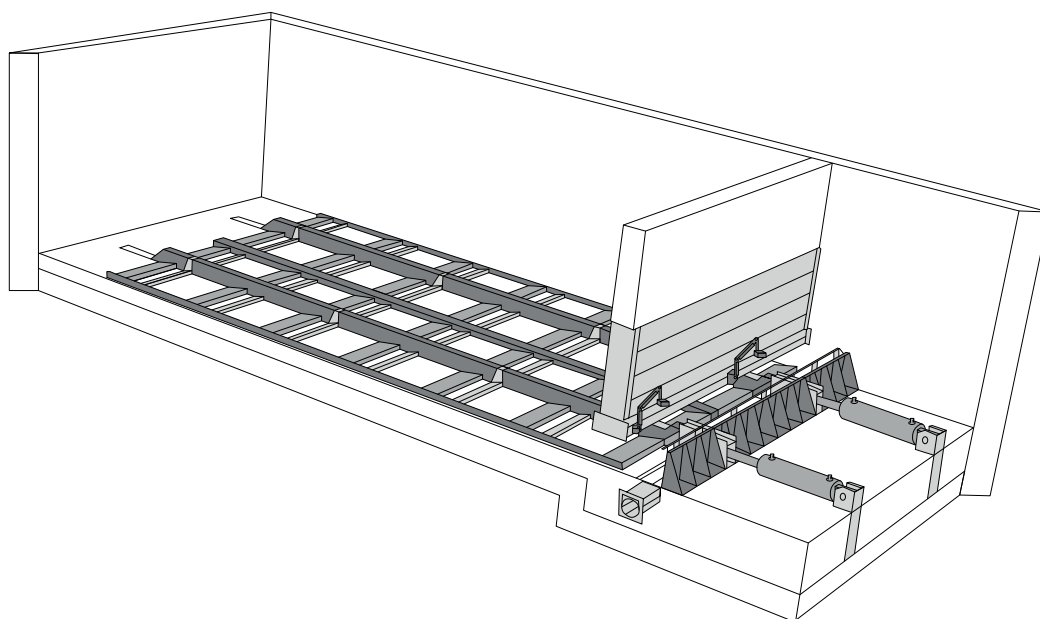


# froling

## Installation and operating instructions **Sliding floor discharge unit**

*with discharge screw*



Translation of original German version of installation and operating instructions for technicians and operators.

Read and follow all instructions and safety instructions.  
All errors and omissions excepted.

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# 1 General information

Thank you for choosing a quality product from Froling. The product features a state-of-the-art design and conforms to all currently applicable standards and testing guidelines.

Please read and observe the documentation provided and always keep it close to the system for reference. Observing the requirements and safety information in the documentation makes a significant contribution to safe, appropriate, environmentally friendly and economical operation of the system.

The constant further development of our products means that there may be minor differences from the pictures and content. If you discover any errors, please let us know: [doku@froeling.com](mailto:doku@froeling.com).

Subject to technical change.

*Issuing a delivery  
certificate*

This is an incomplete machine as defined by the Machinery Directive. The incomplete machine must only be started up when it has been confirmed that the machine, in which the incomplete machine has been installed, conforms to the provisions of Directive 2006/42/EC.

Compliance with the open provisions and verification of the correct installation must be confirmed in the delivery certificate of the declaration of installation (included in documentation).

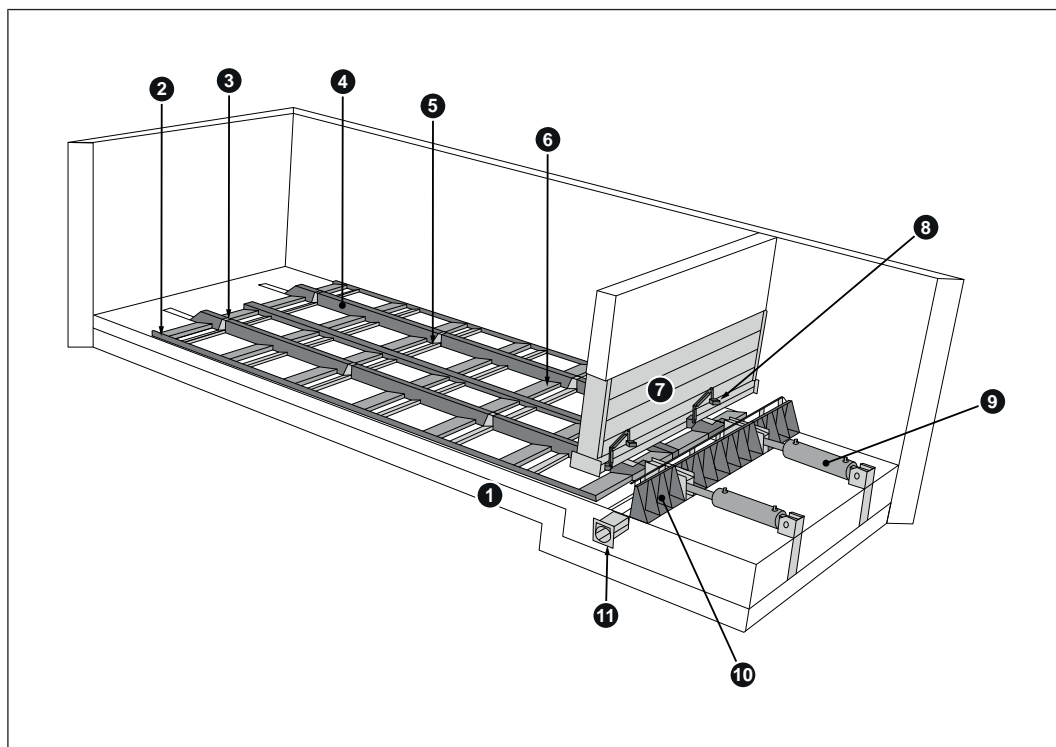
## Warranty and Guarantee Conditions

Our sale and delivery conditions will be applicable. These conditions have been made available to customers, and customers have been made aware of them at the time of order completion.

You can also find the guarantee conditions on the enclosed guarantee certificate.

## 1.1 Functional description

The Fröling discharge system “Sliding floor” consists of:



1	Substructure of the sliding floor	7	Bulkhead
2	Metal tiebacks	8	Light barriers
3	Welded wings	9	Hydraulic drive
4	Slide rods	10	Wall plate
5	Fixed wedge	11	Feeder unit
6	Moveable wedge		

The FRÖLING sliding floor feed system is used to discharge combustion materials from a rectangular or square storeroom. The sliding floor feed system can be equipped with one or more slide rods (4) and is installed on the flat floor of the storeroom. The slide rod (4) is a horizontal I-beam with wing-type components (3) welded to the beam's side. Metal tiebacks (2) are used to secure these wing-type components on the outside and prevent them from standing up. The substructure of the sliding floor is anchored in the base plate and embedded in concrete. This process shall be the responsibility of the customer.

The hydraulic drive (9) is used to move the slide rods back and forth. In the direction of conveyer movement, the end faces of the wedges are vertical and push the fuel material during the forward stroke in the direction of the conveyor (11) lying transverse to the sliding floor. During the return stroke, the tapered side of the wedges undercuts the bulk material. At the same time, the vertical end faces of the fixed wedges prevent the bulk material from moving backwards.

The light barriers (8) detect the amount of fuel quantity, based on which the sliding floor's feed output rate is controlled. The feeder conveys the material to the boiler.

## 2 Safety

### 2.1 Hazard levels of warnings

This documentation uses warnings with the following hazard levels to indicate direct hazards and important safety instructions:

#### **DANGER**

*The dangerous situation is imminent and if measures are not observed it will lead to serious injury or death. You must follow the instructions!*

#### **WARNING**

*The dangerous situation may occur and if measures are not observed it will lead to serious injury or death. Work with extreme care.*

#### **CAUTION**

*The dangerous situation may occur and if measures are not observed it will lead to minor injuries.*

#### **NOTICE**

*The dangerous situation may occur and if measures are not observed it will lead to damage to property or pollution.*

## 2.2 Permitted uses

Fröling's "Sliding floor" discharge system is only designed to discharge fuels from suitable storerooms. Only use fuels specified in the "Permitted fuels" section!

The unit should only be operated when it is in full working order. It must be operated in accordance with the instructions, observing safety precautions, and you should ensure you are aware of the potential hazards. The inspection and cleaning intervals in the operating instructions must be observed. Ensure that any faults which might impair safety are rectified immediately.

The manufacturer or supplier is not liable for any damage resulting from non-permitted uses.

Only original spare parts or specific alternative spare parts authorised by the manufacturer may be used. Any kind of change or modification made to the product will invalidate the manufacturer's conformity with the applicable guideline(s). In such cases, the product will need to undergo new hazard evaluation procedures by the operator. The operator will then be fully responsible for the declaration of conformity according to the valid guideline(s) for the product and will need to issue a corresponding declaration for the device. This person will then assume all of the rights and responsibilities of a manufacturer.

### **DANGER**



If the device is used incorrectly:

***Incorrect use of the system can cause severe injury and damage.***

When operating the system:

- ☐ Observe the instructions and information in the manuals
- ☐ Observe the details on procedures for operation, maintenance and cleaning, as well as troubleshooting in the respective manuals.
- ☐ Any work above and beyond this (e.g. servicing) must be carried out by a heating engineer approved by Fröling Heizkessel- und Behälterbau GesmbH or by Fröling customer services

## 2.2.1 Permitted fuels

### Wood chips

Description according to EN ISO 17225-4	Description
<b>M20</b>	Water content max. 20%
<b>M30</b>	Water content max. 30%
<b>M35</b>	Water content max. 35%
<b>P16S</b>	Main proportion (at least 60% mass portion): 3.15 – 16 mm, max. length of 45 mm, previously referred to as fine wood chips G30
<b>P31S</b>	Main proportion (at least 60% mass portion): 3.15 – 31.5 mm, max. length of 150 mm, previously referred to as medium-sized wood chips G50
From 400 kW: <b>P45S</b>	Main proportion (at least 60% mass portion): 3.15–45 mm, max. length 200 mm, previously referred to as medium-sized wood chips G50
<b>P63</b> <sup>1)</sup>	Main proportion (at least 60% mass portion): 3.15–63 mm, max. length 350 mm, previously referred to as coarse wood chips G100

Note on standards

EU:	Fuel according to EN ISO 17225 – Part 4: Wood chips class A2 / P16S-P31S M35
Additional for Germany:	Fuel class 4 (§3 of the First Federal Emissions Protection Ordinance (BimSchV) in the last amended version)

## 2.3 Qualification of staff

### 2.3.1 Qualification of assembly staff

#### CAUTION



Assembly and installation by unqualified persons:

**Risk of personal injury and damage to property**

During assembly and installation:

- ☐ Observe the instructions and information in the manuals
- ☐ Only allow appropriately qualified personnel to work on the system

Assembly, installation, initial startup and servicing must only be carried out by qualified personnel:

- Heating technicians/building technicians
- Electrical installation technicians
- Froling customer services

The assembly staff must have read and understood the instructions in the documentation.



### 2.3.2 Personal protective equipment for assembly staff

You must ensure that staff have the protective equipment specified by accident prevention regulations!



- During transport, erection and installation:
  - wear suitable work wear
  - wear protective gloves
  - wear safety shoes (min. protection class S1P)

### 2.3.3 Qualification of operating staff

#### CAUTION



If unauthorised persons enter the Storeroom:

#### ***Risk of personal injury and damage to property***

- ☐ The operator is responsible for keeping unauthorised persons, in particular children, away from the system.

Only trained operators are permitted to operate the unit. The operator must also have read and understood the instructions in the documentation.

### 2.3.4 Protective equipment for operating staff

You must ensure that staff have the protective equipment specified by accident prevention regulations!



- For operation, inspection and cleaning:
  - suitable work wear
  - protective gloves
  - sturdy shoes

## 2.4 Design information

Carrying out modifications to the system and changing or disabling safety equipment is prohibited.

Always comply with all fire, building and electrical regulations when installing and operating the system, in addition to following the assembly and operating instructions and mandatory regulations that apply in the country of use.

### 2.4.1 Standards

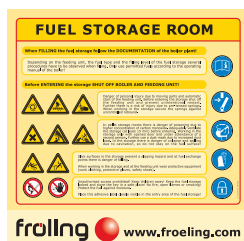
The system must be installed and commissioned in accordance with the local fire and building regulations. The following standards and regulations should be observed in any case:

ÖNORM / DIN EN 60204	Safety of machines; Electrical equipment of machines, Part 1: General requirements
TRVB H 118	Technical directives for fire protection/prevention (Austria)
ÖNORM H 5170	Construction and fire protection requirements (Austria)
ÖNORM H 5190	Heating systems - Acoustic insulation
EN ISO 13857	Safety of machines; Safety distances for maintaining a safe distance from hazardous areas

## 2.4.2 Requirements at the installation site

- Protect the store against all weather conditions.
- Protective structures must be designed in accordance with the applicable standards and regulations

### Information about the fuel store



**NOTICE! The fuel store plate provided must be affixed in a conspicuous place in the access area of the store**

**When FILLING the fuel store, observe the system DOCUMENTATION.**

The filling procedures may vary depending on the discharge system, type of fuel and fill level of the fuel store. Only use fuels permitted according to the boiler's operating instructions.

**SWITCH OFF the HEATING AND FEED SYSTEM before ENTERING the fuel store.**

Risk of injury due to moving parts and automatic startup. Shut off the feeder unit before entering the fuel store and secure it so that it cannot be switched on again. There is a further risk of injury from the uncontrolled rotation of spring-loaded components. These must be secured during work.

There is a risk of carbon monoxide poisoning in the pellet stores. Adequately ventilate the store before entering (at least 15 mins.). Only enter the store under the supervision of a second person. While in the store, keep the door open and use a dust mask! There is a risk of collapse and being buried alive as a result of cavity formation in the store. Therefore, do not enter the fuel area!

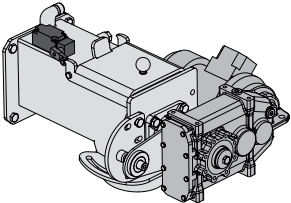
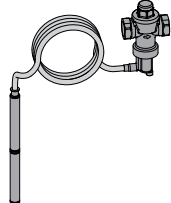
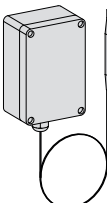
Slick surfaces in the fuel store present a slipping hazard and fuel supply points present a risk of falling.

