

# Operating instructions



**firestar 18 – 40 Lambda**

## INTRODUCTION

**Dear Customer,**

Your heating system is operated using a HERZ firestar boiler unit and we are pleased to be able to welcome you to the wide circle of satisfied operators of HERZ equipment. The HERZ biomass furnace system is the result of many years of experience and further development. Please take into account that a good product also requires the correct service and maintenance, in order to be able to fulfil its function. Therefore, please read through this documentation carefully – it will be worthwhile. Please take particular note of the safety notes. Adhering to the operating regulations is a precondition of any claim against the factory guarantee. In the event of faults, please contact your heating specialist or the HERZ factory customer service.

Yours sincerely

**HERZ- Energietechnik**

We reserve the right to make technical changes.

Version 01/2014

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## 1 SAFETY NOTES

- Please read the documentation carefully prior to commissioning and pay particular attention to the marked safety notes. Please look up in these instructions anything about which you are unsure.
- Ensure that you understand the instructions in this manual and that you are sufficiently informed about the functioning of the biomass furnace system. HERZ is at your disposal at all times for any questions.
- For safety reasons the operator must not alter the system, the construction or its condition, without the agreement of the manufacturer or their authorised representative.
- Ensure you have sufficient fresh air entering the boiler room. (Please take note of any regional regulations or directives).
- The tightness of all connecting points is to be monitored before the system is started up.
- A portable fire extinguisher of the prescribed size must be placed in front of the boiler room. (Please take note of any regional regulations or directives).
- When opening the combustion chamber doors take care that no flue gas and sparks are released. Never leave the combustion chamber door open. Toxic gases may be emitted.
- Never heat up the boiler with liquid fuels such as petrol or similar.
- Carry out maintenance work (maintenance plan) regularly or make use of our customer services. (TRVB minimum maintenance interval are to be respected)
- When maintaining the system or opening the control system the power supply must be interrupted and the general valid safety regulations respected.
- No fuels should be stored outside the equipment in the boiler room Furthermore, the storage of items not required for operating the equipment is not permitted in the boiler room.
- Always use low voltage lamps for lighting the storeroom (these must be approved for use by each manufacturer).
- The equipment can only be operated using designated fuels.
- Prior to further transportation of ashes, these must be cooled down for a minimum period of 96 hours before storage.
- If you have any questions, please contact us on telephone no. +43 3357 / 42840-840.
- The first start-up must be carried out by HERZ factory customer service or an authorised specialist. (otherwise guarantee claims are invalid)
- The boiler conform the regulation of the Swiss VKF and respectively the particular state regulations regarding fire prevention. The costumer is fully responsible for the compliance with those regulations.

## 1.1 Warning notes

	Risk of injury from incorrect handling of the equipment. Material damage may also occur.
	Warning – hot surfaces
	Warning – injury to hands
	No access for unauthorised persons

However, adherence to guidelines for transportation, installation, operation and maintenance notices as well as technical data (in the operating instructions, product documentation and on the equipment itself) which are not specifically highlighted, is also vital to avoid breakdowns which may directly or indirectly cause major personal or material damage.

### General note

For reasons of clarity and possible permutations, this documentation does not contain all detailed information and cannot take account of every conceivable operating or maintenance scenario. Should you require further information or encounter specific problems, which are not handled in detail in the documentation supplied, you can obtain the required information from your specialist dealer or direct from HERZ.

People (including children) who are not in a position to use the equipment safely due to their physical, sensory or mental capacities or their inexperience or lack of knowledge should not use this equipment without supervision or instruction by a responsible person.

## Basic safety information



Due to its functionally limited electrical and mechanical characteristics with regard to usage, operation and maintenance, if the equipment is not able to work according to its appropriate use or improper interference occurs, it may cause serious health and material damage. It is therefore conditional that the planning and implementation of all installations, transportation, operation and maintenance will be carried out and supervised by responsible, qualified persons.



When operating electrical equipment certain parts are inevitably under electrical tension or mechanical stress. Only appropriately qualified staff may work on the equipment. Staff must be basically familiar with the content of these and all other instructions. The smooth and safe use of this equipment is dependent upon appropriate transportation and storage as well as designated operation and careful maintenance. Notes and indications on the equipment must also be observed.

## 1.2 Installation



### General notes

In order to guarantee correct functioning of the equipment, the installation of the equipment must be carried out with adherence to the relevant standards and installation regulations of the manufacturer.

Manufacturer documents for the devices and components being used the equipment are available from HERZ upon request.



### 1.3 Operation and maintenance

#### 1.3.1 General notes

	For safe operation and maintenance of all equipment, it is assumed that actions will be carried out appropriately by qualified staff, taking heed of the warning notes in this documentation and the notes on the equipment.
	Under incorrect operating conditions, temperatures above 80°C could occur at parts of the casing.

#### 1.3.2 Operation

##### General safety notes

	Coverings that prevent the moving of hot or rotating parts or which are required for the correct supply of air and effective functioning must not be opened during operation.
	Any faults or unusual operating conditions such as the emission of smoke or the appearance of flames mean that the equipment must be immediately switched off using EMERGENCY OFF. The HERZ factory customer service must then be notified of this straight away.

- When the main switch at the back of the boiler is deactivated or if the power supply fails, the equipment immediately goes out of operation. The residual amount of fuel burns independently without toxic gases being given off, provided that the naturally occurring chimney draw is sufficiently high. The chimney must therefore be dimensioned and designed according to EN 13384. When resetting the installation it is obligatory to check for serviceability and to ensure safe operation of the total installation.
- The noise caused by the machinery during operation does not have any adverse effects upon the health of people.




#### 1.3.3 Maintenance

##### General safety measures



Before commencing any work on the equipment, but particularly before opening coverings of parts under voltage, the equipment must be enabled according to the instructions. As well as the main electrical circuit, any additional or auxiliary circuits should be noted. The usual safety rules according to ÖNORM are:

- Switch off all poles on all sides
- Ensure that they is not switched on again
- Check that there is no voltage
- Earth and short-circuit
- Covering neighbouring live parts and isolate dangerous parts

	The aforementioned measures may only be retracted once the equipment is completely installed and the maintenance completed.
	For overhaul work in the combustion chamber, ash chamber, on flue gas-carrying parts, emptying of the ash store, etc., the use of personal dust protection masks and gloves is required.
	For overhaul work in the storage room, low voltage bulbs must be used. The design of electrical equipment in the storeroom must conform to ÖNM7137.

In order to prevent any commissioning errors due to incorrect maintenance, it is recommended that regular maintenance servicing be carried out by authorised staff or the HERZ factory customer service.

Spare parts may only be obtained direct from the manufacturer or sales partner. No health risks will be caused to the customer from noise arising from the machinery. Details of any residual risks can be requested from the residual risk analysis from Herz as required.

