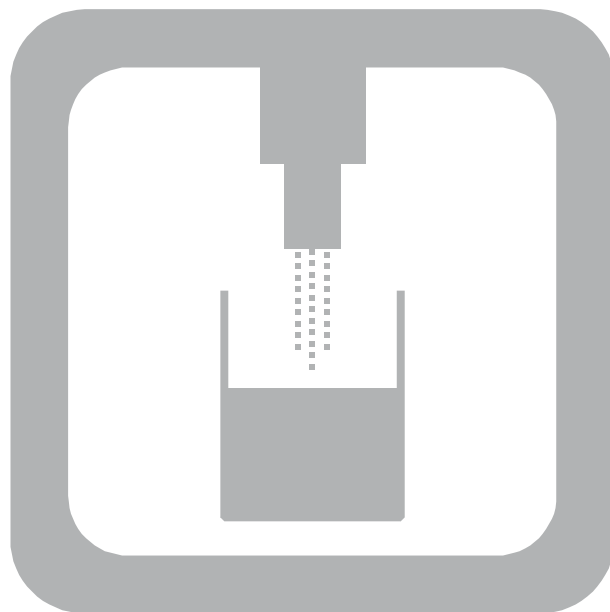


Innofill



Operating instructions

Can filling machine

Innofill Can C

Machine number: 10349026 89407962-000100

Order: 89407962

Item: 000100



KHS USA, Inc.
880 Bahcall Court
Waukesha, Wisconsin 53186
Telephone: +1262797.7200
Email: info@khs.com
Internet: www.khs.com

www.khs.com





Table of contents

1 General information.....	9
1.1 Target Group.....	9
1.2 Notes on technical documentation.....	9
1.3 Machine assignment.....	9
1.4 Integrated components.....	11
1.5 Customer Service.....	11
1.6 Copyright.....	12
1.7 Notes on reading this manual.....	12
2 Safety.....	15
2.1 Purpose of safety information.....	15
2.2 Intended use.....	15
2.3 Reasonably foreseeable misuse.....	16
2.4 Obligations of the operator.....	16
2.5 Personnel requirements.....	17
2.6 Protective equipment.....	21
2.7 Hazardous areas and identification of these areas.....	22
2.7.1 Warning signs.....	22
2.7.2 Mandatory signs.....	23
2.7.3 Installation location of signs.....	23
2.8 Safety equipment.....	25
2.8.1 Machine paneling.....	25
2.8.2 Door switch with locking mechanism.....	26
2.8.3 Emergency stop switch.....	27
2.8.4 Safety valve.....	28
2.8.5 Conveyors guard cover.....	29
2.8.6 Installation location of safety equipment.....	30
2.8.7 Equipment for disconnecting and securing.....	30
2.9 Conduct in hazardous situations and in the event of an accident.....	31
2.10 Operating statuses and operating modes.....	32
2.10.1 De-energized machine.....	33
2.10.2 Operating status OFF.....	33
2.10.3 Operating status ON.....	33
2.11 Pressure tanks and pipelines.....	34
2.12 Residual risks.....	36
3 Layout and function.....	39
3.1 Can filling machine.....	39
3.1.1 Can flow.....	41
3.1.2 Can conveyor.....	42



3.1.3	Machine drive.....	45
3.1.4	Valve manifold.....	46
3.1.5	Filler base.....	55
3.1.6	Filler turret.....	58
3.1.7	Bubble breaker.....	67
3.1.8	Undercover gassing.....	68
3.1.9	Can sealer.....	68
3.2	Cleaning equipment and sprays.....	68
3.2.1	Filling valve spray.....	68
3.2.2	Can shower.....	69
3.3	Signaling equipment.....	71
3.4	Operator console.....	72
3.4.1	Operator side.....	72
3.4.2	Rear side.....	74
3.5	Graphical user interface.....	74
3.5.1	Main window.....	75
3.5.2	Favorites.....	94
3.5.3	Logging in and logging out.....	95
3.5.4	Main menu.....	100
3.5.5	Entire filling machine.....	106
3.5.6	Filler.....	142
3.5.7	Capper.....	182
3.6	Workstations.....	189
3.7	Measuring, control and regulating equipment.....	190
3.7.1	Switch cabinet.....	190
3.7.2	Control system.....	191
3.7.3	Electrical system.....	191
3.7.4	Pneumatics.....	198
3.8	Energy-efficient operation.....	204
3.9	Process.....	207
3.9.1	Filling process.....	207
4	Assembly.....	215
4.1	Check the items included in the delivery and inspect the shipment.....	215
4.2	Transportation.....	215
4.3	Installation.....	216
4.4	Connection.....	216
4.5	Commissioning.....	217
4.6	Decommissioning.....	218
4.7	Storage.....	218



4.8	Recommissioning.....	219
4.9	Disposal.....	219
5	Operation.....	221
5.1	Safety equipment.....	221
5.1.1	Emergency stop.....	221
5.1.2	Emergency unlock.....	223
5.1.3	Repair switch.....	224
5.1.4	Opening and closing doors in the machine paneling.....	224
5.2	Signaling equipment.....	226
5.2.1	Signal lamp.....	226
5.2.2	Signal horn.....	226
5.3	Operating controls.....	227
5.3.1	Removable operating control.....	227
5.3.2	Operator panels P200 and P300.....	228
5.3.3	Main switch.....	229
5.4	Jogging.....	229
5.5	Preparing for operation.....	230
5.6	Production.....	236
5.6.1	Safety instructions.....	236
5.6.2	Prerequisites.....	237
5.6.3	Preparation.....	238
5.6.4	Starting.....	242
5.6.5	Monitoring.....	242
5.6.6	Stopping.....	243
5.6.7	Ending production.....	243
5.7	Cleaning.....	243
5.7.1	Safety instructions.....	244
5.7.2	Prerequisites.....	244
5.7.3	Preparation.....	245
5.7.4	Cleaning the bubble breaker and undercover gassing.....	246
5.7.5	Cleaning the can sealer.....	246
5.7.6	Execution.....	246
5.7.7	Cleaning the machine exterior.....	249
5.8	Setup.....	253
5.8.1	Safety instructions.....	253
5.8.2	Preparation.....	253
5.8.3	Run-out.....	254
5.8.4	Setting the cleaning height.....	254
5.8.5	Changing format parts.....	257



5.8.6	CIP cleaning.....	267
5.8.7	Setting the production height.....	267
5.8.8	External cleaning.....	269
5.8.9	Starting production.....	270
5.8.10	Follow-up tasks.....	270
5.9	Taking the machine out of operation.....	270
6	Servicing.....	275
6.1	Safety instructions.....	275
6.2	Adhering to regulations.....	276
6.3	Setup operating mode.....	276
6.4	Disconnecting and securing.....	277
6.4.1	Emptying the machine manually.....	283
6.5	Maintenance.....	285
6.5.1	Safety instructions.....	285
6.5.2	Maintaining the seals.....	286
6.5.3	Maintenance schedule.....	287
6.5.4	Lubrication schedule.....	292
6.6	Repairs.....	298
6.6.1	Safety instructions.....	299
6.6.2	Repair switch for conveyor.....	299
6.6.3	Tightening torques.....	300
6.6.4	Replacing a process valve.....	302
6.6.5	Filling valve.....	305
6.6.6	Filter silencer on FRL group.....	325
6.6.7	Replacing the flow meter.....	326
6.6.8	Cleaning the dirt collecting filter.....	329
6.6.9	Setting instructions.....	336
7	Faults.....	339
7.1	Safety instructions.....	339
7.2	Displays.....	339
7.2.1	Fault displayed by the signal lamp.....	339
7.2.2	Signal horn.....	340
7.2.3	Faults and warnings on the operator console.....	341
7.2.4	Displaying faults on the overview screen in the operator guidance section.....	342
7.3	Rectifying faults.....	343
7.3.1	Eliminating fault messages from the overview screen.....	343
7.3.2	Malfunction in Electrical Area.....	345
7.3.3	Machine paneling.....	348
7.3.4	Filler.....	351



7.3.5	Filling valve.....	351
7.3.6	Valve manifold.....	366
7.3.7	Can sealer faults.....	370
7.4	Teleservice operating mode.....	370
8	Technical data.....	371
8.1	Media requirements.....	371
8.2	Operation.....	371
8.2.1	Machine specifications.....	371
8.2.2	Plans.....	372
8.2.3	Media connection list.....	384
8.2.4	Noise emissions.....	388
8.2.5	Filler specification sheet.....	389
8.2.6	Settings.....	391
8.3	Servicing.....	392
8.3.1	Lubricants.....	392
8.3.2	Labeling of lubrication points.....	393
8.3.3	Labeling of equipment for disconnecting and securing.....	393
8.3.4	Cleaning agents.....	393
9	Appendix.....	397



This page is left blank for editorial reasons.



1 General information

This operating manual describes the operational safety and the operating characteristics of the machine.

1.1 Target Group

The following persons are to read and adhere to the instructions in this operating manual:

- Persons who use the machine according to its intended purpose
- Persons who are responsible for operational safety, operation, and operating characteristics
- Persons who operate or maintain the machine

1.2 Notes on technical documentation

The technical documentation comprises a number of documents.

Document	Identification
Operating instructions	10349026 89407962-000100
Spare parts list	10349026 89407962-000100
Electrical circuit diagram	10349026 89407962-000100
Purchased parts documentation	10349026
Specific data and KHS standards	89407962
Remote access operating instructions	89407962

The technical documentation forms an integral part of the machine. The machine documents are assigned using the information in the "Identification" column.

The documents may be provided separately or compiled in printed or in electronic format.

The following rules apply to technical documentation:

- Replace old versions with new versions.
- Include all supplements.
- Keep in the immediate vicinity of the machine for future use.
- Pass documentation on to the new owner.

1.3 Machine assignment

The data on the name plate clearly identifies the machine.



Name plate

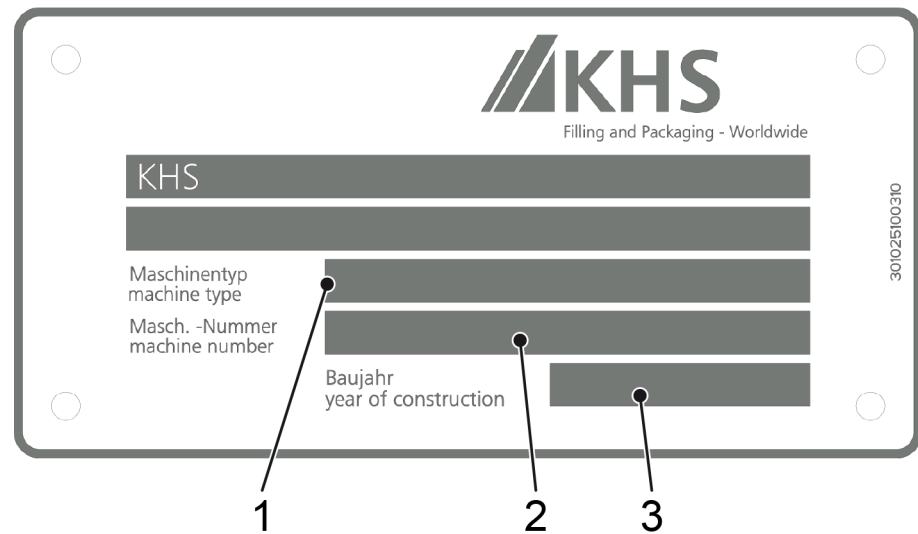


Figure 1: Name plate

1	Model:	Innofill Can C
2	No.:	10349026 89407962-000100
3	Year of manufacture:	2021

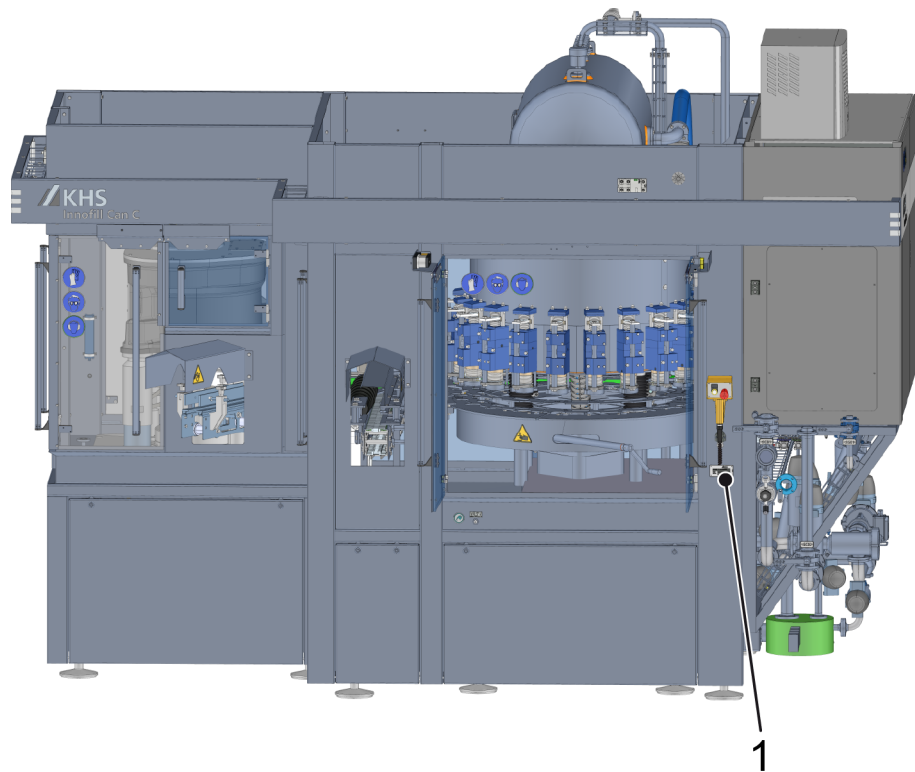


Figure 2: Machine overview

1 Name plate

The name plate is located on the back of the machine.

1.4 Integrated components

Other components are integrated in the machine. These components may have been produced by KHS or by other manufacturers. The instructions provided in the technical documentation for these components must also be followed. The machine documents are assigned using the information in the "Identification" column.

Component	Manufacturer/identification	KHS order number / KHS item number
Capper	Ferrum / 65774003S001	89407962 / 000100

1.5 Customer Service

See back of the cover sheet for contact information.



1.6 Copyright

Without express written consent from KHS no part of this document may be

- copied
- transmitted by photographic means
- reproduced
- translated
- stored on another electronic medium or transferred to machine-readable format

1.7 Notes on reading this manual

Formats of references and names

Format	Meaning
<i>"Italics in quotation marks"</i>	References to chapters in these instructions
<i>"Italics in quotation marks"</i>	References to external documents
<i>"Italics in quotation marks"</i>	Quoted text from the graphical user interface
<i>"File → Save"</i>	Menu control sequences
<i>[Text or characters in square brackets]</i>	Names of buttons, switches and switch positions

Formats for handling instructions

1. ➤ Numbered step within handling instruction in a specified order.

2. ➤ ...

➤ Step within handling instruction with no specified order.

⇒ Results of the handling step.

Format of bulleted item lists

- A bulleted list item with no specified order.
- ...



Format of notes



CAUTION!

This format indicates notes on safety, warning against risk of injury to persons.



NOTICE!

This format indicates notes on safety warning against property-related hazards.



This format indicates tips and recommendations.



ENVIRONMENT!

This format features notes on environmental protection and on using the machine efficiently.



This page is left blank for editorial reasons.



2 Safety

This chapter details the prerequisites and measures for safe operation.

2.1 Purpose of safety information

Safety information warns of hazards that could lead to bodily injury and damage to property. Always observe and follow safety instructions to prevent accidents and injuries from occurring.

The following signal words indicate the category of the hazard and the extent of the danger.

**DANGER!**

This signal word indicates a direct risk leading to death or severe injury.

**WARNING!**

This signal word indicates a potential risk that could lead to death or severe injury.

**CAUTION!**

This signal word indicates a potential risk that could lead to slight or minor injury.

**NOTICE!**

This signal word indicates a potentially damaging situation that could lead to damage to the machine or objects in its vicinity.

2.2 Intended use

The machine is intended for the following applications only:

- Use in the food and beverage industries
- Dispensing products with a maximum alcohol content of 15 percent by volume (Vol%) (ethanol), at a filling temperature below 40°C
- Dispensing the supplied product into cans
- Sealing the cans



Use is only considered to be intended use if the operator observes the following points:

- Use as described in the operating instructions
- Use within the limits specified in the Technical Data
- All activities are carried out only by qualified and trained personnel
- Keep persons who are not working on the machine at a safe distance from hazardous and operating areas
- Use of spare and wear parts that comply with original part specifications
- Replacement of wear parts within the specified intervals
- Only use the remote access function for rectifying errors and malfunctions
- Only carry out remote access via secured network connections

2.3 Reasonably foreseeable misuse

KHS will not be held liable for damage resulting from misuse of the machine.

The following are considered misuse:

- Any use above and beyond intended use
- Alterations or modifications without the knowledge and consent of KHS are considered not proper use
- Circumventing or removing protective equipment and safety measures
- Remote access in a different operating mode than **Teleservice**

- Installation of mismatching format parts despite clearly defined markings of the corresponding dressing set.
- When dispensing alcoholic products with an alcohol content above 15 percent by volume (Vol%), misuse and process faults can create a flammable and explosive atmosphere.

2.4 Obligations of the operator

The operator undertakes to implement measures arising from content in the technical documentation. This includes in particular:

- Compliance with laws and regulations currently applicable at the site.
- Clearly marking hazardous areas.
- Training and instructing personnel.
- Providing personal protective equipment.
- Enforcing prohibitions and mandatory requirements.
- Ensuring devices to secure the shut-off elements are fitted.
- Ensuring signs warning against uncontrolled reactivation are provided.



2.5 Personnel requirements

Personnel who carry out operating and maintenance activities are subject to strict requirements.

These operating instructions assign activities to the following personnel:

- Personnel:
- Operating personnel
 - Maintenance personnel
 - Laboratory personnel
 - KHS personnel
 - Remote access personnel



WARNING!

Personnel who do not meet the requirements

Danger of injury when carrying out operating and maintenance activities.

This can lead to severe or even fatal injury.

- Activities may only be undertaken by personnel assigned to the tasks and meeting the requirements.

Only persons who meet the following requirements are authorized as personnel:

- They have reached the statutory minimum age at the installation site.
- They are neither temporarily nor permanently impaired in terms of the following capabilities:
 - Thinking and acting
 - Seeing
 - Hearing
 - Reacting
 - Moving
 - Lifting and carrying
- They meet the legal health requirements applicable at the installation site in relation to the goods to be processed and the products to be manufactured.

The following capabilities, knowledge and skills are also required:

General capabilities:

- Average intellectual capacity
- Average spatial awareness
- Average hand-eye coordination
- Manual dexterity
- Technical understanding



- Understanding of verbal instructions
- Understanding of written instructions

Basic knowledge and skills:

- Hydraulics
- Quality testing, quality assurance
- Servicing, repairs and maintenance

Machine-related capabilities, knowledge and skills:

- Functional principle of the machine and its systems
- Operating method and technical specifications for the machine and its systems
- Operating controls for the machine
- Control program
- Safety instructions
- Basic hygiene regulations

KHS personnel

KHS personnel are specially trained and authorized by KHS to undertake the activities.

Laboratory personnel

In addition to the general requirements, laboratory personnel must also meet the following requirements:

General capabilities:

- Average abstract and logical reasoning skills
- Average mathematical skills
- Good observational skills
- Sustained attention when monitoring processes
- Manual skills
- Dexterity
- Planning and organizational skills
- Numeracy skills

Basic capabilities and skills:

- Intermediate level of education
- Vocational training in food technology or equivalent vocational experience (proof required) recognized at the installation site
- At least one year's vocational experience in the beverage and packaging industry
- Microbiological testing
- Chemical, biochemical, microbiological, and technical testing and measurement procedures
- Laboratory work, laboratory procedures
- Food hygiene
- Food testing
- Sampling
- Quality testing and assurance



- Documentation
- Health passport/certificate pursuant to §§ 42 and 43 of the German Protection Against Infection Act (IfSG)
- Laboratory control software
- Food chemistry
- Food legislation
- Food technology
- Microbiology
- Recipes

Machine-related capabilities, knowledge and skills:

- Training and instruction on the area of application specified for the intended use
- Training and instruction on safety instructions and hygiene regulations

Maintenance personnel

In addition to the general requirements and the requirements that apply to operating personnel, maintenance personnel must also meet the following requirements:

General capabilities:

- Average abstract and logical reasoning skills
- Average mathematical skills
- Good observational skills
- Manual skills
- Dexterity
- Planning and organizational skills
- Numeracy skills
- Oral communication skills

Basic capabilities and skills:

- Intermediate level of education
- Vocational training recognized at the installation site and relevant to the performance of servicing and maintenance activities, or equivalent vocational experience (proof required)
- Electrical engineering (electronics, electromechanics, electrical installation, mechatronics)
- Automation engineering (hardware and software installation, IT and computer technology, programming, PLC technology and programming)
- Microelectronics (bus systems, microcomputers and microprocessors)
- Production planning
- Hybrid control systems
- Measurement and control technology
- Microelectronics (microcomputer and microprocessor technology)
- Pneumatics



- Test bay operations
- Robotics and handling technology

Machine-related capabilities, knowledge and skills:

- Training and instruction on maintenance and type changes
- Training and instruction on safety instructions and hygiene regulations
- Special training and instruction on servicing and maintenance activities

Maintenance personnel with KHS personnel

The maintenance personnel carry out the work together with the KHS personnel.

The requirements from the *"Maintenance personnel"* and *"KHS personnel"* sections apply.

Operating personnel

In addition to the general requirements, operating personnel must also meet further requirements:

General capabilities:

- Sustained attention when monitoring processes
- Adaptability

Basic capabilities and skills:

- Standard level of education
- Vocational training or equivalent vocational experience (proof required) recognized at the installation site and relevant to the required activities
- At least one year's vocational experience in the beverage and packaging industry
- Knowledge of manufacturing technology
- Knowledge of machine control and operation
- Knowledge of machine setup
- Knowledge of pneumatics

Machine-related capabilities, knowledge and skills:

- Training and instruction on the area of application and method of operation specified for the intended use
- Training and instruction on safety instructions and hygiene regulations

Remote access personnel

Besides the general requirements and requirements that apply for maintenance personnel, remote access personnel must also meet the following requirements:

Component-related capabilities, knowledge, and skills:

- Training and instruction by KHS in the requirements and use of remote access
- **Maintenance technician** or **maintenance personnel** user role for identification on the operator console



2.6 Protective equipment

Persons remaining or working in the vicinity of hazardous and operating areas are required to wear general or special personal protective equipment.



WARNING!

If personal protective equipment is not available or not worn

unprotected body parts may be injured.

This can lead to severe or even fatal injury.

- Wear personal protective equipment.

General personal protective equipment includes:

- Work clothes
- Steel toe-cap safety shoes with non-slip soles
- Hearing protection suitable for the noise level

The operating instructions makes explicit reference to special-purpose personal protective equipment if this equipment is required for the task at hand.



Acid and caustic-resistant safety gloves

They serve to protect the hands against acid and caustic, abrasion, scrapes, punctures, or deeper wounds and against contact with hot surfaces.



Face shield

Wear face shield.



Foot protection

Wear safety shoes.



Hand protection

Wear gloves.



Personal protective equipment

Only enter the inner area of the machine paneling with personal protective equipment.



Safety goggles

The purpose of safety goggles is to protect the eyes against flying parts and splattering liquids.



2.7 Hazardous areas and identification of these areas

The prohibitory signs, warning signs, and mandatory signs described in the following are posted on the machine. They pertain to the immediate vicinity in which they are posted and are intended to protect personnel.



WARNING!

Removed or illegible marking of hazardous areas

If warning signs are removed or rendered illegible, hazardous areas will not be recognized, mandatory rules will be ignored, and prohibitory rules will not be observed. This could result in death or serious injury.

- Never remove warning signs.
- Replace lost, removed, or damaged warning signs immediately.
- Replace or clean illegible warning signs immediately.

2.7.1 Warning signs

Warning: hot surface.



Warning: corrosive substances.



Warning: electrical voltage.



Warning: hazardous area.



Warning: risk of hand injuries.



Warning: rollers turning in opposite directions.





2.7.2 Mandatory signs

Follow the instructions.



Wear hearing protection.



Wear hand protection.



Wear eye protection.



Wear protective headgear.



Disconnect the power supply before carrying out maintenance or repairs.



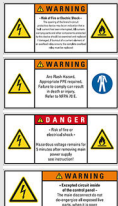
2.7.3 Installation location of signs

Hazardous area	Location	Safety signs	
Can conveyor	Drives		
	Pusher (optional)		
	Outfeed conveyor		
Filler base	Main drive		
	Can plate		
	Electrical power distributor		



Hazardous area	Location	Safety signs	
Valve manifold	Pipelines		
	Rinsing cans		
Switch cabinet	Switch cabinet door		
			
Capper	Paneling		
			
Machine paneling	Doors		
			

2.7.3.1 Installation location of additional signs

Sign	Item
	   Sticker with warning notices close to the main switch.



2.8 Safety equipment

The machine has the following safety equipment:

- Machine paneling/cleanroom
- Door switch with locking mechanism
- Emergency stop switch
- Safety valve
- Conveyors guard cover

2.8.1 Machine paneling

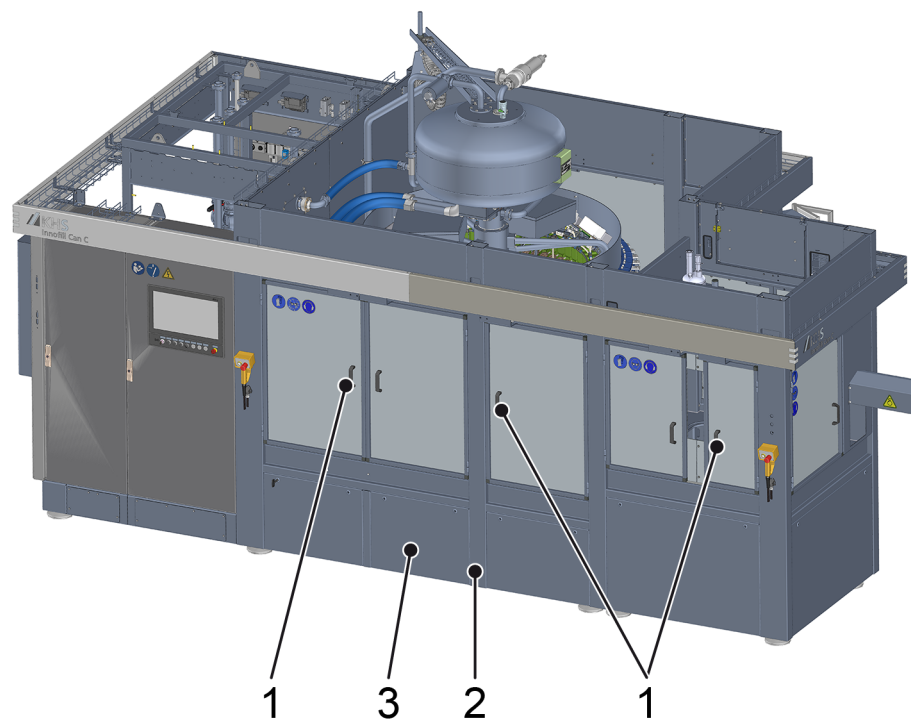


Figure 3: Machine paneling

- 1 Machine paneling doors
- 2 Machine paneling supports
- 3 Fixed elements of the machine paneling

The machine paneling is designed to protect people.

The machine paneling surrounds the machine area in which there could be a risk to people. The machine paneling prevents the machine from being accessed by an unintended route.

The machine can only be safely put into operation if all fixed parts of the machine paneling are present and locked.

Location: The machine paneling surrounds the secured area of the machine; see section *"Installation location of safety equipment"*.



2.8.2 Door switch with locking mechanism

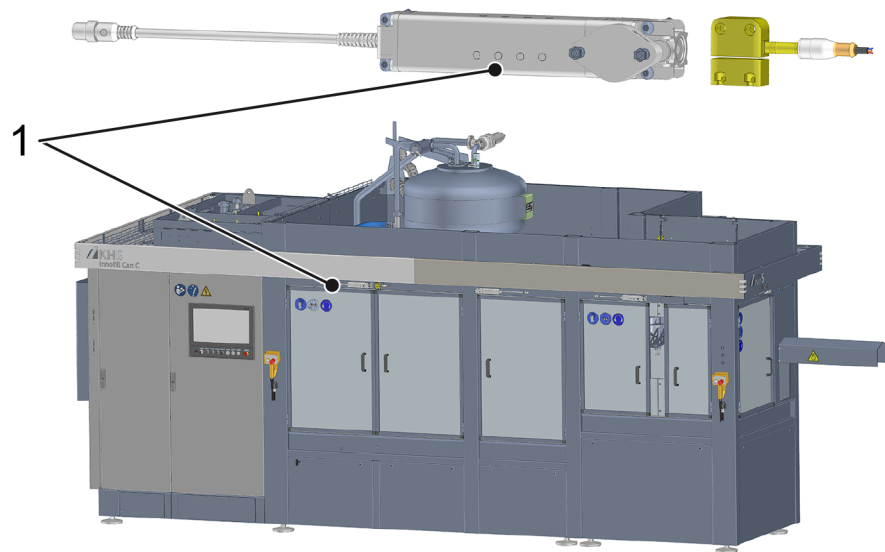


Figure 4: Door with mechanical lock

1 Door switch

The machine paneling is divided into various switching areas. The switching areas are distributed such that the operator can see them. The doors are allocated to these areas (see circuit diagram).

During production and cleaning, the doors are kept closed by the switch with a mechanical locking mechanism.

For setup or maintenance work, all doors can be opened.

In an emergency, all doors can be opened using an emergency unlocking system without help from the outside, see chapter, *“Operation”*, section *“Safety equipment”*.

Location: Door switches are fitted to every door on the machine paneling; see section *“Installation location of safety equipment”*.

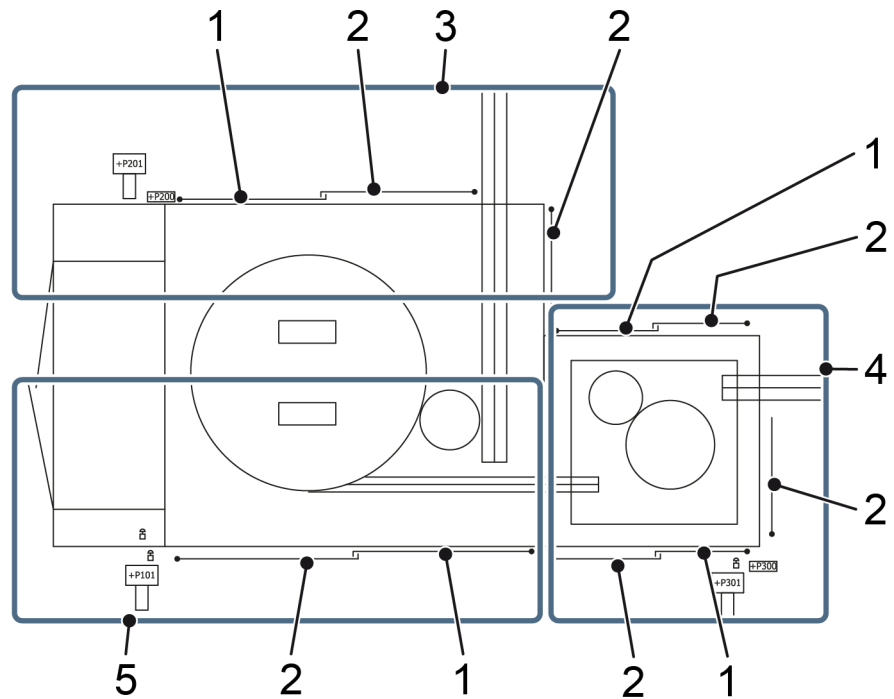


Figure 5: Area overview

- 1 Door with safety switch
- 2 Door with shutting and locking mechanisms
- 3 Protected area P200
- 4 Protected area P300
- 5 Protected area P100

2.8.3 Emergency stop switch

Layout

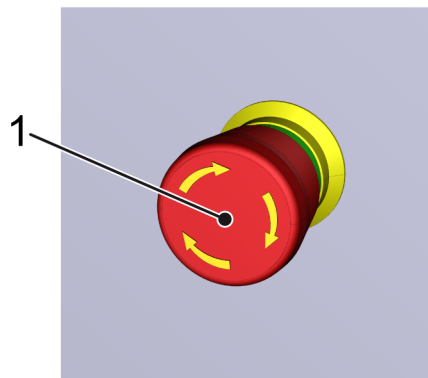


Figure 6: Emergency stop switch

- 1 Emergency stop switch



Function

Pressing the switch interrupts all energy sources, process media, pneumatic control systems, electrical control systems, actuations and drives, see chapter *“Operation”*, section *“Safety equipment”*.

Emergency stop switches are fitted to the following components:

- Control panels
- Removable operating controls
- Operator console

An overview of these components can be found in the chapter *“Layout and function”*, section *“Workstations and operating controls”*.

2.8.4 Safety valve

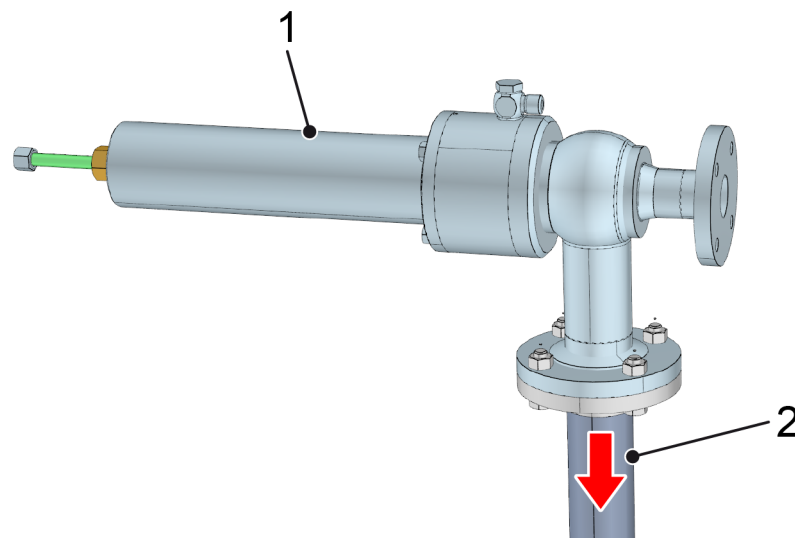


Figure 7: Relief valve

- 1 Relief valve
- 2 Pipeline

The relief valve safeguards the pressurized system and the upstream components against excessively high pressure.

If the permissible pressure—the response pressure of the relief valve—is exceeded, the relief valve channels fluids, gases or steam out of the pipeline and into the surrounding air.

When the pressure drops below the permissible pressure, the spring-loaded relief valve closes and is fully functional again.



The relief valve opens as a result of an emergency situation caused by a technical fault or malfunction, the cause of which must be determined and rectified before starting up again.



Refer to the *"Purchased parts documentation"* for more information

Location: The relief valve is fitted to the ring bowl or central bowl; see section *"Installation location of safety equipment"*.

2.8.5 Conveyors guard cover

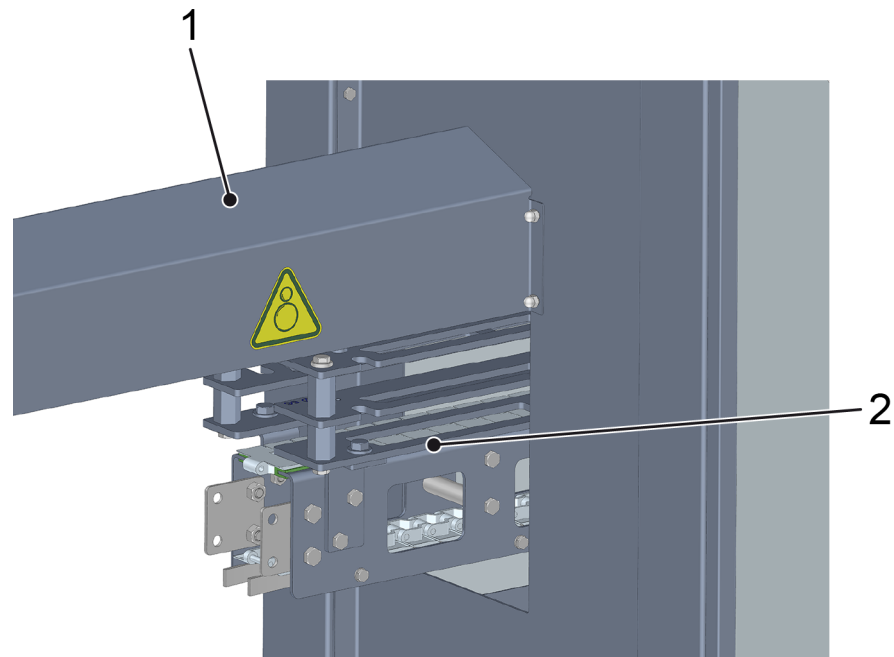


Figure 8: Guard cover

- 1 Guard cover
- 2 Infeed or outfeed conveyor

The guard cover on the machine paneling prevents operating personnel from interfering with the moving parts of the infeed and outfeed conveyors.

Location: The guard cover is located on the can infeed and can outfeed, see section *"Installation location of safety equipment"*.



2.8.6 Installation location of safety equipment

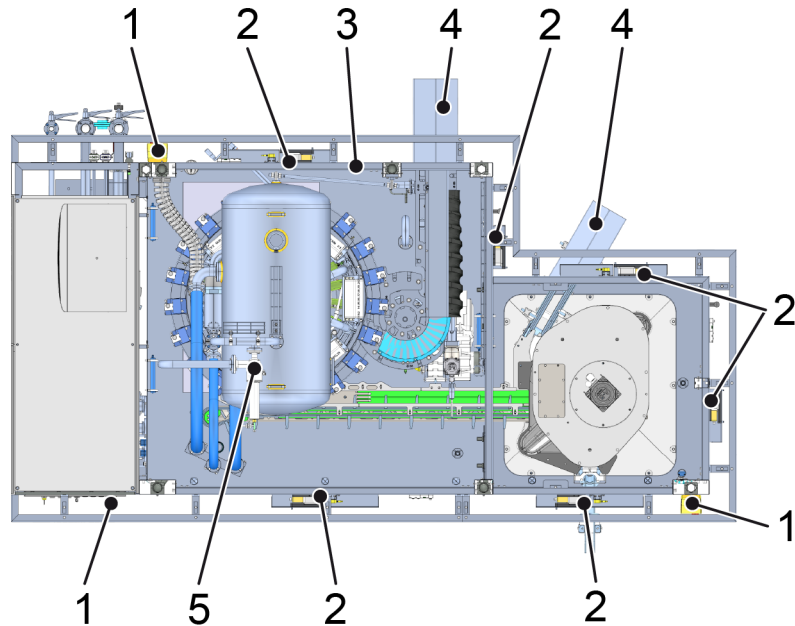


Figure 9: Safety equipment

- 1 Emergency stop switch
- 2 Door switch with locking mechanism
- 3 Machine paneling
- 4 Conveyors guard cover
- 5 Relief valve

2.8.7 Equipment for disconnecting and securing

2.8.7.1 Manual shut-off valves

Layout

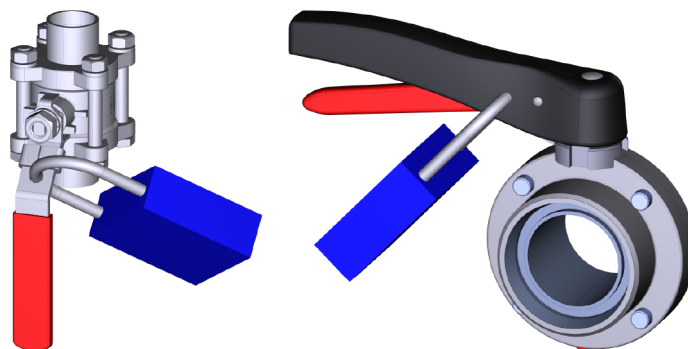


Figure 10: Examples: ball valve, disk valve

Function

Closing the manual shut-off valve protects personnel from the accidental feeding of media.



Closing the manual shut-off valve prevents the supply of media.

The lock secures the closed manual shut-off valve against being turned back on.

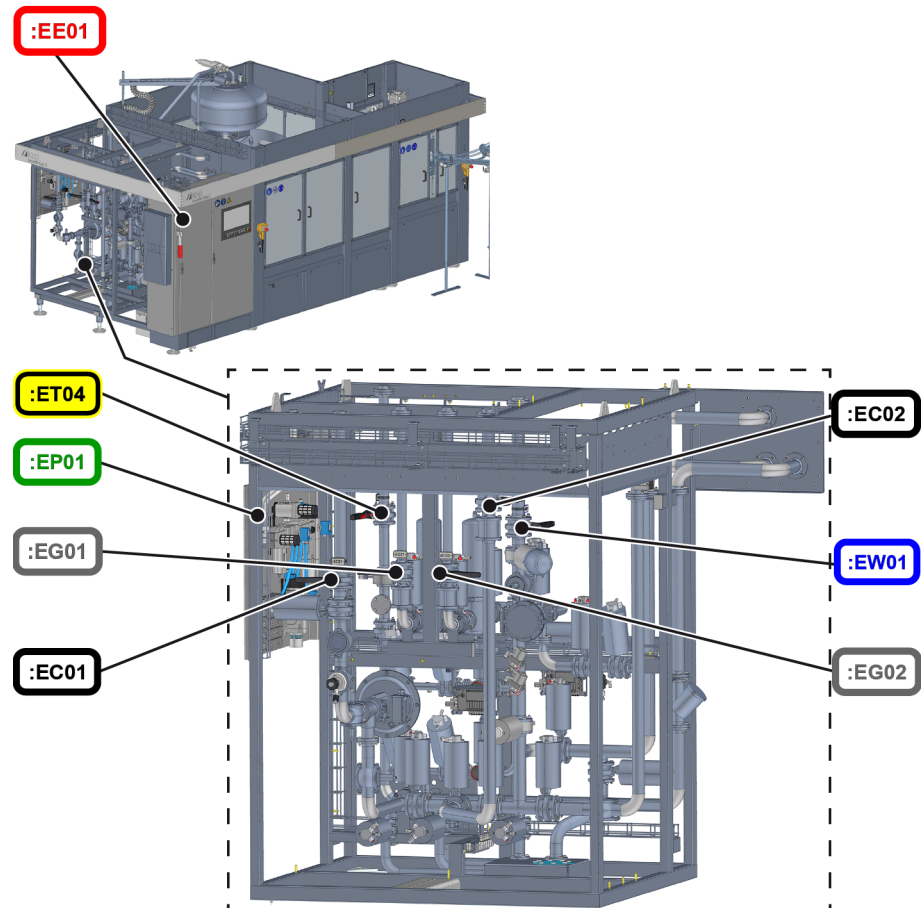


Figure 11: Shut-off elements on the machine

Installation location: The manual shut-off valves are located on the valve manifold and the switch cabinet.

2.9 Conduct in hazardous situations and in the event of an accident

Observe the following regulations in order to act properly and safely in hazardous situations and in the event of an accident:

- Local accident prevention regulations
- Local emergency regulations
- Local occupational safety regulations



Information about hazardous situations

Prior to working on the machine, review the following:

- What risks can arise from the machine?
- How can these risks be averted?
- What must personnel do in an emergency (e.g. shut down the machine, first-aid measures)?
- Where is the emergency equipment prescribed by local regulations (e.g. first-aid provisions, fire extinguisher)?
- What emergency facilities are provided and where are they (e.g. fire alarms, emergency escape routes)?

Procedure in the event of an accident

1. ➤ Shut down the machine.
2. ➤ Turn off the main switch on the switch cabinet and secure it with a padlock.
3. ➤ Initiate the first-aid measures set out in-house.
4. ➤ Report the accident to the responsible person.

2.10 Operating statuses and operating modes

The machine has various operating statuses and operating modes:

- De-energized machine
- Operating status **Off**
- Operating status **On**
 - Operating mode **Automatic**
 - Operating mode **Setup**
 - Operating mode **Teleservice**

The operating modes each provide different safety functions and permit work requiring interventions in hazardous areas.



NOTICE!

Changing the operating mode when the machine is running

Changing the operating mode when the machine is running will damage the motors and gears.

This may result in damage to the machine or to items in the surrounding area.

- Before changing the operating mode, stop production and wait until the machine comes to a standstill.



2.10.1 De-energized machine

The machine is disconnected from the power sources. Residual energy is discharged and the machine is secured against being restarted.

A description of how personnel should activate the machine is provided in chapter *“Servicing”*, section *“Disconnecting and securing”*.

Personnel: ■ Maintenance personnel

The machine is designed for the following activities:

- Routine maintenance
- Limited repairs

2.10.2 Operating status OFF

The control voltage is disconnected, the operating controls are shut down. No operating functions (jog, teach etc.) can be performed.

2.10.3 Operating status ON

The control voltage is switched on, the operating controls and operating functions are activated. Manually controlled operating functions can be carried out.

2.10.3.1 Automatic operating mode

The machine is connected to the power sources. The safety functions to prevent hazardous machine functions are fully functional.

A description of how to turn on **Automatic** mode is provided in the *“Operation”* chapter, *“Preparing for operation”* section.

Personnel: ■ Operating personnel
■ Maintenance personnel

The machine is designed for the following activities:

- Supply with operating materials
- Minor interventions to eliminate faults
- Minor maintenance activities



2.10.3.2 Setup operating mode

The machine can be operated using certain operating functions and is connected to the power sources. The safety functions to prevent hazardous machine functions are partially functional.

There is an increased risk of residual hazards.

A description of how to turn on **Setup** mode is provided in the “*Servicing*” chapter, “*Setup mode*” section.

Personnel: ■ Operating personnel
■ Maintenance personnel

The machine is designed for the following activities:

- Setup
- Maintenance work, see chapter “*Servicing*”, section “*Maintenance*”

2.10.3.3 Teleservice operating mode

The machine is connected to the power sources. All operating functions can be carried out. The safety functions to prevent hazardous machine functions are fully functional for each operating function.

Personnel: ■ Maintenance personnel with KHS personnel

The machine is designed for the following activities:

- Remote diagnostics and remote control for troubleshooting

2.11 Pressure tanks and pipelines

Pressure tanks are closed containers in which the internal pressure is higher than the ambient pressure. Pressure tanks have a fixed installation location and a specific function (e.g. storage, filtration, heat transfer). Pressure tanks are subject to the ASME Boiler and Pressure Vessel Code.

Pressure tanks are tested by companies that have been certified by the ASME. The testing is confirmed by the "U" approval stamp on the name plate for the pressure tank. The name plate with technical data is affixed to the pressurized container.

The pressure tanks of this machine are designed in accordance with Section VIII.Div.1, ASME Code dated Edition 2021 depending on the media used (product, detergents, gases).



There are various national regulations for pressure tanks worldwide.

The relevant national regulations and tests that apply for pressure tanks at the installation site in question must be observed.

**NOTICE!****Excessively high pressure**

The pressure vessel is designed to withstand a specific operating pressure. Exceeding the operating pressure can damage the pressure tank.

This may result in damage to the machine or to items in the surrounding area.

- Do not exceed the technical data indicated on the name plate.
- Introduce measures to reduce the pressure, such as shutting off and relieving pressure in the affected assemblies as appropriate.

**NOTICE!****Aggressive cleaning media**

Aggressive cleaning agents can corrode the pressure tank's materials.

This may result in damage to the machine or the surrounding area.

- Only use cleaning agents recommended in *"Technical data"*, *"Limit values for using detergents"*.

**WARNING!****Pressurized components**

The pressure tank and its components are under pressure during pre-production, production, and cleaning. When working on these components, there is a risk of components being released at high speed or media escaping at high pressure.

This could result in death or serious injury.

- Before starting work, depressurize and drain the pressure tank.
- This work may only be performed by personnel who are trained in working with pressure tanks and pressurized machines and who are familiar with the regulations that apply to operating pressure tanks.

**WARNING!****Safety equipment**

Risk of injury from inoperable or deactivated safety equipment.

Safety equipment is designed to protect operating personnel. However, this equipment can only perform its function if it is in proper working order.

This may result in severe or even fatal injuries.

- Do **not** remove, modify safety equipment, or take such equipment out of operation.
- Only start the machine if the safety devices have been properly fitted and are in full working order.
- Check safety devices on a regular basis.

The following pressure tank is installed: central bowl

2.12 Residual risks

In spite of structural and control-related measures, there may be residual risks even if the machine is used as intended.

The following section identifies residual risks that have been determined by KHS.

To reduce health risks and avoid dangerous situations, observe the safety instructions listed here, as well as the safety instructions in the other chapters of this manual.

Since 06/27/2018, lead (CAS no. 7439-92-1) has been on the SVHC (Substances of Very High Concern) candidate list under the REACH European regulation. Very small amounts of lead are present in the electrical and electronic components of this machinery. This lead will not be released if the machine is used for its intended purpose. The affected components have been coated with a finish or the lead is contained in an alloy. National regulations for the handling and disposal of lead and materials containing lead must be observed.

**WARNING!****Conveyor chain**

Fingers becoming caught in the conveyor

As soon as the machine starts turning, the chain moves from the infeed conveyor and the outfeed conveyor to the next transfer station.

This could result in death or serious injury.

- Maintain a safe distance.



WARNING!

Components that remain in motion

Risk of injury due to moving components. When the drive controllers are deactivated, they remain energized for up to 5 minutes. The drives and moving parts connected to them may remain in motion.

This could result in death or serious injury.

- Maintain a safe distance.
- Deactivate the drives and wait 5 minutes.
- Only then is it safe to reach into the machine.



WARNING!

Residual energy

Risk of injury due to electric shock at the switch cabinet. Residual energy can occur in the deactivated state.

This could result in death or serious injury.

- Observe a safety time of 5 seconds.



WARNING!

Hot surfaces

Risk of injury and burns due to hot surfaces of machine components and containers.

During production or cleaning, the machine may stop with the following states:

- filled with media
- pressurized
- with hot surfaces
- equipped with containers that are also pressurized and hot

Death or serious injury may result.

- Only enter the interior of the machine paneling with protective clothing.
- Wear protective clothing in the area of the valve manifold.



WARNING!

Burn hazard on the valve manifold

Pressurized and potentially hot fluids and gases cause injuries.

During work on the valve manifold, there is a possibility that it may still be filled with fluids or gas and be pressurized. There is also a risk that the above-mentioned components and media are hot.

This could lead to severe or even fatal injury.

- Wear protective clothing.
- Empty and depressurize the valve manifold.
- Wait until the surfaces have cooled down.



CAUTION!

Escaping media at the valve manifold

Danger of slipping on escaping media. Media may escape from pipelines at the valve manifold.

This could result in slight or minor injury.

- Wear protective clothing if working close to the valve manifold.



WARNING!

Persons within the machine paneling

Persons within the machine paneling may be crushed or trapped by moving components.

This could result in death or serious injury.

- Before starting the machine, ensure that there are no persons within the machine paneling.



3 Layout and function

This chapter describes the machine, the work stations, the control equipment, and signaling equipment.

3.1 Can filling machine

Type name

Innofill Can C

Can	Can
C	Compact

The machine is designed to fill cans with non-carbonated and ^{carbo-}nated-products.

The computer in the switch cabinet controls the filling process. A flow meter determines the filling volume in the can.

Layout

The following diagram shows an example of an Innofill Can C machine.

The layout of the machine may differ from the example in the diagram depending on the model.

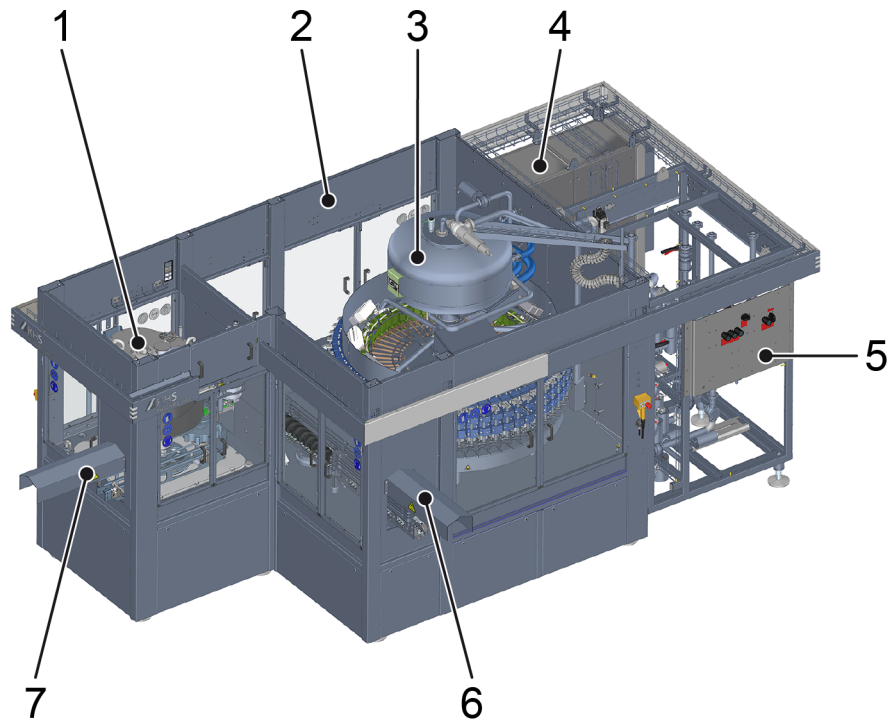


Figure 12: Innofill Can C (example)

- 1 Capper
- 2 Machine paneling
- 3 Filler
- 4 Switch cabinet
- 5 Valve manifold
- 6 Infeed conveyor
- 7 Outfeed conveyor

Function

The media (product, detergent, pressurization gas and return gas) are supplied to the ring bowl and central bowl via the supply lines and the rotary distributor.

The upper part of the filler carousel is height adjustable to make it possible to adjust the filling machine to the can size.

Empty cans are fed through the infeed screw and the infeed star via the infeed conveyor and positioned on the can table. In the infeed star a query is made as to whether a can is present. If a can is present the filling process starts and the can is filled. If no can is present the corresponding filling valve remains closed.

After the filling process the filled cans are discharged tangentially from the can table, fed to the sealer and sealed. The sealed cans are transferred to the outfeed conveyor.



3.1.1 Can flow

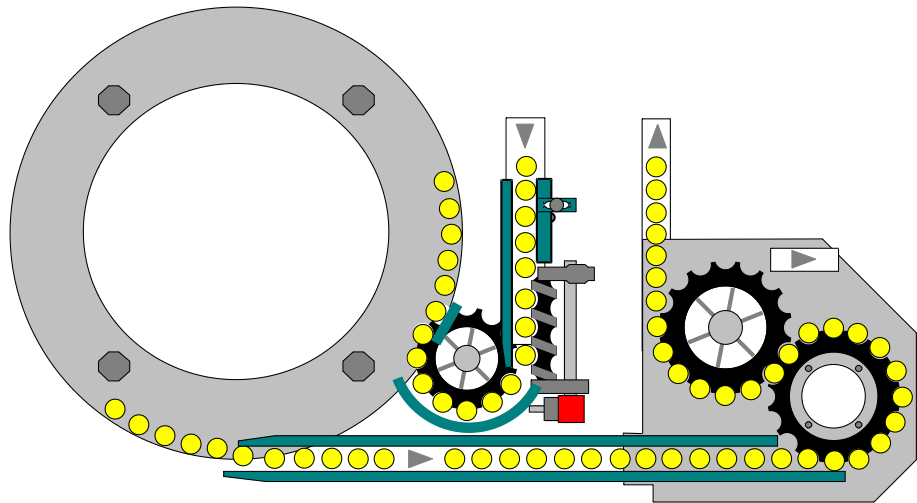


Figure 13: Can flow

The infeed screw separates the cans and transfers them to the filler via the infeed star.

The cam-controlled centering bell of the filling valve is then lowered onto the can and the can is filled according to the selected filling process.

Once the filling process is complete the centering bell is lifted to discharge the cans, which are then supplied to the can sealer via the conveyor chain.



3.1.2 Can conveyor

3.1.2.1 Can detector

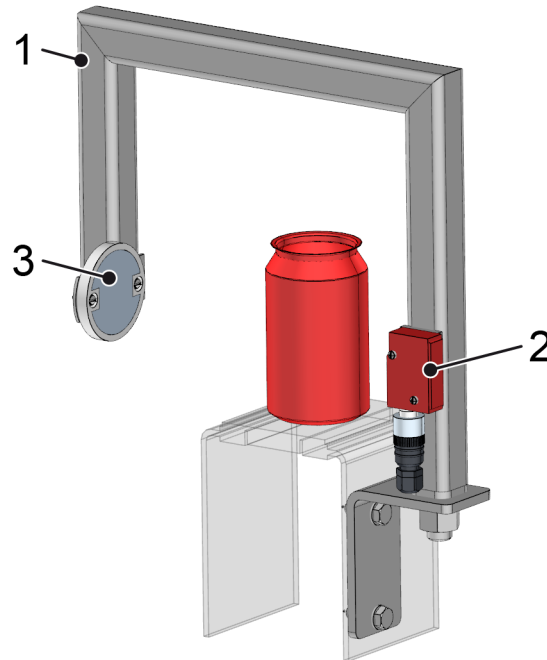


Figure 14: Can detector

- 1 Swivel arm
- 2 Transmitter
- 3 Reflector

A can detector is located on the infeed conveyor a few meters upstream of the infeed screw. The can detector consists of a light barrier with a transmitter and a reflector.

The can detector detects if no can is present (horizontal cans) and triggers a corresponding fault message on the operator console.

After eliminating the fault, it must be acknowledged on the can inlet operator console. This resets the fault message.



3.1.2.2 Can sensor

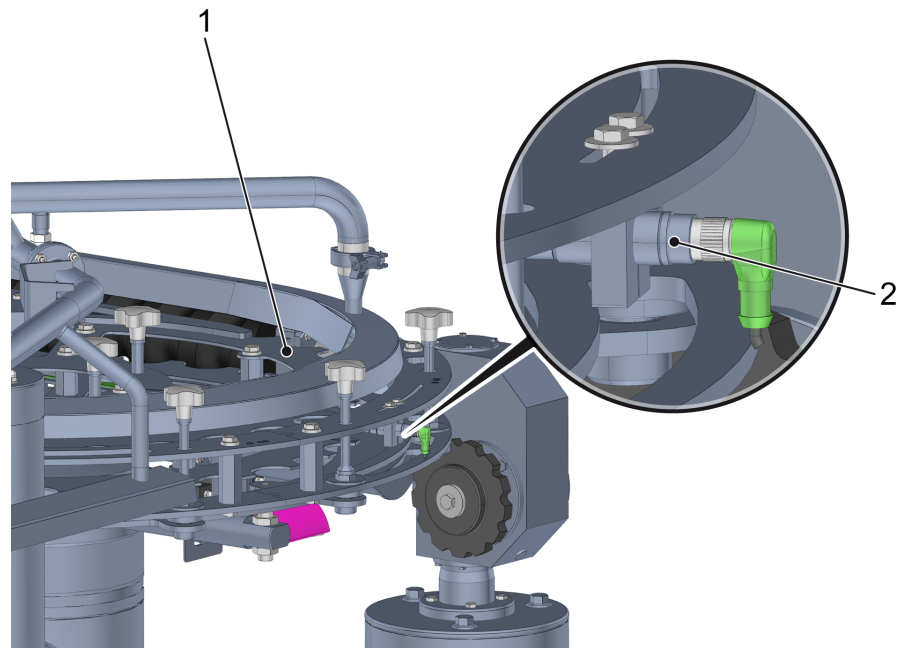


Figure 15: Can sensor

- 1 Infeed starwheel
- 2 Proximity switch

The can sensor is located in the area around the infeed star.

An inductive proximity switch is used to check whether there are any cans in the infeed star for the filler.

The position of the proximity switch must not be changed under any circumstances.

3.1.2.3 Can stopper

The can stopper is mounted upstream of the infeed screw in the can infeed and is used to interrupt the can flow as required.

The can flow can be stopped or released manually by switching the can flowgate on or off at the operator console for the machine.

The can flowgate is switched on automatically by the machine control system when one of the following conditions is met:

- Can shortage
- Can backup
- Lubricant shortage
- A gap is detected in the can flow
- Machine switched off

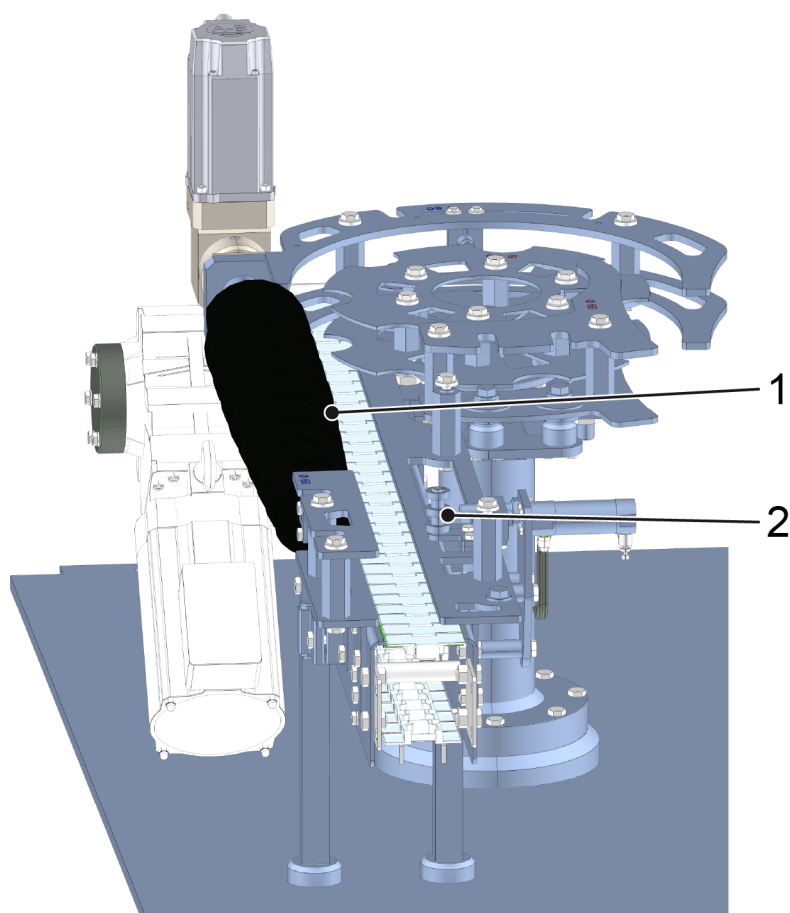


Figure 16: Can stopper in the can infeed

- 1 Feed screw
- 2 Can stopper

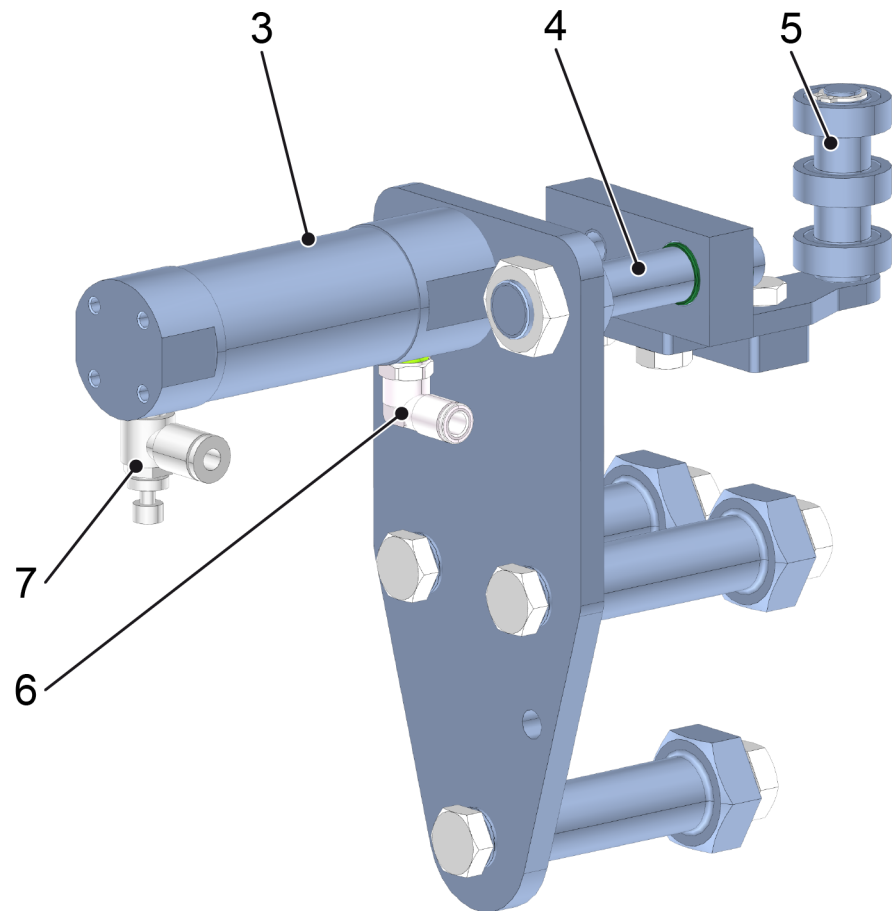


Figure 17: Detailed view of the can stopper

- 3 Pneumatic cylinder
- 4 Piston rod
- 5 Can stopper
- 6 Push-in fitting (compressed air connection)
- 7 One-way restrictor (compressed air connection)

When the can flowgate is switched on, the can stopper is controlled by the pneumatic cylinder in the can conveyor, stopping the can flow. For this process, compressed air is introduced into the pneumatic cylinder via the one-way restrictor. The air stream can be regulated by means of the slotted screw on the one-way restrictor. The air stream must be set so that the cans come to a stop but are not squashed.

The compressed air is supplied via the push-in fitting so that the piston rod moves back into the pneumatic cylinder. The can flow is released again.

3.1.3 Machine drive

The machine drive system comprises multiple servo drives. The machine control system synchronizes all servo drives with the servo drive of the can filling machine (synchronization of drives). The machine output speed entered at the operator console specifies the setpoint for the servo drives.



Filler drive

The servo drive on the base of the filler drives the rotating components on the filler base. Installation location of the servo drive: see chapter *“Design and operation”*, section *“Filler base”*.

Can guide star drive

The servo drive in the support of the can conveyor drives the can guide star.

Feed screw drive

The feed screw is driven by a separate servo motor.

Infeed conveyor drive

The infeed conveyor screw is driven by a separate servo motor.

Capper drive

The servo drive in the sealer base drives the rotating components on the sealer base. Servo drive installation location: see operating instructions for the sealer.

3.1.4 Valve manifold

The pressure reducers and valves integrated in the valve manifold control the supply and regulate the required pressures of the various media required for production and cleaning.

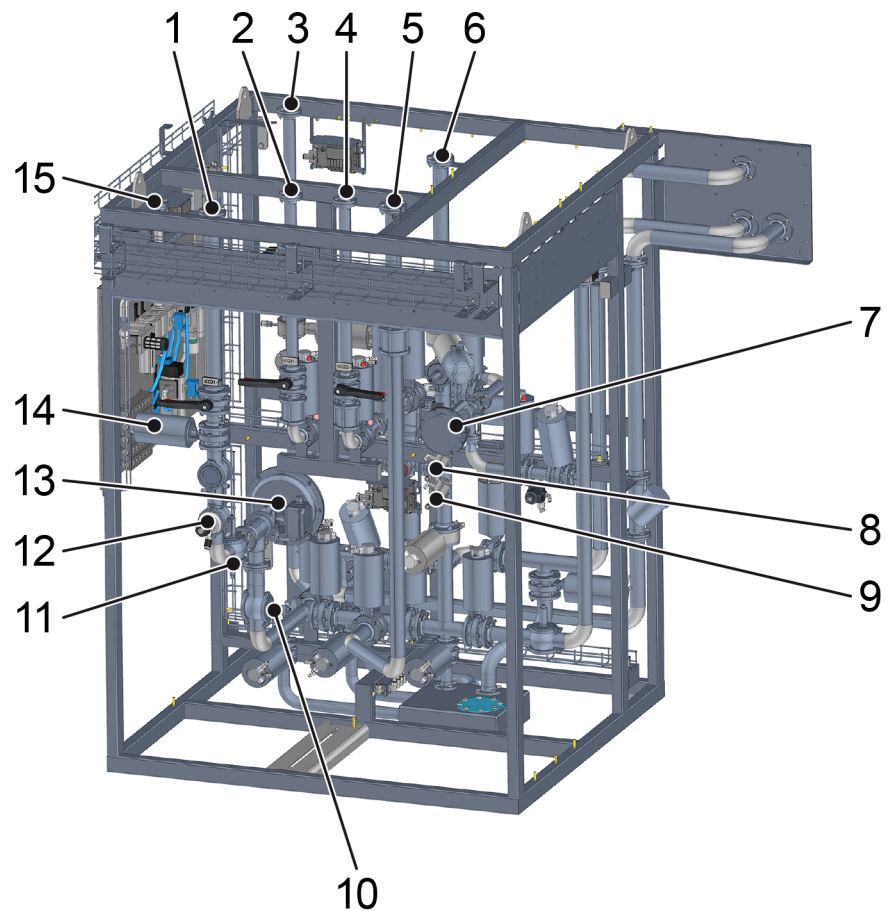


Figure 18: Front view of valve manifold

- 1 Product
- 2 CO₂
- 3 Hot water
- 4 Sterile air
- 5 CIP return feed
- 6 Water
- 7 Pressurization gas control valve
- 8 Water for can spraying
- 9 Bell spray
- 10 Pressure sensor
- 11 Temperature sensor
- 12 Sampling valve
- 13 Product control valve
- 14 Process valve
- 15 Control air

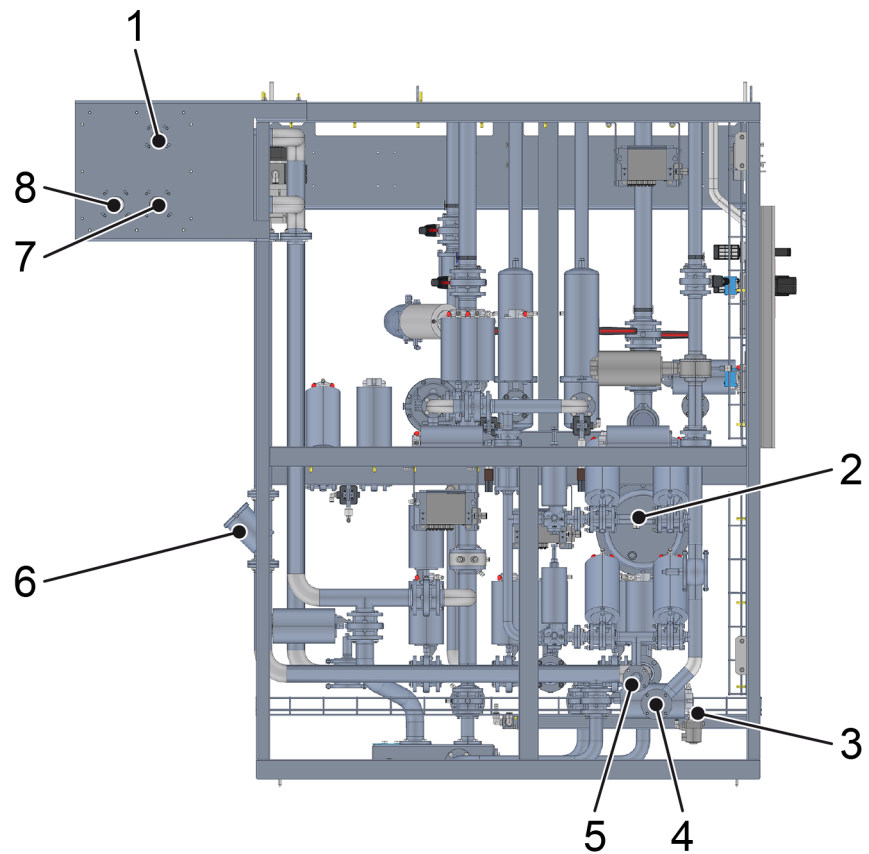


Figure 19: Rear view of valve manifold

- 1 CIP return
- 2 CO₂ bubble breaker
- 3 Air for can spraying
- 4 Hot water
- 5 CO₂ undercover gassing
- 6 Dirt collecting filter
- 7 Return gas/CIP return feed
- 8 Product/CIP primary feed

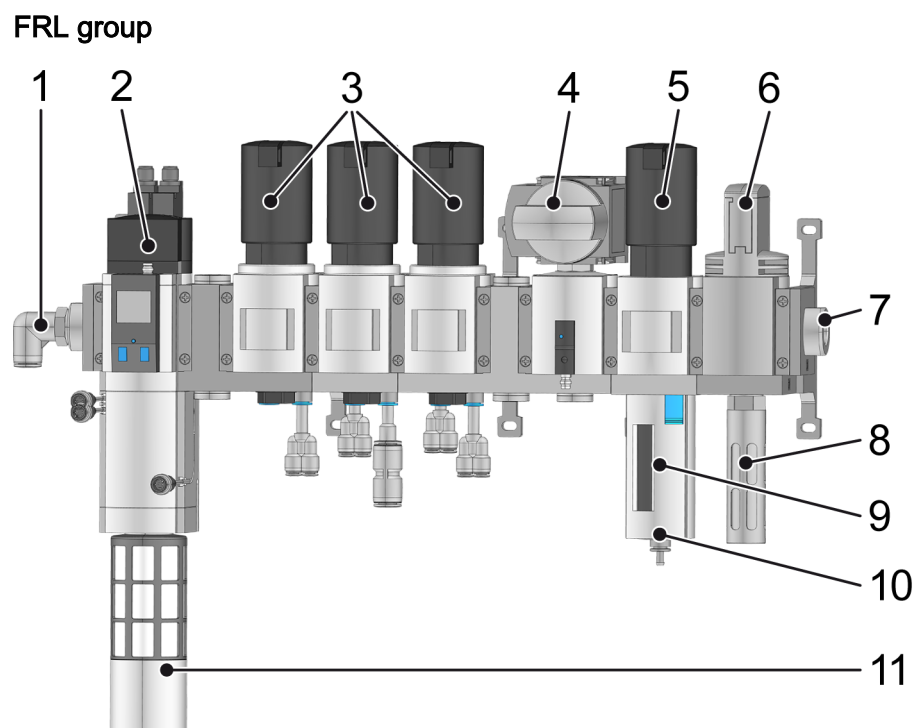


Figure 20: FRL group

- 1 To the air distributor for controlling the valves in the valve manifold
- 2 Relief valve for aerating and venting with inlet pressure monitoring
- 3 Pressure controller for various components
- 4 Air supply to the filler turret with separate shut-off valve
- 5 Pressure controller and filter with pressure gauge (indicates the main supply pressure)
- 6 Shut-off valve with locking mechanism
- 7 Control air connection
- 8 Silencer
- 9 Filter and separator
- 10 Manual condensate drain
- 11 Filter silencer on the relief valve with predetermined breakage point for venting

The FRL group supplies control air to the pneumatic assemblies. The specified air quality for the control air must be observed; see chapter *“Technical data”, section “Media requirements”*.

The filter filters dirt and the separator removes water and oil out of the control air. The condensation is drained manually at the filter.

When the pressure of the control air falls below 5.5 bar, the relief valve shuts off.

The filter silencer on the relief valve has a predetermined breakage point. The predetermined breakage point breaks when the pressure in the filter silencer is too great. The pressure becomes too great when the filter within the filter silencer is blocked. The filter silencer is a safety-related component and may be replaced only with a genuine filter silencer. See the *“purchased parts documentation”* for the FRL group.



Lockable manual shut-off valves for media separation

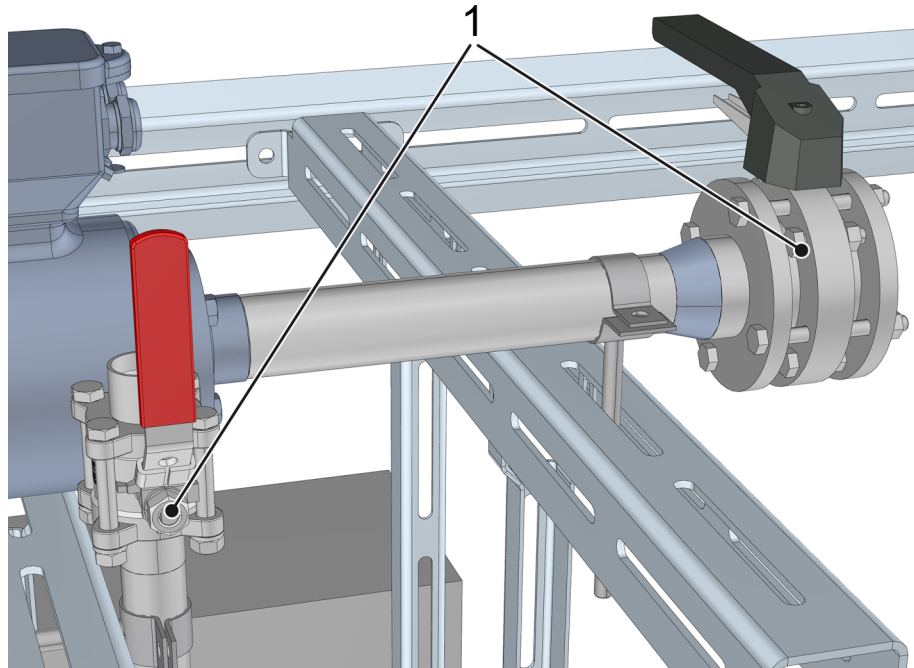


Figure 21: Lockable manual shut-off valves on valve manifold

1 Lockable manual shut-off valves

All valve manifold media connections are equipped with lockable manual shut-off valves. These can be secured with a lock against inadvertent activation; for example, for media separation and safety during maintenance and cleaning work.



Media feed

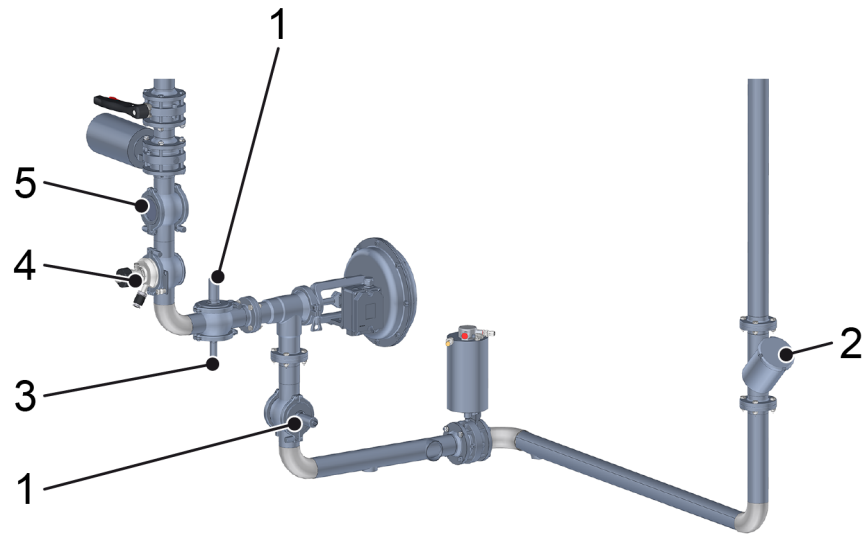


Figure 22: Media feed

- 1 Pressure sensors
- 2 Dirt collecting filter
- 3 Temperature sensor
- 4 Sampling valve
- 5 Inspection glass

The media feed contains a dirt collecting filter, pressure and temperature sensors, the inspection glass, and the sampling valve.

During the cleaning process, the machine control system automatically opens the sampling valve for a short time.



Sampling valve

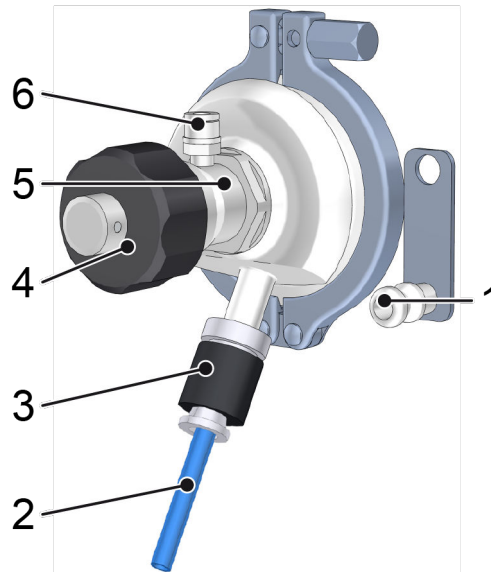


Figure 23: Sampling valve

- 1 Hose fitting
- 2 Hose
- 3 Outfeed
- 4 Handwheel
- 5 Pneumatic actuator
- 6 Pneumatic connection

The sampling valve is integrated into the automatic CIP cleaning process. For cleaning, the sampling valve is cycled and rinsed with detergent. A hose is attached to the outfeed of the sampling valve. This hose is used to route escaping media to the base in a controlled manner. The hose is removed solely to take a sample and is replaced by a suitable sampling attachment. The rest of the time, the hose remains connected to the outfeed.

