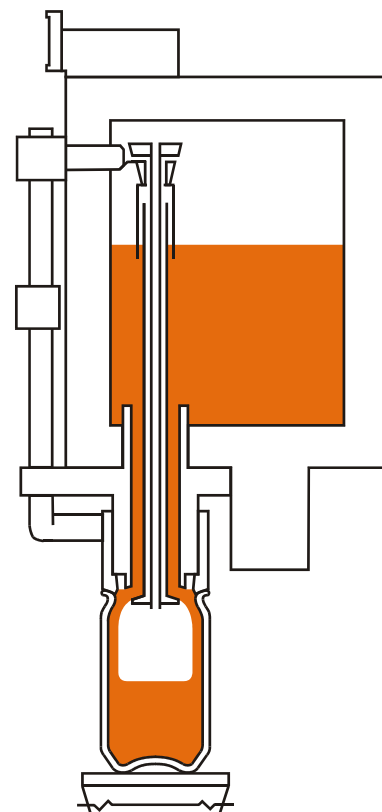


Innofill



Operating Manual

Can filler

DVD 40

Machine n° : 48176



Filling and Packaging – Worldwide

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Filling and Packaging – Worldwide

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Safety

About this chapter

This chapter addresses the employer and the operating and maintenance personnel.

This filling plant conforms with the **latest state of technology** in terms of performance, material, method of operation and operating safety. To ensure operating safety, however, knowledgeable and safety-conscious behaviour on the part of the employer and his operating and maintenance personnel is crucial. This chapter sets out the necessary guidelines.

For your own safety be sure to read this chapter thoroughly and follow all the rules and guidelines strictly.

By not doing so, you put yourself at risk. You may also cause damage to the plant.



All information in this chapter is of a general nature and is not specific to one particular machine.

Chapter on safety and "Safety" brochure

This chapter on safety is included in every newly issued operating manual for products from the KHS range. It is also available in the form of a brochure, as such providing the employer with advance information.

Plant-specific safety information is to be found in the relevant operating manual

Safety information relating to a specific machine or a specific operation is included in the relevant section of the operating manual for that particular machine. Key safety rules are also to be found directly on the machine.



The chapter "General Safety" supplements the operating manual

The "General Safety" chapter on no account replaces the various operating manuals for the filling plant. The machine operator must have access to the operating manual for each machine.

What the employer must ensure:

- The operator must have the necessary qualifications.
- The operator must have access at all times to the relevant operating manual.
- Safety rules must be available in a language that the operator can understand.
- The operator must have read and understood the operating manual before the machine is started up. He must be required to repeat this at least once a year.

General and plant-specific documents

**Laws, Regulations,
Guidelines, Orders,
Standards**

There exist a host of laws, regulations, guidelines, orders, and standards



The most important rules and regulations relating to a filling plant are listed in the appendix to this chapter.

The employer must issue operating instructions

The employer undertakes to observe, implement and control adherence to the required accident-prevention regulations. Unless there is strict and consistent adherence to these regulations and to the additional safety rules in this chapter and in the operating manuals, risks to personnel and damage to machinery will be inevitable.

The employer undertakes to display the required prohibitive and cautionary notices on the operating premises, at the entrances and on the machines. Furthermore, the employer must ensure that these cautions are strictly observed.

A permanent notice should be displayed at each starting and switching device on the machine, requiring every operator to read the relevant operating manual before starting up the machine for the first time.

Prohibitive and cautionary notices have to be displayed

Notices on the machine



Key data for machine operation should be displayed directly and conspicuously on the plant/machine. Locate signs setting out key data are to be hung where they can be seen by the operating personnel. These signs should not be damaged or made unreadable through soiling. Check the condition of the notices regularly. Replace where necessary.

See operating manual of the corresponding machine for further information on which information and data have to be displayed directly on a machine.

Key operating data on the machine

Obligations of the employer vis-a-vis the manufacturer

The employer undertakes to immediately report to the manufacturer any accident or damage to the machine which is presumed to have been caused by mechanical failure. If the employer plans modifications to the machine, these must be discussed with the manufacturer before implementation. The manufacturer can only meet his product-monitoring obligation in the interest of the user if the latter keeps him informed.

Symbols in the operating manual

KHS uses certain symbols in the operating manuals in order to emphasize areas of high risk or especially important points.

Familiarize yourself with these symbols so that you can immediately recognize the implications in the manual. The following symbols are used:



This symbol indicates an operation which can be hazardous (injury can be fatal).



This symbol indicates an operation which can involve damage to the machine (material damage).



This pictogram points out a danger which deserves your particular attention. This can be combined with a pictogram denoting damage to property or material.



This pictogram draws your attention to a danger through voltage which can entail injury to persons (danger to life and limb).

This pictogram draws your attention to a danger through contact with acids or their vapours which can entail injury to persons (danger to life and limbs).



This pictogram means that you must wear safety shoes in the specified areas.



This pictogram means that you must wear protective gloves in the specified areas.



This symbol indicates the need for servicing.



This symbol indicates operations which require you to use special tools.



Here you will find further information and tips for improved handling.



Specifications/limitations as prescribed by law

Noise emission



KHS applies the latest technology to keep the noise level of filling plants at a minimum.

Noise emissions from filling plants relate directly to certain factors :

- the more bottles per hour, the higher the noise level,
- the bigger the bottle, the higher the noise level.

If the filling plant is operating at full capacity, therefore, the highest noise level is to be expected.

Noise emissions which then occur are below the maximum permitted levels according to the

"Machine safety law, accident-prevention regulation VBG 121 .Noise" or ASI 8.11/91 low-noise bottle-filling plants".

KHS measures noise emission levels in accordance with DIN 45635. Exact figures on the level of the noise emissions that can occur are identified separately for each filling plant.

The overall concept of a low-noise filling plant however requires that the operating premises are designed in such a way that the carrying of noise is minimized. The brochure ASI 8.11/91 Low-noise bottle-filling plants sets out the relevant regulations relating to the reduction of noise levels in closed spaces. When planning a filling plant, both employer and manufacturer must consider and realize noise-reduction opportunities.

Emissions through chemical substances

Remember that you can put your health at risk with chemical substances (e.g., cleaning agents) and by applying them without due care. Ensure that chemicals such as cleaning agents (cooling water storage tank) are correctly stored.

Never mix chemicals

Never mix different chemical substances, as hazardous reactions may result.

Beware of scalding steam.

Take care with hot water

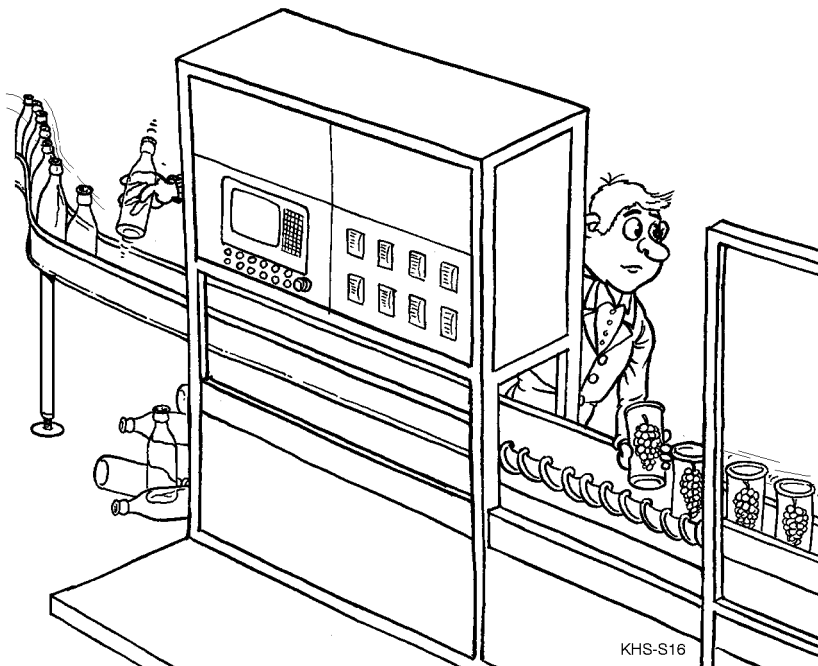
Remember that boiling steam can result when you rinse the machine with hot water. The feeder and return pipes through which the hot water passes can also be very hot.

Utilization of the filling plant for the intended purpose

All the operations which the plant is intended to perform are set out by KHS in the so-called technical specification.

Every purchase contract between customer and KHS defines which beverages the plant is to fill into which containers (bottles, cans). If the user departs from this specification, risks can ensue for personnel and machine. If the user does not adhere to the terms of contract, KHS bears no liability whatsoever.

Intended use is defined in contract



Possible misuse of the filling plant

It is conceivable that an employer may try to use the plant for beverages other than those agreed upon in the contract with KHS. This you must on no account do, as every liquid requires its own specific settings and guide elements. Moreover, the materials used are not designed to take every liquid: washers, valves and walls may be destroyed by some liquids, and personnel may in some circumstances be put at risk.

If you take on contractual filling and wish to fill beverages other than the beverages/containers defined in the contract, you must always discuss this with the responsible members of KHS beforehand.

Contractual filling

Operating/maintenance personnel must have the necessary qualifications

Personnel qualification and training

The personnel responsible for operating, maintenance, servicing and assembly must have the qualifications required for the work involved (**training and qualifications must be up to the KHS standard**). The employer must clearly define areas of responsibility and reporting relationships and ensure close supervision of personnel. If personnel do not have the required qualifications, they must be given the necessary training and instruction. This can, if necessary, be provided by the manufacturer on behalf of the employer. Training should be repeated once a year.

Read and understand manuals



The employer must ensure that personnel has read and fully understood the operating manual.

Additional training

In the event of technical modifications to the plant or to machine parts, the employer must make the following provisions: With regard to technical modifications, personnel must be provided with the necessary additional training.

Take care with temporary staff

Take care with temporary staff; they too must be trained for the job they are to do.

Document training programs

In order to ensure that personnel have the right qualifications, it is advisable to document the content of training programmes. KHS presents each successful participant with a certificate.

General safety rules

Below we describe the possible general dangers

- which can derive from the filling plant,
- which are caused by errors on the part of personnel.

Rules to be observed by operating and maintenance personnel

Only trained and qualified personnel may operate, adjust or alter switches, valves, light barriers, and all switching and control elements.

If the plant operator notices irregularities during the filling process, he must report these directly to his superior or his superior's deputy, and if need be switch off the plant.

Do not take intoxicants

The rule for operating and maintenance personnel carrying out work on or around the plant is :

- The consumption of alcohol or other intoxicating substances can entail danger to yourself and others.
- For this reason you may not perform any work on the system under the influence of alcohol or any other intoxicating substances.

One operator supervises the biggest part of production

Always observe the safety regulations for employees working on their own in accordance with VBG 1 §36 sec. 3.

The inching operation is particularly hazardous, because here most safety devices are not effective. If you have to work with the inching operation of the machine during maintenance or adjustment, you should always do so under supervision.

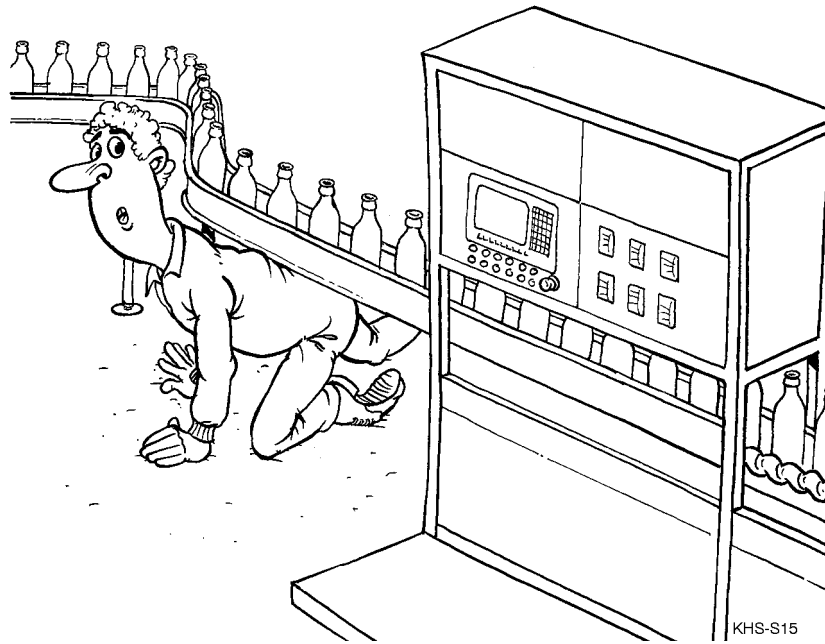
**Define
accountability**

**Watch for
irregularities**



**One operator
supervises
production**

Only use specified pathways



Always use the specified and secured pathways.

Never walk beneath or above the conveyors, because these lead into hazardous, unsecured areas of the plant.

Points to be aware of in the food industry

Hygiene

Hygiene is the number one rule in the food industry.

Remember that contaminated food can be a health hazard. When working in the food industry it is therefore important to keep operating premises, machines and containers especially clean.

Health certificate

We therefore recommend that all persons working on this plant should have a valid health certificate. We also recommend occupation-specific medical checkups (noise pollution).

Points to be aware of when selecting production materials

Bottle quality

The quality of bottles, cans and containers must conform to the capacity of the filling plant. This means that when the plant is operating with a high hourly output, the material used is subject to considerable stress and strain.

Technical safety devices are for your own protection

KHS uses the most up-to-date mechanical and electrical safety devices to provide maximum protection to all persons working in the danger area of the filling plant.

A description of these safety devices is to be found in the operating manual of the corresponding machine and in the general filling plant description.

Pay attention to the after-running of the machine

The plant is equipped with several emergency-off switches.

When an emergency-off switch is operated, this does not mean that the machine stops immediately; every machine continues to run for a certain amount of time (after-running).

After-running means that after pressing the emergency-off switch, it takes a moment or two for all moving parts of a machine to come to a standstill.

Pay attention to the after-running of the machine

The plant is equipped with several emergency-off switches.

When an emergency-off switch is operated, this does not mean that the machine stops immediately; every machine continues to run for a certain amount of time (after-running).

The optic and acoustic warning devices in your plant are to be checked regularly for proper function. Information about the required inspection intervals are to be found in the relevant operating manuals.

The machine stops automatically when

- it is overloaded
- protective glass covers, grids and doors etc. are opened.

Explain optical signals!

In case of machine malfunctions, there are two different light signals (optical displays).

Continuous light:

Continuous light means there is a breakdown and the plant/machine is standing still.

Flashing light:

Flashing light means that the fault is cleared and that the plant/machine can be restarted.



Emergency-off switch

Inspection intervals are to be complied with

***Do not remove
seals***

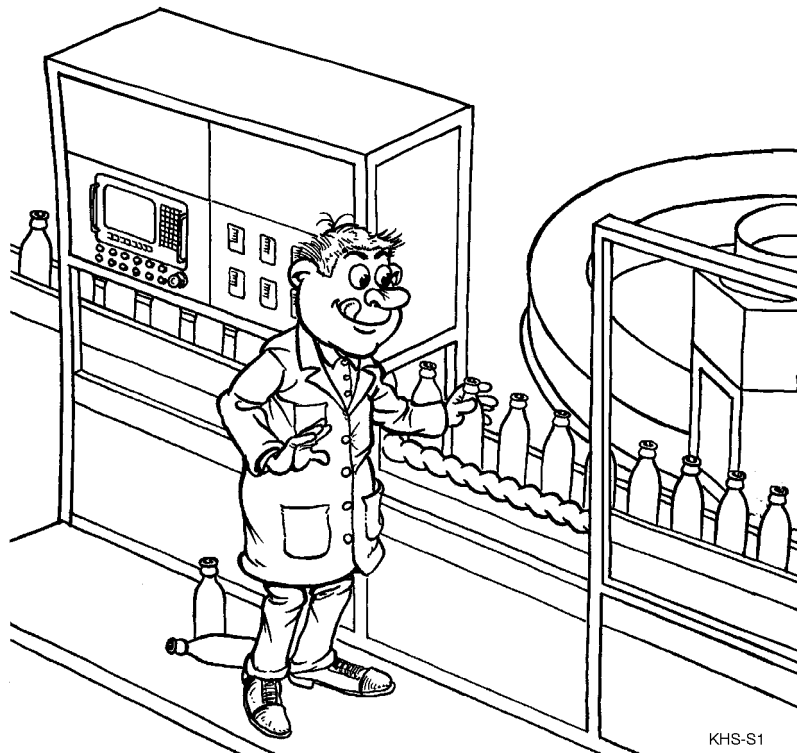
Every machine is equipped with safety valves. These valves are sealed. For your own safety, these seals must never be damaged or removed. If a seal is faulty, you must have the valve checked immediately and resealed.

***Never bypass
safety devices***

The additional safety devices which KHS has provided, such as protective doors, grids, glass covers, light barriers, control devices, load-limited devices, safety valves and emergency-off switches may never on any account be bypassed or put out of action. Their sole purpose is to protect both operating and maintenance personnel and plant/machine.

- The safety devices prevent unintended contact between human and machine.
- The safety devices switch off the machine automatically in the event of malfunction.

***Never interfere with
transportation
channels of
containers***



You must never interfere with bottle transportation channels during the filling process. It is possible that the operator might during the filling process either take containers from or put containers onto the conveyor before or after the checkpoint. This would invalidate the checkpoints, and uncontrolled and thus contaminated or damaged containers could reach the retail outlets.

Wear the required protection in plant proximity

Persons working on and near the plant must wear the required protection.

The employer must ensure that operating and maintenance personnel wear the prescribed protection at all times. Protective clothing is an important factor in helping to avoid accidents and reducing the effects of accidents.



Wear eye protection or, better still, full facial protection

Operating and maintenance personnel should wear at least eye protection if there is no shield between themselves and the containers/beverage. Full facial protection is even more effective.

Accident report: The main cause of accidents is chipped, flying glass. Most minor injuries are attributable to this, but serious injuries also occur which have been fatal in cases.

KHS recommends the use of ear protection whenever the plant is in operation, as there is always a noise level of varying frequency in the vicinity of the machine. KHS products/ machines conform with the latest state of technology, i.e. the noise level is kept as low as possible. However, noise emission cannot be avoided altogether.

Wear ear protection

Wear protective clothing

Wear close-fitting protective clothing so as to avoid being caught by revolving or moving machine parts.



Accident report: Many serious injuries are caused by people getting nearer than permitted to moving parts and being caught by these. Known injuries range from cuts to the crushing and loss of finger ends, loss of fingers, hand or arm. These are injuries which in some cases have been fatal.

Injury statistics

Almost 70% of accidents which had to be reported were injuries to hands. Most serious accidents also involved injuries to hands and/or fingers.

Wear protective gloves

KHS designs the plant so that glass breakage is minimized and guarantees that glass breakage during production is no more than 0.03%. This is a very low percentage. However, where a plant is filling 45,000 bottles per hour, this can mean that a bottle bursts every four minutes. To remove fragments of glass, wear protective gloves.

Wear protective footwear

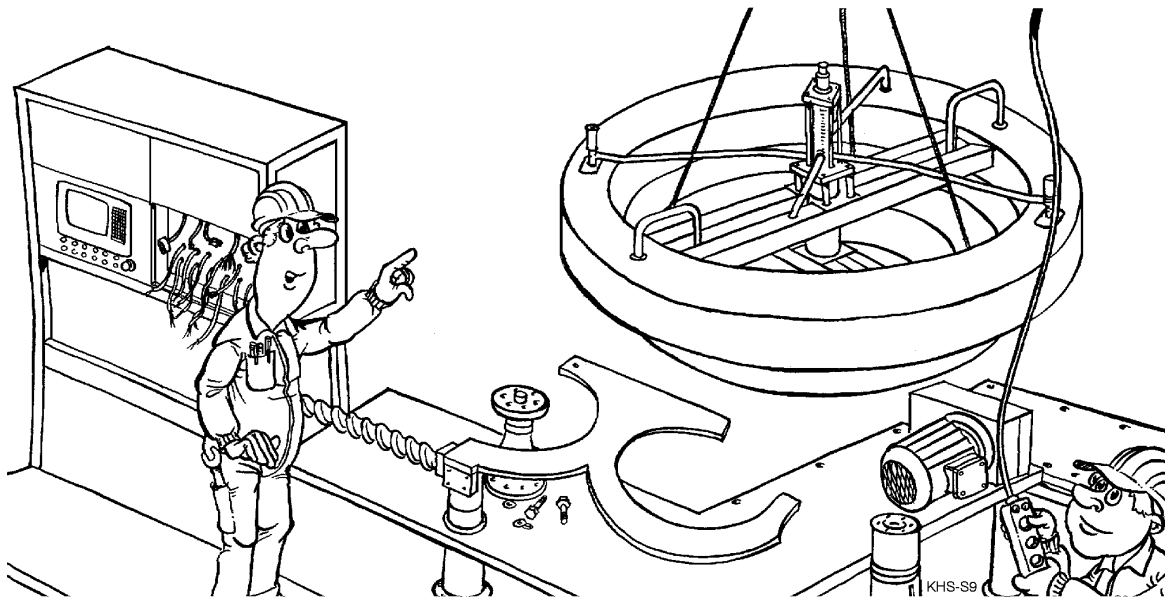
The floor area surrounding a filling plant is wet and therefore very slippery. Also, there can be a large amount of broken glass. Always wear protective footwear!

General safety rules relating to specific operations

Factors to consider in future planning

If the plant is used in combination with machines from a different manufacturer, operating safety and quality is no longer guaranteed. If you wish to combine the filling plant with other machines or machine parts, you must discuss the planned configuration with KHS specialists. Also, a contract should be drawn up defining who has the authority to give instructions for work on and around the plant.

Beware of machines from a different manufacturer



Rules to observe before starting up the plant

All assembly must be supervised by KHS specialists or be carried out by qualified personnel.

A plant may only be started up under the control of KHS specialists.

KHS specialists check that plant and measuring instruments are in working order and clear any faults.

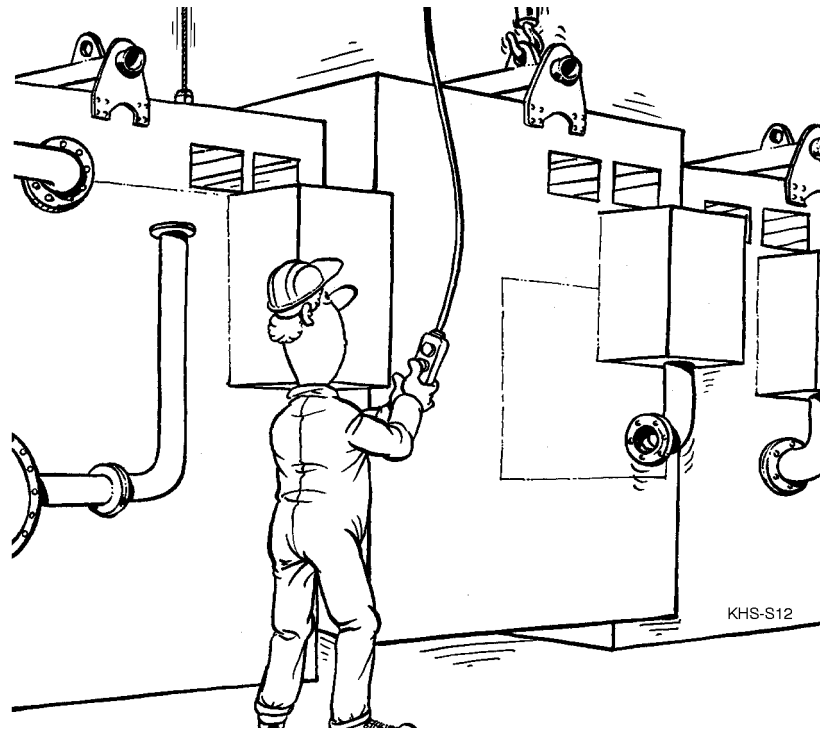
KHS specialists stipulate the necessary settings for the plant and adjust the plant accordingly. These settings are documented by the KHS specialist in accordance with DIN 8784.

Personnel to be substituted if necessary

If, before the plant goes into operation, the KHS specialist finds that operating personnel do not have the necessary qualifications, the employer must substitute them in accordance with DIN 8783. If necessary, KHS replaces them with members of its own organization.

The start-up process should be put down on record. This written record should include the following information :

- What target performance (set values) was expected ?
- What settings were stipulated ?
- What capacity (actual values) was achieved ?



Rules to observe when moving machines

If you wish to replace or add to the plant or parts of the plant, you must remember when moving the plant or parts thereof that for most components there are transportation locks and attachment or lifting regulations which you must always use and observe. For these, see the operating manual for the relevant machine.

Have regard to dead weight

When lifting machine parts, remember that components can have a considerable dead weight. Therefore, use suitable lifting gear such as wire ropes, traverses, and other lifting devices. Also, when securing and transporting, have regard to the centre of gravity so that machine parts cannot slip or shift position.

Rules to observe when changing over machine parts

If you reset the plant to accommodate a different container type, you are interfering directly in an unsecured part of the machine. This means that re-tooling always involves an increased risk of accident.

Remember to reset and control the settings for each cleaning, filling and packaging process.

Also, depending on the type of container some guide elements must be substituted. Some of these guide elements can have quite a considerable dead weight. If you have to lift or carry heavy weights, you should observe the following regulation:

- VBG 76 packaging and auxiliary packaging machines §19 sec.1.

Adjust setting values

Change guide elements

Rules to observe during assembly/ maintenance



Use the right tools for assembly

Accident report: Minor injuries sustained during assembly are usually caused by slipping with a tool. Use only tools in perfect condition for assembly operations. The operating manual contains information about the special tools required.

Pretensioned machine components

Take care when assembling or dismantling parts which are under mechanical tension or under gas pressure, because here there is a risk of high **"potential energy"**. This potential energy can occur in various forms, e.g., spring pressure, gas pressure or vacuum. Such parts may only be assembled or dismantled by a specialist. Each operating manual contains information about such machine parts.

Spare parts

For safety reasons, use only original KHS spare parts.

Other rules to observe during operation

Settings must be constantly controlled and adhered to:

- so that human safety is ensured
- so that high quality is ensured
- so that machine safety is ensured



Rules to observe during cleaning and maintenance

Cleaning

Only water should be used to clean the outside of the machines. Never use substances which corrode the surfaces of the machines.

Remember that toxic emissions can occur as a result of chemicals, fumes and gases.

Additional information on cleaning agents and their usage is included in each operating manual.

The user of the plant must select the cleaning agents carefully. They contain various chemical substances in different levels of concentration, which in some circumstances can cause damage both to humans and machine.

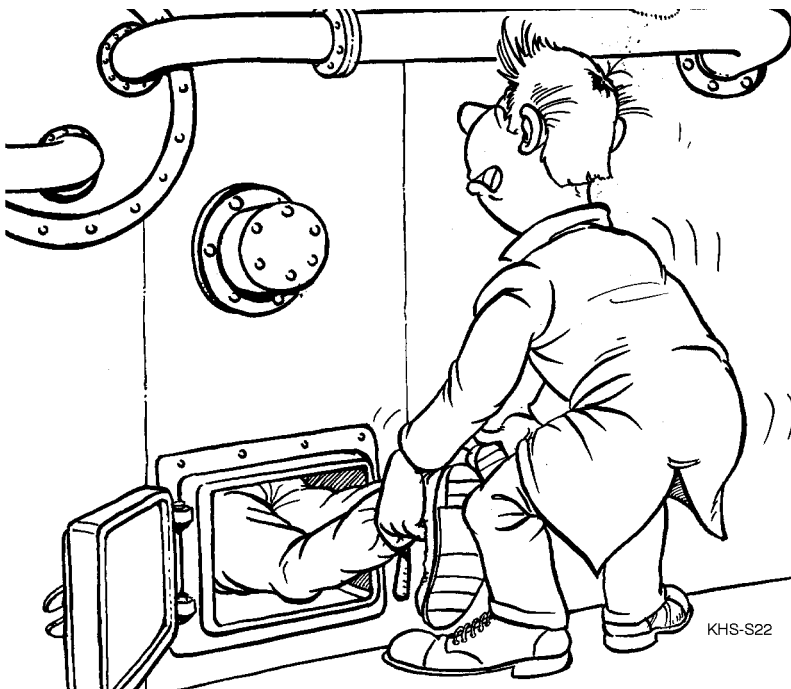
Cleaning agents are available on the market which contain substances listed in the Dangerous Substances Act. These cleaning agents should be avoided wherever possible. If you apply cleaning agents which can put the operator at risk, you must inform him/her accordingly.

Where dirt has been allowed to accumulate, it may be necessary to use very aggressive chemical agents in order to clean the parts thoroughly. Such aggressive agents are acids and alkalis and a major hazard both to humans and machines.

Ensure that you never mix chemicals which are not intended to be put together. The result can be gases and fumes which irritate the skin or breathing.

If machines are equipped with handholes or manholes, these are to be used solely for the purpose of fitting spare parts and cleaning. No one must ever enter the machine through a handhole or a manhole.

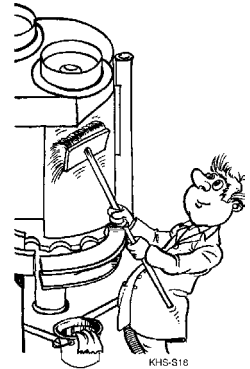
Beware: Risk of suffocation or poisoning !



Prior to all maintenance, servicing and repairs the filling plant must be shut down. Switch off all necessary switches so as to avoid an unintentional start-up of the plant.

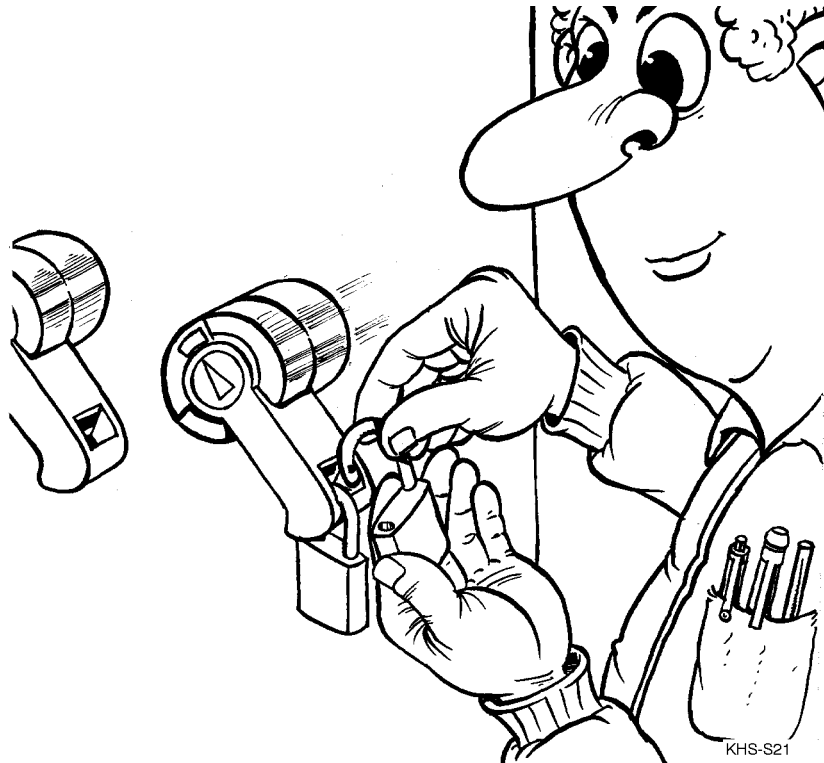
Selection of cleaning agents

Dangerous Substances Act to be observed



Manholes facilitate cleaning or the fitting of spare parts

Maintenance repairs

Secure main switch

Secure the main switch at the main control cabinet with a padlock.

Accident reports show that machines are suddenly started up even though maintenance personnel are still in or on the machine. Serious injuries have usually resulted. Known injuries range from the loss of finger ends to the loss of entire limbs, e.g., finger, hand or arm; injuries which in some cases were fatal.

Whenever two maintenance staff are working on a machine, each must secure the main switch at the main control cabinet with his own padlock to ensure that the machine is not started up unintentionally. Only when both employees have removed their padlocks can the machine be re-started.

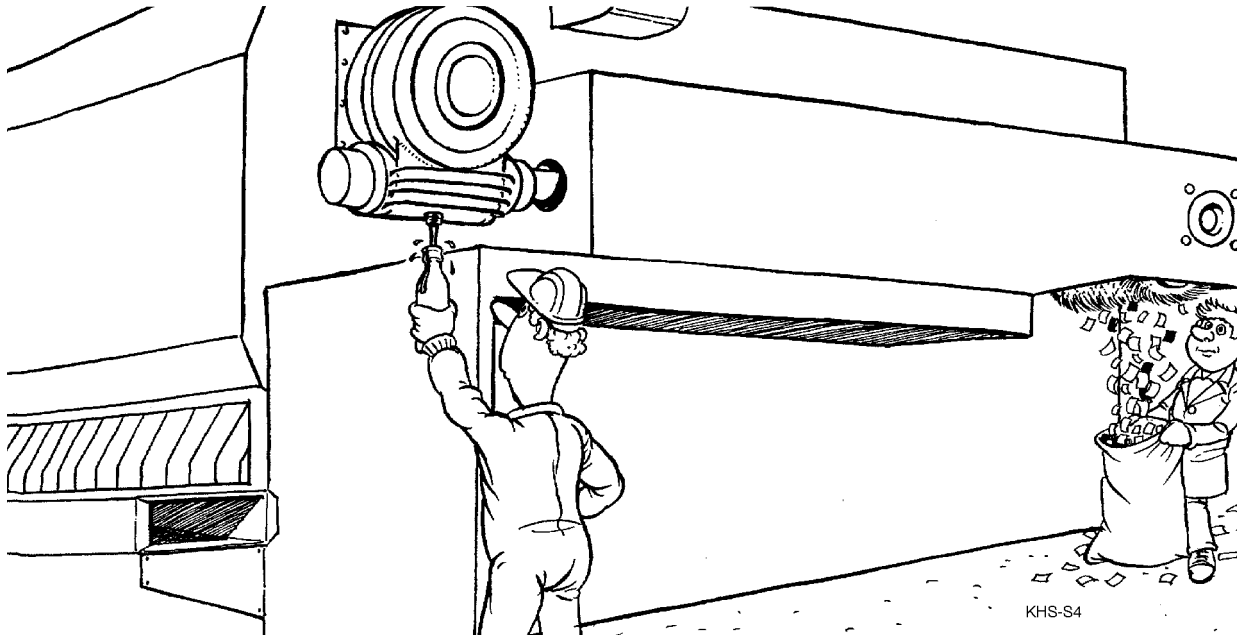
Points to remember when using lubricants**Lubricants**

When lubricants come into contact with food, these lubricants have to be made of edible greases. Here, you must explain to operating and maintenance personnel that there is no recognizable difference between edible greases and mineral or synthetic greases.

Adhere to table of lubricants

Always adhere to the lubricant table which you will find in each operating manual.

Points to remember when disposing of waste



When you have to dispose of all kinds of waste (e.g., fuels, residues, cleaning agents) observe the relevant laws, orders and regulations concerning waste-disposal measures and channels.

Waste disposal

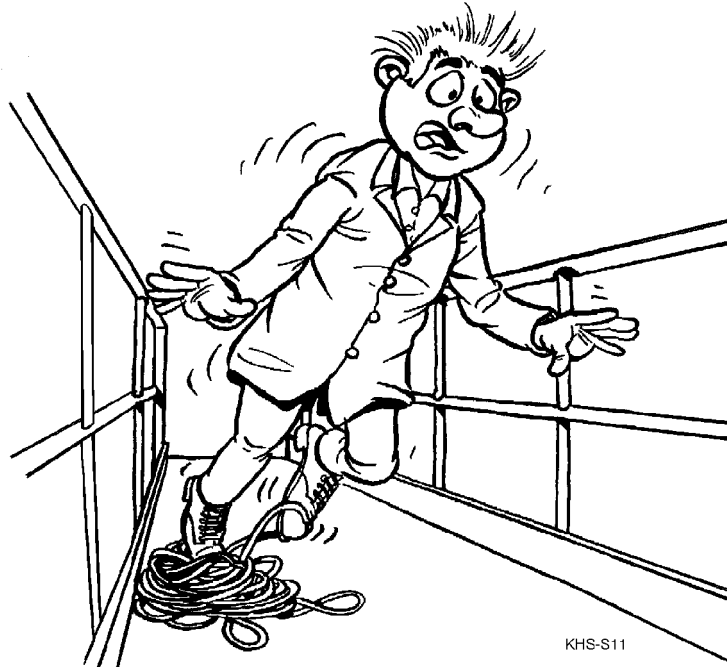
Each machine has its own subassembly-related operating manual. This manual contains information about possible waste materials. Guidelines are included for the correct disposal of scrap, packaging or auxiliary materials waste, and possible leakages. Factors to pay attention to include :

- protective equipment for staff;
- waste-disposal containers;
- absorbents, neutralizing agents, fire-extinguishing agents;
- cleaning methods;
- transportation regulations.

Operating and maintenance personnel must be kept regularly instructed and informed about the relevant laws/regulations so that they can take suitable action in the event of specific danger from harmful substances. Specifically, this involves immediate effective actions in a particular situation (switching off, securing, emergency devices) and clearly defined responsibilities.

Rules to observe when planning workplaces

The work area of the operator must give him sufficient space in which to move. If the operator has insufficient space to move in, he will quickly knock into machine parts or stumble over obstacles. This is the cause of many injuries.



The employer must ensure that the pathways that are required for machine operation and maintenance and for gaining access to the machine are kept free of obstacles.

Rules to observe when clearing faults

Only the specialist may clear major machine faults (not the operator).

Start the machine only when the fault has been cleared.

Emergency measures - what to do if the machine malfunctions

If an unforeseeable accident occurs :

1. apply the in-house first-aid rules.
2. report to the manufacturer so that any defects can be eliminated.

See next section for manufacturer's address.

Address of manufacturer

KHS AG Central Department Customer Service

Juchostraße 20
D- 44143 Dortmund
Telephone 02 31 / 569-0
Telefax 0231 / 569-1409
Internet <http://www.khs.com>

*Address of central
department*

List of key documents

The filling plant and the various components thereof are so complex that a whole range of industries and their specific laws and regulations are relevant for such a plant/machine. To include them all would be to create confusion. Therefore, only the key documents and their sources are included here.

List of laws, standards and regulations which are of particular significance for the beverage industry.

EMVG	Law on electromagnetic compatibility
GSG	Equipment safety law (GSG), 9th order to the equipment safety law
ProdHaftG	Product liability law
ProdSG	Product safety law

Laws

73/23/EEC	guideline on low voltage
80/778/EEC	guideline on the quality of drinking water
89/392/EEC	guideline on machines
89/686/EEC	guideline on protective clothing
92/59/EEC	guideline on product safety
89/336/EEC	guideline on electromagnetic compatibility
VDI 3741	Emissions of bottle filling plants
VDI 3638	Palletizers
VDI 4500	page 1 Technical documentation - user information
VDE 1000	general rules for the safe design of technical products (DIN 31000)

Guidelines

Standards	EN 292	Safety of machines, plant and equipment
	EN 294	Safety distances precluding the emergence of hazardous sites with the upper members
	EN 349	Minimum distances to prevent crushing of parts of the body
	EN 415	Packaging machine safety, part 4: palletizers and depalletizers
	EN 418	Emergency-off devices
	provEN 482	Measured values for hazardous materials at workplaces
	EN 563	Temperature limits for hot surfaces
	EN 574	Machine safety; two-handed switch
	EN 626	Health risks through dust, gas emissions
	EN 775	Safety of industrial robots
	EN 811	Safety distances, lower members
	EN 953	Requirements for partitioning protective facilities
	EN 1050	Safety of machinery, risk assessment
	provEN 1070	Machine safety, terminology
	EN 23 741	Acoustics, determination of audibility levels for broad band sources
	EN 23 742	Acoustic, determination of audibility levels for narrow band sources
	EN 50 081-2	Electromagnetic devices, transmitted interference (industrial production)
	EN 50 082-2	Electromagnetic devices, resistance to jamming (industrial production)
	EN 50 100	Contactless protective facilities
	EN 60204	Electrical equipment of industrial machines
	EN 61310-2	Principles for displays, operating elements and marking
	DIN 8782	Terms for filling plants
	DIN 8783	Beverage filling technology (tests on filling plants)
	DIN 8784	Beverage filling technology (minimum data specifications and order-specific specifications)
	DIN V8418	User information; references for installation
	DIN EN 1672	Safety and hygiene requirements
	DIN EN 45635	Noise measurement on machines

VBG 1	General regulations	Rules and regulations
VBG 4	Electrical plant and production facilities	
VBG 5	Energy-powered means of production	
VBG 10	Continuous mechanical handling equipment	
VBG 15	Lifting platforms	
VBG 76	Packaging and auxiliary packaging machines	
VBG 100	Occupational medical checkups	
VBG 121	Noise	
VBG 125	Safety marking at the workplace	
ASI 8.11/91	Low-noise bottle filling plants	

DruckBehV	Regulation on pressure vessels	Acts and regulations
GefStoffV	Dangerous substances act	
VerpackV	Packaging act	

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Manufacturer's and Conformity Declaration

***Manufacturer's
declaration and
conformity
declaration***

A manufacturer's declaration is provided for all machines or machine parts delivered by KHS.

Before the first operation of their machinery, KHS declare the conformity of the supplied products with the valid, harmonized EC standards.

Finally, the products supplied by KHS are provided with the EC label giving details on the year of manufacture or of the first operation.

For example:

CE 95

Machine Description

Introduction

Dear customer !

This information has been written to be read, understood and observed in all points by the persons responsible for the KHS-Machine.

The complete technical documentation should always be kept in the proximity of the machine.

Reference is made to very important details of the machine in this operating manual.

Only a good knowledge of this operating manual can avoid damage to the machine and ensure trouble-free operation. It is therefore very important to ensure that the responsible persons are thoroughly acquainted with this manual.

We recommend to read this manual carefully before putting the machine into service, since we will not be liable for damage and stoppages resulting from the nonobservance of this manual!

Should you nevertheless have difficulties, please contact our service or spare part department or one of our representations. They will be pleased to help you.

***Phone our service
or spare part de-
partment***

Descriptions and information given in this operating manual are subject to technical changes necessary for improving the machine.

Area of Application and Intended Purpose

This filler is designed exclusively to fill the cans (referred to hereafter as containers) and the products to be filled as agreed in the contract.



Any use above and beyond the intended purpose previously indicated is considered as being not in accordance with the intended purpose. The manufacturer will accept no liability for any damages resulting from non-compliance; the user is solely responsible.



This note also applies to modifications carried out on machine the without the knowledge and consent of KHS.

KHS assumes no liability for damages resulting from the above!

The DVD Filling System

The abbreviation **DVD** means that this is a canning machine designed to fill products in cans by means of a volume meter under pressure.

D = Can filler

V = Volume meter

D = Pressure

Innofill DVD is the computer-controlled pressure filling system with volumetric filling for beer, soft drinks, mineral water, and other carbonated and non-carbonated products in cans.

The filling process is controlled electro-pneumatically.

The volume is measured by means of an electromagnetic inductive flowmeter. This not only guarantees consistently uniform filling results in all capacity and operating phases, but also that the filling process can be carried out independently of the respective machine speed.

The pneumatic pressure filling system is a real all-rounder in this regard. Even hot filling of highly foaming products and filling of cans according to the widget (N2) method presents no problems whatsoever for the Innofill DVD.

All sequences are automated and all processes are documented and reproducible at all times. Operator prompting at the monitor is easy and convenient. CIP sanitizing is possible when the machine stopped.

Brief Description

Design

The machine is divided into two main components:

- Filler
- Pipelines

All main components rest on cup-shaped feet thus making it possible to shorten the time required for installation and retrofitting of various types of sealers.

Operation

The media: the product to be filled, cleaning agents, pressurization gas, and return gas are fed into the ring vessel through the infeed lines and the intake with its distribution lines.

In order to adapt the filler to the size of the can, the upper section of the filler carousel is height adjustable.

The empty cans incoming over the infeed conveyor are positioned on the can table by the infeed worm and infeed star. A query is performed in the infeed star to determine whether or not a can is present. If a can is present, then the filling process is started and the can is filled. If a can is missing, then the corresponding filling valve remains closed.

After the filling process the filled cans are conducted tangentially from the can table and fed to the sealer where they are sealed. The sealed cans are then transferred to the discharge conveyor.

Drive

The filler is driven by the sealer by means of corresponding gears and joint shafts.

The height adjustment is driven by its own three-phase motors and corresponding gears.

Safety Facilities

Operating personnel must be familiar with all safeguards and their functions in order to avoid the risk of injury and machine damage.



One or more "**EMERGENCY STOP switches**", located in the immediate vicinity of the machine, can be pushed to stop the machine immediately.



Those machine areas that present a potential hazard to operating personnel are covered by appropriate paneling.

It is not permitted to operate the machine without the paneling in place.

No one is allowed inside the close safety paneling during machine operation!

All machine panels are secured by mechanical and electrical locks according to safety regulations and cannot be opened while the machine is rotating.

Open or remove the paneling only for changeover or servicing work in accordance with pertinent safety regulations.

The paneling is grouped and assigned to machine areas (see wiring diagram). The paneling groups are mutually interlocked against opening. Only the paneling in one group can be opened or removed.

A locking handle and lock are located on the inside of the front paneling to secure the front paneling during changeover and repair work.

Lock the front paneling with the locking handle to prevent the front paneling from being closed inadvertently when performing changeover and repair work. Remove the key!



Refer to chapter, *Operating Instructions* for information on lubricants and lubricating intervals.



The moveable safety screens are mounted between columns. Counterweights running inside the columns are connected to the safety screens. For this reason, **do not** modify the columns in any way (drill holes, insert pins, screws, etc.).



Identification of Machine Hazards

Certain machine areas are additionally marked with the following informational and warning signs:



Danger zone warning



Dangerous electrical current warning



Hot surface warning



Automatic restart warning



No fire, open flame, and smoking



Do not open paneling while machine is running



Do not enter, danger of collapse



Wear face shield



Follow instructions in Operating Manual

Can Brake

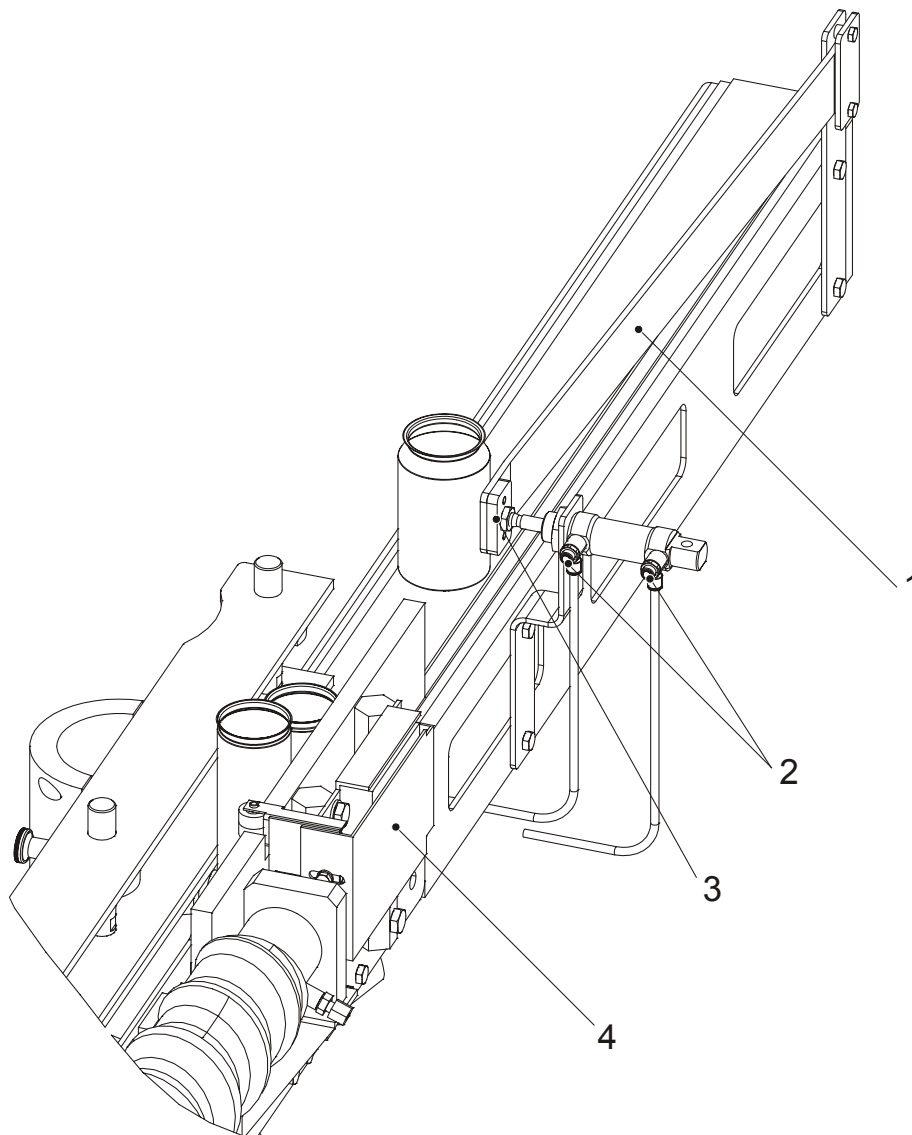


Figure 1-1 :
Can Brake

The purpose of the can brake **(3)** installed in the can infeed ahead of the can flowgate **(4)** is to slow down the flow of cans.

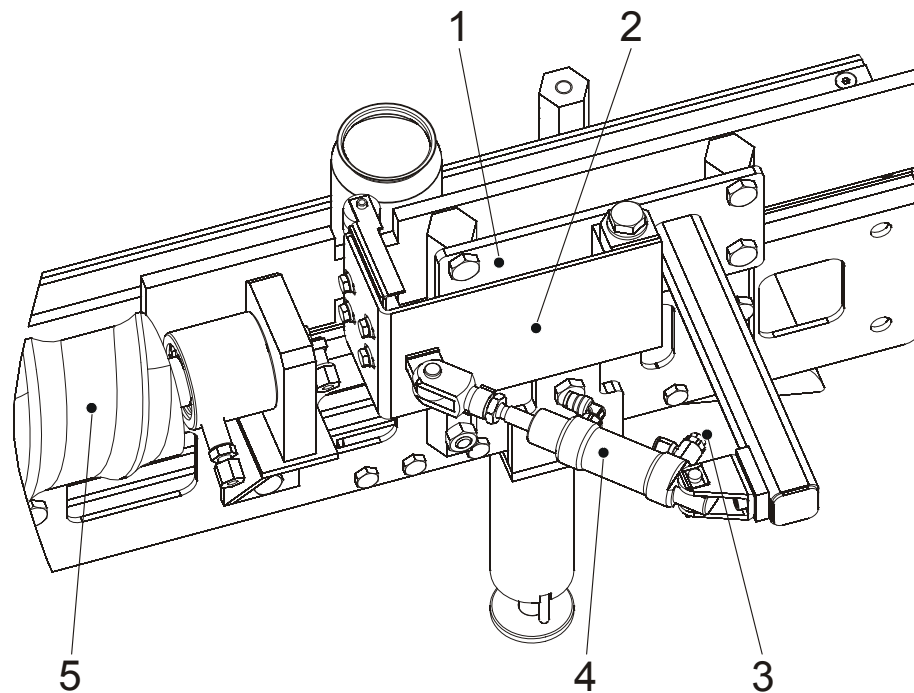
Actuating the can flowgate slows down or releases the flow of cans.

When the can brake is switched on, a lever **(1)** is pneumatically driven into the can conveyor to slow down the flow of cans.

The air pressure required to control the pneumatic cylinder is adjusted at flow control valves **(2)**. Adjust the pressure of the air so that the cans are slowed down but not crushed.

Can Flowgate

Figure 1-2 :
Can Flowgate



The purpose of the can flowgate **(1)** installed in the can infeed ahead of the can feedscrew **(5)** is to interrupt the flow of cans to the canner.

The flow of cans can be stopped or released by switching the can flowgate on or off at the operator panel of the machine.

The can flowgate is swivelable. When the can flowgate is switched on, a lever **(2)** is pneumatically driven into the can conveyor by a pneumatic cylinder **(4)** thereby stopping the flow of cans.

The compressed air required to control the pneumatic cylinder is adjusted at the control valve **(3)**. Adjust the pressure of the air so that the cans are slowed down but not crushed.



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

- No cans
- Backup of can
- No lubricant
- Gap detected in the can flow
- Machine is switched off

Container Flow

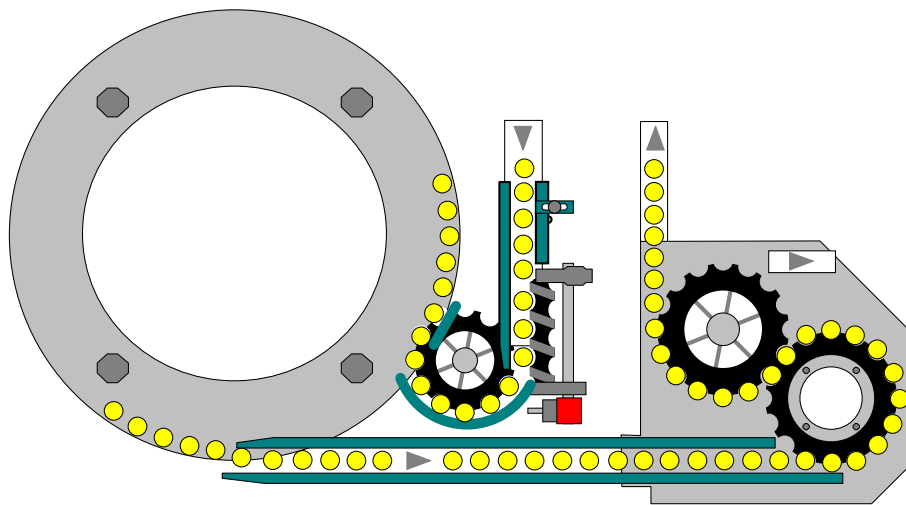


Figure 1-3 :
Container Flow

The containers are spaced by the feedscrew and transferred to the filler carousel by the infeed starwheel.

The cam-controlled bell of the filling element is then lowered onto the container.

A rubber seal and a pressure spring are used to create the seal between the container and the filling element.

A lifting rod raised and lowered by a plastic roller running on a cam race creates the bell lifting movement.

The containers are released by lifting the bell after the filling process and conveyed by a transport chain to the capper.

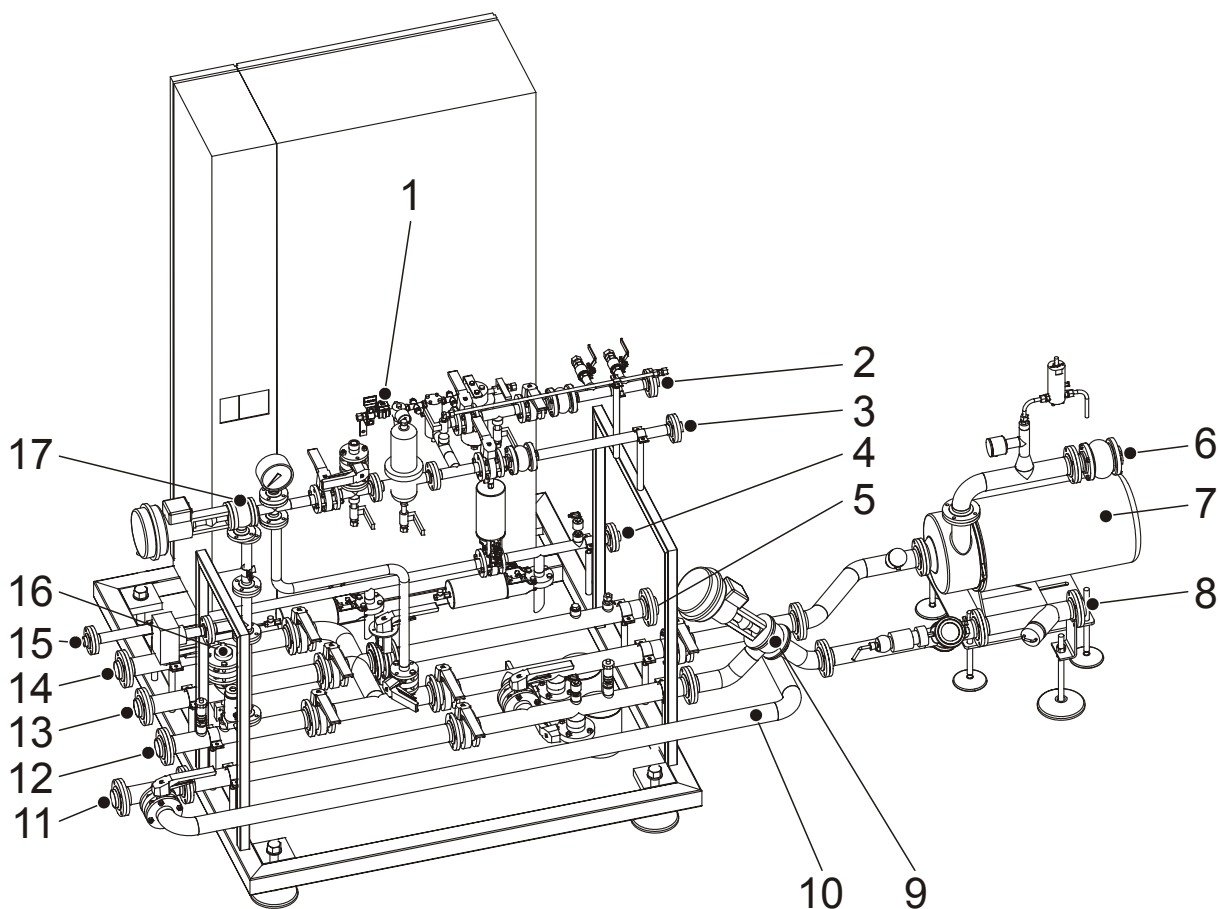
Valve Manifold for Media Control

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



The piping can cause skin burns when touched during production and cleaning!