## 2 FUELS

The HERZ – firestar is suitable for burning logs to operate central heating systems for closed hot water installations. Smaller split logs enable higher boiler performance than whole ones. We recommend triangular firewood with side lengths of 50cm and edge lengths of 8cm. Too coarse or too long firewood may lead to reduced performance and hollow fire. The heat value of the wood is primarily dependent on its moisture content. The heat value decreases with increased moisture. The combustion of wood with high moisture content also causes a decrease in the degree of efficiency of the boiler.

Wood should therefore be stored for at least two years in a dry, ventilated place. Oak needs to be stored for about a year longer. Dry bark displays a heat value similar to wood but there is more likely to be increased formation of ash.

The burning of **unsuitable fuels** could lead to uncontrolled combustion. The guarantee becomes invalid! Operational faults and consequential damage are likely to occur.

Possible consequential damage:

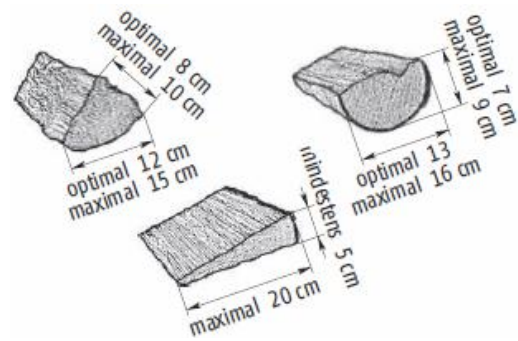
- Damage to the thermodynamic combustion chamber, the lambda probe, the flue gas probe due to aggressive residues in the boiler.
- Sooting or corrosion in the filling area due to condensation as a result of using fuel that is too moist.
- The escape of flue gas from the airflow apertures through uncontrolled combustion (deflagrations).

### Combustion time at nominal load up to

Type	Combustion time in hours			
	FS 18	FS 20	FS 30	FS 40
Softwood	5	6,5	6	3,5
Hardwood	6	8	7	4,5
Wood chips	3	4	3,5	2,5

### 2.1 Suitable fuels

The firewood must be air dried, that is, dried at least one year with water content below 20%, preferable half-meter logs with an average diameter of 10cm. Are the cleavage planes of the log much longer, according to the log should be thinner, in extreme cases 20 to 5cm.



Small sized material may be burned only as admixture. From the smaller material may be added less. Wood briquette with 6 to 10 cm diameter according EN 14961-3.

### Only one oversized log each boiler filling.

To split a root stock to such thin pieces is very hard work. Per boiler filling maximum one large root stock piece are burned up in the stack.



Type of wood	Calorific values (by wood moisture 25%) in kWh/ster
Beech	1890
Oak	1930
Pine	1520
Spruce	1330



We recommend the use of beech wood. Do not mix different types of wood. The use of one type of wood promotes a consistent burn-off. However, if it cannot be avoided to use different types of wood, the boiler must be filled in layers (softwood below, hardwood above)

### 2.2 Not suitable fuels

When burning wet fuel with more than 30% water content, condensation water formation and corrosion on the walls of the filling chamber occur.

Furthermore should not be burned:

Garbage, plastics, paper and cardboard (only for starting the fire) sanding dust, wood shavings, wood chips smaller than thumb-size, coal and coke, the respective Clean Air Act (state law) usually prohibited fuels such as old railroad ties, plastics, particle board, impregnated wood....

### 3 STARTING UP A COLD SYSTEM

After a long period of not being used, you should take particular note of the following points when starting up the system:

- Where the equipment has cooled down, the boiler requires a proportionate amount of time to reach temperature if all heat consumers are switched on during the heating up process. Therefore, firstly put only one small heating circuit into operation and only switch the other heating circuits on when the boiler has reached its operating temperature. The first start-up should only be carried out by HERZ factory customer service or persons authorised as such.



## 4 HANDLING OF THE HEATING SYSTEM

### 4.1 Sealing the boiler

It is imperative that all doors are closed during operation so that no leak air can disrupt the combustion process. If this is not observed then damage to the boiler may result.

### 4.2 Operation with low performance decrease

Should fuel be burned in the transition period (spring or autumn) it is vital to ensure that for low decreased performance (less than 50%) the filling shaft is not completely put on. Decreased performance of less than 50%, means the boiler and the chimney may become clogged with soot. It is also possible that smoke may develop in the chimney. The firestar boiler should therefore basically be operated equipped with a **correctly dimensioned buffer** (according to EN 303-5). Recommended dimensions are listed in the document "installation instructions".

### 4.3 Overheating of the boiler

Should the boiler temperature exceed maximum boiler temperature, the safety temperature limiter switches the controls off and the warning light illuminates. After the equipment has cooled off under about 75°C, the Safety Temperature Limiter (STL) should be tripped by unscrewing the covering cap (press the knob). Then screw up the covering cap again afterwards. Before re-starting the cause of the overheating should be identified and corrected.

#### Thermal flow protection

If the boiler overheats then the "thermal flow protection" opens automatically (at 95°C) via a sensor and cold water flows through the heat exchanger. The boiler water is thereby cooled off and dangerous operating conditions are prevented. The water heated up in the heat exchanger must be able to run away freely (directly into the waste water channel). After the boiler water has cooled off to about 90°C the "thermal flow safeguard" automatically interrupts the cold water feed. After cooling off, the equipment pressure and/or water level of the equipment is to be controlled and if necessary the missing amount of water topped up. According to DIN 4751 sheet 2, the operator is obliged to regulate the functioning of the "thermal flow safeguard" and the heat exchanger belonging to it at least once a month by activating the test button. Furthermore this safety instruction is to be

monitored once a year by the manufacturing company or another competent organisation.

#### **Note:**

Where there is a combined non-functioning of the "thermal flow protection" and heat exchanger, the set-up of the equipment is prohibited.

### 4.4 Sweating of the boiler

During long-term operation it should be guaranteed that the return flow temperature does not fall below 65°C. For this reason a return flow temperature bypass is obligatory.

#### **Note:**

Corrosion damage caused by too low return flow temperatures, do not come under the guarantee or warranty claims.

### 4.5 Taking out of operation

The mains switch should not be turned to "OFF" during the burn-off but only after complete burn-off. (Status: **unit off (1)**)

## 5 BOILER OPERATION

### 5.1 Preparation for heating up

If possible, store enough fuel for two or three combustion processes near the boiler room.

#### Prepare firewood

The firewood must correspond to size (circumference 8 – 10cm) and dimensions to the size of the boiler. Firewood without bark burns better.

