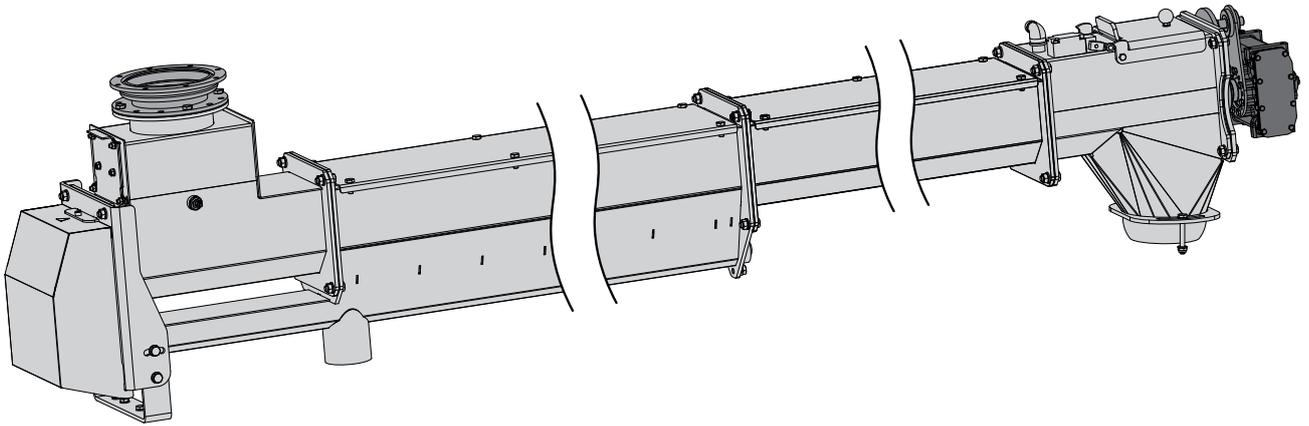


Installation and Operating Instructions
Screening screw 150



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!

M1940017_en | Edition 03/04/2017



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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.

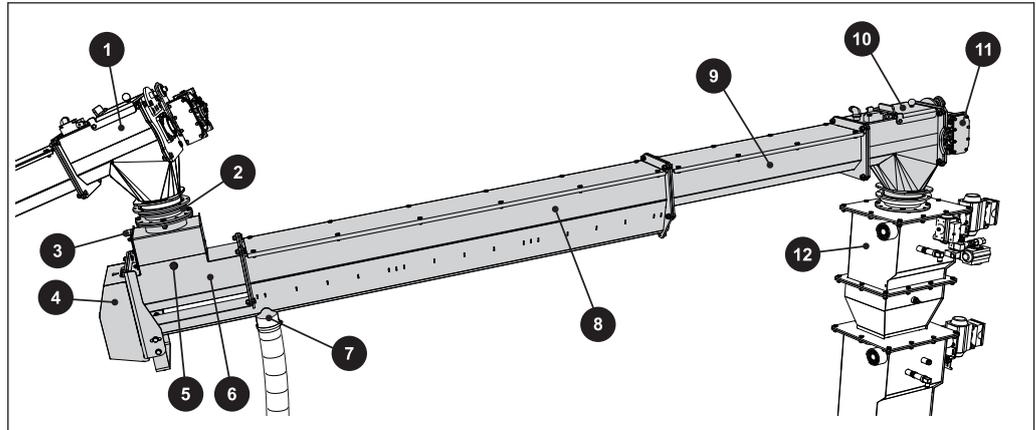
Issuing a delivery certificate

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

Froling's "Screening Screw 150" discharge system consists of:



1	Top part of discharge gravity shaft (e.g. FBR, TGR, feed screw etc.)
2	Transfer beaker
3	Inspection cover
4	Chain drive for screening screw
5	Light barrier to monitor fill level
6	Bottom part of gravity shaft
7	Ejection pipe for dust / fines
8	Closed trough with screen
9	Closed trough
10	Gravity shaft cover with safety limit switch
11	Drive of feed screw
12	System fuel lock / stoker

Using a screening screw can compensate for long distances between the discharge and the system, with some of the fine wood chips being filtered out by an adjustable screen.

If fuel is requested via the system controller, the discharge starts feeding the wood chips to the feed screw. This feeds the material via the closed trough to the transfer position, where it falls through to another feed screw or through the system's burn back protection system (burn back flap, rotary valve or fuel lock).

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 or damage to property.

2.2 Permitted uses

Froling's "Screening screw 150" discharge system is only designed to discharge fuels from suitable stores. Only use fuels specified in the "Permitted fuels" section.

Depending on the material fed, the screening screw filters out some of the fine wood chips, but is no replacement for a filtration system!

