

Installation and Operating Instructions
Bunker filling screw 250



Translation of the original German operating and installation instructions for technicians and operators

Read and follow the instructions and safety information!

Technical changes, typographical errors and omissions reserved!

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1 General

Thank you for choosing a quality product from Fröling. 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.

Subject to technical change.

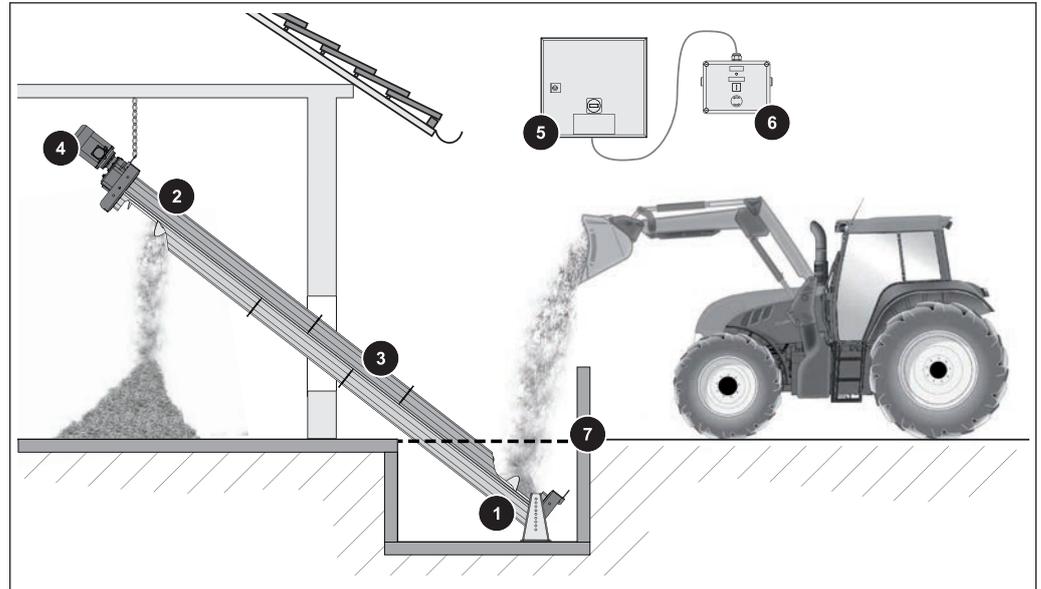
***Issuing a delivery
certificate***

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).

1.1 Functional description

The Froling bunker filling screw 250 comprises:

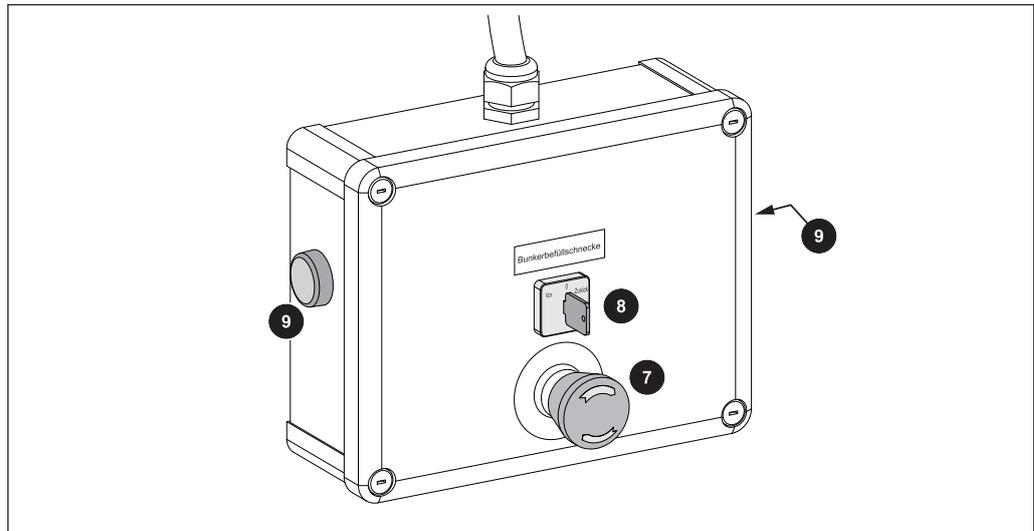


1	Inlet opening
2	Outlet opening
3	Troughs with internal screw 250
4	Geared motor
5	Control cabinet
6	Control
7	Protective structures

The Froling bunker filling screw 250 has been designed for the automatic filling of a fuel store. The screw is loaded with fuel via the inlet opening (1) located outside the store. The system is started using the two-hand tripping device of the mobile control unit (6), which is connected to the stationary control cabinet (5) via a flexible control line.

The screw driven by a geared motor (4) then transports the fuel up to the outlet opening (2), after which the material is discharged in the fuel store via the discharge system.

1.1.1 Control unit



- | | |
|---|--|
| 7 | Emergency stop for shutting down the system immediately in a hazardous situation |
| 8 | Key-operated selector switch for changing the direction of rotation of the screw |
| 9 | Start button for two-hand tripping device (one push-button on the left and right-hand side). Both push-buttons have to be pressed to start the system. |

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

The Froling bunker filling system is solely designed for transporting fuels into suitable store spaces. 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.

