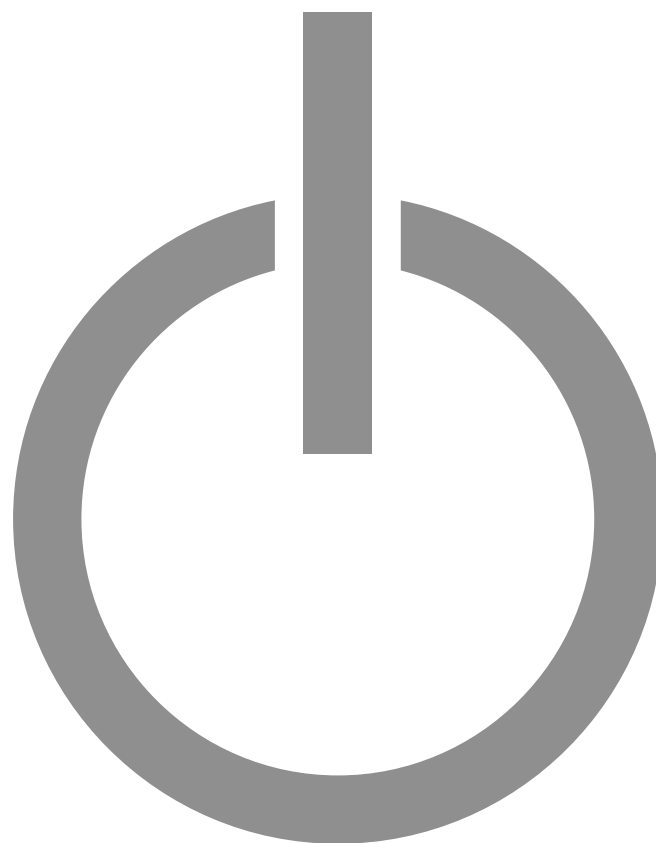


Operation Manual



*Comfortable
heating. With wood!*

HDG M299/300/350/400



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1 Notes on this manual

1.1 Introduction

SAFE AND SIMPLE OPERATION	<p>This operating manual contains important instructions on the heating system</p> <ul style="list-style-type: none">• HDG M299/300/350/400 <p>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 life expectancy of the heating system.</p>
READING THE OPERATING MANUAL	<p>This operating manual must be read and observed by everyone who operates or works on the HDG M299/300/350/400.</p>
TECHNICAL CHANGES	<p>We continuously develop and improve our boilers. The information in this edition was correct at the time of going to press.</p> <p>We reserve the right to make changes which may then differ from the technical details and illustrations in this operating manual.</p>
COPYRIGHT	<p>Written permission is required from HDG Bavaria GmbH for reprinting, storage in a data-processing system or transmission by electronic, mechanical, photographic or any other means, and for copies or translations of this publication, in whole or in part.</p>
GUARANTEE	<p>The terms and conditions of the guarantee of your (central-heating) boiler can be found in the enclosed information sheet.</p>
SYMBOLS USED	<p>In this operating manual, the following designations and symbols are used for particularly important information:</p> <ol style="list-style-type: none">1. Instructions to the operator2. Work through the steps in the sequence specified. <ul style="list-style-type: none">✓ Result of the action described Cross reference for more explanation• List<ul style="list-style-type: none">– 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 heating system.
3 Mode of operation	... the structure and all of the features of the heating system.
4 Planning and installation	... how to properly plan and install the heating system.
5 Commissioning the system	... how the heating system is put into initial service.
6 Using the heating system	... how to properly operate the heating system.
7 Cleaning and servicing the heating system	... how to clean the heating system and who is responsible for its maintenance.
8 Troubleshooting	... how to rectify faults in the heating system.
9 Notes on dismantling and disposal	... what has to be considered when dismantling and disposing of the heating system.

Table 1/1 - Structure of the operating manual

1.3 Glossary

Term	Explanation
Actuator	This is a component that carries out a certain function in the heating system, for example the stoker auger.
Ash removal augers	These transport the combustion chamber ash and fly ash into the exterior ash containers.
Ash removal motor	Powers the ash removal augers and the ash walking floor
Delivery system	Fuel transport system - carries fuel from the storage to the dosing unit or to the intermediate container.
Display	Display of the HDG Control unit in the refrigerator.
Emergency stop	Must be used in an emergency - interrupts all actuators; does not switch off the mains supply to the entire heating system.
Extinguishing device	Extinguishes what is within the delivery system if the temperature of the contents exceeds 90 °C.
Feeding system	Feeds the fuel to the boiler by means of the rotary feeder and the stoker auger.
HDG Control	Electronic control unit of the boiler, feeding system and delivery system.
HDG M299/300/350/400	Boiler for burning wood chips, shavings and wood pellets
Heating system	Comprised of boiler and corresponding accessories.
Main switch	Switches off the mains supply to the entire heating system.
Rotary feeder	Part of the feeding system - separates the combustion chamber from the silo and transport unit and acts as back-burn protection.
Sensor	Records certain parameters (temperature, fill level) and forwards them to the control for analysis.
Stoker auger	Carries the fuel from the rotary feeder into the combustion chamber.
Turbulator	Component for improving heat transfer from the flue gas to the heat exchanger surface

Table 1/2 - Glossary

2 Safety instructions

2.1 Intended use

BASIC SYSTEM DESIGN PRINCIPLES

BASIC PRINCIPLES

The heating system was built using state-of-the-art technology and conforms to recognised safety regulations. Nevertheless, there is still a risk of injury or death to users or bystanders, 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 heating system.

USING THE HEATING SYSTEM

Only use the heating system when it is in perfect condition. Use it properly, as intended, be aware of safety and hazards, and observe the Operating Manual. Have any faults which could impair safety fixed immediately.

This device can be used by children over 8 years old and people with reduced physical, sensory or mental capabilities or a lack of experience and knowledge, provided they are supervised or have been instructed on the safe use of the device and understand the resulting risks. Children may not play with the device. Cleaning and user maintenance must not be carried out by children without supervision.

BASIC PRINCIPLES FOR 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 M299/300/350/400 heating systems. Any further implementation of applicable standards, for example with regard to the installation of the heating system (pipework, etc.) is not part of this operating manual. HDG Bavaria does not assume any liability for this.

PROPER AND IMPROPER MANNER OF OPERATION

PURPOSE OF THE HEATING SYSTEM

The HDG M299/300/350/400 heating system is designed for the standard use of burning wood fuel products made from untreated wood in the form of wood chips, shavings and pellets for the purpose of warm water heating.


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

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

Modification of the specified operating values will affect the heating system's control programme and could lead to malfunctions. Only trained maintenance and operating personnel may undertake modifications to the operating values.

The use of materials with other technical burning characteristics requires comprehensive modification of the control parameters by qualified specialists.



 For more information on fuel, see section "3 Mode of operation" in chapter "3.4 Fuel quality requirements".

2.2 Residual risks

Despite all precautions, the following residual risks remain:



Caution!

Hot surfaces

Contact with the hot surfaces of the boiler can lead to burns.

Wait until the boiler has cooled down before touching non-insulated components.



Danger!

Danger of asphyxiation due to lack of oxygen

If the boiler is operating, carbon monoxide can be emitted through the cleaning or inspection openings.

Do not leave these open any longer than necessary.



Warning!

Danger of fire

Opening doors and lids to hot combustion residues can pose the danger of fires.

Keep the openings closed during operation, and when performing cleaning work, allow the combustion residues to cool down before you place them in a fireproof container.



Warning!

Danger from suspended loads

Each of the boiler units weight more than 2500 kg. If the boiler is dropped during transport, persons can be seriously injured and the boiler can be damaged.

Make sure that you use appropriate lifting gear when placing the boiler.



Warning!

Danger of injury

The cleaning shaft lids are very heavy and can fall shut. Hands and arms could thereby be crushed.

Take care not to bump into the opened cleaning shaft lid and cause it to fall shut.



Danger!

Danger of explosion due to carbon monoxide

When the boiler is in operation, carbon monoxide escaping from open cleaning or inspection hatches can cause explosions.

Do not leave these open any longer than necessary.



Warning!

Risk of injury from automatically driven components

When working on the automatic ash removal or automatic cleaning systems, hands and arms could be injured.

Turn off the main switch when performing any work on automatically driven components and secure it against being turned back on.



Danger!

Dangerous 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.



Warning!

The boiler is under pressure.

2.3 Warnings and safety symbols used

The following warnings and safety symbols are used in this Operating Manual:



Danger!

Dangerous 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.



Caution!

Hot surfaces

Working in areas marked with this symbol can lead to burns.



Warning!

Danger of fire

Working in areas marked with this symbol can lead to a fire.



Danger!

Danger of asphyxiation due to lack of oxygen

When working in areas marked with this symbol, there is a danger of asphyxiation due to high concentrations of carbon monoxide.



Danger!

Danger of explosion

When working in areas marked with this symbol, there is a danger of explosion due to high concentrations of carbon monoxide.



Warning!

Suspended loads

When working in areas marked with this symbol, there is a danger of falling objects.



Caution!

Frost danger

Work on locations marked with this symbol can lead to frost damage.



Instructions regarding disposal



Additional information for the operator

2.4 Duty of information

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 “2 Safety instructions”.

This is especially important for persons who only occasionally work on the heating system, for example when cleaning or servicing it.

The Operating Manual must always be kept readily accessible at the place where heating system is installed.

3 Mode of operation

3.1 Overview

The HDG M299/300/350/400 is constructed in two parts. It consists of the combustion unit and the heat exchanger.

The HDG M299/300/350/400 heating system is equipped as standard with the following:

- Central ash removal system for grate ash and fly ash 1
- Automatic ash removal of fly ash 2 and 3 into exterior ash containers
- Automatic cleaning of the heat exchanger surfaces

The HDG M299/300/350/400 heating system is equipped with the HDG TBZ 200 for loading wood chips and shavings or with the HDG TBZ 150 for loading pellets.

The HDG M299/300/350/400 heating system can also be equipped with the following delivery systems:

- Hinged arm delivery system
- Walking floor delivery system
- Silo delivery system
- Walking floor changing container
- Pellet delivery system

Regarding the volume of the ash container, there are three different options:

- 240 l (central ash removal system)
- 80 l or 140 l (fly ash)



Unless otherwise specified, the product version with the TBZ 200 feed system will be illustrated and described in this Operating Manual.

HDG M299/300/350/400 FRONT SIDE

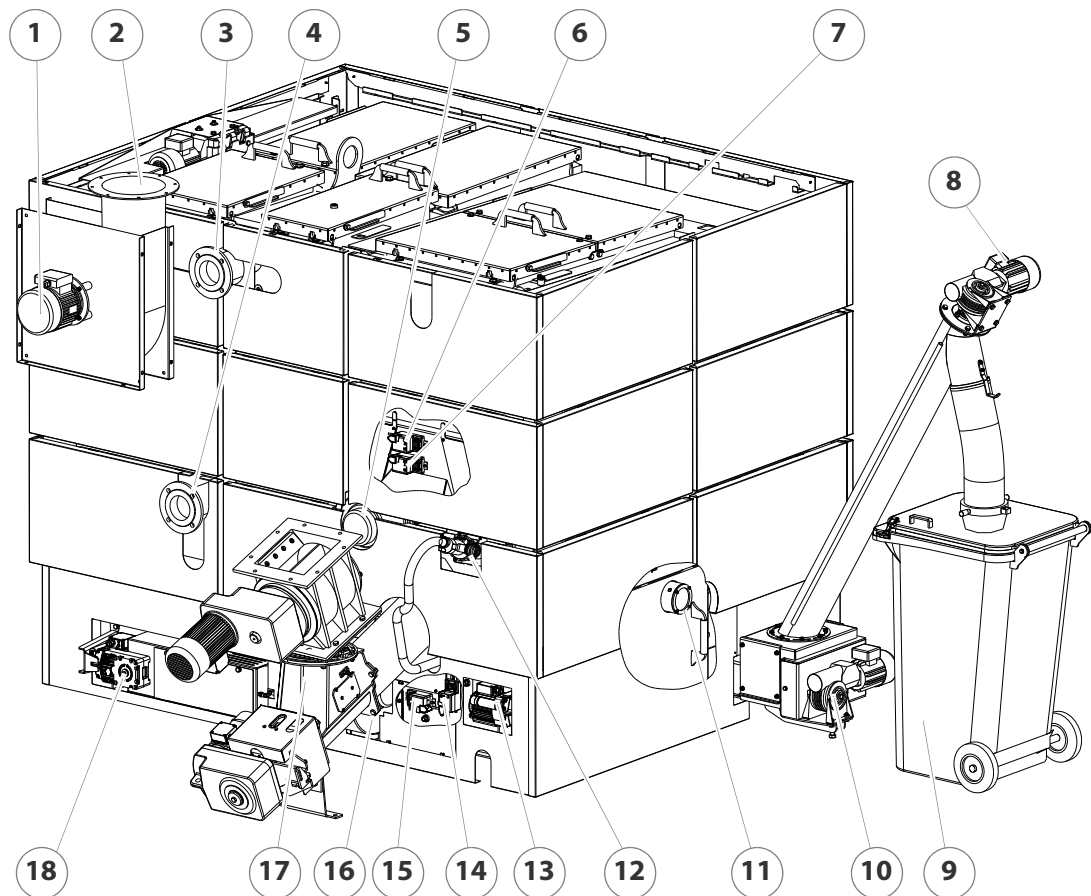


Figure 3/1 - HDG M299/300/350/400 front side

- 1 Flue gas fan
- 2 Flue pipe connection
- 3 Boiler supply connection (DN 100 flange)
- 4 Boiler return connection (DN 100 flange)
- 5 Secondary air fan
- 6 Actuator for tertiary air
- 7 Actuator for secondary air
- 8 Drive motor for central ash removal system
- 9 Ash bin
- 10 Drive motor for ash removal auger
- 11 Inspection window for stepping grate
- 12 Ignition fan
- 13 Drive motor for stepping grate
- 14 Actuator for primary air 1
- 15 Actuator for primary air 2
- 16 Primary air fan
- 17 Feeding system
- 18 Drive motor for fly ash augers

HDG M299/300/350/400 BACK SIDE

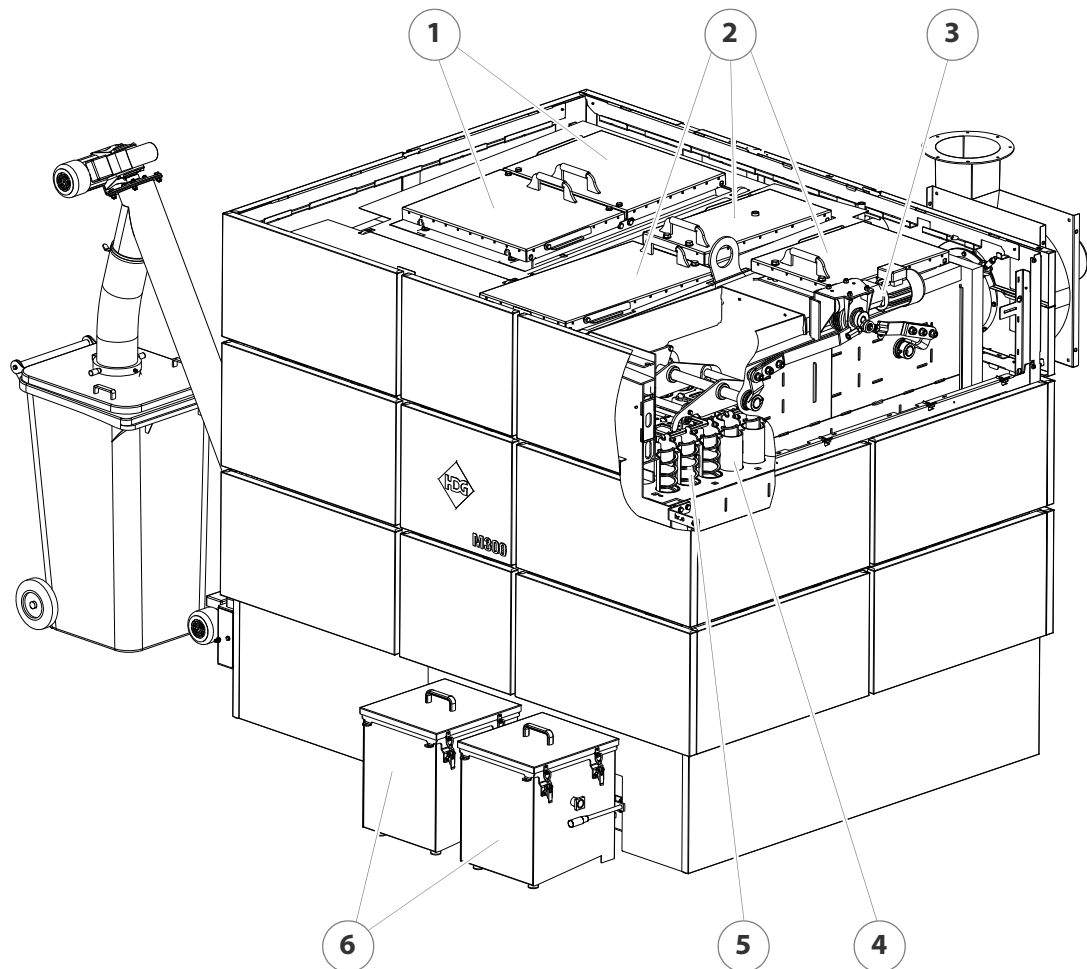


Figure 3/2 - HDG M299/300/350/400 back side

- 1 Cleaning shaft lid of combustion unit
- 2 Cleaning shaft lid of heat exchanger
- 3 Cleaning system drive motor
- 4 Lambda sensor
- 5 Tubular heat exchanger
- 6 Turbulators
- 7 Fly ash container

CROSS SECTION OF HDG M299/300/350/400

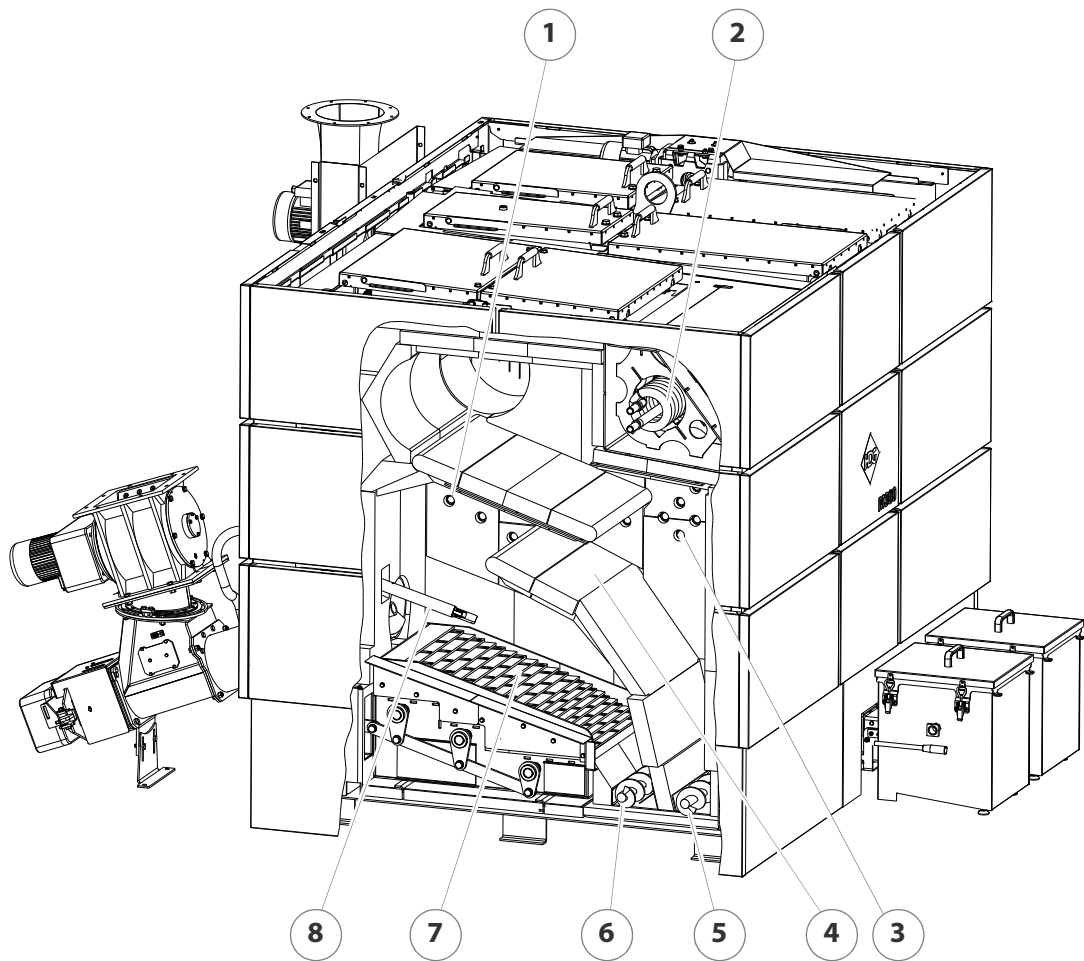


Figure 3/3 - Cross section of HDG M299/300/350/400

- 1 Secondary air openings
- 2 Safety heat exchanger, combustion unit
- 3 Tertiary air openings
- 4 Combustion chamber
- 5 Ash removal auger for fly ash 1
- 6 Ash removal auger for grate ash
- 7 Stepping grate
- 8 Ignition pipe or fill level indicator

3.2 Functional description

The HDG M299/300/350/400 heating system may contain the following components:

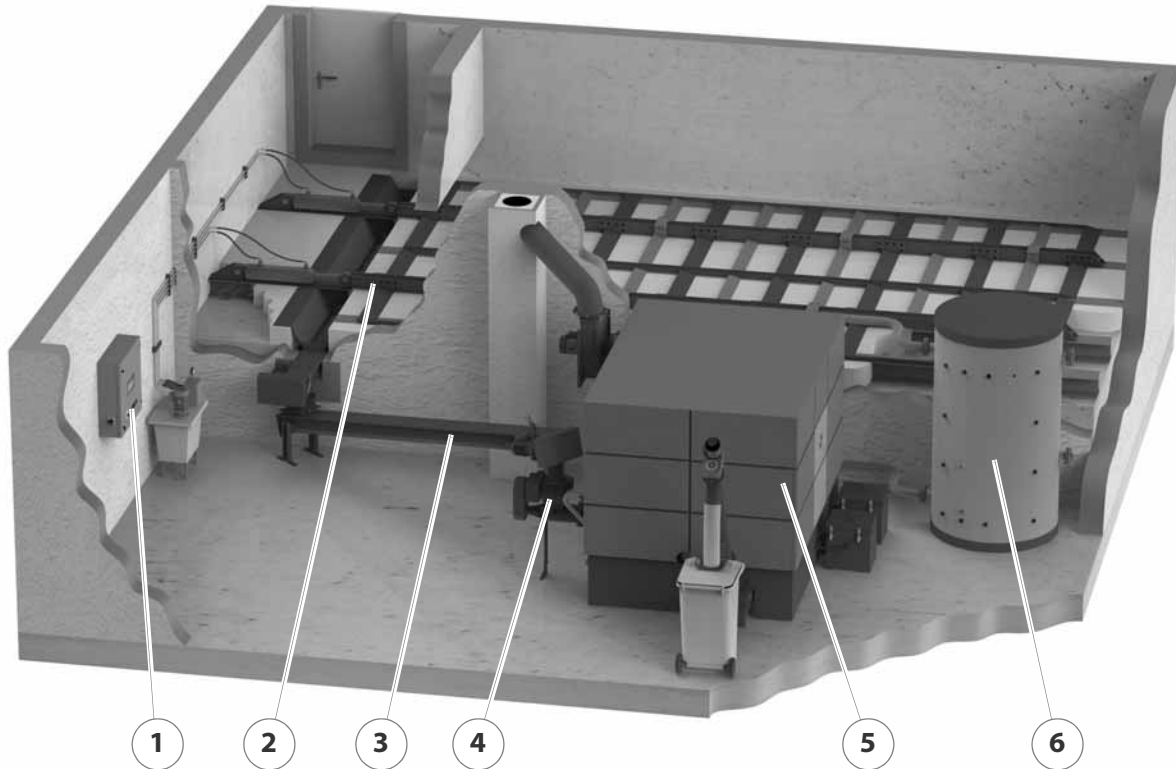


Figure 3/4 - Overview

- 1 Control cabinet
- 2 Delivery system
- 3 HDG material conveying auger TFQ 200
- 4 Feeding system
- 5 HDG M299/300/350/400 boiler
- 6 Accumulator

COMBUSTION PROCESS

With the HDG M299/300/350/400 heating system, the fuel is automatically fed from the storage room into the combustion chamber of the boiler via the delivery and feeding systems. The combustion fan is already activated here in order to eliminate any possible residual combustion gases or negative flue pressure conditions along the combustion path.

Once the filling cycle is complete, the fuel introduced into the combustion chamber is automatically ignited with an electrical ignition fan. During the subsequent heating-up phase, the specified fuel feed quantity is set.

Following the heating-up phase, the system switches to automatic operation. In this mode, combustion is carried out according to the entered control options.

In order to free the grate from ash which collects during combustion, every second segment of the grate moves back and forth periodically. The automatic cleaning system cleans the heat exchanger surfaces using the turbulators which move up and down.

The grate ash and fly ash 1 are conveyed toward the central ash removal system by the automatic ash removal system using ash removal augers in the transfer station. From there an ascending auger conveys the ash into an optional 240 l ash bin. Fly ash 2 and 3 are propelled into the external ash containers by the ash removal augers of the automatic ash removal system.

The air necessary for combustion is supplied as required via two combustion air fans.

Sensors are used in the following:

- To continuously monitor the firing
- To adapt boiler output for the heat requirements
- To minimise emissions
- To optimise boiler efficiency

DELIVERY SYSTEM

The delivery system is in the fuel storage room.

The fuel is transported from the fuel storage room to the dosing unit.

The delivery system is controlled through the HDG Control.

HDG CONTROL



Figure 3/5 - HDG Control control unit

The HDG Control boiler controller in the control cabinet represents the electronic hub. This is a freely programmable PLC control.

Using the control unit, you can adjust the HDG M299/300/350/400 heating system and obtain information on the current process status.

The current operating status is displayed.

CONTROL MODES

You can choose between three control modes:

- **Fixed value:**
 - Constant feed rate and constant combustion air flow rate (even in emergency operation)
- **Combustion control:**
 - Constant, specified combustion chamber temperature and optimal combustion through modification of primary and secondary air and fuel quantity
 - No output regulation
 - Preferred method of operation with accumulator
- **Control of combustion and output:**
 - Output supplied is adjusted to heat used with optimised combustion
 - Operation without accumulator

3.3 Technical data

Boiler type	HDG M299 Wood chips	HDG M300 Wood chips / pellets	HDG M350 Wood chips / pellets	HDG M400 Wood chips / pellets
Performance data (measured according to DIN EN 303-5)				
Nominal thermal power	299	310/328 kW	350/350 kW	400/400 kW
Minimum thermal power	85 kW	92/97 kW	105/105 kW	120/120 kW
Boiler efficiency at nominal thermal power	93.2 %	93.2 / 94.2 %	93.2 / 94.2 %	93.3 / 94.2 %
Electrical power consumption at nominal thermal power	856/856 W		899/868 W	952/894 W
Electrical connection: Voltage	400 V			
Frequency	50 Hz			
Back-up fuse	20A			
General boiler data				
Boiler class	3	5		
Maximum permissible operating pressure	6.0 bar			
Maximum supply temperature	100 °C*			
Minimum return temperature	60 °C			
Water capacity	2110 l		2150 l	2200 l
Weight of combustion unit	2640 kg		2700 kg	2730 kg
Weight of heat exchanger	2860 kg		2900 kg	2920 kg
Planning data for flue calculation (DIN EN 13384-1)				
Flue gas temperature (Tw) at				
• Nominal thermal power	140 °C	150 °C	160 °C	170 °C
• Minimum thermal power	120 °C	120 °C	120 °C	120 °C
Flue gas mass flow at				
• Nominal thermal power	0.167 kg/s	0.167 / 0.169 kg/s	0.186 / 0.177 kg/s	0.210 / 0.196 kg/s
• Minimum thermal power	0.048 kg/s	0.051 / 0.047 kg/s	0.051 / 0.047 kg/s	0.051 / 0.047 kg/s
CO ₂ content at nominal thermal power	15.6 %	15.6 / 15.0 %	15.5 / 15.1 %	15.4 / 15.2 %
CO ₂ content at lowest thermal power	12.3 %	15.6 / 15.1 %	15.6 / 15.1 %	15.6 / 15.1 %
Flue draught requirement (Pw)	10 Pa			
Diameter of flue pipe connection	300 mm			
Height at middle of flue pipe connection	2290 mm			
Water-side connections				
Supply and return connections (flange)	DN 100			
Connection for safety heat exchanger (bushing)	DN 20, outside thread			
Connection for drain (bushing)	DN 30, inside thread			
Recommended pipe dimensions (minimum)	DN 100			

Table 3/1 - Technical data

Boiler type	HDG M299 Wood chips	HDG M300 Wood chips / pellets	HDG M350 Wood chips / pellets	HDG M400 Wood chips / pellets
Water-side resistance at nominal thermal power				
• 10 K	9100 Pa	9100 / 10200 Pa	11500 / 13100* Pa	14600 Pa
• 20 K	2500 Pa	2500 / 2800 Pa	3100 / 3500* Pa	4000 Pa
Other information				
Sound pressure level emitted	< 70 dB(A)			
Min. air inlet cross section	648 cm ²	670 / 700 cm ²	750 / 750 cm ²	850 / 850 cm ²

Table 3/1 - Technical data

*Maximum operating temperatures of up to 110 °C can also briefly occur.

3.4 Fuel quality requirements

The HDG M299/300/350/400 heating system is designed for the standard use of burning untreated wood in the form of wood chips, shavings/pressed wood briquettes and wood pellets.

WOOD CHIPS IN ACCORDANCE WITH DIN EN ISO 17225-4



With regard to the quality standards for wood chips, DIN EN ISO 17225-4 "Biogenic solid fuel - fuel specifications and classes - classification of wood chips" applies.

Based on this standard, the properties of wood chips which can be used with the HDG M300/350/400 are specified in more detail below.

With respect to origin, wood of the entire tree, forestry waste and chemically untreated wood residue can be used for both property class A1 and A2.

Essential criteria for the definition of the property classes are particle size, moisture content and ash content of the fuel.

PARTICLE SIZE

In accordance with DIN EN ISO 17225-4, the fuel specifications for wood chips are separated into P31S and P45S. The numeric value of the P class refers to the size of the wood chips in mm, which fit through a circular mesh with the indicated sieve opening size.

P class	Main content (mass fraction min. 60%)	Fine content (% by weight) ≤ 3.15 mm	Coarse content (% by weight) Max. length, max. cross section
P31S	3.15 mm ≤ P ≤ 31.5 mm	≤ 10 %	≤ 6 % > 45 mm, all ≤ 150 mm, cross section of the outsized particles ≤ 4 cm ²
P45S	3.15 mm < P ≤ 45 mm	≤ 10 %	≤ 10 % > 63 mm, all ≤ 200 mm, cross section of the outsized particles ≤ 6 cm ²

Table 3/2 - Particle size

- P31S

Wood chips with a typical particle size smaller than 31.5 mm (P31S) are a machine-compatible material suitable primarily for small systems. Oversized pieces (end pieces) could lead to malfunctions during system operation. Higher proportions of finer content (dust) can lead to high emissions and ejection of glowing particles.

Wood chips from category P31S can be used as fuel in all HDG wood chip boilers. For P31S wood chips, at least 60% of the wood chips by weight must be between 3.15 mm and 31.5 mm. The fine content (<3.15 mm) may not exceed a maximum of 10% by weight and the coarse content (>45 mm) may not exceed a maximum of 6% by weight. Lengths greater than 150 mm are not permissible. The cross section of the outsized particles may not exceed a maximum of 4 cm².

- P45S

Medium wood chips with a particle size of up to 45 mm (P45S) are used in larger systems, but may however also still be suitable for small systems depending on the diameter of the conveyor auger.

Wood chips from category P45S can be used as fuel in all HDG HDG M300/350/400 wood chip boilers. For P45S wood chips, at least 60% of the wood chips by weight must be between 3.15 mm and 45 mm. The fine content (<3.15 mm) may not exceed a maximum of 10% by weight and the coarse content (>63 mm) may not exceed a maximum of 10% by weight. Lengths greater than 200 mm are not permissible. The cross section of the outsized particles may not exceed a maximum of 6 cm².

WATER CONTENT

When selecting fuel, note that the calorific value of the wood is primarily dependent on the water content. The more water contained in the wood, the smaller the calorific value, since the water vaporises in the course of the burning process and thereby consumes heat. This leads to a decreased efficiency and thus to higher fuel consumption. A higher water content in the fuel also results in a steadily decreasing output of the (central-heating) boiler, greater amounts of ash and smoke, as well as making it increasingly unfit for storage.

The water content in accordance with DIN EN ISO 17225-4 for property class A1 with M10 ($\leq 10\%$) or M25 ($\leq 25\%$) differs here from the water content for property class A2 with M35 ($\leq 35\%$). The maximum permissible water content of the wood chips is 30% (M30).

For technical considerations, a representative calorific value is selected depending on water content. For burning that is both economical and low on emissions, the calorific value should not be less than 4 kWh/kg.

Water content	Moisture	Calorific value	Relative wood consumption
10.0 %	11.1 %	4.6 kWh/kg	87 %
20.0 %	25.0 %	4.0 kWh/kg	100 %
26.0 %	35.0 %	3.7 kWh/kg	110 %
30.0 %	42.9 %	3.4 kWh/kg	120 %

Table 3/3 - Calorific value depending on water content

ASH CONTENT

A lower ash content is stipulated for compliance with the requirements of property classes A1 and A2 in accordance with DIN EN ISO 17225-4. At the same time, this also minimizes the content of elements critical for combustion. Inorganic substances which are aerosol forming, such as potassium, chlorine or sodium are the main factors determining dust emissions in combustion. These elements are predominantly found in the needles, leaves and bark of the tree. Well-prepared, pure wood types, such as delimbed energy wood without needles, leaves and only a minimal proportion of bark, have the lowest content of elements critical for combustion. They are therefore recommended for use in residential boiler systems.

The maximum ash content for property class A1 is 1.0% (A1.0), and for property class A2 it is 1.5% (A1.5). The ideal ash content of wood chips for use with the HDG M300/350/400 is 0.5% by weight, the maximum ash content permitted is 1.0% by weight (A1.0) and this complies with property class A1.

When using wood chips with a higher ash content, such as A1.5 ($\leq 1.5\%$, complies with property class A2), the use of secondary measures (filter technology) may be necessary for compliance with the dust emission limit values under the 1st Federal Emission Control Ordinance (2nd stage).

PELLETS IN ACCORDANCE WITH DIN EN ISO 17225-2



With regard to the quality standards for pellets, DIN EN ISO 17225-2 “Biogenic solid fuel - fuel specifications and classes - classification of pellets” applies.

On the basis of this standard, the properties of pellets which may be used with the HDG M300/350/400 are specified in more detail below.

Wood pellets are pressed into a cylindrical shape. They consist of untreated shavings and sawdust from the wood processing industry as well as unprocessed forestry waste. They have a standardised diameter and length. They are pressed at a very high pressure and have a very low water content. The energy contained in 2 kg of pellets corresponds approximately to the energy contained in a litre of heating oil.

In accordance with EN ISO 17225-2, the fuel specification is separated for wood pellets into property classes A1 and A2. Regarding origin, the wood for A1 comes from trunk wood and chemically untreated wood residue; for A2 the wood of the entire tree and forestry waste can be used. The ash content for wood in property class A2 is higher than that of property class A1 due to the higher proportion of bark, needles and leaves.

LENGTH AND DIAMETER

- D06

The diameter of the pellets must be 6 mm +/- 1 mm. The length of the pellets must measure between 3.15 mm and 40 mm. A maximum of 1.0% by weight of the pellets may be longer than 45 mm.

- D08

The diameter of the pellets must be 8 mm +/- 1 mm. The length of the pellets must measure between 3.15 mm and 40 mm. A maximum of 1.0% by weight of the pellets may be longer than 45 mm.

WATER CONTENT

For both property class A1 as well as A2, the water content must be smaller than 10% (M10).

ASH CONTENT

The maximum ash content for property class A1 is 0.7% by weight (A0.7) and for property class A2 the maximum ash content is 1.2% by weight (A1.2) In accordance with the 1st Federal Emission Control Ordinance, operation with pellets in Germany is limited to property class A1.

Alternatively pellets with the “ENplus” or “DINplus”, certificate are also suitable as these also meet the quality requirements of property class A1.

PRESSED WOOD BRIQUETTES IN ACCORDANCE WITH DIN EN ISO 17225-3



With regard to the quality standards for pressed wood briquettes, DIN EN ISO 17225-3 “Biogenic solid fuel - fuel specifications and classes - classification of pressed wood briquettes” applies.

On the basis of this standard, the properties of pressed wood briquettes which may be used with the HDG M300/350/400 are specified in more detail below.

Pressed wood briquettes are pressed shavings, with or without various forms of additives, with a diameter of more than 25 mm. In accordance with DIN EN 17225-3 these consist of trunk wood and untreated wood residue for property class A1, and with the addition of wood of the entire tree for property class A2.

LENGTH AND DIAMETER

- D60/L50

The diameter of the briquettes must not exceed 60 mm and the length must not exceed 50 mm. A maximum of 1.0% by weight of the pellets may be longer than 45 mm.

WATER CONTENT

The water content must not exceed a maximum of 12% (M12) for property class A1 and a maximum of 15% (M15) for property class A2.

ASH CONTENT

The maximum ash content for property class A1 is 1.0% by weight (A1.0) and for A2 a maximum of 1.5% by weight (A1.5). The ideal ash content of pressed wood briquettes for use with the HDG M300/350/400 is 0.5% by weight, the maximum ash content permitted is 1.0% by weight (A1.0) and thus complies with property class A1.

When using wood chips with a higher ash content, such as A1.5 ($\leq 1.5\%$, complies with property class A2), the use of secondary measures (filter technology) may be necessary for compliance with the dust emission limit values under the 1st Federal Emission Control Ordinance (2nd stage).

RECOMMENDED FUEL

It is important that fuel is used according to HGD fuel recommendations in order to be able to guarantee compliance with emission limit values under the 1st Federal Emission Control Ordinance (2nd stage). In particular, all fuel requirements concerning size, water content and ash content must be met. Without the use of secondary measures (filter technology), only fuels of property class A1 are suitable for this in each case.



Pay particular attention to the fuel quality, both when ordering and at delivery.



Important!

If there is a significant change of fuel, the system must be reset accordingly and checked for emissions by authorised specialists.