Figure 1-4 :
Valve Manifold



Product distribution

- 8 Product supply
- 9 Pressure control valve
- 11 Supply to filler

Cleaning media distribution

- 6 Return
- 7 Return pump
- 8 Feed through product supply
- 10 CIP - Bypass

Cold water distribution

- 1 Supply unit for bell actuation lubrication
- 5 Cold water supply
- 13 Supply to the sprays

Hot water distribution

- 4 Hot water supply
- 15 Supply to the sealer

Gas distribution for pressurization

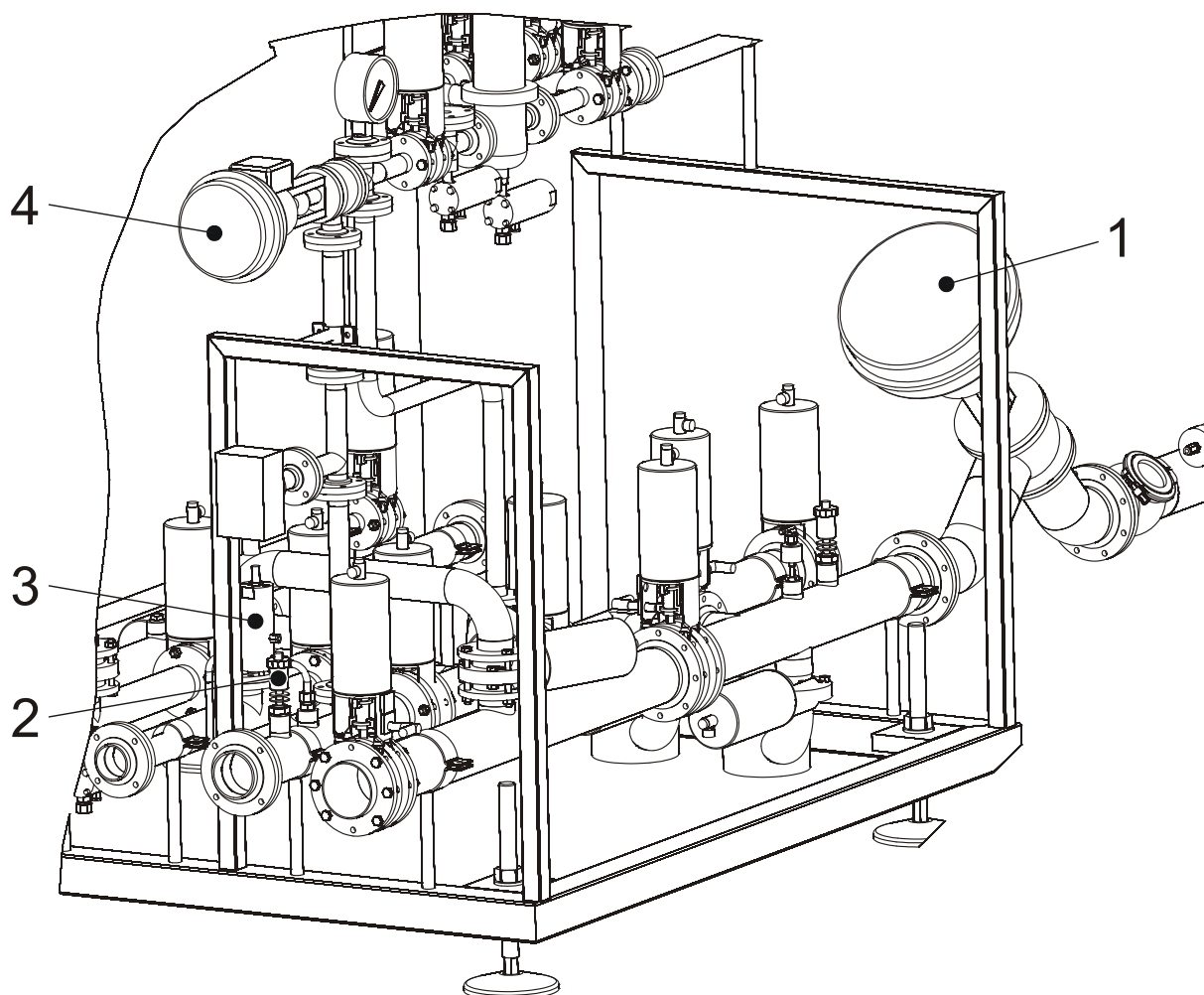
- 2 Air supply
- 3 CO2 supply
- 12 Air or CO2 supply to the filler
- 16 CO2 recovery connection
- 17 Pressure control valve for pressurization gas (air or CO2)

Return gas distribution and snifting

- 14 Snifting from the filling elements

Controllers

Figure 1-5 :
Overview of
Controllers



Pressurization Pressure Control

The ring bowl is pressurized with CO₂ or air. The pressure in the ring bowl determines the pressurization and filling pressures. The amount of gas necessary to pressurize the cans is supplied from the ring bowl and is returned to the ring bowl during filling. The pressurization pressure control maintains a constant level of pressure in the ring bowl.

The actual pressure in the ring bowl is measured by a pressure sensor **(2)** and is sent to the machine control. The desired pressure (setpoint) in the ring bowl is entered at the operator terminal.

The machine control regulates the pressure control valve **(4)** depending on the difference between the actual and set pressures in order to adapt the pressure in the ring bowl to the setpoint level. Any overpressure produced by the controller is released to the atmosphere through an exhaust valve **(3)**.

Product Level Control

The product level control maintains a constant level of product in the ring bowl.

The actual filling level is measured by several probes in the ring bowl located in the ring bowl and is forwarded to the machine control. The desired filling level (setpoint) is entered at the operator terminal.

The machine control regulates the product control valve **(1)** depending on the difference between the actual and set filling levels in order to adapt the filling level in the ring bowl to the setpoint level.

Control Air for the Control Valves

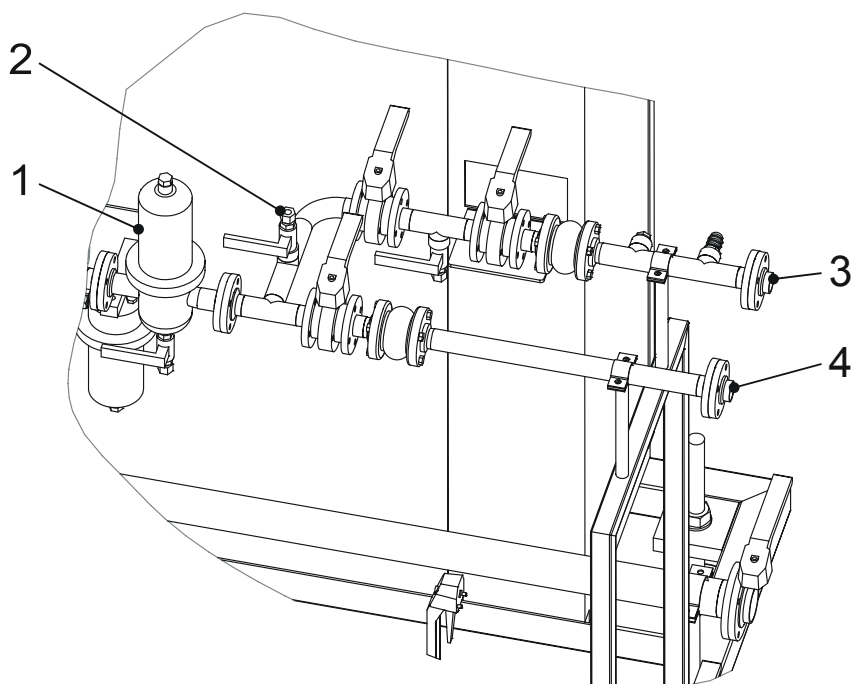
The product, and pressurization gas pressure control valves require a constant amount of admission air pressure in order to operate. The pressure controllers are located in the fitting cabinet at the valve node.

Refer to section, *Requirements and Settings* contained in chapter, *Technical Specifications* for information on the pressure settings and the quality of the air supply.



Steam Supply for Cleaning Filter Candles

Figure 1-6 :
Steam Supply for
Cleaning Filter
Candles



- (1) Air and CO2 filters
- (2) Steam supply
- (3) CO2 line
- (4) Air line

The steam supply for cleaning the filter candles in the filters is located at the valve manifold.



Refer to chapter, "Technical Specifications" for information on the specifications and settings for the steam supply.

Pressurization Gas Filter

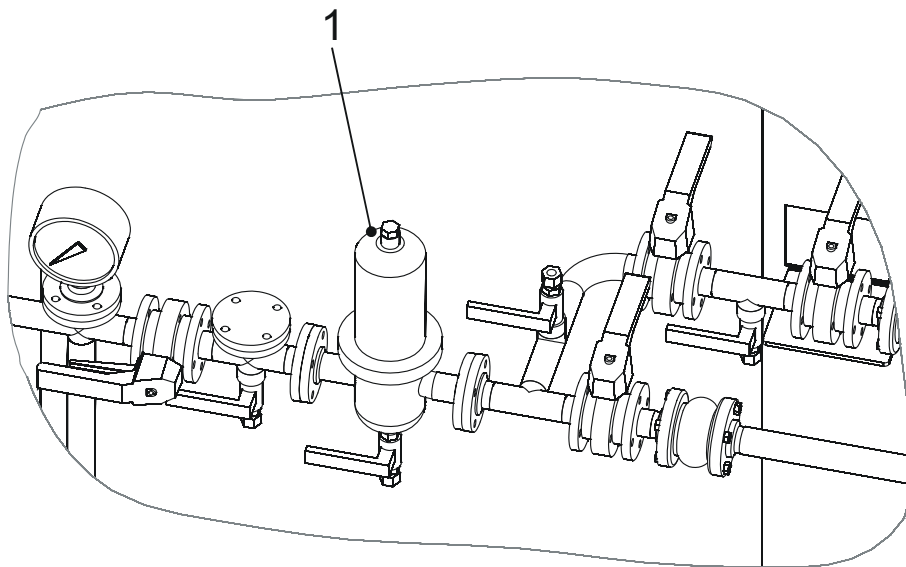


Figure 1-7 :
Pressurization Gas
Filter

The inflowing pressurization gas is cleaned by a pressurization gas filter **(1)**.

The inflowing pressurization gas must be free of water, oil, and particles!

Use a coarse filter for pre-filtering if necessary.



Treatment of the Filter Candle

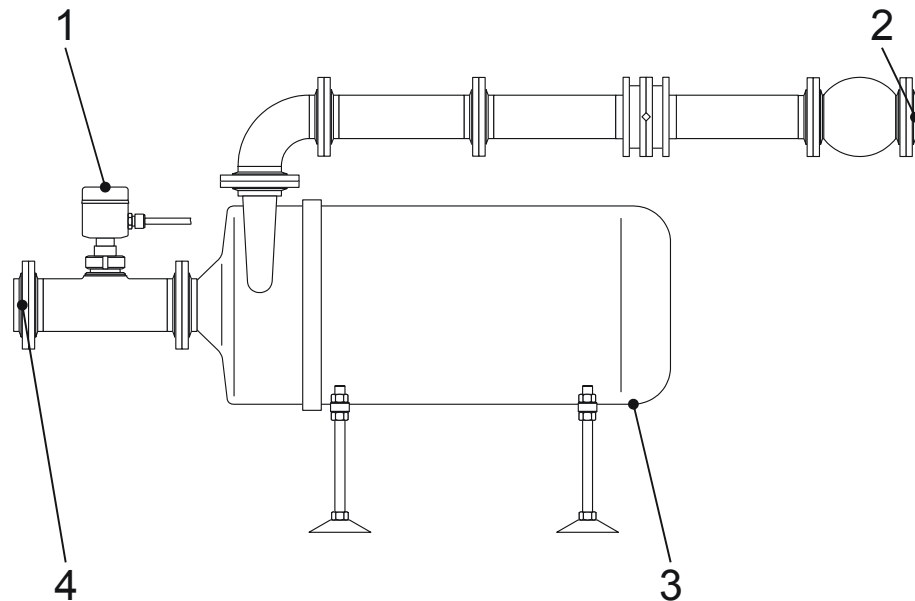
The filter candle used may be sterilized only by steaming in the direction of flow (inline steam sterilization) or by autoclaving.

Replace the filter candle immediately if it comes in contact with water or cleaning agents!



Return Flow Pump

Figure 1-8 :
Return Flow Pump



A pump **(3)** pumps the product and the cleaning agents back to the tank.

The product and the cleaning agents are supplied to the tank at connection **(4)** and through connection **(2)**.

A sensor **(1)** checks if the pipe contains liquid. The machine control activates the pump when the sensor **(1)** signals that product or a cleaning agent is in the intake.



You can switch the pump on and off at the operator terminal in the Function Releases menu.



Refer to the operating instructions provided by the manufacturer of the pump in the *"Purchase Parts Documentation"* for information on the pump operating characteristics and required servicing.

Fitting Cabinet

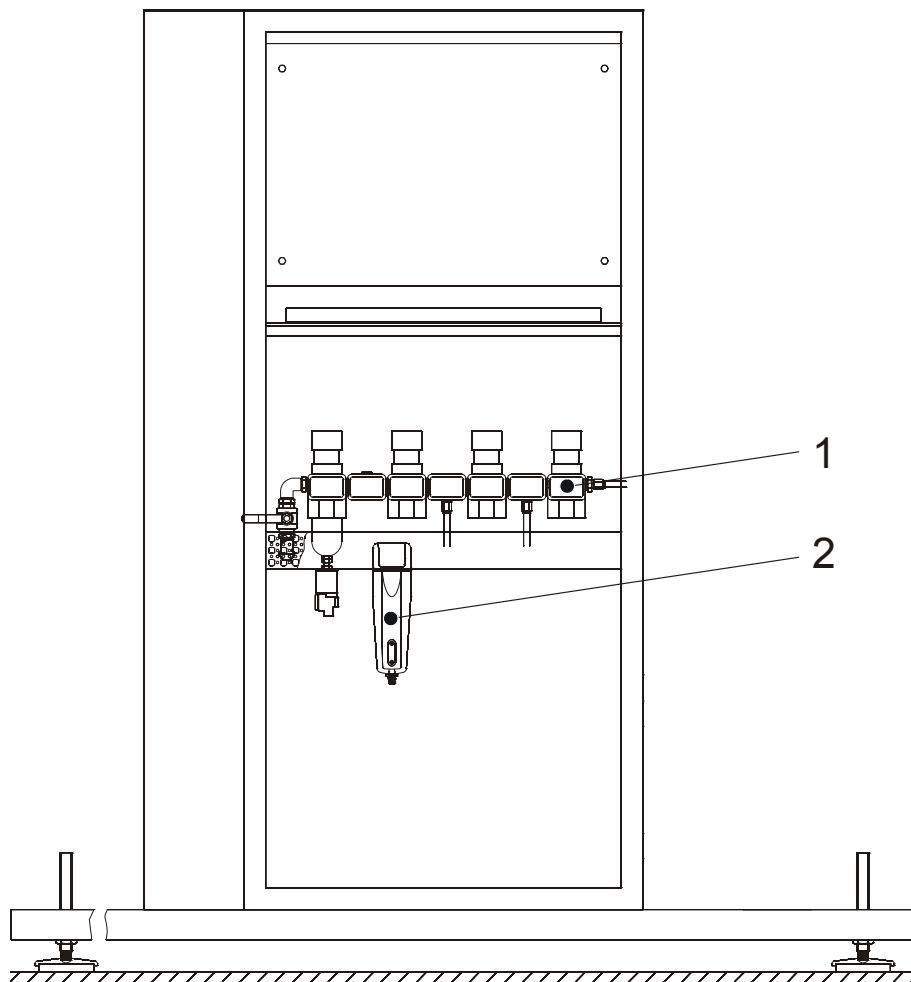
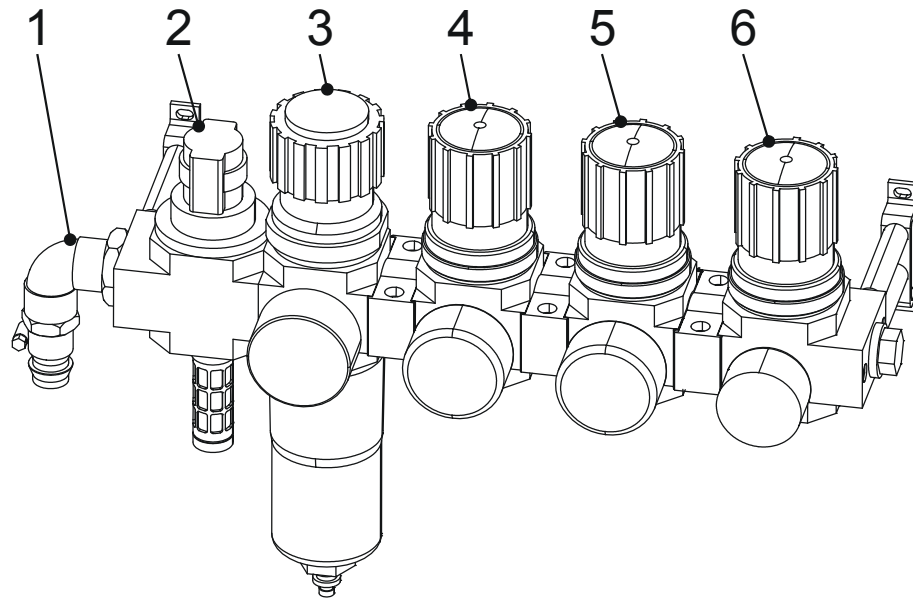


Figure 1-9 :
Fitting Cabinet

- (1) Service group
- (2) Air filter for the capper air supply

FRL Group

Figure 1-10 :
FRL Group



- (1) Air supply
- (2) Shutoff valve
- (3) Pressure controller and filter with pressure gauge (indicates the main supply pressure).
- (4) Pressure controller: control air for actuating the butterfly valves and the can flowgate
- (5) Pressure controller: control air for the control valve in the product line and the pressurization controller in the pressurization line
- (6) Pressure controller, not used

The FRL unit supplies control air to the pneumatic components.

The filter filters dirt, water, and oil out of the control air. The condensation water is drained automatically at the filter.

Central lubrication

The term central lubrication is used to describe a lubrication system which supplies the various lubrication points with the required amount of lubricant from a central point.

The central lubrication of your machine is a so-called progressive system, i.e. the progressive distributors gradually supply the lubricant in proportioned amounts to the connected lubrication points through individual openings.

Design

The lubricant distributors of the individual machine components are supplied with lubricant through a main distributor by a motor-driven central lubrication pump. Lubrication lines with special connections provide the connection between the pump and the distributors.

A pressure switch located in the connecting line between the grease pump and the main distributor limits the pressure in the lubrication system.

(See Spare Parts List / Filler Base / Central Lubrication System for information on the pressure setting.)

The individual lubrication points connected to the central lubrication system can be found in the central lubrication unit assembly drawing contained in the Spare Parts List.



Function

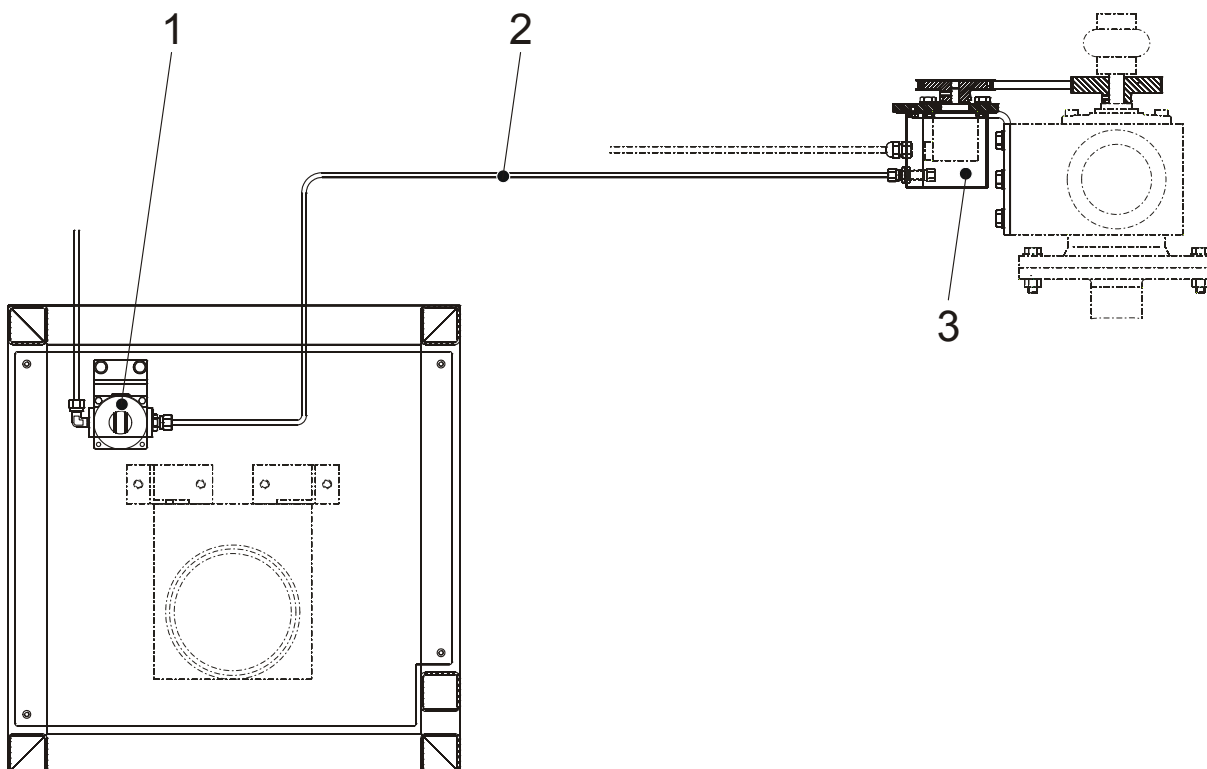
The machine control automatically activates the central lubrication pump at fixed intervals and receives a response from the main distributor regarding the number of lubrication cycles performed. After the required number of lubrication cycles has been reached, the machine control switches off the lubrication pump until the next interval.

Specifications regarding maintenance and filling of the lubricant pump can be found in the manufacturer specifications (see List of Purchased Parts).



Electrical Component Air Supply

Figure 1-11 :
Electrical
Component Air
Supply



The electrical components (e.g. rotation pulse generators **(3)**) of the machine are ventilated by an air line **(2)**.

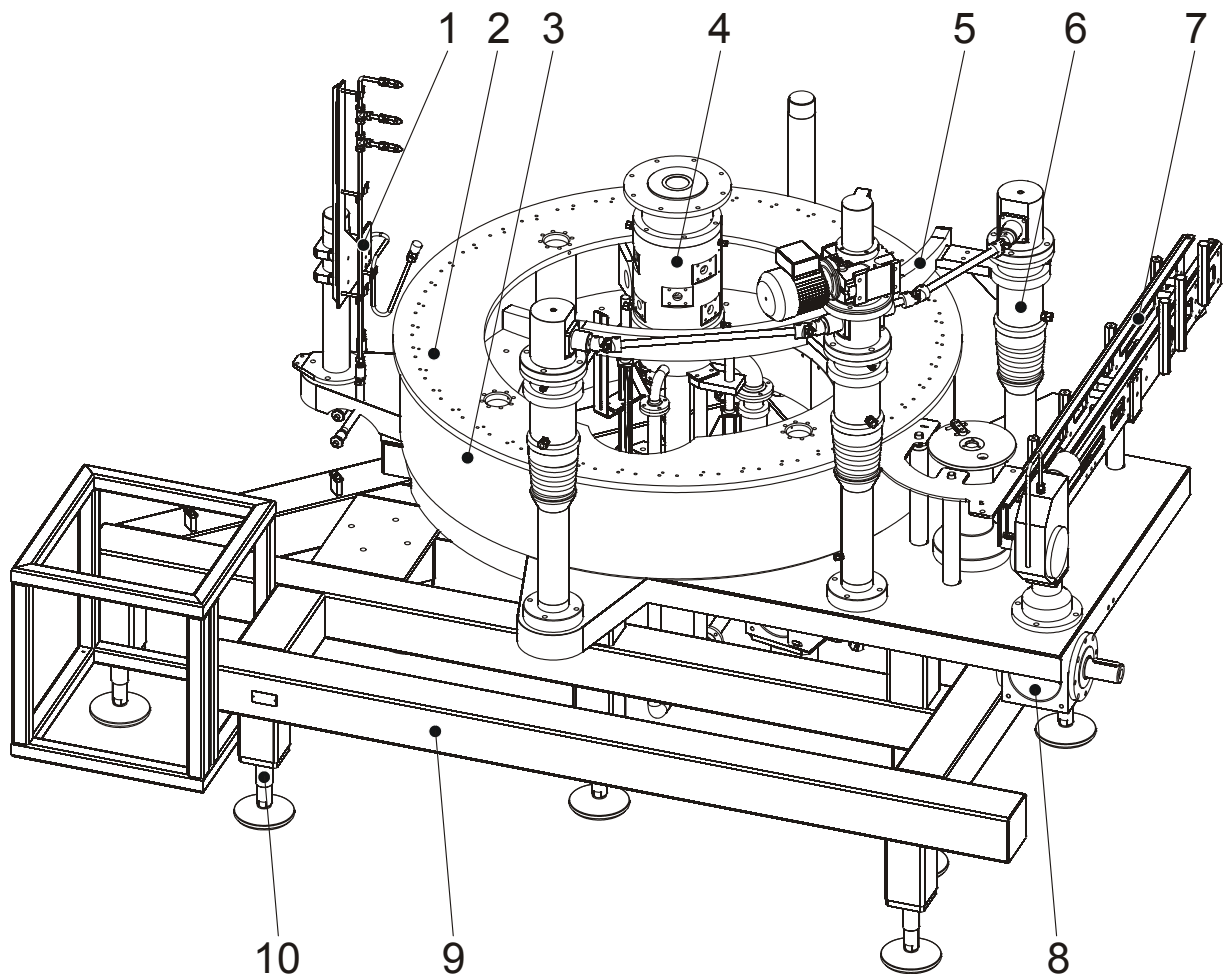
The pressure controller **(1)** to adjust the air pressure is located under the filler terminal box.



Pressure setting: see chapter Technical Specifications, Requirements and Settings.

Filler Base

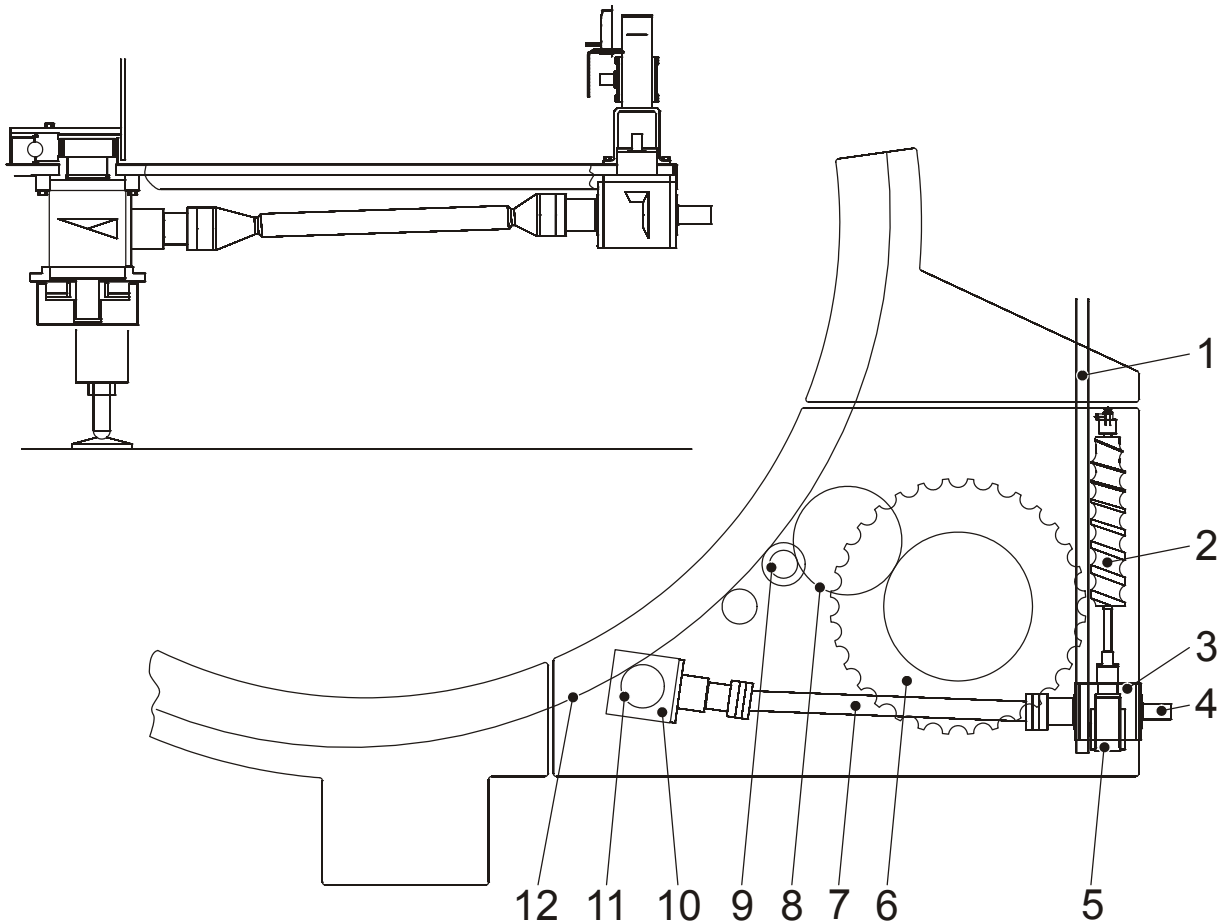
**Figure 1-12 :
Filler Base**



- 1 Valve spray-off
- 2 Can table
- 3 Ball bearing rim of the filler turret
- 4 Rotary leadthrough
- 5 Cam race
- 6 Columns for the cam race
- 7 Infeed conveyor
- 8 Drive unit for the rotating container table
- 9 Base frame
- 10 Height adjustable cup-shaped feet

Drive

Figure 1-13 :
Gear train



The can filler is driven from the can sealer through joint shaft (4) to gear (3) and from here through joint shaft (7) to gear (10). The gear wheel (11) drives the ball bearing slewing rim (12). Gear wheels (9), mounted on a shaft, the intermediate wheel (8) and the infeed star (6) are driven by this ball bearing slewing rim. Gear (5), located above gear (3), drives the infeed worm (2) and the infeed conveyor (1).



All gear train lubrication points are connected to the central lubrication unit.

Interrogating the Machine Timing

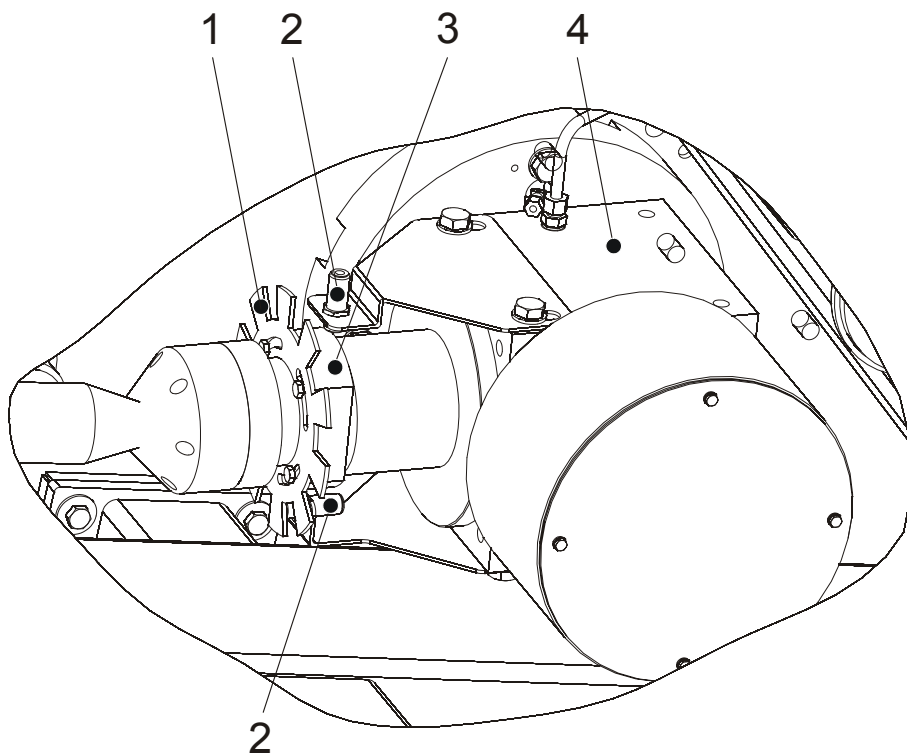


Figure 1-14 :
Interrogating the
Machine Timing

A timing disk **(1)** (1/5 machine cycle) and a cam actuator **(3)** (1/1 machine cycle) are flanged to the gear **(1)** of the main drive in the filler base to interrogate the machine timing.

The timing disk activates proximity switches **(2)** during each revolution.

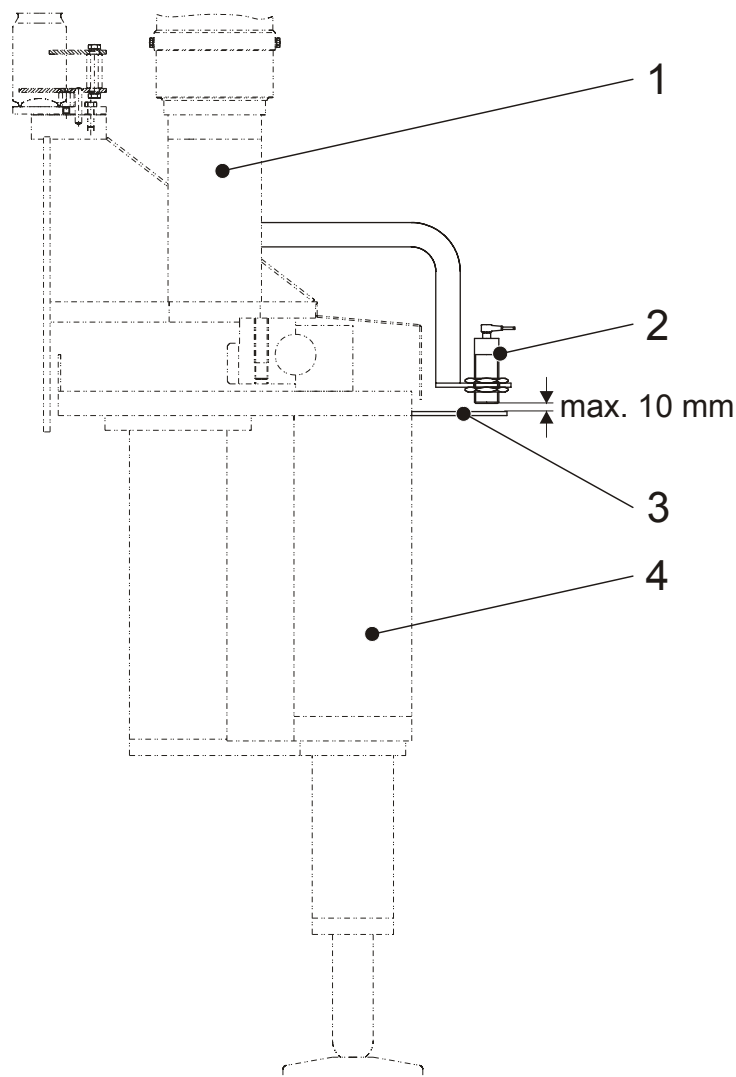
The electrical pulses emitted are forwarded to the filler control.

The distance between the timing disk and the proximity switch should be **max. 5 mm**.



Synchronous Timing

Figure 1-15 :
Synchronous
Timing



The synchronous timing is generated by a proximity switch (2) mounted on the filler turret (1) and a switching vane (3) mounted on the filler base (4). Synchronous timing signals are thus generated during filler rotation.



Set the distance between the proximity switch and the switching vane to a maximum of **10 mm**.

Filler Turret

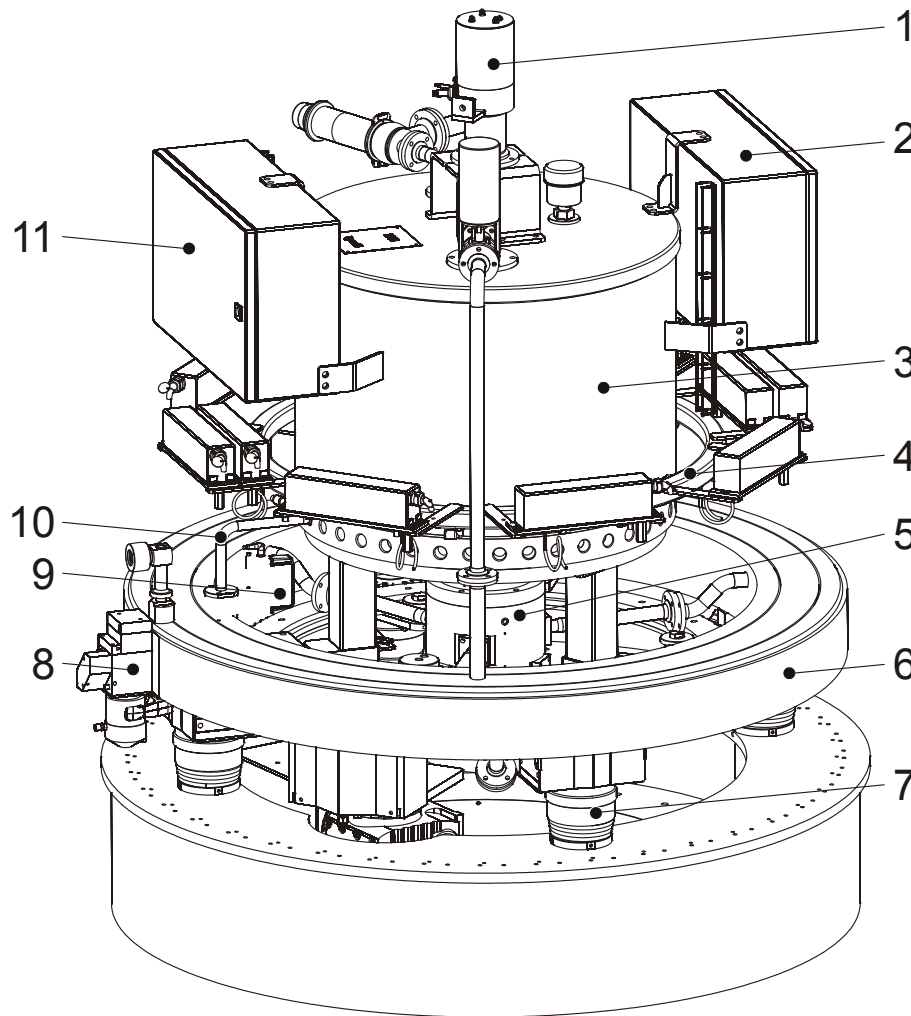
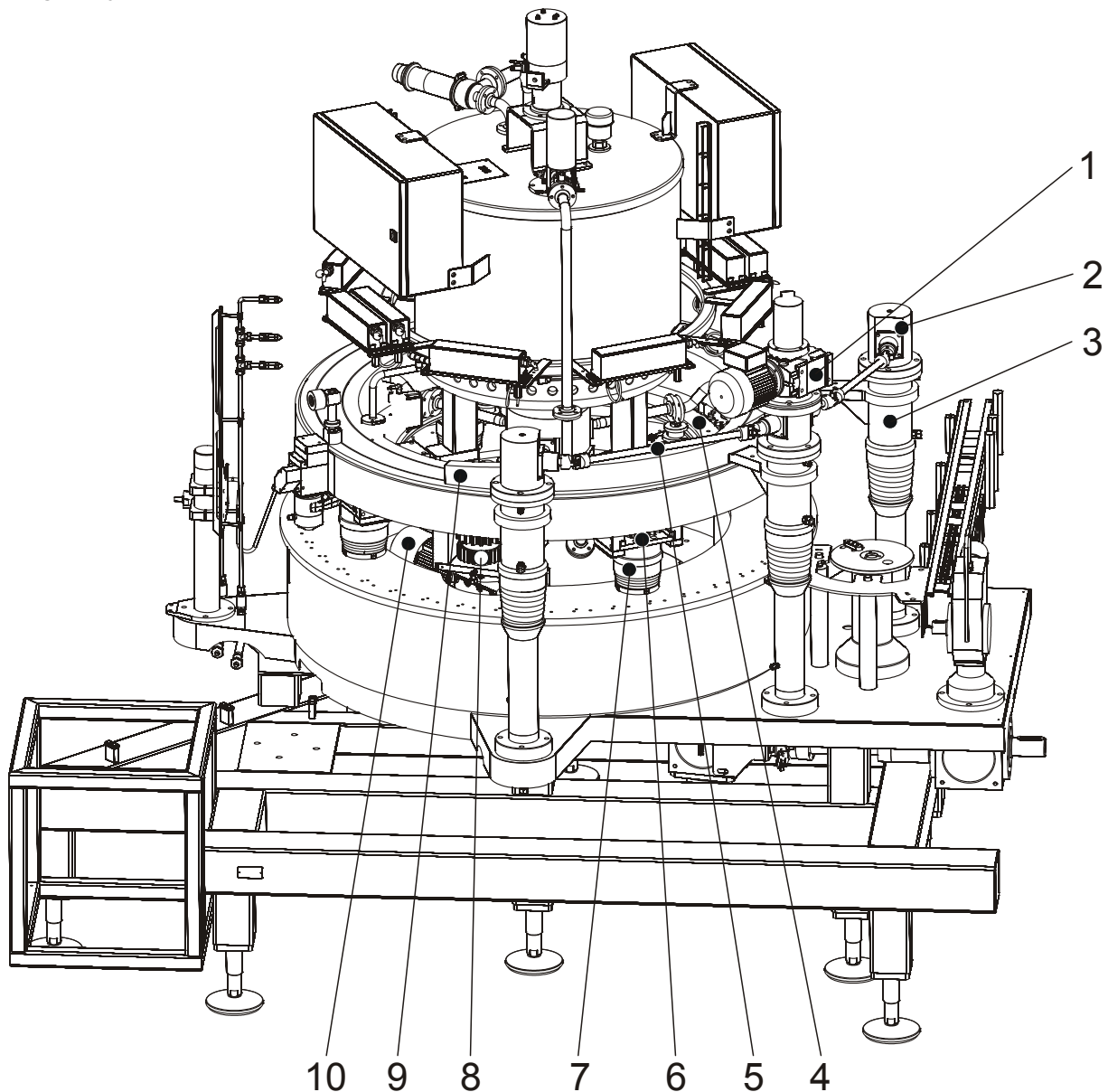


Figure 1-16 :
Filler Turret

- 1 Distributor for electrical power, control air, and lubrication
- 2 Pneumatic equipment cabinet
- 3 Central tank for product and pressurization gas.
- 4 Control air ring and valve panels for filling element control
- 5 Rotary leadthrough
- 6 Distributor ring for product, pressurization gas, and return gas
- 7 Inner columns
- 8 Filling elements
- 9 Flowmeter for product
- 10 Connecting line between the central tank and distributor ring
- 11 Pneumatic equipment cabinet

Height Adjustment

Figure 1-17 :
Height Adjustment



Use the height adjustment to adjust the height of the filler turret and the cam race (9) to adapt the machine to cans of different heights. The heights of the filler turret and the cam race are each adjusted by their own drive system. The machine control controls both systems. Each system is equipped with a rotary pulse generator that signals the current height to the machine control. Limit switches are used to limit the minimum and maximum heights. The height adjustment is operated by controls at the operator panels and operator terminal (see **Changeover / Height Adjustment**).

Filler Turret Height Adjustment

The driving gears (6) of the threaded spindles of the inner columns (7) supporting the filler turret are interconnected by a gear rim (4). The gear rim rests in a guide. The driving gear (8) of the gear motor (10) mounted on the filler turret engages in the teeth of the gear rim. The gear rim moves the inner column up or down depending on the direction of rotation of the driving gear.

Height Adjustment Cam Race

The cam race (9) is mounted between the container discharge and infeed. The control roller, controlled by the cam race, lowers the centering bell on the empty containers and lifts it off the full containers.

The cam race is equipped with a height adjustment facility to change the height.

The universal joint shafts (5) begin to turn when the gear motor (1) is switched on. The gear (2) likewise turns the threaded spindles in the columns (3) thus adjusting the height of the cam race. The height adjustment is controlled by rotation pulse generators.

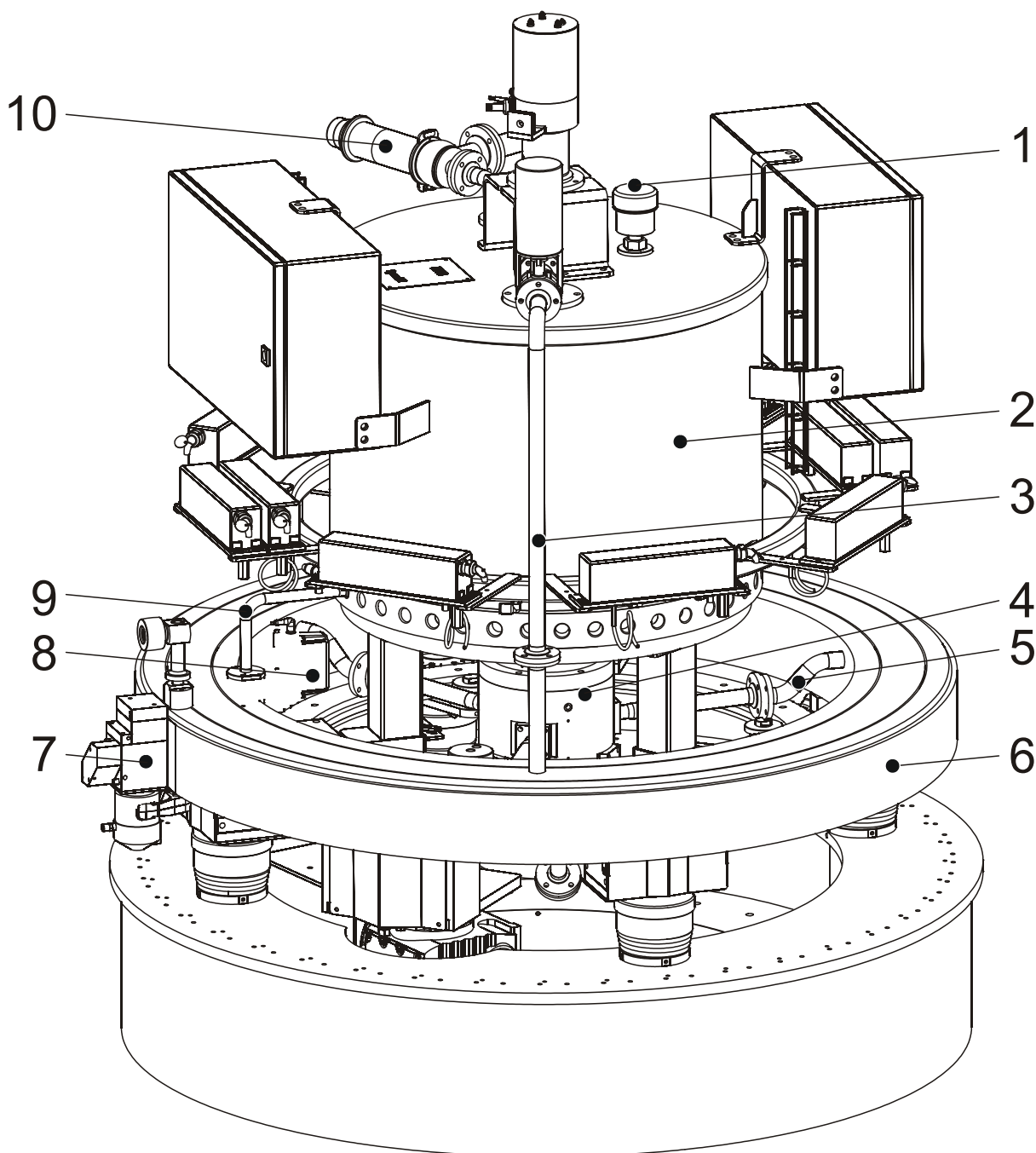
The machine is operated at the operator panel aided by operator prompting.

Refer to the chapter ***Servicing / Lubrication Schedule*** or the manufacturer specifications contained in the ***List of Purchase Parts*** for information on lubrication intervals and lubricants.



Central Bowl and Distributor Ring

Figure 1-18 :
Ring Bowl and
Distributor Ring



The media required for production operation and sanitizing are distributed to the filling elements through the central bowl and the distributor ring. The media are conducted through pipes from the media distributor to the central bowl and distributor ring.

- 1 Probe for measuring the filling product level in the central bowl
- 2 Central bowl with chambers for product and pressurization gas
- 3 Piping for pressurization gas between the distributor ring and the central bowl
- 4 Rotary leadthrough
- 5 Product pipe
- 6 Distributor ring with pressurization gas, return gas, and depressurization channels
- 7 Filling element
- 8 Flowmeter for product
- 9 Piping for product between the central bowl and the distributor ring
- 10 Safety valve to relieve overpressure in the central bowl

Flowmeter for Product

A flowmeter is built in the connecting line between the ring bowl and the distributor ring for each filling element. The flowmeter exactly measures the amount to be filled in each container.

The filling volume for the container is set at the operator terminal and represents the setpoint volume for the flowmeter. The filling process is terminated when the filling volume measured by the flowmeter is reached.

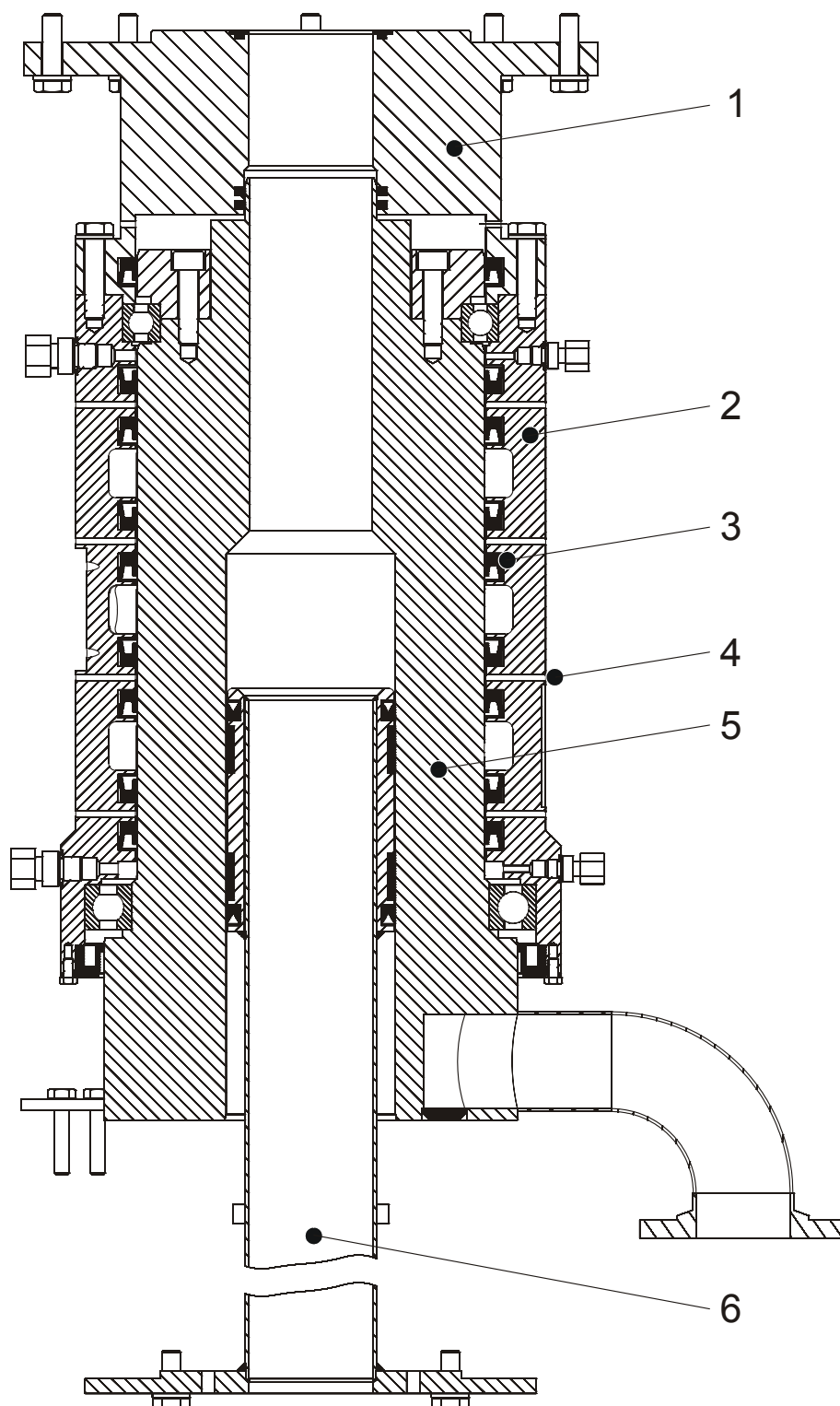


Refer to the description of the flowmeter contained in the List of Purchase Parts for information on operation, principle of operation, servicing, and correction of malfunctions.

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Rotary Leadthrough

Figure 1-19 :
Media Distributor



The rotary distributor is attached to the base of the central bowl. All stationary piping is conducted up from below; all outgoing piping radiate from the distributor ring.

The purpose of the rotary leadthrough is to conduct several pressure lines separately from the stationary to the rotating part of the filler carousel.

The rotary leadthrough shaft **(5)** is the stationary part of the rotary leadthrough while the flange **(1)** and the distributor housing **(2)** rotate together with the central bowl and the distributor ring.

The permanently mounted piping leading in from the outside is connected to the housing.

The product to be filled runs centrally through the feed pipe **(6)** and the rotary leadthrough into the central bowl.

The return and pressurization air leadthroughs lead in from connections through the axial holes in the thick-walled part of the rotary leadthrough shaft where they radiate outward at various levels.

Due to the various outlet levels of the pressure line, the pipes can be grouped in various chambers in the distributor housing and conducted to the ring chambers in the distributor ring.

The joint between each chamber to the neighboring chambers or bearings is secured by two seals **(3)**. Externally venting relief holes **(4)** are provided between the two seals.

Gas or liquids can escape through the relief openings should a seal become defective.

Maintenance

The bearings of the rotary leadthrough are connected to and lubricated by the central lubrication system.

The rotary leadthrough requires little maintenance.

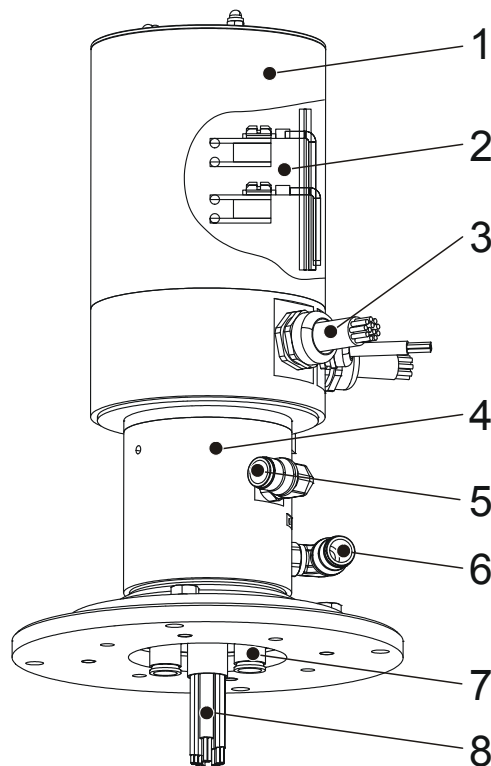


Always ensure that the leakage openings are kept **open!**



Distributor for Electrical Power and Control Air

Figure 1-20 :
Distributor for
Electrical Power
and Control Air



The distributor supplies control air, electrical power, and electrical control signals from the stationary to the rotating part of the filler.

- (1) Distributor for electrical power and control signals.
- (2) Collector rings and brushes in the distributor.
- (3) Power connection line from the stationary part of the machine.
- (4) Distributor for control air and grease.
- (5) Pneumatic supply line from the stationary part of the machine.
- (6) Grease supply line from the stationary part of the machine
- (7) Pneumatic supply lines leading to the rotary part of the machine.
- (8) Electrical lines to leading to the rotary part of the machine.



Refer to the manufacturer specifications for information on the servicing and adjustment work.

Valve Manifold to Control Filling Elements

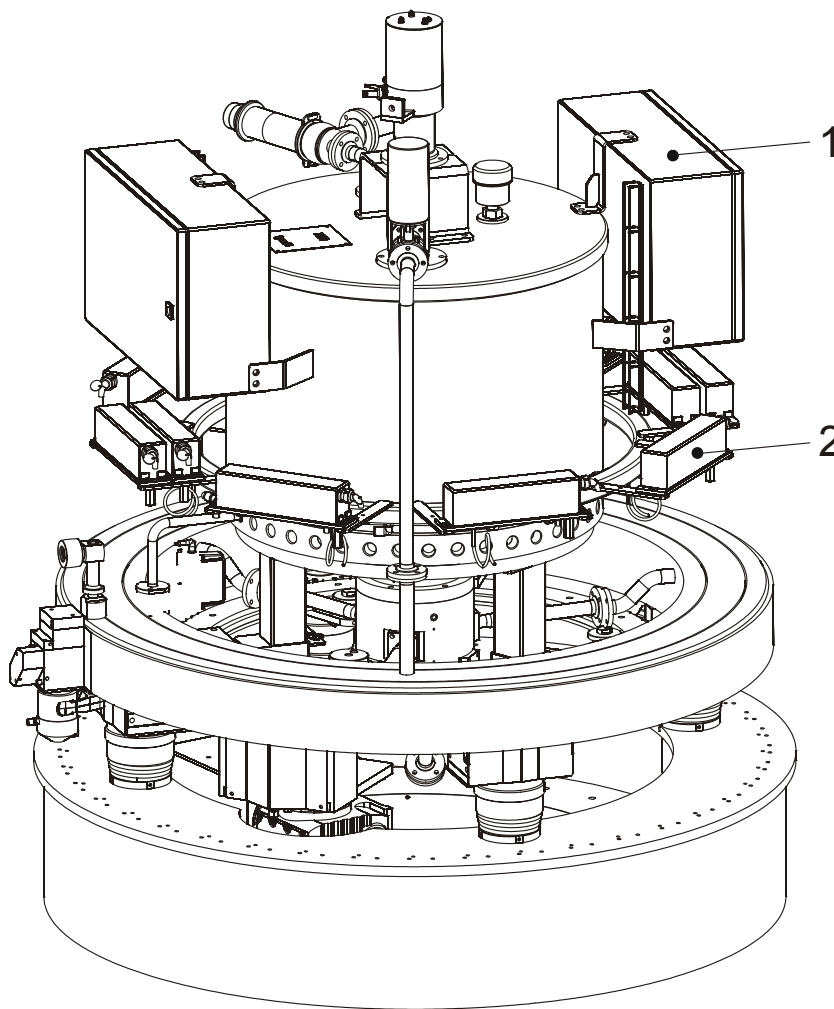


Figure 1-21 :
Valve Manifold

The control valves grouped in valve manifolds **(2)** open and close the pneumatically actuated control cylinders at the filling elements.

The control valves are actuated electrically by the machine control.

The valve manifolds are supplied from the control air and electrical power distributor by a pressure regulator in the terminal box **(1)**.

