFH Foamatic [ECOLAB]
Type	Dosing system
Number	XXXX-XX-XXXXX
Type of manual	EG-Konformitätserklärung
Manufacturer	Ecolab Engineering GmbH Raiffeisenstrasse 7 D-83313 Siegsdorf (+49) 86 62 / 61 0 (+49) 86 62 / 61 166 www.ecolab-engineering.com

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projektspezifisches
PDF
ausgetauscht.**

***Will be replaced by
project-specific
PDF.***

A.3 P&ID flow diagram

Name	Data
Designation	P&ID flowchart BFH [ECOLAB]
Type	Basic filler hygiene system
Number	XXXX-XX-XXXXX
Type of manual	P&ID flow chart
Manufacturer	Ecolab Engineering GmbH Telephone (+49) 86 62 / 61 0 Fax (+49) 86 62 / 61 166 http://www.ecolab-engineering.com

**Wird durch
projektspezifisches
PDF
ausgetauscht.**

***Will be replaced by
project-specific
PDF.***

A.4 Circuit diagram

Name	Data
Designation	Circuit diagram BFH [ECOLAB]
Type	Basic filler hygiene system
Number	XXXX-XX-XXXXX
Type of manual	Circuit diagram
Manufacturer	Ecolab Engineering GmbH Telephone (+49) 86 62 / 61 0 Fax (+49) 86 62 / 61 166 http://www.ecolab-engineering.com

**Wird durch
projektspezifisches
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ausgetauscht.**

***Will be replaced by
project-specific
PDF.***

A.5 Spare parts

Name	Data
Designation	BFH Foamatic [ECOLAB]
Type	Spare parts list BFH Foamatic
Number	XXXX-XX-XXXXX
Type of manual	Spare parts list
Manufacturer	Ecolab Engineering GmbH Raiffeisenstrasse 7 D-83313 Siegsdorf (+49) 86 62 / 61 0 (+49) 86 62 / 61 166 www.ecolab-engineering.com

Please note that correct functionality of the Plant is guaranteed only if original spare parts from Ecolab are used. This applies in particular to the electrical components in your Plant. Please refer to the notes in [↪ Chapter 11 'Fault rectification' on page 205](#).



When ordering maintenance-related spare parts (electrical modules, in particular), make sure that they are pre-configured at the factory for use in the system.

Please therefore notify our Customer Service team of the exact location and purpose of the metering system.

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project-specific
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A.6 Safety Data Sheet (SDS)

Name	Data
Designation	Safety datasheets
Type	BFH Foamatic
Number	
Type of manual	Safety datasheets
Manufacturer	Ecolab Engineering GmbH Raiffeisenstrasse 7 D-83313 Siegsdorf (+49) 86 62 / 61 0 (+49) 86 62 / 61 166 www.ecolab-engineering.com

**Wird durch
projektspezifisches
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ausgetauscht.**

***Will be replaced by
project-specific
PDF.***

A.7 Storage and handling of cleaning agents and disinfectants

Name	Data
Designation	Safety Brochure "Safety First"
Type	Safety Brochure "Safety First" [Ecolab]
Number	13022017
Type of manual	Safety Brochure
Manufacturer	Ecolab Engineering GmbH Raiffeisenstraße 7 D-83313 Siegsdorf (+49) 86 62 / 61 0 (+49) 86 62 / 61 166 www.ecolab-engineering.com



SAFETY FIRST

Safe Storage & Handling of
Cleaning Agents & Disinfectants

ECOLAB®

Everywhere It Matters.™

Worldwide Headquarters
Ecolab Inc.
370 Wabasha Street N
St. Paul, MN 55102

European Headquarters
Ecolab Europe GmbH
Richtistr. 7
CH-8304 Wallisellen

www.ecolab.com

ECOLAB®

Safe storage & handling of cleaning agents & disinfectants

It's a matter of your safety

Cleaning agents & disinfectants are not dangerous, if you handle them correctly. Failure to do so may have hazardous consequences. In this flyer you can learn about some safety precautions, comply with these & you can safely use the products. It is a matter of your personal safety, the safety of your workplace & environmental protection.



Cleaning agents & disinfectants

Cleaning agents & disinfectants are necessary to ensure proper hygiene at your working area.

Visible soil such as food residues cannot be removed properly without the use of cleaning agents.

Neither can bacteria nor other microorganisms be removed without the use of disinfectants.



Directions for use

For effective use of detergents & disinfectants always follow the correct cleaning procedure:

1. Remove gross soil
2. Pre-rinse
3. Detergent cleaning
4. Intermediate rinse
5. Disinfection
6. Post rinse



This general procedure should be documented in the cleaning schedule for equipment in the area.

Optimum chemical performance

To make sure you get the best result possible from the product, ensure you have the correct cleaning & disinfecting agents:

- ▲ Correct concentration
- ▲ Correct contact time
- ▲ Correct usage temperature
- ▲ Follow correct cleaning schedule



Get to know your hazard pictograms



- Extremely/highly flammable/flammable solid/gas/aerosol/liquid/vapour
- Heating may cause a fire/explosion
- Catches fire spontaneously if exposed to air
- Self-heating (in large quantities); may catch fire
- In contact with water releases flammable gases (which may ignite spontaneously)

WHAT TO DO:

- Do not smoke, have a naked flame, spark or glowing object nearby
- Ensure working areas are very well ventilated



- May cause/intensify fire; oxidizer
- May cause fire or explosion; strong oxidizer

WHAT TO DO:

- Keep away from combustible material & metals
- Keep empty containers out of storage room
- Keep spillage separated from other materials



- Contains gas under pressure; may explode if heated
- Contains gas under pressure; may cause cryogenic burns or injury

WHAT TO DO:

- Protect from sunlight & do not expose to temperatures exceeding 50°C.
- Do not pierce or burn, even after use.
- Do not spray on a naked flame or any incandescent material.
- Keep away from sources of ignition - No smoking.



- May be corrosive to metals
- Causes severe skin burns & eye damage
- Causes serious eye damage

WHAT TO DO:

- Avoid inhalation of vapours & any contact with skin, eyes & clothes
- Wear suitable clothing, protective gloves & eye/face protection

Get to know your hazard pictograms



- May be fatal if swallowed & enters airways
- May cause allergy, asthma symptoms or breathing difficulties if inhaled
- May cause/Suspected of causing genetic defects/ cancer
- May damage/Suspected of damaging fertility or the unborn child
- Causes damage/May cause damage to organs (through prolonged or repeated exposure)

WHAT TO DO:

- Avoid inhalation of vapours & any contact with skin, eyes & mucous membranes
- Wear suitable clothing, protective gloves & eye/face protection
- If exposed or if you feel unwell: call a poison centre /doctor/physician



- Harmful if swallowed/inhaled/in contact with skin
- Causes skin irritation/serious eye irritation
- May cause an allergic skin reaction
- May cause respiratory irritation/drowsiness or dizziness

WHAT TO DO:

- Avoid inhalation of vapours & any contact with skin, eyes & mucous membranes
- Wear suitable clothing, protective gloves & eye/face protection



- (Very) toxic to aquatic life (with long lasting effects)

WHAT TO DO:

- Avoid discharge to the environment, especially in concentrated form
- Storage facilities should have a safety collecting vessel or further safety precautions in the building in case of leakage spills



- Fatal/Toxic if swallowed/in contact with skin/if inhaled

WHAT TO DO:

- Avoid inhalation of vapours & any contact with skin, eyes & mucous membranes
- Wear suitable clothing, protective gloves & eye/face protection
- If exposed, immediately call a poison centre or doctor/physician

Personal Protective Equipment

Eyes

- ▲ Safety Spectacles
- ▲ Face Shield and Goggles



Hands

- ▲ Wear suitable gloves
- ▲ For the appropriate gloves see recommendations in the safety data sheet
- ▲ Leather only when handling hot objects
- ▲ Gloves must be worn under the sleeves of overalls



Body Protection

- ▲ Wear chemical protective suit or protective apron when working with dangerous products
- ▲ Use it when transferring products from chemical tankers
- ▲ Filling of dosing equipment & containers
- ▲ At rescue work after accidents



Feet

- ▲ Wear safety rubber boots & pull pair of pants over the boots to avoid substances running into the boots
- ▲ When transferring chemicals or filling large dosing equipment, containers & chemical tanker
- ▲ At rescue work after damage or accidents



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Directions for handling

To avoid accidents it is important to take precautions when you dilute & dissolve the products:

- ▲ Wear suitable gloves
- ▲ Use correct dispensing equipment

If dosing manually:

- ▲ First fill water into the container – then the product
- ▲ Use cold water
- ▲ Add product slowly
- ▲ Mix product & water thoroughly



Use of the following equipment will make handling safer:

- ▲ Closed systems
- ▲ Fully automated dosing systems
- ▲ Manually operated dosing aids, e.g. special taps, pumps, etc.



Avoid mixing products as they may react & cause:

- ▲ Generation of heat & risk of splashes
- ▲ Toxic gasses & fumes
- ▲ Risk of explosion
- ▲ Risk of ineffectiveness

ECOLAB

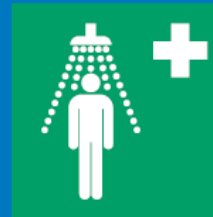
Storage: Order & Cleanliness

Remember to follow the guidelines for order & cleanliness where the cleaning agents & disinfectants are stored:

- ▲ Correct concentration
- ▲ No entry of unauthorized personnel
- ▲ Always wear suitable clothing, protective gloves & shoes & eye/face protection when entering the storage room
- ▲ Alkaline & acidic products must be stored separately to avoid mixing
- ▲ Acidic, oxidizing & chlorinated products must be stored separately to avoid mixing in case of accidents
- ▲ Peroxyacetic acid & hydrogen peroxide containing products should not be stored together with alkaline products
- ▲ Do not eat, drink, or smoke in storage room



First Aid



Skin

- ▲ Rinse skin under running water for at least 15 minutes
- ▲ Remove immediately damp/wet clothing & shoes
- ▲ Seek medical advice
- ▲ Show the label or the safety datasheet to the physician
- ▲ Where skin is less burned, rinse, clean & use hand lotion



Eyes

- ▲ Rinse the eye under running water. Persons wearing contact lenses must remove them before rinsing
- ▲ Seek help from your colleagues
- ▲ See an eye specialist (ophthalmologist) immediately
- ▲ Show the label or the safety datasheet to the specialist



Respiratory passages

- ▲ Remove to fresh air
- ▲ Loosen tight clothing
- ▲ In case of dizziness or pain, see a physician
- ▲ Show the label or the safety data sheet to the physician



Mouth & ingestion

- ▲ Rinse mouth with plenty of water
- ▲ Drink only water
- ▲ Do not induce vomiting
- ▲ Seek immediately medical advice from a physician
- ▲ Show the label or the safety datasheet to the physician



Emergency plan:

- ▲ Locations of fire alarms & fire extinguishers
- ▲ Emergency escape routes & safety equipment
- ▲ Special security instructions for your department (e.g. damage control plan)



The emergency call:

1. Where did it happen?
2. What has happened?
3. How many people are injured?
4. Who is calling?
5. Wait for questions! Do not hang up until you are told by the emergency coordinator!



What to do in case of emergencies (fire / accidents with injured people):

- ▲ Make an emergency call following the instruction given above
- ▲ Secure the accident site
- ▲ In case of danger, bring injured people or helpless people to a safe place or arrange for help
- ▲ Arrange for first aid
- ▲ In case of small fires start fighting the fire with fire extinguishers, do not tackle large fires
- ▲ Leave emergency site via the most direct escape routes, guide people not familiar on the site
- ▲ Wait for the emergency teams (fire brigade, paramedics) to arrive & show them to the place of the accident
- ▲ Do not use lifts!
- ▲ Go to the emergency collection point
- ▲ Do not leave the premises unless instructed!



1. Always follow regulations & instructions for the use of cleaning & disinfection products.
2. Observe the pictogram(s), hazard & precautionary (H & P) statements.
3. If you are in doubt, ask your supervisor.
4. Use the prescribed protective clothing, protective gloves & eye/face protection.
5. Clean your protective outfit after use & check it for damage.
6. Never mix different products - it may create dangerous reactions.
7. In case of dilution: first cold water, then add the product.
8. Return products to storage room after use.
9. Always store cleaning agents & disinfectants in the original packing
10. Store products apart which may react with each other.
11. No eating, drinking, or smoking in the storage room & when handling chemicals
12. Always wash your hands before breaks, before & after going to the toilet & locker rooms.
13. Take care of yourself & your colleagues.

B Component operating manuals

B.1	Suction lance D32 [ECOLAB].....	323
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B.3	Compressed air unit [FESTO].....	377
B.4	Centrifugal pump CRNE 5 [GRUNDFOS].....	391
B.5	Flow Monitors SI500x [IFM].....	473
B.6	EVOGUARD Butterfly valve [KRONES].....	489
B.7	Hybrid Foamatic MA-SA.....	567
B.8	Inductive switch IMB12 [SICK].....	679
B.9	Pressure switch PBS [SICK].....	683
B.10	Manometer D40 - D63 [WIKA].....	707

Component operating manuals



The service life of the Plant depends both on the service life of the components used and on the maintenance work being carried out properly.

All the following component operating instructions must be followed in order to keep the Plant in good condition.



NOTICE

Ecolab accepts no responsibility for the contents of the component operating instructions!

The respective manufacturers are exclusively responsible for the contents!

The up-to-dateness of these instructions was checked at the time these operating instructions were prepared. If newer documents have been published by the manufacturers in the meantime, it is the operator's own responsibility to take care of the corresponding document.

Furthermore, we would like to point out that not all purchase documentation is always available in the corresponding language. Although we make every effort to always provide the necessary language, we are also dependent on our suppliers. If your language is not available at the time of writing, we will provide the "English version".

In the event of any updates to these overall instructions, we will again check the available component instructions for your language variants and, if available by then, incorporate the correct language. Otherwise, please contact the manufacturer of the corresponding system component directly.

B.1 Suction lance D32 [ECOLAB]

Name	Data
Designation	Suction lance
Type	D32 (Art.Nr. 10240407, 10240408, 10240409)
Number	MAN053596 Rev. 2-10-2023
Type of manual	Operating instructions
Manufacturer	Ecolab Engineering GmbH Phone (+49) 86 62 / 61 0 Fax (+49) 86 62 / 61 166 http://www.ecolab-engineering.com

Operating instructions

Suction lance D32

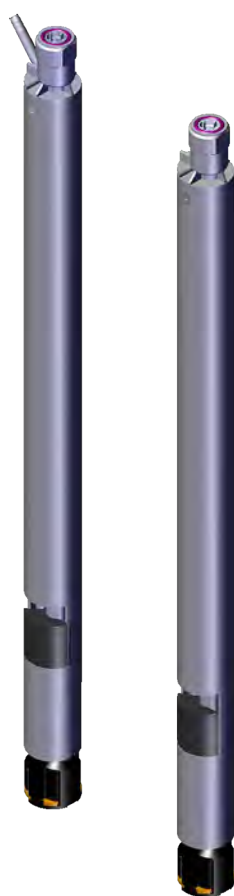


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1 General

These operating instructions contain instructions for commissioning and adjusting suction lances.

Assembly, connection, adjustment, maintenance and repairs are carried out exclusively by authorized specialist personnel.

1.1 Notes on the operating instructions



CAUTION!

Read the instructions!

Prior to commencing any works and/or operating, appliances or machinery, these instructions must be read and understood as a strict necessity. In addition, always heed all the instructions relating to the product that are included with the product!

All instructions are also available for download if you have mislaid the original. Furthermore, you will always have the opportunity to get the latest version of the manuals. The German-language manual is the **original operating manual**, which is legally relevant. **All other languages are translations.**

Particular attention should be paid to the following:

- Personnel must have carefully read and understood all instructions belonging to the product before starting any work. The basic premise for safe operation is observing all safety instructions and work instructions in this manual.
- Figures in this manual are provided for basic understanding and may deviate from the actual product.
- All manuals and guides must be placed at the disposal of the operating and maintenance personnel at all times. Therefore, please store all manuals and guides as a reference for operation and service.
- If the system is resold, this manual must always be supplied with it.
- The relevant sections of this operating manual must be read, understood and noted before installing the system, using it for the first time, and before carrying out any maintenance or repair work.

This operating manual contains all the instructions for installing, commissioning, maintenance and repairs.

Latest operating instructions



The latest and complete operating manual is available on the Internet:

https://www.ecolab-engineering.de/fileadmin/download/bedienungsanleitungen/dosiertechnik/Zubeh-r/MAN053596_Sauglanze_32.pdf

If you want to download the operating manual with a tablet or smartphone, you can use the QR code listed.

1.1.1 Retrieve the latest instructions

If an operating manual or software manual (hereinafter referred to as '*operating instructions*') is changed by the manufacturer, it will be put '*online*' immediately. This ensures that Ecolab Engineering GmbH complies with the requirements of the German Product Liability Law with regard to its '*product monitoring obligation*'.

All operating instructions are provided in PDF format .

To open and display the operating instructions, we recommend that you use Adobe '*Acrobat*' PDF Viewer (<https://acrobat.adobe.com>).

Through the above measures, Ecolab provides various options for ensuring that you can access the most recent operating instructions at all times.

Accessing operating instructions using the website of Ecolab Engineering GmbH

You can search for and select the required instructions on the manufacturer's website (<https://www.ecolab-engineering.de>) under [Media Centre] / [Operating Instructions].

Accessing operating instructions using the '*DocuAPP*' for Windows®

You can use the '*DocuApp*' for Windows® (as of Version 10) to download, read and print all published operating instructions, catalogues, certificates and CE declarations of conformity on a Windows® PC.



To install this program, open the '*Microsoft Store*' and enter "***DocuAPP***" in the search field. <https://www.microsoft.com/store/productId/9N7SHKNHC8CK>. Follow the installation instructions.

Accessing manuals using a smartphone/tablet

You can use the Ecolab '*DocuApp*'  to access all operating manuals, catalogues, certificates and CE declarations of conformity published by Ecolab Engineering on a smartphone or tablet (Android  & iOS  systems).

The documents shown in the '*DocuApp*'  are always up to date and new versions are displayed as soon as they are available. Further information about the '*DocuApp*'  is provided in a separate software description ((art. no. 417102298)).

'Ecolab DocuApp' guide for download



Further information about the '*DocuApp*'  is provided in a separate software description (art. no. MAN047590).

Download: https://www.ecolab-engineering.de/fileadmin/download/bedienungsanleitungen/dosiertechnik/Dosierpumpen/417102298_DocuAPP.pdf

The following section describes the installation of the '*Ecolab DocuApp*'  for '*Android*'  and '*iOS (Apple)*'  systems

Installing the 'Ecolab DocuApp' for Android

For Android-based smartphones , the 'Ecolab DocuApp'  can be found in the Google Play Store .

1. ➤ Open the Google Play Store  on your smartphone/tablet.
2. ➤ Enter the name "Ecolab DocuApp" in the search field.
3. ➤ Use the search term **Ecolab DocuApp** and select 'Ecolab DocuApp' with the icon .
4. ➤ Choose [Install].
⇒ The 'Ecolab DocuApp'  is installed.

The 'Ecolab DocuApp'  can be accessed using the following link on a PC or in a browser: <https://play.google.com/store/apps/details?id=ecolab.docuApp>

Installing the 'DocuApp' for iOS (Apple)

For iOS-based smartphones , the 'Ecolab DocuApp'  can be found in the App Store .

1. ➤ Open the App Store  on your smartphone/tablet.
2. ➤ Go to the search function.
3. ➤ Enter the name "Ecolab DocuApp" in the search field.
4. ➤ Use the search term **Ecolab DocuApp** and select 'Ecolab DocuApp' with the icon .
5. ➤ Choose [Install].
⇒ The 'Ecolab DocuApp'  is installed.

1.2 Article numbers / EBS-Article numbers



Both item numbers and EBS numbers could be shown in these operating instructions. EBS numbers are Ecolab-internal item numbers and are used exclusively "internal within the group".

1.3 Representation in the manual

Symbols, highlights and bulleted lists

Safety instructions in this manual are identified by symbols and introduced by signal words expressing the extent of the hazard.



DANGER!

Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.



WARNING!

Indicates a potentially imminent danger that can lead to serious injuries or even death.

**CAUTION!**

Indicates a potentially hazardous situation which may result in minor or slight injury.

**NOTICE!**

Indicates a potentially dangerous situation that may result in property damage.

**Tips and recommendations**

This symbol highlights useful tips, recommendations and information for an efficient and trouble-free operation.

**ENVIRONMENT!**

Indicates potential hazards to the environment and identifies environmental protection measures.

Safety instructions in the operating instructions

Safety instructions can refer to specific, individual operating instructions. These safety instructions are embedded in the operating instructions, so they do not interrupt the reading flow when executing the action. The signal words described above are used.

Example:

1. ➤ Loosen screw.

2. ➤

**CAUTION!**

Risk of trapping on the cover!

Close the cover carefully.

3. ➤ Tighten screw.

**Tips and recommendations**

This symbol highlights useful tips, recommendations and information for an efficient and trouble-free operation.

Other markings

The following markings are used in these instructions to provide emphasis:

- 1., 2., 3. ... Step-by-step operating instructions
- Results of the operating steps
- ↪ References to sections of these instructions and related documents
- Lists in no set order
- [Button] Controls (e.g. button, switch), indicators (e.g. signal lights)
- 'Display' Screen elements (e.g. buttons, assignment of function keys)

1.4 Transportation

Please refer to "technical data" for the packaging dimensions and packaging weight.

Improper transport



NOTICE!

Material damage due to improper transportation!

Transport units can fall or tip over if improperly transported. This can cause considerable damage.

- Be careful when unloading transport units on delivery and during in-house transport; observe symbols and instructions on the packaging.
- Only use the attachment points provided.
- Remove packaging just before assembly.



DANGER!

Danger due to commissioning of damaged goods.

Installation or starting up must not take place if any transport damage is detected when unpacking the system.

By installing/commissioning damaged components, unmanageable errors may occur, which may lead to irreparable damage to personnel and/or the system with the use of aggressive dosing agents.

Transport inspection



NOTICE!

Check the delivery for completeness and any transport damage.

In case of visible damage, proceed as follows:

- Do not accept the delivery or accept provisionally.
- Note the extent of damage in the transport documents or on the carrier's delivery slip.
- Report the damage.



Report any defects as soon as you notice them.

Damage claims can only be filed within the applicable period for complaints.

1.5 Packaging

The individual packages are packed to reflect the expected transport conditions. Only environmentally-friendly materials were used for the packaging. The packaging is designed to protect the individual components up to assembly against shipping damage, corrosion and other damage.

Therefore, do not destroy the packaging and only remove it just before assembly.



ENVIRONMENT!

Risk of environmental damage due to incorrect disposal

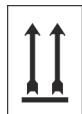
Incorrect disposal of packaging materials can be a threat to the environment. Packaging materials are valuable raw materials and can, in many cases, be used again or be usefully processed and recycled.

- Observe the locally applicable disposal regulations.
- Dispose of the packaging materials in an environmentally friendly manner. If necessary, ask a specialist company to dispose of them.



There may be handling instructions on the packages (e.g. on top, fragile, protect from moisture, etc.). These must be complied with accordingly. Symbols shown below are examples only.

Possible symbols on the packaging



Top

The arrowheads indicate the top of the package. They must always point upwards, otherwise the contents could be damaged.



Fragile

Indicates packages with fragile or sensitive content. Handle the package with care, do not drop or knock.



Keep this product dry

Protect packages from moisture and keep dry.



Electronic components

Electronic components contained in the package.



Cold

Protect packages from the cold (frost).



Stacking

The package may be stacked with other similar packages until the specified maximum number is reached. Pay attention to the exact stacking number.

International symbol: Treatment status on wooden packaging



IPPC symbol

- DE: Country code (e.g. Germany)
- NW: Regional identification (e.g. NW for North Rhine Westphalia)
- 49XXX: Registration number of the wood suppliers
- HAT: Heat treatment
- MB: Methyl bromide (gas-treated)
- DB: Debarked

1.6 Storage



Under certain circumstances, instructions for storage, which go beyond the requirements listed here, can be found on the package. These must be complied with accordingly.

- Do not store outdoors.
- Store in a dry and dust-free place.
- Do not expose to aggressive media.
- Protect from sunlight.
- Avoid mechanical vibrations.
- Storage temperature: +5 to 40° C.
- Relative humidity: max. 80 %.
- For storage periods of more than 3 months, check the general condition of all parts and packaging regularly. If necessary, refresh or renew the preservative.

1.7 Equipment marking – identification plate



Information on equipment marking or the information on the identification plate can be found in the chapter on "Technical data". It is important for all queries to state the correct name and type. This is the only way of ensuring fast and accurate processing.

1.8 Warranty

The manufacturer provides a warranty for operational safety, reliability and performance under the following conditions only:

- Assembly, connection, adjustment, maintenance and repairs must be carried out by qualified and authorised specialists with the aid of the User Manual and all the provided documents.
- Our products are used in accordance with the instructions in the User Manual.
- Only OE spare parts must be used for repairs.



Our products are built, tested and CE certified in accordance with current standards/guidelines. They left the factory in a safe, faultless condition. To keep the equipment in this condition and to ensure risk-free operation, the user must observe the instructions/warnings, maintenance regulations, etc. contained in these operating instructions and, if applicable, affixed to the product.

The warranty and service conditions of the manufacturer also apply.

1.9 Contact

1.9.1 Manufacturer

Ecolab Engineering GmbH
Raiffeisenstraße 7
83313 Siegsdorf, Germany
Telephone (+49) 86 62 / 61 0
Fax (+49) 86 62 / 61 166
engineering-mailbox@ecolab.com
<http://www.ecolab-engineering.com>



1.9.2 Technical support contact

ECOLAB Engineering GmbH
Raiffeisenstraße 7
83313 Siegsdorf, Germany
Telephone (+49) 86 62 / 61 234
Fax (+49) 86 62 / 61 166
Email: eursiefb-technicalservice@ecolab.com
<http://www.ecolab-engineering.com>



If you contact technical support, make sure to include the type code in the e-mail. The type code is the only way to identify the metering station and its documentation. You can find the type code on the rating plate.

2 Safety

2.1 General safety advice



DANGER!

Danger of accidents with dosing chemicals!

If the connections of the suction line and the return line are interchanged, an accident with dosing chemical may occur due to overpressure in the dosing system:

- Connect suction line to upper connector (on hose connection).
- Connect return line to side connector (on return pipe).



CAUTION!

Risk of injury and damage due to escape of aggressive gases!

When conveying outgassing dosing media, aggressive gases may escape through the vent hole on the suction lance:

- Check the safety data sheet of the dosing medium for any necessary protective measures, such as the use of a vapor lock.
- If necessary, contact the manufacturer/supplier of the dosing medium.



CAUTION!

Risk of injury and damage due to damaged chemical containers

If delivery pumps with too high a delivery rate are used, the chemical tank may be contracted. This will destroy the container and possibly the suction lance. Dosing chemicals may leak out.

- Ensure that the suction capacity of the feed pump matches the suction lance used.
- In case of doubt, contact the Technical Service. ↪ *Chapter 1.9 'Contact' on page 10*

2.2 Intended use

The following use of the suction lance is considered as intended:

- The suction lance may only be used for conveying liquid dosing media.
- The suction lance may only be used after correct installation, in accordance with the technical data and specifications listed in the operating instructions.
- General restrictions regarding viscosity limits, chemical resistance and tightness must be observed.



Intended use also includes compliance with all operating and maintenance instructions and conditions prescribed by the manufacturer.

2.3 Reasonably foreseeable incorrect use

Any use other than that described above may lead to hazards and damage and is not in accordance with the intended use. This includes in particular:

- Conveying of gaseous and solid dosing media.
- Conveying flammable or radioactive media.
- Carrying out modifications to the suction lance.
- Use as a handle or as a lever to move chemical containers.

2.4 Lifetime

In relation to the dependence of the adequate maintenance protocols the life time is 2 years (visual and functional testing, replacement of wearing parts, etc.). Afterwards a revision is necessary, in some cases also a subsequent general overhaul.

2.5 Safety data sheets

The safety data sheet is intended to be consulted by users and enables them to take any steps necessary to safeguard their health and safety at work.



DANGER!

Safety data sheets are always provided with the supplied chemicals. These sheets must be read, understood and all instructions implemented on site before using the chemicals. Ideally, they should be displayed close to the workplace or to the supply containers so that the appropriate measures can be taken quickly in the event of an accident.

The operator must provide the necessary protective equipment (PPE), as well as the described emergency equipment (e.g. eye bottle, etc.). Persons entrusted with operating the equipment must be instructed accordingly and trained.

Downloading of safety data sheets



The latest safety data sheets are available online. To download them, go to the following link or scan the QR code. You can then enter your required product and download the associated safety data sheet.

<https://www.ecolab.com/sds-search>

2.6 Obligations of the operator



Applicable Directives

In the EEA (European Economic Area), national implementation of the Directive (89/391/EEC) and corresponding individual directives, in particular the Directive (2009/104/EC) concerning the minimum safety and health requirements for the use of work equipment by workers at work, as amended, are to be observed and adhered to.

Should you be outside the scope of the EEA (European Economic Area), the regulations applicable to you shall always apply. Make sure, however, that the EEA regulations do not apply to you as a result of special agreements.

It is the responsibility of the operator to check the permissible regulations.

The operator must adhere to the local legal provisions for:

- the safety of the personnel (in the area of application of the Federal Republic of Germany in particular the BG and accident prevention regulations, workplace guidelines, e.g. operating instructions, also according to §20 GefStoffV, personal protective equipment (PPE), preventive medical check-ups);
- safety of work materials and tools (protective equipment, work instructions, procedural risks and maintenance);
- product procurement (safety data sheets, list of hazardous substances);
- disposal of products (Waste Act);
- disposal of materials (decommissioning, Waste Act);
- cleaning (detergents and disposal);
- as well as complying with current environment protection regulations.

The owner is also required:

- to provide personal protective equipment (PPE).
- to incorporate the measures into operating instructions and to instruct personnel accordingly;
- for operating sites (from 1m above ground): to provide safe access;
- The lighting of the workstations must be provided by the operator in accordance with DIN EN 12464-1 (within the scope of the Federal Republic of Germany). Observe the regulations applicable to you!
- to ensure that local regulations are complied with during installation and commissioning, if these procedures are conducted by the owner.

2.7 Personnel requirements

- Only persons who can be expected to carry out their work reliably can be approved as personnel.
- Individuals whose reactions are impaired, e.g. by drugs, alcohol, medicines, are not authorised.
- When selecting personnel, the valid age and occupation-specific regulations must be observed.
- The personnel carrying out maintenance and repair work must obtain information from the operator about risks arising from the working environment or the chemicals used.

Qualifications

In these operating instructions, the following qualifications are designated for various areas of activity:

Operator

The operator has been instructed about the tasks assigned to him and possible dangers in case of improper behaviour. He may only carry out tasks that go beyond operation during normal operation if this is specified in these instructions or the owner has expressly authorised the operator to do so.

Specialist

A person with appropriate training, schooling and experience enabling him or her to identify risks and avert danger.



DANGER!

Auxiliary personnel without special qualifications

Auxiliary personnel without special qualifications or without special training who do not meet the requirements described here are unaware of the dangers in the work area.

Therefore, there is a risk of injury to auxiliary personnel.

It is imperative that auxiliary personnel without specialist knowledge are familiarised with the use of personal protective equipment (PPE) for the activities to be performed, or are appropriately trained, and that these measures are monitored. These personnel may then only be deployed on activities for which intensive training has been given beforehand.



DANGER!

Unauthorised personnel

Unauthorised persons who do not meet the requirements described here are not familiar with the risks in the operating area.

Therefore unauthorised persons are at risk of injury.

Working with unauthorised persons:

- All work must be suspended for as long as unauthorised persons are present in hazardous or working areas.
- If in doubt as to whether a person is authorised to be in hazardous and operating area, approach said person and lead them out of this area.
- General information: Keep unauthorised persons away!

2.8 Personal protection equipment (PPE)



DANGER!

Personal protective equipment, hereinafter referred to as PPE, is used to protect personnel. It is imperative to pay attention to the PPE described in the product data sheet (safety data sheet) for the metered medium.



Chemical-resistant protective gloves

Chemical-resistant protective gloves are used to protect the hands against aggressive chemicals.



Protective eyewear

Protective eyewear protects the eyes against flying parts and liquid splashes.



Safety shoes

Safety shoes protect feet against crushing, falling parts, sliding on slippery surfaces and against aggressive chemicals.

2.9 General information about risks

Risk of fire



DANGER!

Risk of fire

If there is a risk of fire, it is imperative to use the designated extinguishing agent and to implement suitable safety measures to tackle the fire. It is also imperative here to comply with the safety data sheet for the chemicals you use to tackle the fire!

Unauthorised access



DANGER!

Unauthorised access

The owner must ensure that unauthorised personnel are prevented from accessing the operating area.

2.10 General hazards in the workplace

Risk of slipping



DANGER!

Risks of slipping are to be identified using the adjacent symbol. Spilled chemicals are a slipping hazard in wet conditions.



WARNING!

Risk of slipping due to fluid in the operation and provisioning area!

- Wear non-slip, chemically resistant shoes when working.
- Place product containers in a tank to prevent a slipping hazard caused by leaking fluids.



ENVIRONMENT!

Leaked, spilled metering media must be cleaned and disposed of correctly, according to the instructions on the safety data sheet. It is essential to ensure that the required personal protective equipment (PPE) is used.

Chemical hazards (metering medium/active substance)



DANGER!

Risk of injury to the skin and eyes caused by the chemical used (metering medium).

- Read the enclosed safety data sheet carefully before using the metering medium.
- The safety regulations and the required protective clothing when working with chemicals must be complied with.
- Attention must be paid to the information included on the product data sheet for the metering medium used.



DANGER!

Hands must be washed before breaks and at the end of the working day. Information about the usual precautions when handling chemicals and about the use of PPE can be found on the relevant safety data sheet for the chemical being used and must be complied with.



ENVIRONMENT!

Metering medium that leaks or spills may be harmful to the environment.

Leaks or spills of a metering medium must be cleaned up and disposed of correctly in accordance with the instructions on the safety data sheet. It is imperative to use the prescribed PPE.

Preventive action:

Place product containers in a tray to collect leaking fluids without harming the environment.

2.11 Installation, maintenance and repair work



NOTICE!

Material damage by using incorrect tools!

Material damage may arise by using incorrect tools. **Use the correct tools.**

**DANGER!**

Damage and injuries may occur if installation, maintenance or repair work is carried out incorrectly.

All installation, maintenance and repair work must only be performed by authorised and trained specialist personnel in accordance with the applicable local regulations. Safety regulations and prescribed protective clothing when handling chemicals should be followed. Attention must be paid to the information included on the product data sheet for the metering medium used. Prior to all work the feeding of the metering medium should be disconnected and the system cleaned.

**NOTICE!**

Only original equipment spare parts may be used for maintenance and repairs.

3 Delivery



Suction lance D32 including empty signal

- Precision O-ring 12 x 2.5 mm
 - EPDM (black)
 - or
 - FKM (black with red dot)
- 5m cable with connection plug

or



Suction lance D32 including empty signal and level pre-warning

- Precision O-ring 12 x 2.5 mm
 - EPDM (black)
 - or
 - FKM (black with red dot)
- 5m cable with connection plug

or



Suction lance D32 including empty signal, level pre-warning and return connection

- Precision O-ring 12 x 2.5 mm
 - EPDM (black)
 - or
 - FKM (black with red dot)
- 5m cable with connection plug

Not illustrated

Short operating instructions
Article no. MAN053620



Hose connecting kits must be ordered separately, ↗ Chapter 8 'Accessories' on page 35

4 Structure

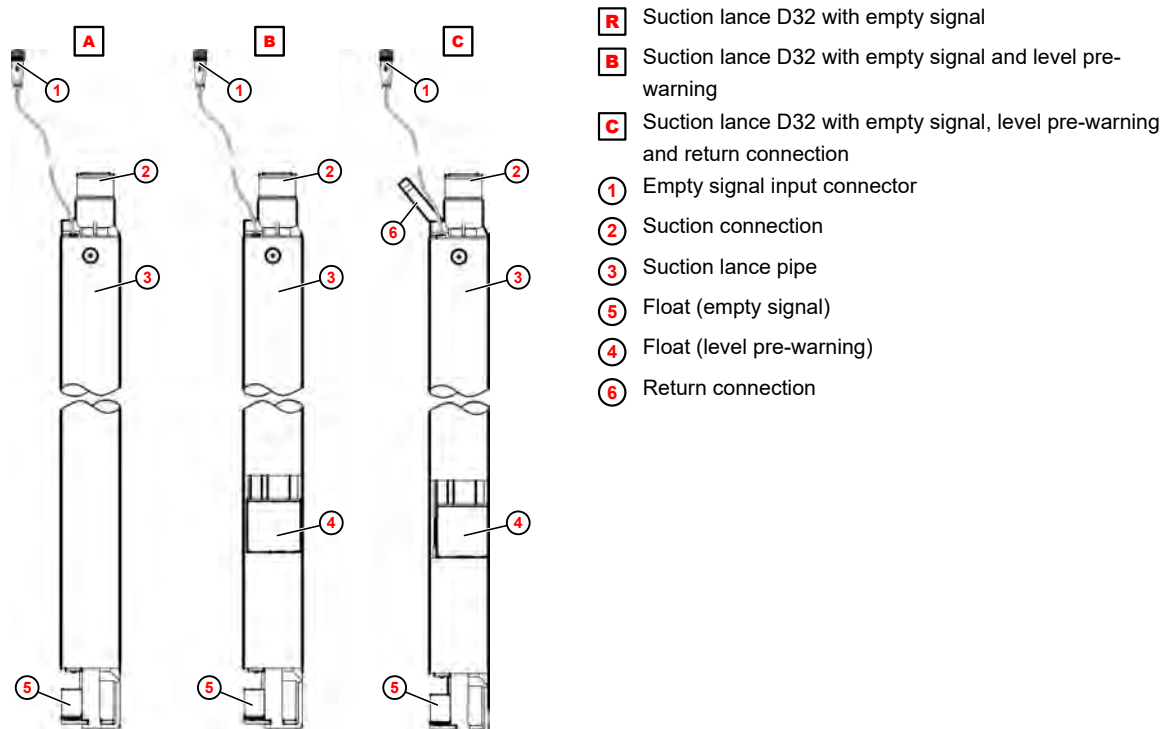
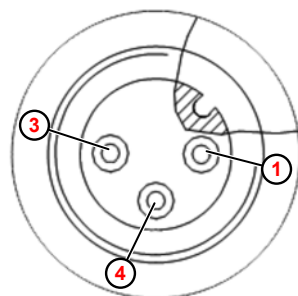


Fig. 1: Structure

Assignment of the empty signal input connector



- 1 "Level pre-warning" signal input (white)
- 3 "Empty" signal input (brown)
- 4 GND (green)

Fig. 2: Empty signal input connector

Switching function of the empty signal:

- "Empty signal undershot" - contact 3/4 open (level < 33 ± 5 mm)
- "Level pre-warning undershot" - contact 1/4 open (level < 130 ± 5 mm)

5 Commissioning / operation

5.1 Start-up

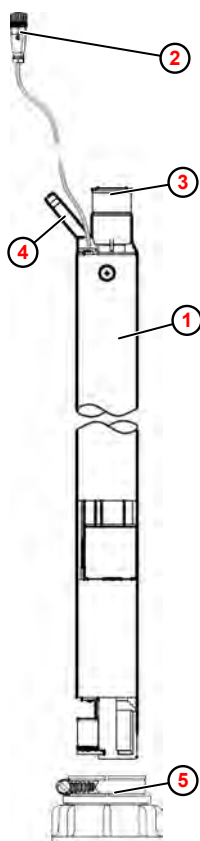
- Personnel:
- Operator
 - Specialist
- Protective equipment:
- Protective eyewear
 - Chemical-resistant protective gloves
 - Safety shoes



NOTICE!

Prior to initial operation, check the resistance of the O-rings to the chemicals to be conveyed:

- EPDM for alkaline
- FKM HF for acid



- ① Suction lance
Example: Suction lance D32 with empty signal, level pre-warning and return connection
- ② Empty signal input connector
- ③ Suction connection
- ④ Return connection
- ⑤ Suction lance adapter (e.g. 286197)

Fig. 3: Putting the suction lance into operation

1. ➔



NOTICE!

Only hand-tighten union nuts on the suction connection, the clamp connection on the suction lance adapter and, if necessary, the barrel screw connection. Do not use any tools.

—

Fit a compatible suction lance adapter ⑤ on to the container opening.

2. ➤ Install a compatible connecting kit for the pump connection thread ③ .
3. ➤ If necessary, fit the return line to the return connection ④ (if present) and secure in place with a hose clamp.
4. ➤ Connect the empty signal input connector ② to the empty signal reserve contact.



NOTICE!

The suction lance is a component sensitive to shocks:

- Always secure the suction lance to the chemical container using a suction lance adapter
- Carefully insert the suction lance into the suction lance adapter opening or remove

5. ➤ Carefully insert the suction lance into the suction lance adapter and, if necessary, secure in place using the clamp.

5.2 Change container



This section explains the container change using the example of a D32 suction lance with empty signal and level pre-warning and a conical suction lance adapter.

- Personnel:
- Operator
 - Specialist
- Protective equipment:
- Protective eyewear
 - Chemical-resistant protective gloves
 - Safety shoes



DANGER!

It is essential that the personal protective equipment (PPE) described on the product data sheet (safety data sheet) for the metering medium is used.



CAUTION!

Hazard from the use of incorrect chemicals

When changing containers, there is a risk of mixing up chemical containers:

- Before opening the new chemical container, check the product label and compare it with the label of the empty container.



CAUTION!

Risk of leaking chemicals

If the suction lance is laid down, the non-return valve becomes ineffective and the metering medium leaks out of the suction lance.

- Do not lay down the suction lance during the container change.
- or**
- When changing the container, place the suction lance upright in a collecting container.



CAUTION!

Contamination of the metering medium

When changing the container, there is a risk that the metering medium may become dirty or contaminated:

- Do not touch the part of the suction lance tube that protrudes into the container.
- Do not transfer residual content from the old container to the new container.
- When switching over the suction lance, move the suction lance directly from the old container into the new container or place it upright in a collection container.



CAUTION!

Danger of slipping on wet floors

Liquids leaking in the working and preparation area can cause slipping and injuries.

- Wear non-slip, chemical-resistant shoes when working
- Shut off the area of the escaping liquid
- Duly absorb any liquids escaping during work
- Keep a suitable container ready to collect the liquids during maintenance work

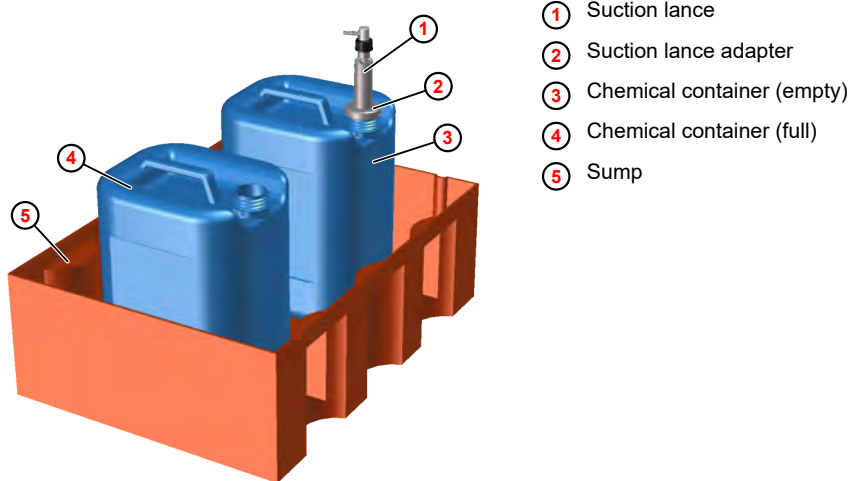


Fig. 4: Container change - preparation

1.



Compare the product labels on the old and new chemical containers.

Provide a full chemical container (4) and remove the lid.

2.

If required, unscrew the suction lance adapter (2) from the empty chemical container (3).

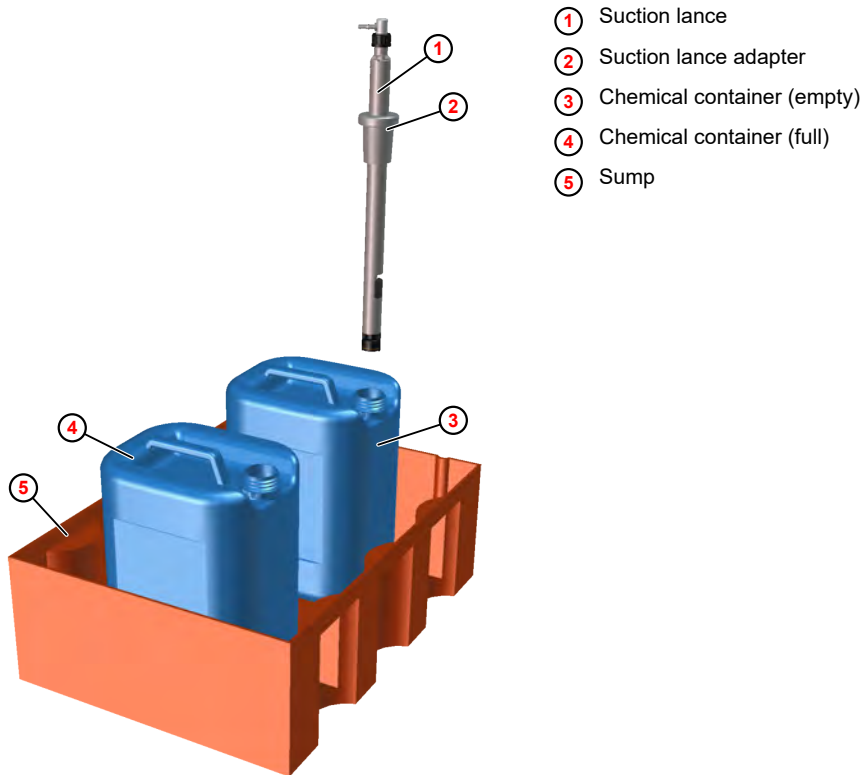


Fig. 5: Container change - remove the suction lance

3. Carefully pull the suction lance ① with suction lance adapter ② out of the chemical container ③.

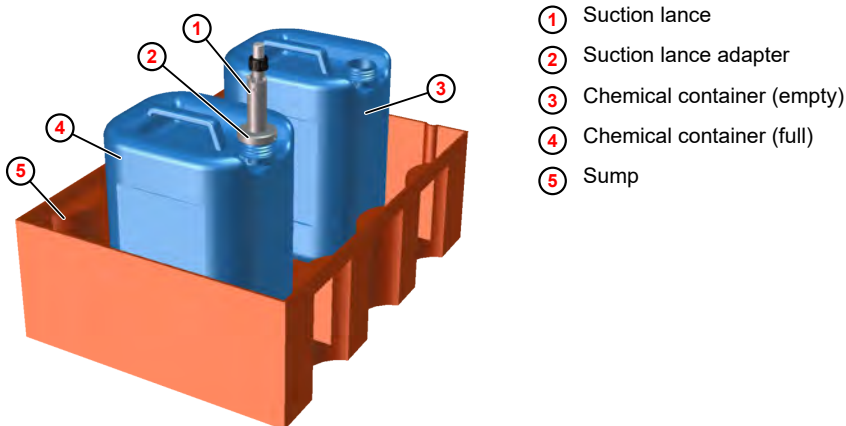


Fig. 6: Container change - insert suction lance

4. Carefully insert the suction lance ① with suction lance adapter ② into the full chemical container ④.

5.



NOTICE!

Only hand-tighten the union nuts on the suction connection and drum fitting. Do not use any tools.

If necessary, screw the suction lance adapter ② onto the chemical container.

6. Close the empty chemical container ③ and dispose of it in accordance with local regulations.

**ENVIRONMENT!****Chemicals can harm the environment.**

Chemical products must never enter the environment undiluted:

- Only empty completely drained chemical containers.
- Flush out residual amounts in chemical canisters with large amounts of water.
- Immediately soak up any leaking liquids with a suitable binding agent and dispose of properly.

Information on retrieval and disposal can always be found in the safety data sheet associated with the chemical. See also  *Chapter 2.5 'Safety data sheets' on page 12*

5.3 Changing the suction lance

- Personnel:
- Operator
 - Specialist
- Protective equipment:
- Protective eyewear
 - Chemical-resistant protective gloves
 - Safety shoes

**DANGER!**

It is essential that the personal protective equipment (PPE) described on the product data sheet (safety data sheet) for the metering medium is used.

**CAUTION!****Hazard from the use of incorrect chemicals**

When changing suction lances, there is a risk of mixing up suction hoses and thus using the incorrect chemicals.

- If several suction lances need to be changed at one station at the same time, we recommend that the chemical canisters and associated suction hoses are marked accordingly before disconnecting the connections.
- When changing several suction lances at one station, always finish working on one suction lance before moving on to another to avoid confusion.

**CAUTION!****Risk of accidents with dosing chemicals!**

If the connections of the suction tube and the return line are reversed, an accident with dosing chemicals can occur due to overpressure in the metering system:

- For suction lances with a return connection, do not mix up the suction line and return line.

**CAUTION!****Danger of slipping on wet floors**

Liquids leaking in the working and preparation area can cause slipping and injuries.

- Wear non-slip, chemical-resistant shoes when working
- Shut off the area of the escaping liquid
- Duly absorb any liquids escaping during work
- Keep a suitable container ready to collect the liquids during maintenance work

1. ➤ If necessary, insert the pressure tube of the delivery pump into a sufficiently large collecting basin.
2. ➤ Provide a suitable container of lukewarm water.
3. ➤ If necessary, unscrew the suction lance adapter from the container connection.
4. ➤ Carefully pull the suction lance out of the container.



The suction lance adapter remains on the suction lance.



NOTICE!

Only tighten the union nut on the suction lance adapter by hand. Do not use any tools.

5. ➤ Wipe down the suction lance pipe and carefully insert the suction lance into the container with lukewarm water.



If required, screw the suction lance adapter onto the container opening.

6. ➤ Activate the delivery pump and flush the suction lance and suction hose with lukewarm water for 30 minutes.
7. ➤ Unscrew the suction lance adapter from the container connection.
8. ➤ Carefully pull the suction lance out of the container, place it in a vertical position and secure it against falling over.

9. ➤



Mark the suction hose and associated chemical container.

Unscrew the suction hose from the suction lance and screw on the protective cap.

10. ➤ If present, unscrew the return line from the suction lance and screw on the protective cap.
11. ➤ If required, remove the suction lance adapter from the suction lance.
12. ➤ Dispose of suction lance correctly. ↗ *Chapter 9 'Decommissioning, disassembly, environmental protection' on page 38*
13. ➤ Mount the new suction lance and put it into operation. ↗ *Chapter 5.1 'Start-up' on page 20*

6 Technical data

6.1 Dimensions

Suction lance D32 with empty signal

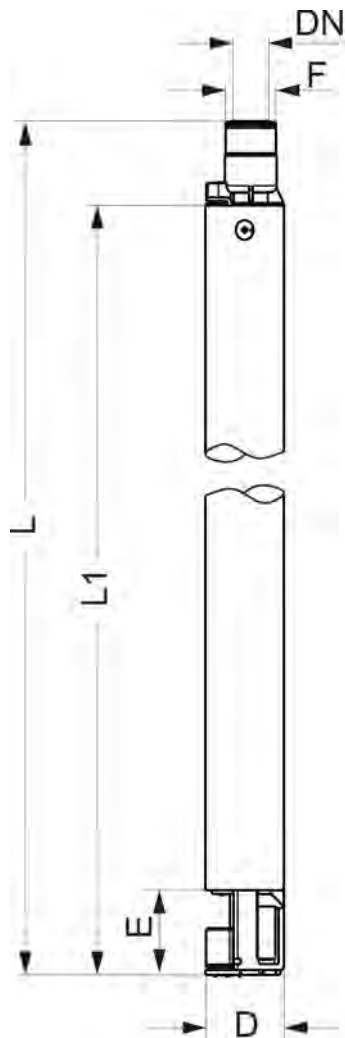


Fig. 7: Dimensions of suction lance D32 with empty signal

No.	10240407	10240408	10240409
L [mm]	520	770	1170
L1 [mm]	475	725	1125
D [mm]	32		
DN [mm]	10		
F [inch]	G5/8"		
E [mm]	33		

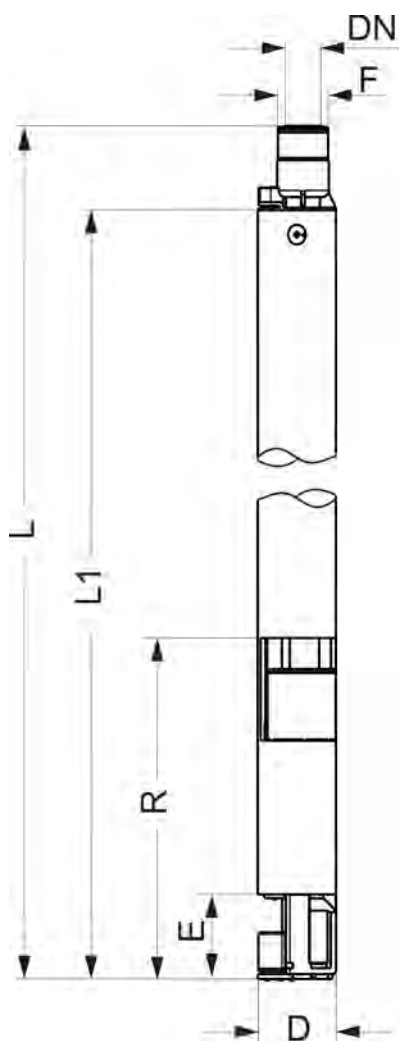
Suction lance D32 with empty signal and level pre-warning


Fig. 8: Dimensions of suction lance D32 with empty signal

No.	10240410	10240411	10240412	10240413
L [mm]	520	770	1170	1345
L1 [mm]	475	725	1125	1300
D [mm]	32			
DN [mm]	10			
F [inch]	G5/8"			
E [mm]	33			
R [mm]	130			

Suction lance D32 with empty signal, level pre-warning and return connection

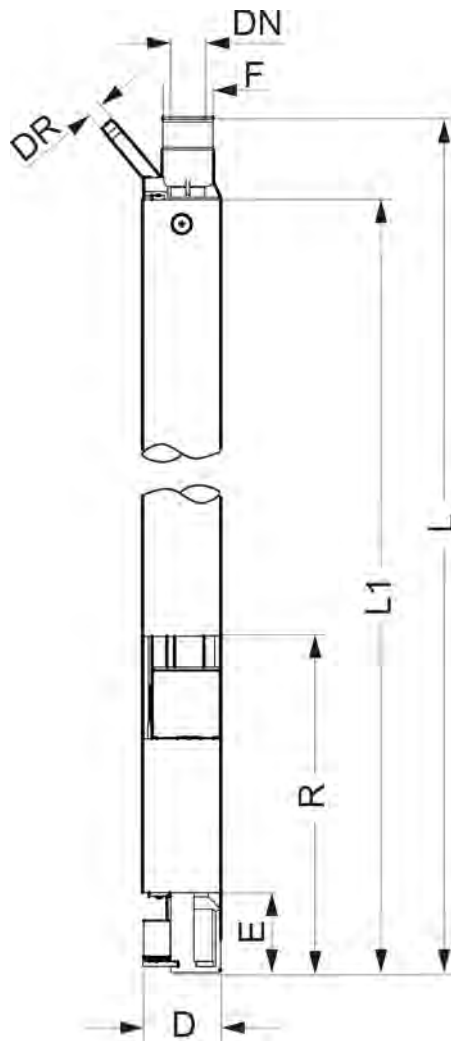


Fig. 9: Dimensions of suction lance with return connection

No.	10240403	10240404	10240405	10240406
L [mm]	520	770	1170	1445
L1 [mm]	475	725	1125	1400
D [mm]	32			
DN [mm]	10			
DR [mm]	6			
F [inch]	G5/8"			
E [mm]	33			
R [mm]	130			

6.2 General data

Suction lance D32 with empty signal

No.	10240407	10240408	10240409
Key no.	A-SGL- VDFEC- G5/8-10-1SA-0475-99-99-p	A-SGL- VDFEC- G5/8-10-1SA-0725-99-99-p	A-SGL- VDFEC- G5/8-10-1SA-1125-99-99-p
Suitable for pump output of max. [l/h]:	120		
Connection seal	FKM or EPDM		
Return connection	No		
Barrel adapter	Hard PVC/Viton B (accessory)		

Suction lance D32 with empty signal and level pre-warning

No.	10240410	10240411	10240412	10240413
Key no.	A-SGL- VDFEC- G5/8-10-2SS-0475-9 9-99-p	A-SGL- VDFEC- G5/8-10-2SS-0725-9 9-99-p	A-SGL- VDFEC- G5/8-10-2SS-1125-9 9-99-p	A-SGL- VDFEC- G5/8-10-2SS-1300-9 9-99-p
Suitable for pump output of max. [l/h]:	120			
Connection seal	FKM or EPDM			
Return connection	No			
Barrel adapter	Hard PVC/Viton B (accessory)			

Suction lance D32 with empty signal, level pre-warning and return connection

No.	10240403	10240404	10240405	10240406
Key no.	A-SGL- VDFEC- G5/8-10-2SS-0475-0 6-99-p	A-SGL- VDFEC- G5/8-10-2SS-0725-0 6-99-p	A-SGL- VDFEC- G5/8-10-2SS-1125-0 6-99-p	A-SGL- VDFEC- G5/8-10-2SS-1400-0 6-99-p
Suitable for pump output of max. [l/h]:	120			
Connection seal	FKM or EPDM			
Return connection	Yes			
Barrel adapter	Hard PVC/Viton B (accessory)			

6.3 Electrical data

Electrical data of reed switch:

50 V, 0.5 A, 10 W / 10 VA

6.4 Suction lance key

The suction lance key comprises three groups:

- **Group I:** Description/material ↗ 'Suction lance key: Group I' on page 32
- **Group II:** Technical data ↗ 'Suction lance key: Group II' on page 32
- **Group III:** Equipment ↗ 'Suction lance key: Group III' on page 33

Example

Description/material							Technical data				Equipment		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	SGL	V	D	F	e	C	Size 5/8	10	2SS	0475	99	99	p

Complete key: A-SGL-VDFEC-G5/8-10-2SS-0475-99-99-p (mat. no. 10240410)

Suction lance key: Group I

"Description/material" [A|SGL|V|D|F|E|C]

No. 1: 'Item type'	
R	Component assembly
No. 2: 'Description'	
SGL	Suction lance
No. 3: 'Material for suction lance pipe/float'	
P	PP
V	PVC
No. 4: 'Material for bottom part/valve housing'	
D	PVDF
P	PP
V	PVC
No. 5: 'Material for seal 1'	
F	FKM
e	EPDM
No. 6: 'Material for seal 2'	
e	EPDM
No. 7: 'Material for valve ball'	
C	Ceramic
T	PTFE

Suction lance key: Group II

"Technical data" [G3/8|10|2SA|0475]

No. 8: 'Connection thread'	
Size 5/8	G5/8"
No. 9: 'Nominal width of suction pipe'	
10	10 mm
No. 10: 'Level contact version'	
1SA	1 contact, ferrule connection
2SA	2 contacts, plug connector
No. 11: 'Suction lance length'	
0475	475 mm
0725	725 mm
1125	1125 mm
1300	1300 mm
1400	1400 mm

Suction lance key: Group III
"Equipment" [99|99|p]

No. 12: 'Return connection'	
99	Without return connection
06	Hose nozzle for hose ID 6 mm
No. 13: 'Connection material for suction or return connection'	
99	Without hose connection parts
No. 14: 'Packaging'	
p	With packaging

7 Maintenance



NOTICE!

Material damage by using incorrect tools!

Material damage may arise by using incorrect tools. **Use the correct tools.**



DANGER!

Damage and injuries may occur if installation, maintenance or repair work is carried out incorrectly.

All installation, maintenance and repair work must only be performed by authorised and trained specialist personnel in accordance with the applicable local regulations. Safety regulations and prescribed protective clothing when handling chemicals should be followed. Attention must be paid to the information included on the product data sheet for the metering medium used. Prior to all work the feeding of the metering medium should be disconnected and the system cleaned.



NOTICE!

Only original equipment spare parts may be used for maintenance and repairs.

Interval	Maintenance work	Personnel
As required	Check seals and replace if necessary	Operator Specialist

8 Accessories

Connection Material

Illustration	Description	Article no.	EBS no.
	Connecting kit for PE/PTFE hose 4/6 and 6/8mm or PVC hose 6/12mm		
	Con. kit Di/Da 4/6-6/8-6/12-G5/8-PP-GY	252139	On request
	Con. kit Di/Da 4/6-6/8-6/12-G5/8-PV-NA	252140	On request
	Connecting kit for PE/PTFE-hose 5/8mm		
	Con. kit Di5/Da8-G5/8-PP-GY	252112	On request
	Con. kit Di5/Da8-G5/8-PVDF-NA	252111	On request
	Connecting kit for PE/PTFE-hose 9/12mm		
	Con. kit Di9/Da12-G5/8-PP-GY	252116	On request
	Con. kit Di9/Da12-G5/8-PVDF-NA	252115	On request
	Connecting kit for PVC hose 6/12 and 10/16mm		
	Con. kit Di/Da 6/12-10/16-G5/8-PP-GY	249237	On request
	Con. kit Di/Da 6/12-10/16-G5/8-PV-NA	249216	On request
	Connecting kit for PVC hose 12/21mm		
	Con. kit PP G5/8"i - hose 12/21	249234	On request
	Con. kit PVDF G5/8"i - hose 12/21	249233	On request

Suction lance adapter

Illustration	Description	Article no.	EBS no.
	Adapter insert cap (soft PVC) For fitting onto: ■ Canister 10 l and 20 l	286198	On request
	Adapter threaded union (hard PVC) Thread pitch: 5 mm Interior thread dimension: 56 mm Exterior thread dimension: 61 mm For screwing onto: ■ Canister 30 l ■ Container 60 - 120 l	286197	On request
	Suction lance adapter (hard PVC/Viton B) for canister or barrel	288549	On request
	Suction lance adapter (hard PVC/Viton B) for barrel (L-ring plus – 220 l barrel with Mauser 2")	288547	On request
	Suction lance adapter (hard PVC/Viton B) for container (ECOBULK container with skid pallet) for screwing into screw cap with 2" Tri-Sure bung	288548	On request
	Adapter insert cap (hard PVC/Viton B) suitable for outgassing products Return connection: 4/6, 6/8 or 6/12 mm (ID/AD) Air bleed connection: 6/12 mm (ID/AD) For fitting onto: ■ Canister 30 l ■ Container 60-200 l	288534	On request
	Threaded union adapter (hard PVC/Viton B) suitable for outgassing products Return connection: 4/6, 6/8 or 6/12 mm (ID/AD) Air bleed connection: 6/12 mm (ID/AD) Thread pitch: 5 mm Interior thread dimension: 63 mm Exterior thread dimension: 69 mm for barrel with internal thread (L-ring plus – 220 l barrel)	288535	On request

Hoses

Art. no.	Description
417400301	Hose Da 6x1mm (4/6) PE - soft natural
417400215	Hose Da 6x1mm (4/6) PTFE, natural
417400300	Hose Da 8x1.5 (5/8) PE soft natural
417400213	Hose Da 8x1.5 (5/8) PTFE natural
417400310	Hose Da 8x1(6/8)soft PE natural
417400224	Hose Da 8x1mm (6/8) PTFE, natural
417400304	Hose Da 12x1.5mm (9/12) LDPE natural
417400281	Hose Da 12x1.5mm (9/12) PTFE natural
417400123	PVC fabric hose 6/12 mm
417400126	PVC fabric hose 10/16 mm
417400127	PVC fabric hose 12/21 mm
415013303	Stainless steel hose clamp DI10-16
415013304	Stainless steel hose clamp DI13-27

9 Decommissioning, disassembly, environmental protection

- Personnel: ■ Specialist
- Protective equipment: ■ Chemical-resistant protective gloves
■ Protective eyewear
■ Safety shoes

**DANGER!**

Risk of injury due to the disregard of the specified personal protective equipment (PPE)!

For all disassembly work, please respect the use of the PSA which is specified on the product data sheet.

9.1 Decommissioning

To take the equipment out of operation, proceed as follows:

1. ► Before carrying out any subsequent work, switch off the electrical supply and secure it against being switched on again.
2. ► Relieve line pressure in the dosing system.
3. ► Drain dosing medium completely from the suction lance
4. ► Thoroughly rinse the suction lance to remove chemical residues.
5. ► Remove the remaining processing materials and dispose of them in an environmentally-friendly way.

9.2 Disposal and environmental protection

All components are to be disposed of in accordance with prevailing local environmental regulations. Dispose of them accordingly, depending on the condition, existing regulations and with due regard for current provisions and criteria.

Recycle the dismantled components:

- Scrap all metals.
- Electrical waste and electronic components must be recycled.
- Recycle all plastic parts.
- Dispose of all other components in line with their material characteristics.
- Hand in batteries at communal collection points or dispose of them through a specialist.



ENVIRONMENT!

Risk of environmental damage from incorrect disposal!

Incorrect disposal can be a threat to the environment.

- Electrical scrap, electronic components, lubricants and other operating fluids must be disposed of by approved waste disposal service providers
- If in doubt, contact your local authority, or an approved waste disposal service provider, for information on correct disposal.

Prior to disposal, all parts which are in contact with media must be decontaminated. Oils, solvents, detergents and contaminated cleaning tools (brushes, cloths, etc.) must be disposed of in compliance with local requirements, in accordance with the prevailing waste code and with due attention to the notes contained in the manufacturers' safety data sheets.



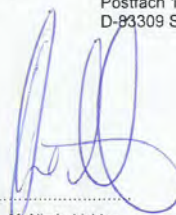
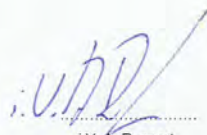
ENVIRONMENT!

Reduction or avoidance of waste from reusable raw materials

Do not dispose of any components in the domestic waste. Take them instead to the appropriate collection points for recycling.

Please follow the Directive on Waste Electrical and Electronic Equipment 2012/19/EU, the aim and purpose of which is the reduction or prevention of waste from recyclable raw materials. This directive requires member states of the EU to increase the collection rate of electronic waste so that it can be recycled.

10 Declaration of Incorporation

D	GB	F
Konformitätserklärung / Declaration of Conformity / Déclaration de Conformité		
		
	gemäß EG Richtlinie referring to EC Directive référant à la EC directive	2011/65/EU, RoHS 2011/65/EU, RoHS 2011/65/EU, RoHS
ECOLAB Engineering GmbH Postfach 1164 D-83309 Siegsdorf		
Wir erklären hiermit, dass das folgende Produkt We herewith declare that the following product Nous déclarons que le produit suivant		
Beschreibung / description / description	Sauglanze Suction lance Lance d'aspiration	
Modell / model / modèle	Suction lance w. floater (LL / opt. PLL)	
Typ / part no / type	All Ecolab Engineering part numbers	
Gültig ab / valid from / valable dès:	2020-03-25	
auf das sich diese Erklärung bezieht, der / den folgenden Norm(en) oder normativen Dokument(en) entspricht: to which this declaration relates is in conformity with the following standard(s) or other normative document(s): auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou autre(s) document(s) normatif(s) EN IEC 63000:2018		
gemäß den Bestimmungen der Richtlinie(n): following the provisions of directive(s): conformément aux dispositions de(s) directive(s): 2011/65/EU		
Bevollmächtigter für die Zusammenstellung der technischen Unterlagen: Authorised person for compiling the technical file: Personne autorisée pour constituer le dossier technique:		
	Ecolab Engineering GmbH Postfach 1164 D-83309 Siegsdorf	
Ort und Datum der Ausstellung Place and date of issue Lieu et date	 M. Niederbichler Geschäftsführer Company Manager Directeur  i.V.A. Ruppert Entwicklung und Konstruktion Research & Development Développement et la Construction	
83313 Siegsdorf, 2020-03-25		

Annex 1 to WI-EU-RDE-602 Rev. 0 / 2019-06-13

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Dokumenten-Nr.: document no.:	Suction lance D32
Erstelldatum: date of issue:	18.10.2023
Version / Revision: version / revision:	MAN053596 Rev. 2-10.2023
Letze Änderung: last changing:	11.10.2023

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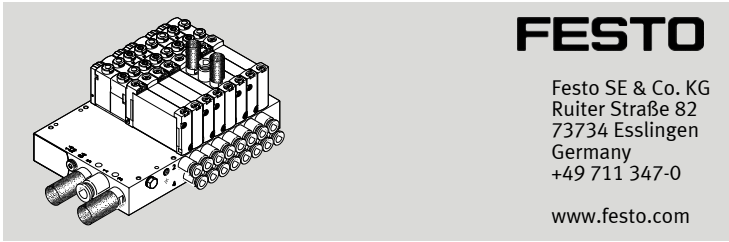
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B.2 Valve terminal VTUG [FESTO]

Name	Data
Designation	Valve terminal
Type	VTUG-M / VTUG-V [FESTO]
Number	8109568 / 01-2020
Type of manual	Instructions
Manufacturer	FESTO Postfach D-73726 Esslingen +49 711 347-0 www.festo.com

VTUG-...-M/VTUG-...-V
Valve terminal



Instructions | Assembly, Installation

8109568
2020-01h
[8109570]



Translation of the original instructions

© 2020 all rights reserved to Festo SE & Co. KG

IO-Link® is a registered trademark of its respective trademark holder in certain countries.

1 Applicable documents

All available documents for the product → www.festo.com/sp.

Documents	Product	Contents
Description	Bus node CTEU-...	Assembly, Installation, Operating
Instructions	H-rail mounting VAME-T-M4	Assembly
Instructions	H-rail mounting VAME-T-M5	Assembly
Instructions	Manifold rail VABM-L1-...GR	Assembly
Instructions	Manifold rail VABM-L1-...HWS1/2-...GR	Assembly
Instructions	Supply plate VABF-L1-14-P3A4-G18	Assembly
Instructions	Separator VABD-... B	Assembly
Instructions	Inscription label holder ASCF-H-L1	Assembly
Instructions	Identification holders ASLR-D	Assembly
Instructions	Connecting cable NEBV-S1G-...-K-...-LE25	Assembly
Instructions	Connecting cable NEBV-S1G-...-K-...-LE44	Assembly

Tab. 1 Applicable documents

2 Safety

2.1 General safety instructions

- Prior to mounting, installation and maintenance work: Switch off power supply and secure it from being switched back on.
- Prior to mounting, installation and maintenance work: Switch off compressed air supply and secure it from being switched back on.
- Exhaust system parts with stored compressed air.
- This product can generate high frequency malfunctions, which may make it necessary to implement interference suppression measures in residential areas.
- Use PELV circuits that guarantee a reinforced isolation from the mains network for the electrical power supply with extra-low voltages.
- Observe IEC 60204-1/EN 60204-1.
- Comply with the handling specifications for electrostatically sensitive devices.
- Only use the product if it is in perfect technical condition.
- Only use the product in original status without unauthorised modifications.
- Use exclusively in combination with modules and components that are certified for the specific product variant and have been tested and approved by Festo.

2.2 Intended use

The product is used to control pneumatic actuators and is intended for installation in machines and automated systems.

2.3 Training of qualified personnel

Installation, commissioning, maintenance and disassembly should only be conducted by qualified personnel. The specialized personnel must be familiar with the installation and operation of electrical and pneumatic control systems.

3 Additional information

- Accessories → www.festo.com/catalogue.
- Spare parts → www.festo.com/spareparts.

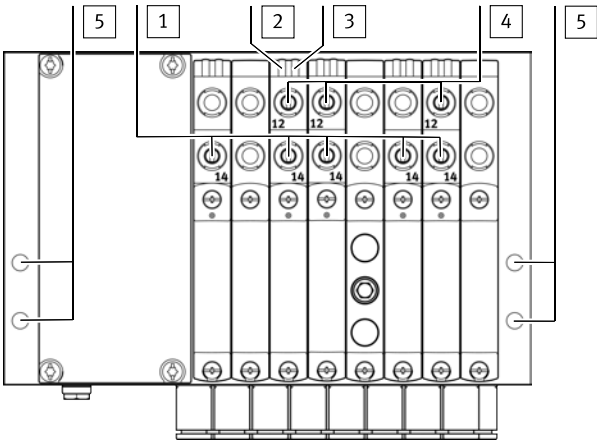
4 Service

Contact your regional Festo contact person if you have technical questions
→ www.festo.com.

5 Design

5.1 Product design

5.1.1 Standard valve terminal (straight sub-base)



- 1 Manual override 14 (non-detenting/detenting by turning)
- 2 LED solenoid coil 12
- 3 LED solenoid coil 14
- 4 Manual override 12 (non-detenting/detenting by turning)
- 5 Mounting holes

Fig. 1 Standard valve terminal (straight sub-base)

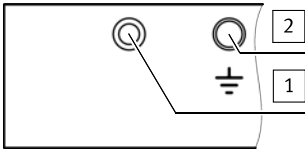


Fig. 2 Width 10 and 18 mm

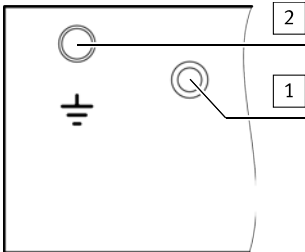
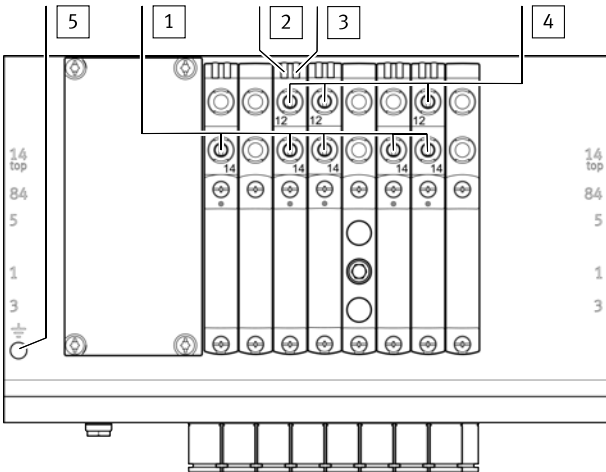


Fig. 3 Width 14 mm

5.1.2 Valve terminal for installation in the control cabinet (T-profile sub-base)



- 1 Manual override 14 (non-detenting/detenting by turning)
- 2 LED solenoid coil 12
- 3 LED solenoid coil 14
- 4 Manual override 12 (non-detenting/detenting by turning)
- 5 Earth terminal

Fig. 4 Valve terminal for installation in the control cabinet (T-profile sub-base)

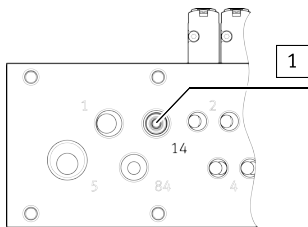


Fig. 5 Width 10 mm

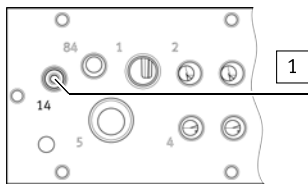


Fig. 6 Width 14 mm

5.1.3 Valve terminal with hot swap function

Hot swap for channel 1

The hot swap function for channel 1 enables the replacement of a valve during operation of the valve terminal.

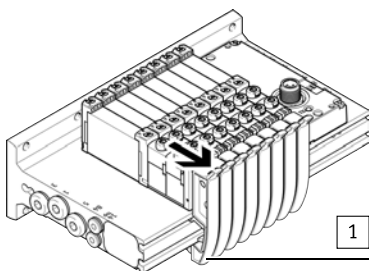


Fig. 7 Hot swap for channel 1

To replace the valve, proceed as follows:

1. Pull lever in the direction of the arrow.
 - ↳ The valve is disconnected from the compressed-air supply (channel 1) and at the same time the working ports (channels 2 and 4) are exhausted on the valve side.
2. Replace valve.
3. If required, lock the lever (hole: $\varnothing$ 4.4 mm) with a pin or bolt ($\varnothing$ 4 mm) to prevent accidental actuation.

Hot swap for channels 2 and 4

The hot swap function for channels 2 and 4 enables replacement of an actuator during operation of the valve terminal.

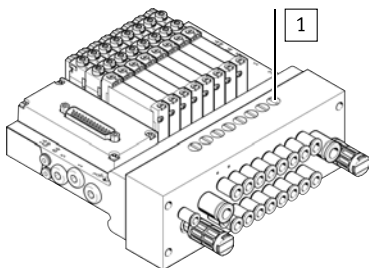


Fig. 8 Hot swap for channels 2 and 4

To replace the actuator, proceed as follows:

1. Screw in plunger with screwdriver.
 - ↳ The working ports (channels 2 and 4) are blocked on the valve side and actuator side.
2. Replace actuator.

5.2 Connections

5.2.1 Valve terminal VTUG-...-M

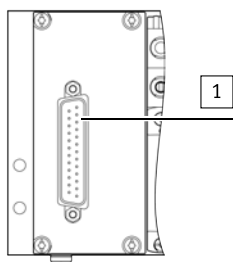


Fig. 9 Connections of the valve terminal VTUG-...- M

- 1 Pilot air selector/blanking plug (port 14)

5.2.2 Valve terminal VTUG-...-V

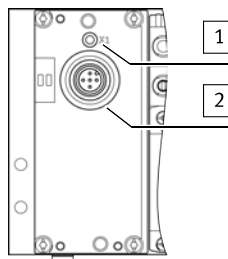


Fig. 10 Connections of the valve terminal VTUG-...- V

- 1 LED X1 (status)
2 IO-Link/I-Port connection

6 Assembly

The valve terminal is designed for mounting on an H-rail.

NOTICE!

It is not approved for mounting on an H-rail if vibration and shock loads are expected.

The valves can be labelled with an inscription label holder ASCF-H-L1 or with identification holders ASLR-D.

The IO-Link/I-Port connecting plate can be fitted with the inscription label ASLR-C-E4.

7 Pneumatic installation

7.1 Pilot air supply for pilot control

The valve terminal is supplied as standard with internal pilot air branched off from channel 1. Ports 14 are sealed with blanking plugs. The valve terminal can optionally be supplied with external pilot air using the pilot air selector. The pilot air is then supplied via port 14 of the valve terminal → 5.1 Product design. Mounting of the pilot air selector is described in the instructions VABM-L1-... GR or VABM-L1-... HWS1 / 2-...- GR.

i

When using the module VTUG hot swap, only an internal pilot air supply is permitted.

7.2 Exhaust

If there are more than 6 simultaneously switched valves, exhaust on both sides is required.

7.3 Supply plates (optional)

i

The supply plates VABF-L1-14-P3A4-G18-T1 and VABF-L1-18-P3A4-G14-T1 must not be equipped with fittings with R-thread.

- Use only fittings with G-thread.

7.4 Pressure zones

The valve terminal can be divided into pressure zones using separators. Mounting of the separators is described in the VABD-... B instructions.

7.5 Check valves

The check valves reduce the back pressure (dynamic pressure) of the air from exhaust ducts 3 and 5 into the solenoid valve. The check valves are integrated into the channels of the sub-base to prevent unintended switching of actuators. Mounting of the check valves in the exhaust ducts 3 and 5 of the sub-base is described in the VABM-L1-... HWS1 / 2-...- GR instructions.

7.6 Fixed flow restrictors

The fixed flow restrictors can be used to set the exhaust flow rate permanently in channels 3 and 5. Mounting of the fixed flow restrictors in exhaust ducts 3 and 5 of the sub-base is described in the instructions VABM-L1-... HWS1 / 2-...- GR.

7.7 Manual override

After mounting the inscription label holder ASCF-H-L1 or the identification holder ASLR-D, these valves can only be actuated non-detenting. A combination with the cover cap VAMC-L1-CD for detenting operation is not permissible.

8 Electrical installation

8.1 Power Supply

The operating voltage is supplied via the IO-Link master or the CTEU bus node. The load voltage is supplied via the IO-Link master port class B or the CTEU bus node. When using a IO-Link master port class A, the load voltage supply must be supplied separately. Separate fuses are required for operating and load voltage.

8.2 Earth terminal

Connect the valve terminal to the functional earth via the earth terminal → 5.1 Product design.

i

The anodised layer must be penetrated to ensure a conductive connection. If necessary, use a retaining screw with toothed disc.

8.3 Electrical interfaces VTUG-...-M

Depending on the connection variant, the valve terminal VTUG -...- M can actuate up to 48 solenoid coils via a multi-pin plug connection. Each solenoid coil of the valve terminal VTUG-...-M must be assigned to a specific pin of the multi-pin plug. Use the following sockets with cables from the Festo range of accessories for connecting the valve terminal VTUG with multi-pin plug connection.

Sockets with cables		
Number of controllable coils	≤ 24	≤ 42
Protection class	IP40 or IP67	IP40 or IP67
Sub-D socket with cable	NEBV-S1... 25 -...- LE25	NEBV-S1... 25 -...- LE44

Tab. 2

i

Double-solenoid valves with 2 coils cannot be mounted on all valve positions. Observe the following tables.

44-pin Sub-D-HD connection (variant 21)

Pin	Address	Valve position no./coil
11631 +++++ +++++ +++++ 153044		
1	0	0/14
2	1	0/12
3	2	1/14
4	3	1/12
5	4	2/14
6	5	2/12
7	6	3/14
8	7	3/12
9	8	4/14
10	9	4/12
11	10	5/14
12	11	5/12
13	12	6/14
14	13	6/12
15	14	7/14
16	15	7/12
17	16	8/14
18	17	8/12
19	18	9/14
20	19	9/12
21	20	10/14
22	21	10/12
23	22	11/14
24	23	11/12
25	24	12/14
26	25	12/12
27	26	13/14
28	27	13/12
29	28	14/14
30	29	14/12
31	30	15/14
32	31	15/12
33	32	16/14
34	33	16/12
35	34	17/14
36	35	17/12
37	36	18/14
38	37	19/14
39	38	20/14
40	39	21/14
41	40	22/14
42	41	23/14
43	Com for coil 0 ... 41 ¹⁾	
44	Com for coil 0 ... 41 ¹⁾	

1) Connect 0 V with positive-switching control signals, 24 V with negative-switching control signals.

Tab. 3 44-pin Sub-D-HD connection (variant 21)

25-pin Sub-D connection (variant V20)

Pin	Address	Number of valve positions (variant V20)			
		4 ... 12	16	20	24
1 14	+++++ +++++	13 25			
		Valve position no./coil designation			
1	0	0/14	0/14	0/14	0/14
2	1	0/12	0/12	0/12	23/14
3	2	1/14	1/14	1/14	1/14
4	3	1/12	1/12	1/12	22/14
5	4	2/14	2/14	2/14	2/14
6	5	2/12	2/12	2/12	21/14
7	6	3/14	3/14	3/14	3/14
8	7	3/12	3/12	3/12	20/14
9	8	4/14	4/14	4/14	4/14
10	9	4/12	4/12	19/14	19/14
11	10	5/14	5/14	5/14	5/14
12	11	5/12	5/12	18/14	18/14
13	12	6/14	6/14	6/14	6/14
14	13	6/12	6/12	17/14	17/14
15	14	7/14	7/14	7/14	7/14
16	15	7/12	7/12	16/14	16/14
17	16	8/14	8/14	8/14	8/14
18	17	8/12	15/14	15/14	15/14
19	18	9/14	9/14	9/14	9/14
20	19	9/12	14/14	14/14	14/14
21	20	10/14	10/14	10/14	10/14
22	21	10/12	13/14	13/14	13/14
23	22	11/14	11/14	11/14	11/14
24	23	11/12	12/14	12/14	12/14
25	–	COM ¹⁾			

1) Connect 0 V with positive-switching control signals, 24 V with negative-switching control signals.

Tab. 4 25-pin Sub-D connection (variant V20)

25-pin Sub-D connection (variants V22 ... V25)

Pin	Address	Number of valve positions (variant)			
		4 ... 10 (V22) ¹⁾	12 (V23) ¹⁾	16 (V24) ¹⁾	20 (V25) ¹⁾
1 14	+++++ +++++ 13 25				
		Valve position no./coil designation			
1	0	0/14	0/14	0/14	0/14
2	1	0/12	0/12	0/12	1/14
3	2	1/14	1/14	1/14	2/14
4	3	1/12	1/12	1/12	3/14
5	4	2/14	2/14	2/14	4/14
6	5	2/12	2/12	2/12	5/14
7	6	3/14	3/14	3/14	6/14
8	7	3/12	3/12	3/12	7/14
9	8	4/14	4/14	4/14	8/14
10	9	4/12	4/12	5/14	9/14
11	10	5/14	5/14	6/14	10/14
12	11	5/12	5/12	7/14	11/14
13	12	6/14	6/14	8/14	12/14
14	13	6/12	6/12	9/14	13/14
15	14	7/14	7/14	10/14	14/14
16	15	7/12	7/12	11/14	15/14
17	16	8/14	8/14	12/14	16/14
18	17	8/12	9/14	13/14	17/14
19	18	9/14	10/14	14/14	18/14
20	19	9/12	11/14	15/14	19/14
21	–	Com for coil 16 ... 19 ²⁾			
22	–	Com for coil 12 ... 15 ²⁾			
23	–	Com for coil 8 ... 11 ²⁾			
24	–	Com for coil 4 ... 7 ²⁾			
25	–	Com for coil 0 ... 3 ²⁾			

1) Not available for valve terminal for installation in the control cabinet with T-profile sub-base.

2) Connect 0 V with positive-switching control signals, 24 V with negative-switching control signals.

Tab. 5 25-pin Sub-D connection (variants V22 ... V25)

50-pin connection for ribbon cable (variant 26)

Pin	Address	Valve position no./coil
2	50	
++++++ ++++++ ++++++		
1	49	
1	0	0/14
2	1	0/12
3	2	1/14
4	3	1/12
5	4	2/14
6	5	2/12
7	6	3/14
8	7	3/12
9	8	4/14
10	9	4/12
11	10	5/14
12	11	5/12
13	12	6/14
14	13	6/12
15	14	7/14
16	15	7/12
17	16	8/14
18	17	8/12
19	18	9/14
20	19	9/12
21	20	10/14
22	21	10/12
23	22	11/14
24	23	11/12
25	24	12/14
26	25	12/12
27	26	13/14
28	27	13/12
29	28	14/14
30	29	14/12
31	30	15/14
32	31	15/12
33	32	16/14
34	33	16/12
35	34	17/14
36	35	17/12
37	36	18/14
38	37	18/12
39	38	19/14
40	39	19/12
41	40	20/14
42	41	20/12
43	42	21/14
44	43	21/12
45	44	22/14
46	45	22/12
47	46	23/14
48	47	23/12
49	Com for coil 0 ... 41 ¹⁾	
50	Com for coil 0 ... 41 ¹⁾	

1) Connect 0 V with positive-switching control signals, 24 V with negative-switching control signals.

Tab. 6 50-pin connection for ribbon cable (variant 26)

26-pin connection for ribbon cable (variant V20)

Pin	Address	Number of valve positions			
		12	16	20	24
2 26 ++++++ ++++++ 1 25					
		Valve position no./coil designation			
1	0	0/14	0/14	0/14	0/14
2	1	0/12	0/12	0/12	23/14
3	2	1/14	1/14	1/14	1/14
4	3	1/12	1/12	1/12	22/14
5	4	2/14	2/14	2/14	2/14
6	5	2/12	2/12	2/12	21/14
7	6	3/14	3/14	3/14	3/14
8	7	3/12	3/12	3/12	20/14
9	8	4/14	4/14	4/14	4/14
10	9	4/12	4/12	19/14	19/14
11	10	5/14	5/14	5/14	5/14
12	11	5/12	5/12	18/14	18/14
13	12	6/14	6/14	6/14	6/14
14	13	6/12	6/12	17/14	17/14
15	14	7/14	7/14	7/14	7/14
16	15	7/12	7/12	16/14	16/14
17	16	8/14	8/14	8/14	8/14
18	17	8/12	15/14	15/14	15/14
19	18	9/14	9/14	9/14	9/14
20	19	9/12	14/14	14/14	14/14
21	20	10/14	10/14	10/14	10/14
22	21	10/12	13/14	13/14	13/14
23	22	11/14	11/14	11/14	11/14
24	23	11/12	12/14	12/14	12/14
25	–	COM ¹⁾			
26	–	Com ¹⁾			

1) Connect 0 V with positive-switching control signals, 24 V with negative-switching control signals.

Tab. 7 26-pin connection for ribbon cable (variant V20)

8.4 Electrical interfaces VTUG- ... -V

8.4.1 IO-LinkI-port interface

Through the IO-Link/I-Port interface , the valve terminal can be connected as follows:

- Directly to the fieldbus, through mounting of a CTEU bus node on the valve terminal
- Decentralised to an external IO-Link master
- Decentralised at an external I-Port master (e.g. CTEU)

Electrical connection:

- Plug connector, 5-pin, M12x1, A-coded

Port Pin Allocation IO-Link/I-Port Interface

Connection	Pin	Allocation	Function
	1	24 V _{EL/SEN} (PS)	Operating voltage supply
	2	24 V _{VAL / OUT} (PL)	Load voltage supply
	3	0 V _{EL/SEN} (PS)	Operating voltage supply
	4	C/Q	Data communication
	5	0 V _{VAL / OUT} (PL)	Load voltage supply
		Housing, FE	Functional earth (optional)

Tab. 8 Port Pin Allocation IO-Link/I-Port Interface

Device Description File IODD

If the valve terminal is operated as a IO-Link device, download the corresponding device description file: → www.festo.com/sp.

8.4.2 Fieldbus Interface

Information on the bus nodes CTEU -... ➔ www.festo.com/sp.

9 Commissioning

NOTICE!

Material damage due to incorrect or incomplete installation.

The following conditions must be fulfilled for commissioning:

- The system must be fully assembled.
- The electrical installation must be complete and checked.
- The pneumatic installation must be complete and checked.

10	Operation
10.1	Manual override

i

Observe permissible actuating force ≤ 20 N.

10.2 LED display X1, IO-Link/I-Port communication
The meaning of the LED display depends on the revision of the software. The software revision is printed on the product label at the IO-Link/I-Port connection.

LED X1	Meaning (up to Rev 07)	Meaning (from Rev. 08)
 green light	Normal operating status	Data communication faulty.
 flashing green	Data communication faulty.	Normal operating status
 flashing alternately red/green	24 V load voltage supply faulty.	–
 flashing red	Device error	
 red light	24 V load voltage supply and data communication faulty.	24 V load voltage supply faulty. Data communication may be faulty.
 Off	No 24 V operating voltage supply or undervoltage	

Tab. 9 LED X1

- 10.3 Address Assignment**
- A maximum of 48 solenoid coils can be actuated.
 - Valve position 0 is located on the left-hand side.
 - Address assignment is in ascending order without gaps, from left to right.
 - Address assignment does not depend on whether the module is equipped with blanking plates.
 - A valve position always occupies two addresses. The following allocation applies here:
 - Solenoid coil for switching position 14: low-value address
 - Solenoid coil for switching position 12: higher-value address

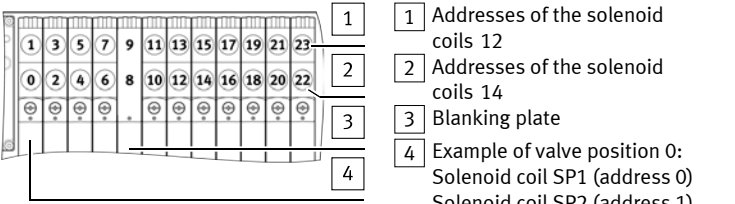


Fig. 11 Example of address assignment with 12 valve positions.

11 Error diagnostics valve terminal VTUG-...-V

Error code		Type	Malfunction and error handling
MSB	LSB		
50h	00h	Error	Device error – Switch the device off and on again; if the error persists, the device is defective.
51h	12h	Warning	Error in the load voltage supply – Check load voltage supply

Tab. 10

12 Technical data

General technical data	Valve width [mm]		
	10	14	18
Mounting position			
Wall mounting	Any		
H-rail mounting	Horizontal		
Environmental conditions			
Ambient temperature	[°C]	-5 ... +60 (VTUG-...-M)	
		-5 ... +50 (VTUG-...-V)	
Storage temperature	[°C]	-20 ... +60	-10 ... +60
Degree of protection	IP40/IP65/IP67 ¹⁾		
Materials	AL, PA, POM, NBR, PU, PC		

1) Valve terminal completely mounted, plug plugged in.

Tab. 11 General technical data

Pneumatic properties	Valve width [mm]		
	10	14	18
Number of valve positions	4 ... 24		
Operating and pilot medium	Compressed air to ISO 8573-1:2010 [7:4:4]		
Operating pressure with external pilot air (IC = ID code)			
5/3; 5/2; 2x 3/2; 3/2-way valves (IC: B, E, G; J, A, M, P; VH, VK, VN, VX, VW)	[bar]	-0.9 ... +10	
2x 3/2-way valves (IC: H, K, N)	[bar]	1.5 ... 10	
Pilot pressure with external pilot air ¹⁾ (IC = ID code)			
5/3-way, 5/2-way valves (IC: B, E, G, A)	[bar]	3 ... 8	
5/2-way valve (impulse) (IC: J)	[bar]	1.5 ... 8	
5/2-way; 3/2-way valve (IC: M, P, VX, VW)	[bar]	2.5 ... 8	
2x 3/2-way valve (IC: VH, VK, VN)	[bar]	2 ... 8	
2x 3/2-way valve with pneumatic spring (IC: H, K, N)	[bar]	1.5 ... 8	
Operating and pilot pressure with internal pilot exhaust air ¹⁾²⁾ (IC = ID code)			
5/3-way; 5/2-way valves (IC: B, E, G, A)	[bar]	3 ... 8	
5/2-way valves (impulse) (IC: J)	[bar]	1.5 ... 8	
5/2-way; 3/2-way valves (IC: M, P, VX, VW)	[bar]	2.5 ... 8	3.5 ... 8
2x 3/2-way valve (IC: VH, VK, VN)	[bar]	2 ... 8	
2x 3/2-way valve with pneumatic spring (IC: H, K, D)	[bar]	1.5 ... 8	

1) For operation with external pilot air: the pilot pressure must be at least 50% of the operating pressure.
2) If there are more than 12 simultaneously switched valves: reduce pilot pressure to ≤ 6 bar.

Tab. 12 Pneumatic properties

Electrical Characteristics		Valve width [mm]		
		10	14	18
Control voltage (reverse polarity protected)	[V DC]	24 ± 10 %		
Current consumption per solenoid coil at 24 V DC				
Pick-up current: 0 ... 20 ms	[mA]	47		–
Holding current: ≥ 20 ms	[mA]	15.5		–
Intrinsic current consumption				
Valves	[mA]	30		
Electronics	[mA]	30		

Tab. 13 Electrical Characteristics

IO-Link Interface	
Specification	V1.1 (V1.0 compatible)
Baud rate	Com 2 (38.4 kBit)
Output data	2 bytes (up to 8 valves)
	4 bytes (up to 16 valves)
	6 bytes (up to 24 valves)

Tab. 14 IO-Link Interface

Tightening Torques		Valve width [mm]		
		10	14	18
Electrical interface	[Nm]	0.7 ± 20%		
Bus node CTEU-... on VTUG -...- V	[Nm]	0.7 ± 0.10		
Valve on terminal strip	[Nm]	0.3 ± 50 %	0.55 ± 20%	0.7 ± 20%
Selector	[Nm]	1.5 – 30%		5 – 20%
Earthing screw	[Nm]	1 ± 20 %		

Tab. 15 Tightening Torques

B.3 Compressed air unit [FESTO]

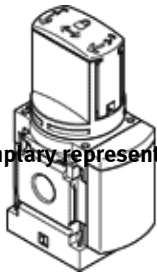
Name	Data
Designation	Compressed air unit
Type	MSB4 [FESTO]
Number	10240488
Type of manual	Operating instructions
Manufacturer	Festo SE & Co. KG Postfach D-73726 Esslingen +49 (0)711 347 0 www.festo.com

on-off valve MS4-EM1

Part number: 541266

FESTO

For manifold assembly, with G thread.



Exemplary representation

Data sheet

Overall data sheet – Individual values depend upon your configuration.

Feature	Value
Design structure	Rotary slide valve
Type of actuation	manual
Exhaust-air function	not throttleable
Type of piloting	direct
Valve function	3/2 bistable
Pressure gauge	Prepared for G1/4 Prepared for G1/8 with pressure sensor with pressure gauge
Operating pressure	0 ... 14 bar
Standard nominal flow rate	1,200 ... 2,200 l/min
Operating medium	Compressed air in accordance with ISO8573-1:2010 [7:4:4] Inert gases
Note on operating and pilot medium	Lubricated operation possible (subsequently required for further operation)
Corrosion resistance classification CRC	2 - Moderate corrosion stress
Materials note	Conforms to RoHS
Medium temperature	-10 ... 60 °C
Ambient temperature	-10 ... 60 °C
Authorisation	c UL us - Recognized (OL)
CE mark (see declaration of conformity)	to EU directive explosion protection (ATEX)
ATEX category Gas	II 2G
ATEX category Dust	II 2D
Explosion ignition protection type Gas	Ex h IIC T6 Gb X
Explosion ignition protection type Dust	Ex h IIIC T60°C Db X
Explosion-proof ambient temperature	-10°C ≤ Ta ≤ +60°C
Food-safe	See Supplementary material information
Mounting type	Line installation with accessories Optional
Assembly position	Any
Flow direction	non reversible
Pneumatic connection, port 3	G1/4
Material seals	TPE-U(PU)
Material housing	Aluminium die cast

filter regulator MS4-LFR

Part number: 526489

★ Core product range

For manifold assembly, with G thread.

FESTO



Exemplary representation

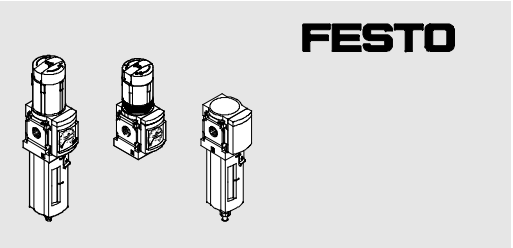
Data sheet

Overall data sheet – Individual values depend upon your configuration.

Feature	Value
Size	4
Series	MS
Actuator lock	Rotary knob with lock Rotary knob with integrated lock with accessories, lockable
Assembly position	Vertical +/- 5°
Grade of filtration	5 ... 40 µm
Condensate drain	fully automatic manual rotary semi-automatic
Design structure	Filter regulator with pressure gauge Filter regulator without pressure gauge
Controller function	Output pressure constant with secondary exhaust with return flow
Bowl guard	Plastic guard integrated as metal shell
Pressure gauge	Prepared for G1/4 Prepared for G1/8 with pressure sensor with pressure gauge
Operating pressure	0.8 ... 14 bar
Pressure regulation range	0.3 ... 12 bar
Max. pressure hysteresis	0.25 bar
Standard nominal flow rate	850 ... 1,800 l/min
Authorisation	c UL us - Recognized (OL)
CE mark (see declaration of conformity)	to EU directive explosion protection (ATEX)
ATEX category Gas	II 2G
ATEX category Dust	II 2D
Explosion ignition protection type Gas	Ex h IIC T6 Gb X
Explosion ignition protection type Dust	Ex h IIIC T60°C Db X
Explosion-proof ambient temperature	+5°C ≤ Ta ≤ +60°C
Operating medium	Compressed air to ISO 8573-1:2010 [-:4:-] Compressed air in accordance with ISO8573-1:2010 [7:4:-] Inert gases
Corrosion resistance classification CRC	2 - Moderate corrosion stress
Storage temperature	-10 ... 60 °C
Food-safe	See Supplementary material information
Medium temperature	-10 ... 60 °C
Ambient temperature	-10 ... 60 °C
Mounting type	Front panel installation Line installation

Feature	Value
	with accessories Optional
Materials note	Conforms to RoHS
Material of connecting plate	Aluminium die cast
Material seals	NBR
Material filter	PE
Material housing	Aluminium die cast
Material membrane	NBR
Material separating plate	POM

MS4/6-LFR/LR(B)
MS4/6-LF(M)/LFX
MS6-LWS



Bedienungsanleitung
Operating instructions
Instrucciones de utilización

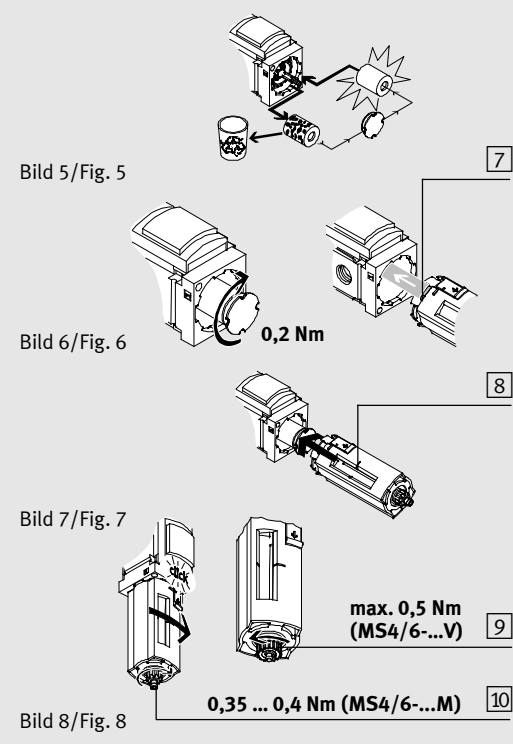
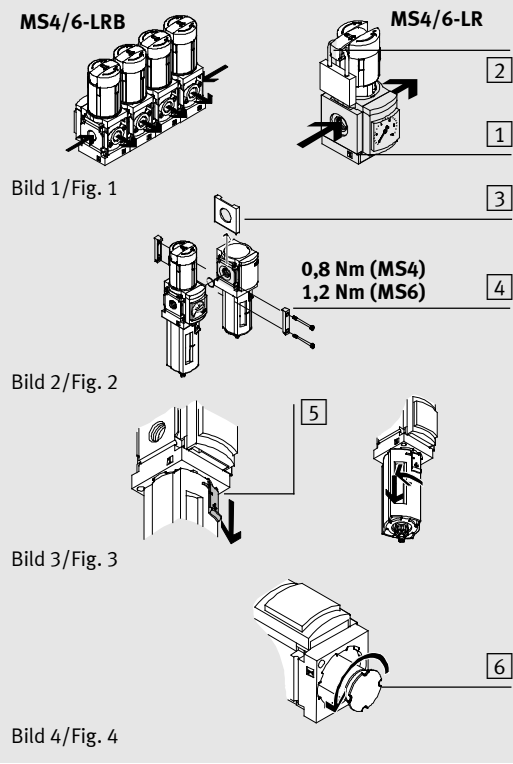
Festo SE & Co. KG
Postfach
D-73726 Esslingen
Phone:
+49/711/347-0
www.festo.com

Original: de

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[8040785]

→ **Hinweis, Note**

en Fitting and commissioning are to be carried out only by authorized trained personnel in accordance with the operating instructions. These products are intended for use exclusively with compressed air. They are not suitable for use with other media (fluids or gases).
Controllers without secondary venting (applies only to MS4/6-...**OS**):
Note that the secondary pressure p2 can rise to the level of the primary pressure p1 if no consumption is required at the output (e.g. if the operating pressure is not switched off overnight).