4 Planning and installation

4.1 Planning the heating system

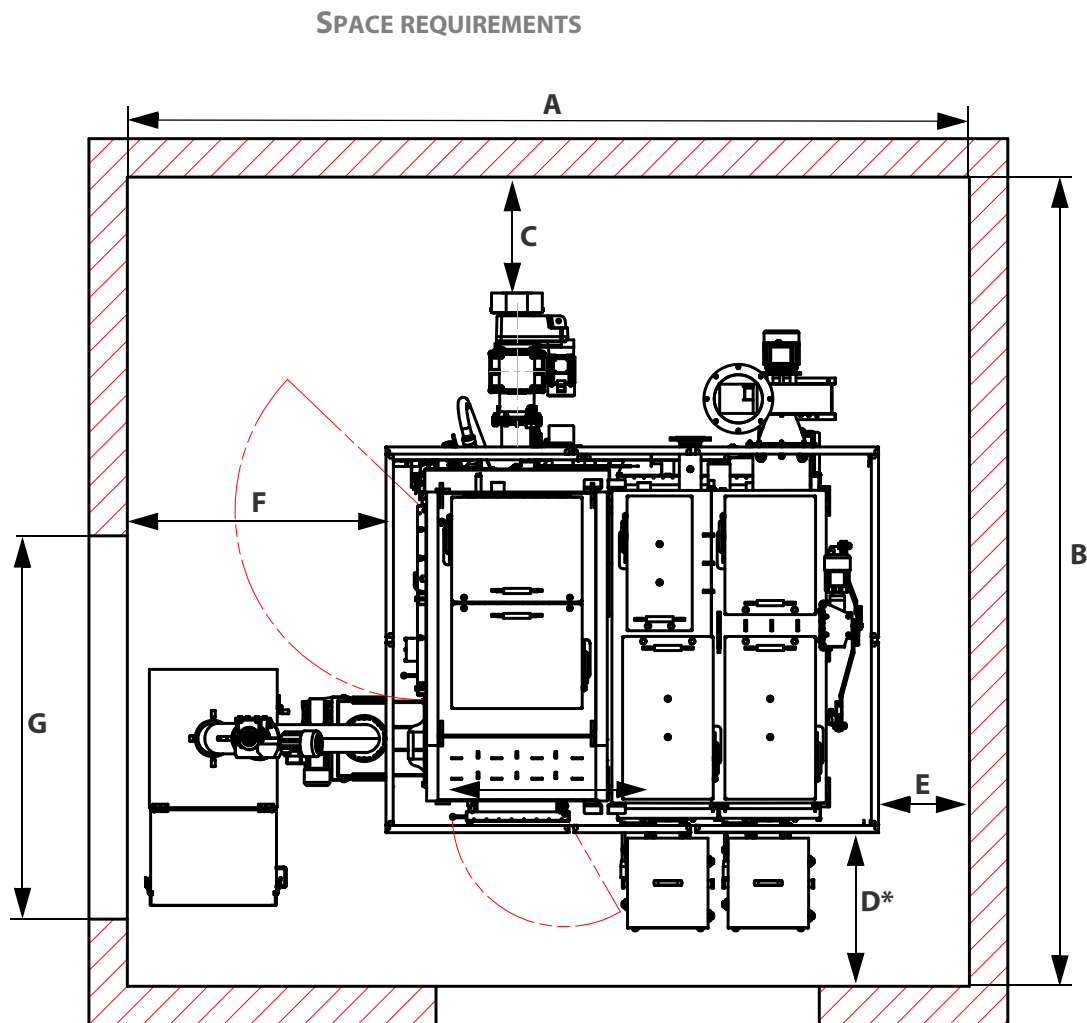


Figure 4/1 - Space requirements

	A	B	C	D*	E	F	G
HDG M299/300/350/400	4400	4250	600	950	500	1400	2000

Table 4/1 - Minimum size (mm)

* The automatic de-ashing for fly ash 1 or 2 can also be installed in such a way that both fly ash containers are on the opposite side. This reduces dimension D to 500 mm.

ROOM HEIGHT REQUIREMENTS

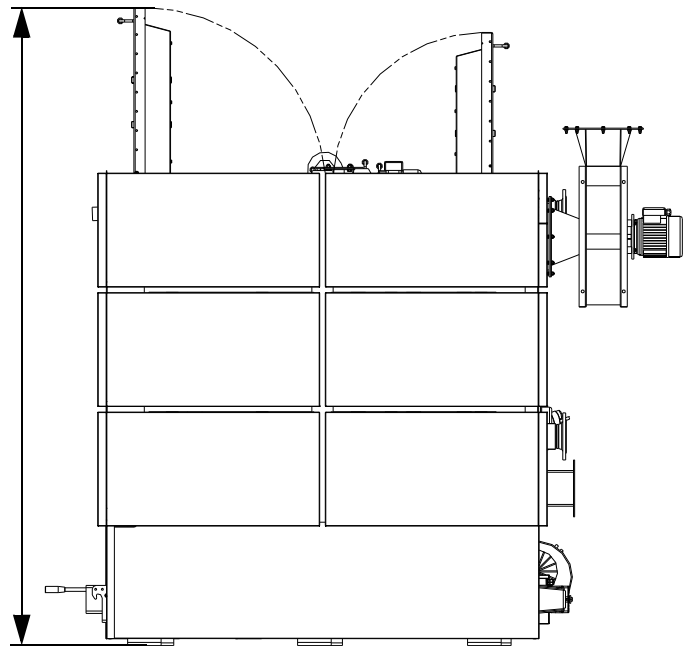


Figure 4/2 - Room height requirements

- Minimum ceiling height: 2900 mm / optimal ceiling height: 3500 mm
- Minimum insertion height: 2500 mm

INSTALLATION DIMENSIONS

	Combustion unit	Heat exchanger
Length*	2070 mm / 1900 mm*	2175 mm / 2000 mm *
Width*	1200 mm / 1200 mm*	1374 mm / 1250 mm*
Height*	2160 mm / 2070 mm*	2175 mm / 2070 mm*

Table 4/2 - Installation dimensions

* Dimensions with attachments removed

MINIMUM CLEARANCES

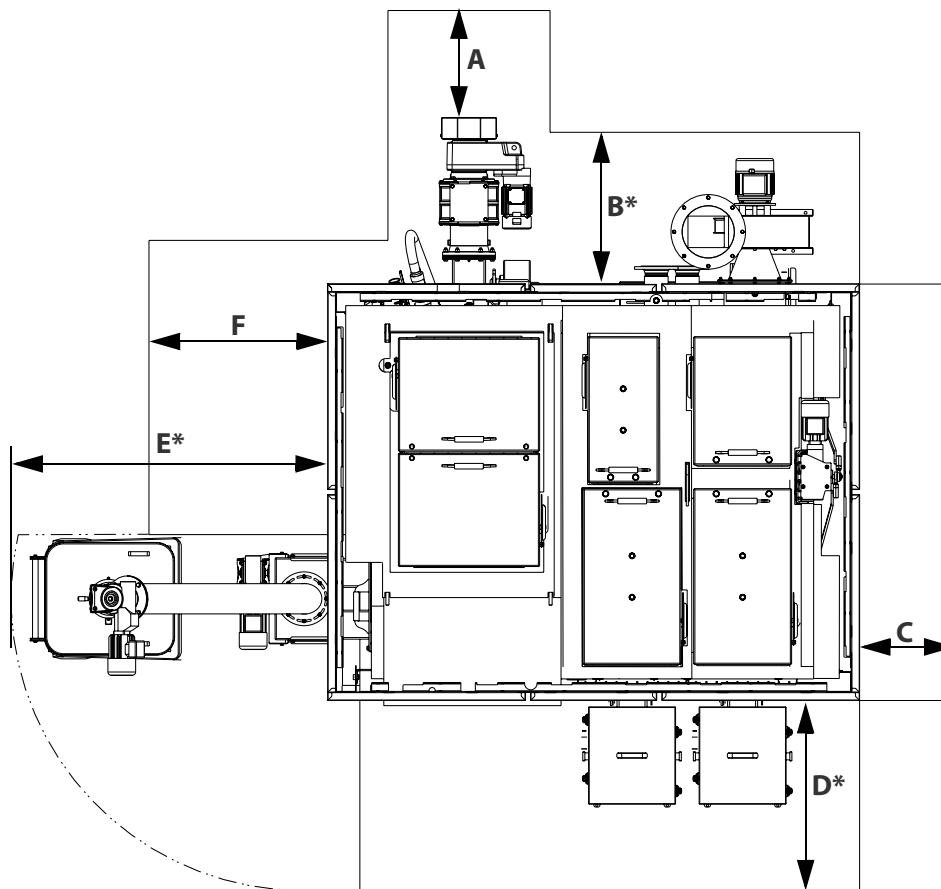


Figure 4/3 - Minimum clearances

	A	B	C	D	E	F
HDG M299/300/350/400	600	750*	500	950*	1400*	870

Table 4/3 - Minimum clearances (mm)

* The minimum distance recommended for removal of the ash removal system is 1500 mm.

BOILER ROOM

Furnaces for solid fuels with a nominal thermal power of more than 50 kW may only be installed in special boiler rooms.

APPLICABLE REGULATIONS

Local building regulations always apply. In Germany, individual state regulations on boilers and furnaces (FeuVO) also apply.

Make sure there is an adequate supply of fresh air to the boiler room so that there is enough air available for the combustion process and to protect the operator from the hazards of insufficient oxygen.

INSTALLATION



Building regulations may differ from country to country and state to state.

For this reason, consult a qualified specialist for the planning and installation of your boiler room.

The floor of the boiler room must be of a fireproof design. A base is not necessary for installation of the heating system. Ensure alignment on a horizontal plane.



Observe the fire safety regulations.

For unhindered operation and maintenance of the heating system, you must ensure that it is installed to our specifications and that the minimum clearances are maintained.

Also note that the thresholds in DIN 4109 “Soundproofing in building construction” may not be exceeded.

More detailed information can be found in the respective ordinances of the German states.



Also observe the accident prevention regulations of the official safety organisations.

We recommend that objects which are not needed for the operation or maintenance of the heating system not be stored in the boiler room.



Ensure adequate illumination in the boiler room.

FUEL STORAGE

The fuel storage should have the following characteristics:

- dry
- dust-proof
- statically suitable
- accessible for the filling process
- free of other installations, especially in existing buildings
- adapted to fuel requirements

The refilling intervals should be kept as long as possible. The heating system should be located within the building so that the noise generated does not exceed the permissible values of DIN 4109, “Soundproofing in building construction”.

PROPER DIMENSIONING

The size of the fuel storage depends on the heating system, the determined heating demand, the resulting annual fuel requirements and existing building conditions. Practice has shown that filling the fuel storage four to six times per heating period is ideal.

PASSAGE THROUGH THE WALL

The passage through the wall normally has to be made in the wall between the boiler room and the fuel storage. Its position depends on the distance and the alignment of the heating system within the room and the customer's installation diagram. The passage through

VENTILATION OF FUEL STORAGE ROOMS

the wall between the boiler room and the fuel storage should have a width of 70 cm and height of 70 cm in order to allow the assembly of the delivery auger.

Wood fuel products with higher moisture can cause relatively high air humidity in the fuel storage. Cold surfaces may thereby experience a drop below the dew point and develop condensation water. This condensation water often occurs on non-insulated lids, doors or cold walls and can result in a further moistening of the fuel.

It is therefore recommended to provide a suitable ventilation system that corresponds to the building's features.




Observe the requirements of the fire regulations for fuel storage rooms.

4.2 Connections

CHIMNEY



According to EN 303-5, the entire flue system must be installed in such a way that contamination, condensation and insufficient flue draught are avoided. Here it is to be noted that, in the accessible operational area of the boiler, flue gas temperatures of less than 160 K above room temperature may arise.

 The required flue gas values are listed in chapter “3 Mode of operation”, section “3.3 Technical data”.

The benefits of the HDG M299/300/350/400 can only be reaped if all of the factors necessary for good combustion are carefully adjusted. The heating system and chimney form a single functional unit and must be adapted to one another in order to guarantee fault-free and economical operation.

Since the flue gas temperature may lie below 100°C when the system is under partial load, a chimney/flue is required which meets the requirements of DIN EN 13384-1: 2003-03 “Thermal and fluid dynamic calculation methods”. If it does not meet this standard, contact your specialist heating company or chimney technician.



When planning the flue system, a flue calculation based on DIN EN 13384-1 must be performed by authorised specialists.

Another essential criterion is to achieve the correct flue draught. This depends on three major factors.

CHIMNEY CHARACTERISTICS

The requirements for minimising the draught loss in the chimney are:

- Good thermal insulation to avoid the flue gases cooling down too quickly.
- Smooth interior surface to reduce the flow resistance.

- Chimney well-sealed to avoid outside air leaking in. Air penetrating from the outside speeds up the cooling of the flue gases.

These requirements correspond to chimneys of the type conforming to DIN EN 13384-1: 2003-03 "Thermal and fluid dynamic calculation methods".

Free-standing chimneys require particularly good insulation.

The system may only be connected to a chimney which has been dimensioned in accordance with DIN EN 13384-1, taking into account the fuel planned and the expected load, and which meets local building regulations for the installation site.

A chimney can only be designed with full knowledge of the on-site conditions. This includes taking into account the following factors:

- Building location
 - Surrounding hills/slopes
 - Wind direction
- Location of the chimney in the roof
 - The opening of the chimney must be at least 0.5 m above the highest edge of roofs with a slope of more than 20° or at least 1.0 m higher than roof surfaces which slope at 20° or less.
- The effective height of a chimney is measured from the flue entrance into it to the end of the chimney.

CHIMNEY DIMENSIONS

CONNECTING THE BOILER TO THE CHIMNEY

The firing system must be connected with a connecting piece which is as short as possible, at an angle which is less than 30-45° to the chimney. You should aim for a connecting piece with a maximum length of 1 m using just one fitting.

Every additional fitting results in a greater pressure loss in the exhaust path and should thus be avoided. The same is true for overly long connecting pieces. If, for constructional reasons, they have to be longer than 1 m, they should be adequately insulated (at least 5 cm of mineral wool or equivalent material) and, if possible, should be fitted with an upward inclination.

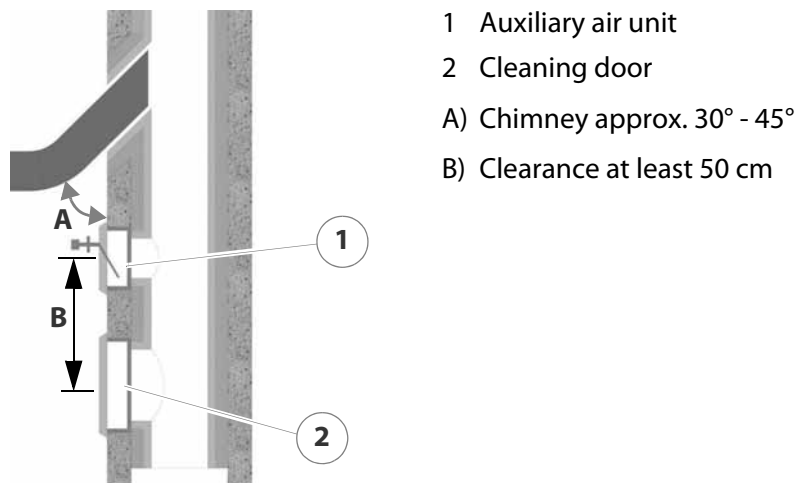


Figure 4/4 - Connection to the chimney

To compensate for irregularities in the flue draught of the chimney, HDG Bavaria recommends installing an auxiliary air unit in the flue pipe, or even better, in the chimney itself as shown in Figure 4/4 - Connection to the chimney.


The following should also be considered:

- The connecting piece may not protrude into the chimney.
- If the system flue pipe has a larger diameter than the chimney, the connecting piece must reduce to the diameter of the connection. In this case, the connecting piece should taper as gently as possible.
- Use bends rather than elbows; the radius of the elbow may not be less than the diameter of the pipe.
- The chimney should be vertical and straight, if possible without deformations (take particular care in older buildings).
- All of the cleaning and measurement hatches on the chimney must be tightly sealed.
- To reduce the entry of additional cold air, only attach one heat generator per chimney.
- To prevent dust from escaping, the flue pipe must be sealed with heat-resistant silicone.

ELECTRICAL SYSTEM

The directive 2006/95/EC (low voltage guideline) must be followed for the electrical connections to the system.

No electrical installations, such as power sockets, distribution boxes, lights or light switches may be located in the fuel storage. Any lights must be suitable for use in areas at risk of explosion. The VDE regulations for rooms with a risk of dust explosion must be followed.

 The required connection values are described in chapter "3 Mode of operation", section "3.3 Technical data".

CONTROL CABINET

The HDG Control unit is located in the EMD-C215 Exclusiv control cabinet. The cables are inserted from the top of the control cabinet and the wiring is connected in accordance with the supplied wiring diagrams.

ACCUMULATOR SENSOR

The temperature sensors are immersion sensors with a moulded cable and serve to measure the temperature of the accumulator.

WATER

**Important!**

The heating system must be filled with water in accordance with VDI guideline 2035, "Avoiding damage in hot water heating systems".

The coatings formed by stones in the heat generator can have a detrimental effect on the efficiency (energy efficiency) of the heating/boiler system and can lead to damage and faults.



Antifreeze agents may only be used after prior consultation with HDG.

USING AN ACCUMULATOR

When calculating the thermal requirements of buildings, e.g. according to DIN EN 12831 "Method for calculating the normal heating load", the lowest outside temperature of the relevant climate zone (e.g. -15 °C) is used. These conditions only apply a few days per year, thus, the thermal performance of the heating system is greater than required on most days when heating is needed. For this reason, the HDG M299/300/350/400 is fitted as standard with power control and automatic ignition.

It is, however, highly recommended to use an accumulator even with automatic boiler systems.

The size of the accumulator will depend on the nominal thermal power of the boiler and on the thermal requirements of the building. As a benchmark value, 20 litres per kilowatt boiler power can be used. This results in a boiler burning duration of approximately one hour at full-capacity operation, during which the accumulator is completely filled. The emptying time of the accumulator at 25% nominal load is 3.7 hours for this type of design, with an assumed usable temperature difference of 40 Kelvin.

One advantage of an accumulator is the low number of operating hours for the system and fewer start phases due to extended heating periods, which leads to a reduction in the proportion of external energy and to lower wear of the mechanical components.

One further advantage of the accumulator is in summer operation when only hot water is required. When operating in this mode, the accumulator helps avoid frequent ON/OFF switching.

For the above-mentioned reasons, we recommend an accumulator even for automatic boiler systems.


SAFETY DEVICES

Safety devices (e.g. boiler safety module, insufficient water cutout, etc.) must be installed in accordance with DIN EN 12828: 2003 "Design of water-based heating systems in buildings".

RETURN TEMPERATURE CONTROL

Operating temperatures which are too low significantly shorten the service life of the boiler. Water vapour contained in the flue gas could be released in the form of condensation if the temperature drops below the dew point (approx. 50–55 °C), especially in the area around the water-cooled heat-exchanger surfaces. This condensation, in combination with combustion residue, can lead to corrosion.

For these reasons, a return temperature control **must** be installed for the HDG M299/300/350/400 heating system. The return temperature control causes the water from the boiler return line to be mixed with the water from the boiler supply line until the minimum return temperature has been reached.

 The minimum return temperature is listed in chapter “3 Mode of operation”, section “3.3 Technical data”.


The return temperature is regulated by the HDG control unit.

The return temperature control consists of a 3-way mixing valve with a 230 V servo drive (running time 120-240 s) and a circulation pump. For the HDG M299/300/350/400, we recommend:

- Wilo Stratos 50/1-12, 3-way mixing valve DN 80



The pipe dimensions must be adapted to meet the requirements at the site. Take the water-side connections of the boiler for the supply and return into account.

 See chapter “3 Mode of operation”, section “3.3 Technical data”.

The hydraulic system must be installed in accordance with specific technical principles of the heating construction industry. Take into account the stop cocks required for maintenance work and repairs.



The return temperature control is not designed for the use of a gravity brake and this should therefore not be installed.

The return temperature control must be installed according to the specifications of HDG Bavaria.

WATER-SIDE CONNECTIONS FOR HDG M299/300/350/400

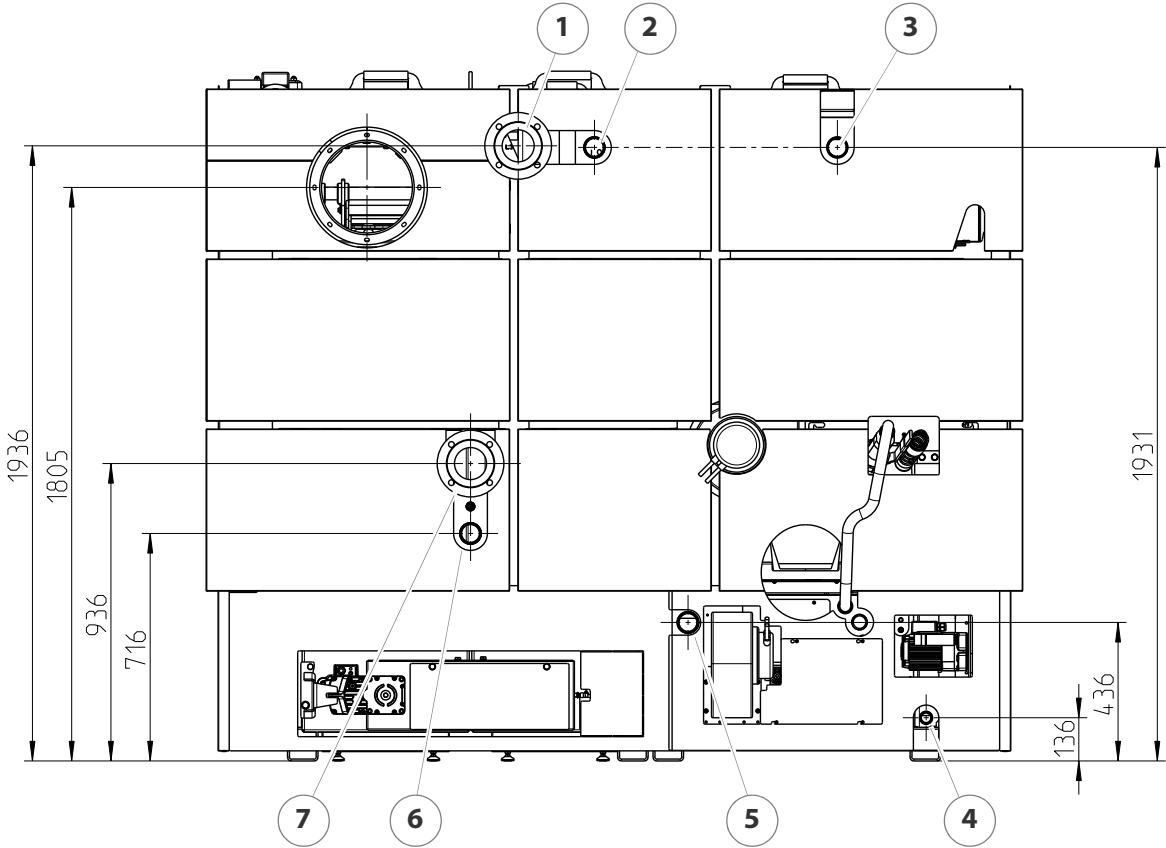


Figure 4/5 - Water-side connections for HDG M299/300/350/400

- 1 Boiler supply connection (DN 100 flange)
- 2 Connection (DN 50 bushing) of heat exchanger to combustion unit
- 3 Connection (DN 50 bushing) of combustion unit to heat exchanger
- 4 Filling / draining connection (DN 25, inside thread) for combustion unit
- 5 Connection (DN 50 bushing) of combustion unit to heat exchanger
- 6 Connection (DN 50 bushing) of heat exchanger to combustion unit
- 7 Boiler return connection (DN 100 flange)

SENSORS AND CONNECTIONS OF THE HDG M299/300/350/400

FRONT SIDE

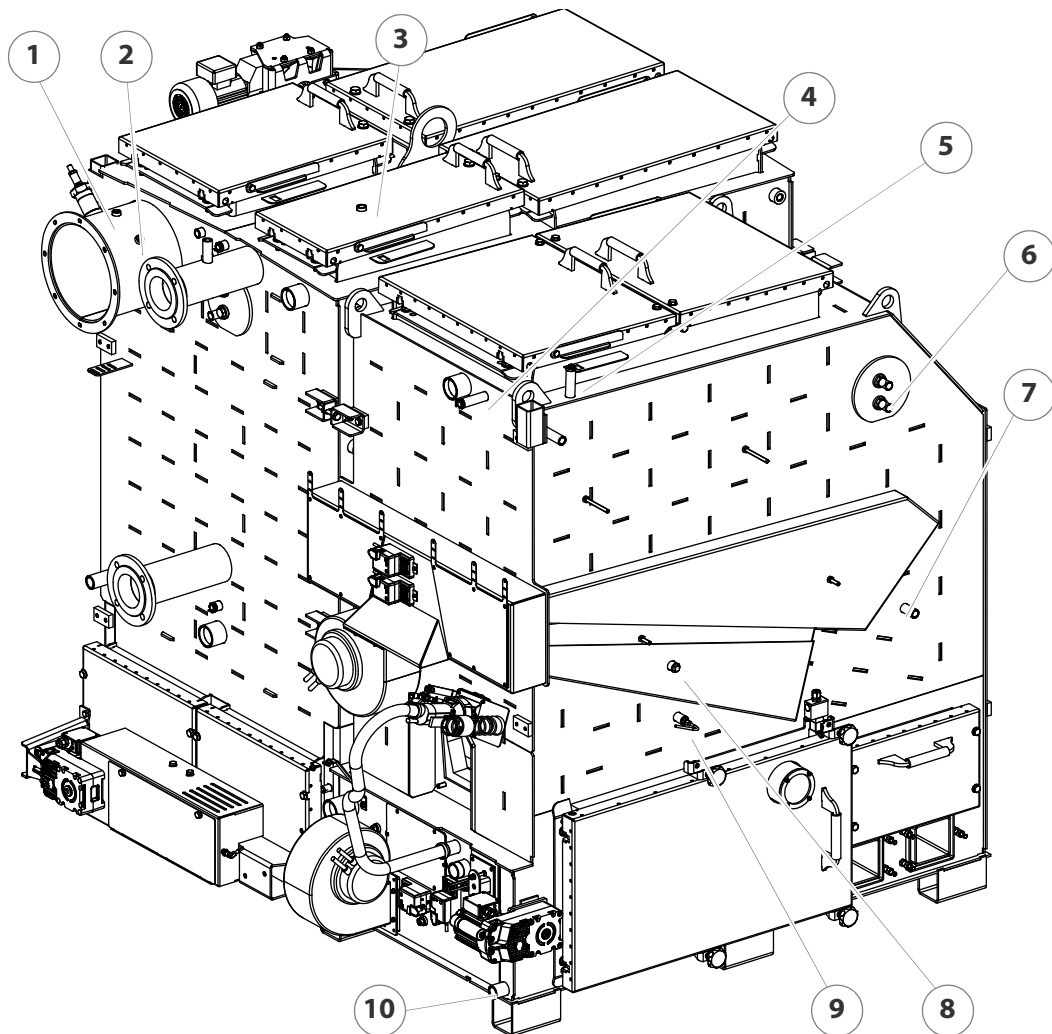


Figure 4/6 - Sensors and connections on the front side of the HDG M299/300/350/400

- 1 Flue gas temperature sensor
- 2 Pressure capsule connection for vacuum pressure control of heat exchanger
- 3 Hot gas sensor
- 4 Immersion sleeve connection for boiler temperature sensor and safety temperature limiter sensor (DN 15 inside thread)
- 5 Immersion sleeve connection for thermal safety device (DN 15 inside thread) of combustion unit
- 6 Safety heat exchanger connections (DN 20 outside thread) of combustion unit
- 7 Combustion chamber temperature sensor of combustion unit (alternative 8)
- 8 Combustion chamber temperature sensor of combustion unit (alternative 7)
- 9 Pressure capsule connection for vacuum pressure control of combustion unit

10 Filling / draining connection (DN 25 inside thread) for combustion unit

BACK SIDE

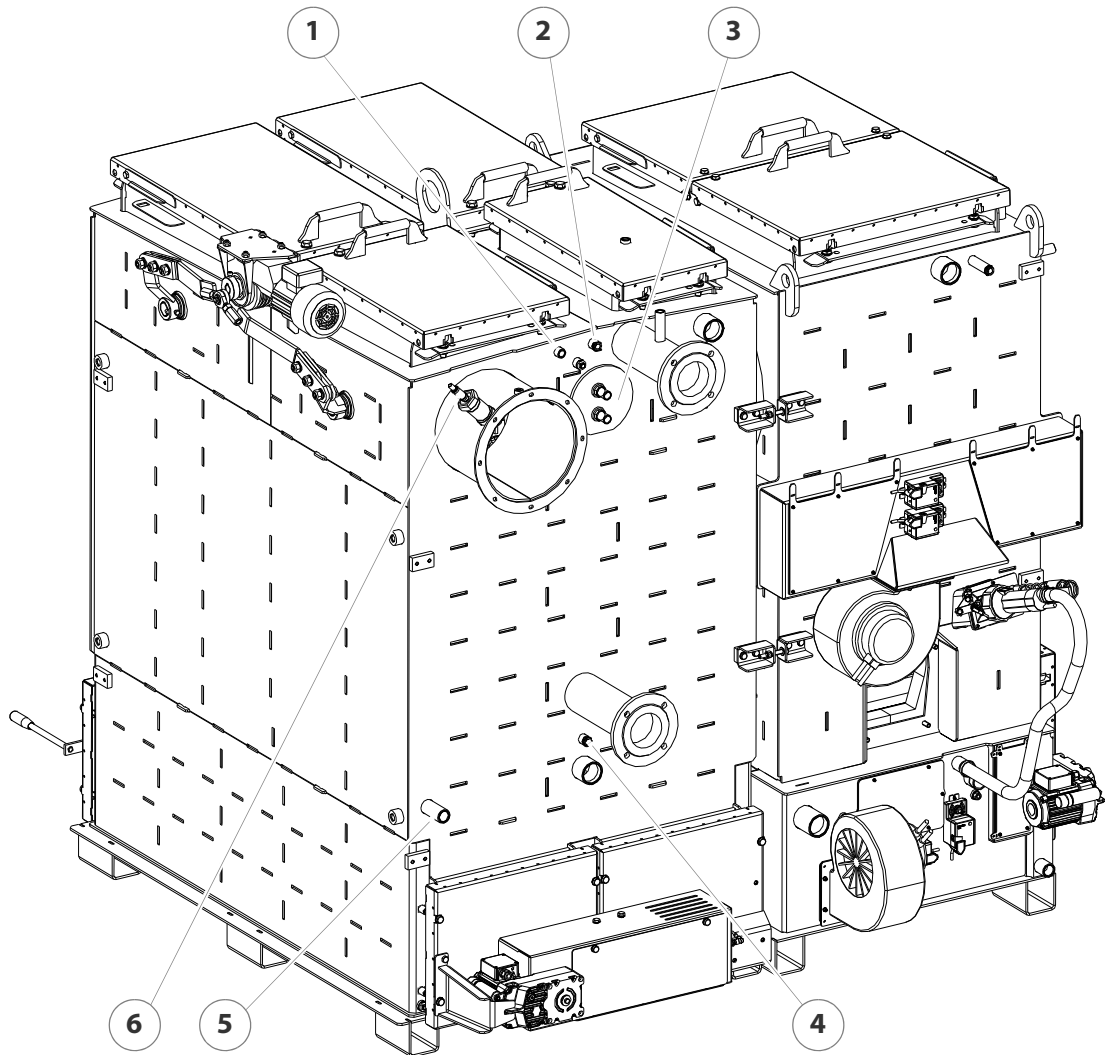


Figure 4/7 - Sensors and connections on rear side of HDG Compact 150/200

- 1 Immersion sleeve connection for thermal safety device (DN 15 inside thread) of heat exchanger
- 2 Immersion sleeve connection for supply temperature sensor and safety temperature limiter sensor (DN 15 inside thread)
- 3 Safety heat exchanger connections (DN 20 outside thread) on heat exchanger
- 4 Immersion sleeve connection for return temperature sensor (DN 15 inside thread)
- 5 Filling / draining connection (DN 25 inside thread) for heat exchanger
- 6 Lambda sensor

HYDRAULIC CONNECTION OF COMBUSTION UNIT TO HEAT EXCHANGER

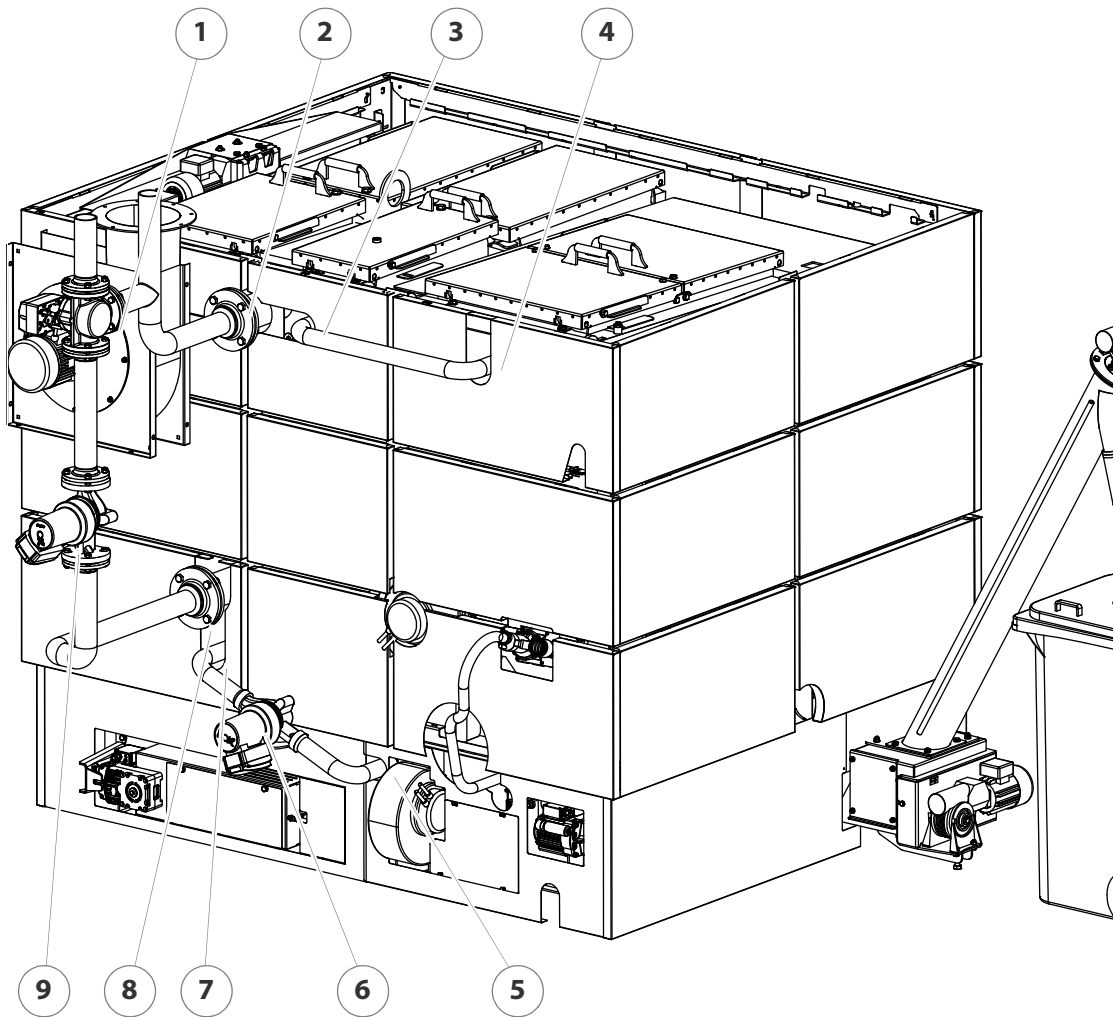


Figure 4/8 - Hydraulic connection

- 1 Return mixing valve (3-way mixer DN 100)
- 2 Boiler supply connection (DN 100 flange)
- 3 Connection (DN 50 bushing) of heat exchanger to combustion unit
- 4 Connection (DN 50 bushing) of combustion unit to heat exchanger
- 5 Connection (DN 50 bushing) of combustion unit to heat exchanger
- 6 Circulation pump (Wilo 30/1-8) (Direction of conveyance from heat exchanger to combustion unit)
- 7 Connection (DN 50 bushing) of heat exchanger to combustion unit
- 8 Boiler return connection (DN 100 flange)
- 9 Circulation pump (Wilo 50/1-12)

4.3 Scope of delivery

Included in the scope of delivery:

- HDG M299/300/350/400 boiler
- Control cabinet model EMD-C 215 Exclusiv
- Feeding system (customer-specific)
- Delivery system (customer-specific)
- Cleaning tools
- Operating documentation

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

The HDG M299/300/350/400 boiler is delivered disassembled. The combustion unit, heat exchanger, cladding and all other components must be assembled on site. To unload individual components, a suitable lifting device able to lift at least 4 tonnes should be made available at the site.

4.4 Installing the heating system

REQUIREMENTS

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 damage.

Only allow authorised specialists to perform the installation.



Danger!

Dangerous electrical current or voltage

Working on live components can result in an electric shock.

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



Caution!

Danger due to explosive atmospheres

The heating system is not equipped with explosion-proof components. If parts of the system are installed in areas where there is a risk of an explosive atmosphere forming, they could explode.

No part of the system should be installed or operated in an area where there is a risk of an explosive atmosphere.



Important!

Make sure that the boiler is erected on an adequately dimensioned foundation.




Important!

Due to the noise, we recommend acoustic insulation measures for components which are in contact with the floor or walls of the boiler room.



Important!

When laying the pipelines, observe the minimum required clearances.

 See section “4.1 Planning the heating system” in this chapter.

**Important!**

When working on the boiler, the fall protection device must be fitted. If the room height is not sufficient for the assembly, the height of the fall protection device must be adjusted.