A sample of the content of the pipeline can be taken using the sampling valve. To do so, remove the hose from the outfeed and attach it to the hose fitting. Place a suitable sampling attachment onto the sampling valve. Once the sample has been collected, reattach the hose to the sampling valve.



Pressure reducer for pre-pressurization gas

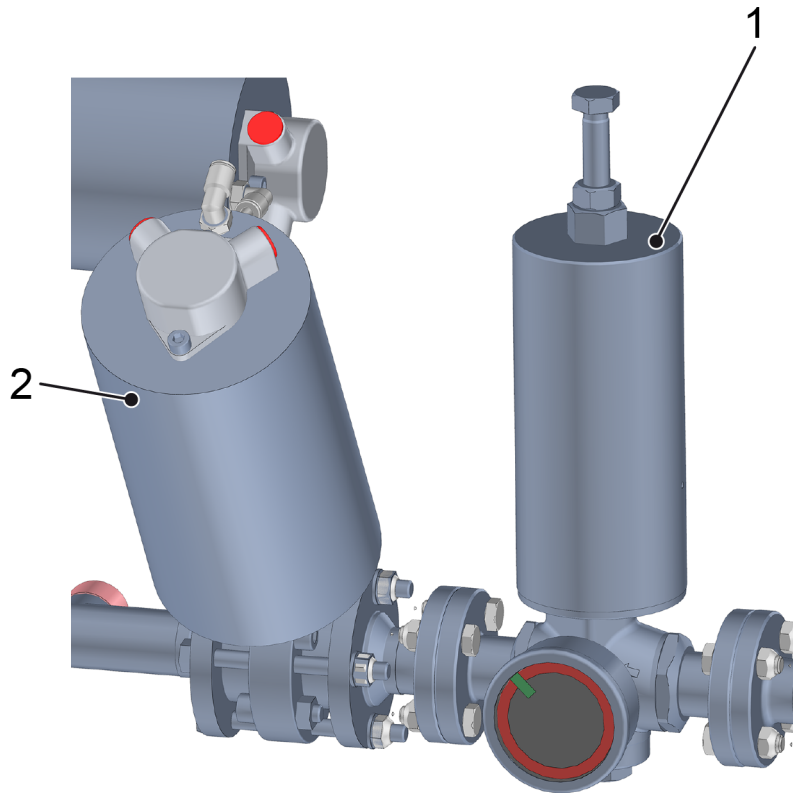


Figure 24: Pressure reducer for pre-pressurization gas

- 1 Pressure reducer
- 2 Process valve

The pressure reducer reduces the pre-pressurization gas provided by the operator to the permitted operating pressure. For details of the correct pressure setting, see chapter *“Technical data”*, section *“Settings”*.



Filter for pre-pressurization gas

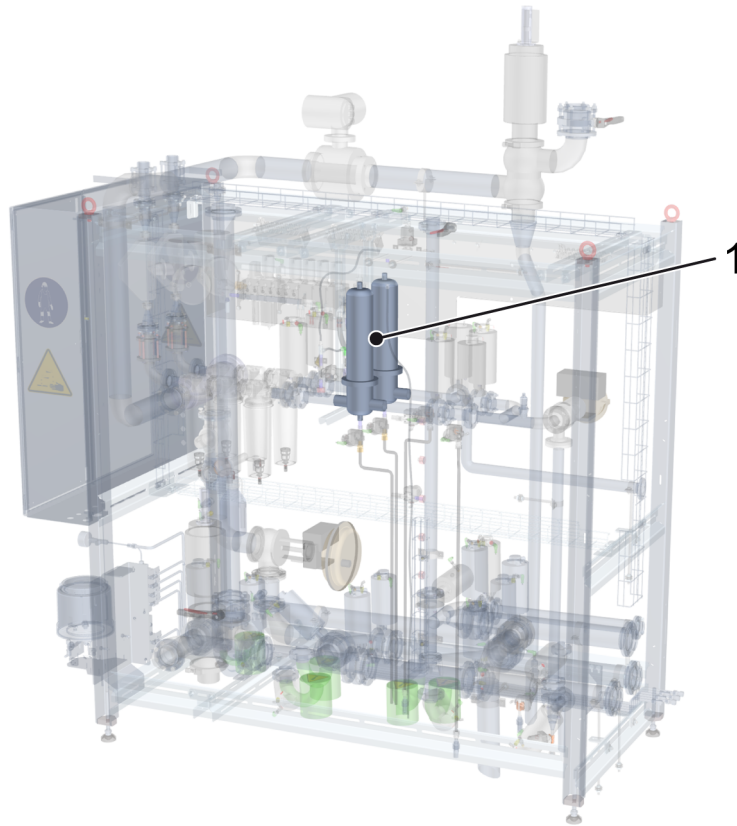


Figure 25: Valve manifold

1 Filter cartridges in the filter housing

The incoming pre-pressurization gas is filtered by the filter cartridges.



The pre-pressurization gas must match the media requirements and the settings in chapter "Technical specifications".

3.1.4.1 Feed line

Various media and gases are conducted through a feed line from the valve manifold through a rotary leadthrough to the filler turret and back to the valve manifold.



3.1.5 Filler base

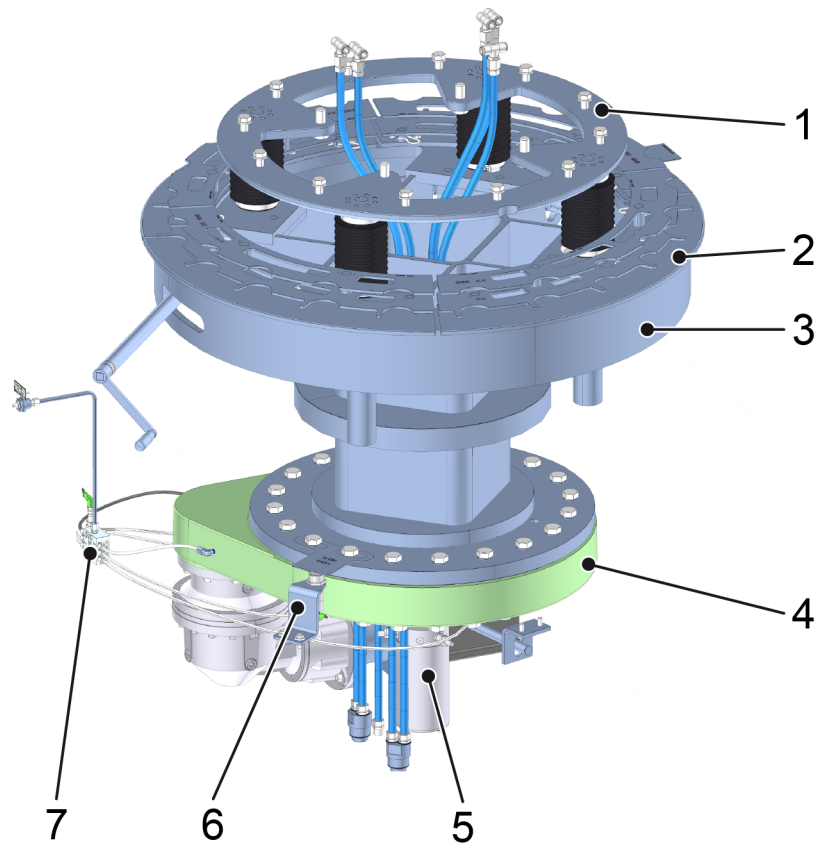


Figure 26: Filler base

- 1 Height adjustment
- 2 Can plate
- 3 Can table
- 4 Drive
- 5 Electrical power distributor
- 6 Synchronous cycle sensor
- 7 Central lubrication system

Synchronization switch

The synchronization switch is used to synchronize the filling computer and is operated once per filler rotation.

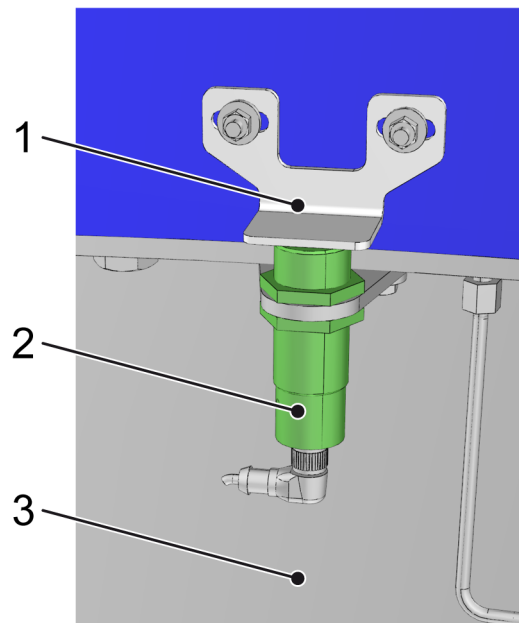


Figure 27: Synchronization switch

- 1 Switching flag
- 2 Proximity switch
- 3 Base ring

The synchronization switch consists of a proximity switch and a switching flag.

The proximity switch is attached to the static base ring of the filler base. The switching flag is located on the rotating part of the filler base.



3.1.5.1 Electrical power distributor with air supply

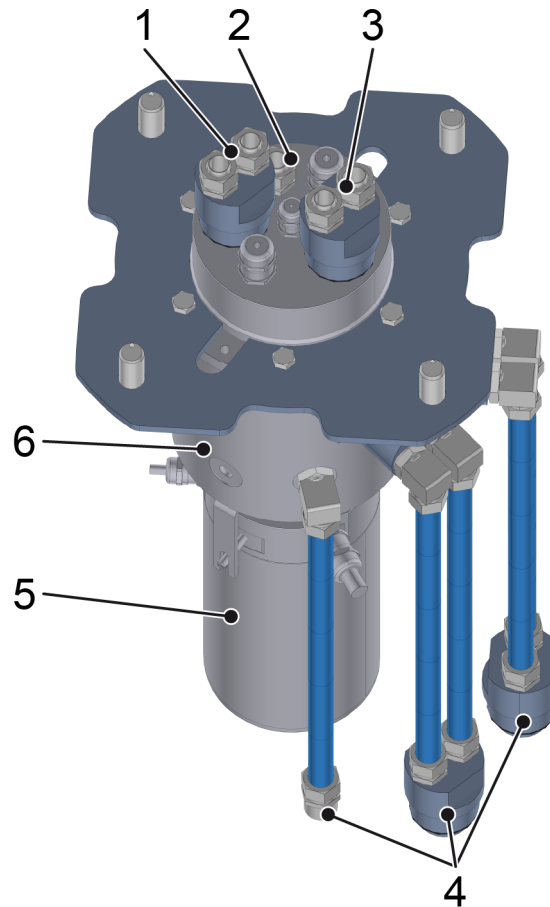


Figure 28: Electrical power distributor with air supply

- 1 Pneumatic actuation P2
- 2 Pneumatic actuation P3
- 3 Pneumatic actuation P1
- 4 Control air to the FRL group
- 5 Distributor for electrical power and control signals
- 6 Control air distributor

The distributors transfer and distribute electrical power, control signals and control air from the stationary part of the filler to the rotating part of the filler.

Pneumatic control of the upper part of the filler is divided into three circuits:

- P1 supplies the valve clusters KH1 to KH...
- P2 supplies the valve clusters KH80 to KH...
- P3 is used to empty the annular channels of the distributor ring.



For information on maintaining the distributor, see the manufacturer's instructions in the "Purchased parts documentation".



3.1.6 Filler turret

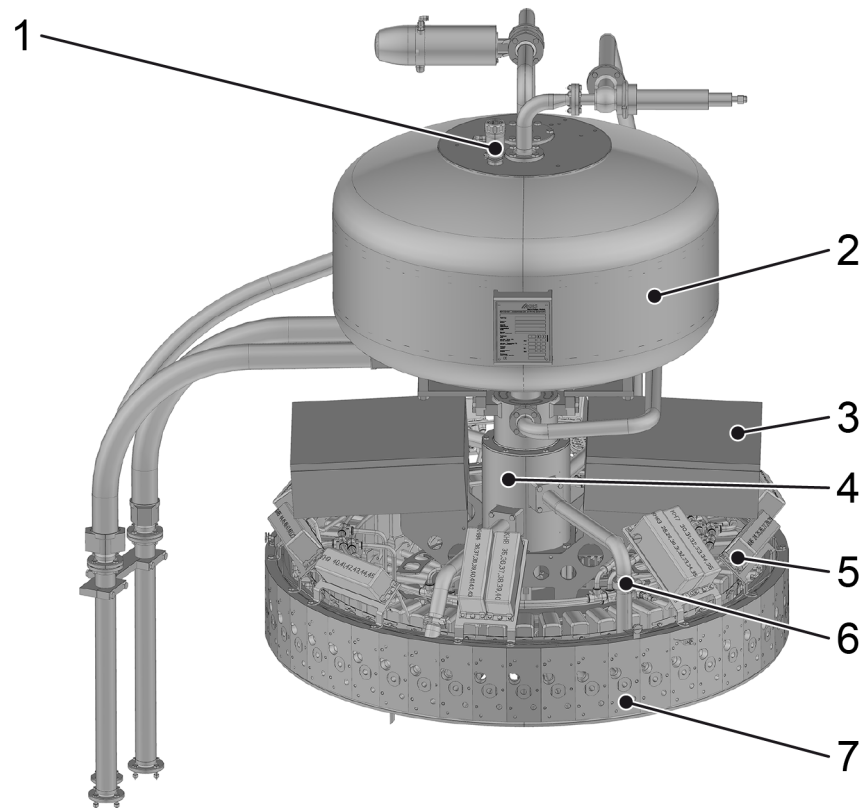


Figure 29: Filler turret

- 1 Level measurement probe
- 2 Central bowl for product and pressurization gas
- 3 Terminal box for electrical components
- 4 Rotary distributor
- 5 Valve strips for filling valve control
- 6 Pipeline for distribution of pressurization gas
- 7 Distributor ring for product, pressurization gas and return gas



3.1.6.1 Height adjustment

Layout

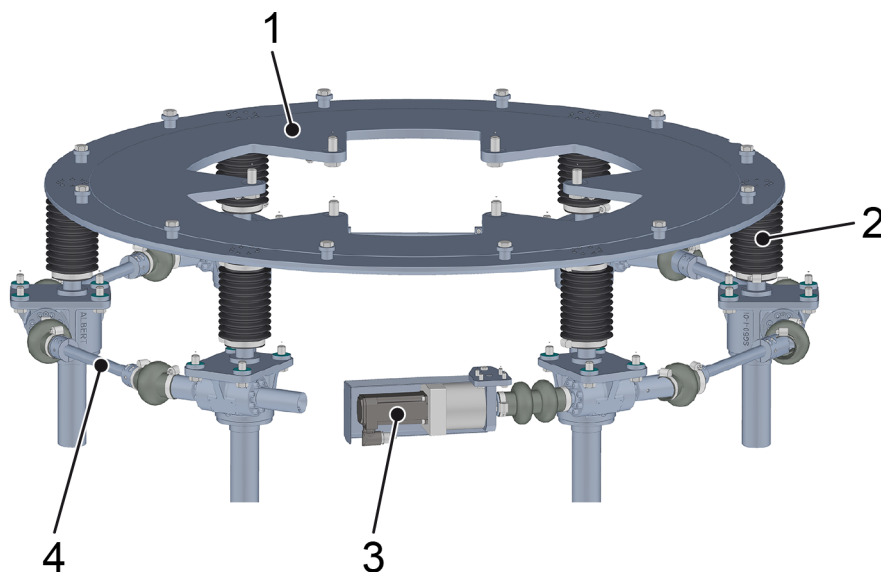


Figure 30: Height adjustment components

- 1 Plate
- 2 Spindle
- 3 Motor
- 4 Joint shaft

Function

The height adjustment is used to set the height of the filler turret in line with the cans to be filled.

The motor rotates the joint shafts.

The joint shafts transfer the movement to the spindles.

The spindles move the filler turret upwards or downwards, depending on the direction they are turned.



3.1.6.2 Rotary distributor

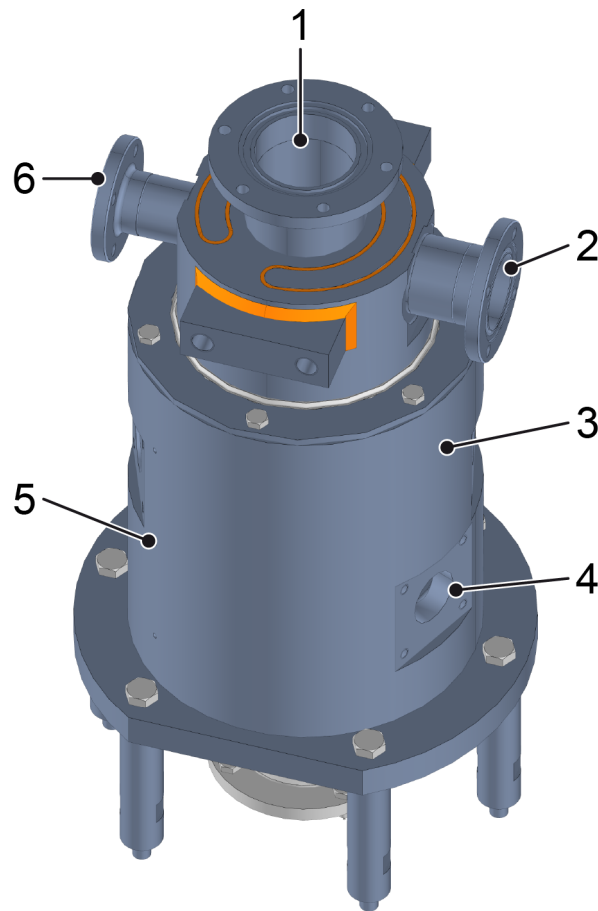


Figure 31: Rotary distributor

- 1 Product connection
- 2 Connection for purge gas/return gas/pressure relief
- 3 Rotating outer cylinder
- 4 Lines to filler turret
- 5 Snifting hole
- 6 CO₂ connection

The rotary distributor distributes the media from the stationary part to the rotating part of the filler. The outer cylinder rotates on ball bearings over the inner cylinder. There are seals between the ball bearings and the media discharge holes. These seals prevent media from leaking out and keep foreign substances out of the holes. Pressure relief holes are located between the seals. They conduct media out and away if the seals are damaged.

The media is supplied and discharged via the supply line. During the height adjustment procedure, the supply line moves through the rotary joint.



3.1.6.3 Central bowl

The central bowl has two functions, product distribution and level maintenance.

The media required for production and cleaning are distributed to the filling valves via the central bowl and distributor ring. The rotary distributor feeds the media out of the central bowl and into the distributor ring via pipelines.

With the level maintenance in the central bowl, the filling speed of the filling valves and therefore the filling accuracy is affected.

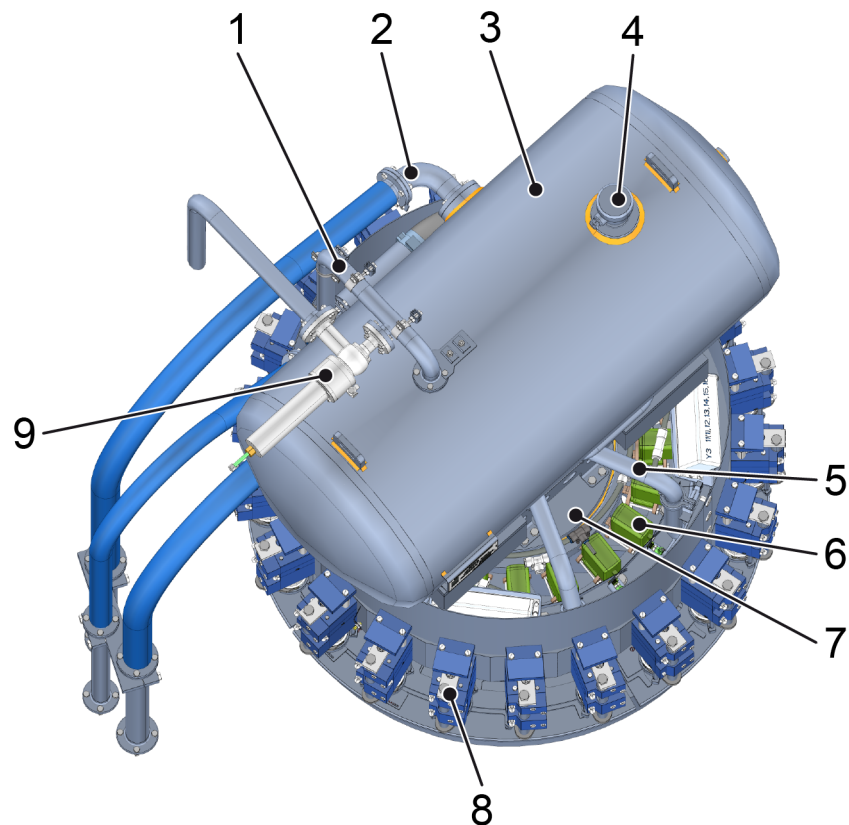


Figure 32: Central bowl

- 1 CO₂ connection
- 2 Product connection
- 3 Central bowl
- 4 Probe for measuring the product level in the central bowl
- 5 Line between the central bowl and distributor ring
- 6 Flow meter
- 7 Rotary distributor
- 8 Filling valve
- 9 Safety valve to relieve overpressure in the central bowl

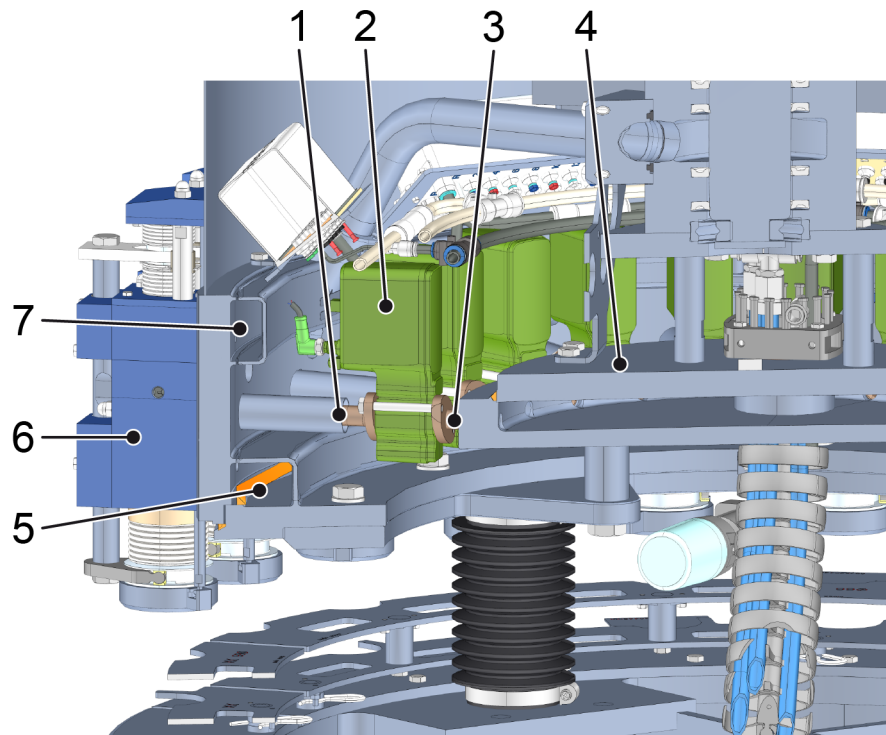


Figure 33: Cross-section of distributor ring with gas channels

- 1 Pipeline between the flow meter and the filling valve
- 2 Flow meter
- 3 Pipeline between the rotary distributor and the flow meter
- 4 Rotary distributor
- 5 Purge gas and relief channel in the distributor ring
- 6 Filling valve
- 7 Pressurization gas channel in the distributor ring

The product is supplied to the filling valves via the pipelines and flow meter.

The pressurization gas is located in the pressurization gas channel and is supplied to the filling valves from there.

Gas displaced from the can is fed to the purge gas channel and the pressure relief channel.

The interaction between the gas channels in the distributor ring during the filling process is described in the *“Layout and function”* chapter, in the *“Process”* section.

3.1.6.4 Product valve flow meter

A flow meter is installed in the corresponding connection line between the central bowl and the distributor ring for each filler valve. The flow meter is used to accurately measure the filling volume per container.

The filling volume for the containers is set on the operator console and constitutes the specified value for the flow meter. The filling process is terminated once the filling volume measured by the flow meter reaches the specified value.

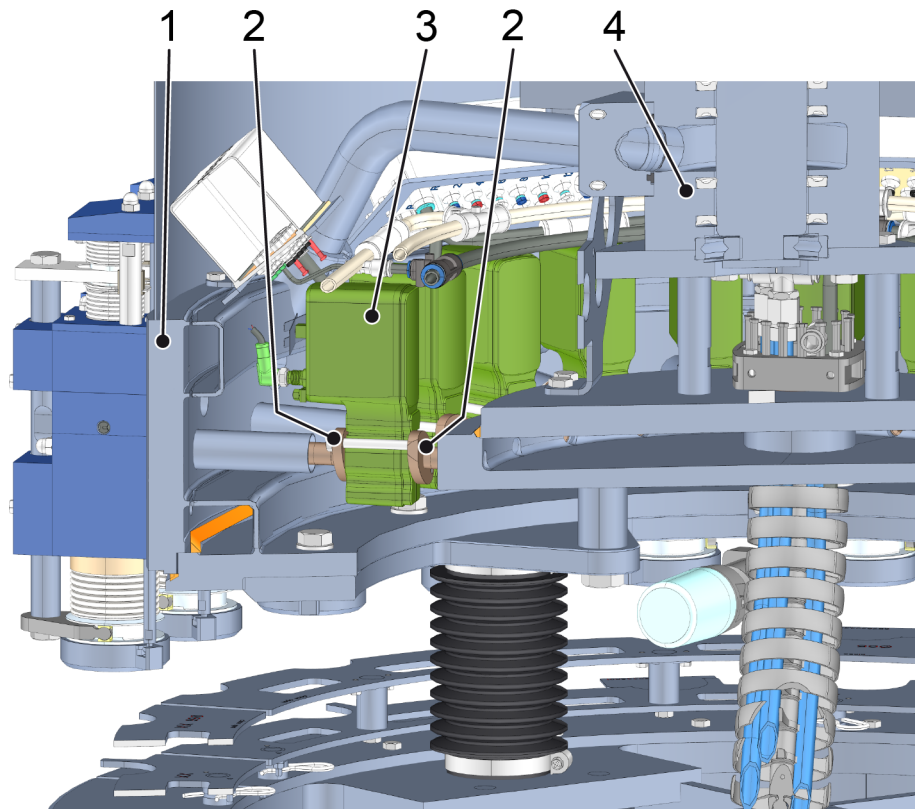


Figure 34: Flow meter in the connection line between the central bowl and the distributor ring

- 1 Distributor ring
- 2 Mounting flange
- 3 Flow meter
- 4 Rotary distributor

To protect the flow meter, there are three inspection holes on each mounting flange, i.e. a total of six inspection holes per flow meter.



NOTICE!

If the seal between the flow meter and the flanges is defective, liquid or gas will escape from the inspection hole.

The seal must then be replaced immediately (see: chapter “Servicing”, section “Repairs”).

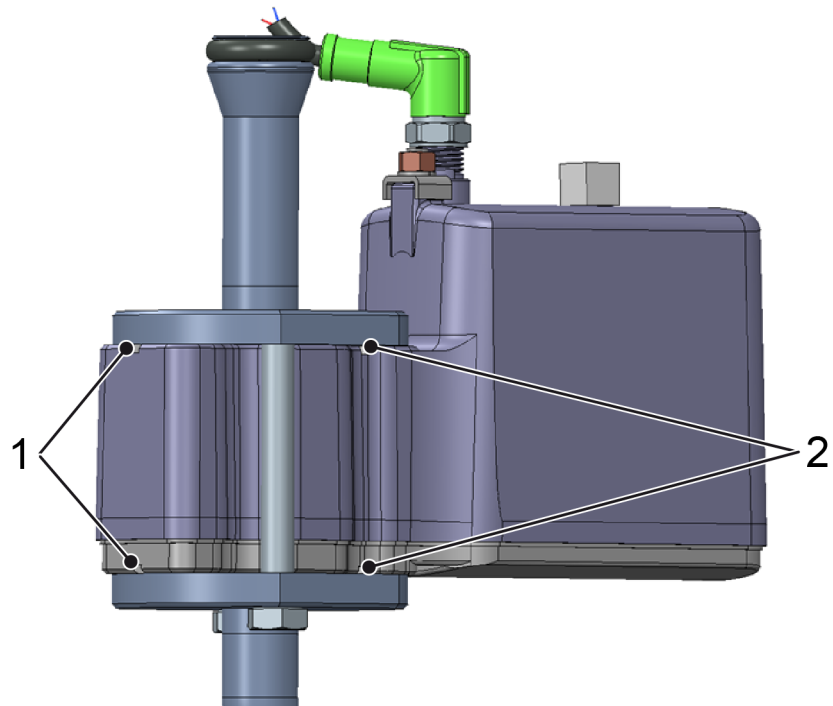


Figure 35: Inspection holes on the flow meter

- 1 Upper and lower inspection hole
- 2 Side inspection holes



For information on how the flow meter works, the measuring principle, maintenance, and fault elimination, see the description of the flow meter in the "Purchased parts documentation".



3.1.6.5 Filling valve

Layout

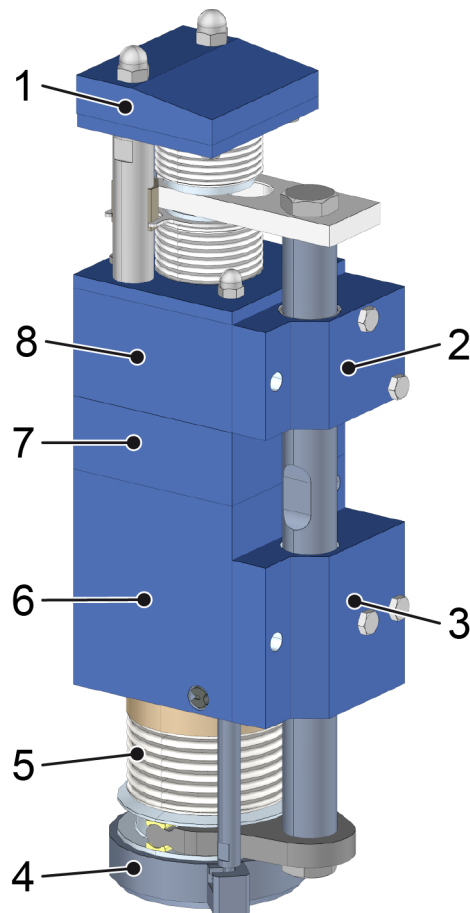


Figure 36: Filling valve

- 1 Head plate
- 2 Cylinder housing with pressurization gas cylinder and pressure relief cylinder
- 3 Cylinder housing with CO₂ rinsing cylinders
- 4 Centering bell
- 5 Bellows
- 6 Valve housing
- 7 Upper part of valve
- 8 Valve cover with product cylinder

Function

The filling valve has several functions:

- Rinsing the cans with purge gas
- Pre-pressurizing the cans to the filling pressure
- Filling the cans with the respective product

Before filling oxygen-sensitive drinks, the cans are rinsed with pressurization gas media (CO₂, N₂) in order to displace the oxygen in the air. The drinks are then pre-pressurized to the filling pressure.



It is not necessary to carry out the rinsing step when filling drinks that are not sensitive to oxygen. The cans be pre-pressurized using the pressurization gas medium (CO₂, N₂, compressed air that is suitable for foodstuffs) straight away.

The centering bell fixes the cans in place and seals them from the gas in the atmosphere.

The product cylinder, purge gas cylinder, pressurization gas cylinder and pressure relief cylinder are designed as diaphragm valves. The diaphragm valves open or close the gas or product supply to the cans.

The diaphragm of the diaphragm valves is located in a separating chamber with a ventilation hole.

Leakage protection

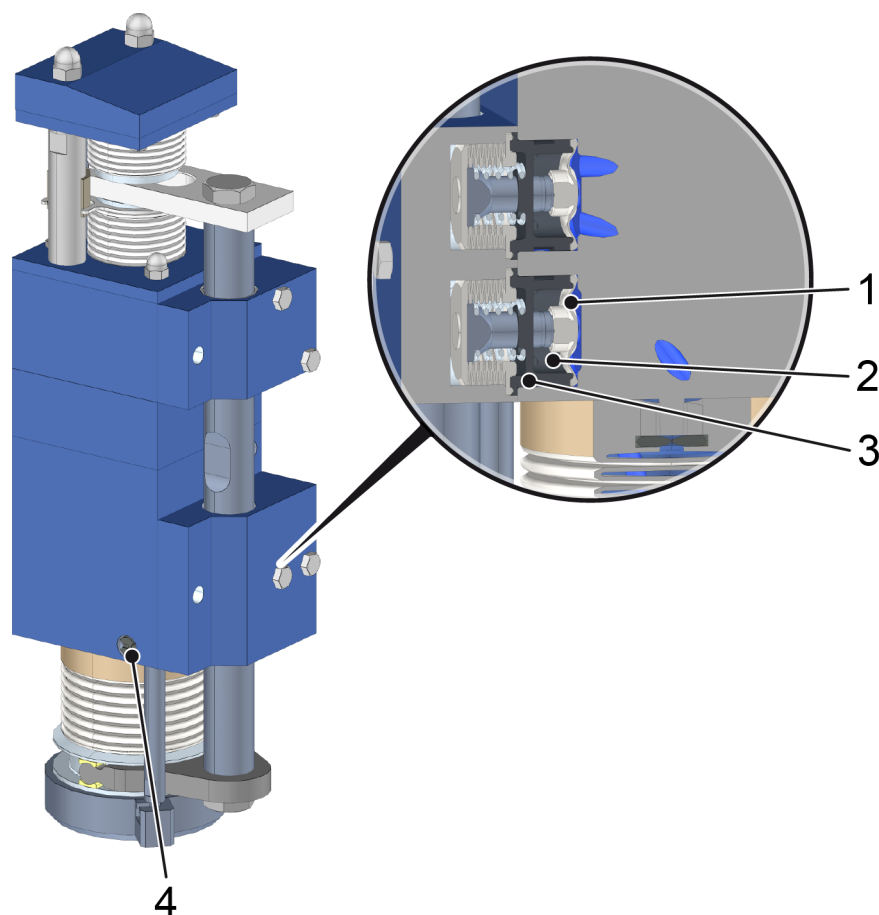


Figure 37: Leakage protection

- 1 Product membrane
- 2 Leakage space
- 3 Compressed air control membrane
- 4 Leakage hole with ventilation plug

The filling valve has a leakage hole with ventilation plug, which is used to detect if the membrane has broken.



If a medium or gas is escaping from a ventilation hole, the product membrane or the compressed air control membrane is damaged.

The damage must be remedied immediately to prevent contaminants and substances that are not suitable for foodstuffs entering the medium; see chapter *"Servicing"*, section *"Repairs"*.

3.1.6.5.1 Machine functions of the filling valves

The gas and media passages in the filling valve are opened or closed in various processing steps during pre-production, production and cleaning. The machine functions for the filling valves alert the machine control system when the gas and media passages are to be opened and closed for the corresponding processing steps.

The machine functions of the filling valves can be selected on the operator console. The machine control system activates the machine functions automatically for machines equipped with an automatic valve manifold.

Operating mode	Description
Pre-pressurization	The cans are filled with gas.
Filling	The cans are filled with product.
CIP/rinsing	Cleaning of the product passage in the filling valve. The filling valves are sealed with rinsing plates or rinsing caps during cleaning.
Rinsing into the open	The media passage in the filling valve is rinsed with product or water to remove detergent residues.
Draining	The filling valves open in bursts to drain the ring bowl and the valve manifold.
Blow-drying	Sterile air is blown into the product passage.
Interim rinsing	Rinse the return gas and snifting channel into the open.
Lifting the bells	Lift the centering bells of the filling valves.

3.1.7 Bubble breaker

The bubble breaker breaks the foam bubbles in the product after filling. Gas is used to break them. The gas is provided via the filling machine's valve manifold. The gases used are CO₂ and N₂.



3.1.8 Undercover gassing

The oxygen in the air is displaced from the head room between the product and the upper edge of the can via undercover gassing. To do so, gas is blown in. The gas is provided via the filling machine's valve manifold. The gases used are CO₂ and N₂.

3.1.9 Can sealer

The can sealer seals the filled cans.

The electrical safety equipment of the sealer is integrated into the filler control system and includes the emergency stop switch, door locks, and jog mode.

Separate manufacturer's documentation is available for the sealer.

3.2 Cleaning equipment and sprays

3.2.1 Filling valve spray

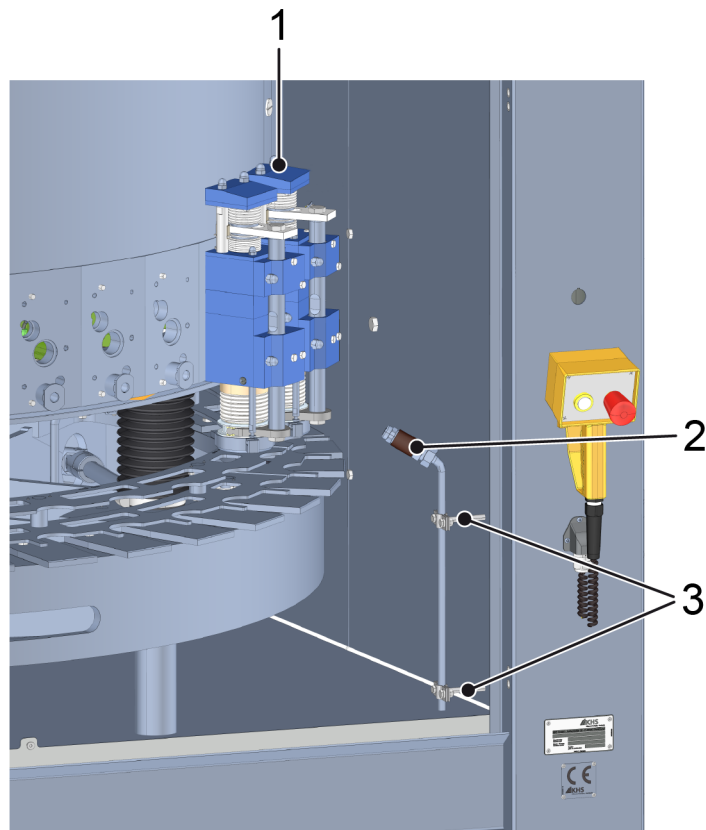


Figure 38: Filling valve spray

- 1 Filling valve
- 2 Spray head
- 3 Bracket



The filling valve spray is secured to the machine paneling with two brackets.

As soon as the filler is rotating without cans, the filling valve is sprayed with water by a spray head. The volume of water in the filling valve spray must be set at the valve manifold.

The water is supplied via a connection at the valve manifold.

3.2.2 Can shower

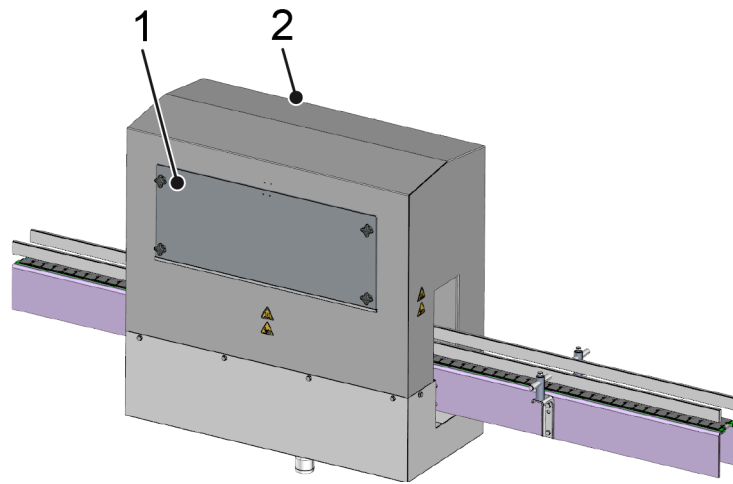


Figure 39: Can shower with cover hood

- 1 Pane
- 2 Cover hood

The can shower cleans product residue from the filled cans after they have been seamed.

The can shower is located under a cover hood. The shower can be observed through the viewing pane.

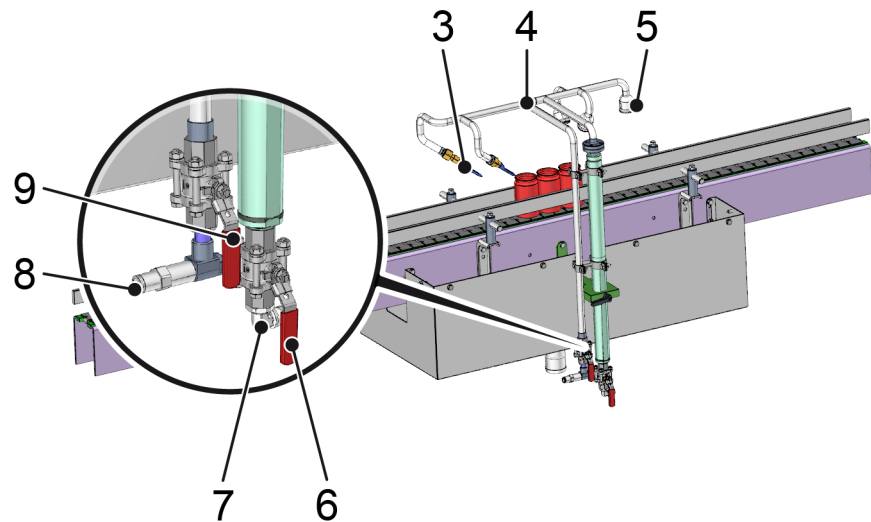


Figure 40: Can shower without cover hood

- 3 Nozzles for air
- 4 Nozzle holder
- 5 Water nozzles
- 6 Manual shut-off valve for water line
- 7 Water supply
- 8 Air connection
- 9 Manual shut-off valve for air line

Two connections supply the can shower with cold water and air respectively. When the first can has entered the filler, valves on the valve manifold automatically open the water and air supplies with a time delay. When the last can has been transported into the filler, the water supply and air supply valves close with a time delay.

The quantities of water and air are set using manual shut-off valves. Nozzles spray the cans with water while other nozzles blow off the residual water on the lid and in the collecting tray.



The viewing pane must have been installed during production!



When changing the machine over to a different can type, the height of the nozzle holders must be readjusted (see chapter "Setup", section "Changeover of the can shower").



The can shower is not suitable for operation with hot water over 60°C or for integration in the automatic CIP cleaning process for the filler or the system. Cleaning must be carried out manually using suitable equipment and methods.



3.3 Signaling equipment

The machine is equipped with the following signaling equipment:

- Signal lamp
- Signal horn

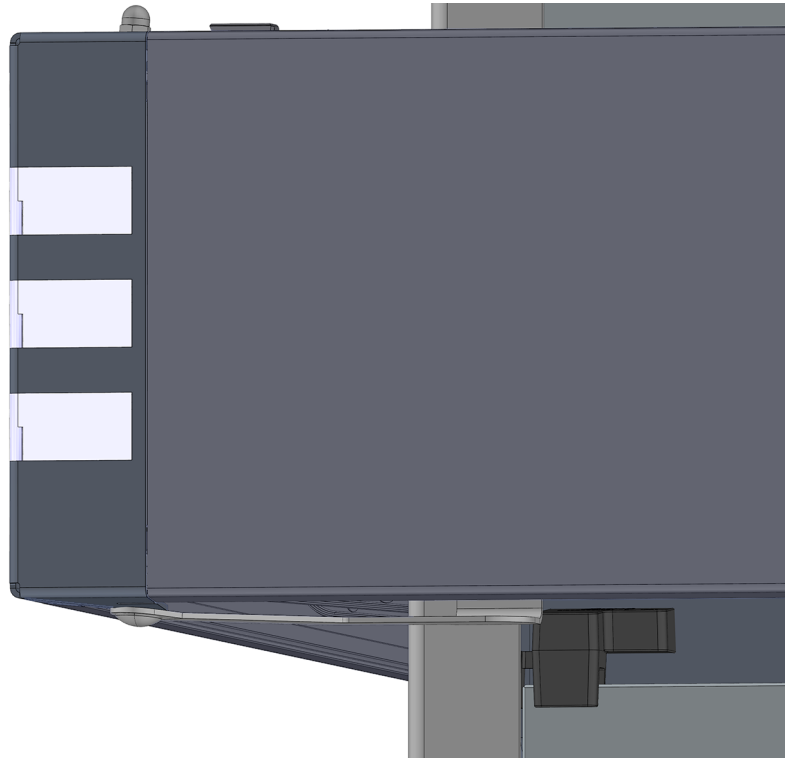


Figure 41: Signal lamp



Figure 42: Signal horn



3.4 Operator console

The machine can be monitored and controlled using the operator console.

3.4.1 Operator side

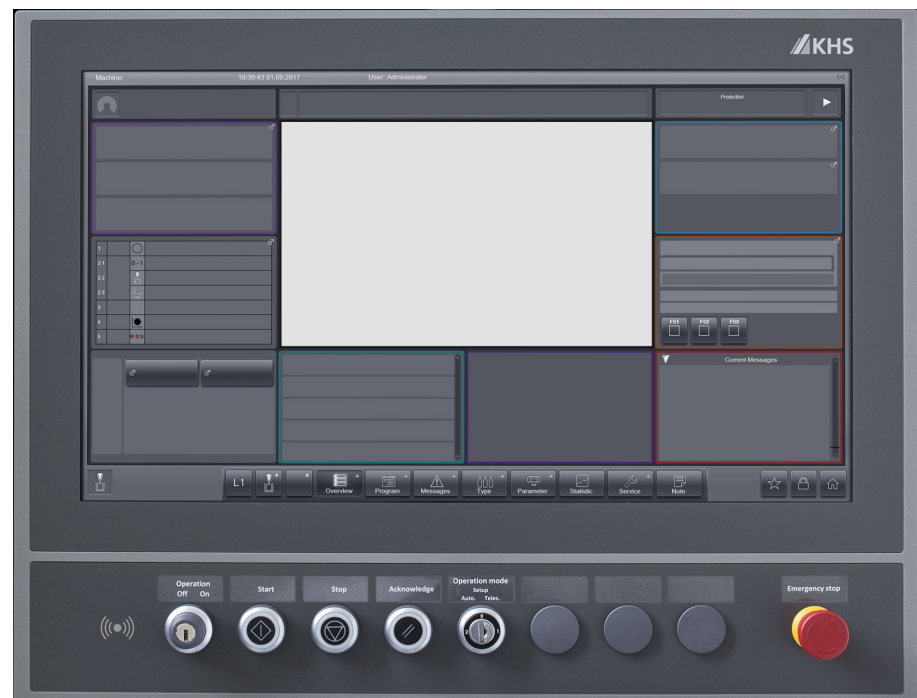


Figure 43: Example of an operator console

The operator console has a screen for the graphical user interface and includes a range of operating controls.

The operating controls on the operator console are (from left to right):

-  RFID card reader
-  *[Operation]* key switch
-  *[Start]* illuminated pushbutton
-  *[Stop]* illuminated pushbutton
-  *[Acknowledge]* illuminated pushbutton
-  *[Reserve]* key switch
-  *[Paneling]* illuminated selector switch
-  Two reserve positions
-  *[Emergency stop]* switch

Function

The screen is a capacitive multi-touchscreen; it displays the graphical user interface of the control program. The screen is switched on using the main switch.



A capacitive multi-touchscreen only reacts to conductive input devices, e.g. fingers. The screen does not react to gloves, pens or fingernails.

For further details of the layout, function and operation of the graphical user interface, see section “*Graphical user interface*”.

The operating controls below the screen have the following meanings:

Operating control	Type	Meaning
 [Operation]	Key switch with two settings	Switches the control voltage on and off: ■ [On]: switches on the control voltage. The operating status display is enabled in the graphical user interface. ■ [Off]: switches off the control voltage, the machine is shut down. The operating status display is disabled in the graphical user interface.
 [Start]	Illuminated pushbutton	Starts the machine.
 [Stop]	Illuminated pushbutton	Stops the machine.
 [Acknowledge]	Illuminated pushbutton	Acknowledges a message.
 [Reserve]	Key switch, three settings	Not assigned.
	Illuminated selector switch with three settings	Confirms or opens door lock
	Reserve	Not assigned.
	Reserve	Not assigned.
	Emergency stop switch	Stops the machine.



 and  are illuminated pushbuttons and have the following meanings:

Button	No light	Flashing	Steady light
	Machine not running.	Press button to start machine. Not all components of the machine are activated.	Machine is running.
	Machine is running without fault.	A fault has occurred. The appropriate message is displayed in the status bar on the screen. Press button to reset message.	

3.4.2 Rear side

Function

The industrial PC, on which the graphical user interface runs, can either be installed in the switch cabinet or at the rear of the operator console. The user can insert the USB stick into the USB connection and can then save screenshots, for example, or other data to it.

3.5 Graphical user interface

This section describes the functions of the graphical user interface that are enabled for the predefined user role of operator.



3.5.1 Main window

The main window is visible when the screen is on.

The main window is divided into several sections. This figure shows the sections that are always visible.

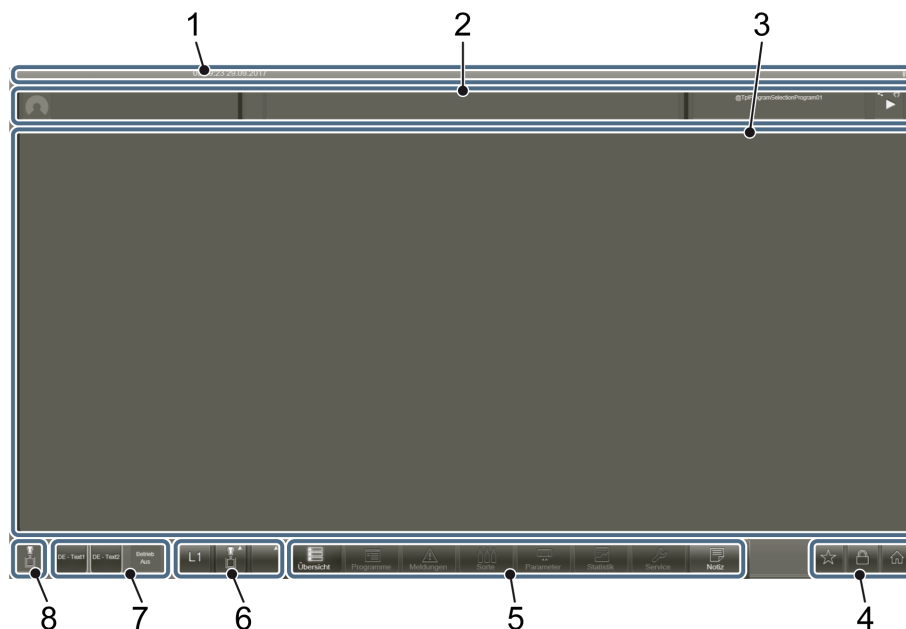


Figure 44: Window sections in the main window

- 1 Title bar
- 2 Status bar
- 3 Work area
- 4 Icon bar
- 5 Menu bar
- 6 Navigation
- 7 Machine functions
- 8 Machine symbol

3.5.1.1 Title bar

The title bar contains assignment information. From left to right, the title bar displays:

- Name of the program controlled via the main panel
- Current date and time
- Name of the person logged in
- Symbol for the RFID connection

3.5.1.2 Status bar

The status bar shows the status of the machine.



Figure 45: Status bar

The status bar is split into the following areas (from left to right):

- Display of service interval
- Message area for error messages
- Displays current program and type
- Machine status

Messages

When a fault occurs or action is required at a machine, a message is displayed in the status bar. In addition, the machine symbol is outlined in the color corresponding to the message type.

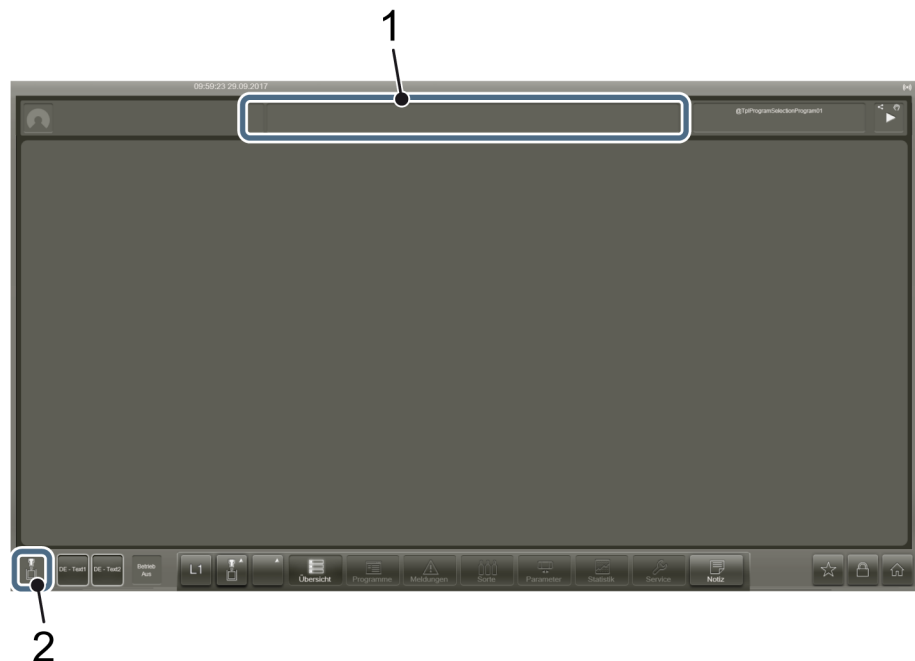


Figure 46: Message areas in the main window

- 1 Machine-specific output fields
- 2 Machine symbol

A message has the following components, from left to right:

- Identifying color
- Code letter
- Message number
- Message text

Example

"F0001 control cabinet overvoltage protection"

The identifying color and identifying letter indicate the message type:



Identifying color	Code letter	Message type
Red	C	Critical fault
Blue	F	Faults
Yellow	W	Warning
White	I	Information

The message number and message text state the message cause.

The message area in the status bar is split into two:



Figure 47: Message area

- On the left, shortened to the color symbol, all error message types with their number, sorted according to priority. If the user taps this field, the “Current messages” view opens.
- The message text of the first critical message is on the right. When the user taps this field, a dialog opens containing detailed information for the message.

The user cannot start the machine without having first resolved the cause of the message and acknowledged the message.

Responding to messages

Personnel: ■ Operating personnel

1. ➤ Identify the message based on the message number in chapter “Fault”.
2. ➤ Correct the cause of the message as described there.
3. ➤ If the  button is flashing on the operator console, press the button to acknowledge the message.

Machine status

The machine status displays both the operating status and the operating mode.

Operating status

Icon	Meaning
	Machine is running.
	Machine not running.



Icon	Meaning
	Production stopped.
	Transition between two statuses

Operating mode

Icon	Meaning
	Automatic mode
	Semi-automatic mode
	Setup mode
	Teleservice

Machine status dialog

The “*Machine status*” dialog opens when the user taps the output field for the machine status on the status bar. The “*Machine status*” dialog shows the status of the machine in a different way.

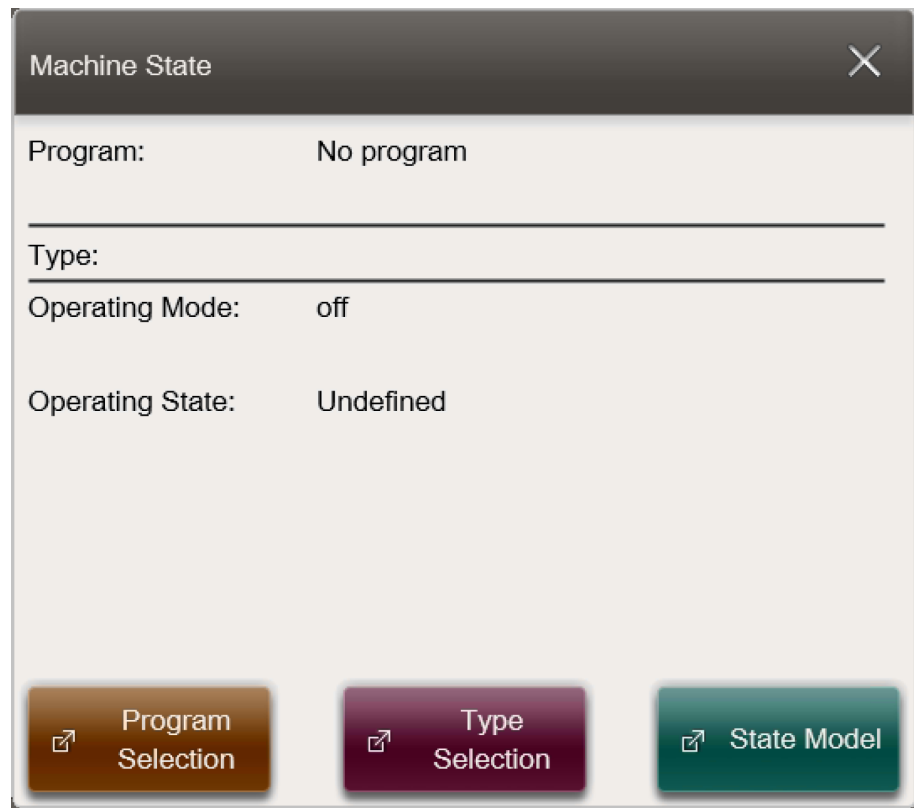


Figure 48: Machine status dialog

From top to bottom, the dialog displays the following information:

- *“Program”*: program currently running
- *“Type”*: type currently being used for production
- *“Operating mode”*: current operating mode
- *“Operating status”*: current machine status

The buttons at the bottom in the dialog have the following meanings:

Actions

Button	Meaning
<i>“Program selection”</i>	Opens the <i>“Program selection”</i> view.
<i>“Type selection”</i>	Opens the <i>“Type selection”</i> view.
<i>“Status model”</i>	Opens the <i>“State model”</i> view.

3.5.1.3 Work area

In the work area, there are different types of content:

- Dashboard
- Individual views
- Assistants (several views in sequence)



Dashboard

The dashboard fills out the entire work area and contains all the important information about the machine. The user has an overview of the current machine status and can quickly navigate to key views.

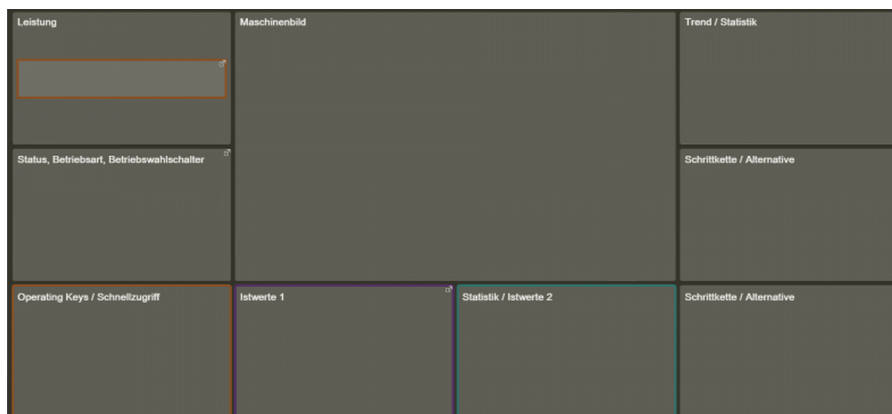


Figure 49: Dashboard

The center of the dashboard contains an image of the machine supplying the displayed values. Overviews of particular machine parameters are arranged all around it.



The user can open the linked view directly using .

Views

A view will open on the dashboard showing detailed information and settings for the line, machine or component selected.



Figure 50: View

Each view has a name displayed in the top left. The line, machine or component to which the view applies is displayed underneath the name.

Scrolling and browsing



If there is more information than fits in the visible area, there are two options for distributing the information:

- The information is distributed across multiple pages and the operator can scroll through the pages of the view. The arrows for scrolling to the next/previous page are at the top of the view.
- The information is all on one page, and the operator can scroll up and down the view. The scroll bar represented on the right illustrates that the view contains information that is not visible. The user moves the visible area using fingers. The scroll bar itself has no function.



Figure 51: Moving the visible area of a view

- 1 Arrow for returning to the previous page
- 2 Arrow for advancing to the next page
- 3 X to close the view
- 4 Scroll bar indicated

With touchscreen control

The visible area of a view can be moved by touching the screen, similar to mobile end devices. The touchscreen moves are as follows:

Move	Meaning
	Moves the visible area up and down or side to side.
	Enlarges the visible area.



Move	Meaning
	Selects an option in a view.

Moving and scaling

Some views have additional buttons for moving the visible area.

Button	Meaning
	Zoom in
	Zoom out
	Zoom in incrementally
	Zoom out incrementally
	Move visible area upwards
	Move visible area downwards
	Move visible area to the left
	Move visible area to the right

Wizard

A wizard guides the operator through a defined handling sequence step by step, enabling the user to perform a complex task in a single process. The user opens a wizard in the same way as a view.

A wizard usually consists of several views that the user processes in sequence. The number of views of a wizard and the position of the current view in the sequence is indicated in the title bar.

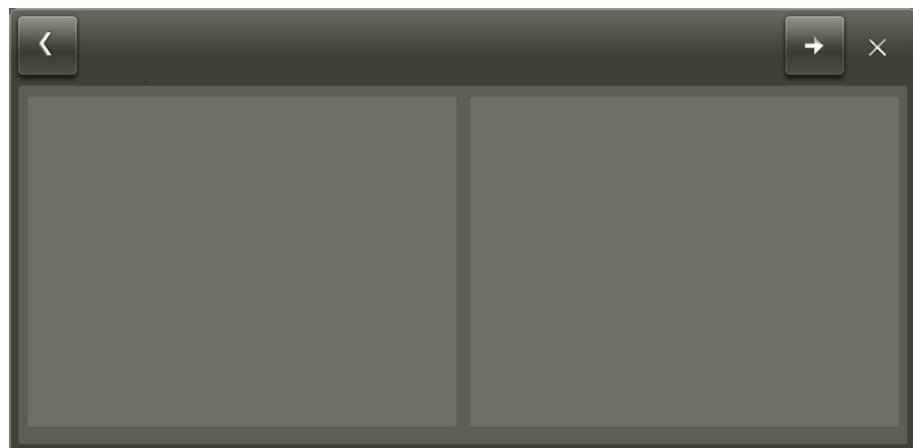


Figure 52: Wizard

The following data is indicated in the title bar of the view on the left:

- Name of the wizard
- Position of the current view in the sequence
- Name of the current view



The user alternates to the next view of the wizard with .

The final view of the wizard contains buttons to apply or discard the settings made by the user in the course of the wizard.



A wizard is not defined for every machine.



3.5.1.4 Icon bar

The icon bar provides fast access to frequently used functions. Not all functions are always available.



Figure 53: Icon bar

Button	Description	Meaning
	Favorites	Opens the <i>"Favorites"</i> dialog, see section entitled <i>"Favorites"</i> .
	Login or logout	Opens the <i>"User login"</i> dialog, see section <i>"Logging in and logging out"</i> . If a user is already logged in, the <i>"User information"</i> dialogue opens and displays information about the person who is logged in.
	Main menu	Opens the main menu, see section <i>"Main menu."</i>



3.5.1.5 Menu bar

The menu bar contains several menus in one line.



Figure 54: Menu bar

The menus group commands into the following groups:

Icon	Description	Meaning
	Overview	Overview of the selected unit
	Programs	Select and adapt a program
	Messages	Information on messages
	Type	Settings and information on types
	Parameters	Check and set parameters
	Statistics	Request statistical data
	Service	Maintenance and service functions
	Note	Information on the selected unit



Opening a view

Personnel: ■ Operating personnel

1. Tap the corresponding button in the menu bar.

⇒ If there is only one command in this menu, that view opens immediately.

If there are multiple commands, the menu opens.

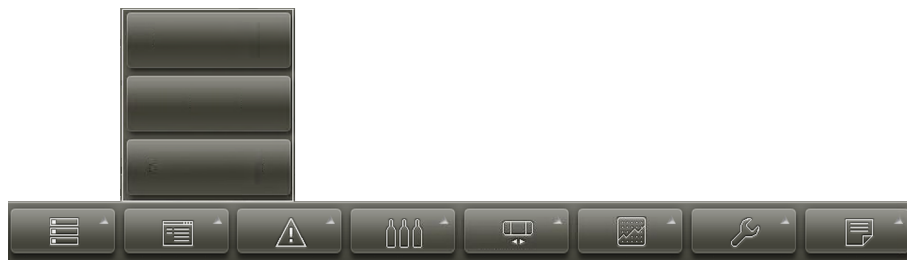


Figure 55: Menu bar with opened menu

2. Tap the appropriate command.

⇒ The corresponding view will open in the work area on the dashboard.

Closing the menu

Personnel: ■ Operating personnel

If the operator has opened the menu, but no longer wants to select a view:

Tap the menu button again.

⇒ The menu closes.

Closing a view

Personnel: ■ Operating personnel

Tap "X" at the top right of the view.

⇒ The view will close.

3.5.1.6 Navigation

Navigation determines the machine or component to be managed. The selected machine or component determines the control options and views that an operator sees.

From left to right, the navigation buttons have the following meanings:



Button	Description	Meaning
	Machine	Displays the selected machine A machine is a self-contained unit, such as the container conveyor. If several machines of the same type are connected to the operator console, the machines are numbered consecutively. The number is displayed below the icon.
	Component	Displays the selected component A component is part of a machine. For example, a filling machine may consist of the rinser, filler and sealer components. Components can be used to divide conveyors into activation areas. If the container conveyor and pack conveyor share the same operator console, both machines can be selected as separate components so that separate types can be selected for each machine. The components of a machine have a name consisting of one or more letters. If a machine contains several components of the same type, the components are numbered consecutively and the corresponding number is added to the letters. If the component button is hidden or empty, the machine information is displayed.

A triangle in the button indicates that multiple machines or components are connected to the operator console. If the button does not contain a triangle, only this machine or component is connected to the operator console.

Selecting a different line, machine or component



Personnel: ■ Operating personnel

1. To control a different line, machine or component, tap the corresponding navigation button.

⇒ If this is a single line, machine or component (without triangle), the line, machine or component is selected.

If there are multiple lines, machines or components, a list opens with all of the available lines, machines or components.



Figure 56: Opened list

2. Select the line, machine or component from this list.

3.5.1.7 Machine functions

The machine can be controlled using the machine functions selected in the navigation. The name of the machine appears in the title bar.

The icons have the following meanings:

Icon	Meaning
	Represents the machine.
Flowgate open	Opens the bottle or can flowgate: the containers are transported.



Icon	Meaning
Flowgate closed	Closes the bottle or can flowgate: the containers are not transported.
Operating status	This icon corresponds to the <i>[Operation]</i> key switch and indicates the operating status: ■ The operating status display is activated when the control voltage is switched on. ■ When the control voltage is switched off, the operating status display is deactivated.

Machine information dialog

The “*Machine information*” dialog opens when the user taps the machine icon. The “*Machine information*” dialog shows the number and severity of the messages.

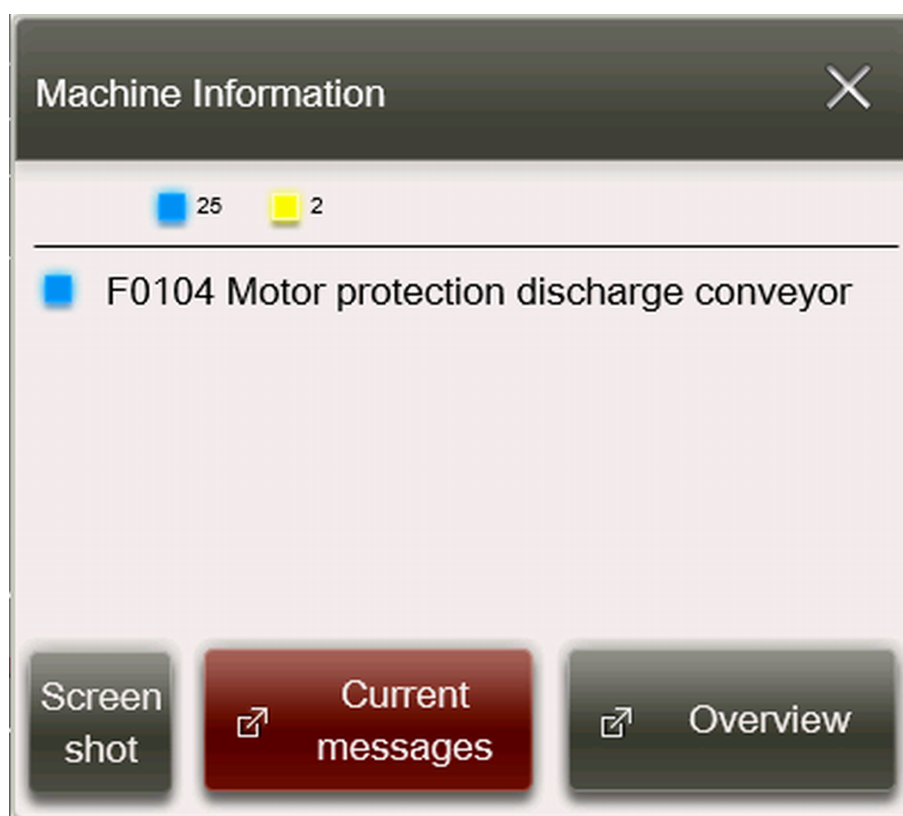


Figure 57: Machine information dialog

The buttons at the bottom in the dialog have the following meanings:

**Actions**

Button	Meaning
<i>"Screenshot"</i>	Takes a picture of the current screen with all open views and saves the screenshot with the image name in the <i>"General"</i> folder. See also the <i>"Saving to USB"</i> section in this chapter. The user can then confirm the finished message in the <i>"Save image"</i> dialog via <i>"Close"</i> .
<i>"Current messages"</i>	Opens the <i>"Current messages"</i> view.
<i>"Overview"</i>	Opens the <i>"Overview"</i> view.

3.5.1.8 Input elements

The operator can use input elements to change values or settings.
The operator can use the following elements:

Input element	Description	Meaning
	Input field	Input fields have a white background. After tapping, a dialog opens with a numerical keypad or keyboard.
	Input field	The values in these input fields can be increased or decreased in steps.
	Button	Tapping the button triggers an action. The text or the symbol on the button describes the action.
 	Option selected Option not selected	Related options are grouped inside a white frame. Exactly one can be selected from this group of options. By selecting a different option from the group, the operator deselects the previously selected option.
 	Option selected Option not selected	Any number of these options can be selected. Related options are grouped inside a white frame.



Input element	Description	Meaning
	Link	Links open a view or a dialog.
	Dialog	Dialogs overlap the current view. They can be closed by pressing the “X” button.

Entering a value

Personnel: ☒ Operating personnel

1. Tap the input field.

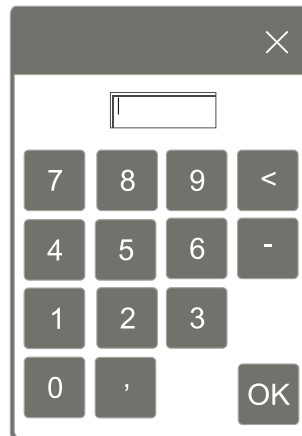


Figure 58: Numeric keypad

- ⇒ A dialog opens with a numerical keypad or keyboard.
2. Use the buttons to enter the value.
 3. Tap “OK”.
- ⇒ The dialog closes and the value is copied into the input field.

The operator can use the “X” button to cancel the action and close the dialog at any time.



Buttons

Views can be operated using buttons. The symbols on these buttons have the following meanings:

	Execute action		Reload
	Delete		Reset
	Filter		Filter by time
	Undo		Save
	Select manually		Edit
	Overview		Details
	Percent		Progress
	X axis		Y-axis
	Counter		Starting
	Pause		Stopping



3.5.1.9 Output elements

The following elements on the graphical user interface provide information:

Output element	Description	Meaning
	Output field	Output fields display information such as current actual values.
	Extended output field	Extended output fields are shown as depressed. Tapping opens a dialog.
	Inactive element	It is not always the case that all functions are available. In this case, the corresponding buttons are shown as inactive.
	Locked element	Buttons and input fields for functions for which the operator does not have authorization are indicated by a padlock icon. Tapping opens a dialog.



3.5.2 Favorites

Saving a view as a favorite

Personnel: ☐ Operating personnel



➔ Tap  in a view.

⇒ The current view is saved as a favorite.

Opening a view using favorites

Personnel: ☐ Operating personnel



1. ➔ Tap  in the icon bar.

⇒ The “Favorites” dialog opens and displays all previously saved favorites.

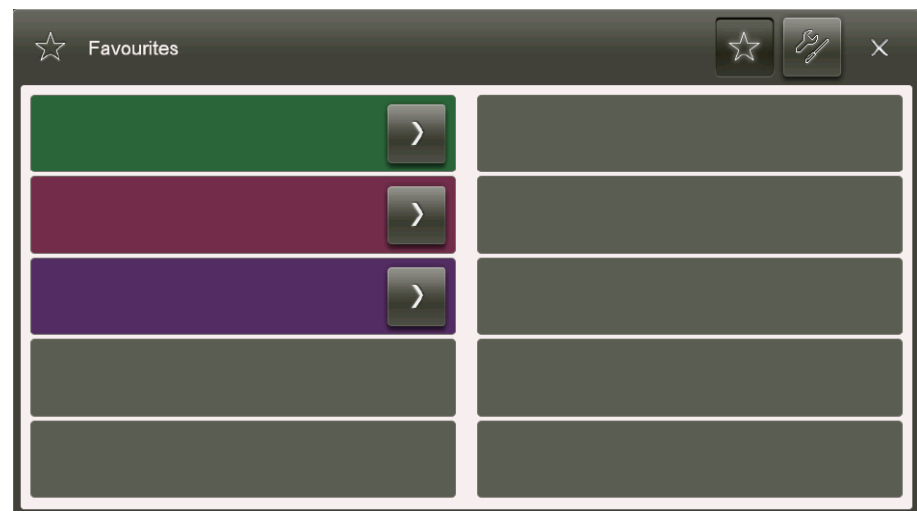


Figure 59: Favorites dialog



2. ➔ Tap  next to a favorite.

⇒ The “Favorites” dialog closes and the selected view opens.

Resorting favorites

Personnel: ☐ Operating personnel

1. ➔ Tap  in the icon bar.

⇒ The “Favorites” dialog opens and displays all previously saved favorites.



2. ➔ Tap .

⇒ The “Favorites settings” dialog opens.



Figure 60: Favorite settings dialog



3. Tap  or  next to the favorite.
⇒ The favorite is moved up or down by one row.
4. Close the dialog with the “X” button.

Deleting favorites

Personnel: ☐ Operating personnel

1. Tap  in the icon bar.
⇒ The “Favorites” dialog opens and displays all previously saved favorites.
2. Tap .
⇒ The “Favorites settings” dialog opens.
3. Tap  next to the favorite.
⇒ The favorite is deleted.
4. Close the dialog with the “X” button.



3.5.3 Logging in and logging out

There are various ways for a user to log in:

- With an RFID card
- Without an RFID card



3.5.3.1 Logging in with an RFID card



When the operator logs in for the first time using the RFID card, the RFID card must be held in front of the RFID card reader for at least four seconds.

Personnel: ☒ Operating personnel



→ Hold the RFID card in front of the RFID card reader on the operator console.

⇒ If the user is already logged in, the message “*RFID card recognized*” appears. The user currently logged on is then logged out and the new user is logged in.

If no user is logged in, the user is logged in.

In both cases, the user can use the graphical user interface in accordance with his or her access authorizations once he or she has logged in. The username is displayed in the title bar.

3.5.3.2 Logging in without an RFID card

If the RFID card has been lost or is faulty, the user can either log in using a password or a PIN code.

- The password is for longer-term access.
- The PIN code is for temporary access.

3.5.3.2.1 Logging in with a password

Personnel: ☒ Operating personnel



1. → Tap  in the icon bar.

⇒ The “*User login*” dialog opens.

2. → Press “*User login*”.

⇒ The “*User login*” dialog opens.

3. → Touch the input field for the “*password*”.

⇒ A dialog with a keypad opens.

4. → Enter the password.

⇒ The “*User login*” dialog closes and the user is logged in.

The user can use the graphical user interface in accordance with their access authorization. The user name is displayed in the title bar.



3.5.3.2.2 Logging in with a PIN code

Logging in with a PIN code involves two steps:

- The user must first apply for temporary access from KHS.
- The second step is logging in using the temporary access PIN.

Applying for temporary access

Personnel: ■ Operating personnel



1. Tap  in the icon bar.
⇒ The “*User login*” dialog opens.
2. Tap “*Alternative user login*”.
⇒ A list with various roles opens.
3. Tap the role for which you want to apply for access.
⇒ A “*machine code*” and contact details for the manufacturer are displayed.
4. Provide this machine code to KHS via email or telephone to receive temporary access.
⇒ The manufacturer KHS will send an access code.
5. In the “*Alternative user login*” dialog, use  to turn to the next page.
6. Tap in the first input field.
⇒ A dialog with a keypad opens.
7. Enter the access code.
8. Tap “*Login*”.
⇒ The PIN corresponding to the access code and the validity period of the PIN are displayed.
9. Make a note of the PIN.
10. Tap “*OK*”.
⇒ The “*Overview*” view opens.

Using temporary access

Personnel: ■ Operating personnel



1. Tap  in the icon bar.
⇒ The “*User login*” dialog opens.
2. Tap “*PIN login*”.
⇒ The “*PIN login*” view opens with an input field.
3. Tap the input field.
⇒ A dialog with a keypad opens.
4. Enter the PIN.



5. Tap “Log in”.

- ⇒ The “User login” dialog closes and the user can use the graphical user interface according to their access authorization.

3.5.3.3 Logging out



For security reasons, operators are logged out automatically after a certain period of inactivity.

There are multiple ways for a user to log out:

- With the RFID card
- With the  button on the toolbar

Logging out with an RFID card

Personnel: ■ Operating personnel

- ➔ To log out, hold your RFID card up to the RFID card reader again.
- ⇒ A message appears and the user is logged out. After logging out, no username is displayed in the title bar.

Logging out with the button

Personnel: ■ Operating personnel



- 1.** Tap the  button on the toolbar to log out.

⇒ The “User information” dialog box opens. This shows the role, the username and the language set for the user.
- 2.** Tap “Logout”.

⇒ The user will be logged out. After logging out, no username is displayed in the title bar.
- 3.** Tap “Cancel”.

⇒ The user remains logged in.

3.5.3.4 User roles

Users can be assigned various roles. A role is a set of rights that are defined across the system.



The roles define the following:

- What the user sees in the program.
- What the user is permitted or not permitted to do.

The following roles are available:

- The **operator** is part of the operating personnel and looks after up to three machines in a line. Operators monitor the automated processes, control the material flow and operate the machine in automatic mode. In automatic mode, operators rectify minor and frequently occurring problems. Operators have blue key tags.
- The **maintenance technician** is part of the maintenance personnel and is called in if problem or fault situations occur that the operator cannot rectify on their own. Maintenance technicians operate functions in automatic and setup mode. They can also switch to teleservice mode. Maintenance technicians have green key tags.
- The **foreman** is part of the maintenance personnel. He is responsible for multiple machines and instructs multiple operators. Foremen have yellow key tags.
- The **administrator** is part of the specially trained personnel employed by KHS. He performs administrative tasks and assigns access rights. Administrators have red key tags.

A user identifies themselves at the control panel using the key tag and the RFID card. The key tags are color-coded and depend on the user's role.

The following table shows which functions are assigned to which role (default KHS setting), where the function is relevant to the machine.

