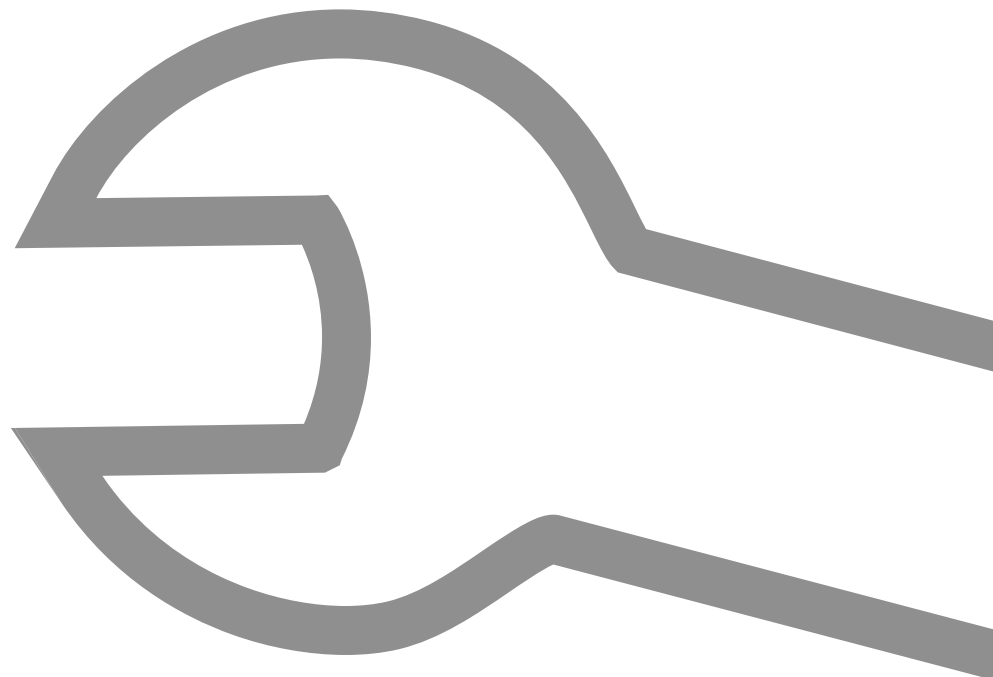


Operating Manual



*Comfortable
heating. With wood!*

HDG Flexi Blade Delivery System FRA 2.5/3.5/4.5



Content

1	Notes on this manual	5
1.1	Introduction.....	5
1.2	Structure of the operating manual	6
2	Safety instructions.....	7
2.1	Intended use	7
	Basic principles for the construction of the system	7
	Basic principles regarding the content of the operating manual	7
	Proper and improper manner of operation.....	7
2.2	Residual risk.....	8
2.3	Warnings and safety symbols used.....	8
2.4	Safety instructions for bulk pellet storage	9
2.5	Duty to inform	10
3	Mode of operation	11
3.1	Overview.....	11
3.2	Functional description.....	12
3.3	Technical data.....	13
4	Planning and installation	14
4.1	Planning the delivery system	14
	Fuel bunker.....	14
	Operation with pellets	14
	Electrical system	18
4.2	Scope of delivery	19
4.3	Installing the delivery system	19
	General.....	19
	Requirements.....	19
	Setting up the delivery system	20
	Installing the intermediate floor	23
	Installing the dished base, spring steel arms and metering plate.....	25
	Installing the extinguishing device	28
	Electrical connections.....	28
4.4	Pellet bunker.....	29
	Installing the injection and extraction nozzles.....	29
	Installing the door rails.....	30
	Installing the pellet anti-shatter protective mat	31
	Installing the safety limit switch	31
	Attaching safety stickers	31
5	Commissioning the system	32
6	Filling the fuel bunker	33
6.1	Requirements	33
6.2	Procedure for filling with wood fuel products	33
6.3	Procedure for filling of pellets.....	34

7	Cleaning and servicing the delivery system.....	36
7.1	Cleaning and maintenance schedule.....	36
	Checking the drive chain	36
	Inspecting the fuel bunker	38
8	Troubleshooting	39
9	Declaration of incorporation	41

1 Notes on this manual

1.1 Introduction

EASY AND SAFE OPERATION

This operating manual contains important instructions on the

- HDG Flexi Blade Delivery System FRA 2.5/3.5/4.5

and how to operate it properly and safely.

Following these instructions helps to avoid dangers, prevent repair costs and downtimes, maintain reliability and extend the service life of the delivery system.

READING THE OPERATING MANUAL

The operating manual must be read and applied by everyone who plans or carries out the installation of the above named components.

TECHNICAL CHANGES

We continuously develop and improve our delivery systems. The information in this edition was correct at the time of going to press.

All details in these instructions on standards, regulations and worksheets should be checked before use and should be compared with the regulations applying locally at the site where the system is installed.

We reserve the right to make changes which may then deviate from the technical details and illustrations in this operating manual.

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SYMBOLS USED

In this operating manual, the following denotations or symbols will be used for particularly important information:

1. Instructions to the operator

✓ Result of the action described

 Cross reference for more explanation

• List

– List

1.2 Structure of the operating manual

The operating manual is structured as follows:

Chapter	This explains ...
1 Notes on this manual	... how to use this operating manual.
2 Safety notes	... everything on the subject of safety that you should consider when using the delivery system.
3 Mode of operation	... the structure and all of the features of the delivery system.
4 Planning and installation	... how to properly plan for and install the delivery system.
5 Commissioning the system	... how the delivery system is to be put into initial service.
6 Filling the fuel bunker	... how to correctly fill the fuel bunker.
7 Cleaning and servicing the delivery system	... how to clean the delivery system and who is responsible for its maintenance.
8 Troubleshooting	... how to rectify faults in the delivery system.

Table 1/1 - Structure of the operating manual

2 Safety instructions

2.1 Intended use

BASIC PRINCIPLES FOR THE CONSTRUCTION OF THE SYSTEM

BASIC PRINCIPLES

The HDG Flexi Blade Delivery System was built using state of the art technology and conforms to recognised safety regulations. Nevertheless, its use still poses the risks of injury or death of the user or a third party, and of adverse effects upon the heating system or upon other material goods.

Have your specialist heating company provide you with detailed instructions on the operation of the delivery system.

USING THE DELIVERY SYSTEM

Only use the delivery system if in perfect condition. Use it properly, as intended, and be aware of safety concerns and the dangers involved under observance of the operating manual. Have any faults which could impair safety fixed immediately.

BASIC PRINCIPLES REGARDING THE CONTENT OF THE OPERATING MANUAL

SCOPE

The content of this operating manual is intended exclusively for the planning, installation and operation of the HDG Flexi Blade Delivery System FRA 2.5/3.5/4.5. Any further implementation of applicable standards, for example with regard to the installation of the heating system (pipework, etc.), fuse protection, bunker openings or fire safety is not part of this operating manual. HDG Bavaria does not assume any liability for this.

PROPER AND IMPROPER MANNER OF OPERATION

APPLICATION OF THE HEATING SYSTEM

The HDG Flexi Blade Delivery System FRA 2.5/3.5/4.5 is designed for the standard use of delivering wood fuel products made from untreated wood in the form of wood chips, shavings or pellets (maximum grain size G 50 or P45 to EN14961-1) from the fuel bunker to the feeding unit of the HDG Compact 25 - 200 heating system.

Any other application is considered improper use. The manufacturer will accept no liability for any damage resulting from improper use. The operating company bears sole responsibility in such cases.

Proper use includes adherence to the installation, operation and maintenance requirements specified by the manufacturer.

2.2 Residual risk

Despite all precautions, the following residual risks remain:



Warning!

Risk of crushing injury from moving parts

The HDG Flexi Blade Delivery System has components that move automatically. Hands and arms could thereby be crushed.

Ensure that all access openings in the fuel bunker are secured by a safety limit switch.



Warning!

Risk of injury from automatically driven components

Hands and arms could be injured when working on the opened deflection box.

Turn off the main switch of the heating system when performing any work on these components and ensure that it is secured against being switched back on.



Danger!

Danger from electrical current or voltage

The circuit boards and electrical components carry current.

Have work on electrical components performed only by a qualified electrician and turn the main switch off.

2.3 Warnings and safety symbols used

The following warnings and safety symbols are used in this operating manual:



Danger!

Danger from electrical current or voltage

Work in areas marked with this symbol may only be performed by a qualified electrician.



Warning!

Hazardous area

Working in areas marked with this symbol can lead to serious injuries or to extensive material damage.



Warning!

Hand injuries can occur

Working in areas marked with this symbol can lead to hand injuries.



Warning!

Automatic start-up

Working in areas marked with this symbol can lead to injuries due to automatic start-up.



Warning!

Danger of explosions

Working in areas marked with this symbol can lead to an explosion.



Instructions regarding disposal



Additional information for the operator

2.4 Safety instructions for bulk pellet storage

For pellet bunkers with a storage capacity of more than 10 tons, a label must be attached on the access hatch to the bunker.

It lists the following instructions:


- Entrance prohibited unless authorised, keep doors closed
- Smoking, flames and other sources of ignition prohibited
- Life-threatening hazard posed by odourless carbon monoxide (CO) and insufficient oxygen
- Before entering, ensure there is adequate ventilation - keep door opened during accessing
- Enter bunker only under observation of someone standing outside the bunker
- Risk of injury from moving components
- Have the bunker filled by the heating engineer and pellet supplier under observation of the on-site conditions
- Protect pellets from the effects of moisture

2.5 Duty to inform

READING THE OPERATING MANUAL

Every person performing any tasks on the system is required to read the operating manual prior to beginning work, particularly the chapter entitled “2 Safety instructions”.

