

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

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.

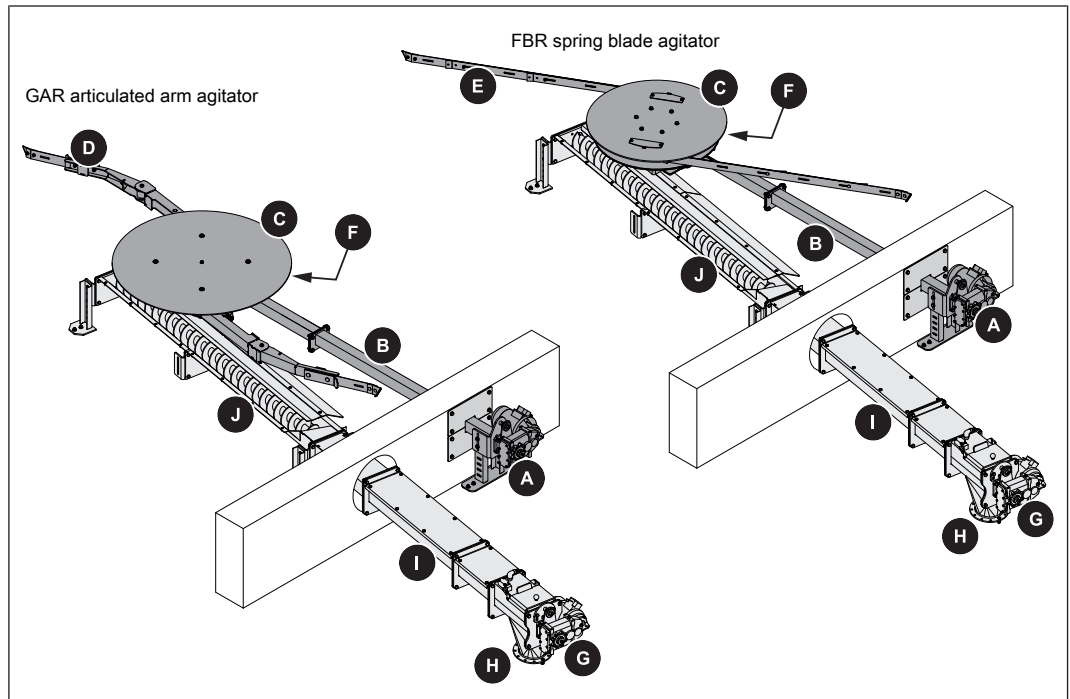
Subject to technical change.

*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



A	Rotary agitator geared motor	F	Rotary agitator mitre gear
B	Rotary agitator duct with drive shaft	G	Discharge screw geared motor
C	Agitator head	H	Upper part of gravity shaft
D	Articulated arms with spring piles (GAR)	I	Discharge screw closed trough
E	Spring piles (FBR)	J	Discharge screw open trough

When the store is full, the agitator arms are positioned at the agitator plate, reducing resistance during system operation due to the smaller diameter.

When fuel is requested by the boiler controller, the system starts and the material is loosened by the pre-tensioned agitator arms, and fed to the open trough of the discharge screw. The discharge screw feeds the material to the transfer position, where it falls through the burn back protection system (burn back flap/rotary valve) into the stoker screw of the boiler which is positioned below or into another feed screw.

Irrespective of the discharge screw, the feed output can be varied by means of the separate drive of the agitator.

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 "Separate rotary agitator drive FBR-G / GAR-G" 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

Designation to EN ISO 17225-4	Description
M20	Water content max. 20%
M30	Water content max. 30%
M35	Water content max. 35%
P16s	Main proportion (at least 60% by mass): 3.15 – 16 mm, max. length of 45 mm, previously referred to as fine wood chips G30
P31s	Main proportion (at least 60% by mass): 3.15 – 31.5 mm, max. length of 120 mm, previously referred to as medium-sized wood chips G50

Note on standards

EU:	Fuel to EN ISO 17225 – Part 4: Wood chips class A1+A2 / P16s-P31s M35
Additional for Germany:	Fuel class 4 (§3 of the 1st Federal Emissions Protection Ordinance (BImSchV) in the latest amended version)

Wood pellets

Wood pellets made from natural wood with a diameter of 6 mm

Note on standards

EU:	Fuel acc. to EN ISO 17225 - Part 2: Wood pellets class A1 / D06
and/or:	ENplus / DINplus certification scheme

General note:

Before refilling the store, check for pellet dust and clean if necessary.

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 Installation room:

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

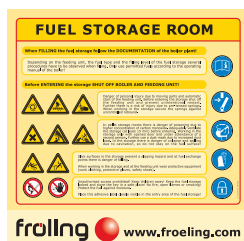
The system must be installed and commissioned in accordance with the local fire and building regulations. The following standards and regulations should always be observed:

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

- 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, refer to 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.

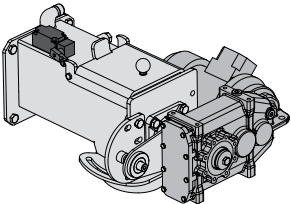
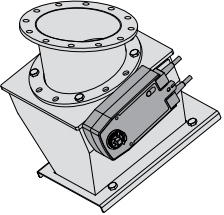
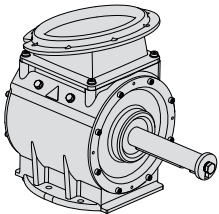
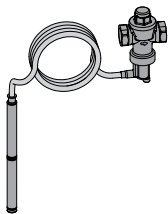
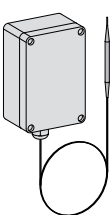
There is a risk of carbon monoxide poisoning in the pellet stores. Adequately ventilate the store before entering (at least 15 mins.). Only enter the store under the supervision of a second person. While in the store, keep the door open and use a dust mask! There is a risk of collapse and being buried 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 against moisture.

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 <ul style="list-style-type: none"> ↳ The power supply remains switched on
<p>Burn back flap:</p> 	<p>The burn back protection system (BPS) is part of the boiler and is located directly below the top part of the gravity shaft. During the heating up phase, after loading has taken place and in the event of a fault, it reliably disconnects the discharge and infeed devices, preventing fire from spreading to the fuel store.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Depending on the design of the system, a burn back flap or a rotary valve is fitted.
<p>Rotary valve:</p> 	
<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>
<p>TMF:</p> 	<p>Temperature monitoring device in the fuel store (as per TRVB H118, Austria only) which activates the customer's alarm(s) when the temperature in the fuel store exceeds 70°C.</p>

2.6 Residual risks

DANGER

When working on rotary agitator arms:

Serious injuries possible from pre-tensioned rotary agitator arms!

When working on the rotary agitator arms, you must therefore:

- ☐ Loosen the tension in the rotary agitator arms, or secure them so they cannot spring back in an uncontrolled way before dismantling them

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



NOTICE

Filling the store when the discharge system is switched off

Equipment damage hazard.

Due to the high resistance from the weight of the fuel on the rotary agitator arms, the system cannot be started. The drive would be overloaded

- ☐ Take the following precautions:
 - ↪ The discharge system must be switched on during filling, see the section “Filling/refilling the store with fuel”

NOTICE

If the rotary agitator arms touch the fuel store wall:

damage to equipment may occur

If the structural layout means that the rotary agitator arms come into contact with the fuel store wall:

- ☐ rotary agitator arms can dislodge pieces of plaster
- ☐ Pieces of wall or plaster that have broken off can block the discharge system or disrupt the material feed into the boiler, causing a system failure.
 - ↳ If this happens:
- ☐ Fit an approx. 300 mm high covering made of sheet metal or hardwood to the fuel store wall.
 - ↳ Froling offers a ready-made wall protection pack for this purpose. The staff at Froling will be happy to advise you.

NOTICE

If non-permitted 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 this manual.

NOTICE

Operating the discharge system at too steep a gradient angle

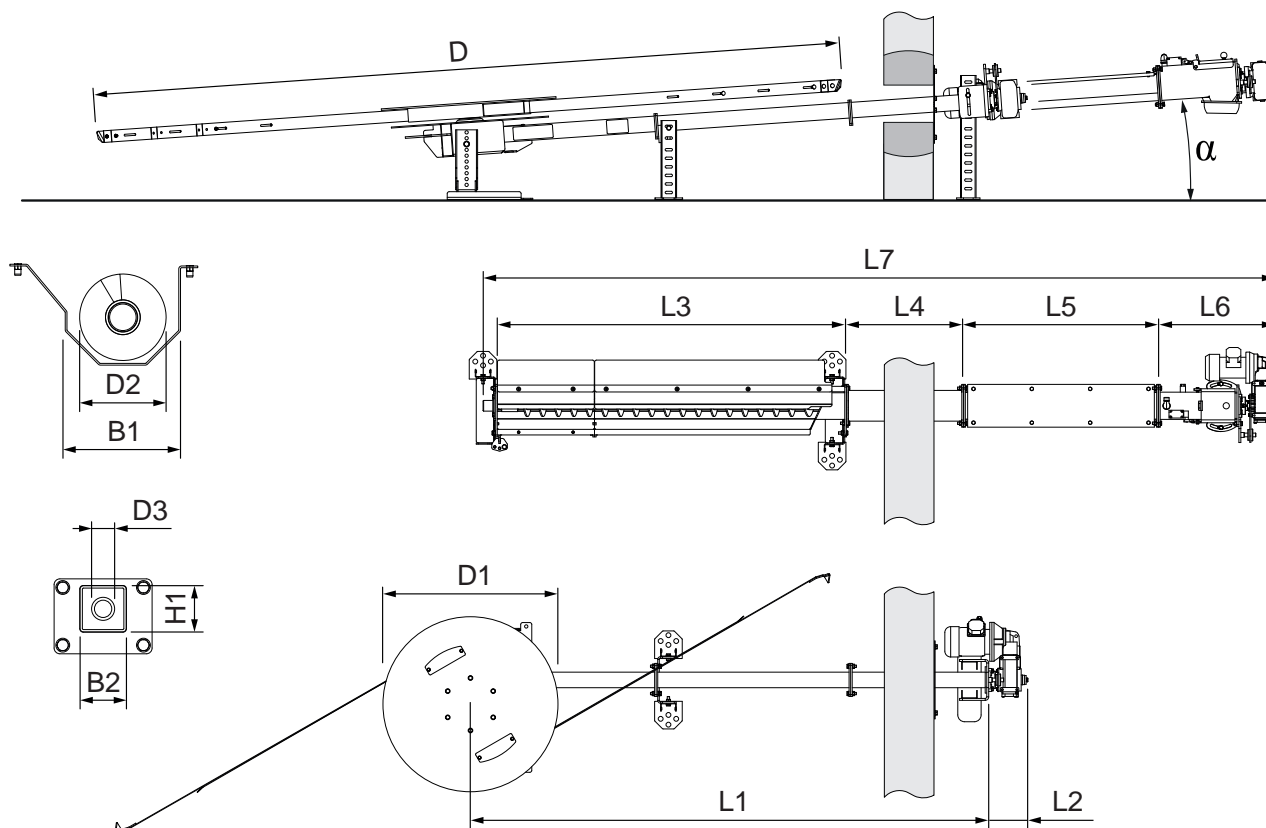
The mitre gear can break due to insufficient lubrication!

When installing the discharge system, you should therefore ensure:

- ☐ FBR with wood chips gradient angle α maximum 15°
- ☐ FBR with pellets gradient angle α maximum 5°
- ☐ GAR with wood chips gradient angle α maximum 10°
- ☐ GAR with pellets gradient angle α maximum 3°
 - ↳ The rotary agitator should always be fitted as flat as the place of installation allows

3 Technical information

3.1 Dimensions

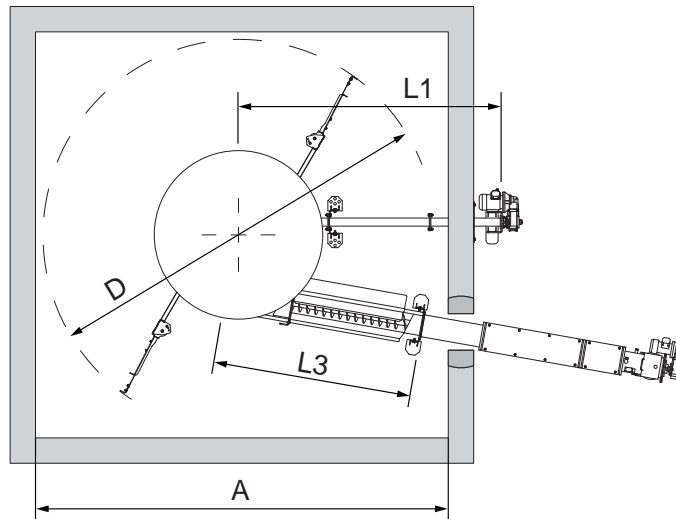


Ref.	Description	FBR 110	GAR 110	FBR 150	GAR 150	FBR 200	GAR 200
D	Diameter of spring blade (FBR) / articulated arm (GAR)	↻ "Store sizes" [▶ 16]					
D1	Diameter of rotary agitator plate	900 mm	1300 mm	900 mm	1300 mm	900 mm	1300 mm
D2	Diameter, screw	110 mm		150 mm		190 mm	
D3	Diameter of drive shaft	40 mm					
W1	Width of trough screw	140 mm		200 mm		250 mm	
W2	Width of rotary agitator duct	80 mm					
H1	Height of rotary agitator duct	80 mm					
L1	Length of rotary agitator duct	↻ "Store sizes" [▶ 16]					
L2	Length of geared motor	194 mm					
L3	Length of open trough	↻ "Store sizes" [▶ 16]					
L4	Length of transfer channel	600 mm					
L5	Length of closed trough	Varies – available in lengths from 100 mm					
L6	Length of gravity shaft top + geared motor	590 mm		600 mm		750 mm	
L7	Length of screw	Determined during planning of the store					
α	Gradient angle for wood chips	0 – 15 °	0 – 10 °	0 – 15 °	0 – 10 °	0 – 15 °	0 – 10 °
	Gradient angle for pellets	0 – 5 °	0 – 3 °	0 – 5 °	0 – 3 °	0 – 5 °	0 – 3 °

3.2 Store sizes

The spring blade / articulated arm diameter and the length of the open trough / agitator channel vary depending on the size of the store. The tables below show the respective dimensions.

IMPORTANT! The nominal diameter of the discharge system must be selected according to the side length (A) of the space that runs parallel to the agitator channel.



FBR spring blade agitator		2.0 ²⁾	2.5 ²⁾	3.0	3.5	4.0	4.5	5.0
Length of the store in the direction of the agitator (A)	m	≤ 2.0	≤ 2.5	≤ 3.0	≤3.5	≤ 4.0	≤ 4.5	≤ 5.0
Nominal diameter	mm	2000	2500	3000	3500	4000	4500	5000
Spring blade diameter (D) ¹⁾		2400	2950	3450	4000	4500	5050	5600
Length of rotary agitator duct (L1)		1650	1900	2150	2400	2650	2900	3150
Length of open trough (L3) - Screw Ø 110 - Screw Ø 150		1045 ²⁾ -	1295 ²⁾ -	1545 1595	1795 1845	2045 2095	2295 2345	2545 2595
Length of open trough (L3) - Screw Ø 110 - Screw Ø 150 (for extra long screws)		1545 -	2045 -	2545 2595	3045 3095	3545 3595	4045 4095	4545 4595
Maximum height of dumped material ³⁾ - Pellets - Wood chips	m	2.5 5.0						
1. The spring blades have a certain oversize to ensure optimum use of the fuel store 2. Available only for screw Ø 110 3. The greater the height of the pile of dumped material, the greater the likelihood of creation of voids								

GAR articulated arm agitator		5.0	5.5	6.0
Length of the store in the direction of the agitator	m	≤ 5.0	≤ 5.5	≤ 6.0
Articulated arm diameter (D)	mm	5000	5500	6000
Length of rotary agitator duct (L1)		3165	3415	3665
Length of open trough (L3) - Screw Ø 110 - Screw Ø 150		2545 2595	2795 2845	3045 3095
Length of open trough (L3) - Screw Ø 110 - Screw Ø 150 (for extra long screws)		4545 4595	5045 5095	5545 5595
Maximum height of dumped material ¹⁾ - Pellets - Wood chips	m	3.0 6.0		

1. The greater the height of the pile of dumped material, the greater the likelihood of creation of voids

3.3 Technical specifications

Agitator geared motor

Name	FBR	GAR
Output	0.37 kW	0.55 kW
Speed	10.5 rpm	10.5 rpm.

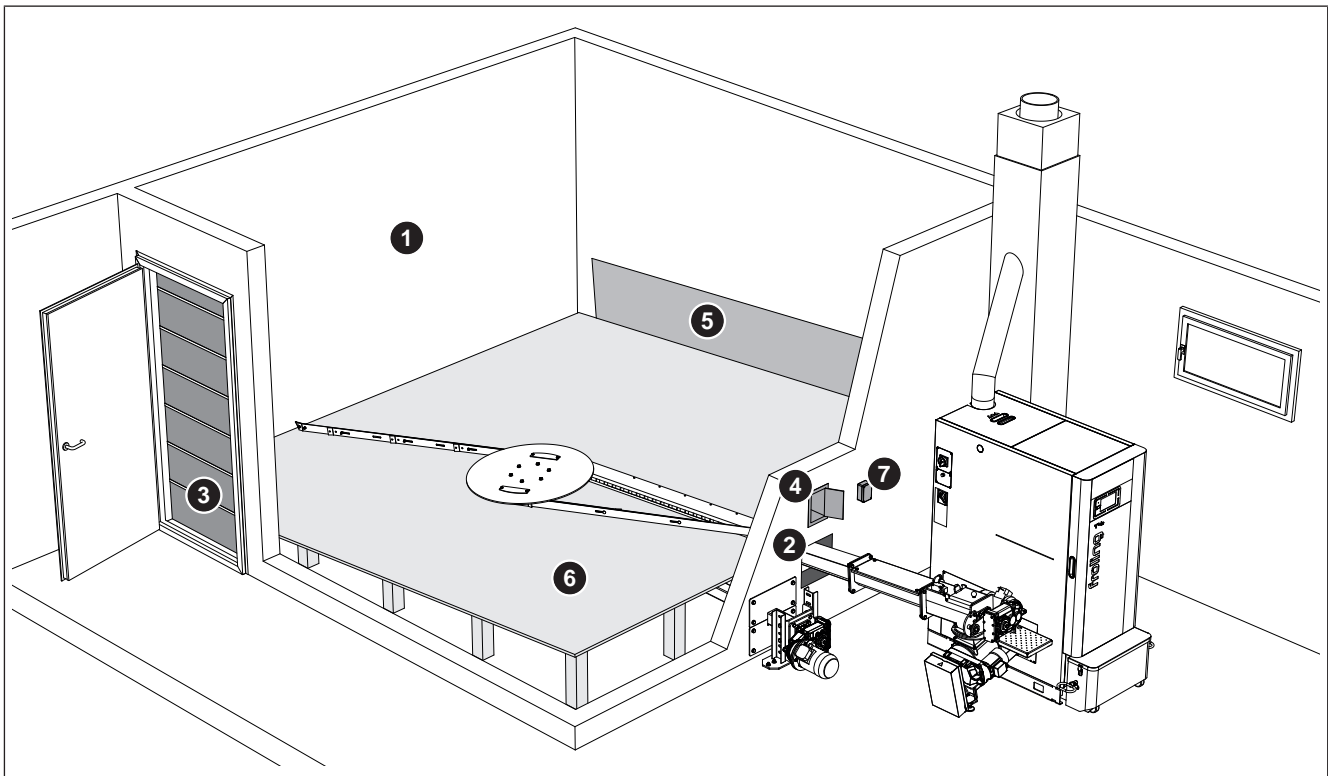
Discharge screw geared motor

Boiler Output	Screw Diameter	Standard length ¹⁾		Extra long ¹⁾	
20-75 kW	Ø 110	4-5 rpm	0.25 kW	4-5 rpm	0.37 kW
80-120 kW		10-11 rpm	0.37 kW	10-11 rpm	0.55 kW
130-180 kW	Ø 150	4-5 rpm	0.25 kW	4-5 rpm	0.37 kW
200-350 kW		10-11 rpm	0.55 kW	10-11 rpm	0.75 kW
400-550 kW	Ø 200	10-11 rpm	0.55 kW	10-11 rpm	0.75 kW

1. The data are applicable for wood chip fuel. If the fuel used is pellets the data may vary depending on the system.

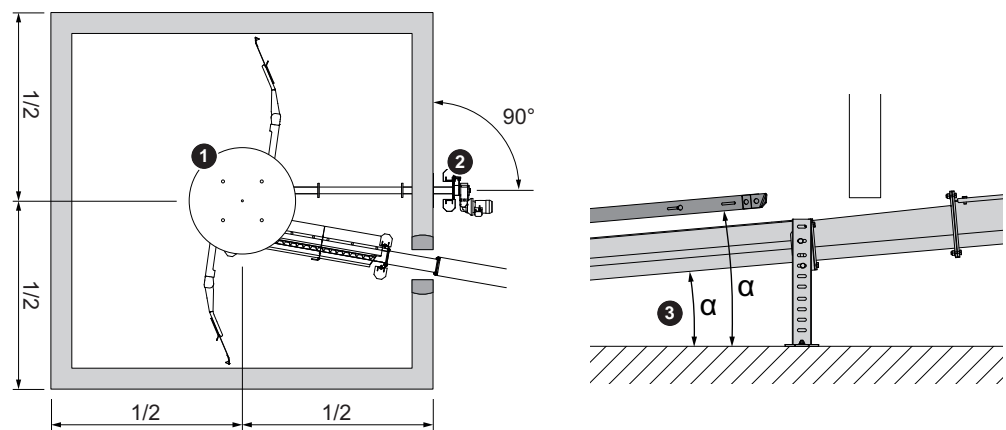
Geared motor power supply	400 VAC / 50 Hz
Safety switch	24 VDC

4 Design information



Store room details		Design information
1	Walls and ceilings	The walls and ceilings of the store and the boiler room must be fire-proof (REI 90) in compliance with local regulations
2	Hole in wall	Do not fix or cement the transfer trough and agitator channel to the brickwork as this can create a bridge transferring mechanical noise and vibration into the entire brickwork! For this reason, fill any gaps around holes made in walls with insulating material to EN 1366-3 and EN 13501-2. For the dimensions of the opening see the heading "Wall penetration"
3	Boarding the store door	The store door must be a fire door with an EI ₂₃₀ -C fire resistance rating; it must have a seal. Wooden boards should also be fitted on the interior of the store so that the fuel does not press against the door.
4	Inspection opening	Maintenance opening with class EI ₂₉₀ -C fire resistance rating (e.g. chimney door) immediately over the hole in the wall for easy clearance of any blockages from oversized material around the shear edge of the discharge screw. The inspection opening must be designed in such a way that it can only be opened with a tool. The operator must highlight residual risks at the inspection opening.
5	Side wall protection	If the structure of the store means that the arms come into contact with the wall (rectangular room), we recommend that you fit an approx. 300 mm high covering made of sheet metal or hardwood to the wall of the store. This prevents pieces of the wall and plaster from breaking off and blocking the discharge system.
6	Raised floor	This prevents material from remaining below the rotary agitator arms. This material would decay, and this could affect the heating value. For this reason, we recommend that the customer installs a raised floor. The construction should be dimensioned so that the raised floor is not deformed under the static load of the fuel. The raised floor must also be self-supporting, and it should not be supported by the screw channel.
7	Temperature monitoring in the fuel store (TMF)	Position the temperature sensor in the fuel store at the transition from open to closed trough. If the temperature exceeds the set limit (approx. 70 °C or a maximum of 20 °C above the highest anticipated ambient temperature), warning device(s) provided by the customer will be triggered.