Function	Operator	Maintenance technician	Foreman	Administrator
Current messages and message history	Yes	Yes	Yes	Yes
Reset to factory settings	--	--	--	Yes
Additional service functions	--	Yes	--	Yes
Function activations	Yes	Yes	Yes	Yes
Capacity	Yes	Yes	Yes	Yes
Change product parameters	--	Yes	Yes	Yes
Program selection	Yes	Yes	Yes	Yes
Start program	Yes	Yes	Yes	Yes
Service functions	--	--	Yes	Yes
Manage type data	--	Yes	Yes	Yes



Function	Operator	Maintenance technician	Foreman	Administrator
Type selection	Yes	Yes	Yes	Yes
View statistics	Yes	Yes	Yes	Yes
Backup/restore the control program	--	--	--	Yes

3.5.4 Main menu



The “Main menu” opens when the user taps  in the icon bar

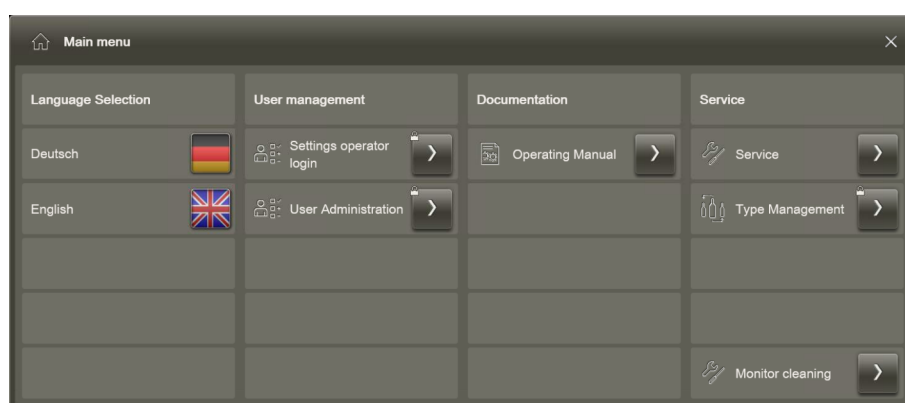


Figure 61: Main menu

The “Main menu” contains the following submenus:

Submenu	Meaning
“Language selection”	Displays the available languages for the user interface of the machine. If there are more than four languages available for the user interface, the user can open the “Language selection” dialog and set the language there.
“User management”	These functions are locked for the user.
“Documentation”	Opens a dialog with the available documentation, e.g. instructions for this user interface
“Service”	Opens further submenus for the accessible functions.



Setting the language

When a user logs in using their RFID card, the graphical user interface for the machine is displayed in the set language. This language setting can be changed by the user.

Personnel: ☒ Operating personnel



1. Using open the *"Main menu"*.
2. In the *"Main menu"*, tap the flag icon in the *"Language selection"* submenu.
⇒ The language of the user interface is changed.



The language set on the RFID card does not change if the operator selects another language manually.

3.5.4.1 Service submenu

The *"Service"* submenu contains the following commands for the user to set the graphical user interface:

Command	Meaning
<i>"Temperature"</i>	Opens the <i>"Temperatures"</i> view with an overview of the temperature values for the computer's components.
<i>"Drives"</i>	Opens the <i>"Drive system information"</i> view with an overview of drive utilization on the computer.
<i>"Time setting"</i>	Opens the <i>"Time setting"</i> view where the user can set the time for the graphical user interface.
<i>"Network settings"</i>	Opens the <i>"Network settings"</i> view where the user can find out about the network settings.
<i>"Backup/restore"</i>	Opens the <i>"Backup/restore"</i> view. These functions are locked for the user.
<i>"Saving to USB"</i>	Opens the <i>"Save to USB"</i> view, in which the user can save specific data to a USB stick.
<i>"RFID settings"</i>	Opens the <i>"RFID settings"</i> view where the user can find out about the RFID settings.
<i>"Reset to factory settings"</i>	Resets the settings in the graphical user interface to the defaults.
<i>"Display mouse pointer"</i>	Shows the mouse pointer on the screen.



3.5.4.1.1 Temperatures



The “*Temperatures*” view can be opened via “*Main menu* → *Service* → *Temperatures*”. The view shows the temperature values for the computer components on which the graphical user interfaces run.



Figure 62: Temperatures view

3.5.4.1.2 Drive system information



The “*Drive system information*” view can be opened via “*Main menu* → *Service* → *Drive system information*”. The view shows the utilization of the computer drives on which the graphical user interfaces run.

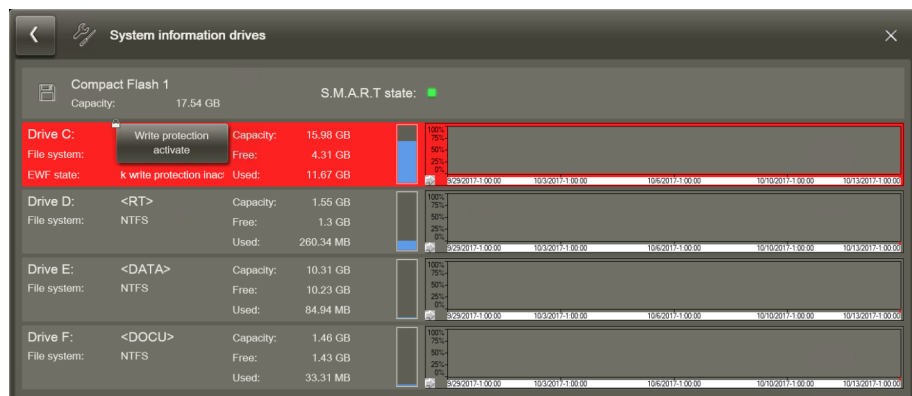


Figure 63: Drive system information view

The “*S.M.A.R.T status*” displays the status of the memory card (cFast).

3.5.4.1.3 Time setting



The “*Time setting*” view can be opened via “*Main menu* → *Service* → *Time setting*”.

The operator can set the following time parameters:

- the time on the computer (BIOS)
- whether the time on the computer should be displayed in the 12-hour or 24-hour clock format (BIOS)



- the zone time (select from the dropdown list)
- whether the time should be automatically updated at the start and end of daylight saving time

The user cannot change the date.

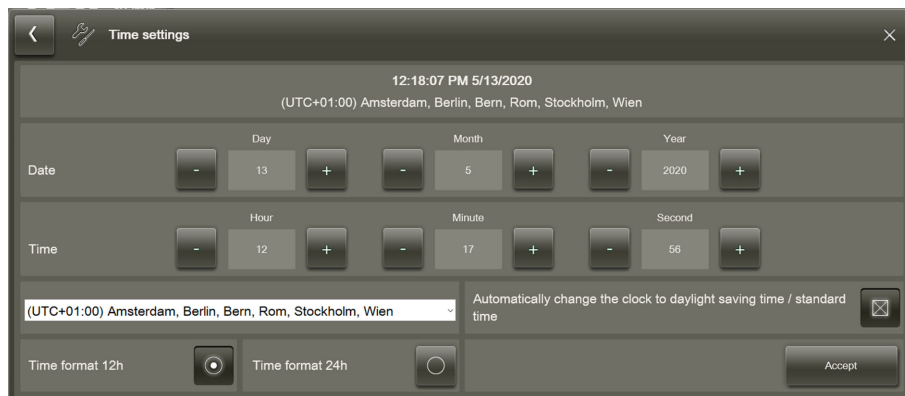


Figure 64: Time setting view

3.5.4.1.4 Network settings



The “*Network settings*” view can be opened via “*Main menu* → *Service* → *Network settings*”. The user can find out about the current network settings in this view.

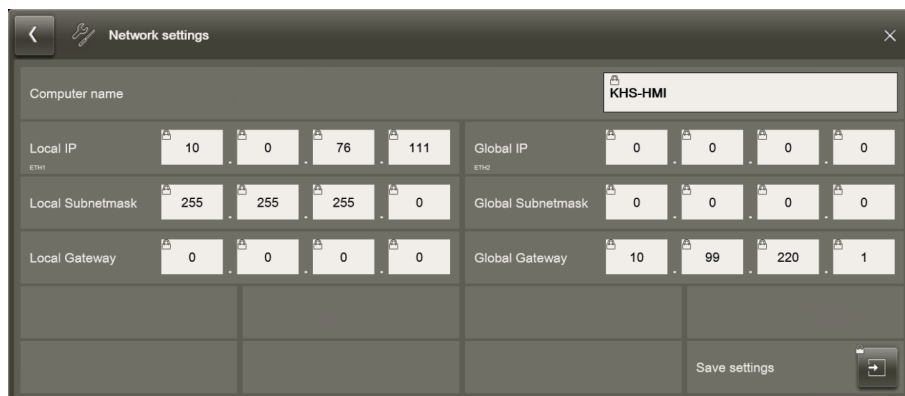


Figure 65: Network settings view

3.5.4.1.5 Backup/restore



The “*Backup/restore*” view can be opened via “*Main menu* → *Service* → *Backup/restore*”. The functions in this view are locked for the user.

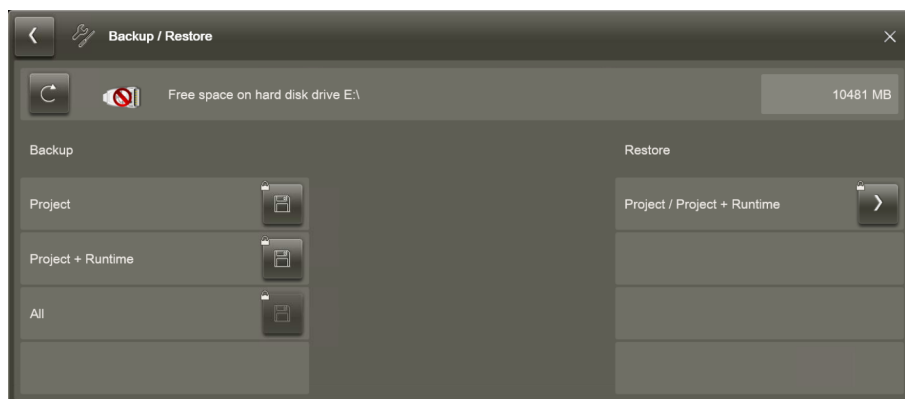


Figure 66: Backup/restore view



The top row displays the storage media and the free memory space. The user can toggle between storage media using . In doing so, the color on the USB icon illustrates whether the USB stick is selected or not:

Color	Meaning
Red	The USB stick is not selected and E:\ is the storage medium.
Green	The USB stick is selected as the storage medium.

3.5.4.1.6 Saving to USB



USB sticks can be a security risk. Only use USB sticks which have been checked with a virus protection program.



The “Save to USB” view can be opened via “Main menu → Service → Save to USB”. In this view, the user can move various data onto a USB stick that was previously saved on disk.



Figure 67: Save to USB view



Both lists show the folder content on the disk where the user can save data, such as screenshots.

- The upper list shows the folder on the disk.
- The lower list shows the content of the folder that the user has selected in the upper list.

Icon	Meaning
	Selects all data in the lower list that is to be moved to the USB stick.
	Resets the selection.
	Saves the selected data to the USB stick.
	Function not authorized for the user.
	The color on the USB icon illustrates whether a USB stick is inserted or not: ■ Red: the USB stick is not inserted and data cannot be saved. ■ Green: the USB stick is ready as a storage medium.
"100%"	Shows the transfer was completed successfully.

3.5.4.1.7 RFID settings



The *"RFID settings"* view can be opened via *"Main menu → Service → RFID settings"*. The user can find out about the current settings for the RFID system in this view.



Figure 68: RFID settings view



3.5.4.2 Cleaning the screen

The user can switch off the touch sensitivity of the touchscreen for 30 seconds so that he can clean the screen.

Personnel: ■ Operating personnel

1. ➔ In the Main menu, select the *"Clean screen"* command.

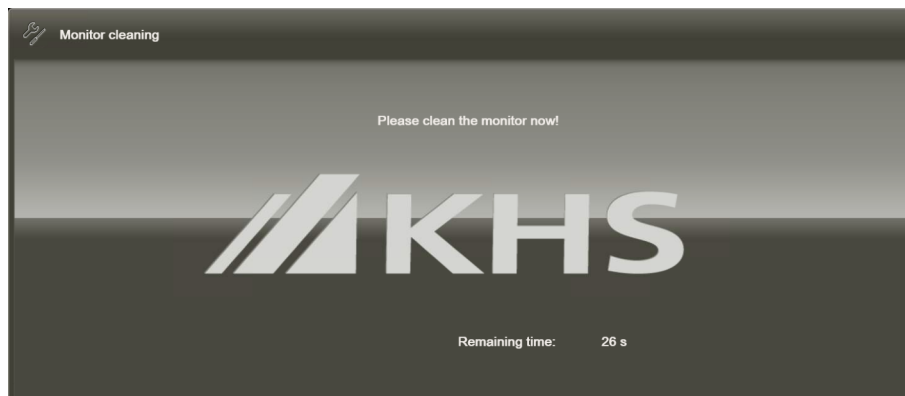


Figure 69: Clean the fixed image for the screen

- ⇒ The image on the screen is frozen and a seconds counter is displayed to count down the seconds until the touchscreen will react to touch again.
2. ➔ If cleaning has not been completed by the end of the count-down, tap *"Clean screen"* again.

3.5.5 Entire filling machine

3.5.5.1 Dashboard

The dashboard is divided into several areas for different functions.

The areas show an illustration of the machine, individual data and measurement values, buttons or extracts from views.

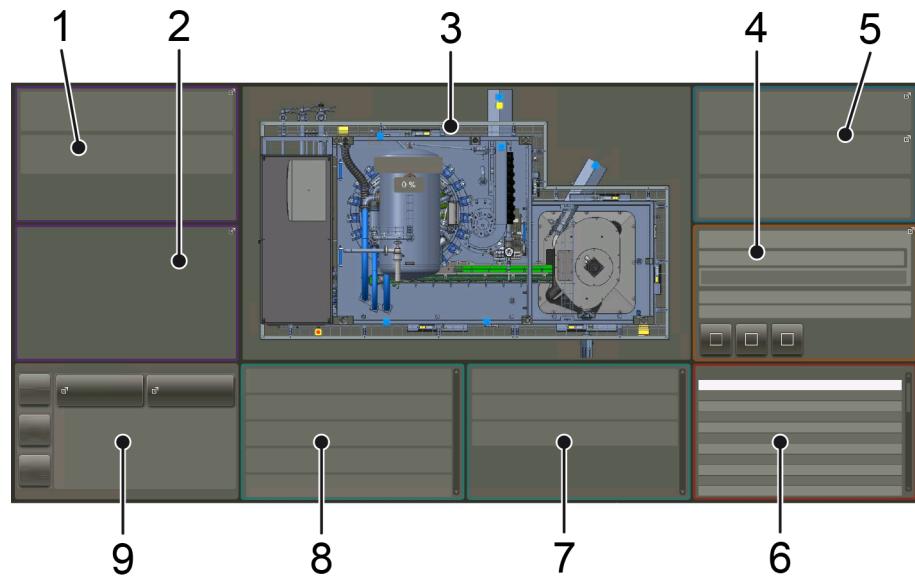


Figure 70: Dashboard

- 1 Machine output display
- 2 Operating mode selection display
- 3 Overview of the machine and its assemblies
- 4 Displays the current step of the step sequence with conditions for continuing to the next step and operator information
- 5 Statistics including the can counter and operating hours counter
- 6 Current messages
- 7 Display of current actual values for the capper
- 8 Displays the current actual values for the filling machine
- 9 Switching elements



The user can open the linked view directly using .

Contact element	Description
Blow out	Starts the "blow-out" function using air or pressurized gas for a filling cycle.
Bell upwards	The filling valve bells are moved upward.
Bell downwards	The filling valve bells are moved downward.

3.5.5.2 Operating mode selection

The *"Operating mode selection"* view opens if the user taps the *"Operating mode selection"* button in the dashboard. The operator can change the operating mode of the machine in this view.

The following operating modes can be selected:



Operating mode	Operating status	Use
Off	Off	Idle state
Automatic	On	Production, cleaning
Setup	On	Retooling, repairs, fault rectification
Teleservice	On	Troubleshooting

For a description of the machine's operating statuses and operating modes, see chapter *"Safety"*, section *"Operating statuses and operating modes"*.

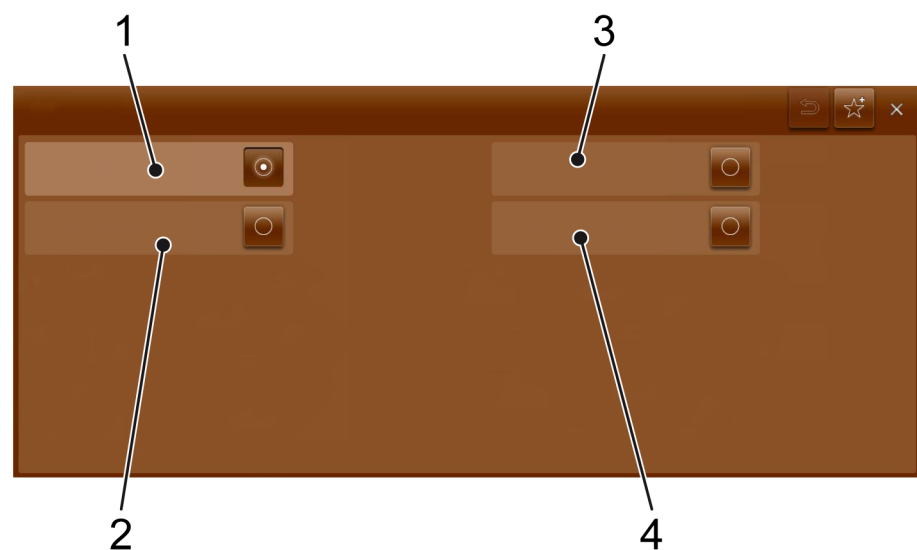


Figure 71: "Operating mode selection" view

- 1 Operating mode: "Off"
- 2 Operating mode "Automatic"
- 3 Operating mode "Setup"
- 4 Operating mode "Teleservice"

Selecting the operating mode

1. On the dashboard, tap the "Operating mode selection" button.
⇒ The "Operating mode selection" view opens.
2. Select the required operating mode and confirm.
⇒ The machine switches to the selected operating mode.

Which operating modes and machine functions a user can select depends on which RFID chip they have logged in with. The user roles are specific to the RFID chip. The machine's safety controller uses the user role to control the soft key selection on the graphical user interface and the machine functions associated with them.



If a machine function is required that is not enabled and on the graphical user interface therefore cannot be selected, this machine function must be enabled by logging in with a chip that has a higher user role authorization level.

If a new chip with a lower authorization level is then logged in, the higher authorization level used beforehand is reset.

The user roles defined by KHS are essential for functional safety and risk minimization.

3.5.5.3 Menu structure

The table shows the menu commands applicable to the entire machine. The user opens the associated view using these commands. A component must not be selected in the navigation panel.

Icon	Name	Command
	Overview	Components
		Status/diagnostics
	Programs	Program selection
		Functions
	Messages	Current messages
		Message history
	Type	Current type
		Type selection
	Parameters	Servo
		Capacity
	Statistics	Event list
		Can counter
		Operating hours
	Service	Servo
		Water graphic
		Expanded diagnostics
		Interfaces
		Maintenance
	Note	About



3.5.5.4 Overview menu

The “*Overview*” menu contains the following commands:

Command	Meaning
Components	Opens a view with all components of the filling machine.
Status/diagnostics	Opens a view in which the operator can select one of the following views: ■ Bus status ■ Remaining time function test ■ Maintenance unit ■ Paneling

3.5.5.4.1 Components

The “*Overview*” view can be opened via “*Overview* → *Components*”. This view displays all the components of the filling machine.

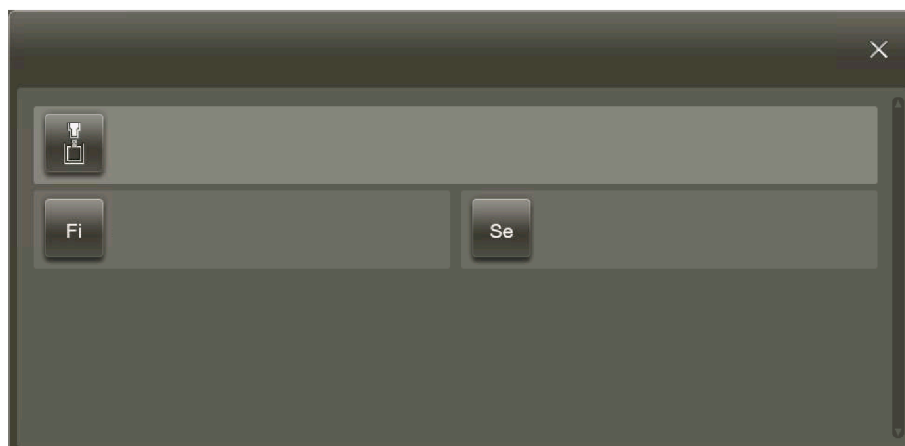


Figure 72: “*Overview*” view

The operator is able to select a component.

3.5.5.4.2 Status/diagnostics

The “*Status/diagnostics*” view is opened via “*Overview* → *Status/diagnostics*”.



Command	Meaning
Bus status	Opens a view that displays faults in the Profibus and Profinet subscribers.
Remaining time function test	Opens a view with an overview of the remaining time before the function test.
Maintenance unit	Opens a picture of the maintenance unit.
Paneling	Opens a view in which the SDD controller mode, bus fault device and number of devices is/should be displayed.

Bus status

The “*Bus status*” view can be opened using “*Overview* → *Status/diagnostics* → *Bus status*”. This view displays faults in the Profibus and Profinet subscribers.

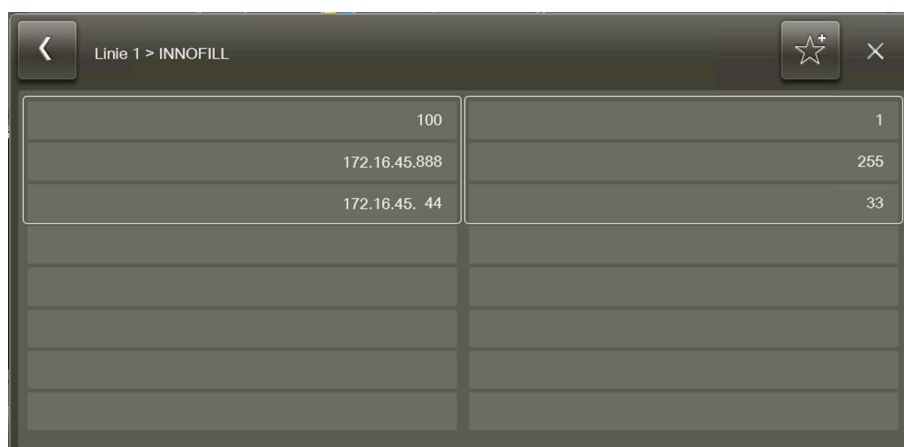


Figure 73: “*Bus Status*” view

Remaining time function test

The “*Remaining time function test*” view opens via “*Overview* → *Status/diagnostics*” → “*Remaining time function test*”. This view displays a schematic diagram of the switching areas and the remaining time before the function test.



Figure 74: “Remaining time function test” view

The function test is used to check that the emergency stop switch safety groups, safety door locking mechanism and escape unlock are working correctly in combination with the machine safety control system. The emergency stop switches and the safety door locking mechanism are assigned to the protected areas of the machine.

The emergency stop switch group is tested by actuating and unlocking an emergency stop switch from any protected area.

The safety door locking mechanism is tested by opening and closing a door from any protected area; see chapter “*Operation*”, section “*Safety equipment*”.

The escape unlock is tested by actuating an escape unlock.

The operating time until the next function test must be carried out is displayed on the screen.

Color	Meaning
Yellow	Time until a message about carrying out a function test appears on the machine.
Blue	Time until the machine is brought to a safe stop. The machine can only be restarted once the function test is complete.

Maintenance unit

The “*Maintenance unit*” view can be opened using “*Overview* → *Status/diagnostics* → *Bus status*”.

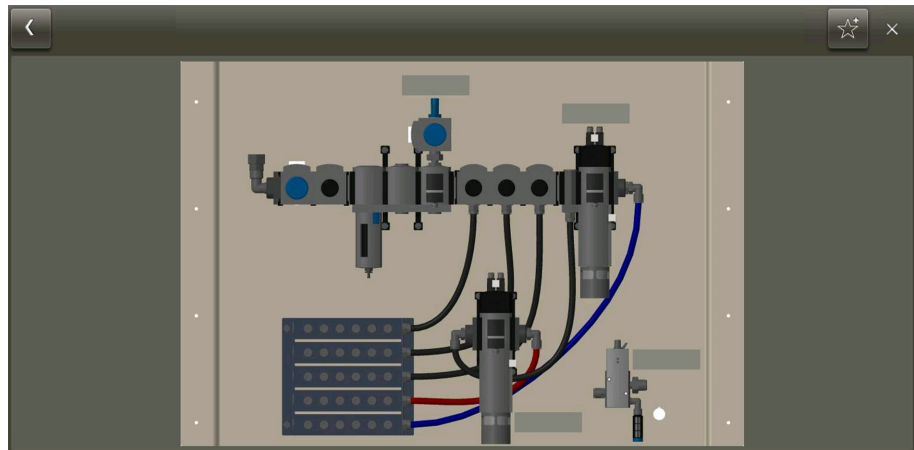


Figure 75: "Maintenance unit" view

Paneling

The "Paneling" view can be opened using "Overview → Status/Diagnostics → Paneling". The view displays faults in the paneling.

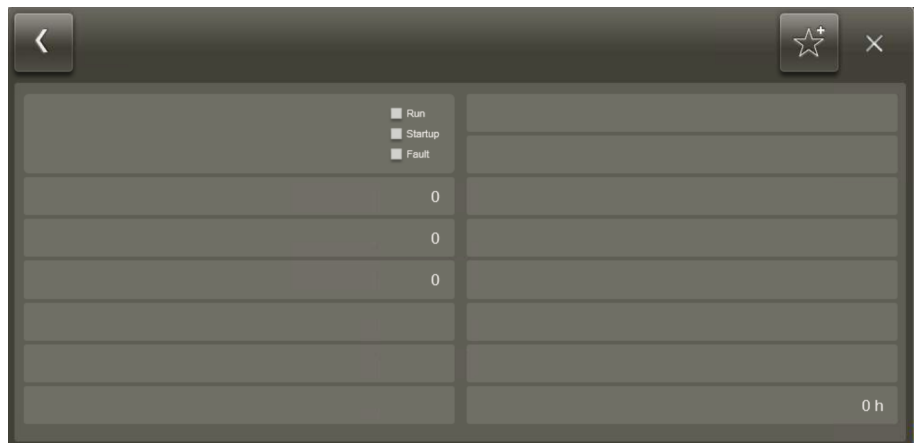


Figure 76: "Paneling" view

3.5.5.5 Programs menu

The "Programs" menu contains the following commands:

Command	Meaning
"Program selection"	Opens the "Program selection" view, in which the operator can start the automation program for production and cleaning.
"Functions"	Opens the "Functions" view. Here the user can switch various functions on or off, and select either automatic or manual modes.



3.5.5.5.1 Program selection

To open the *“Program selection”* view, select *“Programs*
➔ *Program selection”*.

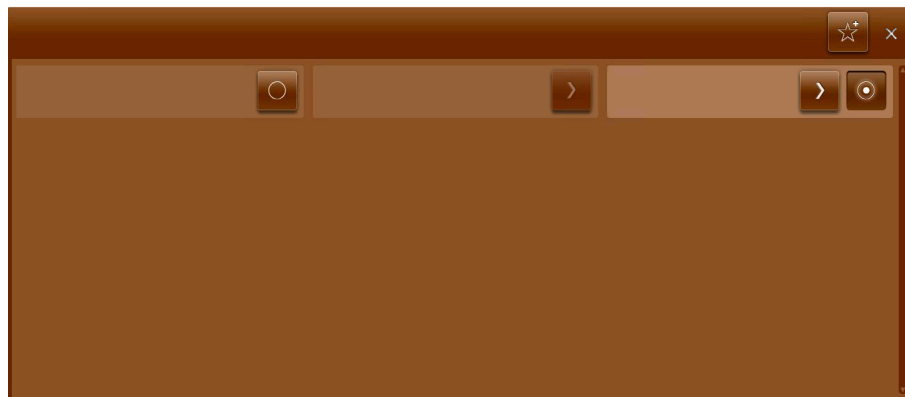


Figure 77: *“Program selection”* view

Option	Meaning
No program	Deselects the programs.
Cleaning	Activates the cleaning program and opens <i>“Stepview 1”</i> for the filler.
Production	Activates the production program and opens <i>“Stepview 1”</i> for the filler.

3.5.5.5.2 Functions

The *“Functions”* view can be opened via *“Programs* ➔ *Functions”*. In this view, the operator can switch various functions on or off and toggle between automatic and manual modes.

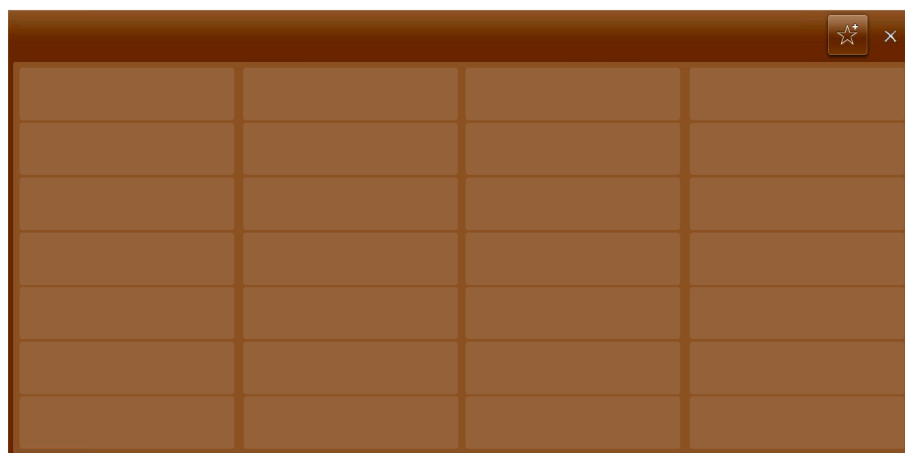


Figure 78: *“Functions”* view



The following section lists and describes all functions of the machine. Depending on the equipment and degree of automation of the machine, the function buttons are active and visible in the graphical user interface.

Function	Meaning
Run empty	Activates the run empty function. The run empty function bypasses level control at the end of production and opens the bottle flowgate to empty the bowl.
Changing a bottle flowgate star	Opens and closes the air supply in order to replace the bottle flowgate star.
Manual lubrication	Starts a lubrication cycle. The lubrication system is switched back to automatic mode after a defined number of lubricating cycles
Lamp test	Switches the lamp test function on and off. If the lamp test function is switched on, all functioning lamps of the operating controls, the operating status indicator lamps and the warning lamps light up.
Infeed conveyor	Sends the request signal to the infeed conveyor control.
Outfeed	Sends the request signal to the outfeed conveyor control.
Internal infeed conveyor	Switches the infeed conveyor control on or off inside the machine paneling.
Internal outfeed conveyor	Switches the outfeed conveyor inside the machine paneling on or off.
Swath suction	Switches on the swath suction function.

3.5.5.6 Messages menu

The *“Messages”* menu contains the following commands:

Command	Meaning
<i>“Current messages”</i>	Opens the <i>“Current messages”</i> view with the current messages that need to be processed by the operator.
<i>“Message history”</i>	Opens the <i>“Message history”</i> view with a history of all messages.

The views are the same for all components. Messages are displayed for all components.



3.5.5.6.1 Current messages

The “*Current messages*” view is opened via “*Messages*” → “*Current messages*” and shows the current fault messages. As soon as the cause of the message is corrected, the fault message moves to the message history.

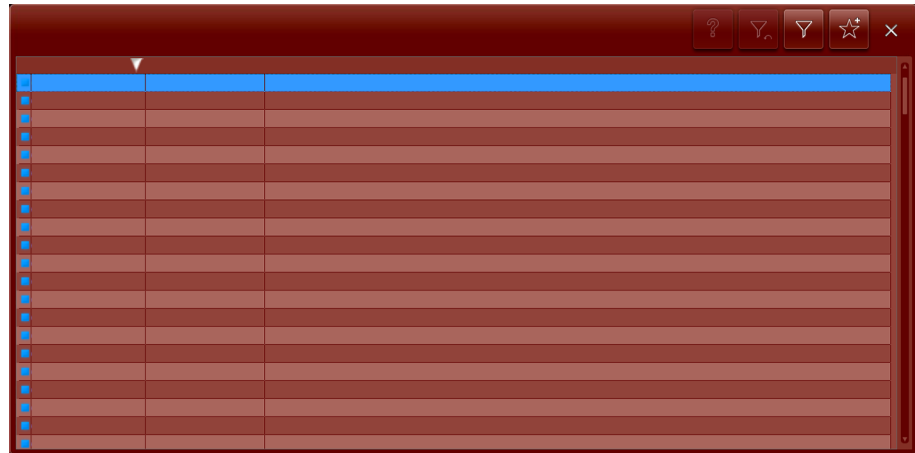


Figure 79: “*Current messages*” view

Filtering messages

Personnel: ☒ Operating personnel



1. Tap .
⇒ The “*Filter*” dialog with filter settings is opened.
2. Select filter setting.
3. Select “OK”.
⇒ The dialog closes and the messages are then sorted according to the filter.

Resetting the filter

Personnel: ☒ Operating personnel

A filter is selected.

1. Tap .
⇒ The “*Filter*” dialog with filter settings is opened.
2. Deselect the filter setting.
3. Select “OK”.
⇒ The dialog closes and the messages are displayed unfiltered.



3.5.5.6.2 Message history

The *“Message history”* view can be opened via *“Messages”* → *Message history* and shows processed and acknowledged error messages.



Figure 80: *“Message history”* view

Processed error messages can be sorted in exactly the same way as current messages. The fault messages can also be filtered by time.

Filtering messages by time

Personnel: ☒ Operating personnel



1. Tap .
- ⇒ The *“Time Filter”* dialog with presets is opened.
2. Select timeframe.
3. Select *“OK”*.
- ⇒ The dialog closes and the messages for the set time frame are displayed.

Resetting the filter

Personnel: ☒ Operating personnel

A filter is selected.

1. Tap .
- ⇒ The *“Time Filter”* dialog opens with the filter settings.
2. Deselect the filter setting.
3. Select *“OK”*.
- ⇒ The dialog closes and the messages are displayed unfiltered.



3.5.5.7 Type menu

The “*Type*” menu contains the following commands:

Command	Meaning
“ <i>Current type</i> ”	Opens the “ <i>Current Type</i> ” view using the current type.
“ <i>Type selection</i> ”	Opens the “ <i>Type selection</i> ” view in which the operator can select the type.

3.5.5.7.1 Current type

The “*Current type*” view is opened via “*Type* → *Current type*”. This view shows the current type.



Figure 81: Current type view

Saving the current type



The operator must explicitly save changes in this view using ; otherwise they will not be adopted. The values are saved according to type.

3.5.5.7.2 Type selection

The type can be changed only when the following conditions have been fulfilled:

- There are no containers left in the machine.
- The machine is stopped.
- The doors of the machine paneling are closed.
- The control panel P1 is activated.

Before the “*Type selection*” view can be opened via “*Type* → *Type selection*”, these criteria are determined from the machine specifications and the status is displayed:

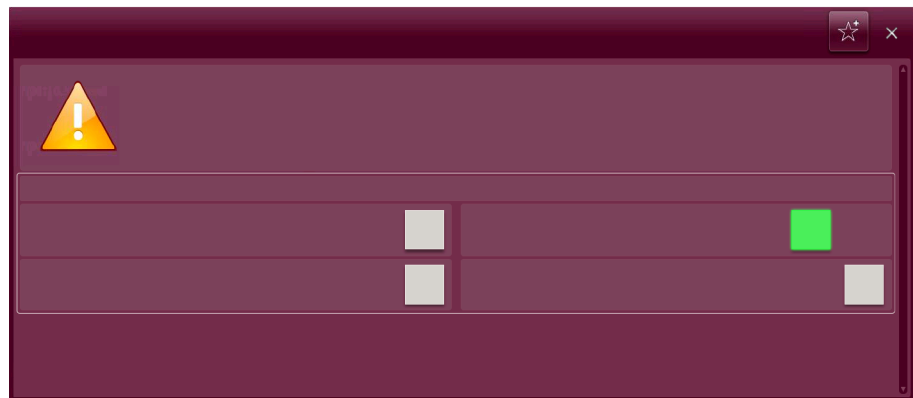


Figure 82: "Type selection" view, first page

Status display

Color	Meaning
Green	The condition has been fulfilled.
Gray	The condition has not been fulfilled.

When all conditions have been fulfilled, the second page of the view opens.

The second page of the view shows the types that are set up for the filling machine.

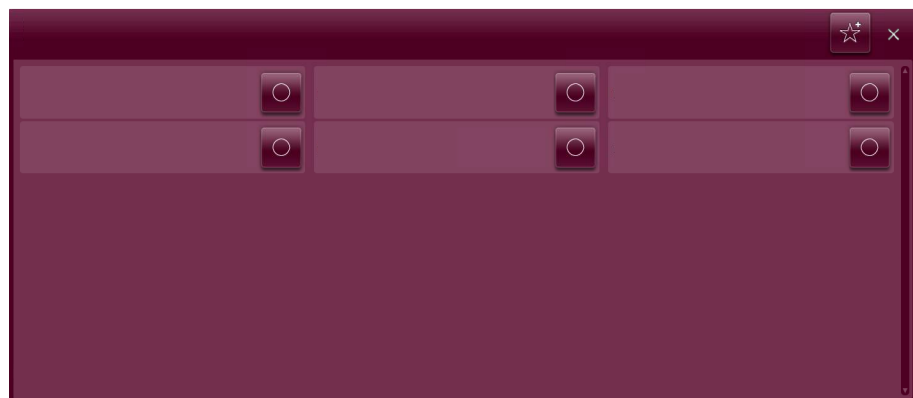


Figure 83: "Type selection" view, second page

If the user has selected a different type, all the type-dependent parameters are loaded.

Before a different type is displayed, the following dialog opens:
"Unsaved settings will be lost! Are you sure you want to load the selected type?"

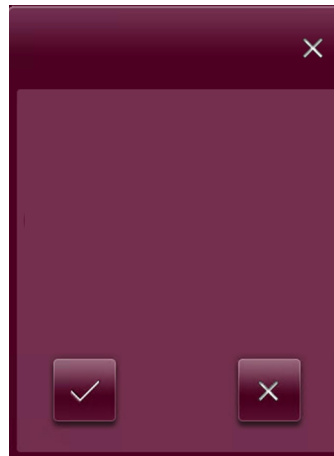


Figure 84: Confirming type selection

Once the type selection has been confirmed or canceled, the type selection is executed or canceled.

3.5.5.8 Parameters menu

The *“Parameters”* menu contains the following commands:

Command	Meaning
Servo	Opens the <i>“Servo”</i> view where the operator can switch the required servo drives on and off.
Capacity	Opens the <i>“Capacity”</i> view where the operator can adjust the machine output and configure the capacity thresholds according to type.

3.5.5.8.1 Servo

The *“Servo synchronized run”* view can be opened via *“Parameters → Servo”*. In this view, the user can switch the required servo axes on or off according to type.



The user can only switch the servo axes on or off when the machine is stopped.

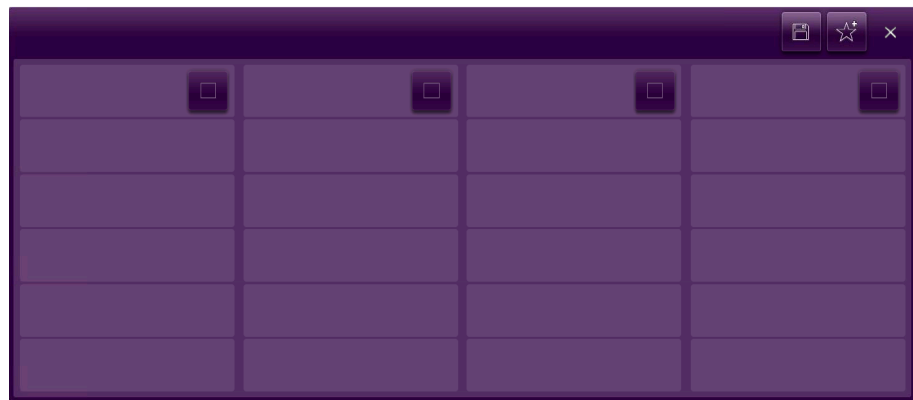


Figure 85: “Servo synchronized run” view

Every servo axis has the option for the axis to be switched on or off.

Save settings



The operator must save changes in this view specifically using ; otherwise these will not be adopted. The values are saved according to type.

3.5.5.8.2 Capacity

The “Capacity” view can be opened via “Parameters → Capacity”. The view is split over two pages. On the first page, the operator sees the current machine capacity and can adjust the setpoint.

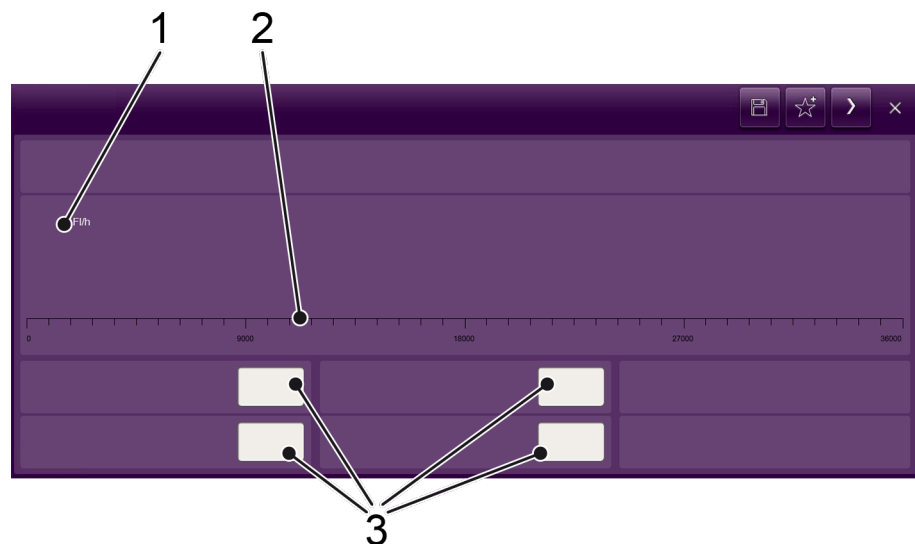


Figure 86: Capacity view, first page

- 1 Value: current machine capacity
- 2 Range: current machine capacity
- 3 Setpoints



The second page of the “Capacity” view can be opened using .

Changing the setpoint

Personnel: ☐ Operating personnel

1. Tap the input field.
⇒ A dialog with a keypad opens.
2. Enter the new setpoint and confirm by touching “OK”.
⇒ The dialog box closes and the new value is recorded in the input field.

Save settings



The operator must save changes in this view specifically using ; otherwise these will not be adopted. The values are saved according to type.

Capacity threshold according to type

In this view, the operator limits the capacity according to the size of the containers and the product in the input fields:

- “Full capacity”: value from the filler specification sheet
- “Half capacity”: 50% of full capacity
- “Empty capacity”: 20-25% of full capacity

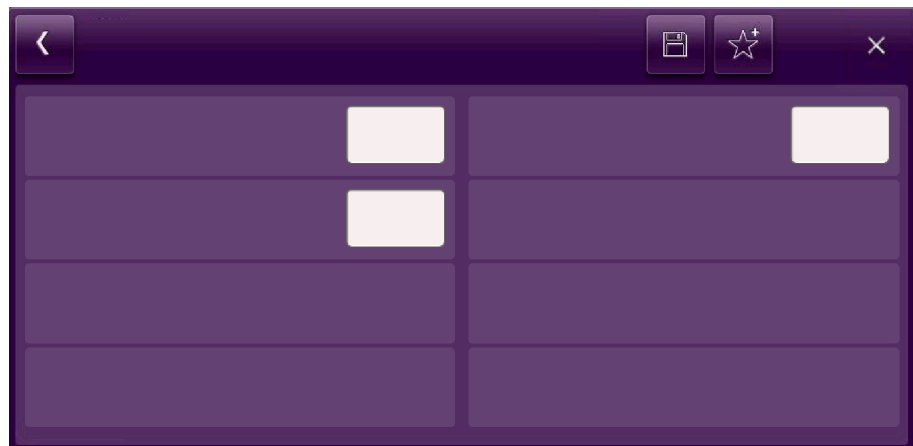


Figure 87: “Type-dependent capacity thresholds” view



The first page of the “Capacity” view can be opened using .

Save settings



The operator must save changes in this view specifically using ; otherwise these will not be adopted. The values are saved according to type.



3.5.5.9 Statistics menu

The “*Statistics*” menu contains the following commands:

Command	Meaning
“ <i>Event list</i> ”	Opens the “ <i>Event list</i> ” view with the log of all machine activity.
“ <i>Can counter</i> ”	Opens the “ <i>Can counter</i> ” view, which contains the values of the can counter.
“ <i>Operating hours</i> ”	Opens the “ <i>Operating hours</i> ” view with values from the operating hours counter.

3.5.5.9.1 Event list

The “*Audit trail*” view is opened via “*Statistics* ➔ *Audit trail*”. The “*Event list*” logs all machine activity.

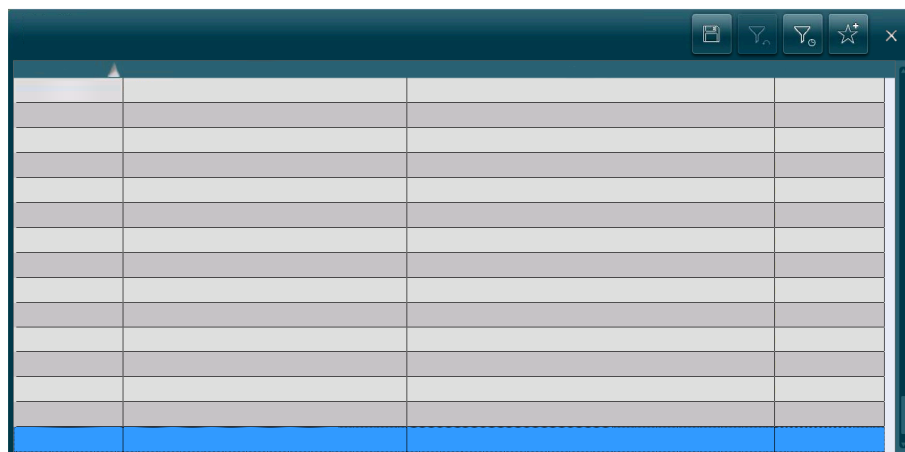


Figure 88: “*Event list*” view



Tapping  will save the event list as a text file.

Filter by time

Personnel: ☒ Operating personnel



1. Tap .

⇒ The “*Time Filter*” dialog with presets is opened.

2. Select timeframe.

3. Select “*OK*”.

⇒ The dialog closes and the messages for the set timeframe are displayed.



Reset the filter

Personnel: ☒ Operating personnel

A filter is selected.

1. Tap .

⇒ The *"Time Filter"* dialog opens with the filter settings.

2. Deselect the filter setting.

3. Select *"OK"*.

⇒ The dialog box closes and the messages are displayed unfiltered.

3.5.5.9.2 Can counter

The *"Can counter"* view opens via *"Statistics → Can counter"*. The can counter counts the cans that have entered the machine since the last reset.

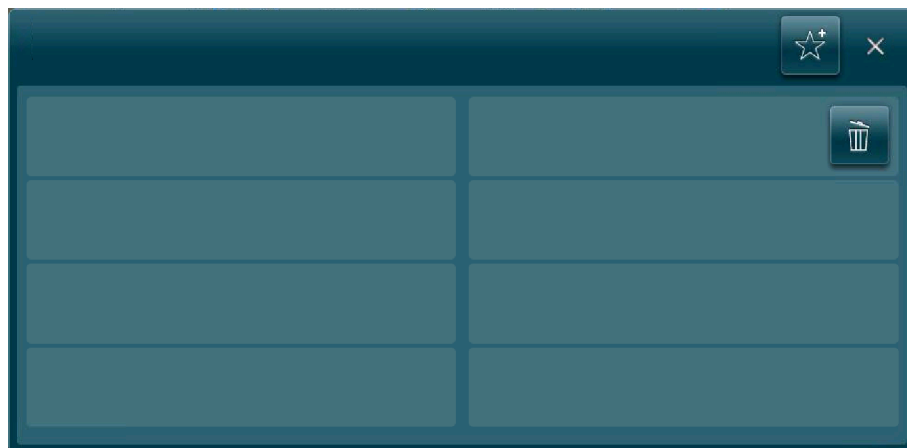


Figure 89: *"Can counter"* view



The can counter is reset.

3.5.5.9.3 Operating hours

To open the *"Operating hours"* view, select *"Statistics → Operating hours"*. The operating hours meter displays the operating time of the machine.

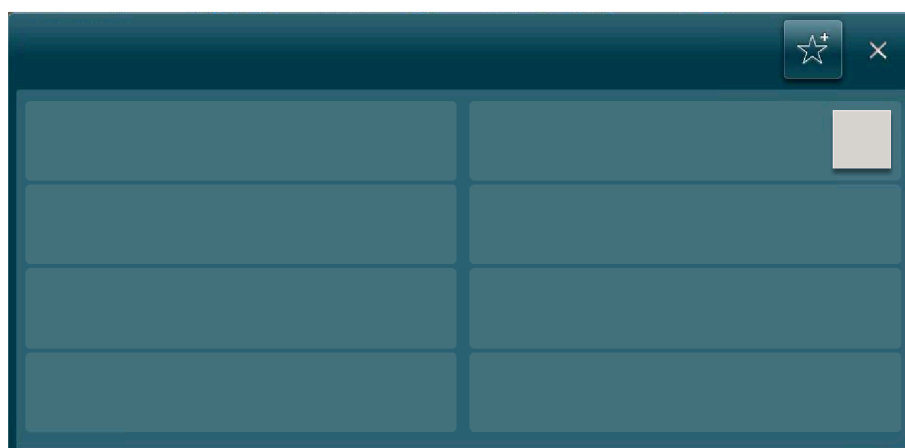


Figure 90: “Operating hours” view

The production hour meter cannot be reset. The status of the operating hours meter can be seen in the status indicator.

Status display

Color	Meaning
Green	The machine is active.
Gray	The machine is not active.

3.5.5.10 Service menu

The “Service” menu contains the following commands:

Command	Meaning
Servo	Opens the “Servo” view where the operator can adjust the servo drives.
Water graphic	Opens the “Water graphic” view, including the graphic detailing water flushoff.
Expanded diagnostics	Opens a view with diagnostic functions.
Interfaces	Opens the “Interfaces” view to show the status of interfaces to and from the filling machine.
Maintenance	Opens the “Maintenance” view with the service hours meter.



3.5.5.10.1 Servo

Personnel: ☐ Maintenance personnel
☐ KHS personnel

The “*Servo*” view can be opened via “*Service* → *Servo*”. The operator can select various functions for the servo axes in this view. Settings for the selected function are displayed on the second page.

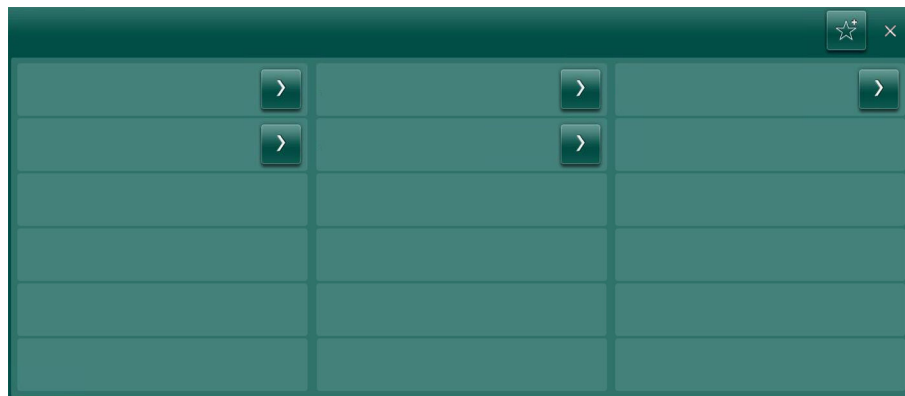


Figure 91: Servo view

The functions are briefly described below. All functions are not always visible.

Function	Meaning
Step jog servo/position to zero point	Opens a view where the operator can adjust one or all axes, advancing them by one pitch using the <i>[Jog machine]</i> button on the portable operating control.
Servo rough synchronization	Opens a view where the operator can reset an individual axis (drive) back to zero point.
Set servo machine zero point	Assigns new zero points to all servo axes simultaneously.
Set servo axis to position	Assigns a new zero point to a servo axis.
Servo faults	Opens a view with the servo axis errors.
Network/intermediate circuit identification	Opens a view with network/intermediate circuit identification



Function	Meaning
Phasing of actual axis	Individual machine drives can be adjusted while the machine is running.
Phasing of virtual axis	The machine as a whole can be adjusted to the blowing machine while the machine is running. This is possible while block mode is in operation.



The second page of the “Servo” view can be opened using .

Inch servo/position to zero point

The “*Step jog servo/position to zero point*” view opens if the user selects the “*Step jog servo/position to zero point*” function in the “*Service → Servo*” view.

The user can set one or all axes in this view to advance by one pitch forwards or backwards using the [*Jog machine*] button on the portable operating control. Here, one pitch corresponds to the distance between two filling valves.

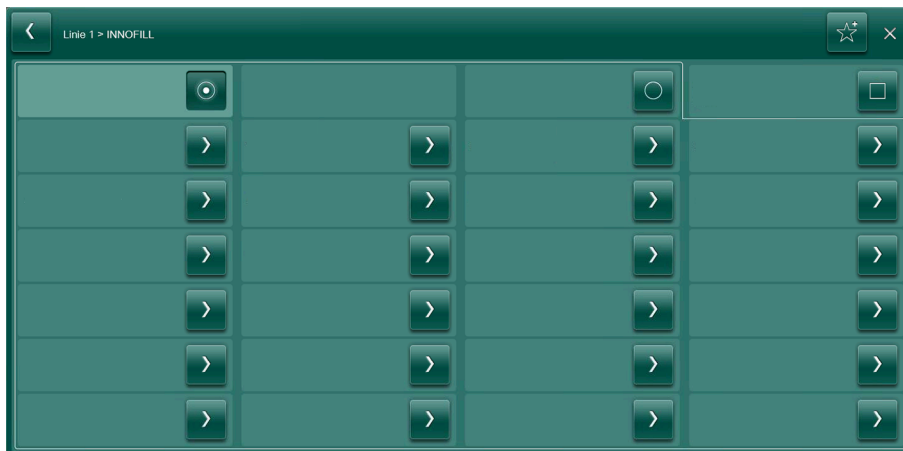


Figure 92: “*Step jog servo/position to zero point*” view

In the top row of the view, the user can select one of the following options:



Option	Meaning
Deactivate step jog/backwards	Adjusts one axis so that it rotates by one pitch using the <i>[Jog machine]</i> button on the portable operating control. If the user selects this option, the “ <i>Step jog</i> ” dialog can be opened by tapping  .
Jog all axes backwards	Adjusts all axes so that they move backwards by one pitch using the <i>[Jog machine]</i> button on the portable operating control. If the user selects this option, the  symbols behind the axes are deactivated.
Positioning to zero point (all axes)	Also sets all axes to zero point.

All axes that the user can step jog are displayed under the row with the options.

Inching



The “*Inching*” dialog opens when the user selects an axis using . In this dialog, the user sets the direction in which the selected axis should advance using the *[Inching]* button on the removable operating control: forwards or backwards.

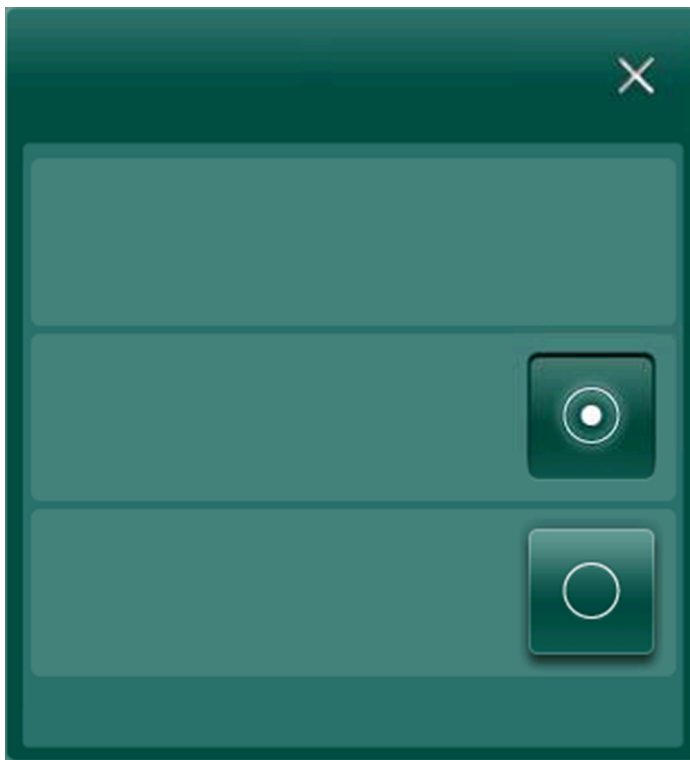


Figure 93: “*Inching*” dialog



Servo rough synchronization

The “*Servo rough synchronization*” view opens if the user selects the “*Servo rough synchronization*” function in the “*Service → Servo*” view.

The view displays whether the servo axes are in sync.

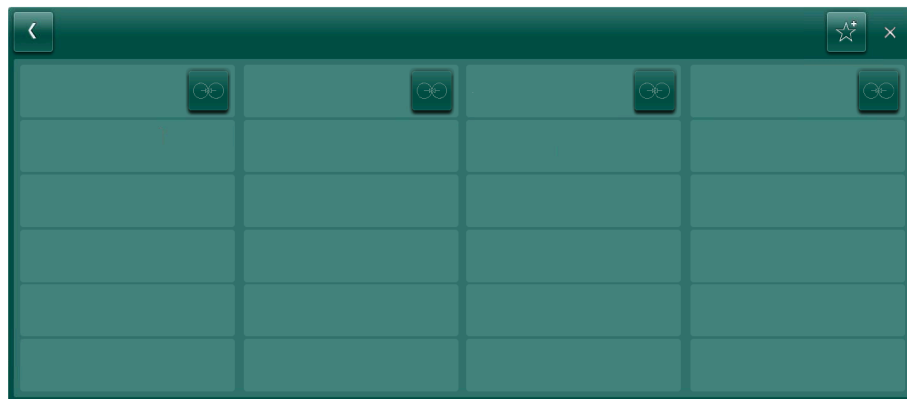


Figure 94: “*Servo rough synchronization*” view

Rough synchronization of the servo axes is required if the permissible angular offset between the drives is exceeded. The icon color indicates the status of an axis:

Icon color	Meaning
Green	The axis is synchronous.
Flashing blue	Rough synchronization is required.

The status of the axis is also illustrated by the alignment of two arrows on the operating controls. If the two arrows on the operating controls are offset to each other, then rough synchronization is necessary.

The operator activates rough synchronization of an axis by tapping the blue flashing button.

1. Check the relevant axis for jamming or clearance.
2. If the fault is resolved and the axis is clear, press the buttons with the blue flashing background. The background color then changes to light green.
3. Press the *[Acknowledge message]* illuminated pushbutton.
4. Press the *[Start]* illuminated pushbutton.
 - ⇒ The acknowledged drives rotate; this can be done forwards and backwards. The axes are again shown as synchronized. Once all selected axes are synchronous, the filler starts automatically.



For information on rectifying the fault, see chapter *“Faults”*, section *“Servo drive faults”*.

Set machine servo zero point

The *“Servo machines zero point”* dialog opens if the operator selects the *“Servo machine zero point”* function in the *“Service → Servo”* view.



This function overwrites all previous axis position configurations.

The function assigns new zero points to all servo axes simultaneously. To do this, the machine must be set to the zero point marking and all servo axes mechanically synchronized.



Zero point setting should only be done in consultation with KHS personnel!

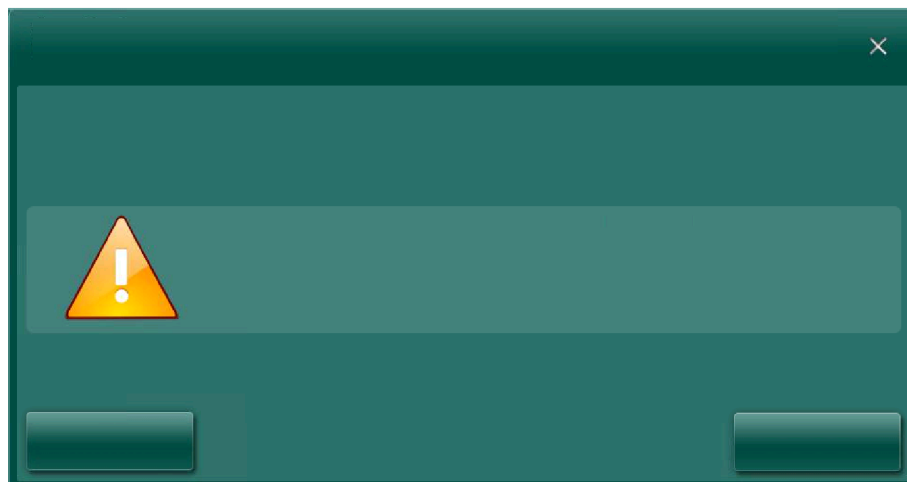


Figure 95: *“Setting servo machines zero point”* dialog

When the operator confirms the dialog with *“OK”*, another dialog opens with the message: *“This function overwrites the current position”*.

If the user also confirms this dialog by tapping *“OK”*, all axes are set to the zero point.

Set servo axis to position

The *“Set servo axis to position”* view opens when the user selects the *“Set servo axis to position”* function in the *“Service → Servo”* view.



This function assigns a new zero point to an individual servo axis. To do this, the machine must be set to the zero point marking.



Zero point setting should only be done in consultation with KHS personnel!



Figure 96: "Set servo axis to position" view

When the operator starts the positioning using , a dialog box opens with the message: "This function adopts the current position".

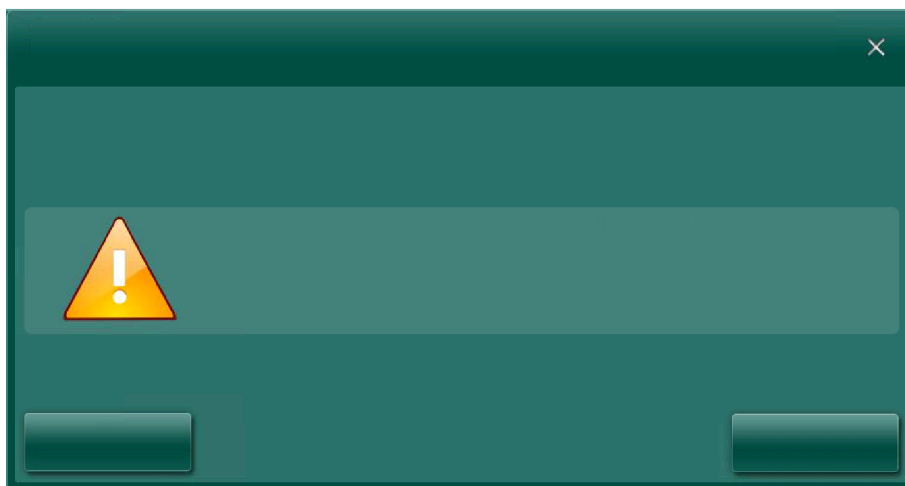


Figure 97: Set selected axis into position dialog box

If the operator confirms this dialog box with "OK", the selected axis is set to the zero point.

Servo faults

The "Servo fault" view opens if the operator selects the "Servo fault" function in the "Service → Servo" view. The view can cover several pages and displays the status and faults for the servo drives in a table.

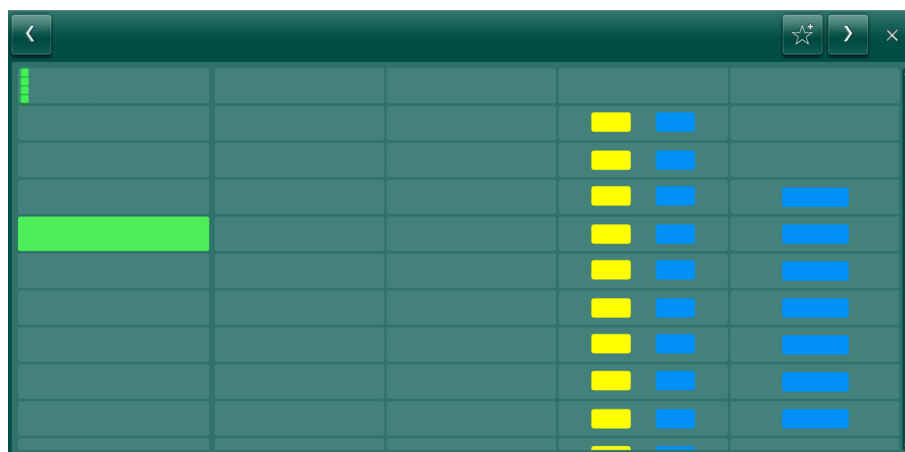


Figure 98: "Servo Faults" view

The columns in the table have the following meanings:

Column	Meaning
Synchronous	Shows the names of the servo axes. The synchronized axis fields are highlighted in green.
Drag fault	Shows a blue square if the difference between setpoint/actual position of the servo drive is too great.
Torque	Shows a blue square if the servo drive torque exceeds the tolerance range. Torque warnings are displayed as a yellow square.
Drive object	Shows a blue square and the fault number if the servo controller, control unit or infeed have a malfunction. Warnings are displayed as a yellow square and have a warning number.
Technology object	Shows a blue square and the fault number if the servo axis has a malfunction.

The fault numbers refer to the servo fault IDs in the "SINAMICS S120/S150 List Manual (LH1)". This manual is not supplied by KHS. The operator can download it from ["http://support.automation.siemens.com/ww/view/de/33974002/"](http://support.automation.siemens.com/ww/view/de/33974002/).



The next page of the "Servo faults" view can be opened using .

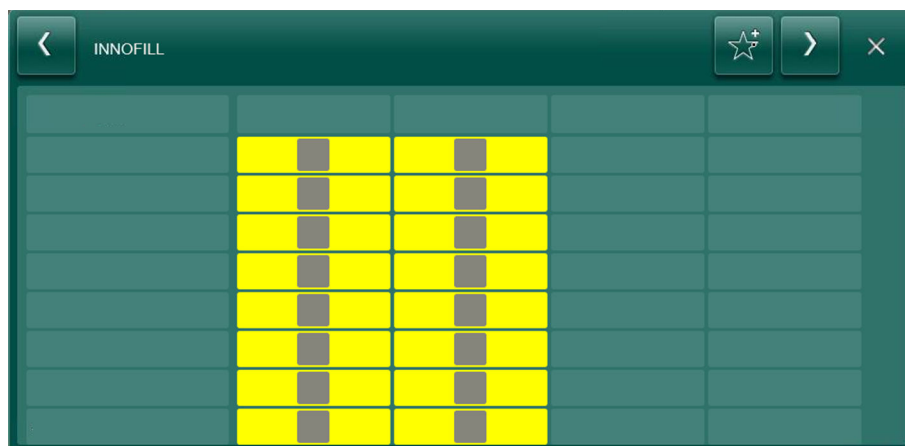


Figure 99: “Servo Faults” view, page 2

Column	Description	Statuses
Synchronous	Shows the names of the servo axes.	Green = servo axis is synchronous
Standstill	Shows the status of the servo axis.	Gray = servo axis in motion Green = servo axis stationary
SLS	Shows whether the servo axis has a reliable speed.	Gray = servo axis does not have a reliable speed Green = servo axis has a reliable speed



Reliable speed means that the speed is lower than or the same as the maximum jog speed.



Open the first page of the “Servo faults” view by tapping .

Network/intermediate circuit identification

The “Network/intermediate circuit identification” view can be opened via “Service → Servo → Network/intermediate circuit identification”. The network/intermediate circuit identification can be activated in this view.

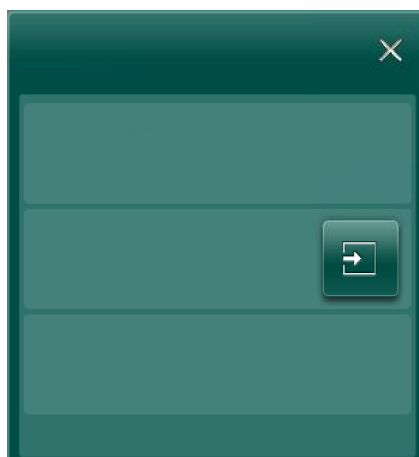


Figure 100: "Network/intermediate circuit identification" view

Network/intermediate circuit identification is carried out for changes to the network conditions in the DC intermediate circuit. Changes to the network conditions include:

- Changing the power supplier
- Changing components such as the supply, motor and condensate modules

After activating network/intermediate circuit identification, the network or the intermediate circuit is measured out within 5 - 10 seconds.

Phasing of actual axis

To open the "Phasing of actual axis" view, select "Service → Servo → Phasing of actual axis". This function allows individual servo drives on the machine to be adjusted while the machine is running. The servo drives are adjusted in relation to the machine's zero point.

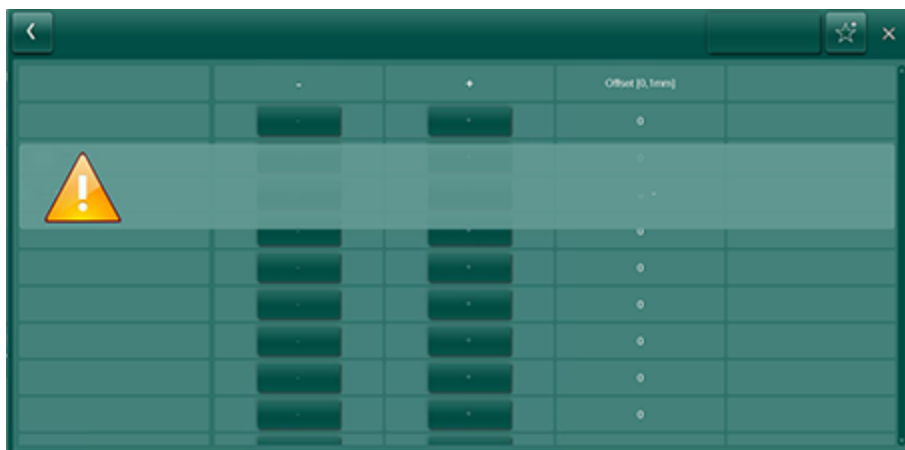


Figure 101: Phasing of actual axis view



1. ➤ Control the machine so that the corresponding servo drives are turning at a constant speed.
2. ➤ Use the + or - button to adjust the position of the servo drives.
The position is adjusted in a 0.1-mm grid.
All axes, viewed in the direction of travel, are adjusted with the same offset.
The master axis acts as a reference and cannot be adjusted. It is grayed out in the screen view.
If the settings have the desired effect, the offset values can be permanently adopted.
3. ➤ Activate the settings with the *“Adopt”* button.
⇒ If these steps are not carried out, all offsets are automatically deleted again when the machine is switched off.

Phasing of virtual axis

To open the *“Phasing of virtual axis”* view, select *“Service ➔ Servo ➔ Phasing of virtual axis”*. This function allows the entire filler to be adjusted to the zero point of the blowing machine. This function can be carried out while block mode is in operation.

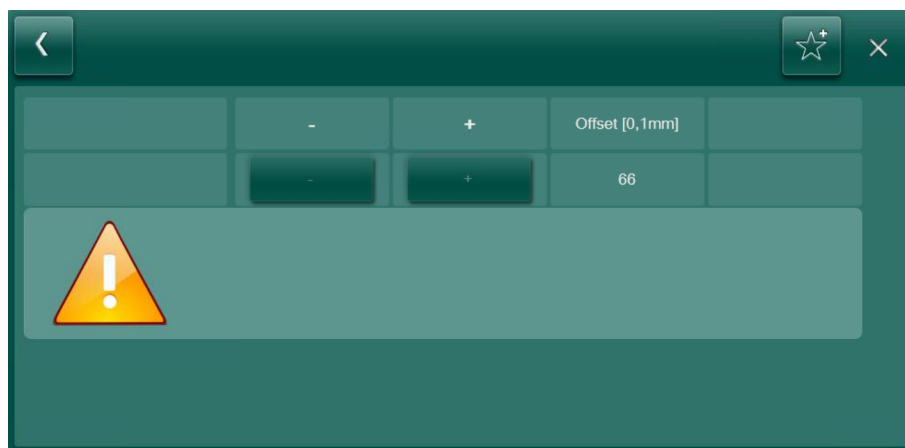


Figure 102: *“Phasing of virtual axis”* view

1. ➤ Turn the machine at a constant speed in block mode.
2. ➤ Use the + or - button to adjust the position of the servo drives.
The position is adjusted in a 0.1-mm grid.
The offset is permanently retained and is only deleted using the *“Set servo machine zero point”* function.

3.5.5.10.2 Water graphic

The *“Water graphic”* view can be opened via *“Service ➔ Water graphic”*. This view displays the media flow, water temperature and the valve status during water flushoff.

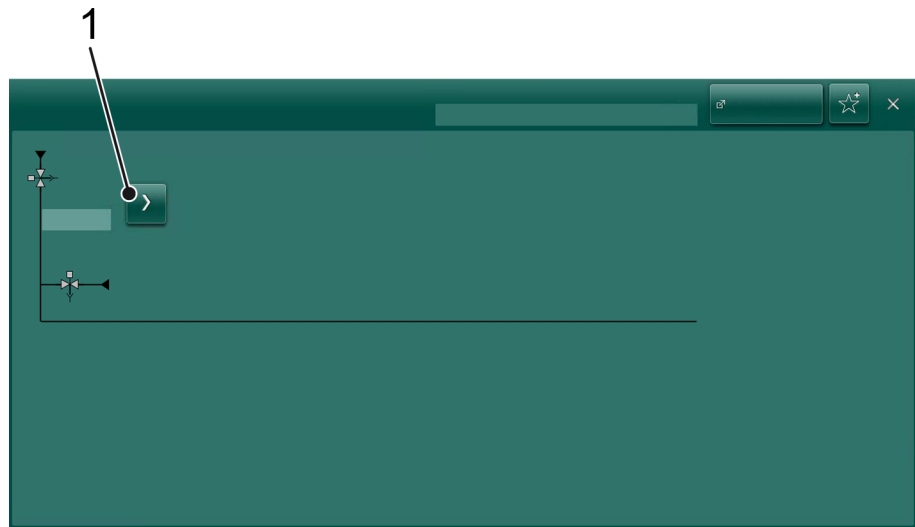


Figure 103: Water graphic view

1 Opens the *"Filler graphic"* view in the Service menu of the filler.



"Water flushoff" opens the *"Parameters → Water flushoff"* view.



The button opens the *"Filler graphic"* view in the Service menu of the filler.

Valves

The color of a valve shows its status:

Color	Status
Gray	The valve is closed.
Green	The valve is open.
Flashing red/gray	The valve does not open.
Flashing green/gray	The valve does not close.

3.5.5.10.3 Expanded diagnostics

The *"Expanded diagnostics"* view is opened via *"Service → Expanded diagnostics"*.

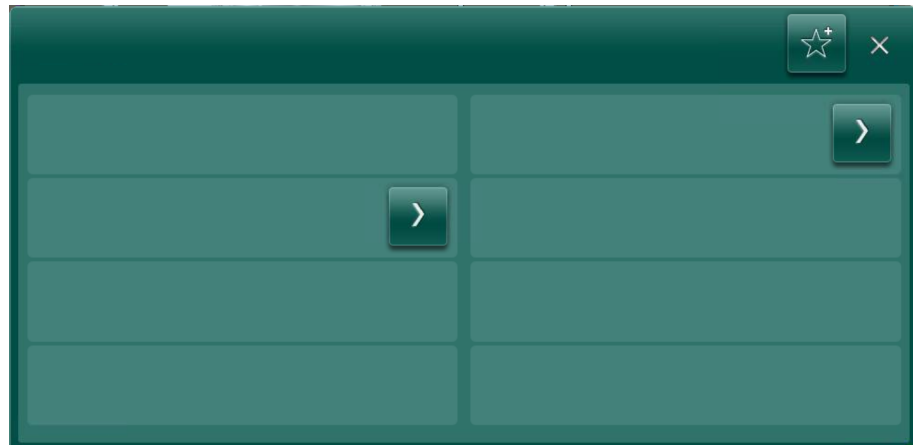


Figure 104: “Expanded diagnostics” view

The functions are briefly described below.

Function	Meaning
I/O link diagnostics	Opens the view for fault diagnostics of the I/O link module.
Process valve service life	Opens the view containing the service activities for the process valves.

I/O link diagnostics

The “I/O-Link diagnostics” view opens via “Service → Expanded diagnostics → I/O link diagnostics”.

This view allows maintenance personnel to see fault diagnostics information for the IO link module.



Figure 105: “Expanded diagnostics” view



Process valve service life

To open the *"Process valve service life"* view, tap *"Service"* → *Expanded diagnostics* → *Process valve service life*.

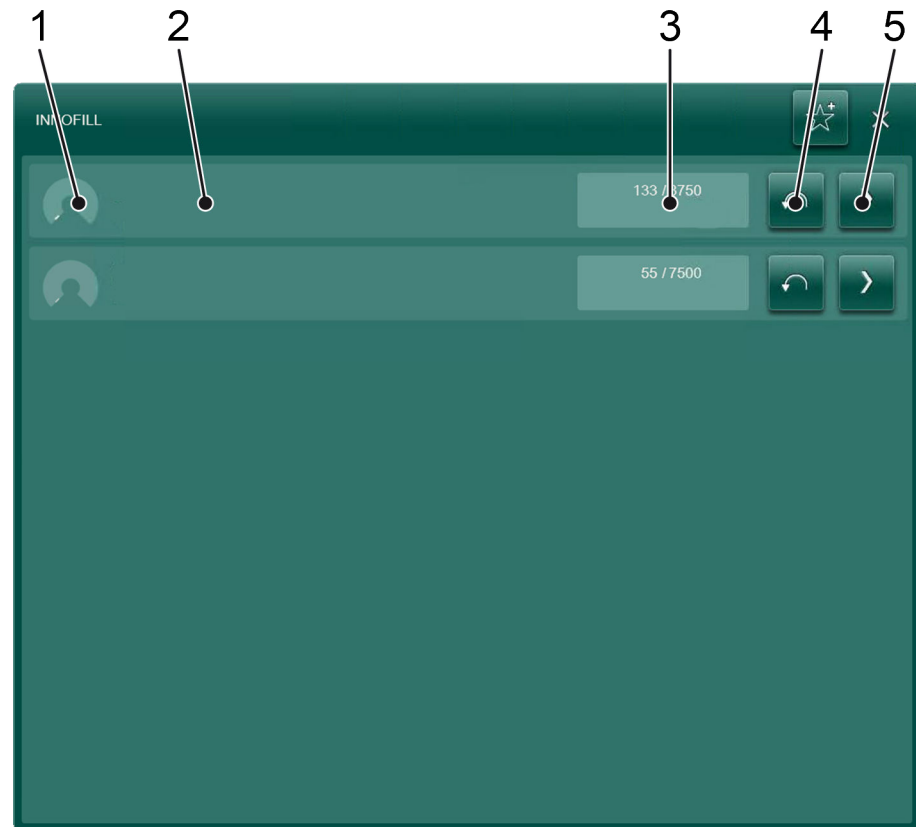


Figure 106: *"Process valve service life"* view

- 1 Display icon
- 2 Service activity
- 3 Operating hours counter for the service life
- 4 Reset counter
- 5 User guidance

This view displays the service activities for the process valves on the machine.

A service activity with the scheduled interval is listed in each row, and is accompanied by a display icon. When one hour of operation has elapsed, the machine control system adds an hour for each service activity and adjusts the filling level of the icons to the number of operating hours completed.

The operating hours counter for the service life starts and stops in parallel with the selection and deselection of a machine program.

Once the advance warning time (7,500 hours) has been reached, a message text is displayed on the HMI indicating the remaining time until the service life of XXX hours is reached:



Carry out preventive maintenance on valve in XXX hours; see operating instructions

The fault message is set together with the program selection

The fault can be acknowledged by the operating personnel

After reaching the service life (8,750 hours), a fault text is displayed on the HMI:

Carry out preventive maintenance on valve; see operating instructions

The number of acknowledgments by the operating personnel until the “Maintenance” measure is confirmed or the process valves are replaced by the maintenance personnel is counted

The resetting of fault messages after maintenance or replacement of process valves by the operator or the KHS service department can only be carried out by maintenance personnel or higher

The process valves are listed individually. Each valve must be reset individually.

If a service activity is defined, the user can tap the “*User guidance*” button to be guided through the service activity.

The “*Reset counter*” button is only used for commissioning the machine by KHS personnel.

Reset counter

The valve service life can be reset in this view.

The user must confirm the reset of each process valve individually.



Figure 107: “Reset counter” view



3.5.5.10.4 Interfaces

The “Interfaces” view can be opened via “Service → Interfaces”. This view shows the possible interfaces to and from the machine.