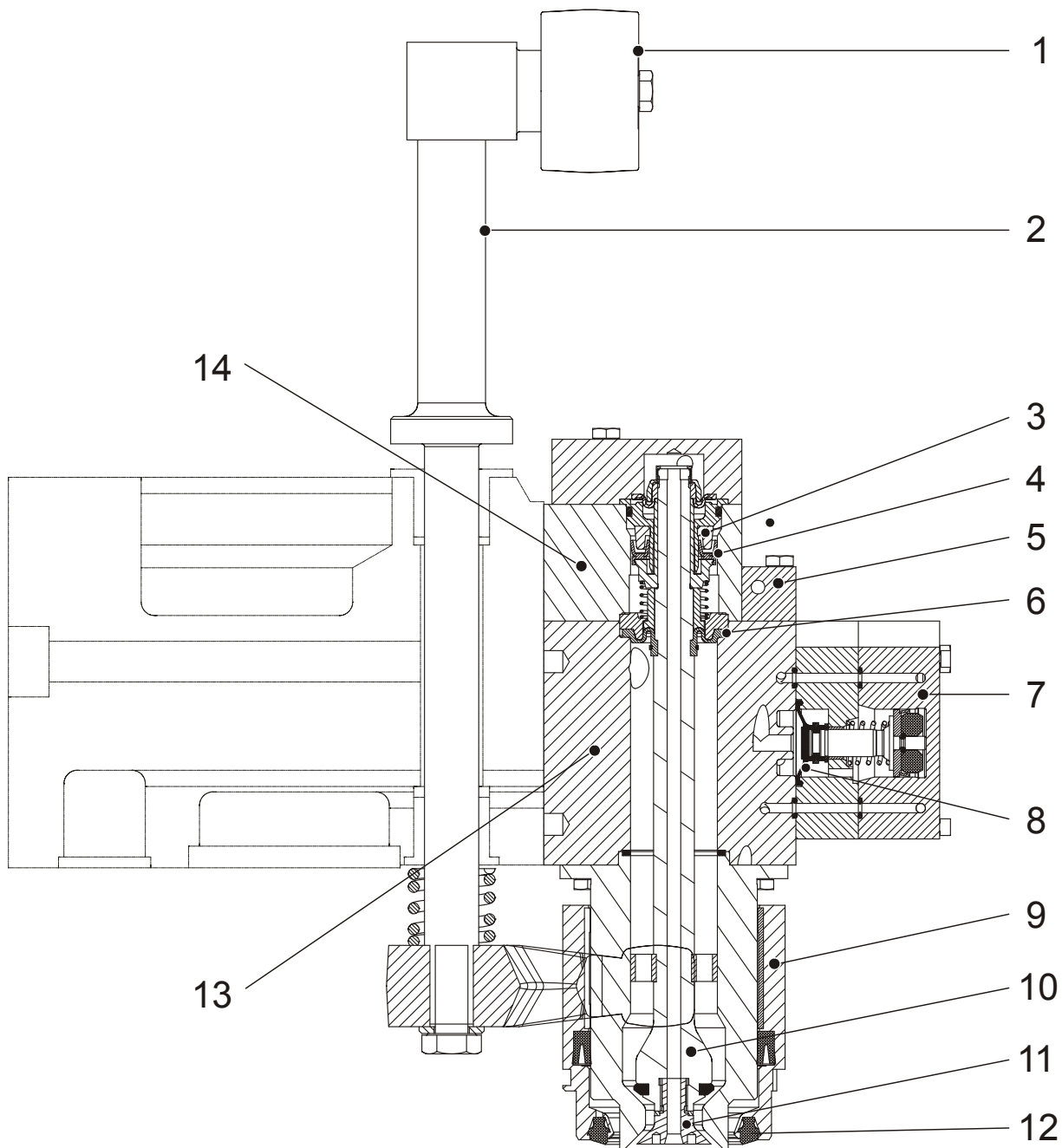
Also located in the terminal box is a pressure controller for setting the air for ventilating the electrical equipment.

Setting the pressure regulator: See section, "Air Settings" in chapter, "Technical Specifications".



Filling Element Design

Figure 1-22 :
Filling Element
Design



The filling elements are flanged to the outside of the distributor ring. All media path cross-sections designed accordingly to meet filling and cleaning requirements.

Valve Housing and Valve Head

Located in the valve housing **(13)** and valve head **(14)** are the valve tube and channels for product, pressurization and return gas, and rinsing and pressure relief gas.

Main Cylinder

The valve tube **(10)** and the valve cone **(11)** are actuated by a pneumatic cylinder **(3)** to open and close the product channel. The cylinder space is sealed off from the product and gas channels by membranes **(4, 6)**.

Nozzle Bar

Pressure relief nozzles are located in the nozzle bar **(5)**.

Gas Control Cylinder

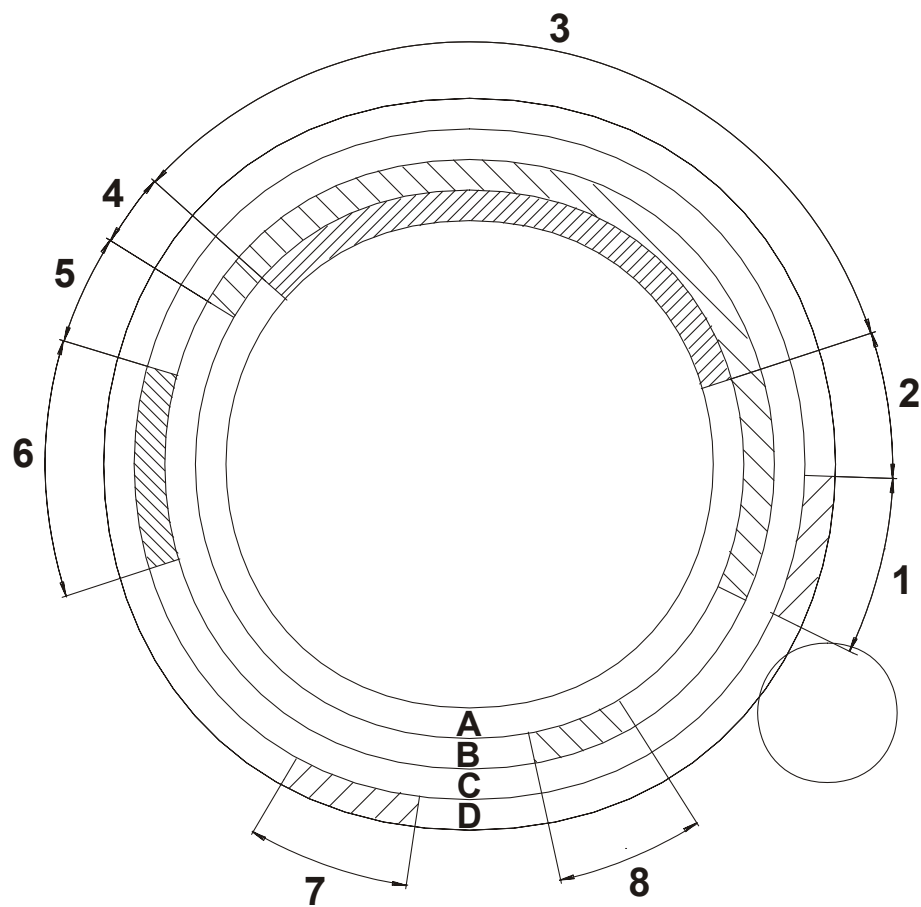
The various gas passages in the filling element are opened and closed by pneumatically actuated gas control cylinders **(7)**. The cylinder space is sealed off from the gas passage by a membrane **(8)**.

Centering Bell

A moveable centering bell **(9)** and rubber contact seal **(12)** are mounted on the bell rod **(2)**. A control roller **(1)** running along the control cam moves the bell rod and thus the centering bell.

Principles of Filling Element Operation

Figure 1-23 :
Filling Scheme



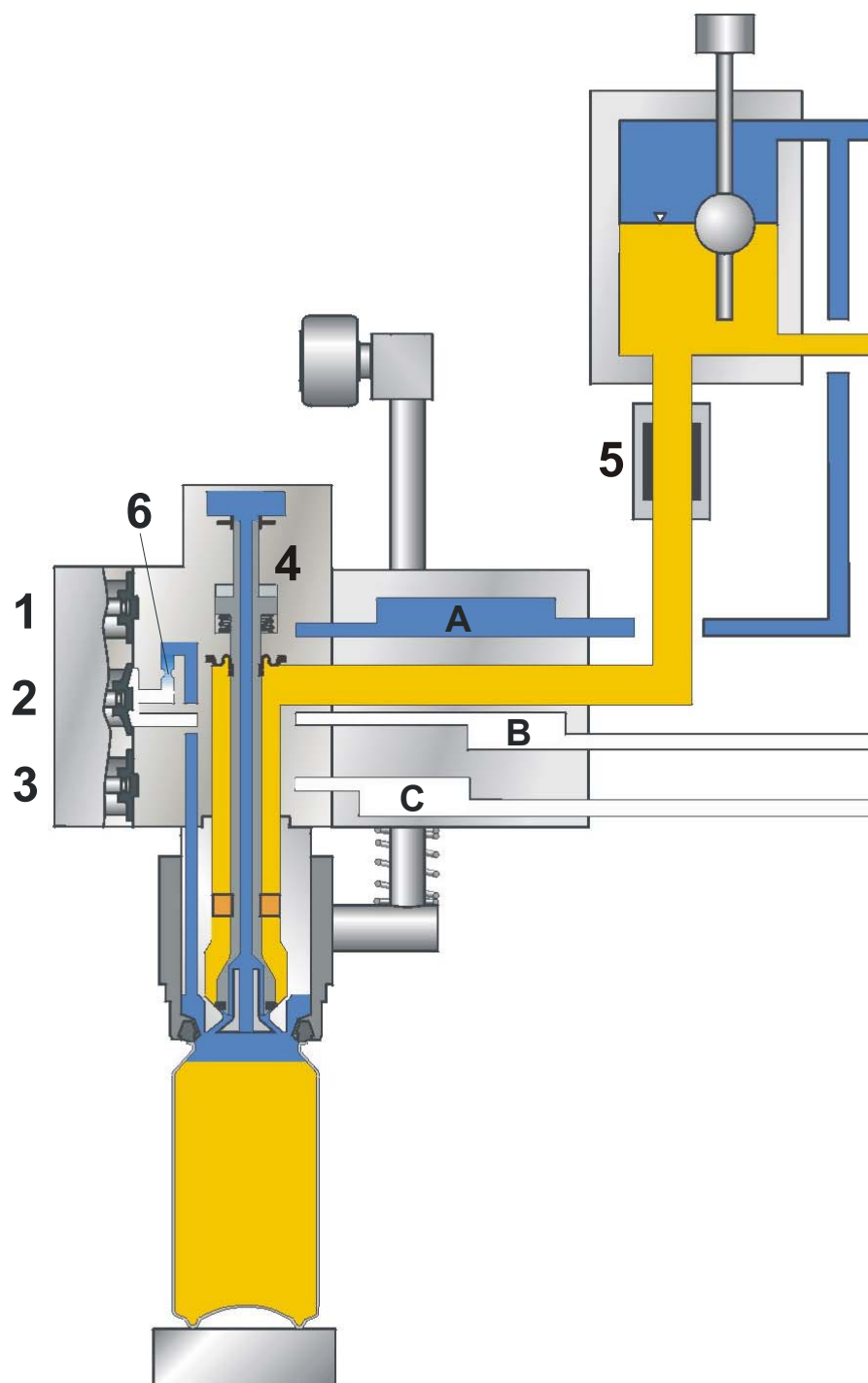
A	Product cylinder	Closed	
		Open	
B	Pressurization gas cyl.	Closed	
		Open	
C	Pressure relief cylinder	Closed	
		Open	
D	Rinsing cylinder	Closed	
		Open	

1	Prerinsing
2	Pressurize
3	Set filling volume
4	Return gas reserve
5	Calming
6	Pressure relief
7	Final pressure relief and centering bell pulloff
8	Blowout

Can Infeed

The cans are pushed onto the lower chucks by the infeed starwheel. The can is simultaneously held in place by lowering the centering bell and sealed gas tight from the atmosphere by a rubber contact seal.

Figure 1-24 :
Principles of Filling
Element Operation



A = CO2

B = Pressure relief

C = CO2 rinsing

Prerinsing

The pressurization cylinder **(1)** and CO2 rinsing cylinder **(3)** are opened. This opens a passage between the can with the pressurization channel and the CO2 rinsing channel. CO2 flows out of the pressurization gas channel into the can thereby displacing the air into the CO2 rinsing channel. The CO2 rinsing cylinder is closed at the end of the rinsing phase.

The duration of the prerinsing phase can be set at the operator terminal. (See Chapter **Operator Prompting**)

Pressurization

The can is pressurized to the pressure prevailing in the pressurization gas chamber through the open pressurization gas cylinder **(1)** and valve tube. Filling begins at the end of the pressurization period. The pressurization gas cylinder remains open during the filling process.

You can set the **pressurization period** at the operator terminal. (See Chapter **Operator Prompting**)

Filling

The main cylinder **(4)** is opened and the product flows out of the ring bowl through the flowmeter **(5)**, and filling element into the can. The pressurization gas contained in the can flows back through the valve tube and the open pressurization gas cylinder **(1)** into the pressurization gas chamber.

The filling speed attained during filling is primarily determined by the static filling level in the ring bowl. The filling level control can be used to adapt the speed to the requirements of the specific beverage and the shape of the can to be filled.

The filling process is ended when the set fill volume measured by the flowmeter is reached.

You can set the **setpoint filling volume** at the operator terminal. (See Chapter **Operator Prompting**)

End of Filling and Calming

The pressurization gas cylinder **(1)** is closed with a time delay after the main cylinder **(4)** is closed.

The beverage calms in the can after the pressurization gas cylinder is closed.

You can set the **time delay** for closing the pressurization gas cylinder and the calming period at the operator terminal. (See Chapter ***Operator Prompting***)

Pre-relief

The pressure relief cylinder **(2)** opens a gas passage and the pressure in the can is decrease through the nozzle **(6)**.

You can set the **pressure relief period** at the operator terminal. (See Chapter ***Operator Prompting***)

Final Pressure Relief

The rinsing cylinder **(3)** opens a gas passage to the CO2 rinsing channel. The pressure in the can drops to atmospheric pressure. The rinsing cylinder is closed again at the end of the final pressure relief period.

The beginning and end of final relief are fixed settings.

Blowout

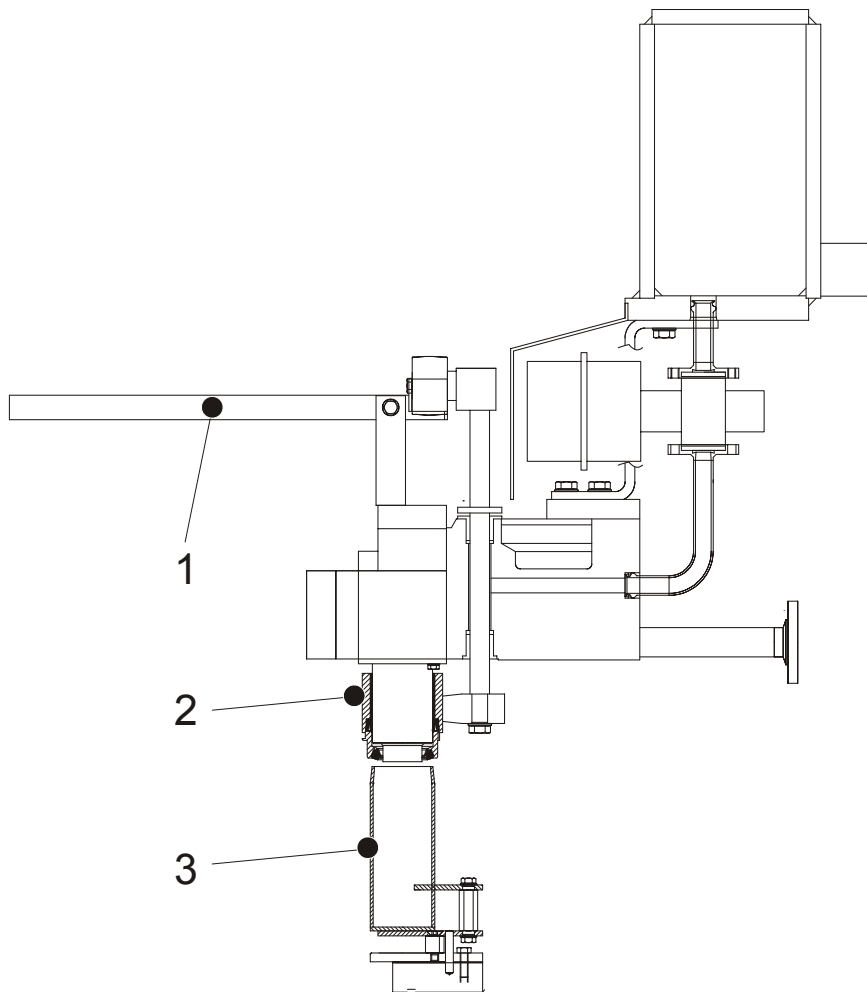
The valve tubes can be blown out with pressurization gas when the filling elements are located between the filler discharge and filler infeed. This removes any beverage still remaining in the return gas tube.

After the blowout function is switched on, the gas control cylinder is opened in the area between the filler discharge and filler infeed. The pressurization gas flows through the valve tube to the atmosphere. The blowout function is automatically switched off by the machine control after one revolution of the filler (all valve tubes are blown out once).

You can switch on the blowout function at the operator terminal. (See Chapter ***Operator Prompting***)

Test Can

Figure 1-25 :
Test Can



A transparent Plexiglas can is supplied for each type of can that you process.

You can use this can to watch the filling process at any filling valve.

To place the test can under the filling valve, push the bell (2) up by pressing the lever (1).

Wear **protective clothing** (e.g. a face shield) when carrying out filling tests using the transparent can.



Filling Element Control

The machine control activates the pneumatically actuated main and gas cylinders by electropneumatic pilot valves.

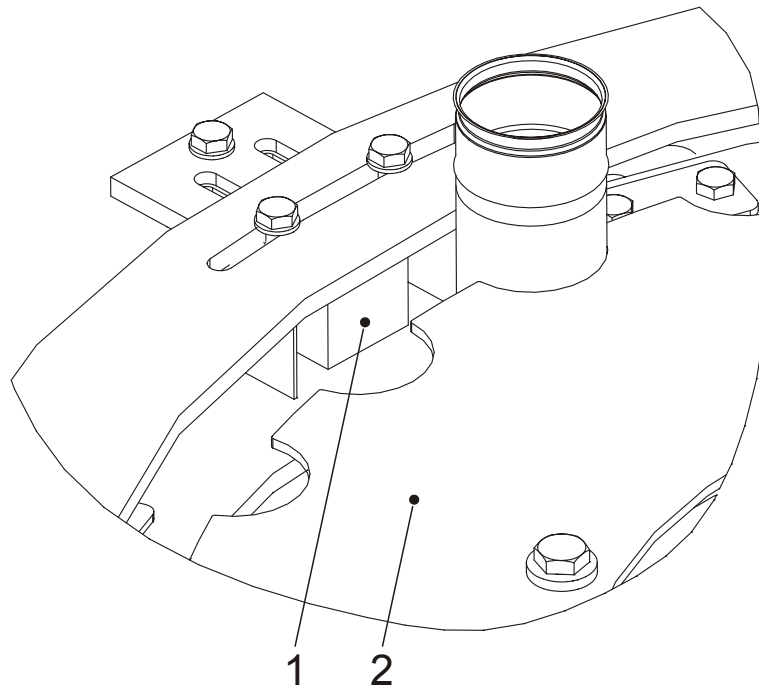
The actuation positions of the cylinders are calculated by the machine control based on the synchronous timing, the machine timing, and can sensing.



Refer to chapter **Machine Description** for information on synchronous and machine timing.

Can Sensing

Figure 1-26 :
Can Sensing



A proximity switch (1) senses whether or not a can is located under the filling element.

This proximity switch is mounted in the area of the infeed starwheel (2).

Filling Valve Operation Modes

The gas and media passages in the filling valve are opened or closed in various processing steps during preparation for production operation, production operation itself, and sanitizing.

The filling valve OP modes signal the machine control when the gas and media passages are to be opened and closed for the corresponding processing steps.

You can select the operation modes for the filling valves at the operator terminal of the filler.

The machine control activates the operation modes automatically for machines equipped with automatic valve manifolds.

Pressurizing

- Preparing for production.
- The gas and media passages are closed.
- The control valve in the product line regulates the filling level in the central bowl.

Filling

- Production
- The machine control opens and closes the gas and media passages according to the processing steps.
- The control valve in the product line regulates the fill level in the central bowl.

Filling Valve Rinsing/CIP Sanitizing

- Sanitizing (CIP) with rinsing sleeves in place.
- The machine control opens and closes the gas and media passages in fixed, predefined areas (angles) according to the circle described by the filling valve during one machine revolution.
- The control valve in the product line regulates the pressure in the central bowl.
- The valve in the pressurization gas line between the distributor ring and the central bowl is closed and the safety valve is open.

Central Bowl Rinsing/CIP Sanitizing

- Sanitizing (CIP) with rinsing sleeves in place.
- The machine control opens and closes the gas and media passages in fixed, predefined areas (angles) according to the circle described by the filling valve during one machine revolution.
- The control valve in the product line regulates the pressure in the central bowl.
- The valve in the pressurization gas line between the distributor ring and the central bowl is open and the safety valve is shut.

Steaming

- Sanitizing (CIP) with rinsing sleeves in place.
- The gas and media passages are open.
- The control valve in the product line regulates the pressure in the central bowl.

Clear Rinsing

- Rinsing into the open
- The machine control opens and closes the gas and media passages in fixed, predefined areas (angles) according to the circle described by the filling valve during one machine revolution.
- The control valve in the product line regulates the pressure in the central bowl.

Draining

- Draining into the open
- The gas and media passages are open.

Blowing Dry

- Drying the gas passages.
- The machine control opens and closes the gas and media passages in fixed, predefined areas (angles) according to the circle described by the filling valve during one machine revolution.

Intermediate Rinsing

- Rinse the purging and sniffing gas channels into the open
- The machine control opens and closes the gas and media passages in fixed, predefined areas (angles) according to the circle described by the filling valve during one machine revolution.

CIP Cap Removal

- Venting the centering bells before removing the CIP caps.
- The machine control opens the purging gas cylinders at all filling valves.

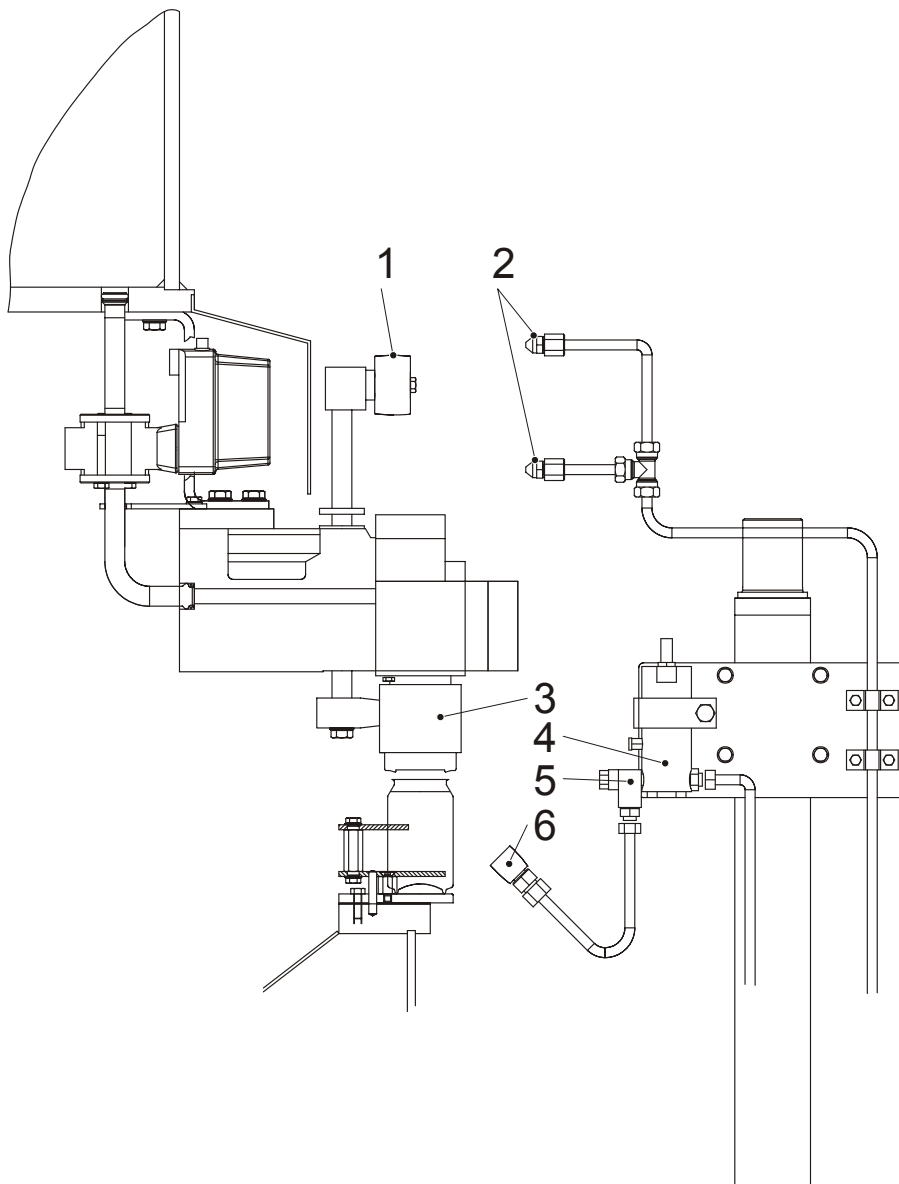
Filling Station Monitoring

Each individual bottle is checked during filling if a certain amount of product has flowed through the flowmeter within a specific time period.

If this quantity is not reached then the filler is stopped and an error message indicating the valve number is issued to the operator terminal.

Bell Actuator and Bell Sprinkler Lubrication

*Figure 1-27 :
Bell Actuator and
Bell Sprinkler
Lubrication*



As soon as the filler begins to rotate, the nozzles **(2)** spray the bell actuators **(1)** with water to lubricate them.

As soon as the filler begins to rotate without cans, the nozzles **(6)** automatically spray the bells **(3)** by opening the pneumatic valve **(4)**.

The volume of water can be set at the flow restrictor valve **(5)**.

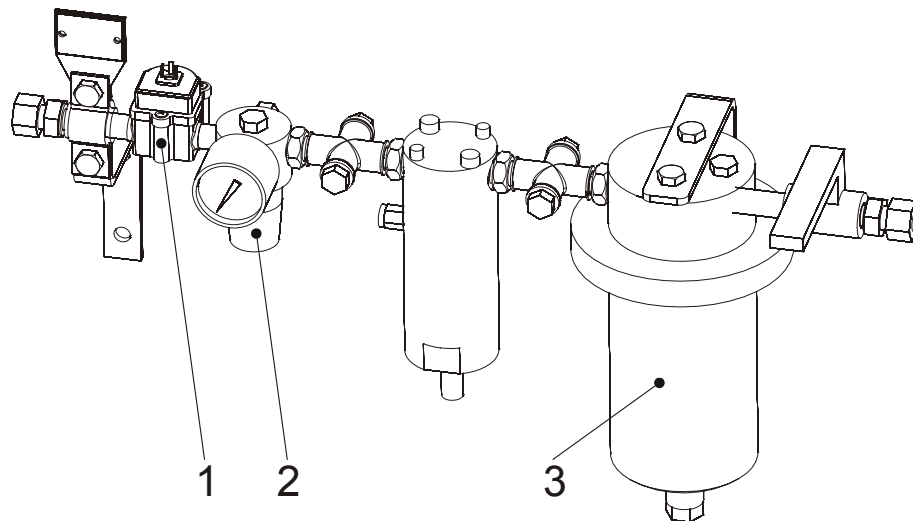
The spray unit is attached to a column of the exterior paneling.

Supply Unit for Bell Actuator Lubrication

The bell actuators of your machine are equipped with a lubricating system.

The supply unit is located at the filler valve node.

Figure 1-28 :
Supply Unit for
Lubrication of Bell
Actuation



Principles of Lubricator Operation

As soon as the filler begins to rotate, the bell actuators are sprayed with water.

The water is supplied to the nozzles through a filter (3), a pressure reducer (2), and a flow monitor (1).

The exterior lubrication function is monitored by a flow monitor. The machine drive is switched off when the flow rate is too low.



- The water supplied must be drinking water grade water.
- Set a water pressure of **3 bars** at the pressure reducer.

Technical specifications

General Safety References

Before the first work on the machine is undertaken, important information on safety must have been read and understood.

This particularly refers to the safety brochure "**Safety - principles for filling plants in the beverage industry**".



It is imperative that this brochure be read and observed prior to installation, connection to energy supply lines, test runs and commissioning of the machine.

In addition, further safety references relating particularly to this machine and included in this manual are to be observed.

The safety equipment of the KHS machines corresponds to the regulations of the professional association, to the law relative to appliance safety (GSG) and the regulations of the EC machine guideline as currently known.

With appropriate operation and for operation with the permissible use (see section Correct use) a hazard to staff or machine is reduced to a measure which is achievable according to the state-of-the-art technology.



Locked, separating protective devices

Locked, separating protective devices switch off the machine when opening doors and safety devices protected with limit or proximity switches.

Do not remove protective covers

Fixed protective covers are mounted at potential danger locations when accessibility is not necessary for the proper operation and regular maintenance. They are connected with the machine and can only be detached by means of special tools. Such covers must not be removed during machine operation and the machine must not be started with covers removed.

Actuate emergency-off switch only in case of danger

Emergency-off switches in the operating panel and at the machine are only to be actuated when staff or machine are at risk.

Please note the intended purpose of the EMERGENCY STOP switch

The emergency-off switches must not be used to switch off the machine in normal cases !

The emergency-off switch locks automatically when actuated.

The machine should only be started again after exclusion of danger for staff and machine !

Intermediate storage

Should it become necessary to place machines and/or components in intermediate storage, then the following conditions must be provided in order to avoid damage to any components sensitive to temperature, moisture, and corrosion.

- Protect the machines and their components against dirt, dust, and paint particles. Cover the machines with plastic foil.
- Store at a room temperature of between -10°C and +50°C.
- Prevent the accumulation of condensation in and on the machine. Provide adequate ventilation.
- Avoid exposing the machine to solvent, acid, and caustics vapors in the immediate vicinity of the machine.
- Place the machine on an even surface. Ensure that the machine is supported evenly by all foot spindles.
- During extended periods of intermediate storage (> 4 to 5 months), check whether or not the batteries in the PLC are intact and if the program and all its components are still stored. When in doubt, check with KHS personnel or authorized KHS personnel.

Variable program components may be entirely or partially lost during extended periods of intermediate storage or if the capacity of the buffer batteries is insufficient. A diskette included in the electrical documentation contains the original control program so that the original version of the program can be restored at any time.

Installation

The installation site is specified in the planning documents. However, in any event it should be ensured that sufficient space is available for maintenance and repair work, not only on the machine itself but also on the container conveyors.

You should also ensure that the installation site is not located in a high disturbance area. Avoid placing the machine high noise areas and in the vicinity of water, falling containers or packaging, broken glass, heavy accumulation of dirt, acids, caustics, etc.

The flooring of the installation site requires sufficient firmness. Refer to foot spindle load ratings in the "Technical Specifications" chapter. The flooring should be even, smooth, and, as the surrounding walls, should be easy to clean.

The machine is shipped completely assembly to a greatest possible extent. Certain parts must be reassembled in the machine in those instances in which it was necessary to partially disassemble the machine prior to shipment. Please observe the following during installation:

- Place the container infeed and discharge with regard to space according to the project plan. The conveyor belt connections must not be rearranged.
- Align the individual components of large machines. Observe the markings when coupling the machine elements.
- Adjust the machine exactly using the foot spindles. Use a level to align the machine. Make certain that the lock nuts on the foot spindles are secured.

Assembly

We urgently recommend that the machine assembly work be performed by KHS staff or authorized KHS personnel only. KHS will accept no responsibility for damages occurring due to improper assembly work.



Place and align the machine at the installation site according to the project plan and in the direction of the container and packaging flow. Report any deviations from the project to KHS or a KHS representative.

Adjust the machines to the exact working level using the foot spindles. Ensure that the machine is exactly level.

Connect the power and air supply lines after completion of the assembly and alignment work. The piping connections are clearly marked. Assemble the pipelines according to the piping plan. Ensure that the piping is not under tension.

The container and packaging conveyors are to be coupled in like manner.

Instructions contained in the electrical documentation

Observe the correct direction of rotation when connecting the power supply lines.



A separate switch cabinet is delivered for the electrical control. The wiring for the loosely packed switching and control devices such as limit switches, approach switches, light barriers, etc. has already been provided in the switch cabinet, but must, however, be installed according to the separate instructions enclosed. The machine wiring diagram is located in the switch cabinet.

Electrical connections

The equipment required for the electrical machine control is located in a separate switch cabinet, which, depending on the project, can be placed in various positions in relation to the machine.

All of the devices built in the machine are connected to a terminal strip in the operator panel or in the terminal box.

The individual terminals in the switch cabinet and in the filler are marked according to DIN/VDE.



The wiring diagram and the operating instructions for special electrical components are located in the switch cabinet.

Machine specifications

Type	: Innofill DVD
Order No.	: 89 401 868 / 000600
Production No.	: 10 312 562
Machine No.	: 48176
Year of Manufacture	: 2008
Identification	: HANOI
Filling positions	: 40
Reference circle	: 1600
Pitch	: 125,7 mm
Closure type	: Can
Manufacturers	: FERRUM

Operating Instructions for Pressure Vessels in Accordance with Pressure Equipment Directive 97/23/EC

General Notes

These operating instructions apply to the pressure vessels integrated into the filler (referred to as ring vessel, tubular ring vessel, or central bowl in the filler operating manual).

The pressure vessel contains and stores pressurized media during production and cleaning.

The rating plate is mounted on the pressure vessel.

Warranty

Liability or warranty is excluded if:

- Modifications are made to the pressure vessel by persons not authorized to do so by KHS
- The pressure vessel is operated or used in a manner not described in the operating manual
- If the notes and instructions on safe handling of pressure vessels specified in the pressure equipment directives, this operating manual, and the filler operating manual are ignored and not applied.
- Safeguards are not used or rendered inoperable
- The pressure vessel including the related built-in parts are not correctly serviced

Safety Regulations

This pressure vessel is designed based on potential hazards according to media properties Article 9 Pressure Equipment Directive 97/23/EC "group 2 other fluids" (watery).

The technical specifications indicated on the rating plate must not be exceeded.

The vessels may be operated and maintained only by those persons who have received training in the handling of pressure vessels / pressurized equipment and are familiar with the regulations pertaining to operating pressure vessels.

Safeguards that have been removed for maintenance, cleaning, or repair work must be re-installed and tested if in proper working order immediately on completion of this work.

Pressure closures, attachment parts (screwed joints) and similar devices must not be opened while the vessel is under pressure.

Adherence and compliance with pertinent national regulations currently in effect at the installation site are mandatory.



Material Resistance

The plant operator is responsible for ensuring that only those media are used to which the pressure vessels including all attachment parts are resistant.

Cleaning

For the selection of cleaning media and methods, the plant operator is responsible for ensuring

- compliance with the compatibility of materials: see Filler Operating Manual, chapter, Operating Instructions, Material Compatibilities.
- compliance with the limit values for the use of cleaning media: See Limit Values for the Use of Cleaning Media in chapter, Operating Instructions of the filler operating manual.
- compliance with the technical specifications indicated on the rating plate of the pressure vessel.

Servicing

Inspect the pressure vessels for damage (e.g. seals, sealing surfaces, etc.).

Use only KHS-approved original spare parts.

Requirements and Settings

Air Requirements

Customer-supplied air	
Pressure	2 bars higher than the maximum filling pressure, minimum 6 bars, maximum 10 bars
Temperature	5 - 30° C
Pressure dew point	-70° C
Water content	0.003 g/m ³
Oil content	0.01 mg/m ³
Solids content	Maximum 5 mg/m ³ Maximum 5 µm
Particle density	
Particle diameter	
Filtration	Sterile filtered 0.2 µm

CO₂ Requirements

Customer-supplied CO ₂	
Pressure	2 bars higher than the maximum filling pressure, minimum 6 bars, maximum 10 bars
Temperature	5 - 30° C
Purity	Minimum 99.9%
Solids content	Maximum 5 mg/m ³ Maximum 5 µm
Particle density	
Particle diameter	
Filtration	Sterile filtered 0.2 µm

Water Requirements

Customer-supplied water	
Quality	Drinking water
Pressure	3.0 - 6.0 bars
Temperature	
Cold water	5 - 25° C
Hot water	70 – 95° C
Solids content	
Particle diameter	Maximum 10 µm
Silt density index (SDI)	1.5
Hardness	
Cold water	Maximum 8° German water hardness (= 14° French water hardness) (= 1.4 mmol Ca ²⁺ Mg ²⁺ per liter) (= 140 CaCO ₃ per liter)
Hot water	Maximum 4° German water hardness (= 7° French water hardness) (= 0.7 mmol Ca ²⁺ Mg ²⁺ per liter) (= 70 CaCO ₃ per liter)
Chloride content	
For flushing after interior and exterior sanitizing	Maximum 150 ppm/liter
For preparing cleaning medium	Maximum 35 ppm/liter

Customer-supplied feed water for generating steam	
Quality	Drinking water
Silicic acid, SiO ₂	Maximum 1.0 mg/l
Iron	Maximum 0.2 mg/l
Cadmium	Maximum 0.005 mg/l
Lead	Maximum 0.05 mg/l
Heavy metals	Maximum 0.1 mg/l
Chloride	Maximum 2.0 mg/l
Phosphates (P ₂ O ₅)	Maximum 0.5 mg/l
Conductivity (at 20° C)	Maximum 15 µS/cm
Hardness(Σ alkaline earths)	Maximum 0.02 mmol/l
pH	5 - 7
Visible characteristics	Colorless, transparent, and no visible residue

Steam Requirements

Customer-supplied steam	
Quality	Culinary and saturated
Pressure	0.5 - 2.5 bars
Temperature	110 - 140° C
Solids content	Maximum 3 µm
Particle diameter	

Cleaning Agent Requirements

Customer-supplied cleaning agents	
Temperature	See section, <i>Limit Values for the Use of Cleaning Agents</i> in chapter, <i>Operating Instructions</i> .
Concentration level	
Pressure	See section, <i>Settings</i> in chapter, <i>Technical Specifications</i> .
Solids content	Maximum 10 µm
Particle diameter	

Air Pressure Settings

Use	Pressure Setting	Location
Product control valve	6.0 bar	Pressure reducer at the fitting cabinet
CO2 control valve return gas control valve	6.0 bar	Pressure reducer at the fitting cabinet
Electrical component ventilation	1,5 bar	Pressure reducer in pneumatics cabinet under the control cabinet at the can infeed
Electrical component ventilation	0,5 - 1,0 bar	Pressure reducer in the can infeed and on the filler turret
Valve manifold for filling valve control	Equal to maximum filling pressure but minimum 4.5 bar	Pressure reducer on the filler turret

Water Pressure Settings

Use	Pressure Setting	Location
Valve spraying for cold fill for hot fill	3.0 bar 5 -25 °C 80 °C	Customer-provided
Bell actuation lubrication	3,0 bar 5-25 °C	Pressure reducer at valve node

Steam Pressure Settings

Use	Pressure Setting	Location
Cleaning (CIP)	0.5 bar 110 °C	Customer-provided
Steam filter cartridge	0.5 bar 110 °C	Customer-provided

Product Pressure Settings

Use	Pressure Setting	Location
Product pressure ahead of valve node	1.5 -2.0 bar more than the highest filling pressure	Customer-provided
Minimum filling pressure	2.0 bar Minimum of 1.0 – 1.5 bar more than the beverage saturation pressure	-
Maximum filling pressure	7.0 bar	-



Refer to section *Filler Specification Sheet* for information on the filling pressures and filling times for specific products and containers to be filled.

Cleaning Media Pressure Settings

Use	Pressure Setting	Location
Cleaning admission pressure	2.5 -3.0 bar	Customer-provided
Flow volume	250-300 liters per hour per filling station	Customer-provided

Filler Specification Sheet

Innofill DVD

Standard filling element parts

Filling element	651 - 55 - 430 S002
Rinsing cover	H 235 15 01 268 1
Relief jet 1,0 mm	
Filling procedure	650 - 36 - 197
CIP process	650 - 36 - 295
Rinse to the atmosphere	650 - 36 - 294
Blow dry	650 - 36 - 294
Intermediate rinse	650 - 36 - 294
Drain	650 - 36 - 294
Special equipment	Pressurization gas membrane made of Teflon

Filling batch	1	
Can contents [l]	0,33	
Can	206 / 211	
Filling product	Beer	
Can height [mm]	115,0	
Filling Output [cph]	30000	
Half speed [cph]	15000	
Filling Temperature [°C]	2,0 - 7,0	
CO ₂ content [gr/l]	5,5	
Filling pressure [bar]	2,5	
Ring tank level [%]	40	
Press against can [Pitch]	1,5	
CO ₂ rinse time [ms]	350	
Pressurization [ms]	330	
Set filling volume [ml]	330	
Return gas reserve [ms]	100	
Wait [ms]	250	
Relief [ms]	0	
Pressure relief pressure [bar]	-	
Start loss angle [Valve]	15	
Start final pressure relief [Valve]	14	
End of final pressure relief [Valve]	9	
Raise bell [Pitch]	1,5	
Start blow-out [Valve]	5	
Blow-out [ms]	0	
Media correction [%]	100	
Valve lead [ml]	10	

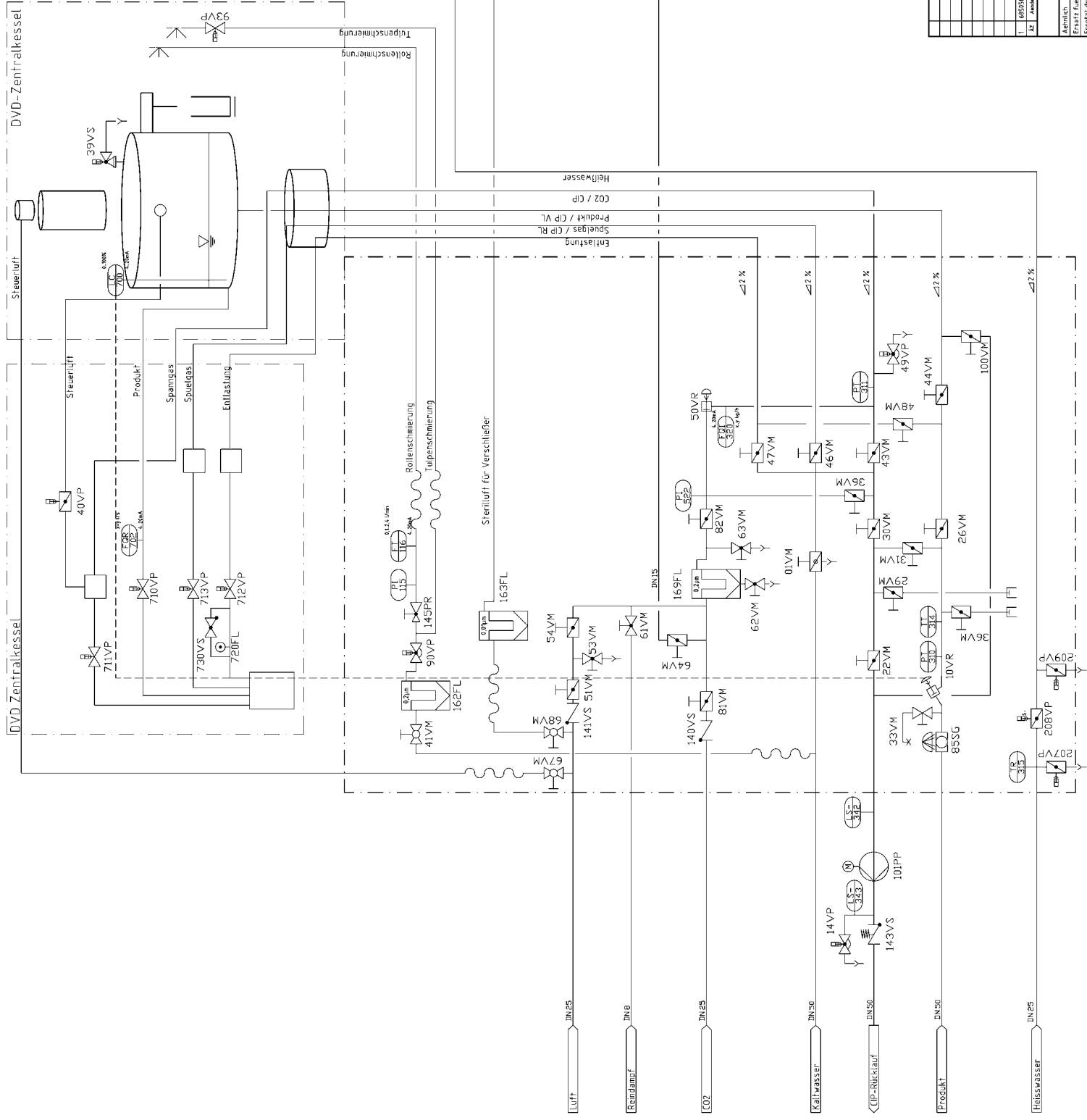
Modifications / Supplements				
Seq. No.	Name	Modification Part / Group	Person Resp.	Date

Remarks :

Piping Diagram (968 - 75 - 475)

Figure 2-1 :
Piping Diagram
(968 - 75 - 475)

German	English
Abschwallung Verschliesser	Capper flush-off
CIP - Rücklauf	CIP return flow
CO ₂	CO ₂
CO ₂ / CIP	CO ₂ / CIP
Dosenverschliesser	Seamer
Dosenvortisch	Can front table
DVD Zentralkessel	DVD Central bowl
Entlastung	Relief
Heisswasser	Hot water
Kaltwasser	Cold water
Lieferumfang Ferrum	Ferrum scope of delivery
Luft	Air
Produkt	Product
Produkt / CIP VL	Product / CIP PF (PF = primary feed)
Reindampf	Clean steam
Rollenschmierung	Roller lubrication
Spanngas	Pressurization gas
Spuelgas	Purging gas
Spuelgas / CIP RL	Purging gas / CIP RF (RF = return flow)
Sterilluft	Sterile air
Sterilluft für Verschliesser	Sterile air for capper
Steuerluft	Control air
Tulpenschmierung	Bell lubrication

[illegible]



Operating Instructions

Preparing for Operation

Prior to switching on the control voltage, check to ensure the following:

- That there is no one in hazardous machine areas
- That all safety screens and panels are closed.
- That all safety devices, controls, and instruments are in proper working order.
- That all guide parts are correctly installed.
- That the infeed and all guide parts are correctly assigned to the containers to be processed.
- That all foreign objects (tools, cleaning rags, etc.) have been removed from the machine.
- That all lubricants and operating materials are refilled
- That the compressed air, water, and electrical power supplies are ready.

General Notes on Safety

Those machine components through which hot media flow during production preparation, production operation, and cleaning attain operating temperatures that could cause burns when touched.

Please note that these components cool down slowly after switching off the machine for servicing and repair work.



There are pipes leading into the open throughout the entire piping system that can be opened by means of valves

There should be no one in the vicinity of draining pipes during production preparations, production operation, and cleaning.

Those persons performing work on the drains during production preparations, production operation, and cleaning must wear suitable protective clothing as a protection against burns and chemical injuries.



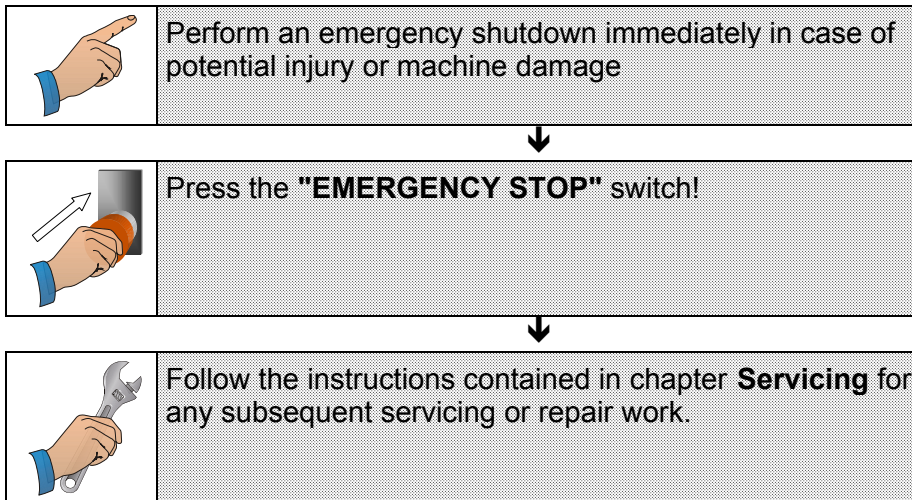
Layout of the Machine Control Panels

Refer to the machine's Electrical Wiring Diagram for information on locations of the control panels of your machine.

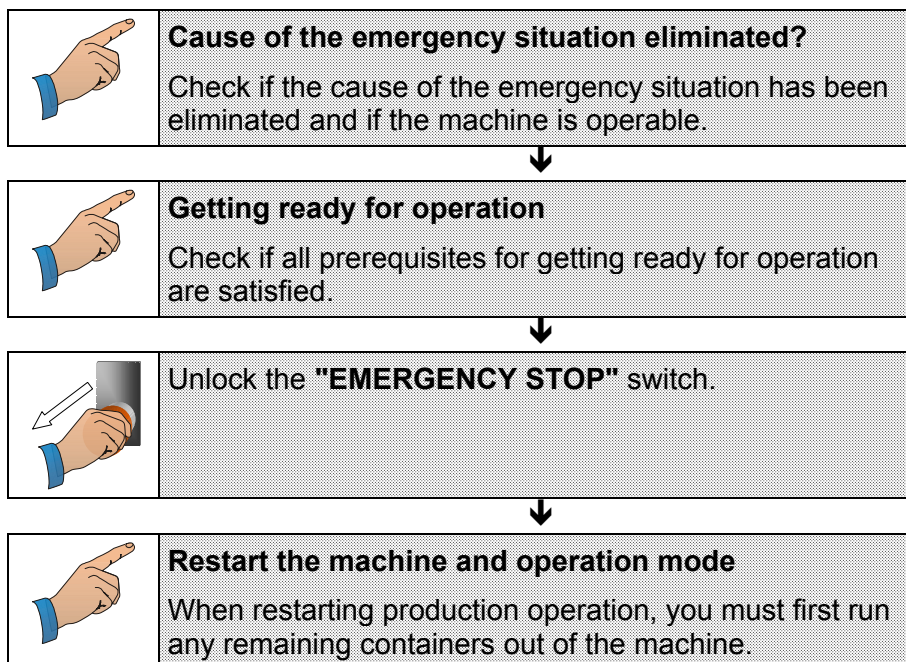
Layout of the Controls on the Control Panels

Refer to the machine's Electrical Wiring Diagram for information on layout of the controls on the control panels.

Emergency Shutdown in Case of Emergency



Restart After an Emergency Shutdown



Opening and Closing the Doors of the Machine Paneling

Safety switches lock the doors of the machine paneling while the machine is running.

The doors can be opened only when the machine is stopped and after releasing the locking mechanisms.

The doors of the front paneling can be opened "Production" mode (see Quick Opening of the Doors in the Front Paneling). The remaining doors in the machine paneling can be opened only in "Setup Mode".



During production operation, open the doors in the front paneling only in case of emergency.

Quick Opening of the Doors in the Front Paneling

	Press the "STOP MACHINE" button at the operator panel located at the front of the machine. Wait until the machine has stopped.
---	--



	Press the "OPEN DOOR" button at the operator panel located at the front of the machine. The machine control will unlock the doors. The yellow indicator lamp in the operator panel will flash. Open the door. The yellow indicator lamp in the operator panel will light.
---	--

Closing the Doors in the Front Paneling

	Close the doors. The yellow indicator lamp in the operator panel will flash. Press the "ACK ERROR" button at the operator panel located at the front of the machine. The yellow indicator lamp in the operator panel will turn off.
---	---

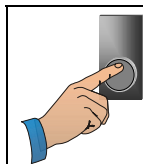


	Press the "START MACHINE" button at the operator panel located at the front of the machine.
---	--

Opening the Paneling Doors



Open the doors in the paneling for changeover and repair work only. Follow the instructions contained in the applicable safety instructions when doing so.



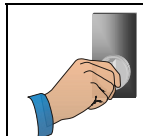
Press the "STOP MACHINE" button at the operator panel located at the front of the machine.
Wait until the machine has stopped.



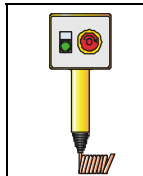
At the operator panel at the front of the machine, turn the "SETUP MODE / PRODUCTION" key switch to "SETUP MODE".
Remove the key from the key switch.



Open the mechanical lock of the door to be opened.



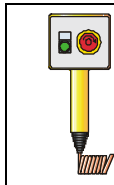
At the operator panel of the door to be opened, insert the key in the "RESET / OPEN" key switch and turn it to "OPEN".
The machine control will unlock the door.
The yellow indicator lamp in the operator panel will flash.
Open the door.
The yellow indicator lamp in the operator panel will light.



The machine can now be run in Inch mode by pushing the "Inch Machine" button at the portable hand unit.

Closing the Paneling Doors

Close the paneling doors only after all changeover and repair work has been completed and neither persons nor foreign objects (such as tools) are inside the machine.



End Inch mode and put the portable hand unit back in place in its holder.



Close the paneling door.
The yellow indicator lamp will flash.
Close mechanical lock in the door.



At the operator panel of the door to be closed, turn the "RESET / OPEN" key switch to "RESET".
The yellow indicator lamp in the operator panel will turn off.
Remove the key from the key switch.



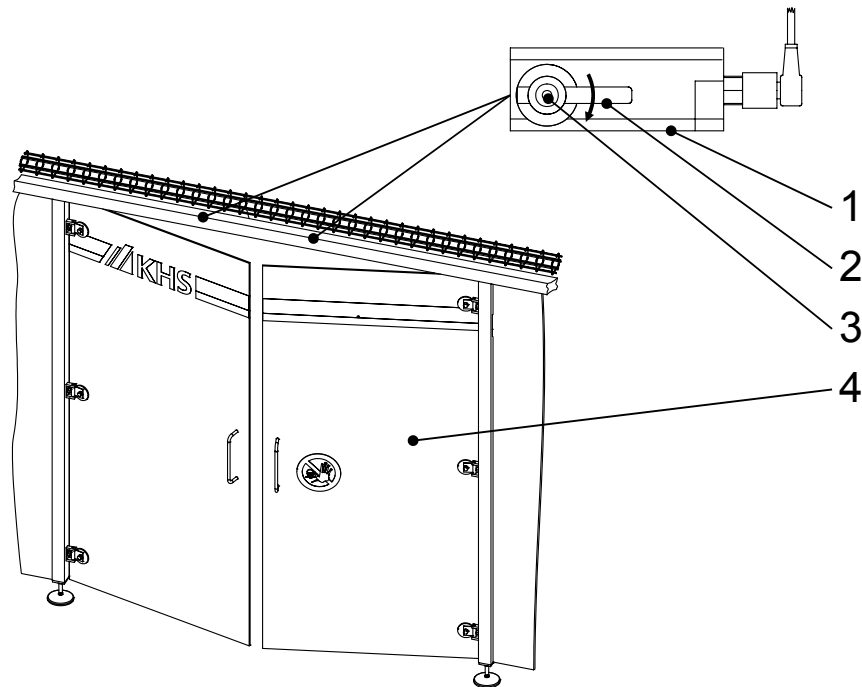
At the operator panel at the front of the machine, insert the key in the "SETUP MODE / PRODUCTION" key switch and turn it to "PRODUCTION".



You can now restart the machine.

Unlocking and Opening the Paneling Doors Manually in Case of Emergency

Figure 3-1 :
Safety Switches on
the Paneling Doors



Turn off the safety switch and open the door

In case of emergency, the electric safety switches **(1)** of the paneling doors **(4)** can be switched off as follows:

- Turn the red lever **(2)** on the safety switch downward in the direction of the arrow.
- Open the door.

Close the door and turn on the safety switch

After correcting the cause of the problem, turn the safety switch back on as follows:

- Close the door.
- Unscrew the screw **(3)** until the lever can be easily moved after pulling it out slightly.
- Return the lever **(2)** to its original position and retighten the screw **(3)**.

Jog Mode

Jog mode can be used to run the machine manually, step-by-step.

Jog mode is possible only if a door in the machine paneling is open.

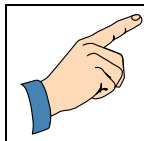
There is a danger of injury and machine damage when running the machine in Jog mode particularly if the safety doors in the machine paneling are open and there are personnel within the machine paneling carrying out maintenance and/or changeover work.

Danger of serious injury caused by crushing, cutting, seizing, and pull-in!

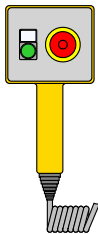
Rotating machine components can cause serious injury resulting from crushing, cutting, seizing, and pull-in!

Before running the machine in Jog mode, always ensure that there is no one inside the machine paneling.

Run Jog mode at a safe distance of at least 2 meters from rotating machine components.



Opening the door in the machine paneling:
see Opening and Closing the Doors in the Machine
Paneling in chapter, Operating Instructions.



Press the **"JOG MACHINE"** button on the portable
control unit to run the machine step-by-step.

Notes on removing rinsing sleeves and rinsing caps



The rinsing sleeves and rinsing caps are under pressure during preparation for production operation and during cleaning and may be removed only when indicated in the Operating Instructions.

Production

The individual steps for starting production operation are indicated in the following.

Strictly adhere to the steps of the startup sequence.