4.1 Information about setup



Observe the following points when positioning the equipment:

- Position the agitator head (1) centrally within the room
- Position the agitator channel (2) at right angles to the wall
- The discharge screw and agitator head should be at the same angle (3)

Correct position of the discharge screw

NOTICE

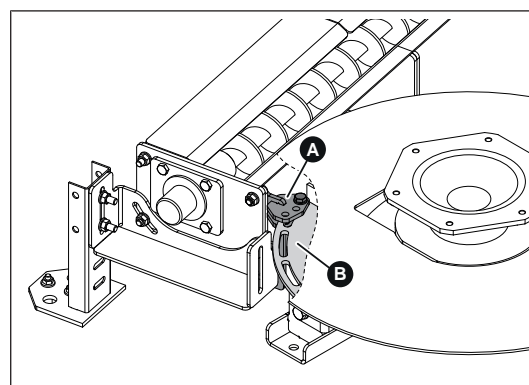
Malfunctioning of discharge system because discharge screw is in incorrect position

Positioning the open trough of the discharge screw next to the rotary agitator plate may cause bridge formation and malfunctioning in the discharge when the bunker is full.

Take the following precautions:

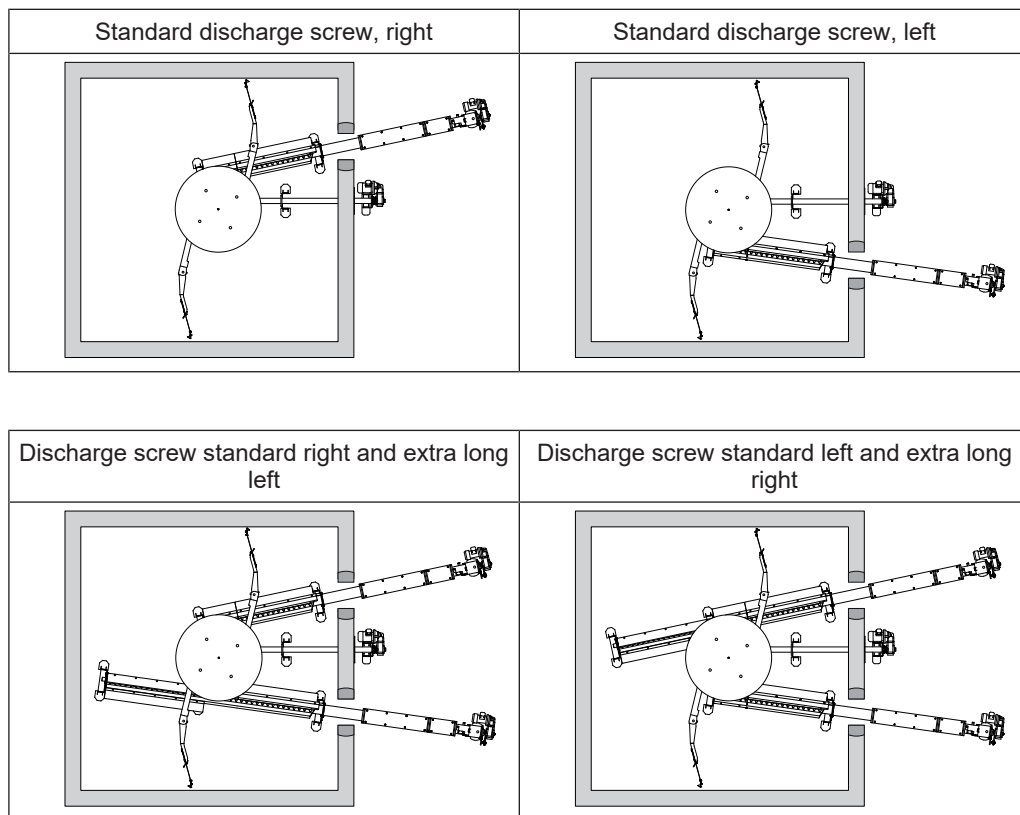
- ☐ Install the discharge screw together with supplied trough holder (A) on the support kit (B)

➔ ["Installing the agitator drive" \[► 40\]](#)



Fitting options for discharge screw

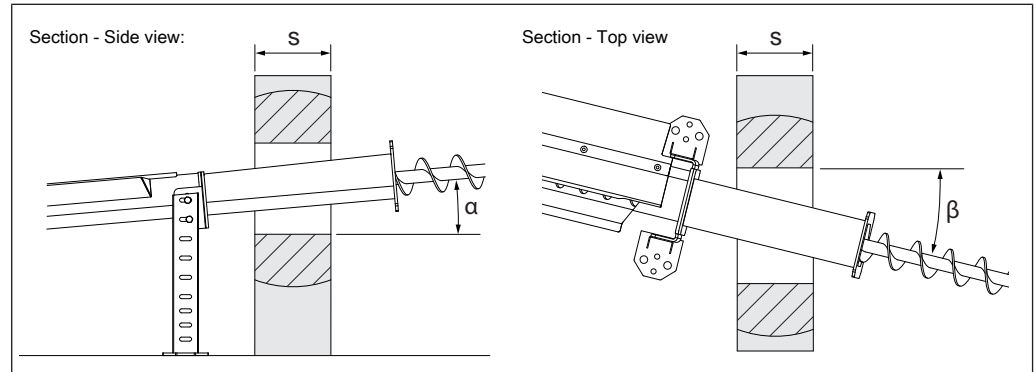
The separate agitator drive means that the discharge screw can be set up in different ways. Below are some examples using a separate rotary agitator drive with GAR. These illustrations apply in the same way to an FBR.



4.2 Wall opening

Before erecting the rotary agitator, the customer must make a hole in the wall for both the trough of the discharge screw and the rotary agitator duct.

Discharge screw trough

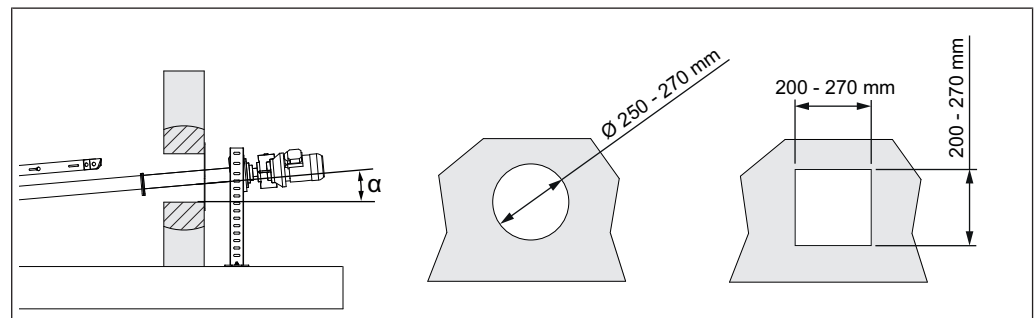


The dimensions of the hole are calculated from the wall thickness (s) and the angle of the trough to the wall (β) or the angle of inclination (α) of the entire system. Experience indicates that an opening of 500 mm x 500 mm is sufficient.

NOTICE! Do not fix the trough to the wall!

NOTICE! Line the hole in the wall with a flexible material!

Rotary agitator duct



The dimensions of the hole depend on the system's angle of inclination (α). Therefore:

- Round hole: Ø min. 250 mm / max. 270 mm
- Square hole: Side length min. 200 mm / max. 270 mm

NOTICE! Do not fix the rotary agitator duct to the wall!

NOTICE! Line the hole in the wall with a flexible material!

5 Transport and handling

The discharge system is supplied part-assembled and packed on a pallet

- ☐ Follow the transport instructions on the packaging!

To prevent damage:

- ☐ Transport components, particularly drive components, with care

A door should be provided in the store or a ceiling opening in the silo for bringing in the unit

- ☐ Note the diameter of the agitator plate!

5.1 Temporary storage

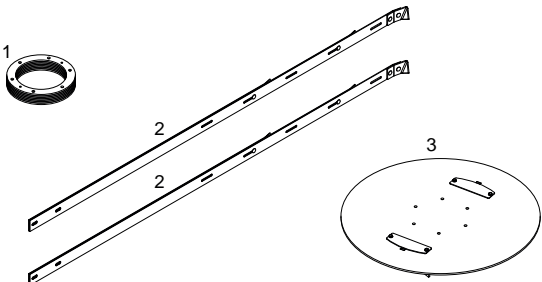
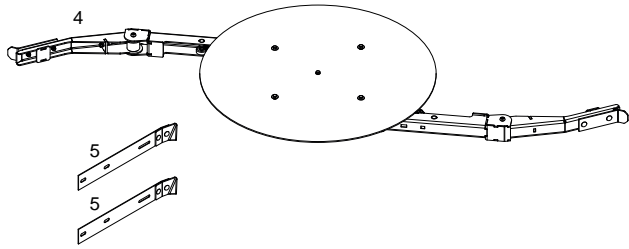
If the system is not going to be assembled immediately:

- ☐ 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!

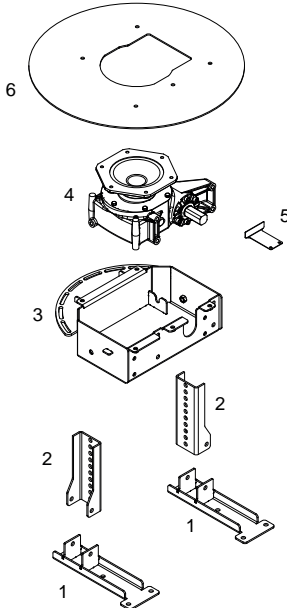
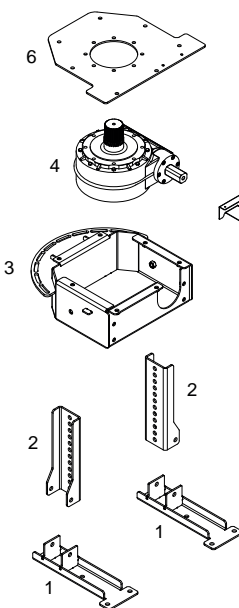
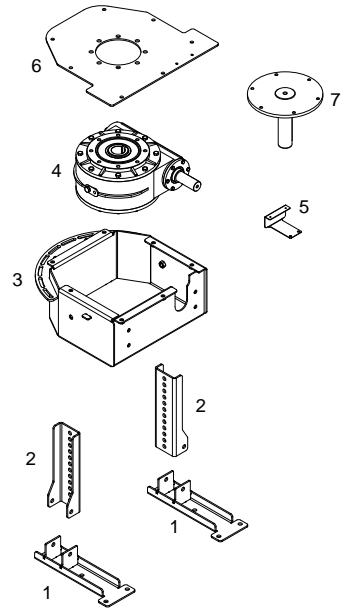
6 Assembly

6.1 Scope of delivery

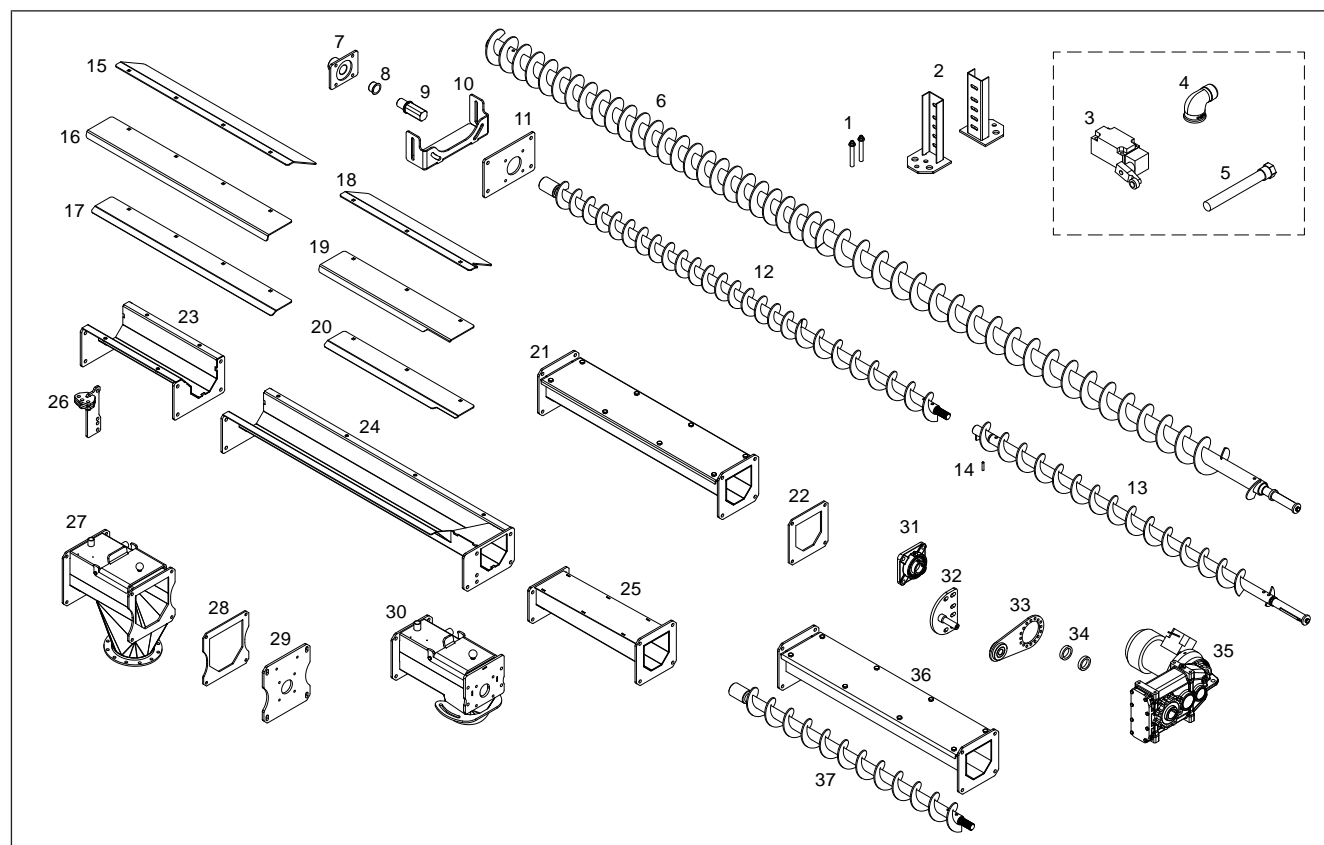
6.1.1 Agitator head

FBR-G	GAR-G
	
1 Spacer ring (for FBR-G with mitre gear RI150)	4 Articulated arm agitator
2 Spring blades	5 Spring blades
3 Agitator plate	

6.1.2 Support kit

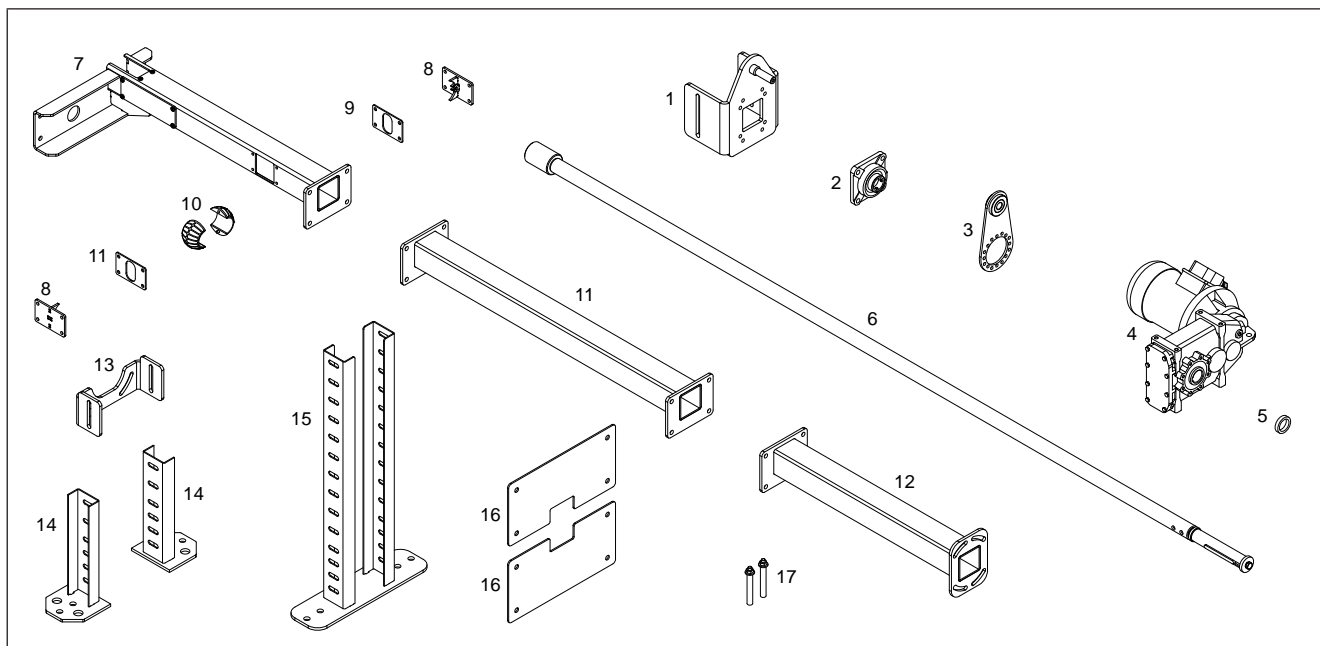
FBR-G (RI 125)	GAR-G (RI 130)	FBR-G / GAR-G (RI 150)
		