### 5.2 Heating up

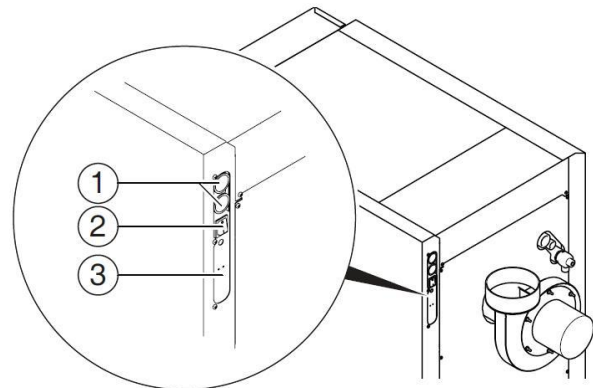
	<p>Warning: Risk of system damage due to improper maintenance!</p> <p>Wrong position or lack of firebricks inside the boiler can lead to damage or destruction of the boiler.</p> <ul style="list-style-type: none"> <li>Before heating up the boiler, check the position of the firebricks.</li> </ul>
	<p>Warning: Risk of system damage due to improper maintenance!</p> <p>Excessive fuel feeding can cause overheating and damage to the boiler.</p> <ul style="list-style-type: none"> <li>Adapt the amount of fuel to the energy absorption capacity of the heating system.</li> </ul>
	<p>Crucial for the clean burn-off in the boiler are the correct operation of the boiler as well as a sufficient feed pressure of the exhaust system.</p>

In the following a possibility for the heating up of the boiler is described. Depending on the ambient conditions (draft, exhaust system, wood, and so on) other heating up processes may be better.

Get familiar with the boiler and find out the best handling for you to use. Test the best opportunity for heating up the boiler.

Please note always the safety notes!

- Switch on the main switch [2] and regulator (→ On/Off – button, page 18). The regulator displays status 1.



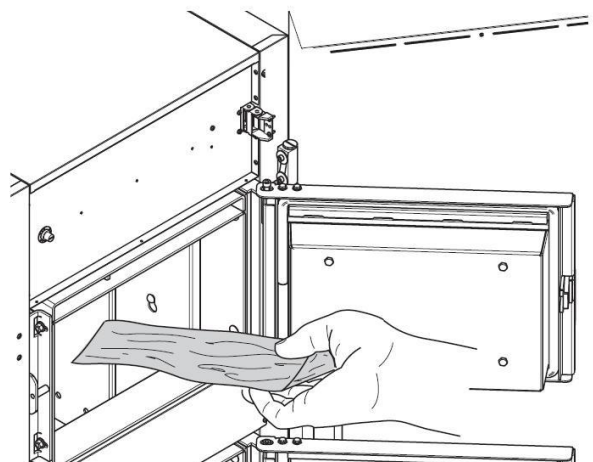
- 1 ... Cable bushing
- 2 ... Main switch
- 3 ... Electric supply

- After the casing door is opened the “burning” phase (Status: 2) starts automatically.



If it is not desired or necessary to heat up the boiler, this process can be interrupted with a long press of the On/Off button.

- To form a good flame it is recommended that the lower third of the filling shaft be filled with small pieces of wood.
- After that normally chopped wood (size around 8cm) can be used for filling.



- Then open the lighting up door (4) and light up with an oil ignition, wood shavings or cardboard.

- When the flue gas temperature is more than 120°C, close all doors

By sufficient feed pressure a firebed (draft) is built up and the wood in the filling room is burning von bottom to top.

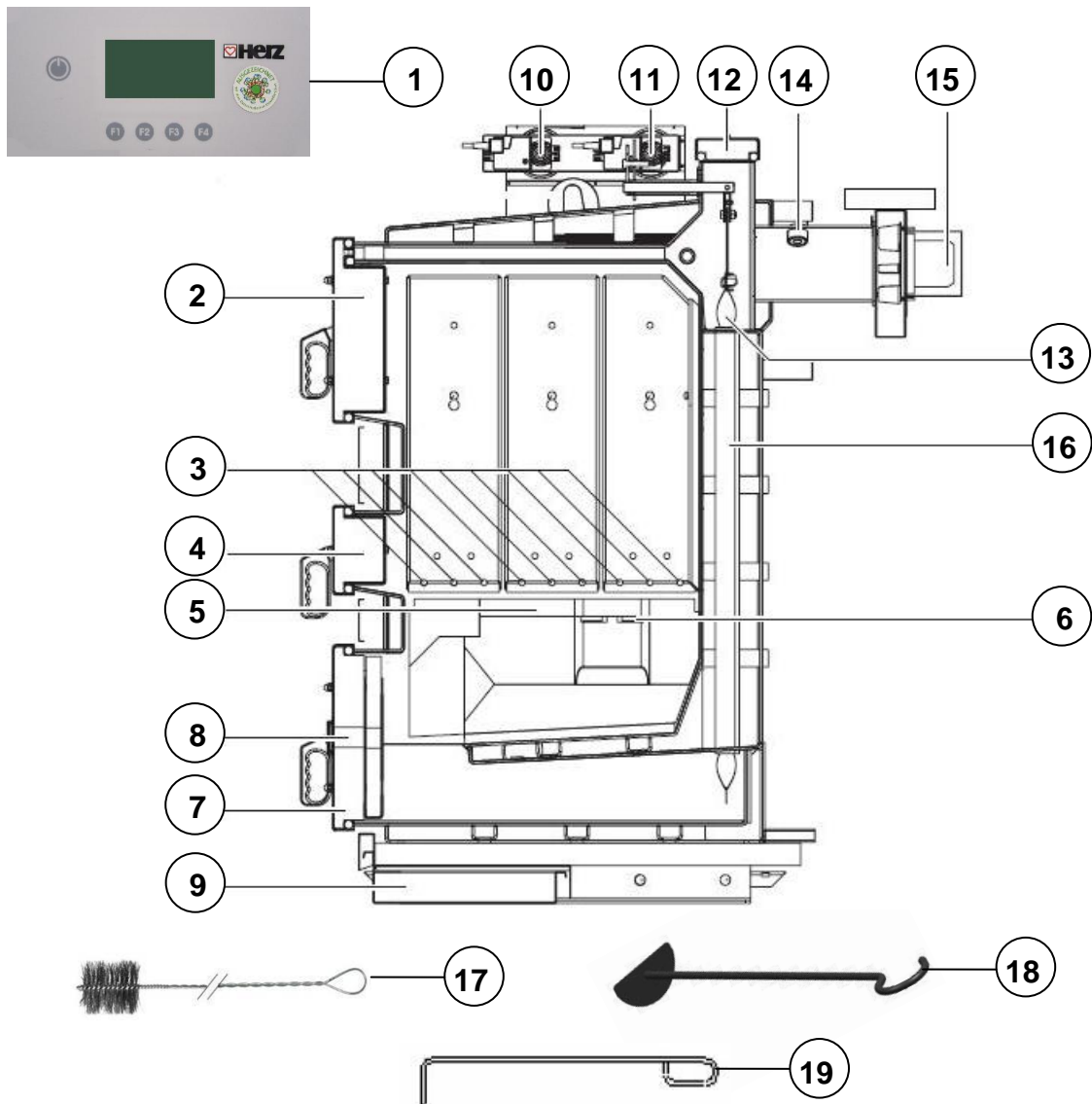
	<p>Too short and thick wood logs lead to an uneven burning behaviour. Too short and thin wood reduces the burning time</p> <p>→ Only use wood logs according to specification</p>
	<p>During operation, all doors must be closed to ensure that no false air can disturb the combustion process.</p>
	<p>The heating-up time can change due to the cleaning condition of the boiler, the local conditions, the used fuels and the weather changes (low pressure in the exhaust system).</p>

The boiler operates according to the principle of the lower burn-up. The control device controls the boiler automatically and completely.