1 Application **en**

As designed, the filter control valve MS4/6-LFR and pressure control valve MS4/6-LR(B) control the work pressure set in the following string. The MS4/6-LFR/LR(B) thereby smooths out: fluctuations in pressure. The MS4/6-LRB enables pressure supply on both sides (→ Fig. 1). The filter control valve MS4/6-LFR and filter MS4/6-LF with centrifugal separator remove dirt particles and condensate, the fine/ultrafine filter MS4/6-LFM dirt particles and oil drops, the activated carbon filter MS4/6-LFX gaseous oil components and the water separator MS6-LWS condensate from the compressed air blown through it.

- 2 Conditions of use**
- Compare the maximum values specified in these operating instructions with your actual application (e.g. pressures, torques). Only if the loading limits are observed can the product be operated in accordance with the relevant safety guidelines.
 - Remove dirt particles in the supply lines by blowing out the tubing with compressed air. In this way you will protect the device from premature failure or heavy wear (see DIN ISO 4414, section 9.4).
 - Use the product in its original state without undertaking any modifications.

- 3 Fitting mechanical components**
- Use shut-off valves in the compressed air tubing for exhausting the system (e.g. for replacing a filter).
 - Note the direction of flow from 1 to 2. The figure [1] on the product housing serves as an orientation.
 - Place the MS4/6-LF... with sufficient space underneath the filter bowl (min. 100 mm). This facilitates replacing the filter cartridge.
 - Adjust the MS4/6-LF.../MS6-LWS standing vertically (±5°).

- Fitting together a filter combination:
- Note the sequence of filters in the direction of flow. If fitted correctly, the fine filter MS4/6-LFM-...-B (1 µm) comes first, then the micro filter MS4/6-LFM-...-A (0.01 µm) and last the active carbon filter MS4/6-LFX.
- Fitting together with an already fitted service unit of the same series (→ Fig. 2):
1. Remove the cover plates [3] on the sides to be fitted together (push upwards).
 2. Place the module connectors MS4/6-MV [4] in the grooves of the individual units. There must be a seal between the individual units.
 3. Insert two screws into the module connectors.
- Fitting pneumatic components**
- Using screw connectors with width across flats larger than A/F 17 (MS4)/ A/F 24 (MS6):
- Remove the cover [3] (push upwards).
- When using screw connectors:
- Note the screw-in depth of the connector thread. Screwing in deeply reduces the flow.
 - Screw the connectors into the pneumatic connections using a suitable sealing material.

- 4 Commissioning**
- Setting pressure regulator MS4/6-LFR/LR(B):
1. Pull the pressure adjustment button upwards away from the housing (if necessary remove padlock and push in the unlocking device [2]).
 2. Close the pressure adjustment button completely in the direction “-”.
4. Open the pressure adjustment button in the direction “+” until the desired pressure is shown on the manometer. The maximum permitted work pressure on the type plate must not be exceeded. If the supply pressure is correct, it will be at least 0.5 bar higher than the output pressure.
5. Press the pressure adjustment button downwards towards the housing. The button will then lock itself against unintentional turning.
- If required:
- Press the unlocking device [2] outwards. A padlock LRVS-D secures the unlocking device.

- 5 Care and maintenance**
- Condensate level approx. 10 mm below the filter element (→ marking [8]).

Manual drainage (MS4/6-...M)	Semi-automatic drainage (MS4/6-...H)	Fully-automatic drainage (MS4/6-...V)
Turn the drainage screw [10] in an anti-clockwise direction as seen from below.	– Briefly exhaust the filter (p1 = 0 bar) or – Turn the drainage screw [10] in an anti-clockwise direction as seen from below.	Filter/water separator empties automatically (manual emptying: Turn the drainage screw [9] in an anti-clockwise direction as seen from below).
The condensate will then flow out.		
Barbed fitting connection for tubing PCN-4-NT already fitted.	Push-in connector QS6 already fitted.	Barbed fitting connection for tubing PCN-4-NT already fitted.

• Replace the filter cartridge if it shows signs of the following:

MS4/6-LFR/LF	MS4/6-LFM	MS4/6-LFX
Low flow despite unmodified pressure setting	Drop in pressure: Δp greater than 0.35 bar	We recommend that the filter be replaced after every 1000 operating hours

1. Exhaust the unit.
2. Push the unlocking slide [5] in the direct. of the arrow.
3. Turn the filter bowl in an anti-clockwise
4. Pull the filter bowl away from the unit (→ Fig. 3).
5. Turn the filter plate [6] (in case of MS4/6-LFM/LFX the complete filter cartridge) in anti-clockwise direction.
6. Replace the filter cartridge if the pores are dirty (→ Fig. 5). Grasp the new filter cartridge only at the lower end. A support span is fitted in the new 5 µm filter cartridge.
7. Tighten the new filter cartridge (LFR/LF: with the filter plate) hand-tight.
8. Fit the individual parts again in the reverse sequence. The following checks must then be made:
 - the locking pin [7] of the filter bowl must face the large recess in the housing.
 - the unlocking slide must be heard to clip into place when the end stop is reached (→ Fig. 8).
9. Complete re-commissioning of the MS4/6-LFR in accordance with the chapter “Commissioning”. MS4/6-LF/LFM/LFX: Commission the system again.

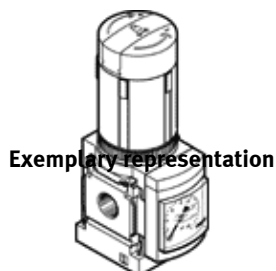
- Cleaning
- Use only the following cleaning agents:
 - water or soap suds (max. +60 °C);
 - petroleum ether (free of aromatic compounds).

pressure regulator MS4-LRB

Part number: 527692

FESTO

For manifold assembly, with G thread.



Data sheet

Overall data sheet – Individual values depend upon your configuration.

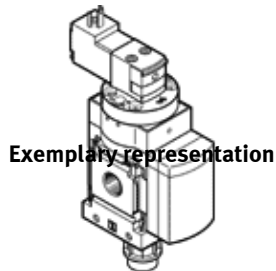
Feature	Value
Size	4
Series	MS
Actuator lock	Rotary knob with lock Rotary knob with integrated lock with accessories, lockable
Assembly position	Any
Design structure	Pressure regulator with gauge
Controller function	Output pressure constant with secondary exhaust with return flow
Pressure gauge	Prepared for G1/4 Prepared for G1/8 with pressure sensor with pressure gauge
Operating pressure	0.8 ... 14 bar
Pressure regulation range	0.3 ... 12 bar
Max. pressure hysteresis	0.25 bar
Standard nominal flow rate	300 ... 2,200 l/min
Authorisation	c UL us - Recognized (OL)
CE mark (see declaration of conformity)	to EU directive explosion protection (ATEX)
ATEX category Gas	II 2G
ATEX category Dust	II 2D
Explosion ignition protection type Gas	Ex h IIC T6 Gb X
Explosion ignition protection type Dust	Ex h IIIC T60°C Db X
Explosion-proof ambient temperature	-10°C ≤ Ta ≤ +60°C
Operating medium	Compressed air in accordance with ISO8573-1:2010 [7:4:4] Inert gases
Note on operating and pilot medium	Lubricated operation possible (subsequently required for further operation)
Corrosion resistance classification CRC	2 - Moderate corrosion stress
Storage temperature	-10 ... 60 °C
Food-safe	See Supplementary material information
Medium temperature	-10 ... 60 °C
Ambient temperature	-10 ... 60 °C
Product weight	222 g
Mounting type	Front panel installation Line installation with accessories Optional
Materials note	Conforms to RoHS
Material of connecting plate	Aluminium die cast
Material control panel	PA POM
Material seals	NBR
Material housing	Aluminium die cast
Material membrane	NBR

on-off valve MS4-EE

Part number: 527709

FESTO

For manifold assembly, with G thread.



Data sheet

Overall data sheet – Individual values depend upon your configuration.

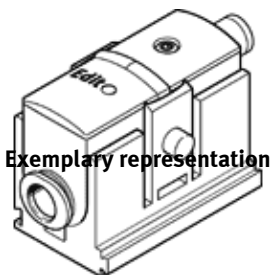
Feature	Value
Design structure	Piston slide
Type of actuation	electrical
Exhaust-air function	not throttleable
Manual override	detenting None Pushing
Type of reset	mechanical spring
Type of piloting	Piloted
Valve function	3/2 closed, monostable
Pressure gauge	Prepared for G1/4 Prepared for G1/8 with pressure sensor with pressure gauge
Operating pressure	4 ... 14 bar
Standard nominal flow rate	1,000 ... 2,000 l/min
Duty cycle	100 %
Characteristic coil data	110 V AC: 50/60 Hz, pick-up power 3 VA, holding power 2.4 VA 230 V AC: 50/60 Hz, pick-up power 3 VA, holding power 2.4 VA 24 V DC: 1.8 W
Operating medium	Compressed air in accordance with ISO8573-1:2010 [7:4:4] Inert gases
Note on operating and pilot medium	Lubricated operation possible (subsequently required for further operation)
Corrosion resistance classification CRC	2 - Moderate corrosion stress
Materials note	Free of copper and PTFE Conforms to RoHS
Medium temperature	-10 ... 60 °C
Protection class	IP65
Ambient temperature	-10 ... 60 °C
Authorisation	c UL us - Recognized (OL)
KC mark	KC-EMV
CE mark (see declaration of conformity)	to EU directive for EMC to EU directive explosion protection (ATEX) to EU directive low-voltage devices
ATEX category Gas	II 3G
ATEX category Dust	II 3D
Explosion ignition protection type Gas	Ex nA IIC T4 X Gc
Explosion ignition protection type Dust	Ex tc IIIC T105°C X Dc IP65
Explosion-proof ambient temperature	-10°C ≤ Ta ≤ +60°C
Food-safe	See Supplementary material information
Mounting type	Line installation with accessories

Feature	Value
	Optional
Assembly position	Any
Flow direction	non reversible
Product weight	273 g
Pneumatic connection, port 3	G1/4
Pilot air supply	Internal
Material seals	NBR
Material housing	Aluminium die cast

pressure sensor SDE5-

Part number: 529027

FESTO



Exemplary representation

Data sheet

Overall data sheet – Individual values depend upon your configuration.

Feature	Value
Authorisation	RCM Mark c UL us - Recognized (OL)
CE mark (see declaration of conformity)	to EU directive for EMC in accordance with EU RoHS directive
KC mark	KC-EMV
Materials note	Conforms to RoHS
Measured variable	Differential pressure Relative pressure
Measurement method	Piezoresistive pressure sensor
Pressure measuring range, initial value	-1 bar
Pressure measuring range, final value	10 bar
Operating medium	Compressed air in accordance with ISO8573-1:2010 [7:4:4]
Note on operating and pilot medium	Lubricated operation possible
Medium temperature	0 ... 50 °C
Ambient temperature	0 ... 50 °C
Repetition accuracy in ± %FS	0.3 %FS
Temperature co-efficient in ± %FS/K	0.05 %FS/K
Switch output	NPN PNP
Switching function	Window comparator Freely programmable Threshold value with fixed hysteresis Threshold value with variable hysteresis
Switching element function	Normally closed contact Normally open contact Switchable
Max. output current	100 mA
Short circuit strength	Yes
Operating voltage range DC	15 ... 30 V
Polarity protected	for all electrical connections
Electrical connection	Cable Plug
Mounting type	with accessories
Assembly position	Any
Pneumatic connection	QS-4 QS-6 QS-5/32 QS-1/4
Material housing	PA POM
Protection class	IP40
Corrosion resistance classification CRC	2 - Moderate corrosion stress

SDE5
Pressure sensor



Instructions | Operating

8110091
2019-06f
[8110093]
CE mark



Translation of the original instructions

1 Safety

1.1 General safety instructions

- Only use the product in original status without unauthorised modifications.
- Only use the product if it is in perfect technical condition.
- Observe labelling on the product.
- Condensation, oil mist, foreign matter and other contaminants in the compressed air can damage the product. Only use media in accordance with the specifications -> Technical data.
- This product can generate high frequency interference, which may make it necessary to implement interference suppression measures in residential areas.

1.2 Intended use

The SDE5 is intended for pressure monitoring of gaseous media in piping systems or terminal equipment in industry.

1.3 Training of qualified personnel

- Installation, commissioning, maintenance and disassembly should only be conducted by qualified personnel.

1.4 Area of application and approval

The information in this section, in combination with the UL marking on the product, must be observed in order to ensure compliance with the certification conditions of Underwriters Laboratories Inc. (UL) for USA and Canada. Observe the following information in English by UL:

In determining the acceptability of the combination, the following details should be examined:

- The mounting suitability shall be determined in the end-use.
- These devices shall be mounted in an enclosure having adequate strength and thickness.
- Devices should be used within its recognized ratings as specified under section RATINGS.
- Devices have to be supplied from:
 - A Class 2 power source or Class 2 transformer in accordance with UL1310 or UL1585, or
 - An isolating device such that the maximum open circuit voltage potential available to the circuit is not more than 30 Vdc and the current is limited to a value not exceeding 8 amperes measured after 1 minute of operation, or
 - A suitable isolating source in conjunction with a fuse in accordance with UL248. The fuse shall be rated max. 3.3 A and be installed in the 30 Vdc power supply to the device in order to limit the available current.

Note that, when more than one power supply or isolating device is used, connection in parallel is not permitted.

- The devices have not been investigated for field-wiring.
- The suitability should be determined in the end-use application.

UL approval information

Table with 2 columns: Field (Product category code, File number, Considered standards, UL mark) and Value (NRNT2 (USA) and NRNT8 (Canada), E253738, UL 508, 17th edition, C22.2 No.14-05, cULus).

Tab. 1 UL approval information

2 Further information

- Accessories -> www.festo.com/catalogue.
- Spare parts -> www.festo.com/spareparts.

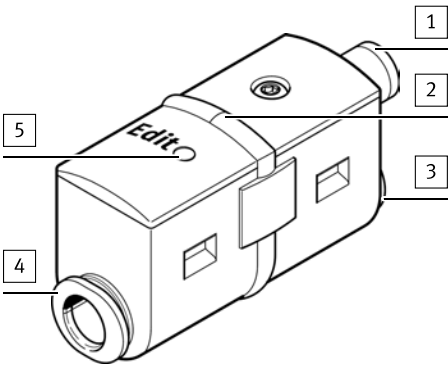
3 Service

Contact your regional Festo contact person if you have technical questions -> www.festo.com.

4 Product overview

4.1 Configuration

4.1.1 Product design

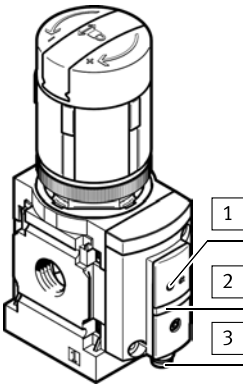


- 1 Electrical connection
- 2 LED indicator (continuous transmission of the LED indicator through fibre-optic cable)
- 3 Connection 2 for compressed air or vacuum
- 4 Connection 1 for compressed air or vacuum
- 5 Edit button (not on SDE5-...X)

Fig. 1 Product design SDE5

MS series service unit component with pressure sensor SDE5

The pressure sensor SDE5 on the series MS service unit component is already permanently attached and pneumatically connected in the delivery status.



- 1 Edit button
- 2 LED indicator (continuous transmission of the LED indicator through fibre-optic cable)
- 3 Electrical connection

Fig. 2 SDE5 installed on the MS series service unit component

Table with 2 columns: MS series service unit component, Attached pressure sensor. Lists various MS series components and their corresponding SDE5 models.

Tab. 2 Assignment of service unit component MS and attached pressure sensor

4.1.2 LED display

Table with 2 columns: LED, Meaning. Describes the meaning of different LED states: illuminated (yellow), off, flashes quickly (yellow), flashes slowly (yellow), and illuminated (green).

Tab. 3 Meaning of the LED indicator

4.2 Function

4.2.1 Functional principle

The SDE5 converts pneumatic pressure values into a voltage proportional to the pressure. Depending on the design of the pressure sensor, the voltage signal is converted into a digital switching signal (SDE5-...P-.../SDE5-...N-...) or amplified for an analogue output (SDE5-...NF-...-V).

The monitored pressure values record either the relative pressure or the differential pressure (SDE5-...-Z-...).

SDE5 with switching output: when the switching point is reached, the pressure sensor closes or opens a circuit.

The SDE5 is available with different switch/teach functions . The switching function is preset ex works and can only be changed for the SDE5-...-FP-... .

5 Mounting

5.1 Mount SDE5 with wall bracket

NOTICE!

Accumulation of condensate in the product can impair its functionality.

- Install the product in such a way that condensate from the compressed air lines cannot collect in the product.

Mounting several wall brackets

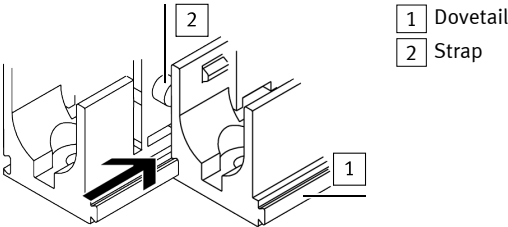


Fig. 3 Connection of wall bracket

- Push the dovetail of the wall bracket into the connecting groove of the next wall bracket (push away the strap).
- Fasten first and last wall bracket with 2 screws each (Ø 4 mm).
If more than 3 wall holders are being used: mount every second wall holder with 2 screws each.

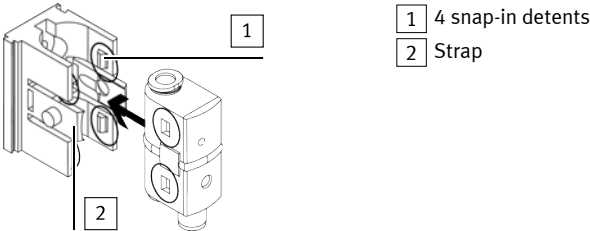


Fig. 4 Mount SDE5 on wall bracket

- Press SDE5 into the wall bracket.
4 snap latches engage audibly.

Individual mounting

- To make it easier to see the LED light, break out the strap of the wall bracket when mounting individually.

6 Installation

6.1 Pneumatic installation

Push-in connector

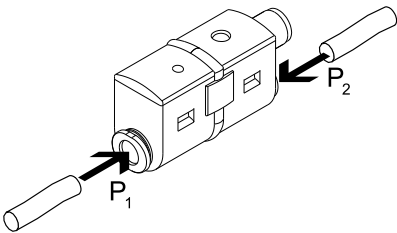


Fig. 5 Push-in connector

Push-in connector at one end

- Mount the hose to connection 1.

Push-in connector at both ends

- Check pressure conditions.
With the pressure sensor for differential pressure (SDE5-...-Z-...), the higher pressure must be applied to port 1 (differential pressure = p₁ - p₂).
- Mount the hoses to connection 1 and 2.

6.2 Electrical installation

WARNING!

Risk of injury due to electric shock.

- For the electric power supply, use only PELV circuits that ensure a reliable electric disconnection from the mains network.
- Observe IEC 60204-1/EN 60204-1.

- Use signal lines that are shorter than 30 m.
- Configure binary outputs according to the wiring → Tab. 4 Pin allocation.
– Tightening torque for the union nut at the plug connector: max. 0.3 Nm

Pin	Wire colour ¹⁾	Allocation	Plug
1	Brown (BN)	Operating voltage +24 V DC	
4	Black (BK)	Switching output A (Out A) or analogue output	
3	Blue (BU)	0 V	

1) When using the connecting cable as per Accessories.

Tab. 4 Pin allocation

Circuit diagrams

Cable connection	Plug connection
SDE5-...-P-...-K	SDE5-...-P-...-M8
SDE5-...-N-...-K	SDE5-...-N-...-M8

Tab. 5 Circuit diagrams for switching output

Cable connection	Plug connection
SDE5-...-V-...-K	SDE5-...-V-...-M8

Tab. 6 Circuit diagrams analogue output

7 Commissioning

NOTICE!

Voltage interruption during the storage process will make the product unusable.
After teaching, the values are written to the internal memory. If the save process is aborted due to power interruption, the transfer process to the memory cannot be completely carried out and the device becomes unusable.

- Ensure power supply for at least 10 seconds after teaching.

→ Fig.6 shows an overview of the possible settings and displays. The activities are described in the subsequent sections.

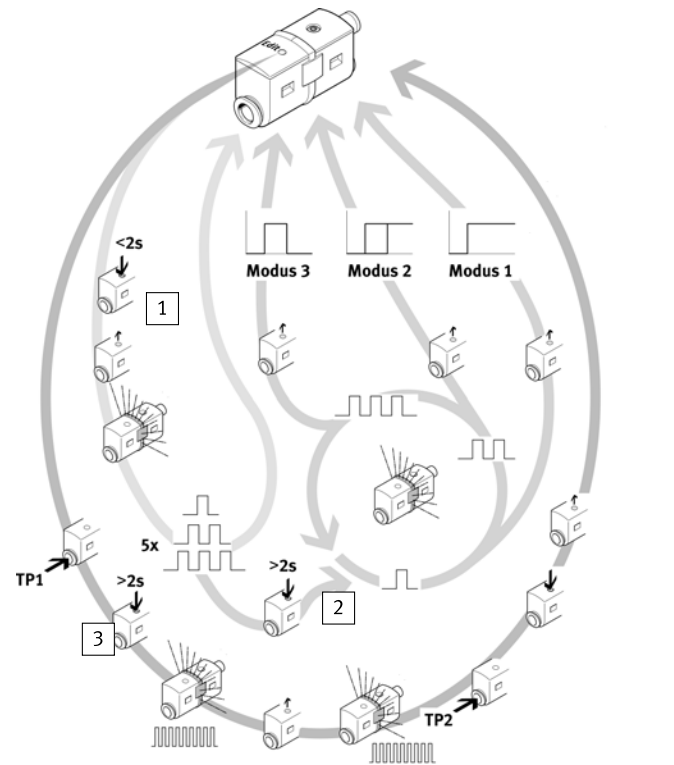


Fig. 6 Commissioning

Legend item	Description
Mode display	Display of the set mode (only with ...-FP)
Mode selection	Selection of modes 1 to 3 (only with ...-FP)
Switching pressure setting	Teaching the switching pressures TP1 and TP2 (mode 0 ... 3)

Tab. 7 Legend Commissioning variants

7.1 SDE5-...-X without Edit button

The SDE5-...-X without Edit button is preset ex works with fixed switching points and requires no additional commissioning.

7.2 SDE5-...-NF-...-V with analogue output

- Switch on the operating voltage.
LED lights green.
- Apply switching pressure to SDE5.
The pressure measuring range is applied
→ Tab. 8 Analogue signal dependent on pressure measuring range to the analogue output as an electrical pressure proportional signal.

Sensor	Pressure measuring range	Signal range		
		0 V	5 V	10 V
SDE5-V1	bar	0	-0.5	-1
	MPa	0	-0.05	-0.1
SDE5-B2	bar	-1	0	1
	MPa	-0.1	0	0.1
SDE5-D2	bar	0	1	2
	MPa	0	0.1	0.2
SDE5-D6	bar	0	3	6
	MPa	0	0.3	0.6
SDE5-D10	bar	0	5	10
	MPa	0	0.5	1

Tab. 8 Analogue signal dependent on pressure measuring range

7.3 SDE5-...-O/C-...-P/N with switching output

Set the switching pressure SP with one teach pressure

- Switch on the operating voltage.
- Apply teach pressure to SDE5.
- Press and hold the Edit button for at least 2 seconds.
LED flashes.
- Release the Edit button.
Teach pressure is stored as switching point SP.
- Ensure power supply for at least 10 seconds.
- Test in test run whether SDE5 switches as desired. The LED lights when the switching signal is output.

Mode	NO (normally open)	NC (normally closed)
Mode 0: Threshold value comparator (threshold value with fixed hysteresis Hy)		

Tab. 9 Signal curve over the applied pressure p with switching points

7.4 SDE5-...-O1/O2/O3/C1/C2/C3-...-P/N with switching output

Set the switching pressure SP with two teach pressures TP1/TP2

- Switch on the operating voltage.
- Apply teach pressure TP1 to SDE5.
- Press and hold the Edit button for at least 2 seconds.
LED flashes.
- Release the Edit button.
Teach pressure TP1 is stored.
- Apply teach pressure TP2 to SDE5.
- Press the Edit button until the LED stops flashing.
- Release the Edit button.
Teach point TP2 is stored.
- Ensure power supply for at least 10 seconds.
- Test in test run whether SDE5 switches as desired. The LED lights when the switching signal is output.

Mode	NO (normally open) ¹⁾	NC (normally closed) ²⁾
Mode 1: - Threshold value comparator (threshold value with fixed hysteresis Hy) - Switching pressure SP = (TP1 1/2 + TP2) - Preset mode for output function FP		
Mode 2: Hysteresis comparator (threshold value with variable hysteresis Hy)		
Mode 3: Window comparator with fixed hysteresis Hy		

1) Default settings: TP1 = 20 % FS; TP2 = 80 % FS

2) Default settings: TP1 = 80 % FS; TP2 = 20 % FS

Tab. 10 Signal curve over the applied pressure p with switching points

7.5 SDE5-...-FP-...-P/N with switching output

Set mode

- Switch on the operating voltage.
- Briefly press Edit button (< 2 seconds).
LED shows the current mode → Tab. 11 Mode display.
- Press and hold the Edit button until the desired mode is displayed.
- To save the mode, release the Edit button.
- Ensure power supply for at least 10 seconds.
- Set switching pressure SP.

	Mode 1	Mode 2	Mode 3
LED flash sequence for set mode ¹⁾			
LED flash sequence at change of mode			

1) The currently set mode is displayed 5 times in succession. The SDE5 then switches to RUN mode.

Tab. 11 Mode display

Set the switching pressure with two teach pressures TP1/TP2

- Relationship between teach pressure, switching pressure and hysteresis
→ Tab. 10 Signal curve over the applied pressure p with switching points.
- When setting the switching points, note the following relationship between the teach points:
 - TP1 < TP2: programming as N/O contact
 - TP1 (TP2 > 2 % FS): Programming as N/C contact
 - Apply teach pressure TP1 to SDE5.

- Press and hold the Edit button for at least 2 seconds.
↳ LED flashes.
- Release the Edit button.
↳ Teach pressure TP1 is stored.
- Apply teach pressure TP2 to SDE5.
- Press the Edit button until the LED stops flashing.
- Release the Edit button.
↳ Teach pressure TP2 is stored.
- Ensure power supply for at least 10 seconds.
- Test in test run whether SDE5 switches as desired. The LED lights when the switching signal is output.

8 Operation and use

NOTICE!

Property damage due to high temperatures.

Extreme pneumatic conditions (high cycle rate with high pressure amplitude) can heat the product above 80 °C.

- Select the operating conditions (in particular the ambient temperature, pressure amplitude, cycle rate, current consumption) such that the product does not heat up above 80 °C.
- Switch on the operating voltage.
↳ The SDE5 is in RUN mode (basic status).

9 Service

- Turn off energy source and compressed air.
- Clean sensor with non-abrasive cleaning agents.

10 Fault clearance

Fault description	Cause	Remedy
No LED indicator	Pressure p < switching pressure (SP)	regular operating status → 4.1.2 LED display
	No operating voltage or impermissible operating voltage	Switch on the operating voltage. / maintain operating voltage range.
	Connections are reversed (reverse polarity)	Wire the SDE5 in accordance with the pin allocation → Tab. 4 Pin allocation.
	Pressure failure	Eliminate pressure failure.
	SDE5 defective	Replace device.
LED indicator or switching output does not react in accordance with the settings	Short circuit or overload at the output	Rectify short circuit/overload.
	Incorrect switching point taught	Repeat teach procedure.
	SDE5 defective	Replace device.

Tab. 12

11 Disassembly

- Turn off energy source and compressed air.
- Disconnect pneumatic and electrical connections.

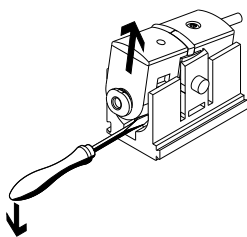


Fig. 7 Disassembly

- Slide the screwdriver into the groove of the wall bracket and swivel out the SDE5.

12 Disposal

ENVIRONMENT!

Send the packaging and product for environmentally sound recycling in accordance with the current regulations → www.festo.com/sp.

13 Technical data

SDE5	-V1	-B2	-D2	-D6	-D10
General					
Approval	RCM, c UL us – Recognised (OL)				
CE marking (declaration of conformity ➔ www.festo.com/sp)	In accordance with EU EMC Directive In accordance with EU RoHS directive				
Note on materials	RoHS-compliant				
Input signal/measuring element					
Pressure measuring range [bar]	0 ... -1	-1 ... 1	0 ... 2	0 ... 6	0 ... 10

SDE5		-V1	-B2	-D2	-D6	-D10
Pressure measuring range	[MPa]	0 ... -0.1	-0.1 ... 0.1	0 ... 0.2	0 ... 0.6	0 ... 1
Max. overload pressure	[bar]	5	5	6	15	15
Max. overload pressure	[MPa]	0.5	0.5	0.6	1.5	1.5
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]				
Note on the operating medium		Lubricated operation possible				
Temperature of medium	[°C]	0 ... +50				
Ambient temperature	[°C]	0 ... +50				
Output, general						
Repetition accuracy	[% FS]	±0.3 (momentary)				
Temperature coefficient	[% FS/K]	max. ±0.05				
Short circuit current rating		Yes				
Overload protection		Present				
Switching output						
Accuracy	[% FS]	Max. ±0.5				
Switching time (On/Off) ¹⁾	[ms]	2 (typical) / 4 (max.)				
Max. output current	[mA]	100				
Capacitive load (maximum DC)	[nF]	100				
Voltage drop	[V]	Max. 1.8				
Inductive protective circuit		adapted to MZ, MY, ME coils				
Analogue output						
Output characteristic	[V]	0 ... 10				
Accuracy	[% FS]	±3 (room temperature: 20 ... 25 °C) max. ±4 (0 ... 50 °C)				
Rise time	[ms]	5 (typical) with resistive load				
Min. load resistance	[kΩ]	2				
Electronics						
Operating voltage range	[V DC]	15 ... 30				
No-load supply current	[mA]	Max. 34				
Ready-state delay	[ms]	≤20				
Reverse polarity protection		For all electrical connections				
Electromechanics						
Max. cable length	[m]	30				
Information on materials - cable sheath		PUR				
Information on materials – plug housing		Brass (nickel-plated, chrome-plated)				
Cable diameter	[mm]	2.9				
Nominal conductor cross section	[mm²]	0.14				
Mechanics						
Mounting position		Any, preferably vertical ²⁾				
Information on materials - housing/keypad		Polyamide (POM) reinforced				
Information on materials – plug housing		PA				
Display/operation						
Threshold value setting range:						
Switching pressure	[% FS]	0 ... 100 (recommended working range: 1 ... 99)				
Hysteresis (mode 2)	[% FS]	0 ... 100 (recommended working range: 1 ... 99)				
Hysteresis (mode 0, 1, 3)	[% FS]	2 (permanently set)				
Immission/emission						
Storage temperature	[°C]	-20 ... +80				
Degree of protection		IP40				
Protection class		III				
Shock resistance		30 g acceleration with 11 ms duration (half-sine)				
Vibration resistance		0.35 mm travel, 5 g acceleration at 10 ... 150 Hz				
Corrosion resistance class CRC		2				

1) Switching times are not applicable with activated additional function ...TF (filter function).

2) Condensation must not collect in the pressure measuring cell.

Tab. 13 Technical data

B.4 Centrifugal pump CRNE 5 [GRUNDFOS]

Name	Data
Designation	Centrifugal pump
Type	CRNE 5 [GRUNDFOS]
Number	98358864 03.2022 ECM: 1338226
Type of manual	Installation and operating instructions
Manufacturer	Grundfos Poul Due Jensens Vej 7 8850 Bjerringbro, Dänemark

CRE, CRIE, CRNE, SPKE, MTRE, CME

Installation and operating instructions



Other languages

<http://net.grundfos.com/qr/i/98358864>

be
think
innovate

GRUNDFOS 

CRE, CRIE, CRNE, SPKE, MTRE, CME

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Орнату және пайдалану нұсқаулықтары	2017
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English (GB) Installation and operating instructions

Original installation and operating instructions

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Read this document before installing the product. Installation and operation must comply with local regulations and accepted codes of good practice.

1. Symbols used in this document

DANGER



Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.

WARNING



Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.

CAUTION



Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.



Tips and advice that make the work easier.



If these instructions are not observed, it may result in malfunction or damage to the equipment.



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.

2. Abbreviations and definitions

AI	Analog input.
AL	Alarm, out of range at lower limit.
AO	Analog output.
AU	Alarm, out of range at upper limit.
CIM	Communication interface module.
Current sinking	The ability to draw current into the terminal and guide it towards GND in the internal circuitry.
Current sourcing	The ability to push current out of the terminal and into an external load which must return it to GND.
DI	Digital input.
DO	Digital output.
ELCB	Earth leakage circuit breaker.
FM	Functional module.
GDS	Grundfos Digital Sensor. Factory-fitted sensor in some Grundfos pumps.
GENIbus	Proprietary Grundfos fieldbus standard.
GFCI	Ground fault circuit interrupter. (USA and Canada).
GND	Ground.
Grundfos Eye	Status indicator light.
LIVE	Low voltage with the risk of electric shock if the terminals are touched.
OC	Open collector: Configurable open-collector output.
PE	Protective earth.
PELV	Protective extra-low voltage. A voltage that cannot exceed ELV under normal conditions and under single-fault conditions, except earth faults in other circuits.
RCD	Residual-current device
SELV	Safety extra-low voltage. A voltage that cannot exceed ELV under normal conditions and under single-fault conditions, including earth faults in other circuits.

3. General information

These installation and operating instructions are a supplement to the installation and operating instructions for the corresponding standard pumps CR, CRI, CRN, SPK, MTR and CM. For instructions not mentioned specifically in this manual, see the installation and operating instructions for the standard pump.

4. General description

Grundfos E-pumps are fitted with frequency-controlled permanent-magnet motors for single-phase or three-phase mains connection.

4.1 Pumps without factory-fitted sensor

The pumps have a built-in PI controller and can be set for an external sensor enabling the control of the following parameters:

- constant pressure
- constant differential pressure
- constant temperature
- constant differential temperature
- constant flow rate
- constant level
- constant curve
- constant other value.

The pumps have been factory-set to constant-curve control mode. You can change the control mode with R100 or Grundfos GO Remote.

4.2 Pumps with factory-fitted pressure sensor

The pumps have a built-in PI controller and are set for a pressure sensor enabling the control of the outlet pressure.

The pumps have been factory-set to constant-pressure control mode. The pumps are typically used to keep a constant pressure in variable-demand systems.

4.3 Settings

The description of settings applies both to pumps without factory-fitted sensor and to pumps with a factory-fitted pressure sensor.

Setpoint

You can set the desired setpoint in three ways:

- on the pump control panel
- via an input for external setpoint signal
- with the Grundfos wireless R100 remote control or Grundfos GO Remote.

Other settings

Make all other settings with R100 or Grundfos GO Remote.

You can read important parameters, such as the actual value of the control parameter and power consumption, via R100 or Grundfos GO Remote.

If special or customised settings are required, use Grundfos PC Tool. Contact your local Grundfos company for more information.

4.4 Radio communication

This product incorporates a radio module for remote control which is a class 1 device and which you can use anywhere in the EU without restrictions.

For use in USA and Canada, see page [2162](#).

Some variants of the product and products sold in China and Korea have no radio module.

This product can communicate with the Grundfos GO Remote and other products of the same type via the built-in radio module.

In some cases, an external antenna may be required. Only Grundfos-approved external antennas may be connected to this product, and only by a Grundfos-approved installer.

4.5 Battery

A Li-ion battery is fitted in CRE, CRIE, CRNE, SPKE and MTRE pumps. The Li-ion battery complies with the Battery Directive (2006/66/EC). The battery does not contain mercury, lead and cadmium.

5. Receiving the product

5.1 Transporting the product

WARNING

Falling objects

- Death or serious personal injury
- Secure the product during transportation to prevent it from tilting or falling down.



CAUTION

Crushing of feet

- Minor or moderate personal injury
- Wear safety shoes when moving the product.



- Motors from 2.2 to 5.5 kW: Do not stack more than two motors in their original packaging.
- Motors from 5.5 to 11 kW: Do not stack the motors.

5.2 Inspecting the product

Before you install the product, do the following.

1. Check that the product is as ordered.
2. Check that no visible parts have been damaged.
3. If parts are damaged or missing, contact your local Grundfos sales company.

6. Mechanical installation

6.1 Handling the product

Observe local regulations setting limits for manual lifting or handling. The motor weight is stated on the nameplate.

CAUTION

Back injury

- Minor or moderate personal injury
- Use lifting equipment.



CAUTION

Crushing of feet

- Minor or moderate personal injury
- Wear safety shoes and attach lifting equipment to the motor eyebolts when handling the product.



Do not lift the product by the terminal box.

6.2 Mounting

CAUTION

Crushing of feet

Minor or moderate personal injury

- Secure the product to a solid foundation by bolts through the holes in the flange or the base plate.



In order to maintain the UL mark, additional requirements apply to the equipment. See page 2162.

6.3 Cable entries

See the size of the cable entries in section 29. *Other technical data*.

6.4 Cable glands

The number and size of cable glands delivered with the pump depends on the motor size. See section 29. *Other technical data*.

6.5 Ensuring motor cooling

Leave at least 50 mm between the end of the fan cover and a wall or other fixed objects. See fig. 1.

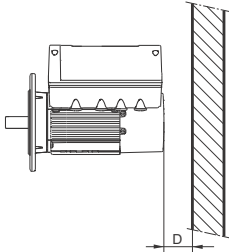


Fig. 1 Minimum distance (D) from the motor to a wall or other fixed objects

TM05 5236 3512

6.6 Outdoor installation

If you install the motor outdoors, provide the motor with a suitable cover and open the drain holes to avoid condensation on the electronic components. See figures 2 and 3.



When fitting a cover to the motor, observe the guideline in section 6.5 *Ensuring motor cooling*.

The cover must be sufficiently large to ensure that the motor is not exposed to direct sunlight, rain or snow. Grundfos does not supply covers. We therefore recommend that you have a cover built for the specific application. In areas with high humidity, we recommend that you connect the motor permanently to the mains supply and activate the built-in standstill heating function. See section 13.24 *Standstill heating*, page 50.

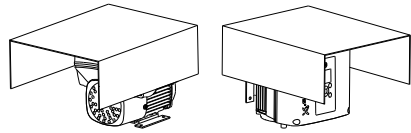


Fig. 2 Examples of covers (not supplied by Grundfos)

TM05 3496 3512



In order to maintain the UL mark, additional requirements apply to the equipment. See page 2162.

6.7 Drain holes

When the motor is installed in moist surroundings or areas with high humidity, the bottom drain hole must be open. The enclosure class of the motor will then be lower. This helps prevent condensation in the motor as the motor becomes self-venting, and it allows water and humid air to escape.

The motor has a plugged drain hole on the drive side. You can turn the flange 90 ° to both sides or 180 °.

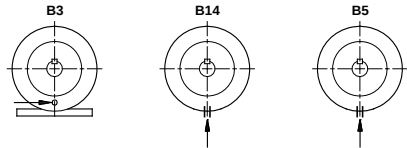


Fig. 3 Drain holes

TM02 9037 1604

7. Electrical installation

DANGER

Electric shock



- Death or serious personal injury
- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before you make any connections in the terminal box. Make sure that the power supply cannot be accidentally switched on.

DANGER

Electric shock



- Death or serious personal injury
- Check that the supply voltage and frequency correspond to the values stated on the nameplate.

If the power supply cable is damaged, it must be replaced by the manufacturer, the manufacturer's service partner or a similarly qualified person.

The user or the installer is responsible for the installation of correct earthing and protection according to local regulations. All operations must be carried out by a qualified electrician.

7.1 Protection against electric shock, indirect contact

WARNING

Electric shock



- Death or serious personal injury
- Connect the motor to a protective earth and provide protection against indirect contact in accordance with local regulations.

Protective-earth conductors must always have a yellow/green (PE) or yellow/green/blue (PEN) colour marking.

7.1.1 Protection against mains voltage transients

The motor is protected against mains voltage transients in accordance with EN 61800-3.

7.1.2 Motor protection

The motor requires no external motor protection. The motor incorporates thermal protection against slow overloading and blocking.

7.2 Cable requirements

7.2.1 Cable cross-section

DANGER

Electric shock



- Death or serious personal injury
- Always comply with local regulations as to cable cross-sections.

1 x 200-230 V

Power [kW]	Conductor type	Cross section	
		[mm ²]	[AWG]
0.25 - 1.5	Solid	1.5 - 2.5	16-12
	Stranded	1.5 - 2.5	16-12

3 x 380-500 V

Power [kW]	Conductor type	Cross section	
		[mm ²]	[AWG]
0.25 - 2.2	Solid	1.5 - 10	16-8
	Stranded	1.5 - 10	16-8
3.0 - 11	Solid	2.5 - 10	14-8
	Stranded	2.5 - 10	14-8

3 x 200-240 V

Power [kW]	Conductor type	Cross section	
		[mm ²]	[AWG]
1.1 - 1.5	Solid	1.5 - 10	16-8
	Stranded	1.5 - 10	16-8
2.2 - 5.5	Solid	2.5 - 10	14-8
	Stranded	2.5 - 10	14-8

7.2.2 Conductors

Type

Stranded or solid copper conductors.

Temperature rating

Temperature rating for conductor insulation: 60 °C (140 °F).

Temperature rating for outer cable sheath: 75 °C (167 °F).

7.3 Mains supply

DANGER



Electric shock

- Death or serious personal injury
- Use the recommended fuse size. See section [26.1 Supply voltage](#).

7.3.1 Single-phase supply voltage

- 1 x 200-240 V - 10 %/+ 10 %, 50/60 Hz, PE.

Check that the supply voltage and frequency correspond to the values stated on the nameplate.



If you want to supply the motor through an IT network, make sure that you have a suitable motor variant. If you are in doubt, contact Grundfos.

The wires in the motor terminal box must be as short as possible. Excepted from this is the separated earth conductor which must be so long that it is the last one to be disconnected in case the cable is inadvertently pulled out of the cable entry.

For maximum backup fuse, see section [26.1 Supply voltage](#).

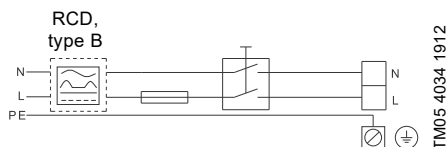


Fig. 4 Example of a mains-connected motor with mains switch, backup fuse and additional protection

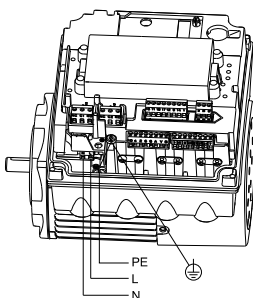


Fig. 5 Mains connection, single-phase motors

7.3.2 Three-phase supply voltage

Three-phase motors are available for the voltages below:

- 3 x 380-500 V - 10 %/+ 10 %, 50/60 Hz, PE
- 3 x 200-240 V - 10 %/+ 10 %, 50/60 Hz, PE.

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

The wires in the motor terminal box must be as short as possible. Excepted from this is the separated earth conductor which must be so long that it is the last one to be disconnected in case the cable is inadvertently pulled out of the cable entry.

In order to avoid loose connections, make sure that you have pressed home the terminal block for L1, L2 and L3 in its socket when you connect the supply cable.

For maximum backup fuse, see section [27.1 Supply voltage](#).



If you want to supply the motor through an IT network, make sure that you have a suitable motor variant. If you are in doubt, contact Grundfos.

Only the following motors can be supplied through an IT network:

- Motors with speed of 1450-2000/2200 rpm and up to 1.5 kW
- Motors with speed of 2900-4000 rpm or 4000-5900 rpm and up to 2.2 kW.



Corner earthing is not allowed for supply voltages above 3 x 240 V and 3 x 480 V, 50/60 Hz.

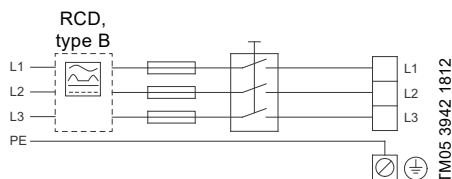


Fig. 6 Example of a mains-connected motor with mains switch, backup fuses and additional protection

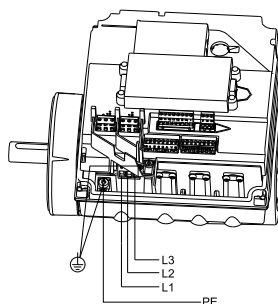


Fig. 7 Mains connection, three-phase motors

7.4 Additional protection

DANGER



Electric shock

- Death or serious personal injury
- Only use residual-current circuit breakers (ELCB, GFCI, RCD) of type B.

The residual-current circuit breaker must be marked with the following symbol:



The total leakage current of all the electrical equipment in the installation must be taken into account. You find the leakage current of the motor in sections [26.2 Leakage current](#) and [27.2 Leakage current \(AC\)](#).

This product can cause a direct current in the protective earth conductor.

Overvoltage and undervoltage protection

Overvoltage and undervoltage may occur in case of unstable power supply or a faulty installation. The motor is stopped if the voltage falls outside the permissible voltage range. The motor restarts automatically when the voltage is again within the permissible voltage range. Therefore, no additional protection relay is required.



The motor is protected against transients from the power supply according to EN 61800-3. In areas with high lightning intensity, we recommend external lightning protection.

Overload protection

If the upper load limit is exceeded, the motor automatically compensates for this by reducing the speed and stops if the overload condition persists. The motor remains stopped for a set period. After this period, the motor automatically attempts to restart. The overload protection prevents damage to the motor. Consequently, no additional motor protection is required.

Overtemperature protection

The electronic unit has a built-in temperature sensor as an additional protection. When the temperature rises above a certain level, the motor automatically compensates for this by reducing the speed and stops if the temperature keeps rising. The motor remains stopped for a set period. After this period, the motor automatically attempts to restart.

Protection against phase unbalance

Three-phase motors must be connected to a power supply with a quality corresponding to IEC 60146-1-1, class C, to ensure correct motor operation at phase unbalance. This also ensures long life of the components.

7.5 Connection terminals

The descriptions and terminal overviews in this section apply to both single- and three-phase motors.

For maximum torques, see section [Torques](#), page [73](#).

7.5.1 Connection terminals, CRE, CRIE, CRNE, SPKE and MTRE pumps

CRE, CRIE, CRNE, SPKE and MTRE pumps have a number of inputs and outputs enabling the pumps to be used in advanced applications where many inputs and outputs are required.

The pumps have these connections:

- three analog inputs
- one analog output
- two dedicated digital inputs
- two configurable digital inputs or open-collector outputs
- Grundfos Digital Sensor input and output
- two Pt100/1000 inputs
- two LiqTec sensor inputs
- two signal relay outputs
- GENibus connection.

See fig. [8](#).



Digital input 1 is factory-set to be start-stop input where open circuit results in stop. A jumper has been factory-fitted between terminals 2 and 6. Remove the jumper if digital input 1 is to be used as external start-stop or any other external function.

DANGER

Electric shock

- Death or serious personal injury
- Make sure that the wires to be connected to the connection groups below are separated from each other by reinforced insulation in their entire lengths.



Inputs and outputs

All inputs and outputs are internally separated from the mains-conducting parts by reinforced insulation and galvanically separated from other circuits. All control terminals are supplied by protective extra-low voltage (PELV), thus ensuring protection against electric shock.

Signal relay outputs

– Signal relay 1:

LIVE:

You can connect supply voltages up to 250 VAC.

PELV:

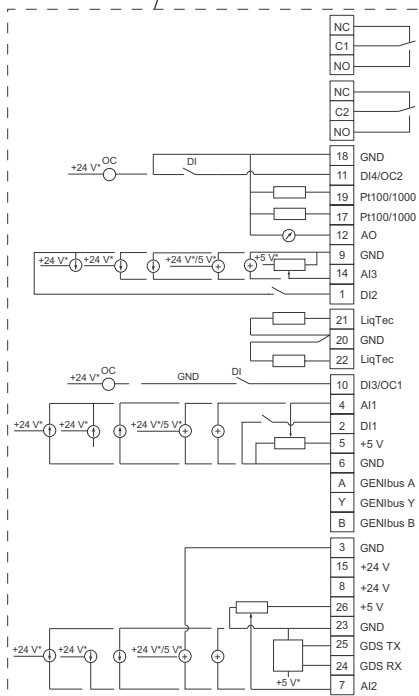
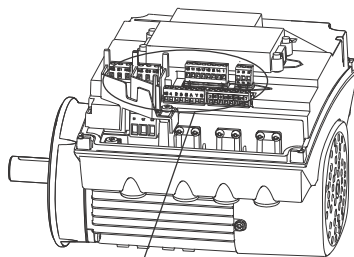
The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.

– Signal relay 2:

PELV:

The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.

- Mains supply (terminals N, PE, L or L1, L2, L3, PE).



- * If you use an external supply source, there must be a connection to GND.

Fig. 8 Connection terminals, CRE, CRIE, CRNE, SPKE and MTRE pumps

TM05 3509 3512

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1 (LIVE or PELV)
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2 (PELV only)
C2	Common	
NO	Normally open contact	
18	GND	Ground
11	DI4/OC2	Digital input/output, configurable. Open collector: Max. 24 V resistive or inductive.
19	Pt100/1000 input 2	Pt100/1000 sensor input
17	Pt100/1000 input 1	Pt100/1000 sensor input
12	AO	Analog output: 0-20 mA / 4-20 mA 0-10 V
9	GND	Ground
14	AI3	Analog input: 0-20 mA / 4-20 mA 0-10 V
1	DI2	Digital input, configurable
21	LiqTec sensor input 1	LiqTec sensor input (white conductor)
20	GND	Ground (brown and black conductors)
22	LiqTec sensor input 2	LiqTec sensor input (blue conductor)
10	DI3/OC1	Digital input/output, configurable. Open collector: Max. 24 V resistive or inductive.
4	AI1	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V
2	DI1	Digital input, configurable
5	+5 V	Supply to potentiometer and sensor
6	GND	Ground

Terminal	Type	Function
A	GENIbus, A	GENIbus, A (+)
Y	GENIbus, Y	GENIbus, GND
B	GENIbus, B	GENIbus, B (-)
3	GND	Ground
15	+24 V	Supply
8	+24 V	Supply
26	+5 V	Supply to potentiometer and sensor
23	GND	Ground
25	GDS TX	Grundfos Digital Sensor output
24	GDS RX	Grundfos Digital Sensor input
7	AI2	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V

7.5.2 Connection terminals, CME pumps

The CME pump has these connections:

- two analog inputs
- two digital inputs or one digital input and one open-collector output
- Grundfos Digital Sensor input and output
- two signal relay outputs
- GENIbus connection.

See fig. 9.



Digital input 1 is factory-set to be start-stop input where open circuit results in stop. A jumper has been factory-fitted between terminals 2 and 6. Remove the jumper if digital input 1 is to be used as external start-stop or any other external function.

DANGER

Electric shock



- Death or serious personal injury
- Make sure that the wires to be connected to the connection groups below are separated from each other by reinforced insulation in their entire lengths.

- Inputs and outputs

All inputs and outputs are internally separated from the mains-conducting parts by reinforced insulation and galvanically separated from other circuits. All control terminals are supplied by protective extra-low voltage (PELV), thus ensuring protection against electric shock.

- Signal relay outputs

– Signal relay 1:

LIVE:

You can connect supply voltages up to 250 VAC to the output.

PELV:

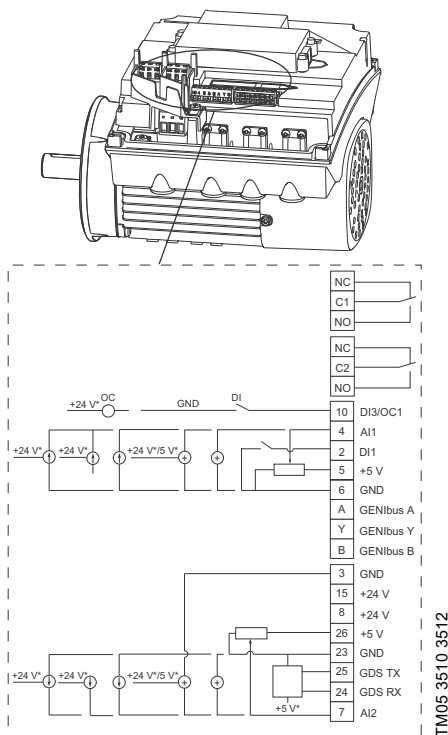
The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.

– Signal relay 2:

PELV:

The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.

- Mains supply (terminals N, PE, L or L1, L2, L3, PE).



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* If you use an external supply source, there must be a connection to GND.

Fig. 9 Connection terminals, CME pump (optional for CRE, CRIE, CRNE, SPKE and MTRE pumps)

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1 (LIVE or PELV)
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2 (PELV only)
C2	Common	
NO	Normally open contact	
10	DI3/OC1	Digital input/output, configurable. Open collector: Max. 24 V resistive or inductive.
4	AI1	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V
2	DI1	Digital input, configurable
5	+5 V	Supply to potentiometer and sensor
6	GND	Ground
A	GENIbus, A	GENIbus, A (+)
Y	GENIbus, Y	GENIbus, GND
B	GENIbus, B	GENIbus, B (-)
3	GND	Ground
15	+24 V	Supply
8	+24 V	Supply
26	+5 V	Supply to potentiometer and sensor
23	GND	Ground
25	GDS TX	Grundfos Digital Sensor output
24	GDS RX	Grundfos Digital Sensor input
7	AI2	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V

7.6 Signal cables

- Use screened cables with a cross-sectional area of minimum 0.5 mm^2 and maximum 1.5 mm^2 for the external on/off switch, digital inputs, setpoint and sensor signals.
- Connect the screens of the cables to the frame at both ends with good connection. The screens must be as close as possible to the terminals. See fig. 10.

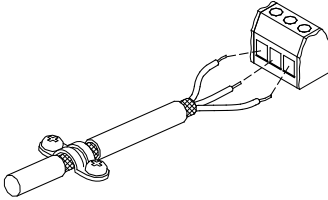


Fig. 10 Stripped cable with screen and wire connections

- Always tighten screws for frame connections whether a cable is fitted or not.
- The wires in the motor terminal box must be as short as possible.

7.7 Bus connection cable

7.7.1 New installations

For the bus connection, use a screened 3-core cable with a cross-sectional area of minimum 0.5 mm^2 and maximum 1.5 mm^2 .

If the motor is connected to a unit with a cable clamp which is identical to the one on the motor, connect the screen to this cable clamp.

If the unit has no cable clamp leave the screen unconnected at this end. See fig. 11.

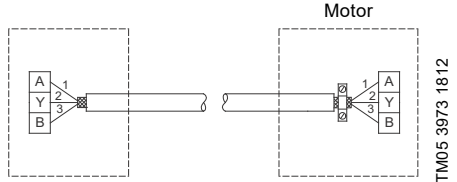


Fig. 11 Connection with screened 3-core cable

7.7.2 Replacing a motor

- If a 2-core cable is used in the installation, connect it as shown in fig. 12.

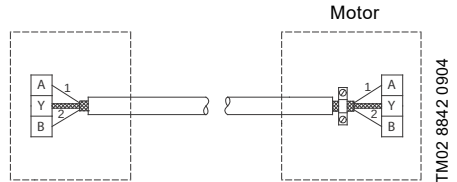


Fig. 12 Connection with screened 2-core cable

- If a screened 3-core cable is used in the installation, follow the instructions in section [7.7.1 New installations](#).

8. Operating conditions

8.1 Maximum number of starts and stops

The number of starts and stops via the power supply must not exceed four times per hour.

When switched on via the power supply, the pump starts after approximately 5 seconds.

If a higher number of starts and stops is desired, use the input for external start-stop when starting/stopping the pump.

When started via an external on/off switch, the pump starts immediately.

8.2 Ambient temperature

8.2.1 Ambient temperature during storage and transportation

Minimum: -30 °C

Maximum: 60 °C.

8.2.2 Ambient temperature during operation

	3 x 200-240 V	3 x 380-500 V
Minimum	-20 °C	-20 °C
Maximum	40 °C	50 °C

The motor can operate with the rated power output (P2) at 50 °C, but continuous operation at higher temperatures reduces the expected product life. If the motor is to operate at ambient temperatures between 50 and 60 °C, select an oversized motor. Contact Grundfos for further information.

8.3 Installation altitude

Installation altitude is the height above sea level of the installation site.

Motors installed up to 1000 m above sea level can be loaded 100 %.

The motors can be installed up to 3500 m above sea level.



Motors installed more than 1000 m above sea level must not be fully loaded due to the low density and consequent low cooling effect of the air.

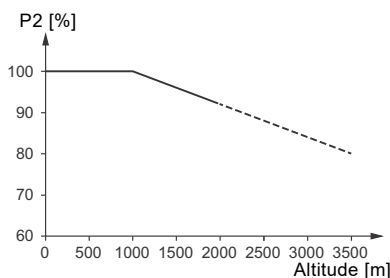
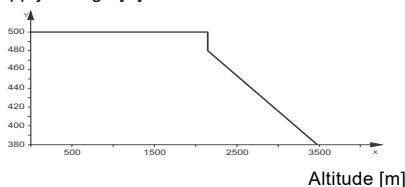


Fig. 13 Motor output power in relation to altitude

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In order to maintain the galvanic isolation and ensure correct clearance according to EN 60664-1:2007, you must adapt the supply voltage to the altitude:

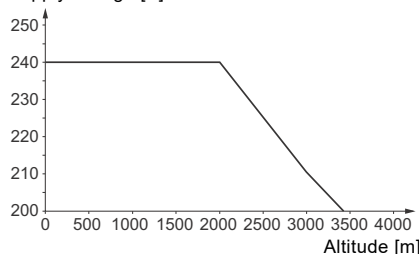
Supply voltage [V]



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Fig. 14 Supply voltage for three-phase motor in relation to altitude

Supply voltage [V]



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Fig. 15 Supply voltage for single-phase motor in relation to altitude

8.4 Humidity

Maximum humidity: 95 %.

If the humidity is constantly high and above 85 %, open the drain holes in the drive-end flange. See section [6.7 Drain holes](#).

8.5 Motor cooling

To ensure cooling of motor and electronics, observe the following:

- Position the motor in such a way that adequate cooling is ensured. See section [6.5 Ensuring motor cooling](#).
- The temperature of the cooling air must not exceed 50 °C.
- Keep cooling fins and fan blades clean.

9. User interfaces

WARNING



Hot surface

Death or serious personal injury

- Only touch the buttons on the display as the product may be very hot.

You can make the pump settings by means of the following user interfaces:

Control panels

- Standard control panel.
See section [10. Standard control panel](#).
- Advanced control panel.
See section [11. Advanced control panel](#).

Remote controls

- Grundfos GO Remote.
See section [12. Grundfos GO Remote](#).
- Grundfos R100 remote control.
See section [13. Description of functions](#).

If the power supply to the pump is switched off, the settings are stored.

10. Standard control panel

The pumps are fitted with this control panel as standard.

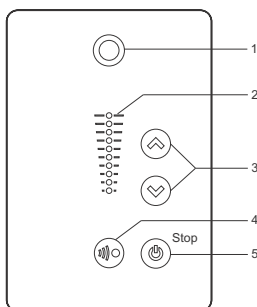


Fig. 16 Standard control panel

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Pos.	Symbol	Description
1		Grundfos Eye Shows the operating status of the pump. For further information, see section 16. <i>Grundfos Eye</i> .
2	-	Light fields for indication of setpoint.
3		Up and down. Changes the setpoint.
4		Allows radio communication with Grundfos GO Remote and other products of the same type. When you try to establish radio communication between the pump and Grundfos GO Remote or another pump, the green indicator light in Grundfos Eye on the pump flashes continuously. Press on the pump control panel to allow radio communication with Grundfos GO Remote and other products of the same type.
5		Makes the pump ready for operation or starts and stops the pump. Start If you press the button when the pump is stopped, the pump only starts if no other functions with higher priority have been enabled. See section 15. <i>Priority of settings</i> . Stop If you press the button when the pump is running, the pump always stops. The "Stop" text next to the button is on.

10.1 Setpoint setting

Set the desired setpoint of the pump by pressing or . The green light fields on the control panel indicate the setpoint set.

10.1.1 Pump in constant pressure control mode

The following example applies to a pump in an application where a pressure sensor gives a feedback to the pump. If the sensor is retrofitted to the pump, you must set it up manually as the pump does not automatically register a connected sensor. See section 13.7 *Analog inputs*.

Figure 17 shows that the light fields 5 and 6 are activated, indicating a desired setpoint of 3 bar with a sensor measuring range from 0 to 6 bar. The setting range is equal to the sensor measuring range.

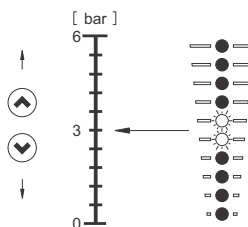


Fig. 17 Setpoint set to 3 bar, constant pressure control

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10.1.2 Pump in constant-curve control mode

In constant-curve control mode, the pump performance lies between the maximum and minimum curve of the pump. See fig. 18.

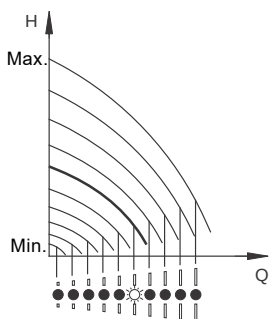


Fig. 18 Pump in constant-curve control mode

Setting to maximum curve:

- Press continuously to change over to the maximum curve of the pump (top light field flashes). When the top light field is on, press for 3 seconds until the light field starts flashing.
- To go back, press continuously until the desired setpoint is indicated.

Example: Pump set to maximum curve.

Figure 19 shows that the top light field is flashing, indicating maximum curve.

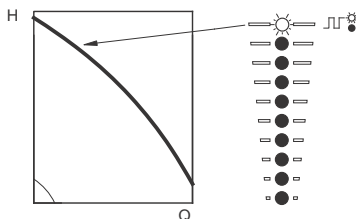


Fig. 19 Maximum curve duty

Setting to minimum curve:

- Press continuously to change over to the minimum curve of the pump (bottom light field flashes). When the bottom light field is on, press for 3 seconds until the light field starts flashing.
- To go back, press continuously until the desired setpoint is indicated.

Example: Pump set to minimum curve.

Figure 20 shows that the bottom light field is flashing, indicating minimum curve.

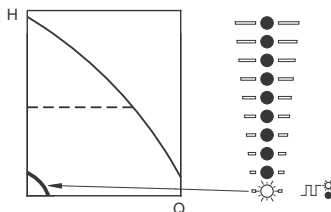


Fig. 20 Minimum curve duty

10.1.3 Start-stop of pump

Stop the pump by pressing . When the pump is stopped, the "Stop" text next to the button is on. You can also stop the pump by continuously pressing until none of the light fields are on.

Start the pump by pressing or by continuously pressing until the desired setpoint is indicated.

If you have stopped the pump by pressing , it can only be given free to operation by pressing again. If you have stopped the pump by pressing , it can only be restarted by pressing .

You can also stop the pump with Grundfos GO Remote or via a digital input set to External stop. See section 15. [Priority of settings](#).

10.1.4 Resetting of fault indications

You can reset a fault indication in one of the following ways:

- Via the digital input if you have set it to Alarm resetting.
- Briefly press or on the pump. This does not change the setting of the pump. You cannot reset a fault indication by pressing or if the buttons have been locked.
- Switch off the power supply until the indicator lights are off.
- Switch the external start-stop input off and then on again.
- With Grundfos GO Remote.

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11. Advanced control panel

The pumps can be fitted with the advanced control panel as an option.

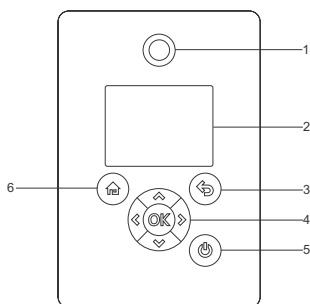


Fig. 21 Advanced control panel

Pos.	Symbol	Description
1		Grundfos Eye Shows the operating status of the pump. For further information, see section 16. Grundfos Eye .
2	-	Graphical colour display.
3		Goes one step back.
4		Navigates between main menus, displays and digits. When you change the menu, the display always shows the top display of the new menu.
		Navigates between submenus. Changes value settings. Note: If you have disabled the possibility to make settings with the Enable/disable settings function, then you can enable it again temporarily by pressing these buttons simultaneously for at least 5 seconds. See section 13.33 "Buttons on product" (Enable/disable settings) .

Pos.	Symbol	Description
4		Saves changed values, resets alarms and expands the value field. Enables radio communication with Grundfos GO Remote and other products of the same type. When you try to establish radio communication between the pump and Grundfos GO Remote or another pump, the green indicator light in Grundfos Eye flashes. A note also appears in the pump display stating that a wireless device wants to connect to the pump. Press on the pump control panel to allow radio communication with Grundfos GO Remote and other products of the same type.
5		Makes the pump ready for operation/starts and stops the pump. Start: If you press the button when the pump is stopped, the pump only starts if no other functions with higher priority have been enabled. See section 15. Priority of settings . Stop: If you press the button when the pump is running, the pump is always stopped. When you stop the pump via this button, the icon appears in the bottom of the display.
6		Goes to the Home menu.

11.1 Home display

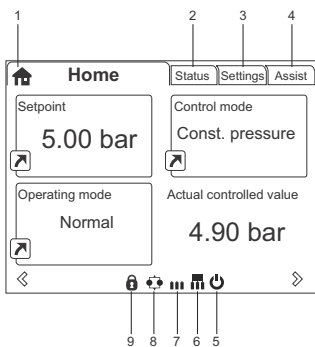


Fig. 22 Example of Home display

Pos.	Symbol	Description
9		Indicates that the possibility to make settings has been disabled for protective reasons. See section 13.33 "Buttons on product" (Enable/disable settings) .

11.2 Startup guide

The pump incorporates a startup guide which is started at the first startup. See section [13.41 Run start-up guide](#). After the startup guide, the main menus appear in the display.

Pos.	Symbol	Description
1		Home This menu shows up to four user-defined parameters. You can select parameters shown as shortcut icon  , and when pressing  you go directly to the "Settings" display for the selected parameter.
2	-	Status This menu shows the status of the pump and system as well as warnings and alarms.
3	-	Settings This menu gives access to all setting parameters. You can make detailed settings of the pump in this menu. See section 13. Description of functions .
4	-	Assist This menu enables assisted pump setup, provides a short description of the control modes and offers fault advice. See section 13.44 Assist .
5		Indicates that the pump has been stopped via the  button.
6		Indicates that the pump is functioning as master pump in a multipump system.
7		Indicates that the pump is functioning as a slave pump in a multipump system.
8		Indicates that the pump is operating in a multipump system. See section 13.48 "Multi-pump setup" (Setup of multi-pump system) .

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11.3 Menu overview for advanced control panel

11.3.1 Home

Home	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system
	•	•	•

11.3.2 Status

Status	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system
Operating status	•	•	•
Operating mode, from	•	•	•
Control mode	•	•	•
Pump performance	•	•	•
Actual controlled value	•	•	•
Resulting setpoint	•	•	•
Speed	•	•	•
Acc. flow and specific energy	•	•	•
Power and energy consumption	•	•	•
Measured values	•	•	•
Analog input 1	•	•	•
Analog input 2	•	•	•
Analog input 3	•	• ¹⁾	• ¹⁾
Pt100/1000 input 1	•	• ¹⁾	• ¹⁾
Pt100/1000 input 2	•	• ¹⁾	• ¹⁾
Analog output	•	• ¹⁾	• ¹⁾
Warning and alarm	•	•	•
Actual warning or alarm	•	•	•
Warning log	•	•	•
Alarm log	•	•	•
Operating log	•	•	•
Operating hours	•	•	•
Fitted modules	•	•	•
Date and time	•	•	•
Product identification	•	•	•
Motor bearing monitoring	•	•	•
Multi-pump system			•
System operating status			•
System performance			•
System input power and energy			•
Pump 1, multi-pump system			•
Pump 2, multi-pump system			•
Pump 3, multi-pump system			•
Pump 4, multi-pump system			•

¹⁾ Only available if an advanced functional module, type FM 300, is fitted.

11.3.3 "Settings"

Settings	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
Setpoint	•	•	•	13.1 Setpoint	30
Operating mode	•	•	•	13.2 Operating mode	30
Set manual speed	•	•	•	13.3 Set manual speed	30
Set user-defined speed	•	•	•	13.4 "Set user-defined speed"	30
Control mode	•	•	•	13.5 "Control mode"	31
Setting the proportional pressure	•	•	•	13.6 Setting the proportional pressure	36
Analog inputs	•	•	•	13.7 Analog inputs	36
Analog input 1, setup	•	•	•		
Analog input 2, setup	•	•	•		
Analog input 3, setup	•	• ¹⁾	• ¹⁾		
Pt100/1000 inputs	•	• ¹⁾	• ¹⁾	13.8 Pt100/1000 inputs	37
Pt100/1000 input 1, setup	•	• ¹⁾	• ¹⁾		
Pt100/1000 input 2, setup	•	• ¹⁾	• ¹⁾		
Digital inputs	•	•	•	13.9 Digital inputs	38
Digital input 1, setup	•	•	•		
Digital input 2, setup	•	• ¹⁾	• ¹⁾		
Digital inputs/outputs	•	•	•	13.10 Digital inputs/outputs	39
Digital input/output 3, setup	•	•	•		
Digital input/output 4, setup	•	• ¹⁾	• ¹⁾		
Relay outputs	•	•	•	13.11 "Signal relays" 1 and 2 (Relay outputs)	40
Relay output 1	•	•	•		
Relay output 2	•	•	•		
Analog output	•	• ¹⁾	• ¹⁾	13.12 Analog output	41
Output signal	•	• ¹⁾	• ¹⁾		
Function of analog output	•	• ¹⁾	• ¹⁾		
Controller settings	•	•	•	13.13 "Controller" (Controller settings)	42
Operating range	•	•	•	13.14 Operating range	43
Setpoint influence	•	•	•	13.15 External setpoint function	44
Ext. setpoint infl.	•	•	•	13.15 External setpoint function	44
Predefined setpoints	•	• ¹⁾	• ¹⁾	13.16 Predefined setpoints	45
Monitoring functions	•	•	•	13.26 Motor bearing monitoring	50
Motor bearing monitoring	•	•	•		
Motor bearing maintenance	•	•	•		
Limit-exceeded function	•	•	•	13.17 Limit-exceeded function	46
LiqTec function	•	•	•	13.18 "LiqTec" (LiqTec function)	47
Alarm handling	•	•	•	13.25 Alarm handling	50

¹⁾ Only available if an advanced functional module, type FM 300, is fitted.

Continued from page 24.

Settings	CRE, CRIE, CRNE, SPKE, MTRT	CME	Multipump system	Section	Page
Special functions	•	•	•		
Low-flow stop function	•	•	•	13.19 "Stop function" (Low-flow stop function)	47
Stop at min. speed	•	•	•	13.20 Stop at min. speed	49
Pipe filling function	•	•	•	13.21 Pipe filling function	49
Pulse flowmeter setup	•	•	•	13.22 "Pulse flowmeter" (Pulse flowmeter setup)	50
Ramps	•	•	•	13.23 Ramps	50
Standstill heating	•	•	•	13.24 Standstill heating	50
Communication	•	•	•		
Pump number	•	•	•	13.28 "Number" (Pump number)	51
Enable/disable radio comm.	•	•	•	13.29 "Radio communication" (Enable/disable radio comm.)	51
General settings	•	•	•		
Language	•	•	•	13.30 Language	51
Set date and time	•	•	•	13.31 "Date and time" (Set date and time)	52
Units	•	•	•	13.32 "Unit configuration" (Units)	52
Enable/disable settings	•	•	•	13.33 "Buttons on product" (Enable/disable settings)	52
Delete history	•	•	•	13.34 Delete history	52
Define Home display	•	•	•	13.35 Define Home display	53
Display settings	•	•	•	13.36 Display settings	53
Store actual settings	•	•	•	13.37 "Store settings" (Store actual settings)	53
Recall stored settings	•	•	•	13.38 "Recall settings" (Recall stored settings)	53
Run start-up guide	•	•	•	13.41 Run start-up guide	54

¹⁾ Only available if an advanced functional module, type FM 300, is fitted.

11.3.4 Assist

Assist	CRE, CRIE, CRNE, SPKE, MTRT	CME	Multipump system	Section	Page
Assisted pump setup	•	•	•	13.45 Assisted pump setup	55
Setup, analog input	•	•	•	13.46 Setup, analog input	55
Setting of date and time	•	•	•	13.47 Setting of date and time	56
Setup of multi-pump system	•	•	•	13.48 "Multi-pump setup" (Setup of multi-pump system)	56
Description of control mode	•	•	•	13.49 Description of control mode	59
Assisted fault advice	•	•	•	13.50 Assisted fault advice	59

12. Grundfos GO Remote

The pump is designed for wireless radio or infrared communication with Grundfos GO Remote.

Grundfos GO Remote enables setting of functions and gives access to status overviews, technical product information and actual operating parameters.

Grundfos GO Remote offers the following mobile interfaces (MI).

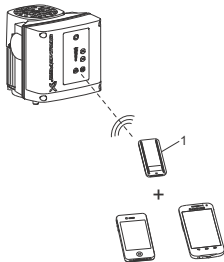


Fig. 23 Grundfos GO Remote communicating with the pump via radio or infrared connection (IR)

Pos.	Description
1	Grundfos MI 301: Separate module enabling radio or infrared communication. You can use the module in conjunction with an Android or iOS-based smart device with Bluetooth connection.

12.1 Communication

When Grundfos GO Remote initiates communication with the pump, the indicator light in the middle of Grundfos Eye flashes green. See section 16. Grundfos Eye.

Furthermore, on pumps fitted with an advanced control panel a text appears in the display saying that a wireless device is trying to establish connection. Press OK on the pump in order to establish connection with Grundfos GO Remote or press Home to reject connection.

Establish communication using one of these communication types:

- radio communication
- infrared communication.

12.1.1 Radio communication

Radio communication can take place at distances up to 30 m. The first time Grundfos GO Remote communicates with the pump, you must enable communication by pressing Loudspeaker or OK on the pump control panel. Later when communication takes place, the pump is recognised by Grundfos GO Remote and you can select the pump from the "List" menu.

12.1.2 Infrared communication

When communicating via infrared light, Grundfos GO Remote must be pointed at the pump control panel.

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12.2 Menu overview for Grundfos GO Remote

Dashboard	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system
	•	•	•
"Status"	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system
"System mode"			• ²⁾
"Resulting setpoint"	•	•	
"Resulting system setpoint"			• ²⁾
"Actual controlled value"	•	•	• ²⁾
"Motor speed"	•	•	
"Power consumption"	•	•	
"Power cons., sys."			• ²⁾
"Energy consumption"	•	•	
"Energy cons., sys."			• ²⁾
"Acc. flow, specific energy"	•	•	• ²⁾
"Operating hours"	•	•	
"Operating hours, system"			• ²⁾
"Pt100/1000 input 1"	•	• ¹⁾	
"Pt100/1000 input 2"	•	• ¹⁾	
"Analog output"	•	• ¹⁾	
"Analog input 1"	•	•	
"Analog input 2"	•	•	
"Analog input 3"	•	• ¹⁾	
"Digital input 1"	•	•	
"Digital input 2"	•	• ¹⁾	
"Digital in/output 3"	•	•	
"Digital in/output 4"	•	• ¹⁾	
"Fitted modules"	•	•	
"Pump 1"			• ²⁾
"Pump 2"			• ²⁾
"Pump 3"			• ²⁾
"Pump 4"			• ²⁾

¹⁾ Only available if an advanced functional module, type FM 300, is fitted.

²⁾ Only available if Grundfos GO Remote is connected to a multipump system.

"Settings"	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
"Setpoint"	•	•	•	13.1 Setpoint	30
"Operating mode"	•	•	•	13.2 Operating mode	30
"Set user-defined speed"	•	•	•	13.4 "Set user-defined speed"	30
"Control mode"	•	•	•	13.5 "Control mode"	31
"Setting the proportional pressure"	•	•	•	13.6 Setting the proportional pressure	36
"Pipe-filling function"	•	•	•	13.21 Pipe filling function	49
"Buttons on product"	•	•		13.33 "Buttons on product" (Enable/disable settings)	52
"LiqTec"	•	• ¹⁾		13.18 "LiqTec" (LiqTec function)	47
"Stop function"	•	•	•	13.19 "Stop function" (Low-flow stop function)	47
"Stop at min. speed"	•	•	•	13.20 Stop at min. speed	49
"Controller"	•	•	•	13.13 "Controller" (Controller settings)	42
"Operating range"	•	•	•	13.14 Operating range	43
"Ramps"	•	•		13.23 Ramps	50
"Number"	•	•		13.28 "Number" (Pump number)	51
"Radio communication"	•	•		13.29 "Radio communication" (Enable/disable radio comm.)	51
"Analog input 1"	•	•			
"Analog input 2"	•	•		13.7 Analog inputs	36
"Analog input 3"	•	• ¹⁾			
"Pt100/1000 input 1"	•	• ¹⁾		13.8 Pt100/1000 inputs	37
"Pt100/1000 input 2"	•	• ¹⁾			
"Digital input 1"	•	•		13.9 Digital inputs	38
"Digital input 2"	•	• ¹⁾			
"Digital in/output 3"	•	•		13.10 Digital inputs/outputs	39
"Digital in/output 4"	•	• ¹⁾			
"Pulse flowmeter"	•	•		13.22 "Pulse flowmeter" (Pulse flowmeter setup)	50
"Predefined setpoint"	•	•	•	13.16 Predefined setpoints	45
"Analog output"	•	• ¹⁾		13.12 Analog output	41
"External setpoint funct."	•	•		13.15 External setpoint function	44
"Signal relay 1"	•	•		13.11 "Signal relays" 1 and 2 (Relay outputs)	40
"Signal relay 2"	•	•			

¹⁾ Only available if an advanced functional module, type FM 300, is fitted.

Continues on page 29.

Continued from page 28.

"Settings"	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
"Limit 1 exceeded"	•	•	•	13.17 Limit-exceeded function	46
"Limit 2 exceeded"	•	•	•		
"Alternating operation, time"			• 2)	13.48 "Multi-pump setup" (Setup of multi-pump system)	56
"Sensor to be used"			• 2)		
"Time for pump changeover"			• 1) + 2)		
"Standstill heating"	•	•		13.24 Standstill heating	50
"Alarm handling"	•	•	•	13.25 Alarm handling	50
"Motor bearing monitoring"	•	•		13.26 Motor bearing monitoring	50
"Service"	•	•		13.27 "Service"	51
"Date and time"	•	• 1)		13.31 "Date and time" (Set date and time)	52
"Store settings"	•	•		13.37 "Store settings" (Store actual settings)	53
"Recall settings"	•	•		13.38 "Recall settings" (Recall stored settings)	53
"Undo"	•	•	•	13.38.1 "Undo"	53
"Pump name"	•	•	•	13.39 "Pump name"	53
"Connection code"	•	•	•	13.40 "Connection code"	54
"Unit configuration"	•	•		13.32 "Unit configuration" (Units)	52

1) Only available if an advanced functional module, type FM 300, is fitted.

2) Only available if Grundfos GO Remote is connected to a multipump system.

"Alarms and warnings"	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
"Alarm log"	•	•	•	13.42 Alarm log	54
"Warning log"	•	•	•	13.43 Warning log	55
"Reset alarm" button	•	•	•		

"Assist"	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
"Assisted pump setup"	•	•		13.45 Assisted pump setup	55
"Assisted fault advice"	•	•	•	13.50 Assisted fault advice	59
"Multi-pump setup"	•	•	•	13.48 "Multi-pump setup" (Setup of multi-pump system)	56

13. Description of functions

13.1 Setpoint

Pump variant	Setpoint
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

You can set the setpoint for all control modes when you have selected the desired control mode. See section [13.5 "Control mode"](#).

Factory setting

See section [24. Factory settings](#).

13.2 Operating mode

Pump variant	Operating mode
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

Possible operating modes:

- **Normal**
The pump runs according to the selected control mode.
- **Stop**
The pump stops.
- **Min.**
You can use the minimum curve mode in periods in which a minimum flow is required. When operating according to the minimum curve, the pump is operating like an uncontrolled pump.
- **Max.**
You can use the maximum curve mode in periods in which a maximum flow is required. When operating according to the maximum curve, the pump is operating like an uncontrolled pump.
- **Manual**
The pump is operating at a manually set speed. In Manual the setpoint via bus is over-ruled. See section [13.3 Set manual speed](#).
- **"User-defined speed"**
The motor is operating at a speed set by the user. See section [13.4 "Set user-defined speed"](#).

All operating modes are illustrated in fig. [24](#).

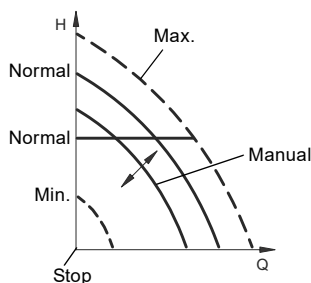


Fig. 24 Operating modes

Factory setting

See section [24. Factory settings](#).

13.3 Set manual speed

This menu is only available in the advanced control panel. With Grundfos GO Remote, you set the speed via the Setpoint menu.

You can set the pump speed in % of the maximum speed. When you have set the operating mode to Manual, the pump starts running at the set speed. The speed can then be changed manually via Grundfos GO Remote or via the advanced control panel.

Factory setting

See section [24. Factory settings](#).

13.4 "Set user-defined speed"

You can set the motor speed in % of the maximum speed. When you have set the operating mode to "User-defined speed", the motor runs at the set speed.

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13.5 "Control mode"

Pump variant	Control mode
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

Possible control modes:

- "Proportional pressure"
- "Constant pressure" (Const. pressure)
- "Constant temperature" (Const. temp.)
- "Constant differential pressure" (Con. diff. press.)
- "Constant differential temperature" (Con. diff. temp.)
- "Constant flow rate" (Const. flow rate)
- "Constant level" (Const. level)
- "Constant other value" (Const. other val.)
- "Constant curve" (Const. curve.)
 - * Requires a measured differential pressure and pump data entered into the controller. See [13.6.5 "Pump data"](#)

Factory setting

See section [24. Factory settings](#).

13.5.1 "Proportional pressure"

Pump variant	"Proportional pressure"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

We recommend this control mode if the pump is installed in a circulating system.

The head of the pump is reduced at decreasing water demand and increased at rising water demand. See [Fig. 25](#).

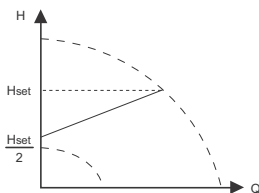


Fig. 25 "Proportional pressure"

This control mode is especially suitable in systems with relatively large pressure losses in the distribution pipes. The head of the pump increases proportionally to the system flow rate to compensate for the large pressure losses in the distribution pipes. For the settings of proportional pressure, see [13.6 Setting the proportional pressure](#).

13.5.2 "Constant pressure"

Pump variant	"Constant pressure"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

We recommend this control mode if the pump is to deliver a constant pressure, independently of the flow in the system. See [fig. 26](#).

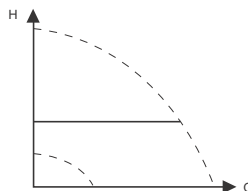


Fig. 26 "Constant pressure"

This control mode uses the factory-fitted pressure sensor, if any, which measures the outlet pressure of the pump.

For pumps without a factory-fitted sensor, you must connect a pressure sensor to one of the analog inputs of the pump. You can set the pressure sensor in the Assist menu. See section [13.45 Assisted pump setup](#).

Examples

- One external pressure sensor.

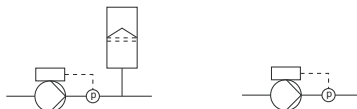


Fig. 27 "Constant pressure"

Controller settings

For recommended controller settings, see section [13.13 "Controller" \(Controller settings\)](#).

Factory setting

See section [24. Factory settings](#).

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13.5.3 "Constant temperature"

Pump variant	"Constant temperature"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This control mode ensures a constant temperature. Constant temperature is a comfort control mode that you can use in domestic hot-water systems to control the flow to maintain a fixed temperature in the system. See fig. 28.

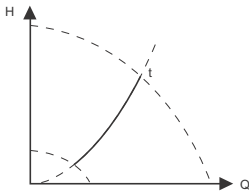


Fig. 28 "Constant temperature"

This control mode requires a temperature sensor placed at the location where the temperature is to be controlled. See the examples below:

Examples



Fig. 29 "Constant temperature"

Controller settings

For recommended controller settings, see section 13.13 "Controller" (Controller settings).

Factory setting

See section 24. Factory settings.

13.5.4 "Constant differential pressure"

Pump variant	"Constant differential pressure"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

The pump maintains a constant differential pressure, independently of the flow in the system. See fig. 30.

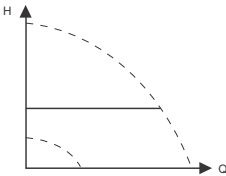
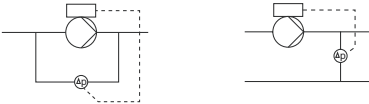


Fig. 30 "Constant differential pressure"

This control mode requires either a differential-pressure sensor or two external pressure sensors. See the examples below:

Examples

- One differential-pressure sensor. The pump uses the input from the sensor to control the differential pressure. You can set the sensor manually or by using the Assist menu. See section 13.45 Assisted pump setup.



- Two pressure sensors. Constant differential-pressure control is achievable with two pressure sensors. The pump uses the inputs from the two sensors and calculates the differential pressure. Both sensors must have the same unit and must be set as feedback sensors. You can set the sensors manually, sensor by sensor, or by using the Assist menu. See section 13.45 Assisted pump setup.



Fig. 31 "Constant differential pressure"

Controller settings

For recommended controller settings, see section 13.13 "Controller" (Controller settings).

Factory setting

See section 24. Factory settings.

13.5.5 "Constant differential temperature"

Pump variant	"Constant differential temperature"
CME	•
CRE, CRIE, CRNE, SPKE, MTRÉ	•

The pump maintains a constant differential temperature in the system and the pump performance is controlled according to this. See fig. 32.

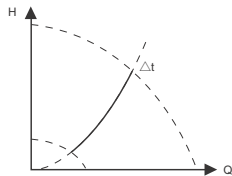


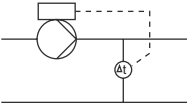
Fig. 32 "Constant differential temperature"

This control mode requires either two temperature sensors or one differential-temperature sensor. See the examples below. The temperature sensors can either be analog sensors connected to two of the analog inputs or two Pt100/Pt1000 sensors connected to the Pt100/1000 inputs, if these are available on the specific pump.

Set the sensor in the Assist menu under Assisted pump setup. See section 13.45 Assisted pump setup.

Examples

- One differential-temperature sensor. The pump uses the input from the sensor to control the differential temperature. You can set the sensor manually or by using the Assist menu. See section 13.45 Assisted pump setup.



- Two temperature sensors. Constant differential-temperature control is achievable with two temperature sensors. The pump uses the input from the two sensors and calculates the differential temperature. Both sensors must have the same unit and must be set as feedback sensors. You can do this manually, sensor by sensor, or by using the Assist menu. See section 13.45 Assisted pump setup.

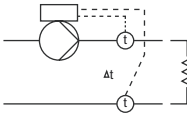


Fig. 33 Constant differential temperature

Controller settings

For recommended controller settings, see section 13.13 "Controller" (Controller settings).

Factory setting

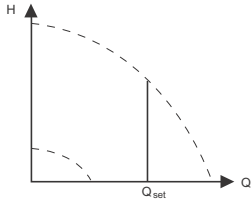
See section 24. Factory settings.

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13.5.6 "Constant flow rate"

Pump variant	"Constant flow rate"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

The pump maintains a constant flow in the system, independently of the head. See fig. 34.



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Fig. 34 Constant flow rate

This control mode requires a flow sensor as shown below:

Example

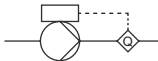


Fig. 35 "Constant flow rate"

Controller settings

For recommended controller settings, see section 13.13 "Controller" (Controller settings).

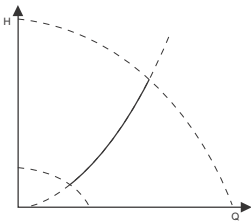
Factory setting

See section 24. Factory settings.

13.5.7 "Constant level"

Pump variant	"Constant level"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

The pump maintains a constant level, independently of the flow rate. See fig. 36.



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Fig. 36 "Constant level"

This control mode requires a level sensor.

The pump can control the level in a tank in two ways:

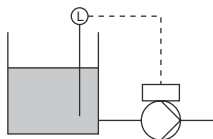
- As an emptying function where the pump draws the liquid from a feed tank.
- As a filling function where the pump pumps the liquid into a storage tank.

See fig. 37.

The type of level control function depends on the setting of the built-in controller. See section [13.13 "Controller" \(Controller settings\)](#).

Examples

- One level sensor.
– emptying function (feed tank).



- One level sensor.
– filling function (storage tank).

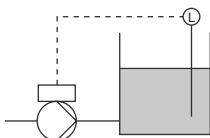


Fig. 37 "Constant level"

Controller settings

For recommended controller settings, see section [13.13 "Controller" \(Controller settings\)](#).

Factory setting

See section [24. Factory settings](#).

13.5.8 "Constant other value"

Pump variant	"Constant other value"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

Any other value is kept constant.

Use this control mode if you want to control a value which is not available in the Control mode menu. Connect a sensor measuring the controlled value to one of the analog inputs of the pump. The controlled value is shown in percentage of sensor range.

Factory setting

See section [24. Factory settings](#).

13.5.9 "Constant curve"

Pump variant	"Constant curve"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

You can set the pump to operate according to a constant curve, like an uncontrolled pump. See fig. [38](#).

The desired speed can be set in % of maximum speed in the range from 13 to 100 %.

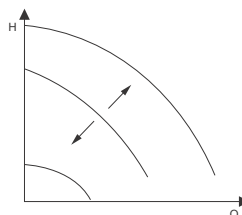


Fig. 38 "Constant curve"

Controller settings

For recommended controller settings, see section [13.13 "Controller" \(Controller settings\)](#).

Factory setting

See section [24. Factory settings](#).

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13.6 Setting the proportional pressure

13.6.1 "Control-curve function"

You can set the proportional curve either to quadratic or linear to match the system curve.

13.6.2 "Zero-flow head"

You can set this value in percentage of the setpoint and define how much the setpoint must be reduced at a closed valve. With a setting of 100 %, the control mode is equal to the constant differential pressure.

13.6.3 "Fixed inlet pressure"

This menu enables the use of a fixed inlet pressure.

13.6.4 "Inlet pressure"

Enter the fixed inlet pressure that is to be supplied to the pump.

13.6.5 "Pump data"

To enable the pump to operate in proportional pressure, the controller needs to process the pump curve. Enter the maximum head, rated head and rated flow from the pump nameplate.

13.7 Analog inputs

Available inputs depend on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Analog input 1, setup (4)	•	•
Analog input 2, setup (7)	•	•
Analog input 3, setup (14)	-	•

* See section 19. Identification of functional module.

If you want to set the analog input for a feedback sensor, we recommend that you do this via the Assisted pump setup menu. See section 13.45 Assisted pump setup.

If you want to set an analog input for other purposes, you can do this manually.

You can set the analog inputs via the Setup, analog input menu. See section 13.46 Setup, analog input.

If you make the manual setting via Grundfos GO Remote, you need to enter the menu for the analog input under the Settings menu.

Function

The analog inputs can be set to these functions:

- Not active
- Feedback sensor
The sensor is used for the selected control mode.
- Ext. setpoint infl.
See section 13.15 External setpoint function.
- Other function.

Measured parameter

Select one of the parameters listed below, i.e. the parameter to be measured in the system by the sensor connected to the actual analog input. See fig. 39.

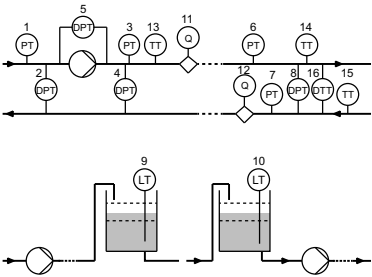


Fig. 39 Overview of sensor locations

Sensor function/measured parameter	Pos.
Inlet pressure	1
Diff. press., inlet	2
Discharge press.	3
Diff. press.,outlet	4
Diff. press.,pump	5
Press. 1, external	6
Press. 2, external	7
Diff. press., ext.	8
Storage tank level	9
Feed tank level	10
Pump flow	11
Flow, external	12
Liquid temp.	13
Temperature 1	14
Temperature 2	15
Diff. temp., ext.	16
Ambient temp.	Not shown
Other parameter	Not shown

Unit

Parameter	Possible units
Pressure	bar, m, kPa, psi, ft
Level	m, ft, in
Pump flow	m ³ /h, l/s, yd ³ /h, gpm
Liquid temperature	°C, °F
Other parameter	%

Electrical signal

Select signal type:

- 0.5-3.5 V
- 0-5 V
- 0-10 V
- 0-20 mA
- 4-20 mA.

Sensor range, minimum value

Set the minimum value of the connected sensor.

Sensor range, maximum value

Set the maximum value of the connected sensor.

Factory setting

See section [24. Factory settings](#).

13.7.1 Setting two sensors for differential measurement

In order to measure the difference of a parameter between two points, set the corresponding sensors as follows:

Parameter	Analog input for sensor 1	Analog input for sensor 2
Pressure, option 1	Differential pressure, inlet	Differential pressure, outlet
Pressure, option 2	Pressure 1, external	Pressure 2, external
Flow	Pump flow	Flow, external
Temperature	Temperature 1	Temperature 2



If you want to use the control mode "constant differential pressure", you must choose the function Feedback sensor for the analog input of both sensors.

13.8 Pt100/1000 inputs

Available inputs depend on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Pt100/1000 input 1, setup (17 and 18)	-	•
Pt100/1000 input 2, setup (18 and 19)	-	•

* See section [19. Identification of functional module](#).

If you want to set the Pt100/1000 input for a feedback sensor, we recommend that you do this via the Assisted pump setup menu. See section [13.45 Assisted pump setup](#).

If you want to set a Pt100/1000 input for other purposes, you can do this manually.

You can set the analog inputs via the Setup, analog input menu. See section [13.46 Setup, analog input](#).

If you make the manual setting via Grundfos GO Remote, you need to enter the menu for the Pt100/1000 input under the Settings menu.

Function

The Pt100/1000 inputs can be set to these functions:

- Not active
- Feedback sensor
The sensor is used for the selected control mode.
- Ext. setpoint infl.
See section [13.15 External setpoint function](#).
- Other function.

Measured parameter

Select one of the parameters listed below, i.e. the parameter to be measured in the system by the PT100/1000 sensor connected to the actual PT100/1000 input. See fig. 40.

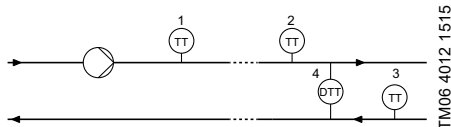


Fig. 40 Overview of PT100/1000 sensor locations

Parameter	Pos.
Liquid temp.	1
Temperature 1	2
Temperature 2	3
Ambient temp.	Not shown

Measuring range

-50 to 204 °C.

Factory setting

See section 24. *Factory settings*.

13.9 Digital inputs

Pump variant	Digital inputs
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

Available inputs depend on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Digital input 1, setup (2 and 6)	•	•
Digital input 2, setup (1 and 9)	-	•

* See section 19. *Identification of functional module*.

To set a digital input, make the settings below.

Function

Select one of these functions:

- Not active.
When set to Not active, the input has no function.
- External stop.
When the input is deactivated (open circuit), the pump stops.
- Min. (minimum speed).
When the input is activated, the pump runs at the set minimum speed.

- Max. (maximum speed).
When the input is activated, the pump runs at the set maximum speed.
- "User-defined speed"
When the input is activated, the motor runs at a speed set by the user.
- External fault.
When the input is activated, a timer is started. If the input is activated for more than 5 seconds, the pump is stopped and a fault is indicated. This function depends on input from external equipment.
- Alarm resetting.
When the input is activated, a possible fault indication is reset.
- Dry running.
When this function is selected, lack of inlet pressure or water shortage can be detected. When lack of inlet pressure or water shortage (dry running) is detected, the pump is stopped. The pump cannot restart as long as the input is activated. This requires the use of an accessory, such as these:
 - a pressure switch installed on the inlet side of the pump
 - a float switch installed on the inlet side of the pump.
- Accumulated flow.
When this function is selected, the accumulated flow can be registered. This requires the use of a flowmeter which can give a feedback signal as a pulse per defined volume of water. See section 13.22 *"Pulse flowmeter" (Pulse flowmeter setup)*.
- Predefined setpoint digit 1 (applies only to digital input 2).
When digital inputs are set to predefined setpoint, the pump operates according to a setpoint based on the combination of the activated digital inputs. See section 13.16 *Predefined setpoints*.
- Active output.
When the input is activated, the related digital output is activated. See 13.10 *Digital inputs/outputs*. This is done without any changes to pump operation.
- Local motor stop.
When the input is activated, the given pump in a multipump system stops without affecting the performance of the other pumps in the system.

The priority of the selected functions in relation to each other appears from section 15. *Priority of settings*.

A stop command always has the highest priority.

Activation delay

Select the activation delay (T1).

It is the time between the digital signal and the activation of the selected function.

Range: 0-6000 seconds.

Duration timer mode

Select the mode. See fig. 41.

- Not active
- active with interrupt (mode A)
- active without interrupt (mode B)
- active with after-run (mode C).

Select the duration time (T2).

It is the time which, together with the mode, determines how long the selected function is active.

Range: 0 to 15,000 seconds.

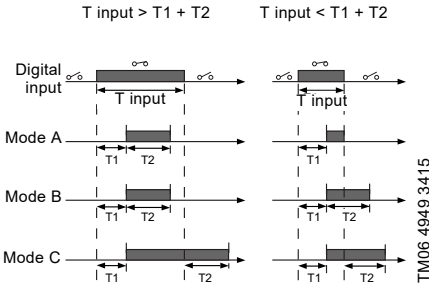


Fig. 41 Duration timer function of digital inputs

Factory setting

See section 24. *Factory settings*.

13.10 Digital inputs/outputs

Pump variant	Digital inputs/outputs
CME	•
CRE, CRIE, CRNE, SPKE, MTRÉ	•

Available inputs/outputs depend on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Digital input/output 3, setup (6 and 10)	•	•
Digital input/output 4, setup (11 and 18)	-	•

* See section 19. *Identification of functional module*.

You can select if the interface is to be used as input or output. The output is an open collector and you can connect it to e.g. an external relay or controller such as a PLC.

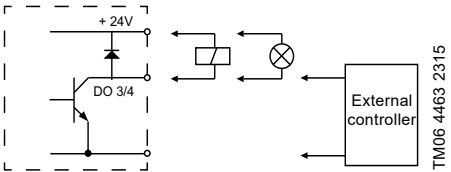


Fig. 42 Example of configurable digital inputs/outputs

To set a digital input/output, make the settings below.

Mode

You can set the digital input/output 3 and 4 to act as digital input or digital output:

- Digital input
- Digital output.

Function

You can set the digital input/output 3 and 4 to the functions stated in the table below:

Possible functions, digital input/output 3

Function if input (See details in section 13.9 Digital inputs)	Function if output (See details in section 13.11 "Signal relays" 1 and 2 (Relay outputs))
- Not active - External stop - Min. - Max. "User-defined speed" - External fault - Alarm resetting - Dry running - Accumulated flow - Predefined setpoint digit 2 - Active output - Local motor stop	- Not active - Ready - Alarm - Operation - Pump running - Warning - Limit 1 exceeded - Limit 2 exceeded - Digital input 1, state - Digital input 2, state - Digital input 3, state - Digital input 4, state

Possible functions, digital input/output 4

Function if input (See details in section 13.9 Digital inputs)	Function if output (See details in section 13.11 "Signal relays" 1 and 2 (Relay outputs))
- Not active - External stop - Min. - Max. "User-defined speed" - External fault - Alarm resetting - Dry running - Accumulated flow - Predefined setpoint digit 3 - Active output - Local motor stop	- Not active - Ready - Alarm - Operation - Pump running - Warning - Limit 1 exceeded - Limit 2 exceeded - Digital input 1, state - Digital input 2, state - Digital input 3, state - Digital input 4, state

Duration timer mode (only for input)

Select the duration timer mode. See fig. 41.

- Not active
- active with interrupt (mode A)
- active without interrupt (mode B)
- active with after-run (mode C)

Select the duration time (T2).

It is the time which, together with the mode, determines how long the selected function is active.

Range: 0 to 15,000 seconds.

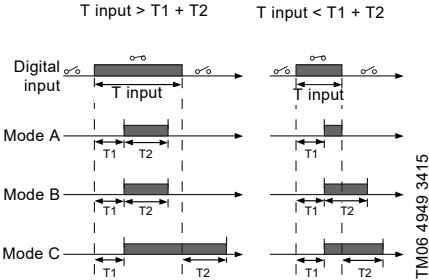


Fig. 43 Duration timer function of digital inputs

Factory setting

See section 24. Factory settings.

13.11 "Signal relays" 1 and 2 (Relay outputs)

Pump variant	"Signal relays" 1 and 2 (Relay outputs)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

The pump incorporates two signal relays for potential-free signalling. For further information, see section 25. Megging.

Function

You can configure the signal relays to be activated by one of the following incidents:

- Not active.
- Ready.
The pump can be running or is ready to run and no alarms are present.
- Alarm.
There is an active alarm and the pump is stopped.

- "Operating" (Operation).
"Operating" equals "Running" but the pump is still in operation when the pump is stopped due to low flow. See section ["Low-flow detection"](#) on page 48.
- "Running" (Pump running).
The pump is running.
- Warning.
There is an active warning.
- Digital input 1, state
If digital input 1 is activated, the output is also activated.
- Digital input 2, state
If digital input 2 is activated, the output is also activated.
- Digital input 3, state
If digital input 3 is activated, the output is also activated.
- Digital input 4, state
If digital input 4 is activated, the output is also activated.
- Limit 1 exceeded
When this function is activated, the signal relay is activated. See section [13.17 Limit-exceeded function](#).
- Limit 2 exceeded.
When this function is activated, the signal relay is activated. See section [13.17 Limit-exceeded function](#).
- "External fan control" (Control of external fan).
When you select "External fan control", the relay is activated if the internal temperature of the motor electronics reach a preset limit value.

Factory setting

See section [24. Factory settings](#).

13.12 Analog output

Pump variant	Analog output
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

Whether the analog output is available or not, depends on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Analog output	-	•

* See section [19. Identification of functional module](#).

The analog output enables the reading of certain operating data to external control systems.

To set the analog output, make the settings below.

Output signal

- 0-10 V
- 0-20 mA
- 4-20 mA.

Function of analog output

- Actual speed

Signal range [V, mA]	Actual speed [%]		
	0	100	200
0-10 V	0 V	5 V	10 V
0-20 mA	0 mA	10 mA	20 mA
4-20 mA	4 mA	12 mA	20 mA

The reading is a percentage of the rated speed.

- Actual value

Signal range [V, mA]	"Actual value"	
	Sensor _{min}	Sensor _{max}
0-10 V	0 V	10 V
0-20 mA	0 mA	20 mA
4-20 mA	4 mA	20 mA

The reading is a percentage of the range between the minimum and maximum value.

- Resulting setpoint

Signal range [V, mA]	Resulting setpoint [%]	
	0	100
0-10 V	0 V	10 V
0-20 mA	0 mA	20 mA
4-20 mA	4 mA	20 mA

The reading is a percentage of the external setpoint range.

- Motor load

Signal range [V, mA]	Motor load [%]	
	0	100
0-10 V	0 V	10 V
0-20 mA	0 mA	20 mA
4-20 mA	4 mA	20 mA

The reading is a percentage of the range between 0 and 200 % of the maximum permissible load at the actual speed.