This holds especially true for persons who only occasionally work on the heating system, e.g. when cleaning or servicing it.

 The operating manual must always be kept readily accessible at the heating system’s installation site.

3 Mode of operation

3.1 Overview

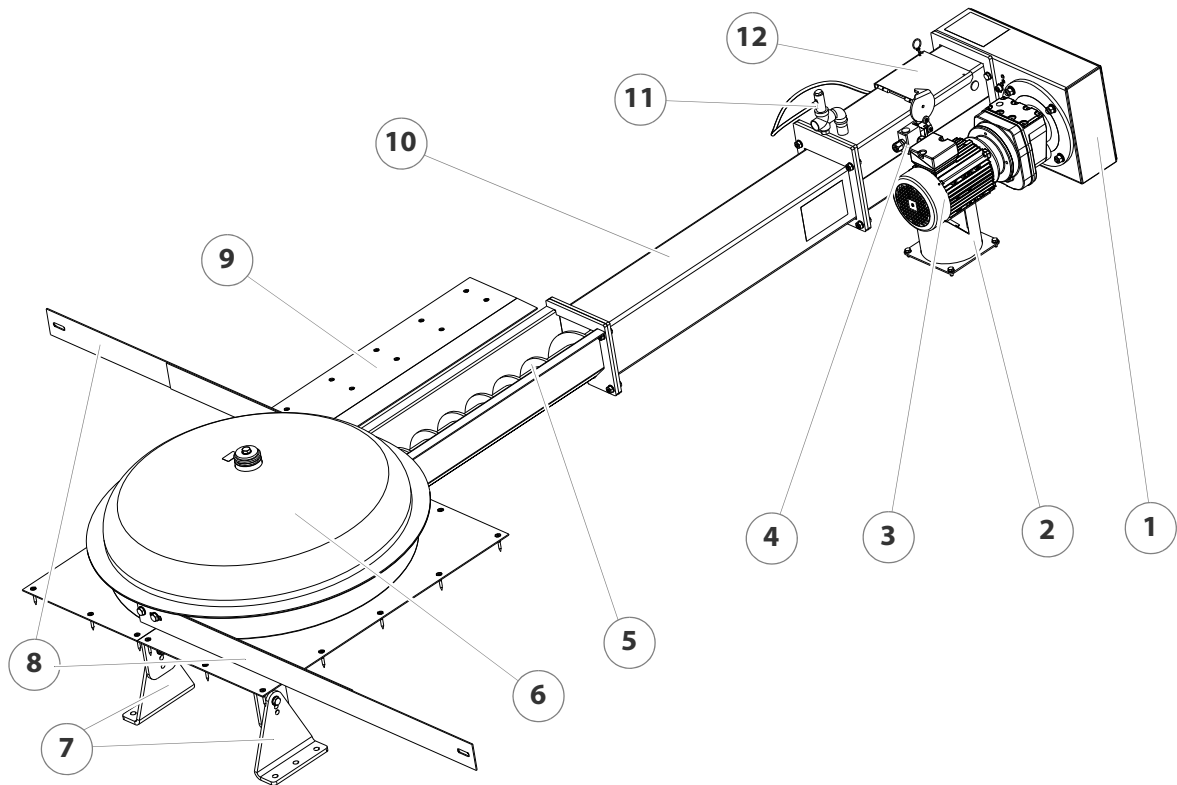


Figure 3/1 - Overview HDG FRA 2.5/3.5/4.5

- 1 Deflection box
- 2 Inclined drop
- 3 Drive motor
- 4 Overfill cover limit switch
- 5 Conveyor auger
- 6 Dished base
- 7 Support feet
- 8 Spring steel arms
- 9 Metering plate
- 10 Auger trough
- 11 Extinguishing device
- 12 Overfill cover

3.2 Functional description

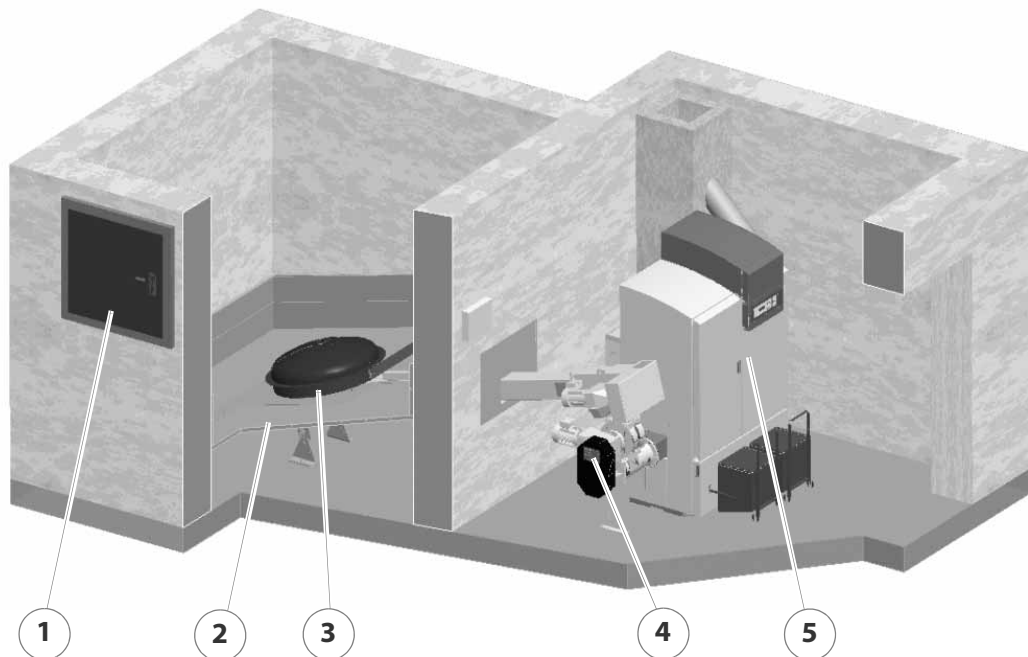


Figure 3/2 - Design

- 1 Access hatch
- 2 Sloping floor
- 3 HDG Delivery System FRA 2.5/3.5/4.5
- 4 HDG Feed System TBZ 150
- 5 HDG Feed System TBZ 150 boiler

The HDG Flexi Blade Delivery System FRA 2.5/3.5/4.5 is suitable for the extraction of wood chips, shavings and pellets up to grain size G 50 or P45 to EN14961-1 and is used for all HDG Compact systems.

The rotation of the dished base attached with spring steel arms conveys the fuel from the bunker into the conveyor auger. This transports the material to the feed system. The geared motor which drives the dished base and the conveyor auger is located at the transition to the feed system.

The delivery system is controlled by the boiler control unit HDG Compatronic (for HDG Compact 25 - 80) or HDG Control (for HDG Compact 100 - 200)

3.3 Technical data

	FRA 2.5		FRA 3.5		FRA 4.5	
	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m
Effective diameter	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m
Length of spring steel arms	1.25 m		1.75 m		2.25 m	
Max. filling height, wood chips (250 kg/m ³)	5.0 m					
Max. filling height, pellets (650 kg/m ³)	3.0 m					
Max. installation angle, wood chips	25°					
Max. installation angle, pellets	5°					
Motor data for HDG Compact 25/35 <ul style="list-style-type: none"> • Output • Speed • Voltage • Frequency 	0.37 kW 6.0 rpm 230 / 400 V 50 Hz					
Motor data for HDG Compact 50 - 200 <ul style="list-style-type: none"> • Output • Speed • Voltage • Frequency 	0.75 kW 12.0 rpm 230 / 400 V 50 Hz					
Drive motor lubricant	Petroleum CLP 220					
Bevel gear	RI 130 / i=15					

Table 3/1 - Technical data

4 Planning and installation

4.1 Planning the delivery system

FUEL BUNKER

The HDG Flexi blade Delivery System is suitable for bunker sizes from 2.5 to 4.5 m. To enable the most efficient emptying of the fuel bunker, it should be square-shaped if possible. The conveyor auger can be up to 6 m long. The maximum possible conveyor output of the delivery system with the fuel bunker fully filled is about 0.50 m³/h. For wood chips with a bulk weight of 250 kg/m³, the bunker can be filled up to a height of maximally 5.0 m. For pellets however, the maximum permissible filling height is 3.0 m for a bulk weight of 650 kg/m³.

An intermediate floor is required for the operation of the delivery system. This is generally provided in the form of a simple wooden construction. The installation angle of the intermediate floor depends on the inclination of the conveyor auger. The installation angle - measured from the floor of the installation site - is maximally 25° for wood chips or maximally 5° for pellets. The intermediate floor is to be constructed so that the spring steel arms do not contact it during their rotating movements.

The area underneath the intermediate floor must be adequately ventilated. If, due to the bunker size, contact of the spring steel arms with the bunker cannot be avoided, it is recommended to attach a 250 mm hardwood sheathing to protect against abrasion of the wall and minimise noise. The feed opening for the delivery between fuel bunker and boiler room must be 0.70 m x 0.70 m.

The fuel bunker must be provided with a suitable access door for entering or performing maintenance work. For reasons of safety, this door must be equipped with a limit switch so that the heating system switches off as soon as the door is opened.

OPERATION WITH PELLETS



Danger!

Dust explosion due to build up of static charge

Only qualified electricians certified according to TRBS 1203-1 or local country regulations may perform work on electrical systems in areas at risk of explosion.

INJECTION AND EXTRACTION NOZZLES

If possible, the bunker should be situated with an outer wall on the narrow side as the injection and extraction nozzles must be accessible from outside. If the bunker is in an inner-lying room, the injection and extraction pipes (made of metal) must be extended out to an external wall.

