

Operating Instructions for Capsule Filling Machine FEC20

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Safety instructions FEC20

Translation of the original

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1. General

1.1. Introduction

The capsule filling machine and its accessories were constructed according to the best available technology in conformance with the recognized safety rules and standards. Incorrect operation can result in damage to the capsule filling machine and endanger people.

This information is intended to be read, understood and followed in every respect by those responsible for using the capsule filling machine and its accessories.

The capsule filling machine and its accessories can only be used safely and without error if the responsible persons have read and followed the entire content of these operating instructions. This applies in particular to the safety instructions.

These operating instructions relate exclusively to the capsule filling machine and its accessories described herein.

We reserve the right to make any technical changes to the illustrations and information in these operating instructions that might be needed to improve the capsule filling machine and its accessories.

Storing the operating instructions

The complete operating instructions must be stored carefully and always kept with the capsule filling machine as they are part of the product.

They should always be kept in the vicinity of the capsule filling machine so that they are available, when required, to everyone working with the machine.

Warranty and technical support

To guarantee fault-free operation, these operating instructions must be read carefully before commissioning. We accept no liability for damage and interruptions that might result from failure to follow these operating instructions.

Observe all safety instructions and hazard warnings in these operating instructions!

If you have any problems, please contact our customer service or spare parts department, or one of our agencies who will be happy to assist you.

1.2. Options

Options represent the standardised electrical, mechanical and software functions of the machine.

Each machine is configured according to machine specification (MAL), which also reflects the purchase agreement. The machine specification includes options that are distinguished in:

- Sales options (e.g. 01.222 or 04.100)
- Software options (e.g. A536 or 536)

A software option can have different characteristics, which are defined in each case by the additional specification of K factors.

Depending on the electrical and mechanical configuration of the machine, the software options are activated or deactivated.

A list of all activated (released) software options can be displayed at the operator terminal (HMI).

→ Therefore, also see section "Activated options" in the Operating instructions software.



NOTICE

The documentation consists of generic documents and does not correspond to the machine specification, but describes all important functions and components of the machine.

Accordingly, the machine may not contain all the functions and components described.

1.3. Operator's duty of care

The operator of the capsule filling machine and its accessories must ensure that

- the capsule filling machine and its accessories are used only for the intended use at all times.
- the capsule filling machine and its accessories are in perfect condition and full working order at all times.
- all safety notes and warnings attached to the capsule filling machine and its accessories are legible and are not removed.
- the capsule filling machine and its accessories are assembled and operated in accordance with these operating instructions only by qualified and authorized personnel.
- these personnel are regularly informed of all the necessary rules concerning safety at work and environmental protection.
- the necessary protective equipment for assembly, operating, maintenance and repair personnel is available in sufficient quantities, is in perfect condition and is worn.

- the operating instructions are always in a legible condition and are available in their entirety at the capsule filling machine's place of use.
- all the instructions in the commissioning instructions are carried out while transporting the machine.

1.4. Copyright

Fette Engineering GmbH retains the copyright to these instructions.

These instructions are intended for personnel who work on the capsule filling machine. They contain specifications and technical drawings which must not be copied or distributed, in whole or in part, or sold or passed on without authorization to other parties for the purposes of competition.

The data processing programs used and the associated program descriptions are also subject to copyright as appropriate.

Unless otherwise specified, when upgrading or replacing existing programs, the buyer undertakes to destroy the previous versions, any copies thereof and the replaced documentation.

They must not be passed on to third parties.

1.5. Contact

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2. Safety

2.1. Requirements for a safe use of the capsule filling machine

This section contains safety-relevant information that will help to spot and avoid hazards on time. This section is complemented by individual warning notes at other places in the Commissioning instruction, Operating instruction and the Maintenance manual. Read the safety instructions carefully and attentively, to identify residual risks of the capsule filling machine.

2.2. Explanation of symbols and notes

The safety notes in the instructions are structured as follows:






- a symbol preceding the safety note offers an initial classification of the danger
- severity of the danger (signal word)
- type and source of danger
- consequences if the danger is ignored
- measures to avoid the danger

Structure of safety notes:

Danger symbol	Danger level! (Signal word / signal color)
	Type and source of danger.
	Consequences if the danger is ignored. Avoidance of the danger.

These instructions contain work safety notes that are identified by the following symbols.

Danger symbols:

		
General danger	Electrical hazard	Crush hazard
		Harmful substances
Crush hazard	Danger of burns	

IMPORTANT! appears at points in these instructions that require particular attention to ensure that the guidelines, specifications, notes and the correct sequence of the work are maintained and to prevent damage to and destruction of the machine and/or other parts of the system.



IMPORTANT!

For a potentially harmful situation in which the machine and/or other parts of the system could be damaged.

Notes are also provided in the instructions. A note also contains important information and additional tips for the user.



NOTE

Contains general or additional information on a particular subject.

The work safety notes contained in the instructions include the following signal words to represent the degree of danger. The signal words have a background in corresponding signal colors.

Signal words for danger levels:

- **NOTE**
For application notes and other useful information.
- **IMPORTANT!**
Non-compliance may result in damage to and destruction of the machine and/or other parts of the system.
- **CAUTION!**
Indicates a potential danger. If it is not avoided, the result may be minor or slight injury.
- **WARNING!**
Indicates a potential danger. If it is not avoided, the result may be death or serious injury.
- **DANGER!**
Indicates an imminent danger. If it is not avoided, the result will be death or serious injury.

Examples:



DANGER!

Electrical hazard due to live components.

Danger of potentially fatal electric shock!
Work on the switch cabinet must be carried out only by trained electricians.



WARNING!

Crush hazard at the pneumatic cylinder due to uncontrolled release.
Crushing of fingers.

Depressurize the compressed air cylinder before making any adjustments.



CAUTION!

Crush hazard when fitting the component.

Crushing of limbs.
The work must only be carried out by familiarized and qualified specialist personnel.

2.3. Personnel

2.3.1. Personnel training

- Only trained, familiarized and authorized personnel who are qualified for the activity may carry out work on the machine.
- The personnel should ideally be qualified by means of a special training course provided by Fette Compacting .

Fette Compacting Training

Phone: + 49 (0) 41 51 12 569

Email training@fette-compacting.com

- Specialist personnel with a mechanical or electrical qualification are needed for the maintenance work, commissioning and fault-finding.
 The specialist personnel should have appropriate technical training plus additional knowledge and experience (see “Approved personnel and responsibilities” section). They should be able to assess the tasks assigned to them and able to identify and avoid possible dangers.
- The users must be familiarized with the machine and have been informed of the possible dangers associated with improper conduct.
- Personnel in training must only carry out the work under the supervision of an experienced person.

2.3.2. Approved personnel and responsibilities

Different dangers may occur during the various phases of the machine's lifecycle. The personnel will require different qualifications according to the activity and phase of the machine's lifecycle. The phases of the machine's lifecycle and the corresponding personnel qualifications required can be identified from the following qualification matrix.

Tab. 1 Qualification matrix

Phase of the machine's lifecycle	Competent or instructed person ⁽¹⁾	Specialist personnel with electrician training ⁽²⁾	Personnel with mechanical training ⁽³⁾	Disposal contractor
Packing	X	—	—	—
Storage	X	—	—	—
Transport	X	—	—	—
(1) A Fette training course is recommended (2) Must have completed a mechatronic / electronic training course or have a comparable qualification (3) Must have completed an industrial mechanic / mechatronic training course or have a comparable qualification				

Phase of the machine's lifecycle	Competent or instructed person ⁽¹⁾	Specialist personnel with electrician training ⁽²⁾	Personnel with mechanical training ⁽³⁾	Disposal contractor
Installation and commissioning (assembly/mechanical installation)	—	—	X	—
Installation and commissioning (assembly/ electrical installation)	—	X	—	—
Operation (production)	X	—	—	—
Shut-down (emergency stop, short-term)	X	—	—	—
Shut-down (long-term)	—	X	X	—
Modification	X	—	—	—
Set-up	X	—	—	—
Cleaning	X	—	—	—
Maintenance (mechanical)	—	—	X	—
Maintenance (electrical)	—	X	—	—
Fault-finding/ elimination on the mechanical system	—	—	X	—
Fault-finding/ elimination on the electrical system	—	X	—	—
Decommissioning	—	X	—	—
Disposal	—	—	—	X
<p>(1) A Fette training course is recommended (2) Must have completed a mechatronic / electronic training course or have a comparable qualification (3) Must have completed an industrial mechanic / mechatronic training course or have a comparable qualification</p>				



WARNING!

Danger from improper use.

Risk of injury from improper use. Depending on the phase of the machine's lifecycle and activity, the machine may represent a hazard if it is used incorrectly by unqualified personnel or if it is not used as intended.

The work may only be carried out by qualified personnel who have received training or instruction for the activity.

- The residual dangers occurring in the different phases of the machine's lifecycle are described in the safety, commissioning and operating instructions and in the maintenance manual.
 - ▶ The instructions must have been read in full and understood. We recommend that the operator have this confirmed in writing.
- Certain phases of the machine's lifecycle and activities require a specific qualification or appropriate technical knowledge and instruction.
 - ▶ Use personnel qualified for the activity as shown in the qualification matrix.
- For each phase of the machine's lifecycle and activity, the responsibilities must be clearly defined and followed to ensure that areas of authority associated with safety are never unclear.
 - ▶ Clearly define responsibilities.
- The operator is responsible for ensuring that unauthorized persons have no access whatsoever to the machine.

2.4. Residual danger / Sources of dangers

2.4.1. General safety instructions



WARNING!

Hazard from inadvertent / unexpected start-up of moving parts / drives (drive compartment including rotary-disk locking mechanism, middle column)!

During maintenance, repair, cleaning work or fault-finding on the machine, a faulty component in the machine e.g. faulty cable, bent compressed air hose, faulty valve, switched-on power source or stored energy (compressed air) may cause a dangerous unpredictable movement which could cause injury.

When working on the TSC, machine, switch cabinet or peripheral devices for maintenance, repair, cleaning or fault-finding:

- Switch off all power supplies that are not essential for the work.
- Switch off mains voltage.
- Switch off compressed air supply.



CAUTION!

Risk of injury at the edges of the machine when the window flaps are open(ed)!

Risk of impact at edges and corners when the window flap is open(ed).

- Open window flaps for intended use of the machine only.
- Wear / Use personal protective equipment.



WARNING!

Crushing hazard between window flap and machine!

Risk of injury caused by crushing of body parts.

- The clamping force of the closed window flap is lower than 100N.
- Check the speed of the window flaps regularly --> indication for faulty oil pressure springs.
- Faulty oil pressure springs must only be changed by specialist personnel with mechanical training.



NOTICE

No effect on medical implants due to magnetic radiation

The magnets used in the machine were examined for magnetic radiation. All components which contain magnets and have a high magnetic field strength are labelled accordingly.



CAUTION!

Health hazards caused by emission of a substance which may be hazardous!

The capsule filling machine is supplied by the customer with a wide variety of products. These products vary in their level of hazardousness. The operator(s) might be exposed to hazardous substances when operating the machine which are being processed by the owner of the machine.

- The owner of the machine must ensure that the operator is not exposed to a health hazard during any life phase of the machine due to substances to be processed.
- The operator must use and wear protective clothing that is appropriate to the respective hazard and take protective measures.



CAUTION!

Risk of injury caused by contact with sharp edges and corners, protruding parts!

The machine consists of many components. These include amongst others paneling plates, dosing units, capsule holder and capsule discharge. There is an increased risk of injury when these components have sharp edges.

- The Maintenance manual describes in detail how the components of the machine are professionally removed for maintenance, conversion or cleaning work.
- The removal of components from the machine for maintenance, conversion or cleaning work may only be carried out by personnel who are qualified and authorised for the respective activity.



CAUTION!

Risk of injury caused by contact with hazardous surfaces!

Machine components, amongst others paneling plates, dosing units, capsule holders and capsule discharge may have hazardous surfaces (e.g. sharp corners and edges, protruding parts). Contact with dangerous surfaces increases the risk of injury.

- Only competent or instructed personnel may remove components from the machine for conversion or cleaning work.
- Only specialist personnel with mechanical training may remove components from the machine for (mechanical) maintenance work.
- Only specialist personnel with electrical training may remove components from the machine for (electrical) maintenance work.



WARNING!

Danger of burns from actuators or materials at high temperature!

Touching the hot surfaces of electrical drives, cooling systems and electrical components may lead to burns or scalds.

- The machine panels that allow access to the drives must only be removed by specialist personnel with electrical or mechanical training.



CAUTION!

Risk of falling from a working height above 2 m! Hazard from falling working equipment.

Take measures to increase the stability of workplaces at height:

- Mobile elevated work platforms e.g. manlifts
- Body belts / Harnesses
- Lifting equipment e.g. mobile cranes or hoists for handling loads at work
- Wear non-slip safety boots.



CAUTION!

Discharge of pressurised media!

General risk of injury from compressed air which is intensified by nozzles, e.g. Capsule Flow Control (CFC) or cleaning nozzles.

- Switch off the compressed-air system prior to commencing works at the compressed air supply.
- The work must be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Trip hazard caused by supply lines!

Supply cables and TSC connection lying around on walking surfaces, etc. constitute a trip hazard.

- Wear non-slip safety boots.
- Cover and identify supply lines / position of cables.
- Clean up any obvious contamination (wet spots etc.).
- Ensure provision of structured installation layout.



CAUTION!

Contamination of floor around the machine!

Risk of injury from slipping.

- If work on the machine has resulted in a dirty floor, the operator must make sure that there are no dangerous slick spots that could cause people to slip.



CAUTION!

Slip hazard on liquid leaks!

During work on the machine, the floor around the machine can be contaminated by leaking liquid, such as cleaning agents and lubricants, making the floor dangerously slippery.

- Clean up any leaked coolant.
- Wear suitable gloves for cleaning.
- Wear suitable safety boots.

WARNING!

Risk of poisoning from ingesting the coolant (with anti-freeze additive)!

Harmful health hazard, if swallowed.

- Do not drink coolant!
- The safety instructions in the coolant manufacturer's datasheet **MUST** be followed when handling the used coolant.



CAUTION!

Risk of scalds by leaking coolant!

Coolant can become extremely hot during operation.

- Allow the cooling circuit to cool down before commencing working on the cooling system.



CAUTION!

Danger of burns caused by hot surfaces!

Touching hot surfaces (motors, heat exchangers, covers, switch cabinet, etc.) can lead to burns.

- Allow hot surfaces to cool down sufficiently before commencing any work.
- Use / Wear personal protective equipment.



CAUTION!

Trip / Slip hazard from liquid leaks!

Cleaning agent can contaminate the floor around the machine.

- Immediately clean up leaked cleaning agent in line with environmental regulations.
- Wear suitable gloves for cleaning.



CAUTION!

Trip / Slip hazard from liquid leaks!

Lubricant can contaminate the floor around the machine.

- Immediately clean up leaked lubricant in line with environmental regulations.
- Wear suitable gloves for cleaning.



WARNING!

Penetration of pressurised media!

Risk of injury from actuators controlled by compressed air, a direct jet of compressed air or by parts that are accelerated by compressed air.

- Work on the machine's pneumatic system must only be carried out by specialist personnel with mechanical training.



CAUTION!

Risk of falling when working on top of the machine!

Risk of injury caused by falling from the top of the machine. Working height above 2 m.

- Operators who carry out works on top of the machine and above machine height, must be secured by suitable protective lifting and safety equipment e.g. mobile elevated work platforms and harnesses which must be provided by the owner of the machine.
- Use appropriate lifting equipment, ladders and personal protective equipment (PPE) to prevent falling.



CAUTION!

Crushing hazard caused by adjustable components of the extraction unit!

Crushing hazard caused by reaching into the rotating adjustment area of the extraction unit.

- Do not reach into hazardous area(s)!
- Ensure that the machine is switched off during cleaning works and secure it against inadvertent switch-on.
- The work must be carried out by specialist personnel with electrical and / or mechanical training.

2.4.2. Safety during transportation



WARNING!

Hazard from falling parts!

Injuries may be caused by removable parts (during format changes, for example).

Risk of injury by the uncontrolled release of components.

- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip gloves
- To be carried out by an instructed or competent person.



IMPORTANT!

Damages caused by moving parts during transportation!

A safe operation of the machinery can no longer be guaranteed.

- Check the rotary-disk locking mechanism before each transport / packaging.



DANGER!

Danger of death by falling or toppling loads!

Transporting work can create dangerous situations that could lead to severe injury or even death.

- Never walk or stand beneath a raised load.
- Use handling equipment that offers sufficient safety and lifting capacity.
- Wear personal protective equipment that conforms to the currently applicable accident prevention regulations (e.g. safety boots, safety gloves, etc.).
- Only allow competent or instructed persons to transport the machine.
- Only allow competent or instructed persons to load / unload the machine during transport.
- Follow the handling instructions and symbols on the shipping crate.



WARNING!

Inadequately secured load!

Hazard from transported material toppling over, shifting or falling off due to unsecured load. The machine in its shipping crate and detached parts in separate shipping crates may come loose from the loading surface during transportation (road, rail, air, sea).

- The load must be secured by a competent or instructed person.
- Follow the handling instructions and symbols on the shipping crate.

2.4.3. Safety during packing



DANGER!

Danger of death by falling or toppling loads

Transporting work can create dangerous situations that could lead to severe injury or even death.

- Never walk or stand beneath a raised load.
- Use handling equipment that offers sufficient safety and lifting capacity.
- Wear personal protective equipment that conforms to the currently applicable accident prevention regulations (e.g. safety boots, safety gloves, etc.).
- Only allow competent or instructed persons to transport the machine.
- Follow the handling instructions and symbols on the shipping crate.

2.4.4. Safety during installation and commissioning



DANGER!

Danger of death by short-circuit!

Danger of death by electrical current in the event of a short-circuit between live and non-live parts or a short-circuit due to faulty electrical components, condensation of air humidity. Danger of electric shocks!

- Work on the electrical installation must be carried out only by specialist personnel with electrical training.
- Use / Wear suitable personal protective equipment.
- Use suitable tools and measuring devices.



CAUTION!

Possible crushing hazard caused by falling parts!

The machine vibrations passed into the floor may constitute a hazard.

- The owner of the machine must provide a suitable installation area for the machine.



IMPORTANT!

Uncontrolled movements of the whole machine could damage parts of the system.



CAUTION!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Live parts!

Possible hazard from direct contact with live parts, specifically electrical conductors or parts that are intended to carry voltage.

- After transporting, check that the protective earth (PE) connections and plug-in connections in the operating terminal and capsule filling machine are seated correctly.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the ejection pins of the capsule ejector!

Crushing is possible between the table top and holder ejection pins.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the suction cup holder!

Crushing is possible between the table top and suction cup holder.
Crushing is possible between the suction cup holder and capsule holder.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the closing station!

Crushing is possible between the bottom closing pin shaft and the table top.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.
- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by tamping pin module!

Crushing is possible between table top / mounting plate and tamping pin holder / lifting column.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the pellet station!

Crushing is possible between slide / temporary container / housing and transfer plate / capsule holder.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.

2.4.5. Electrical voltage



DANGER!

Electrical voltage! Danger of potentially fatal electric shock!

Work on the switch cabinet must be carried out only by authorized trained electricians.

The components inside the switch cabinets carry current during operation.

Switch off all power to the equipment. Before working on electrical systems, switch off at the main switch and secure to prevent it being switched on again.

Even after the machine is switched off at the main switch:

- Orange-colored cables are permanently under voltage!
-
- Mains filters and frequency converters continue to carry dangerous voltages for at least 5 minutes.

Components marked with an electric danger symbol remain live for a short time even after switching off at the main switch.

- After relevant electrical assembly or repair work, any protective measures used should be tested (e.g. grounding resistor).



IMPORTANT!

Plug-in connections

If electrical connections between the machine, switch cabinet or peripherals have to be disconnected, the plugs must be removed. The main switch must be switched off before the plugs are removed.

2.4.6. Safety during operation

- Any mode of operation compromising safety is forbidden.
- The operator is obliged to report all changes compromising safety immediately.
- The operator is obliged to operate the capsule filling machine only in properly functioning and sound condition.
- Arbitrary retrofitting and changes compromising safety are not permitted.
- Window flaps and other flaps must not be opened until the machine has stopped.
- Local safety regulations and accident prevention rules are valid for operating the capsule filling machine.

- The switching-off procedures have to be observed at all works regarding transport, assembly, disassembly and reassembly, commissioning, operation, adjustment, maintenance, shutdown and disposal.
- At increased noise level, suitable precautions have to be adopted (e.g. use ear protection).



CAUTION!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

- The maintenance flaps must be closed during operation.



CAUTION!

Possible crushing hazard caused by falling parts!

The machine vibrations passed into the floor may constitute a hazard.

- The owner of the machine must provide a suitable installation area for the machine.



IMPORTANT!

Uncontrolled movements of the whole machine could damage parts of the system.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Do not reach into the opening of the capsule discharge.



CAUTION!

Crushing hazard caused by the cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

- This should only be done by specialist personnel with electrical training.



CAUTION!

Crushing hazard caused by metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.

2.4.7. Safety during setup



CAUTION!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

- The maintenance flaps must be closed during operation.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Do not reach into the opening of the capsule discharge.



CAUTION!

Crushing hazard caused by the cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.

2.4.8. Safety during conversion



WARNING!

Crushing hazard caused by movable parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

The STO (Safe Torque Off) safety function for all six drives is deactivated by manually enabling the drive train in the middle column. There is a risk that a drive will move unexpectedly due to a controller fault.

The sorting fork drive moves the sorting forks on rows 1 and 2 at the same time.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of format-specific parts reduces the danger points and thus the risk of injury (crushing).
- Format changes must only be carried out by instructed or competent personnel.
- Always wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge housing.

- Only specialist personnel with electrical and / or mechanical training may remove the cover and operate the machine (for maintenance, fault-finding, etc.).



WARNING!

Crushing hazard caused by ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Remove as little as possible (such as extraction unit ejection flap) so that it is difficult to reach into the danger area.



WARNING!

Crushing hazard caused by ejection pins of the capsule ejector!

Crushing is possible between the table top and holder ejection pins.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders and closing pins reduces the danger points and thus the risk of injury (crushing).



WARNING!

Crushing hazard caused by suction cup holder!

Crushing is possible between the table top and suction cup holder.
Crushing is possible between the suction cup holder and capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders reduces the danger points and thus the risk of injury (crushing).



WARNING!

Crushing hazard caused by closing station!

Crushing is possible between closing pins, table top and format-specific parts.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.



WARNING!

Crushing hazard caused by the rotary disks with segments in the process space!

Crushing is possible between the capsule holder and fixed components (suction cup holder, closing station, etc.).

- Format changes must only be carried out by instructed or competent personnel.
- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves



WARNING!

Crushing hazard caused by the removal beam of the tamping station!

Risk of crushing possible by falling parts (tamping station, removal beam,...) or improper handling.

- High jerky torque possible on the cordless screwdriver towards the end of the travel. Move to the end position at low speed.
- Only allow competent or instructed persons to carry out this work.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.



WARNING!

Crushing hazard caused by the tamping station!

Risk of injury (crushing) during assembly and disassembly of heavy components.

- Format changes must only be carried out by instructed or competent personnel.
- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- When setting down the tamping station using the guide carriage, do not reach between the tamping module and the table top.
- Do not reach into the zero-point clamping system.



DANGER!

Danger of death from electrical voltage when removing / changing the pellet station!

The electrical DC link must be disconnected when removing / changing the pellet station (plug-in connector in the head part). Danger from direct contact with live parts.

- Always switch off all power before carrying out any work.
 - Switch off at the main switch
 - Wait until the DC link has discharged! (5 min.)
- To be carried out by an instructed or competent person.



WARNING!

Crushing hazard caused by the pellet station!

Crushing is possible between filling slide / temporary container / housing and transfer plate / capsule holder.

Risk of injury from falling parts when installing the pellet station. Total weight of the pellet station is approx. 25 kg (excluding filling cone, storage container, etc.).

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Format changes must only be carried out by instructed or competent personnel.
- Always wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves

2.4.9. Safety during maintenance and cleaning work

- All work must be done at the standstill of the machine.
- Before commencing any work on the machine or its components, secure the drives and auxiliary equipment to prevent them from inadvertent switch-on.
- After servicing and repair works, check that all safety guards are properly attached and fully functioning before commencing any work on the machine or its components.

- If work on the machine has resulted in a dirty floor, the owner of the machine must make sure that there are no dangerous slick spots that could cause people to slip.
- For cleaning work, always follow the manufacturer's instructions on the cleaning agent packaging.
- Inching mode must only be used by trained and authorised specialist personnel.
- Suitable aids should be used. The steps must be carried out in the order described.



WARNING!

Hazard from inadvertent / unexpected start-up of moving parts / drives (drive compartment including rotary-disk locking mechanism, middle column)!

During maintenance, repair, cleaning work or fault-finding on the machine, a faulty component in the machine e.g. faulty cable, bent compressed air hose, faulty valve, switched-on power source or stored energy (compressed air) may cause a dangerous unpredictable movement could cause injury. When working on the TSC, machine, switch cabinet or peripheral devices for maintenance, repair, cleaning or fault-finding:

- Switch off all power supplies that are not essential for the work.
- Switch off mains voltage.
- Switch off compressed air supply.



WARNING!

Risk of injury from improperly executed maintenance / cleaning work!

Improperly executed maintenance / cleaning work could result in severe injury and considerable damage to property.

- If components are removed, make sure they are refitted correctly. Refit all fixing elements and tighten bolts using the specified tightening torques.
- Maintenance / Cleaning work must only be carried out by specialist personnel with corresponding qualifications.



WARNING!

Crushing hazard caused by falling objects

Always be aware of the weight of mechanical components to be removed or installed.

- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- Only allow competent or instructed personnel to carry out cleaning work.
- Only allow specialist personnel with mechanical training to carry out (mechanical) maintenance work.
- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



WARNING!

Risk of poisoning by breathing in or ingesting cleaning agents and solvents!

Risk of injury from contact with cleaning agents.

- Use cleaning agents for the intended purpose only.
- Apply any protective measures required by the manufacturer.



WARNING!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

Risk of crushing from preloaded spring assembly when removing / raising the dosing disk drive (tamping station).

- The work must be carried out by specialist personnel with electrical and / or mechanical training.
- Deactivate the pneumatic system prior to open the maintenance flaps (set pneumatic system main switch to off!).



WARNING!

Crushing hazard caused by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

The STO (Safe Torque Off) safety function for all six drives is deactivated by manually enabling the drive train in the middle column. There is a risk that a drive will move unexpectedly due to a controller fault.

The sorting fork drive moves the sorting forks on rows 1 and 2 at the same time.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of format-specific parts reduces the danger points and thus the risk of injury (crushing).



CAUTION!

Ejection of objects!

Risk of injury from blowing out jammed capsules when the Capsule Flow Control (CFC) is in the dismantled state (test function).

- The CFC container must be installed.
- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Only specialist personnel with electrical and / or mechanical training may remove the cover and operate the machine (for maintenance, fault-finding, etc.).



WARNING!

Crushing hazard caused by the ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Remove as little as possible (such as extraction unit ejection flap) so that it is difficult to reach into the danger area.
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the ejection pins of the capsule ejector!

Crushing is possible between the table top and the ejection pin holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Removing capsule holders and closing pins reduces the risk of crushing.



CAUTION!

Crushing hazard caused by the cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

Crushing is possible when installing and removing the cover of the switch-cabinet cooling unit (weight and handling).

Crushing, overstretching, etc. are possible when installing and removing the heat exchanger water cooling system (approx. 30 kg).

- Before carrying out any maintenance / cleaning, switch off main switch and secure the switch to prevent it from inadvertent switch-on.
- Always use / wear personal protective equipment while carrying out the work:
 - Safety boots

- Non-slip safety gloves
- This should only be done by specialist personnel with electrical training.



WARNING!

Crushing hazard caused by the suction cup holder!

Crushing is possible between the table top and suction cup holder.
Crushing is possible between the suction cup holder and capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders reduces the danger points and thus the risk of injury (crushing).
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the closing station!

Crushing is possible between closing pins, table top and format-specific parts.

Window flaps may be open.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- This should only be done by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.



WARNING!

Crushing hazard caused by the pellet station!

Crushing is possible between filling slide / temporary container / housing and transfer plate / capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.

2.4.10. Safety during fault-finding / elimination



WARNING!

Hazard from accidental / unexpected start-up of moving parts / drives (drive compartment including rotary disk locking mechanism, middle column).

During troubleshooting and repairs on the machine, a switched-on power source or stored energy (compressed air) may cause a dangerous unpredictable movement of a faulty component in the machine, e.g. a faulty cable, bent compressed air hose or faulty valve. Such unpredictable movements could cause injury.

When working on the TSC, switch cabinet or peripheral devices for maintenance, repair, cleaning or fault-finding:

- Switch off all power supplies that are not essential for the work.
- Switch off the mains voltage.
- Switch off the compressed air supply.



WARNING!

Risk of crushing by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder. There is an additional risk of crushing possible inside the middle column (joints, drivers, etc.).

The STO (Safe Torque Off) safety function for all six drives is deactivated by manually enabling the drive train in the middle column. There is a risk that a drive will move unexpectedly due to a controller fault.

The sorting fork drive moves the sorting forks on rows 1 and 2 at the same time.

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.

- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of format-specific parts reduces the danger points and thus the risk of injury (crushing).



CAUTION!

Risk of crushing from movable parts of the dust extraction system!

Crushing is possible by stepping motor for adjusting the extraction unit.

- Do not reach into the opening for the extraction unit.
- This should only be done by specialist personnel with electrical and / or mechanical training.



CAUTION!

Risk of crushing by deflectors in the capsule discharge!

Crushing is possible between deflectors and the discharge housing.

- Only specialist personnel with electrical and/or mechanical training may remove the cover and operate the machine (for maintenance, fault-finding, etc.).



WARNING!

Risk of crushing by ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Remove as little as possible (such as extraction unit ejection flap) so that it is difficult to reach into the danger area.



WARNING!

Risk of crushing by ejection pins of the capsule ejector!

Crushing is possible between the table surface and holder ejection pins.

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders and closing pins reduces the danger points and thus the risk of injury (crushing).



CAUTION!

Risk of crushing by cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

Crushing is possible when installing and removing the cover of the switch cabinet cooling unit (weight and handling).

Crushing, overstretching, etc. are possible when installing and removing the heat exchanger water cooling system (approx. 30 kg).

- Must only be carried out by specialist personnel with electrical training.
- Always wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves



WARNING!

Risk of crushing by suction pad holder!

Crushing is possible between the table surface and suction pad holder.

Crushing is possible between the suction pad holder and capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders reduces the danger points and thus the risk of injury (crushing).

- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Risk of crushing by closing station!

Crushing is possible between closing pins, table surface and format-specific parts.

Drives may be moved.

Fault finding is possible even with several window flaps open (STO of all drives active).

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- This should only be done by specialist personnel with electrical and / or mechanical training.



CAUTION!

Risk of crushing from metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.



WARNING!

Risk of crushing by pellet station!

Crushing is possible between filling slide / temporary container / housing and transfer plate / capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.

2.4.11. Safety during shut-down, storage and decommissioning



CAUTION!

Risk of poisoning by breathing in or ingesting cleaning agents and solvents!

Risk of poisoning from contact with cleaning agents

- Use cleaning agents for the intended purpose.
- Apply any protective measures required by the manufacturer.



IMPORTANT!

Damage by effects of the weather!

The machine and terminal may be stored for up to 2 years if protected by corrosion protection packaging.

Storage conditions:

- Machine packed in corrosion protection packaging → “Packing” section
- Temperature: 0°C to +40°C
- Store in dry, dust-free place
- Protect against moisture
- Protect against direct sunlight



WARNING!

Hazard from instability of the machine!

Risk of injury from uncontrolled movement of the machine.

- Make sure that the machine is stable.



WARNING!

Risk of crushing by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



CAUTION!

Danger from stored energy!

Under certain circumstances, the gas springs of the window flaps may be pressurized. Risk of injury from gas springs as they are released.

- Must only be carried out by specialist personnel with mechanical training.



WARNING!

Line-to-line fault!

Possible risk of injury.

- Switch off at the main switch before disconnecting any plug-in connection (capsule filling machine, peripheral devices).



WARNING!

Risk of crushing by ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



WARNING!

Risk of crushing by ejection pins of the capsule ejector!

Crushing is possible between the table surface and holder ejection pins.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



WARNING!

Risk of crushing by suction pad holder!

Crushing is possible between the table surface and suction pad holder.
Crushing is possible between the suction pad holder and capsule holder.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



WARNING!

Risk of crushing by closing station!

Crushing is possible between closing pins, table surface and format-specific parts.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



CAUTION!

Emission of a potentially harmful substance!

Possible damage to health. Possible contamination of the environment.

Permanent decommissioning / disposal of the machine requires

- Complete disconnection of all connections
- Safe and environmentally sound disposal of operating materials, consumables and replaced parts (batteries, greases, oils, etc.)
- complete cleaning of all assemblies and components that carry lubricant.

2.4.12. Pharmaceutical dust

In individual phases of the machine's lifecycle, e.g. during cleaning, maintenance or fault elimination, the user can come into contact with powder residues or dusts from the material to be filled. Depending on the material to be filled, this can create a risk of damage to health due to medically active substances in the pharmaceutical dust.

The operator must ensure that users are not exposed to any health hazard associated with the substances to be filled in any phase of the machine's lifecycle. Users must wear protective clothing and take protective measures appropriate to the hazard.



WARNING!

Risk of damage to health due to medically active substances in the pharmaceutical dust.

The operator must ensure that users are not exposed to any health hazard associated with the substances to be filled in any phase of the machine's lifecycle. Users must wear protective clothing and take protective measures appropriate to the hazard.

2.5. Intended use

Function

The capsule filling machine is used to fill hard gelatin and HPMC capsules. These may be pharmaceutical products or other products, such as foods, etc. At the heart of the capsule filling machine there is a synchronizing rotary disc driven by a central torque motor. There are holders for the top and bottom halves of the capsule on this rotary disc. The synchronizing movement of the rotary disc moves the holders to the appropriate process stations, where they are processed.

The capsules are first fed in, opened, filled by various dosing units, closed and finally ejected once more. The individual process stations have separate actuator drives for the different functions.

Intended use

Capsule filling machine of the type used in the chemical industry. Capsule filling machine for filling pre-products consisting of the top and bottom parts of the capsules.

Suitable for filling granules and powdered, non-explosive substances for the pharmaceutical and food industries.

Any other use, or use beyond this scope, is not intended use. The manufacturer accepts no liability for damage resulting from such use. The risk is borne solely by the owner.

Reasonably foreseeable misuse

- Use of powdered or granulated substances that could explode.
- Use for compressing liquid/paste-like substances.
- Use of the capsule filling machine in a room atmosphere that does not conform to the specifications in the operating instructions.
- Cleaning of the capsule filling machine with equipment not listed in the operating instructions, such as pressure washers.
- If a removal arm is integrated, it may only be used for fitting and removal of tamping pin stations.

Conversion of or changes to components require the written approval of the manufacturer.

Only use genuine spare parts and accessories authorized by the manufacturer. The use of other parts will void the liability for the resulting consequences.

These instructions may also list special parts that are not necessarily installed on your capsule filling machine and which have been identified as optional. This will not affect safety.

We reserve the right to make technical changes.

2.5.1. Limits of the capsule filling machine

Time limits

The time limit before scrapping is 10 years, provided that the maintenance intervals are observed.

Class of machine

The capsule filling machine falls under the following class(es):

- Food machinery
- Machinery for pharmaceutical products

Commissioning instructions FEC20

Translation of the original

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1. General

1.1. Introduction

The capsule filling machine and its accessories were constructed according to the best available technology in conformance with the recognized safety rules and standards. Incorrect operation can result in damage to the capsule filling machine and endanger people.

This information is intended to be read, understood and followed in every respect by those responsible for using the capsule filling machine and its accessories.

The capsule filling machine and its accessories can only be used safely and without error if the responsible persons have read and followed the entire content of these operating instructions. This applies in particular to the safety instructions.

These operating instructions relate exclusively to the capsule filling machine and its accessories described herein.

We reserve the right to make any technical changes to the illustrations and information in these operating instructions that might be needed to improve the capsule filling machine and its accessories.

Storing the operating instructions

The complete operating instructions must be stored carefully and always kept with the capsule filling machine as they are part of the product.

They should always be kept in the vicinity of the capsule filling machine so that they are available, when required, to everyone working with the machine.

Warranty and technical support

To guarantee fault-free operation, these operating instructions must be read carefully before commissioning. We accept no liability for damage and interruptions that might result from failure to follow these operating instructions.

Observe all safety instructions and hazard warnings in these operating instructions!

If you have any problems, please contact our customer service or spare parts department, or one of our agencies who will be happy to assist you.

1.2. Options

Options represent the standardised electrical, mechanical and software functions of the machine.

Each machine is configured according to machine specification (MAL), which also reflects the purchase agreement. The machine specification includes options that are distinguished in:

- Sales options (e.g. 01.222 or 04.100)
- Software options (e.g. A536 or 536)

A software option can have different characteristics, which are defined in each case by the additional specification of K factors.

Depending on the electrical and mechanical configuration of the machine, the software options are activated or deactivated.

A list of all activated (released) software options can be displayed at the operator terminal (HMI).

→ Therefore, also see section "Activated options" in the Operating instructions software.



NOTICE

The documentation consists of generic documents and does not correspond to the machine specification, but describes all important functions and components of the machine.

Accordingly, the machine may not contain all the functions and components described.

1.3. Operator's duty of care

The operator of the capsule filling machine and its accessories must ensure that

- the capsule filling machine and its accessories are used only for the intended use at all times.
- the capsule filling machine and its accessories are in perfect condition and full working order at all times.
- all safety notes and warnings attached to the capsule filling machine and its accessories are legible and are not removed.
- the capsule filling machine and its accessories are assembled and operated in accordance with these operating instructions only by qualified and authorized personnel.
- these personnel are regularly informed of all the necessary rules concerning safety at work and environmental protection.
- the necessary protective equipment for assembly, operating, maintenance and repair personnel is available in sufficient quantities, is in perfect condition and is worn.

- the operating instructions are always in a legible condition and are available in their entirety at the capsule filling machine's place of use.
- all the instructions in the commissioning instructions are carried out while transporting the machine.

1.4. Copyright

Fette Engineering GmbH retains the copyright to these instructions.

These instructions are intended for personnel who work on the capsule filling machine. They contain specifications and technical drawings which must not be copied or distributed, in whole or in part, or sold or passed on without authorization to other parties for the purposes of competition.

The data processing programs used and the associated program descriptions are also subject to copyright as appropriate.

Unless otherwise specified, when upgrading or replacing existing programs, the buyer undertakes to destroy the previous versions, any copies thereof and the replaced documentation.

They must not be passed on to third parties.

1.5. Contact

Address:

Fette Engineering GmbH
Grabauer Straße 24
D - 21493 Schwarzenbek

Worldwide service:

Contact:

Phone: +49 (0) 4151 12-0
Fax: +49 (0) 4151 833 371
Email: capsule@fette-compacting.com
Website: <http://www.fette-compacting.com>

Service Hotline:

Phone: +49 (0) 4151 12-483
Fax: +49 (0) 4151 12-573
Email: service@fette-compacting.com

Local contact:

Fette Compacting America, Inc.

Bill Garneau
Manager Service, Training & Doc.
+1 973 586 8722 ext.224
BGarneau@fetteamerica.com

Service Hotline:

Keith Lindemann
+19735868722 ext.219
klindemann@fetteamerica.com

2. Safety

2.1. Safety instructions



DANGER!

All the safety instructions from the operating instructions are to be followed. These include

- the summarized safety notes from the “safety instructions”,
- the section-specific safety notes and
- the embedded warning instructions.

3. Technical data

3.1. Key data for the machine

Tab. 2 Machine

Manufacturer:	Fette Engineering GmbH
Machine type:	FEC20
Machine rating plate:	In the bottom machine interior
Operator terminal rating plate:	On the bottom of the operator terminal
Cycles [min ⁻¹]:	Max. 140
Capsule ejection rate [piece/h]:	Max. 200.000* ¹
Number of stations:	9
Number of capsules per segment:	24
Capsule sizes:	000 to 5
Capsule types:	HGC and HPMC* ²
Dosing stations:	Tamping pin, pellet* ³
<p>*¹ The capsule ejection rate depends on the material to be filled *² Other types upon request *³ Max. 3 pellet types</p>	



NOTICE

The values may differ due to product characteristics and machine configuration.

Tab. 3 Connections

Mains connection ratings:	Operating voltage 400V – 480V, frequency 50/60 Hz ±5%
Customer power supply:	3-phase + PE
Power consumption [kW]:	6
Air connection [bar] / [l/min]:	6 / 1.000
Air consumption [m ³ /h]:	50
Extraction rate [m ³ /h]:	0 – 435,5
Extraction negative pressure [mbar]:	0 – 40
Extraction unit connection Ø [mm]:	70

Tab. 4 Dimensions

Projected floor area of capsule filling machine [mm]:	1.648 x 1.648
Projected floor area of capsule filling machine with handles [mm]:	1.784 x 1.784
Projected floor area of capsule filling machine with open windows [mm]:	3.545 x 3.545
Height of capsule filling machine [mm]:	2.156
Weight of capsule filling machine [kg]:	approx. 3.500
Weight of operator terminal [kg]:	77
Projected floor area of operator terminal [mm]:	550 x 500
Height of operator terminal [mm]:	1.651
Machine feet levelling range [mm]:	+5 / -4

Tab. 5 Ambient conditions

IP degree of protection: (machine and switch cabinet)	IP54
Relative humidity: (non-condensing)	35–65%
Switch cabinet temperature:	Operation: +15°C to +25°C Storage: -5°C to +40°C
User terminal temperature:	Operation: +15°C to +25°C Storage: -5°C to +40°C
Machine temperature:	Operation: +15°C to +25°C Storage: 0°C to +40°C
Compressed air quality: (as per DIN ISO 8573-1 / VDMA standard sheet 15390-1)	Quality classes: <ul style="list-style-type: none"> • Particle: class 1 • Moisture (vapour state): class 3 • Total oil content: class 1

3.2. Rating plate

There is a rating plate for:

1. Machine
2. Operator terminal

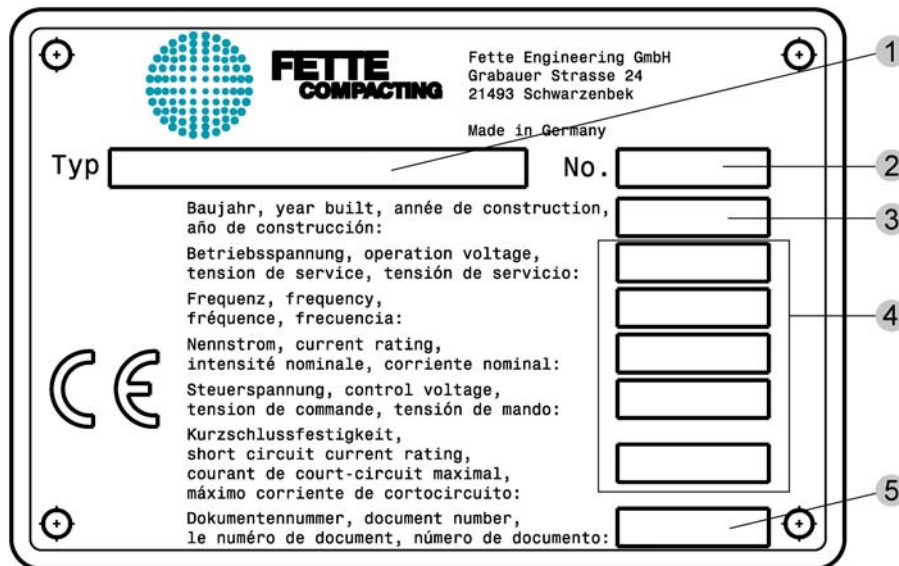


Fig. 1 Rating plate

1. Type
2. Machine number
3. Year of construction
4. Technical data
5. Order number

3.3. Floor plan

The external dimensions of the capsule filling machine and operator terminal can be found in the technical data and the floor plan.

The mobile operator terminal can be set up at any point.



NOTICE

All the drawings in this section are shown without scale.

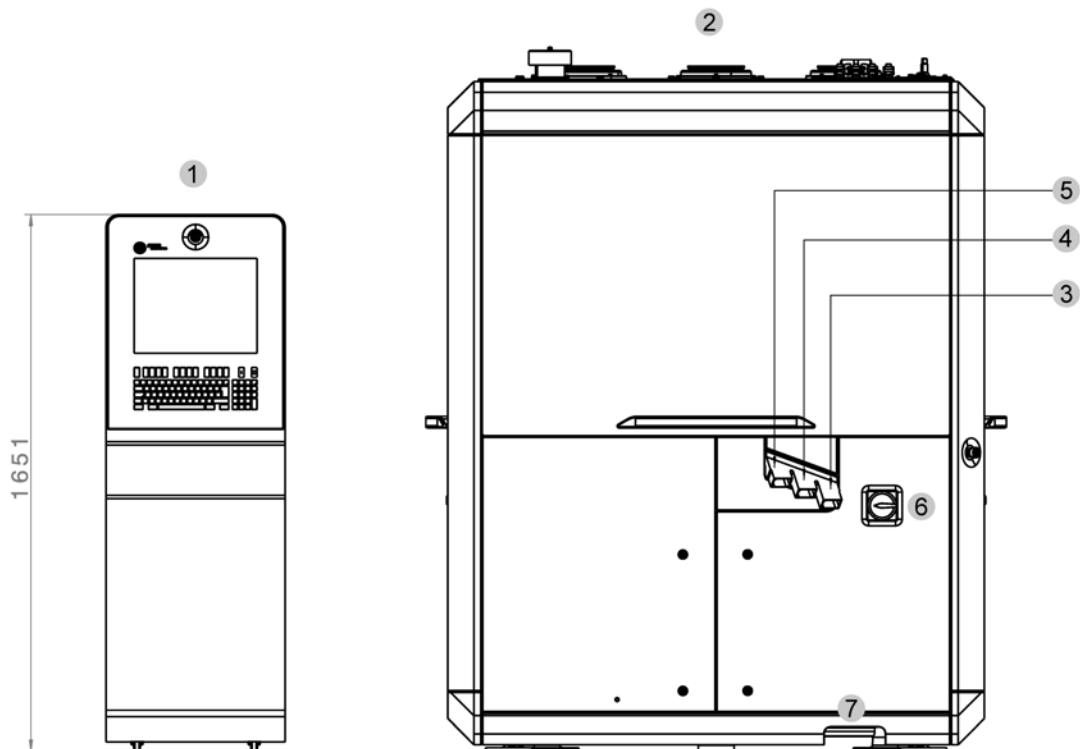


Fig. 2 Floor plan FEC20

1. Operator terminal
2. Capsule filling machine
3. Capsule discharge good channel
4. Capsule discharge sample channel
5. Capsule discharge bad channel
6. Main switch
7. Power cable (mains connection)

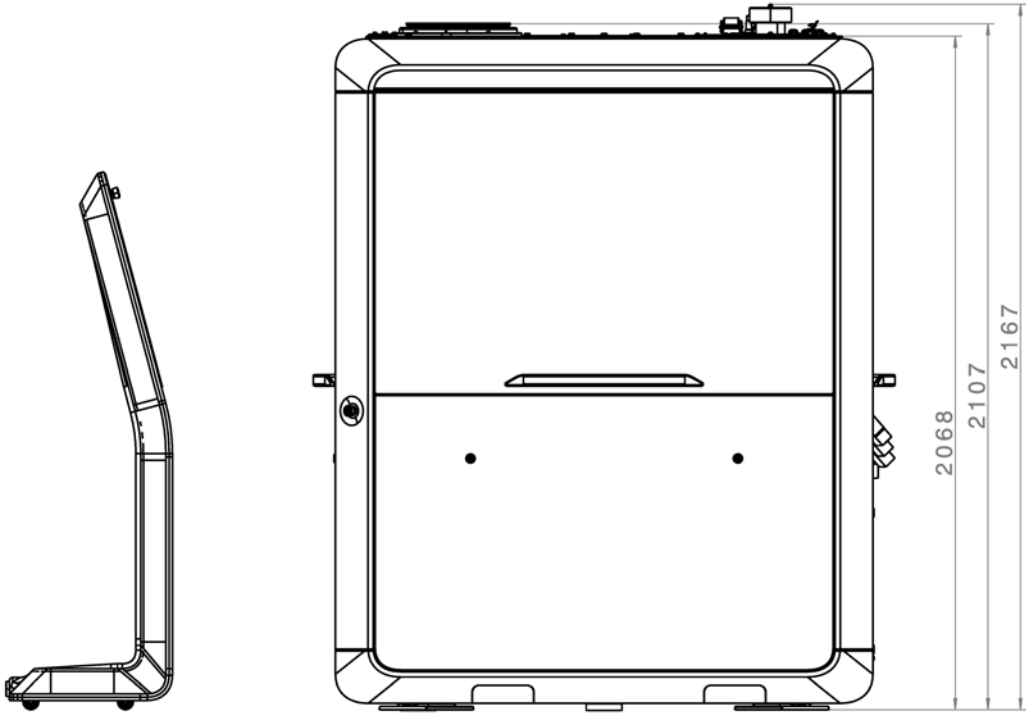


Fig. 3 Floor plan FEC20

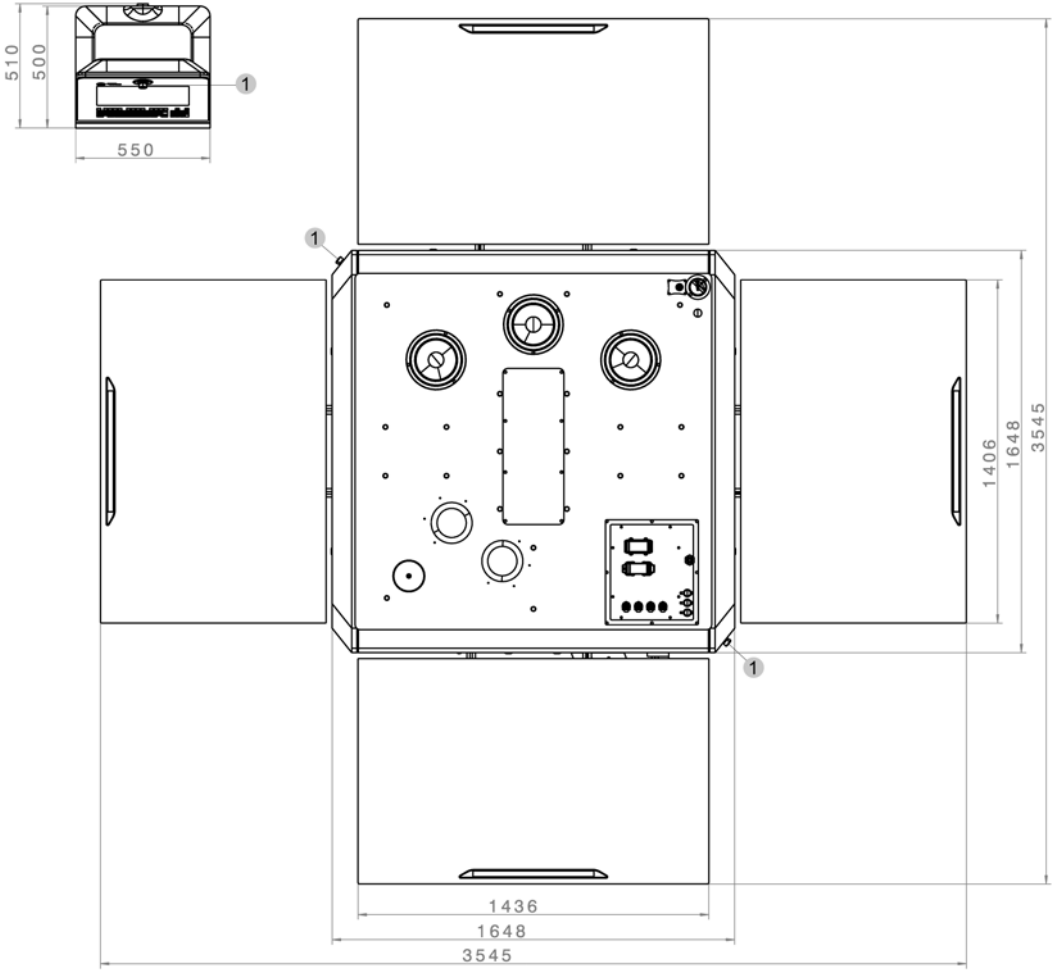


Fig. 4 Floor plan FEC20

- 1. Emergency stop switch

3.4. Load specifications for foundation

The capsule filling machine represents a load of approx. 45 kN on the foundation. The center of gravity lies roughly in the middle of the machine.

This results in a load of approx. 5,8 kN for each of the 6 machine feet.

The dimensions of the contact surfaces of the 4 outer machine feet are approx. 207 x 207 mm, while the contact surfaces of the 2 inner machine feet are approx. 110 x 110 mm.

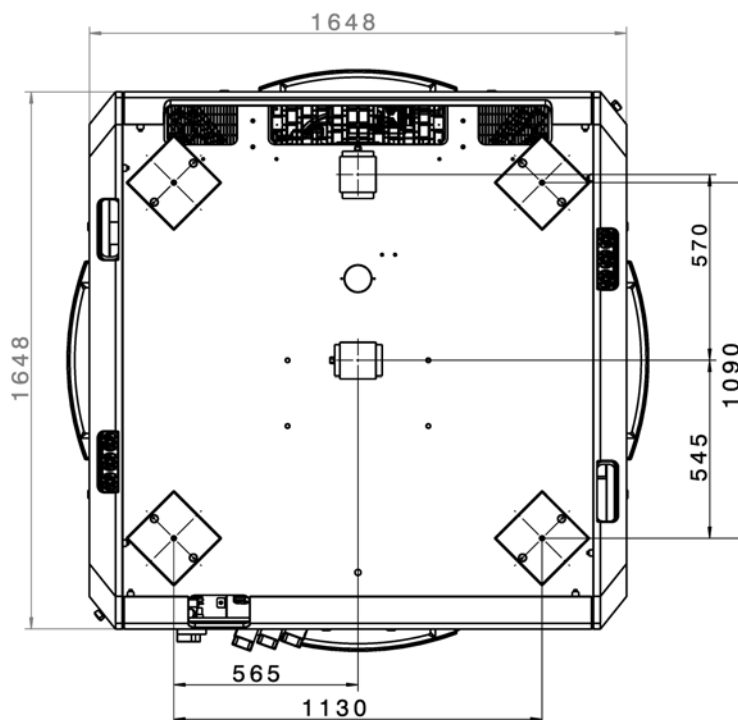


Fig. 5 Load specifications



NOTICE

The owner of the machine must provide a suitable installation area for the machine so that the machine vibrations passed into the ground do not represent any form of hazard.

3.5. Connections

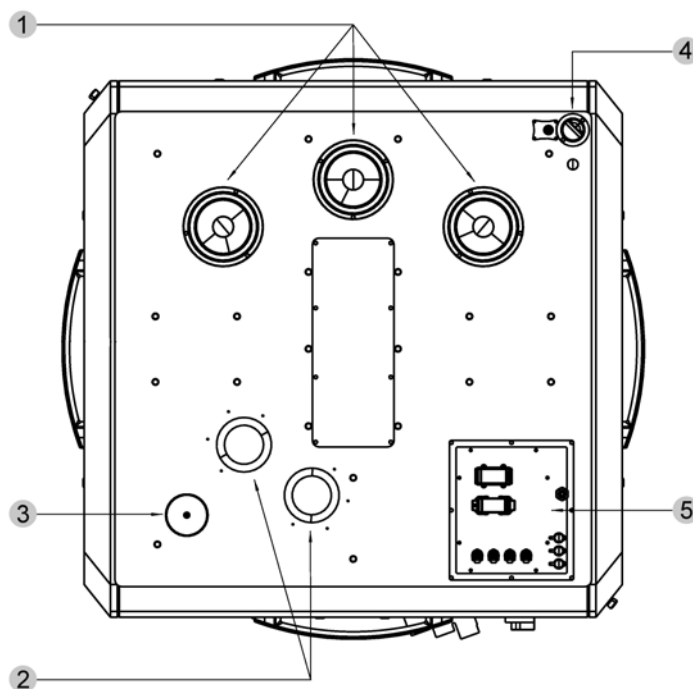


Fig. 6 Connections

1. Product feeder
2. Capsule feeder
3. Incoming air
4. Extraction unit
5. Option: power cable (mains connection) at top

Compressed air connection

The compressed air connection is located inside the maintenance unit on machine side 4 (see “Pneumatic” module).

Power supply

The connection panel for the power cable (mains connection) is located on the machine connection box at the bottom of the drive compartment on machine side 4.

Connections (option: machine mains connection at the top)

The top part of the machine contains a connection panel for the power cable (mains connection) and compressed air.

4. Transport

4.1. Safety during transportation



WARNING!

Hazard from falling parts!

Injuries may be caused by removable parts (during format changes, for example).

Risk of injury by the uncontrolled release of components.

- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip gloves
- To be carried out by an instructed or competent person.



IMPORTANT!

Damages caused by moving parts during transportation!

A safe operation of the machinery can no longer be guaranteed.

- Check the rotary-disk locking mechanism before each transport / packing.



DANGER!

Danger of death by falling or toppling loads!

Transporting work can create dangerous situations that could lead to severe injury or even death.

- Never walk or stand beneath a raised load.
- Use handling equipment that offers sufficient safety and lifting capacity.
- Wear personal protective equipment that conforms to the currently applicable accident prevention regulations (e.g. safety boots, safety gloves, etc.).
- Only allow competent or instructed persons to transport the machine.
- Only allow competent or instructed persons to load / unload the machine during transport.
- Follow the handling instructions and symbols on the shipping crate.



WARNING!

Inadequately secured load!

Hazard from transported material toppling over, shifting or falling off due to unsecured load. The machine in its shipping crate and detached parts in separate shipping crates may come loose from the loading surface during transportation (road, rail, air, sea).

- The load must be secured by a competent or instructed person.
- Follow the handling instructions and symbols on the shipping crate.

4.2. Transporting in a shipping crate

The capsule filling machine is packed in a shipping crate for transportation. The machine is bolted firmly to the bottom of the shipping crate with transport brackets.

The industrial truck used must be adequately dimensioned for the weight of the machine.

The forks of the industrial truck must be of sufficient length.




Qualifications for transporting	Industrial truck operator qualification
Personal protective equipment	Safety boots









Shipping crate capsule filling machine FEC20:

Dimensions of shipping crate: length x width x height	2.030 x 2.030 x 2.500 mm
Gross weight	approx. 4.100 kg
Net weight	approx. 3.500 kg

To avoid damage in transit, it is sensible to transport the crates to the intended installation location and open them there.

4.2.1. Notes on handling and symbols

	This side up
	Fragile - handle with care
	Protect against moisture and humidity

	Use forklift here
	Do not use forklift here
	Center of gravity here
	Package orientation
	Do not tilt
	Identification for packaging made of solid wood IPPC symbol; Country ID Region ID Registration number Treatment method
	Gross weight Net weight
	Impact indicator Tilt indicator
No picture	Machine type Machine number

4.3. Examination for damage in transit

Check the entire delivery immediately for any damage in transit.

- If damage is identified, document it in writing with a description of the damage (photograph or drawing).
- Visible damage should be immediately reported to the carrier in writing on the shipping documents or delivery note.

Impact indicators are attached to the shipping crate for checking for damage in transit. The impact indicators show whether the machine has suffered an impact in transit that could have damaged the machine. Check the impact indicators on delivery. The way in which the impact indicator indicates incorrect handling in transit is explained on the impact indicator.