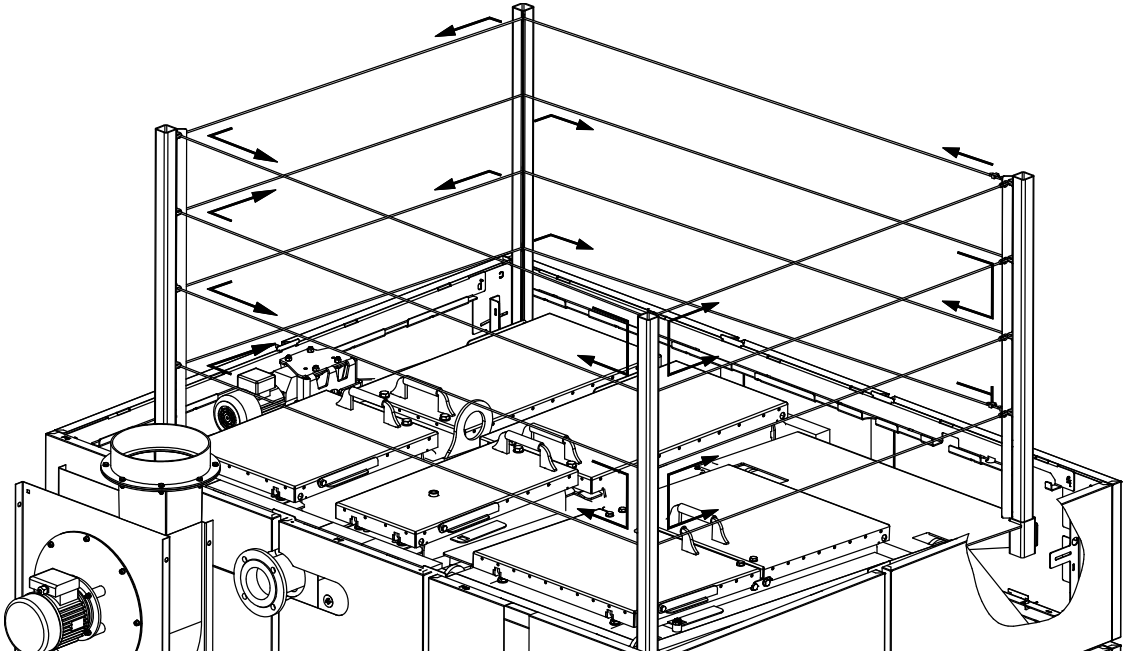


Figure 4/9 - Fall protection

INSTALLING THE BOILER**TRANSPORT****Warning!**

Danger from suspended loads

The individual modules of the boiler weigh more than 1000 kg. If the modules are dropped during transport, persons can be seriously injured and the boiler can be damaged.

Make sure that you use appropriate lifting gear to move the modules when erecting the boiler.

Ensure that the chain hoist is correctly secured to the eyebolt of the boiler during crane transport of the heating system.

There are several options for transporting the HDG M299/300/350/400 boiler. You can use a crane, forklift or a lifting truck.

INSTALLATION SITE

1. Transport the boiler to the installation site using suitable lifting equipment.

CONNECTING MODULES

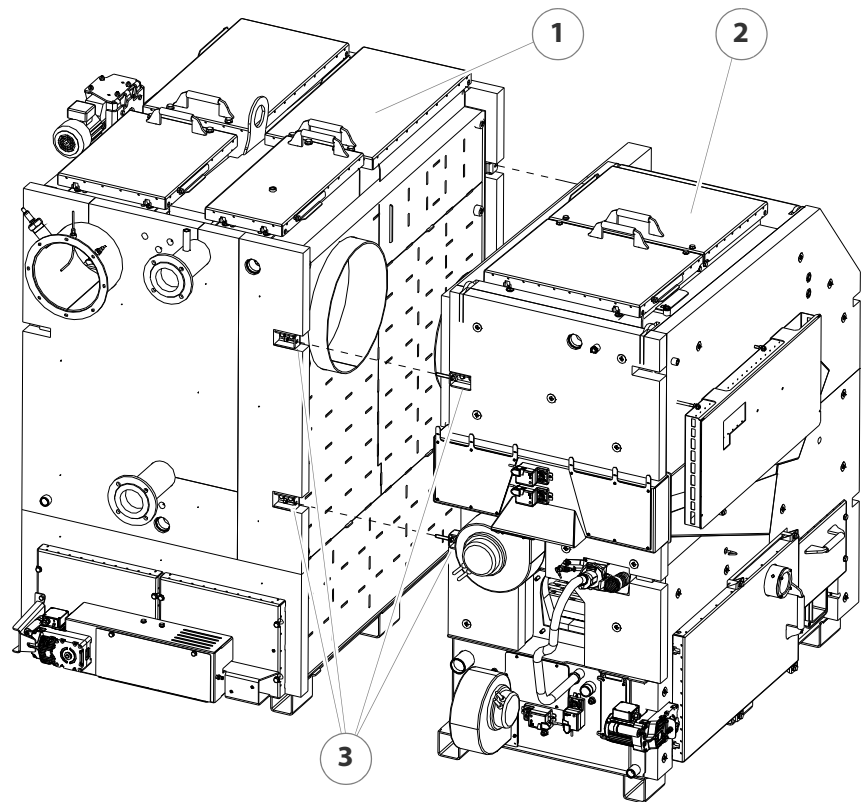


Figure 4/10 - Connecting modules

2. Place the heat exchanger (1) and the combustion unit (2) next to each other.
 3. Align the two units with plastic plates or flat steel strips (not included in the scope of delivery) so they are in a horizontal plane.
 4. Join the combustion unit (2) and heat exchanger (1) together on both sides at the intended points (3) using the M12 screws (19 mm spanner).
- ✓ The boiler is erected.

INSTALLING THE CENTRAL ASH REMOVAL SYSTEM

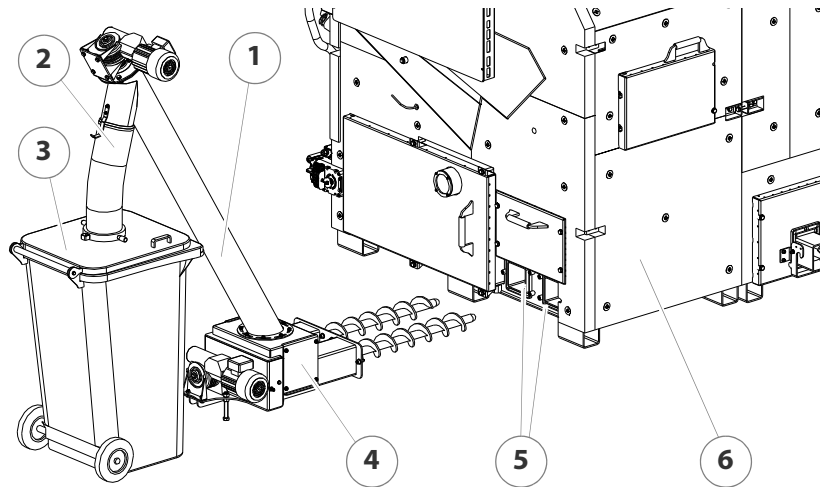


Figure 4/11 - Installing the central ash removal system

1. Slide the transfer station (4) with the ash removal augers into the two ash removal pipes (5).
 2. Install the transfer station (4) on the combustion unit (6) using the M12 hexagon socket screws (10 mm spanner).
 3. Mount the auger trough (1) of the ascending auger on the flange of the transfer station (4) with the M8 screws (13 mm spanner).
 4. Insert the downpipe (2) in the opening of the lid of the ash bin (3).
- ✓ The central ash removal system is now installed.

INSTALLING THE FEEDING SYSTEM

HDG TBZ 200

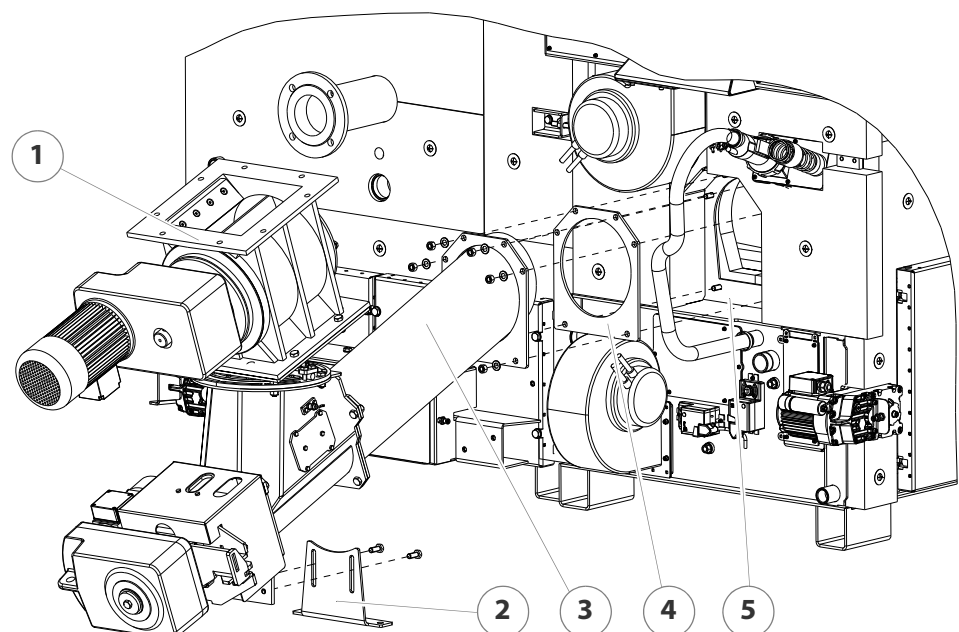


Figure 4/12 - Installing the feeding system TBZ 200



Warning!

Danger of injury

The feeding system is very heavy. Hands and feet could be crushed when it is lifted.

Only lift the feed system using suitable lifting equipment.

1. Place the seal (4) on the insertion flange (5).
2. Push the stoker pipe (3) onto the insertion flange (5).
3. Fasten the stoker pipe (3) with the M12 nuts (19 mm spanner).
4. Bolt the support leg (2) onto the stoker pipe (3) with the M12 screws (19 mm spanner).
5. Fix the support leg (2) to the floor if necessary (screws and screw anchors are not included in the scope of delivery).
6. Mount the rotary wheel (1) on the stoker pipe connection with the M12 screws (19 mm spanner).

✓ The HDG feeding system TBZ 200 is installed.

HDG TBZ 150

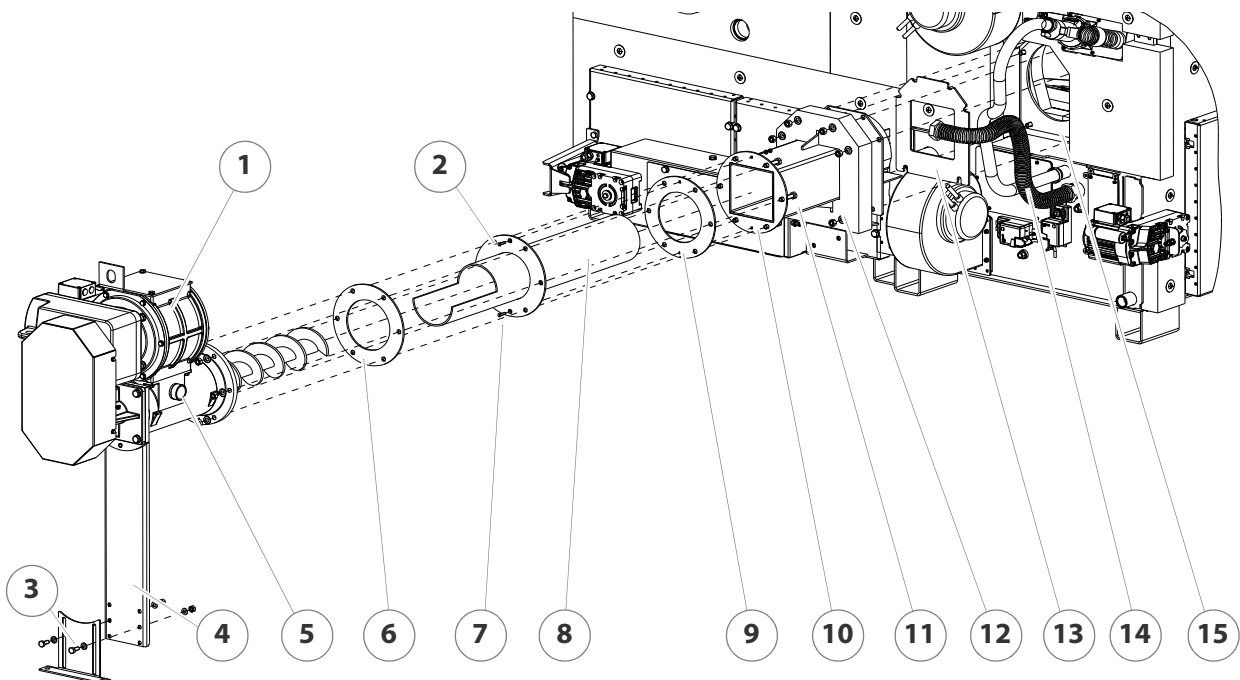


Figure 4/13 - Installing the feeding system TBZ 150

1. Place the seal (13) on the insertion flange (15).
2. Fasten the adapter piece (12) to the insertion flange (15) with the M12 nuts (19 mm spanner).
3. Slide the adapter pipe (8) with the seal (9) into the feed channel (10).
4. Align the seal (9) with the holes.

5. Poke holes through the seal (9) for the centring screws.
6. Insert the centring screws (2 + 7) toward the boiler through the holes and screw tight with the M6 nuts (10 mm spanner).
7. Insert the M12 screws (11) from the boiler through the holes.
8. Slide the second seal (6) on the adapter pipe (8).



Warning!

Danger of injury

The feeding system is very heavy. Hands and feet could be crushed when it is lifted.

Only lift the feed system using suitable lifting equipment.

9. Slide the feeding system (1) onto the adapter pipe (8).
 10. Bolt on the feeding system (1) with the M12 nuts (19 mm spanner).
 11. Bolt the support leg (4) with the M12 screw (19 mm spanner) onto the feeding system (1).
 12. Fix the support leg (4) to the floor as required (screws and screw anchors are not included in the scope of delivery).
 13. Align the feeding system (1) horizontally with the two M10 screws (3).
 14. Place the rubber seal on the connections of the pressure equalisation hose (14).
 15. Mount the pressure equalisation hose (14) with the aid of the union nut (DN 32) on the connection (5) of the feeding system (1).
 16. Insert the dummy plug in the connection on the opposite-lying side of the feeding system.
- ✓ The HDG feeding system TBZ 150 is installed.

INSTALLING THE HOUSING OF THE FLUE GAS FAN

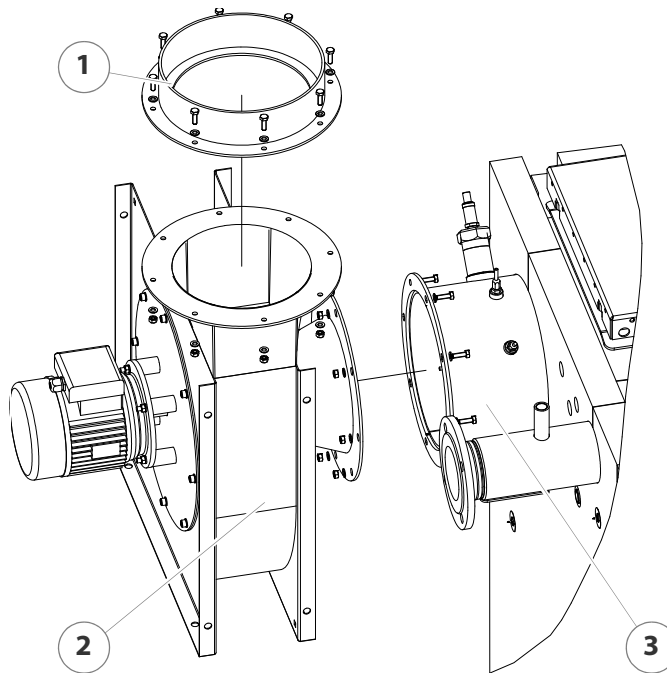


Figure 4/14 - Installing the housing of the flue gas fan



Warning!

Danger of injury

The housing for the flue gas fan is very heavy. Hands and feet could be crushed when installing it.

Only lift the housing using suitable lifting equipment.

1. Install the housing (2) of the flue gas fan on the flue pipe connection (3) of the boiler using the M8 screws (13 mm spanner).
 2. Mount the connection (1) for the flue gas pipe on the housing (2) of the flue gas fan using the M8 screws (13 mm spanner).
- ✓ The housing of the flue gas fan is now installed.

INSTALLING THE CLADDING



When installing the cladding, there are differences depending on whether the HDG M299/300/350/400 heating system is equipped with TBZ 150 or TBZ 200.

The procedure described is for installation with equipment version TBZ 200. Installation with equipment version TBZ 150 is specified explicitly where necessary.



The substructure of the cladding is inscribed with letters which are located on the upper end of the visible face for elements that are to be installed vertically and on the left end of the visible face for elements that are to be installed horizontally.

INSTALLING THE CLADDING BRACKETS

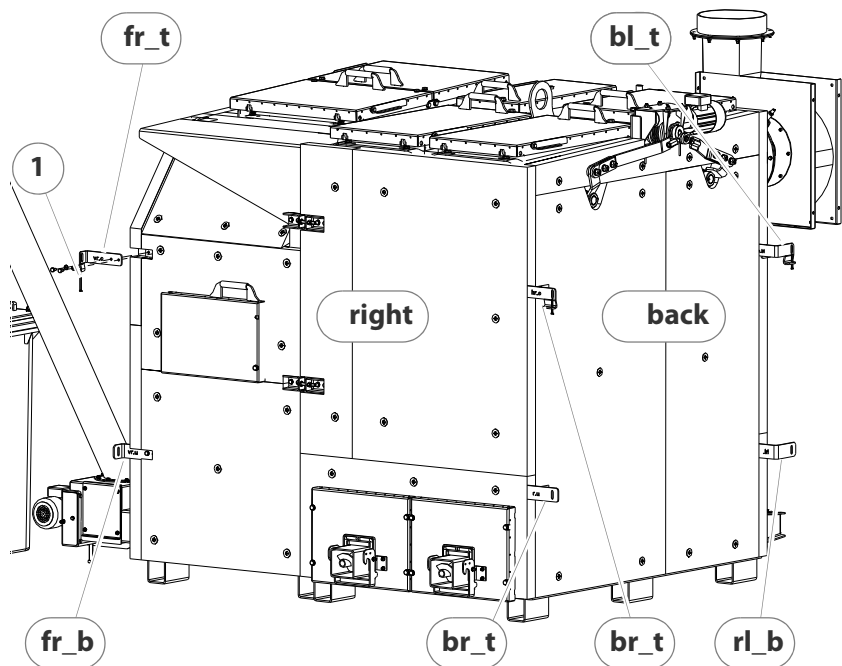


Figure 4/15 - Installing the cladding brackets

1. Install the cladding brackets with the M10 screws (17 mm spanner) according to the inscriptions "fr", "br" and "rl" on the corners of the boiler.
2. Screw in the M6 adjusting screw (1) on each of the upper three cladding brackets (10 mm spanner).

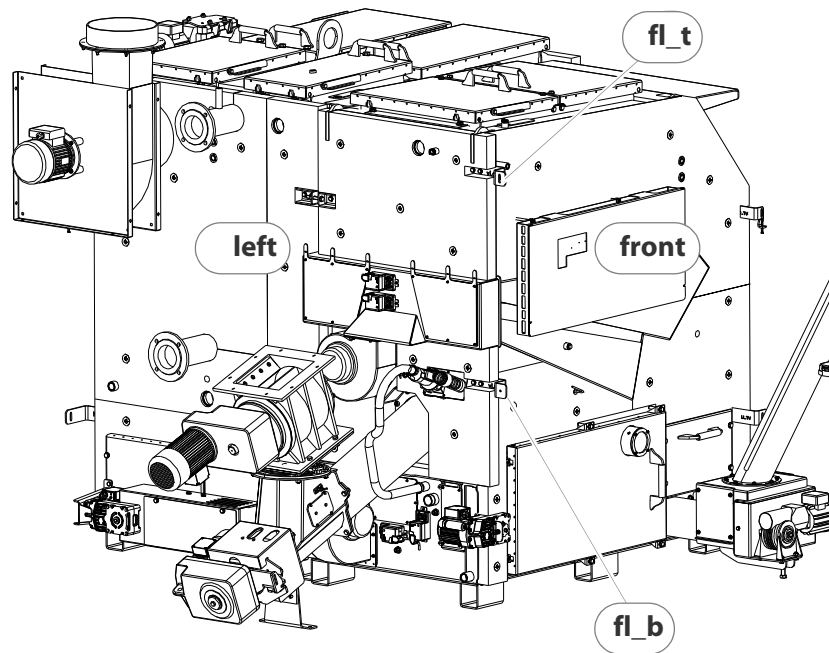


Figure 4/16 - Installing the cladding brackets

3. Install the cladding brackets with the M10 screws (17 mm spanner) according to the inscription "fl" on the corner of the boiler.

INSTALLING THE CLADDING SUPPORTS

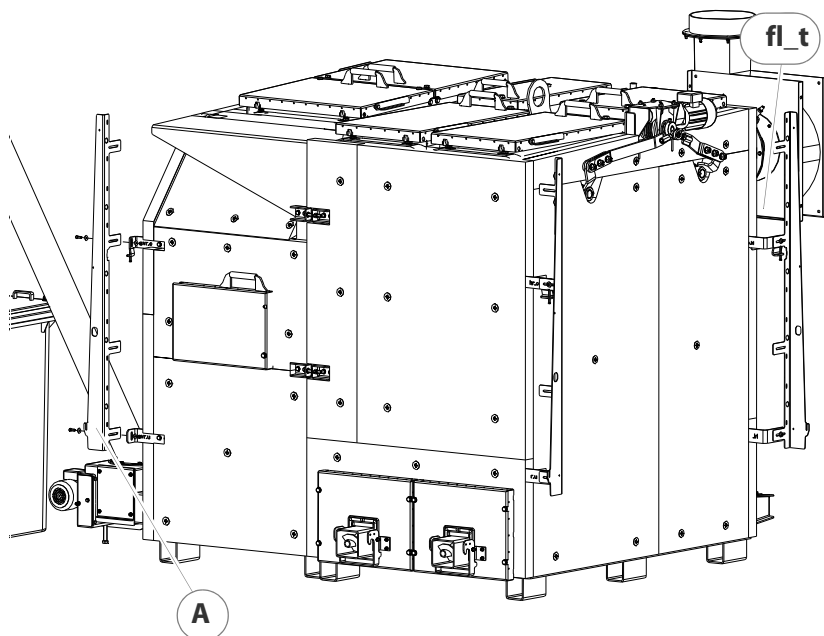


Figure 4/17 - Installing the cladding supports

4. Install the cladding supports (A) on each of the four corners with the M8 hexagon socket screws (6 mm spanner) and M8 nuts (13 mm spanner) with intermediate washers on the cladding brackets, but do not tighten the screws.

INSTALLING THE CORNER SUPPORTS

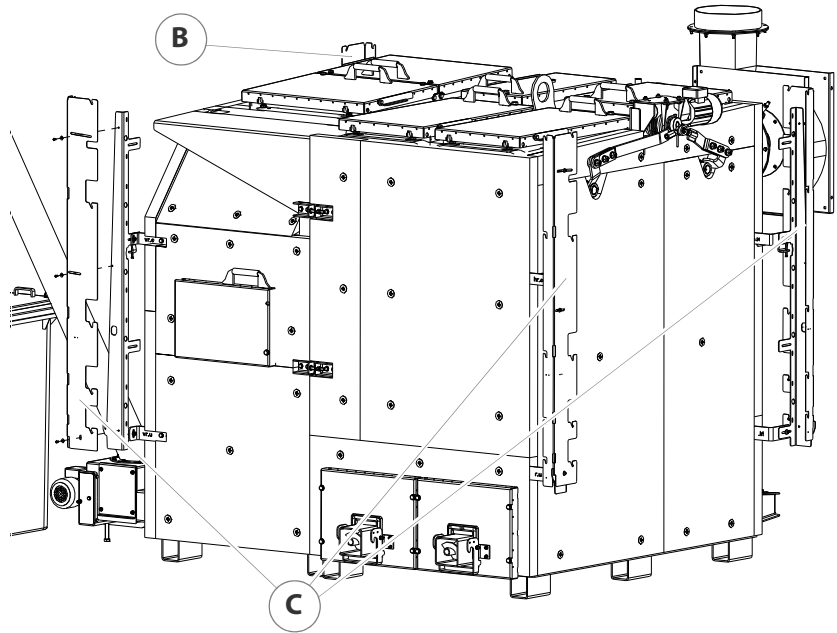


Figure 4/18 - Installing the corner supports

5. On each of the corners "fr", "br" and "bl", install the corner supports (C) with the M8 hexagon socket screws (6 mm spanner) with intermediate washers on the cladding brackets, but do not tighten the screws.

i

Corner support B differs from corner support C due to the two pre-assembled rivets.

6. Install corner support B on the "fl" corner with the M8 hexagon socket screws (6 mm spanner) with intermediate washers on the cladding supports, but do not tighten the screws.

INSTALLING THE SUSPENSION
RAILS

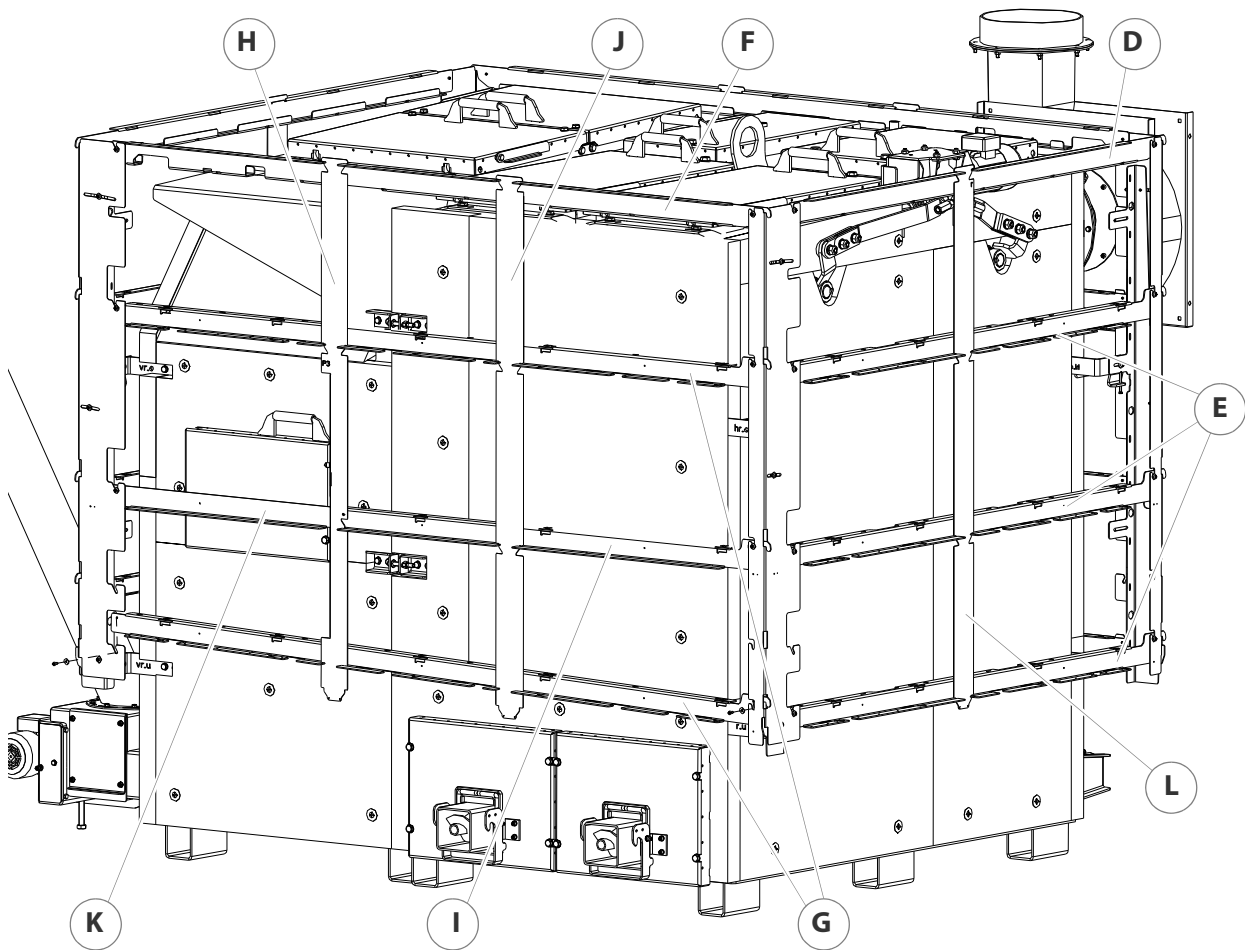


Figure 4/19 - Installing the suspension rails

7. Insert suspension rail (D) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
8. Insert the three suspension rails (E) with the right ends in the corner supports and fasten them with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
9. Insert suspension rail (F) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
10. Insert the two suspension rails (G) with the right ends in the corner supports and fasten them with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
11. Set the vertical rail (H) in the suspension rails.
12. Insert suspension rail (I) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer on the corner support or the vertical rail (H).
13. Set the vertical rail (J) in the suspension rails.

14. Insert suspension rail (K) with the right end in the vertical rail (H) and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer to the vertical rail (H) or the corner support.

15. Set the vertical rail (L) in the suspension rails.



Important!

The description in the following section applies only to systems with an HDG TBZ 200.

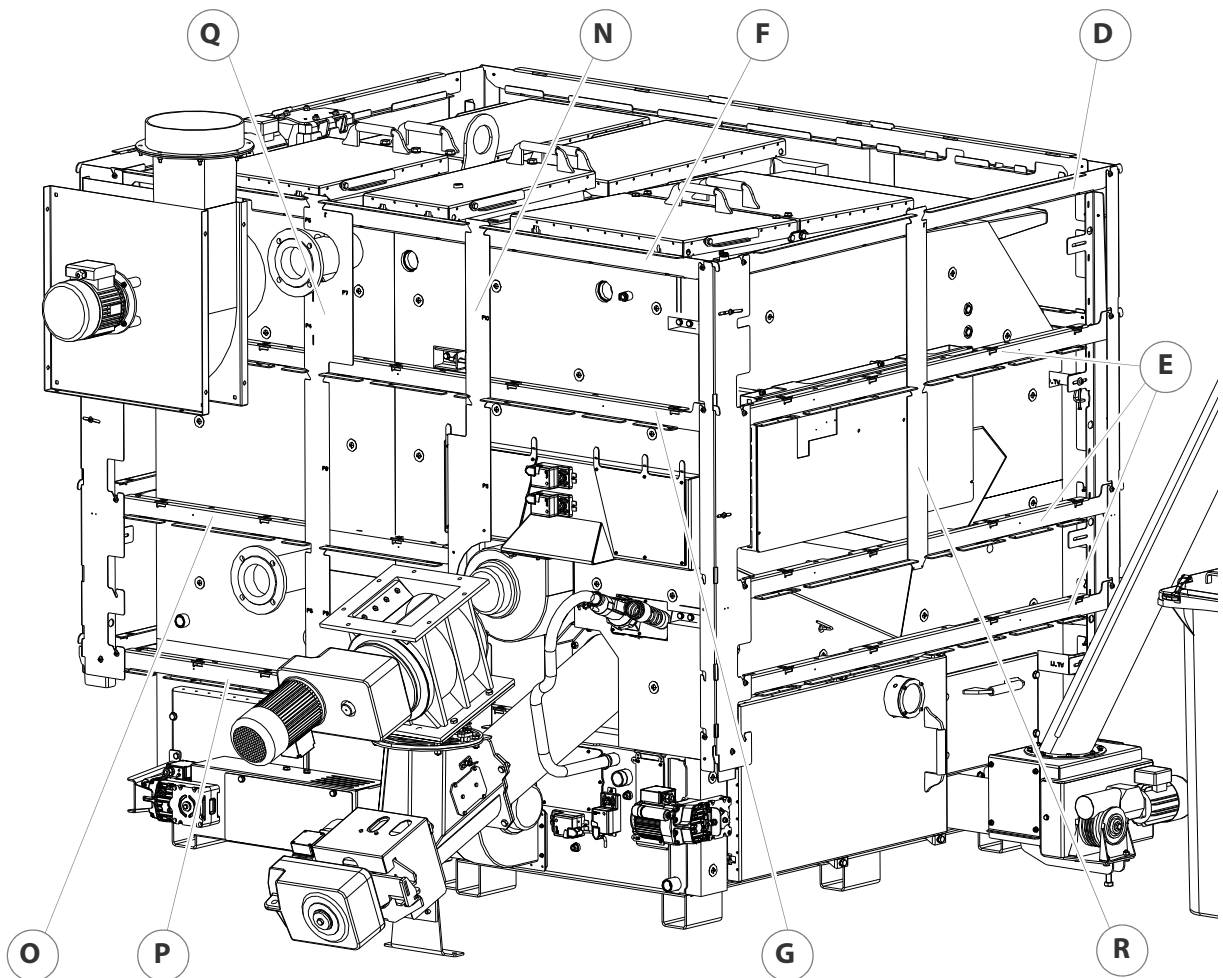


Figure 4/20 - Installing the suspension rails (TBZ 200)

16. Insert suspension rail (D) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.

17. Insert the three suspension rails (E) with the right ends in the corner supports and fasten them with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.

18. Insert suspension rail (F) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.

19. Insert suspension rail (G) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
20. Set the vertical rail (N) in the suspension rails.
21. Insert suspension rail (O) with the right end in the vertical rail (N) and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer to the vertical rail (N) or the corner support.
22. Insert suspension rail (P) with the right end in the vertical rail (N) and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer to the corner support or the vertical rail (N).
23. Set the vertical rail (Q) in the suspension rails.
24. Set the vertical rail (R) in the suspension rails.



Important!

The description in the following section applies only to systems with an HDG TBZ 150.

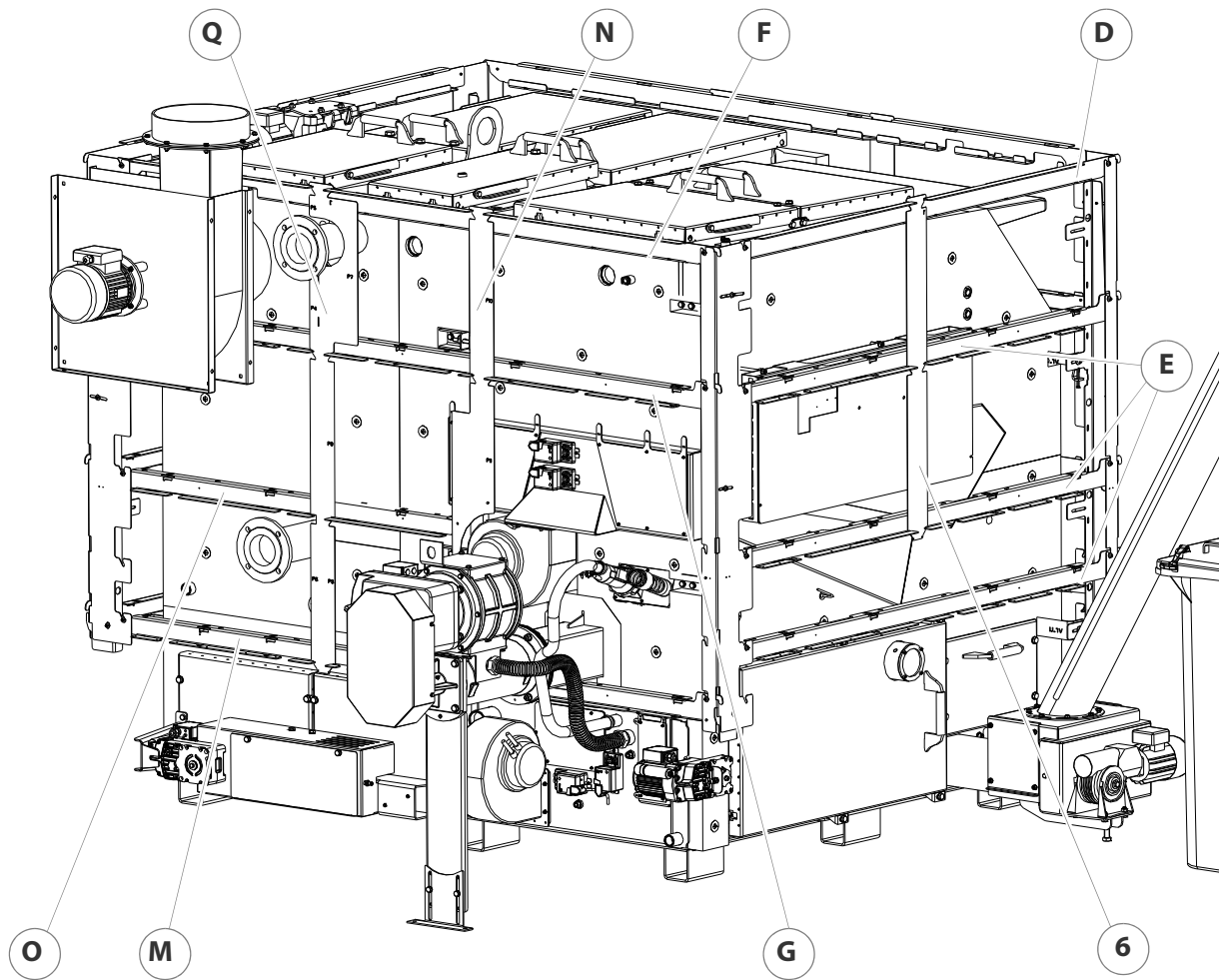


Figure 4/21 - Installing the suspension rails (TBZ 150)

25. Insert suspension rail (D) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
26. Insert the three suspension rails (E) with the right ends in the corner supports and fasten them with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
27. Insert suspension rail (F) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
28. Insert suspension rail (G) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
29. Insert suspension rail (M) with the right end in the corner support and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer.
30. Set the vertical rail (N) in the suspension rails.

31. Insert suspension rail (O) with the right end in the vertical rail (N) and fasten it with the M6 hexagon socket screws (5 mm spanner) and intermediate washer to the vertical rail (N) or the corner support.
32. Set the vertical rail (Q) in the suspension rails.
33. Set the vertical rail (R) in the suspension rails.