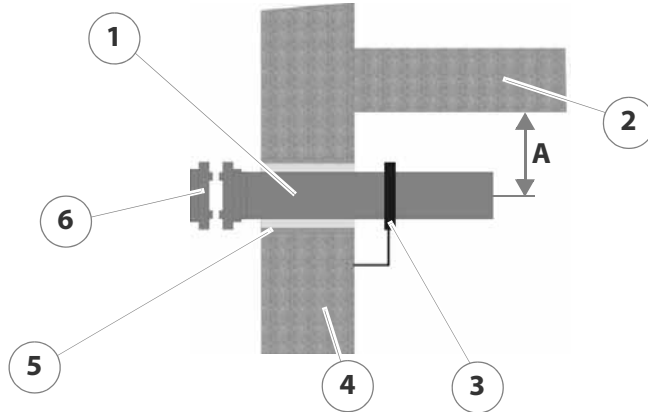


Figure 4/1 - Injection and extraction nozzles

- 1 Injection or extraction nozzles
 - 2 Ceiling
 - 3 Earth cable
 - 4 Outer wall
 - 5 PVC pipe Ø 150 mm (supplied by customer or installer)
 - 6 Coupling nozzle Storz "A" system, Ø 100 mm with cap
- A) Clearance to ceiling approx. 20 cm

Both nozzles must be properly earthed (equipotential bonding).

The injection and extraction nozzles are installed on the narrow side, just underneath the ceiling.

The injection nozzle should be in the middle of the space to ensure even filling.

The passages through the wall for the nozzles must be watertight.

PELLET ANTI-SHATTER PROTECTIVE MAT

Pellets are blown into the bunker at high pressure. To prevent damage to the pellets and to the wall, a protective mat must be installed opposite the injection nozzle. This must be made of a durable material which will not deteriorate with age, e.g. rubber or plastic. The minimum clearance between protective mat and wall must be 30 cm.

ALTERNATIVE INSTALLATIONS

- **Spacing between injection and extraction nozzles over 50 cm:**

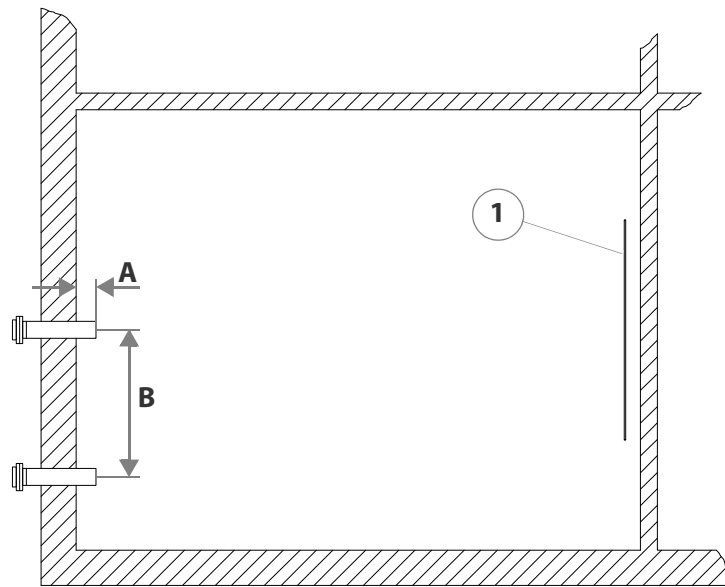


Figure 4/2 - Injection and extraction nozzles, version 1

1 Pellet anti-shatter protective mat

A) approx. 10 cm

B) over 50 cm

- **Spacing between injection and extraction nozzles under 50 cm:**

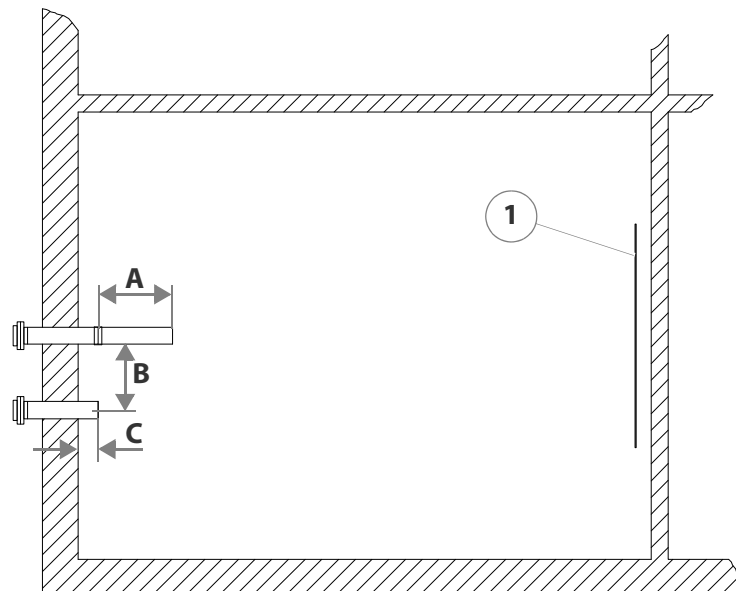


Figure 4/3 - Injection and extraction nozzles, version 2

1 Pellet anti-shatter protective mat

A) min. 50 cm

B) under 50 cm

C) approx. 10 cm

- **Injection and extraction nozzles for filling on alternating sides:**

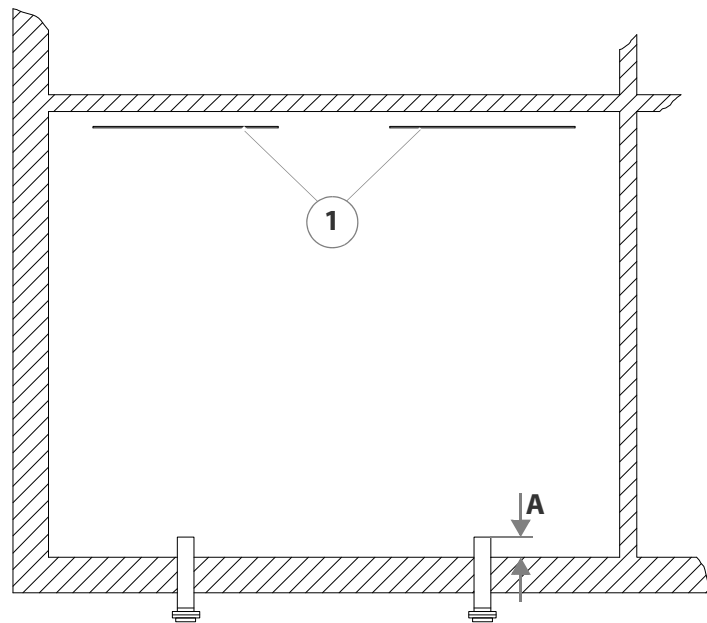


Figure 4/4 - Injection and extraction nozzles, version 3

1 Pellet anti-shatter protective mat

A) approx. 10 cm

If the injection and extraction nozzles on the long side of the pellet bunker are used for filling from alternating sides, the existing space can be better utilised.

A protective mat must then be installed for both nozzles.



Position the pipes as high as possible in the bunker so as to be able to fill to the maximum. Minimum clearance to ceiling approx. 20 cm, so that the pellets don't hit the ceiling. Plaster ceilings will need a protective panel.

CEILINGS, WALLS AND ACCESS POINTS

The walls and ceiling must be dry. Make sure that things are airtight owing to the dust generated and the danger of condensation on cold winter days.

The surrounding walls must be able to bear the weight and pressure produced by the pellets (density 650 kg/m²).

In practice, the following wall thicknesses have proved adequate.

- Medium weight vertically perforated brick:
 - 11.5 cm plastered on both sides
- Solid concrete:
 - 10 cm (steel reinforced)
- Aerated concrete:
 - 11.5 cm plastered on both sides

- Wooden framed wall:
 - approx. 12 cm thick beams
 - with planking on both sides made of 15 - 20 mm timber
 - Beam spacing approx. 62.5 cm

The conditions for proper design include a wall length of max. 5 m and a height of max. 2.5 m, with a well-designed connection between the walls and ceiling on all sides.

ACCESS HATCH

The fuel bunker must be provided with a suitable access hatch for entering or performing maintenance work.



Important!

Each entry point to the pellet bunker must, for reasons of safety, be equipped with a limit switch so that the heating system switches off as soon as the door is opened.

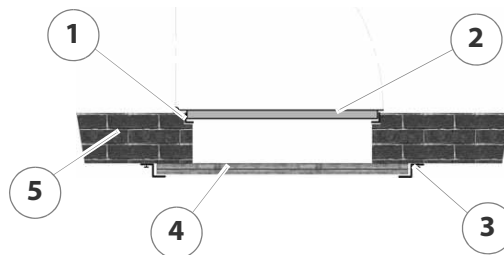


Figure 4/5 - Access hatch for pellet bunker

- 1 Seal
- 2 Access hatch
- 3 Z-shaped retainer
- 4 Wooden boards (supplied by customer)
- 5 Separating wall

Doors and access hatches must have a seal to prevent dust from escaping when pellets are being blown in. On the door to the pellet bunker, wooden boards must be fitted on the inside (at least 3 cm, tongue & groove design if possible), so that the pellets can't press against the door.

ELECTRICAL SYSTEM

The directives of 2006/95/EC (low voltage guidelines) must be followed for the electrical connections to the system.

4.2 Scope of delivery

Included in the scope of delivery:

- HDG Flexi Blade Delivery System FRA 2.5/3.5/4.5
- Extinguishing device
- Attachment accessories
- Operating manual

Upon delivery, check that the scope of delivery matches the information on the delivery note.

4.3 Installing the delivery system

GENERAL

The heating system will initially be commissioned by specialists from HDG Bavaria or from an authorised HDG partner and a qualified electrician.



Danger!