1 Floor bracket	5 Cover plate	
2 Adjustable foot	6 Intermediate plate	
3 Gearbox support	7 Adapter	
4 Mitre gear		

6.1.3 Discharge screw



1	Heavy duty anchor	20	Base trough wood chips cover plate
2	Adjustable foot	21	Closed trough
3	Safety limit switch	22	Gasket for closed trough
4	Elbow of sprinkler system	23	Open extension trough
5	Thermal discharge safety device connection	24	Open base trough with cutting edge
6	Single-piece screw (for Ø 200)	25	Transfer channel
7	Plain bearing support	26	Trough holder
8	Plain bearing	27	Upper part of gravity shaft (for Ø 150/200)
9	Bearing end	28	Gasket for upper part of gravity shaft (for Ø 150/200)
10	Adjustable foot support	29	Flange plate (for Ø 150/200)
11	Bearing flange	30	Upper part of gravity shaft (for Ø 110)
12	Basic screw, modular (for 110 / Ø 150)	31	Flanged bearing
13	Extension screw modular (for 110 / Ø 150)	32	Torque support with pin
14	Spring pin (for Ø 110 / 150)	33	Torque support with bearing
15	Extension trough raising plate	34	Spacer ring
16	Extension trough pellet cover plate	35	Geared motor
17	Wood chips extension trough cover plate	36	Closed trough for middle screw (optional)
18	Base trough raising plate	37	Middle screw (optional)
19	Base trough pellet cover plate		

6.1.4 Agitator drive



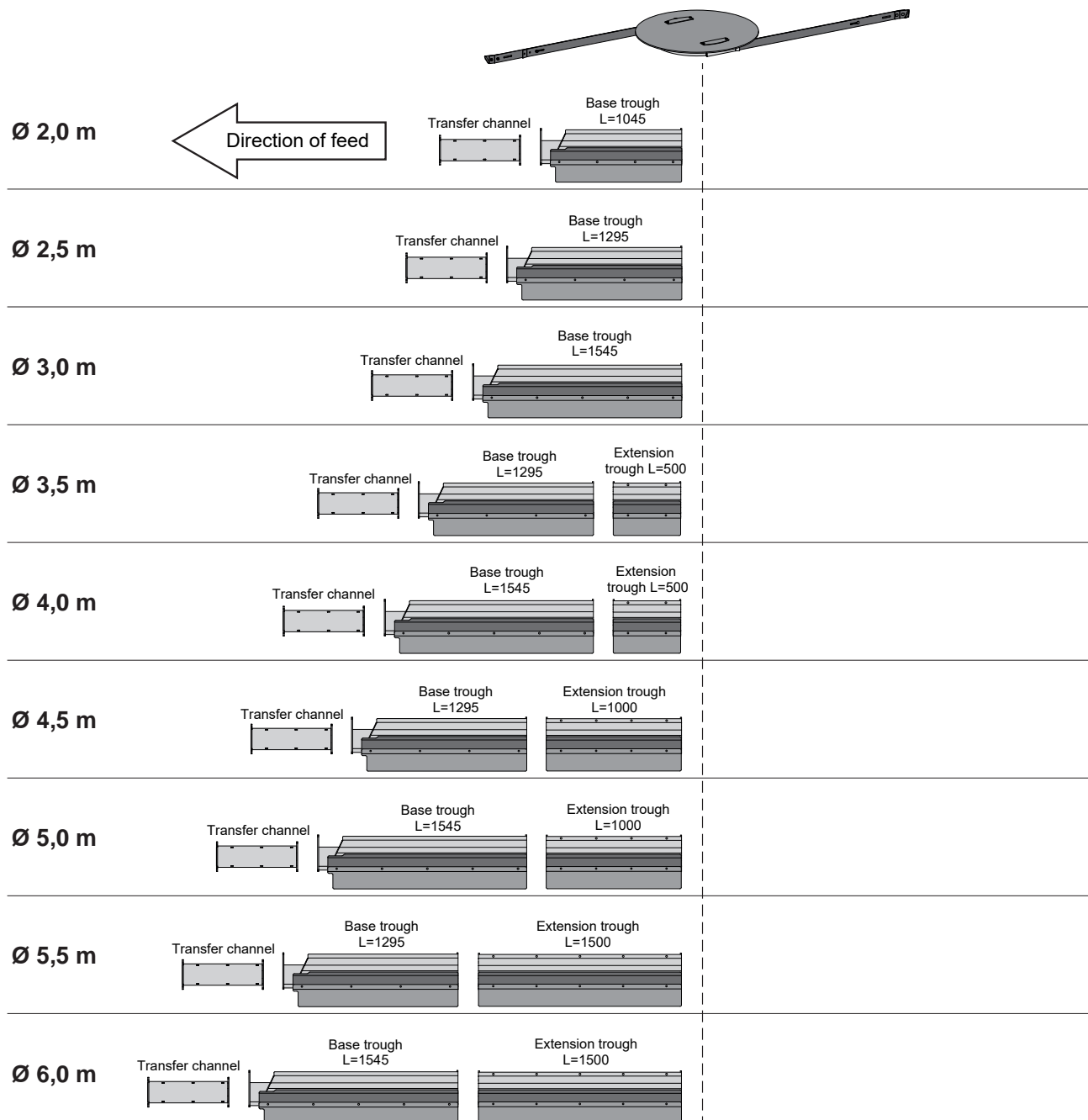
1	Adapter flange plate with torque support	10	Plain bearing calotte
2	Flanged bearing	11	Extension module
3	Torque support with bearing	12	Wall module
4	Geared motor	13	Adjustable foot support
5	Spacer ring	14	Adjustable foot
6	Drive shaft	15	Adjustable foot for geared motor
7	Basic module	16	Wall lining
8	Calotte holder	17	Heavy duty anchor
9	Fibreglass gasket		

6.2 Installing the discharge screw

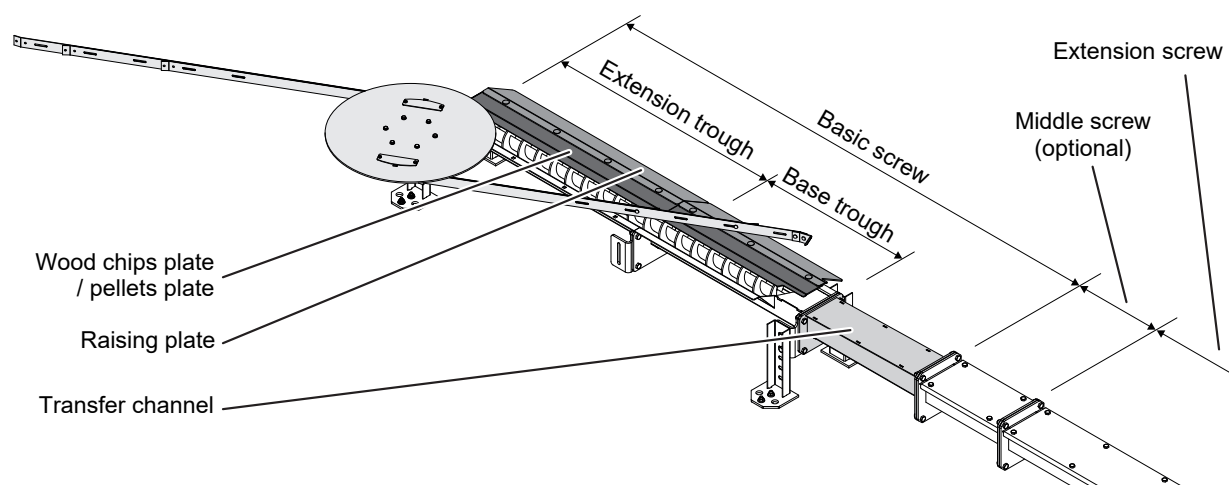
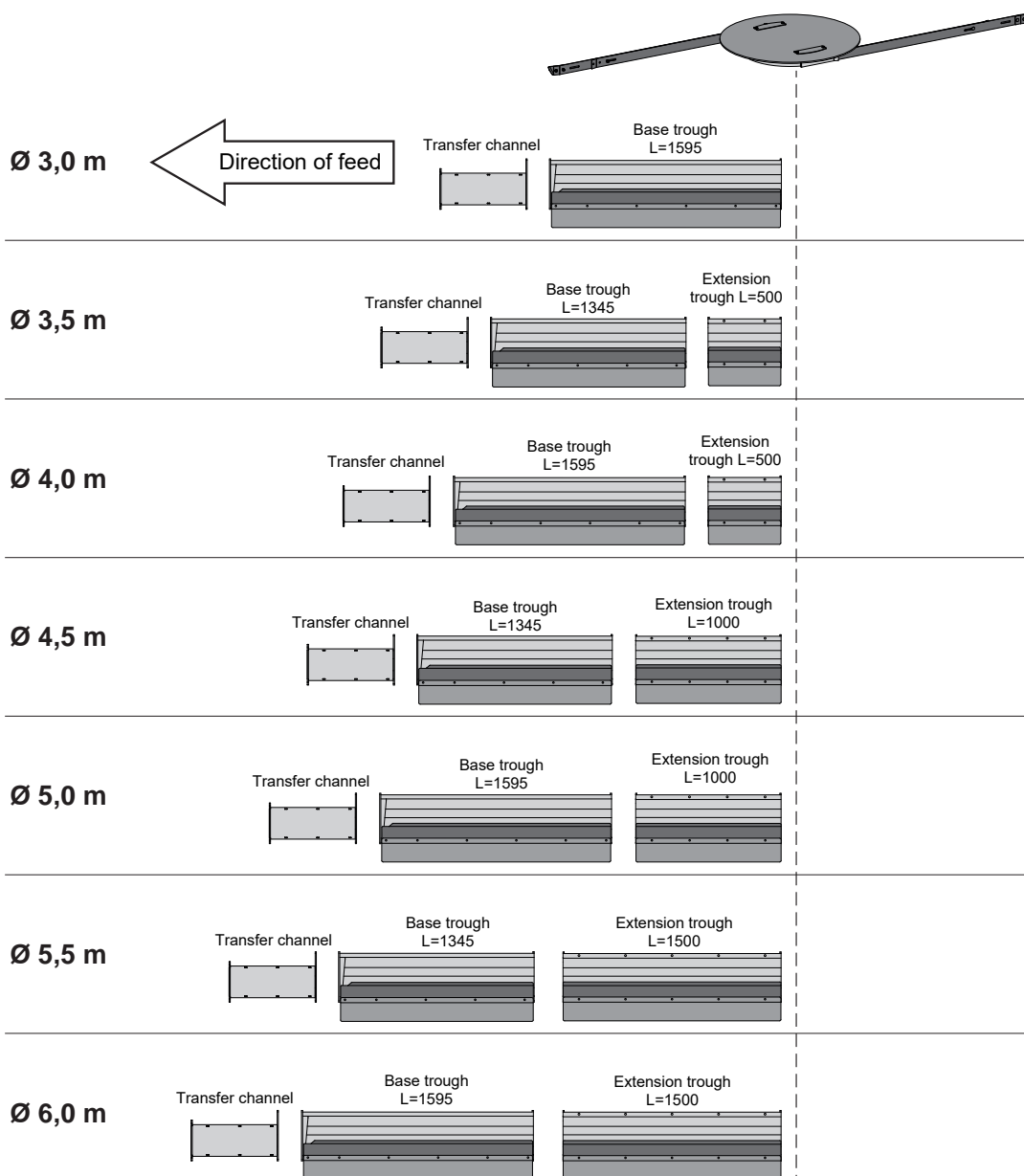
6.2.1 Overview of trough arrangement

The following diagrams show the correct arrangement of the open troughs depending on the diameter of the agitator and diameter of the screw.

Screw Ø 110



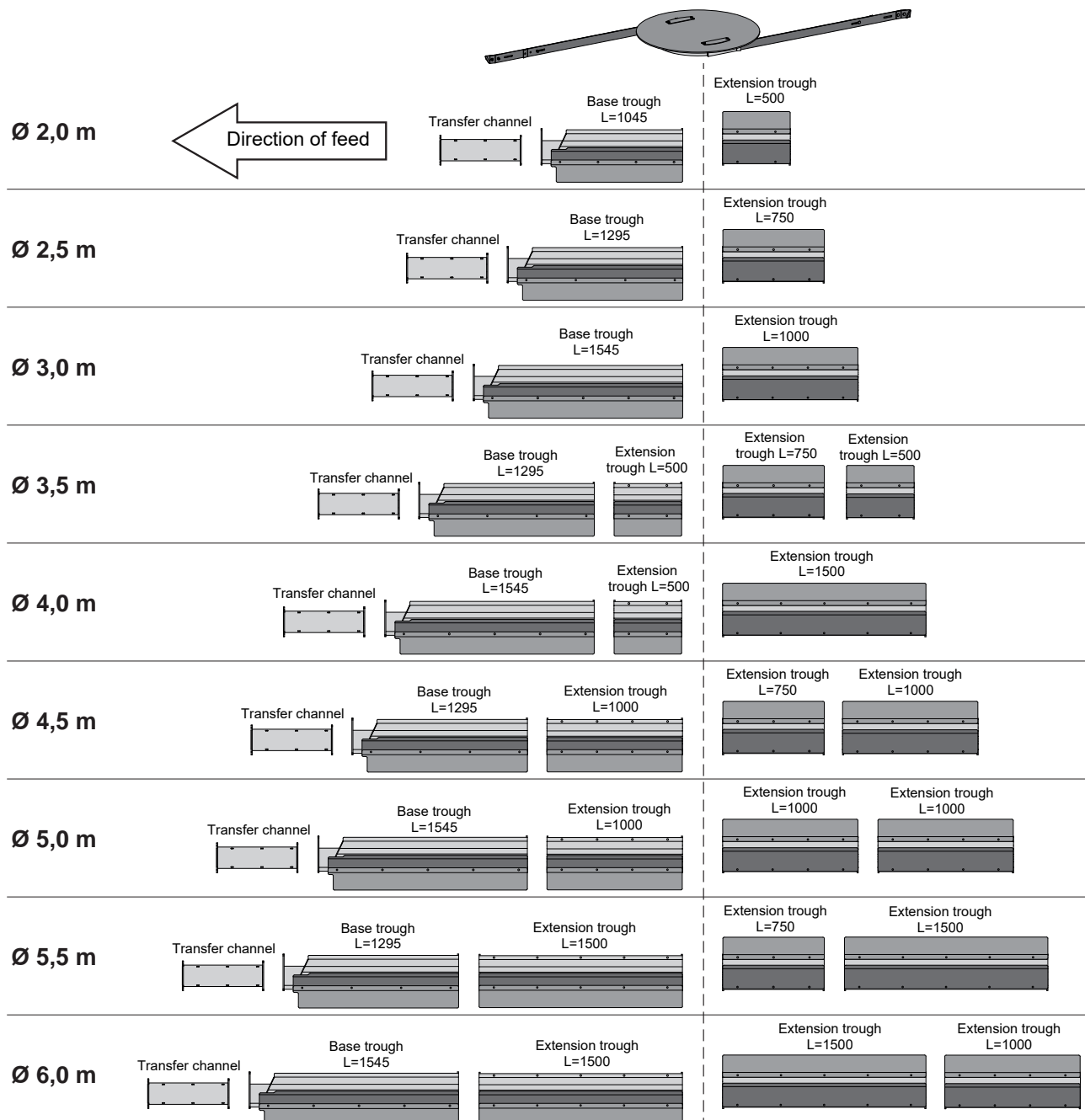
Screw Ø 150 / 200



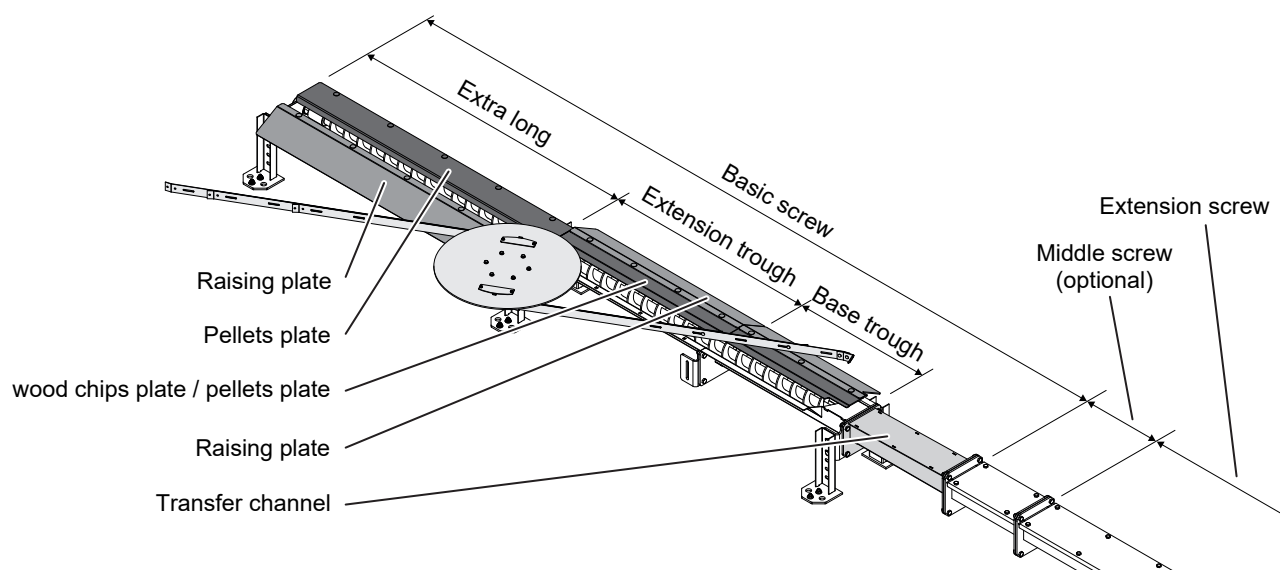
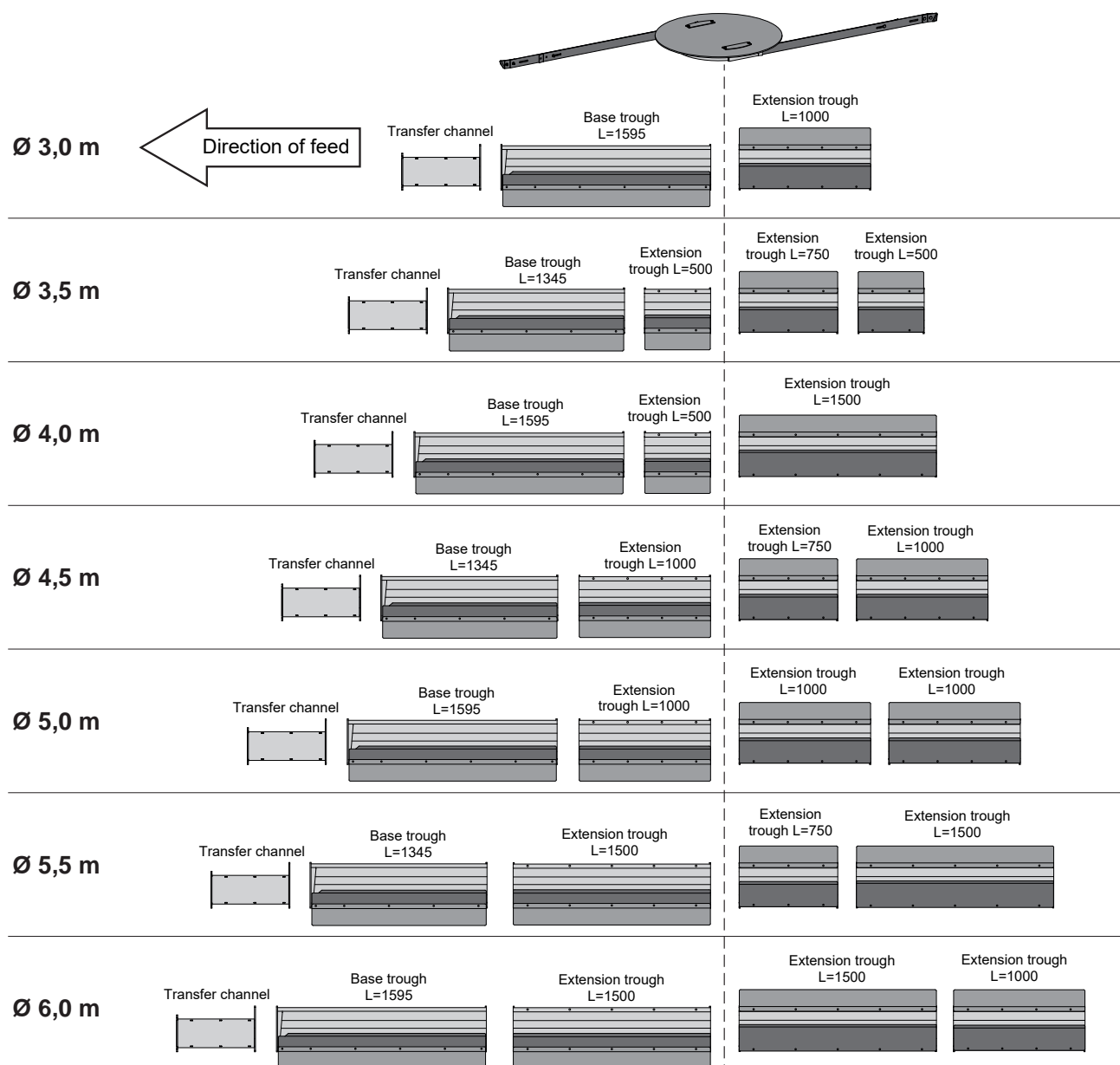
6.2.2 Overview of trough arrangement with extended length

The following diagrams show the correct arrangement of the open troughs depending on the diameter of the agitator and diameter of the screw.