### 5.3 Energy absorption capacity / STL

The energy absorption capacity of the heating system (in general consisting of the boiler and buffer) depends on the actual value of the water temperature of the buffer. For economic operation of the heating system, the amount of the used fuel must be adjusted to the relative energy absorption capacity. As a result, the overheating of the boiler is avoided and the pollutant emission is reduced. By significantly transgression of the maximum boiler temperature, the safety temperature limiter switches off the controller. If the system is cooled below 75°C the safety temperature limiter (STL) must be unlocked.

- Unscrew the cover cap of the STL
- Press the button of the STL. The STL is unlocked.
- Screw on the cover cap again.
- Before resuming operation: Find and fix the cause of failure



**Legend:**

- |                              |                               |                                      |
|------------------------------|-------------------------------|--------------------------------------|
| 1... Control NanoControl     | 8 ... Viewing glass           | 15 ... Ventilator                    |
| 2 ... Filling shaft door     | 9 ... Ash tray                | 16 ... Heat exchanger pipes          |
| 3 ... Primary air feed       | 10 ... Secondary air aperture | 17 ... Cleaning brush                |
| 4 ... Lighting-up door       | 11 ... Primary air aperture   | 18 ... Bellows for burner plate      |
| 5 ... Burner plate           | 12 ... Cleaning cover         | 19 ... Bellows for primary air feeds |
| 6 ... Secondary air aperture | 13 ... Turbulators            |                                      |
| 7 ... Ash doors              | 14 ... Lambda sensor          |                                      |

## 5.4 Re-heating

Depending on the wood type and quality the burning time of a filled boiler by nominal capacity is about three to eight hours.



By intermediate opening of the front door or the filling room door the combustion is disturbed. These can lead to a poorer combustion behaviour and excessive escape of flue gas.

- ➔ Filling should burn down completely

To refill fuel or to check the level:



- Open the casing door – with the ventilator going at full speed, so that the flue gas is sucked out via the smoke flue channel by opening the filling shaft door (2).
- Slowly open the filling shaft (2)
- Put in the fuel
- Close the filling shaft door and casing door.



- A quick covering of the glow with wood logs reduces the leakage of hot gases from the filling room. Refill only as much fuel as for the energy absorption capacity of the system is permitted.



- Pay attention to the lower buffer temperature. If the buffer is already loaded (lower buffer temperature over 40°C), please avoid a reloading of fuel. By too slight heat consumption the risk of tar formation and overheating of the boiler is existing.

The HERZ firestar special boiler is characterised by its long combustion duration. It does not have to be re-filled with fuel at frequent intervals. It is recommended that the **filling shaft only be filled according to the heating requirement**, so that frequent opening of the filling shaft door does not have a negative effect on combustion.

## 6 MAINTENANCE AND CLEANING

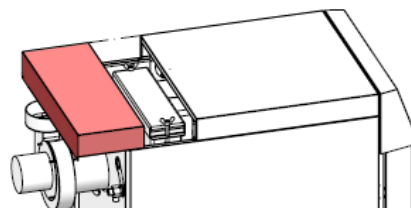
### 6.1 De-ashing and cleaning general

In order to counteract increased fuel consumption, rising flue temperature, decreasing efficiency level, etc., we recommend that the boiler be cleaned at frequent intervals. The combustion chamber only has to be cleaned every two to six days, depending on the type of fuel used. The heat recovery areas are automatically cleaned at each start-up or switching off of the equipment.

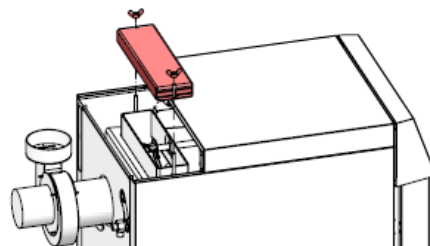
### 6.2 Cleaning of the heat recovery areas (manual)

The heat exchanger pipes are to be checked regularly for soiling and should be cleaned manually if required (Cleaning interval is shown at error 27 on page 27). Rust and fly ash deposits on the heat recovery areas (16) have a considerable effect on the economy and performance of the boiler.

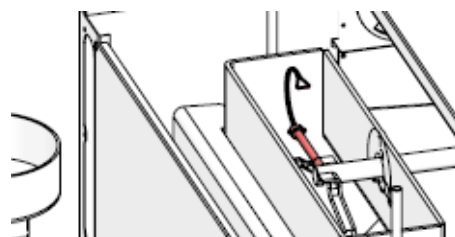
- Removing the upper boiler casing



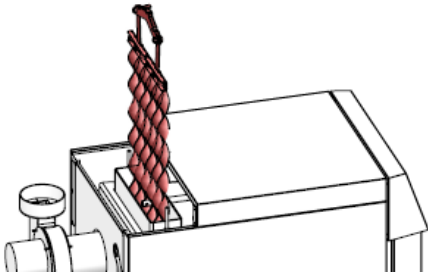
- Loosening screw caps and removing cleaning cover (12)



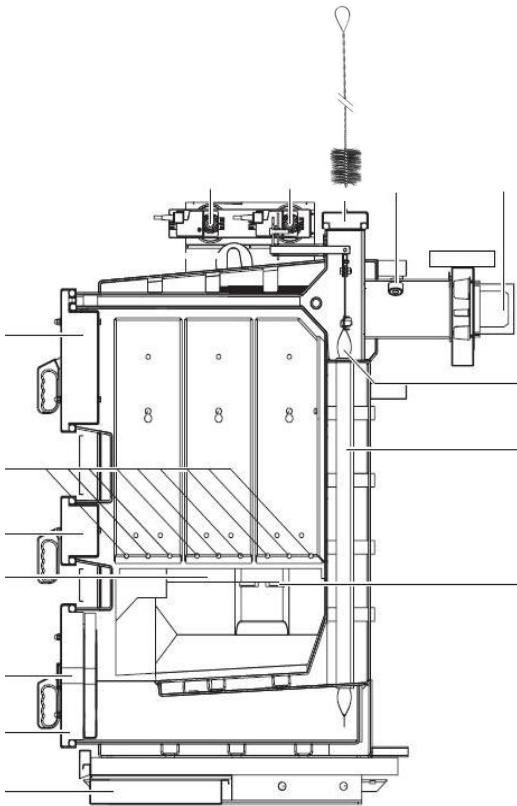
- Loosening the fixture of the turbulators



- Removing and cleaning of turbulators (13)



Clean the heat exchange pipes with the boiler brushes (17). Here the ventilator can also be switched on in order to suck away any dust forming in the air. This can simply be carried out in the Unit Off (1) condition in the so-called aggregate test. (Parameter A04 – ID Fan)



After cleaning

- Set the turbulators (13) correctly again,
- Put on the cleaning cover (12), tighten the closing screws and
- Install the boiler casing.