- Motor current

Signal range [V, mA]	Motor current [%]		
	0	100	200
0-10 V	0 V	5 V	10 V
0-20 mA	0 mA	10 mA	20 mA
4-20 mA	4 mA	12 mA	20 mA

The reading is a percentage of the range between 0 % and 200 % of the rated current.

- Limit 1 exceeded and Limit 2 exceeded

Signal range [V, mA]	Limit-exceeded function	
	Output not active	Output active
0-10 V	0 V	10 V
0-20 mA	0 mA	20 mA
4-20 mA	4 mA	20 mA

This function is typically used for monitoring of secondary parameters in the system. If the limit is exceeded, an output, a warning or an alarm is activated.

- Flow rate

Signal range [V, mA]	Flow rate [%]		
	0	100	200
0-10 V	0 V	5 V	10 V
0-20 mA	0 mA	10 mA	20 mA
4-20 mA	4 mA	12 mA	20 mA

The reading is a percentage of the range between 0 and 200 % of the nominal flow.

Factory setting

See section 24. [Factory settings](#).

13.13 "Controller" (Controller settings)

Pump variant	"Controller" (Controller settings)
CME	•
CRE, CRIE, CRNE, SPKE, MTRÉ	•

The pumps have a factory default setting of gain (K_p) and integral time (T_i).

However, if the factory setting is not the optimum setting, you can change the gain and the integral time:

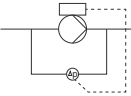
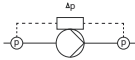
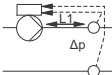
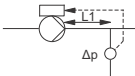
- Set the gain within the range from 0.1 to 20.
- Set the integral-action time within the range from 0.1 to 3600 seconds.
If you select 3600 seconds, the controller functions as a P controller.

Furthermore, you can set the controller to inverse control.

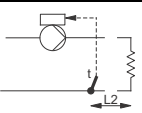
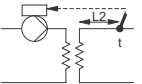
This means that if you increase the setpoint, the speed is reduced. In the case of inverse control, you must set the gain within the range from -0.1 to -20.

Guidelines for setting of PI controller

The tables below show the recommended controller settings:

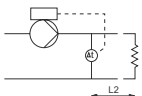
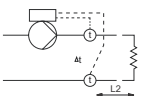
Constant differential pressure	K_p	T_i
	0.5	0.5
		
	0.5	L1 < 5 m: 0.5 L1 > 5 m: 3 L1 > 10 m: 5
		

L1: distance in metres between pump and sensor.

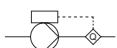
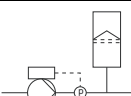
Constant temperature	K_p		T_i
	Heating system ¹⁾	Cooling system ²⁾	
	0.5	-0.5	$10 + 5L2$
	0.5	-0.5	$30 + 5L2$

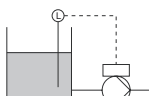
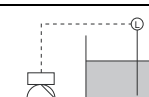
- 1) In heating systems, an increase in pump performance results in a rise in temperature at the sensor.
- 2) In cooling systems, an increase in pump performance results in a drop in temperature at the sensor.

L2: distance in metres between heat exchanger and sensor.

Constant differential temperature	K_p	T_i
	-0.5	$10 + 5L2$
		

L2: Distance [m] between heat exchanger and sensor.

Constant flow rate	K_p	T_i
	0.5	0.5
Constant pressure	K_p	T_i
	0.5	0.5
	0.5	0.5

Constant level	K_p	T_i
	-10	0
	10	0

General rules of thumb

If the controller is too slow-reacting, increase the gain.

If the controller is hunting or unstable, dampen the system by reducing the gain or increasing the integral time.

Factory setting

See section 24. [Factory settings](#).

13.14 Operating range

Pump variant	Operating range
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

Set the operating range as follows:

- Set the minimum speed within the range from fixed minimum speed to user-set maximum speed.
- Set the maximum speed within the range from user-set minimum speed to fixed maximum speed.

The range between the user-set minimum and maximum speeds is the operating range. See fig. 44.

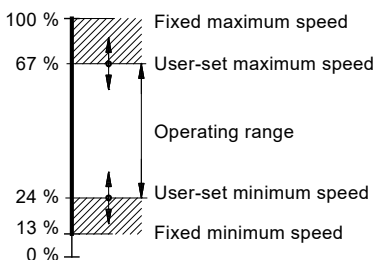


Fig. 44 Example of minimum and maximum settings

Factory setting

See section 24. [Factory settings](#).

13.15 External setpoint function

Pump variant	External setpoint function
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

You can influence the setpoint by an external signal, either via one of the analog inputs or, if an advanced functional module (FM 300) is fitted, via one of the Pt100/1000 inputs.



Before you can enable the function, you must set one of the analog inputs or Pt100/1000 inputs to *External setpoint function*.

See sections [13.7 Analog inputs](#) and [13.8 Pt100/1000 inputs](#).

Example with constant pressure with linear influence

Actual setpoint: actual input signal x (setpoint - sensor min.) + sensor min.

At a sensor min. of 0 bar, a setpoint of 2 bar and an external setpoint of 60 %, the actual setpoint is $0.60 \times (2 - 0) + 0 = 1.2$ bar. See fig. 45.

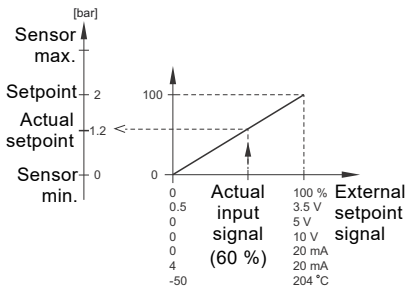


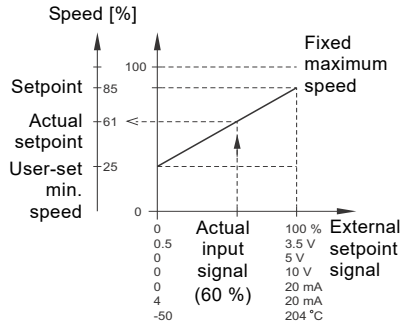
Fig. 45 Example of setpoint influence with sensor feed back

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Example with constant curve with linear influence

Actual setpoint: actual input signal x (setpoint - user-set minimum speed) + user-set minimum speed.

At a user-set minimum speed of 25 %, and a setpoint of 85 % and an external setpoint of 60 %, the actual setpoint is $0.60 \times (85 - 25) + 25 = 61$ %. See fig. 46.



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Fig. 46 Example of setpoint influence with constant curve

13.15.1 "Setpoint influence" functions

You can select these functions:

- Not active.
When set to Not active, the setpoint is not influenced from any external function.
- Linear function.
The setpoint is influenced linearly from 0 to 100 %. See fig. 47.

Setpoint influence [%]

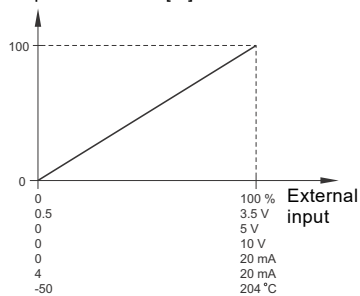


Fig. 47 Linear function

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- Linear with Stop

In the input signal range from 20 to 100 %, the setpoint is influenced linearly.
If the input signal is below 10 %, the pump changes to operating mode Stop.
If the input signal is increased above 15 %, the operating mode is changed back to Normal.
See fig. 48.

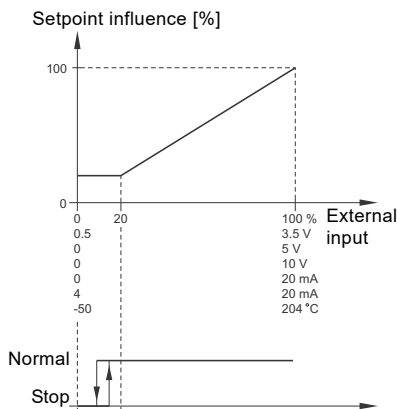


Fig. 48 Linear with Stop

- Influence table.

The setpoint is influenced by a curve made out of two to eight points. There is a straight line between the points and a horizontal line before the first point and after the last point.

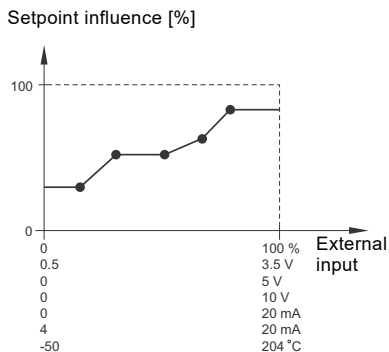


Fig. 49 Influence table (example with five points)

Factory setting

See section 24. [Factory settings](#).

13.16 Predefined setpoints

Pump variant	Predefined setpoints
CME	-
CRE, CRIE, CRNE, SPKE, MTR E	•

You can set and activate seven predefined setpoints by combining the input signals to digital inputs 2, 3 and 4. See the table below.

Set the digital inputs 2, 3 and 4 to Predefined setpoints if all seven predefined setpoints are to be used. You can also set one or two of the digital inputs to Predefined setpoints but this limits the number of predefined setpoints available.

Digital inputs			Setpoint
2	3	4	
0	0	0	Normal setpoint or stop
1	0	0	Predefined setpoint 1
0	1	0	Predefined setpoint 2
1	1	0	Predefined setpoint 3
0	0	1	Predefined setpoint 4
1	0	1	Predefined setpoint 5
0	1	1	Predefined setpoint 6
1	1	1	Predefined setpoint 7

0: Open contact

1: Closed contact

Example

Figure 50 shows how you can use the digital inputs to set seven predefined setpoints. Digital input 2 is open and digital inputs 3 and 4 are closed. If you compare with the table above, you can see that Predefined setpoint 6 is activated.

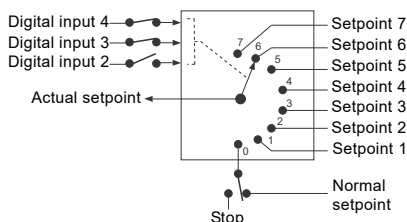


Fig. 50 Principle sketch showing how predefined setpoints function

If all digital inputs are open, the pump stops or runs at the normal setpoint. Set the desired action with Grundfos GO Remote or with the advanced control panel.

Factory setting

See section 24. [Factory settings](#).

13.17 Limit-exceeded function

Pump variant	Limit-exceeded function
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This function can monitor a measured parameter or one of the internal values such as speed, motor load or motor current. If a set limit is reached, a selected action can take place. You can set two limit-exceeded functions meaning that you can monitor two parameters or two limits of the same parameter simultaneously.

The function requires setting of the following:

"Measured"

Here you set the measured parameter which is to be monitored.

"Limit"

Here you set the limit which activates the function.

"Hysteresis band"

Here you set the hysteresis band.

"Limit exceeded when"

Here you can set if you want the function to activate when the selected parameter exceeds or drops below the set limit.

- Above limit.
The function is activated if the measured parameter exceeds the set limit.
- Below limit.
The function is activated if the measured parameter drops below the set limit.

"Action"

If the value exceeds a limit, you can set an action. You can select the following actions:

- No action.
The pump remains in its current state. Use this setting if you only want to have a relay output when the limit is reached. See section [13.11 "Signal relays" 1 and 2 \(Relay outputs\)](#).
- Warning/alarm.
A warning is given.
- Stop.
The pump stops.
- Min..
The pump reduces speed to minimum.
- Max..
The pump increases speed to maximum.
- "User-defined speed"
The pumps runs at a speed set by the user.
- Alarm + Stop
An alarm is given, and the pump stops.
- Alarm + Min.
An alarm is given, and the pump decreases speed to minimum.
- Alarm + Max.
An alarm is given, and the pump increases speed to maximum.

- Alarm + User-defined speed
An alarm is given, and the pump runs at the speed set by the user.

Detection delay

You can set a detection delay which ensures that the monitored parameter stays above or below a set limit in a set time before the function is activated.

Resetting delay

The resetting delay is the time from which the measured parameter differs from the set limit including the set hysteresis band and until the function is reset.

Example:

The function is to monitor the outlet pressure from a CRE pump. If the pressure is below 5 bar for more than 5 seconds, a warning must be given. If the outlet pressure is above 7 bar for more than 8 seconds, reset the limit exceeded warning.

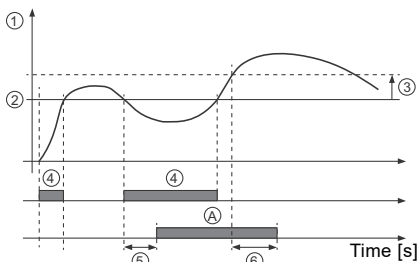


Fig. 51 Limit exceeded (example)

Pos.	Setting parameter	Setting
1	"Measured"	Outlet pressure
2	"Limit"	5 bar
3	"Hysteresis band"	2 bar
4	"Limit exceeded when"	Below limit
5	"Detection delay"	5 seconds
6	"Resetting delay"	8 seconds
A	"Limit exceeded function active"	-
-	"Action"	Warning

Factory setting

See section [24. Factory settings](#).

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13.18 "LiqTec" (LiqTec function)

Pump variant	"LiqTec" (LiqTec function)
CME	-
CRE, CRIE, CRNE, SPKE, MTRE	•

You can enable the function of the LiqTec sensors in this display. A LiqTec sensor protects the pump against dry running.

The function requires that a LiqTec sensor has been fitted and connected to the pump.

When you have enabled the LiqTec function, it stops the pump if dry running occurs. Restart the pump manually if it has been stopped due to dry running.

"Dry running detection delay"

You can set a detection delay in order to make sure that the pump is given a chance to start up before the LiqTec function stops the pump due to dry running.

Range: 0-254 seconds.

Factory setting

See section 24. *Factory settings*.

13.19 "Stop function" (Low-flow stop function)

Pump variant	"Stop function" (Low-flow stop function)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

You can set the "Low-flow stop function" to these values:

- Not active
- Energy-optimal mode
- High-comfort mode
- "User-defined mode" (Customised operating mode).

When the low-flow stop function is active, the flow is monitored. If the flow becomes lower than the set minimum flow ($Q_{\min}$), the pump changes from continuous operation at constant pressure to start-stop operation and stops if the flow reaches zero.

The advantages of enabling the "Low-flow stop function" are the following:

- no unnecessary heating of the pumped liquid
- reduced wear of the shaft seals
- reduced noise from operation.

The disadvantages of enabling the "Low-flow stop function" may be the following:

- The delivered pressure is not completely constant as it fluctuates between the start and stop pressures.
- The frequent starts/stops of the pump may in some applications cause acoustic noise.

The impact of the above disadvantages very much depends on the setting selected for the stop function.

The High-comfort mode setting minimises pressure fluctuations and acoustic noise.

Select Energy-optimal mode if the main priority is to reduce the energy consumption as much as possible.

Possible settings of the stop function:

- **Energy-optimal mode**
The pump automatically adjusts the parameters for the stop function so that the energy consumption during the start-stop operation period is minimised.
In this case, the stop function uses the factory-set values of the minimum flow ($Q_{\min1}$) and other internal parameters. See fig. 52.
- **High-comfort mode:**
The pump automatically adjusts the parameters for the stop function so that the disturbances during the start-stop operation period are minimised.
In this case, the stop function uses the factory-set values of the minimum flow ($Q_{\min2}$) and other internal parameters. See fig. 52.
- **"User-defined mode" (Customised operating mode):**
The pump uses the parameters set for ΔH and minimum flow ($Q_{\min3}$) respectively for the stop function. See fig. 52.

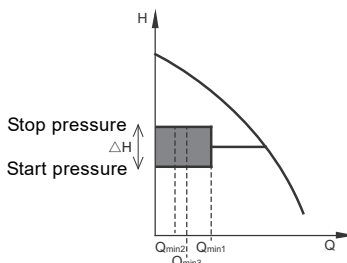


Fig. 52 Difference between start and stop pressures (ΔH) and minimum flow rate

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In start-stop operation, the pressure varies between the start and stop pressures. See fig. 52.

In "User-defined mode" (Customised operating mode), ΔH has been factory-set to 10 % of the actual setpoint. ΔH can be set within the range from 5 to 30 % of actual setpoint.

The pump changes to start-stop operation if the flow becomes lower than the minimum flow.

The minimum flow is set in % of the nominal flow of the pump (see the pump nameplate).

In "User-defined mode" (Customised operating mode), the minimum flow has been factory-set to 10 % of nominal flow.

Factory setting

See section 24. [Factory settings](#).

"Low-flow detection"

Low flow can be detected in two ways:

1. A built-in low-flow detection function which is active if none of the digital inputs are set for flow switch.
2. A flow switch connected to one of the digital inputs.

1. Low-flow detection function:

The pump checks the flow regularly by reducing the speed for a short time. If there is no or only a small change in pressure, this means that there is low flow. The speed is increased until the stop pressure (actual setpoint + $0.5 \times \Delta H$) is reached and the pump stops. When the pressure has fallen to the start pressure (actual setpoint - $0.5 \times \Delta H$), the pump restarts.

- If the flow is higher than the set minimum flow, the pump returns to continuous operation at constant pressure.
 - If the flow is still lower than the set minimum flow ($Q_{\min}$), the pump continues in start-stop operation until the flow is higher than the set minimum flow ($Q_{\min}$). When the flow is higher than the set minimum flow rate ($Q_{\min}$), the pump returns to continuous operation.
2. Flow switch:
When the digital input is activated for more than 5 seconds because there is low flow, the speed is increased until the stop pressure (actual setpoint + $0.5 \times \Delta H$) is reached, and the pump stops. When the pressure has fallen to start pressure, the pump restarts. If there is still no flow, the pump quickly reaches the stop pressure and stops. If there is flow, the pump continues operating according to the setpoint.

Operating conditions for the low-flow stop function

You can only use the stop function if the system incorporates a pressure sensor, a non-return valve and a diaphragm tank.



Always install the non-return valve before the pressure sensor. See figures 53 and 54.

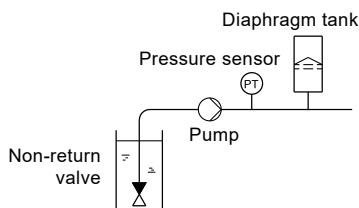


Fig. 53 Position of the non-return valve and pressure sensor in system with suction lift operation

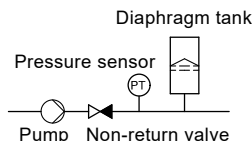


Fig. 54 Position of the non-return valve and pressure sensor in a system with a positive inlet pressure

"Set minimum flow"

Set the minimum flow ($Q_{\min}$) in this display. This setting determines at which flow rate the system is to change from continuous operation at constant pressure to start-stop operation. The setting range is 5 to 30 % of rated flow.

Factory setting

See section 24. [Factory settings](#).

"Diaphragm tank volume"

The stop function requires a diaphragm tank of a certain minimum size. Set the size of the installed tank in this display.

In order to reduce the number of start-stops per hour or to reduce the ΔH , install a larger tank.

Install the tank immediately after the pump. The precharge pressure must be 0.7 x actual setpoint.

Recommended diaphragm tank size:

Rated flow rate of pump [m ³ /h]	Typical diaphragm tank size [litres]
0-6	8
7-24	18
25-40	50
41-70	120
71-100	180

Factory setting

See section 24. [Factory settings](#).

13.20 Stop at min. speed

This function stops the pump when consumption is low or not present. This variant of the stop function can be utilised, for example, in constant level applications, where a boost of pressure before stop is not optimal.

The function monitors the speed of the pump. When the PI-controller has forced speed to a minimum due to the feedback value, after a preset period of time, the pump will be stopped. The pump will remain stopped until the feedback value decreases and the PI-controller starts the pump again.

"Enable stop at min. speed"

The selection enables the stop at min. speed function.

"Delay"

The required amount of time the pump must be running at minimum speed before it is stopped.

"Restart speed"

The speed of the pump, specified in percentage, at which the pump is set to start again (hysteresis). The restart speed must be set higher than the minimum speed of the pump.

13.21 Pipe filling function

Pump variant	Pipe filling function
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This function is typically used in pressure-boosting applications and ensures a smooth startup of systems with for instance empty pipes.

Startup takes place in two phases. See fig. 55.

1. Filling phase.

The pipes are slowly filled with water. When the pressure sensor of the system detects that the pipes have been filled, phase two begins.

2. Pressure build-up phase.

The system pressure is increased until the setpoint is reached. The pressure build-up takes place over a pressure build-up time. If the setpoint is not reached within a given time, a warning or an alarm can be given, and the pumps can be stopped at the same time.

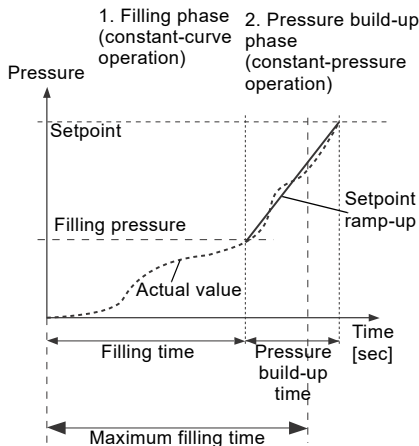


Fig. 55 Filling and pressure build-up phases

Setting range

- "Filling speed".
Fixed speed of the pump during the filling phase.
- "filling pressure".
The pressure that the pump must reach before the maximum filling time.
- "max. filling time".
The time in which the pump must reach the filling pressure.
- Max. time reaction.
Reaction of the pump if the maximum filling time is exceeded:
 - warning
 - alarm (pump stops).
- Pressure build-up time.
Ramp time from when the filling pressure is reached until the setpoint must be reached.



When you activate this function, the function always starts when the pump has been in operating mode "Stop" and is changed to "Normal".

Factory setting

See section 24. [Factory settings](#).

TM03 9037 3207

13.22 "Pulse flowmeter" (Pulse flowmeter setup)

Pump variant	"Pulse flowmeter" (Pulse flowmeter setup)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

You can connect an external pulse flowmeter to one of the digital inputs in order to register the actual and accumulated flows. Based on this, you can also calculate the specific energy.

To enable a pulse flowmeter, set one of the digital-input functions to Accumulated flow and set the pumped volume per pulse. See section [13.9 Digital inputs](#).

Factory setting

See section [24. Factory settings](#).

13.23 Ramps

Pump variant	Ramps
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

The ramps determine how quickly the pump can accelerate and decelerate during start-stop or setpoint changes.

You can set the following:

- acceleration time, 0.1 to 300 seconds
- deceleration time, 0.1 to 300 seconds.

The times apply to the acceleration from 0 rpm to maximum (fixed) speed and the deceleration from maximum (fixed) speed to 0 rpm, respectively.

At short deceleration times, the deceleration of the pump may depend on load and inertia as there is no possibility of actively braking the pump.

If the power supply is switched off, the deceleration of the pump only depends on load and inertia.

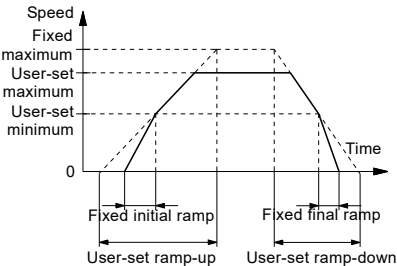


Fig. 56 Ramp-up and Ramp-down

Factory setting

See section [24. Factory settings](#).

13.24 Standstill heating

Pump variant	Standstill heating
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

You can use this function to avoid condensation in humid environments. When you set the function to Active and the pump is in operating mode Stop, a low AC voltage is applied to the motor windings. The voltage is not high enough to make the motor rotate but ensures that sufficient heat is generated to avoid condensation in the motor including the electronic parts in the drive.



Remember to remove the drain plugs and fit a cover over the motor.

Factory setting

See section [24. Factory settings](#).

13.25 Alarm handling

The alarm handling determines how the pump must react in case of a sensor failure.

Input	Alarm handling
"Analog input 1"	Warning: no change of operation
"Analog input 2"	Stop: an alarm is given, and the pump stops
"Analog input 3"	Min: an alarm is given, and the pump reduces speed to minimum
"Built-in Grundfos sensor"	Max: an alarm is given, and the pump increases speed to maximum
"Liqtec input"	User-defined speed: an alarm is given, and the pump runs at a speed set by the user

13.26 Motor bearing monitoring

You can set the motor bearing monitoring function to these values:

- Active
- Not active.

When the function is set to Active, a counter in the controller starts counting the mileage of the bearings.



The counter continues counting even if the function is changed to Not active, but a warning will not be given when it is time for replacement.

When the function is changed to Active again, the accumulated mileage is again used to calculate the replacement time.

13.27 "Service"

"Time to next service" (Motor bearing service)

This display shows when to replace the motor bearings. The controller monitors the operating pattern of the motor and calculates the period between bearing replacements.

Displayable values:

- "in 2 years"
- "in 1 year"
- "in 6 months"
- "in 3 months"
- "in 1 month"
- "in 1 week"
- "Now"

"Bearing replacements"

Indicates the number of bearing replacements that have been done during the lifetime of the motor.

"Bearings replaced" (Motor bearing maintenance)

When the bearing monitoring function is active, the controller gives a warning when the motor bearings are due to be replaced.

When you have replaced the motor bearings, press [Bearings replaced].

13.28 "Number" (Pump number)

Pump variant	"Number" (Pump number)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

You can allocate a unique number to the pump. This makes it possible to distinguish between pumps in connection with GENibus communication.

Factory setting

See section [24. Factory settings](#).

13.29 "Radio communication" (Enable/disable radio comm.)

Pump variant	"Radio communication" (Enable/disable radio comm.)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

You can set the radio communication to either enabled or disabled. You can use this function in areas where radio communication is not allowed.



IR communication remains active.

Factory setting

See section [24. Factory settings](#).

13.30 Language

Pump variant	Language
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This menu is only available in the advanced control panel.

In this menu, you select the desired language. A number of languages is available.

Factory setting

See section [24. Factory settings](#).

13.31 "Date and time" (Set date and time)

Pump variant	"Date and time" (Set date and time)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

The availability of this menu depends on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
"Date and time"	-	•

* See section 19. Identification of functional module.

You can set date and time as well as how you want them to be viewed in the display:

- Select date format:
YYYY-MM-DD
DD-MM-YYYY
MM-DD-YYYY.
- Select time format:
HH:MM 24-hour clock
HH:MM am/pm 12-hour clock.
- Set date
- Set time.

Factory setting

See section 24. Factory settings.

13.32 "Unit configuration" (Units)

Pump variant	"Unit configuration" (Units)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

In this menu, you can select between SI and US units. The setting can made generally for all parameters or you can customise for each parameter.

Factory setting

See section 24. Factory settings.

13.33 "Buttons on product"
(Enable/disable settings)

Pump variant	"Buttons on product" (Enable/disable settings)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

In this display, you can disable the possibility of making settings for protective reasons.

Grundfos GO Remote

If you set the buttons to "Not active" the buttons on the standard control panel are disabled. If you set the buttons to "Not active" on pumps fitted with an advanced control panel, see below.

Advanced control panel

If you have disabled the settings, you can still use the buttons to navigate through the menus but you cannot make changes in the Settings menu.

When you have disabled the possibility to make settings, the  symbol appears in the display.

Advanced control panel:
To unlock the motor and allow settings, press  and  simultaneously for at least 5 seconds.



Standard control panel:
The  button always remains active but you can only unlock all other buttons on the motor with Grundfos GO Remote.

Factory setting

See section 24. Factory settings.

13.34 Delete history

Pump variant	Delete history
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This menu is only available in the advanced control panel.

In this menu, you can delete the following historic data:

- Delete operating log.
- Delete energy consumption.

13.35 Define Home display

Pump variant	Define Home display
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This menu is only available in the advanced control panel.

In this menu, you can set the Home display to show up to four user-defined parameters.

Factory setting

See section [24. Factory settings](#).

13.36 Display settings

Pump variant	Display settings
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This menu is only available in the advanced control panel.

In this menu, you can adjust the display brightness and set whether or not the display is to turn off if no buttons have been activated for a period of time.

Factory setting

See section [24. Factory settings](#).

13.37 "Store settings" (Store actual settings)

Pump variant	"Store settings" (Store actual settings)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

Grundfos GO Remote

In this menu, you can store the actual settings for later use in the same pump or in other pumps of the same type.

Advanced control panel

In this menu, you can store the actual settings for later use in the same pump.

13.38 "Recall settings" (Recall stored settings)

Pump variant	"Recall settings" (Recall stored settings)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

Grundfos GO Remote

In this menu, you can recall stored settings from a number of previously stored settings that the pump then uses.

Advanced control panel

In this menu, you can recall the last stored settings that the pump then uses.

13.38.1 "Undo"

Pump variant	"Undo"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This menu is only available in Grundfos GO Remote.

In this display, you can undo all settings that have been made with Grundfos GO Remote in the current communication session. Once you have recalled settings, you cannot undo.

13.39 "Pump name"

Pump variant	"Pump name"
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This menu is only available in Grundfos GO Remote.

In this display, you can give the pump a name. In this way, you can easily identify the pump when connecting with Grundfos GO Remote.

13.40 "Connection code"

Pump variant	"Connection code"
CME	•
CRE, CRIE, CRNE, SPKE, MTRÉ	•

This menu is only available in Grundfos GO Remote. You can set a connection code to avoid having to press the connection button each time and to restrict remote access to the product.

Setting the code in the product using Grundfos GO Remote

1. Connect Grundfos GO Remote to the product.
2. In the product dashboard, select "Settings".
3. Choose "Connection code".
4. Enter the wanted code and press [OK].
The code must be a character string (ASCII).
You can always change the code. The old code is not needed.

Setting the code in Grundfos GO Remote

You can define a default connection code in Grundfos GO Remote so that it automatically attempts to connect to the selected product via this code.

When you select a product with the same connection code in Grundfos GO Remote, Grundfos GO Remote automatically connects to the product and you do not have to press the connection button on the module.

Define the default code in Grundfos GO Remote in this way:

1. In the main menu, under "General", select "Settings".
2. Choose "Remote".
3. Enter the connection code in the field "Preset connection code". The field now says "Connection code set".

You can always change the default connection code by pressing [Delete] and entering a new one.

If Grundfos GO Remote fails to connect and ask you to press the connection button on the product, it means that the product has no connection code or has a different connection code. In this case, you can only establish connection via the connection button.



After setting a connection code, switch off the product until the light in Grundfos Eye turns off before you can use the new connection code.

13.41 Run start-up guide

Pump variant	Run start-up guide
CME	•
CRE, CRIE, CRNE, SPKE, MTRÉ	•

This menu is only available in the advanced control panel.

The startup guide automatically starts when you start the pump for the first time.

You can always run the startup guide later via this menu.

The startup guide guides you through the general settings of the pump.

- Language. See section [13.30 Language](#).
- Select date format.*
See section [13.31 "Date and time" \(Set date and time\)](#).
- Set date.*
See section [13.31 "Date and time" \(Set date and time\)](#).
- Select time format.*
See section [13.31 "Date and time" \(Set date and time\)](#).
- Set time.*
See section [13.31 "Date and time" \(Set date and time\)](#).
- Setting of pump "
 - Go to Home
 - Run with Constant curve/Run with Constant pressure.
See section [13.5 "Control mode"](#).
 - Go to "Assisted pump setup".
See section [13.45 Assisted pump setup](#).
 - Return to factory settings.
- * Applies only for pumps fitted with advanced functional module, FM 300. For further information, see section [19. Identification of functional module](#).

13.42 Alarm log

This menu contains a list of logged alarms from the product. The log shows the name of the alarm, when the alarm occurred and when it was reset.

13.43 Warning log

This menu contains a list of logged warnings from the product. The log shows the name of the warning, when the warning occurred and when it was reset.

13.44 Assist

This menu consist of a number of different assist functions which are small guides that take you through the steps needed to set the pump.

13.45 Assisted pump setup

Pump variant	Assisted pump setup
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This menu guides you through the following:

Setting of pump

- Selection of control mode. See page 31.
- Configuration of feedback sensors.
- Adjusting the setpoint. See page 30.
- Controller settings. See page 42.
- Summary of settings.

Example of how to use the Assisted pump setup for setting up the pump to constant pressure:

Grundfos GO Remote

1. Open the Assist menu.
2. Select Assisted pump setup.
3. Select control mode "Constant pressure" (Const. pressure).
4. Read the description for this control mode.
5. Select which analog input to use as sensor input.
6. Select sensor function according to where the sensor is installed in the system. See fig. 39 on page 36.
7. Select electrical input signal according to the sensor specifications.
8. Select measuring unit according to the sensor specifications.
9. Set the minimum and maximum sensor range values according to the sensor specifications.
10. Set the desired setpoint.
11. Set the gain and integral time of the controller. See section 13.13 "Controller" (Controller settings).
12. Type the desired pump name.
13. Check the summary of settings and confirm them.

Advanced control panel

1. Open the Assist menu.
2. Select Assisted pump setup.
3. Select control mode Const. pressure.
4. Select which analog input to be used as sensor input.
5. Select the measured parameter which is to be controlled. See fig. 39 on page 36.
6. Select measuring unit according to the sensor specifications.
7. Set the minimum and maximum sensor range values according to the sensor specifications.
8. Select electrical input signal according to the sensor specifications.
9. Set the desired setpoint.
10. Set the gain and integral time of the controller. See section 13.13 "Controller" (Controller settings).
11. Check the summary of settings and confirm them by pressing [OK].

13.46 Setup, analog input

Pump variant	Setup, analog input
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This menu is only available in the advanced control panel.

This menu guides you through the following:

Setup, analog input

- "Analog inputs" 1 to 3. See page 36.
- "Pt100/1000 input" 1 and 2. See page 37.
- "Adjusting the setpoint". See page 30.
- "Summary".

13.47 Setting of date and time

Pump variant	Setting of date and time
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

This menu is only available in the advanced control panel.

Whether this menu is available or not, depends on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
"Setting of date and time"	-	•

* See section 19. Identification of functional module.

This menu guides you through the following:

- Select date format. See section 13.31 "Date and time" (Set date and time).
- Set date. See section 13.31 "Date and time" (Set date and time).
- Select time format. See section 13.31 "Date and time" (Set date and time).
- Set time. See section 13.31 "Date and time" (Set date and time).

13.48 "Multi-pump setup" (Setup of multi-pump system)

Pump variant	"Multi-pump setup" (Setup of multi-pump system)
CME	•
CRE, CRIE, CRNE, SPKE, MTRE	•

The multipump function enables the control of up to four pumps connected in parallel without the use of external controllers. The pumps in a multipump system communicate with each other via the wireless GENlair connection or the wired GENI connection.

You can set a multipump system via the master pump, i.e. the first selected pump.

If two or more pumps in the system are configured with a sensor, they can all function as master pumps and take over the master pump function if the other should fail. This provides additional redundancy in the multipump system.

The multipump functions are described in the following sections.

13.48.1 "Alternating operation"

Alternating operation functions as a duty/standby operating mode and is possible with two pumps of the same size and type connected in parallel. The main purpose of the function is to ensure an even amount of running hours and to ensure that the standby pump starts if the duty pump stops due to an alarm.

Each pump requires a non-return valve in series with the pump.

You can choose between two alternating operating modes:

- "Alternating operation, time"
Change from one pump to the other is based on time.
- "Alternating operation, energy"
Change from one pump to the other is based on energy consumption.

If the duty pump fails, the other pump starts. XX11B: New sections

13.48.2 "Backup operation"

Backup operation is possible with two pumps of the same size and type connected in parallel. Each pump requires a non-return valve in series with the pump.

One pump is operating continuously. The backup pump is operated for a short time each day to prevent seizing up. If the duty pump stops due to a fault, the backup pump starts.

13.48.3 "Cascade operation"

Cascade operation is only available in CRE and CME pumps on request. Contact Grundfos for further information.

Cascade operation is possible with up to four pumps of the same size and type connected in parallel. Each pump requires a non-return valve in series with the pump.

Up to 4 pumps can be operating continuously depending on consumption. Pumps will be cut in and cut out to ensure a constant controlled value, for example, constant pressure, and to ensure a high system efficiency and an even amount of running hours.

13.48.4 "Alternating operation, time"

The interval of alternation between the two pumps. The function is only available in alternating operation. See section [13.48.1 "Alternating operation"](#).

13.48.5 "Time for pump changeover"

Time of day for a pump changeover to take place. The function is only available in alternating operation. See section [13.48.1 "Alternating operation"](#).

13.48.6 "Sensor to be used"

Defines the sensor to be used for controlling the pump system. If a sensor is placed in a way that enables it to measure the output from all pumps in the system, for example, in the manifold, then select "Master pump sensor".

If a sensor is placed on or across the individual pumps, for example, installed behind non-return valves and not able to measure the output from all pumps, then select "Running pump sensor".

13.48.7 Setting up a multipump system

You can set a multipump system in the following ways:

- [Grundfos GO Remote and wireless pump connection](#)
- [Grundfos GO Remote and wired pump connection](#)
- [Advanced control panel and wireless pump connection](#)
- [Advanced control panel and wired pump connection](#)

See step-by-step descriptions below.

Grundfos GO Remote and wireless pump connection

1. Power on the pumps.
2. Establish contact to one of the pumps with Grundfos GO Remote.
3. Set the needed analog and digital inputs via Grundfos GO Remote according to the connected equipment and the required functionality. See section [13.45 Assisted pump setup](#).
4. Assign a pump name to the pump using Grundfos GO Remote. See section [13.39 "Pump name"](#).
5. Disconnect Grundfos GO Remote from the pump.
6. Establish contact to the next pump.
7. Set the needed analog and digital inputs via Grundfos GO Remote according to the connected equipment and the required functionality. See section [13.45 Assisted pump setup](#).
8. Assign a pump name to the pump using Grundfos GO Remote. See section [13.39 "Pump name"](#).
9. Repeat steps 5 to 8 if more pumps are installed in the system.
10. Select the "Assist" menu and choose Setup of multi-pump system.
11. Select the desired multipump function. See sections [13.48.1 "Alternating operation"](#), [13.48.2 "Backup operation"](#) and [13.48.3 "Cascade operation"](#).
12. Press [>] to continue.
13. Set the time for a pump changeover i.e. the time at which the alternation between the two pumps is to take place.



This step applies only if you have selected "Alternating operation, time" and if the motors are fitted with FM 300.

14. Press [>] to continue.
15. Select "Radio" as the communication method to be used between the pumps.
16. Press [>] to continue.
17. Select pump 2.
18. Select the pump from the list.
 - If applicable, select pump 3 (only in cascade)
 - If applicable, select pump 4 (only in cascade)



Use the [OK] or  button to identify the pump.

19. Press [>] to continue.
20. Confirm the setting by pressing [Send].
21. Press [Finish] in the "Setup complete" dialog box.
22. Wait for the green indicator light in the middle of Grundfos Eye to light up.

Grundfos GO Remote and wired pump connection

1. Connect the pumps with each other with a 3-core screened cable between the GENIBus terminals A, Y, B.
2. Power on the pumps.
3. Establish contact to one of the pumps with Grundfos GO Remote.
4. Set the needed analog and digital inputs via Grundfos GO Remote according to the connected equipment and the required functionality. See section [13.45 Assisted pump setup](#).
5. Assign a pump name to the pump using Grundfos GO Remote. See section [13.39 "Pump name"](#).
6. Assign pump number 1 to the pump. See section [13.28 "Number" \(Pump number\)](#).
7. Disconnect Grundfos GO Remote from the pump.
8. Establish contact to the next pump.
9. Set the needed analog and digital inputs via Grundfos GO Remote according to the connected equipment and the required functionality. See section [13.45 Assisted pump setup](#).
10. Assign a pump name to the pump using Grundfos GO Remote. See section [13.39 "Pump name"](#).
11. Repeat steps 7 to 10 if more pumps are installed in the system.
12. Select the "Assist" menu and choose Setup of multi-pump system.
13. Select the desired multipump function. See sections [13.48.1 "Alternating operation"](#), [13.48.2 "Backup operation"](#) and [13.48.3 "Cascade operation"](#).
14. Press [>] to continue.
15. Set the time for a pump changeover i.e. the time at which the alternation between the two pumps is to take place.



This step applies only if you have selected "Alternating operation, time" and if the motors are fitted with FM 300.

16. Press [>] to continue.
17. Select "BUS cable" as the communication method to be used between the two pumps.
18. Press [>] to continue.
19. Press "Select pump 2".
20. Select the pump from the list.



Use the [OK] or  button to identify the pump.

21. Press [>] to continue.
22. Confirm the setting by pressing [Send].
23. Repeat steps 19 to 21 if more than two pumps are installed in the system. See section [13.48.3 "Cascade operation"](#).
24. Press [Finish] in the "Setup complete" dialog box.
25. Wait for the green indicator light in the middle of Grundfos Eye to light up.

Advanced control panel and wireless pump connection

1. Power on the pumps.
2. On the pumps, set the analog and digital inputs according to the connected equipment and the required functionality. See section [13.45 Assisted pump setup](#).
3. Select the Assist menu on one of the pumps, and choose Setup of multi-pump system.
4. Press [>] to continue.
5. Select Wireless as the communication method to be used between the pumps.
6. Press [>] to continue.
7. Select the desired multipump function. See sections [13.48.1 "Alternating operation"](#), [13.48.2 "Backup operation"](#) and [13.48.3 "Cascade operation"](#) above.
8. Press [>] three times to continue.
9. Press [OK] to search for other pumps. The green indicator light in the middle of Grundfos Eye flashes on the other pumps.
10. Press the connect button on the pumps which are to be added to the multipump system.
11. Press [>] to continue.
12. Set the time for a pump changeover i.e. the time at which the alternation between the two pumps is to take place.



This step applies only if you have selected "Alternating operation, time" and if the motors are fitted with FM 300.

13. Press [>] to continue.
14. Press [OK] to confirm the setting. The multipump-function icons appear in the bottom of the control panels.

Advanced control panel and wired pump connection

1. Connect the pumps with each other with a 3-core screened cable between the GENIbus terminals A, Y, B.
2. On the pumps, set the needed analog and digital inputs according to the connected equipment and the required functionality. See section [13.45 Assisted pump setup](#).
3. Assign pump number 1 to the first pump. See section [13.28 "Number" \(Pump number\)](#).
4. Assign pump number 2 to the next pump. See section [13.28 "Number" \(Pump number\)](#).
5. Assign pump number 3 and 4 if more than two pumps are installed in the system. See sections [13.48.3 "Cascade operation"](#) and [13.28 "Number" \(Pump number\)](#).
6. Select the Assist menu on one of the pumps and choose Setup of multi-pump system.
7. Press [>] to continue.
8. Select Wired GENIbus as the communication method to be used between the two pumps.
9. Press [>] twice to continue.
10. Select the desired multipump function. See sections [13.48.1 "Alternating operation"](#), [13.48.2 "Backup operation"](#) and [13.48.3 "Cascade operation"](#) above.
11. Press [>] to continue.
12. Press [OK] to search for other pumps.
13. Select the pump from the list.
14. Press [>] to continue.
15. Set the time for a pump changeover i.e. the time at which the alternation between the two pumps is to take place.



This step applies only if you have selected "Alternating operation, time" and if the motors are fitted with FM 300.

16. Press [>] to continue.
17. Press [OK] to confirm the setting.
The multipump function icons appear in the bottom of the control panels.

Disabling a multipump system via Grundfos GO Remote

1. Select the "Assist" menu.
2. Select Setup of multi-pump system.
3. Select "Disable".
4. Press [>] to continue.
5. Confirm the setting by pressing [Send].
6. Press [Finish].

Disabling a multipump system via the advanced control panel

1. Select the Assist menu.
2. Select Setup of multi-pump system.
3. Press [>] to continue.
4. Confirm No multi-pump function by pressing [OK].
5. Press [>] to continue.
6. Press [OK] to confirm.

13.49 Description of control mode

This menu is only available in the advanced control panel.

This menu describes each of the possible control modes. See also section [13.5 "Control mode"](#).

13.50 Assisted fault advice

This menu gives guidance and corrective actions in case of pump failures.

14. Bus signal

The pump supports serial communication via an RS-485 input. The communication is carried out according to the Grundfos GENIbus protocol and enables connection to other pumps as well as a building management system or another external control system.

Via a bus signal, you can remote-set pump operating parameters, such as setpoint and operating mode. At the same time, the pump can, via the bus, provide status information about important parameters, such as actual value of control parameter, input power and fault indications.

Contact Grundfos for further information.



If you use a bus signal, the number of settings available via R100 or Grundfos GO Remote are reduced.

15. Priority of settings

You can always set the pump to stop by pressing  on the pump control panel. When the pump is not in Stop mode, you can always set the pump to stop by continuously pressing . Furthermore, you can set the pump to maximum speed by continuously pressing . You can always set the pump to operation at maximum speed or to stop with Grundfos GO Remote.

If two or more functions are enabled at the same time, the pump operates according to the function with the highest priority.

Example: If you have set the pump to maximum speed via the digital input, the pump control panel or Grundfos GO Remote can only set the pump to Manual or Stop.

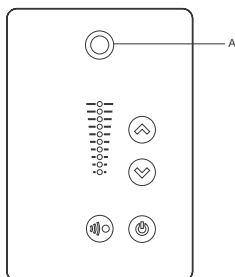
The priority of the settings appears from the table below:

Priority	Start-stop button	Grundfos GO Remote or control panel on pump	Digital input	Bus communication
1	Stop			
2		Stop*		
3		Manual		
4		"Max. speed"* / "User-defined speed"		
5			Stop	
6			"User-defined speed"	
7				Stop
8				"Max. speed"
9				"Min. speed"
10				"Start"
11			"Max. speed"	
12		"Min. speed"		
13			"Min. speed"	
14			"Start"	
15		"Start"		

* "Stop" and "Max. speed" settings made with Grundfos GO Remote or on the motor control panel can be overruled by another operating-mode command sent from a bus, for example "Start". If the bus communication is interrupted, the motor resumes its previous operating mode, for example "Stop", selected with Grundfos GO Remote or on the motor control panel.

16. Grundfos Eye

The operating condition of the pump is indicated by Grundfos Eye on the control panel. See fig. 57, A.



TM05 5993 4312

Fig. 57 Grundfos Eye

Grundfos Eye	Indication	Description
	No lights are on.	The power is off. The pump is not running.
	The two opposite green indicator lights are rotating in the direction of rotation of the pump when seen from the non-drive end.	The power is on. The pump is running.
	The two opposite green indicator lights are permanently on.	The power is on. The pump is not running.
	One yellow indicator light is rotating in the direction of rotation of the pump when seen from the non-drive end.	Warning. The pump is running.
	One yellow indicator light is permanently on.	Warning. The pump is stopped.
	The two opposite red indicator lights flash simultaneously.	Alarm. The pump is stopped.
	The green indicator light in the middle flashes quickly four times.	This is a feedback signal which the pump gives in order to ensure identification of itself.
	The green indicator light in the middle flashes continuously.	Grundfos GO Remote or another pump is trying to communicate with the pump. Press on the pump control panel to allow communication.
	The green indicator light in the middle is permanently on.	Remote control with Grundfos GO Remote via radio. The pump is communicating with Grundfos GO Remote via radio connection.
	The green indicator light in the middle flashes quickly while Grundfos GO Remote is exchanging data with the pump. It takes a few seconds.	Remote control with Grundfos GO Remote via infrared light. The pump is receiving data from Grundfos GO Remote via infrared communication.

17. Signal relays

The pump has two outputs for potential-free signals via two internal relays.

You can set the signal outputs to Operation, Pump running, Ready, Alarm and Warning.

The functions of the two signal relays appear from the table below:

Description	Grundfos Eye	Contact position of signal relays when activated					Operating mode
		Operation	Pump running	Ready	Alarm	Warning	
The power is off.	 Off						-
The pump runs in Normal mode.	 Green, rotating						Normal, Min. or Max.
The pump runs in Manual mode.	 Green, rotating						Manual
The pump is in operating mode Stop.	 Green, steady						Stop
Warning, but the pump is running.	 Yellow, rotating						Normal, Min. or Max.
Warning, but the pump runs in Manual mode.	 Yellow, rotating						Manual
Warning, but the pump was stopped via a Stop command.	 Yellow, steady						Stop
Alarm, but the pump is running.	 Red, rotating						Normal, Min. or Max.
Alarm, but the pump runs in Manual mode.	 Red, rotating						Manual
The pump is stopped due to an alarm.	 Red, flashing						Stop
The pump is stopped due to Low-flow stop function.	 Green, steady						Normal

18. Installing a communication interface module

DANGER

Electric shock



- Death or serious personal injury
- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before starting any work on the motor. Make sure that the power supply cannot be accidentally switched on.

Always use an antistatic service kit when handling electronic components. This prevents static electricity from damaging the components.



When unprotected, place the component on the antistatic cloth.

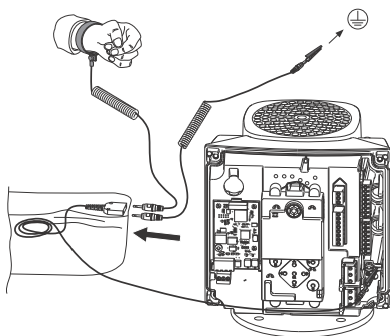


Fig. 58 Antistatic service kit

TM06 4462 2315

1. Loosen the four screws (fig. 59, A) and remove the terminal box cover (fig. 59, B).

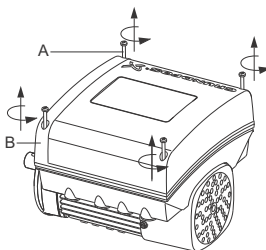


Fig. 59 Removing the terminal box cover

TM06 4081 1515

2. Remove the CIM cover (fig. 60, A) by pressing the locking tab (fig. 60, B) and lifting the end of the cover (fig. 60, C). Then lift the cover off the hooks (fig. 60, D).

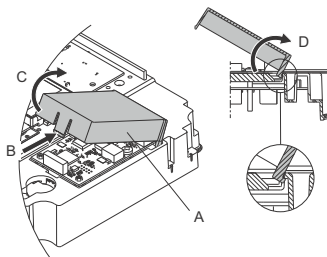


Fig. 60 Removing the CIM cover

TM06 4084 1515

3. Remove the securing screw (fig. 61, A).

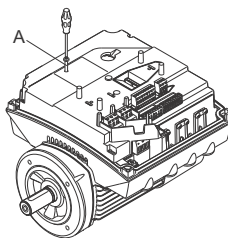
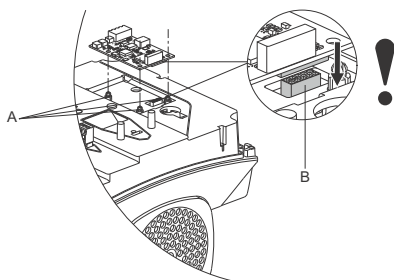


Fig. 61 Removing the securing screw

TM06 4082 1515

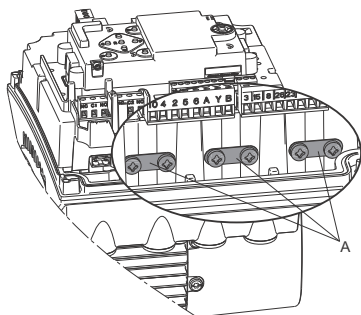
4. Fit the CIM module by aligning it with the three plastic holders (fig. 62, A) and the connecting plug (fig. 62, B). Press home the module using your fingers.



TM06 4083 1515

Fig. 62 Fitting the CIM module

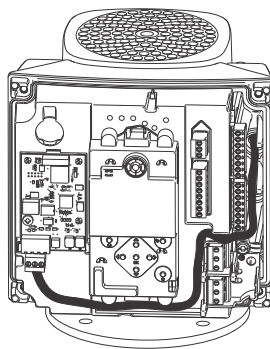
5. Fit and tighten securing screw (fig. 61, A) to 1.3 Nm.
6. Make the electrical connections to the CIM module as described in the instructions delivered with the module.
7. Connect the cable screens of the bus cables to earth via one of the earth clamps (fig. 63, A).



TM06 4195 1615

Fig. 63 Connecting the cable screens to earth

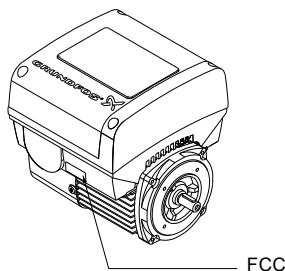
8. Route the wires for the CIM module. See the example in fig. 64.



TM06 4085 1515

Fig. 64 Example of wire routing

9. Fit the CIM cover.
10. If the CIM module is supplied with an FCC label, then place this on the terminal box. See fig. 65.



TM05 7028 0413

Fig. 65 FCC label

11. Fit the terminal box cover (fig. 59, B) and cross-tighten the four mounting screws (fig. 59, A) to 6 Nm.



Make sure that the terminal box cover is aligned with the control panel. See section 21. *Changing the position of the control panel.*

19. Identification of functional module

You can identify the fitted module in one of the following ways:

Grundfos GO Remote

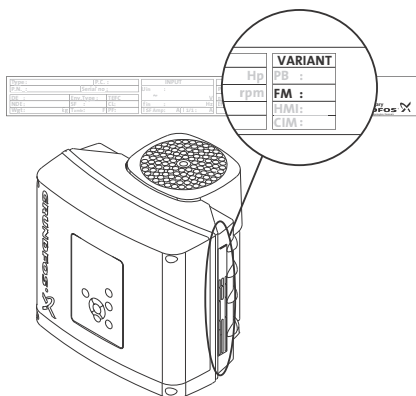
You can identify the functional module in the "Fitted modules" menu under "Status".

Pump display

For pumps fitted with the advanced control panel, you can identify the functional module in the Fitted modules menu under Status.

Motor nameplate

You can identify the fitted module on the motor nameplate. See fig. 66.



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Fig. 66 Identification of functional module

Variant	Description
FM 200	Standard functional module
FM 300	Advanced functional module

20. Identification of control panel

You can identify the fitted module in one of the following ways:

Grundfos GO Remote

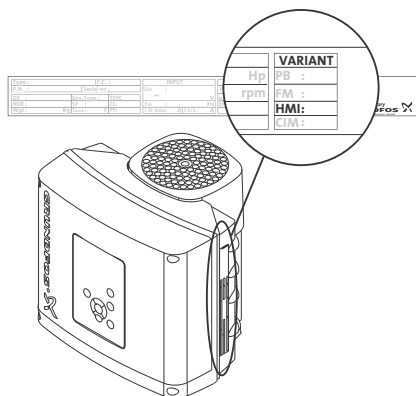
You can identify the control panel in the "Fitted modules" menu under "Status".

Pump display

For pumps fitted with the advanced control panel, you can identify the control panel in the Fitted modules menu under Status.

Motor nameplate

You can identify the fitted control panel on the motor nameplate. See fig. 67.



TM06 4013 1415

Fig. 67 Identification of control panel

Variant	Description
HMI 200	Standard control panel
HMI 300	Advanced control panel

21. Changing the position of the control panel

DANGER

Electric shock

- Death or serious personal injury
- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before starting any work on the motor. Make sure that the power supply cannot be accidentally switched on.



You can turn the control panel 180°. Follow the instructions below.

1. Loosen the four screws (TX25) of the terminal box cover.

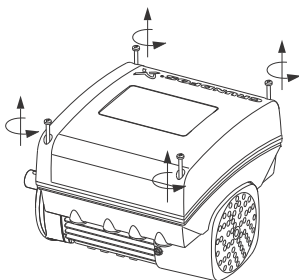


Fig. 68 Loosening the screws

2. Remove the terminal box cover.

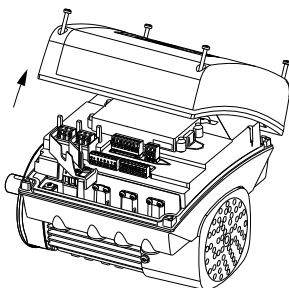


Fig. 69 Removing the terminal box cover

3. Press and hold in the two locking tabs (A) while gently lifting the plastic cover (B).

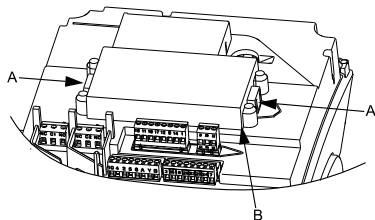


Fig. 70 Lifting the plastic cover

4. Turn the plastic cover 180°.



Do not twist the cable more than 90°.

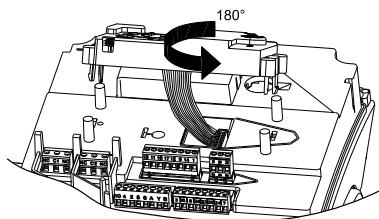


Fig. 71 Turning the plastic cover

5. Position the plastic cover correctly on the four rubber pins (C). Make sure that the locking tabs (A) are placed correctly.

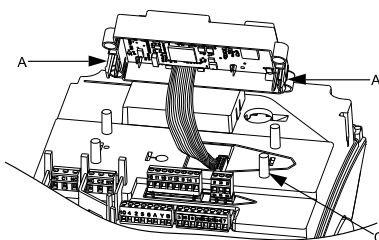


Fig. 72 Positioning the plastic cover

6. Fit the terminal box cover, and make sure that it is also turned 180° so that the buttons on the control panel are aligned with the buttons on the plastic cover.

7. Tighten the four screws (TX25) with 5 Nm.

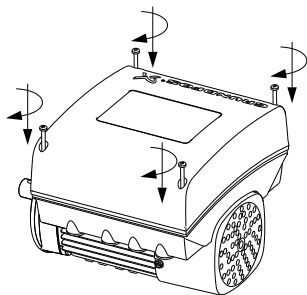


Fig. 73 Fitting the terminal box cover

TM05 5356 3612

23. Cleaning the product

WARNING

Electric shock



- Death or serious personal injury
- Switch off the power supply to the motor and to the signal relays. Check that the terminal box cover is intact before spraying water on the product.

In order to avoid condensation in the motor, let the motor cool down before spraying it with cold water.

22. Servicing the product

DANGER

Electric shock



- Death or serious personal injury
- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before starting any work on the motor. Make sure that the power supply cannot be accidentally switched on.

DANGER

Magnetic field



- Death or serious personal injury
- Do not handle the motor or rotor if you have a pacemaker.

22.1 Motor

If service is needed on the product, please contact Grundfos Service.

22.2 Pump

Service documentation is available in Grundfos Product Center
(<http://product-selection.grundfos.com/>).

If you have any questions, please contact the nearest Grundfos company or service workshop.

24. Factory settings

- Function is enabled.
- Function is disabled.
- Function is not available.

Settings	CRE, CRIE, CRNE, SPKE, MTRE			Function description on page
	With factory-fitted sensor	Without factory-fitted sensor	CME	
Setpoint	75 % of sensor range	75 % speed	75 % speed	30
Operating mode	Normal	Normal	Normal	30
Control mode	"Constant pressure"	"Constant curve"	"Constant curve"	31
Pipe filling function	Not active	Not active	Not active	49
"Buttons on product"	Active	Active	Active	52
"Stop function" (Low-flow stop function)	Not active	Not active	Not active	47
"Controller" (Controller settings)	●	●	●	42
"Ti"	0.5	0.5	0.5	
"Kp"	0.5	0.5	0.5	
Operating range	25-100 %	25-100 %	25-100 %	43
Ramps				
Ramp-up	1 second	1 second	1 second	50
Ramp-down	3 seconds	3 seconds	3 seconds	
"Number" (Pump number)	-	-	-	51
"Radio communication"	Active	Active	Active	51
"Analog input 1"	4-20 mA	Not active	Not active	36
"Analog input 2"	Not active	Not active	Not active	
"Analog input 3" ¹⁾	Not active	Not active	_ ¹⁾	
"Pt100/1000 input 1" ¹⁾	Not active	Not active	_ ¹⁾	37
"Pt100/1000 input 2" ¹⁾	Not active	Not active	_ ¹⁾	
"Digital input 1"	External stop	External stop	External stop	38
"Digital input 2" ¹⁾	Not active	Not active	_ ¹⁾	
"Digital in/output 3"	Not active	Not active	Not active	39
"Digital in/output 4" ¹⁾	Not active	Not active	_ ¹⁾	
"Pulse flowmeter"	○	○	○	50
Predefined setpoints	0 bar	0 %	0 %	45
Analog output ¹⁾	"Speed"	"Speed"	_ ¹⁾	41
External setpoint function	Not active	Not active	Not active	44
"Signal relay 1"	"Alarm"	"Alarm"	"Alarm"	40
"Signal relay 2"	"Running"	"Running"	"Running"	
Limit 1 exceeded	Not active	Not active	Not active	46
Limit 2 exceeded	Not active	Not active	Not active	

Settings	CRE, CRIE, CRNE, SPKE, MTRE			Function description on page
	With factory-fitted sensor	Without factory-fitted sensor	CME	
"LiqTec" ¹⁾	Not active	Not active	_ ¹⁾	47
"Detection delay time" ¹⁾	10 seconds	10 seconds	_ ¹⁾	
Standstill heating	Not active	Not active	Not active	50
Motor bearing monitoring	Not active	Not active	Not active	50
"Pump name"	-	-	-	53
"Connection code"	-	-	-	54
"Unit configuration"	SI	SI	SI	52

¹⁾ Only available if an advanced functional module, type FM 300, is fitted.

25. Megging

Do not meg an installation incorporating MGE motors, as the built-in electronics may be damaged.

26. Technical data, single-phase motors

26.1 Supply voltage

- 1 x 200-240 V - 10 %/+ 10 %, 50/60 Hz, PE.

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

Recommended fuse size

Motor size [kW]	Min. [A]	Max. [A]
0.25 - 0.75	6	10
1.1 - 1.5	10	16

You can use standard as well as quick-blow or slow-blow fuses.

26.2 Leakage current

Earth leakage current less than 3.5 mA, AC.

Earth leakage current less than 10 mA, DC.

The leakage currents are measured in accordance with EN 61800-5-1:2007.

27. Technical data, three-phase motors

27.1 Supply voltage

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

Recommended fuse size

- 3 x 380-500 V - 10 %/+ 10 %, 50/60 Hz, PE.

Motor size [kW]	Min. [A]	Max. [A]
0.25 - 1.1	6	6
1.5	6	10
2.2	6	16
3	10	16
4	13	16
5.5	16	32
7.5	20	32
11	32	32

- 3 x 200-240 V - 10 %/+ 10 %, 50/60 Hz, PE.

Motor size [kW]	Min. [A]	Max. [A]
1.1	10	20
1.5	10	20
2.2	13	35
3	16	35
4	25	35
5.5	32	35

Standard as well as quick-blow or slow-blow fuses may be used.

27.2 Leakage current (AC)

Speed [min ⁻¹]	Power [kW]	Mains voltage [V]	Leakage current [mA]
1400-2000 1450-2200	0.25 - 1.5	≤ 400	< 3.5
		> 400	< 5
	2.2 - 4	≤ 400	< 3.5
		> 400	< 3.5
	5.5 - 7.5	≤ 400	< 3.5
		> 400	< 5
2900-4000	0.25 - 2.2	≤ 400	< 3.5
		> 400	< 5
	3 - 5.5	≤ 400	< 3.5
		> 400	< 3.5
	7.5 - 11	≤ 400	< 3.5
		> 400	< 5
4000-5900	0.25 - 2.2	≤ 400	< 3.5
		> 400	< 5
	3 - 5.5	≤ 400	< 3.5
		> 400	< 3.5
	7.5 - 11	≤ 400	< 3.5
		> 400	< 5

The leakage currents are measured without any load on the shaft and in accordance with EN 61800-5-1:2007.

28. Inputs/outputs

Earth reference

All voltages refer to earth. All currents return to earth.

Absolute maximum voltage and current limits

Exceeding the following electrical limits may result in severely reduced operating reliability and motor life:

Relay 1:

Maximum contact load: 250 VAC, 2 A or 30 VDC, 2 A.

Relay 2:

Maximum contact load: 30 VDC, 2 A.

GENI terminals: -5.5 to 9.0 VDC or less than 25 mADC.

Other input/output terminals: -0.5 to 26 VDC or less than 15 mADC.

Digital inputs, DI

Internal pull-up current greater than 10 mA at V_i equal 0 VDC.

Internal pull-up to 5 VDC (currentless for V_i greater than 5 VDC).

Certain low logic level: V_i less than 1.5 VDC.

Certain high logic level: V_i greater than 3.0 VDC.

Hysteresis: No.

Screened cable: 0.5 - 1.5 mm², 28-16 AWG.

Maximum cable length: 500 m.

Open-collector digital outputs, OC

Current sinking capability: 75 mADC, no current sourcing.

Load types: Resistive or/and inductive.

Low-state output voltage at 75 mADC: maximum 1.2 VDC.

Low-state output voltage at 10 mADC: maximum 0.6 VDC.

Overcurrent protection: Yes.

Screened cable: 0.5 - 1.5 mm², 28-16 AWG.

Maximum cable length: 500 m.

Analog inputs, AI

Voltage signal ranges:

- 0.5 - 3.5 VDC, AL AU.
- 0-5 VDC, AU.
- 0-10 VDC, AU.

Voltage signal: R_i greater than 100 k Ω at 25 °C.

Leak currents may occur at high operating temperatures. Keep the source impedance low.

Current signal ranges:

- 0-20 mADC, AU.
- 4-20 mADC, AL AU.

Current signal: R_i is equal 292 Ω .

Current overload protection: Yes. Change to voltage signal.

Measurement tolerance: - 0/+ 3 % of full scale (maximum-point coverage).

Screened cable: 0.5 - 1.5 mm², 28-16 AWG.

Maximum cable length: 500 m excluding potentiometer.

Potentiometer connected to +5 V, GND, any AI:

Use maximum 10 k Ω .

Maximum cable length: 100 m.

Analog output, AO

Current sourcing capability only.

Voltage signal:

- Range: 0-10 VDC.
- Minimum load between AO and GND: 1 k Ω .
- Short-circuit protection: Yes.

Current signal:

- Ranges: 0-20 and 4-20 mADC.
- Maximum load between AO and GND: 500 Ω .
- Open-circuit protection: Yes.

Tolerance: - 0/+ 4 % of full scale (maximum-point coverage).

Screened cable: 0.5 - 1.5 mm², 28-16 AWG.

Maximum cable length: 500 m.

Pt100/1000 inputs, Pt

Temperature range:

- Minimum: -30 °C. 88 Ω / 882 Ω .
- Maximum: 180 °C. 168 Ω / 1685 Ω .

Measurement tolerance: $\pm$ 1.5 °C.

Measurement resolution: less than 0.3 °C.

Automatic range detection, Pt100 or Pt1000: Yes.

Sensor fault alarm: Yes.

Screened cable: 0.5 - 1.5 mm², 28-16 AWG.

Use Pt100 for short wires.

Use Pt1000 for long wires.

LiqTec sensor inputs

Use Grundfos LiqTec sensor only.

Screened cable: 0.5 - 1.5 mm², 28-16 AWG.

Grundfos Digital Sensor input and output, GDS

Use Grundfos Digital Sensor only.

Power supplies**+5 V:**

- Output voltage: 5 VDC - 5 %/+ 5 %.
- Maximum current: 50 mADC (sourcing only).
- Overload protection: Yes.

+24 V:

- Output voltage: 24 VDC - 5 %/+ 5 %.
- Maximum current: 60 mADC (sourcing only).
- Overload protection: Yes.

Digital outputs, relays

Potential-free changeover contacts.

Minimum contact load when in use: 5 VDC, 10 mA.

Screened cable: 0.5 - 2.5 mm², 28-12 AWG.

Maximum cable length: 500 m.

Bus input

Grundfos GENIbus protocol, RS-485.

Screened 3-core cable: 0.5 - 1.5 mm², 28-16 AWG.

Maximum cable length: 500 m.

29. Other technical data

EMC (electromagnetic compatibility)

Standard used: EN 61800-3.

The table below shows the emission category of the motor.

C1 fulfils the requirements for residential areas.

Note: When connected to a public network, 11 kW motors do not comply with the partial weighted harmonic distortion (PWhd) requirements of EN 61000-3-12. If required by the distribution network operator, compliance can be obtained in the following way:

The impedance of the mains cables between the motor and the point of common coupling (PCC) must be equivalent to the impedance of a 50 m cable with a cross-section of 0.5 mm.

C3 fulfils the requirements for industrial areas.

Note: When the motors are installed in residential areas, supplementary measures may be required as the motors may cause radio interference.

Motor [kW]	Emission category	
	1450-2000 min ⁻¹	2900-4000 min ⁻¹ 4000-5900 min ⁻¹
0.25	C1	C1
0.37	C1	C1
0.55	C1	C1
0.75	C1	C1
1.1	C1	C1
1.5	C1	C1
2.2	C1	C1
3	C1	C1
4	C1	C1
5.5	C3/C1*	C1
7.5	C3/C1*	C3/C1*
11	-	C3/C1*

* C1, if equipped with an external Grundfos EMC filter.

Immunity: The motor fulfils the requirements for industrial areas.

Contact Grundfos for further information.

Enclosure class

Standard: IP55 (IEC 34-5).

Optional: IP66 (IEC 34-5).

Insulation class

F (IEC 85).

Standby power consumption

5-10 W.

Cable entries

Motor [kW]	Number and size of cable entries	
	2900-4000 min ⁻¹	4000-5900 min ⁻¹
0.25 - 1.5	4xM20	4xM20
2.2	4xM20	4xM20
3-4	1xM25 + 4xM20	1xM25 + 4xM20
5.5	1xM25 + 4xM20	1xM25 + 4xM20
7.5 - 11	1xM32 + 5xM20	1xM32 + 5xM20

Cable glands delivered with the pump

Motor [kW]	Quantity	Thread size	Cable diameter [mm]
0.25 - 2.2	2	M20 x 1.5	5
	1		7-14
3 - 5.5	4	M20 x 1.5	5
	1	M25 x 1.5	9-18
7.5 - 11	4	M20 x 1.5	5
	1	M32 x 1.5	14-25

Torques

Terminal	Thread size	Maximum torque [Nm]
L1, L2, L3, L, N	M4	1.8
NC, C1, C2, NO	M2.5	0.5
1-26 and A, Y, B	M2	0.5

29.1 Sound pressure level

Motor [kW]	Maximum speed stated on nameplate [min ⁻¹]	Speed [min ⁻¹]	Sound pressure level ISO 3743 [dB(A)]	
			1-phase motors	3-phase motors
0.25 - 0.75	2000	1500	37	37
		2000	43	43
	4000	3000	50	50
		4000	60	60
	5900	4000	58	58
		5900	68	68
1.1	2000	1500		37
		2000		43
	4000	3000	50	50
		4000	60	60
	5900	4000	58	58
		5900	68	68
1.5	2000	1500		42
		2000		47
	4000	3000	57	57
		4000	64	64
	5900	4000	58	58
		5900	68	68
2.2	2000	1500		48
		2000		55
	4000	3000		57
		4000		64
	5900	4000		58
		5900		68
3	2000	1500		48
		2000		55
	4000	3000		60
		4000		69
	5900	4000		64
		5900		74
4	2000	1500		48
		2000		55
	4000	3000		61
		4000		69
	5900	4000		64
		5900		74

Motor [kW]	Maximum speed stated on nameplate [min ⁻¹]	Speed [min ⁻¹]	Sound pressure level ISO 3743 [dB(A)]	
			1-phase motors	3-phase motors
5.5	2000	1500		58
		2000		61
	4000	3000		61
		4000		69
	5900	4000		64
		5900		74
7.5	2000	1500		58
		2000		61
	4000	3000		66
		4000		73
	5900	4000		69
		5900		79
11	4000	3000		66
		4000		73
	5900	4000		69
		5900		79

The grey fields indicate that the motor is not available in this MGE motor range.

30. Disposing of the product

This product or parts of it must be disposed of in an environmentally sound way:

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

Dispose of the waste battery through the national collective schemes. If in doubt, contact your local Grundfos company.



The crossed-out wheellie bin symbol on a product means that it must be disposed of separately from household waste. When a product marked with this symbol reaches its end of life, take it to a collection point designated by the local

waste disposal authorities. The separate collection and recycling of such products will help protect the environment and human health.

See also end-of-life information at www.grundfos.com/product-recycling.

Appendix

A.1. Installation in the USA and Canada



To maintain the cURus approval, the additional information in this section must be followed.
The UL approval is according to UL 1004-1.

Outdoor installation

According to UL 778/C22.2 No 108-14, pumps intended for outdoor use must be marked enclosure type 3 and the product must be tested at a surface temperature down to -35 °C. The MLE enclosure is approved for type 3 or 4 and is rated at a surface temperature down to 0 °C, thus it is only for indoor use in UL 778/C22.2 No 108-14 pump applications.

For more information about ambient temperature during operation, see *8.5.2.2 Ambient temperature during operation*.

Canadian Interference-Causing Equipment Standard

This product complies with the Canadian ICES-003 Class B specifications. This Class B device meets all the requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada. Cet appareil numérique de la Classe B respecte toutes les exigences du règlement sur le matériel brouilleur du Canada.

A.1.1. Electrical codes

For the USA

This product complies with the Canadian Electrical Code and the US National Electrical Code.

This product has been tested according to the national standards for Electronically Protected Motors:

CSA 22.2 100-14:2014 (applies to Canada only).

UL 1004-1:2015 (applies to USA only).

Pour le Canada

Codes de l'électricité:

Ce produit est conforme au code canadien de l'électricité et au code national de l'électricité américain.

Ce produit a été testé selon les normes nationales s'appliquant aux moteurs protégés électroniquement:

CSA 22.2 100.04: 2009 (s'applique au Canada uniquement).

UL 1004-1: Juin 2011 (s'applique aux États-Unis uniquement).

A.1.2. Radio communication

For the USA

This device complies with Part 15 of the FCC rules and RSS210 of the IC rules. Operation is subject to the following two conditions:

- This device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation of the device.

Users are cautioned that changes or modifications not expressly approved by Grundfos could void the user's authority to operate the equipment.

Pour le Canada

Ce dispositif est conforme à la partie 15 des règles de la FCC et aux normes RSS210 de l'IC. Son fonctionnement est soumis aux deux conditions suivantes:

- Ce dispositif ne doit pas provoquer de brouillage préjudiciable.
- Il doit accepter tout brouillage reçu, y compris le brouillage pouvant entraîner un mauvais fonctionnement.

A.1.3. Identification numbers

For the USA

Grundfos Holding A/S

Contains FCC ID: OG3-RADIOM01-2G4.

For Canada

Grundfos Holding A/S

Model: RADIOMODULE 2G4

Contains IC: 10447A-RA2G4M01.

Pour le Canada

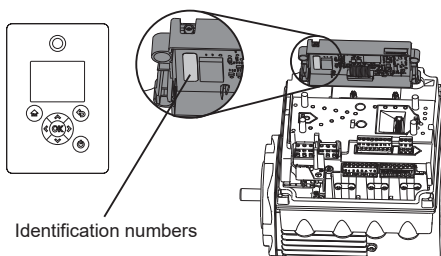
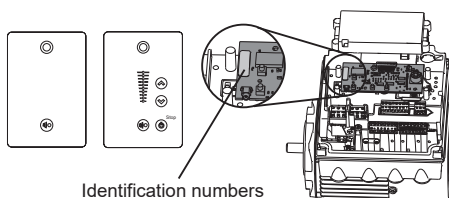
Numéros d'identification:

Grundfos Holding A/S

Modèle: RADIOMODULE 2G4

Contient IC: 10447A-RA2G4M01.

Location of identification numbers



A.1.4. Electrical connection

Conductors

See 7.2 *Cable requirements*.

Torques

See *Torques* in section 29.

Line reactors

The maximum line reactor size in front of the drive must not exceed the following values:

TM069745

TM069746

P2 [kW]	Maximum line reactor [mH]	
	1450-2000 rpm 1450-2200 rpm	2900-4000 rpm 4000-5900 rpm
0.25 - 3	1.5	1.5
4	0.7	0.7
5.5	0.9	0.3
7.5	0.6	0.6
11	0.3	0.3

Exceeding these values creates resonance between the reactor and the drive, which reduces the life of the product.

Short-circuit current

If a short circuit occurs, the pump can be used on a mains supply delivering not more than 5000 RMS symmetrical amperes, 600 V maximum.

Fuses

Fuses used for motor protection must be rated for minimum 500 V. Motors up to and including 10 hp require class K5 UL-listed fuses. Any UL-listed fuse can be used for motors of 15 hp.

Branch-circuit protection

When the pump is protected by a circuit breaker, the circuit breaker must be rated for a maximum voltage of 480 V. The circuit breaker must be of the "inverse time" type.

Overload protection

Degree of overload protection provided internally by the drive, in percent of full-load current: 102 %.

Argentina

Bombas GRUNDFOS de Argentina S.A.
Ruta Panamericana km. 37.500 Industrias
1619 - Garín Pcia. de B.A.
Tel.: +54-3327 414 444
Fax: +54-3327 45 3190

Australia

GRUNDFOS Pumps Pty. Ltd.
P.O. Box 2040
Regency Park
South Australia 5942
Tel.: +61-8-8461-4611
Fax: +61-8-8340-0155

Austria

GRUNDFOS Pumpen Vertrieb
Ges.m.b.H.
Grundfosstraße 2
A-5082 Grödig/Salzburg
Tel.: +43-6246-883-0
Fax: +43-6246-883-30

Belgium

N.V. GRUNDFOS Bellux S.A.
Boomsesteenweg 81-83
B-2630 Aartselaar
Tel.: +32-3-870 7300
Fax: +32-3-870 7301

Belarus

Представительство ГРУНДФОС в
Минске
220125, Минск
ул. Шафарнянская, 11, оф. 56, БЦ
«Порт»
Тел.: +375 17 397 397 3
+375 17 397 397 4
Факс: +375 17 397 397 1
E-mail: minsk@grundfos.com

Bosnia and Herzegovina

GRUNDFOS Sarajevo
Zmaja od Bosne 7-7A
BIH-71000 Sarajevo
Tel.: +387 33 592 480
Fax: +387 33 590 465
www.ba.grundfos.com
E-mail: grundfos@bih.net.ba

Brazil

BOMBAS GRUNDFOS DO BRASIL
Av. Humberto de Alencar Castelo
Branco, 630
CEP 09850 - 300
São Bernardo do Campo - SP
Tel.: +55-11 4393 5533
Fax: +55-11 4343 5015

Bulgaria

Grundfos Bulgaria EOOD
Slatina District
Iztocna Tangenta street no. 100
BG - 1592 Sofia
Tel.: +359 2 49 22 200
Fax: +359 2 49 22 201
E-mail: bulgaria@grundfos.bg

Canada

GRUNDFOS Canada inc.
2941 Brighton Road
Oakville, Ontario
L6H 6C9
Tel.: +1-905 829 9533
Fax: +1-905 829 9512

China

GRUNDFOS Pumps (Shanghai) Co. Ltd.
10F The Hub, No. 33 Suhong Road
Minhang District
Shanghai 201106 PRC
Tel.: +86 21 612 252 22
Fax: +86 21 612 253 33

Columbia

GRUNDFOS Colombia S.A.S.
Km 1.5 vía Siberia-Cota Conj. Potrero
Chico,
Parque Empresarial Arcos de Cota Bod.
1A,
Cota, Cundinamarca
Tel.: +57(1)-2913444
Fax: +57(1)-8764586

Croatia

GRUNDFOS CROATIA d.o.o.
Buzinski prilaz 38, Buzin
HR-10010 Zagreb
Tel.: +385 1 6595 400
Fax: +385 1 6595 499
www.hr.grundfos.com

Czech Republic

GRUNDFOS Sales Czechia and Slovakia
s.r.o.
Čajkovského 21
779 00 Olomouc
Tel.: +420-585-716 111

Denmark

GRUNDFOS DK A/S
Martin Bachs Vej 3
DK-8850 Bjerringbro
Tel.: +45-87 50 50 50
Fax: +45-87 50 51 51
E-mail: info_GDK@grundfos.com
www.grundfos.com/DK

Estonia

GRUNDFOS Pumps Eesti OÜ
Peterburi tee 92G
11415 Tallinn
Tel.: + 372 606 1690
Fax: + 372 606 1691

Finland

OY GRUNDFOS Pumput AB
Trukkikuja 1
FI-01360 Vantaa
Tel.: +358-(0) 207 889 500

France

Pompes GRUNDFOS Distribution S.A.
Parc d'Activités de Chesnes
57, rue de Malacombe
F-38290 St. Quentin Fallavier (Lyon)
Tel.: +33-4 74 82 15 15
Fax: +33-4 74 94 10 51

Germany

GRUNDFOS GMBH
Schlüterstr. 33
40699 Erkrath
Tel.: +49-(0) 211 929 69-0
Fax: +49-(0) 211 929 69-3799
E-mail: infoservice@grundfos.de
Service in Deutschland:
kundendienst@grundfos.de

Greece

GRUNDFOS Hellas A.E.B.E.
20th km. Athinon-Markopoulou Av.
P.O. Box 71
GR-19002 Peania
Tel.: +0030-210-66 83 400
Fax: +0030-210-66 46 273

Hong Kong

GRUNDFOS Pumps (Hong Kong) Ltd.
Unit 1, Ground floor, Siu Wai Industrial
Centre
29-33 Wing Hong Street & 68 King Lam
Street, Cheung Sha Wan
Kowloon
Tel.: +852-27861706 / 27861741
Fax: +852-27858664

Hungary

GRUNDFOS Hungária Kft.
Tópark u. 8
H-2045 Törökbalint
Tel.: +36-23 511 110
Fax: +36-23 511 111

India

GRUNDFOS Pumps India Private Limited
118 Old Mahabalipuram Road
Thorapakkam
Chennai 600 097
Tel.: +91-44 2496 6800

Indonesia

PT GRUNDFOS Pompa
Graha Intrub Lt. 2 & 3
Jln. Cililitan Besar No.454. Makasar,
Jakarta Timur
ID-Jakarta 13650
Tel.: +62 21-469-51900
Fax: +62 21-460 6910 / 460 6901

Ireland

GRUNDFOS (Ireland) Ltd.
Unit A, Merrywell Business Park
Ballymount Road Lower
Dublin 12
Tel.: +353-1-4089 800
Fax: +353-1-4089 830

Italy

GRUNDFOS Pompe Italia S.r.l.
Via Gran Sasso 4
I-20060 Truccazzano (Milano)
Tel.: +39-02-95838112
Fax: +39-02-95309290 / 95838461

Japan

GRUNDFOS Pumps K.K.
1-2-3, Shin-Miyakoda, Kita-ku
Hamamatsu
431-2103 Japan
Tel.: +81 53 428 4760
Fax: +81 53 428 5005

Korea

GRUNDFOS Pumps Korea Ltd.
6th Floor, Aju Building 679-5
Yeoksam-dong, Kangnam-ku, 135-916
Seoul, Korea
Tel.: +82-2-5317 600
Fax: +82-2-5633 725

Latvia

SIA GRUNDFOS Pumps Latvia
 Deglava biznesa centrs
 Augusta Deglava ielā 60
 LV-1035, Rīga,
 Tel.: + 371 714 9640, 7 149 641
 Fax: + 371 914 9646

Lithuania

GRUNDFOS Pumps UAB
 Smolensko g. 6
 LT-03201 Vilnius
 Tel.: + 370 52 395 430
 Fax: + 370 52 395 431

Malaysia

GRUNDFOS Pumps Sdn. Bhd.
 7 Jalan Peguam U1/25
 Glenmarie Industrial Park
 40150 Shah Alam, Selangor
 Tel.: +60-3-5569 2922
 Fax: +60-3-5569 2866

Mexico

Bombas GRUNDFOS de México
 S.A. de C.V.
 Boulevard TLC No. 15
 Parque Industrial Stiva Aeropuerto
 Apodaca, N.L. 66600
 Tel.: +52-81-8144 4000
 Fax: +52-81-8144 4010

Netherlands

GRUNDFOS Netherlands
 Veluwezoom 35
 1326 AE Almere
 Postbus 22015
 1302 CA ALMERE
 Tel.: +31-88-478 6336
 Fax: +31-88-478 6332
 E-mail: info_gnl@grundfos.com

New Zealand

GRUNDFOS Pumps NZ Ltd.
 17 Beatrice Tinsley Crescent
 North Harbour Industrial Estate
 Albany, Auckland
 Tel.: +64-9-415 3240
 Fax: +64-9-415 3250

Norway

GRUNDFOS Pumper A/S
 Strømsveien 344
 Postboks 235, Leirdal
 N-1011 Oslo
 Tel.: +47-22 90 47 00
 Fax: +47-22 32 21 50

Poland

GRUNDFOS Pompy Sp. z o.o.
 ul. Klonowa 23
 Baranowo k. Poznań
 PL-62-081 Przeźmierowo
 Tel.: (+48-61) 650 13 00
 Fax: (+48-61) 650 13 50

Portugal

Bombas GRUNDFOS Portugal, S.A.
 Rua Calvet de Magalhães, 241
 Apartado 1079
 P-2770-153 Paço de Arcos
 Tel.: +351-21-440 76 00
 Fax: +351-21-440 76 90

Romania

GRUNDFOS Pompe România SRL
 S-PARK BUSINESS CENTER, Clădirea
 A2, etaj 2
 Str. Tipografilor, Nr. 11-15, Sector 1, Cod
 013714
 București, Romania
 Tel.: 004 021 2004 100
 E-mail: romania@grundfos.ro

Russia

ООО Грудфос Россия
 ул. Школьная, 39-41
 Москва, RU-109544, Russia
 Тел. (+7) 495 564-88-00 (495) 737-30-00
 Факс (+7) 495 564 8811
 E-mail grundfos.moscow@grundfos.com

Serbia

Grundfos Srbija d.o.o.
 Omladinskih brigada 90b
 11070 Novi Beograd
 Tel.: +381 11 2258 740
 Fax: +381 11 2281 769
 www.rs.grundfos.com

Singapore

GRUNDFOS (Singapore) Pte. Ltd.
 25 Jalan Tukang
 Singapore 619264
 Tel.: +65-6681 9688
 Fax: +65-6681 9689

Slovakia

GRUNDFOS s.r.o.
 Prievozská 4D 821 09 BRATISLAVA
 Tel.: +421 2 5020 1426
 sk.grundfos.com

Slovenia

GRUNDFOS LJUBLJANA, d.o.o.
 Leskoškova 9e, 1122 Ljubljana
 Tel.: +386 (0) 1 568 06 10
 Fax: +386 (0) 1 568 06 19
 E-mail: tehnika-si@grundfos.com

South Africa

GRUNDFOS (PTY) LTD
 16 Lascelles Drive, Meadowbrook Estate
 1609 Germiston, Johannesburg
 Tel.: (+27) 10 248 6000
 Fax: (+27) 10 248 6002
 E-mail: lgradidge@grundfos.com

Spain

Bombas GRUNDFOS España S.A.
 Camino de la Fuentecilla, s/n
 E-28110 Algete (Madrid)
 Tel.: +34-91-848 8800
 Fax: +34-91-628 0465

Sweden

GRUNDFOS AB
 Box 333 (Lunnagårdsgatan 6)
 431 24 Mölndal
 Tel.: +46 31 332 23 000
 Fax: +46 31 331 94 60

Switzerland

GRUNDFOS Pumpen AG
 Bruggacherstrasse 10
 CH-8117 Fällanden/ZH
 Tel.: +41-44-806 8111
 Fax: +41-44-806 8115

Taiwan

GRUNDFOS Pumps (Taiwan) Ltd.
 7 Floor, 219 Min-Chuan Road
 Taichung, Taiwan, R.O.C.
 Tel.: +886-4-2305 0868
 Fax: +886-4-2305 0878

Thailand

GRUNDFOS (Thailand) Ltd.
 92 Chaloom Phrakiat Rama 9 Road
 Dokmai, Pravej, Bangkok 10250
 Tel.: +66-2-725 8999
 Fax: +66-2-725 8998

Turkey

GRUNDFOS POMPA San. ve Tic. Ltd.
 Sti.
 Gebze Organize Sanayi Bölgesi
 Ihsan dede Caddesi
 2. yol 200. Sokak No. 204
 41490 Gebze/ Kocaeli
 Tel.: +90 - 262-679 7979
 Fax: +90 - 262-679 7905
 E-mail: satis@grundfos.com

Ukraine

ТОВ "ГРУНДФОС УКРАЇНА"
 Бізнес Центр Європа
 Столичне шосе, 103
 м. Київ, 03131, Україна
 Tel.: (+38 044) 237 04 00
 Fax: (+38 044) 237 04 01
 E-mail: ukraine@grundfos.com

United Arab Emirates

GRUNDFOS Gulf Distribution
 P.O. Box 16768
 Jebel Ali Free Zone, Dubai
 Tel.: +971 4 8815 166
 Fax: +971 4 8815 136

United Kingdom

GRUNDFOS Pumps Ltd.
 Grovebury Road
 Leighton Buzzard/Beds. LU7 4TL
 Tel.: +44-1525-850000
 Fax: +44-1525-850011

U.S.A.

GRUNDFOS Water Utility Headquarters
 856 Koomey Road
 Brookshire, Texas 77423 USA

Uzbekistan

Grundfos Tashkent, Uzbekistan
 The Representative Office of Grundfos
 Kazakhstan in Uzbekistan
 38a, Oybek street, Tashkent
 Tel.: (+998) 71 150 3290 / 71 150 3291
 Fax: (+998) 71 150 3292

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ECM: 1338226

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B.5 Flow Monitors SI500x [IFM]

Name	Data
Designation	Flow Monitors
Type	SI500x [IFM]
Number	704056 / 03 08 / 2010
Type of manual	Operating instructions
Manufacturer	ifm electronic www.ifm.com

ifm electronic



Operating instructions
Flow monitors

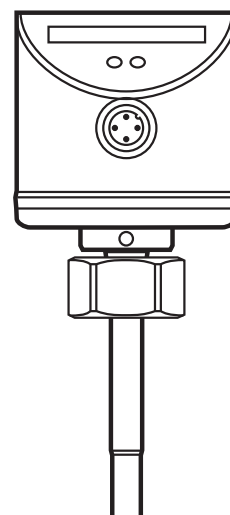
efector300[®]

SI5000

SI5001

UK

704056 / 01 06 / 2007



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Preliminary note

- An instruction is indicated by “►”:
Example: ► Check whether the unit operates correctly.
- A reaction to the action is indicated by ">":
Example: > LED 9 lights.

1 Safety instructions

- Please read the product description prior to set-up of the unit. Ensure that the product is suitable for your application without any restrictions.
- The unit conforms to the relevant regulations and EC directives.
- Improper or non-intended use may lead to malfunctions of the unit or to unwanted effects in your application.
- That is why installation, electrical connection, set-up, operation and maintenance of the unit must only be carried out by qualified personnel authorised by the machine operator.

UK

2 Functions and features

2.1 Application area

The unit monitors the flow of liquid and gaseous media.

2.2 Operating principle flow monitoring

- The unit detects the flow speed to the calorimetric measuring principle and switches the output:
 - output closed if medium is flowing / output open if no medium is flowing.

This applies to the unit on delivery: output = normally open. In case of need you can change the output to normally closed (→ 7.2). It then applies: output open if medium is flowing.
- If the flow speed increases, the switching status changes when the switch point is reached.
- If the flow speed falls again, the switching status changes if the value "SP minus hysteresis" is reached.

The hysteresis changes with the flow speed and it is essentially influenced by the set monitoring range.

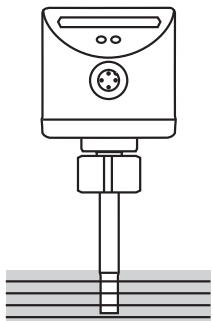
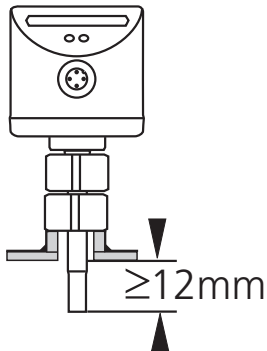
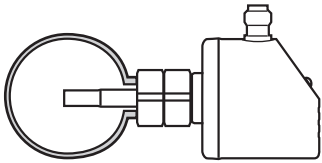
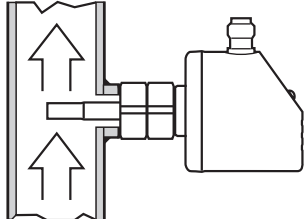
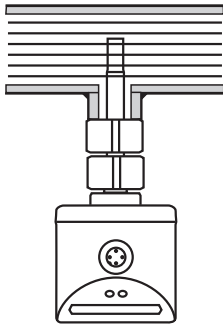
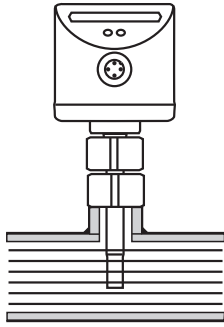
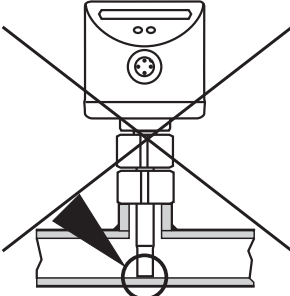
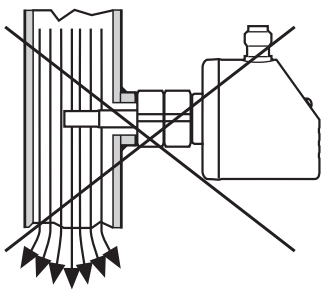
It is 2...5 cm/s for the setting 5...100 cm/s (= factory setting), it increases with higher flow speeds.
- The typical response time of the unit is 1...10 s. It can be influenced by the setting of the switch point:
 - Low switch point = quick reaction with rising flow.
 - High switch point = quick reaction with falling flow.

3 Installation

Using process adapters the unit can be adapted to different process connections.

- Adapters have to be ordered separately as accessories.
A correct fit of the unit and ingress resistance of the connection are only ensured using ifm adapters.
- For small flow rates ifm adapter blocks are available.

3.1 Installation location

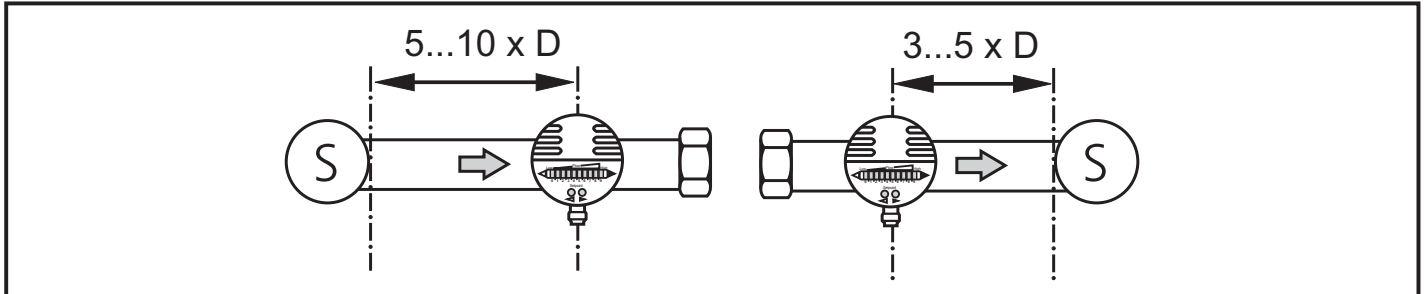
General • The sensor tip is to be completely surrounded by the medium. • Insertion depth of the sensor: minimum 12 mm.		
Recommended • For horizontal pipes: mounting from the side. • For vertical pipes: mounting in the rising pipe.		
Conditional • Horizontal pipe /mounting from the bottom: if the pipe is free from build-up. • Horizontal pipe /mounting from the top: if the pipe is completely filled with medium.		
To avoid • The sensor tip must not be in contact with the pipe wall. • Do not mount in downpipes that are open at the bottom!		

UK

3.2 Sources of interference in the pipe system

Components integrated in the pipes, bends, valves, reductions, etc. lead to turbulence of the medium. This affects the function of the unit.

Recommendation: Adhere to the distances between sensor and sources of interference:

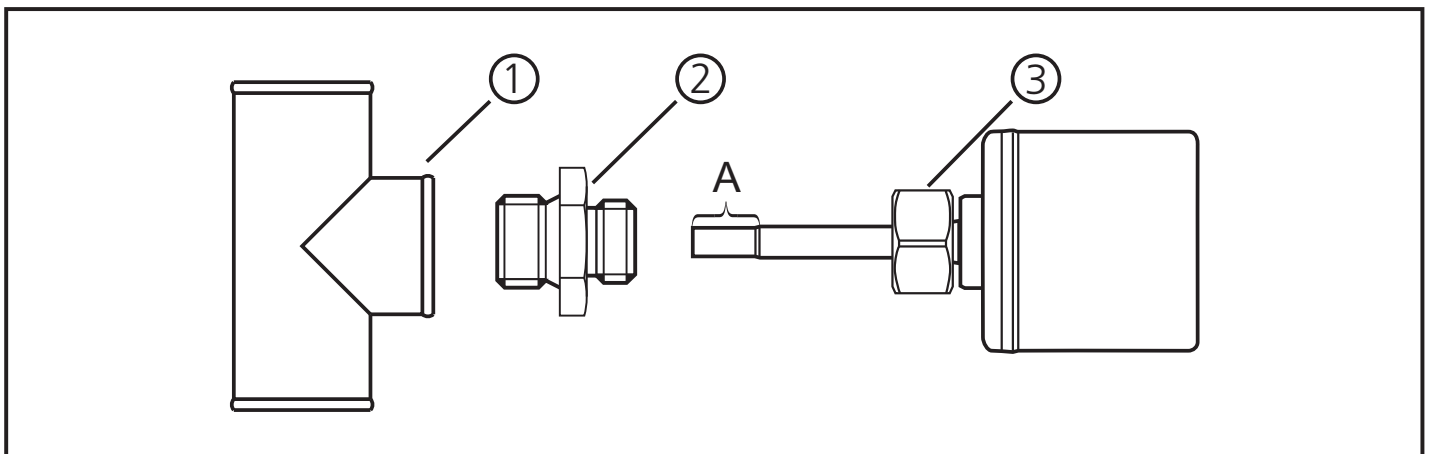


D = pipe diameter; S = sources of interference

3.3. Mounting operation



- Ensure that the system is free of pressure during installation.
- Ensure that no media can leak at the mounting location during installation.



- Grease the threads of the process connection (1), adapter (2) and nut (3).
Note: The sensor tip (A) must not be in contact with grease.
- Screw the suitable adapter into the process connection.
- Place the flow monitor onto the adapter and tighten the nut. Tightening torque max. 50 Nm. Ensure that the unit is correctly oriented.

4 Electrical connection



The unit must be connected by a qualified electrician.

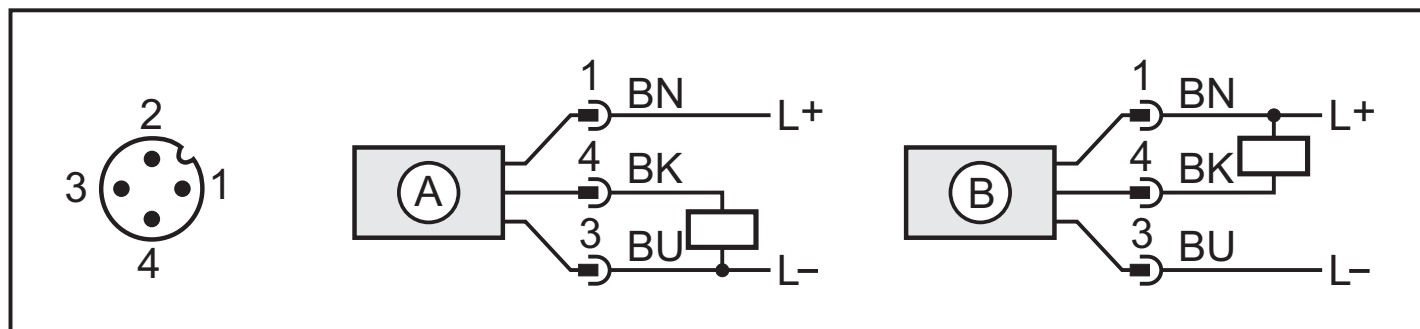
The national and international regulations for the installation of electrical equipment must be adhered to.

Voltage supply to EN 50178, SELV, PELV.

The unit shall be supplied from an isolating source and protected by an overcurrent device. The "limited voltage" requirements according to UL508 must be complied with.

- ▶ Disconnect power.
- ▶ Connect the unit as follows:

UK

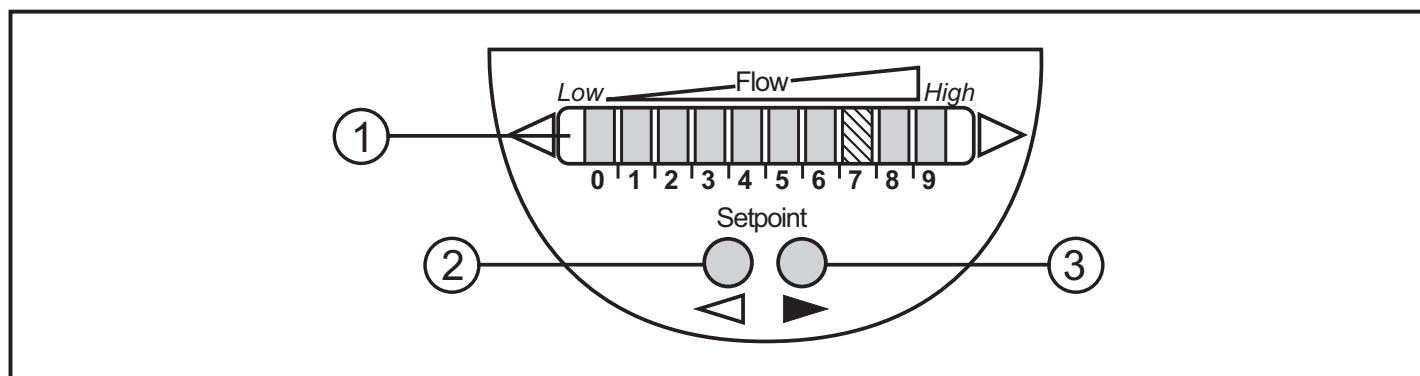


A: SI5000 (positive switching); B: SI5001 (negative switching)

Core colours of ifm sockets:

1 = BN (brown), 3 = BU (blue), 4 = BK (black)

5 Operating and display elements



1: Operation display

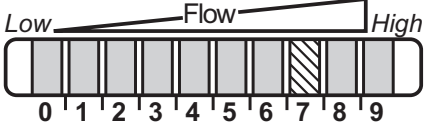
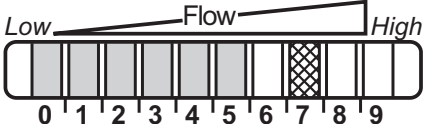
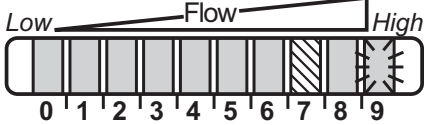
- The green LEDs indicate the current flow (the LEDs 0 to 9 represent the range between no flow and maximum flow).
- A lighting LED indicates the position of the switch point (orange = output closed, red = output open).

2, 3: Setting buttons for adjustment and configuration

6 Set-up and settings for water

(For media other than water → 7.1: Low flow adjustment).

- ▶ Switch on the supply voltage.
- > All LEDs light and go out again step by step. During this time the output is closed (if configured as normally open). The unit is in the operating mode.
- ▶ Let the normal flow circulate in the installation.
- ▶ Check the display and determine further actions.

1		The factory setting is suitable for the application. ▶ No further settings are required.
2		Your normal flow is below the representation range of the display. 2 setting options: ▶ Change the switch point (→ 6.1). ▶ Carry out high flow adjustment (→ 6.2).
3		Your normal flow exceeds the representation range of the display (LED 9 flashes). ▶ Carry out high flow adjustment (→ 6.2).

You can restore the factory setting any time. (→ 7.3).