NOTE

Complaints will not be accepted unless they are reported immediately.

4.4. In-house transport

The capsule filling machine is only suitable for transporting with an industrial truck. For in-house transport, the capsule filling machine must be shut down long-term and any protruding components must be detached.



IMPORTANT!

Damage to capsule filling machine

The industrial truck must be pushed beneath the capsule filling machine from all sides. Observe the two inner machine feet.

The lower clamps on machine sides 1 to 4 must be removed.

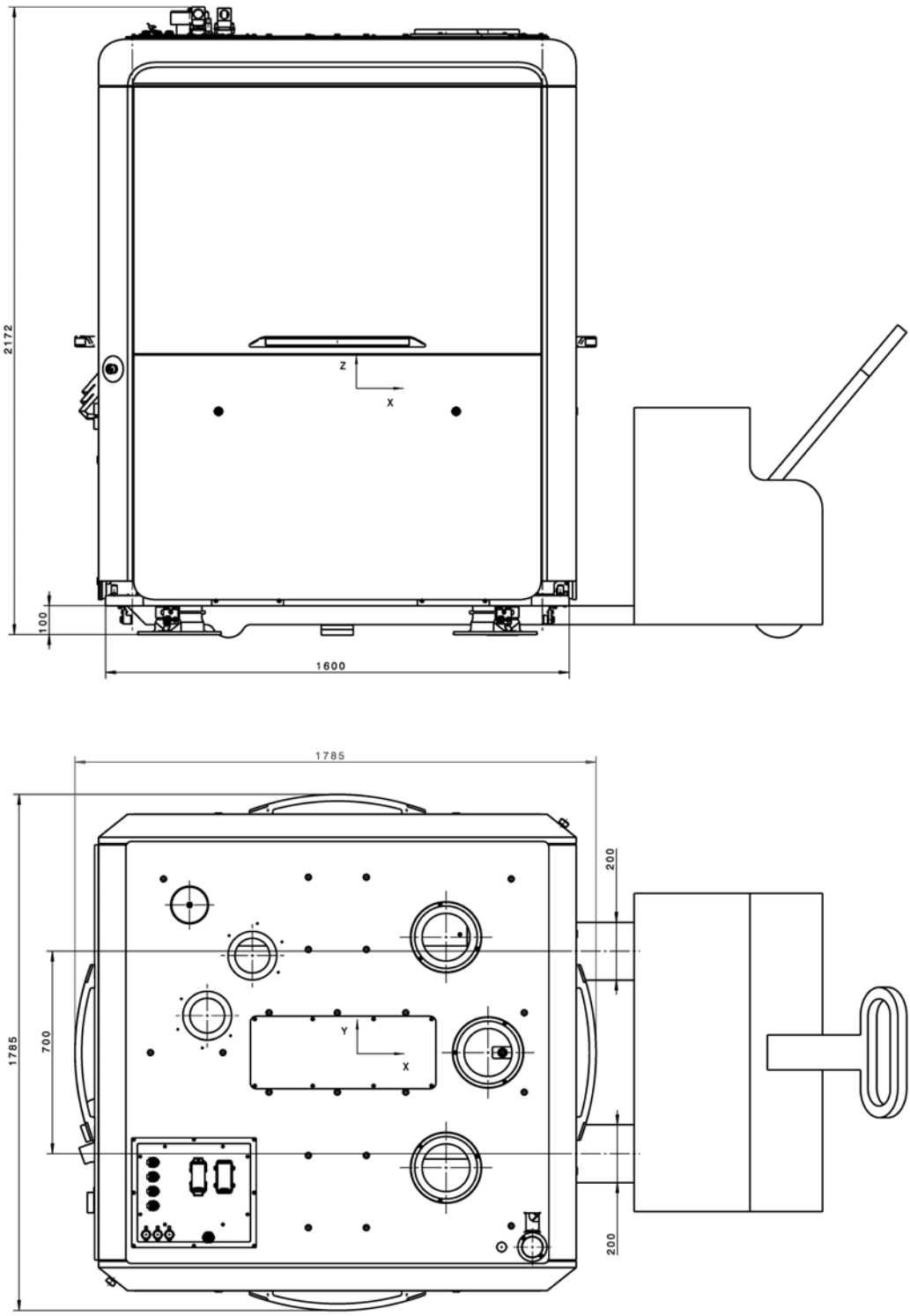
The industrial truck used must be adequately dimensioned for the weight of the machine.

Qualifications for shutting down	Persons with mechanical and electrical training
Qualifications for transporting	Industrial truck operator qualification
Personal protective equipment	Safety boots

Dimensions of capsule filling machine: length x width x height [mm]	1.785 x 1.785 x 2.172 mm
Weight [kg]	approx. 3.500

Requirements for the industrial truck:

Safe working load [kg]	at least 4.500
Minimum fork length (effective length) [mm]	1.600
Fork width [mm]	200 – 300
Maximum height with forks lowered (insertion height) [mm]	90
Fork spacing [mm]	700



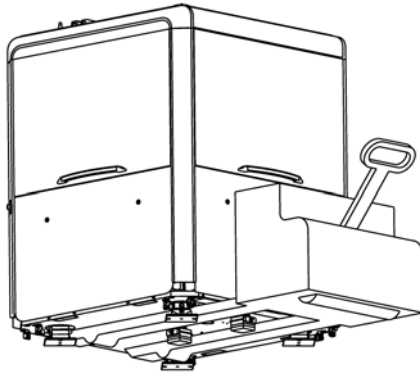


Fig. 7 Lift the machine

Prepare the machine for in-house transport.

Shut down

1. Shut down the machine, see the “Shut-down (long-term)” section.

Removal of components for transportation. The removed parts are transported separately in shipping crates.

1. Capsule feeder
 - 2 x capsule storage container
 - 1 x filling cone
 - 1 x downpipe to the compacting station (optional)
 - 2 x capsule magazine
2. Capsule discharge
 - Discharge covers
 - Gates
 - Discharge chute
3. Capsule ejector
 - Ejection flap, extraction
 - Ejection flap
 - Ejection guide (L-piece)
4. 1 x non-separated capsule ejection unit
5. 1 x cover for incoming air for process space
6. 4 x lower clamps (machine sides 1 to 4)

5. Installation and commissioning

5.1. Safety during installation and commissioning



DANGER!

Danger of death by short-circuit!

Danger of death by electrical current in the event of a short-circuit between live and non-live parts or a short-circuit due to faulty electrical components, condensation of air humidity. Danger of electric shocks!

- Work on the electrical installation must be carried out only by specialist personnel with electrical training.
- Use / Wear suitable personal protective equipment.
- Use suitable tools and measuring devices.



CAUTION!

Possible crushing hazard caused by falling parts!

The machine vibrations passed into the floor may constitute a hazard.

- The owner of the machine must provide a suitable installation area for the machine.



IMPORTANT!

Uncontrolled movements of the whole machine could damage parts of the system.



CAUTION!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Live parts!

Possible hazard from direct contact with live parts, specifically electrical conductors or parts that are intended to carry voltage.

- After transporting, check that the protective earth (PE) connections and plug-in connections in the operating terminal and capsule filling machine are seated correctly.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the ejection pins of the capsule ejector!

Crushing is possible between the table top and holder ejection pins.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the suction cup holder!

Crushing is possible between the table top and suction cup holder.
Crushing is possible between the suction cup holder and capsule holder.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the closing station!

Crushing is possible between the bottom closing pin shaft and the table top.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.
- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by tamping pin module!

Crushing is possible between table top / mounting plate and tamping pin holder / lifting column.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the pellet station!

Crushing is possible between slide / temporary container / housing and transfer plate / capsule holder.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.

5.2. Installing and aligning the machine

General installing guidelines

- Install the machine as shown in the installation layout drawing.
- Do not exceed the out-of-flatness limit for the machine set-up area; max. 5 mm over 2 m between measuring points.
- The machine feet should be loaded over as much of the surface area as possible, and at least over 75% of the contact surface.



IMPORTANT!

Risk of tipping and risk of breaking the machine feet!

One-sided or spot loading of the machine feet creates a risk of tipping and a risk of breaking the feet!

- Never set the machine down on the installation area with the feet already fitted.

- The contact surfaces and area around them must be free from oil and grease.
- It will not be possible to move the machine once it has been set down.

Pre-assembly

1. Position the machine feet.



NOTICE

Before aligning, set the machine feet to the minimum height.

- Position the machine feet on the installation area. → Fig. 8
- Mark measuring points MP0 to MP5 on the installation area. → Fig. 8

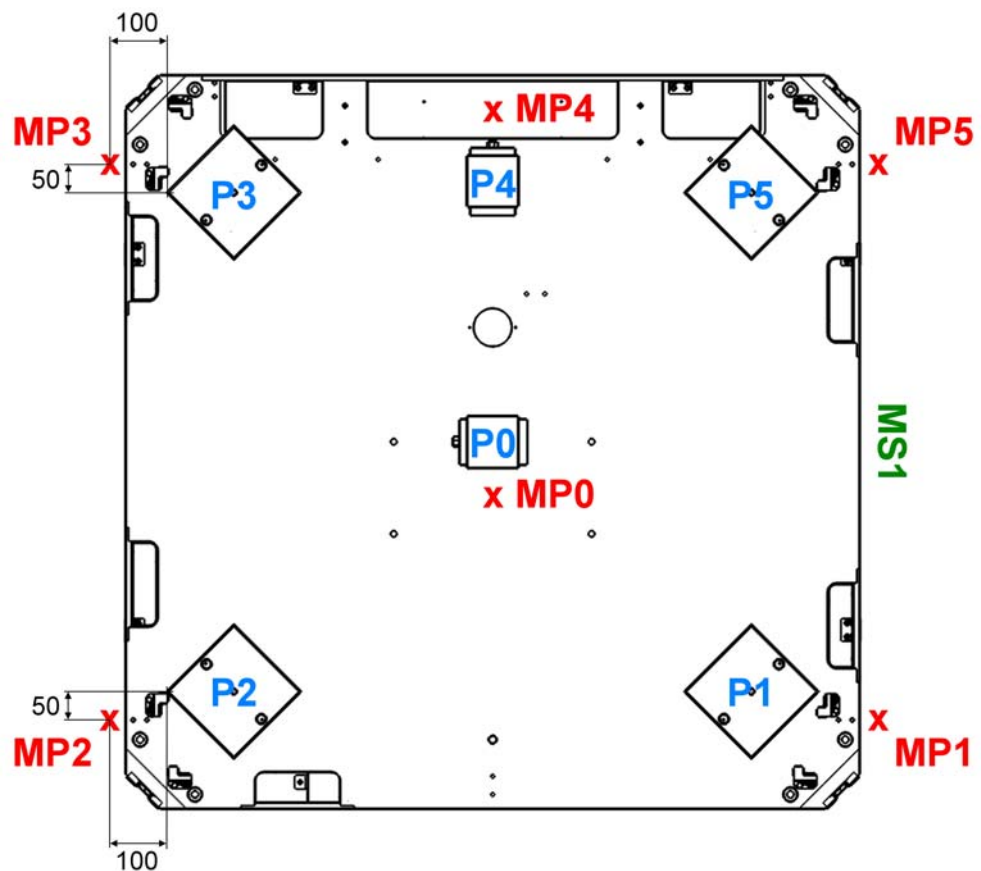


Fig. 8 Arrangement of the machine feet on the FEC20

Abbreviations:

- MS1: Machine side 1
- MP: Measuring point (MP0 – MP5), marked by x
- P: Position of the machine feet (P0 – P5)



IMPORTANT!

The difference in level between the contact surfaces at positions P1, P3, P4 and P6 should not exceed 0.3 mm over the length or width of the machine foot (205 mm x 205 mm).

2. Use spacers.

- Insert spacers at positions P0 and P4 to adjust the height on the machine feet.
- Select the spacer height according to the machine's serial number:

Serial number FEC20	Spacer height in mm
from #0050	17

3. Level the machine feet.

- Turn the machine foot adjusting spindles to adjust the machine foot heights.
- Use a straight edge or similar and a precision spirit level to check the levels of the machine feet. → **Fig. 9**

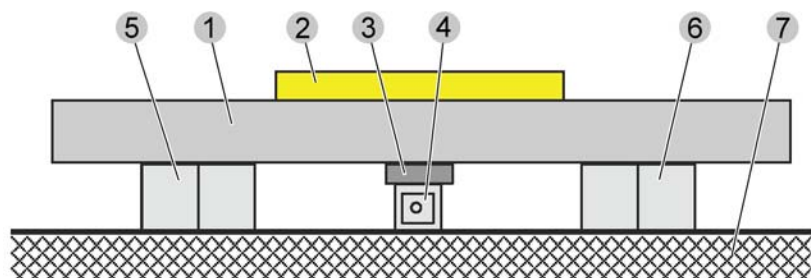


Fig. 9 Arrangement for leveling the machine feet

1. Straight edge (or similar)
2. Precision spirit level
3. Spacer
4. Machine foot at position P4 / P0
5. Machine foot at position P3 / P2
6. Machine foot at position P5 / P1
7. Installation area

4. Determine and record the adjusted heights of the leveled machine feet.

- Document determination of the adjusted heights of the leveled machine feet using the Machine alignment test report below.

Machine alignment test report (specimen):

Position		P0	P1	P2	P3	P4	P5
Measuring point		MP0	MP1	MP2	MP3	MP4	MP5
Measured height in mm ^{1) 2)}	a						
Height of the straight edge in mm ²⁾	b						
Machine foot height (c = a - b) in mm	c						
Floor plate thickness in mm	d						
Pocket depth of the floor plate mm ³⁾	e	0				0	
Adjusted height of the machine feet (f = c + d - e) in mm	f						
1) Perpendicular to measuring points MP0 to MP5 measured without a load 2) → Fig. 10 3) at the positions P1, P2, P3, P5							

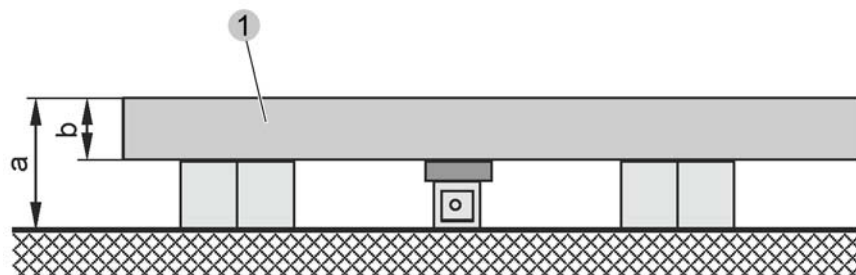


Fig. 10 Arrangement for determining the machine feet heights

1. Straight edge (or similar)
 - a Measured heights, perpendicular to measuring points MP0 to MP5
 - b Height of the straight edge
5. Remove spacers.
 - Remove spacers from the machine feet at positions P0 and P4.
 6. **Carefully** set. the machine down on all the machine feet at the same time, noting the positions of the fixing holes.
 7. Leave the machine feet for **24 to 48 hours** under to deform further (creep).

Final assembly

1. Adjust the machine feet.



IMPORTANT!

Loosen the fixing screws before leveling the machine feet. Do not exceed the maximum permitted deviation in the adjusted heights of ± 0.05 mm.

- Turn the adjusting spindles to adjust the machine feet to the calculated adjusted heights as recorded in the completed Machine alignment test report.
 - Record the adjustment of the adjusted height of the machine feet.
2. Firmly bolt the machine feet.
 - Tighten the fixing bolts for the machine feet using 34 Nm torque.
 3. Adjust the machine feet as required in response to any change in loading.

Measures to reduce noise and vibration



NOTICE

The owner of the machine must provide a suitable installation area so that the machine vibrations passed into the ground do not represent any form of hazard.

Measures to reduce noise and vibration are taken into account in the machine design, such as decoupling from the floor.

The machine feet damp vibrations and impacts.

5.3. Power supply and electrical connections



DANGER!

Electrical voltage! Danger of potentially fatal electric shock!

Work on the switch cabinet must be carried out only by authorized trained electricians.

The components inside the switch cabinets carry current during operation.

Switch off all power to the equipment. Before working on electrical systems, switch off at the main switch and secure to prevent it being switched on again.

Even after the machine is switched off at the main switch:

- Orange-colored cables are permanently under voltage!
- Mains filters and

- Frequency converters continue to carry dangerous voltages for at least 5 minutes.

Components marked with an electric danger symbol remain live for a short time even after switching off at the main switch.

A connection is to be created from the switch cabinet to the main power supply in order to power the capsule filling machine.

The power supply must be connected as shown in the wiring diagram and as described in the “Technical data” section. The position of the connection panel is described in the “Technical data” section.

230 V to 600 V supplies may optionally be connected if an upstream transformer is used.

Check that the mains voltage meets the specifications.

The protective earth conductor should also be connected to ensure immunity to interference.



NOTE

This is particularly important for devices and production equipment in the immediate vicinity of the machine if they are capable of generating inadmissible noise emissions.

The applicable standards and directives should also be observed with respect to the operating power network and protective earth connection, such as:

- DIN EN 60204 part 1 / IEC 204-1

Connecting the system

All connections between the capsule filling machine, user terminal and peripheral devices must be created using the appropriately identified connecting cables.

Plug connectors are to be connected according to their reference designators. The wiring diagrams supplied should be followed.



IMPORTANT!

Line-to-line fault

Switch off at the main switch before disconnecting any plug-in connection (capsule filling machine, peripheral devices).



IMPORTANT!

After transporting or commissioning, check that the protective earth (PE) connections and plug-in connections in the user terminal and capsule filling machine are seated correctly.

5.4. Compressed air connection



WARNING!

Risk of injury from compressed air

Risk of injury from actuators controlled by compressed air, a direct jet of compressed air or by parts that are accelerated by compressed air.

- All lines that carry compressed air must be depressurized before they are opened.
- Work on the machine's pneumatic system must only be carried out by personnel with mechanical training.

The position and implementation of the compressed air connection are described in the "Technical data" section.

Inside the machine there is a compressed air connection with quick-release coupling, so a compressed air shut-off valve must be provided outside the machine.

There is also a compressed air main switch inside the machine. This can be secured to prevent it being switched on again.



NOTE

A drop in air pressure during operation can result in malfunctions.

5.5. Connecting the peripheral devices

The peripheral devices should be arranged and connected as shown in the circuit diagram.

5.6. Commissioning the machine

1. Reference drives.
2. Check vacuum switches.
3. Fit format-specific set and check height and alignment.
4. Check coolant level.
5. Reference fill level sensors.
6. Rating plate (50 / 60 Hz)

7. Test mains voltage.
8. Test compressed air.
9. Test pressure regulator.
10. Test nominal pressure.
11. Test the extraction unit.
12. Connect and set up printer (option).
13. Set up service portal (option).
14. Introduce product onto the machine.
15. Connect peripheral devices (option).

6. Shutting down, storage and withdrawing from service

6.1. Safety during shut-down, storage and decommissioning



CAUTION!

Risk of poisoning by breathing in or ingesting cleaning agents and solvents!

Risk of poisoning from contact with cleaning agents

- Use cleaning agents for the intended purpose.
- Apply any protective measures required by the manufacturer.



IMPORTANT!

Damage by effects of the weather!

The machine and terminal may be stored for up to 2 years if protected by corrosion protection packaging.

Storage conditions:

- Machine packed in corrosion protection packaging → “Packing” section
- Temperature: 0°C to +40°C
- Store in dry, dust-free place
- Protect against moisture
- Protect against direct sunlight



WARNING!

Hazard from instability of the machine!

Risk of injury from uncontrolled movement of the machine.

- Make sure that the machine is stable.



WARNING!

Risk of crushing by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



CAUTION!

Danger from stored energy!

Under certain circumstances, the gas springs of the window flaps may be pressurized. Risk of injury from gas springs as they are released.

- Must only be carried out by specialist personnel with mechanical training.



WARNING!

Line-to-line fault!

Possible risk of injury.

- Switch off at the main switch before disconnecting any plug-in connection (capsule filling machine, peripheral devices).



WARNING!

Risk of crushing by ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



WARNING!

Risk of crushing by ejection pins of the capsule ejector!

Crushing is possible between the table surface and holder ejection pins.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



WARNING!

Risk of crushing by suction pad holder!

Crushing is possible between the table surface and suction pad holder.
Crushing is possible between the suction pad holder and capsule holder.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



WARNING!

Risk of crushing by closing station!

Crushing is possible between closing pins, table surface and format-specific parts.

- Deactivate motor protective circuit-breakers for the compact infeed (KE) and wait 5 minutes until the DC link has discharged fully.
- Must only be carried out by specialist personnel with electrical training.



CAUTION!

Emission of a potentially harmful substance!

Possible damage to health. Possible contamination of the environment.

Permanent decommissioning / disposal of the machine requires

- Complete disconnection of all connections
- Safe and environmentally sound disposal of operating materials, consumables and replaced parts (batteries, greases, oils, etc.)
- complete cleaning of all assemblies and components that carry lubricant.

6.2. Shut-down (long-term)

With a long-term shut-down, the machine is brought out of service for an indeterminate period.

This applies to both transportation and storage of the machine.

Qualifications for shutting down	Persons with mechanical and electrical training
----------------------------------	---



NOTE

The complete actual status of the machine should be documented. Before shut-down, the machine should also be calibrated and maintained.

1. Move drives to starting position.
 - Check whether the compacting station is clamped.
 - Switch to computer run, all drives move to the starting position.
 - Check that the rotary disk locking mechanism has immobilized the rotary disk.
2. Run a data backup.
3. Switch off at the main switch.
4. Disconnect peripheral devices.
5. Disconnect supply lines and terminal.
 - Disconnect terminal from the machine.
 - Disconnect power supply cable.
 - Detach the compressed air connection line.
 - Remove the product feeder.
 - Remove exhaust air lines.
6. Clean the entire machine. See “Cleaning” section.

6.3. Storage

The machine and terminal may be stored for up to 2 years if protected by corrosion protection packaging.

Storage conditions:

1. Machine packed in corrosion protection packaging. See “Packing” section.
2. Temperature: 0°C to +40°C
3. Store in dry, dust-free place.
4. Protect against moisture.
5. Protect against direct sunlight



NOTE

Once the VCI film hood is removed, there is no longer any corrosion protection.

The VCI film hood may be removed for a short time in order to lift the machine.

The machine should then be immediately covered with the VCI film hood once more.

Do not permanently remove the VCI film hood until the machine is in its definitive location.

In the event of fluctuating temperatures, leave the VCI film hood on the machine for 24 hours to allow it to acclimatize in order to prevent corrosion.



NOTE

Do not damage the packing!

Damaging the packing will allow the protective atmosphere to escape. If any damage to the packing is identified, reseal it immediately. Do not open packing until you need to use its content.

The wrapping may be opened briefly for inspection purposes. Close it again immediately after inspection. The protective atmosphere will be automatically restored when the packing is resealed.

Contents protected against corrosion in Corparc Cortec VCI. The VCI inhibitors attached to the inside of the packing vaporize and protect the metal surfaces against corrosion.

6.4. Permanently withdrawing the capsule filling machine from service



NOTE

The operator is responsible for the proper decommissioning of the capsule filling machine.

The decommissioning must only be carried out by trained and authorized specialist personnel.



WARNING!

Danger from stored energy. It is possible that the gas springs may be under pressure.

Risk of injury from gas springs as they are released.
The decommissioning must only be carried out by trained and authorized specialist personnel.



WARNING!

Permanent decommissioning requires

- complete disconnection of all connections
- safe and environmentally sound disposal of operating materials, consumables and replaced parts (batteries, greases, oils, etc.)
- complete cleaning of all assemblies and components that carry lubricant.

7. Packing

7.1. Safety during packing



DANGER!

Danger of death by falling or toppling loads

Transporting work can create dangerous situations that could lead to severe injury or even death.

- Never walk or stand beneath a raised load.
- Use handling equipment that offers sufficient safety and lifting capacity.
- Wear personal protective equipment that conforms to the currently applicable accident prevention regulations (e.g. safety boots, safety gloves, etc.).
- Only allow competent or instructed persons to transport the machine.
- Follow the handling instructions and symbols on the shipping crate.

7.2. Packing the capsule filling machine

For off-premises transportation, the capsule filling machine is corrosion-protected and packed in a wooden crate.

The capsule filling machine must be shut down long-term and cleaned. Protruding components should be removed.

Qualifications for shutting down	Persons with mechanical and electrical training
Qualifications for packing	Instructed in packing machines
Qualifications for transporting	Industrial truck operator qualification
Personal protective equipment	Safety boots
Materials: protective wrappers	VCI flat film VCI hood - bubble wrap VCI foam mats (cut-off) VCI adhesive tape
Materials: wooden crate for capsule filling machine	Dimensions: 2.030 mm x 2.030 mm x 2.500 mm 1x crate bottom 4x side panel 1x cover 4x transport bracket Small parts
Gross weight	approx. 4.100 kg
Net weight	approx. 3.500 kg

Prepare the machine for packing.

Shut down

1. Shut down the machine long-term, see the “Shut-down (long-term)” section.

Removal of components for transportation. The removed parts are transported separately in shipping crates.

1. Capsule feeder
 - 2 x capsule storage container
 - 1 x filling cone
 - 1 x downpipe to the compacting station (optional)
 - 2 x capsule magazine
2. Capsule discharge
 - Discharge covers
 - Gates
 - Discharge chute
3. Capsule ejector
 - Ejection flap, extraction
 - Ejection flap
 - Ejection guide (L-piece)
4. 1 x non-separated capsule ejection unit
5. 1 x cover for incoming air for process space
6. 4 x lower clamps (machine sides 1 to 4)

Pack the machine in the shipping crate.

1. Place VCI foam mats in the machine.
2. Prepare crate bottom:
 - Thoroughly clean the crate bottom (e.g. remove any wood shavings or sawdust).
 - Spread VCI flat film evenly over the crate bottom.
3. Place the machine on the crate bottom and wrap with the film.



IMPORTANT!

Damage to capsule filling machine

The industrial truck can be pushed beneath the capsule filling machine from all sides. Observe the two inner machine feet.

The lower clamps on machine sides 1 to 4 must be removed.

The industrial truck used must be adequately dimensioned for the weight of the machine.

- Lift the machine.
- Place the machine on the crate bottom.
- Firmly bolt the machine to the crate bottom with the transport brackets.
- Fold the VCI flat film up against the machine and fix tightly against the machine with the VCI adhesive tape.
- Pull the VCI bubble wrap over the machine. Fix tightly against the machine with the VCI adhesive tape.
- Affix the following stickers to the film for information (2 of each on the outside on opposite sides).



NOTICE

Once the VCI film hood is removed, there is no longer any corrosion protection!

The VCI film hood may be removed for a short time in order to lift the machine.

The machine should then be immediately covered with the VCI film hood once more!

Do not permanently remove the VCI film hood until the machine is in its definitive location!

In the event of fluctuating temperatures, leave the VCI film hood on the machine for 24 hours to allow it to acclimatize in order to prevent corrosion!



NOTICE

Do not damage the packing!

Damaging the packing will allow the protective atmosphere to escape. If any damage to the packing is identified, re-seal it immediately. Do not open packing until you need to use its content.

The wrapping may be opened briefly for inspection purposes. Close it again immediately after inspection. The protective atmosphere will be automatically restored when the packing is resealed.

Contents protected against corrosion in Corparc Cortec VCI. The VCI inhibitors attached to the inside of the packing vaporize and protect the metal surfaces against corrosion.

4. Close the shipping crate and secure to prevent it opening accidentally.
5. Attach handling instructions and symbols to the shipping crate.

7.3. Packing the terminal

To protect against corrosion, the terminal is packed in a VCI hood inside a wooden crate.

Qualifications for packing	Instructed in packing machines
Qualifications for transporting	Industrial truck operator qualification Crane operator qualification
Personal protective equipment	Safety boots
Materials: protective wrappers	1x VCI hood VCI adhesive tape
Materials: wooden crate for terminal	Dimensions: 775 mm x 775 mm x 1,895 mm 1x crate bottom 4x side panel 1x cover 1x wooden lath for fixing the terminal to the crate bottom 1x protective cardboard sheet
Gross weight	approx. 172 kg
Net weight	approx. 77 kg

1. Prepare the terminal, see the “Shut-down (long-term)” section
 - Roll up the cable and fix in position
 - Wrap terminal in protective film

2. Prepare crate bottom:
 - Thoroughly clean the crate bottom (e.g. remove any wood shavings or sawdust).
 - Spread VCI hood evenly over the crate bottom.
3. Place the terminal on the crate bottom.
4. Fold up the VCI hood.
5. Fix the terminal to the crate bottom.
6. Wrap the terminal entirely in the VCI hood and fix in place with VCI adhesive tape.



NOTE

Once the VCI film hood is removed, there is no longer any corrosion protection.

The VCI film hood may be removed for a short time in order to lift the machine.

The machine should then be immediately covered with the VCI film hood once more.

Do not permanently remove the VCI film hood until the machine is in its definitive location.

In the event of fluctuating temperatures, leave the VCI film hood on the machine for 24 hours to allow it to acclimatize in order to prevent corrosion.



NOTE

Do not damage the packing!

Damaging the packing will allow the protective atmosphere to escape. If any damage to the packing is identified, re-seal it immediately. Do not open packing until you need to use its content.

The wrapping may be opened briefly for inspection purposes. Close it again immediately after inspection. The protective atmosphere will be automatically restored when the packing is resealed.

Contents protected against corrosion in Corparc Cortec VCI. The VCI inhibitors attached to the inside of the packing vaporize and protect the metal surfaces against corrosion.

7. Close the shipping crate and secure to prevent it opening accidentally.
8. Attach handling instructions and symbols to the shipping crate.

Operating instructions FEC20

Translation of the original

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1. General

1.1. Introduction

The capsule filling machine and its accessories were constructed according to the best available technology in conformance with the recognized safety rules and standards. Incorrect operation can result in damage to the capsule filling machine and endanger people.

This information is intended to be read, understood and followed in every respect by those responsible for using the capsule filling machine and its accessories.

The capsule filling machine and its accessories can only be used safely and without error if the responsible persons have read and followed the entire content of these operating instructions. This applies in particular to the safety instructions.

These operating instructions relate exclusively to the capsule filling machine and its accessories described herein.

We reserve the right to make any technical changes to the illustrations and information in these operating instructions that might be needed to improve the capsule filling machine and its accessories.

Storing the operating instructions

The complete operating instructions must be stored carefully and always kept with the capsule filling machine as they are part of the product.

They should always be kept in the vicinity of the capsule filling machine so that they are available, when required, to everyone working with the machine.

Warranty and technical support

To guarantee fault-free operation, these operating instructions must be read carefully before commissioning. We accept no liability for damage and interruptions that might result from failure to follow these operating instructions.

Observe all safety instructions and hazard warnings in these operating instructions!

If you have any problems, please contact our customer service or spare parts department, or one of our agencies who will be happy to assist you.

1.2. Options

Options represent the standardised electrical, mechanical and software functions of the machine.

Each machine is configured according to machine specification (MAL), which also reflects the purchase agreement. The machine specification includes options that are distinguished in:

- Sales options (e.g. 01.222 or 04.100)
- Software options (e.g. A536 or 536)

A software option can have different characteristics, which are defined in each case by the additional specification of K factors.

Depending on the electrical and mechanical configuration of the machine, the software options are activated or deactivated.

A list of all activated (released) software options can be displayed at the operator terminal (HMI).

→ Therefore, also see section "Activated options" in the Operating instructions software.



NOTICE

The documentation consists of generic documents and does not correspond to the machine specification, but describes all important functions and components of the machine.

Accordingly, the machine may not contain all the functions and components described.

1.3. Operator's duty of care

The operator of the capsule filling machine and its accessories must ensure that

- the capsule filling machine and its accessories are used only for the intended use at all times.
- the capsule filling machine and its accessories are in perfect condition and full working order at all times.
- all safety notes and warnings attached to the capsule filling machine and its accessories are legible and are not removed.
- the capsule filling machine and its accessories are assembled and operated in accordance with these operating instructions only by qualified and authorized personnel.
- these personnel are regularly informed of all the necessary rules concerning safety at work and environmental protection.
- the necessary protective equipment for assembly, operating, maintenance and repair personnel is available in sufficient quantities, is in perfect condition and is worn.

- the operating instructions are always in a legible condition and are available in their entirety at the capsule filling machine's place of use.
- all the instructions in the commissioning instructions are carried out while transporting the machine.

1.4. Copyright

Fette Engineering GmbH retains the copyright to these instructions.

These instructions are intended for personnel who work on the capsule filling machine. They contain specifications and technical drawings which must not be copied or distributed, in whole or in part, or sold or passed on without authorization to other parties for the purposes of competition.

The data processing programs used and the associated program descriptions are also subject to copyright as appropriate.

Unless otherwise specified, when upgrading or replacing existing programs, the buyer undertakes to destroy the previous versions, any copies thereof and the replaced documentation.

They must not be passed on to third parties.

1.5. Contact

Address:

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D - 21493 Schwarzenbek

Worldwide service:

Contact:

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2. Safety

2.1. Safety instructions



DANGER!

All the safety instructions from the operating instructions are to be followed. These include

- the summarized safety notes from the “safety instructions”,
- the section-specific safety notes and
- the embedded warning instructions.

3. Functions

3.1. General description

The capsule filling machine serves to fill and close hard gelatine capsules and HPMC capsules. These capsules may be used as pharmaceutical or other products, such as food products etc.

Key part of the capsule filling machine is a cyclically operating rotary disk which is driven by a central torque motor. The rotary disk carries the mountings for the capsule bottom and top parts. Each cycle of the rotary disk transports the capsule parts to their respective stations where they are processed.

The capsules are first fed in, opened, filled by several dosing units, closed and finally ejected. The individual process stations are equipped with separate actuators for different functions.

3.2. Machine arrangement

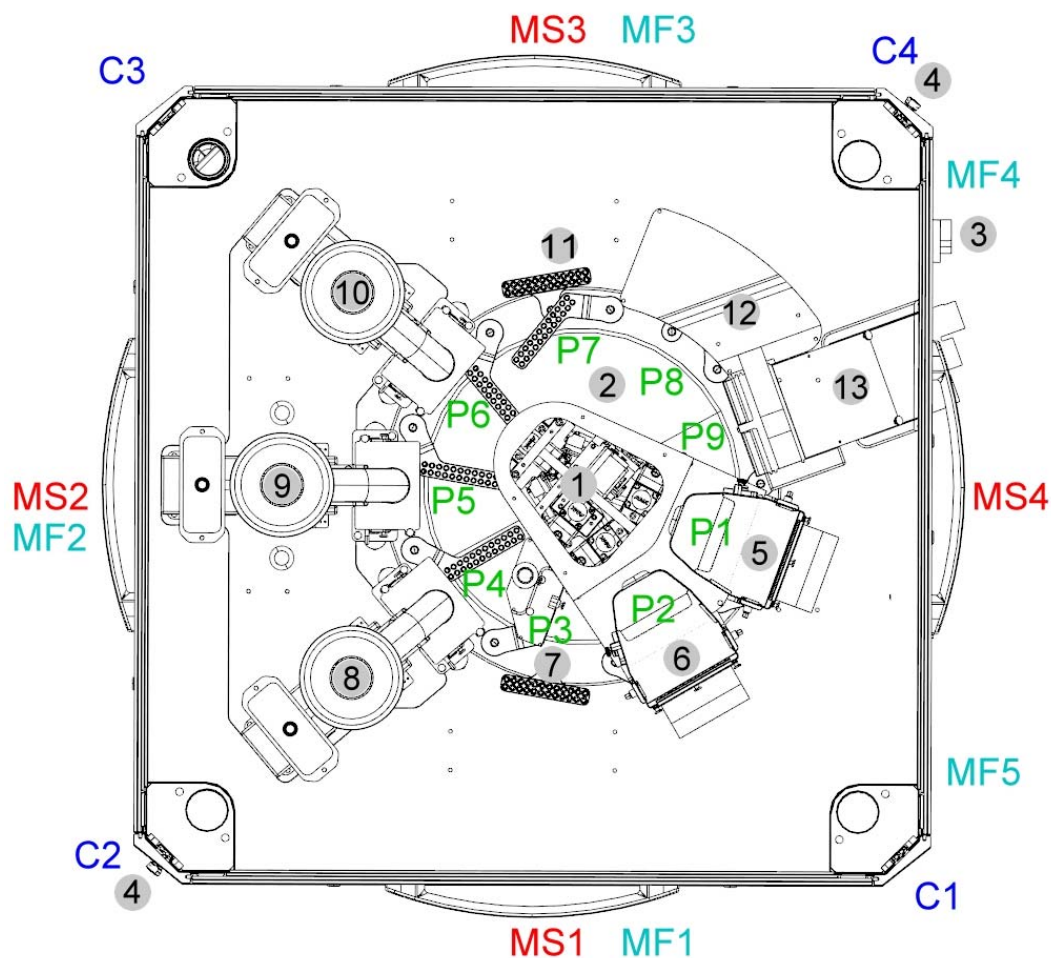


Fig. 11 Machine arrangement (configuration with three pellet stations)

Abbreviations:

- C: Column
- MF: Maintenance flap
- MS: Machine Side
- P: Position

1. Middle column
2. Rotary disk
3. Main switch
4. Emergency stop button
5. Capsule feeder row 1
6. Capsule feeder row 2 / Separate capsules

-
7. Ejection of non-separated capsules
 8. Dosing units 1
 9. Dosing units 2
 10. Dosing units 3
 11. Not in use
 12. Close capsules
 13. Capsule rejection / Clean segments

3.3. Dosing combinations

The FEC20 can be used to fill capsules with powder or pellets. The tamping station and pellet station are available as dosing units. The dosing units can also be combined with one another.

Tab. 6 Possible dosing combinations of the FEC20

Parameter 500 "Dosing combinations"	Dosing 1 (position 4)	Dosing 2 (position 5)	Dosing 3 (position 6)
0	—	—	—
2	—	—	Pellet station
10	—	Tamping station	—
12	—	Tamping station	Pellet station
20	—	Pellet station	—
22	—	Pellet station	Pellet station
200	Pellet station	—	—
202	Pellet station	—	Pellet station
210	Pellet station	Tamping station	—
212	Pellet station	Tamping station	Pellet station
220	Pellet station	Pellet station	—
222	Pellet station	Pellet station	Pellet station



NOTICE

Parameter 500 specifies the installed dosing combination. The machine cannot be started, if parameter 500 does not match the installed dosing combination.

3.4. Switching time / idle time

The machine's **idle time**, parameter 3, is the time during which the rotary disk does not move, i.e. when it waits in its current position. During this time, the corresponding processes take place at the various stations, such as supplying, filling and closing the capsules.

The machine's switching time, parameter 4, is the time during which the rotary disk is moving to the next station.

The machine's **cycle time**, parameter 2, is the calculated from the idle and switching times.

3.5. Servo drives – decoupling the switching time and idle time

In capsule filling machines that are driven by a stepping gear, the switching and idle times are in a fixed ratio to one another. All movements are produced by mechanically-coupled cam plates. The movement paths and dependencies are defined mechanically for each cycle. If one time is increased, the other time is automatically increased as well. This results in a longer cycle time and thus a poorer output. A poorly flowing product, for example, may require the idle time to be increased or a loss of product while moving onward may require the switching time to be increased.

Replacing the stepping gear with an electronically-controlled torque drive and replacing each cam plate with a servo drive allows the individual idle and switching times to be set independently of one another. Because the switching and idle times are now decoupled, one limiting factor will no longer affect the other time. This results in a shorter cycle time and thus increased output.

Specific adaptations can also be made to achieve greater process reliability or to be able to process a broader spectrum of capsules or products. Many different adaptations are possible, such as increasing closing or separating times or changing lift strokes.

4. Assembly groups

4.1. Overall machine

The capsule filling machine is mounted on a base frame with vibration-damping and height-adjustable supporting feet.

The capsule filling machine is made up of the drive compartment and the process space. The drive compartment is closed off by maintenance flaps and sash locks. The process space is closed off by window flaps.

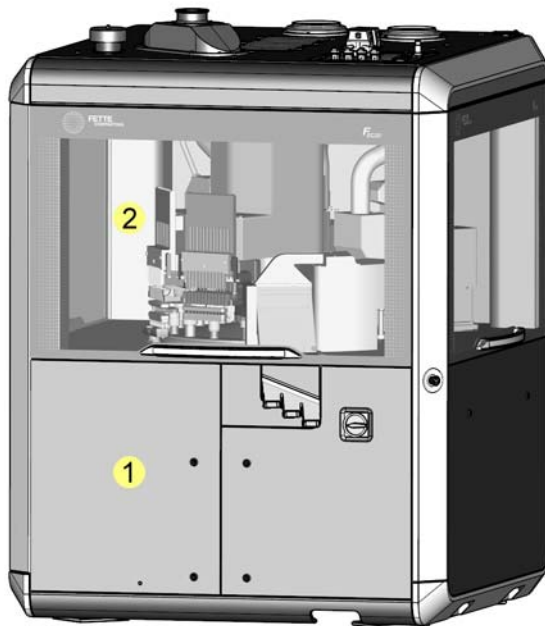


Fig. 12 Overall machine

1. Drive compartment
2. Process space

4.1.1. Measures to reduce noise and vibration

Measures to reduce noise and vibration are taken into account in the machine design, such as decoupling the paneling and decoupling from the floor.

In combination with the rubber elements, the machine feet reduce the vibration emissions.

4.2. Main drive

The machine's main drive is a water-cooled synchronous torque motor that is excited with permanent magnets and designed as an external rotor motor. The main drive is mounted on bearings at top and bottom. The middle column is mounted, via a mounting flange, on the base which also acts as the cover for the main drive's bearing.

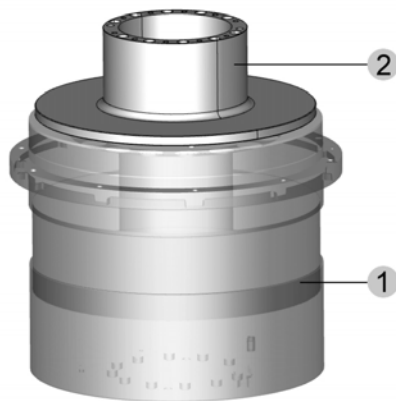


Fig. 13 Main drive

1. Main drive
2. Cover for bearing

The main drive drives the rotary disk with a defined cycle time. The drive is controlled via an absolute rotary encoder and a frequency converter and is thus very controllable in terms of cycle time and position.

The main drive's cycle time is entered using parameter 2. The number of capsules produced per hour (parameter 1) is determined by parameter 2.

4.3. Cooling system

There is an internal cooling system integrated into the drive compartment. This cooling system cools the following components:

- the main drive
- the rotary drives for the tamping station option
- the lifting drives for the tamping station option
- the main drive's frequency converter and the power supply module via a cold plate

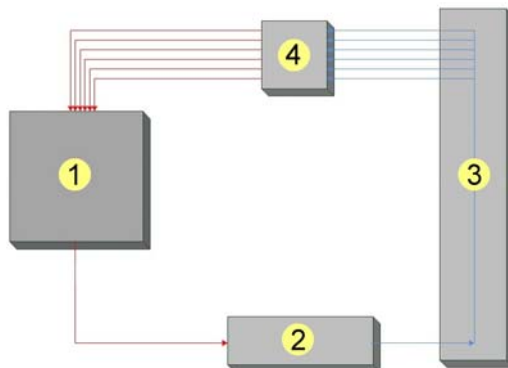


Fig. 14 Cooling

1. Expansion tank with pump
2. Heat exchanger module
3. Distributor
Distributes the coolant coming from the heat exchangers to the individual system components
4. Components to be cooled:
 - Main drive
 - Rotary drive for the tamping station option
 - 2 lifting drives for the tamping station option
 - Cold plate

The cooling system is filled with a coolant that is fed around the circuit by the pump. The heat from the components to be cooled that is absorbed by the coolant is dissipated once more via an air / water heat exchanger.

4.4. Description of the rotary disk unit

4.4.1. Description of the rotary disk unit

The rotary disk unit consists of the rotary disk with capsule holders, the rotary disk locking mechanism and the cam guide. Every station has two capsule holders for holding the top and bottom part of each capsule. The rotary disk is sealed with 2 shaft sealing rings.

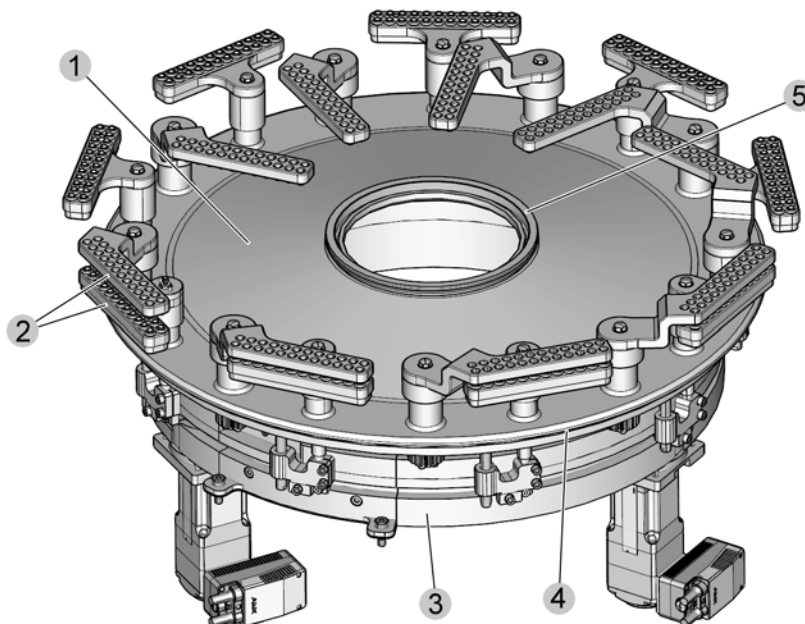


Fig. 15 Rotary disk unit

1. Rotary disk
2. Capsule holder
3. Cam guide

4. Outer shaft sealing ring
5. Inner shaft sealing ring

4.4.2. Description of the rotary disk

On the top side of the rotary disk there are mountings for 18 capsule holders, corresponding to 9 stations. At each station there are two mountings, one for the capsule bottom part holder and one for the capsule top part holder.

Mechanical components connected to the capsule top part holder shaft and capsule bottom part holder shaft are mounted on the underside of the rotary disk.

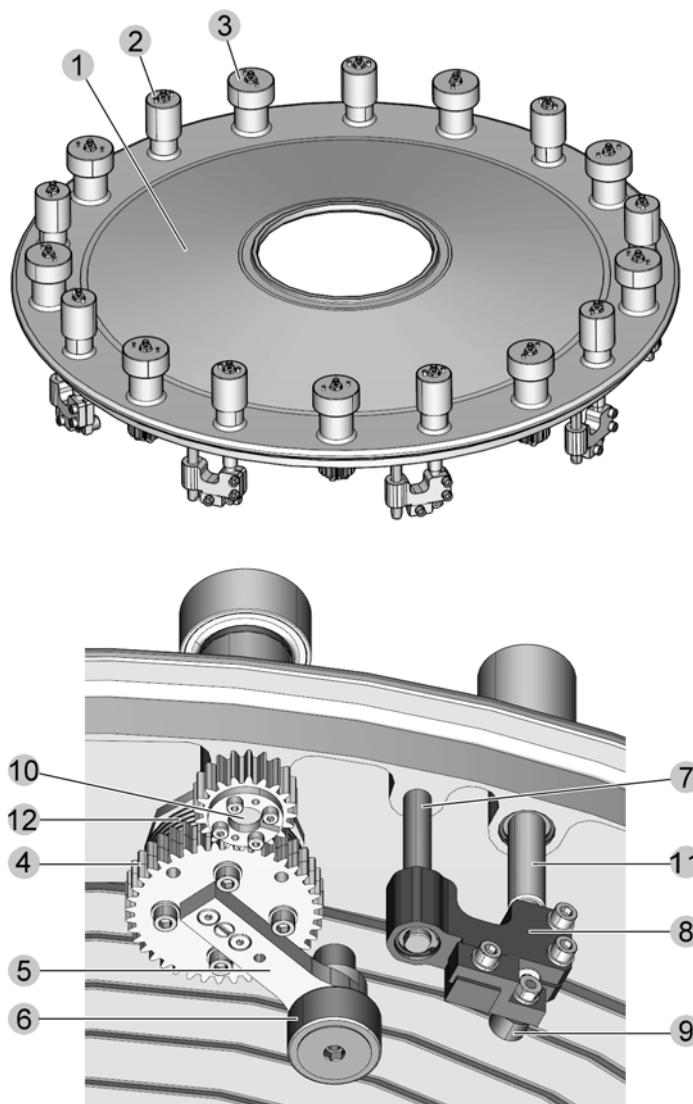


Fig. 16 Rotary disk

1. Rotary disk
2. Mounting for capsule bottom part holder

3. Mounting for capsule top part holder
4. Gear wheels
5. Rocker finger
6. Cam roller for capsule top part holder
7. Lifting column
8. Guide bridge
9. Cam roller for capsule bottom part holder
10. Capsule top part holder shaft
11. Capsule bottom part holder shaft
12. Torsion spring

4.4.3. Description of the rotary disk locking mechanism

The rotary disk locking mechanism is mounted in the machine frame beneath the intermediate plate. It consists of the guide for the locking mechanism, a single-acting flat cylinder with pneumatic connection and a locking pin.

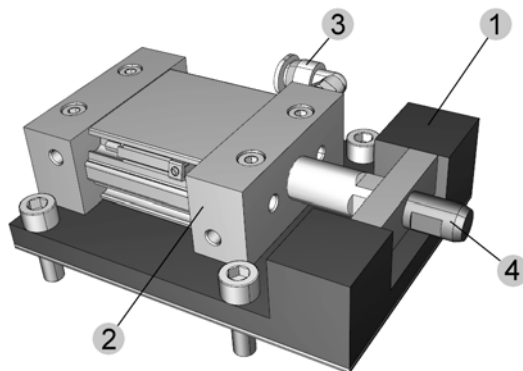


Fig. 17 Rotary disk locking mechanism

1. Guide for rotary disc locking mechanism
2. Flat cylinder, single-acting
3. Pneumatic connection
4. Locking pin

4.4.4. Description of the cam guide

The cam guide consists of the individual cam guides "removal opening", "separate capsule", "close capsule" and "swivel capsule holder". The top ring surface and the outer shell surface of the cam guide each have a continuous guide groove.

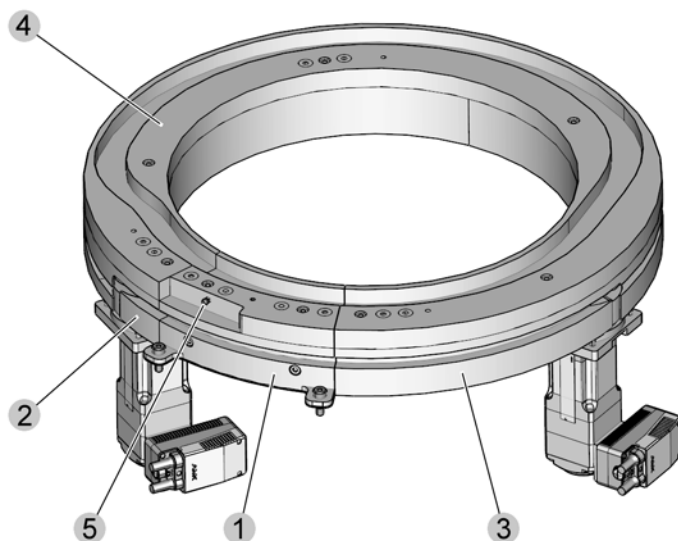


Fig. 18 Cam guide, complete

1. "Removal opening" cam guide
2. "Separate capsule" cam guide
3. "Close capsule" cam guide
4. "Swivel capsule holder" cam guide
5. Grease nipple

A cylindrical "Separate capsule" track cam is used in the "Separate capsule" cam guide. The track cam has a helical guide groove running around the shell surface and is connected to a servo motor.

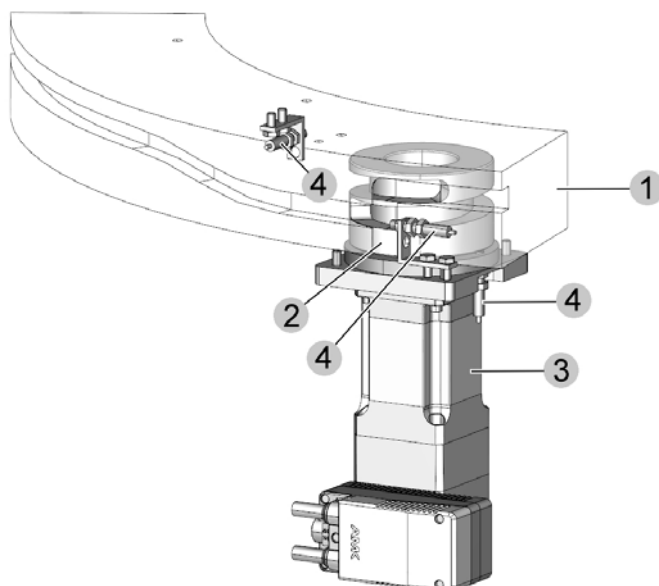


Fig. 19 "Separate capsule" cam guide

1. "Separate capsule" cam guide

2. "Separate capsule" track cam
3. Servo motor
4. Proximity switch

A cylindrical "Separate capsule" track cam is used in the "Separate capsule" cam guide. The track cam has a helical guide groove running part-way around the shell surface and is connected to a servo motor.

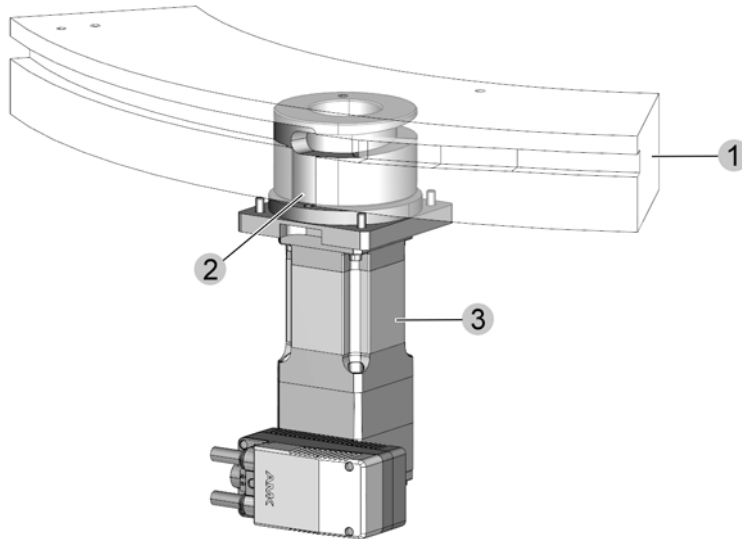


Fig. 20 "Close capsule" cam guide

1. "Close capsule" cam guide
2. "Close capsule" track cam
3. Servo motor

4.4.5. Description of the capsule holder

Two parallel rows, each with 12 format-specific top part sleeves, are glued into the capsule top part holders. Two corresponding parallel rows, each with 12 format-specific bottom part sleeves, are glued into the capsule bottom part holders.

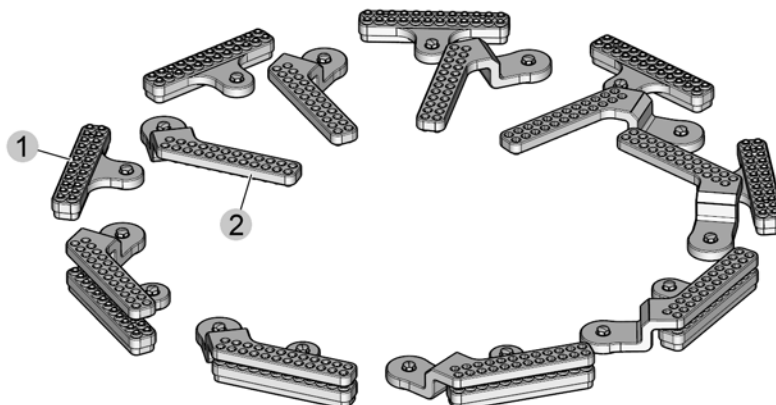


Fig. 21 Capsule holder

1. Capsule bottom part holder
2. Capsule top part holder

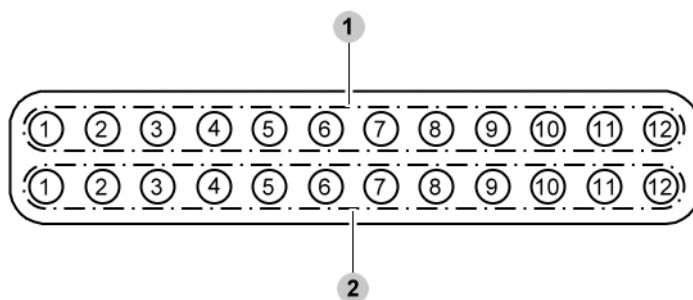


Fig. 22 Numbering of the capsule tracks

1. Row 1: single tracks 1 to 12
2. Row 2: single tracks 1 to 12

4.4.6. Changing the capsule holders

Change the capsule holders on machine side 4 / position 1 (capsule feeder row 1) or machine side 3 / position 7 (capsule feeder row 1) since the capsule holders are most easily accessible at these positions and correct installation can be most easily checked.

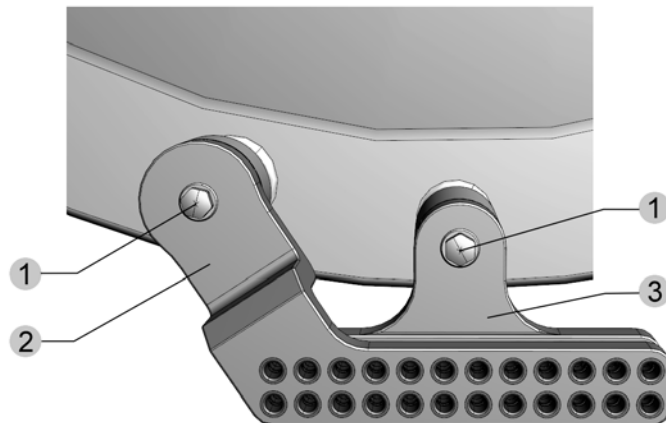


Fig. 23 Capsule holder installed at position 1 / position 7 (capsule feeder row 1)

1. Hexagon nuts for format-specific parts
2. Capsule top part holder
3. Capsule bottom part holder



WARNING!

Risk of crushing by capsule holder

Crushing is possible between the capsule holder and its immediate vicinity.

- Always wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves

Removing the capsule holders

1. Loosen the hexagon nut for format-specific parts on the capsule top part holder.
2. Remove the capsule top part holder.
3. Loosen the hexagon nut for format-specific parts on the capsule bottom part holder.
4. Remove the capsule bottom part holder.

Repeat steps 1 - 4 until all capsule holders are removed.

Fitting the capsule holders



IMPORTANT!

When installing, make sure that the capsule holders are correctly aligned.

The capsule holders at position 1 / position 7 (capsule feeder row 1) are correctly installed when the 24 top part sleeves of the top part holder are aligned concentrically with the 24 bottom part sleeves of the capsule bottom part holder. → **Fig. 23**

1. Fit the capsule bottom part holder and align in such a way that the two pin holes on the underside are connected to the two parallel pins in the mounting for the capsule bottom part holder.
2. Tighten the hexagon nut for format-specific parts on the capsule bottom part holder using the specified torque. Therefore, see also section → "Tightening torque for bolts" section in the Maintenance manual.
3. Fit the capsule top part holder and align in such a way that the two pin holes on the underside are connected to the two parallel pins in the mounting for the capsule top part holder.
4. Tighten the hexagon nut for format-specific parts on the capsule top part holder using the specified torque. Therefore, see also section → "Tightening torque for bolts" section in the Maintenance manual.