Risk of material damage and injury due to incorrect installation

Installing the system requires comprehensive specialist knowledge. If installed by untrained persons, the heating system can be damaged and persons may be injured due to secondary damages.

Only allow authorised specialists to perform the installation.



Danger!


Danger from electrical current or voltage

Switch off the mains supply to the heating system during the installation.

REQUIREMENTS

In order for the HDG Flexi Blade Delivery System FRA 2.5/3.5/4.5 to be installed, certain requirements must be met:

- Structural conditions on-site (feed opening, bunker base of adequate structural strength, etc.) must be prepared in advance
- The HDG Compact boiler must be erected
- The HDG Feed System TBZ 150 must be mounted on the boiler

 See the operating manuals of the HDG Compact 25- 200, chapter “4 Planning and installation”, section “Installing the feed system”.

SETTING UP THE DELIVERY SYSTEM



Caution!

Danger of injury

The delivery system is very heavy. Hands and feet could be crushed during installation.

Only lift the delivery system with suitable lifting equipment and take care so that hands and feet are not crushed.

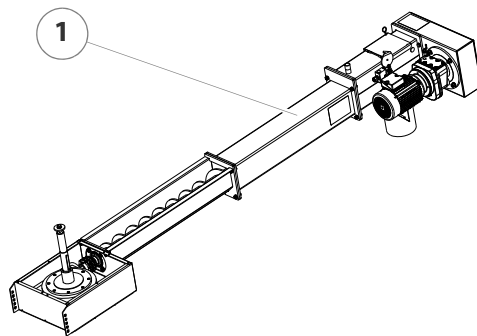


Figure 4/6 - Attaching the conveyor auger

1. Bring the delivery system (1) into the fuel bunker.

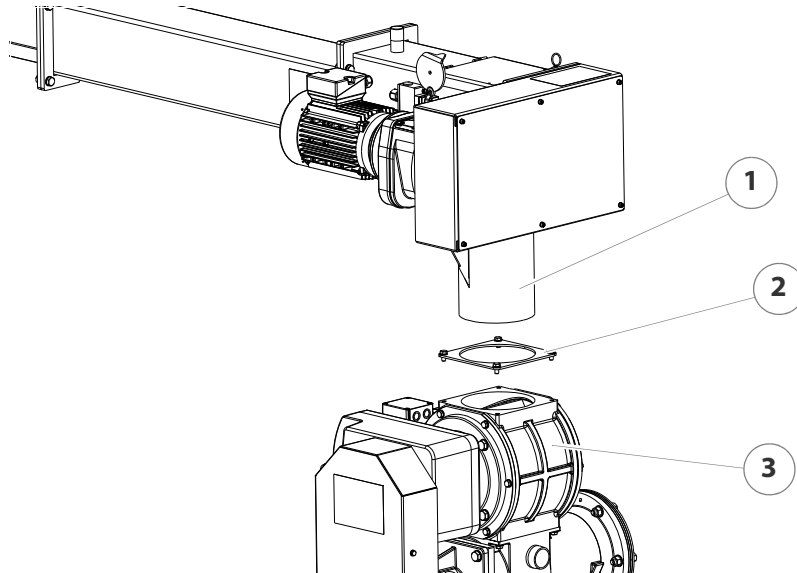


Figure 4/7 - Attaching the delivery system

2. Mount the downpipe flange (2) with the four M8 screws onto the rotary feeder (3) using a size 13 spanner.
3. Place the inclined drop (1) of the delivery system on the rotary feeder (3) in the fastened downpipe flange (2).
4. Align the gearbox roughly to the specified centre dimension of the bunker in the plan diagram (dished base drive shaft = measurement reference point)

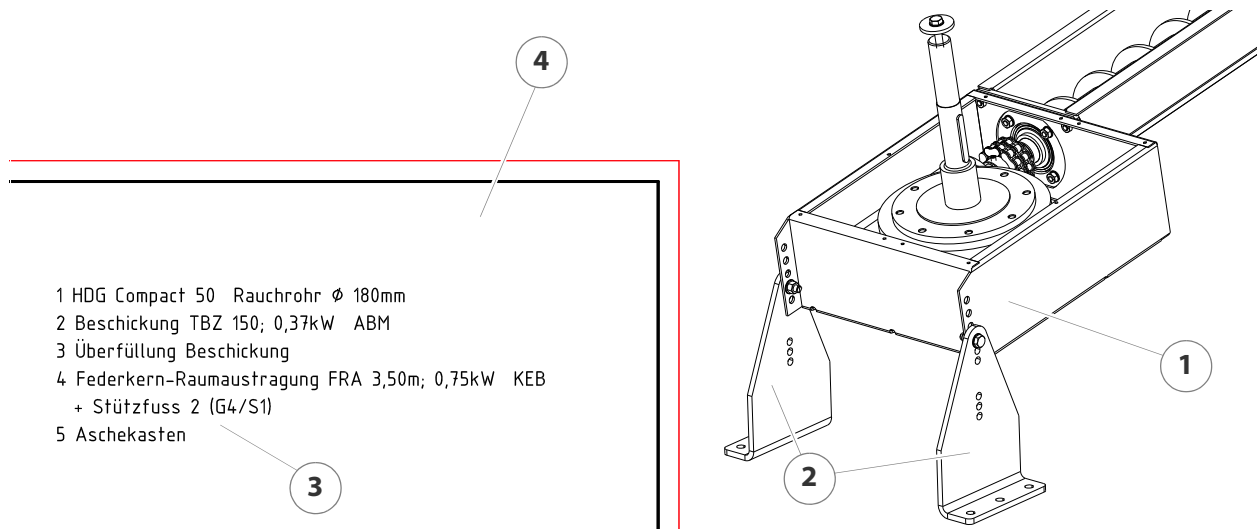


Figure 4/8 - Attaching the support feet

5. Mount the support feet (2) with the M12 screws (size 19 spanner) and lock nuts (with washers) onto the gearbox (1) according to the specifications (3) on the previously supplied plan diagram (4).



Explanation of the above example:

Support foot 2: Type of support foot (size 2)

G4/S1: Hole 4 on the gearbox / hole 1 on the support foot; each counted from the top downward.

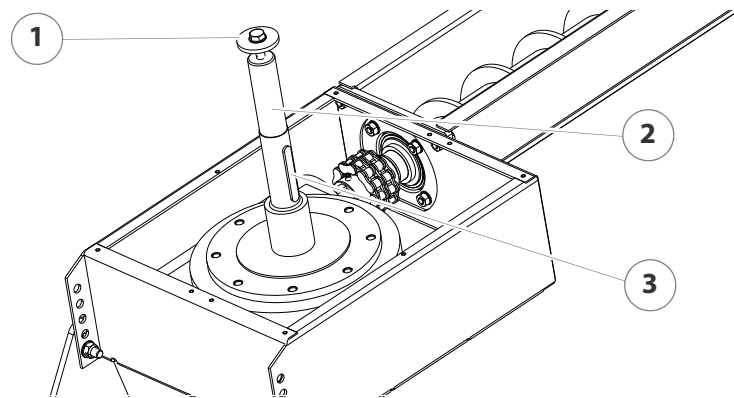


Figure 4/9 - Removing the fastening screw and feather key

6. Remove the M12 fastening screw (1) from the drive shaft (2).
7. Remove the feather key (3) from the drive shaft (2).

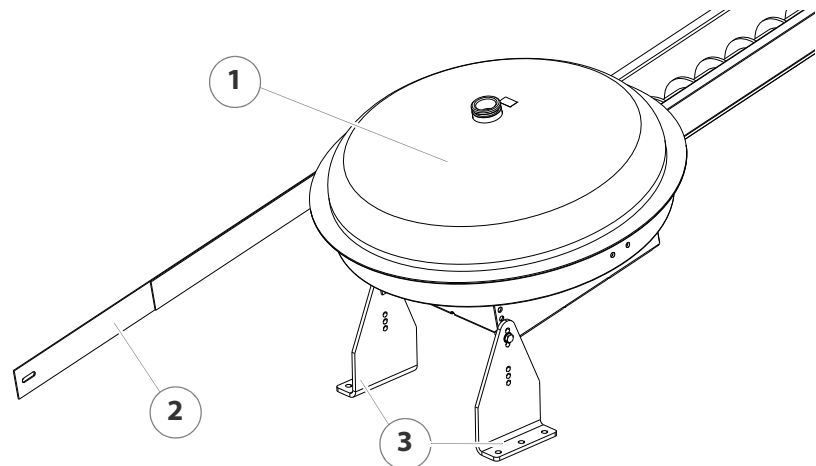


Figure 4/10 - Check for ease of movement

8. Place the dished base (1) on the drive shaft.



Caution!

Install the spring steel arms so that the shortest spring blade is on the dished base side and the longest spring blade is on the wall side.

Also make sure that the spring steel arms do not under any circumstances hang downwards. Press the spring steel arms upward as far as possible when installing them.

-
9. Fasten one spring steel arm (2) onto the dished base (1) with the M12 screws and a size 19 spanner.
 10. Turn the dished base (1) and make sure that the spring steel arms (2) do not contact the floor of the fuel bunker.
 11. Take the dished base (1) with the spring steel arm (2) back off the drive shaft.
 12. Fasten the support feet (3) to the floor with the supplied M12 heavy-duty anchors.