As a rule, personal protective equipment (work clothing, protective gloves, sturdy shoes) should be worn when working in the store and on the conveyor.

Unauthorized access prohibited! Keep children away! Design the fuel store in such a way that it is safe to access and keep it locked. Keep the key in a safe place. No fire, open flames or smoking! Protect the fuel from moisture.

Affix this notice in a conspicuous place in the access area of the fuel store.

## 2.5 Safety devices

Safety equipment	Safety function
Limit switch for top of gravity shaft 	Protection against access to the danger area of the feed screw or discharge screw when the system is switched on <input type="checkbox"/> If the inspection cover is opened, the system is switched off via the limit switch ↳ The power supply remains switched on
Water sprinkler system 	Self-activating extinguisher system to limit burn back around the top of the trough. If the temperature in the trough rises above 95 °C, the valve of the sprinkler system opens, water flows out and thus prevents a fire from spreading to the fuel store.
TMF 	Temperature monitoring device in the fuel store (according to TRVB H118, only in Austria), which activates the on-site warning device(s) if 70 °C is exceeded in the fuel store.

### 2.5.1 External safety devices

#### Hydraulic chamber safety switch



Before starting any maintenance work in the hydraulic chamber of the sliding floor:

- ☐ Turn the safety switch to the "0" position
  - ↳ The boiler follows the shutdown procedure and the discharge is deactivated
- ☐ If turning the selector switch past the "0" position, the locking lever can be depressed
  - ↳ Use a padlock to secure the switch and prevent the system from starting accidentally

After the maintenance work in the hydraulic chamber of the sliding floor has been completed:

- ☐ Remove the padlock
- ☐ Turn the selector switch past the "0" position. This automatically releases the locking switch. Now, the selector switch can be turned back to the "1" position
- ☐ Acknowledge fault that has occurred on the boiler

## 2.6 Residual risks

The discharge system has been designed and built to comply with the relevant safety directives. Nevertheless, by the nature of its operation and function, there are residual risks which cannot be eliminated completely.

### DANGER



Operating the system without the on-site safety equipment:

***Risk of serious injury from unprotected system components!***

For safe operation of the system:

- ☐ Only operate the system once the required safety equipment has been installed
  - ↳ Observe the instructions and information about on-site safety equipment in the manuals
  - ↳ Compliance with open provisions in the declaration of installation as per Machinery Directive 2006/42/EC must be verified!

### DANGER



If the device is used incorrectly:

***Incorrect use of the system can cause severe injury and damage.***

When operating the system:

- ☐ Observe the instructions and information in the manuals
- ☐ Observe the details on procedures for operation, maintenance and cleaning, as well as troubleshooting in the respective manuals.
- ☐ Any work above and beyond this (e.g. servicing) must be carried out by a heating engineer approved by Fröling Heizkessel- und Behälterbau GesmbH or by Fröling customer services

### DANGER



Maintenance work if the system is switched on:

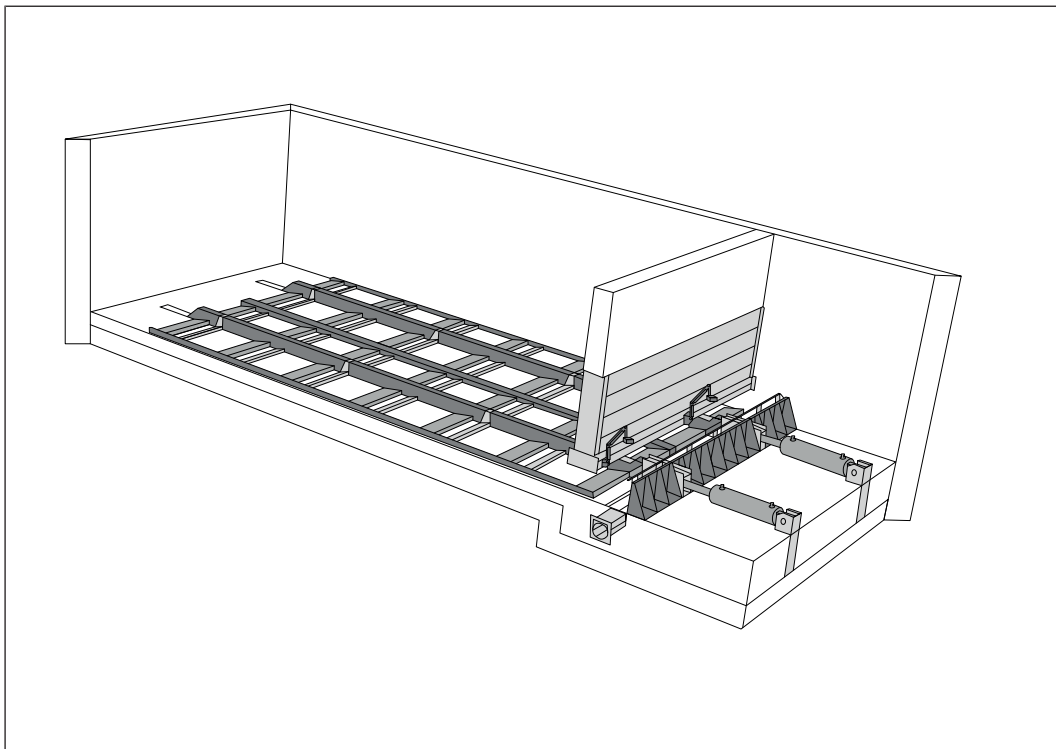
***Risk of severe injuries from system components or if the system is switched on without authorisation!***

Before starting any maintenance work on the system or in the storeroom:

- ☐ Turn the safety switch inside the hydraulic chamber to the "0" position
- ☐ Use a padlock to secure the switch and prevent the system from starting accidentally

## 3 Technology

### 3.1 Technical data



Description	Value
width of wing/slide rod	1.5 – 3.0 m
Storeroom length	4.6 – 16.2 m
Bulk volume	27.6 – 129.6 m <sup>3</sup>
Max. load per slide rod	36 t

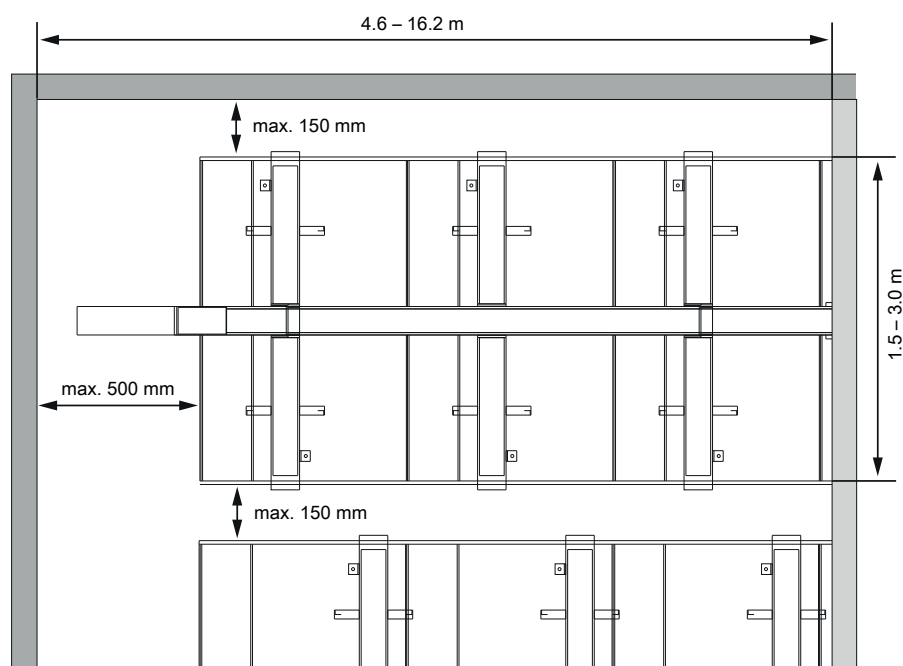
### Hydraulic units

Overall output of the system	> 500 kW	> 1,000 kW	> 1,500 kW
Output	4 kW	7.5 kW	11 kW
Air volume flow	12 L/min	16 L/min	24 L/min
Motor voltage	400 V / 50 Hz		
Solenoid valve	24 VDC		

## Discharge screw

Overall output of the system	> 320 kW	> 500 kW	> 1,500 kW
Diameter	Ø 150 mm	Ø 200 mm	Ø 250 mm
Output	0.55 kW	0.55 kW	0.55 kW
Speed	10.9 rpm	10.8 rpm	10.7 rpm
Motor voltage	400 V / 50 Hz		
Safety switch	24 VDC		

## 3.2 Store layout and construction

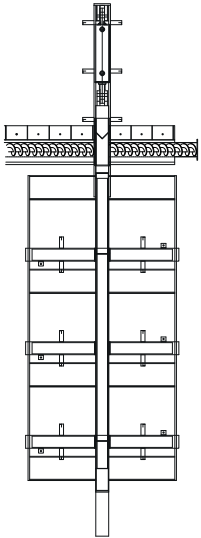


### 3.2.1 Design data for the sliding floor discharge unit

The following tables indicate the maximum permissible dumping height as a function of the wing's width and the store length.

**NOTICE!** If the bulk density of the wood chips is more than 250 kg/m<sup>3</sup> (e.g. due to moisture), the maximum dumping height is reduced accordingly.

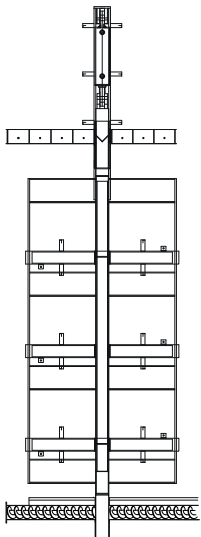
#### Cylinder in tension



Cylinder	Number of movable wedges	Length of store room	Width of wing [m]							Maximum dumping height [m]
			3,00	2,75	2,50	2,25	2,00	1,75	1,50	
200/100-500	11	~ 12,8 m						4,5	5,2	
	10	~ 11,6 m					4,3	4,9	5,7	
	9	~ 10,4 m				4,3	4,8	5,8	6,4	
	8	~ 9,3 m			4,3	4,8	5,4	6,2	7,2	
	7	~ 8,1 m	4,1	4,5	4,9	5,5	6,2	7,0	8,2	
	6	~ 7,0 m	4,8	5,2	5,7	6,4	7,2	8,2	9,6	
	5	~ 5,8 m	5,7	6,3	6,9	7,7	8,6	9,9	11,5	
	4	~ 4,6 m	7,2	7,8	8,6	9,6	10,8	12,3	14,4	
180/90-500	8	~ 9,3 m					4,4	5,0	5,8	
	7	~ 8,1 m			4,0	4,4	5,0	5,7	6,7	
	6	~ 7,0 m		4,2	4,7	5,2	5,8	6,7	7,8	
	5	~ 5,8 m	4,7	5,1	5,6	6,2	7,0	8,0	9,3	
	4	~ 4,6 m	5,8	6,3	7,0	7,8	8,7	10,0	11,6	

#### Cylinder pressurised

**NOTICE!** If the cylinder is pressurised, the transmission of power can be increased.



Cylinder	Number of movable wedges	Length of store room	Width of wing [m]							Maximum dumping height [m]
			3,00	2,75	2,50	2,25	2,00	1,75	1,50	
200/100-200	14	~ 16,2 m					4,0	4,6	5,3	
	13	~ 15,1 m					4,3	4,9	5,7	
	12	~ 13,9 m				4,2	4,7	5,3	6,2	
	11	~ 12,8 m			4,1	4,5	5,1	5,8	6,8	
	10	~ 11,6 m	3,7	4,1	4,5	5,0	5,6	6,4	7,5	
	9	~ 10,4 m	4,2	4,5	5,0	5,5	6,2	7,1	8,3	
	8	~ 9,3 m	4,7	5,1	5,6	6,2	7,0	8,0	9,3	
180/90-500	7	~ 8,1 m	5,3	5,8	6,4	7,1	8,0	9,1	10,7	
	10	~ 11,6 m				4,0	4,5	5,2	6,1	
	9	~ 10,4 m			4,0	4,5	5,0	5,8	6,7	
	8	~ 9,3 m		4,1	4,5	5,0	5,7	6,5	7,6	
	7	~ 8,1 m	4,3	4,7	5,2	5,8	6,5	7,4	8,6	
	6	~ 7,0 m	5,2	5,5	6,1	6,7	7,6	8,6	10,1	



## 4 Installation

### 4.1 Transport and positioning

The discharge system is supplied without a pallet and requires a loading area of up to 8 m, depending on the length of the profiles.

- ☐ Follow the transport instructions on the packaging!
- ☐ Transport components with care.

A door should be provided to access the store or a ceiling opening for bringing in the unit.

#### NOTICE



Possibility of damage to components if handled incorrectly

- ☐ Follow the transport instructions on the packaging
- ☐ Transport components with care to avoid damage
- ☐ Protect components against damp
- ☐ Unloading, positioning and installation should only be performed by appropriately trained professionals. Staff must be trained in techniques for moving heavy loads (correct tools and lifting equipment, hooking and slinging points, etc.)

#### 4.1.1 Temporary storage

If the system is to be assembled at a later stage:

- ☐ Store components at a protected location, which is dry and free of dust
  - ↳ Damp can damage components, particularly in the motor.