Repeat steps 1 - 4 until all capsule holders are finished.

4.5. Middle column

The following drives are located inside the middle column:

- Drive capsule magazine row 1
- Drive capsule magazine row 2
- Drive rejection of non-separated capsules
- Drive sorting fork

The middle column is fixed via a mounting flange to the cover of the main drive's bearing. The seal mounting for the middle column is fixed to the head piece of the machine.

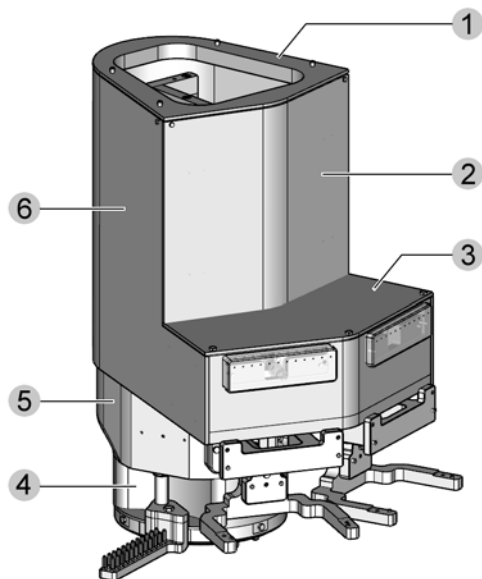


Fig. 24 Middle column

1. Seal mounting
2. Front panelling
3. Front panelling
4. Mounting flange
5. Base
6. Rear panelling

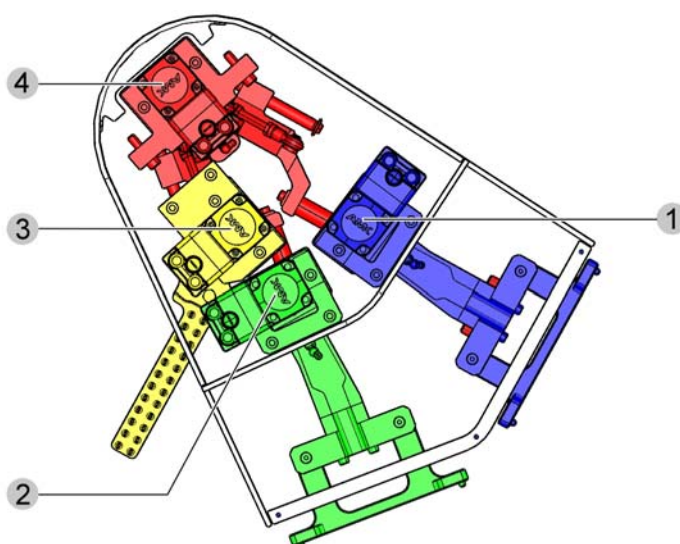


Fig. 25 Drives middle column (top view)

1. Drive capsule magazine row 1
2. Drive capsule magazine row 2

3. Drive rejection of non-separated capsules
4. Drive sorting fork

Drive capsule magazine row 1 / drive capsule magazine row 2

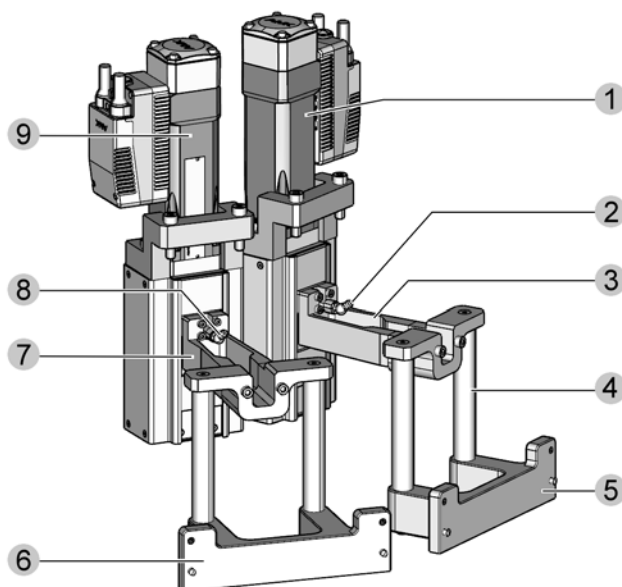


Fig. 26 Drive capsule magazine row 1 / drive capsule magazine row 2

1. Drive capsule magazine row 1
2. Grease nipple for drive capsule magazine row 1
3. Follower capsule magazine row 1
4. Lifting column (2x per drive)
5. Mounting capsule magazine row 1
6. Mounting capsule magazine row 2
7. Follower capsule magazine row 2
8. Grease nipple for drive capsule magazine row 2
9. Drive capsule magazine row 2

The drive capsule magazine row 1 and the drive capsule magazine row 2 generate the vertical lifting movement of the mountings for the capsule magazines row 1 via the follower and the lifting columns.

Drive rejection of non-separated capsules

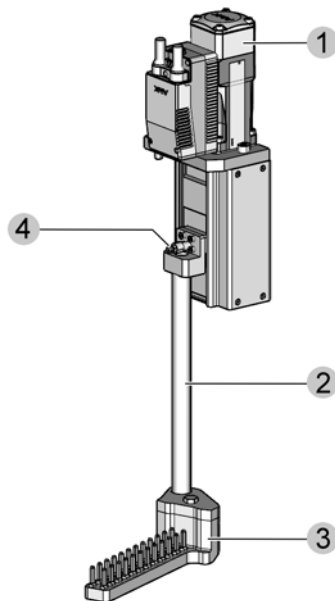


Fig. 27 Drive rejection of non-separated capsules

1. Drive ejection of non-separated capsules
2. Lifting rod
3. Fixing plate with inserted ejecting pins (24x)
4. Grease nipple for drive rejection for non-separated capsules

The drive rejection of non-separated capsules generates the vertical lifting movement of the ejecting pins for non-separated capsules.

Drive sorting fork

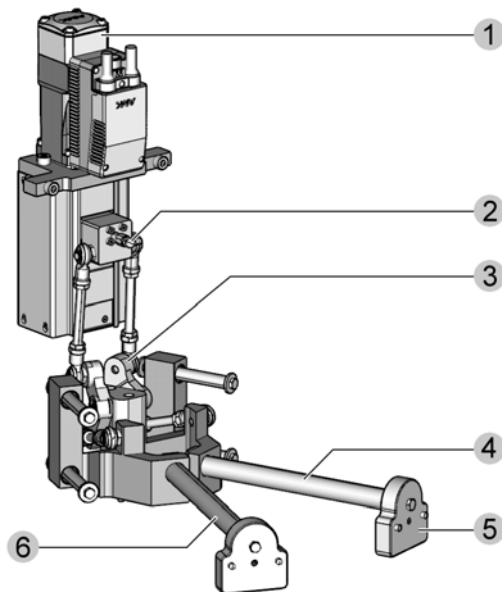


Fig. 28 Drive sorting fork

1. Drive sorting fork
2. Grease nipple for drive sorting fork
3. Lever mechanism sorting forks row 1 and 2
4. Lifting guide sorting fork row 1
5. Flange plates (2x) for sorting fork row 1 and row 2
6. Lifting guide sorting fork row 2

The drive sorting fork generates the horizontal lifting movement of the two flange plates, on which the sorting forks row 1 and 2 of the capsule feeder are mounted, via a lever mechanism and lifting columns.

4.6. Capsule feeder

4.6.1. Description of the capsule feeder

The capsule feeder consists of the capsule hopper and the capsule magazine.

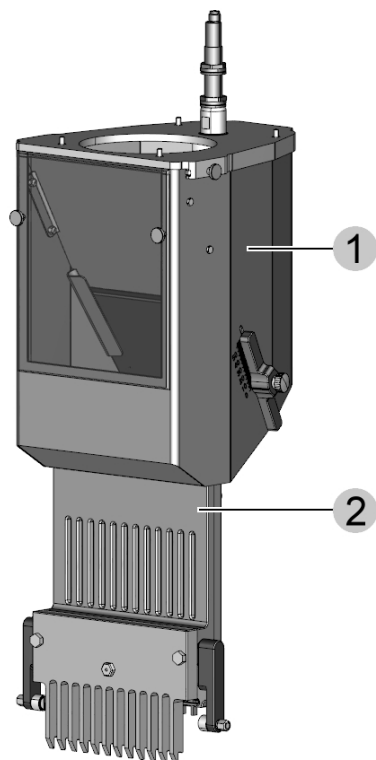


Fig. 29 Capsule feeder

1. Capsule hopper
2. Capsule magazine

The mounting for the capsule hopper is mounted on the head of the machine. The capsule hopper is pushed into the mounting on rails and fixed in place with knurled screws. The empty capsules are supplied to the hopper in the top part. A sensor measures the fill level in the capsule hopper. The capsule bed height in the bottom part of the hopper can be adjusted with a separating plate using the adjusting lever.

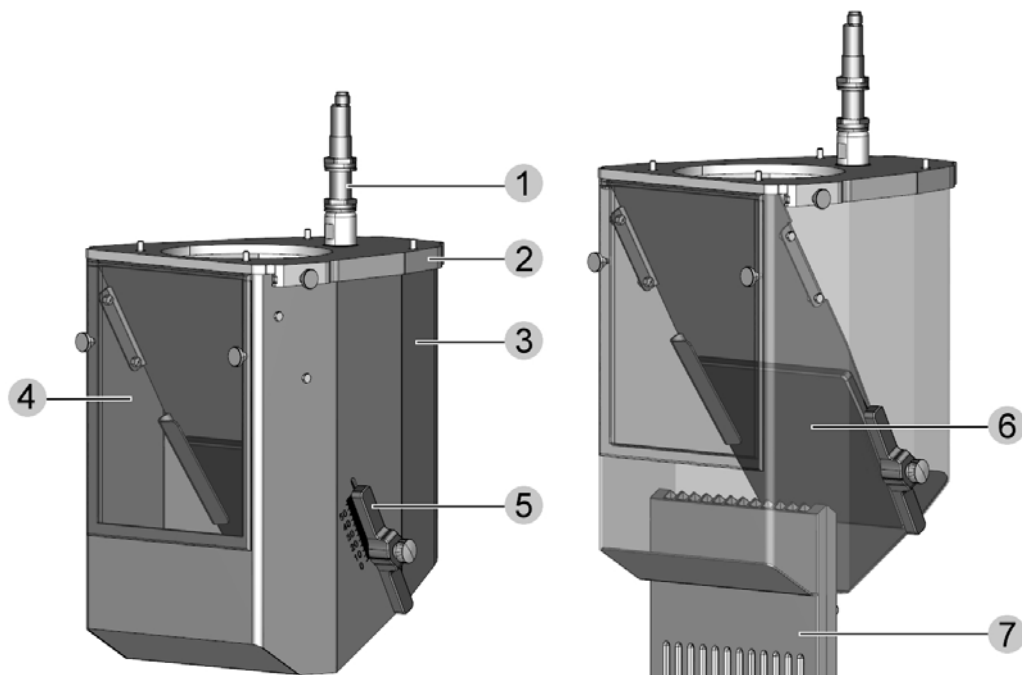


Fig. 30 Capsule hopper

1. Capsule bed height sensor
2. Capsule hopper mounting
3. Capsule hopper
4. Capsule hopper inspection window
5. Capsule bed height adjusting lever
6. Capsule bed height separating plate
7. Capsule magazine

The capsule magazine protrudes into the capsule hopper. A drive in the middle column moves the magazine up and down. The magazine has 12 tracks onto which the capsules are separated. The capsules enter the sorting block via the capsule magazine and, from there, pass via the sorting and guide forks into the capsule holders.

The clamping force of the retaining springs can be adjusted using the capsule release adjustment screw.

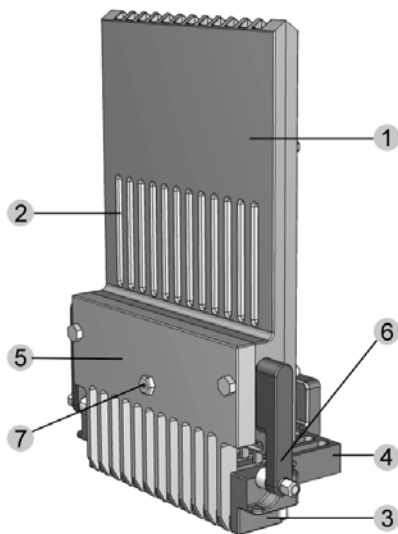


Fig. 31 Capsule magazine

1. Capsule magazine
2. Tracks 1–12 with inspection slots
3. Sorting block
4. Sorting fork
5. Guide fork
6. Capsule release with retaining spring
7. Capsule release adjustment screw

4.6.2. RFID capsule magazine (option)

The capsule magazine can optionally be fitted with an RFID system. The transponder is located on the back of the magazine and the scanner is in the middle column. The coding provides a unique identification for the capsule magazine.

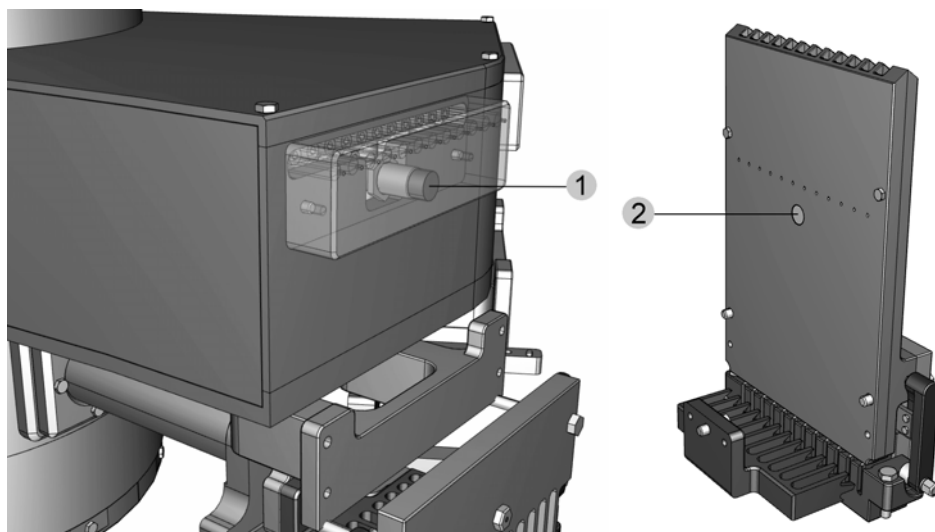


Fig. 32 RFID capsule magazine

1. RFID scanner
2. RFID transponder

4.6.3. Changing the capsule feeder

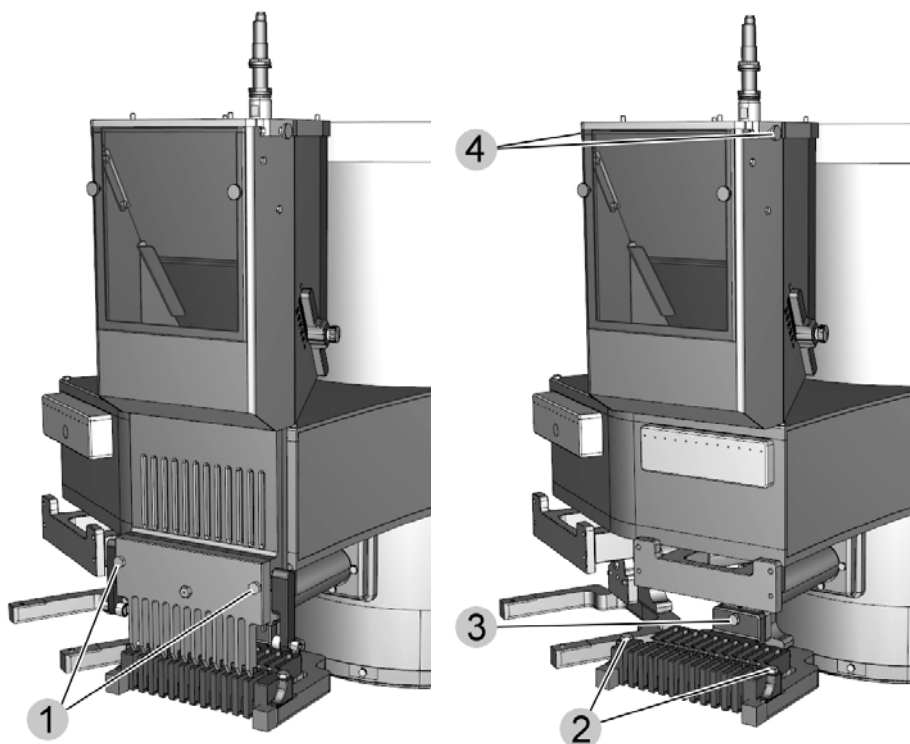


Fig. 33 Removing the capsule feeder

Removal of the capsule feeder:

1. Loosen the two screws on the guide fork. Tilt the guide fork and capsule magazine slightly in order to remove.
2. Loosen the two screws on the sorting block and remove the sorting block.
3. Loosen the screw on the sorting fork and remove the sorting fork.
4. Loosen the two screws on the capsule hopper mounting and remove the capsule hopper from its mounting.

Installation of the capsule feeder:

Reverse the above sequence to install the capsule feeder.

4.7. Capsule Flow Control CFC (option)

In the event of a fault in the capsule feeder caused by oversized or damaged capsules, the individual tracks can be blown clear with a blast of air. The tracks of the magazine have a calibrating bar that catches oversized or damaged capsules. The collecting container for the reject capsules is attached to the filling cone. The terminal manifold and air blast nozzles are integrated into the middle column.

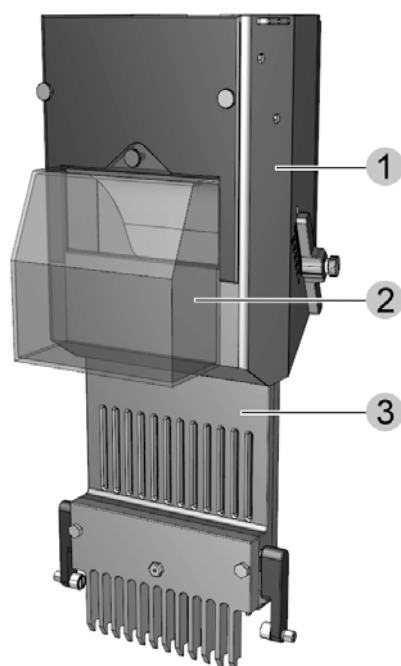


Fig. 34 Capsule feeder with CFC (option)

1. Filling cone
2. Collecting container

3. Capsule magazine

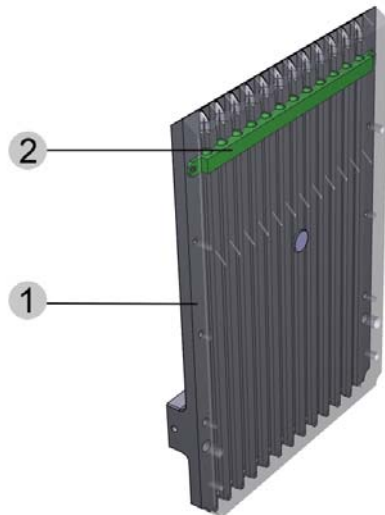


Fig. 35 Calibrating bar

1. Capsule magazine
2. Calibrating bar

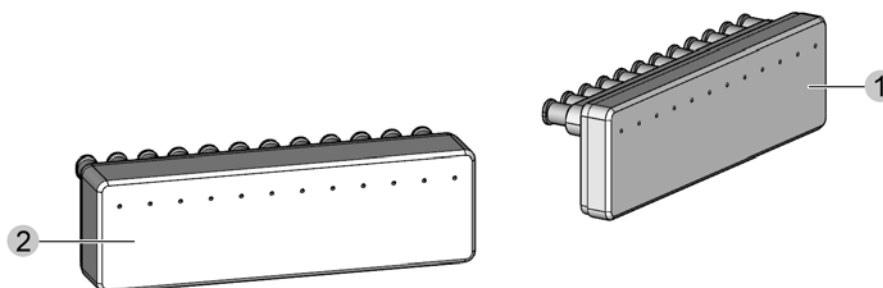


Fig. 36 Air blast nozzle CFC

1. Air blast nozzle row 1
2. Air blast nozzle row 2

4.8. Capsule separation unit

4.8.1. Description of the capsule separation unit

The suction cup holder with adjustment drive is mounted at the position for separating the empty, pre-closed capsules. Both the suction cup plates and the connecting duct have air ducts inside to control each capsule track individually.

Two parallel rows, each with 12 push-in fittings for the pneumatic connections, are mounted on the topmost suction cup plate. Two corresponding parallel rows, each with 12 suction cups, are screwed into the topmost suction cup plate.

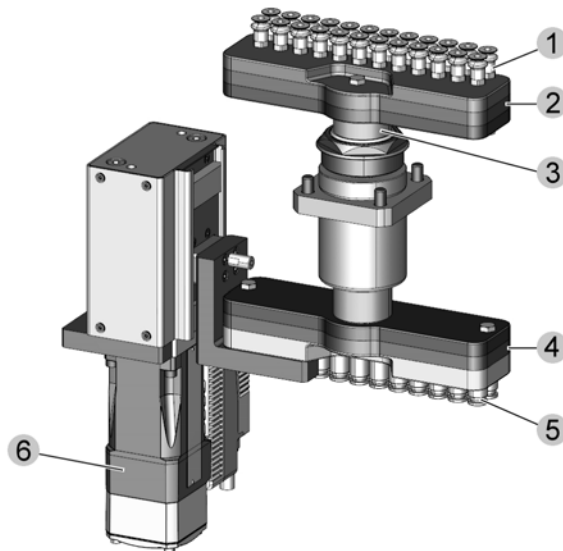


Fig. 37 Suction cup holder

1. Suction cups
2. Suction cup plates
3. Connecting duct
4. Suction cup plates
5. Push-in fittings
6. Adjustment drive with guide

4.8.2. Capsule Separation Control CSC (option)

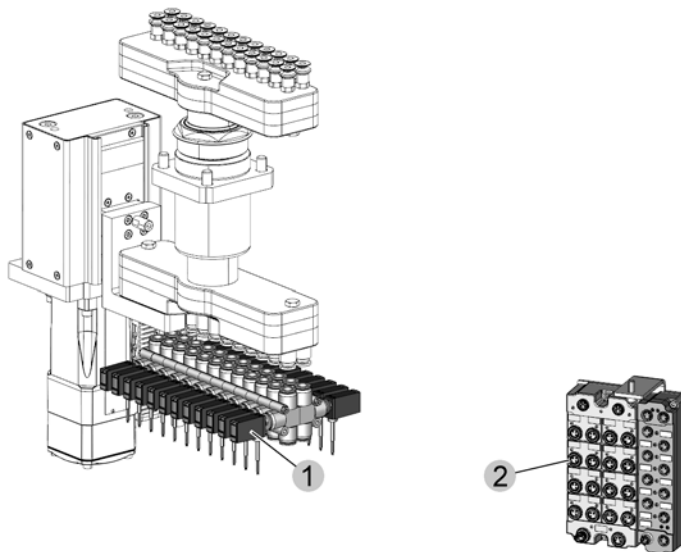


Fig. 38 Capsule Separation Control CSC (option)

1. Vacuum switch
2. Digital inputs and outputs

The Capsule Separation Control (CSC) option checks for the presence of a capsule bottom part at the capsule separation unit.

When the pre-closed empty capsules are separated at position "Capsule feeder row 2 / Separate capsules", there is a check for the presence of capsule bottom parts in the capsule bottom part holder on each capsule track.

Missing capsule bottom parts, i.e. non-separated capsules, are determined for each capsule track by vacuum switches. Non-separated capsules are ejected at position "Rejection of non-separated capsules".

4.9. Tamping station

4.9.1. Description of the tamping station

The tamping station with drive consists of:

- Powder feed unit
- Compression unit
- Powder dosing unit
- Rotary drive
- Lifting drives

plus:

- Fixing adapter with adjusting screw

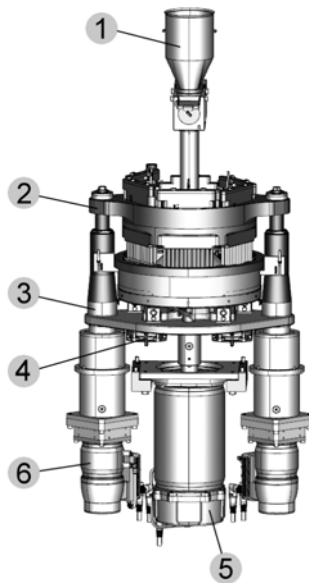


Fig. 39 Tamping station with optional zero-point clamping system

1. Powder feed unit
2. Compression unit
3. Powder dosing unit
4. Zero-point clamping system (option)
5. Rotary drive
6. Lifting drive

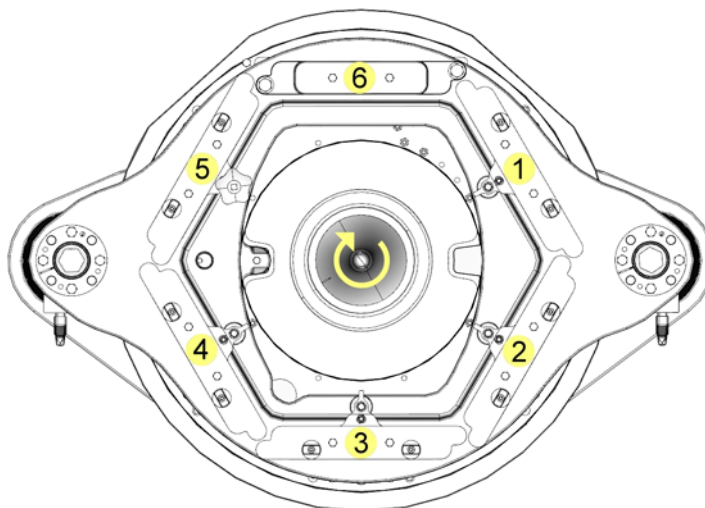


Fig. 40 Numbering of the tamping stations

1. Station 1
2. Station 2
3. Station 3
4. Station 4

- 5. Station 5
- 6. Station 6 (transfer stations)

4.9.2. Description of the powder feed unit

The powder feed unit consists of the filling cone, rotary valve with metering drum, a drive with deflection unit and the material downpipe.

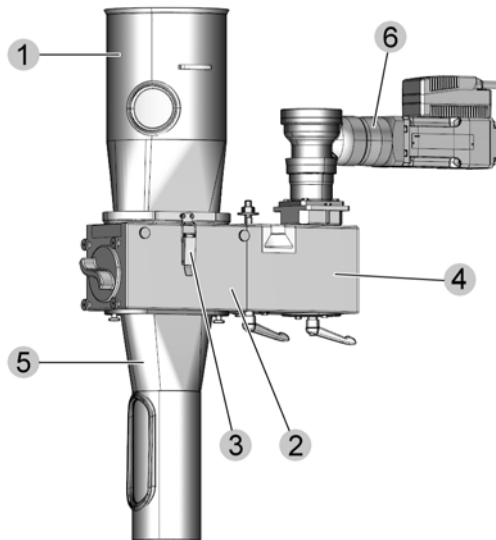


Fig. 41 Powder feed unit

- 1. Filling cone
- 2. Rotary valve with metering drum
- 3. Tension latch
- 4. Deflection unit
- 5. Material downpipe
- 6. Drive for metering drum

Filling cone with sensor

The filling cone is fixed in the top part of the housing with a bayonet closure. There is a sensor fitted on the outside in front of the filling cone inspection window.

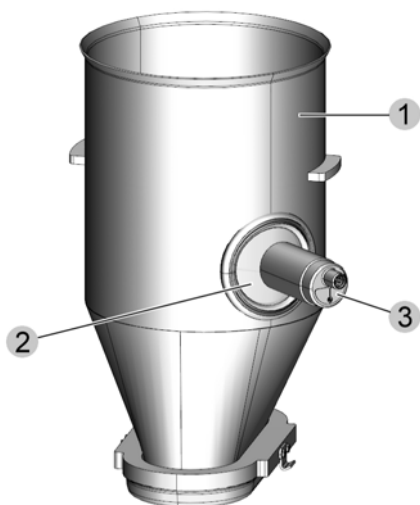


Fig. 42 Filling cone with sensor

1. Filling cone
2. Inspection window
3. Sensor

Rotary valve

The rotary valve is installed between the filling cone and the material downpipe.

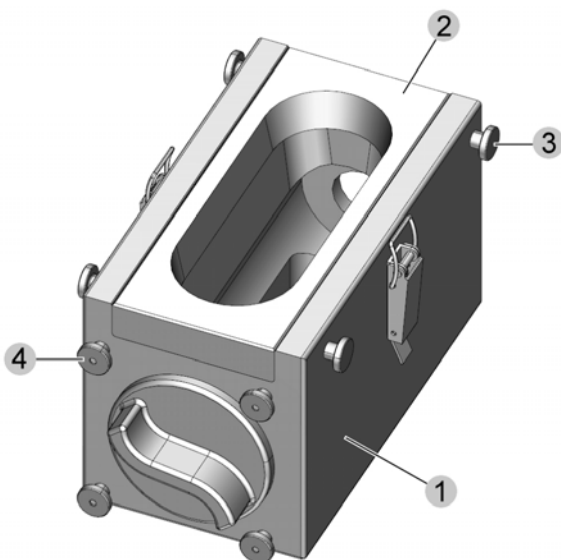


Fig. 43 Rotary valve

1. Rotary valve housing
2. Insert filling cone
3. Screw for fixing the insert of the filling cone (4x)
4. Screw for fixing rotary valve (4x)

Metering drum

The outer shell surface of the metering drum has a specific number of chambers. The metering drum (lying horizontally) is connected to the output shaft of the deflection unit in the rotary valve housing.

Various types of metering drum wheels with different chamber volumes may be used

→ see the “Changing the metering drum” section in the Operating instructions.

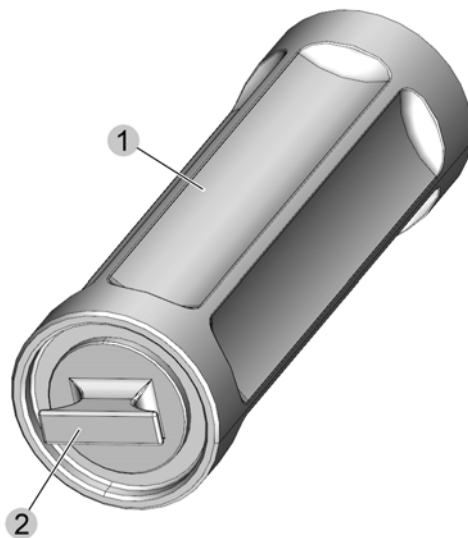


Fig. 44 Metering drum with handle

1. Metering drum
2. Handle

Deflection unit

The deflection unit consists of a bevel gear and an integrated pivot mounting. The deflection unit is held with the integrated pivot mounting by the supporting pin for the removal jig and is bolted to the head piece of the machine by means of two clamping levers.

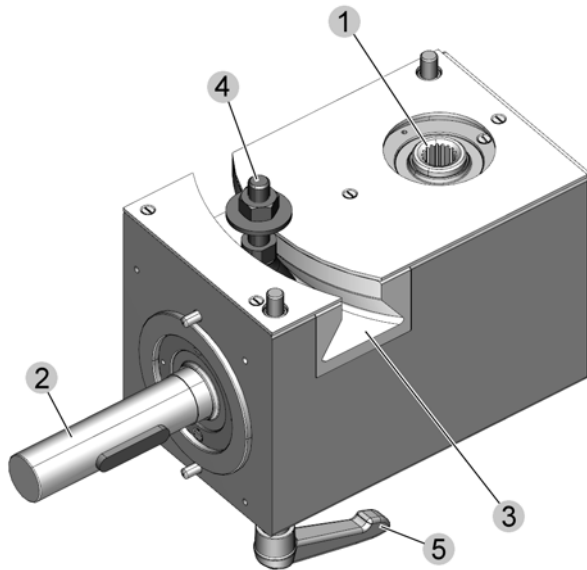


Fig. 45 Deflection unit

1. Drive shaft
2. Output shaft
3. Pivot mounting
4. Supporting pin
5. Clamping lever (2x)

Drive for metering drum

The metering drum is driven by a drive with an externally-gear motor shaft. The servo motor is integrated into the top part of the machine housing and the externally-gear motor shaft is connected to the internally-gear drive shaft (hub) of the deflection unit.

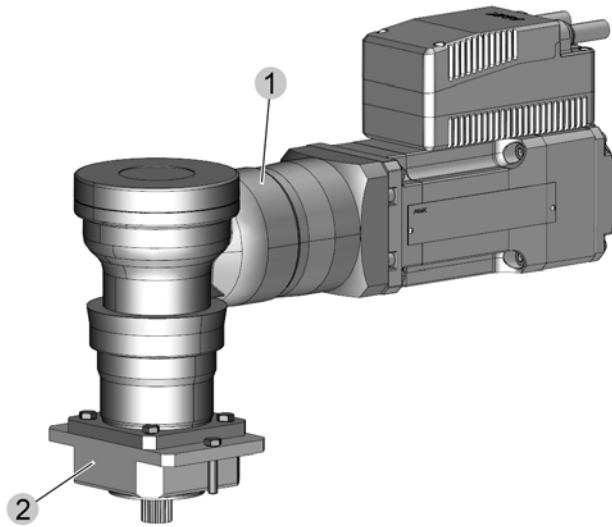


Fig. 46 Drive for metering drum

1. Drive
2. Adapter plate

4.9.3. Vibration unit (option)

The flow properties of the powder inside the powder dosing unit is facilitated by the installation of a vibration unit.

A pneumatically operated vibrator is fixed at the filling cone by means of a clamp and pneumatically connected.

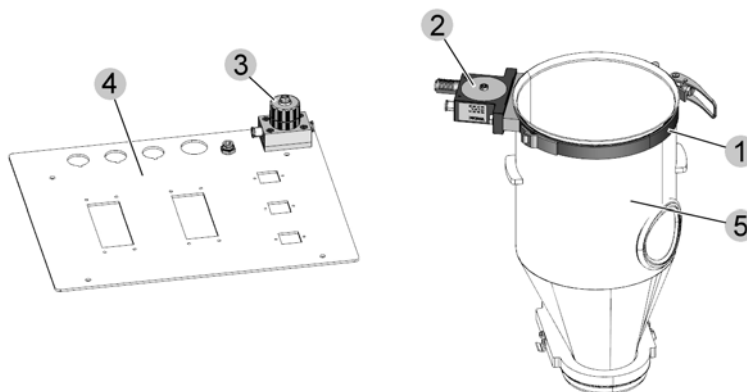


Fig. 47 Vibration unit (option)

1. Clamp
2. Vibrator
3. Throttle valve
4. Valve mounting plate
5. Filling cone

4.9.4. Description of the compression unit

The main part of the compression unit is the tamping pin holder which has six integrated compression segments (stations 1 - 6), each with 24 format-specific tamping pins.

Two lifting shafts are connected to the tamping pin holder by self-centering clamping assemblies and are bolted to the lifting spindles of the two lifting drives with tie bolts.

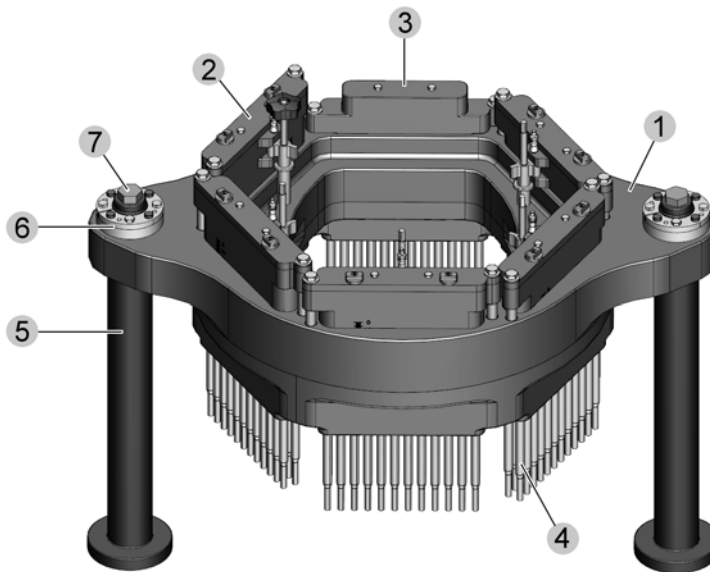


Fig. 48 Compression unit

1. Tamping pin holder
2. Compression segment (station 1 – 5)
3. Compression segment (station 6 = transfer station)
4. Tamping pins
5. Lifting shaft
6. Clamping assembly
7. Tie bolt

Compression segments (stations 1 – 5)

The compression segments at stations 1 – 5 consist of a guide block with two guide spindles and two screws for fixing the guide block into the tamping pin holder. Two parallel rows, each with 12 spring-mounted, format-specific tamping pins, are inserted into the receptacle of the guide block.

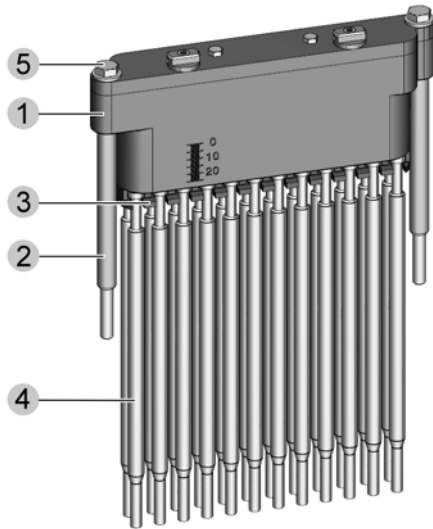


Fig. 49 Compression segments (stations 1 – 5)

1. Guide block
2. Guide shaft
3. Mounting tamping pins
4. Tamping pins
5. Screw

Compression segment (station 6)

The compression segment at station 6 (transfer station) is bolted into the tamping pin holder with two screws. Two parallel rows, each with 12 non-sprung, format-specific tamping pins, are inserted into the mounting at the compression segment.

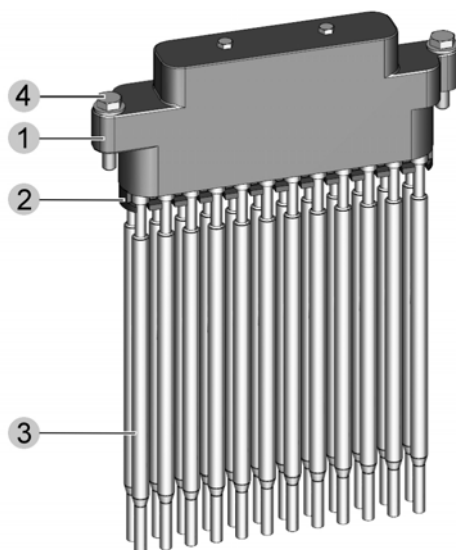


Fig. 50 Compression segment (station 6)

1. Counter-bearing
2. Mounting tamping pins
3. Tamping pins
4. Screw

4.9.5. Description of the powder dosing unit

The powder dosing unit is based on the mounting plate in the middle of which is the output flange of the rotary drive. The output flange is connected to the dosing disk and the distributor cone. The rake holder is fixed to two lifting columns.

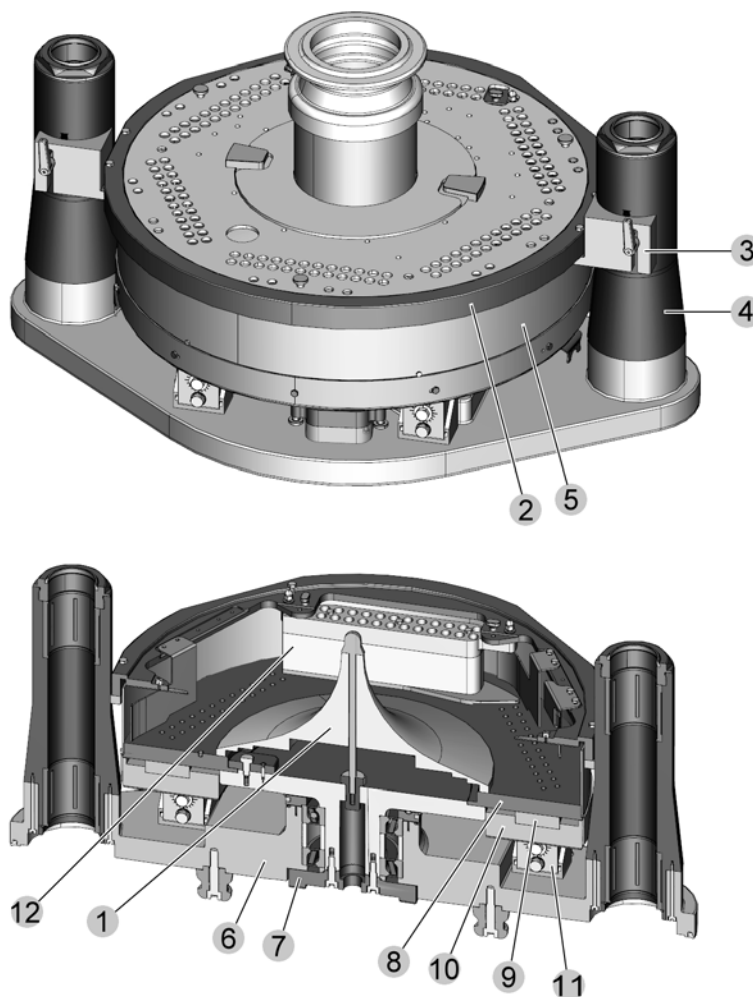


Fig. 51 Powder dosing unit

1. Distributor cone
2. Rake holder with dust seal
3. Rake holder slide
4. Lifting column
5. Powder pan

6. Mounting plate
7. Output flange
8. Dosing disk
9. Compacting ring
10. Mounting
11. Adjusting unit with counter-bearing
12. Transfer station scraper

Distance sensor

A distance sensor is fitted in the top part of the machine housing, above the dosing disk of the tamping station. The distance sensor uses class 2 laser light as defined in EN 60825-1.

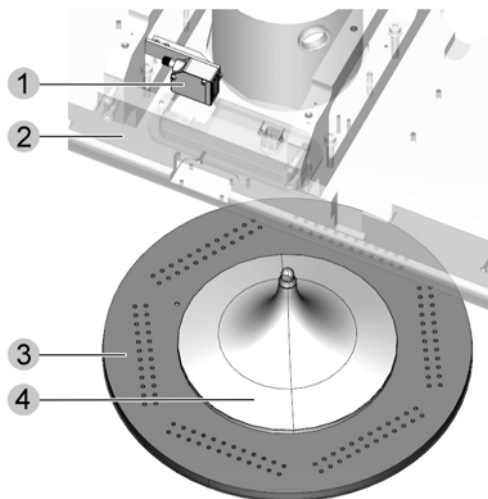


Fig. 52 Distance sensor

1. Distance sensor
2. Top part of housing
3. Dosing disk
4. Distributor cone



NOTICE

Class 2 laser as defined in EN 60825-1

The accessible laser radiation is non-hazardous for brief irradiation of the eyes under reasonably foreseeable conditions.

The reasonably foreseeable conditions apply when the machine is used as intended.

Dosing disk

The dosing disk contains six dosing hole sections, each with 24 format-specific dosing holes. The dosing holes are arranged in double rows and offset by 60° to one another on the ring surface.

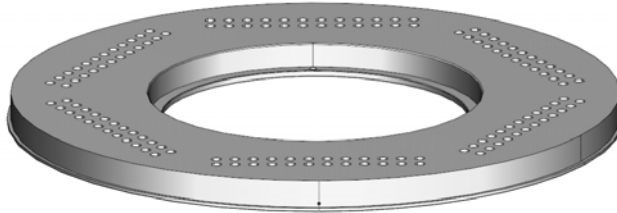


Fig. 53 Dosing disk

Distributor cone

The distributor cone is arranged in the middle of the dosing disk and is fixed in place with a central clamping screw.

Deflector plates and return feeders adapted for the distributor cone may also be fitted.

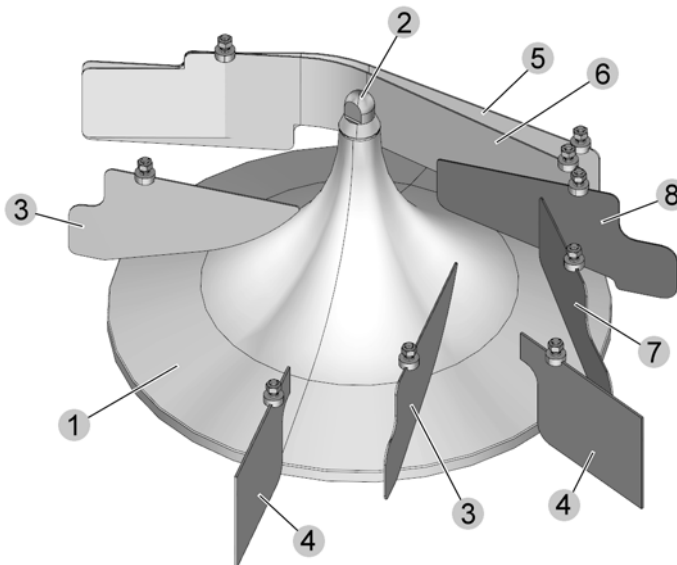


Fig. 54 Distributor cone

1. Distributor cone
2. Clamping screw
3. Return feeder
4. Return feeder
5. Deflector plate
6. Deflector plate
7. Return feeder

8. Return feeder

Rake holder with dust seal

The rakes, deflector plates and transfer station scraper are mounted on the rake holder. The rake holder is bolted to the two lifting columns with the two slides. The slide heights can be adjusted and fixed in place with clamping levers. The rake holder is covered with a dust seal.

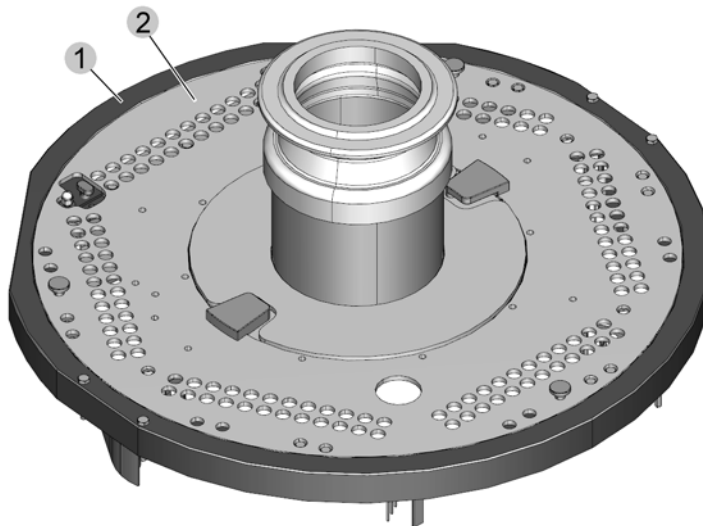


Fig. 55 Rake holder with dust seal

1. Rake holder
2. Dust seal

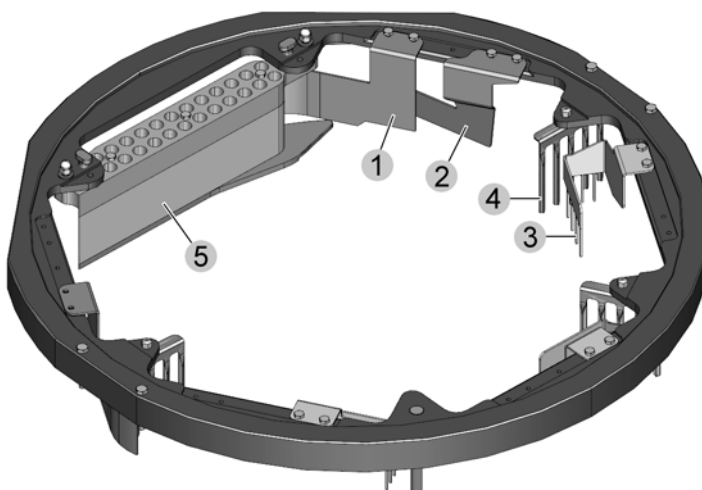


Fig. 56 Rake holder

1. Guide plate
2. Guide plate
3. Guide plate

4. Rake
5. Scraper transfer station

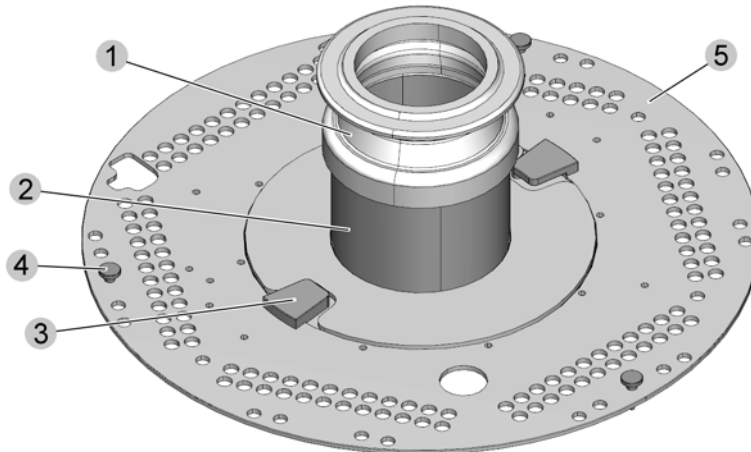


Fig. 57 Dust seal

1. Collar
2. Pipe stub
3. End stop
4. Screw for fixing the dust seal
5. Dust seal

Scraper transfer station

There are two parallel rows, each with 12 through holes, in the multi-part main body of the transfer station scraper. A scraper is pushed in on the underside. Two guide pins are pressed in on the top.

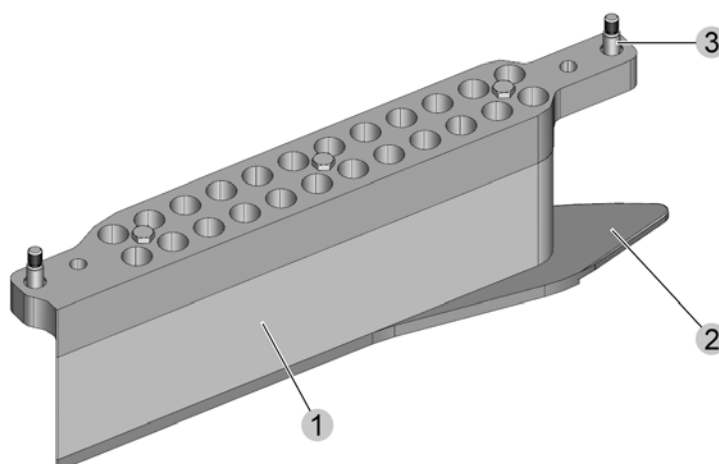


Fig. 58 Transfer station scraper

1. Main body

2. Scraper
3. Guide pin

4.9.6. Description of the compacting ring extraction unit

Together the dosing disk and mounting for the compacting ring form annular extraction ducts which are connected to the dust extraction system.

The mounting for the compacting ring has secondary air openings which can be wholly or partly covered by two adjustable sliders.

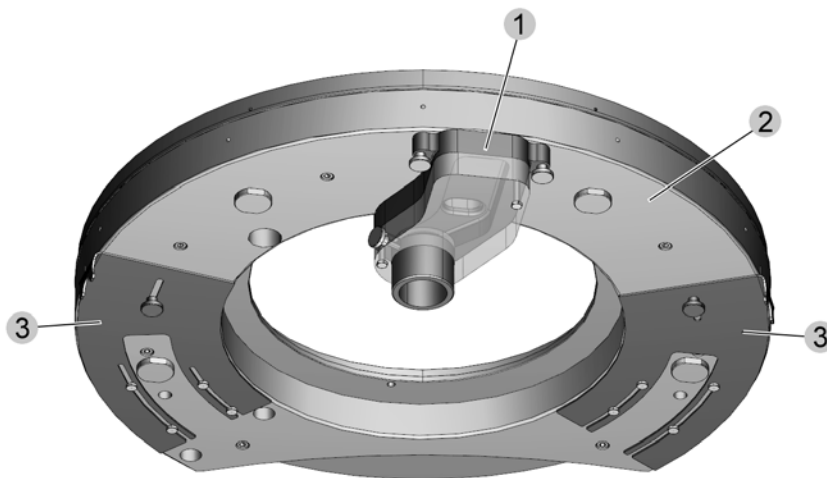


Fig. 59 *Compacting ring extraction unit*

1. Compacting ring extraction unit
2. Mounting for the compacting ring
3. Filling slide

4.9.7. Description of the extraction unit at the product transfer to dosing unit

Below the point at which the pre-compressed product (tamping station) or pellets (pellet station) are transferred from the pellet station into the capsule bottom parts, each dosing station (1, 2 and 3) has an extraction unit which is connected to the dust extraction line.

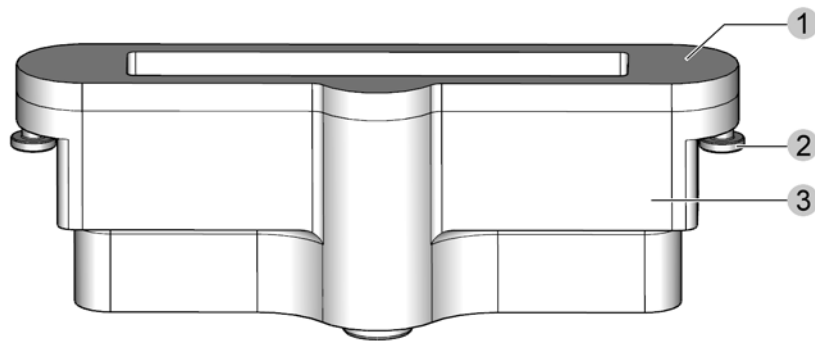


Fig. 60 Extraction unit at the product transfer to dosing unit

1. Extraction cover
2. Screws (2x)
3. Extraction unit

4.9.8. Description of the rotary drive

The tamping station has a rotary drive that is arranged beneath the intermediate plate of the machine frame in the form of a float-mounted torque motor. The motor mounting plate is mounted on four braced compression springs. The flange on the motor side (drive flange) and the output flange are connected positively and non-positively by splines on the axial face (Hirth coupling).

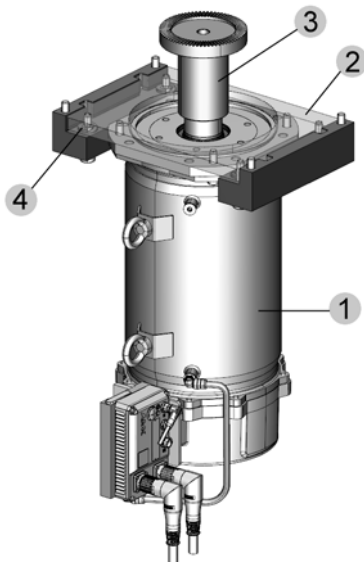


Fig. 61 Rotary drive

1. Torque motor
2. Motor mounting plate
3. Flange on motor side (drive flange)
4. Compression spring (4x)

4.9.9. Description of the lifting drive

The tamping station has two lifting drives that are designed with integrated lifting spindle and rotating spindle nut. The lifting spindles are connected to the lifting shafts of the compression unit.

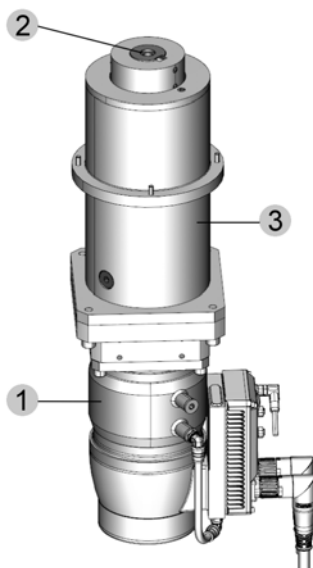


Fig. 62 Lifting drive

1. Drive
2. Lifting spindle
3. Motor bell housing

4.9.10. Description of the fixing adapter

The tamping station mounting plate is bolted to the tabletop of the machine frame with two fixing adapters. Two adjusting screws connect two locating holes on the underside of the mounting plate to the locating holes of the two fixing adapters.

The powder dosing unit, compression unit and dosing disk are mounted on the tamping station's mounting plate.

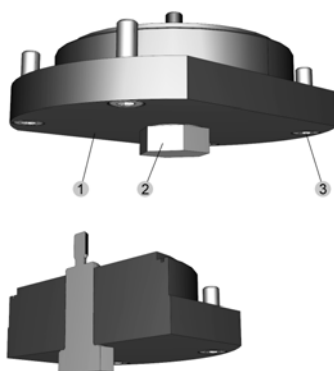


Fig. 63 Fixing adapter

1. Fixing adapter

2. Adjusting screw
3. Fixing screws

4.9.11. Zero-point clamping system (option)

The tamping station's mounting plate, including the powder dosing and compression units mounted on it, can as an option be efficiently changed as a complete module using the zero-point clamping system.

The mounting plate is positioned and fixed in relation to the machine frame tabletop via two zero-point clamping modules in conjunction with two clamping bolts. The two clamping bolts are each inserted into a locating hole in the mounting plate and fixed in place with screws.

The zero-point clamping module is closed by spring force and locks the clamping bolts with its self-locking effect. The module is released by compressed air.

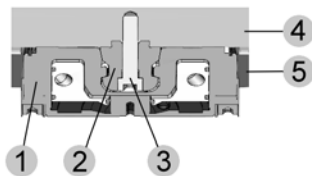


Fig. 64 Zero-point clamping system (sectional view)

1. Zero-point clamping module
2. Clamping bolt
3. Fixing screw
4. Mounting plate
5. Tabletop (machine frame)

4.9.12. RFID dosing disk (option)

There is an RFID tag inserted on the underside of the RFID dosing disk. This tag contains an identifying code. This ID can be read by the RFID scanner head via an RFID coupler.

RFID technology (*Radio Frequency IDentification*) allows the dosing disk to be identified without contact, e.g. by reading the dosing disk thickness and capsule size.

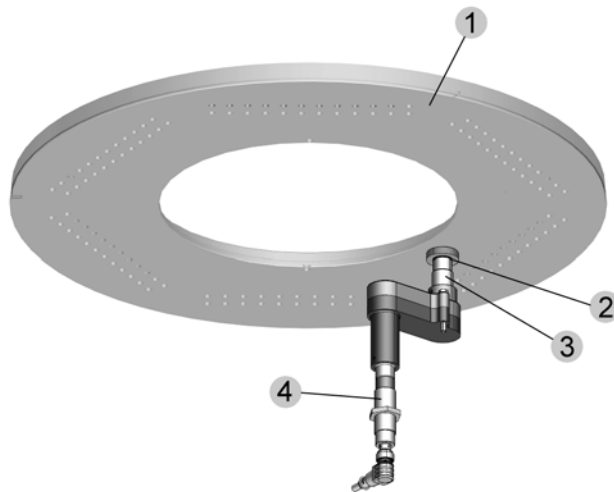


Fig. 65 RFID dosing disk with sensor

1. RFID dosing disk
2. RFID tag
3. RFID coupler
4. RFID scanning head

4.9.13. Changing the metering drum

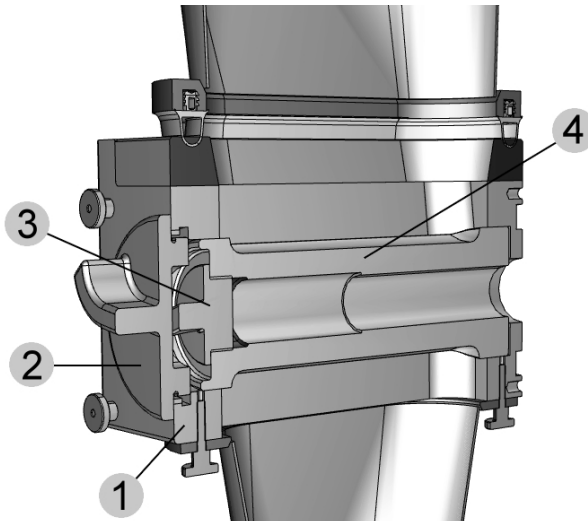


Fig. 66 Changing the metering drum (sectional view)

1. Rotary valve housing
2. Bayonet cap
3. Handle
4. Metering drum

Removing the metering drum

1. Empty the filling cone before removing the metering drum.
2. Give the bayonet cap a quarter turn counter-clockwise and remove.
3. Use the grab handle on the metering drum to pull it off the deflection unit drive shaft.