ALIGNING THE SUSPENSION RAILS

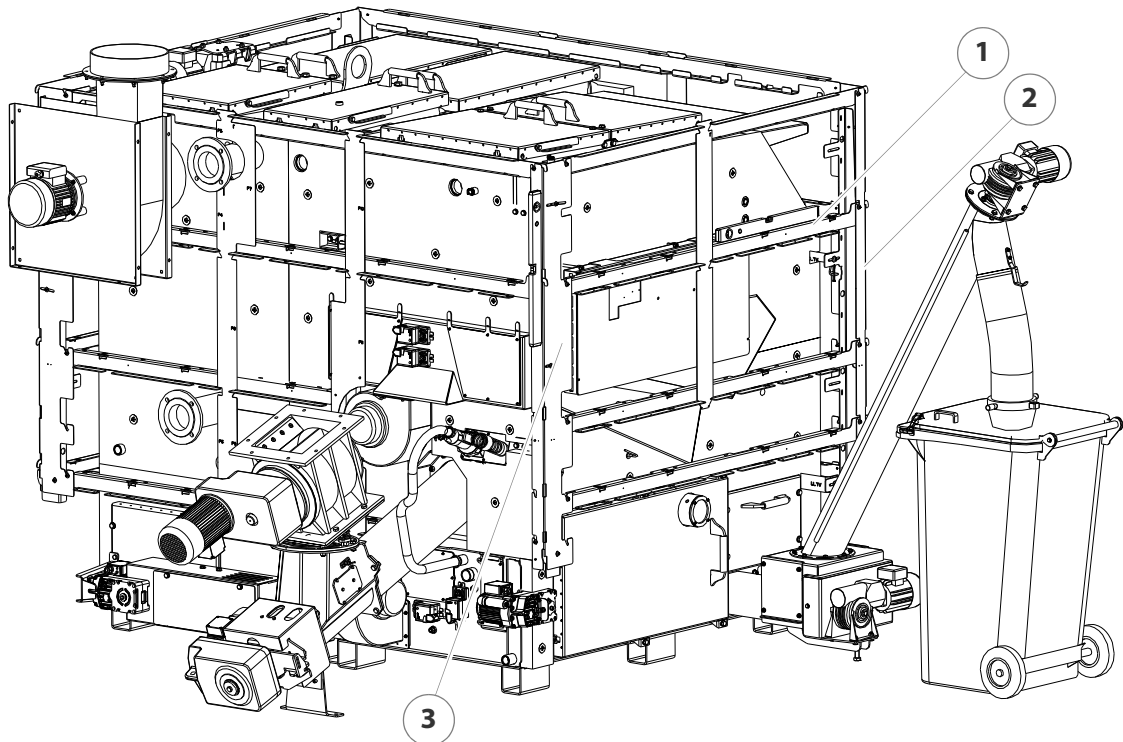


Figure 4/22 - Aligning the suspension rails

34. Align the corner support (3) vertically with the aid of a spirit level.
35. Tighten the three M6 hexagon socket screws (5 mm spanner).
36. Align the support rail (1) horizontally using the adjusting screw in the cladding bracket and a spirit level.
37. Align the corner support (2) vertically with the aid of a spirit level.
38. Tighten the three M6 hexagon socket screws (5 mm spanner).
39. Proceed with the alignment of the suspension rails in the same manner as described above for the remaining three sides of the boiler.

INSTALLING THE BASE CLADDING HDG TBZ 200



Important!

Adhere to the specified sequence when installing the base cladding. The sequence is indicated by the numbers with asterisk (e.g. 1*, 2*, etc.).

**Important!**

The description in the following section applies only to systems with an HDG TBZ 200.

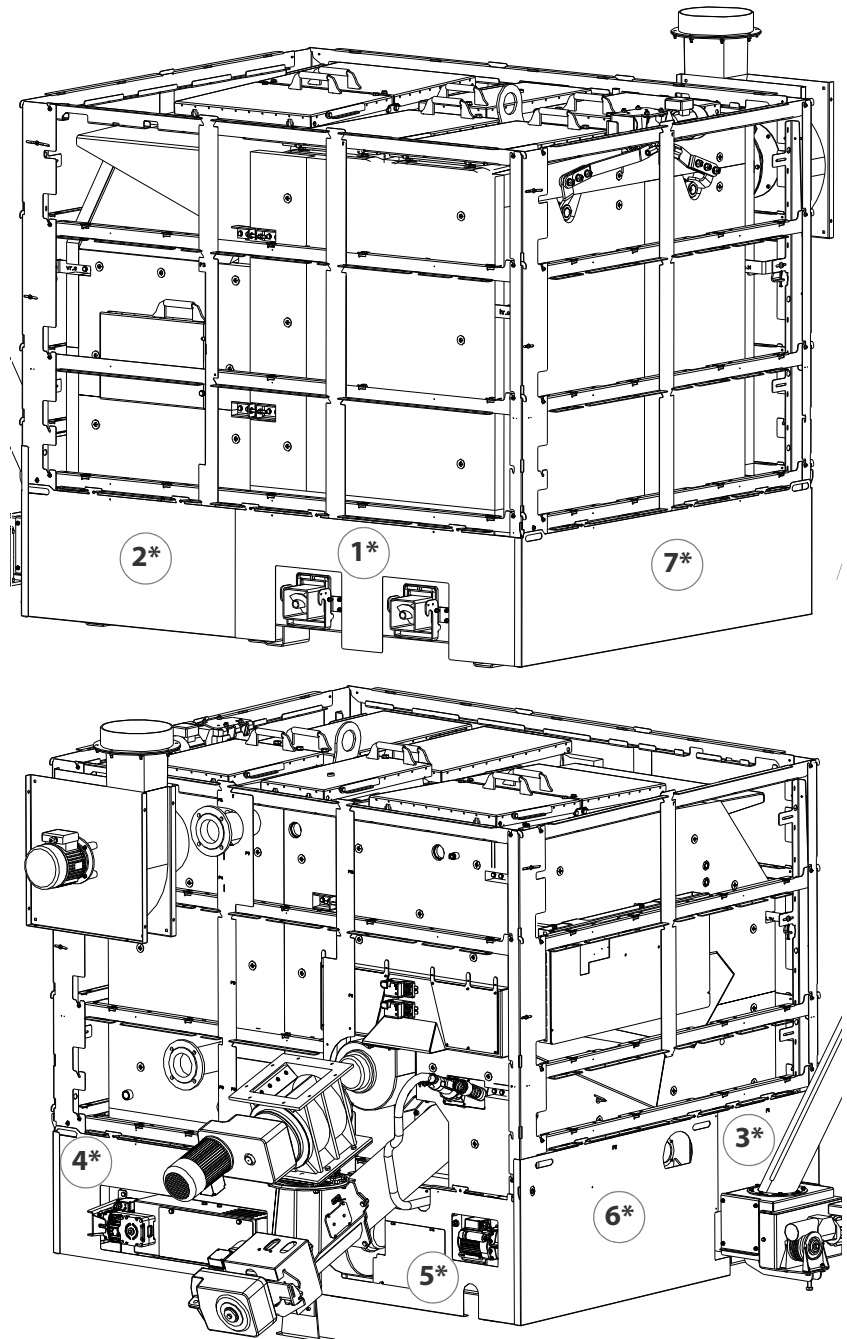


Figure 4/23 - Installing the base cladding (TBZ 200)

40. Insert the base cladding (1* - 7*) in the suspension rails in the specified sequence.

INSTALLING THE BASE CLADDING
HDG TBZ 150



Important!

The description in the following section applies only to systems with an HDG TBZ 150.

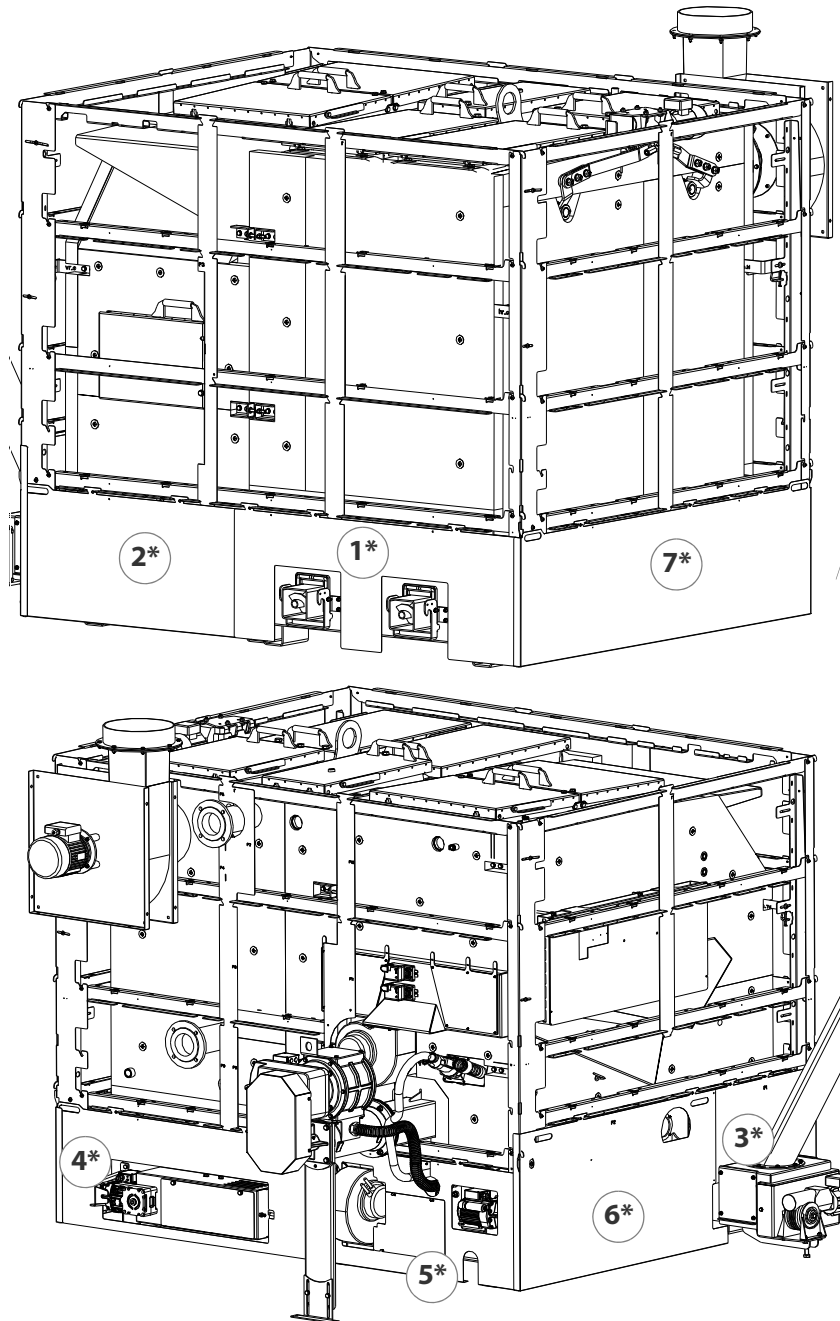


Figure 4/24 - Installing the base cladding (TBZ 150)

41. Insert the base cladding (1* - 7*) in the suspension rails in the specified sequence.

INSTALLING THE ASSEMBLY PLATES

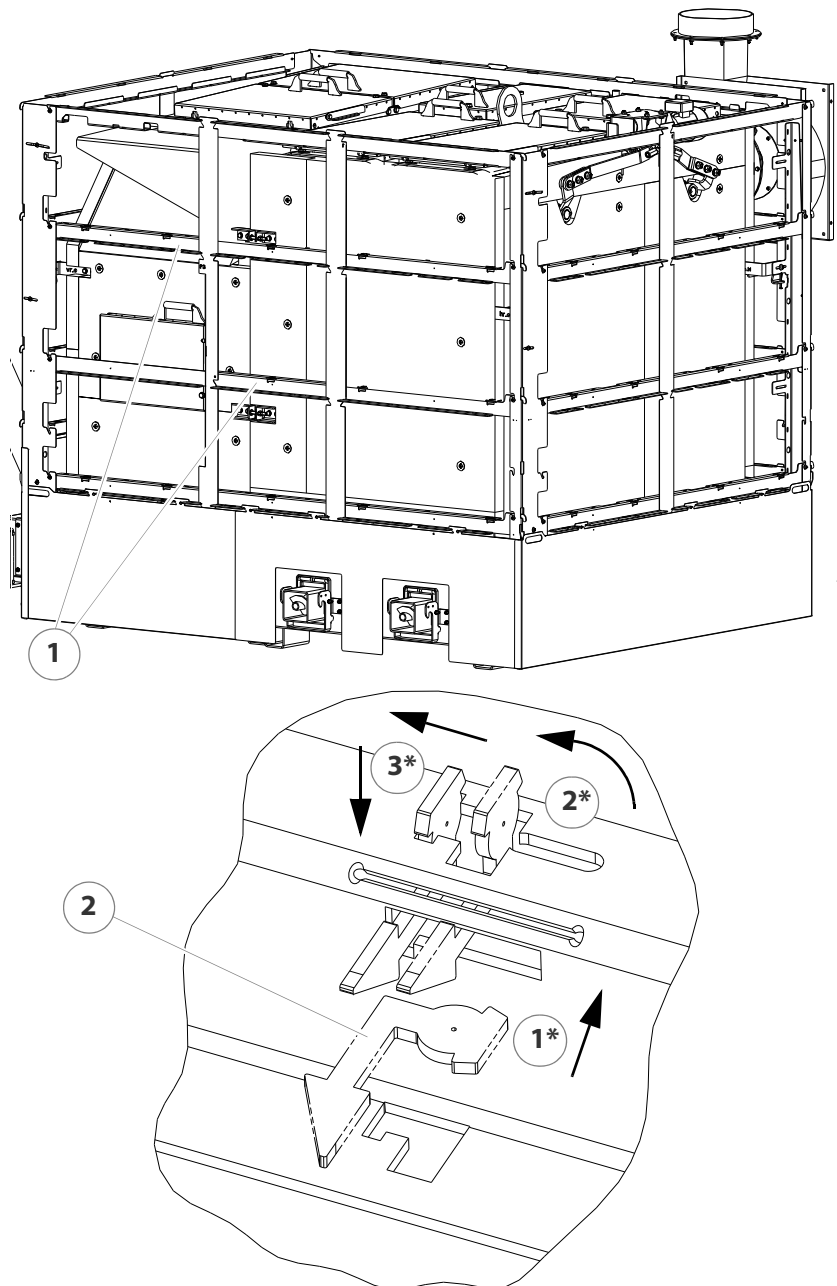


Figure 4/25 - Installing the assembly plates



Individual steps for installing the assembly plates (2):

- Push the assembly plate through the recess from below (1*).
- Turn the assembly plate 90° anticlockwise (2*).
- Lift the assembly plate and push it to the left (3*).
- Allow the assembly plate to latch in position.

42. Mount the assembly plates (2) in each of their intended positions in the two middle suspension rails (1) on each side.

INSTALLING THE SIDE CLADDING
HDG TBZ 200



Important!

The description in the following section applies only to systems with an HDG TBZ 200.

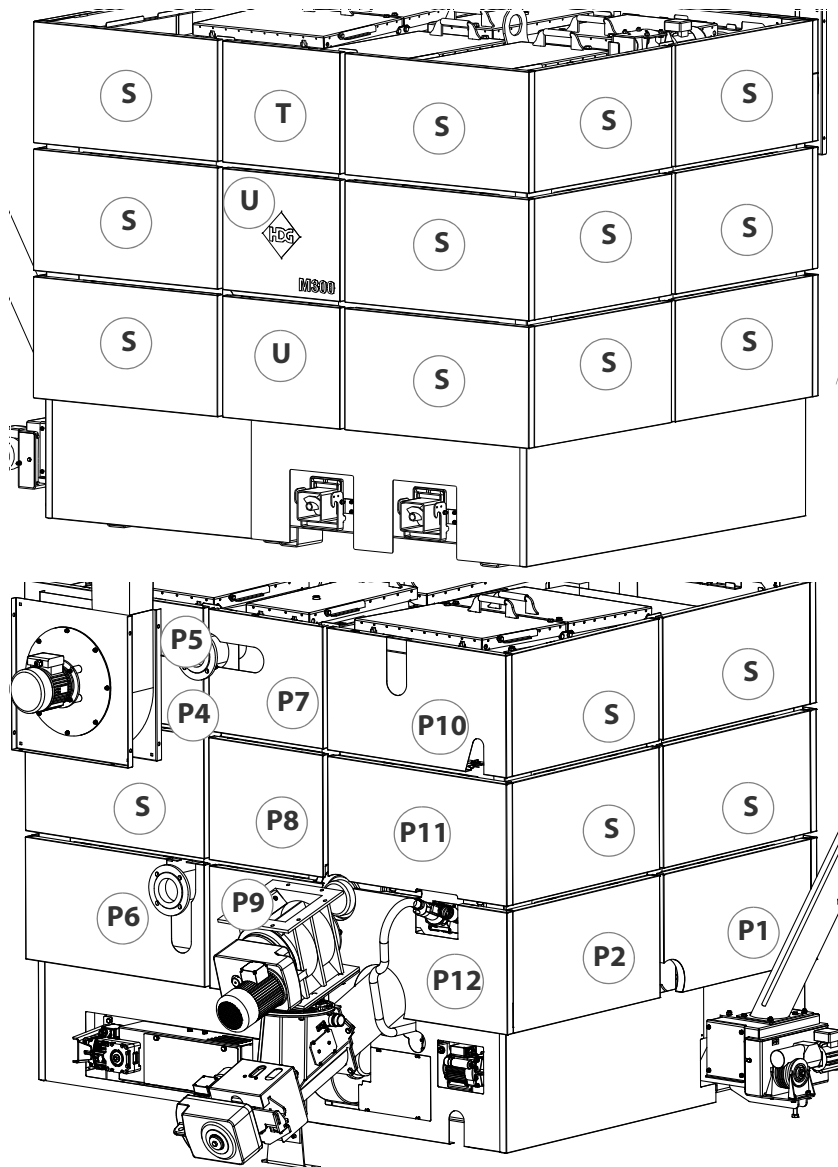


Figure 4/26 - Installing the side cladding (TBZ 200)

43. Install the side cladding "S", "T" and "U" in the insertion plates.



Important!

Adhere to the specified sequence when installing the side cladding P1-P12. The sequence is indicated by the number.

44. Insert the side cladding "P1" through "P12" in the insertion plates.

INSTALLING THE SIDE CLADDING
HDG TBZ 150



Important!

The description in the following section applies only to systems with an HDG TBZ 150.

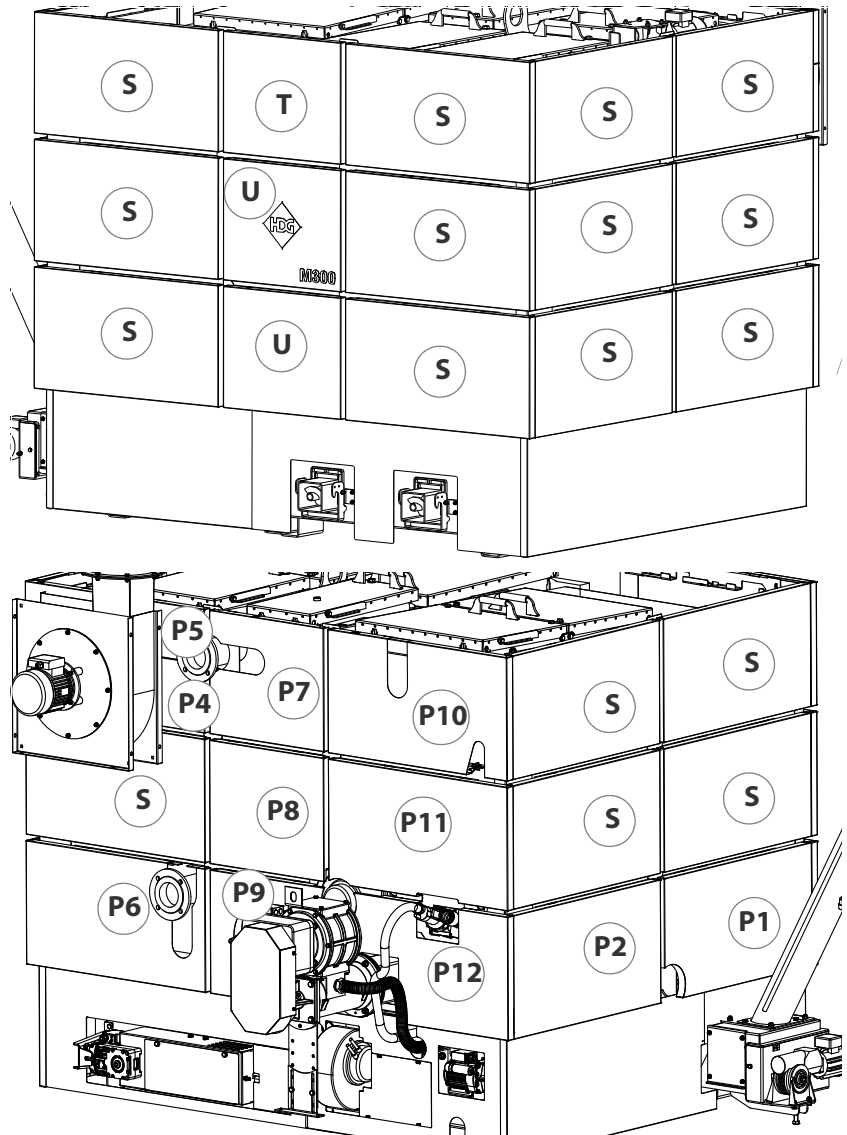


Figure 4/27 - Installing the side cladding (TBZ 150)

45. Install the side cladding "S", "T" and "U" in the insertion plates.



Important!

Adhere to the specified sequence when installing the side cladding P1-P12. The sequence is indicated by the number.

46. Insert the side cladding "P1" through "P12" in the insertion plates.

✓ The cladding is installed.

INSTALLING ASH CONTAINERS

1. Remove the ash containers from the packaging.

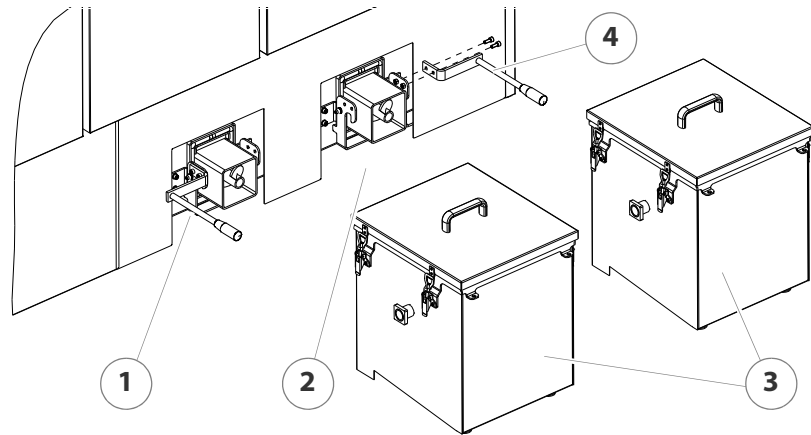


Figure 4/28 - Installing ash containers

2. Mount the two clamp handles (1 + 4) with the M8 hexagon socket screws (6 mm spanner) and the M8 nuts (13 mm spanner).
3. Lift up the two clamp handles (1 + 4).
4. Insert the ash containers (3) on the ash removal pipe.
5. Press the clamp handles (1 + 4) downward.
- ✓ Grasp the clamp handles and press the ash containers against the seal of the ash removal door.
6. If the handles do not clamp, adjust them as follows.

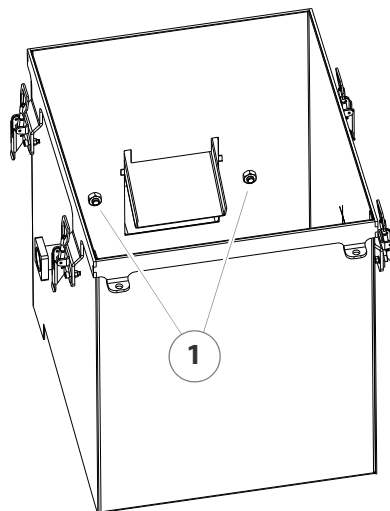


Figure 4/29 - Adjusting the ash containers

1. Remove the cover from the ash container.
2. Release the external nuts on the ash container.
3. Adjust the ash container with the inside nuts (1) until the clamping handles latch firmly.
4. Screw the outer nuts tight and check that the clamp handles latch firmly.
- ✓ Grasp the clamp handles and seal the ash containers solidly on the ash removal door.
5. Close the ash containers in the reverse sequence.
6. Adjust the two support feet on the underside of the ash container to the appropriate height.
- ✓ The ash containers are mounted and adjusted.

FITTING THE ACCUMULATOR SENSORS



The sensors for the accumulator are stored in the EMD-C 215 Exclusiv control cabinet for further use.

INSTALLING THE EMD-C 215 EXCLUSIV CONTROL CABINET



Warning!


Danger of injury

The control cabinet is heavy. Hands and feet could be crushed during installation.

Observe the following when installing the EMD-C 215 Exclusiv control cabinet:

- Install the control cabinet at least one metre from the flue pipe.
- Prevent the control cabinet from tipping by fixing it to the wall securely.
- If possible, install the control cabinet in such a way that you can see the boiler when operating the control panel of HDG Control.
- Install the control cabinet at a height comfortable for you to operate.

CONNECTING THE CHIMNEY

 See section “4.2 Connections” in this chapter.

1. Connect the flue pipe to the chimney connection.
 2. Make sure that the connecting piece does not protrude into the chimney.
 3. Seal the connection to the chimney with highly fireproof silicone or with a suitable mortar.
- ✓ The boiler is now connected to the chimney.

4.5 Delivery system

GENERAL INFORMATION

The description for planning, installation and operation of the employed delivery system can be found in the corresponding operating manual.


 See the operating manual “Delivery system”.

4.6 Vacuum pressure control


Optionally available is an HDG vacuum pressure control with frequency converter and differential pressure transmitter for adapting to changing chimney conditions. It creates an automatic adjustment to the underpressure required for output and combustion control and thereby improves the partial load capacity of the system.

4.7 Electrical system

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

 The technical details are described in the chapter "3 Mode of operation", section "3.3 Technical data".

1. Install the electrical connections in accordance with the provided wiring diagrams.

 The wiring diagrams can be found in the supplied documentation.

4.8 Water



Important!

The heating system must be filled with water in accordance with VDI guideline 2035, "Avoiding damage in hot water heating systems".



Once the combustion unit and the heat exchanger have been assembled, the HDG M299/300/350/400 boiler must be submitted to a water pressure test, at a testing pressure of 4 bar.

The diaphragm expansion vessel must be constructed in accordance with DIN EN 13831 "Closed expansion vessels with built-in diaphragm for integration in water installations".

Before putting the system into operation, the pressure of the diaphragm expansion vessel must be adjusted for the conditions in the heating system and in the building.

After putting the system into operation, heat up the system to the maximum boiler temperature and bleed air from the system again to make sure that there are no air pockets.

In Germany, the requirements of the German energy conservation ordinance (EnEV) must be met.

4.9 Thermal safety device

In accordance with DIN EN 12828, heating systems must be equipped with safety devices to prevent the maximum operating temperature from being exceeded. The safety heat exchanger serves to protect the boiler against overheating and may not be used for other purposes (i.e. as a regular heat exchanger). If the heat transfer capacity is suddenly lost (for example, if the circulation pump for raising the return temperature fails), heat production cannot be stopped as quickly as with an oil- or gas-fired boiler. When the maximum operating temperature is exceeded, the thermal safety device (TAS) is triggered and cold water flows through the safety heat exchanger. The excess energy generated is thus dissipated by this “emergency cooling”. (This is an alternative to fast regulation.)

However, the safety heat exchanger and thermal safety device can only serve their purpose if the following requirements have been met:

- A flow pressure of at least **two** bar and a flow rate of 1800 l/h must be available at the cold water inlet of the safety heat exchanger.



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

- The distance between the supply and return lines of the thermal safety device and the safety heat exchanger should not be less than their nominal width. The supply line may not be equipped with a shut-off valve.
- Water must be able to flow freely through the system.
- The flow pressure at the flue pipe connection on the boiler may not significantly exceed the prescribed value.



The thermal safety device is to be inspected annually by an authorised, qualified technician to verify that it is functional.

The thermal safety device must be installed according to guidelines from HDG Bavaria.



Important!

In order to prevent leaks, avoid turning the connections of the safety heat exchanger anticlockwise when installing the thermal safety device.



Important!

The HDG M299/300/350/400 heating system is equipped with two safety heat exchangers. One is located in the combustion unit and one in the regular heat exchanger.

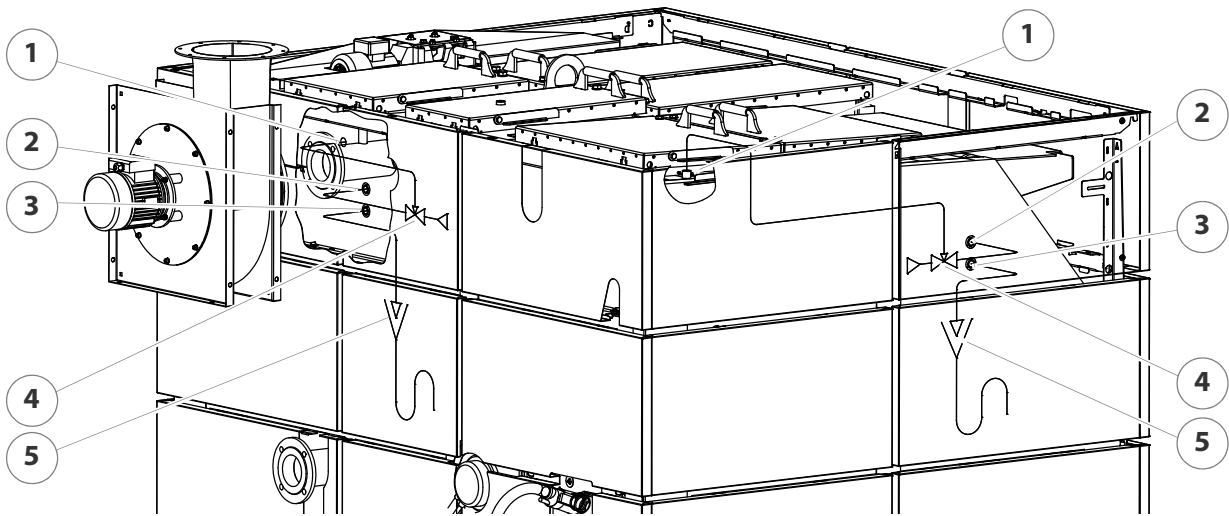


Figure 4/30 - Installing the thermal safety device

- 1 Connection of immersion sleeve for thermal safety device (DN 15 inside thread)
- 2 Safety heat exchanger inlet (DN 20 male)
- 3 Safety heat exchanger outlet (DN 20 male)
- 4 Thermal safety device (TAS)
- 5 Runoff connection to drainage system

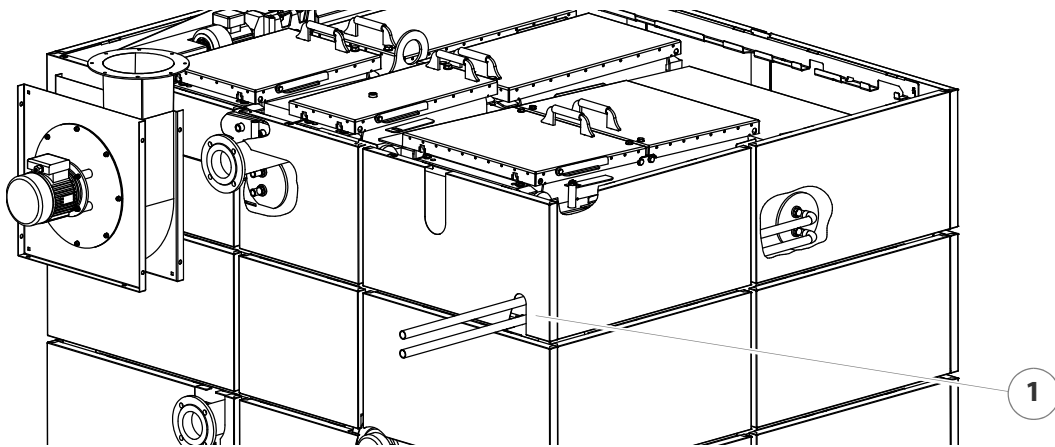


Figure 4/31 - Thermal safety device pipework



The pipe work of the combustion unit's safety heat exchanger can be fed outside via hole (1) in the cladding at the side.

4.10 Hydraulic system

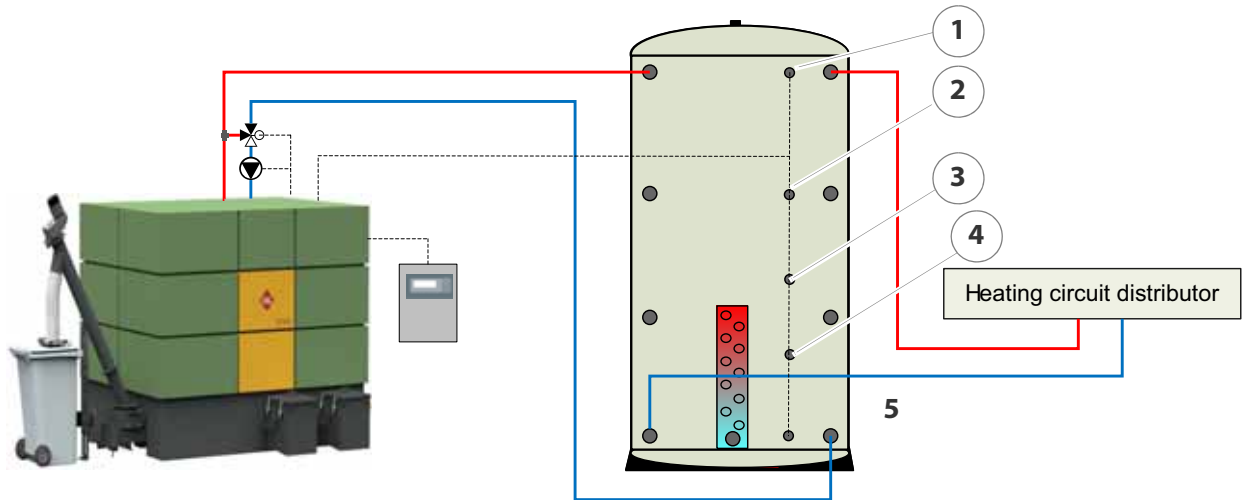


Figure 4/32 - Hydraulic system (accumulator 1)

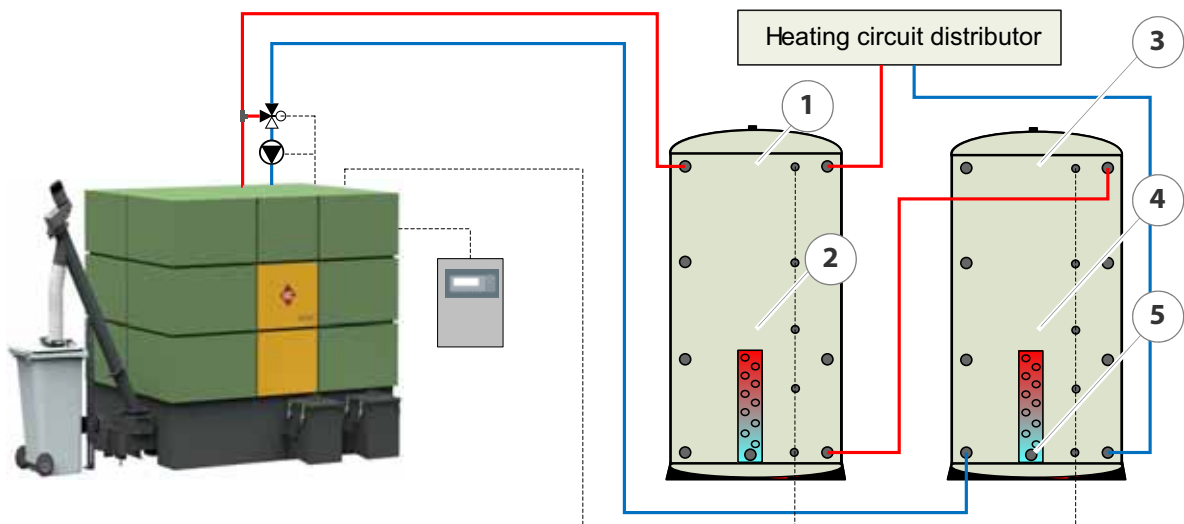


Figure 4/33 - Hydraulic system (accumulator 2)

- 1 Accumulator sensor, top
- 2 Accumulator sensor, middle
- 3 Accumulator sensor, (optional)
- 4 Accumulator sensor, (optional)
- 5 Accumulator sensor, bottom



These hydraulic systems are only suitable for use in the specified manner and for the intended purpose. Any deviation from this usage could make adjustments necessary.

Consult with a trained specialist on issues relating to the hydraulic system.

5 Commissioning the system

The heating system is initially commissioned by specialists from HDG Bavaria 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 expertise. If this commissioning is done by an untrained person, the heating system could be damaged.

Only allow authorised specialists to perform the commissioning.

5.1 Requirements

The following conditions must be met before the system can be commissioned without faults:

SWITCH OFF THE MAINS SUPPLY

- Is the circuit breaker of the mains supply to the heating system switched off?

CHECK THE MECHANICAL STRUCTURE OF THE FEEDING SYSTEM

- Does the mechanical structure meet the specifications of this operating manual?

CHECK THE HYDRAULIC CONNECTIONS

- Do the mechanical connections meet the specifications of this operating manual?
- Has the safety equipment been installed to conform to the applicable standards and guidelines?

CHECK THE MECHANICAL STRUCTURE OF HDG COMPACT

- Does the mechanical structure meet the specifications of this operating manual?

CHECK THE ELECTRICAL
CONNECTIONS**Danger!**

Danger from electrical current or voltage!

Isolate the mains cable to the heating system.

- Are all the sensors and actuators connected correctly?
- Has the mains power supply cable been correctly connected?
 - L1 on terminal X11
 - L2 on terminal X12
 - L3 on terminal X13
 - Neutral conductor on terminal X14
 - Earthing conductor on terminal X15.
- Are the connection cables properly attached between the boiler and the control cabinet?

5.2 Procedure

SWITCHING ON THE HEATING SYSTEM



1. Turn the heating system main switch on.

- ✓ The control is activated.
- ✓ After a start-up phase, the display will first of all show a switch-on message and then the standard display.



2. Set the engage switch to "1".

- ✓ The display switches to **Heating ON**.
- ✓ The heating system is now switched on.

SETTING THE DISPLAY LANGUAGE

Different languages can be set for the display texts.

- 🔗 See chapter "6 Using the heating system", section "6.5 Calling up information, selecting and modifying parameters".

CHECKING THE ACTUATORS IN MANUAL OPERATION

In the **MANUAL** menu you can manually test the functionality of all actuators, e.g. drive motors, fans and electrical mounted parts.



Danger!


Material damage and injury due to incorrect operation.

Activating the following parameters requires comprehensive technical expertise. If the parameters are not activated by trained personnel, the heating system can be damaged and dangerous operating conditions can arise.

Have the commissioning performed only by an authorised specialist.

COMBUSTION AIR AND IGNITION FAN

The fans can be activated manually in this submenu.

 See chapter "6 Using the heating system", section "6.9 MANUAL menu", paragraph "Combustion air and ignition fan".


PRIMARY AND SECONDARY AIR FLAPS

This submenu is used to manually activate the primary and secondary air flaps.

See chapter "6 Using the heating system", section "6.9 MANUAL menu", paragraph "Primary and secondary air flaps".