The accumulated ash should be removed via the ash door (7).

### 6.3 Cleaning of the combustion chamber

This only has to be cleaned every two to six days, depending on the type of fuel used. When burning fuels with a high proportion of fly ash (e.g. paper, cardboard, bark, etc.) on combustion, the

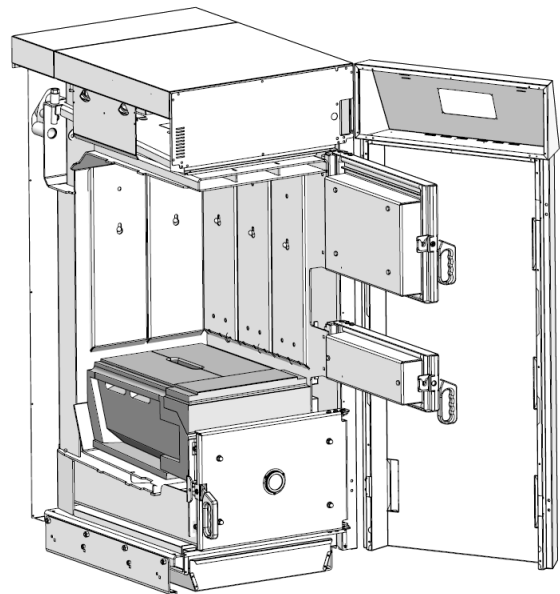
combustion chamber should be cleaned more frequently:

- Open the casing door and ash door (7)
- Clean the combustion chamber
- Keep the primary air feeds (3) clean with bellows for primary air feeds (19)
- Keep the combustion plate inputs clean with (5) clean with bellows for primary air feeds (19)
- Clean out the combustion tray and combustion plate using the bellows for the combustion plate (18)
- Close the ash door (7) and casing door



Any elongation fissures on the insulation plates or combustion chamber bricks do not affect their functioning and therefore do not represent a claim against the guarantee.

During cleaning ensure that the slot between the burner plates is not clogged (see picture below). On the burner plates themselves, an ash layer of about 3cm can be left which is provided for glow sustainment.



#### Note:

The combustion chamber must always be cleaned last, as the ash may fall in the burn-off areas when cleaning the heat exchanger pipes.

## 6.4 Cleaning the flue pipe

This should be cleaned at least once a month using a chimney cleaning brush.

**Note:** Remove the flue temperature sensor before cleaning as it could be damaged.

## 6.5 Filling shaft – Filling shaft door

The filling shaft walls are not heating surfaces and must therefore not be cleaned. The deposit arising on the filling shaft walls is a normal chemical process and flakes off from time to time by itself or can be removed using the bellows (18).

**Note:**

For perfect functioning of the boiler the filling shaft door must always be shut tightly.



The filling shaft door should be tested for leaks once a year!

## 6.6 Checking the heat exchanger

In “hard water” areas in particular, there should be checks on whether the heat exchanger is furred up and has to be cleaned. Where faults are identified, ongoing maintenance is offered, as this may mean important safety checking for operation in closed heating units (checking the heat exchanger can be carried out by manually pressing the thermal flow protection. There should be a free flow of water into the heat exchanger).

## 6.7 Checking the water level for the heating unit

Care should be taken that the required water level or unit pressure (min. 1.5 bar in cold condition) should be maintained in the heating unit. Regular checks are required.



Too low a unit pressure may lead to simmering noises or the build up of steam bubbles in the unit.

## 6.8 Keeping the boiler room clean

Items that are not required for the operation or maintenance of the boiler unit should not be stored in the boiler room. Cleanliness and tidiness enable good access for service and maintenance and reduce the risk of accidents.

For reasons of fire protection and according to the valid regulations: Only designated and permitted materials are allowed to be stored in the boiler room.

# 7 FAULT-FREE OPERATION

To avoid fault-free operation, some basic points should be adhered to for installation, service and maintenance. The following table may be helpful to the operator for rectifying any faults.

Please note that faults arising due to non-adherence to installation and/or service instructions, do not come under the guarantee or warranty provisions.

## 8 BOILER STATUS

### 8.1 Unit off

In this condition the unit is switched off.

### 8.2 Burning phase

In the **BURNING PHASE(2)** condition wait to see if the logs catch fire in the combustion chamber. During 30 minutes an adequate flue temperature (**HEATING UP FROM MIN(P06)**) is adjusted so that it can be switched on into the **HIGH RUNNING PHASE(3)** condition. If this flue temperature is not set, it switches into the **UNIT OFF(1)** condition and a fault is declared accordingly.

In this condition it is possible to switch manually into the **UNIT OFF(1)** condition.

### 8.3 High running phase

In the **HIGH RUNNING PHASE(3)** condition, after lightings the logs, it tries to stabilise the combustion and achieve the minimum boiler temperature. The optional combustion control (lambda control) is already activated at this time. When reaching 65°C the boiler temperature (set out in the program) is switched on into the control phase. Should the flue temperature decrease in this phase (under **HEAT UP MIN(P06)**), it switches into the **NEW START-UP(6)**.

### 8.4 Control phase

The **CONTROL PHASE(4)** condition carries out actual boiler control, which splits into an output and combustion control (OPTIONAL). If the boiler temperature in this phase increases above the maximum boiler temperature (**BOILER MAX(P02)**), it switches into the **READY(5)** condition. Should the flue temperature decrease in this phase (**HEAT UP MIN(P06)**), it switches into the **NEW START-UP(6)**.

### 8.5 Ready

The maximal boiler temperature (**BOILER MAX(P02)**) has been reached due to too low heat capturing. Therefore the boiler has been switched off. The boiler starts up again if the boiler temperature falls 3°C below **BOILER MAX(P02)**.

### 8.6 New start-up

The **NEW START-UP(6)** condition tries to re-stabilise the combustion within a time limit (adjustable via **MAXIMUM RE-START(P07)**). It will always be activated if the flue temperature is too low. If stable combustion adjusts again, it switches immediately into the **CONTROL PHASE(4)**. Should a sufficient flue temperature not be achieved after a specified time (under **HEAT-UP MIN(P06)**), the boiler is switched off as it is switched to the **UNIT OFF(1)** condition.