Fitting the metering drum

1. Using the handle, push the metering drum as far as it will go onto the deflection unit output shaft.
2. Insert the bayonet cap and give a quarter turn clockwise to fix in place.

4.9.14. Set the transfer station scraper

The force with which the transfer station scraper presses on the dosing disk affects the product losses at the transfer station and the wear on the scraper.

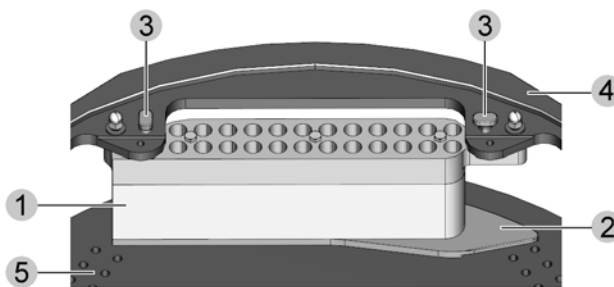


Fig. 67 Set the transfer station scraper

1. Main body
2. Scraper
3. Adjusting screw
4. Rake holder
5. Dosing disk

The pressing force of the transfer station scraper can be adjusted as follows:

- Turn the adjusting screws clockwise to increase the preset pressing force or
- Turn the adjusting screws counter-clockwise to decrease the preset pressing force.

4.9.15. Change the transfer station scraper

At batch changes, visually inspect the cleaned scraper for wear. If necessary, replace the worn scraper with a new scraper.

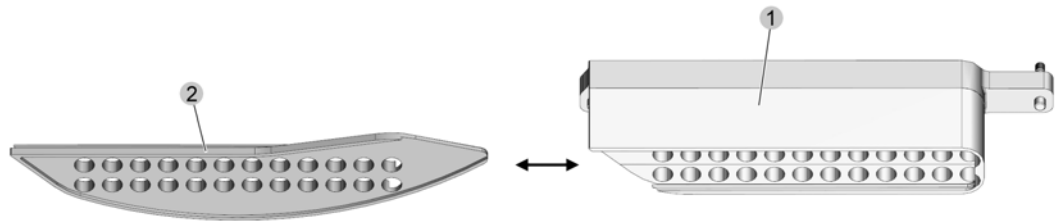


Fig. 68 Change the transfer station scraper

1. Main body
2. Scraper

To remove the transfer station scraper

1. Push the scraper out of the main body.
2. Remove the scraper.

To fit the transfer station scraper

1. Introduce the scraper into the groove on the underside of the main body.
2. Push the scraper in as far as it will go.

4.10. Removal jig for tamping station (option)

4.10.1. Description of the removal jig for tamping station

The tamping station removal jig consists of:

- Removal beam
- Guide carriage
- Assembly carrier

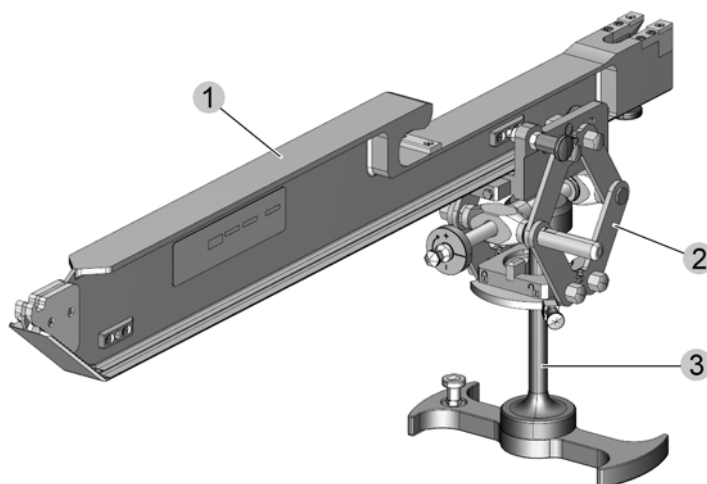


Fig. 69 Removal jig for tamping station

1. Removal beam
2. Guide carriage
3. Assembly carrier

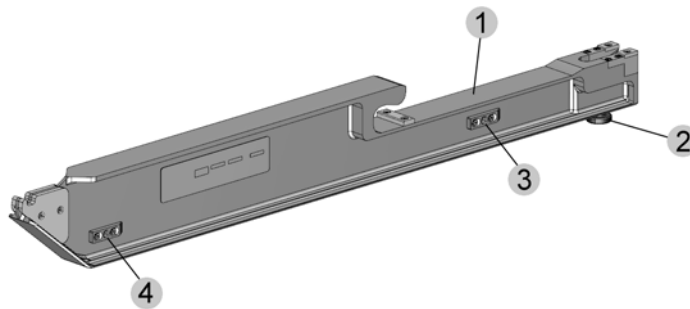


Fig. 70 Removal beam

1. Removal beam
2. Indexing plunger for locking the removal beam
3. Locking mechanism for the guide carriage (removal / installation position)
4. Locking mechanism for the guide carriage (park position)

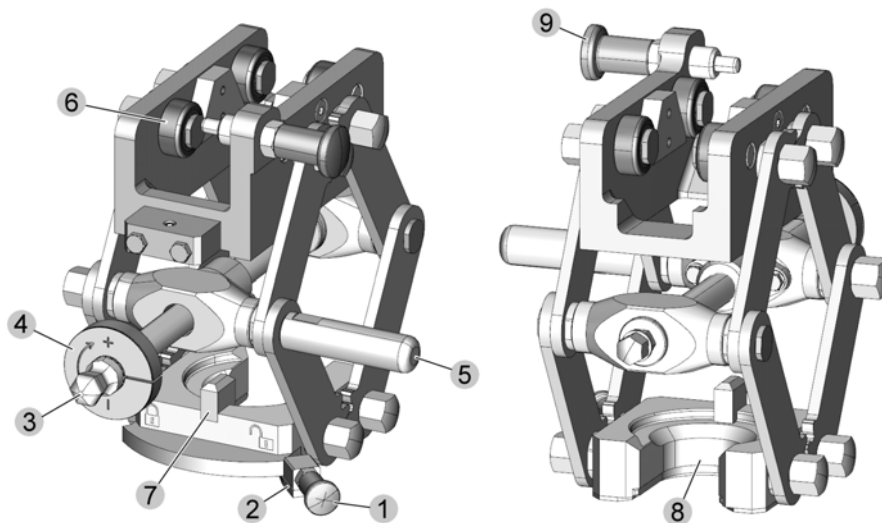


Fig. 71 Guide carriage

1. Indexing plunger for latch-lever locking mechanism
2. Latch lever
3. Threaded spindle
4. Direction of rotation indicator
5. Grab handle
6. Roller
7. Guide for groove in lifting support

8. Mounting for lifting support
9. Indexing plunger for guide-carriage locking mechanism

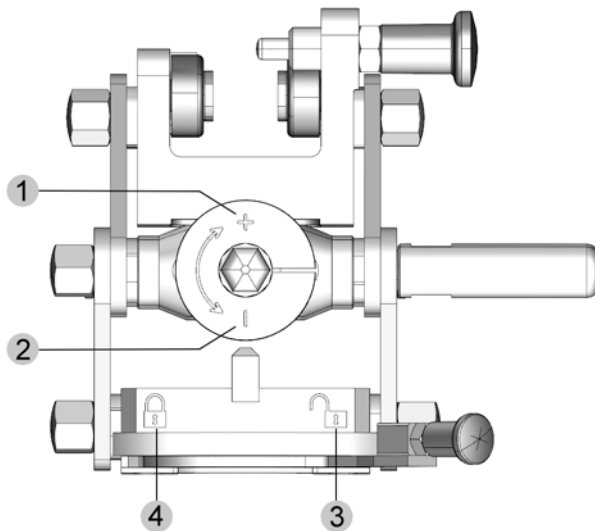


Fig. 72 Symbols on the guide carriage

1. Threaded spindle direction of rotation "+": Raise tamping module
2. Threaded spindle direction of rotation "-": Lower tamping module
3. Indexing plunger for latch-lever locking mechanism in "open" position: mounting for lifting support opened
4. Indexing plunger for latch-lever locking mechanism in "closed" position: mounting for lifting support closed

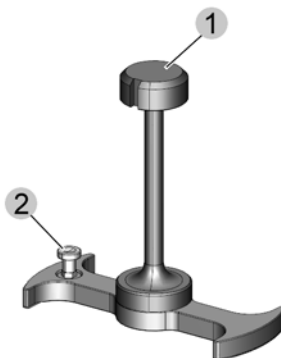


Fig. 73 Assembly carrier

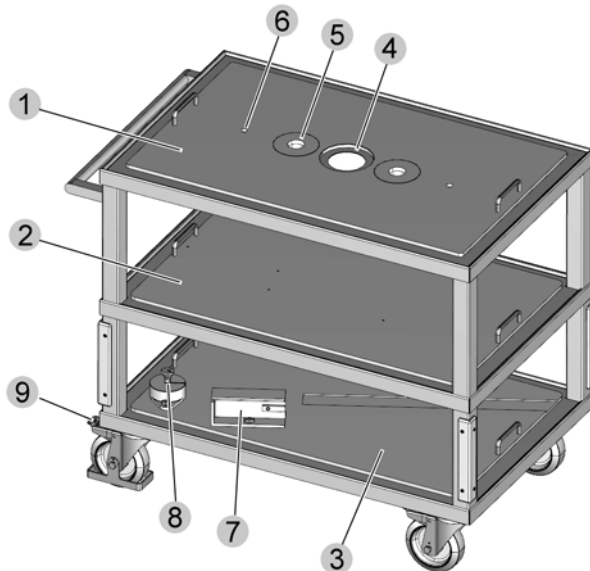
1. Lifting support
2. Indexing plunger for locking the assembly carrier

4.10.2. Changing the tamping station with the removal jig

→ "Changing the tamping station with the removal jig" section in the maintenance manual.

4.11. Service cart for accomodating a tamping station

The moveable service cart for accomodating a tamping station can be used to temporarily place down interchangeable parts which are installed in or removed from the machine in an orderly manner during the exchange of the tamping station by means of a removal jig.



1. Top mounting plate for a tamping module
2. Middle mounting plate for interchangeable parts
3. Bottom mounting plate for interchangeable parts
4. Mounting for output flange
5. Mounting for clamping bolt
6. Mounting for tie bolt(s)
7. Mounting for guide carriage
8. Supporting pin for removal beam
9. Parking brake

4.12. Pellet station

4.12.1. Description of the pellet station

The pellet station consists of:

- Pellet feeder
- Pellet doser
- Housing (sensor housing, top, middle and bottom parts of the housing)
- Drives

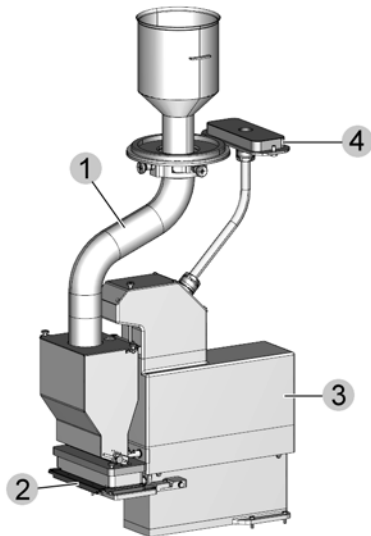


Fig. 74 Pellet station

1. Pellet feeder
2. Pellet doser
3. Housing with drives and pellet filling cone sensor
4. Cover for head part with cable protection conduit

4.12.2. Description of the pellet feeder

The pellet feeder consists of filling cone, filling pipe and pellet filling cone.

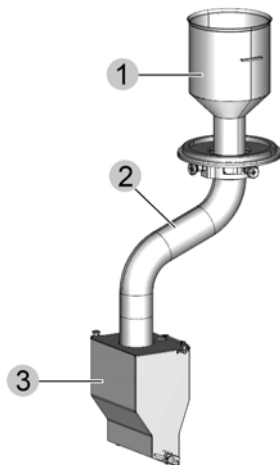


Fig. 75 Pellet feeder

1. Filling cone
2. Filling pipe
3. Pellet filling cone (also called storage container)

Filling cone

The filling cone is fixed in the top part of the machine housing with a bayonet closure.

Filling pipe

The filling pipe is bolted to the filling cone outlet and runs to the pellet filling cone.

Pellet filling cone

The pellet filling cone is pivot mounted on the pellet station housing.

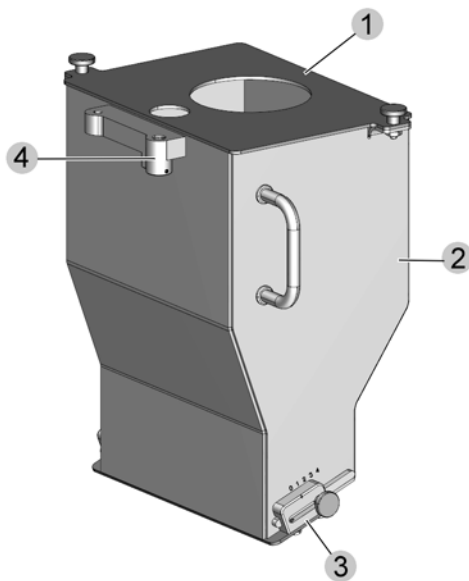


Fig. 76 Pellet filling cone

1. Cover
2. Housing
3. Slide
4. Pivot mounting

4.12.3. Description of the pellet doser

The pellet doser consists of the temporary container and the format-specific set (top dosing plate, bottom dosing plate and transfer plate).

The two dosing plates (top dosing plate, bottom dosing plate) together form the dosing unit and the dosing chamber.

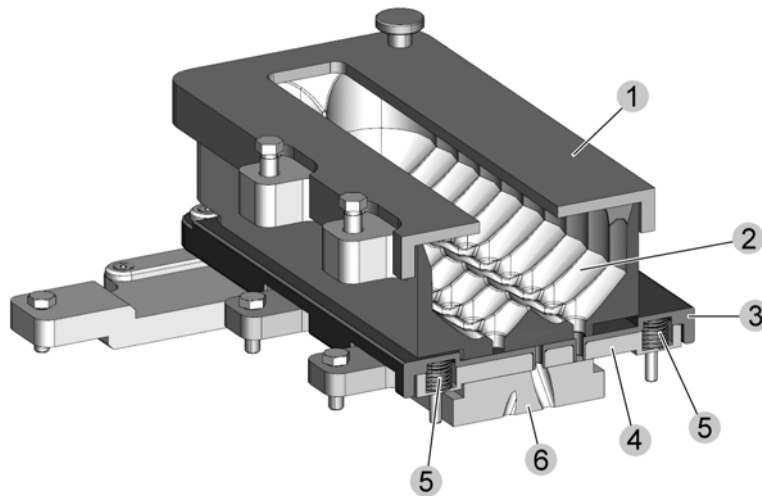


Fig. 77 Pellet doser (sectional view)

1. Cover
2. Temporary container
3. Top dosing plate
4. Bottom dosing plate
5. Compression spring
6. Transfer plate

4.12.4. Description of the extraction unit at the product transfer to dosing unit

Below the point at which the pre-compressed product (tamping station) or pellets (pellet station) are transferred from the pellet station into the capsule bottom parts, each dosing station (1, 2 and 3) has an extraction unit which is connected to the dust extraction line.

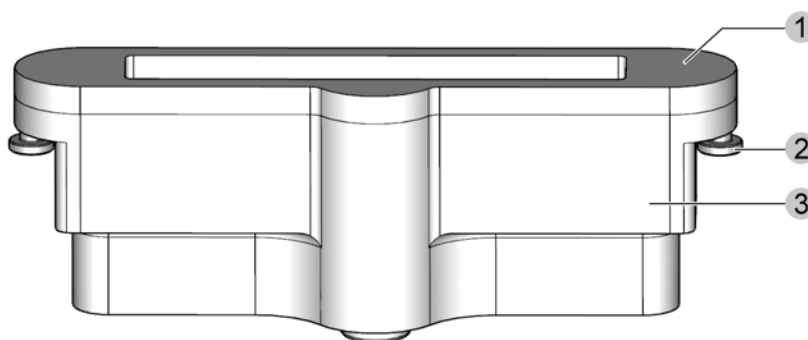


Fig. 78 Extraction unit at the product transfer to dosing unit

1. Extraction cover
2. Screws (2x)
3. Extraction unit

4.12.5. Description of the pellet station housing

The pellet station housing (sensor housing and top, middle and bottom parts of the housing) integrates the drives and sensors for the pellet station.

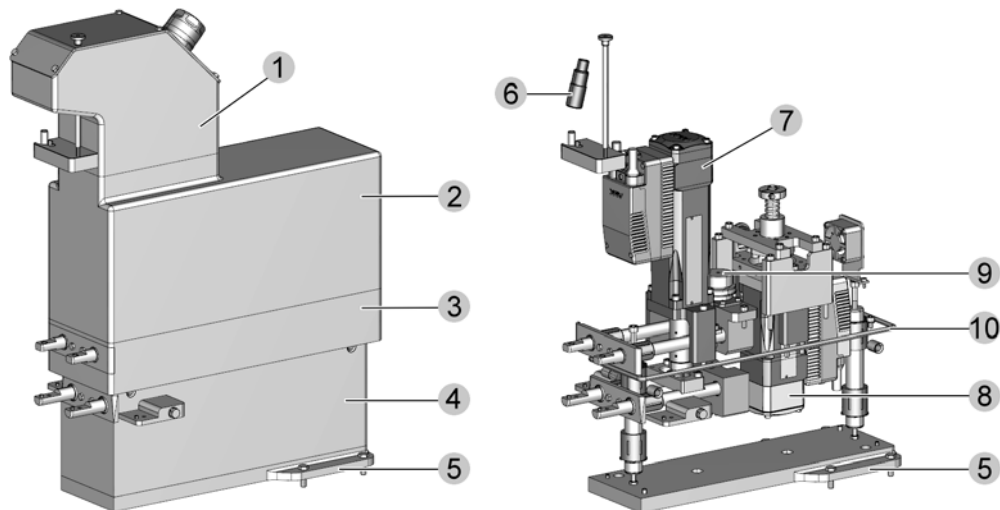


Fig. 79 Pellet station housing

1. Sensor housing
2. Top part of housing
3. Middle part of housing
4. Bottom part of housing
5. Housing base
6. Pellet filling cone sensor
7. Drive dosing unit
8. Adjustment drive for the volume adjustment of the dosing chamber
9. Vibrator (option)
10. O-Ring

4.12.6. Description of drive dosing unit

The motor shaft of the drive for the dosing unit is connected to an eccentric shaft as a tight fit. There is a roller mounted on the off-center tappet of the eccentric cam.

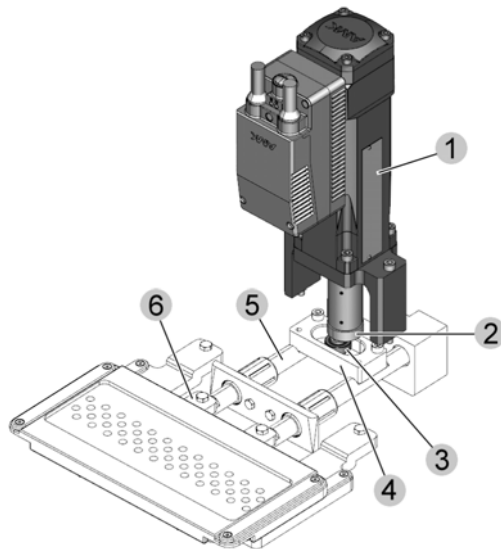


Fig. 80 Drive dosing unit

1. Drive dosing unit
2. Eccentric shaft
3. Roller
4. Eccentric plate
5. Guide shaft
6. Bottom dosing plate

4.12.7. Description of the adjustment drive for volume adjustment of the dosing chamber

The adjustment drive for the volume adjustment of the dosing chamber is a spindle motor with spindle nut (ball screw drive). The spindle motor is connected to the bottom part of the housing and the spindle nut to the middle part.

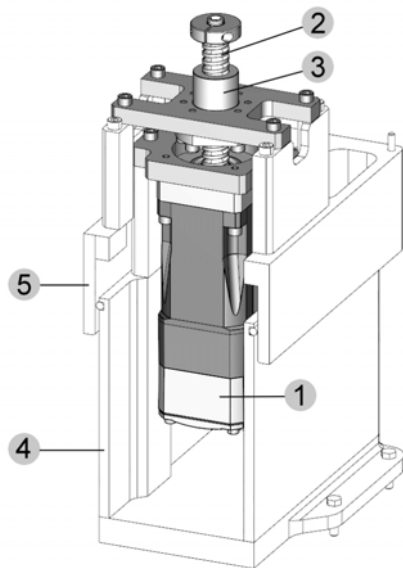


Fig. 81 Adjustment drive for the volume adjustment of the dosing chamber

1. Spindle motor
2. Spindle
3. Spindle nut
4. Bottom part of housing (sectional view)
5. Middle part of housing (sectional view)

4.12.8. Vibrator (option)

The flow properties of the pellets in the temporary container of the pellet doser can be improved by the vibrator.

A compact electric motor can be installed in the middle part of the housing as an option. The shaft of this motor is connected to an eccentric cam. There is a roller mounted on the slightly off-center tappet of the eccentric cam.

The rotary movement of the eccentric cam, in conjunction with the roller in the square mounting on the connecting plate, is converted into a horizontal lifting movement (vibration) of the connecting plate.

The resulting vibration is transferred from the connecting plate via the two guide shafts to the temporary container.

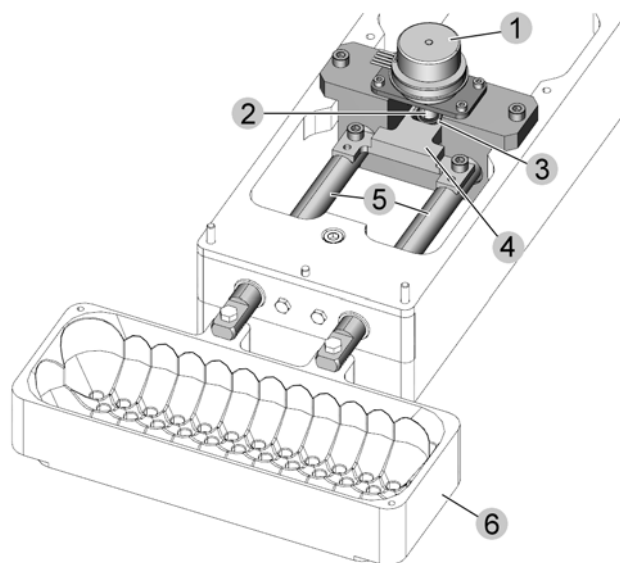
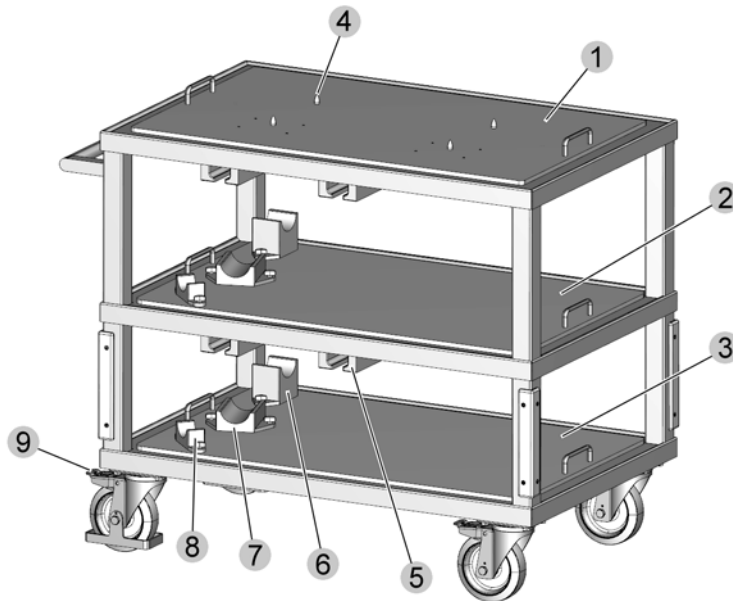


Fig. 82 *Vibration drive*

1. Electric motor
2. Eccentric cam
3. Roller
4. Connecting plate
5. Guide shafts
6. Temporary container

4.13. Service cart for accomodating up to two pellet stations

The moveable service cart for accomodating up to two pellet stations can be used to temporarily place down interchangeable parts which are installed in or removed from the machine in an orderly manner during the exchange of the pellet station.



1. Top mounting plate for two pellet stations
2. Middle mounting plate for interchangeable parts
3. Bottom mounting plate for interchangeable parts
4. Centering pin
5. Mounting for support plate with clamping bolt
6. Mounting for filling cone
7. Mounting for filling pipe
8. Mounting for filling pipe
9. Parking brake

4.14. Rejection of non-separated capsules

4.14.1. Ejection unit for non-separated capsules

The extraction unit for non-separated capsules, which is connected to the extraction line, is located at position "Ejection unit for non-separated capsules", above the mounting plate including ejecting pins.

Inside the extraction nozzle are two adjustable guide plates. There is also a height-adjustable slide. The extraction pipe has an opening for the subsidiary air line which can be partially or fully covered by the air regulation slide.

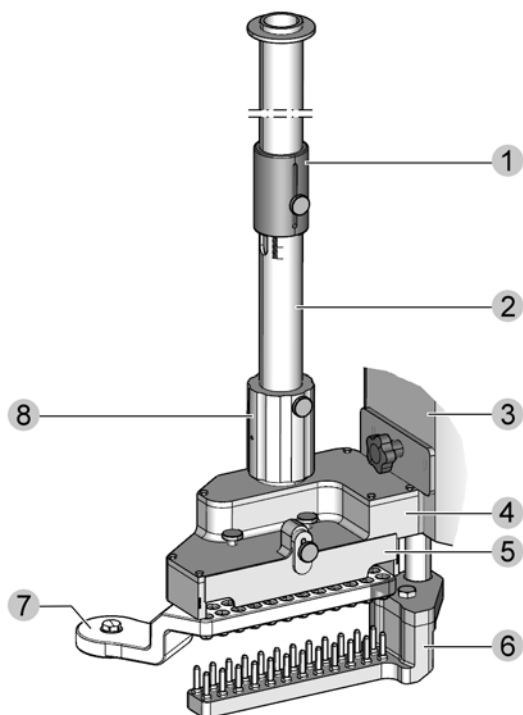


Fig. 83 Ejection unit for non-separated capsules

1. Air regulation slide
2. Extraction pipe
3. Base middle column
4. Extraction nozzle
5. Slide extraction nozzle
6. Fixing plate with inserted ejecting pins (24x)
7. Capsule top part holder
8. Tension lock

4.14.2. Changing ejecting pins for non-separated capsules

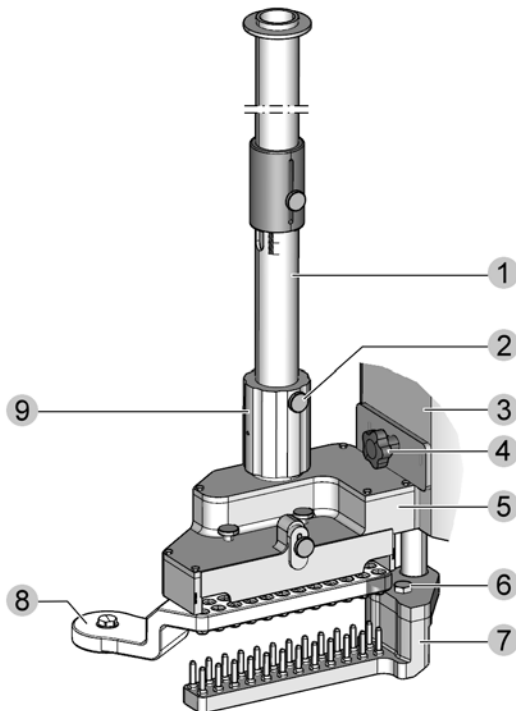


Fig. 84 Changing ejecting pins for non-separated capsules

1. Extraction pipe
2. Knurled screw
3. Base middle column
4. Star grip screw
5. Extraction nozzles
6. Screw
7. Fixing plate with inserted ejecting pins (24x)
8. Capsule top part holder
9. Tension lock

In order to facilitate accesability to the components, the extraction of non-separated capsules and the capsule top part holder at position "Ejection of non-separated capsules" should be removed prior to the change of the ejecting pins.

Disassembly of ejecting pins

1. Dismounting the extraction of non-separated capsules:
 - Loosen knurled screw (2).
 - Turn the tension lock (9) clockwise (which then moves up) until the end stop is reached.

- Push the tension lock up until the air gap between the lower end of the extraction pipe and the extraction nozzle becomes visible.
- Tighten knurled screw (2).

The connection between the extraction pipe and the extraction nozzle is open.

- Remove extraction pipe (1).
- Unscrew the star grip screw (4) from the base of the middle column (3).
- Remove the extraction nozzle (5).

2. Removing the capsule top part holder:

- Remove capsule top part holder (8) at position "Ejection of non-separated capsules". Therefore, see also section → "Changing of the capsule holders" in the Operating instructions of the machine.

3. Removing the ejecting pins:

- Unscrew screw (6).
- Remove fixing plate with inserted ejecting pins (7).

Assembly of ejecting pins

1. Mounting the ejecting pins:

- Insert fixing plate with inserted ejecting pins (7).
- Tighten (6) screw.

2. Installing the capsule top part holder:

- Install capsule top part holder (8) at position "Ejection of non-separated capsules". Therefore, see also section → "Changing of the capsule holders" in the Operating instructions of the machine.

3. Installing the extraction of non-separated capsules:

- Position extraction nozzle (5) at the base of the middle column (3).
- Tighten star grip screws at the (4) base of the middle column.
- Insert the upper end of the extraction pipe (1) into the head piece of the machine.
- Position the lower end of the extraction pipe above the extraction nozzle.
- Loosen the knurled screw, if necessary (2).
- Push the tension lock down until the end stop is reached (9).
- Move the tension lock manually anticlockwise (which then moves down) until the end stop is reached.
- Tighten knurled screw (2).

The connection between the extraction pipe and the extraction nozzle is closed.

4.15. Closing station

4.15.1. Description of the closing station

The closing station consists of an upper and a lower closing unit. Each closing unit is moved by an adjustment drive and is guided by linear units. The closing units have either 24 upper or 24 lower closing pins for closing the capsules.

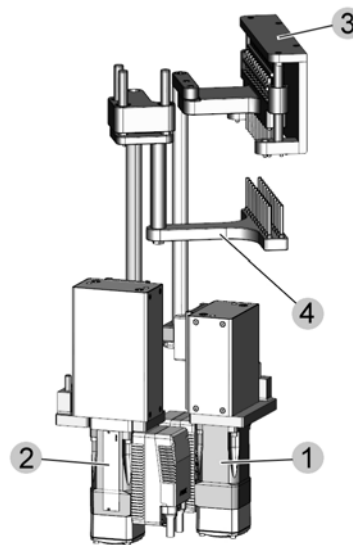


Fig. 85 Closing station

1. Adjustment drive for upper closing unit
2. Adjustment drive for lower closing unit
3. Upper closing unit
4. Lower closing unit

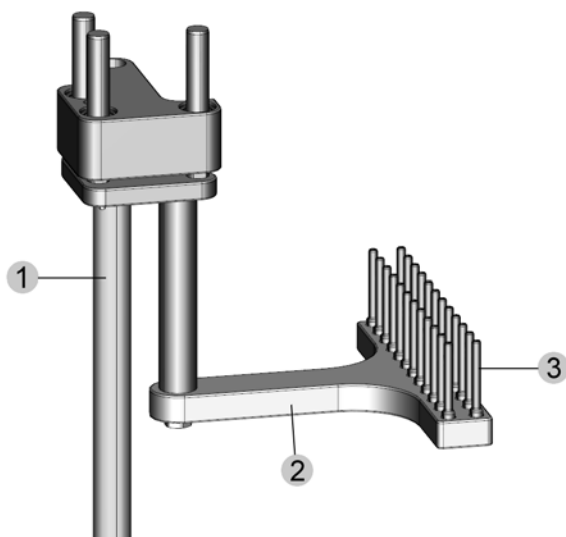


Fig. 86 Lower closing unit

1. Lifting shaft for lower closing unit
2. Fixing plate for lower closing pins
3. Lower closing pins

The lower closing unit is moved vertically towards the capsule bottom parts by the adjustment drive.

The lower closing pins are format parts which are changed by replacing the fixing plate. The format depends on the capsule size.

The length of the capsules is taken into account by the format-specific lift of the upper and lower closing units.

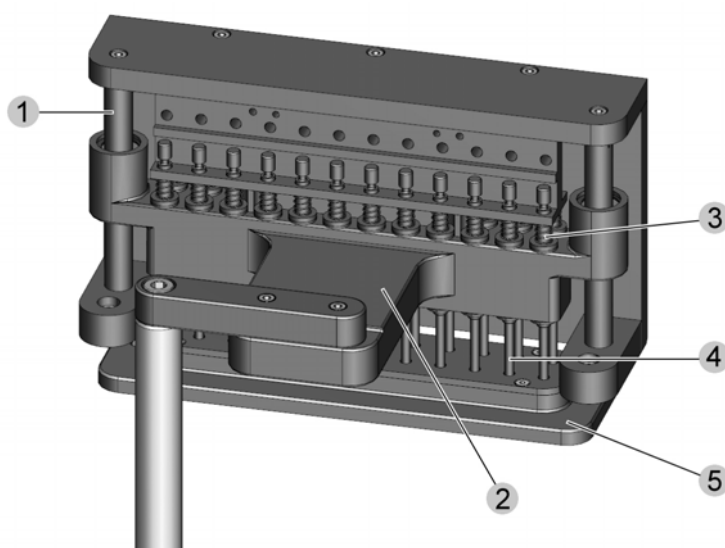


Fig. 87 Upper closing unit

1. Mounting for linear guide with 2 guide shafts
2. Guide block for upper closing pins
3. Springs
4. Upper closing pins
5. Scraper holder with scrapers

The mounting for the linear guide is fixed to the housing of the closing station. The guide block is moved by the adjustment drive and guided by the linear guides. The guide block acts as the mounting for the upper closing pins. These are individually spring-mounted.

4.15.2. Capsule Closing Control CCC (option)

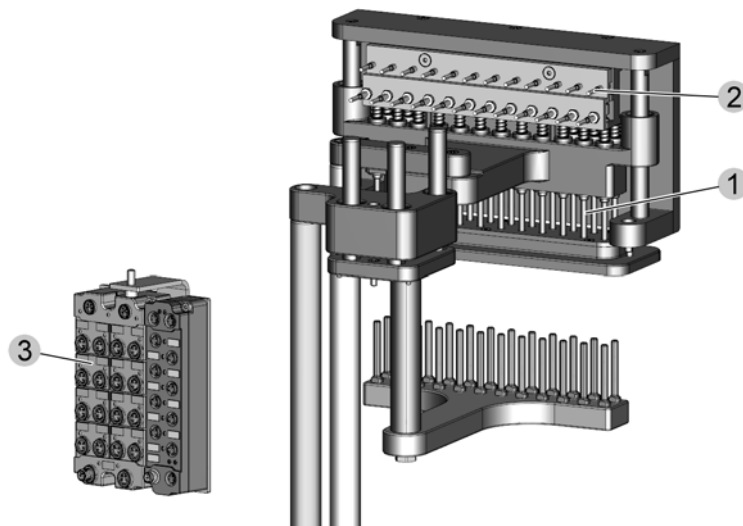


Fig. 88 Capsule Closing Control (CCC)

1. Upper closing pins
2. Proximity switch
3. I/O-module

The Capsule Closing Control (CCC) describes the closing control via proximity switches at the closing station.

The movement of each of the individual upper closing pins is monitored by a separate proximity switch.

If the capsule has been closed successfully, the relevant pin is moved up by the capsule. The proximity switches detect the pins that are deflected upwards.

If there is no capsule or no capsule top part present, the pin remains in its lower position, i.e. the proximity switch is not triggered and an unsuccessful closing attempt is reported.

4.16. Capsule ejector and cleaning

4.16.1. Description of the capsule ejector and cleaning

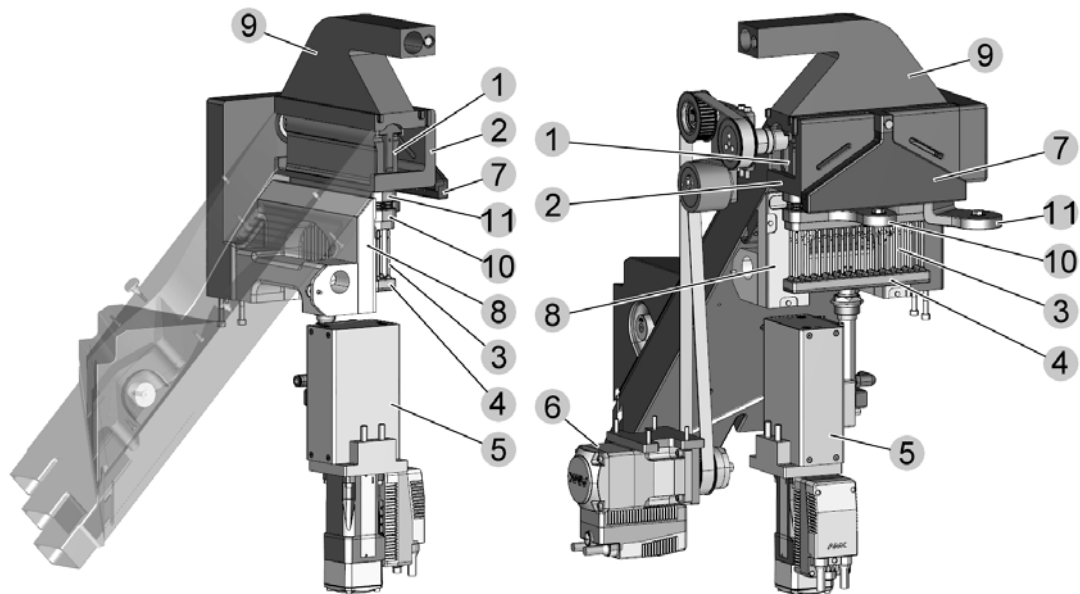


Fig. 89 Capsule ejection and cleaning

1. Ejection flap
2. Ejection guide
3. Ejecting pins
4. Ejecting pin holder
5. Ejecting pin drive
6. Ejection flap drive
7. Capsule holder cleaning nozzle
8. Capsule holder extraction unit
9. Ejection flap, extraction
10. Capsule bottom part holder
11. Capsule top part holder

Capsule ejector

The ejecting flap is located above the ejection guide and is driven by a belt drive.

The capsule holder is positioned beneath the ejection guide. There is a holder with ejecting pins beneath the capsule holder and ejection guide. The ejecting pin holder is moved into the capsule holder from below.

The ejection guide is a format-specific part and must be replaced when the format changes.

Cleaning

The ejecting pins have integrated air ducts with outlet slots. These are used to inject the compressed air for cleaning the top part and bottom part sockets in the capsule holders.

The extraction unit is connected via the through holes in the ejecting flap.

The cleaning nozzle attached at the side is directed onto the area between the top part and bottom part holders. The capsule holder extraction unit is on the opposite side.

4.16.2. Changing the capsule ejector



WARNING!

Risk of crushing by ejection pins of the capsule ejector

Crushing is possible between the table surface and holder ejection pins.

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.



WARNING!

Risk of injury from compressed air

Risk of injury from actuators controlled by compressed air, a direct jet of compressed air or by parts that are accelerated by compressed air.

- Work on the machine's pneumatic system must only be carried out by personnel with mechanical training.

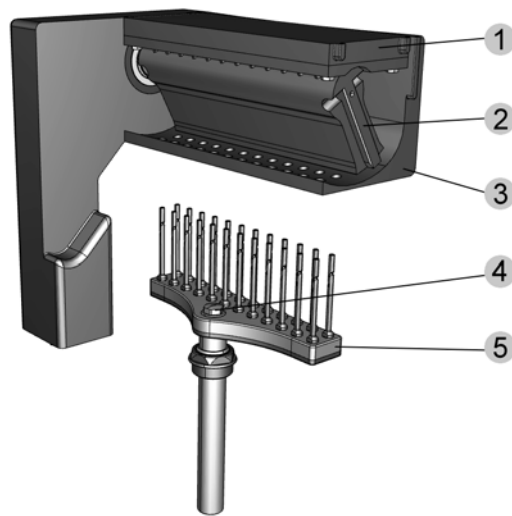


Fig. 90 Removing the capsule ejector

Removing the capsule ejector

1. Remove the extraction unit
2. Remove the ejecting flap
3. Remove the ejection guide
4. Loosen the screw
5. Remove the ejecting pin holder

Installing the capsule ejector

Reverse the sequence to install the capsule ejector.

4.17. Capsule discharge

4.17.1. Capsule discharge with 3 channels

The capsules are removed from the machine via the capsule discharge. The capsule discharge is clipped into the machine.

The discharge is checked by an initiator; the machine cannot be started unless the discharge is installed.

The capsules are sorted into the desired channels by gates. The gates sort good, reject and sample capsules into the corresponding channels.

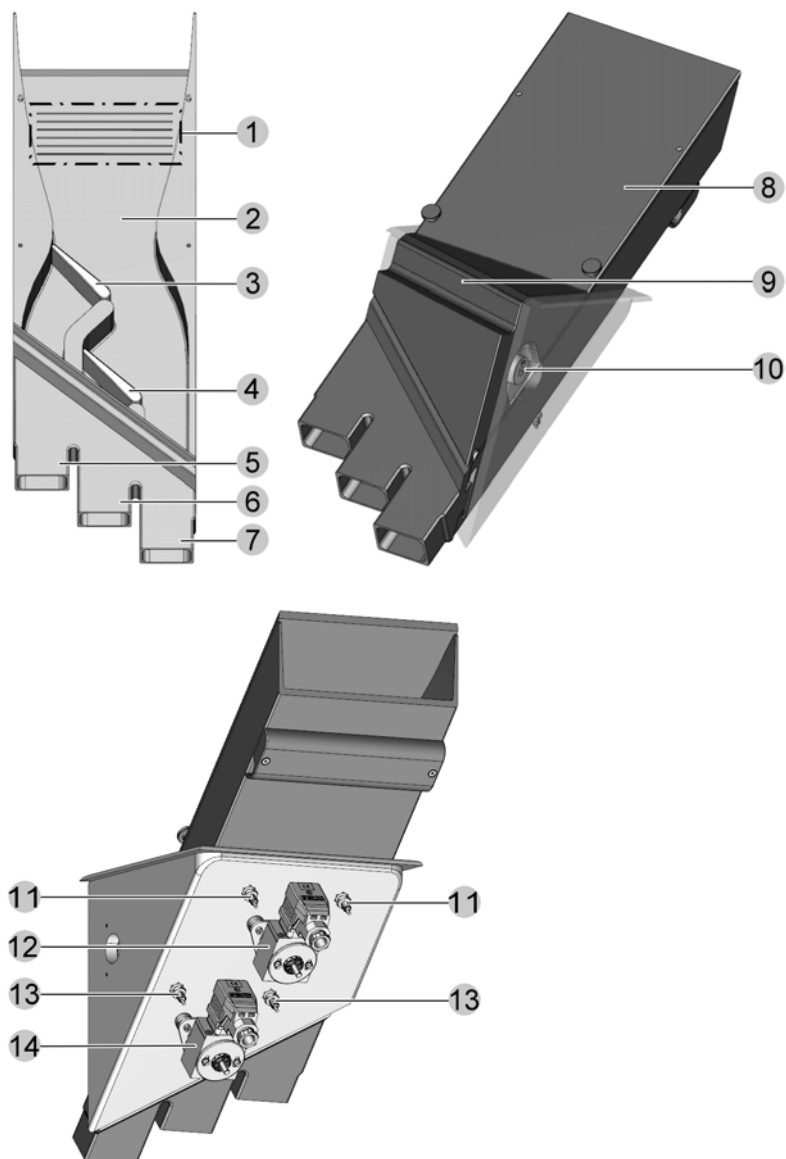


Fig. 91 Capsule discharge

1. Capsule discharge extraction unit
The capsule discharge contains a dust extraction for the capsules (see also the "Dust extraction" section).
2. Discharge chute
3. Reject channel gate
4. Sample channel gate
5. Reject channel
6. Sample channel
7. Good channel
8. Cover for discharge chute

9. Cover for discharge
10. Discharge position check
11. Position check proximity switch for reject channel gate
12. Reject channel gate drive
13. Position check proximity switch for sample channel gate
14. Gate drive sample channel

4.17.2. Changing the capsule discharge



CAUTION!

Risk of crushing by deflectors in the capsule discharge

Crushing is possible between deflectors and the discharge housing.

- Only specialist personnel with electrical and/or mechanical training (for maintenance, fault-finding, etc.) may remove the cover and operate the machine.

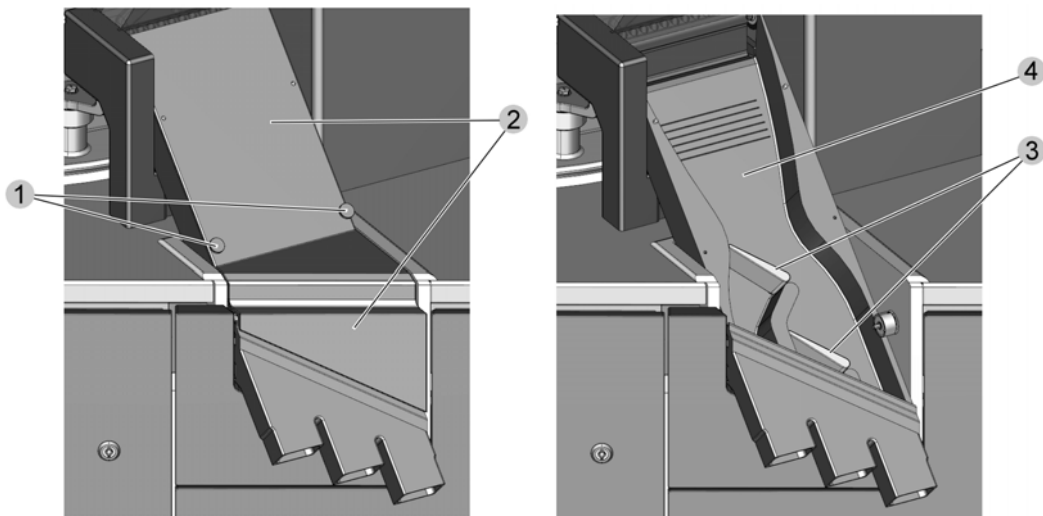


Fig. 92 Removing the capsule discharge

Removing the capsule discharge

1. Loosen the knurled screws
2. Remove the capsule discharge covers
3. Remove the deflectors
4. Remove the discharge chute

Installing the capsule discharge

Reverse the sequence to install the capsule discharge.

4.18. Dust extraction system

Extraction points are installed on each side in the interior of the machine. These extraction points are connected via hoses to a distributor block which is located in the machine compartment. The extraction unit(s) can be connected from above or below as required.



NOTICE

The adjustment of one extraction point will also affect other if not all extraction points.

The following overview lists the extraction points of the machine and refers to their respective description in the Operating instructions:

Extraction points	Respective section in the Operating instructions
Extraction unit compacting ring	→ See also the "Description of extraction unit compacting ring" section
Extraction unit product transfer to dosing station	→ See also the following section: "Description of rejection of non-separated capsules"
Ejection of non-separated capsules	→ See the following section: "Rejection of non-separated capsules"
Extraction ejection flap	→ See the following section: "Description of capsule ejector and cleaning"
Extraction capsule holder	
Extraction capsule discharge	→ See also the "Capsule discharge" section
Extraction unit terminal manifold drive compartment	→ See also the "Terminal manifold drive compartment" section

4.19. Extraction vacuum regulator (option)

The extraction vacuum regulator monitors and regulates the volume flow of the dust extraction line. It is connected with the extraction hose of the corner column and consists of:

- Measuring equipment
- Adjustment equipment

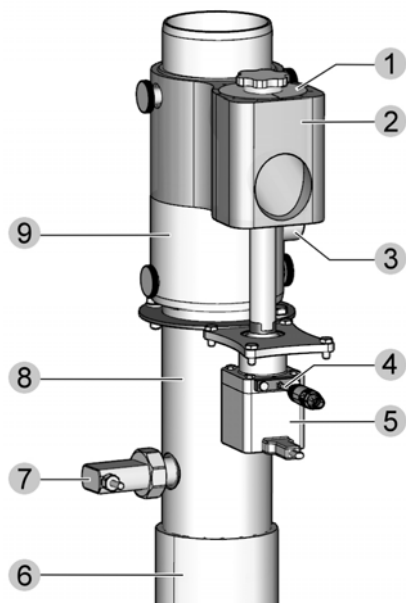


Fig. 93 Extraction vacuum regulator

1. Rotary slide (0° angle position)
2. Bypass element
3. Pipe nozzle for connecting the dust extraction line of the non-separated capsules
4. Proximity switch
5. Stepping motor
6. Extraction hose corner column
7. Flow sensor
8. Connecting pipe
9. Bypass pipe

Measuring equipment

The flow sensor in the connecting pipe measures the flow speed and gives a feedback to the control.

If the measuring value deviates from the set value (parameter 49 "Extraction vacuum"), the bypass opening for the subsidiary air line of the adjustment equipment is readjusted.

Adjustment equipment

The machine control changes the position of rotary slide in the bypass element via the stepping motor.

The relationship between the position of the rotary slide and the bypass opening for the subsidiary air line is as follows:

Angle position rotary slide	Bypass opening	Extraction volume
0°	fully opened (100 % subsidiary air line)	low (minimum)
90°	closed (0 % subsidiary air line)	high (maximum)

After each switch-on, the reference position (0° angle position) of the rotary slide is approached. This position is used as a reference point when moving the stepping motor. The reference position is controlled by a proximity switch.

4.20. Switch cabinets

The power components and control components are physically separated into different and separate switch cabinets.

The electrical equipment for the capsule filling machine is divided into

- Power cabinet
- Control cabinet
- Bottom machine terminal box with peripherals connection panel
- Top machine terminal box with peripherals connection panel

Power cabinet

The power cabinet contains the power components such as frequency converters, transformers and power supply units.

Downstream of a mains filter at the input, all the components for generating the various control voltages are provided with motor circuit-breakers. The motor circuit-breakers are set to the nominal currents of the individual consumers. On the output side, all voltages have circuit-breakers appropriate for the nominal current.

The power cabinet also contains the frequency converter for the main drive.

Control cabinet

The control cabinet contains the control components: The control cabinet is integrated into the machine and is supplied with all its voltages from the power cabinet.

The control cabinet contains the machine computer, operator computer, safety PLC, controller for the digital and analog inputs and outputs and the uninterruptible power supply for the operator computer. The control cabinet controls all the machine functions and is connected to all the sensors and actuators in the machine.

Cooling for the switch cabinets

The switch cabinets are cooled by integrated air-to-air heat exchangers with recirculation of both internal and external air. The switch cabinets are monitored for

temperature. When the preset limit temperature is reached, the machine switches off.

The switch cabinets are sealed to prevent dust from penetrating inside.

There is a cold plate integrated into the power cabinet for cooling the frequency converter and infeed module. The cold plate is integrated into the cooling system.

The cover can be removed for cleaning the cooling units of both switch cabinets.

- The electrical connection must be disconnected first.
- Loosen the knurled nuts on the cover and pull the cover forward.



CAUTION!

Risk of crushing by freely accessible fans.

Crushing of fingers by freely accessible fans.

Work on the cooling system in the switch cabinet must only be carried out by qualified and authorized personnel.

4.21. Pneumatic system

The drive compartment of the capsule filling machine accommodates:

- a terminal manifold
- a maintenance unit

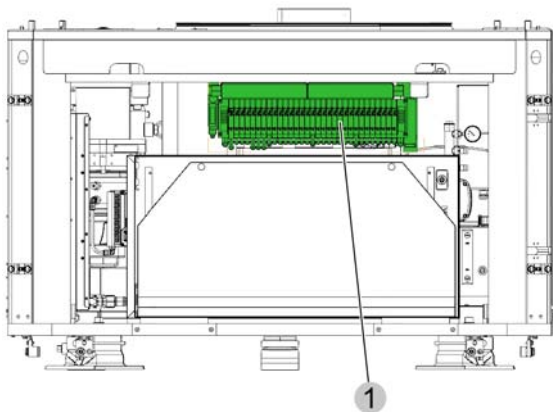


Fig. 94 Pneumatic system (machine side 1)

1. Terminal manifold

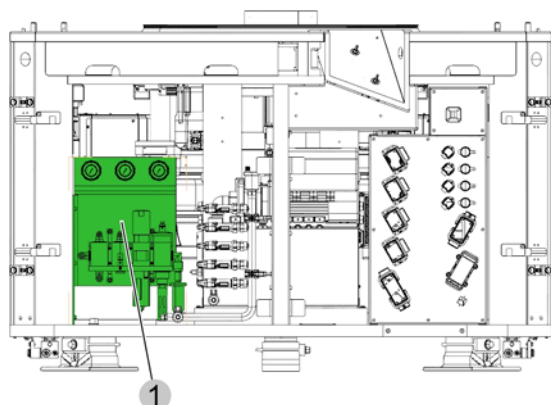


Fig. 95 Pneumatic system (machine side 4)

1. Maintenance unit

4.21.1. Maintenance unit

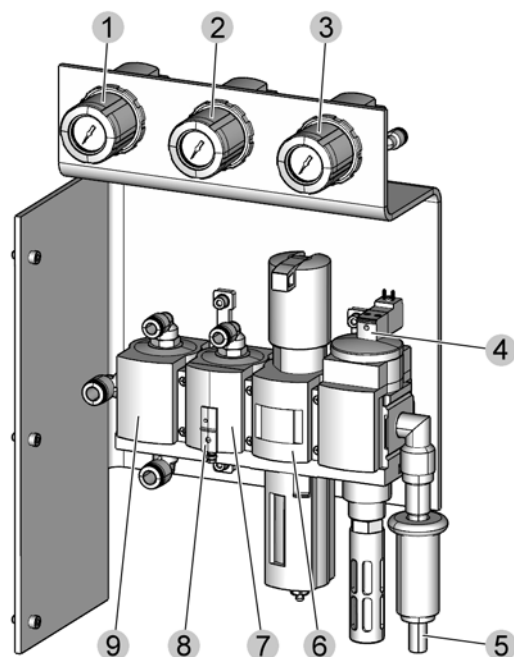


Fig. 96 Maintenance unit

1. Pressure controller vacuum separation
2. Pressure controller cleaning ejecting pins
3. Pressure controller CFC (option)
4. On-off valve, electrically actuated
5. Connection compressed air supply
6. Filter regulating valve with integrated manometer, condensate drain and rotary knob
7. Filter
8. Manometer
9. Condensate drain

7. Distributor block with connections for the terminal manifold
8. Pressure switch
9. Distributor block with connections for the terminal manifold (vacuum), CFC function (option)

4.21.1.1. Switching off the compressed air

Switch off the compressed air:

- Maintenance flap at machine side which provides access to the maintenance unit.
- Turn down the filter regulating valve with integrated manometer, condensate drain and rotary knob until the manometer reads 0 bar.

Alternatively:

- Switch off at the machine's main switch.
- Disconnect the compressed air connection.

4.21.1.2. Set the CFC valve block

At the machine's maintenance unit (→ "Maintenance unit" section of the operating instructions), use the CFC pressure regulator to set the pressure for controlling the CFC valve block to at least 1 bar lower than the pilot air pressure.



NOTE

The valves of the CFC valve block will not switch if the recommended pressure for controlling the CFC valve block is not maintained.

4.21.2. Terminal manifold drive compartment

Depending on the machine design, the drive compartment of the machine accommodates the following components:

- Single rotary machine: 1 terminal manifold
- Double rotary machine: 2 terminal manifolds (one for machine side A and one for machine side B)

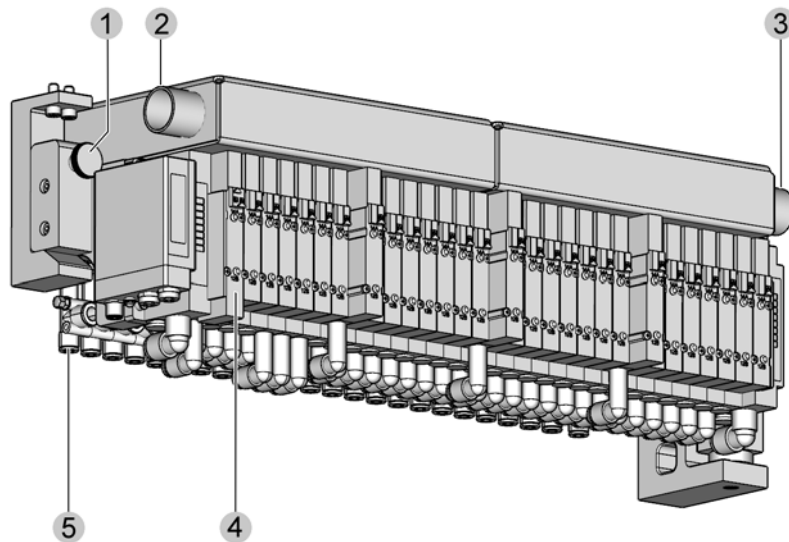


Fig. 97 Terminal manifold drive compartment

1. Knurled screw to open / close the swivelling terminal manifold
2. Extraction left terminal manifold
3. Extraction right terminal manifold
4. Valves (31x)
 - 7 valves: diverse functions, e.g. loosen clamping system, window flap locking mechanism
 - 24 valves: separation of capsules (one valve for each track)
5. Vacuum ejectors (24x)

The terminal manifold can be swivelled out for maintenance purposes.

Extraction terminal manifold drive compartment

The terminal manifold in the drive compartment has a two-step extraction unit which is connected with the dust extraction unit.

5. Operating the capsule filling machine

5.1. Description of the workplace

The capsule filling machine is designed for predominantly unattended production, as is generally the case in pharmaceutical production facilities. Operator input at the capsule filling machine in order to change parameters, for example, is carried out from a standing position at the operator terminal. The mobile operator terminal can be set up at any point.

Cleaning, maintenance and set-up work on the capsule filling machine is partly menu-driven.

5.2. Safety during operation

- Any mode of operation compromising safety is forbidden.
- The operator is obliged to report all changes compromising safety immediately.
- The operator is obliged to operate the capsule filling machine only in properly functioning and sound condition.
- Arbitrary retrofitting and changes compromising safety are not permitted.
- Window flaps and other flaps must not be opened until the machine has stopped.
- Local safety regulations and accident prevention rules are valid for operating the capsule filling machine.
- The switching-off procedures have to be observed at all works regarding transport, assembly, disassembly and reassembly, commissioning, operation, adjustment, maintenance, shutdown and disposal.
- At increased noise level, suitable precautions have to be adopted (e.g. use ear protection).