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 Froling customer services



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	W10	M10	dried in chamber
	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 as per 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)

2.3 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 always be carried out by qualified personnel:

- Heating technician / building technician
- Electrical installation technician
- Fröling 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 work wear
 - protective gloves
 - sturdy shoes (min. protection class S1P)

2.3.3 Qualification of operating staff

CAUTION



If unauthorised persons enter the store:

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

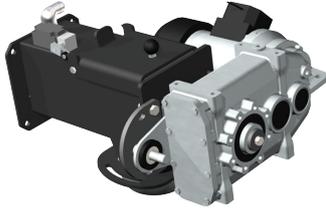
The system must be installed and commissioned in accordance with the local fire and building regulations. The following standards and regulations should be observed in any case:

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

- The floor must be even, clean and dry and have an adequate load-bearing capacity
- Always install control cabinet indoors
- If installing outdoors, protect electrical components (e.g. geared motors) from the effects of weather
- Covers provided by the customer must be designed in such a way that maintenance areas remain freely accessible
- Low temperatures in conjunction with wet wood chips can cause system components to freeze. Protect the system from frost!
- Protective structures must be designed in accordance with the applicable standards and regulations

2.5 Safety devices

Safety equipment	Safety function
<p>Limit switch for top of gravity shaft:</p> 	<p>Protection against access to the danger area of the feed/ discharge screw when the system is switched on</p> <ul style="list-style-type: none"> <input type="checkbox"/> If the inspection cover is opened, the system is switched off via the limit switch ➔ The power supply remains switched on
<p>Water Sprinkler System:</p> 	<p>Self-activating extinguisher system to limit burn back around the top of the gravity shaft.</p> <p>If the temperature in the top of the gravity shaft rises above 95°C, the valve of the sprinkler system opens, water flows out and prevents the fire from spreading to the fuel store.</p>

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

When working on the unit with a live power supply:

Serious injury possible due to automatic startup!

When working on the system or in the store, it is essential that the five safety directives are followed:

- Disconnect all poles on all sides
- Secure so that it cannot be switched on again
- Check that there is no power
- Earth and short circuit
- Cover any adjacent live parts and limit area of risk



 **CAUTION**

If unauthorised fuel types are used:

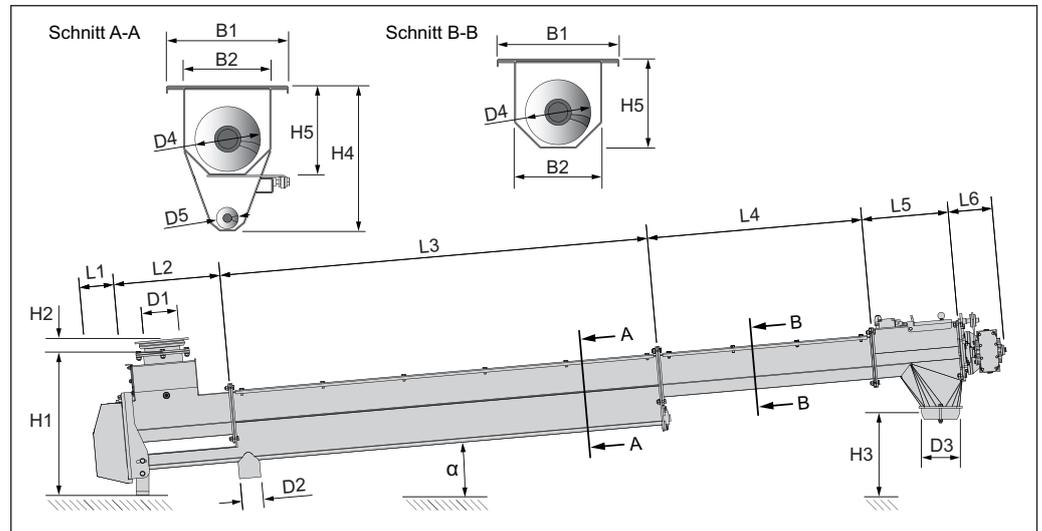
Non-standard fuels can cause stiffness and block the system, resulting in the failure/breakage of components.

Therefore:

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

3 Technical information

3.1 Dimensions



Item	Description	Unit	Value
L1	Length, chain guard	mm	156
L2	Length, bottom part of gravity shaft		500
L3	Length, screening screw		2000
L4	Length, closed trough		see installation diagram
L5	Length, top part of gravity shaft		405
L6	Length, drive		215
H1	Height, bottom part of gravity shaft	see installation diagram	
H2	Height, transfer beaker		60
H3	Height, top part of gravity shaft connection		
H4	Height, screening screw trough		336
H5	Height, closed trough		206
D1	Diameter, ball connection		180
D2	Diameter, ejection pipe for dust / fines		100
D3	Diameter, ball connection		180
D4	Diameter, feed screw		150
D5	Diameter, screening screw		50
B1	Width, trough cover		280
W2	Width, trough		200
α	Inclination	°	5 (±8)

3.2 Technical data

	Screening screw 150
Geared motor	Offset gears
Electrical output	0.55 kW
Speed	10.9 rpm
Weight	28.5 kg
Electricity supply	400 VAC / 50 Hz