- Drain filler
- Pressurize the filler
- Draw in product
- Fill the ring bowl
- Start production

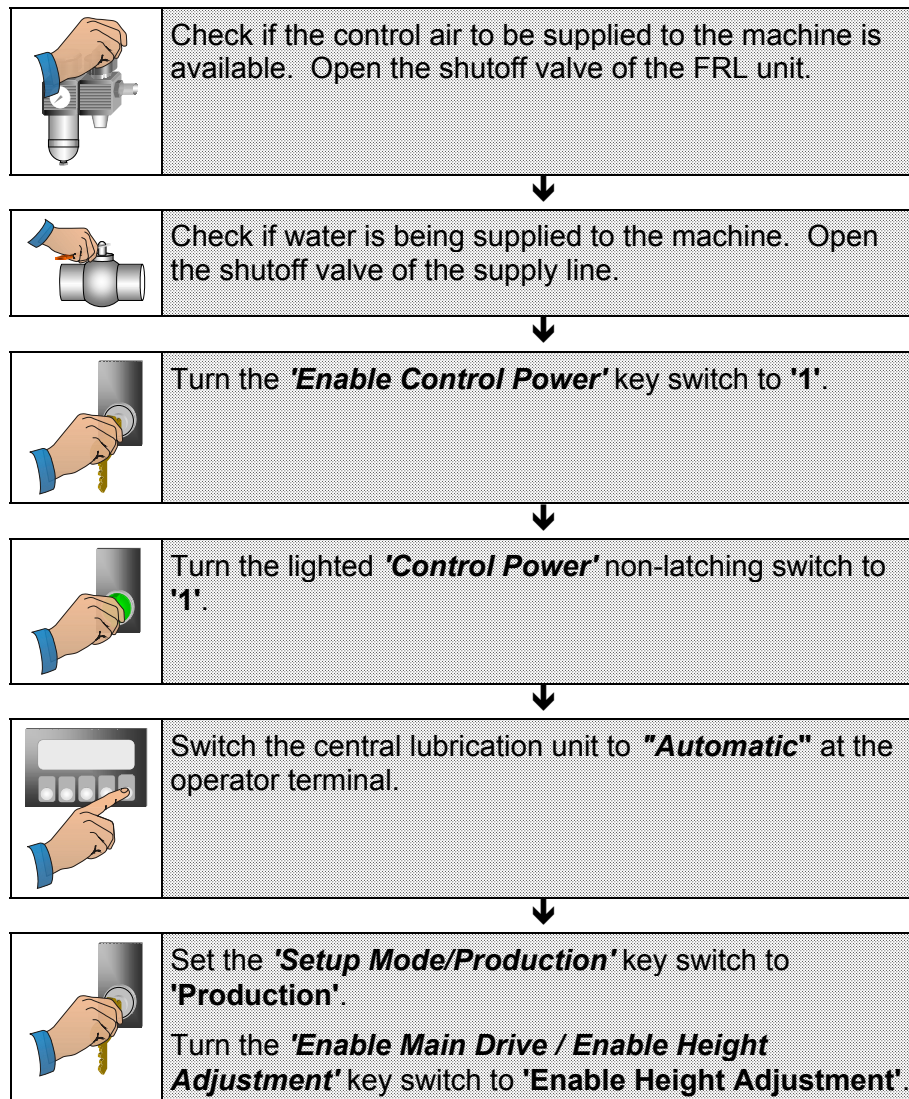
The times indicated in this chapter are reference values and must be adapted accordingly.

The pressurization gas to be used (air or CO₂) depends on the product to be filled by the machine.

Requirements

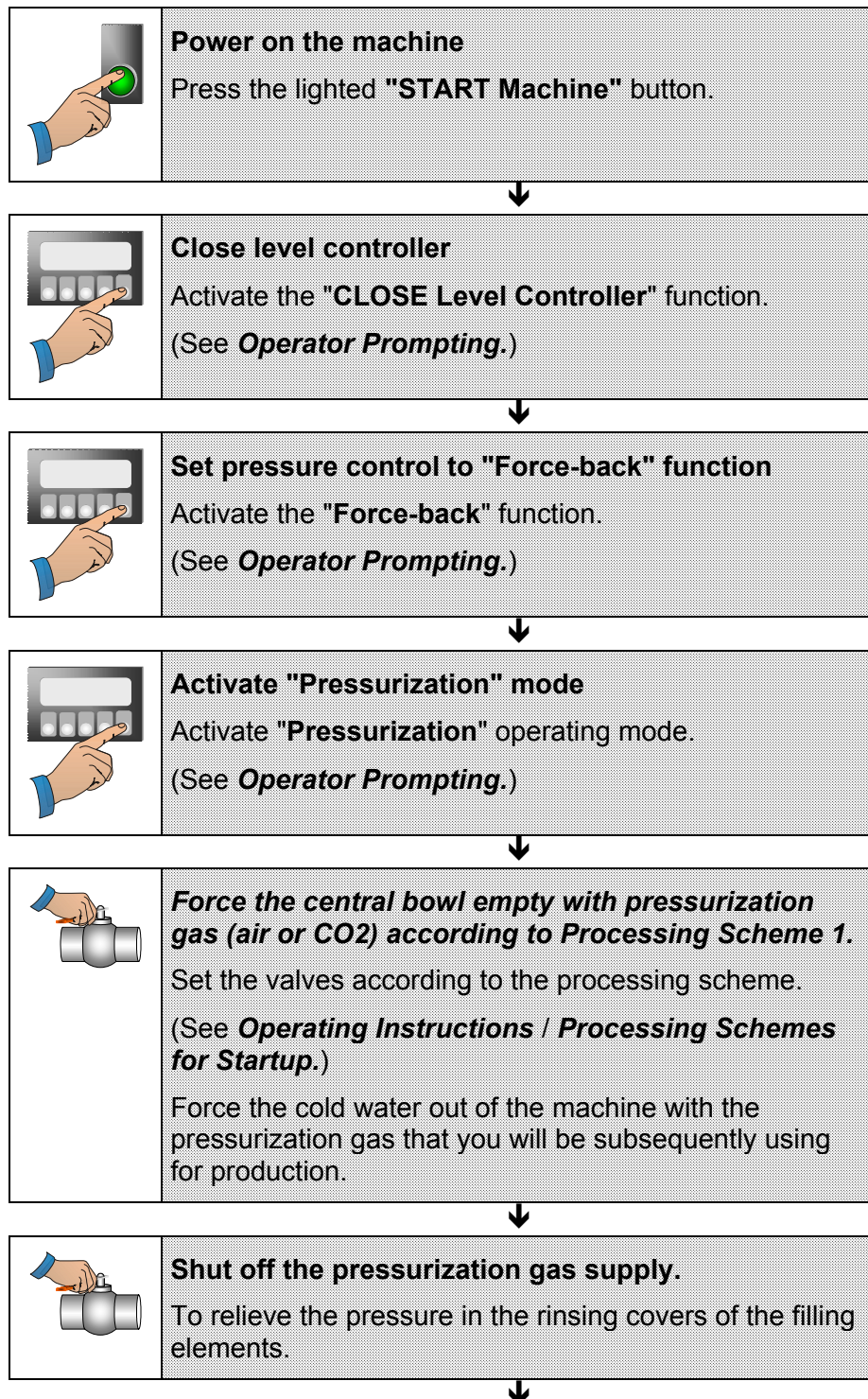
- Initial Startup; KHS service staff has completed commissioning.
- Getting Ready for Operation; The prerequisites for getting ready for startup must have been met. (See chapter Operating Instructions).
- No container starvation; An adequate supply of containers must be ready at the container infeed.
- No container backups; The bypass table and the discharge conveyor must be free of containers.

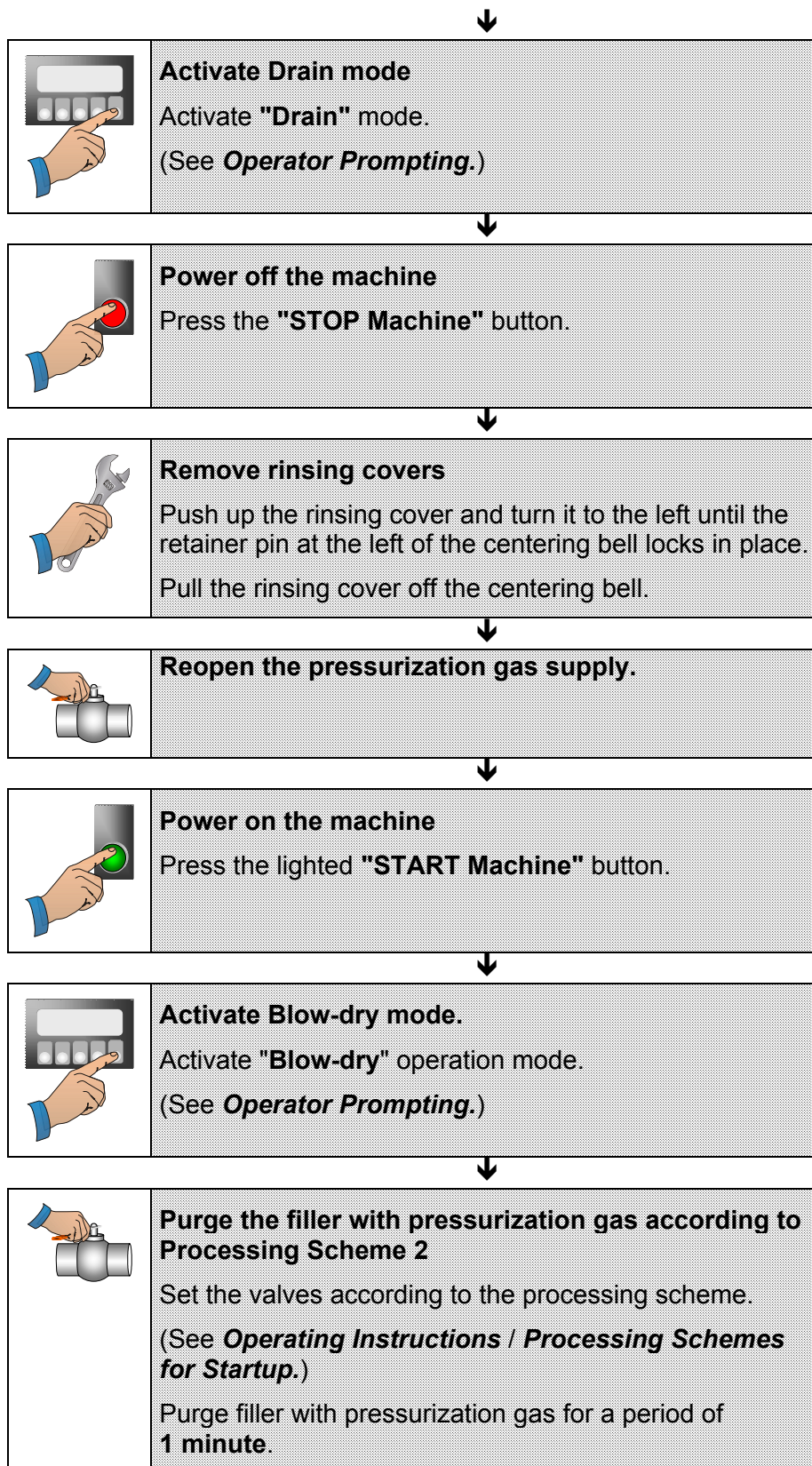
Preparing the Machine



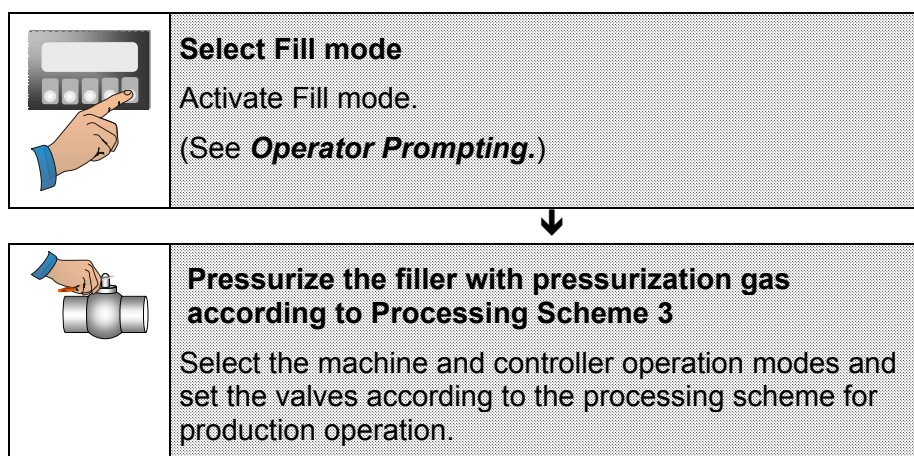
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Draining the Filler



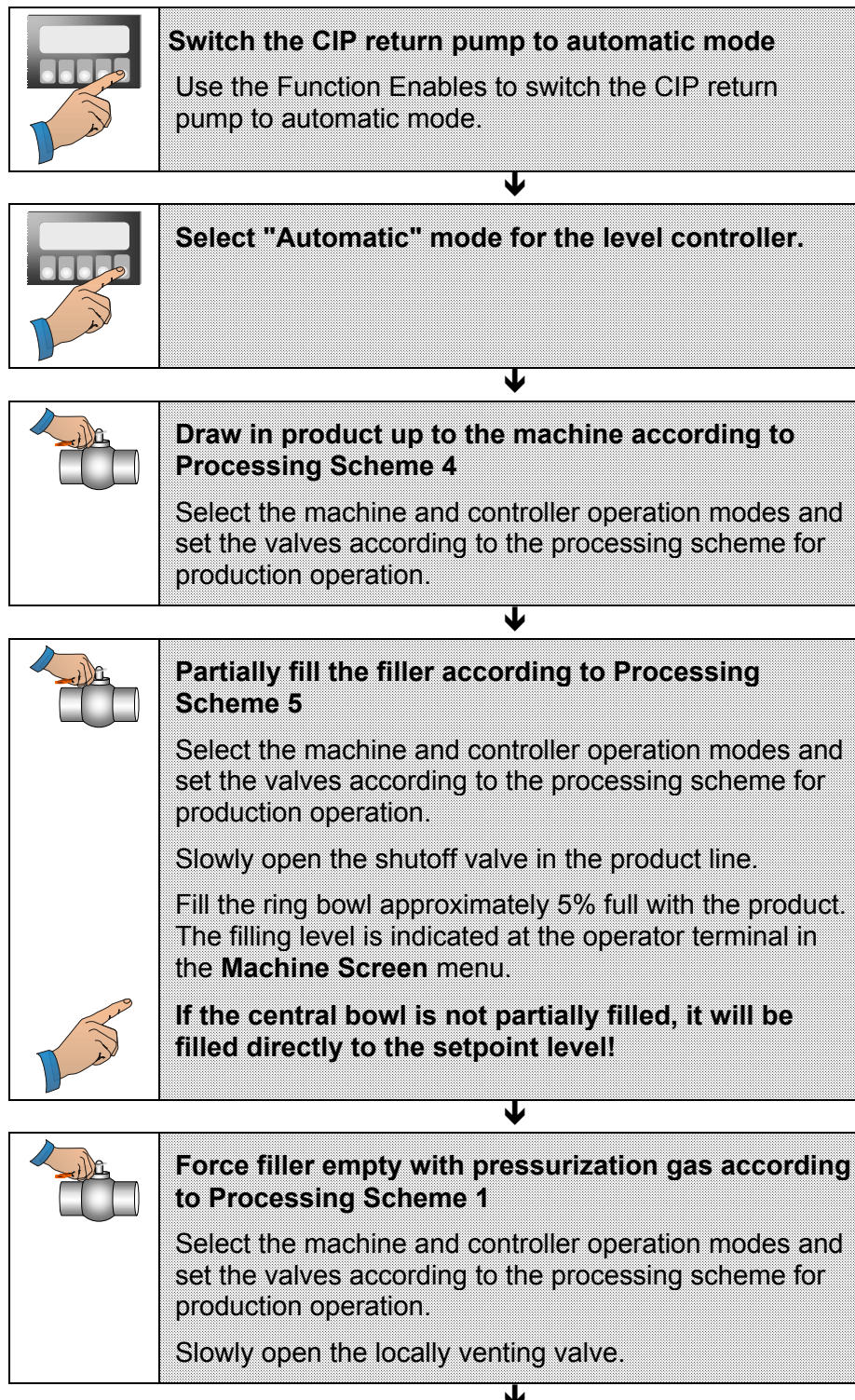


Filler Pressurization



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Filling the Filler with Product





	Pressurize the filler with pressurization gas according to Processing Scheme 3 Select the machine and controller operation modes and set the valves according to the processing scheme for production operation.
---	---



	Fill the filler according to Processing Scheme 5 Set the valves according to the processing scheme for production. Slowly open the shutoff valve in the product line. Fill the ring bowl with product up to the setpoint level.
---	--



	Power off the machine Press the "STOP Machine" button.
--	---



	Switch off CIP return pump Switch off the CIP return pump.
---	---

Processing Schemes for Production



Refer to the piping diagram for the valve number assignments.

Processing Scheme 1, Force Empty

OP Mode					
Filler		Pressurization pressure controller		Level controller	
Pressurize	X	Force back	X	Closed	X
Fill		Open		Open	
Rinse into the open		Automatic		Automatic	
Drain					
Blow dry					

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open			X	X	X	X	X				X
Closed	X	X						X	X	X	

Valve number	46	47	48	51	53	54	63	81	82	100
Open	X	X	X	X		X			X	
Closed					X		X	X		X

Processing Scheme 2, Blow Out

OP Mode					
Filler		Pressurization pressure controller		Level controller	
Pressurize		Force back	X	Closed	X
Fill		Open		Open	
Rinse into the open		Automatic		Automatic	
Drain					
Blow dry	X				

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open	X		X	X	X		X			X	
Closed		X				X		X	X		X

Valve number	46	47	48	51	53	54	63	81	82	100
Open	X	X	X	X		X			X	
Closed					X		X	X		X

Processing Scheme 3, Pressurize Filler

OP Mode					
Filler		Pressurization pressure controller		Level controller	
Pressurize		Force back		Closed	X
Fill	X	Open		Open	
Rinse into the open		Automatic	X	Automatic	
Drain					
Blow dry					

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open				X							X
Closed	X	X	X		X	X	X	X	X	X	

Valve number	46	47	48	51	53	54	63	81	82	100
Open	X	X		X		X			X	
Closed			X		X		X	X		X

Processing Scheme 4, Draw in Product

OP Mode					
Filler		Pressurization pressure controller		Level controller	
Pressurize		Force back		Closed	
Fill	X	Open		Open	
Rinse into the open		Automatic	X	Automatic	X
Drain					
Blow dry					

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open		X					X				X
Closed	X		X	X	X	X		X	X	X	

Valve number	46	47	48	51	53	54	63	81	82	100
Open	X	X		X		X			X	
Closed			X		X		X	X		X

Processing Scheme 5, Production

OP Mode					
Filler		Pressurization pressure controller		Level controller	
Pressurize		Force back		Closed	
Fill	X	Open		Open	
Rinse into the open		Automatic	X	Automatic	X
Drain					
Blow dry					

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open				X	X	X					X
Closed	X	X	X				X	X	X	X	

Valve number	46	47	48	51	53	54	63	81	82	100
Open	X	X		X		X			X	
Closed			X		X		X	X		X

Processing Scheme 6, Drain Filler

OP Mode					
Filler		Pressurization pressure controller		Level controller	
Pressurize		Force back		Closed	X
Fill		Open		Open	
Rinse into the open		Automatic	X	Automatic	
Drain	X				
Blow dry					

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open			X	X	X	X	X			X	X
Closed	X	X						X	X		

Valve number	46	47	48	51	53	54	63	81	82	100
Open	X	X	X	X		X				
Closed					X		X	X	X	X

Processing Scheme 7, Rinse Bowl through Spray Ball

OP Mode					
Filler		Pressurization pressure controller		Level controller	
Pressurize		Force back		Closed	
Fill		Open		Open	
Rinse into the open	X	Automatic	X	Automatic	X
Drain					
Blow dry					

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open						X	X			X	
Closed	X	X	X	X	X			X	X		X

Valve number	46	47	48	51	53	54	63	81	82	100
Open	X	X		X		X				X
Closed			X		X		X	X	X	

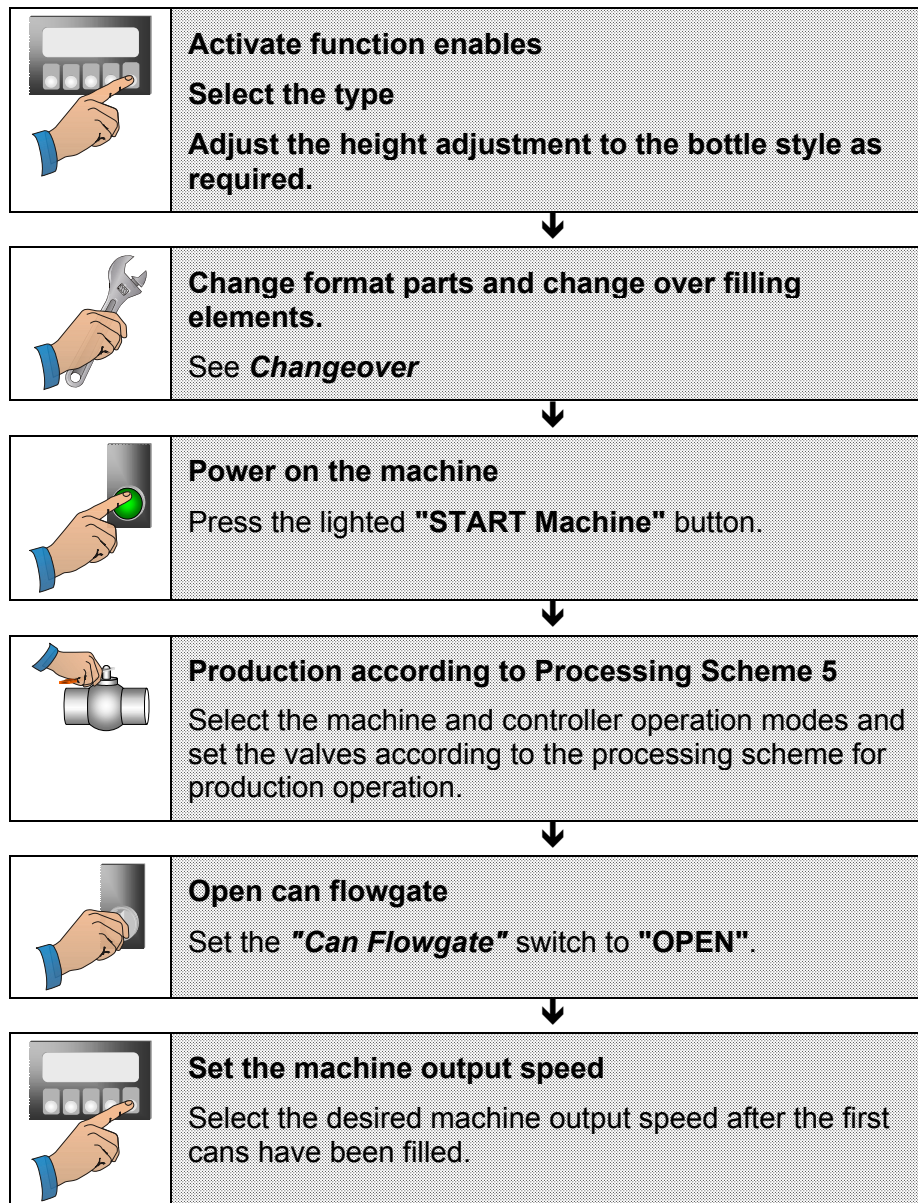
Processing Scheme 8, Rinse Product Passage

OP Mode					
Filler		Pressurization pressure controller		Level controller	
Pressurize		Force back		Closed	
Fill		Open		Open	
Rinse into the open	X	Automatic	X	Automatic	X
Drain					
Blow dry					

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open				X							X
Closed	X	X	X		X	X	X	X	X	X	

Valve number	46	47	48	51	53	54	63	81	82	100
Open				X		X				
Closed	X	X	X		X		X	X	X	X

Starting Production



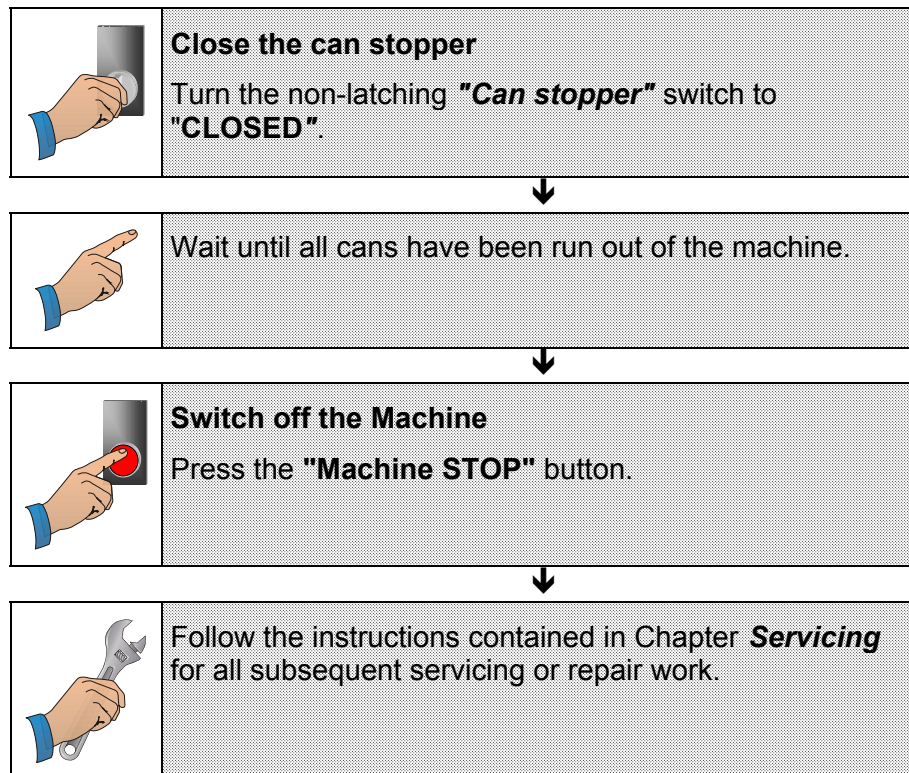
Monitoring Production Operation



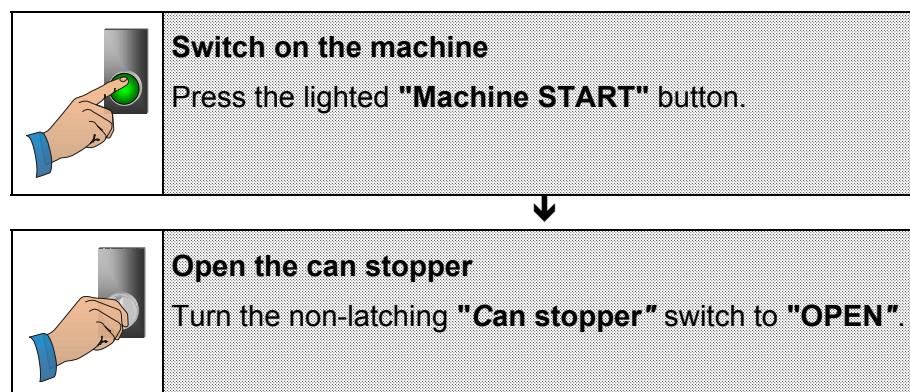
Check the following at regular intervals to avoid disruptions during production operation:

- Media pressures
- Filling product pressure and temperature
- Supply of caps
- Leakage valves
- Listen for unusual machine noises

Stop Production



Resume Production Operation



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Intermediate Rinsing for Production Interruptions

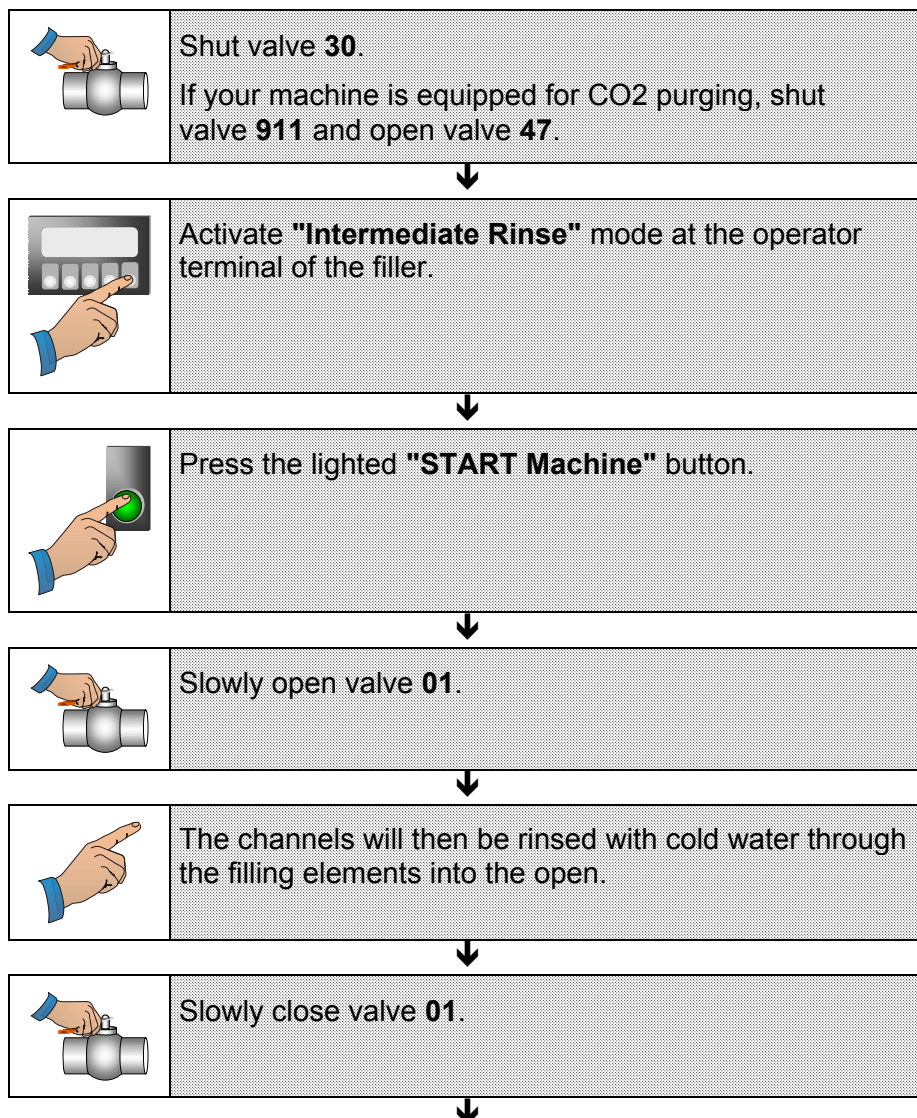
Intermediate rinsing rinses the depressurization and return flow lines through the filling valves to the atmosphere without rinsing covers.

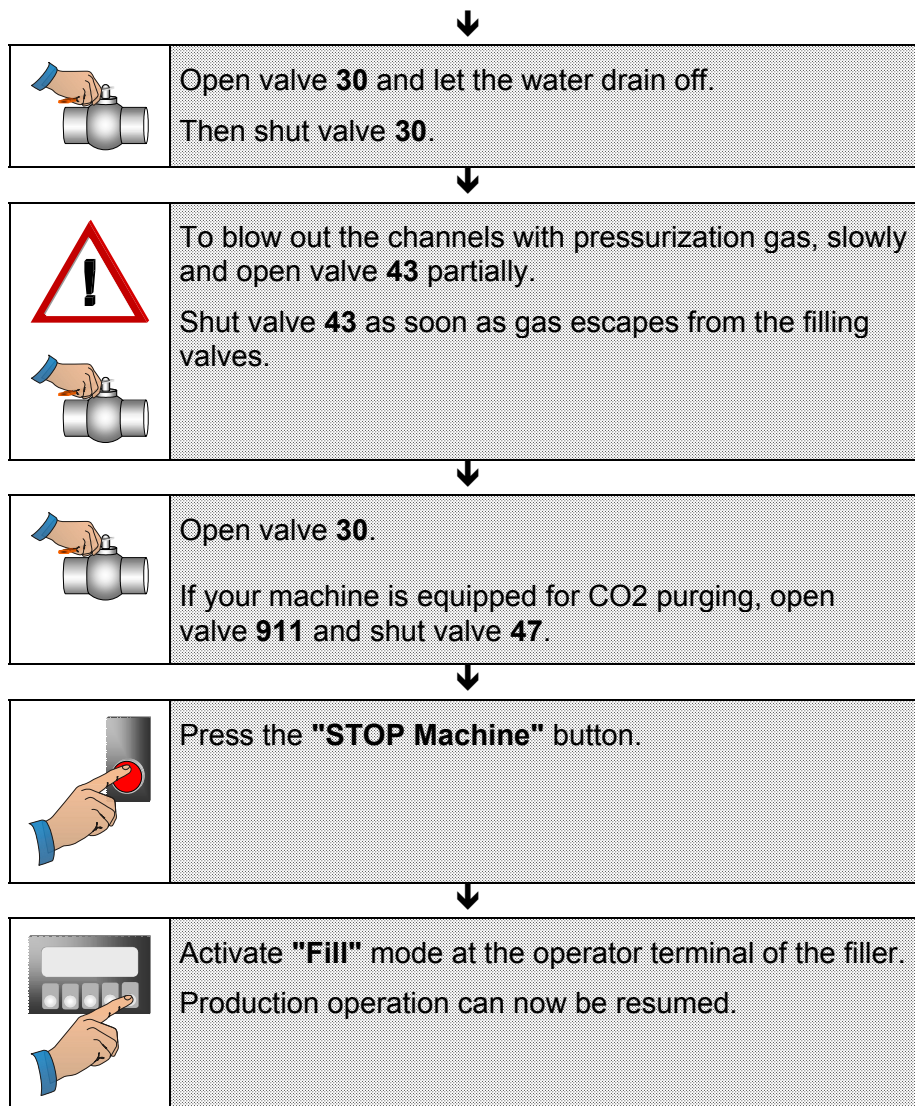


Intermediate rinsing must be carried out after **8 hours of operation** at the latest when producing soft drinks.

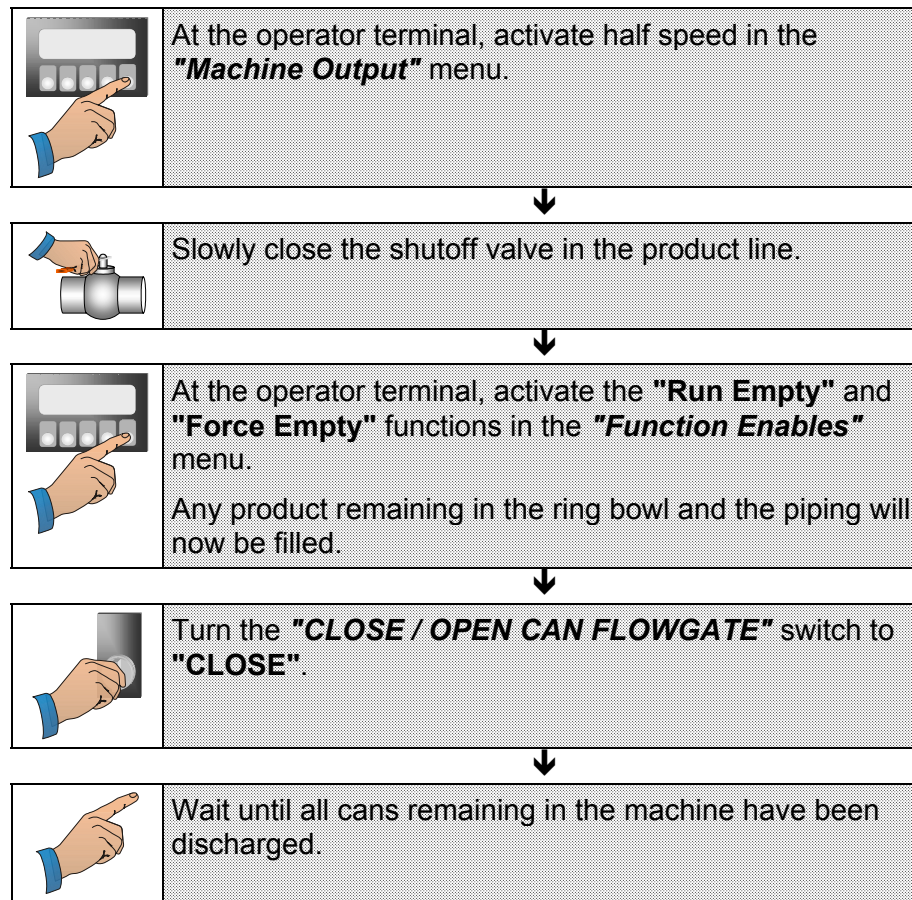


The specified valve numbers are referenced in the **"Piping Diagram"** contained in chapter, **"Technical Specifications"**.



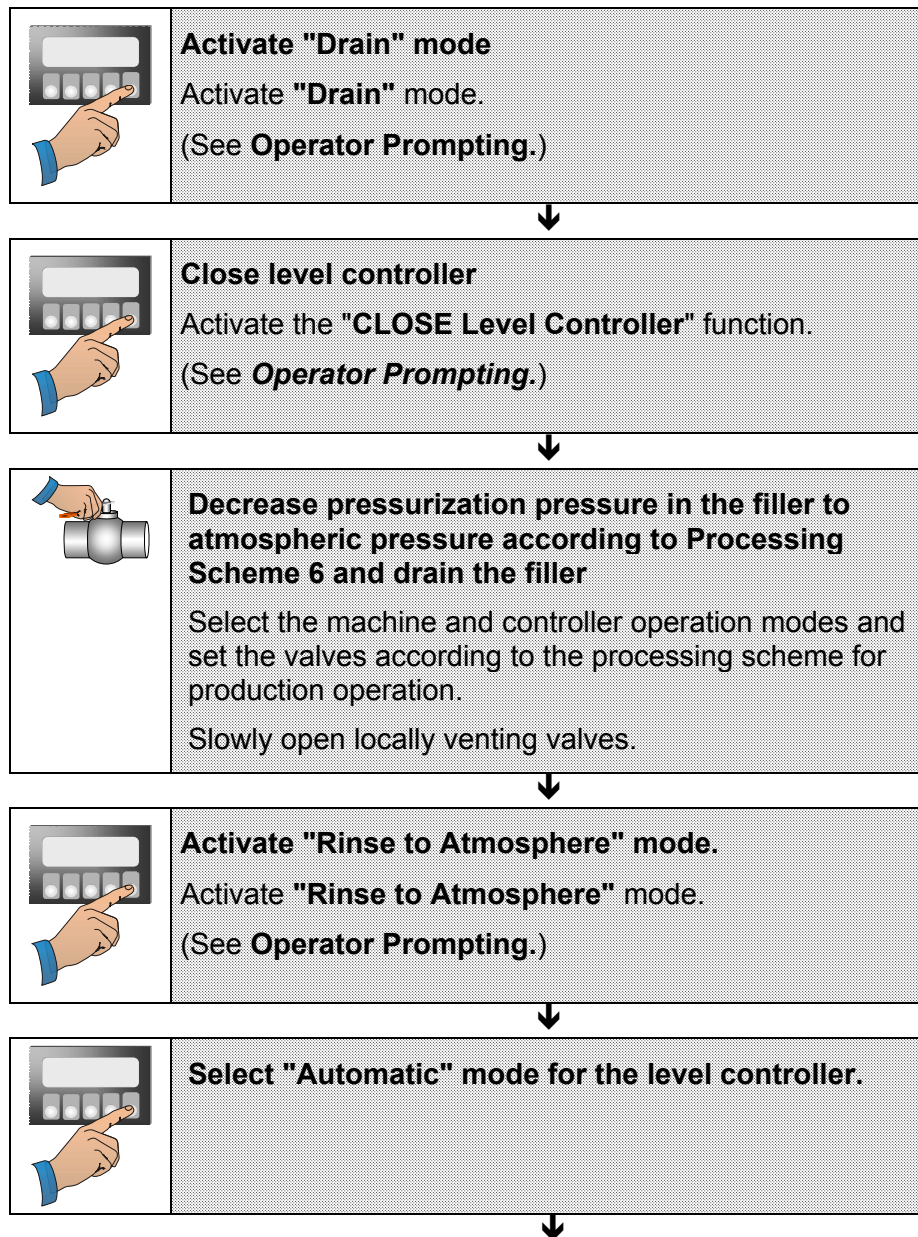


Ending Production Operation

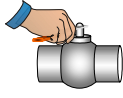


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Rinsing the Ring Bowl after Production





	Rinse the central bowl according to Processing Scheme 7 with cold water for a period of 10 minutes. Select the machine and controller operation modes and set the valves according to the processing scheme for production operation.
---	--



	Rinse the product passages with cold water for 10 minutes according to Processing Scheme 8. Select the machine and controller operation modes and set the valves according to the processing scheme for production operation.
---	--



	Power off the machine Press the "STOP Machine" button.
--	--



	You can now: ● Sanitize the filler (CIP). ● Leave the filler filled with water at a standstill until the begin of the next production run (maximum overnight, since otherwise it will be necessary to re-CIP). ● Drain the filler and restart production operation.
---	---

Cleaning

Basics and Purpose of Sanitizing

The purpose of sanitizing food-processing systems is to achieve prespecified quality standards for end product.

Under normal conditions, it is not possible to bottle products in an aseptic environment. However, in order to obtain an aseptic environment to a greatest possible extent, mechanical sanitizing and subsequent disinfection are necessary.



Disinfection of non-mechanically sanitized surfaces does not achieve the desired level of cleanliness and is generally ineffective.

Mechanical sanitizing involves flushing all product-conducting passages with water or a suitable chemical cleaning agent. During flushing, particles of dirt are loosened and removed from these surfaces by using a combination of various cleaning agents and a high flow velocity.

The product-conducting passages are disinfected by flushing them with hot water, steam, or a suitable chemical disinfectant.

Cleaning machine surfaces is also important!

Rinse off with drinking water after each cleaning!

Successful sanitizing requires a suitable processing scheme and adherence to the following parameters:

- Cleaning agent pressure during flushing
- Flow rate
- Temperature of the cleaning agent
- Concentration level of the chemical cleaning agents
- Exposure time



The user is solely responsible for the quality of cleaning.

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Compatibility of Materials

All of the chemical agents offered by well-known companies are generally usable for sanitizing the machines. Although KHS AG uses only high-quality materials in the manufacture of its machines, the manufacturer of the cleaning agents should nevertheless be consulted regarding the corrosiveness of the chemicals intended for use. Many manufacturers offer clearance certificates, which in any case should be obtained.

According to our experience, using alkaline and neutral cleaning agents and disinfectants is not only sufficient but also largely unproblematic. If acidic agents are to be used, then handle these types of agent with care to avoid damage to materials.



When using acidic chemicals, always be certain to avoid strong mineral acids such as HCl (hydrogen chloride), H₂SO₄ (sulfuric acid), and H₂SO₃ (sulfurous acid). Additionally be sure to adhere exactly to the application concentration levels, temperatures, and periods specified by the manufacturer.

Avoid increased local concentration caused by the formation of droplets or evaporation. In this conjunction, static disinfection such as soaking overnight is not advisable.

It is absolutely essential and extremely important to rinse thoroughly with water after applying acidic agents.



Chlorides in both acidic chemicals (e.g. technical impurities) and water can cause pitting. The chloride content of the water used in the preparation of cleaning agents must therefore not exceed 35 ppm.



Using halogens (chlorine, iodine) for disinfection needs to be controlled very carefully since improper application could easily corrode stainless steel. Consequently, chlorinated agents should be allowed to act only cold at a pH of more than 10 for a period not to exceed 20 minutes at a maximum free chlorine concentration of 150 ppm. Rinsing with water is imperative in this case as well. It is advisable to carry out disinfection with acidic or halogenated agents immediately prior to beginning the filling process.

Plastic machine parts must be protected against contact with acids.
Chemical aggression on sealing materials leading to increase wear
can be expected when using deoxidants.



Contact the KHS laboratory in special cases and/or when in doubt.

The following table contains a list of the limits for the application of
cleaning agents.

Limiting Values for Applying Cleaning Agents

Cleaning Agent	Maximum Concentration	Maximum Contact Time	Maximum Temperature
Cleaning with a sodium hydroxide-based (<i>NaOH</i>) alkaline cleaning agent	3.0% (30,000 ppm*)	45 min.	80° C
Combined cleaning and disinfection with caustic soda (<i>NaOH</i>) based and sodium hypochlorite (<i>NaClO</i>) based <i>cleaning agent</i> (pH >11 due to chlorine ions)	2.0% (20,000 ppm*)	45 min.	70° C
Acidic orthophosphoric acid (<i>H₃PO₄</i>) based and/or nitric acid (<i>HNO₃</i>).based cleaning agents	1.0% (10,000 ppm*) Pure acid concentration	45 min.	60° C
Sodium hypochlorite (<i>NaClO</i>) based disinfectant (pH = 9)	0.02% (200 ppm*)	45 min.	30° C
Peroxide /peracetic acid based disinfection with chloride content of the water used to prepare the cleaning agent of up to 35 ppm*	0.05% (500 ppm*)	2 Std.	20° C
Iodophor-based disinfection with a chloride content of the water used to prepare the cleaning agent of 35 ppm*	0.005% (50 ppm*) active iodine	16 Std.	30° C
Disinfection with chlorine dioxide (<i>ClO₂</i>)	0.0001% (1 ppm*)	-	25° C
Cleaning and sterilization with hot water	-	45 min.	95° C
Cleaning and sterilization with steam at a pressure of 0.5 bar.	-	45 min.	110° C

* ppm = parts per million

Standing disinfection with oxidizing agents (e.g. peracetic acid, hypochlorite, chlorine dioxide) may be performed only within the specified application limits. Application of this kind could cause corrosion of stainless steel.

Cleaning programs

There is no optimum cleaning program applicable to all filling operations. The cleaning programs described in the following are only suggestions and must be adapted to the conditions prevailing in the particular filling and production operation.

Cleaning processes are described for the following rinsing media:

- Cold water
- Hot water
- Caustic
- Acid (disinfectant)
- Steam

There are various methods of applying and combining these rinsing media as required. Only the user can define their specific application.

Always wear suitable protective clothing when handling aggressive cleaning agents.



Ensure that the following criteria are met before cleaning:



- Adjust the filler turret to the **highest bottle size**.
(See chapters **Operating Instructions** and **Operator Prompting**)
- Hang rinsing covers in place when cleaning the filling valve is cleaning agents.
- **Ensure that the rinsing covers do not collide with the format parts!**
- Clean the exterior of the filler before cleaning.
- Do not point the stream of water directly at motors, switches and other electrical parts, and gears (bleeder valves, shaft seals).
- Replace worn or damaged parts.
- Ensure that the pressure of the rinsing medium ahead of the filler is correctly set.

Pressure setting: see Technical Specifications.

- Ensure that the cleaning agent concentration and cleaning agent temperature limits and contact periods are not exceeded.
- Set the filler to its lowest output speed.
- The CO₂ recirculation and CIP return flow must be connected to the CIP system.

Preparing the Machine for Sanitizing

	Activate the cleaning program Activate the 'Filler Program' menu in the 'Program Selection' menu. Activate the 'Filler Program' menu in the 'Program' menu. In this menu, activate the machine and controller operation modes required for the processing schemes for sanitizing. (See Chapter, Operator Prompting).
---	---



	Adjust the height of the filler for cleaning After activating the CIP sanitizing / rinsing mode, run height adjustment to adjust the filler turret to the height of the tallest can (tallest can + 10 mm) for sanitizing. (See chapter Changeover).
---	--



	Mount rinsing covers Hold the rinsing cover under the centering bell so that the retainer pin is under the groove at the left of the bell rod. Push the rinsing cover up and turn it to the right until it locks in place.
---	---

Close all cladding on the filler and seamer.



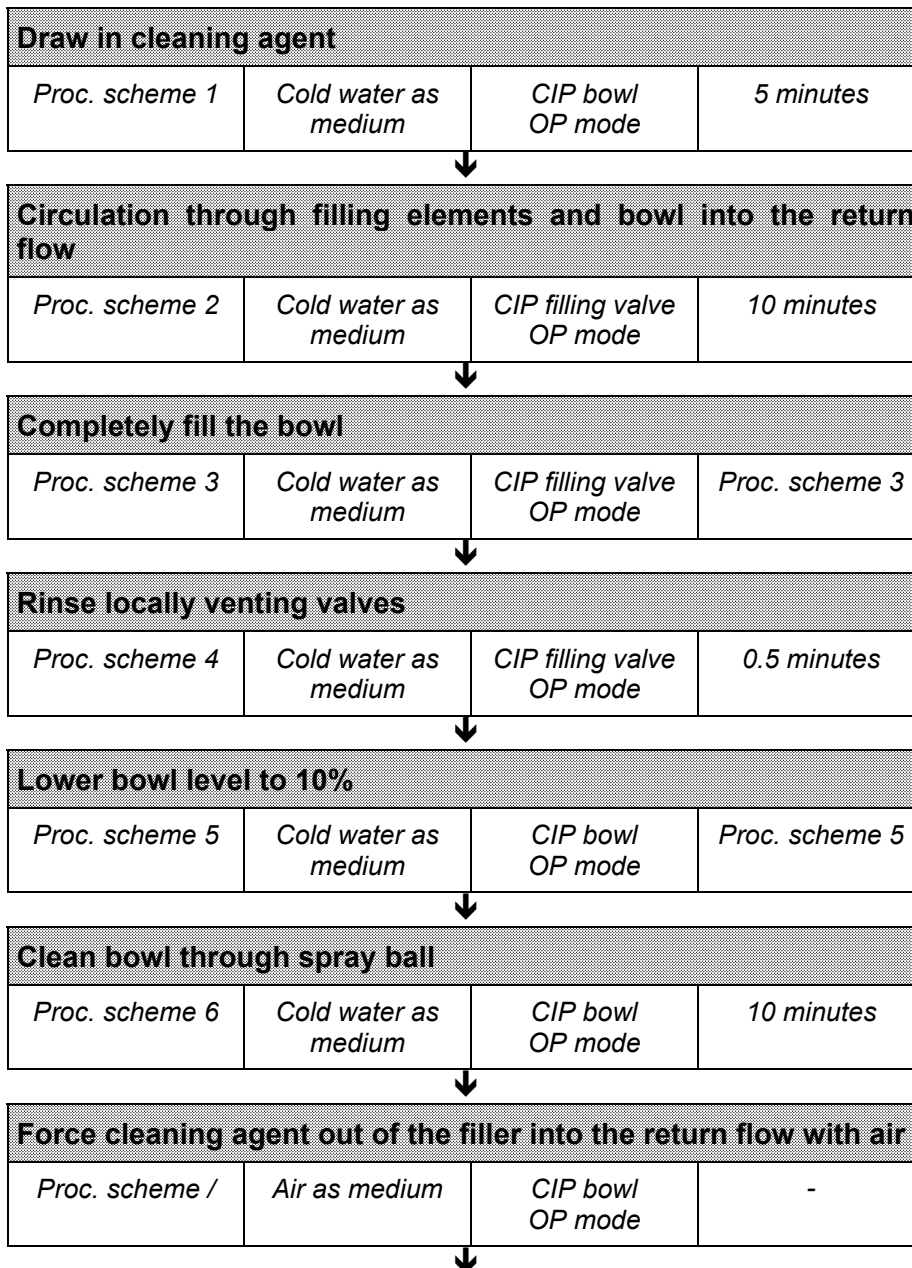
Examples of Cleaning and Processing Schemes

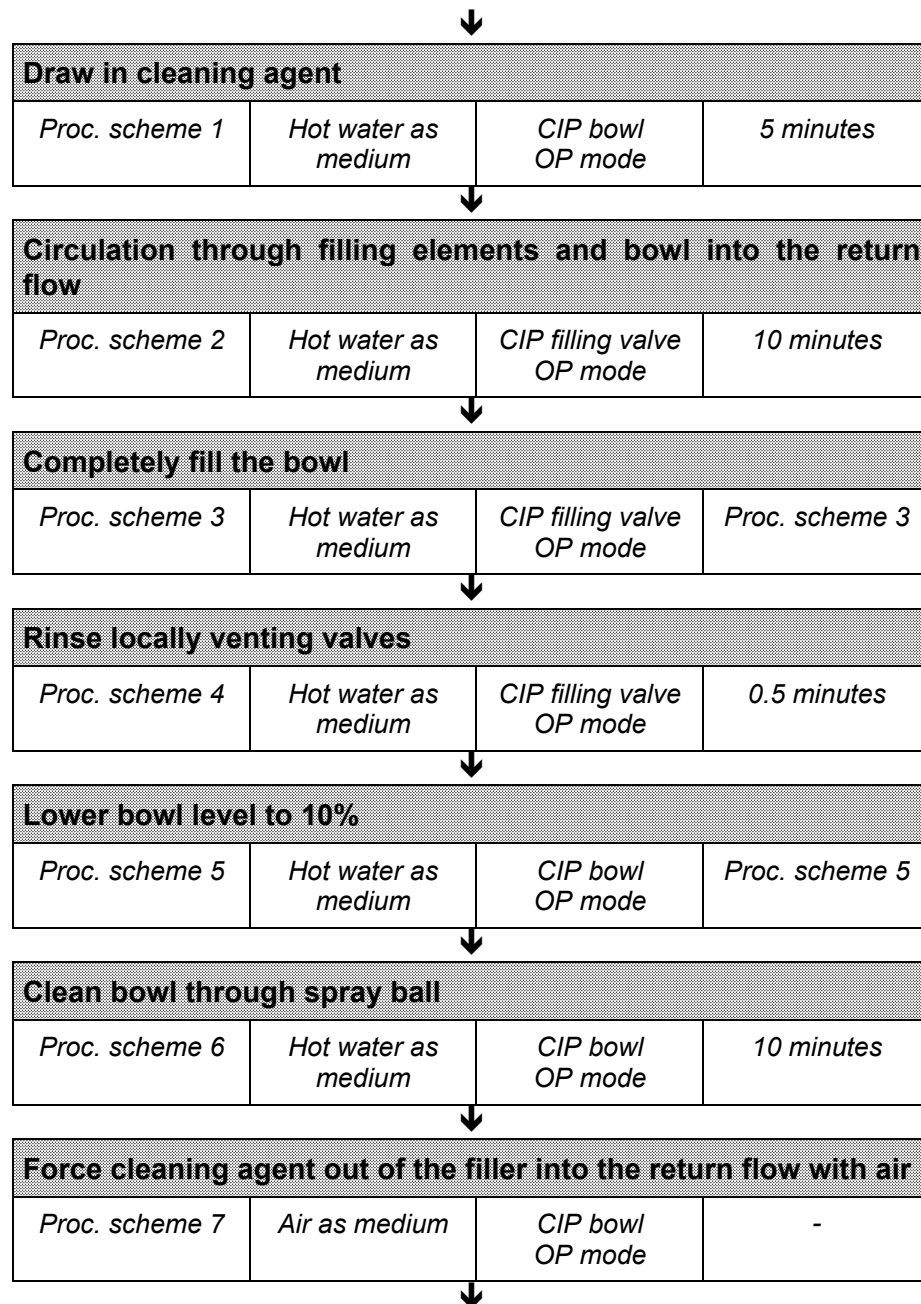
The following contains suggested cleaning processes that must be adapted to the operating conditions of your particular filling operation.

Cleaning with Cold Water

Draw in cleaning agent			
<i>Proc. scheme 1</i>	<i>Cold water as medium</i>	<i>CIP bowl OP mode</i>	<i>5 minutes</i>
↓			
Circulation through filling elements and bowl into the return flow			
<i>Proc. scheme 2</i>	<i>Cold water as medium</i>	<i>CIP filling valve OP mode</i>	<i>10 minutes</i>
↓			
Completely fill the bowl			
<i>Proc. scheme 3</i>	<i>Cold water as medium</i>	<i>CIP filling valve OP mode</i>	
↓			
Rinse locally venting valves			
<i>Proc. scheme 4</i>	<i>Cold water as medium</i>	<i>CIP filling valve OP mode</i>	<i>0.5 minutes</i>
↓			
Lower bowl level to 10%			
<i>Proc. scheme 5</i>	<i>Cold water as medium</i>	<i>CIP bowl OP mode</i>	
↓			
Clean bowl through spray ball			
<i>Proc. scheme 6</i>	<i>Cold water as medium</i>	<i>CIP bowl OP mode</i>	<i>10 minutes</i>
↓			
Shut all valves			
(Sterile air can be sucked in through the air filter to avoid creation of a vacuum)			

Cleaning with Cold Water, Hot Water, Cold Water







Draw in cleaning agent			
<i>Proc. scheme 1</i>	<i>Hot water as medium</i>	<i>CIP bowl OP mode</i>	<i>5 minutes</i>



Circulation through filling elements and bowl into the return flow			
<i>Proc. scheme 2</i>	<i>Cold water as medium</i>	<i>CIP filling valve OP mode</i>	<i>10 minutes</i>



Completely fill the bowl			
<i>Proc. scheme 3</i>	<i>Cold water as medium</i>	<i>CIP filling valve OP mode</i>	<i>Proc. scheme 3</i>



Rinse locally venting valves			
<i>Proc. scheme 4</i>	<i>Cold water as medium</i>	<i>CIP filling valve OP mode</i>	<i>0.5 minutes</i>



Lower bowl level to 10%			
<i>Proc. scheme 5</i>	<i>Cold water as medium</i>	<i>CIP bowl OP mode</i>	<i>Proc. scheme 5</i>



Clean bowl through spray ball			
<i>Proc. scheme 6</i>	<i>Cold water as medium</i>	<i>CIP bowl OP mode</i>	<i>10 minutes</i>



Shut all valves			
(Sterile air can be sucked in through the air filter to avoid creation of a vacuum)			

Cleaning with Cold Water, Caustic, Hot Water

The processing scheme sequence is analogous to cleaning with cold water, hot water, cold water. Use caustic as the second cleaning agent instead of hot water.

Caustic can be rinsed out better with hot water.

Cleaning with Cold Water, Acid, Cold Water

The processing scheme sequence is analogous to cleaning with cold water, hot water, cold water. Use acid as the second cleaning agent instead of hot water.

End of Cleaning

The filler remains at a standstill after cleaning with the rinsing caps mounted and filled with cold water.

Processing Schemes for Sanitizing

Refer to the piping diagram for the valve number assignments.



Processing Scheme 1, Draw in Cleaning Agent

OP Mode					
Filler		Pressurization pressure controller		Level controller	
CIP filling valves		Force back	X	Closed	
CIP bowl	X	Open		Open	
Drain		Automatic		Automatic	X

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open		X					X				
Closed	X		X	X	X	X		X	X	X	X

Valve number	46	47	48	51	53	54	63	81	82	100
Open							X			
Closed	X	X	X	X	X	X		X	X	X

Processing Scheme 2, Circulation through Filling Valves

OP Mode					
Filler		Pressurization pressure controller		Level controller	
CIP filling valves	X	Force back	X	Closed	
CIP bowl		Open		Open	
Drain		Automatic		Automatic	X

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open		X		X		X				X	X
Closed	X		X		X		X	X	X		

Valve number	46	47	48	51	53	54	63	81	82	100
Open		X	X				X			
Closed	X			X	X	X		X	X	X

Processing Scheme 3, Fill Bowl Brim Full

The filler must not rotate in this step.



Fill the bowl until liquid comes out of the safety valve.

OP Mode					
Filler		Pressurization pressure controller		Level controller	
CIP filling valves	X	Force back	X	Closed	
CIP bowl		Open		Open	
Drain		Automatic		Automatic	X

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open			X	X	X			X	X		X
Closed	X	X				X	X			X	

Valve number	46	47	48	51	53	54	63	81	82	100
Open		X	X				X			
Closed	X			X	X	X		X	X	X

Processing Scheme 4, Rinse Locally Venting Valves

OP Mode					
---------	--	--	--	--	--

Filler		Pressurization pressure controller		Level controller	
CIP filling valves	X	Force back		Closed	
CIP bowl		Open	X	Open	
Drain		Automatic		Automatic	X

Valve Settings											
----------------	--	--	--	--	--	--	--	--	--	--	--

Valve number	01	22	25	26	29	30	31	33	36	43	44
Open		X	X	X	X	X		X	X		X
Closed	X						X			X	

Valve number	46	47	48	51	53	54	63	81	82	100
Open		X	X				X			
Closed	X			X	X	X		X	X	X

Processing Scheme 5, Drain Bow to 10%

Force up to 10% of the contents of the bowl back into the tank with the CIP return pump.