6.1 Change the switch point (optional)

For the factory setting the switch point is at LED 7. A change makes sense if:

- the display shows example 2.
 - the flow fluctuates much or pulsates.
 - if a faster response time of the unit is requested (low switch point = fast response with rising flow, high switch point = fast response with falling flow).
- ▶ Briefly press the pushbutton ◀ or ▶.
- > The switch point LED flashes.
- ▶ Press the pushbutton ◀ or ▶ as often as required. Each press of the pushbutton shifts the LED by one position in the indicated direction.

Note: If no pushbutton is pressed for 2 s, the unit returns to the operating mode with the newly set value.

6.2 High flow adjustment (optional)

The unit determines the existing flow as normal flow and adapts the display representation (all LEDs except the switch point LED light green).

- ▶ Let the normal flow circulate in the installation.
- ▶ Press the pushbutton  and keep it pressed.
- > LED 9 lights, after approx. 5 s it flashes.
- ▶ Release the pushbutton.

The unit is now adapted to your flow conditions. It passes into the operating mode, the display should now show example 1.

Note: The adjustment affects the switch point: It is increased proportionally (maximum up to LED 7).

UK

7 Additional settings (optional)

7.1 Low flow adjustment

If the unit is used in media other than water, you should additionally adapt the unit to the minimum flow.

Note: The following adjustment must only be carried out after the high flow adjustment.

- ▶ Let the minimum flow circulate in the installation or ensure flow standstill.
- ▶ Press the pushbutton  and keep it pressed.
- > LED 0 lights, after approx. 5 s it flashes.
- ▶ Release the pushbutton. The unit adopts the new value and passes into the operating mode.

7.2 Configure the switching output

The unit is delivered as normally open. In case of need you can change the output to normally closed:

- ▶ Press the pushbutton  for at least 15 s.
- > LED 0 lights, after approx. 5 s it flashes.
- > After 10 s the current setting is displayed: LEDs 5...9 light orange (= output normally open).
- > After approx. 15 s LEDs 0...4 flash orange.
- ▶ Release the pushbutton. The output is changed to normally closed operation.

For a new changeover repeat the operation.

7.3 Restore the factory setting (reset)

- ▶ Press the pushbutton ► for at least 15 s.
- > LED 9 lights, after approx. 5 s it flashes.
- > After approx. 15 s LEDs 0...9 flash orange.
- ▶ Release the pushbutton. All settings are reset to the factory setting:
 - operating area: 5 ...100 cm/s for water
 - switch point: LED 7
 - output function: NO
 - unlocked.

7.4 Lock / unlock the unit

The unit can be locked electronically to prevent unintentional settings.

- ▶ Press both setting pushbuttons simultaneously for at least 10 s in the operating mode.
 - > The indication goes out, the unit locks or unlocks.
- On delivery: unlocked.

8 Error during adjustment

If no adjustment is possible, all LEDs flash red. The unit then passes into the operating mode with unchanged values.

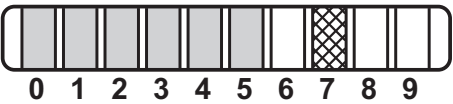
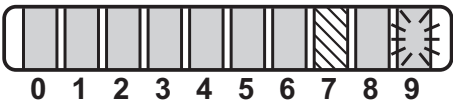
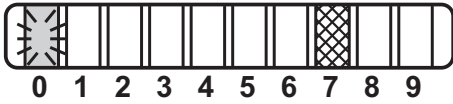
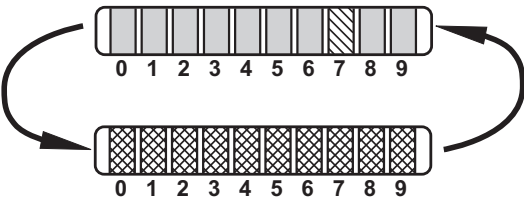
Possible cause /aid:

Error during installation.	▶ Read chapter 3 Installation. Check whether all requirements have been met.
The difference between maximum flow and minimum flow is too small.	▶ Increase the flow difference and carry out the adjustment once again.
The sequence high flow /low flow adjustment was not adhered to.	▶ Carry out the two adjustment operations again in the right sequence.

9 Operation

After every power on all LEDs light and go out again step by step (during this time the output is closed if configured as normally open). The unit is then ready for operation.

In case of power failure or interruption all settings remain.

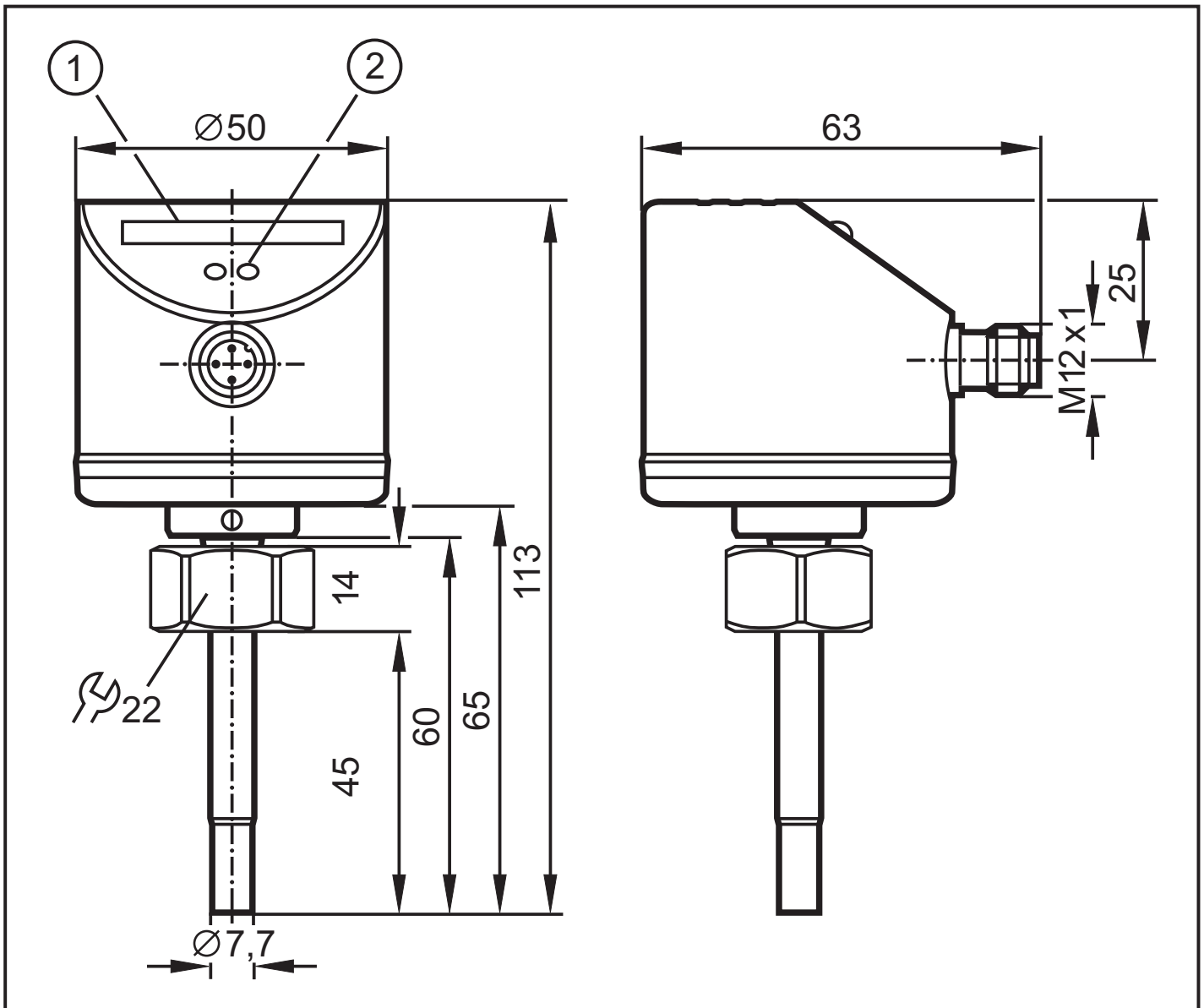
Operating indicators	
	Green LED bar: Current flow within the representation range. Indication of the switch point (SP): - LED orange: output closed. - LED red: output open.
	LED 9 flashes: current flow above the representation range.
	LED 0 flashes: current flow far below the representation range.
Interference indicators	
	Short circuit at the switching output: The operating indicator and red LEDs light alternately. If the short circuit has been rectified, the unit immediately passes into the normal operating state. The current operating state is displayed.
Display OFF (no LED lights):	Operating voltage too low (< 19 V) or failed. Ensure a correct voltage supply.

10 Maintenance

Recommended maintenance:

- Check the sensor tip for build-up from time to time.
- Clean it using a soft cloth. Stubborn build-up (e.g. lime) can be removed using a common vinegar cleaning agent.

11 Scale drawing



- 1: LED bar display
2: set button

12 Technical data

Application area.....	Liquids and gases
Operating voltage [V].....	19 ... 36 DC ¹⁾
Current rating [mA]	250
Short-circuit protection, pulsed; reverse polarity / overload protection	
Voltage drop [V]	< 2.5
Current consumption [mA]	< 60
Power-on delay time [s]	10, optically indicated

Liquids	
Medium temperature [°C]	-25 ... +80
Setting range [cm/s].....	3 ... 300
Greatest sensitivity [cm/s]	3...100
Temperature gradient [K/min]	300
Gases	
Medium temperature [°C]	-25 ... +80
Setting range [cm/s].....	200 ... 3000
Greatest sensitivity [cm/s].....	200 ... 800
Switch point accuracy [cm/s]	$\pm 2... \pm 10^{2)}$
Hysteresis [cm/s]	2...5 ²⁾
Repeatability [cm/s]	1...5 ²⁾
Temperature drift [cm/s x 1/K].....	0.1 ³⁾
Response time [s].....	1 ... 10
Pressure resistance [bar].....	30
Operating temperature [°C]	-25 ... +80
Protection rating	IP 67
Protection class	III
Shock resistance [g]	50 (DIN / IEC 68-2-27, 11 ms)
Vibration resistance [g]	20 (DIN / IEC 68-2-6, 55-2000 Hz)
Housing materials.....	stainless steel (304S15); PC (Makrolon); PBT-GF 20; EPDM/X (Santoprene)
Materials (wetted parts).....	high-grade stainless steel (316S12) O-ring: FPM 8x1.5 gr 80° Shore A
EMC	
EN 61000-4-2 ESD:	4 kV CD / 8 kV AD
EN 61000-4-3 HF radiated:	10 V/m
EN 61000-4-4 Burst:	2 kV
EN 61000-4-6 HF conducted:	10 V

¹⁾ to EN50178, SELV, PELV;

²⁾ for water; 5...100 cm/s; 25°C (factory setting)

³⁾ for water; 5...100 cm/s; 10...70°C

The sensor conforms to the standard EN 61000-6-2

Technical data and further information at
www.ifm.com → Select your country → Data sheet direct:



EU – Konformitätserklärung

EU declaration of conformity

Déclaration de conformité UE

ifm electronic gmbh

Friedrichstraße 1

45128 Essen

Germany

Telefon: +49 (0)201 / 24 22 - 0

Telefax: +49 (0)201 / 24 22 - 1200

Internet: www.ifm.com

Die EU-Konformitätserklärung gilt für folgende Geräte:

The EU declaration of conformity applies to the following units:

La déclaration de conformité UE s'applique aux appareils suivants:

Elektronische Strömungssensoren der Produktfamilie
Electronic flow sensors of the product family
Capteurs de débit électroniques de la famille de produits

SI5xxx / SI05xx

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.

This declaration of conformity is issued under the sole responsibility of the manufacturer.

La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.

Wir bestätigen die Übereinstimmung mit den grundlegenden Anforderungen der europäischen Richtlinie(n):

We confirm the conformity to the essential requirements of the European directive(s):

Nous confirmons la conformité aux exigences essentielles de la (des) directive(s) européenne(s):

2011/65/EU
2014/30/EU

2011/65/EU
2014/30/EU

2011/65/UE
2014/30/UE

Folgende Norm(en) wurde(n) angewandt:

The following standard(s) was (were) applied:

La (Les) norme(s) suivante(s) a (ont) été appliquée(s):

EN IEC 63000 : 2018
EN IEC 61000-6-2 : 2019
EN 61000-6-3 : 2007 +A1 : 2011 +AC : 2012

Tettngang, 25.08.2021

(Ort und Datum der Ausstellung)

(Place and date of issue)

(Lieu et date de l'établissement)

Walter Reichart

(Unterschrift) (Name, Funktion) i.V. Walter Reichart /

(Signature) (name, function) Head of Department

(Signature) (nom, fonction)

Dokument-Nr.: 8003485

B.6 EVOGUARD Butterfly valve [KRONES]

Name	Data
Designation	Butterfly valve
Type	EVOGUARD [KRONES]
Number	TD11001839 DE 04
Type of manual	Operating instructions
Manufacturer	Krones AG Böhmerwaldstraße 5 93073 Neutraubling +49 9401 70-0 Fax +49 9401 70-2488 www.krones.com

Operating manual

Butterfly Valve B, Standard



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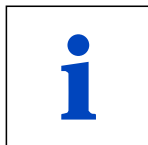
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1 Preface

1.1 About this Operating Manual

1.1.1 Original Operating Manual



This operating manual is the original operating manual.

1.1.2 Purpose of the Operating Manual

This operating manual is valid for all of the specified machine series. It contains all of the information required to ensure safe and proper use in all operating phases.

1.1.3 Target Groups

Target group	Documentation type
Operating company	Keep this manual available next to the system, also for later use. Urge the employees to read and observe this operating manual and the other applicable documents, in particular the safety/warning instructions. Observe any other regulations and instructions relating to this system.
Professionals, engineers	Read and observe and follow the information in this operating manual and the other applicable documents, in particular the safety/warning instructions.

1.1.4 Warnings in the Operating Manual

In the operating manual, warnings are provided before potentially hazardous tasks. The warnings are categorised into hazard levels. The hazard level indicates the probability and severity of harm/damage associated with not following the warning. Follow these warnings, as they help prevent hazards which cause damage to property, bodily injury, or in the worse case, death.

Warning Identification/Hazard Levels

Warnings are identified by a safety alert symbol, by the hazard level (degree) indicated in the left margin, and by the borderlines above and below.

Safety Alert Symbol	Hazard Level	Description of Safety Level
	DANGER	High-risk hazard which could result in severe bodily injury or death if not avoided.
	WARNING	Medium-risk hazard which could result in severe bodily injury or death if not avoided.
	CAUTION	Low-risk hazard which could result in medium or minor bodily injury or death if not avoided.
	NOTICE	Warns of property damage.

Structure of warnings

WARNING



Hazard description

Hazard implications

- ▶ Hazard precautions

Example – warning

WARNING

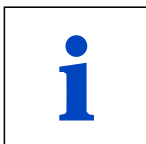


Rotating machine parts!

Severe injuries or death can result from being crushed, shearing off or pulling in.

- ▶ Leave the guard door(s) open while working inside the machine. This prevents turning on.
- ▶ Do not do any work unless the machine has been emptied and stopped.

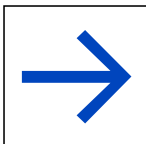
Information



Information symbol

This symbol is associated with additional instructions and information on a particular subject.

References



Arrow symbol

This symbol is associated with references to other sections of the operating manual, additional manuals in the supplement, or separate documents.

1.1.5 Abbreviations and units

Term	Meaning
AA	Air-Air (valve with air-air drive)
BD (Operation manual)	Butterfly valve with angle of rotation limiter
CP	British standard
bar	Unit of measurement for pressure
°C	Unit of measurement for temperature, degrees Celsius
dm ³ n	Unit of measurement for volume, cubic decimetres, standard volume (standard litres)
DN	DIN-Nominal diameter
DIN	German Standard from DIN Deutsches Institut für Normung e.V. (German Institute for Standardization)
EN	European standard
°F	Unit of measurement for temperature, degrees Fahrenheit
h	Unit of measurement for time, hour
IP	Ingress protection rating
ISO	International standard of the International Organization for Standardization
kg	Unit of measurement for weight, kilogrammes
kN	Unit of measurement for force, kilo Newton

Term	Meaning
l	Unit of measurement for volume, litre, 1 l = 1 dm ³
mm	Unit of measurement for length, millimetres
µm	Unit of measurement for length, micrometres
M	metric
MA	Manual actuator
MAV	Manual actuator, lockable
ms	main stroke
MS1	Top air connection for actuator AA (closing valve)
MS2	Bottom air connection for actuator AA (opening valve)
NC	Normally closed. Valve closed when not in operation
Nm	Unit of measurement for work, newton metres Designation for torque 1 Nm = 0.737 lbft
NO	Normally open. Valve open when in a non-operative state
Ω	Resistor
psi	Unit of measurement for pressure
SW	Indicates the size of a wrench i.e. its width across the flats
V DC	Volts direct current
V AC	Volts alternating current
W	Unit of measurement for power, watts
TIG	Welding procedure, tungsten inert gas welding
Inches OD	Pipe dimensions according to British standard (BS), Outside Diameter
Inches IPS	American pipe dimensions (Iron Pipe Size)

1.1.6 Warranty

Observe the following to make sure you do not void your warranty from Evoguard GmbH:

- Use only original spare parts for maintenance, or Evoguard GmbH must be consulted when spare parts are selected.
 - Use the valves only for their permissible application.
 - Use the valve only in accordance with the technical data specified in the supplement!
 - Unauthorised modification or alteration of the valve is not permitted.
 - Observe the applicable safety instructions/regulations as well as the safety signs on the valve.
 - During the guarantee period, seek the manufacturer's approval before performing any conversions, maintenance, or modifications.
 - Safety devices must not be by-passed, removed or disabled without authorisation.
- Failure to comply with the above-mentioned instructions will void any warranty and liability claims for personal injury and property damage.

1.1.7 Copyright

This operating manual is protected by copyright. It contains technical descriptions and illustrations which must not be reproduced, edited, translated, issued to, or made accessible to third persons without the written consent of Evoguard GmbH. Subject to technical changes. Errors and omissions excepted.
© Evoguard GmbH

2 Safety

2.1 General Safety Instructions



The manufacturer shall not assume liability for damage due to the non-observance of the complete documentation.
Observe the following regulations before doing any work.

2.1.1 Permissible Application

Safe operation of the valves can be guaranteed only if they are used for their approved application.

Complying with the operating, maintenance, and preventive maintenance conditions is also part of the approved application.

2.1.2 Impermissible application

DANGER



Use in explosive areas!

Danger to life

- ▶ Do not use valves without EX identification in explosive areas.

DANGER



Use during the processing of liquid gases!

Danger to life

- ▶ The valves must not be used during the processing of liquid gases.

The valves are intended only for the agreed application. Any other application is regarded as being prohibited. The operating company shall be liable for any risk involved.

2.1.3 Product safety

The valves are built according to state-of-the-art technology and the recognised safety-engineering regulations. Even so, the life of the operator or third persons may be at risk when the valve is used and the valve and other tangible assets may also be damaged.

- Only operate the valves in a technically perfect condition, for the job for which they were designed and taking into account the safety issues and risks involved, while observing this operating manual.
- Keep this manual and all other valid documents in a complete and legible condition. They should be accessible to personnel at all times.
- Prohibit any method of operation which puts the personnel or uninvolved third persons at risk.
- Should a safety-relevant malfunction occur, stop the system immediately and have the malfunction rectified by the personnel responsible.
- In addition to the complete documentation, observe the statutory or other safety and accident-prevention regulations, as well as the valid standards and guidelines for the country in which the equipment is operated.
- Do not remove the technical stickers, replace them if necessary.

2.1.4 Responsibilities of the Operating Company

Safety-conscious operation

The operating company must ensure the following:

- Only operate the valves in a technically perfect condition, for the job for which they were designed and taking into account the safety issues and risks involved, while observing this operating manual.
- Make sure the following are observed and monitored:
 - Proper use.
 - Statutory or other applicable safety and accident prevention regulations.
 - Safety regulations regarding working with hazardous materials.
 - Valid standards and guidelines of the land in which the equipment is operated.
- If necessary, provide personal protective equipment.
- Do not do this work on the system until it has been stopped.

Personnel Requirements

The personnel should meet the following requirements:

- The operating and maintenance personnel must be qualified to perform this work.
- The personnel must receive special instructions regarding the dangers which can occur.
- Make sure that personnel contracted to perform work on the valve has read and understood this manual and all other valid documents, including the safety, maintenance and preventive maintenance information, before commencing work.
- Read the information on the valve and keep it legible.
- Regulate the areas of responsibility and monitoring of the personnel.
- Have all work done only by professional technical personnel when the machine/line is at a standstill:
 - Assembly, preventive maintenance, maintenance work
 - Work on the electrical equipment.
- Have any work on the electrical system done only by specialist electrical engineers who have been trained and qualified in accordance with VDE regulations.
- Do not remove the protection provided against hot, cold and moving parts during operation.
- When necessary, use personal protective equipment.
- Once all of the work on the valve has been completed, mount the safety devices again correctly.
- Perform any work on live parts with the assistance of a second person (to press the master switch).
- Do not touch the valve while it is in operation.

The following regulations must also be observed in addition to this operating manual:

- Accident prevention regulations.
- Safety regulations.
- National regulations for the country where the equipment is operated.
- In-house work and safety regulations.
- Installation and operating regulations for use in potentially explosive areas.

2.2 Special dangers / residual hazards

2.2.1 Explosive Environments



If valves are used in areas with an explosive atmosphere, compliance with the ATEX 2014/34/EU guideline is compulsory with regard to all ignition hazards.

For this reason, it is imperative to observe the following:

- When working on explosion-proof systems, observe the applicable standards on gasses and dusts.
- Ensure compliance with the Directive 99/92/EC for the health and safety protection of the employees in an explosive atmosphere.
- Any work to be done is restricted to specially trained professionals.
- Use only valves with special identification in an explosive atmosphere.

2.2.2 Pressure Equipment

Valves are pressure equipment (without safety function) in accordance with the Pressure Equipment Directives: Directive PED 2014/68/EU.

2.2.3 Pumping Media

Only media suitable for the use defined in the section "Technical Data" are permissible. Other media may only be used following prior agreement.

2.2.4 Residual Hazards

General residual hazards

The valves are state of the art and are safe to operate. In manufacturing the valves, as many safety risks as possible have been eliminated. There are still the following residual hazards.

- Switching valves which are not installed.
Do not reach into the pipe or valve mount. The fingers can be crushed or cut off.
- Sharp-edged housing stubs.
It is imperative that you wear suitable protective gloves when transporting and assembling these parts.
- Drives are spring-loaded.
Do not open the drives.

3 Construction/Method of Operation

3.1 Machine Marks/Labels

3.1.1 Identification Plate

Identification plate

The diagram shows a rectangular identification plate for EVOGUARD. It contains the following fields and labels:

- 1 — Type:
- 2 — Part No.:
- 3 — Material:
- 4 — Air min.-max.: bar/psi
- 5 — Product: bar/psi
- 6 — Serial No.:
- 7 — (with CE mark)
- 8 — QR code

Additional text on the plate includes: "EVOGUARD", "Made in Germany", and contact information: "EVOGUARD GmbH, Dr.-Hermann-Kronseder-Str. 1, 93149 Nittenau, Germany, Tel.: +49 9436 307 700, www.evoguard.com".

80bo1447

- | | |
|------------------------|--------------------|
| 1 Type | 5 Product pressure |
| 2 Part number | 6 Serial number |
| 3 Material | 7 Test date |
| 4 Control air pressure | 8 QR code |



Bear in mind that particular sealing materials are specified for the valve type in question when ordering spare parts. For pertinent information, see the "Type" box on the identification plate.

3.1.2 QR code

A QR code is printed on the identification plate. Use a smartphone to open the Evo-guard Data Viewer where information about the specification, spare parts and documentation is available. You can also contact EVOGUARD customer support directly.

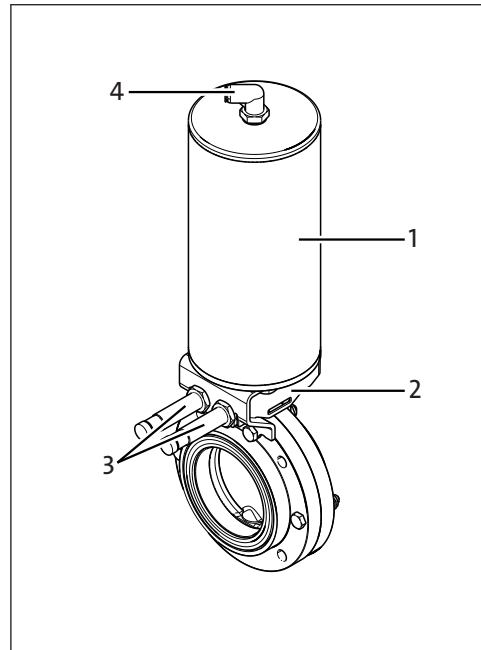
3.2 Application

The valve is used for opening and fully or partially shutting off pipe system sections in the beverage and food industry, see the "Technical Data" section. The valve is automatically actuated by a pneumatic cylinder or manually with a lever.

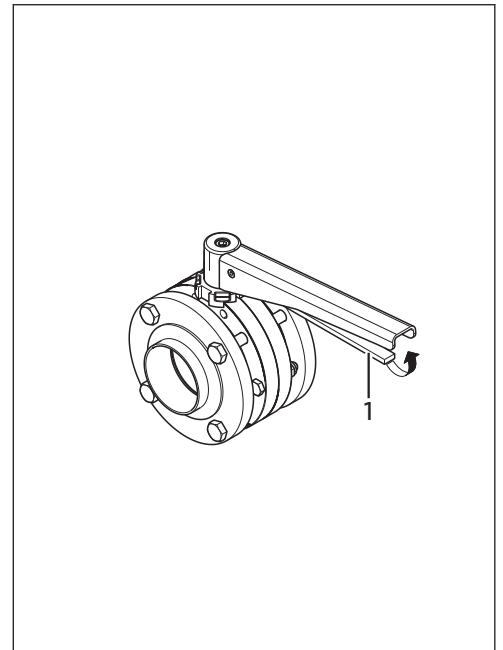
3.3 Structure

3.3.1 Actuation

Pneumatic actuation



Manual actuation

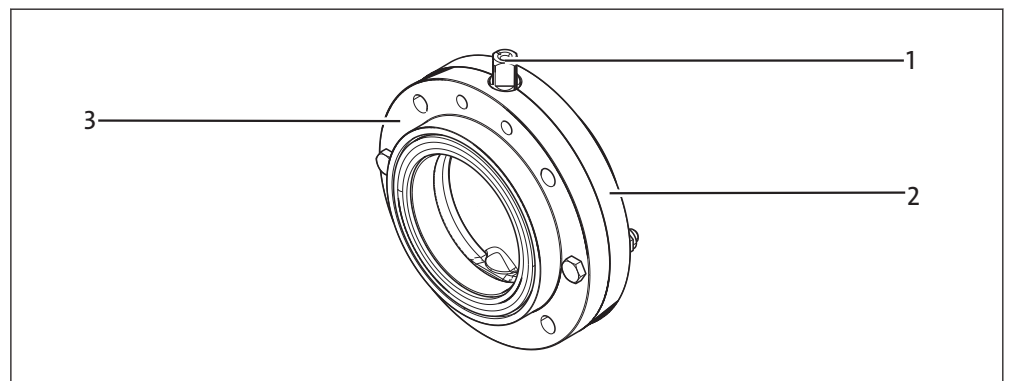


- 1 Actuator
- 2 Guard
- 3 Proximity switches for check-back signals of the switching states
- 4 Air connection

- 1 Lever

3.3.2 Shut-Off Valve

Shut-off valve



- 1 Disk
- 2 Flange
- 3 Flange

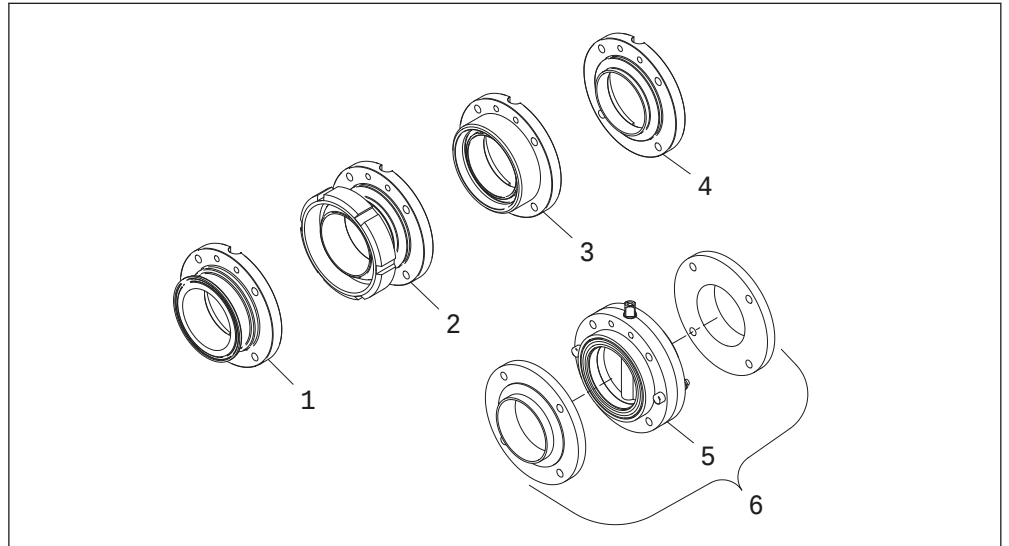
The disk is mounted between two screw-connected flanges on a separate bearing. Depending on the actuator position, the disk is opened to various degrees within the pipe.

If the disk is positioned parallel to the centre axis of the pipe, the valve is fully open and allows maximum flow.

In closed position, the disk of the valve shuts off the flow through the valve.

3.3.3 Flange Designs

Flange designs



80bo0193

- | | | | |
|---|---------------------|---|---|
| 1 | Clamp flange (C) | 4 | Weld flange (W) |
| 2 | Taper flange (L) | 5 | Intermediate flange (OVO) |
| 3 | Threaded flange (M) | 6 | Intermediate flange with counter-flange (FVF) |

3.4 Function

3.4.1 Actuation

Pneumatic actuation

The compressed air flowing in above the piston forces the piston downward. The disk of the valve is opened and/or closed.

The length of the piston stroke is limited to a 90-degree rotation of the shaft. The rotation corresponds to the angle required for opening and closing the disk in the flange-mounted valve. Once the air supply is shut off, the springs return the piston into its initial position.

- NC actuator: The disk is closed by spring force and opened by compressed air.
- NO actuator: The disk is closed by compressed air and opened by spring force.
- AA actuator: The disk is closed by compressed air and opened by compressed air.

Manual actuation

For opening and closing, press the lever upward. The locking device is released. Rotate the lever up to 90 degrees and release it. The lever locks in place. The position can be determined by proximity switches.

3.5 Manufacturer and contact person

3.5.1 Manufacturer's address

EVOGUARD GmbH
Dr.-Hermann-Kronseder-Straße 1
93149 Nittenau
Germany
Phone: +49 9436 307-700
Fax: +49 9401 70-943
<http://www.evoguard.com>

3.5.2 Contact

General information

■ info@evoguard.com

Sales and Distribution

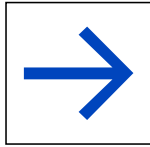
■ sales@evoguard.com

Customer service

■ customer.support@evoguard.com

4 Transportation/Storage

4.1 Fundamental Information



For weight specifications, see chapter 9.1.3 "Weights".

4.1.1 Checking the Delivery

Checking the delivery:

- ▶ Compare the information on the identification plate with the information provided in the order and delivery documents.
 - ▶ Check whether the delivery is complete upon receipt.
 - ▶ Check the delivery for any transport damage upon receipt.
 - ▶ Notify the supplier of any transport damage or missing parts and inform the manufacturer about what is happening.
 - ▶ Notify the supplier of any transport damage which was not immediately visible within 6 days. Any damage detected after this deadline will be the responsibility of the recipient.
 - ▶ Dispose of the packaging material in accordance with the locally valid guidelines.
- The delivery is checked.

4.1.2 Lifting

DANGER



Transported materials could fall!

Risk of fatal injury or crushed limbs.

- ▶ Observe the symbols applied to the packaging.
- ▶ Transport the valve with care to prevent damage occurring through the use of force or careless loading and unloading.

4.1.3 Storage

NOTICE

Transport or storage temperatures too low!

Physical damage to the valve due to condensation and/or the formation of ice crystals at temperatures below 0 °C [32 °F].

- ▶ Before installing it, store the valve for 24 hours in a dry condition at temperatures above 5 °C [41 °F].

5 Installation/Commissioning

5.1 Installation

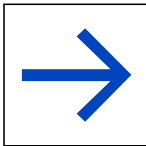
5.1.1 Fundamental Information



When installing, observe the following:

- The installation position must have the appropriate ambient conditions. See the "Technical Data" chapter in the appendix.
- The valve must be freely accessible from all sides.
- Make sure that there is enough space to install/remove the valve and to do maintenance and repair work.
- Prevent external vibrations acting on the valve.
- Provide anti-freezing protection.
- No objects are enclosed in the system, e.g. tools, screws, lubrication oils.
- The valve can be installed in any position. Reliable draining of the valve housing and pipe system must be ensured.
- When installing in the pipe system, make sure it is not under mechanical stress. Tensile and compression stresses in the pipe system must be prevented.
- When using sealing caps for the threaded flange, the leak-tightness must be ensured by the operating company of the line.

5.1.2 Mounting the Valve With Weld Flange



See "Welding Guidelines" section in the supplement.

Mounting the valve with weld flange:

- ▶ Split open the pipe at the mounting position.
- ▶ Weld the valve housing into the pipe system free from strain or stresses and distortion.
- ▶ Install the seals, bearing and disk.
- ▶ Mount the actuator and proximity switches.

The valve is mounted.

5.1.3 Mounting the Valve With Screw Fittings

Mounting the valve with screw fittings:

- ▶ Screw together the valve body with the fitted seal and disk.
- ▶ Open the mounting position provided with a pipe adapter.
- ▶ Mount the valve with the stubs/flanges onto the welded pipe adapter.

The valve is mounted.

5.2 Connecting

5.2.1 Pneumatic Connections



Observe the following instructions for pneumatic connections:

- For the optimum seat in the push-in connector, use a hose cutter to cut off the pneumatic hoses at right angles.
- Establish double or single acting air connections, as required, and check them.
- Pay attention to the quality of the compressed air, see the "Technical Data" chapter.

Establishing the pneumatic connection:

- ▶ Shut off the compressed-air supply.
- ▶ Remove the plug from the cylinder.
- ▶ Screw in the push-in connector.
- ▶ Insert the hose into the push-in connector.
- ▶ Enable the compressed-air supply.

The pneumatic connection is established.

5.2.2 Electrical Connection

DANGER



Electric shock!

Danger to life from electric shock.

- ▶ Have work on electrical components done only by specialist electrical engineers.
- ▶ Check the permissible operating voltage.

5.3 Start-Up



Observe the following during start-up:

- Have the valve started only by a professional.
- The pipes and the valve must be clean and any possible welding residue or other foreign particles must have been removed.
- The compressed air must meet the requirements.
- Pipe systems and connections must have been checked for leakage.
- Prior to starting production, clean the pipe system.
- During start-up, check regularly whether any of the seals are leaking. Replace faulty seals.

5.3.1 Commissioning of a Manual Valve

Commissioning a manual valve:

- ▶ Open and close the valve several times to check whether the disk operates properly and moves into the seal.

The valve is commissioned.

5.3.2 Commissioning of a Pneumatic Valve

Commissioning a pneumatic valve:

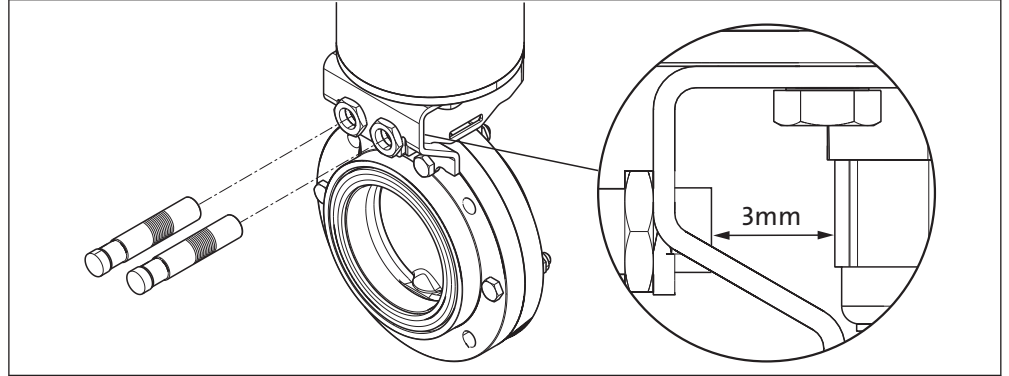
- ▶ Actuate the valve using compressed air. The opening and closing process should be performed without problems.
- ▶ Check the check-back signals of the proximity switches.

The valve is commissioned.

5.4 Auxiliary Functions

5.4.1 Adjust the Proximity Switches

Proximity switches - variant with pneumatic actuator



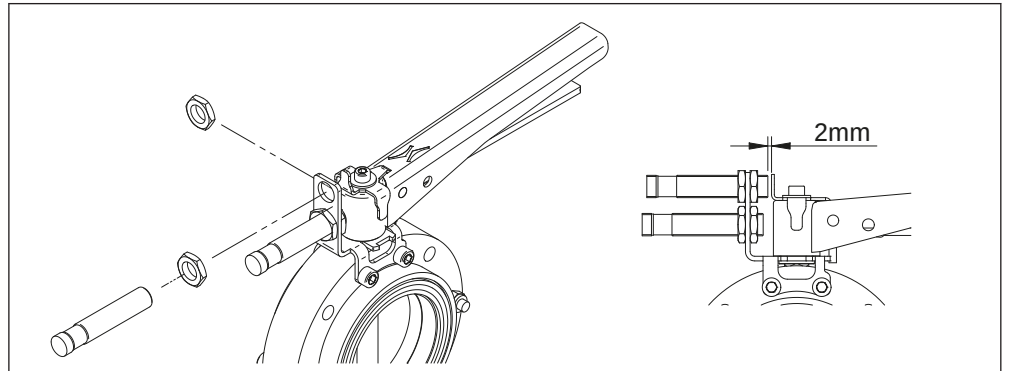
75bo0317

Adjusting the proximity switches:

- Screw in the proximity switches up to a switching distance of approximately 3 mm from the contact element in order to ensure that signalling is reliable.
- Tighten the nut.

The proximity switches have been adjusted.

Proximity switches - variant with hand lever



80bo0185

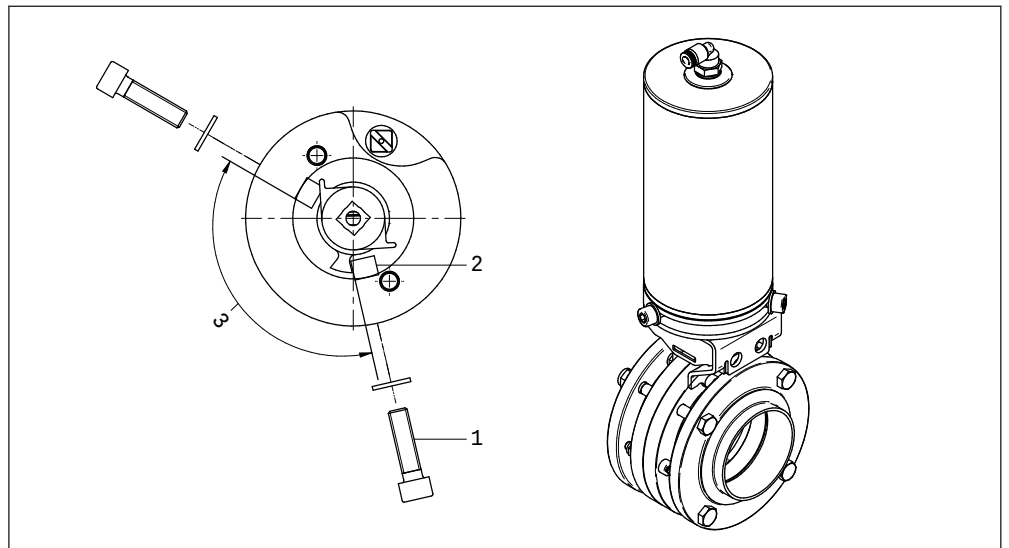
Adjusting the proximity switches:

- Loosen the nut.
- Screw in the proximity switches up to a switching distance of approximately 2 mm from the contact element in order to ensure that signalling is reliable.
- Tighten the nut.

The proximity switches have been adjusted.

5.4.2 Valve with BD angle of rotation limiter

Pneumatic drive with angle of rotation limiter



80bo0177

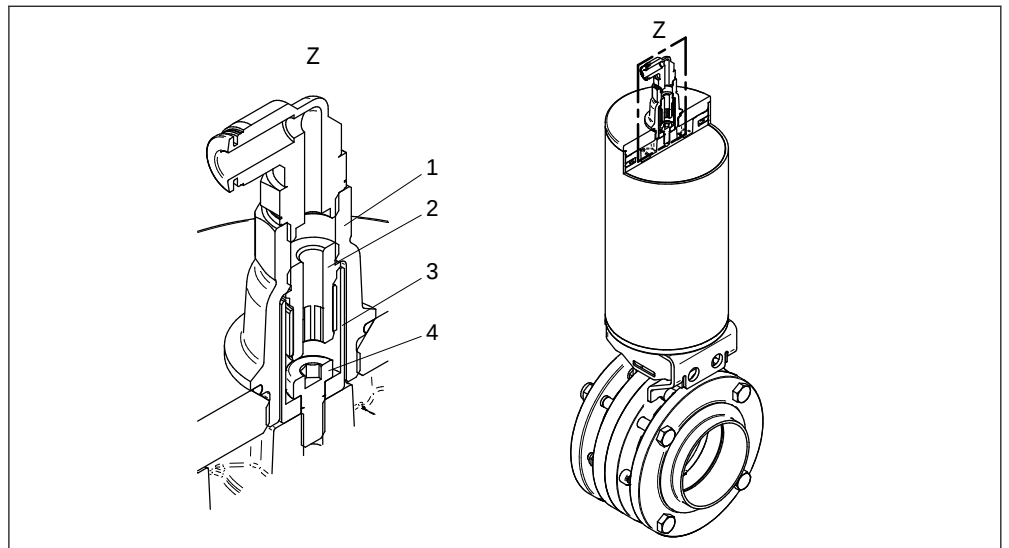
- | | | | |
|---|---------------|---|-------------------|
| 1 | Screw | 3 | Angle of rotation |
| 2 | Rotation stop | | |

Observe the following for the angle of rotation limiter:

- Observe the instructions in the operating manual regarding the differences between assembly/dismantling.
- An angle of rotation limiter is mounted on the pneumatic drive. The opening or closing angle can be adjusted with the rotation stop (2) and screw (1).
- The angle of rotation limiter can be retrofitted as a completely assembled unit or also individual parts.
- See appendix for spare parts.

5.4.3 Valve with BS position indicator

Pneumatic drive with position indicator



80bo1285

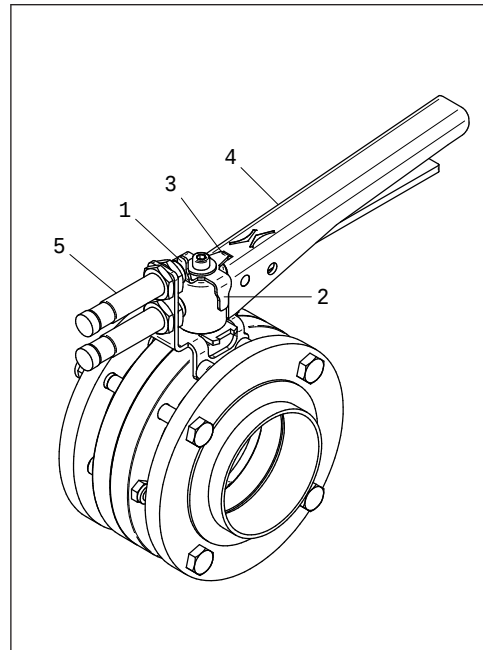
- | | | | |
|---|------------------|---|-------------------|
| 1 | Indicator bonnet | 3 | Indicator pin |
| 2 | Indicator pin | 4 | Cheese head screw |

Note the following in connection with the position indicator:

- Observe the instructions in the operating manual regarding the differences between assembly/dismantling.
- A position indicator is mounted on the pneumatic drive. The open or closed position of the valve is shown depending on the position of the indicator pin.
- The position display can be retrofitted as a completely assembled unit or also in individual parts.
- See appendix for spare parts.

5.4.4 Hand Lever

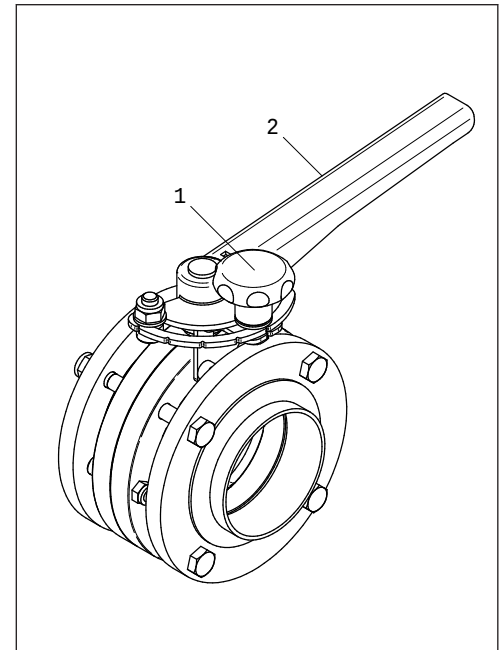
Monitored manual lever



80bo0178

- 1 Flap
- 2 Wing
- 3 Check-back plate
- 4 Hand Lever
- 5 Proximity switches

Manual actuation of steplessly lockable MAV



80bo0179

- 1 Star knob
- 2 Hand Lever

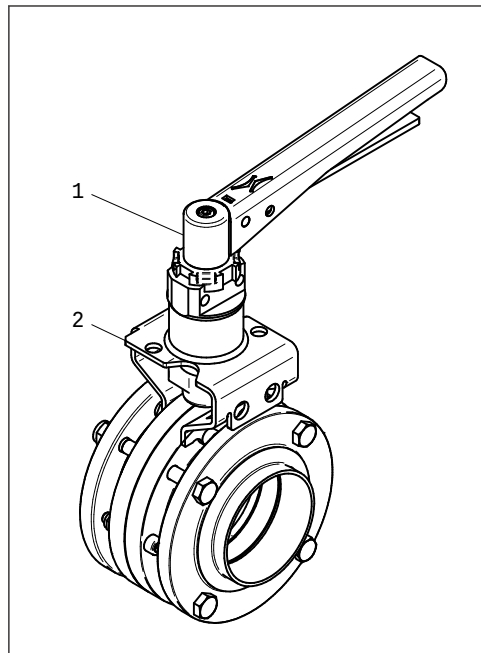
Observe the following for the monitored hand lever:

- Observe the instructions in the operating manual regarding the differences between assembly/dismantling.
- A check-back plate (3) can be installed on the manual lever. The respective position can be determined with the wings (1,2) of the plate.
- The individual parts of the monitored hand lever can be retrofitted.
- See annex for spare parts.

Observe the following for the hand lever with infinitely adjustable locking device:

- Observe the instructions in the operating manual regarding the differences between assembly/dismantling.
- The position of the flap or of the hand lever (2) can be infinitely adjusted by pulling the star knob (1).
- The hand lever with infinitely adjustable locking device can only be retrofitted as a complete unit.
- See annex for spare parts.

Actuator extension



80bo0180

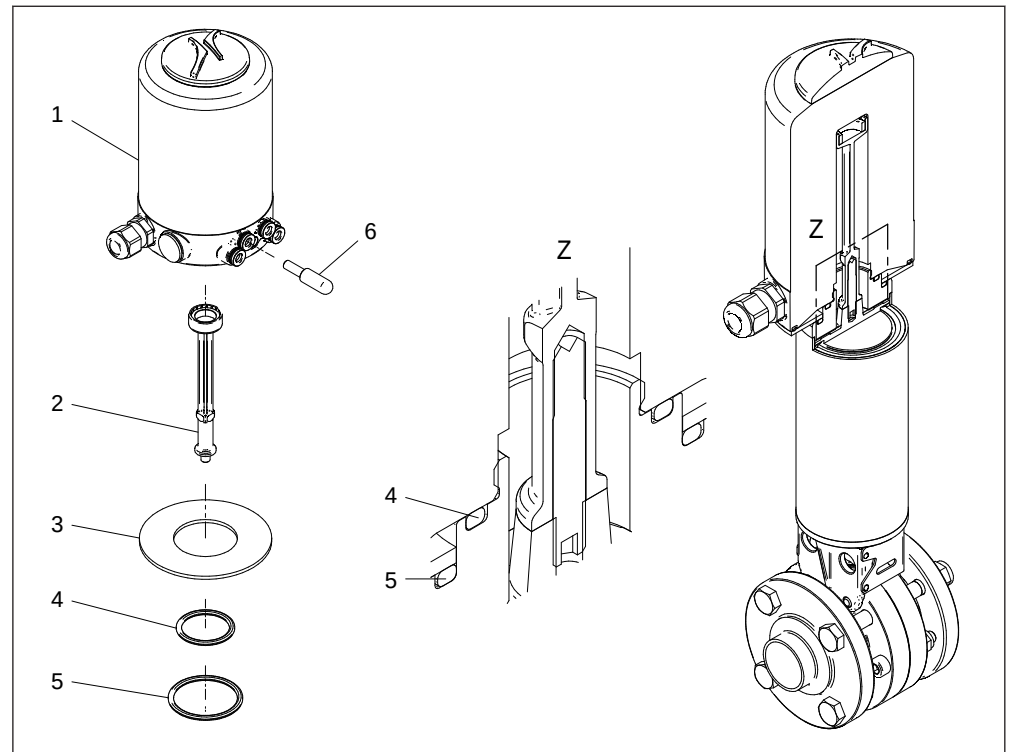
- 1 Hand lever
- 2 Actuator extension

Note the following in connection with the drive extension:

- Observe the instructions in the operating manual regarding the differences between assembly/dismantling.
- If constricted room makes it necessary, an extension (2) can be used.
- The drive extension can be retrofitted in various lengths as an assembled unit. The hand lever (1) is not included in the scope of supply.
- See appendix for spare parts.

5.4.5 Evoguard D54 control head

Evoguard valve control head



80bo1294

- | | | | |
|---|----------------|---|----------|
| 1 | Control head | 4 | O-ring |
| 2 | Check-back rod | 5 | O-ring |
| 3 | Spacer | 6 | Silencer |

Dismantle interface

CAUTION



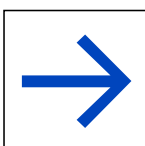
Unexpected movement of components!

Risk of injury from impact, jolt and crushing.

- The drive must be in the basic position.
- Make sure that the feed lines are disconnected from the power supply and depressurised.
- Lock the system to prevent it being turned ON unintentionally.



During maintenance, the control head can remain in the system.



When removing the control head, the manufacturer's operating manual must be taken into account.

Removing the interface:

- Remove the control head (1).

- ▶ Remove spacer (3) and O-ring (4, 5).
 - ▶ Use an open-end wrench (WAF 10) to unscrew (right-hand thread) the check-back rod (2) from the drive.
 - ▶ Place the parts on a soft surface.
- The interface has been removed.

Installation of interface

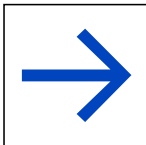
CAUTION



Unexpected movement of components!

Risk of injury from impact, jolt and crushing.

- ▶ The drive must be in the basic position.
- ▶ Make sure that the feed lines are disconnected from the power supply and depressurised.
- ▶ Lock the system to prevent it being turned ON unintentionally.
- ▶ When installing, make sure the seals and connection surfaces are clean.



When installing the control head, the manufacturer's operating manual must be observed and the sections on seals and plain bearings in the "Installation" chapter.

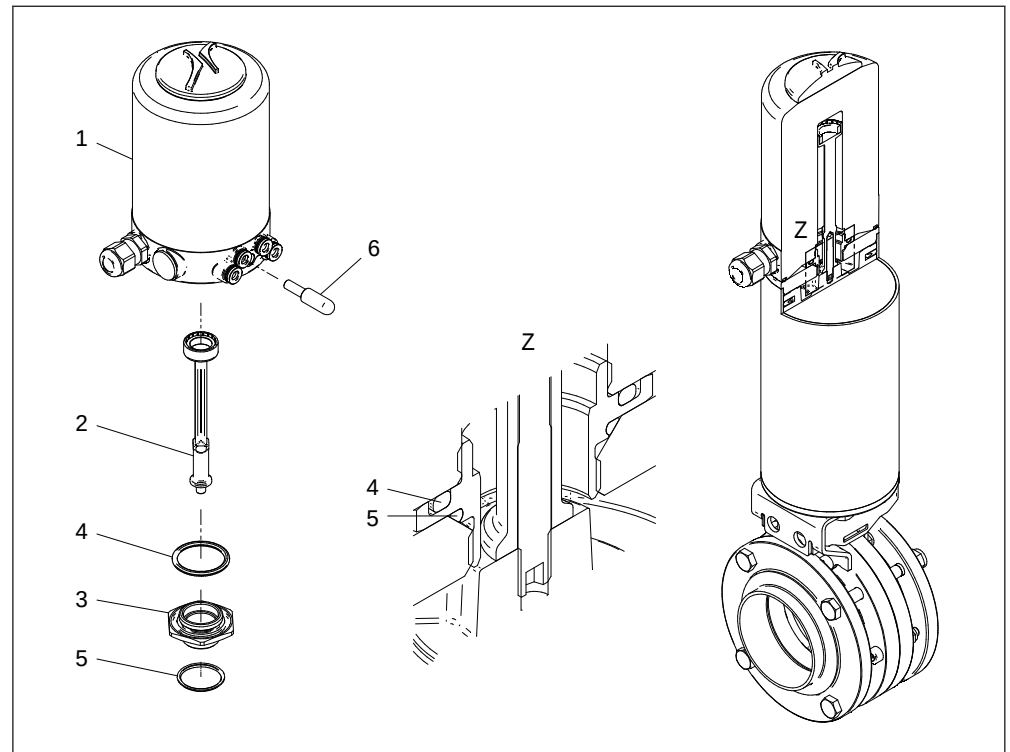
Installing the interface:

- ▶ Grease the threads (30-19 lubricant).
- ▶ Screw the check-back rod (2) into the drive with an open-end wrench (WAF10) (right-hand thread).
Tightening torque 5 Nm
- ▶ Mount the O-rings (4, 5) and spacer (3).
- ▶ Install the valve control head (1).

The interface has been installed.

5.4.6 Evoguard D85 and D110 control head

Evoguard valve control head



80bo0174

- | | | | |
|---|-------------------|---|----------|
| 1 | Control head | 4 | O-ring |
| 2 | Check-back rod | 5 | O-ring |
| 3 | Screwable bearing | 6 | Silencer |

Dismantle interface

CAUTION



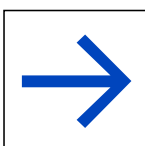
Unexpected movement of components!

Risk of injury from impact, jolt and crushing.

- The drive must be in the basic position.
- Make sure that the feed lines are disconnected from the power supply and depressurised.
- Lock the system to prevent it being turned ON unintentionally.



During maintenance, the control head can remain in the system.



When removing the control head, the manufacturer's operating manual must be taken into account.

Removing the interface:

- Remove the control head (1).

- ▶ Use an open-end wrench (WAF 10) to unscrew (right-hand thread) the check-back rod (2) from the drive.
- ▶ Release the screwable bearing (3) with an open-end wrench (WAF 41) (right-hand thread).
- ▶ Remove the O-ring (5) from the screwable bearing (3).
- ▶ Place the parts on a soft surface.

The interface has been removed.

Installation of interface

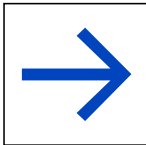
CAUTION



Unexpected movement of components!

Risk of injury from impact, jolt and crushing.

- ▶ The drive must be in the basic position.
- ▶ Make sure that the feed lines are disconnected from the power supply and depressurised.
- ▶ Lock the system to prevent it being turned ON unintentionally.
- ▶ When installing, make sure the seals and connection surfaces are clean.



When installing the control head, the manufacturer's operating manual must be observed and the sections on seals and plain bearings in the "Installation" chapter.

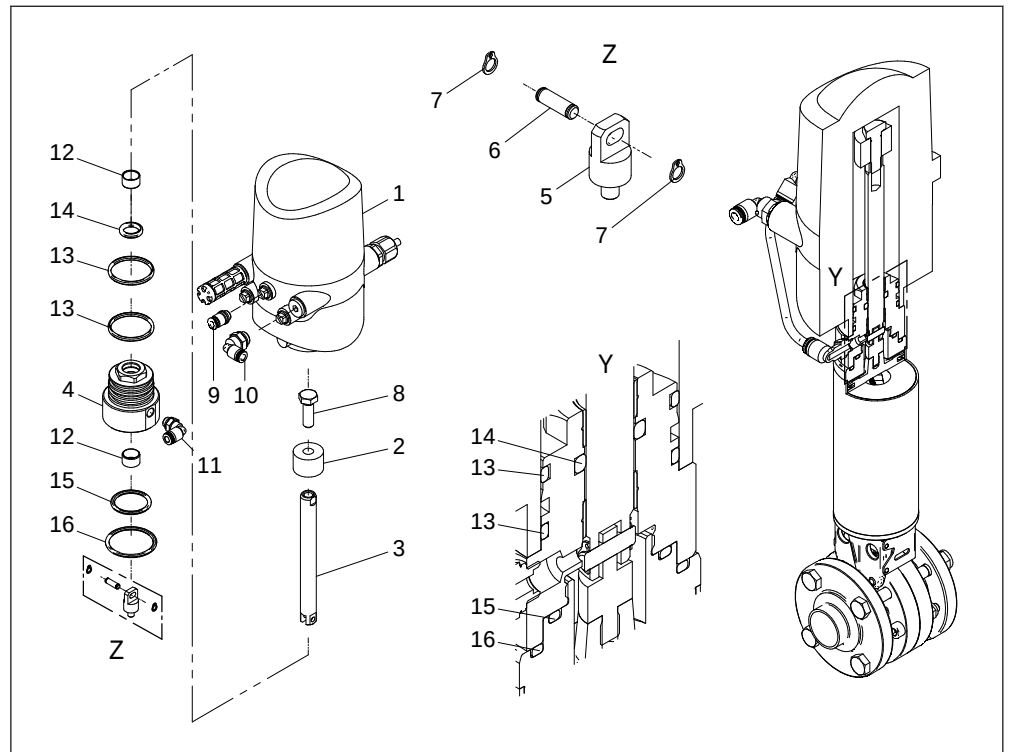
Installing the interface:

- ▶ Fit the O-ring (5) on the screwable bearing (3).
- ▶ Grease the threads (30-19 lubricant).
- ▶ Screw the screwable bearing (3) into the drive up to the stop with an open-end wrench (WAF41) (right-hand thread).
Tightening torque 50 Nm.
- ▶ Screw the check-back rod (2) into the drive with an open-end wrench (WAF10) (right-hand thread).
Tightening torque 5 Nm
- ▶ Install the control head (1).

The interface has been installed.

5.4.7 Bürkert D54 control head

Bürkert valve control head



80bo1295

- | | |
|---------------------|-----------------------------|
| 1 Control head | 9 Push-in connector |
| 2 Target | 10 Elbow screw-in connector |
| 3 Magnetic holder | 11 Elbow screw-in connector |
| 4 Screwable bearing | 12 Bush |
| 5 Screwable lug | 13 O-ring |
| 6 Bolt | 14 O-ring |
| 7 Safety ring | 15 O-ring |
| 8 Hexagon screw | 16 O-ring |

Dismantle interface

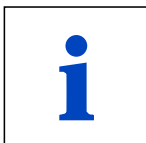
CAUTION



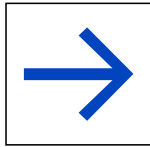
Unexpected movement of components!

Risk of injury from impact, jolt and crushing.

- ▶ The drive must be in the basic position.
- ▶ Make sure that the feed lines are disconnected from the power supply and depressurised.
- ▶ Lock the system to prevent it being turned ON unintentionally.



During maintenance, the control head can remain in the system.



When removing the control head, the manufacturer's operating manual must be taken into account.

Removing the interface:

- ▶ Remove the control head (1).
- ▶ Remove the O-rings (13).
- ▶ Screw out the hexagon screw (8) with an open-end wrench (WAF 17) and remove the target (2) while bracing on the magnetic holder (3).
- ▶ Release the screwable bearing (4) with an open-end wrench (WAF 27) (right-hand thread).
- ▶ Remove the O-rings (14) from the screwable bearing (4).
- ▶ Remove the O-rings (15, 16).
- ▶ Remove the retaining rings (7) and bolts (6) The magnetic holder (3) can be removed.
- ▶ Unscrew the screwable lug (5) from the drive.
- ▶ Remove the push-in connectors (9, 10, 11) if necessary.
- ▶ Place the parts on a soft surface.

The interface has been removed.

Installation of interface

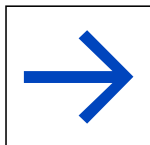
CAUTION



Unexpected movement of components!

Risk of injury from impact, jolt and crushing.

- ▶ The drive must be in the basic position.
- ▶ Make sure that the feed lines are disconnected from the power supply and depressurised.
- ▶ Lock the system to prevent it being turned ON unintentionally.
- ▶ When installing, make sure the seals and connection surfaces are clean.



When installing the control head, the manufacturer's operating manual must be observed and the sections on seals and plain bearings in the "Installation" chapter.

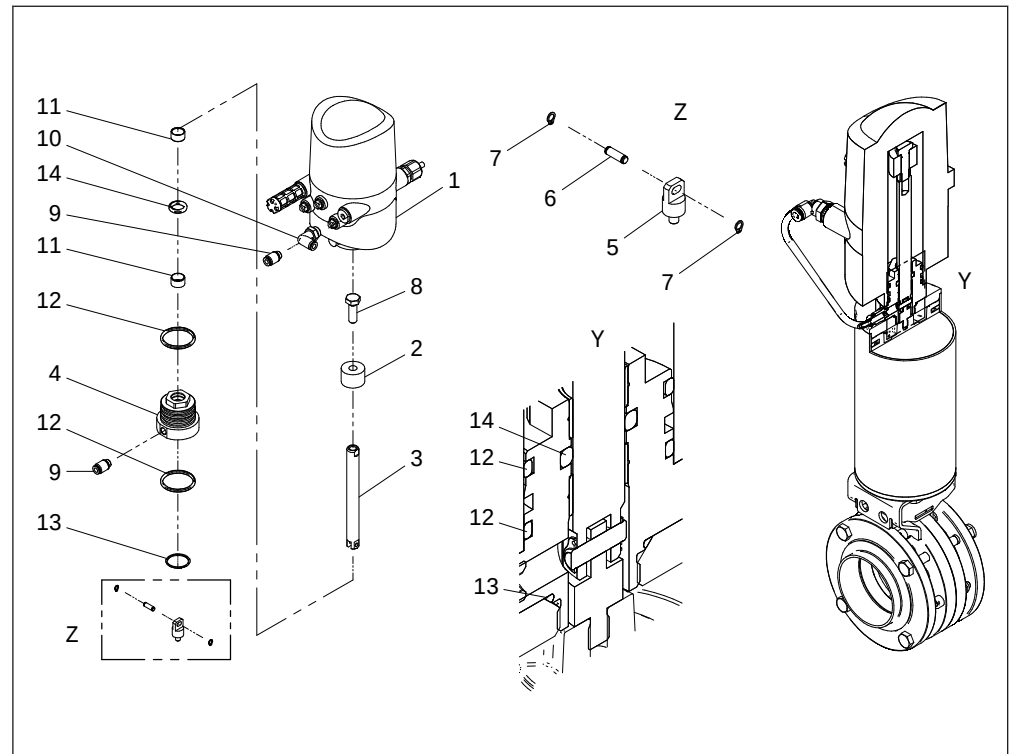
Installing the interface:

- ▶ Screw the screwable lug (5) into the drive (right-hand thread). Torque 5 Nm.
- ▶ Connect the magnetic holder (3) and screwable lug (5) with the bolt (6) and secure with the retaining rings (7).
- ▶ Install the O-rings (15, 16).
- ▶ Install the O-rings (13,14) on the magnetic holder (4) and grease the threads (with lubricant 30-19).
- ▶ Screw the screwable bearing (4) to the drive (right-hand thread). Introduce the magnetic holder (3) through the bearing to do so. Tighten with an open-end wrench (WAF 27). Torque 50 Nm.
- ▶ Use the hexagon screw (8) to screw the target (2) to the magnetic holder (3). Press against the magnetic holder (3).
- ▶ Fit the O-rings (13).
- ▶ Install the valve control head (1).

The interface has been installed.

5.4.8 Bürkert D85 and D110 control head

Bürkert valve control head



80bo0175

- | | |
|---------------------|-----------------------------|
| 1 Control head | 8 Hexagon screw |
| 2 Target | 9 Push-in connector |
| 3 Magnetic holder | 10 Elbow screw-in connector |
| 4 Screwable bearing | 11 Bush |
| 5 Screwable lug | 12 O-ring |
| 6 Bolt | 13 O-ring |
| 7 Safety ring | 14 O-ring |

Dismantle interface

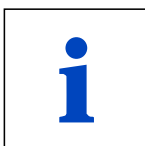
CAUTION



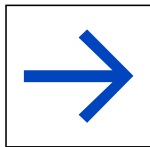
Unexpected movement of components!

Risk of injury from impact, jolt and crushing.

- ▶ The drive must be in the basic position.
- ▶ Make sure that the feed lines are disconnected from the power supply and depressurised.
- ▶ Lock the system to prevent it being turned ON unintentionally.



During maintenance, the control head can remain in the system.



When removing the control head, the manufacturer's operating manual must be taken into account.

Removing the interface:

- ▶ Remove the control head (1).
- ▶ Remove the O-rings (12).
- ▶ Screw out the hexagon bolt (8) with an open-end wrench (WAF17) and remove the target (2). Press against the magnetic holder (3).
- ▶ Release the screwable bearing (4) with an open-end wrench (WAF 27) (right-hand thread).
- ▶ Remove the O-rings (14,13) from the screwable bearing (4).
- ▶ Remove the safety rings (7) and bolts (6). The magnetic holder (3) can be removed.
- ▶ Unscrew the screwable lug (5) from the drive.
- ▶ Remove the screw connections (9, 10) if necessary.
- ▶ Place the parts on a soft surface.

The interface has been removed.

Installation of interface

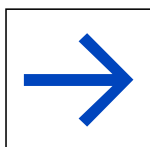
CAUTION



Unexpected movement of components!

Risk of injury from impact, jolt and crushing.

- ▶ The drive must be in the basic position.
- ▶ Make sure that the feed lines are disconnected from the power supply and depressurised.
- ▶ Lock the system to prevent it being turned ON unintentionally.
- ▶ When installing, make sure the seals and connection surfaces are clean.



When installing the control head, the manufacturer's operating manual must be observed and the sections on seals and plain bearings in the "Installation" chapter.

Installing the interface:

- ▶ Screw the screwable lug (5) into the drive (right-hand thread). Torque 5 Nm.
- ▶ Connect the magnetic holder (3) and screwable lug (5) with the bolt (6) and secure with the safety rings (7).
- ▶ Install the O-rings (13,14) on the magnetic holder (4) and grease the threads (with lubricant 30-19).
- ▶ Screw the screwable bearing (4) to the drive (right-hand thread). Introduce the magnetic holder (3) through the bearing to do so. Tighten with an open-end wrench (WAF 27). Torque 50 Nm.
- ▶ Use the hexagon screw (8) to screw the target (2) to the magnetic holder (3). Press against the magnetic holder (3).
- ▶ Fit the O-rings (12).
- ▶ Install the control head (1).

The interface has been installed.

6 Maintenance

6.1 Fundamental Information



Observe the following during maintenance:

- Valves must only be assembled and removed by authorised professionals.
- Trained service engineers are available for assembly and repair work.
- Provide certification for the conveyed media if required (DIN safety data sheet).
- When performing maintenance or preventive maintenance work, turn OFF the power supply and secure it to prevent it from being turned ON.
- Turn OFF the compressed air before performing any maintenance work.

6.1.1 Maintenance Intervals



To guarantee the highest operational reliability of the valves, all of the wear parts must be replaced after longer intervals.

Practice-oriented maintenance intervals can only be calculated by the user as they are dependent upon the application conditions, e.g.:

- Period of use per day
- Switching frequency
- Type and temperature of the product
- Type and temperature of the cleaning agent
- Operating environment

Media temperatures	Maintenance interval (recommendation)
60 °C to 130 °C [140 °F to 266 °F]	Every 3 months
<60 °C [140 °F]	Every 12 months

6.1.2 Maintenance Work



The valves must be regularly monitored for leakage and proper operation in between the maintenance deadlines.

DANGER



Hazardous media!

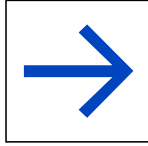
Risk of poisoning and other injury.

- Use protective gear when working with hazardous media.

6.1.3 Lubricants



Only use lubricants which have been tested and approved by the manufacturer.



The lubricants which match the lubricant number can be found in the attached lubricant table.

6.2 Overhauling Work

Observe the following safety instructions when doing work on the valve.

DANGER



Electric shock!

Danger to life from electric shock.

- ▶ Have work on electrical components done only by specialist electrical engineers.

DANGER



Hazardous and/or hot media!

Risk of poisoning and other injury.

- ▶ Use protective gear when working on the valve.
- ▶ Allow the valve to cool down before doing any work.
- ▶ Make sure that the pipe system is not pressurised.
- ▶ Empty the pipe system, safely collect the medium and dispose of it in an environmentally-friendly manner.

DANGER



Pressurised pipes!

Risk of injury.

- ▶ Empty all of the pipe system elements leading to the valve and, if necessary, clean or rinse them.
- ▶ Block the control air, depressurise and lock it to prevent it from being turned ON again.
- ▶ Interrupt the power supply.
- ▶ Make sure that no processes are in progress in the affected pipe system section.

DANGER



Spring force of 2.4 kN!

Danger to life caused by opening actuated valves.

- ▶ Never open pneumatic actuators.
- ▶ Dispose of inactive actuators only.

DANGER

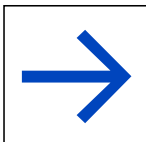


Switching valves!

Crush hazard.

- ▶ Never reach into the pipe.
- ▶ Do not reach into the valve mount of pneumatic actuators.

6.2.1 Disassembly

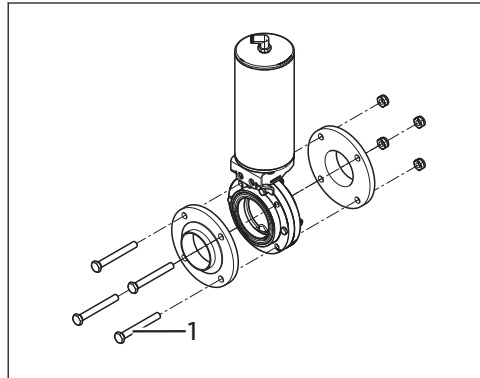


For a valve with proximity switches or a control head, the section “Additional functions” in the “Installation/Commissioning” chapter must be observed.

Remove the FVF valve

i

To remove the valve from the pipe, the disk must be closed, i.e., at a 90-degree angle to the pipe. Look at the position indicator (2).



75bo0304

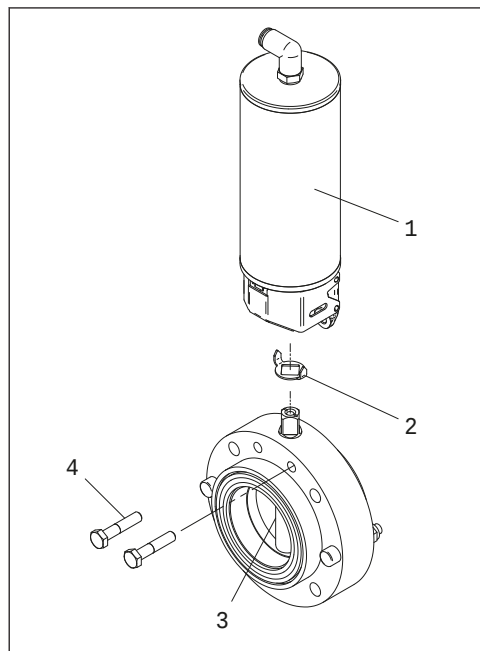
Removing the FVF valve from the pipe:

- Remove the screws (1).
- Remove the valve from the pipe.

The valve has been removed.

Dismantle the drive

D54 drive



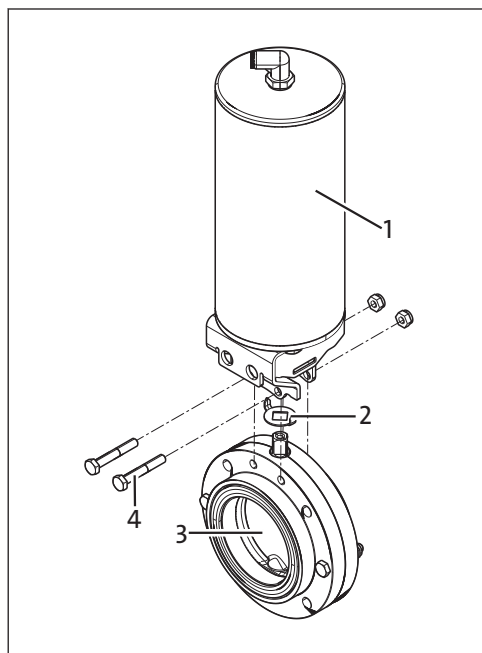
80bo0176

Dismantling the actuator:

- Remove the screws (4) with an open-end wrench (WAF 10).
- Lift off the drive (1).
- The red position indicator (2) aligns with the disk (3) of the valve, thereby indicating the valve's position.

The actuator has been dismantled.

D85 and D110 drive



75bo0305

Dismantling the actuator:

- ▶ Remove the screws with an Allen wrench (WAF 5).
- ▶ Lift off the drive (1).
- ▶ The red position indicator (2) aligns with the disk (3) of the valve, thereby indicating the valve's position.

The actuator has been dismantled.

Removing single parts from the actuator

DANGER

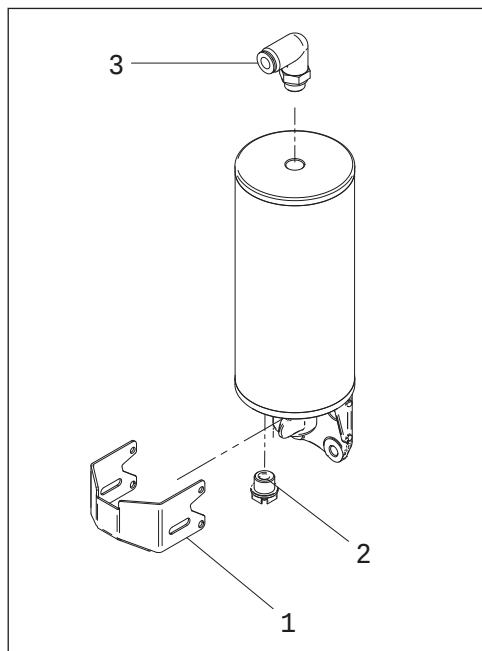


Tensioned spring with force of 2.4 kN!

Danger to life when opening valves while in operation.

- ▶ Never open pneumatic actuators.
- ▶ Do not dispose of actuators until they are completely worn out.

D54 actuator



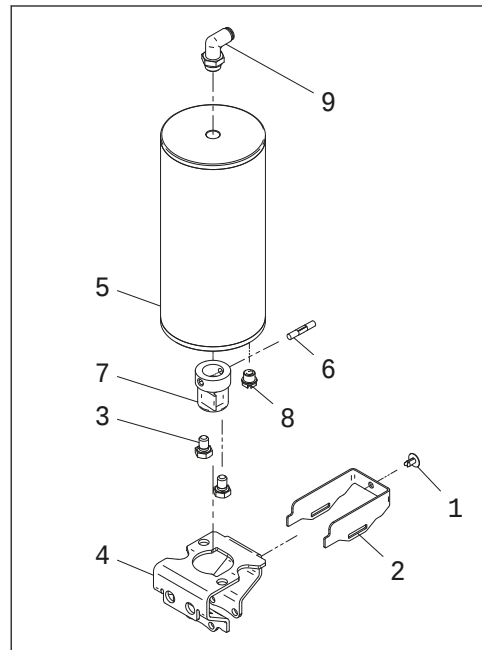
80bo0211

Removing single parts from the actuator:

- ▶ Remove the guard (1).
- ▶ Unscrew the vent screw (2).
- ▶ If necessary, unscrew the air connection (3) with integrated flow restriction.

The single parts have been removed from the actuator.

D85 and D110 drive



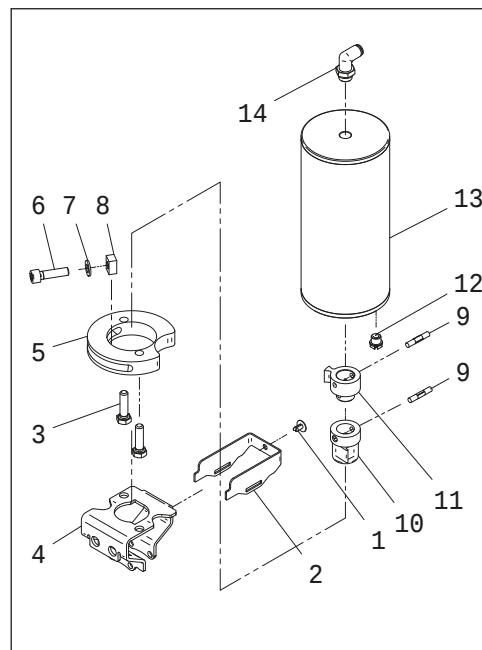
80bo0186

Removing individual parts from the drive:

- ▶ Remove the screw(1).
- ▶ Remove the guard (2).
- ▶ Use an open-end wrench (WAF13) to remove the hexagon screws (3) (right-hand thread).
- ▶ Remove the lantern (4) and the drive (5).
- ▶ Remove the groove pin (6) with a pin punch (dia. 5).
- ▶ Remove the coupling (7).
- ▶ Unscrew the bleeder valve (8).
- ▶ Unscrew the air connection (9) if necessary.

The single parts have been removed from the drive.

BD D85 drive



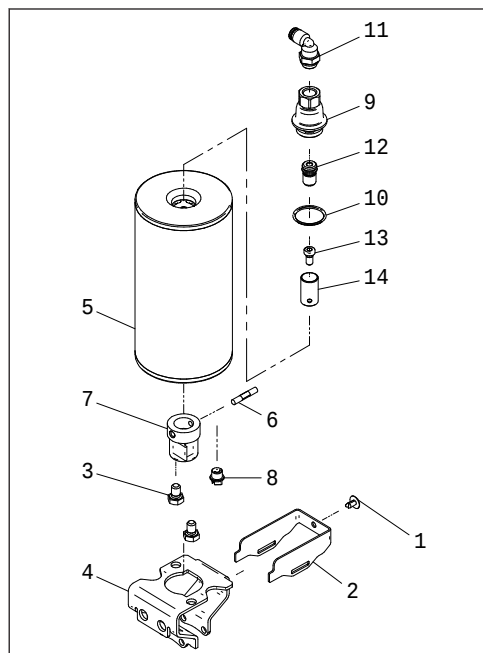
80bo0181

Removing individual parts from the drive with an angle of rotation limiter:

- ▶ Remove the screw(1).
- ▶ Remove the guard (2).
- ▶ Use an open-end wrench (WAF13) to remove the hexagon screws (3) (right-hand thread).
- ▶ Remove the lantern (4), rotation ring (5) and drive (13).
- ▶ Use an Allen wrench (WAF 6) to remove the screw (6) (right-hand thread). Remove the disk (7) and rotation stop (8).
- ▶ Remove the groove pins (9) with a pin punch (dia. 5).
- ▶ Remove the couplings(10, 11).
- ▶ Unscrew the bleeder valve (12).
- ▶ Unscrew the air connection (14) if necessary.

The single parts have been removed from the drive with an angle of rotation limiter.

BS D85 and D110 drive



80bo1296

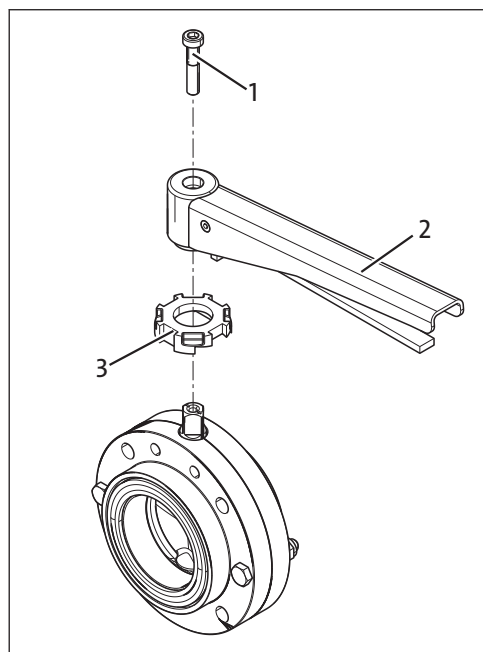
Removing individual parts from the drive with a position indicator:

- Loosen the screw (1).
- Remove the guard (2).
- Use an open-end wrench (WAF13) to remove the hexagon screws (3) (right-hand thread).
- Remove the lantern (4) and the drive (5).
- Remove the groove pin (6) with a pin punch (dia. 5).
- Remove the coupling (7).
- Unscrew the bleeder valve (8).
- Unscrew the indicator bonnet (9) from the drive (5) with an open-end wrench (WAF 19) and remove the O-ring (10).
- Unscrew the air connection (11) and the indicator pin (12) from the indicator bonnet (9).
- Unscrew the cap screw (13) and remove the indicator pin (14).

The single parts have been removed from the drive with a position indicator.

Removing the manual actuator

Hand lever



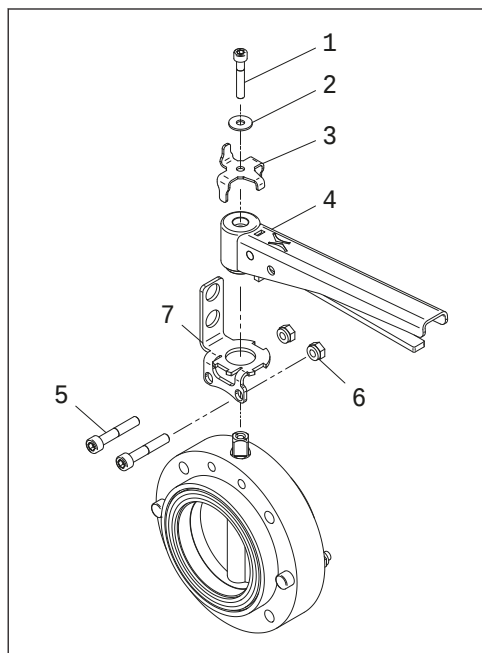
75bo0307

Dismantling the hand lever:

- Unscrew the screw (1) with an Allen wrench.
- Remove the hand lever (2).
- Remove the locking device (3).

The hand lever has been dismantled.

Monitored manual lever



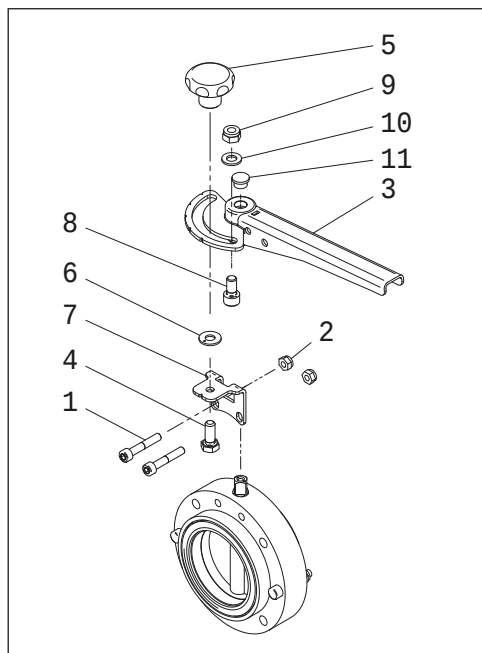
80bo0182

Dismantling the monitored hand lever:

- Unscrew the screw (1) with an Allen wrench.
- Remove the disk (2), check-back plate (3) and hand lever (4).
- Use an Allen wrench (WAF 5) to remove the screws (5). Remove the nuts (6) and the locking device (7).

The monitored hand lever has been dismantled.

Lockable hand lever



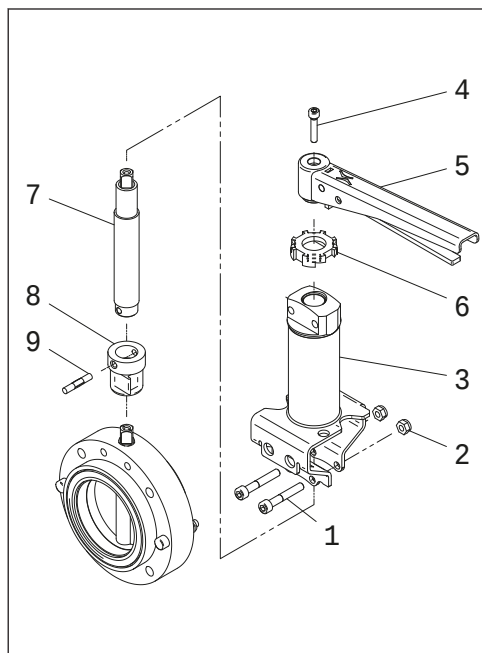
80bo0183

Dismantling the monitored hand lever:

- Use an Allen wrench (WAF 5) to remove the screws (1). Remove the nuts (2) and the hand lever (3).
- Remove the screw (4) with an open-end wrench (WAF 13). Remove the star knob (5), washer (6) and plate (7).
- Use an Allen wrench (WAF 6) to remove the screw (8). Remove the nut (9) and the washer (10).
- Use a flat screw driver to remove the plug (11) from the hand lever.

The lockable hand lever has been dismantled.

Actuator extension



80bo0184

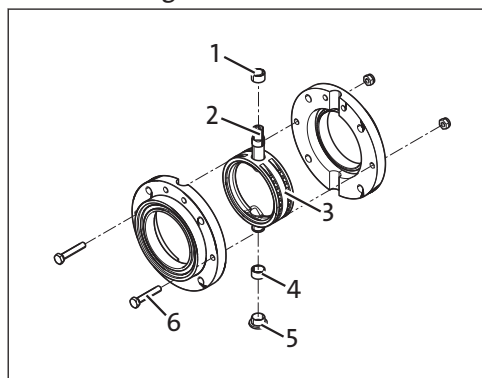
Dismantling the actuator extension:

- Use an Allen wrench (WAF 5) to remove the screws (1). Remove the nuts (2) and actuator extension (3).
- Unscrew the screw (4) with an Allen wrench. Remove the hand lever (5) and the locking device (6).
- Introduce the shaft (7) with coupling (9) mounted on it through the lantern.
- Remove the groove pin (8) with a pin punch (dia. 5).
- Remove the coupling (9).

The actuator extension has been dismantled.

Disassembling the valve body

Disassembling the valve



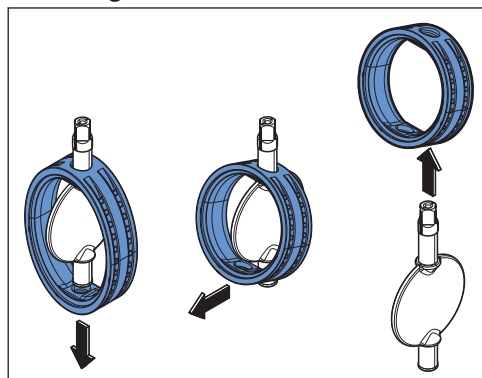
75bo0309

Disassembling the valve:

- Remove the screw fittings (6).
- Pull apart the valve body.
- Remove the plug (5).
- Remove the disk (2) with the seal (3).
- Pull off the bushes (1, 4).

The valve is disassembled.

Removing the seal



75bo0310

Removing the seal:

- Fix the square end of the disk shaft in a clamping device.
- Turn the seal until it is positioned at a 90-degree angle to the disk.
- Pull out the seal via the exposed end of the disk.
- Remove the disk from the clamping device.
- Pull the seal via the long end of the shaft.

The seal is removed.

Cleaning the valve

NOTICE

Wrong cleaning agents!

Material damage to the valve.

- Pay attention to the safety data sheets provided by the cleaning agent manufacturer.
- Use only non-grinding cleaning agents and cleaning agents which will not damage stainless steel surfaces and seals.
- Carefully clean the single parts.

6.2.2 Assembly

Lubricating seals and threads

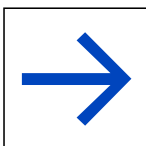
CAUTION



Wrong sealing materials used!

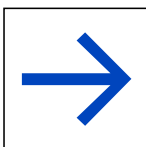
Risk of injury due to outflowing media.

- Select the sealing materials suitable for the valve type from the spare parts list.



For the valve type, see the "Machine Marks and Labels" section in the "Construction/ Method of Operation" chapter.

For the spare parts list, see the "Spare Parts Lists" section in the "Supplement" chapter.



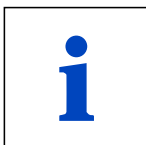
For a valve with proximity switches or a control head, the section "Additional functions" in the "Installation/Commissioning" chapter must be observed.

NOTICE

Use of wrong greases/oils!

Damage to the valve. Contamination due to use of greases which are not food-grade.

- Do not use conventional greases and oils for seals which come into contact with the product.
- Observe the safety data sheets provided by the lubricant manufacturer.



Use only 30-06 lubricant. This lubricant is approved for use with foodstuffs, is resistant to beer foam and has NSF-HI-(USDA HI) registration.

Lubricating seals and threads:

- Lubricate all threads moderately.
- Lubricate all seals moderately.
- Lubricate the shaft ends moderately.

The seals and threads are lubricated.



Inspection and replacement of plain bearings

- The bearings used have a very long service life.
- The bearings can continue to be used after being properly inspected.
- If they cannot be inspected, we recommend replacing the bearings.

Checking the pressed in plain bearings:

- ▶ Check all pressed in plain bearings for cracks and chipping (visual inspection).
- ▶ If the pressed in plain bearings are damaged:
 - ▶ Replace the plain bearings.
- ▶ Check all pressed in plain bearings for tight fit.
- ▶ If the pressed in plain bearings are loose:
 - ▶ Replace the plain bearings which are loose or no longer completely in the bearing carrier.
- ▶ Check the dimensions.

New pressed in bearings have a hole with ISO tolerance H7. The wear limit is reached, if the nominal dimension is +0.2 mm.
- ▶ If the wear limit is reached:
 - ▶ Press out and/or break out the old plain bearings and press in new plain bearings with a flat plunger.

The pressed in plain bearings have been checked.



Assembly

Assemble the valve in the reverse order.

Observe the following during assembly:

- Replace worn parts by original spare parts.
- Replace seals.
- Before fitting it into the flanges, the disk must be at a 90-degree angle to the seal.
- Refit the bushes.
- For fitting the actuator, the disk must be in basic position:
 - For NC-type actuator: Disk closed.
 - For NO-type actuator: Disk open.

7 Malfunctions

7.1 Malfunction Table



Observe the following during malfunctions:

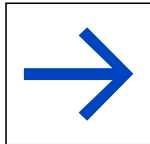
- If the valve malfunctions, stop it immediately and secure it to prevent turning ON.
- Troubleshoot the malfunctions immediately.
- Malfunctions must be eliminated only by trained professionals while observing the safety instructions.
- Should malfunctions occur which are not listed in the following table, or which cannot be traced back to the specified source, contact the manufacturer.

Malfunction	Causes and remedies
Actuator not operating	The air hoses are clogged or leaking. ▶ Clean or replace the air hoses. The control pressure is too low. ▶ Increase the control pressure. The disk is blocked. ▶ Remove the blockage.
No check-back signal	The proximity switch is misaligned. ▶ Adjust the proximity switch. The proximity switch is not connected correctly. ▶ Correctly connect the proximity switch. The proximity switch is faulty. ▶ Replace the proximity switch.
Leakage	The disk seal is faulty. ▶ Replace the disk seal. The flange seal is faulty. ▶ Replace the flange seal. The screw fitting seal is faulty. ▶ Replace the screw fitting seal.

8 Removal/Disposal

8.1 Fundamental Information

8.1.1 Removal



The removal is described in the "Disassembly" section of the "Maintenance" chapter.

8.1.2 Disposal

WARNING



Hazardous media!

Risk of poisoning and damage to the environment.

- ▶ Always use protective gear when working on valves with hazardous media.
- ▶ Dispose of valves only if they have been cleaned from hazardous media and dangerous contaminants.

DANGER



Spring force of 2.4 kN!

Danger to life caused by opening actuators.

- ▶ Never open pneumatic actuators.
- ▶ Dispose of inactive actuators only.

Disposing of a valve:

- ▶ Dispose of the valve in accordance with the locally applicable regulations.
- ▶ Send faulty actuators back to the manufacturer for disposal.

The valve is disposed of.

9 Supplement

9.1 Technical Data

9.1.1 General Technical Data

Size	DN 25 to DN 150; OD1.0" to OD6.0"
Installation position	Any (draining must be ensured if necessary).
Valve ambient temperature	Standard: 0 °C to 45 °C [32 °F to 104 °F] At temperatures <0 °C [<32 °F]: Use control air with a low dew point. Protect valve rods against freezing.

9.1.2 Material Data

Stainless steels in contact with product	1.4404 (AISI 316 L) optional: 1.4435 (AISI 316 L)
Stainless steels not in contact with product	1.4301 (AISI 304) / 1.4307 (AISI 304 L)
Surfaces in contact with product	$R_a \leq 0.8 \mu\text{m}$ optional: electropolished
Surfaces not in contact with product	Bare metal, $R_a \leq 1.6 \mu\text{m}$

Seal materials

	EPDM	HNBR	FKM	VMQ
Continuous duty temperature in air	-40 to +130 °C [-40 to +266 °F]	-25 to +130 °C [-13 to +266 °F]	-20 to +200 °C [-4 to +392 °F]	-50 to +200 °C [-58 to +392 °F]
Resistant to hot water	up to 100 °C [up to 212 °F]	up to 100 °C [up to 212 °F]	up to 80 °C [up to 176 °F]	up to 100 °C [up to 212 °F]
Resistant to steam, continuous duty	up to 130 °C [up to 266 °F]	up to 130 °C [up to 266 °F]	—	—
Resistant to steam, short term	up to 150 °C [up to 302 °F]	up to 150 °C [up to 302 °F]	—	—



The application parameters for the seals depend on:

- Period of use per day
- Switching frequency
- Type and temperature of the product
- Type and temperature of the cleaning agent
- Operating environment

9.1.3 Weights

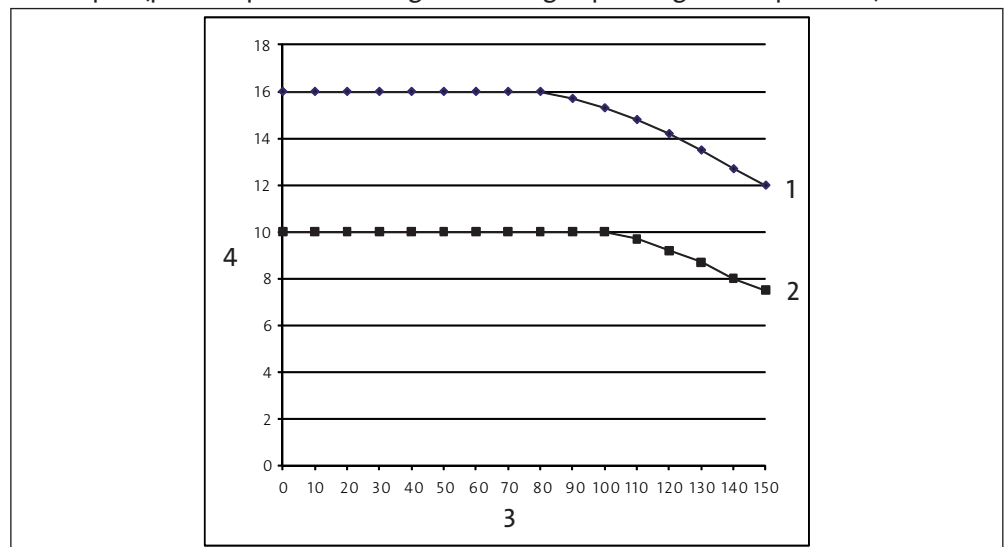
Flange	Actuator	DN 25 OD1.0"	DN 40 OD1.5"	DN 50 OD2.0"	DN 65 OD2.5"	DN 80 OD3.0"	DN 100 OD4.0"	DN 125	DN 150 OD6.0"
WVM	Manual actuator	1.6 kg	2.1 kg	2.4 kg	2.9 kg	3.6 kg	4.3 kg	8.9 kg	11.4 kg
	Pneumatic NC/NO	5.2 kg	5.7 kg	6.0 kg	6.5 kg	7.2 kg	8.0 kg	13.5 kg	16.1 kg
	Pneumatic AA	3.8 kg	4.2 kg	4.6 kg	5.1 kg	5.7 kg	6.5 kg	11.0 kg	13.6 kg
	Pneumatic NC/NO D54	2.5 kg	3.0 kg	3.3 kg	-	-	-	-	-
FVF	Manual actuator	2.5 kg	3.2 kg	3.6 kg	4.5 kg	5.2 kg	6.4 kg	11.3 kg	13.0 kg
	Pneumatic NC/NO	6.1 kg	6.8 kg	7.2 kg	8.1 kg	8.8 kg	10.0 kg	16.0 kg	17.7 kg
	Pneumatic AA	4.6 kg	5.4 kg	5.8 kg	6.7 kg	7.3 kg	8.6 kg	13.5 kg	15.2 kg

Flange	Actuator	DN 25 OD1.0"	DN 40 OD1.5"	DN 50 OD2.0"	DN 65 OD2.5"	DN 80 OD3.0"	DN 100 OD4.0"	DN 125	DN 150 OD6.0"
	Pneumatic NC/NO D54	3.4 kg	4.1 kg	4.5 kg	-	-	-	-	-

9.1.4 Product pressure

Maximum product pressure, valve closed (pressure against disk)	10 bar [145 psi]
Vacuum	-0.95 bar [-13.8 psi]

Valve open (product pressure acting on housing depending on temperature)



75o0323

- 1 Characteristic temperature/pressure level curve butterfly valve DN 25 to DN 100
- 2 Characteristic temperature/pressure level curve butterfly valve DN 125 to DN 150
- 3 Temperature in °C
- 4 Pressure in bar

9.1.5 Cleaning Agents/Disinfectants for Interior/Exterior Cleaning

Commonly used concentrates from leading manufacturers for the beverage and food industry. Suitable for stainless steels (V2A and V4A) and seals made of NBR or EPDM.

	Maximum concentration	Maximum reaction time	Maximum temperature
Cleaning agent, caustic soda NaOH	3 %	45 min.	90 °C [194 °F]
Hydrogen peroxide products (H ₂ O ₂) as intensifier for NaOH with 1-2 % concentration (permanent injection and/or as single caustic batch)	0.5 %	30 min.	80 °C [176 °F]
Acidic cleaning agents based on phosphoric acid H ₃ PO ₄	3 %	30 min.	40 °C [104 °F]
Acidic cleaning agents based on nitric acid HNO ₃	1.5 %	30 min.	30 °C [86 °F]
Acidic cleaning agents based on the mixture of phosphoric and nitric acids	1.5 %	30 min.	30 °C [86 °F]
Acidic disinfectants based on peracetic acid, concentrate approx. 5 %	1.0 %	20 min.	25 °C [77 °F]

	Maximum concentration	Maximum reaction time	Maximum temperature
Acidic disinfectants based on peracetic acid, concentration up to 15 %	0.5 %	20 min.	25 °C [77 °F]
Acidic disinfectants based on halogenated carboxylic/phosphoric acids, or halogenated carboxylic/nitric acids	1.0 %	20 min.	25 °C [77 °F]
Neutral disinfectants based on hydrogen peroxide H ₂ O ₂	1.0 % 0.5 %	30 min. 60 min.	25 °C [77 °F] 25 °C [77 °F]
Chlorinated alkaline cleaning agents/disinfectants (pH value > 11)	1.5 %	20 min.	40 °C [104 °F]
Ozonised cold water for rinsing	3 mg/l	60 min.	25 °C [77 °F]

Instructions for foam and gel cleaning



For foam and gel cleaning, observe the following:

- The operating manual must be followed for each machine and labelling station to be cleaned. Caution must be exercised with electrical components, coated surfaces, aluminium, etc.
- For cleaning the systems with foam/gel use the products of leading manufacturers, who produce cleaning chemicals for the food and beverage industry.
- Use foam/gel cleaners which are suitable for the exterior cleaning of systems in the food and beverage industry in accordance with the recommended application (product data sheet, manufacturer's adviser). Strictly follow the concentration of use indicated in the product data sheet.
- Use foam/gel cleaners when they are cold or at room temperature. The application must not exceed 30 minutes.
- If different cleaning steps are used in succession, and after the treatment, rinse thoroughly with fresh water, without leaving any trace.

9.1.6 Products



The processing of ozoniferous/highly chloridic products must be specified when the order is placed, as specially suited materials/seals are required.

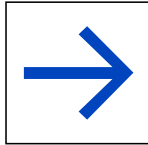
Product	Seal
Beer/mixed drinks containing beer	EPDM
Non-alcoholic beverages/juices	EPDM
Milk/mixed milk beverages, max. 10 % fat content	EPDM
Vegetable juices, max. 10 % fat content	EPDM
Alcoholic beverages	EPDM

Permissible Processing and Operating Materials, Permissible Operating Limits

	Unit	Water
Appearance		Colourless/clear
pH value		5.5–9.2
Chlorides (Cl ⁻)	ppm	≤40
Overall hardness		Keep the valves free of deposits

Check the resistance of the stainless steel.

When using a control head, the requirements for operating air must be taken from the manufacturer's operating manual.



9.1.8 Dimensions

Technical drawings of the 1000 Series pressure washer, showing side and top views for models M, L, W, C, OVO, and FVF. Dimensions are provided in millimeters.

Side Views:

- Model M:** Dimensions include D3 (total height), D1 (height to trigger gun), and L1 (width).
- Model L:** Dimensions include D3 (total height), D1 (height to trigger gun), and L2 (width).
- Model W:** Dimensions include D1 (height to trigger gun) and L3 (width).
- Model C:** Dimensions include D4 (total height), D1 (height to trigger gun), and L4 (width).
- Model OVO:** Dimensions include D1 (height to trigger gun) and L5 (width).
- Model FVF:** Dimensions include D1 (height to trigger gun) and L6 (width).