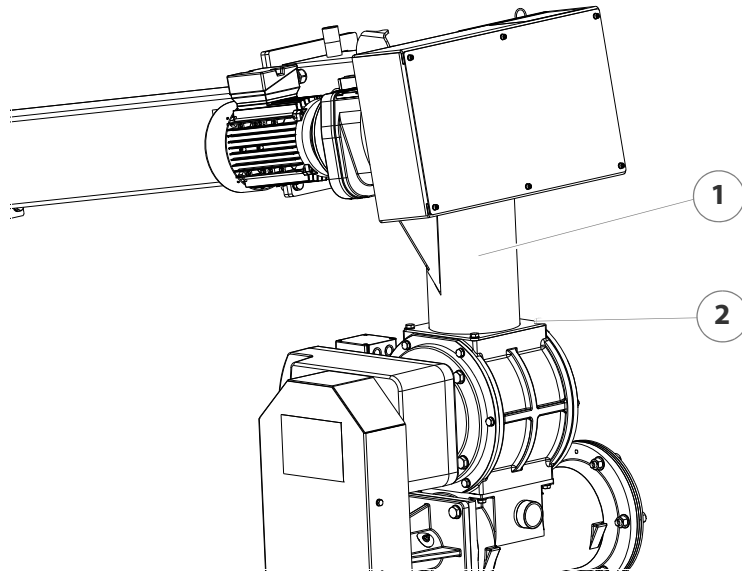


Figure 4/11 - Welding the inclined drop

13. Weld the inclined drop (1) of the delivery system onto the downpipe flange (2) using multiple short (2 cm) weld seams.
 14. Seal the joint between inclined drop (1) and downpipe flange (2) with acrylic sealant.
 15. Coat the weld seams or acrylic joints with the supplied paint.
- ✓ The setup of the HDG Flexi Blade Delivery System FRA 2.5/3.5/4.5 is completed.

INSTALLING THE INTERMEDIATE FLOOR

When installing the intermediate floor, the following must be observed:

- The level of the intermediate floor is specified by the two-piece gearbox cover under the dished base and the edges of the open auger channel.
- The wooden base is mounted **underneath** the edges of the open trough.
- The clearance of the spring steel arms to the intermediate floor must be uniform around the circumference. To ensure this, check it several times while mounting the intermediate floor by placing a spring steel arm on the drive shaft and rotating it.
- To achieve greater efficiency of extraction, the surface of the intermediate floor should be as smooth as possible.

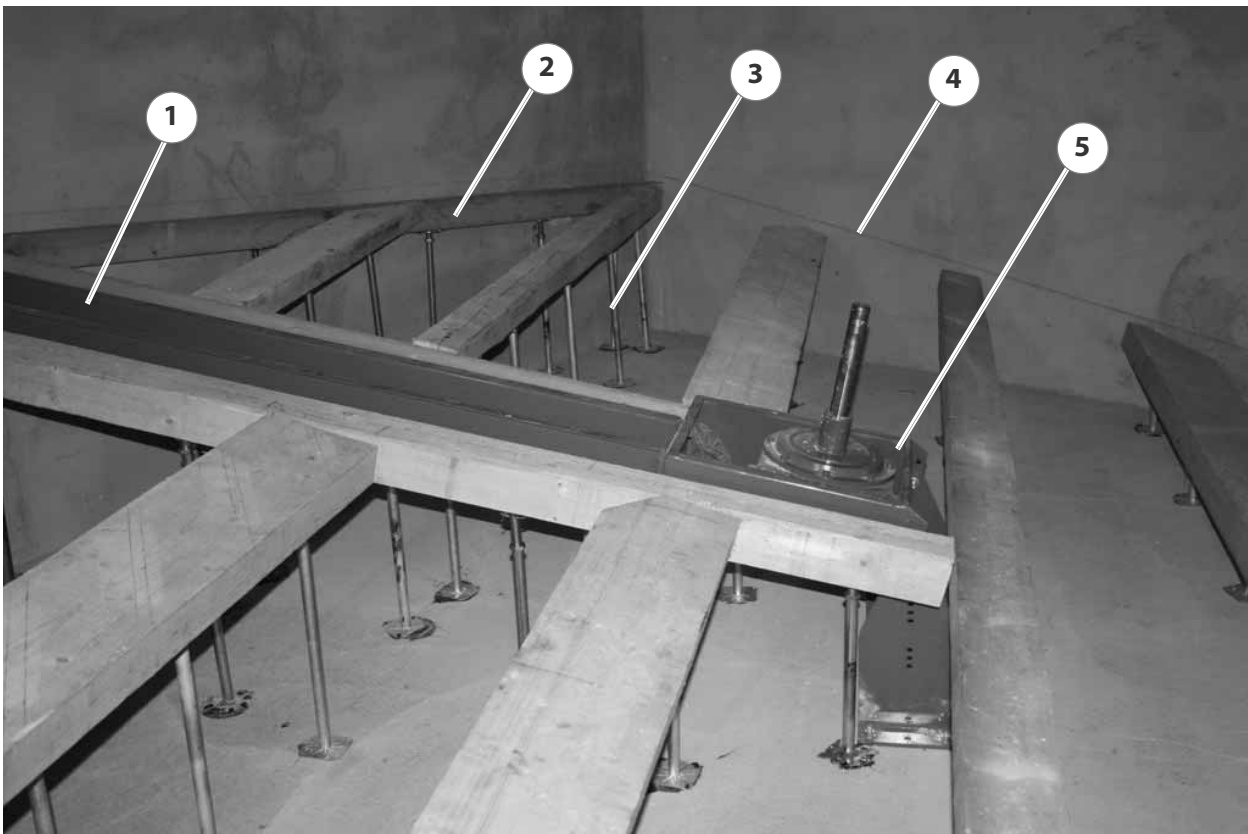


Figure 4/12 - Intermediate floor base

1. Copy the level of the auger trough (1) or gearbox (5), with the aid of an aluminium straight edge for example, onto the four walls (4) of the fuel bunker.
2. With the aid of supports (3) and taking into account the calculated height, construct the base (2) of the intermediate floor.



In the above specified structure, height-adjustable steel pipes were used as supports. Other materials would also be suitable however, such as wooden beams.

Ensure that the load-bearing beams of the base cannot fall. Reinforce these bearing beams from underneath, for example, with wood slats, to prevent their falling during the installation.



Caution!

In general when installing the base, the thickness of the intermediate floor lining must also be taken into account.

The final level of the intermediate floor may **not** exceed the level of the auger trough and the gearbox.

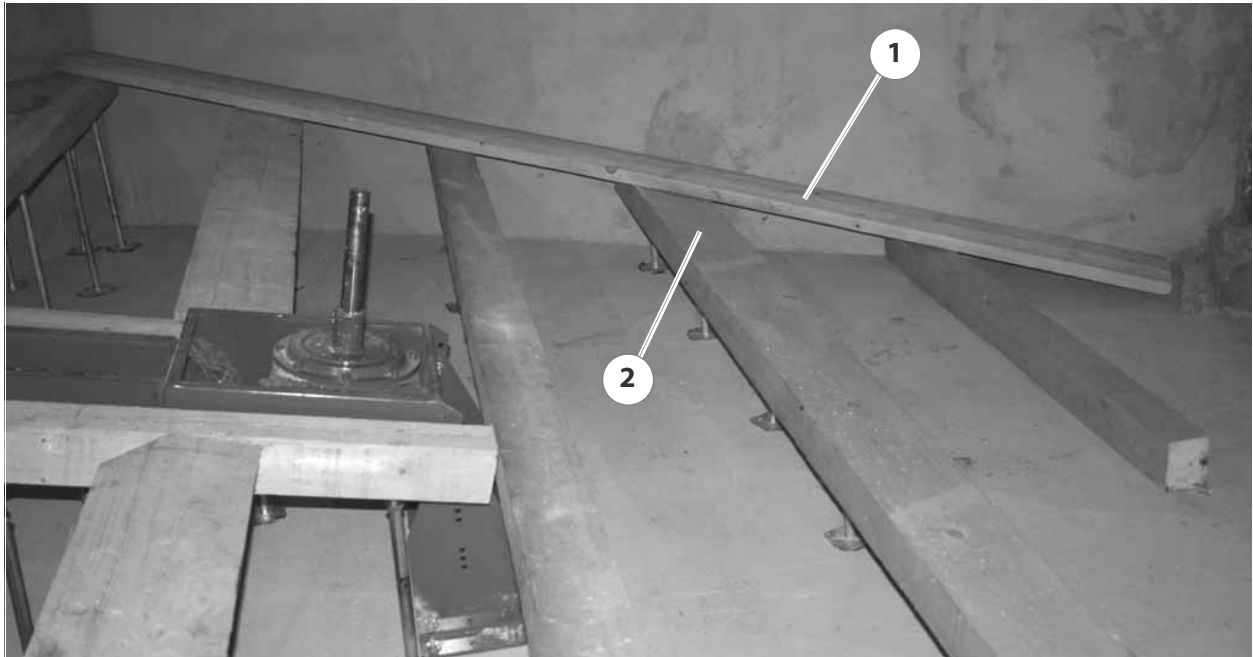


Figure 4/13 - Installing the intermediate floor

3. Mount the intermediate floor (1) on the base (2) using, for example, universal screws.



The clearance of the spring steel arms to the intermediate floor must be uniform around the circumference. To ensure this, check it several times while mounting the intermediate floor by placing a spring steel arm on the drive shaft and rotating it.

INSTALLING THE DISHED BASE, SPRING STEEL ARMS AND METERING PLATE



The following is only to be carried out once the intermediate floor has been completely installed.