CAUTION!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

- The maintenance flaps must be closed during operation.



CAUTION!

Possible crushing hazard caused by falling parts!

The machine vibrations passed into the floor may constitute a hazard.

- The owner of the machine must provide a suitable installation area for the machine.



IMPORTANT!

Uncontrolled movements of the whole machine could damage parts of the system.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Do not reach into the opening of the capsule discharge.



CAUTION!

Crushing hazard caused by the cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

- This should only be done by specialist personnel with electrical training.



CAUTION!

Crushing hazard caused by metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.

5.3. Run type (operating mode)

There are various run types for operating the capsule filling machine. The selected run type provides the operator with a number of different functions.



Press the "Run type" button in the main menu to select the various run types from a sub-menu.

5.3.1. Computer run

To call up Computer run

- "Run type" button
- [Computer run]

When the machine is switched on at the main switch, it is automatically set to computer run.

The switched on machine must be stationary in order to switch to computer run.

An operator must have logged in before parameters can be entered in computer run mode and can be accepted by the operator unit. All outputs to the machine remain deactivated and the machine does not respond.

The status lamps are off (red/green).

In computer run mode, the operator can:

- Select recipes
- Create new recipes
- Modify selected recipes
- Copy recipes
- Save changes to recipe settings made in standard run mode
- Trigger a new batch of the selected recipe
- Read and print reports

5.3.2. Test run

Select test run

- "Run type" button
- [Test run]

Test run can only be selected while the machine is stopped.

In test run mode, the operator can:

- Move individual drives with the hand-held terminal
- Reference drives
- Remove/install stations
- Move drives to the park position

5.3.3. Setup run

Select setup run mode:

- "Run type" button
- [Setup run]

In setup run mode, the machine moves to the settings for the selected recipe.

Setup run mode is a production run that differs from the standard run mode in that:

- The rejection function is not active even if it is switched on
- The discharge gate is in the reject position all the time; all capsules run into the reject channel

In setup run mode, the operator can:

- Change parameters; the machine then adopts these settings
- Start a batch of the selected recipe
- Read and print reports

5.3.4. Standard run

Select standard run mode:

- "Run type" button
- [Standard run]

The standard run mode is the production run, i.e. all the diagnoses are active.

-
- The monitoring and regulating functions are executed if they are switched on.
- Normal production takes place.

5.4. Inching mode



WARNING!

Risk of crushing

Crushing of limbs is possible.

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.
- Work in inching mode must be carried out only by one person on their own to avoid the possibility of other persons standing in the danger area of the capsule filling machine.

To guarantee operator safety, all the drives of the capsule filling machine are switched off when one or more window flaps are opened. The window flaps are locked during operation.

In inching mode, the positioning drives are able to move despite the opened window flap in order to be able to make adjustments.



Fig. 98 Hand-held terminal

1. Enabling switch / emergency stop
2. “Move drive down” button
3. “Move drive up” button
4. LED lamps

- The drives are selected via the operator terminal.
- The drives can only move if the enabling switch is pressed.
- The drives can be moved up and down using the two buttons on the hand-held terminal.
- Press both buttons at the same time for at least 5 seconds to save the current position as the reference position.
- An emergency stop can be triggered by fully depressing the enabling switch.

Connecting the hand-held terminal to the filling machine switches the machine to test run mode. A diagnosis appears.

Pressing the enabling switch on the hand-held terminal switches on the selected positioning drive, which can then be moved. Releasing the enabling switch switches the positioning drive off once more.

The tamping station drives and main drive can only be moved when the window flaps are closed.

Emergency stop function

If the enabling switch is fully depressed, the drives stop immediately and the filling machine performs an emergency stop. Releasing the enabling switch acknowledges the emergency stop.

One window flap may be opened in inching mode. If several window flaps are opened, the drives switch off.

5.5. Red-green signal status display

The status display shows the current operating status of the filling machine.

The following operating statuses are displayed:

- Green:
 - Filling machine is producing and there is no active warning diagnosis
- Green flashing:
 - Filling machine is producing and at least one warning diagnosis is active
- Red:
 - The filling machine is in one of the possible run types: test, setup or standard run
- Red flashing:
 - Drives are moving to position.
 - The machine stops in response to a certain error at a drive and the machine is in computer run mode.
- Red off, green off:
 - The filling machine is in computer run mode or the main switch is off

5.6. Start of the machine with a new recipe

1. Switch main switch "ON".
2. Login operator. Therefore, see also section
→ "Operator login and logoff" in the Operating instruction software.
3. Carry out a format change, if necessary. Therefore, see also section
→ "Setup change" in the Maintenance manual.

5.6.1. Create new recipe

1. Select computer run
 - Press the "Run type" button
 - Press the [Computer run] button
2. Create new recipe:
 - Press the [Recipe] button
 - Press the [New] button
 - Enter the recipe name.
 - When you confirm the name, the recipe is created and loaded at the first free place in the recipe list.
The Recipe Editor opens so you can edit the parameters.
If a basic recipe has been saved, the settings from the basic recipe are transferred to the new recipe.
3. Accept capsule-specific parameters:
 - Press the [Capsule type manager] button.
The Capsule type manager opens.

- Select the desired capsule type and press the [Load] button.
The parameters stored for this capsule type are transferred to the recipe and are displayed in red in the Recipe editor.
- 4. Set cycle time:
 - In parameter 2 “Rotary disk cycle time”, enter the desired setpoint.
The Intellimatic automatically calculates the resulting travel times and sets the setpoints for the corresponding parameters. The values are displayed in red in the Recipe editor.
- 5. Select dosing combination:
 - In parameter 500 “Dosing combination”, enter the value for the desired dosing combination.
For a double rotary press, carry out this step for side A and side B.
- 6. Make other parameter settings.

For a double rotary press, this step must be done for side A and side B, depending on the parameter.
- 7. Run a recipe check.
 - Press the [Test] button. A plausibility check is carried out on the recipe, including collision calculations.
A message appears on the user terminal to indicate whether the test was completed successfully.
If this is not the case, the recipe must be adapted accordingly and the recipe check carried out again.
- 8. Save recipe:
 - Press the [Save] button. The new recipe is saved and is displayed in the recipe list.

5.6.2. Setting up the machine

Some of the following steps can only be carried out with an opened window flap.



CAUTION

Risk of injury on the corners of the opened window flap!
Risk of injury on the corners of the opened window flap!

- Only open window flaps for their intended use.
- Wear personal protective equipment.



NOTICE

Opening a window flap automatically switches the run type to *Computer run* and all drives are stopped.
When the window flap(s) is / are closed, it is possible to change to another run type, such as *Setup run*. This must be done manually.

1. Select the setup run type on the operator terminal.

- Press button the "Run type".
 - Select [Setup run].
 - Confirm the prompt, if necessary.
2. Call up the "General overview" process graphic.
 - Switch on "All stations working".
 3. Fill filling cone with pre-closed empty capsules.

Depending on the available empty capsule supply and feeder:

 - Move storage container with pre-closed empty capsules into position and connect.
 - Fill empty capsule conveyor (optional) with pre-closed empty capsules and switch on device. Follow instructions in the → empty capsule conveyor documentation.
 4. Deactivate all installed dosing units.

Depending on the dosing combinations (parameter 500), carry out the following steps for the installed dosing station(s): Dosing unit 1 (option) process graphic side A / B: Switch off "Station working".

 - Call up "Pellet station" / "Tamping station" process graphic side A / B.
 - Switch off "Station working".
 5. Lock the capsule magazine.
 - Call up the "Capsule feeder" process graphic.
 - Switch off "Station working".
 6. Optionally: Switch on the empty capsule conveyor.
 - Open submenu [Functions].
 - Open menu item [Capsule conveyor] and open item [Peripherals].

Dialog "Capsule conveyor" is opened.
 - Press button [Automatic (Side A)].

Empty capsule conveyor is started in automatic mode.
 7. Fill capsule magazine with pre-closed empty capsules.
 - Call up "Capsule feeder" process graphic side A / B.
 - Switch on "Load magazine 1".
 - Switch on "Load magazine 2".
 - Start machine by pressing the "Start" button.
 - Let the machine run until all capsule magazines are filled with pre-closed capsules.
 - Adjust capsule bed height, if necessary, if the capsule magazine cannot or cannot be fully filled with pre-closed capsules.
 - Stop the machine by pressing the "Stop" button.
 8. Place empty containers under the capsule discharge chutes beside the machine.
 9. Switch on the dust extraction system.

- Switch on the machine's dust extraction system.
- 10.** Enable the capsule magazines.
 - Call up "Capsule feeder" process graphic.
 - Switch on "Enable magazine 1".
 - Switch on "Enable magazine 2".
 - 11.** Insert pre-closed empty capsules cyclically into capsule top part holders on side A / B and separate the capsules.
 - With the window flaps closed, press function key [F12] to run the rotary disk for a few cycles in inching mode.
 - Check separation of the pre-closed empty capsules (visual inspection).
 - 12.** Close and eject separated empty capsules cyclically on side A / B.
 - With the window flaps closed, press function key [F12] to run the rotary disk for a few cycles in inching mode.
 - Check that empty capsule halves inserted into one another are closed correctly (visual inspection).
 - 13.** Adjust closing stroke correction offset, if necessary.
 - Enter parameter 328 "Closing stroke offset" side A / B.

If capsules are not closed correctly, the stroke of the bottom closing pins can be adjusted by ± 1.0 mm via this parameter.
 - 14.** Simulate non-separated capsules.

Carry out the following steps according to the availability of the single track check (option).

<p>Single track control (option) available</p>	<ul style="list-style-type: none"> • Call up "Capsule separation / Rejection of non-separated capsules" process graphic side A / B. • Switch on "Single track control". • Touch multiple active capsule tracks to deactivate (set to inactive), such as single tracks 1, 5, 6 and 12. • Touch multiple active capsule tracks to deactivate (set to inactive), such as single tracks 1, 5, 6 and 12. <p>The capsule top part holder with the non-separated capsules stops at position 3 (rejection of non-separated capsules).</p>
<p>Single track control (option) not available</p>	<ul style="list-style-type: none"> • Call up process graphic "Capsule feeder". • Switch off function "Station working". • With the window flaps closed, press function key [F12] to run the rotary disk for one cycle in inching mode until all tracks of the capsule top part holder at position 1 (capsule feeder row 1) are free. • Prepare the desired number of pre-closed, and therefore simulated, capsules by manually closing a certain amount of capsules. (Contrary to pre-closed empty capsules, closed empty capsules are not separated at position 2.) • At position 1 (capsule feeder row 1) in the capsule top part holder, manually insert the closed empty capsules into several tracks of row 1 and 2, for example in the individual tracks no. 1, 5, 6 and 12. • With the window flaps closed, press function key [F12] to run the rotary disk for two cycle in inching mode. <p>The capsule top part holder with the non-separated capsule stops at position 3 (Rejection of non-separated capsules).</p>

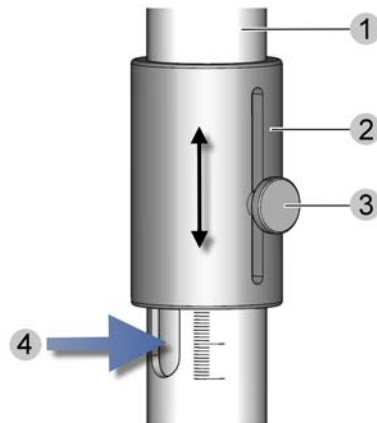
15. Check rejection of non-separated capsules.

- Carry out a visual inspection at position 3 (rejection of non-separated capsules) to check, whether all non-separated empty capsules have been ejected and extracted.

- 16.** If necessary, adjust the extraction rate of the extraction unit for non-separated capsules on side A / B.

Move the continuously air regulation slide between the end positions to adapt the extraction rate via adjusting the opening for the secondary air line. Thereby the following table applies:

Adjusting plate scale	Secondary air opening	Extraction rate
Bottom (end position)	closed (0% secondary air)	high (maximum)
Top (end position)	open (100 % secondary air)	low (minimal)



- Loosen knurled (3) screw.
- If the extraction rate is to be increased, push the air regulation slide (2) down (the secondary air line (4) is decreased).
- If the extraction rate is to be decreased, push the air regulation slide (2) up (push the air regulation slide (4) is increased).
- Tighten knurled (3) screw.

A scale at the extraction pipe shows the respective position of the air regulation slide with regard to the secondary air opening.

- 17.** If the extraction rate of the extraction of non-separated capsules has not been adjusted, repeat the following steps until the extraction of non-separated capsules is satisfactory.
- Simulate non separated capsules by manually closing a certain amount of capsules.
 - Check rejection of non-separated capsules.
 - If necessary, adjust the extraction rate of the rejection non-separated capsules.



NOTICE

If the extraction unit is set up ideally, non-separated capsules are extracted and, at the same time, capsule caps for the separated capsules are not extracted.

18. Switch off single track control (option) / Switch on capsule feeder.
 Depending on the availability of the single track control (option), carry out the following steps:

Single track control (option) available	<ul style="list-style-type: none"> • Call up the process graphic "Separate capsules / Rejection of non-separated capsules". • Switch off "Single track control". • With the window flaps closed, press function key [F12] to run the rotary disk for two cycles in inching mode.
Single track control (option) not available	<ul style="list-style-type: none"> • Call up the process graphic "Capsule feeder". • Switch on "Station working". • With the window flaps closed, press function key [F12] to run the rotary disk for two cycles in inching mode.

19. Fill product into the filling cones of the dosing units.

Depending on the available product feeder:

- Mount storage container and connect it with the rest of the machine.
- Fill the product feeder (option) with product and switch on device. Observe the
 → Technical documentation of the product feeder.

20. Set up dosing unit(s).
 Depending on the dosing combination (parameter 500), carry out the following steps for the installed dosing unit(s):

Tamping station	<ul style="list-style-type: none"> • If necessary, adjust tamping pins. Therefore, see also section → "Adjust tamping pins" in the Maintenance manual.
------------------------	--

21. Option: Switch on "Product feeder" (automatic mode).

- Open the [Functions] sub-menu.
- Select menu item [Peripherals] and press [Product feeder].
 Dialog "Product feeder" opens.
- Press button [Automatic (Side A)].

Product feeder is started in automatic mode.

22. Set up dosing unit(s).

Depending on the dosing combination (parameter 500), carry out the following steps for the installed dosing unit(s):

Tamping station	<ul style="list-style-type: none"> • Call up process graphic "Tamping station". • Switch on "Metering drum" (manual mode). • Leave the metering drum switched on until the bis powder pan is filled with the desired quantity of product. • .Switch off "Metering drum" (manual mode). • Switch on "Station working".
Pellet station	<ul style="list-style-type: none"> • Call up "Pellet station". • Switch on "Station working".

23. Start machine.

- Press the "Start" button.

24. Set up dosing unit(s).

Depending on the dosing combination (parameter 500), carry out the following steps for the installed dosing unit(s):

Tamping stations	<ul style="list-style-type: none"> • Call up process graphic "Tamping station". • Observe the powder bed height (actual value) and wait until a uniform powder bed is formed.
Pellet station	<ul style="list-style-type: none"> • Call up process graphic "Pellet station". • Option: Switch on the "Jogging" function.



NOTICE

The powder which is fed into the tamping station is only processed to stabile pellets after a specified start-up phase.

25. Adjust capsule weight.

- Filled, closed, ejected capsule are ejected as random samples and must be weighed.
- Adjust the settings of the parameters relevant to the capsule weight until the specification is met.
- Readjust the tamping pins at the tamping station, if necessary. Therefore, see also section → "Adjust tamping pins" in the Maintenance manual.

26. Enter the mechanical position of the slide position air regulation for the extraction of non-separated capsules.

- Call up process graphic "Capsule separation / Rejection of non-separated capsules".

- Enter parameter for the slide position air regulation for the extraction of non-separated capsules (parameter 92).

27. Record mechanical adjustment, if necessary.

- Call up process graphics "Tamping station".
- Enter the parameters for the spring adjustment of the springs installed in tamping pin blocks 1 to 5 (parameter 273 to 277).
- Enter the parameters for the spring adjustment of the springs installed in tamping pin blocks 1 to 5 (parameter 278).

28. Save recipe. Therefore, see also section
→ "Manage recipes" in the Operating instruction software.

5.6.3. Starting the machine

1. Create new batch. Therefore, see also section
→ "Batch management" in the Operating instruction software.
2. Select [Standard run].
 - Press the "Run type" button.
 - Select [Standard run].
3. Start capsule production.
 - Start the machine by pressing the "Start" button.
4. Take random samples during the start-up phase.
 - Open the [Functions] sub-menu.
 - Select [Take sample] menu option.
The "Take sample" dialog opens.
 - Single rotary machine: Press button [Side A].
 - Double rotary machine: Press button [Side A] / [Side B].

5.7. Starting the machine with a saved recipe

1. Switch main switch "ON".
2. Login operator. Therefore, see also section
→ "Operator login and logoff" in the Operating instruction software.
3. Carry out a format change, if necessary.
→ See also section "Setup change" in the Maintenance manual.
Select [Computer run].
 - Press the "Run type" button.
 - Press the [Computer run] button.
4. Load recipe. Therefore, see also section
→ "Edit recipes" in the Operating instruction software

5.7.1. Setting up the machine

Some of the following steps can only be carried out with an opened window flap.



CAUTION

Risk of injury on the corners of the opened window flap!

Risk of injury on the corners of the opened window flap!

- Only open window flaps for their intended use.
- Wear personal protective equipment.



NOTICE

Opening a window flap automatically switches the run type to *Computer run* and all drives are stopped.

When the window flap(s) is / are closed, it is possible to change to another run type, such as *Setup run*. This must be done manually.

1. Select the setup run type on the operator terminal.
 - Press button the "Run type".
 - Select [Setup run].
 - Confirm the prompt, if necessary.

2. Call up the "General overview" process graphic.

- Switch on "All stations working".

3. Fill filling cone with pre-closed empty capsules.

Depending on the available empty capsule supply and feeder:

- Move storage container with pre-closed empty capsules into position and connect.
- Fill empty capsule conveyor (optional) with pre-closed empty capsules and switch on device. Follow instructions in the → empty capsule conveyor documentation.

4. Deactivate all installed dosing units.

Depending on the dosing combinations (parameter 500), carry out the following steps for the installed dosing station(s): Dosing unit 1 (option) process graphic side A / B: Switch off "Station working".

- Call up "Pellet station" / "Tamping station" process graphic side A / B.
- Switch off "Station working".

5. Lock the capsule magazine.

- Call up the "Capsule feeder" process graphic.
- Switch off "Station working".

6. Optionally: Switch on the empty capsule conveyor.

- Open submenu [Functions].
- Open menu item [Capsule conveyor] and open item [Peripherals].
Dialog "Capsule conveyor" is opened.
- Press button [Automatic (Side A)].

Empty capsule conveyor is started in automatic mode.

7. Fill capsule magazine with pre-closed empty capsules.
 - Call up "Capsule feeder" process graphic side A / B.
 - Switch on "Load magazine 1".
 - Switch on "Load magazine 2".
 - Start machine by pressing the "Start" button.
 - Let the machine run until all capsule magazines are filled with pre-closed capsules.
 - Adjust capsule bed height, if necessary, if the capsule magazine cannot or cannot be fully filled with pre-closed capsules.
 - Stop the machine by pressing the "Stop" button.
8. Place empty containers under the capsule discharge chutes beside the machine.
9. Switch on the dust extraction system.
 - Switch on the machine's dust extraction system.
10. Enable the capsule magazines.
 - Call up "Capsule feeder" process graphic.
 - Switch on "Enable magazine 1".
 - Switch on "Enable magazine 2".
11. Insert pre-closed empty capsules cyclically into capsule top part holders on side A / B and separate the capsules.
 - With the window flaps closed, press function key [F12] to run the rotary disk for a few cycles in inching mode.
 - Check separation of the pre-closed empty capsules (visual inspection).
12. Close and eject separated empty capsules cyclically on side A / B.
 - With the window flaps closed, press function key [F12] to run the rotary disk for a few cycles in inching mode.
 - Check that empty capsule halves inserted into one another are closed correctly (visual inspection).
13. Adjust closing stroke correction offset, if necessary.
 - Enter parameter 328 "Closing stroke offset" side A / B.

If capsules are not closed correctly, the stroke of the bottom closing pins can be adjusted by ± 1.0 mm via this parameter.
14. Simulate non-separated capsules.

Carry out the following steps according to the availability of the single track check (option).

<p>Single track control (option) available</p>	<ul style="list-style-type: none"> • Call up "Capsule separation / Rejection of non-separated capsules" process graphic side A / B. • Switch on "Single track control". • Touch multiple active capsule tracks to deactivate (set to inactive), such as single tracks 1, 5, 6 and 12. • Touch multiple active capsule tracks to deactivate (set to inactive), such as single tracks 1, 5, 6 and 12. <p>The capsule top part holder with the non-separated capsules stops at position 3 (rejection of non-separated capsules).</p>
<p>Single track control (option) not available</p>	<ul style="list-style-type: none"> • Call up process graphic "Capsule feeder". • Switch off function "Station working". • With the window flaps closed, press function key [F12] to run the rotary disk for one cycle in inching mode until all tracks of the capsule top part holder at position 1 (capsule feeder row 1) are free. • Prepare the desired number of pre-closed, and therefore simulated, capsules by manually closing a certain amount of capsules. <p>(Contrary to pre-closed empty capsules, closed empty capsules are not separated at position 2.)</p> <ul style="list-style-type: none"> • At position 1 (capsule feeder row 1) in the capsule top part holder, manually insert the closed empty capsules into several tracks of row 1 and 2, for example in the individual tracks no. 1, 5, 6 and 12. • With the window flaps closed, press function key [F12] to run the rotary disk for two cycle in inching mode. <p>The capsule top part holder with the non-separated capsule stops at position 3 (Rejection of non-separated capsules).</p>

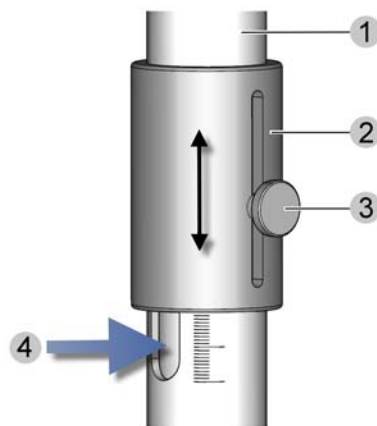
15. Check rejection of non-separated capsules.

- Carry out a visual inspection at position 3 (rejection of non-separated capsules) to check, whether all non-separated empty capsules have been ejected and extracted.

16. If necessary, adjust the extraction rate of the extraction unit for non-separated capsules on side A / B.

Move the continuously air regulation slide between the end positions to adapt the extraction rate via adjusting the opening for the secondary air line. Thereby the following table applies:

Adjusting plate scale	Secondary air opening	Extraction rate
Bottom (end position)	closed (0% secondary air)	high (maximum)
Top (end position)	open (100 % secondary air)	low (minimal)



- Loosen knurled (3) screw.
- If the extraction rate is to be increased, push the air regulation slide (2) down (the secondary air line (4) is decreased).
- If the extraction rate is to be decreased, push the air regulation slide (2) up (push the air regulation slide (4) is increased).
- Tighten knurled (3) screw.

A scale at the extraction pipe shows the respective position of the air regulation slide with regard to the secondary air opening.

17. If the extraction rate of the extraction of non-separated capsules has not been adjusted, repeat the following steps until the extraction of non-separated capsules is satisfactory.
- Simulate non separated capsules by manually closing a certain amount of capsules.
 - Check rejection of non-separated capsules.
 - If necessary, adjust the extraction rate of the rejection non-separated capsules.



NOTICE

If the extraction unit is set up ideally, non-separated capsules are extracted and, at the same time, capsule caps for the separated capsules are not extracted.

18. Switch off single track control (option) / Switch on capsule feeder.
 Depending on the availability of the single track control (option), carry out the following steps:

Single track control (option) available	<ul style="list-style-type: none"> • Call up the process graphic "Separate capsules / Rejection of non-separated capsules". • Switch off "Single track control". • With the window flaps closed, press function key [F12] to run the rotary disk for two cycles in inching mode.
Single track control (option) not available	<ul style="list-style-type: none"> • Call up the process graphic "Capsule feeder". • Switch on "Station working". • With the window flaps closed, press function key [F12] to run the rotary disk for two cycles in inching mode.

19. Fill product into the filling cones of the dosing units.

Depending on the available product feeder:

- Mount storage container and connect it with the rest of the machine.
- Fill the product feeder (option) with product and switch on device. Observe the
 → Technical documentation of the product feeder.

20. Set up dosing unit(s).

Depending on the dosing combination (parameter 500), carry out the following steps for the installed dosing unit(s):

Tamping station	<ul style="list-style-type: none"> • If necessary, adjust tamping pins. Therefore, see also section → "Adjust tamping pins" in the Maintenance manual.
------------------------	--

21. Option: Switch on "Product feeder" (automatic mode).

- Open the [Functions] sub-menu.
- Select menu item [Peripherals] and press [Product feeder].
 Dialog "Product feeder" opens.
- Press button [Automatic (Side A)].

Product feeder is started in automatic mode.

22. Set up dosing unit(s).

Depending on the dosing combination (parameter 500), carry out the following steps for the installed dosing unit(s):

Tamping station	<ul style="list-style-type: none"> • Call up process graphic "Tamping station". • Switch on "Metering drum" (manual mode). • Leave the metering drum switched on until the bis powder pan is filled with the desired quantity of product. • .Switch off "Metering drum" (manual mode). • Switch on "Station working".
Pellet station	<ul style="list-style-type: none"> • Call up "Pellet station". • Switch on "Station working".

23. Start machine.

- Press the "Start" button.

24. Set up dosing unit(s).

Depending on the dosing combination (parameter 500), carry out the following steps for the installed dosing unit(s):

Tamping stations	<ul style="list-style-type: none"> • Call up process graphic "Tamping station". • Observe the powder bed height (actual value) and wait until a uniform powder bed is formed.
Pellet station	<ul style="list-style-type: none"> • Call up process graphic "Pellet station". • Option: Switch on the "Jogging" function.



NOTICE

The powder which is fed into the tamping station is only processed to stabile pellets after a specified start-up phase.

25. Adjust capsule weight.

- Filled, closed, ejected capsule are ejected as random samples and must be weighed.
- Adjust the settings of the parameters relevant to the capsule weight until the specification is met.
- Readjust the tamping pins at the tamping station, if necessary. Therefore, see also section → "Adjust tamping pins" in the Maintenance manual.

26. Enter the mechanical position of the slide position air regulation for the extraction of non-separated capsules.

- Call up process graphic "Capsule separation / Rejection of non-separated capsules".

- Enter parameter for the slide position air regulation for the extraction of non-separated capsules (parameter 92).

27. Record mechanical adjustment, if necessary.

- Call up process graphics "Tamping station".
- Enter the parameters for the spring adjustment of the springs installed in tamping pin blocks 1 to 5 (parameter 273 to 277).
- Enter the parameters for the spring adjustment of the springs installed in tamping pin blocks 1 to 5 (parameter 278).

28. Save recipe. Therefore, see also section
→ "Manage recipes" in the Operating instruction software.

5.7.2. Starting the machine

1. Create new batch. Therefore, see also section
→ "Batch management" in the Operating instruction software.
2. Select [Standard run].
 - Press the "Run type" button.
 - Select [Standard run].
3. Start capsule production.
 - Start the machine by pressing the "Start" button.
4. Take random samples during the start-up phase.
 - Open the [Functions] sub-menu.
 - Select [Take sample] menu option.
The "Take sample" dialog opens.
 - Single rotary machine: Press button [Side A].
 - Double rotary machine: Press button [Side A] / [Side B].

5.8. Starting the machine after an emergency stop

After the machine has performed an emergency stop (and once the cause of the emergency stop has been eliminated), the machine must be restarted:

- Mechanically release the emergency stop button.
- Acknowledge diagnosis
 - Press the [Reports] button to call up the sub-menu
 - Press the [Current diagnoses] button
 - Select the diagnosis from the list
 - Press the [Acknowledge diagnosis] button
- Press the "Start" button.

5.9. Switching the machine off and on again

Switching off

- Press the “Stop” button
- Select computer run
 - Press the "Run type" button
 - Press the [Computer run] button
- Switch the main switch “OFF”

The computer performs a controlled shut-down.

Switching on again

- Wait until the computer in the control unit has shut down fully.
- Then switch the main switch “ON” again.

Maintenance manual FEC20

Translation of the original

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1. General

1.1. Introduction

The capsule filling machine and its accessories were constructed according to the best available technology in conformance with the recognized safety rules and standards. Incorrect operation can result in damage to the capsule filling machine and endanger people.

This information is intended to be read, understood and followed in every respect by those responsible for using the capsule filling machine and its accessories.

The capsule filling machine and its accessories can only be used safely and without error if the responsible persons have read and followed the entire content of these operating instructions. This applies in particular to the safety instructions.

These operating instructions relate exclusively to the capsule filling machine and its accessories described herein.

We reserve the right to make any technical changes to the illustrations and information in these operating instructions that might be needed to improve the capsule filling machine and its accessories.

Storing the operating instructions

The complete operating instructions must be stored carefully and always kept with the capsule filling machine as they are part of the product.

They should always be kept in the vicinity of the capsule filling machine so that they are available, when required, to everyone working with the machine.

Warranty and technical support

To guarantee fault-free operation, these operating instructions must be read carefully before commissioning. We accept no liability for damage and interruptions that might result from failure to follow these operating instructions.

Observe all safety instructions and hazard warnings in these operating instructions!

If you have any problems, please contact our customer service or spare parts department, or one of our agencies who will be happy to assist you.

1.2. Options

Options represent the standardised electrical, mechanical and software functions of the machine.

Each machine is configured according to machine specification (MAL), which also reflects the purchase agreement. The machine specification includes options that are distinguished in:

- Sales options (e.g. 01.222 or 04.100)
- Software options (e.g. A536 or 536)

A software option can have different characteristics, which are defined in each case by the additional specification of K factors.

Depending on the electrical and mechanical configuration of the machine, the software options are activated or deactivated.

A list of all activated (released) software options can be displayed at the operator terminal (HMI).

→ Therefore, also see section "Activated options" in the Operating instructions software.



NOTICE

The documentation consists of generic documents and does not correspond to the machine specification, but describes all important functions and components of the machine.

Accordingly, the machine may not contain all the functions and components described.

1.3. Operator's duty of care

The operator of the capsule filling machine and its accessories must ensure that

- the capsule filling machine and its accessories are used only for the intended use at all times.
- the capsule filling machine and its accessories are in perfect condition and full working order at all times.
- all safety notes and warnings attached to the capsule filling machine and its accessories are legible and are not removed.
- the capsule filling machine and its accessories are assembled and operated in accordance with these operating instructions only by qualified and authorized personnel.
- these personnel are regularly informed of all the necessary rules concerning safety at work and environmental protection.
- the necessary protective equipment for assembly, operating, maintenance and repair personnel is available in sufficient quantities, is in perfect condition and is worn.

- the operating instructions are always in a legible condition and are available in their entirety at the capsule filling machine's place of use.
- all the instructions in the commissioning instructions are carried out while transporting the machine.

1.4. Copyright

Fette Engineering GmbH retains the copyright to these instructions.

These instructions are intended for personnel who work on the capsule filling machine. They contain specifications and technical drawings which must not be copied or distributed, in whole or in part, or sold or passed on without authorization to other parties for the purposes of competition.

The data processing programs used and the associated program descriptions are also subject to copyright as appropriate.

Unless otherwise specified, when upgrading or replacing existing programs, the buyer undertakes to destroy the previous versions, any copies thereof and the replaced documentation.

They must not be passed on to third parties.

1.5. Contact

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2. Safety

2.1. Safety instructions



DANGER!

All the safety instructions from the operating instructions are to be followed. These include

- the summarized safety notes from the “safety instructions”,
- the section-specific safety notes and
- the embedded warning instructions.

2.2. Safety during maintenance and cleaning work

- All work must be done at the standstill of the machine.
- Before commencing any work on the machine or its components, secure the drives and auxiliary equipment to prevent them from inadvertent switch-on.
- After servicing and repair works, check that all safety guards are properly attached and fully functioning before commencing any work on the machine or its components.
- If work on the machine has resulted in a dirty floor, the owner of the machine must make sure that there are no dangerous slick spots that could cause people to slip.
- For cleaning work, always follow the manufacturer's instructions on the cleaning agent packaging.
- Inching mode must only be used by trained and authorised specialist personnel.
- Suitable aids should be used. The steps must be carried out in the order described.



WARNING!

Hazard from inadvertent / unexpected start-up of moving parts / drives (drive compartment including rotary-disk locking mechanism, middle column)!

During maintenance, repair, cleaning work or fault-finding on the machine, a faulty component in the machine e.g. faulty cable, bent compressed air hose, faulty valve, switched-on power source or stored energy (compressed air) may cause a dangerous unpredictable movement could cause injury. When working on the TSC, machine, switch cabinet or peripheral devices for maintenance, repair, cleaning or fault-finding:

- Switch off all power supplies that are not essential for the work.
- Switch off mains voltage.
- Switch off compressed air supply.



WARNING!

Risk of injury from improperly executed maintenance / cleaning work!

Improperly executed maintenance / cleaning work could result in severe injury and considerable damage to property.

- If components are removed, make sure they are refitted correctly. Re-fit all fixing elements and tighten bolts using the specified tightening torques.
- Maintenance / Cleaning work must only be carried out by specialist personnel with corresponding qualifications.



WARNING!

Crushing hazard caused by falling objects

Always be aware of the weight of mechanical components to be removed or installed.

- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- Only allow competent or instructed personnel to carry out cleaning work.
- Only allow specialist personnel with mechanical training to carry out (mechanical) maintenance work.
- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



WARNING!

Risk of poisoning by breathing in or ingesting cleaning agents and solvents!

Risk of injury from contact with cleaning agents.

- Use cleaning agents for the intended purpose only.
- Apply any protective measures required by the manufacturer.



WARNING!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

Risk of crushing from preloaded spring assembly when removing / raising the dosing disk drive (tamping station).

- The work must be carried out by specialist personnel with electrical and / or mechanical training.
- Deactivate the pneumatic system prior to open the maintenance flaps (set pneumatic system main switch to off!).



WARNING!

Crushing hazard caused by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

The STO (Safe Torque Off) safety function for all six drives is deactivated by manually enabling the drive train in the middle column. There is a risk that a drive will move unexpectedly due to a controller fault.

The sorting fork drive moves the sorting forks on rows 1 and 2 at the same time.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of format-specific parts reduces the danger points and thus the risk of injury (crushing).



CAUTION!

Ejection of objects!

Risk of injury from blowing out jammed capsules when the Capsule Flow Control (CFC) is in the dismantled state (test function).

- The CFC container must be installed.
- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Only specialist personnel with electrical and / or mechanical training may remove the cover and operate the machine (for maintenance, fault-finding, etc.).



WARNING!

Crushing hazard caused by the ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Remove as little as possible (such as extraction unit ejection flap) so that it is difficult to reach into the danger area.
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the ejection pins of the capsule ejector!

Crushing is possible between the table top and the ejection pin holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Removing capsule holders and closing pins reduces the risk of crushing.



CAUTION!

Crushing hazard caused by the cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

Crushing is possible when installing and removing the cover of the switch-cabinet cooling unit (weight and handling).

Crushing, overstretching, etc. are possible when installing and removing the heat exchanger water cooling system (approx. 30 kg).

- Before carrying out any maintenance / cleaning, switch off main switch and secure the switch to prevent it from inadvertent switch-on.
- Always use / wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- This should only be done by specialist personnel with electrical training.



WARNING!

Crushing hazard caused by the suction cup holder!

Crushing is possible between the table top and suction cup holder.

Crushing is possible between the suction cup holder and capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders reduces the danger points and thus the risk of injury (crushing).
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the closing station!

Crushing is possible between closing pins, table top and format-specific parts.
Window flaps may be open.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- This should only be done by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.



WARNING!

Crushing hazard caused by the pellet station!

Crushing is possible between filling slide / temporary container / housing and transfer plate / capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.

2.3. Pharmaceutical dust

In individual phases of the machine's lifecycle, e.g. during cleaning, maintenance or fault elimination, the user can come into contact with powder residues or dusts from the material to be filled. Depending on the material to be filled, this can create a risk of damage to health due to medically active substances in the pharmaceutical dust.

The operator must ensure that users are not exposed to any health hazard associated with the substances to be filled in any phase of the machine's lifecycle. Users must wear protective clothing and take protective measures appropriate to the hazard.



WARNING!

Risk of damage to health due to medically active substances in the pharmaceutical dust.

The operator must ensure that users are not exposed to any health hazard associated with the substances to be filled in any phase of the machine's lifecycle. Users must wear protective clothing and take protective measures appropriate to the hazard.

3. Technical information

3.1. Tightening torques for bolts

Bolts can work loose if they are not tightened with sufficient torque.

The bolt, thread or components to be fixed can be damaged if the tightening torque is too great. Plastic curves or panels can be mechanically deformed or break.

The tightening torques in the following table apply to the nuts and bolts from the specified strength class as delivered.

Tab. 7 Tightening torques for bolts and nuts with metric standard threads for various material pairings to be clamped

External diameter (Nominal diameter)	Tightening torques in Nm for components to be clamped made from		
	Steel and/or bronze	Plastic (POM, PETP)	Aluminium alloys and/or stainless steel and/or bronze
	Use of nuts/bolts from strength class		
	8.8	8.8	70
M4	2,8	1,4	1,9
M5	5,5	2,8	3,7
M6	9,6	4,8	6,4
M8	23	11,5	15,3
M10	46	23	31
M12	79	39,5	52
M14	125	62,5	83
M16	195	97,5	130
M20	395	197,5	263

The following nuts / bolts require torques that differ from the values in the table:

- | | |
|---|------------------------------|
| • Tie bolts for the tamping station
(Hexagon bolt DIN 931 - M16 x 500) | 75 Nm |
| • Hexagon nuts for format-specific parts
(Size 13, fine metric thread M6 x 0.75) | Use value in table for
M6 |



NOTE

To protect the surface of hexagon nuts for format-specific parts (special nuts), use suitable tools for loosening and tightening.



NOTE

Lightly oil or grease nuts and bolts before using.
Only lubricants approved as grade H1 by the NSF may be used in the area in contact with the product.

4. Setting up

4.1. Safety during setup



CAUTION!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

- The maintenance flaps must be closed during operation.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Do not reach into the opening of the capsule discharge.



CAUTION!

Crushing hazard caused by the cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

- Commissioning must only be carried out by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.

4.2. Inching mode



WARNING!

Risk of crushing

Crushing of limbs is possible.

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.
- Work in inching mode must be carried out only by one person on their own to avoid the possibility of other persons standing in the danger area of the capsule filling machine.

To guarantee operator safety, all the drives of the capsule filling machine are switched off when one or more window flaps are opened. The window flaps are locked during operation.

In inching mode, the positioning drives are able to move despite the opened window flap in order to be able to make adjustments.



Fig. 99 Hand-held terminal

1. Enabling switch / emergency stop
2. “Move drive down” button
3. “Move drive up” button
4. LED lamps

- The drives are selected via the operator terminal.
- The drives can only move if the enabling switch is pressed.
- The drives can be moved up and down using the two buttons on the hand-held terminal.
- Press both buttons at the same time for at least 5 seconds to save the current position as the reference position.
- An emergency stop can be triggered by fully depressing the enabling switch.

Connecting the hand-held terminal to the filling machine switches the machine to test run mode. A diagnosis appears.

Pressing the enabling switch on the hand-held terminal switches on the selected positioning drive, which can then be moved. Releasing the enabling switch switches the positioning drive off once more.

The tamping station drives and main drive can only be moved when the window flaps are closed.

Emergency stop function

If the enabling switch is fully depressed, the drives stop immediately and the filling machine performs an emergency stop. Releasing the enabling switch acknowledges the emergency stop.

One window flap may be opened in inching mode. If several window flaps are opened, the drives switch off.

4.3. Capsule supply

4.3.1. Adjusting the capsule bed height

The empty capsules reach the bottom part of the capsule hopper via the separating plate. The separating plate can be used to adjust the height of the capsule bed in the bottom part. If the CFC option is active, the capsule bed must not project above the capsule magazine when the magazine is in its top position so that capsules can be blown out, if necessary.

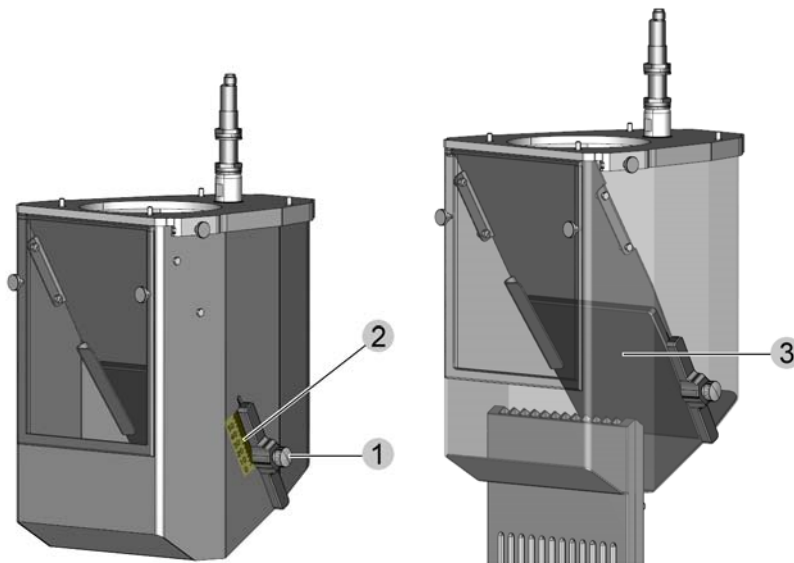


Fig. 100 Adjusting the capsule bed height

1. Adjusting lever with knurled screw
2. Capsule bed height scale
3. Capsule bed height separating plate

To adjust the capsule bed height:

- Loosen the knurled screw
- Use the adjusting lever to set the separating plate to the required height with reference to the scale.
- Tighten the knurled screw

4.3.2. Adjusting the capsule release clamping force

The clamping force of the retaining springs can be adjusted using the capsule release adjustment screw.

- Use the adjustment screw to set the retaining spring so that the capsules are transferred to the sorting fork when the capsule magazine is in the bottom position. If the magazine is not in the bottom position, the capsules must be held by the springs without being damaged.

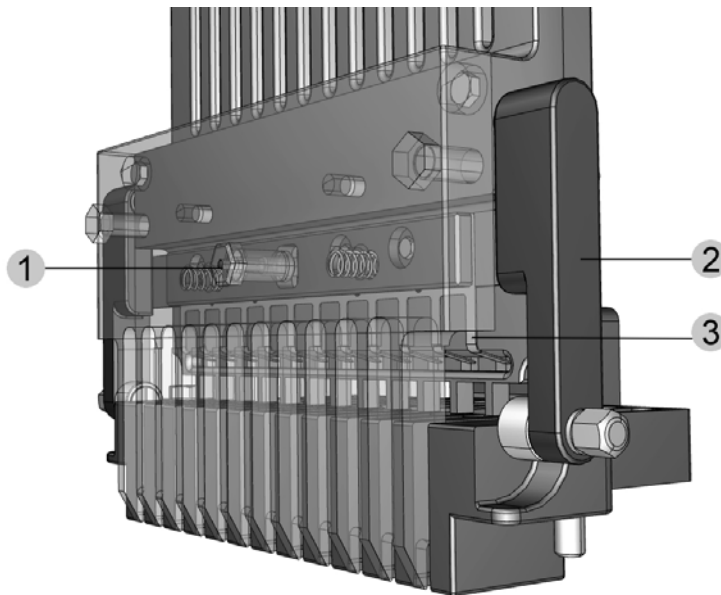


Fig. 101 Adjusting the clamping force

1. Capsule release adjustment screw
2. Capsule release
3. Retaining spring

4.4. Tamping station

4.4.1. Adjusting the tamping pins

The optimum compression force of the tamping pins at stations 1 - 5 depends on the material used and can be determined by preliminary tests. The compression forces at stations 1 - 5 must be set to approximately equal values.

The transferred compression force results from the change in length of the compression springs within the compression segment under load. Two extending pins in the compression segment make the change in length of the spring visible from the outside.

If necessary, the compression force range can be extended by the use of compression springs with other spring rates. There are suitable compression springs available for this purpose → see also the “Replacing compression springs in the compression segment” section in the Maintenance manual.

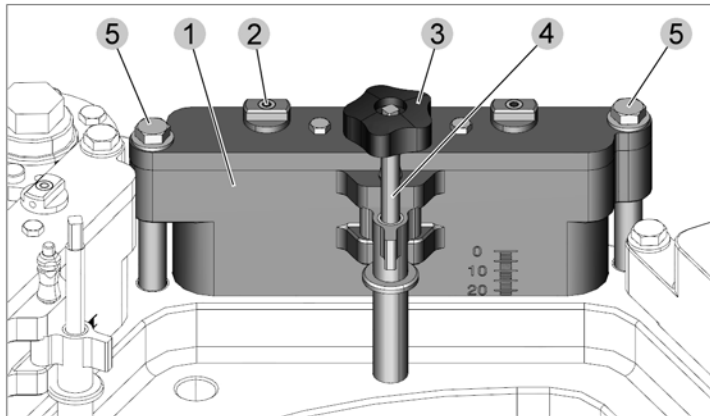


Fig. 102 Adjusting the tamping pins

1. Compression segment (station 1 – 5)
2. Pin
3. Star grip
4. Spindle
5. Screw

Adjust the tamping pins of a compression segment:

1. Loosen screws (2x).
2. Attach the star grip with square to the spindle of the station to be adjusted.
3. Turn the star grip to change the vertical position of the compression segment or the compression force:
 - Turn the star grip clockwise to reduce the compression force (the compression segment moves up).
 - Turn the star grip counter-clockwise to increase the compression force (the compression segment moves down).

A scale on the compression segment indicates the distance between the bottom edge of the tamping pin and the bottom edge of the dosing disk in millimeters - in relation to the compression unit in the bottommost position and with the dosing holes closed.

4. Tighten screws (2x).

Repeat steps 1 to 4 until the tamping pins of the compression segments at stations 1 – 5 are adjusted.

The tamping pins at station 6 (transfer station) cannot be adjusted.



NOTICE

For a uniform compression force distribution, the following pellets are obtained:

- Station 1 approx. 50 %
- Station 2 approx. 75 %
- Station 3 - 5 approx. 100 %

With the IPC software option (InProcess Control), the stroke length of the compression unit can be adjusted a further ± 1 mm.

4.4.2. Replacing compression springs of the compression segment

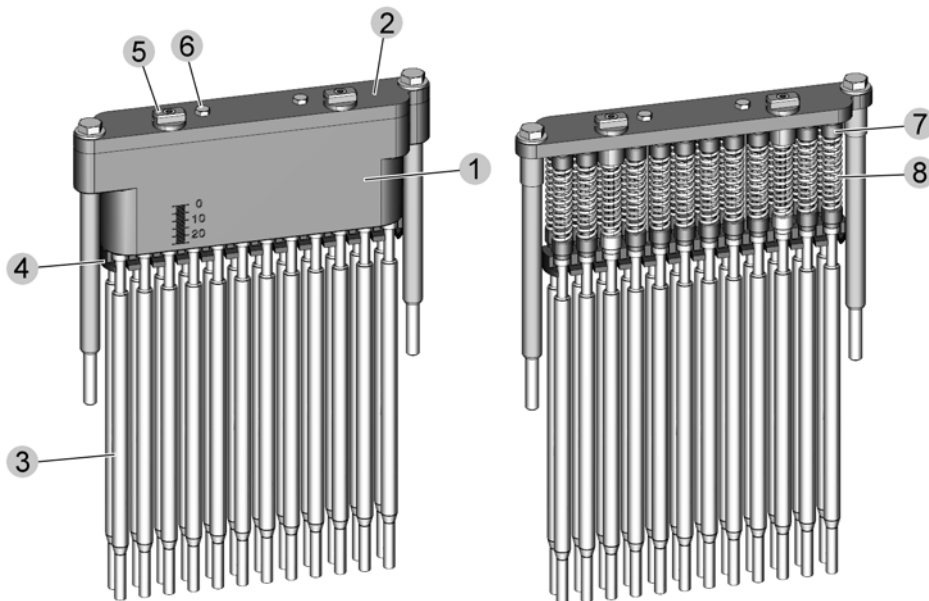


Fig. 103 Replacing compression springs of the compression segment

1. Guide block housing
2. Guide block cover
3. Tamping pin(s)
4. Mounting tamping pin
5. Guide bolt
6. Screw
7. Tappet
8. Compression spring

Removing compression springs of the compression segment

1. Remove compression segment.
→ See also the “Disassembly of the tamping pin station” section in the Maintenance manual.
2. Remove the tamping pins from the tamping pin mounting.
Take suitable precautions to prevent risk of injury due to dropping out tamping pins!
3. Loosen and unscrew guide bolts (2x).
4. Loosen and unscrew screws (2x).
5. Loosen and remove guide block cover.
6. Remove tappets from the top of the guide block housing.
7. Pull compression springs out of guide block housing.

Fitting compression springs of the compression segment

1. Insert compression springs into guide block housing.
Make sure only to employ correct and identical compression springs!
2. Insert tappets into compression springs.
Make sure that the end of the tappet with the smaller diameter is inserted into the compression spring!
3. Put the guide block cover on top of the guide block housing.
4. Insert and tighten guide bolts (2x).
5. Insert and tighten screws (2x).
6. Insert tamping pins into tamping pin mounting.
Take suitable precautions to prevent risk of injury due to dropping out tamping pins!
7. Install compression segment.
→ See also the “Assembly of the tamping pin station” section in the Maintenance manual.

4.4.3. Adjusting the compacting ring

The compacting ring can be adjusted vertically using four adjusting units. The height of the adjusting unit can be changed by turning an adjustment screw. The change in height (stroke) is shown on a scale without units.

There are four counter-bearings on the underside of the compacting ring mounting. These lie on the four top sides of the adjusting units which curve outwards.

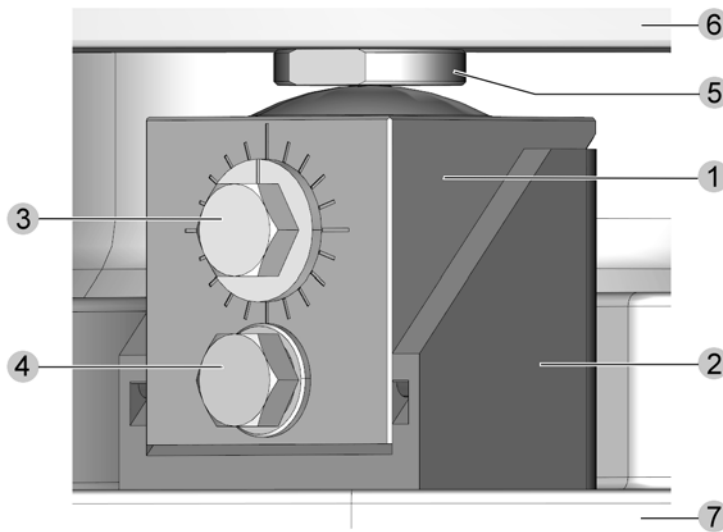


Fig. 104 Adjusting unit with counter-bearing

1. Top part of the slide
2. Bottom part of the slide
3. Adjustment screw
4. Reverse thread screw
5. Counter-bearing
6. Compacting ring mounting
7. Mounting plate

Set the gap between the compacting ring and dosing disk as follows:

1. Loosen the reverse thread screws on the four adjusting units.
2. Turn the adjustment screws of the four adjusting units alternately until the compacting ring lies flat against the dosing disk.
3. Starting from this reference position, use the four adjustment screws to set the gap between the compacting ring and the dosing disk.



NOTICE

The optimum gap setting depends on the material to be used.
One turn of the adjustment screw allows a stroke of 1 mm.
One graduation mark on the scale represents a stroke of 0.05 mm.

4. Tighten the reverse thread screws on the four adjusting units once the gap is set correctly.

5. Conversion

5.1. Safety during conversion



WARNING!

Crushing hazard caused by movable parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

The STO (Safe Torque Off) safety function for all six drives is deactivated by manually enabling the drive train in the middle column. There is a risk that a drive will move unexpectedly due to a controller fault.

The sorting fork drive moves the sorting forks on rows 1 and 2 at the same time.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of format-specific parts reduces the danger points and thus the risk of injury (crushing).
- Format changes must only be carried out by instructed or competent personnel.
- Always wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge housing.

- Only specialist personnel with electrical and / or mechanical training may remove the cover and operate the machine (for maintenance, fault-finding, etc.).



WARNING!

Crushing hazard caused by ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Remove as little as possible (such as extraction unit ejection flap) so that it is difficult to reach into the danger area.



WARNING!

Crushing hazard caused by ejection pins of the capsule ejector!

Crushing is possible between the table top and holder ejection pins.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders and closing pins reduces the danger points and thus the risk of injury (crushing).



WARNING!

Crushing hazard caused by suction cup holder!

Crushing is possible between the table top and suction cup holder.
Crushing is possible between the suction cup holder and capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders reduces the danger points and thus the risk of injury (crushing).



WARNING!

Crushing hazard caused by closing station!

Crushing is possible between closing pins, table top and format-specific parts.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.



WARNING!

Crushing hazard caused by the rotary disks with segments in the process space!

Crushing is possible between the capsule holder and fixed components (suction cup holder, closing station, etc.).

- Format changes must only be carried out by instructed or competent personnel.
- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves



WARNING!

Crushing hazard caused by the removal beam of the tamping station!

Risk of crushing possible by falling parts (tamping station, removal beam,...) or improper handling.

- High jerky torque possible on the cordless screwdriver towards the end of the travel. Move to the end position at low speed.
- Only allow competent or instructed persons to carry out this work.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.



WARNING!

Crushing hazard caused by the tamping station!

Risk of injury (crushing) during assembly and disassembly of heavy components.

- Format changes must only be carried out by instructed or competent personnel.
- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- When setting down the tamping station using the guide carriage, do not reach between the tamping module and the table top.
- Do not reach into the zero-point clamping system.



DANGER!

Danger of death from electrical voltage when removing / changing the pellet station!

The electrical DC link must be disconnected when removing / changing the pellet station (plug-in connector in the head part). Danger from direct contact with live parts.

- Always switch off all power before carrying out any work.
 - Switch off at the main switch
 - Wait until the DC link has discharged! (5 min.)
- To be carried out by an instructed or competent person.



WARNING!

Crushing hazard caused by the pellet station!

Crushing is possible between filling slide / temporary container / housing and transfer plate / capsule holder.

Risk of injury from falling parts when installing the pellet station. Total weight of the pellet station is approx. 25 kg (excluding filling cone, storage container, etc.).

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.

- Format changes must only be carried out by instructed or competent personnel.
- Always wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves

5.2. Replacing the tamping station with the removal jig

5.2.1. Safety when replacing the tamping station with the removal jig



DANGER!

Risk of crushing and cuts from moving parts.

Work on the tamping station removal jig and replacement of the tamping station must only be carried out by qualified and authorized personnel.



WARNING!

Risk of injury

The machine must be aligned horizontally in order to use the removal jig.



WARNING!

Risk of injury by trapping of body parts and loose clothing due to the rotary movement.

The tamping station must only be installed and removed by qualified and authorized specialist personnel.



DANGER!

Danger from suspended loads.

Never stand or work beneath suspended loads.



WARNING!

- This removal jig must only be used in the manner described for the tamping station of the machine described in this manual.
- Raising and lowering movements of the guide carriage are only permitted if the removal jig is engaged.
- The guide carriage may only be moved with the grab handle (even for raising and lowering movements).
- The tamping station removal jig is not designed for continuous loads.



DANGER!

Check the tamping station removal jig for visible defects before use (e.g. damage)

If the components have any visible defects or damage, eliminate the problem before continuing with the procedure.
Call Fette Service if necessary.

5.2.2. Description of the removal jig for tamping station

The tamping station removal jig consists of:

- Removal beam
- Guide carriage
- Assembly carrier

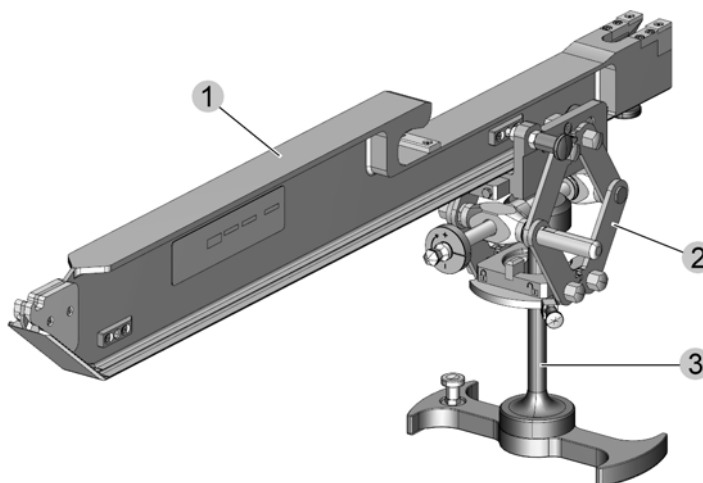


Fig. 105 Removal jig for tamping station

1. Removal beam
2. Guide carriage

3. Assembly carrier

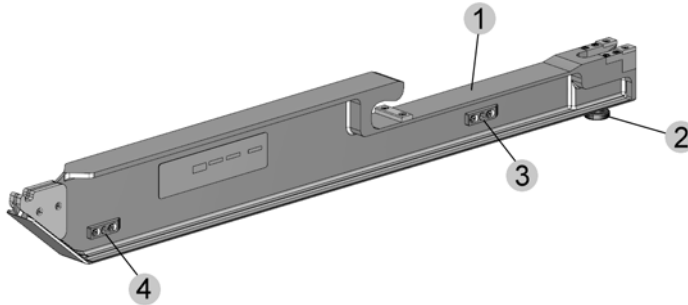


Fig. 106 Removal beam

1. Removal beam
2. Indexing plunger for locking the removal beam
3. Locking mechanism for the guide carriage (removal / installation position)
4. Locking mechanism for the guide carriage (park position)

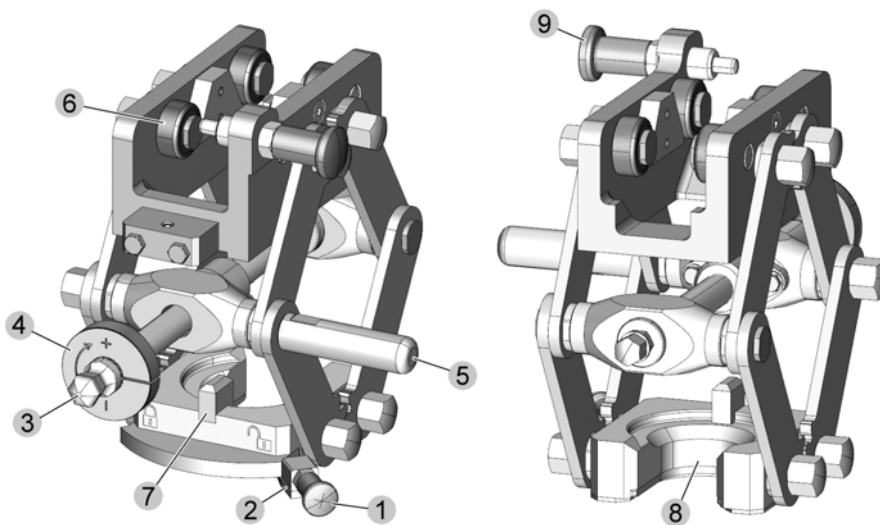


Fig. 107 Guide carriage

1. Indexing plunger for latch-lever locking mechanism
2. Latch lever
3. Threaded spindle
4. Direction of rotation indicator
5. Grab handle
6. Roller
7. Guide for groove in lifting support
8. Mounting for lifting support
9. Indexing plunger for guide-carriage locking mechanism

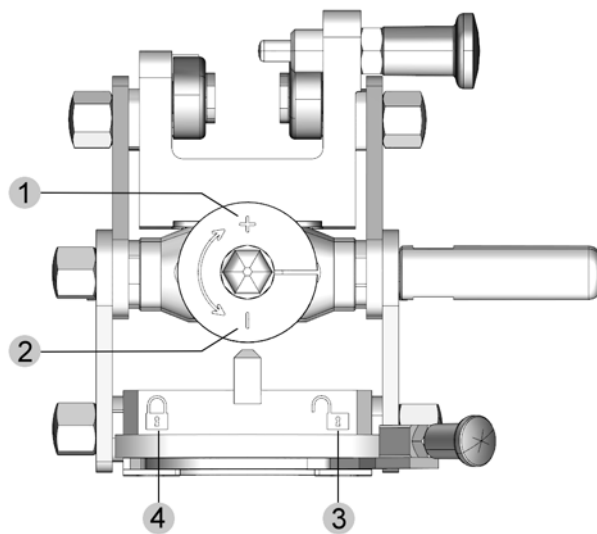


Fig. 108 Symbols on the guide carriage

1. Threaded spindle direction of rotation "+": Raise tamping module
2. Threaded spindle direction of rotation "-": Lower tamping module
3. Indexing plunger for latch-lever locking mechanism in "open" position: mounting for lifting support opened
4. Indexing plunger for latch-lever locking mechanism in "closed" position: mounting for lifting support closed

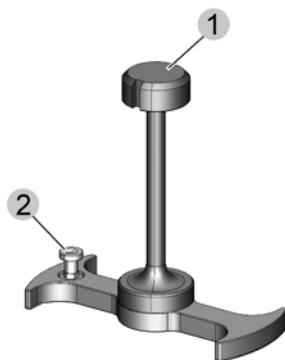


Fig. 109 Assembly carrier

1. Lifting support
2. Indexing plunger for locking the assembly carrier

5.2.3. Removal of the tamping station with the removal jig



WARNING

Risk of crushing from falling components.