2.2.1 Permitted fuels

Wood chips

Criterion	Designation as per		Description acc. to ÖNORM M 7133
	ÖNORM M 7133	EN ISO 17225	
Water content	W20	M20	air-dried
	W30	M30	suitable for storage
	W35	M35	limited suitability for storage
Size	G30	P16S	Fine wood chip
	G50	P31S	Medium-sized wood chip

Note on standards

EU:	Fuel acc. to EN ISO 17225 - Part 4: Wood chips class A1 / P16S-P31S
Additional for Germany:	Fuel class 4 (§3 of the First Federal Emissions Protection Ordinance (BimSchV) - applicable version)

2.2.2 Non-permitted fuels

The use of fuels not defined in the "Permitted fuels" section is not permitted.

NOTICE

The system is not permitted to be used for supplying other fuel types, which the underlying heating system may also be suitable for, e.g. pellets, shavings or miscanthus.

2.3 Qualification of staff

2.3.1 Qualification of assembly staff



CAUTION

Assembly and installation by untrained personnel:

Risk of personal injury and damage to property.

During assembly and installation:

- Observe the instructions and information in the manuals
- Only allow trained staff to carry out assembly and installation

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

- Heating technician / building technician
- Electrical installation technician
- 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.



- For transportation, setup and assembly:
 - suitable workwear
 - protective gloves
 - sturdy shoes

2.3.3 Qualification of operating staff



CAUTION

If unauthorised persons enter the store / working range:

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 inspection and cleaning:
 - suitable workwear
 - protective gloves
 - sturdy shoes



- Additional for operating:
 - Hearing protection (sound level > 70 dB)
 - Protective goggles

2.4 Design information

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

Always comply with all fire, building, and electrical regulations when installing or operating the system, in addition to following the operating instructions and mandatory regulations that apply in the country in which the system is operated.

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 always be observed:

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
EN 13501	Fire classification of construction products and building elements

2.4.2 Requirements at the installation site

- The installation site must have a suitable, level surface within the working range of the system (filling area, switching unit with operating elements)
- The assembly material and the structure of the ceiling construction to which the filling screw is mounted must be designed and approved for the loads.
- The operating area must be designed so as to avoid risks posed by the loading vehicle
- The system does not provide any light, so the customer must provide sufficient lighting in accordance with national workplace design regulations.
- The switching unit must be installed indoors with protection from the weather
- The wall duct for the connection cable of the control unit must be positioned so that the length of the cable allows the control unit to be located outside the danger zone. The filling area must be visible during operation
- Protective structures must be designed in accordance with the applicable standards and regulations
- On-site weather protection over the filling area must be provided.
- When working in the fuel store, observe the information on the “fuel store” notice (supplied).
- Low outside temperatures in conjunction with wet wood chips can cause system components to freeze. Protect the system from frost!

2.5 Safety devices

Description	Description
<p>Main switch on the control cabinet</p> 	<p>For switching off the entire system. When working on the system or in the store space, always padlock the main switch to ensure it cannot be switched on without authorisation.</p>
<p>EMERGENCY STOP button</p> 	<p>For shutting down the system with any danger. There is imminent risk:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Press emergency stop on control <ul style="list-style-type: none"> ➤ All units will stop immediately ➤ The power supply remains switched on <p>When there is no longer any risk:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Rest the emergency stop button by rotating
<p>Safety two-hand tripping device</p> 	<p>Safety switch for operating the system. The bunker filling system can only be activated by constantly pressing the two buttons mounted on each side.</p>

2.6 Residual risks


 **DANGER**

Operating the system without the safety equipment provided by the customer:

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 safety equipment to be provided by the customer 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 bunker filling screw is switched on when someone is in the danger zone:

Risk of serious injury from rotating feed screw!

Therefore:

- Ensure that there is no one in the filling area of the bunker filling screw and that no one enters the danger zone for the duration of the filling process
- Ensure that no one is in the store and that the entrance to the store is secured against entry for the duration of the filling process
- Only start the filling process once these conditions have been met


 **DANGER**

Maintaining the system when the main switch is switched on:

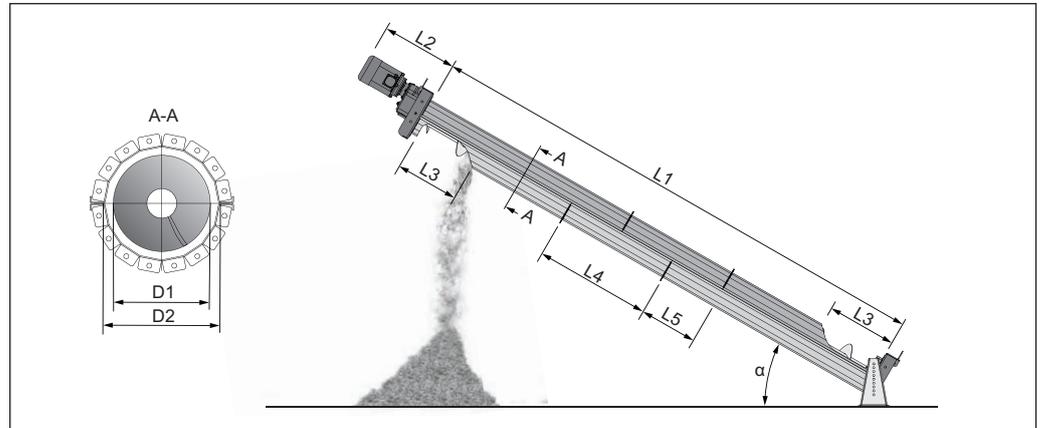
Risk of serious injury from unauthorised switching on!