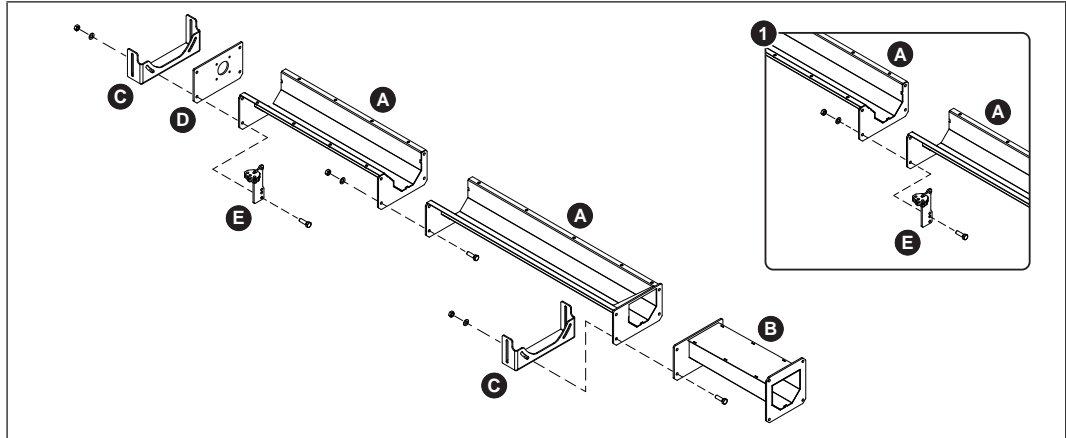
Screw Ø 110



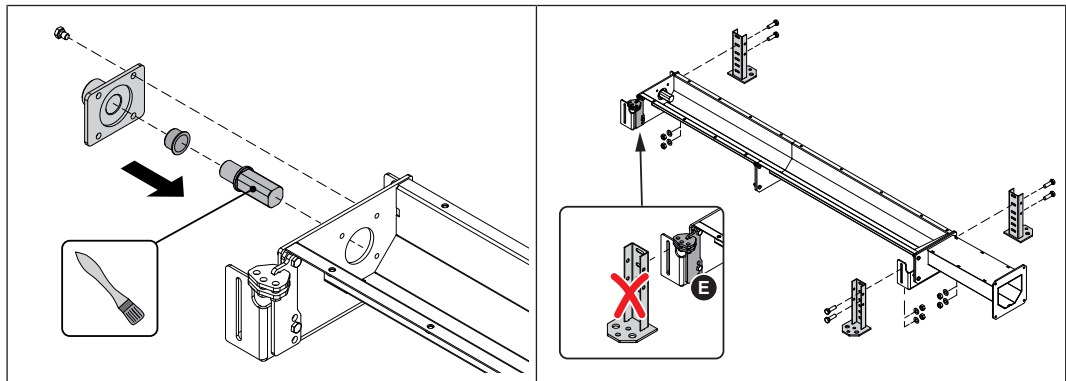
Screw Ø 150 / 200



6.2.3 Fitting the troughs

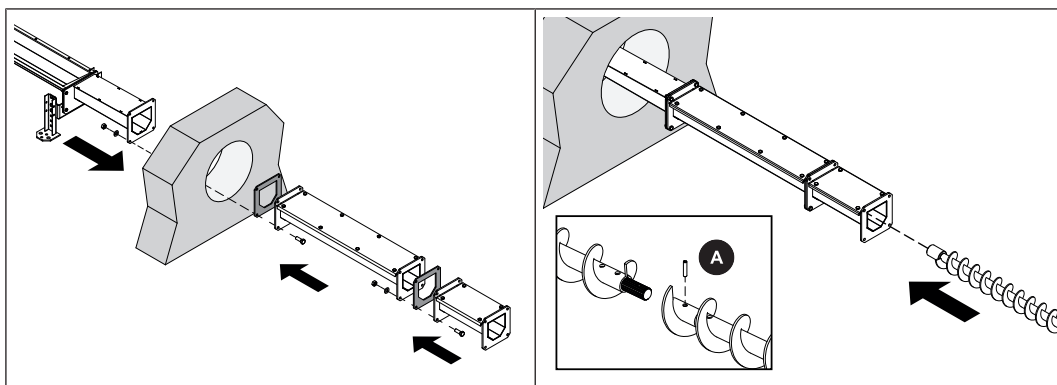


- ❑ Bolt the open troughs (A), transfer channel (B), adjustable foot support (C), flanged bearing (D) and trough holder (E) together
 - 4x hexagon head screws M12 x 35 for each flanged joint
- 🔧 Make sure the troughs are aligned
- 🔧 Install the trough holder (E) on the side of the agitator, see the installation drawing
- 🔧 For an extra long trough (1) install the trough holder (E) in position on the support kit

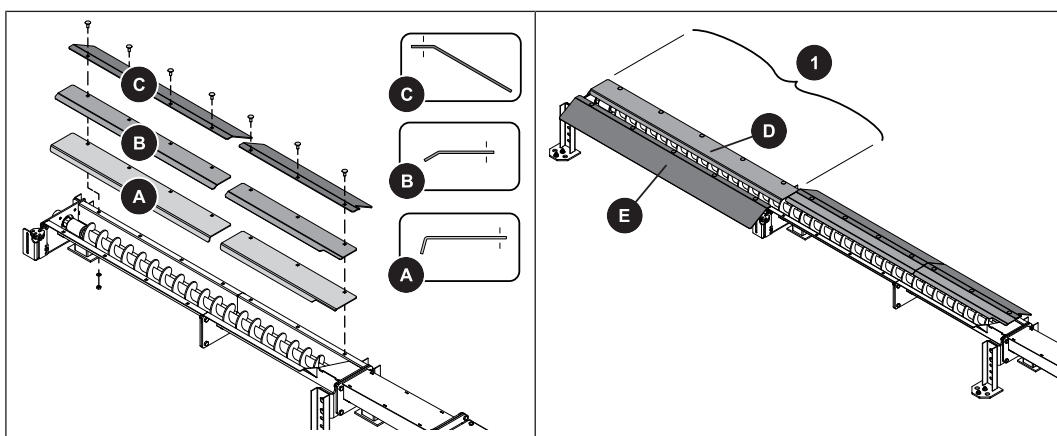


- ❑ Mount the plain bearing support on the bearing flange
 - 4x hexagon head screws M12 x 16
- ❑ Push the bearing end and plain bearing into the plain bearing support
- ❑ Lubricate bearing end with grease
 - 🔧 Recommendation: Molykote BR2 Plus (Froling item no. 55633)
- ❑ Cut the adjustable feet to the desired length and fit them to the adjustable feet supports (E)
 - 2x hexagon screws M12 x 35 for each adjustable foot
 - 🔧 3 adjustable feet for each discharge screw without extended length
 - 🔧 5 adjustable feet for each discharge screw with extended length

NOTICE! No adjustable feet are fitted to the trough holder (E)



- ❑ Position the trough in the store according to the installation drawing
- ❑ Fit the closed troughs with ceramic fibre gasket to the transfer channel
 - 4x hexagon head screws M12 x 35 for each flange connection
 - ↳ Make sure the troughs are aligned
- ❑ Connect the modular feed screws with the spring pin (A)
 - ↳ Spring pin Ø 8 x 40 for Ø 110 mm screw
 - ↳ Spring pin Ø 10 x 60 for Ø 150 mm screw
- ❑ Slide the feed screw into the trough on the boiler room side



Fit the following cover plates to the open trough using M10 x 25 round-head screws:

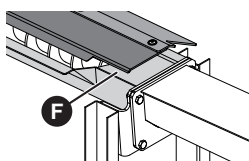
- Pellet cover plate (A) for pellet version
- Wood chips cover plate (B) for wood chips version
- Raising plate (C) for version without raised floor

On extra long trough (1):

- Pellet cover plate (D)
- For versions without raised floor, fit the raising plate (E) on the opposite side

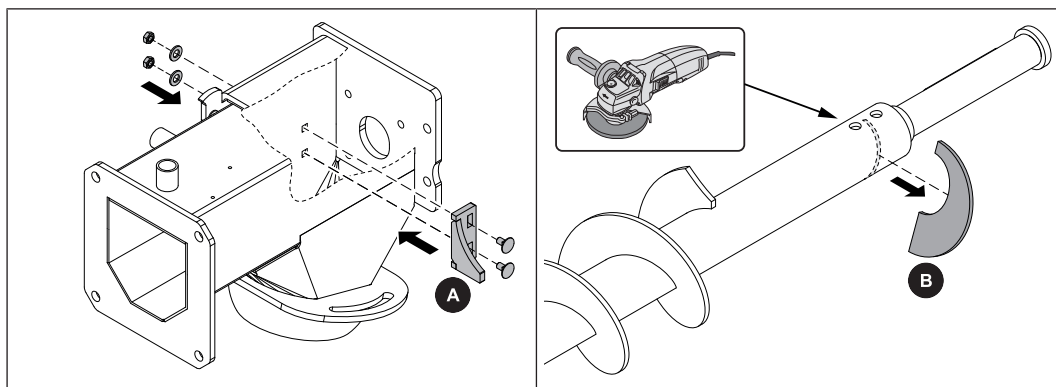
NOTICE! Refer to the overview for the trough arrangement,

➔ "Overview of trough arrangement" [► 26] / ➔ "Overview of trough arrangement with extended length" [► 28]

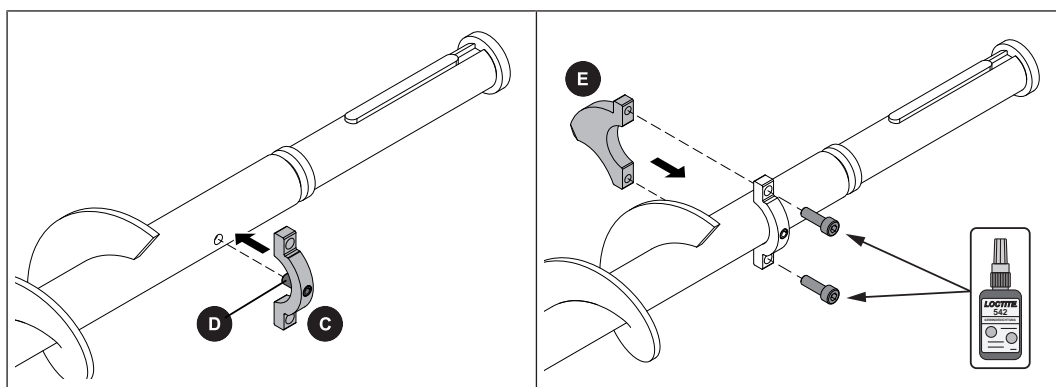


NOTICE! The rear end of the cover plate rests on the cutting edge (D) of the open trough.

6.2.4 Mounting the fibre shredder (optional)



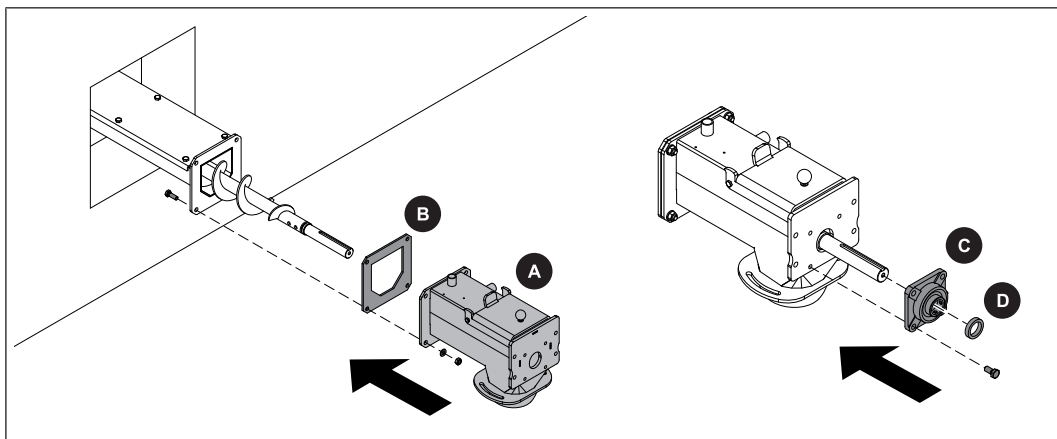
- ☐ Remove the screws on the side of the top part of gravity shaft
- ☐ Instead, mount the shearing jaw (A) on the inside of the top part of gravity shaft as shown
 - 2x round-head screw M8 x 20
- ☐ Remove the counter plate (B) from the screw shaft



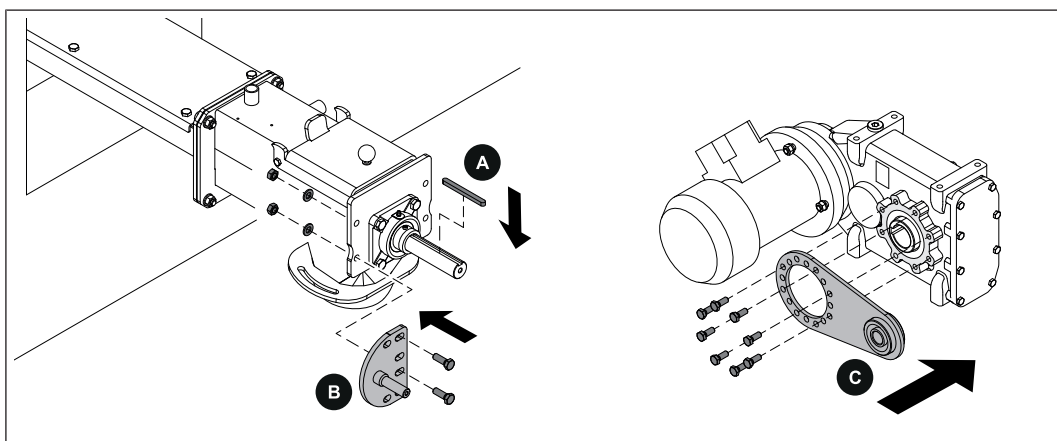
- ☐ Position the clamping jaw (C) on the screw shaft, pushing the spring pin (D) into the hole
- ☐ Fix the clamping jaw (C) and cutting jaw (E) to the screw shaft
 - 2x cylinder head screw M8 x 25
- ☐ Secure screws against loosening with Loctite (Froling item no.: 50378)

6.2.5 Fitting the upper part of gravity shaft and drive unit

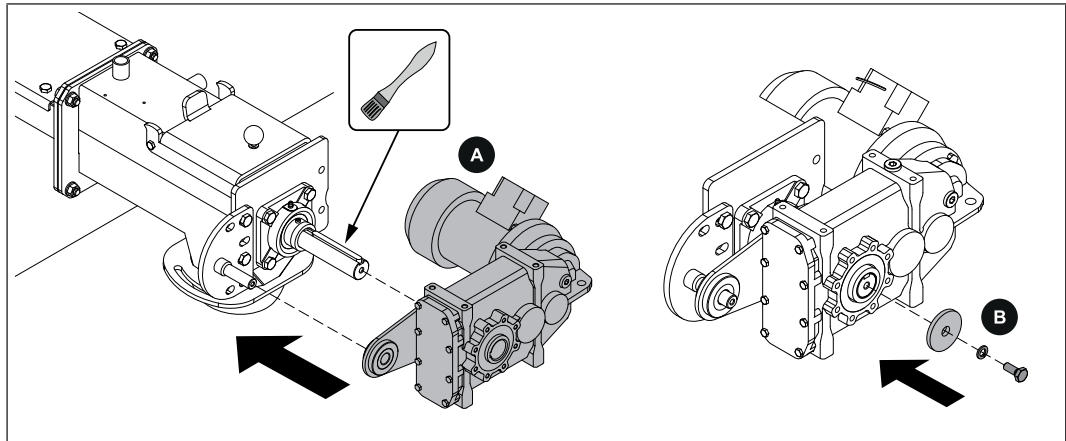
Assembly with screw Ø110



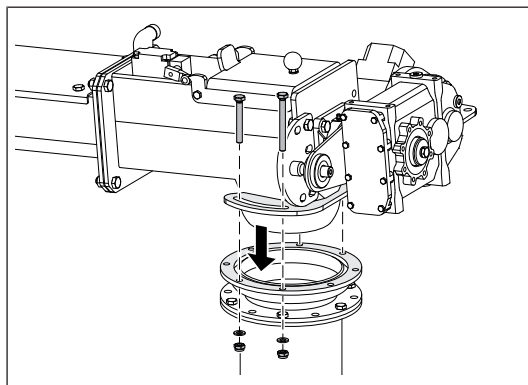
- ☐ Install the upper part of the gravity shaft (A) with gasket (B) to the closed trough on the boiler room side
 - 4 hexagon head screws M12 x 35
- ☐ Install the flange bearing (C) on to the screw stub and fix it to the upper part of the gravity shaft
 - 4 hexagon head screws M12 x 25
- ☐ Push the spacer ring (D) on to the screw stub



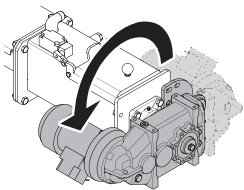
- ☐ Insert the key (A) into the slot on the screw stub
- ☐ Install the torque support with pin on to the upper part of the gravity shaft
 - 2x hexagon head screws M12 x 35
 - ↗ The pin and screw stub must be at the same height
 - ↗ Centre distance of pin and screw end: 150 mm
- ☐ Install the torque support and bearing (A) to the geared motor as shown
 - 8 hexagon head screws M8 x 20



- ☐ Lubricate shaft stub incl. key with copper paste
- ☐ Push the geared motor (A) on to the screw stub
- ☐ Fit the locking washer Ø 45 x 8 (B) on to the shaft stub
 - 1 hexagon head screw M10 x 25



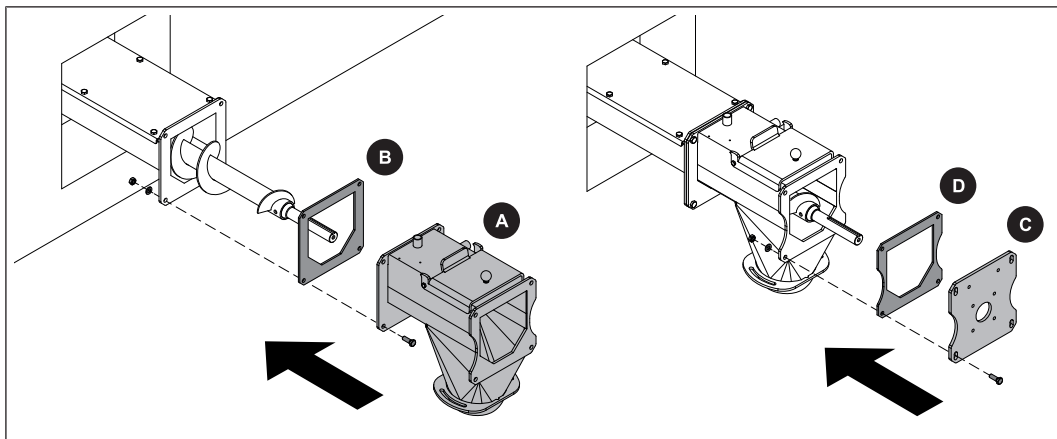
- ☐ Install the upper part of the gravity shaft
 - 2x hexagon head screws M10 x 80
 - 2x hexagon head screws M10 x 100
- ↳ Depending on the design of the system, installation on the cup of the downpipe, stoker or intermediate screw



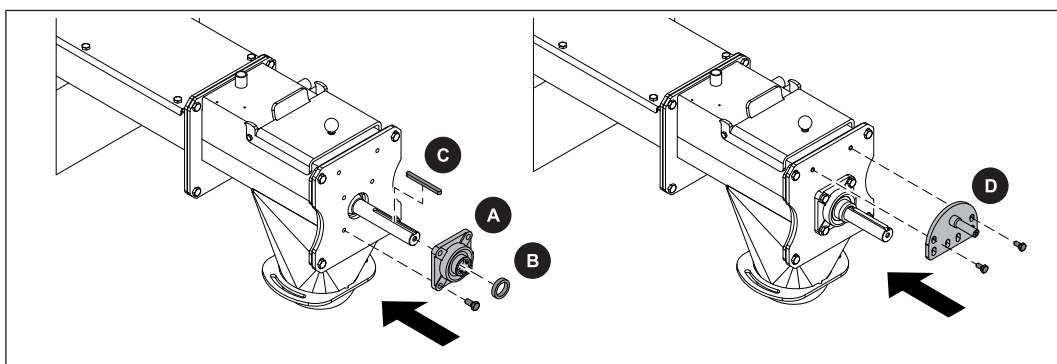
If due to lack of space the geared motor cannot be installed as shown above, the drive unit can be turned around:

- ☐ Fit the torque support with pin on the opposite side
- ☐ Turn the geared motor and torque support through 180° and fit them to the screw stub and torque support as explained above

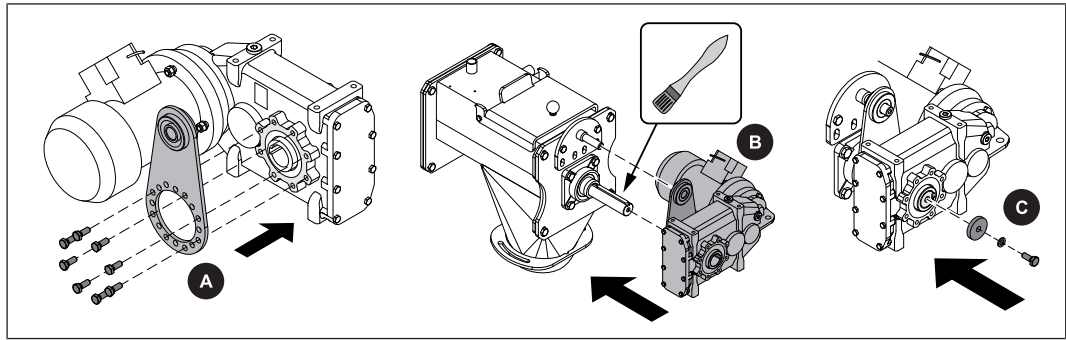
Assembly with screw Ø150 and Ø200



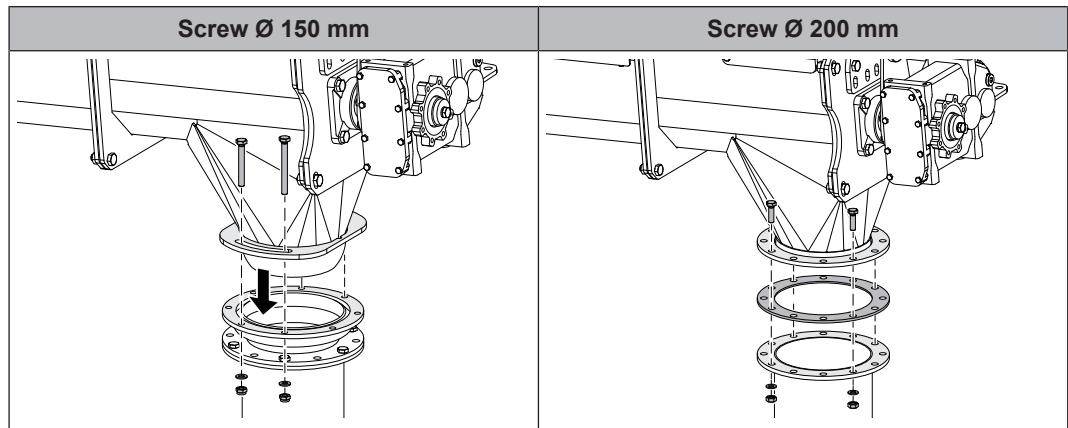
- ☐ Install the upper part of the gravity shaft (A) with gasket (B) to the closed trough on the boiler room side
 - 4 hexagon head screws M12 x 35
- ☐ Secure the flange plate (C) with gasket (D) to the upper part of the gravity shaft
 - 4 hexagon head screws M12 x 35



- ☐ Slide the flanged bearing unit (A) on to the screw stub and fix it to the upper part of the gravity shaft
 - 4 hexagon head screws M12 x 25
 - ☐ Push the spacer ring (B) on to the screw stub
 - ☐ Insert the key (C) into the slot on the screw stub
 - ☐ Secure the torque support with a pin (D) to the upper part of the gravity shaft
 - 2 hexagon head screws M12 x 20
- 📏 Centre distance of pin and screw stub: 150 mm



- ☐ Install the torque support and bearing (A) to the geared motor as shown
 - 8x hexagon head screws M8 x 20
- ☐ Lubricate the shaft stub including the key with copper paste
- ☐ Push the geared motor (B) on to the screw stub
- ☐ Fit the locking washer Ø 45 x 8 (C) on to the shaft stub
 - 1 hexagon head screw M10 x 25

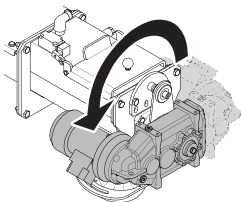


Screw Ø 150 mm:

- ☐ Install the upper part of the gravity shaft
 - 2x hexagon head screws M10 x 80
 - 2x hexagon head screws M10 x 100
- ↳ Depending on the design of the system, installation on the cup of the downpipe, stoker or intermediate screw

Screw Ø 200 mm:

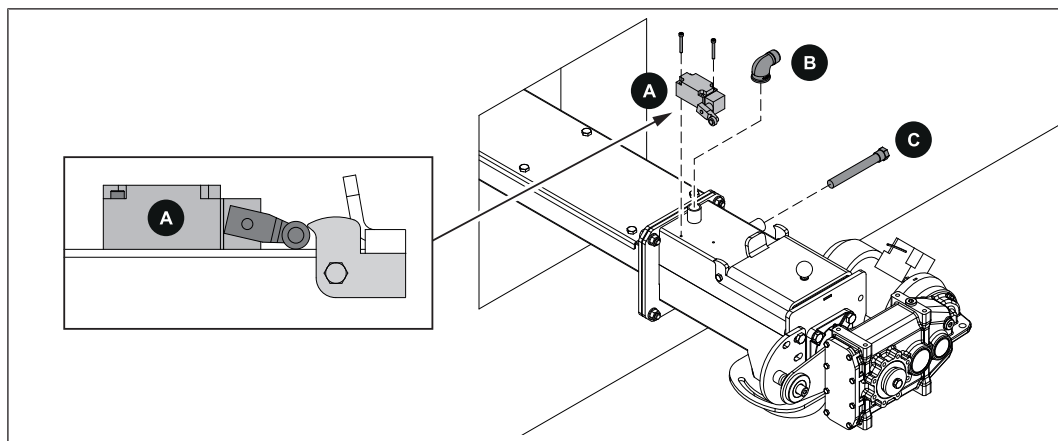
- ☐ Install the upper part of the gravity shaft
 - 4x hexagon head screws M10 x 35
- ↳ Depending on the design of the system, installation on the flange of the downpipe, stoker or intermediate screw



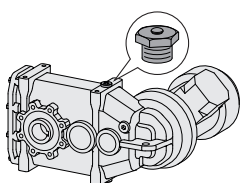
If due to lack of space the geared motor cannot be installed as shown above, the drive unit can be turned around:

- ☐ 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

6.2.6 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 on to the side sleeve



For the STM geared motor:

- ☐ Remove the blanking plug from the highest point of the geared motor and insert the vent screw that is supplied

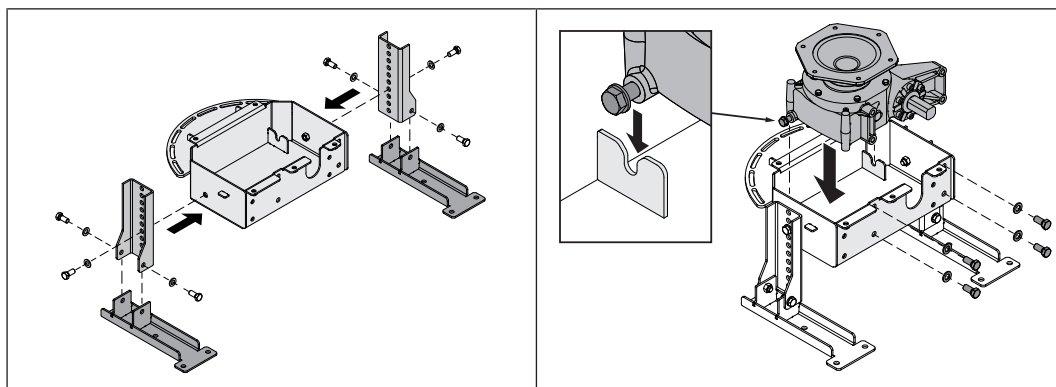
6.3 Fitting the agitator

6.3.1 Fitting the support kit

The following support kits are installed depending on the design of the system:

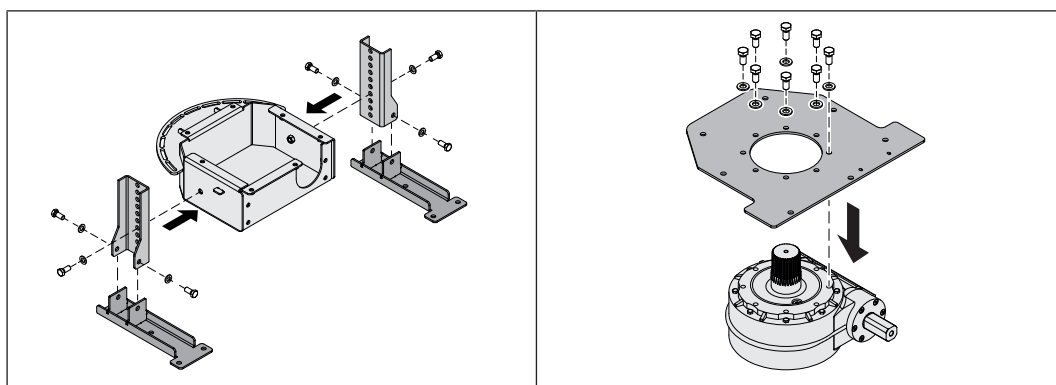
RI 125	RI 130	RI 150
➔ "Mitre gear RI 125" ► 38]	➔ "Mitre gear RI 130" ► 38]	➔ "Mitre gear RI 150" ► 39]

Mitre gear RI 125

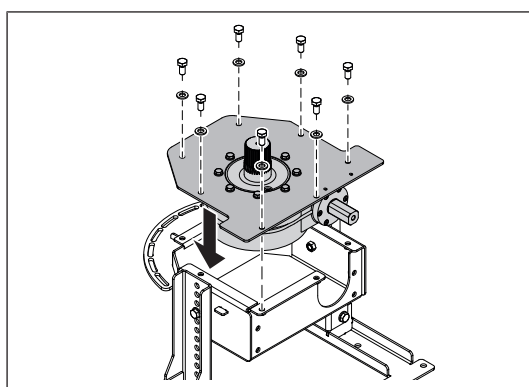


- ☐ Install the floor brackets and adjustable feet on the gearbox support
 - 6x hexagon head screws M16 x 35
- ☐ Insert the mitre gear on the gearbox support and install it
 - 4x hexagon head screws M16 x 35

Mitre gear RI 130

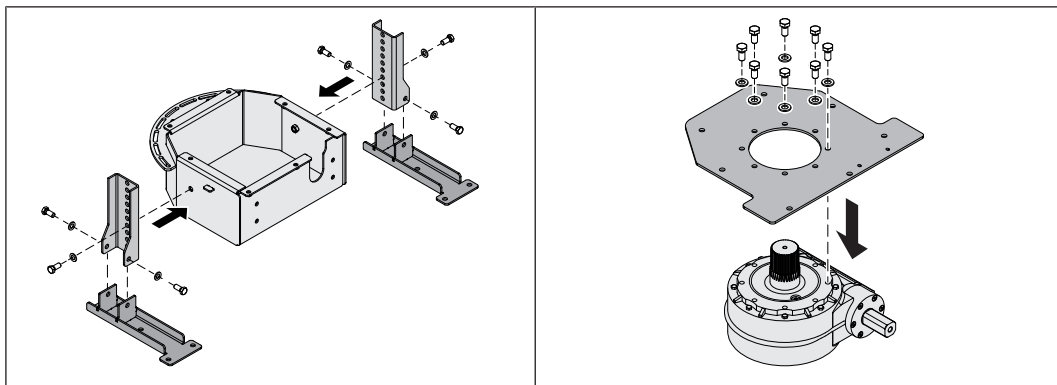


- ☐ Install the floor brackets and adjustable feet on the gearbox support
 - 6x hexagon head screws M16 x 35
- ☐ Install the intermediate plate on the mitre gear
 - 8x hexagon head screws M12 x 25

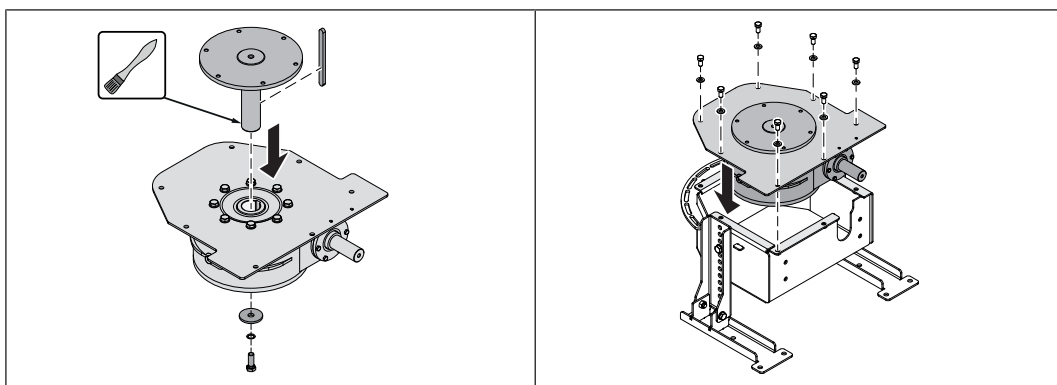


- ☐ Insert the intermediate plate and mitre gear into the gearbox support and install them
 - 7x hexagon head screws M12 x 25

Mitre gear RI 150

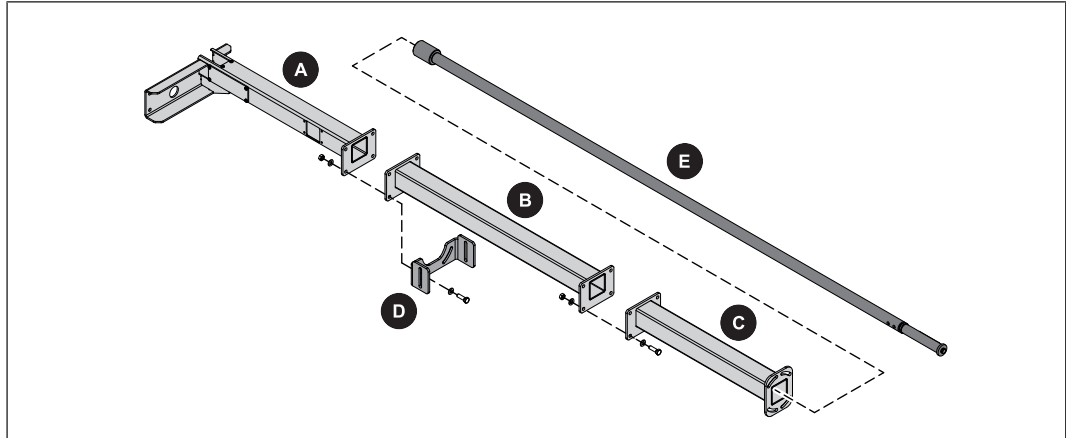


- ☐ Install the floor brackets and adjustable feet on the gearbox support
 - 6x hexagon head screws M16 x 35
- ☐ Install the intermediate plate on the mitre gear
 - 8x hexagon head screws M14 x 35

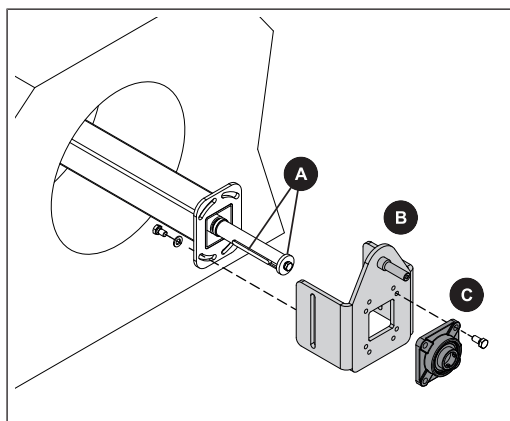


- ☐ Insert the key into the slot on the adapter and grease the stub with copper paste
- ☐ Push the adapter into the mitre gear and secure it with the shaft retainer Ø 68 x 6
 - 1x hexagon head screw M16 x 45
- ☐ Insert the intermediate plate and mitre gear into the gearbox support and install them
 - 7x hexagon head screws M12 x 25

6.3.2 Installing the agitator drive

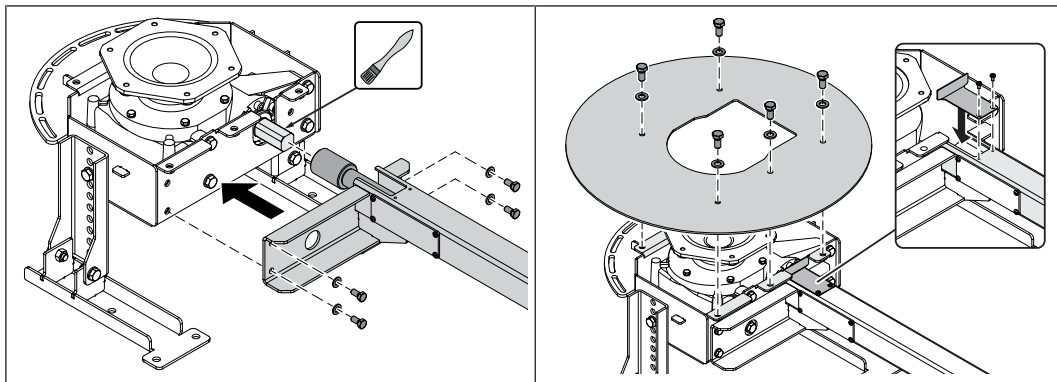


- ❑ Assemble the basic module (A), extension module (B) and wall module (C)
 - 4x hexagon head screws M12 x 40 for each flanged joint
 - ↳ Screw the adjustable foot support (D) to the underside of the flange
 - ↳ Make sure the module is aligned
- ❑ Slide the drive shaft (E) into the agitator channel



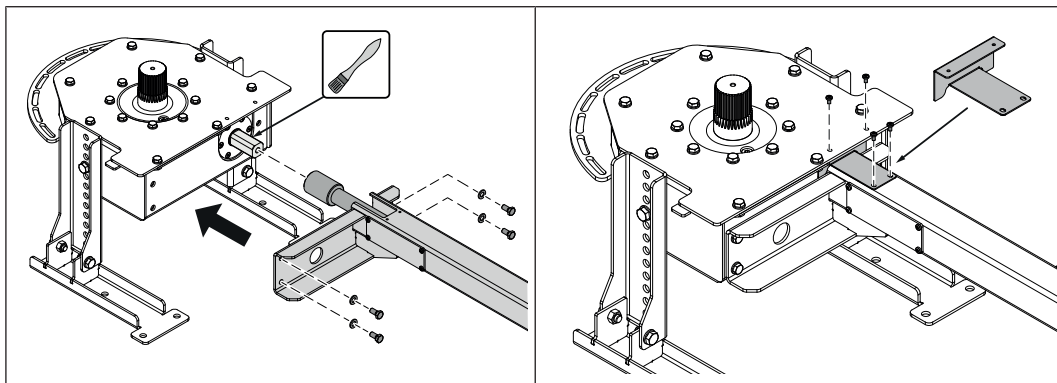
- ❑ Push the agitator channel through the hole in the wall
 - ↳ When doing so, place the wall module close to the hole in the wall
- ❑ Remove the key and shaft retainer (A) from the shaft stub
- ❑ Lubricate the shaft stub with copper paste
- ❑ Fit the adapter flange (B) to the agitator channel
 - 4x hexagon head screws M12 x 20
- ❑ Mount the flange bearing (C) on the intermediate flange
 - 4x hexagon head screws M12 x 25

Mitre gear RI 125



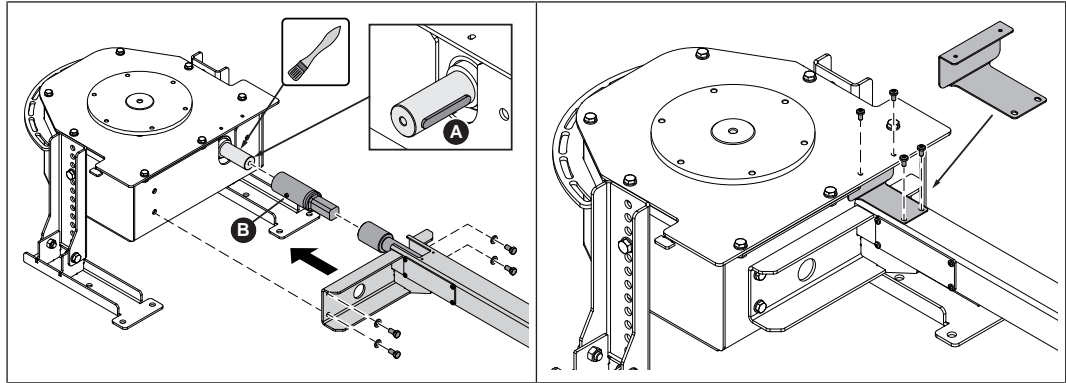
- ☐ Grease the shaft stub of the mitre gear with copper paste
- ☐ Install the bearing flange of the agitator channel on the support kit
 - 4x hexagon head screws M12 x 25
 - ↳ When doing so, slide the drive shaft on to the shaft stub of the mitre gear
- ☐ Fit the cover plate to the agitator channel
 - 2x hexagon head screws M6 x 12
- ☐ Install the intermediate plate on to the gearbox support
 - 5x hexagon head screws M12 x 25