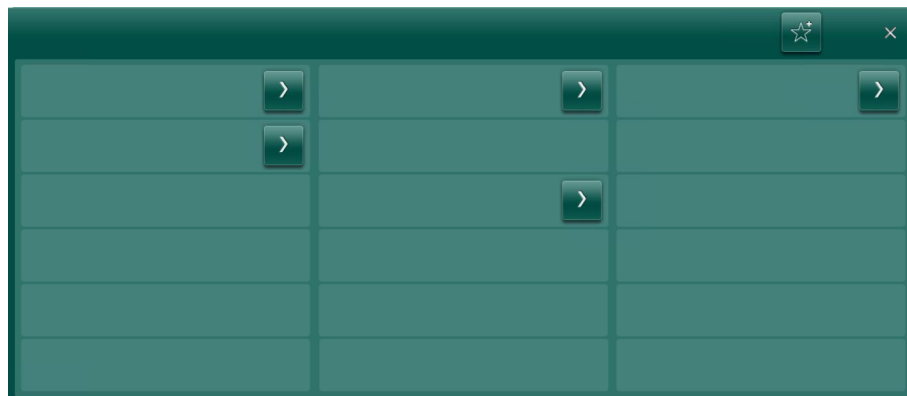


Figure 108: “Interfaces” view



The second page of the “Interfaces” view can be opened via .

The second page of the “Interfaces” view shows the status for the components of the selected interface.

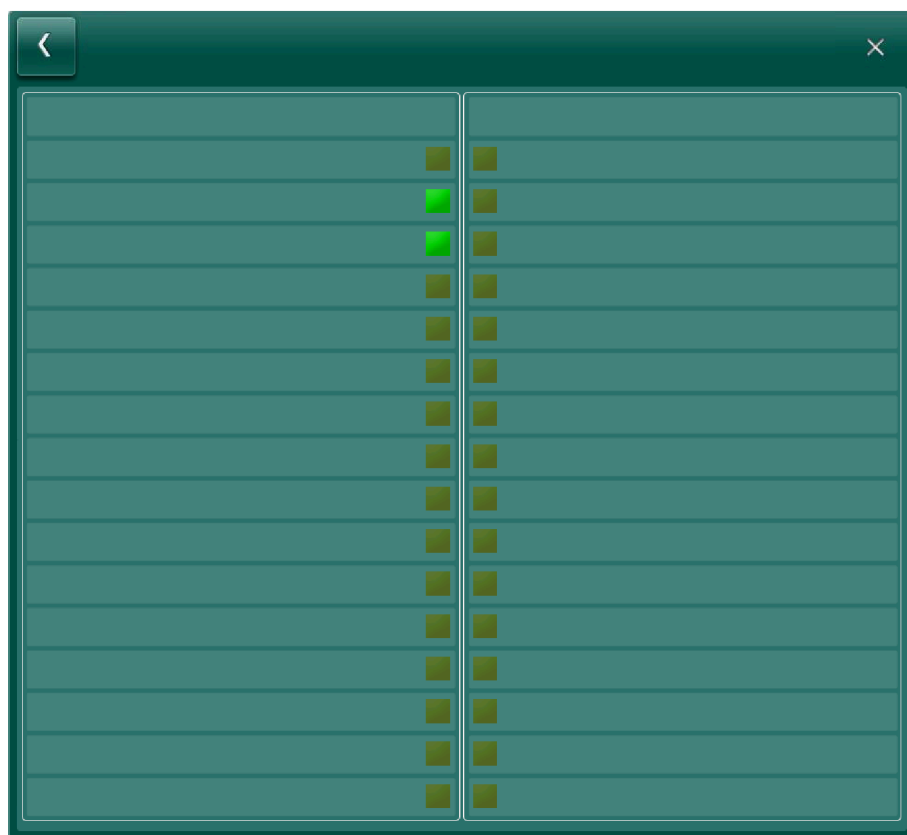


Figure 109: “Interfaces” view, second page

The component status can be seen in the status display:



Color	Meaning
Light green	Signal
Dark green	No signal



The first page of the “*Interfaces*” view can be opened using .

3.5.5.10.5 Maintenance

The “*Routine maintenance*” view is opened via “*Service* → *Routine maintenance*”. The operator can reset the meter and update the service interval in this view.

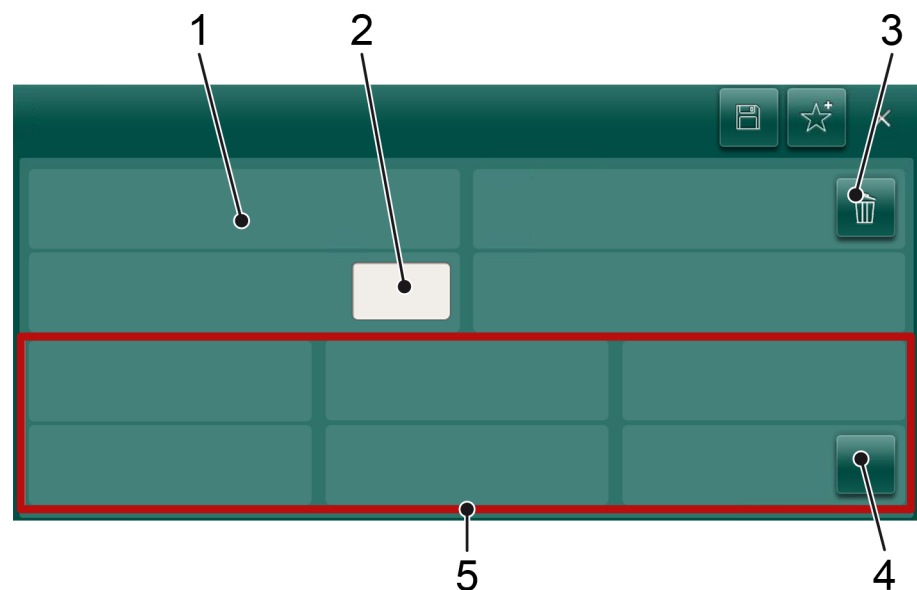


Figure 110: Maintenance view

- 1 Maintenance hours meter
- 2 Service interval
- 3 Resetting the maintenance hours meter
- 4 Confirm
- 5 Lubrication cycles

The operator will see the following lubrication cycles:

- Time between lubrication cycles
- Time until next lubrication cycle
- Setpoint for number of lubrication cycles
- Number of lubrication cycles
- Confirmation for manual lubrication cycles

The operator confirms that the manual lubrication cycle has been carried out via the “*Confirm*” button.



3.5.5.11 Note

The “About...” view opens when the user taps  in the menu bar. This view shows the manufacturer's contact information and information about the machine.

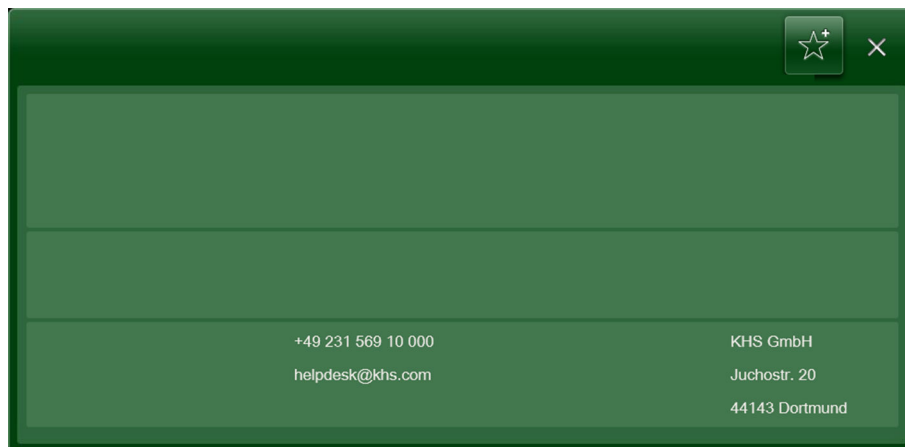


Figure 111: “About” view

3.5.6 Filler

3.5.6.1 Menu structure

The table displays the commands in the menus that are applicable for the component selected in the navigation screen. The user opens the relevant view using these commands.

Icon	Name	Command
	Overview	Overview
	Programs	Stepview 1
		Functions
		Program options
		Filler computer mode
	Messages	Current messages
		Message history
	Type	Height adjustment
	Parameters	Setpoints, controllers
		Filling process
		Filling parameters



Icon	Name	Command
	Statistics	Trend
	Service	Filler graphic
		Test function/filler valve
		Interface
		Actual values
	Note	Not assigned

3.5.6.2 Overview

Open the “*Overview*” by pressing “*Overview*”. This view displays all the components of the filling machine.

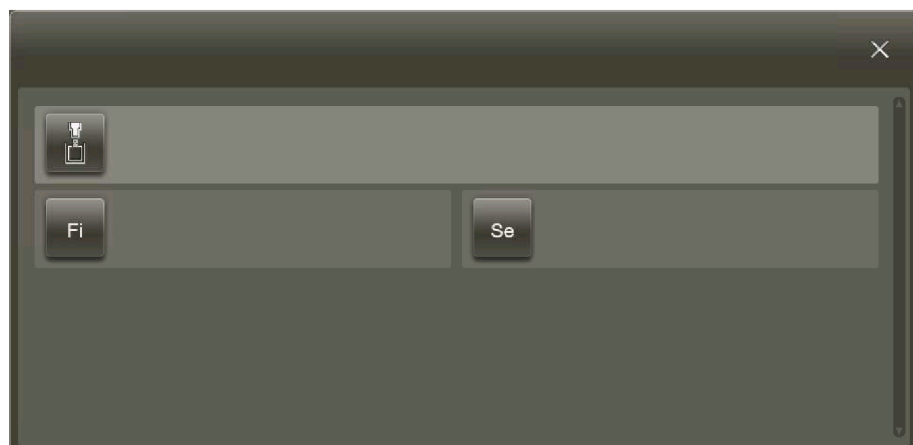


Figure 112: “*Overview*” view

The operator is able to select a component.

3.5.6.3 Programs menu

The “*Programs*” menu contains the following commands:

Command	Meaning
“ <i>Stepview 1</i> ”	Opens a view in which the user can start programs for production and cleaning.
“ <i>Functions</i> ”	Opens a view in which the user can choose between automatic and manual mode and switch machine functions on or off.



Command	Meaning
<i>"Program options"</i>	Opens a view in which the user can select programs to change the product and end production.
<i>"Filler computer mode"</i>	Opens a view in which the user can set a machine function for the filler computer.

3.5.6.3.1 Stepview 1

The *"Stepview 1"* view opens via *"Programs → Stepview 1"*. The view displays the current program and the user can select individual program steps.

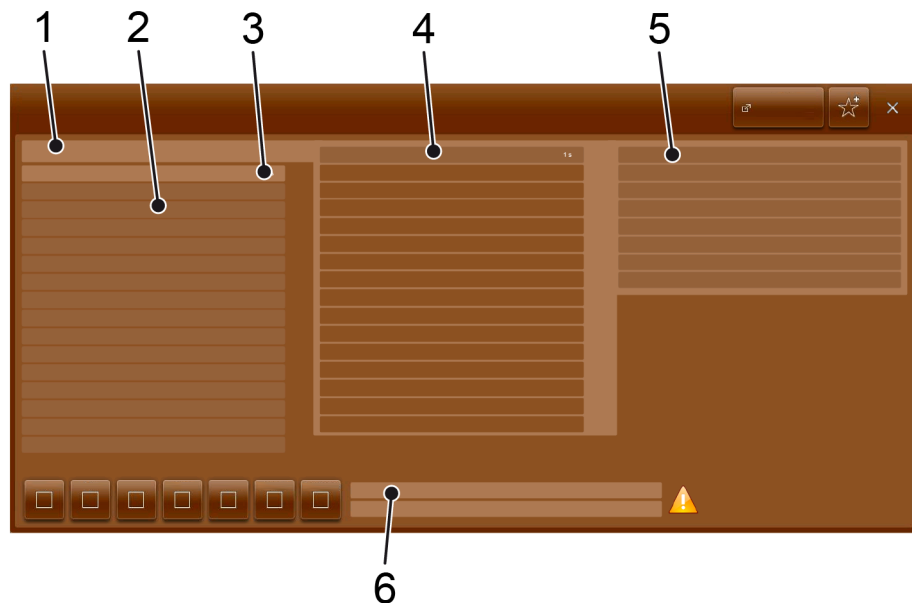


Figure 113: *"Stepview 1"* view

- 1 Name of the selected program
- 2 Main program
- 3 Active main program with remaining time
- 4 Active sub-routine with remaining time
- 5 Transition conditions for sub-routine
- 6 Operator information

The transition conditions are color-coded and show whether the conditions for continuing a program, sub-routine or program step have been met. The conditions that must be met are listed in the *"Operator information"*.

**Transition condition**

Color	Meaning
Light green	Prerequisite met
Dark green	Prerequisite not met

**NOTICE!**

The functions ***“Stop”***, ***“Reset”***, ***“Select”*** and ***“Monitoring”*** change the program sequence.

These options may only be used by KHS service personnel or personnel authorized by KHS.

The manufacturer is not responsible for faults in production or product faults resulting from misuse by unauthorized personnel.

The operator can control the programs in the *“Stepview 1”* view using the following options:

Option	Meaning
FS1	Continues the program with various alternatives. Additional operation steps can then be found in the operator information.
FS2	
FS3	
Stop	Stops processing of the program in the current step. A cross flashes in the symbol. Tapping on this symbol again continues processing of the program and the cross disappears.
Reset	Ends processing of the program and resets the program to the initial state.
Select	Activates program selection.
Monitoring	Monitors individual faults.



“Filler graphic” opens the *“Service → Filler graphic”* view.

Select

“Select” activates the program selection in the view, allowing the operator to select and start programs and individual program steps.

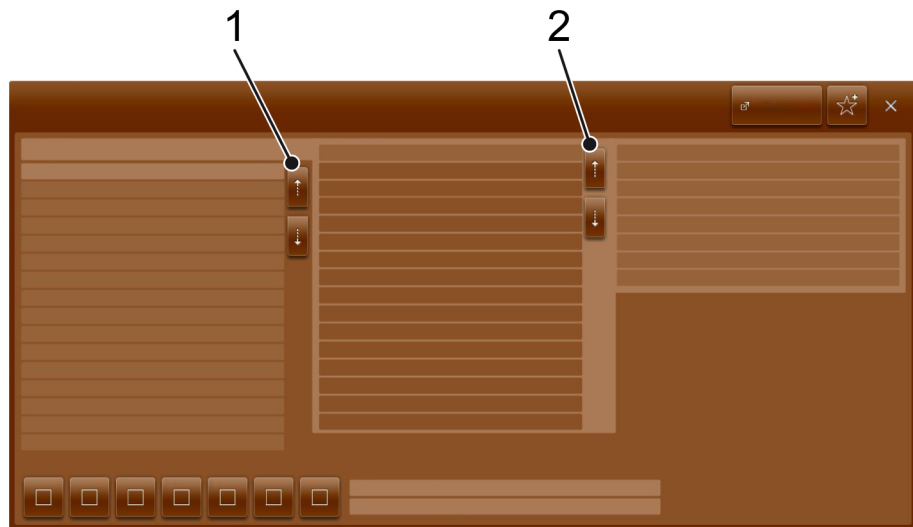


Figure 114: Activated program selection

- 1 Select main program step
- 2 Select subprogram step

Selecting the program step

1. ➤ Click on *“Select”*.
2. ➤ Using the *“Select main program step”* arrows, select the main program step.
3. ➤ Using the *“Select subprogram step”* arrows, select the subprogram step.



4. Click on *"Select"* again.

⇒ A dialog opens containing the question: *"Do you really want to execute the action?"*

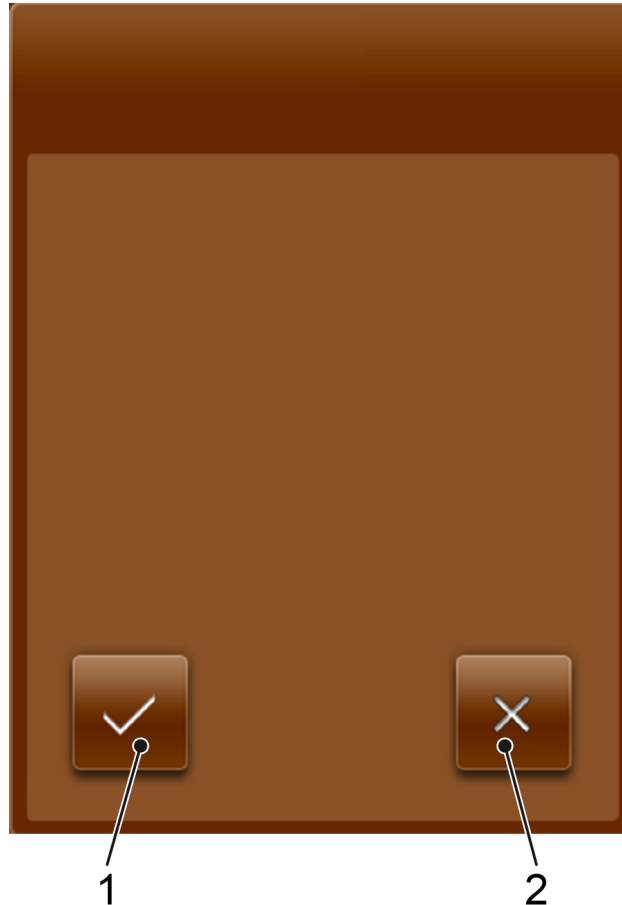


Figure 115: Stepview confirmation

- 1 Confirm selection of the program step
- 2 Cancel selection of the program step

5. Confirm or cancel selection of the program step.

⇒ After confirm of the program step, the step selection is carried out.

3.5.6.3.2 Functions

The *"Functions"* view can be opened via *"Programs → Functions"*. In this view, the operator can switch various functions on or off and toggle between automatic and manual modes.

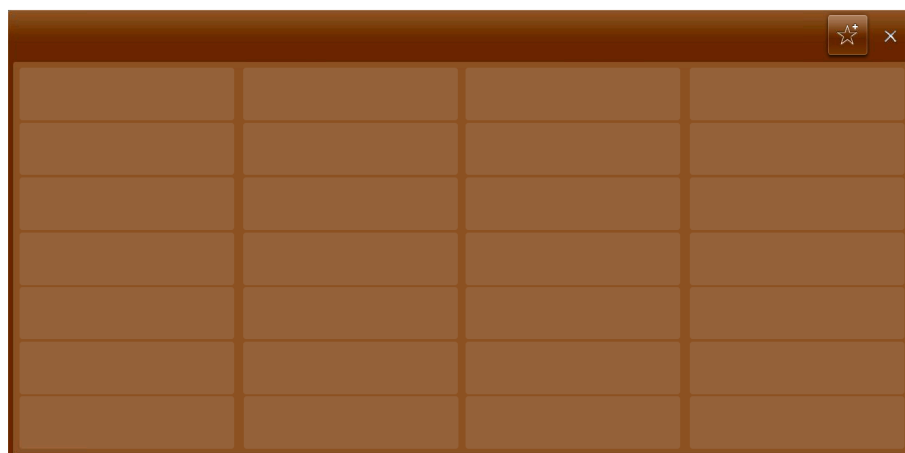


Figure 116: "Functions" view

The following section lists and describes all functions of the machine. Depending on the equipment and degree of automation of the machine, the function buttons are active and visible in the graphical user interface.

Function	Meaning
Product pump	Switches the product pump on and off.
Return pump	Switches the return pump on and off.
Analog value monitoring	Switches automated valve monitoring on and off.
MANUAL can spraying	Switches can spraying to manual mode so that the operator switches can spraying on or off.
AUTO can spraying	Switches can spraying to automatic mode and transfers control to the control program.
MANUAL bell spraying	Switches bell spraying to manual mode so that the operator switches bell spraying on or off.
AUTO bell spraying	Switches bell spraying to automatic mode and transfers control to the control program.
Nitrogen dosing	Switches nitrogen dosing on or off.
Alcohol spraying	Switches alcohol spraying on and off.
CO ₂ return	Switches the CO ₂ return on or off.
UV lamp	Switches the UV lamp on or off.
Bell relief	Switches the bell relief on and off.



Function	Meaning
Lighting ON	Switches the machine lighting on.
Move ladder position	Automatically move the ladder to the access position in order to access the filler turret.

3.5.6.3.3 Program options

The *“Program options”* view can be opened via *“Programs → Program options”*. The user can select programs to change the product and end production in this view.



Figure 117: *“Program options”* view

3.5.6.3.4 Filler computer mode

If no automated program is active, the *“Filler computer mode”* view can be opened via *“Programs → Filler computer mode”*. The user can set a machine function for the filler computer in this view.

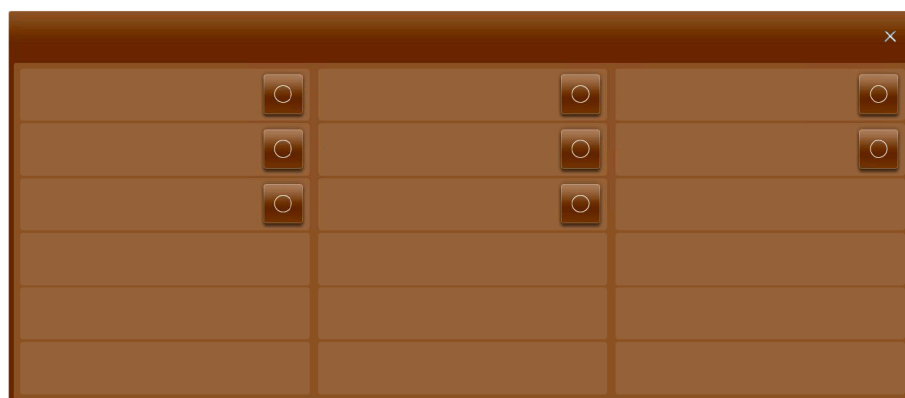


Figure 118: *“Filler computer mode”* view



The machine functions are described as *“Machine functions of the filling valves”* in the *“Layout and function”* chapter, section *“Can filling machine”*.

3.5.6.4 Messages menu

The *“Messages”* menu contains the following commands:

Command	Meaning
<i>“Current messages”</i>	Opens the <i>“Current messages”</i> view with the current messages that need to be processed by the operator.
<i>“Message history”</i>	Opens the <i>“Message history”</i> view with a history of all messages.

The views are the same for all components. Messages are displayed for all components.

3.5.6.5 Parameters menu

The *“Parameters”* menu contains the following commands:

Command	Meaning
<i>“Setpoints, controllers”</i>	Opens a view where the operator can set various pressure setpoints and control valves.
<i>“Filling process”</i>	Opens a view where the operator can set filling parameters.
<i>“Filling parameters”</i>	Opens a view where the operator can change the filling parameters during production.

3.5.6.5.1 Setpoints and controllers

The *“Setpoints, controllers”* view can be opened via *“Parameters → Setpoints, controllers”*. In this view, the operator can toggle between the setpoints and controllers that he wishes to set.

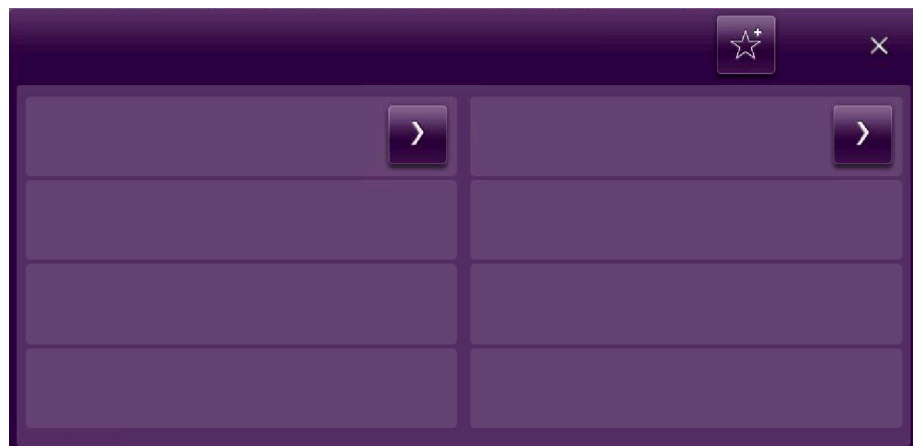


Figure 119: “Setpoints, controllers” view



The second page of the “Setpoints, controllers” view can be opened using  in each case.

Setpoints

The “Setpoints” view opens if the user has selected “Setpoints” in the “Parameters → Setpoints, controllers” view. This view shows the various setpoint values for pressure, temperature and filling level that apply irrespective of the type.

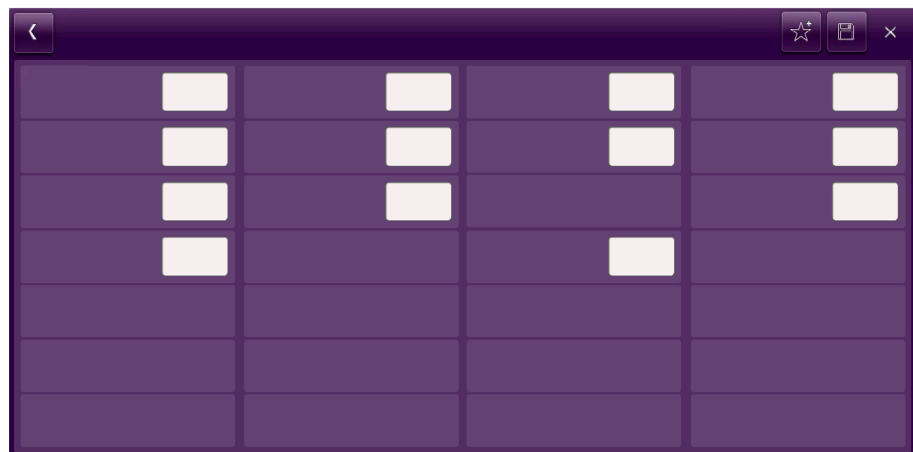


Figure 120: “Setpoints” view

It is not always possible to see all values. The operator can change the following values regardless of type:

Setpoint	Meaning
Bowl level tolerance	Tolerance range for bowl filling level as a percentage.
Bowl partial filling	A partially filled bowl can contain up to 10% product.



Setpoint	Meaning
Bowl full	A full bowl contains 95% product.
Bowl empty	An empty bowl can contain up to 2% product.
Pressurization gas tolerance	Tolerance range for pressurization gas pressure.
Pressurization gas pressure dropped	Value below which pressurization gas pressure must not drop. If the pressurization gas pressure falls below this value, a message will be displayed.
Fixed value 60-460 primary product feed	Opens the control valve to a defined percentage: ■ 0% is closed ■ 100% is fully open
Pushback pressure	Pressure to force back liquid.
Pressure for CIP cleaning	Detergent pressure.
Pressure when rinsing out	Pressure for rinsing out.
Return gas pressure tolerance	Tolerance range for return gas pressure.
Contents of the pipeline	The contents of the pipeline between the mixer and the filler or between the flash pasteurizer and the filler. This value is required when shutting down production in order to calculate the number of containers that can still be filled.
Max. STOP time with ozone	Downtime after which the entire content of the ring bowl is either discharged into the open air or pushed back to the water treatment plant/ozonator so that fresh ozonized product can be fed into the bowl.
Steaming setpoint time	Time during which steaming is to take place.
Pressure when blowing out	Pressure for blowing out.
Setpoint for fresh-water rinse following filler rounds	Optional number of filler rounds to be followed by a rinse with fresh water.
Fixed value for CIP pump MA270	The CIP pump runs at a set output between 0% and 100%.
Fixed value for CIP pump MA270 pumping out	The CIP pump runs at a set output between 0% and 100% when pumping out.



Setpoint	Meaning
Fixed value of return pump when steaming	The return pump runs at a set output between 0% and 100% when steaming.
CIP bowl level	Bowl filling level during CIP cleaning as a percentage.
Fixed value for product return pump MA110 heating up	The product return pump runs at a set output between 0% and 100% when heating up.
Fixed value for product return pump MA110 filling up	The product return pump runs at a set output between 0% and 100% during the primary product feed.
MM460 pressure when heating up	Pressure at product control valve when heating up the product.
External saturation pressure offset	Adjust the setpoint for the bowl pressure specified by the mixer or product line. The <i>“External saturation pressure”</i> must first be selected via <i>“Programs → Program options”</i> .
Setpoint for return temperature 62-51	Optional temperature at the CIP return pump.
Setpoint for steam temperature 60-540	Optional steam temperature in the steam line.
Setpoint for steam temperature in product line 60-231	Optional steam temperature in the product line.
Fixed value for product return pump MA110 circulation	The product return pump runs at a set output between 0% and 100% during the circulation of the product.
Fixed value for product return pump MA110 production	The product return pump runs at a set output between 0% and 100% during the filling process.
Bell pressure setpoint	Pressure for raising and lowering the bell.
Minimum bowl filling level	Minimum bowl filling level at which the containers are still completely filled.
Maximum water pressure	Maximum value for the water pressure in the valve manifolds.



Setpoint	Meaning
CO ₂ suction	Speed at which the frequency converter of the CO₂ extractor should run. The following conditions must be met to start the suction: ■ The filler is turning ■ The bottle stopper is open ■ The filler is in the main program "Production" and the subprogram "Production" If the bottle stopper closes, the CO₂ suction stops and switches off after five minutes.
Booster pump setpoint	Determines the power of the booster pump.
Downtime for ozonized water	If the filler has stopped, the product in the bowl will no longer be used after a specified downtime. The downtime can be set for 0 to 120 minutes. After this time, the bowl will be emptied.
Additional BBT/correction pressure	This adjustable setpoint is added to the setpoint for the filler bowl pressure and then sent to BBT.
Max. STOP time with Velcorin	Downtime after which the entire content of the ring bowl is discharged into the open air so that fresh product with added Velcorin can be fed into the bowl.



The first page of the *"Setpoints, controllers"* view can be opened using .

Controller selection

The *"Controller selection"* view opens if the operator has selected *"Controllers"* in the *"Parameters → Setpoints, controllers"* view. This view lists the various pressure and level controls for the filler.

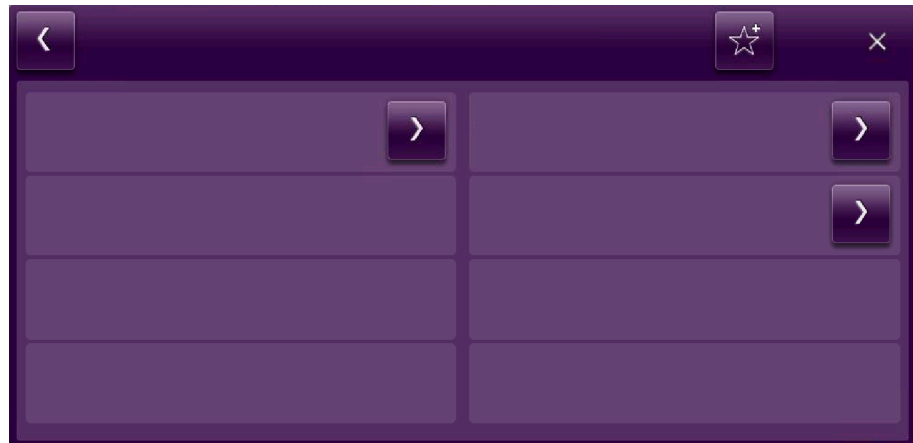


Figure 121: "Controller selection" view



The first page of the "Setpoints, controllers" view can be opened using .

Users can set each of the following controllers in their own view, called the "controller screen":

Depending on the machine capabilities, not all controllers are available.

- Level infeed controller
- Pressurization gas controller
- Trinox controller
- Return gas controller
- Widget gas controller
- Pressure infeed controller
- Vacuum pump temperature controller
- CIP return pump, boiler level
- Product pump
- Product return pump, bowl level
- CO₂ suction
- Booster pump
- Controller for releasing into the open



The next page "Controller" can be opened via .

Controllers

The "Controllers" view opens when the operator has selected a special controller via the "Parameters → Setpoints, controllers → Controller selection" view. This view is divided into three and displays from left to right for the controller selected:



- Diagram representation of the actual value and setpoint value development of the control variable; for example, pressure.
- Vertical bar display of the control variable for the current actual value and setpoint value, for example, pressure in bar and %.
- Current values for the controller.

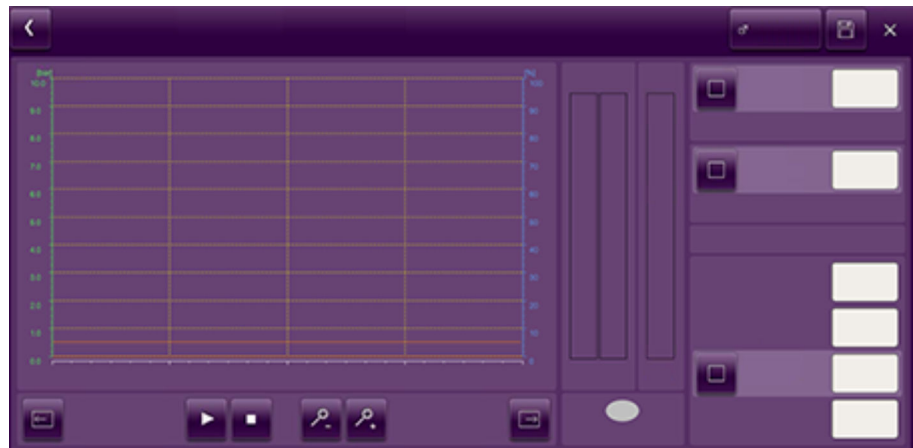


Figure 122: "Controller screen" view

The operator controls the view of the graph using the icons:

Icon	Meaning
<<	Move detail to the left.
>>	Move detail to the right.
	Start recording.
	End recording.
	Minimize detail.
	Maximize detail.



The first page of the "Controller selection" view can be opened via .

**NOTICE!****Changing the controller parameters**

Unauthorized modification of the values may lead to production malfunctions and product faults.

Only KHS personnel or authorized personnel may modify controller settings.

KHS will not be held liable for production malfunctions and product faults resulting from misuse by unauthorized personnel.



“Filler graphic” opens the *“Service → Filler graphic”* view.

3.5.6.5.2 Filling process

The *“Filling process”* view can be opened via *“Parameters → Filling process”*. It comprises two pages and displays a schematic diagram of the filling process with relevant parameters.

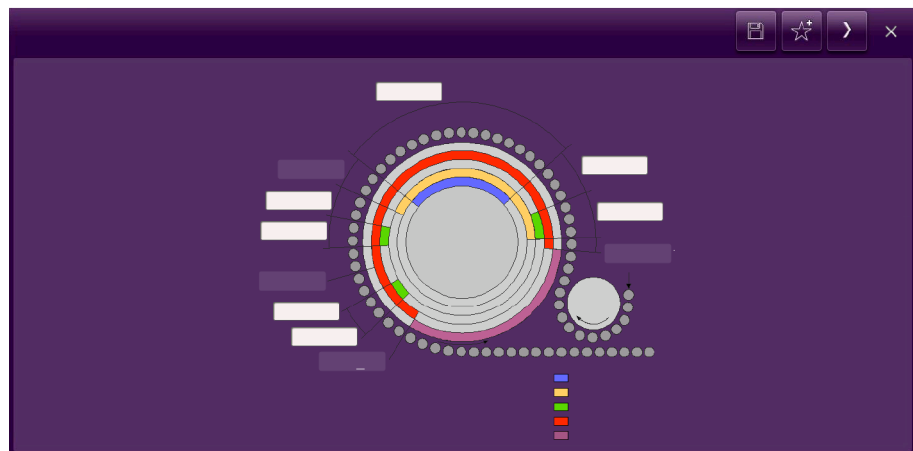


Figure 123: “Filling process” view, first page

The fields display parameters for the filler. Parameters in fields with a white background can be changed. Parameters in fields with a colored background are actual values.



The second page of the *“Filling process”* view can be via .

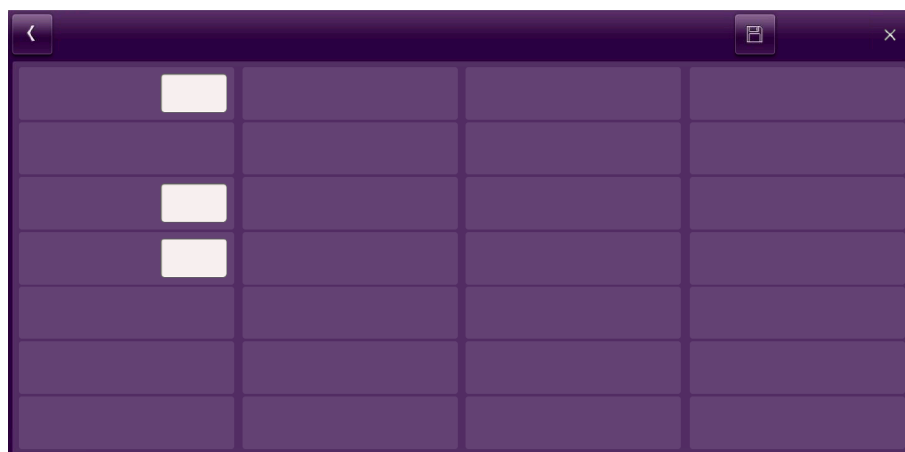


Figure 124: “Filling process view”, page 2



The first page of the “Filling process” view can be opened via .

All parameters are dependent on the type. The following values can be changed by the operator in the input fields:

Filling parameters	Meaning
Maximum filling time	Enter the maximum filling time after which the main cylinder is forced closed, in milliseconds.
Media correction	Enter the correction value corresponding to the product (as a percentage). This correction value changes the measurement behavior of the flow meter (IFM) as regards the density and conductivity of the product.
Valve suspension	Enter the filling volume (in milliliters) that still flows into the can in the period between actuating the main cylinder and actually closing the filling valve.

The operator can choose from the following pressurization gases:

Option	Meaning
Pre-pressurization: air	Uses air for pre-pressurization.
CO ₂ pre-pressurization	Uses CO ₂ for pre-pressurization.

Save settings



The operator must save changes in this view specifically using ; otherwise these will not be adopted. The values are saved according to type.



3.5.6.5.3 Filling parameters

The “*Filling parameters*” view can be opened via “*Parameters*” → “*Filling parameters*”. This view displays a graphic representation of the filling valve together with the parameters.

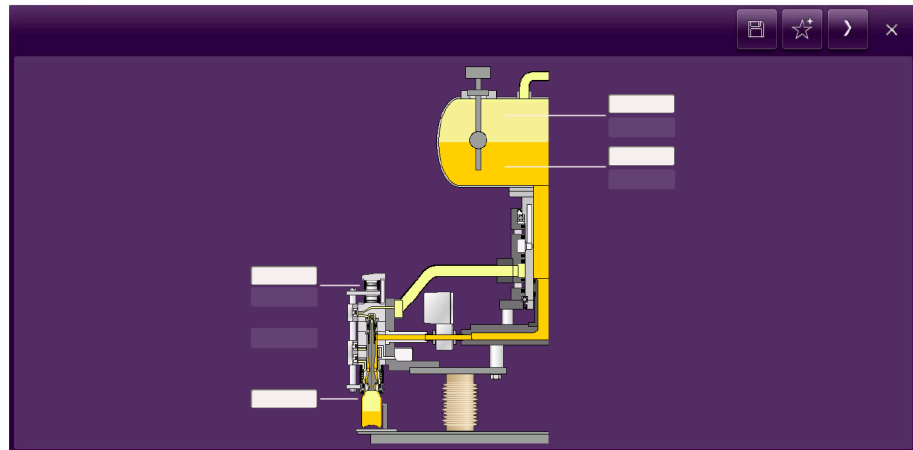


Figure 125: Filling parameters view, first page

For explanations of the parameters, see chapter “*Layout and operation*”, section “*Function of filling valves*”.

Setting the parameters

Changing the filling parameters in the input fields.

Parameters in fields with a white background can be changed. Parameters in fields with a colored background are actual values.



The second page of the “*Filling parameters*” view can be opened using .

All parameters vary by type. The following values can be changed by the operator in the input fields:

Filling parameters	Meaning
Bowl pressure	Current medium pressure in bar.
Bowl level	The level of product in the ring bowl determines the filling speed.
Target fill level	Determines the quantity in ml.
Bell pressure	Current bell pressure in bar.

Save settings



The operator must save changes in this view specifically using ; otherwise these will not be adopted. The values are saved according to type.



The operator can change the type-dependent filling parameters in this view.

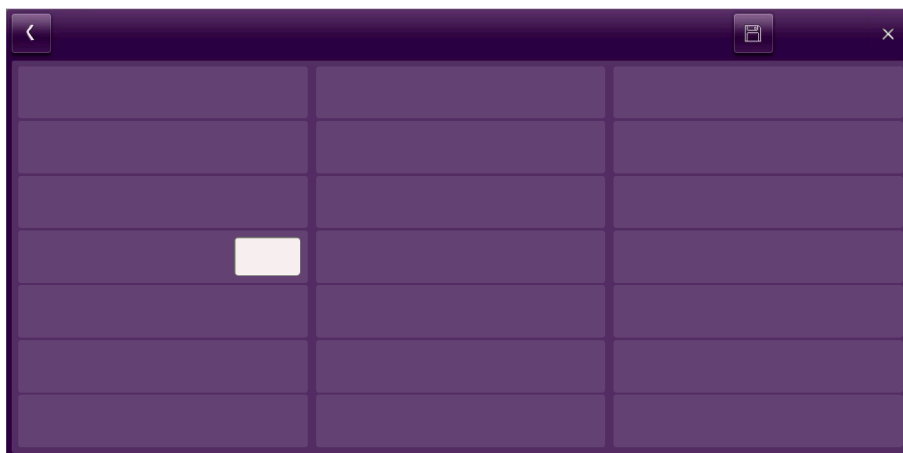


Figure 126: “Filling parameters” view, second page



The first page of the “Filling parameters” view can be opened using .

The filling parameters are briefly described below.

Filling parameters	Meaning
Fill until empty meter	The number of cans to still be filled when running the machine empty.

Save settings



The operator must save changes in this view specifically using ; otherwise these will not be adopted. The values are saved according to type.

3.5.6.6 Statistics

3.5.6.6.1 Trend

The “Trend” view opens via “Statistics”. The view shows how various parameters changed over time.

The view is divided into three parts:

- The progression curves are shown in the middle
- The buttons that the operator can use to control the recording and display are below the progression curves
- The legend appears in the box on the right

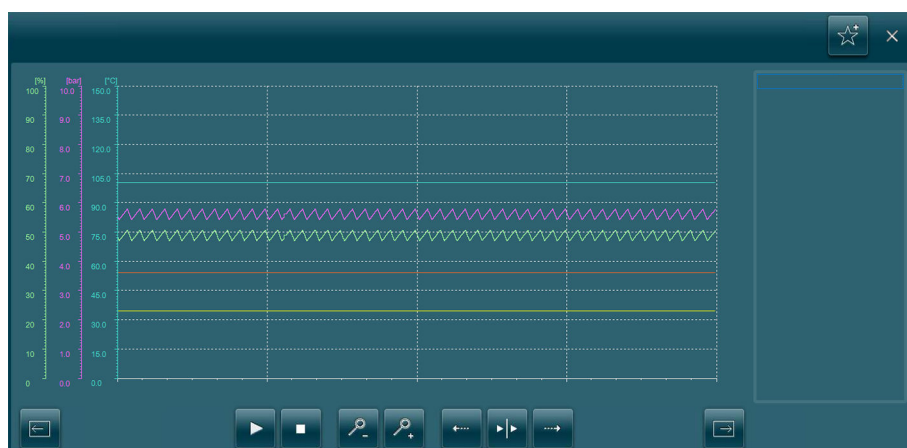
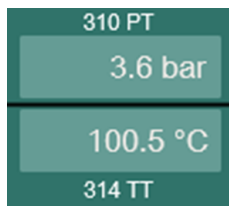


Figure 127: "Trend" view

The operator controls the view of the graph using the icons:

Icon	Meaning
	Move the display backward chronologically.
	Start recording.
	Stop recording.
	Maximize detail.
	Minimize detail.
	Select an earlier time point.
	Display parameter values of a time point. This time point is represented in the diagram by a vertical solid line.
	Select a later time point.
	Move the display forward chronologically.



Shows the media temperature and media pressure.



Shows the filling level in the ring bowl as a percentage.



“Stepview 1” opens the *“Programs → Stepview 1”* view.



The button opens the *“Water graphic”* view in the *“Service”* menu of the machine.



NOTICE!

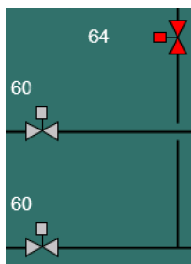
The following functions change the program sequence.

These functions may only be used by KHS service personnel or personnel authorized by KHS.

The manufacturer will not be held liable for any production or product failures resulting from operating errors made by unauthorized persons.

Valves

If the operator taps a valve icon, a dialog opens with the following valve functions:



Icon	Function
	Monitoring OFF
	Monitoring ON

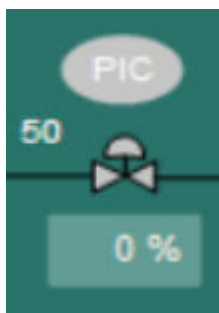


Icon	Function
	Hand OFF
	Hand ON
	Valve closed (OFF)
	Valve open (ON)

The color of a valve represents the following:

Color	Meaning
Gray	The valve is closed.
Green	The valve is open.
Flashing green	The valve does not open.
Flashing red	The valve does not close.
Framed in red	Valve monitoring is switched off.
No background	Automatic level is switched on.
Blue background	Manual level is switched on.

Controllers



The output field indicates how far the controller is open as a percentage.

The color of a controller represents the following:

Color	Meaning
Green	The controller is active.
Yellow	The controller is set to a fixed value.



Color	Meaning
Blue	The controller is permanently set to a fixed setting.
Blue background	Manual level is switched on.

3.5.6.7.2 Test functions/filling valve

The *“Test functions/filling valve”* view opens via *“Service*
→ *test functions/filling valve”*.

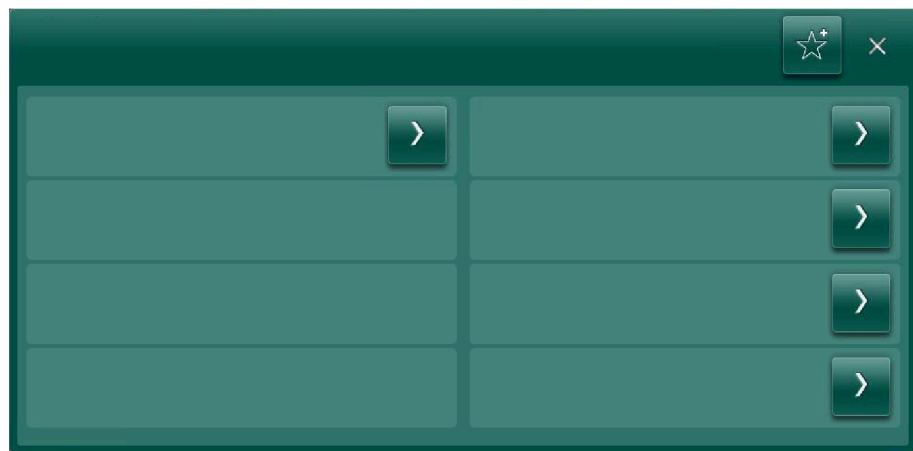


Figure 130: *“Test functions/Filling valve”* view

The functions are described briefly below.

Function	Meaning
<i>“Test functions”</i>	Perform test functions on the filling valves and on the filler computer.
<i>“Filling valve correction”</i>	Set the flow meter correction value.
<i>“Send correction value to the filler computer”</i>	Set the flow meter correction value.
<i>“Read correction valve from the filler computer”</i>	Reads flow meter correction values from the filler computer.
<i>“IFM bridging”</i>	Bridges a defective inductive flow meter (IFM). The neighboring flow meter takes over the function of the defective inductive flow meter.



The second page of the *“Test functions/Filling valve”* view can be opened using .



Test functions

Before the *“Test functions”* view is opened via *“Service → Test functions/filling valve → Test functions”*, a dialog opens with the question: *“Should the filling operation really be ended?”*

If the operator answers with *“OK”*, the dialog closes and the *“Test functions”* view opens. Filling is suspended.

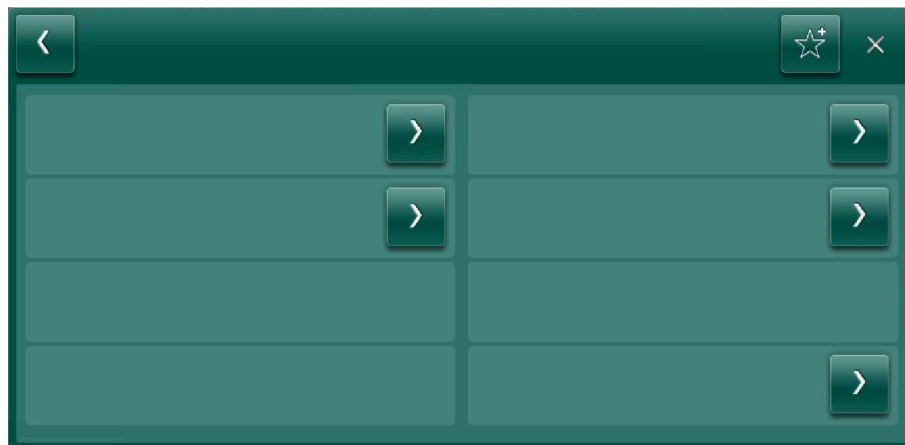


Figure 131: *“Test functions”* view, first page

The operator can test the following functions:

Function	Meaning
<i>“Inputs”</i>	Tests the input signals on the filler computer.
<i>“Outputs”</i>	Tests the output signals on the filler computer.
<i>“Memory dump”</i>	Displays the storage area of the filler computer.
<i>“Test filling”</i>	Tests one or more neighboring filling stations using a test fill when the machine is stopped.
<i>“Wiring test”</i>	Tests the various cylinders on the filling valve, either individually or together.



The next page of the *“Test functions”* view can be opened using .

Inputs

The *“Inputs”* view opens, if the operator has selected the inputs in the *“Service → Test functions/filling valve → Test functions”* view. The user can test the various input signals here.

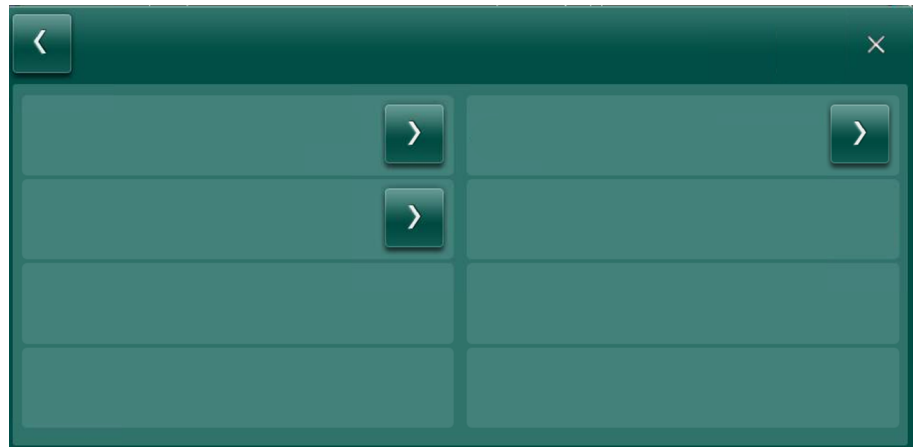


Figure 132: “Test functions” view, second page: Inputs



Open the first page of the “Inputs” view by tapping .

The operator can select from the following inputs:

Input	Meaning
Machine cycle	Tests the input signal for the machine cycle.
Synchronous cycle	Tests the input signal for the synchronous cycle.
Can sensor	Tests the input signal for can detection.
Machine cycle 1:10	Tests the input signal for machine cycle 1:10.



The next page of the “Test functions, Inputs” view can be opened using .

Input testing

The “Inputs test screen” view opens if the user has selected an input in the “Test functions → Inputs” view. The view shows whether the input is available or not.

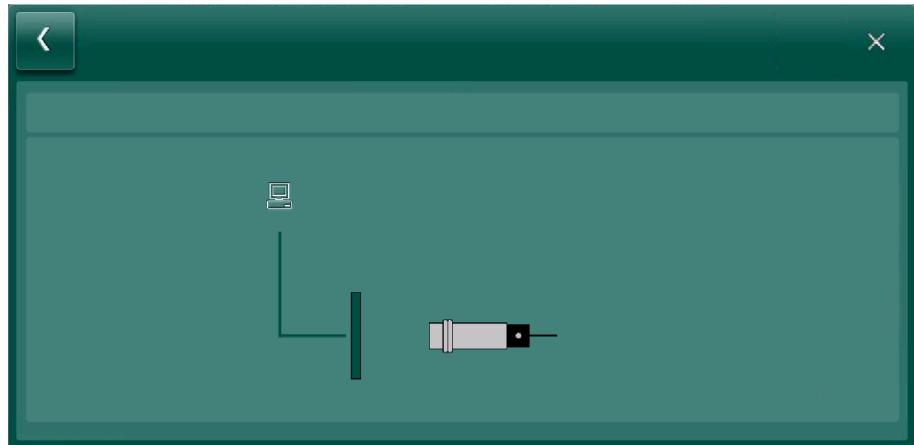
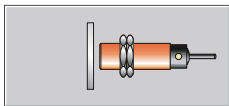
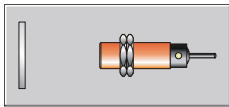


Figure 133: “Inputs test screen” view

To test the input, the user must hold a can or a piece of metal in front of the selected sensor. Read the result from the icon on the test screen:



The sensor is activated and therefore an input signal is present.



The sensor is not activated and therefore no input signal is present.

Outputs

The “Outputs” view opens if the user has selected the outputs in the “Service → Test functions” view. The user can test the various output signals here.

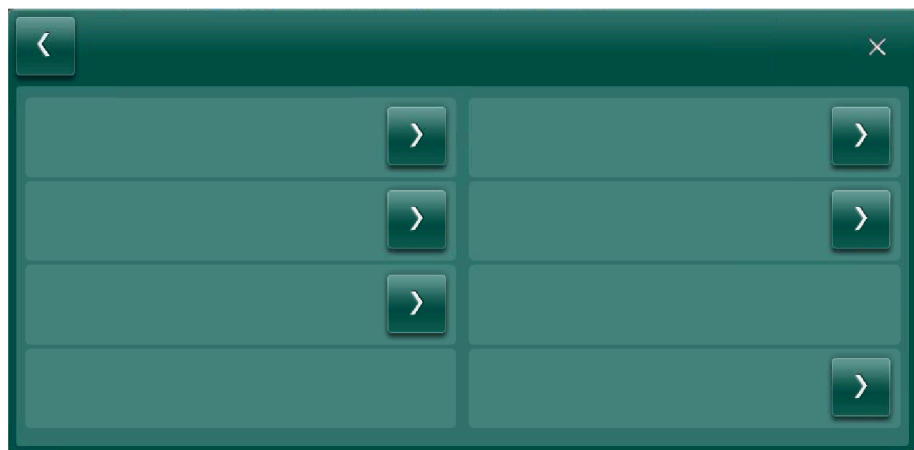


Figure 134: “Test functions” view, second page: Outputs



The first page of the “Test functions” view can be opened via .

The operator can select from the following outputs:



Output	Meaning
...cylinder	Tests the output signal for operation of the control cylinders on the filling valves.
Signal...	Tests the signal for data transfer between the filler computer and control program (PLC).



The next page of the “*Outputs*” view opens via .

Cylinder

The “*Cylinder*” view opens when the user selects a cylinder in the “*Test functions* → *Outputs*” view. The user can test the cylinder for the selected filling valve here.

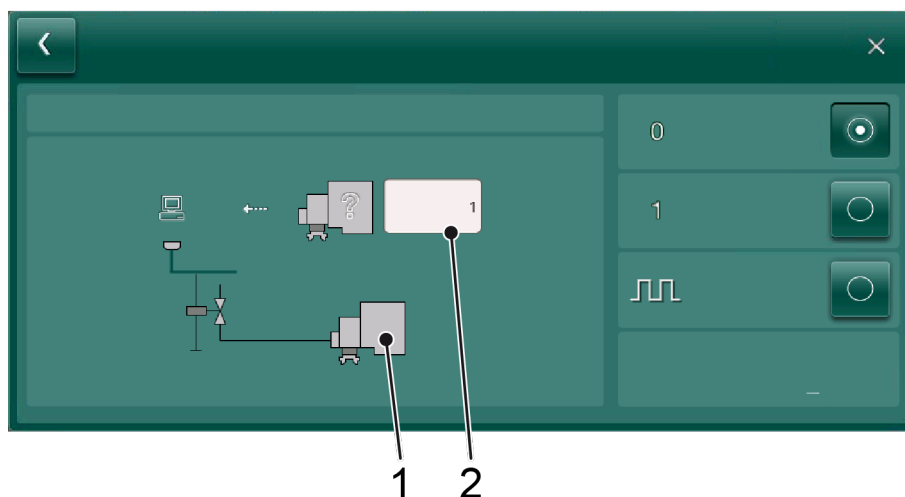


Figure 135: “*Outputs*” view, third page: *Cylinder*

- 1 Output display
- 2 Filling valve number

The user can select one of the following options to activate the respective test:

Option	Meaning
	Signal off
	Signal on
	Cycle signal

During testing, the color of the filling valve represents the status of the cylinder:



Color	Meaning
Gray	Cylinder is closed.
Yellow	Cylinder is open.
Flashing yellow	Cylinder being cycled.



Open the “*Outputs*” view by tapping .

Signal

The “*Signal*” view opens when the user selects a signal in the “*Test functions* → *Outputs*” view. The user can test the signal to the filler computer here.

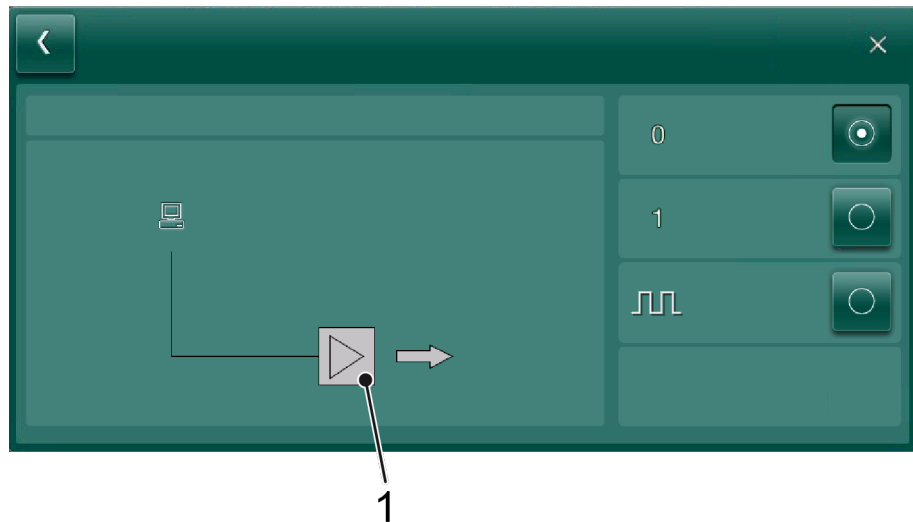


Figure 136: “*Outputs*” view, third page: *Signal*

1 Output

The user can select one of the following options to activate the respective test:

Option	Meaning
	Signal off
	Signal on
	Cycle signal

During testing, the color of the output represents the status of the signal:



Color	Meaning
Gray	Signal is off.
Yellow	Signal is present.
Flashing yellow	Signal is cycling.



Open the “*Outputs*” view by tapping .

Memory dump

Choose “*Test functions* → *Storage dump*” in the view. Specific information can be read from the filler computer using a memory dump.

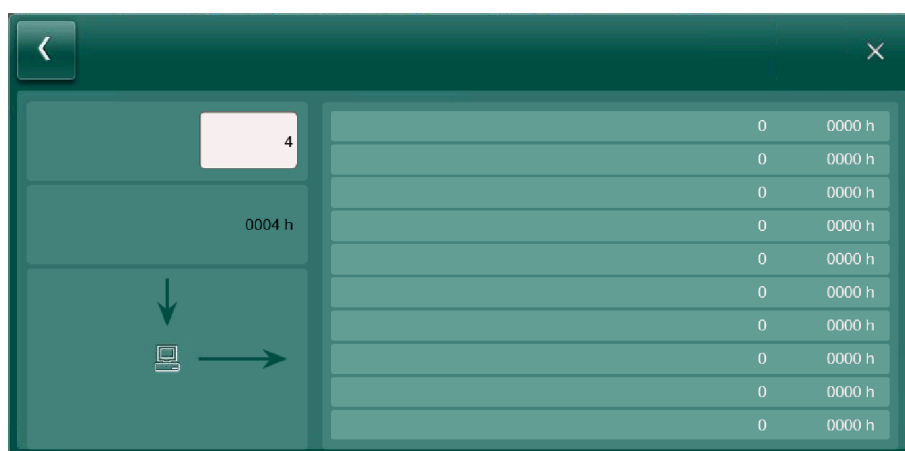


Figure 137: “*Memory dump*” view



The “Memory dump” test function may only be used by KHS service personnel or by personnel authorized by KHS.

Test filling

Follow the menu path “*Test functions* → *Test filling*”. The “*Test filling*” view covers two pages.

The first page contains the warning message: “*Have the required protective measures been taken?*”

If operators are wearing body, face and ear protection, confirm the warning message.

The second page of the “*Test filling*” view will then open.

**WARNING!****Media leakage**

Pressurized product can escape during production due to leaks or broken cans.

As a result of leaks, hot, pressurized, corrosive detergent may escape during the cleaning process.

This could result in death or serious injury.

- Protective clothing must be put on before opening the machine paneling and entering the machine area.

**WARNING!****Machine noise and bangs caused by containers that burst**

Operating the machine during production creates noise.

Containers that burst create loud bangs.

This could result in serious hearing damage.

- Wear ear protection.

On the second page of the view, the user can fill containers at one or more of the adjacent filling stations for the test.

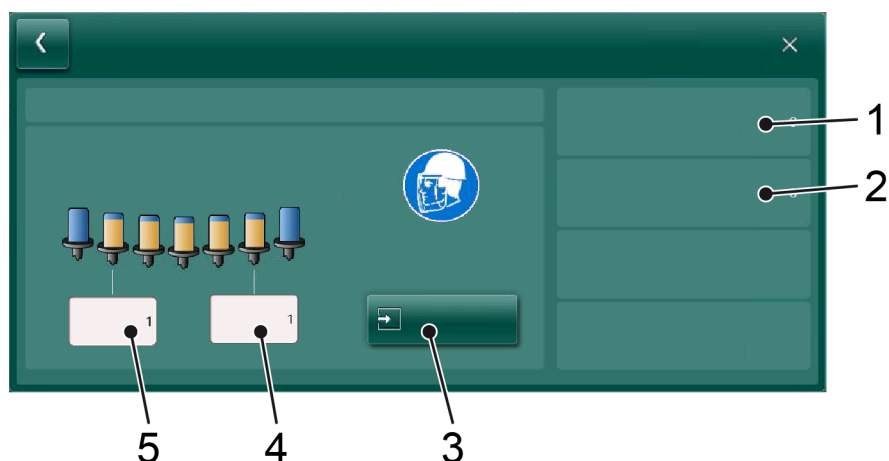


Figure 138: "Test filling" view

- 1 IFM pulses
- 2 Filling time
- 3 Start test filling
- 4 Last filling station
- 5 First filling station



Test filling

1. On the screen, open the *"Test functions → Test filling"* view.
2. Provide empty containers on the filler that are suitable for the filling stations to be monitored.
3. Manually run (jog mode) the filling stations to be monitored to an easily accessible position.
4. In the *"Test filling"* view, enter the first and last filling station for test filling in the input fields.
5. Tap *"Start"* to commence test filling.
 - ⇒ At the end of filling, the measured filling time and the IFM pulses counted are displayed in the output area on the right.

Wiring test

The *"Wiring test"* view can be opened via *"Test functions → Wiring test"*. The operator can test the various cylinders here.



Figure 139: *"Wiring test"* view, first page



The first page of the *"Test functions"* view can be opened via .

The operator can select from the following cylinders:

Output	Meaning
...cylinder	Test the electrical contact on a cylinder.
All cylinders	Test the electrical contact on all cylinders.



The next page of the *"Wiring test"* view can be opened using .



Testing the cylinders

The *"Cylinder"* view opens when the operator has selected the cylinders in the *"Test functions" → "Wiring test"* view. The operator can test the selected cylinder here.

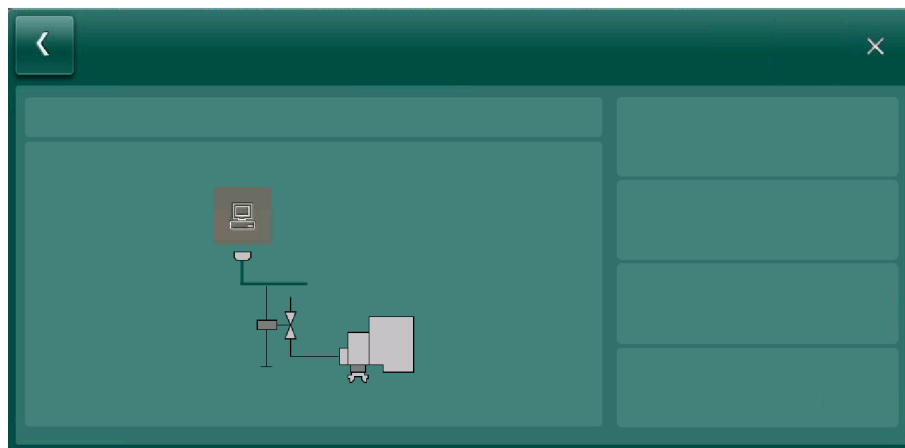


Figure 140: *"Wiring test" view, second page*

A distinction is made here:

Test	Meaning
...cylinder	Once a cylinder is selected, the test on the first filling valve is started by repeatedly opening and closing the cylinder. The same procedure is then followed for testing the same cylinder on all filling valves.
All cylinders	The test on the first filling valve is started by repeatedly opening and closing the individual cylinders. The same procedure is then followed for testing the cylinders on all the filling valves one after the other.

During the test, the filling valve symbol changes color from gray to yellow.



The first page of the *"Wiring test"* view can be opened using .

Filling valve correction

Navigate to the following view and select the option as set out below:
"Test functions/Filling valve" → "Filling valve correction".

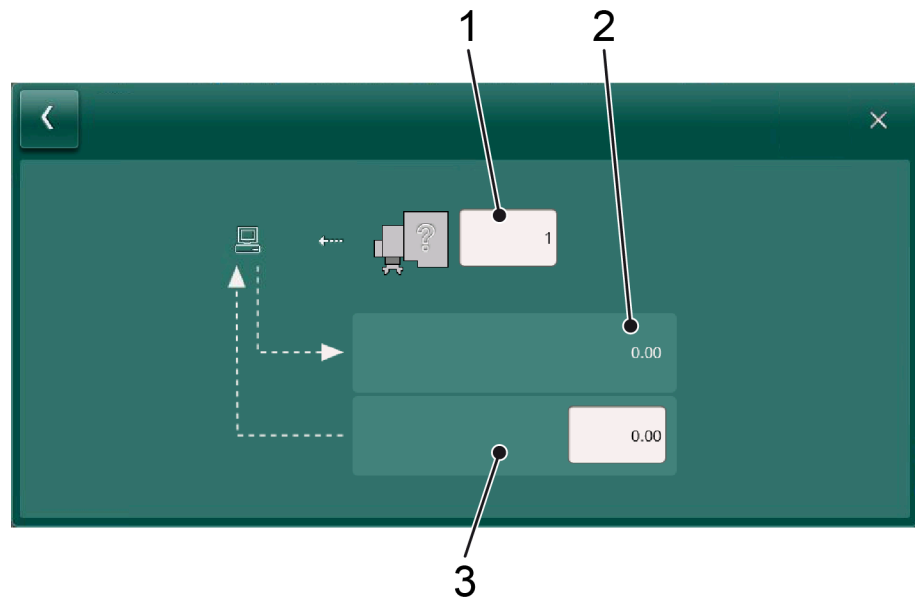


Figure 141: Filling valve correction

- 1 Input of the filling station number
- 2 Display showing the current correction value
- 3 Input of the new correction value

The correction values change the flow meter tolerances in order to correct the fill volume. The new correction value is adopted automatically.

Send correction value to the filler computer

This menu must only be used by the following personnel:

- Personnel:
- KHS personnel
 - Maintenance personnel

Navigate to the following view and select the option as set out below:

“Test functions/Filling valve

➔ Send correction value to the filler computer”.

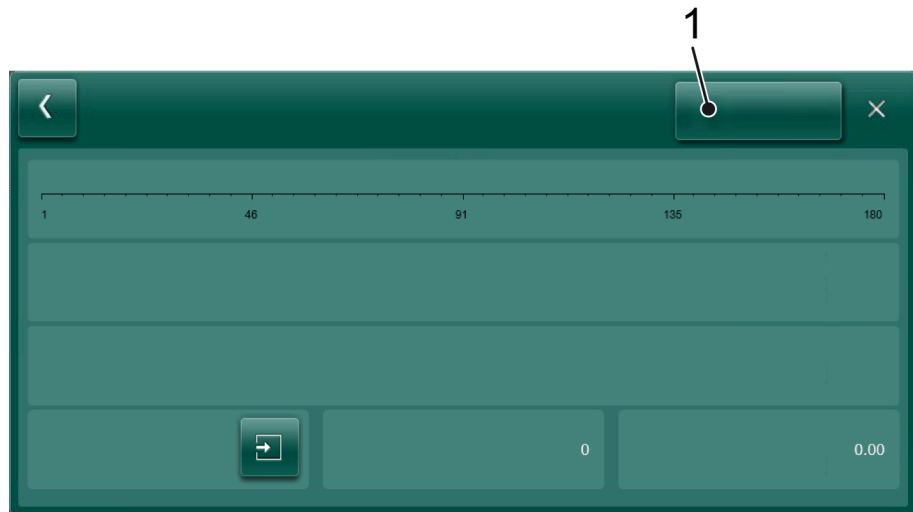


Figure 142: “Send correction value to the filler computer” view

1 CopyFuellven.mis

Correction data for the flow meter (IFM) are saved in file “*Fuellven.mis*”. The dialog window is opened via the “*CopyFuellven.mis*” button.

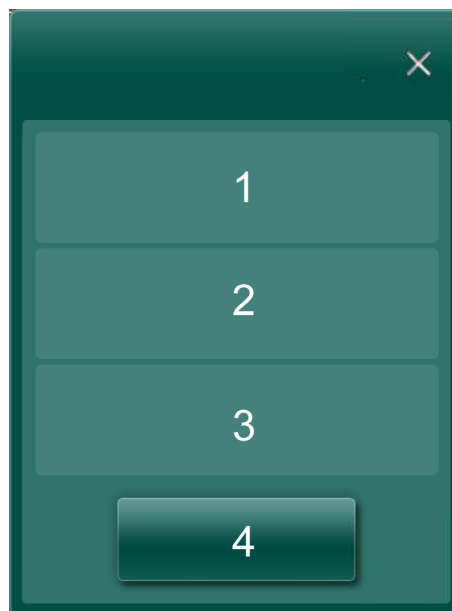


Figure 143: “Copy” dialog

- 1 Source: USB stick\KHS-Backups\Fuellven.mis
- 2 Target: Additional\Fuellven.mis
- 3 Activate copy
- 4 Copy

1. ➤ Copy file “*Fuellven.mis*” to a USB stick in the following folder:
KHS-Backups
2. ➤ Insert the USB stick into the screen.

**3.** Activate the *“Copy”* button.

⇒ The file *“Fuellven.mis”* is copied to the computer in the following folder:

D:\Visualisation\FFXXXXXXXXP1\RT\FILES\zenon\custom
\additional

Read correction valve from the filler computer

This menu must only be used by the following personnel:

Personnel: ☐ KHS personnel
☐ Maintenance personnel

Navigate to the following view and select the option as set out below:
“Test functions/Filling valve”

→ *Read correction value from the filler computer”*.

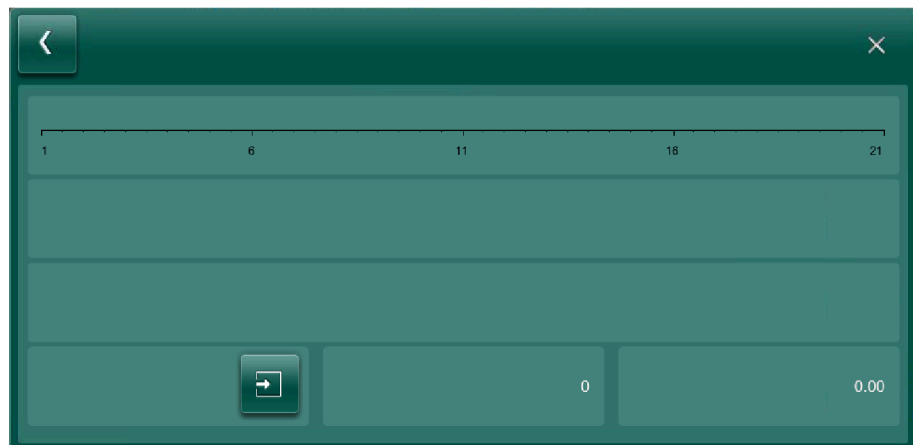


Figure 144: *“Read correction value from the filler computer”* view

IFM bridging

Navigate to the following view and select the option as set out below:
“Test functions/Filling valve → IFM bridging”.

"IFM bridging" obtains the function of a defective flow meter (IFM) from the neighboring flow meter.

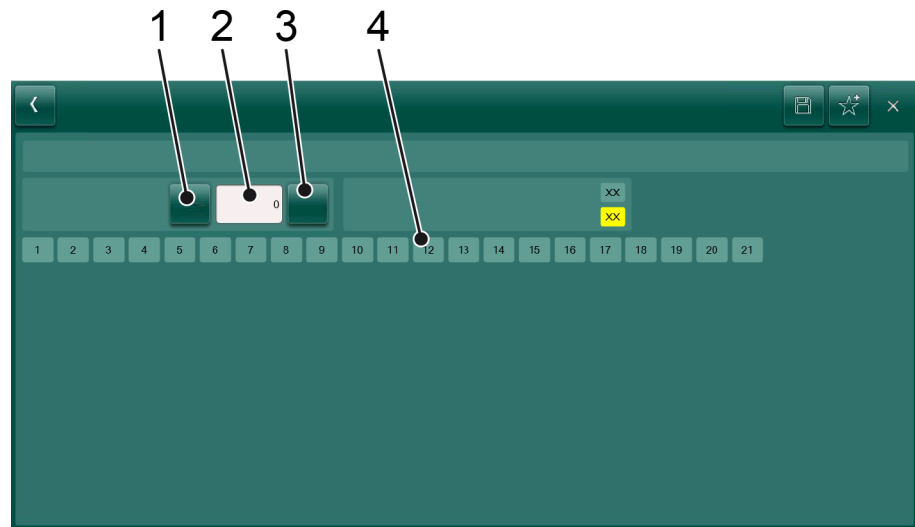


Figure 145: “IFM bridging” view

- 1 Reset
- 2 Filling valve number
- 3 Set
- 4 Filling valve number overview screen

Icon	Meaning
Reset	Resets the IFM bridging.
Filling valve number	Input field for the valve number to be bridged by IFM.
Set	Confirms the specified valve number.
Filling valve number over-view screen	Color display of the status of all valves: ■ green: IFM bridging of the valve is inactive ■ yellow: IFM bridging of the valve is active

Activating IFM bridging

1. Tap the input field.
2. Enter the valve number of the valve to be bridged.
3. Confirm the input by pressing “Set”.
 - ⇒ The display of the filling valve number changes from green to yellow in the overview screen.

Deactivating IFM bridging

1. Tap the input field.
2. Enter the valve number of the valve that is being bridged.
3. Confirm the input by pressing “Reset”.
 - ⇒ The display of the filling valve number changes from yellow to green in the overview screen.



3.5.6.7.3 Interface

The “*Interface*” view can be opened via “*Service* → *Interface*” and displays the interfaces between the filler and the processing systems.

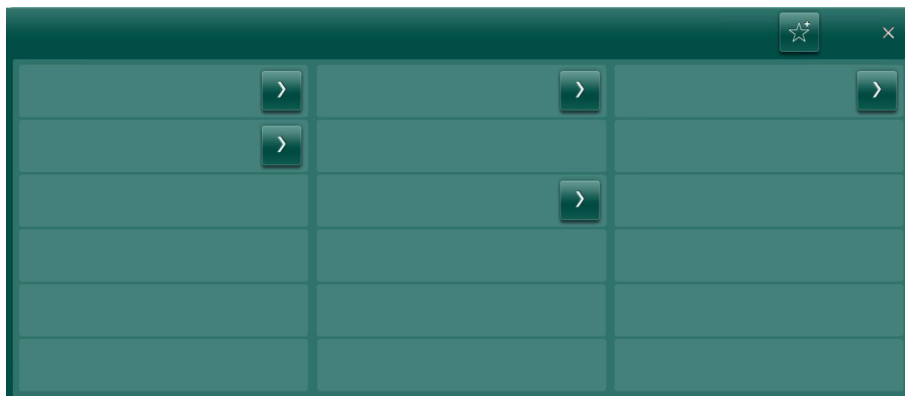


Figure 146: “*Interface*” view, first page



The second page of the “*Interface*” view can be opened using .

The second page of the “*Interface*” view indicates whether the signal is present using the status display:

Color	Meaning
Light green	Signal
Dark green	No signal

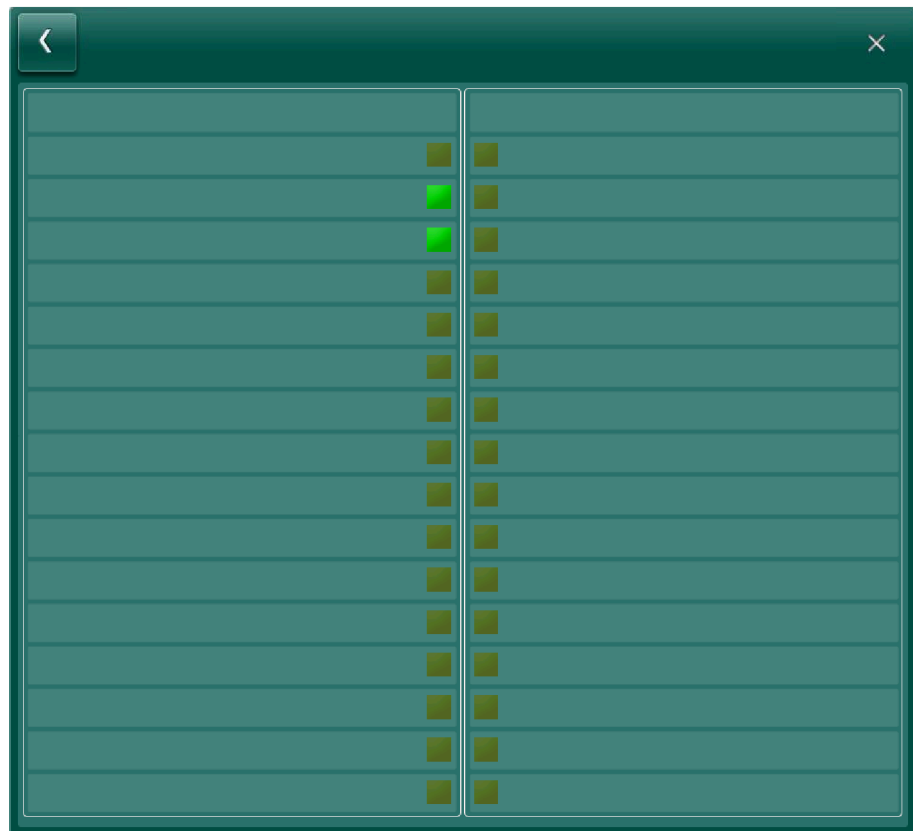


Figure 147: "Interface" view (second page)



The operator can manually switch the interface on or off using . This is called forcing. The user administration only enables the "forcing" function if the user who is currently logged in has authorization.



NOTICE!

The "forcing" function changes communication between the filler and the processing system.

Only KHS service personnel or KHS-authorized personnel are permitted to use this function.

The manufacturer will not be held liable for any production or product failures resulting from operator errors carried out by unauthorized personnel.



The first page of the "Interface" view can be opened using .

The filler has the following interfaces:

- Filler >< CIP
- Filler >< Product line

**Filler >< CIP**

CIP -> filler	Filler -> CIP
C001F: Life signal CIP	F001C: Filler life signal
C002F: End of cleaning	F002C Filler ready for CIP
C003F: Fill up filler	F003C: Filler filled up
C004F: Push out and drain filler	F004C: Filler drained
C005F:	F005C:
C006F:	F006C:
C007F:	F007C:
C008F:	F008C:
C009F: Fresh water cycle	F009C:
C010F Hot water cycle	F010C:
C011F: Caustic cycle	F011C:
C012F: Acid cycle	F012C:
C013F: Disinfectant cycle	F013C:
C014F:	F014C:
C015F:	F015C:
C016F: Bus monitoring	F016C: Bus monitoring

Filler >< Product line

Product line -> filler	Filler -> product line
P001F: Product line life signal	F001P: Filler life signal
P002F: Fresh water feedback	F002P Fresh water request
P003F:	F003P:
P004F:	F004P:
P005F:	F005P:
P006F:	F006P:
P007F:	F007P:
P008F:	F008P:
P009F: Primary product feed	F009P: Ready to receive product
P010F: Product ready	F010P:
P011F: End of production	F011P: End of production
P012F:	F012P:
P013F: Production interruption	F013P: Filler in production



Product line -> filler	Filler -> product line
P014F:	F014P:
P015F:	F015P:
P016F: Bus monitoring	F016P: Bus monitoring

3.5.6.7.4 Actual values

The “*Actual values*” view opens via “*Service* → *Actual values*” and displays all the actual values of the machine.