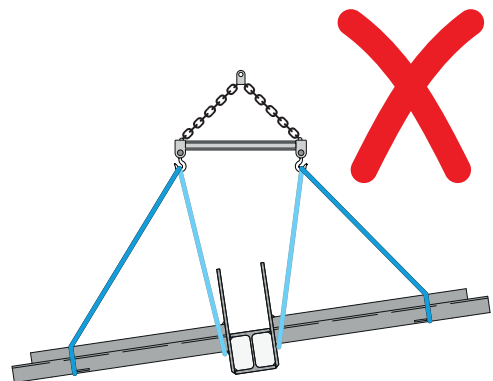
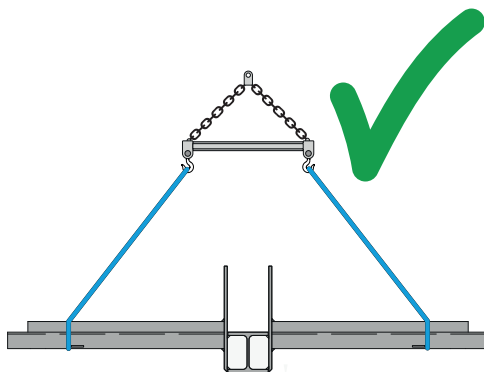
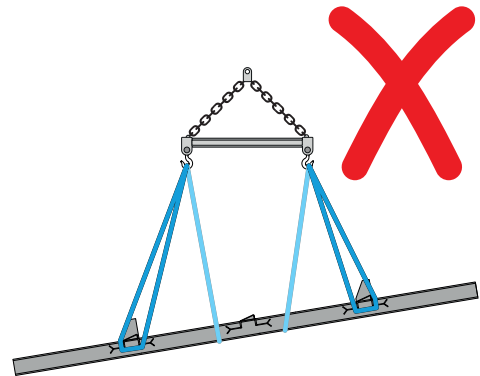
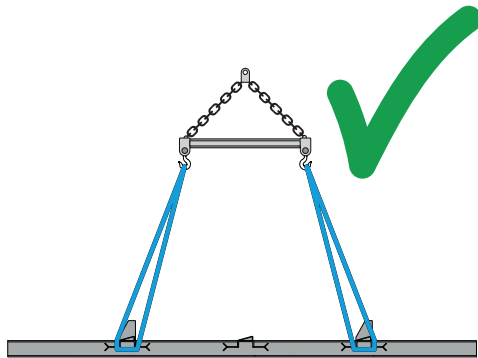
### 4.1.2 Positioning

#### NOTICE



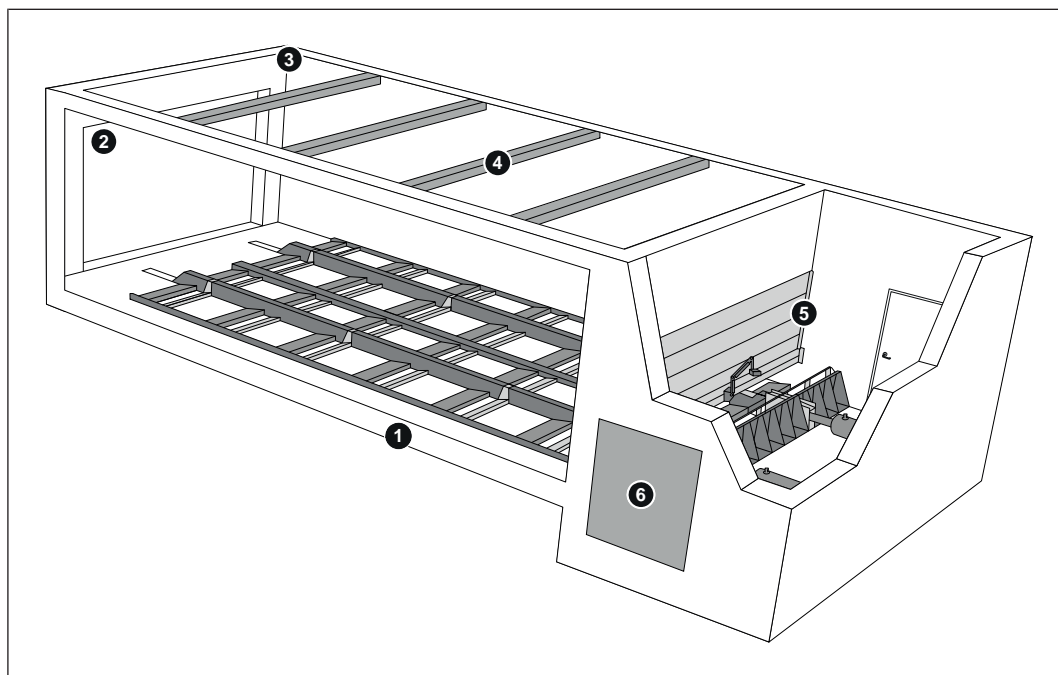
Careful positioning of the components

- ☐ Compliance with the maximum load capacity of the transporting equipment is mandatory
- ☐ The lifting device must not damage the attached load
- ☐ When attaching the lifting device, observe the load's centre of gravity and consider the possibility that the load might slip. After raising the load initially, stop and readjust the load if necessary
- ☐ Do not raise the load higher than necessary for the transport
- ☐ Avoid abrupt movements of the load
- ☐ Use suitable lifting gear to transport individual parts of the sliding floor into the store and hydraulic chamber
  - ↳ Connect the parts to the four attachment points



## 4.2 Installation site

When planning the fuel store, compliance with the following design specifications is mandatory:



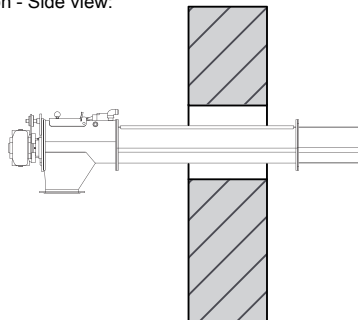
Storeroom detail		Design information
1	Substructure of the sliding floor	The substructure of the sliding floor must be embedded in concrete. This process shall be the responsibility of the customer.
2	Access opening	Depending on the length of the profiles, a door or an opening in the ceiling must be provided in order to insert the sliding floor.
3	Walls and ceilings	The walls and ceiling of the storeroom and boiler room must be fire-proof in compliance with local regulations.  The storeroom must be rectangular or square.
4	Material fracture	If the dumping height exceeds 4 m, the use of horizontal structural tubing is highly recommended in order to reduce material fracture.
5	Bulkhead	Height of fuel passage below the bulkhead <ul style="list-style-type: none"> <li>▪ 500 mm</li> <li>▪ 350 mm – if using a raking chain conveyor and conveyor belt</li> </ul> The bottom 1,000 mm of the bulkhead shall be removable.
6	Wall duct and inspection opening	The shapes of the wall duct and inspection opening can be different for the various discharge systems.  Dimensions of the opening ➡ <a href="#">"Wall penetration" [► 20]</a>  Maintenance opening with class EI <sub>2</sub> 90-C fire resistance rating (e.g. chimney door) immediately above the hole in the wall for easy clearance of any blockages from oversized material around the shear edge of the discharge duct.

**NOTICE! For special installations (raking chain conveyors with slide system, centre discharges, etc.) consulting Fröling GesmbH is highly recommended.**

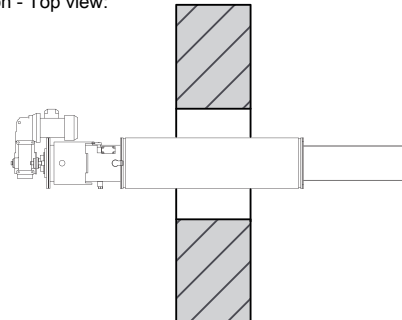
### 4.2.1 Wall penetration

Before installing the sliding floor, a wall opening must be provided for the trough of the discharge screw. This task is the responsibility of the customer.

Section - Side view:



Section - Top view:



Experience indicates that an opening of 500 mm x 500 mm is sufficient.

## 4.3 Installation of the sliding floor discharge unit

### ⚠ CAUTION



Assembly and installation by unqualified persons:

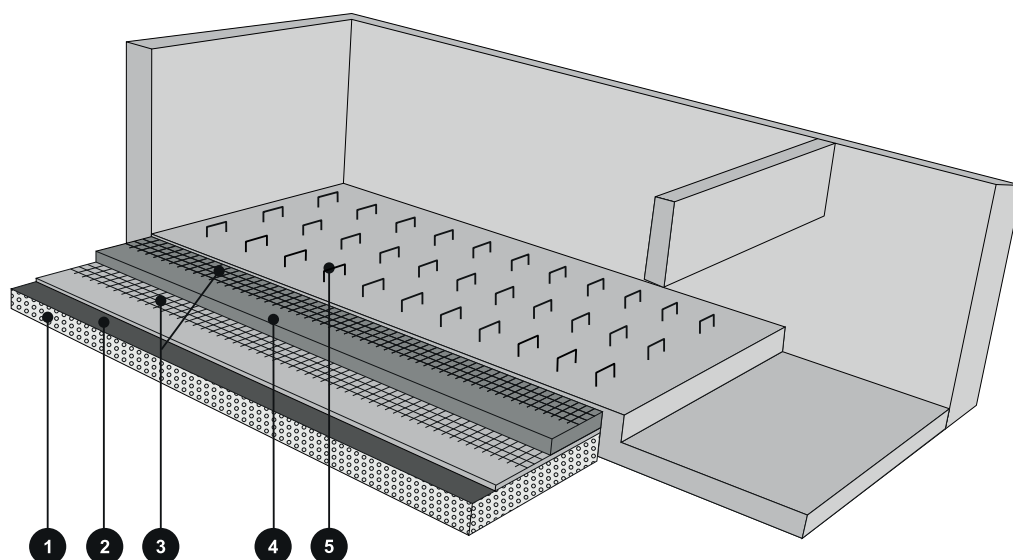
***Risk of personal injury and damage to property***

During assembly and installation:

- ☐ Observe the instructions and information in the manuals
- ☐ Only allow appropriately qualified personnel to work on the system

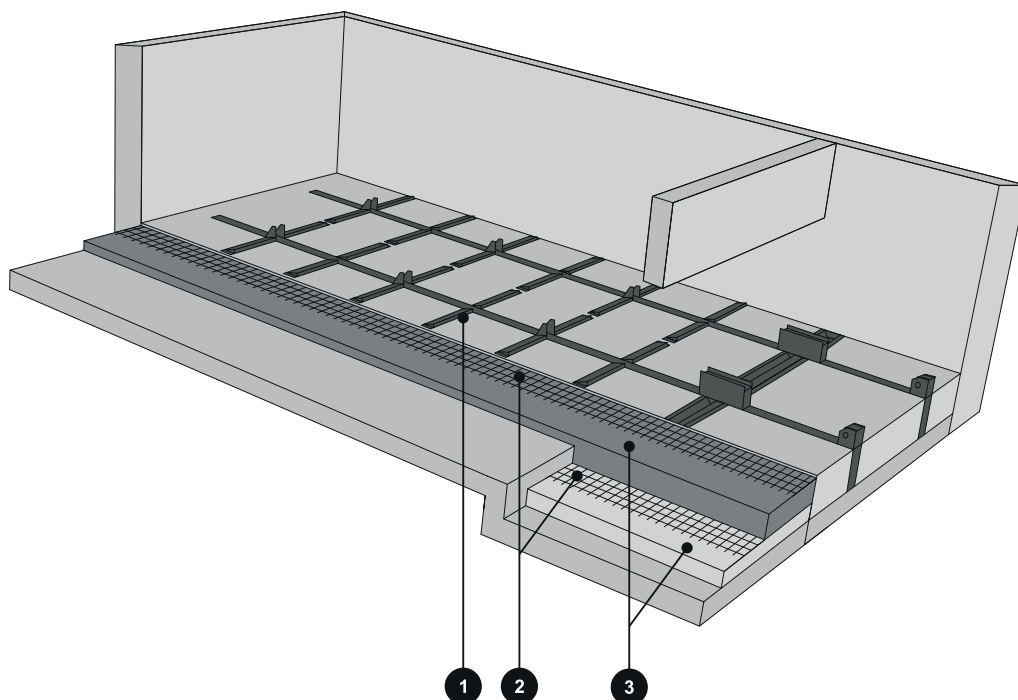
### 4.3.1 Masonry and concreting work

#### Base plate construction



1. Level substructure with a deformation module  $E_{v1} \geq 60 \text{ MN/m}^2$  ( $E_{v2}/E_{v1} < 2.2$ )
2. Barrier membrane (e.g. PE foil) underneath the reinforced concrete slab in order to prevent bleed
3. Reinforcing steel mesh BSt 500 Q 257 A at top and bottom with a concrete layer 30 mm thick
  - Reinforcement for sliding floor 20 kg/m<sup>2</sup>
  - Reinforcement for hydraulic chamber 25 kg/m<sup>2</sup>
4. Reinforced concrete (at least C16/20, XC1) with a thickness of at least 200 mm
  - Surface must be smooth
5. Provide a non-positive connection between the base plate and the layer of top concrete layer

## Connection between base plate and sliding floor

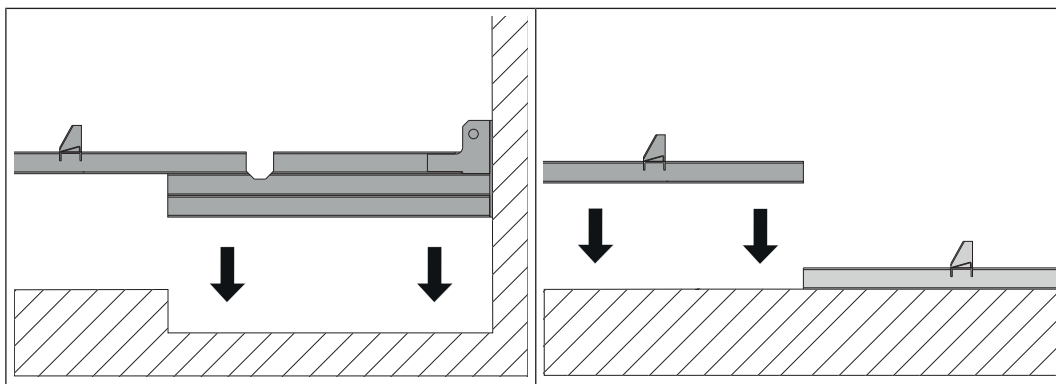


1. Non-positive connection between base plate and sliding floor, using suitable fixings (e.g. heavy-duty anchors)
2. Reinforced steel mesh BSt 500 Q 257 A between the sliding floor elements with a concrete layer 30 mm thick
  - Reinforcement for sliding floor 12 kg/m<sup>2</sup>
  - Reinforcement inside the hydraulic chamber 20 kg/m<sup>2</sup>
3. Reinforced steel (at least C20/25, XC1)
  - For sliding floor, a thickness of 180 mm is required
  - For the hydraulic chamber, a thickness of 530 mm is required

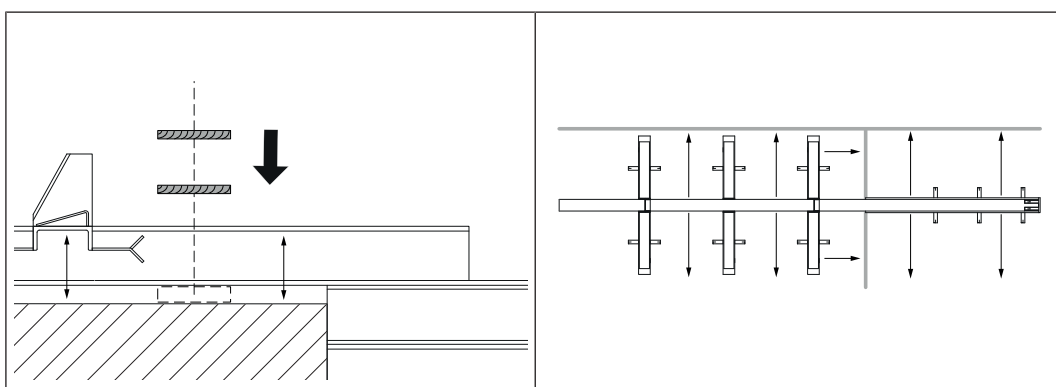
### 4.3.2 Installing the substructure

The exact installation positions, dimensions and number of components are listed in the enclosed system diagram.