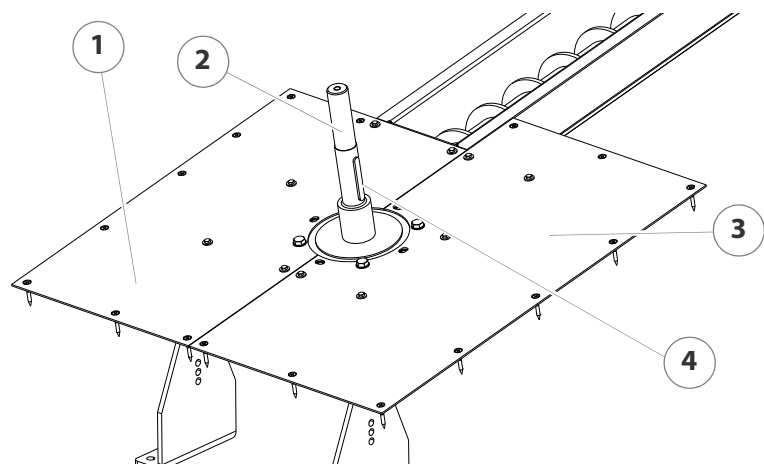


Figure 4/14 - Mounting the gearbox cover



When installing the gearbox cover, use the M12 screws (size 19 spanner) on the gearing, the M6 screws (size 10 spanner) with washers on the gearbox and the fixing plate screws (size 6x50) for the intermediate floor.

1. Install the large (1) and small (3) gearbox cover on the gearing.
2. Insert the feather key (4) in the intended position in the drive shaft (2).

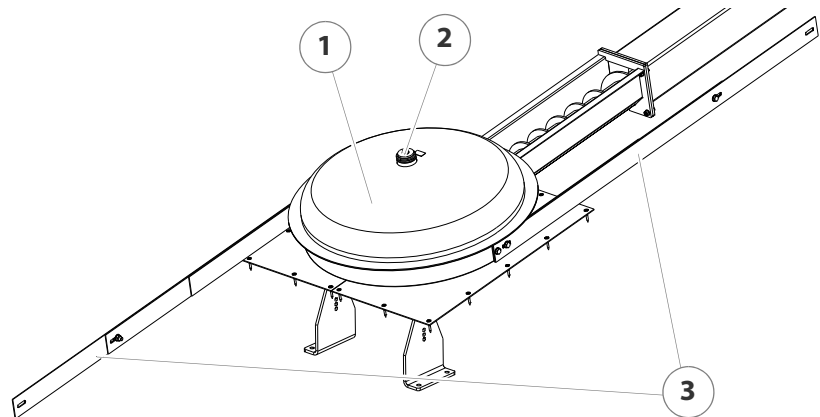


Figure 4/15 - Installing the dished base

3. Place the dished base (1) on the drive shaft.
4. Fasten the dished base (1) to the drive shaft with the aid of the M12 screw (2) and washer and using a size 19 spanner.



Caution!

Install the spring steel arms so that the shortest spring blade is on the dished base side and the longest spring blade is on the wall side.

Also make sure that the spring steel arms do not under any circumstances hang downwards. Press the spring steel arms upward as far as possible when installing them.

5. Fasten the two spring steel arms (3) onto the dished base (1) with the M12 screws and a size 19 spanner.

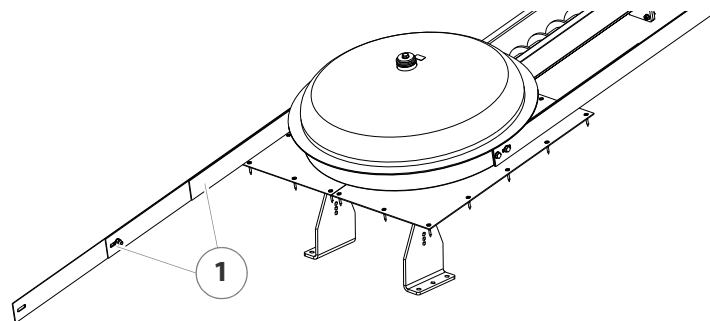


Figure 4/16 - Connection screws in the elongated holes

6. Make sure that the connection screws (1) of the individual spring blades can move freely in the provided elongated holes. Otherwise the spring steel arms can be bent and will no longer function.

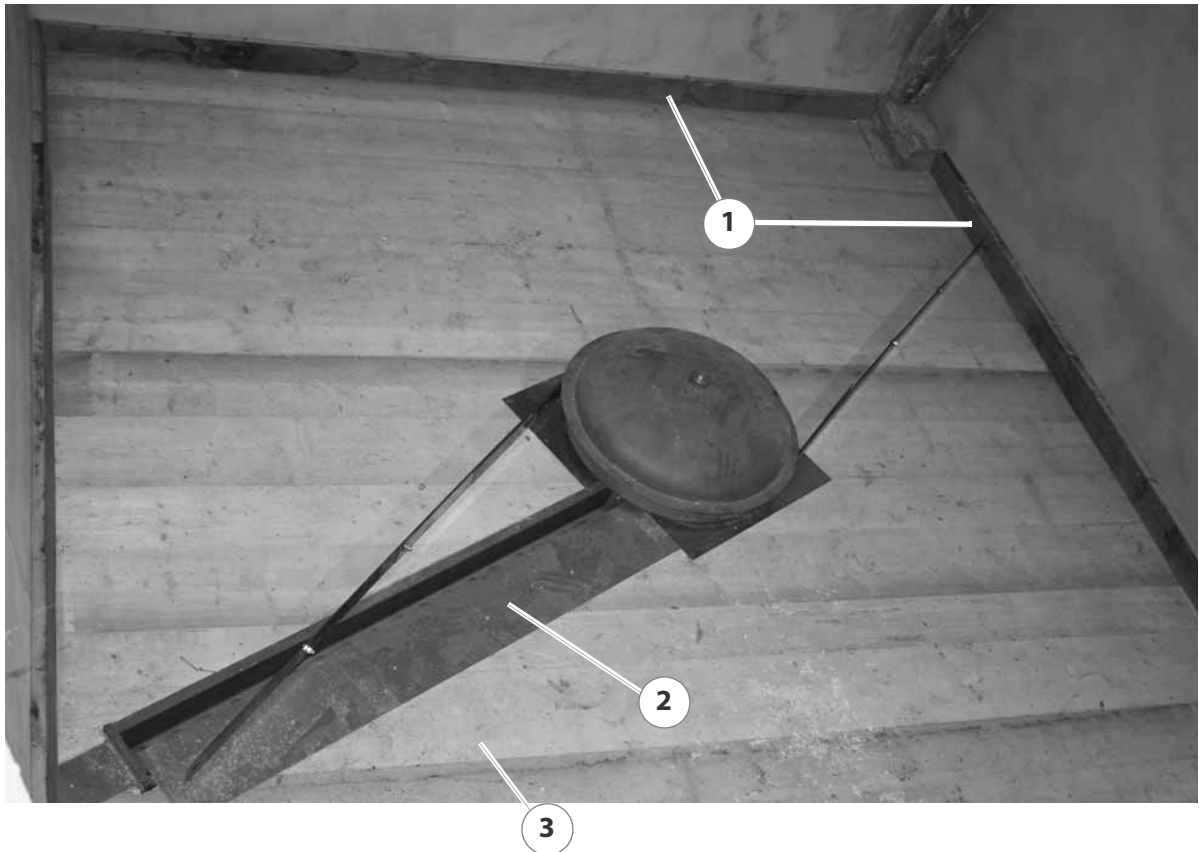


Figure 4/17 - Complete intermediate floor



For operation of the heating system with wood chips, the metering plate is to be installed on the intermediate floor so that it covers about 1/3 of the auger trough.

For operation with pellets, about one half of the auger trough should be covered.

7. Install the metering plate (2) on the intermediate floor (3).
 8. If, due to the bunker size, contact of the spring steel arms with the bunker cannot be avoided, a 250 mm hardwood sheathing should be attached to protect against abrasion of the wall and minimise noise.
- ✓ The gearbox cover, spring steel arms and metering plate are installed.

INSTALLING THE EXTINGUISHING DEVICE

The extinguishing device can only fulfil its intended purpose if the following requirements are met:

- Flow pressure of at least two bar must be available at the cold water inlet of the extinguishing device.



Mains-dependent, stand-alone supply systems are not safe enough due to dependence upon the power supply!

- The clear width of the extinguishing device supply line may not be less than its nominal width. The supply line may not be equipped with a shut-off.



The extinguishing device is to be inspected annually by a qualified technician to verify that it is functional.

The thermal safety device is to be installed according to HDG specifications.

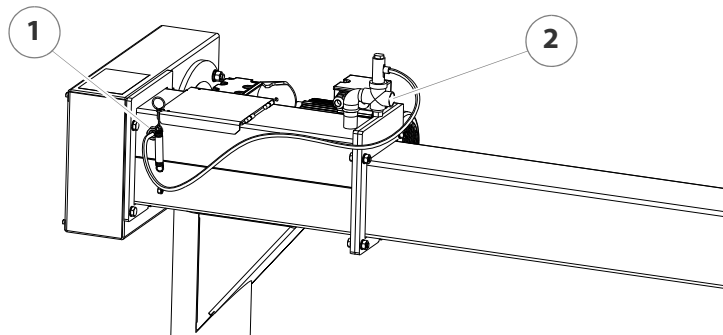



Figure 4/18 - Installing the extinguishing device


1. Mount the extinguishing device (2) on the Flexi Blade Delivery System.
 2. Mount the sensor for the extinguishing device at the position (1) provided for it.
- ✓ The extinguishing device is now installed.

ELECTRICAL CONNECTIONS

The electrical connections must be made in accordance with DIN IEC 60364 "Setting up low-voltage electrical installations".

 The technical data is listed in chapter "3 Mode of operation", section "3.3 Technical data".

The electrical connections of the HDG Flexi Blade Delivery System are to be connected in accordance with the circuit diagram of the heating system and the boiler circuit boards.

 See the supplied circuit diagram of the HDG Compact 25 - 200 heating system.

4.4 Pellet bunker



The following section is only relevant for the operation of the HDG Flexi Blade Delivery System with wood pellets.