When maintaining the system or in the storage area:

- Switch off the main switch of the bunker filling system and re-secure it against unauthorized restarting using a padlock
- Switch off any other devices in the fuel store which potentially have dangerous movements (e.g. discharge system) and take precautions to prevent accidental switching on.
 - Also observe the information on the notice (supplied) for working in the fuel store.

3 Technical information

3.1 Dimensions



Item	Description	Unit	Value
L1	System length	mm	4050
			4500
			4950
			5400
			5850
			6300
			6750
			7200
			7650
8100			
L2	Length of geared motor with bearing flange		592
L3	Length of inlet / outlet		500
L4	Trough length		900
			1350
			1800
L5	Offset of the half shells		450
D1	Diameter, screw		250
D2	Diameter, trough channel		300
α	Gradient angle	°	0 – 60

3.2 Weights

Description		Weight of bunker filling screw [kg]	
		without wood chips	with wood chips ¹⁾
Geared motors:			
	Geared motor 4.0 kW (ATEX)	37	
	Geared motor 5.5 kW (ATEX)	46	
Filling screw incl. geared motor (5.5 kW):			
	System length 4050 mm	206	267
	System length 4500 mm	224	292
	System length 4950 mm	248	323
	System length 5400 mm	267	348
	System length 5850 mm	285	373
	System length 6300 mm	302	397
	System length 6750 mm	320	422
	System length 7200 mm	339	447
	System length 7650 mm	357	472
	System length 8100 mm	382	504
<small>1. As a rough estimate, 15 kg of wood chips per meter of screw length are assumed. The value depends on the quality, water content and grain size of the wood chips.</small>			

3.3 Technical data

Designation		Value
Feed output of filling screw ¹⁾		approx. 30 m ³ /h
Electrical connection		230 / 400 V / 50 Hz
Electric fuses		C 20 A
Power consumption of drive ²⁾		4 kW 5.5 kW
Output speed of drive	4.0 kW	162 rpm
	5.5 kW	229 rpm
<small>1. Depending on the type of wood chips and the structural design of the filling area 2. Depending on system – see circuit diagram</small>		

4 Assembly

4.1 Transport and handling

The filling screw comes pre-assembled and packed on a pallet.

NOTICE



Possibility of damage to components if handled incorrectly

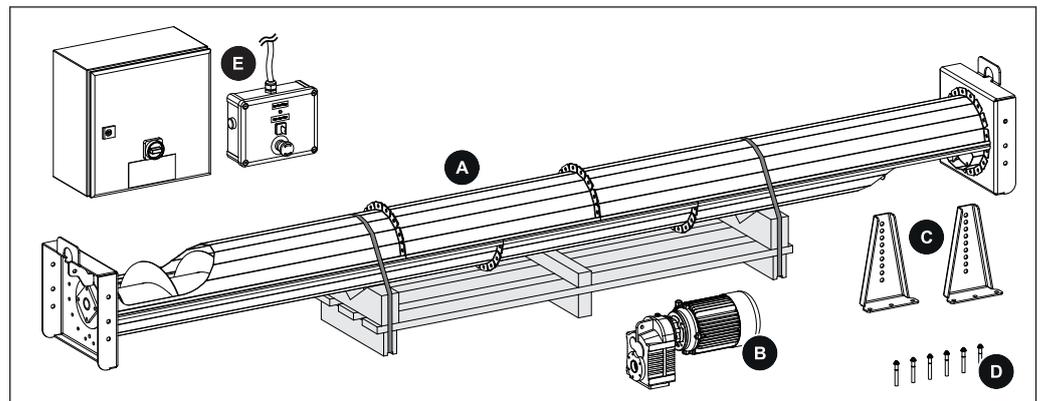
- Follow the transport instructions on the packaging
- Transport components, in particular drive components, with care to avoid damage

4.1.1 Temporary storage

If the system is not going to be assembled immediately:

- Store components at a protected location, which is dry and free from dust
 - ➔ Damp can lead to damage to individual parts, particularly in the motor!

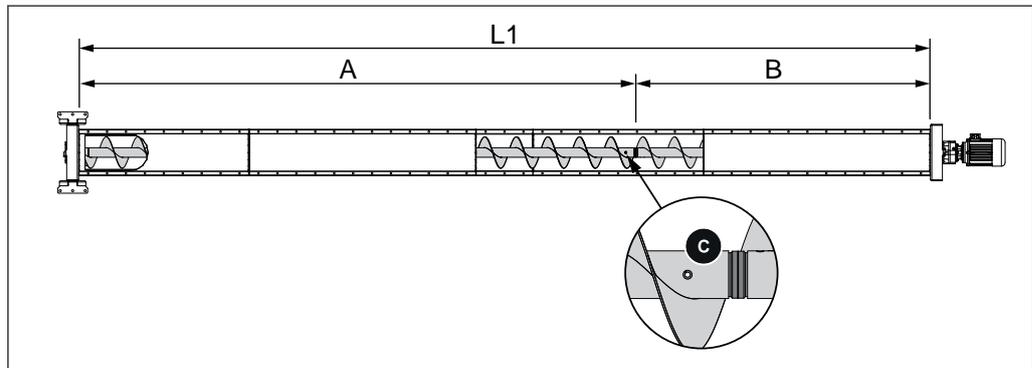
4.1.2 Materials supplied



Position	Description
A	Bunker filling screw 250 (mounted on a pallet)
B	Geared motor incl. torque support
C	Support for floor mounting
D	Assembly material (heavy duty anchors, etc.)
E	Control cabinet, control, plug connection