The fill level in the bowl is indicated at the operator terminal under "Analog Values".

OP Mode					
Filler		Pressurization pressure controller		Level controller	
CIP filling valves		Force back	X	Closed	
CIP bowl	X	Open		Open	
Drain		Automatic		Automatic	X

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open						X					
Closed	X	X	X	X	X		X	X	X	X	X

Valve number	46	47	48	51	53	54	63	81	82	100
Open		X		X		X			X	X
Closed	X		X		X		X	X		

An error message will appear at the operator terminal and the filler will stop if the fill level in the bowl exceeds 70% in "CIP Bowl" mode. After you have lowered the fill level in the bowl, you can acknowledge the error and restart the filler.



Processing Scheme 6, Clean Bowl through Spray Ball



The fill level must not exceed 20% in this step.

OP Mode					
Filler		Pressurization pressure controller		Level controller	
CIP filling valves		Force back	X	Closed	
CIP bowl	X	Open		Open	
Drain		Automatic		Automatic	X

Valve Settings											
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open						X	X			X	
Closed	X	X	X	X	X			X	X		X

Valve number	46	47	48	51	53	54	63	81	82	100
Open	X	X					X			X
Closed			X	X	X	X		X	X	

Processing Scheme 7, Force Back Cleaning Agent

OP Mode					
---------	--	--	--	--	--

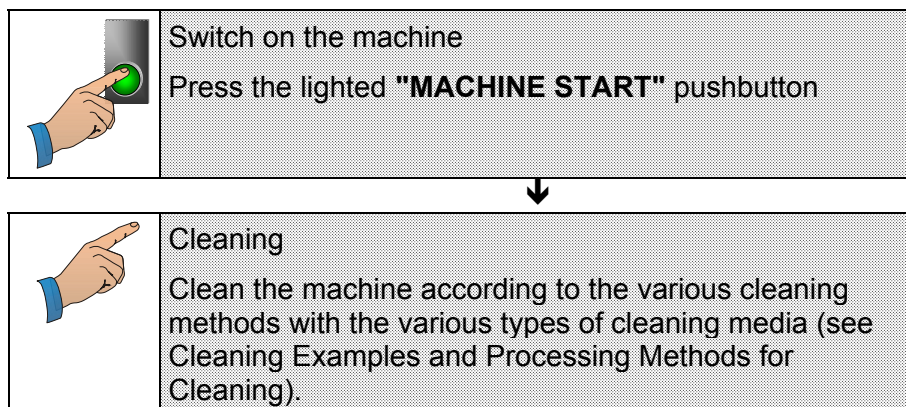
Filler		Pressurization pressure controller		Level controller	
CIP filling valves		Force back	X	Closed	X
CIP bowl		Open		Open	
Drain	X	Automatic		Automatic	

Valve Settings											
----------------	--	--	--	--	--	--	--	--	--	--	--

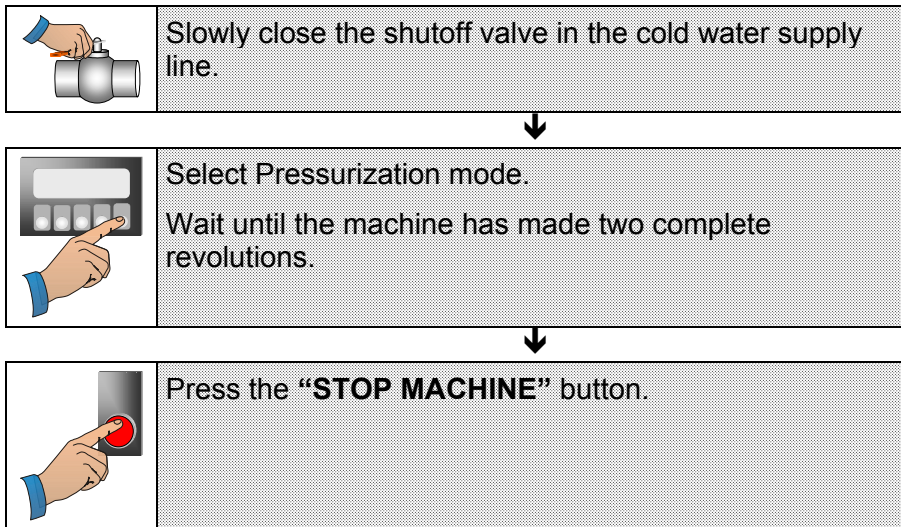
Valve number	01	22	25	26	29	30	31	33	36	43	44
Open										X	
Closed	X	X	X	X	X	X	X	X	X		X

Valve number	46	47	48	51	53	54	63	81	82	100
Open	X	X		X		X			X	X
Closed			X		X		X	X		

Starting Cleaning



Terminate Cleaning



Cleaning the Safety Valve on the Ring Bowl

The safety valve on the ring bowl are automatically opened and closed at fixed intervals by the machine control when cleaning in Rinse mode. This cleans the safety valve.



When the safety valve is opened, the cleaning medium is conducted through a pipe to the center of the filler from where it is discharged into the open.

Processing Scheme, Cleaning the Air and CO₂ Filters

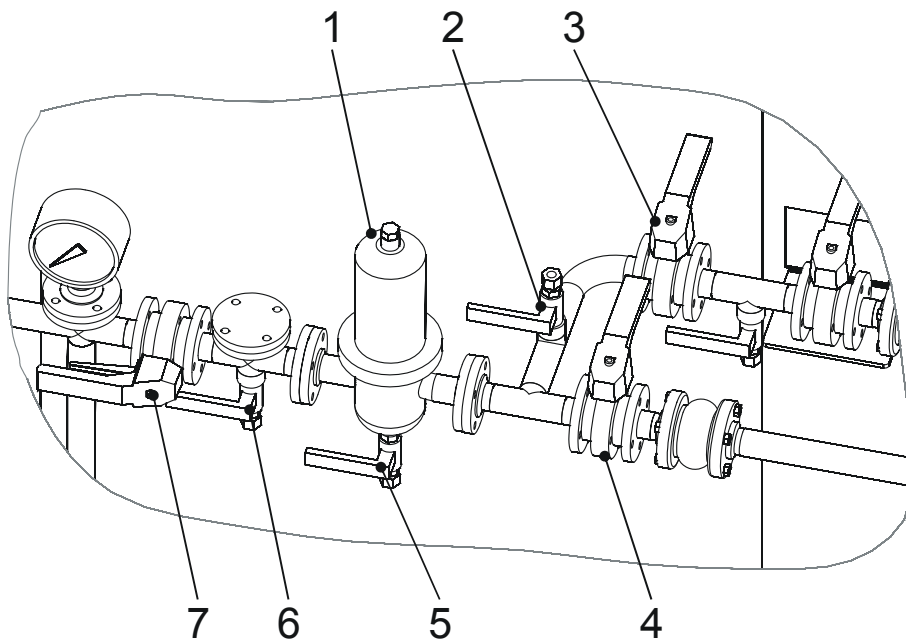


Figure 3-2 :
Processing
Scheme, Cleaning
the Air and CO₂
Filters

Steam filter housing (1) and filter candles

See chapter, Technical Specifications, Steam Settings for information on the steam pressures and temperatures.



- Close valves **(3, 4, 7)**.
- Open valves **(5, 6)**.
- Open steam supply valve **(2)**.
- Close valve **(5)** once pure steam escapes from this valve.
- Then steam the filter for a period of at least 20 minutes.

Let the filter candles cool-down after steaming. Then check the quality of filter candles: refer to the description of the filter candle for further information.



Cleaning Machine Surfaces

During production operation, all machine surfaces are coated with a film of product residue enabling growth of product-contaminating microorganisms.

These microorganisms could lead to contamination of the filled product.

Regular and thorough cleaning of all machine surfaces is therefore necessary in order to prevent contamination of this kind. The cleaning process should be designed to remove all deposits on all machine surfaces. It could also be necessary to remove and dismantle individual machine parts in order to sufficiently clean all critical areas.

Automatic cleaning systems can be used to clean closed machine paneling.

Automatic cleaning systems are required for aseptic processes.



The hygienic conditions in the machine surroundings must be monitored through effective biological operation inspections by the machine operator in order to ensure the conditions required for the biological stability of the filled beverage.

The quality of cleaning is the sole responsibility of the machine operator.

Use of High-pressure Sprays

The following should be noted when cleaning machines using high-pressure water sprays:

The water jet can lift the sealing lips and allow water to penetrate into protected areas if the jet is held too close to the sealing elements. This can, for example, result in a distinct decrease in the lubricating effect in enclosed lubrication spaces (gears). This in turn can shorten the service life of the equipment concerned. An increased risk of corrosion is an additional negative effect.

Moisture in electrical component cabinets likewise facilitates the formation of corrosion on components and contacts and there is a risk of undesired tracking current.

However, the aerosols produced during cleaning that spread evenly over the entire machine can be considered the greatest disadvantage of this method of cleaning. This distributes micro-organisms from infected areas throughout large machine areas and are thus also spread to those areas of the machine in which there is a risk of contaminating the filled product during production operation.

The production of aerosols increases drastically in particular when a spraying pressure of more than 20 bar is used.

We recommend that high-pressure water sprays with spraying pressures exceeding 20 bar not be used for the reasons mentioned above.

We will assume no liability for damage and contamination caused by this method of cleaning!



Remove Cleaning Agent Residue



Remove cleaning agent residue from all machine surfaces by re-rinsing with drinking water.



The chloride content of the water used for rinsing should **not** exceed a concentration of **150 ppm** (parts per million).

Rinsing should be continued until normal methods of analysis are unable to find evidence of identifying properties of the cleaning agent used.

Rub-dry all polished machine parts with a cloth or blow-dry with compressed air.



If the machine surfaces are not rinsed off, water evaporation will increase the concentration of acids and caustics on the stainless steel and plastic surfaces which could destroy these surfaces through severe corrosion.

Cleaning the Plastic Screens in the Machine Paneling

Clean the screens in the machine paneling with a damp cloth or sponge using the cleansers specified in the following and rinsing with clear water.

Use only non-alcohol, non-abrasive, neutral cleansers such as soap or a mild household cleanser for cleaning. The temperature of the cleanser must not exceed 60° Celsius. Solutions which could have a corrosive affect on the machine surfaces must not be used.

Do not use sharp tools such as razor blades to clean the screens.



Machine Switch-off



To prevent the accumulation of moisture in solenoid valves, electrical equipment, etc., the air supply must remain on during periods of suspended operations such as overnight and on weekends.

In order to ensure an adequate air supply, it is sufficient to close the shutoff valves ahead of the air filter and following the CO₂ filter and have sufficient pressure in the supply line by leaving the shutoff valve open ahead of the service group

The main switch may be switched off for servicing and repair work only.



Switch off control voltage

Turn the "**Control voltage**" lighted non-latching button to "0".



Switch off the Enable control voltage

Turn the "**Enable control voltage**" key-lock switch to "0".

Change-over

Safety

When carrying out change-over work - replacement of stars and bottle guide elements - always observe the guidelines **"Safety principles for filling plants of the beverage industry"**.



Stop machine

If persons might be at risk, change-over, fault clearance or maintenance should be first started when machine power has been switched off, the machine has stopped and is secured against unintentional restart.

When carrying out work which cannot be carried out at machine standstill (e.g. height adjustment), switch the machine on only for the required time.

If persons might be at risk, change-over, fault clearance or maintenance should be first started when machine power has been switched off, the machine has stopped and is secured against unintentional restart.

During work on the machine, non-authorized persons should not have access to the machine.

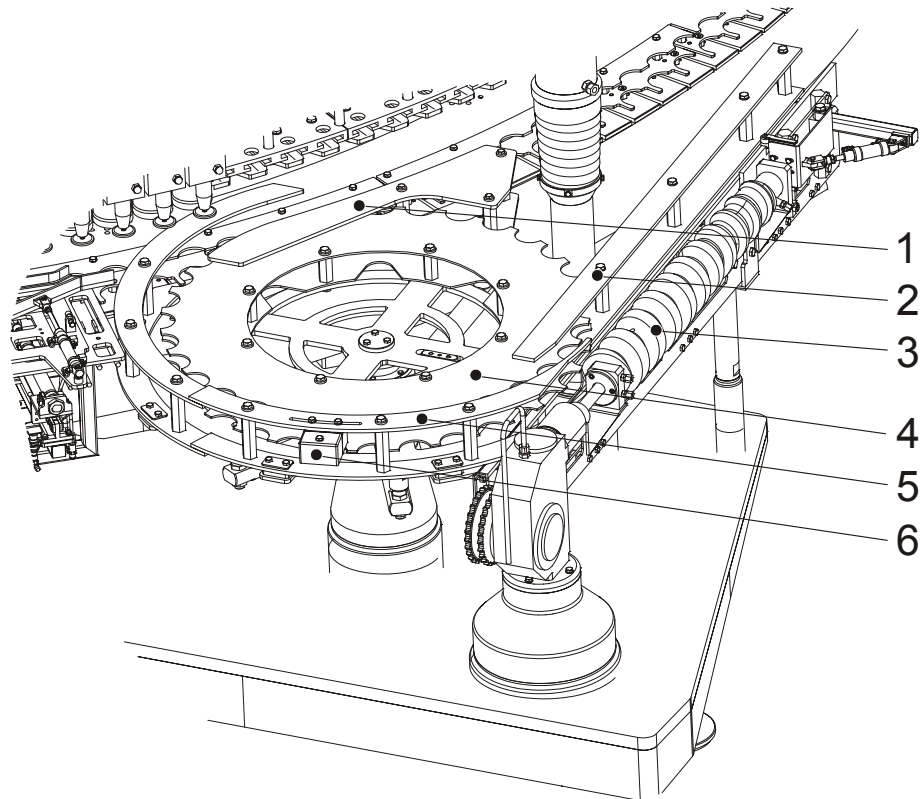
Use only KHS original parts

When replacing stars and bottle guide elements, only use KHS original parts. We expressly draw your special attention to the fact that original parts as well as accessories which we do not supply are not checked or authorized by us.

The manufacturer is not liable for damage resulting from the use of non-KHS parts and accessories.

Changing Can Guides

Figure 4-1 :
Changing Can
Guides



Install the format parts in the sequence indicated below.

1. Infeder **(1)**
2. Can infeed star **(4)**
3. Infeed star guide curve **(5)** and
4. Can guide railing **(2)**
(change only for various can diameters)
5. Feedscrew **(3)** (if required)
6. Holddown (not shown)
7. Can sensing **(6)**.

Remove in reverse order to the installation sequence.

Adjusting the Can Guide at the Infeed Conveyor

It will be necessary to change the can guide **(1)** at the infeed conveyor when changing over to a can type of a different height.

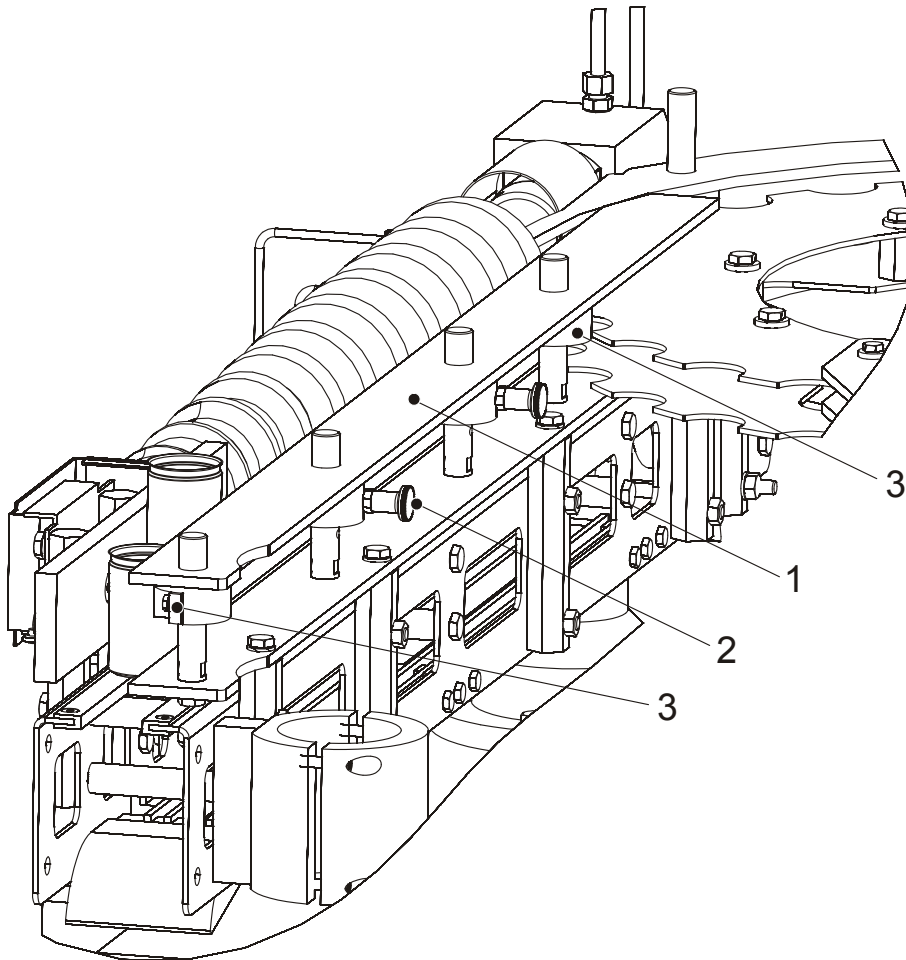
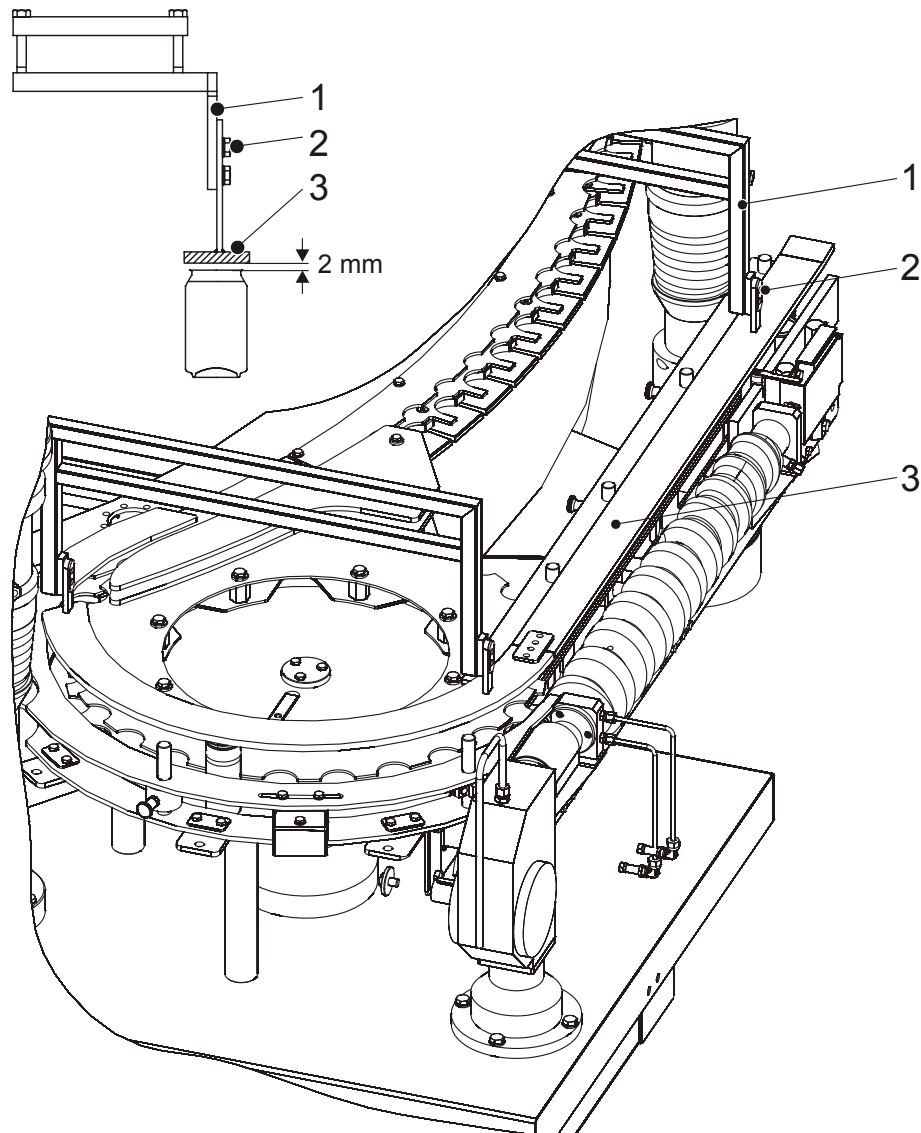


Figure 4-2 :
Can Guide
Adjustment

- Pull out safety pin **(2)** and turn it 90°.
- Release clamps **(3)**.
- Push or pull the can guide up or down and turn the safety pin back 90°.
- Push or pull the can guide until the safety pin locks in place.
- Repeat the process until the proper position for the type of can is reached.
- Retighten the clamps.

Changing and Adjusting Holddowns

Figure 4-3 :
Changing Can
Guides



Remove the holddown **(3)** before changing the can guide parts and reinstall and readjust after changeover.

The holddown is screwed to the mount **(1)** with screws **(2)**. Unscrew and remove the screws to remove the holddown.

After you have changed format parts, mount the holddown so that there is a **2 mm** gap between the lower edge of the holddown and the upper edge of the can.

Changing Feedscrews

It will be necessary to change the feedscrew (3) when changing over to a new style of can of a different diameter.

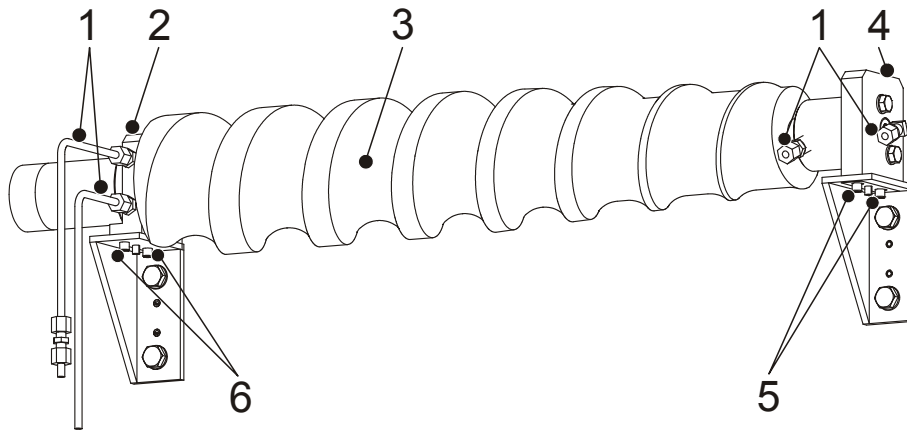


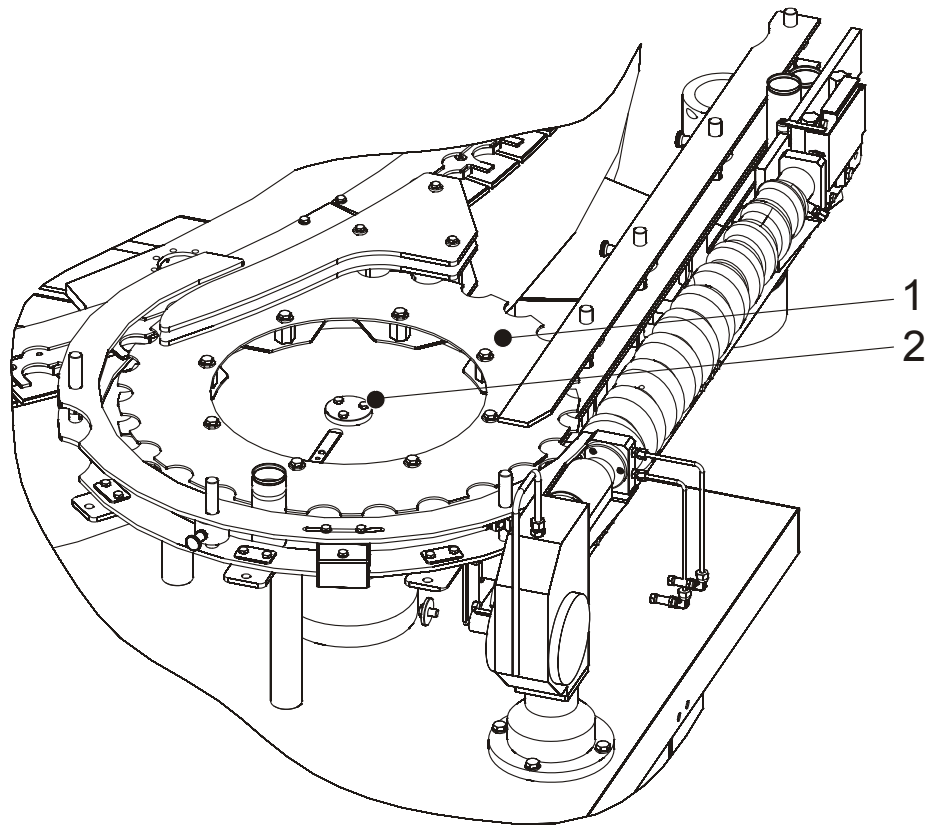
Figure 4-4 :
Changing
Feedscrews

Sequence of the Work Steps

- Disconnect the lubrication lines (1) from feedscrew bearings (2) and (4).
- Unscrew and remove the screws (5) and (6).
- Pull the feedscrew and remove out of the bearing (2).
- Insert the new feedscrew.
- Screw in and tighten the screws (5) and (6).
- Reconnect the lubrication lines.

Changing Can Guide Star

Figure 4-5 :
Changing Stars



When changing over to a can type with a diameter different to that of the current can, then the can guide star **(1)** must be changed.

- Unscrew and remove screws **(2)**.
- Lift out the star and insert the new star by pressing it downward with a slight amount of pressure until it locks in place.
- Put the screws back in place and tighten securely.

Changing Format Parts for Cans of Various Heights but Equal Diameters

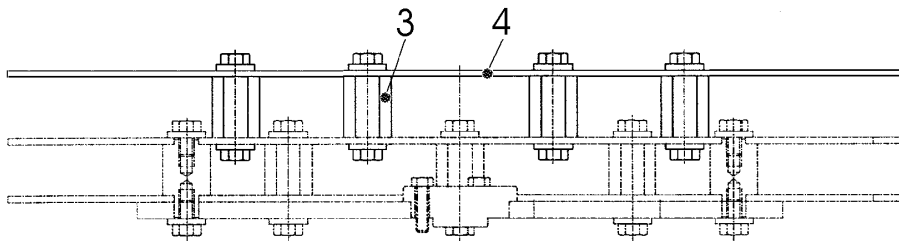


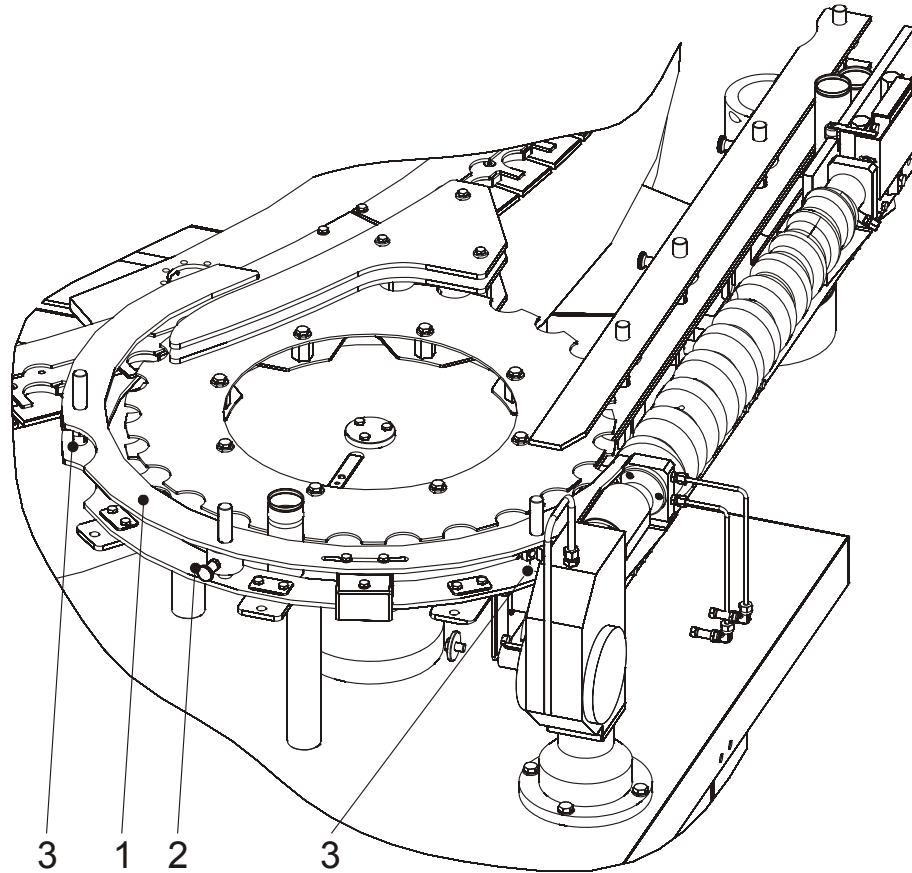
Figure 4-6 :
Changing Format
Parts

Additional guide parts **(3)** are screwed to the set of format parts being used by means of transition pieces **(4)**. The transition pieces assigned to the can height can be found in the **Spare Parts List**.

Can Guide Curve Adjustment

Can guide curves **(1)** must be adjusted when changing over to a different can height.

Figure 4-7 :
Can Guide Curve
Adjustment



- Pull out safety pin **(2)** and turn it 90°.
- Release clamps **(3)**.
- Push or pull the marshaler up or down and turn the safety pin back 90°.
- Push or pull the curve until the safety pin locks in place.
- Repeat the process until the proper position for the type of can is reached.
- Retighten the clamps.

Changing Marshalers

When changing over to a can type with a diameter different to that of the current can then the can marshaler **(2)** must be changed.

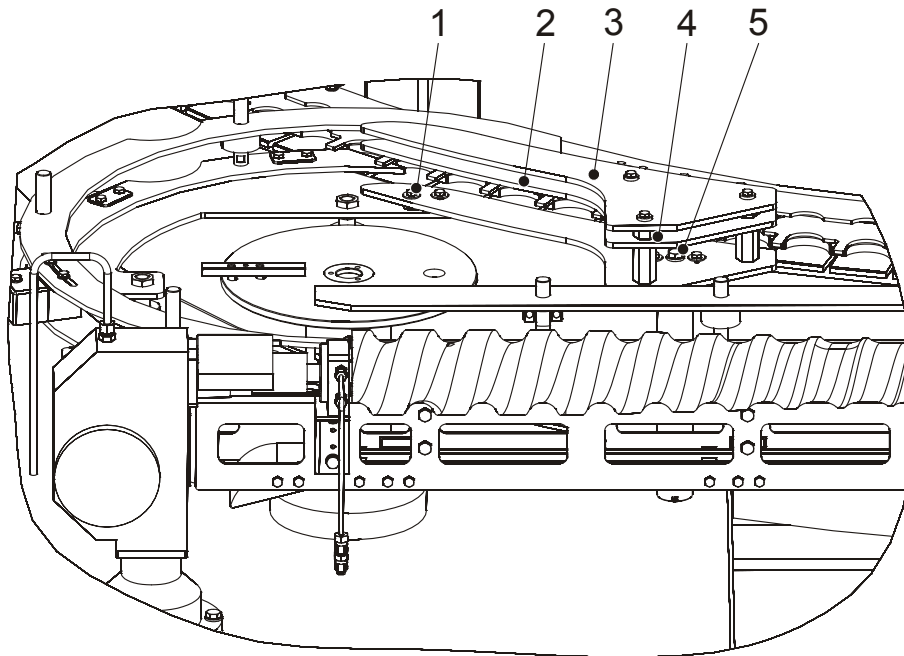


Figure 4-8 :
Changing
Marshalers

- Unscrew and remove screw **(5)** at the top and screw **(1)** at the bottom.
- Lift the can marshaler out and insert the new can marshaler.
- Put screws **(5)** and **(1)** back in place and tighten securely.

When changing over from a low to a higher can, as a rule you must also mount a guide plate **(3)** and distance piece **(4)** on the marshaler.

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Height Adjustment

It is necessary to adjust the height of the filler and seamer to the when changing your machine over to a new container type with a different can height. The following describes the sequence of steps to be performed for filler height adjustment:

(Refer to the Seamer Operating Manual for information on adjusting the seamer height.)

General Notes

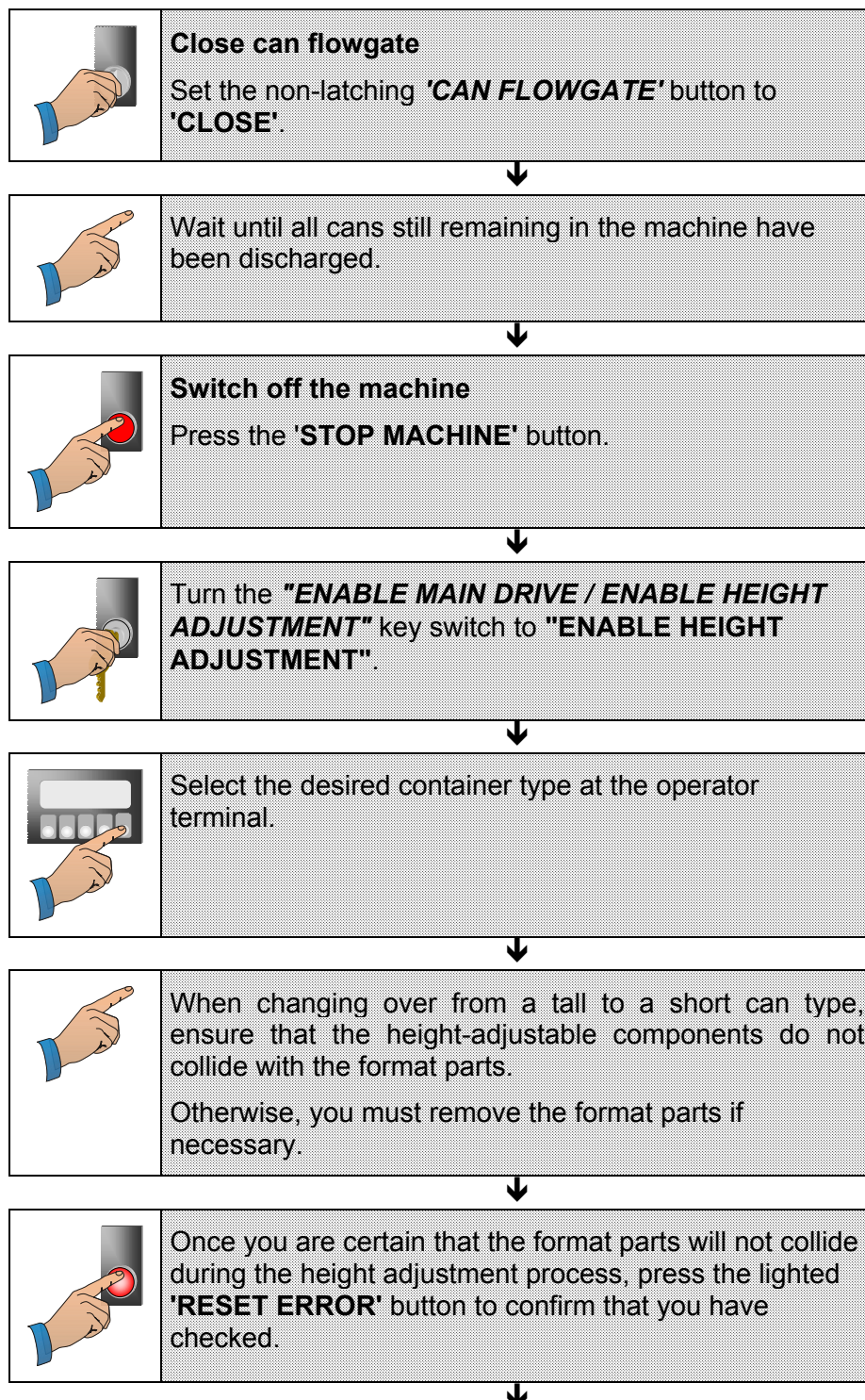
An intermediate sterilization is recommended when changing over from short to tall containers.

The **height adjustment** process **cannot and must not** be run when the filler is being sanitized or if any containers are still in the filler.

When running the height adjustment, no other persons should be on or in the vicinity of the machine. The paneling and safety screens must be closed.



Filler Height Adjustment





	Activate the 'Height Adjustment' menu at the operator terminal and confirm or, if necessary, change the setpoint height indicated for the height adjustment. Please note that the height adjustment will be blocked if a height setting is entered that is beyond the specified limits.
---	--



	Press the 'CAN HEIGHT UP / DOWN' button. The filler turret will automatically run to the set height.
---	---



	Terminate the Height Adjustment menu. Please note that you can exit the Height Adjustment menu only if the setpoint height has been reached. (See chapter, <i>Operator Prompting</i>)
---	---



	Turn the "ENABLE MAIN DRIVE / ENABLE HEIGHT ADJUSTMENT" key switch to "ENABLE MAIN DRIVE".
---	---



Trouble Shooting

Fault Finding Aid (Elimination of Malfunctions)

This chapter should help finding faults and eliminating malfunctions.

Never clear malfunctions before having read the guidelines **"safety - principles for filling plants in the beverage industry"**.

Once a malfunction has been cleared, the machine can only be started after pressing acknowledgment key.



Always wear the prescribed protective clothing!

Secure the machine against unintentional running!

Switch off machine drive!

Secure especially main switch at control cabinet with your own padlock!



Possible sources of failures, their causes and solutions are listed on the following pages. Major machine malfunctions should be cleared only by specialists such as electrical or electronic engineers or fitters (not by the operator).

The following symbols indicate the skill required for eliminating the malfunctions:

Faults can be eliminated by the operator.



Faults require elimination by specialist: electrical and / or electronics engineer.



Faults require elimination by specialist: fitter.



Only use KHS original parts

When replacing spare parts, only use KHS original parts.

We expressly draw your special attention to the fact that original parts as well as accessories which we do not supply are not checked or authorized by us.

The manufacturer is not liable for damage resulting from the use of non-KHS parts and accessories.

Display of Malfunctions

A rotary warning lamp indicates any malfunctions that occur.

Depending on the model of the operator terminal, malfunctions are additionally indicated at the operator panel by symbols or in clear text.

Malfunctions are indicated by the rotary warning lamp as follows:

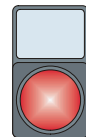
Lighted blue indicator lamp:

General errors

(e.g. open paneling, no corks, accumulation table full, bottle fallovers, container flowgate closed, etc.).



Reset the error at the control panel after correcting the cause of the malfunction. The lamp will then be turned off.



Flashing green indicator lamp:

Indicates a error in the container infeed or discharge (e.g. container backups, no containers).

The rotary warning lamp will be turned off automatically after you have corrected the container backup or container starvation situation.



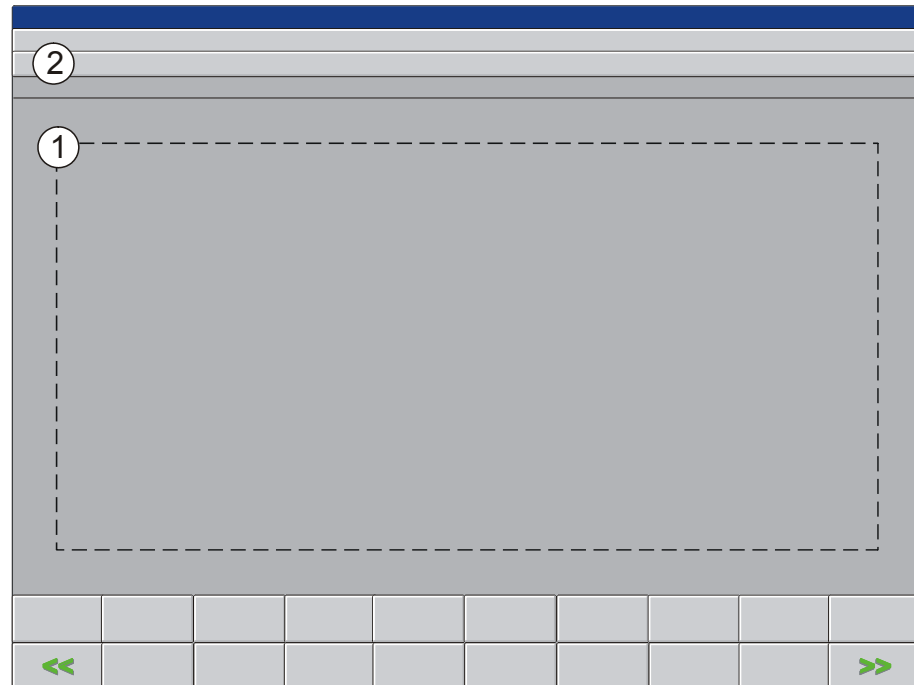
Lighted green indicator lamp:

There are no errors pending and the machine is ready for production operation.



Overview of Faults with Display of Symbols and/or Texts

Figure 5-1 :
Faults with Display
of Symbols and
Texts



A graph (1) of the machine will appear at the operator terminal after activating the **'Program Selection'** menu.

The following symbols appearing in the graph indicate faults that have occurred in the various machine areas.

The faults will be displayed in clear text in the text line (2) of each menu.

Machine operating
(various symbols can be displayed at this point).



Filler computer status



Emergency Stop



Machine paneling, front



Machine paneling, rear



Infeed conveyor



Outfeed conveyor



Can Infeed



Accumulation table



Drives



Lubrication



When a malfunction occurs, the appearance of the symbol for the machine area is modified accordingly and a corresponding error message is displayed in the second line from the top.





Manual Stop		
Cause		Remedy
The filler was switched off.		Switch the filler back on.
Can flowgate has been closed.		Open the can flowgate.
Defective switching elements or disrupted switching circuit.		Replace the switching elements and test the switching circuits of the ON and OFF switches of the machine and can flowgate.



Screen cannot be exited		
Cause		Remedy
The machine is currently in an automatic execution phase.		Wait until the automatic execution phase has completed.



Synchronization error		
Cause		Remedy
The switching flag used to detect synchronous timing is incorrectly positioned.		Correct the position of the switching flag.
Defective proximity switch for detecting synchronous timing.		Check if the proximity switch and the circuit are in proper working order and replace the proximity switch.
Defective proximity switch for detecting machine timing.		

Filling error		
Cause		Remedy
An error has occurred in the filling valve control.		Activate the Valve Error function at the operator terminal.



Emergency stop button [specification of machine area]		
The area of the machine in which the EMERGENCY STOP button was pressed is indicated in the <i>error text</i> .		
Cause		Remedy
The emergency stop button was pressed.		First, determine and eliminate the cause of the emergency and then unlock the emergency stop button.
Defective emergency stop button.		Replace the emergency stop button.
Broken wire in the switching circuit.		Check the switching circuit and repair the broken wire.





No cans at filler		
Conveyor disruption		
Cause		Remedy
The infeed conveyor is stopped.		Switch on the infeed conveyor.
One of the upstream machines has signaled a malfunction.		Eliminate the error at the particular machine.
Blocked or defective infeed conveyor drive.		Check the motor power supply, the motor protection switch, and the switching circuit.
		Check the gear and the drive.



Gap or downed can		
Cause		Remedy
A can has fallen over in front of the feedscrew.		Remove the downed or jammed cans.
Jammed cans on the infeed conveyor in front of the feedscrew.		
Defective infeed sensor (proximity switch).		Check if the infeed sensor and the circuit are in proper working order and replace if necessary.

Backup behind filler		
Conveyor disruption		
Cause		Remedy
The outfeed conveyor is switched off.		Switch on the outfeed conveyor.
Cans are backed up on the outfeed conveyor.		Eliminate the cause of the can backup.
One of the downstream machines has signaled a malfunction.		Eliminate the error at the particular machine.
Defective backup switch.		Replace the backup switch and check the circuit.
Blocked or defective outfeed conveyor drive.		Check the motor power supply, the motor protection switch, and the switching circuit.
		Check the gear and the drive.



Machine stop, bypass table		
Cause		Remedy
The bypass table is full.		Check the can conveyors following this machine and eliminate any errors. Clear the bypass table.
Defective bypass table backup switch.		Check if the backup switch and the circuit are in proper working order and replace if necessary.





Front paneling open		
Cause		Remedy
The front machine paneling is open.		Close the paneling properly.
Door contact switch does not engage or is defective.		Check if the door contact switch and the circuit are in proper working order and replace the switch if necessary.



Filler carousel safety doors		
Cause		Remedy
The back paneling around the machine rotary is open.		Close the paneling properly.
Door contact switch does not engage or is defective.		Check if the door contact switch and the circuit are in proper working order and replace the switch if necessary.



Batch error, drives		
Motor protection switch, machine drives		
Frequency converter error		
Posistor - thermistor		
Cause		Remedy
The motor is blocked or overloaded.		Check drive system for stiff movement or blockage and eliminate the cause. Replace the motor if necessary.
Motor protection switch cutout.		Check the setting of the motor protection switch and switch the motor protection switch back on.
Faulty or damaged motor connection.		Check the motor connection and possibly the connection to the frequency converter.
Defective motor protection switch.		Check if the switch and the circuit are in proper working order and replace the switch.
The frequency converter has signaled a malfunction.		Refer to the Operating Manual for the frequency converter.



No grease		
Cause		Remedy
The lubricant reservoir is empty.		Check the filling level of the lubricant reservoir and refill if necessary. (See manufacturer specifications / NP parts).
Central lubrication system malfunction.		Refer to the operating manual of the central lubrication pump for further information on troubleshooting. (See <i>List of NP Parts</i> attached to the <i>Spare Parts List</i>).



Greasing error		
Cause		Remedy
One or more lubricant distributors or lubrication points are clogged.		Refer to the operating manual of the central lubrication pump for further information on troubleshooting. (See <i>List of NP Parts</i> attached to the <i>Spare Parts List</i>).
Defective solenoid valve in the main distributor supply. (Only for machines for where the main distributor lubricant supply is controlled by solenoids.)		Check the control and if in the solenoid valve is in proper working order and replace the solenoid valve if necessary.

Fuse in [<i>machine area specification</i>]		
The area of the machine in which the monitored switch was tripped is indicated in the <i>error text</i> .		
Cause		Remedy
The fuse-protected area was overloaded or a short circuit or short to ground occurred.		Eliminate the cause of the overload and replace the fuse or switch the circuit breaker back on.

PLC battery failure		
Cause		Remedy
Low standby battery in the Programmable Logical Controller (PLC).		Backup the PLC program and then replace the standby battery (see PLC Operating Manual).

SIMATIC ventilator line		
Cause		Remedy
Defective or overloaded programmable logical controller (PLC) ventilator.		Clean the filter. Check the power supply and the operability of the ventilator and replace if necessary.

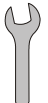
PLC to filler computer data transmission		
Cause		Remedy
The signal transmission line between the Programmable Logical Controller (PLC) and the filler computer is malfunctioning or disrupted.		Check the shielding, the connection, and the signal line for damage and repair if necessary.
The filler computer or the PLC is out of order.		Check if the corresponding control is switched on and if power is being supplied.

Front carousel paneling override malfunction		
Cause		Remedy
Defective contactor in the safety circuit for overriding the front screen.		Using the wiring diagram, check if the contactor in the safety circuit is in proper working order.

Bus link group error		
Cause		Remedy
The bus communications link to the individual electronic components (data and signal exchange) is disrupted. An electrical component connected to the bus communications link is disrupted.		Check the bus system communication lines and the connections of the electronic components.

Height Adjustment Faults

F_037 Inner ring time-out (vessel) F_038 Outer ring time-out (control ring)		
Cause		Remedy
The pulse monitor of the rotary pulse generator at the inner or outer ring was triggered.		Check that the rotary pulse generator is working properly and calibrate the height adjustment.

F_039 Filler height adjustment invalid positive difference F_040 Filler height adjustment invalid negative difference		
Cause		Remedy
The difference between the outer and inner rings exceeds the 1.6-mm limit.		Recalibrate the height adjustment.

F_049 Bottom limit switch occupied F_050 Top limit switch occupied		
Cause		Remedy
The height adjustment has been run to its upper or lower limit.		Run the height adjustment back to its correct height.

F_005 Inner or outer ring motor protection		
Cause		Remedy
The motor protection switch for the height adjustment motor of the outer or inner ring has cutout.		Check the motor, the supply of the motor protection switch, and the input signal to the PLC. Switch the motor protection switch back on.

F_064 Height adjustment not completed		
Cause		Remedy
The actual value has not reached the setpoint value.		Continue to run the height adjustment until the setpoint has been reached.

F_059 Height adjustment process must be recalibrated		
Cause		Remedy
Lost height adjustment control data.		Recalibrate the height adjustment.

Bell Actuation / Roller Lubrication Fault Messages

F_012 Roller lubrication flow metering fault		
Insufficient water flow for lubricating the bell actuation rollers.		
Cause		Remedy
Insufficient water supply to the filler.		Check the water supply to the filler.
Clogged water filter.		Clean the water filter. (Refer to the description of the filter cartridge contained in the ' List of NP Parts ').
Defective solenoid valve.		Check the operability of the solenoid valve.
No control air at the solenoid valve.		Check the control air supply.
Defective flow monitoring device.		Check the flow-monitoring device and replace if defective.
Clogged water nozzles.		Clean the water nozzles.

Malfunctions During Filling

No build up of pressure in the ring tank		
Cause		Solution
Pressurize mode has not been selected.		Select Pressurization mode.
The main and/or gas cylinders do not close.		Increase the control air pressure for controlling the filling elements to at least 4.5 bars .
The pressurization pressure control valve is not working.		Set the control air pressure to 5 -6 bars . Check the indicator (I.O, CTRL_ADP) at the I/P regulating converter and the active current signal (4 - 20 mA). Recalibrate the I/P regulating converter (refer to the manufacturer operating instructions contained in the List of Purchase Parts).
Leaky exhaust valve in the pressurization gas line.		Check the control air supply and the drive valve. Replace the exhaust valve if defective.
The safety valve is open.		Close the safety valve.
Defective solenoid valve for controlling the safety valve.		Replace the solenoid valve.

No cans are being pressurized		
Cause		Solution
Fill mode has not been selected.		Select Fill mode.
Incorrectly set pressurization time and/or pressurization pressure.		Re-set the pressure and/or time.
Defective can sensing proximity switch.		Replace the defective proximity switch.
The filler is not synchronous.		Synchronize the filler and check the synchronous timing and machine timing.

No cans are being filled		
Cause		Solution
Cans are not being pressurized		See <i>malfunction</i> : Not all cans are being pressurized.
Cans are not being pressed against the valve.		Check can height setting of the height adjustment and correct if necessary.
The flowmeter (EIF) is not operable.		Use the wiring diagram to check the supply of electrical power.
The product control valve is not functioning properly.		Set the control air pressure to 5 – 6 bars . Check the indicator (I.O, CTRL_ADP) at the I/P regulating converter and the active current signal (4 - 20 mA). Recalibrate the I/P regulating converter (refer to the manufacturer operating instructions contained in the List of Purchase Parts).
The level probes in the ring bowl are not functioning properly.		Use the wiring diagram to check the supply of electrical power.

Some cans are not being filled		
Cause		Solution
The valve cartridge of the corresponding filling station is defective.		Replace the valve cartridge.
Leaky filling element.		Check the rubber contact seal in the centering bell and replace if necessary. Check the leakage holes of the filling element for leakage and replace any defective seals and membranes if necessary.
The centering bell of the corresponding filling station is blocked.		Check if the bell actuation is in proper working order. Replace the bell actuators if necessary.
Extreme fluctuation of the pressurization gas pressure.		Check the operability of the controller. Replace the seals or controller as required.
The sensing distance of the can detection proximity switch is too great.		Readjust the can detection proximity switch.
The flowmeter (EIF) of the corresponding filling station is not operable.		Check the connection, power, and the control. Replace the flowmeter if necessary.

Irregular can filling process		
Cause		Solution
The pressurization time is too short.		Increase the pressurization time.
Extreme fluctuation of the pressurization gas pressure.		Check the operability of the controller. Replace the seals or controller as required.
The control air pressure for the filling element control is too low.		Increase the control air pressure for controlling the filling elements to at least 4.5 bars .

All can foam over during filling		
Cause		Solution
The can guide parts or format parts mounted do not correspond to the can type or are defective.		Change the wrong parts or replace the defective parts. Check the mutual adjustment of the parts and correct if necessary.
The cans are not clean.		Supply clean cans to the machine.
The product is too warm.		Decrease the machine output speed. Increase the pressures taking the pressurization times into account.
The product is over-carbonated.		Check the CO2 content.
The filling volume setting is too high.		Decrease the filling volume.
Insufficient pressure relief.		Check the pre-relief angle.
The filling level in the ring bowl is too high.		Decrease the setpoint for the product filling level in the ring bowl.
Cans are not being pressed against the valve.		Check can height setting of the height adjustment and correct if necessary.





Leaky pressurization pressure control valve.		Check the indicator (I.O, CTRL_ADP) at the I/P regulating converter and the active current signal (4 - 20 mA). Recalibrate the I/P regulating converter (refer to the manufacturer operating instructions contained in the List of Purchase Parts).
The pressurization pressure control valve is not working.		Set the control air pressure to 5 – 6 bars . Check the indicator (I.O, CTRL_ADP) at the I/P regulating converter and the active current signal (4 - 20 mA). Recalibrate the I/P regulating converter (refer to the manufacturer operating instructions contained in the List of Purchase Parts).
Filling pressure set too low.		Set the filling pressure to 1 - 1.5 bars higher than the saturation pressure.

Some cans foam over during filling		
Cause		Solution
The valve cartridge of the corresponding filling station is defective.		Replace the valve cartridge.
Leaky filling element.		Check the rubber contact seal in the centering bell and replace if necessary. Check the leakage holes of the filling element for leakage and replace any defective seals and membranes if necessary.
The pressure relief nozzles are clogged.		Clean the nozzles and replace if defective.
The product cylinder in the filling element is blocked.		Replace the filling element.
The filling station correction of the flowmeter (EIF) is maladjusted.		Check the ground contact and the supply voltage and adjust the filling station correction.

Filling speed too slow		
Cause		Solution
The product filling level in the ring bowl is too low.		Increase the setpoint for the product filling level in the ring bowl.
The pressure relief nozzles are clogged.		Clean the nozzles and replace if defective.
The pressurization pressure control valve and/or the return gas control valve(s) is/are not working.		See problem: "All cans foam over during filling" .
The product control valve is not functioning properly.		See problem: "All cans are not being filled" .

All cans are underfilled		
Cause		Solution
Insufficient filling speed		See malfunction "Filling speed too slow" .
Insufficient filling volume.		Increase the filling volume.
The product filling level in the ring bowl is too low.		Increase the setpoint for the product filling level in the ring bowl.
Maladjusted medium correction.		Readjust the medium correction (5% adjustment range).

Some cans are underfilled		
Cause		Solution
The pressure relief nozzles are clogged.		Clean the nozzles and replace if defective.
Leaky filling element.		Check the rubber contact seal in the centering bell and replace if necessary. Check the leakage holes of the filling element for leakage and replace any defective seals and membranes if necessary.
The valve cartridge of the corresponding filling station is defective.		Replace the valve cartridge.
The filling station correction of the flowmeter (EIF) is maladjusted.		Check the ground contact and the supply voltage and adjust the filling station correction.
The flowmeter (EIF) of the corresponding filling station is not operable.		Check the connection, power, and the control. Replace the flowmeter if necessary.

The flowmeter (EIF) does not switch off		
Cause		Solution
The output card of the machine control is defective.		Replace the defective card.
The product cylinder in the filling element is blocked.		Replace the filling element.

Decreasing filling level in the ring bowl		
Cause		Solution
The dirt trap in the product line is clogged.		Clean the dirt trap.
The product admission pressure is too low or the filling pressure is too high.		Check the pressures. The admission pressure must be at least 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 controller has no setpoint value.		Check the setpoint value output at the machine control.

Pressurization gas pressure fluctuates		
Cause		Solution
The pressure controller is not functioning properly.		Check proportional valve for setpoint generation, the voltage signal, and the control air supply.
Leaky pressure controller.		Check the seals and membranes and replace if defective.
Leaky pressure controller rinsing lines or valves.		Eliminate the cause of the leakage.
The sterile filters are dirty.		Clean the filters.
Insufficient gas admission pressure.		Increase the admission pressure.

Maintenance

Notes

Always adhere to the guidelines contained in the "**Safety Fundamentals for Filling Plants in the Beverage Industry**" when performing all servicing, inspection, and maintenance work.



Operational disruptions caused by insufficient or inadequate servicing can result in expensive repairs and extended periods of machine standstill. Servicing at regular intervals is therefore essential.

Regular servicing is essential

Only a conscientiously maintained machine can provide the long lasting high performance expected.

Servicing and maintenance work may be performed only if the machine / system is secured and not under power.

Turn off all switches necessary to prevent inadvertent start-up.

Protect against inadvertent start-up

Above all, use your own padlock to secure the main switch at the electrical switch cabinet. Accident reports indicate that machines suddenly start-up even though maintenance personnel is located in or on machines.

Particularly when two members of the maintenance staff are working on the same machine, each person must use his/her own padlock to secure the machine from unintentionally being switched on. The machine can be started only after both padlocks have been removed.

Lock the main switch

Regular adherence to the maintenance and servicing work indicated in the following is prerequisite for flawless operation and long service life of the machine.

Use only original KHS spare parts for part replacement. We explicitly point out that spare and accessory parts not supplied by us have also not been tested and approved by us. The manufacturer will accept no liability for damage resulting from the use of spare and accessory parts not supplied by KHS.

Use original KHS spare parts only

We urgently recommend that servicing be performed according to the following time schedule.



Regulations

The regulations in effect for the particular installation site must be adhered to. This applies in particular to regulations and guidelines:

- regarding storage, use, and the proper disposal of materials,
- regarding substances hazardous to health or environment,
- regarding storage, use, and the proper disposal of processing materials,
- for the operation of electrical systems, and
- those applicable to your production plant.

Proper disposal

- Make certain that acids and caustics are properly disposed of according to regulations in effect. They must not be introduced to the sewage system without first being neutralized.
- Check whether or not replaced parts and other waste materials resulting from servicing or repair work require special treatment prior to disposal.
- If necessary, ensure proper disposal accordingly.

Particularly critical is the proper disposal of the following items and chemical materials:

- Oil and grease and their containers (e.g. sprays, PERMA grease guns),
- cleansers, solvents, and refrigerants,
- batteries, cathode ray tubes, neon lamps, etc., and
- plastic materials.

Lubrication Schedule

Notes on Lubricating and Servicing Procedures

The lubricating and servicing intervals indicated apply to an 8-hour day of operation.



Immediately correct any defects and damage detected when performing the lubricating and servicing work.



When lubricating:

- Remove any excess lubricant at the lubrication points.



When switching off the main power switch for servicing work, bear in mind that certain components in the control cabinet are still supplied electrical power.