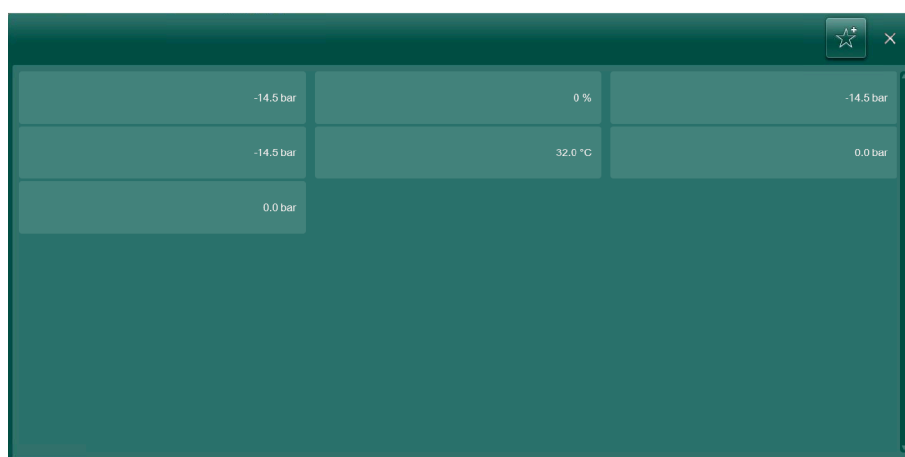


Figure 148: “*Actual values*” view

3.5.7 Capper

3.5.7.1 Menu structure

The table displays the commands in the menus that are applicable for the component selected in the navigation screen. The user opens the relevant view using these commands.

Icon	Name	Command
	Overview	Overview
	Programs	Functions
	Messages	Current messages Message history
	Type	Height adjustment



Icon	Name	Command
	Parameters	Parameters
	Statistics	Consumption
	Service	Actual values
	Note	Not assigned

3.5.7.2 Overview

Open the *“Overview”* by pressing *“Overview”*. This view displays all the components of the filling machine.

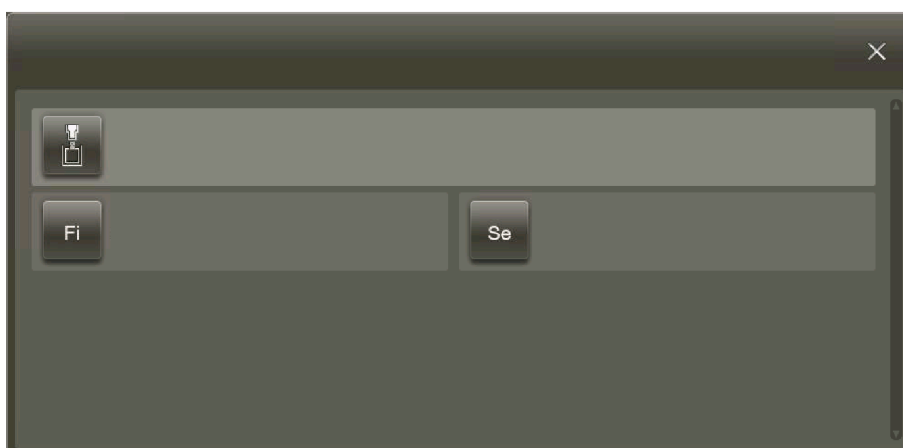


Figure 149: *“Overview”* view

The operator is able to select a component.

3.5.7.3 Programs

3.5.7.3.1 Functions

The *“Functions”* view is opened via *“Programs”*. In this view, the operator can switch various functions on or off and toggle between automatic and manual modes.

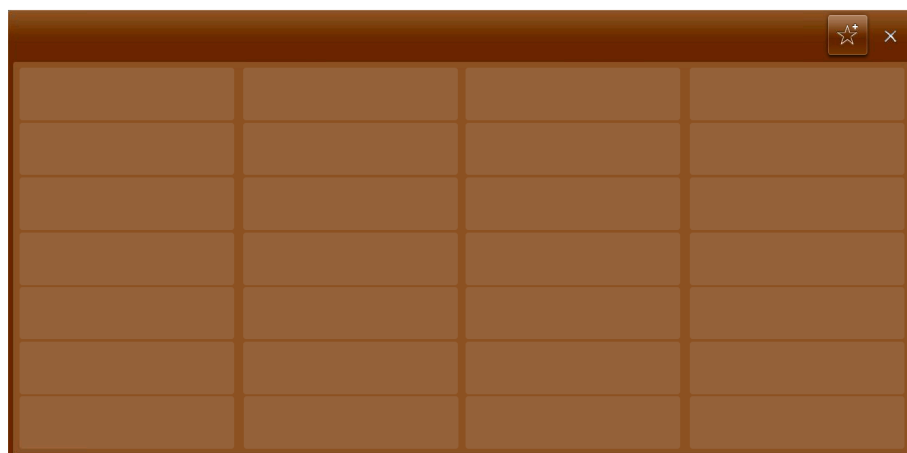


Figure 150: "Functions" view

The following section lists and describes all functions of the machine. Depending on the equipment and degree of automation of the machine, the function buttons are active and visible in the graphical user interface.

Function	Meaning
Unlock cap table	See sealer operating instructions.
Can bypass monitoring	See sealer operating instructions.
Flush gas	See sealer operating instructions.
Gas adjustment mode	Switches the gas control of the capper to manual mode.
AUTO/MANUAL lid feed	Switch the sealer lid feed to automatic or manual mode or turn it off.
Oil filter pump	See sealer operating instructions.
Oil filter cycle	See sealer operating instructions.
Crimp test first operation	See sealer operating instructions.

3.5.7.4 Messages menu

The "Messages" menu contains the following commands:

Command	Meaning
"Current messages"	Opens the "Current messages" view with the current messages that need to be processed by the operator.
"Message history"	Opens the "Message history" view with a history of all messages.



The *“Message history”* and *“Current messages”* views are the same for all components. Messages are displayed for all components.

3.5.7.5 Type

3.5.7.5.1 Height adjustment



NOTICE!

Damage to machine components

Components can damage other parts if they move upwards or downwards during the height adjustment process.

- Check that the height-adjustable components will not collide with the format parts. If necessary, remove the format parts.
- When you are sure there will be no collision during height adjustment, confirm the warning message.

The height adjustment moves the can sealer to the appropriate height for the type.

The *“Height adjustment”* view can be opened via *“Type”*.

In this view, the operator can adjust the height to suit the type.

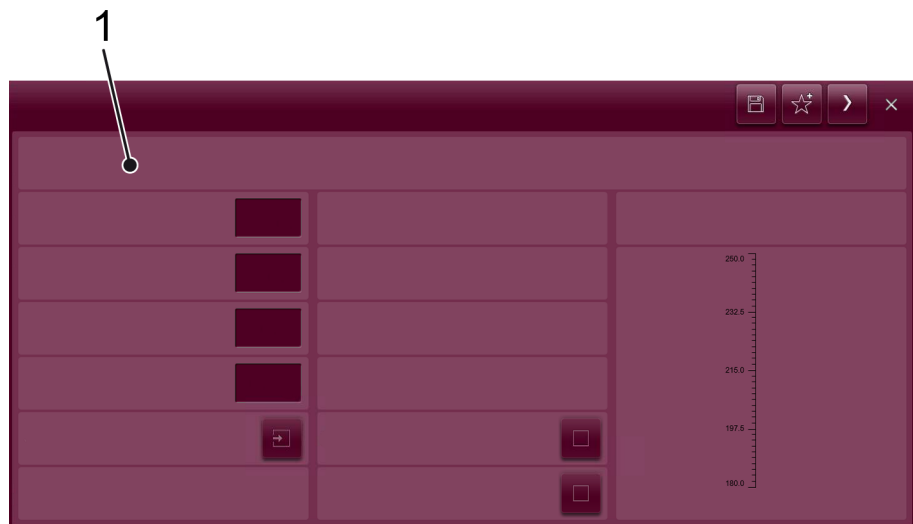


Figure 151: Height adjustment view

1 Operating instructions



Element	Description
Current setpoint by type	Setpoint value for current type.
Can height	The current actual value of the inner ring saved in the machine control system (PLC) is based on the can height.
Seaming head height	The seaming head height is needed in order to calculate the correct upper part height (reference height).
Core depth of lid	The core depth of the lid.
Grooves in the seaming plate	Depth from 0.00 mm to 1.00 mm for possible grooves in the seaming plate.
Confirm setpoint	Transfers the <i>“Current setpoint from PLC”</i> to set the height adjustment.
Up/down	Moves the machine to the set height.
Cleaning position	Position to be reached for the cleaning process.
Position for tool change	Position to be reached to enable tool change.
Can height (bar)	Bar with current actual value for the can height.



The *“Height adjustment setup mode”* page opens by tapping .

Height adjustment setup mode

Height adjustment setup mode can only be operated by a KHS technician or a Ferrum technician.

The *“Height adjustment”* view can be opened via *“Type”*.

In this view, the operator can adjust the height adjustment parameters.

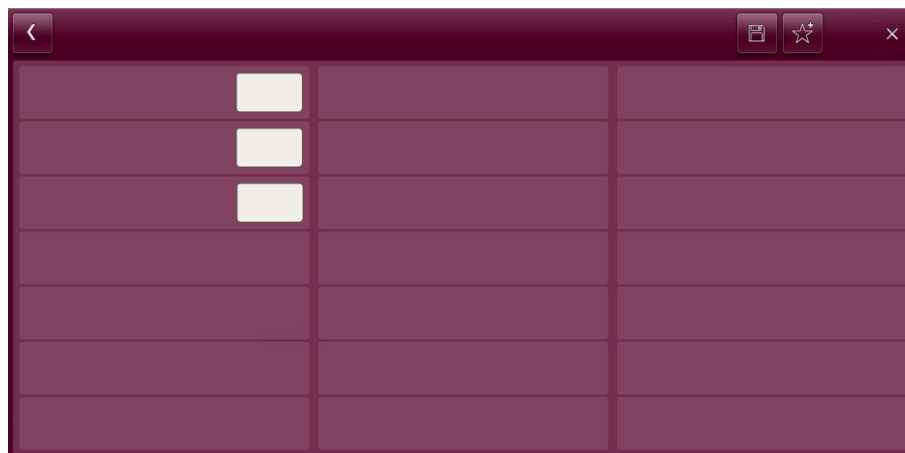


Figure 152: Height adjustment view



Element	Description
Element	The measured actual value of the pin height for an absolute machine offset.
Cleaning position	The position to be reached for the cleaning process.
Position for tool change	Position to be reached to enable the tool change.



Open the first page of the *"Height adjustment"* view by tapping .

Save settings



The operator must save changes in this view specifically using ; otherwise these will not be adopted. The values are saved according to type.

Performing height adjustment

1. Tap *"Confirm setpoint"*.

⇒ A dialog box opens with the warning message: *"Attention! Before adjusting the height, please check whether upward/downward movement is possible"*

2. Confirm the warning message with *"OK"*.

3. Press *"Up/down"*.

⇒ The height adjustment moves to the value that is set.

3.5.7.6 Parameters

3.5.7.6.1 Parameters

The *"Parameters"* view opens via *"Parameters"*. The view displays an overview of the capper parameters.

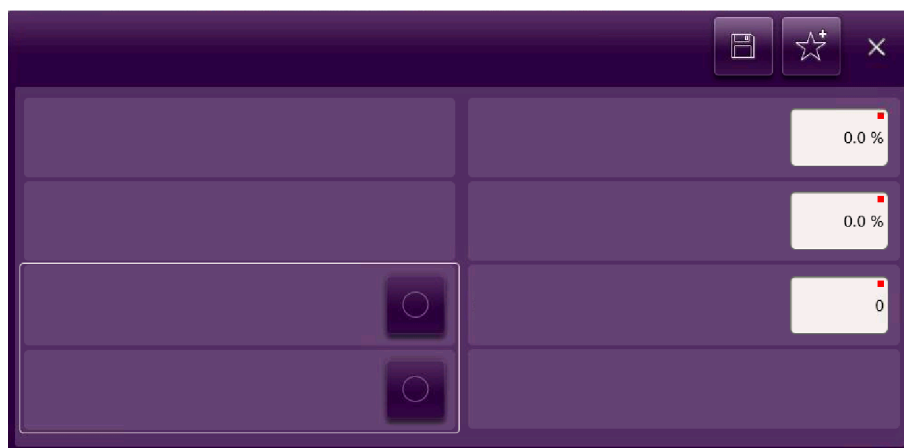


Figure 153: Parameter view



Function	Meaning
Gassing at pitch	Inputting the filling station from which the undercover gassing is active.

3.5.7.7 Statistics

3.5.7.7.1 Consumption

The “*Consumption*” view opens via “*Statistics*”. This view displays the total consumption and the consumption per shift.



Figure 154: “*Consumption*” view



Clear the consumption per shift by tapping .

3.5.7.8 Service

3.5.7.8.1 Actual values

The “*Actual values*” view opens via “*Service* → *Actual values*” and displays all the actual values of the sealer.



Figure 155: “*Actual values*” view



3.6 Workstations

On the exterior paneling of the machine, there are several workstations and operating controls:

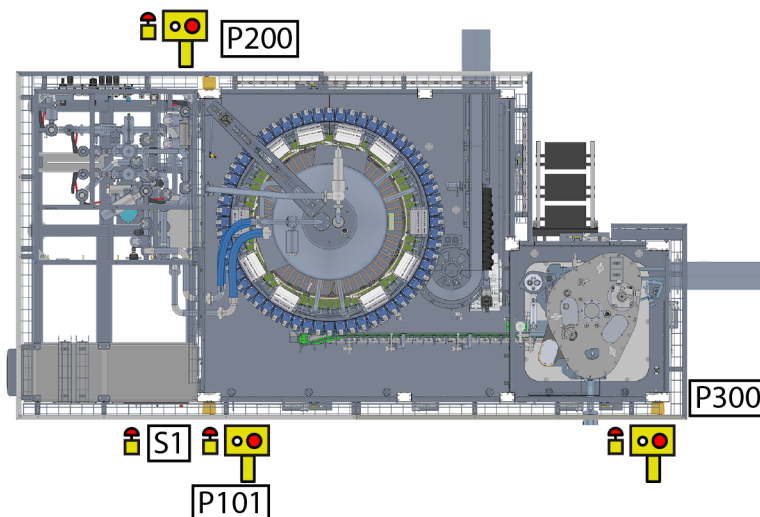


Figure 156: Schematic diagram of the machine

Icon	Meaning
S1 	Operator console (main workstation)
P101	Operator panel (main workstation)
P200	Operator panel (secondary workstation)
P300	Operator panel (secondary workstation)
	Removable operating control for Inching mode with the emergency stop switch
	Emergency stop switch

- Main workstation:
 - Operator console with screen
 - Operator panel
 - Removable operating control
- Secondary workstation at the machine paneling doors:
 - Operator panel
 - Removable operating control



The operator panel of the main workstation includes the two key switches for switching the control voltage on and off.

The operator panel of the secondary workstation on the machine paneling doors includes the switches and indicator lights for opening and locking the doors.

The removable operating controls include the button for the Inching mode of the machine.

An emergency stop switch is located on every operator panel and removable operating control.

3.7 Measuring, control and regulating equipment

3.7.1 Switch cabinet

The machine is equipped with a switch cabinet. The switch cabinet is located on the machine.

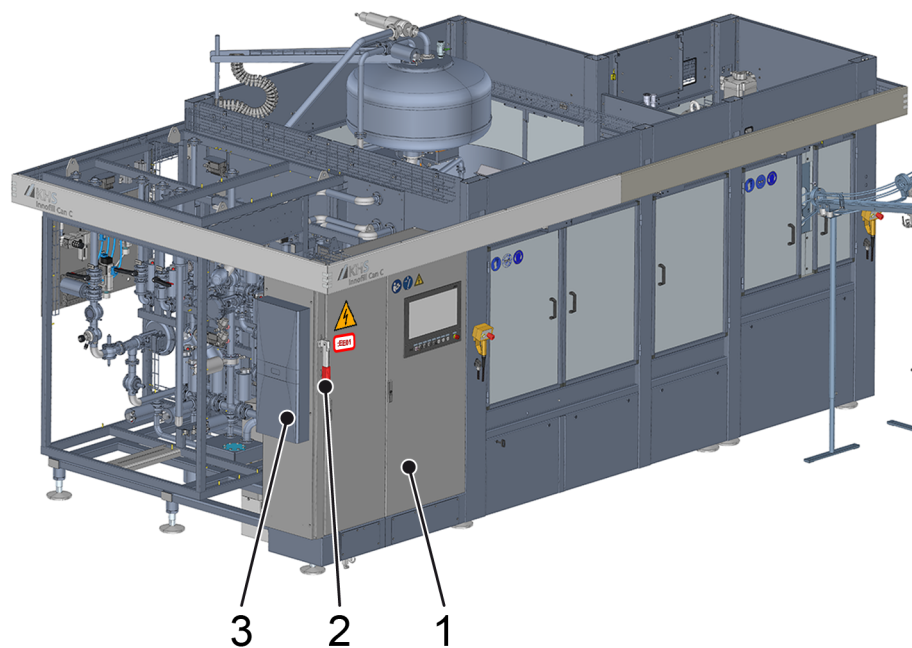


Figure 157: Switch cabinet

- 1 Switch cabinet
- 2 Main switch
- 3 Cooling unit

In the switch cabinet, depending on the expected heat development, there are either integrated fans with outlet filters or cooling devices.

The switch cabinet contains the following components:

- Electrical switching devices and control devices
- Fuses
- PLC (programmable controller)
- Safety switch
- CPUs for the servo drives



- Clamp strips (input and output)
- Filler computer

The main switch is color-coded.

If the machine is equipped with ReDiS, the router is there for ReDiS Single or the interface for ReDiS Net.

***[Reset paneling fault]* illuminated pushbutton**

The switch cabinet also contains the illuminated pushbutton *[Reset paneling fault]* for resetting machine paneling faults.

3.7.2 Control system

3.7.2.1 Controlling the filling valves

The electropneumatic pilot valves located in the valve panels pneumatically actuate the main cylinder (product cylinder) and the gas control cylinder in the filling valve. The filler computer calculates the actuation positions for opening and closing the control cylinders based on the synchronous clock, the machine timing, can sensing, and the predefined operating mode of the filling valves.

3.7.3 Electrical system

3.7.3.1 Pressure sensor

Layout

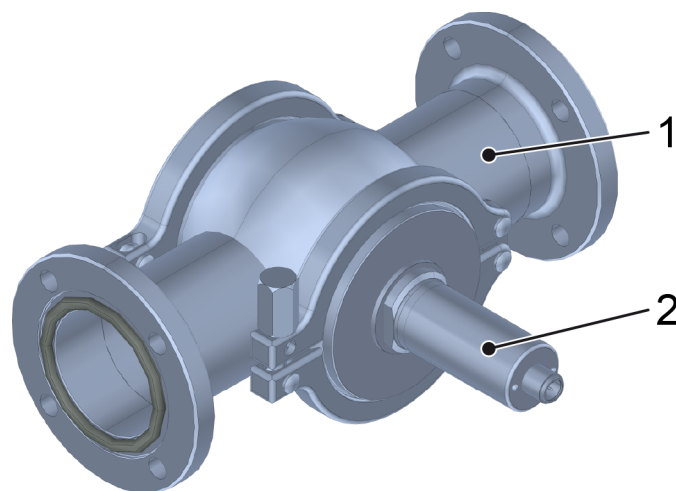


Figure 158: Pressure sensor

- 1 Media line
- 2 Pressure sensor

Function

Pressure sensors record the pressure of the media in the media lines.



Using the pressure measurement, the machine control system regulates the process-dependent pressures, such as filling pressure, CIP pressure and pressurization gas pressure.



Measuring devices  can be identified in the pipeline plan with legend; see chapter "Technical Data", section "Operation".

3.7.3.2 Temperature sensor

Layout

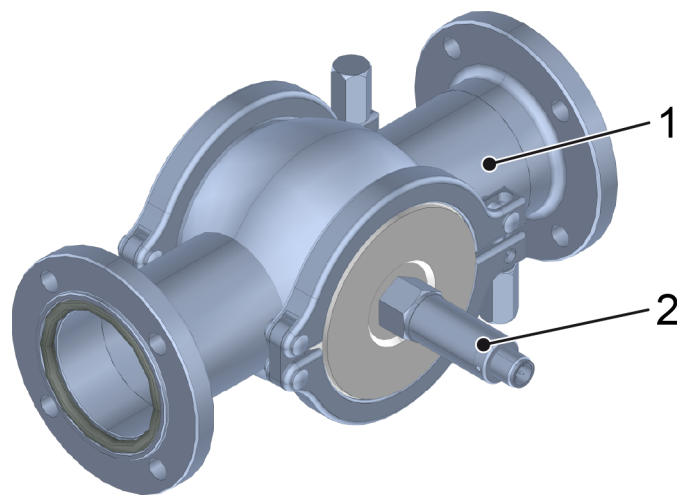


Figure 159: Temperature sensor

- 1 Media line
- 2 Temperature sensor

Function

Temperature sensors record the temperature of the medium in the machine's media supply feed.

The control system detects and monitors the temperatures specified by the process, such as the drink filling temperature, CIP and media temperature, based on the temperature measurement.



Measuring devices  can be identified in the pipeline plan with legend; see chapter "Technical Data", section "Operation".



3.7.3.3 Flow meter

Layout

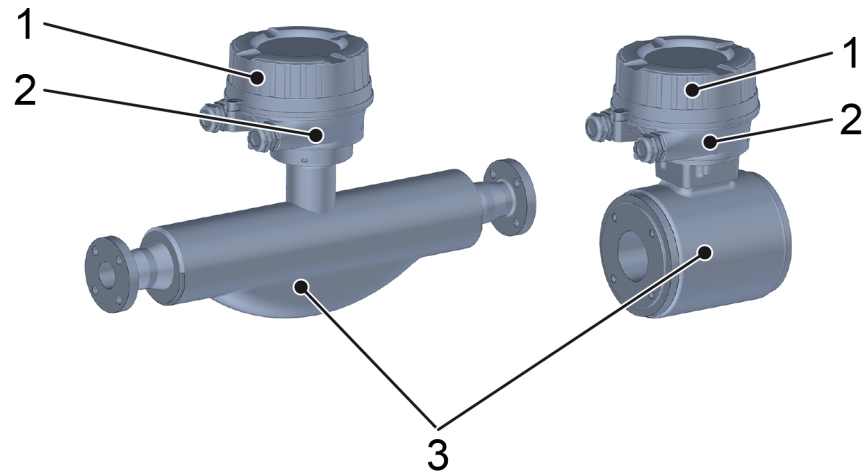


Figure 160: Flow meter

- 1 Measurement sensor
- 2 Housing of measurement sensor
- 3 Housing cover of measuring transducer

Function

Flow meters record the current quantity of media per time unit (volume flow) in the media supply feed.

The control system detects and monitors the project-dependent flow based on the flow measurement.



Measuring devices  can be identified in the pipeline plan with legend; see chapter "Technical Data", section "Operation".



3.7.3.4 Filling level sensor

Layout

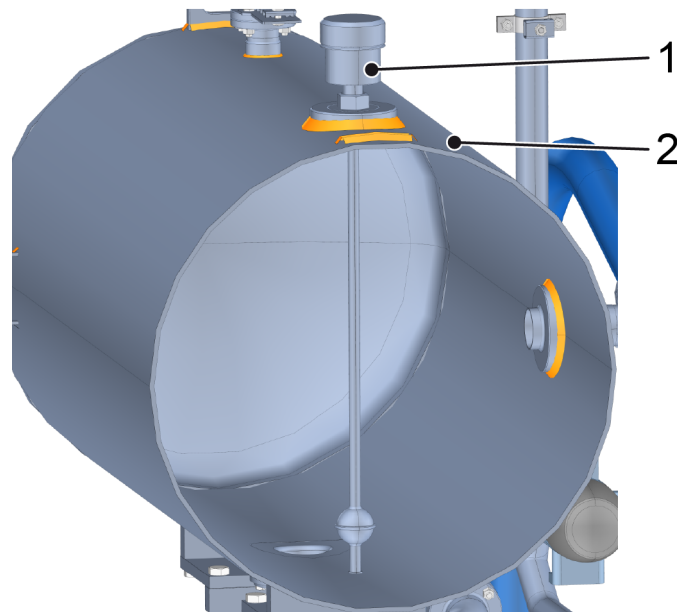


Figure 161: Filling level sensor

- 1 Filling level sensor
- 2 Central bowl

Function

The filling level probe measures the fill level in the bowl. Two or more filling level probes can be installed, depending on the size of the bowl.

The product control valve uses the filling level measurement to control the media feed to the bowl in order to keep the bowl level specified by the process constant when the filling volumes are changed.



Measuring devices  can be identified in the pipeline plan with legend; see chapter "Technical Data", section "Operation".



3.7.3.5 Pressurization gas control valve

Layout

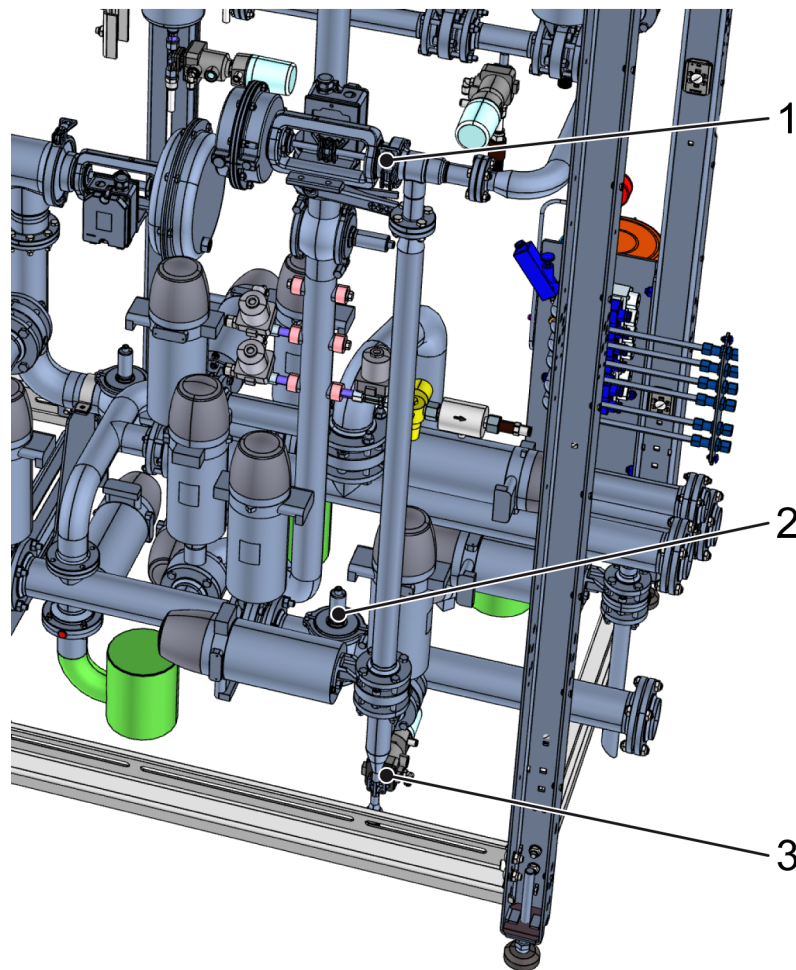


Figure 162: Valve manifold

- 1 Pressurization gas control valve
- 2 Pressure sensor
- 3 Snifting valve

Function

The pressurization gas control system maintains a constant filling pressure in the ring bowl. The ring bowl is pre-pressurized with gas. Air, CO₂ or N₂ are used as pre-pressurization gases. A mixture of these gases can also be used. The pressurization gas used in production is stored in the type parameters.



The current filling pressure (actual value) is measured by the pressure sensor in the pressurization gas line and transferred to the machine control system. The desired filling pressure (setpoint) is included in the type parameters. The type parameters are automatically loaded on the operator console when a type is selected. The pressurization gas control valve regulates the filling pressure in the ring bowl depending on the difference between the actual value and the setpoint. The excess gas is released into the open air via the relief valve.



The setpoint filling pressure is 1-1,5 bar higher than the saturation pressure of the beverage and is specified in the filler specification sheet. This is included in chapter "Technical data", section "Operation". The value of the setpoint filling pressure can be changed on the operator console.



3.7.3.6 Product control valve

Layout

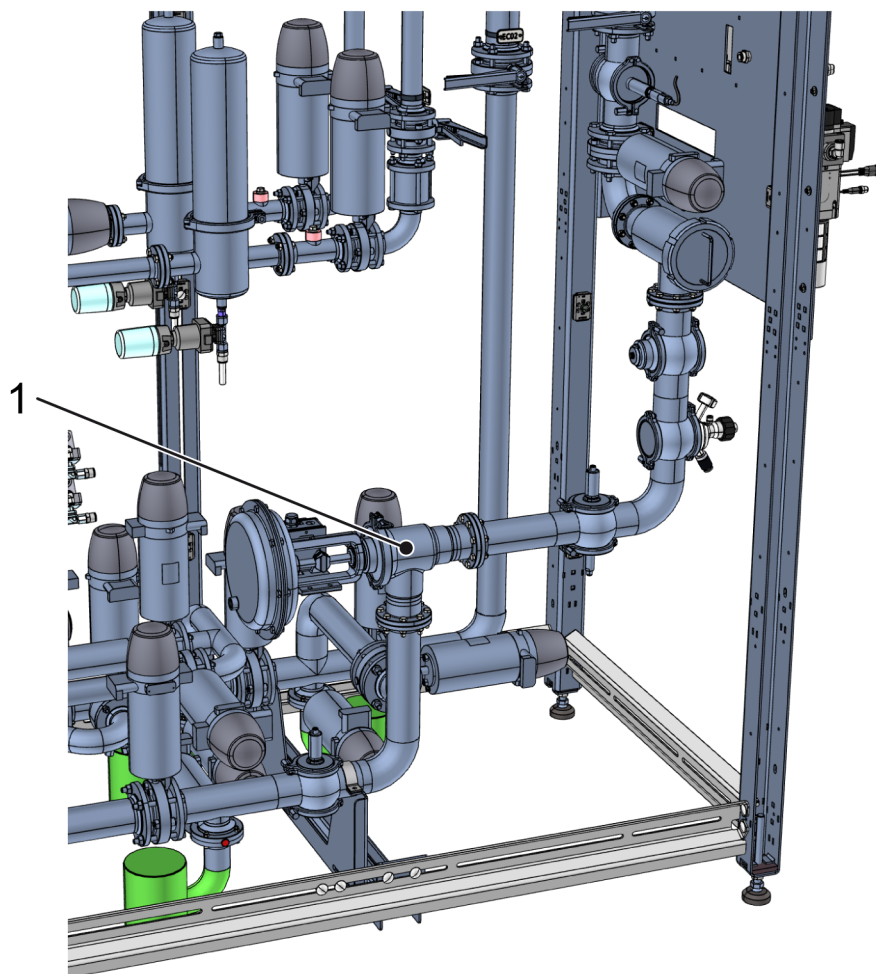


Figure 163: Valve manifold

1 Product control valve

Function

The product level control maintains a constant filling level in the bowl. The filling level in the bowl affects the filling speed and the filling accuracy. A consistent filling speed is important for filling level accuracy.

The desired product level in the bowl (setpoint) is included in the type parameters. The type parameters are automatically loaded on the operator console when a type is selected. The current product level in the bowl is measured by multiple probes. The values are determined and transferred to the product control valve as a controller variable (actual value). The product control valve integrated in the machine control system regulates the product level in the bowl depending on the difference between the actual value and the setpoint.



For the setpoint product level in the bowl, see the filler specification sheet. The filler specification sheet is included in chapter "Technical data", section "Operation". The value of the setpoint product level can be changed on the operator console.

3.7.4 Pneumatics

3.7.4.1 Valve clusters and air supply of the filler turret

Layout

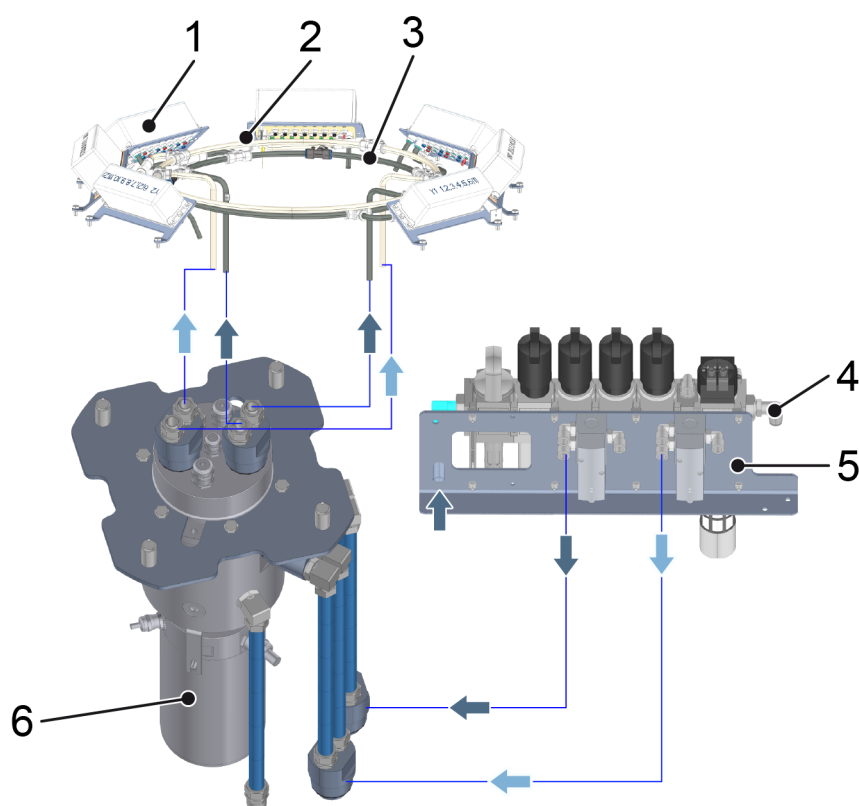


Figure 164: Air supply

- 1 Valve cluster
- 2 Air supply ring for the lift actuator
- 3 Air supply ring
- 4 Operator's control air
- 5 FRL group
- 6 Rotary distributor



Function

The control air on the operator's side is connected at the valve manifold and distributed via the FRL group. From the connection, the air flows to the filler valves through the following components:

- FRL group
- Proportional pressure valve
- Rotary distributor
- Control ring
- Valve cluster

The control valves grouped into valve clusters open and close the pneumatic control cylinders at the filling valves. The control valves are electrically actuated by the machine control system.



If the supply air pressure in the pneumatic control box falls below 5.5 bar, the can stopper is closed after a set amount of time and an error message is displayed on the screen. If the air pressure does not rise to at least 5.5 bar again within a set time after closing the can stopper, the air supply to the filling valve control is closed in order to protect the pneumatic components.

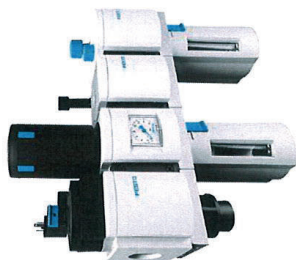
3.7.4.2 Connection plan

The valve clusters on the filler turret are required to actuate the filling valve cylinders. Several filler valves can be connected at each valve cluster.



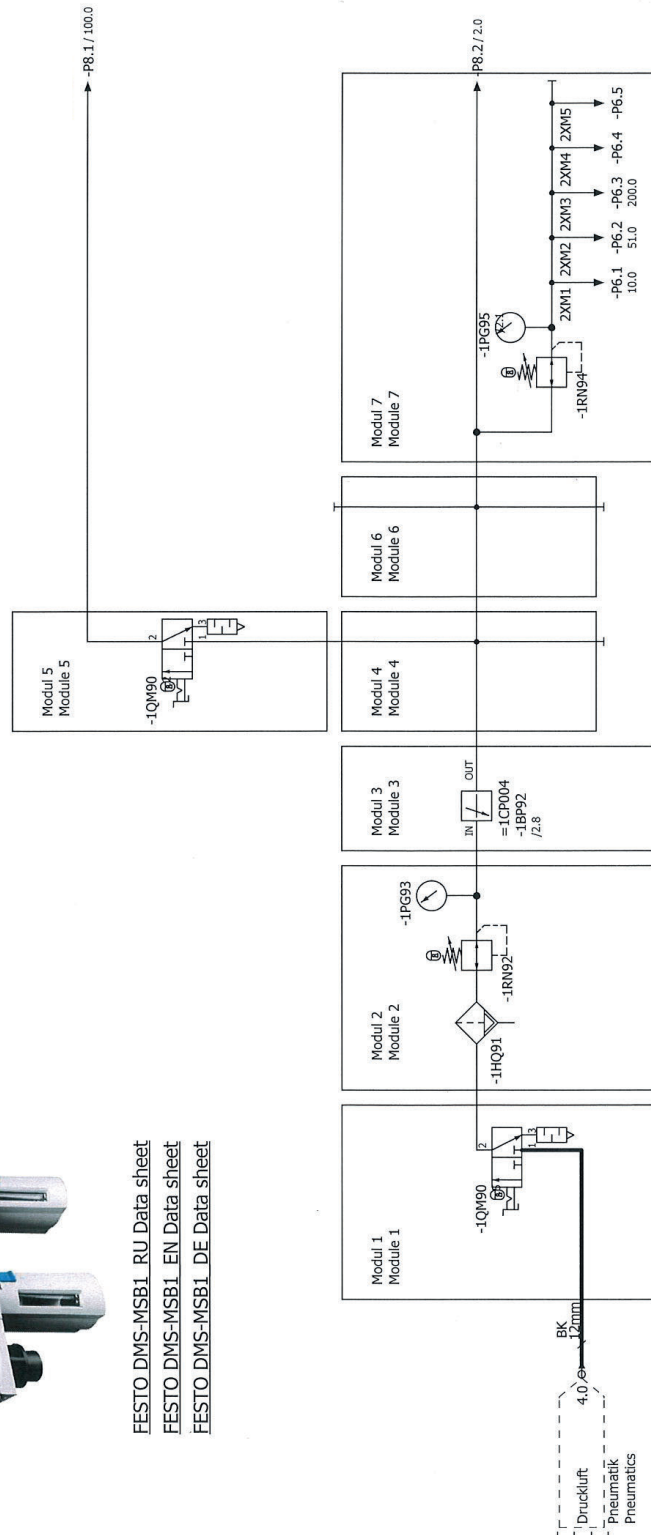


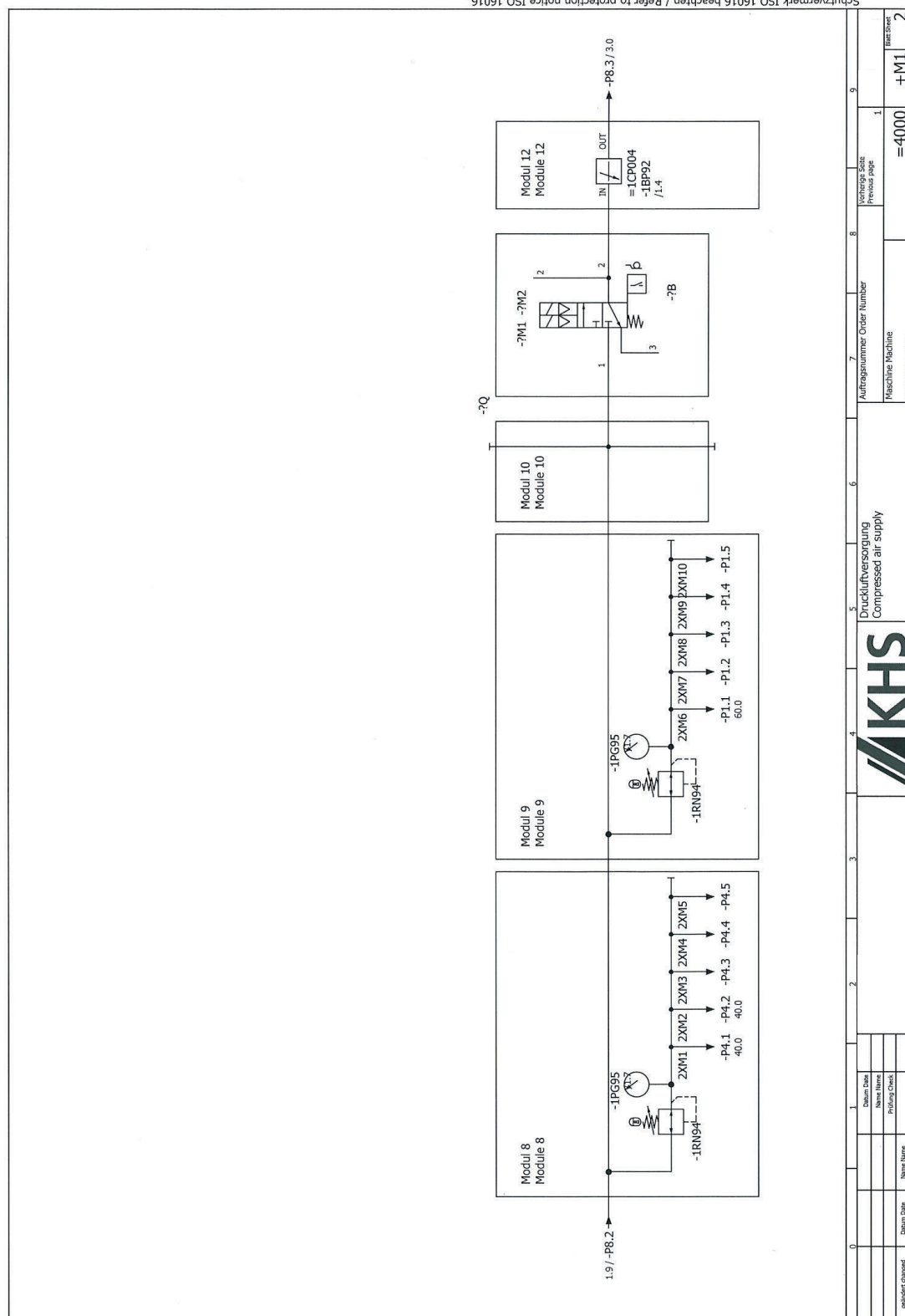
3.7.4.3 Pneumatic diagram



Wartungseinheit
Maintenance Unit

FESTO DMS-MSB1 RU Data sheet
FESTO DMS-MSB1 EN Data sheet
FESTO DMS-MSB1 DE Data sheet

[illegible]





Assignment of the FRL group to the air supply

The FRL group diagram assigns the components within the FRL group to the modules in the “FRL group” plan.

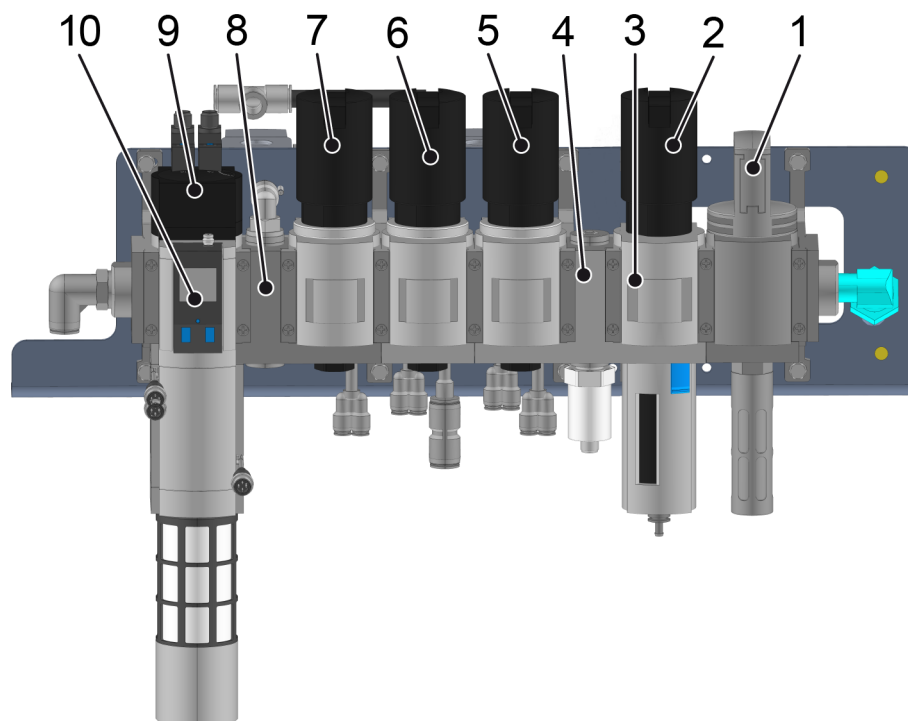


Figure 165: FRL group

- 1 Module 1
- 2 Module 2
- 3 Module 3
- 4 Module 6
- 5 Module 7
- 6 Module 8
- 7 Module 9
- 8 Module 10
- 9 Module 11
- 10 Module 12

3.8 Energy-efficient operation

This section includes measures that can be taken to reduce the energy consumption of the machine.

Energy consumption represents a significant cost factor when using the machine. The operator can reduce energy consumption without negatively impacting quality and machine output.

A lower level of energy consumption makes the machine more economical, while protecting the environment and climate.



The following energy carriers are used during machine operation:

- Electrical power
- Heating energy
- Compressed air for process and control
- Detergent and rinsing media (CIP media)
 - Hot caustics
 - Hot acids
 - Hot water
- Pressurization gas, purge gas and protective gas
 - N₂ compressed gas
 - CO₂

Below is a list of measures that can be taken to reduce the energy consumption.

Prevent loss of energy due to leakage

- Regularly inspect and check the pipelines and control systems for the product and detergents.
- Regularly check and test the pneumatic hoses, control systems, cylinders and valve drives.
- Regularly check and test the electrical equipment and setting parameters.

Optimize the production plan

- Optimize the product sequence in the case of product change-overs and product switches to reduce the consumption of rinsing media and detergents and electrical pump drive and heat output.
 - Switch from a clear product to a product containing dye.
 - Switch from a product with a delicate flavor to a product with a stronger flavor.

Prevent short production interruptions (stop and go operation)

- Ensure a continuous flow of product in the production system.
- Analyze any faults that occur and eliminate their causes promptly.

Tools to help you to identify faults:

 - Display of the fault message statistics on the operator console
 - Operating data acquisition (Innoline MES)
- Pay attention to the following qualities of packaging materials:
 - Shape retention and dimensional stability
 - Compressive strength
 - Tear strength
- Analyze general sources of faults and eliminate promptly.
 - Remove packaging and product residue.
 - Check product guide parts and format parts for wear and retention of their dimensions.



Check and monitor machine setting parameters

- The machine parameters were adjusted and optimized when it was commissioned for the customer (IBN) depending on the system, filling products and the packaging material, to achieve maximum production efficiency with efficient energy usage.



The optimized machine setting parameters are stored, managed and saved in recipe management (type parameter list) depending on the product and type of can or bottle in the machine control system.

Machine setting parameters that have been changed temporarily can be reset to the saved settings in recipe management.

Preventive maintenance

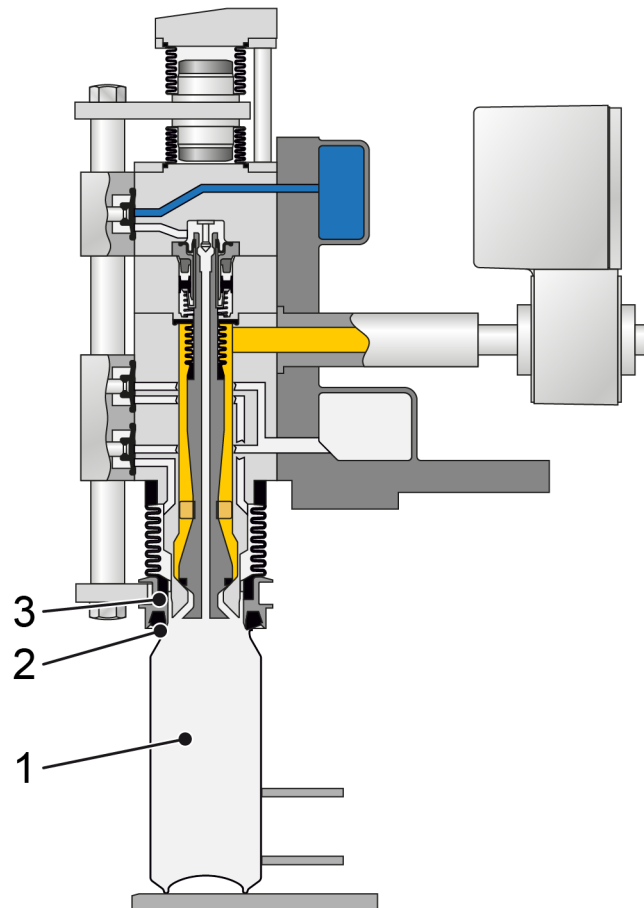
- Worn and damaged machine parts on the machine can lead to a cluster of machine downtimes. A cluster of machine downtimes interrupts the optimum production flow and at the same time, increases energy consumption. Preventive maintenance keeps the efficiency level high and minimizes energy consumption.



3.9 Process

3.9.1 Filling process

Can infeed

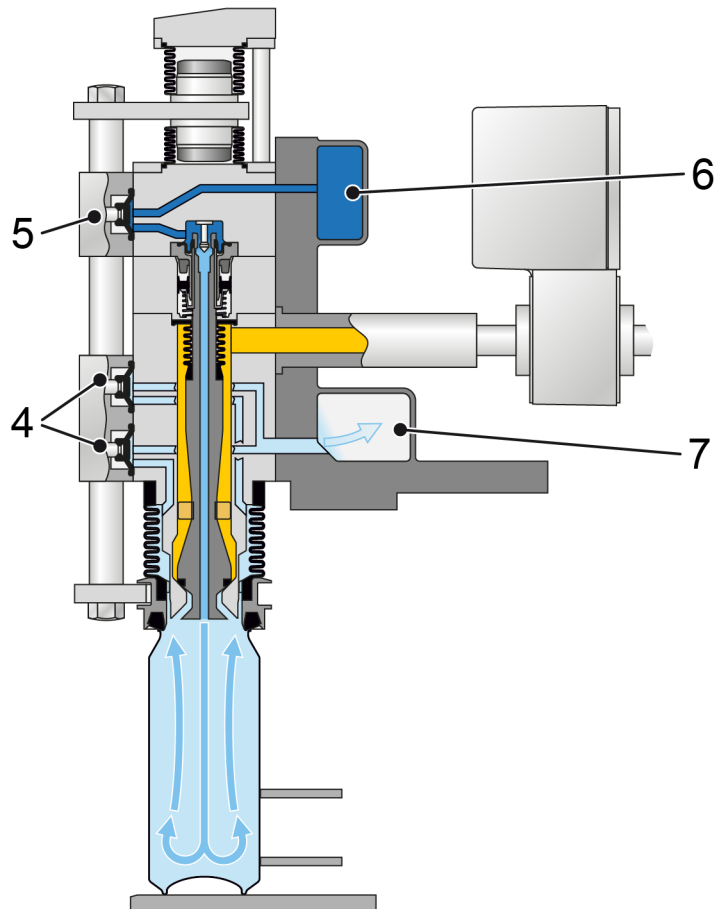


- 1 Can
- 2 Centering bell
- 3 Rubber contact seal

The can is pushed under the filling valve via the can infeed star. At the same time, the can is stabilized by the lowering of the centering bell. The can is sealed from the outside atmosphere by the rubber contact seal.



Pre-rinsing



- 4 Rinsing gas cylinder
- 5 Pressurization gas cylinder
- 6 Pressurization gas channel
- 7 Purge gas channel

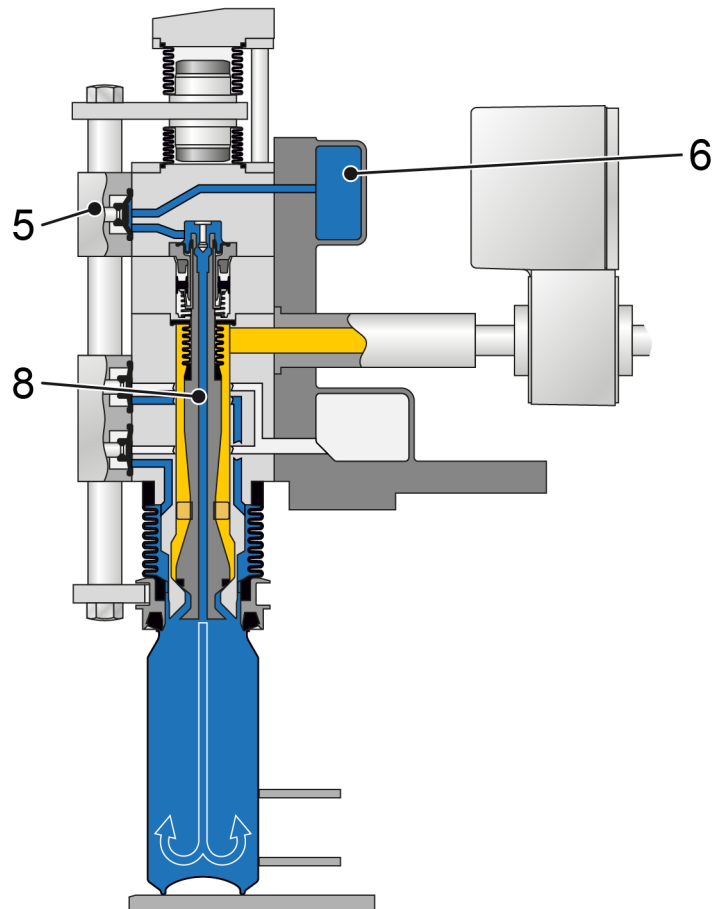
The pressurization gas cylinder and the rinsing gas cylinder are opened. CO₂ flows from the pressurization gas channel into the can, displacing the air in the rinsing gas channel. The rinsing gas cylinders are closed at the end of the rinsing phase.



The duration of the pre-rinsing process is set on the operator console.



Pre-pressurization



- 5 Pressurization gas cylinder
- 6 Pressurization gas channel
- 8 Valve pipe

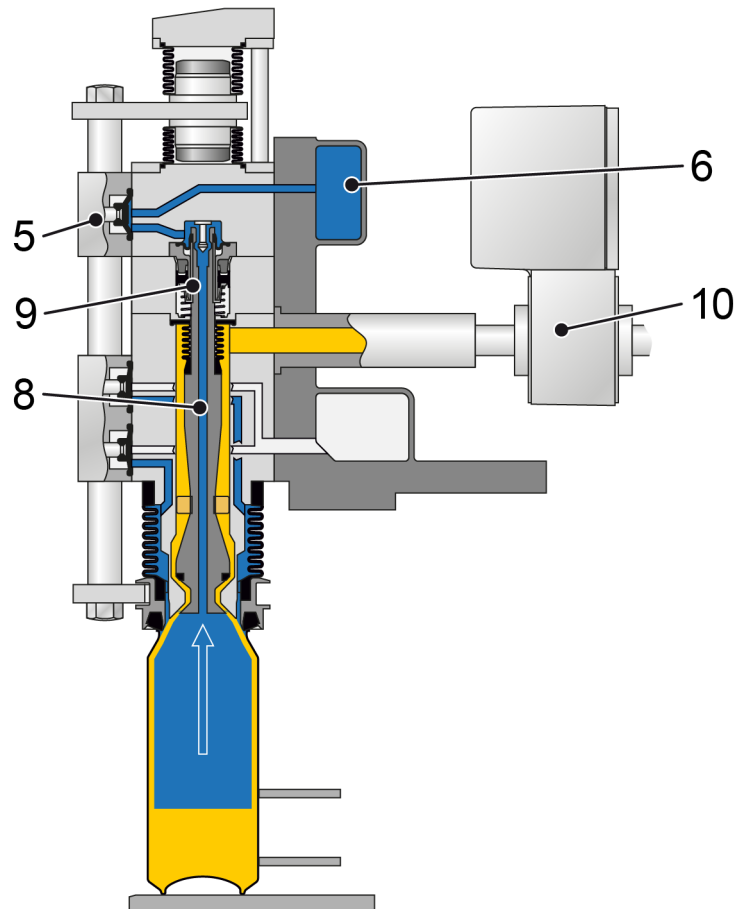
The opened pressurization gas cylinder pre-pressurizes the can to the pressure level present in the pressurization gas channel via the valve pipe. Filling starts once the pre-pressurization time has elapsed. The pressurization gas cylinder remains open during the filling process.



The duration of the pre-pressurization process is set on the operator console.



Filling



- 5 Pressurization gas cylinder
- 6 Pressurization gas channel
- 8 Valve pipe
- 9 Product cylinder
- 10 Flow meter

The product cylinder is opened and the product flows from the central bowl through the flow meter and filling valve into the can. The pressurization gas present in the can flows through the valve pipe and the opened pressurization gas cylinder into the pressurization gas channel.

The filling speed achieved during the filling process depends on the static level in the central bowl. The filling speed can be adapted to the requirements of each product or to the shape of the can to be filled via the level control.

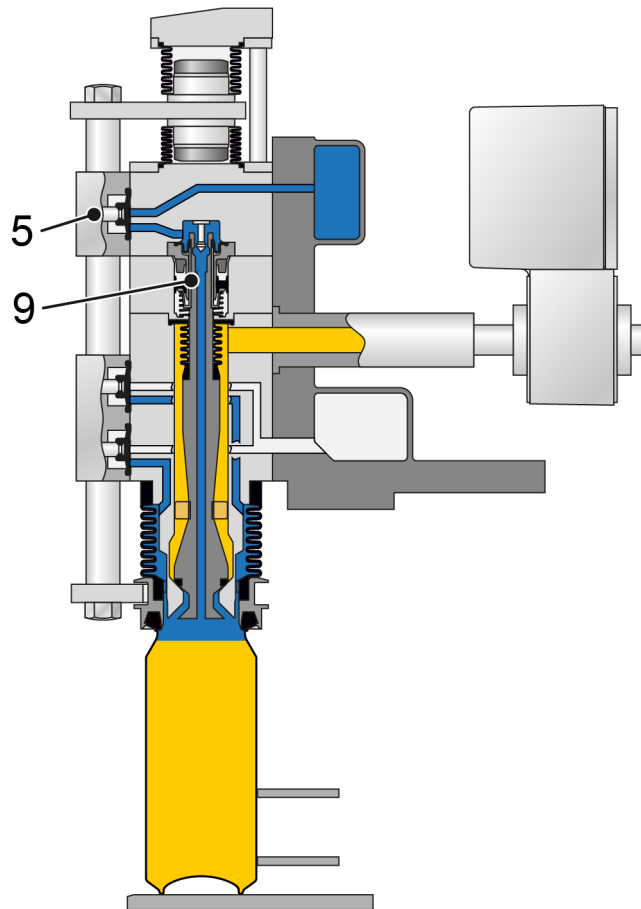
The filling process ends when the setpoint fill level has been reached.



The setpoint fill level is set on the operator console.



End of filling and resting



5 Pressurization gas cylinder

9 Product cylinder

The pressurization gas cylinder is closed after a time delay after the product cylinder has been closed.

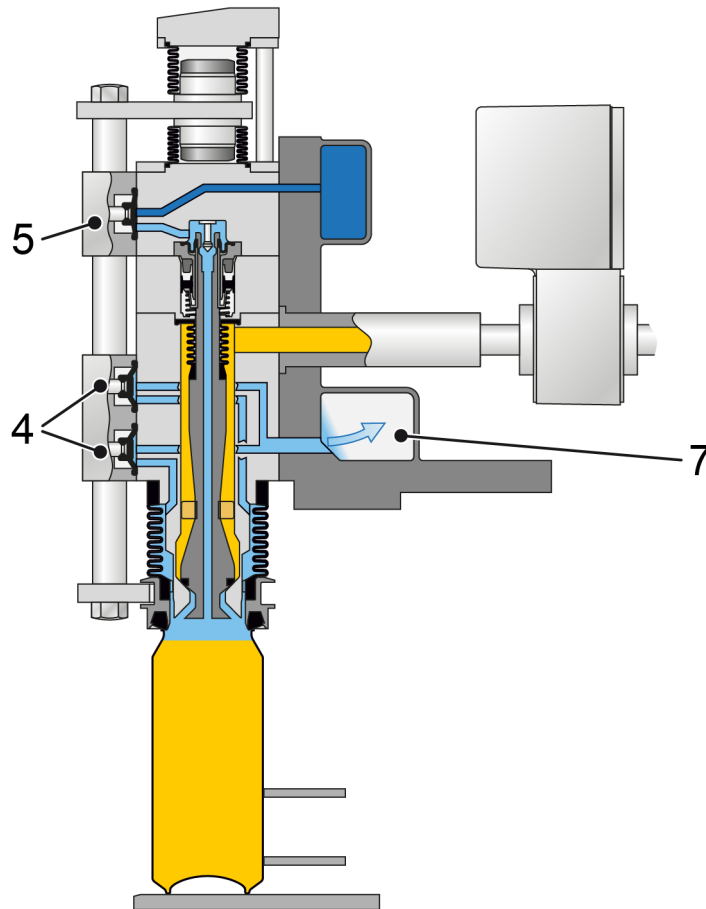
The product settles in the can once the pressurization gas cylinder has closed.



The time delay before closing the pressurization cylinder and the resting time are set on the operator console.



Pressure relief



- 4 Rinsing gas cylinder
- 5 Pressurization gas cylinder
- 7 Purge gas channel

For relief, the return gas cylinder opens the gas passage to the return gas channel and the pressure in the can decreases.



The pressure relief period is set on the operator console.

Final snifting

After the resting phase, the purge gas cylinder opens the gas passage to the purge gas channel again so that the pressure in the can drops to the atmospheric pressure.



The start and end of the final pressure relief phase cannot be adjusted!



Can outfeed

The centering bell is raised from the can.

The filled cans leave the filler in the direction of the sealer.

Blowing-out the filling valve's pressurized gas passage

In the valve blow-out angle between the can infeed system and the can transfer to the sealer, the filling valve's pressurized gas passage can be blown out. This removes any product residue remaining in the pressurization gas passage.

Once the blow-out function has been activated, the pressurization gas cylinder in the area between the filler infeed and outfeed is opened. The pre-pressurization gas flows into the open via the pressurization gas passage. The blow-out function is automatically deactivated by the machine control system after one filler round.



The blow-out function is set on the operator console.



This page is left blank for editorial reasons.



4 Assembly

This chapter provides information, instructions and safety instructions that are required for assembly.

4.1 Check the items included in the delivery and inspect the shipment



For information on the items included in the delivery, keep the sales documentation to hand.

Inspect the shipment

1. ➤ Use the sales documents to immediately check the completeness of the shipment upon receipt.
2. ➤ Inspect the entire shipment for any signs of shipping damage.



Submit a complaint about any faults as soon as they are discovered. Claims for damages may only be lodged within the applicable deadlines for complaints.

File a complaint on any apparent transport damage

1. ➤ Conditionally accept the shipment.
2. ➤ Record the extent of the damage in the transporter shipping documents or on the packing slip.
3. ➤ Initiate a complaint.

4.2 Transportation



This machine is delivered and installed by KHS.



WARNING!

Improper transportation

Residual risks may occur during transportation that could cause accidents and major property damage.

Knowledge of the machine and experience in assessing and avoiding residual risks is required for proper transportation.

- Never transport components without authorization.
- Always entrust the initial installation and any subsequent changes of location to KHS personnel.

4.3 Installation



Personnel from KHS are responsible for assembling and connecting this machine.



WARNING!

Improper setup

Residual risks may occur when setting up the machine that could cause accidents and major property damage.

Knowledge of the machine and experience in assessing and avoiding residual risks are required in order to properly set up the machine.

- Never set up components without authorization.
- Always entrust the initial installation and any subsequent changes of location to KHS personnel.

4.4 Connection



Personnel from KHS are responsible for assembling and connecting this machine.

**WARNING!****Improper connection**

Residual risks may occur during connection work that could cause accidents and major property damage.

Knowledge of the machine and experience in assessing and avoiding residual risks is required in order to connect the machine properly.

- Never connect components without authorization.
- Always entrust connection to personnel from KHS.

4.5 Commissioning



Personnel from KHS are responsible for commissioning this machine.

**DANGER!****Starting a machine that is not ready for operation could result in fatal injury!**

Serious or even fatal injury to operating and maintenance personnel and/or considerable property damage could result if the machine is insufficiently or incorrectly prepared.

There is a risk of injury if safety devices are inoperable or have been rendered inoperable.

- All criteria for making the machine operational must be met before switching on the machine.

**WARNING!****Improper commissioning**

Residual risks may occur during commissioning that could cause accidents and major machine damage.

Knowledge of the machine and experience in assessing and avoiding residual risks is required in order to commission the machine properly.

- Never commission the machine without authorization.
- Always entrust commissioning to personnel from KHS.



4.6 Decommissioning



Personnel from KHS are responsible for decommissioning this machine.



WARNING!

Improper decommissioning

Residual risks may occur during decommissioning that could cause accidents and major machine damage.

Knowledge of the machine and experience in assessing and avoiding residual risks is required in order to decommission the machine properly.

- Never decommission components without authorization.
- Always entrust decommissioning to personnel from KHS.

4.7 Storage



Store packing units observing the following conditions:

- Do not store outdoors.
- Store in a dry place that is free from dust.
- Do not expose to aggressive media.
- Keep out of direct sunlight.
- Avoid mechanical vibrations.
- Maintain a storage temperature of 15 ... 35°C.
- Maintain a relative humidity of max. 60%.
- When storing for longer than 3 months, check the general condition of all parts and packages at regular intervals. Refresh or renew the means of preservation if necessary.



NOTICE!

Note the instructions given on the packing units

Material damage may occur from failure to adhere to the specific information pertaining to storage given on the packing units.

- Check the packing units for information that goes beyond the general information mentioned.
- General information and information pertaining specifically to the packing unit must be observed in all cases.



4.8 Recommissioning



KHS personnel recommission the machine.



WARNING!

Improper recommissioning

Residual risks may occur during recommissioning that could cause accidents and major machine damage.

Knowledge of the machine and experience in assessing and avoiding residual risks is required in order to recommission the machine properly.

- Never recommission components without authorization.
- Always entrust recommissioning to KHS personnel.

4.9 Disposal



WARNING!

Environmental pollution resulting from improper disposal

There is a risk of polluting the environment if operating materials such as lubricants and detergents are not disposed of properly.

- Follow the instructions in the leaflets enclosed with the operating materials.
- Collect used operating materials in suitable containers marked in accordance with regulations.
- Properly dispose of cleaning utensils in suitable containers marked in accordance with regulations.
- Adhere to local waste disposal regulations.



WARNING!

Improper disposal

Residual risks may cause accidents if waste is not disposed of properly.

This could result in severe or even fatal injury.

- Knowledge of the machine and experience in assessing and avoiding residual risks is required in order to dispose of waste properly.
- Always entrust waste disposal to KHS personnel.

Prerequisite: There is no return or disposal agreement currently in effect with KHS.

1. ➤ Dismantle the machine in such a way that components are suitable for re-use.
2. ➤ Component disposal:
 - Scrap metals.
 - Recycle plastics.
 - Dispose of the remaining components sorted by material composition.



5 Operation

This chapter provides personnel instructions on carrying out operating modes.

5.1 Safety equipment

5.1.1 Emergency stop

Press an emergency stop switch in emergency situations.

Machine reaction:

- The machine stops as soon as possible.
- The control air supply closes.
Components close or remain in their current position.
- The control voltage switches off.



WARNING!

Hot surfaces

Risk of injury and burns due to hot surfaces of machine components and containers.

During production or cleaning, the machine may stop with the following states:

- filled with media
- pressurized
- with hot surfaces
- equipped with containers that are also pressurized and hot

Death or serious injury may result.

- Only enter the interior of the machine paneling with protective clothing.
- Wear protective clothing in the area of the valve manifold.

**WARNING!****Hot or corrosive fluids**

Components and pipelines contain hot or corrosive fluids during cleaning, sterilization, and production. These hot or corrosive fluids escape into the open.

There is a risk of injury from chemical burns or scalding if these fluids come into contact with skin. If these media come into contact with the eyes, there is a risk of damage or loss of eyesight.

Death or serious injury could result.

- Wear personal protective equipment:
 - Protective clothing
 - Gloves
 - Safety goggles
 - Safety shoes

**NOTICE!****Improper use of the emergency stop switch**

Continuous use of the emergency stop switch causes damage to the drive system.

This may result in damage to the machine or to items in the surrounding area.

Interrupt production or cleaning as described in the chapter “Operation”.

Restarting after an emergency stop

1. ➤ Eliminate the cause of the emergency stop.

For subsequent maintenance or repair work, observe the notes in chapter “Servicing”.

2. ➤ Unlock the actuated emergency stop switch.

3. ➤ Prepare the machine for operation.

4. ➤ Check and clear the fault messages displayed on the operator terminal.

5. ➤ Acknowledge the fault messages by pressing the illuminated *[Acknowledge fault]* button.

6. ➤ Prepare for production or cleaning.

Before production starts, any containers remaining in the machine must be removed.



5.1.2 Emergency unlock

All door switches are equipped with an emergency unlock that enables the locking system to be manually unlocked without help from outside the hazardous area.

**NOTICE!**

Machine damage caused by improper use of the emergency unlock

Continuous use of the emergency unlock causes damage to the drive system.

Opening and closing the doors during normal operation must only be carried out as described in chapter *"Operation"*, section *"Safety systems"*.

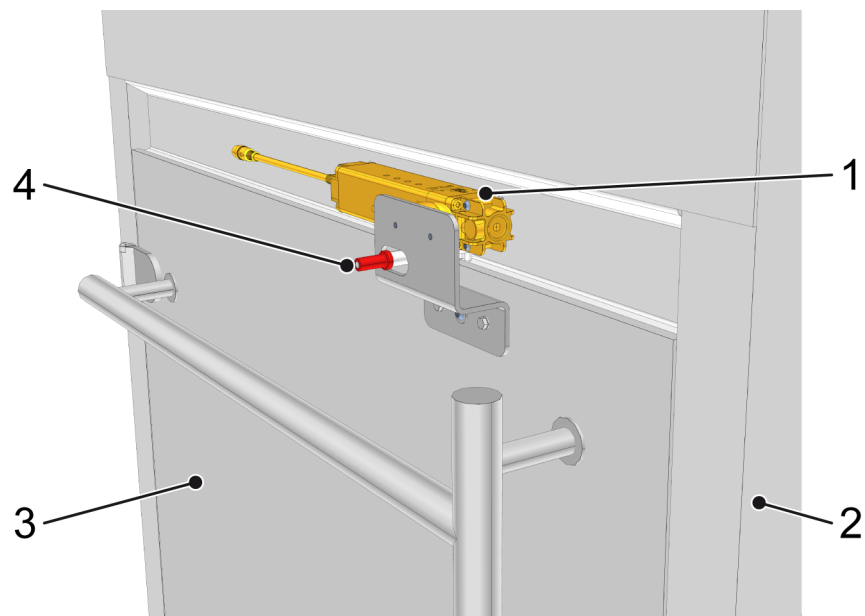


Figure 166: Emergency unlock

- 1 Door switch with lock
- 2 Exterior paneling
- 3 Door
- 4 Pin with sleeve

Function

Personnel: ■ Operating personnel

In an emergency, the door can be unlocked from outside.

1. ➞ Remove the sleeve.
2. ➞ Push the pin in the direction of the locking system.

⇒ The door can be opened.

A fault message is displayed on the screen.



5.1.3 Repair switch

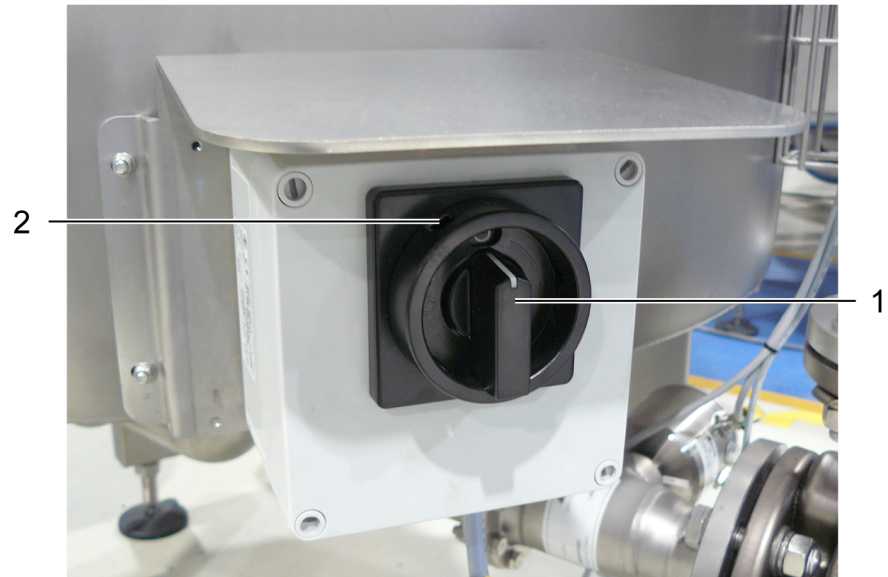


Figure 167: Repair switch

- 1 Repair switch
- 2 Opening for lock

Switching on

Personnel: ■ Operating personnel

1. ➤ Open and remove the lock preventing the *[repair switch]* from being switched back on.
2. ➤ Turn the *[repair switch]* to position *[1]*.

Switching off

Personnel: ■ Operating personnel

1. ➤ Turn the *[repair switch]* to position *[0]*.
2. ➤ Attach and close the lock preventing the *[repair switch]* from being switched back on.

5.1.4 Opening and closing doors in the machine paneling

Safety switches lock the doors of the paneling while the machine is running.

The doors can only be opened when the machine is stopped and after releasing the lock.



The doors can only be opened in "Setup" mode. It is not possible to jog the machine when the doors are open.

Opening the doors in the machine paneling

1. Stop production.
See chapter "Operation", section "Production".
2. Select "Setup" operating mode on the operator console's graphical user interface.
3. On the operator panel on the door that is to be opened, the *[Acknowledge/open paneling]* illuminated selector switch must be turned to the *[Open]* position.
 - ⇒ The lock for the door is opened and the illuminated selector switch on the operator panel lights up.
4. Open the door.

Closing Paneling Doors



NOTICE!

Tools inside the machine paneling

Material damage from tools or other foreign items inside the machine paneling.

This may result in damage to the machine or the surrounding area.

Make sure that the following prerequisites are met:

- All changeover and maintenance tasks are completed.
- There are no tools or other foreign items left in the machine paneling.

Closing the doors in the machine paneling

1. Close the door.
 - ⇒ The illuminated selector switch on the operator panel on the door begins to flash.
2. Turn the *[Acknowledge/open paneling]* illuminated selector switch to the *[Acknowledge]* position.
3. On the operator panel on the front of the machine, acknowledge the existing fault messages by pressing the *[Acknowledge]* button.
4. Select "Automatic" operating mode on the operator console's graphical user interface.
5. The machine can then be restarted.



Door operating errors

Door operating errors cause an emergency stop; see chapter *“Operation”*, section *“Safety equipment”*.

The machine cannot be operated for 10 minutes after an operating error (penalty time).

5.2 Signaling equipment

5.2.1 Signal lamp

The signal lamp is integrated into the machine paneling and indicates operating statuses or faults in the machine by means of colored lamps.

See chapter *“Faults”*.

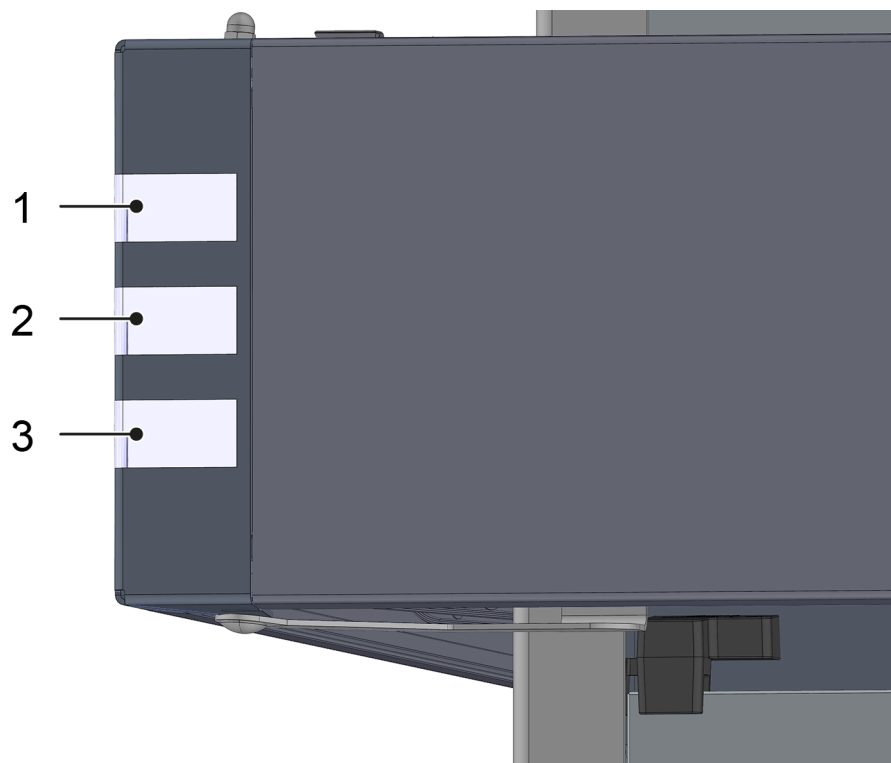


Figure 168: Signal lamp

- 1 Lamp color red, yellow, or white
- 2 Lamp color green
- 3 Lamp color blue

5.2.2 Signal horn

The signal horn is located on the valve manifold. The signal horn emits an audible signal when a fault occurs.



Figure 169: Signal horn on the valve manifold

5.3 Operating controls

5.3.1 Removable operating control

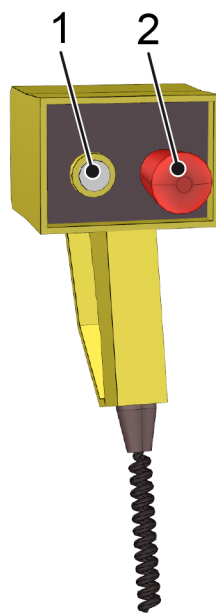


Figure 170: Removable operating control

The removable operating controls are connected to the machine paneling via a spiral cable and can be removed as required.



The removable operating controls are only active when the corresponding operator console is active.

Number	Operating control	Name	Function / use
1	Illuminated push button	Jog	Run the machine in jog mode
2	Emergency stop	EMERGENCY STOP	Stop the machine in an emergency situation

5.3.2 Operator panels P200 and P300

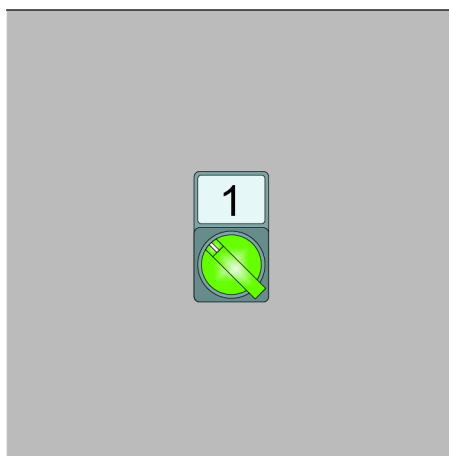


Figure 171: Operator panel

Number	Operating control	Name	Function/use
1	Illuminated selector switch	Acknowledge/open paneling	Confirms or opens door lock



5.3.3 Main switch



Figure 172: Main switch (example)

The main switch is on the switch cabinet.

The main switch turns the power supply to the machine on and off.

5.4 Jogging

The filler or sub-segments of it can be operated at a low speed. The filler runs at a low speed while the *[Jog]* button on the portable control unit is pressed.



Jogging is only possible if "Setup" operating mode (see chapter "Safety", section "Operating status and operating modes") is active, and all doors in the machine paneling are closed and acknowledged.



WARNING!

Rotating machine components

Danger of injury from crushing, cutting, entanglement, and entrapment.

This could result in death or serious injury.

- Make sure that no persons are located inside the machine paneling.

**WARNING!****Components that remain in motion**

Risk of injury due to moving components. When the drive controllers are deactivated, they remain energized for up to 5 minutes. The drives and moving parts connected to them may remain in motion.