Parts of the substructure are already pre-assembled and may consist of several components.



- ☐ Insert the substructure into the shuttered recesses of the walled-off hydraulic chamber
- ☐ If a two-part substructure is used, install the remaining substructure whilst in the storeroom

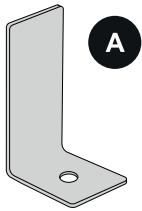
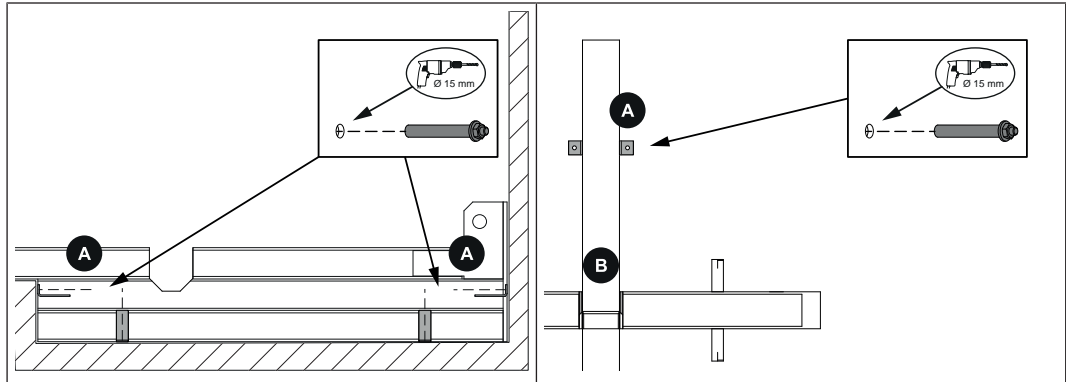


- ☐ Use suitable material to adjust the height
- ☐ Align the substructure according to the system diagram

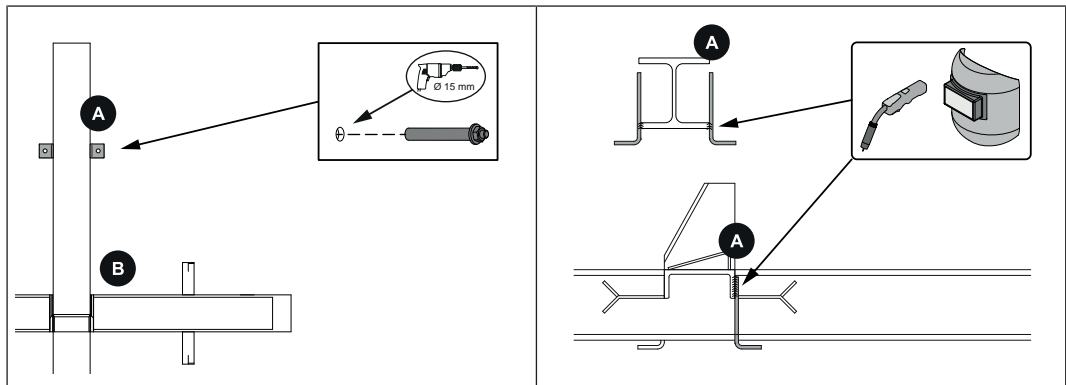
During the installation, always check the correct position of the substructure!

## Screw the substructure to the floor and wall

- ☐ Copy the hole pattern of the anchor brackets to the floor
- ☐ Drill the holes as marked
  - drill diameter 15 mm
  - min. drill depth 105 mm
- ☐ Insert the heavy load anchors into the bore holes and tighten with a spanner (AF 17 mm)



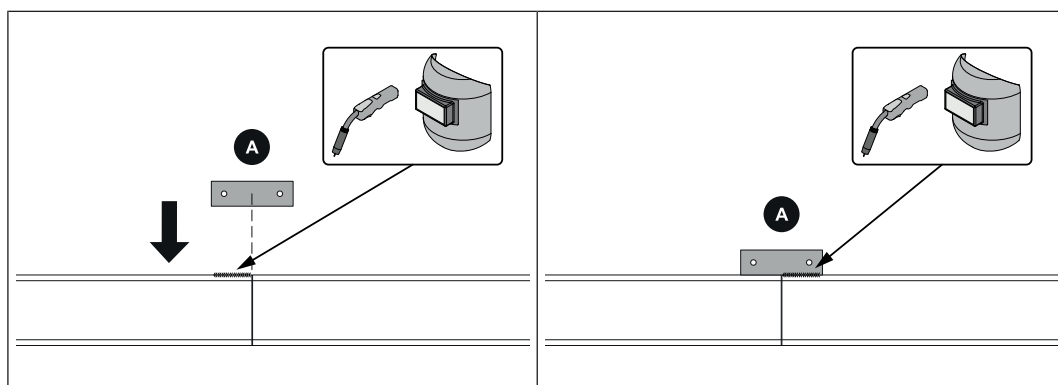
- ☐ Screw down the anchor bracket (A) in the hydraulic chamber and weld the bracket to the substructure
- ☐ Inside the hydraulic chamber, position the two anchor bracket on both sides of the longitudinal profile (B) and screw the anchor brackets into place
  - ↳ The position of the substructure is secured against slipping



- ☐ Inside the storeroom, position the anchor bracket (A) according to the system diagram, screw it on and weld it to the substructure
- ☐ Screw on the anchor bracket
- ☐ Weld the anchor bracket onto the substructure



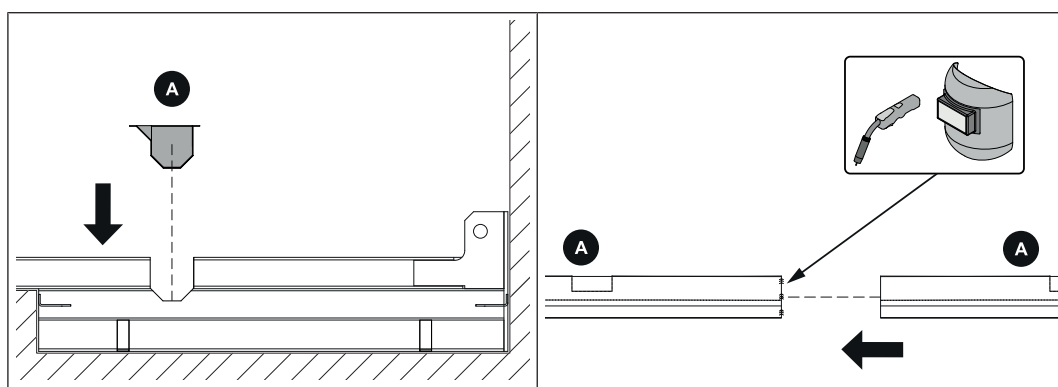
### If a two-part substructure is used



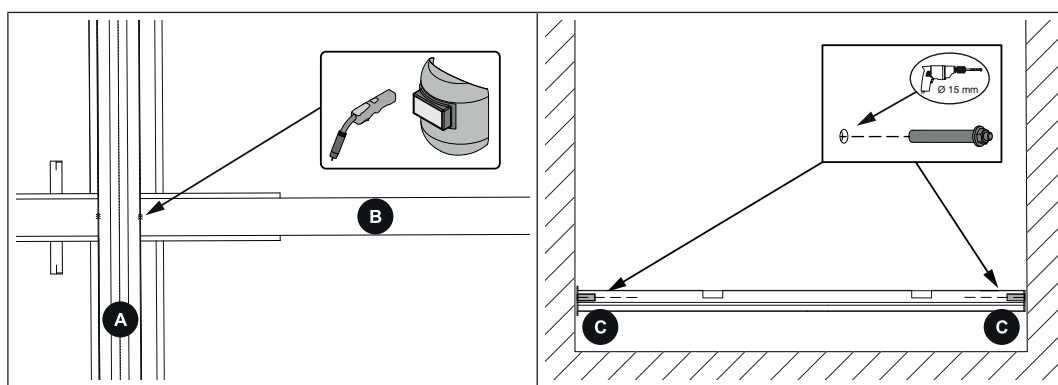
- ☐ Weld on the steel plates (A) at the end of the second part of the substructure
- ☐ Position the anchor bracket as shown in the system diagram, screw it on and weld it to the substructure
- ☐ Steel plates must also be welded to the first part of the substructure

### 4.3.3 Installing the transverse conveyor unit

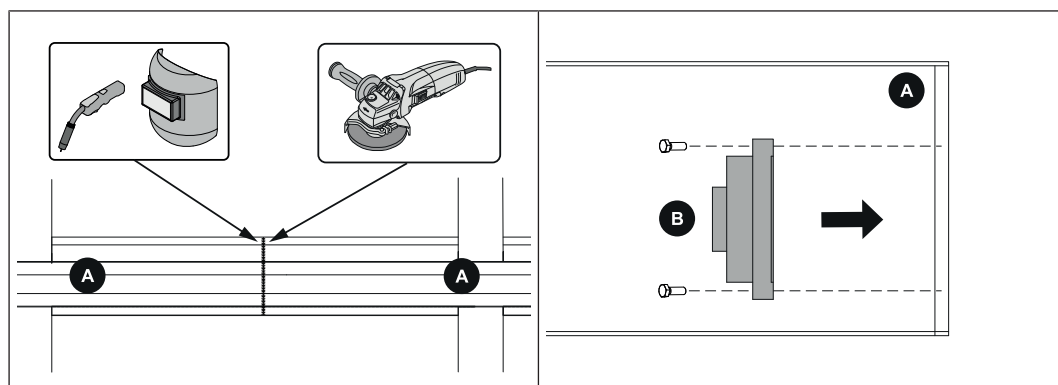
During the installation, always check the correct position of the discharge screw!



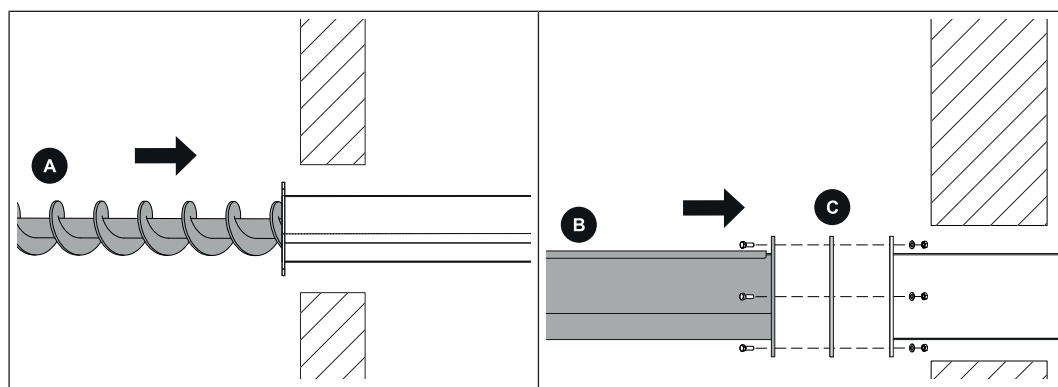
- ☐ Insert the individual parts of the trough (A) into the recesses on the substructure
  - ↳ The connections must be positioned flat
- ☐ Detail parts of the trough must be spot-welded



- ☐ Spot weld the trough (A) to the substructure (B)
- ☐ Screw two anchor brackets (C) each to the rear wall and wall opening and weld them to the trough

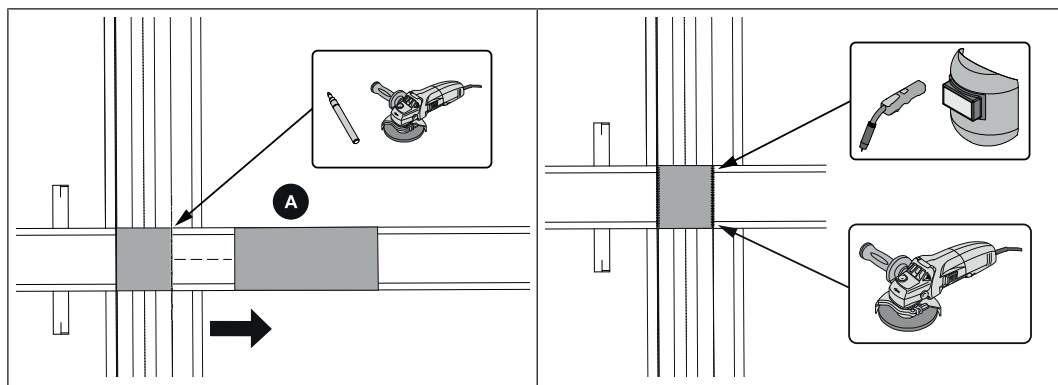


- ☐ Apply a continuous weld to the individual trough parts (A), then grind them
  - ↳ At this point, sharp edges must have been removed
- ☐ Mount the flange bearing (B) to the closed end of the trough
  - 4 hexagonal screws M12 x 35

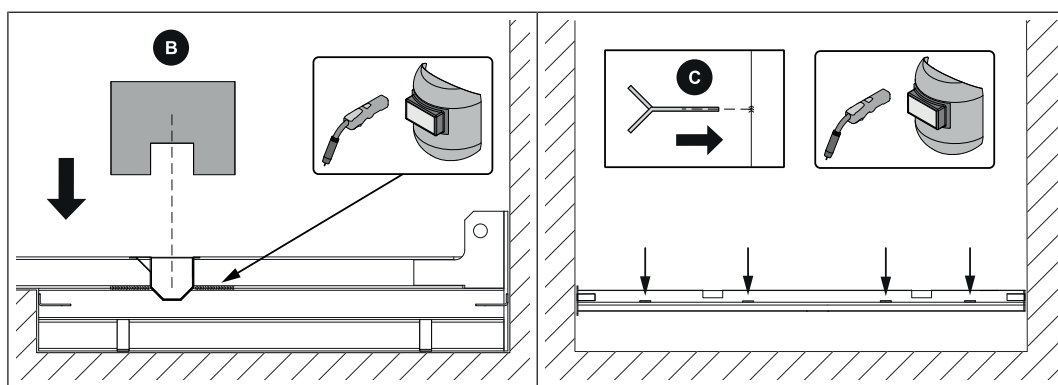


- ☐ Thread the feed screw (A) into the trough on the boiler room side
- ☐ Screw together the open trough and transition trough (B) including the seal (C)
  - 8 hexagonal screws M12 x 35
  - ↳ Check the alignment of the flange plates!
- ☐ Connecting the discharge screws
  - ↳ Compliance with the notes about welding of the feed screws is mandatory!