Follow the instructions in the operating instructions for non-production parts in addition to the specified lubricating and servicing intervals. (See *List of NP Parts* attached to the *Spare Parts List*).



Information on Lubricant Identifiers



Problems during production

Damage to and destruction of machine components

Using the wrong lubricants can cause problems during production operation and damage and destroy machine components.

Adhere to the identifiers when selecting lubricants.

Pay particular attention to the symbols. There is a potential risk of mistakenly mixing synthetic or partially synthetic liquids with mineral-oil-based lubricants.

The lubricants are marked in accordance with DIN 51502.

The various lubricants are assigned codes comprised of code designations and simple symbols.

The identifying color of the identifying background is white. The lettering is black.

Code designations

See DIN 51502

Symbols

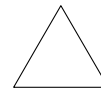
Mineral oils (lubricating oils, special oils).



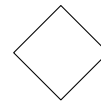
Non-flammable hydraulic fluids; synthetic or partially synthetic fluids.



Mineral-oil-based lubrication grease.



Synthetic-oil-based lubrication grease.



Examples

Mineral-oil-based lubricating oil.



Polyglycol-based lubricating oil (synthetic lubricant).



Mineral-oil-based lubricating grease.



Synthetic-oil-based lubricating grease.



Electrical maintenance

Switching devices	
<i>Mechanical switching devices</i>	Those switching devices with mechanical contacts are subject to wear. The service life of the devices and the number of expected switching actions can be found in the manufacturer specifications.
<i>Electronic switching devices</i>	Electronic switching devices are not subject to wear and are maintenance-free. They do, however, require adequate cooling and dry surrounding air (general conditions according to VDE 0113, Part 1).
<i>Filters</i>	Clean and replace filter mats and cabinet ventilator regularly (according to prevailing local conditions)!

Motors	
<i>Three-phase motors</i>	For three-phase motors it is sufficient to keep the cooling air passages clean and to monitor the roller bearings at regular intervals.

Light barriers and light scanners	
<i>Basics</i>	Always protect light barriers, light scanners, electronic and optical equipment against splash water during production and cleaning.
<i>Daily prior to operation</i>	Clean lenses and reflectors daily prior to beginning operations.

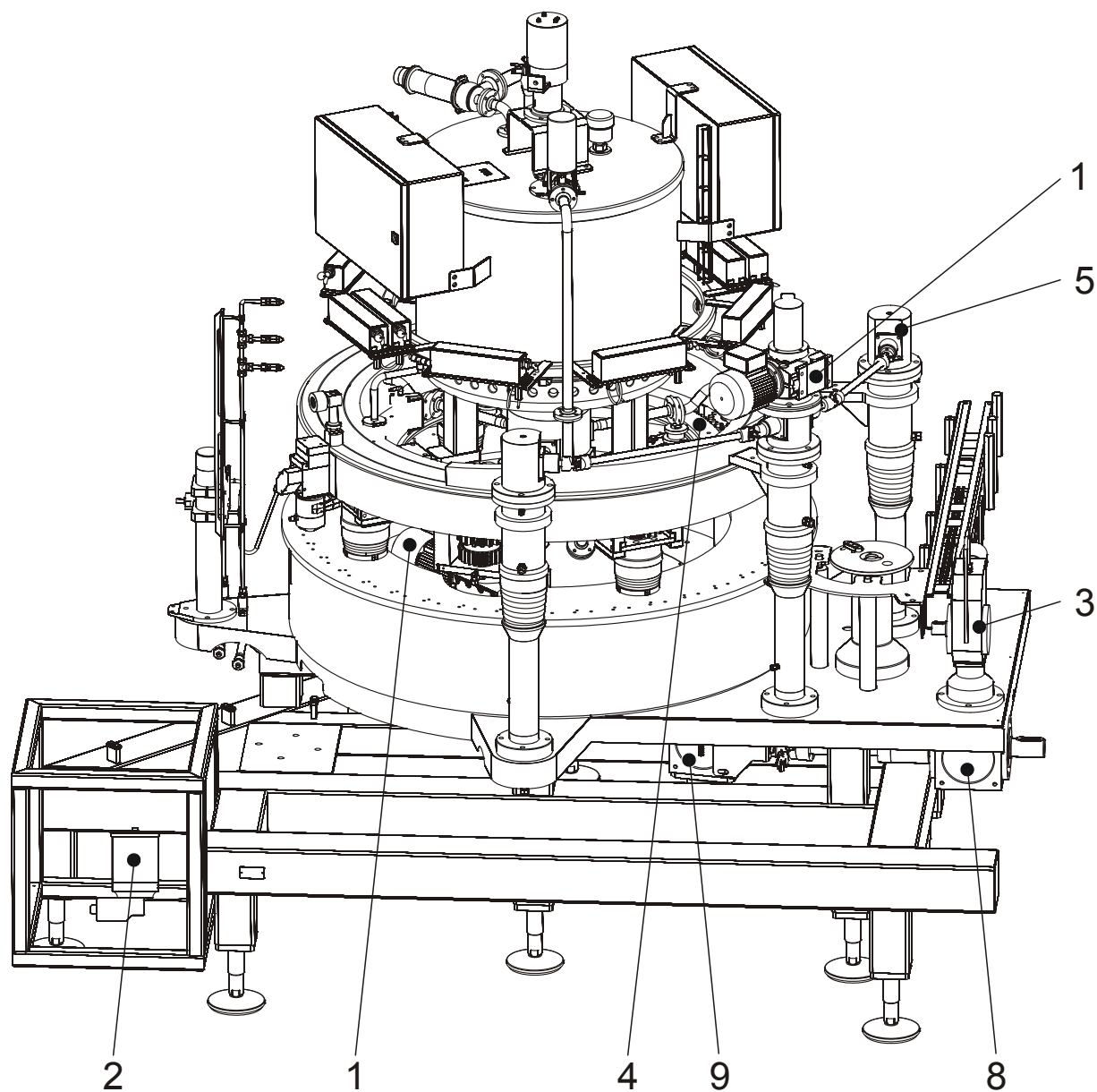
Pneumatic equipment maintenance

Daily or after every 8 hours of operation	
Maintenance unit	Check the proper function of the maintenance unit and drain the water separator if necessary!

Weekly or after every 40 hours of operation	
Leakage	Check hoses, hose connections, and connection fittings for leakage and damage and replace any defective parts!

Filler lubrication points

Figure 6-1 :
Filler lubrication
points



Of the following specifications, only those items indicated in the drawing apply to your machine.

(1)	Lubrication of purchase parts	Refer to the manufacturer's specifications contained in the List of Purchase Parts for information on lubricating gears, motors, and pumps.
(2)	Central lubrication	(Refer to the manufacturer specifications contained in the List of Purchase Parts for information on refilling).
	After every 170 hours of operation or when a No Grease message is displayed at the operator terminal.	Check the filling level of the lubricant reservoir and refill as required with the specified lubricant. Refill the lubricant reservoir using the filling nipple only.
(3)	Gear filled with food-grade oil	Refer to the manufacturer specifications contained in the List of Purchase Parts for information on lubricating the gears.
CLP 220 e.g. Turmasyath VG 150 from Lubcon	After every 170 hours of operation First oil change after 500 hours of operation and after every 10 000 hours of operation thereafter	Check the level of oil and refill as required with the specified lubricant. Change using the specified lubricant.
(4)	Gear rim of the height adjustment	
	After every 170 hours of operation	Check that the gear rim and the edges of the gear rim and gear wheels are greased. Regrease as required.

(5)	Gear of the height adjustment	
	After every 8000 hours of operation	Change the lubricant using the specified lubricant.
(6)	Product infeed, rotary media distributor	
Paralique GTE 703 or Berulub Sihaf 2	After every 170 hours of operation	Lubricate with the specified lubricant as described in section Rotary Distributor Lubrication in chapter Servicing .
(8)	Gears	
	After every 170 hours of operation First oil change after 500 hours of operation and after every 10 000 hours of operation thereafter	Check the level of oil and refill as required with the specified lubricant. Change using the specified lubricant.
(9)	Beveled gear and/or spur wheel drive	
	After every 170 hours of operation First oil change after 500 hours of operation and after every 10 000 hours of operation thereafter	Check the level of oil and refill as required with the specified lubricant. Change using the specified lubricant.

KHS Table of Lubricants for Machines of the Beverage Industry and Process Engineering Systems

Please note that special operating instructions are provided for KHS hydraulic systems.

Dear Customer:

We would like to bring your attention to the importance of proper lubrication for your high quality machines in the following. The application of the most suitable lubricant is prerequisite for achieving highest possible machine performance and service life and to prevent operation disruptions.

In the following schedule we provide you a selection of those lubricants which, according to the lubricant manufacturer, should be well suited for lubricating your system. Therefore, please use only these or other equivalent lubricants of proven quality.

Importance of Proper Lubrication

ATTENTION!

The lubricating effect of lubricants may be affected by contact with certain cleansers and disinfectants (get in touch with the manufacturer of the cleanser and disinfectant, if necessary).

Mineral oil-based and synthetic lubricants must not be combined.

Machine parts must be thoroughly cleaned prior to changing over from mineral oil-based to synthetic lubricants or from synthetic to mineral oil-based lubricants.



Mineral oil-base and synthetic lubricants must be properly disposed of separately.

Proper disposal may be performed only in accordance with the applicable national legal regulations in effect.



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KHS Standard Table of Lubricants						1/6	01.03.01
Type	⇒	Hydraulic Oils DIN 51 524/2					
Basis	⇒	Mineral Oils					
Designation DIN 51502 Manufacturer ↓	⇒	HLP 10 ↓	HLP 22 ↓	HLP 32 ↓	HLP 46 ↓	HLP 68 ↓	
AGIP		OSO 10	OSO 22	OSO 32	OSO 46	OSO 68	
			Precis HLP 22	Precis HLP 32	Precis HLP 46	Precis HLP 68	
ARAL		VITAM F 10	VITAM F 22	VITAM GF 32	VITAM GF 46	VITAM GF 68	
AVIA		AVIA FLUID RSL	AVILUB RSL 22	AVILUB RSL 32	AVILUB RSL 46	AVILUB RSL 68	
BECHHEIM		STAROIL Nr. 10	STAROIL Nr. 22	STAROIL Nr. 32	STAROIL Nr. 46	STAROIL Nr. 68	
BP			ENERGOL HLP-HM 22	ENERGOL HLP-HM 32	ENERGOL HLP-HM 46	ENERGOL HLP-HM 68	
MOBIL		MOBIL DTE 21	MOBIL DTE 22	MOBIL DTE 24	MOBIL DTE 25	MOBIL DTE 26	
CASTROL		HYSPIN SP 10	HYSPIN SP 22	HYSPIN SP 32	HYSPIN SP 46	HYSPIN SP 68	
ELF			ELFOLNA 22	ELFOLNA 32	ELFOLNA 46	ELFOLNA 68	
ESSO		NUTO-H 10	NUTO-H 22	NUTO-H 32	NUTO-H 46	NUTO-H 68	
TOTAL		AZOLLA ZS 10	AZOLLA ZS 22	AZOLLA ZS 32	AZOLLA ZS 46	AZOLLA ZS 68	
			LUBRIPLATE FMO 85AW	LUBRIPLATE FMO 200AW	LUBRIPLATE FMO 350AW		
FINA			HYDRAN 22	HYDRAN 32	HYDRAN 46	HYDRAN 68	
FUCHS		RENOLIN B 3 VG 10	RENOLIN B 5 VG 22	RENOLIN B 10 VG 32	RENOLIN B 15 VG 46	RENOLIN B 20 VG 68	
				RENOLIN ZAF 32B	RENOLIN ZAF 46B	RENOLIN ZAF 68B	
KLÜBER				LAMORA HLP 32	LAMORA HLP 46	LAMORA HLP 68	
OPTIMOL		HYDO 10	HYDO 22	HYDO 32	HYDO 46	HYDO 68	
					HYDO E 46	HYDO E 68	
SHELL		TELLUS 10	TELLUS 22	TELLUS 32	TELLUS 46	TELLUS 68	
SRS		Wintershall WIOLAN HX15	Wintershall WIOLAN HX22	Wintershall WIOLAN HX32	Wintershall WIOLAN HX46		
TEXACO		RANDO HD 10	RANDO HD 22	RANDO HD 32	RANDO HD 46	RANDO HD 68	
TRIBOL			TRIBOL 943 AW 22	TRIBOL 943 AW 32	TRIBOL 943 AW 46	TRIBOL 943 AW 68	
OKS					OKS 3770		
Lubricants must not be combined, even within the same group!							

KHS Standard Table of Lubricants						2/6	01.03.01
Type →	Hydraulic Oils DIN 51 524-2 / 51 517-3						
Basis →	Synthetic polyalphaolefin-based / recognized as physiologically safe						
Designation DIN 51502 Manufacturer ↓	HLP HC 32 ↓	HLP HC 68 ↓	HLP HC 100 ↓	HLP HC 220 ↓	HLP HC 320 ↓	HLP HC 460 ↓	HLP HC 680 ↓
AGIP							
ARAL	EURAL Hyd 32	EURAL Gear 68	EURAL Gear 68	EURAL Gear 220	EURAL Gear 220/460	EURAL Gear 460	
AVIA							
BECHHEIM	BERUSYNTH EURAL HYD 32	BERUSYNTH EURAL HYD 68		BERUSYNTH EURAL GEAR 220		BERUSYNTH EURAL GEAR 460	
BP							
MOBIL	DTE FM 32	DTE FM 68	DTE FM 100	DTE FM 220	DTE FM 320	DTE FM 460	
CASTROL							
ELF							
ESSO				SPARTAN SEP 220	SPARTAN SEP 320		
TOTAL	LUBRIPLATE SFGO-32	LUBRIPLATE SFGO-68	LUBRIPLATE SFGO-100	LUBRIPLATE SFGO-220	LUBRIPLATE SFGO-320	LUBRIPLATE SFGO-460	LUBRIPLATE SFGO-680
FINA							
FUCHS	HYD OIL 32	HYD OIL 68	GEAR OIL 80	GEAR OIL 220	GEAR OIL 320		WORM GEAR LUBE 680
KLÜBER	KLÜBER SUMMIT HySyn FG-32	KLÜBER SUMMIT HySyn FG-68	Klüberoil 4UH1-100	Klüberoil 4UH1-220		Klüberoil 4UH1-460	Klüberoil 4UH1-680
OPTIMOL	Obtileb HY 32	Obtileb HY 32	Obtileb GT 100	Obtileb GT 220	Obtileb GT 320	Obtileb GT 460	Obtileb GT 680
SHELL	Cassida HF32	Cassida HF68	Cassida HF100	Cassida GL220	Cassida GL320	Cassida GL460	Cassida GL680
SRS							
TEXACO							
TRIBOL							
OKS							
Lubricants must not be combined, even within the same group!							

KHS Standard Table of Lubricants						3/6	01.03.01	
Type	⇒	Lubricating Oils / Gear Oils) DIN 51 517-3						
Basis	⇒	Mineral Oils						
Designation DIN 51502 Manufacturer ↓	⇒	CLP 32 ↓	CLP 68 ↓	CLP 100 ↓	CLP 220 ↓	CLP 320 ↓	CLP 460 ↓	CLP 680 ↓
AGIP		Blasia 32	Blasia 68	Blasia 100	Blasia 220	Blasia 320	Blasia 460	Blasia 680
		Precis CLP32	Precis CLP68	Precis CLP100	Precis CLP220	Precis CLP3200	Precis CLP460	Precis CLP680
ARAL		DEGOL BG 32	DEGOL BG 68	DEGOL BG 100	DEGOL BG 220	DEGOL BG 320	DEGOL BG 460	DEGOL BG 680
AVIA			AVIA GEAR RSX 68	AVIA GEAR RSX 100	AVIA GEAR RSX 220	AVIA GEAR RSX 320	AVIA GEAR RSX 460	AVIA GEAR RSX 680
BECHHEIM		STAROIL G 32	STAROIL G 68	STAROIL G 100	STAROIL G 220	STAROIL G 320	STAROIL G 460	STAROIL G 680
BP			Energol GR-XP 68	Energol GR-XP 100	Energol GR-XP 220	Energol GR-XP 320	Energol GR-XP 460	Energol GR-XP 680
MOBIL			MOBILGEAR XMP 68	MOBILGEAR XMP 100	MOBILGEAR XMP 220	MOBILGEAR XMP 320	MOBILGEAR XMP 460	MOBILGEAR XMP 680
CASTROL			ALPHA SP 68	ALPHA SP 100	ALPHA SP 220	ALPHA SP 320	ALPHA SP 460	ALPHA SP 680
ELF			REDUKTELF SP 68	REDUKTELF SP 100	REDUKTELF SP 220	REDUKTELF SP 320	REDUKTELF SP 460	REDUKTELF SP 680
ESSO			SPARTAN EP 68	SPARTAN EP 100	SPARTAN EP 220	SPARTAN EP 320	SPARTAN EP 460	SPARTAN EP 680
TOTAL			CARTER EP 68	CARTER EP 100	CARTER EP 220	CARTER EP 320	CARTER EP 460	CARTER EP 680
			LUBRIPLATE FMO 350AW	LUBRIPLATE FMO 500AW	LUBRIPLATE FMO 1100AW	LUBRIPLATE FMO 1700AW	LUBRIPLATE FMO 2400AW	LUBRIPLATE FMO 3800AW
FINA			GIRAN L68	GIRAN L100	GIRAN L220	GIRAN L320	GIRAN L460	GIRAN L680
FUCHS		RENOLIN B10 VG 32	RENOLIN B10 VG 68	RENOLIN B10 VG 100	RENOLIN B10 VG 220	RENOLIN B10 VG 320	RENOLIN B10 VG 460	RENOLIN B10 VG 680
KLÜBER			Klüberoil GEM 1-68	Klüberoil GEM 1-100	Klüberoil GEM 1-220	Klüberoil GEM 1-320	Klüberoil GEM 1-460	Klüberoil GEM 1-680
OPTIMOL		ULTRA 32	ULTRA 68	ULTRA 100	ULTRA 220	ULTRA 320	ULTRA 460	ULTRA 680
		Optigear 32	Optigear 68	Optigear 100	Optigear 220	Optigear 320	Optigear BM 460	Optigear BM 680
SHELL		Tegula 32	Omala 68	Omala 100	Omala 220	Omala 320	Omala 460	Omala 680
SRS			Wintershall Ersolan 68	Wintershall Ersolan 100	Wintershall Ersolan 220	Wintershall Ersolan 320	Wintershall Ersolan 460	Wintershall Ersolan 680
TEXACO		RANDO EP ASHLESS	MEROPA 68	MEROPA 100	MEROPA 220	MEROPA 320	MEROPA 460	MEROPA 680
TRIBOL			TRIBOL 1100-68	TRIBOL 1100-100	TRIBOL 1100-220	TRIBOL 1100-320	TRIBOL 1100-460	TRIBOL 1100-680
OKS				OKS 3760	OKS 3720		OKS 3730	
Lubricants must not be combined, even within the same group!								

KHS Standard Table of Lubricants						4/6	01.03.01
Type →	Lubricating Oils / Gear Oils) DIN 51 517-3						
Basis →	Synthetic / Polyglycols						
Designation DIN 51502 Manufacturer ↓	CLP PG 150 ↓	CLP PG 220 ↓	CLP PG 320 ↓	CLP PG 460 ↓	CLP PG 680 ↓	CLP PG 1000 ↓	
AGIP	BLASIA S150	BLASIA S220	BLASIA S320	BLASIA S460	BLASIA S680	BLASIA S1000	
ARAL	DEGOL GS 150	DEGOL GS 220	DEGOL GS 320	DEGOL GS 460	DEGOL GS 680	DEGOL GS 1000	
AVIA	AVIA GEAR VSG 150	AVIA GEAR VSG 220	AVIA GEAR VSG 320	AVIA GEAR VSG 460	AVIA GEAR VSG 680	AVIA GEAR VSG 1000	
BECHHEIM	BERUSYNTH EP 150	BERUSYNTH EP 220	BERUSYNTH EP 320	BERUSYNTH EP 460	BERUSYNTH EP 680	BERUSYNTH EP 1000	
BP		ENERGOL SG-XP 220		ENERGOL SG-XP 460	ENERGOL SG-XP 680		
MOBIL	GLYGOYLE 22	GLYGOYLE 30	GLYGOYLE HE 320	GLYGOYLE HE 460	GLYGOYLE HE 680		
CASTROL	ALPHASYN PG 150	ALPHASYN PG 220	ALPHASYN PG 320	ALPHASYN PG 460	ALPHASYN PG 680	ALPHASYN PG 1000	
ELF	SYTHERMA P 150	SYTHERMA P 270		SYTHERMA P 460	SYTHERMA P 680		
ESSO		ESSO GLYCO LUBE 220		ESSO GLYCO LUBE 460			
TOTAL	CORTUSA SY 150	CORTUSA SY 220	CORTUSA SY 320	CORTUSA SY 460	CORTUSA SY 680	CORTUSA SY 1000	
FINA	GIRAN S 150	GIRAN S 220	GIRAN S 320	GIRAN S 460	GIRAN S 680	GIRAN S 1000	
FUCHS	RENOLIN PG 150	RENOLIN PG 220	RENOLIN PG 320	RENOLIN PG 460	RENOLIN PG 680	RENOLIN PG 1000	
KLÜBER	SYNTHESO D 150 EP	SYNTHESO D 220 EP	SYNTHESO D 320 EP	SYNTHESO D 460 EP	SYNTHESO D 680 EP	SYNTHESO D 1000 EP	
OPTIMOL	OPTIFLEX A 150	OPTIFLEX A 220	OPTIFLEX A 320	OPTIFLEX A 460	OPTIFLEX A 680	OPTIFLEX A 1000	
SHELL	Tivela WA	Tivela WB		Tivela SD			
SRS							
TEXACO	SYNLUBE 150	SYNLUBE 220	SYNLUBE 320	SYNLUBE 460	SYNLUBE 680	SYNLUBE 1000	
TRIBOL	TRIBOL 800/150	TRIBOL 800/220	TRIBOL 800/320	TRIBOL 800/460	TRIBOL 800/680	TRIBOL 800/1000	
OKS							
Lubricants must not be combined, even within the same group!							

KHS Standard Table of Lubricants					5/6	01.03.01
Type ⇒	Lubricating Oils / Gear Oils) DIN 51 517-3					
Basis ⇒	Synthetic / Polyalphaolefin-based					
Designation DIN 51502 Manufacturer ↓		CLP HC 220 ↓				
AGIP						
ARAL		DEGOL PAS 220				
AVIA		AVIA SYNTO GEAR EP 220				
BECHHEIM		BERUSYNTH GP 220				
BP		BP ENERSYN MTX 220				
MOBIL		MOBILGEAR SHC XMP 220				
CASTROL		ALPHASYN T 220				
ELF						
ESSO		SPARTAN SEP 220				
TOTAL		CARTER EP/HT 220				
FINA						
FUCHS		RENOLIN UNISYN CLP 220				
KLÜBER		Klübersynth EG 4-220				
OPTIMOL		OPTIGEAR Synthetic A 220				
SHELL		Omala HD 220				
SRS						
TEXACO		PINNACLE EP220				
TRIBOL		TRIBOL 1510/220				
OKS						
Lubricants must not be combined, even within the same group!						

KHS Standard Table of Lubricants					6/6	01.03.01
Type	Central Lubricating Capabilities					Gear Grease
Basis	Mineral oil-based	Synthetic oil-based				
Designation DIN 51502 Manufacturer						
			Recognized as physiologically safe H1 USDA FDA			
AGIP	GR MU/EP2					GR SLL
ARAL	ARALUB HLP2 ARALUB 4822		ARALUB SI 5000	Eural Grease EP2		ARALUB 4842
AVIA	AVIALITH 2 EP		AVILUB OKS 1110	AVILUB OKS 477		AVILUB 428
BECHHEIM	HIGH LUB 474	BERULUB FG 24/0	BERULUB SIHAF 2	BERULUB FB 34 (KPHC 1P-20)		BERULUB FG 8EP
BP	Energraese LS-EP 2					
MOBIL	Mobilgraese XHP 222			Mobilgrease FM 102		GLYGOYLE Grease 00
CASTROL	LZV-EP					GLS GRAESE Spheerol EPL 1000
ELF	EPEXA 2			NEVASTANE 2 PLUS		POLY G00
ESSO	RONEX MP-D BEACON EP 2 GREASE LT2 EP Langzeitfett			CARUM 330 (KP1 K-30) BEACON 325 (KE2G-60)		Fließfett s420 (GPPG-00N-50)
TOTAL	MULTIS EP 2 LUBRIPLATE SFL-2			LUBRIPLATE SFL-2		SPECIS SY00 LUBRIPLATE SFL-00
FINA	MARSON EPL 2					MARSON EPL 3
FUCHS	RENOLIT EP 2 RENOLIT CX-EP2	RENOLIT CX-EPO	Silikonfett 410 mittel	BEL-RAY NO-TOX Synthetic AL Grease 2		RENOLIT LST 00
KLÜBER	POLYLUB GA 352P POLYLUB WH2	Klübersynth UH1 14-1600	PARALIQ-GTE 703	Klübersynth UH1 14-151 (KHC 1K-40)		Klübersynth GE 64-1200
OPTIMOL	OLISTA LONGTIME 2 OLIT CLS	LONGTIME PDO	Optisil LEB 2	Obeen UF2 Obeen TAP2		
SHELL	ALVANIA EP(LF)2 RETINAX EP2 ALBIDA EP2			CASSIDA EPS2		TIVELA COMPOUND A
SRS	Wintershall WIOLUB LFP2			Wintershall WIOLUB AFL2		
TEXACO	MULTIFAK EP2	MULTIFAK 6833 EP00		CYGNUSGREASE CA 1/2		
TRIBOL	TRIBOL 4020/220-2 TRIBOL 4747/220/2			Molub-Aloy FoodProf 8765 Molub-Aloy FoodProf F 823-2 FM		TRIBOL 302071000-00 (GP00K-40)
OKS	OKS 470		OKS 1100	OKS 479		OKS 428
Lubricants must not be combined, even within the same group!						

Servicing Schedule

Carry out the lubricating intervals indicated in the Lubrication Schedules in addition to the following servicing intervals.

After every 8 hours of operation

<i>Remove excess lubricating grease</i>	Remove any excess lubricating grease at the lubrication points.
<i>Gears</i>	Check the gears for leakage.
<i>Exterior cleaning</i>	● Spray the machine off with water. ● Check the machine for possible wear.
<i>Filling element</i>	Check the centering bells and rubber contact seals for damage.
<i>Format parts</i>	Check the format parts for damage and/or if correctly set for the can type.

After every 40 hours of operation

Height adjustment	Run the height-adjustable components of your machine at least once to their upper limits and lower limits.
Water trap	Check the water trap of the FRL unit and drain if necessary.
Valve spray	Check the settings of the spray nozzles of the valve spray. When the components are being sprayed, the nozzles must be adjusted so that there are no dry areas and that the filling element is sprayed only below the housing.
Air and CO2 filters	Clean the filters. See section, "Cleaning Air and CO2 Filters" in chapter, "Operating Instructions".
Air filter	Check the air filters of the pneumatic supply and the switch cabinet ventilation.
Infeed 	Check the relief openings of the infeed distributor for escaping gases or liquids. It will be necessary to have KHS service personnel repair the escape of any gas or liquid from the relief openings.
Valve manifold	Clean the fiber strainer in the dirt trap at the product infeed to the valve manifold.

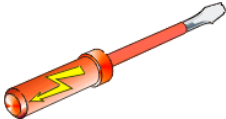
After every 170 hours of operation

<i>Dirt trap</i>	Clean the dirt traps in the FRL group.
<i>Gears</i>	Check the amount of lubricant in the gears and refill as required with the specified lubricant. (Refer to the specifications provided by the gear manufacturer for information on the lubricant specifications and checking the amount of lubricant.)

After every 1000 hours of operation

<i>Supply lines</i>	Check the pneumatic and lubrication supply lines for leakage.
<i>Can guide parts</i>	Check all can guide parts for wear.
<i>Electrical power distributor</i>	Check the brushes and silver brushes of the collector ring in the electrical power distributor for wear. Use a cloth to remove any deposits from the electrical power distributor.
<i>Synchronized universal shaft</i>	Check the bearings and the expansion bellows of the synchronized universal shaft for wear.
<i>Pneumatic supply of the capper</i>	Change the filter cartridges in the air filters in the fitting cabinet (see chapter, Machine Description, Fitting Cabinet).

After every 2000 hours of operation

Standby battery 	As a precautionary measure, replace the standby batteries of the PLC, the operator terminal, and the filler computer. The main switch must remain on when changing the standby battery of the PLC! First, make a note of the data entered to the filler computer before changing the standby battery and then disconnect the power from the computer.
Non-return valve of the product flowmeter	Replace the non-return valve in the ventilation line of the product flowmeter.
Bell actuation rollers	As a precautionary measure, replace the bell actuation rollers.
Machine paneling	Check the cables of the lift-up machine panels for damage and replace if necessary.
General overhaul 	We recommend a general overhaul of your machine by KHS service staff once each year or after every 2000 hours of operation.



Setting Instructions

Safety

Repair and maintenance work is only to be carried out when the machine/plant has been secured and is energy-free.



Always observe the guidelines "Safety Principles for Filling Plants of the Beverage Industry".



Secure against unintentional start-up

Switch off all necessary switches to ensure that the machine is not started up unintentionally.

Lock main switch

Secure especially the main switch at the control cabinet with your own padlock.



Whenever two maintenance staff are working on a machine, each must secure the main switch at the control cabinet with his own padlock to ensure that the machine is not started unintentionally.

Only when both employees have removed their padlocks can the machine be re-started.

Tightening Torque

Adherence to the relevant tightening torques for the filler is mandatory as specified by KHS as the machine manufacturer and listed in the following.



The manufacturer will not be held liable for any damages resulting from non-compliance; the user is solely responsible.

General Tightening Torques M_A [Nm]:

The following table refers to **corrosion** and **acid resistant**, property class 70 screws (**A2 / A4**) with **metric coarse-pitch** grade **8.8. threads** in accordance with DIN 13.

Thread	8,8	A2 / A4	Thread	8,8	A2 / A4
M 3	1,3		M 14	135	83
M 4	3		M 16	210	114
M 5	5,9		M 18	300	
M 6	10	7	M 20	425	158
M 8	25	18	M 22	580	200
M 10	49	33	M 24	730	280
M 12	85	57	M 27		370

Filler Tightening Torques:

Filling element: (DVD only)

Nuts on stud bolts (M10)	34 Nm
Bell actuation forks (M12)	57 Nm

Holding bushings:

ETP holding bushings:

M 4 screws	4.5 Nm
M 5 screws	7.6 Nm
M 6 screws	13 Nm
M 8 screws	32 Nm

ETP-T holding bushings:

M 20 screws	40 Nm
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Shaft coupling:

M8 screws	30 Nm
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Central lubrication system:

Pumping elements	30-35 Nm
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Solenoid valves:

(e.g. to actuate filling elements, sprays, etc.)

Top nuts on the coil	1 Nm
Bottom nuts on the coil	5 Nm

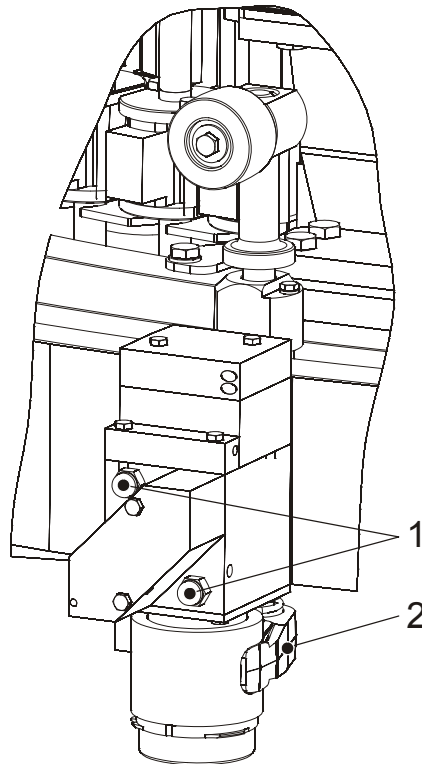
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Changing Filling Elements

The ring bowl must be empty and not under pressure in order to replace filling valves.



Figure 7-1 :
Changing Filling
Elements

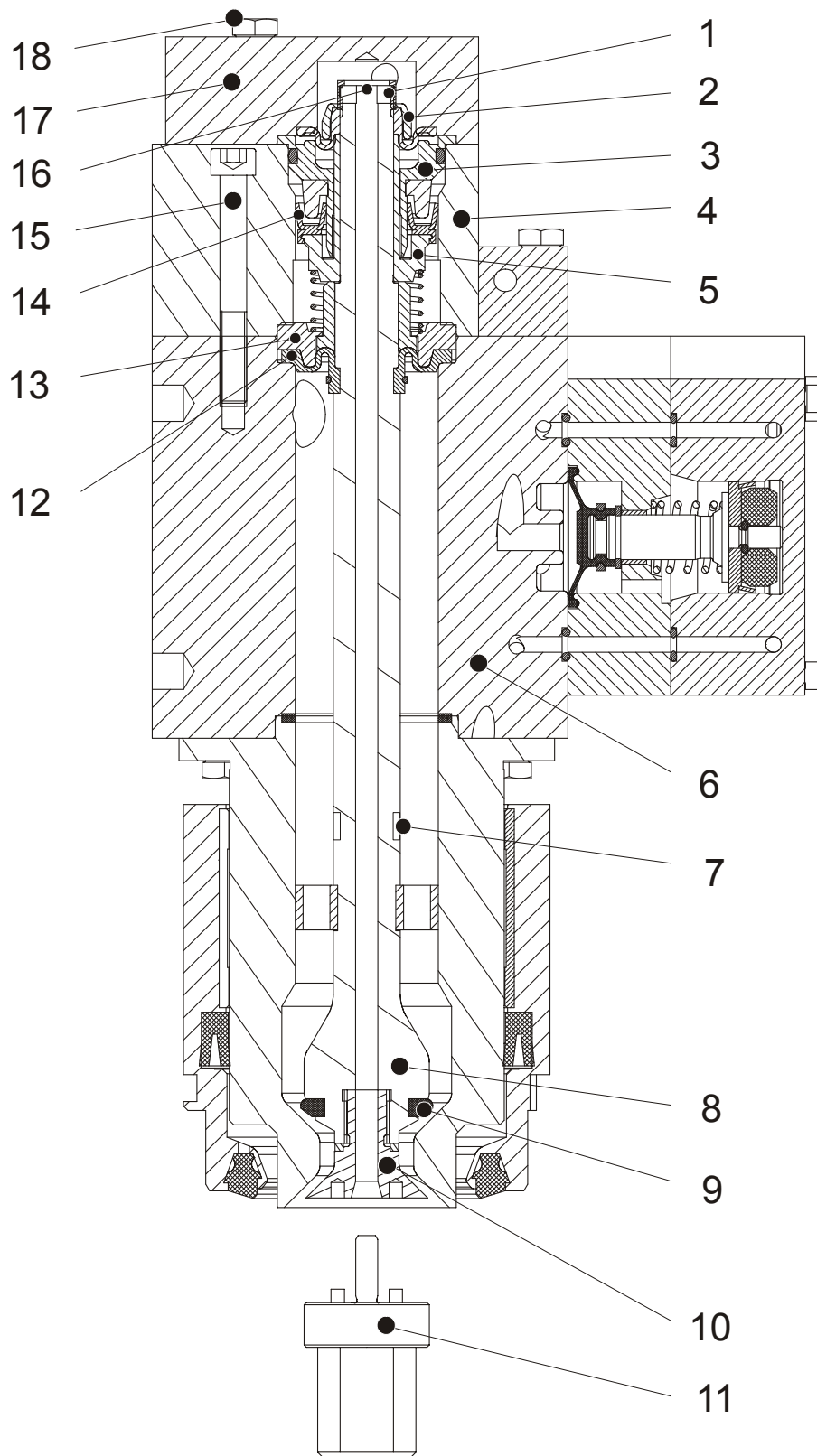


The filling elements are placed on two stud bolts and fastened with cap nuts (1).

- Unscrew the cap nuts and pull the filling element towards the front and off the stud bolts and the bell actuators (2).
- Before reinstalling the filling elements, retighten the stud bolts to a torque of **34 Nm** with a torque wrench.
- Push the filling element on the stud bolts and bell actuator.
- Screw the cap nuts on the stud bolts and tighten to a torque of **34 Nm** with a torque wrench.
- Retighten the stud bolts and cap nuts to a torque of **34 Nm** once more after the first rinsing and steaming operations.

Taking the Filling Elements Apart to Change Valve Piston Seals

Figure 7-2 :
*Taking the Filling
Elements Apart to
Change Valve
Piston Seals*



The filling element must be removed in order to replace the membranes **(12)** and valve seals **(9)**. Then take the filling element apart in the following sequence:

- Unscrew the screws **(18)** and remove the valve cover **(17)**.
- Use the tool **(11)** to unscrew the valve cone **(10)** out of the valve tube **(8)**. Insert an Allen wrench in the hex screw **(16)** to keep the valve tube from twisting.
- Unscrew and remove the screws **(15)**.
- Loosen the valve head **(4)** and lift it off the valve housing **(6)** together with the valve tube.
- Hold the valve tube with an open-end wrench at the dog point **(7)** and loosen nut **(1)**.
- Remove bushing **(2)** and guide sleeve **(3)** together with cup seal **(14)** from valve tub.
- Remove piston support **(5)** together with the spring and distance piece **(13)**.

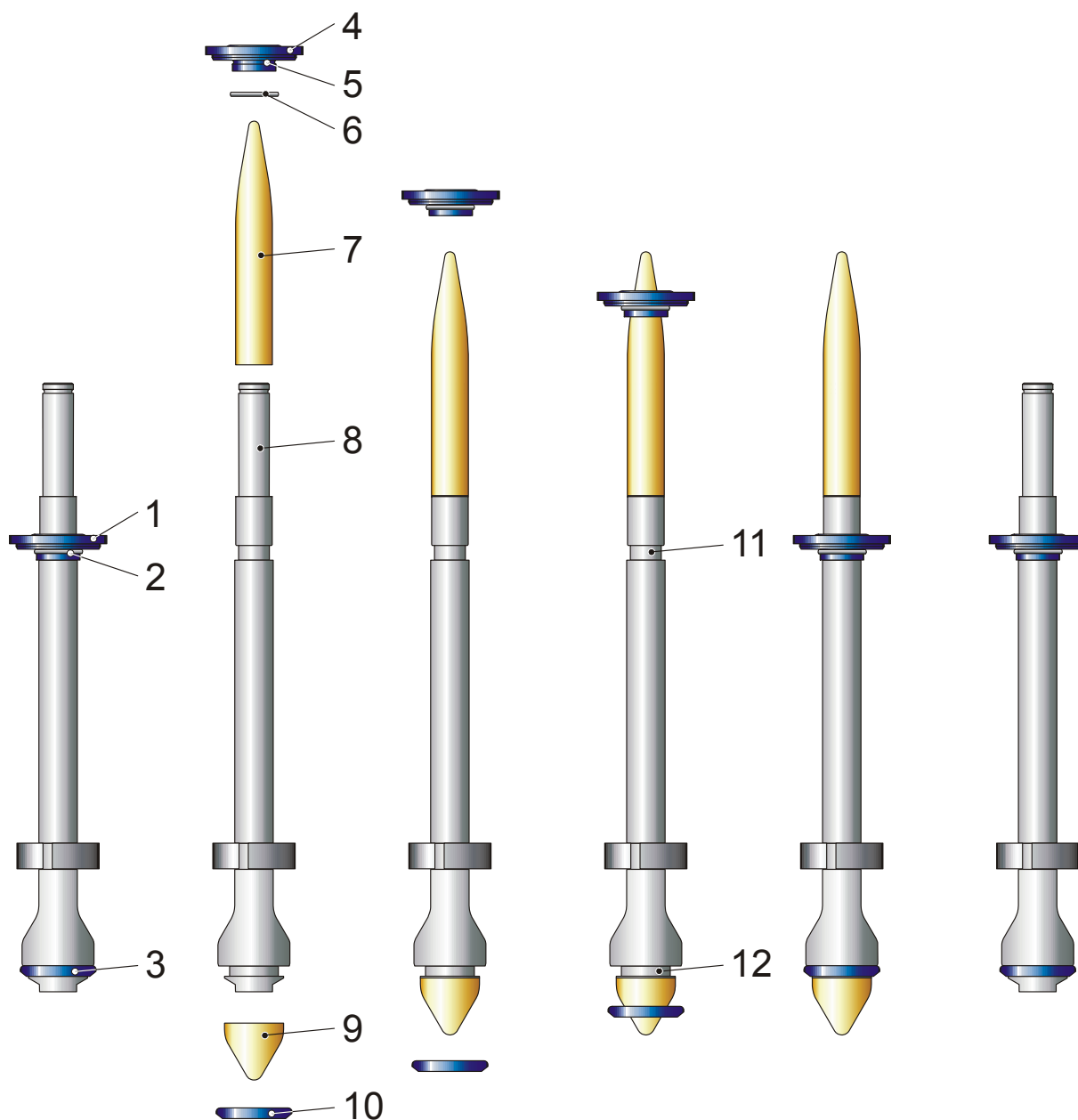
You can now replace the membranes and valve seals.

Refer to the instructions in the following
(Changing Valve Tube Seals).



Changing Valve Tube Seals

Figure 7-3 :
Changing Valve
Tube Seals



Use only the special assembly sleeve to replace the membranes **and** seals. Apply a thin coating of **PARALIQ GTE 703** lubricant to the special assembly tool and the valve piston to facilitate pulling on the membrane.

(See Table of Lubricants in chapter **Servicing**)



- Use tongs to cut and remove the old retainer ring **(2)**.
- Remove the old membrane **(1)** and the old seal **(3)**.
- Place the assembly sleeves **(7 + 9)** on the valve piston **(8)**.
- Push the new retainer ring **(6)** in the groove **(5)** of the new membrane **(4)**.
- Push the new membrane together with the retainer ring over the assembly sleeve **(7)** into the groove **(11)**.
- Push the new seal **(10)** over the assembly tool **(9)** into the groove **(12)**.
- Remove assembly sleeve from the valve plunger.

You can now reassembly the filling element in reverse order:.

Also tighten screw joints on the bell rods to a torque of **18 Nm** with a torque wrench.



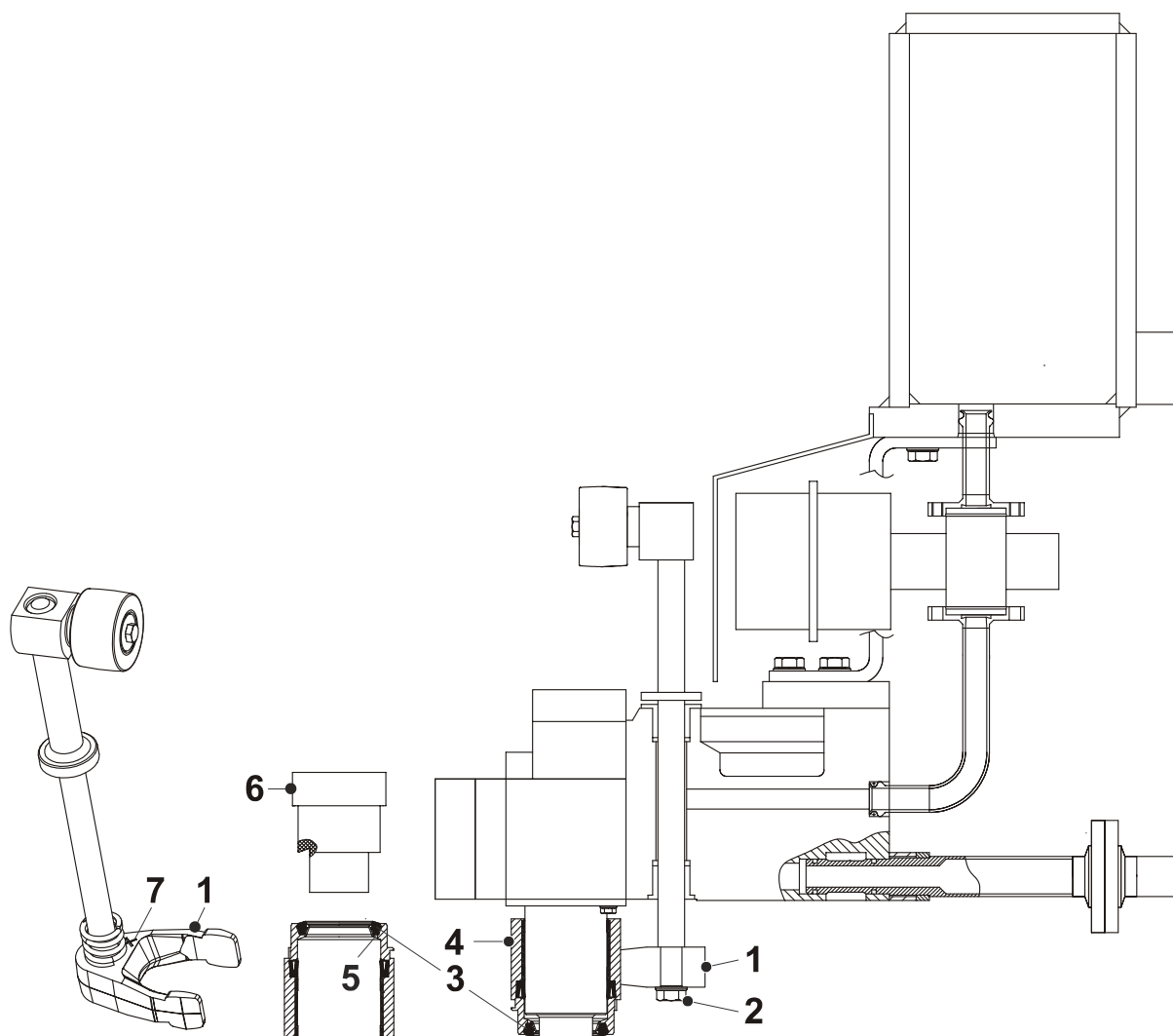
Check that the bell rods can be easily moved before reinstalling the filling element.



Reinstall the filling element on the ring bowl.

Changing Rubber Contact Seals

Figure 7-4 :
Changing Rubber
Contact Seals



Replace the rubber contact seals **(3)** when worn or externally damaged.



Remove the screws of the bell actuators **(2)**.

- Pull the centering bell together with the fork **(1)** down and off the filling valve.
- There is a hole **(5)** in the bell leading to the rubber contact seal. You can force out and remove the rubber contact seal out of the groove by placing an air gun on this hole.
- Push in the new rubber contact seal with the spacer **(6)**.
- Push the centering bell and fork back on the bell actuator and filling element.

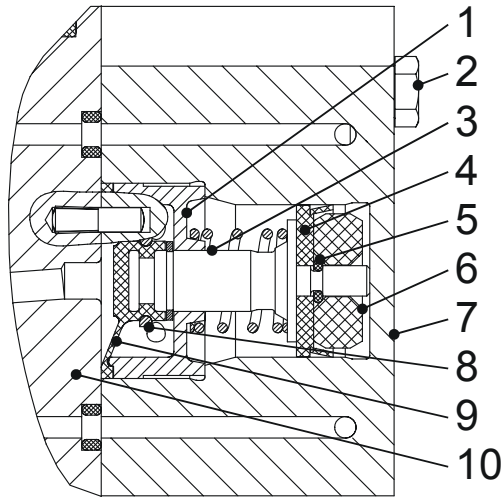
The marking **(7)** on the fork must point upwards!



- Secure the screw **(3)** with a soluble thread locking compound and screw it back into the bell actuator. Tighten screw to a torque of **57 Nm**.

Changing Membranes and Cup Collars in the Control Cylinder of the Control Housing

Figure 7-5 :
Removing
Membranes



- Unscrew and remove the screws (2).
- Remove the control housing (7) from the valve housing (10).
- Pull the control cylinder (1) out of the control housing (7).
- Remove the lock ring (8) and the membrane (9) from the piston (3).
- Apply a small amount of "**PARALIQ GTE 703**" grease from Klüber, Munich or "**Berulub Sihaf 2**" grease from Carl Bechem, Hagen to the tip of the piston
- Pull a new lock ring on the new membrane.
- Place the new membrane on the tip of the piston (3) at an angle and push the membrane onto the piston.
- Remove the displacement body (6), the O-ring (5), and the cup collar (4).
- Insert the new cup collar, the O-ring (5), and the displacement body (6).



Do not grease the control cylinder when reassembling.

- Reinstall the control cylinder of the steps indicated above in reverse order.

Changing Solenoid Valves of the Control Air Distributor on the Filler Turret

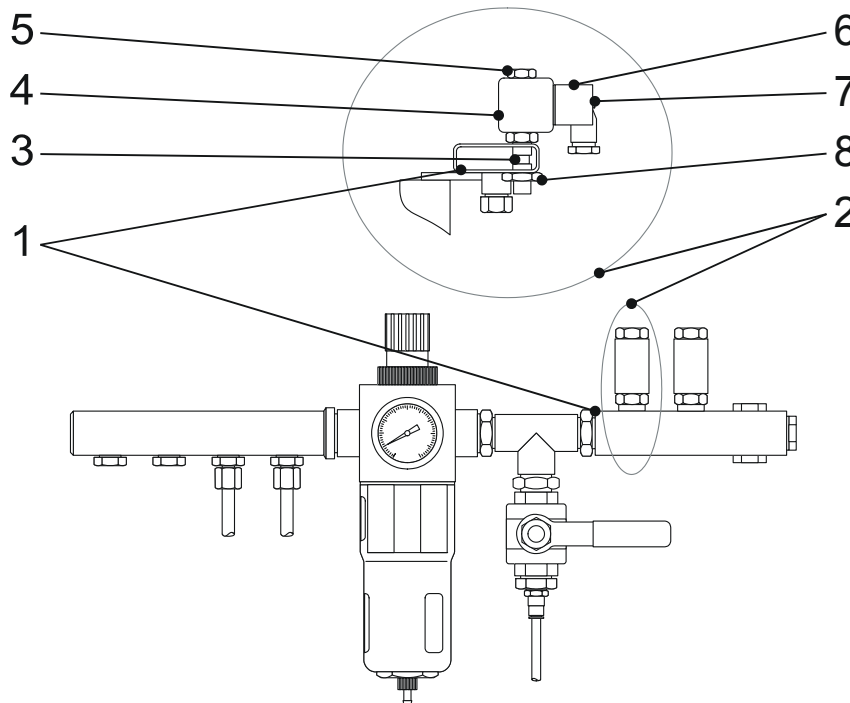


Figure 7-6 :
Changing Solenoid
Valves

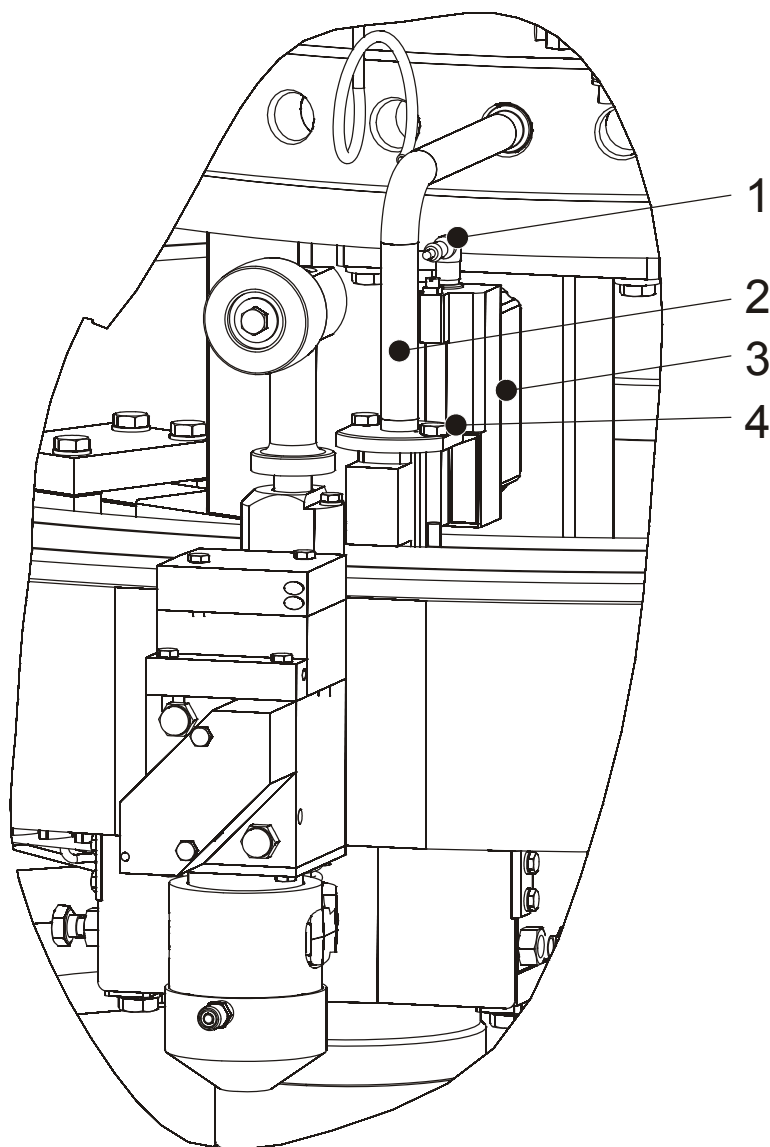
The solenoid valves **(2)** are screwed air tight to the distributor panel **(1)**. Unscrew the screw **(7)** of the power supply plug **(6)** and unplug. Then unscrew the top nut **(5)** and pull off the solenoid **(4)**. Remove the nut **(8)** to change the valve cartridge **(3)**.

When reassembling, use a torque wrench to tighten nut **(8)** to a **maximum torque of 5 Nm** and nut **(5)** to a **maximum torque of 1 Nm**.



Changing Flowmeters

Figure 7-7 :
Changing
Flowmeters



- Drain and relieve the pressure in the central bowl and then switch off the control power.
- Remove the cover and the electrical connection (1) from the flowmeter (3).
- Remove the locking screws (4).
- Pull out the intake line (2) and remove the flowmeter.

An arrow that indicates the direction of flow through the flowmeter must point downward after installation!



- Place the new flowmeter on the distributor ring. Push the intake line a maximum of **10 mm** up into the central bowl hole.
- Retighten the locking screws.
- Connect the electrical power supply and put the cover back in place.

A complete startup procedure must now be performed (see chapter, **Operating Instructions**).

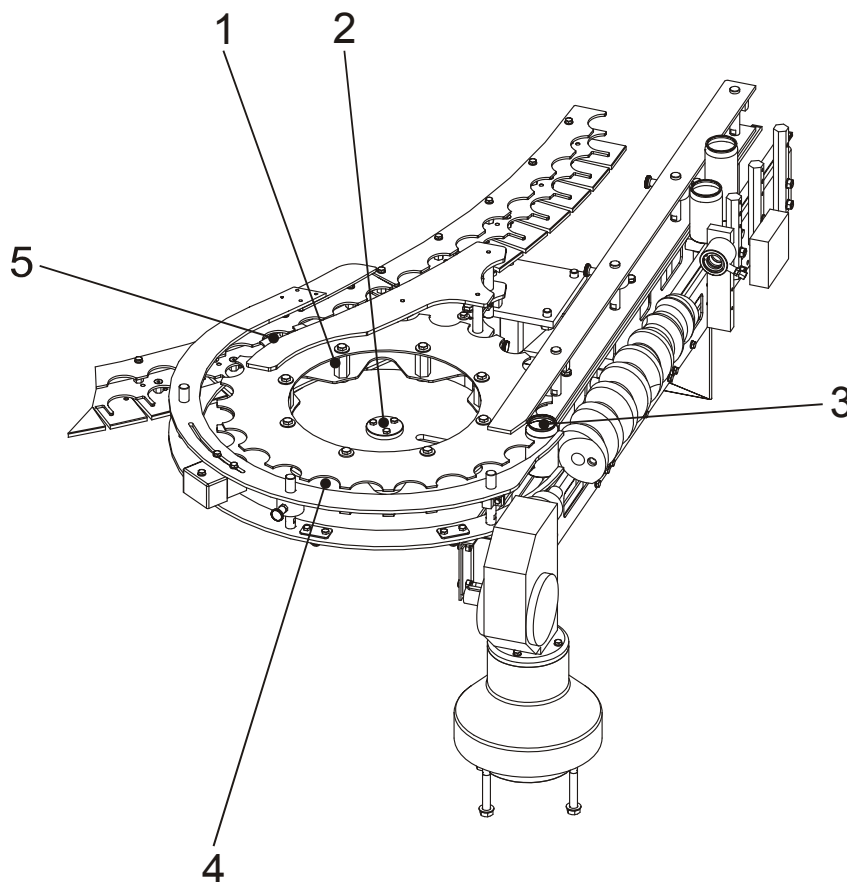


During the next filling operation, check volume being filled at the filling station where the flowmeter was replaced and correct if necessary with the filling valve correction at the operator terminal (see chapter, **Operator Prompting**).



Adjusting the Container Guide Star

Figure 7-8 :
Adjusting the
Container Guide
Star

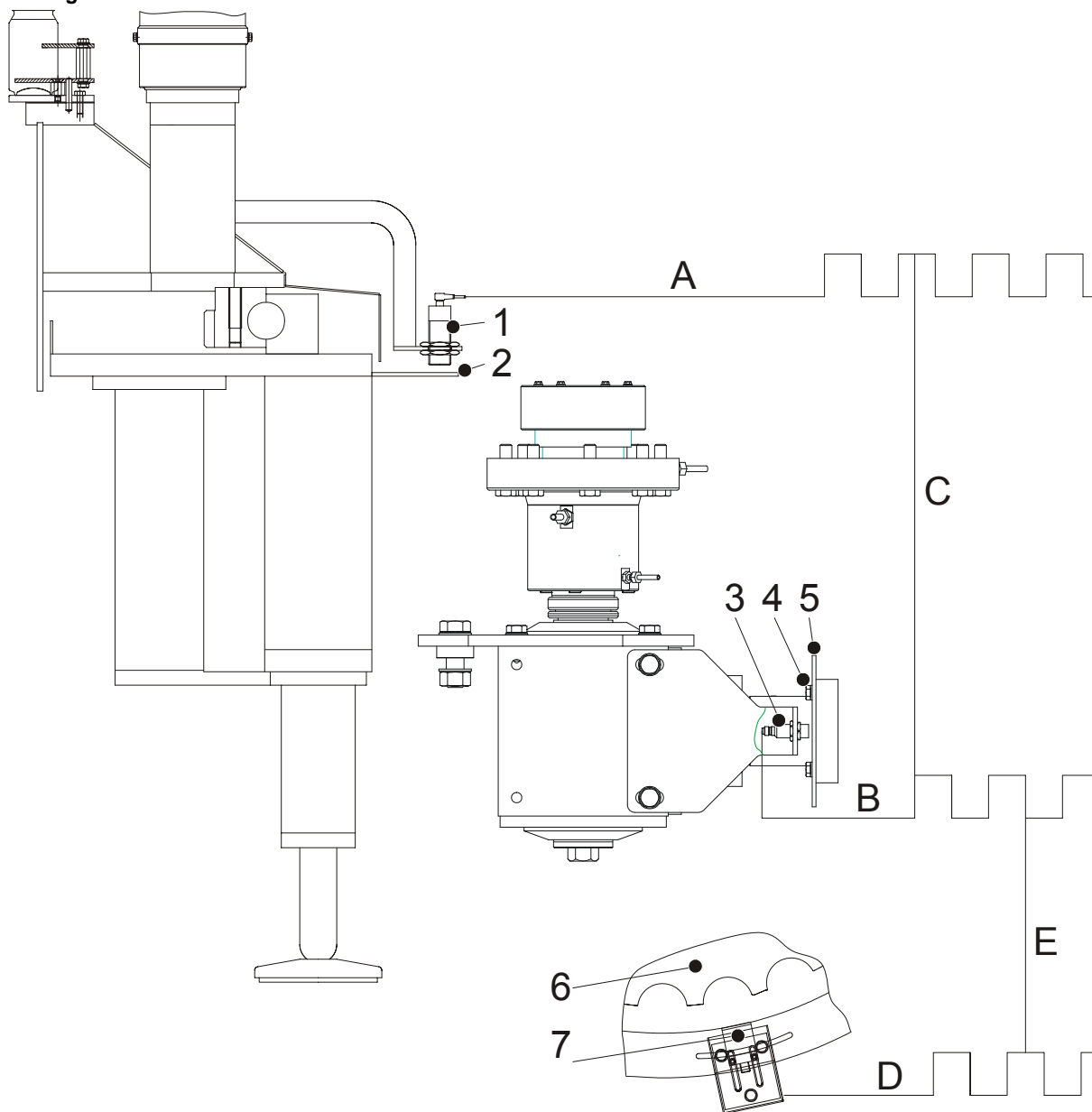


- There are two screws located under the star (1). Unscrew screws until you can move the star mounted on the shaft (2).
- Move the star (1) on the shaft (2) until a test can fits in positions (3, 4, 5).
- Retighten the screws.