INSTALLING THE INJECTION AND EXTRACTION NOZZLES



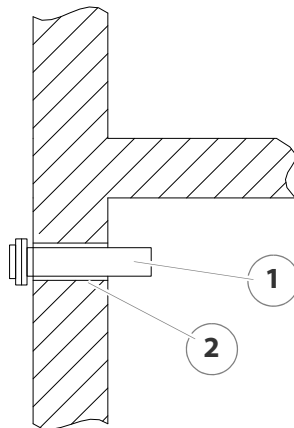
Danger!

Dust explosion due to build up of static charge

Only qualified electricians certified according to TRBS 1203-1 or local country regulations may perform work on electrical systems in areas at risk of explosion.



On the connecting pipes, there should not be any protruding interior edges or weld beads. Otherwise, the pellets would be damaged at these points when blown in.



1. Insert the injection nozzle (1) into the passage through the wall (2).
2. Cement the injection nozzle in place with mortar or inject the cavity around the nozzle with expanding foam which is suitable for the on-site conditions.
3. Earth the injection nozzle.

Figure 4/19 - Installing the injection and extraction nozzles

4. Install the extraction nozzle as just described.
 5. Earth the extraction nozzle.
- ✓ The injection and extraction nozzles have been installed.

INSTALLING EXTENSION PIPES

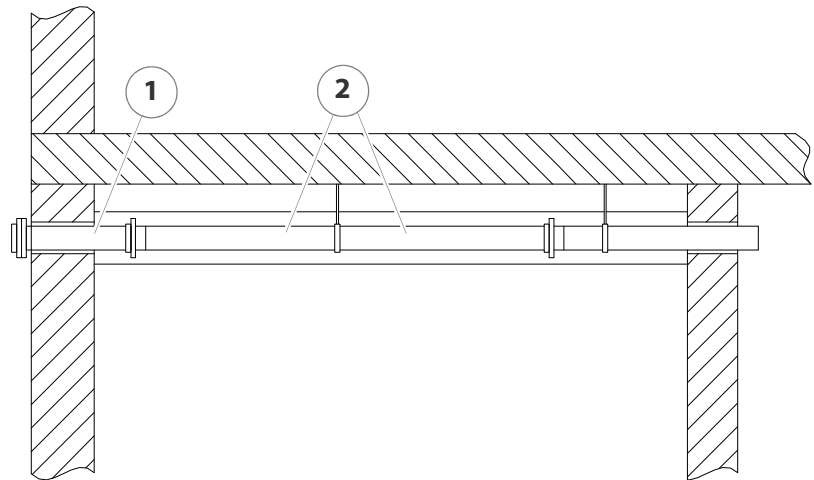


Figure 4/20 - Installing extension pipes

6. If necessary, install the extension pipes (2) on the injection and extraction nozzles (1).

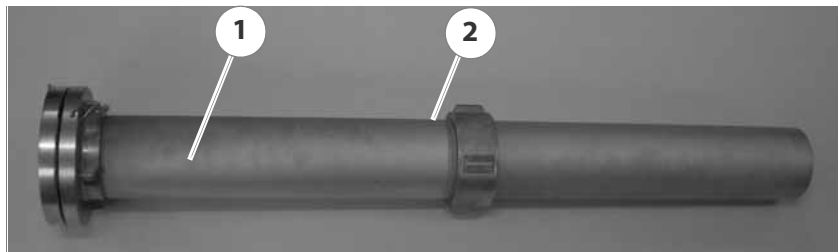


Figure 4/21 - Earthing extension pipes

7. Earth the injection and extraction nozzles (1) on the screws (2) intended for that purpose.

✓ The extension pipes have been installed.

INSTALLING THE DOOR RAILS

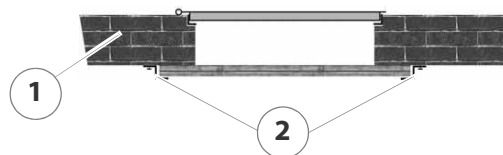


Figure 4/22 - Installing door rails (view from above)

1. Saw the door rails (2), if necessary, down to the required length.
2. Bolt on the door rails (2) at a sufficient distance to the ceiling (at least 1.5 times the height of the boards used) to the side of the access hatch on the inner wall (1) of the pellet bunker.

✓ The door rails have been installed.

INSTALLING THE PELLET ANTI-SHATTER PROTECTIVE MAT


1. Bolt the protective mat onto the ceiling, opposite the injection nozzle and at a distance of at least 30 cm from the wall.
- ✓ The pellet anti-shatter protective mat has been installed.

INSTALLING THE SAFETY LIMIT SWITCH

The HDG Flexi Blade Delivery System FRA must be shut down if the inspection opening of the pellet bunker is opened. This is necessary for preventing injuries due to rotating components.



The customer is to have a safety limit switch installed and connected to the terminal provided for this on the HDG Compact 25 -200 heating system and label it "Auger door switch".

-  See the supplied circuit diagram of the HDG Compact 25 - 200 heating system.

ATTACHING SAFETY STICKERS

1. Adhere the DEPV sticker "Safety instructions for pellet bunkers > 10 tons" (included in the scope of delivery) in a position where it can be easily read on the access hatch of the pellet bunker.

5 Commissioning the system

The heating system will initially be commissioned by specialists from HDG Bavaria GmbH or from an authorised HDG partner.

The commissioning includes an introduction to the operation and maintenance of the heating system as well as performing measurements on the system to determine exhaust emissions and firing performance.




Danger!

Material damage and injury due to incorrect commissioning

Commissioning the system requires comprehensive specialist knowledge. If this commissioning is done by an untrained person, the heating system could be damaged.

Only allow authorised specialists to perform the commissioning.


The initial startup of the HDG Flexi Blade Delivery System FRA is completed in connection with the complete HDG Compact heating system.

 The procedure for commissioning the heating system can be found in the HDG Compact 25 - 200 operating manuals in the chapter entitled "5 Commissioning the system".

In addition, the following must be observed in particular prior to the initial startup of the delivery system:

- Check the electrical fuses (motor protection/limit switches of fuel bunker)
- Perform a visual inspection to ensure there are no foreign bodies in the bunker
- Check that the spring steel arms move freely over the intermediate floor
- Check the direction of rotation of the dished base

6 Filling the fuel bunker

 For this, see also the HDG Compact 25 - 200 operating manuals, chapter “6 Using the heating system”, section “Filling the fuel bunker”.

6.1 Requirements

The following requirements must be met before the fuel bunker can be filled:

- The fuel bunker must have initially been approved by an authorised specialist.
- The fuel bunker must be dry and free of any foreign bodies.
- The requirements of government safety organisations must be met.
- The spring steel arms may not contact the intermediate floor during their rotating movements.
- The connection screws of the individual spring blades must move freely so that the spring steel arms can lie against the dished base.

6.2 Procedure for filling with wood fuel products




Warning!

Damage to delivery system during filling

If the heating system is not switched on for filling of the fuel bunker, in cases of a particularly high filling height, the overload protection of the delivery system could be triggered with subsequent switching on of the heating system.

HDG COMPACT 25 - 80


When filling the fuel bunker to a height of about 2.0 m or greater, activate the delivery system by switching to manual mode. Allow the delivery system to run about 10-15 seconds.

 See the HDG Compact 25 - 80 operating manuals, chapter “5 Commissioning the system”, section “5.2 Procedure”, paragraph “Checking the actuators in manual operation”.

1. Fill the fuel bunker.
- ✓ The filling of the fuel bunker is completed.

HDG COMPACT 100 - 200

When filling the fuel bunker, activate the parameter **4-10 Filling fuel bunker** by pressing the *F4* key under the **ON** command. This ensures the delivery system is in motion during the filling of the fuel bunker.

 See the HDG Compact 100 - 200 operating manual, chapter “6 Using the heating system”, section “6.9 Manual menu”, paragraph “Filling the fuel bunker”.


1. Fill the fuel bunker.
 2. Then set parameter **4-10 Filling fuel bunker** to **OFF**.
- ✓ The filling of the fuel bunker is completed.

6.3 Procedure for filling of pellets




Important!

Observe the safety instructions for bulk pellet storage

 See chapter “2 Safety instructions”, section “2.4 Safety instructions for bulk pellet storage” or the DEPV sticker “Safety instructions for bulk pellet storage > 10 tons”.

HDG COMPACT 25 - 80

1. Switch the heating system off.

 See also the HDG Compact 25 - 200 operating manuals, chapter “6 Using the heating system”, section “6.3 Switching off the heating system”.

- ✓ The heating system is switched off.
2. Recheck that the heating system is switched off.
-




Warning!


Damage to delivery system during filling

If the heating system is not switched on for filling of the fuel bunker, in cases of a particularly high filling height, the overload protection of the delivery system could be triggered with subsequent switching on of the heating system.

When filling the fuel bunker to a height of about 2.0 m or greater, activate the delivery system by switching to manual mode. First signal the driver of the tanker to stop the filling procedure. Allow the delivery system to run about 10-15 seconds.

 See the HDG Compact 25 - 200 operating manuals, chapter “5 Commissioning the system”, section “5.2 Procedure”, paragraph “Checking the actuators in manual operation”.

3. Inform the tanker driver that the pellet bunker can be filled.
4. After the tank is filled, close the injection and extraction nozzles.
5. Switch the heating system on.

 See the HDG Compact 25 - 200 operating manuals, chapter "6 Using the heating system", section "6.2 Switching on the heating system".

✓ The filling of the pellet bunker is completed.

HDG COMPACT 100 - 200

1. Set parameter **4-10 Filling fuel bunker** to **ON**.

✓ The heating system is switched off.

2. Recheck that the heating system is switched off.




Warning!