CENTRAL ASH REMOVAL, GRATING ASH REMOVAL AUGER AND GRATE DRIVE

This submenu is used to manually activate the central ash removal and the grate drive.

 See chapter "6 Using the heating system", section "6.9 MANUAL menu", paragraph "Central ash removal, grate ash removal auger and grate drive".


HEAT EXCHANGER ASH REMOVAL AUGERS AND CLEANING SYSTEM

This submenu is used to manually activate the heat exchanger ash removal auger and cleaning system.

See chapter "6 Using the heating system", section "6.9 MANUAL menu", paragraph "Heat exchanger ash removal auger and cleaning system".


RETURN PUMP, RETURN MIXER AND INTERMEDIATE PUMP

This submenu is used to manually activate the return pump, the return mixer and the intermediate pump.

 See chapter "6 Using the heating system", section "6.9 MANUAL menu", paragraph "Return pump, return mixer and intermediate pump".


**STOKER AUGER, ROTARY FEEDER
AND MATERIAL CONVEYING
AUGER**

In this submenu, the stoker auger, rotary feeder and material conveying auger can be activated manually in connection with the HDG feeding system TBZ 200.

 See chapter “6 Using the heating system”, section “6.9 MANUAL menu”, paragraph “Feed system, rotary wheel and material conveying auger”.

**FEED SYSTEM, AUGER TROUGH 2
AND DOSAGE**

In this submenu, the feed system, auger trough 2 and dosage can be activated manually in connection with the HDG feeding system TBZ 150.

 See chapter “6 Using the heating system”, section “6.9 MANUAL menu”, paragraph “Feed system, auger trough 2 and dosage”.


**MATERIAL CONVEYING AUGER
AND AGITATOR**

In this submenu the material conveying auger and agitator can be activated manually in connection with a distributing container.

See chapter “6 Using the heating system”, section “6.9 MANUAL menu”, paragraph “Material conveying auger and agitator”.


**MOVING FLOOR - TRANSVERSE
AUGER**

In this submenu the transverse auger can be activated manually in connection with the HDG walking floor feeding system TAK.

 See chapter “6 Using the heating system”, section “6.9 MANUAL menu”, paragraph “Moving floor - transverse auger”.

**MOVING FLOOR - HYDRAULIC
SYSTEM**

In this submenu the drive of the walking floor can be activated manually in connection with the HDG walking floor feeding system.

 See chapter “6 Using the heating system”, section “6.9 MANUAL menu”, paragraph “Moving floor - hydraulic system”.

Once the functionality of all the actuators is checked in manual operation, the HDG M299/300/350/400 heating system can be operated in accordance with the set control mode.

**FILLING THE TRANSFER STATION OF THE CENTRAL ASH REMOVAL
SYSTEM**



Caution!

Backfiring or smoke can cause injuries or material damage

If the transfer station is not at least half-filled when commissioning or re-starting after a cleaning, there is a danger of backfiring or smoke from the boiler. This can cause damage to the heating system or injury to persons.

Make sure that the transfer station is at least half-filled with ash, sand, etc.

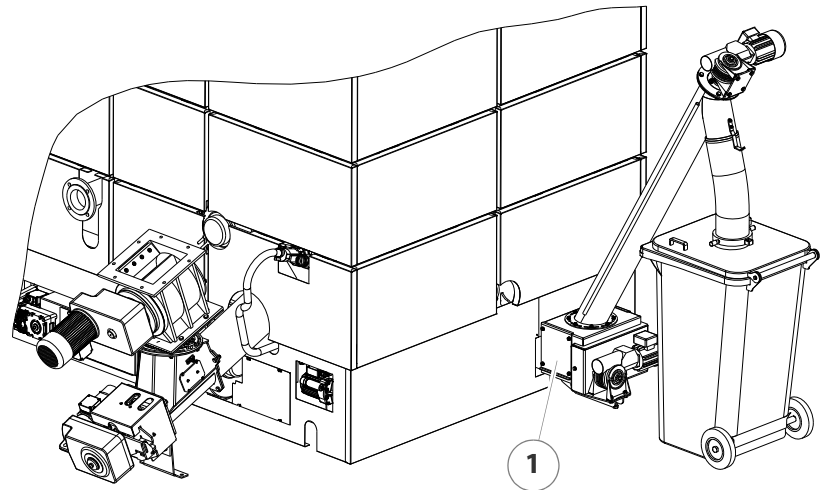



Figure 5/1 - Filling the ash accumulation bin

1. When commissioning the system, make sure that the transfer station (1) is at least half-filled with ash, sand, etc.

FILLING THE FUEL STORAGE

 See also Chapter “6 Using the heating system”, section “6.13 Filling the fuel storage”.



The fuel storage may only be filled once the actuators have been tested.

1. Before filling the fuel storage, check the rotational direction, the intermediate base, the leaf springs and the dosing plate of the delivery system.




Warning!

Damage to extraction system during filling.

If the heating system is not switched on during filling of the fuel storage, the overload protection of the delivery system could be triggered when the heating system is switched on after the filling.

When filling the fuel storage for the first time, activate the delivery system by switching in manual operation.

2. Fill the fuel storage.

 See chapter “6 Using the heating system”, section “6.13 Filling the fuel storage”.

- ✓ The fuel storage is filled.

ADAPTING PARAMETERS



Danger!

Material damage and injury due to incorrect settings.

Adjusting these parameters requires comprehensive specialist knowledge. If the parameters are adjusted by an untrained person, the heating system can be damaged.

Only allow authorised specialists to make adjustments to the parameters.

The parameters of the HDG Control unit are programmed with the predefined factory settings upon delivery. The predefined values of the factory settings are intended for operation with wood chips.

In practice, operators usually have their own heating system requirements. Differences result from, for example, the sit-specific requirements or the heating fuel. If the heating system is operated with wood pellets or chips, the relevant parameters must be changed.

In all cases, it is necessary to check the predefined parameters and, if necessary, change them accordingly before commissioning the system.

6 Using the heating system

6.1 Overview of the controls and display components

MAIN SWITCH



The main switch is located on the side of the control cabinet. The heating system can be shut down using the main switch.

EMERGENCY STOP



The emergency stop switch is located on the front plate of the control cabinet. If the emergency stop switch is pressed, all moving parts of the heating system are switched off.



Danger!

Danger from electrical current or voltage!

The heating system is **not** rendered voltage-free by switching off with the emergency stop switch. The heating system is only voltage-free if the main switch is turned off.

If the emergency stop switch is pulled out, the *Acknowledge fault* button must first be pressed. Only then will all moving parts of the heating system be switched back on and operational.

ADDITIONAL CONTROLS



Engage switch:

- switches the heating system on or off.



“System operation” indicator light

- lights up when the heating system is switched on.



Acknowledge fault button

- flashes when there is a fault.
- lights up when a fault is eliminated.
- must be pressed after rectifying a fault.

CONTROL CABINET MODEL EMD-C 215 EXCLUSIV

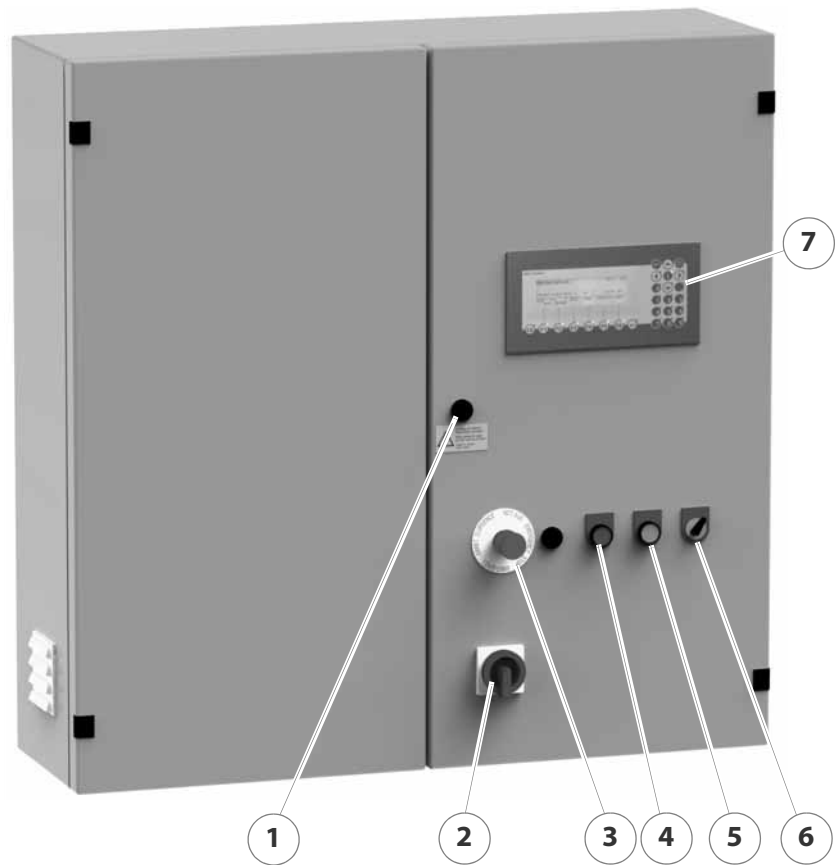


Figure 6/1 - Control cabinet model EMD-C 215 Exclusiv

- 1 Lock mechanism of control cabinet
- 2 Main switch
- 3 Emergency stop
- 4 *Acknowledge fault* button with fault light
- 5 "System operation" indicator light
- 6 Engage switch
- 7 Control unit HDG Control

CONTROL UNIT FOR HDG CONTROL

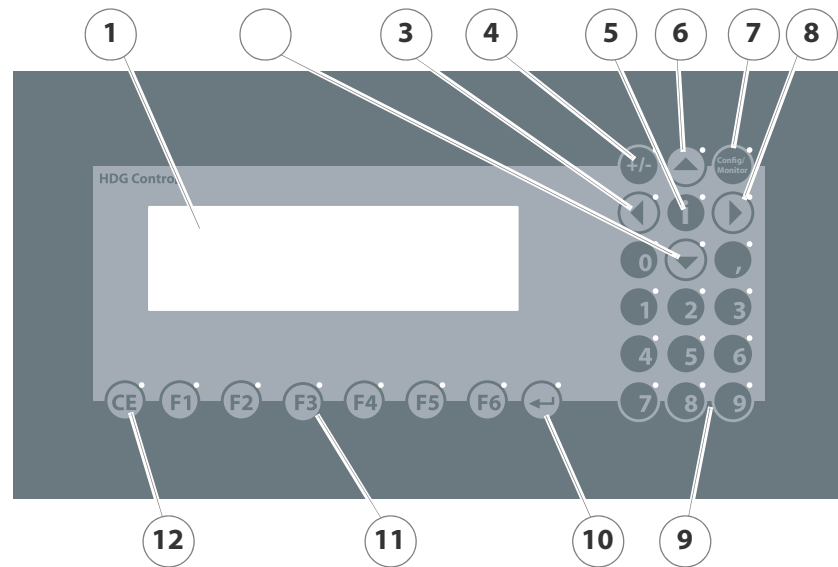


Figure 6/2 - Control unit for HDG Control

- 1 Display
- 2 *Down arrow* button
- 3 No function assigned
- 4 *Plus/minus sign change* button
- 5 *Programme version info / Language selection* button
- 6 *Up arrow* button
- 7 *Configuration* button
- 8 No function assigned
- 9 Numerical keypad
- 10 *Enter or Input* button
- 11 *Function buttons (F1 to F6)*
- 12 *CE* button

The control unit of the HDG Control is located in the front plate of the control cabinet.

Through the control unit, you can adjust the HDG Control and obtain information on current processes.

DISPLAY

The display shows the selected information and parameters.

BUTTONS

The heating system can be operated using the buttons.



Not all keys are always activated on the keypad.

Depending on the menu, various buttons may be deactivated.

If a button is activated, a diode is lit in the upper right corner of the button. Pressing the button will trigger the respective function.

The individual buttons have the following functions:



Arrow keys

- Switch between individual parameters in a display.



Plus/Minus button

- Changes the initial sign in front of numerical values.



Program version info key

- Displays the software version and enables changing the language.



Function (1 - 5) keys

- In the standard display, these buttons enable access to various menus, e.g. the **ON/OFF** menu, as well as the triggering of functions which are shown in the bottom line of the display.



Function F6 key

- In the bottom line above the *F6* button, **END** is always visible. Press the *F6* button to exit any submenu and return to the standard display.



Keys of the numerical keypad

- The keys of the numerical keypad are used to enter settings and times.



Enter or Input key

- Confirms the changed value.
- One step forwards.



Configuration button

- If the HDG Control is traded, the configuration key is used to confirm adoption of the previous hours of operation.


6.2 Switching on the heating system

REQUIREMENTS

Before the heating system is switched on, the following requirements must be met:

- The heating system has been commissioned by authorised specialists.
- The fuses of the power supply are switched on.
- The main switch on the heating system is turned off.
- No operating mode is displayed on the control unit of the HDG Control.
- The fuel storage is filled.



 See section “6.13 Filling the fuel storage” in this chapter.

PROCEDURE



1. Turn the heating system main switch on.

✓ The control is activated.

✓ After a start-up phase, the display will first of all show a switch-on message and then the standard display.



2. Set the engage switch to "1".

✓ The display switches to **Heating ON**.

✓ The heating system is now switched on.

6.3 Switching off the heating system

The heating system can be switched off from any operating mode.



Warning!

Frost danger!

Only switch off the heating system completely if you are certain there is no danger of frost.



1. Set the engage switch to "0".

✓ The heating system is switched off; the supplying of fuel is stopped; the combustion air fan continues running for a preset burn-out time.

2. Allow the heating system to burn out until the combustion air fan switches off.



3. Turn the heating system main switch off.

✓ No operating mode is displayed on the control unit of the HDG Control.

✓ The heating system has been de-energised.

6.4 Operating statuses

The heating system goes through the following states during operation:

Operating status	Description
Heating OFF	<ul style="list-style-type: none"> • The main switch is turned on. • The engage switch is at "0".
1st filling combustion chamber	<ul style="list-style-type: none"> • The current combustion chamber temperature is lower than the preset ignition temperature. • This operating status is maintained until the preset time for filling the combustion chamber has been reached, the fill level indicator signals or the combustion chamber temperature exceeds the ignition temperature.

Table 6/1 - Operating statuses

Operating status	Description
Ignition	<ul style="list-style-type: none"> The preset ignition temperature has not been exceeded. The ignition fan runs.
Add fan	<ul style="list-style-type: none"> The ignition fan runs and the flue fan or primary and secondary air fan will start after the preset delay. This operating status is maintained until the preset time for ignition has been reached or the combustion chamber temperature exceeds the ignition temperature.
Pre-ventilation	<ul style="list-style-type: none"> The ignition fan shuts off. The flue fan or primary and secondary air fan run.
Heating-up	<ul style="list-style-type: none"> The feed quantity is increased by increments. This operating status is maintained until the preset time for heating up or the preset temperature in the combustion chamber have been reached.
Automatic control	<ul style="list-style-type: none"> Only for "Combustion control" or "Combustion and output control" mode. The heating system runs automatically according to the configured control mode.
Autom. not controlled	<ul style="list-style-type: none"> Operation of the heating system in "Fixed value" mode.
Burn out	<ul style="list-style-type: none"> The preset boiler temperature has been reached. The boiler has been switched off. This operating status is maintained until the preset burn-out time has elapsed.
Temperature reached	<ul style="list-style-type: none"> The current boiler temperature is higher than the preset boiler temperature. No demand on accumulator. The boiler temperature is higher than the set temperature on the regulating thermostat and the burn-out phase is complete.
Timer off	<ul style="list-style-type: none"> Operating status outside of the set enable time. The heating system is not in operation.
Emergency operation active	<ul style="list-style-type: none"> A sensor in the heating system is faulty. The boiler operates in accordance with the parameter values from the submenu "Fixed value settings".
Not enabled	<ul style="list-style-type: none"> The heating system is controlled via an external heating circuit regulator. There was no enable command from the higher-level heating circuit regulator.
Lambda stop	<ul style="list-style-type: none"> The residual oxygen value for combustion has fallen below the minimum. The heating system waits until the minimum residual oxygen value has been reached again.

Table 6/1 - Operating statuses (continuation)

Operating status	Description
Material stop	<ul style="list-style-type: none"> • The level indicator in the combustion chamber has signalled. • There is too much material in the combustion chamber. • The heating system waits until the level indicator enables filling again.
Combustion chamber temperature stop	<ul style="list-style-type: none"> • The maximum permitted temperature in the combustion chamber has been exceeded. • The heating system waits until the combustion chamber falls back below the maximum permitted temperature.
Maintenance On	<ul style="list-style-type: none"> • The maintenance function is activated. • The burn-out time has elapsed. • The flue gas fan is running.

Table 6/1 - Operating statuses (continuation)



When restarting after a power outage, the heating system resumes the operating mode last used if no safety-relevant functions have been triggered.

6.5 Calling up information, selecting and modifying parameters

On the display of the control panel for the HDG Control, you can call up various information as well as select and modify parameters.

Due to the freely programmable design and the numerous options in heating system combinations, especially in regard to the extraction technology, the number of parameters can vary greatly.

STANDARD DISPLAY

The standard display shows you various information, such as operating status of the heating system, hours of operation, boiler temperature and the time.

Heating OFF				0.0 hrs	
Boiler temperature			: 40 °C	15:55	
ON	°C	TIME	MAN.	SERVICE	INFO
OFF	QTY				

PROGRAM VERSION /
LANGUAGE SELECTION



1. Press the *Information* key.
- ✓ The programme version will appear in the display.

Programme info	
Basic programme: Programme file: M300_TV	
Programme date: 16/04/2012 Programme update:	
	Language



2. Press the *F6* key to select the menu language
- ✓ The display switches to the submenu **Language selection**.

Language selection		1-13	
Language : 1 - German			
		FIELD	CHOOSE
			END



3. Press the *F3* key under the **FIELD** command.



4. Press the *F4* key under the **CHOOSE** command and select the desired menu language.



By pressing the *F6* key under the **END** command, you can exit the **Language selection** menu window without changing the setting.



5. Confirm the desired menu language with the *Enter* key.
- ✓ The desired menu language is set.



The following pages show all practically available menu windows. In actuality, only those menu windows are available to the operator which are relevant for the heating system version.



Danger!

Material damage and injury due to incorrect settings!

Changing the following parameters requires comprehensive technical expertise. If the parameters are changed by untrained individuals, the heating system can be damaged and dangerous operating conditions can arise.

Have changes to the following parameters made only by authorised specialists.

6.6 ON/OFF menu

PROCEDURE



1. Press the *F1* key under the standard display screen.
✓ You are in the **ON/OFF** menu.
2. Scroll with the *F1* or *F2* key to the previous or next submenu.
3. Use the *F3* key under the **FIELD** command in the respective submenu to select the desired parameter.
4. Press the *F4* key under the **CHOOSE** command and select the desired setting.
5. Confirm each change with the *Enter* key.
✓ The desired parameter is set.
6. Press the *F6* key under the **END** command to exit the submenu.
✓ The standard display is restored.

SETTING THE BASE LOAD / PEAK LOAD BOILER



This is an optional submenu and only available with double heating systems.

An additional peak load boiler can be integrated using a third accumulator temperature sensor. With a double heating system, both boilers store energy in the accumulator. If the base load boiler cannot charge the accumulator by itself, the peak load boiler switches on for support.

This menu allows you to configure which heating system will be the base load boiler and the which will be the peak load boiler in a double heating system. A changeover is required once a certain number of operating hours is reached so that both boilers will be in operation approximately the same number of hours over several years.

See "Procedure" in this section.

Changeover base load / peak load		1-09	
Base load	Peak load		
Boiler-1	Boiler-2		
After operating hours		:	0 / 0 h
		FIELD	CHOOSE
			END

ACTIVATING BOILER-2

Boiler activation must be set to "External" on Boiler 2 with parameter 1-05 . Boiler 2 is activated by a relay (K21) of Boiler 1. A normally-open contact of K21 is wired to the outgoing terminals 68/

FUNCTION OF THE RETURN PUMP

69/70 on terminal strip X2. Boiler 2 likewise has terminals 68/69/70 on terminal strip X2, which are internally wired to the PLC input "External demand". In order to ensure this function works properly, it is necessary to lay a connecting line (recommended: flexible control cable of the type YSLY-JZ 3 x 1.0 mm²) between the two control cabinets.



The return pump always runs if there is demand on the boilers and the combustion chamber temperature exceeds 200 °C. This means that Boiler 1 must receive demand signals from the accumulator sensor and Boiler 2 must receive the external demand signal from Boiler 1.

SETTING OPERATING TIMES

In this menu you can view and set the operating times of the heating system. There are two switch-on and switch-off cycles available per weekday.

BOILER OPERATING TIMES

 See "Procedure" in this section.

Show switch on/off time			1-01		
On: 00:00	On: 00:00	Time:15:55			
Off: 24:00	Off: 00:00				
Day : Monday					
			EDIT		END



1. In the **Show switch on/off time 1-01** submenu, press the **F4** key under the **EDIT** command in the display.

✓ The display switches to the **Enter switch on/off time 1-11** submenu.

Enter switch on/off time			1-11		
On: 00:00	On: 00:00	Time:15:55			
Off: 24:00	Off: 00:00				
Day : Monday					
			CHOOSE		END

✓ The day of the week and the first switch-on time are shown in black.



2. Press the **F4** key under the **CHOOSE** command in the display to select the day of the week that is to be reset.



If you want the heating system to be ready for operation 24 hours a day, the first switch-on time must be set to **ON: 00:00** and the first switch-off time to **OFF: 24:00!**



3. Set the times using the numerical keypad.



4. Confirm each change with the *Enter* key.

✓ The cursor moves to the next digit pair.



5. Press the *F4* key again under the **CHOOSE** command in the display to select the next day of the week that is to be reset.



6. Press the *F6* key under the **END** command to exit the **Enter switch on/off time 1-11** submenu.

✓ The operating times of the heating system are set.

✓ The display switches to **Show switch on/off time 1-01**.



7. Press the *F6* key under the **END** command to exit the **Show switch on/off time 1-01** submenu.

✓ The standard display is restored.

SETTING THE CONTROL, BOILER ACTIVATION AND LAMBDA STOP

SETTING THE CONTROL MODES

The heating system can be operated in different control modes. These are:

- **Fixed value**

In this version, the combustion is not optimised and there is no output regulation. The combustion air supply and fuel quantity is fixedly set and remains unchanged.

- **Combustion control**

This version optimises the combustion. The primary and secondary air supplies and the fuel quantity are adapted automatically within a specified range of combustion. There is no output regulation. (Standard setting for use of accumulator).

- **Control of combustion and output**

In addition to combustion control, this version also adapts the output of the heating system to the demand.

- **Control via DDC**

This version is set if an overriding control controls the boiler (0 - 10 V).

See "Procedure" in this section.

Setting	1-02
Control	: Combustion control
Activate boiler	: Accumulator sensor
Lambda stop	: On
FIELD	CHOOSE
	END



The standard setting for systems with accumulators is **Combustion control**.

SELECTING AND SETTING BOILER ACTIVATION

In boiler activation mode, there are various ways of switching the heating system on and off.

- **Accumulator temperature sensor**

In this version, the heating system is switched on and off through two accumulator temperature sensors. After falling below the preset temperature at the “Acc. top” sensor, the boiler is started. After exceeding the preset temperature at the “Acc. bottom” sensor, the boiler is switched off.

 See section “6.7 °C/QUANTITY menu” in this chapter.

- **Accumulator and external**

In this version, the heating system is switched on and off if the accumulator temperature sensor has enabled this and there is a simultaneous external demand.

- **Accumulator or external**

In this version, the heating system is switched on and off if the accumulator temperature sensor has enabled this or there is a simultaneous external demand.

- **On**

In this version, the heating system is switched on and off through the boiler supply temperature sensor. The accumulator temperature sensors are ignored.

- **Thermostat**

In this version, the heating system is switched off through the boiler supply temperature sensor and switched on through the accumulator thermostat.

- **External**

In this version, the heating system is switched on and off through an external controller. Observe the terminal connection points on the wiring diagram in the control cabinet.

 See “Procedure” in this section.



ACTIVATING OR DEACTIVATING AUTOMATIC IGNITION

The standard setting for systems with accumulators is **Acc. temp. sensor**.

The automatic ignition function can be switched off, thus activating the function for sustaining the embers.

 See “Procedure” in this section.




The standard setting is **On**.

Sustaining the embers is only performed in emergency operation!

ACTIVATING THE FUNCTION “LAMBDA STOP”

If the specified minimum residual oxygen value is not met, the fuel feeding is interrupted until the residual oxygen values are again within the acceptable range.

 See “Procedure” in this section.

 For the setting of the minimum lambda value, see section “6.7 °C/ QUANTITY menu”, paragraph “Entering the residual oxygen setting”.

MODIFYING FAN SETTINGS

This submenu is used to change the settings for the flue gas fan or the primary and secondary air fans. Setting options:



- **Controlled**

On this setting the flue gas fan works at a set speed according to the existing vacuum pressure conditions.

- **Not controlled**

On this setting the flue gas fan works at a constant preset value.

 See “Procedure” in this section.

Setting					1-03
Flue gas fan					: controlled
Primary air fan					: controlled
Secondary air fan					: controlled
		FIELD			END





The standard setting is **controlled**.

ADJUSTING THE ASH REMOVAL SETTING

The movement of the stepped grate and the ash removal system can be switched off.

 See “Procedure” in this section.

Setting					1-04
De-ashing					: Automatic
			CHOOSE		END





The standard setting is **Automatic**.

CHANGING THE CLEANING SYSTEM SETTING

The automatic heat exchanger cleaning system can be switched off.

 See "Procedure" in this section.

Setting				1-05	
Cleaning system : On					
			CHOOSE		END




The standard setting is **On**.

MODIFYING THE EXTRACTION SETTING

The heating system can, for example, include a separate delivery system for a shaving silo. In addition, the flexi-blade delivery system can be employed for extraction in combination with an additional conveyor auger. Extraction can be controlled in various ways.

- **Cycles**



In this version, the extraction runs in a cycle with configurable pause intervals and runtimes.

 For setting options, see the section "6.8 TIME menu" in this chapter.

- **Continuous running**

In this version, the extraction runs continuously upon demand.

 See "Procedure" in this section.

Setting				1-06	
Delivery system : Continuous running					
			CHOOSE		END



The standard setting is **Continuous**.

MODIFYING THE WALKING FLOOR SETTING

A walking floor delivery system can be an optional component of a heating system. The individual scraper blades of the walking floor can be separately controlled.

- **Off**

In this version, all scraper blades are switched off.

- **Auto scraper 1**

In this version, only scraper 1 of the walking floor is controlled.

- **Auto scraper 2**

In this version, only scraper 2 of the walking floor is controlled.



- **Auto scraper 1 + 2**

In this version, both scraper blades of the walking floor are alternately controlled.

- **MANUAL**

In this version, the walking floor scrapers can be controlled by hand. The manual control function in the **Manual** menu is enabled.

 See "Procedure" in this section.

Setting					1-07
Walking floor					: MANUAL
		FIELD			END





6.7 °C/QUANTITY menu

In this menu, you can view and set temperatures, combustion air quantity, fuel type/quantity and control parameters. All target values can be modified. The actual values displayed indicate the current status.

PROCEDURE



1. Press the *F2* key under the standard display screen.
 ✓ You are in the °C/**Quantity** menu.
2. Scroll with the *F1* or *F2* key to the previous or next submenu.
 ✓ The first resettable parameter is shown in black.
3. Enter the desired value using the numerical keypad.

- 
 4. Confirm each change with the *Enter* key.
 - ✓ The desired parameter is set.
- 

 5. Scroll with the *Up* or *Down* key to the next parameter.
 - ✓ The next resettable parameter is shown in black.
- 
 7. Press the *F6* key under the **END** command to exit the submenu.
 - ✓ The standard display is restored.

DEFINING THE SWITCH ON/OFF TIMES FOR THE BOILER

This submenu is used to define the switch on/off times of the boiler based on the temperature sensor of the accumulator. The switching on and off of the boiler can be changed by adapting the temperature.

- **Temp. acc. top below**


If this temperature set for the top accumulator sensor is not met, the boiler switches back on.

- **Temp. acc. bottom above**



If the temperature set for the bottom accumulator sensor is exceeded, the boiler switches off.



Temperature adjustment using the accumulator sensors is only available if the boiler activation is set to "Accumulator temperature sensor".

 See section "6.6 ON/OFF menu", under "Selecting and setting boiler activation".

 See "Procedure" in this section.

Boiler on/off		2-11
On: acc. top below	:	70 / 70°C
acc. temp. middle	:	60°C
Off: acc. bottom above	:	70 / 57°C
		END



The standard setting for the boiler switch-on temperature for **acc. top below** is 70 °C.



The standard setting for the boiler switch-off temperature for **acc. bottom above** is 70 °C.

INTEGRATING THE PEAK LOAD BOILER



This is an optional submenu and only available with double heating systems (if necessary, also with oil/gas boilers).

An additional peak load boiler can be integrated using a third accumulator temperature sensor. The switch-on and switch-off temperatures of the accumulator for the peak load boiler are set here.

- **Temp. acc. top below**

If this temperature set for the upper accumulator sensor is not met, the peak load boiler switches on.

- **Temp. acc. middle above**

If this temperature set for the middle accumulator sensor is exceeded, the peak load boiler switches off.

See "Procedure" in this section.

Peak load boiler					2-12
On: Temp. acc. top below					55 / 70°C
Off: Temp. acc. middle above					65 / 60°C
					END

SETTING THE BOILER AND RETURN TEMPERATURE

This submenu is used to set the boiler and return temperature. The furnace temperature in the combustion unit is also set. This switches the intermediate pump between the combustion unit and heat exchanger.

See "Procedure" in this section.

°C / Quantity					2-01
Boiler temperature max.					: 85 / 79 °C
Target boiler temperature					: 75 °C
Return temperature					: 65 / 64 °C
Combustion unit					: 80 / 64 °C
					END





The **Boiler temperature** must not fall below 70°C and must not exceed 85°C. The **Return temperature** target value must not fall below 60°C.

VIEWING COMBUSTION CHAMBER TEMPERATURE, RESIDUAL OXYGEN AND VACUUM PRESSURE IN THE COMBUSTION CHAMBER

Combustion chamber temperature, residual oxygen and vacuum pressure in the combustion chamber appear in this submenu

 See "Procedure" in this section.

°C / Quantity		2-02
Comb. chamber temp.	:650 /411 °C	
Residual oxygen	: 7.0/8.7 %	
Vacuum pressure comb.chamb.	: -15/ -30* Pa	
		END





Combustion.chamber temp., residual oxygen and vacuum pressure comb. chamber cannot be changed!

SETTING COMBUSTION CHAMBER TEMPERATURE 2 AND VIEWING FLUE GAS TEMPERATURE

In this submenu you can set the combustion chamber temperature 2 in the heat exchanger or view the flue gas temperature.

 See "Procedure" in this section.



°C / Quantity		2-03
Comb. chamber temp 2	:1100 / 650 °C	
Flue gas temperature	: 70 °C	
		END

SELECTING A FUEL TYPE

In this submenu you can choose from four different heating material settings. The varying quality of the heating material can also be taken into account. All parameters can be newly defined and reset for each type of material.

The current return temperature can also be read here.

 See "Procedure" in this section.

Material Type					2-05
Fuel 1 : (Fuel 1)					
					END





The standard setting for start-up is usually **Fuel: 1**.

Independent modification of settings for adapting to the fuel should be made under another fuel type so as not to change the startup settings. For example, save the start-up setting under **Fuel: 2** and only then modify this setting.

FIXED VALUE - SETTING THE FUEL AND AIR QUANTITY


This submenu is used to set the "fixed value" control options.

 See "Procedure" in this section.

Settings fixed value					2-06
Fuel	: 60.0 / 55.0 %				
Primary air fan	: 30 / 30 %				
Secondary air fan	: 30 / 15 %				
Comb. chamb. temp.	: 600 / 411 °C				
					END





In this menu, the settings of the fuel and air quantities are fixed value presets for "Fixed value" operation only.

 See section "6.6 ON/OFF menu", under "Setting the control, boiler activation and Lambda Stop".

SETTING THE RETURN PUMP



 See "Procedure" in this section.

PID return pump regulated				2-09	
Boiler_set	:75°C	MAX: 100%	KP: 8.0		
Boiler_actual	:74°C	MIN: 30%	TN: 5.0		
			TV: 0.0		
			ACT: 100%		
					END

SETTING THE RETURN MIXER


In this menu the settings for a controlled return mixer can be made (0 - 10 V).

 See "Procedure" in this section.

PID return mixer				2-10	
T_SET	: 65°C			KP: 5.0	
T_ACTUAL	: 64°C			TN: 5.0	
			TV: 0.0		
Position	100%				
					END

OTHER PARAMETERS

Parameter group 6 can also be found in the **Service** menu

 See section "6.10 SERVICE menu", paragraph "Setting output control" and the following paragraphs in this chapter.






6.8 TIME menu

In this menu you can view and set all time parameters relating to ignition, de-ashing, cleaning and delivery systems. All target values can be modified. The actual values displayed indicate the current status.

PROCEDURE







1. Press the *F3* key under the standard display screen.
 ✓ You are in the **Time** menu.
2. Scroll with the *F1* or *F2* key to the previous or next submenu.
 ✓ The first resettable parameter is shown in black.

- 
 3. Enter the desired value using the numerical keypad.
- 
 4. Confirm each change with the *Enter* key.
 - ✓ The desired parameter is set.
- 

 5. Scroll with the *Up* or *Down* key to the next parameter.
 - ✓ The next resettable parameter is shown in black.
- 6. Repeat steps 3 to 5 for additional parameters.
- 
 7. Press the *F6* key under the **END** command to exit the submenu.
 - ✓ The standard display is restored.

SETTING THE FILLING, IGNITION AND FAN ACTIVATION

This submenu is used to set the time for the initial filling with fuel and the running time of the ignition fan. You can also set the time after which the combustion fan is added during the igniting phase.

 See "Procedure" in this section.

Time						3-01
1st filling	:	10.0	/	0.0	m	
Ignition	:	7.0	/	0.0	m	
Start combustion air fan	:	1.0	/	0.0	m	
						END



When changing the fuel, the parameters **1st filling** and **Ignition** must be regulated to avoid malfunctions during ignition.

SETTING PRE-AIR, HEATING UP AND BURNING OUT

This submenu enables you to set the pre-ventilation time for fanning the fuel without material feeding, the heating up time during which the fuel quantity is heated to the target value, and the burn-out time during which material feeding is stopped and the combustion fan switches off after a specified time.



 See "Procedure" in this section.

Time						3-02
Pre-ventilation	:	30	/	0	s	
Heating up	:	10.0	/	0.0	m	
Burning out	:	60.0	/	0.0	m	
						END

SETTING THE GRATE TIMES

This submenu is used to set the time for the grate motion and thus the de-ashing interval.

 See "Procedure" in this section.

Time						3-03
Grate runtime cycles	:	1 / 0	i			
Cleaning system pause time	:	3.0/ 0.0	m			
Grate runtime cycles long	:	2 / 0	i			
Grate pause time long	:	9.0/ 0.0	m			
						END





When changing the heating material, the burn-out behaviour must be checked on the grate of the boiler. If necessary, adjust the **Grate pause time** parameter. In general, only this parameter should be changed, and the **Grate runtime cycles** parameter should only be changed, where necessary, in exceptional cases.

SETTING GRATE ASH REMOVAL AUGERS AND ASCENDING AUGER TIMES

This submenu is used for setting grate ash removal augers and the ascending auger for the central ash removal.

 See "Procedure" in this section.

Time						3-04
Ash auger. Grate runtime	:	30/0				
sAsh auger. Grate pause time	:	13.0/0.0	m			
Ascending auger lag time	:	30/0	s			
						END

SETTING TIMES FOR THE HEAT EXCHANGER ASH REMOVAL AUGERS AND THE CLEANING SYSTEM

This submenu is used for setting times for the heat exchanger ash removal augers and the time for the movements of the cleaning system.

See "Procedure" in this section.

Time						3-05
Ash auger. exch Runtime	:	60	/	0	s	
Ash auger. exch Pause time	:	60.0	/	0.0	m	
Cleaning system pause time	:	12.0	/	0.0	h	
Cleaning system runtime	:	140	/	0	s	
						END



When changing the heating material, the burn-out behaviour of the boiler must be checked in the area of the heat exchanger surfaces. If necessary, adjust the **Cleaning pause time** parameter. In general, only this parameter should be changed and the **Cleaning system runtime** parameter only changed in exceptional instances.

SETTING MAIN CLEANING

In this submenu you can set up to two times for the main cleaning. Cleaning and ash removal are activated at the preset time.

See "Procedure" in this section.

Cleaning						3-06
On: 00:00	On: 00:00	Time 11:50				
						END

STOKER AUGER DELAY

This submenu is used to set the lag time for the stoker auger. The stoker auger starts later than the rotary wheel by the amount of the preset time.

See "Procedure" in this section.

Time						3-11
Filling delay Stoker auger	:	3	/	0	s	
						END

SETTING PAUSE INTERVALS AND RUNNING TIME FOR DELIVERY

In this submenu you can set the pause intervals and running time for delivery.



This is an optional submenu and only available with feeding system TBZ 150.

See "Procedure" in this section.

Time	3-13
Delivery system runtime	: 2.0 / 0.0 s
Delivery system pause time	: 4.0 / 0.0 s
END	

SETTING THE AGITATOR

In this submenu you can enter the settings for the lag time of the agitator in connection with a walking floor delivery system.



This is an optional submenu and only available with walking floor delivery systems and double heating systems.

See "Procedure" in this section.

Agitator	3-14
Agitator lag time	: 2.0 / 0.0 s
END	

SETTING THE WALKING FLOOR DELIVERY SYSTEM

In this submenu you can enter settings for a walking floor delivery system.



This parameter is an optional submenu and only available with walking floor delivery systems.

See "Procedure" in this section.

Walking floor					3-15
Walking floor runtime	:	10.0	/	0.0 s	
Walking floor pause time	:	10.0	/	0.0 s	
Walking floor delay time	:	10.0	/	0.0 s	
Walking floor lead time	:	0.0	/	0.0 s	
					END

SETTING THE DAY, DATE AND TIME

In this submenu you can enter the current day, date and time.

1. Open the **TIME** menu.

See "Procedure" in this section.



2. Press the *F2* key under the display and scroll to the **Time** 3-20 submenu.

					3-20
Day / Date / Time					
Set :	04	/	2012-03-29	/	23:10
Act.:	04	/	2012-03-29	/	23:10
				Clock OK	END

✓ The **Day** parameter is shown in black.



3. Change the setting with the numerical keypad.



The day setting can be set to any day of the week; for Monday the setting is **Day 01**.