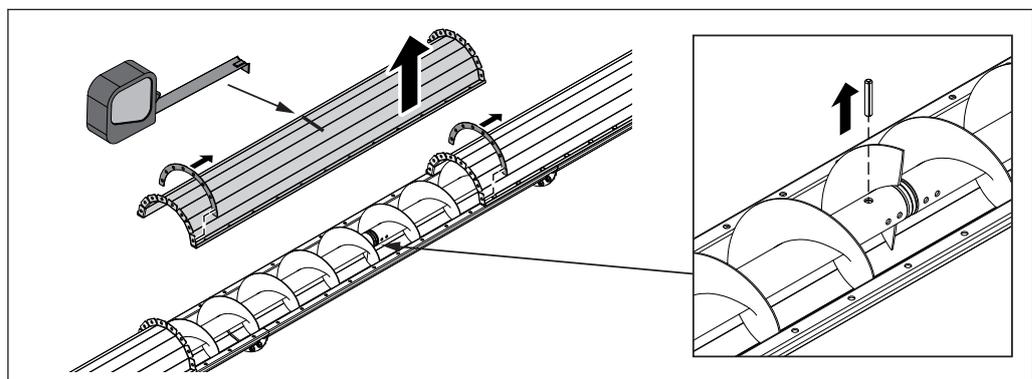
4.1.3 Dismantling for locations difficult to access

If positioning of the entire discharge is not possible due to its length, the screw can be taken apart at a specified point. The following table shows the position in the trough where it can be taken apart (C):

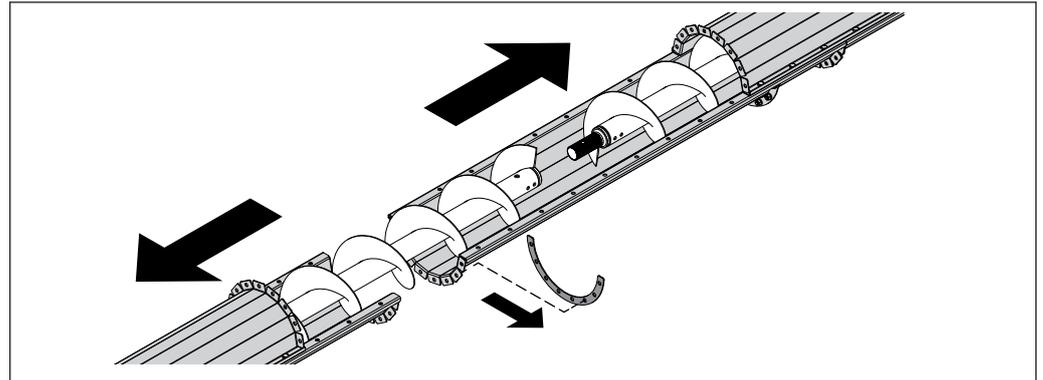


System length L1	Distance A (inlet side)	Distance B (outlet side)
4050	cannot be taken apart	
4500	cannot be taken apart	
4950	2616	2334
5400	2616	2784
5850	2616	3234
6300	2616	3684
6750	4416	2334
7200	4416	2784
7650	4416	3234
8100	4416	3676

Dismantling:



- Dismantle the upper half shell of the trough at the connection point
- Remove the spring pin
 - ↳ Use a 14 mm punch

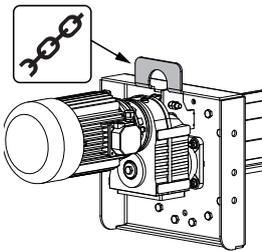


- Loosen the screw connection on the lower half shells
- Carefully separate both halves and insert components

After positioning, assembly is carried out in the reverse order!

4.2 Assembly aids

Lifting



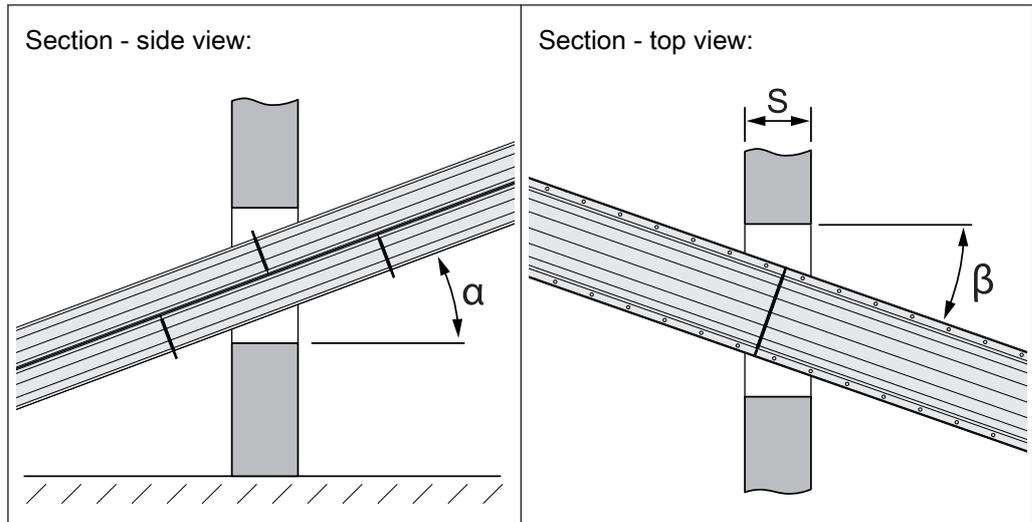
Suitable lifting equipment with sufficient load-bearing capacity is required on site to manoeuvre the components. The bunker filling screw is designed for transport and installation with eye bolts.