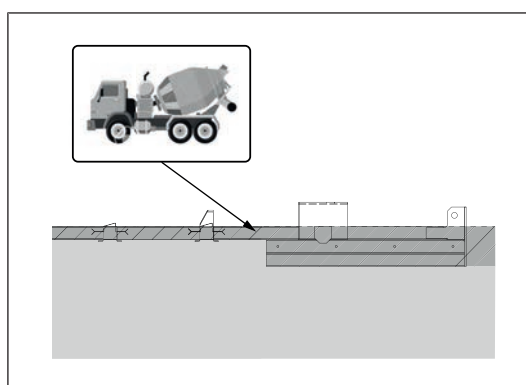
### 4.3.4 Finishing work on the substructure



- ☐ Put down the longitudinal sheets (A), use a pen to mark their position, then trim them to the appropriate length
- ☐ Weld on the longitudinal plates and grind off the weld seams
  - ↳ At this point, sharp edges must have been removed



- ☐ Insert the lead-through plates (B) and connect them to the substructure
- ☐ Distribute the concrete claws (C) evenly and weld them to the outside of the trough

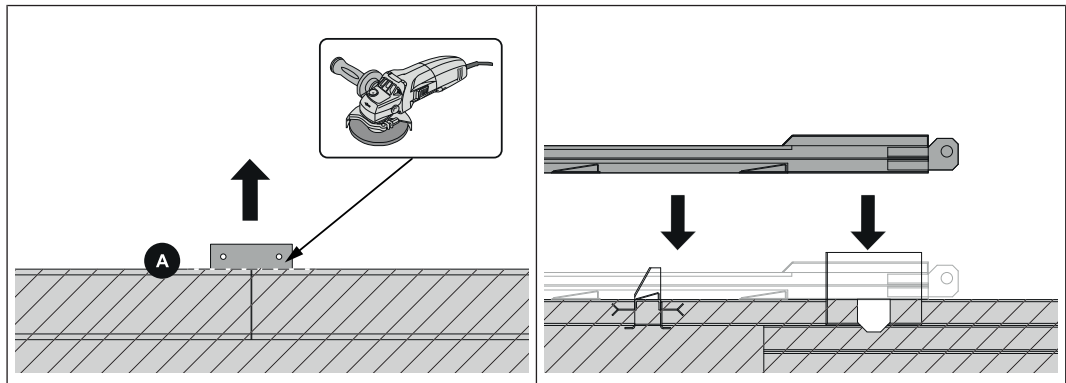


- ☐ Use the system diagram to verify the correct position of the components
- ☐ Embed the substructure in concrete
- ☐ Smooth the top concrete layer in the area of the movable wedges
  - ↳ This reduces the friction and, by using a smoother movement, requires less power

### 4.3.5 Installing the upper structure

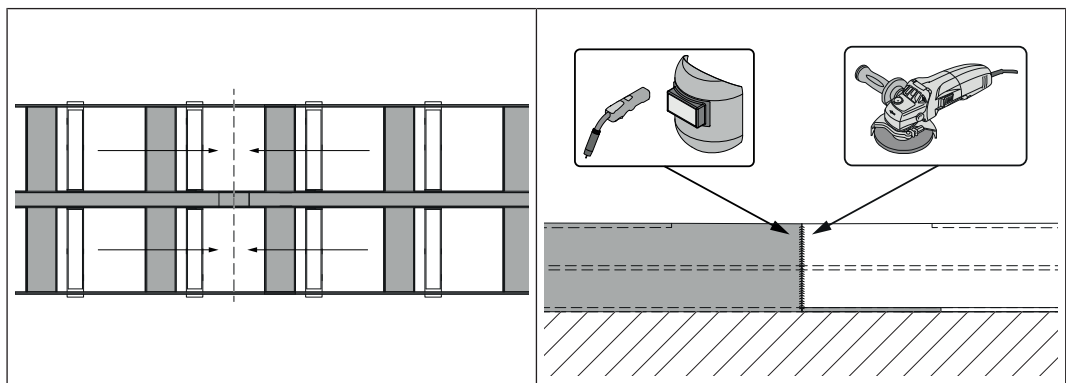
**NOTICE!** Before installing the upper structure, the concrete must be fully cured.

The upper structure is already pre-assembled and may consist of several components.

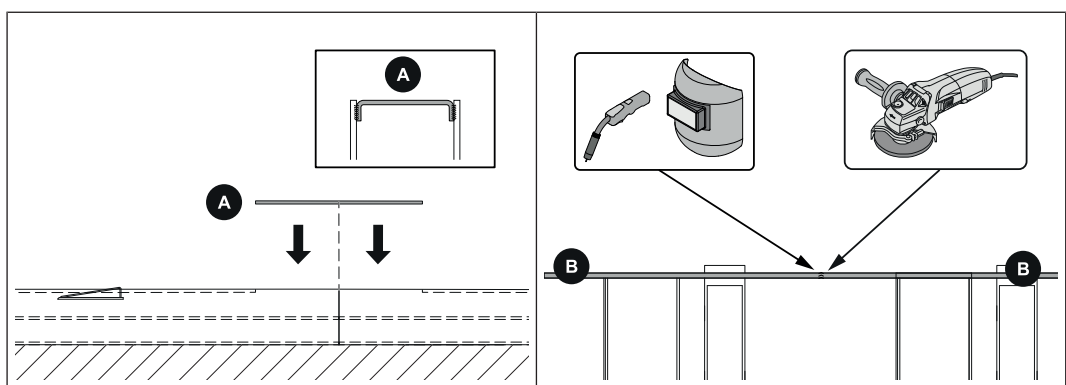


- ☐ If a two-part substructure is used: At the connection of the substructure remove the steel sheets (A) and grind them smooth
  - ↳ At this point, sharp edges must have been removed
- ☐ Move the upper structure into the storeroom and carefully insert the slide rods with the guides

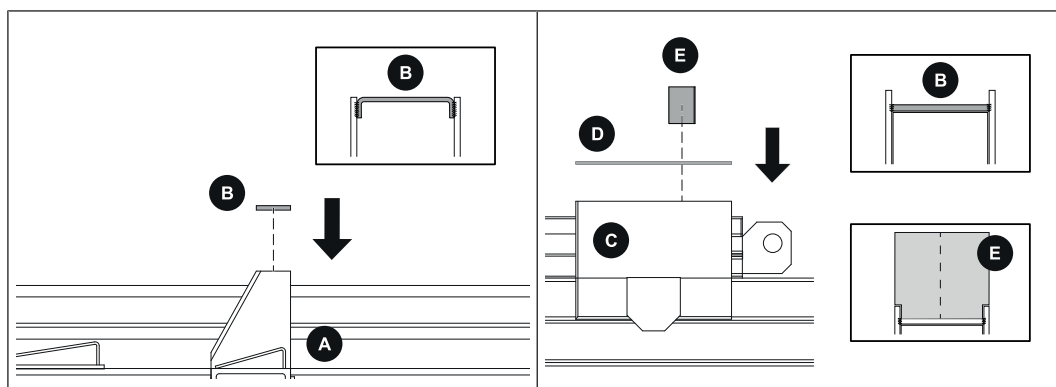
#### If a two-part upper substructure is used



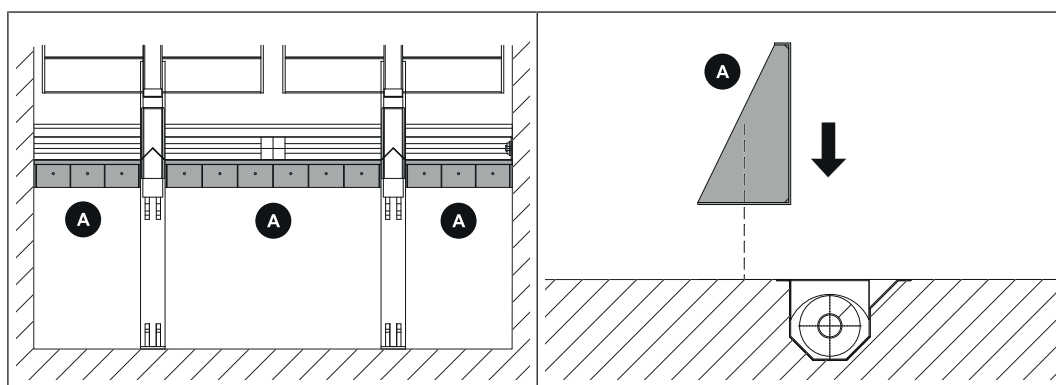
- ☐ Align the slide rods with each other and weld them together



- ☐ Weld on the cover plate (A) at the connecting point of the slide rods, then grind off the weld seams
- ☐ Weld the metal tiebacks (B), which are running along the sides of the two parts of the superstructure, then grind the weld seams
  - ↳ At this point, sharp edges must have been removed

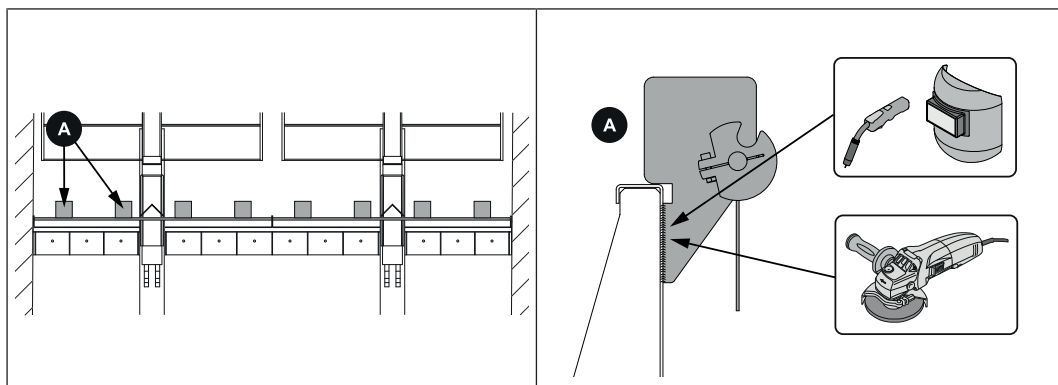


- ☐ Weld the cover plate (B) onto the side parts of the retainers (A)
  - ↳ In order to ensure the necessary spacing to the slide rod, suitable material may be used to maintain this clearance
- ☐ Weld the cover (D) onto the lead-through plates (C)
  - ↳ In order to ensure the necessary spacing to the slide rod, suitable material may be used to maintain this clearance
- ☐ Weld a dust baffle (E) onto the cover
- ☐ Grind off weld seams

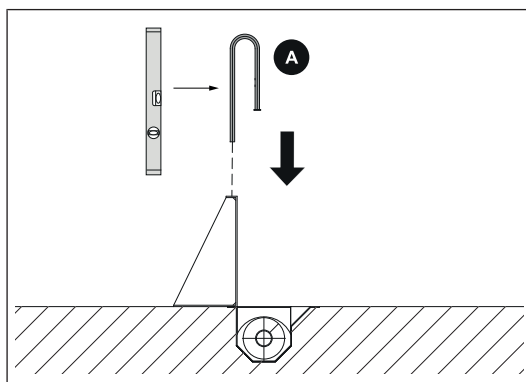


- ☐ Position the wall plates (A) inside the hydraulic chamber
- ☐ Copy the hole pattern of the wall plates to the floor
- ☐ Drill the holes as marked
  - drill diameter 15 mm
  - min. drill depth 105 mm
- ☐ Insert the heavy load anchors into the bore holes and tighten with a spanner (AF 17 mm)

If the wall plate is not flush with the feed through for the slide rod, a plate must be fitted in these gaps in order to prevent material from becoming trapped.