4. Press the *Enter* button.

✓ The input is saved; the next parameter **Date** is shown in black.

5. Set the additional parameters as required in the same manner.



6. Press the *F5* key under the command **Clock OK** to confirm the entered values.

✓ The entered settings are saved and shown in the **Act** line.



7. Press the *F6* key under the **END** command to exit the **Time** 3-20 submenu.

✓ The standard display is restored.

6.9 MANUAL menu

This menu can be used to functionally test all actuators such as drive motors, fans and electrical mounted parts.

PROCEDURE



1. Press the *F4* key under the display of the standard display screen.
✓ You are in the **MANUAL** menu.
2. Scroll with the *F1* or *F2* key to the previous or next submenu.
3. Use the *F3* key under the **FIELD** command in the respective submenu to select the desired parameter.
4. Press the *F4* or *F5* key to test the actuators in manual operation.
5. Press the *F6* key under the **END** command to exit the submenu.
✓ The standard display is restored.

COMBUSTION AIR AND IGNITION FAN

The fans can be activated manually in this submenu.

See "Procedure" in this section.

Manual mode					4-01
Flue gas fan					
Primary air fan					
Secondary air fan					
Ignition fan					
		FIELD	On	Off	END

PRIMARY AND SECONDARY AIR FLAPS

This submenu is used to manually activate the primary and secondary air flaps.

See "Procedure" in this section.

Manual mode					4-02
Primary_1		: 100 %	Secondary_1		: 100 %
Primary_2		: 100 %	Secondary_2		: 100 %
					END

CENTRAL ASH REMOVAL, GRATE ASH REMOVAL AUGER AND GRATE DRIVE


This submenu is used to manually activate the central ash removal, the grate ash removal augers and grate drive.



 See "Procedure" in this section.

Manual mode					4 - 03	
Cent.ash remov. Ash auger. Grate Grate drive						
		FIELD	On	Off	END	

HEAT EXCHANGER ASH REMOVAL AUGER AND CLEANING SYSTEM

This submenu is used to manually activate the heat exchanger ash removal auger and cleaning system.



 See "Procedure" in this section.

Manual mode					4 - 04	
Ash auger. heat exchanger Cleaning system						
		FIELD	On	Off	END	

RETURN PUMP, RETURN MIXER AND INTERMEDIATE PUMP

This submenu is used to manually activate the return pump and return mixing valve.

 See "Procedure" in this section.

Manual mode					4 - 05	
Return pump Return mix.v. OPENED Return mix.v. CLOSED Intermediate pump						
		FIELD	On	Off	END	

FEED SYSTEM, ROTARY WHEEL AND MATERIAL CONVEYING AUGER



The following actuators are only available when using the HDG feeding system TBZ 200.

This submenu is used to manually activate the feed system, the rotary wheel and the material conveying auger from the fuel storage.

See "Procedure" in this section.

Manual mode					4-06
Stoker auger Rotary feeder Delivery system					
		FIELD	FOR- WARD	BACK	END



Danger!

Material damage and injury due to incorrect operation.

Activation of the **BACK** parameter is only possible with the rotary wheel and may only be used for short intervals of no more than 3 seconds.

FEED SYSTEM, AUGER TROUGH 2 AND DOSAGE



The following actuators are only available when using the HDG feeding system TBZ 150.

This submenu is used to manually activate the feed system, auger trough 2 and dosage.

See "Procedure" in this section.

Manual mode					4-07
Feeding system Trough auger 2 Dosage					
		FIELD	FOR- WARD	BACK	END



Danger!

Material damage and injury due to incorrect operation.

Activation of the **BACK** parameter is only possible during feeding and may only be used for short intervals of no more than 3 seconds.

MATERIAL CONVEYING AUGER AND AGITATOR



The following actuators are only available when using a distributing container

This submenu is used to manually activate the material conveying auger and agitator.

See "Procedure" in this section.

Manual mode					4-08	
Mat. convey. auger Agitator						
		FIELD	FOR- WARD	BACK	END	



Danger!

Material damage and injury due to incorrect operation.

Activation of the **BACK** parameter is only possible with the agitator and may only be used for short intervals of no more than 3 seconds.

MOVING FLOOR - TRANSVERSE AUGER



The following actuators are only available when using the HDG walking floor feeding system.

In this submenu the transverse auger can be activated manually.

See "Procedure" in this section.

Manual mode					4-08	
Transverse auger						
		FIELD	On		END	

MOVING FLOOR - HYDRAULIC SYSTEM



The following actuators are only available when using the HDG walking floor feeding system.

In this submenu the drive of the walking floor can be activated manually.

See "Procedure" in this section.

Manual mode					4-09
Hydraulic walking floor					
Cylinder1 walking floor					
Cylinder2 walking floor					
		FIELD	On		END

6.10 SERVICE menu

PROCEDURE

**Important!**

Modifying the settings in this menu is only permitted in consultation with authorised specialists of HDG Bavaria GmbH!



1. Press the *F5* key under the display of the standard display screen.

✓ You are in the **SERVICE** menu.

✓ The display switches to the **Service 5-01** submenu in which the signal states of the digital inputs and outputs are shown.

Service					5-01
Digital inputs	0-15		00000000	00000000	
Digital outputs	0-15		00000001	00000000	
		Maintenance		Control	END



2. Press the *F2* key and scroll to the next submenu **Service 5-02**.

Service					5-02
Analogue inputs channel0	0	1	0		
	2	0	3	128	
		*	*	*	END

✓ The display switches to the submenu in which the analogue input channels are shown.



3. Simultaneously press the keys *F3*, *F4* and *F5* under the display.

✓ You are now in submenu **Service 5-03**.



4. Scroll with the *F1* or *F2* key to the previous or next submenu.

✓ The first resettable parameter is shown in black.



5. Enter the desired value using the numerical keypad.



6. Confirm each change with the *Enter* key.

✓ The desired parameter is set.



7. Scroll with the *Up* or *Down* key to the next parameter.

✓ The next resettable parameter is shown in black.

8. Repeat steps 5 to 7 for additional parameters.



9. Press the *F6* key under the **END** command to exit the submenu.

✓ The standard display is restored.

CHIMNEY SWEEP TEST



When operating the heating system without an accumulator, the chimney sweep test can also be carried out in partial load operation with 30% of the nominal thermal power.

- **30%**

Starts the partial load measurement

- **100%**

Starts the nominal load measurement



1. Press the *F5* key under the display of the standard display screen.

✓ You are in the **SERVICE** menu.

✓ The display changes to the **Service 5-01** submenu.



2. Press the *F4* key under the "Chimney sweep test" symbol.

✓ The display changes to the **Chimney sweep test5-12** submenu.

Chimney sweep mode					5-12
Enable boiler temperature : 75 / 0 °C					
Enable combustion chamber temperature : 550 / 0 °C					
boiler temp. Set 30/100% : 85 / 85 °C					
Combustion chamber temp. Set 30/100% : 500 / 600 °C					
		30%	100%		END



- Press the *F3* or *F4* key to start the chimney sweep test.
 ✓ The chimney sweep test is carried out.

OPERATING HOURS COUNTER

Various operating hours are displayed. Pressing the *RESET* key for more than 3 seconds resets all operating hours.

- Open the **Service 5-02** submenu.

See "Procedure" in this section.



- Using the *F1* key, select **service hour counter 11-01** in the submenu.

Counter operating hours					11-01
Boiler	:				0:00:00
Dosage	:				0:00:00
Feeding	:				0:00:00
Ash removal	:				0:00:00
					RESET END

SERVICE MESSAGES 1 - SETTING REMINDER TIME

This submenu can be used to set various times at which service messages should appear.

- Cleaning WA grate**

When the preset operating hours are exceeded, the warning "Please clean the primary air space of the stepped grate" appears. The heating system does not shut off at the appearance of this warning. The "0" setting deactivates this function.

- **Cleaning ST grate**

When the preset operating hours are exceeded, the fault message "Please clean the primary air space of the stepped grate" appears. The heating system shuts off at this fault. The "0" setting deactivates this function.

- **WA Lubricate stoker auger**



When the preset runtime of the stoker auger is exceeded, the warning "Please lubricate the screw stoker bearing" appears. The heating system does not shut off at the appearance of this warning. The "0" setting deactivates this function.

1. Open the **Service 5-02** submenu.

 See "Procedure" in this section.



2. Using the **F1** key select **service messages 11-03** in the submenu.

Service messages			11-03	
Clean WA grate	:	400.0/	0.0 h	
Clean ST grate	:	450.0/	0.0 h	
WA Lubricate sto.auger:		150.0/	0 h	
				RESET END



3. Press the **F5** key under the **RESET** command to reset the times.

SERVICE MESSAGES 2 - SETTING REMINDER TIME

- **WA Empty ash box**

When the preset runtime of the ash removal auger is exceeded, the warning "Please empty ash box" appears. The heating system does not shut off at the appearance of this warning. The "0" setting deactivates this function.

- **ST Full ash box**

When the preset runtime of the ash removal auger is exceeded, the fault message "Ash box full" appears. The heating system shuts off at this fault. The "0" setting deactivates this function.

- **Emptying WA fly ash container**



When the preset runtime of the ash removal auger is exceeded, the warning "Please empty fly ash container" appears. The heating system does not shut off at the appearance of this warning. The "0" setting deactivates this function.

1. Open the **Service 5-02** submenu.

 See "Procedure" in this section.



2. Using the **F1** key select **service messages 11-04** in the submenu.

Service messages		11-04	
ST Empty ash box:	0.0/ 0.0 m		
ST Empty ash box:	0.0/ 0.0 m		
Empty WA fly ash container			
:	0.0/ 0.0 m		
			RESET END



3. Press the **F5** key under the **RESET** command to reset the times.

SERVICE MESSAGES 3 - SETTING REMINDER TIME

- **Filling WA_1 fuel storage room**

When the preset runtime of the ash removal auger is exceeded, the warning "**Please fill fuel storage room soon**" appears. The heating system does not shut off at the appearance of this warning. The "0" setting deactivates this function.

- **Filling WA_2 fuel storage room**

When the preset runtime of the ash removal auger is exceeded, the warning "**Fill fuel storage room**" appears. The heating system does not shut off at the appearance of this warning. The "0" setting deactivates this function.

- **Perform WA_1 Service**

When the preset runtime of the ash removal auger is exceeded, the warning "**Perform service soon**" appears. The heating system does not shut off at the appearance of this warning. The "0" setting deactivates this function.

- **Perform WA_2 Service**

When the set runtime of the ash removal auger is exceeded, the warning "**Perform service**" appears. The heating system does not shut off at the appearance of this warning. The "0" setting deactivates this function.

1. Open the **Service 5-02** submenu.

 See "Procedure" in this section.



2. Using the *F1* key select **service messages 11-05** in the submenu.

Service messages		11-05	
Fill WA_1 fuel storage room:	0.0/	0.0 m	
Fill WA_2 fuel storage room:	0.0/	0.0 m	
Perform WA_1 Service :	0.0/	0.0 m	
Perform WA_2 Service :	0.0/	0.0 m	
			RESET END



3. Press the *F5* key under the **RESET** command to reset the times.

SETTING THE BOILER OVERHEATING TEMPERATURE OR HYSTERESIS, MINIMUM RETURN TEMPERATURE AND COMBUSTION CHAMBER STOP TEMPERATURE

- **Boiler overheat temperature**

When the set boiler temperature is exceeded by this set value, the boiler shuts off.

- **Boiler temperature hysteresis**

The boiler temperature hysteresis is used to set a temperature difference between the temperature at which the heating system is switched on and the temperature at which it is switched off (only for “Boiler activation on”).

- **Minimum return temperature**

Set the minimum return temperature. This sets the lower threshold for the return temperature in parameter 2-02.

- **Combustion chamber temperature stop**

After the set temperature is exceeded, the heating system switches to the operating state **Comb.chamber temp. stop**.

See “Procedure” in this section.

Service		5-03	
Boiler temp. Overheating :		5 °C	
Boiler temp. hysteresis :		2 °C	
Return temperature minimum:		60 °C	
Comb.chamb. temp. stop :		750 °C	
			END

SETTING REVERSE FEEDING AND IGNITION TEMPERATURE

- **Delay reverse movement**

This submenu is used to change the delay in the reversal of the feeding system. The feeding system reverses for overcurrent if the rotary feeder becomes blocked. The change of rotational direction is then delayed by this amount of time.

- **Reverse moving runtime**

The running time of the backward running of the feeding system can also be corrected. This value is limited to a maximum of three seconds.



- **Reverse moving attempts**

Setting the maximum number of reverse moving attempts.

- **Ignition temperature**

If the temperature in the hot combustion chamber exceeds this value, the HDG Control does not switch on the ignition fan for starting the heating system.

 See "Procedure" in this section.

Service		5-04
Reversing delay	:	00.7 s
Reverse moving runtime	:	01.0 s
Reverse moving attempts	:	3 x
Ignition temperature	:	200 °C
		END

MODIFYING THE DOSAGE PAUSE MIN. OR IMPULSE MIN. AND FEEDING UNITS LAG TIME OR LEAD TIME PARAMETERS

- **Dosage pause min. and dosage impulse min.**


- These parameters are used to set the minimum pause intervals and running time of the extraction for the fuel metering.



- **Feeding unit lag time**

- This parameter determines the lag time of the rotary feeder and the stoker auger. The continued running empties the auger channel when the heating system is shut off.

- **Feeding unit lead time**

- After a prior Lambda stop, combustion chamber temperature stop or material stop, the rotary wheel starts earlier than the delivery system by the period of the preset value.

 See "Procedure" in this section.

Service					5-05
Dosage pause_min.	:	3.0 /	3.0 s		
Dosage pause_min.	:	3.0 /	4.5 s		
Feeding unit lag time	:	2.0 /	s		
Feed system lead time	:	2.0 s			
					END

FUEL QUANTITY 1ST MODIFYING FILLING AND AIR START SETTING



- **Fuel quantity 1st filling**

Change the fuel quantity of the first filling in heating up mode.

- **Air start setting**

These parameters determine the air quantity of the primary air and secondary air for heating up mode.

 See "Procedure" in this section.



Service					5-06
Fuel quantity 1st filling :			25.0 %		
Primary air start :			15 %		
Secondary air start :			30 %		
					END

IGNITION FAN

You can set the phase and form in which the ignition fan is switched on to aid the start-up procedure. Three settings are available in each phase:

- Off: The ignition fan is not yet activated in this phase.
- Fan: Only the fan of the ignition fan is activated.
- Fan + heating: The ignition fan switches on completely (fan + heating).

 See "Procedure" in this section.

Ignition fan					5-08
1st filling	:		Off		
Pre-ventilation	:		Off		
Heating up	:		Off		
					END

SETTING VACUUM PRESSURE CONTROLLER

- **Negative pressure limit**

If this set value is not met, the boiler switches to “Burn out”.

- **Positive pressure limit**

If this set value is exceeded, the boiler is stopped as with an “Emergency stop”.



- **Delay pressure control for grate**

The response time of the pressure switch can be set.

- **Vacuum fan rotational speed uncontrolled**

The constant rotational speed for an uncontrolled flue gas fan can be set

 See “Procedure” in this section.

Vacuum pressure control settings		5-09
Negative pressure limit	: -350 / -400 pa	
Positive pressure limit	: 0 / -400 pa	
Delay press.control grate	: 5.0 / 0.0 m	
Vacuum fan speed uncontr.	: 60 %	
		END

CALIBRATING THE LAMBDA SENSOR



During the test procedure, do **not** close this submenu.

Duration: approx. 15 minutes!

The calibration of the lambda sensor can only be performed when the heating system is in a cooled state and should be performed once yearly.

The voltage of the lambda sensor must reach -7.0 mV within 15 minutes.

1. Open the **SERVICE** menu and scroll to the **Service 5-02** submenu.

 See “Procedure” in this section.



2. Simultaneously press the keys *F3*, *F4* and *F5* under the display.



3. Press the F2 key and scroll to the **Service 5-10** submenu.

Service				5-10	
Lambda sensor test : : -Off-					
Lambda setpoint 21.0% : 12.8 % : / .0 mV					
Test time 15 minutes : 00.0 m					
		Start	Stop		END

✓ The test mode **Off** message is shown in black.



4. Press the F3 key to start the lambda sensor test.

✓ The calibration of the lambda sensor begins; the message **-ON-** appears in the display. The minute counter starts running. The lambda sensor heater switches on, the main fan starts and the secondary air supply opens.

If the voltage of -7.0 mV is reached after 15 minutes, the lambda sensor test has been successfully completed.

✓ The testing of the lambda sensor is completed.



5. Press the F6 key under the **END** command to exit the **Service 5-07** submenu.

✓ The standard display is restored.

CHIMNEY SWEEP TEST

- **Enabling boiler temperature**

After this set boiler temperature is exceeded, the chimney sweep test is enabled.

- **Enabling combustion chamber temperature**

After this set combustion chamber temperature is exceeded, the chimney sweep test is enabled.



- **Boiler set temperature 30/100%**

The boiler set temperature for the chimney sweep test in partial load (30%) and nominal load (100%) can be set.

- **Combustion chamber set temperature 30/100%**

The combustion set temperature for the chimney sweep test in partial load (30%) and nominal load (100%) can be set.

See "Procedure" in this section.

Chimney sweep mode					5-12
Enable boiler temperature : 70 / 60 °C					
Enable comb. chamb. temp. : 550 / 328 °C					
Boiler temp. Set 30/100% : 85 / 85 °C					
Comb.chamb.set temp. 30/100% : 500 / 570 °C					
					END

PEAK LOAD BOILER MONITORING





This is an optional submenu and only available with double heating systems (if necessary, also with oil/gas boilers).

An additional peak load boiler can be integrated using a third accumulator temperature sensor.

The actual (ACT) temperature on the accumulator middle sensor must be below the SET temperature

If the set value for the temperature increase is not reached within the specified delay time, the peak load boiler is automatically activated.

 See "Procedure" in this section.

Peak load boiler					5-13
Control accumulator temperature top					
Temp. rise less than					5 / 70 °C
Delay time					30 / 0 m
					END

FLUE GAS TEMPERATURE

- **Cleaning system start**

When this set temperature is exceeded, the cleaning system starts up.

- **Max. flue gas temperature**


When this set temperature is exceeded, the fault message "Flue gas temperature too high" appears and the boiler switches off.



- **Delay error**

The fault message "Flue gas temperature too high" appears after this set delay time has elapsed.

• **Increase**

System-specific parameter, can only be set and modified by authorised HDG technicians.

 See "Procedure" in this section.

Flue gas temperature		5-14
Cleaning system start	:	220 / 50 °C
Maximum flue gas temp.	:	250 / 50 °C
Delay error	:	1.0 m
Increase	2	
		END



SETTING INTERFACE RS485

• **Interface RS485**

Setting options:

- without interface
- Modbus RTU web server
- Modbus RTU DDC
- Profibus DP DDC



 See "Procedure" in this section.

Interface parameters		5-17
Function RS485-1 :without interface		
		EDIT
		END

SETTING MODBUS RTU - WEB SERVER

The address of the controller can be set here (especially with multiple systems).

 See "Procedure" in this section.

Setting Modbus RTU - Webserver		10-02
Modbus address : Address = 1		
		FIELD
		END

SETTING MODBUS RTU - DDC

- **Modbus address**

Setting the PLC address for a Modbus network



- **Modbus baud rate**

Setting the transmission speed of the PLC for a Modbus network

- **Modbus rights**

Setting the minimum required rights or enabling only certain PLC parameters in a Modbus network

 See "Procedure" in this section.

Setting Modbus RTU - DDC					10-03
Modbus address : Address = 1					
Modbus baud rate : 9,600 Baud					
Modbus rights : 3-HDG					
		FIELD			END

SETTING PROFIBUS DP- DDC



- **Profibus address**

Setting the PLC address for a Profibus network

- **Profibus rights**

Setting the minimum required rights or enabling only certain PLC parameters in a Profibus network

 See "Procedure" in this section.

Setting Profibus DP - DDC					10-04
Profibus address : Address = 1					
Profibus rights : 3-HDG					
		FIELD			END

ENTERING PASSWORDS

For protection against undesired operation, a password can be defined. After 300 seconds inactivity, the controller logs out of the main screen. Reactivation is then only possible by entering the previously set password. The "0" setting deactivates this function.

 See "Procedure" in this section.

Service				5-18
Enter password (4-digit):				0
(Entering 0 = password deactivated!!!)				
				END

RESETTING PARAMETERS TO THE FACTORY DEFAULT

1. Open the **SERVICE** menu and scroll to the **Service 5-02** submenu.

See "Procedure" in this section.



2. Simultaneously press the keys *F3*, *F4* and *F5* under the display.

3. Press the *F2* button and scroll to the **Service 5-20** submenu.

Service				5-20
Factory setting	F4	+	F5	
Runtime (adopt with "conf")				.0 h
				END

✓ The **Operat.hours** parameter is shown in black and the hours of operation can be read.



Important!

All settings that were previously made will be irrevocably overwritten!



4. Press the *F4* and *F5* keys to adopt the factory settings.

✓ The factory settings are adopted.

5. Press the *F6* key under the **END** command to exit the **Service 5-20** submenu.

✓ The standard display is restored.

SETTING OUTPUT CONTROL

The criterion governing the output control can be set in this menu.

- **Acc. middle**

Output is controlled according to the accumulator sensor middle.

- **Acc. top**

Output is controlled according to the accumulator sensor top.

- **Boiler temperature**

Output is controlled according to the boiler temperature sensor.

- **Manual preset value**

Output is controlled according to the fuel quantity.

1. Open the **SERVICE** menu and scroll to the **Service 5-02** sub-menu.

 See "Procedure" in this section.



2. Press the **F5** key under the **Control** command.

✓ The display changes to the **Output control 6-01** submenu.

Output control				6-01	
T_SET: 75°C		MAX: 100%	KP: 50.0		
T_ACTUAL : 74°C		MIN: 30%	TN: 40.0		
Acc. middle		TV: 0.0	SET:100%		
		+C			END



1. In the **Output control 6-01** submenu, press the **F3** key under the **+C** command in the display.

✓ The display changes to the **Preset value output control 6-11** submenu.

Preset value output control				6-11	
Acc. middle		: 60 °C			
		FIELD	CHOOSE		END



2. In the **Preset value output control 6-11** submenu, press the **F3** key under the **FIELD** command in the display.



3. Press the **F4** key under the **CHOOSE** command in the display and enter the desired value.



4. Press the **F6** key under the **END** command to exit the **Preset value output control 6-11** submenu.


5. You are now in the **Output control 6-01** submenu.

OUTPUT CONTROL VIA
ACCUMULATOR MANAGEMENT


The HDG accumulator and cascade management serves as an extension to the output operation of the HDG M300-400.

Temperature ranges are assigned to the connected accumulator by means of 5 accumulator sensors. The control monitors these ranges continuously and generates output settings for the connected HDG (central heating) boiler. If this output setting changes, this is balanced and forwarded in an even pattern to the system. The respective minimal and maximum system outputs, the steepness of the output demand, time delay for boiler starts and the weighting of the individual boilers can be adapted to the individual systems.

If output is controlled via “accumulator management”, then the following setting options become available. The requirement for this is that **Control via DDC** is set as control mode and **External** is set as activate boiler.

 See section “6.6 ON/OFF menu”, paragraph “Setting the control, boiler activation and Lambda Stop” in this chapter.



1. Open the **SERVICE** menu and scroll to the **Service 5-02** sub-menu.

 See “Procedure” in this section.



2. Press the *F5* key under the **Control** command.



✓ The display changes to the **Output control 6-01** submenu.

Output control					6-01
Preset value 3 - 10V					:100.0%
		+C			END



1. In the **Output control 6-01** submenu, press the *F3* key under the **+C** command in the display.

✓ The display changes to the **Preset value output control 6-11** submenu.

Preset value output control					6-11
Preset value 3 - 10V					:100.0%
		FIELD	CHOOSE		END



2. In the **Preset value output control 6-11** submenu, press the *F3* key under the **FIELD** command in the display.



3. Press the *F4* key under the **CHOOSE** command in the display and enter the desired value.



4. In the **Output control 6-11** submenu, press the *F2* key in the display.

- ✓ The display changes to the **Output and accumulator management: submenu. 9-01.**

Output and accumulator management:					9-01
Mode of operation DDC : PM Master 3..10V					
Accumulator sensor : t / tm / m / mb / b					
Boiler in the system : 1 Boiler					
		FIELD			END



5. In the **Output control 9-01** submenu, press the *F2* key in the display

- ✓ The display switches to the submenu **System boiler 1:. 9-02.**

System boiler 1:					9-02
Boiler type : M300					
Pmin: 90 kW demand : 0					
Pmax: 300 kW operation : 0 operating hours:					
P set 0 kW ok : 0 0:00:00					
		FIELD		Next	END



6. In the **System boiler 1:9-02** submenu, press the *F2* key in the display.

- ✓ The display switches to the submenu **output overview. 9-03.**

Output overview:					9-03
Fmin:	1.00	Pmin:	90kW	Demand. :	0
Fmax:	4.00	Pmax:	300kW	Operation :	0
Fact:	5.00	P set:	300kW	ok. :	0
					END



7. In the **Output overview 9-03** submenu, press the *F2* key in the display.

- ✓ The display changes to the submenu **Accumulator warm/cold messages: 9-04.**

Accumulator warm/cold messages:					9-04
Actual-°C	o:	0	tm:	0...m:	0 mb: 0 b: 0
Wa >°C		75		75	75 75 75
Co <°C		70		70	70 70 70
		Cold		Cold	Cold Cold Cold
					END



8. In the submenu **Accumulator warm/cold messages:** 9-04 press the **F2** key in the display.

✓ The display changes to the **Service boiler options 1** submenu. 9-09.

System boiler 1 options:					9-09
Operating hours.:		0:00:00			
Factor	:	1			
delay +/-	:	10	[min]		
F message	:	15	[min]		
				Next	END



9. Press the **F6** key under the **END** command to exit the **Preset value output control 6-11** submenu.

You are now in the **Output control 6-01** submenu.

ENTERING THE COMBUSTION CHAMBER TEMPERATURE SETTING

In this menu, you can define the combustion chamber temperature for controlled operation of the boiler.



The temperature settings apply for **Combustion control** as well as **Combustion and output control**.

See section "6.6 ON/OFF menu", under "Setting the control, boiler activation and Lambda Stop".

See "Procedure" in this section.

Combustion chamber temperature					6-02
Max:	650 °C	Output_set:		100.0 %	
Min:	400 °C	CCT_set:		650 %	
					END

ENTERING MATERIAL SETTING

In this menu, you can define the fuel quantity for controlled operation of the boiler.



The fuel settings apply for **Combustion control** as well as **Combustion and output control**.

See section "6.6 ON/OFF menu", under "Setting the control, boiler activation and Lambda Stop".

See "Procedure" in this section.

Material controller					6-03
Max:	50.0%	CCT_set:	650°C	KP:	10.0
Min:	10.0%	CCT_ACT :	0°C	TN:	75.0
			650°C	TV:	0.0
SET	50.0%	Factor	: 5	KP_:	15.0
					END

ENTERING THE PRIMARY AIR SETTING



The difference between fuel quantity **MAX** and **MIN** should be specified as a range (approx. 25%) adapting to the required value.

In this menu, you can set the primary air quantity for controlled operation of the boiler.



The primary air settings apply for **Combustion control** as well as **Combustion and output control**.

See section "6.6 ON/OFF menu", under "Setting the control, boiler activation and Lambda Stop".

See "Procedure" in this section.

Primary air fan					6-04
Air_Max	: 35%	Fuel_SET	: 50.0%		
Air_MIN	: 25%	Air_SET	: 30 %		
					END



The difference between primary air quantity **Air_Max** and **Air_Min** should be specified as a range adapting to the required value (approx. 25 %).

SETTING PRESET VALUES FOR PRIMARY AIR FLAPS

In this menu, you can set the preset values for the primary air flaps for controlled operation of the boiler.



The primary air settings apply for **Combustion control** as well as **Combustion and output control**.

See section "6.6 ON/OFF menu", under "Setting the control, boiler activation and Lambda Stop".

See "Procedure" in this section.

Preset value primary air flaps		6-05
P1_Partial load:	40 %	P2_Partial load: 0 %
P1_Level 1:	100 %	P2_Level 1 : 20 %
P1_Level 2:	100 %	P2_Level 2 : 35 %
P1_Full load :	100 %	P2_Full load : 50 %
		END

ENTERING THE RESIDUAL OXYGEN SETTING

This menu is used to enter the residual oxygen setting for controlled operation of the boiler.



The residual oxygen setting applies for **Combustion control** as well as **Combustion and output control**.

See section "6.6 ON/OFF menu", under "Setting the control, boiler activation and Lambda Stop".

See "Procedure" in this section.

O2 preset value		R-2	6-06
O2_MAX :	7.0 %	CCT_SOLL:	650 °C
O2_MIN :	7.0 %	CCT_IST :	50 °C
O2_SET :	7.0 %		
O2_ACT :	12.8		
			END



The standard setting for **O2_Max** and **O2_Min** is 7.0 %.

ENTERING THE SECONDARY AIR SETTING

In this menu, you can set the secondary air quantity for controlled operation of the boiler. The O2 minimum value for the Lambda Stop function can also be defined.



The secondary air setting applies for **Combustion control** as well as **Combustion and output control**.

See section "6.6 ON/OFF menu", under "Setting the control, boiler activation and Lambda Stop".

See "Procedure" in this section.

Secondary air fan			6-07
Max: 70 %	SET: 7.0%	KP: 65.0	
Min: 15 %	ACT: 12.8%	TN: 50.0	
ACT: 15 %	MIN: 5.0%	TV: 0.0	
			END



The standard setting for the secondary air is 70 % for **Max** and 15 % for **Min**.



If this O2 minimum value is not met, the Lambda Stop function is triggered.

See section "6.6 ON/OFF menu", under "Activating the function "Lambda Stop"".

SETTING PRESET VALUES FOR SECONDARY AIR FLAPS

In this menu, you can set the preset values for the secondary air flaps for controlled operation of the boiler.



The secondary air settings apply for **Combustion control** as well as **Combustion and output control**.

See section "6.6 ON/OFF menu", under "Setting the control, boiler activation and Lambda Stop".

See "Procedure" in this section.

Preset value secondary air flaps		6-08
S1_Partial load: 12 %	S2_Partial load: 0 %	
S1_Level 1 : 50 %	S2_Level 1 : 100 %	
S1_Level 2 : 100 %	S2_Level 2 : 100 %	
S1_Full load : 100 %	S2_Full load : 100 %	
		END

ADAPTING THE FUEL QUANTITY/O2

This menu allows fuel to be increased or adapted within a range defined by the Delta Min/Max values.



The fuel quantity/O2 settings apply for **Combustion control** as well as **Combustion and output control**.

See section "6.6 ON/OFF menu", under "Setting the control, boiler activation and Lambda Stop".

See "Procedure" in this section.

Fuel quant modification by O2 R-3			6-09
Delta_FUE_MIN:	-10%	FUEL_SET:	50.0%
Delta_FUE_MAX:	10%	Fuel_ACT:	50.0%
Delta_FUE_ACT:	0%		
Delay :	10s		
			END



The standard setting is -10% for **Delta FUE_MIN** and 10% for **Delta FUE_MAX**.

SETTING VACUUM PRESSURE CONTROL VALUES

This menu is used to define the settings for fan speed with the HDG cyclone dust extractor and the vacuum pressure value for the vacuum pressure control.

See "Procedure" in this section.

PID pressure control fan			6-10
MAX :	100%	P_Min :	-15pa
MIN :	15%	P_Max :	-25pa
ACT :	15%	P_Set :	-15pa
Fact.:	5%	P_Act :	-30pa
		KP:	65.0
		TN:	11.0
		TV:	0.0
		KP_:	97.5
			END





The standard setting is 100% for **MAX** and 15 % for **MIN**.

SETTING AIR FLAP DELAY

In this submenu you can set the delay time for the air flaps.

 See "Procedure" in this section.

Air flap delay					6-12
Flap closure delay					: 400 s
					END

6.11 INFO menu

This menu displays the current / archived errors with date and time.



1. Press the *F6* key under the standard display screen.
- ✓ You are in the **INFO** menu.
- ✓ The display changes to the **Errors pending** submenu.

Errors - pending					1-12
11/11 037 ST digital module failure					
Due: 15:44:32					19.11.2013
Plus	Minus		Arch.		END



2. In the display, press the *F1* key under the plus sign or *F2* under the minus sign to scroll forward or backward through the error messages.



3. Press the *F4* or *F3* key to switch between the most recent fault and the archived faults.



4. In the fault archive, press the *F5* key under the **RESET** command to delete the fault.



5. Press the *F6* key under the **END** command to exit the **Fault information** menu.

- ✓ The standard display is restored.

6.12 Maintenance function

The maintenance function is used to interrupt the current operating mode and activate the burning out phase. When the burn-out time has elapsed, maintenance is enabled and the primary and secondary air fans switch off. Only the flue gas fan continues running with controlled vacuum pressure. This serves to suction up dust and remove radiant heat during cleaning and maintenance work.

After the cleaning and maintenance work is completed, the function must be deactivated. The boiler switches back to the previous mode.



1. Press the *F5* key under the standard display screen.
 - ✓ You are in the **Service** menu.
 - ✓ The display changes to the **Service 5-01** submenu.

Service				5-01	
Digital inputs	0-15	00000000	00000000		
Digital outputs	0-15	00000001	00000000		
		Mainte n.			END




2. Press the *F3* key under the **Maintenance** command.
 - ✓ The display changes to the **Function 1-10** submenu.

Function				1-10	
Maintenance : On					
Waiting for enabling					
			On	Off	END



3. Press the *F4* key under the **On** command.
 - ✓ The message **Waiting for enabling** appears in the display.
 - ✓ The boiler switches to the **burning out phase**.
 - ✓ When the burn-out time is complete, the message **Maintenance enabled** appears in the display.

Function				1-10	
Maintenance : On					
Maintenance enabled					
		FIELD	On	Off	END

- ✓ The flue gas fan is running.
- ✓ You can now begin the cleaning and maintenance work.
-  See chapter “7 Cleaning and servicing the heating system”.



4. After completing the cleaning and maintenance work, press the *F5* key under the command **OFF**.

- ✓ The maintenance function is now finished.



5. Press the *F6* key under the command **End**.

- ✓ The standard display is restored.

6.13 Filling the fuel storage

REQUIREMENTS

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


- The fuel storage has been initially approved by an authorised specialist.
- The fuel storage is dry and free of any foreign bodies.
- Large dust deposits must be removed (with pellet fuel).
- The requirements of government safety organisations must be met.

PROCEDURE FOR FILLING WITH WOOD CHIPS



1. Turn the heating system main switch on.

- ✓ The control is activated.

 See section “6.2 Switching on the heating system” in this chapter.

2. Check whether the delivery system is running.



Caution!

Damage to delivery system during filling

If the heating system is not switched on during filling of the fuel storage, the overload protection of the delivery system could be triggered when the heating system is switched on after the filling.

Check each time when filling that the delivery system is running.

3. Fill the fuel storage.

- ✓ The filling of the fuel storage is completed.

PROCEDURE FOR FILLING WITH PELLETS



1. Turn on the main switch of the heating system.
 - See section “6.2 Switching on the heating system” in this chapter.
 - ✓ The heating system is switched off.
2. Recheck that the heating system is switched off.
3. Inform the tanker driver that the pellet storage can be filled.
4. After filling is completed, close the injection and extraction nozzles.
5. Re-starting the heating system.
 - See section “6.2 Switching on the heating system” in this chapter.
 - ✓ The filling of the fuel storage is completed.

6.14 Performing the chimney sweep test

In Germany, there is a legal obligation for heating systems with a power rating above 4 kW to undergo an emissions measurement every two years by a qualified combustion engineer to ensure that federal pollution limits are met (ordinance regarding smaller and medium-sized boiler systems -1. BImSchV).

INITIAL TEST

The operating company must notify the responsible combustion engineer of the installation of the heating system before it is commissioned, and must also arrange an appointment for the chimney sweep test within four weeks of commissioning. To ensure a stable operating ability, sufficient heat transfer must occur while operating at full load.

TEST EVERY TWO YEARS

In Germany, regular inspections every two years must be carried out in accordance with the requirements of the federal emission limits (1. BImSchV).





Warning!

Material damage and injury due to incorrect chimney sweep test

The chimney sweep test requires comprehensive technical knowledge.

Only permit authorised specialists to perform the chimney sweep test.

BEFORE THE TEST

1. Clean the heating system completely about 2-3 days prior to the test.
 -  See chapter "7 Cleaning and servicing the heating system", section "7.1 Cleaning and maintenance schedule".
2. Check that the lambda sensor is securely mounted and tighten it if necessary.
 -  See chapter "7 Cleaning and servicing the heating system", section "7.1 Cleaning and maintenance schedule".

DURING THE TEST

At the start of the measurement, the boiler temperature should not exceed 75°C. If there is an accumulator, its temperature should not exceed 60°C. Ensure there that the heating circuit has sufficient heat transfer capacity.




The chimney sweep measurement must be performed when operating at full load. (It is absolutely essential to avoid the heating up and burning out phases.) Having the test repeated by the combustion engineer or by HDG specialists will incur charges.

Please observe the following when carrying out the chimney sweep test:

- Make sure that there is sufficient fuel in the fuel storage to avoid interruption of material feeding during the measurement.
- No fault should be present in the system.



1. Press the *F5* key under the standard display screen.
 - ✓ You are in the **Service** menu.
 - ✓ The display changes to the **Service 5-01** submenu.

Service				5.0	
Digital inputs	0-15	00000000	00000000		
Digital outputs	0-15	00000001	00000000		
		Main- tenanc e			END



2. Press the *F4* key under the “**Chimney sweep test**” symbol.

Chimney sweep mode					5-11
Heating OFF					
Enable boiler temperature		:	75 / 0 °C		
Enable comb. chamb. temp.		:	450 / 0 °C		
Measurement duration		:	75 / 0 m		
		30%	100%		END

✓ You are now in the **Chimney sweep test 5-02** submenu.



When operating the heating system without an accumulator, the chimney sweep test can also be carried out in partial load operation with 30% of the nominal thermal power.



3. Press the *F3* key under the **30%** command to start the chimney sweep test in partial load operation.



4. Press the *F4* key under the **100%** command to start the chimney sweep test in nominal load operation.

✓ The **Heating up** message appears in the display.

✓ Once the specified temperatures have been reached, the display shows the **Measurement enabled** message.

✓ The measurement is carried out.



Press the *F6* key under the **End** command to cancel the chimney sweep test.

The chimney sweep test is also cancelled if the specified measurement duration is exceeded.

7 Cleaning and servicing the heating system

GENERAL INFORMATION

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.