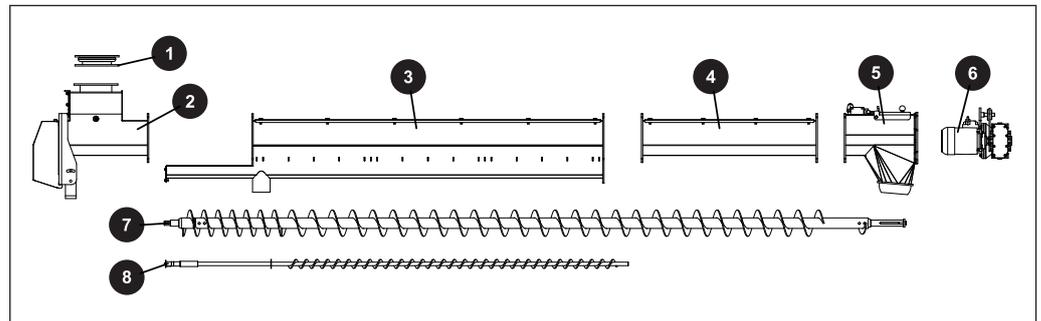
Safety limit switch	24 VDC
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4 Assembly

NOTICE! If several feed screws are being used, it is recommended that the screening screw be mounted closest to the system. This means that the dust generated from the feed can also be filtered out.

4.1 Weight

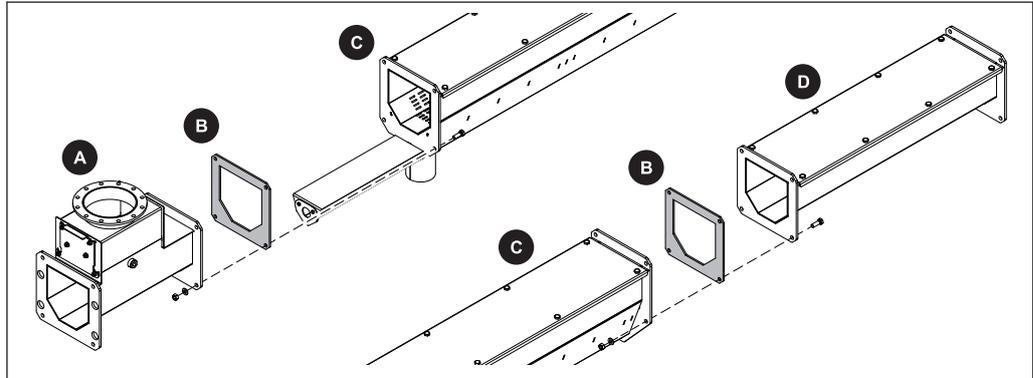
The total weight will depend on the design of the screening screw. This must be taken into account for transportation and assembly.



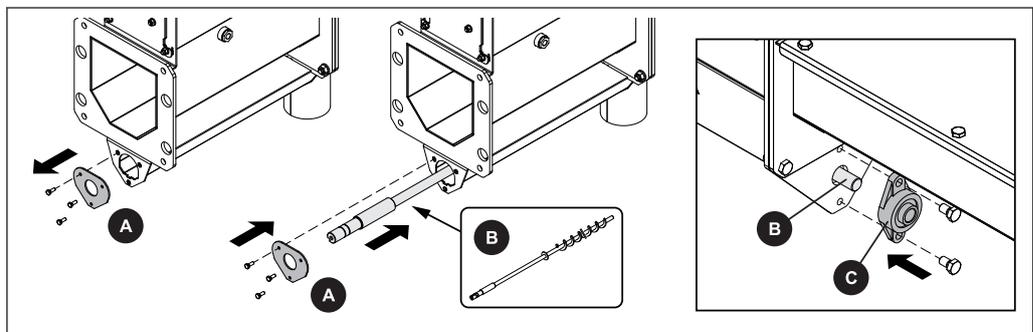
Item	Description	Weight [kg]
1	Transfer beaker Ø 180	4.0
2	Bottom part of gravity shaft 0° with support and chain guard	36.0
3	Screening screw trough	78.0
4	Closed trough (specified in kg/m)	26.5
5	Top part of gravity shaft 5°	19.5
6	Screw drive	⇒ See "Technical data" [page 14]
7	Feed screw Ø 150 (specified in kg/m)	12.5
8	Screening screw Ø 50	9.5

4.2 Fitting the troughs

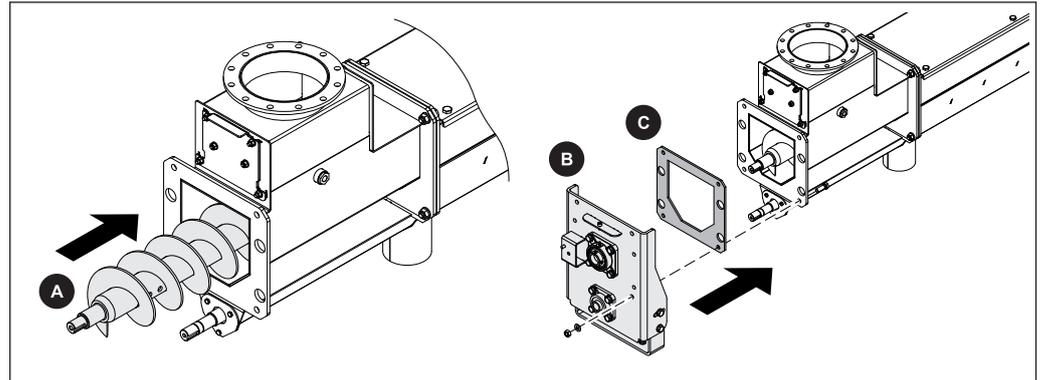
NOTICE! The number of closed troughs (D) depends on the total length of the screening screw