Top View:

- Overall width: $\varnothing 106,7$
- Height from base to top of motor housing: 227
- Height from base to trigger gun: 158
- Motor housing diameter: $\varnothing 90$

Front View:

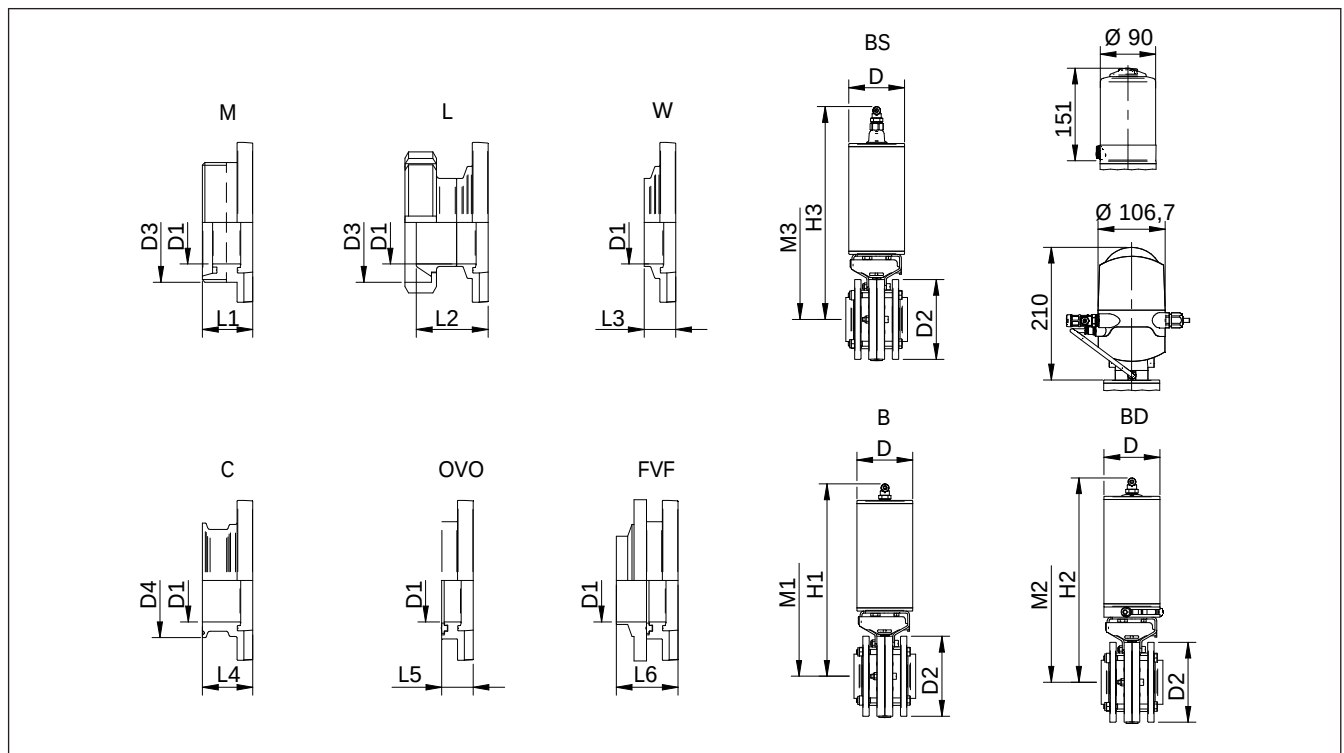
- Overall height: H1
- Height from base to trigger gun: M1
- Width of the base: D2
- Width of the motor housing: D

Dimension		DN25	DN40	DN50
D B	NC/NO	57	57	57
D1		26	38	50
D2		83	99	109
D3		Rd 52x1/6"	Rd 65x1/6"	Rd 78x1/6"
D4		50.5	50.5	64
L1		38	38	38
L2		47	51	53
L3		25	25	25
L4		38	38	38

Dimension		DN25	DN40	DN50
L5		25	25	25
L6		49	49	49
H1 B	NC/NO	222	230	235
M1 B	NC/NO	264	272	278
Square end of disk shaft		10	10	10

Dimension		OD1.0	OD1.5	OD2.0
D B	NC/NO	57	57	57
D1		22.1	34.8	47.5
D2		83	99	109
D3		Rd 52x1/6"	Rd 65x1/6"	Rd 78x1/6"
D4		50.5	50.5	64
L1		38	38	38
L2		47	51	53
L3		25	25	25
L4		38	38	38
L5		25	25	25
L6		49	49	49
H1 B	NC/NO	222	230	235
M1 B	NC/NO	264	272	278
Square end of disk shaft		10	10	10

D85 and D110 pneumatic drive



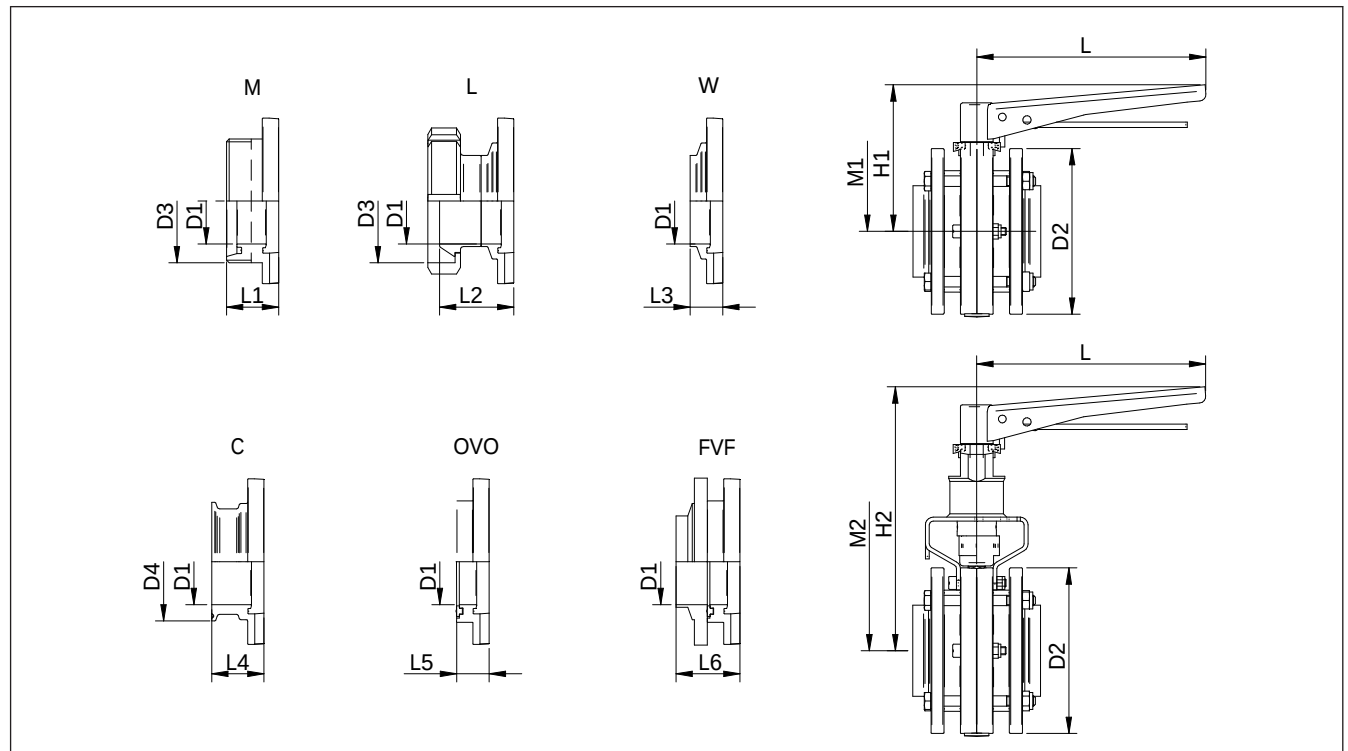
80bo0167

Dimension		DN25	DN40	DN50	DN65	DN80	DN100	DN125	DN150
D B	NC/NO	-	-	-	89	89	89	114	114
	Analog output	89	89	89	89	89	89	114	114
D BD		89	89	89	89	89	89	-	-
D BS		89	89	89	89	89	89	114	114
D1		26	38	50	66	81	100	125	150

Dimension		DN25	DN40	DN50	DN65	DN80	DN100	DN125	DN150
D2		83	99	109	127	142	162	189	214
D3		Rd 52x1/6"	Rd 65x1/6"	Rd 78x1/6"	Rd 95x1/6"	Rd 110x1/4"	Rd 130x1/4"	Rd 160x1/4"	Rd 190x1/4"
D4		50.5	50.5	64	91	106	119	155	183
L1		38	38	38	40	43	43	83	87
L2		47	51	53	57	62	69	71	74
L3		25	25	25	25	25	25	37	37
L4		38	38	38	40	43	43	65	65
L5		25	25	25	25	25	25	27	27
L6		49	49	49	49	49	49	54	54
H1 B	NC/NO	-	-	-	305	313	323	369	382
	Analog output	283	290	297	305	313	323	369	382
H2 BD		299	306	313	321	329	339	-	-
H3 BS		316	323	330	338	346	356	402	415
M1 B	NC/NO	-	-	-	347	354	364	416	428
	Analog output	325	334	338	347	354	364	416	428
M2 BD		341	350	354	363	370	380	-	-
M3 BS		358	367	371	380	387	397	449	461
Square end of disk shaft		10	10	10	10	10	10	14	14

Dimension		OD1.0	OD1.5	OD2.0	OD2.5	OD3.0	OD4.0	OD6.0
D B	NC/NO	-	-	-	89	89	89	114
	Analog output	89	89	89	89	89	89	114
D BD		89	89	89	89	89	89	-
D BS		89	89	89	89	89	89	114
D1		22.1	34.8	47.5	60.2	72.9	97.38	146.86
D2		83	99	109	127	142	162	214
D3		Rd 52x1/6"	Rd 65x1/6"	Rd 78x1/6"	Rd 95x1/6"	Rd 104x1/6"	Rd 130x1/4"	-
D4		50.5	50.5	64	77.5	91	119	167
L1		38	38	38	40	43	43	87
L2		47	51	53	57	57	69	-
L3		25	25	25	25	25	25	37
L4		38	38	38	40	43	43	65
L5		25	25	25	25	25	25	27
L6		49	49	49	49	49	49	54
H1 B	NC/NO	-	-	-	305	309	323	382
	Analog output	283	290	297	305	309	323	382
H2 BD		299	306	313	321	325	339	-
H3 BS		316	323	330	338	342	356	415
M1 B	NC/NO	-	-	-	347	350	364	428
	Analog output	325	334	338	347	350	364	428
M2 BD		341	350	354	363	366	380	-
M3 BS		358	367	371	380	383	397	461
Square end of disk shaft		10	10	10	10	10	10	14

manual drive



80bo1286

Dimension		DN25	DN40	DN50	DN65	DN80	DN100	DN125	DN150
D1		26	38	50	66	81	100	125	150
D2		83	99	109	127	142	162	189	214
D3		Rd 52x1/6"	Rd 65x1/6"	Rd 78x1/6"	Rd 95x1/6"	Rd 110x1/4"	Rd 130x1/4"	Rd 160x1/4"	Rd 190x1/4"
D4		50.5	50.5	64	91	106	119	155	183
L		176							
L1		38	38	38	40	43	43	83	87
L2		47	51	53	57	62	69	71	74
L3		25	25	25	25	25	25	37	37
L4		38	38	38	40	43	43	65	65
L5		25	25	25	25	25	25	27	27
L6		49	49	49	49	49	49	54	54
H1		90	99	104	112	120	130	145	157
H2	H90	180	189	194	202	210	220	235	247
	H150	240	249	254	262	270	280	295	307
M1		131	139	144	153	160	170	188	200
M2	H90	221	229	234	243	250	260	278	290
	H150	281	289	294	303	310	320	338	350
Square end of disk shaft		10	10	10	10	10	10	14	14

Dimension		OD1.0	OD1.5	OD2.0	OD2.5	OD3.0	OD4.0	OD6.0
D1		22.1	34.8	47.5	60.2	72.9	97.38	146.86
D2		83	99	109	127	142	162	214
D3		Rd 52x1/6"	Rd 65x1/6"	Rd 78x1/6"	Rd 95x1/6"	Rd 104x1/6"	Rd 130x1/4"	-
D4		50.5	50.5	64	77.5	91	119	167
L		176						
L1		38	38	38	40	43	43	87
L2		47	51	53	57	57	69	-
L3		25	25	25	25	25	25	37

Dimension		OD1.0	OD1.5	OD2.0	OD2.5	OD3.0	OD4.0	OD6.0
L4		38	38	38	40	43	43	65
L5		25	25	25	25	25	25	27
L6		49	49	49	49	49	49	54
H1		90	99	104	112	116	130	157
H2	H90	180	189	194	202	206	220	247
	H150	240	249	254	262	266	280	307
M1		131	139	144	153	156	170	200
M2	H90	221	229	234	243	246	260	290
	H150	281	289	294	303	306	320	350
Square end of disk shaft		10	10	10	10	10	10	14

9.1.9 Lubricants

Use

Fundamental information

Initial lubrication is carried out by the manufacturer.

The following chart contains lubricants which are optimally suited for lubrication. These lubricants have been tested, approved, and used for initial lubrication by the manufacturer.

Therefore, use only these lubricants.

Suitable lubricants from the lubricant chart are recommended for each lubrication point in the operating manual.

If you wish to use other manufacturers' lubricants which are not listed in the lubricant chart below, note the following information:

- The lubricants (original and substitute) must mix with each other.
- The substitute lubricant must have the same properties as the one specified in the operating manual.
- Have your lubricant supplier or manufacturer confirm the suitability of the substitute lubricants for the purpose in question taking into account the information provided above.

NOTICE Property damage caused by the use of unsuitable lubricants

Using unsuitable lubricants can cause damage to the machine.

- Use only the specified lubricants.
- Have your lubricant supplier or manufacturer confirm the suitability of the substitute lubricants for the purpose in question.

Lubricant Chart

Identification no.	Lubricant type	Lubricant for initial lubrication	Order no.	Supplied quantity	Basis	NSF registration	Viscosity according to ISO VG	Consistency according to NLGI	Designation DIN 51502	"enviro" compliant
30-06	Grease	KRONES celerol L 7001	0901491960	25 kg hobbock	Synthetic	H1	—	3	MFSI3N-50	x
			0901491928	750 g can						
			0904173264	650 g cartridge						
			0901491929	60 g tube						

Identification no.	Lubricant type	Lubricant for initial lubrication	Order no.	Supplied quantity	Basis	NSF registration	Viscosity according to ISO VG	Consistency according to NLGI	Designation DIN 51502	"enviro" compliant
30-14	Grease	KRONES celerol L 7006	0904173559	1000 g cartridge	Synthetic	H1	-	2	KFFK2U-40	x
			0904671982	100 g tube						
			0902700432	4 g sealed pouch						
30-19	Fat	Cassida Grease P1	0903091966	1 kg can	Synthetic	H1	-	0-1	KPF1P-30	x
			0906109837	25 g tube						
-	Oil	Bremer & Lequil GmbH Rivolta F.L. SI	0903621273	1 l bottle		H1	350 mm ² /s			

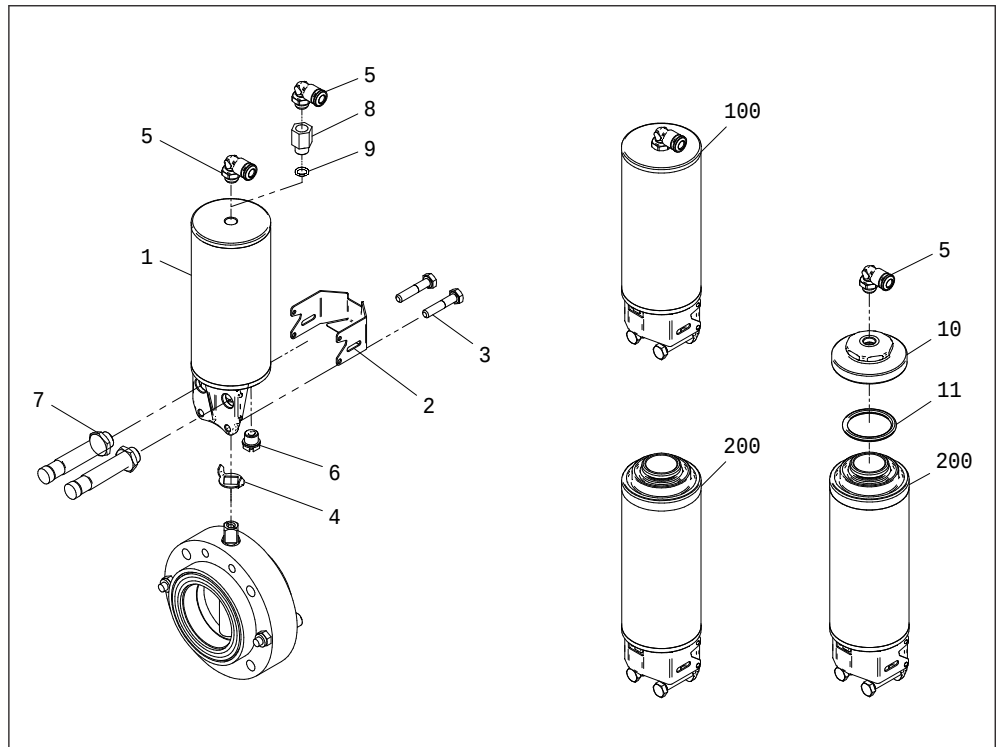
9.2 Spare Parts Lists



Bear in mind that particular sealing materials are specified for the valve type in question when ordering spare parts. For pertinent information, see the "Type" box on the identification plate.

9.2.1 Actuation

D54 pneumatic drive

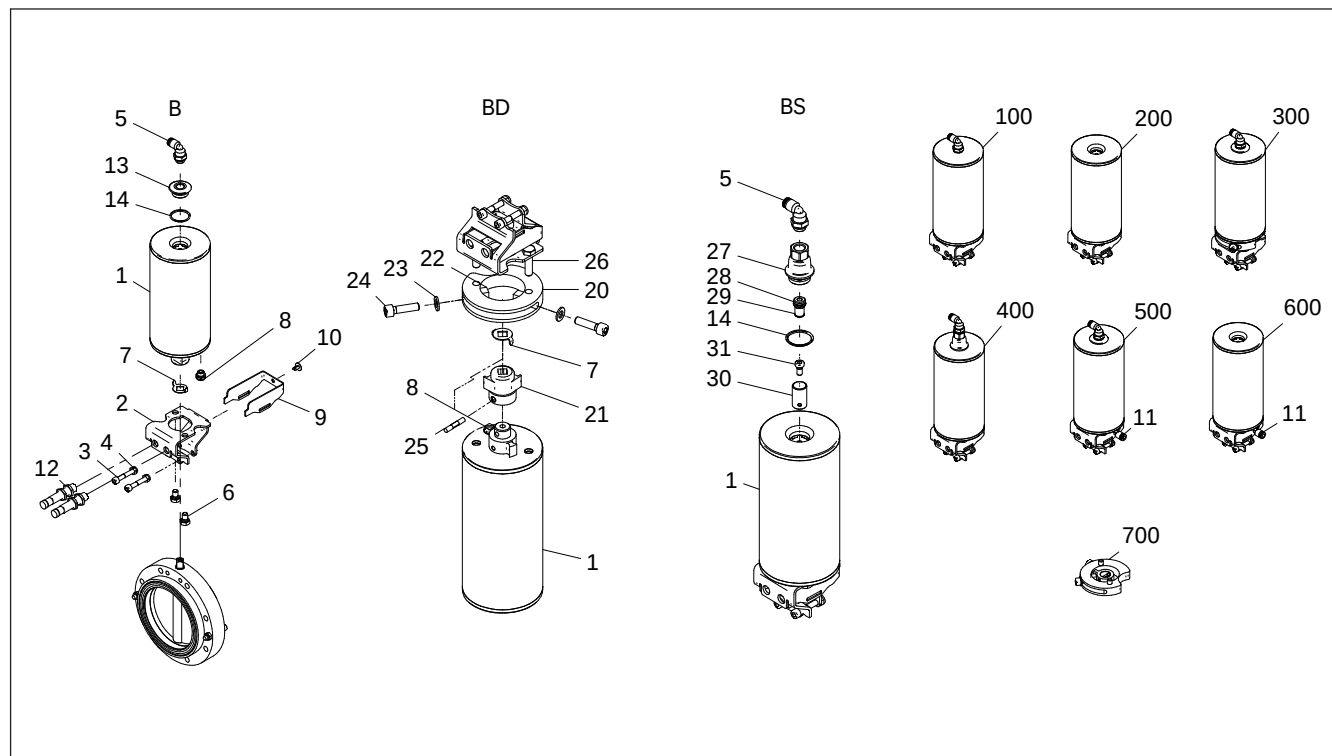


80bo0212

Pos.	Designation	Material	DN25/ OD1.0	DN40/ OD1.5	DN50/ OD2.0
100	Drive installed B NC/NO 6 mm air hose			0904151959	
	Drive installed B NC/NO 1/4" air hose			0905925891	
200	Drive installed B NC/NO control head			0905541063	
1	B NC/NO drive			0903937491	
	B NC/NO drive control head			0905540579	
2	Guard	1.4301		0903933734	
3	Hexagon screw	A2-70		0956252010	
4	Position indicator	PA12		0903935586	
5	Elbow screw-in connector 6 mm air hose	PBT		0904197563	
	Elbow screw-in connector 6 mm air hose	1.4301		0027600067	
	Elbow screw-in connector 1/4" air hose	PBT		0905896985	
6	Bleeder valve	PP		0901818892	
7	Proximity switch		According to specification		
8	Diaphragm	1.4301		0901889039	
9	O-ring	NBR		0900047038	
10	Adapter	1.4301		0905909260	

Pos.	Designation	Material	DN25/ OD1.0	DN40/ OD1.5	DN50/ OD2.0
11	O-ring	NBR	0162201622		

D85 and D110 pneumatic drive

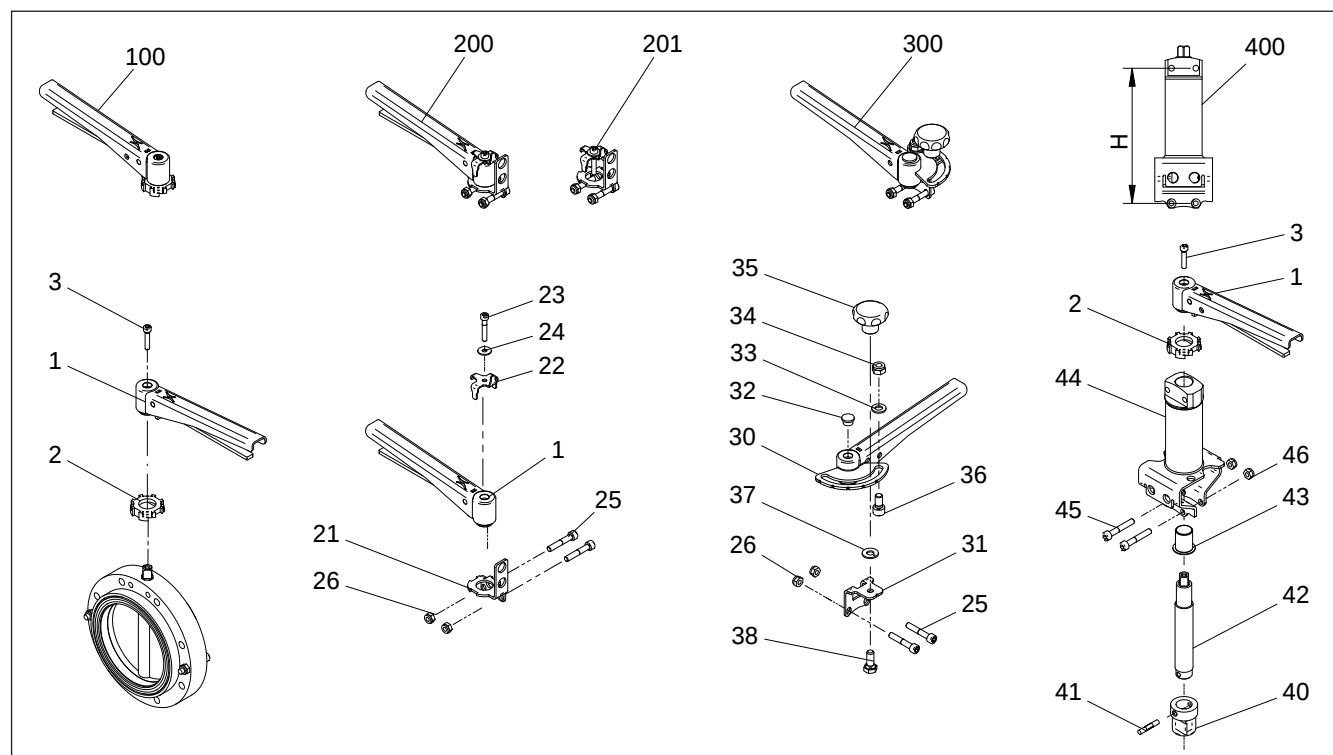


80bo0168

Pos.	Designation	Material	DN25/ OD1.0	DN40/ OD1.5	DN50/ OD2.0	DN65/ OD2.5	DN80/ OD3.0	DN100/ OD4.0	DN125	DN150/ OD6.0
100	Drive installed B NC/NO 6 mm air hose		-			0901842273			0902235650	
	Drive installed B NC/NO 1/4" air hose		-			0905925941			-	
200	Drive installed B NC/NO control head		-			0902776958			0903365298	
300	Drive installed BD NC/NO 6 mm air hose		0904085352						-	
	Drive installed BD NC/NO 1/4" air hose		0905925887						-	
400	Drive installed BS NC/NO 6 mm air hose		0903718196						0904193805	
500	Drive installed B AA 6 mm air hose		0902085297						0902339175	
600	Drive installed B AA control head		0902776959						0903137416	
700	Rotation angle limiter 2-compartment		0902834557						-	
1	B NC drive		-			0904173628			0904389914	
	B NC drive control head		-			0905596945			0904389914	
	BD NC drive		0906093197						-	
	B AA drive		0905898332						0904389915	
	B AA drive control head		0905596740						0904389915	
2	Lantern	1.4301				0901785014				
3	Cylinder screw	A2-70				0902211542				
4	Hexagon screw	A2				0424946002				
5	Elbow screw-in connector 6 mm air hose	PBT				0904704040				
	Elbow screw-in connector 6 mm air hose	1.4301				0902105930				
	Elbow screw-in connector 1/4" air hose	PBT				0905896986				
6	Hexagon screw	A2-70				0625555242				
7	Position indicator	PA12	0902075089						0902075123	
8	Silencer	1.4306				0903957821				
9	Cover plate	1.4301				0901796280				

Pos.	Designation	Material	DN25/ OD1.0	DN40/ OD1.5	DN50/ OD2.0	DN65/ OD2.5	DN80/ OD3.0	DN100/ OD4.0	DN125	DN150/ OD6.0
10	Screw rivet	PA66	0902268744							
11	Elbow screw-in connector 6 mm air hose	PBT	0904703767							
	Elbow screw-in connector 6 mm air hose	1.4301	0027600067							
	Elbow screw-in connector 1/4" air hose	PBT	0905896985							
12	Proximity switch		According to specification							
13	Screw connection	1.4301	0903613945							
14	O-ring	NBR	0162201342							
20	Ring	1.4301	0901904380							-
21	Clutch	1.4308	0902018206							-
22	Stop	1.4057	0901842244							-
23	Disk	A2	0560557002							-
24	Cheese head screw	A2-70	0623755452							-
25	Groove pin	1.4305	0902077359							-
26	Hexagon screw	A2-70	0625555452							-
27	Indicator bonnet	PSU	0902995919							
28	Indicator pin	PE	0903773768							
29	Plain bearing bush	Iglidur X	0903861547							
30	Indicator pin	PE	0902995971							
31	Cheese head screw	A2-70	0901970348							

Manual actuation

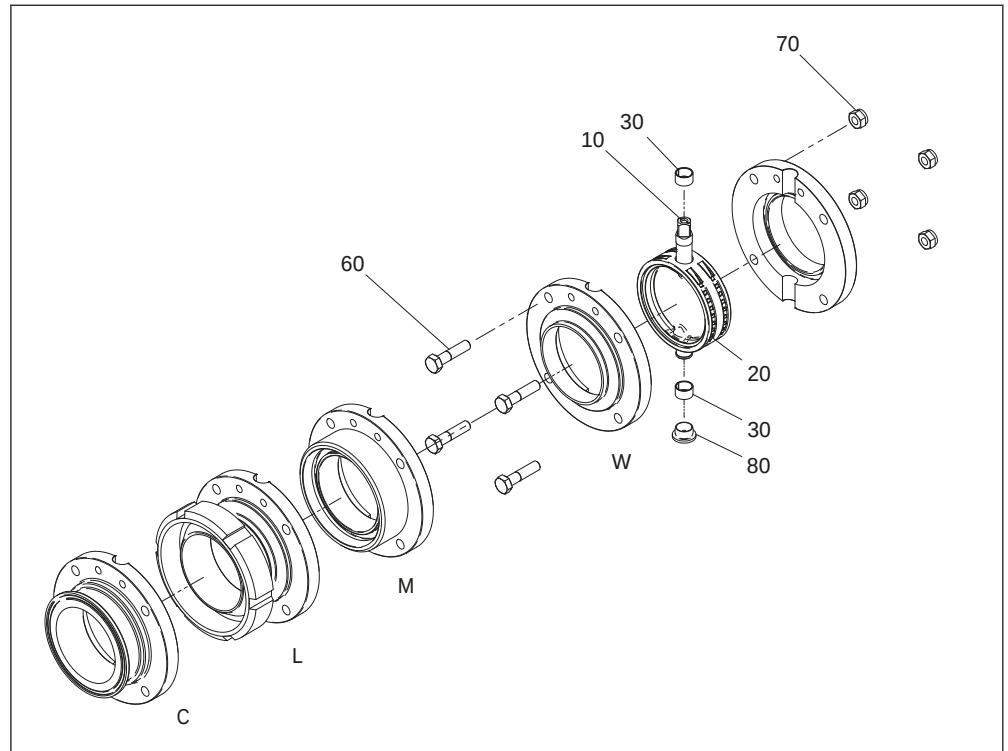


80bo0169

Pos.	Designation	Material	DN25/ OD1.0	DN40/ OD1.5	DN50/ OD2.0	DN65/ OD2.5	DN80/ OD3.0	DN100/ OD4.0	DN125	DN150/ OD6.0
100	Hand lever installed		0902159728							0902159760
200	Hand lever installed with check-back signal		0902159729							0902159761
201	Check-back kit		0902732145							0902732147
300	Hand lever installed with stepless locking device		0902477802							0902477803
400	Actuator extension	H90	0902326527							0902771203

Pos.	Designation	Material	DN25/ OD1.0	DN40/ OD1.5	DN50/ OD2.0	DN65/ OD2.5	DN80/ OD3.0	DN100/ OD4.0	DN125	DN150/ OD6.0
		H150			0902324992				-	
1	Hand lever	1.4301			0901851571				0902173067	
2	Locking device	1.4301			0901846263					
3	Cylinder screw	A2-70			0623739402				0623746402	
21	Locking device with proximity switch bracket	1.4301			0901851511					
22	Check-back plate	1.4301			0901851526				0902456401	
23	Cheese head screw	A2-70			0623739452				0623746452	
24	Disk	A2-70			0563542002				0563548002	
25	Cheese head screw	A2-70			0623746512					
26	Hexagon nut	A2			0424946002					
30	Hand lever	1.4301			0902477758				0902477795	
31	Hand lever plate	1.4301			0902477757					
32	Plug	PE-LD			0244004008				0244005008	
33	Disk	A2			0560557002					
34	Hexagon nut	A2			0424955000					
35	Star knob	1.4305			0900376389					
36	Cheese head screw	A2-70			0623755302					
37	Thrust washer	Iglidur X			0951299060					
38	Hexagon screw	A2-70			0625555342					
40	Coupling	1.4308			0902018206				0902018208	
41	Groove pin	1.4305			0902077359				0902342018	
42	Shaft	H90			0902326571				0902771280	
		H150			0902324998				-	
43	Bush	Iglidur G			0129905958					
44	Actuator extension	H90			0902326529					
		H150			0902324993					
45	Cylinder screw	A2-70			0902211542					
46	Hexagon screw	A2			0424946002					

9.2.2 Disk Valve Flange Designs C, L, M, W



80bo0170

Pos.	Designation	Material	DN25	DN40	DN50	DN65	DN80	DN100	DN125	DN150
	Valve housing WVV welded end	EPDM	0902-182439	0902-182461	0902-182462	0902-182463	0902-182466	0902-182467	0902-182468	0902-182470
		Fluorocarbon rubber	0903-364625	0903-178035	0903-582325	0903-582379	0903-364626	0905-169036	0905-169038	0905-366778
		HNBR	0905-246689	0903-057956	0905-246843	0903-508210	0905-246846	0905-107840	0905-246851	0905-827596
		VMQ	-	-	-	-	0905-357944	-	-	-
	Valve housing WVM welded end/ threaded stub DIN11851	EPDM	0902-096095	0902-096096	0902-096097	0902-096098	0902-096130	0902-096133	0902-212010	0902-212023
		Fluorocarbon rubber	0903-930727	0903-908860	0902-751244	0903-886809	0903-219171	0904-655562	-	0905-829283
		HNBR	0905-300049	0904-045805	0905-458921	0905-402542	0903-074805	0905-838992	-	-
		VMQ	-	-	-	-	-	-	-	-
	Valve housing WVL welded end/taper stub DIN11851	EPDM	0903-743603	0904-383256	0903-744740	0905-299339	0904-650977	0905-838994	-	-
		Fluorocarbon rubber	0904-181412	-	-	-	-	-	-	-
		HNBR	-	-	-	-	-	-	-	-

Pos.	Designation	Material	DN25	DN40	DN50	DN65	DN80	DN100	DN125	DN150
		VMQ	-	-	-	-	-	-	-	-
	Valve housing WVC welded end/clamping stub DIN32676	EPDM	0905-663991	0905-569180	0903-299708	-	0905-569184	-	0903-795443	-
		Fluorocarbon rubber	-	-	-	-	-	-	-	-
		HNBR	-	-	-	-	-	-	-	-
		VMQ	-	-	-	-	-	-	-	-
	Valve housing CVC clamping stub DIN32676	EPDM	0903-471476	0902-208688	0902-208689	0902-208690	0902-208691	0902-208692	0902-208693	0902-208694
		Fluorocarbon rubber	0903-670253	0904-448501	0903-670106	0903-660003	0903-670107	0903-642362	-	-
		HNBR	0905-153393	0906-068079	0905-939005	0905-401298	-	0903-402083	-	0906-112457
		VMQ	-	-	-	-	-	0903-823466	-	0905-384557
	Valve housing MVL thread/taper stub DIN11851	EPDM	0902-207119	0902-208681	0902-208682	0902-208683	0902-208684	0902-208685	0902-208686	0902-208687
		Fluorocarbon rubber	0903-735017	-	0903-709981	0905-327603	-	0905-789374	-	-
		HNBR	-	-	0904-043970	-	-	-	-	-
		VMQ	-	-	-	-	-	-	-	-
	Valve housing MVM threaded stub DIN11851	EPDM	0902-206612	0902-208319	0902-208431	0902-208436	0902-208629	0902-208680	0902-211206	0902-211343
		Fluorocarbon rubber	0903-742945	-	-	0905-844286	-	0905-832310	-	-
		HNBR	-	0905-945523	0905-945526	0905-945529	-	0905-741472	-	-
		VMQ	-	-	0903-502486	-	-	-	-	-
W	Valve body welded end	1.4404	0902-081797	0902-081799	0902-081844	0902-081845	0902-081846	0902-081847	0902-081848	0902-081849
M	Valve body screw connecting piece	1.4404	0902-091507	0902-091508	0902-091509	0902-091530	0902-091531	0902-091532	0902-091533	0902-091534
L	Valve body conical connecting piece	1.4404	0902-093178	0902-093179	0902-093230	0902-093231	0902-093233	0902-093234	0902-093235	0902-093236
C	Valve body clamping connecting piece	1.4404	0902-093440	0902-093442	0902-093444	0902-093445	0902-093446	0902-093448	0902-093450	0902-093452
10	Disk	1.4404	0901-796743	0901-796746	0901-796749	0901-796770	0901-796771	0901-796772	0901-948271	0901-948276
20	Valve seal	EPDM	0901-796651	0901-796656	0901-796715	0901-796718	0901-796740	0901-796741	0901-995185	0901-995186
		Fluorocarbon rubber	0902-606746	0902-606748	0902-606749	0902-606960	0902-606961	0902-606962	0902-613853	0902-613856
		HNBR	0902-384283	0902-384288	0902-384303	0902-384305	0902-384306	0902-384307	0902-384308	0902-384309

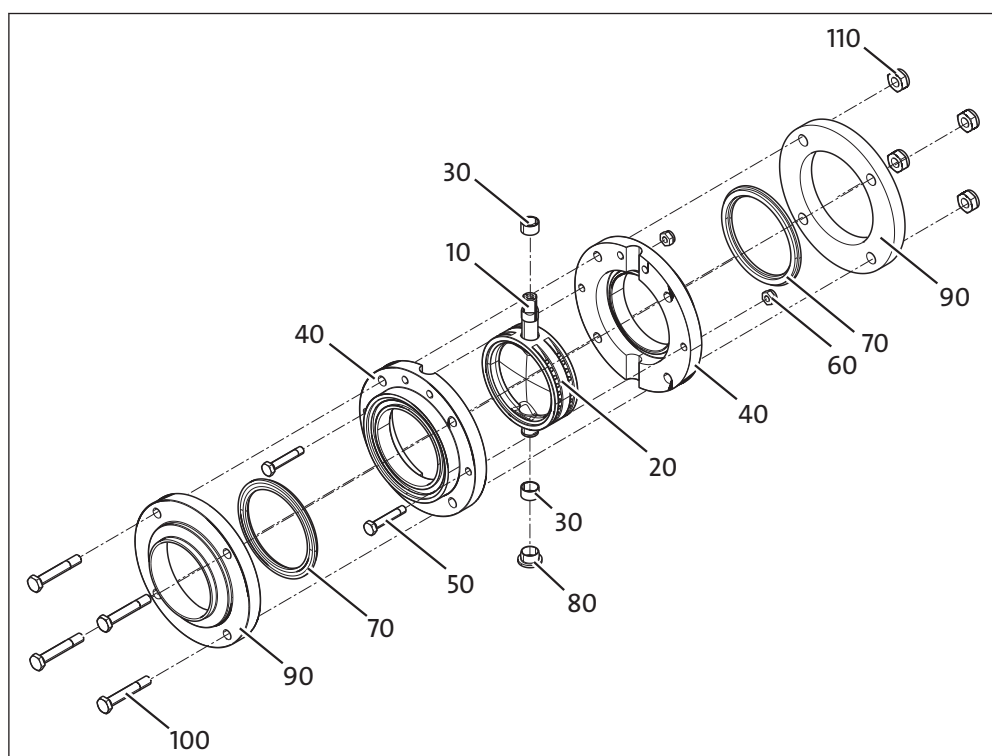
Pos.	Designation	Material	DN25	DN40	DN50	DN65	DN80	DN100	DN125	DN150
		VMQ	0902-723710	0902-723711	0902-723714	0902-723715	0902-723716	0902-723717	0902-723718	0902-723730
30	Piston ring	Iglidur X	0902541356						0902541430	
60	Screw	A2-70	0623755512						0625262732	
70	Hexagon nut	A2	0424955000						0424962002	
80	Plug	PE	0902091644						-	
	Blind nut DIN11851 with button chain and seal	1.4301	CA50-170022	CA50-170012	CA50-170017	CA50-170015	CA50-170016	CA50-170019	CA50-170021	CA50-170032
	Sealing ring G DIN11851	EPDM	0023-119086	0023-119126	0023-119146	0903-644845	0023-119186	0023-119226	0023-119225	0023-119223

Pos.	Designation	Material	OD1.0	OD1.5	OD2.0	OD2.5	OD3.0	OD4.0	OD6.0
	Valve housing WVW welded end	EPDM	0903-178935	0903-646367	0903-468151	0903-650486	0903-847495	0903-650401	0904-771268
		Fluorocarbon rubber	0904-906351	0904-906374	0904-906355	0904-906358	0903-659868	0904-795061	-
		HNBR	0904-425914	0904-516316	0904-915079	0905-561123	0904-968604	0904-638856	0906-076762
		VMQ	-	-	-	-	-	-	-
	Valve housing WVM welded end/ threaded stub DIN11851	EPDM	0903-833366	0905-221100	0903-833293	0905-156204	0905-221332	0905-221276	0905-548201
		Fluorocarbon rubber	0905-298835	0905-298903	0905-298909	0905-298998	-	-	-
		HNBR	-	-	-	-	-	-	-
		VMQ	-	-	-	-	-	-	-
	Valve housing WVSM welded end/threaded stub SMS 1145	EPDM	-	-	0905-645515	-	0905-645517	-	-
		Fluorocarbon rubber	0905-330029	-	-	-	-	-	-
		HNBR	0905-395535	-	-	-	-	-	-
		VMQ	-	-	-	-	-	-	-
	Valve housing WVL welded end/taper stub DIN11851	EPDM	-	-	0905-430507	-	-	-	-
		Fluorocarbon rubber	-	-	-	-	-	-	-
		HNBR	-	-	-	-	-	-	-
		VMQ	-	-	-	-	-	-	-
	Valve housing WVC welded end/clamping stub DIN32676	EPDM	0905-121655	0904-709370	0904-709311	0905-091194	0905-569182	0905-193001	0905-193003
		Fluorocarbon rubber	-	-	0905-940799	-	0906-026542	-	-
		HNBR	-	-	-	-	-	-	-
		VMQ	-	-	-	-	-	-	-

Pos.	Designation	Material	OD1.0	OD1.5	OD2.0	OD2.5	OD3.0	OD4.0	OD6.0
	Valve housing CVC clamping stub DIN32676	EPDM	0903-542545	0903-542222	0903-541167	0903-650056	0903-548511	0903-258095	0905-094388
		Fluorocarbon rubber	0905-937163	0904-877325	0905-006131	0904-882253	0904-882257	0904-799014	0905-965708
		HNBR	-	09053-48112	0904-791234	0904-877433	0905-609126	-	-
		VMQ	-	-	0903-764672	-	-	-	-
	Valve housing MVL thread/taper stub DIN11851	EPDM	0902-207119	0902-208681	0902-208682	0905-558361	0905-458973	0902-208685	0902-208687
		Fluorocarbon rubber	0903-735017	-	0903-709981	-	-	0905-789374	-
		HNBR	-	-	0904-043970	-	-	-	-
		VMQ	-	-	-	-	-	-	-
	Valve housing MVM threaded stub DIN11851	EPDM	0902-206612	0902-208319	0902-208431	-	-	0902-208680	0902-211343
		Fluorocarbon rubber	0903-742945	-	-	-	-	0905-832310	-
		HNBR	-	0905-945523	0905-945526	-	-	0905-741472	-
		VMQ	-	-	0903-502486	-	-	-	-
	Valve housing SMVSM threaded stub SMS 1145	EPDM	0905-391222	0905-391210	0905-480067	0905-391216	0905-480111	-	-
		Fluorocarbon rubber	0905-299911	0905-299912	0905-299913	0905-299914	0905-299915	-	-
		HNBR	-	-	-	-	-	-	-
		VMQ	-	-	-	-	-	-	-
W	Valve body welded end	1.4404	0903-178544	0903-178545	0903-467854	0903-178547	0903-708388	0903-178604	0903-707614
M	Valve body screw connecting piece	1.4404	0902-091507	0902-091508	0902-091509	0905-970981	0905-971460	0902-091532	-
L	Valve body conical connecting piece	1.4404	0902-093178	0902-093179	0902-093230	0905-558360	0905-458971	0902-093234	-
C	Valve body clamping connecting piece	1.4404	0903-542481	0903-542688	0903-285118	0905-470292	0903-870455	0903-257512	0905-094385
10	Disk	1.4404	0901-796743	0901-796746	0901-796749	0902-492242	0902-492243	0901-796772	0901-948276
20	Valve seal	EPDM	0901-796651	0901-796656	0901-796715	0902-492282	0902-492283	0901-796741	0901-995186
		Fluorocarbon rubber	0902-606746	0902-606748	0902-606749	0904-216465	0904-216464	0902-606962	0902-613856
		HNBR	0902-384283	0902-384288	0902-384303	0902-492284	0902-492285	0902-384307	0902-384309
		VMQ	0902-723710	0902-723711	0902-723714	0905-957661	0905-957599	0902-723717	0902-723730

Pos.	Designation	Material	OD1.0	OD1.5	OD2.0	OD2.5	OD3.0	OD4.0	OD6.0
30	Piston ring	Iglidur X	0902541356						0902-541430
60	Screw	A2-70	0623755512						0625-262732
70	Hexagon nut	A2	0424955000						0424-962002
80	Plug	PE	0902091644						-
	Blind nut DIN11851 with button chain and seal	1.4301	CA50-170022	CA50-170012	CA50-170017	-	-	CA50-170019	CA50-170032
	Sealing ring G DIN11851	EPDM	0023-119086	0023-119126	0023-119146	-	-	0023-119226	0023-119223

9.2.3 Butterfly valve with intermediate flange O, F



75bo0313

Pos.	Designation	Material	DN25	DN40	DN50	DN65	DN80	DN100	DN125	DN150
	Valve housing OVO groove flange (APV) without Position 90, 100, 110	EPDM	0901-796728	0901-796729	0901-796750	0901-796751	0901-796752	0901-796753	0902-020799	0902-020820
		Fluorocarbon rubber	0902-734116	0902-734117	0902-734119	0902-734130	0902-734131	0902-734132	0903-134733	0904-468469
		HNBR	0902-561090	0902-561660	0902-591005	0902-561091	0902-561092	0902-666081	0903-471961	0904-874472
		VMQ	0902-795702	0902-795704	0903-471656	0902-795706	0902-751246	0902-795707	-	-
	Valve housing FVF groove flange with counter flange (APV)	EPDM	0902-209536	0902-209965	0902-210281	0902-210828	0902-211139	0902-211318	0902-211764	0902-212180

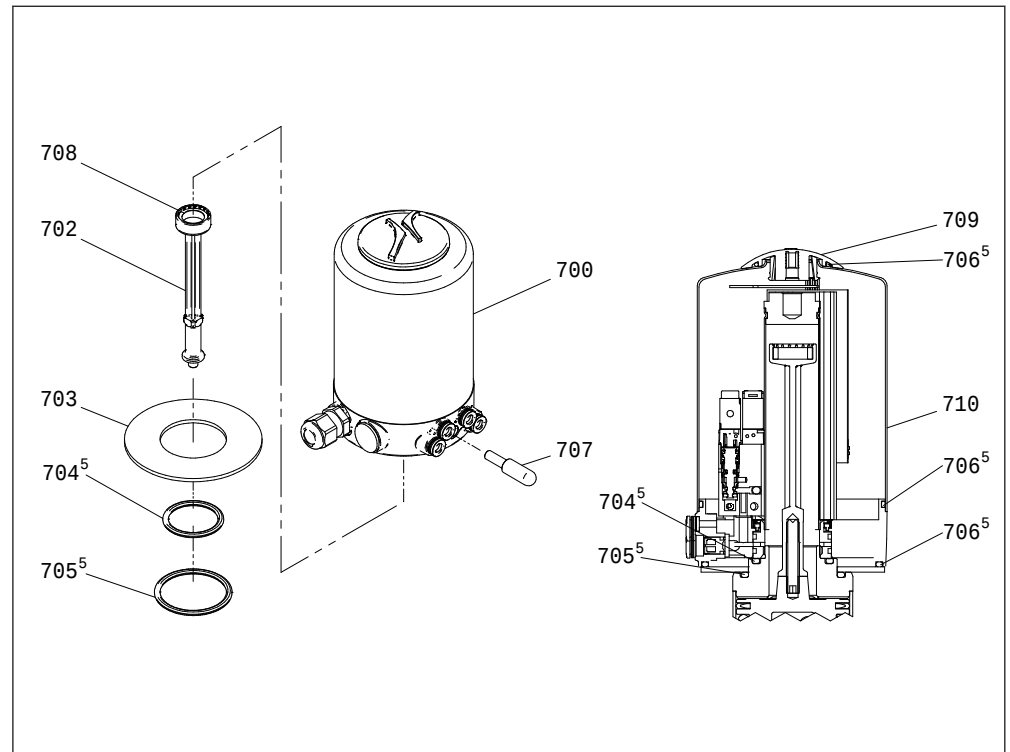
Pos.	Designation	Material	DN25	DN40	DN50	DN65	DN80	DN100	DN125	DN150
		Fluorocarbon rubber	0902-731345	0902-991476	0902-991563	0902-991600	0902-731347	0902-991602	0904-968310	0904-968339
		HNBR	0904-219908	0904-219931	0903-710724	0903-469047	0904-219933	0904-081230	0904-219936	0904-219938
		VMQ	0903-110718	0903-110719	0903-110724	0903-110725	0903-110730	0903-110726	-	-
10	Disk	1.4404	0901-796743	0901-796746	0901-796749	0901-796770	0901-796771	0901-796772	0901-948271	0901-948276
20	Valve seal	EPDM	0901-796651	0901-796656	0901-796715	0901-796718	0901-796740	0901-796741	0901-995185	0901-995186
		Fluorocarbon rubber	0902-606746	0902-606748	0902-606749	0902-606960	0902-606961	0902-606962	0902-613853	0902-613856
		HNBR	0902-384283	0902-384288	0902-384303	0902-384305	0902-384306	0902-384307	0902-384308	0902-384309
		VMQ	0902-723710	0902-723711	0902-723714	0902-723715	0902-723716	0902-723717	0902-723718	0902-723730
30	Piston ring	Iglidur X	0902541356						0902541430	
40	Valve body flange	1.4404	0901-796675	0901-796676	0901-796677	0901-796678	0901-796679	0901-796720	0901-842246	0901-842248
50	Cylinder screw	A2-70	0623746512						0623755402	
60	Hexagon nut	A2	0424946002						-	
70	Flange seal	EPDM	0023-700607	0023-700617	0023-700627	0023-700637	0023-700647	0023-700657	0023-700667	0023-700677
		Fluorocarbon rubber	0023-700074	0023-700073	0023-700072	0023-700071	0023-700070	0023-700069	0900-690363	0901-289879
		HNBR	0950-237004	0950-237007	0950-237005	0950-237006	0950-237008	0950-237009	0902-499051	0902-498223
		VMQ	0901-898602	0901-898606	0901-898603	0901-898605	0901-964876	0901-922787	-	-
80	Plug	PE	0902091644						-	
90	Flange	1.4404	0904-732760	0904-732761	0904-732762	0904-732763	0904-732764	0904-732765	0904-732766	0904-732767
100	Hexagon screw	A2-70	0625255782						0625262822	
110	Hexagon nut	A2	0424955000						0424962002	

Pos.	Designation	Material	OD1.0	OD1.5	OD2.0	OD2.5	OD3.0	OD4.0	OD6.0
	Valve housing OVO groove flange (APV) without Position 90, 100, 110	EPDM	0902-493347	0902-493348	0902-493349	0902-493390	0903-971499	0902-493392	0902-020820
		Fluorocarbon rubber	0906-096470	0906-096472	0906-096473	-	0906-097815	0904-581060	0904-468469
		HNBR	-	-	0904-956119	0904-956287	-	-	0904-874472
		VMQ	-	-	-	-	-	-	-
	Valve housing FVF groove flange with counter flange (APV)	EPDM	0903-345171	0903-345173	0903-345174	0903-345176	0903-345268	0903-345178	0903-348098
		Fluorocarbon rubber	0903-758925	0904-932035	0904-587922	0904-931778	0904-934845	0904-580145	-
		HNBR	0904-982739	0903-758235	0903-755541	0903-755637	0903-766971	-	-

Pos.	Designation	Material	OD1.0	OD1.5	OD2.0	OD2.5	OD3.0	OD4.0	OD6.0
		VMQ	-	-	-	-	-	0905-541080	0905-541084
10	Disk	1.4404	0901-796743	0901-796746	0901-796749	0902-492242	0902-492243	0901-796772	0901-948276
20	Valve seal	EPDM	0901-796651	0901-796656	0901-796715	0902-492282	0902-492283	0901-796741	0901-995186
		Fluorocarbon rubber	0902-606746	0902-606748	0902-606749	0904-216465	0904-216464	0902-606962	0902-613856
		HNBR	0902-384283	0902-384288	0902-384303	0902-492284	0902-492285	0902-384307	0902-384309
		VMQ	0902-723710	0902-723711	0902-723714	0905-957661	0905-957599	0902-723717	0902-723730
30	Piston ring	Iglidur X	0902541356						0902-541430
40	Valve body flange	1.4404	0902-492246	0902-492247	0902-492248	0902-492249	0903-708491	0902-492281	0901-842248
50	Cylinder screw	A2-70	0623746512						0623-755402
60	Hexagon nut	A2	0424946002						-
70	Flange seal	EPDM	CA65-090233	CA65-090234	CA65-090235	CA65-090236	CA65-090237	CA65-090238	0023-700677
		Fluorocarbon rubber	0904-933524	0904-933527	0904-589737	0904-934773	0901-415082	0904-589734	0901-289879
		HNBR	0904-956825	0904-956810	0904-956811	0904-956812	0904-956826	0904-956827	0902-498223
		VMQ	-	-	-	-	-	-	-
80	Plug	PE	0902091644						-
90	Flange	1.4404	0906-032019	0906-032100	0906-032102	0906-032104	0906-032106	0906-032108	0903-344263
100	Hexagon screw	A2-70	0625255782						0625-262822
110	Hexagon nut	A2	0424955000						0424-962002

9.2.4 Control head

Evoguard D54 control head

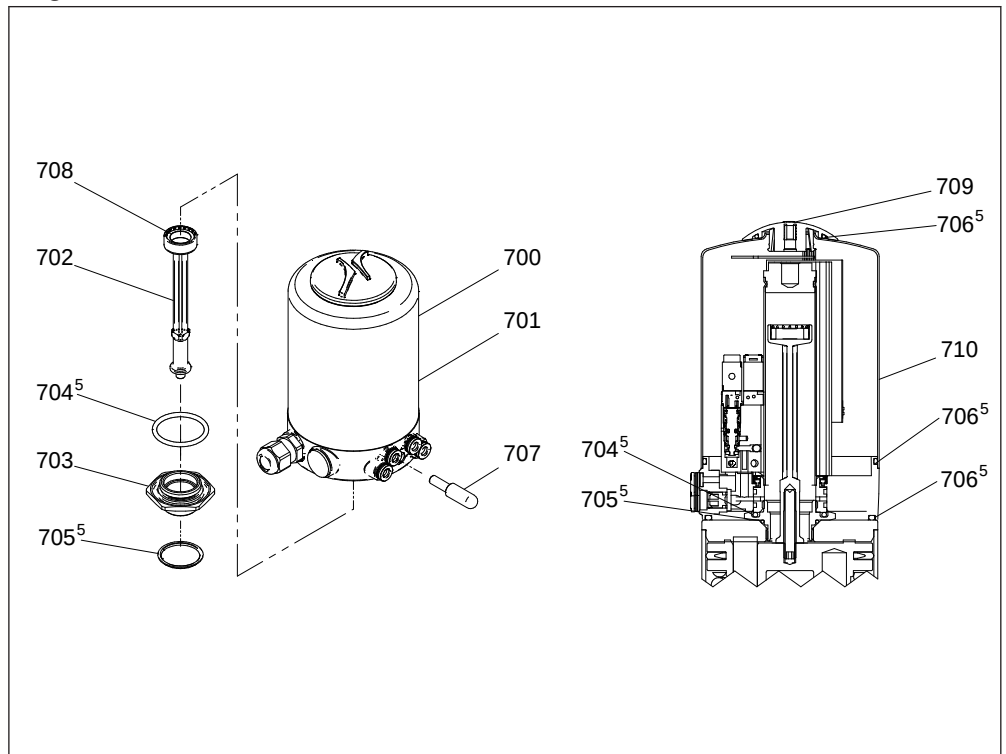


80bo1287

Pos.	Designation	Material	
700	Multipol S-1M32C-2T control head assembly		0905545381
	ASI 1F-AS-AB-1M32C-2T control head assembly		0905545347
701	Multipol CPPI-K-1S-1M32C-2T control head		0902830838
	ASI CPPI-K-1-F-AS-AB-1M32C-2T valve control head		0902830808
702	Check-back rod	POM	0905033339
703	Spacer	1.4301	0905317114
704 ⁵	O-ring	NBR	0162201622
705 ⁵	O-ring	NBR	0162201982
706 ⁵	Seal set only control head	EPDM	0903888567
707	Silencer	PE	CA35030144
708	Magnet		0902958106
709	Covers		0905391878
710	Hood	1.4301	0905391877
	Valve control head seal kit		0906085414

⁵) Valve control head seal kit

Evoguard D85 and D110 control head

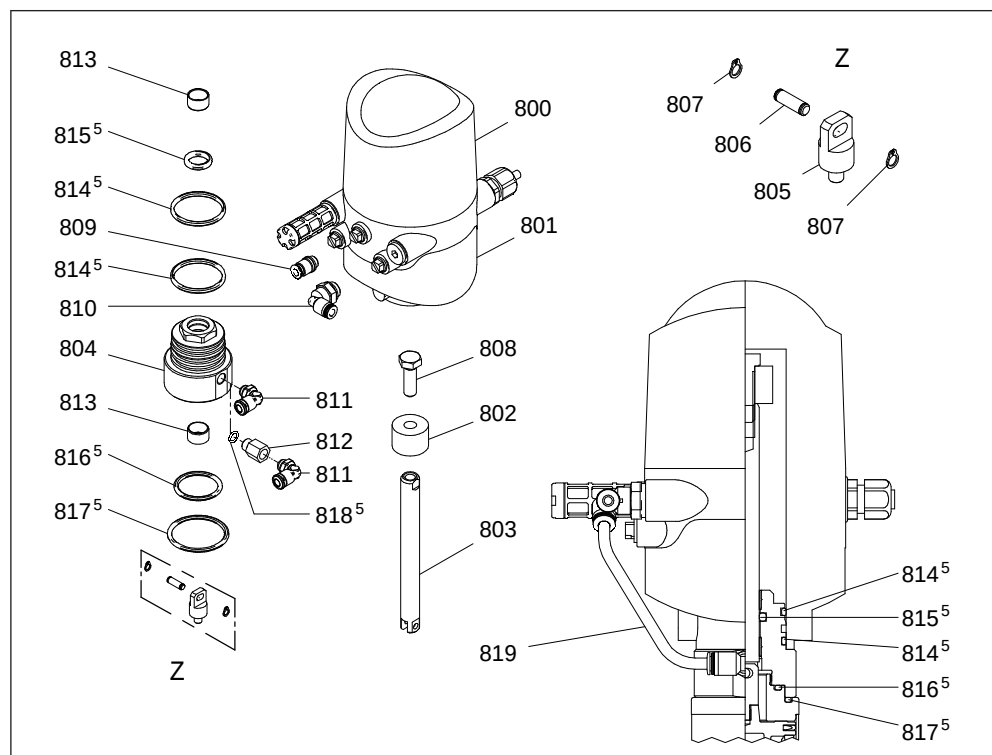


80bo0171

Pos.	Designation	Material	
700	Multipol S-1M32C-2T control head assembly		0902928158
	ASI 1F-AS-AB-1M32C-2T control head assembly		0904617590
701	Multipol CPPI-K-1S-1M32C-2T control head		0902830838
	ASI CPPI-K-1-F-AS-AB-1M32C-2T valve control head		0902830808
702	Check-back rod	POM-C	0905033339
703	Control head screwable bearing M24x1.5	1.4305	0902600914
704 ⁵	O-ring	NBR	0162201622
705 ⁵	O-ring	NBR	0162201342
706 ⁵	Seal set only control head	EPDM	0903888567
707	Silencer	PE	CA35030144
708	Magnet		0902958106
709	Covers		0905391878
710	Hood	1.4301	0905391877
	Valve control head seal kit		0903891851

⁵) Valve control head seal kit

Bürkert D54 control head



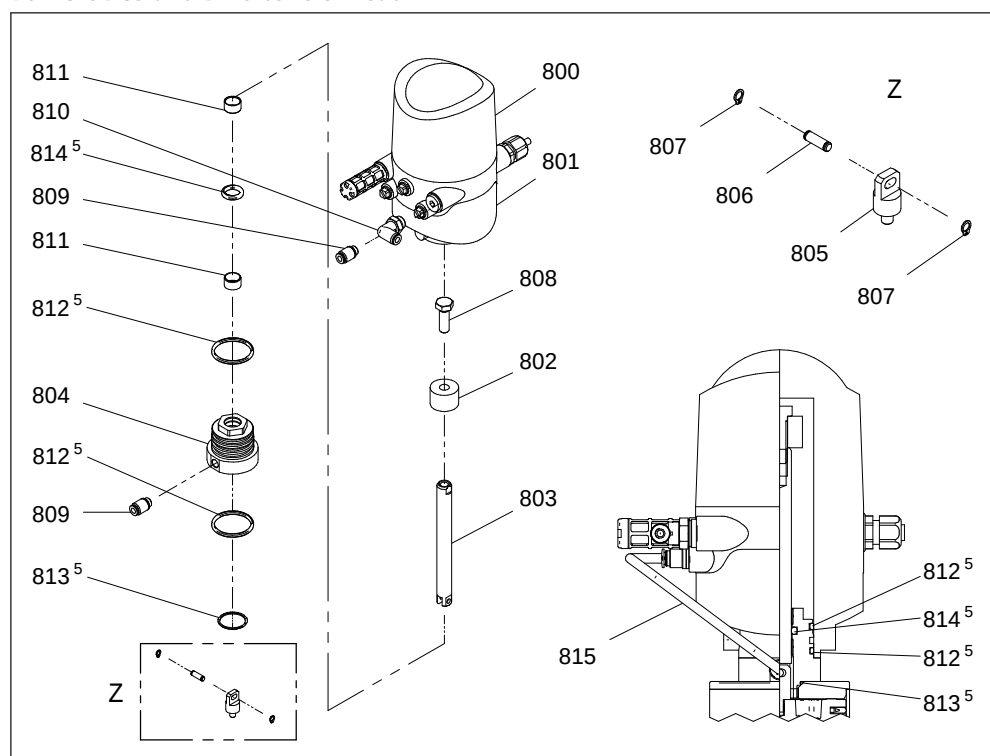
80bo1288

Pos.	Designation	Material	
800	Multipol Type 8681 6 mm air hose control head assembly		0905545375
	ASI Type 8681 6 mm air hose control head assembly		0905545420
	Multipol type 8681 1/ 8681" air hose control head assembly		-
	ASI Type 8681 8681/ 4" air hose control head assembly		0905937167
	IO Type 8681 8681 4-pole 6 mm air hose control head assembly		-
	IO Type 8681 8681 5-pole 6 mm air hose control head assembly		0905883652
	DeviceNet Type 8681 6 mm air hose control head assembly		-
801	Multipol type 8681 valve control head		0905920084
	ASI type 8681 valve control head		0905920086
	IO link Type 8681 4-pole control head		0905827562
	IO link Type 8681 5-pole control head		0905877075
	DeviceNet Type 8681 control head		0904656328
802	Target	1.4021	0902863456
803	Magnetic holder	1.4305	0902947101
804	Control head screwable bearing M24x1.5	1.4305	0905312983
805	Screwable lug	1.4305	0902947029
806	Bolt	1.4305	0902217880
807	Retaining ring	St	0681713021
808	Hexagon screw	A2-70	0625562452
809	Push-in connector 6 mm air hose	PBT	0904703993
	Push-in connector 6 mm air hose	1.4301	0900048819
	Push-in connector 1/4" air hose	PBT	0905897090
810	Elbow screw-in connector 6 mm air hose	PBT	0904704040
	Elbow screw-in connector 6 mm air hose	1.4301	0902105930

Pos.	Designation	Material	
	Elbow screw-in connector 1/4" air hose	PBT	0905896986
811	Elbow screw-in connector 6 mm air hose	PBT	0904197563
	Elbow screw-in connector 6 mm air hose	1.4301	0027600067
	Elbow screw-in connector 1/4" air hose	PBT	0905896985
812	Diaphragm	1.4301	0901889039
813	Bush	Iglidur X	0901224584
814 ⁵	O-ring	NBR	0162201962
815 ⁵	O-ring	NBR	0162200762
816 ⁵	O-ring	NBR	0162201622
817 ⁵	O-ring	NBR	0162201982
818 ⁵	O-ring	NBR	0900047038
819	Pneumatic hose 6 mm	TPU Ether	0902208501
	Pneumatic hose 1/ 4"		0905967282
	D54 control head seal kit		0906086161
	D54 1/4" control head seal kit		0906086163

⁵) Valve control head seal kit

Bürkert D85 and D110 control head



80bo0172

Pos.	Designation	Material	
800	Multipol Type 8681 6 mm air hose control head as- sembly		0902950090
	Multipol Type 8681 AA 6 mm air hose control head as- sembly		0906007840
	ASI Type 8681 6 mm air hose control head assembly		0902862309
	Multipol type 8681 1/ 8681"air hose control head as- sembly		-
	ASI Type 8681 8681/ 4" air hose control head assembly		0905937509

Pos.	Designation	Material	
	IO Type 8681 8681 4-pole 6 mm air hose control head assembly		0905827973
	IO Type 8681 8681 5-pole 6 mm air hose control head assembly		0905873447
	DeviceNet Type 8681 6 mm air hose control head assembly		0905849585
801	Multipol type 8681 valve control head		0905920084
	Multipol type 8681 AA control head		0906008087
	ASI type 8681 valve control head		0905920086
	IO link Type 8681 4-pole control head		0905827562
	IO link Type 8681 5-pole control head		0905877075
	DeviceNet Type 8681 control head		0904656328
802	Target	1.4021	0902863456
803	Magnetic holder	1.4305	0902947101
804	Control head screwable bearing M24x1.5	1.4305	0902837536
805	Screwable lug	1.4305	0902947029
806	Bolt	1.4305	0902217880
807	Retaining ring	St	0681713021
808	Hexagon screw	A2-70	0625562452
809	Push-in connector 6 mm air hose	PBT	0904703993
	Push-in connector 6 mm air hose	1.4301	0900048819
	Push-in connector 1/4" air hose	PBT	0905896985
810	Elbow screw-in connector 6 mm air hose	PBT	0904704040
	Elbow screw-in connector 6 mm air hose	1.4301	0902105930
	Elbow screw-in connector 1/4" air hose	PBT	0905896986
811	Bush	Iglidur X	0901224584
812 ⁵	O-ring	NBR	0162201962
813 ⁵	O-ring	NBR	0162201342
814 ⁵	O-ring	NBR	0162200762
815	Pneumatic hose 6 mm	TPU Ether	0902208501
	Pneumatic hose 1/ 4"		0905967282
	D85/110 control head seal kit		0904076241

⁵⁾ Valve control head seal kit

9.3 Welding Guidelines

NOTICE Excessive welding distortion! Changed position of rivets!

Damage to the valve!

- Have welding work done only by qualified professionals (according to DIN287-1 W11).
- Weld valve only in assembled condition without seals and disk.
- Remove the drive and proximity switches.

NOTICE Faulty weld seam!

Damage to the valve!

- While tacking and welding the valve housing into the pipe, make sure that full flushing with forming gas is provided.



Follow the instructions of the customer's company with regard to current welding processes and all prescribed conditions.

Application area	Welded joints between weld-in fittings and pipes according to DIN EN 10357 Series 2
Welding process	TIG (tungsten inert gas welding)
Seam type	Seam preparation according to DIN 2559 (joint shape I/for I-seams) Weld seams according to DIN EN ISO 5817, evaluation group B (high)
Weld seam preparations	Saw off the pipe ends level and at right angles and deburr them (pipe sawing tool) Adjust the welding end of the housing with the pipe so that it fits closely in radial and axial direction (centring device) There must not be any gap between the ends to be welded, as escaping forming gas may affect the quality and corrosion resistance of the welded joint.
Welding	Connect the forming gas supply. Tack at 3-4 points. Tungsten inert gas welding, manual or orbital (automatic welding machine)
Additional welding filler material	Welded parts: 1.4404 Suitable filler material: 1.4430
Weld seam treatment, interior	Post treatment of welded seam is not needed. Improvement of the surface finish by scotching (accessible positions)
Process for treatment of weld seam, exterior	Pickling – dispose of pickling paste properly Brushes Grinding Polishing

9.4 EU Declaration of Incorporation

Declaration of incorporation (original)

EVOGUARD GmbH
Dr.-Hermann-Kronseider-Straße 1
93149 Nittenau



EU-Einbauerklärung im Sinne der EU-Maschinenrichtlinie 2006/42/EG, Anhang II 1.B

Hiermit erklären wir, dass es sich bei dieser Lieferung um die nachfolgend bezeichnete, unvollständige Maschine bzw. Maschinen- und Anlagenteile im Sinne der EU-Maschinenrichtlinie handelt. Diese Artikel der Fa. EVOGUARD sind in der gelieferten Ausführung nicht verwendungsfertig, können nicht unabhängig voneinander funktionieren und werden am Bestimmungsort in eine andere Maschine eingebaut oder erst dort zu einer funktionsfähigen Anlage zusammengefügt.

EVOGUARD untersagt die Inbetriebnahme der genannten Maschine bzw. Maschinenteile bis festgestellt wird, dass die Anlage, die aus den vorgenannten Maschinenteilen zusammengefügt wird bzw. die Maschine, in die die Maschinenteile eingebaut werden, den Bestimmungen der EU-Maschinenrichtlinie 2006/42/EG in der jeweils gültigen Fassung entspricht, sofern sie dieser unterliegt.

EVOGUARD verpflichtet sich, einzelstaatlichen Stellen auf begründetes Verlangen die speziellen Unterlagen zu dieser unvollständigen Maschine auf elektronischem Wege zu übermitteln.

Die speziellen technischen Unterlagen gemäß 2006/42/EG Anhang VII B wurden erstellt.

Bezeichnung der Maschine: EVOGUARD SCHEIBENVENTIL

Bevollmächtigter für technische Unterlagen:
Daniel Gross, EVOGUARD GmbH, Dr.-Hermann-Kronseider-Straße 1, 93149 Nittenau

Angewandte Anforderungen der 2006/42/EG:
Anhang I, Allgemeine Grundsätze sowie Absätze 1.1.2, 1.1.3, 1.1.5, 1.1.6, 1.3.8.1, 1.4.2.1 und 2.1.1

Angewandte harmonisierte Normen:
DIN EN ISO 12100

Nittenau, 27.07.2016

Unterschrift 
Martin Zierer, Geschäftsführer

Geschäftsführer:
Martin Zierer

Telefon +49 9436 307-700
Telefax +49 9401 70 943700
E-Mail info@evoguard.com
Internet www.evoguard.com

Commerzbank Regensburg
60 6846 400 (BLZ 750 400 62)
IBAN: DE15 7504 0052 0006 8464 00
BIC: COBADE33 750

USt-IdNr. DE 288092359
Steuer-Nr. 211/125/81224

Sitz Nittenau
HRB Amberg Nr. 5203
Gerichtsstand Schwandorf

Declaration of incorporation (translation)

EVOGUARD GmbH
Dr.-Hermann-Kronseder-Straße 1
93149 Nittenau



EU Declaration of Incorporation in terms of Annex II 1.B of the EU Machinery Directive 2006/42/EC

We hereby declare that this shipment is comprised of the incomplete machine and/or machine and plant components specified in the following in terms of the EU Machinery Directive.
In the condition delivered, these items manufactured by EVOGUARD are neither ready for use nor able to function independently of each other and are intended for incorporation into another machine or only assembled into a functional plant after arrival at their place of destination.

EVOGUARD prohibits commissioning of the above-mentioned machine and/or machine components until after it has been ascertained that the plant to be assembled from the above-mentioned machine components or the machine to be equipped with the above-mentioned machine components is in compliance with the provisions of EU Machinery Directive 2006/42/EC as amended, if the plant or machine is subject to said directive.

EVOGUARD agrees to provide state authorities upon justified demand with the specific technical documentation to said incomplete machine by electronic means.

The specific technical documentation according to Annex VII B of EU Machinery Directive 2006/42/EC has been prepared.

Machine designation: EVOGUARD BUTTERFLY VALVE

Person in charge of technical documentation:
Daniel Gross, EVOGUARD GmbH, Dr.-Hermann-Kronseder-Straße 1, 93149 Nittenau

Applied requirements of Machinery Directive 2006/42/EC:
Annex I, General Principles as well as sections 1.1.2, 1.1.3, 1.1.5, 1.1.6, 1.3.8.1, 1.4.2.1 and 2.1.1

Applied harmonised standards:
DIN EN ISO 12100

Nittenau, 27.07.2016

Signature

Martin Zierer, Managing Director

Geschäftsführer:
Martin Zierer

Telefon +49 9436 307-700
Telefax +49 9401 70-943700
E-Mail info@evoguard.com
Internet www.evoguard.com

Commerzbank Regensburg
60 6846 400 (BLZ 750 400 62)
IBAN: DE15 7504 0062 0606 8464 00
BIC: COBADEFF 750

USt-IdNr. DE280993359
Steuer-Nr. 211/125/81224

Sitz Nittenau
HRB Amberg Nr. 5203
Gerichtsstand Schwandorf

9.5 Declaration of Conformity

Declaration of conformity (original)

EVOGUARD GmbH
Dr.-Hermann-Kronseder-Straße 1
93149 Nittenau



EU-Konformitätserklärung gemäß Anhang IV der Richtlinie 2014/68/EU

Hiermit erklären wir, dass das nachfolgend bezeichnete Druckgerät aufgrund seiner Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der EU-Druckgeräte-Richtlinie 2014/68/EU entspricht.

Die Vorgaben in der Betriebsanleitung bezüglich des Druckgeräts sind zu beachten!

Bei einer nicht mit uns abgestimmten Änderung des Druckgeräts verliert diese Erklärung ihre Gültigkeit!

Typ: EVOGUARD SCHEIBENVENTIL

Angewandte harmonisierte Norm: AD 2000

Das Druckgerät wurde folgendem Konformitätsbewertungsverfahren unterzogen:
Kategorie II, Modul A2

Die Überwachung erfolgte durch die TÜV SÜD Industrie Service GmbH, Westendstraße 199,
80686 München, Kennnummer: 0036

Nittenau, 01.06.2017

Unterschrift


Martin Zierler, Geschäftsführer

Geschäftsführer:
Martin Zierler

Telefon: +49 9436 307-700
Telefax: +49 9403 700-943700
E-Mail: info@evoguard.com
Internet: www.evoguard.com

Commerzbank Regensburg
60 8846 400 (BLZ 750 400 62)
IBAN: DE15 7504 0062 0506 8464 00
BIC: COBADE33150

USt-IdNr.: DE 288092359
Steuer-Nr. 232/125/61224

Stz Nittenau
HRB-Ändg. Nr. 5368
Gerichtsstand Schwandau

Declaration of conformity (translation)

EVOGUARD GmbH
Dr.-Hermann-Kronseder-Straße 1
93149 Nittenau



EU Declaration of Conformity according to Appendix IV of EU Directive 2014/68/EU

We hereby declare that the concept and design of the pressure equipment specified hereinafter, as well as the version introduced to the market, complies with the relevant fundamental safety and health requirements, as defined in the EU Pressure Equipment Directive 2014/68/EU.

The requirements in the operating manual for the pressure equipment must be observed!

Modification of the pressure equipment without our prior consent will render this declaration null and void!

Type: EVOGUARD BUTTERFLY VALVE

Applied harmonised standards: AD 2000

The pressure equipment has been subjected to the following conformity evaluation process:
Category II, module A2

The process was supervised by TÜV SÜD Industrie Service GmbH, Westendstraße 199,
80686 München. Identification no.: 0036

Nittenau, 01.06.2017

Signature


Martin Zierer, Managing Director

Geschäftsführer:
Martin Zierer

Telefon: +49 9436 100-700
Telefax: +49 9403 700943700
E-Mail: info@evoguard.com
Internet: www.evoguard.com

Commerzbank Regensburg
60 6846 400 (BLZ 750 400 62)
IBAN: DE15 7504 0062 0906 8464 00
BIC: COBADE33 150

USt-IdNr.: DE 288092359
Steuer-Nr. 211/125/61224

StU Nittenau
HRB Amtsng Nr. 5303
Gerichtsland Schwandl

B.7 Hybrid Foamatic MA-SA

Name	Data
Designation	Hybrid Foamatic
Type	MA-SA
Number	110004669M 08/2017
Type of manual	Directions for use
Manufacturer	NILFISK-ALTO Blytækkervej 2 DK 9100 Aalborg - Dänemark

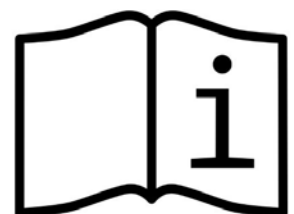


Hybrid Foamatic

MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3
SA2CM, SA3CM, SA2C, SA3C, SA2M, SA3M, SA2, SA3



Directions for use



For this unit the following manuals are available :

110004669 Direction for use – Hybrid Foamatic MA/SA

110004670 Userguide - Hybrid Foamatic MA/SA

110004671 Software manual –Hybrid Foamatic MA/SA*

Direction for use and Userguide will be enclosed as physical paper manuals.

*The Software manual must be downloaded from nilfiskfood.com -
in order to ensure that you always have the latest updated version.

Declaration of Conformity

EN	Declaration of Conformity
FR	Déclaration de Conformité
ES	Declaración de Conformidad
EL	Δήλωση Συμμόρφωσης
SV	Försäkran om överensstämmelse
DA	Overensstemmelseserklæring
RU	Декларация о соответствии
SL	Izjava o skladnosti
SR	Deklaracija o konformitetu
BG	Декларация за съответствие
SK	Prehlásenie o konformite
ET	Vastavusdeklaratsioon
LV	Paziņojums par atbilstību prasībām

MA

DE	Konformitätserklärung
IT	Dichiarazione di Conformità
PT	Declaração de Conformidade
NL	Overeenkomstigheidsverklaring
FI	Vaatimustenmukaisuusvakuutus
PL	Deklaracja zgodności
HU	Megfelelőségi nyilatkozat
HR	Izjava o usklađenosti
RO	Declarație de Conformitate
CS	Prohlášení o shodě
TR	Uygunluk Bildirgesi
LT	Atitikties deklaracija
UK	Свідчення про відповідність вимогам

Nilfisk FOOD
Blytækkervej 2
9000 Aalborg
Danmark

EN Declaration of Conformity

We Nilfisk FOOD, declare under our sole responsibility that the products MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3. To which this declaration relates, are in conformity with these Council directives on the approximation of the laws of the EC member states:

Machinery Directive (2006/42/EC).

- EN 60335-2-79 : 2012

EMC Directive (2014/30/EU)

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

FR Déclaration de conformité

Nous, Nilfisk FOOD, déclarons sous notre seule responsabilité, que les produits MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, auxquels se réfère cette déclaration, sont conformes aux Directives du Conseil concernant le rapprochement des législations des Etats membres CE relatives aux normes énoncées ci-dessous : Directive Machines (2006/42/EC).

- EN 60335-2-79 : 2012

Directive Compatibilité Electromagnétique CEM (2014/30/EU)

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

EN 61000-3-2 : 2013.

DE Konformitätserklärung

We Nilfisk FOOD, declare under our sole responsibility that the products MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3. To which this declaration relates, are in conformity with these Council directives on the approximation of the laws of the EC member states:

Machinery Directive (2006/42/EC).

- EN 60335-2-79 : 2012

EMC Directive (2014/30/EU)

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

IT Dichiarazione di conformità

Nilfisk FOOD dichiara sotto la sua esclusiva responsabilità che i prodotti MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, ai quali si riferisce questa dichiarazione, sono conformi alle seguenti direttive del Consiglio riguardanti il riavvicinamento delle legislazioni degli Stati membri CE:

Direttiva Macchine (2006/42/EC).

- EN 60335-2-79 : 2012

Direttiva EMC (2014/30/EU)

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

ES Declaración de conformidad

Nosotros, Nilfisk FOOD, declaramos bajo nuestra entera responsabilidad que los productos MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, a los cuales se refiere esta declaración, están conformes con las Directivas del Consejo en la aproximación de las leyes de los Estados Miembros del EM:

Directiva de Maquinaria (2006/42/EC).

- EN 60335-2-79 : 2012

Directiva EMC (2014/30/EU)

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

PT Declaração de Conformidade

A Nilfisk FOOD declara sob sua única responsabilidade que os produtos MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, aos quais diz respeito esta declaração, estão em conformidade com as seguintes Directivas do Conselho sobre a aproximação das legislações dos Estados Membros da CE:

Directiva Máquinas (2006/42/EC).

- EN 60335-2-79 : 2012

Directiva EMC (2014/30/EU)

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013

EL Δήλωση συμμόρφωσης

Εμείς, η Nilfisk FOOD, δηλώνουμε με αποκλειστικά δική μας ευθύνη ότι τα προϊόντα MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3 στα οποία αναφέρεται η παρούσα δήλωση, συμμορφώνονται με τις εξής Οδηγίες του Συμβουλίου περί προσέγγισης των νομοθεσιών των κρατών μελών της ΕΕ:

Οδηγία για μηχανήματα (2006/42/EC).

- EN 60335-2-79 : 2012

Οδηγία Ηλεκτρομαγνητικής Συμβατότητας (EMC) (2014/30/EU).

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

NL Verklaring van overeenstemming

Wij, Nilfisk FOOD, verklaren geheel onder eigen verantwoordelijkheid dat de producten MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3 waarop deze verklaring betrekking heeft, in overeenstemming zijn met de Richtlijnen van de Raad in zake de onderlinge aanpassing van de wetgeving van de EG Lidstaten betreffende:

Machine Richtlijn (2006/42/E).

- EN 60335-2-79 : 2012

EMC Richtlijn (2014/30/EU).

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

SV Försäkran om överensstämmelse

Vi, Nilfisk FOOD, försäkrar under ansvar att produkterna MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, som omfattas av denna försäkran, är i överensstämmelse med rådets direktiv om inbördes närmande till EU-medlemsstaternas lagstiftning, avseende: Maskindirektivet (2006/42/EG).

- EN 60335-2-79 : 2012
- EMC-direktivet (2014/30/EU).
- EN 55014-1 : 2007
- EN 55014-1 : 2015
- EN 61000-3-2 : 2014
- EN 61000-3-2 : 2013.

DA Overensstemmelseserklæring

Vi, Nilfisk FOOD, erklærer under ansvar at produkterne MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3 som denne erklæring omhandler, er i overensstemmelse med disse af Rådets direktiver om indbyrdes tilnærmelse til EF-medlemsstaternes lovgivning:

- Maskindirektivet (2006/42/EF).
- EN 60335-2-79 : 2012
 - EMC-direktivet (2014/30/EU).
 - EN 55014-1 : 2007
 - EN 55014-1 : 2015
 - EN 61000-3-2 : 2014
 - EN 61000-3-2 : 2013.

RU Декларация соответствия

Мы, компания Nilfisk FOOD, со всей ответственностью заявляем, что изделия MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, к которым относится настоящая декларация, соответствуют следующим Директивам Совета Евросоюза об унификации законодательных предписаний стран-членов ЕС: Механические устройства (2006/42/EC).

- EN 60335-2-79 : 2012
- Электромагнитная совместимость (2014/30/EU)
- EN 55014-1 : 2007
- EN 55014-1 : 2015
- EN 61000-3-2 : 2014
- EN 61000-3-2 : 2013.

SL Izjava o skladnosti

V Nilfisk FOODu s polno odgovornostjo izjavljamo, da so naši izdelki MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3na katere se ta izjava nanaša, v skladu z naslednjimi direktivami Sveta o približevanju zakonodaje za izenačevanje pravnih predpisov držav članic ES:

- Direktiva o strojih (2006/42/ES).
- EN 60335-2-79 : 2012
 - Direktiva o elektromagnetni združljivosti (EMC) (2014/30/EU).
 - EN 55014-1 : 2007
 - EN 55014-1 : 2015
 - EN 61000-3-2 : 2014
 - EN 61000-3-2 : 2013.

FI Vaatimustenmukaisuusvakuutus

Me, Nilfisk FOOD, vakuutamme omalla vastuullamme, että tuotteet MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, joita tämä vakuutus koskee, ovat EY:n jäsenvaltioiden lainsäädännön yhdenmukaistamiseen tähtäävien Euroopan neuvoston direktiivien vaatimusten mukaisia seuraavasti:

- Konedirektiivi (2006/42/EY).
- EN 60335-2-79 : 2012
 - EMC-direktiivi (2014/30/EU).
 - EN 55014-1 : 2007
 - EN 55014-1 : 2015
 - EN 61000-3-2 : 2014
 - EN 61000-3-2 : 2013.

PL Deklaracja zgodności

My, Nilfisk FOOD, oświadczamy z pełną odpowiedzialnością, że nasze wyroby MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, których deklaracja niniejsza dotyczy, są zgodne z następującymi wytycznymi Rady d/s ujednolicenia przepisów prawnych krajów członkowskich WE:

- Dyrektywa Maszynowa (2006/42/WE).
- EN 60335-2-79 : 2012
 - Dyrektywa EMC (2014/30/EU).
 - EN 55014-1 : 2007
 - EN 55014-1 : 2015
 - EN 61000-3-2 : 2014
 - EN 61000-3-2 : 2013.

HU Megfelelőségi nyilatkozat

Mi, Nilfisk FOOD, izjavljujemo pod vlastitom odgovorností da je proizvod MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, na koji se ova izjava odnosi, u skladu s direktivama ovog Vijeća o usklađivanju zakona država članica EU:

- Direktiva za strojeve (2006/42/EZ).
- EN 60335-2-79 : 2012
 - Direktiva za elektromagnetsku kompatibilnost (2014/30/EU).
 - EN 55014-1 : 2007
 - EN 55014-1 : 2015
 - EN 61000-3-2 : 2014
 - EN 61000-3-2 : 2013.

HR Izjava o usklađenosti

Mi, Nilfisk FOOD, izjavljujemo pod vlastitom odgovorností da je proizvod MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, na koji se ova izjava odnosi, u skladu s direktivama ovog Vijeća o usklađivanju zakona država članica EU:

- Direktiva za strojeve (2006/42/EZ).
- EN 60335-2-79 : 2012
 - Direktiva za elektromagnetsku kompatibilnost (2014/30/EU).
 - EN 55014-1 : 2007
 - EN 55014-1 : 2015
 - EN 61000-3-2 : 2014
 - EN 61000-3-2 : 2013.

SR Deklaracija o konformitetu

Mi, Nilfisk FOOD, izjavljujemo pod vlastitom odgovornošću da je proizvod MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3 na koji se ova izjava odnosi, u skladu sa direktivama, Saveta za usklađivanje zakona država članica EU:

Direktiva za mašine (2006/42/EC).

- EN 60335-2-79 : 2012

EMC direktiva (2014/30/EU).

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

BG Декларация за съответствие

Ние, фирма Nilfisk FOOD, заявяваме с пълна отговорност, че продуктите MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, за които се отнася настоящата декларация, отговарят на следните указания на Съвета за уеднаквяване на правните разпоредби на държавите членки на ЕС:

Директива за машините (2006/42/EC).

- EN 60335-2-79 : 2012

Директива за електромагнитна съвместимост (2014/30/ EU).

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

RO Declarație de conformitate

Noi, Nilfisk FOOD, declarăm pe propria răspundere că produsele MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3 la care se referă această declarație, sunt în conformitate cu aceste Directive de Consiliu asupra armonizării legilor Statelor Membre CE:

Directiva Utilaje (2006/42/CE).

- EN 60335-2-79 : 2012

Directiva EMC (2014/30/EU)

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

CS Prohlášení o shodě

My firma Nilfisk FOOD prohlašujeme na svou plnou odpovědnost, že výrobky MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, na něž se toto prohlášení vztahuje, jsou v souladu s ustanoveními směrnice Rady pro sblížení právních předpisů členských států Evropského společenství v oblastech:

Směrnice pro strojní zařízení (2006/42/ES).

- EN 60335-2-79 : 2012

Směrnice pro elektromagnetickou kompatibilitu (EMC) (2014/30/EU)

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

SK Prehlásenie o zhode

My firma Nilfisk FOOD prehlasujeme na svoju plnú zodpovednosť, že výrobky MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, na ktoré sa toto prehlásenie vzťahuje, sú v súlade s ustanovením smernice Rady pre zblíženie právnych predpisov členských štátov Európskeho spoločenstva v oblastiach:

Smernica pre strojové zariadenie (2006/42/EC).

- EN 60335-2-79 : 2012

Smernica pre elektromagnetickú kompatibilitu (2014/30/EU).

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

TR Uygunluk Beyanı

Nilfisk FOOD olarak bu beyannameye konu olan MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, ürünlerinin, AB Üyesi Ülkelerin kanunlarını birbirine yaklaştırma üzerine Konsey Direktifleriyle uyumlu olduğunu yalnızca bizim sorumluluğumuz altında olduğunu beyan ederiz:

Makinelere Yönetmeliği (2006/42/EC).

- EN 60335-2-79 : 2012

EMC Direktifi (2014/30/ EU).

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

ET Vastavusdeklaratsioon

Meie, Nilfisk FOOD, deklareerime enda ainuvastutuse, et tooted MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, mille kohta käesolev juhend käib, on vastavuses EÜ Nõukogu direktiividega EMÜ liikmesriikide seaduste ühitamise kohta, mis käsitlevad:

Masinate ohutus (2006/42/EC).

- EN 60335-2-79 : 2012

Elektromagnetilise ühilduvus (EMC direktiiv) (2014/30/ EU).

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

LT Atitikties deklaracija

Kompanija Nilfisk FOOD заявляє про свою виключну відповідальність за те, що продукти MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, на які поширюється дана декларація, відповідають таким рекомендаціям Ради з уніфікації правових норм країн - членів ЕС:

Механічні прилади (2006/42/EC).

- EN 60335-2-79 : 2012

Електромагнітна сумісність (2014/30/ EU).

- EN 55014-1 : 2007

- EN 55014-1 : 2015

- EN 61000-3-2 : 2014

- EN 61000-3-2 : 2013.

LV Atbilstības deklarācija

Sabiedrība NILFISK FOOD ar pilnu atbildību dara zināmu, ka produkti MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, uz kuriem attiecas šis paziņojums, atbilst šādām Padomes direktīvām par tuvināšanos EK dalībvalstu likumdošanas normām: Mašīnbūves direktīva (2006/42/EK).

- EN 60335-2-79 : 2012
- Elektromagnētiskās saderības direktīva (2014/30/EU).
- EN 55014-1 : 2007
- EN 55014-1 : 2015
- EN 61000-3-2 : 2014
- EN 61000-3-2 : 2013.

Technical file responsible:

Flemming Asp
Nilfisk FOOD
Blytaekervej 2
9000 Aalborg, Denmark

UK Свідчення про відповідність

Вимогам

Компанія Nilfisk FOOD заявляє про свою виключну відповідальність за те, що продукти MA2CM, MA3CM, MA2C, MA3C, MA2M, MA3M, MA2, MA3, на які поширюється дана декларація, відповідають таким рекомендаціям Ради з уніфікації правових норм країн - членів ЕС:

- Механічні прилади (2006/42/EC).
- EN 60335-2-79 : 2012
- Електромагнітна сумісність (2014/30/EU).
- EN 55014-1 : 2007
- EN 55014-1 : 2015
- EN 61000-3-2 : 2014
- EN 61000-3-2 : 2013.

Signature:



Flemming Asp
R & D Manager
Aalborg d. 31-01-2017

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2. Symbols used in this document

	Read before use
	Wear glasses when using the unit.
	Wear gloves and suitable clothing when using the unit.
	Note: A potentially damaging situation. Possible consequences: The product or something in its vicinity could be damaged. Prevention.
	Caution: A dangerous situation. Possible consequences: light or minor injuries. Can also be used to warn against damage to property or other goods prevention.
	Warning: A Potentially dangerous situation. Possible consequences: Death or severe injury.
	Danger: A dangerous situation. Possible consequences: Death or severe injury.
	Danger: Risc of electric shock! Possible consequences: Death or severe injury.
	Danger: Warning! Sharp edges – watch your fingers.
	Hot Surfaces Risc of burns! Possible consequences: Severe injuries.

3. General information

Nilfisk FOOD congratulates you on your new low-pressure foam and sanitising cleaning equipment.

The equipment provides the latest standard of technology in low pressure cleaning equipment in your factory.

The equipment can be used for rinsing, foaming and application of disinfectants.

It is important that your operational staff read these directions for use prior to installation, start up and use of the equipment.

Manual series

For this unit the following manuals are available :

110004669 Direction for use – Hybrid Foamatic MA/SA

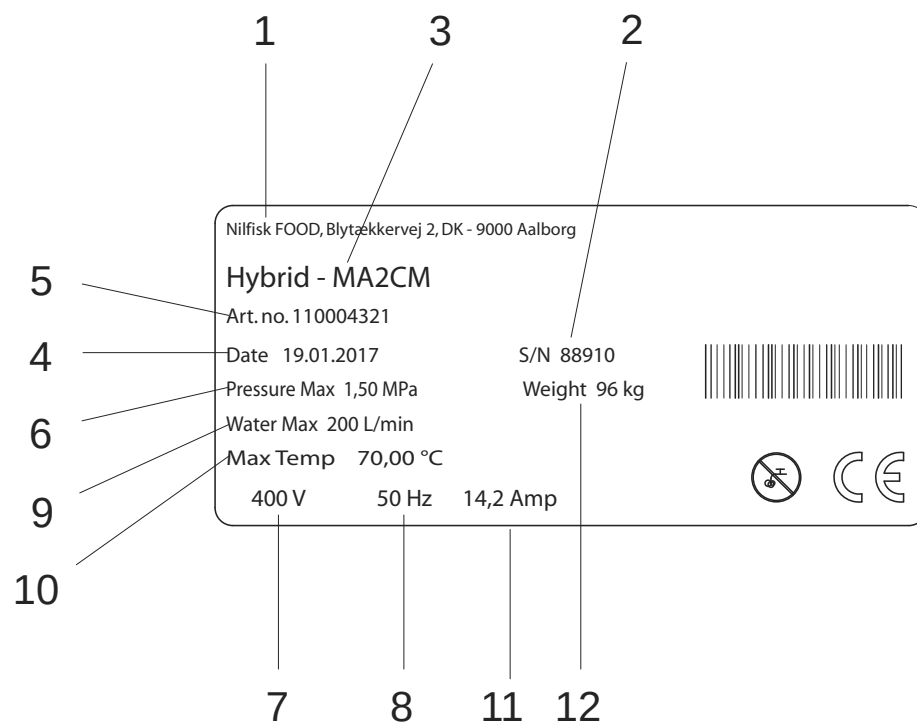
110004670 User guide - Hybrid Foamatic MA/SA

110004671 Software manual –Hybrid Foamatic MA/SA*

Direction for use and User guide will be enclosed as physical paper manuals.

*The software manual must be downloaded from nilfiskfood.com - in order to ensure that you always have the latest updated version.

3.1. Identification plate



1. Producer
2. Serial no
3. Type
4. Date of production
5. Article no
6. Maximum pressure
7. Supply voltage
8. Frequency
9. Maximum water consumption
10. Maximum temperature
11. Current
12. Weight

3.2. Supplier

Nilfisk FOOD
Blytækkervej 2
DK-9000 Aalborg, Denmark
Tel.: +45 7218 2000
CVR no. 6257 2213
www.nilfiskfood.com

3.3. Specifications

Water	Unit	MA
Max.outlet pressure.	MPa (bar)	1,5 (15)*
Consumption during rinsing (manual)	L/min	30
Consumption during foaming (manual)	L/min	8
Consumption during rinsing max. (automatic)	L/min	200
Consumption during foaming (automatic)	L/min	8/16/24
Min. supply pressure	MPa (bar)	0,2 (2)
Max. supply pressure	MPa (bar)	0,8 (8)
Min. water supply	L/min	200
Max water temperature	C°	70
Pipe dimension inlet Ø	mm	38
Pipe dimension outlet Ø	mm	38
Clamp connection type/size (Ferrole)	Type/mm	DS-SMS/ø50,4
Compressed air		
Min/max. air pressure	MPa (bar)	0,5-1,0 (5-10)
Compressed air consumption	NL/min	200-450
Pipe dimension inlet Ø	mm	6
Electricity		
Supply voltage	V	3/PE 400Vac ±10%
Frequency	Hz	50/60Hz 48-0%..62+0%
Motor load (kW)	kW	5.5
Nominal current	A	14.2
Fuse	A	20
Internal fuse 5x20mm - 400V	A	1 slow blow
L1, L2, L3, PE	mm ²	2.5
General		
Sound level ISO 11202	dB	Below 70
Dimensions HxWxD	mm	1260x560x400
Weight	kg	96
IP class		55

4. Overview and use

The mainstation in the Hybrid range is a completely functioning hygiene and pumping station that supplies pressurised water to both its integrated hygiene points (optional) and to several connected cleaning areas. Therefore the mainstation must be supplied with:

water in sufficient quantity, power, compressed air, detergent(s), disinfectant.

The station is then ready for hygiene duties.

The mainstation is fitted with a frequency controlled pump which ensures a constant working pressure independent of usage pattern.



Warning: Do not use the water from the system for applications other than cleaning.

Consumptions:

The unit is approved for the use of detergents and disinfectants.



Warning: Do not change the settings made or recommended by the supplier of the detergents!

Detergents are supplied via a User Pack system or from separate standard cans. Supply is also possible via piping systems.

Before installation and set up of the unit always read this instruction thoroughly. Always make sure to follow personal safety procedures for chemicals in connection with refilling procedures (product change), maintenance and repair. See also product label and Material Safety Data Sheet (MSDS).

Safety instructions

Only professional service personnel are allowed to carry out service and repairs on the unit.

Only instructed personnel are allowed to operate the unit.

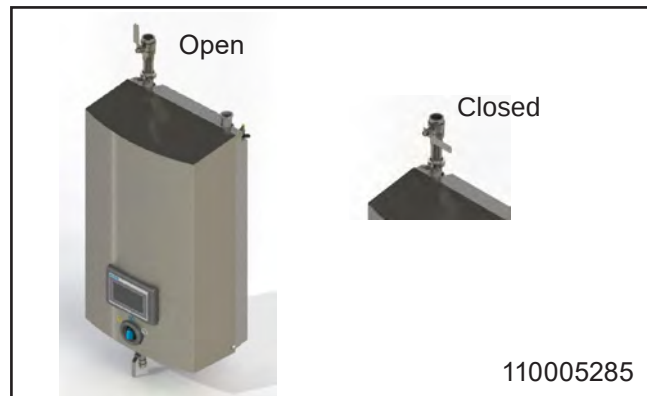
5. System safety

In case of error/defect or service on equipment:

1. Close the water supply
2. Close the air supply
3. Turn off power supply

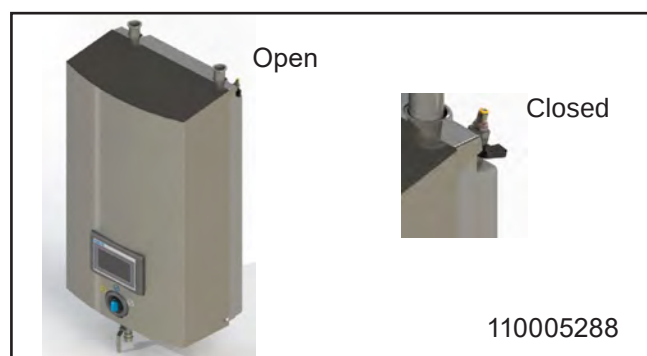
5.1. Closing valve for water supply.

With this valve the unit can be isolated from the water supply. Further, a non-return valve is built in the unit to prevent backflow of water.



5.2. Closing valve for air supply

With this valve the unit can be isolated from the air supply. Two non-return valves for air are built in the unit to prevent backflow of air.



The air pressure regulation/gauge only works when the supply valve is open.



Wear glasses when using the unit.



Wear gloves and suitable clothing when using the unit.



Warning:

The spray jets can be dangerous if subjected to misuse. The jets must not be directed at persons, live electrical equipment or the unit itself.



Warning:

Do not use the unit within range of persons unless they wear protective clothing.

5.3. Noise

Sound level according to ISO 11202: Below 70dB.

5.4. Vibrations

Hand-arm vibrations according to ISO 5349-1

5.5. Anticipated failures

Bursting air tube in unit:

- The unit must never be used without the front cover being mounted.
- The air closing valve on /in connection with the unit must always be closed when not in use.
- Air tube and fitting should be examined regularly and exchanged in case of visible damages.

Breakdown of non-return valves for air and water:

- The unit must never be used without the cover being mounted.
- Air and water closing valve on/in connection with the unit must always be closed when the unit is not in use.
- After use of the unit all chemical non-return valves must be thoroughly rinsed with clean water. Follow instructions in paragraph 9.4.
- Non-return valves for air and water should be examined minimum once a year by authorised personnel for defects.

Repair of unit:

- Do not attempt to repair a defect unit by yourself. Always contact an authorised service company.
- Block and mark any defect unit in order to avoid unintended use - see paragraph below regarding "Rest risk - Use of the unit"
- For safety reasons only use approved and original spare parts.

5.6. Rest Risk

Use of unit:

- Never use the unit without prior instructions in use of the unit and its safety instructions. The instruction must be prepared by an educated/instructed personnel.
- Never use the unit without having read the enclosed guide and safety instructions.
- Always close water and air supply after use.

Damaged unit:

- Never use the unit if leakages (air, water or chemical) are observed.
- Never use the unit if it is not possible to operate the closing valves and/or if it is not possible to select required operation.
- Never use the unit if it has been dislodged for its original place of mounting.

6. Installation

For safety reasons it is important to read all of the enclosed information before installation of this equipment. In addition, the legislation in force at the time of purchase must always be considered in connection with the installation and mounting of this equipment, no matter the contents of this manual. If there are matters of dispute please contact your dealer.



The pipeline must be rinsed through before the system is connected.



Remove cover before the unit is mounted on the wall.

6.1. Directions for mounting



- The unit should be mounted in frost-free rooms only.
- The unit can be mounted on a wall or on a separate frame which may be installed in production areas and anchored to the floor.
- For mounting on walls, please note the following:

The wall for mounting should be either a stable brick wall or a wall made of concrete.



- If the wall the unit is to be mounted on is made of bricks or concrete, the enclosed screws and rawl plugs are usable to mount the delivered bracket, otherwise you have to make sure that the carrying capacity of the wall is sufficient.
- The wall bracket should be mounted on the wall according to the above description and the station is hung on to the bracket.
- When mounted on the bracket secure the unit in the top by two screws through the designated holes. The hose and User Pack holders should be mounted afterwards. (See installation drawing)

6.2. Transportation

For secure transportation of the unit, we recommend always to ensure, that the unit can not slide or tip. The unit might have to be secured with straps. Transportation of the unit only in horizontal position: The unit must not be placed on the front where you find the operation panel. Neither can it be placed on top or bottom where connections and outlets are mounted.

In case the unit is moved at a temperature of approx or below 0°C (32°F), you must always make sure that the unit has been fully emptied for water. If this is not the case, you may damage the unit.

6.3. Electrical installation

6.3.1. Power supply

Connection instruction is mounted on the cables.
The phase order is subordinated.

6.3.2. Earth leakage circuit breaker (ELCB).

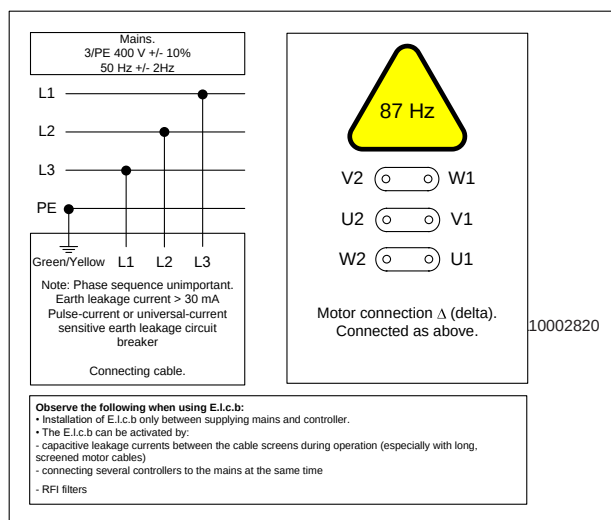
When using an earth leakage circuit breaker (ELCB) also known as a residual current device (RCD) or a residual current circuit breaker (RCCB) in a system that incorporates a variable speed drive connected to 3 phase 400 V. The trip level of the ELCB has to be 300 mA. (30 mA used in house hold will malfunction due to earth leakage).