This could result in death or serious injury.

- Maintain a safe distance.
- Deactivate the drives and wait 5 minutes.
- Only then is it safe to reach into the machine.

Jogging the machine

→ Press the *[Jog]* button on the portable control unit to run the machine step-by-step.

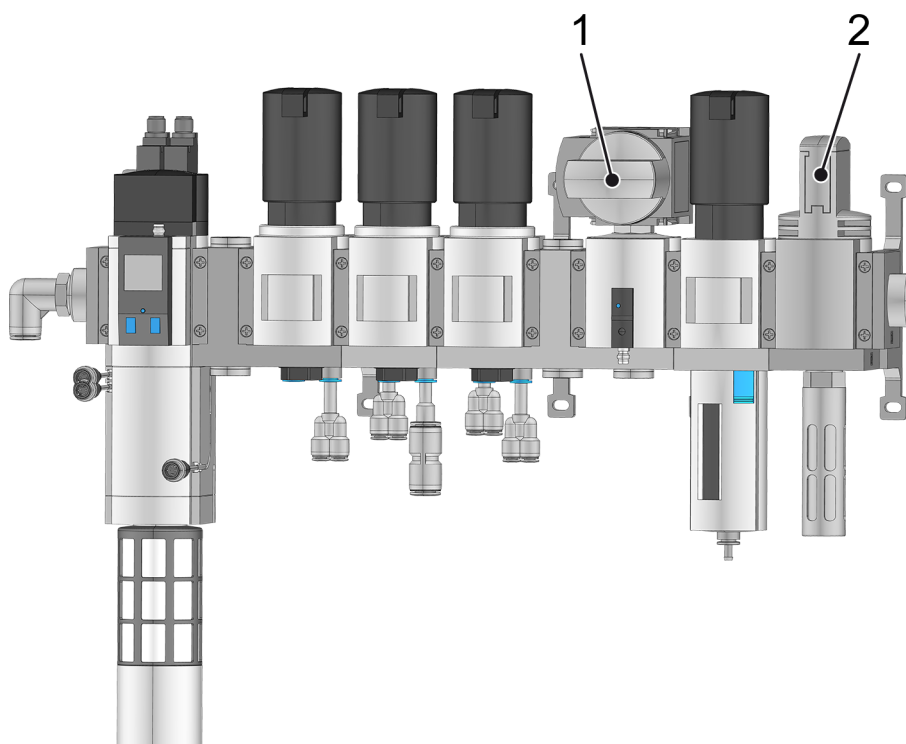
5.5 Preparing for operation**Preparing the control air supply**

Figure 173: FRL group

- 1 Valve for the control air supply of the filler turret
- 2 Shut-off valve



Prerequisite: The operator's control air supply must be established.

1. ➤ Open the shut-off valve.
2. ➤ Open the valve for the control air supply of the filler turret.



Opening manual shut-off valves

At the valve manifold, open the manual shut-off valves in the media passages.

Opening the disk valve

Personnel: ■ Operating personnel

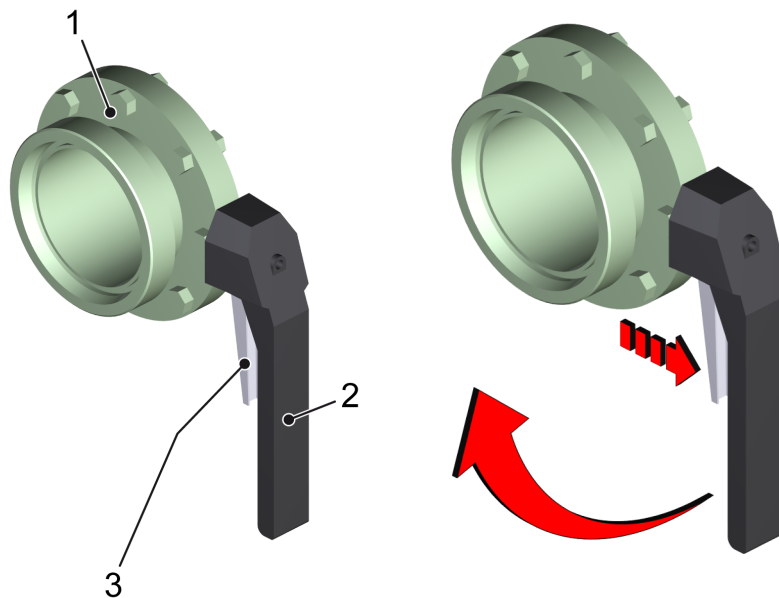


Figure 174: Opening the disk valve

- 1 Disk valve
- 2 Shut-off lever
- 3 Locking lever

1. ➔ Pull the locking lever up to the shut-off lever and rotate the shut-off lever 90° in one direction so that it is parallel with the pipe-line.
2. ➔ Release the locking lever again.
⇒ The manual shut-off valve is open.
3. ➔ Without moving the locking lever, move the shut-off lever back and forth to check that the shut-off lever is engaged.

Opening the ball valve

Personnel: ■ Operating personnel

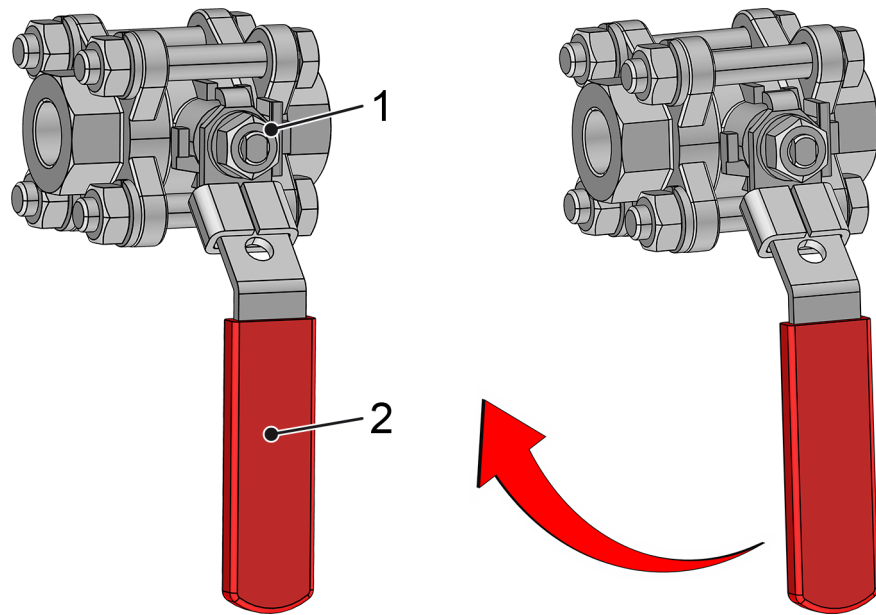


Figure 175: Opening the ball valve

- 1 Ball valve
- 2 Shut-off lever

➔ Rotate the shut-off lever 90° in one direction so that it is parallel to the pipeline.

⇒ The manual shut-off valve is open.

Switching on the repair switch

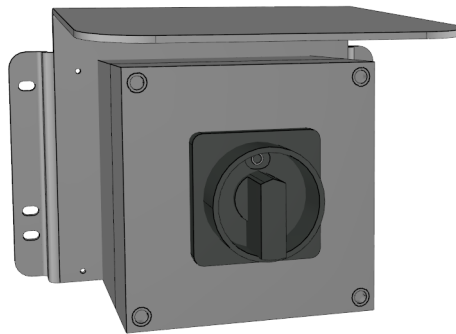


Figure 176: Repair switch

The drive of the conveyor features a lockable repair switch.
Turn the repair switch to position "1".



Switching on the power supply



Figure 177: Main switch for the power supply on the switch cabinet

Personnel: ■ Operating personnel

➔ Push the *[main switch]* to position *[1]*.

⇒ The power supply is switched on.

When the power supply is reactivated, the following programs start:

- The programmable controller program
- The filler computer program
- The operator console program

Closing the doors

Close all doors in the machine paneling; see chapter “*Operation*”, section “*Safety equipment*”.

Switching on the control voltage

➔ Turn the *[Operation on]* key switch on the operator panel on the front of the machine to position *[1]*.



Setting the operating mode to Automatic

- Select “Automatic” operating mode on the operator console's graphical user interface.



Automatic mode can only be selected with an RFID card of level 2 (operator) or above.

See chapter “Layout and function”, section “Graphical user interface”.

Operator login on the operator console



Figure 178: Operator console

1 RFID antenna

- Hold the RFID card in front of the antenna.



For security reasons, the user is logged off automatically after 30 minutes. You can log in at any time.

If an operator is already logged in and the RFID card of another operator is held in front of the antenna, the first operator is logged out (and their access authorizations disabled) and the new operator logged in.



5.6 Production

This chapter provides personnel with instructions for carrying out production tasks.

5.6.1 Safety instructions



CAUTION!

Hot surfaces

Gears and components through which hot media flow reach high operating temperatures.

Risk of burns.

This could cause slight or minor injury.

- Only enter the machine area that is separated by the protection partition if absolutely necessary.
- Wait until the hot surfaces have cooled down.
- Wear protective gloves.



CAUTION!

Escaping product

Pressurized product can escape during production due to leaks or bursting cans.

Products filled when hot represent a risk of burns and slipping.

This could cause slight or minor injury.

- Wear safety goggles and protective gloves.



CAUTION!

Danger of slipping on escaping liquids

Danger of injury through slipping.

This could cause slight or minor injury.

- Make sure liquids are drained away safely.
- Set up warning signs.



WARNING!

Escaping CO₂

Escaping CO₂ can accumulate in the room.

Risk of suffocation and risk to health due to dizziness, headaches, breathing difficulties and loss of consciousness.

This could result in death or serious injury.

- The customer is responsible for providing adequate ventilation in the location of the valve manifold, sealer and filler.
- The concentration of CO₂ in the workplace must be monitored.
- Observe local operational requirements.



WARNING!

Actuating the jog button during set-up

Machine parts move at a slower rate when the jog button is pressed.

There is a risk of body parts being crushed, trapped and severed.

This could result in death or serious injury.

- Keep a safe distance.



WARNING!

Automatic restart

After all drives are stopped, the drive controllers remain live for up to five seconds. Automatic start-up of the machine cannot be ruled out within this period of time.

There is a risk of body parts being crushed, trapped and severed.

This could result in death or serious injury.

- Keep a safe distance.

5.6.2 Prerequisites

- The upstream and downstream machines are ready for production.
- There are no foreign bodies on the infeed and outfeed conveyors.
- The format parts corresponding to the type are installed.



5.6.3 Preparation

5.6.3.1 Removing rinsing caps

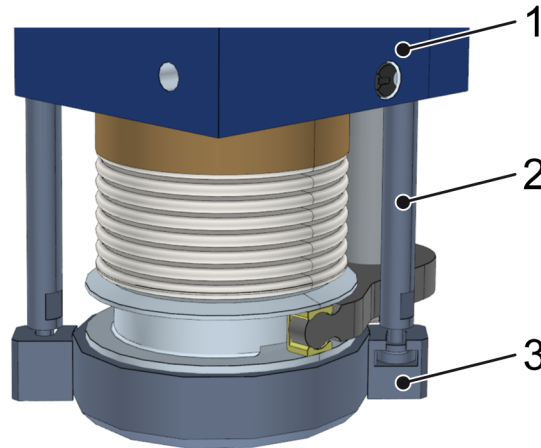


Figure 179: Rinsing caps on the filling valve

- 1 Filling valve
- 2 Guide pin
- 3 Rinsing cap

Personnel: ■ Operating personnel

Requirement: The program for cleaning or production is idle.

1. ➔ Press the *“Bell upwards”* button that can be found in the switching elements on the dashboard on the screen.
⇒ The bells are lifted and the filling valves are depressurized.
2. ➔ Select *“Setup”* operating mode on the operator console's graphical user interface.
3. ➔ Open the machine paneling doors; see chapter *“Operation”*, section *“Safety equipment”*.
4. ➔ Slightly lift the rinsing caps and turn to the left until the lock releases.

5.6.3.2 Preparing the bubble breaker

For information on preparing the bubble breaker, see the documentation for the can seamer.

5.6.3.3 Preparing the undercover gassing

For information on preparing the undercover gassing, see the can sealer documentation.



5.6.3.4 Selecting the type

Personnel: ■ Operating personnel

1. ➤ Select Machine without components on the operator console.
2. ➤ Press "*Type → Type selection*".
3. ➤ Select the type to be filled.

5.6.3.5 Selecting the production program

Personnel: ■ Operating personnel

1. ➤ Call up the machine without components in the navigation of the operator console.
2. ➤ Tap "*Programs → Program selection*".
3. ➤ Tap "*Production*".
 - ⇒ The screen automatically switches to the "*Stepview 1*" view of the filler component.
4. ➤ Tap the "*FS1*" button to start the step sequence.
 - ⇒ The step sequence is carried out and stops at the waiting step "*Sampling*".

5.6.3.6 Taking a product sample



WARNING!

Hot or corrosive fluids

Components and pipelines contain hot or corrosive fluids during cleaning, sterilization, and production. These hot or corrosive fluids escape into the open.

There is a risk of injury from chemical burns or scalding if these fluids come into contact with skin. If these media come into contact with the eyes, there is a risk of damage or loss of eyesight.

Death or serious injury could result.

- Wear personal protective equipment:
 - Protective clothing
 - Gloves
 - Safety goggles
 - Safety shoes



CAUTION!

Hot surfaces

Hot media flows through pipelines, components, bowls and nozzles. The surface temperature of the components reaches a high level.

Risk of burns.

This could cause slight or minor injury.

- Wear personal protective equipment.
 - Protective gloves
 - Protective clothing
- Work in a safe manner and be aware of potential hazards.



CAUTION!

Danger of skin burns and scalding

During steaming, escaping steam creates the risk of burning and scalding.

This could cause slight or minor injury.

- Wear protective clothing:
 - Gloves
 - Safety goggles

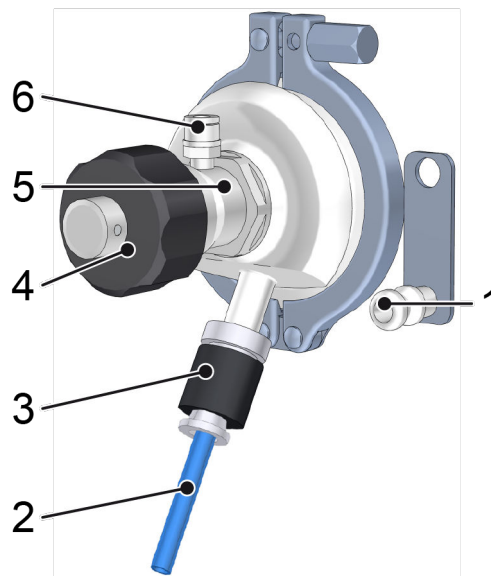


Figure 180: Sampling valve

- 1 Hose fitting
- 2 Hose
- 3 Outfeed
- 4 Handwheel
- 5 Pneumatic actuator
- 6 Pneumatic connection

Personnel: ■ Laboratory personnel

Protective equipment: ■ Acid and caustic-resistant safety gloves

■ Safety goggles

1. ➤ Disconnect the cleaning hose from the sampling valve outlet and attach it to the hose fitting.
2. ➤ Place a suitable sampling attachment onto the outfeed.



For heavily foaming products, such as beer, we recommend using a spiral hose.

3. ➤ Sterilize the sampling valve and sampling attachment with disinfectant.
 - ⇒ The sample is not affected by germs from the sampling valve.
4. ➤ Hold a suitable container under the outlet on the sampling valve.
5. ➤ Open the sampling valve using the handwheel.
6. ➤ When a sufficiently large sample has been taken, close the handwheel.
7. ➤ Use suitable means, e.g. water, to remove any traces of the sampled medium from the sampling valve.
8. ➤ Remove the sampling attachment.



9. ➤ Attach the cleaning hose to the sampling valve outlet.
 - ⇒ Escaping detergent or products are routed to the base of the valve manifold.



More detailed information on maintaining the sampling valve can be found in the documentation from the manufacturer.

Drawing in the product

Personnel: ■ Laboratory personnel

If the product sample is not OK, the product must be "prerun".

1. ➤ On the screen, press the button assigned to the primary feed in "Stepview 1".
 - ⇒ The product in the supply line is drawn in for 5 seconds.
2. ➤ Take another product sample at the sampling valve.
3. ➤ If the product sample is OK, press one of the buttons assigned to the program in "Stepview 1".
 - ⇒ The product is released for filling. The step sequence continues.
4. ➤ If the product sample is not OK, prerun the product again.

5.6.4 Starting

Personnel: ■ Operating personnel

1. ➤ Press the *[Start machine]* illuminated push button on the operator console.
2. ➤ Wait until the filler has completed at least one round.
3. ➤ Touch the "Flowgate open" machine function on the operator console.

5.6.5 Monitoring

Monitor the following during production:

- Pressurization gas pressure
- Pressure and temperature of the product to be filled
- Seal supply
- Leak valves at the valve manifold
- Operating noise of the machine



5.6.6 Stopping

Personnel: ■ Operating personnel

1. ➤ Touch the *"Flowgate closed"* machine function on the operator console.
2. ➤ Wait until all containers have left the machine.
3. ➤ Press the *[Stop]* illuminated push button on the operator console.

5.6.7 Ending production

Run out and end

Personnel: ■ Operating personnel

1. ➤ Press *"Programs ➔ Function keys"* on the operator console.
2. ➤ Select the *"Run out"* function.
 - ⇒ The infeed conveyor is run empty. The gap detection system is switched off. The machine speed is restricted to run-out capacity. The can stopper is forced to activate.
3. ➤ On the operator console, press *"Service ➔ Interface ➔ Filler>< product line"* at the filler level.
4. ➤ Manually set the signals that are required to end production via the interface.

5.7 Cleaning

During the cleaning process (CIP), all product-conducting passages are rinsed with detergents.

Rinsing with a combination of various cleaning agents at high flow rates loosens and removes particles of dirt. Rinsing with hot detergents disinfects the product-conducting passages.

A processing sequence defines the combination of detergents used and adherence to the following parameters: flow volume, pressure, temperature, concentration level and exposure time.

The operator is responsible for the processing sequence and for supplying the detergents. The requirements and limits for detergents specified in the Technical Data must be adhered to.

For information on CIP system operation, see the manufacturer's instructions.



The operator must regularly check the quality of cleaning.



Exterior cleaning/machine surfaces

Part of every cleaning operation includes the subsequent automatic or manual cleaning of the machine surfaces.



One of the purposes of cleaning the machine surfaces is to protect against corrosion.

Material compatibilities and limit values for using detergents

See chapter “Technical specifications”

5.7.1 Safety instructions



WARNING!

Escaping detergent

As a result of leaks, hot, pressurized, corrosive detergent may escape during the cleaning process.

Risk of burns and chemical burns.

This could result in death or serious injury.

- Wear protective clothing when performing any work close to the valve manifold.
- Protective clothing must be put on before opening the machine paneling and entering the machine area.
- Once cleaning is complete, rinse off any surfaces exposed to detergent thoroughly with water.

5.7.2 Prerequisites

The following conditions must be met before starting cleaning:

- There are no cans left in the machine.
- The filler has been emptied and is depressurized.
- There are no more covers in the can sealer.
- The CIP system is ready.
- There is a sufficient quantity of detergent at the required primary pressure.
- The limit values for the detergent are adhered to.



5.7.3 Preparation

Emptying the capper

Remove all lids from the sealer and the lid feed.



For further information, see the can sealer operating manual.

Removing coarse dirt

1. ➤ Remove cans and lids from the machine.
2. ➤ Clean the floor outside the machine paneling.
3. ➤ Clean the front table inside the machine paneling.

Clean gullies

1. ➤ Clean the gullies inside and outside the machine paneling.
2. ➤ Clean the gullies around the valve manifold.

Setting the cleaning height

- Move the machine to the cleaning height; see chapter “Operation”, section “Setup”.

Fitting the rinsing sleeves



NOTICE!

Damaged rinsing sleeves

Continuing to run the machine in jog mode could cause the rinsing sleeves to hit the format parts and cause damage.

Check if the rinsing sleeves collide with the format parts. If they do, remove the format parts.

1. ➤ Press the “Bell upwards” button that can be found in the switching elements on the dashboard on the screen.
⇒ The bells are lifted and the filling valves are depressurized.
2. ➤ Select “Setup” operating mode on the operator console's graphical user interface.
3. ➤ Open the machine paneling doors; see chapter “Operation”, section “Safety equipment”.
4. ➤ Push the rinsing sleeves onto the guide pins of the filling valves from below and turn them clockwise until they lock in place.



5.7.3.1 Closing the machine paneling

After preparing the machine and capper cleaning, exit the interior of the machine paneling and close all doors.

See chapter “Operation”, section “Safety equipment”.

5.7.4 Cleaning the bubble breaker and undercover gassing



For information on cleaning the can sealer, see the operating instructions.

In Stepview 1, the machine control system is idle.

1. ➔ Select the “CIP sealer” function from the program options on the screen.
2. ➔ On the operator panel on the front of the machine, press the [Start machine] button.

5.7.5 Cleaning the can sealer



For information on cleaning the can sealer, see the operating manual.

5.7.6 Execution

Cleaning program

The machine is equipped with an automatic cleaning program.

The machine automation system actuates the valves at the valve manifold and switches the various cleaning passages.

The individual steps for starting the cleaning program and external machine cleaning are listed in the description below.

The cleaning program runs in cycles until the program sequence is ended by the signal interface.

Manually set the signals for starting, executing and ending the cleaning program using the operator console; see chapter “Layout and function”, section “Graphical user interface”.



5.7.6.1 Selecting the cleaning program

1.  Press *"Programs"* on the screen.
2.  Press the *"Program selection"* list element.
3.  In the *"Program selection"* view, select the option *"Cleaning"*.
⇒ The screen automatically switches to the *"Stepview 1"* view.

5.7.6.2 Starting the cleaning program

1.  Press *"Programs"* on the screen.
2.  Tap the *"Stepview 1"* list element.
3.  In the *"Stepview 1"* view, press the Start button assigned to the cleaning program.
4.  Press *"Service → Interfaces → Filler >< CIP"* at filler level on the control panel.
5.  Manually set the signals that are required for cleaning via the interface.



5.7.6.3 Checking ventilation holes

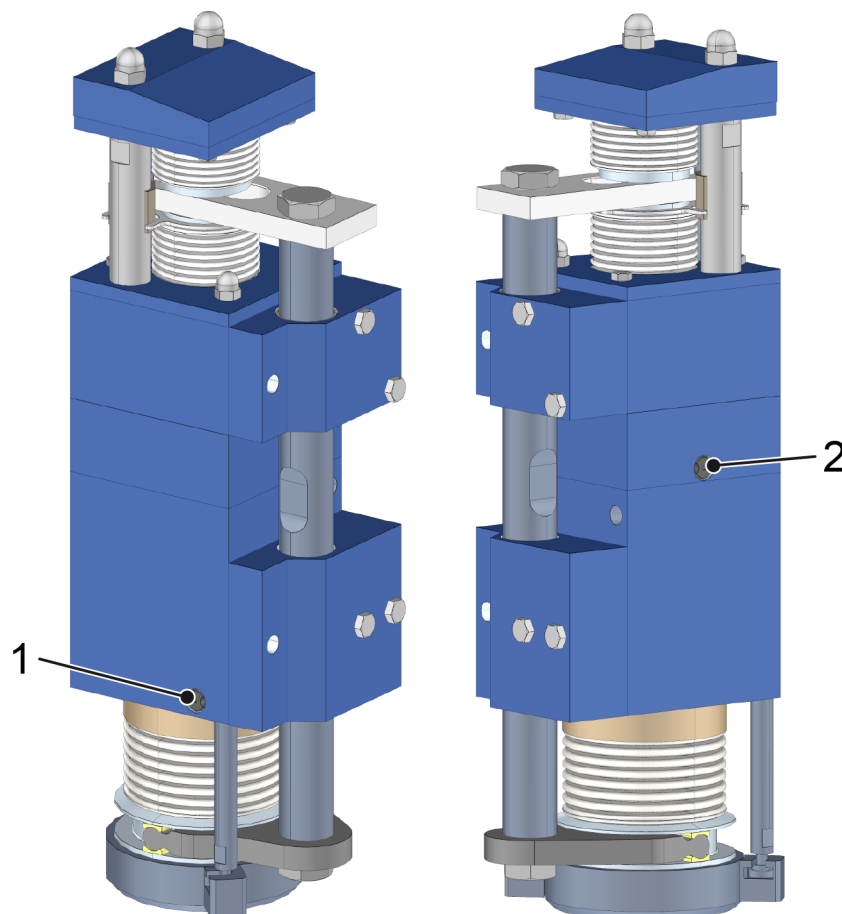


Figure 181: Ventilation holes in the filling valve

- 1 Ventilation hole in the valve housing with ventilation plug
- 2 Ventilation hole in the upper part of the valve with ventilation plug

Personnel: ■ Operating personnel

Prerequisite: Automatic Cleaning (CIP) has been started.

1. During the cleaning process, monitor the filler valves from outside of the machine housing.
2. Liquid escaping from a ventilation hole on the filler valve indicates a torn membrane.
3. Replace the faulty membrane. See chapter *“Servicing”*, section *“Repairs”*.

5.7.6.4 Continuing the cleaning program

1. Press *“Programs”* on the screen.
2. Tap the *“Stepview 1”* list element.
3. In the *“Stepview 1”* view, press the Start button assigned to the cleaning program.



4. ➤ Press “Service ➔ Interfaces ➔ Filler >< CIP” at filler level on the control panel.
5. ➤ Manually set the signals that are required for cleaning via the interface.



When setting the signals, observe the time specifications in the appendix “Cleaning recommendation for machine hygiene”.

5.7.6.5 Opening paneling



WARNING!

Hot or corrosive fluids

Hot or corrosive liquids escape during cleaning. Risk of injury on contact due to chemical burns or scalding.

This could result in death or serious injury.

- Only open the doors of the machine paneling in the event of an emergency.
- Wear personal protective equipment:
 - Protective clothing
 - Gloves
 - Face shield
 - Safety shoes

All doors in the machine paneling must be closed while the cleaning program is running.

Opening the door will interrupt the cleaning program.

5.7.6.6 Ending the cleaning program

1. ➤ Observe the step sequence given on the “Stepview” screen.
2. ➤ The last step in the step sequence for cleaning must use water.
3. ➤ Manually set the signals that are required to end cleaning via the interface.

5.7.7 Cleaning the machine exterior

This machine processes beverages. Keeping the system externally sanitary and brightly polished at all times is prerequisite for ensuring the required hygienic conditions.

Deposits from carryover of product remnants form on the surfaces.



- Microorganisms growing in these deposits will contaminate the product.
- These deposits result in increased wear of moving parts.

This can be prevented by thoroughly cleaning surfaces regularly.

5.7.7.1 Using high-pressure cleaners



WARNING!

High water pressure, hot and corrosive fluids

Risk of injury due to high water pressure, hot and corrosive fluids in the event of incorrect handling of the high-pressure cleaner.

This could result in death or serious injury.

- Wear personal protective equipment:
 - Protective clothing
 - Gloves
 - Face shield
 - Safety shoes
- Keep all people out of the danger area
- Do not direct the spray gun at people

**NOTICE!****Damage to components and contamination of the surfaces**

When cleaning the machine surface using the spray gun of a high-pressure cleaner, detergent (water or chemicals) can enter the following components due to the high pressure:

- Bearings
- Lubrication areas
- Housing of electrical and pneumatic components

This may cause the following:

- Malfunctions and resulting flaws in products
- Operating errors
- Damage or destruction of components
- Spreading of microorganisms from infected areas to clean areas.

All of these examples will shorten the service life of the components involved. A further negative effect is the increased risk of corrosion.

Correct procedure when using high-pressure cleaners:

- Set the spray pressure of the high-pressure cleaner to a maximum of 20 bar.
- The distance between the spray gun nozzle and the machine surface must be at least 1.50 meters.
-
- Do not point the spray directly at bearings or lubrication areas.
- Do not point the spray directly at electrical or pneumatic components or at the housings of these components.



KHS will not be held liable for any damage resulting from the use of high-pressure cleaners.

5.7.7.2 Cleaning the filler turret

Depending on the machine model, the filler turret is made exclusively of stainless steel or a combination of painted steel and stainless steel components.

Irrespective of the materials used, the filler turret and the components mounted on it can be cleaned with commercial detergents.

The detergents can be applied with the external cleaning system spray gun or with a high-pressure cleaner.

**NOTICE!****Using incorrect detergents**

Incorrect detergents corrode the surfaces and components of the machine.

This may result in damage to the machine or to items in the surrounding area.

- Only use detergents which meet the specifications, see chapter “*Technical data*”, section “*Maintenance*” and section “*Media requirements*”.

5.7.7.3 Cleaning machine surfaces

The customer/user is responsible for checking the quality of cleaning.

The machine user is solely responsible for the quality of cleaning!

Cleaning machine surfaces

- Remove all visible dirt and deposits using detergents and physical means (brushes).
- Remove parts at critical points for cleaning and reinstall after drying.
- Re-rinse with water until normal methods of analysis find no evidence of the typical indications of detergent remnants.
- Rub dry.

5.7.7.4 Cleaning Makrolon sheets**NOTICE!****Damage to the Makrolon sheets**

The Makrolon sheets are not scratch-resistant.

Do not use any sharp tools, such as razor blades, to clean the sheets.

The Makrolon sheets can be cleaned with commercially available detergents. Remove all visible dirt and deposits using detergents and physical means (brushes).



Power washers

Adhere to the instructions contained in section *"Using power washers"* when applying detergents with spray guns from the exterior cleaning system or when using power washers.

5.8 Setup

This chapter provides personnel instructions on setting up the machine for the production of various goods.

5.8.1 Safety instructions



WARNING!

Unauthorized person within the machine paneling

During changeover of the machine to a different product type, the machine is repeatedly operated in jog mode. As a result, unauthorized persons could be trapped and injured by the machine.

This could result in death or serious injury.

- The operator of the jog button must ensure, before operating the button, that there are no persons, including the operator, within the machine paneling.



WARNING!

Danger of injury caused by crushing, cutting, seizing, and pull-in

Rotating machine components in jog mode can cause serious injury resulting from crushing, cutting, seizing, and pull-in!

This could cause severe and even fatal injury.

- The operator of the jog button must ensure, before operating the button, that there are no persons, including the operator, within the machine paneling.

5.8.2 Preparation

- Prepare the format parts container or format parts carriage with the new format parts.
- Check the format parts for damage.
- Prepare the CIP caps.
- Ensure access to work areas.



- Prepare tools and special tools.
- Check personal protective equipment for damage and ensure it is complete.

5.8.3 Run-out

Personnel: ■ Operating personnel

For a product changeover, it is recommended that the bowl and primary product feed be rinsed.

1. ➤ On the operator console, press *"Programs"* at the filler level.
2. ➤ Press the *"Program options"* list element.
3. ➤ Select one of the following program options:
 - Product changeover with rinsing
 - Product changeover without rinsing
 - End of production with rinsing
 - End of production without rinsing
4. ➤ On the operator console, press *"Programs ➔ Function keys"* at the machine level.
5. ➤ Select the *"Run out"* function.
 - ⇒ The infeed conveyor is run empty. The gap detection system is switched off. The machine speed is restricted to run-out capacity. The can stopper is forced to activate.
6. ➤ On the operator console, press *"Service ➔ Interface ➔ Filler>< product line"* at the filler level.
7. ➤ Manually set the required signals via the interface.
8. ➤ On the operator console, press *"Programs ➔ Stepview 1"* at the filler level.
9. ➤ Select one of the following options:
 - Press *"FS1"*.
 - The tank is completely emptied.
 - The containers that were not filled can be moved through the filler and discharged.
 - Do not press *"FS1"*.
 - The containers are filled and capped to the end.
 - The remaining product is rinsed out via the gully.

5.8.4 Setting the cleaning height

When changing the machine over to a new can type with a different height to the can type currently in use, the height of the filler and the can sealer must be adjusted.

The sequence of steps to be performed is described below.

**CAUTION!****Hand injuries**

The components move up or down and there is therefore a risk of hand injuries.

All persons must leave the area inside the machine paneling before height adjustment is actuated. Then close all machine guard panels.

**NOTICE!****Destruction of machine components**

The components move up or down and will destroy any format parts which do not correspond to the type as well as any cans still in the machine.

Before operating the height adjustment, run all bottles out of the machine and mount the format parts that correspond to the type of can to be processed.



The machine can be restarted only when the height adjustment has reached the setpoint height.

Selecting the cleaning program

➔ Select the cleaning program; see chapter *“Operation”*, section, *“Cleaning”*.

Setting the filler to the change-over height

1. ➔ Select the *“Filler”* component on the navigation screen.
2. ➔ In the menu bar, press *“Type”*.
⇒ The *“Height adjustment”* view opens.
3. ➔ In the *“Height adjustment”* view, press *“Change-over height”*.



4. ➤ Confirm the setpoint.

- ⇒ After confirming the value, the following message appears
"Before carrying out height adjustment, please check if up/down is possible without danger."



NOTICE!

Damage to machine components

Components can damage other parts if they move upwards or downwards during the height adjustment process.

- Check that the height-adjustable components will not collide with the format parts. If necessary, remove the format parts.
- When you are sure there will be no collision during height adjustment, confirm the warning message.

5. ➤ Once you have confirmed that there will be no collision during height adjustment, confirm the warning message.

- ⇒ The "Up/down" button is displayed on the operator terminal.

6. ➤ Press the "Up/down" button.

- ⇒ The filler turret moves to the set height automatically.

7. ➤ Exit the *"Height adjustment"* view.

- ⇒ The height adjustment ends. Once the height adjustment has completed, exit the view.



Checking the cleaning height

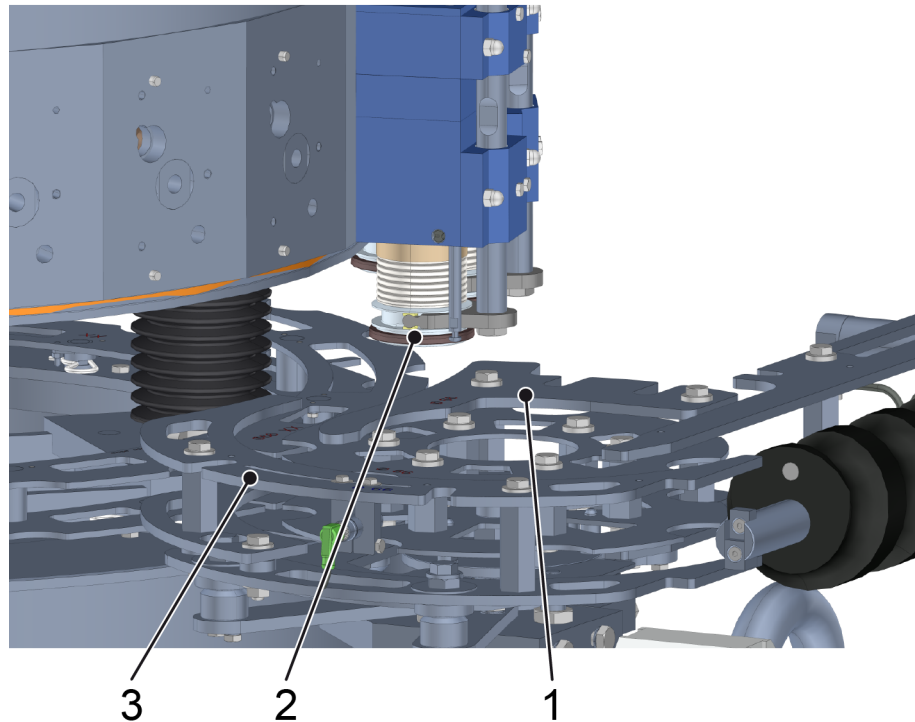


Figure 182: Checking the cleaning height

- 1 Pusher
- 2 Bell
- 3 Round blank

The cleaning height is reached when the bell is between 50 and 80 mm above the pusher.

5.8.5 Changing format parts

5.8.5.1 Unlocking the machine paneling

Selecting Setup operating mode

Personnel: ☒ Operating personnel

- ➔ Select “Setup” operating mode on the operator console’s graphical user interface.

Opening the doors in the machine paneling

- ➔ Open the doors in the machine paneling; see chapter “Operation”, section “Safety equipment”.

5.8.5.2 Format part ID

The format parts must be changed if the machine is to be changed over to a different can diameter.



On each format part, the can diameter for which that format part is designed is specified.

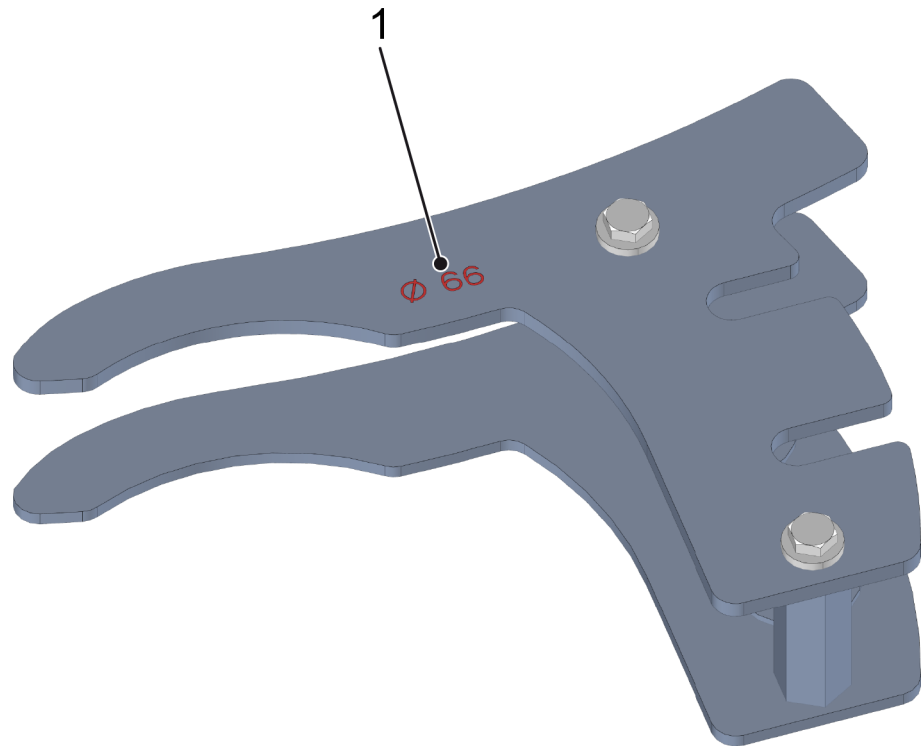


Figure 183: Example format part ID on the pusher

1 Can diameter

5.8.5.2.1 Overview of format parts

The diagram below shows an overview of the format parts to be changed over:

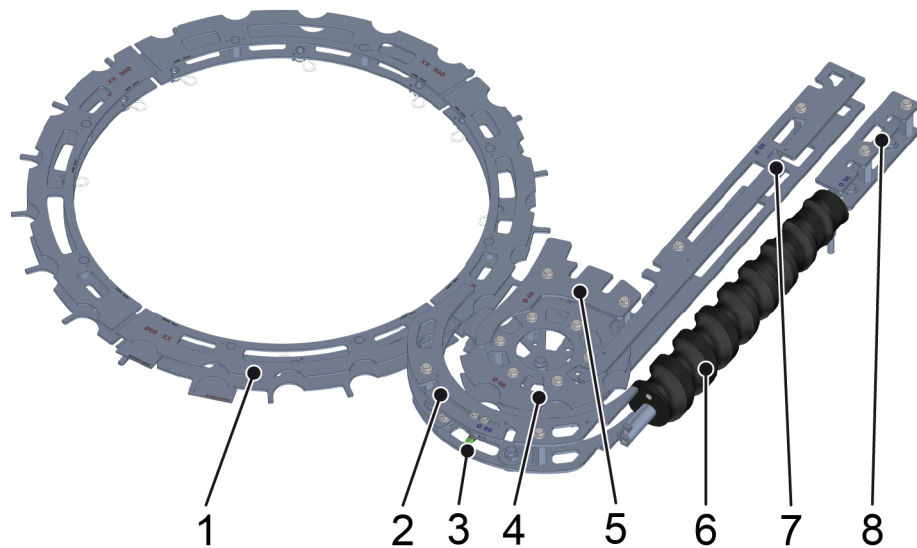


Figure 184: Overview

- 1 Can plate
- 2 Round blank
- 3 Can detection sensor
- 4 Star
- 5 Pusher
- 6 Screw conveyor
- 7 Counterstay
- 8 Guide

The filler should be moved upwards before starting work so that the pressure bracket does not hinder the format part changeover.

It is recommended to disassemble the format parts in the following order in order to make the task more manageable:

- 1. ➤ Guide
- 2. ➤ Screw conveyor
- 3. ➤ Counterstay
- 4. ➤ Pusher
- 5. ➤ Round blank
- 6. ➤ Star
- 7. ➤ Can plate

To assemble the format parts, proceed in reverse order.



5.8.5.2.2 Guide

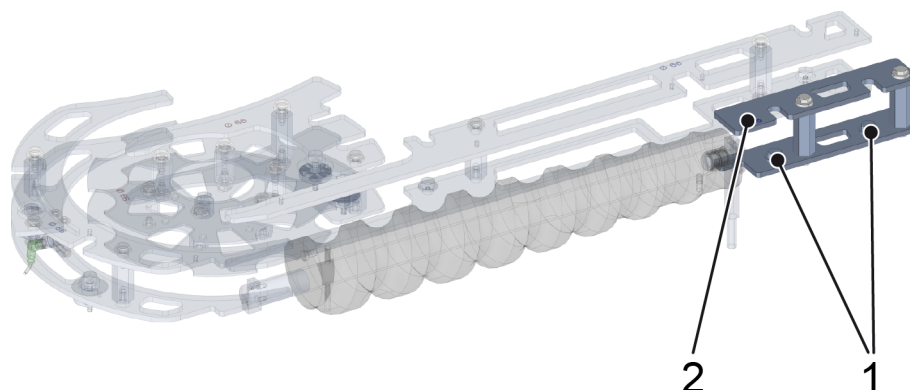


Figure 185: Changing the guide

- 1 Screw
- 2 Guide

Disassembly

1. ➤ Loosen the screws.
2. ➤ Remove the guide.

Assembly

1. ➤ Insert the guide corresponding to the new can type.
2. ➤ Tighten the screws.



5.8.5.2.3 Worm

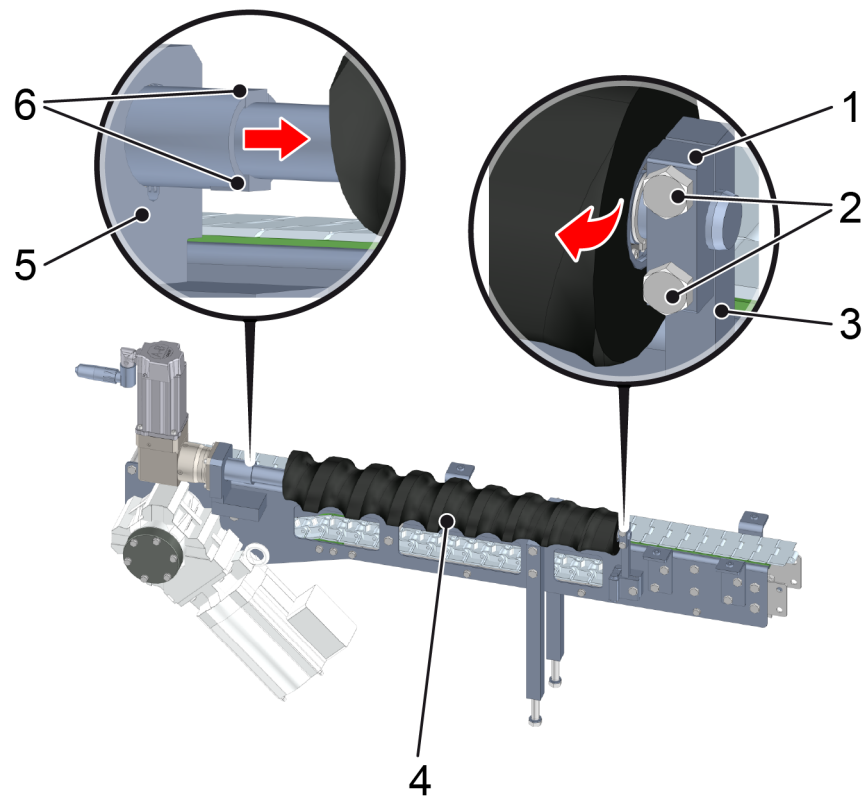


Figure 186: Changing the worm

- 1 Bracket
- 2 Screws
- 3 Right bracket
- 4 Worm
- 5 Left bracket
- 6 Adjustment pins

Disassembly

1. Unscrew the screws from the holder.
2. Remove the holder and remove the worm from the front.
3. Remove the worm from the left bracket.

Assembly

1. Insert the worm corresponding to the can diameter in the left holder.



Ensure that the adjustment pins are in the correct position.

2. Place the worm into the right bracket.
3. Secure the holder with the screws.



5.8.5.2.4 Counterstay

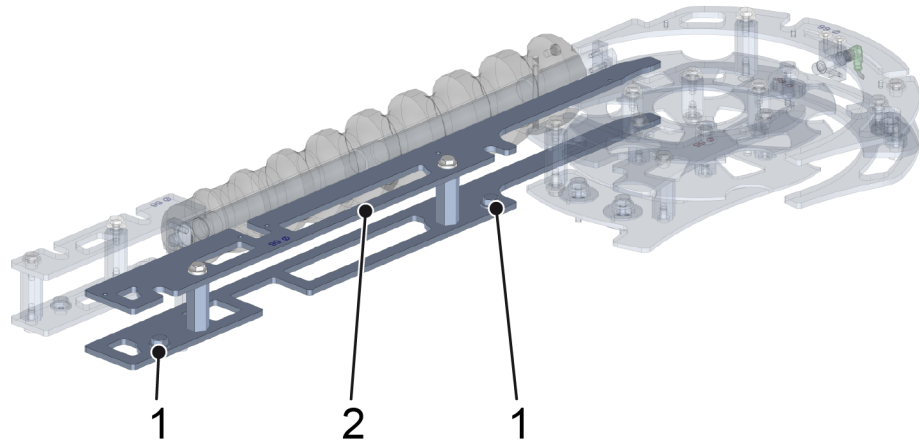


Figure 187: Changing the counterstay

- 1 Screw
- 2 Counterstay

Disassembly

1. ➞ Loosen the screws.
2. ➞ Remove the counterstay.

Assembly

1. ➞ Insert the correct counterstay for the new can type.
2. ➞ Tighten the screws.

5.8.5.2.5 Pusher

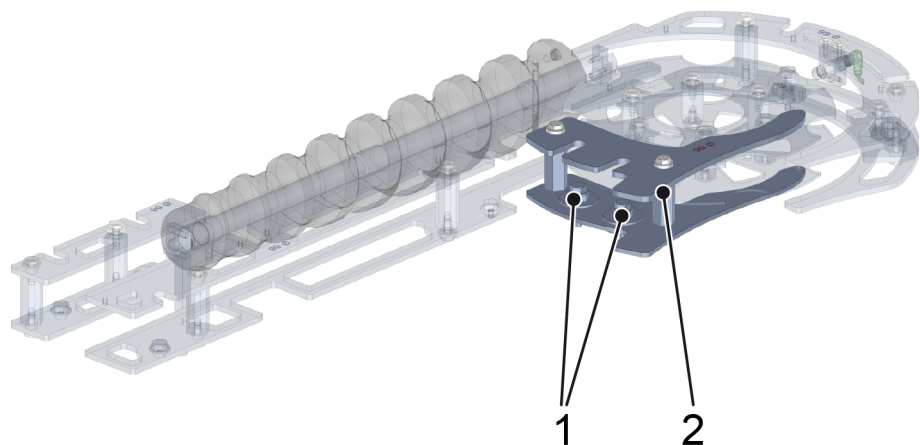


Figure 188: Changing the pusher

- 1 Screws
- 2 Pusher

Disassembly



1. Loosen the screws.
2. Lift the pusher up.

Assembly

1. Insert the pusher corresponding to the new can type.
2. Tighten the screws.

5.8.5.2.6 Round blank

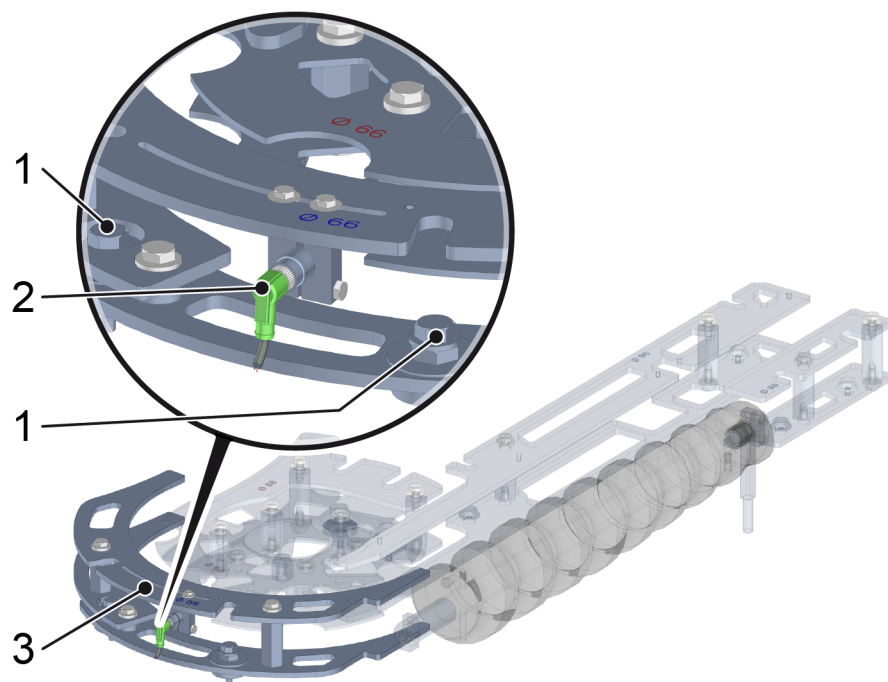


Figure 189: Changing the round blank

- 1 Screw
- 2 Can detection sensor
- 3 Round blank

Disassembly

1. Loosen the screws using a combination spanner (19 mm).
2. Loosen the can detection sensor using a combination spanner (14 mm).
3. Lift the round blank up.

Assembly

1. Insert the round blank for the new can type.
2. Tighten the screws.
3. Connect and tighten the can detection sensor.



5.8.5.2.7 Star

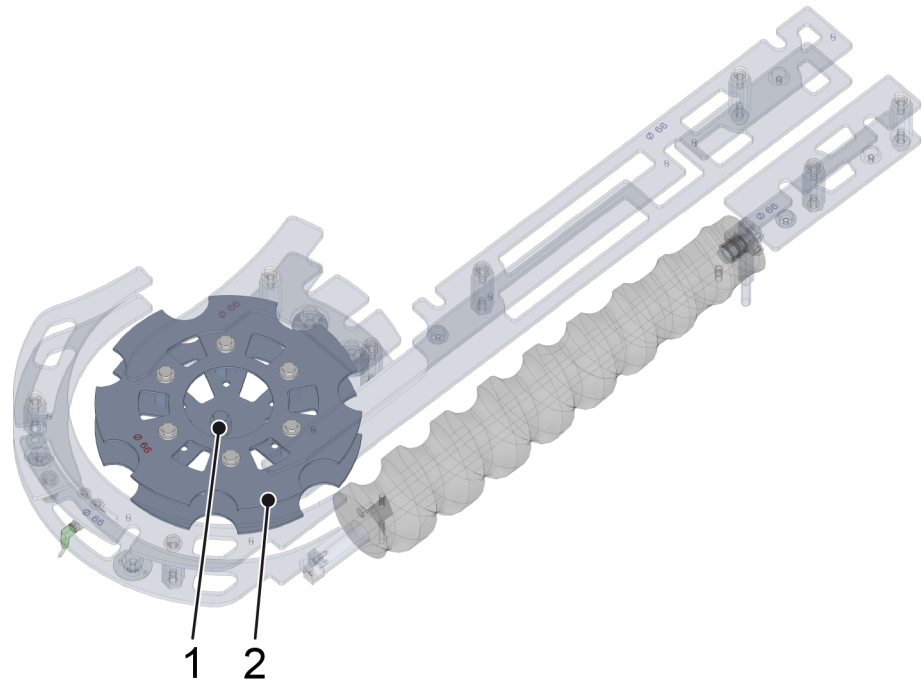


Figure 190: Changing the star

- 1 Screw
- 2 Star

Disassembly

1. ➤ Loosen the screw.
2. ➤ Remove the star.

Assembly

1. ➤ Insert the star corresponding to the can type so that it fits into the centering device.
2. ➤ Tighten the screw.



5.8.5.2.8 Can plate

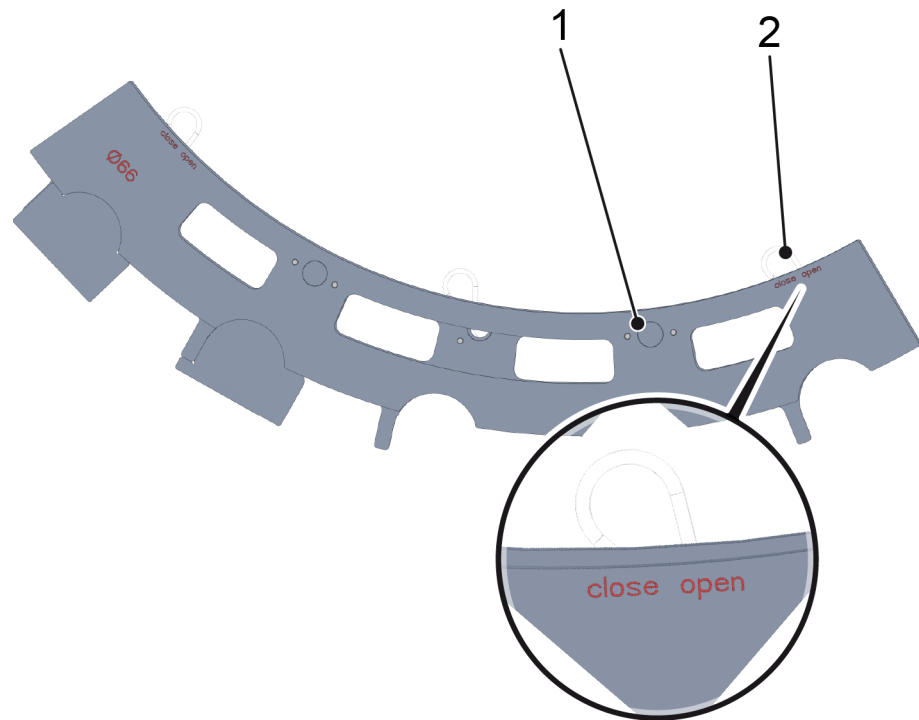


Figure 191: Changing the can plate

- 1 Segment
- 2 Fuse

Disassembly

1. Turn the safety catches on the segments to the "open" position.
2. Lift the segments up.

Assembly

1. Insert the segments corresponding to the can diameter.
2. Turn the safety catches on the segments to the "close" position.

5.8.5.3 Adjusting the can sealer



For information on adjustment work, see the can sealer operating manual.

5.8.5.4 Setting the can shower

If the can height changes, the height of the can shower nozzles must be adjusted.

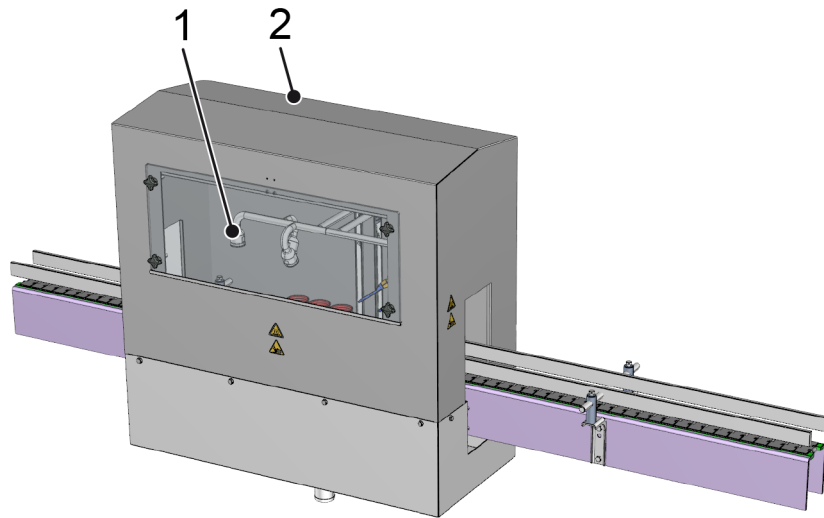


Figure 192: Can shower with cover

- 1 Water nozzle
- 2 Cover

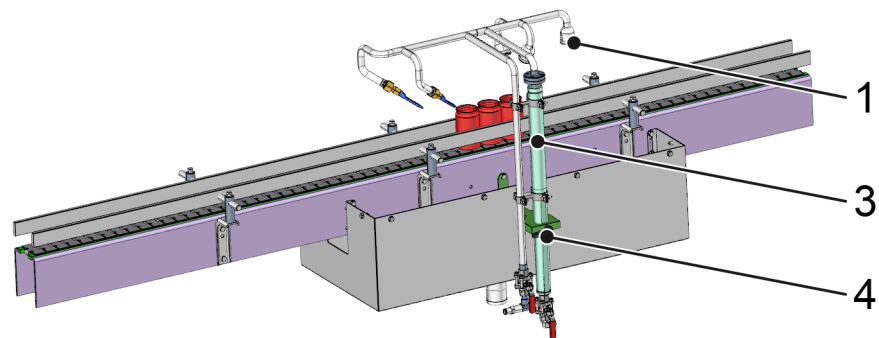


Figure 193: Can shower without cover

- 1 Water nozzle
- 3 Nozzle holder
- 4 Clamping screw

- 1. Loosen the clamping screw on the rear side of the cover.
- 2. Move the nozzle holder so that there is a gap of 50 mm between the top edge of the can and the bottom edge of the nozzle.
- 3. Retighten the clamping screw.

5.8.5.5 Locking the machine paneling

Closing the doors in the machine paneling

- Close the doors in the machine paneling; see chapter "Operation", section "Safety equipment".



5.8.6 CIP cleaning

When the dirt collection filter is changed or comes into contact with the product area, sterilization must be performed.

→ Perform CIP cleaning with sterilization; see chapter *“Operation”*, section *“Cleaning”*.

5.8.7 Setting the production height

When changing the machine over to a new can type with a different height to the can type currently in use, the height of the filler and the can sealer must be adjusted.

The sequence of steps to be performed is described below.



CAUTION!

Hand injuries

The components move up or down and there is therefore a risk of hand injuries.

All persons must leave the area inside the machine paneling before height adjustment is actuated. Then close all machine guard panels.



NOTICE!

Destruction of machine components

The components move up or down and will destroy any format parts which do not correspond to the type as well as any cans still in the machine.

Before operating the height adjustment, run all bottles out of the machine and mount the format parts that correspond to the type of can to be processed.



The machine can be restarted only when the height adjustment has reached the setpoint height.

Selecting the production program and type

→ Select the production program and type; see chapter *“Operation”*, section *“Production”*.



Setting the filler to the change-over height

1. ➤ Select the *"Filler"* component on the navigation screen.
2. ➤ In the menu bar, press *"Type"*.
 - ⇒ The *"Height adjustment"* view opens.
3. ➤ In the *"Height adjustment"* view, press *"Change-over height"*.
4. ➤ Confirm the setpoint.

⇒ After confirming the value, the following message appears
"Before carrying out height adjustment, please check if up/down is possible without danger."



NOTICE!

Damage to machine components

Components can damage other parts if they move upwards or downwards during the height adjustment process.

- Check that the height-adjustable components will not collide with the format parts. If necessary, remove the format parts.
- When you are sure there will be no collision during height adjustment, confirm the warning message.

5. ➤ Once you have confirmed that there will be no collision during height adjustment, confirm the warning message.
 - ⇒ The "Up/down" button is displayed on the operator terminal.
6. ➤ Press the "Up/down" button.
 - ⇒ The filler turret moves to the set height automatically.
7. ➤ Exit the *"Height adjustment"* view.
 - ⇒ The height adjustment ends. Once the height adjustment has completed, exit the view.

Checking the production height

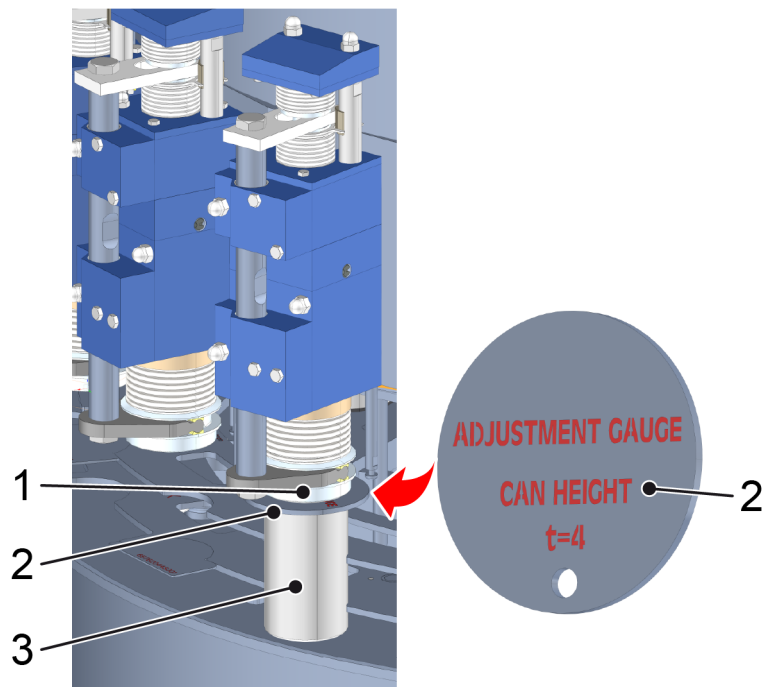


Figure 194: Checking the cleaning height

- 1 Bell
- 2 Setting gage
- 3 Can

➔ Guide the setting gage between the bell and the can.

⇒ The production height is reached when the bell sits on the setting gage and the setting gage can be easily removed.

Moving the can sealer

After adjusting the filler, set the height of the can sealer. The height is adjusted on the operator console on the can sealer.



Please refer to the manufacturer's description for information on operation.

5.8.8 External cleaning

➔ Perform external cleaning; see chapter "Operation", section, "Cleaning".



5.8.9 Starting production

**NOTICE!****Tools inside the machine paneling**

Material damage from tools or other foreign items inside the machine paneling.

This may result in damage to the machine or the surrounding area.

Make sure that the following prerequisites are met:

- All changeover and maintenance tasks are completed.
- There are no tools or other foreign items left in the machine paneling.

➞ Start production; see chapter *“Operation”*, section *“Production”*.

5.8.10 Follow-up tasks

- Put the format parts container or carriage away in the right place.
- Clear away the CIP caps to the place provided.
- Clear away tools and special tools.

5.9 Taking the machine out of operation

Prerequisite: Production or cleaning is complete.



Closing manual shut-off valves

At the valve manifold, close the manual shut-off valves in the media passages.

Closing the disk valve

Personnel: ■ Operating personnel

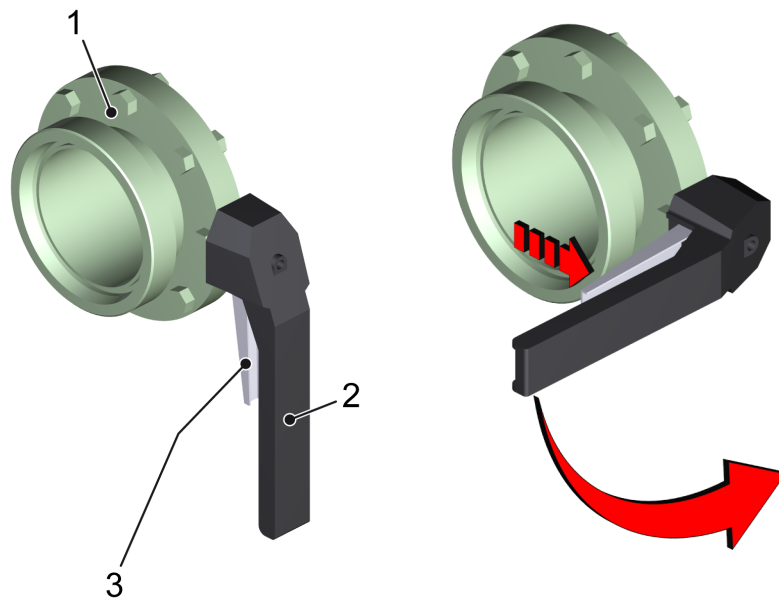


Figure 195: Closing the disk valve

1. ➔ Pull the locking lever up to the shut-off lever and rotate the shut-off lever 90° in one direction so that it is perpendicular to the pipeline.
2. ➔ Release the locking lever again.
⇒ The manual shut-off valve is closed.
3. ➔ Without moving the locking lever, move the shut-off lever back and forth to check that the shut-off lever is engaged.

Closing the ball valve

Personnel: ■ Operating personnel

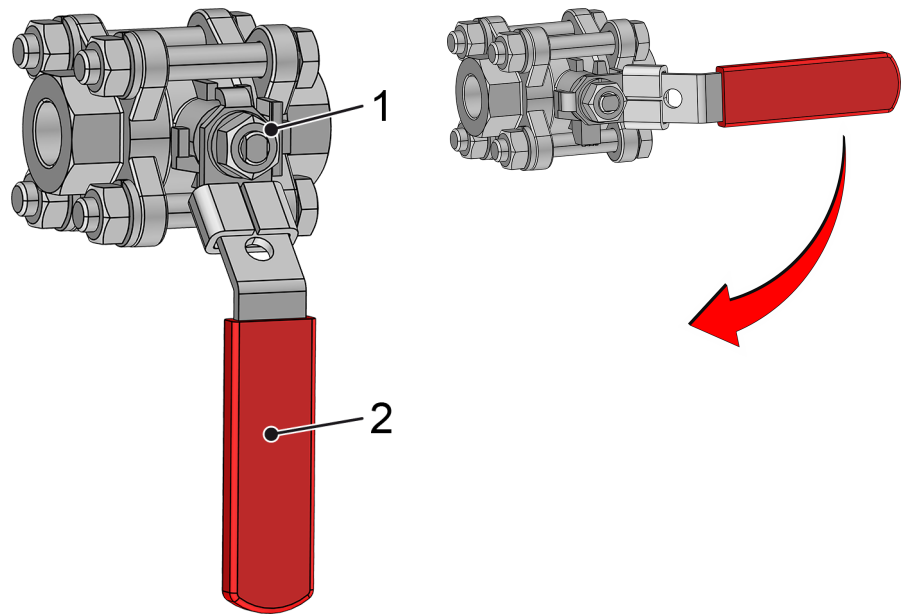


Figure 196: Closing the ball valve

- 1 Ball valve
- 2 Shut-off lever

➔ Rotate the shut-off lever 90° in one direction so that it is perpendicular to the pipeline.

⇒ The manual shut-off valve is closed.

Switching off the control air supply

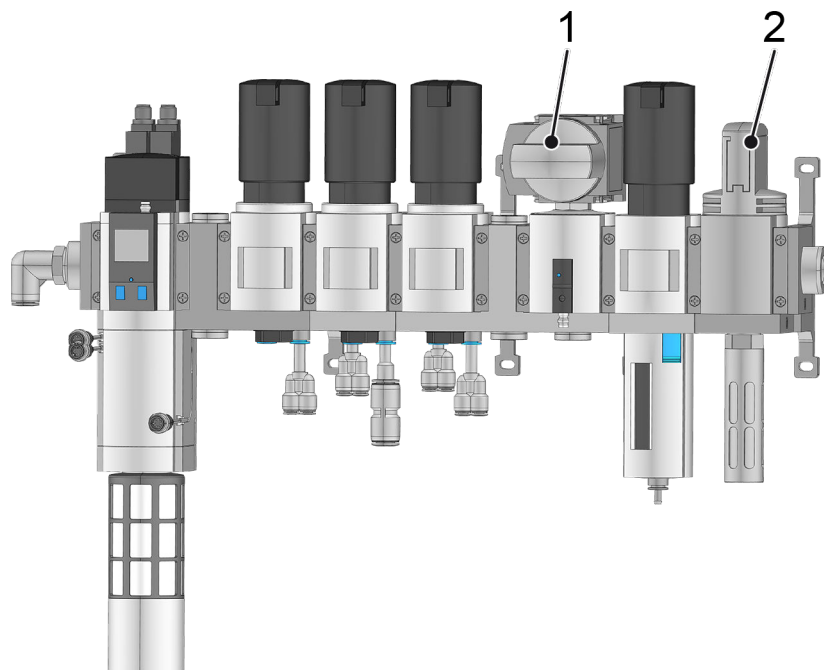


Figure 197: FRL group

- 1 Shut-off valve for control air to the filler turret
- 2 Shut-off valve



➞ Close both shut-off valves.

Switching off the control voltage

➞ Turn the *[Operation on]* key switch to position *[0]*.

See chapter “Operation”, section “Operating controls”.

Switching off the power supply



Figure 198: Main switch for the power supply on the switch cabinet

Personnel: ■ Operating personnel



NOTICE!

Humidity accumulation in the control cabinet

If the power supply is switched off, then the ventilation in the control cabinet is out of operation.

Penetrating moisture can lead to malfunctions.

This may result in damage to the machine or to items in the surrounding area.

Only switch off the power supply in the following cases:

- Emergency
- Maintenance work
- Troubleshooting

➞ Pull the *[main switch]* to position *[0]*.

⇒ The power supply is switched off.



This page is left blank for editorial reasons.



6 Servicing

This chapter provides personnel with instructions on actions required for maintaining or restoring functionality of the machine.

6.1 Safety instructions

**WARNING!****Pressurized system**

Danger of injury from flying components and flowing media when opening pressurized components, tanks, and pipes.

This could cause severe and even fatal injury.

- Before working on the system, depressurize (relieve the pressure) and drain the system and components.

**WARNING!****Hot surfaces**

Risk of injury and burns due to hot surfaces of machine components and containers.

During production or cleaning, the machine may stop with the following states:

- filled with media
- pressurized
- with hot surfaces
- equipped with containers that are also pressurized and hot

Death or serious injury may result.

- Only enter the interior of the machine paneling with protective clothing.
- Wear protective clothing in the area of the valve manifold.

**WARNING!****Risk of chemical burns from leaking liquids**

Risk of injury from chemical burns

This could result in death or serious injury.

- Make sure liquids are drained away properly.
- Set up warning signs.
- Wear protective clothing.
 - Shoes
 - Clothing
 - Gloves
 - Goggles

**WARNING!****Noise**

A noise level that is too high may result in loss of hearing and loss of balance. A noise level that is too high may lead to lack of attention, faulty communication and adversely affect perception of acoustic signals.

This could result in death or serious injury.

- The operator must arrange for hearing protection to be worn.

**CAUTION!****Danger of slipping on escaping liquids**

Danger of injury through slipping.

This could cause slight or minor injury.

- Make sure liquids are drained away safely.
- Set up warning signs.

6.2 Adhering to regulations

Disposal of materials

Dispose of materials removed from the machine in accordance with the instructions and directives applicable at the installation location.

6.3 Setup operating mode

- ➔ Select “*Setup*” operating mode on the operator console’s graphical user interface.



See chapter “Operation”, section “Operating controls”.

6.4 Disconnecting and securing

This section provides personnel with instructions on setting the machine to the **Deenergized machine** operating status.

The activities to be performed comprise the following:

- Completely disconnect the machine from the power sources.
- Discharge residual energy.
- Secure the machine to prevent it from being restarted.
- Check the effectiveness of the energy isolation.



WARNING!

Carrying out maintenance on unsecured shut-off elements

Shut-off elements are used for energy isolation and to secure devices to prevent them from being restarted. The shut-off elements themselves are not disconnected from the power sources. There is therefore a risk of injury when carrying out maintenance on shut-off elements.

This can lead to severe or even fatal injury.

- Before carrying out maintenance on a shut-off element, interrupt the operator's media supply.

General procedure

Personnel: ■ Maintenance personnel

1. Preparation

Identify any power sources affected and any hazards that are caused by you.

Locate shut-off elements.

Prepare material to secure each shut-off element.

2. Informing

Inform all persons involved about the shut-off and the corresponding measures.

3. Isolation

Switch off the energy supplies in the specified order, see section “Work steps for disconnecting and securing”.



4. Finalizing

Secure shut-off elements against an unintentional restart using the equipment intended for this purpose.

Label shut-off elements with labels that display a warning about unintentional restarts.

5. Checking

Ensure that the shut-off elements have been shut off properly and are secured against restarting unintentionally.

Ensure that any residual energy has been discharged.

6. Maintenance and repair

Ensure that maintenance work is performed only by trained personnel.

Pay attention to residual energy and protect against residual risks.

Perform maintenance work.

If individual power sources are required to check maintenance work, carry out the "Restart" step for this energy source.

7. Restarting

Ensure that all maintenance tasks have been completed.

Inform all persons involved before energy supplies are switched on.

Observe labels, remove labels and shut-off equipment.

Switch on the energy supplies in the specified order, see section *"Work steps for restarting"*.

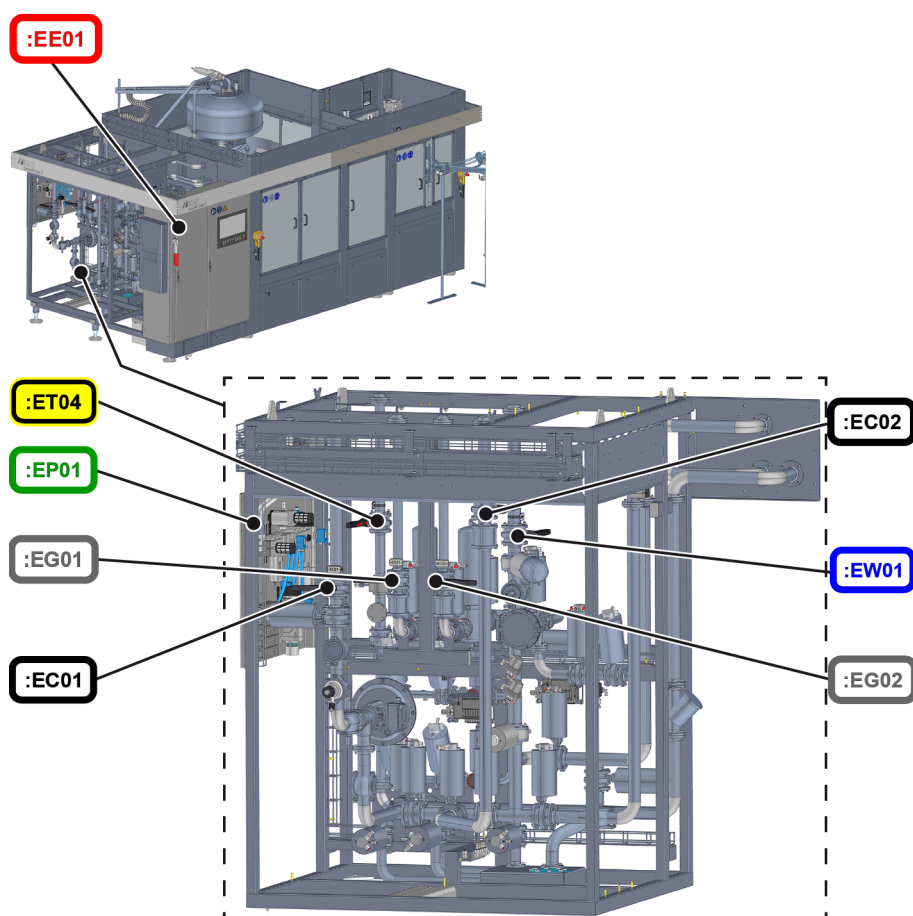


Figure 199: Shut-off elements on the machine

- :EE00 Electrical energy
- :EC00 Chemical substances
- :EG00 Gases
- :EP00 Pneumatic energy
- :EW00 Water

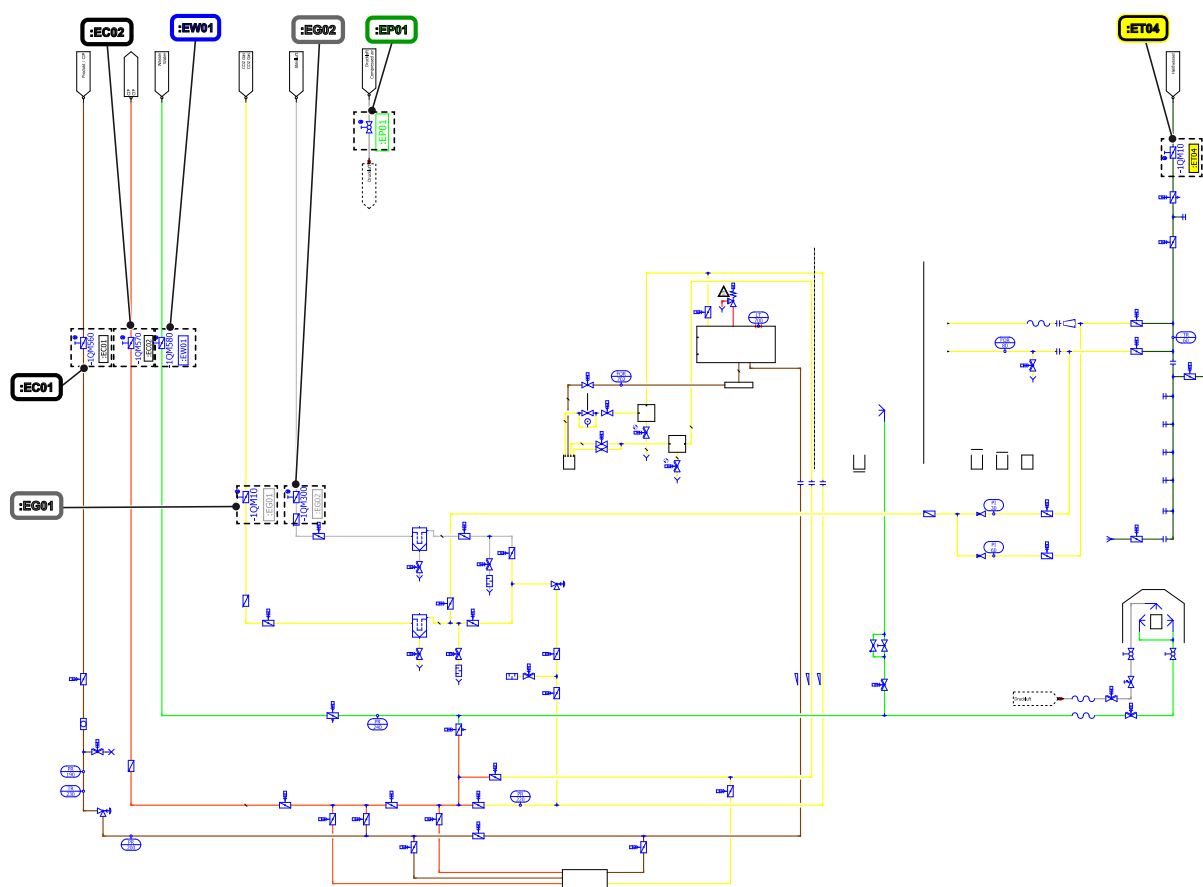


Figure 200: Overview of the shut-off elements in the pipeline diagram

- :EC00** Chemical substances
- :EG00** Gases
- :EP00** Pneumatic energy
- :EW00** Water

Introductory work steps

For planned servicing work, carry out the preliminary steps listed below. Perform all realizable actions in the event of a fault. Evaluate residual risks and initiate protective measures.

1. End production program; see operating manual, chapter “Operation”, section “Production”.
2. Perform CIP cleaning; see operating manual, chapter “Operation”, section “Cleaning”.
3. Empty machine; see operating manual, chapter “Maintenance”, section “Emptying the machine”.

Work steps for disconnecting and securing

Before beginning maintenance work, switch off the power supplies according to the following work steps.



	Power source	Shut-off element	Action	Check
4.	Media (product, chemical detergent) 	Manual shut-off valve  	Secure closed manual shut-off valves against being switched back on. Attach an information sign. Once the actual values are checked, shut down the operator console.	On the operator console, check the actual values of the media (Filler components > Service > Actual values).
	Media (water)	Manual shut-off valves 		
	Media (CO ₂ , sterile air)	Manual shut-off valves  		
5.	Pneumatic energy (compressed air)	Shut-off valve 	Switch off the control air supply on the maintenance group at the valve manifold and prevent it from being switched back on. The valves in the pipelines close. Attach an information sign.	Check the existing pressure on the pressure gauge on the FRL group, or open the drain plug on the manual condensate drain. Air should not be heard escaping.
6.	Thermal energy (hot water) 	Manual shut-off valve 	Secure closed manual shut-off valves against being switched back on. Attach an information sign.	