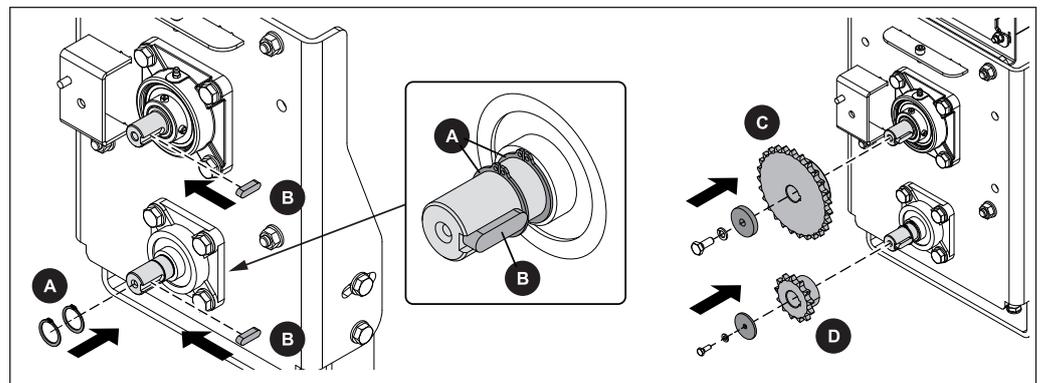
- Secure bottom part of gravity shaft (A) with ceramic fibre seal (B) to the screening screw trough (C) (opposite inspection cover)
 - 4 hexagonal screws M12x35
 - 4 hexagonal nuts M12
 - 4 spacer washers M12
- Connect all closed troughs (D) to each other
 - For each flange connection
 - 1 ceramic fibre seal (B)
 - 4 hexagonal screws M12x35
 - 4 hexagonal nuts M12
 - 4 spacer washers M12



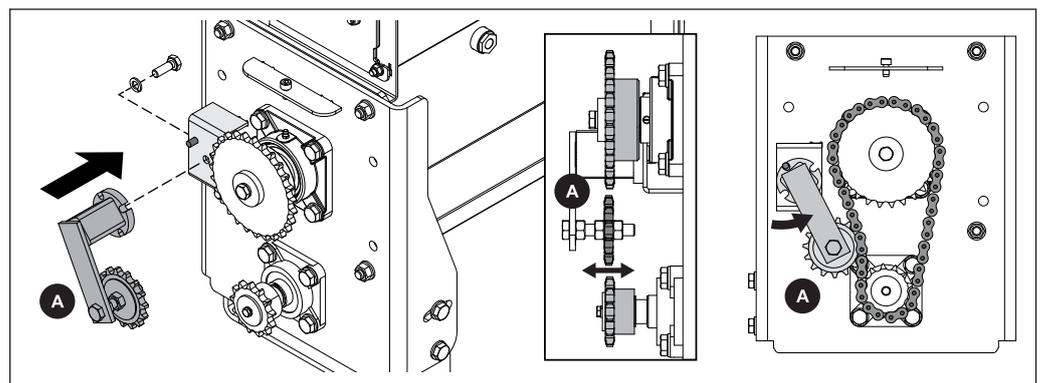
- Remove cover plate (A) from screening screw trough
- Push in screening screw (B) as shown and refit the cover plate (A)
- Push flange bearing unit (C) onto shaft stub of screening screw (B) and fix in place



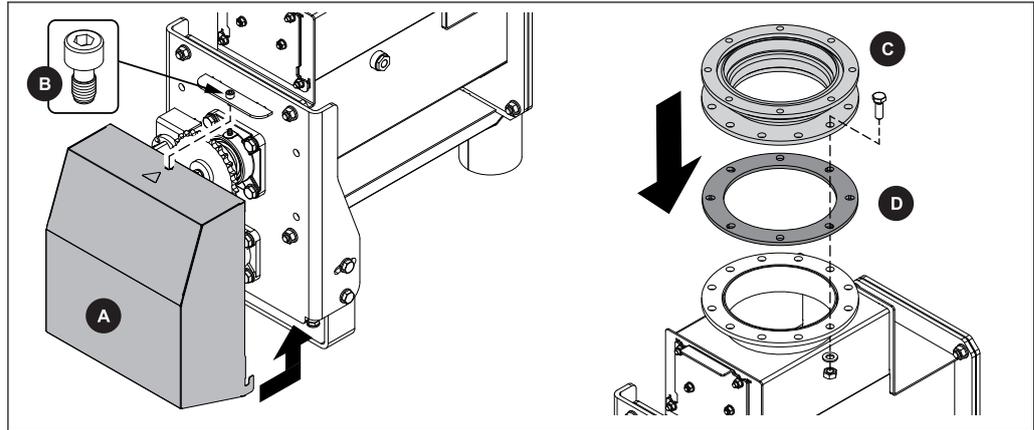
- Push feed screw (A) onto bottom part of gravity shaft
- Secure bearing bracket (B) to bottom part of gravity shaft with ceramic fibre seal (C)
 - ↳ Shaft stubs of feed and screening screws must protrude out of flange bearing units