Mitre gear RI 130

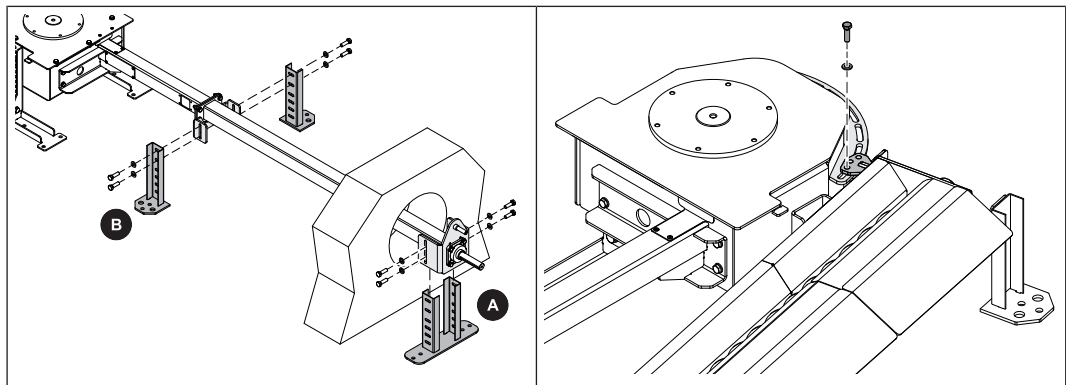


- ☐ Grease the shaft stub of the mitre gear with copper paste
- ☐ Install the bearing flange of the agitator channel on the support kit
 - 4x hexagon head screws M12 x 25
 - ↳ When doing so, slide the drive shaft on to the shaft stub of the mitre gear
- ☐ Fit the cover plate to the agitator channel and intermediate plate
 - 4x hexagon head screws M6 x 12

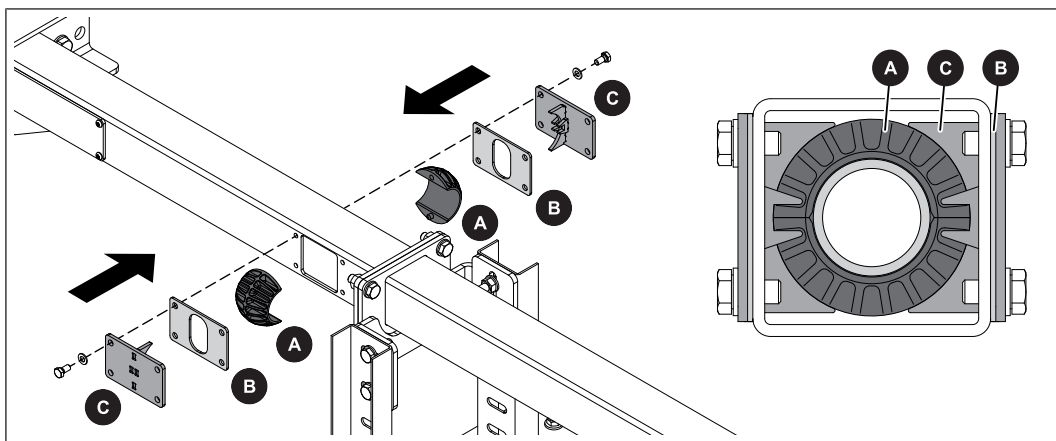
Mitre gear RI 150



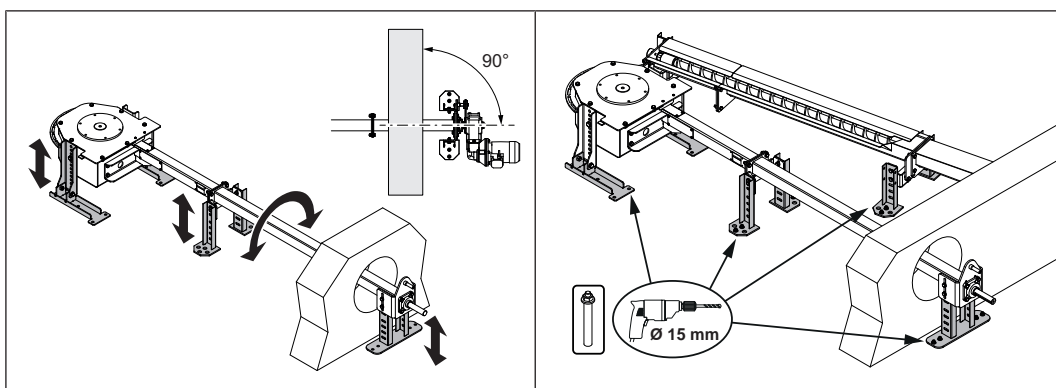
- ☐ Insert the key into the shaft stub of the mitre gear and grease the stub with copper paste
- ☐ Slide the coupling on to the shaft stub of the mitre gear and secure it with the threaded pin (B)
- ☐ Install the bearing flange of the agitator channel on the support kit
 - 4x hexagon head screws M12 x 25
 - ↳ Whilst doing so, slide the drive shaft into the coupling
- ☐ Fit the cover plate to the agitator channel and intermediate plate
 - 4x hexagon head screws M6 x 12



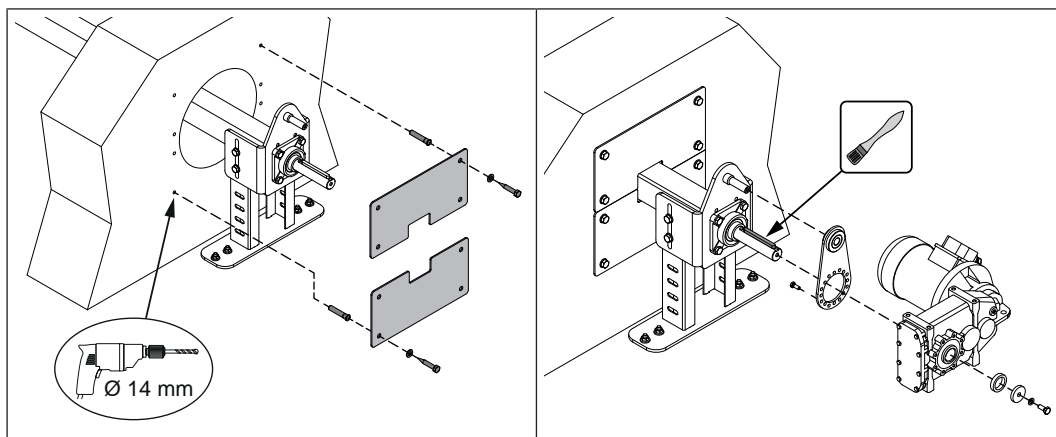
- ☐ Fit the adjustable foot for the geared motor on to the intermediate flange
 - 4x hexagon head screws M12 x 40
- ☐ Fit the adjustable feet (B) on to the adjustable feet supports on the agitator channel
 - 2x hexagon head screws M12 x 40 per adjustable foot
- ☐ Fit the trough holder for the discharge screw on to the support kit
 - 1x hexagon head screw M12 x 40



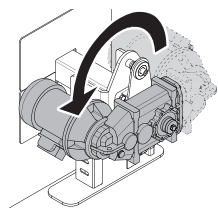
- ❑ Fit the plain bearing calottes (A) on to the drive shaft
- ❑ Install the calotte holder (C) and gasket (B)
 - 4x hexagonal screws M8 x 16 per calotte holder
 - ↪ Make sure that the plain bearing calottes (A) are secured by the calotte holder (B) (see detail)



- ❑ Align the agitator channel and discharge screw as shown on the installation drawing
 - ↪ Position the agitator channel centrally within the store at an angle of 90° to the wall
- ❑ Secure the adjustable feet to the floor
 - 2x heavy duty anchors for each adjustable foot
 - ↪ Drill diameter 15 mm
 - ↪ Drill depth at least 105 mm
- ❑ Shorten the adjustable feet using an angle grinder so that the agitator arms are not obstructed

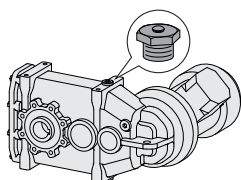


- ☐ Install the wall linings outside the store
 - 8x dowels Ø 14 x 76 and frame screws Ø 12 x 80
- ☐ Insert the key into the slot and lubricate the shaft stub with copper paste
- ☐ Secure the torque support and bearing to the geared motor as shown
 - 8 hexagon head screws M8 x 20
- ☐ Push the geared motor and spacer ring on to the shaft stub
- ☐ Fix the locking washer on the shaft stub
 - 1x hexagon head screw M10 x 25



If due to lack of space the geared motor cannot be installed as shown above, the drive unit can be turned around:

- ☐ Turn the torque support with bearing 180° and secure to geared motor
- ☐ Turn the geared motor and torque support through 180° and fit them to the shaft stub and torque support as explained above

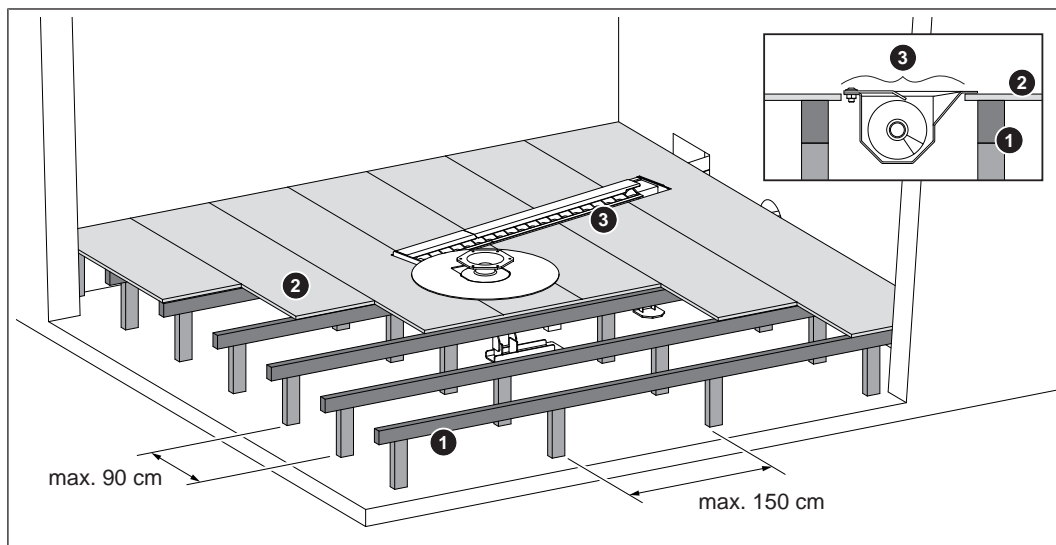


For the STM geared motor:

- ☐ Remove the blanking plug from the highest point of the geared motor and insert the vent screw that is supplied

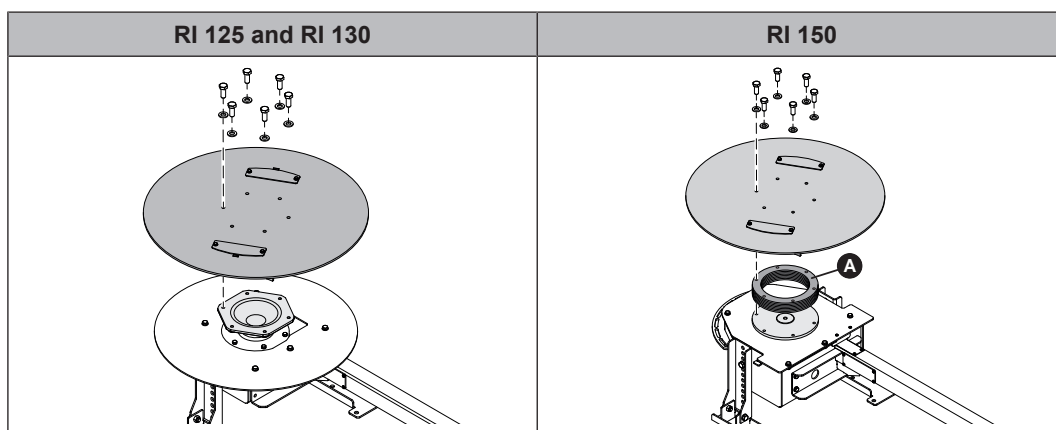
6.3.3 Installing the raised floor (optional)

IMPORTANT! If a raised floor is installed there is no need for raising plates



- The framework (1) of beams must be dimensioned so that the raised floor is not deformed by static loads
- The raised floor boarding (2) with wooden boards must run transversely across the framework of beams
- The boards must have a cut-out (3) in the area of the open trough. The boards must not rest on the discharge
An additional framework of beams parallel to the open trough must be provided in the area of the cut-out

6.3.4 Installing the FBR-G spring blade agitator



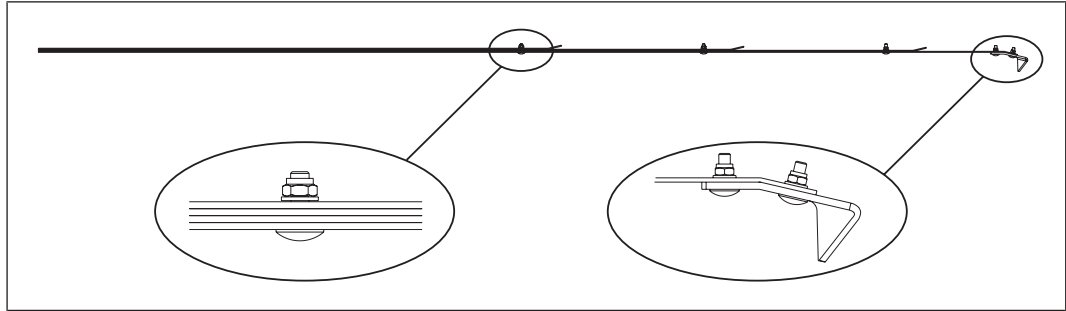
For mitre gears RI 125 and RI 130

- ❑ Install the agitator plate on the flange of the mitre gear
 - 6x hexagon head screws M12 x 30

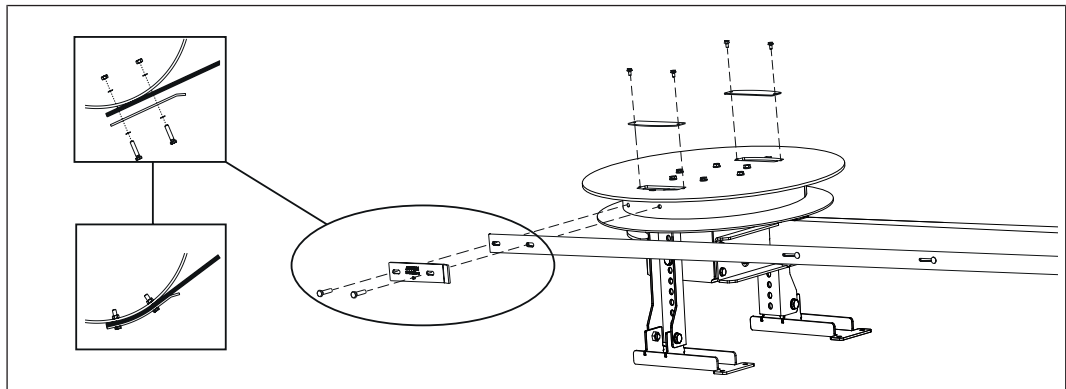
For mitre gear RI 150

- ❑ Install the spacer ring (A) and agitator plate on the flange of the mitre gear
 - 6x hexagon head screws M12 x 80

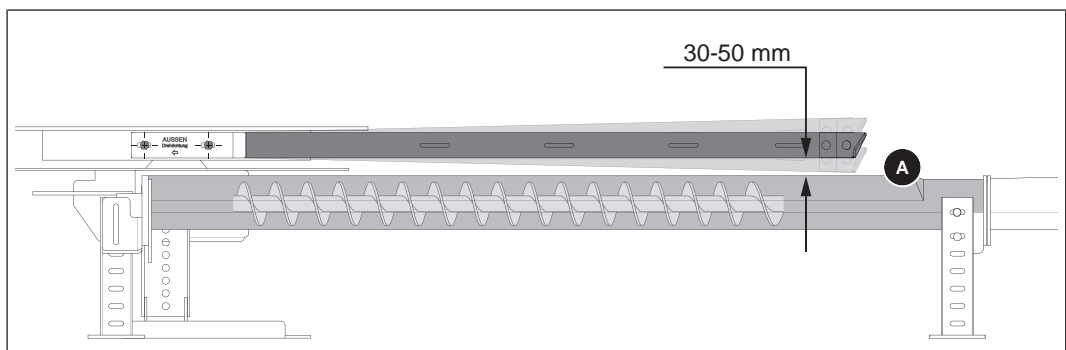
Fitting the spring blades



- ❑ Screw the spring blades to a pile according to their size. The longest spring blade should be used in such a way that the bend points in the other direction (see diagram above)
 - ⚠ **CAUTION: Do not fully tighten the screw joints yet**
 - ⚠ The number of parts required varies depending on the store size
- ❑ Fit the tearing hook to the longest spring blade as shown



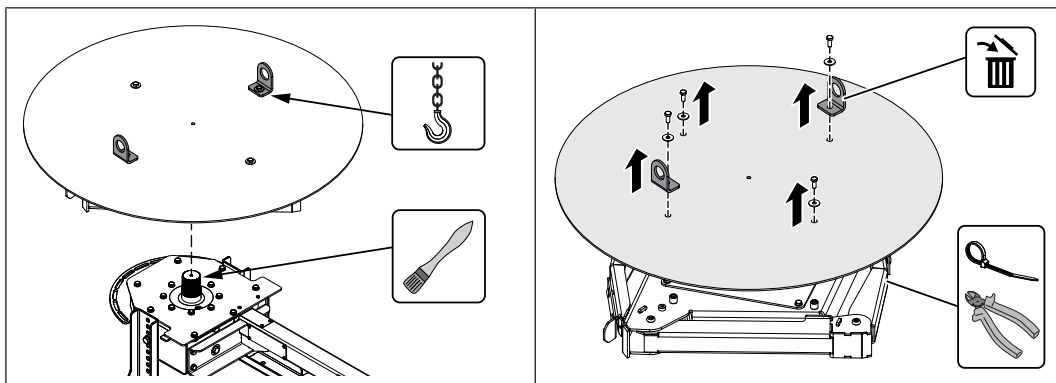
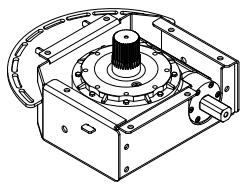
- ❑ Fit the spring packet to the ring of the agitator head with a clamping plate
 - 2x hexagon head screws M12 x 55 for each side
 - ⚠ The bend in the clamping plate must face away from the agitator head!
- ❑ Tighten the left and right screw connections alternately by 2 - 3 turns each, until the spring pile is right next to the ring of the rotary agitator head
- ❑ Repeat the steps for each spring packet
- ❑ Fitting the cover plates to the agitator head
 - 2x hexagon head screws M8 x 16 for each cover plate



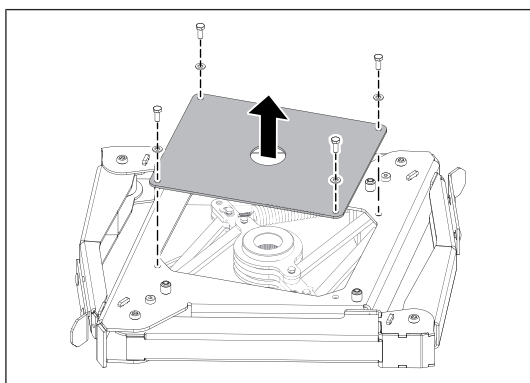
- ❑ Fit the spring packets parallel to the upper edge of the open trough (A) at a distance of 30-50 mm