	Power source	Shut-off element	Action	Check
7.	Electrical energy 400 V/230 V 	Main switch 	Turn the main switch to the <i>[OFF]</i> position and secure it against being switched back on. Attach an information sign. There may be residual energy in the drive controllers. Startup of the machine cannot be ruled out; wait 5 minutes. For maintenance work, the lighting and sockets are still supplied with electrical power. These areas can only be switched off by a qualified and trained electrician.	In the switch cabinet, have the electrical power checked by a qualified and trained electrician.

Once the work steps for disconnecting and securing have been carried out, the machine is disconnected from all power sources.

➔ Before carrying out any maintenance work, confirm that the power has been successfully isolated.

Work steps for switching the machine on again

Upon completion of maintenance work, switch on the power supplies according to the following work steps.

8.	Switch on the energy supplies in the reverse order; see table.
9.	Prepare the machine for operation, see operating instructions, chapter " <i>Operation</i> ", section " <i>Preparing for operation</i> ".
10.	In the " <i>Filler diagram</i> " view, switch manually opened valves to " <i>Automatic</i> ".
11.	Perform CIP cleaning; see operating instructions, chapter " <i>Operation</i> ", section " <i>Cleaning</i> ".
12.	Prepare for production; see operating instructions, chapter " <i>Operation</i> ", section " <i>Production</i> ".
13.	Start production, see operating instructions, chapter " <i>Operation</i> ", section " <i>Production</i> ".



6.4.1 Emptying the machine manually

1. ➔ Close the following manual shut-off valves on the valve manifold:

- Area FD060:
 - -1QM 560
 - -1QM 570
 - -QM 580
- Area FD070:
 - -1QM 10
 - -1QM 300
- Area FD083:
 - -1QM 10



The automatic valves cannot be controlled when the control voltage and control air are switched off. One possible reason for the control voltage and control air being switched off is an actuated emergency stop switch. If the emergency stop switch has been actuated, follow the instructions in the chapter "Operation", section "Safety equipment".

2. ➔ On the operator console, open the "Program selection" view and select "No program".



3. ➤ On the operator console in the *"Filler graphic"* view, set the following valves to *"Manual"* in the sequence listed and select *"Forcing on"*. The manually opened valves are shown on the screen:
 - Area FD051:
 - MM39
 - Area FD060:
 - MM300
 - MM310
 - MM350
 - MM410
 - MM290
 - MM340
 - MM450
 - Wait until no more liquid flows out.
 - MM330
 - MM370
 - MM380
 - MM390
 - MM400
 - Area FD070:
 - MM740
 - MM60
 - MM50
 - MM340
 - MM360
 - MM350
 - MM370
 - MM70
 - MM110
 - Area FD051:
 - MM720
 - MM721
 - Depressurize the pressurization gas:
 - MM51-40
 - MM70-740
 - MM70-730
4. ➤ Wait until no more liquid or gas flows out.
 - ⇒ The valve manifold is empty and depressurized.
5. ➤ On the operating console, open the *"Operating mode"* view and select *"Empty"*.
 - ⇒ The filling valves are emptied.
6. ➤ Once no more liquids are flowing out of the valves, select *"Pre-pressurization"* on the operator console.



6.5 Maintenance

This chapter provides personnel with instructions on preventative actions for reducing wear and maintaining the functionality of the machine.

6.5.1 Safety instructions

**WARNING!****Danger of falling**

During tasks on the front filler table, there is the risk of falling from the front filler table.

This could result in death or serious injury.

- Use an appropriate stepladder to access the front filler table.

**DANGER!****Non-compliance with safety precautions**

Non-compliance with safety precautions can cause detergent leakage.

This could cause severe and even fatal injury.

Adhere to the safety precautions before commencing maintenance work:

- Wear personal protective equipment.
- Switch off and secure the machine.

**NOTICE!****Unrepaired defects**

Any defects found during maintenance and not repaired could cause product flaws, operational downtime, and damage or destruction of components.

- Always repair any defects or damage found immediately.

**NOTICE!****Using non-original manufacturer parts**

Replacing components with non-original manufacturer parts during maintenance.

The result is misuse with regard to the intended use. This could lead to product flaws, loss of safety functions, and damage or destruction of components.

- Replace parts only with original spare parts from KHS.

6.5.2 Maintaining the seals

This operating instructions applies to seals that are exposed to the following media:

- Beverages
- Process gases
- Solutions and liquids for
 - Sterilization
 - Cleaning
 - Disinfection



Seals are wear parts.

The following factors shorten the service life of the seals:

- *High temperatures and temperature fluctuation*
- *Chemical loads (reactions) from detergent and the contents of products*
- *Mechanical loads from rotary movements (pump shafts, disk valves) and linear movements (seat valves and control valves)*
- *Environmental factors (e.g. sunlight, UV, ozone)*

The material FKM (also commonly known as Viton) can have an up to 50% shorter service life in comparison to EPDM at the same level of mechanical load. FKM should only be used where absolutely necessary.

The operator is responsible for implementing continuous checking procedures.



Interval: Regularly as necessary, but at least once a year. The interval depends on the type of material, the load, the locations of the seals and the products processed.

Place	Maintenance work	Personnel
Seals, membranes	Take microbiological and hygienic aspects into consideration during the replacement process.	Maintenance personnel

6.5.3 Maintenance schedule

The maintenance schedule is sorted by operating status and operating mode. The operating statuses and operating modes are described in the “*Operating statuses and operating modes*” section of the “*Safety*” chapter.

6.5.3.1 Operating status ON

Prerequisite: the [Operation on] key switch is in the [1] position.

Interval: Weekly/every 125 operating hours

Place	Maintenance work	Personnel
Machine	Operate one of the emergency stop switches once a week. Operate a different emergency stop switch with each test. Note: the machine will shut down automatically if these tests are not carried out within the specified 7-day period.	Operating personnel
Machine	Open and close one door in each machine area once a week. Open and close a different door with each test. Note: the machine will shut down automatically if these tests are not carried out within the specified 7-day period.	Operating personnel

6.5.3.2 Automatic

Prerequisite: Select “*Automatic*” operating mode on the operator console's graphical user interface.

Interval: Every shift/every 8 operating hours

Place	Maintenance work	Personnel
Machine	Clean the floor outside the machine paneling.	Operating personnel

**Interval: Daily/every 24 operating hours**

Place	Maintenance work	Personnel
Electrical system	Activate the <i>"Lamp test"</i> function key on the operator console. Check if the visual signaling equipment is working properly. Instruct the maintenance personnel to replace any faulty lights.	Operating personnel

Interval: Weekly/every 125 operating hours

Place	Maintenance work	Personnel
Machine	Operate one of the emergency stop switches once a week. Operate a different emergency stop switch with each test. Note: the machine will shut down automatically if these tests are not carried out within the specified 7-day period.	Operating personnel
Process engineering	Check the valve manifold for leaks.	Operating personnel

6.5.3.3 Setup

Prerequisite: Select *"Setup"* operating mode on the operator console's graphical user interface.

Interval: Every shift/every 8 operating hours

Place	Maintenance work	Personnel
Format parts	Check the format parts for damage.	Operating personnel
Filler base	Check the spray head in the bell spray for blockages.	Operating personnel

Interval: Daily/every 24 operating hours

Place	Maintenance work	Personnel
Electrical system	Clean the light barriers and the associated reflectors.	Operating personnel
Machine	Remove any visible signs of excess lubricant.	Operating personnel
Process engineering	Check water separator in the maintenance group filter and empty if necessary. The maintenance groups are described in the <i>"Layout and operation"</i> chapter.	Maintenance personnel

**Interval: Weekly/every 125 operating hours**

Place	Maintenance work	Personnel
Machine	Open and close one door in each machine area once a week. Open and close a different door with each test. Note: the machine will shut down automatically if these tests are not carried out within the specified 7-day period.	Operating personnel
Filling valve	Check rubber contact seal and centering bell for glass fragments and damage.	Operating personnel
Filling valve	Check the ventilation holes for leaking gases or liquids. If liquid leaks out of a ventilation hole, the membrane is defective. A defective membrane results in malfunctions. The defective membrane must be replaced immediately. Servicing by the maintenance personnel is required where appropriate.	Operating personnel
Electrical system	Check the sensors (e.g. limit switches, light barriers, proximity switches and pressure controllers) for damage.	Maintenance personnel
Filler turret	Check the relief openings of the rotary distributor for leaking gases or liquids. Any maintenance work in the case of gas or fluid leaks must be carried out by KHS staff.	Operating personnel
Filler turret	Manually actuate the relief valve and make sure that it moves freely.	Maintenance personnel
Filling valve	Sterilize the centering bells together with the rubber contact seals for a period of 40 minutes in a water bath heated to 85°C.	Operating personnel
Machine	Check the signs for damage and legibility. Have the signs cleaned or replaced.	Operating personnel
Machine	Check the gearing mechanism for leaks.	Maintenance personnel
Machine	Run all height-adjustable components once to their upper and lower limits.	Operating personnel

**Interval: Monthly/every 500 operating hours**

Place	Maintenance work	Personnel
Electrical system	Check the electrical lines, connections and distributors for damage.	Maintenance personnel
Machine	Inspect the pneumatic lines, connections and distributors for leaks and damage.	Maintenance personnel
Machine	Check the lines, connections and distributors in the lubrication system for leaks and damage.	Maintenance personnel
Machine	Inspect the threaded joints on all moving parts and parts subject to stress.	Maintenance personnel
Bottle conveyor	Check the infeed screw for leaks.	Maintenance personnel

Interval: Annually/every 7000 operating hours

Place	Maintenance work	Personnel
Filler base	Check the axial clearance of the ball bearing ring. The axial clearance should not exceed 1.5 mm.	Maintenance personnel
Electrical system	Calibrate the sensors; see <i>"Purchased parts documentation"</i> .	Maintenance personnel
Filler turret	Replace rubber contact seal and centering bell.	Maintenance personnel

6.5.3.4 De-energized machine

Prerequisite: The machine is disconnected from the power supply.

A description of how personnel should disconnect the machine from the power supply is provided in the chapter *"Servicing"*, section *"Disconnecting and securing"*.

Interval: Every shift/every 8 operating hours

Place	Maintenance work	Personnel
Area around the machine	Clean the floor inside the machine paneling.	Operating personnel

Interval: Twice a week/every 72 operating hours

Place	Maintenance work	Personnel
Machine	Check the paneling for damage and loose screws.	Maintenance personnel

**Interval: Monthly/every 500 operating hours**

Place	Maintenance work	Personnel
Electrical system	Check the filter mats in the ventilation system and the cooling units and clean if necessary.	Maintenance personnel
Electrical system	Maintain the cooling units as specified by the manufacturer: see <i>"Purchased parts documentation"</i> .	Maintenance personnel

Interval: Every two months/every 1000 operating hours

Place	Maintenance work	Personnel
Machine	Check the motor cable for corrosion.	Maintenance personnel

Interval: Annually/every 7000 operating hours

Place	Maintenance work	Personnel
Electrical system	Replace the buffer battery in the machine control system (PLC), the filler computer and the operator console. The main switch must remain switched on.	Maintenance personnel
Filler turret	Replace all seals on the rotary distributor.	Maintenance personnel
Machine	Replace all seals and membranes that are exposed to the product, detergent or process gases.	Maintenance personnel
Filler turret	Check the springs of the control cylinder and the main cylinder on the filling valve.	Maintenance personnel
Filler turret	Change the bearings and seals on the rotary distributor.	Maintenance personnel
Filler base	Check the tooth clearance of the ball bearing ring between the drive shaft and ball bearings (max. 0.2 mm). If the tooth clearance is greater than the maximum, readjust the ball bearing ring. If the tooth clearance is greater than 0.4 mm, replace the ball bearing ring.	Maintenance personnel
Process engineering	Check the control valves on the valve manifold for damage.	Maintenance personnel

Interval: Every two years/every 14,000 operating hours

Place	Maintenance work	Personnel
Filler turret	Maintain the rotary distributor as specified by the manufacturer: see the <i>"Purchased parts documentation"</i> .	Maintenance personnel



Interval: Every four years/every 28,000 operating hours

Place	Maintenance work	Personnel
Filler turret	Check the leakage holes of the filling valve for media leakage. Replace the membranes if necessary.	Maintenance personnel
Filler turret	Check the leakage holes of the rotary distributor for air or grease leaking out.	Maintenance personnel

6.5.3.5 Machine maintenance schedule

Interval: Annually/every 7000 operating hours

Place	Maintenance work	Personnel
Complete machine	A general overhaul of the machine by KHS personnel is recommended.	KHS personnel

6.5.4 Lubrication schedule

This section contains the lubrication points on the machine indicating the lubricant to be used and the lubrication interval.

The lubricants and lubrication intervals specified by KHS may differ from the specifications in the operating and maintenance instructions of the suppliers of the motors and gears.

All gears not listed are lubricated for life.

The lubrication of the gears must be carried out by maintenance personnel while the machine is in the **Deenergized machine** operating status.

Manual lubrication other lubrication points and filling the central lubrication system must be performed by maintenance personnel while the machine is in the **setup** operating mode. These tasks can also be performed by operating personnel.

The operating statuses and operating modes are described in the “*Operating statuses and operating modes*” section of the “*Safety*” chapter.



Lubricant filling

*For assembly and for filling of the central lubrication system, KHS uses the grease **KHSMULTI GREASE 01**. **KHSMULTI GREASE 01** is approved for use in the foodstuffs industry and is listed according to NSF H1.*

The integrated gears are also filled with lubricants that are approved for use in the foodstuffs industry.

**Components with lifetime lubrication**

Components with lifetime lubrication are designed for specific operating conditions. If these operating conditions are met, do not relubricate the components with lifetime lubrication.

In difficult operating conditions, such as high levels of humidity, extreme temperature fluctuations and aggressive ambient conditions, relubricate components with lifetime lubrication.

Check components with lifetime lubrication regularly to ensure that they are lubricated.

**NOTICE!****Incompatibility of lubricant**

The grease **KHS MULTI GREASE 01** is not suitable for lubricating components which are made from the sealing material EPDM.

- Use only **KHS SEAL & SILICON GREASE 04** to lubricate parts made from the sealing material EPDM.

6.5.4.1 Lubricants

Material number	Lubricant	Container size	
301142150102	KHS MULTI GREASE 01	0.5	kg
301142150106	KHS MULTI GREASE 01	19	kg
301142150108	KHS MULTI GREASE 01	50	kg
301142110507	KHS GEAR FLUID 220	22	l
301142110509	KHS GEAR FLUID 220	205	l
301142110607	KHS GEAR FLUID 320	22	l
301144110042	Two-handed press	1	units
301142150413	KHS SEAL & SILICONE GREASE 04	0.1	kg
301142150403	KHS SEAL & SILICONE GREASE 04	0.9	kg



The table lists the recommended KHS lubricants for the machine. KHS lubricants are NSF and/or InS "H1" certified and are therefore classified as not presenting any health risks. This certification guarantees maximum product safety and food safety. In the event of incidental product contact, KHS lubricants meet all hygiene requirements and can be used at any stage of the production process.

Do not mix mineral oil-based and synthetic lubricants. All lubrication points must be free of impurities for applications involving foodstuffs.

Particular care must be taken when mixing synthetic lubricants. Make sure that the thickener, base oil and additives are compatible or the same.

The original lubricant must be removed completely before switching from mineral oil-based to synthetic lubricants or from synthetic to mineral oil-based lubricants. Drain the oil when warm to avoid gumming or leaving unwanted residue in the reservoir.

The information in the following sections refers to a standard operating temperature of up to 70°C. Higher operating temperatures may shorten the service life of the lubricant significantly.

The lubrication points are labeled with stickers stating the required lubricant. The quantities of lubricant required are stated in the spare parts list.

If you are unsure of which lubricant to use, please contact **Service.products@khs.com**.

Information about the lubricants can be found in the technical documentation *"Specific data and KHS standards"*, chapter *"K1000 — Lubricant overview"*.



6.5.4.2 Filler lubrication points

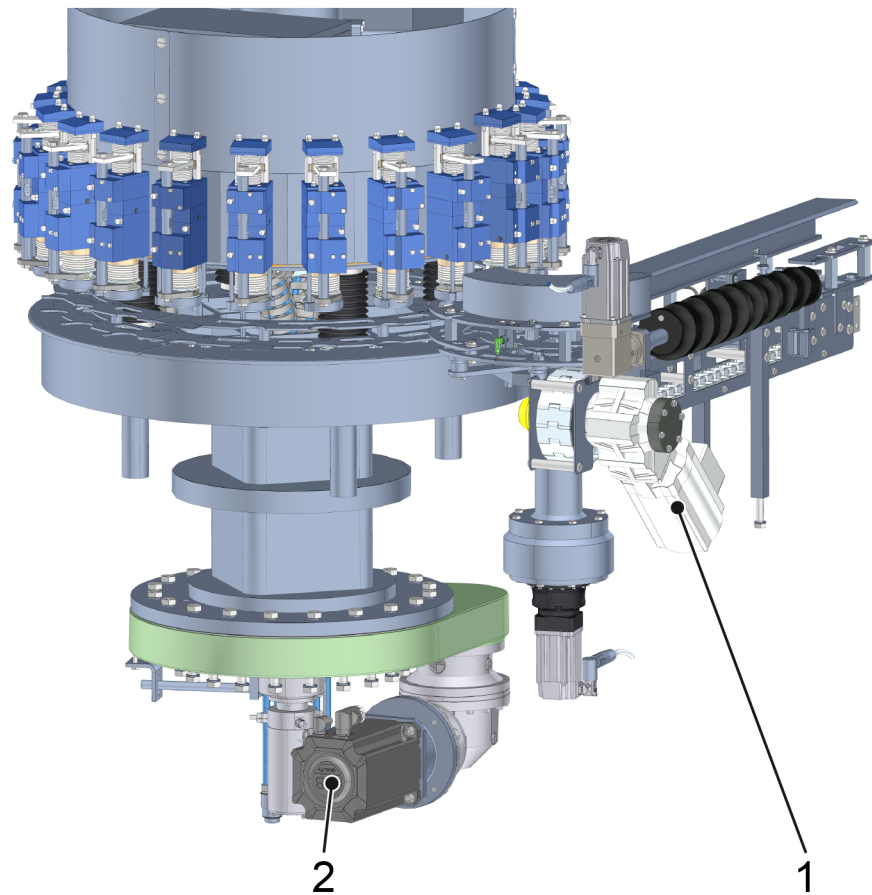


Figure 201: Filler lubrication points

Item	Assembly	Lubricant	Interval	Task
1	Infeed conveyor gearing mechanism; belt drive	KHS GEAR FLUID 220	Annually/ every 7 000 h	Changing the lubricant
2	Main drive gears	KHS GEAR FLUID 320	Annually/ every 7 000 h	Changing the lubricant



6.5.4.3 Lubrication points on the height adjustment

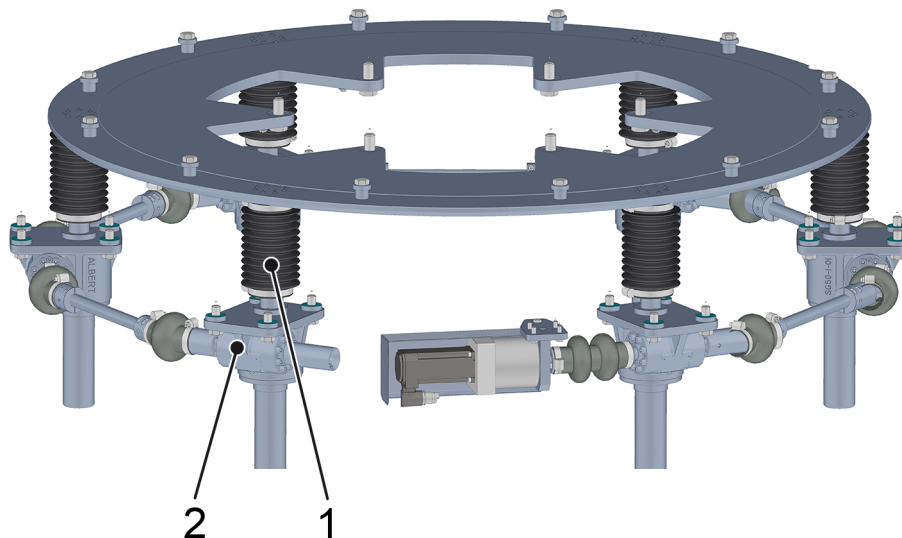


Figure 202: Lubrication points on the height adjustment gears

Item	Assembly	Lubricant	Interval	Task
1	Trapezoidal spindle	KHS MULTI GREASE 01	Every two years/ 14000 hours	Lubricating
2	Spindle lift gear	KHS MULTI GREASE 01	Every two years/ 14000 hours	Changing the lubricant



6.5.4.4 Can sealer lubrication points

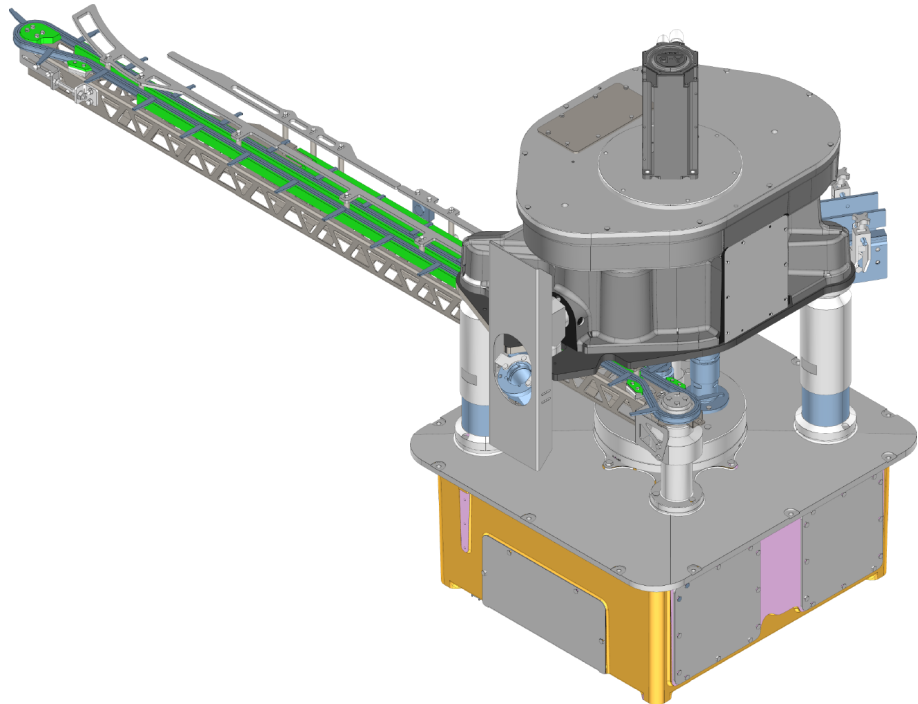


Figure 203: Lubrication point on can sealer without machine paneling

Item	Assembly	Lubricant	Interval	Task
	Can sealer			See "manufacturer's doc- umentation"



6.5.4.5 Lubrication points on the machine

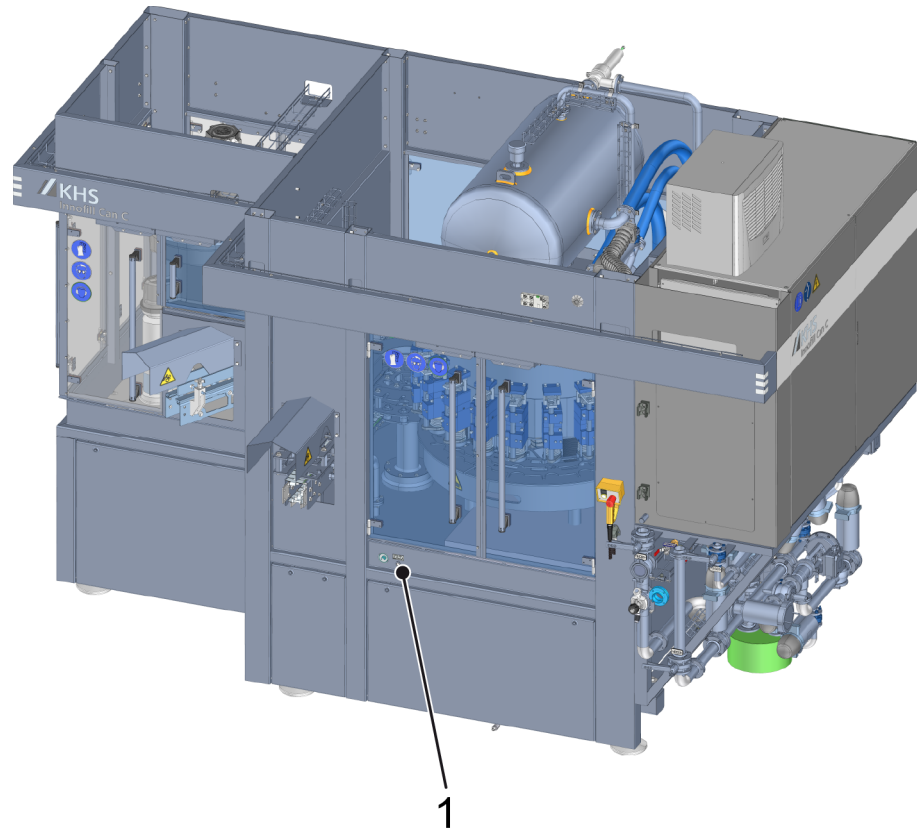


Figure 204: Lubrication points for machine

Item	Assembly	Lubricant	Interval	Task
1	Manual lubrication distribution system	KHS MULTI GREASE 01	Twice a week/every 72 hours	Lubricate via lubricating nipple: The lift number is displayed on the operator console.

6.6 Repairs

This chapter provides personnel with instructions on preventative actions for reducing wear and restoring the functionality of the machine.



6.6.1 Safety instructions

**WARNING!****Machine not deenergized**

Risk of electric shock and contact with escaping pressurized media

This could result in death or serious injury.

Deenergize the machine before commencing repair work:

- Drain the ring bowl.
- Close the manual shut-off valves on the valve manifold and use a padlock to secure against opening.
- Shut off the control air.
- Turn off the control voltage.
- Turn off the main switch on the machine.

6.6.2 Repair switch for conveyor

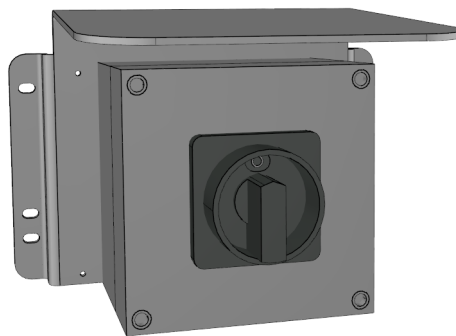


Figure 205: Repair switch for conveyor

The conveyor features a lockable repair switch. The repair switch can be used to disconnect the drive for the conveyor from the power supply.

The repair switch is operated manually.

During maintenance work, turn the repair switch to position "0" and ensure that it cannot be inadvertently switched on. An ideal way to do so would be by using a padlock, for example.

**Protection against unexpected startup during cleaning, setup and maintenance tasks**

In a production line, additional systems and machines may be located on the filler conveyors that require intervention in the event of faults or during cleaning and maintenance. The conveyor belts are controlled via the filler control system and can start up unexpectedly at any time when the system is in automatic or jog mode. This may lead to personal injury. The user can prevent this risk by actuating the repair switch and securing it with a padlock.

6.6.3 Tightening torques**NOTICE!****Machine damage**

If the screws are not tightened with the corresponding tightening torque, the screwed joints can become loose over time.

Tighten the screws to the specified torques using a torque wrench.

General tightening torques MA [Nm]

The following table applies to screws with **metric coarse-pitch thread**, quality **8.8** (coefficient of friction * = 0.14) and screws in **corrosion and acid-resistant** design (**A2/A4**, property class 70 (coefficient of friction * = 0.20, greased thread)).

Thread	8.8	A2/A4	Thread	8.8	A2/A4
M4	3,3	2,6	M16	230	183
M5	6,5	5,1	M18	329	260
M6	11,3	8,8	M20	464	370
M8	27,3	21,4	M22	634	488
M10	54	44	M24	798	608
M12	93	74	M27	1176	/
M14	148	119	M30	1597	/



General tightening torques MA [Nm] for screws with Nord-Lock washers

The following table applies to screws with a **metric coarse-pitch thread** in a **corrosion and acid-resistant** design (**A2/A4**, property class 70 (coefficient of friction * = 0.14, thread greased with graphite paste)).

Thread	A2/A4
M10	33 Nm
M12	56 Nm
M16	136 Nm
M20	267 Nm
M24	460 Nm

Source: Nord-Lock catalog

6.6.3.1 Special tightening torques

Tightening torque on the filling valve

The nuts above and below the filling valve bell rod (M16 X 1.5 A2) must be tightened to a torque of **95Nm!**

Ball bearing ring	
Fastening screw M16	183 Nm

Central lubrication system	
Pump element at the central lubrication system	30-35 Nm

Holding bushing



Always tighten or loosen the screws of the holding bushings one after the other clockwise one half turn.

ETP holding bushings	
with fastening screw M4	4.5 Nm
with fastening screw M5	7.6 Nm



ETP holding bushings	
with fastening screw M6	13 Nm
with fastening screw M8	32 Nm

ETP-T holding bushing	
with fastening screw M20	40 Nm

Shrink disks on the drive gears

See the supplier's installation instructions contained in the Documentation on purchased parts.

6.6.4 Replacing a process valve

If a process valve is replaced, the new process valve must have the same properties as the previous process valve.

Properties of the process valve:

- Suitability for the medium
- Electronic device description
- Starting position

There are two starting positions. One starting position is open (NO = normally open), the other starting position is closed (NC = normally closed).

**WARNING!****Hot, corrosive medium**

With a faulty process valve, hot or corrosive media may be trapped in the pipelines and in the machine when power is removed and when the machine is emptied. When removing the process valve that needs replacing, these hot or corrosive pressurized media may be expelled from the pipelines or the machine. Risk of injury on contact due to chemical burns or scalding.

If a process valve is replaced, the new process valve must have the same properties as the previous process valve. A process valve with different properties may lead to unexpected media flow in the machine. Hot or corrosive media can stream flow and be expelled from the machine unexpectedly.

This can lead to severe or even fatal injury.

- Wear protective clothing.
 - Goggles
 - Clothing
 - Gloves
 - Shoes
- Ensure that the new process valve has the same design and the same starting position.
- Before production starts, check that the process valve correctly applies the control.
- Check that the process valve matches the associated IO link master signal.
- Replace process valves only with original replacement parts from KHS.

**NOTICE!****Using a process valve for the wrong medium or with the wrong starting position**

If a process valve is replaced, the new process valve must have the same properties as the previous process valve. Using a process valve with different properties can lead to the wrong medium entering the wrong pipelines. This can lead to a serious malfunction of the machine or to a loss of product.

This may result in damage to the machine or to items in the surrounding area.

- Ensure that the new process valve has the same design and the same starting position.
- Before production starts, check that the process valve correctly applies the control.
- Check that the process valve matches the associated IO link master signal.
- Replace process valves only with original replacement parts from KHS.

Before replacing the process valve, the machine must be empty and depressurized. See chapter *“Servicing”, “Disconnecting and securing”*. It is possible that a faulty process valve can lead to corrosive or hot, pressurized media remaining in the pipelines and the machine.

For replacing a process valve, see *“purchase part documentation”*.

Checking the assignment of the process valve

1. ➤ Switch the replaced process valve from automatic to manual actuation in the *“Filler graphic”*.
2. ➤ Actuate the process valve.
3. ➤ The actuation at the valve manifold must be checked.
 - ⇒ A change in status is displayed on the control head.
Green = Open
Red = Closed
4. ➤ The position of the replaced processed valve must correspond to the position in the *“Filler graphic”*.



6.6.5 Filling valve

6.6.5.1 Replacing the filling valve

Personnel: ■ Maintenance personnel

Protective equipment: ■ Personal protective equipment

Prerequisite: The machine is deenergized from the power supply. A description of how personnel should activate the machine is provided in chapter "Servicing", section "Disconnecting and securing".

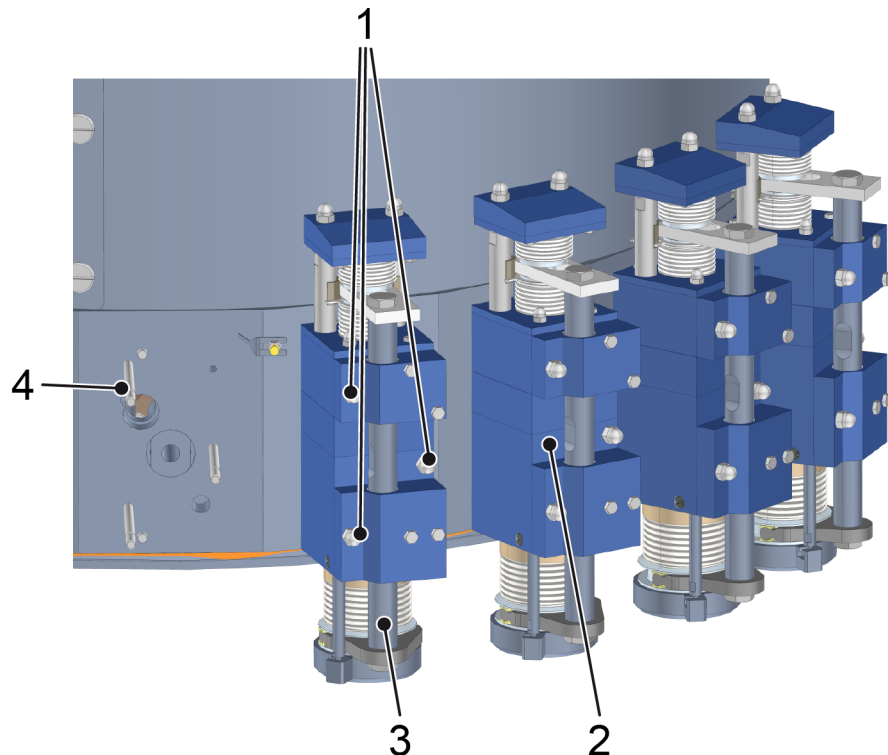


Figure 206: Filling valve on the distributor ring

- 1 Nuts
- 2 Filling valve
- 3 Bell rod
- 4 Threaded bolt

1. Loosen the nuts.
2. Remove the filling valve.
3. Mount the new filling valve on the threaded bolts.
4. Screw nuts onto the threaded bolts.
5. Tighten the nuts.
6. Check that the bell rod moves easily.
7. If the bell rod is stiff, loosen the nuts again and retighten them.



8. ➔ Retighten the nuts again after the initial rinsing and steam operation.



Tightening torques: See chapter "Repairs", section "General tightening torques".

6.6.5.2 Replacing the bellows

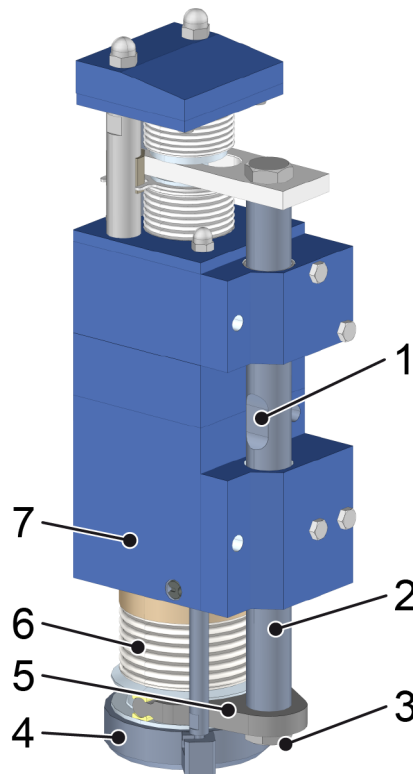


Figure 207: Filling valve

- 1 Wrench dog point
- 2 Bell rod
- 3 Screw
- 4 Centering bell
- 5 Fork
- 6 Bellows
- 7 Lower part of valve

Replacing the bellows

Personnel: ■ Maintenance personnel

- 1. ➔ Hold the bell rod at the dog point using a suitable tool.
- 2. ➔ Remove the screw on the bell actuator.
- 3. ➔ Remove the fork.



4. ➔ Unscrew the centering bell from the lower part of the valve together with the bellows.



Figure 208: Open-end wrench (58 mm)

5. ➔ Place the open-end wrench (58 mm) on the wrench flat of the centering bell to hold the centering bell in place, and unscrew the bellows from the centering bell.

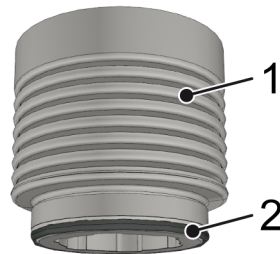


Figure 209: Bellows

- 1 Bellows
2 Seal ring

6. ➔ Remove the seal ring from the bellows and place it on the new bellows.
7. ➔ Screw the new bellows into the centering bell.

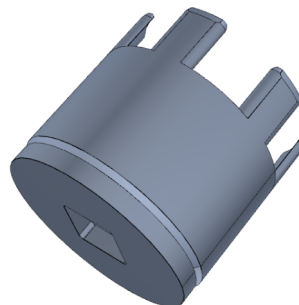


Figure 210: Socket wrench

8. ➔ Place the socket wrench on the pin of a torque wrench.

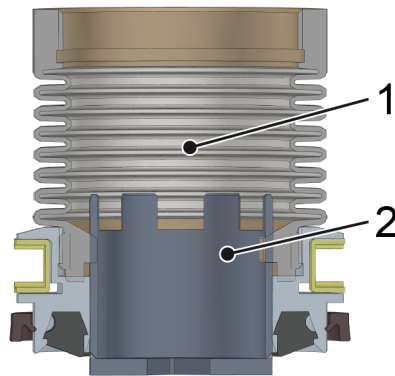


Figure 211: Bellows with socket wrench

- 1 Bellows
- 2 Socket wrench

- 9. ➤ Insert the socket wrench into the bellows.
- 10. ➤ Tighten the bellows to a torque of 20 Nm. Hold the centering bell back using the open-end wrench (58 mm).
- 11. ➤ Screw the bellows onto the lower part of the valve together with the centering bell.

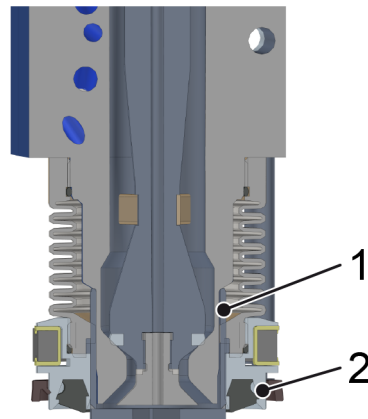


Figure 212: Centering bell with socket wrench

- 1 Socket wrench
- 2 Centering bell

- 12. ➤ Insert the socket wrench into the centering bell.
- 13. ➤ Tighten the centering bell to a torque of 20 Nm.
- 14. ➤ Reattach the fork to the centering bell.
- 15. ➤ Hold the bell rod at the dog point using a suitable tool.
- 16. ➤ Apply a removable thread-locking compound to the screw and screw onto the bell actuator.

Recommended thread-locking compound: "Loctite 243"



6.6.5.3 Changing the valve pipe seals

Personnel: ■ Maintenance personnel

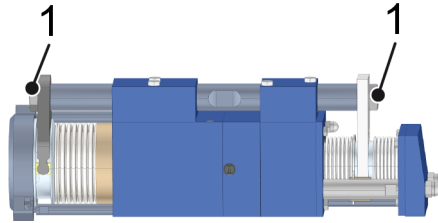


Figure 213: Filling valve

1 Screw

1. ➔ Remove the bolts.

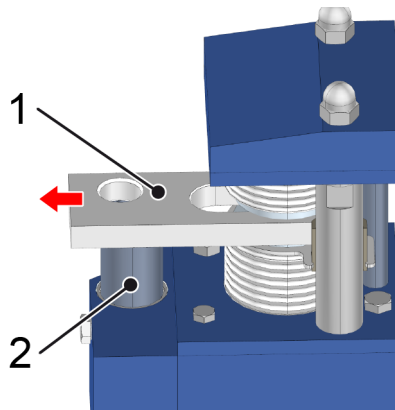


Figure 214: Valve cover with lift actuator

1 Guide plate

2 Guide rod

2. ➔ Remove the guide plate and pull out the guide rod.

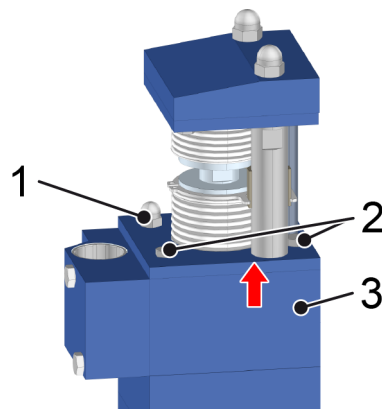


Figure 215: Valve cover with lift actuator

1 Cap nut

2 Screw

3 Valve cover

3. ➔ Loosen the cap nuts and screws and remove the valve cover.

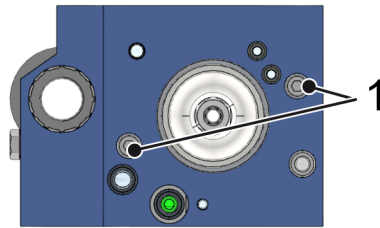


Figure 216: View of filling valve

1 Cheese head cap screws

4. ➔ Unscrew and remove the cheese head cap screws.

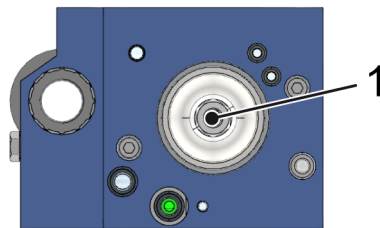


Figure 217: View of filling valves

1 Allen head

5. ➔ Insert an Allen wrench into the hexagonal hole of the valve tube in order to prevent the valve tube from twisting.

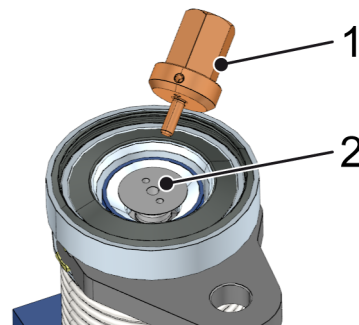


Figure 218: Underside of filling valve

1 Socket wrench

2 Valve plug

6. ➔ Use the socket wrench to unscrew the valve plug from the valve tube.

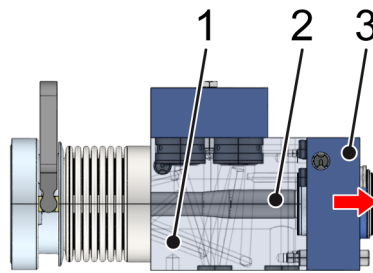


Figure 219: Valve housing and upper part of valve

- 1 Valve housing
- 2 Valve pipe
- 3 Upper part of valve

7. ➞ Pull the valve tube on the upper part of the valve from the valve housing.

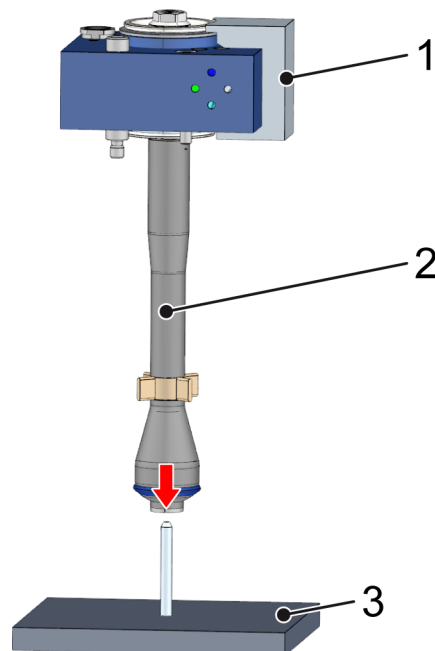


Figure 220: Upper part of valve with valve tube

- 1 Clamp
- 2 Valve pipe
- 3 Stand

8. ➞ Place the valve tube onto the stand and attach the clamp to the upper part of the valve.

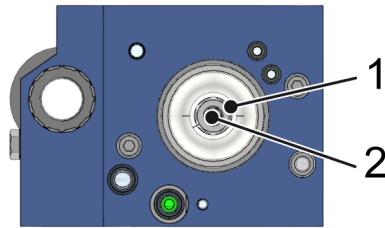


Figure 221: View of filling valves

- 1 Nut
- 2 Allen head

9. → Prevent the valve tube from twisting using an Allen wrench. Remove the nuts.

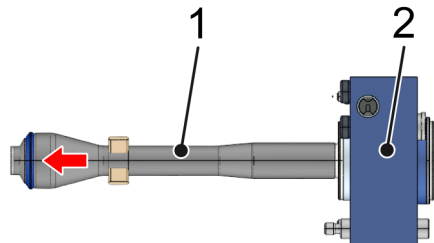


Figure 222: Valve pipe with upper part of valve

- 1 Valve pipe
- 2 Upper part of valve

10. → Pull the valve pipe out of the upper part of the valve.

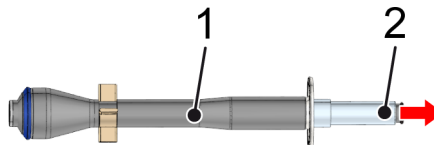


Figure 223: Valve pipe

- 1 Valve pipe
- 2 Sleeve

11. → Remove the sleeve from the valve piston.

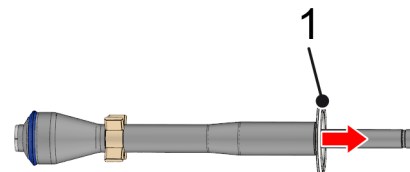


Figure 224: Valve pipe

- 1 Membrane

12. → Remove the old membrane from the valve pipe.

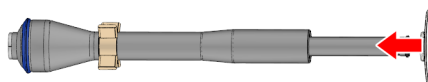


Figure 225: Valve pipe

13. ➔ Slide a new membrane onto the valve pipe.

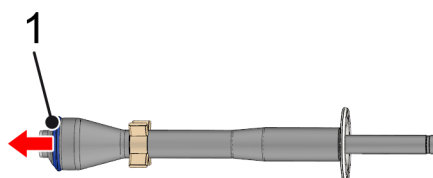


Figure 226: Valve pipe

- 1 Seal

14. ➔ Remove the old seal from the valve pipe.

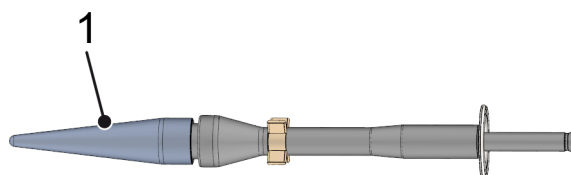


Figure 227: Valve pipe with assembly tool

- 1 Assembly tool

15. ➔ Attach the assembly tool to the valve pipe and lightly grease it using the lubricant **PARALIQ GTE 703**.

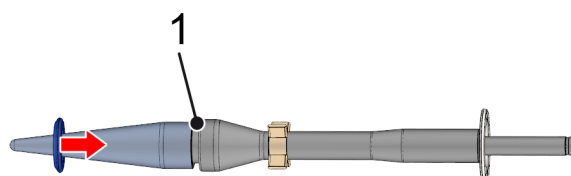


Figure 228: Valve pipe with assembly tool

- 1 Groove

16. ➔ Push a new seal over the assembly tool into the groove of the valve pipe.

17. ➔ Reassemble the filling valves.



6.6.5.4 Replacing the membrane and bellows in the control cylinder

Personnel: ■ Maintenance personnel



NOTICE!

Use of incorrect greases and lubricants

Only the piston point may be lightly lubricated with grease. The use of lubricants and grease on other control cylinder components can result in malfunctions and damage to the control cylinder.

This may result in damage to the machine or to items in the surrounding area.

- Lightly lubricate the piston point with grease only.
- Only use grease which is approved for use in food processing.

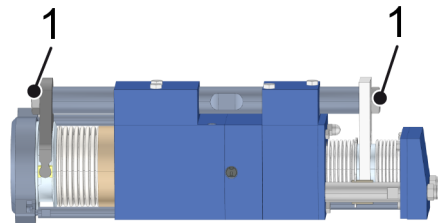


Figure 229: Filling valve

1 Screw

1. ➡ Remove the bolts.

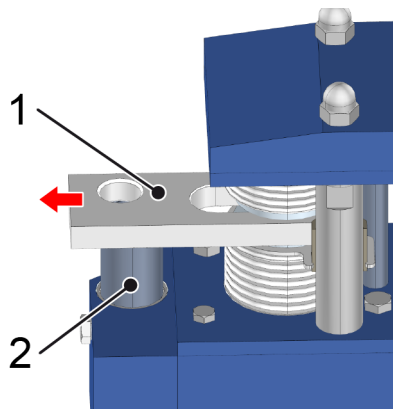


Figure 230: Valve cover with lift actuator

1 Guide plate

2 Guide rod

2. ➡ Remove the guide plate and pull out the guide rod.

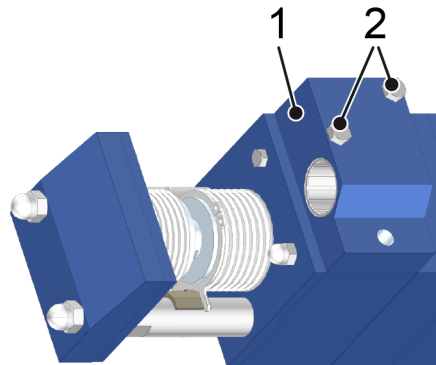


Figure 231: Valve cover with cylinder housing

- 1 Cylinder housing
- 2 Screw

3. ➔ Unscrew the screws and remove the cylinder housing.

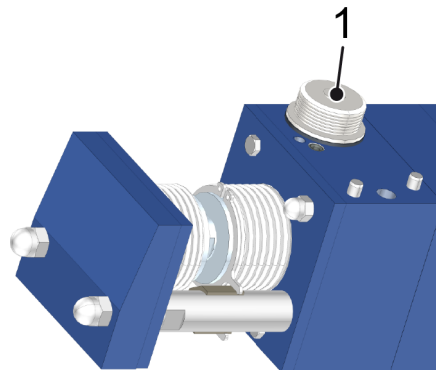


Figure 232: Valve cover without cylinder housing

- 1 Bellows

4. ➔ Remove the bellows.

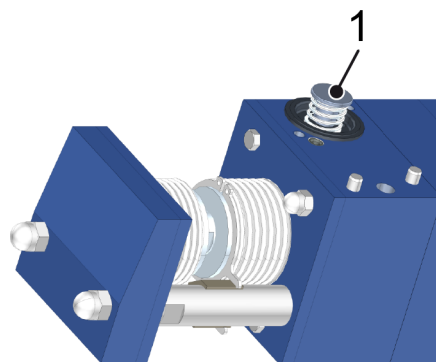


Figure 233: Bellows and control cylinder

- 1 Piston

5. ➔ Pull the control cylinder on the piston out of the valve cover.

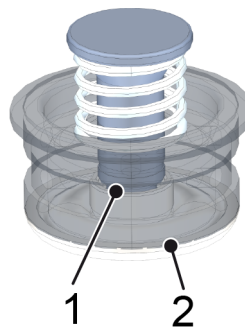


Figure 234: Control cylinder

- 1 Supporting ring
- 2 Membrane

6. ➤ Remove the membrane together with the supporting ring from the piston.
7. ➤ Lightly grease the piston point (using Klüber "PARALIQ GTE 703" or Carl Bechem "Berulub Sihaf 2").
8. ➤ Push a new supporting ring onto the new membrane.
9. ➤ Place the new membrane onto the piston point at an angle and press it on.
10. ➤ Reinsert the control cylinder into the valve housing.
11. ➤ Place on the new expansion joint.
12. ➤ Reinstall the cylinder housing and screw it down.

6.6.5.5 Replacing the bellows and stop plate

The filling valve must be removed in order to replace the bellows and stop plate, see chapter "Servicing", section "Repairs". The filling valve must then be dismantled in the following order:

Personnel: ■ Maintenance personnel

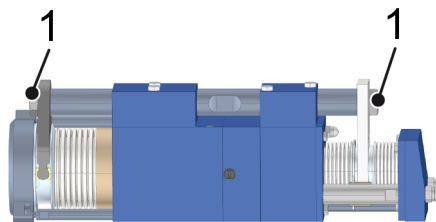


Figure 235: Filling valve

- 1 Screw
1. ➤ Remove the bolts.

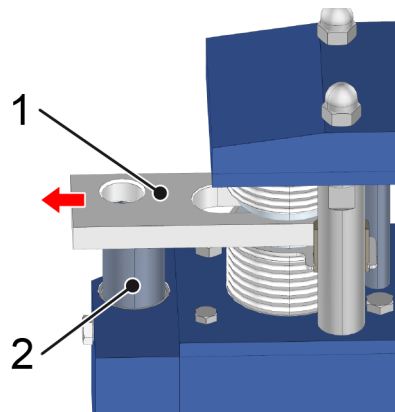


Figure 236: Valve cover with lift actuator

- 1 Guide plate
- 2 Guide rod

2. ➔ Remove the guide plate and pull out the guide rod.

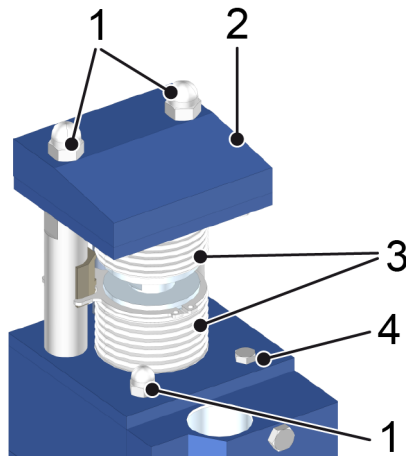


Figure 237: Valve cover

- 1 Cap nut
- 2 Head plate
- 3 Bellows
- 4 Screw

3. ➔ Loosen the cap nuts and all the screws and remove the head plate together with the bellows and the stop plate.

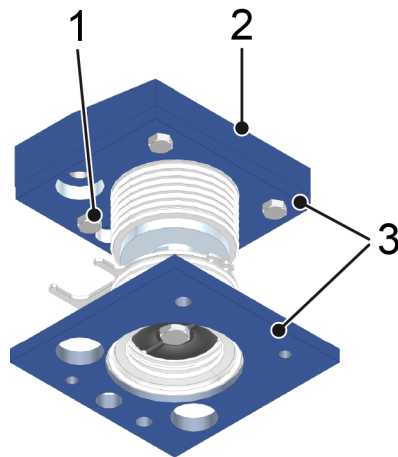


Figure 238: Head plate with bellows and stop plate

- 1 Screw
- 2 Head plate
- 3 Mechanism plate

4. Loosen all the screws and remove the head plate.

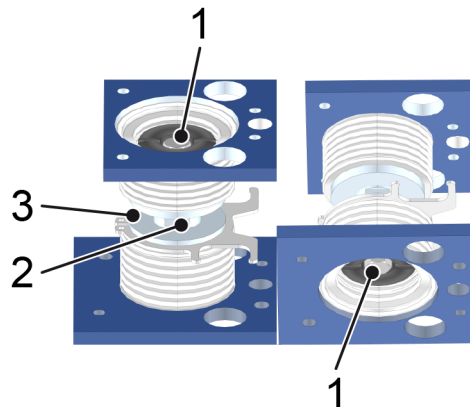


Figure 239: Bellows and stop plate

- 1 Screw
- 2 Wrench dog point
- 3 Guide element

5. Hold the guide element at the dog point with an open-end wrench and remove the screw.

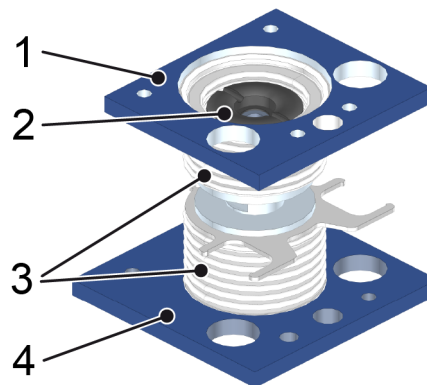


Figure 240: Removing the mechanism plate

- 1 Upper mechanism plate
 - 2 Stop plate
 - 3 Bellows
 - 4 Lower mechanism plate
- 6.** ➔ Remove the stop plate and the bellows together with the locking washer from the mechanism plates.

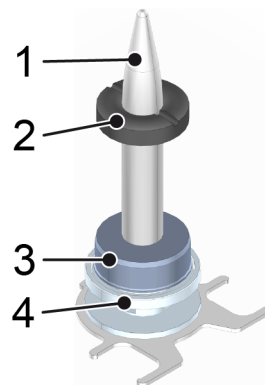


Figure 241: Assembly sleeve

- 1 Assembly sleeve
 - 2 Stop plate
 - 3 Locking washer
 - 4 Guide element
- 7.** ➔ Push the new stop plate over the assembly sleeve onto the locking washer and the guide element.



Complete step 7 for both the locking washers and the stop plate.

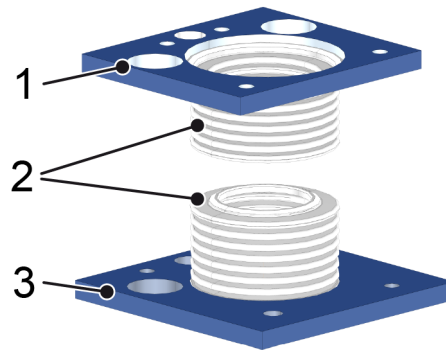


Figure 242: Inserting the bellows

- 1 Upper mechanism plate
- 2 Bellows
- 3 Lower mechanism plate

8. ➔ Insert the new bellows into the mechanism plates.

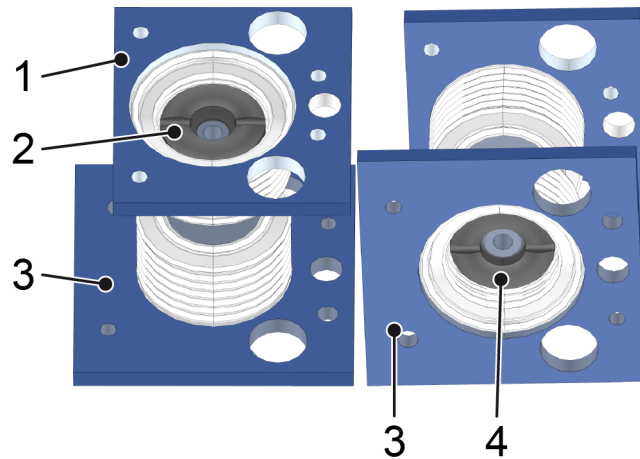


Figure 243: Inserting the locking washer and bellows

- 1 Upper mechanism plates
- 2 Upper locking washer and stop plate
- 3 Lower mechanism plates
- 4 Lower locking washer and stop plate

9. ➔ Insert the locking washer together with the stop plate into the bellows.

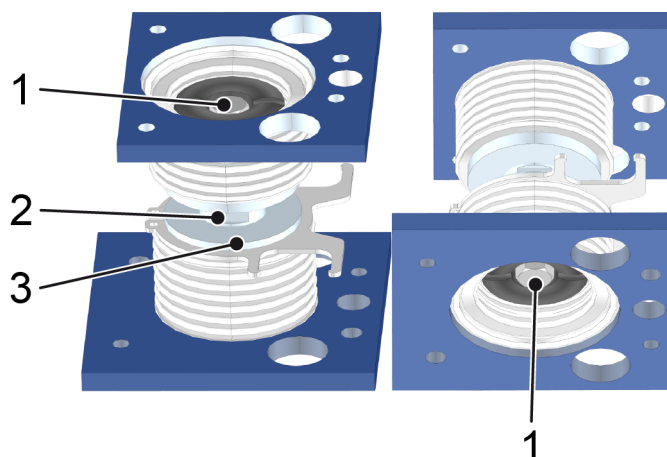


Figure 244: Inserting the screws

- 1 Screw
- 2 Wrench dog point
- 3 Locking washer

10. Hold the guide element at the dog point using an open-end wrench, attach the bellows with the locking washer and the stop plate, then insert and tighten the screw.

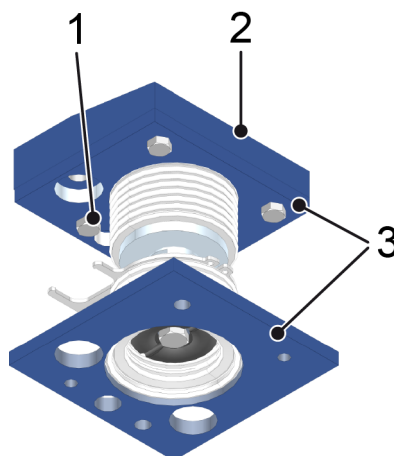


Figure 245: Head plate with bellows and stop plate

- 1 Screw
- 2 Head plate
- 3 Mechanism plates

11. Mount the head plate, insert all the screws and tighten them.

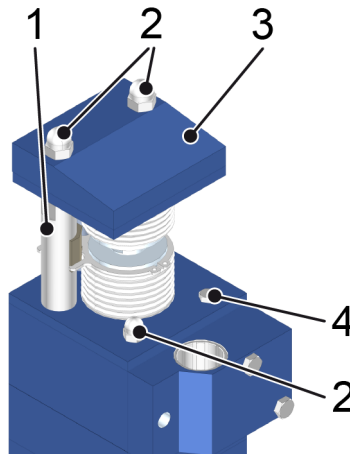


Figure 246: Mounting the head plate

- 1 Stud bolts
- 2 Cap nut
- 3 Head plate
- 4 Screw

12. ➔ Mount the head plate onto the stud bolts, insert the cap nuts and screws and tighten them.

13. ➔ Reinstall the bell actuator.

6.6.5.6 Changing the rubber contact seal

Personnel: ■ Maintenance personnel



NOTICE!

When changing the rubber contact seal, make sure that the edges of the centering bell are not damaged.



Prerequisite: The centering bell and the bellows have been removed; see section *"Replacing the bellows"*.

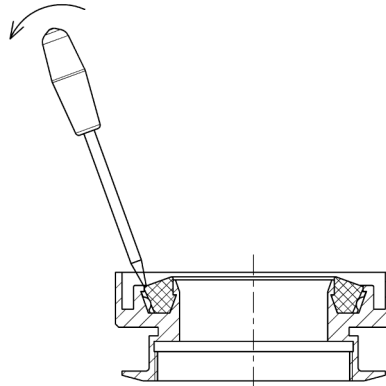


Figure 247: Centering bell with a rubber contact seal

1. ➔ Insert a screwdriver into the outer edge of the rubber contact seal and prize it out of the groove.
2. ➔ Insert the new rubber contact seal into the groove by hand.

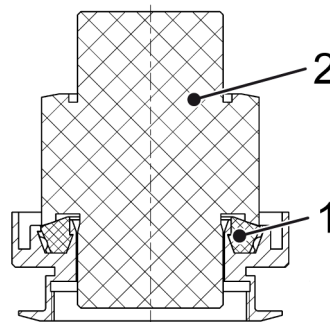


Figure 248: Centering bell with pressure piece

- 1 Rubber contact seal
- 2 Pressure piece
3. ➔ Hold the pressure piece as shown in the diagram. Use the pressure piece to push down the outer edge of the rubber contact seal.

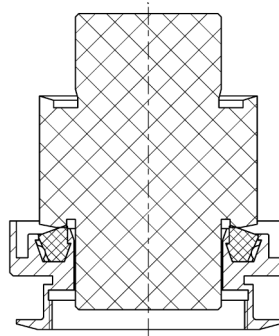


Figure 249: Centering bell with pressure piece

4. ➤ Rotate the pressure piece 180° so that the top is pointing down.
5. ➤ Use the pressure piece to push down the inner edge of the rubber contact seal.

6.6.5.7 Change the grooved ring

Personnel: ■ Maintenance personnel



NOTICE!

When changing the grooved ring, make sure that the edges of the centering bell are not damaged.

Prerequisite: The centering bell and the bellows have been removed; see section *"Replacing the bellows"*.

1. ➤ Use a screwdriver to remove the grooved ring from the groove.
2. ➤ Insert a new grooved ring.

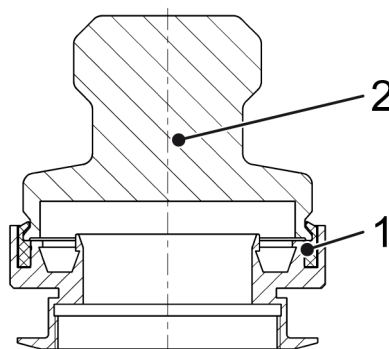


Figure 250: Centering bell with grooved ring and pressure piece

- 1 Grooved ring
- 2 Pressure piece
3. ➤ Push in the grooved ring with the pressure piece.



6.6.6 Filter silencer on FRL group

Maintenance of filter silencer on FRL group



WARNING!

Noise from control air

A filter silencer with a predetermined breakage point is located on the relief valve of the FRL group. If the predetermined breakage point is broken, the noise of the escaping air is no longer muted.

This could result in death or serious injury.

- Replace the filter silencer with a genuine filter silencer for the maintenance unit.
- Wear personal protective equipment:
 - Noise protection
 - Safety goggles
 - Protective clothing
 - Gloves
 - Safety shoes

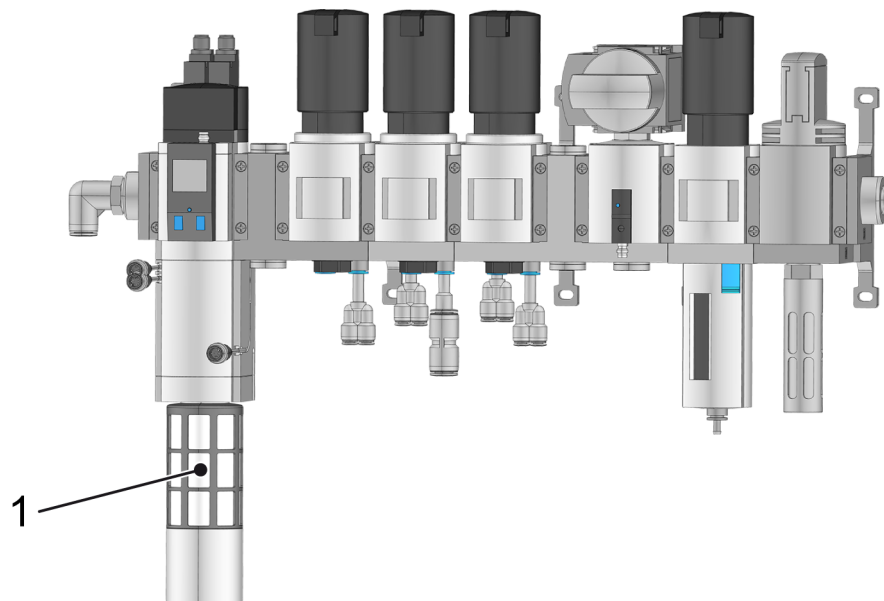


Figure 251: FRL group

- 1 Filter silencer on the relief valve with predetermined breakage point for venting

The filter silencer on the relief valve has a predetermined breakage point. The predetermined breakage point breaks when the pressure in the filter silencer is too great. The pressure becomes too great when the filter within the filter silencer is blocked. The filter silencer is a safety-related component and may only be replaced with a genuine filter silencer for the maintenance unit. If the filter silencer is not replaced with a genuine spare part, there is a risk that the safety function will fail. See the purchased parts documentation for the maintenance unit.



6.6.7 Replacing the flow meter

Removal

Personnel: ■ Maintenance personnel

Protective equipment: ■ Personal protective equipment

Prerequisite: The machine is deenergized. A description of how personnel should activate the machine is provided in chapter "Servicing", section "Disconnecting and securing".

1. ➤ Using the removable operating control, move the machine such that the valve to be replaced is easy to access.
2. ➤ Empty and depressurize the central bowl.
3. ➤ Switch off the control voltage.

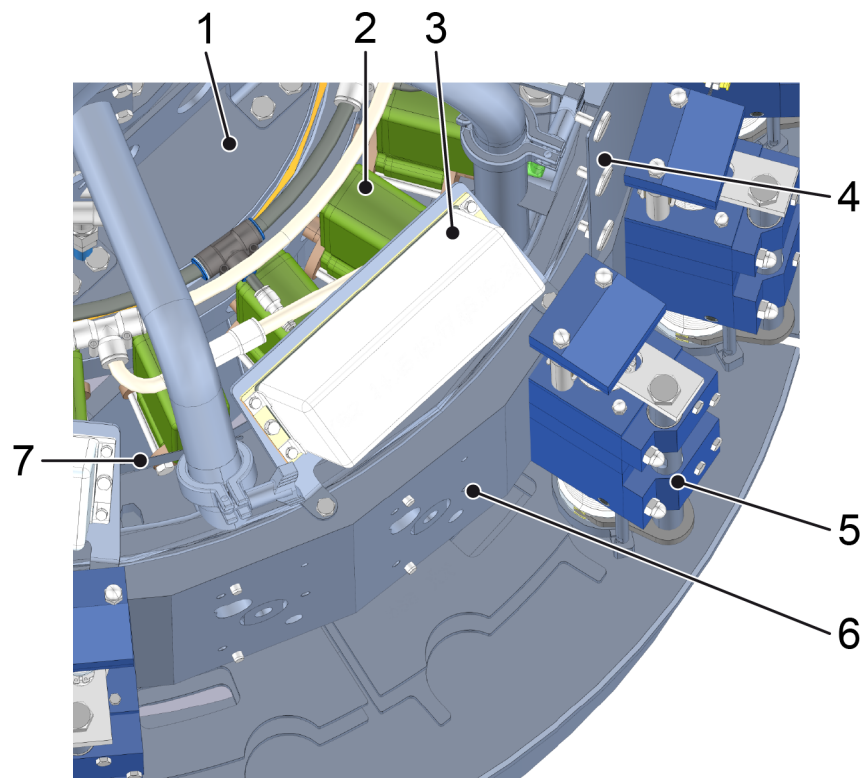


Figure 252: Fitted flow meter

- 1 Distributor ring
- 2 Flow meter
- 3 Valve cluster
- 4 Paneling
- 5 Filling valve
- 6 Carrier ring
- 7 Earth circuit connector

4. ➤ Remove the filling valve upstream of the flow meter to be replaced.
5. ➤ Remove the paneling over the flow meter.
6. ➤ Loosen the valve cluster on the carrier ring and push it to one side.

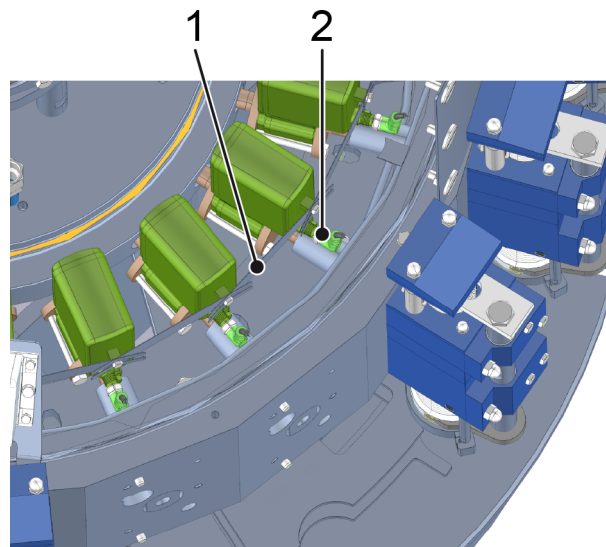


Figure 253: Electrical connection and earth circuit connector

- 1 Earth circuit connector
- 2 Electrical connection

7. ➤ Remove the electrical connector and the earth circuit connector.

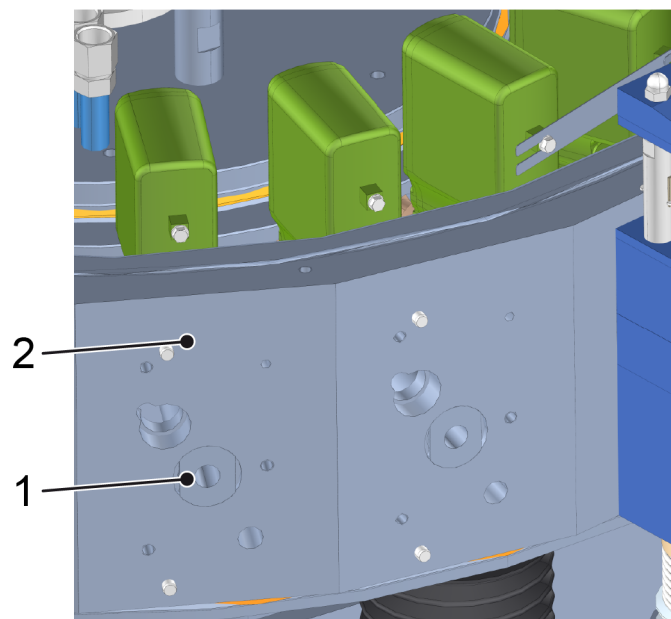


Figure 254: Sleeve

- 1 Sleeve
- 2 Carrier ring

8. ➤ Use a screwdriver to remove the sleeve from the carrier ring.

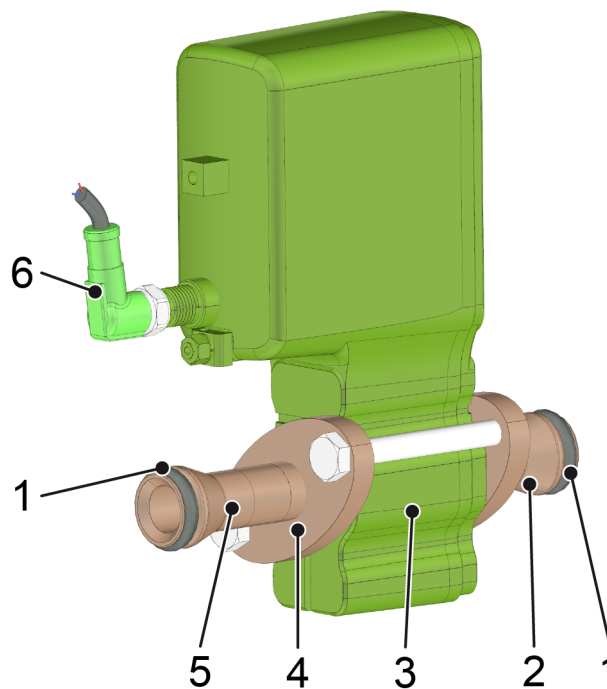


Figure 255: Unit consisting of a flow meter, flange, and supply and discharge lines

- 1 Seal
- 2 Supply line
- 3 Flow meter
- 4 Flange
- 5 Outlet line
- 6 Electrical connection

9. ➔ Remove the whole unit consisting of a flow meter, flange, supply line and discharge line from the distributor ring and lift it out.

Installation

1. ➔ Remove the supply line and the discharge line from the old flow meter and fit them on the new flow meter.



The flow direction of the flow meter is marked with an arrow; this arrow must point downward during installation.

2. ➔ Place the sealing rings on the supply and drain lines and lubricate with food-grade grease.



Only use grease that is approved for use in food processing.

3. ➔ Push the unit into the distributor ring.
4. ➔ Push the sleeve through the carrier ring and secure it.



5. ➤ Align the flow meter.
6. ➤ Mount the electrical connection and the earth circuit connector.
7. ➤ Push back the valve cluster and secure it.
8. ➤ Install the filling valve.
9. ➤ Perform commissioning (see chapter “Operation”).
10. ➤ During the next filling process, check the filled quantity at the filling station of the replaced flow meter. If necessary, correct this using the "Filling valve correction" function on the operator console.

6.6.8 Cleaning the dirt collecting filter

If the message *“Insufficient product”* is displayed on the graphical user interface, this means the product level is too low. If at the same time, the product pressure according to the product control valve is higher than the filling pressure specified in the type parameters, the filter insert in the dirt collecting filter is full and must be cleaned.

The specified filling pressure can be read on the filler diagram on the graphical user interface of the pressure sensor in the pressurization gas line.

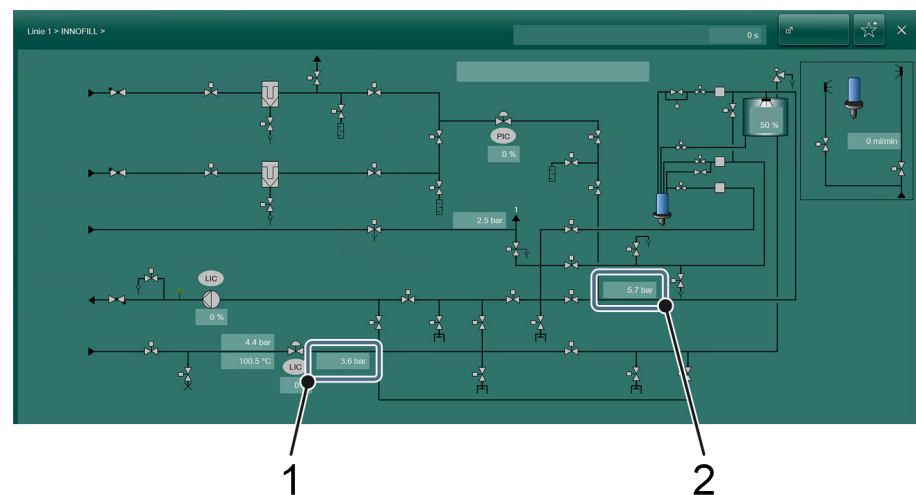


Figure 256: Filler diagram (example)

- 1 Pressure sensor display — product pressure (PR200)
- 2 Pressure sensor display — pressurization gas pressure (PR220)

6.6.8.1 Cleaning the dirt collecting filter by back flushing

6.6.8.1.1 Preparation

1. ➤ Press *“Flowgate closed”* on the graphical user interface.
⇒ The flowgate closes.



2. ➔ Select the program step *"Fill until empty"* on the graphical user interface. See chapter *"Operation"*, section *"Setup"*.

3. ➔ Close all the manual shut-off valves.

The manual shut-off valves are listed in the overview graphic and in *"Work steps for disconnecting and securing"* in chapter *"Servicing"*, section *"Disconnecting and securing"*.

6.6.8.1.2 Back flushing during production

Protective equipment: ■ Face shield
■ Hand protection
■ Foot protection

When valve MM410 is opened, large quantities of product can escape. The product is pressurized. Secure the area of the valve clusters.

➔ On the graphical user interface in the *"Filler diagram"* view, set the following valves to *"Manual"* in the order listed and select *"ON/OFF"* to open or close the valves; see chapter *"Layout and function"*, section *"Graphical user interface"*.

- Close valve MM390.
- Close valve MM410.
- Open valve MM410 for two seconds.

The product flows back from the ring bowl through the dirt collecting filter and releases the coating on the filter insert.

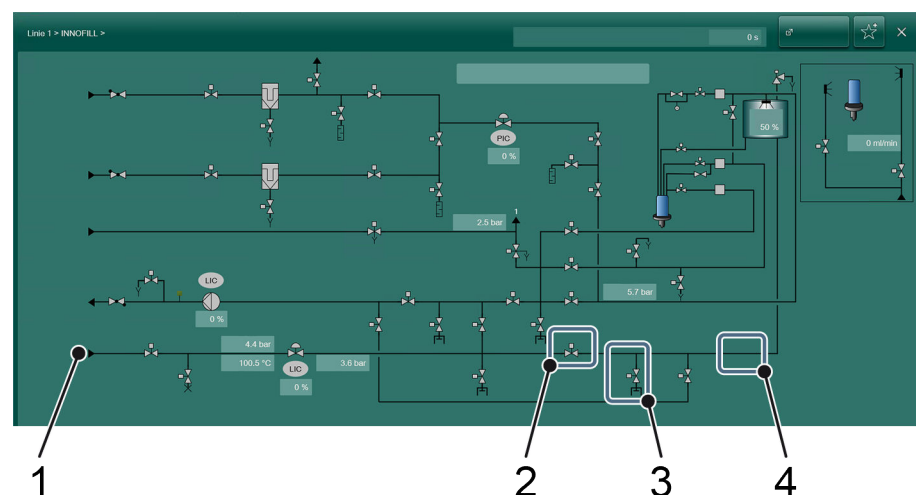


Figure 257: Filler diagram (example)

- 1 Product primary feed/CIP primary feed
- 2 Valve MM390
- 3 Valve MM410
- 4 Area in which the dirt collecting filter is found (not shown)



6.6.8.1.3 Back flushing during CIP cleaning

Pressure relief is required when back flushing the dirt collecting filter with cleaning media.

Pressure relief

Protective equipment: ■ Face shield
■ Hand protection
■ Foot protection

When valve MM410 is opened, large quantities of cleaning media can escape. The cleaning media is under pressure and can be hot. Secure the area of the valve clusters.