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Setting Machine Timing for Synchronous Timing

Figure 7-9 :
Setting Machine
Timing for
Synchronous
Timing



Only trained service technicians may make the following settings.



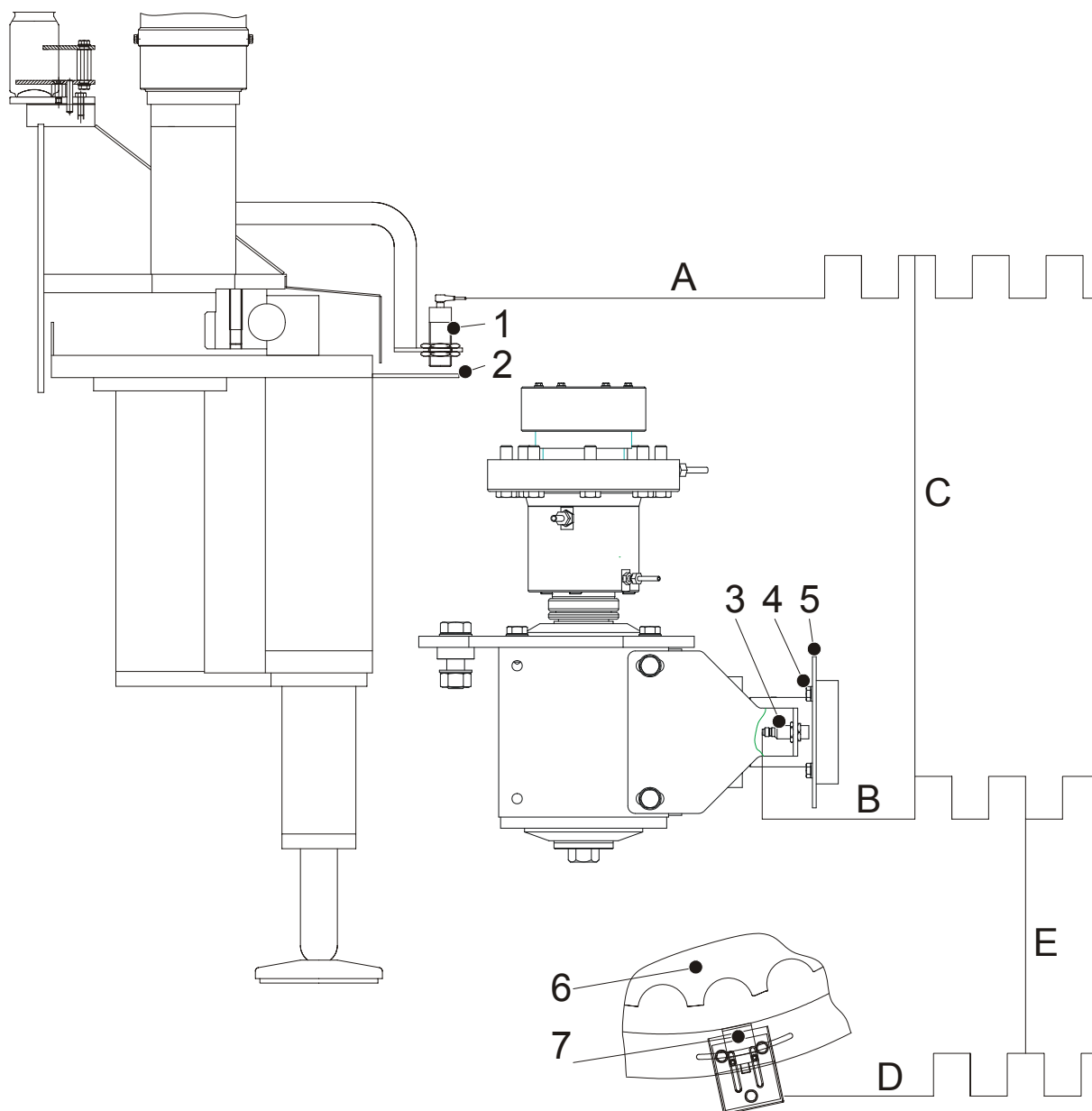
(A) Synchronous timing

(B) Machine timing

- Turn the **"Setup mode / Production"** key-lock switch to **"Setup mode"**.
- Use the Inch button to run the filler to a position in which the filling element with the highest valve number is located at the transfer point between the infeed starwheel and the filler.
- Using the Inch button, run the filler exactly to position **(C)** where the proximity switch **(1)** is above the switching flag **(2)**. The synchronous timing is occupied. (The LED of the proximity switch must light.)
- Loosen the screw **(2)** and move the timing disk **(5)** for the machine timing so that it reaches the switching point of the proximity switch **(3)** for sensing the machine timing.
The LED of the proximity switch must light.
- Return the **"Setup mode / Production"** key-lock switch to its original setting.
- Then check the adjustment of the can sensing in relation to the machine timing.

Setting Can Sensing for Machine Timing

Figure 7-10 :
Setting Can
Sensing for
Machine Timing



Only trained service technicians may make the following settings.



(B) Machine timing

(C) Can timing (can sensing)

- Turn the **"Setup mode / Production"** key-lock switch to **"Setup mode"**.
- Run cans into the filler using the Inch button until the can sensing proximity switch **(7)** detects a bottle at the infeed starwheel.
- Using the Inch button, run the filler to position **(E)** where the switching point of proximity switch **(3)** for sensing the machine timing is exited.

The LED of the proximity switch must still light.

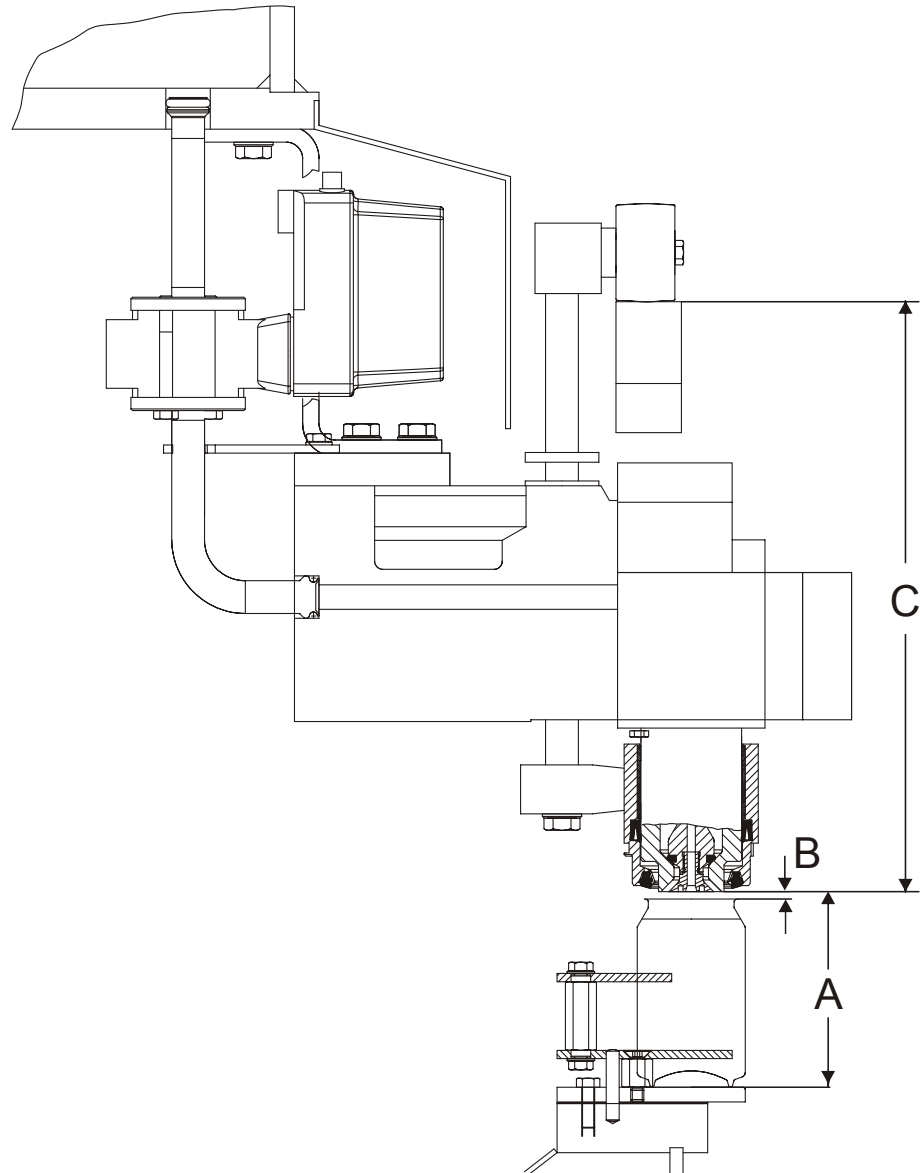
When performing the following adjustment, ensure that you do not move the proximity switch for can sensing a whole pitch.



- Move proximity switch **(7)** for can sensing so that the can is detected after proximity switch **(3)** has reached the switching point and before proximity switch **(3)** leaves the switching point again.
- Then run all of the can out of the machine and return the **"Setup mode / Production"** key-lock switch back to its original position.

Calibrating and Setting Up the Height Adjustment

Figure 7-11 :
Height Adjustment
Control
Dimensions



Dim. A = Lower edge of filling element to upper edge of lower can chuck

Dim. B = Lower edge of filling element to upper edge of can = 4.5 mm

Dim. C = Lower edge of filling element to upper edge of cam race = 360.5 mm

The height adjustment setup procedure is comprised of **calibration** and **setup** steps.

It will become necessary to readjust the height adjustment if fault occurs during the adjustment process. A message indicating the problem will appear in the display of the operator terminal.

Proceed as follows to correct the cause of the fault.



Check the distance between the lower edge of the filling element and the upper edge of the cam race. The distance must be **360.5 mm** ('C').

- If the actual distance is not as specified then the height adjustment must be set up again. (See 'Setting Up the Height Adjustment')
- If the distance is correct then calibrate the height adjustment. (See 'Calibrating the Height Adjustment')

Calibrating the Height Adjustment

- Terminate the current mode of operation.
- Activate the '**Service Functions 2**' program at the operator terminal.
- Select the '**Calibrate Height Adjustment**' program.
- Turn the '**ENABLE MAIN DRIVE / ENABLE HEIGHT ADJUSTMENT**' key switch to '**ENABLE HEIGHT ADJUSTMENT**'.
- Measure the distance ('A') between the upper edge of the lower can chuck and the lower edge of the filling element. Subtract **4.5 mm** ('B') from this measurement. Enter this figure as the 'New actual value'.
- Confirm the entry.
- The fault will be corrected.
- Exit the '**Service Functions 2**' program.
- Turn the '**ENABLE MAIN DRIVE / ENABLE HEIGHT ADJUSTMENT**' key switch to '**ENABLE MAIN DRIVE**'.
- Start the desired operation mode.

Setting Up the Height Adjustment

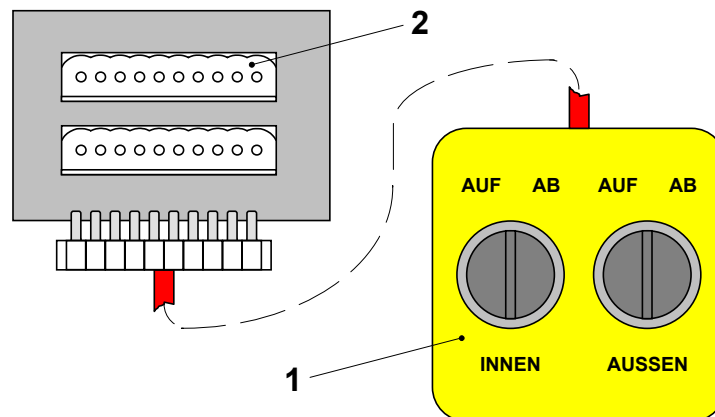
When setting up the height adjustment, the ring bowl and the cam race are run separately to new reference points.



The automatic height limiting facility is deactivated during the height adjustment setup process. Take care that the ring bowl and cam race limits are not exceeded.

- In order to adjust the height adjustment, the height adjustment correction switch (2) must be plugged into the plug strip (1) in the terminal box.

Figure 7-12 :
Correction Switch
for Setting Up the
Height Adjustment



You can move the ring bowl (inner ring) and the cam race (outer ring) separately by turning the non-latching switch to 'UP' and 'DOWN'.

- Set the type of can at the operator terminal and make a note of the can height.
- Select the 'Height Adjustment' program.
- Turn the '**ENABLE MAIN DRIVE / ENABLE HEIGHT ADJUSTMENT**' key switch to '**ENABLE HEIGHT ADJUSTMENT**'..

The following separate ring bowl and control ring movements may be made only in increments of **maximum 2 mm!**



When running the height adjustment downward:

The cam race must be moved first!

When running the height adjustment upward:

The ring bowl must be moved first!

- Move the ring bowl (inner ring) until distance between the upper edge of the lower chuck and the lower edge of the filling element is **4.5 mm plus the can height ('A')** (of the can type to be set).
- Move the cam race (outer ring) until distance between the lower edge of the filling element and the upper edge of the cam race is **360.5 mm ('C')**.
- Exit the **'Height Adjustment'** program and activate the **'Service Functions 2'** program.
- Calibrate the height adjustment as described in section, 'Calibrating the Height Adjustment'.



Operator Prompting

Notes

Please consider the information contained in the safety brochure "Safety - Fundamentals for Filling Plants of the Beverage Industry" in regard to all instructions described here.



The intention of these Operating Instructions is to explain operator terminal handling and how to operate the machine. Since actual machine operation is tailored to your requirements and conditions slight deviations from the instructions furnished here are unavoidable.

These Operating Instructions are not intended for machine commissioning but are designed to provide orientation and explain the machine functions available.

In order to prevent machine malfunction the actions described here are to be performed by KHS authorised personnel only.



The operator terminal features a Help Function which you can use to select explanatory texts in several areas of the programme.

KHS staff will always be happy to provide you with any assistance should there be any uncertainty regarding machine operation or modification of settings.

Control Terminal with Touchscreen Operation

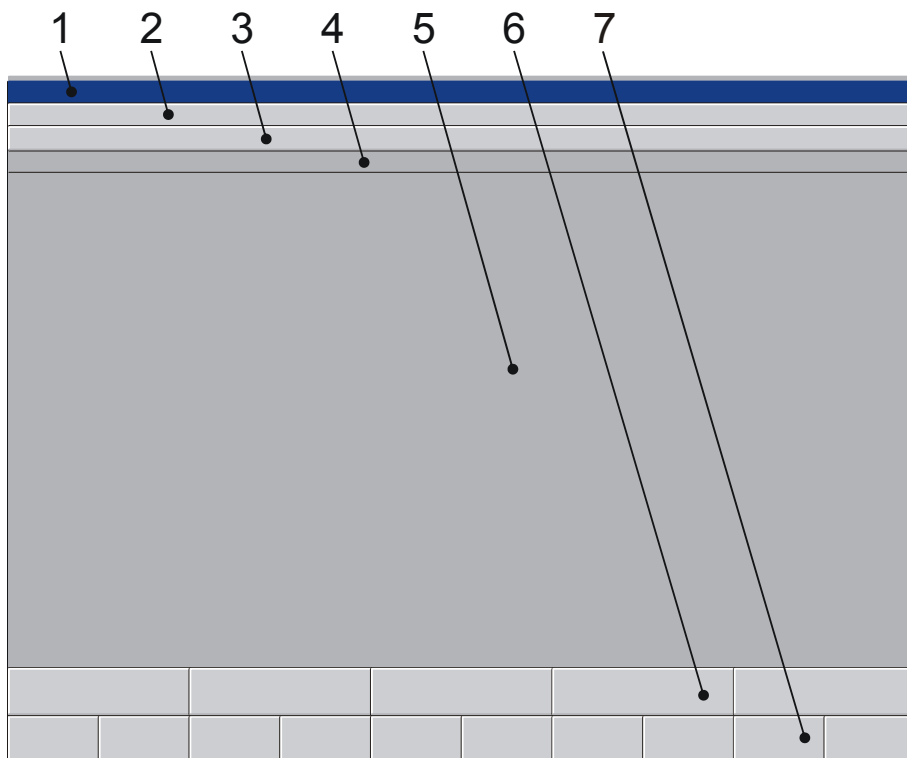
After you have switch on the machine's power supply, the communication link between the computers and the programmable logical controller (PLC) is automatically set up and the Base Screen appears on the operator terminal display .



The pictures and messages displayed on the screen provide you the support and guidance required to operate and monitor the machine.

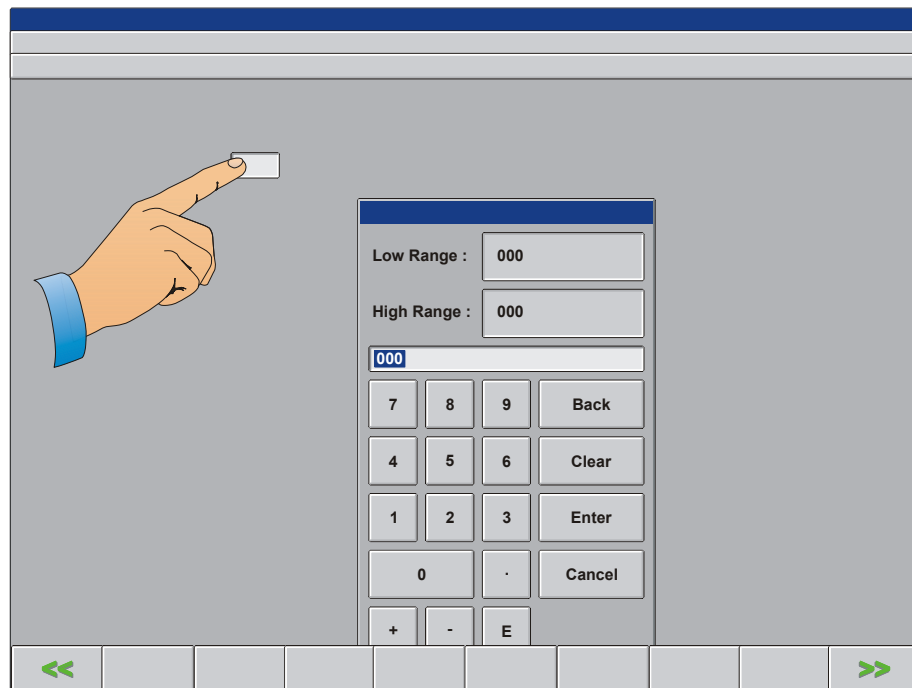
The display is designed as a touchscreen for entering values and executing functions by simply touching the corresponding symbol on the screen. Touching or pressing a symbol is similar to the operation of a PC mouse.

Layout of Graphical User Interface



- (1) Name of the menu and name of the logged in machine operator.
- (2) Notes
- (3) Error messages
- (4) Name of the program or the currently active operating mode and the set type of container.
- (5) Graphics, texts, and fields
- (6) Variable function buttons
- (7) Fixed function buttons

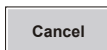
Entering and Changing Parameters



- Touch the input box of the parameter you would like to enter or change. An input window will then open.
- Enter the new value. Enter values that are within the maximum upper and lower limits when doing so.



- Touch the **Enter** button to accept the value. The input window will then close.



- Touch the **Cancel** button to **not** accept the value. The input window will then close.

Fixed Function Buttons for Menu Activation

Back

Return to the previous menu or screen.



Help

Display program or operating help texts.



Function Enables

Switch various machine component functions on and off.



Special Functions

Set base machine data and test various machine functions.



Malfunctions

Display all current machine malfunction messages.



Home

Return to the Main Menu.



Stop

Exit the program if it no longer reacts to operating due to an error.



Statistics

Show various statistical reports.



Password Administration

Assign operating personnel passwords in order to enable certain functions and menus.



Next

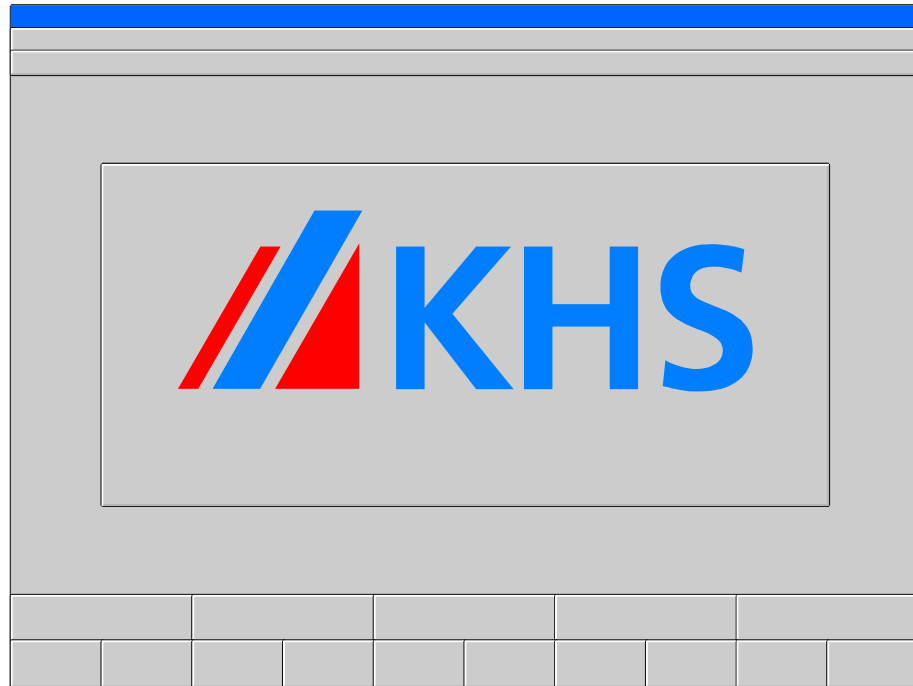
Skip to the next page of a menu.



Main Menu



Touch the Home button.



Menu Selection

Program Selection

Pressing the **"Program Selection"** button opens **"Machine Screen"** in which production and cleaning can be started, changed, and monitored.

Type

Set the machine to a type for production operation.

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User Logon

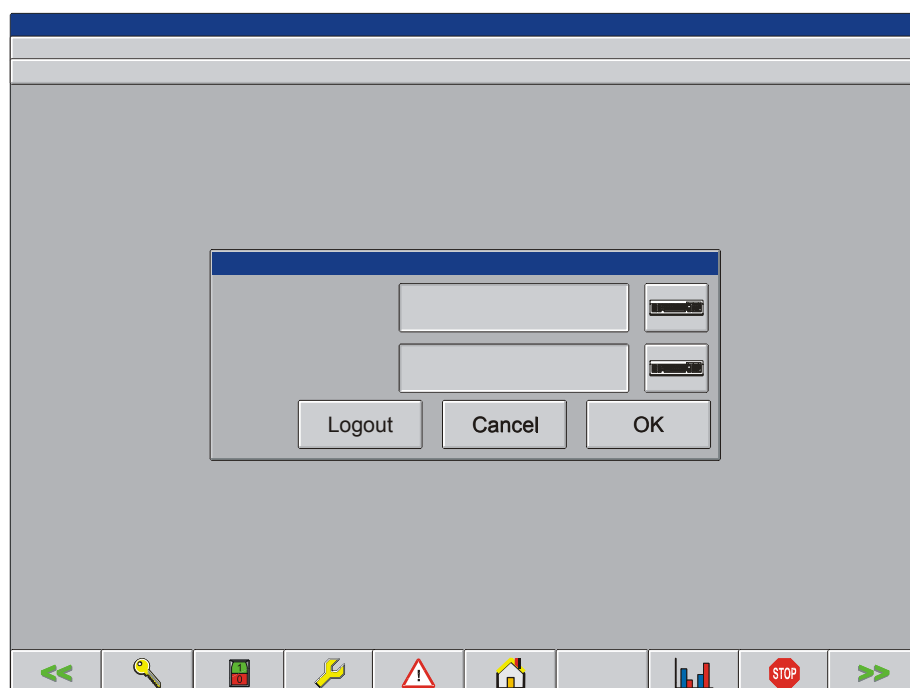
Various menus within the program are password protected. Depending on the user access authorizations, various menus and parameters are not displayed or cannot be modified.

The following menu appears automatically

or



Touch the **"Password"** button.



Touch the button with the keyboard symbol next to the **User** input field and enter your user name.

(Factory setting: User)

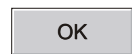


Touch the button with the keyboard symbol next to the **Password** input field and enter your password.

(Factory setting: 2001)



Touch the **"OK"** button.



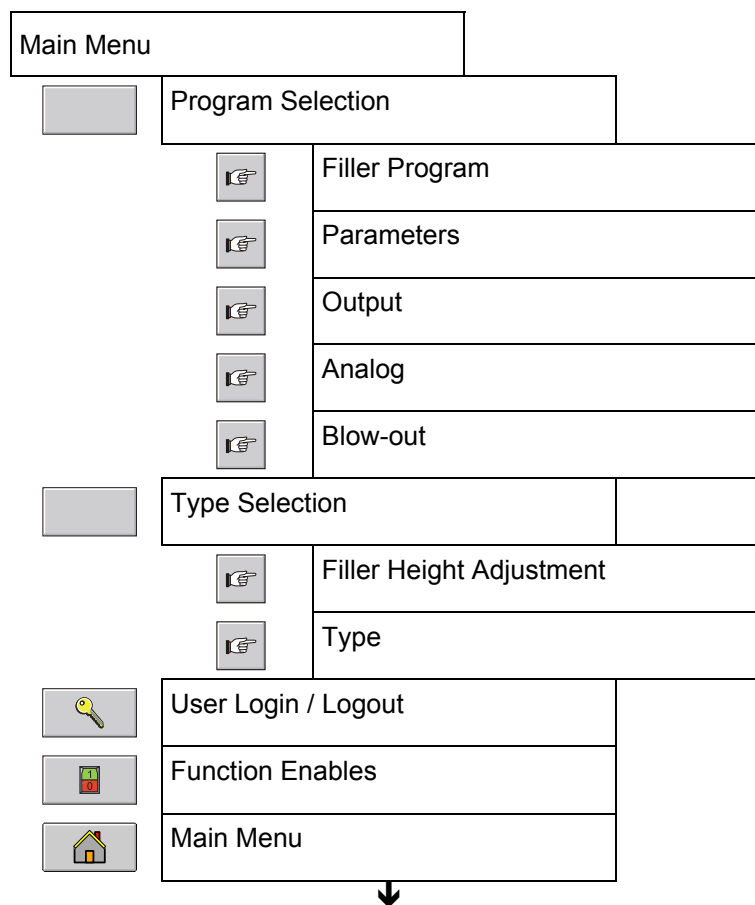
Logon with the **User /2001** factory setting is automatically logged off after 30 minuts.

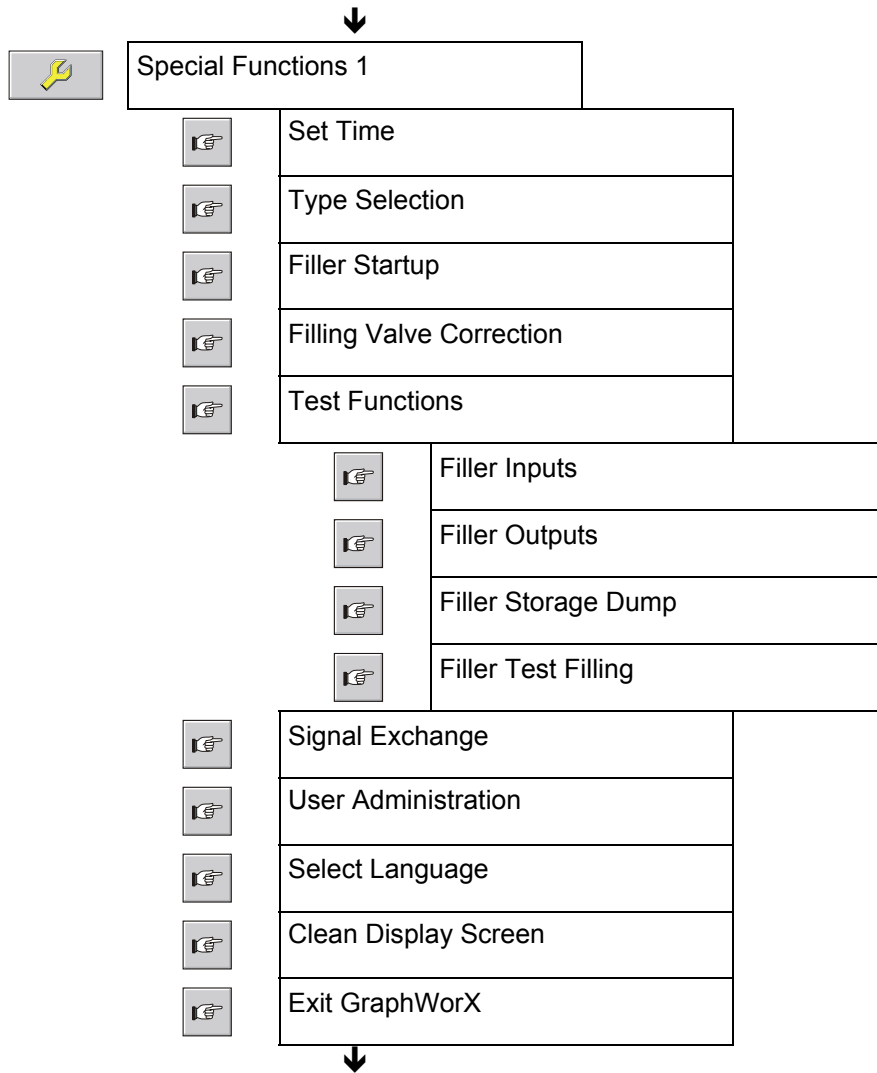


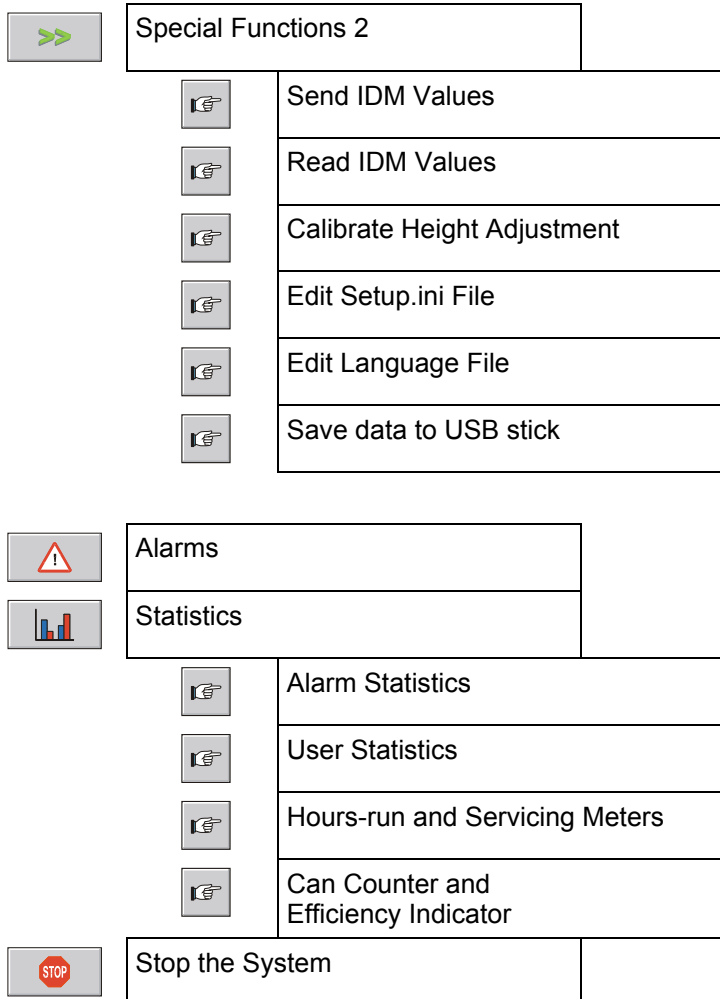
Press the **"Password"** button and then **"Logout"** to log off before then.



Program Structure

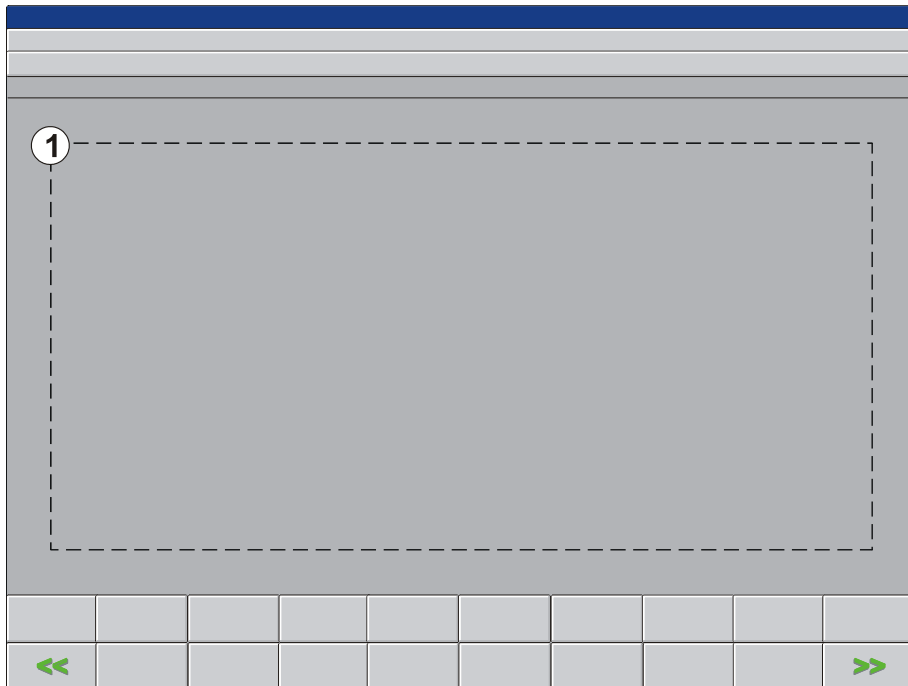






Program Selection

Touch **"Program Selection"** in the **"Main Menu"**.



A graphic of the machine layout will appear in display (1). Refer to sections, *"Displays in the Machine Menu"* and *"Symbols in Machine Menu"* for information and descriptions of the meanings and display of each of the symbols.

Use this menu to set the machine operating modes and the controllers for production and sanitizing.

Filler Program

Use this menu to change the parameters that influence the filling process.

Parameters

You can set the machine speed in this menu.

Output

Pressures, temperatures, and the filling level of the bowl are displayed in this menu.

Analog

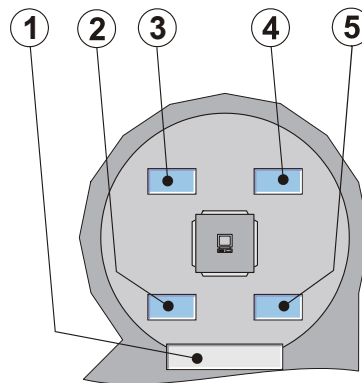
Blow-out of the return air tubes is started in this menu.

Blow-out

This function can be exited only if the step sequence is completed or has not been started.



Displays in the Machine Screen



- (1) The selected operation mode is indicated in clear text in this field.
- (2) The current machine speed in **cph** (cans per hour) is indicated in this field.
- (3) The filling level of the ring bowl in % (in percent) is indicated in this field.
- (4) The current media pressures are indicated in **bars** in these fields.
- (5) This field displays the number of cans fed into the machine during the currently active production operation.

Symbols in the Machine Screen

You cannot exit the current screen.



The machine was manually stopped.



The EMERGENCY STOP switch has not been pressed (color of the symbol is gray).



The EMERGENCY STOP button was pressed (color of the symbol is red).



The conveyor is switched off (the color of the symbol is gray).



The conveyor is switched on (the color of the symbol is green).



Backup of cans at the discharge conveyor (color of the symbol is red).



No cans at the infeed conveyor (the color of the symbol is gray).



The conveyor is operating at half speed (the color of the symbol is yellow).



The conveyor drive has signaled an error (the color of the symbol is red).



The can infeed is OK (the color of the symbol is gray).



Can fallover ahead of the feedscrews (the color of the symbol is red).



The can discharge is OK (the color of the symbol is gray).



The accumulation table at the can discharge is full (the color of the symbol is red).





The front machine paneling is closed (the color of the symbol is gray).



The front machine paneling is open (the color of the symbol is red).



The outer machine paneling is closed (the color of the symbol is gray).



The outer machine paneling is open (the color of the symbol is red).



The monitored drives are OK (the color of the symbol is gray).



The monitored drives are active (the color of the symbol is green).



A monitored drive has signaled an error (the color of the symbol is red).



The central lubrication system is OK (the color of the symbol is gray).



The central lubrication system is active (the color of the symbol is green).



The central lubrication system has signaled an error (the color of the symbols is red).



The filler still contains cleaning media.



The filler computer status is OK (the color of the symbol is gray).



The filler is not synchronous.



A filling error has occurred (the color of the symbol is red).

There is no SRAM card plugged in the operator computer for storing data.



The SRAM card in the operator computer is write-protected. No data can be stored.



Invalid format of the data to be stored on the SRAM card.



An error has occurred while storing data on the SRAM card.



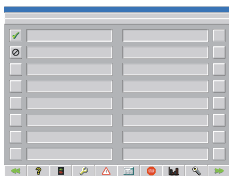
Low battery in the SRAM card. Data can no longer be stored.



Program



Touch **"Program"** in the **"Program Selection"** menu.



☒			
☐			
☐			
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☐			
☐			

Navigation buttons: << [] [] [] [] [] [] [] >>

In this menu, you can activate the filler operation modes and the controllers required for production and cleaning.

Automatic mode is default if no operation mode is selected for the controllers.



This switch symbol indicates the currently selected operation mode.



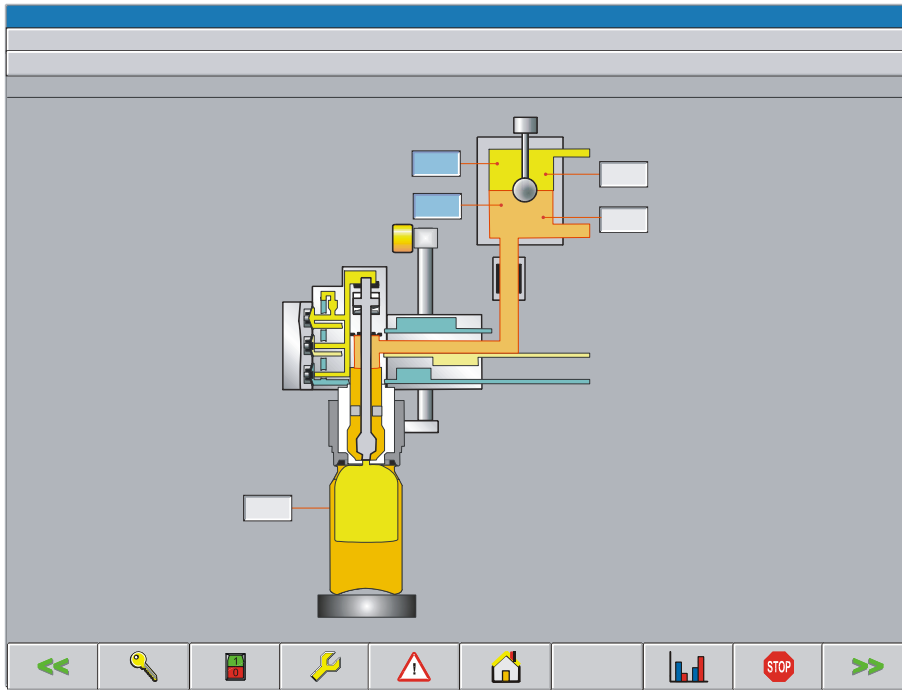
This switch symbol indicates the operation modes not currently selected.



Touch the button assigned to the operation mode to activate the operation mode.

Parameter

Touch **"Parameters"** in the **"Program Selection"** menu.



Refer to chapter, **Machine Description** for information on the parameters.

The filling parameters can be changed in the input boxes:
(See chapter **Operator Prompting / Entering and Changing Parameters**)



The actual values are shown in boxes highlighted in color.



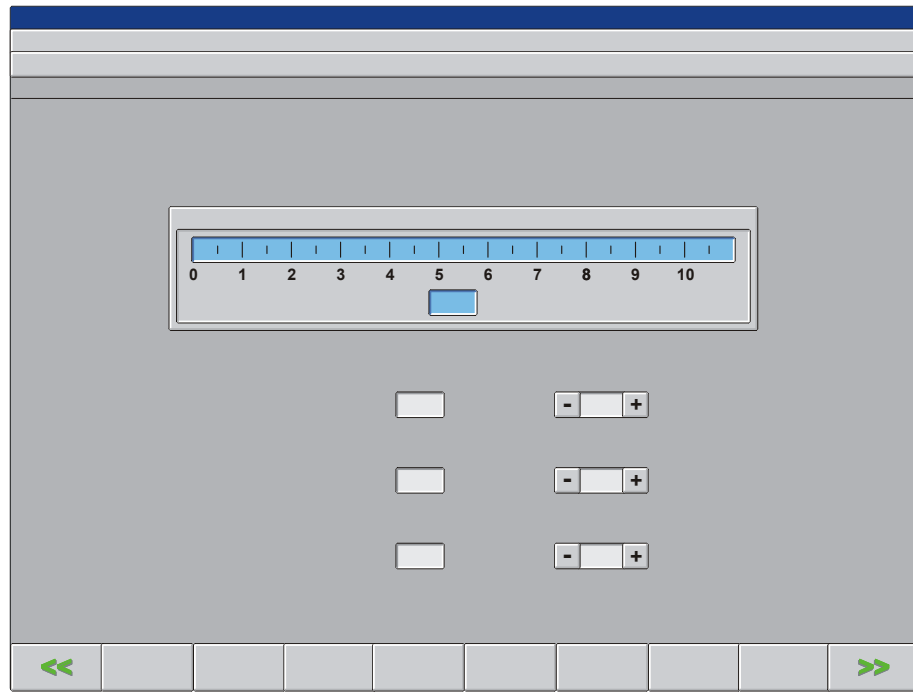
The current parameter settings are saved for the selected can type when the menu is exited.



Output



Touch **"Output"** in the **"Program Selection"** menu.



The currently machine output speed is indicated in this display.



You can enter the full, half, and the machine output speeds required for filling until empty for Fill mode in the input fields (see chapter, **Operator Prompting / Entering and Changing Parameters**).

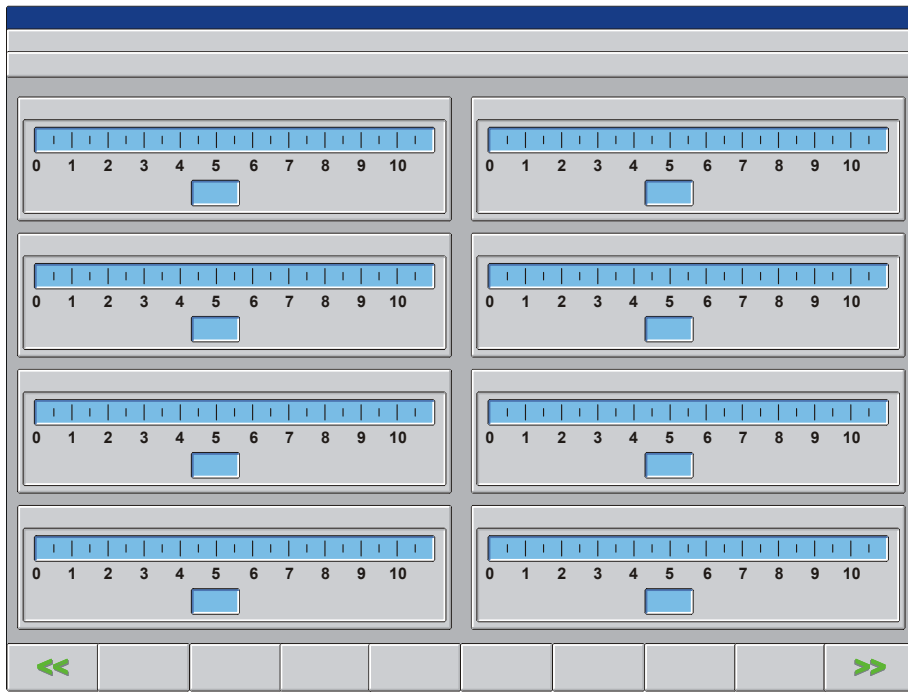


You can additionally adjust the full and half machine output speeds in increments of 1000 containers per hour each by touching the **[-/+]** buttons.

The machine output setting range is limited to the values specified in the Startup menu.

Analog Values

Touch **"Analog"** in the **"Program Selection"** menu.



This menu displays the data measured for the system in the analog value fields.



More than eight lines of measured data will be displayed on page 2 of this menu. If the filler is blocked with a KHS rinser, the filler and rinser measurement data will be displayed on separate screens.



Blow-out



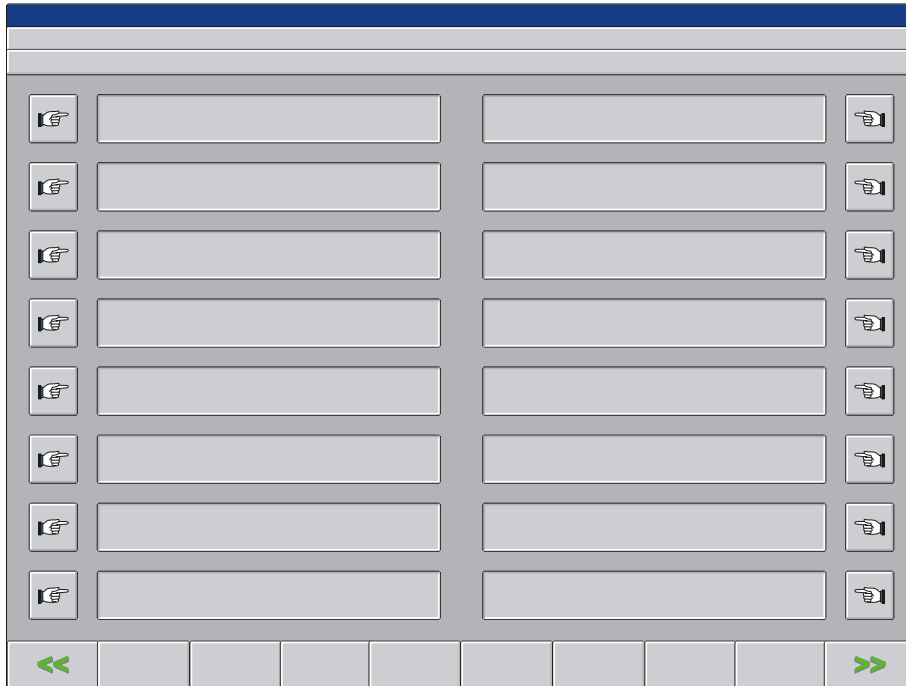
Touch "**Blow-out**" in the "***Program Selection***" menu.

The return air tubes of all filling elements will be blown out within one revolution of the filler.

Blow-out will be automatically terminated.

Type

Touch **"Type Selection"** in the **"Main Menu"** or **"Special Functions 1"** menu.



Use this menu to run the filler height adjustment to the height that corresponds to the type.

**Filler height
adjustment**

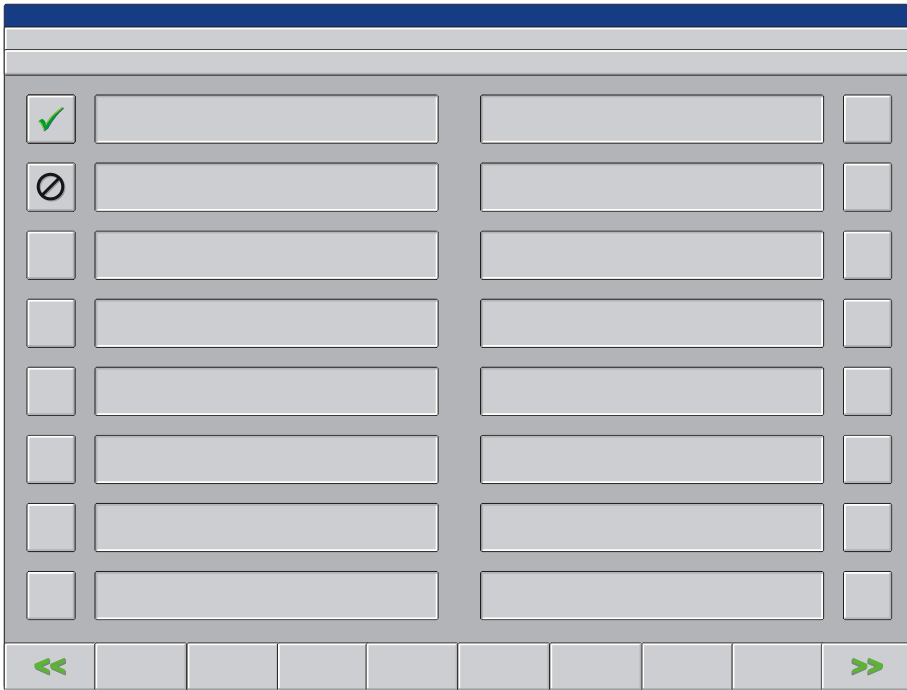
Use this menu to select the type for production operation.

Type

Selecting the Type



Selecting the **"Type"** in the **"Type Selection"** menu.



This switch symbol indicates the currently selected type.



This switch symbol indicates a deselected type.



Touch this button to access types 17 through 32 if your system is designed for more than 16 types.



Touch the button assigned to the desired type.

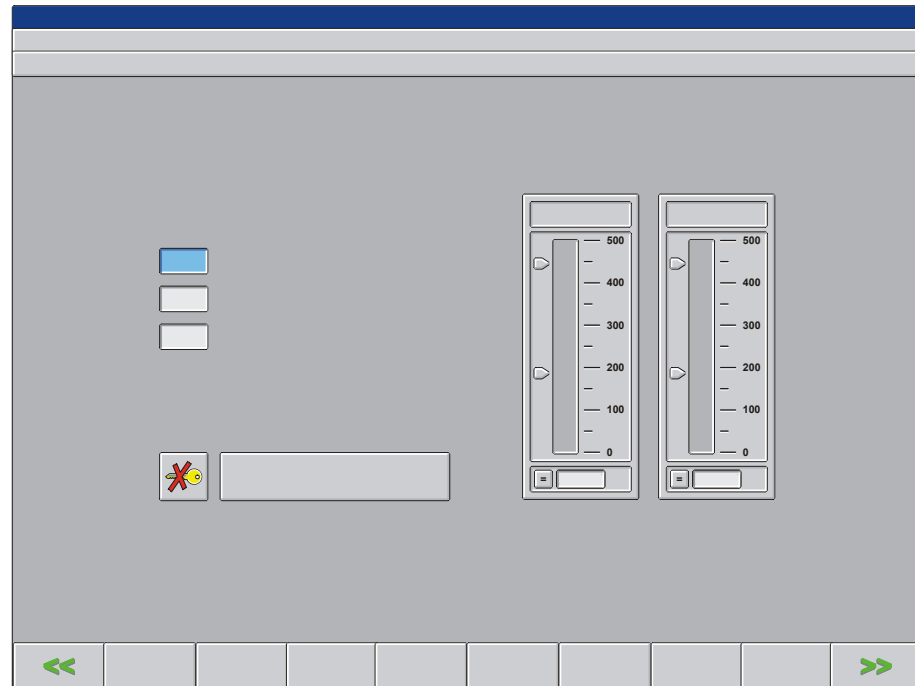
The associated filling process will then be activated and the data corresponding to the type will be loaded; all functions are disabled during the loading process.

This page is blank for technical reasons !

Filler Height Adjustment



Touch 'Filler Height Adjustment' in the '**Type**' menu.



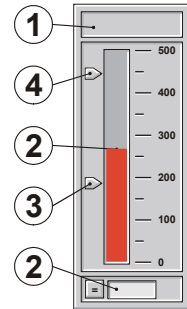
The corresponding setpoint value of the current type for running the height adjustment appears in the upper input field (**current setpoint value according to type**). This value can be changed (see chapter, **Operator Prompting / Entering and Changing Parameters**). The changed value is saved for the current type by confirming the entry.



The setpoint currently saved in the machine control (PLC) is displayed in the lower box (**current setpoint from the PLC**).

The following values for the inner ring (filler turret) and outer ring (control ring) are indicated in the displays (1):

- (2) Current height in millimeters.
- (3) Minimum possible height in millimeters.
- (4) Maximum possible height in millimeters.



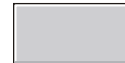
This symbol indicates that the **'Enable Main Drive / Enable Height Adjustment'** key switch is set to **'Enable Main Drive'**.



This symbol indicates that the **'Enable Main Drive / Enable Height Adjustment'** key switch is set to **'Enable Height Adjustment'**.



By pressing the **'Confirm Setpoint Value'** button, the value displayed or changed in the **'Current Setpoint Value According to Type'** box is transferred to the machine control.



This symbol indicates that the setpoint was confirmed and that the height adjustment can now be run.



Follow the instructions in section, *Filler Height Adjustment* contained in chapter, *Changeover* when running the height adjustment.



Do not exit the menu during the height adjustment process. Wait until the height adjustment process is completed.

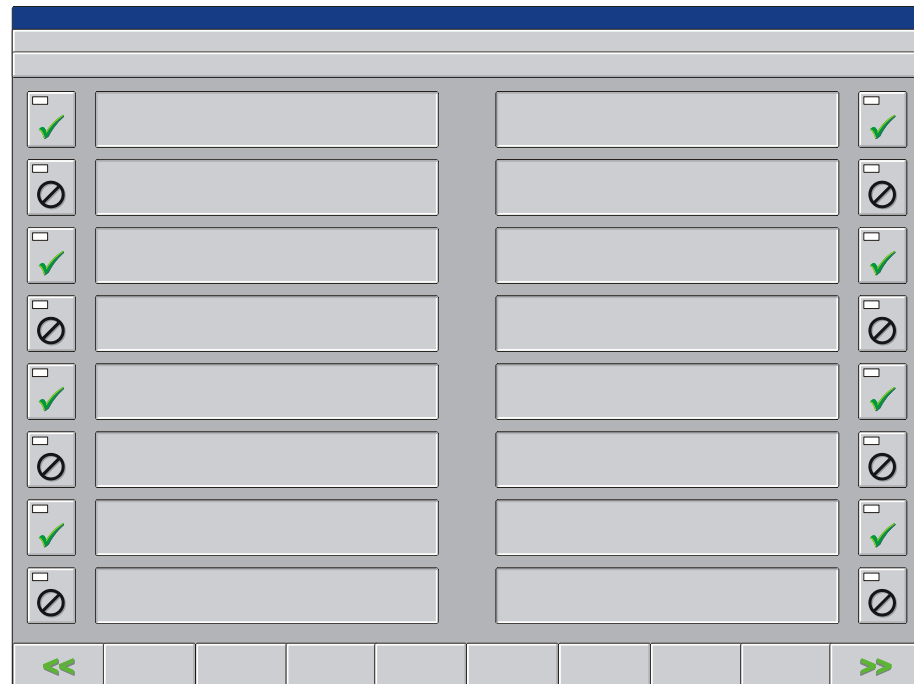


Function Releases

In the Function Releases menu, you can switch various machine functions on and off and set the machine to Automatic or Manual mode.



Touch the **"Function Releases"** button.



Further functions, if any, are contained in the following pages in this menu. Touch this button to skip to the next page.



Touch the symbol assigned to the function to switch a function on or off or set the machine to Automatic or Manual mode.



This symbol indicates that the function is active.



This symbol indicates that the function is not active.



The following contains a brief description of all functions. Only the functions displayed in the Function Releases menu are available according to the layout of your machine.

Infeed conveyor ON

Switch on and off.

Discharge conveyor ON

Switch on and off.

Steam filter

Switch on and off.

Lamp test

You can start the lamp test.

All lamps that are in proper working order emit a steady light for a period of 10 seconds during this test. The function is then automatically switched off.

MANUAL lubrication

You can manually start the automatic lubrication system.

The lubrication system is switched back to AUTOMATIC mode after a defined number of lubricating cycles.

Product pump / CIP Return flow pump ON

Switch the product pump in the product line on and off.

Blow out air tube ON

Switch return air tube blowout on and off.

Run Empty

You can switch on the Run Empty function to end production operation. For this purpose, the level control is overridden and the can flowgate is forced open.

Bell spraying ON

Set to MANUAL (continuous operation) or AUTOMATIC.

Force empty ON

Switch on and off.

Seamer production with CO2 ON

(See the seamer Operating Manual.)

Seamer CO2 Setting ON

(See the seamer Operating Manual.)

Seamer cleaning ON

(See the seamer Operating Manual.)

Seamer rinsing ON

Seamer production with steam ON

Seamer impeller rinsing with steam ON

(See the seamer Operating Manual.)

Seamer Lid Feed AUTO

(See the seamer Operating Manual.)

Start seamer oil filter pump ON

(See the seamer Operating Manual.)

Seamer can backup override ON

(See the seamer Operating Manual.)

Seamer safety door override ON

Seamer hot water flushing ON

(See the seamer Operating Manual.)

Hot Water Flushing MANUAL / AUTO

You can set hot water flushing to continuous operation, automatic mode, or switch it off.