NOTICE! Lifting with suitable lifting equipment should only be carried out by technicians with a specific knowledge of lifting loads!

NOTICE! Lifted components must be secured by the lifting equipment until firmly attached!

Working height When performing assembly at great heights, suitable scaffolding or elevating work platforms are necessary on site. Their design and dimensioning in relation to the permissible working height and load capacity should be selected according to the accident prevention regulations!

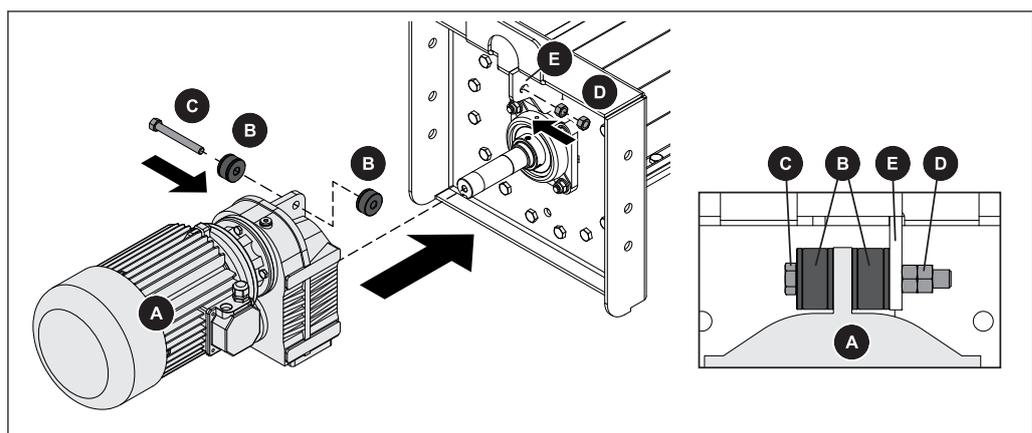
4.3 Wall opening



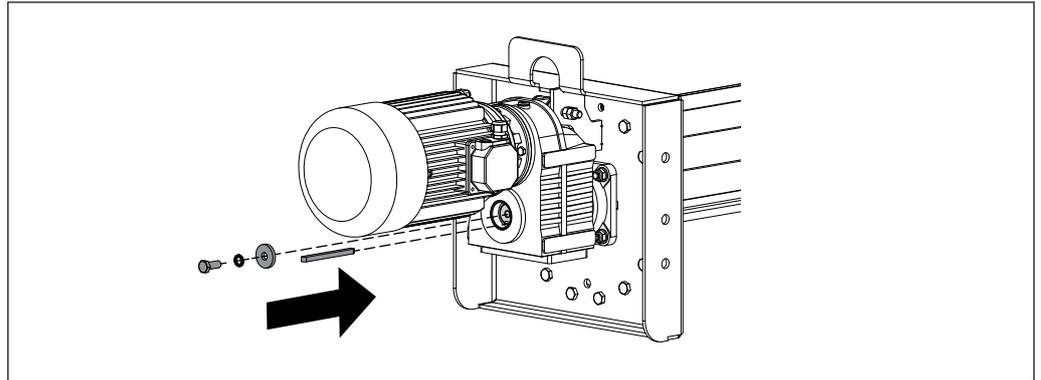
Before installing the discharge system, the customer must provide a wall opening for the trough. The dimensions of the opening are calculated from the wall thickness (S) and the angle of the trough to the wall (β) as well as the angle of inclination (α) of the entire discharge system. Experience has shown that for right angles an opening of 600 mm x 600 mm is sufficient. You should also note that the discharge must not be connected to the wall in order to avoid vibration transmission (structure-borne noise) and noise generation. Finally, the wall opening must be elastically lined with a non-combustible material in accordance with ÖNORM B 3836 or DIN 4102-11.