- Insert two circlips (A) into shaft grooves of screening screw
- Insert keys (B) into grooves on shaft stub
- Secure chain wheels (C, D) with washers onto shaft stubs



- Place roller chain around sprockets of the two screws and secure with chain lock
- Fit chain tensioner (A) to bearing bracket and tighten chain
- Set the sprocket on the chain tensioner (A) so that all three sprockets are flush

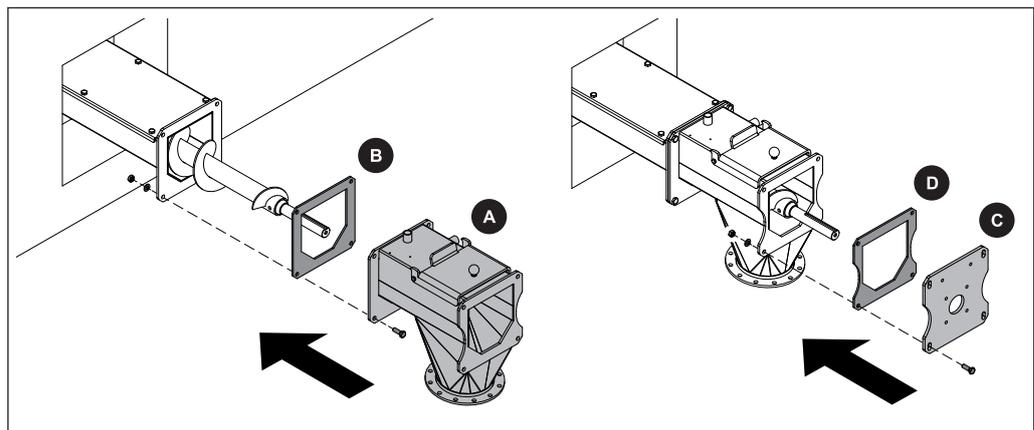


- Fit chain guard (A) to bearing bracket from underneath and secure with captive screw (B)

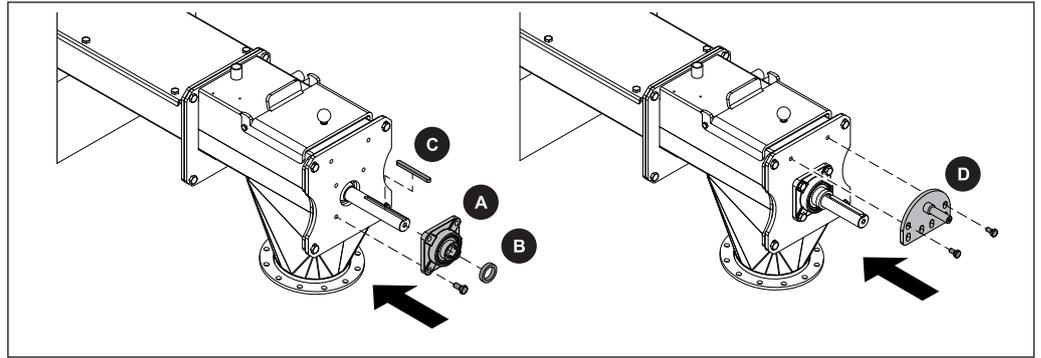
For ball design:

- Secure transfer beaker (C) to round flange of bottom part of gravity shaft with ceramic fibre seal (D)

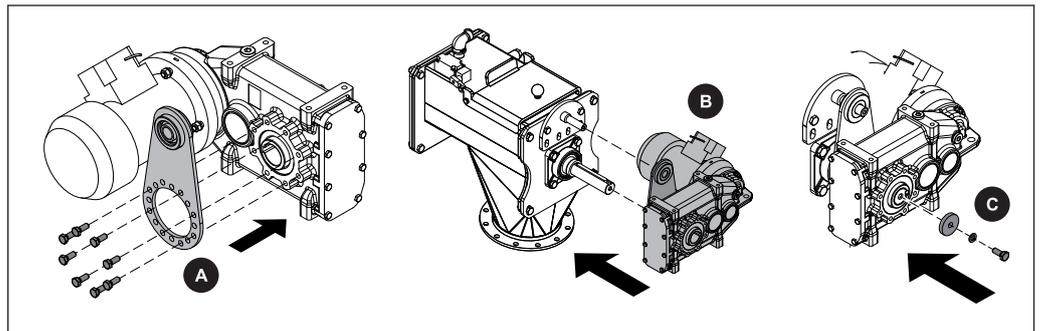
4.3 Fitting the top part of gravity shaft and drive unit