Observe the weight of the individual components at disassembly.

1. Stop and block product supply.
2. Deplete powder from filling cone.
3. Use the operator terminal to carry out the removal of the tamping station. Therefore:
 - Press the "Run type" button in the header and select [Test run].
 - Open submenu [Functions].
 - Under menu item [MIRA View], select the [Disassembly] button.
 - Press button "Tamping Station".The "Tamping station removed" dialog opens.
 - Press button [A] / [B] to select either side A or side B (only at the double rotary machine).



HINWEIS

The most important working steps for the removal of the premium tamping station appear in the form of a checklist on the left-hand pane of the screen.

If a working step is selected, a corresponding description and depiction is shown on the right-hand pane of the screen.

Additional buttons are shown for some steps.

Tick the checkboxes prior to carrying out the working steps as visual confirmation that the individual step has been successfully completed.

4. Start automatic record of runtime data of the RFID dosing disk. Therefore:
 - Select working step "RFID: Write Dosing disc Runtime data" from the checklist on the left-hand pane of the screen.
 - Press button [Dosing disc to RFID position].
 - Check RFID data.
5. Move compression unit to its topmost position. Therefore:
 - Select step "Prepare disassembly of tamping pin station at the HMI" from the checklist on the left-hand pane of the screen.
 - Press button [Move drives to assembly position].
6. Open window flap.

7. Remove metering drum. Therefore:
 - Loosen bayonet cap inside the rotary valve housing by an anti-clockwise quarter turn before taking the cap off.
 - Use grab handle to pull the metering drum off the output drive shaft of the deflection unit.
 - Re-insert bayonet cap into the rotary valve housing and tighten clockwise by a quarter turn.
8. Remove material downpipe. Therefore:
 - Loosen screws for fixing the material downpipe at the rotary valve housing.
 - Remove material downpipe.
9. Remove rotary valve. Therefore:
 - Loosen screws for fixing the rotary valve.
 - Open tension latches at the rotary valve housing.
 - Remove rotary valve.
10. Remove deflection unit. Therefore:



WARNING

Remove deflection unit. Therefore:

Observe the weight of the individual components at assembly and disassembly:

- Deflection unit weighs approx. 4.5 kg.

- Release clamping lever of deflection unit.
 - Manually swivel the deflection unit about its own drive shaft until the integrated pivot mounting is no longer held by the supporting pin.
 - Move the deflection unit down for removal.
11. Remove vibration unit (option). Therefore:
 - Release clamp of the vibration unit.
 - Remove clamp of the filling cone.
 12. Remove filling cone. Therefore:

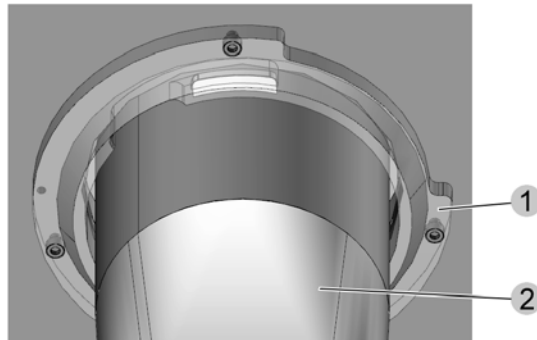


Fig. 110 Filling cone (installed)

1. Bayonet
2. Filling cone

- Hold the bottom part of the filling cone firmly with both hands.
- Push the filling cone up until it reaches the end stop and hold in place with a slight pressure.
- Turn the filling cone anti-clockwise until it reaches the end stop (removal / assembly position).
- Move the filling cone down for removal.

13. Remove pipe socket and collar of the dust cover. Therefore:

- Hold pipe socket firmly with both hands.
- Turn pipe socket clockwise for approx. 12.5 degrees until it is in removal / assembly position.
- Push both the pipe socket and the collar up before removing them.

14. Connect assembly carrier to the tamping pin holder of the tamping station module to be removed. Therefore:

- Position the assembly carrier into the two crescent-shaped cut-outs of the tamping pin holder.
- Secure assembly carrier with indexing plunger to prevent it from twisting.

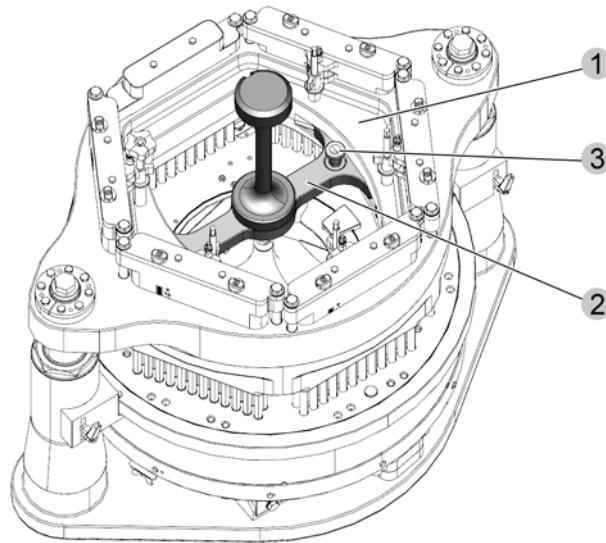


Fig. 111 Tamping pin holder with installed assembly carrier

1. Tamping pin holder
2. Assembly carrier
3. Indexing plunger for locking the assembly carrier



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

Check the following:

- Is the indexing plunger of the assembly carrier engaged in the indexing pin hole of the tamping pin holder?

15. Open front mounting for removal beam at the top part of the machine housing.
Therefore:

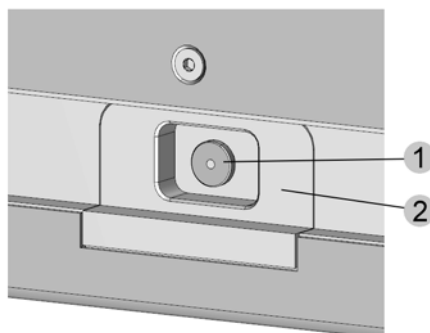


Fig. 112 Cover of front mounting for removal beam

1. Screw

2. Cover

- Unscrew screw.
- Remove cover.

16. Fit removal beam into the top part of the machine housing. Therefore:

- Insert removal beam into the rear mounting.
- Insert removal beam into the front mounting.

The removal beam engages into the rear mounting.

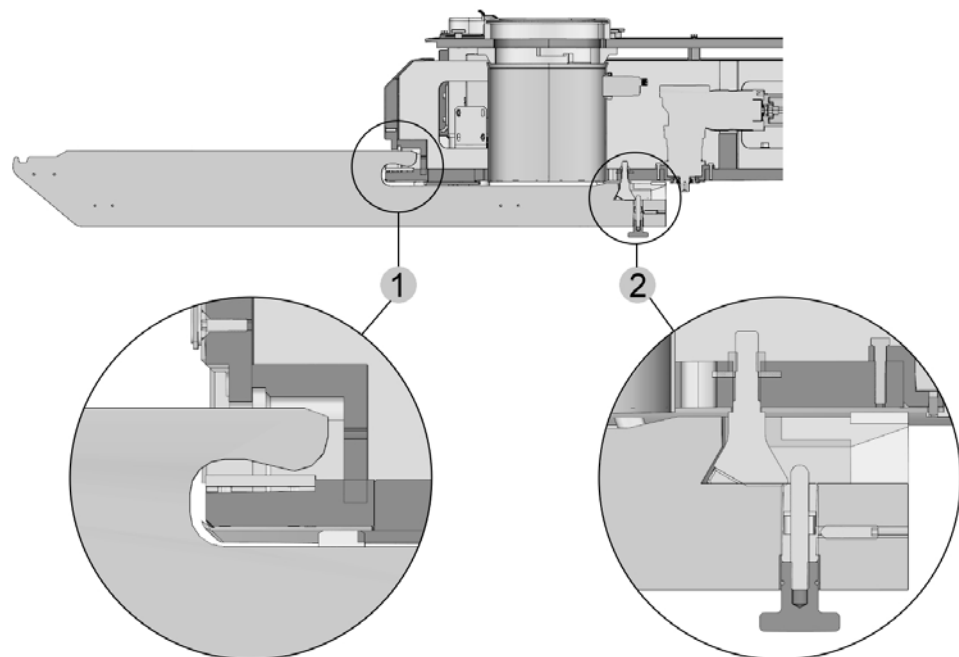


Fig. 113 Installed removal beam (sectional view)

1. Front mounting
2. Rear mounting



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

Check the following:

- Is the removal beam completely engaged in the mounting?

Check with reference to the red warning ring on the indexing plunger of the rear mounting.

The removal beam is correctly engaged in the mounting

behind the supporting pin, if the warning ring does not become visible.



CAUTION

Risk of injury from protruding removal beam

The installed removal beam protrudes out of the top part of the machine housing and could cause injury.

- Only install the removal beam in the top part of the machine housing for the duration of the removal / assembly procedure.
- Use / Wear personal protective equipment.

17. Connect guide carriage to removal beam. Therefore:

- Insert wheels of the guide carriage into the runway of the removal beam.

Ensure sure that the indexing plunger for locking the guide carriage is on that removal beam side which provides locking mechanisms for the removal / assembly position and parking position.

18. Move guide carriage into removal / assembly position. Therefore:

- Use grab handle to move the guide carriage into the removal / assembly position.
- Engage indexing plunger for locking the guide carriage into the removal / assembly position.

The direction of rotation indicator of the guide carriage points forward.



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

Check the following:

- Is the indexing plunger for locking the guide carriage securely engaged in the locking mechanism for the removal beam (removal / assembly position)?

19. Connect assembly carrier to guide carriage. Therefore:

- Position the lifting support in the open mounting of the guide carriage so that the groove in the lifting support is connected to the guide in the guide carriage.
- Lock the latch lever of the guide carriage to secure the lifting support.
- Lock latch lever, which is positioned in locked position, with indexing plunger for the latch-lever locking mechanism.



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

Check the following:

- Is the latch lever for securing the lifting support locked and the indexing plunger for the latch-lever locking mechanism engaged?

20. Detach lifting shafts of the compression unit from the two lifting drives. Therefore:

- Unscrew tie bolts from the two lifting shafts.

21. Detach tamping station module from the tabletop of the machine. Therefore:

- Select working step "Remove tamping station from tabletop" from the checklist on the left-hand pane of the screen.
- Press button [Loosen clamping system].

The clamping system must be pressurised with 6 bar air pressure in order to pneumatically release the clamping bolt.

22. Raise tamping station module. Therefore:

- Turn the threaded spindle of the guide carriage in direction of rotation "+" (direction indicator) either manually or by using a cordless screwdriver.



CAUTION

Risk of injury from using a cordless screwdriver

The rotating tool of a cordless screwdriver can lock up, causing it to recoil.

- Hold the cordless screwdriver firmly with both hands whilst working.
- Switch the cordless screwdriver off immediately if the rotating tool locks up.
- Always run the cordless screwdriver at low speed.

- Raise the tamping station module at least 40 mm so that it can then be moved horizontally without collisions.
- Check that there is an adequate gap between the tabletop of the machine frame and the underside of the raised tamping station module (visual inspection).

23. Move the tamping station module into parking position. Therefore:

- Disengage the indexing plunger for locking the guide carriage in the removal / assembly position.
- Use grab handle of the guide carriage to move the tamping station module slowly to its parking position outside the machine.

- Lock guide carriage whilst being in parking position by using the indexing plunger of the guide carriage.



WARNING

Crushing hazard to extremities.

The guide carriage must be moved between the lock-in positions using always the provided grab handle!



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

The guide carriage must only be moved very slowly in its runway!

24. Prepare the service cart and move it into position. Therefore:
 - Position the service cart underneath the tamping station module.
 - Apply the parking brakes to prevent the service cart from moving.
25. Position the tamping station module on the service cart's top mounting plate and set down. Therefore:
 - To lower the module, turn the threaded spindle of the guide carriage in direction of rotation "-" (direction indicator) either manually or by using a cordless screwdriver.



CAUTION

Risk of injury from using a cordless screwdriver!

The rotating tool of a cordless screwdriver can lock up, causing it to recoil.

- Hold the cordless screwdriver firmly with both hands whilst working.
 - Switch the cordless screwdriver off immediately if the rotating tool locks up.
 - Always run the cordless screwdriver at low speed.
- The connecting points on the underside of the tamping station module and on the service cart's top mounting plate must fit together perfectly while the module is being set down.
 - Check that the set-down module is lying fully on the top mounting plate of the service cart (visual inspection).
26. Detach the guide carriage in the parking position from the assembly carrier. Therefore:
 - Disengage the indexing plunger for the latch-lever locking mechanism in the "locked" position.

- Move the latch lever of the guide carriage to "open" position in order to open the mounting for the lifting support.
- When the latch lever is in "open" position, lock with the indexing plunger of the latch-lever locking mechanism.

27. Move guide carriage into top parking position. Therefore:

- Disengage the indexing plunger for locking the guide carriage in the parking position.
- Use grab handle to move the guide carriage into the top parking position and engage it there.

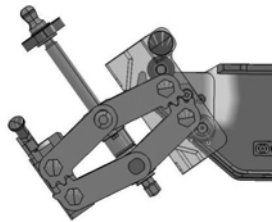


Fig. 114 Guide carriage in top parking position

28. Move the service cart. Therefore:

- Release the parking brakes of the service cart.
- Move the service cart away from the machine.
- Stop the service cart safely and apply the parking brakes.



WARNING

Crushing hazard to body parts caused by fall of the tamping station.

The service cart must:

- always be moved at a slow walking pace when transporting the tamping station!
- only be used on flat floors with a sufficient load-bearing capacity!

29. Detach guide carriage from the removal beam. Therefore:

- Remove guide carriage from the removal beam whilst the guide carriage is in the top parking position.

30. Remove the removal beam from the top part of the machine housing. Therefore:

- Disengage the indexing plunger for locking the removal beam.
- Raise and remove the removal beam.



WARNING

Crushing hazard to body parts caused by fall of the removal beam.

When removing the removal beam, pull it back carefully and observe the weight of the removal beam. The guide carriage must be detached from the removal beam before the beam can be removed.

31. Detach the assembly carrier from the tamping pin holder. Therefore:
 - Disengage indexing plunger of the assembly carrier.
 - Take the assembly carrier out of the crescent-shaped cut-outs in the tamping pin holder.
32. Close the front mounting for the removal beam in the top part of the machine housing. Therefore:

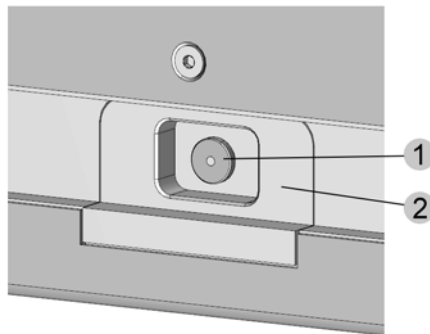


Fig. 115 Cover for front mounting for removal beam

1. Screw
2. Cover

- Insert cover.
 - Screw in screw.
33. Cover the connecting openings in the tamping station in the machine tabletop. Therefore:
 - Position the cover plate on the tabletop in order to cover the holes and prevent contamination of the drive compartment.
 34. Fix cover plate onto tabletop. Therefore:
 - Select working step "Fasten cover plate onto tabletop" from the checklist on the left-hand pane of the screen.
 - Press button [Tighten zero-point clamping system].

The zero-point clamping system must be vented in order to lock the two clamping bolts in the cover plate with the zero-point clamping modules.

5.2.4. Assembly of the tamping station with the removal jig



WARNING

Risk of crushing from falling components.

Observe the weight of the individual components at assembly.

1. Provide a "ready to install" tamping station module and place it on top of the service cart.
 - Apply the parking brakes to prevent the service cart from moving.
2. Align the tamping pins and dosing holes (dosing disk) of the tamping station module to be installed.
 - Align the adjusting hole in the tamping pin holder and dosing disk with the aligning rod.
3. Connect assembly carrier to the tamping pin holder of the tamping station module to be installed. Therefore:
 - Position the assembly carrier into the crescent-shaped cut-outs of the tamping pin holder.
 - Secure assembly carrier with indexing plungers to prevent it from twisting.

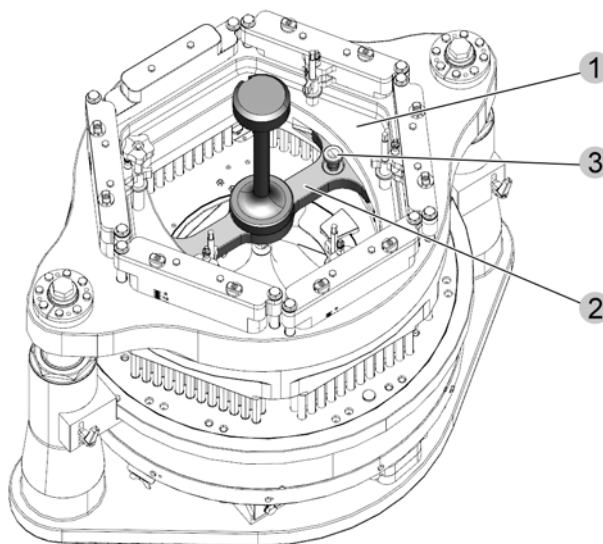


Fig. 116 Tamping pin holder with installed assembly carrier

1. Tamping pin holder
2. Assembly carrier
3. Indexing plunger for locking the assembly carrier



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

Check the following:

- Is the indexing plunger of the assembly carrier engaged in the indexing-plunger pin groove of the tamping pin holder?

4. Use the operator terminal to carry out the assembly of the tamping station. Therefore:

- Press the "Run type" button on the header and select [Test run].
- Open submenu [Functions].
- Under menu item [MIRA view], select the [Assembly] button.
- Press button "Tamping station".

The "Assembly tamping pin station" dialog opens.

- Press button [A] / [B] to select either side A or side B (only at double rotary machines).



NOTICE

The most important working steps for the assembly of the premium tamping station appear in the form of a checklist on the left-hand pane of the screen.

If a working step is selected, a corresponding description and depiction is shown on the right-hand pane of the screen.

Additional buttons are shown for some steps.

Tick the checkboxes prior to carrying out the working steps as visual confirmation that the individual step has been successfully completed.

5. Open window flap.

6. Detach cover plate from the tabletop of the machine. Therefore:

- Select working step "Remove cover plate from tabletop" on the left-hand pane of the screen.
- Press button [Loosen clamping system].

The clamping system must be pressurised with 6 bar air pressure in order to pneumatically release the clamping bolt.

7. Provide access to the connecting openings of the tamping station in the machine tabletop. Therefore:

- Remove cover plate.

8. Open front mounting for inserting the removal beam at the top part of the machine housing. Therefore:

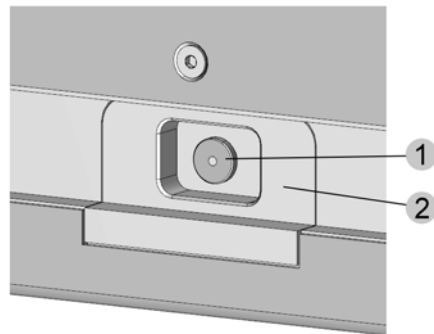


Fig. 117 Cover of front mounting for removal beam

1. Screw
2. Cover

- Unscrew screw.
- Remove cover.

9. Fit removal beam into the top part of the machine housing. Therefore:
 - Insert removal beam into the rear mounting.
 - Insert removal beam into the front mounting.

The removal beam engages into the rear mounting.

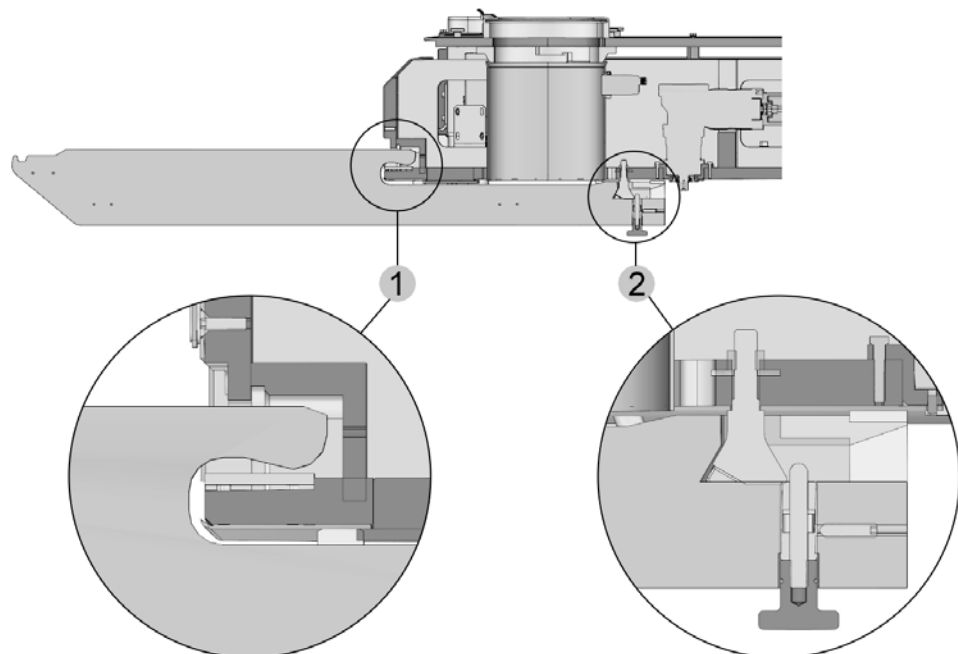


Fig. 118 The removal beam engages into the rear mounting.

1. Front mounting
2. Rear mounting



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

Check the following:

- Is the removal beam completely engaged in the mounting?

Check with reference to the red warning ring on the indexing plunger of the rear mounting.

The removal beam is correctly engaged in the mounting behind the supporting pin, if the warning ring does not become visible.



CAUTION!

Risk of injury from protruding removal beam!

The installed removal beam protrudes out of the top part of the machine housing and could cause injury.

- Only install the removal beam in the top part of the machine housing for the duration of the removal / assembly procedure.
- Use / Wear personal protective equipment.

10. Connect guide carriage to removal beam. Therefore:

- Insert wheels of the guide carriage into the runway of the removal beam.

Ensure sure that the indexing plunger for locking the guide carriage is on that removal beam side which provides locking mechanisms for the removal / assembly position and parking position.

11. Move guide carriage into the top parking position. Therefore:

- Move guide carriage into the top parking position and engage.

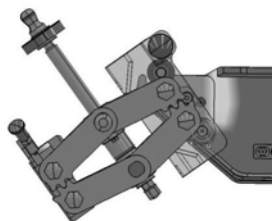


Fig. 119 Guide carriage in the top parking position

12. Move the service cart with the "ready to install" tamping station module close to the machine. Therefore:

- Position the service cart at machine side.

- Apply the parking brakes to prevent the service cart from moving.



WARNING

Crushing hazard to body parts caused by fall of the tamping station.

The service cart must:

- always be moved at a slow walking pace when transporting the tamping station!
- only be used on flat floors with a sufficient load-bearing capacity!

13. Move guide carriage into parking position. Therefore:

- Use grab handle to move the guide carriage from the top parking position to the parking position.
- Engage the indexing plunger for locking the guide carriage in the parking position.

The direction of rotation indicator for the guide carriage points forward.



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

Check the following:

- Is the indexing plunger for locking the guide carriage (parking position) securely engaged in the locking mechanism for the removal beam?

14. Connect assembly carrier to guide carriage. Therefore:

- Position the lifting support in the open guide carriage mounting so that the groove in the lifting support is connected to the guide in the guide carriage.
- Close the guide carriage latch lever to secure the lifting support.
- When the latch lever is in the closed position, lock with the latch lever of the indexing plunger.



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

Check the following:

- Is the latch lever for securing the lifting support locked and the indexing plunger for the latch-lever locking mechanism engaged?

15. Raise tamping station module from the service cart. Therefore:

- Turn the threaded spindle of the guide carriage in direction of rotation "+" (direction indicator) either manually or by using a cordless screwdriver.



CAUTION

Risk of injury from using a cordless screwdriver

The rotating tool of a cordless screwdriver can lock up, causing it to recoil.

- Hold the cordless screwdriver firmly with both hands whilst working.
- Switch the cordless screwdriver off immediately if the rotating tool locks up.
- Always run the cordless screwdriver at low speed.

- Raise the tamping station module at least 40 mm so that it can then be moved horizontally without collisions.
- Check that there is an adequate air gap between the service cart's top mounting plate and the underside of the raised tamping station module (visual inspection).

16. Move the tamping station module into removal / assembly position. Therefore:

- Disengage the indexing plunger for locking the guide carriage whilst being in parking position.
- Use grab handle of the guide carriage to move the tamping station module slowly to its removal / assembly position inside the machine.
- Lock guide carriage whilst being removal / assembly position indexing plunger for locking the guide carriage.



WARNING

Crushing hazard to extremities.

The guide carriage must be moved between the lock-in positions using always the provided grab handle!



DANGER

Crushing hazard to body parts caused by fall of the tamping station.

The guide carriage must only be moved very slowly in its runway!

17. Position the tamping station module onto the tabletop of the machine and set down. Therefore:

- To lower the module, turn the threaded spindle of the guide carriage in direction of rotation "-"(direction indicator) either manually or by using a cordless screwdriver.



CAUTION

Risk of injury from using a cordless screwdriver

The rotating tool of a cordless screwdriver can lock up, causing it to recoil.

- Hold the cordless screwdriver firmly with both hands whilst working.
 - Switch the cordless screwdriver off immediately if the rotating tool locks up.
 - Always run the cordless screwdriver at low speed.
- The connecting points on the underside of the tamping station module and on the service cart's top mounting plate must fit together perfectly while the module is being set down.
 - Check that the set-down module is lying fully on the table top of the machine (visual inspection).
- 18.** Connect the tamping station module with the tabletop of the machine frame. Therefore:
- Select working step "Fasten tamping station onto tabletop" from the checklist on the left-hand pane of the screen.
 - Press button [Tighten clamping system].
- The clamping system must be vented in order to lock the two clamping bolts in the mounting plate with the clamping modules.
- 19.** Connect the lifting spindles of the compression unit with the two lifting drives. Therefore:
- Tighten the tie bolts from the two lifting spindles.
- 20.** Detach the guide carriage in the removal / assembly position from the assembly carrier. Therefore:
- Disengage the indexing plunger for the latch-lever locking mechanism in the "locked" position.
 - Move the latch lever of the guide carriage to "open" position in order to open the mounting for the lifting support.
 - When the latch lever is in "open" position, lock with the indexing plunger of the latch-lever locking mechanism.
- 21.** Detach the guide carriage from the removal beam.
- Disengage the indexing plunger for locking the guide carriage in the removal / assembly position.
 - Use grab handle to move the guide carriage slowly to its parking position outside the machine.

- Use grab handle to move the guide carriage into the top parking position and detach the guide carriage from the removal beam.
- 22.** Remove the removal beam from the top part of the machine housing. Therefore:
- Disengage the indexing plunger for locking the removal beam.
 - Raise and remove the removal beam.



WARNING

Crushing hazard to body parts caused by fall of the removal beam.

When removing the removal beam, pull it back carefully and observe the weight of the removal beam. The guide carriage must be detached from the removal beam before the beam can be removed.

- 23.** Close the front mounting for the removal beam in the top part of the machine housing. Therefore:

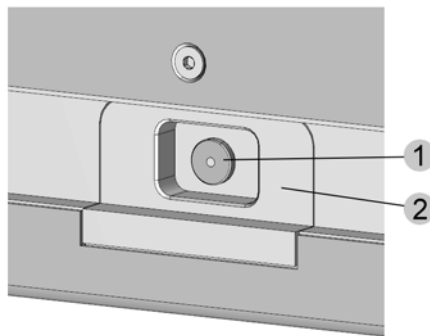


Fig. 120 Cover for front mounting for removal beam

1. Screw
 2. Cover
- Insert cover.
 - Screw in screw.
- 24.** Detach the assembly carrier from the tamping pin holder. Therefore:
- Disengage the indexing plunger of the assembly carrier.
 - Take the assembly carrier out of the crescent-shaped cut-outs in the tamping pin holder.
- 25.** Install both pipe socket and collar into the dust cover of the tamping station module. Therefore:
- Position the pipe socket onto the dust cover whilst in removal / assembly position.
 - Turn pipe socket anti-clockwise for approx. 12.5 degrees until it reaches the end stop.

- Push collar on top of pipe socket.

26. Install filling cone into the top part of the machine housing. Therefore:

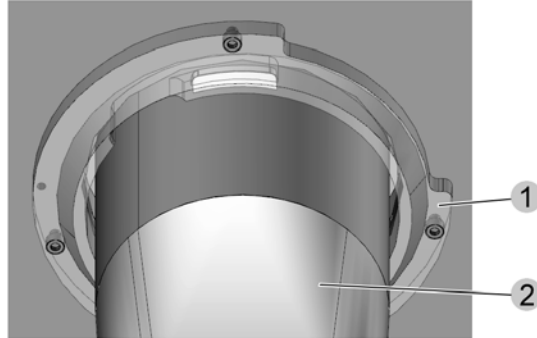


Fig. 121 Filling cone (installed)

1. Bayonet
2. Filling cone

- Hold the bottom part of the filling cone firmly with both hands.
- Insert the filling cone into the removal / assembly position of the bayonet.
Observe that the sight glass of the filling cone points in the direction of the sensor which monitors the filling level.
- Push the filling cone up and hold in place with a slight pressure.
- Turn the filling cone clockwise until it reaches the end stop.
- Move the filling cone down until it reaches the end stop.

27. Install vibration unit (option). Therefore:

- Put the clamp of the vibration unit around the filling cone top.
- Close clamp.

28. Install deflection unit. Therefore:



WARNING

Risk of crushing from falling components.

Observe the weight of the individual components at assembly and disassembly:

- Deflection unit weighs approx. 4.5 kg.

- Push the deflection unit with the internally-gear drive shaft onto the externally-gear motor shaft of the drive for the metering drum.
- Manually swivel the deflection unit about its own drive shaft until the integrated pivot mounting is held by the supporting pin.
- Apply clamping lever for deflection unit.

29. Install rotary valve. Therefore:
 - Push the rotary valve onto the output drive shaft of the deflection unit.
 - Tighten screws for fixing the rotary valve at the deflection unit.
 - Close tension latches.
30. Install metering drum. Therefore:
 - Turn bayonet cap inside the rotary valve housing by an anti-clockwise quarter turn before taking the cap off.
 - Push the metering drum onto the output drive shaft of the deflection unit reaching the end stop.
 - Insert bayonet cap into the rotary valve housing and tighten clockwise by a quarter turn.
31. Install material downpipe. Therefore:
 - Position material downpipe at the rotary valve housing.
 - Tighten screws for fixing the material downpipe.
32. Close window flap
33. Fill filling cone.
34. Set parameter 256 "Dosing disk height".
 - Select working step "Set parameter 256 'Dosing disk height'" from the checklist on the left-hand pane of the screen.
 - Press button [Set parameter 256].
 - Enter the height of the installed dosing disk by using the dialog "Parameter entry" and confirm with [OK].
35. Read out the parameters for the RFID dosing disk. Therefore:
 - Select working step "RFID: Read Dosing disc parameters" from the checklist on the left-hand pane of the screen.
 - Press button [Dosing disc to RFID position].
 - Check the read out RFID parameter.

5.3. Dismantling and reassembling the tamping station

5.3.1. Safety when dismantling and reassembling the tamping station



DANGER!

Risk of crushing and cuts from moving parts.

The tamping station must only be dismantled and reassembled by qualified and authorized personnel.



WARNING!

Risk of injury by trapping of body parts and loose clothing due to the rotary movement.

The tamping station must only be installed and removed by qualified and authorized specialist personnel.



DANGER!

Danger from suspended loads.

Never stand or work beneath suspended loads.



WARNING!

Risk of crushing during format change at the tamping station

Risk of crushing due to heavy components that need to be removed. A format change (change of dosing disk, tamping pins, etc.) is generally carried out on the basic machine version.

- Always use personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves

5.3.2. Dismantling the tamping station

The tamping station can be dismantled if required for maintenance or cleaning, for example.



WARNING

Risk of crushing from falling components.

Be aware of the weight of the individual components during installation.

1. If the tamping station has already been removed using the removal jig:
 - Move the tamping station module into place on the service cart.
 - Apply the parking brakes to prevent the service cart moving.
 - Dismantle the module on the service cart as described from step 3.
2. If the tamping station is still installed in the machine:

- Empty filling cone.
- Carry out removal of the tamping station on the operator terminal.
→ Therefore, see also section "Removing the tamping station with the removal jig" in the Maintenance manual.
- Move the compression unit into its topmost position.
→ Therefore, see also section "Removing the tamping station with the removal jig" in the Maintenance manual.
- Open window flaps.

The run type automatically switches to computer run and all drives are stopped.

- Remove the powder feed unit (filling cone, rotary valve with metering drum, deflection unit and material downpipe).
→ Therefore, see also section "Removing the tamping station with the removal jig" in the Maintenance manual.
- Dismantle the module in the machine as described from step 3.

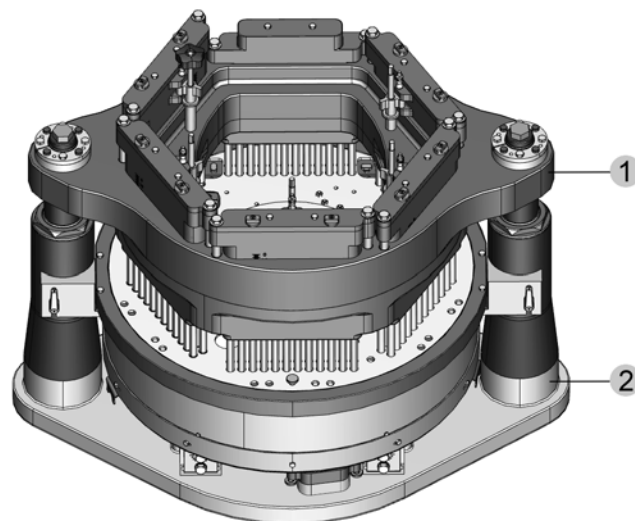


Fig. 122 Tamping station module before dismantling

1. Compression unit
2. Powder dosing unit

3. Remove compression segments (station 1 – 5).

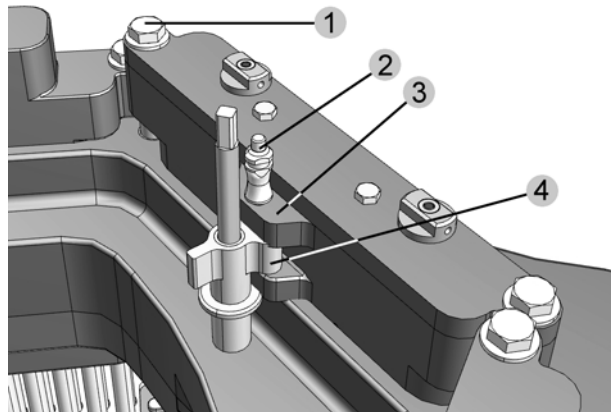


Fig. 123 Removing compression segments (station 1 – 5)

1. Fixing screw
2. Ball lock pin
3. Guide block housing
4. Locking element (closed)

Carry out the following steps for each compression segment at stations 1 - 5 in succession:

- Unscrew fixing screws (2x) from compression segment.
- Release the ball lock pin by pressing and holding down the sprung pressure pin.
- Pull the ball lock pin up and out of the pin hole in the guide block housing to remove.
- Turn the locking element approx. 90° to open.

The locking element is open when the eccentric part of the locking element is no longer connected to the guide block housing.

- Pull the compression segment with the tamping pins up and out of the tamping pin holder to remove.

The individual tamping pins are engaged into the compression segment and may fall out. The tamping pins (24x) can be held together and completely removed by means of the removal jig.

- If the format (changing the tamping pins) is to be changed:
Remove the tamping pins (24x) from the retainer.

4. Remove the compression segment (station 6, transfer station).

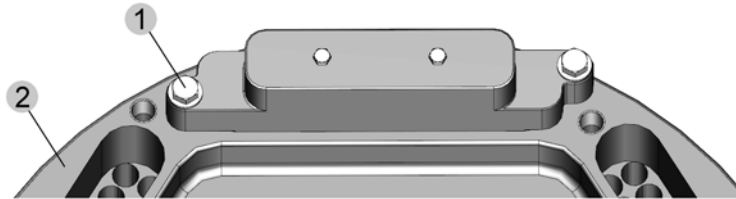


Fig. 124 Removing the compression segment (station 6)

1. Fixing screw
2. Tamping pin holder

- Unscrew adjusting screws (2x) from the tamping pin holder.
- Pull the compression segment with the tamping pins up and out of the tamping pin holder to remove.
- If the format (changing the tamping pins) is to be changed:
Remove the tamping pins (24x) from the retainer.

5. Remove clamping assemblies.

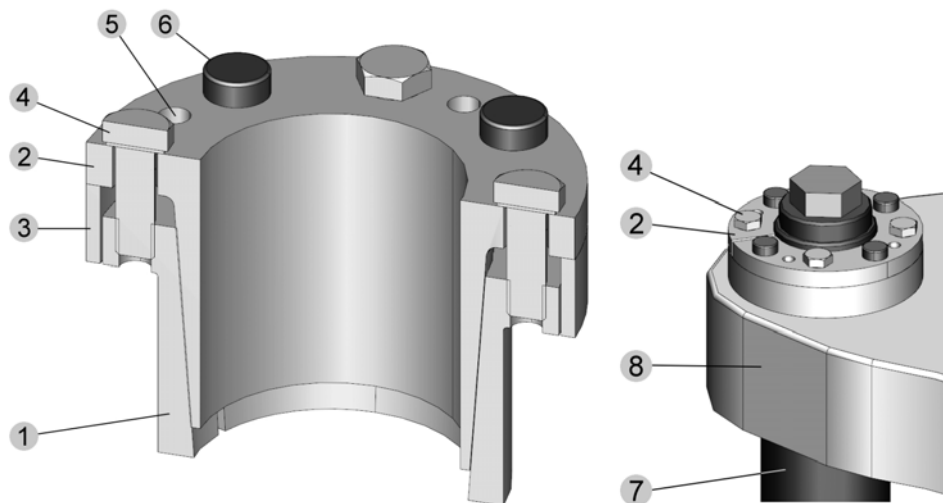


Fig. 125 Clamping assembly (braced)

1. Outer ring (slotted)
2. Inner ring (slotted)
3. Axial ring
4. Clamping screw
5. Threaded extraction holes
6. End plug
7. Lifting spindle
8. Tamping pin holder

Carry out the following for both clamping clamping assemblies:

- Loosen all clamping screws evenly one after the other and remove.
- Screw the clamping screws into the threaded extraction hole of the inner ring.
- Tighten the clamping screws evenly with a $\frac{1}{4}$ turn following a diagonal sequence. Gradually increase the extraction torque until the outer ring and inner ring separate.
- Remove the released clamping assembly between the lifting spindle and hub bore in the tamping pin holder.

6. Remove the tamping pin holder.



WARNING

Risk of crushing from falling components.

Be aware of the weight of the individual components during removal and installation.

- Tamping pin holder weighs approx. 24 kg

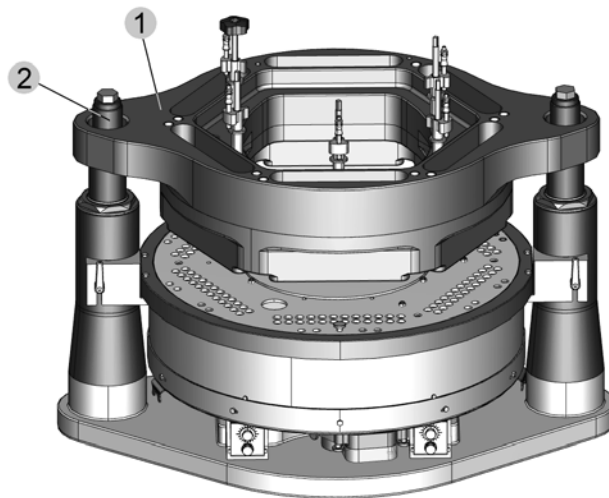


Fig. 126 Removing the tamping pin holder

1. Tamping pin holder
2. Lifting spindle

- Lift the tamping pin holder up and away from the lifting spindles.

7. Remove dust seal.

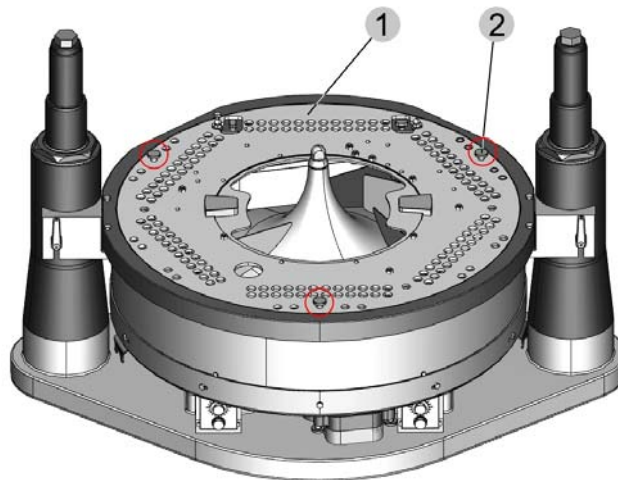


Fig. 127 Removing the dust seal

1. Dust seal
2. Knurled screws

- Loosen and unscrew knurled screws (3x).
- Lift up dust seal.

8. Remove rake holder.

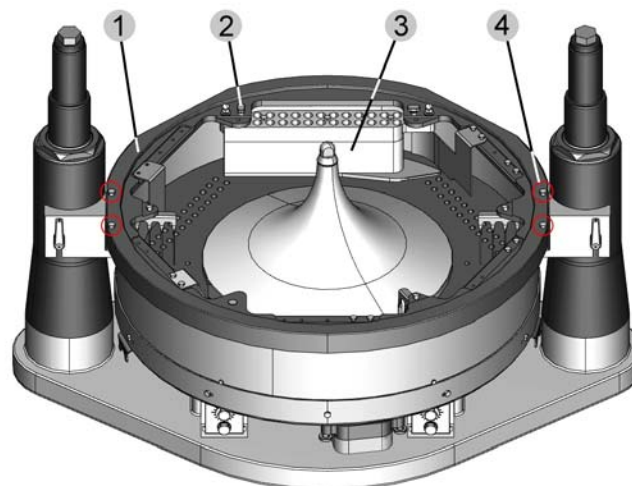


Fig. 128 Removing the rake holder

1. Rake holder
2. Adjusting screws and parallel pins
3. Scraper transfer station
4. Fixing screw

- Loosen and unscrew fixing screws (4x).

- Loosen adjusting screw (2x) of the scraper transfer station.
- Lift the rake holder including mounted rake and guide plates up and away from the machines.

9. Remove scraper transfer station.

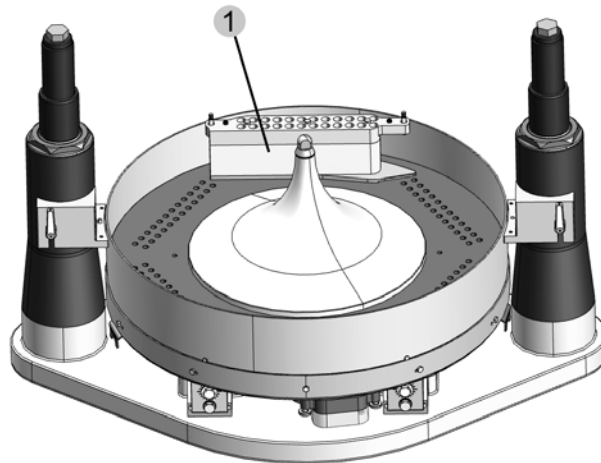


Fig. 129 Removing the scraper transfer station

1. Scraper transfer station

- Lift the scraper transfer station up and away.

10. Dismantle cone distributor.

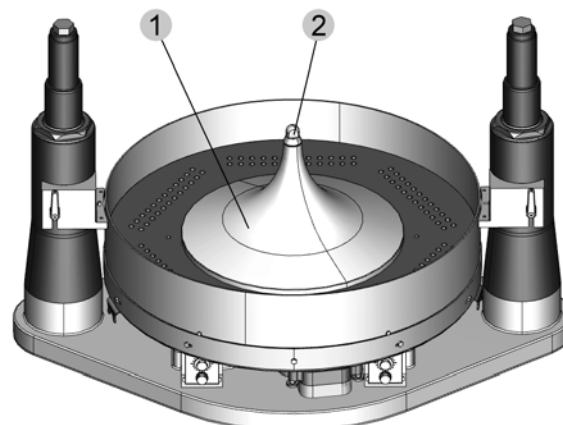


Fig. 130 Removing the cone distributor

1. Cone distributor
2. Clamping screw

- Loosen and unscrew central clamping screw.
- Remove cone distributor.

11. Removing the silicone strip.

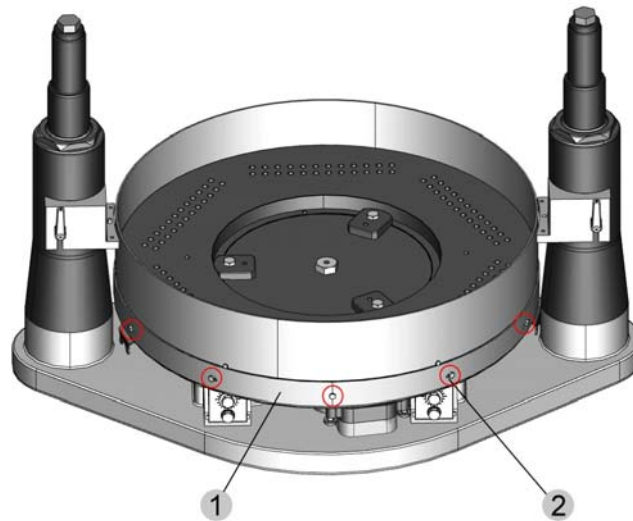


Fig. 131 Removing the silicone strip

1. Silicone strip
2. Fixing screw

- Unscrew and remove all the fixing screws for the silicone strip.
- Remove silicone strip.

12. Remove the dosing disk and powder pan.



WARNING

Risk of crushing from falling components.

Be aware of the weight of the individual components during removal and installation:

- Dosing disk and powder pan weigh (together) approx. 24 kg

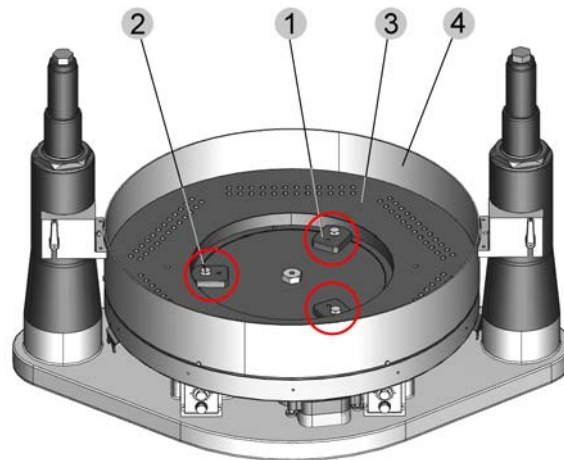


Fig. 132 Removing the dosing disk and the powder pan

1. Clamping lugs (3x)
2. Fixing screws for clamping lugs (3x)
3. Dosing disk
4. Powder pan

- Remove powder pan.
Remove fastening screws (6x) on the outer periphery of the powder pan and separate the powder pan from the dosing disk.
- Unscrew and remove clamping lug fixing screws.
- Turn each clamping lug 180° inwards.
- Remove dosing disk.
- When the fixing screws are secured:
Turn the clamping lugs back outwards and screw in and tighten the fastening screws.

13. Remove compacting ring and extraction unit.



WARNING

Risk of crushing from falling components.

Be aware of the weight of the individual components during removal and installation.

- Compacting ring and mounting weigh (together) approx. 24.5 kg

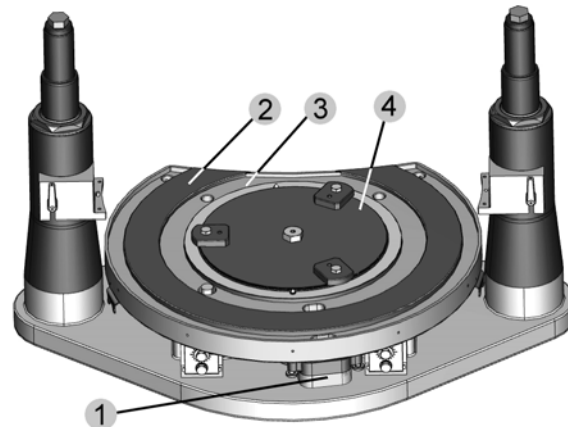


Fig. 133 Removing the compacting ring and the extraction unit

1. Extraction unit compacting ring
2. Compacting ring
3. Mounting
4. Support plate

- Loosen the knurled screws (2x) for fixing the extraction unit to the mounting.
The extraction unit must first only be loosened, then remove the compacting ring including its mounting. Only then can the extraction unit be removed.
- Lift up the compacting ring and mounting together.
- Remove extraction unit of compacting ring.

14. Remove adjusting units and rake holder slider.

If the tamping station is dismantled for complete cleaning, the adjusting units and the rake holder slider must be removed as well.

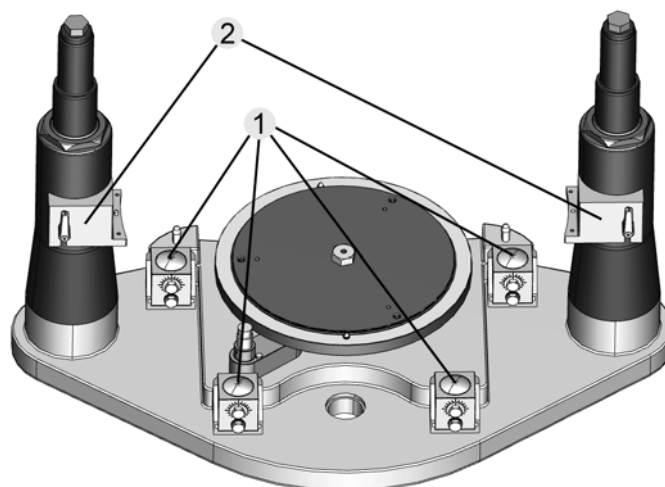


Fig. 134 Removing the adjusting units and rake holder slider

1. Adjusting units
 2. Rake holder slider
- Lift adjusting units (4x levelling blocks) up and away.
 - Loosen toggle clamping lever and remove rake holder slider (2x).

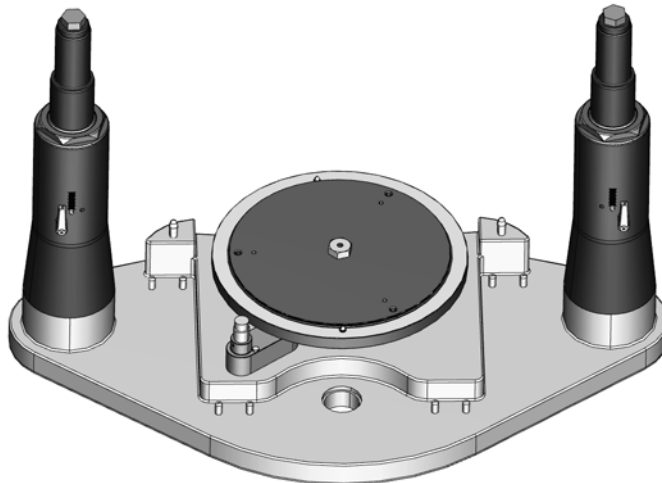


Fig. 135 Tamping station module after dismantling

5.3.3. Reassembling the tamping station



WARNING

Risk of crushing from falling components.

Be aware of the weight of the individual components during installation.

1. If the tamping station is to be installed in the machine using the removal jig:
 - Move the dismantled tamping station module into place on the service cart.
 - Apply the parking brakes to prevent the service cart moving.
 - Reassemble the module on the service cart as described from step 3.
2. If the tamping station is to be installed in the machine without the removal jig:
 - Carry out installation of the tamping station at the operator terminal.
→ Therefore, see also section "Installing the tamping station with the removal jig" in the Maintenance manual.
 - Move the lifting spindles of the lifting drives into their topmost positions.
→ Therefore, see also section "Installing the tamping station with the removal jig" in the Maintenance manual.
 - Open window flaps.

The run type automatically switches to computer run and all drives are stopped.

- Reassemble the module in the machine as described from step 3.

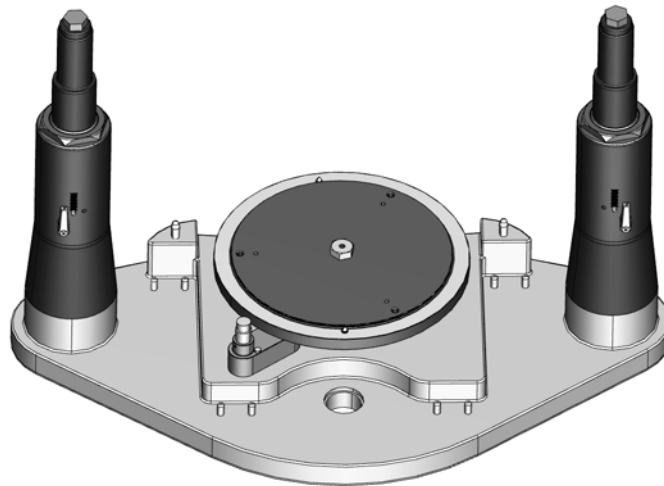


Fig. 136 Dismantled tamping station module before reassembly

For a complete cleaning of the tamping station, the adjusting unit and the rake holder slider were also removed.

3. Install adjusting unit and rake holder slider.

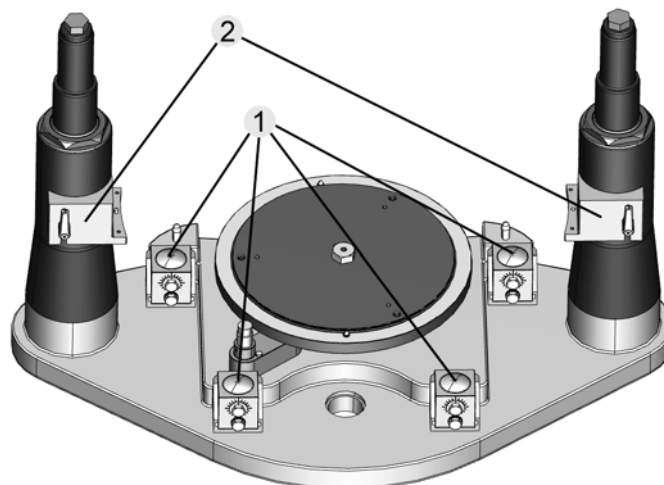


Fig. 137 Install adjusting unit and the rake holder slider

1. Adjusting unit
2. Rake holder slider

- Insert adjusting units (4x levelling block) above the alignment pin (2x each) and push in.

- Insert the rake holder slider (2x) into the guide column and fix with toggle clamping lever.

4. Install compacting ring and extraction unit.



WARNING!

Risk of crushing from falling components.

Be aware of the weight of the individual components during removal and installation.

- Compacting ring and mounting (together) approx. 24.5 kg

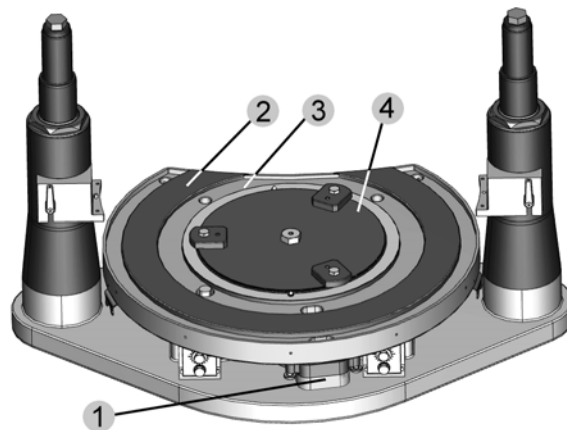


Fig. 138 Install compacting ring and extraction unit

1. Extraction unit compacting ring
2. Compacting ring
3. Mounting
4. Contact plate

- Insert extraction unit compacting ring.
The extraction unit must first only be inserted, then install the compacting ring including its mounting. Only then can the extraction unit be mounted.
- Place compacting ring and mounting on top of the adjusting units.
- Tighten the extraction unit compacting ring at the mounting by screwing in two knurled screws.

5. Install dosing disk and powder pan.



WARNING!

Risk of crushing from falling components.

Be aware of the weight of the individual components during removal and installation.

- Compacting ring and powder pan (together) approx. 24.5 kg

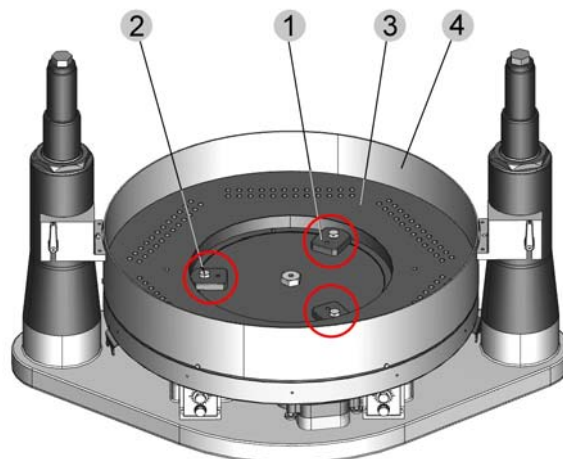


Fig. 139 Install dosing disk and powder pan

1. Clamping lug (3x)
2. Fastening screw clamping lug (3x)
3. Dosing disk
4. Powder pan

- When the fastening screws are secured:
Loosen fastening screws, unscrew and turn the clamping lugs inwards.
- Position and put down dosing disk.