- ☐ Weld the limit switch (A) onto the wall plate and grind off the weld seams

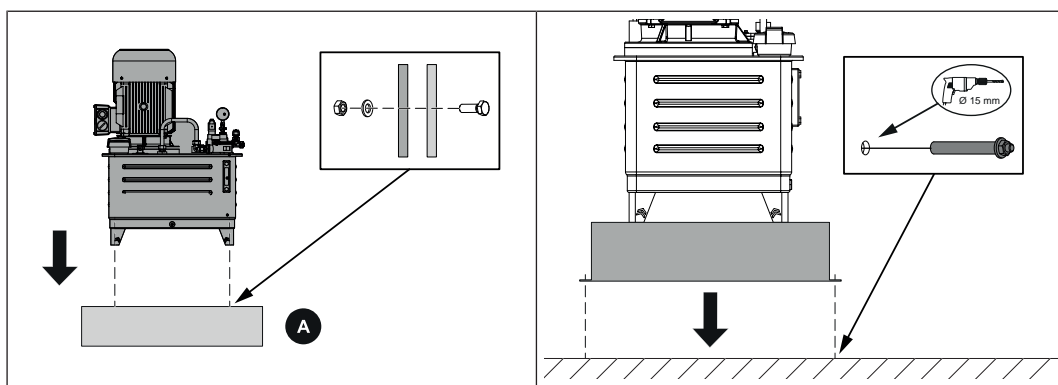


- ☐ Weld on the light barrier brackets (A) according to the system diagram and grind off the weld seams
  - ↳ Do this approx. 200 mm upstream of the shear edge in front of each slide rod and in front of the transition into the closed trough
- ☐ Apply black paint to all weld seams inside the hydraulic compartment

#### 4.3.6 Installing the hydraulic unit and cylinder

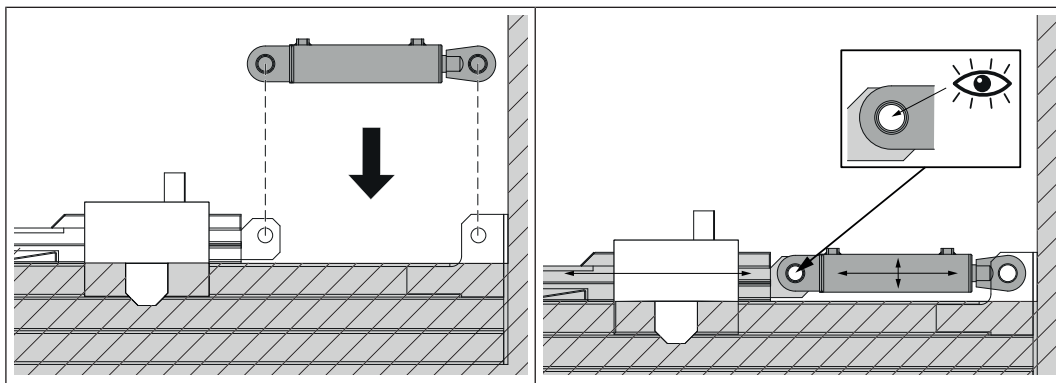
- ☐ Place the hydraulic unit and oil tray into the hydraulic chamber

**NOTICE! Compliance with the information on the placement and assembly can be found in the manufacturer's documentation!**

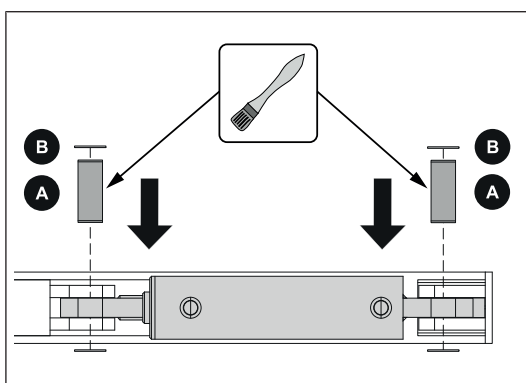


- ☐ Place the hydraulic unit on the guides of the oil tray (A) and tighten the screws
  - ↳ use suitable fixings
- ☐ Copy the hole pattern of the oil tray's attachments to the floor

- ☐ Drill the holes as marked
  - drill diameter 15 mm
  - min. drill depth 105 mm
- ☐ Insert the heavy load anchors into the bore holes and tighten with a spanner (AF 17 mm)



- ☐ Fit the hydraulic cylinder into the recesses of the substructure and the slide rod
- ☐ Adjust the position of the cylinders and slide rods in order to fit the pins through the eyelets

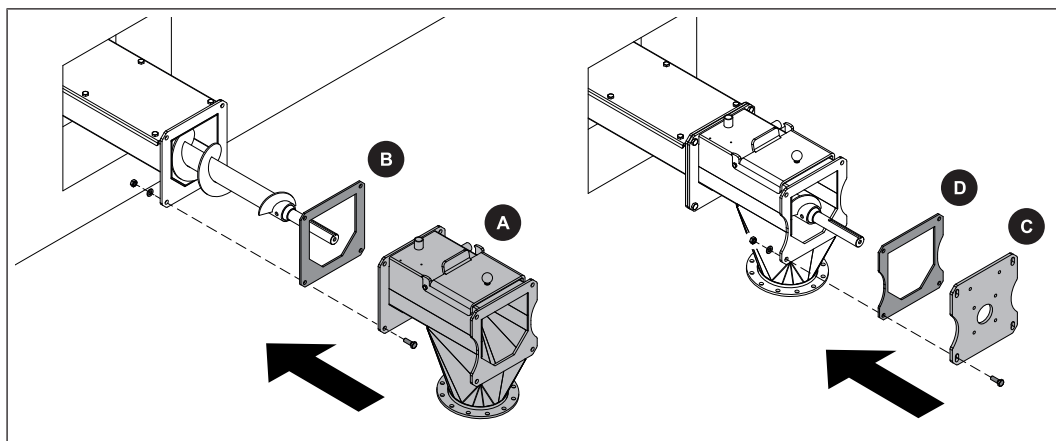


- ☐ Use copper paste to grease the pins (A); then push the pins through the eyelets and secure the pins on both sides using the shaft locking rings (B)
- ☐ Connect the hydraulic unit as indicated on the hydraulic diagram; then fill the hydraulic unit with the appropriate fluid

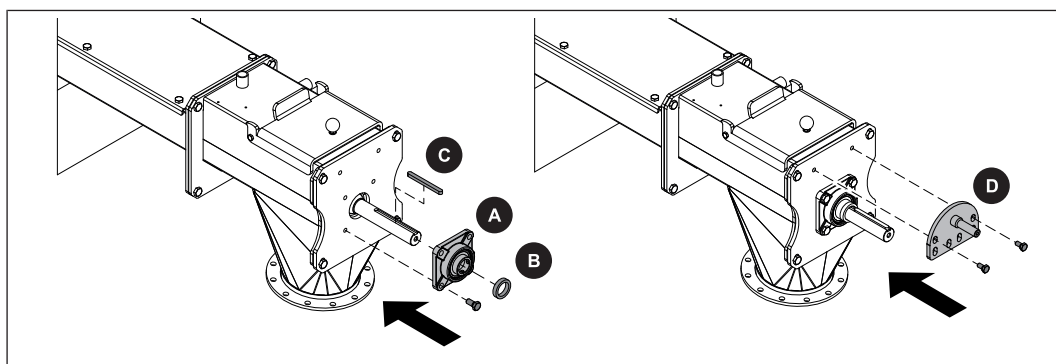
**NOTICE! Compliance with the information on the connection and filling can be found in the manufacturer's documentation!**

- ☐ After completing the installation of the hydraulic unit and cylinders, proceed with a test run
  - ↪ Oil spreads in the cylinder and lines
  - ↪ If necessary, add more oil

### 4.3.7 Fitting the upper part of the gravity shaft and drive unit

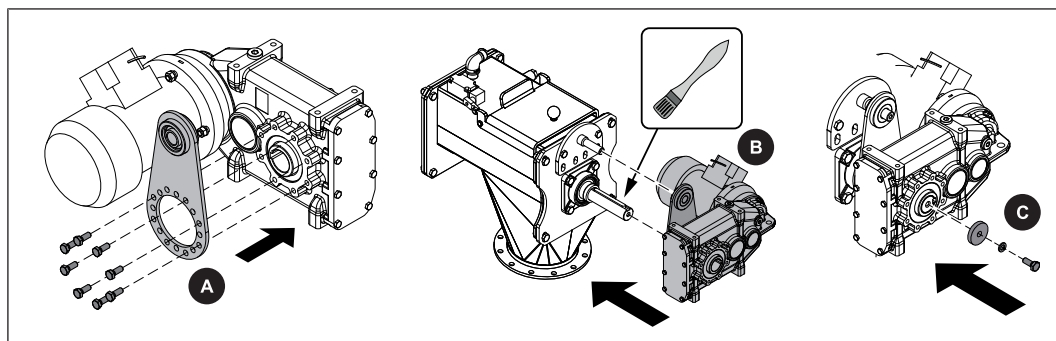


- ☐ Secure the upper part of the gravity shaft (A) with gasket (B) to the closed trough on the boiler room side
  - 4 hexagonal screws M12 x 35
- ☐ Secure the flange plate (C) with gasket (D) to top part of gravity shaft
  - 4 hexagonal screws M12 x 35



- ☐ Slide the flange bearing (A) onto the screw end and fix it to the upper part of the gravity shaft
  - 4 hexagonal screws M12 x 25
- ☐ Push the spacer ring (B) onto the screw end
- ☐ Insert the key (C) into groove on the screw end
- ☐ Secure torque support with pin (D) to the top part of the gravity shaft
  - 2 hexagonal screws M12 x 20
  - ↳ Centre distance of pin and screw end: 150 mm



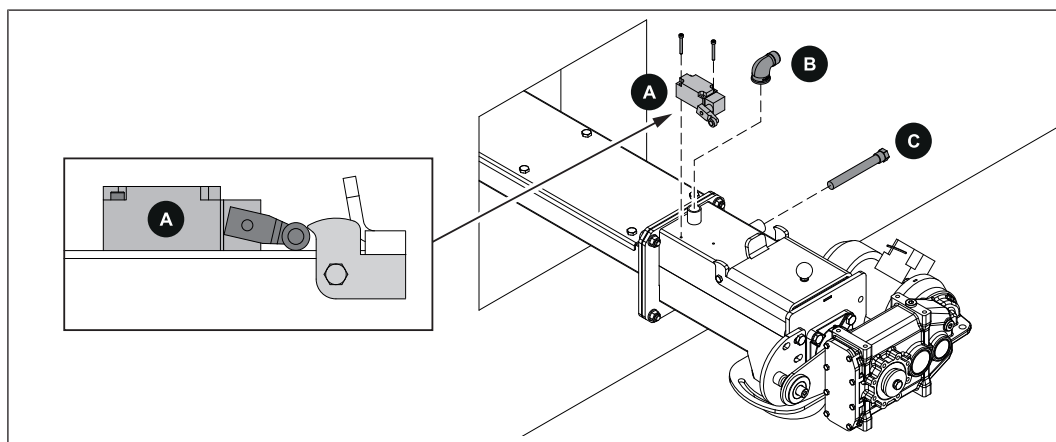


- ☐ Secure the torque support and bearing (A) to the geared motor as illustrated  
- 8 hexagonal screws M8 x 20
- ☐ Lubricate the shaft stub incl. key with copper paste
- ☐ Push the geared motor (B) onto the screw end
- ☐ Secure locking washer Ø 45 x 8 (C) to shaft stub  
- 1 hexagonal screw M10 x 25

If the geared motor cannot be installed as shown above due to lack of space, it is possible to turn the drive unit:

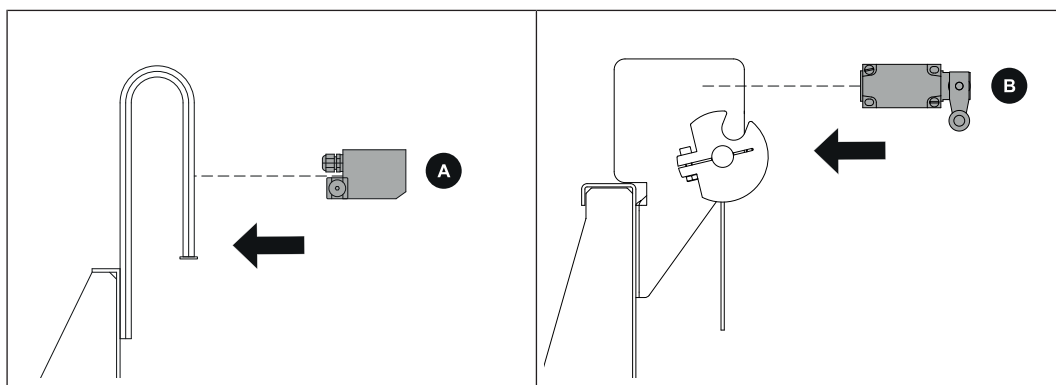
- ☐ Turn the torque support with bearing 180° and secure it to the geared motor
- ☐ Turn the geared motor and torque support 180° and fit to the screw end and torque support as explained above

### Fitting attachments



- ☐ Secure the limit switch (A) to the top part of the gravity shaft  
- 2 cylinder head screws M5 x 40  
↳ The reel of the safety limit switch (A) must be positioned as illustrated
- ☐ Fit the elbow (B) of the water sprinkler system to the upper sleeve on the upper part of gravity shaft
- ☐ Fit the immersion sleeve (C) of the water sprinkler system to the side sleeve

### 4.3.8 Installing the sensors

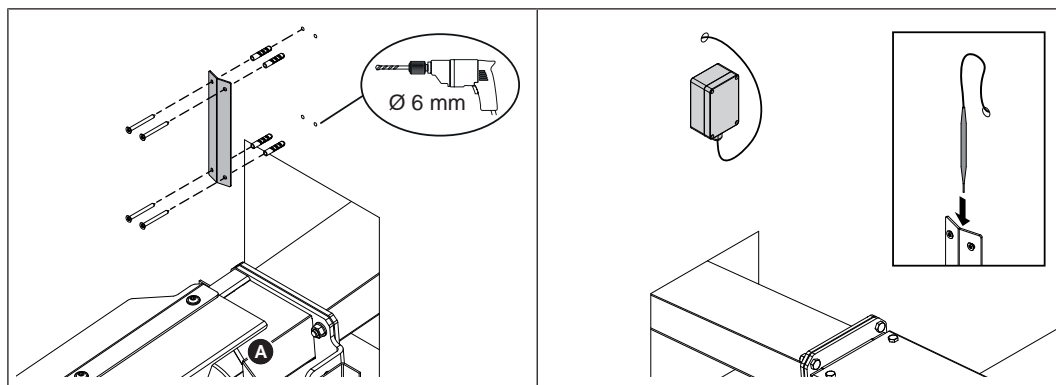


- ☐ Install the light barriers onto the bracket
- ☐ Instal the limit switch sensor

### 4.3.9 Closing the wall penetration

- ☐ Pack the space in the wall penetration with a non-flammable insulating material
  - ↳ Insulate the partition as per EN 1366-3 / EN 13501-2
- ☐ Close the wall penetration on the store side and the boiler room side with a non-flammable covering