- Secure top part of gravity shaft (A) with seal (B) to the closed trough
 - 4 hexagonal screws M12x35
 - 4 hexagonal nuts M12
 - 4 spacer washers M12
- Secure flange plate (C) with seal (D) to upper part of gravity shaft
 - 4 hexagonal screws M12x35
 - 4 hexagonal nuts M12
 - 4 spacer washers M12



- Push the flange bearing (A) onto the screw end and secure to upper part of gravity shaft
 - 4 hexagonal screws M12x25
- Push the space ring (B) onto the screw end
- Insert key (C) into nut on screw end
- Secure torque support with pin (D) to top part of gravity shaft
 - 2 hexagonal screws M10x20
 - Centre distance of pin and screw end: 150 mm

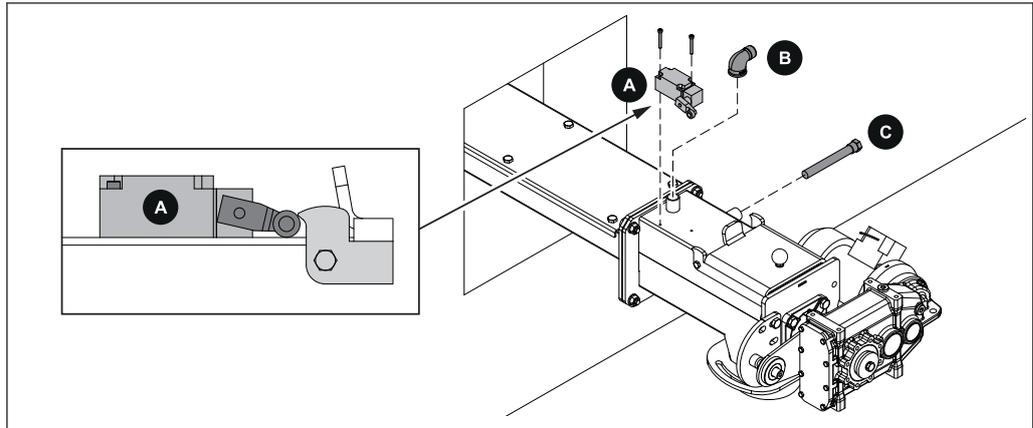


- Secure torque support with bearing (A) to the geared motor as illustrated
 - 8 hexagonal screws M8x20
- Push the geared motor (B) onto the screw end
- Secure locking washer (C) with hexagonal screw and washer
 - 1 hexagonal screw M10x25

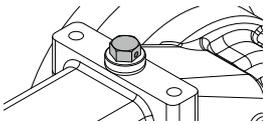
If the geared motor cannot be installed as shown above for reasons of space, it is possible to turn the drive unit:

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

4.4 Fitting attachments



- Secure limit switch (A) to upper part of gravity shaft
- 2 cylinder head screws M5x40
 - 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

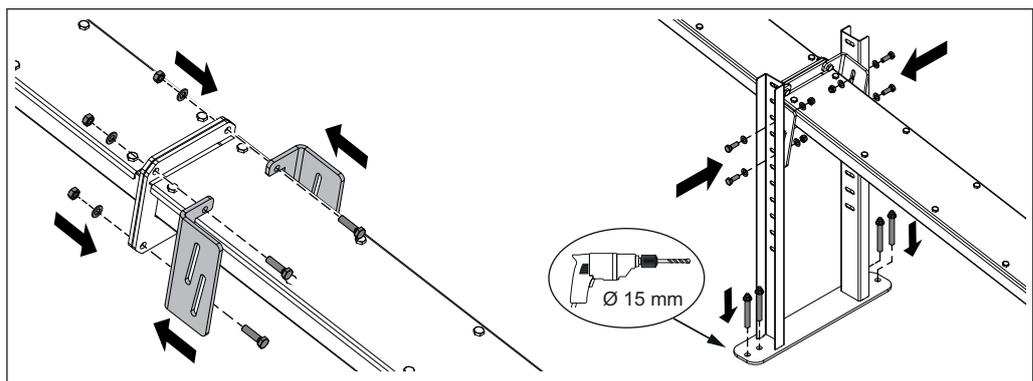


Prepare the geared motor:

- Remove the transport lock
- Fit the vent screw (supplied) to the highest point

4.5 Fitting adjustable feet in boiler room (optional)

If the closed duct in the boiler room exceeds 2m, an additional support is recommended:



- Remove the brackets from the supporting post
- Remove the screws of the trough flange at the relevant position
- Secure the brackets to the trough flange with the previously removed screws
- Position the supporting post at the bracket and screw together

Screwing the adjustable feet to the floor:

- Make two holes each in the floor on the left and right for the adjustable feet

- Drill the holes 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)