Make sure that the positioning holes in the dosing disk are perfectly aligned with the centering taper pins in the contact plate.

- Turn each clamping lug 180° outwards.
- Screw in and lightly tighten the clamping lug fastening screws.
- Tighten powder pan.
Connect the powder pan to the dosing disk. Screw the fastening screws (6x) into the dosing disk at the outer circumference of the powder pan. Then tighten fastening screws.

6. Setting the adjusting units

Adjust the gap between dosing disk and compacting ring by using the adjusting units (4x levelling blocks) → Therefore, see also section "Adjust compacting ring" in the Maintenance manual.

7. Insert silicone strip.

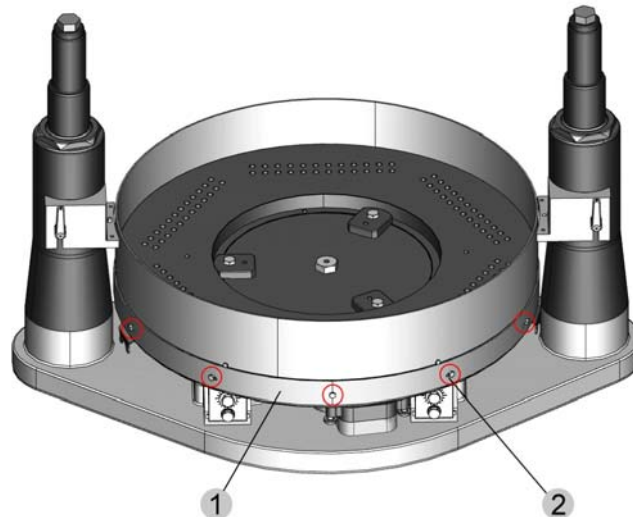


Fig. 140 Insert silicone strip

1. Silicone strip
2. Fastening screw

- Insert silicone strip.
- Screw in and tighten all fastening screws for the silicone strip.

8. Install distributor cone.

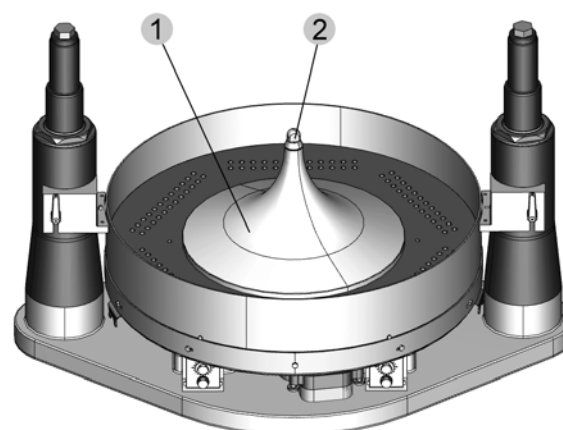


Fig. 141 Install distributor cone

1. Distributor cone
2. Clamping screw

- Position and set down distributor cone.
- Insert and tighten central clamping screw.

9. Insert scraper transfer station.

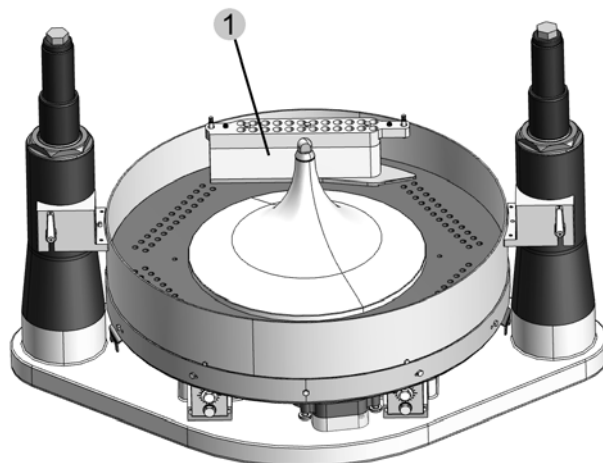


Fig. 142 Insert scraper transfer station

1. Scraper transfer station

Position the scraper at the transfer station on top of the dosing plate.

10. Insert rake holder.

The rake holder must be installed including mounted rake and guide plate.

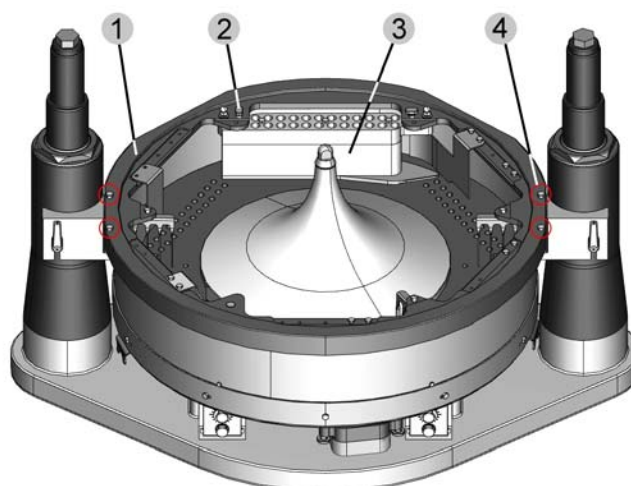


Fig. 143 Insert rake holder

- 1. Rake holder**
- 2. Adjusting screws and parallel pins**
- 3. Scraper transfer station**

4. Fixing screw

- Set down rake holder.
Fit the adjusting screws (2x) through the rake holder into the fitting holes of the scraper at the transfer station.
Position and set down the rake holder on top of the rake holder slider.
- Screw in and tighten fastening screws (4x) into.
- Tighten adjusting screws (2x) of the scraper at the transfer station.
- The vertical position of the rake holder can be adjusted to the thickness dosing disk by adjusting the height of the rake holder slider.
- Adjust scraper transfer station → Therefore, see also section "Adjust scraper transfer station" in the operating instructions.

11. Insert dust seal.

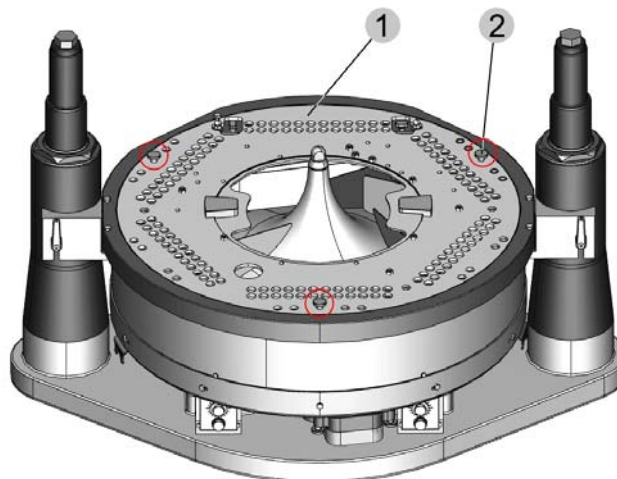


Fig. 144 Install dust seal

1. Dust seal
2. Knurled screws

- Insert and tighten knurled screws (3x).

12. Insert tamping pin holder.



WARNING!

Risk of crushing from falling components.

Be aware of the weight of the individual components during removal and installation:

- Tamping pin holder weighs approx. 24 kg

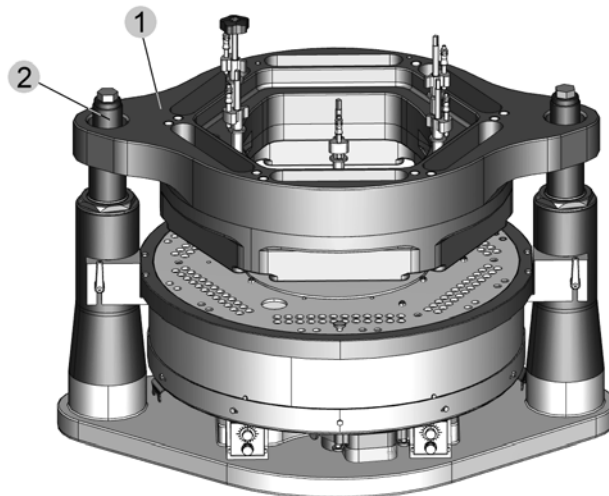


Fig. 145 Install tamping pin holder

1. Tamping pin holder
2. Lifting spindle

- Position the tamping pin holder with the hub bores over the lifting spindles.
- Set down tamping pin holder.

13. Insert clamping assemblies

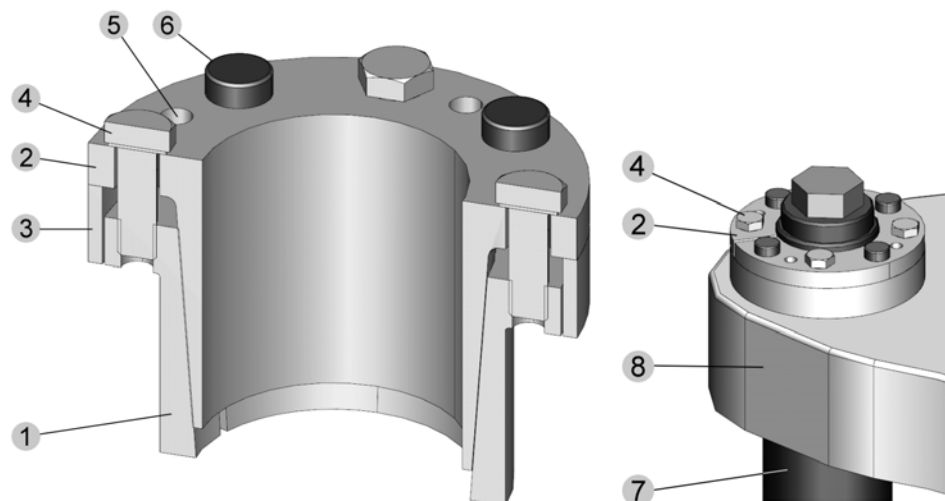


Fig. 146 Clamping assembly (clamped)

1. Outer ring (slotted)
2. Inner ring (slotted)
3. Axial ring
4. Clamping screw
5. Threaded extraction holes
6. End plug

7. Lifting spindle
8. Tamping pin holder

Carry out the following for both clamping assemblies:

- Assemble the inner ring (slotted) and outer ring (slotted).



IMPORTANT

Make sure that the slots of the inner and outer rings are arranged offset in order to prevent vibration or unbalance. In addition, none of the threaded extraction holes on the inner ring must coincide with the slot in the outer ring.

- Clean the contact surfaces of the clamping assembly along with the lifting spindle and hub bore in the tamping pin holder, then provide a light application of low viscosity oil.



IMPORTANT

Do not use oils or grease containing molybdenum disulfide or high pressure additives, Teflon or silicone additives or lubricant pastes that will greatly reduce the friction coefficients. Tables and calculations will have different values if the clamping assembly cone is assembled without oil.

- Loosen the clamping screws slightly.
- For ease of assembly, fix the inner and outer rings in position using two clamping screws in the threaded extraction hole.
- Insert the clamping assembly between the lifting spindle and hub bore in the tamping pin holder.
- Remove the clamping screws used for fixing and insert in the thread of the outer ring once more.
- Lightly tighten the clamping screws by hand and align the clamping assembly with the tamping pin holder.

Make sure that the axial ring of the clamping assembly is fitted evenly.

- Tighten the clamping screws gradually in stages to the specified tightening torque, applying the torque evenly in a diagonal sequence.
- Repeat until it is not possible to make another $\frac{1}{4}$ turn of the bolts.
- Then tighten all the clamping screws in succession with the tightening torque of 17 Nm.

14. Install the compression segment (station 6, transfer station).

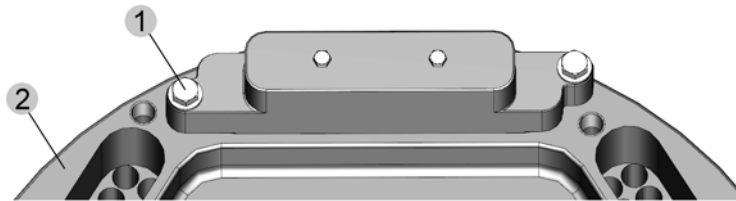


Fig. 147 Installing the compression segment (station 6, transfer station)

1. Fastening screws
 2. Tamping pin holder
- If format change is required (change of tamping pins): Insert tamping pins (24x) into the retainer.
 - Insert the compression segment with the tamping pins into the tamping pin holder from above.
 - Screw in and tighten the fastening screws (2x) in the tamping pin holder slides.

15. Install the compression segments (station 1 – 5).

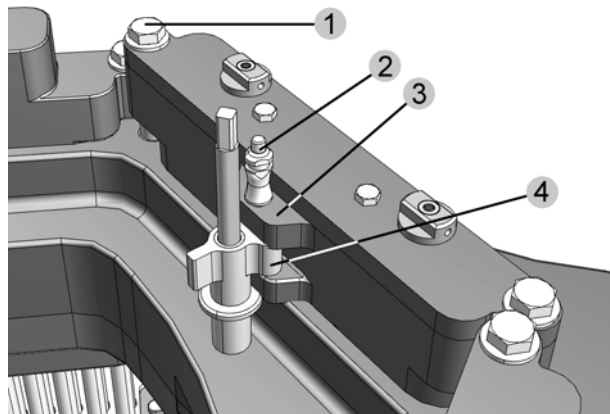


Fig. 148 Installing the compression segments (station 1 – 5)

1. Fastening screw
2. Ball lock pin
3. Guide block housing
4. Locking element (closed)

Carry out the following steps for each compression segment at stations 1 - 5 in succession:

- If format change is required (change of tamping pins): Insert tamping pins (24x) into the retainer.
- Insert the compression segment with the tamping pins into the tamping pin holder from above while the locking element is open.
- Turn the locking element approx. 90° to close.

The locking element is open when the eccentric part of the locking element is positioned in the locking element mounting of the guide block housing.

- Release the ball lock pin by pressing and holding down the sprung pressure pin.
- Insert the ball lock pin from above into the pin bore in the guide block housing.
- Push the ball lock pin through the pin bore in the eccentric part of the locking element until it is right at the bottom.
- Lock the ball lock pin by releasing the sprung pressure pin.
- Tighten compression segment with fastening screws (2x).

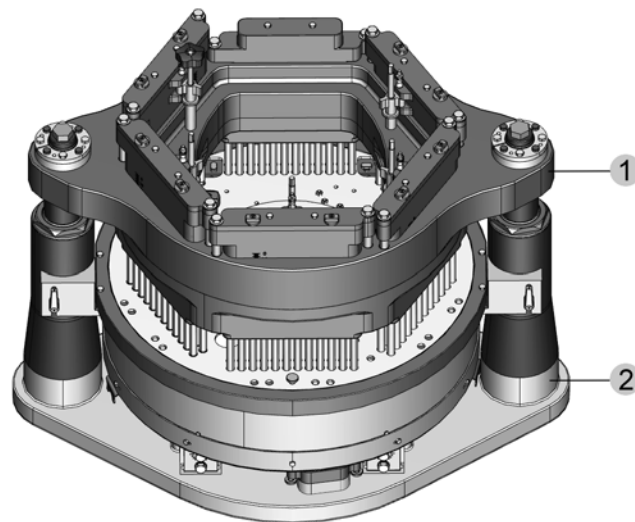


Fig. 149 Reassembled tamping station module

1. Compression unit
2. Powder dosing unit

16. If the tamping station module was reassembled on the service cart and is to be installed in the machine using the removal jig:
→ Therefore, see also section "Installing the tamping station with the removal jig" in the Maintenance manual.
17. If the tamping station module was reassembled and installed in the machine without the removal jig:
 - Install the powder feed unit (filling cone, rotary valve with metering drum, deflection unit and material downpipe).
→ Therefore, see also section "Installing the tamping station with the removal jig" in the Maintenance manual.

5.4. Change pellet station

5.4.1. Safety when changing the pellet station



WARNING!

Risk of injury from falling parts!

Injuries may be caused by detachable parts during format changes, for example.

- Always wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- To be carried out by an instructed or competent person.



WARNING!

Risk of crushing by pellet station!

Crushing is possible between filling slide / temporary container / housing and transfer plate / capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and/or mechanical training.
- Format changes must only be carried out by instructed or competent personnel.
- Always wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves



DANGER!

Danger of death from electrical voltage when removing / changing the pellet station!

The electrical DC link must be disconnected when removing / changing the pellet station (M23 plug-in connector in the head part). Danger from direct contact with live parts.

- Always switch off all power before carrying out any work.
 - Switch off at the main switch
 - Wait until the DC link has discharged! (5 min.)

- To be carried out by an instructed or competent person.

5.4.2. Removing the pellet station

1. Stop and disable the product supply.
2. Deplete pellets from filling pipe and pellet filling cone.
3. Carry out the removal of the pellet station as listed at the operator terminal.
 - Press the "Run type" button in the header and select [Test run].
 - Open the sub-menu [Functions].
 - Select menu item [MIRA View], then press [Disassembly].
 - Press the "Disassembly pellet station" button.

The "Disassembly pellet station" checklist opens.

- Press button [A] / [B] – then select the respective side A or B (only at double rotary machines).



NOTICE

The most important steps for the removal of the pellet station appear in the form of a checklist on the left-hand pane of the screen.

By highlighting a step, the corresponding description is displayed with a graphic on the right-hand pane of the screen. Additional buttons are displayed for some steps.

Tick off the checkboxes before carrying out the individual steps as visual confirmation that they have been carried out.

4. Move temporary container to assembly position.
 - Select working step "Move temporary container to assembly position" at the checklist on the left-hand pane of the screen.
 - Press button [Height adjustment drive to assembly position dos. 1] for dosing unit 1.
 - Press button [Height adjustment drive to assembly position dos. 2] for dosing unit 2.
 - Press button [Height adjustment drive to assembly position dos. 3] for dosing unit 3 (only at single rotary machine).
5. Open window flap.
6. Close slide of pellet filling cone.

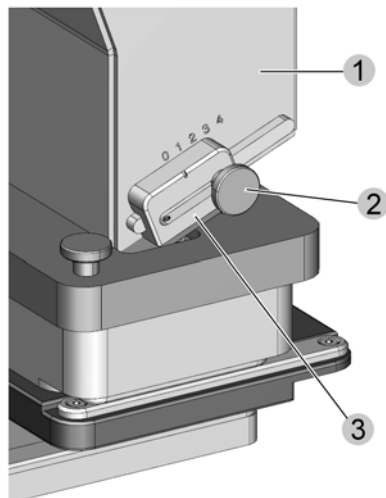


Fig. 150 Closing the slide of pellet filling cone

1. Pellet filling cone
2. Fastening screw
3. Slide

- Loosen fastening screws.
- Close slide.
- Tighten fastening screws.

7. Remove filling pipe.

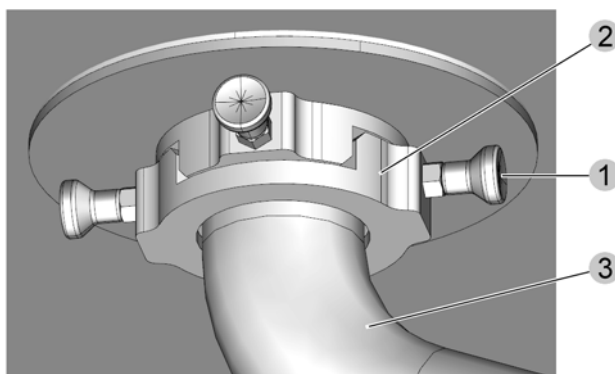


Fig. 151 Removing the filling pipe

1. Locking pin
2. Clamping sleeve for filling pipe
3. Filling pipe

- Unlock locking pin.
- Loosen clamping sleeve.
- Remove filling cone.

8. Remove pellet filling cone.

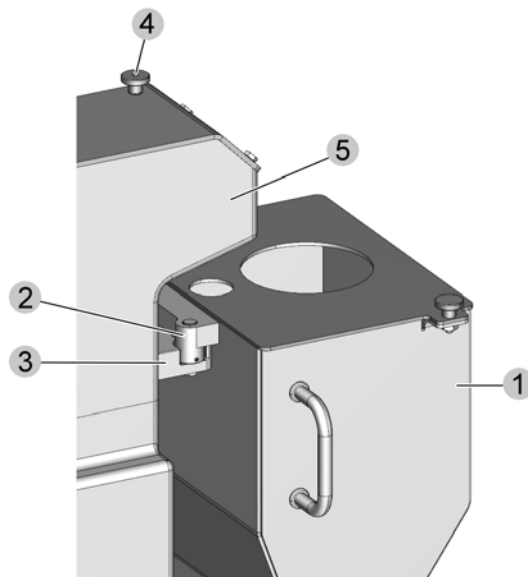


Fig. 152 Removing the pellet filling cone

1. Pellet filling cone
2. Pivot mounting
3. Holding plate
4. Fastening screw
5. Sensor housing

- Loosen and remove fastening screw from sensor housing.
- Lift off and remove pellet filling cone.

9. Empty temporary container.

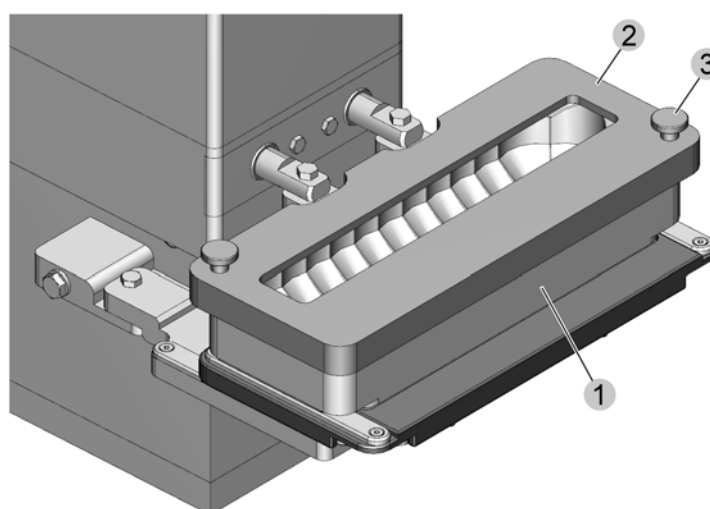


Fig. 153 Removing the cover of temporary container

1. Temporary container
2. Cover
3. Fastening screw

- Unscrew fastening screws.
- Remove cover.
- Extract residual pellets from temporary container.

10. Remove temporary container.

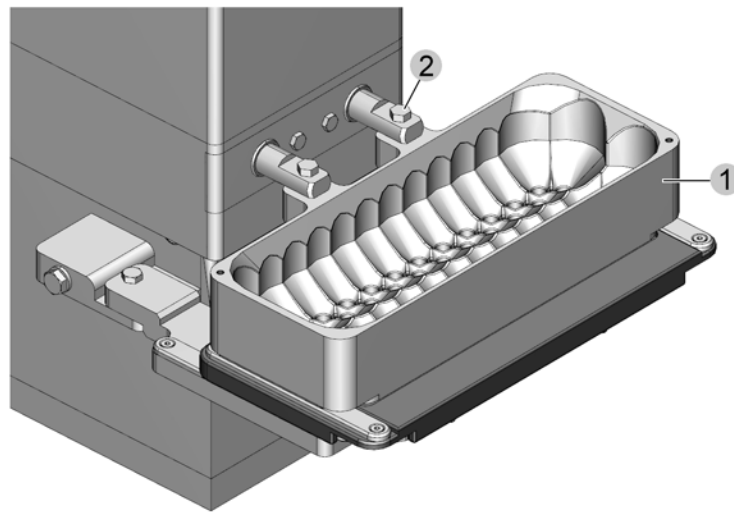


Fig. 154 Removing the temporary container

1. Temporary container
2. Adjusting screw

- Unscrew adjusting screws (2x).
- Remove temporary container.

11. Remove format-specific set.

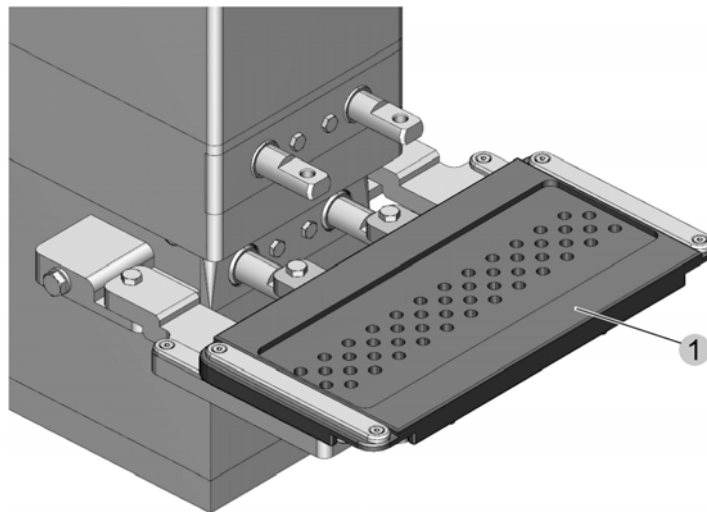


Fig. 155 Removal of the top dosing plate

1. Top dosing plate

- Lift off and remove top dosing plate.

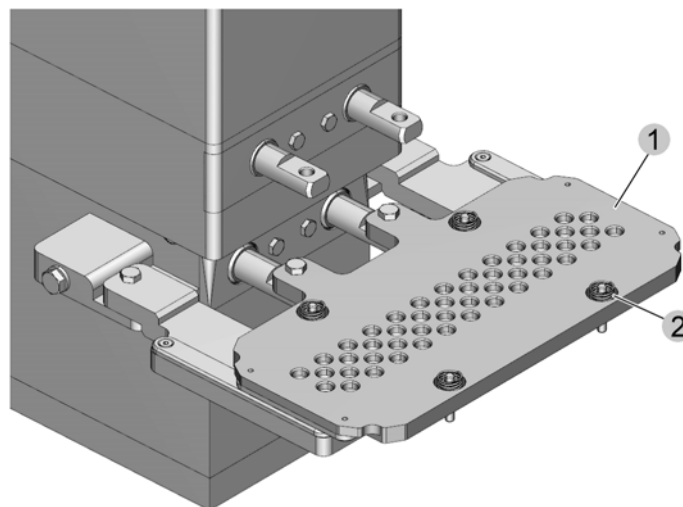


Fig. 156 Removal of compression springs

1. Bottom dosing plate
2. Compression spring

- Remove compression springs from bottom dosing plate.

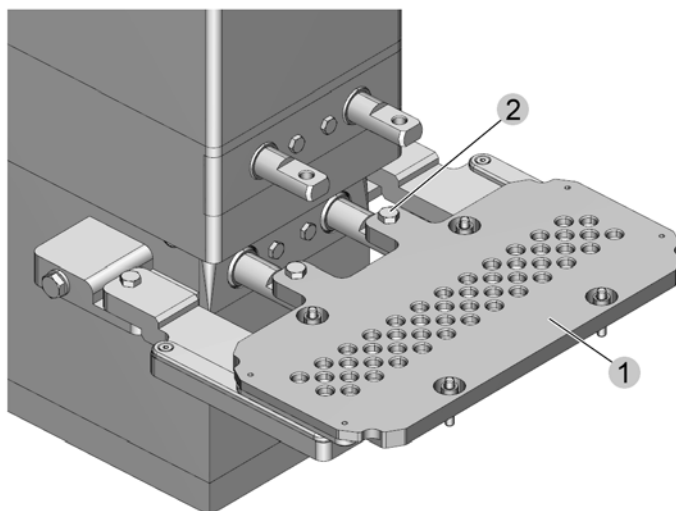


Fig. 157 Removal of bottom dosing plate

1. Bottom dosing plate
2. Fastening screw

- Unscrew fastening screws (2x).
- Remove bottom dosing plate.

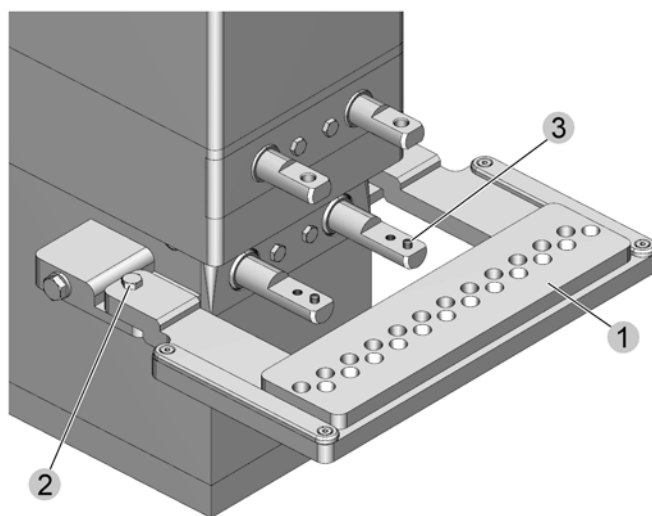


Fig. 158 Removal of transfer plate

1. Transfer plate
2. Fixing screw
3. Parallel pin in guide shaft

- Unscrew fixing screws (2x).
- Remove transfer plate.

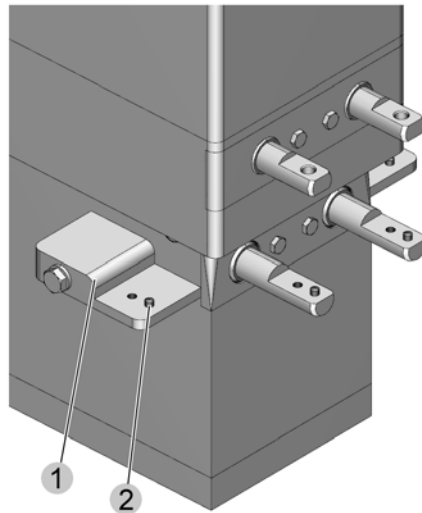


Fig. 159 Format-specific set removed

1. Aligning base
2. Parallel pin

12. Load / edit / create new recipe.

- Load or edit an existing recipe or create a new recipe.



NOTICE

Parameter 500 "Dosing combination" must correspond to the installed dosing stations.

13. Discharge the electrical temporary circuit in a safe manner. Therefore:

- Press the "Run type" button in the header and select [Computer run].
- Wait 5 minutes (300 sec.) until the electrical temporary circuit is safely discharged.



NOTICE

When changing the run type to "Computer run", the "Time period til the temporary circuit is safely discharged: 300 seconds" countdown is started automatically. The following working step shows the pending time period: "Change to run type 'Computer run'. Wait 5 minutes". Once the 300 seconds have expired, the following message is displayed: "Temporary circuit safely discharged".

14. Remove the head piece cover.



DANGER

Danger of death from electrical voltage when removing / changing the pellet station!

The electrical temporary circuit must be disconnected when removing / changing the pellet station (M23 plug-in connector connected to head piece). Danger from direct contact with live parts.

- Always disconnect all systems from mains supply and secure against inadvertent switch-on before carrying out any work.
 - Switch off main switch.
 - Wait until the temporary circuit is discharged (5 min.).
- This step must only be carried out by an instructed or competent person.

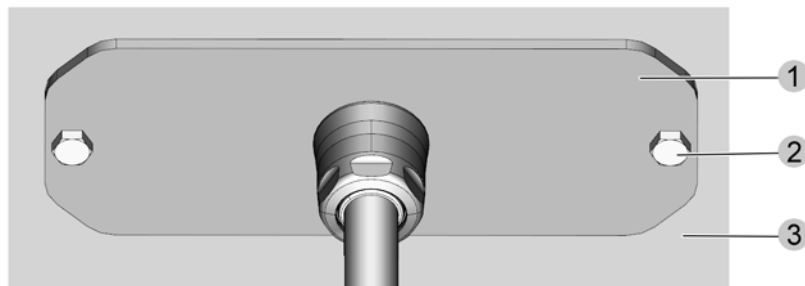


Fig. 160 Head piece cover on pellet station

1. Head piece cover
2. Fixing screw
3. Head piece of the machine

- Unscrew fixing screws (2x).
- Remove head piece cover.
- Slightly pull out the plug-in connector(s) (from inside the head piece) from the corresponding plug holders and disconnect.

15. Install the combination cover / blanking cover into the head piece of the machine.

The removed head piece cover of the pellet station must be replaced by either a combination cover or a blanking cover, depending on the respective position.

Make sure that:

- The combination cover will be installed at position 4 / 10 (dosing 2) and the integrated safety window is positioned directly underneath the distance sensor of the tamping station.
- The blanking cover is installed at position dosing 1.
- A blanking cover at position dosing unit 3 will be installed (only at single rotary machine).
- Make sure that no lines or cables are bent or crushed in the process.



Fig. 161 Combination cover

1. Combination cover
2. Safety window for distance sensor of the tamping station
3. Fixing screw
4. Head piece of the machine

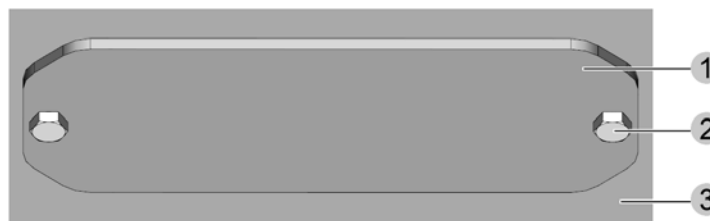


Fig. 162 Blanking cover

1. Blanking cover
2. Fixing screw
3. Head piece of the machine

- Connect the detached plug-in connectors (from inside the head piece) with the corresponding plug holders on the inside of the combination cover / blanking cover.
- Insert the combination cover / blanking cover into the head piece of the machine and tighten fixing screws (2x per item).

16. Remove pellet station from contact plate.



WARNING!

Risk of crushing from falling components!

Be aware of the weight of the individual components during removal and installation.

- Pellet station (without pellet filling cone) weighs approx. 27 kg.



IMPORTANT

The pellet station must only be lifted by using the removal jig.

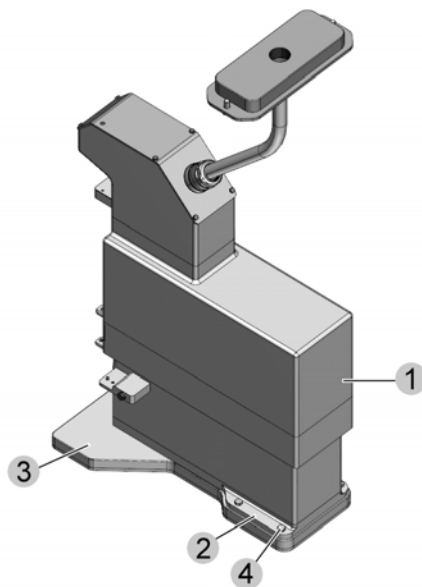


Fig. 163 Removing the pellet station from contact plate

1. Pellet station
2. Housing base
3. Contact plate (various designs possible)
4. Fixing screw

- Loosen and unscrew fixing screws (4x) of the housing base of the pellet station to be removed.
- Install removal jigs (2x).

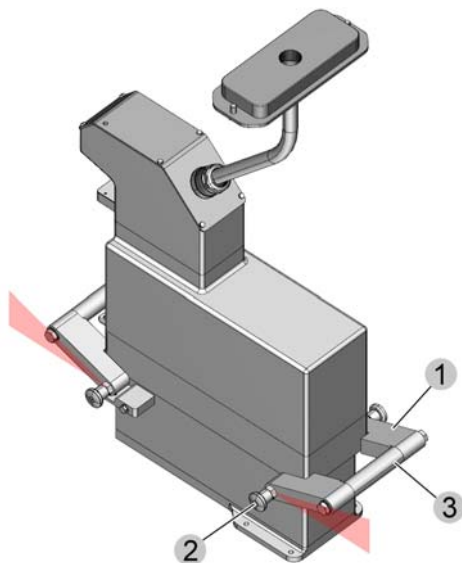


Fig. 164 Pellet station with installed removal jig

1. Removal jig
2. Indexing plunger
3. Grab handle



IMPORTANT

Always use two removal jigs for one pellet station.

Check the correct installation of the removal jigs. Make sure that:

- The pins of the indexing plungers are engaged in the designated indexing-plunger pin grooves of the pellet station housing.
- The grab handle can be swivelled upwards whilst the removal jig is inclined to an angle of up to 20 degrees.

- Lift up the pellet station whilst holding it firmly by using both grab handles of the removal jig.

17. Remove filling cone.

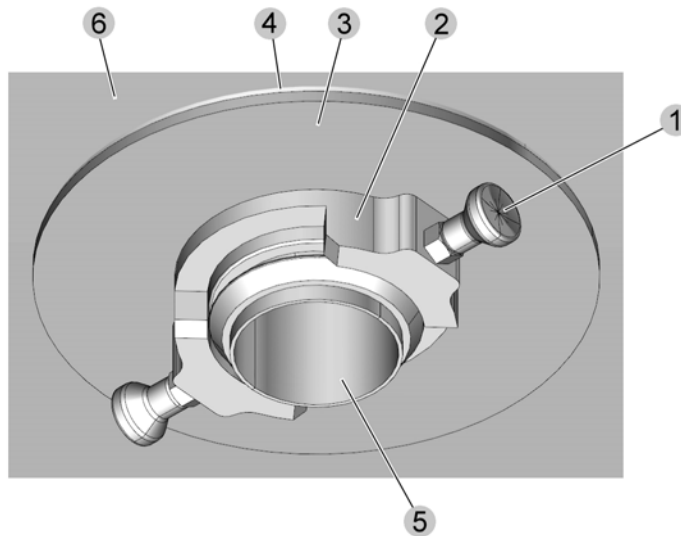


Fig. 165 Removing the filling cone

1. Locking pin
2. Clamping sleeve for filling cone
3. Clamping ring
4. Seal
5. Filling cone
6. Head piece of the machine

- Unlock locking pin.
- Loosen clamping sleeve.
- Remove clamping ring and seal.
- Push the filling cone up until reaching the end stop and hold it in place.
- Turn the filling cone anti-clockwise until reaching the end stop (removal / installation position).

The bayonet closure in the head piece of the machine is now open.

- Remove the filling cone by moving it downwards.
- 18.** Remove the contact plate of the pellet station from the tabletop of the single rotary machine.



WARNING

Risk of crushing from falling components.

Be aware of the weight of the individual components during removal and installation.

- Support plate can weigh up to approx. 12 kg.

Depending on the dosing combination and design of the contact plate, carry out the following steps:

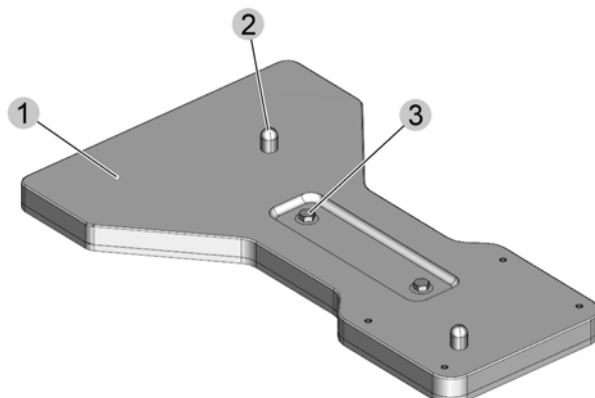


Fig. 166 Contact plate for 1 pellet station at position 4 (dosing unit 1) / position 6 dosing unit 3)

1. Contact plate
2. Positioning pins (2x)
3. Adjusting screws (2x)

Removal:

- Unscrew adjusting screws (3, 2x).
- Lift off contact plate (1).

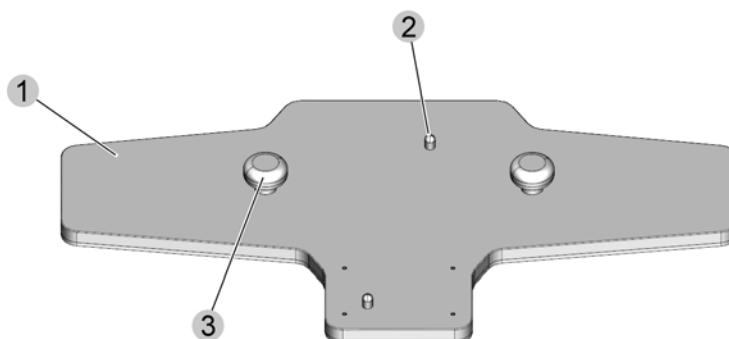


Fig. 167 Contact plate for 1 pellet station at position 5 (dosing unit 2)

1. Contact plate
2. Positioning pins (2x)
3. Handles (2x)

Removal:

- Press button "Run type" in the header and select [Test run].
- Select working step "Separate and remove base plate from tabletop" from the checklist on the left-hand pane of the screen.
- Press button [Release clamping system].

The clamping system must be pressurised with 6 bar air pressure in order to pneumatically release the clamping bolt.

- Use (1) both grab handles (3, 2x) to pull the contact plate from the tabletop of the machine.

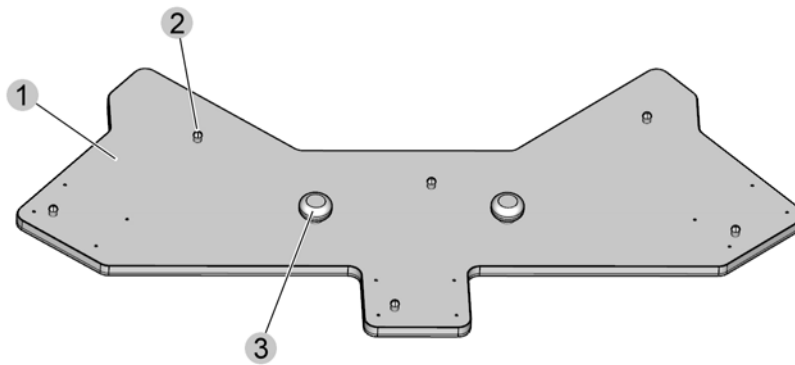


Fig. 168 Contact plate for up to 3 pellet stations at positions 4 – 6 (dosing units 1 – 3)

1. Contact plate
2. Positioning pins (6x)
3. Handles (2x)

Removal:

- Press button "Run type" in the header and select [Test run].
- Working step "Separate and remove base plate from tabletop" from the checklist on the left-hand pane of the screen.
- Press button [Release clamping system].

The clamping system must be pressurised with 6 bar air pressure in order to pneumatically release the clamping bolt.

- Use (1) both grab handles (3, 2x) to pull the contact plate from the tabletop of the machine.

19. Remove the contact plate of the pellet station from the tabletop of the double rotary machine.



WARNING

Risk of crushing from falling components.

Be aware of the weight of the individual components during removal and installation.

- Support plate can weigh up to approx. 12 kg.

Depending on the dosing combination and design of the contact plate, carry out the following steps:

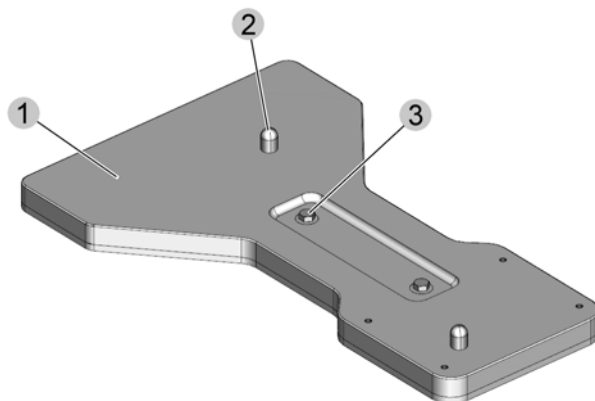


Fig. 169 Auflageplatte für 1 Pelletstation an Position 3 (Dosierung 1) / Position 9 (Dosierung 1)

1. Auflageplatte
2. Positionierstift (2x)
3. Passschraube (2x)

Ausbau:

- Passschrauben (3, 2x) herausdrehen.
- Auflageplatte (1) abheben.

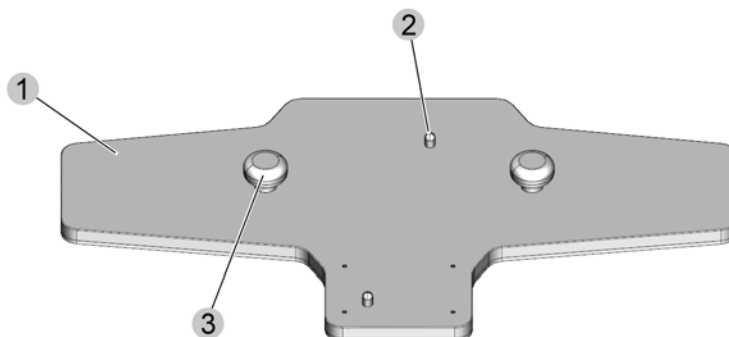


Fig. 170 Auflageplatte für 1 Pelletstation an Position 4 (Dosierung 2) / Position 10 (Dosierung 2)

1. Auflageplatte
2. Positionierstift (2x)
3. Griff (2x)

Ausbau:

- Button "Laufart" in Kopfzeile drücken und [Testlauf] wählen.
- Handlungsschritt "Auflageplatte von der Tischplatte trennen und abnehmen" in der Checkliste im linken Bildschirmbereich anwählen.
- Button [Spannsystem lösen] drücken.

Das Spannsystem muss mit 6 bar Luftdruck beaufschlagt werden, um die Spannbolzen pneumatisch freizugeben.

- Auflageplatte (1) an beiden Griffen (3, 2x) festhalten und von der Tischplatte der Maschine abheben.

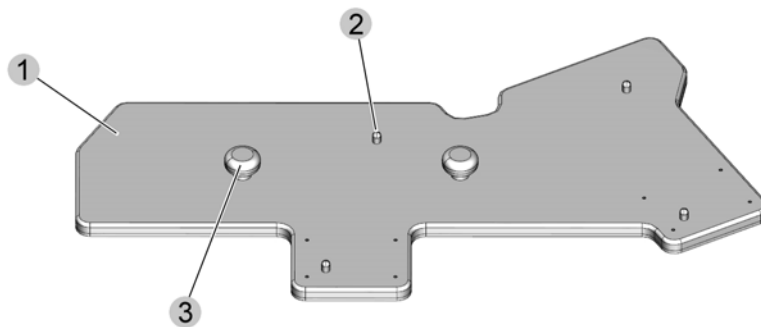


Fig. 171 Auflageplatte für bis zu 2 Pelletstationen an Position 3 – 4 (Dosierung 1 – 2) / Position 9 – 10 (Dosierung 1 – 2)

1. Auflageplatte
2. Positionierstift (4x)
3. Griff (2x)

Ausbau:

- Button “Laufart” in Kopfzeile drücken und [Testlauf] wählen.
- Handlungsschritt “Auflageplatte von der Tischplatte trennen und abnehmen” in der Checkliste im linken Bildschirmbereich anwählen.
- Button [Spannsystem lösen] drücken.

Das Spannsystem muss mit 6 bar Luftdruck beaufschlagt werden, um die Spannbolzen pneumatisch freizugeben.

- Auflageplatte (1) an beiden Griffen (3, 2x) festhalten und von der Tischplatte der Maschine abheben.

5.4.3. Installing the pellet station

1. Carry out the installation of the pellet station as listed at the operator terminal.
 - Press the "Run type" button in the header and select [Test run].
 - Open the [Functions] sub-menu.
 - Select menu item [MIRA View], then press [Assembly].
 - Press the "Assembly pellet station" button.

The "Assembly pellet station" checklist opens.

- Press button [A] / [B] – then select the respective side A or B (only at double rotary machine).



NOTICE

The most important steps for the assembly of the pellet station appear in the form of a checklist on the left-hand pane of the screen.

By highlighting a step, the corresponding description is displayed with a graphic on the right-hand pane of the screen. Additional buttons are displayed for some steps.

Tick off the checkboxes before carrying out the individual steps as visual confirmation that they have been carried out.

2. Open window flap.
3. Fasten the contact plate of the pellet station to the tabletop of the single rotary machine.



WARNING

Risk of crushing from falling components

Be aware of the weight of the individual components during removal and installation.

- The contact plate can weigh up to approx. 12 kg.

Depending on the dosing combination and design of the contact plate, carry out the following steps:

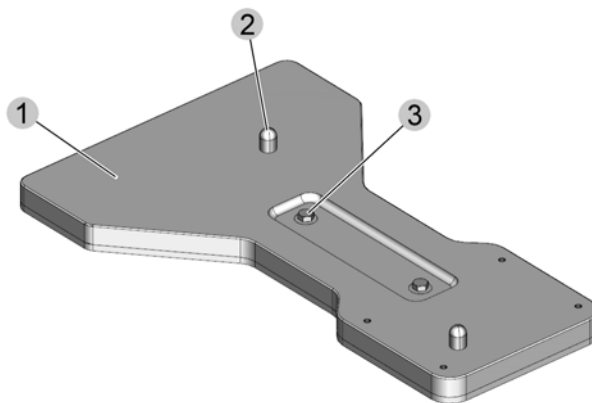


Fig. 172 Contact plate for 1 pellet station at position 4 (dosing unit 1) / position 6 (dosing unit 3)

1. Contact plate
2. Positioning pins (2x)
3. Adjusting screws (2x)

Assembly:

- Position the contact plate (1) onto the tabletop of the machine and set down.

- Screw in and tighten adjusting screws (3, 2x).

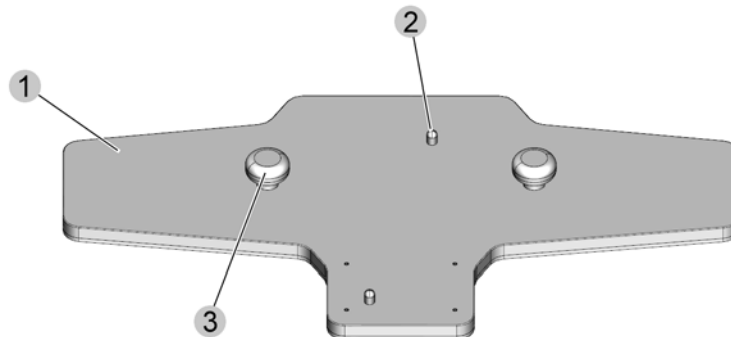


Fig. 173 Contact plate for 1 pellet station at position 5 (dosing unit 2)

1. Contact plate
2. Positioning pins (2x)
3. Handles (2x)

Assembly:

- Select working step "Fasten the base plate to the table top" from the checklist on the left-hand pane of the screen.
- Press button [Release clamping system].

The clamping system must be pressurised with 6 bar air pressure in order to pneumatically release the clamping bolt.

- Use (1) both grab handles (3, 2x) to hold firmly to the contact plate before positioning it onto the tabletop of the machine and set down.
- Press button [Tighten clamping system].

The clamping system must be vented in order to lock the two clamping bolts in the contact plate with the clamping modules.

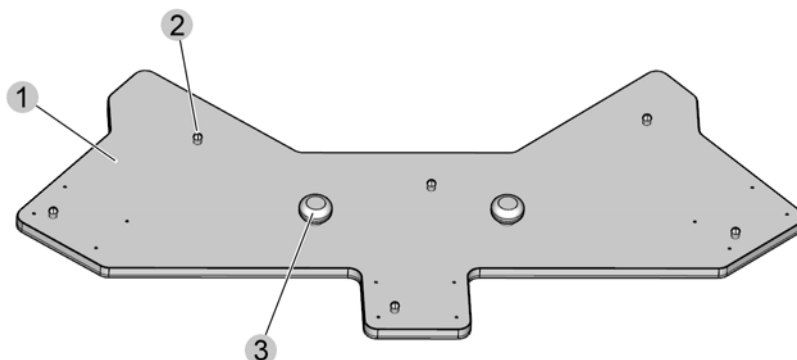


Fig. 174 Contact plate for up to 3 pellet stations at positions 4 – 6 (dosing units 1 – 3)

1. Contact plate
2. Positioning pins (6x)
3. Handles (2x)

Assembly:

- Select working step "Fasten the base plate to the table top" from the checklist on the left-hand pane of the screen.
- Press button [Release clamping system].

The zero-point clamping system must be pressurised with 6 bar air pressure in order to pneumatically release the clamping bolt.

- Use (1) both grab handles (3, 2x) to hold firmly to the contact plate before positioning it onto the tabletop of the machine and set down.
- Press button [Tighten clamping system].

The clamping system must be vented in order to lock the two clamping bolts in the contact plate with the clamping modules.

4. Fasten the contact plate of the pellet station to the machine tabletop of the double rotary machine.



WARNING

Risk of crushing from falling components

Be aware of the weight of the individual components during removal and installation:

- The contact plate can weigh up to approx. 12 kg.

Depending on the dosing combination and design of the contact plate, carry out the following steps:

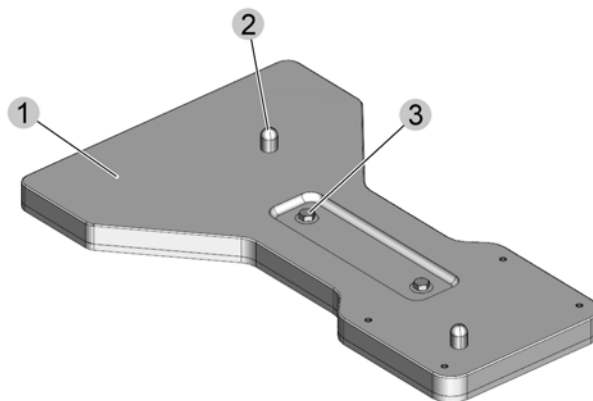


Fig. 175 Contact plate for 1 pellet station at position 3 (dosing unit 1) / position 9 (dosing unit 1)

1. Contact plate
2. Positioning pins (2x)
3. Adjusting screws (2x)

Assembly:

- Position the contact plate (1) onto the tabletop of the machine and set down.
- Screw in and tighten adjusting screws (3, 2x).

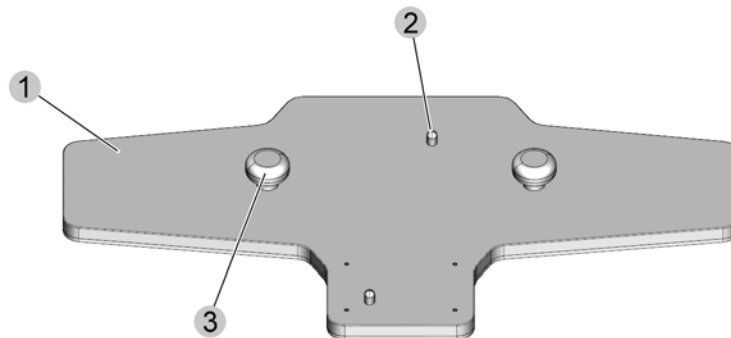


Fig. 176 Contact plate for 1 pellet station at position 4 (dosing unit 2) / position 10 (dosing unit 2)

1. Contact plate
2. Positioning pins (2x)
3. Handles (2x)

Assembly:

- Select working step "Fasten cover plate onto tabletop" from the checklist on the left-hand pane of the screen.
- Press button [Release clamping system].

The clamping system must be pressurised with 6 bar air pressure in order to pneumatically release the clamping bolt.

- Use (1) both grab handles (3, 2x) to hold firmly to the contact plate before positioning it onto the tabletop of the machine and set down.
- Press button [Tighten clamping system].

The clamping system must be vented in order to lock the two clamping bolts in the contact plate with the clamping modules.

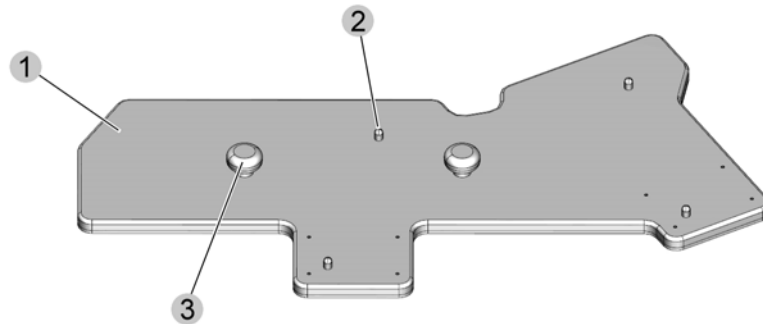


Fig. 177 Contact plate for up to 2 pellet stations at positions 3 – 4 (dosing units 1 – 2) / position 9 – 10 (dosing units 1 – 2)

1. Contact plate
2. Positioning pins (4x)
3. Handles (2x)

Assembly:

- Select working step "Fasten the base plate to the table top" from the checklist on the left-hand pane of the screen.
- Press button [Release clamping system].

The clamping system must be pressurised with 6 bar air pressure in order to pneumatically release the clamping bolt.

- Use (1) both grab handles (3, 2x) to hold firmly to the contact plate before positioning it onto the tabletop of the machine and set down.
- Press button [Tighten clamping system].

The clamping system must be vented in order to lock the two clamping bolts in the contact plate with the clamping modules.

5. Install filling cone.

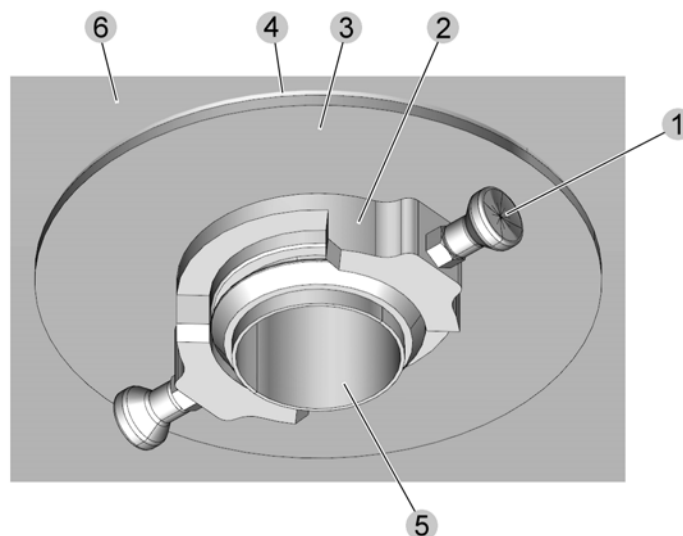


Fig. 178 Installed filling cone

1. Locking pin
2. Clamping sleeve for filling cone
3. Clamping ring
4. Seal
5. Filling cone
6. Head piece of the machine

- Insert the filling cone in the bayonet removal / installation position at the head piece of the machine.
- Push the filling cone up until reaching the end stop and hold it in place.
- Turn the filling cone clockwise until reaching the end stop.
- Pull the filling cone down until reaching the end stop.

The bayonet closure in the head piece of the machine is now closed.

- Position clamping ring and seal.
- Insert clamping sleeve with unlocked locking pin.
- Lock locking pin.

6. Fasten the pellet station (without pellet filling cone) to the contact plate.



WARNING

Risk of crushing from falling components.

Be aware of the weight of the individual components during removal and installation:

- Pellet station (without pellet filling cone) weighs approx. 27 kg.



IMPORTANT

The pellet station must only be lifted by using the removal jig!

- Install removal jig (2x).