### 8.7 Re-heating

The **RE-HEATING(7)** condition is used for safe operation for re-heating. If the customer re-heats a larger amount of logs in operation, then this operation is activated. The boiler then remains in this condition for the time set. Should the boiler temperature in the meantime increase above the maximum boiler temperature, the boiler will be switched off. After the set time, it switches to the **CONTROL PHASE(4)** condition once an adequate flue temperature is reached, and if the flue temperature is too low (under **HEAT UP MIN(P06)**), it is switched off and reported as a fault. This function may only be activated by long pressing the On/Off-switch in the STATUS MENU, if the unit is in **HIGH RUNNING(3)** or **CONTROL PHASE(4)**.

### 8.8 Chimney sweeper

The **CHIMNEY SWEEPING(8)** condition is available as a test mode for the chimney sweeper. The boiler is precisely operated using rated output and the chimney sweeper can carry out its test measurements. The boiler usually runs high and the chimney sweeper function is only activated instead of the **CONTROL PHASE(4)**. This condition is left when deactivation occurs or when the boiler maximum temperature is exceeded or when the maximum chimney sweeping time is exceeded (45min).



## 8.9 Lambda calibration (password protected)

By activating the parameter **LAMBDA CALIBRATION (P20)** in the parameter menu the calibration starts (only in condition **UNIT OFF(1)** activatable). The lambda sensor is calibrated at the factory.

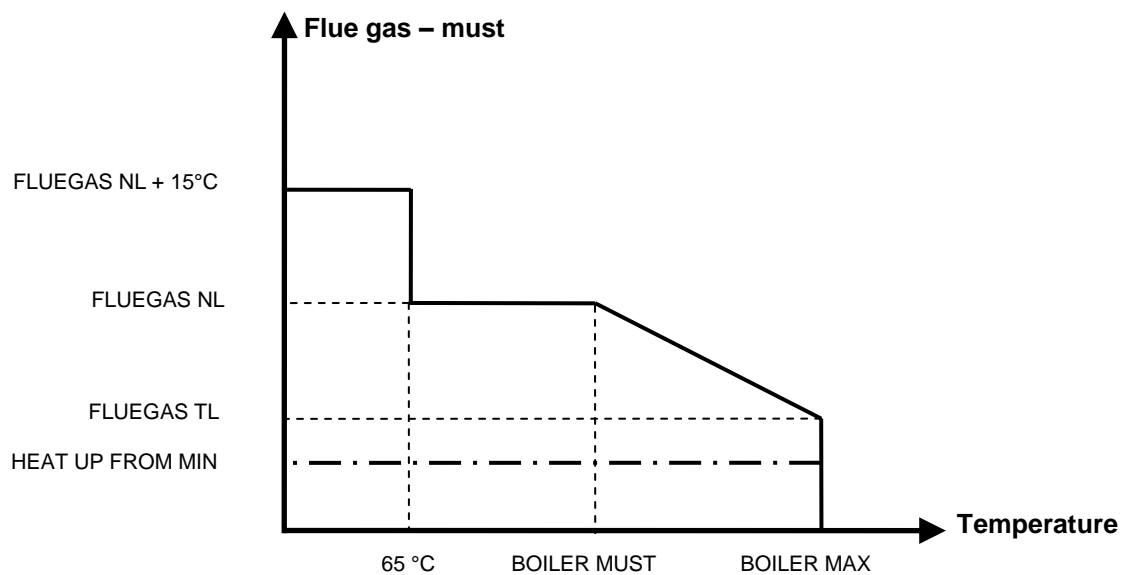
### 8.9.1 Flue temperature control

The flue temperature control begins if the **HEAT UP FROM MIN(P06)** is exceeded. The target temperature modulates between the set values **FLUE NL(P04)** and **FLUE PL(P05)**. In the high running phase as well as when re-heating, it will be controlled at an increased flue temperature (**FLUE NL + 15**). The 15°C are a setpoint specification. The actual temperature deviance may be higher.

### 8.9.2 Lambda control

The primary and secondary air is controlled via the lambda sensor. This serves to optimise the combustion and can detect slight fuel fluctuations.

### 8.9.3 Control curve



## 9 DESCRIPTION OF THE MENU NAVIGATION AND ADJUSTMENT VALUES

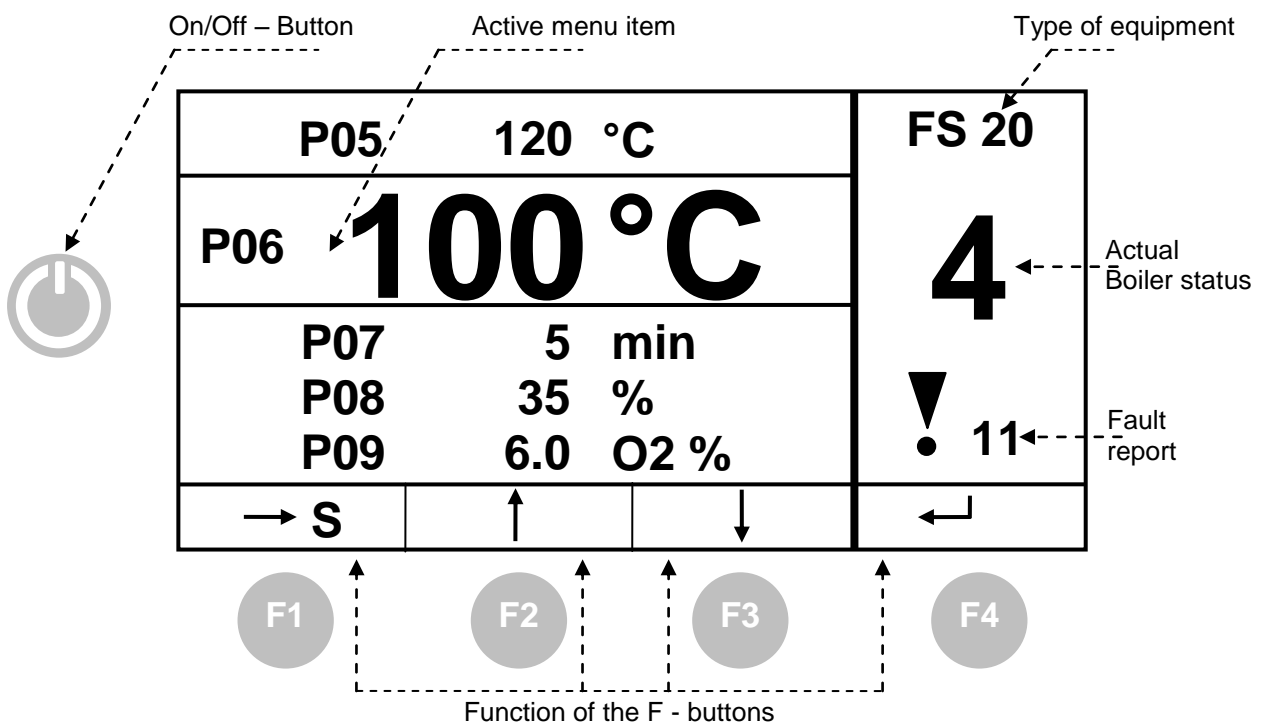
### 9.1 Main menu

#### 9.1.1 Structure

The Structure of the displays consists of the menu (Parameter, Status, Aggregate-Test-Input, Aggregate-Test-Output), the boiler status and the fault reporting.