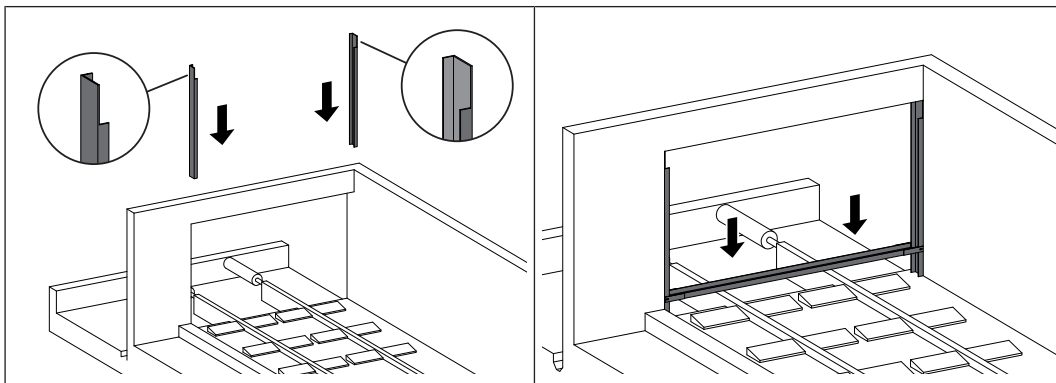
### 4.3.10 Temperature monitoring device in the fuel store (TMD):



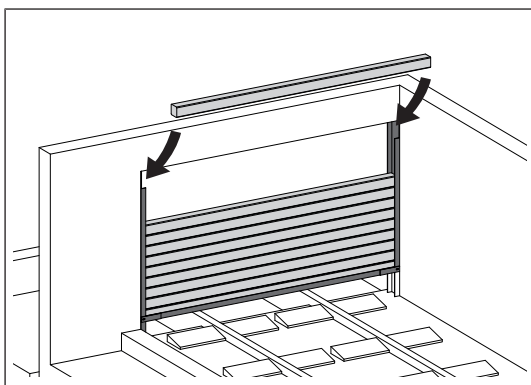
- ☐ Position the sensor plate above the transfer channel from open to closed trough (A) and transfer the holes to the wall
- ☐ Drill the marked holes
  - Drill diameter 6 mm
  - Min. drill depth 50 mm
- ☐ Hammer dowel Ø 6 x 30 into wall and mount sensor plate
  - 4x screw Ø 4 x 40
- ☐ Mount the housing outside the fuel store
- ☐ Guide the sensor through the wall at a suitable point and push it into the sensor plate
  - ⚠ **CAUTION:** Do not kink the capillary tube!
- ☐ Further cabling of the on-site warning device(s) according to the enclosed installation instructions

### 4.3.11 Installing the bulkhead

**NOTICE!** Depending on the specifications, the bulkhead's design may differ from the following version.

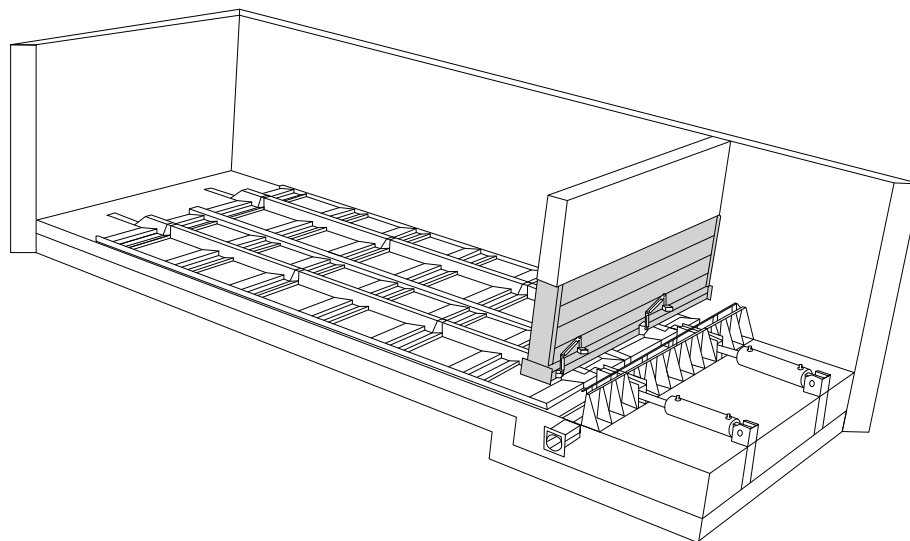


- ☐ Fasten the U-profiles (A) to the existing walls
  - ↳ If reinforced concrete walls are used, the use of dowels is usually sufficient
  - ↳ If the walls are made of masonry, it may be necessary to attach a counter plate to the back of the walls
- ☐ Connect the vertical and horizontal structural profiles



- ☐ Insert wooden planks into the structure
  - ↳ If necessary, use welded-on threaded rods to connect the blanks to each other

## Design information about the bulkhead



- dimensioned assuming horizontal loads
  - Assumption: Applying a vertical load of moist wood chips with a dump height of 4 m horizontally
  - Compaction of the material must be taken into account when using vehicles to bring in the material
  - To be measured at the lower edge of the bulkhead where the height of the brought in material should be approx. 50 cm
- for up to two sliding floors, the storage is not restricted
- If three or more sliding floors are used, additional horizontal intermediate support must be installed in order to ensure that the material is not interrupted
- the specific weight can be assumed to be 4 kN/m<sup>3</sup>
- safety factor of at least 1.35

## 4.4 Connecting the system

### 4.4.1 Electrical connection

#### **DANGER**



When working on electrical components:

***Risk of electrocution!***

When work is carried out on electrical components:

- ☐ Always have work carried out by a qualified electrician
- ☐ Observe the applicable standards and regulations
  - ↳ Work must not be carried out on electrical components by unauthorised persons
  
- ☐ Lay cables of components to control cabinet
  - ↳ Lay the cables so that nobody will trip over them!
  - ↳ Do not lay the cable over or around sharp edges!
- ☐ Wire the connections according to the wiring diagram

### 4.4.2 Connecting the sprinkler system

Connection should only be carried out by authorised technicians.

When connecting the sprinkler system, please also note:

- ☐ Put a stopcock and bolted joint in front of the thermal discharge safety device
  - ↳ Important for easy dismantling in the event of maintenance work!

## 5 Operating the System

### 5.1 General information

#### **DANGER**



If the device is used incorrectly:

***Incorrect use of the system can cause severe injury and damage.***

When operating the system:

- ☐ Observe the instructions and information in the manuals
- ☐ Observe the details on procedures for operation, maintenance and cleaning, as well as troubleshooting in the respective manuals.
- ☐ Any work above and beyond this (e.g. servicing) must be carried out by a heating engineer approved by Fröling Heizkessel- und Behälterbau GesmbH or by Fröling customer services

#### **CAUTION**



If unauthorised persons enter the Storeroom:

***Risk of personal injury and damage to property***

- ☐ The operator is responsible for keeping unauthorised persons, in particular children, away from the system.

### 5.2 Initial start-up


#### **NOTICE**

Efficient operation can only be guaranteed if the system is set by specialist staff and the default factory settings are observed.

Therefore:

- ☐ Initial startup should be carried out with an installer approved by Fröling Heizkessel- und Behälterbau GesmbH or with Fröling customer services

Before commissioning or before the first filling, the following checks must be completed:

- ☐ Conformity of the cross conveyor cylinder's stroke with the limit switch
- ☐ Function of all limit switches
- ☐ Connection of the sprinkler device
- ☐ Material inside the storeroom compliant with the specifications
- ☐ Correct cover of the transverse conveyor unit
- ☐ Function and tightness of the hydraulic system
- ☐ Function of the light barrier
- ☐ Function of the drive motor's protection device
- ☐ Material flow not impeded by downstream system components
- ☐ Proper assembly of the system
  -  Check that all the components supplied have been installed in accordance with the assembly instructions
- ☐ Supply lines and electrical fuses

- ☐ Direction of rotation of the screw
- ☐ On-site protective structure of the bulk chute
  - ↳ The bulk chute must be secured so that no one is at risk of injury while the system is in operation!
  - ↳ Follow the instructions for implementing the protective structure
- ☐ Ensure all persons remain outside the danger zone (storeroom, hydraulic chamber)

When the check is finished:

- ☐ Proceed with the test run without using fuel and check for any defects
- ☐ Only after the test run was successful, fill the storeroom with fuel
- ☐ Observe the fuel transport around the bulk chute (e.g. bridge formation) and if necessary, regulate by adjusting cover plates

### 5.3 Filling the store with fuel

#### CAUTION

Entering the store space when the system is switched on

***Risk of injury due to automatic startup of system, particularly the discharge system!***

Therefore, before entering the fuel store:

- ☐ Switch off the power supply to the entire system
  - ↳ Depending on the model via boiler, expansion switch cabinet, etc.

#### CAUTION

Blowing in fuel when the boiler is switched on:

***The underpressure generated from blowing in fuel can lead to smoke being sucked back into the store if the boiler is switched on. Possible excess pressure could cause smoke to escape into the installation room, possibly resulting in injury and damage!***

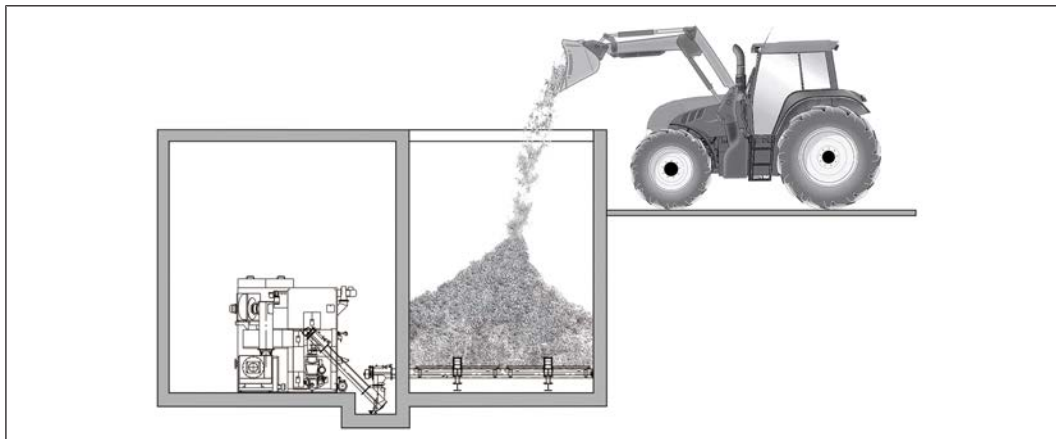
Therefore, before blowing in the fuel:

- ☐ Switch off the power supply to the entire system
  - ↳ Depending on the model via boiler, expansion switch cabinet, etc.
- ☐ Allow the system to cool for **at least two hours**

**NOTICE! Compliance with the maximum dumping height of the fuel according to the assembly instructions of the sliding floor discharge system is mandatory**

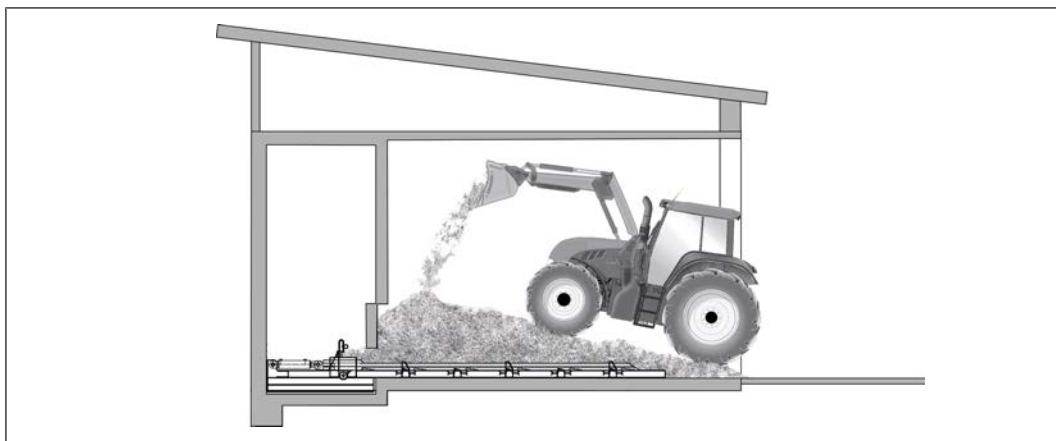


### Filling the storeroom without moving the slide rods



- ❑ Use the filling opening to add the fuel
  - ↳ The system does not have to be shut down during the filling process

### Filling the storeroom by moving the slide rods



Only move the slide rods in compliance with the following instructions:

- ❑ Fuel quantity of at least 30 cm on the slide rods
- ❑ Do not drive on the wedges and longitudinal members of the sliding floor discharge.  
TIP: A guiding device for driving inside the storeroom must be provided, e.g. gates must be positioned appropriately
- ❑ Hydraulic unit switched off and secured to prevent accidental restart
- ❑ When driving across the slide rods, the steering movements of the vehicle must be kept to a minimum

**NOTICE! Driving onto the slide rods may compact the fuel and thus causing the sliding floor discharge unit to move sluggish**

## 5.4 During operation

The boiler is controlled by the boiler controller. The discharge system switches on and off automatically when material is requested.

When filling, or in the event of a fault, the system is operated in manual mode. For the necessary steps, and how to display and alter parameters:

**NOTICE! See operating instructions for boiler controller**

## NOTICE



When transporting wood chips or pellets using the feed screw, there may be noise, depending on the function.

## 5.5 Decommissioning

### 5.5.1 Disassembly

To disassemble the system, follow the steps for assembly in reverse order.

### 5.5.2 Disposal

- ☐ Disposal should be carried out according to the valid national regulations and guidelines.
- ☐ You can separate and clean recyclable materials and send them to a recycling centre.

## 6 Servicing the system

### **DANGER**



Maintenance work if the system is switched on:

***Risk of severe injuries from system components or if the system is switched on without authorisation!***

Before starting any maintenance work on the system or in the storeroom:

- ☐ Turn the safety switch inside the hydraulic chamber to the "0" position
- ☐ Use a padlock to secure the switch and prevent the system from starting accidentally

### **WARNING**



Do not use unskilled personnel for hydraulic system maintenance

***Risk of injury and damage to property!***

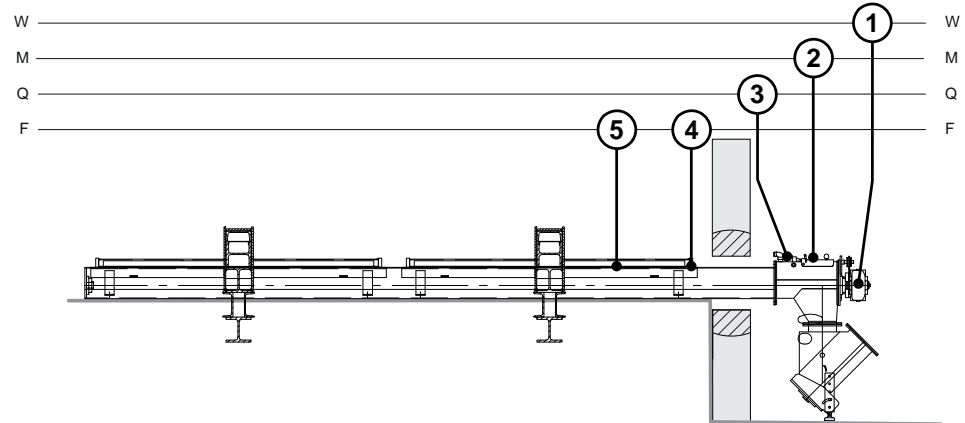
Take the following precautions:

- ☐ Only allow trained professionals to carry out servicing and maintenance work on the hydraulic system. Follow the manufacturer's operating instructions.