In Automatic mode, hot water flushing is switched on and off by the machine control.

CO2 Purging ON

The automated CO2 purging valve is opened.

Can purging cleaning ON

The cleaning cycle for CO2 purging can be switch on and off.

Circulate mode (heat retention) MANUAL / AUTO

You can set the heat retention facility to manual operation, automatic operation, or switch it off.

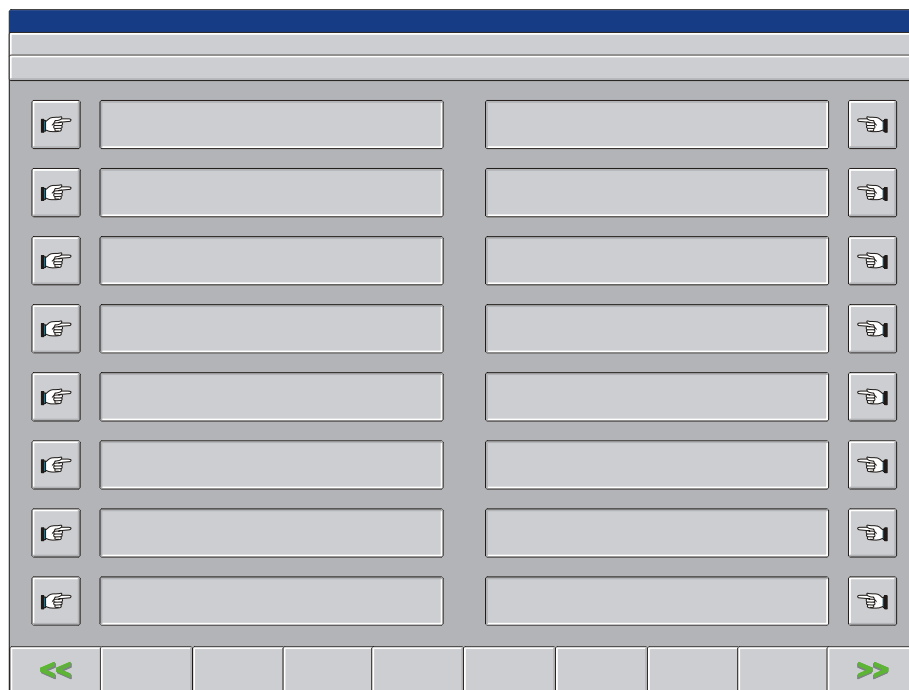
In Manual mode, all heat retention valves are open and the product is continuously circulated.

In Automatic mode, the machine control opens and closes the valves necessary for circulation as required.

Special Functions 1



Touch the "**Special Functions**" button.



Touch this button to open the related menu.

Time	Use this menu to set the date and time.
Type	Use this menu to set the machine to the style of container to be filled.
Filler Startup	Use this menu to set the machine startup parameters for the style of can.
Filling Valve Correction	Use this menu to load the correction factors to the flowmeters or make a backup copy.
Test Functions	You can use this menu to switch on various machine functions.

Special Functions 1 (Right-hand Side of the Screen)

Menu Selection

Switch on test machine functions.

Test Functions

View the exchange of signals between the filler and other line components: see chapter, Operator Prompting, Special Functions 1, Interfaces / Signal Exchange.

**Signal
Exchange...**

Setup and change users and passwords.

**User
Administration**

Deactivate the display screen for 30 seconds in order to clean it.

**Clean Display
Screen**

Exit the visualization program (graphical user interface).

Exit GraphWorX

A warning will appear in the display:

Really terminate the program?



Do not terminate the program during ongoing operation.



Terminate "GraphWorX". The operating system will then appear in the display.



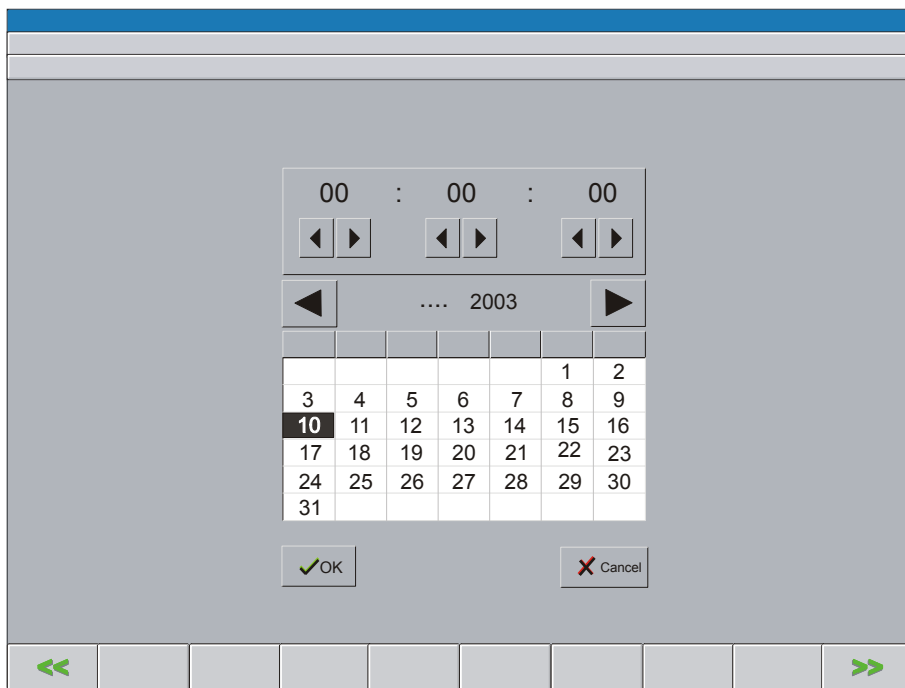
Cancel the action. "GraphWorX" will not be terminated.



Setting Time



Touch **"Set Time"** in the **"Special Functions 1"** menu.



00		:	00		:	00	
◀	▶		◀	▶		◀	▶
◀		 2003				▶	
					1	2	
3	4	5	6	7	8	9	
10	11	12	13	14	15	16	
17	18	19	20	21	22	23	
24	25	26	27	28	29	30	
31							
✓ OK				✗ Cancel			

Touch the appropriate arrow keys to change the time and the month.

Select the date by touching the corresponding number of the day.

Press the **"OK"** button to accept the set values and exit the menu.

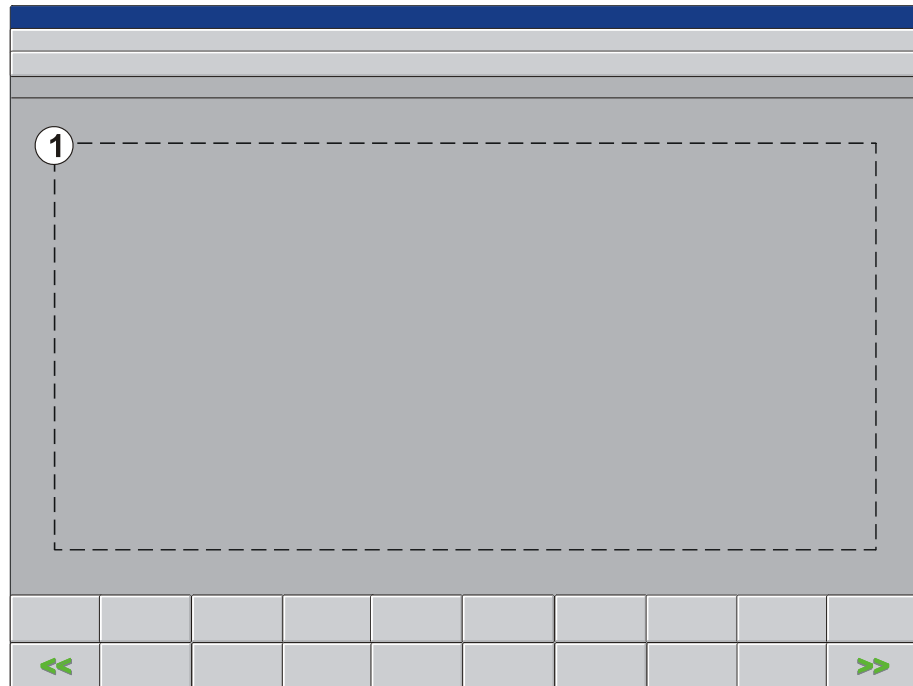
Press the **"Cancel"** button to exit the menu without accepting the settings.

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Startup Filler



Touch **"Filler Startup"** in the **"Special Functions 1"** menu.



A graphic display of the filling method will appear in display (1).



The selected parameter settings are stored for the selected can type when the menu is exited. In order to change the parameters for another can type, you must first select the desired can style before invoking the **Startup** menu.

Filler Zero-point Definition

You must first run the filler to its zero-point in order to determine and enter the positions in zero-point.

When the filler computer first detects the synchronous signal and machine timing signal during machine rotation then this point is assumed to be the filler zero-point. This point is located so that filling element number 1 is at the tangent point of the infeed starwheel.

Parameters

You can change or enter the corresponding parameters in the input fields. (See chapter ***Operator Prompting / Entering and Changing Parameters***)



Enter the correction value (in percent) for the specific product. This correction valve changes the flowmeter measurement behavior with regard to the density and conductivity of the product.

Media correction

Enter the filling volume (in milliliters) that is to flow into the can during the period between activating the main cylinder and actually closing of filling valve.

Valve lead

Enter the time (in milliseconds) between opening and closing the rinsing cylinder during the rinsing phase.

Prerinsing

Enter the time (in milliseconds) between opening and closing the pressurization gas cylinder during the pressurization phase.

Pressurize

Enter the desired volume (in milliliters) for the specific can type.

Desired volume

Enter the time delay (in milliseconds) for closing the pressurization gas cylinder after closing the main cylinder.

**Return gas
reserve**

Enter the wait time (in milliseconds) until pressure relief begins.

Wait

Enter the time (in milliseconds) between opening and closing the pressure relief cylinder during the pressure relief phase.

Pressure relief

Display only.

Start loss angle

Enter the time period in milliseconds for final pressure relief.

**Final pressure
relief**

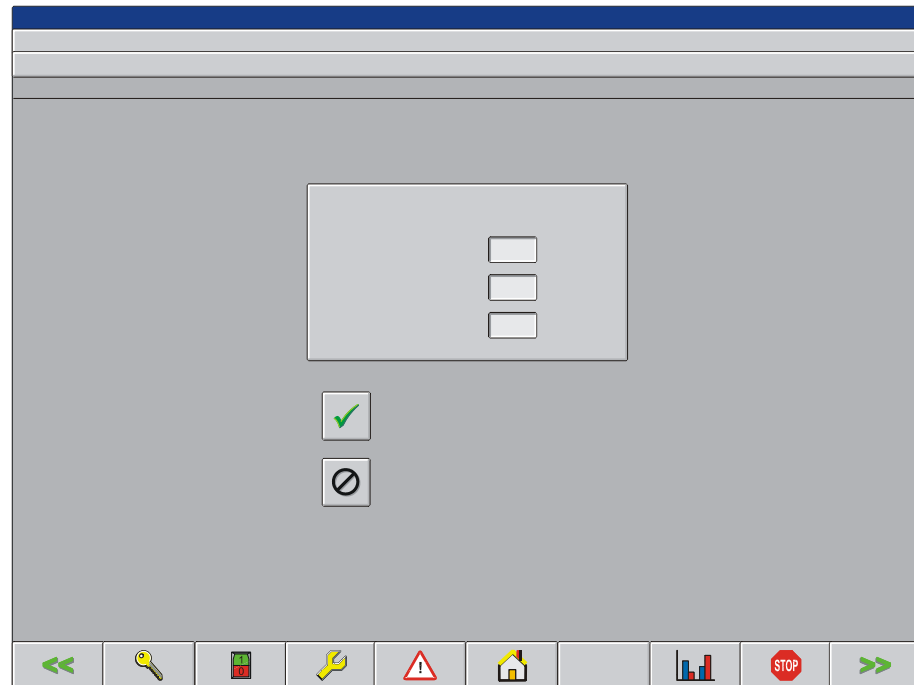
Enter the number of the filling element in relation to the filler zero-point where final pressure relief is to begin.

Start final relief

Type-dependent Parameters



Touch the **"Next"** button in the **"Startup"** menu.



You can enter full, half, and the machine output speed required for fill until empty in the input fields for the selected type. (See **"Entering and Changing Parameters"** in this chapter.)

You can select **Seamer Production with Gas** or **Without Gas** with regard to the selected type.



This symbol indicates the selected production method.



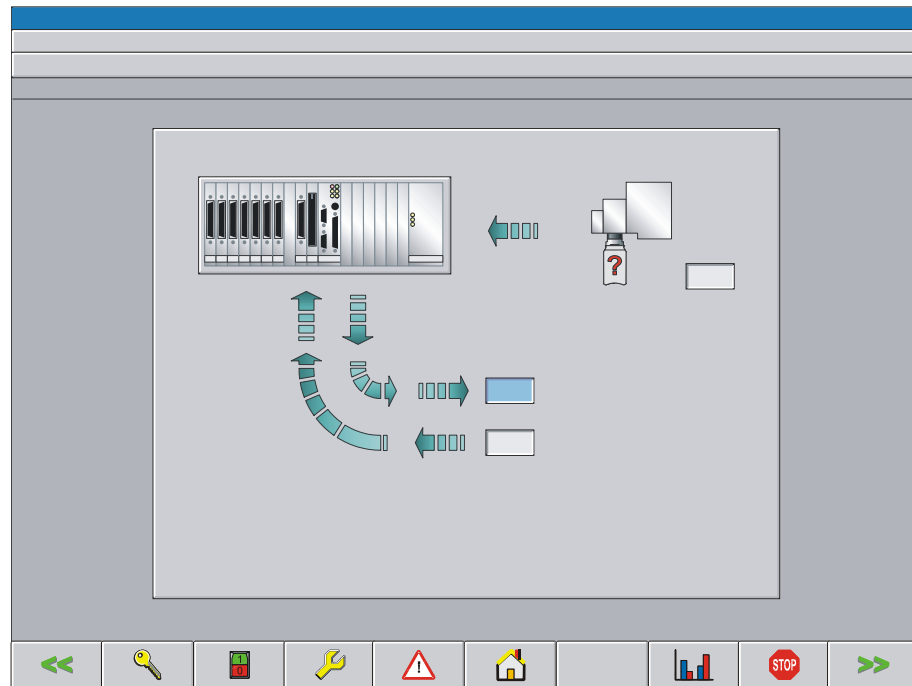
The current parameter settings are saved for the selected container type when the menu is exited.

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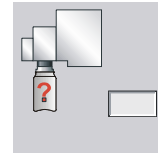
Filling Valve Correction



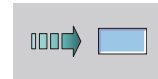
Touch **"Filling Valve Correction"** in the **"Special Functions 1"** menu.



Enter in the input box the number of the filling valve to read the correction setting of its flowmeter (See **"Entering and Changing Parameters"** in this chapter.).



The current correction setting will appear in the *Current correction value* box of the selected filling valve.



You can enter a new correction value in the *New correction value* box. (See **"Entering and Changing Parameters"** in this chapter.).



The correction value is used to correct the tolerances of the activated flowmeter to thereby achieve exact fill volumes at this flowmeter.

These symbols are displayed when errors occur transferring data to the SRAM card. Refer to section **"Symbols in the Machine Screen"** for information on the meanings of the symbols.



Test Functions



Touch **"Test Functions"** in the **"Special Functions"** menu.



A warning will appear in the display:

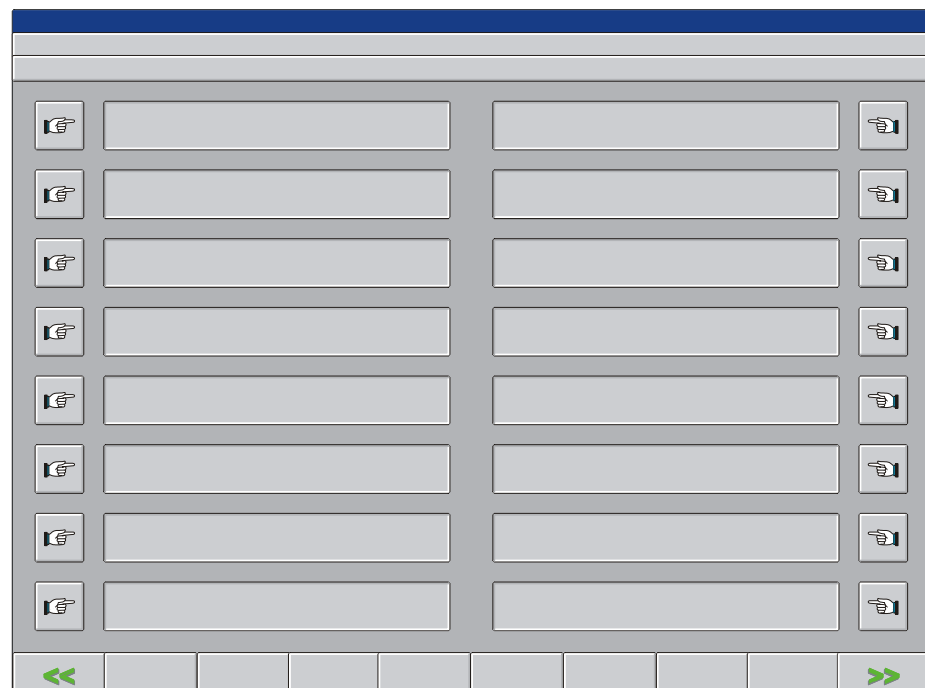
Really terminate filling operation?



Touch this button to abort the filling operation in order to activate the **"Test Functions"** menu.



Touch this button if you would like to return to the **"Special Functions"** menu.



Touch this button if you would like to open a menu.



Use this menu to test various input signals at the filler computer.

Filler Inputs

Use this menu to test various output signals of the filler computer.

Filler Outputs

Use this menu to view various areas of filler computer memory.

**Filler Storage
Dump**

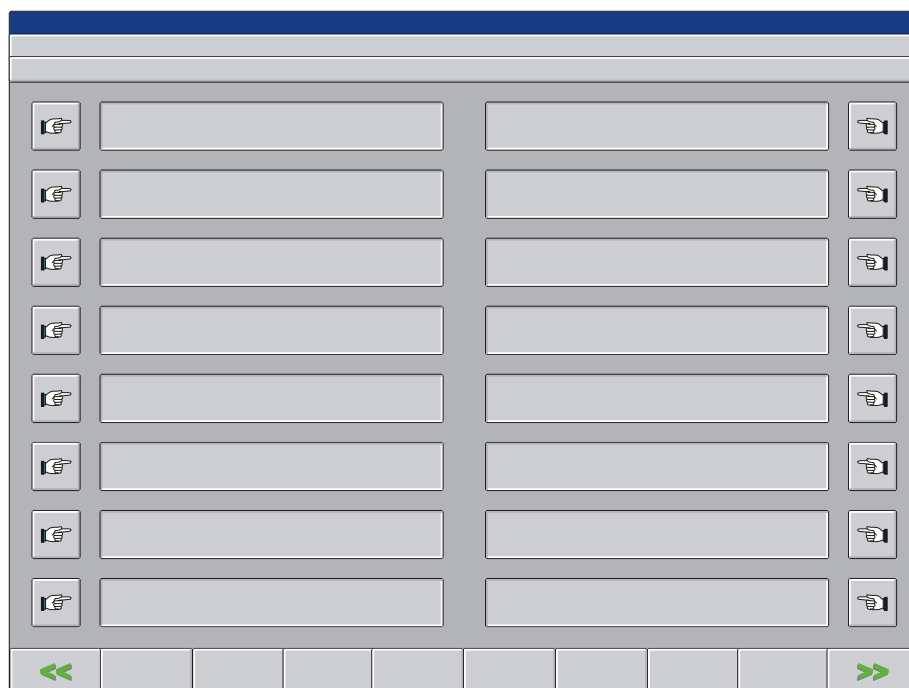
You can test the filling capabilities of one or more neighboring filling stations without having the machine rotate.

Filler Test Filling

Filler Inputs



Touch **"Filler Inputs "** in the **"Test Functions"** menu.



Touch this button if you would like to open the menu.

Machine timing

Use this menu to test the proximity switch for machine timing.

Synchronous timing

Use this menu to test the proximity switch for synchronous timing.

Can sensor

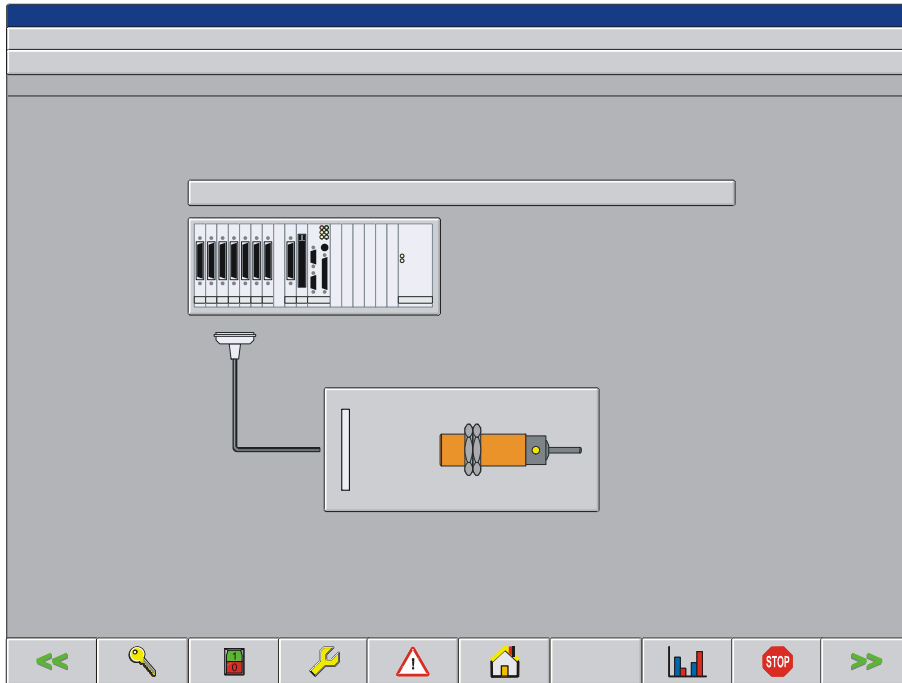
Use this menu to test the proximity switch for the can sensor (can sensing).



Refer to section *Testing Inputs* in this chapter for instructions on testing input signals.

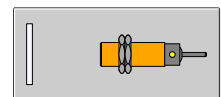
Testing Inputs

Touch the desired function in the **"Inputs"** menu.

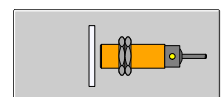


Then trigger the proximity switch of the selected function while taking the principles of operation and the switching interval into consideration.

This symbol indicates that there is no input signal.



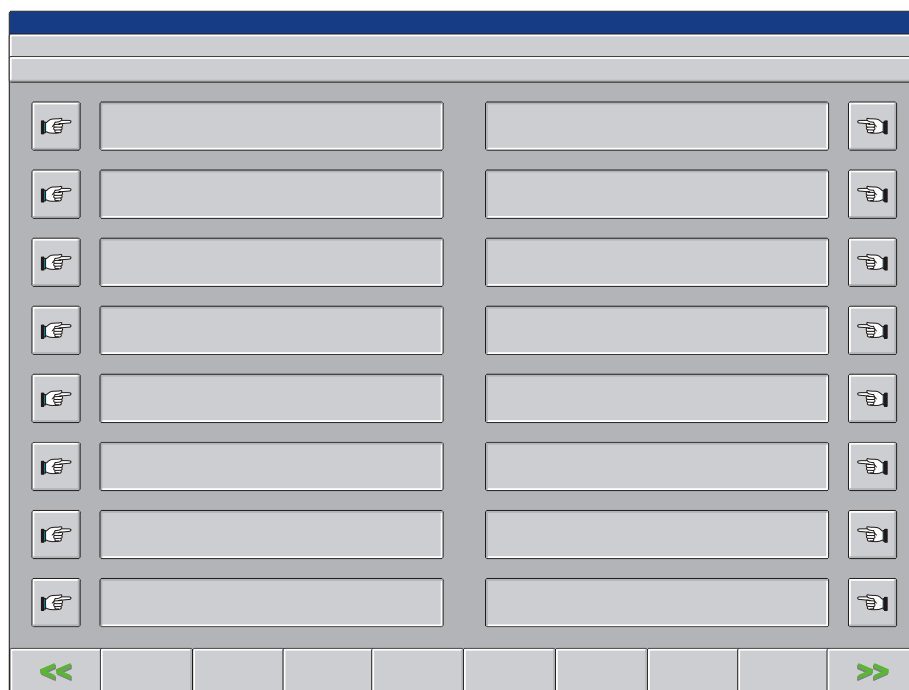
This symbol indicates that there is an input signal.



Filler Outputs



Touch **"Filler Outputs"** in the **"Test Functions"** menu.



Touch this button if you would like to open the menu.

.....cylinder

Use this menu to test the control cylinders of the individual filling valves.



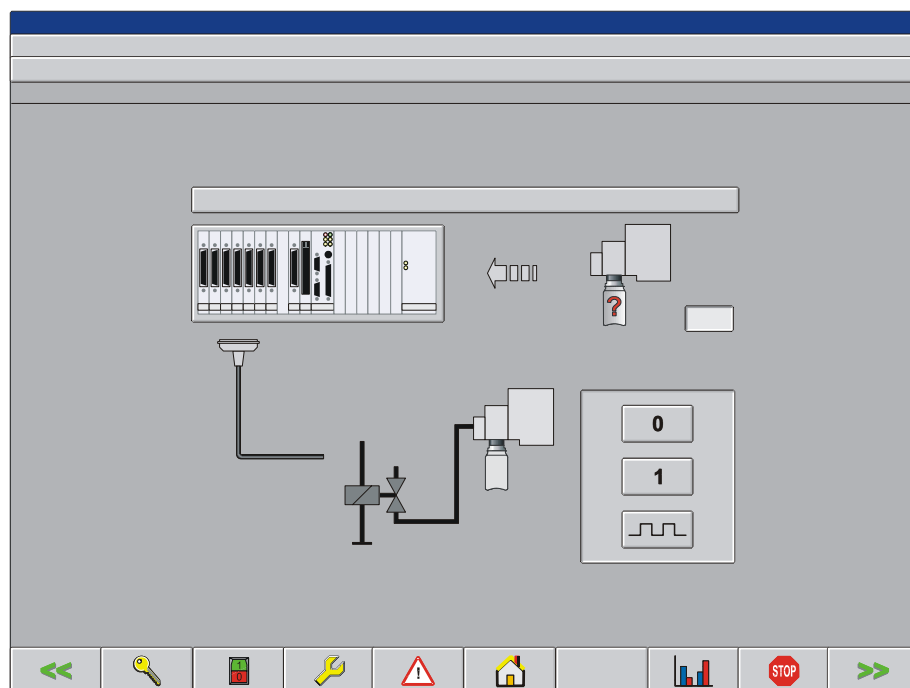
Refer to section *Testing Outputs* in this chapter for instructions on testing output signals.

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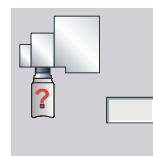
Testing Outputs



Touch the desired function in the **"Filler Outputs"** menu.



Enter number of the filling valve in the input box on the valve to test the cylinder of this filling valve. (See "**Entering and Changing Parameters**" in this chapter.)



Touch this button to close the cylinder.



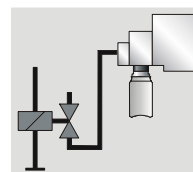
Touch this button to open the cylinder.



Touch this button to clock the cylinder (open and close at fixed intervals).



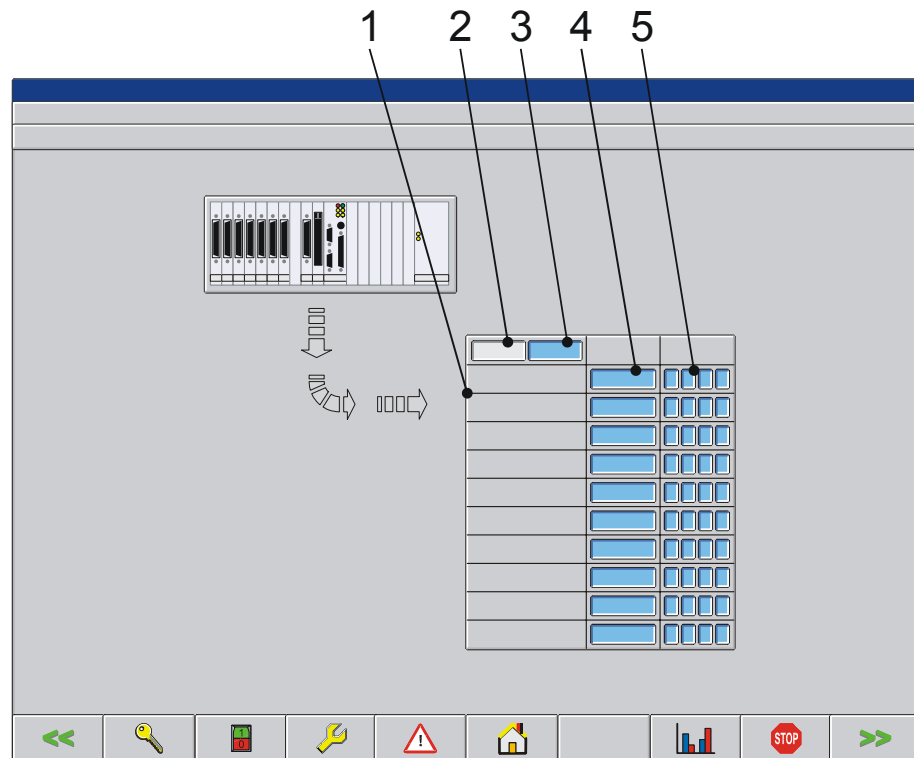
This symbol indicates the operational status of the cylinder at the filling as follows:



Symbol Indicators	Function
Gray	Cylinder is closed
Yellow	Cylinder is open
Flashing yellow	Cylinder being clocked

Filler Storage Dump

Touch **"Storage Dump"** in the **"Test Functions"** menu.



- (1) Display of the next ten addresses beginning with the start address
- (2) Starting address, decimal
- (3) Starting address, hexadecimal
- (4) Starting address, decimal
- (5) Contents of storage at the address, hexadecimal

Enter the decimal starting address in input box (2) (see chapter Operator Prompting / Entering and Changing Parameters).

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Test Filling



When carrying out a test filling, you and all persons observing this test must wear safety eyeglasses or face shields to safeguard against any spraying liquids!



Touch **"Test Filling"** in the **"Test Functions"** menu.



A warning will appear in the display:

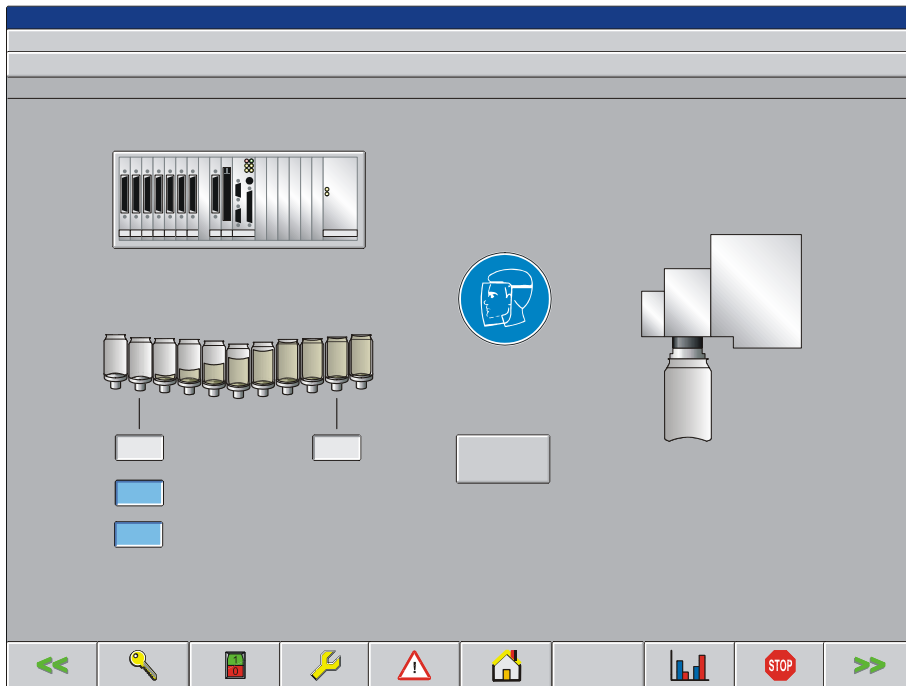
Have the required protective measures been taken?



Touch this button to abort filling in order to activate the **"Test Filling"** menu.

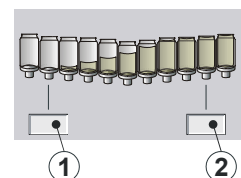


Touch this button if you would like to return to the **"Test Functions"** menu.



The Test Filling function enables you to observe the filling process at one or more filling stations in succession without the filler rotating. In Inch mode, run the filling stations you would like to observe to an easily visible position.

You can enter the first and last filling stations for the test filling range in the input fields. (See chapter **Operator Prompting / Entering and Changing Parameters**)



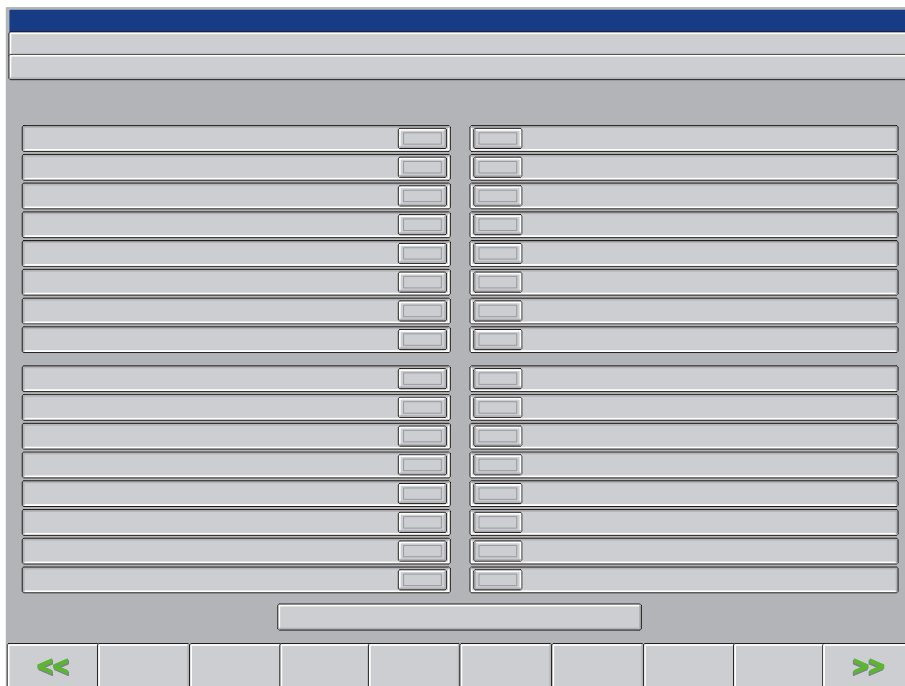
Touch **"Start"** to begin the filling test.



Interfaces / Signal Exchange



Touch **"Interfaces"** in the **"Program filler"** or **"Signal Exchange"** in the **"Special Functions 1"** menu.



The green field in the indicator shows that a signal exists.



Here, you can choose the signal exchange to be displayed on the monitor.

User Admin

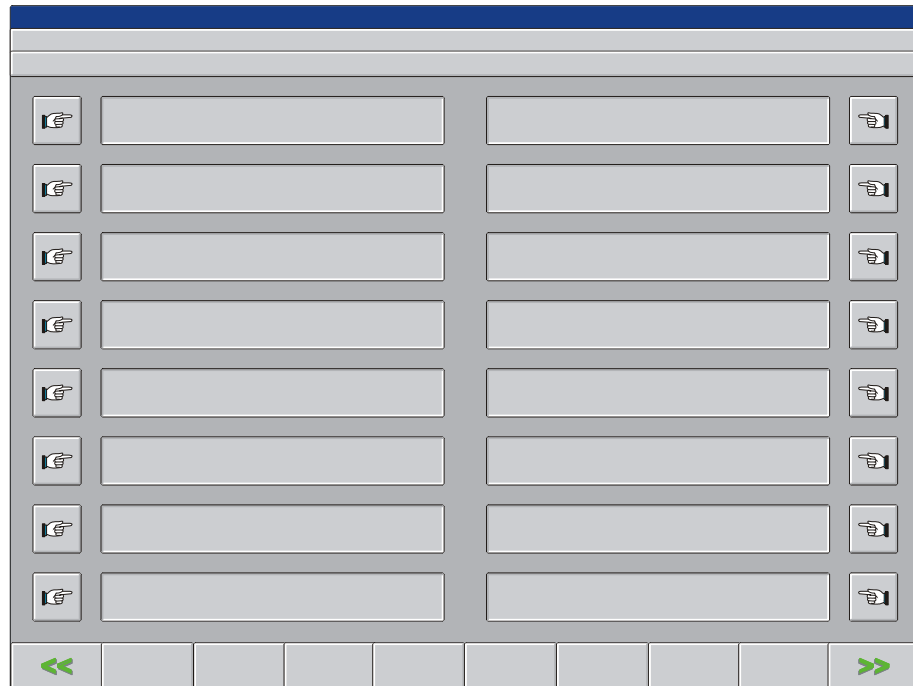
The user administration is reserved for **KHS service staff** and may not be executed by operating personnel!



Special Functions 2



Touch the **"Next"** button in the **"Special Functions 1"** menu.



Touch this button to open the related menu.

**Send IDM Correction
Values to the Filler
Computer**

Send flowmeter correction values to the filler computer.

**Read IDM Correction
Values from the Filler
Computer**

Read flowmeter correction values from the filler computer.

**Calibrate Height
Adjustment**

Use this menu to assign a new reference point in the machine control for the height adjustment.

Edit Setup.ini File

Save, load, and edit the file.

Edit Language File

Save, load, and edit the file.

**Save data to USB
stick**

Save data to USB stick.

Sending IDM Correction Values to the Filler Computer

The menu is reserved for **KHS service staff** and may not be executed by the operating crew!



Reading IDM Correction Values from the Filler Computer

The menu is reserved for **KHS service staff** and may not be executed by the operating crew!



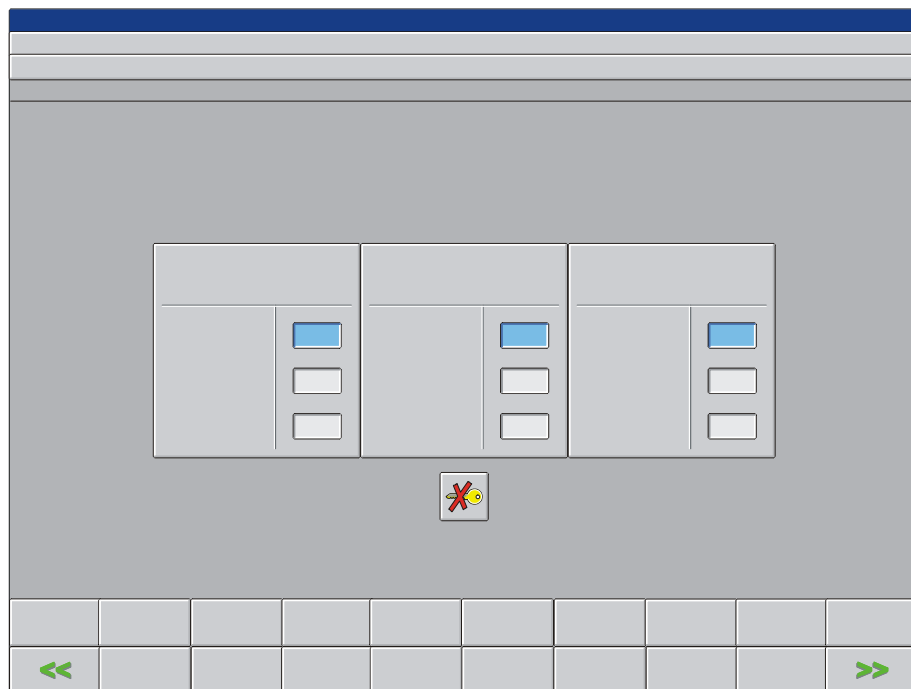
Calibrate Height Adjustment



Follow the instructions in section, '*Setting the Height Adjustment*' contained in chapter, '*Setting Instructions*'.



Touch '**Calibrate Height Adjustment**' in the '*Special Functions 2*' menu.



This symbol indicates that the **'Enable Main Drive / Enable Height Adjustment'** key switch is set to **'Enable Main Drive'**.



Once all containers have been run out of the machine (run machine empty) and the machine is switched off, turn the **'Enable Main Drive / Enable Height Adjustment'** key switch to **'Enable Height Adjustment'**.



This symbol indicates that the **'Enable Main Drive / Enable Height Adjustment'** key switch is set to **'Enable Height Adjustment'**.

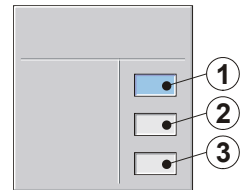


Press the **'Filler'** button to activate the filler height adjustment.

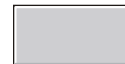


The actual heights for the inner ring (filler turret) and outer ring (control ring) are shown in boxes **(2, 3)**.

The current calibration height is indicated in box **(1)**. You can change this height as required (see section, **'Entering and Changing Parameters'** in chapter, **'Operator Prompting'**).



Press the **'Start'** button to calibrate the filler height adjustment.



Editing the Setup.ini



These menus are reserved for **KHS service staff** and may not be executed by operating personnel!

Editing the Language Files



These menus are reserved for **KHS service staff** and may not be executed by operating personnel!

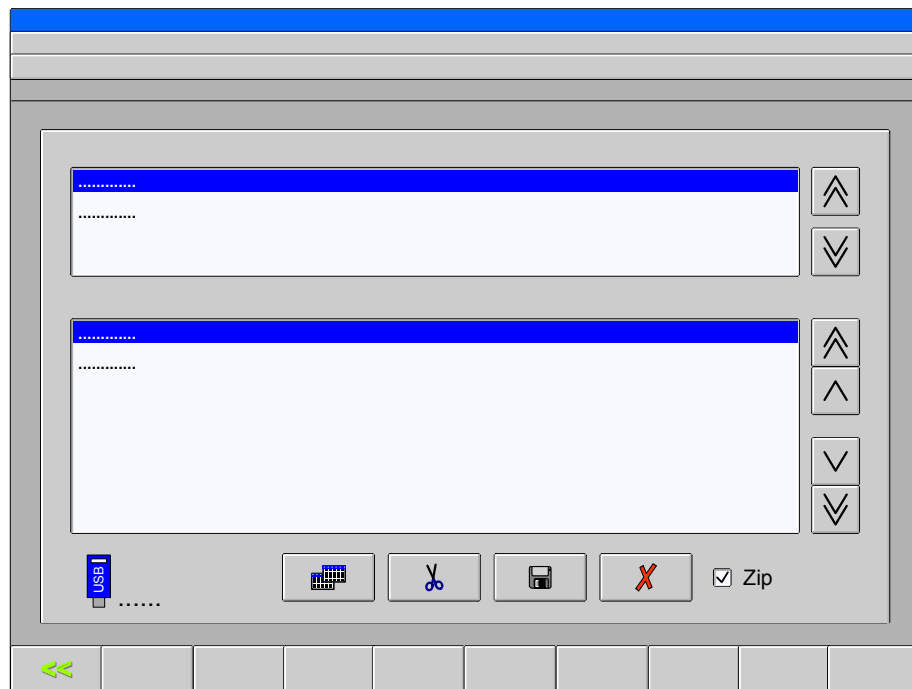
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Save Data to USB Stick



The menu is reserved for **KHS service staff** and may not be executed by the operating crew!

Touch **"Save Data to USB Stick"** in the **"Special Functions 2"** menu.



Insert the USB stick in the USB port at control computer "PC627". See folder, Wiring Diagram, Overview of the Control for the control cabinet that contains the control computer.

Save data to a USB stick from the control computer using the following functions.

Activate the "Group Selection" box or the "File Selection" box and scroll up or down in the boxes.



This symbol indicates that a USB stick is plugged in. The amount of free space on the USB stick is shown next to the symbol.



Mark or unmark the files.



Delete the marked files in the control computer.



Save the marked files to the USB stick.



Cancel the save process.



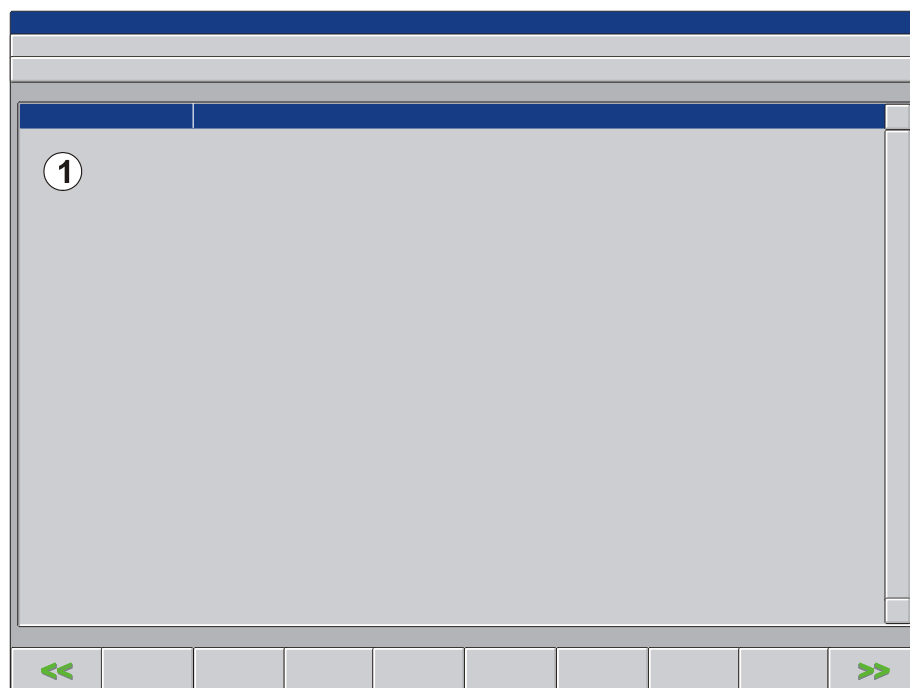
Use the "Save" to save the selected files as a ZIP file on the USB stick. Touch the box to activate or deactivate the function. A checkmark in the box shows that the function is active.

☒ Zip

Error Messages Menu



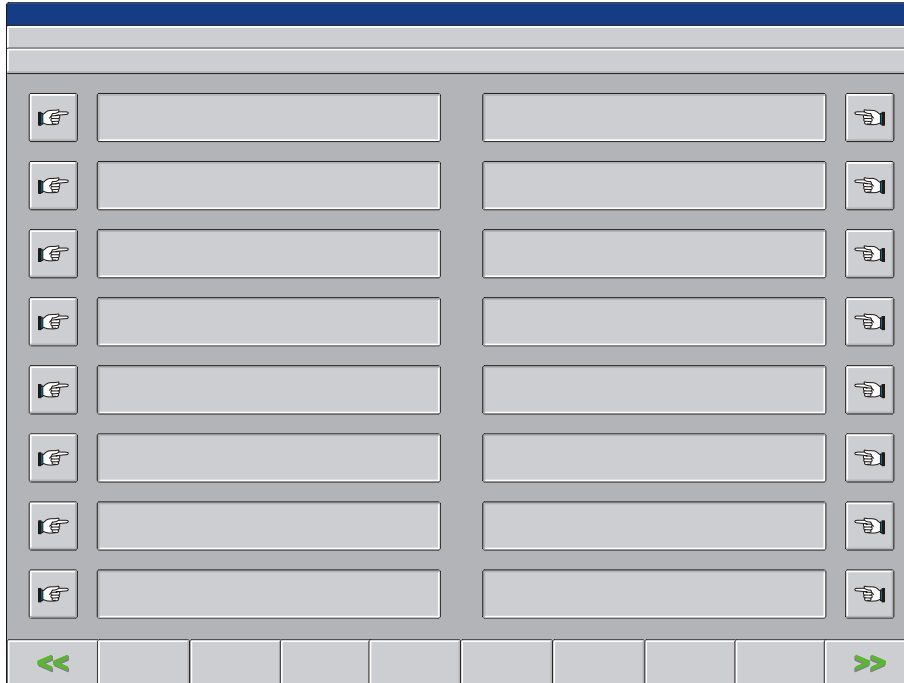
Touch the "Error Messages" button.



Any currently pending error messages but not including filling valve errors are indicated in the display **(1)**.

Statistics

Touch the **"Statistics"** button.



Touch this button to open the associated menu.



List of logged alarms.

Alarm Statistics

Log of actions executed by the machine operator.

User Statistics

Display of the hours run.

View and set the hours for the next servicing interval.

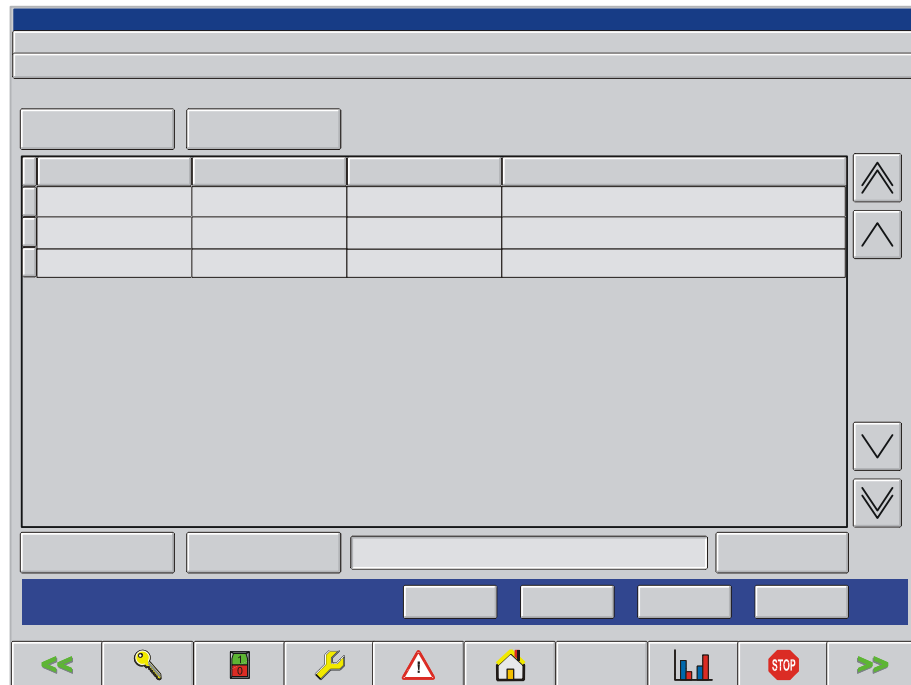
**Hours-run and
Servicing Hours
Meters**

View the efficiency and the number of cans fed to the machine.

**Can Counter and
Efficiency
Indicator**

Alarm Statistics

Touch **"Alarm Statistics"** in the **"Statistics"** menu.



The list contains all logged malfunctions together with a timestamp for the current day.

Setting the display

Touch the arrow keys to scroll up and down in the list.

Touch the DAY, WEEK (last seven days), MONTH (last 30 days) buttons to expand or compress the list.

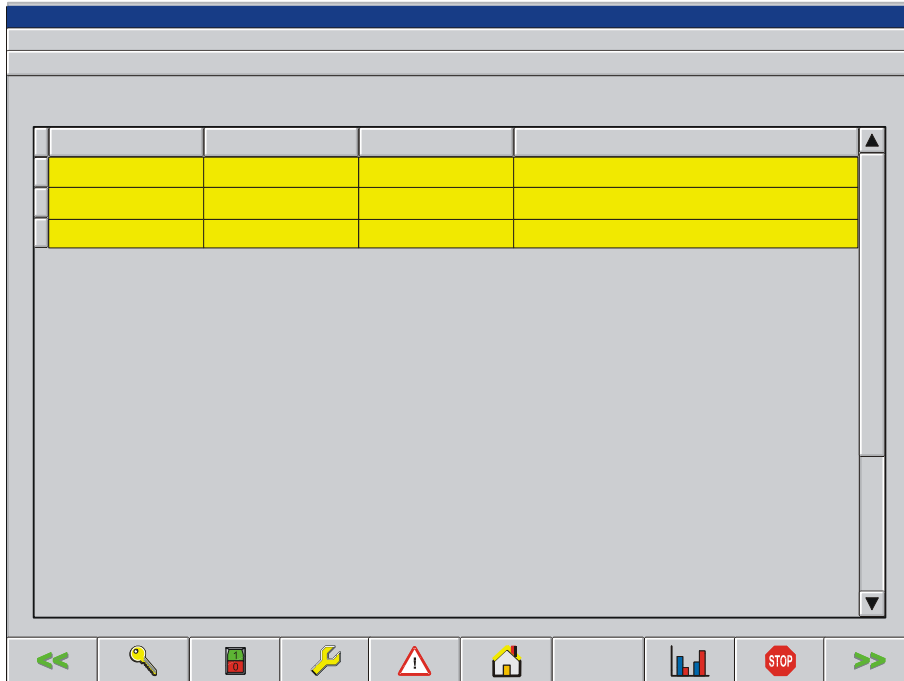
Touch the ALL, LOW, MEDIUM, HIGH buttons to limit the display according to priorities.

Touch the SUMMARY button to view the alarms together with the frequency.

Touch the OVERVIEW button to view the alarms with timestamps.

User Statistics

Touch **"User Statistics"** in the **"Statistics"** menu.

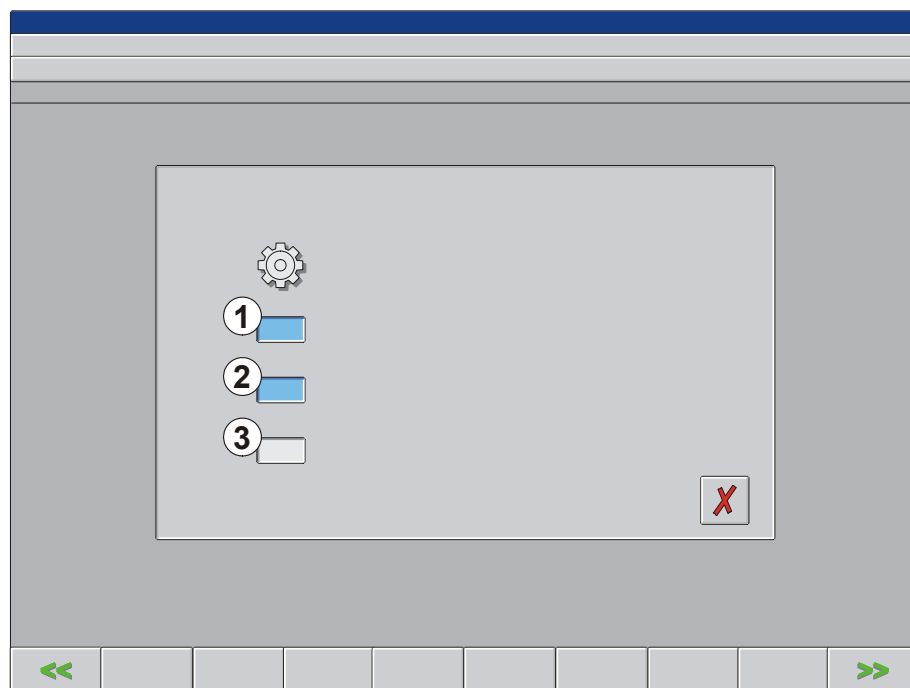


The list contains all logged actions together with the user name for a limited period.

Hours-run and Servicing Hours Meters



Touch **"Hours-run and Servicing Hours Meter"** in the **"Statistics"** menu.



This symbol indicates that the hours-run meter is running. The hours of operation are being recorded.



This symbol indicates that the hours-run meter is stopped. The hours of operation are not being recorded.



The hours-runs meter **(1)** records the hours the filler rotates. Counting begins when the machine is commissioned and cannot be reset to zero.



The servicing hours meter **(2)** also records the hours the filler rotates. The counter must be cleared manually after which it will automatically restart counting at zero.



Enter the number of hours until the next servicing is due (servicing interval) in the box **(3)**.



When the servicing interval and the servicing hours counter are equal, a message issued at the operator terminal will request that the impending servicing work be carried out.

Reset and restart the servicing hours counter after the servicing work has been completed by touching this symbol. The following message will appear at the operator terminal:



Really reset the servicing hours meter?



Reset and restart the servicing hours meter by touching this symbol.



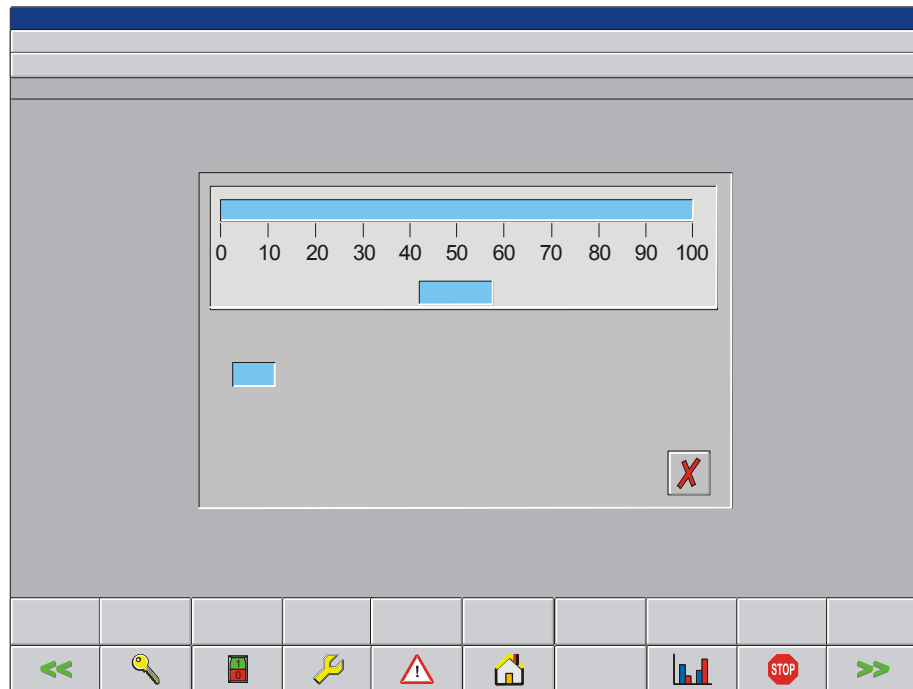
Cancel resetting the servicing hours meter by touching this symbol.



Can Counter and Efficiency Indicator



Touch **"Can Counter and Efficiency Indicator"** in the **"Statistics"** menu.



- The efficiency in % (percent) is displayed.
- Display of the can counter.



Touch this symbol if you would like to clear the can counter and restart calculation of the efficiency.



A warning will appear in the display:

Really clear can counter?



Touch this symbol if you would like to clear the can counter.



Touch this symbol if you **do not** want to clear the can counter.

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