6.3.3. Service switch

The unit must always be connected to the main supply through a separate service switch.

NB! Installation must always be in accordance with local legislation.

	MAXXX
Voltage:	3/PE 400 Vac $\pm$ 10%
Frequenz:	50/60 Hz 48 -0%...62 +0%
Motor load:	5.5 kW
Nominal current:	14.2 A
Fuse:	20 A
L1, L2, L3, PE	2.5 mm ²



6.4. Safety relay

The mainstation is equipped with a safety relay. The relay breaks the main supply to the motor inverter when activated. Please see enclosed electrical schematic for connection terminals.

6.5. Water connection



- Before the unit is connected to the water supply pipe, the supply line should be rinsed carefully in order to remove coarse impurities and metal shavings.
- The connection for water must be made at the top of the unit. (see layout drawing).
- Minimum diameter of the supply pipe must be at least Ø38 external (ø35mm internal).
- The unit must be fitted with a closing valve for water on the inlet (see drawing 110005285 on page 14).



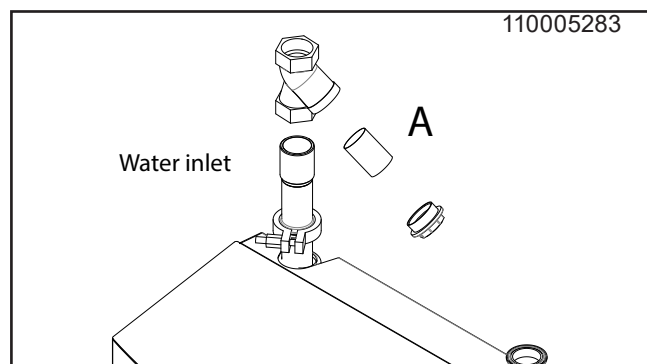
- The pressure loss in the supply line must be held as low as possible by
 - avoiding long supply pipes
 - mounting low pressure resistance ball valves and
 - avoiding fittings with high pressure loss.
- When installing the piping, take care to avoid air traps.
- All pipe connections to the unit must be clamp connections ensuring simple maintenance and dismantling of the station.

Max. allowed temperature of supply water: 70°C

Max. allowed pressure of supply water: 2-8 bar



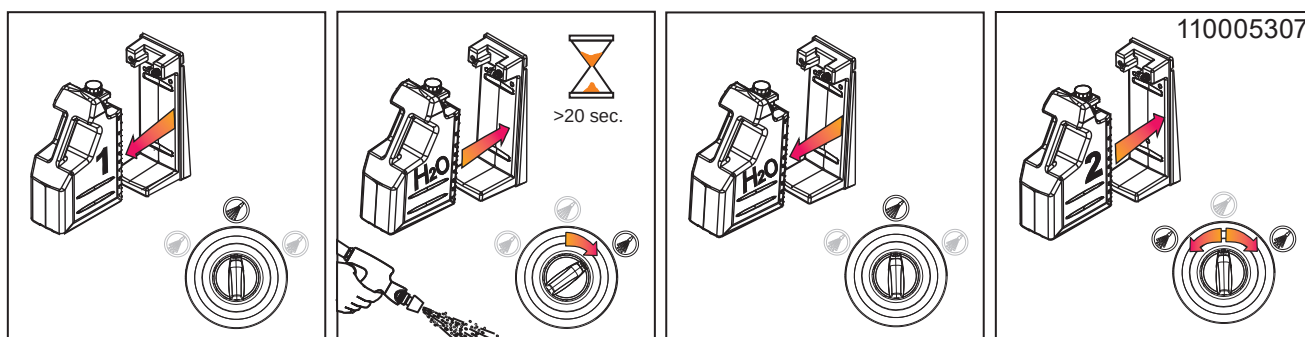
For an optimum functioning of the injector system, we recommend installing a filter on the inlet to avoid impurities.



6.6. Air connection



Before the unit is connected to the air supply, the pipe system must be carefully rinsed in order to remove coarse impurities.



- The unit requires an air supply boosting
- an inlet pressure of minimum 6 bar
- a minimum capacity of 200 l/min.
- The air supply pipe is connected directly with a quick fitting for easy dismantling. In all units an inlet valve with 1/4" thread is fitted (layout drawings).

Mainstation with user pack system

See drawing no 110005307.

- Place the specially designed user pack in the automatic holder.
- If changing to a different product when ending the cleaning process, rinse the product inlet line with clean water as follows:

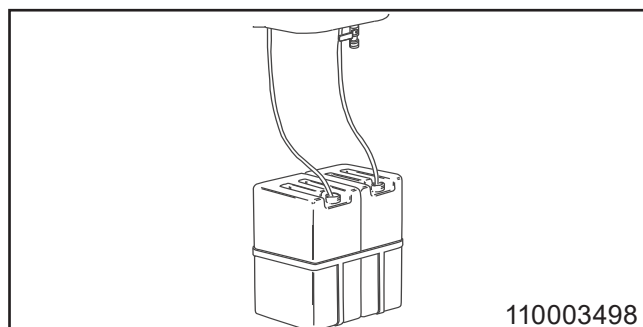
Replace the User Pack containing product by one with clean water; place the foam nozzle and open the spray gun/outlet valve. The product inlet line is now rinsed with clean water before use of another product.

6.7. Supply of detergent

Mainstation without user pack system.

See drawing no 110003498

- Place the can with detergent in the can holder
- Check the suction filter for impurities.
- Put the suction hose into the can below product level and avoid suction of air.
- After pre-rinsing, check again that the hose is sufficiently below product level and avoid suction of air during foam or spray operation.
- After use of and when changing product as well as after use of the unit, remove the hose from the can and rinse the product inlet line and injector with clean water.



6.8. Hose connection

- The special hose fitted with spray gun/outlet valve is connected to the outlet quick coupling of the unit (layout drawing).
- Maximum hose length: 30 m.
- It is recommended only to use Nilfisk FOOD hoses, which have been tested for resistance.

7. System preparation

7.1. Start up of new system

In order to ensure a problem-free start up of a new system the pipe system and pump must be flushed and bled.

Bleeding the pipe system

1. Turn on the water supply to rinse and bleed the entire system. If satellites are installed open the tap furthest away until no air or dirt comes out. Then rinse and bleed the next tap and continue until the tap closest to you has been rinsed and bled.

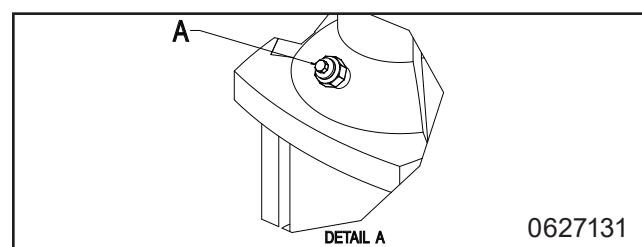
Bleeding the pump

1. Loosen the relief plug (A) (drawing 0627131) 1-2 revolutions until water and air begin to flow out.



Never loosen the relief plug while the pump is running as this may damage the packing. Tighten the relief plug again.

2. Start the pump so that all remaining air pockets are forced up to the top of the pump.
3. Stop the pump
4. Loosen the relief plug 1-2 revolutions again and bleed the system until only water flows out.
5. Tighten the relief plug once more.



The mainstation is now ready for operation.



7.1.1. Start

1. Make sure that the water and air supply to the unit is open. For air see layout drawing. In case of central chemical supply this must be activated too.
2. Select requested function. Use the unit according to the "User guide".

7.1.2. Stop

1. Press "□" to stop program if running.
2. Close the water supply (see drawing 110005285-page 14).
3. Close the air supply (see drawing 110005288-page 14).
4. Deactivate chemical supply by pulling up the suction hose or removing the User Pack.



Due to the following it is very important to close water, air and chemical supply when the unit is not in use.

- If the air supply is open when the unit is not in use - air might seep into the water pipe - which means that the system has to be bled again.

7.1.3. Adjustment of air

Remove the cover from the unit.

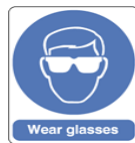
Adjust the air pressure on the reduction valve until an appropriate foam quality is reached.



When setting the regulator, carefully pull up the knob and turn it clockwise for pressure increase and counter clockwise for pressure decrease.



8. Operation



Wear glasses when using the unit.



Wear gloves and suitable clothing when using the unit.



WARNING

This machine has been designed for use with the cleaning agents supplied or recommended by the supplier

8.1. Start/Stop (change, rinse, foam, des)

Start mainstation

1. Check that water- and air supplies for the system are open.
2. Make sure that the water and air supply to the unit is open. For air see drawing 110005288-page 14. In case of central chemical supply this must be activated too.
3. Select requested function. Use the unit according to the "user guide".

Stop mainstation

1. Press "□" to stop program if running.
2. Turn off the water supply
3. Close the air supply
4. Deactivate chemical supply by pulling up the suction hose or removing the User Pack.



It is important to shut off the water and air when the unit is left after use .

If the air supply is open when the unit is not in use, air may seep into the water pipe. If this is the case the system may have to be bled again.

It may be necessary to bleed the pipes and the unit again after it has been closed for a longer period of time (holidays, and the like)



CAUTION

The chemical supply must always be rinsed thoroughly after use.

The following procedure will clean the chemical supply for detergents and/or remains of disinfectants:

1. Remove User Pack or standard can.
2. Hold the rinsing bottle with clean water tightly against the suction opening (with User Pack). Alternatively, you can place a User Pack with clean water in the holder or – without User Pack – place the hose in a bucket of clean water.
3. Activate the hose handle until clean water comes out of the nozzle (approx. 30 seconds).

8.2. Long stops

If long production stops are planned (more than 6 months) and the pump is emptied of water, it is recommended that the pump be secured as follows:

1. Remove the coupling safety guard.
2. Spray a couple of drops of silicone oil onto the axle between the top section and the coupling.

Carefully follow the instructions given in the manual provided by the pump supplier. Never store or install the equipment where the ambient temperature gets at or below the freezing point.

8.3. Regular maintenance

Quick coupling; it is recommended to lubricate all coupling parts regularly, approx. once a month) by waterproof grease to prevent leaks and damage of o-rings.

1. If the quick couplings leak, o-rings should be replaced.
2. Depending on usage, maintenance should be undertaken by an authorised service engineer at least once a year in order to prevent defects and failure of operation. Authorised engineers are persons who due to their skills and experience have sufficient knowledge of Hygiene Systems and are confident with the state work safety regulations, accident preventing regulations, lines and generally acknowledged technical regulations such as DIN-norms and VDE-provisions. For your safety, this cleaning unit has been manufactured according to all relevant regulations valid in the EU and therefore it has been supplied with the CE-marking. For further information, please refer to the service department.
3. When the cleaning process has been completed or chemicals have been changed, it is important to rinse the suction and injector system in the following way:
 - Replace the can with a can containing clean water.
 - Put the suction hose into the water can.
 - Connect the foam nozzle.
 - Open the spray gun/outlet valve and keep it open until the injector has been rinsed through (approx. 30 seconds).
 Remove the suction hose from the water can.
4. It is recommended to delime the unit according to paragraph 9.6

9. Maintenance, trouble shooting, service

Service may only be carried out by authorized and qualified personnel.



CAUTION

The system must only be serviced when there is no voltage or pressure on the system.

1. Turn off the main switch.
2. Open a water outlet to depressurise the system.



CAUTION

The system might be hot. Ensure sufficient cooling time.



Wear glasses.



Wear gloves and be aware of chemicals.

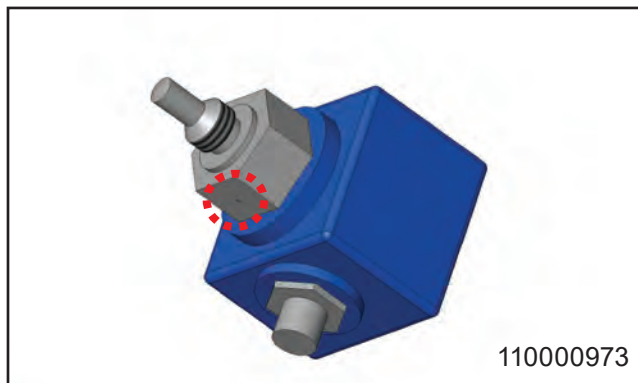


WARNING

To ensure machine safety, use only original and approved spare parts.

9.1. Installation instruction for flow switch

There is a dot on one of the nut surfaces on the sensor. This is used to position the contact point of the sensor in relation to the direction of flow of the medium.



110000973

This marking must be located within an angle of $\pm 30^\circ$ parallel to the direction of flow, as shown in the example.

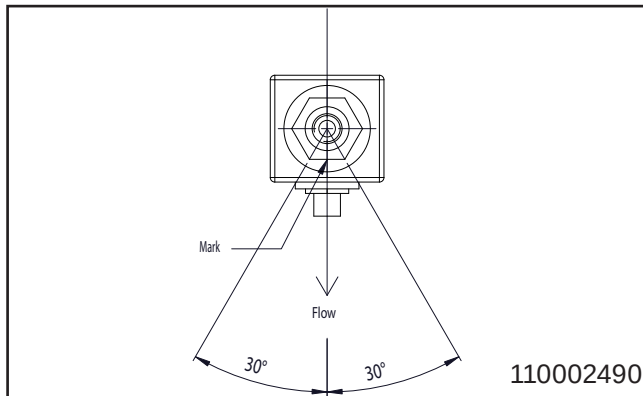
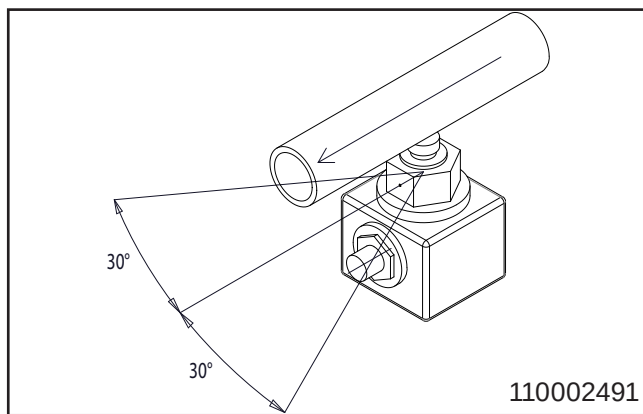


Diagram of sensor fitted in a pipe.



Loctite 577 is used at the factory to seal the thread, but packing yarn/packing tape can also be used.

9.2. Components

9.2.1. Pump/motor

Pump/motor are maintenance free.

9.2.2. Control system

Maintenance free.

If defective: Call a service technician.

9.2.3. Flow switch

Maintenance free.

If defective, replace the flow switch.

1. Press "□" on the control display to stop the system.
2. Remove the cover.
3. Turn the "rinse/foam" handle to foam position.
4. Activate the spray handle on the outlet hose so water runs out.
5. Check that the flow switch is turned the correct way (the wire must follow the flow direction).
6. Turn the brass screw at the bottom of the hole until a green diode lights up.
7. Close the spray handle again and check that the red diode lights up.
8. Mount the cover.

9.2.4. Product solenoid valve

Maintenance free.

If defective, replace the product solenoid valve and/or replace chemical supply hoses.



Warning: Risk of chemical residue.
Wear protective gear.

1. Turn off power supply.
2. Remove valve with a slot-head screwdriver.
3. Change valve and/or hoses. Be ware of flow direction marked on bracket.
4. Mount the valve in the bracket.



The flow direction is marked on the bracket. The flow of chemical supply is in the direction of the arrow with the tip pointing towards the automatic block. Do NOT use the marking printed on the solinoid valve.

9.3. Preventive maintenance

Depending on usage, maintenance should be undertaken by an authorised service engineer at least once a year in order to prevent defects and failure of operation. Authorised engineers are persons who due to their skills and experience have sufficient knowledge of the Hygiene Systems and are confident with the state work safety regulations, accident preventing regulations, lines and generally acknowledged technical regulations such as DIN-norms and VDE-provisions. For your safety, this cleaning unit has been manufactured according to all relevant regulations valid in the EU and therefore it has been supplied with the CE-marking. For further information, please refer to the service department.

9.4. Rinsing the chemical supply/injector system



The chemical supply must always be rinsed thoroughly after use.

Remains of detergents or disinfectants can clog the injector so it needs to be rinsed or replaced.

The following procedure will clean the chemical supply for detergents and/or remains of disinfectants.

1. Remove User Pack, if any.
2. Hold the rinsing bottle with clean water tightly against the suction opening (with User Pack) or against the hose (without User Pack). Alternatively, you can place a User Pack with clean water in the holder or – without User Pack – place the hose in a bucket of clean water.
3. Activate the hose handle until clean water comes out of the nozzle (approx. 30 seconds).



This procedure should be followed both on the detergent and the disinfectant side (if this is installed).

9.5. Change of injector

1. Turn off power supply.
2. Turn off water and air supply.
3. Depressurise the system.
4. Unscrew and change injector. Beware of chemical residue.
5. Reconnect water, air supply and power supply.



WARNING

Risk of chemical residue.
Wear protective clothing.



CAUTION

The unit might be hot.
Ensure sufficient cooling time.

9.6. Deliming

The interval of the deliming procedure depends on the water hardness. Please see table in the end of this section.

9.6.1. Manual block

1. Make sure the water and the power to the unit is disconnected.
2. Remove the cover from the unit.
3. Depressurise the system.
4. Dismount the injector block, product non-return valve, air valve and air non-return valve including the air fittings.
5. Rinse the injector block in the clean water.
6. Place the injector block and product non-return valves in a deliming bath - make sure the selector knob is over the surface.
7. Wait for 60 minutes.
8. Rinse the injector block in clean water.
9. Mount the air valve, air non-return valve and product non-return valve on the injector block and mount the injector block in the unit.
10. Reconnect water to the unit.
11. Test the unit in foam position make sure the vacuum is sufficient, it is recommended to be between 14,8-20,7 inHg/-0,05-0,07MPa.
12. Test that the unit can start and stop in both foam and rinse position.
13. Reinstall the cover on the unit.

9.6.2. Automatic block

A dedicated deliming program is needed for the following process:

1. Remove the cover from the unit.
2. Place the chemical supply hoses in clean water and activate the foaming function on all chemical valves for 1 minute.

3. Place the chemical hoses in deliming fluid and activate the foaming function for all chemical valves for 1 minute.
4. Wait 60 minutes.
5. Place the chemical hoses in clean water and activate the foaming function on all chemical valves for 5 minutes.
6. Activated the rinsing function for 1 minute.
7. Test foaming function and make sure the vacuum is sufficient, it is recommended to be between 14,8-20,7 inHg/-0,05-0,07MPa.
8. Reinstall the cover on the unit.

°dH	ppm	Time between deliming
0-5	18-90	12 months
5-10	90-180	6 to 12 months
10-15	180-270	3 to 6 months
15-20	270-360	3 to 6 months
>20	>360	1 to 3 months

Table 9.1

9.7. Coupling

It is recommended to lubricate all coupling parts regularly (approx. once a week) with waterproof grease to prevent leaks and damage of o-ring. If the unit is equipped with a spray gun the o-ring of the gun should also be lubricated.

In leaking quick couplings the o-rings should be replaced.

9.8. Internal cleaning of the unit

Depending on the environment where the unit is installed, internal cleaning of the unit might be required. We recommend opening and cleaning the unit inside once a year. Do not spray inside the unit.

Chemical hoses; it is recommended to check all chemical hoses regularly, approx. once every 3rd month.

9.9. Trouble shooting and remedy

In case of errors/troubles not mentioned above, please contact your local service technician for further assistance.

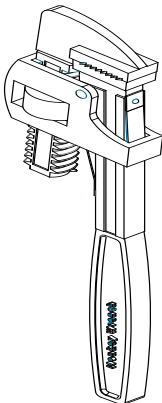
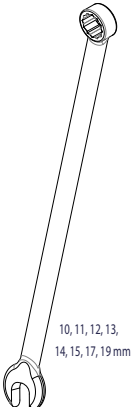
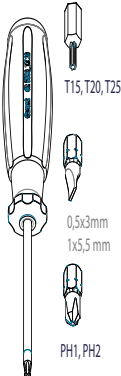
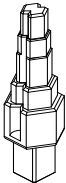
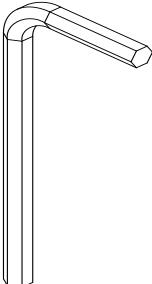
Fault	Cause	Remedy
The unit does not start	- Is there supply voltage to the unit - Error message in display - Flow switch out of adjustment	- Reconnect voltage and ensure 3x400V supply - Read error and act accordingly - Try to readjust flow switch
No pressure / too low pressure	- Insufficient water supply at unit - Is the filter clogged - Is the pump leaking or making jarring sounds - Rinsing nozzle not installed - Defect in mainstation unit - No water supply	- Open water supply valve - Clean the filter - Call technician - Place rinsing nozzle - Consult direction for use of mainstation - Ensure water supply
Insufficient foam creation	- No supply of diluted products - Product not suitable - Insufficient air supply at unit - Air pressure in mixing chamber too high - Defect non-return valve for air - Incorrect nozzle - Leaking or blocked chemical non-return valve - System needs deliming	- Consult directions for use of dosing unit - Choose suitable product - Provide sufficient air supply - Adjust air pressure setting - Replace non-return valve for air - Place foam nozzle 50/200 - Clean or replace chemical non-return valve - Delime the unit according to paragraph 9.5
No foam creation	- No supply of diluted products - Product not suitable - Air pressure in mixing chamber too high - Defect non-return valve for air - No air supply at unit - Non-return valve blocked - Nozzle of mixing chamber blocked - Leaking or blocked chemical non-return valve - System needs deliming	- Consult directions for use of dosing unit - Choose suitable product - Adjust air pressure setting - Replace non-return valve for air - Ensure air supply - Clean or replace non-return valve - Clean nozzle - Clean or replace chemical non-return valve - Delime the unit according to paragraph 9.5
No spray sanitising	- No supply of diluted products - Non-return valve blocked - Nozzle of mixing chamber blocked - Leaking or blocked chemical non-return valve - System needs deliming	- Consult directions for use of dosing unit - Clean or replace non-return valve - Clean nozzle - Clean or replace chemical non-return valve - Delime the unit according to paragraph 9.5

9.10. Service address

Please see the back cover of this manual.

10. Tools

Standard tools that are useful/necessary for service and maintenance on the full range of equipment.

	BF/BW & MB Booster Mainstation Foamatic mainstation		Satellites BF/BW & MB Booster Mainstation Foamatic satellites Foamatic mainstation
 10, 11, 12, 13, 14, 15, 17, 19 mm	Satellites BF/BW & MB Booster Mainstation Foamatic satellites Foamatic mainstation	 T15, T20, T25 0.5x3mm 1x5.5 mm PH1, PH2	Satellites BF/BW & MB Booster Mainstation Foamatic satellites Foamatic mainstation
	BF/BW & MB Booster		Foamatic satellites Foamatic mainstation
 3, 4, 5, 6, 8, 10 mm	Satellites BF/BW & MB Booster Mainstation Foamatic satellites Foamatic mainstation		Satellites Mainstation Foamatic satellites Foamatic mainstation

11. End of use

11.1. Dismounting

Close all supply valves and remove the unit from wall.

11.2. Disposal

In case the unit should be disposed, it must be separated and sorted in recyclable and non-recyclable parts. The steel construction is easily separated and disposed and constitutes no environmental risk - nor for the user.

Disposal must be made according to rules and regulations in force for disposal of machines as well as all standards in connection with environmental protection.

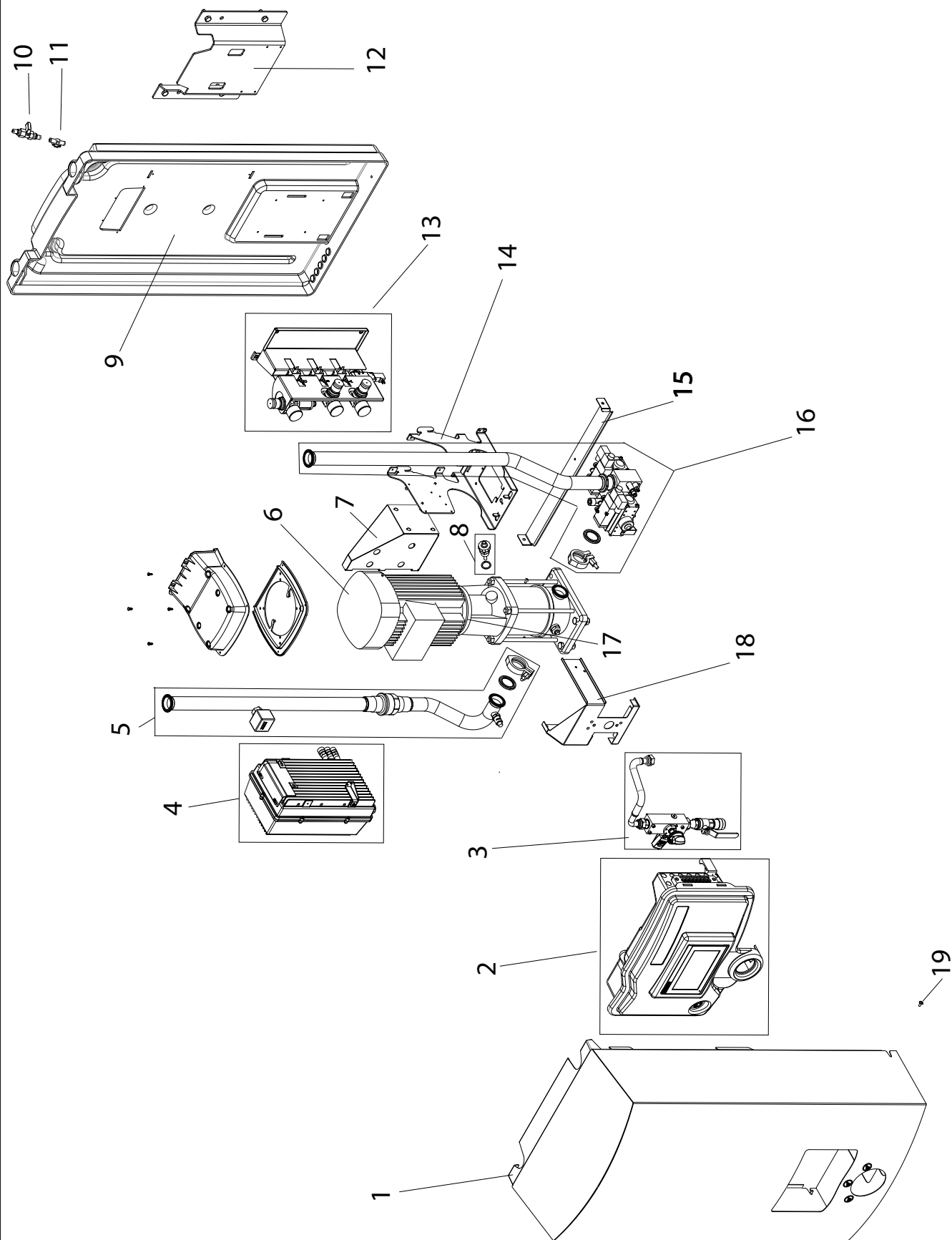


CAUTION

Disposal of electronic components and other remedies must be handled as special disposal when disposed. Alternatively, it can be disposed by a specialised disposal company.

Recommended spare parts
Empfehlenswerte Ersatzteile
Pièces de rechange conseiées
Piezas de requesto recomendadas

Hybrid Foamatic



110004575

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic MA2	Hybrid Foamatic MA3	Hybrid Foamatic MA2C	Hybrid Foamatic MA3C	Hybrid Foamatic MA2M	Hybrid Foamatic MA3M	Hybrid Foamatic MA2CM	Hybrid Foamatic MA3CM
1	110005300	Cover complete	1	1	1	1	1	1	1	1
2		See page 38-40 drawing 110005233 and 110005256								
3		See page 28 drawing 110004572								
4		See page 36 drawing 110005271								
5		See page 34 drawing 110001888								
6	110004300	Pumpe CRN 5-6 kW	1	1	1	1	1	1	1	1
7	110005088	Hinge bracket Mounting part	1	1	1	1	1	1	1	1
8	110004713	PT1000 Sensor complete	1	1	1	1	1	1	1	1
9	0606745	Back cabinet	1	1	1	1	1	1	1	1
10	110001115	Closing valve complete	1	1	1	1	1	1	1	1
11	0608135	Air non return valve								
12	110001141	Wall bracket complete	1	1	1	1	1	1	1	1
13		See page 42 drawing 110004606								
14	110001142	Pump bracket	1	1	1	1	1	1	1	1
15	110003496	Cover bracket	1	1	1	1	1	1	1	1
16		See page 32 drawing 110004580								
17	0634047	Axle sealing	1	1	1	1	1	1	1	1
18	110004949	Block bracket manual block	1	1	1	1	1	1	1	1
19	110003512 (156704)	Screw kit	1	1	1	1	1	1	1	1

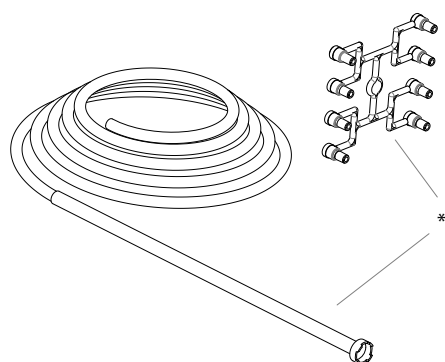
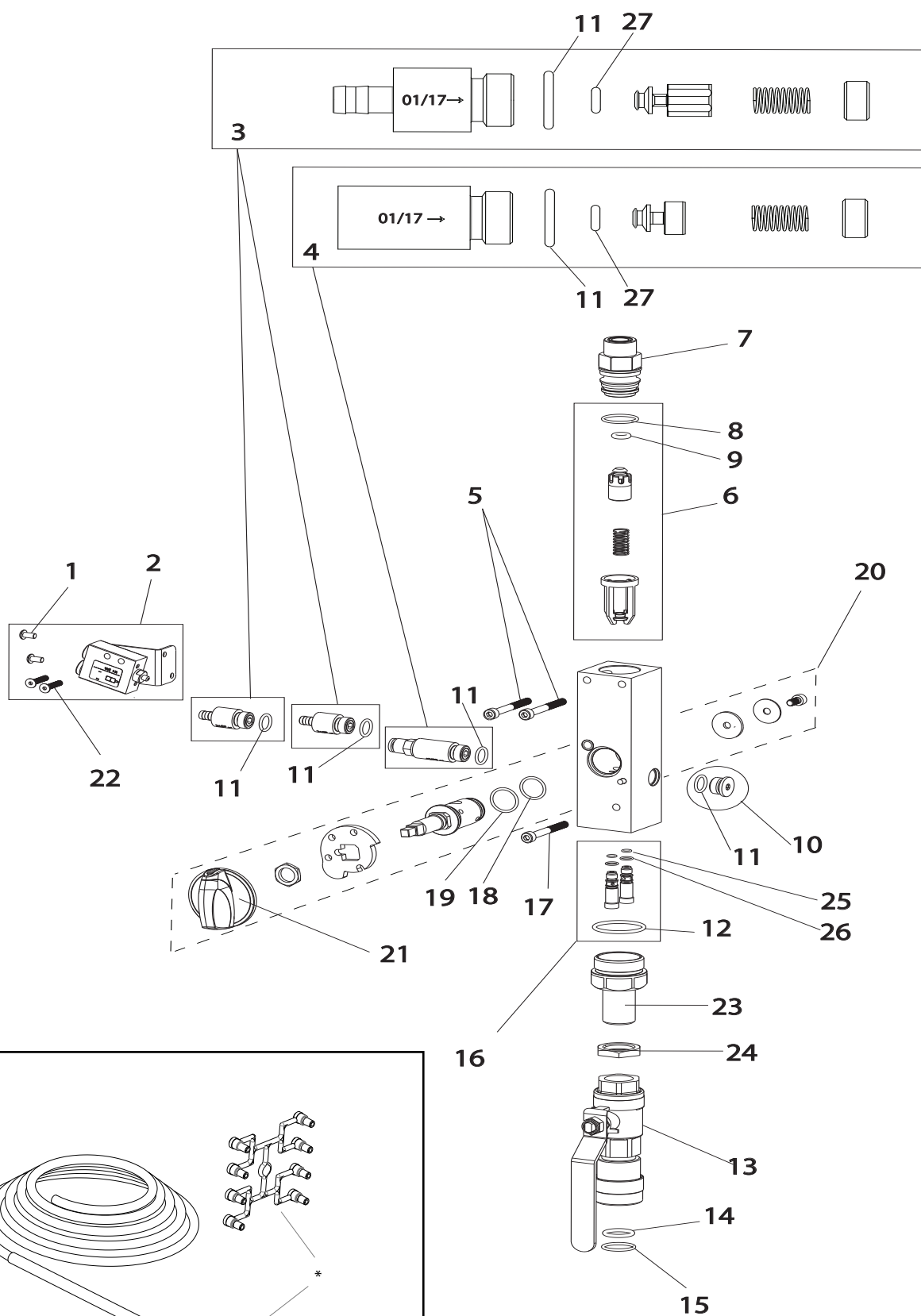
English (EN)

Deutsch (DE)

Français (FR)

Español (ES)

Manuel Block - MA2M, MA3M, MA2CM, MA3CM



110001405

110004572MA-1

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic MA2	Hybrid Foamatic MA3	Hybrid Foamatic MA2C	Hybrid Foamatic MA3C	Hybrid Foamatic MA2M	Hybrid Foamatic MA3M	Hybrid Foamatic MA2CM	Hybrid Foamatic MA3CM
1	110003512 (0602021)	Screw kit								
2	110003282	Air regulation valve complete					1	1	1	1
3	110001102	Chemical non return valve					2	2	2	2
4	110001979	Air non return valve					1	1	1	1
5	110003512 (110000526)	Screw kit								
6	110004384	Water non return valve complete					1	1	1	1
7	110004246	Fitting					1	1	1	1
8	110005355 (0600078)	O-ring kit								
9	110005355 (110002785)	O-ring kit								
10	110002306	Plug					1	1	1	1
11	110005355 (110002952)	O-ring kit								
12	110005355 (110000038)	O-ring kit								
13	110003682	Outlet coupling complete					1	1	1	1
14	110005355 (641101)	O-ring kit								
15	110005355 (641102)	O-ringkit								
16	110003283	Injector kit					1	1	1	1
17	110003512 (110000526)	Screw kit								
18	110005355 (110002508)	O-ring kit								
19	110005355 (350108)	O-ring kit								
20	110003401	Axle for block complete					1	1	1	1
21	909100214	Operation button					1	1	1	1
22	110003512 (110000525)	Screw kit								
23	110003092	Hexagon nipple					1	1	1	1
24	350705	Lock nut					1	1	1	1
25	110005355 (110004888)	O-ring kit								
26	110005355 (110004887)	O-ring kit								
27	110003355 (0635021)	O-ring kit								
*	110001214 110001197 110001198 110001199 0646105	Chemical hose (blue) Chemical hose (yellow) Chemical hose (red) Chemical hose (green) Chemical limiting nozzle								

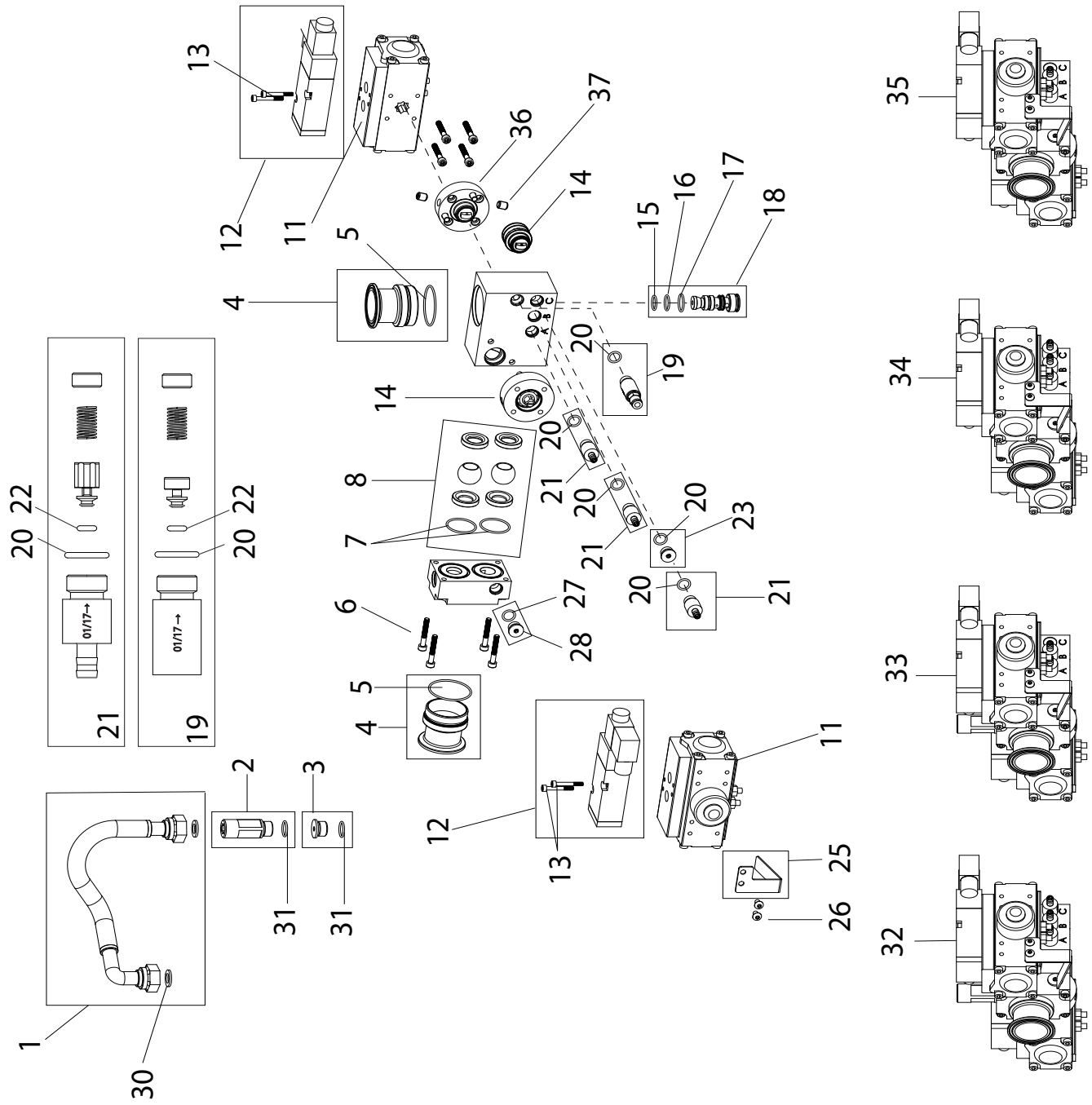
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Deutsch (DE)

Français (FR)

Español (ES)

Hybrid Foamatic Automatic



110004572MA-2

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic MA2	Hybrid Foamatic MA3	Hybrid Foamatic MA2C	Hybrid Foamatic MA3C	Hybrid Foamatic MA2M	Hybrid Foamatic MA3M	Hybrid Foamatic MA2CM	Hybrid Foamatic MA3CM
1	110004875	Hose					1	1	1	1
2	110005274	Fitting					1	1	1	1
3	110005275	Plug	1	1	1	1				
4	110005279	Clamp fitting	2	2	2	2	2	2	2	2
5	110005355 (110004837)	O-ring kit								
6	110003512 (110005104)	Screw kit								
7	110005355 (110004835)	O-ring kit								
8	110005276	Service kit actuator	1	1	1	1	1	1	1	1
11	0605792	Actuator	2	2	2	2	2	2	2	2
12	110004622	Solenoid valve	1	1	1	1	1	1	1	1
13	110003512 (110004573)	Screw kit								
14	110005277	Service kit automatic block	2	2	2	2	2	2	2	2
15	110005355 (110004870)	O-ring kit								
16	110005355 (110004871)	O-ring kit								
17	110005355 (110002955)	O-ring kit								
18	110005278	Injector kit	1	1	1	1	1	1	1	1
19	110001979	Air non return valve	1	1	1	1	1	1	1	1
20	110005355 (110002952)	O-ring kit								
21	110001102	Chemical non return valve	2	3	2	3	2	3	2	3
22	110005355 (0635021)	O-ring kit								
23	110002306	Plug	1		1		1		1	
25	110005207	Bracket	1	1	1	1	1	1	1	1
26	110003512 (110003900)	Screw kit								
27	110005355 (110002952)	O-ring kit								
28	110002306	Plug								
29	110000890	Sensor								
30	110005355 (0635042)	O-ring kit					2	2	2	2
31	110005355 (110004140)	O-ring kit								
32	110005227	Block automatic complete						1		1
33	110005226	Block automatic complete					1		1	
34	110005229	Block automatic complete		1		1				
35	110005228	Block automatic complete	1		1					
36	110005351	Fixation for actuator								
37	110003512 (156519)	Pinol screw								

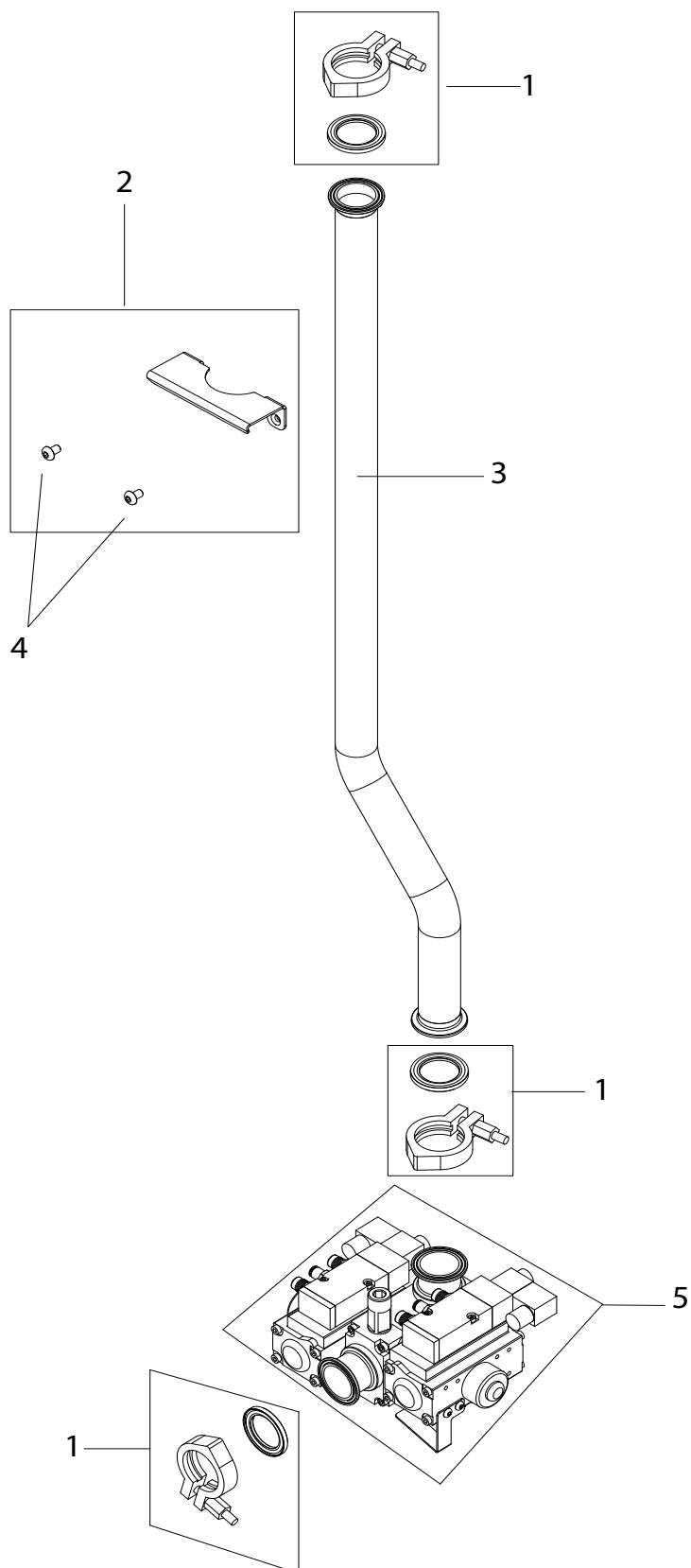
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Español (ES)

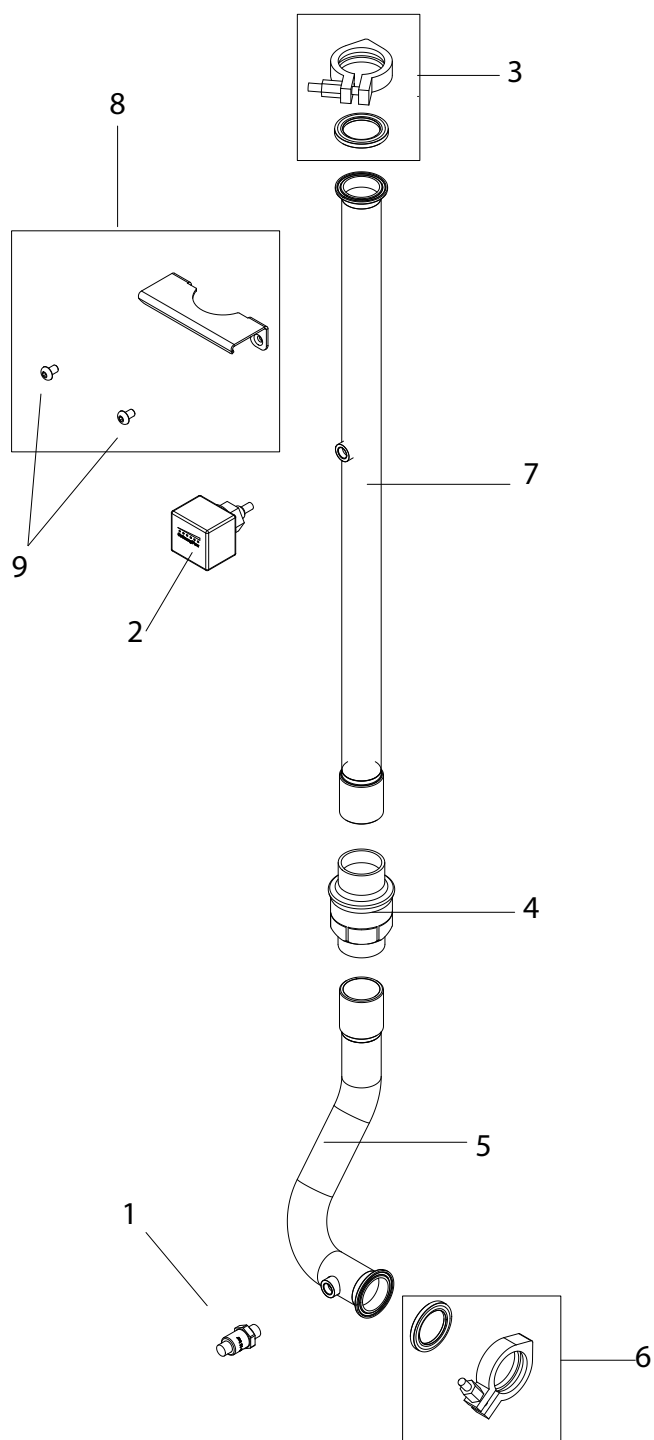
Outlet pipe



110004580

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic MA2	Hybrid Foamatic MA3	Hybrid Foamatic MA2C	Hybrid Foamatic MA3C	Hybrid Foamatic MA2M	Hybrid Foamatic MA3M	Hybrid Foamatic MA2CM	Hybrid Foamatic MA3CM
1	110005273	Clamp kit Foamatic	1	1	1	1	1	1	1	1
2	110005280	Bracket	1	1	1	1	1	1	1	1
3	110005106	Outlet pipe complete	1	1	1	1	1	1	1	1
4	110003512 (110005317)	Screw kit	1	1	1	1	1	1	1	1
5		See page 30 drawing 110004572	1	1	1	1	1	1	1	1

Inlet pipe



110001888

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic MA2	Hybrid Foamatic MA3	Hybrid Foamatic MA2C	Hybrid Foamatic MA3C	Hybrid Foamatic MA2M	Hybrid Foamatic MA3M	Hybrid Foamatic MA2CM	Hybrid Foamatic MA3CM
1	110000889	Sensor 1-16 bar	1	1	1	1	1	1	1	1
2	110000973	Flow switch	1	1	1	1	1	1	1	1
3	110005273	Clamp kit Foamatic	1	1	1	1	1	1	1	1
4	630900	Non return valve 1 1/4"1	1	1	1	1	1	1	1	1
5	110004913	Piping support inlet	1	1	1	1	1	1	1	1
6	110005273	Clamp kit Foamatic	1	1	1	1	1	1	1	1
7	110005200	Inlet pipe straight	1	1	1	1	1	1	1	1
8	110005280	Bracket	1	1	1	1	1	1	1	1
9	110003512 (110005317)	Screw kit								

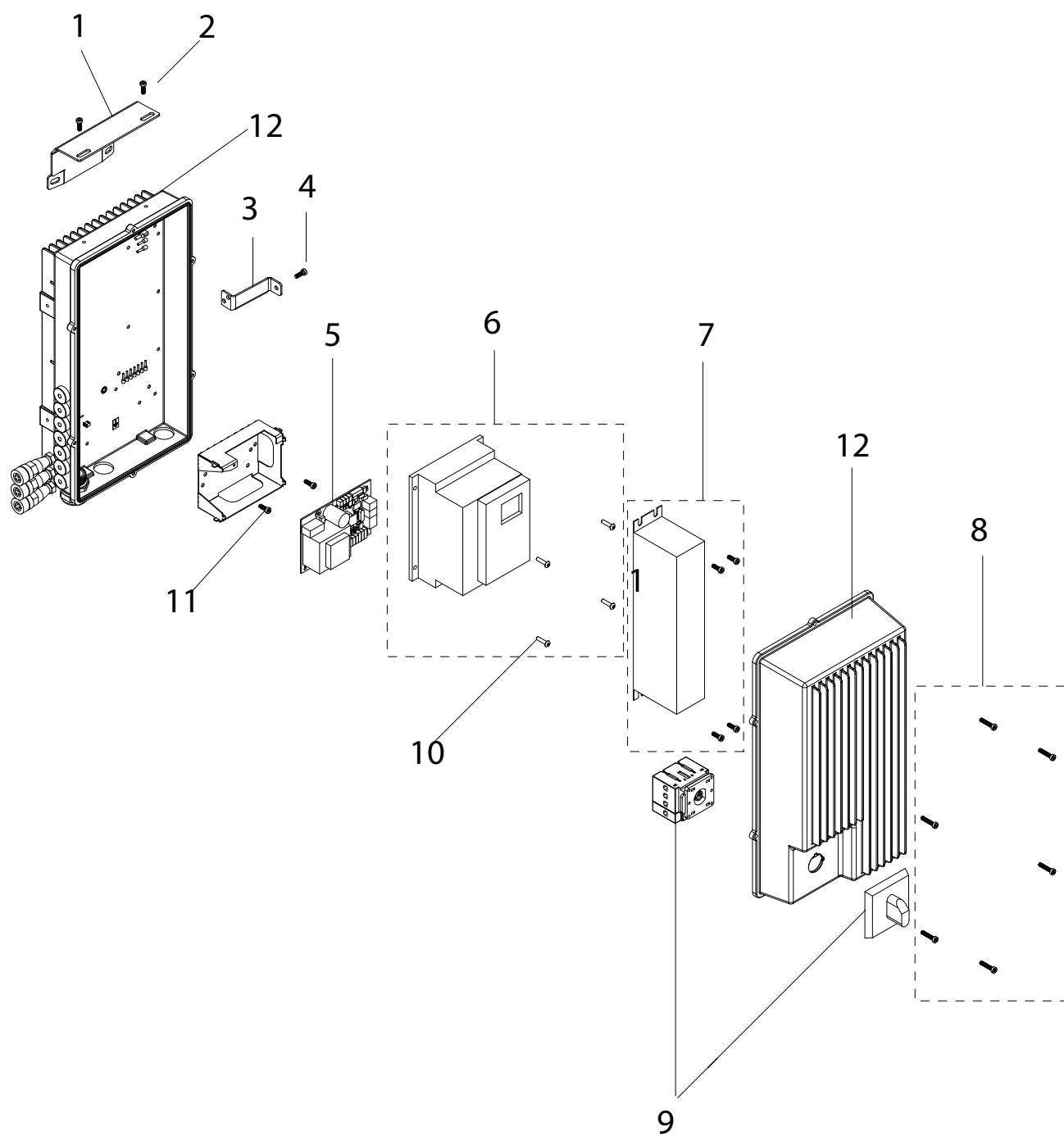
English (EN)

Deutsch (DE)

Français (FR)

Español (ES)

El box



110005271

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic MA2	Hybrid Foamatic MA3	Hybrid Foamatic MA2C	Hybrid Foamatic MA3C	Hybrid Foamatic MA2M	Hybrid Foamatic MA3M	Hybrid Foamatic MA2CM	Hybrid Foamatic MA3CM
1	110005005	Top bracket	1	1	1	1	1	1	1	1
2	110003512 (110001369)	Screw kit	1	1	1	1	1	1	1	1
3	110001340	Bottom bracket	1	1	1	1	1	1	1	1
4	110003512 (156208)	Screw kit								
5	110001124	Controller board incl. cable	1	1	1	1	1	1	1	1
6	110001136	Frequency converter incl. cable	1	1	1	1	1	1	1	1
7	0631057	EMC Filter 4/5.5 kW								
8	110003512	Screw kit								
9	110001881	Main switch	1	1	1	1	1	1	1	1
10	110003512 (110004617)	Screw kit								
11	110003512 (0602104)	Screw kit								
12	110005012	El-box	1	1	1	1	1	1	1	1

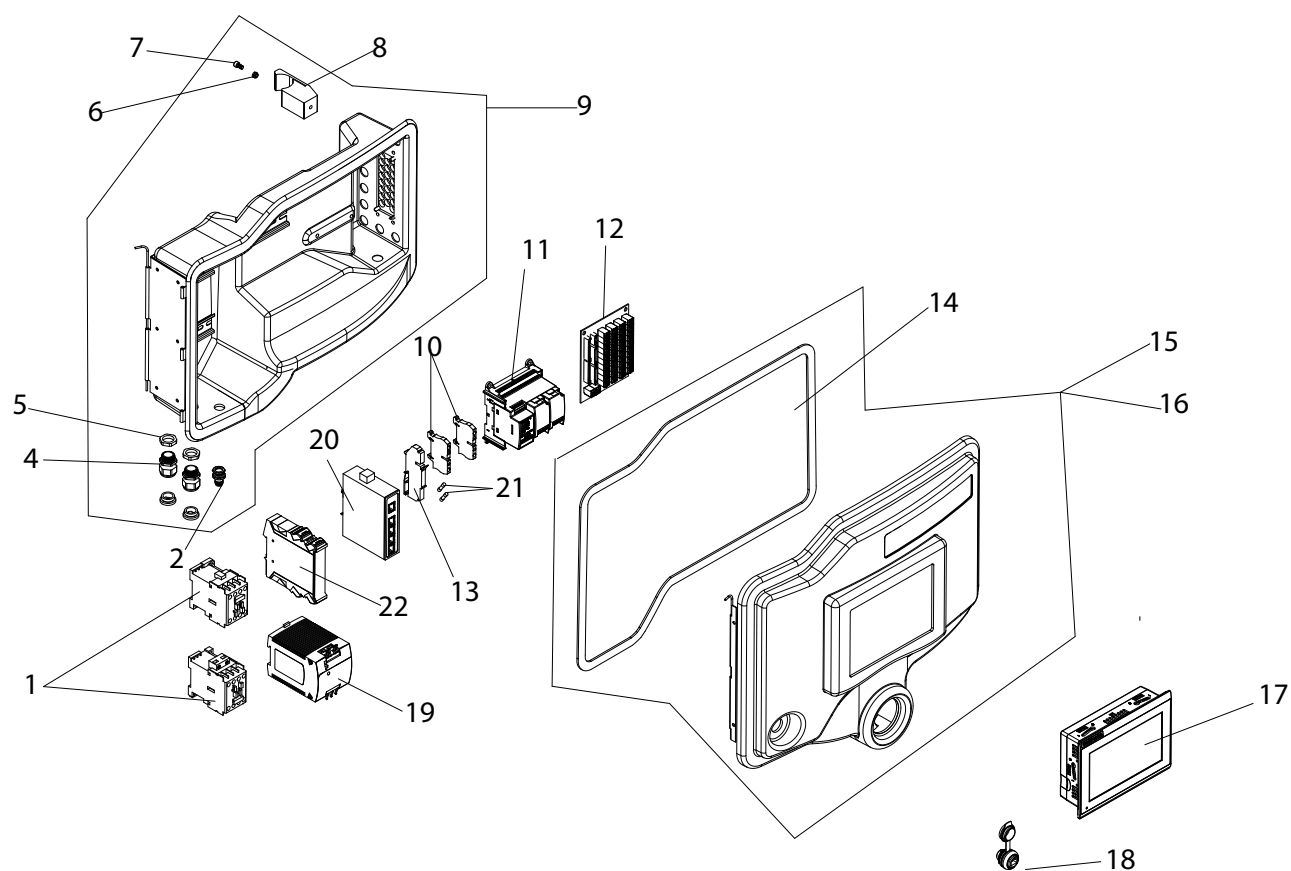
English (EN)

Deutsch (DE)

Français (FR)

Español (ES)

Controller MA2C, MA3C, MA2CM, MA3CM



110005233

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic MA2	Hybrid Foamatic MA3	Hybrid Foamatic MA2C	Hybrid Foamatic MA3C	Hybrid Foamatic MA2M	Hybrid Foamatic MA3M	Hybrid Foamatic MA2CM	Hybrid Foamatic MA3CM
1	110004642	Contactor			2	2			2	2
2	110004220	MI2 plug			1	1			1	1
4	0631091	Strain relief			2	2			2	2
5	0631092	Counter nut			2	2			2	2
6	110003512 (156310)	Nut								
7	110003512 (110000526)	Screw								
8	110005291	Piping lock			1	1			1	1
9	110005297	Controller back complete			1	1			1	1
10	150640	Screw terminals			2	2			2	2
11	110004645	PLC			1	1			1	1
12	110004920	Controller board			1	1			1	1
13	110004649	Terminal block			1	1			1	1
14	110004925	Sealing			1	1			1	1
15	110005293	Controller front								
16	110005295	Controller front			1	1			1	1
17	110003993	Display			1	1			1	1
18	110004444	Ethernet plug			1	1			1	1
19	110004641	Power supply			1	1			1	1
20	110005513	Switch			1	1			1	1
21	110003167	Fuses			2	2			2	2
22	110004644	Safety relay			1	1			1	1

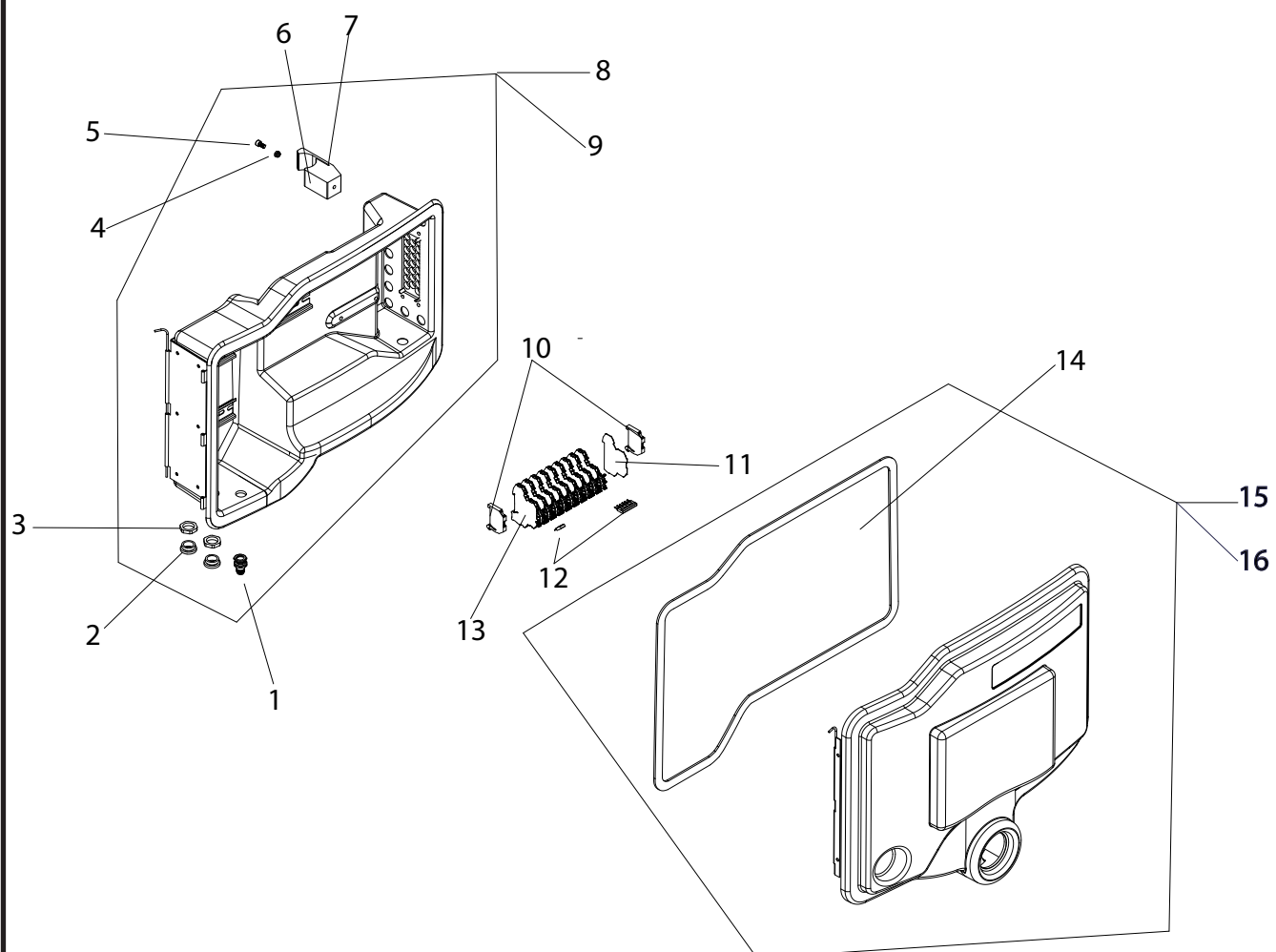
English (EN)

Deutsch (DE)

Français (FR)

Español (ES)

Screw Terminal



110005256

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic MA2	Hybrid Foamatic MA3	Hybrid Foamatic MA2C	Hybrid Foamatic MA3C	Hybrid Foamatic MA2M	Hybrid Foamatic MA3M	Hybrid Foamatic MA2CM	Hybrid Foamatic MA3CM
1	110004220	Plug	1	1			1	1		
2	0601477	Plug	2	2			2	2		
3	0631092	Counter nut	2	2			2	2		
4	110003512 (156310)	Nut								
5	110003512 (110000526)	Screw								
6	110005292	Piping lock								
7	110005291	Piping lock	1	1			1	1		
8	110005297	Controller back complete								
9	110005298	Controller back complete								
10	152200	End stop	2	2			2	2		
11	319918	End plate	1	1			1	1		
12	0631034	Center lug	1	1			1	1		
13	319917	Double clamps	9	9			9	9		
14	110004925	Sealing	1	1			1	1		
15	110005294	Terminal box					1	1		
16	110005296	Terminal box	1	1						

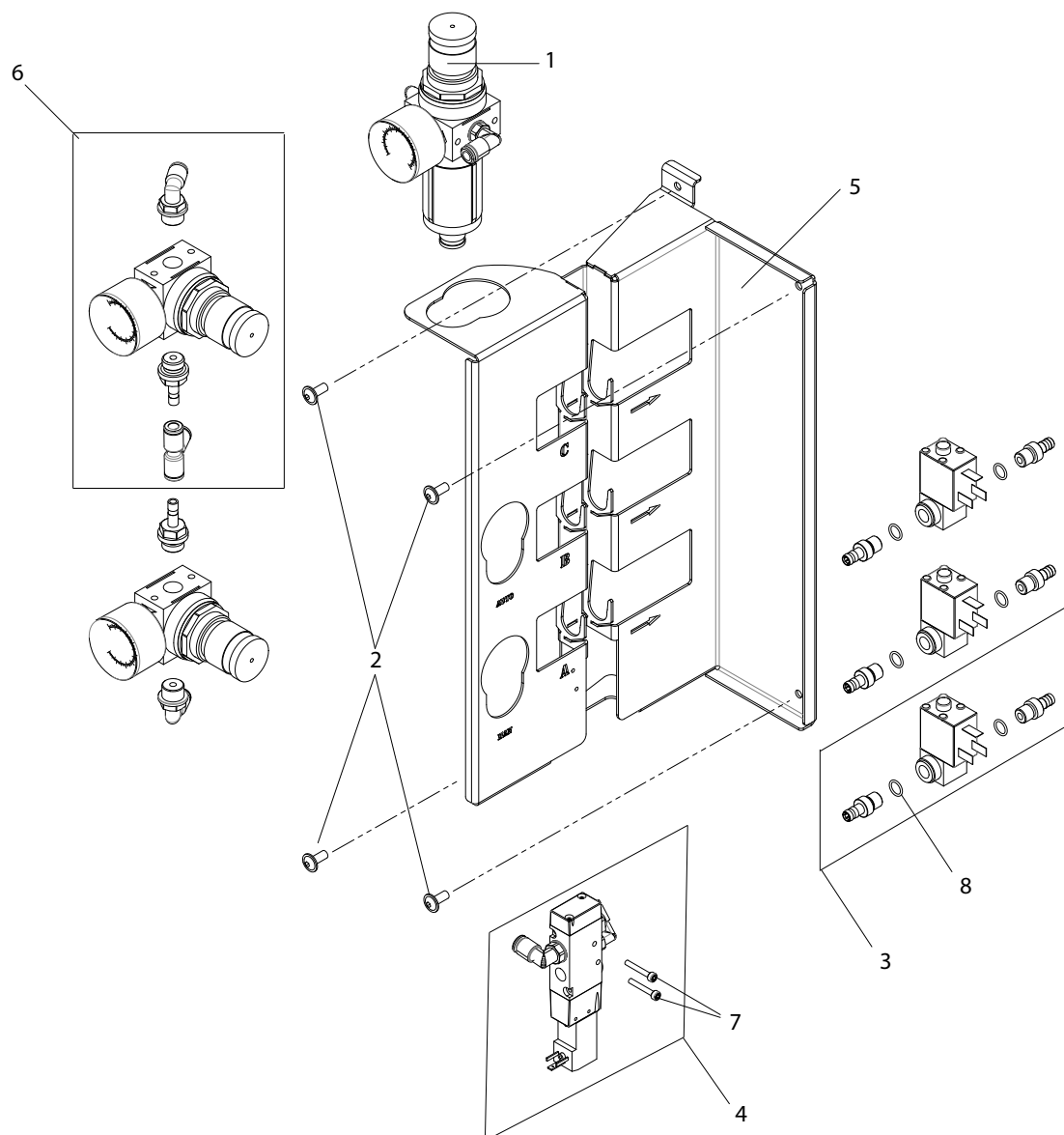
English (EN)

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Français (FR)

Español (ES)

Chemical valve bracket



110004606

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic MA2	Hybrid Foamatic MA3	Hybrid Foamatic MA2C	Hybrid Foamatic MA3C	Hybrid Foamatic MA2M	Hybrid Foamatic MA3M	Hybrid Foamatic MA2CM	Hybrid Foamatic MA3CM
1	110005282	Filter regulator complete	1	1	1	1	1	1	1	1
2	110003512 (110000847)	Screw kit								
3	110005281	Solenoid valve Bürkert complete	2	3	2	3	2	3	2	3
4	110002787	Solenoid valve 5/2" complete	1	1	1	1	1	1	1	1
5	110004297	Chemical valve bracket MA	1	1	1	1	1	1	1	1
6	110005396	Reduction valve with manometer	1	1	1	1	2	2	2	2
7	110003512 (110002749)	Screw kit								
8	110005355 (0635031)	O-ring kit								

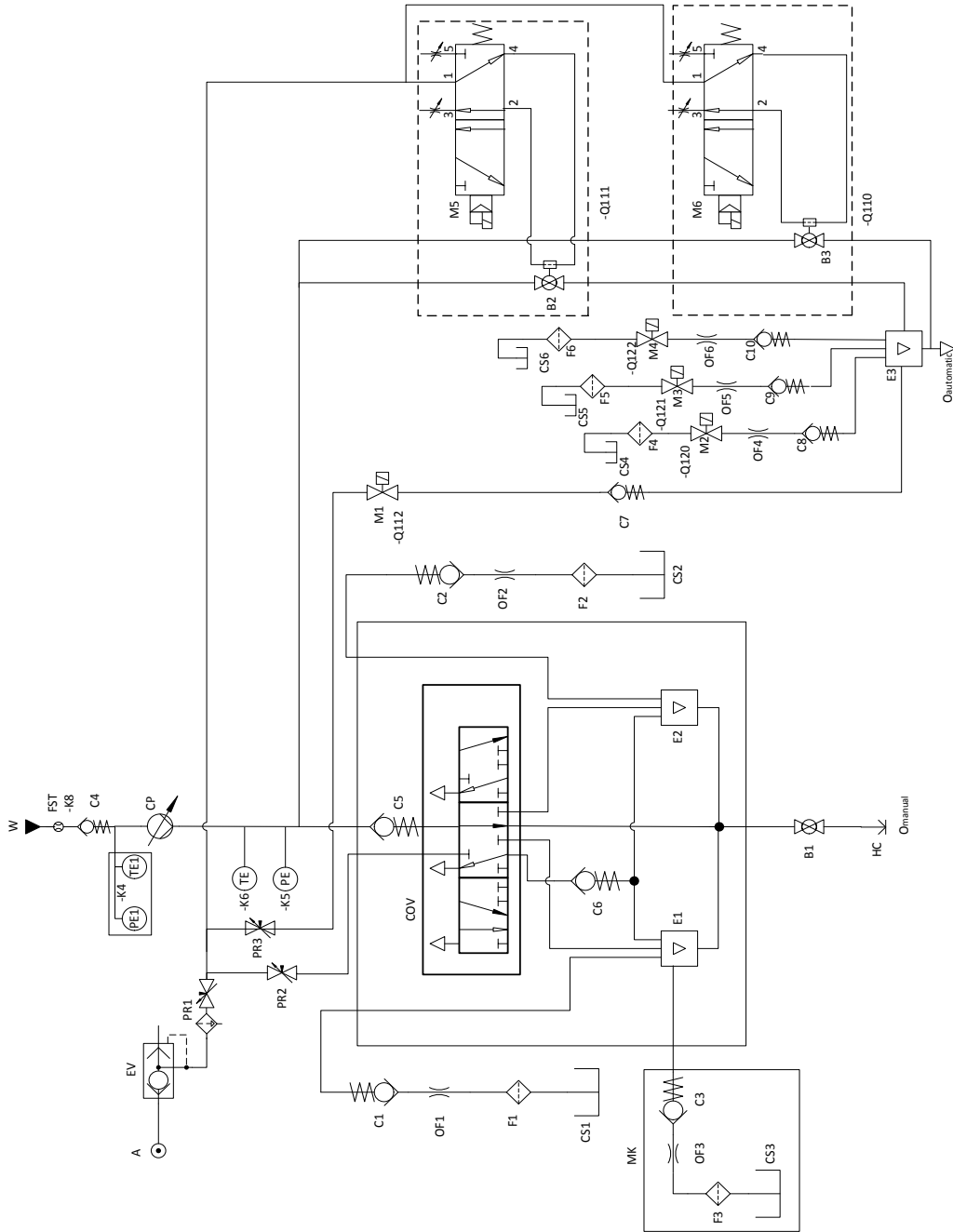
Español (ES)

Français (FR)

Deutsch (DE)

English (EN)

Operating Diagram



Number/Mark	Description
A	Air supply
B	Ball valve
C	Check valve
COV	Change over valve
CP	Centrifugal pump
CS	Chemical supply
E	Ejector
EV	Exhaust valve
F	Filter
FST	Flowsensor and -trigger
HC	Hose coupling
K	Component reference
M	Magnetic valve
MK	Mix kit (optional)
O	Outlet
OF	Orifice
PE	Pressure sensor
PR	Pressure regulator
Q	Component reference
TE	Temperature sensor
W	Water inlet

110004635

Nilfisk Food

Blytaekervej 2
DK- 9000 Aalborg
Tlf. +45 7218 2000

Project : Hybrid Foamatic MRKII MA

Item No. : 110005376

Rated Voltage : 400V

Rated frequency : 50Hz

Full-load current : 11,6A

Max single load : 11,6A

Rated short time
withstand current, I_{cw} : 6kA

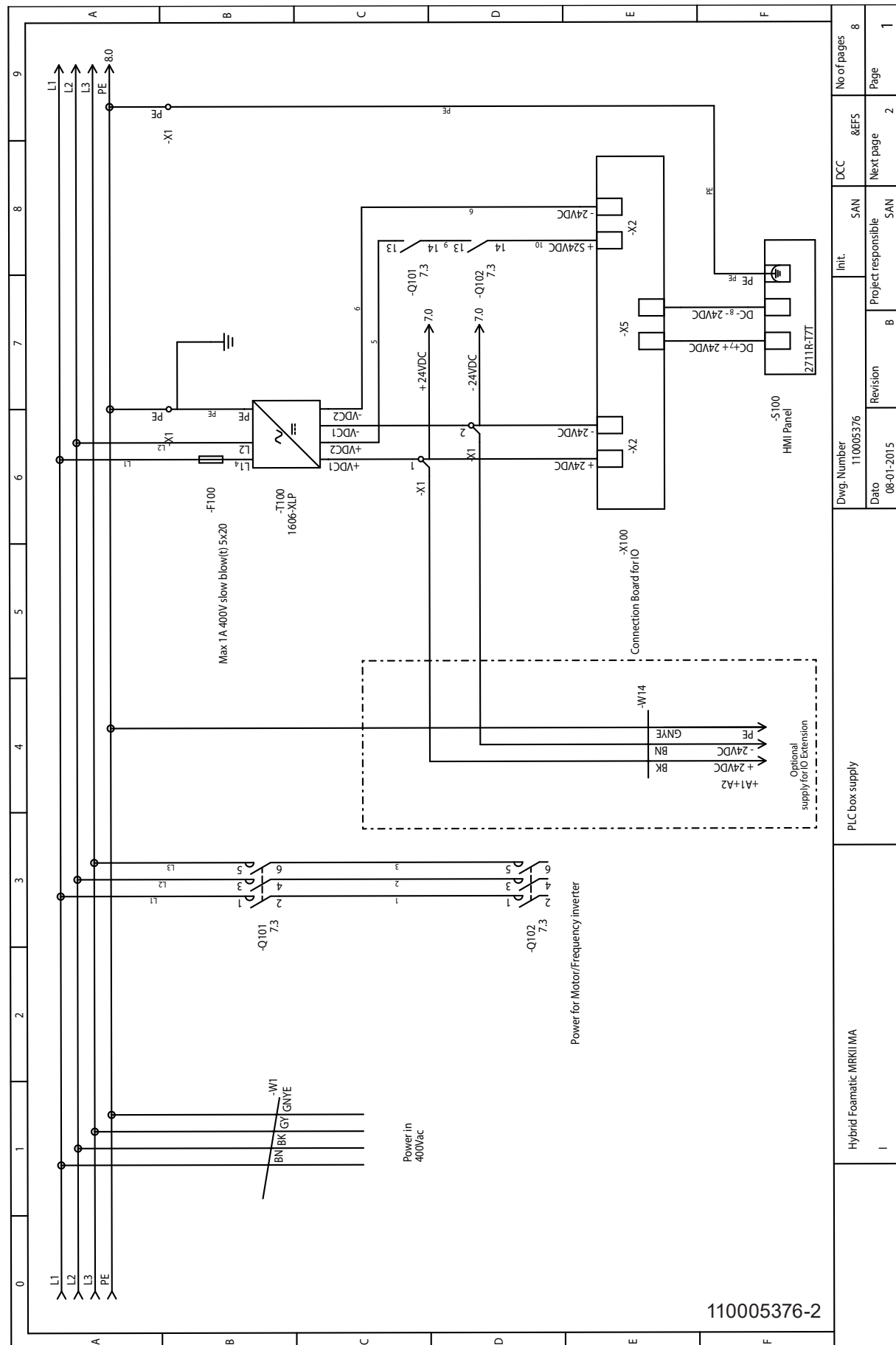
Max fuse : 16A

Document revision : I

Project Responsible : SAN

110005376-1

El Diagrama/Sensor Diagram

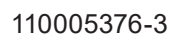


English (EN)

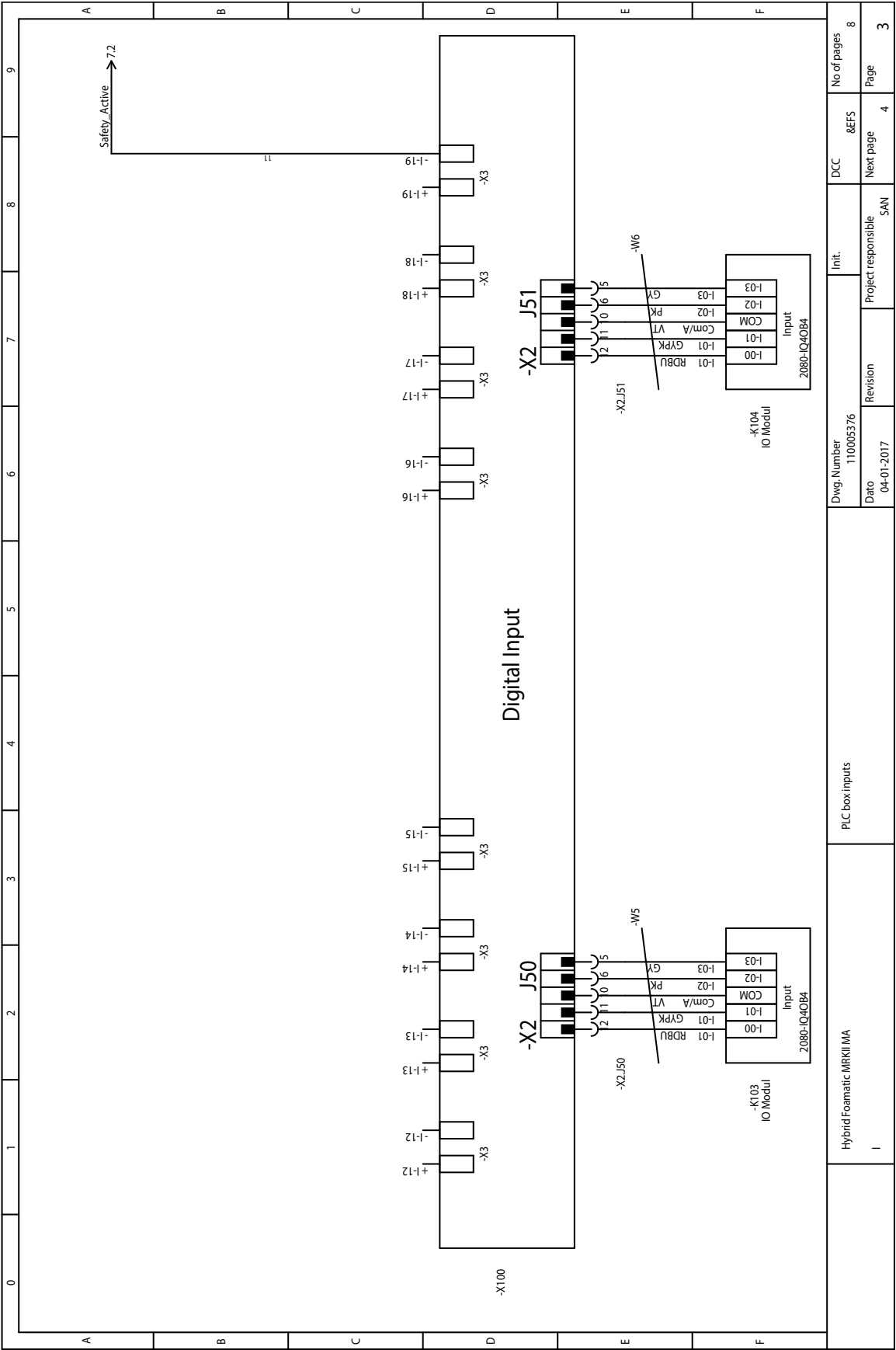
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Français (FR)

Español (ES)

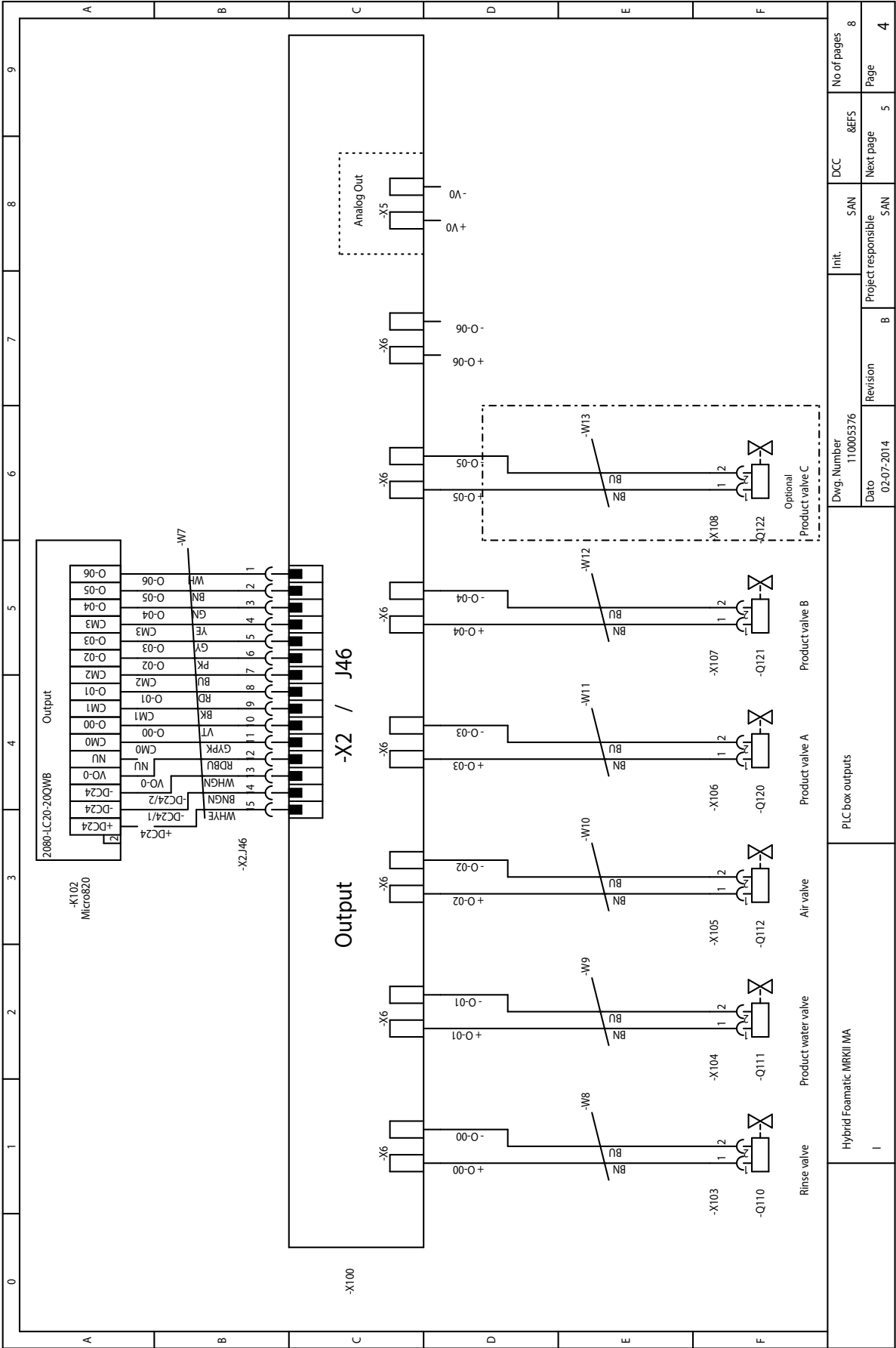


EI Diagram/Sensor Diagram



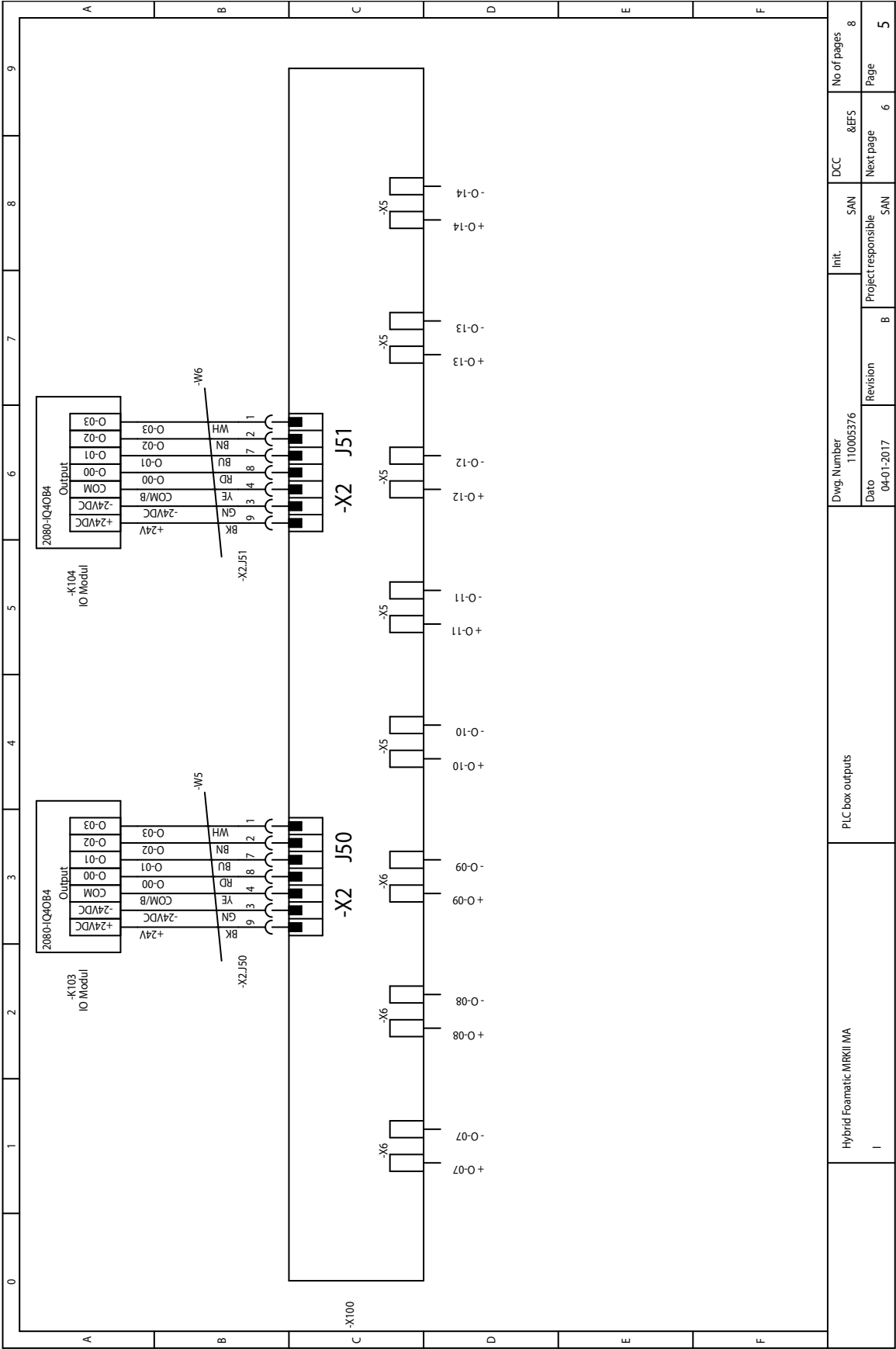
110005376-4

EI Diagram/Sensor Diagram

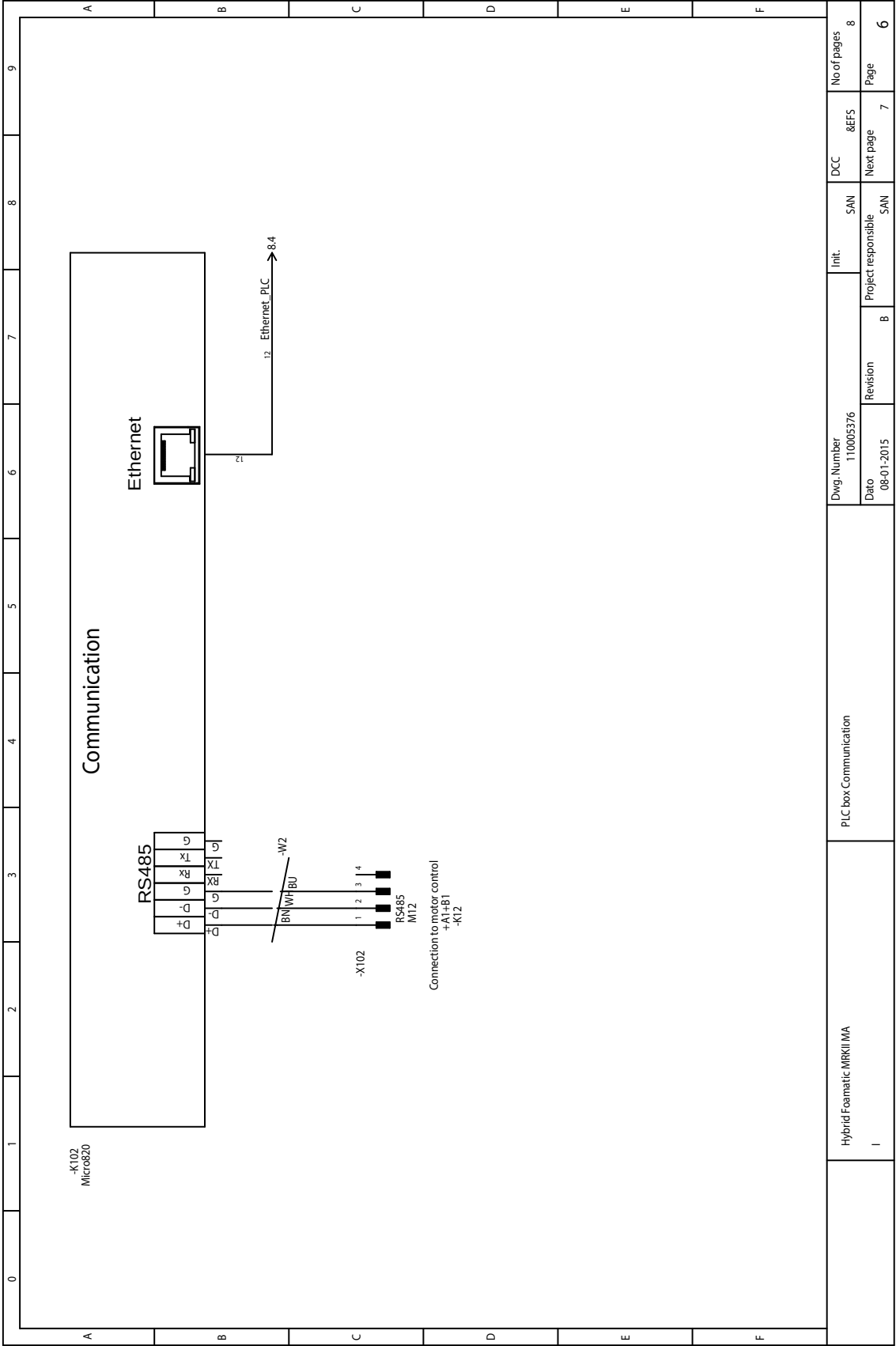


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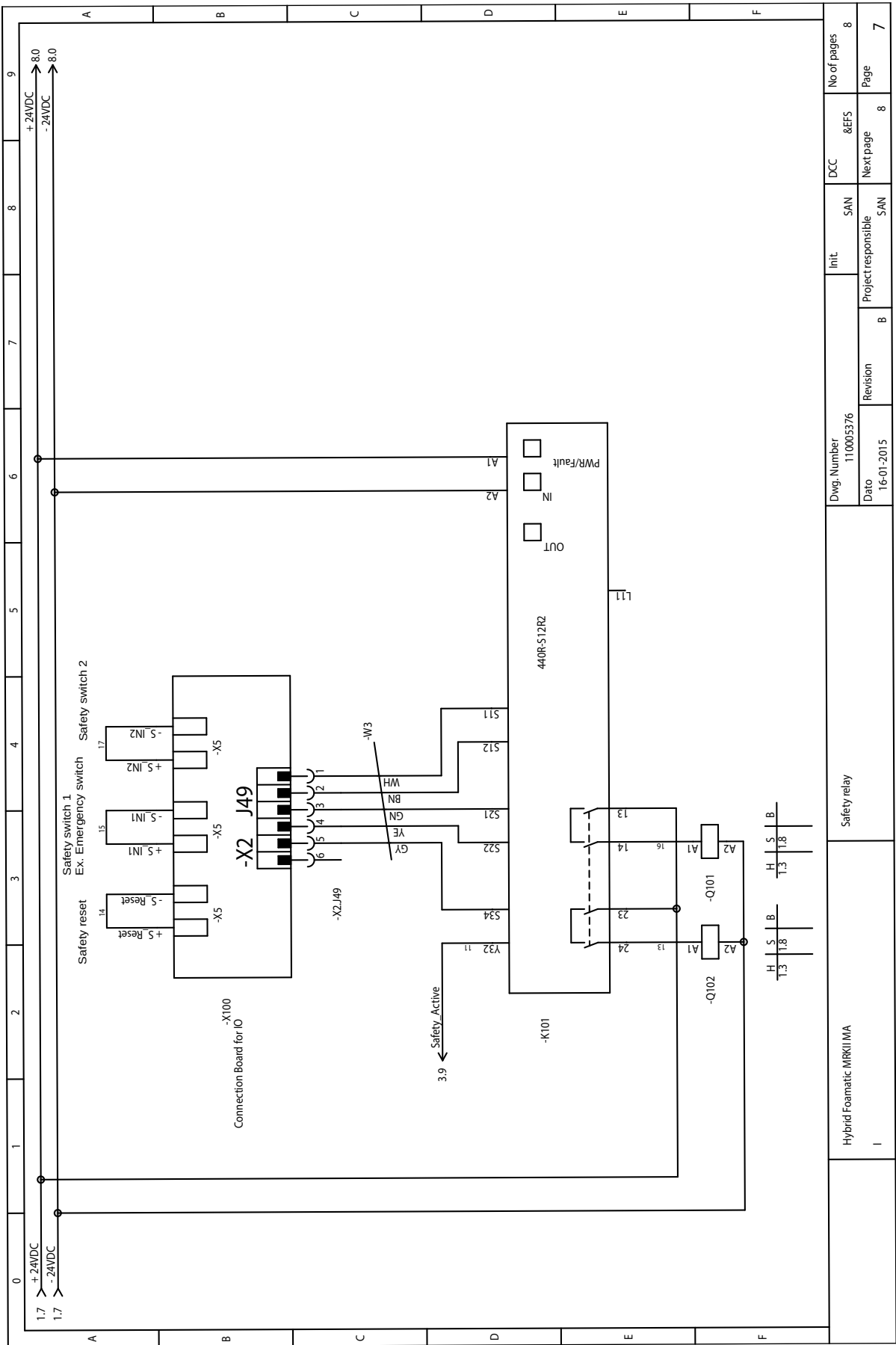


EI Diagram/Sensor Diagram



110005376-7

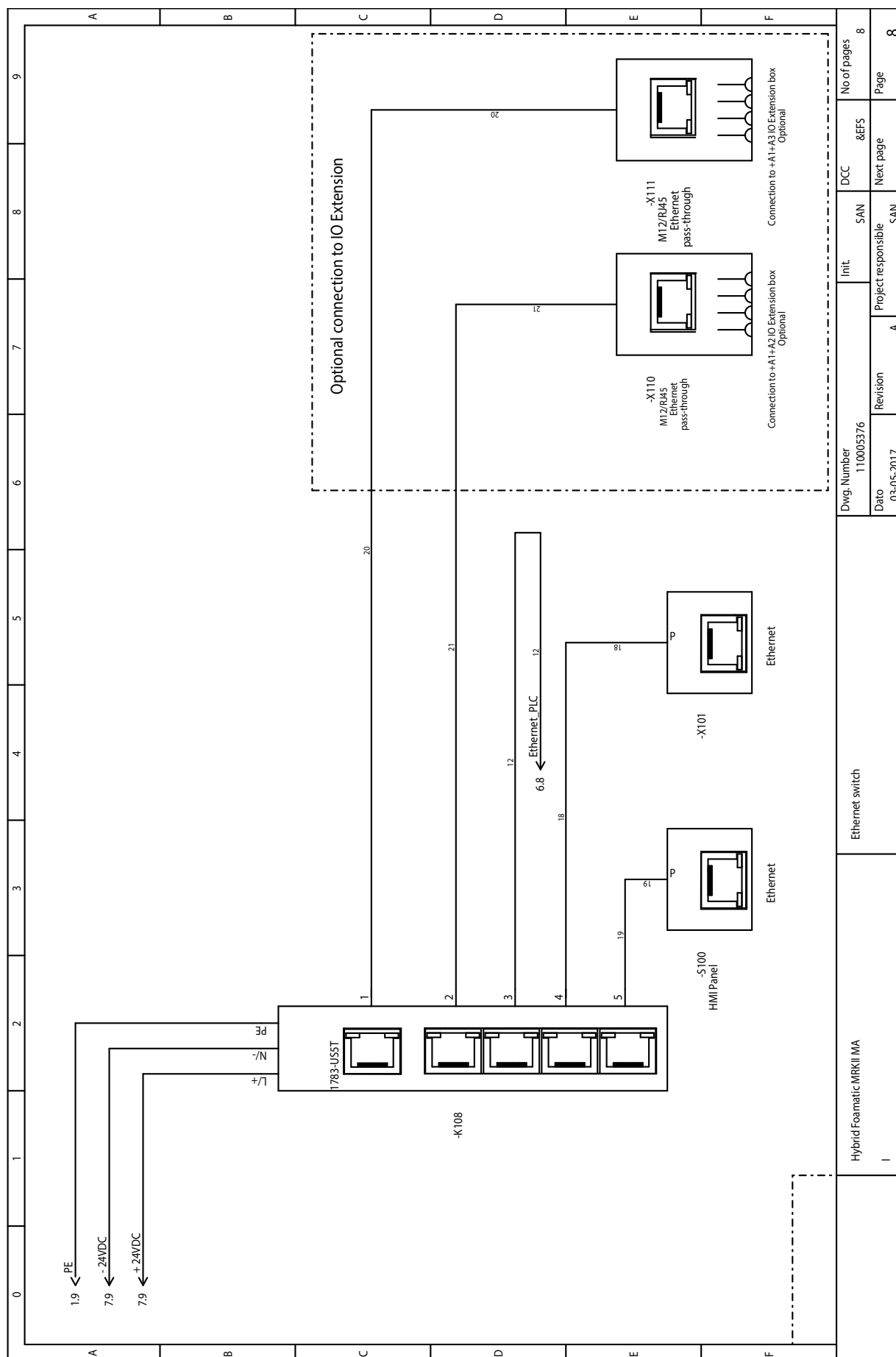
EI Diagram/Sensor Diagram



Dwg. Number	110005376	Init.	SAN	DCC	&EFS	No of pages	8
Dato	16-01-2015	Revision	B	Project responsible	SAN	Next page	8
						Page	7

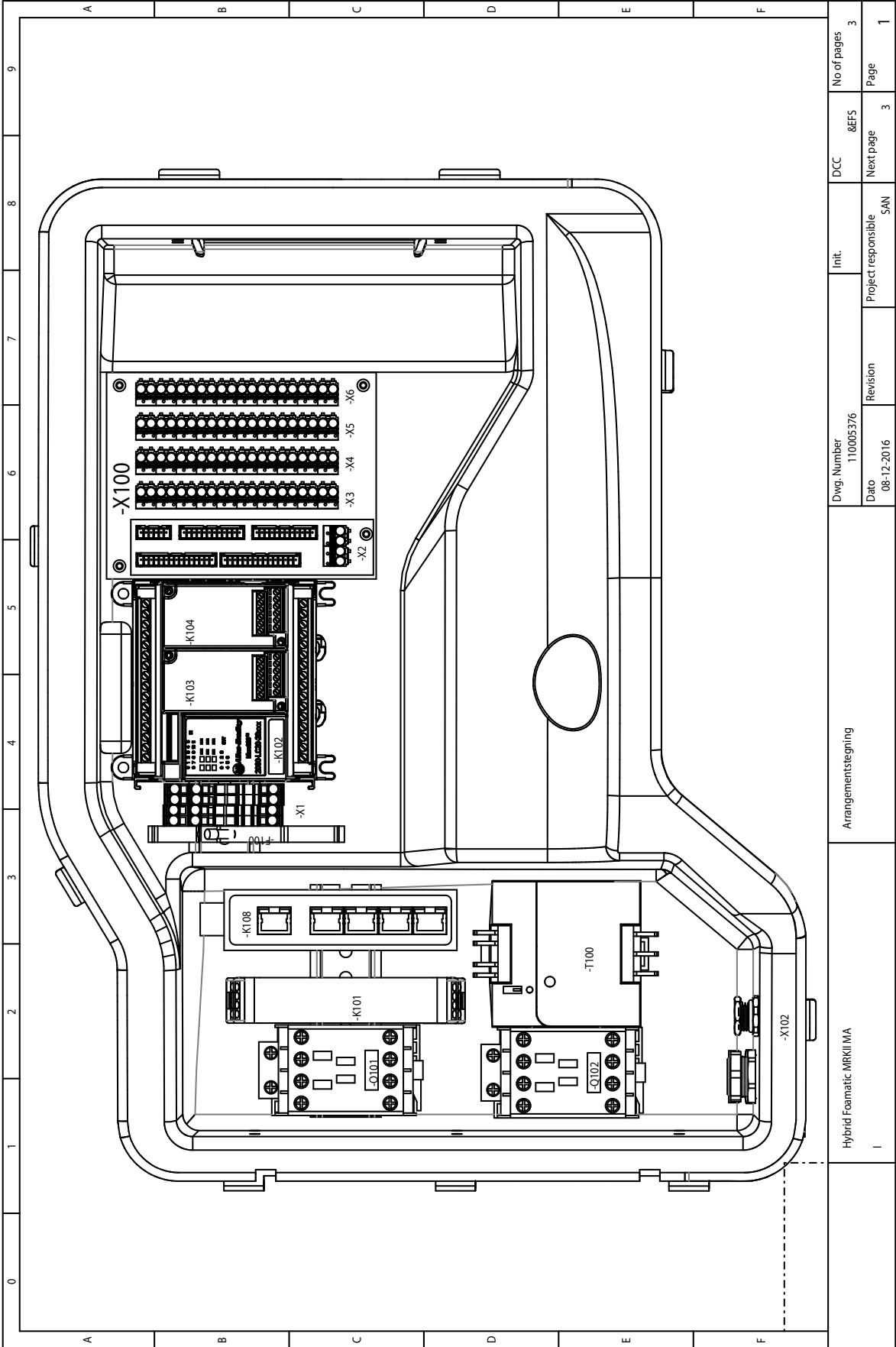
Hybrid Foamatic MRKII MA	Safety relay						
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El Diagram/Sensor Diagram