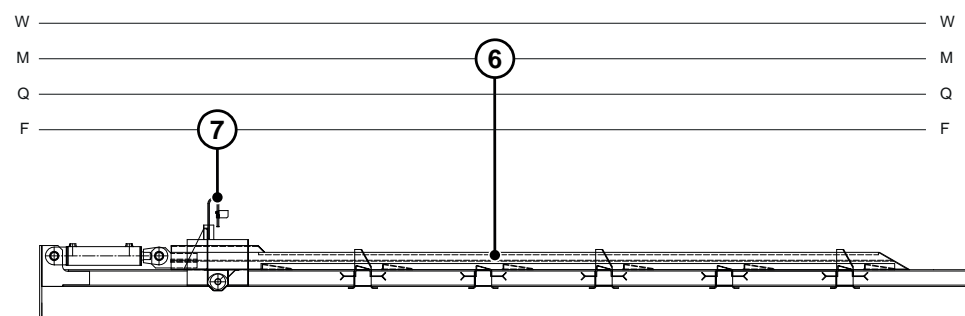
## 6.1 Maintenance work by the operator

- ❑ Regular maintenance of the discharge extends the service life of the entire plant and is a basic requirement for trouble-free operation!

### Discharge screw



### Sliding floor



W = weekly, M = monthly, Q = quarterly, F = prior to each filling of the storeroom

No.	Components	Intv l.	Activity
1	Motor / gears	W	<input type="checkbox"/> General visual inspection of the drive motor ↳ Large oil leaks must not be visible! - - A few drops of leaking oil do not adversely affect the function of the unit ↳ Ensure the drive is running smoothly
2	Gravity shaft / safety switch	M	Function test of the safety switch: <input type="checkbox"/> Open the inspection cover of the gravity shaft ↳ The system should switch off immediately! <input type="checkbox"/> Check the inlet area for material build-up and clean where necessary <input type="checkbox"/> Close the gravity shaft cover <input type="checkbox"/> Check fault message on the controller
3	Sprinkler system	Q	Sprinkler system ready for operation <input type="checkbox"/> Check the position of the sensor <input type="checkbox"/> Visual inspection of the sensor and the capillary tube <input type="checkbox"/> Check water supply for sufficient pressure
4	Inlet area / transfer channel	F	<input type="checkbox"/> Check the inlet area for material build-up or jammed fuel and clean if necessary <input type="checkbox"/> Check the shear plate in the entry area of the transfer trough for wear
5	Trough / screw	F	<input type="checkbox"/> Check trough and screw for dirt and damage <input type="checkbox"/> Check the screw container for wear
6	Overall system	F	Cleaning: <input type="checkbox"/> Switch off the system and secure it to prevent accidental startup <input type="checkbox"/> Check the slide rods for wear and clean the trough and slide rod feed-throughs
7	Light barriers	M	<input type="checkbox"/> Clean the light barriers

## 6.2 Maintenance work by technicians

**NOTICE! An annual inspection by an authorised partner (third party maintenance) or Fröling's factory customer service is recommended!**

Regular maintenance and servicing by a heating specialist will ensure a long, trouble-free service life for your discharge! Regular maintenance and servicing ensures that the system operates trouble-free and economically, and in the course of maintenance the entire discharge is checked and optimised. For this reason, FRÖLING offers a maintenance agreement that maximizes the reliability of these systems. Please see the details in the accompanying guarantee certificate.

Your Fröling customer service office will be happy to advise you.

**IMPORTANT: An annual inspection by a specialist does not replace the maintenance work to be carried out by the operating company in accordance with the maintenance plan!**

## NOTICE

The prerequisite for the feasibility of the inspection and maintenance work is unrestricted access to the components of the discharge system!

**Therefore:**

- ☐ The storeroom must be empty on the agreed upon date
- ☐ Provide for any service openings
- ☐ Sufficient ventilation of the storeroom (CO concentration)

Check the following components as part of the maintenance work:

- Motor / gears
- Gravity shaft / safety switch
- Sprinkler system
- Trough / dosing screw
- Inlet area / transfer channel
- Flange bearing unit

### 6.2.1 Maintenance instructions for hydraulic systems

**NOTICE! Work on the hydraulic system should only be carried out by trained professionals.**

1. Oil changes depend on a variety of factors including the age of the oil and the amount of dirt contained in it. The first oil and filter change must be carried out after between 50 to 100 service hours after commissioning. Thereafter, the oil must be constantly monitored.
2. In any case, the oil must be changed after approx. 5,000 service hours or yearly. At this time, the filter inserts (return and ventilation filters) must also be changed.
3. The oil level must be checked regularly (there should be no visible signs of foaming) and screws should be tightened.
4. The piping system must be checked regularly for leaks.
5. The return filter must be checked and cleaned approx. every 200 service hours (change the cartridge if necessary).
6. The oil temperature must not exceed 50 °C or fall below -30 °C.

**The following procedure is recommended for oil changes:**

- All hydraulic cylinders must be put to the end positions, so that the entire oil content can be removed.
- Empty or pump out the oil in the hydraulic unit.
- Removing the unit's cover or opening the inspection cover.
- Clean thoroughly in the interior of the oil tank and complete remove the oil sludge, if necessary wipe with a lint-free cleaning cloth.
- Replacing the oil filter and the ventilation filter, if the latter is installed.
- Closing the unit cover or the inspection cover.

- Fill the relevant hydraulic oil via a filter unit up to the mark on the gauge glass.
- In order to be able to remove the residual oil in the hydraulic cylinder the hydraulic hose at the opposite end of the cylinder that is pushed into the end position (the side that still contains old oil) must be closed.
- The hydraulic hose is taken off on the fixed piping side to be able to push the oil into a container.
- Using the unit the cylinders are now pushed into the other end position, and thus the old oil is transported out of the cylinder.
- Reconnect all hydraulic piping and hoses and check the seal.
- Fill up new hydraulic oil in the unit or the filter unit.
- If using small hydraulic cylinders (grate, ash rake, etc.) short-circuit the hydraulic hoses at the cylinder connection and switch on the hydraulic pump (activate the valve). This ensures that the oil is circulated in the system, and air pockets are removed from the system.
- Check the oil level and refill if necessary.

## 6.3 Replacement parts

With Froling original replacement parts in your system, you are using parts that match perfectly. As the parts fit together so well, installation times are shortened and a long service life is maintained.

### NOTICE

Installing non-original parts will invalidate the guarantee.

- ☐ Only replace components or parts with original replacement parts.



## 7 Troubleshooting

There are two main types of fault: internal and external to the boiler.

External faults:

- ☐ Heating EMERGENCY OFF switch activated
- ☐ Household fuse (FI circuit breaker) or component fuse blown

Internal faults are shown in the form of error messages on the boiler controller:

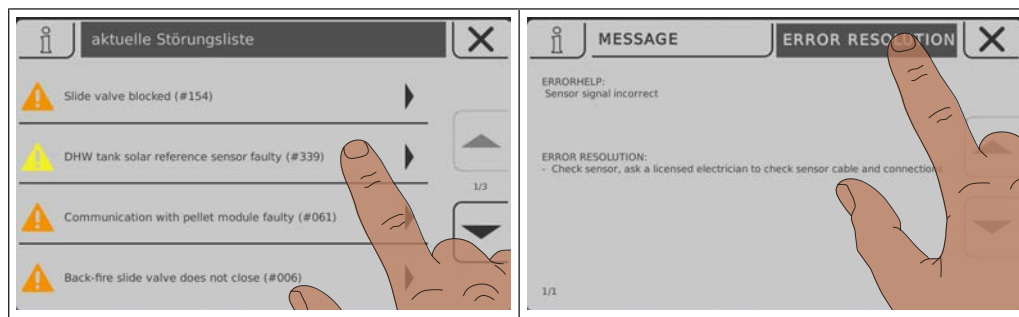
### 7.1 Troubleshooting the Lambdatronic H 3200 control system

#### 7.1.1 Procedure for fault messages

If a fault occurs on the boiler, it will be shown on the display.

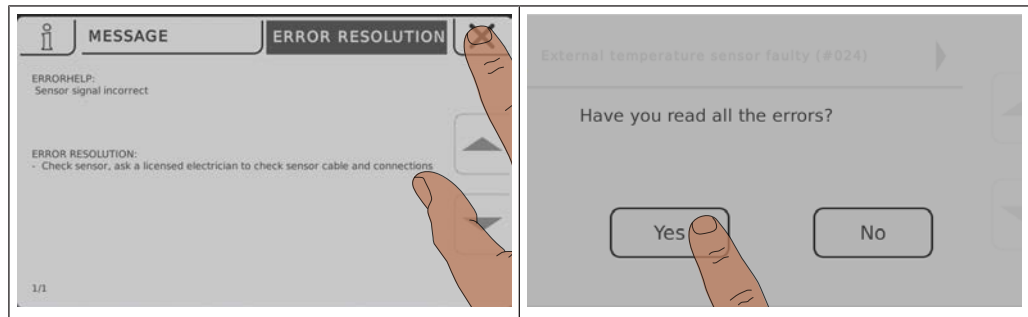
If the fault is acknowledged, although it has not been rectified, the window with the associated fault can be reopened as follows:

##### Open error display



The error display lists all faults at that time

- ☐ Open by tapping the listed fault
- ☐ The “Message” tab displays the fault at that time
- ☐ Press the “Error resolution” tab to view possible causes and troubleshooting procedures

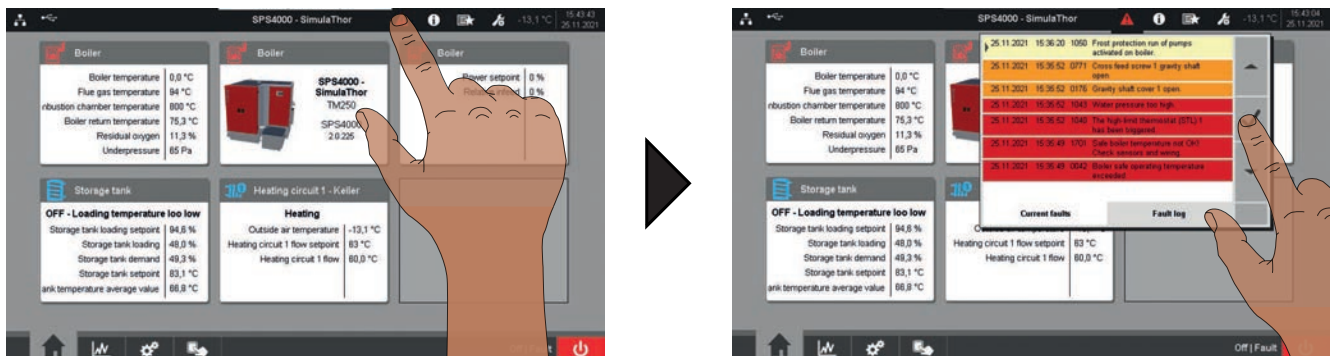


- ☐ Tap the Cancel icon to close the current fault and display the fault list
- ☐ Tap the Cancel icon again and confirm that you have read all of the errors to return to the basic display
  - The boiler is in the previously set mode

## 7.2 Troubleshooting the SPS 4000 control system

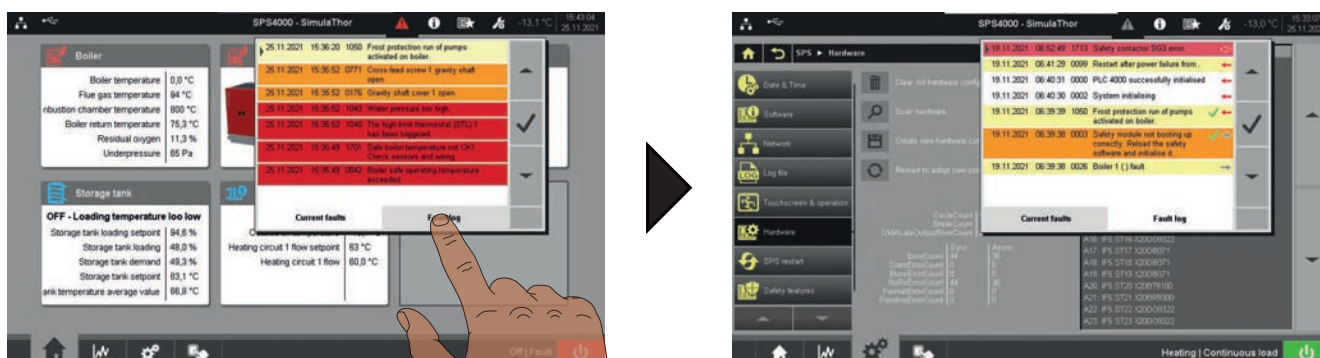
### 7.2.1 Procedure in case of malfunctions

If a fault occurs in the system, the warning symbol flashes in the quick selection area and the system switches off depending on the type of fault. The following procedure applies for rectifying the fault:



- ☐ Open fault information by tapping on the warning icon
- ☐ Eliminate the cause of the fault
- ☐ Navigate to the fault entry using the “arrow DOWN” and “arrow UP” buttons
- ☐ Acknowledge the fault by tapping on the “Confirm” icon

If the fault has been successfully acknowledged and is no longer present, the entry in the current fault is removed:



❑ In the fault information, tap on the "Fault log" tab

↳ The list of the last fault messages with additional information on occurrence, acknowledgement and associated times is displayed

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