6.3.5 Installing the GAR-G articulated arm agitator

Fit the rotary agitator head to mitre gear RI 130

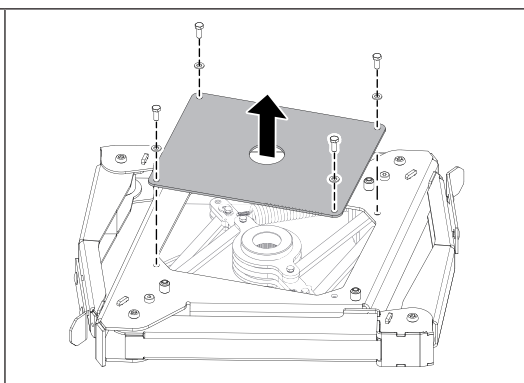
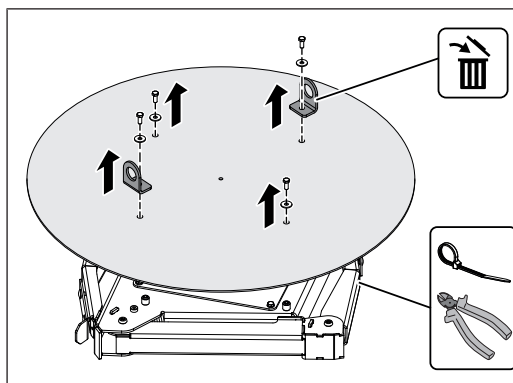
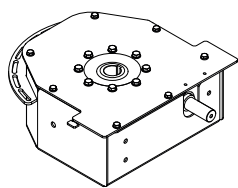


- ☐ Grease the multi-tooth shaft of the mitre gear with copper paste
- ☐ Place rotary agitator head on multi-tooth shaft
 - ↳ Use mounted eye bolts for this purpose
- ☐ Loosen the four hexagonal screws M12 x 30 and remove the rotary disc
 - ↳ Eye bolts are no longer required
- ☐ Remove the cable ties (transport lock) on both articulated arms

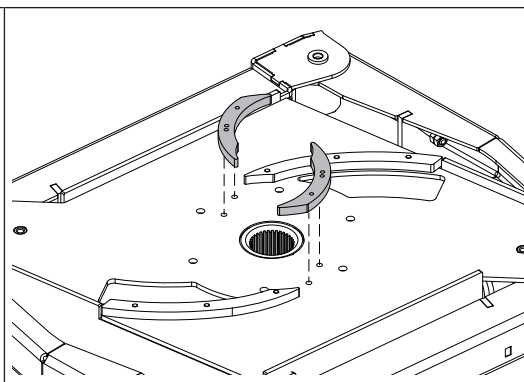
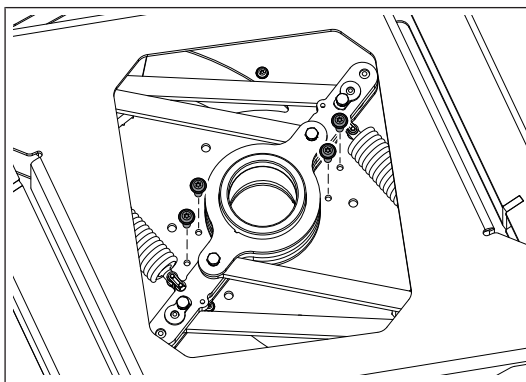


- ☐ Remove the cover of the basic module
 - 4x hexagon head screw M12 x 30

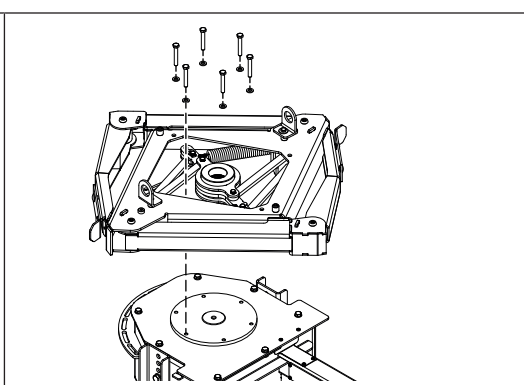
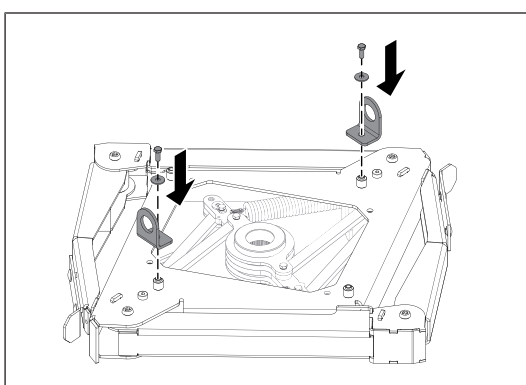
Fit the rotary agitator head to mitre gear RI 150



- ☐ Loosen the four hexagonal screws M12 x 30 and remove the rotary disc
- ☐ Remove the cable ties (transport lock) on both articulated arms
- ☐ Remove the cover of the basic module
 - 4x hexagonal screw M12 x 30



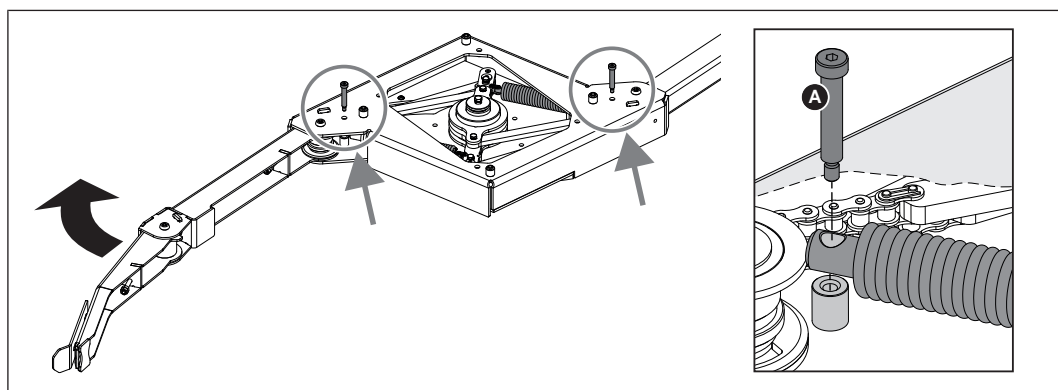
- ☐ Undo the screws inside the basic module
 - 4x raised head screws M8 x 25
- ☐ Remove the inner clearing plates from the bottom



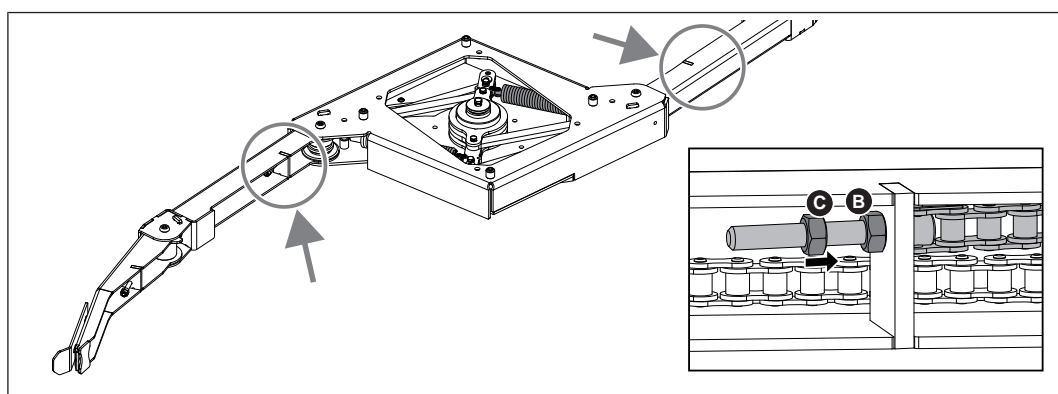
- ☐ Fit eye bolts to the agitator head
 - 2x hexagon head screw M12 x 30
- ☐ Install the agitator head on the mitre gear
 - 6x hexagon head screws M12 x 80
- ☐ Remove eye bolts
 - ↳ Eye bolts are no longer required

Adjusting the articulated arms

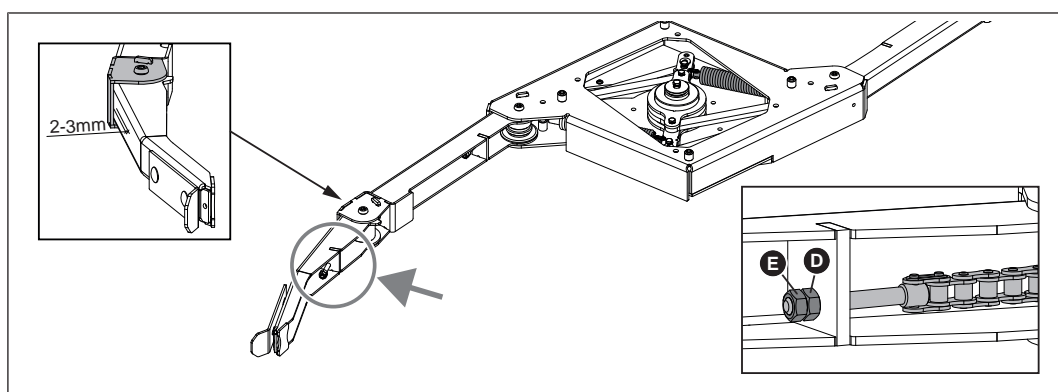
Carry out the following steps for both articulated arms in the same way:



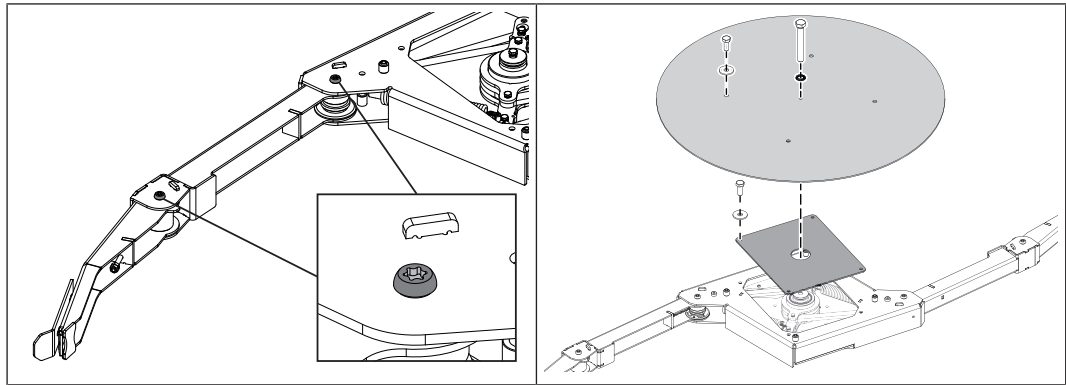
- ☐ Remove the fitting screws M12 x 65 (A) on the top of the housing and fully extend the articulated arms
- ☐ Fix the tension springs with previously removed fitting screws M12 x 65 (A)



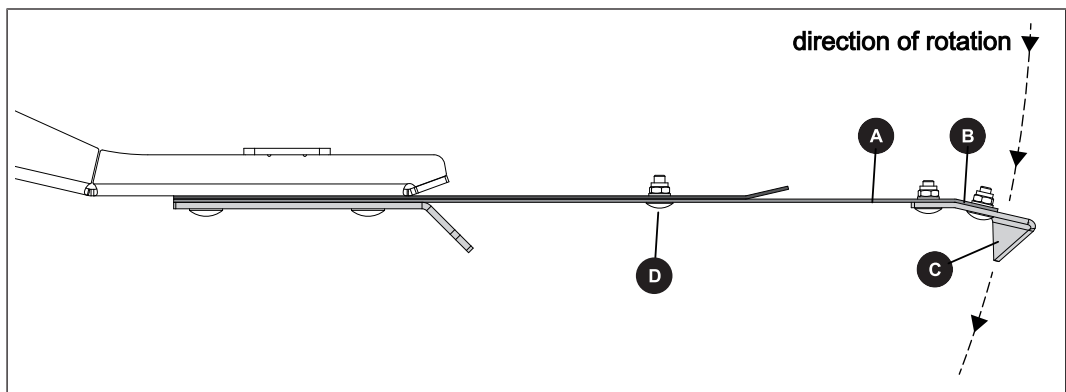
- ☐ Fully tighten nut (B) on the inner joint and lock with second nut (C)



- ☐ Tighten the nut (D) on the outer joint until the chain is slightly tensioned and a play of approx. 2-3 mm remains to the stop
- ☐ Lock screw connection with second nut (E)

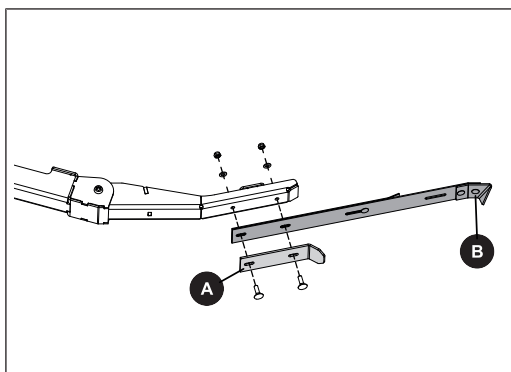


- Check the screws on the joints for tightness
 - ↳ Max. tightening torques 300 Nm
- Re-install cover of basic module and rotary disc on the basic module
 - 8x hexagon head screw M12 x 30
 - 1x hexagon head screw M12 x 90 (for RI 130)



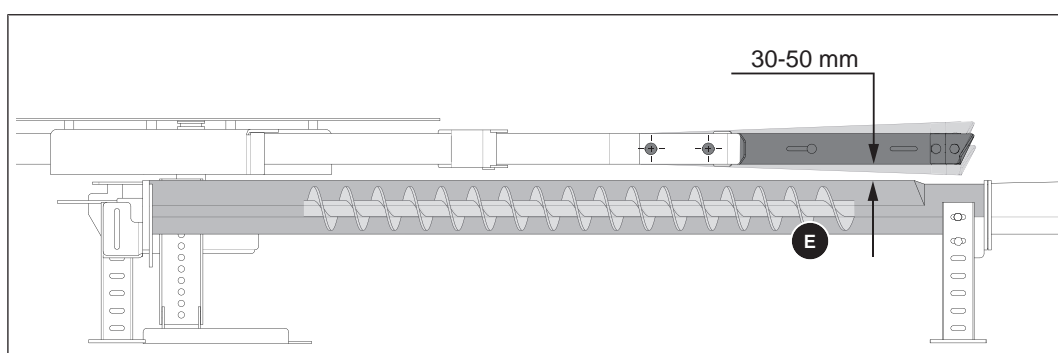
- Screw the spring blades to a pile according to their size. The longest spring blade (A) should be used in such a way that the bend (B) points in the other direction (=direction of rotation)
- Fit the tearing hook (C) to the bend (B) of the longest spring blade
 - ↳ The tip of the tearing hook (C) points in the direction of rotation of the rotary agitator

CAUTION: Do not tighten the screw connections to the spring blades (D).
The number of parts required varies depending on the store size and the length of the packs of springs.



- ❑ Fit the spring blades with clamping plates (A) to the agitator arms
 - 2x Round head screws M12 x 40 on each side

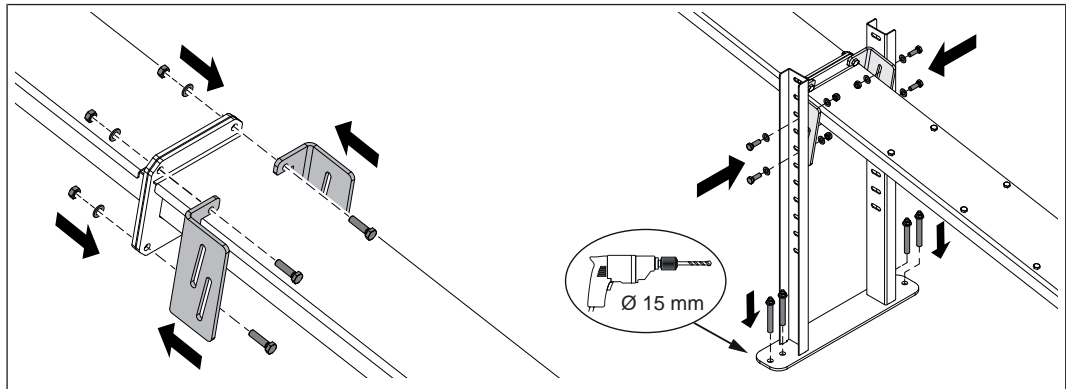
➡ Hook (B) must point in the direction of the clamping plate (A – in the direction of rotation)



- ❑ Fit the spring blades parallel to the upper edge of the open trough (A) at a distance of 30-50 mm

6.4 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
 - 4x hexagonal screw M12 x 35
- ☐ Secure the brackets to the trough flange with the previously removed screws
- ☐ Position the supporting post at the bracket and screw together
 - 4x hexagonal screw M12 x 35

Screwing the adjustable feet to the floor:

- ☐ Mark two holes each for the adjustable feet on the left and right on the floor
- ☐ 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)

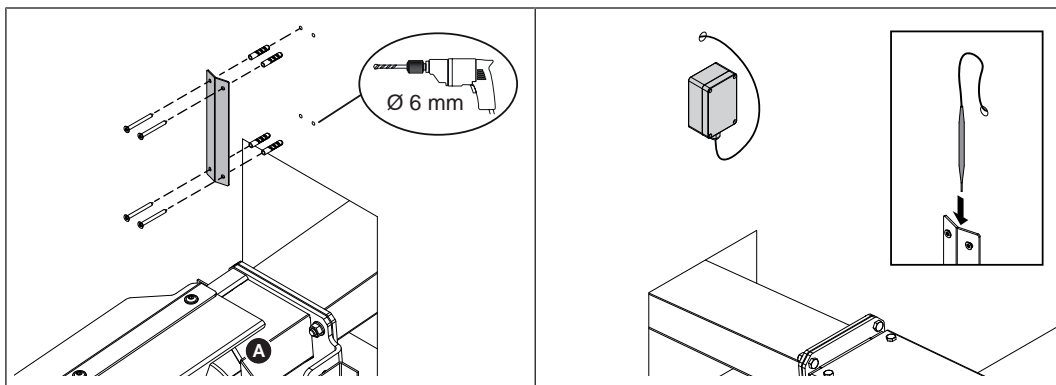
6.5 Closing the wall penetration

- ☐ 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

NOTICE

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

6.6 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

6.7 Connecting the system

6.7.1 Electrical connection

DANGER



When working on electrical components:

Risk of electrocution!

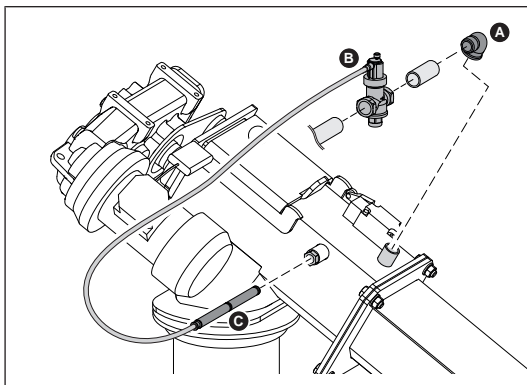
When work is carried out on electrical components:

- ☐ 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

6.7.2 Connecting the sprinkler system

NOTICE! Connection should only be carried out by authorised technicians



- ☐ Seal 90° bend (A) to top part of gravity shaft
- ☐ Seal drain valve (B) for thermal discharge safety device in supply line
- ☐ Slide sensor (C) of the thermal discharge safety valve into the immersion sleeve and secure with screw
- ☐ Connect the thermal discharge safety sensor to a pressurised cold water mains supply

7 Operating the system

7.1 General information

The steeper the angle (FBR maximum 15° / GAR maximum 10°) at which a rotary agitator is fitted, the more likely that fuel will remain behind when the bunker empties.