This page loads automatically once you have switched on the equipment using the main switch (at the back side of the boiler). From here you can navigate quite simply through the settings.

#### 9.1.2 Display



#### Boiler status:

- |                          |                     |                          |
|--------------------------|---------------------|--------------------------|
| 1 ... Unit off           | 4 ... Control phase | 7 ... Re-heating         |
| 2 ... Burning phase      | 5 ... Ready         | 8 ... Chimney – sweeper  |
| 3 ... High running phase | 6 ... New start up  | 9 ... Lambda calibration |

#### By pressing the button:

- „On/Off“: long: the equipment is switched on/off  
brief: starts up the FAILURE CHECK
- „F1“: Changes to the displayed menu / Confirmation of modification
- „F2“: The bar is pushed up / increase value
- „F3“: The bar is pushed down / decrease value
- „F4“: „ENTER“ – button / aborts the modification

#### 9.1.3 Modify value

The modification of values is ONLY possible in the menus **“PARAMETER” (P01-P99)** and **„AGGREGATE-TEST OUTPUT” (A01-A99)**. By pressing the “ENTER-Button” in those menus a „★“-symbol appears next to the active menu item. This means that the parameter can be modified. By pressing F2 or F3 the value can then be increased or decreased respectively.

**Example: Modification of parameter P02**

P01 ***			FS 20
P02 * <b>80 °C</b>			<b>4</b>
P03	84 °C		! 11
P04	180 °C		
P05	120 °C		
↶	+	-	↵
F1	F2	F3	F4

**By pressing the button:**

„On/Off“:	The equipment is switched on/off
„F1“:	The modification is aborted
„F2“:	The value is increased
„F3“:	The value is decreased
„F4“:	The modification is confirmed

**9.1.4 Code entry (only Service)**

P01 * ***			FS 20
P02 90 °C			<b>4</b>
P03	84 °C		! 11
P04	180 °C		
P05	120 °C		
+100	+10	+1	↵
F1	F2	F3	F4

For safety reasons most of the menu items are password protected. The entry of the code is done via Parameter P01 in the menu "PARAMETER". When the code is entered correctly, the code is "active". After 10 minutes of inactivity, the code entry will be automatically set to "inactive".

**By pressing the button:**

„On/Off“:	The equipment is switched on/off
„F1“:	The first digit of the code is increased
„F2“:	The second digit of the code is increased
„F3“:	The third digit of the code is increased
„F4“:	The entry is confirmed

## 9.2 Status menu (S)

S01      37 °C			FS 20
S02      35 °C			4
S03      36 °C			!
S04      35 °C			11
S05      40 °C			
→ P	↑	↓	⏴
F1	F2	F3	F4

	DESCRIPTION
S01	BOILER TEMPERATURE Displays the boiler temperatures in °C
S02	BACKFLOW TEMPERATURE Displays the backflow temperatures in °C
S03	BUFFER-UPPER-TEMPERATURE Displays the current upper buffer temperature in °C
S04	BUFFER-LOWER-TEMPERATURE Displays the current lower buffer temperature in °C
S05	FLUE GAS TEMPERATURE Displays the current flue gas temperature in °C
S06	ID-FAN (password protected) Displays the condition of ID-Fan in %
S07	ROTARY SPEED (password protected) Displays the suction speed in %
S08	O2 (password protected) Displays the O2 values (e.g. 90 = 9% O2)
S09	LAMBDA HEATING (password protected) Displays the condition of the Lambda heating
S10	PRIMARY AIR FLAP (password protected) Displays the actual PRIMARY AIR FLAP position in %

**By pressing the button:**

- „On/Off“:      long: the equipment is switched on/off  
                      brief: the fault check is started
- „F1“:            (→P) changes to the „PARAMETER“ menu
- „F2“:            the bar is pushed up
- „F3“:            the bar is pushed down
- „F4“:            If the symbol „⏴“ is displayed, then the status (condition) changes into condition CHIMNEY SWEEPER(9).

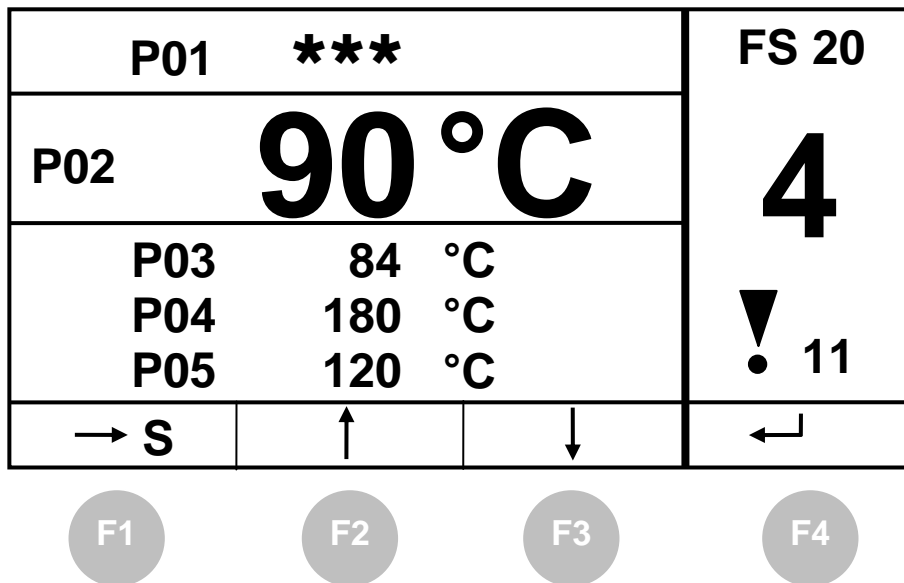
<b>S11      35 %</b> <b>S12      X</b> <b>S13      0</b> <b>S14      0</b> <b>S15      X</b>			<b>FS 20</b>  <b>4</b>  <b>! 11</b>
→ <b>P</b>	↑	↓	⌵
<b>F1</b>	<b>F2</b>	<b>F3</b>	<b>F4</b>