110005376-9

EI Diagram/Sensor Diagram



Hybrid Foamatic MRKII MA

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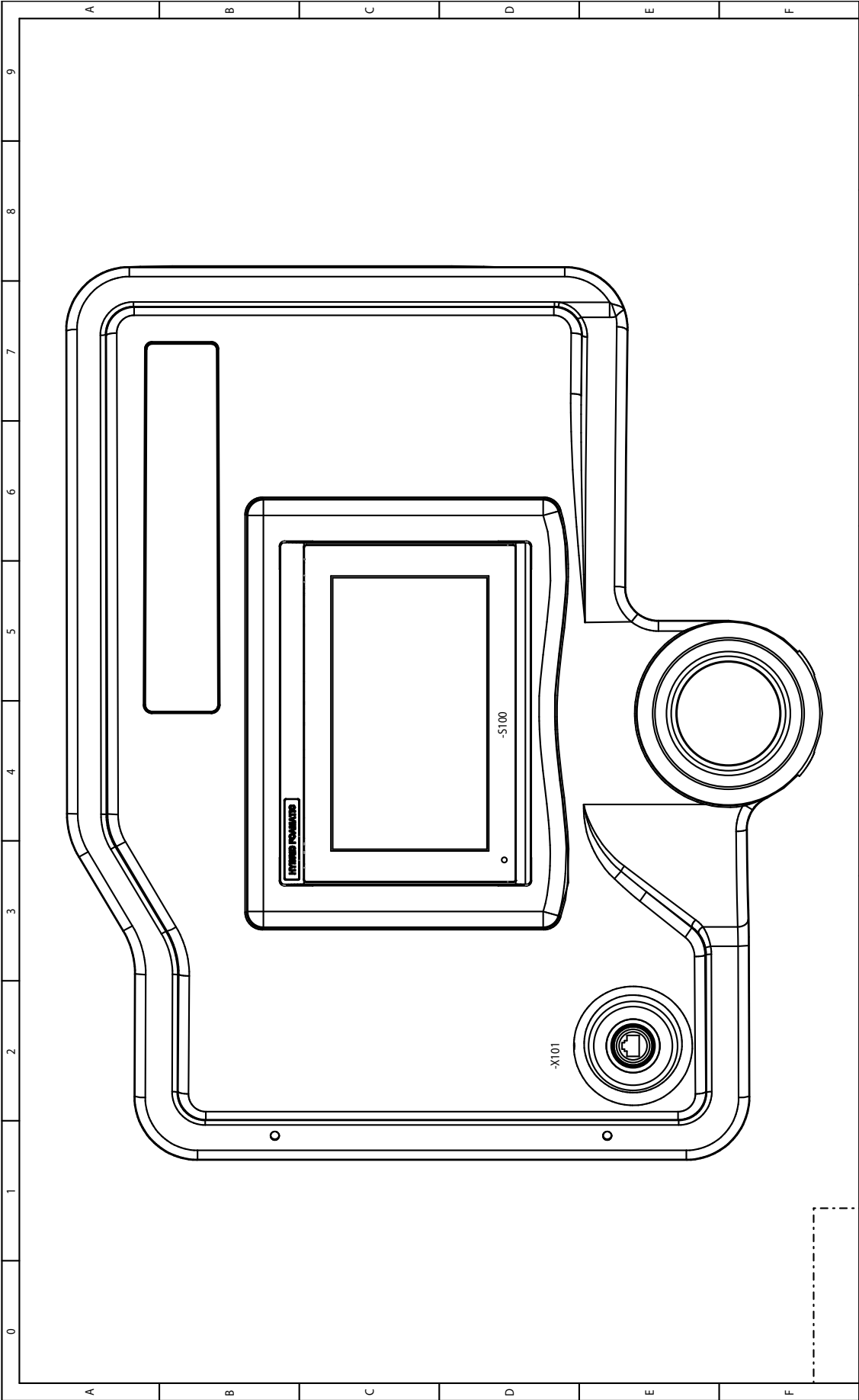
Date
08-12-2016

Project responsible
SAN

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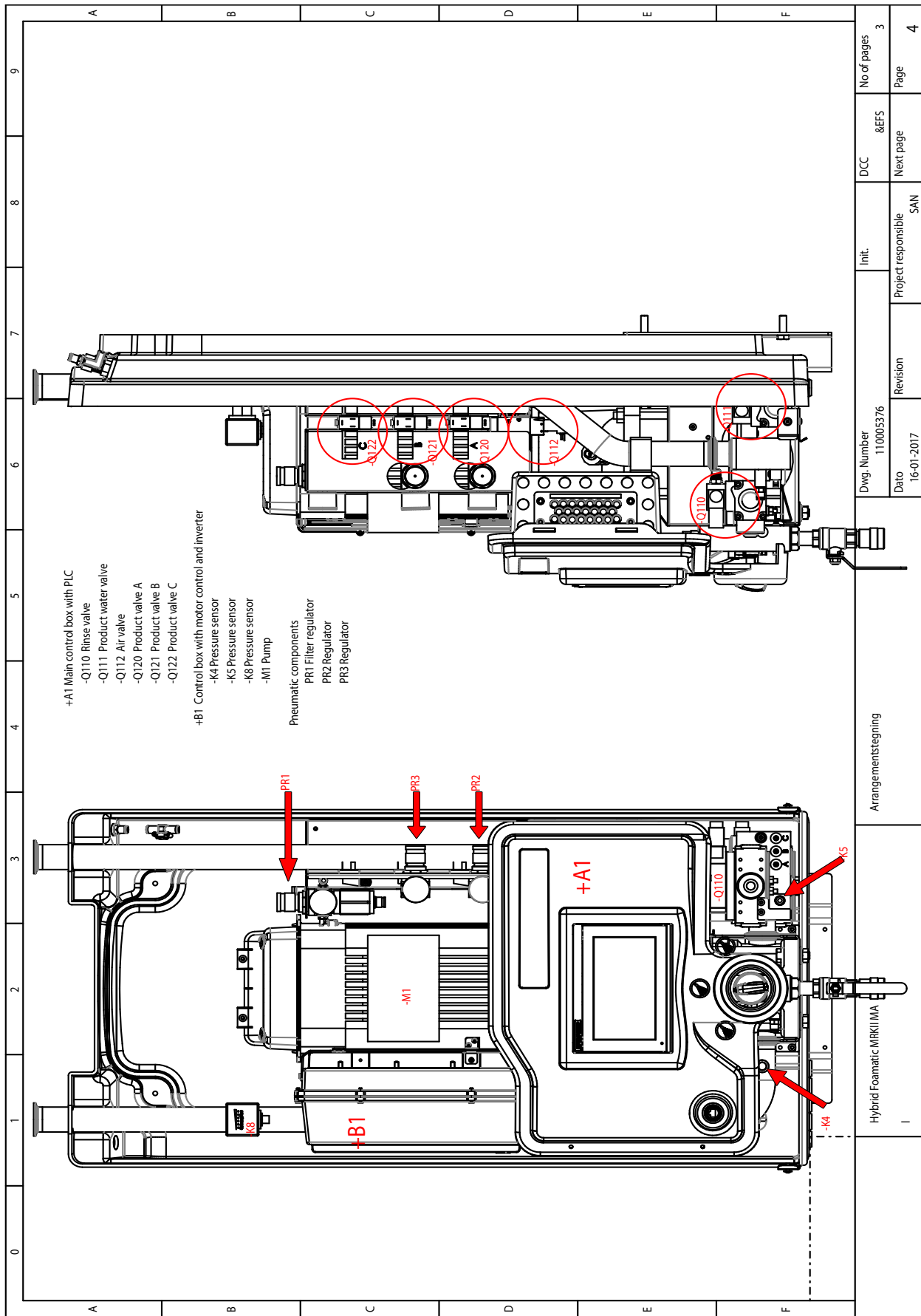
El Diagram/Sensor Diagram



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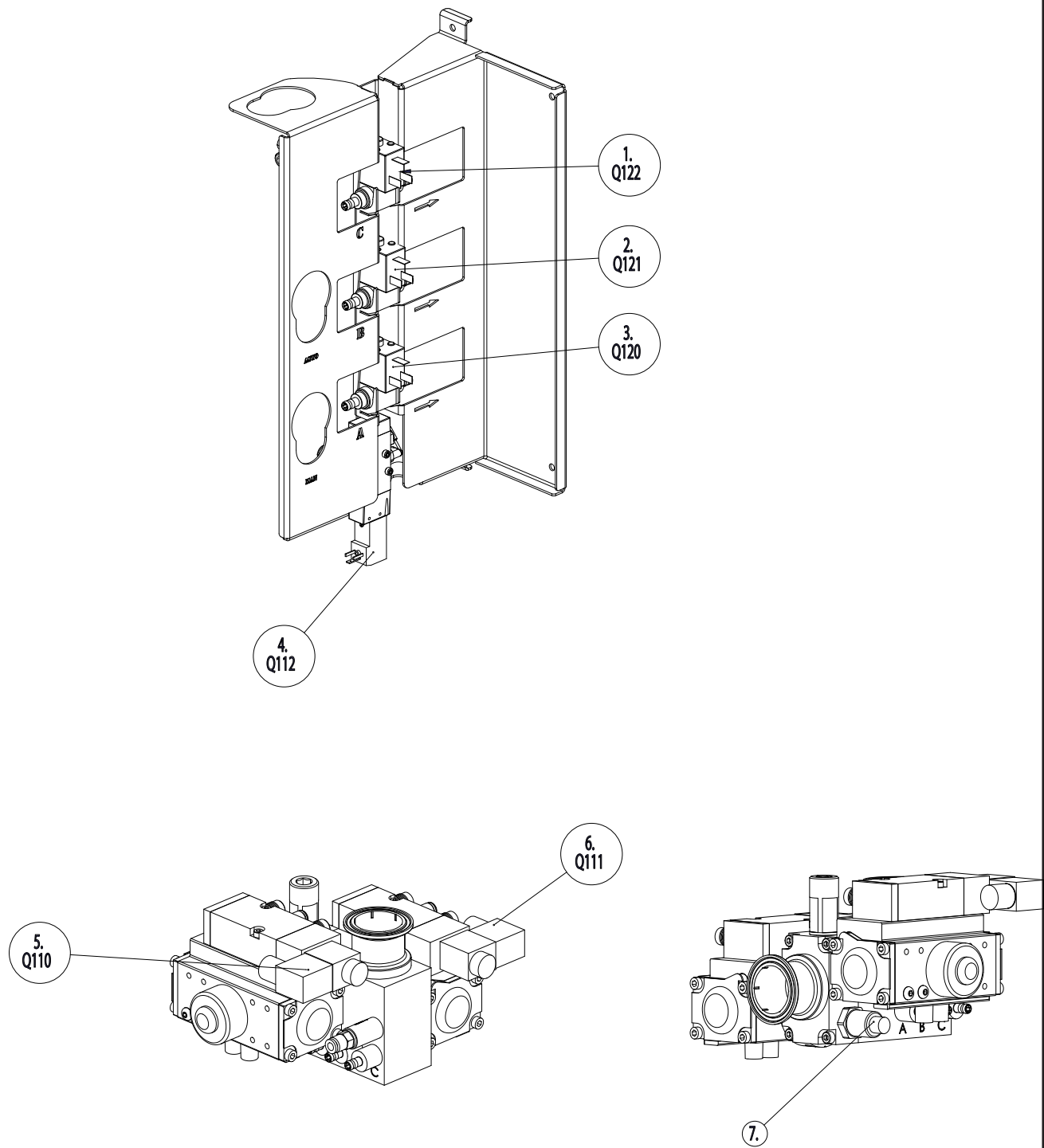
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EI Diagram/Sensor Diagram



110005376-12

Chemical Product valves



Position	Description
1. Q122	Chemical product valve C
2. Q121	Chemical product valve B
3. Q120	Chemical product valve A
4. Q112	Air valve
5. Q110	Rinse valve
6. Q111	Product water valve
7.	Pressure transmitter 0-40 bar (only for MA)

110005520B

Nilfisk Food

Blytaekkervej 2
DK- 9000 Aalborg
Tlf. +45 7218 2000

Project : Main Terminal box

Item No. : 110 005 249

Rated Voltage : 3 x 400

Rated frequency : 50Hz

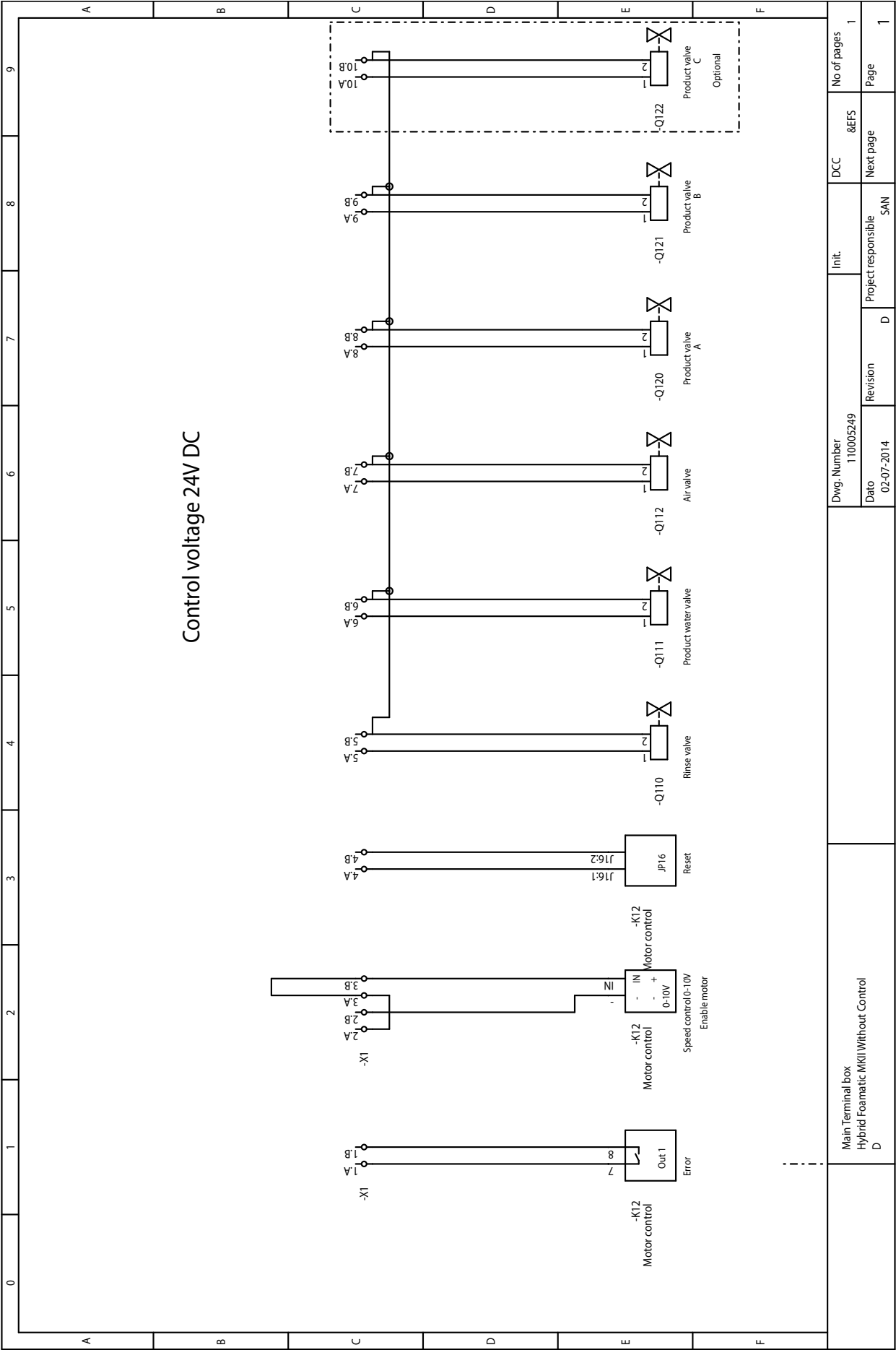
Full-load current : 11,6A

Max single load : 11,6A

Rated short time
withstand current, I_{cw} : 6kA

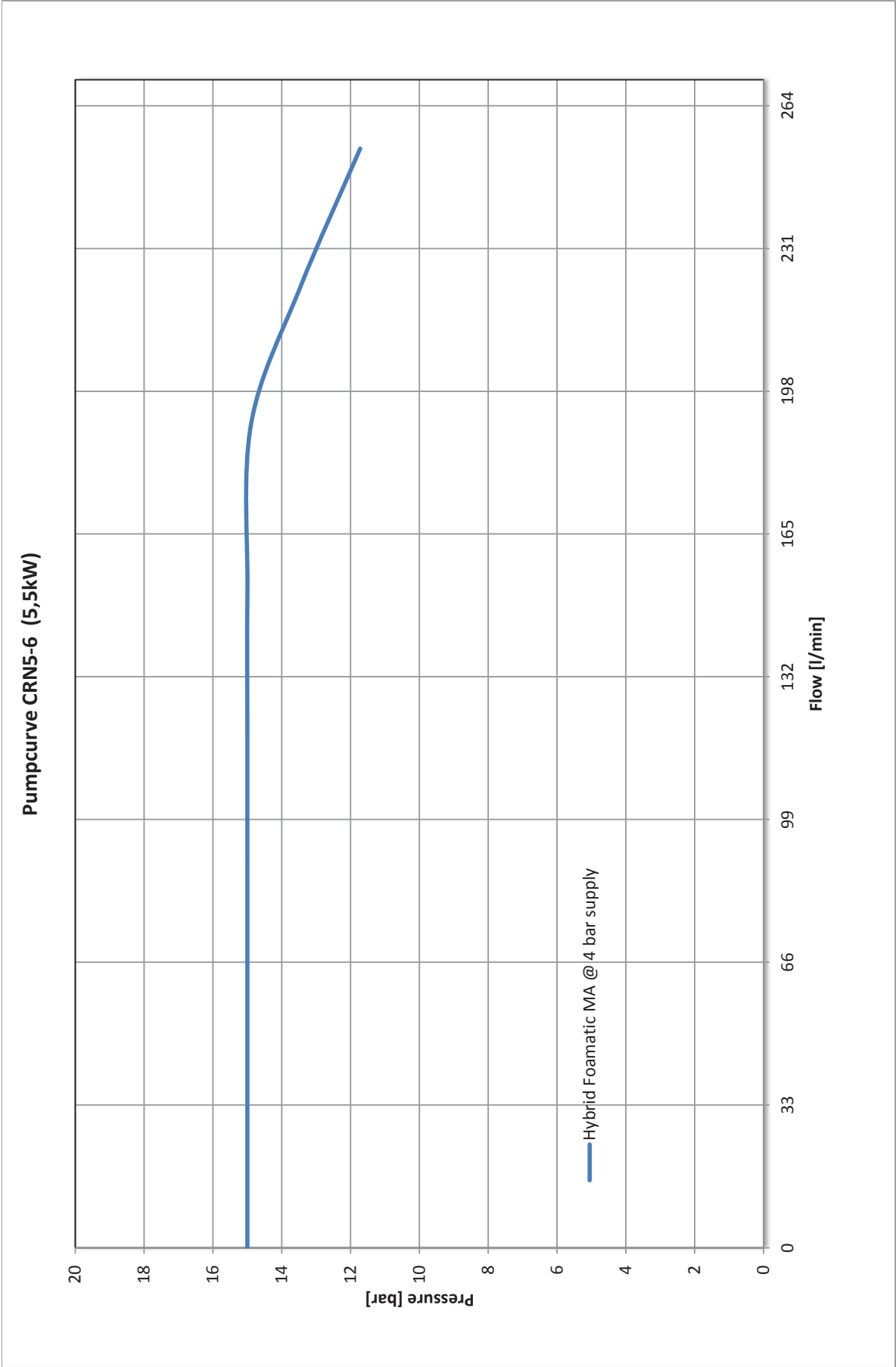
Max fuse : 16A

Project Responsible : SAN

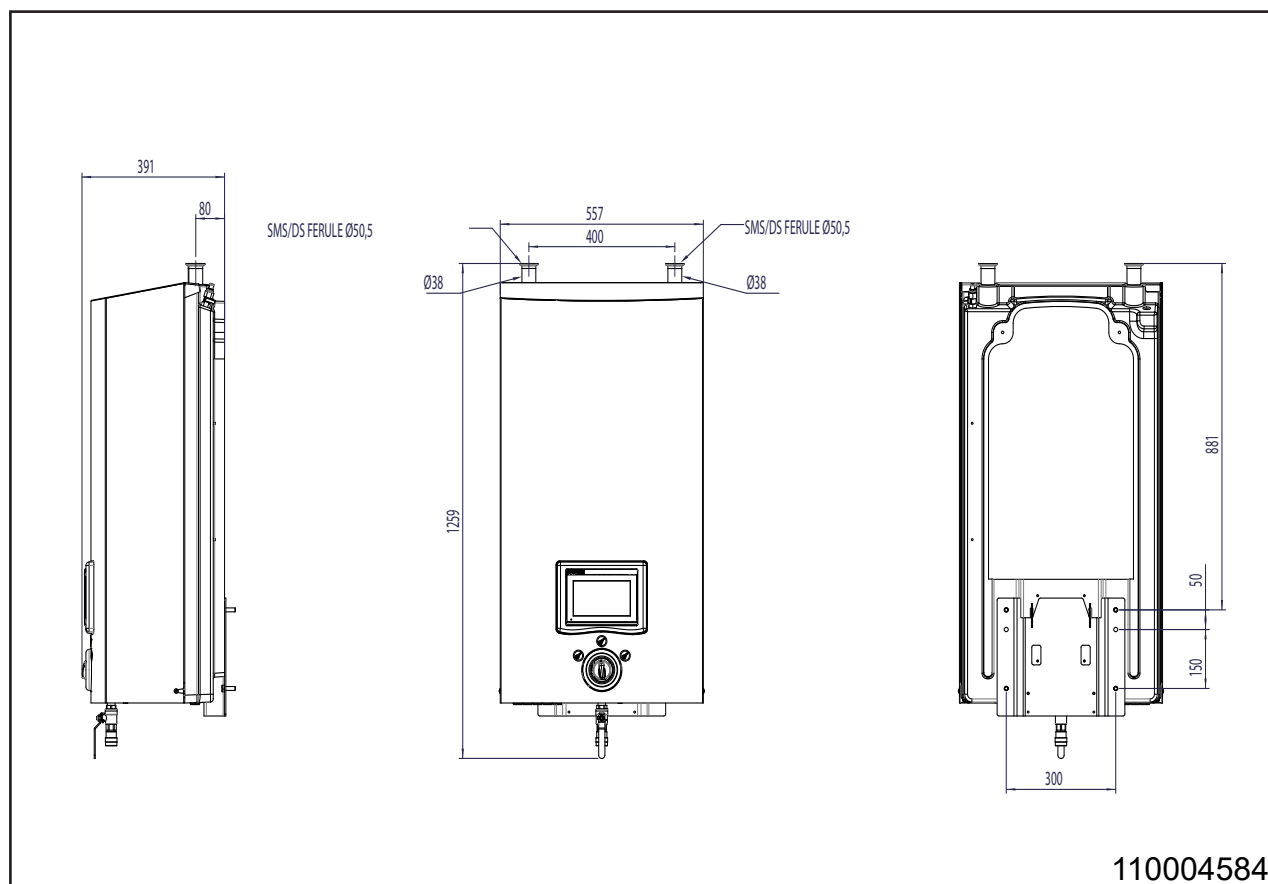
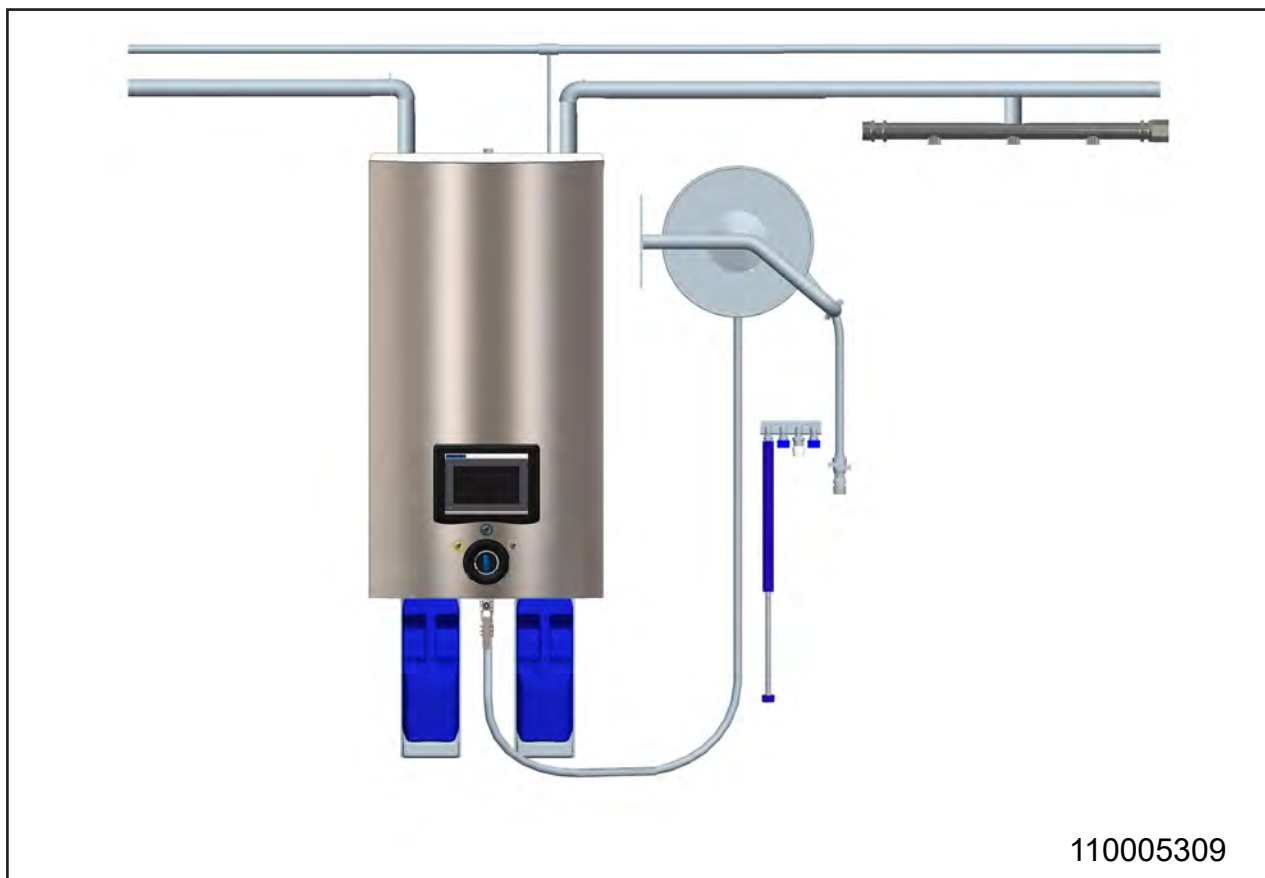


110005249-2

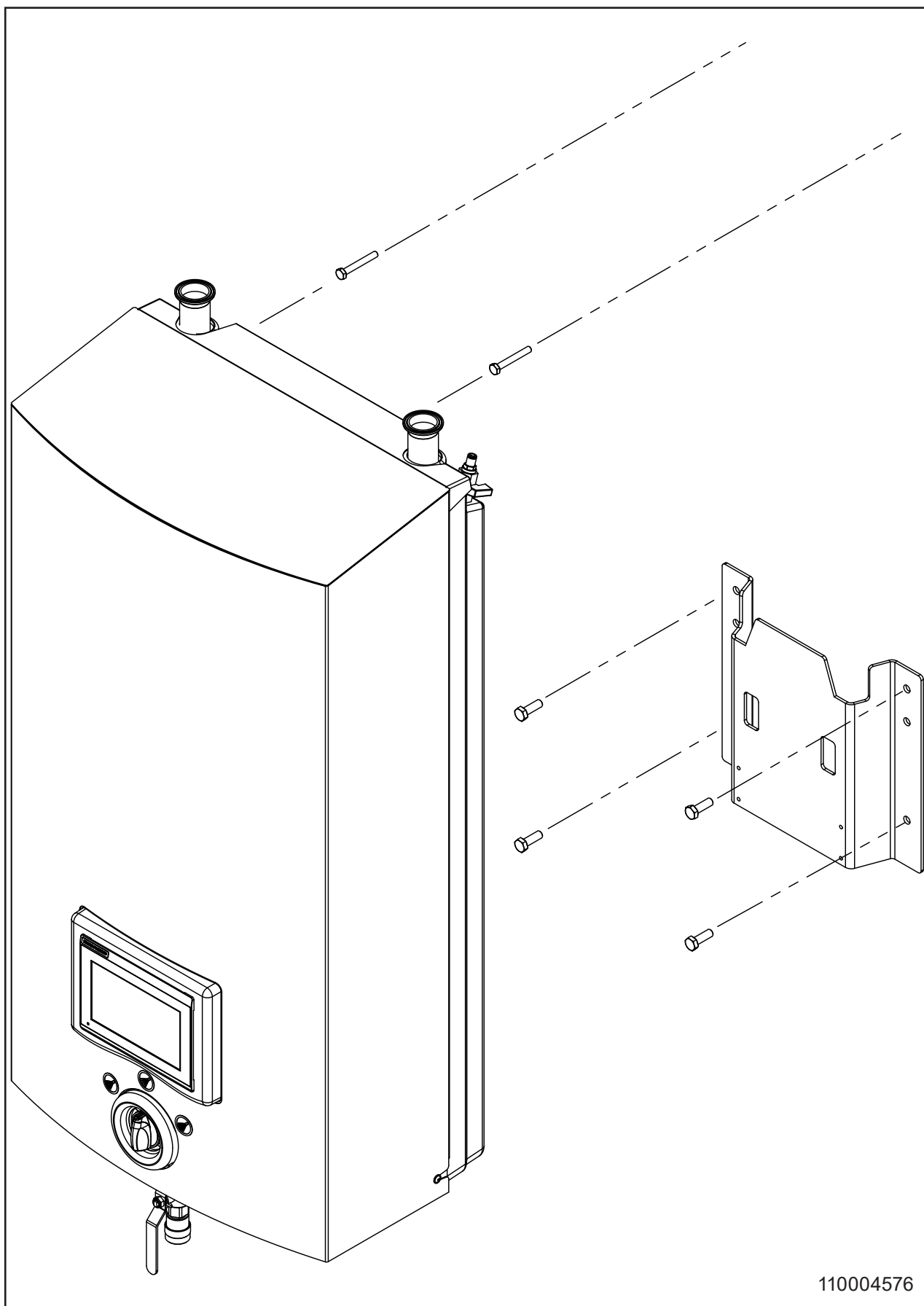
Pump curve 25 bar 60 Hz



Installation Diagram



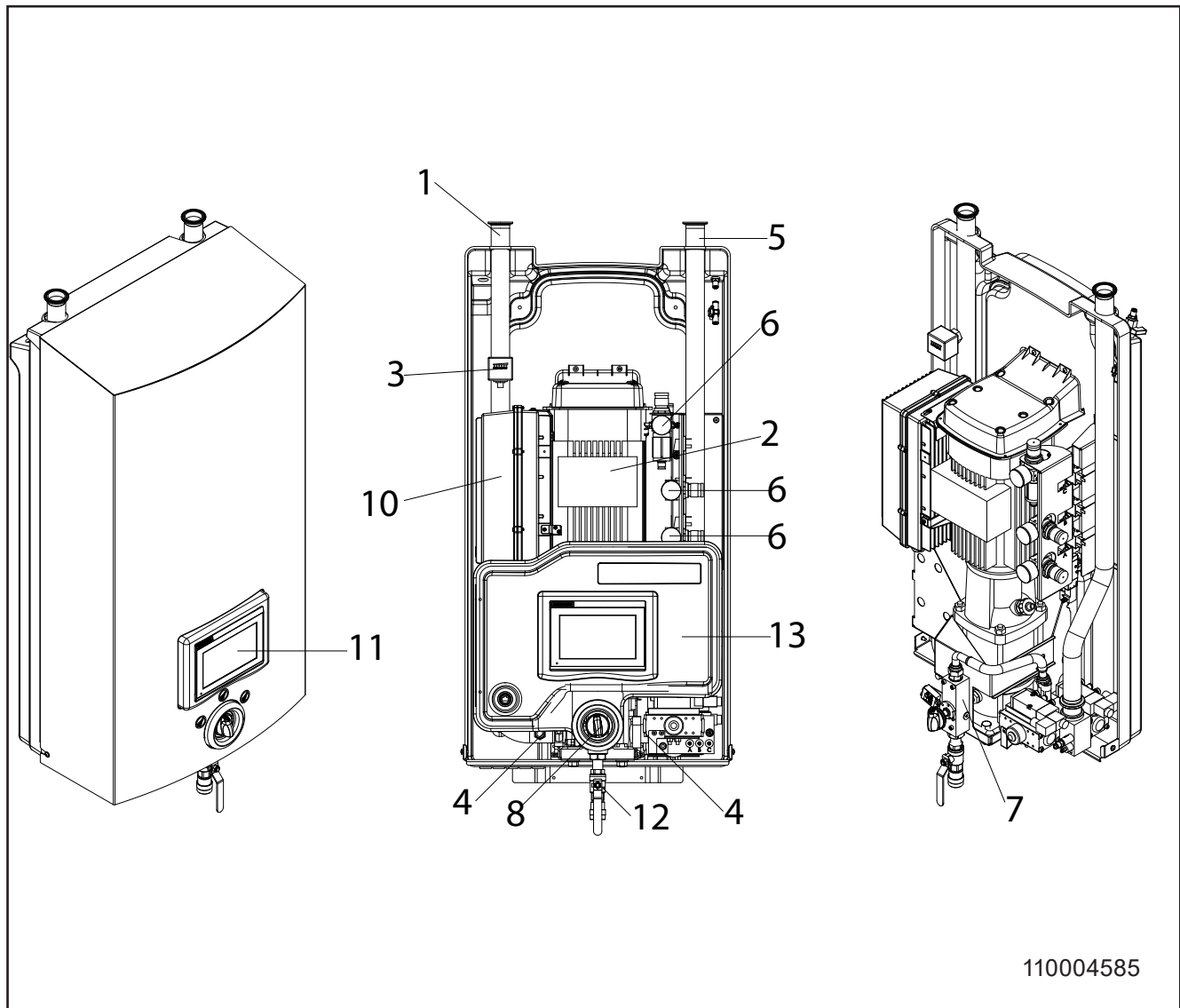
Mounting



110004576

Layout Hybrid Foamatic MA

Layout Hybrid Foamatic



110004585

	English	German	French	Spanish
1	Water inlet	Wassereinlauf	Entrée d'eau	Entrada de agua
2	Pump	Pumpe	Pompe	Bomba
3	Flow switch	Durchflussschalter	Interrupteur de débit	Interruptor de caudal
4	Pressure sensor	Drucksensor	Capteur de pression	Sensor de presión
5	Water Outlet pipe	Wasser Auslaufrohr	Conduit sortie	Tubería de salida
6	Air regulator with manometer	Luftregler mit Manometer	Régulateur d'air avec manomètre	Regulador de aire con manómetro
7	Multi block	Multi Block	Multi Block	Multibloque
8	Operation button	Bedientaste	Bouton de commande	Botón de funcionamiento
9	Compressor	Kompressor	Compresseur?	Compresor
10	Controller	Regler	Contrôleur	Controlador
11	Display	Display	Affichage	Visor
12	Ball valve with quick coupling	Kugelventil mit Schnellkupplung	Robinet à boisseau sphérique avec raccord rapide	Válvula de bola con acoplamiento rápido
13	Automatic Controller	Automatikregler	Contrôleur automatique	Controlador automático

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2. Symbols used in this document

	Read before use
	Wear glasses when using the unit.
	Wear gloves and suitable clothing when using the unit.
	Note: A potentially damaging situation. Possible consequences: The product or something in its vicinity could be damaged. Prevention.
	Caution: A dangerous situation.'Possible consequences: light or minor injuries. Can also be used in warn against damage to property or other goods prevention.
	Warning: A Potentially dangerous situation. Possible consequences: Death or severe injury Prevention.
	Danger: A dangerous situation.'Possible consequences: Death or severe injury Prevention.
	Danger: Risc of electric shock! Possible consequences: Death or severe injury Prevention
	Danger: Warning! Sharp edges – watch your fingers.
	Hot Surfaces Risc of burns! Possible consequences: Severe injuries prevention

3. General information

Nilfisk FOOD congratulates you on your new low-pressure foam and sanitising cleaning equipment.

The equipment provides the latest standard of technology in low pressure cleaning equipment in your factory.

The equipment can be used for rinsing, foaming and application of disinfectants.

It is important that your operational staff read these directions for use prior to installation, start up and use of the equipment.

Manual series

For this unit the following manuals are available :

110004669 Direction for use – Hybrid Foamatic MA/SA

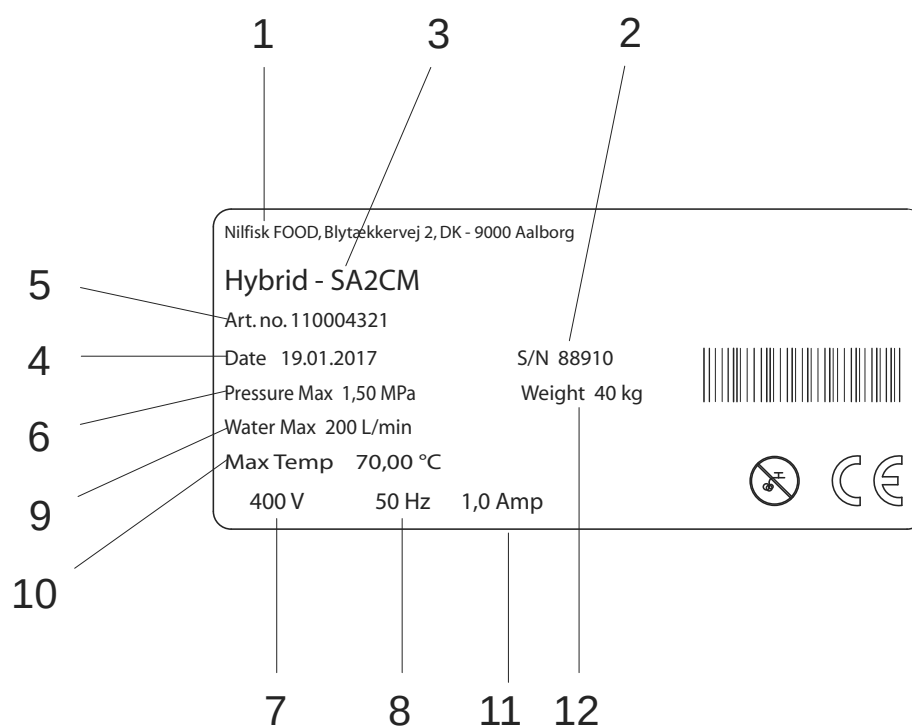
110004670 User guide - Hybrid Foamatic MA/SA

110004671 Software manual –Hybrid Foamatic MA/SA*

Direction for use and User guide will be enclosed as physical paper manuals.

*The software manual must be downloaded from nilfiskfood.com - in order to ensure that you always have the latest updated version.

3.1. Identification plate



1. Producer
2. Serie No.
3. Type
4. Date of production
5. Article No.
6. Maximum pressure
7. Supply voltage
8. Frequency
9. Maximum water consumption
10. Maximum temperature
11. Current
12. Weight

3.2. Supplier

Nilfisk FOOD
 Blytækkervej 2
 DK-9000 Aalborg, Denmark
 Tel.: +45 7218 2000
 CVR no. 6257 2213
www.nilfiskfood.com

3.3. Specifications

Technical Data		
	Units	SA
Water		
Consumption during rinsing.	l/min	30
Consumption during foaming	l/min	1,2
Min. supply pressure.	Mpa (bar)	0,7 (7)
Max. supply pressure.	Mpa (bar)	2,5 (25)
Min. supply.	l/min	
Max. temp.	C	70°
Pipe dimension inlet Ø	mm	38
Pipe dimension outlet Ø	mm	38
Electricity		
Supply voltage	V	3/PE 400Vac ±10%
Frequency	Hz	50/60Hz 48-0%..62+0%
Nominal current	A	1
Fuse	A	20
Internal fuse 5x20mm - 400V	A	1 slow blow
L1, L2, L3, PE	mm ²	2.5
Air		
Min/max air pressure.	Mpa/bar	0,6-1 / 6-10
Compressed air consumption.	l/min	200
Pipe dimension inlet Ø.	mm	6
General		
Dimensions H x B x D	mm	530 x 400 x 140
Weight	kg	40
IP class		55

4. Overview and use

The satellite in the hybrid range is a completely functioning hygiene station that supplies pre pressurised water to both its integrated hygiene points (optional) and to several connected cleaning areas. Therefore the satellite must be supplied with:

Pressurised water in sufficient quantity, power, compressed air, detergent(s) and disinfectant.

The satellite is then ready for hygiene duties.

Consumptions:

The unit is approved for the use of detergents and disinfectants.



Warning: Do not change the settings made or recommended by the supplier of the detergents!

Detergents are supplied via a User Pack system or from separate standard cans. Supply is also possible via piping systems.

Before installation and set up of the unit always read this instruction thoroughly. Always make sure to follow personal safety procedures for chemicals in connection with refilling procedures (product change), maintenance and repair. See also product label and Material Safety Data Sheet (MSDS).

Safety instructions

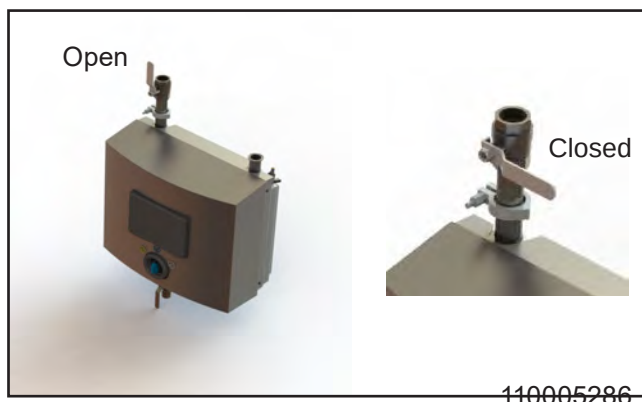
Only professional service personel are allowed to carry out service and repairs on the unit.

Only instructed personel are allowed to operate the unit.

5. System safety

In case of error/defect or service on equipment:

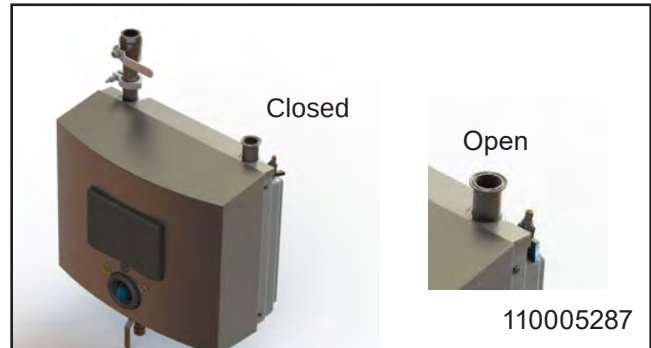
1. Close the water supply
2. Close the air supply
3. Turn of power supply



110005286

5.1. Closing valve for water supply.

With this valve the unit can be isolated from the water supply. Further, a non-return valve is built in the block to prevent backflow of water.



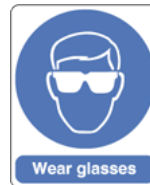
110005287

5.2. Closing valve for air supply.

With this valve the unit can be isolated from the air supply. Two non-return valves for air are built in the unit to prevent backflow of air.



The air pressure regulation/gauge only works when the supply valve is open.



Wear glasses when using the unit.



Wear gloves and suitable clothing when using the unit.



Warning: The spray jets can be dangerous if subjected to misuse. The jets must not be directed at persons, live electrical equipment or the unit itself.



Warning: Do not use the unit within range of persons unless they wear protective clothing.

5.3. Noise

Sound level according to ISO 11202; Below 70 dB

5.4. Vibrations

Hand-arm vibrations according to ISO 5349-1

5.5. Anticipated failures

Bursting air tube in unit:

- The unit must never be used without the front cover being mounted.
- The air closing valve on/in connection with the unit must always be closed when not in use.
- Air tube and fitting should be examined regularly and exchanged in case of visible damages.

Breakdown of non-return valves for air and water:

- The unit must never be used without the cover being mounted.
- Air and water closing valve on/in connection with the unit must always be closed when the unit is not in use.
- After use of the unit all chemical non-return valves must be thoroughly rinsed with clean water. Follow instructions in paragraph 9.2.
- Non-return valves for air and water should be examined minimum once a year by authorised personnel for defects.

Repair of unit:

- Do not attempt to repair a defect unit by yourself. Always contact an authorised service company.
- Block and mark any defect unit in order to avoid unintended use - see paragraph below regarding "Rest risk - Use of the unit"
- For safety reasons only use approved and original spare parts.

5.6. Rest risk

Use of unit:

- Never use the unit without prior instructions in use of the unit and its safety instructions. The instruction must be prepared by an educated/instructed personnel.
- Never use the unit without having read the enclosed guide and safety instructions.
- Always close water and air supply after use.

Damaged unit:

- Never use the unit if leakages (air, water or chemical) are observed.
- Never use the unit if it is not possible to operate the closing valves and/or if it is not possible to select required operation.
- Never use the unit if it has been dislodged for its original place of mounting.

6. Installation

For safety reasons it is important to read all of the enclosed information before installation of this equipment. In addition, the legislation in force at the time of purchase must always be considered in connection with the installation and mounting of this equipment, no matter the contents of this manual. If there are matters of dispute please contact your dealer.



The pipe line must be rinsed through before the system is connected.



Remove cover before the unit is mounted on the wall.

6.1. Directions for mounting



- The unit should be mounted in frost-free rooms only.
- The unit can be mounted on a wall or on a separate frame which may be installed in production areas and anchored to the floor.
- For mounting on walls, please note the following:

The wall for mounting should be either a stable brick wall or a wall made of concrete.



- The wall bracket should be mounted on the wall according to the above description and the station is hung on to the bracket. When mounted on the bracket secure the unit in the top by two screws through the designated holes. The hose and User Pack holders should be mounted afterwards. (See Installation drawing).

6.2. Transportation

For secure transportation of the unit, we recommend always to ensure, that the unit can not slide or tip.

The unit might have to be secured with straps.

Transportation of the unit only in horizontal position: The unit must not be placed on the front where you find the operation panel. Neither can it be placed on top or bottom where connections and outlets are mounted.

In case the unit is moved at a temperature of approx or below 0°C (32°F), you must always make sure that the unit has been fully emptied for water. If this is not the case, you may damage the unit.

6.3. Electrical Installation

6.3.1. Power supply

Connection instruction is mounted on the cables. The phase order is subordinated.

6.3.2. Earth Leakage Circuit Breaker (ELCB).

When using an earth leakage circuit breaker (ELCB) also

known as a residual current device (RCD) or a residual current circuit breaker (RCCB) in a system that incorporates a variable speed drive connected to 3 phase 400 V. The trip level of the ELCB has to be 300 mA. (30 mA used in house hold will malfunction due to earth leakage).

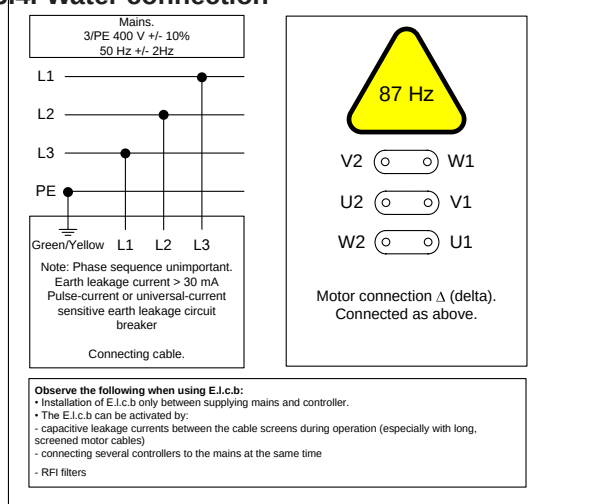
6.3.3. Service switch:

The unit must always be connected to the main supply through a separate service switch.

NB! Installation must always be in accordance with local legislation.

	SAXXX
Voltage:	3/PE 400 Vac $\pm 10\%$
Frequenz:	50/60 Hz 48 -0%...62 +0%
Nominal current:	1 A
Fuse:	20 A
L1, L2, L3, PE	2.5 mm ²

6.4. Water connection



110002820

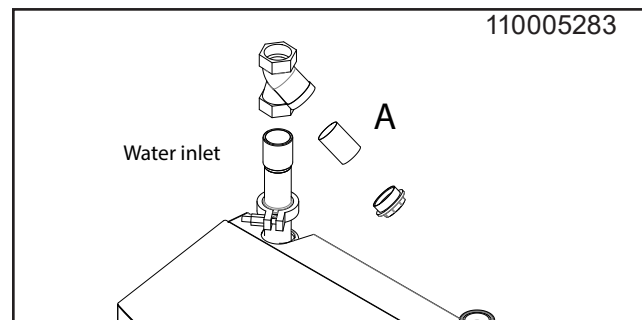


- Before the unit is connected to the water supply pipe, the supply line should be rinsed carefully in order to remove coarse impurities and metal shavings.
- The connection for water must be made at the top of the unit. (see layout drawing).
- Minimum diameter of the supply pipe must be at least $\varnothing 38$ external ($\varnothing 35$ mm internal).
- The unit must be fitted with a closing valve for water on the inlet (see layout drawing).
- The pressure loss in the supply line must be held as low as possible by
 - avoiding long supply pipes
 - mounting low pressure resistance ball valves and
 - avoiding fittings with high pressure loss.
- When installing the piping, take care to avoid air traps.

nections ensuring simple maintenance and dismantling of the station.

Max. allowed temperature of supply water: 70°C

Max. allowed pressure of supply water: 40 bar



For an optimum functioning of the injector system, we recommend installing a filter on the inlet to avoid impurities.

6.5. Air connection



Before the unit is connected to the air supply, the pipe system must be carefully rinsed in order to remove coarse impurities.

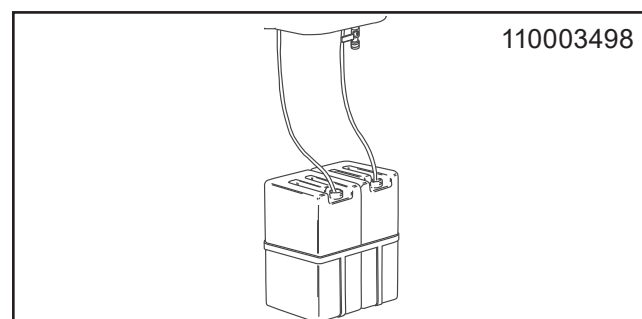
- The unit requires an air supply boosting
 - an inlet pressure of minimum 6 bar
 - a minimum capacity of 200 l/min.
- The air supply pipe is connected directly with a quick fitting for easy dismantling. In all units an inlet valve with 1/4" thread is fitted (layout drawings).

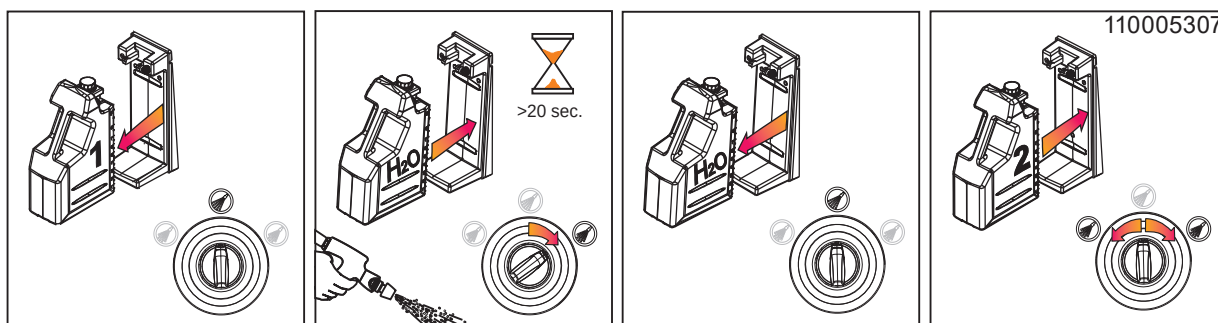
6.5.1. Supply of detergent

Satellite without User Pack system.

See drawing no 110003498

- Place the can with detergent in the can holder
- Check the suction filter for impurities.
- Put the suction hose into the can below product level and avoid suction of air.
- After pre-rinsing, check again that the hose is sufficiently below product level and avoid suction of air during foam or spray operation.





- After use of and when changing product as well as after use of the unit, remove the hose from the can and rinse the product inlet line and injector with clean water.

Satellite with User Pack system

See drawing no 110003485.

- Place the specially designed User Pack in the automatic holder.
- If changing to a different product when ending the cleaning process, rinse the product inlet line with clean water as follows:

Replace the User Pack containing product by one with clean water; place the foam nozzle and open the spray gun/outlet valve. The product inlet line is now rinsed with clean water before use of another product.

6.6. Hose Connection

- The special hose fitted with spray gun/outlet valve is connected to the outlet quick coupling of the unit (layout drawing).
- Maximum hose length: 30 m.
- It is recommended only to use Nilfisk FOOD hoses, which have been tested for resistance.

7. System preparation

7.1. Start up

In order to ensure a problem-free start up of a new system the pipe system and pump must be flushed and bled.

Bleeding the pipe system

1. Turn on the water supply to rinse and bleed the entire system. If satellites are installed open the tap furthest away until no air or dirt comes out. Then rinse and bleed the next tap and continue until the tap closest to you has been rinsed and bled.

7.1.1. Start

1. Make sure that the water and air supply to the unit is open. For air see layout drawing. In case of central chemical supply this must be activated too.
2. Select requested function. Use the unit according to the "User guide".

7.1.2. Stop

1. Press "□" to stop program if running.
2. Close the water supply (see drawing 110005285).

3. Close the air supply (see drawing 110005288).
4. Deactivate chemical supply by pulling up the suction hose or removing the User Pack.



Due to the following it is very important to close water, air and chemical supply when the unit is not in use.

- If the air supply is open when the unit is not in use - air might seep into the water pipe - which means that the system has to be bled again.

7.1.3. Adjustment of air

Remove the cover from the unit.

Adjust the air pressure on the reduction valve until an appropriate foam quality is reached.



When setting the regulator, carefully pull up the knob and turn it clockwise for pressure increase and counter clockwise for pressure decrease.

7.2. Regular maintenance

1. Quick coupling; it is recommended to lubricate all coupling parts regularly, approx. once a month) by waterproof grease to prevent leaks and damage of o-rings.
2. If the quick couplings leak, o-rings should be replaced.
3. Depending on usage, maintenance should be undertaken by an authorised service engineer at least once a year in order to prevent defects and failure of operation. Authorised engineers are persons who due to their skills and experience have sufficient knowledge of Hygiene Systems and are confident with the state work safety regulations, accident preventing regulations, lines and generally acknowledged technical regulations

such as DIN-norms and VDE-provisions. For your safety, this cleaning unit has been manufactured according to all relevant regulations valid in the EU and therefore it has been supplied with the CE-marking. For further information, please refer to the service department.

4. When the cleaning process has been completed or chemicals have been changed, it is important to rinse the suction and injector system in the following way:
 - Replace the can with a can containing clean water.
 - Put the suction hose into the water can.
 - Connect the foam nozzle.
 - Open the spray gun/outlet valve and keep it open until the injector has been rinsed through (approx. 30 seconds).
 - Remove the suction hose from the water can.
5. It is recommended to delime the unit according to paragraph 9.4

8. Operation

8.1. Before operation



Wear glasses when using the unit.



Wear gloves and suitable clothing when using the unit.



WARNING

This machine has been designed for use with the cleaning agents supplied or recommended by the supplier

8.2. Start/Stop (change, rinse, foam, des)

Start satellite

1. Check that water- and air supplies for the system are open.
2. Make sure that the water and air supply to the unit is open. For air see layout drawing. In case of central chemical supply this must be activated too.
3. Select requested function. Use the unit according to the "User guide".

Stop satellite

1. Press "□" to stop program if running.
2. Turn off the water supply
3. Close the air supply
4. Deactivate chemical supply by pulling up the suction hose or removing the User Pack.



It is important to shut off the water and air when the unit is left after use .

- If the air supply is open when the unit are not in use, air may seep into the water pipe. If this is the case the system may have to be bled again.

It may be necessary to bleed the pipes and the unit again after it has been closed for a longer period of time (holidays, and the like)



CAUTION

The chemical supply must always be rinsed thoroughly after use

The following procedure will clean the chemical supply for detergents and/or remains of disinfectants.

1. Remove User Pack or standard can.
2. Hold the rinsing bottle with clean water tightly against the suction opening (with User Pack). Alternatively, you can place a User Pack with clean water in the holder or – without User Pack – place the hose in a bucket of clean water.
3. Activate the hose handle until clean water comes out of the nozzle (approx. 30 seconds)

9. Maintenance, trouble shooting, service

9.1. Preventive maintenance

Depending on usage, maintenance should be undertaken by an authorised service engineer at least once a year in order to prevent defects and failure of operation. Authorised engineers are persons who due to their skills and experience have sufficient knowledge of the Hygiene Systems and are confident with the state work safety regulations, accident preventing regulations, lines and generally acknowledged technical regulations such as DIN-norms and VDE-provisions. For your safety, this cleaning unit has been manufactured according to all relevant regulations valid in the EU and therefore it has been supplied with the CE-marking. For further information, please refer to the service department.

9.2. Product solenoid valve

Maintenance free.

If defective, replace the product solenoid valve and/or need to replace chemical supply hoses.



Warning: Risk of chemical residue. Wear protective gear.

1. Turn off power supply.
2. Remove valve with a slot-head screwdriver.
3. Change valve and/or hoses. Be ware of flow direction marked on bracket.
4. Mount the valve in the bracket.



The flow direction is marked on the bracket. The flow of chemical supply is in the direction of the arrow with the tip pointing towards the automatic block. Do NOT use the marking printed on the solinoid valve.

9.3. Rinsing the chemical supply/injector system



The chemical supply must always be rinsed thoroughly after use.

Remains of detergents or disinfectants can clog the injector so it needs to be rinsed or replaced. The following procedure will clean the chemical supply for detergents and/or remains of disinfectants.

1. Remove User Pack, if any.
2. Hold the rinsing bottle with clean water tightly against the suction opening (with User Pack) or against the hose (without User Pack). Alternatively, you can place a User Pack with clean water in the holder or – without User Pack – place the hose in a bucket of clean water.
3. Activate the hose handle until clean water comes out of the nozzle (approx. 30 seconds).



This procedure should be followed both on the detergent and the disinfectant side (if this is installed).

9.4. Change of injector

1. Turn off power supply.
2. Turn off water and air supply.
3. Depressurise the system.
4. Unscrew and change injector. Beware of chemical residue.
5. Reconnect water, air supply and power supply.



WARNING

Risc of chemical residue.
Wear protective clothing.



CAUTION

The unit might be hot.
Ensure sufficient cooling time.

9.5. Deliming

The interval of the deliming procedure depends on the water hardness.

9.5.1. Manual block

1. Make sure the water and the power to the unit is disconnected.
2. Remove the cover from the unit.
3. Depressurize the system.
4. Dismount the injector block, product non-return valve, air valve and air non-return valve including the air fittings.
5. Rinse the block in the clean water.

6. Place the injector block and product non-return valve in a deliming bath - make sure the selector knob is over the surface.
7. Wait for 60 minutes.
8. Rinse the block in clean water.
9. Mount the air valve, air non-return valve and product non-return valve on the injector block and mount the injector block in the unit.
10. Reconnect water to the unit.
11. Test the unit in foam position make sure the vacuum is sufficient, it is recommended to be between 14,8-20,7 inHg/-0,05-0,07MPa.
12. Test that the unit can start and stop in both foam and rinse position.
13. Reinstall the cover on the unit.

9.5.2. Automatic block

A dedicated deliming program is needed for the following process:

1. Remove the cover from the unit.
2. Place the chemical supply hoses in clean water and activate the foaming function on all chemical valves for 1 minute.
3. Place the chemical hoses in deliming fluid and activate the foaming function for all chemical valves for 1 minute.
4. Wait 60 minutes.
5. Place the chemical hoses in clean water and activate the foaming function on all chemical valves for 5 minutes.
6. Activated the rinsing function for 1 minute.
7. Test foaming function and make sure the vacuum is sufficient, it is recommended to be between 14,8-20,7 inHg/-0,05-0,07MPa.
8. Reinstall the cover on the unit.

°dH	ppm	Time between deliming
0-5	18-90	12 months
5-10	90-180	6 to 12 months
10-15	180-270	3 to 6 months
15-20	270-360	3 to 6 months
>20	>360	1 to 3 months

9.6. Coupling

It is recommended to lubricate all coupling parts regularly (approx. once a week) with waterproof grease to prevent leaks and damage of o-rings. If the unit is equipped with a spray gun the piston of the gun should also be lubricated.

In leaking quick couplings the o-rings should be replaced.

9.7. Internal cleaning of the unit

Depending on the environment where the unit is installed, internal cleaning of the unit might be required. We recommend opening and cleaning the unit inside once a year. Do not spray inside the unit.

9.8. Trouble shooting and remedy

In case of errors/troubles not mentioned above, please contact your local service technician for further assistance.

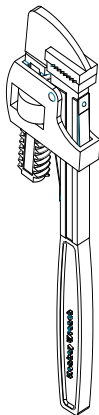
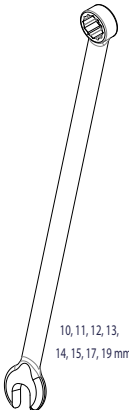
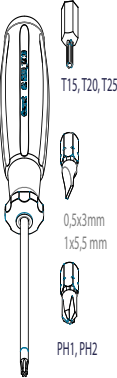
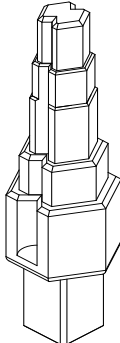
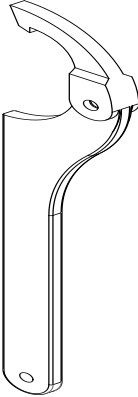
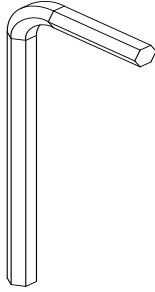
Fault	Cause	Remedy
The unit does not start	- Is there supply voltage to the unit - Error message in display - Flow switch out of adjustment	- Reconnect voltage and ensure 3x400V supply - Read error and act accordingly - Try to readjust flow switch
No pressure / too low pressure	- Insufficient water supply at unit - Is the filter clogged - Is the pump leaking or making jarring sounds - Rinsing nozzle not installed - Defect in booster unit - No water supply	- Open water supply valve - Clean the filter - Call technician - Place rinsing nozzle - Consult direction for use of booster unit - Ensure water supply
Insufficient foam creation	- No supply of diluted products - Product not suitable - Insufficient air supply at unit - Air pressure in mixing chamber too high - Defect non-return valve for air - Incorrect nozzle - Leaking or blocked chemical non-return valve - System needs deliming	- Consult directions for use of dosing unit - Choose suitable product - Provide sufficient air supply - Adjust air pressure setting - Replace non-return valve for air - Place foam nozzle 50/200 - Clean or replace chemical non-return valve - Delime the unit according to paragraph 9.5
No foam creation	- No supply of diluted products - Product not suitable - Air pressure in mixing chamber too high - Defect non-return valve for air - No air supply - Non-return valve blocked - Nozzle of mixing chamber blocked - Leaking or blocked chemical non-return valve - System needs deliming	- Consult directions for use of dosing unit - Choose suitable product - Adjust air pressure setting - Replace non-return valve for air - Ensure air supply - Clean or replace non-return valve - Clean nozzle - Clean or replace chemical non-return valve - Delime the unit according to paragraph 9.5
No spray sanitising	- No supply of diluted products - Non-return valve blocked - Nozzle of mixing chamber blocked - Leaking or blocked chemical non-return valve - System needs deliming	- Consult directions for use of dosing unit - Clean or replace non-return valve - Clean nozzle - Clean or replace chemical non-return valve - Delime the unit according to paragraph 9.5

9.9. Service address

Please see the back cover of this manual

10. Tools

Standard tools that are useful/necessary for service and maintenance on the full range of equipment.

	BF/BW & MB Booster Mainstation Foamatic Mainstation		Satellites BF/BW & MB Booster Mainstation Foamatic Satellites Foamatic Mainstation
	Satellites BF/BW & MB Booster Mainstation Foamatic Satellites Foamatic Mainstation		Satellites BF/BW & MB Booster Mainstation Foamatic Satellites Foamatic Mainstation
	BF/BW & MB Booster		Foamatic Satellites Foamatic Mainstation
	Satellites BF/BW & MB Booster Mainstation Foamatic Satellites Foamatic Mainstation		Satellites Mainstation Foamatic Satellites Foamatic Mainstation

11. End of use

11.1. Dismounting

Close all supply valves and remove the unit from wall.

11.2. Disposal

In case the unit should be disposed, it must be separated and sorted in recyclable and non-recyclable parts. The steel construction is easily separated and disposed and constitutes no environmental risk - nor for the user.

Disposal must be made according to rules and regulations in force for disposal of machines as well as all standards in connection with environmental protection.

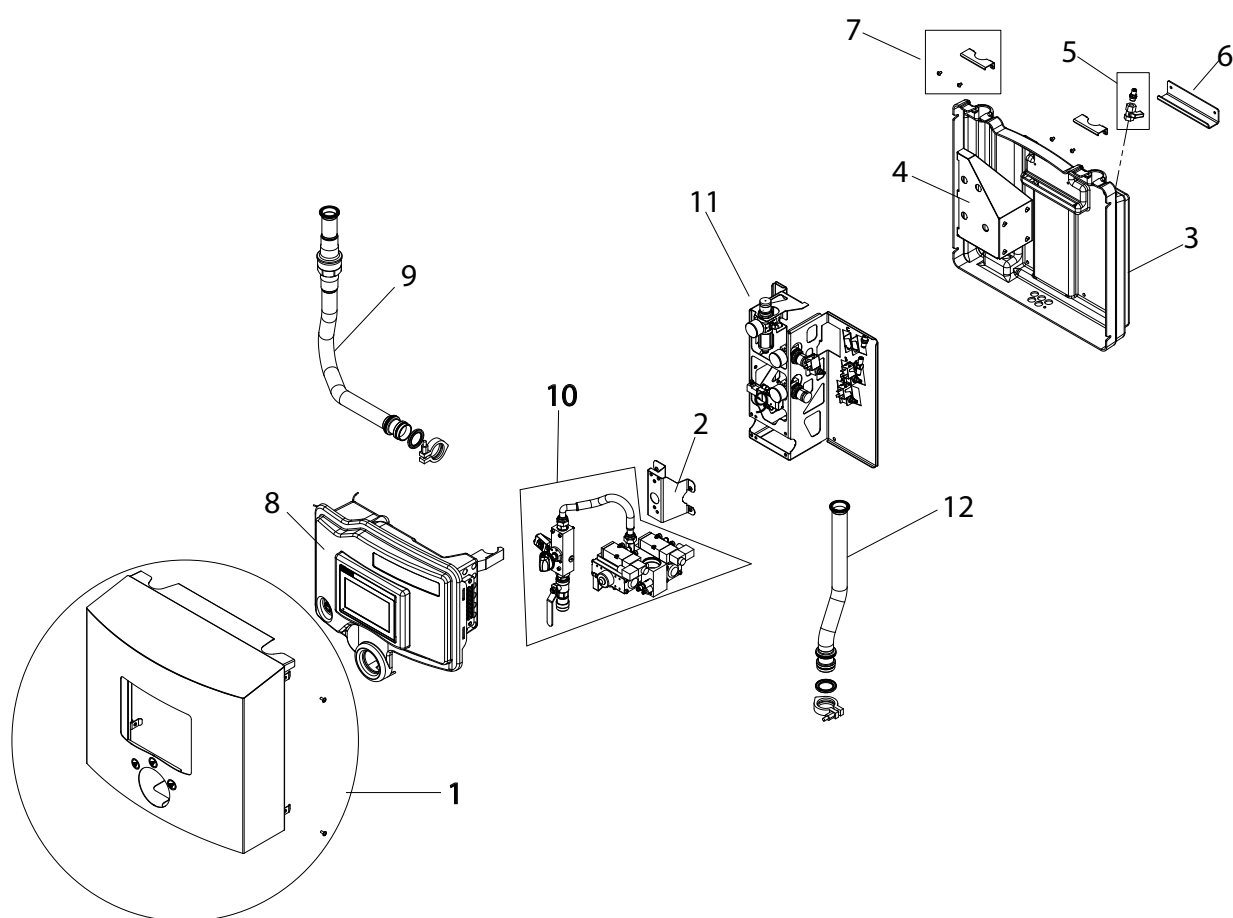


CAUTION

Disposal of electronic components and other remedies must be handled as special disposal when disposed. Alternatively, it can be disposed by a specialised disposal company.

Recommended spare parts
Empfehlenswerte Ersatzteile
Pièces de rechange conseiées
Piezas de requesto recomendadas

Hybrid Foamatic



110004618

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic SA2	Hybrid Foamatic SA3	Hybrid Foamatic SA2C	Hybrid Foamatic SA3C	Hybrid Foamatic SA2M	Hybrid Foamatic SA3M	Hybrid Foamatic SA2CM	Hybrid Foamatic SA3CM
1	110005284	Cover complete	1	1	1	1	1	1	1	1
2	110004949	Bracket manual block					1	1	1	1
3	110004964	Back part	1	1	1	1	1	1	1	1
4	110005088	Bracket	1	1	1	1	1	1	1	1
5	110001105	Closing valve	1	1	1	1	1	1	1	1
6	110001066	Wall bracket	1	1	1	1	1	1	1	1
7	110005280	Bracket	2	2	2	2	2	2	2	2
8		See page 90 drawing 110005253								
9		See page 94 drawing 110004316								
10		See page 86-89 drawing 110004383/110004572								
11		See page 96 see drawing 110005272								

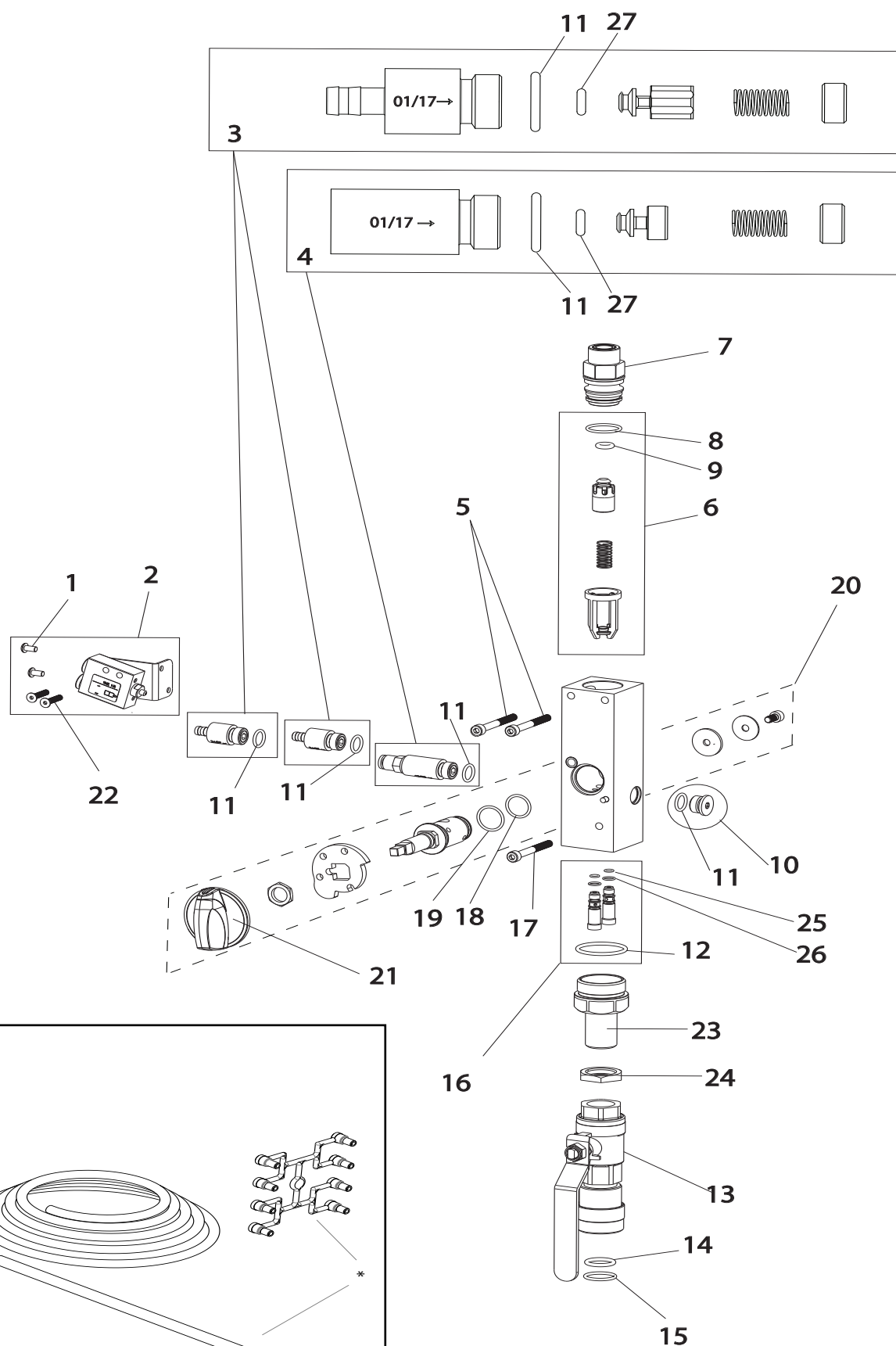
English (EN)

Deutsch (DE)

Français (FR)

Español (ES)

Manual Block - SA2M, SA3M, SA2CM, SA3CM



110001405

110004572-SA-1

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic SA2	Hybrid Foamatic SA3	Hybrid Foamatic SA2C	Hybrid Foamatic SA3C	Hybrid Foamatic SA2M	Hybrid Foamatic SA3M	Hybrid Foamatic SA2CM	Hybrid Foamatic SA3CM
1	110003512 (0602021)	Screw kit								
2	110003282	Air regulation valve complete					1	1	1	1
3	110001102	Chemical non return valve					2	2	2	2
4	110001979	Air non return valve					1	1	1	1
5	110003512 (110000526)	Screw kit								
6	110004384	Water non return valve complete					1	1	1	1
7	110004246	Fitting					1	1	1	1
8	110005355 (0600078)	O-ring kit								
9	110005355 (110002785)	O-ring kit								
10	110002306	Plug					1	1	1	1
11	110005355 (110002952)	O-ring kit								
12	110005355 (110000038)	O-ring kit								
13	110003682	Outlet coupling complete					1	1	1	1
14	110005355 (641101)	O-ring kit								
15	110003513 (641102)	O-ringkit								
16	110003283	Injector kit					1	1	1	1
17	110003512 (110000526)	Screw kit								
18	110005355 (110002508)	O-ring kit								
19	110005355 (350108)	O-ring kit								
20	110003401	Axle for block complete					1	1	1	1
21	909100214	Operation button					1	1	1	1
22	110003512 (110000525)	Screw kit								
23	110003092	Hexagon nipple					1	1	1	1
24	350705	Lock nut					1	1	1	1
25	110005355 (110004888)	O-ring kit								
26	110005355 (110004887)	O-ring kit								
27	110005355 (0635021)	O-ring kit								
*	110001214 110001197 110001198 110001199 0646105	Chemical hose (blue) Chemical hose (yellow) Chemical hose (red) Chemical hose (green) Chemical limiting nozzle								

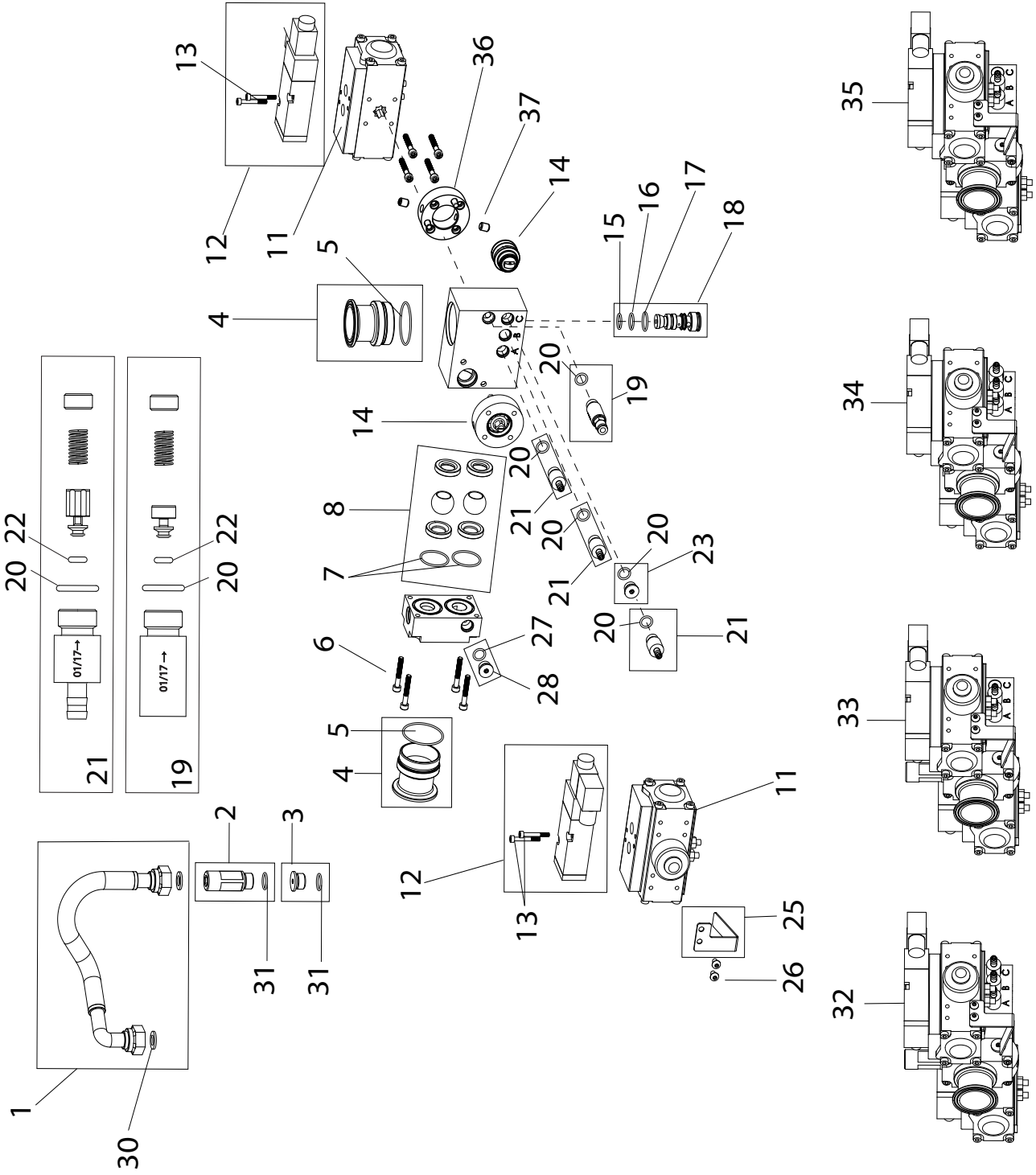
English (EN)

Deutsch (DE)

Français (FR)

Español (ES)

Block



110004572SA-2

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic SA2	Hybrid Foamatic SA3	Hybrid Foamatic SA2C	Hybrid Foamatic SA3C	Hybrid Foamatic SA2M	Hybrid Foamatic SA3M	Hybrid Foamatic SA2CM	Hybrid Foamatic SA3CM
1	110005255	Hose					1	1	1	1
2	110005274	Fitting					1	1	1	1
3	110005275	Plug	1	1	1	1				
4	110005279	Clamp fitting	2	2	2	2	2	2	2	2
5	110005355 (110004837)	O-ring kit								
6	110003512 (110005104)	Screw kit								
7	110005355 (110004835)	O-ring kit								
8	110005276	Service kit actuator	1	1	1	1	1	1	1	1
11	0605792	Actuator	2	2	2	2	2	2	2	2
12	110004622	Solenoid valve	1	1	2	3	1	1	1	1
13	110003512 (110004573)	Screw kit								
14	110005277	Service kit automatic block	2	2	2	2	2	2	2	2
15	110005355 (110004870)	O-ring kit								
16	110005355 (110004871)	O-ring kit								
17	110005355 (110002955)	O-ring kit								
18	110005278	Injector kit	1	1	1	1	1	1	1	1
19	110001979	Air non return valve	1	1	1	1	1	1	1	1
20	110005355 (110002952)	O-ring kit								
21	110001102	Chemical non return valve	2	3	2	3	2	3	2	3
22	110005355 (0635021)	O-ring kit								
23	110002306	Plug	1		1		1		1	
25	110005207	Bracket	1	1	1	1	1	1	1	1
26	110003512 (110003900)	Screw kit								
27	110005355 (110002952)	O-ring kit								
28	110002306	Plug	1	1	1	1	1	1	1	1
29	110000890	Sensor								
30	110005355 (0635042)	O-ring kit					2	2	2	2
31	110005355 (110004140)	O-ring kit								
32	110005227	Block automatic complete						1		1
33	110005226	Block automatic complete					1		1	
34	110005229	Block automatic complete		1		1				
35	110005228	Block automatic complete	1		1					
36	110005351	Fixation for actuator								
37	110003512 (156519)	Pinol screw								

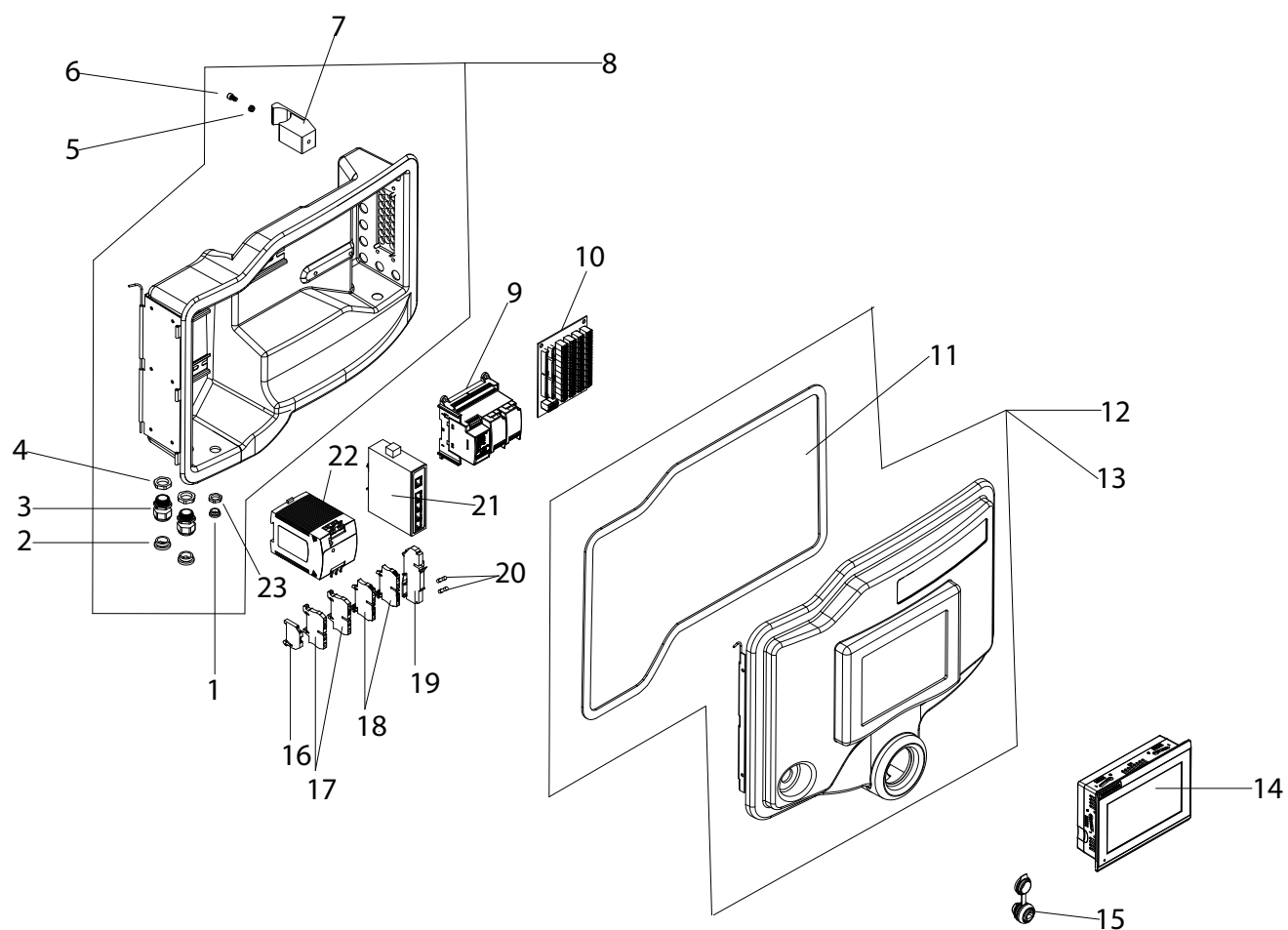
English (EN)

Deutsch (DE)

Français (FR)

Español (ES)

Controller SA2C, SA3C, SA2CM, SA3CM



110005253

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic SA2	Hybrid Foamatic SA3	Hybrid Foamatic SA2C	Hybrid Foamatic SA3C	Hybrid Foamatic SA2M	Hybrid Foamatic SA3M	Hybrid Foamatic SA2CM	Hybrid Foamatic SA3CM
1	110004220	M12 Plug			1	1			1	1
2	0601477	Plug								
3	0601848	Strain relief			2	2			2	2
4	0631092	Counter Nut			2	2			2	2
5	110003512 (156310)	Nut								
6	110003512 (110000526)	Screw								
7	110005292	Piping lock	1	1	1	1	1	1	1	1
8	110005298	Controller complete			1	1			1	1
9	110004645	PLC			1	1			1	1
10	110004920	Connecting board			1	1			1	1
11	110004925	Sealing			1	1			1	1
12	110005293	Controller front							1	1
13	110005295	Controller front			1	1				
14	110003993	Display			1	1			1	1
15	110004444	Ethernet plug			1	1			1	1
16	152200	End stop			1	1			1	1
17	150640	Screw terminal			2	2			2	2
18	150650	Screw terminal			2	2			2	2
19	110004649	Screw terminal			1	1			1	1
20	110003743	Fuses			2	2			2	2
21	110005513	Switch			1	1			1	1
22	110004641	Power supply			1	1			1	1
23	0601794	Counter nut			1	1			1	1

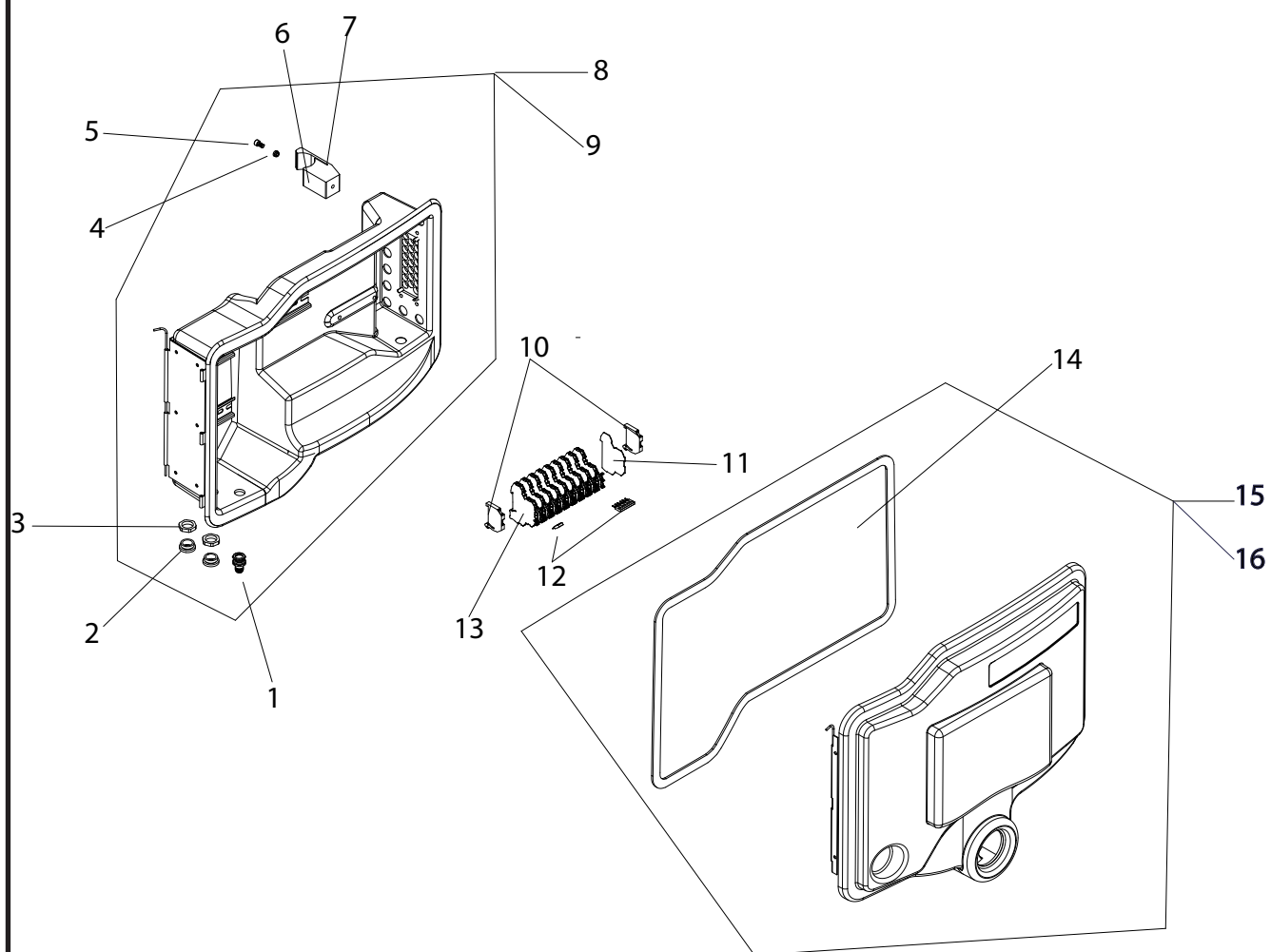
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Deutsch (DE)

Français (FR)

Español (ES)

Screw terminal



110005256

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic SA2	Hybrid Foamatic SA3	Hybrid Foamatic SA2C	Hybrid Foamatic SA3C	Hybrid Foamatic SA2M	Hybrid Foamatic SA3M	Hybrid Foamatic SA2CM	Hybrid Foamatic SA3CM
1	110004220	Plug	1	1			1	1		
2	0601477	Plug	2	2			2	2		
3	0631092	Counter nut	2	2			2	2		
4	110003512 (156310)	Nut								
5	110003512 (110000526)	Screw								
6	110005292	Piping lock	1	1	1	1	1	1	1	1
7	110005291	Piping lock								
8	110005297	Controller bottom complete								
9	110005298	Controller bottom complete	1	1			1	1		
10	152200	Endstop	2	2			2	2		
11	319918	End plate	1	1			1	1		
12	0631034	Center lug	1	1			1	1		
13	319917	Double clamps	9	9			9	9		
14	110004925	Sealing	1	1			1	1		
15	110005294	Terminal box					1	1		
16	110005296	Terminal box	1	1						

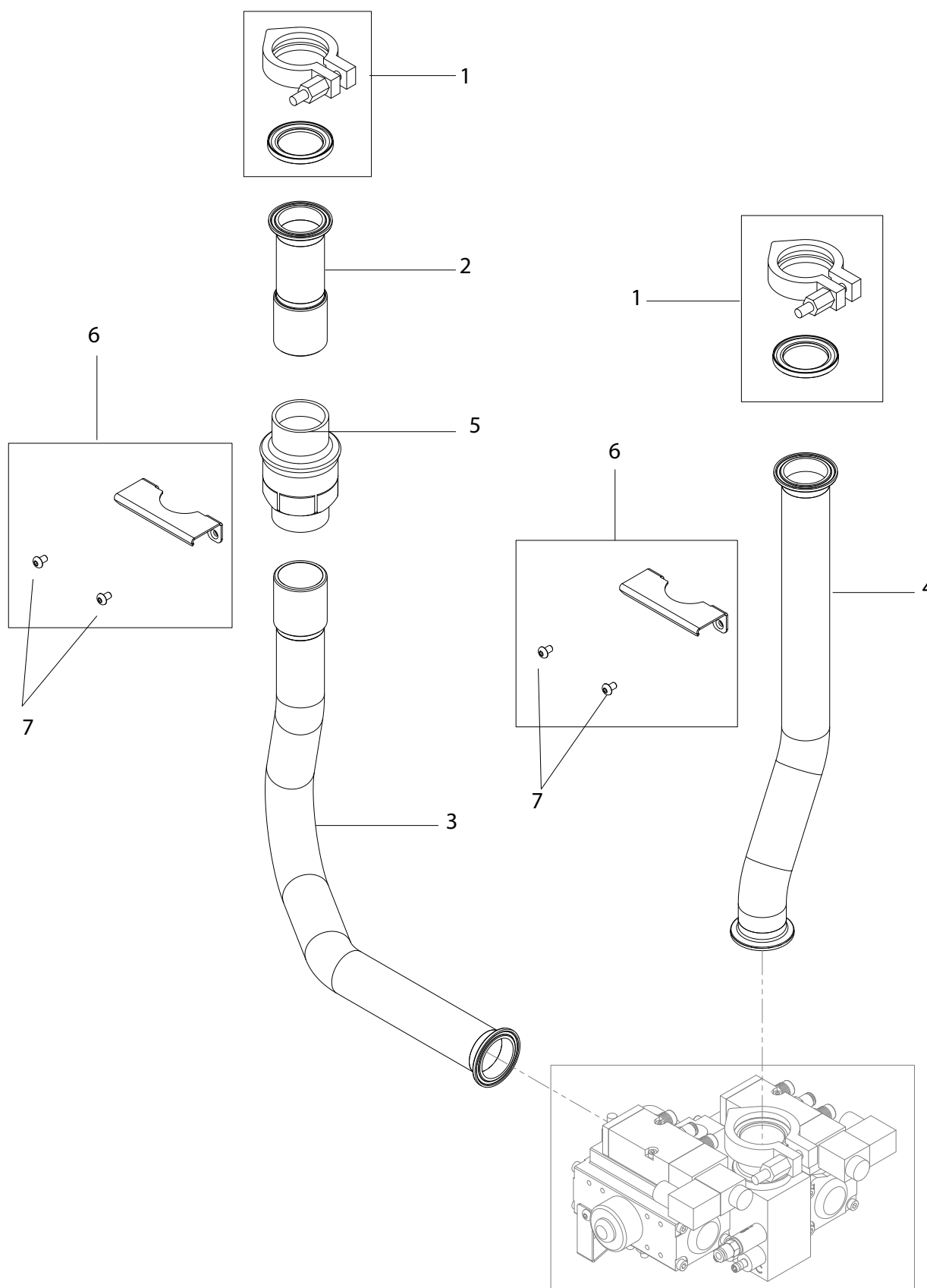
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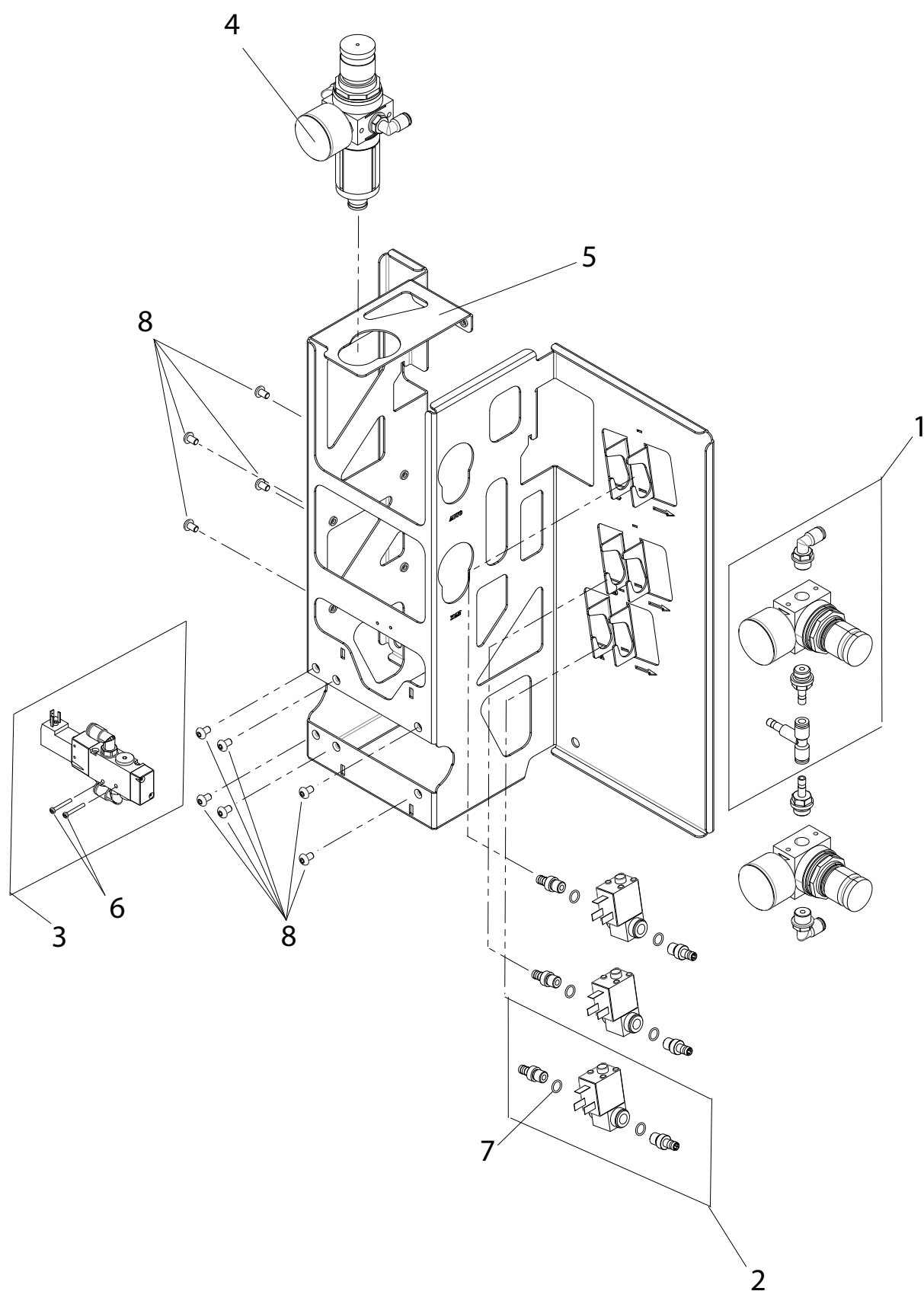
Inlet & Outlet pipe



110004616

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic SA2	Hybrid Foamatic SA3	Hybrid Foamatic SA2C	Hybrid Foamatic SA3C	Hybrid Foamatic SA2M	Hybrid Foamatic SA3M	Hybrid Foamatic SA2CM	Hybrid Foamatic SA3CM
1	110005273	Clamp kit	1	1	1	1	1	1	1	1
2	110005257	Pipe inlet	1	1	1	1	1	1	1	1
3	110005198	Pipe inlet	1	1	1	1	1	1	1	1
4	110004972	Pipe outlet	1	1	1	1	1	1	1	1
5	630900	Non return valve water	1	1	1	1	1	1	1	1
6	110005280	Bracket	2	2	2	2	2	2	2	2
7	110003512 (110003900)	Screw kit								

Chemical valve bracket



110005272

Pos./Ref.	Nr. No.	Description Beschreibung Désignation Designación	Hybrid Foamatic SA2	Hybrid Foamatic SA3	Hybrid Foamatic SA2C	Hybrid Foamatic SA3C	Hybrid Foamatic SA2M	Hybrid Foamatic SA3M	Hybrid Foamatic SA2CM	Hybrid Foamatic SA3CM
1	110005396	Regulation unit air with manometer	2	2	2	2	2	2	2	2
2	110005281	Solenoid valve chemical	2	3	2	3	2	3	2	3
3	110002787	Solenoid valve air	1	1	1	1	1	1	1	1
4	110005282	Filter regulator complete	1	1	1	1	1	1	1	1
5	110005053	Bracket for valves	1	1	1	1	1	1	1	1
6	110003512 (110002749)	Screw kit								
7	110005399 (0635031)	O-ring kit								
8	110003512 (110003900)	Screw kit								

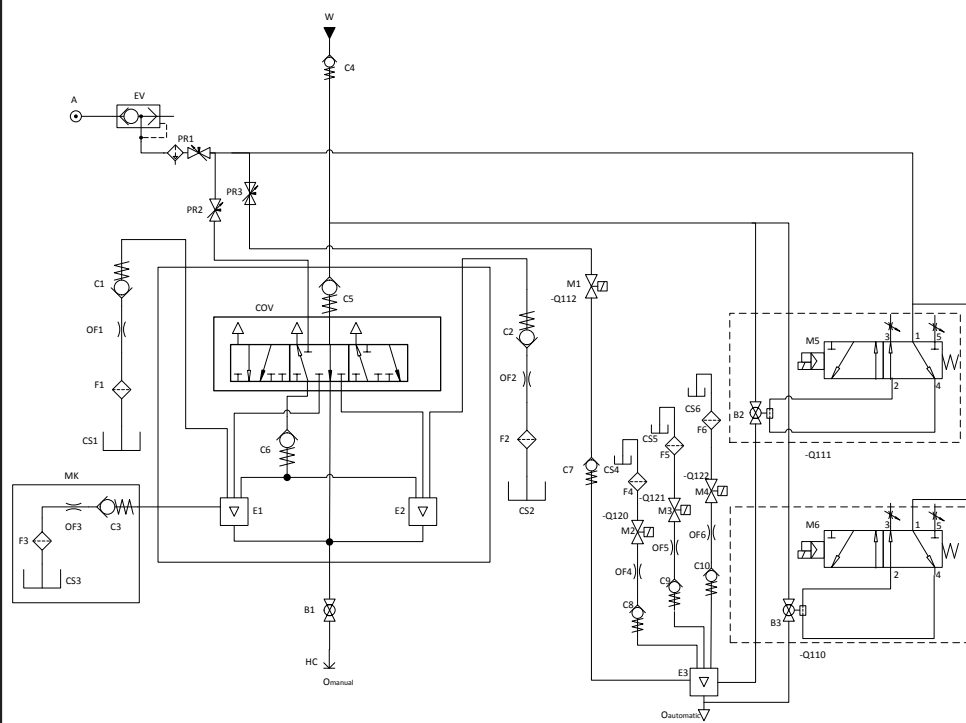
English (EN)

Deutsch (DE)