SPARE PARTS



Only use genuine HDG spare 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 ...
after approx. 150 and 1000 operating hours respectively	<ul style="list-style-type: none"> Lubricating the feeding system 	138
after approx. 500 operating hours	<ul style="list-style-type: none"> Cleaning the stepping grate Cleaning the combustion chamber Check and empty the ash container 	139 140 142
after approx. 2000 operating hours*	<ul style="list-style-type: none"> Cleaning the cleaning shaft Cleaning the vacuum pressure pipe for the pressure switches Cleaning the vacuum pressure pipe for the differential pressure transmitters 	144 146 147
after approx. 4000 operating hours*	<ul style="list-style-type: none"> Cleaning the control unit Checking the drive chains Cleaning the ignition fan Cleaning and calibrating the lambda sensor Cleaning the flue gas temperature sensor Cleaning the flue gas pipe Cleaning the pressure equalisation hose Cleaning fly ash section 	148 148 151 152 153 154 155 156
before every second filling	<ul style="list-style-type: none"> Inspecting the fuel storage 	157

Table 7/1 - Cleaning and maintenance schedule

*At least once per year

7.2 Procedure

MAINTENANCE FUNCTION

The maintenance function is used to interrupt the current operating mode and activate the burning out phase. When the burn-out time has elapsed, maintenance is enabled and the primary and secondary air fans switch. Only the flue gas fan continues running with controlled vacuum pressure. This serves to suction up dust and remove radiant heat during cleaning and maintenance work.

After the cleaning and maintenance work is completed, the function must be deactivated. The boiler switches back to the previous mode.



1. Press the *F5* key under the standard display screen.

✓ You are in the **Service** menu.

✓ The display changes to the **Service 5-01** submenu.

Service				5-01	
Digital inputs	0-15	00000000	00000000		
Digital outputs	0-15	00000001	00000000		
		Maintenanc e			END



2. Press the *F3* key under the **Maintenance** command.

✓ The display changes to the **Function 1-10** submenu.

Function				5-22	
Maintenance :					
		FIELD	On	Off	END



3. Press the *F3* key under the **FIELD** command.

✓ The **Maintenance** function is selected.

Function				5-22	
Maintenance : On					
Waiting for enabling					
		FIELD	On	Off	END



4. Press the *F4* key under the **FIELD** command.
 - ✓ The message **Waiting for enabling** appears in the display.
 - ✓ The boiler switches to the **burning out phase**.
 - ✓ When the burn-out time is complete, the message **Maintenance enabled** appears in the display.

Function						5-22
Maintenance : On						
Maintenance enabled						
		FIELD	On	Off	END	

- ✓ The flue gas fan starts to run.
- ✓ You can now begin the cleaning and maintenance work.



5. After completing the cleaning and maintenance work, press the *F5* key under the command **Off**.

- ✓ The maintenance function is now finished.



6. Press the *F6* key under the command **End**.

- ✓ The standard display is restored.

GENERALLY APPLICABLE SAFETY INSTRUCTIONS



Warning!

Danger of asphyxiation due to carbon monoxide

If the boiler is in operation, carbon monoxide can be emitted through opened doors, lids or other cleaning openings.

When performing cleaning and maintenance work, do not leave the cleaning openings, doors and lids open any longer than necessary.



Caution!

Danger of burns from hot surfaces

During operation, the boiler surfaces under the cladding are hot. Even when turned off, they only cool down slowly.

Switch the heating system off and only start with the cleaning and maintenance work when the surfaces have cooled down. Ensure that the main switch is secured against being switched back on.



Warning!

Risk of injury from automatically driven components

If the heating system is switched on, automatically driven components can unexpectedly start running. Limbs or fingers could become caught and crushed.

Turn off the main switch when performing any work on automatically driven components and secure it against being turned back on.



Important!

When applying lubricants, oils and grease, observe the specifications of the respective manufacturer.

CLEANING TOOLS

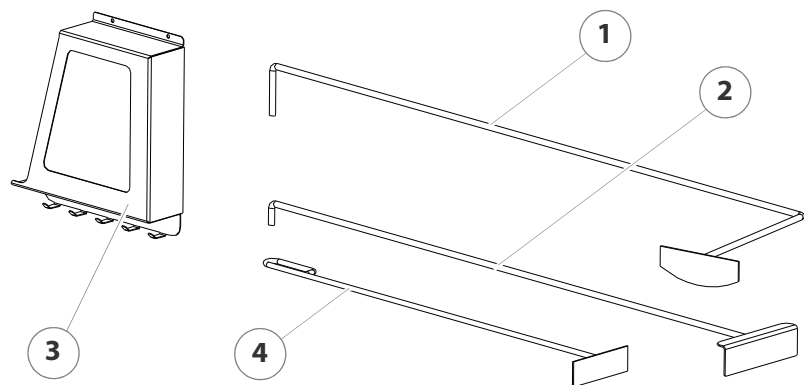


Figure 7/1 - Cleaning tools

- 1 Scraper, angled
- 2 Scraper, straight
- 3 Wall holder
- 4 Scraper, short

REMOVING THE CLADDING

In order to perform certain cleaning and maintenance tasks, parts of the boiler cladding must be removed.

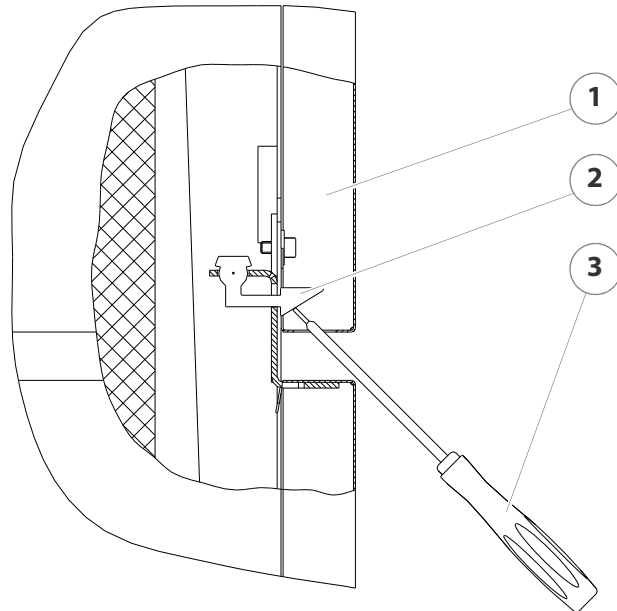


Figure 7/2 - Removing the cladding

1. Insert a screwdriver (4) in the recess on the underside of the cladding section.
 2. Pry the mounting plate (2) upward with the screwdriver (4).
 3. Unhook the cladding section (1).
 4. Proceed in the same manner with the other cladding sections.
- ✓ The cladding is removed.

LUBRICATING THE FEEDING SYSTEM

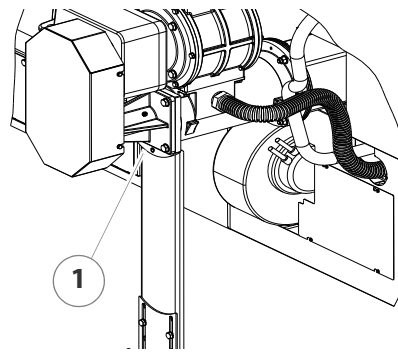


Important!

🔧 Observe the “Generally applicable safety instructions” in this section.

HDG TBZ 150

The HDG feeding system TBZ 150 must be lubricated every 150 operating hours.



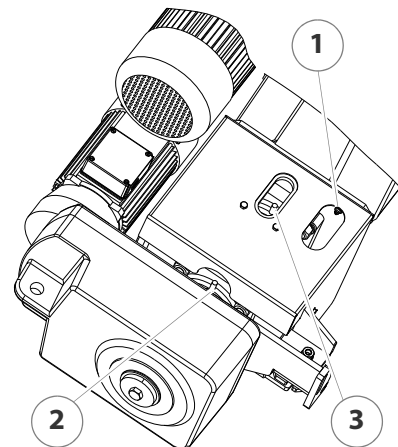
1. Place the grease gun on the lubricating nipple (1).
2. Press three strokes of grease into the feeding system.

✓ The HDG feeding system TBZ 150 is lubricated.

Figure 7/3 - Lubricating the feeding system (TBZ 150)

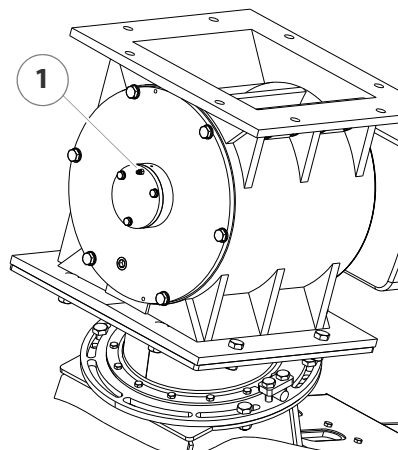
HDG TBZ 200

The HDG feeding system TBZ 200 must be lubricated every 1000 operating hours.



1. Place the grease gun on the three lubricating nipples (1 + 2 + 3).
2. Press three strokes of grease each into the feeding system.

Figure 7/4 - Lubricating the feeding system (TBZ 200)



3. Place the grease gun on the lubricating nipple (1).
4. Press three strokes of grease into the rotary wheel.

✓ The HDG feeding system TBZ 200 is lubricated.

Figure 7/5 - Lubricating the rotary wheel (TBZ 200)

CLEANING THE STEPPING GRATE

**Important!**

🔧 Observe the “Generally applicable safety instructions” in this section.

**Caution!**

Danger of fire from combustion residues

Hot combustion residues can lead to a fire.

Allow the ash to cool and place it only in a suitable fireproof container.

1. Activate the maintenance function.

🔧 See section “Maintenance function” in this chapter.

2. Allow the fire in the heating system to burn out and cool down.

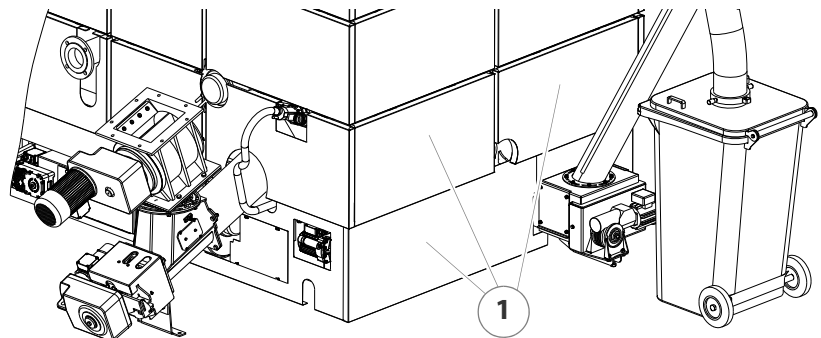


Figure 7/6 - Removing the cladding

3. Remove the three cladding sections (1).

🔧 See “Removing the cladding” in this section.

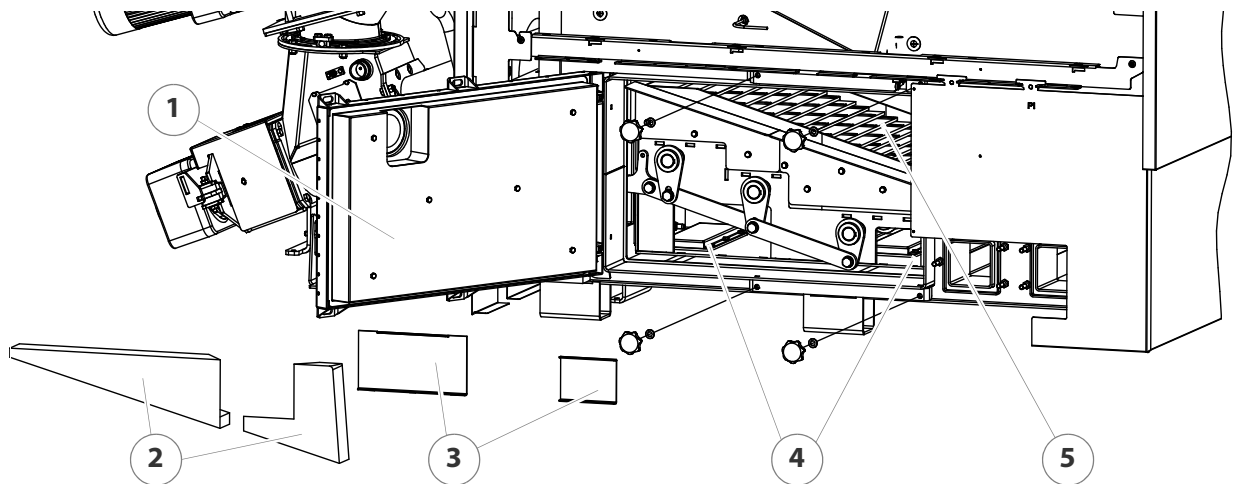




Figure 7/7 - Cleaning the stepping grate

4. Release the star-grip screws and open the stepping grate door (1).
 5. Remove the two combustion chamber bricks (2).
 6. Lift the two covers (3) out of their position.
 7. Inspect the stepping grate (5) for encrustations of cinder or foreign bodies.
 8. Remove any encrustations with a suitable cleaning tool.
 9. Clean the area (4) under the stepping grate with the supplied cleaning tools or with a vacuum cleaner.
 10. Check the grate ash removal auger for wear.
 11. Close the boiler in the reverse order.
 12. Deactivate the maintenance function.
-  See section "Maintenance function" in this chapter.
- ✓ The cleaning of the stepping grate is completed.

CLEANING THE COMBUSTION CHAMBER



Important!

-  Observe the "Generally applicable safety instructions" in this section.
-




Caution!

Danger of fire from combustion residues

Hot combustion residues can lead to a fire.

Allow the ash to cool and place it only in a suitable fireproof container.

1. Activate the maintenance function.

 See section "Maintenance function" in this chapter.

2. Allow the fire in the heating system to burn out and cool down.

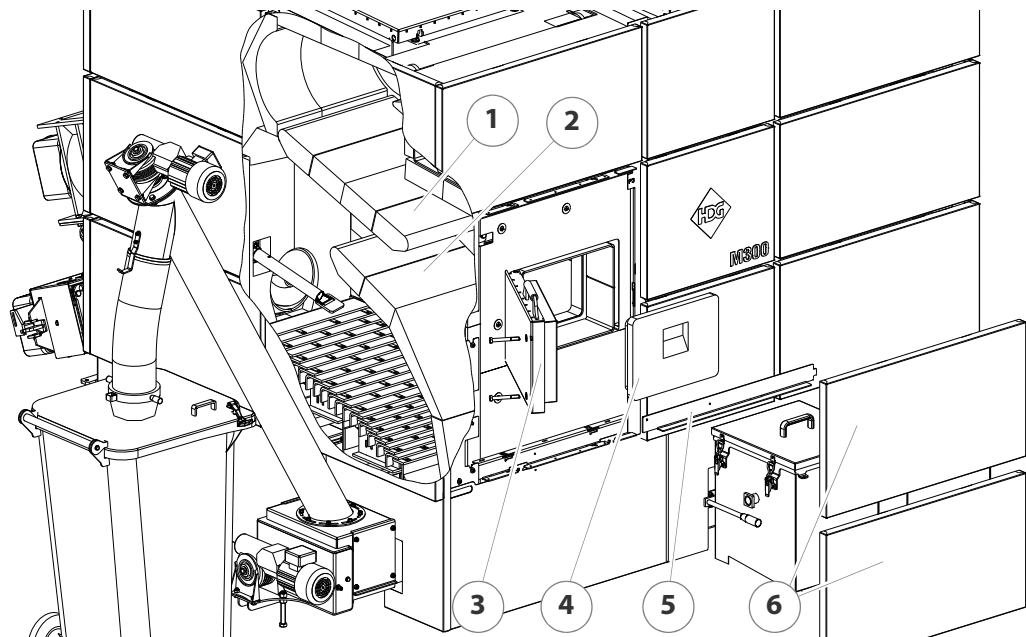


Figure 7/8 - Cleaning the combustion chamber

3. Remove the two cladding sections (6).

🔧 See “Removing the cladding” in this section.

4. Remove the suspension rail (5).

5. Release the M12 screws (19 mm spanner) and open the combustion chamber door (3).

6. Remove the insulation block (4).

7. Clean the combustion chamber area (1 + 2) with the supplied cleaning tools or with a vacuum cleaner.

8. Check the fly ash removal auger for wear.

9. Close the boiler in the reverse order.

10. Deactivate the maintenance function.


🔧 See section “Maintenance function” in this chapter.

✓ The cleaning of the combustion chamber is completed.

CHECKING AND EMPTYING THE ASH CONTAINER



Important!

 Observe the “Generally applicable safety instructions” in this section.



Caution!

Danger of fire from combustion residues

Hot combustion residues can lead to a fire.

Allow the ash to cool and place it only in a suitable fireproof container.



Caution!

Backfiring or smoke can cause injuries or material damage

If the transfer station is not at least half-filled when commissioning or re-starting after a cleaning, there is a danger of backfiring or smoke from the boiler. This can cause damage to the heating system or injury to persons.

Make sure that the transfer station is at least half-filled with ash, sand, etc.

CENTRAL ASH REMOVAL SYSTEM



Important!

To ensure it can be moved safely, the ash bin should only be filled to a weight of 100 kg. If the 100 kg fill level is exceeded, a suitable conveying device or lifting gear must be used.

Consult the responsible disposal company beforehand to determine the handling options.

1. Activate the maintenance function.

 See section “Maintenance function” in this chapter.

2. Allow the fire in the heating system to burn out and cool down.

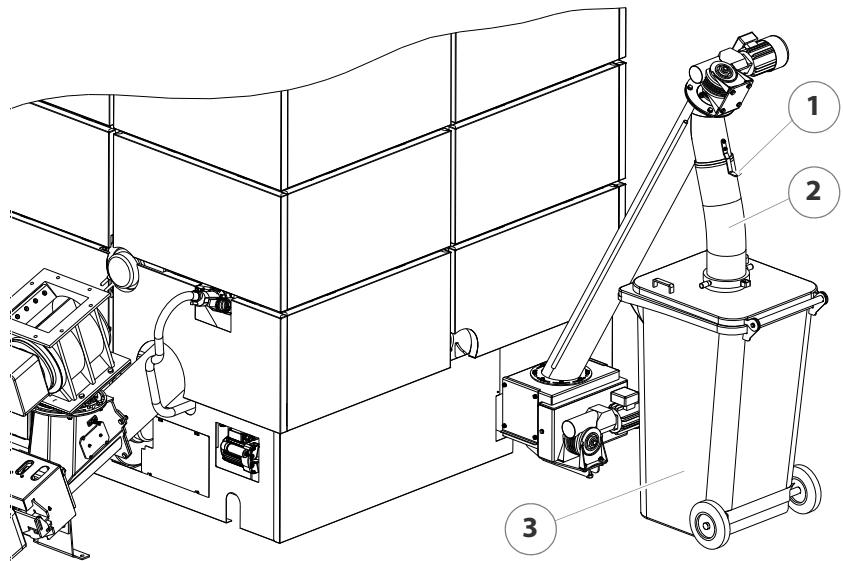


Figure 7/9 - Checking and emptying the ash bin

3. Pull out the downpipe (2) in an upward direction.
4. Insert the downpipe (1) on the hook (3).
5. Check the fill level of the ash bin (3).

**Warning!****Danger of injury**

The ash bin is heavy when full. Arms or legs can be crushed should it fall during emptying.

Use suitable lifting gear or conveying device when emptying.

- ✓ If the ash bin is not yet full, reclose it.
 - ✓ If the ash bin is full, empty it.
6. Do this by pulling out the ash bin (3).
 7. Empty the ash into a fireproof container.
 8. Reattach the ash bin (3) to the heating system by reversing these steps.
 9. Deactivate the maintenance function.
- 🔧 See section "Maintenance function" in this chapter.
 - ✓ The emptying of the ash bin is completed.
1. Activate the maintenance function.
- 🔧 See section "Maintenance function" in this chapter.
2. Allow the fire in the heating system to burn out and cool down.

FLY ASH CONTAINER

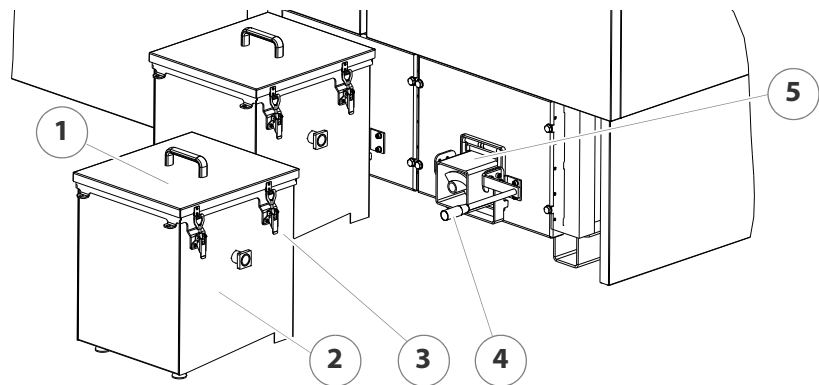


Figure 7/10 - Checking and emptying the fly ash container

3. Open the clamp locks (3).
4. Lift up the lid (1) and remove it.
5. Check the fill level of the ash containers (2).
 - ✓ If the ash containers are not yet full, reclose them.
 - ✓ If the ash containers are full, empty them.
6. Do this by lifting up the clamp handle (4) and releasing the stop on the ash container (2).
7. Pull the ash container (2) forward out of the ash channel (5) of the ash removal system.
8. Empty the ash into a fireproof container.
9. Reinsert the ash container (2) in the heating system in the reverse order.
10. Deactivate the maintenance function.
 - ✎ See section "Maintenance function" in this chapter.
 - ✓ The ash containers have been emptied.

CLEANING THE CLEANING SHAFT



Important!

✎ Observe the "Generally applicable safety instructions" in this section.



Warning!

Risk of crushing injury

The cleaning shaft lid is very heavy and can fall shut. Hands and arms could thereby be crushed.

Take care not to bump into the opened cleaning shaft lid and cause it to fall shut.

**Important!**

When working on the boiler, the fall protection device must be fitted. If the room height is not sufficient for the assembly, the height of the fall protection device must be adjusted.

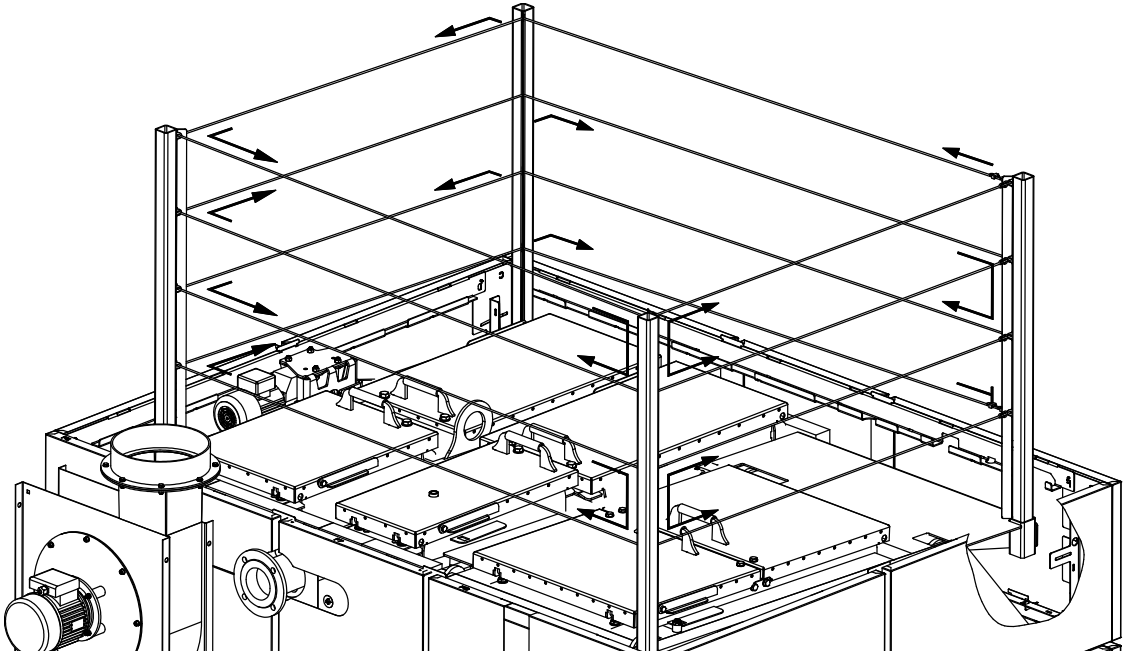


Figure 7/11 - Fall protection

1. Activate the maintenance function.

 See section "Maintenance function" in this chapter.

2. Allow the fire in the heating system to burn out and cool down.

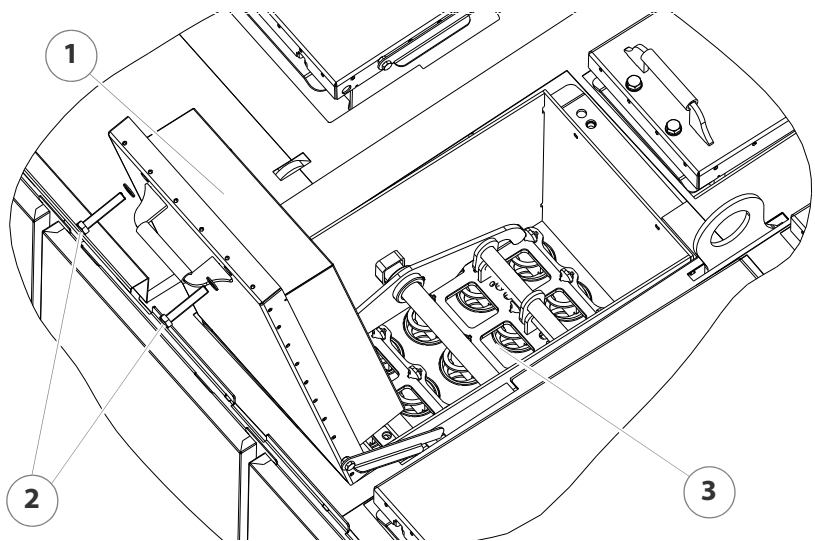



Figure 7/12 - Cleaning the cleaning shaft

3. Release the two M16 screws (2) (24 mm spanner).


4. Fold open the cleaning shaft lid (1) towards the back.


5. Check the cleaning shaft (3) and the cleaning system for any deposits.
 6. If necessary, remove deposits and dust with a suitable vacuum cleaner.
 7. Close the cleaning shaft lid in the reverse sequence.
 8. Proceed with the remaining cleaning shafts in the same manner described above.
 9. Deactivate the maintenance function.
-  See section “Maintenance function” in this chapter.
- ✓ The cleaning of the cleaning shaft is completed.

CLEANING THE VACUUM PRESSURE PIPE FOR THE PRESSURE SWITCHES



Important!

-  Observe the “Generally applicable safety instructions” in this section.
-

1. Activate the maintenance function.
-  See section “Maintenance function” in this chapter.
2. Allow the fire in the heating system to burn out and cool down.

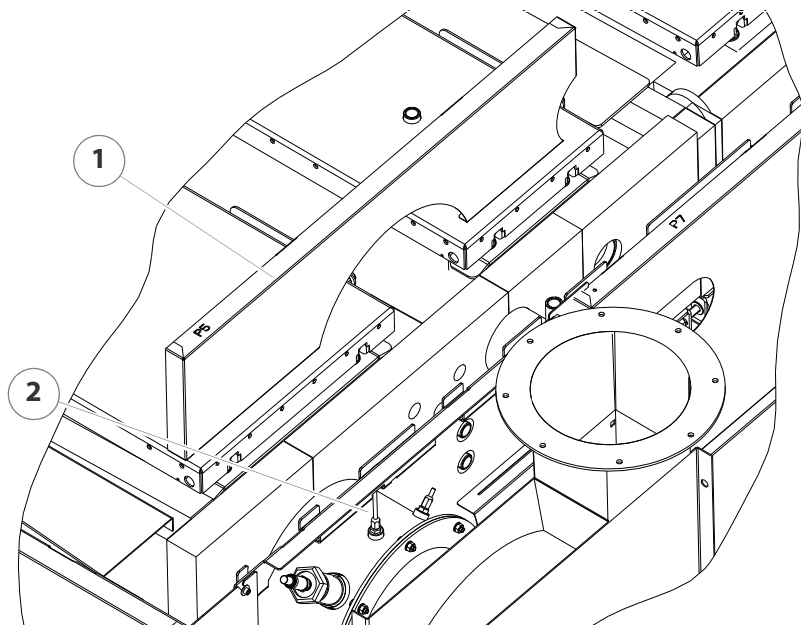


Figure 7/13 - Cleaning the vacuum pressure pipe for the pressure switches

3. Remove the upper cladding (1) by lifting it upward.
4. Detach the hose from the vacuum pressure pipe (2).
5. Inspect the vacuum pressure pipe (2) for dirt and dislodge it if necessary with a wire or a compressor.
6. Attach the hose to the vacuum pressure pipe (2).

7. Mount the upper cladding (1) in the reverse sequence.
 8. Deactivate the maintenance function.
- ✎ See section “Maintenance function” in this chapter.
 - ✓ The cleaning of the vacuum pressure pipe for the pressure switches is completed.

CLEANING THE VACUUM PRESSURE PIPE FOR THE DIFFERENTIAL PRESSURE TRANSMITTERS



Important!

- ✎ Observe the “Generally applicable safety instructions” in this section.

1. Activate the maintenance function.
- ✎ See section “Maintenance function” in this chapter.
2. Allow the fire in the heating system to burn out and cool down.

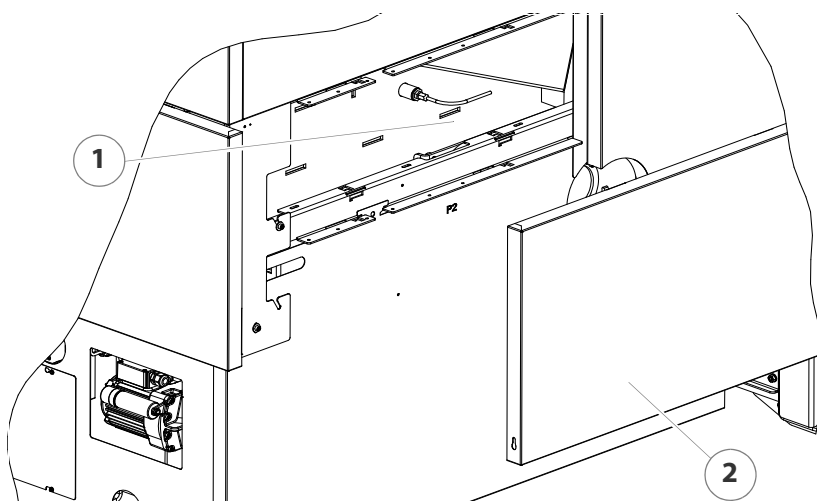


Figure 7/14 - Cleaning the vacuum pressure pipe for the differential pressure transmitters

3. Take the cladding (2) off toward the front.
 4. Detach the hose from the vacuum pressure pipe (1).
 5. Inspect the vacuum pressure pipe (1) for dirt and dislodge it if necessary with a wire or a compressor.
 6. Attach the hose to the vacuum pressure pipe (1).
 7. Mount the cladding (2) in the reverse sequence.
 8. Deactivate the maintenance function.
- ✎ See section “Maintenance function” in this chapter.
 - ✓ The cleaning of the vacuum pressure pipe for the differential pressure transmitters is completed.

CLEANING THE CONTROL UNIT




Figure 7/15 - Control unit for HDG Control

1. Clean the control unit with a moist, lint-free cloth.
 2. For stubborn dirt, use a mild detergent.
 3. Wipe the control unit dry with a soft cloth.
- ✓ The control unit has been cleaned.

CHECKING THE DRIVE CHAINS



Important!

 Observe the “Generally applicable safety instructions” in this section.




Warning!

Risk of injury from automatically driven components

If the heating system is switched on, the gears and drive chains may start unexpectedly. Body parts could be crushed during cleaning and servicing work.

Turn off the main switch and secure it against being turned back on before you check the drive chains.

1. Activate the maintenance function.

 See section “Maintenance function” in this chapter.

2. Allow the fire in the heating system to burn out and cool down.

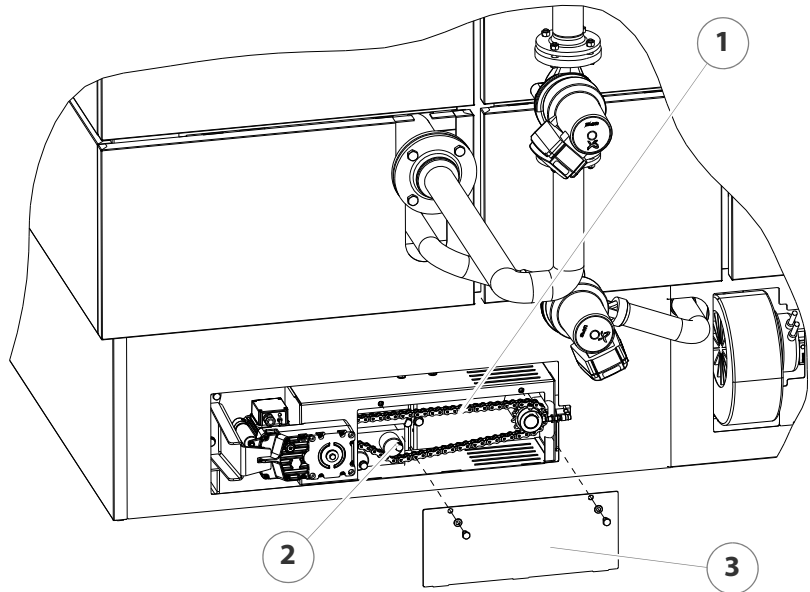


Figure 7/16 - Checking the fly ash drive chain

3. Release the M8 screws (13 mm spanner) and remove the cover (3).
4. Check the chain tension (1).
 - ✓ If the drive chain has approximately 1 cm play, the tension is correct.
 - ✓ If the drive chain has more play, it must be tightened.
5. Loosen the locking screw on the chain tensioner (2).
 - ✓ The chain tensioner can be moved.
6. Move the chain tensioner (2) downwards until the drive chain again has sufficient tension.
7. Secure the chain tensioner (2) in this position.
 - ✓ The drive chain is tightened.
8. Mount the cladding on the boiler in the reverse sequence.
9. Deactivate the maintenance function.
 - 🔗 See section "Maintenance function" in this chapter.
 - ✓ The check of the drive chain of the ash removal system is completed.

CHECKING DRIVE CHAIN OF THE
HDG FEEDING SYSTEM TBZ150



Warning!

Risk of injury from automatically driven components

If the heating system is switched on, the gears and drive chains may start unexpectedly. Body parts could be crushed during cleaning and servicing work.

Turn off the main switch and secure it against being turned back on before you check the drive chains.

1. Activate the maintenance function.

 See section “Maintenance function” in this chapter.

2. Allow the fire in the heating system to burn out and cool down.

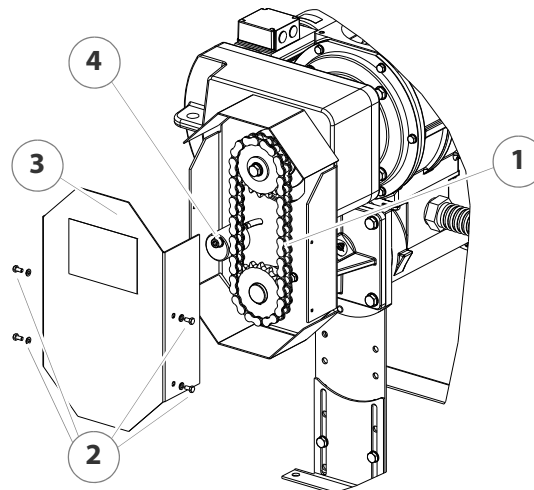


Figure 7/17 - Checking the feeding system drive chain

3. Release the screws (2) (10 mm spanner) of the cover (3) on the feeding system and remove them.

4. Check the chain tension (1).

✓ If the drive chain has approximately 1 cm play, the tension is correct.

✓ If the drive chain has more play, it must be tightened.

5. Loosen the locking screw on the chain tensioner (4).

✓ The chain tensioner can be moved.

6. Move the chain tensioner (4) to the side until the drive chain has sufficient tension again.

7. Secure the chain tensioner (4) in this position.

✓ The drive chain is tightened.

8. Replace the cover (3) on the feeding system.

9. Deactivate the maintenance function.

 See section “Maintenance function” in this chapter.

✓ The check of the drive chain of the feeding system is completed.

CLEANING THE IGNITION FAN

**Important!**

🔧 Observe the “Generally applicable safety instructions” in this section.

**Caution!**

Danger of burns from hot surfaces

The hot air nozzle of the ignition fan becomes very hot during operation. Even when turned off, it cools down very slowly.

Switch the heating system off and only start with the cleaning and maintenance work once the hot air nozzle has cooled down.

1. Activate the maintenance function.

🔧 See section “Maintenance function” in this chapter.

2. Allow the fire in the heating system to burn out and cool down.

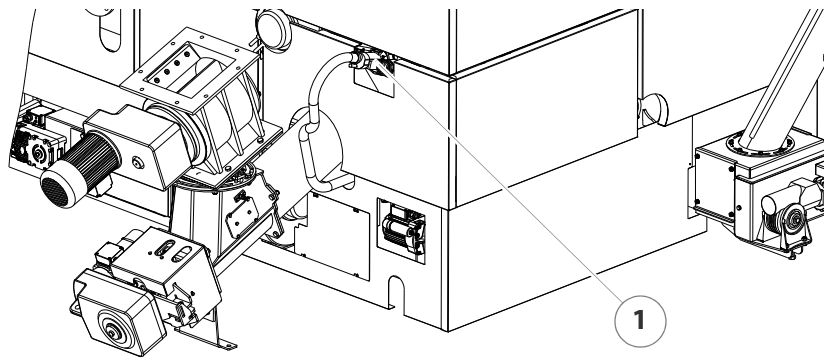


Figure 7/18 - Disassembling the ignition fan

3. Pull the ignition fan (1) out of the retainer.

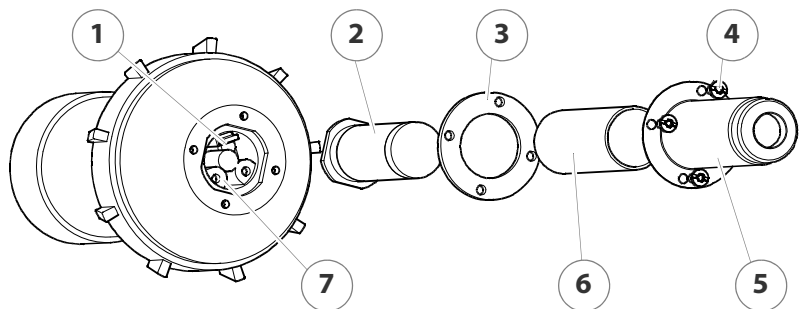



Figure 7/19 - Cleaning the ignition fan

4. Unscrew the four M4 stainless steel slotted screws (4) of the hot air nozzle (5).

5. Pull off the hot air nozzle (5).

6. Remove the insulating tube (6) and the seal (3).


7. Pull the heating element (2) out of the plug contacts (7).


8. Check the heating element (2) for dirt.
 9. Remove any dirt by blowing it off.
 10. Check the photocell (1) for dirt.
 11. Remove any dirt using a cotton swab.
 12. Reinstall the ignition fan into the heating system in the reverse sequence.
 13. Deactivate the maintenance function.
-  See section “Maintenance function” in this chapter.
- ✓ The inspection and cleaning of the ignition fan system is completed.