➔ On the graphical user interface in the “*Filler diagram*” view, set the following valves to “*Manual*” in the order listed and select “*ON/OFF*” to open or close the valves; see chapter “*Layout and function*”, section “*Graphical user interface*”.

- Close valve MM730.
- Open valve MM740.
- Open valve MM730.

The bowl and the pipelines are depressurized.

The pressure is relieved when the displays of the pressure sensors for product pressure and pressurization gas pressure show the following values:

- Pressure sensor — product pressure (PR200) ≤ 0.1 bar
- Pressure sensor — pressurization gas pressure (PR220) ≤ 0.2 bar

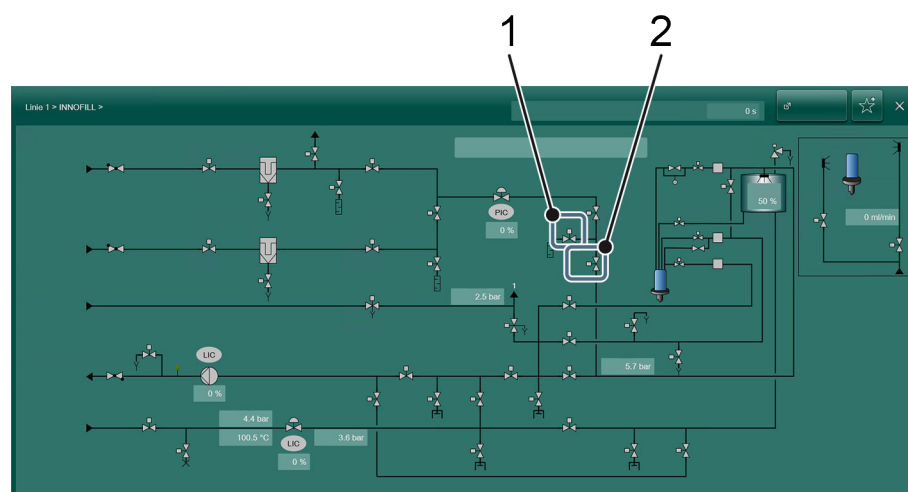


Figure 258: Filler diagram (example)

- 1 Valve MM730
- 2 Valve MM740

Back flushing



➔ In the “*Filler diagram*” view on the graphical user interface, set the following valves to “*Manual*” in the order listed and select “*ON/OFF*”, to open or close the valves; see chapter “*Layout and function*”, section “*Graphical user interface*”.

- Close valve MM390
- Close valve MM410
- Open valve MM39.

The ring bowl is ventilated and the pressure in the ring bowl falls.

- Open valve MM410 for 5–10 seconds.

The cleaning media flows back from the ring bowl through the dirt collecting filter and releases the coating on the filter insert.

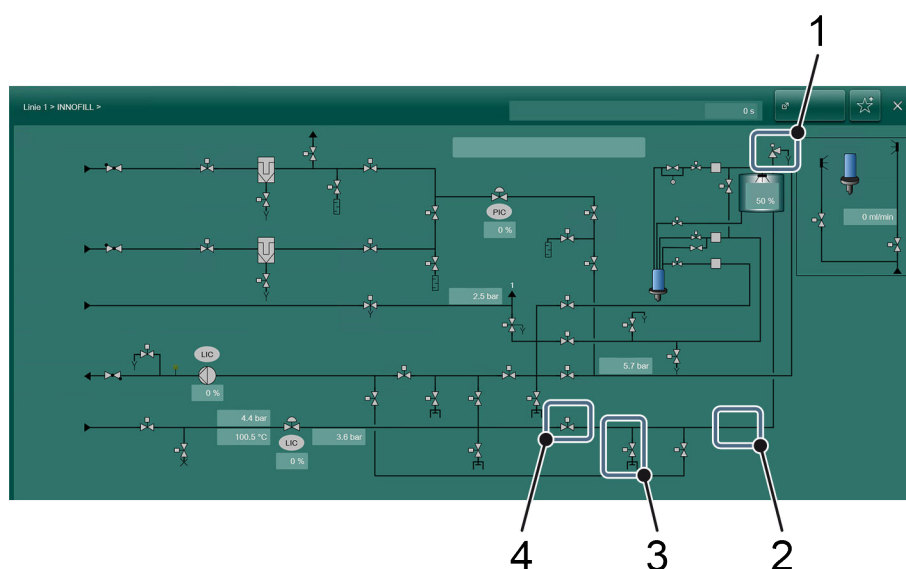


Figure 259: Filler diagram (example)

- 1 Valve MM39
- 2 Area in which the dirt collecting filter is found (not shown)
- 3 Valve MM410
- 4 Valve MM390

6.6.8.1.4 Removing and cleaning the filter insert of the dirt collecting filter

Emptying the pipelines



- Protective equipment:
- Face shield
 - Hand protection
 - Foot protection

1. ➤ Close all the manual shut-off valves.

The manual shut-off valves are listed in the overview graphic and in *“Work steps for disconnecting and securing”* in chapter *“Servicing”*, section *“Disconnecting and securing”*.

2. ➤ Select the program step *“Fill until empty”* on the graphical user interface. See chapter *“Operation”*, section *“Setup”*.

3. ➤ On the graphical user interface in the *“Filler diagram”* view, tap the pressurization gas control valve.

⇒ The controller view opens.

4. ➤ Switch on *“Manual/Setpoint”* and adjust this to 0.5 bar above the ambient pressure.

5. ➤ On the graphical user interface in the *“Filler diagram”* view, set the following valves to *“Manual”* in the order shown and select *“ON/OFF”* to open or close the valves; see chapter *“Layout and function”*, section *“Graphical user interface”*.

- Open valve MM410.

When only gas escapes from the filler, the filler is empty.

- Close valve MM30.
- Close valve MM320.

6. ➤ On the graphical user interface in the *“Filler diagram”* view, tap the product control valve.

⇒ The controller view opens.

7. ➤ Switch on *“Manual/Setpoint”* and adjust this to the ambient pressure.

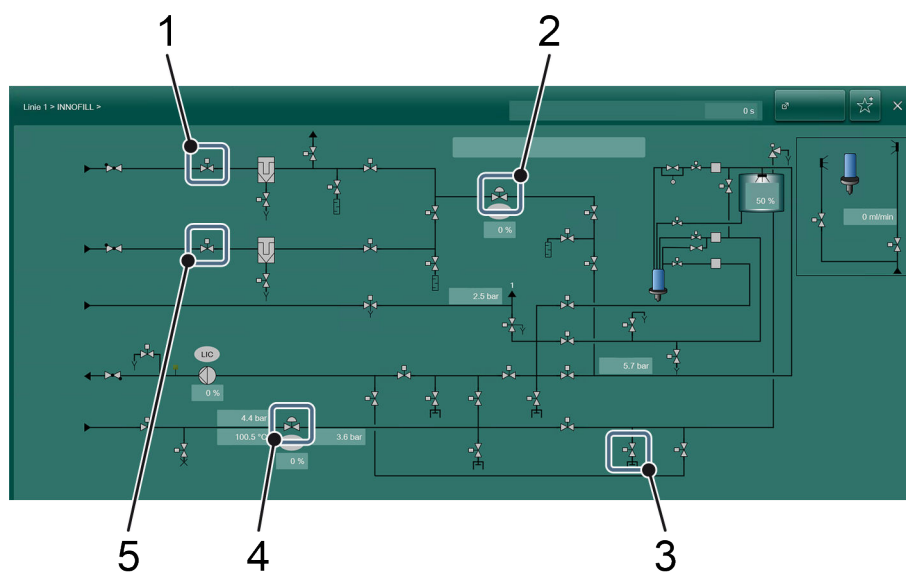


Figure 260: Filler diagram (example)

- 1 Valve MM30
- 2 Pressurization gas control valve
- 3 Valve MM410
- 4 Product control valve
- 5 Valve MM320

Removing and cleaning the filter insert

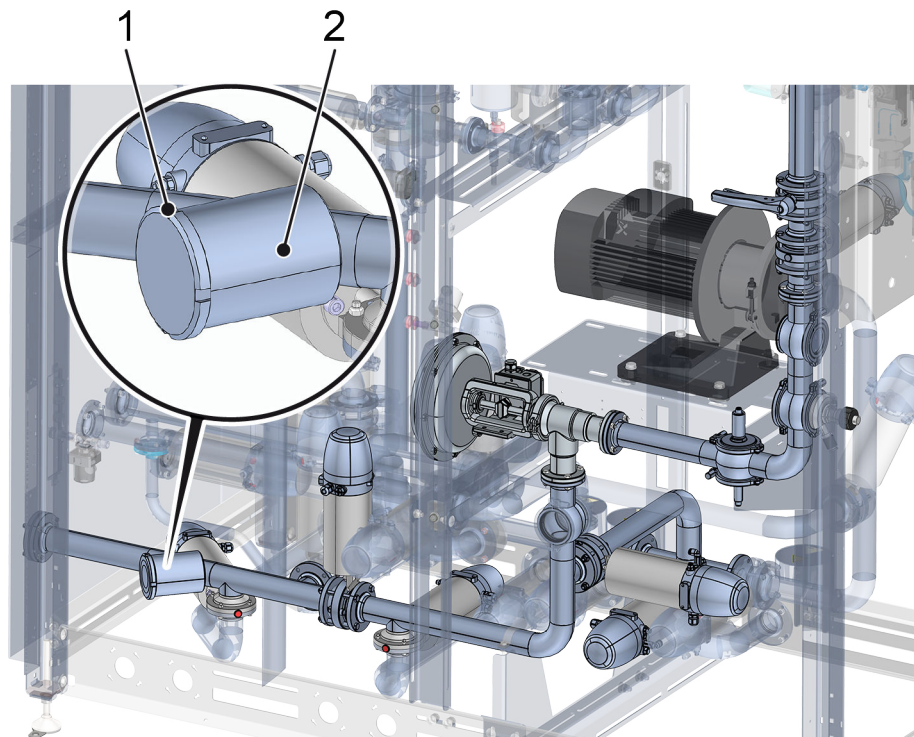


Figure 261: Dirt collecting filter in the valve manifold product feed

- 1 Union nut
- 2 Dirt collecting filter

1. Disconnect the power. See chapter *“Servicing”*, section *“Disconnecting and securing”*.
2. Leave valve MM410 open.
3. Loosen and remove the union nut.
4. Pull out the dirt collecting filter.
5. Clean the dirt collecting filter strainer.
6. Reinsert the dirt collecting filter.
7. Replace and tighten the union nut.

6.6.8.1.5 Preparing for operation

1. Switch on the power supply; see chapter *“Operation”*, section *“Preparing for operation”*.
2. Switch on the control voltage; see chapter *“Operation”*, section *“Preparing for operation”*.
3. Close all valves.
 - ⇒ The valves are closed during the next manual operation.
 - In automatic mode, the valves open in a controlled way.
4. Set all valves to *“Manual off”*.



5. ➤ In the controller view, switch off both *"Manual/Setpoint"* control valves.
6. ➤ Reconnect the power.
Switch on the power supplies in the specified order, see section *"Work steps for restarting"*.
7. ➤ Press the *[Acknowledge]* button on the operator console.
8. ➤ Press *[Start]* on the operator console.

6.6.9 Setting instructions

6.6.9.1 Adjusting the can sensor

Personnel: ■ Maintenance personnel

Prerequisite: There are no bottles left in the machine.

1. ➤ Open the *"Step jog servo/position to zero point"* view via *"Service ➔ Step jog servo/position to zero point"*.
2. ➤ Activate *"Positioning to zero point (all axes)"*
3. ➤ Select *"Setup"* operating mode on the operator console's graphical user interface.
4. ➤ Press and hold the *[Jog]* button on the removable operating control until all drives are running.
⇒ The machine stops at the zero point.
5. ➤ Opening the doors

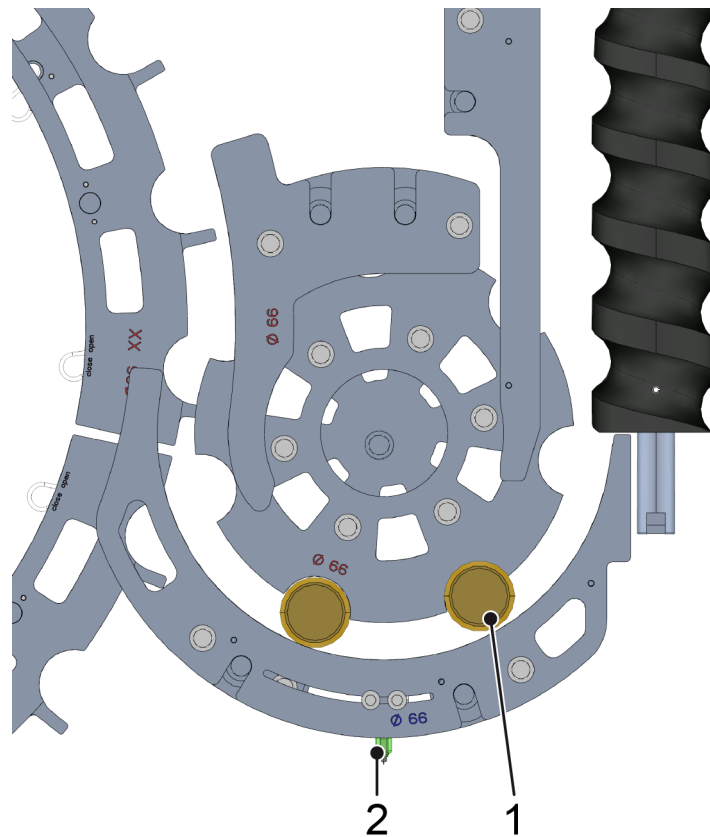


Figure 262: Can sensor on the star round blank

- 1 Can
- 2 Can sensor
6. Place two cans in the infeed star. The distance between the can and the can sensor should be 1 - 2 mm.
7. Check whether the can sensor is located between two cans (see diagram). In this position the can sensor is not assigned and the LED on the can sensor will not light up.
8. If the position of the can sensor is incorrect, the proximity switch must be mechanically adjusted. To do so, move the proximity switch along the slot.



NOTICE!

Adjusting the proximity switch

Never move the proximity switch by more than half a pitch (half a can) as otherwise the cycles in the shift register will no longer be correct.

This results in malfunctions and filling faults.

9. Close doors and acknowledge.
10. If the machine is moved forward a cycle using the removable operating control, the LED lights up to indicate that a can has been detected.



This page is left blank for editorial reasons.



7 Faults

This chapter describes the causes of faults and how to correct them.

7.1 Safety instructions



Always observe the content of the *“Safety”* chapter during all work.

7.2 Displays

Reaction of the machine to faults

The machine responds to faults with the following actions depending on the severity of the fault:

- Closing of container flowgates and machine stop
 - For faults: F0001 to F0128 and F0257 to F0352
- Closing of the container flowgate and machine continues running at reduced speed
 - For faults: F0129 to F0192 and F0353 to F0384
- Automatic closure and opening of the container flowgates
 - For information messages: W0001 to W0065

7.2.1 Fault displayed by the signal lamp

The signal lamp is integrated into the machine paneling and indicates operating statuses or faults in the machine by means of colored lamps.

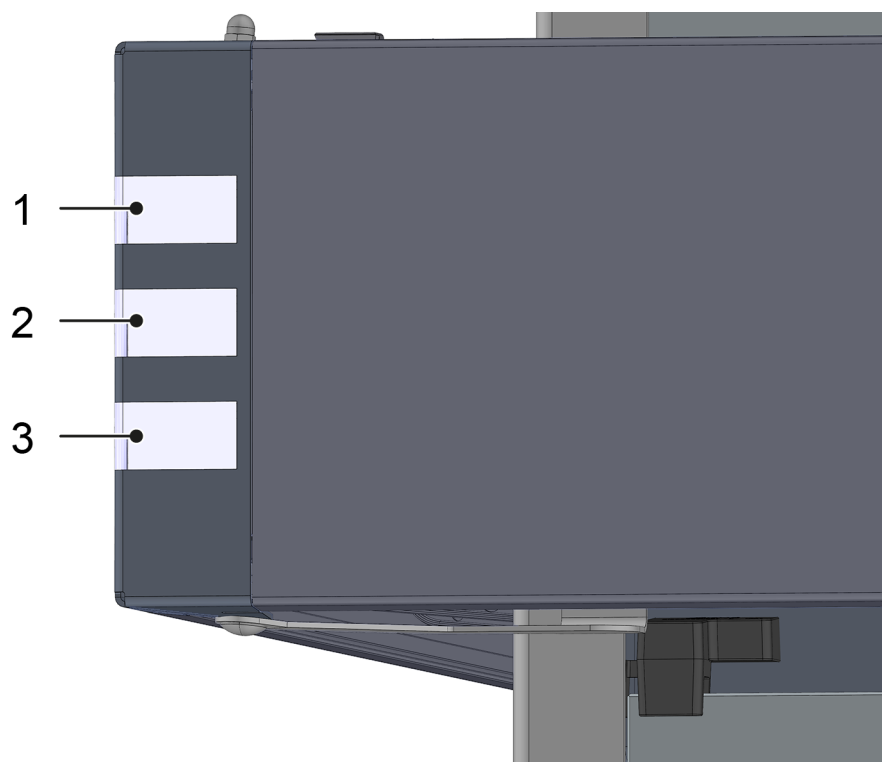


Figure 263: Signal lamp

- 1 Red, yellow or white lamp
- 2 Green lamp
- 3 Blue lamp

The colors of the lamps have the following meanings:

Color	Flashing light	Steady light
Red	Safety device open	Emergency stop
Yellow	Material defect (machine is in standby)	Material defect (machine is in opera- tion)
White	Reserve	Machine in operation
Green	Service on	Power on
Blue	Acknowledge fault	Fault

7.2.2 Signal horn

The signal horn emits an audible signal when a fault occurs.



Figure 264: Safety horn on the machine paneling

7.2.3 Faults and warnings on the operator console



Figure 265: Status bar

- 1 Marking
- 2 Status bar
- 3 Border

Warnings and faults are displayed with error numbers and error text in the status row and overlap the machine parameters.

The color of the marking and the border indicate the type of message:

Color of the frame	Type of message
Red	Fault with hazard
Blue	Fault
Yellow	Note
White	Information



7.2.4 Displaying faults on the overview screen in the operator guidance section

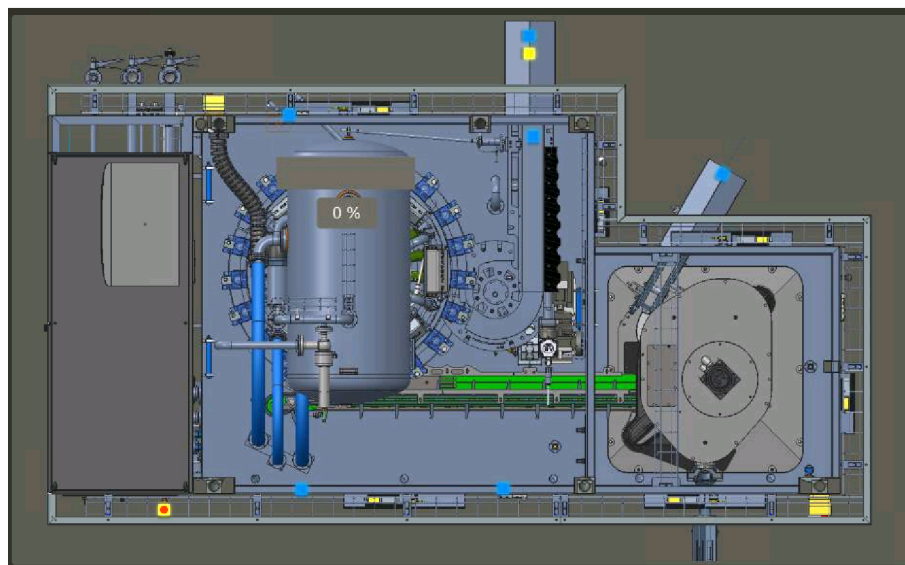


Figure 266: Overview screen on the operator console

Any faults that have occurred or instructions are displayed in the overview diagram by illuminated colored dots.

Assembly	Colored dot	Meaning
Machine paneling	Blue	Door open
	Yellow	Area selected
Can stopper	Blue	Can stopper closed due to machine fault
	Yellow	Can stopper closed automatically
Infeed conveyor	Blue	The infeed conveyor is stationary
	Yellow	Can shortage
	Flashing yellow	Half capacity
Outfeed conveyor	Blue	Conveyor running
	Yellow	Can backup
	Flashing yellow	Half capacity
Emergency stop	Yellow with red flashing dot	Emergency stop activated
Filler computer	Blue	Synchronous fault
	Yellow	Filling fault



7.3 Rectifying faults

7.3.1 Eliminating fault messages from the overview screen

Filler computer

No.	Fault description	Cause	Solution
F00148	Blue: Synchronous fault	The machine has not yet reached the machine zero point	Let the filler run for two or three cycles.
		The switching flag for detection of the synchronous clock is in the wrong position.	Correct the position of the switching flag.
		The proximity switch for detection of the synchronous clock is faulty.	Check the functionality and the circuit of the proximity switch and replace the proximity switch if necessary.
		The proximity switch for detection of the machine timing is faulty.	Check the functionality and the circuit of the proximity switch and replace the proximity switch if necessary.

Fault description	Cause	Solution
Yellow: Filling fault	A fault has occurred in the filling valve control.	Activate the "Fault" function at the operator terminal.

Paneling

No.	Fault description	Cause	Solution
F0105 to F0108	Blue: Paneling	A paneling door is open	Close the paneling.
		The door contact switch is not available or is faulty.	Check the functionality and the circuit of the proximity switch and replace the proximity switch if necessary.

Fault description	Cause	Solution
Yellow: Paneling	Area/operator bar is selected	Turn the "Acknowledge/open paneling" switch to position "Acknowledge" at the displayed bar.

Infeed conveyor

No.	Fault description	Cause	Solution
F0152	Blue: Fault	Infeed conveyor not running	See faults and warning messages in the status bar.



Fault description	Cause	Solution
Yellow: Can shortage	A can has fallen over in front of the feed screw.	Remove the fallen or jammed cans.
	The infeed sensor (proximity switch) on the infeed conveyor is faulty.	Check the functionality and the circuit of the proximity switch and replace the proximity switch if necessary.
	The infeed conveyor is stationary.	Switch on the infeed conveyor.
	The drive of the infeed conveyor is blocked or defective.	Check the power supply of the motor, the protective motor switch and the circuit.

Fault description	Cause	Solution
Flashing yellow: Half capacity	Can shortage	A can gap was detected on the infeed conveyor.
	Can backup	A can backup has occurred on the outfeed conveyor.
	One of the upstream machines has signaled a malfunction.	Eliminate the fault on the corresponding machine.

Can stopper

Fault description	Cause	Solution
Blue: Fault	A fault has occurred which resulted in automatic closure of the can stopper.	Eliminate the fault and acknowledge the fault with the acknowledgment button on the operator console.
Fault description	Cause	Solution
Yellow: Warning	A fault has occurred which resulted in automatic closure of the can stopper.	Due to the type of fault, the can stopper is automatically opened again.

Emergency stop

Fault description	Cause	Solution
Yellow: Emergency stop	The emergency stop button has been actuated.	Check and eliminate the danger and then unlock the emergency stop switch.



Fault description	Cause	Solution
	The emergency stop button is defective.	Replace the emergency stop switch.
	Broken wire in the circuit.	Check the circuit and remove the broken wire.

Outfeed conveyor

No.	Fault description	Cause	Solution
F0015	Blue: Fault	Outfeed conveyor not running.	See faults and warning messages in the status bar.

Fault description	Cause	Solution
Yellow: Can backup	Cans are backed up on the outfeed conveyor.	Clear the can backup.
	The outfeed conveyor is stationary.	Switch on the outfeed conveyor.
	Defective backup switch on the outfeed conveyor.	Check the functionality and the circuit of the proximity switch and replace the proximity switch if necessary.
	The drive of the outfeed conveyor is blocked or defective.	Check the power supply of the motor, the protective motor switch and the circuit.

Fault description	Cause	Solution
Flashing yellow: Half capacity	Can backup	A can backup has occurred on the outfeed conveyor.
	Can shortage	A can gap was detected on the infeed conveyor.
	One of the upstream machines has signaled a malfunction.	Eliminate the fault on the corresponding machine.

7.3.2 Malfunction in Electrical Area

No.	Fault description	Cause	Solution
F0002 to F0004	Circuit breaker in.... "specify machine area"	In the fault text, the machine area in which the monitored fault was triggered is specified.	



No.	Fault description	Cause	Solution
		The protected area was overloaded or indicates a short circuit or short to earth.	Eliminate the cause of the overload and replace the circuit breaker, or switch on the min. circuit breaker again.

No.	Fault description	Cause	Solution
F0005	The protective motor switch in switch cabinet S1 has triggered	The motor is overloaded, blocked or defective.	Check the drive system for difficulty of movement or blockage and eliminate this fault. Replace the motor if necessary.
		A protective motor switch has been triggered.	Check the setting of the protective motor switch and reactivate the motor protection.
		The motor connection is faulty or damaged.	Check the motor connection and, if relevant, the connection to the frequency converter.
		The protective motor switch is defective.	Check the functionality and the circuit of the proximity switch and replace the proximity switch if necessary.
		The frequency converter signals a fault.	See the frequency converter operating manual for further information.

No.	Fault description	Cause	Solution
F0017	The frequency converter is not ready	The frequency converter signals a fault.	See the frequency converter operating manual for further information.

No.	Fault description	Cause	Solution
F0019	Thermistor protection cutout	The motor is overloaded, blocked or defective.	Check the drive system for difficulty of movement or blockage and eliminate this fault. Replace the motor if necessary.



No.	Fault description	Cause	Solution
		A protective motor switch has been triggered.	Check the setting of the protective motor switch and reactivate the motor protection.
		The motor connection is faulty or damaged.	Check the motor connection and, if relevant, the connection to the frequency converter.
		The protective motor switch is defective.	Check the functionality and the circuit of the proximity switch and replace the proximity switch if necessary.

No.	Fault description	Cause	Solution
F0041	Bus connection batch fault	The bus connection through which the individual electronic components communicate (data and signal exchange) is interrupted.	Check the connection lines of the bus system and the connections to the electronic components. See also fault message "F0141 Fault DP Mastersystem/Profibus".
		One of the external electronic components connected to the bus connection, or its transfer passage, is interrupted.	Check the connection lines of the bus system and the connections to the electronic components.

No.	Fault description	Cause	Solution
F0150	Data transfer fault PLC - Filler computer	The signal line between the programmable controller (PLC) and the filler computer is interrupted or disrupted	Check the shielding, the connection and the course of the signal line for damage and eliminate this as necessary.
		The filler computer or the PLC is decommissioned	Check if the corresponding CPU is switched on and if there is a power supply.

Note

No.	Fault description	Cause	Solution
W0078	Simatic CPU Fault: Buffer battery flat	The buffer battery for the programmable controller (PLC) is discharged.	Save the PLC program and then change the buffer battery (see PLC operating manual).



7.3.3 Machine paneling

7.3.3.1 Safety circuit

No.	Fault description	Cause	Solution
F0097 to F0100	Safety: Test of paneling area +P... was not performed	The regular inspection of the safety devices (machine paneling including wiring) was not carried out.	Open and close a door in the respective area and reset at the operator panel.

No.	Fault description	Cause	Solution
F0101	Safety: Emergency stop test was not performed	The regular inspection of the emergency stop devices was not carried out.	Actuate an emergency stop button, unlock it, actuate the "Acknowledge Fault" illuminated pushbutton and reactivate the control voltage

No.	Fault description	Cause	Solution
F0112	Safety: Manipulation of paneling detected, blocking time active	An attempt was made to open a locked door.	Before opening the door, undo the lock, see chapter "Operation", section "Opening and closing doors of the machine paneling".
		The door control reports "Door open" without prior console activation.	Check the wiring of the door switch.



When fault message F0112 occurs, the machine is stopped and activation of the engine drive is only possible again after a blocking time of 10 minutes has elapsed.

No.	Fault description	Cause	Solution
F0124	Safety: Maintenance/service safety area not closed	One of the service doors on the machine is open	Close the service door, reactivate the control voltage and acknowledge.
		The limit switch/door switch is defective.	Check the switches for damage and replace as required.



Information messages



The following information messages have no influence on the current activity of the machine. However, the information messages must be processed, as there could otherwise be interruptions in the sequence of operations!

(see fault descriptions F_097 to F_101)

No.	Fault description	Cause	Solution
W0137	Please test the emergency stop	The regular inspection of the emergency stop devices was not carried out.	Actuate an emergency stop button, unlock it, actuate the "Acknowledge fault" illuminated pushbutton and reactivate the control voltage.

No.	Fault description	Cause	Solution
W0138 to W0140	Please test the paneling in area P...	The regular inspection of the safety devices (machine paneling including wiring) was not carried out.	Open and close a door in the respective area and reset at the operator panel.

No.	Fault description	Cause	Solution
W0156	Paneling error, actuate the paneling reset	A door switch is in an undefined status.	Briefly turn every "Acknowledge/open paneling" switch to the "Acknowledge" position. If the error persists: When the machine is stationary, actuate the blue illuminated "Reset paneling error" pushbutton in switch cabinet S1. If the error persists: Check the wiring of the door switch.

7.3.3.2 Control system

No.	Fault description	Cause	Solution
F0096	Safety: Timeout connection PNOZmulti <-> PLC	No communication between the safety control system and the machine control system (PLC)	Check the BUS connection between the PLC and the safety control system.



No.	Fault description	Cause	Solution
F0102	Safety: PLC safety fault (Fault, O fault, I Fault or Diag)	Fault -> Batch fault, O Fault > Output fault, I Fault > Input fault, Diag > Diagnosis	Read out the PNOZmulti error stack and run the remedy.

No.	Fault description	Cause	Solution
F0109	Safety: Internal EMERGENCY STOP message	An EMERGENCY STOP has been triggered, e.g. at the can sealer	■ Check the cause of the EMERGENCY STOP, eliminate it and acknowledge. ■ Check the connection and components and replace the components as required.

No.	Fault description	Cause	Solution
F0110	Safety: External EMERGENCY STOP message	An EMERGENCY STOP has been triggered, e.g. for exterior cleaning of the filler, N2 dosing.	■ Check the cause of the EMERGENCY STOP, eliminate it and acknowledge. ■ Check the connection and components and replace the components as required.

No.	Fault description	Cause	Solution
F0111	Safety: Timeout connection PNOZmulti <-> PNOZmulti	One or more safety control systems are not in RUN mode.	Acknowledge the safety control by briefly interrupting the 24-V supply (see circuit diagram)
		The connection between the safety control systems is interrupted due to a hardware fault.	Check the wiring and replace the components as required.

No.	Fault description	Cause	Solution
F0113 to F0116 and F0119 and F0120	Safety: Fault with return circuit contactor: Paneling area +P....	Actuation of the output contactor and the response are not correct (both "1" or "0").	Check the connection and replace the components as required.
		The output contactor or the contactor is defective.	Check the components and replace if necessary.



No.	Fault description	Cause	Solution
F0125 to F0128	Safety: Fault with return circuit contactor: Control voltage, paneling, primary, secondary	Actuation of the output contactor and the response are not correct (both "1" or "0").	Check the connection and replace the components as required.
		The output contactor or the contactor is defective.	Check the components and replace if necessary.

7.3.4 Filler

7.3.4.1 Can infeed

No.	Fault description	Cause	Solution
F0023	Infeed screw fault	A can has fallen over in the area of the infeed screw. This has pushed the infeed screw outwards.	Check the can infeed.
		The infeed screw sensor is defective.	Check the sensor and replace if necessary.

No.	Fault description	Cause	Solution
F0013	"Replace can stopper star" function enable activated.	The "Replace can stopper star" function enable is still activated or was activated (see chapter "Operator guidance").	Deactivate the "Replace can stopper star" function enable.

7.3.5 Filling valve

7.3.5.1 Check filling process

You can monitor the filling process using the control cans made of Plexiglas.

Observing how the control cans are filled can lead to conclusions concerning possible sources of errors.

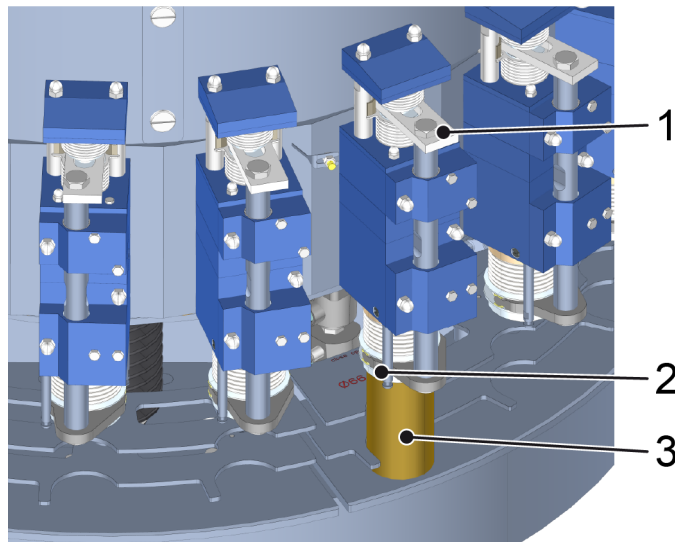


Figure 267: Control can under the filling valve

- 1 Lift actuator
- 2 Centering bell
- 3 Control can

1. Using the removable operating control, turn the filling valve to be tested to the loss angle between the can infeed and the can out-feed.
2. On the graphical user interface, press *"Programs → Filler computer mode"* at the filler level.
3. Press *"Lift bells"*.
4. Open the machine paneling.
5. Place the control can centrally under the centering bell.
6. Close the machine paneling.
7. Press *"Service → Test functions/Filling valve → Test functions → Test filling"*.
8. In the *"Test filling"* view, enter the first and last filling station for test filling in the input fields.
9. Tap *"Start"* to commence test filling.
 - ⇒ At the end of filling, the measured filling time and the IFM pulses counted are displayed in the output area on the right.



A Plexiglas control can is supplied for each type of can to be processed.



7.3.5.2 Fault messages for the filling valve and centering bell control system



The occurrence of one of the faults listed here causes the can stopper to close.

Press the [Reset fault] illuminated pushbutton on the operator console after eliminating the fault.

For information on the components that are installed in the pneumatic control box, see the folder "Purchased parts documentation".

No.	Fault description	Cause	Solution
F353; F359	Tulip supply pressure, up/down R1 not OK; Supply pressure air R1 not OK (the pressure of the air supply to the pneumatic control box on the filler turret has fallen below 3.0 bar)	Insufficient air supply to the filler turret.	Check the air supply to the valve manifold and from the valve manifold to the filler turret.
		Air pressure too low.	Check the on-site network pressure. The on-site network pressure must be at least 6 bar.
		Leak in air supply.	Check the air supply and distribution on the filler turret.
		The pressure monitor for the filling valve control system is faulty.	Check that the pressure monitor is in proper working order and replace if necessary.
		The pressure controller for the filling valve control system is faulty.	Check that the pressure controller is in proper working order and replace if necessary.
F360	Working pressure air R1 not OK (filling valves) (the pressure in the pneumatic control box on the filler turret has fallen below 5.5 bar)	Insufficient air supply to the filler turret.	Check the air supply to the valve manifold and from the valve manifold to the filler turret.
		Air pressure too low.	Check the on-site network pressure. The on-site network pressure must be at least 6 bar.
		Leak in air supply.	Check the air supply and distribution on the filler turret.
F354	Tulip pressure not OK (the tulip pressure has fallen below the setpoint. There are no cans in the filler)	Insufficient air supply to the filler turret.	Check the air supply to the valve manifold and from the valve manifold to the filler turret.



No.	Fault description	Cause	Solution
		Air pressure too low.	Check the on-site network pressure. The on-site network pressure must be at least 6 bar.
		Leak in air supply.	Check the air supply to the air chamber in the distributor ring and the seals between the filling valve and the distributor ring.
		The bellows in the bell actuator are faulty.	Check the bellows and replace if necessary.
		The pressure monitor for the centering bell control system is faulty.	Check that the pressure monitor is in proper working order and replace if necessary.
		The pressure controller for the centering bell control system is faulty.	Check that the pressure controller is in proper working order and replace if necessary.



In addition to closing the can stopper, the occurrence of the following faults will also cause the machine to stop.

No.	Fault description	Cause	Solution
F282	Tulip pressure not OK (there are bottles in the filler and the tulip pressure has fallen below the set-point)	Insufficient air supply to the filler turret.	Check the air supply to the valve manifold and from the valve manifold to the filler turret.



No.	Fault description	Cause	Solution
		Air pressure too low.	Check the on-site network pressure. The on-site network pressure must be at least 6 bar.
		Leak in air supply.	Check the air supply to the air chamber in the distributor ring and the seals between the filling valve and the distributor ring.
		The bellows in the bell actuator are faulty.	Check the bellows and replace if necessary.
		The pressure monitor for the centering bell control system is faulty.	Check that the pressure monitor is in proper working order and replace if necessary.
		The pressure controller for the centering bell control system is faulty.	Check that the pressure controller is in proper working order and replace if necessary.

7.3.5.3 Several underfilled cans fault

No.	Fault description	Cause	Solution
F0142	Several underfilled cans	It was ascertained that several consecutive cans were under-filled	See fault description "No probe contact before loss angle".

7.3.5.4 Filler computer fault

No.	Fault description	Cause	Solution
F0144	Defective electronic filler computer module	An output module for the filling valves in the filler computer is defective	Have the filler computer checked by authorized KHS staff and replace the component as required.

No.	Fault description	Cause	Solution
F0170 to F0175	Failure of probe card	The probe card specified in the fault text is faulty.	Have the probe card checked by authorized KHS staff and replace the probe card as required.



No.	Fault description	Cause	Solution
F00148	Synchronous fault	The switching flag for detection of the synchronous clock is in the wrong position.	Correct the position of the switching flag.
		The proximity switch for detection of the synchronous clock is faulty.	Check the functionality and the circuit of the proximity switch and replace the proximity switch if necessary.
		Too few or too many machine timings counted	Leave the machine to run for another cycle
		The proximity switch for detection of the machine timing is faulty.	Check the functionality and the circuit of the proximity switch and replace the proximity switch if necessary.
		More than one synchronous clock signal per cycle was detected	Remove any foreign bodies from the switching flag for detection of the synchronous clock.

7.3.5.5 Filling valve test functions

Test functions are available on the operator terminal for testing the functions associated with the filling valve.

7.3.5.6 Faults during filling

Fault description	Cause	Solution
No pressure build-up in the ring bowl	The "Pre-pressurize" operating mode is not selected.	Select the "Pre-pressurize" operating mode.



Fault description	Cause	Solution
	The main cylinder and/or the pressurization gas cylinder do not close.	Set the control air pressure for the filling valve control to at least 4.5 bar.
	The pressurization pressure control valve is not working.	■ Set the control air pressure to 5-6 bar at the FRL group on the valve manifold. ■ Check the current signal (4-20 mA) at the I/P regulating converter ■ Recalibrate the I/P regulating converter (see the manufacturer's operating instructions contained in the folder <i>"Purchased parts documentation"</i>).
	The evacuation valve in the pressurization gas line is leaking	Check the control air supply and the drive valve. If necessary, replace the evacuation valve.
	The magnetic valve for control of the safety valve is faulty.	Replace the magnetic valve.

Fault description	Cause	Solution
No cans are pressurized	The "Fill" operating mode is not selected.	Select the "Fill" operating mode.
	The pressurization time and/or counter pressure is incorrect.	Reset the pressure and/or the time.
	The proximity switch for can detection is faulty.	The bellows in the bell actuator are faulty.
	Check the expansion joint and replace if necessary.	Replace the proximity switch.
	The centering bells are not pressed in adequately.	Check that the pressure monitor for the centering bell control system is working correctly and replace if necessary. In addition, check the pressure specification on the screen.
	The filler is still not synchronous.	Synchronize the filler and check the synchronous and machine timers.



Fault description	Cause	Solution
No cans are filled	The cans are not pressurized.	See the fault "No cans are pressurized" .



Fault description	Cause	Solution
	The "Fill" operating mode is not selected.	Select the "Fill" operating mode.
	The cans are not pressed in.	The height adjustment to can height setting is not correct. Correct the setting.
	The centering bells are not pressed in adequately.	Check that the pressure monitor for the centering bell control system is working correctly and replace if necessary. In addition, check the pressure specification on the screen.
	The set pre-pressurization pressure and/or pre-pressurization time is incorrect.	■ Check the pre-pressurization time set for the type. See the filler specification sheet in the <i>"Technical data"</i> chapter ■ Set the counter pressure to 1 bar above the saturation pressure of the beverage
	The bellows in the bell actuator are faulty.	Check the bellows and replace if necessary.
	The filler valve control has no control air pressure.	Check that the control air supply is in proper working order and is set correctly. (See chapter <i>"Technical data"</i>)
	The flow meters are not working.	Check the electric power supply using the circuit diagram.
	The proximity switch for the can sensor is faulty or set incorrectly.	Check that the proximity switch supply is in proper working order and is adjusted correctly.
	The filler is still not synchronous.	Synchronize the filler and check the synchronous and machine timers.
	The product control valve is not working.	■ Set the control air pressure to 5-6 bar at the FRL group on the valve manifold. ■ Check the current signal (4-20 mA) at the I/P regulating converter



Fault description	Cause	Solution
		■ Recalibrate the I/P regulating converter (see the manufacturer's operating instructions contained in the folder <i>"Purchased parts documentation"</i>).
	The level probes in the bowl are not working.	Check the electrical supply using the circuit diagram.

Fault description	Cause	Solution
Individual cans are not filled	The pilot valve in the valve cluster for the corresponding filling valve is faulty.	Replace the pilot valve. A drawing with the assignment of the pilot valve/valve clusters to the filling valves can be found in the filler computer housing.
	The filling valve is leaking.	■ Check the rubber contact seal in the centering bell and replace if necessary. ■ Check the filler valve at the leakage holes for leaks and, if necessary, replace the corresponding membranes and seals.
	The centering bell at the corresponding filling station is blocked.	Check that the bell actuator is working correctly and replace if necessary.
	Severe fluctuation in pressurization gas pressure.	Check that the pressurization pressure control is in proper working order. If necessary, replace the seals or the controller.
	The switching distance for the can sensor proximity switch is too big.	Readjust the can sensor proximity switch.
	The flow meter at the corresponding filling station is not working.	Check the connection, supply, and controller. Replace the flow meter if necessary.

Fault description	Cause	Solution
Can filling is unstable	The pressurization time is too short	Increase the pre-pressurization time.



Fault description	Cause	Solution
	The centering bells are not pressed in adequately.	Check that the pressure monitor for the centering bell control system is working correctly and replace if necessary. In addition, check the pressure specification on the screen.
	Severe fluctuation in pressurization gas pressure.	Check that the pressurization pressure control is in proper working order. If necessary, replace the seals or the controller.
	The control air pressure for the filling valve control is too low.	Set the control air pressure for the filling valve control to at least 4.5 bar.

Fault description	Cause	Solution
All cans foam over during filling	The can guide parts and format parts are not correctly fitted for the can or are defective.	Replace incorrect or defective parts. If required, check and correct the adjustment of the parts with each other.



Fault description	Cause	Solution
	The cans are not clean.	Only use clean and dust-free cans.
	The product is too hot.	■ Reduce the machine output ■ Increase the pre-pressurization time ■ Increase the pressures
	The product is over-carbonated	Check the CO2 content.
	The filling level is too high.	Reduce the correction time
	The filler volume is set too high.	Reduce the filler volume.
	The snifting level is insufficient.	Check the pre-pressure relief angle.
	The filling level in the ring bowl is too high.	Reduce the desired value for the product level in the ring bowl.
	The cans are not pressed in.	Check the height adjustment settings against the can height and correct the setting as necessary.
	The cans are not pressed in.	Check that the pressure monitor for the centering bell control system is working correctly and replace if necessary. In addition, check the pressure specification on the screen.
	The pressurization pressure control is not tight	Check that the pressurization pressure control is in proper working order. If necessary, replace the seals or the controller.
	The pressurization pressure control valve is not working.	■ Set the control air pressure to 5-6 bar at the FRL group on the valve manifold. ■ Check the current signal (4–20 mA) at the I/P regulating converter.



Fault description	Cause	Solution
		Recalibrate the I/P regulating converter (see the manufacturer's operating instructions contained in the folder <i>"Purchased parts documentation"</i>).
	The filling pressure is set too low.	Set the filling pressure at 1 to 1.5 bar above the saturation pressure.

Fault description	Cause	Solution
Individual cans foam over during filling	The pilot valve in the valve cluster for the corresponding filling valve is faulty.	Replace the pilot valve. A drawing with the assignment of the pilot valve/valve clusters to the filling valves can be found in the filler computer housing.
	The filling valve is leaking.	- Check the rubber contact seal in the centering bell and replace if necessary. - Check the filler valve at the leakage holes for leaks and, if necessary, replace the corresponding membranes and seals.
	The pressure relief nozzles are blocked.	Clean the nozzles. See <i>"Operation"</i> chapter, <i>"Vacuum channel"</i> section " "
	The pressure relief nozzle at the filling valve is blocked.	Clean the nozzles
	The product cylinder in the filling valve is blocked.	Replace the corresponding filling valve.
	The filling level correction on the flow meter has been incorrectly set.	Check the ground contact and the supply voltage and adjust the filling level correction.
	The cans are pressurized while wet.	Active the blow-out function in the machine functions, see chapter <i>"Layout and function"</i> , section <i>"Process"</i>



Fault description	Cause	Solution
The filling speed is too low	The filling level in the ring bowl is too low.	Increase the setpoint for the product level in the ring bowl.
	The pressure relief nozzles are blocked.	Clean the nozzles. See <i>"Operation"</i> chapter, <i>"Vacuum channel"</i> section " "
	The control valves for the pressurization pressure or for the return gas pressure are not working.	See fault "All cans foam over during filling".
	The product control valve is not working.	See fault "No cans are filled".

Fault description	Cause	Solution
All cans are underfilled	The filling speed is too low.	See fault "Filling speed too low".
	The machine output is set too high.	Reduce the filler output
	The cans are not pressed in.	Check the height adjustment settings against the can height and correct the setting as necessary.
	The cans are not pressed in.	Check that the pressure monitor for the centering bell control system is working correctly and replace if necessary. In addition, check the pressure specification on the screen.
	The media level correction point is incorrectly set.	Adjust the media level correction point (setting range of 5%).

Fault description	Cause	Solution
Individual cans are underfilled	The pressure relief nozzles are blocked.	Clean the nozzles or replace if necessary.



Fault description	Cause	Solution
	The filling valve is leaking.	■ Check the rubber contact seal in the centering bell and replace if necessary. ■ Check the filler valve at the leakage holes for leaks and, if necessary, replace the corresponding membranes and seals.
	The pilot valve in the valve cluster for the corresponding filling valve is faulty.	Replace the pilot valve. A drawing with the assignment of the pilot valve/valve clusters to the filling valves can be found in the filler computer housing.
	The filling level correction on the flow meter has been incorrectly set.	Check the ground contact and the supply voltage and adjust the filling level correction.
	The flow meter on the corresponding filling station is not working.	Check the connection, supply, and controller. Replace the flow meter necessary.

Fault description	Cause	Solution
The flow meter will not switch off	The machine control system's output card is faulty.	Replace the card.
	The product cylinder in the filling valve is blocked.	Replace the filling valve.

Fault description	Cause	Solution
The product level in the bowl falls	The dirt collecting filter in the product line is blocked.	Clean the dirt collecting filter.
	The product admission pressure is too low or the filling pressure too high.	Check the pressure settings. The supply pressure must be 1 bar higher than the filling pressure.
	The control air pressure for the level control valve is too low.	Check the control air supply and increase the control air pressure.
	The control has no specified value.	Check the setpoint output in the machine control system.



Fault description	Cause	Solution
Fluctuation in pressurization gas pressure	The pressure controller is not working.	■ Check the current signal (4–20 mA) at the I/P regulating converter. ■ Recalibrate the I/P regulating converter (see the manufacturer's operating instructions contained in the folder <i>"Purchased parts documentation"</i>).
	The pressure controller is leaking.	Check the seals and membranes and replace if necessary.
	The sterile filters are contaminated.	Clean the filters.
	The gas pressure is too low.	Increase the pressure.

7.3.6 Valve manifold

7.3.6.1 Machine automation fault messages

If a fault occurs in the filler machine, this is indicated acoustically by a signal from the horn, which is located on the terminal cabinet of the valve manifold.

The horn is activated if:

- A process valve has not reached the end position monitored by a sensor.
- A current measured value (e.g.: temperature, pressure) is outside the permissible range.

This will cause the automation to switch to a defined emergency step. Only signals and valves that are required for operational safety are actuated.



Switching off the horn

To do this, press the illuminated "Acknowledge fault" pushbutton on the operator console once, in order to confirm that the fault has been recognized.



Possible fault messages

No.	Fault description	Cause	Solution
F0449	Bowl filling level in impermissible range. (The bowl filling level is below the setpoint level set at the operator console.)	Insufficient product supply to the filler	Check the product supply to the filler.
		Product pressure at the filler infeed too low.	Check the product pressure ahead of the filler (admission pressure at least 1 bar above filling pressure).
		Defective product control valve	Check that the product control valve in the product line is in proper working order and check for leaks.
		Defective position controller	Check the position controller on the product control valve is in proper working order.
		No control air at the product control valve	Check the control air supply.
		Defective pressure sensor	Check, and if necessary, replace the pressure sensor.
No.	Fault description	Cause	Solution
F0449	Impermissible value: bowl filling level. (The bowl filling level exceeds the setpoint level set at the operator console.)	Defective product control valve	Check that the product control valve in the product line is in proper working order and check for leaks.
		Leaks in the filling system	Check the product line, bowl, and rotary distributors for leaks.
		Defective position controller	Check the position controller on the product control valve is in proper working order.
		Incorrect pressurization pressure	Check the pressurization pressure setpoint.
		Insufficient pressurization gas supply to the filler	Check the pressurization gas supply to the filler.
		Defective pressurization pressure controller	Check that the pressurization pressure controller in the pressurization gas line is in proper working order and check for leaks.
		Defective pressure sensor	Check, and if necessary, replace the pressure sensor.



No.	Fault description	Cause	Solution
F0450	Pressurization and bowl pressure too low. (The pressurization and ring bowl pressure is below the setpoint level set at the operator terminal.)	Insufficient pressurization gas supply to the filler	Check the pressurization gas supply to the filler.
		Defective pressurization pressure controller	Check that the pressurization pressure controller in the pressurization gas line is in proper working order and check for leaks.
		Defective pressure sensor	Check, and if necessary, replace the pressure sensor.

No.	Fault description	Cause	Solution
F0842, F0843	Detergent temperature too low	Defective temperature sensor	Check, and if necessary, replace the pressure sensor.
		Defective CIP system heater	Check the temperature at the heating system.

No.	Fault description	Cause	Solution
F0844	Infeed cleaning pressure too low	Insufficient detergent supply to the filler	Check the detergent supply to the filler.
		Defective product control valve	Check that the product control valve in the product line is in proper working order and check for leaks.
		Defective position controller	Check that the position controller of the product control valve is in proper working order.
		No control air at the product control valve	Check the control air supply.
		Defective pressure sensor	Check, and if necessary, replace the pressure sensor.

No.	Fault description	Cause	Solution
F0841	No product at the filler	No signal from the product supply	Check the product supply



No.	Fault description	Cause	Solution
F0846, F0847, F0848, F0849, F0850	No detergent available	No signal from the CIP plant	Check the CIP plant

No.	Fault description	Cause	Solution
F0453	Filler not turning	The automation program demands that the filler turns.	Switch on the filler.

No.	Fault description	Cause	Solution
F0467	Filling valves in safety mode. (The short distance was activated and the relief valve opened)	The operating controls to open a paneling door were actuated and then door was then opened.	Close door and acknowledge.

No.	Fault description	Cause	Solution
F0470	Process valve malfunction, see Filler diagram	Control air pressure too low	Set a pressure of 6 bar at the pressure controller in the FRL group at the valve manifold.
		No air supply to the valves	Check the air supply.
		Defective drive	Check the drive and replace if necessary.
		Defective proximity switch for monitoring	Check the proximity switch and replace if necessary.
		Defective actuating valve/block	Check the actuating valve/block and replace if necessary.

No.	Fault description	Cause	Solution
F0845	No supply pressure +V1 filler	No air supply to the valves	Check the air supply to the valve manifold.

Acknowledging correction of the fault

After correcting the fault, press the illuminated "Acknowledge fault" push button again.



- The automation jumps to the last processed process step, and restarts its time.
- After a set time has elapsed (approx. 10 seconds) monitoring is active again.

7.3.7 Can sealer faults



For information on faults and fault elimination, see the can sealer operating manual.

7.4 Teleservice operating mode

Switching on

Select the Teleservice operating mode on the graphical user interface of the operator console.



*The **Teleservice** operating mode can only be set with an RFID chip of [Administrator] level.*

Faults during remote access

The procedure for detecting and rectifying faults during remote access is described in the “*Remote access operating instructions*”.



8 Technical data

This chapter outlines values and information that restrict intended use.

The units of measurement are metric.

The technical data in the following documents must also be observed:

- *“Specific data and KHS standards”*
- *“Electrical circuit diagram”*
- *“Purchased parts documentation”*
- *“Integrated components”*

8.1 Media requirements



NOTICE!

Supply or use of unspecified media or media that do not meet requirements

The control system and the process controls and the component materials are not designed for these media.

This could cause product flaws, production disruptions, and damage or destruction of components.

- Supply only the media specified in the flow sheet to the transfer points. Adhere to the requirements specified for these media.
- Specify deviating requirements and get approval from KHS.

Information about the requirements for media can be found in the technical documentation *“Specific data and KHS standards”*, chapter *“K0255 — Media quality”*.

8.2 Operation

8.2.1 Machine specifications

Model:	Innofill Can C
Order no.:	89407962
Parts list no.:	10349026
Machine no.:	10349026 89407962-000100
Year of manufacture:	2021
Password:	Indianapolis



Number of filling stations:	60
Pitch:	30 °
Filler pitch circle:	1800 mm

8.2.2 Plans

The following machine plans are contained on the pages below:

- Piping diagram
- Legend





8.2.2.1 Legend

Valves

Icon	Description
	Disk valve
	Disk valve with hole
	Disk valve leakage
	Pressure reducer, angle valve
	Pressure reducer
	Angle valve
	Three-way valve
	Four-way valve
	Straight-flow valve
	Ball valve
	Ball valve leakage
	Three-way ball valve
	Four-way ball valve
	Non-return gate valve
	Non-return valve
	Relief valve
	Relief angle valve



Icon	Description
	Diaphragm valve
	Aseptic diaphragm valve
	Vacuum valve
	Slider
	Vacuum valve



Varivent valves

Icon	Description
	Seat valve, 1 chamber
	Seat valve, 2 chamber
	Seat valve, 3 chamber
	Seat valve, 1 chamber, aseptic
	Seat valve, 2 chamber, aseptic
	Seat valve, 3 chamber, aseptic
	Double-seal valve, 1 chamber
	Double-seal valve, 2 chambers
	Double-seal valve, 3 chambers



Pumps and fans

Icon	Description
	Rotary pump
	Diaphragm pump
	Piston pump
	Rotary piston pump
	Eccentric screw pump
	Hose pump
	Screw pump
	Powder mixer
	Water ring vacuum pump
	Axial fan
	Radial fan



Icon	Description
	Side-channel compressor

Drives

Icon	Description
	Manual
	Pneumatics
	Magnet
	Fluid
	Motor
	Membrane
	Weight
	Spring

End position monitoring

Icon	Meaning
+	"Open" final position monitored
-	"Closed" final position monitored
±	"Open" and "closed" position monitored



Others

Icon	Description
	Spring force closed
	Spring force open
	Monitoring of open position
	Monitoring of closed position
	Monitoring of both positions
	Safety-related
	Closable
	Electric motor
	Frequency converter
	Pneumatic motor
	Agitator propeller
	Agitator beam
	Main stream mixer
	Spray ball
	Deflector
	Aeration/deaeration
	Gully
	Rinsing container
	Sampling
	Detachable connector
	Flanged joint
	Blind flange
	Steam/condensate junction
	T-connector
	Concentric reduction
	Eccentric reduction
	Orifice



Icon	Description
	Rupture disk
	Corner tube strainer
	Dirt collecting filter
	Mixing nozzle
	Static mixer
	Sound absorber
	Steam trap
	Hose
	Inspection glass
	Lamp
	Filter
	Heat exchanger
	Tubular heat exchanger
	Multi-tube heat exchanger
	Mono-tube heat exchanger
	Plate heat exchanger
	Heating
	Transfer points
	Pipe labeling



Media arrows

Icon	Description
	External media arrow
	Internal media arrow
	External media arrow
	Internal media arrow

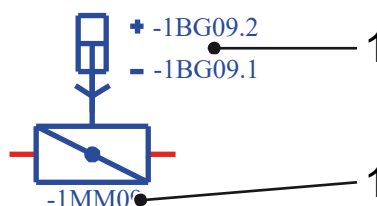


Figure 268: Component labeling

1 Operating material labels

Operating material labeling

Icon	Meaning	Icon	Meaning
-xBDxx	Density measurement	-xMAxx	Electric motor
-xBFxx	Flow measurement	-xMBxx	Magnetic drive
-xBGxx	Proximity switch	-xMLxx	Spring drive
-xBLxx	Filling level measurement	-xMMxx	Pneumatic drive
-xBPxx	Pressure measurement	-xPFxx	Indicator lamp
-xBQxx	Measurement (Brix, CO ₂)	-xPGxx	Status indicator
-xBTxx	Temperature measurement	-xPHxx	Line recorder
-xBWxx	Power sensor	-xPJxx	Horn



Icon	Meaning	Icon	Meaning
-xCLxx	Tank, open	-xQMxx	Shut-off device
-xCMxx	Tank, closed	-xQNxx	Control valve
-xCNxx	Transport container	-xQQxx	Automatic lock
-xEAx	Lamp	-xRLxx	Lock
-xEBxx	Heating, electric	-xRMxx	Non-return fitting
-xEPxx	Steam trap	-xRNxx	Pressure reducer, orifice
-xFLxx	Relief valve	-xRPxx	Sound absorber
-xGMxx	Crane	-xRQxx	Insulation
-xGPxx	Pump; conveyor	-xSxx	Switch, button
-xGQxx	Fan; vacuum pump	-xTxx	Frequency converter
-xGSxx	Injector	-xWLxx	Conveyor
-xHQxx	Filter; strainer	-xWMxx	Channel, groove
-xHRxx	Magnetic filter	-xWNxx	Hose
-xHSxx	Ion exchange filter	-xWPxx	Pipeline
-xHUxx	Mill; crusher, general	-xWSxx	Steps, platform
-xHWxx	Agitator; mixer	-xXLxx	Flange, screw
-xKKxx	Control valve, valve cluster	-xXMxx	Hose connector

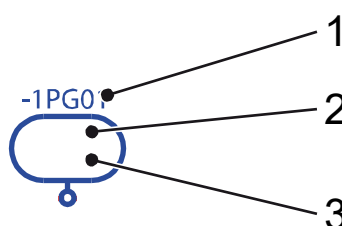


Figure 269: Labeling of a measurement point with on-location indicator

- 1 Operating material labels
- 2 Code letter
- 3 Key figure

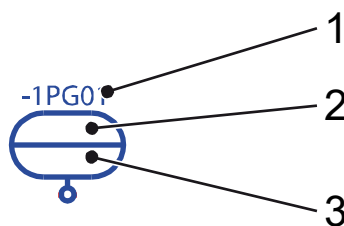


Figure 270: Labeling of a measurement point with electrical assessment

- 1 Operating material labels
- 2 Code letter
- 3 Key figure

Code letter (first position)

Code	Explanation
Txx	Temperature
Pxx	Pressure
Lxx	Fill level
Fxx	Flow
Qxx	Media property
Dxx	Density
Mxx	Moisture
Sxx	Speed
Vxx	Viscosity
Wxx	Weight

Code letter (second position)

Code	Explanation
xDx	Difference
xQx	Sum/integral

Code letters (third - 6. position)

Code	Explanation
xxC	Control
xxI	Indicator
xxR	Registration
xxS	Switching



Code	Explanation
xxA	Alarm
xx+	First upper limit
xx-	First lower limit
xx++	Second upper limit
xx--	Second lower limit

8.2.3 Media connection list

Code no.	German		English (US)	
	Durchflussrichtung	Durchflusstoff	Flow direction	Flow substance
1.0 steam	ein	Dampf	in	Steam
1.1 steam	aus	Dampf	out	Steam
1.2 culinary steam	ein	kulinarischer Dampf	in	Culinary steam
1.3 culinary steam	aus	kulinarischer Dampf	out	Culinary steam
1.4 condensate	ein	Kondensat	in	Condensate
1.5 condensate	aus	Kondensat	out	Condensate
1.6 heating water	ein	Heizwasser	in	Hot water
1.7 heating water	aus	Heizwasser	out	Hot water
1.8 fuel	ein	Brennstoff	in	Fuel
1.9 fuel	aus	Brennstoff	out	Fuel
2.0 cooling tower water	ein	Kühlturm Wasser	in	Cooling tower water
2.1 cooling tower water	aus	Kühlturm Wasser	out	Cooling tower water
2.3 cooling medium	ein	Kühlmedium	in	Cooling medium
2.4 cooling medium	aus	Kühlmedium	out	Cooling medium
3.0 water 1	ein	Wasser 1	in	Water 1
3.1 water 1	aus	Wasser 1	out	Water 1
3.2 water 2	ein	Wasser 2	in	Water 2
3.3 water 2	aus	Wasser 2	out	Water 2
3.4 water 3	ein	Wasser 3	in	Water 3
3.5 water 3	aus	Wasser 3	out	Water 3
3.6 utility water	ein	Brauchwasser	in	Service water



Code no.	German		English (US)	
	Durchflussrichtung	Durchflusstoff	Flow direction	Flow substance
3.7 utility water	aus	Brauchwasser	out	Service water
3.8 hot water	ein	Heißwasser	in	Hot water
3.9 hot water	aus	Heißwasser	out	Hot water
3.10 sterile water	ein	Sterilwasser	in	Sterile water
3.11 sterile water	aus	Sterilwasser	out	Sterile water
3.12 degassed water	ein	Entgastes Wasser	in	Deaerated water
3.13 degassed water	aus	Entgastes Wasser	out	Deaerated water
4.0 compressed air	ein	Druckluft	in	Compressed air
4.1 compressed air	aus	Druckluft	out	Compressed air
4.2 sterile air	ein	Sterilluft	in	Sterile air
4.3 sterile air	aus	Sterilluft	out	Sterile air
5.0 CO ₂ gas	ein	CO ₂ Gas	in	CO ₂ gas
5.1 CO ₂ gas	aus	CO ₂ Gas	out	CO ₂ gas
5.2 N ₂ gas	ein	N ₂ Gas	in	N ₂ gas
5.3 N ₂ gas	aus	N ₂ Gas	out	N ₂ gas
5.4 O ₂ gas	ein	O ₂ Gas	in	O ₂ gas
5.5 O ₂ gas	aus	O ₂ Gas	out	O ₂ gas
5.6 Argon gas	ein	Argon Gas	in	Argon gas
5.7 Argon gas	aus	Argon Gas	out	Argon gas
5.8 aeration	ein	Zuluft	in	Aeration
5.9 deaeration	aus	Abluft	out	Vent air
5.10 gas mixture	ein	Gasgemisch	in	Gas mixture
5.11 gas mixture	aus	Gasgemisch	out	Gas mixture
6.0 CIP	ein	CIP	in	CIP
6.1 CIP	aus	CIP	out	CIP
6.2 caustic	ein	Lauge	in	Caustic
6.3 caustic	aus	Lauge	out	Caustic
6.4 acid	ein	Säure	in	Acid
6.5 acid	aus	Säure	out	Acid
7.1 gully pressureless	aus	Gully drucklos	in	Gully pressureless



Code no.	German		English (US)	
	Durchflussrichtung	Durchflusstoff	Flow direction	Flow substance
7.3 gully pressuized	aus	Gully druckbeaufschlagt	out	Gully pressurized
8.0 syrup / CIP	ein	Sirup / CIP	in	Syrup/CIP
8.1 syrup / CIP	aus	Sirup / CIP	out	Syrup/CIP
8.2 product / CIP	ein	Produkt / CIP	in	Product/CIP
8.3 product / CIP	aus	Produkt / CIP	out	Product/CIP
9.0 caustic concentrate	ein	Lauge Konzentrat	in	Caustic concentrate
9.1 caustic concentrate	aus	Lauge Konzentrat	out	Caustic concentrate
9.2 acid concentrate	ein	Säure Konzentrat	in	Acid concentrate
9.3 acid concentrate	aus	Säure Konzentrat	out	Acid concentrate
9.4 additive	ein	Additiv	in	Additive
9.5 additive	aus	Additiv	out	Additive
9.6 N ₂ liquid	ein	N ₂ Flüssigkeit	in	N ₂ liquid
9.7 N ₂ liquid	aus	N ₂ Flüssigkeit	out	N ₂ liquid
9.8 H ₂ O ₂ liquid	ein	H ₂ O ₂ Flüssigkeit	in	H ₂ O ₂ liquid
9.9 H ₂ O ₂ liquid	aus	H ₂ O ₂ Flüssigkeit	out	H ₂ O ₂ liquid
9.10 monomer liquid	ein	Monomer Flüssigkeit	in	Liquid monomer
9.11 monomer liquid	aus	Monomer Flüssigkeit	out	Liquid monomer
9.12 disinfectant	ein	Desinfektionsmittel	in	Disinfectant
9.13 disinfectant	aus	Desinfektionsmittel	out	Disinfectant
9.14 defoamer	ein	Entschäumer	in	Defoamer
9.15 defoamer	aus	Entschäumer	out	Defoamer
9.16 hardness stabilizer	ein	Härtestabilisator	in	Hardness stabilizer
9.17 hardness stabilizer	aus	Härtestabilisator	out	Hardness stabilizer
9.18 corrosion inhibitor	ein	Korrosionsinhibitor	in	Corrosion inhibitor
9.19 corrosion inhibitor	aus	Korrosionsinhibitor	out	Corrosion inhibitor
9.20 biocide	ein	Biozid	in	Biocide



Code no.	German		English (US)	
	Durchflussrichtung	Durchflusstoff	Flow direction	Flow substance
9.21 biocide	aus	Biozid	out	Biocide
9.22 kieselguhr	ein	Kieselgur	in	Diatomite
9.23 kieselguhr	aus	Kieselgur	out	Diatomite
9.24 ink	ein	Tinte	in	Ink
9.25 ink	aus	Tinte	out	Ink
9.26 cleaning liquid	ein	Reinigungsflüssigkeit	in	Detergent
9.27 cleaning liquid	aus	Reinigungsflüssigkeit	out	Detergent
E electrical connection		Elektroanschluss		Electrical connection



8.2.4 Noise emissions

8.2.4.1 Information on noise emissions

Operating conditions and specific noise-related characteristics.	Nominal throughput: see technical specifications The noise emission levels may increase or decrease according to changes in operating conditions or specific characteristics.
Specified noise emission level dyads in accordance with ISO 4871	
A-weighted emission sound pressure level LpA in dB at workplaces KpA uncertainty	75-82 +/- 2
C-weighted peak emission sound pressure level LpCpeak in dB at workplaces KpCpeak uncertainty	Does not exceed 130 +/- 2
A-weighted acoustic power LwA in dB KwA uncertainty	Not specified due to very large machine dimensions ./.
Basic standards EN ISO 11204 or EN ISO 3744, accuracy class 2 were used to determine the levels in accordance with EN 415-9.	
Emission data sheets are available on request containing tables showing the noise emissions at each of the measurement points and a sketch of the machine indicating the locations of these measurement points.	

8.2.4.2 Noise Reduction/Acoustics Requirements

The machines to be delivered comply with advanced noise reduction techniques tried and tested in the beverage industry in effect at the time of order placement.

The emission levels at the workstations of the line are not only dependent on the emissions of the particular machines but also on the interrelationship of the sources of noise within the room layout, outside noises (neighboring systems, ventilation, etc.), and the room's acoustics.

A line comprised of several machines equipped with preferably controlled, interconnecting conveying facilities is able to comply with advanced noise reduction techniques tried and tested in practical operation only if the future operator makes low-noise dimensioning of machines and conveying segments possible and provides a sound-insulated room.



Room sound proofing is achieved by installing an effective sound-absorbing ceiling (high-pitch sound absorbers) in conjunction with absorbing wall paneling (particularly behind the operators).

Key room acoustics parameters are the reverberation time and the average decrease in sound intensity. According to the state of the art, the reverberation period must be 0.5 to 0.8 seconds in octave bands of between 500 Hz and 4 kHz, depending on the size of the room, and the average decrease in sound intensity should amount to at least 4.5 dB(A) each time the distance is doubled.

The emission sound level at the workstation is measured in dB(A) at a distance of 1 meter from the outside edge of the machine and at a height of 1.6 meters from the floor when the operator is standing (ear height). If an operating face is installed (e.g. in front of the filler or bottle washer), the arithmetic average measured at three measurement points along the operating face applies for the sound level at the workstation. Floor spaces limited towards the back (e.g. platforms or catwalks) must therefore be at least 1.3 meters wide.

If the future operating company intends to provide machines or line components himself, he must ensure that these components also comply with the advanced rules of noise reduction and safety technology tried and tested in practice.

Project planning shall be carried out chiefly with regard to the required line capacity, installed on the floor space provided by the customer.

It may therefore also be necessary to take additional secondary noise-reduction measures even after the acoustic requirements to be met on the part of the operator have been implemented.

8.2.5 Filler specification sheet

	Parameters addicted to the Sort										Filling system		DVD Compact	
											Machine No.		10349026-89407952-000100	

Botting party		1	2	3	4	Botting party		5	6	7	8
Can		1	2	3	4	Can content		5	6		
Can content	[oz.ml]	12 / 355	12 / 355	16 / 473	8 / 237	Can content	[oz.ml]	19.2 / 568	16.9 / 500		
Can type (M/A)	[Type]	Sleek 202/204	Standard 202/211	Standard 202/211	Standard 202/211	Can type (M/A)	[Type]	Standard 202/211	Standard 202/211		
Can height	[mm]	155,63	122,22	157,23	87	Can height	[mm]	188	168		
Can diameter	[mm]	57,38	66,04	66,04	66	Can diameter	[mm]	66	66,3		
Product		Carbonated Beverage	Carbonated Beverage	Carbonated Beverage	Carbonated Beverage	Product		Carbonated Beverage	Carbonated Beverage		
Temperature	[°C]	4	4	4	4	Temperature	[°C]	4	4		
CO ₂ content	[g/l]	5,5	5,5	5,5	5,5	CO ₂ content	[g/l]	5,5	5,5		
Performance	[cans/h]	44.700	44.700	31.500	???	Performance	[cans/h]	???	33.600		
Filling light	[mm]					Filling light	[mm]				
Brimfull volume	[ml]					Brimfull volume	[ml]				
Filling pressure	[bar]	2	2	2	2	Filling pressure	[bar]	2	2		
Vessel level	[%]	50	50	50	50	Vessel level	[%]	50	50		
						Fresh gas (N ₂) pressure	[bar]				
Operating pressure bell actuation during filling process	(max) [bar]	2,5				Operating pressure bell actuation during filling process	(max) [bar]	2,5			
Operating pressure bell actuation during CIP, fixed in PLC	(max) [bar]	1				Operating pressure bell actuation during CIP, fixed in PLC	(max) [bar]	1			
Operating pressure bell actuation during flushing to atmosphere, fixed in PLC	(fixed) [bar]	1,5				Operating pressure bell actuation during flushing to atmosphere, fixed in PLC	(fixed) [bar]	1,5			
Operating pressure bell actuation during dry blowing, fixed in PLC	(fixed) [bar]	1,5				Operating pressure bell actuation during dry blowing, fixed in PLC	(fixed) [bar]	1,5			
Operating pressure bell actuation during intermediate flushing, fixed in PLC	(fixed) [bar]	1,5				Operating pressure bell actuation during intermediate flushing, fixed in PLC	(fixed) [bar]	1,5			
Operating pressure bell actuation during draining, fixed in PLC	(fixed) [bar]	1,5				Operating pressure bell actuation during draining, fixed in PLC	(fixed) [bar]	1,5			
Operating pressure bell actuation during instal and remove CIP caps, fixed in PLC	(fixed) [bar]	1				Operating pressure bell actuation during instal and remove CIP caps, fixed in PLC	(fixed) [bar]	1			
Lower bell (angle)	[valve-no.]	1,5	1,5	1,5	1,5	Lower bell (angle)	[valve-no.]	1,5	1,5		
Lower bell (time), fixed in PLC	[ms]	120	120	120	120	Lower bell (time), fixed in PLC	[ms]	120	120		
CO ₂ flushing time	[ms]	200	200	200	150	CO ₂ flushing time	[ms]	400	400		
Pressurisation time	[ms]	350	350	470	230	Pressurisation time	[ms]	570	500		
filling capacity	[ml]	355	355	473	237	filling capacity	[ml]	568	500		
Return gas buffer (fix)	[ms]	50	50	50	50	Return gas buffer (fix)	[ms]	50	50		
Waiting time	[ms]	0	0	0	0	Waiting time	[ms]	0	0		
Relief 1	[ms]	-	-	-	-	Relief 1	[ms]	-	-		
Enforced closing of product cyl.	[valve-no.]	16 (???)	16 (???)	16 (???)	16 (???)	Enforced closing of product cyl.	[valve-no.]	16 (???)	16 (???)		
Start relief 2	[valve-no.]	16 (???)	16 (???)	16 (???)	16 (???)	Start relief 2	[valve-no.]	16 (???)	16 (???)		
Time relief 2	[ms]	300	300	300	300	Time relief 2	[ms]	300	300		
Lifting bell	[valve-no.]	12,5 (???)	12,5 (???)	12,5 (???)	12,5 (???)	lower bell	[valve-no.]	12,5 (???)	12,5 (???)		
Start blow out	[valve-no.]	6	6	6	6	Start blow out	[valve-no.]	6	6		
Time blow out	[ms]	400	400	400	400	Time blow out	[ms]	400	400		
media correktion	[%]	100	100	100	100	media correktion	[%]	100	100		
Valve lead	[ml]	10	10	10	10	Valve lead	[ml]	10	10		
half performance	[cans/h]	22350	22350	15750	#WERT!	half performance	[cans/h]	#WERT!	16800	0	0



8.2.6 Settings

8.2.6.1 Settings for process air

Use	Pressure	Pressure setting location
CO ₂ control valve/return gas control valve	6.0 bar	Pressure reducer in the FRL group of the valve manifold
Valve cluster for filling valve control	min. 6 bar or 1 bar above the highest filling pressure	Pressure reducer on filler turret
Control air and pressurization gas	min. 6 bar or 1 bar above the highest filling pressure	Pressure reducer at valve manifold

8.2.6.2 Settings for control air

Use	Pressure	Pressure setting location
Product control valve	6.0 bar	Pressure reducer in the FRL group of the valve manifold
Actuation of the valves in the valve manifold	2.0 bar above the maximum filling pressure, minimum 6 bar, maximum 10 bar	Pressure reducer in the FRL group of the valve manifold

8.2.6.3 CO₂ settings

Use	Pressure	Pressure setting location
Pre-pressurization gas	min. 6 bar or 1 bar above the highest filling pressure	Pressure reducer at valve manifold
Gas for can seamer	6.0 bar	Pressure reducer at valve manifold

8.2.6.4 Water settings

Use	Temperature	Temperature setting location	Pressure	Pressure setting location
Hot water flushoff	90 - 95 °C	operator side	3.0 - 4.0 bar	operator side



8.2.6.5 Product settings

Use	Pressure	Pressure setting location
Product pressure ahead of valve manifold	1.5 - 2.0 bar higher than the highest filling pressure.	operator side
Minimum filling pressure	min. 1.0 - 1.5 bar higher than the gas saturation pressure of the beverage	--
Maximum filling pressure	For pressure filler: Beer (5.5 g CO ₂): 3.0 - 3.5 bar CSD (8 g CO ₂): 5.0 - 6.0 bar Sparkling wine (9 - 10 g CO ₂): 6.0 - 9.0 bar	--



Refer to the "Filler specification sheet" section for information on the relevant filling pressure and filling time settings for the specific product and containers to be filled.

8.2.6.6 Settings for detergents

Use	Pressure setting	Pressure setting location
Cleaning supply pressure	3.5 - 4.0 bar	operator side



The machine control system specifies the required cleaning pressure.

8.3 Servicing

8.3.1 Lubricants



NOTICE!

Wrong lubricant

Selecting the wrong lubricant causes damage to machine components.

- Use only the lubricants as indicated in the lubrication plan.



Information about the lubricants can be found in the technical documentation *"Specific data and KHS standards"*, chapter *"K1000 — Lubricant overview"*.

8.3.2 Labeling of lubrication points

All lubrication points are labeled in accordance with KHS standards.

Information about the labels can be found in the technical documentation *"Specific data and KHS standards"*, chapter *"K0357 — Operating material labeling"*.

8.3.3 Labeling of equipment for disconnecting and securing

All equipment for disconnecting and securing is labeled in accordance with KHS standards.

Information about the labels can be found in the technical documentation *"Specific data and KHS standards"*, chapter *"K0357 — Operating material labeling"*.

8.3.4 Cleaning agents



NOTICE!

Material damage due to acidic chemicals

Improper use of acidic chemicals will cause material damage.

- Always be certain to avoid strong mineral acids such as HCl (hydrogen chloride), H₂SO₄ (sulfuric acid), and H₂SO₃ (sulfurous acid).
- Adhere to the application concentration levels, temperatures, and periods specified by the manufacturer.
- Avoid increased local concentration caused by the formation of droplets or evaporation.
- Avoid disinfection by soaking, e.g. overnight.
- After applying acidic media, ensure thorough rinsing with water.

**NOTICE!****Reaction of stainless steel with cleaning chemicals**

Exposure of stainless steel surfaces to cleaning chemicals containing chlorine, chlorides, halogens, and sulfates (combined with chlorides). The effect is increased in combination with high temperatures, high concentrations, and low pH.

This could result in corrosion which could cause product flaws, operational downtime, and damage or destruction of components.

- Adhere to the requirements of the media.
- The exposure time is not to exceed 20 minutes.
- Expose components to only cold chlorinated cleaning agents.
- Rinse surfaces off thoroughly after sanitizing with water and then dry. The chloride content of the water must not exceed a concentration of 50 ppm (parts per million).

**NOTICE!****Oxygen-separating detergents**

Oxygen-separating detergents act aggressively on sealing materials.

Do not use these detergents on every cleaning cycle.

**NOTICE!****Penetration of detergent**

If the lift cylinders are not pressurized during cleaning, detergent will penetrate the lift cylinders. This will result in a reduction of the service life of the seals used. A further negative effect is increased corrosion.

- Before cleaning the machine surfaces, open the air supply to the lift cylinders.

**NOTICE!****Detergent residues**

If detergent residues are not removed by rinsing, evaporating water content of acids and caustics will increase the concentration levels on stainless steel and plastic surfaces. As a result, the surfaces may be destroyed by corrosion.

- Remove detergent residue from the machine surfaces by rinsing them with drinking water.
- Use drinking water with a chloride content that does not exceed a concentration of 150 ppm (parts per million).
- Rinse the machine until normal analytical methods detect no more identifying properties of the detergents used.
- Rub polished machine parts dry or blow-dry them with compressed air.

**NOTICE!****Chloride in detergents**

Chloride in detergents can cause pitting.

- Do not exceed the maximum concentration of chloride in detergents. The maximum recommended chloride content values are listed in the tables below.

Unless otherwise stated, all the chemical agents offered by reputable companies for the relevant application are suitable for cleaning the machines. Although KHS uses only high-quality materials to manufacture its machines, the manufacturer of the detergents should nevertheless be consulted regarding the corrosiveness of the chemicals intended for use. Some manufacturers offer clearance certificates, which must always be obtained.

The use of alkaline and neutral cleaning agents and disinfectants is usually sufficient. If acidic media are used, a particularly careful working method must be used in order to prevent material damage.



Contact the KHS laboratory in special cases and/or when in doubt.

Information about the limits for detergents can be found in the technical documentation *“Specific data and KHS standards”*, chapter *“K0255 — Media quality”*.



This page is left blank for editorial reasons.



Appendix



1 / 1

Operating instructions
Can filling machine
Innofill Can C
10349026 89407962-000100

Innofill



1 / 1

Operating instructions
Can filling machine
Innofill Can C
10349026 89407962-000100

Innofill



1 / 2

Operating instructions
Can filling machine
Innofill Can C
10349026 89407962-000100

Innofill



2 / 2

Operating instructions
Can filling machine
Innofill Can C
10349026 89407962-000100

Innofill



2 / 2

Operating instructions
Can filling machine
Innofill Can C
10349026 89407962-000100

Innofill