Français (FR)

Español (ES)

Operating Diagrams



Number/Mark	Description
A	Air supply
B	Ball valve
C	Check valve
COV	Change over valve
CP	Centrifugal pump
CS	Chemical supply
E	Ejector
EV	Exhaust valve
F	Filter
FST	Flowsensor and -trigger
HC	Hose coupling
K	Component reference
M	Magnetic valve
MK	Mix kit (optional)
O	Outlet
OF	Orifice
PE	Pressure sensor
PR	Pressure regulator
Q	Component reference
TE	Temperature sensor
W	Water inlet

110005305

Nilfisk Food

Blytaekkervej 2
DK- 9000 Aalborg
Tlf. +45 7218 2000

Project : Hybrid Foamatic MKII SA

Item No. : 110005259

Rated Voltage : 400V

Rated frequency : 50Hz

Full-load current : 1A

Max single load : 1A

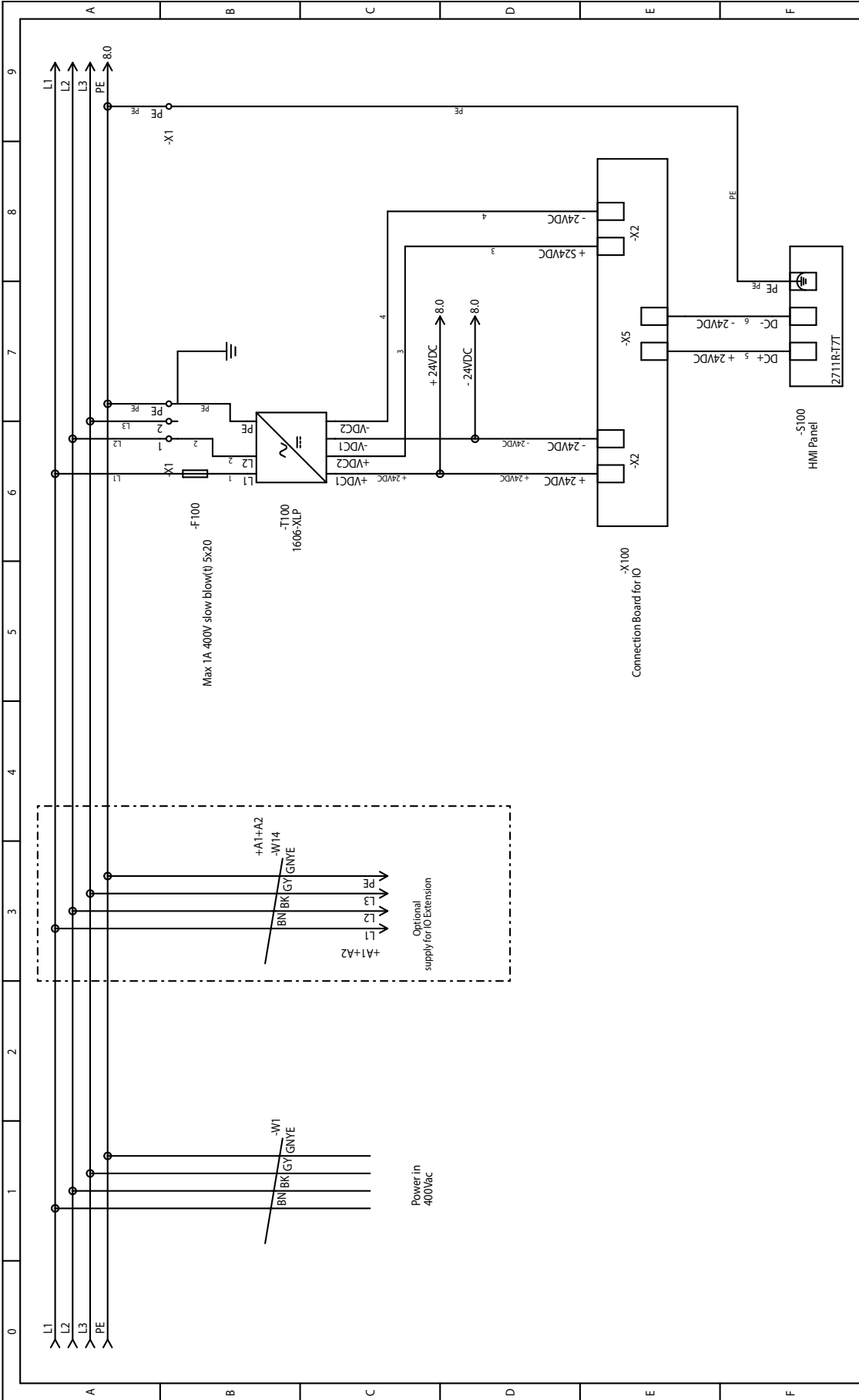
Rated short time
withstand current, I_{cw} : 6kA

Max fuse : 16A

Project Responsible : SAN

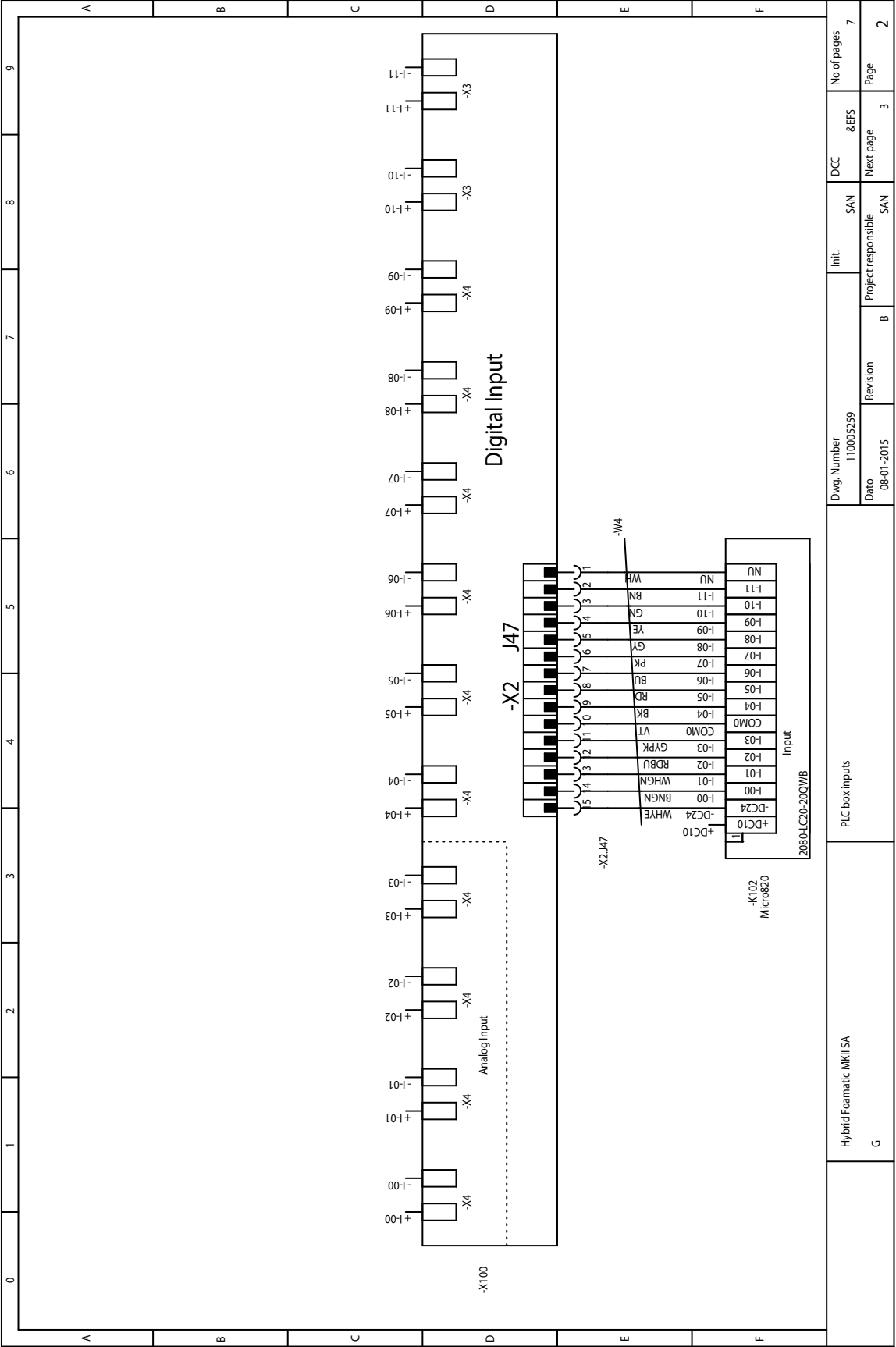
Document revision : G

EI Diagrams/Sensor Diagram



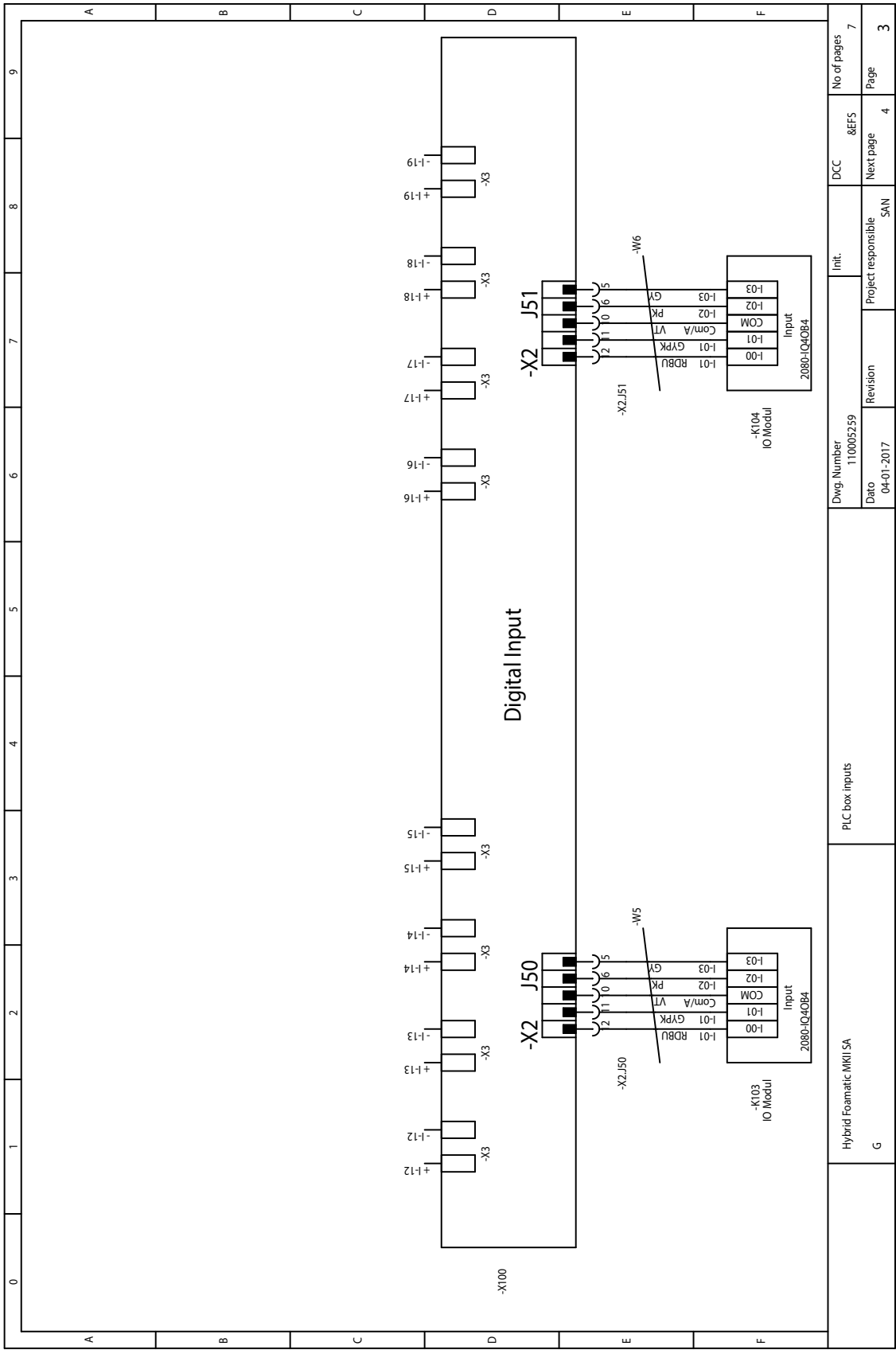
PLC box supply		Init.		DCC		No of pages	
Hybrid Foamatic MKII SA		SAN		SAN		7	
G		Revision		Next page		Page	
		D		SAN		1	
Dwg. Number		Project responsible		DCC		No of pages	
110005259		SAN		SAN		7	
Dato		Revision		Next page		Page	
08-01-2015		D		SAN		1	

EI Diagrams/Sensor Diagram

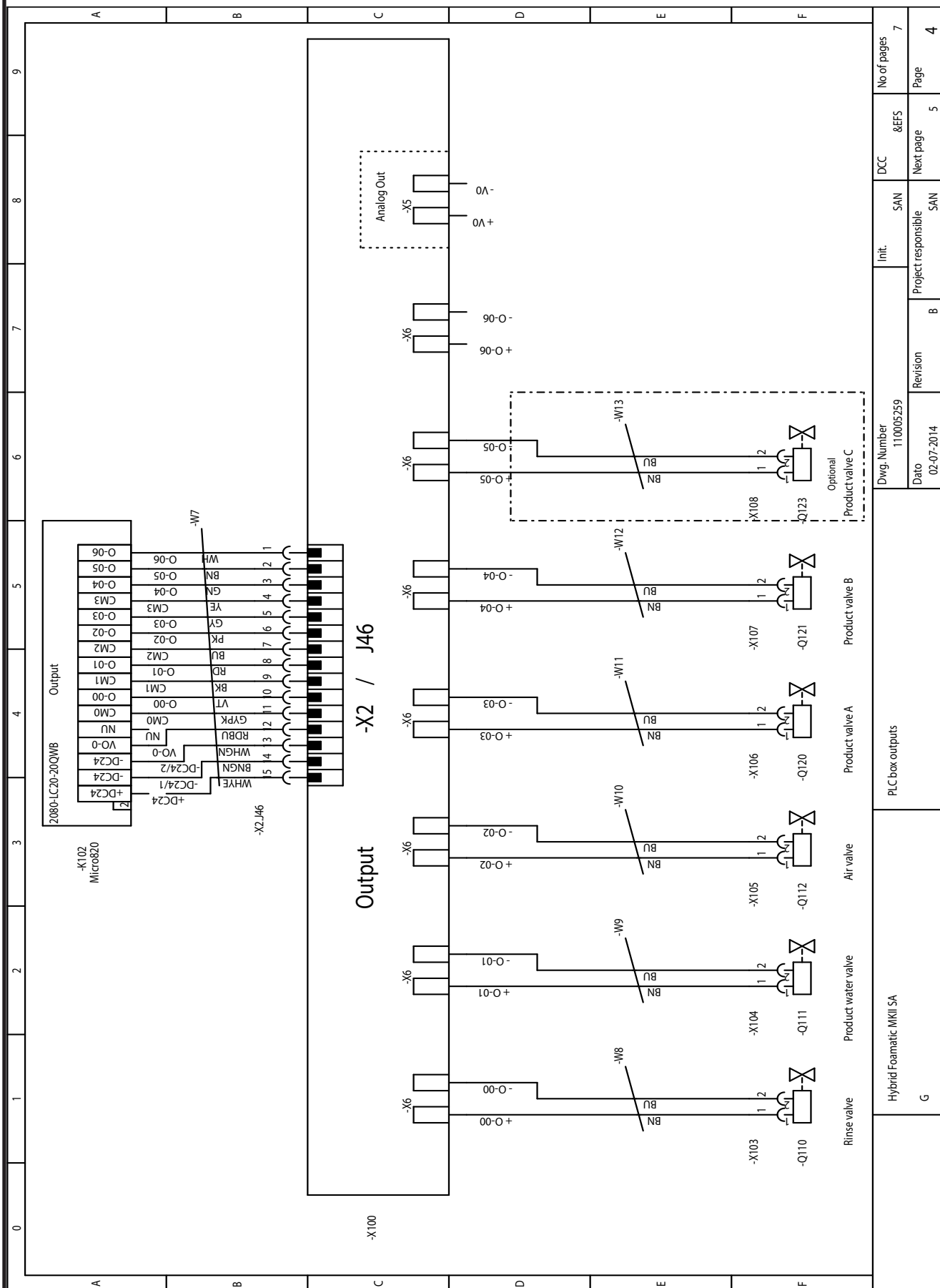


110005259-3

EI Diagrams/Sensor Diagram

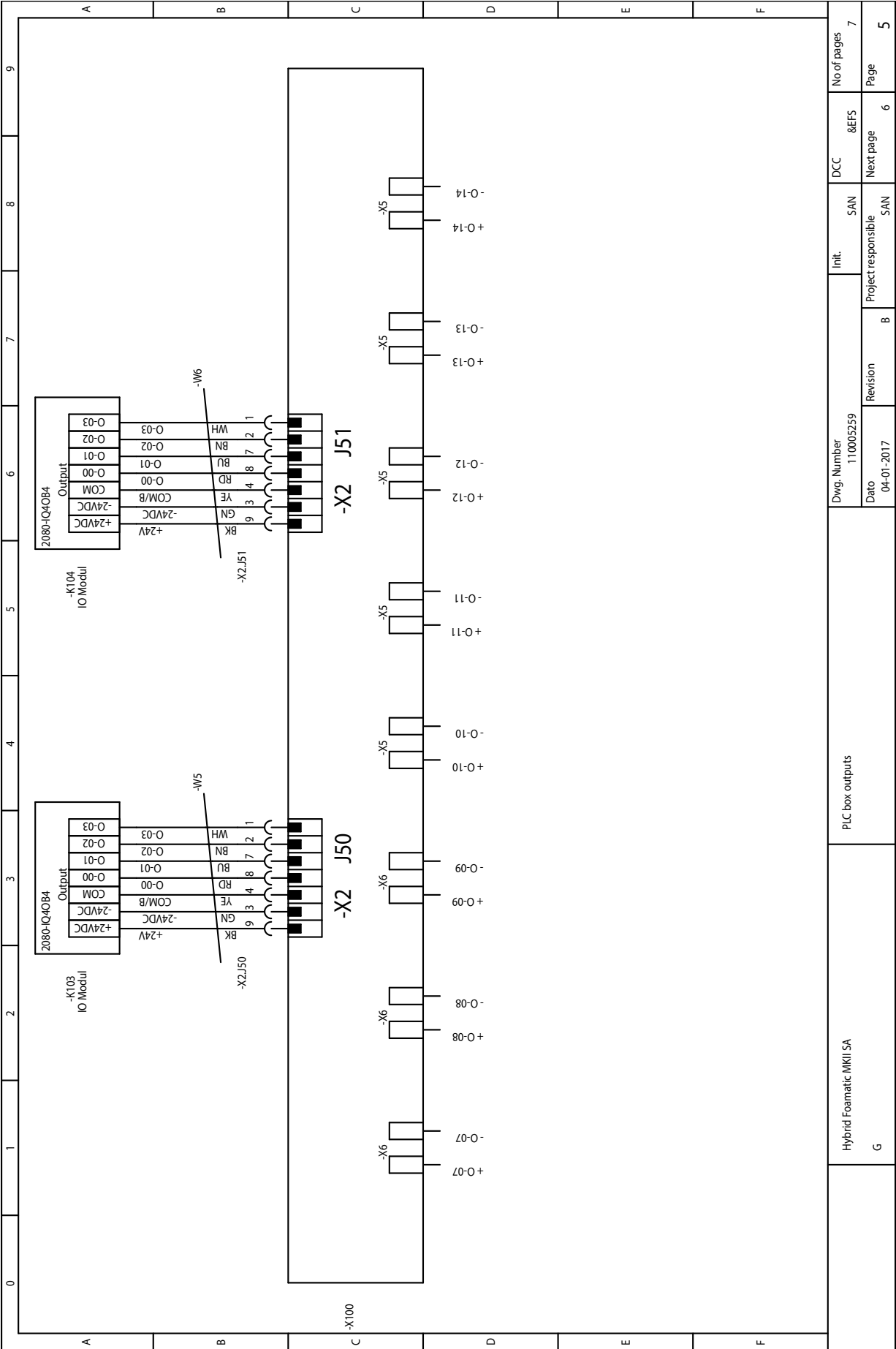


El Diagrams/Sensor Diagram



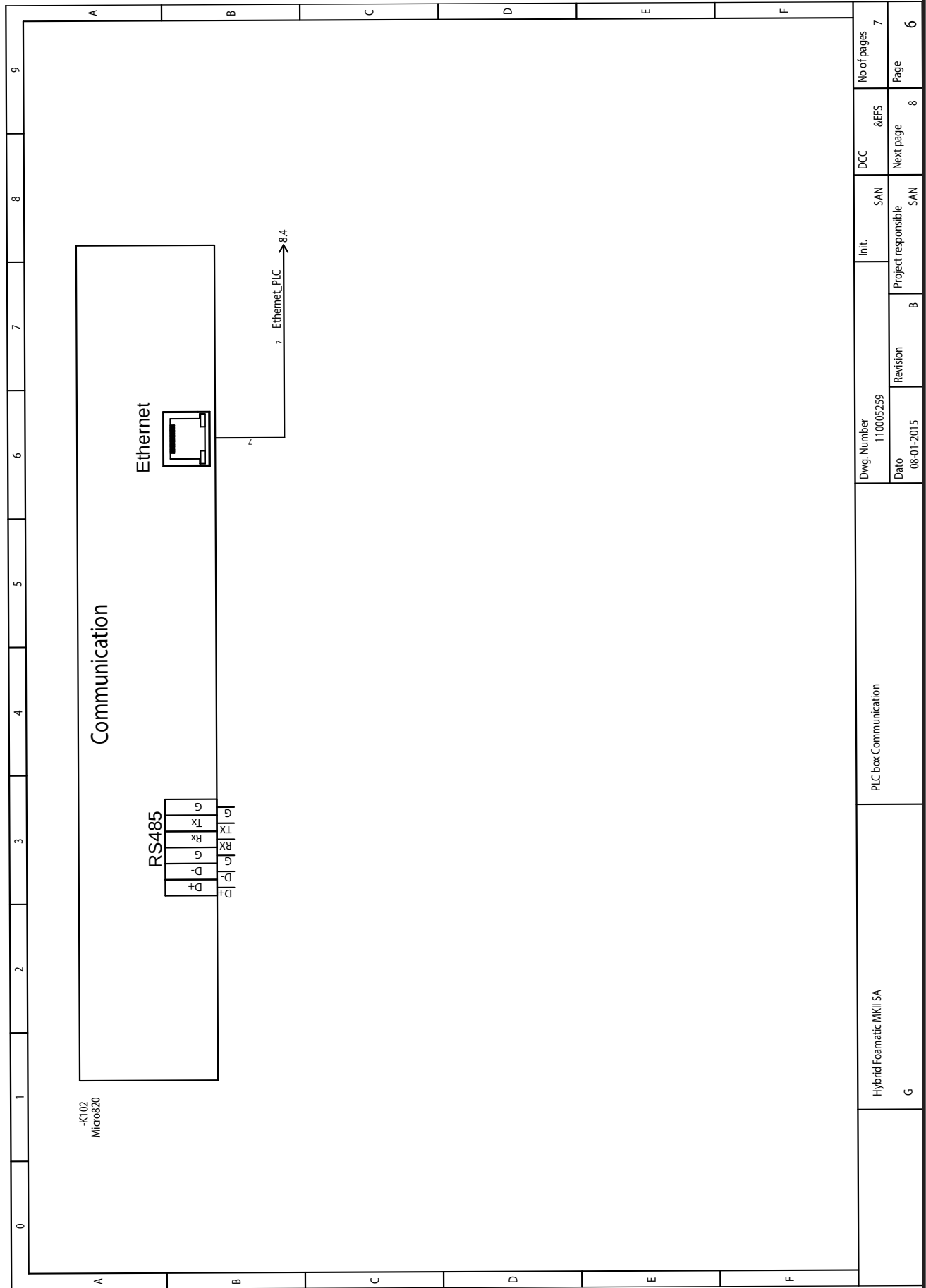
110005259-5

EI Diagrams/Sensor Diagram



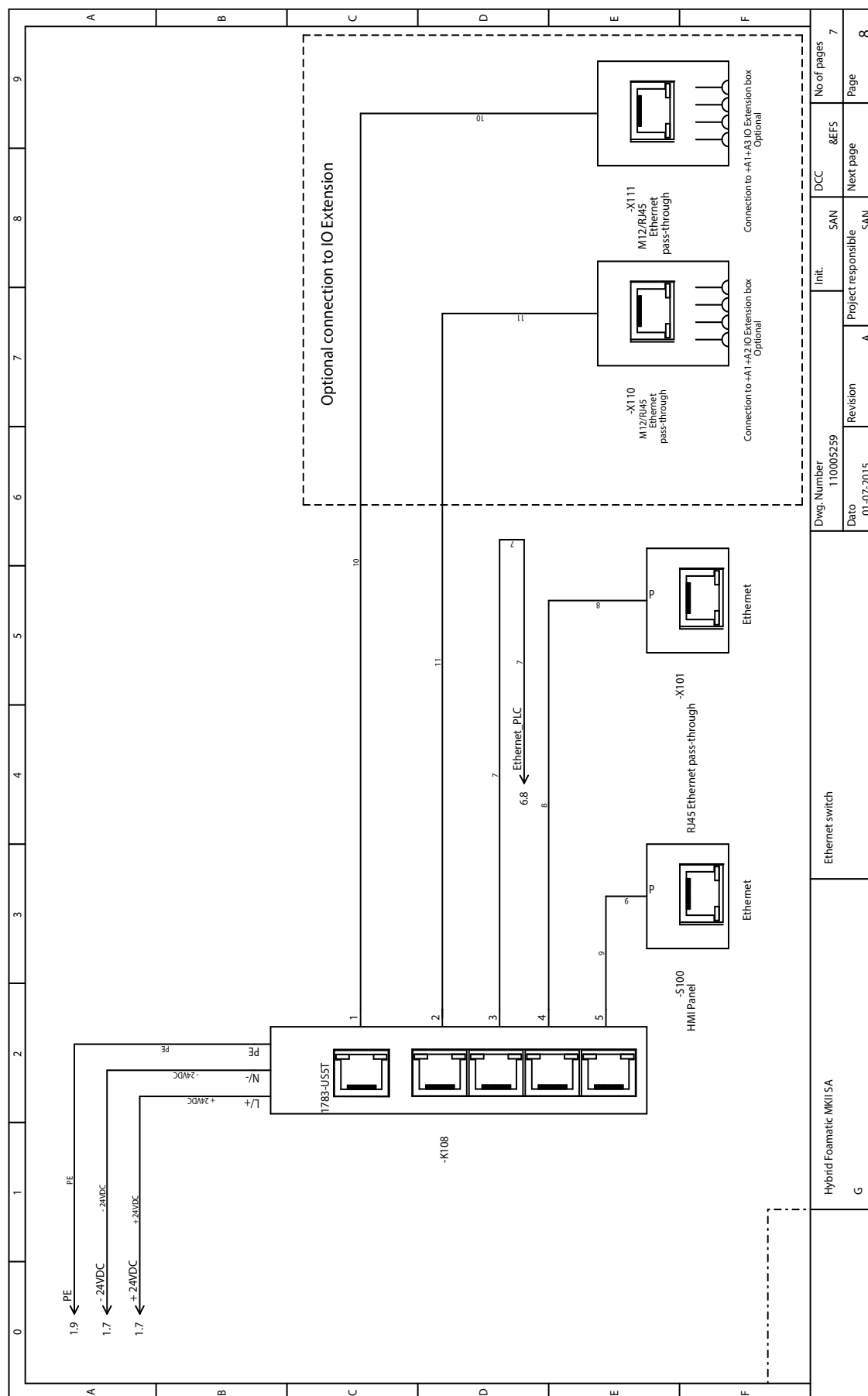
110005259-6

EI Diagrams/Sensor Diagram

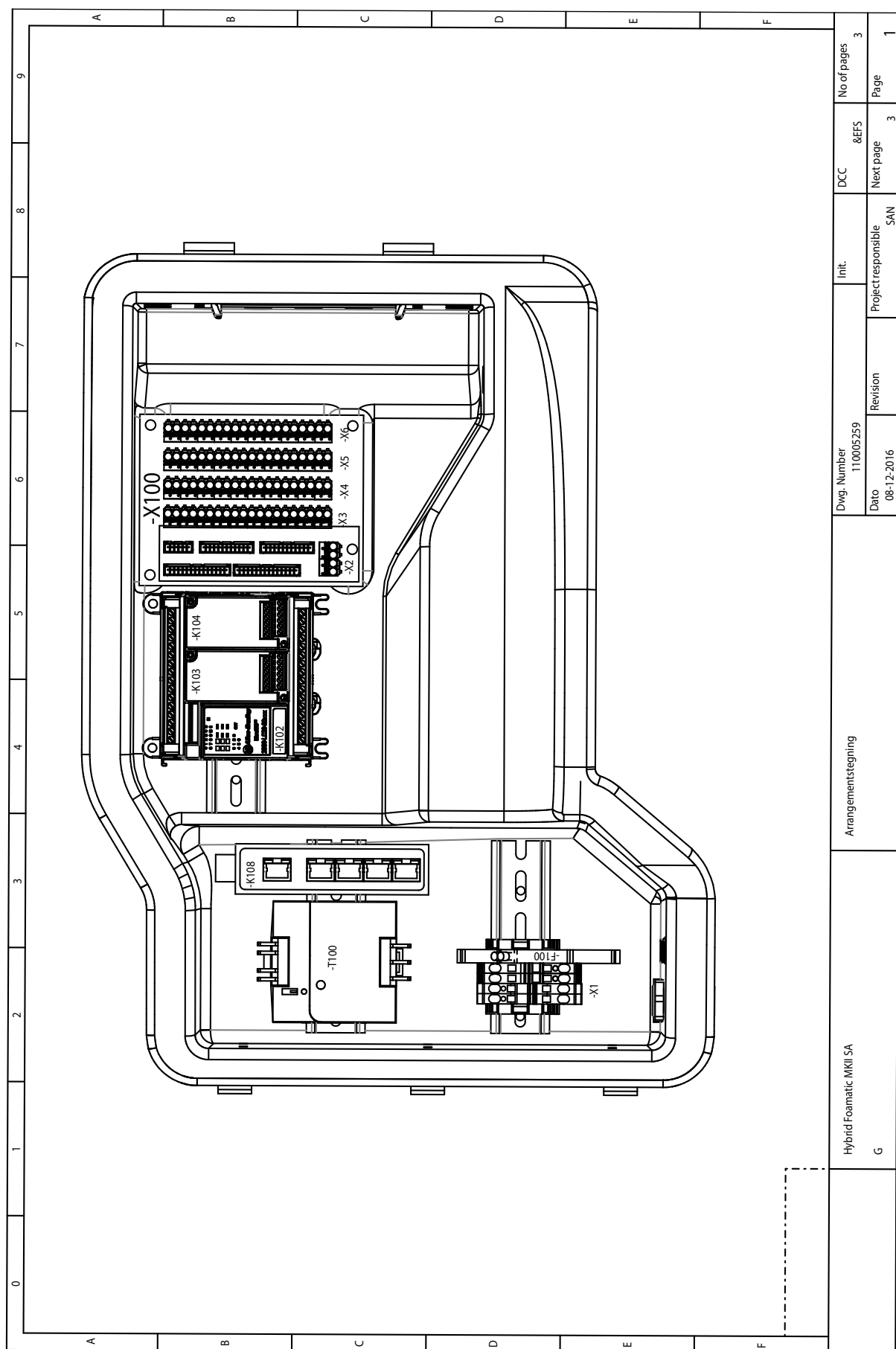


110005259-7

110005259-8

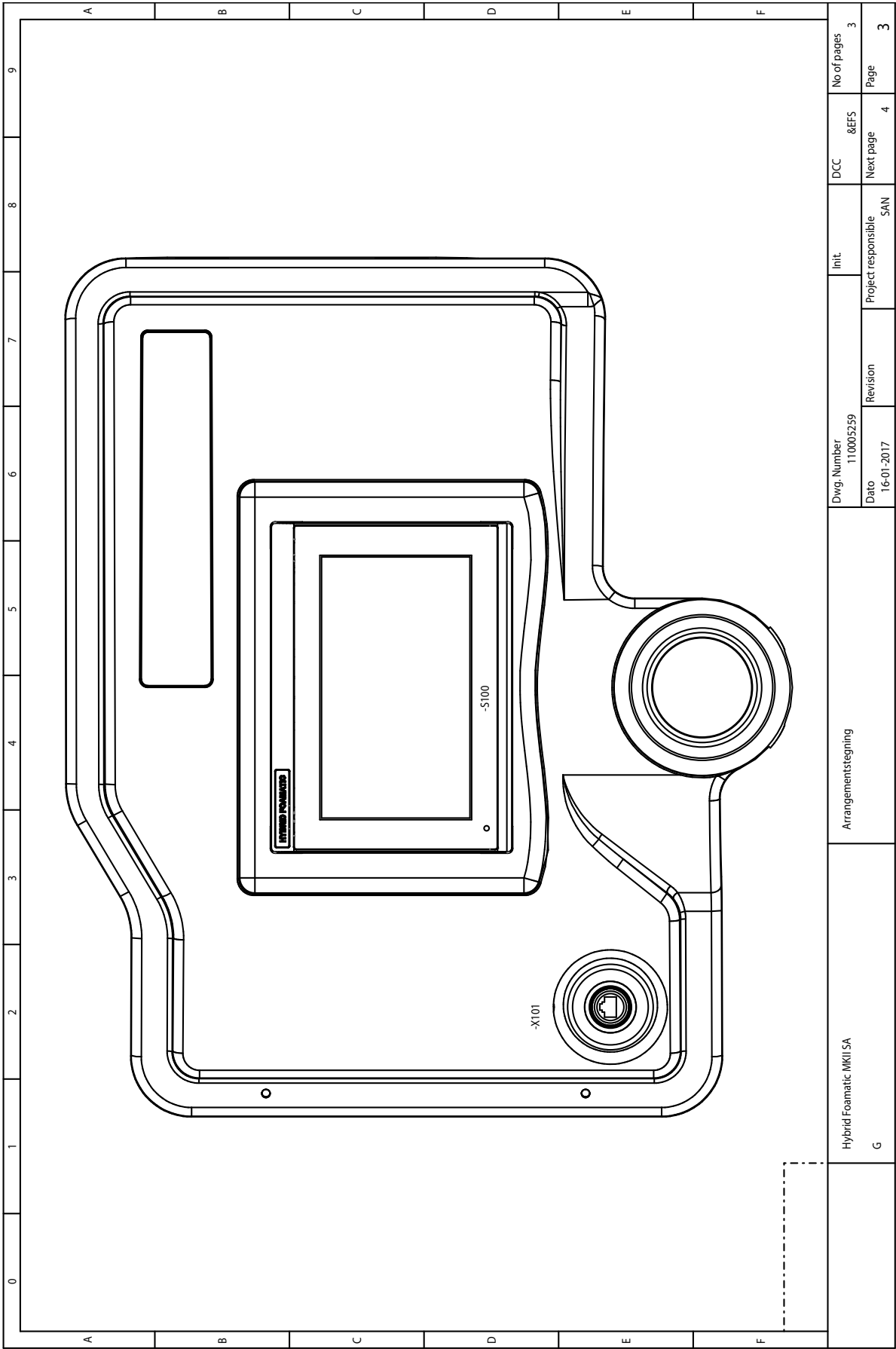


EI Diagrams/Sensor Diagram

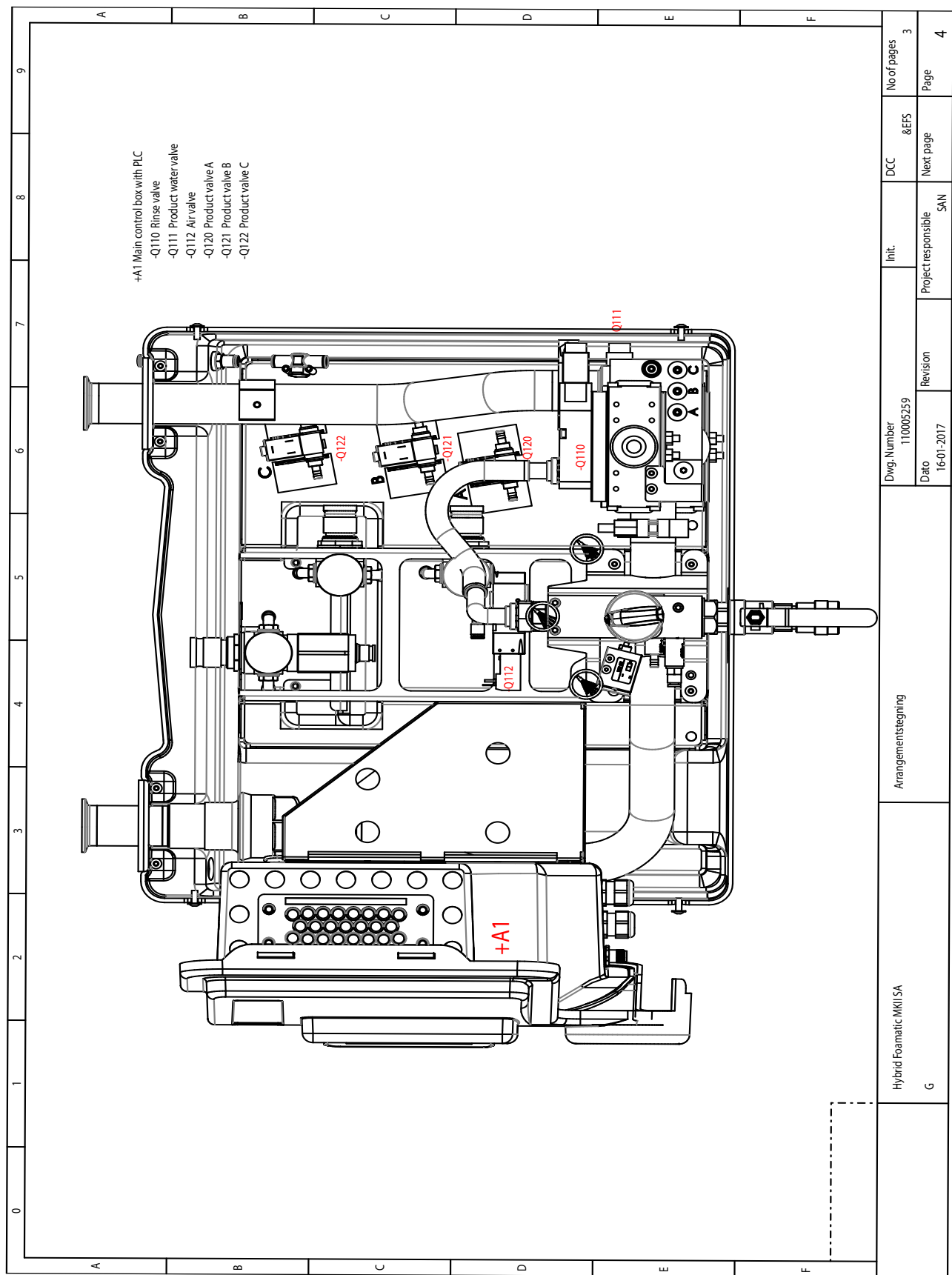


110005259-9

EI Diagrams/Sensor Diagram

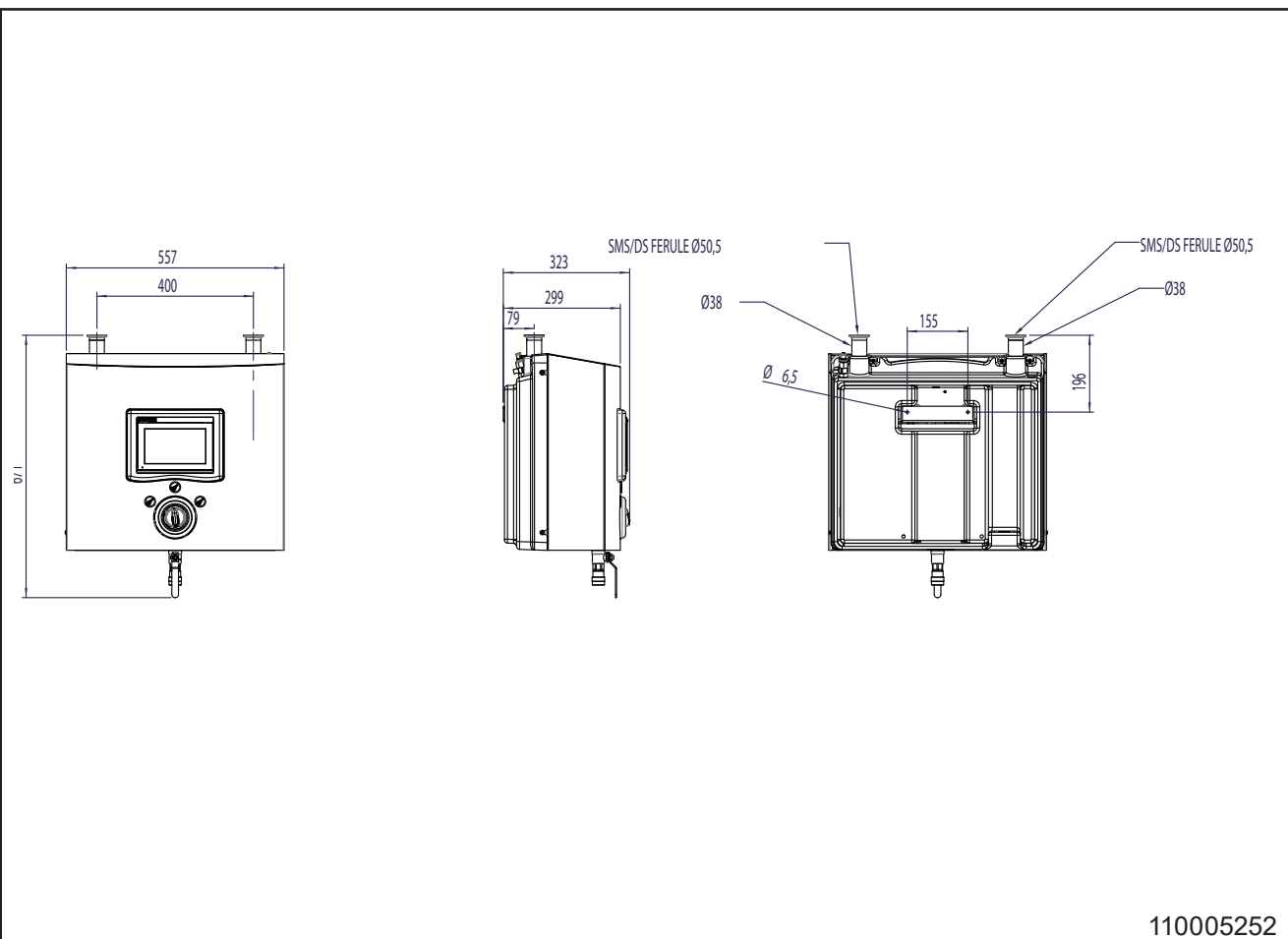
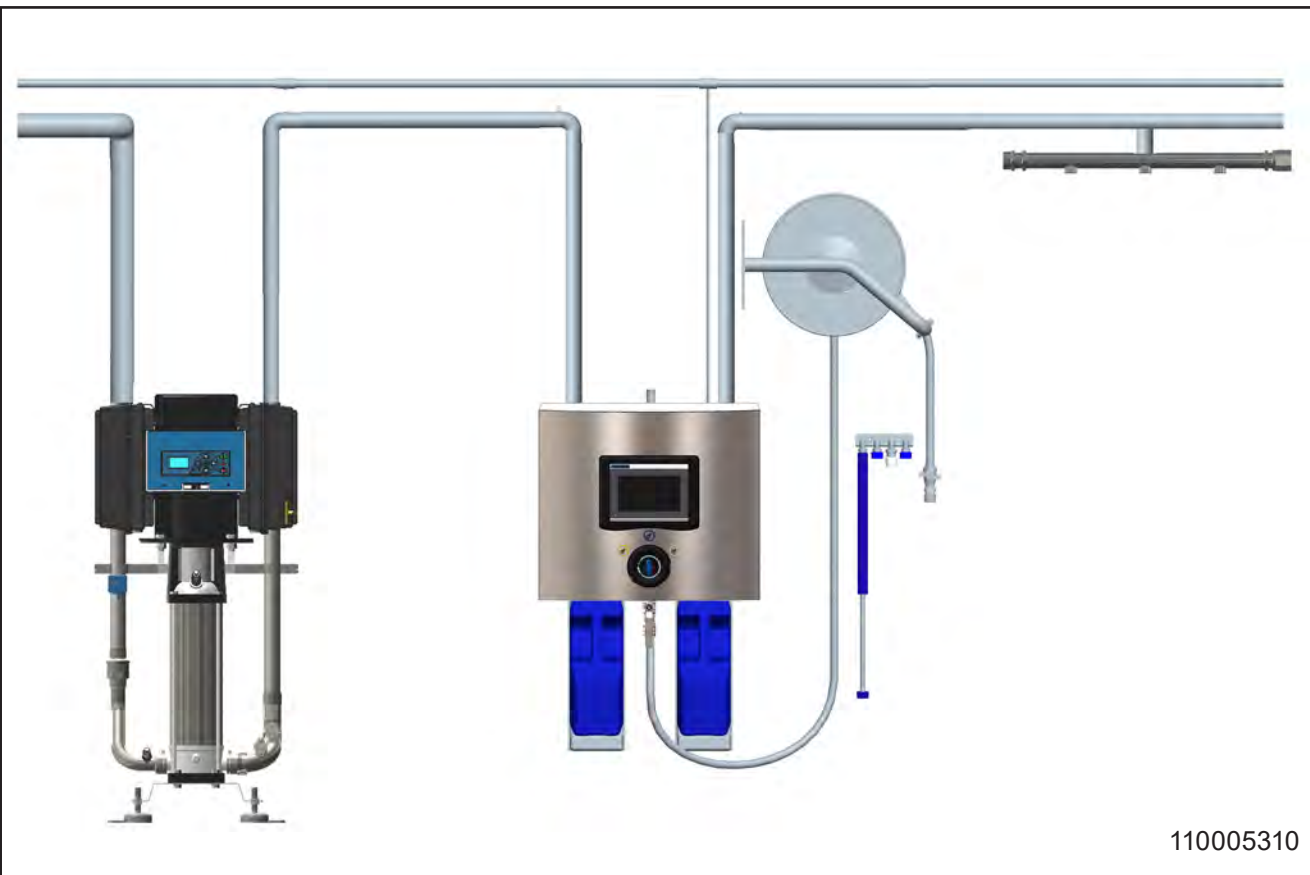


El Diagrams/Sensor Diagram

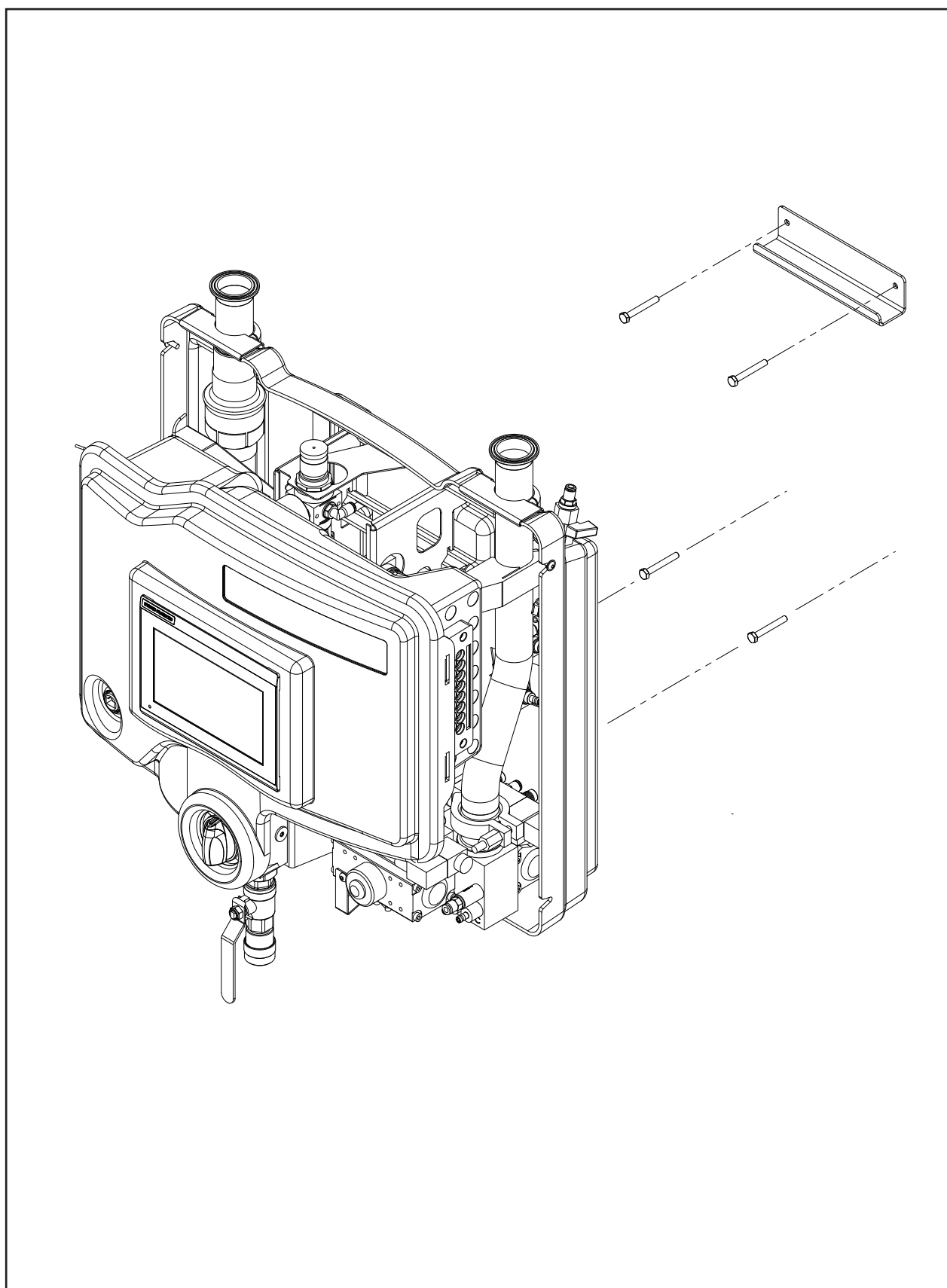


110005259-11

Installation



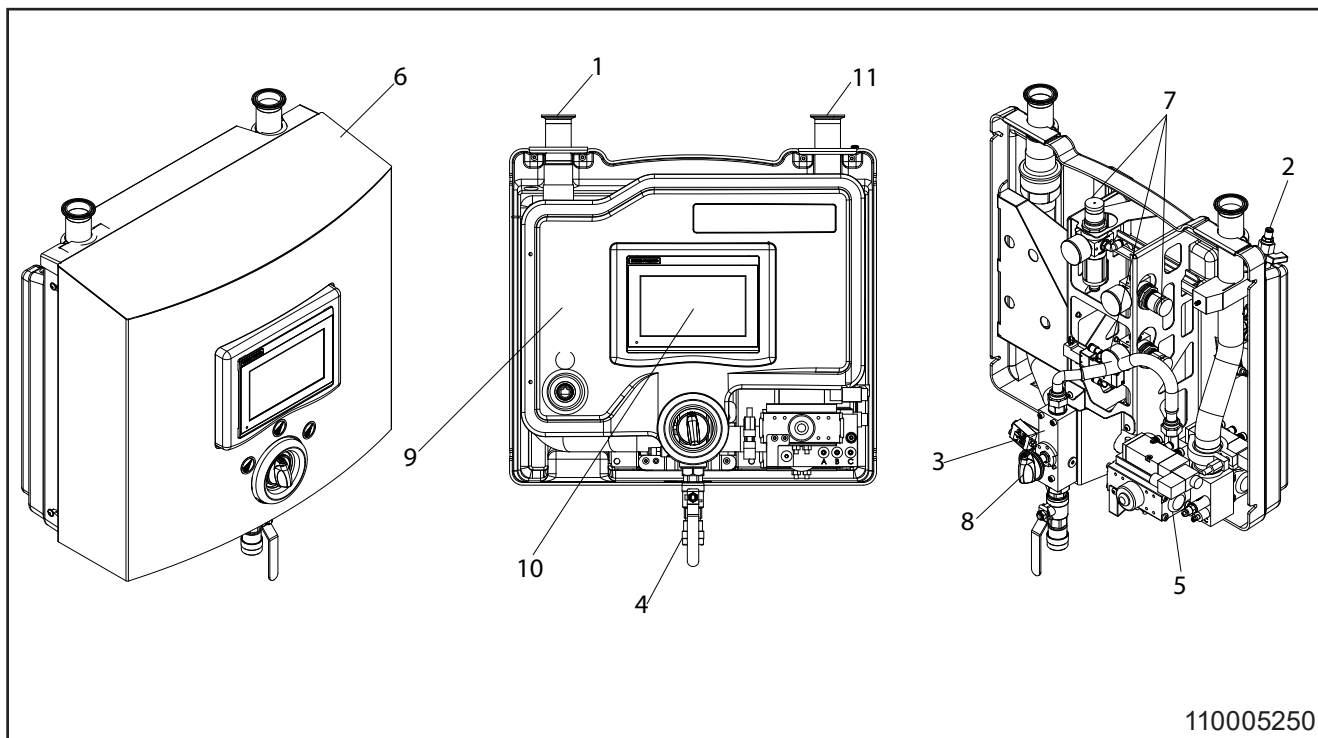
Mounting



110005254

Layout Hybrid Foamatic SA

Layout Hybrid Foamatic



	English	German	French	Spanish
1	Water inlet	Wassereinlauf	Entrée d'eau	Entrada de agua
2	Air inlet	Lufteinlass	Entrée d'air	Entrada de aire
3	Manual block	Manueller Block	Bloc manuel	Bloque manual
4	Ball valve with quick coupling	Kugelventil mit Schnellkupplung	Robinet à boisseau sphérique avec raccord rapide	Válvula de bola con acoplamiento rápido
5	Automatic block	Automatischer Block	Bloc automatique	Bloque automático
6	Cover	Abdeckung	Couverture	Cubrir
7	Air regulator	Luftregler	Régulateur d'air	Regulador de aire
8	Operation button	Bedientaste	Bouton de commande	Botón de funcionamiento
9	Controller	Regler	Contrôleur	Controlador
10	Display	Display	Affichage	Visor
11	Water outlet	Wasserabfluss	Sortie d'eau	Salida de agua

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ECOLAB Engineering GmbH,
F & B Engineering Competence Centre EMEA,
Raiffeisenstraße 7,
D-83313 Siegsdorf
Telephone.: (+49) 86 62 / 61 0 - Fax: (+49) 86 62 / 61 2 35
e-Mail: engineering-mailbox@ecolab.com



B.8 Inductive switch IMB12 [SICK]

Name	Data
Designation	Inductive switch
Type	IMB12 [SICK]
Number	2016-04-11
Type of manual	Data sheet & operating instructions
Manufacturer	SICK SICK Vertriebs-GmbH Willstätterstr. 30 40549 Dusseldorf +49 (0)2 11 53 01-0 +49 (0)2 11 53 01-1 00 info@sick.de https://www.sick.com/

ENGLISH

Inductive proximity sensors
Operating Instructions

Safety notes

- Inductive proximity sensors for Category II 3G and II 3D
- Ambient temperature
Ta = -20°C ... +70°C / 80°C / 85°C / 90°C / 95°C (depending on continuous current and supply voltage; see "Sensor performance data" for details)
- Temperature class T4 or maximum surface temperature T = 135°C
- IP 67 enclosure rating
- Read the operating instructions before commissioning.
- Mounting, connection and commissioning only by competent technicians.
- Not a safety component in accordance with the EU Machinery Directive.
- The sensors themselves do not provide adequate levels of safety against impacts in terms of Ex standard EN 60079-0. The operator of the sensor must therefore ensure that the sensor is not exposed to any mechanical impacts.
- Reduced protection against impacts in the area of the front cap in terms of Ex standard EN 60079-0 is achieved with sensors of type IM*12-04B... with SICK protective cap M12 (order no. 2083430) and for sensors of type IM*18-08B... with SICK protective cap M18 flush (order no. 2083431).
- The intended protection against impacts in the area of the front cap in terms of Ex standard EN 60079-0 is achieved with sensors of type IIM*30-15B... with SICK protective cap M30 flush (order no. 2083541) and for sensors of type IM*30-20N... with SICK protective cap M30 non-flush (order no. 2083542).
- The sensor must be protected from UV light.
- Do not separate male connector when live!
- The cable must be protected against physical damage or a cord grip should be installed.
- The sensors features an M8 or M12 male connector. The included release safety clips must be mounted over the plug connector.
- The specified maximum tightening torque must be observed without fail during mounting. Also observe the other mounting information.

Proper use

These inductive proximity sensors are used to detect metallic targets in explosion-hazardous areas of zone 2 or zone 22.

Performance data of sensor

Design	Temperature range	Supply voltage	Continuous current
IMB08 / IMF08	T _a = -20 ... +70 °C	U _s = DC 10 to 30 V	I _s ≤ 200 mA
	T _a = -20 ... +80 °C	U _s = DC 10 to 30 V	I _s ≤ 100 mA
IMB12 / IMF12	T _a = -20 ... +85 °C	U _s = DC 10 to 30 V	I _s ≤ 50 mA
	T _a = -20 ... +80 °C	U _s = DC 10 to 30 V	I _s ≤ 200 mA
IMB18 / IMF18	T _a = -20 ... +85 °C	U _s = DC 10 to 30 V	I _s ≤ 100 mA
	T _a = -20 ... +90 °C	U _s = DC 10 to 30 V	I _s ≤ 100 mA
IMB30 / IMF30	T _a = -20 ... +90 °C	U _s = DC 10 to 30 V	I _s ≤ 200 mA
	T _a = -20 ... +95 °C	U _s = DC 10 to 30 V	I _s ≤ 100 mA

Commissioning

The following must be observed when connecting the sensor to a voltage source:

- the performance data (supply voltage, continuous current)
- the connection diagram for the sensor

Sensor designation

Due to space constraints, only one abridged designation is marked on the sensor. Depending on the size of the sensor, one of the following versions are used:

Ex II 3G X II 3D X Ex II 3G Ex T4 X II 3D Ex X II 3G Ex ec IIC T4 X II 3D Ex tc IIIC X

Maintenance

The SICK inductive proximity sensors are maintenance-free. We recommend that you check the connections at regular intervals.

SICK

8023967 1019 COMAT

Inductive proximity sensors / Induktive Näherungssensoren

Ex II 3G Ex ec IIC T4 Gc X II 3D Ex tc IIIC T135°C Dc X

Australia Phone	+61 (3) 9457 0600 1800 33 48 02 - tollfree	Netherlands Phone	+31 (0) 30 229 25 44
Austria Phone	+43 (0) 2236 62288-0	New Zealand Phone	+64 9 415 0459 0800 222 278 - tollfree
Belgium/Luxembourg Phone	+32 (0) 2 466 55 66	Norway Phone	+47 67 81 50 00
Brazil Phone	+55 11 3215-4900	Poland Phone	+48 22 539 41 00
Canada Phone	+1 905.771.1444	Romania Phone	+40 356-17 11 20
Czech Republic Phone	+420 234 719 500	Russia Phone	+7 495 283 09 90
Chile Phone	+56 (2) 2274 7430	Singapore Phone	+65 6744 3732
China Phone	+86 20 2882 3600	Slovakia Phone	+421 482 901 201
Denmark Phone	+45 45 82 64 00	Slovenia Phone	+386 591 78849
Finland Phone	+358-9-25 15 800	South Africa Phone	+27 10 060 0550
France Phone	+33 1 64 62 35 00	South Korea Phone	+82 2 786 6321/4
Germany Phone	+49 (0) 2 11 53 010	Spain Phone	+34 93 480 31 00
Greece Phone	+30 210 6825100	Sweden Phone	+46 10 110 10 00
Hong Kong Phone	+852 2153 6300	Switzerland Phone	+41 619 29 39
Hungary Phone	+36 1 371 2680	Taiwan Phone	+886-2-2375-6288
India Phone	+91-22-6119 8900	Thailand Phone	+66 2 645 0009
Israel Phone	+972 97110 11	Turkey Phone	+90 (216) 528 50 00
Italy Phone	+39 02 27 43 41	United Arab Emirates Phone	+971 (0) 4 88 65 878
Japan Phone	+81 3 5309 2112	United Kingdom Phone	+44 (0)17278 31121
Malaysia Phone	+603-9080 7425	USA Phone	+1 800.325.7425
Mexico Phone	+52 (472) 748 9451	Vietnam Phone	+65 6744 3732

SICK AG, Erwin-Sick-Strasse 1, D-79183 Walldrich
Detailed addresses and further locations at www.sick.com

62 en/49

SICK AG, Erwin-Sick-Strasse 1, D-79183 Waldkirch

Detailed addresses and further locations at www.sick.com

More representatives and agencies at www.sick.com · Subject to change without notice · The specified product features and technical data do not represent any guarantee.

Weitere Niederlassungen finden Sie unter www.sick.com · Irrtümer und Änderungen vorbehalten · Angegebene Produkteigenschaften und technische Daten stellen keine Garantieerklärung dar.

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DEUTSCH

Induktive Näherungssensoren
Betriebsanleitung

Sicherheitshinweise

- Induktive Näherungssensoren für Kategorie II 3G und II 3D
- Umgebungstemperatur
Ta = -20°C ... +70°C / 80°C / 85°C / 90°C / 95°C (abhängig von Dauerstrom und Betriebsspannung; Details siehe unter „Leistungsdaten des Sensors“)
- Temperaturklasse T4, bzw. maximale Oberflächentemperatur von T = 135°C
- Schutzart IP 67
- Vor der Inbetriebnahme die Betriebsanleitung lesen.
- Montage, Anschluss und Inbetriebnahme nur durch Fachpersonal.
- Kein Sicherheitsbauteil gemäß EU-Maschinenrichtlinie.
- Die Sensoren selbst bieten keine ausreichende Sicherheit gegen-über Schlägen im Sinne der Ex-Norm EN 60079-0. Der Betreiber des Sensors hat daher sicherzustellen, dass der Sensor keinen mechanischen Schlägen ausgesetzt wird.
- Einen reduzierten Schlagschutz im Bereich der Frontkappe im Sinne der Ex-Norm EN 60079-0 wird bei Sensoren des Typs IM*12-04B... mit der SICK-Schutzkappe M12 (Bestell-Nr. 2083430) und bei Sensoren des Typs IM*18-08B... mit der SICK-Schutzkappe M18 bündig (Bestell-Nr. 2083431) erreicht.
- Den vorgesehenen Schlagschutz im Bereich der Frontkappe im Sinne der Ex-Norm EN 60079-0 wird bei Sensoren des Typs IM*30-15B... mit der SICK-Schutzkappe M30 bündig (Bestell-Nr. 2083541) und bei Sensoren des Typs IM*30-20N... mit der SICK-Schutzkappe M30 nicht-bündig (Bestell-Nr. 2083542) erreicht.
- Installieren Sie den Sensor nicht an Orten, die direkter Sonneneinstrahlung oder sonstigen Wittereeinflüssen ausgesetzt sind, ausser dies ist in der Betriebsanleitung ausdrücklich erlaubt.
- Stecker nicht unter Spannung trennen
- Die Leitung ist geschützt zu verlegen, bzw. es ist eine zusätzliche Zugentlastung vorzusehen
- Die Sensoren verfügen über einen M8- bzw. M12 Stecker. Die beiliegenden Abzugs-Sicherheits-Clips müssen über die Steck-Verbindung montiert werden.
- Die angegebenen maximalen Anzugsdrehmomente sind bei der Montage unbedingt zu beachten. Auch die weiteren Montagehinweise beachten.

Bestimmungsgemäße Verwendung

Diese Induktiven Näherungssensoren werden zum Erfassen von metallischen Targets in explosionsgefährdeten Bereichen der Zone 2 bzw. Zone 22 eingesetzt.

Leistungsdaten der Sensoren

Bauform	Temperaturbereich	Betriebsspannung	Dauerstrom
IMB08 / IMF08	T _a = -20 ... +70°C	U _b = 10 ... 30 V DC	I _s ≤ 200 mA
	T _a = -20 ... +80°C	U _b = 10 ... 30 V DC	I _s ≤ 100 mA
IMB12 / IMF12	T _a = -20 ... +85°C	U _b = 10 ... 30 V DC	I _s ≤ 50 mA
	T _a = -20 ... +80°C	U _b = 10 ... 30 V DC	I _s ≤ 200 mA
IMB18 / IMF18	T _a = -20 ... +85°C	U _b = 10 ... 30 V DC	I _s ≤ 100 mA
	T _a = -20 ... +90°C	U _b = 10 ... 30 V DC	I _s ≤ 100 mA
IMB30 / IMF30	T _a = -20 ... +90°C	U _b = 10 ... 30 V DC	I _s ≤ 200 mA
	T _a = -20 ... +95°C	U _b = 10 ... 30 V DC	I _s ≤ 100 mA

Inbetriebnahme

Beim Anschluss des Sensors an eine Spannungsquelle müssen folgende Punkte berücksichtigt werden:

- die Leistungsdaten (Betriebsspannung, Dauerstrom).
- das Anschlussdiagramm des Sensors.

Sensorkennzeichnung:

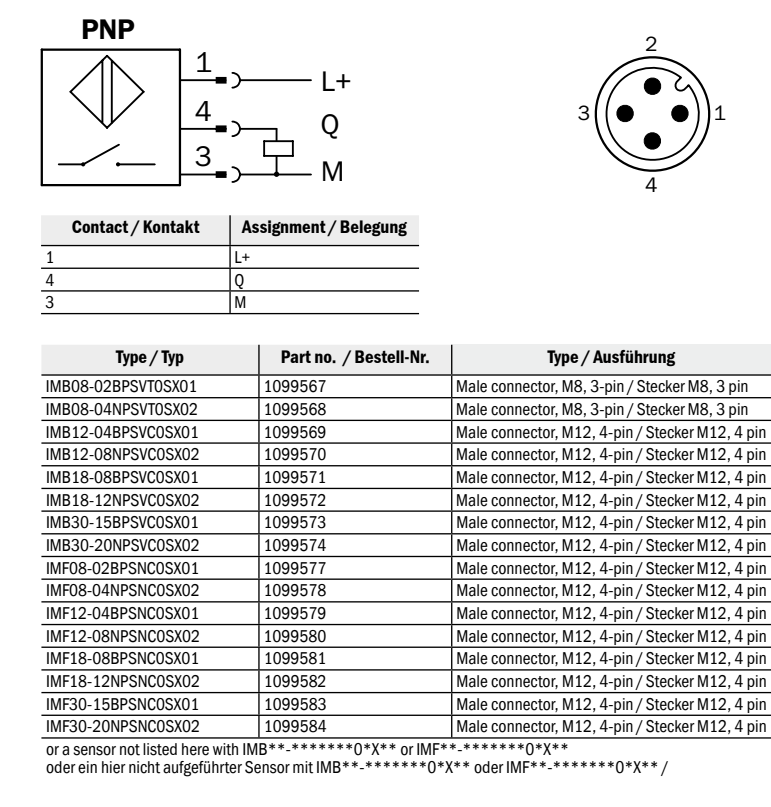
Aus Platzgründen wird auf dem Sensor nur eine eingeschränkte Kennzeichnung angebracht. Je nach Baugröße des Sensors wird eine der folgenden Ausführungen verwendet:

Ex II 3G X II 3D X Ex II 3G Ex T4 X II 3D Ex X Ex II 3G Ex ec IIC T4 X II 3D Ex tc IIIC X

Wartung

Die Induktiven Näherungssensoren von SICK sind wartungsfrei. Wir empfehlen, in regelmäßigen Abständen die Anschlüsse zu überprüfen.

A Connection diagram / Anschlussschema



Contact / Kontakt	Assignment / Belegung
1	L+
4	Q
3	M

Type / Typ	Part no. / Bestell-Nr.	Type / Ausführung
IMB08-02BPSVTSOX1	1099567	Male connector, M8, 3-pin / Stecker M8, 3 pin
IMB08-04NPVSVCOSX02	1099568	Male connector, M8, 3-pin / Stecker M8, 3 pin
IMB12-04BPSVCOSX01	1099569	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMB12-08NPVSVCOSX02	1099570	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMB18-08BPSVCOSX01	1099571	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMB18-12NPVSVCOSX02	1099572	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMB30-15BPSVCOSX01	1099573	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMB30-20NPVSVCOSX02	1099574	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMF08-02BPSNCSOX1	1099577	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMF08-04NPNSCOSX02	1099578	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMF12-04BPSNCSOX1	1099579	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMF12-08NPNSCOSX02	1099580	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMF18-08BPSNCSOX1	1099581	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMF18-12NPNSCOSX02	1099582	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMF30-15BPSNCSOX1	1099583	Male connector, M12, 4-pin / Stecker M12, 4 pin
IMF30-20NPNSCOSX02	1099584	Male connector, M12, 4-pin / Stecker M12, 4 pin

or a sensor not listed here with IMB***.*****0*X** or IMF***.*****0*X**/ oder ein hier nicht aufgeführter Sensor mit IMB***.*****0*X** oder IMF***.*****0*X**/

TYPE:
IMB/IMF Ex 3G/3D

SICK AG
Erwin-Sick-Strasse 1
D-79183 Waldkirch
Germany

Ident-Nr.: 9309953

EU declaration of conformity
The undersigned, representing the following manufacturer herewith declares that the product is in conformity with the provisions of the following EU directives (including all applicable amendments), and that the respective standards and/or technical specifications have been used as a basis for this (download: www.sick.com).

You can obtain the EU declaration of conformity with the standards used at: www.sick.com

Date: 2019-09-07

L.V. Dr. Olaf Machat
Business Unit Sensors & Connectivity
SBO Process Detection

EU-Konformitätserklärung
Der Unterzeichnete, der den nachstehenden Hersteller vertritt, erklärt hiermit, dass das Produkt in Übereinstimmung mit den Bestimmungen der nachstehenden EU-Richtlinie(n) (einschließlich aller zutreffenden Änderungen) ist, und dass die entsprechenden Normen und/oder technischen Spezifikationen zugrunde gelegt sind (Download: www.sick.com).

EC-dichiararea de conformitate
Subsemnarea, reprezentând următorul producător, declară faptul că produsul este în conformitate cu dispozițiile din legislația UE (inclusiv toate modificările aplicabile) și că toate normele și/sau specificațiile tehnice corespunzătoare au fost utilizate ca bază pentru acest document (Download: www.sick.com).

Prodoteky a shody EU
Hábe potpisoval, zastupující následující výrobce, tímto prohlašuji, že výrobek je v souladu s ustanoveními nařízení(ů) evropské unie (včetně všech změn) a že jsem použil jako základ pro tento technický specifikace. (ke stažení: www.sick.com).

EU-conformiteitsverklaring
Ondergetuende, die representeerde volgende producent, verklaart hiermee dat het product voldoet aan de bepalingen van de volgende EU-richtlijn(en) (inclusief alle van toepassing zijnde wijzigingen) en dat de overeenkomstige normen en/of technische specificaties als grondslag werden gebruikt (Download: www.sick.com).

EU-samsvarendeerklæring
Underskrevet, som repræsenterer nedenstående producent, erklærer hermed at produktet er i overensstemmelse med bestemmelserne i følgende EU-direktiv(er) (inklusive alle ændringer) og at relevante normer og/eller tekniske specifikationer er lagt til grund for dette dokument (Download: www.sick.com).

Declarație de conformitate UE
Eu, subsemnarea, reprezentând următorul producător, declar că produsul este în conformitate cu dispozițiile din legislația UE (inclusiv toate modificările aplicabile) și că toate normele și/sau specificațiile tehnice corespunzătoare au fost utilizate ca bază pentru acest document (Download: www.sick.com).

EU-yhtäisessä shodot
Olen allekirjoittanut, edustamälläni seuraavaa valmistajaa, ja vakuutan, että tuote on yhteensopiva seuraavien Euroopan unionin (EU) direktiivien (kaikkien muutosten mukaisesti) kanssa ja että olen käyttänyt teknisiä spesifiikaatioita (lataa: www.sick.com).

EU-vatarmenitverklaring
Afskrevet, som repræsenterer nedenstående producent, erklærer hermed, at produktet er i overensstemmelse med bestemmelserne i følgende EU-direktiv(er) (inklusive alle ændringer) og at relevante normer og/eller tekniske specifikationer er brugt som grundlag for dette dokument (Download: www.sick.com).

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B.9 Pressure switch PBS [SICK]

Name	Data
Designation	Pressure switch
Type	PBS [SICK]
Number	8013154/UP90/2015-03-30
Type of manual	Operating instructions
Manufacturer	SICK AG Waldkirch Germany +49 (0) 211 5301-301 www.sick.com

PBS

Pressure switch



EN



Operating instructions

SICK
Sensor Intelligence.

1. Important details for your information
2. A quick overview for you
3. Signs, symbols and abbreviations
4. Function
5. For your safety
6. Packaging
7. Starting, operation
8. Maintenance, accessories
9. Trouble shooting
10. Storage, disposal



Read these operating instructions **without fail** before installing and starting the pressure transmitter.

1. Important details for your information

Keep the operating instructions in a place that is accessible to all users at any time.

The following installation and operating instructions have been compiled by us with great care but it is not feasible to take all possible applications into consideration. These installation and operation instructions should meet the needs of most pressure measurement applications. If questions remain regarding a specific application, you can obtain further information:

- Via our Internet address www.sick.com
- The product data sheet is designated as 8013162

With special model number please note specifications in the delivery note.

If the serial number gets illegible (e.g. by mechanical damage or repainting), the retraceability of the instrument is not possible any more

SICK pressure switches are carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality and environmental inspection before assembly and each instrument is fully tested prior to shipment. Our environmental management system is certified to DIN EN ISO 14001.

Use of the product in accordance with the intended use PBS:

Use the pressure switch (indoor and outdoor) to transform the pressure into an electrical signal.

Knowledge required

Install and start the pressure switch only if you are familiar with the relevant regulations and directives of your country and if you have the qualification required. You have to be acquainted with the rules and regulations on measurement and control technology and electric circuits, since this pressure switch is „electrical equipment“ as defined by EN 50178. Depending on the operating conditions of your application you have to have the corresponding knowledge, e.g. of aggressive media.

2. A quick overview for you

If you want to get a quick overview, read **Chapters 3, 5, 7 and 10**. There you will get some short safety instructions and important information on your product and its starting. **Read these chapters in any case.**

3. Signs, symbols and abbreviations



Warning

Potential danger of life or of severe injuries.



Warning

Potential danger of life or of severe injuries due to catapulting parts.



Caution

Potential danger of burns due to hot surfaces.



Notice, important information, malfunction.



The product complies with the applicable European directives.

L+	Positive supply connection
M	Negative supply connection
Q1	Switching point 1
Q2	Switching point 2
C/Q1	Communication/ Switching point 1
Q _A	Analog output
3-wire	Two connection lines are intended for the voltage supply. One connection line is intended for the measurement signal.

4. Function

The pressure prevailing within the application is transformed into a switching output or standardised electrical signal through the deflection of the diaphragm, which acts on the sensor element with the power supply fed to the transmitter. This electric signal changes in proportion to the pressure and can be evaluated correspondingly.

5. For your safety



Warning

- Select the appropriate pressure switch with regard to scale range, performance and specific measurement conditions prior to installing and starting the instrument.
- Observe the relevant national regulations (e.g.: EN 50178) and observe the applicable standards and directives for special applications (e.g. with dangerous media such as acetylene, flammable gases or liquids and toxic gases or liquids and with refrigeration plants or compressors). **If you do not observe the appropriate regulations, serious injuries and/or damage can occur!**
- **Open pressure connections only after the system is without pressure!**
- Please make sure that the pressure switch is only used within the overload threshold limit all the time!
- Observe the ambient and working conditions outlined in section 7 „Technical data“.
- Observe the technical data for the use of the pressure switch in connection with aggressive / corrosive media and for the avoidance of mechanical hazards.
- Ensure that the pressure switch is only operated in accordance with the provisions i.e. as described in the following instructions.
- Do not interfere with or change the pressure transmitter in any other way than described in these operating instructions.
- Remove the pressure switch from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation
- **Take precautions with regard to remaining media in removed pressure transmitter. Remaining media in the pressure port may be hazardous or toxic!**
- Have repairs performed by the manufacturer only.
- Open circuit before removing connector.

6. Packaging

Has everything been supplied?



Check the scope of supply:

- Completely assembled pressure switches
- Ordered accessories
- Inspect the pressure switch for possible damage during transportation. Should there be any obvious damage, inform the transport company and SICK without delay.
- Keep the packaging, as it offers optimal protection during transportation (e.g. changing installation location, shipment for repair).
- Ensure that the pressure connection thread and the connection contacts will not be damaged.

7. Starting, operation



Required tools: wrench (flats 27), screw driver

Diaphragm test for your safety

It is necessary that before starting the pressure switch you test the instrument visual, as the diaphragm is a **safety-relevant component**.

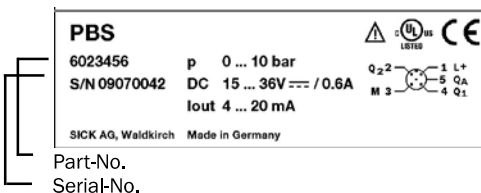


Warning

- Pay attention to any liquid leaking out, for this points to a diaphragm damage.
- Use the pressure switch only if the diaphragm is undamaged.
- Use the pressure switch only if it is in a faultless condition as far as the safety-relevant features are concerned.

Mechanical connection

Product label (example)



- When mounting the instrument, ensure that the sealing faces of the instrument and the measuring point are clean and undamaged.
- Screw in or unscrew the instrument only via the flats using a suitable tool and the prescribed torque. The appropriate torque depends on the dimension of the pressure connection and on the sealing element used (shape/material). Do not use the case as working surface for screwing in or unscrewing the instrument.
- When screwing the transmitter in, ensure that the threads are not jammed.
- The blue cap of the sensor housing can be twisted up to 330° on the stainless steel housing until it can turn no more. Do not overtwist the cap.
- With a flush-mounted process connection, remove the protective cap shortly before mounting. Ensure that the membrane is not damaged during installation.

Electrical connection

-  ■ Connect the instrument to earth via the pressure connection.
- For power supply, use a circuit with energy limitation (EN/UL/IEC 61010-1, section 9.3) with the following maximum values for the current: with L + = 35 V (DC): 4.0 A. Provide a separate switch for the external power supply. Alternative for North America: The connection may also be made to „Class 2 Circuits“ or „Class 2 Power Units“ according to CEC (Canadian Electrical Code) or NEC (National Electrical Code).
- Zero-point adjustment: Check the zero point shown on the display during commissioning. If, for installation reasons, an offset is displayed, this can be reset in programming mode using the OSET parameter.

Wiring details

	Circular connector M12x1, 4-pin				Circular connector M12x1, 5-pin				
									
	2 switching outputs or 1 switching output + 1 analogue output				2 switching outputs + 1 analogue output				
	L+ = 1	M = 3	Q1 1 = 4 C/Q1 = 4	Q2 = 2 / Q_A = 2	L+ = 1	M = 3	Q1 = 4 C/Q1 = 4	Q2 = 2	Q_A = 5
Ingress Protection per IEC 60 529	IP 67				IP 67				
	The ingress protection classes specified only apply while the pressure transmitter is connected with female connectors that provide the corresponding ingress protection.								

Specifications		Model PBS							
Pressure ranges	bar	1	1.6	2.5	4	6	10	16	25
Over pressure safety	bar	2	3.2	5	8	12	20	32	50
Burst pressure	bar	5	10	10	17	34	34	100	100
Pressure ranges	bar	40	60	100	160	250	400	600	
Over pressure safety	bar	80	120	200	320	500	800	1200	
Burst pressure	bar	400	550	800	1000	1200	1700	2400	
		MPa and kg/cm ² are available							
		Absolute pressure: 0 ... 1 bar bis 0 ... 25 bar							
		Vakuumdruck: -1 ... 0 bar bis -1 ... 24 bar							
Pressure ranges	psi	15	25	30	50	100	160	200	300
Over pressure safety	psi	30	60	60	100	200	290	400	600
Burst pressure	psi	75	150	150	250	500	500	1500	1500
Pressure ranges	psi	500	1000	1500	2000	3000	5000	8000	
Over pressure safety	psi	1000	1740	2900	4000	6000	10000	17400	
Burst pressure	psi	2500	7975	11600	14500	17400	24650	34800	
		Absolute pressure: 0 ... 15 psi bis 0 ... 300 psi							
Fatigue life		10 Mio. max. load cycles							
Materials									
■ Wetted parts									
» Pressure connection			316 L						
» Pressure sensor			316 L (up to 0 ... 10 bar rel 13-8 PH)						
■ Case									
» Lower body			316 L						
» Plastic head			PC + ABS						
» Keyboard			TPE-E						
» Display window			PC						

Specifications		Model PBS
■ Internal transmission fluid		Synthetic Oil (only for pressure ranges < 0 ... 10 bar and ≤ 0 ... 25 bar abs)
Power supply L+	L+ in V DC	15 ... 35
Signal output and maximum ohmic load R _A	R _A in Ohm	4 ... 20 mA, 3-wire R _A ≤ 0,5 k 0 ...10 V, 3-wire R _A > 10 k Adjustment zero point offset, max. 3 % of span
Setting time (Analogue signal)	ms	3
Current consumption	mA	max. 100
Total current consumption	mA	max. 600 (max. 500 with IO-Link) incl. switching current
Switch points		Individually adjustable via external control keys
■ Type		Transistor switching output PNP or NPN, with IO-Link: C/Q1: PNP
■ Number		1 or 2
■ Function		normally open / normally closed; windows- and hysteresis function freely adjustable
■ Contact rating	V DC	Supply voltage L+ - 1 V
■ Switching current	mA	Q1: 250 (with IO-Link: C/Q1: 100), Q2: 250
■ Response time	ms	≤ 10 (20 ms at IO-Link)
■ Accuracy	% of span	≤ 0.5 (setting accuracy)
Insulationvoltage	V DC	500
Display		
■ Design		14-Segment-LED, blue 4-digits, height 9 mm
■ Range		Electronic 180° rotatable
■ Accuracy	% of span	≤ 1.0 ± 1 Digit
■ Update	ms	1000, 500, 200, 100 (adjustable)
Accuracy	% of span	≤ 1.0 *) *) Including non-linearity, hysteresis, zero point and full scale error (corresponds to error of measurement per IEC 61298-2)
Non-linearity	% of span	≤ ± 0,5 (BFSL) according to IEC 61298-2

Specifications		Model PBS	
Long-term drift	% of span	≤ 0.2	according to IEC 61298-2
Permissible temperature of			
■ Medium	°C	-20 ... +85	
■ Ambience	°C	-20 ... +80	
■ Storage	°C	-20 ... +80	
Rated temperature range	°C	0 ... +80	
Temperature error within rated temperature range	% of span	≤ 1.0 typ., ≤ 2.5 max.	
Temperature coefficients within rated temperature range			
■ Mean TC of zero	% of span	≤ 0.2 / 10 K	
■ Mean TC of span	% of span	≤ 0.2 / 10 K	
Reference condition	%	Relative humidity: 45 ... 75 according to IEC 61298-1	
RoHS-conformity		Yes	
CE-conformity			
■ Pressure equipment directive		This instrument is a pressure accessory as defined by the directive 97/23/EC	
■ EMC directive		2004/108/EEC, EN 61326-2-3	
Shock resistance	g	50 according to IEC 60068-2-27	(mechanical shock)
Vibration resistance	g	10 according to IEC 60068-2-6	(vibration under resonance)
Wiring protection			
■ Overvoltage protection	V DC	40	
■ Short-circuit proofness		Q _N /Q1/Q2 towards M	
■ Reverse polarity protection		L+ towards M	
Weight	kg	Approx. 0.2	



When designing your plant, take into account that the stated values (e.g.burst pressure, over pressure safety) apply depending on the material, thread and sealing element used.

Keys and functions

	Display-Mode	Programming-Mode
	short press: Display units long press: Run-through Parameter Info 1. UNIT + unit 2. SP1 / FH1 + value 3. RP1 / FL1 + value 4. SP2 / FH2 + value (optional) 5. RP2 / FL2 + value (optional) 6. LOW + value 7. HIGH + value 8. TAG + value (Only display when value set)	short press: - Menu up - Increase parameter value long press: - Menu up - Increase parameter value - Increment rate is time dependent
	short press: display units long press: Switch to Programme Mode If the password is set to <> 0000, a password will be requested. If authentication is successful, then it enters the Programme Mode, otherwise it reverts to Display Mode.	short press: - Menu down - Decrease parameter value long press: - Menu down - Decrease parameter value - Increment rate is time dependent
	short press: display units	short press: - Select Menu Item - Confirmation of the entry (Parameter value)
 + 	-	short press (both keys at the same time): Return to Display Mode

- 4-digit LED display - Display system pressure
1. LED (blue)

2. LED (blue)

- Display Menu Item

- Display Parameter

- Status Switch Output 1

- Status Switch Output 2 (Optional)

Operating Modes

- System start
- Display is fully activated for 2s

- When the pressure switch is powered up within the range of the hysteresis, the output switch is set to „not active“ by default
- Display Mode
- normal operation, displays system pressure
- Programming Mode
- Setting Parameters

Parameter

Parameter	Description
SP1 / SP2	Hysteresis function: Switch point Switch output (1 or 2)
FH1 / FH2	Window function: Window high switch output (1 or 2)
RP1 / RP2	Hysteresis function: Reset point switch output (1 or 2)
FL1 / FL2	Window function: Window Low switch output (1 or 2)
EF	Enhanced Programme Functions
RES	Return the set parameter to the Factory Settings
DS1	Switch Delay Time, which must occur without interruption before any electrical signal change occurs (Q1 or Q2)
DS2	
DR1	Switch Delay Time, which must occur without interruption before any electrical signal change occurs (RP1 or RP2)
DR2	
OU1	Switching Function Switching Output (1 or 2) HNO = Hysteresis Function, normally open HNC = Hysteresis Function, normally closed FNO = Window Function, normally open FNC = Window Function, normally closed
OU2	
UNIT	Changing Units (If the pressure range is higher than the display range, no change of the unit is possible and the parameter UNIT is not shown)

Parameter	Description
OSET	Zero Point adjustment (+ 3% of Nominal Pressure)
DISM	Display value in Display Mode ACT = Current System Pressure LOW, HIGH = Minimum, Maximum System Pressure SP1(FH1), RP1(FL1), SP2(FH2), RP2(FL2), OFF = Display off
DISU	Display-Update 1, 2, 5, 10 Updates/Second
DISR	Display rotate 180°
RHL	Clear the Min- and Max-value memory
PAS	Password input, 0000 = no password Password input Digit by Digit
TAG	Input of a 16-digit alphanumeric Measuring Point number

Error display Acknowledgement of an Error Display by pressing the „Enter“ key.

Error	Description
ATT1	On changing the Switch Point the system automatically reduces the Reset Point
ATT2	Zero Point adjustment error, current pressure is outside the limits
ATT3	Password entered for Menu access is incorrect
ERR	Internal error
OL	Overpressure, measuring range exceeded > approx. 5% (Display blinks)
UL	Underpressure, under measuring range < approx. 5% (Display blinks)

Menu (Programming and Factory Setting)

Display-Mode

▼ ▲ Long press on Menu Key

Programming-Mode

SP1 / FH1

→ value

(Min: LLR + 0,5% Max: ULR)

RP1 / FL1

→ value

(Min: LLR Max: SP1 - 0.5%)

SP2 / FH2

→ value

(Min: LLR + 0,5% Max: ULR)

RP2 / FL2

→ value

(Min: LLR Max: SP2 - 0.5%)

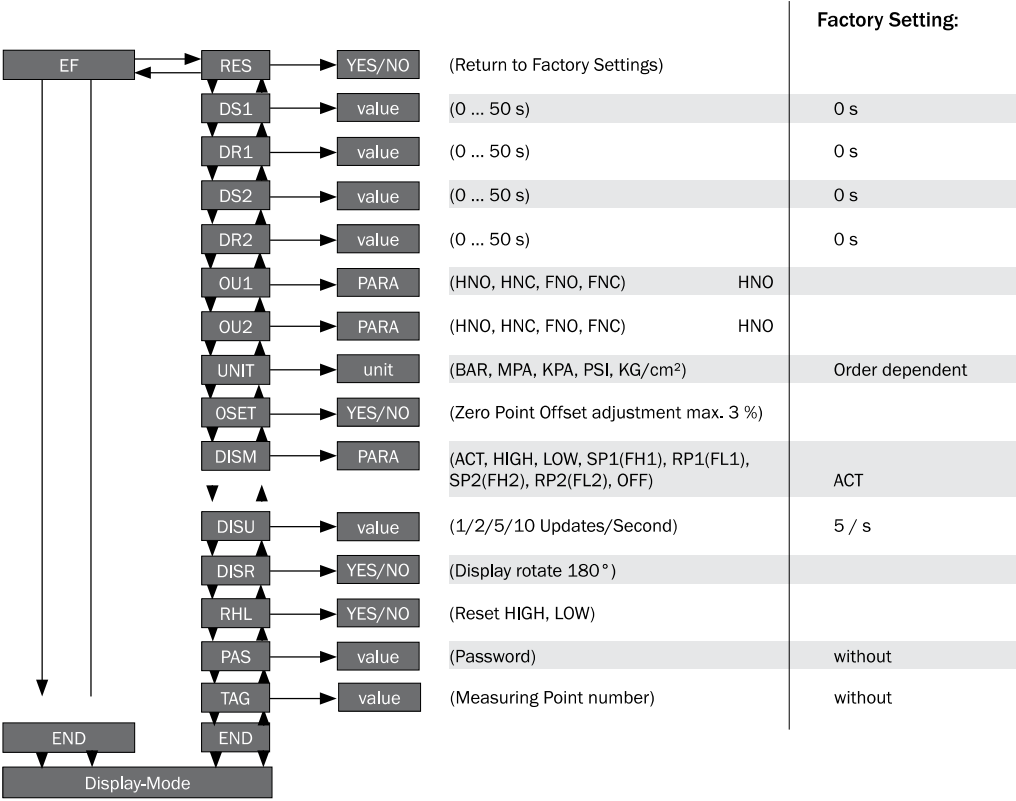
Factory Setting:

Instrument Nominal Pressure

Instrument Nominal Pressure-10%

Instrument Nominal Pressure

Instrument Nominal Pressure-10%



Legend:
LLR = lower limit of range
ULR = upper limit of range

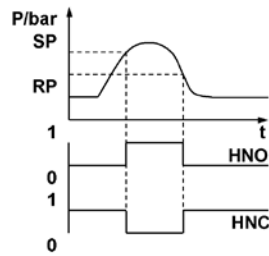
Switch function

Hysteresis function

If the system pressure fluctuates around the nominal value, the hysteresis keeps the switch status of the outputs stable. When the system pressure is rising, the output switches when it reaches the respective set point (SP); if the pressure falls again, the output switches back only if the reset point (RP) is reached.

Application example: loading an accumulator.

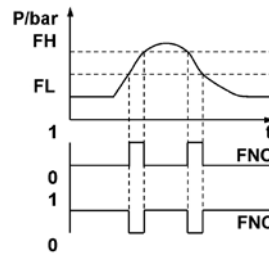
The shut-off valve loads up to 80 bar and then shuts off. When 70 bar is reached again, it switches on once more.



Window function

The window function allows the monitoring of a defined range.

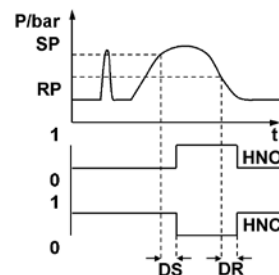
If the system pressure is between the window high (FH) and the window low (FL), the output is activated (NO) respective deactivated (NC).



Delay times (0.00 to 50 s):

By this means unwanted pressure peaks of short duration or high frequency can be filtered out.

The pressure must remain for at least this time to enable the switch to operate. The switching output does not immediately change its status when it reaches the switching event, but only after the delay time has elapsed. If the switching event no longer pertains when the delay time has elapsed, the switching output does not change.



Description of IO-Link functionality (if available)

A description of the IO-Link functions of the PBS and the corresponding IODD (IO-Link Device Description) file can be downloaded from www.sick.com.

Functional test

The output signal must be proportional to the pressure. If not, this might point to a damage of the diaphragm. In that case refer to chapter 9 „Troubleshooting“.

**Warning****Caution**

- Open pressure connections only after the system is without pressure!
- Observe the ambient and working conditions outlined in section 7 „Technical data.“
- Please make sure that the pressure switch is only used within the overload threshold limit at all times!
When touching the pressure switch, keep in mind that the surfaces of the instrument components might get hot during operation.

8. Maintenance, accessories

- SICK pressure switches require no maintenance.
- Have repairs performed by the manufacturer only.

Accessories: Mounting clamp (Order No. 5322501), connection cables

For details about the accessories (e. g. connectors), please refer to SICK's price list or contact our sales department.

9. Trouble shooting**Warning****Warning**

- Open pressure connections only after the system is without pressure!
- Take precautions with regard to remaining media in removed pressure switches. Remaining media in the pressure port may be hazardous or toxic!
- Remove the pressure switch from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation.
- Have repairs performed by the manufacturer only.



Do not insert any pointed or hard objects into the pressure port for cleaning to prevent damage to the diaphragm of the pressure connection.

Please verify in advance if pressure is being applied (valves/ ball valve etc. open) and if the right voltage supply and the right type of wiring (3-wire) has been chosen?

Failure	Possible cause	Procedure
No output signal	Cable break	Check connections and cable
No output signal	No/incorrect voltage supply or current spike	Adjust the voltage supply to correspond with the Operating Instructions
No/False output signal	Incorrectly wired	Follow pin assignment (see Instrument Label / Operating Instructions)
Output signal unchanged after change in pressure	Mechanical overload through overpressure	Replace instrument; if failure reoccurs, consult the manufacturer
Abnormal zero point signal	Overload limits exceeded	Ensure permissible overload limits are observed (see Operating Instructions)
Signal span too small	Mechanical overload through overpressure	Replace instrument; if failure reoccurs, consult the manufacturer
Signal span too small	Power supply too high/too low	Correct the power supply in line with the Operating Instructions
Signal span drops off	Moisture present (e.g. at the cable tail)	Install the cable correctly
Signal span dropping off/too small	Diaphragm is damaged, e.g. through impact, abrasive/aggressive media; corrosion of diaphragm/pressure connector; transmission fluid missing.	Contact the manufacturer and replace the instrument

If the problem persists, contact our sales department.

Non risk declaration (Contamination declaration for returned goods)

Purge / clean dismounted instruments before returning them in order to protect our employees and the environment from any hazard caused by adherent remaining media.

Service of instruments can only take place safely when a Product Return Form has been submitted and fully filled-in. This Return Form contains information on all materials with which the instrument has come into contact, either through installation, test purposes, or cleaning. You can find the Product Return Form on our internet site (www.sick.com).

10. Storage, disposal



Warning

When storing or disposing of the pressure switch, take precautions with regard to remaining media in removed pressure transmitters. We recommend cleaning the transmitter properly and carefully. Remaining media in the pressure port may be hazardous or toxic!

Disposal



Dispose of instrument components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the instrument is supplied.

SICK reserves the right to alter these technical specifications.

Australia

Phone +61 3 9497 4100
1800 33 48 02 – tollfree
E-Mail sales@sick.com.au

Belgium

Phone +32 (0)2 466 55 66
E-Mail info@sick.be

Brasil

Phone +55 11 3215-4900
E-Mail sac@sick.com.br

Česká Republika

Phone +420 2 57 91 18 50
E-Mail sick@sick.cz

China

Phone +852-2763 6966
E-Mail ghk@sick.com.hk

Danmark

Phone +45 45 82 64 00
E-Mail sick@sick.dk

Deutschland

Phone +49 211 5301-301
E-Mail kundenservice@sick.de

España

Phone +34 93 480 31 00
E-Mail info@sick.es

France

Phone +33 1 64 62 35 00
E-Mail info@sick.fr

Great Britain

Phone +44 (0)1727 831121
E-Mail info@sick.co.uk

India

Phone +91-22-4033 8333
E-Mail info@sick-india.com

Israel

Phone +972-4-999-0590
E-Mail info@sick-sensors.com

Italia

Phone +39 02 27 43 41
E-Mail info@sick.it

Japan

Phone +81 (0)3 3358 1341
E-Mail support@sick.jp

Nederlands

Phone +31 (0)30 229 25 44
E-Mail info@sick.nl

Norge

Phone +47 67 81 50 00
E-Mail austefjord@sick.no

Österreich

Phone +43 (0)22 36 62 28 8-0
E-Mail office@sick.at

Polska

Phone +48 22 837 40 50
E-Mail info@sick.pl

Republic of Korea

Phone +82-2 786 6321/4
E-Mail info@sickkorea.net

Republika Slovenija

Phone +386 (0)1-47 69 990
E-Mail office@sick.si

România

Phone +40 356 171 120
E-Mail office@sick.ro

Russia

Phone +7 495 775 05 34
E-Mail info@sick-automation.ru

Schweiz

Phone +41 41 619 29 39
E-Mail contact@sick.ch

Singapore

Phone +65 6744 3732
E-Mail admin@sicksgp.com.sg

Suomi

Phone +358-9-25 15 800
E-Mail sick@sick.fi

Sverige

Phone +46 10 110 10 00
E-Mail info@sick.se

Taiwan

Phone +886 2 2375-6288
E-Mail sales@sick.com.tw

Türkiye

Phone +90 216 587 74 00
E-Mail info@sick.com.tr

United Arab Emirates

Phone +971 4 8865 878
E-Mail info@sick.ae

USA/Canada/México

Phone +1(952) 941-6780
1 800-325-7425 – tollfree
E-Mail info@sickusa.com

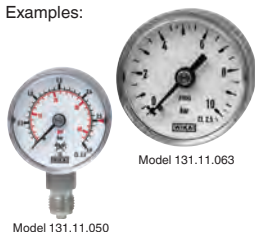
SICK
Sensor Intelligence.

B.10 Manometer D40 - D63 [WIKA]

Name	Data
Designation	Manometer
Type	D40 - D63 [WIKA]
Number	11195411.04 12/2018
Type of manual	Operating instructions
Manufacturer	Wika WIKA Alexander Wiegand SE & Co. KG Alexander-Wiegand-Straße 30 63911 Klingenberg/Germany (+49) 93 72/132-0 (+49) 93 72/132-406 info@wika.de https://www.wika.de

Pressure Gauges

Examples:



Model 131.11.050

Model 131.11.063



Part of your business

Notes per current pressure equipment directive

- The pressure gauges are defined as "pressure accessories"
- The volume of the "pressure-bearing housings" of WIKA pressure gauges is $< 0.1 \text{ L}$
- The pressure gauges carry CE marking for fluid group 1 per annex II, diagram 1 when their permissible working pressure is $> 200 \text{ bar}$

Instruments that do not carry the mark are manufactured per article 4, paragraph 3 "sound engineering practice".

Applicable standards (depending on model)

- EN 837-1 Bourdon tube pressure gauges, dimensions, metrology, requirements and testing
- EN 837-2 Selection and installation recommendations for pressure gauges
- EN 837-3 Diaphragm and capsule pressure gauges, dimensions, metrology, requirements and testing

Specifications: see data sheet on www.wika.de

Subject to technical modifications.

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WIKA Alexander Wiegand SE & Co. KG

Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Tel. (+49) 93 72/132-0
Fax (+49) 93 72/132-406
info@wika.de
www.wika.de

11195411.04 12/2018

1. Safety



WARNING!

Before installation, commissioning and operation, ensure that the appropriate pressure gauge has been selected in terms of measuring range, design and suitable wetted material (corrosion) for the specific measuring conditions. In order to guarantee the measuring accuracy and long-term stability specified, the corresponding load limits must be observed.

Only qualified persons authorised by the plant manager are permitted to install, maintain and service the pressure gauges.

For hazardous media such as oxygen, acetylene, flammable or toxic gases or liquids, and refrigeration plants, compressors, etc., in addition to all standard regulations, the appropriate existing codes or regulations must also be followed.

From pressure gauges which do not correspond to a safety version per EN 837 highly pressurised media might leak out through the possibly bursting window in case of a component failure. For gaseous media and working pressures $> 25 \text{ bar}$ a pressure gauge with safety version S3 is recommended per EN 837-2.

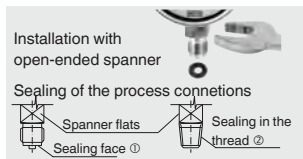
After an external fire, pressure media can leak out, particularly at soft solder joints. All instruments must be checked and, if necessary, replaced before recommissioning the plant.

Non-observance of the respective regulations can cause serious injuries and/or damage to the equipment.

2. Mechanical connection

In accordance with the general technical regulations for pressure gauges (e.g. EN 837-2). When screwing the instruments in, the force required to do this must not be applied through the case, but only through the spanner flats provided for this purpose, and using a suitable tool.

For parallel threads, use flat gaskets,



lens-type sealing rings or WIKA profile sealings at the sealing face ①. With tapered threads (e.g. NPT threads), sealing is made in the threads ② using additional sealing materials, e.g. PTFE tape (EN 837-2).

The torque depends on the sealing used. In order to orientate the measuring instrument so that it can be read as well as possible, a connection with clamp socket or union nut should be used.

When a blow-out device is fitted to a pressure gauge, it must be protected against being blocked by debris and dirt. With safety pressure gauges (see ⑤) there must be a free space of $> 20 \text{ mm}$ behind the blow-out back.



After installation, open the vent valve (if available) or set from CLOSE

to OPEN. With models 4 and 7, do not open the flange mounting screws. The version of the vent valve depends on the model and can deviate from the above illustration!

Requirements for the installation point

If the line to the measuring instrument is not adequately stable, a measuring instrument holder should be used for fastening (and possibly via a flexible capillary). If vibrations cannot be avoided by means of suitable installation, instruments with case filling should be used. The instruments should be protected against coarse dirt and wide fluctuations in ambient temperature.

Note for model 732.14, for front bezel mounting: The front bezel serves as centring and as the aperture in the mounting panel. Securing and thus the weight-bearing must be made via the pressure connection piping.

3. Permissible ambient and operating temperatures

When mounting the pressure gauge it must be ensured that, taking into consideration the influence of convection and heat radiation, no deviation above or below the permissible temperature limits can occur. Observe the influence of temperature on the indication accuracy!

4. Storage

To protect the pressure gauges from mechanical damage keep them in the original packaging until installation. Protect the measuring instruments from humidity and dust.
Storage temperature range: $-40 \dots +70 \text{ }^{\circ}\text{C}$
Storage temperature range model PG23LT: $-70 \dots +70 \text{ }^{\circ}\text{C}$

5. Maintenance and repairs

The pressure gauges are maintenance-free. Regular checks should be carried out to ensure the measurement accuracy. Checks or recalibrations must only be carried out by qualified skilled personnel with the appropriate equipment. When dismantling, close the vent valve (if available).



WARNING!

Residual media in dismantled pressure gauges can result in a risk to persons, the environment and equipment. Take sufficient precautionary measures.

Ecolab Engineering GmbH
Raiffeisenstrasse 7
D-83313 Siegsdorf
Telephone: +49 (0) 86 62 / 61 0
Fax: +49 (0) 86 62 / 61 235

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