CLEANING AND CALIBRATING THE LAMBDA SENSOR



Important!

-  Observe the “Generally applicable safety instructions” in this section.
-

1. Activate the maintenance function.
 See section “Maintenance function” in this chapter.
2. Allow the fire in the heating system to burn out and cool down.

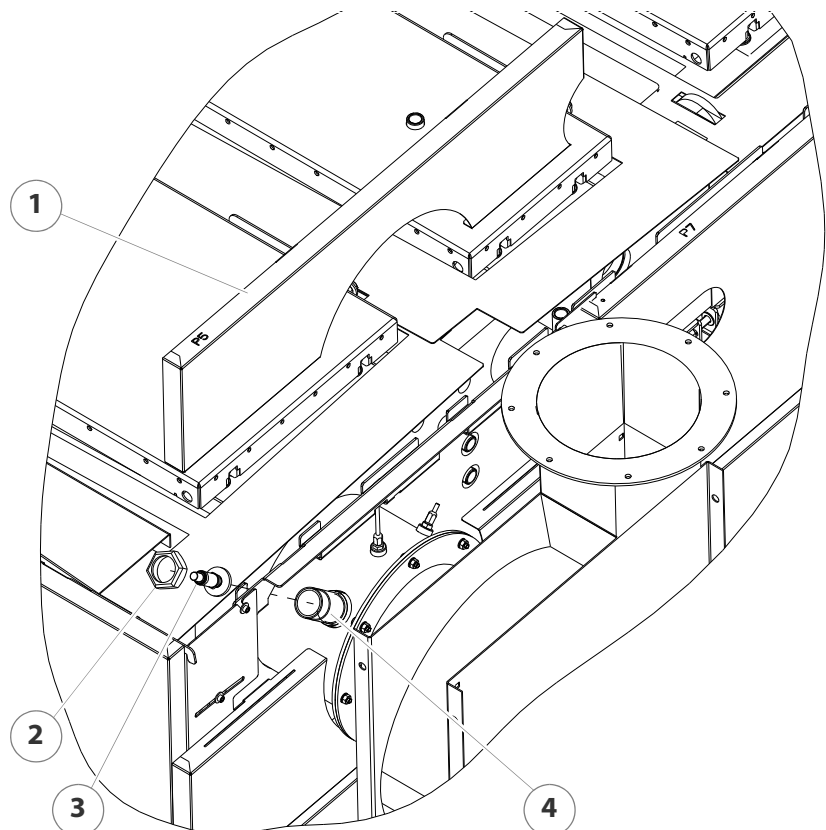


Figure 7/20 - Cleaning the lambda sensor

3. Remove the upper cladding (1) by lifting it upward.
4. Unscrew the union nut (2) with a pipe wrench.
5. Pull the lambda sensor (3) with insulating washer out of the connection nozzle (4) of the flue pipe.

**Important!**

Steel bristles will damage the lambda sensor.



To clean the lambda sensor, use a fine brass brush instead of a steel brush.

6. Brush off the lambda sensor (3) with a brass brush.
7. Clean out any deposits inside the connection nozzle (4).


**Important!**


When reinstalling the lambda sensor, make sure its seal is intact.

Use a pipe wrench to tighten the union nut. Do not tighten the lambda sensor excessively. Never tighten the lambda sensor by the shaft body.

8. Reinstall the lambda sensor (3) in the reverse sequence.
 9. Check the lambda sensor (3) for a secure fit.
 10. Carefully tighten the lambda sensor (3) with a 22 mm spanner.
 11. Mount the upper cladding (1).
 12. Deactivate the maintenance function.
 -  See section "Maintenance function" in this chapter.
 13. Calibrate the lambda sensor.
 -  See chapter "6.10 SERVICE menu", section "Flue gas temperature".
- ✓ The lambda sensor is cleaned and calibrated.

CLEANING THE FLUE GAS TEMPERATURE SENSOR**Important!**

 Observe the "Generally applicable safety instructions" in this section.

1. Activate the maintenance function.
 -  See section "Maintenance function" in this chapter.

2. Allow the fire in the heating system to burn out and cool down.

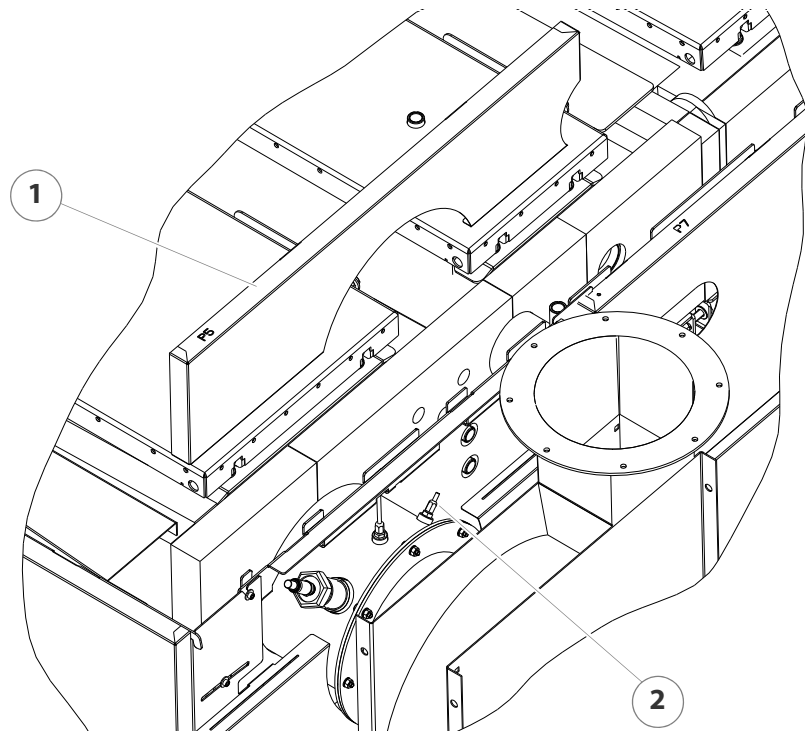


Figure 7/21 - Cleaning the flue gas temperature sensor

3. Remove the upper cladding (1) by lifting it upward.
 4. Loosen the M10 union nut (17 mm spanner) and pull the flue gas temperature sensor (2) out of the clamp screw connections.
 5. Clean the sensor surface with a moist cloth.
 6. Reinstall the flue gas temperature sensor (2) in the reverse sequence.
 7. Mount the upper cladding (1).
 8. Deactivate the maintenance function.
🔧 See section “Maintenance function” in this chapter.
- ✓ The cleaning of the flue gas temperature sensor is completed.

CLEANING THE FLUE GAS PIPE



Important!

- 🔧 Observe the “Generally applicable safety instructions” in this section.

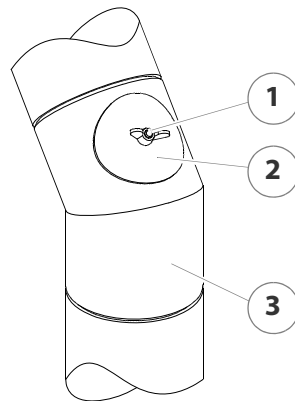
1. Activate the maintenance function.
🔧 See section “Maintenance function” in this chapter.
2. Allow the fire in the heating system to burn out and cool down.

**Caution!**

Danger of burns from hot surfaces

The surface of the flue pipe becomes very hot during operation. Even when turned off, it only cools down slowly.

Switch the heating system off and only start with the cleaning and maintenance work when the surfaces have cooled down.



3. Unscrew the wing nut (1) on the inspection hatch cover (2).
4. Remove the inspection hatch cover (2) from the flue pipe (3).
5. Check whether the flue gas pipe (3) needs cleaning.
6. If necessary, suction the ash out of the flue pipe using a vacuum cleaner (3).

Figure 7/22 - Cleaning the flue gas pipe

7. Fasten the inspection hatch cover firmly on the flue pipe with the wing nut.
8. Deactivate the maintenance function.
 - See section "Maintenance function" in this chapter.
 - ✓ The cleaning of the flue pipe is completed.

CLEANING THE PRESSURE EQUALISATION HOSE



The pressure equalisation hose is only available in connection with the HDG feeding system TBZ 150.

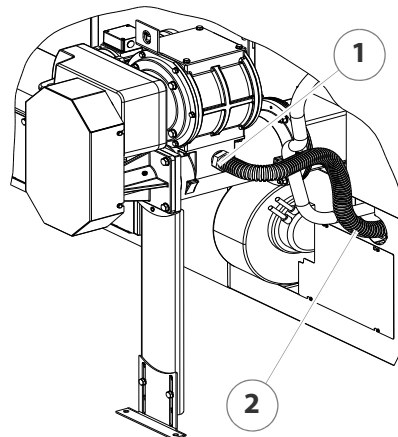
**Important!**

Observe the "Generally applicable safety instructions" in this section.

1. Activate the maintenance function.

See section "Maintenance function" in this chapter.

2. Allow the fire in the heating system to burn out and cool down.



3. Unscrew the DN 40 union nuts on the connection pieces of the feeding system (1) and on the connection pieces on the boiler using a pipe wrench.
4. Detach the pressure equalisation hose (2).

Figure 7/23 - Cleaning the pressure equalisation hose

5. Inspect the pressure equalisation hose (2) for dirt and dislodge it if necessary by forceful shaking and careful bending.
6. Check the two connections for dirt and remove it if necessary.
7. Mount the pressure equalisation hose in the reverse sequence.
8. Deactivate the maintenance function.

 See section “Maintenance function” in this chapter.

✓ The pressure equalisation hose is cleaned.

CLEANING FLY ASH SECTION

1. Activate the maintenance function.

 See section “Maintenance function” in this chapter.

2. Allow the fire in the heating system to burn out and cool down.

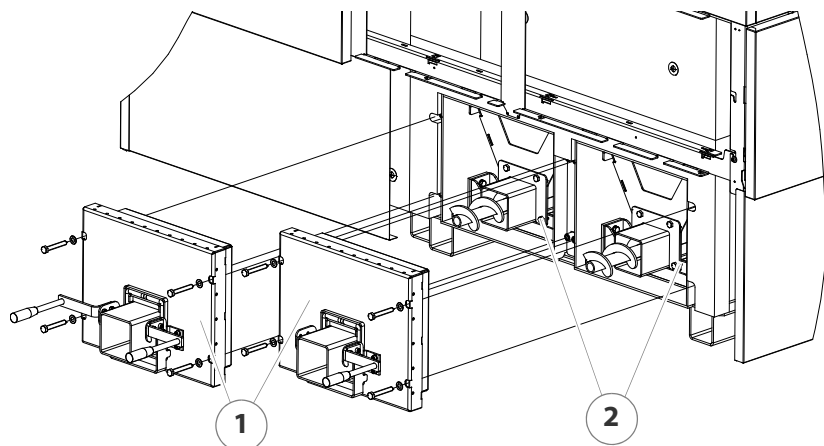



Figure 7/24 - Remove fly ash container


3. Do this by lifting up the clamp handle (4) and releasing the stop on the ash container (5).

4. Pull the ash container (5) forward out of the ash channel (3) of the ash removal system.
5. Remove the two cladding sections (1 + 2).
 -  See “Removing the cladding” in this section.
 - ✓ The fly ash section is cleaned.

INSPECTING THE FUEL STORAGE



Important!

-  Observe the “Generally applicable safety instructions” in this section.
-





Caution!

Risk of injury from automatically driven components

If the heating system is switched on, the delivery system in the fuel storage room may start unexpectedly. Hands and feet could thereby be crushed.

Turn off the main switch and secure it against being turned back on before you enter the fuel storage room. Follow the advice from the official safety organisation.

1. Activate the maintenance function.
 -  See section “Maintenance function” in this chapter.
 2. Allow the fire in the heating system to burn out and cool down.
 3. Open the access hatch.
 4. Inspect the fuel storage for the burning of unsuitable residues or foreign bodies and remove these if necessary.
 5. Close the access hatch.
 6. Deactivate the maintenance function.
 -  See section “Maintenance function” in this chapter.
- ✓ The inspection of the fuel storage is completed.

8 Troubleshooting



If a fault occurs in the heating system, the *Acknowledge fault* key flashes and the fault is shown in the display. Faults can be fixed as follows.

8.1 Procedure

1. Look for the displayed fault's cause and remedy in Table 8/1 - Faults.

2. Fix the fault, or have it fixed.



✓ The *Acknowledge fault* key lights up.

3. Acknowledge the fault with the *Acknowledge fault* key.



4. For faults which **affect safety**, switch the main switch off and back on again after waiting a few seconds.

✓ The fault message is no longer shown in the display.

✓ The fault is fixed.

8.2 Possible faults



Possible fault and warning messages are divided into three categories:

ES: Emergency stop. The boiler switches off.

FA: Fault. The boiler switches to the "burn-out" phase and then switches off.

WA: Warning! The boiler continues to run.

No.	Fault	Cause	Remedy
ES001	Emergency stop	<ul style="list-style-type: none"> Emergency stop switch was pressed Emergency stop switch was not connected properly or is not connected 	<ul style="list-style-type: none"> Unlock emergency stop switch and confirm with the <i>Acknowledge fault</i> key Check the electrical connection
ES017	Overpressure in combustion chamber	<ul style="list-style-type: none"> Overpressure in combustion chamber Heat exchanger dirty 	<ul style="list-style-type: none"> Clean heat exchanger

Table 8/1 - Faults

No.	Fault	Cause	Remedy
ES018	FC vacuum pressure controller defective	<ul style="list-style-type: none"> • Frequency converter of vacuum pressure control is defective • Vacuum pressure control is defective 	<ul style="list-style-type: none"> • Check frequency converter • Reset vacuum pressure control
NA019	Pressure control fan activated	<ul style="list-style-type: none"> • Fan defective • Time relay K55T/K55 in control cabinet defective • Pressure control defective 	<ul style="list-style-type: none"> • Check fan • Check time relay • Check pressure control
NA020	FC fan defective	<ul style="list-style-type: none"> • Frequency converter defective 	<ul style="list-style-type: none"> • Check frequency converter
FA033	Power supply available again	<ul style="list-style-type: none"> • Power failure • Main switch off 	<ul style="list-style-type: none"> • Press the <i>Acknowledge fault</i> key
FA034	Switching on	<ul style="list-style-type: none"> • The system was switched on 	<ul style="list-style-type: none"> • Press the <i>Acknowledge fault</i> key
FA035	Safety chain fault	<ul style="list-style-type: none"> • Relay in control cabinet faulty • Over temperature • Low on water • Overfilling triggered • Fuel storage door end switch is disconnected 	<ul style="list-style-type: none"> • Check relay in control cabinet • Check for excessive temperature • Check for insufficient water • Check for overfilling • Check fuel storage door end switch
FA036	Analogue module failed	<ul style="list-style-type: none"> • Analogue module faulty • Analogue module without power • Bus cable disconnected or not connected properly 	<ul style="list-style-type: none"> • Check the analogue module and power supply • Check the bus cable
FA037	Digital module failed	<ul style="list-style-type: none"> • Digital module faulty • Digital module without power • Bus cable disconnected or not connected properly 	<ul style="list-style-type: none"> • Check the digital module and power supply • Check the bus cable
ST038	Analog. module 2 failed	<ul style="list-style-type: none"> • Analogue module 2 faulty • Analogue module 2 without power • Bus cable disconnected or not connected properly 	<ul style="list-style-type: none"> • Check the analogue module 2 and power supply • Check the bus cable
ST039	Overpressure in combustion chamber	<ul style="list-style-type: none"> • Overpressure in combustion chamber • Heat exchanger dirty 	<ul style="list-style-type: none"> • Clean heat exchanger

Table 8/1 - Faults (continuation)

No.	Fault	Cause	Remedy
FA041	Motor protection triggered	<ul style="list-style-type: none"> • Motor incorrectly connected • Motor overload • Motor is faulty • Motor cable faulty • Protected switch faulty 	<ul style="list-style-type: none"> • Check the motor connection • Check the drive • Check the motor • Check the motor cable
FA049	Boiler overtemperature	<ul style="list-style-type: none"> • Supply temperature has exceeded 95°C • Relay in control cabinet faulty • Connection cable faulty • STB faulty 	<ul style="list-style-type: none"> • Let the boiler cool down • Check the relay • Check the connection cable • Check STB • Check the electrical connection
FA050	Flue gas temperature too low	<ul style="list-style-type: none"> • Connection cable faulty • Improperly worked clamping point • Ignition fan is faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check connection cable • Check clamping points • Check ignition fan • Check analogue module
FA051	Ignition fault 3 attempts!	<ul style="list-style-type: none"> • Ignition fan is faulty • Connection cable faulty • Combustion chamber temperature sensor is faulty • Line to combustion chamber temperature sensor faulty • No material available 	<ul style="list-style-type: none"> • Check ignition fan • Check the electrical connection • Check combustion chamber temperature sensor • Check fuel storage
FA052	Water pressure out of range	<ul style="list-style-type: none"> • Water pressure outside of the set range 	<ul style="list-style-type: none"> • Check pressure switch (min./max.)
FA053	Low on water	<ul style="list-style-type: none"> • Too little water in cycle • Relay in control cabinet faulty • Connection cable faulty • Insufficient water cut-out faulty 	<ul style="list-style-type: none"> • Refill water • Check the relay • Check the connection cable • Check the insufficient water cut-out • Check the electrical connection
FA054	Oil burner plug seal	<ul style="list-style-type: none"> • Oil burner plug seal not locked • Faulty limit switch • Connection cable faulty 	<ul style="list-style-type: none"> • Check lock • Check limit switch • Check the connection cable • Check the electrical connection
FA055	Combustion chamber sensor is faulty	<ul style="list-style-type: none"> • Combustion chamber temperature sensor is faulty • Line from combustion chamber temperature sensor faulty 	<ul style="list-style-type: none"> • Check the combustion chamber temperature sensor/line and replace if necessary

Table 8/1 - Faults (continuation)

No.	Fault	Cause	Remedy
FA056	Flue gas temperature sensor is faulty	<ul style="list-style-type: none"> Flue gas temperature sensor faulty Line from flue gas temperature sensor faulty 	<ul style="list-style-type: none"> Check the flue gas temperature sensor/line and replace if necessary
FA057	Exhaust temperature too high	<ul style="list-style-type: none"> Flue gas temperature above set maximum value 	<ul style="list-style-type: none"> Press the <i>Acknowledge fault</i> key
FA058	Ash box full	<ul style="list-style-type: none"> Set monitoring time for ash removal augers exceeded 	<ul style="list-style-type: none"> Empty ash box Reset time in the parameter 11 - 04 with <i>RESET</i>
ST059	Boiler temperature sensor is faulty	<ul style="list-style-type: none"> Boiler temperature sensor faulty Line from boiler temperature sensor faulty Outlet on analogue module faulty 	<ul style="list-style-type: none"> Check the flue gas temperature sensor/line and replace if necessary Check analogue module and replace if necessary
FA065	Feed system overfilling	<ul style="list-style-type: none"> The overfilling cover was opened Faulty limit switch Connection cable faulty Material blockage 	<ul style="list-style-type: none"> Close overfilling cover Check limit switch Check the electrical connection Eliminate material blockage
FA066	Dosage overfilling	<ul style="list-style-type: none"> The overfilling cover was opened Faulty limit switch Connection cable faulty Material blockage 	<ul style="list-style-type: none"> Close overfilling cover Check limit switch Check the electrical connection Eliminate material blockage
FA067	Overfilling Delivery system	<ul style="list-style-type: none"> The overfilling cover was opened Faulty limit switch Connection cable faulty Material blockage 	<ul style="list-style-type: none"> Close overfilling cover Check limit switch Check the electrical connection Eliminate material blockage
FA068	Overfilling Trough auger 2	<ul style="list-style-type: none"> The overfilling cover was opened Faulty limit switch Connection cable faulty Material blockage 	<ul style="list-style-type: none"> Close overfilling cover Check limit switch Check the electrical connection Eliminate material blockage
FA069	Lateral auger overfilling	<ul style="list-style-type: none"> The overfilling cover was opened Faulty limit switch Connection cable faulty Material blockage 	<ul style="list-style-type: none"> Close overfilling cover Check limit switch Check the electrical connection Eliminate material blockage

Table 8/1 - Faults (continuation)

No.	Fault	Cause	Remedy
FA070	Dosage container overfilling	<ul style="list-style-type: none"> • The overfilling cover was opened • Faulty limit switch • Connection cable faulty • Material blockage 	<ul style="list-style-type: none"> • Close overfilling cover • Check limit switch • Check the electrical connection • Eliminate material blockage
FA071	Foreign bodies in rotary feeder	<ul style="list-style-type: none"> • Foreign bodies in feed system or stoker auger • Transformer in control cabinet faulty • Motor is faulty 	<ul style="list-style-type: none"> • Check for foreign bodies • Moving forwards and backwards in the manual menu • Check transformer in control cabinet • Check the motor
FA073	Fuel storage door end switch	<ul style="list-style-type: none"> • Fuel storage door was opened • Faulty limit switch • Connection cable faulty 	<ul style="list-style-type: none"> • Close the door • Check limit switch • Check the cable • Check the electrical connection
FA074	Check material stop limit switch	<ul style="list-style-type: none"> • Limit switch triggered 1 filling at start 	<ul style="list-style-type: none"> • Checking the fill level indicator
ST075	Foreign bodies in rotary feeder 2	<ul style="list-style-type: none"> • Foreign bodies in feed system or stoker auger • Transformer in control cabinet faulty • Motor is faulty 	<ul style="list-style-type: none"> • Check for foreign bodies • Moving forwards and backwards in the manual menu • Check transformer in control cabinet • Check the motor
FA077	Pellet auger overfilling	<ul style="list-style-type: none"> • The overfilling cover was opened • Faulty limit switch • Connection cable faulty • Material blockage 	<ul style="list-style-type: none"> • Close overfilling cover • Check limit switch • Check the electrical connection • Eliminate material blockage
FA078	Overfilling of pellet auger at tube converter position 1	<ul style="list-style-type: none"> • The overfilling cover was opened • Faulty limit switch • Connection cable faulty • Material blockage 	<ul style="list-style-type: none"> • Close overfilling cover • Check limit switch • Check the electrical connection • Eliminate material blockage
FA079	Overfilling of pellet auger at tube converter position 2	<ul style="list-style-type: none"> • The overfilling cover was opened • Faulty limit switch • Connection cable faulty • Material blockage 	<ul style="list-style-type: none"> • Close overfilling cover • Check limit switch • Check the electrical connection • Eliminate material blockage

Table 8/1 - Faults (continuation)

No.	Fault	Cause	Remedy
FA080	Overfilling of pellet auger at tube converter position 3	<ul style="list-style-type: none"> • The overfilling cover was opened • Faulty limit switch • Connection cable faulty • Material blockage 	<ul style="list-style-type: none"> • Close overfilling cover • Check limit switch • Check the electrical connection • Eliminate material blockage
FA081	Walking floor safety chain	<ul style="list-style-type: none"> • Relay in control cabinet faulty • Hydraulic float switch faulty • Fuel storage door was opened • Emergency stop button on boiler was pressed 	<ul style="list-style-type: none"> • Check relay in control cabinet • Check float switch • Check door end switch • Unlock emergency stop button
FA082	Check walking floor hydraulic oil level	<ul style="list-style-type: none"> • Oil level in hydraulic component too low • Float switch faulty • Connection cable faulty 	<ul style="list-style-type: none"> • Check oil level • Check float switch • Check the cable • Check the electrical connection
FA083	Walking floor emergency stop	<ul style="list-style-type: none"> • The emergency stop switch of the walking floor was pressed • Cable faulty 	<ul style="list-style-type: none"> • Unlock emergency stop button • Check the cable
FA084	Walking floor lateral auger overfilling	<ul style="list-style-type: none"> • The overfilling flap was opened • Faulty limit switch • Connection cable faulty • Material blockage 	<ul style="list-style-type: none"> • Close the overfilling flap • Check switch • Check the electrical connection • Eliminate material blockage
FA085	Walking floor motor protection triggered	<ul style="list-style-type: none"> • Motor incorrectly connected • Motor overload • Motor is faulty • Motor cable faulty 	<ul style="list-style-type: none"> • Check the motor connection • Check the drive • Check the motor • Check the motor cable
FA086	Walking floor door end switch at fuel storage	<ul style="list-style-type: none"> • Fuel storage door was opened • Faulty limit switch • Connection cable faulty 	<ul style="list-style-type: none"> • Close the door • Check limit switch • Check the cable
FA087	Moving floor hydraulic unit pressure switch is faulty	<ul style="list-style-type: none"> • Pressure switch faulty 	<ul style="list-style-type: none"> • Check pressure switch and replace if necessary
ST090	Primary air fan defective	<ul style="list-style-type: none"> • Thermal contact in fan is faulty • Relay in control cabinet faulty • Plug contacts on the fan are faulty 	<ul style="list-style-type: none"> • Check thermal contact • Check the relay • Check plug contact

Table 8/1 - Faults (continuation)

No.	Fault	Cause	Remedy
ST091	Secondary air fan defective	<ul style="list-style-type: none"> • Thermal contact in fan is faulty • Relay in control cabinet faulty • Plug contacts on the fan are faulty 	<ul style="list-style-type: none"> • Check thermal contact • Check the relay • Check plug contact
ST092	Stepping grate blocked	<ul style="list-style-type: none"> • Grate runtime monitoring faulty • Stepping grate blocked • Motor is faulty • Drive chain torn 	<ul style="list-style-type: none"> • Check limit switch (orange LED lights up with contact) • Check stepping grate • Check the motor • Check drive chain
ST093	Ash auger grate blocked	<ul style="list-style-type: none"> • Ash auger runtime monitoring faulty • Ash auger blocked • Motor is faulty • Drive chain torn 	<ul style="list-style-type: none"> • Check limit switch (orange LED lights up with contact) • Check ash auger • Check the motor • Check drive chain
ST094	Klixon grate drive	<ul style="list-style-type: none"> • Thermal contact in motor is faulty • Overheating of motor 	<ul style="list-style-type: none"> • Check thermal contact • Let motor cool down
ST095	Return pump faulty	<ul style="list-style-type: none"> • Relay in control cabinet faulty • Return pump faulty • Control unit (0-10V) faulty 	<ul style="list-style-type: none"> • Check the relay • Check return pump • Check control unit
ST098	Container 1 + 2 empty	<ul style="list-style-type: none"> • Faulty limit switch • Removable container empty 	<ul style="list-style-type: none"> • Check limit switch • Fill removable container
WA193	Boiler temperature sensor faulty	<ul style="list-style-type: none"> • Supply sensor faulty • Line faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check supply temperature sensor • Check the electrical connection • Replace analogue module
WA194	Return temperature sensor is faulty	<ul style="list-style-type: none"> • Return line sensor faulty • Line faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check return line sensor • Check the electrical connection • Replace analogue module
WA195	Accumulator top temperature sensor faulty	<ul style="list-style-type: none"> • Accumulator sensor faulty • Line faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check accumulator sensor • Check the electrical connection • Replace analogue module
WA196	Accumulator top temperature sensor faulty	<ul style="list-style-type: none"> • Accumulator sensor faulty • Line faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check accumulator sensor • Check the electrical connection • Replace analogue module

Table 8/1 - Faults (continuation)

No.	Fault	Cause	Remedy
WA197	Accumulator lower temperature sensor faulty	<ul style="list-style-type: none"> • Accumulator sensor faulty • Line faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check accumulator sensor • Check the electrical connection • Replace analogue module
WA198	Combustion unit temperature faulty	<ul style="list-style-type: none"> • Combustion chamber temperature sensor is faulty • Line faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check combustion chamber temperature sensor • Check the electrical connection • Replace analogue module
WA199	Heat exchanger cleaning drives defective	<ul style="list-style-type: none"> • Motor is faulty 	<ul style="list-style-type: none"> • Check the motor
WA200	Check ash auger heat exchanger	<ul style="list-style-type: none"> • Ash augers runtime monitoring faulty • Ash auger blocked • Motor is faulty • Drive chain torn 	<ul style="list-style-type: none"> • Check limit switch (orange LED lights up with contact) • Check ash auger • Check the motor • Check drive chain
WA202	Combustion chamber temperature sensor 2 faulty	<ul style="list-style-type: none"> • Combustion chamber temperature sensor is faulty • Line faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check combustion chamber temperature sensor • Check the electrical connection • Replace analogue module
WA203	Flue gas sensor faulty	<ul style="list-style-type: none"> • Flue gas temperature sensor faulty • Line from flue gas temperature sensor faulty 	<ul style="list-style-type: none"> • Check the flue gas temperature sensor/line and replace if necessary
WA205	Accumulator top middle temperature sensor faulty	<ul style="list-style-type: none"> • Accumulator sensor faulty • Line faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check accumulator sensor • Check the electrical connection • Replace analogue module
WA206	Accumulator lower middle temperature sensor faulty	<ul style="list-style-type: none"> • Accumulator sensor faulty • Line faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check accumulator sensor • Check the electrical connection • Replace analogue module
WA208	Replace buffer battery	<ul style="list-style-type: none"> • Memory battery of control unit discharged 	<ul style="list-style-type: none"> • Replace memory battery
WA209	Cleaning system faulty	<ul style="list-style-type: none"> • Motor incorrectly connected • Motor overload • Motor is faulty • Motor cable faulty • Faulty limit switch 	<ul style="list-style-type: none"> • Check the motor connection • Check the drive • Check the motor • Check the motor cable • Check limit switch

Table 8/1 - Faults (continuation)

No.	Fault	Cause	Remedy
WA210	Lambda sensor Heating faulty	<ul style="list-style-type: none"> • Heating element of lambda sensor faulty • Lambda sensor faulty • Relay in control cabinet faulty • Fuse F12 blown 	<ul style="list-style-type: none"> • Check the electrical connection • Replace lambda sensor • Replace relay • Unlock automatic circuit breaker F12
WA211	Lambda sensor sensor	<ul style="list-style-type: none"> • Heating element of lambda sensor faulty • Lambda sensor faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check the electrical connection • Replace lambda sensor • Check analogue module
WA212	Lambda sensor faulty	<ul style="list-style-type: none"> • Heating element of lambda sensor faulty • Lambda sensor faulty • Analogue module faulty 	<ul style="list-style-type: none"> • Check the electrical connection • Replace lambda sensor • Check analogue module
WA213	Check pellet container filling level	<ul style="list-style-type: none"> • Pellet storage space empty 	<ul style="list-style-type: none"> • Check pellet storage space and fill if necessary
WA215	Runtime vacuum junction, anticlockwise	<ul style="list-style-type: none"> • Tube converter blocked • Faulty reference limit switch • Fuse triggered • Motor incorrectly connected • Motor overload • Motor is faulty • Motor cable faulty 	<ul style="list-style-type: none"> • Check tube converter • Check reference limit switch • Check fuse • Check the motor connection • Check the drive • Check the motor • Check the motor cable
WA216	Runtime vacuum junction, clockwise	<ul style="list-style-type: none"> • Tube converter blocked • Faulty reference limit switch • Fuse triggered • Motor incorrectly connected • Motor overload • Motor is faulty • Motor cable faulty 	<ul style="list-style-type: none"> • Check tube converter • Check position limit switch • Check fuse • Check the motor connection • Check the drive • Check the motor • Check the motor cable
WA217	Walking floor not enabled	<ul style="list-style-type: none"> • Switch in control cabinet not switched on • Fault not acknowledged 	<ul style="list-style-type: none"> • Switch on the switch in the control cabinet • Acknowledge fault
WA218	Walking floor is switched off	<ul style="list-style-type: none"> • Information on walking floor activity 	
WA224	Boiler-2 faulty	<ul style="list-style-type: none"> • Fault with boiler 2 	<ul style="list-style-type: none"> • Remove fault
WA225	Please empty ash box!	<ul style="list-style-type: none"> • Set monitoring time for ash removal augers exceeded 	<ul style="list-style-type: none"> • Empty ash box • Reset time in the parameter 11 - 04 with <i>RESET</i>

Table 8/1 - Faults (continuation)

No.	Fault	Cause	Remedy
WA226	Please lubricate screw stoker bearing!!	<ul style="list-style-type: none"> Set monitoring time for stoker auger exceeded 	<ul style="list-style-type: none"> Lubricate stoker auger Reset time in the parameter 11 - 03 with <i>RESET</i>
WA228	Please fill fuel storage room soon!!	<ul style="list-style-type: none"> Set monitoring time for filling WA-1 fuel storage room exceeded 	<ul style="list-style-type: none"> Fill fuel storage room Reset time in the parameter 11 - 05 with <i>RESET</i>
WA229	Fill fuel storage room!!	<ul style="list-style-type: none"> Set monitoring time for filling WA-2 fuel storage room exceeded 	<ul style="list-style-type: none"> Fill fuel storage room Reset time in the parameter 11 - 05 with <i>RESET</i>
WA230	Carry out service soon please!!	<ul style="list-style-type: none"> Set WA-1 monitoring time for service exceeded 	<ul style="list-style-type: none"> Carry out service Reset time in the parameter 11 - 05 with <i>RESET</i>
WA231	Carry out service!!	<ul style="list-style-type: none"> Set WA-2 monitoring time for service exceeded 	<ul style="list-style-type: none"> Carry out service Reset time in the parameter 11 - 05 with <i>RESET</i>
WA233	Please empty fly ash container	<ul style="list-style-type: none"> Set monitoring time for emptying fly ash container exceeded 	<ul style="list-style-type: none"> Empty fly ash container Reset time in the parameter 11 - 04 with <i>RESET</i>
WA241	Container 1 not in position	<ul style="list-style-type: none"> Faulty limit switch Removable container not in position 	<ul style="list-style-type: none"> Check limit switch Check position of removable container
WA242	Container 1 empty	<ul style="list-style-type: none"> Faulty limit switch Removable container empty 	<ul style="list-style-type: none"> Check limit switch Fill removable container
WA243	Container 2 not in position	<ul style="list-style-type: none"> Faulty limit switch Removable container not in position 	<ul style="list-style-type: none"> Check limit switch Check position of removable container
WA244	Container 2 empty	<ul style="list-style-type: none"> Faulty limit switch Removable container empty 	<ul style="list-style-type: none"> Check limit switch Fill removable container
WA245	No container selected	<ul style="list-style-type: none"> Control unit faulty 	<ul style="list-style-type: none"> Check control unit
WA246	Traverse auger container 1 full	<ul style="list-style-type: none"> Photoelectric barrier faulty Traverse auger overfull Traverse auger motor faulty 	<ul style="list-style-type: none"> Check photoelectric barrier Check traverse auger Check the motor
WA247	Traverse auger container 2 full	<ul style="list-style-type: none"> Photoelectric barrier faulty Traverse auger overfull Traverse auger motor faulty 	<ul style="list-style-type: none"> Check photoelectric barrier Check traverse auger Check the motor

Table 8/1 - Faults (continuation)

9 Notes on dismantling and disposal

9.1 Dismantling




Danger!

Material damage and personal injury due to incorrect dismantling
Dismantling the system requires comprehensive specialist knowledge. If the boiler is dismantled by an untrained person, injuries may occur.

Only allow authorised specialists to dismantle the system.

The heating system can be dismantled as follows:

1. Set the engage switch to "0".

 See the chapter entitled „6 Using the heating system“ section „6.3 Switching off the heating system“.

- ✓ The heating system is switched off; the supplying of fuel is stopped; the combustion air fan continues running for a preset burn-out time.

2. Allow the fire in the boiler to burn out and wait until the combustion air fan switches off.



3. Turn the heating system main switch off.

- ✓ The system has been de-energised.

4. Switch the circuit breaker for the heating system off.

5. Disconnect the boiler from the electrical power supply.

6. Once it has cooled down, drain the heating water from the system.

7. Observe the safety regulations for personnel when disconnecting the boiler from the heating system.

8. Dismantle the individual components of the boiler.

- ✓ The boiler has been dismantled.

9.2 Disposal

The following components are made of steel and can be recycled via a local recycling centre.

- Boiler without motors
- Claddings
- Feeding system without motor
- Transfer station without motor
- Delivery system

The electrical components can also be recycled via a local recycling centre.

Fibreglass, mineral wool and plastic parts such as suction hoses etc. should be handed in to the respective waste disposal centres.

The geared motors used consist largely of materials which can be recycled. If a geared motor cannot be handed over complete to a suitable company for proper disposal, proceed as follows:

1. The gear oil must be drained into a suitable container.
2. The geared motor should be dismantled into its separate components and cleaned if necessary.
3. Metal parts should be recycled.



Oily or greasy components and condensers may only be disposed of through a specialist waste disposal centre.

10 Declaration of Conformity



EC Declaration of Conformity

in accordance with Section A of Part 1 of Annex II of the
EC Directive 2006/42 on machinery



Producer:

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

Resident of the EC authorized to assemble the adequate technical documentation:

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

Description and identification of the machinery:

Product: HDG M
Type: HDG M300/350/400

We definitely declare hereby that the machinery complies with each and every relevant provision of the following EC Directives:

2006/42/EC:2006-05-17	EC Directive on machinery 2006/42/EC
2006/95/EC:	(Low Voltage Directive) Directive of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to Electrical Equipment designed for use within certain voltage limits (codified version) (1)
2004/108/EC:	Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC

In accordance with section 2 of article 7 the applied harmonized regulations are to be found under:

EN 60335-1:2002	Household and similar electrical appliances Safety - Part 1: General requirements
EN 60204-1:2006-06	Safety of Machinery - Electrical Equipment of Machines - Part 1: General requirements
EN ISO 14121-1:2007	Safety of machinery –Risk assessment - Part 1: Principles (ISO 14121-1:2007)

Further technical standards and specifications applied are to be found under:

EN ISO 12100-1:2003-11	Safety of machinery — Basic concepts, general principles for design - Part 1: Basic terminology, methodology
EN ISO 12100-2:2003-11	Safety of machinery — Basic concepts, general principles for design - Part 2: Technical principles
EN 303-5:1999	Part 5: Heating boilers for solid fuels, hand and automatically fired, nominal heat output of up to 300 kW. Terminology, requirements, testing and marking

Massing, 17.05.2013

Place, date

Signature
Martin Ecker
CEO

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NOTICE

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