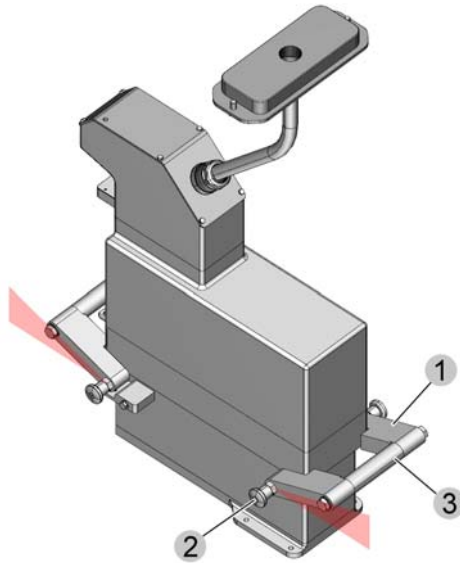


Fig. 179 Pellet station with installed removal jig

1. Removal jig.
2. Indexing plunger
3. Grab handle



IMPORTANT

Always use two removal jigs for one pellet station.

Check the correct installation of the removal jigs. Make sure that:

- The pins of the indexing plungers are engaged in the designated indexing-plunger pin grooves of the pellet station housing.
 - The grab handle can be swivelled upwards whilst the removal jig is inclined to an angle of up to 20 degrees.
- Lift up the pellet station whilst holding it by using both grab handles of the removal jig.
 - Place the pellet station (without pellet filling cone) on top of the contact plate and lower it down.
- Make sure that the two pin holes on the underside of the housing base are connected to the two respective positioning pins of the contact plate.
- Screw in and tighten the fixing screws (4x) through the housing base of the pellet station into the contact plate.

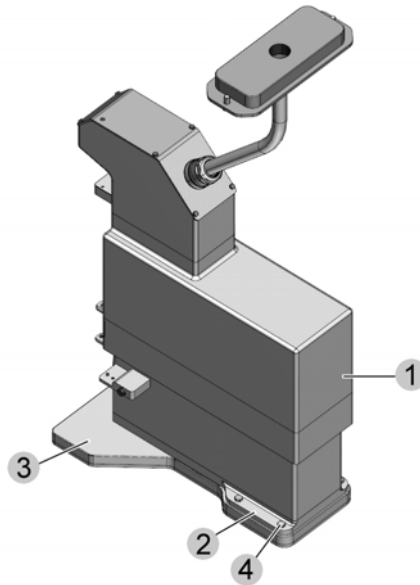


Fig. 180 Pellet station with connected contact plate

1. Pellet station
2. Housing base
3. Contact plate (various designs possible)
4. Fixing screw

7. Load / edit / create recipe.

- Load or edit an existing recipe or create a new recipe.



NOTICE

Parameter 500 "Dosing combination" must correspond to the installed dosing stations.

8. Discharge the electrical temporary circuit in a safe manner. Therefore:

- Press the "Run type" button in the header and select [Computer run].
- Wait 5 minutes (300 sec.) until the electrical temporary circuit is safely discharged.



NOTICE

When changing the run type to "Computer run", the "Time period til the temporary circuit is safely discharged: 300 seconds" countdown is started automatically. The following step shows the pending time period: "Change to run type 'Computer run'. Wait 5 minutes." Once the 300 seconds have expired, the following message is displayed: "Temporary circuit safely discharged".

9. Remove the combination cover / blanking cover from the head piece of the machine.



DANGER

Danger of death from electrical voltage when removing / changing the pellet station!

The electrical temporary circuit must be disconnected when removing / changing the pellet station (M23 plug-in connector connected to head piece). Danger from direct contact with live parts.

- Always disconnect all systems from mains supply and secure against inadvertent switch-on before carrying out any work.
 - Switch off main switch.
 - Wait until the temporary circuit is discharged (5 min.)!
- This step must only be carried out by an instructed or competent person.



Fig. 181 Combination cover

1. Combination cover
2. Safety window for distance sensor of the tamping station
3. Fixing screw
4. Head piece of the machine

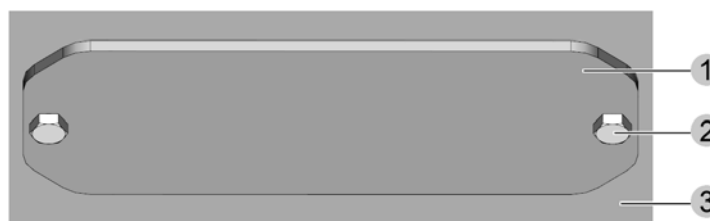


Fig. 182 Blanking cover

1. Blanking cover

2. Fixing screw
3. Head piece of the machine

- Loosen the fixing screws of the combination cover / blanking cover (2x per item).
- Remove the combination cover / blanking cover from the head piece of the machine.
- Detach the plug-in connectors (from inside the head piece) from the corresponding plug holders on the inside of the combination cover / blanking cover.

10. Install head piece cover on the pellet station.

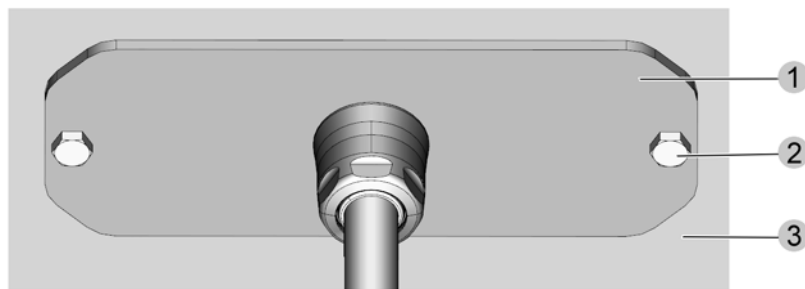


Fig. 183 Head piece cover on pellet station

1. Head piece cover
2. Fixing screw
3. Head piece of the machine

- Connect plug-in connector(s).
- Insert head piece cover.
- Tighten fixing screws for head piece cover (2x).

Make sure that no lines or cables are bent or crushed in the process.

11. Install format-specific set.

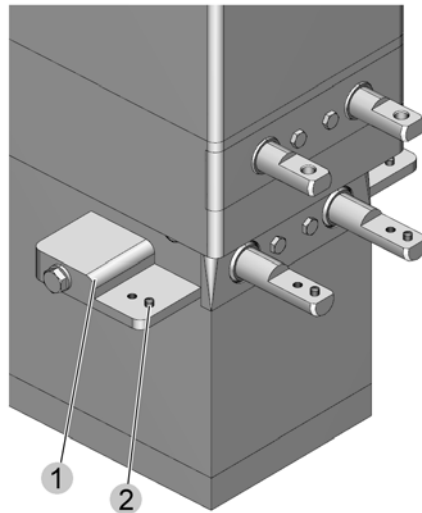


Fig. 184 Pellet station without format-specific set

1. Aligning base
2. Parallel pin in aligning base

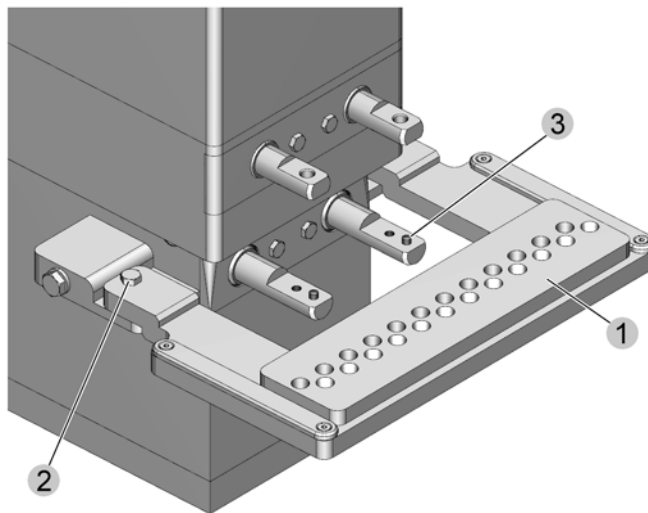


Fig. 185 Install transfer plate

1. Transfer plate
2. Fixing screw
3. Parallel pin in guide shaft

- Position transfer plate.

Make sure that the two pin holes on the underside of the transfer plate are connected to the two parallel pins in the aligning base.

- Screw in and tighten fixing screws (2x).

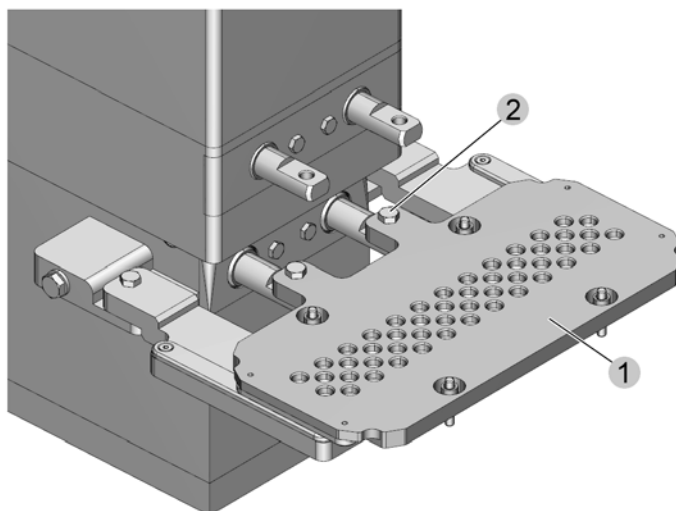


Fig. 186 Install bottom dosing plate

1. Bottom dosing plate
2. Fixing screw

- Install bottom dosing plate.

Make sure that the two pin holes on the underside of the bottom dosing plate are connected to the two parallel pins in the guide shafts.

- Screw in and tighten fixing screws (2x).

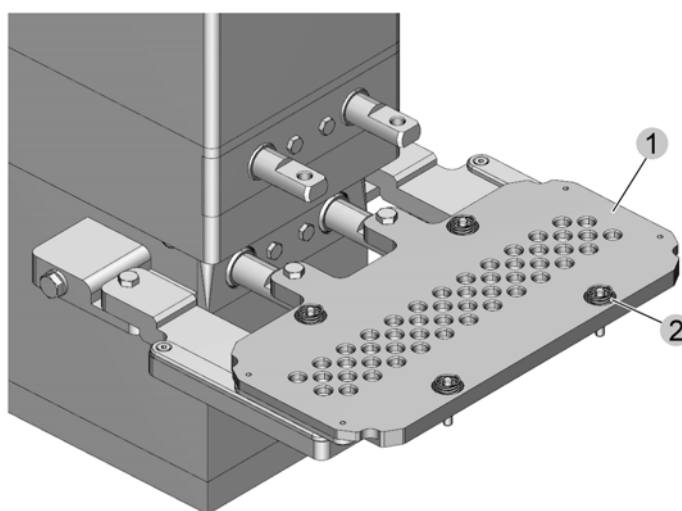


Fig. 187 Install compression springs

1. Bottom dosing plate
2. Compression spring

- Insert compression springs (4x) into the corresponding mountings of the bottom dosing plate.

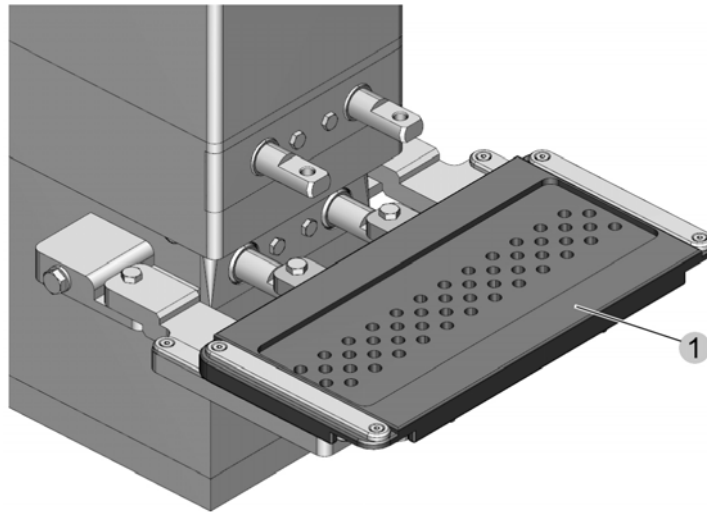


Fig. 188 Install top dosing plate

1. Top dosing plate

- Connect the top dosing plate to the bottom dosing plate.

Make sure that:

- The socket panel on the underside of the top dosing plate engages with the hole panel of the bottom dosing plate.
- The compression springs between the two dosing plates are correctly positioned.

12. Install temporary container.

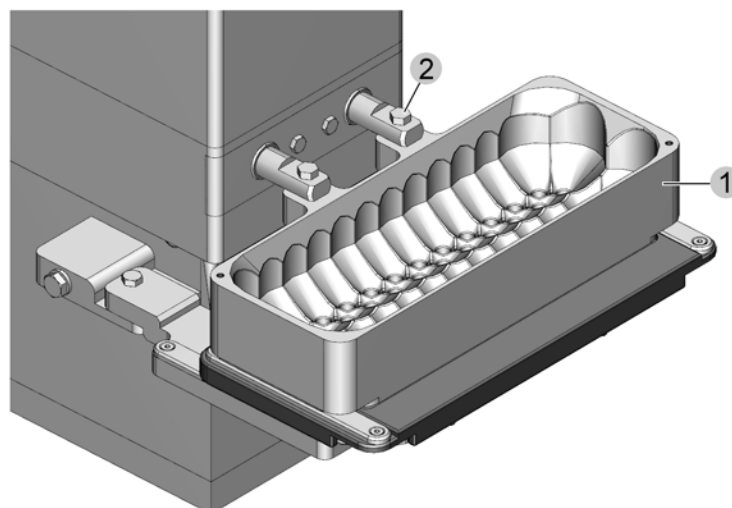


Fig. 189 Install temporary container

1. Temporary container
2. Adjusting screw

- Put temporary container on top of top dosing plate.
- Push the temporary container slightly down and hold it in place.
- Position temporary container.
- Screw in and tighten adjusting screws (2x).

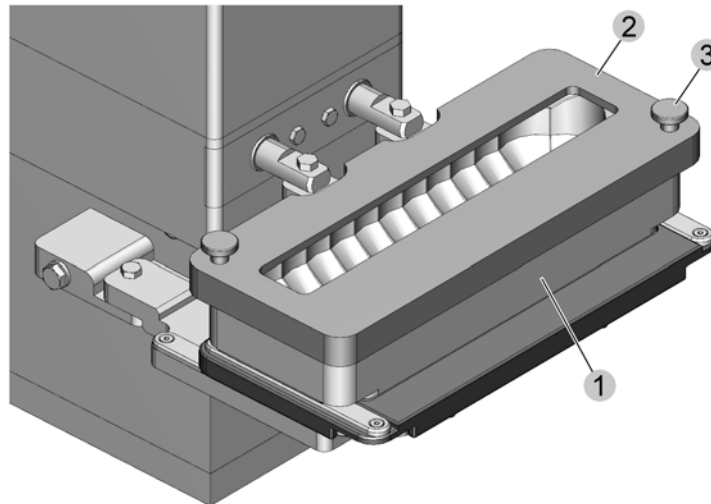


Fig. 190 Install cover of the temporary container

1. Temporary container
2. Cover
3. Fastening screw

- Put the cover on top of the temporary container.
 - Screw in and tighten fastening screws (2x).
- 13. Install pellet filling cone.**

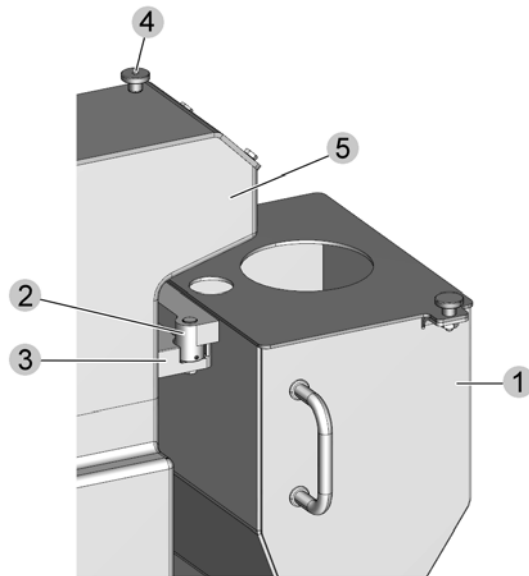


Fig. 191 Install pellet filling cone

1. Pellet filling cone
2. Pivot mounting
3. Holding plate
4. Fastening screw
5. Sensor housing

- Insert pellet filling cone.
- Screw in and tighten the fastening screws (4x) through the sensor housing into the holding plate

14. Install filling pipe.

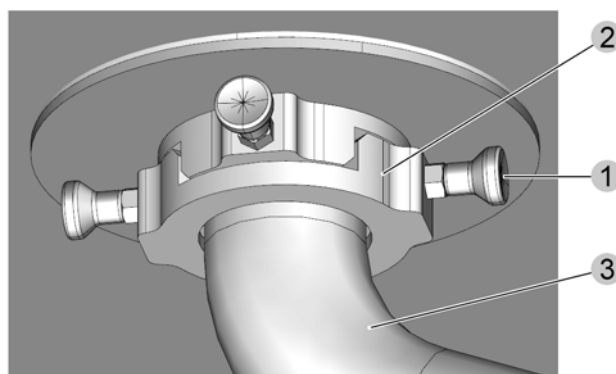


Fig. 192 Installed filling pipe

1. Locking pin
2. Clamping sleeve for filling pipe
3. Filling pipe

- Push the clamping sleeve onto the filling pipe.
- Insert filling pipe.
- Insert clamping sleeve with unlocked locking pin.
- Lock locking pin.

5.5. Format change



NOTICE

The installation and removal of the individual assembly groups is described in the appropriate sections within the assembly groups.

Removal of format-specific parts

1. Deplete the machine until empty and roughly clean.
2. Select test run: Therefore, press the "Run type" button, then press the [Test run] button.
3. Remove dosing unit(s).
Depending on the dosing, carry out the respective work steps as described in the Maintenance manual:
 - Removal of the pellet station
→ Therefore, see also section "Change pellet station".
 - Removal of the tamping station with removal jig.
→ Therefore, see also section "Change tamping station with removal jig"
 - Dismantling of the tamping station (with removal jig)
→ Therefore, see also section "Dismantling and assembling the tamping station"
4. Remove extraction product transfer dosing unit 1, 2 and 3.
5. Remove capsule feeder (2x).
→ Therefore, see also section "Change of the capsule feeder" in the Operating instruction
6. Remove capsule holders (18x).
→ Therefore, see also section "Change of the capsule holders" in the Operating instruction
7. Remove capsule discharge (1x).
→ Therefore, see also section "Change capsule discharge" in the Operating instruction
8. Remove capsule rejection (1x).
→ Therefore, see also section "Remove capsule rejection" in the Operating instruction
9. Remove extraction of non-separated capsules (1x).
→ Therefore, see also section "Change of ejecting pins non-separated capsules" in the Operating instruction

10. Remove ejecting pins (1x).
→ Therefore, see also section "Change of ejecting pins non-separated capsules" in the Operating instruction
11. Remove lower closing pins (1x)
12. Clean the format-specific parts, preserve if necessary and store as a format-specific set.

Installing the format-specific parts

1. Move the new set of format-specific parts into position.
2. Reverse the sequence of the work steps to install the format-specific parts.

6. Cleaning

6.1. General notes on cleaning

Following all the cleaning instructions, correct care and careful handling of the machine's components and tools will help to extend its service life.

The following sections contain recommendations on cleaning.



NOTE

We recommend regular cleaning to keep the machine as dust-free as possible.

The cleaning intervals will depend on the product and format. Clean the machine and dosing systems at least 1x weekly and whenever the product / format is changed.



NOTE

To guarantee thorough cleaning, visually check the components for possible damage before installation and after cleaning.

6.2. Safety during maintenance and cleaning work

- All work must be done at the standstill of the machine.
- Before commencing any work on the machine or its components, secure the drives and auxiliary equipment to prevent them from inadvertent switch-on.
- After servicing and repair works, check that all safety guards are properly attached and fully functioning before commencing any work on the machine or its components.

- If work on the machine has resulted in a dirty floor, the owner of the machine must make sure that there are no dangerous slick spots that could cause people to slip.
- For cleaning work, always follow the manufacturer's instructions on the cleaning agent packaging.
- Inching mode must only be used by trained and authorised specialist personnel.
- Suitable aids should be used. The steps must be carried out in the order described.



WARNING!

Hazard from inadvertent / unexpected start-up of moving parts / drives (drive compartment including rotary-disk locking mechanism, middle column)!

During maintenance, repair, cleaning work or fault-finding on the machine, a faulty component in the machine e.g. faulty cable, bent compressed air hose, faulty valve, switched-on power source or stored energy (compressed air) may cause a dangerous unpredictable movement could cause injury. When working on the TSC, machine, switch cabinet or peripheral devices for maintenance, repair, cleaning or fault-finding:

- Switch off all power supplies that are not essential for the work.
- Switch off mains voltage.
- Switch off compressed air supply.



WARNING!

Risk of injury from improperly executed maintenance / cleaning work!

Improperly executed maintenance / cleaning work could result in severe injury and considerable damage to property.

- If components are removed, make sure they are refitted correctly. Refit all fixing elements and tighten bolts using the specified tightening torques.
- Maintenance / Cleaning work must only be carried out by specialist personnel with corresponding qualifications.



WARNING!

Crushing hazard caused by falling objects

Always be aware of the weight of mechanical components to be removed or installed.

- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- Only allow competent or instructed personnel to carry out cleaning work.
- Only allow specialist personnel with mechanical training to carry out (mechanical) maintenance work.
- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



WARNING!

Risk of poisoning by breathing in or ingesting cleaning agents and solvents!

Risk of injury from contact with cleaning agents.

- Use cleaning agents for the intended purpose only.
- Apply any protective measures required by the manufacturer.



WARNING!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

Risk of crushing from preloaded spring assembly when removing / raising the dosing disk drive (tamping station).

- The work must be carried out by specialist personnel with electrical and / or mechanical training.
- Deactivate the pneumatic system prior to open the maintenance flaps (set pneumatic system main switch to off!).



WARNING!

Crushing hazard caused by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

The STO (Safe Torque Off) safety function for all six drives is deactivated by manually enabling the drive train in the middle column. There is a risk that a drive will move unexpectedly due to a controller fault.

The sorting fork drive moves the sorting forks on rows 1 and 2 at the same time.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of format-specific parts reduces the danger points and thus the risk of injury (crushing).



CAUTION!

Ejection of objects!

Risk of injury from blowing out jammed capsules when the Capsule Flow Control (CFC) is in the dismantled state (test function).

- The CFC container must be installed.
- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Only specialist personnel with electrical and / or mechanical training may remove the cover and operate the machine (for maintenance, fault-finding, etc.).



WARNING!

Crushing hazard caused by the ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Remove as little as possible (such as extraction unit ejection flap) so that it is difficult to reach into the danger area.
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the ejection pins of the capsule ejector!

Crushing is possible between the table top and the ejection pin holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Removing capsule holders and closing pins reduces the risk of crushing.



CAUTION!

Crushing hazard caused by the cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

Crushing is possible when installing and removing the cover of the switch-cabinet cooling unit (weight and handling).

Crushing, overstretching, etc. are possible when installing and removing the heat exchanger water cooling system (approx. 30 kg).

- Before carrying out any maintenance / cleaning, switch off main switch and secure the switch to prevent it from inadvertent switch-on.
- Always use / wear personal protective equipment while carrying out the work:
 - Safety boots

- Non-slip safety gloves
- This should only be done by specialist personnel with electrical training.



WARNING!

Crushing hazard caused by the suction cup holder!

Crushing is possible between the table top and suction cup holder.
Crushing is possible between the suction cup holder and capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders reduces the danger points and thus the risk of injury (crushing).
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the closing station!

Crushing is possible between closing pins, table top and format-specific parts.

Window flaps may be open.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- This should only be done by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.



WARNING!

Crushing hazard caused by the pellet station!

Crushing is possible between filling slide / temporary container / housing and transfer plate / capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.

6.3. Pharmaceutical dust

In individual phases of the machine's lifecycle, e.g. during cleaning, maintenance or fault elimination, the user can come into contact with powder residues or dusts from the material to be filled. Depending on the material to be filled, this can create a risk of damage to health due to medically active substances in the pharmaceutical dust.

The operator must ensure that users are not exposed to any health hazard associated with the substances to be filled in any phase of the machine's lifecycle. Users must wear protective clothing and take protective measures appropriate to the hazard.



WARNING!

Risk of damage to health due to medically active substances in the pharmaceutical dust.

The operator must ensure that users are not exposed to any health hazard associated with the substances to be filled in any phase of the machine's lifecycle. Users must wear protective clothing and take protective measures appropriate to the hazard.

6.4. Preparation for cleaning the machine

1. Make sure the infeed of product and empty capsules is closed.
2. Deplete machine until all residual material is discharged.
 - If a capsule polisher is available, deplete the polisher until no more capsules emerge.
 - After emptying the filling cone of the tamping station, discharge the material from the dosing holes of the dosing disk at a low cycle speed.
3. Open window flaps.
4. Remove coarse material residues from the entire machine interior.

6.5. Cleaning the machine



IMPORTANT!

The preferred cleaning agents are weakly to averagely alkaline cleaners equivalent to CIP90, CIP92, PUR80 in 1–3% cleaning solutions. Surfactants, highly-concentrated alcohols and acidic cleaning agents are not permitted.



NOTE

More extensive cleaning will depend on a pending product change, on the cleaning agent or on internal regulations.

It is the owner's responsibility to create and ensure compliance with internal protocols, workflows or a standardized operating procedure (SOP) for cleaning.



IMPORTANT!

- After cleaning, all moisture should be wiped away with cleaning cloths. Both residual moisture and atmospheric humidity have a corrosive and damaging effect. The machine should be completely dried.
- Remove material residues. Even the tiniest amounts when combined with moisture can have a highly corrosive effect.
- Subsequent preservation should offer adequate protection against corrosion until the machine is used again. A light coating of oil is sufficient for this purpose.



IMPORTANT!

Due to the interruption to production, the maintenance work described in the "Maintenance" section should be carried out in addition to the normal cleaning tasks.

The maintenance intervals should be followed.



IMPORTANT!

Risk of damage to the machine.
There is a risk of damage to the machine due to improper cleaning.
Do not dismantle ball bearings and gear wheels.
Do not wet clean ball bearings and gear wheels (e.g. ultrasound bath) or clean in an autoclave.



NOTE

If an additional, cleaned and set up dosing unit is available, such as an additional tamping station, this may be used upon completion of the cleaning process.

The following workflow describes a basic cleaning process with notes from the manufacturer.

The appropriate steps should be carried out to suit the dosing unit and removal equipment.

Cleaning the capsule filling machine and dosing unit

After the preparatory cleaning:

1. Remove and dismantle the dosing unit.

Tamping station with removal jig (option)

- Remove the tamping station
→ “Removing the tamping station with the removal jig” section in the maintenance manual.
- Dismantle the module removed from the tamping station
→ “Dismantling the tamping station” section in the maintenance manual.

Tamping station without removal jig

- Remove and dismantle the tamping station.
→ “Dismantling the tamping station” section in the maintenance manual.

2. Open window flaps.



NOTE

When the window flaps are open, block access to the working area and identify so that no unauthorized persons can enter the area.

3. Remove format-specific parts.
→ “Format change” section in the maintenance manual.
4. Clean the entire process space in the machine using the recommended cleaning agents.



NOTE

Observe the hazard warnings for the cleaning agent.

5. Remove the tamping pins from the retainers in the tamping station compression segments and then clean, dry, if necessary, and preserve as described in the “Maintenance and care of the tamping pins” section.
6. Install the cleaned format-specific parts.
→ “Format change” section in the maintenance manual.
7. Reassemble and install the cleaned dosing unit.

Tamping station with removal jig (option)

- Reassemble the tamping station
→ “Reassembling the tamping station” section in the maintenance manual.
- Install the tamping station
→ “Installing the tamping station with the removal jig” section in the maintenance manual.

Tamping station without removal jig

- Reassemble and install the tamping station
→ “Reassembling the tamping station” section in the maintenance manual.

6.6. Cleaning of the operator terminal



IMPORTANT

Disconnect the machine from the power supply to avoid operating errors during cleaning of the operator terminal!

Recommended cleaning agents for the operator terminal:
→ Therefore, see also section “Cleaning overview” in the Maintenance manual.

6.7. Maintenance and care of the tamping pins



NOTE

Proper and thorough maintenance and care of the tamping pins have a significant effect on the service life.

Maintenance

Maintenance comprises:

- Checking the tools before installation
- Careful tool changes
- Not exceeding the permitted compression force
- Cleaning and checking after compacting
- Storage of the tools

Cleaning



NOTE

The cleaning and preserving agents listed here are recommendations.

The cleaning and preserving agent will essentially depend on the product used, the level of soiling and the cleaning method.

Please refer to the manufacturer's data sheets to determine whether cleaning and preserving agents can be used.

The tamping pins may be cleaned mechanically in suitable washing machines or in ultrasound baths.

Before cleaning in the washing machine, wipe the tamping pins to avoid too much compressed material collecting in the washing machine.

For cleaning, we recommend:

- A washing solution consisting of hot water at 70 °C and the neutral cleaning agent P3-cosa PUR 80 / 3 % solution from ECOLAB.
or
- The highly alkaline cleaning agent CIP power-x from Borer in a 0.5 - 2.0% solution. See the manufacturer's datasheet for notes on use.



IMPORTANT!

After washing, always wear gloves to handle the tamping pins.

Otherwise the tamping pins can be soiled again.

After washing, wipe the tamping pins with a clean, dry cloth to ensure that there is no remaining moisture on the tamping pins.

Checking the tamping pins

Before putting the tamping pins away, measure them and inspect with a magnifier. Also make sure that there are no cleaning residues left on the tools after cleaning.

Preservation and storage

The tools may be stored without preservation if the atmospheric humidity is below 35%.

If the atmospheric humidity exceeds 35%, the tools must be preserved.

We recommend that the deconex HT1191 anti-corrosion agent from Borer be used to preserve the tools.

We recommend using a suitable storage box for storing the tamping pins.

6.8. Maintenance and care of the tamping station



NOTE

Proper and thorough maintenance and care of the tamping station have a significant effect on the service life.

Cleaning

For long stoppages, clean the tamping station thoroughly and then protect against corrosion.

Use a weakly or averagely alkaline cleaning agent and a soft cloth to clean the tamping station.

For more detailed information on the topic of cleaning, see → “Cleaning overview” section in the maintenance manual.

6.9. Cleaning overview

The listed cleaning agents are recommendations.

Of course, other cleaning agents (obtained from other manufacturers) with the same chemical properties may be used.

In this case, please refer directly to the manufacturer.

The cleaning agent to be used will essentially depend on the processed product, the level of soiling and the cleaning method. Please refer to the manufacturer’s data sheets to determine whether the cleaning agent can be used.



NOTICE

When handling cleaning agents, the danger notes for those cleaning agents must be observed.
See the manufacturer's datasheet for notes on use.

Tab. 8 Cleaning overview

Part, component or material	Max. cleaning temperature*	Cleaning aids	Preferred cleaning agent	Alternative cleaning agent	Prohibited cleaning agent
Operator terminal user interface	40 °C	Use soft cloths moistened with cleaning agent, avoid hard, scratchy materials	For glass surfaces: mild, commercially available glass cleaner; For other surfaces: soapy water	Alcohol (or ethanol) 70–80%	Surfactants, highly-concentrated alcohols and acidic cleaning agents
Panelling: white bracket parts and black maintenance flaps, operator terminal (DuPont™ Corian® solid surface material)	50 °C	Soft cloths, avoid hard, scratchy materials	Hot water	—	Surfactants, highly-concentrated alcohols and acidic cleaning agents
NMC sensor (option)	20 °C	Use soft cloths moistened with cleaning agent and / or soft brush avoid hard, scratchy materials	Purified water	Alcohol (or ethanol) 70–80%	Abrasive or acidic cleaning agents, surfactants, highly-concentrated alcohols
Window flaps	40 °C, avoid rapid temperature changes	Use soft cloths moistened with cleaning agent, avoid hard, scratchy materials	For glass surfaces: commercially available glass cleaner; For other surfaces: soapy water	Alcohol (or ethanol) 70–80%	Surfactants, highly-concentrated alcohols and acidic cleaning agents

* Temperature stability range as defined by manufacturer

Part, component or material	Max. cleaning temperature*	Cleaning aids	Preferred cleaning agent	Alternative cleaning agent	Prohibited cleaning agent
Stainless steel	80 °C	Soft cloths, avoid hard, scratchy materials	A weakly to moderately alkaline cleaning solution made from water and P3-cosa PUR 80 neutral cleaner (from ECOLAB) in a concentration of 1.0 - 3.0 % by volume.	A weakly to moderately alkaline cleaner comparable to CIP 90 or CIP 92 in a concentration of 1.0 - 3.0 % by volume.	Surfactants, highly-concentrated alcohols and acidic cleaning agents
POM	80 °C	Soft cloths, avoid hard, scratchy materials	A weakly to moderately alkaline cleaning solution made from water and P3-cosa PUR 80 neutral cleaner (from ECOLAB) in a concentration of 1.0 - 3.0 % by volume.	A weakly to moderately alkaline cleaner comparable to CIP 90 or CIP 92 in a concentration of 1.0 - 3.0 % by volume.	Surfactants, highly-concentrated alcohols and acidic cleaning agents
Silicones	80 °C	Soft cloths, avoid hard, scratchy materials	A weakly to moderately alkaline cleaning solution made from water and P3-cosa PUR 80 neutral cleaner (from ECOLAB) in a concentration of 1.0 - 3.0 % by volume.	A weakly to moderately alkaline cleaner comparable to CIP 90 or CIP 92 in a concentration of 1.0 - 3.0 % by volume.	Surfactants, highly-concentrated alcohols and acidic cleaning agents
* Temperature stability range as defined by manufacturer					

Part, component or material	Max. cleaning temperature*	Cleaning aids	Preferred cleaning agent	Alternative cleaning agent	Prohibited cleaning agent
Plexiglas	40 °C, avoid rapid temperature changes	Soft cloths, avoid hard, scratchy materials	A weakly to moderately alkaline cleaning solution made from water and P3-cosa PUR 80 neutral cleaner (from ECOLAB) in a concentration of 1.0 - 3.0 % by volume.	A weakly to moderately alkaline cleaner comparable to CIP 90 or CIP 92 in a concentration of 1.0 - 3.0 % by volume.	Cleaning agents containing alcohol, acetone and benzene
PAN Bronze ²⁾	80 °C	Soft cloths and bottle cleaning brushes, avoid hard, scratchy materials	Alcohol (or ethanol) 70–80%	—	Alkaline cleaning agents containing ammonia, soda, sodium and potassium hydroxide Surfactants or soap solutions.
Aluminum parts, coated ¹⁾	20 °C	Use soft cloths moistened with cleaning agent, avoid hard, scratchy materials	A weakly to moderately alkaline cleaning solution made from water and P3-cosa PUR 80 neutral cleaner (from ECOLAB) in a concentration of 1.0 - 3.0 % by volume.	Slightly alkaline cleaning agent (e.g. pH 9± 0.5)	Abrasive or acidic cleaning agents, surfactants, highly-concentrated alcohols
* Temperature stability range as defined by manufacturer					



NOTICE

1) The relevant cleaning sections as set out above must be observed.



IMPORTANT

2) After cleaning, always rinse thoroughly with alcohol (70–80%) or wipe and dry.

If a prohibited cleaning agent was used for cleaning or if the concentration was too high, the part or material must be thoroughly cleaned to remove all residues and then dried.

Rinse off cleaning agent residues with cold or warm water. Deionized or purified water dries without limescale deposits and minimises rusting.

7. Preventive maintenance

7.1. Safety during maintenance and cleaning work

- All work must be done at the standstill of the machine.
- Before commencing any work on the machine or its components, secure the drives and auxiliary equipment to prevent them from inadvertent switch-on.
- After servicing and repair works, check that all safety guards are properly attached and fully functioning before commencing any work on the machine or its components.
- If work on the machine has resulted in a dirty floor, the owner of the machine must make sure that there are no dangerous slick spots that could cause people to slip.
- For cleaning work, always follow the manufacturer's instructions on the cleaning agent packaging.
- Inching mode must only be used by trained and authorised specialist personnel.
- Suitable aids should be used. The steps must be carried out in the order described.



WARNING!

Hazard from inadvertent / unexpected start-up of moving parts / drives (drive compartment including rotary-disk locking mechanism, middle column)!

During maintenance, repair, cleaning work or fault-finding on the machine, a faulty component in the machine e.g. faulty cable, bent compressed air hose, faulty valve, switched-on power source or stored energy (compressed air) may cause a dangerous unpredictable movement could cause injury. When working on the TSC, machine, switch cabinet or peripheral devices for maintenance, repair, cleaning or fault-finding:

- Switch off all power supplies that are not essential for the work.

- Switch off mains voltage.
- Switch off compressed air supply.



WARNING!

Risk of injury from improperly executed maintenance / cleaning work!

Improperly executed maintenance / cleaning work could result in severe injury and considerable damage to property.

- If components are removed, make sure they are refitted correctly. Refit all fixing elements and tighten bolts using the specified tightening torques.
- Maintenance / Cleaning work must only be carried out by specialist personnel with corresponding qualifications.



WARNING!

Crushing hazard caused by falling objects

Always be aware of the weight of mechanical components to be removed or installed.

- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- Only allow competent or instructed personnel to carry out cleaning work.
- Only allow specialist personnel with mechanical training to carry out (mechanical) maintenance work.
- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



WARNING!

Risk of poisoning by breathing in or ingesting cleaning agents and solvents!

Risk of injury from contact with cleaning agents.

- Use cleaning agents for the intended purpose only.
- Apply any protective measures required by the manufacturer.



WARNING!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

Risk of crushing from preloaded spring assembly when removing / raising the dosing disk drive (tamping station).

- The work must be carried out by specialist personnel with electrical and / or mechanical training.
- Deactivate the pneumatic system prior to open the maintenance flaps (set pneumatic system main switch to off!).



WARNING!

Crushing hazard caused by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

The STO (Safe Torque Off) safety function for all six drives is deactivated by manually enabling the drive train in the middle column. There is a risk that a drive will move unexpectedly due to a controller fault.

The sorting fork drive moves the sorting forks on rows 1 and 2 at the same time.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of format-specific parts reduces the danger points and thus the risk of injury (crushing).



CAUTION!

Ejection of objects!

Risk of injury from blowing out jammed capsules when the Capsule Flow Control (CFC) is in the dismantled state (test function).

- The CFC container must be installed.
- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Only specialist personnel with electrical and / or mechanical training may remove the cover and operate the machine (for maintenance, fault-finding, etc.).



WARNING!

Crushing hazard caused by the ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Remove as little as possible (such as extraction unit ejection flap) so that it is difficult to reach into the danger area.
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the ejection pins of the capsule ejector!

Crushing is possible between the table top and the ejection pin holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Removing capsule holders and closing pins reduces the risk of crushing.



CAUTION!

Crushing hazard caused by the cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

Crushing is possible when installing and removing the cover of the switch-cabinet cooling unit (weight and handling).

Crushing, overstretching, etc. are possible when installing and removing the heat exchanger water cooling system (approx. 30 kg).

- Before carrying out any maintenance / cleaning, switch off main switch and secure the switch to prevent it from inadvertent switch-on.
- Always use / wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- This should only be done by specialist personnel with electrical training.



WARNING!

Crushing hazard caused by the suction cup holder!

Crushing is possible between the table top and suction cup holder.

Crushing is possible between the suction cup holder and capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of capsule holders reduces the danger points and thus the risk of injury (crushing).
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the closing station!

Crushing is possible between closing pins, table top and format-specific parts.
Window flaps may be open.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- This should only be done by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.



WARNING!

Crushing hazard caused by the pellet station!

Crushing is possible between filling slide / temporary container / housing and transfer plate / capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.

7.2. General notes



NOTE

- The machine is designed to require little maintenance. This description of the preventive maintenance covers all components of the machine along with recommended tests and all lubrication intervals.
- Operational disruptions caused by inadequate or improper maintenance can result in very high repair costs and long

machine stoppages. Regular preventive maintenance is therefore essential.

- The operational safety and service of your machine are dependent on correct preventive maintenance, along with a number of other factors.
- Thorough cleaning and a detailed visual inspection are important factors in preventive maintenance.
- The following recommendations contain times, inspections and maintenance instructions that are appropriate for **normal** use of your machine.
- **Operational conditions can differ**, however, so it is not possible to strictly define how often wear checks, inspections, maintenance and servicing will be needed. If regular checks identify an increased level of wear, the maintenance intervals should be shortened to take account of the actual identified wear.
- A **maintenance schedule** should be drawn up that takes account of your operational conditions.
- Maintenance instructions for peripheral devices should be taken from the individual manufacturers' instructions.

7.3. Recommended lubricants

Tab. 9 Friction point: rotary disk (gear wheels)

NLGI / ISO-VG	2
Kinematic viscosity at 40°C	185
Kinematic viscosity at 100°C	15
Manufacturer	SKF
Brand name ®™	LGWA 2 *1

Tab. 10 Friction point: cam guide

NLGI / ISO-VG	2
Kinematic viscosity at 40°C	185
Kinematic viscosity at 100°C	15
Manufacturer	SKF
Brand name ®™	LGWA 2 *1

Tab. 11 Friction point: cam rollers

NLGI / ISO-VG	2
Kinematic viscosity at 40°C	185
Kinematic viscosity at 100°C	15
Manufacturer	SKF
Brand name ®™	LGWA 2 *1

Tab. 12 Friction point: spindles

NLGI / ISO-VG	2
Kinematic viscosity at 40°C	97
Kinematic viscosity at 100°C	11.5
Manufacturer	Klüber
Brand name ®™	STABURAGS NBU 8 EP *1

Tab. 13 Friction point: ball bushings

NLGI / ISO-VG	2
Kinematic viscosity at 40°C	150
Kinematic viscosity at 100°C	18
Manufacturer	FAG
Brand name ®™	Arcanol FOOD2 *1
Approved and certified NSF / H1	X
Approved and certified ISO / 21469	—
Approved and certified Halal / Kosher	X

Tab. 14 Friction point: Linear guide

NLGI / ISO-VG	2
Kinematic viscosity at 40°C	200
Kinematic viscosity at 100°C	
Manufacturer	HIWIN TECHNOLOGIES CORP.
Brand name ®™	HIWIN G05

Of course, other lubricants (from other manufacturers) with the same technical properties may be used.

*1) The identified lubricants are used or supplied when the unit is filled for the first time.

7.4. Choice of lubricant

We reserve the right to make brand-specific changes to improve lubricating properties, even if the recommended lubricant specified here is based on the relevant standards.

Classification for lube oils based on viscosity class ISO VG (determined as per DIN 51519) and the kinematic viscosity at 40°/100 °C in [mm²/s] and [cST] (determined as per DIN 51562).

Classification for greases based on NLGI class (as per DIN 51818) and the classification code (as per DIN 51502).



IMPORTANT!

Synthetic polyglycol-based oil must not be mixed with mineral oils.

7.5. Overview preventive maintenance

Tab. 15 Maintenance intervals

Interval	Part	Component	Activity
Every time the machine is cleaned	Cam guide	Cam guides	Check for wear
		Track cams	Check for wear
	Capsule holders	Capsule mounting	Visual inspection for damage
	Capsule feeder	Cam rollers	Check for wear
		Clamping springs	Check for wear
	Capsule separation unit	Suction cups	Visual inspection for damage and wear
	Tamping station	Filling cone	Check seal
		Metering drum	Visual inspection for damage
		Compression segments (stations 1 – 5): compression springs and tamping pins	Check for wear and clean
		Compression segment (station 6): tamping pins	Check for wear and clean
		Tamping pin holder / lifting spindles: clamping assemblies	Check for wear and clean
		Tamping pin holder: counter-bearing	Check for wear and clean
		Dosing disk: dosing holes	Check for soiling / damage and clean
		Scraper transfer station: inserting segment (transfer station scraper)	Check for wear
	Rejection of non-separated capsules	Ejecting pin	Visual inspection for damage
	Closing station	Closing pins	Visual inspection for damage
	Capsule rejection and cleaning	Ejecting pins	Visual inspection for damage
	Pneumatic system	Water trap (water separator)	Check
		Pneumatic system	Check for leaks
	Window flaps	Seal	Visual check for damage and cracks

Interval	Part	Component	Activity
At least 1x per week / every time the machine is cleaned	Emergency stop button	Emergency stop button	Test function
At least 1x per month / every time the machine is cleaned	Rotary disk	Scraper	Check for tight fit and closure
Every 6 months, depending on the product	Cooling	Fans and filter mats	Visual check and replacement
Every 6 months	Rotary disk	Outer shaft sealing ring	Check for wear
		Inner shaft sealing ring (split)	Check for wear
		Scraper	Replace
		Shaft sealing rings	Check for wear
	Middle column	Scraper	Visual inspection for damage
	Capsule separation unit	Scraper	Check for wear
	Tamping station	Deflection unit: shaft sealing rings	Check for wear
		Drive for metering drum: shaft sealing ring	Check for wear
		Bearing cap / support plate: shaft sealing ring	Check for wear
		Scraper	Check for wear
	Pellet station	Scraper	Check for wear
	Closing station	Shaft sealing rings	Check for wear
		Scraper	Check for wear
	Capsule rejection and cleaning	Shaft sealing rings	Check for wear
Scraper		Check for wear	
Every 12 months	Cooling	Cooling system and coolant hoses	Visual inspection for damage
	Cam guide	Cam rollers	Check for wear
	Capsule rejection and cleaning	Toothed belt	Check for wear and check initial tension
	Window flaps	Seal	Replace

Interval	Part	Component	Activity
After removal and installation	Removal jig for tamping station (option)	Guide carriage	Visual inspection for damage
		Guide carriage	Visual inspection for damage, check for ease of movement
		Assembly carrier	Visual inspection for damage
		Service cart	Visual inspection for damage
If "Coolant fill level undershot" diagnosis is displayed	Cooling	Coolant level	Top up coolant

Tab. 16 Lubrication intervals

Interval	Part	Component	Activity
Every time the machine is cleaned	Cam guide	Cam guides	Lubricate
Every 12 months	Cam guide	Cam rollers	Lubricate
Every 1.250 operating hours	Drive capsule magazine	Linear guide for capsule magazine (only at double rotary machines)	Lubricate
After removal and installation	Removal jig for tamping station (option)	Guide carriage	Lubricate



NOTICE

The lubrication interval recommended for those drives that require lubrication is 2500 operating hours. If the lubrication interval is exceeded, the machine stops and cannot be restarted until the pending lubrication is carried out.

7.6. Capsule separation unit

7.6.1. Suction cups

Wear, breaks or damages to the suction cups will reduce their holding effect and thus the vacuum effect.

Faulty suction cups may be the cause of non-separation of capsules, which is indicated by a build-up of non-separated capsules on certain capsule tracks.

- Check suction cups for faults (visual inspection).

- Replace faulty suction cups.

Changing the suction cups → see the "Suction cups" section in the Maintenance manual.

7.6.2. Scraper on the suction cup holder

The connecting duct of the rise-and-fall suction cup holder (lifting movement) is sealed by a scraper inserted into the tabletop.

Wear of the scraper reduces the sealing effect and thus the protection against contamination.

- Check scraper for faults (visual inspection).
- Replace faulty scrapers.

Changing the scraper → see the "Scraper on the suction cup holder" section in the Maintenance manual.

7.7. Removal jig for tamping station

- Check the jig and associated components for external damage. All securing clips and latching positions must be present and in working order.
- Test ease of movement of the guide carriage. There must be no running noise.
- Check adjusting travel of guide carriage threaded spindle.

8. Maintenance

8.1. Safety during maintenance and cleaning work

- All work must be done at the standstill of the machine.
- Before commencing any work on the machine or its components, secure the drives and auxiliary equipment to prevent them from inadvertent switch-on.
- After servicing and repair works, check that all safety guards are properly attached and fully functioning before commencing any work on the machine or its components.
- If work on the machine has resulted in a dirty floor, the owner of the machine must make sure that there are no dangerous slick spots that could cause people to slip.
- For cleaning work, always follow the manufacturer's instructions on the cleaning agent packaging.
- Inching mode must only be used by trained and authorised specialist personnel.
- Suitable aids should be used. The steps must be carried out in the order described.



WARNING!

Hazard from inadvertent / unexpected start-up of moving parts / drives (drive compartment including rotary-disk locking mechanism, middle column)!

During maintenance, repair, cleaning work or fault-finding on the machine, a faulty component in the machine e.g. faulty cable, bent compressed air hose, faulty valve, switched-on power source or stored energy (compressed air) may cause a dangerous unpredictable movement could cause injury. When working on the TSC, machine, switch cabinet or peripheral devices for maintenance, repair, cleaning or fault-finding:

- Switch off all power supplies that are not essential for the work.
- Switch off mains voltage.
- Switch off compressed air supply.



WARNING!

Risk of injury from improperly executed maintenance / cleaning work!

Improperly executed maintenance / cleaning work could result in severe injury and considerable damage to property.

- If components are removed, make sure they are refitted correctly. Refit all fixing elements and tighten bolts using the specified tightening torques.
- Maintenance / Cleaning work must only be carried out by specialist personnel with corresponding qualifications.



WARNING!

Crushing hazard caused by falling objects

Always be aware of the weight of mechanical components to be removed or installed.

- Always use and wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- Only allow competent or instructed personnel to carry out cleaning work.
- Only allow specialist personnel with mechanical training to carry out (mechanical) maintenance work.

- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



WARNING!

Risk of poisoning by breathing in or ingesting cleaning agents and solvents!

Risk of injury from contact with cleaning agents.

- Use cleaning agents for the intended purpose only.
- Apply any protective measures required by the manufacturer.



WARNING!

Crushing hazard caused by moving parts / drives in the drive compartment!

Crushing is possible between the track cam and circulating track, rotary-disk locking mechanism, all guides for actuating drives, suction cup holders, apart from tamping station lifting drives (which are self-contained), external rotor torque motor and frame and dosing disk drive and frame.

Risk of crushing from preloaded spring assembly when removing / raising the dosing disk drive (tamping station).

- The work must be carried out by specialist personnel with electrical and / or mechanical training.
- Deactivate the pneumatic system prior to open the maintenance flaps (set pneumatic system main switch to off!).



WARNING!

Crushing hazard caused by moving parts / drives in the middle column!

Crushing is possible between the middle column, magazine, sorting fork, guide fork, sorting block, holder for non-separated capsule reject function and capsule holder.

The STO (Safe Torque Off) safety function for all six drives is deactivated by manually enabling the drive train in the middle column. There is a risk that a drive will move unexpectedly due to a controller fault.

The sorting fork drive moves the sorting forks on rows 1 and 2 at the same time.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.

- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- The removal of format-specific parts reduces the danger points and thus the risk of injury (crushing).



CAUTION!

Ejection of objects!

Risk of injury from blowing out jammed capsules when the Capsule Flow Control (CFC) is in the dismantled state (test function).

- The CFC container must be installed.
- Only allow specialist personnel with electrical training to carry out (electrical) maintenance work.



CAUTION!

Crushing hazard caused by the gates in the capsule discharge!

Crushing is possible between gates and the discharge gate housing.

- Only specialist personnel with electrical and / or mechanical training may remove the cover and operate the machine (for maintenance, fault-finding, etc.).



WARNING!

Crushing hazard caused by the ejection flap of the capsule ejector!

Crushing is possible between ejection flap and format-specific part housing.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Remove as little as possible (such as extraction unit ejection flap) so that it is difficult to reach into the danger area.
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the ejection pins of the capsule ejector!

Crushing is possible between the table top and the ejection pin holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- Removing capsule holders and closing pins reduces the risk of crushing.



CAUTION!

Crushing hazard caused by the cooling system (switch cabinet and motors)!

Crushing is possible between fan wall and rotor (switch cabinet and water cooling). The pump is encapsulated.

Crushing is possible when installing and removing the cover of the switch-cabinet cooling unit (weight and handling).

Crushing, overstretching, etc. are possible when installing and removing the heat exchanger water cooling system (approx. 30 kg).

- Before carrying out any maintenance / cleaning, switch off main switch and secure the switch to prevent it from inadvertent switch-on.
- Always use / wear personal protective equipment while carrying out the work:
 - Safety boots
 - Non-slip safety gloves
- This should only be done by specialist personnel with electrical training.



WARNING!

Crushing hazard caused by the suction cup holder!

Crushing is possible between the table top and suction cup holder.

Crushing is possible between the suction cup holder and capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.

- The removal of capsule holders reduces the danger points and thus the risk of injury (crushing).
- This should only be done by specialist personnel with electrical and / or mechanical training.



WARNING!

Crushing hazard caused by the closing station!

Crushing is possible between closing pins, table top and format-specific parts.

Window flaps may be open.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.
- This should only be done by specialist personnel with electrical and / or mechanical training.



CAUTION!

Crushing hazard caused by the metering drum of the tamping station!

Crushing is possible between metering drum and housing.

- Do not reach into the filling pipe from above.



WARNING!

Crushing hazard caused by the pellet station!

Crushing is possible between filling slide / temporary container / housing and transfer plate / capsule holder.

- The hand-held terminal must only be used by specialist personnel with electrical and / or mechanical training.
- Work in inching mode must be carried out only by one person on their own. During this time, other people must be prevented from standing in the danger area of the capsule filling machine.

8.2. Rotary disk unit

8.2.1. Changing the inner shaft sealing ring

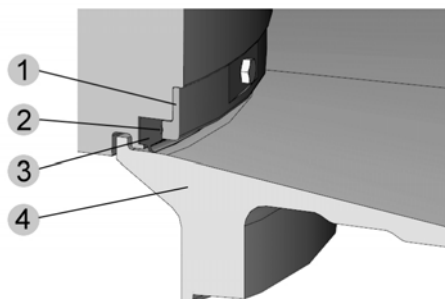


Fig. 193 Inner shaft sealing ring (sectional view)

1. Locking ring (two-part)
2. O-ring cord
3. Inner shaft sealing ring (split, four segments)
4. Rotary disk

Removing the inner shaft sealing ring

1. Loosen six screws to remove the locking ring (two-part).
2. Remove the O-ring cord and four segments of the inner shaft sealing ring.

Fitting the inner shaft sealing ring

1. Install the front and rear sealing segments of the inner shaft sealing ring, offset by 90°.
2. Insert the O-ring cord.
3. Install and firmly screw together the two locking ring halves.

8.2.2. Changing the outer shaft sealing ring

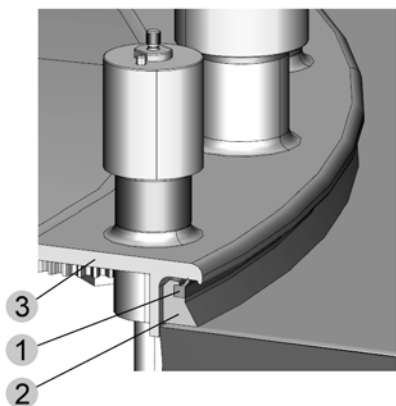


Fig. 194 Outer shaft sealing ring (sectional view)

1. Outer shaft sealing ring
2. Mounting
3. Rotary disk

Removing the outer shaft sealing ring

1. Detach the shaft sealing ring from its mounting and remove.

Fitting the outer shaft sealing ring

Before the outer shaft sealing ring is fitted, the mounting for the shaft sealing ring must be freely accessible.

1. Remove the capsule magazine.
2. Remove the guide fork.
3. Remove the capsule filling cone.
4. Remove the closing pins.
5. Remove the ejecting pins.
6. Remove the capsule holder.
→ Therefore, see also section "Changing the capsule holder".
7. Detach the connection between the middle column and the head piece at the single rotary machine.
Remove the following components from the middle column:
 - Front panelling (vertical)
 - Rear panelling
 - Seal mounting
8. Detach the connection between the middle column and the head piece at the double rotary machine.
Remove the following components from the middle column:
 - Orifice plate (two-piece)
9. Guide the shaft sealing ring between the middle column and head piece and place around the middle column.
10. Guide the shaft sealing ring down and insert in the mounting.

Reverse steps 1 to 8 in order to reinstall the removed parts.

8.3. Capsule separation unit

8.3.1. Suction cups

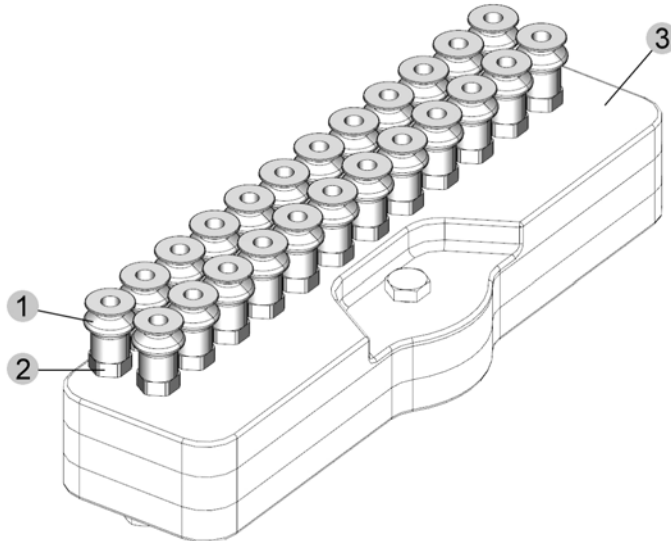


Fig. 195 Changing the suction cups

1. Suction cup
2. Connecting nipple suction cup
3. Topmost suction cup plate



WARNING!

Risk of injury from compressed air

Risk of injury from actuators controlled by compressed air, a direct jet of compressed air or by parts that are accelerated by compressed air.

- Work on the machine's pneumatic system must only be carried out by personnel with mechanical training.

Removing the suction cups

1. Remove the suction cup manually from the connecting nipple.
2. Repeat step 1 until all suction cups are removed.

Fitting the suction cups

1. Insert the suction cups manually as a tight fit onto the connecting nipple.
2. Repeat step 1 until all suction cups are fitted properly.

8.3.2. Scraper on the suction cup holder

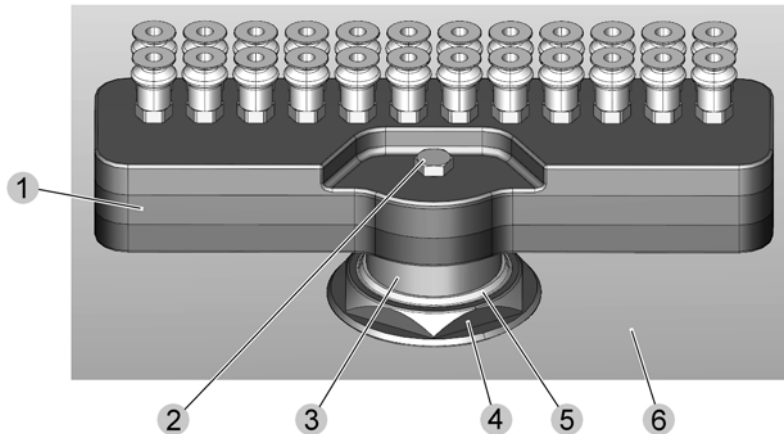


Fig. 196 Changing the scraper on the suction cup holder

1. Suction cup plates with suction cups
2. Fixing screw
3. Connecting duct
4. Mounting sleeve
5. Scraper
6. Tabletop

Removing the scraper

1. Loosen and remove the fixing screws of the suction cup plates.
2. Remove the suction cup plates.
3. Loosen the mounting sleeve and unscrew from the tabletop.
4. Push the mounting sleeve (with inserted scraper) up and pull away from the connecting duct.
5. Remove the scraper from the mounting sleeve.

Installing the scraper

1. Insert a new scraper in the mounting sleeve.
2. Push the mounting sleeve (with inserted scraper) down and over the connecting duct.
3. Screw the mounting sleeve into the tabletop and tighten.
4. Place suction cup plate with the pot hole as a tight fit on the underside onto the connecting duct.
5. Screw the fixing screw into the suction cup plates and tighten.