4.4 Assembly of the geared motor

The geared motor is delivered individually packaged to avoid damage. Carry out assembly as follows:



- Position the rubber buffer (B) with hexagon screw (C) in the geared motor (A).
- Lubricate the inside of the screw shaft stub and gears with copper paste
- Push the geared motor (A) onto the shaft stub
 - Position the shaft stub so that the groove is aligned with the groove of the gears
- Fix torque support to bearing flange (E) with two hexagon nuts (D)

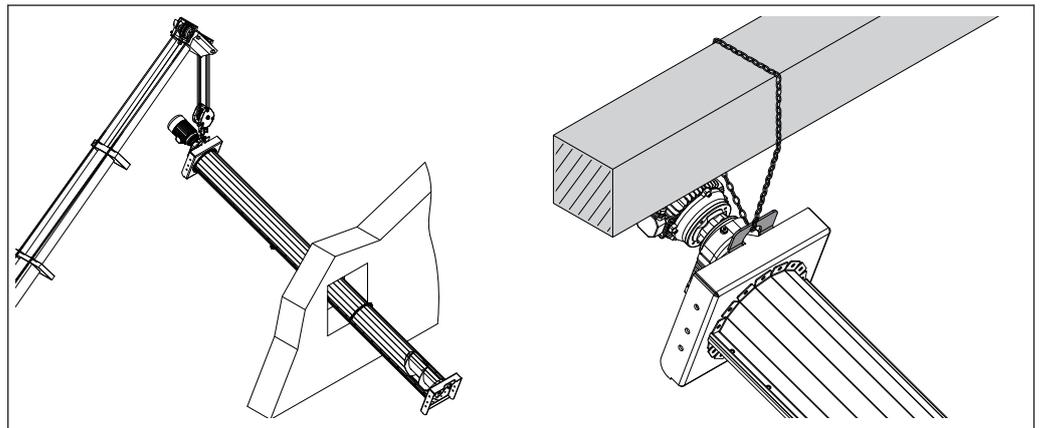


- Slide key into groove and fit shaft retainer

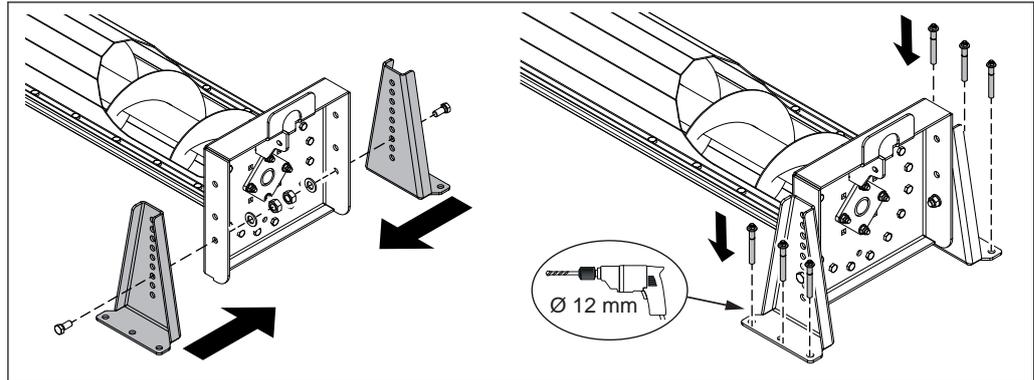
4.5 Fitting the bunker filling screw

NOTICE

Depending on the attachment basis, the responsibility for selecting the fasteners lies with the assembly staff.



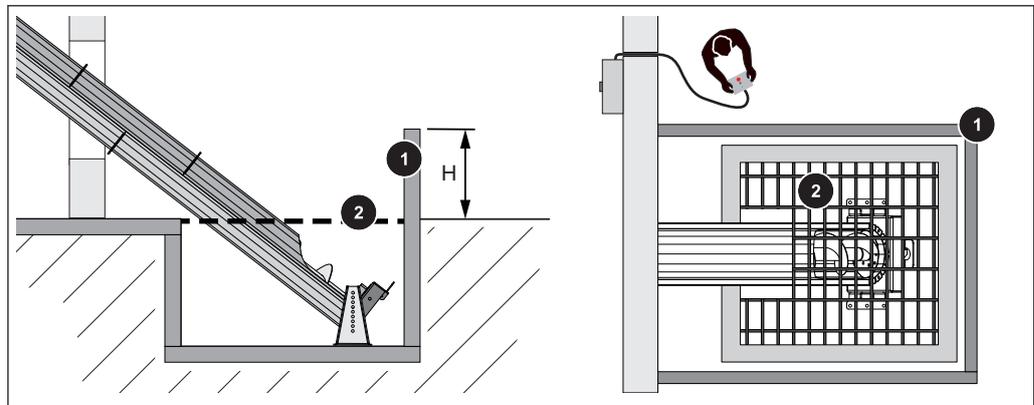
- Position the bunker filling screw according to the installation diagram using suitable lifting equipment
- Attach the discharge to the element provided for this purpose (crossbar, etc.) with appropriately dimensioned chains



- Mount the adjustable feet to the bearing flange in the desired position
- Mark three holes for each adjustable foot on the ground
- Drill the holes marked
 - Drill diameter 12 mm
 - Drill depth at least 105 mm
- Insert the heavy duty anchors into the bore holes and tighten with a spanner (SW 13 mm)

4.6 On-site final work

The diagram below illustrates how the bunker filling screw might be implemented in the filling area. It is important that the user can see into the filling area for the entire filling process.