4.6 Closing the wall penetration

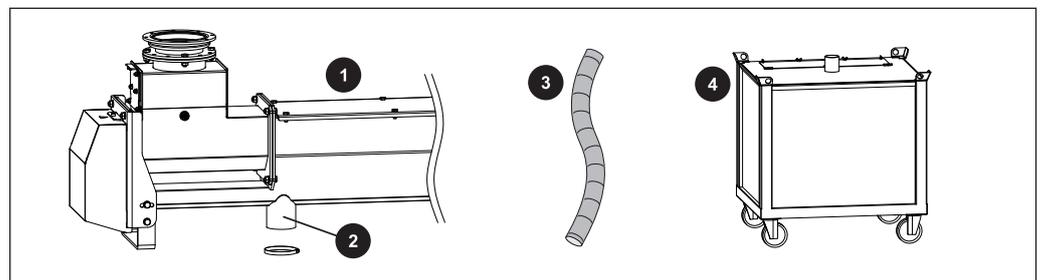
- Pack the space in the wall penetration with a non-flammable insulating material
 - The partition must be insulated to conform with ÖNORM B 3836 or DIN 4102-11!
- Close the wall penetration on the store side and the boiler room side with a non-flammable covering

NOTICE

Do not connect the transfer channel to the brickwork (with concrete), as this will transfer sound through all the brickwork.

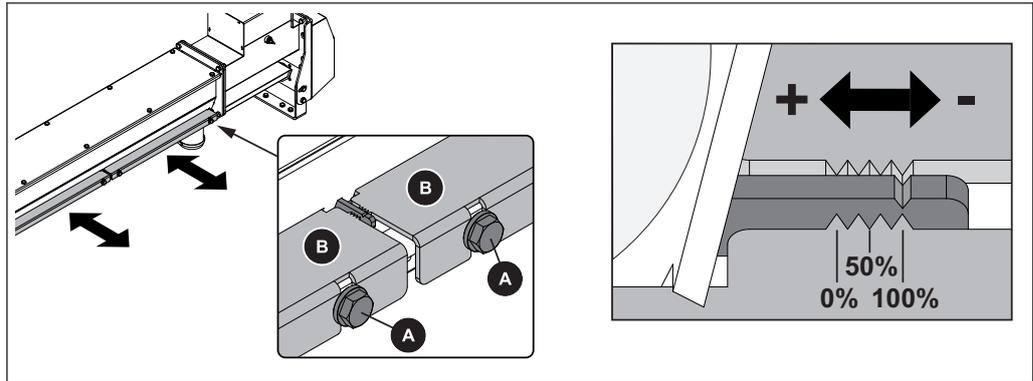
4.7 Receiving tank for dust / fines

The filtered dust / fines are fed from the screening screw to the ejection pipe. A suitable receptacle must be provided by the customer.



- | | |
|---|--|
| 1 | Screening screw |
| 2 | Ejection pipe Ø 100 mm |
| 3 | suitable connection line (e.g. flexible hose) |
| 4 | suitable receiving tank (e.g. flap-bottomed container) |

4.8 Adjusting the screen



- Adjust the mesh size on side of trough using hexagonal screws (AF 17 mm – A)
 - ↳ Screw in screen plates (B) => increases the mesh size
 - ↳ Unscrew screen plates (B) => reduces mesh size

NOTICE! Note the teeth on the screen plates – see image!

4.9 Connecting the system

4.9.1 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

- Lay cables of components to control cabinet
 - Lay the cables so that nobody will trip over them!
 - Do not lay the cables over or around sharp edges!

Screening screw upstream of system's stoker / fuel lock:

- Lay all cables and connect to controller / control cabinet
 - **see controller instructions for system**

Discharge (e.g. FBR, TGR, etc.) / every other feed screw:

- Lay and connect all cables to the feed system module
 - **see feed system module installation instructions**
- Wire the connections according to the wiring diagram

4.9.2 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 Initial startup

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, carry out the following checks:

- Check the direction of rotation of the screw
- Check that the safety limit switch on the gravity shaft is working
- Check that the motor overload for the drive motor is working
- Check the connection of the sprinkler device
- Check the shear edge is present in the area of the transition from open to closed trough

When the check is finished:

- Fill the store with fuel

5.2 During operation

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

When filling, or in the event of a fault, the system can be operated in manual mode.

For the necessary steps, and how to display and alter parameters:

NOTICE! See operating instructions for system controller



NOTICE

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

5.3 Decommissioning

5.3.1 Disassembly

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

5.3.2 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

! DANGER

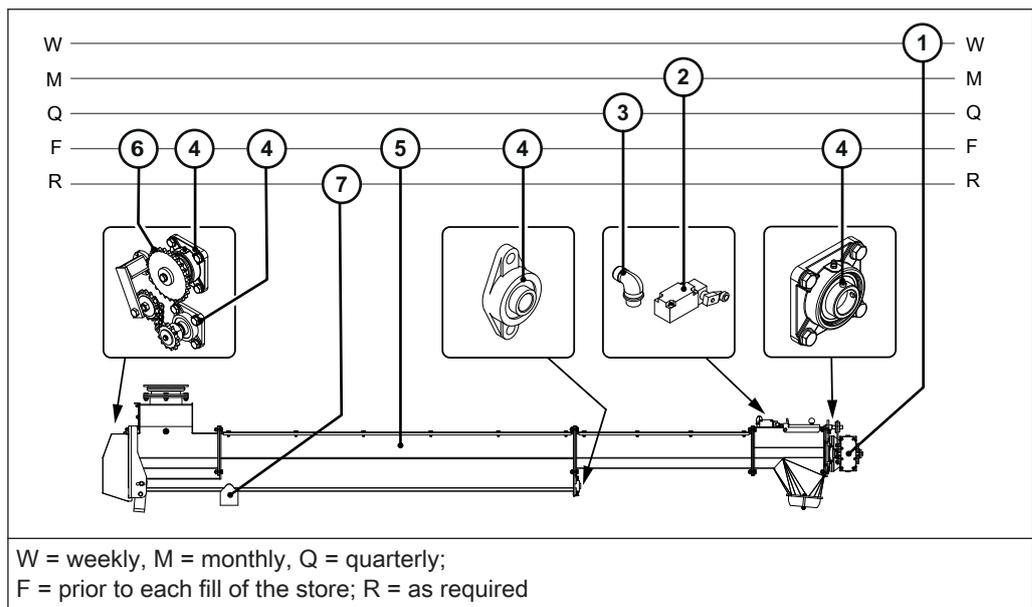
When working on the unit with a live power supply:

Serious injury possible due to automatic startup!

When working on the system or in the store, it is essential that the five safety directives are followed:

- Disconnect all poles on all sides
- Secure so that it cannot be switched on again
- Check that there is no power
- Earth and short circuit
- Cover any adjacent live parts and limit area of risk

6.1 Maintenance schedule



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	Gravity shaft / safety limit switch	M	Function test of the safety limit switch: <ul style="list-style-type: none"> <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 gravity shaft cover <input type="checkbox"/> Check fault message on the controller
3	Sprinkler system	Q	Sprinkler system function test: <ul style="list-style-type: none"> <input type="checkbox"/> Note the manufacturer's specifications

No	Component	Int.	Operation
4	Flange bearing	F	<input type="checkbox"/> Lubricate bearing at lubricating nipple with grease gun
5	Trough / screw		<input type="checkbox"/> Check trough and screw for dirt and damage <input type="checkbox"/> Check the screw blades for wear
6	Sprockets / chain		<input type="checkbox"/> Check sprockets and chain for dirt and damage <input type="checkbox"/> Lubricate chain
7	Fines container	R	<input type="checkbox"/> Empty fines container ↳ Interval depends on raw material and volume of container

7 Troubleshooting

7.1 Error list

Error characteristics	Possible cause	Error resolution
Discharge empty (level sensor!)	<input type="checkbox"/> No fuel in the container <input type="checkbox"/> Motor defective <input type="checkbox"/> Bridge formation in the gravity shaft	<input type="checkbox"/> Check the store and refill with fuel if necessary <input type="checkbox"/> Check the motor and wiring for damage <input type="checkbox"/> Open the inspection cover and check the gravity shaft for material build-up
Gravity shaft cover is open!	<input type="checkbox"/> Gravity shaft opened manually <input type="checkbox"/> Position switch defective <input type="checkbox"/> Bridge formation in the gravity shaft <input type="checkbox"/> Fuel pieces too large for gravity shaft	<input type="checkbox"/> Close gravity shaft cover <input type="checkbox"/> Check the position switch and wiring for damage <input type="checkbox"/> Open the inspection cover and check the gravity shaft for fuel build-up
Gravity shaft empty (level sensor!)	<input type="checkbox"/> No fuel in the container <input type="checkbox"/> Motor defective <input type="checkbox"/> Bridge formation in the gravity shaft <input type="checkbox"/> Screw blocked	<input type="checkbox"/> Check the store and refill with fuel if necessary <input type="checkbox"/> Check the motor and wiring for damage <input type="checkbox"/> Open the inspection cover and check the gravity shaft for material build-up <input type="checkbox"/> Free the screw
Gravity shaft does not fill	<input type="checkbox"/> Screw blocked	<input type="checkbox"/> Move the discharge screw backwards and forwards briefly a few times in test mode/manual mode If the error message does not disappear: <input type="checkbox"/> Check the discharge screw for blockages and free if necessary
Gravity shaft full		
Motor prot. disch conv!		
Motor prot. fault feed conv.	<input type="checkbox"/> Feed screw blocked	<input type="checkbox"/> Move the feed screw backwards and forwards briefly a few times in test mode/manual mode If the error message does not disappear: <input type="checkbox"/> Check the screw for blockages and free if necessary
Freq. o/current disch conv.	<input type="checkbox"/> Revised too often on blockage	<input type="checkbox"/> Free the discharge screw and clear blockage (foreign body)
Screening screw not feeding	<input type="checkbox"/> Chain snapped <input type="checkbox"/> Ejection pipe or connection line to container blocked <input type="checkbox"/> Screen busy	<input type="checkbox"/> Check that sprockets are flush, replace chain <input type="checkbox"/> Check ejection pipe / connection line for material build-up <input type="checkbox"/> Open trough and clean screen

8 Appendix

8.1 Addresses

8.1.1 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
INTERNET www.froeling.com

8.1.2 Address of the installer

Stamp