When operating with pellets it is particularly important to note:

- Fit as flat as possible (FBR maximum 5° / GAR maximum 3°), ideally horizontal
- Fuel may remain in the store due to its high propensity to trickle
- The boiler must be turned off at least two hours before fuel is blown in

7.2 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 the direction of rotation of the rotary agitator arms
- ☐ 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

When the check is finished:

- ☐ Fill the store with fuel

7.3 Filling/refilling the store with fuel

When filling the store you should always ensure that you are using the right fuel:

➡ "Permitted fuels" [► 8]

- ☐ Remove foreign bodies from the store before filling

⚠ 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

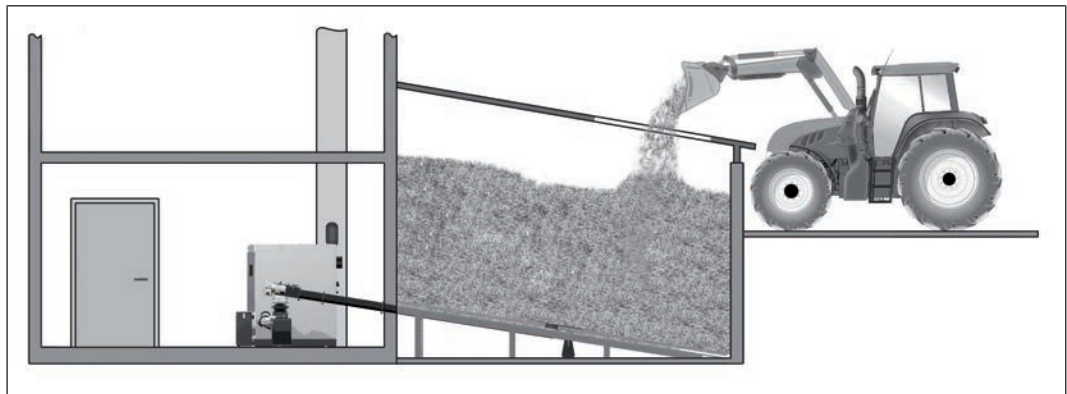
Blowing in fuel when the boiler is switched on:

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**

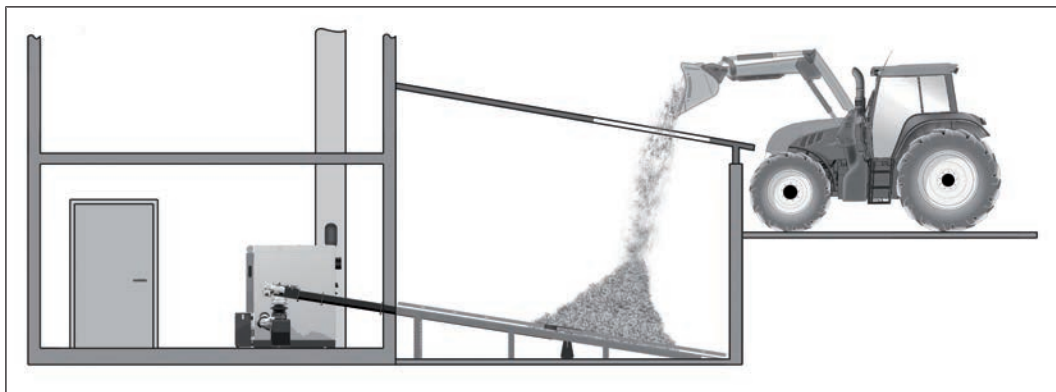
7.3.1 Loading of fuel for a partially emptied store with rotary agitator



If there is still sufficient fuel in the fuel store (the rotary agitator head is completely covered with fuel and the rotary agitator arms / spring blades are not extended), the store can be filled.

- ☐ Load the fuel at the filling opening

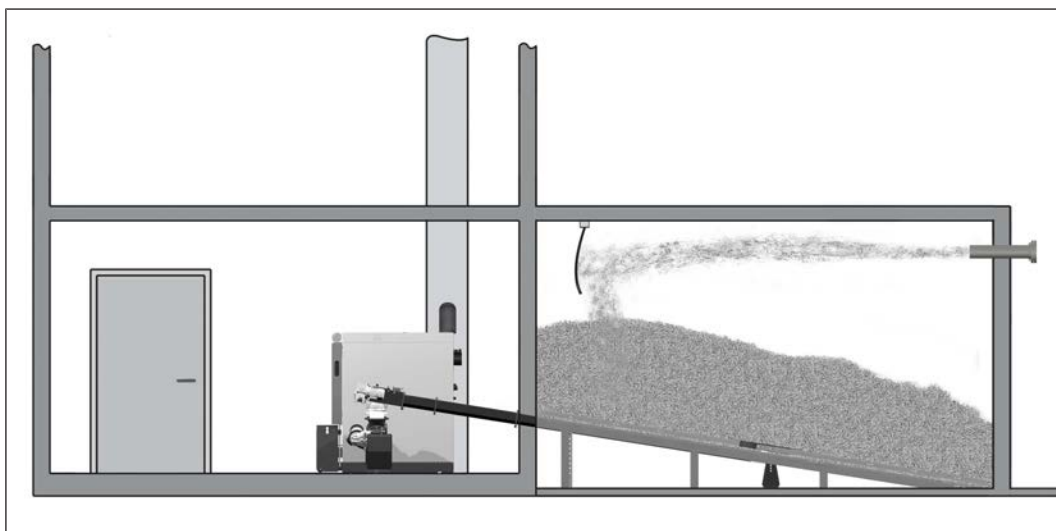
7.3.2 Loading fuel into an empty fuel store with a rotary agitator



If the rotary agitator head is already free from material and the rotary agitator arms / spring blades are extended, the feeder unit must be active until the rotary agitator arms / spring blades have fully retracted.

- ☐ Tap “On” in “Bunker filling rotary agitator” during manual operation
 - ↳ The rotary agitator head runs for approx. 3 minutes
- ☐ Load a small quantity of wood chips and wait until the arms / spring blades are touching the head of the rotary agitator (approx. 2 revolutions)
- ☐ Only then should you load the remaining material

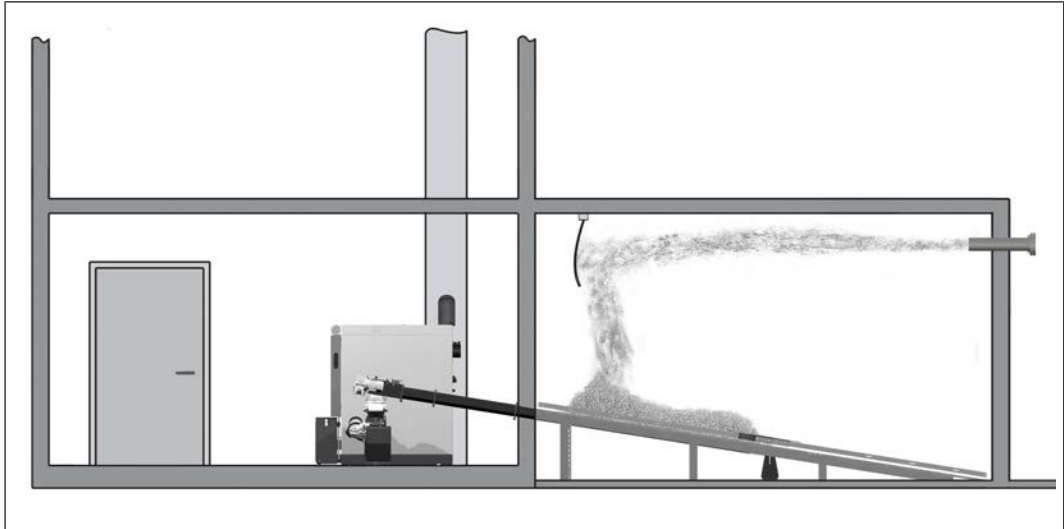
7.3.3 Blowing in fuel for a partially emptied store with rotary agitator



If there is still sufficient fuel in the fuel store (the rotary agitator head is completely covered with fuel and the rotary agitator arms / spring blades are not extended), the fuel store can be filled as follows:

- ☐ Switch off the boiler by tapping “Boiler off” at the mode icon and allow to cool for at least two hours
- ☐ Close all openings to the store to seal out dust
- ☐ Blow the fuel into the fuel store

7.3.4 Blowing in fuel for an empty store with rotary agitator



If the rotary agitator head is already free from material and the rotary agitator arms / spring blades are extended, they should be covered with the remaining fuel in the fuel store and retracted. This should be done well before the agreed loading time.

Before working in the fuel store

- ☐ Switch off the boiler by tapping “Boiler off” at the mode icon and switch off main switch
- ☐ Turn off the main switch on the expansion switch cabinet (if installed)
- ☐ Distribute any fuel remaining in the store (in corners, against walls) over the head of the rotary agitator with your hands
 - ↳ Follow the instructions on working in the fuel store!

NOTICE! Refer to the notice at the entrance to the fuel store

After working in the fuel store

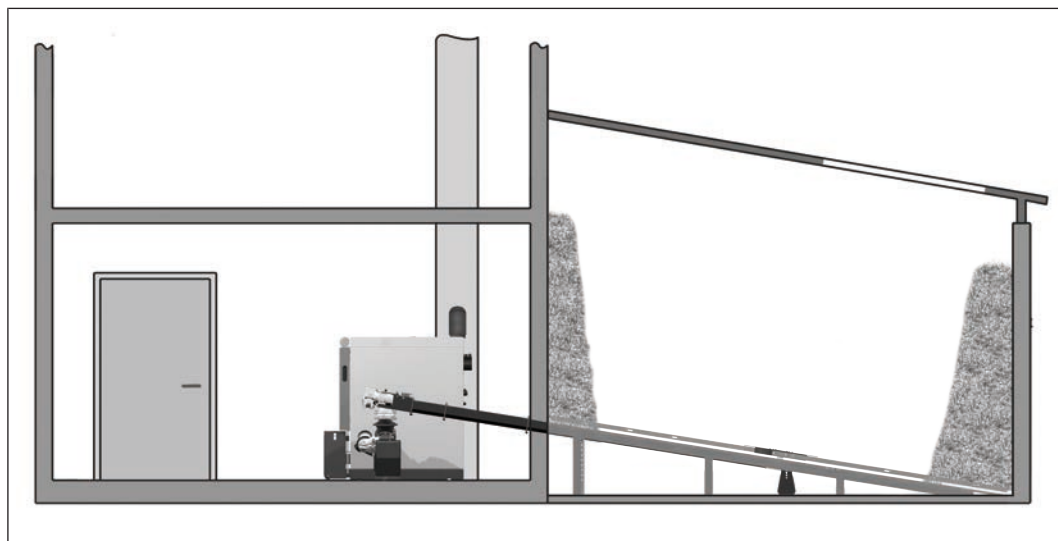
- ☐ Turn on the main switch on the boiler and on the expansion switch cabinet (if installed)
- ☐ Tap “On” in “Bunker filling rotary agitator” during manual operation
 - ↳ The rotary agitator head runs for approx. 3 minutes
- ☐ Wait until the rotary agitator arms / spring blades are touching the head of the rotary agitator (approx. 2 revolutions)
- ☐ Switch off the boiler by tapping “Boiler off” at the mode icon and allow to cool for at least two hours
- ☐ Close all openings to the store to seal out dust
- ☐ Blow the fuel into the fuel store

If the fuel store is completely empty and there is no residual fuel to redistribute:

- ☐ Contact Froling and seek advice before filling the fuel store

7.3.5 Drainage of fuel store

When the fuel store is emptied, a certain amount of fuel remains and is not removed by the rotary agitator. This is not a malfunction but occurs due to the nature of the system. This effect is amplified when the wood chips are compressed.



Tips for better emptying:

- Use suitable wood chips in terms of moisture content, size etc.
- Reduce the dumping height onto the rotary agitator
- Avoid compressing the wood chips, e.g. by carefully adding to the fuel store
- Design the walls in the bunker so they are as smooth as possible

7.4 During operation

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

NOTICE



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

7.5 Decommissioning

7.5.1 Disassembly

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

7.5.2 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.

8 Servicing the system

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

WARNING



Incorrect inspection and cleaning:

Incorrect or insufficient inspection and cleaning of the discharge can cause serious faults and subsequently result in accidents and damage to property.

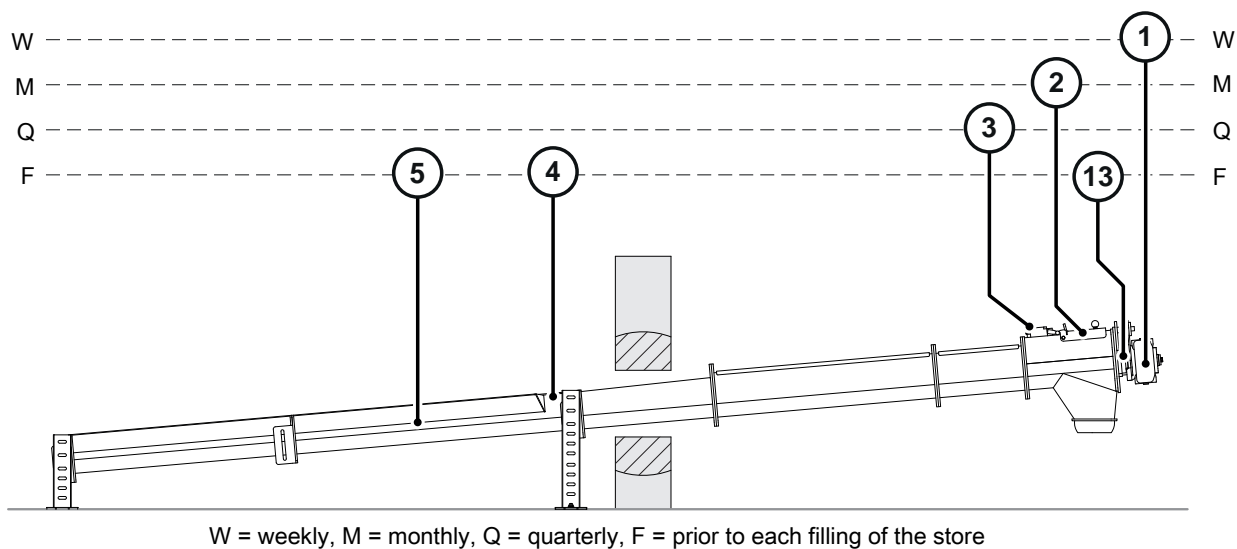
Therefore:

- ☐ Carry out maintenance of the discharge according to the instructions!

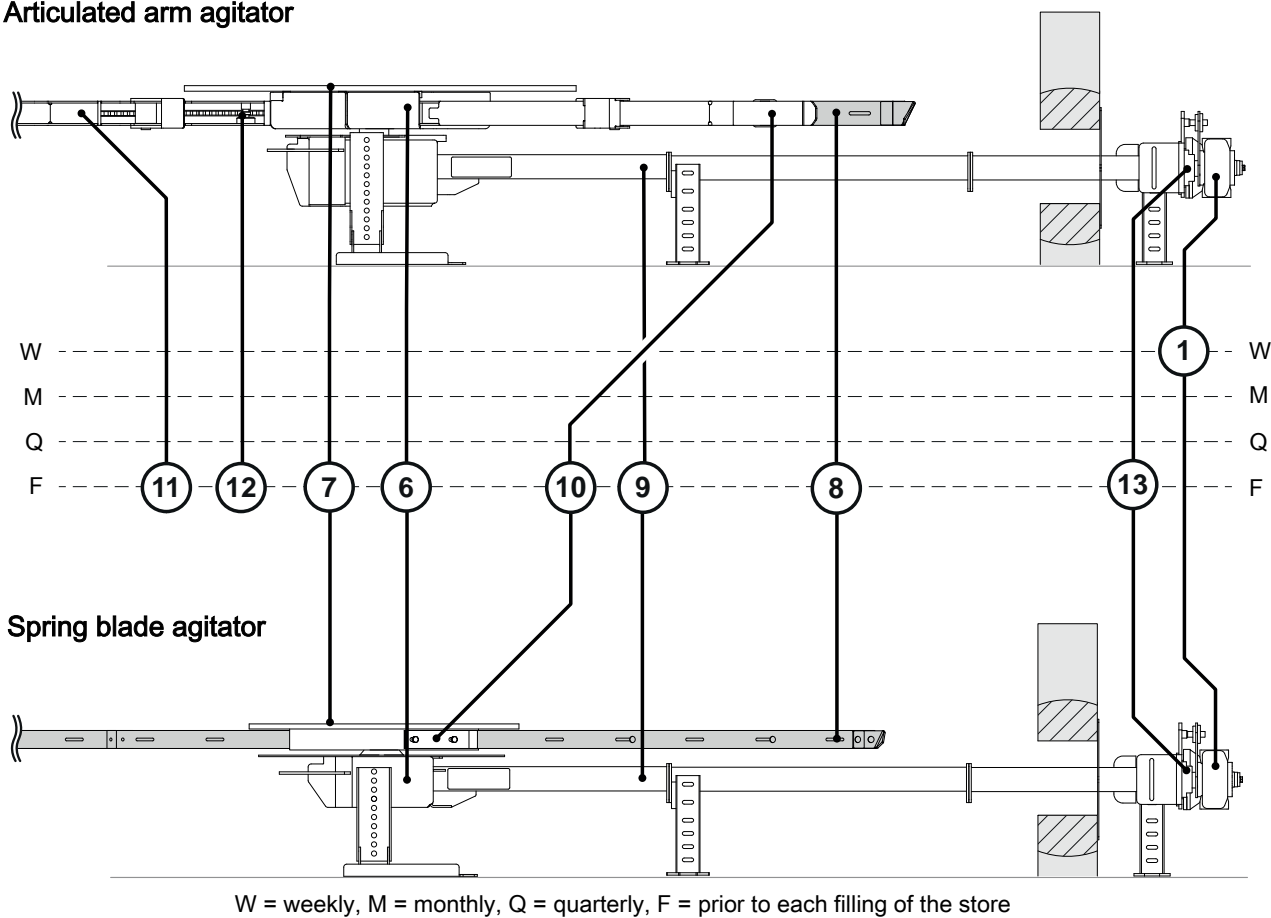
8.1 Maintenance work by the operator

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

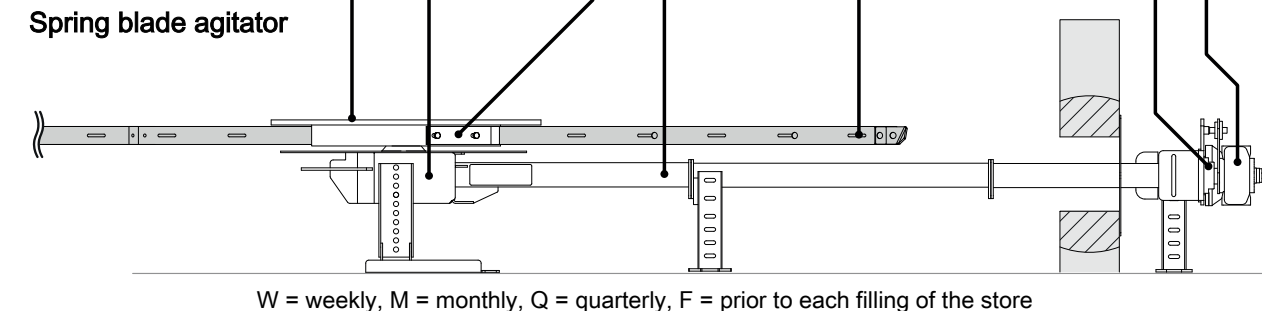
Discharge screw









Articulated arm agitator



Spring blade agitator



No.	Component	Interval	Operation
1	Motor / gears	W	<input type="checkbox"/> Carry out a general visual inspection of drive motors  No major oil leaks should be visible.
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	BF	<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		<input type="checkbox"/> Check trough and screw for dirt and damage <input type="checkbox"/> Check the screw blades for wear
6	Mitre gear		<input type="checkbox"/> Carry out a general visual inspection  No oil leaks should be visible.
7	Rotary agitator plate		<input type="checkbox"/> Check rotary agitator plate for material build-up and clean if necessary
8	Spring piles		<input type="checkbox"/> Check that the connecting screws of the clamping plate are firmly in position and tighten if necessary  Replace broken screws immediately <input type="checkbox"/> Check that the connections of the spring piles have a little play (approx. 1mm)  Tighten or loosen the screws if necessary <input type="checkbox"/> Check the spring piles and joints for wear  Distance between the spring piles/cover plate joints on the open trough must be at least 10 mm
9	Positioning of drive shaft		<input type="checkbox"/> Check half shells for wear / damage
10	Clamping plates of spring piles		<input type="checkbox"/> Check that the screws of the clamping plate are firmly in position and tighten if necessary
11	Rotary agitator arms		<input type="checkbox"/> General visual inspection of the rotary agitator arms and screw joints for damage
12	Chain guide		<input type="checkbox"/> Check chain for wear / damage
13	Flange bearing unit		<input type="checkbox"/> Use a grease gun to grease the bearing at the grease nipple

8.2 Maintenance work by technicians

NOTICE! An annual inspection by an authorized partner (external maintenance) or the Fröling factory customer service is recommended!

Regular maintenance and servicing by a heating specialist will ensure a long, trouble-free service life for your discharge. It ensures that the plant operates trouble-free and economically, and

in the course of maintenance the entire discharge is checked and optimized.

For this reason, FROLING offers a maintenance contract, which optimises operating safety. Please see the details in the accompanying guarantee certificate.

Your Froling customer service office will also be happy to advise you.

IMPORTANT: An annual inspection by a specialist does not replace the maintenance work to be carried out by the operator 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:

- ☐ Empty fuel store on the agreed date
- ☐ Provide for any service openings
- ☐ Sufficient ventilation of the fuel store (CO concentration)

Check the following components as part of the maintenance work:

- Motor / gears
- Gravity shaft / safety switch
- Sprinkler system
- Spring piles
- Clamping plate of the spring piles
- Joints
- Mitre gear
- Rotary plate
- Trough / dosing screw
- Inlet area / transfer channel
- Flange bearing

8.3 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.

9 Troubleshooting

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

External faults:

- Heating EMERGENCY STOP activated
- Household fuse (FI circuit breaker) or component fuse blown

Internal faults:

- are displayed as error messages on the boiler controller
see boiler operating instructions

[illegible]

[illegible]

Manufacturer's address

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