The following protective constructions must be erected on site:

- | | |
|---|--|
| 1 | Protective structure to prevent reaching over when in operation.
Structure dimensions (H) as per EN ISO 13857 |
| 2 | Cover to prevent climbing into the filling area when in operation.
Structure dimensions as per EN ISO 13857 |

5 Electrical connection

DANGER



When working on electrical components:

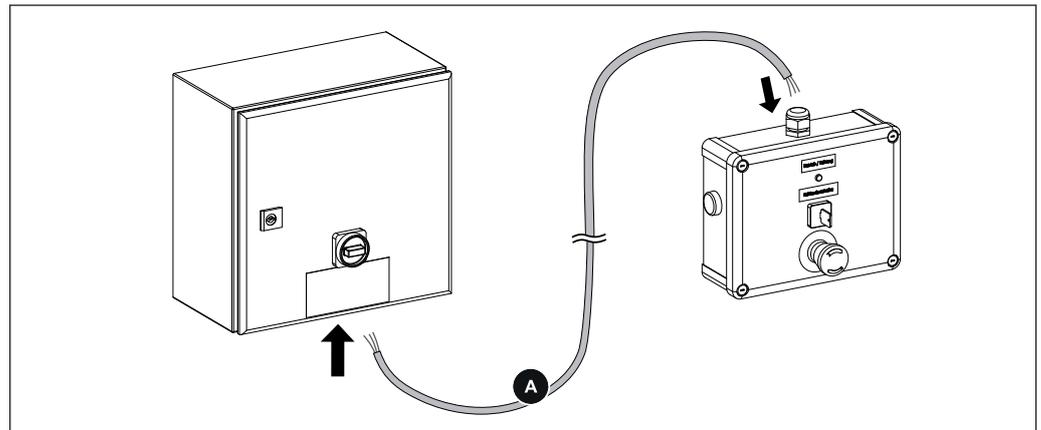
Risk of electrocution!

When work is carried out on electrical components:

- Only 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

- Install the control cabinet supplied within the protected area
- Install the wiring of the electrical components according to the circuit diagram supplied

5.1 Wiring the control unit



- Wire the control and control cabinet according to the circuit diagram

5.2 Mains connection

- Lay the mains connection cable to the control cabinet and connect it to the terminal blocks and the earth terminal
- Electrical power supply to be fused by customer with C20A

NOTICE! Flexible sheathed cable must be used for the wiring; this must be of the correct size to comply with applicable regional standards and regulations.

6 Operating the system

6.1 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

During initial start-up:

- Check that the system has been assembled correctly
 - Check that all the components supplied have been installed in accordance with the assembly instructions
- Check the supply pipe and electrical fuse
- Check the direction of rotation of the screws
- Check that the motor overload for the drive motor is working
- Check the on-site protective structure of the inlet opening
 - The inlet opening 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 structures
 - ⇒ See "On-site final work" [page 22]
- Affix the identification plate to the control cabinet
- Affix the "fuel store" warning notice in a conspicuous place in the access area

When the check is finished:

- Perform a test run and fill the store space with fuel

6.2 Fill the store with fuel

NOTICE

Before starting with the filling process, check that the bunker filling system is working properly.

CAUTION

If unauthorised fuel types are used:

Non-standard fuels can cause stiffness and block the system, resulting in the failure/breakage of components.

Therefore:

- Only use fuels specified in the "Permitted uses" section of these operating instructions.

6.2.1 Switching on the power supply



- Turn the main switch on the switching unit to "I"
 - The power supply is switched on
 - The components in the switching unit are live

6.2.2 Start filling process



DANGER

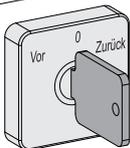
If the bunker filling screw is switched on when someone is in the danger zone:

Risk of serious injury from rotating feed screw!

Therefore:

- Ensure that there is no one in the filling area of the bunker filling screw and that no one enters the danger zone for the duration of the filling process
- Ensure that no one is in the store and that the entrance to the store is secured against entry for the duration of the filling process
- Only start the filling process once these conditions have been met

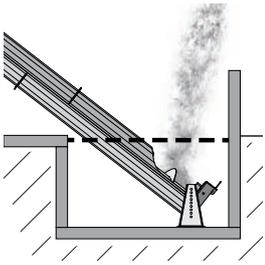
Bunkerbefüllschnecke



- Insert key into key-operated selector switch
- Select the direction of rotation of the filling screw
 - To fill the fuel store, set the key counterclockwise to "FORWARD".



- Simultaneously press both start buttons of the two-hand tripping device (one button on each side, left and right)
 - The geared motor is activated



- Load screw with fuel

NOTICE! When filling the screw with a tipper or front loader, fuel may fall past the screw. In this case the unloading speed of the loading vehicle has to be adjusted to the feed speed.

6.2.3 Stop filling process

- Release one or both start buttons of the two-hand tripping device
 - The filling screw is stopped immediately

After finishing filling:

- Remove the key from the selector switch and store in a safe place

6.2.4 Switch off the power supply



- Turn the main switch on the switching unit to "O"
 - The power supply is switched off
 - The components in the switching unit are no longer live

NOTICE! The main terminal in the switching unit is still live!

- Padlock the main switch to ensure it cannot be switched on
- Remove the key from the padlock and keep in a safe place

7 Servicing the System

DANGER



Maintaining the system when the main switch is switched on:

Risk of serious injury from unauthorised switching on!