Damage to delivery system during filling

If the heating system is not switched on for filling of the fuel bunker, in cases of a particularly high filling height, the overload protection of the delivery system could be triggered with subsequent switching on of the heating system.


When filling the fuel bunker to a height of about 2.0 m or greater, activate the delivery system by switching to manual mode. First signal the driver of the tanker to stop the filling procedure. Allow the delivery system to run about 10-15 seconds.

 See the HDG Compact 25 - 200 operating manuals, chapter "5 Commissioning the system", section "5.2 Procedure", paragraph "Checking the actuators in manual operation".

3. Inform the tanker driver that the pellet bunker can be filled.

4. After the tank is filled, close the injection and extraction nozzles.

5. Set parameter **4-10 Filling fuel bunker** to **OFF**.

 See section "6.9 MANUAL menu", paragraph "Filling fuel bunker" in this chapter.

✓ The filling of the pellet bunker is completed.

7 Cleaning and servicing the delivery system

GENERAL

To ensure fault-free and safe operation, certain cleaning and maintenance work is necessary. This effort will also help you avoid expensive repairs, provided you observe the recommended intervals.

The cleaning and maintenance work can also be performed by an authorised specialist heating company through a servicing contract.

REPLACEMENT PARTS



Only use original HDG replacement parts! You can obtain HDG replacement parts from your specialist heating company.

7.1 Cleaning and maintenance schedule



The specified maintenance intervals are guidelines. Depending on the quality of the fuel and the power used by the heating system (more frequent on/off operation) the intervals may vary.

Interval	Component	See page ...
monthly	<ul style="list-style-type: none"> Check drive chain 	36
before every second filling	<ul style="list-style-type: none"> Inspect the fuel bunker 	38

Table 7/1 - Cleaning and maintenance schedule

CHECKING THE DRIVE CHAIN



Important!

Risk of injury from the rotating cogs.

When the heating system is switched on, the gears and drive chains that move the various augers rotate. Fingers could be crushed during cleaning and maintenance work.

Switch the heating system off before checking the drive chains.

1. Switch the heating system off.

See also the HDG Compact 25 - 200 operating manuals, chapter "6 Using the heating system", section "6.3 Switching off the heating system".

2. Release the screws with a 4 mm hexagon socket wrench and remove the cover from the deflection box.

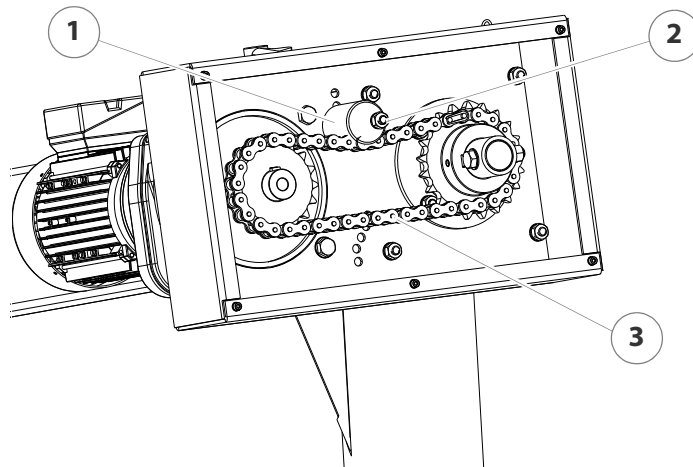


Figure 7/1 - Checking the drive chain of the delivery system

3. Check the chain tension (3).
 - ✓ If the drive chain has approximately 1 cm play, the tension is correct.
 - ✓ If the drive chain has more play, it must be tightened.
4. Loosen the locking screw (2) on the chain tensioner (1).
 - ✓ The chain tensioner (1) can be moved.
5. Move the chain tensioner (1) to the side until the drive chain has sufficient tension again.
6. Secure the chain tensioner (1) in this position.
 - ✓ The drive chain is tightened.
7. Replace the cover on the deflection box.
8. Switch the heating system back on.
 - ✎ See the HDG Compact 25 - 200 operating manuals, chapter "6 Using the heating system", section "6.2 Switching on the heating system".
 - ✓ The check of the delivery system drive chain is completed.

INSPECTING THE FUEL BUNKER



Important!

Risk of crushing injury from the rotating conveyor auger.

If the heating system is switched on, the delivery auger rotates in the fuel bunker. Hands and feet could thereby be crushed.

Switch the heating system off before you enter the fuel bunker. Observe the advisories of government safety organisations.

1. Switch the heating system off.

✓ See the HDG Compact 25 - 200 operating manuals, chapter "6 Using the heating system", section "6.3 Switching off the heating system".

2. Allow the heating system to burn out.



3. Turn the main switch off.

4. Open the access hatch.

5. Inspect the fuel bunker for the burning of unsuitable residues or foreign bodies and remove these if necessary.

6. Close the access hatch.

7. Switch the heating system back on.


✎ See the HDG Compact 25 - 200 operating manuals, chapter "6 Using the heating system", section "6.2 Switching on the heating system".

8. Set the desired operating mode.

✎ The inspection of the fuel bunker is completed.

8 Troubleshooting

If a fault occurs in the heating system, all the icons of the operating modes (HDG Compact 25 - 80) or the *Acknowledge fault* key (HDG Compact 100 - 200) will flash and the fault is shown in the display of the heating system.

 The possible faults in connection with the HDG Flexi Blade Delivery System FRA 2.5/3.5/4.5 and their causes and resolutions can be found in the HDG Compact 25 - 200 operating manuals, chapter "8 Troubleshooting".

In particular for the HDG Flexi Blade Delivery System, the following can occur in addition to the faults described in the boiler operating manuals:

Fault	Causes
No material conveyed	<ul style="list-style-type: none"> • No material in the fuel bunker or in the conveying auger • Bridge has formed over the auger (unsuitable material) • Deflection chain of the drive motor is defective • Motor electrical connection faulty • Pipe-shaft connection in the deflection box is defective
Drive motor sluggish/blocked	<ul style="list-style-type: none"> • Motor protection setting too low • Overfilling at the inclined drop of the delivery system • Limit switch of the overfill cover is faulty • Auger trough is clogged • Auger shaft is impeded due to high levels of fine material / high levels of moisture (causing compression in the auger trough)
Spring steel arms are bent	<ul style="list-style-type: none"> • Connection screws of the spring steel arms are too tight and the spring blades are thus unable to move • Fuel caught in between the spring blades • Spring steel arms contact the intermediate floor when fuel bunker is empty
Material is compressed underneath the dished base plate	<ul style="list-style-type: none"> • Clearance of dished base to intermediate floor is not uniform around circumference


Table 8/1 - Faults



Important!

Damage to equipment due to reverse motion

In order to free a possibly stuck foreign body on the conveyor auger, the auger can be move backwards in manual operation.

 See the HDG Compact 25 - 80 operating manuals, chapter "5 Commissioning the system", section "Checking the actuators in manual operation".

If the reverse motion is too lengthy, there is a danger that the spring steel arms could be bent.

Run the reverse movement for maximally 1 second. If this does not remedy the problem, please consult a trained specialist.

9 Declaration of incorporation

Installation declaration

in accordance with Directive 2006/42/EC on machinery, App. II, 1.B
for partially complete machinery

Manufacturer:

HDG Bavaria GmbH, Heating systems for wood
Siemensstraße 22
D-84323 Massing

Company representative with the authority to compile the relevant technical documentation:

Stefan Holfelder
HDG Bavaria GmbH, Heating systems for wood
Siemensstraße 22
D-84323 Massing

Description and identification of the partially complete machinery:

Product: Spring-loaded transportation unit FRA
Type: FRA 2.5 /3.5/4.5
Project number: 2009-12-0009
Project designation: MRL2006 spring-loaded transportation unit FRA

It is declared that the following basic requirements of Directive 2006/42/EC on machinery are fulfilled:

1.1.6.; 1.1.7.; 1.2.1.; 1.2.2.; 1.2.3.; 1.2.4.; 1.2.5.; 1.3.; 1.3.1.; 1.3.7.; 1.5.1.; 1.5.16.; 1.5.3.; 1.5.4.; 1.6.3.; 1.7.1.1.;
1.7.1.2.; 13.5.; 3.2.1.; 3.3.3.; 3.3.4.; 3.3.5.; 3.4.; 3.6.1.; 4.1.2.1.; 4.1.2.2.; 4.1.2.7.; 4.4.1.; 4.4.2.; 5.1.; 5.3.; 5.4.; 6.1.1.;
6.1.2.; 6.3.3.; 6.4.1.; 6.4.3.; 6.5.

It is also declared that the special technical documentation was created in accordance with Appendix VII,
part B.

It is expressly declared that the partially complete machinery corresponds to all relevant requirements of the following EC directives:

2006/95/EC:2006-12-12 (Low-voltage directive) Directive of the European Parliament and Council from 12th December 2006 to bring member state regulations concerning electrical equipment for use within certain voltage limits in line (codified version) (1)

Source of the applied harmonised standards according to Article 7, Paragraph 2:

EN ISO 12100-1:2003-11 Safety of machinery – basic terms, general design principles – part 1: Basic Terminology, Methodology
EN ISO 12100-2:2003-11 Safety of machinery – basic terms, general design principles – part 2: Technical Principles
EN ISO 14121-1:2007 Safety of machinery – risk assessment – part 1: Principles (ISO 14121-1:2007)

The manufacturer or the authorised person is obliged to communicate special documentation for partially complete machinery to individual state authorities if reasonably requested. This communication takes place: industrial rights remain unaffected.

Important note: partially complete machinery may only be taken into operation when it has been determined that the machine/installation in which the partially complete machinery is to be installed complies with the terms of this directive.

Massing, 23.03.2010

Location, date

Signature: Wohlmannstetter, Managing Director

NOTE

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