When maintaining the system or in the storage area:

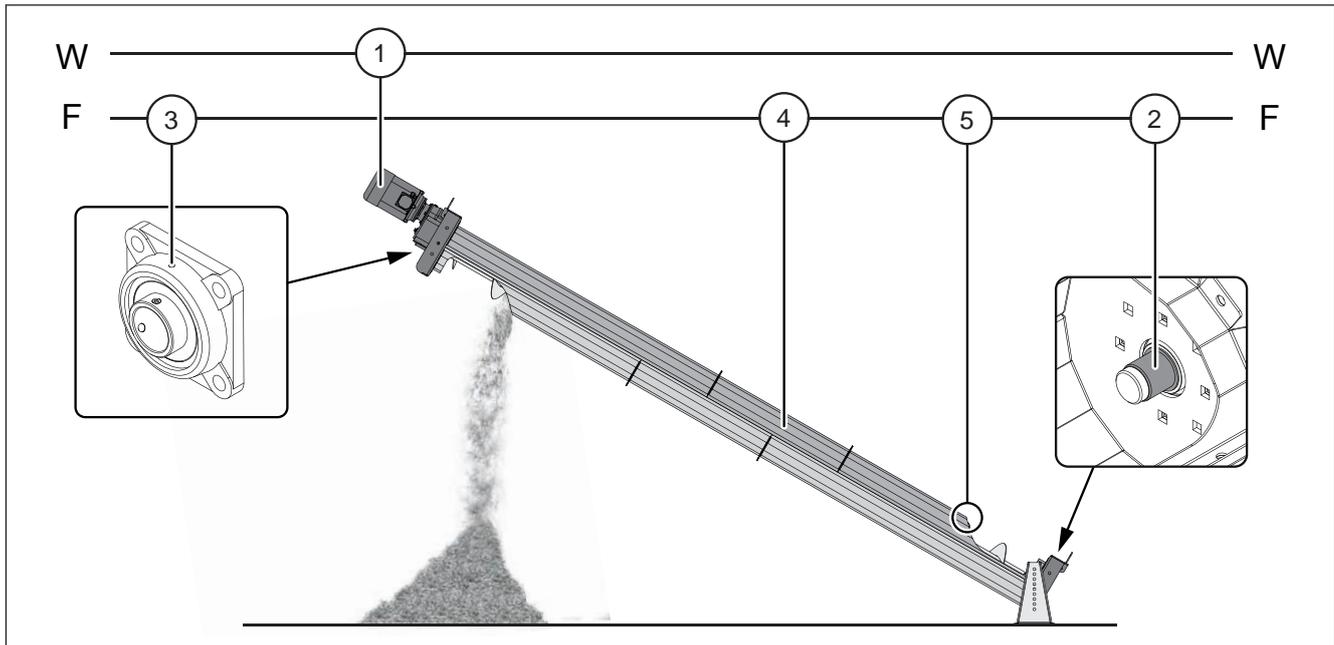
- Switch off the main switch of the bunker filling system and re-secure it against unauthorized restarting using a padlock
 - Switch off any other devices in the fuel store which potentially have dangerous movements (e.g. discharge system) and take precautions to prevent accidental switching on.
- Also observe the information on the notice (supplied) for working in the fuel store.

Regular inspection and cleaning prolongs the lifespan of the system and is essential for proper operation.

The points listed in the maintenance plan below must be carried out at the appropriate intervals, however at least once a year, depending on the hours of operation and fuel quality. We recommend performing each point after every filling process.

You should also check for visible signs of damage after the filling process.

7.1 Maintenance schedule



W = weekly; F = prior to each fill of the fuel store

No.	Component	Int.	Operation
1	Motor / gears	W	<input type="checkbox"/> Carry out a general visual inspection of the drive motor ➤ No major oil leaks should be visible.
2	Screw bearing	F	<input type="checkbox"/> Clean friction bearing bushing and check for abrasion <input type="checkbox"/> Apply grease to inside and outside of friction bearing (Molykote BR2 Plus, Froling item no.: 55633)
3	Flange bearing	F	<input type="checkbox"/> Lubricate bearing at lubricating nipple with grease gun
4	Troughs / screw	F	<input type="checkbox"/> Check troughs and screw for dirt and damage <input type="checkbox"/> Check the screw blades for wear
5	Inlet area	F	<input type="checkbox"/> Check inlet area for material build-up and jammed material and clean if necessary

8 Troubleshooting

Error	Possible cause	Error resolution
Motor circuit switch has activated	<ul style="list-style-type: none"> ▪ Feed screw blocked 	<ul style="list-style-type: none"> <input type="checkbox"/> Check screw for blockage and free up <input type="checkbox"/> Wait until the motor protection switch has cooled down and switch back on
Filling screw blocked	<ul style="list-style-type: none"> ▪ Wood chips frozen in filling screw 	<ul style="list-style-type: none"> <input type="checkbox"/> Activate the screw briefly several times

9 Appendix

9.1 Addresses

9.1.1 Address of manufacturer

FRÖLING
Heizkessel- und Behälterbau GesmbH

Industriestraße 12
A-4710 Grieskirchen
AUSTRIA

TEL 0043 (0)7248 606 0
FAX 0043 (0)7248 606 600
EMAIL info@froeling.com
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Customer service

Austria	0043 (0)7248 606 7000
Germany	0049 (0)89 927 926 400
Worldwide	0043 (0)7248 606 0

9.1.2 Address of the installer

Stamp