	<b>DESCRIPTION</b>
S11	SECONDARY AIR FLAP (password protected) Displays the actual SECONDARY AIR FLAP position in %
S12	BACKFLOW PUMP Displays the condition of the backflow pump
S13	BACKFLOW MIXER OPEN Displays condition of the BF-Mixer
S14	BACKFLOW MIXER CLOSED Displays condition of the BF-Mixer
S15	HEAT EXCHANGER CLEANING (HEC) (password protected) Displays the condition of the HEAT EXCHANGER CLEANING
S16	HEC MONITORING (password protected) Displays the condition of the HEAT EXCHANGER CLEANING MONITORING
S17	COMPOSITE ERROR / ALARM Alarm contact
S18	HARDWARE-VERSION HZS621
S19	SOFTWARE-VERSION HZS621
S20	HARDWARE-VERSION HZS631
S21	SOFTWARE-VERSION HZS631

#### By pressing the button:

- „On/Off“:      long: the equipment is switched on/off  
                   brief: the fault check is started
- „F1“:            (→P) changes to the „PARAMETER“ menu
- „F2“:            The bar is pushed up
- „F3“:            The bar is pushed down
- „F4“:            If the symbol „⌵“ is displayed, then the status (condition) changes into condition CHIMNEY SWEEPER(9).

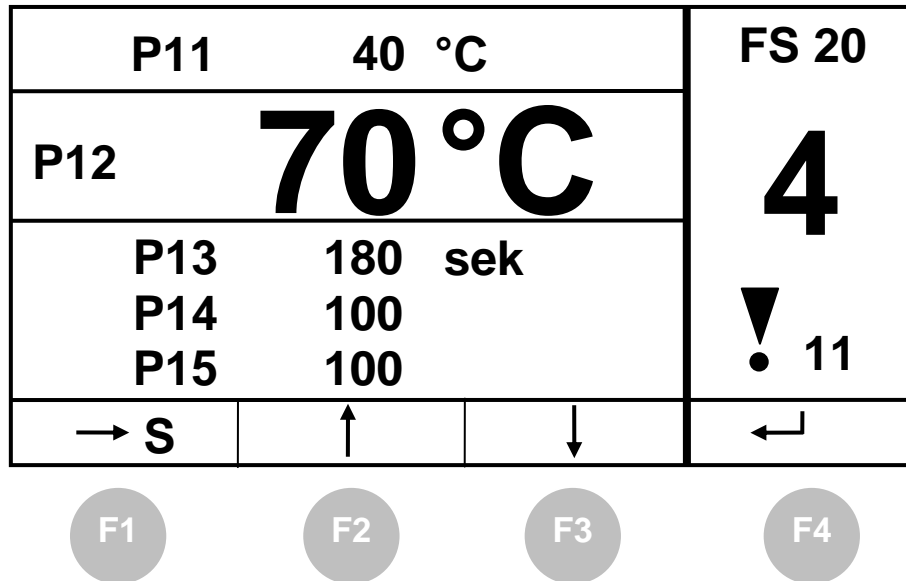
### 9.3 Parameter menu (P)



	DESCRIPTION
P01	CODE Code entry
P02	BOILER MAX At this temperature ends the condition CONTROL PHASE(4) (Equipment changes into condition READY(5))
P03	BOILER MUST At this temperature starts the CONTROL PHASE(4)
P04	FLUEGAS NOMINAL LOAD (password protected) Flue gas-Must-Temperature at nominal load
P05	FLUEGAS PARTIAL LOAD (password protected): Flue gas-Must-Temperature at partial load
P06	MIN FLUE GAS (password protected): This parameter determines the minimum flue temperature which is required for leaving the burning phase.
P07	MAXIMUM RE-START (password protected) maximal duration of the Re-start
P08	PRIMARY AIR FLAP MIN (password protected): Minimal primary air flap position
P09	O2 MUST (password protected): O2 – must value for combustion control
P10	BUFFER DIFFERENCE (password protected) Difference between boiler temperature and actual buffer-lower-temperature. For the controlling of the Backflow-pump.

#### By pressing the button:

„On/Off“:	The equipment is switched on/off
„F1“:	(→S) changes into menu „STATUS“ (→A) changes into menu „AGGREGATETEST-OUTPUT“ (if code is active)
„F2“:	The bar is pushed up
„F3“:	The bar is pushed down
„F4“:	The value can be modified



	DESCRIPTION
P11	RESIDUAL HEAT TEMPERATURE (password protected) Temperature which specifies how far the boiler may be "emptied" when recharging or from when the return flow bypass pump is switched on
P12	BACKFLOW-MUST (password protected) Setting value of the backflow temperature
P13	MIXER RUNNING TIME (password protected) Adjust specified mixer run time on the motor mixer
P14	KP (password protected) P part of the Backflow-control
P15	KD (password protected) D part of the Backflow-control
P16	TTOT (password protected) Setting value of the system break
P17	RESET STANDARD VALUES (password protected) : Re-setting the parameters to preset values (only in condition UNIT OFF(1))
P18	CHOICE BOILER TYPE (password protected): Choice of boiler (only in condition UNIT OFF(1))
P19	CHOICE ADDITIONAL CIRCUIT BOARD(password protected): Choice of additional circuit board (only in condition UNIT OFF(1))
P20	LAMBDA CALIBRATION (password protected): Starts the Lambda calibration (only in condition UNIT OFF(1))
P21	SET CONTRAST
P22	ID FAN - Impulse Selection: 0 / 1 / 6 / 11 / 12 Impulse

#### By pressing the button:

„On/Off“:	The equipment is switched on/off
„F1“:	(→S) changes into menu „STATUS“ (→A) changes into menu „AGGREGATETEST-OUTPUT“ (if Code is active)
„F2“:	The bar is pushed up
„F3“:	The bar is pushed down
„F4“:	The value can be modified

### 9.4 Aggregate-Test Output (A)

Only available when Code is active and the boiler condition is UNIT OFF(1)!

A01		X	FS 20
A02		X	
A03		0	
A04		0 %	
A05		X	
→ E	↑	↓	←
F1	F2	F3	F4

	DESCRIPTION
A01	BF-PUMP (password protected): Output Backflow-pump
A02	BF-MIXER OPEN (password protected): Output Backflow-mixer
A03	BF-MIXER CLOSED (password protected): Output Backflow-mixer
A04	ID FAN (password protected): Output ID-Fan in %
A05	LAMBDA HEATING (password protected): Output Lambda heating
A06	PRIMARY AIR FLAP (password protected): Output Primary air flap position in %
A07	SECONDARY AIR FLAP (password protected): Output Secondary air flap position in %
A08	HEAT EXCHANGER CLEANING (HEC) (password protected): Output Heat exchanger cleaning
A09	COMPOSITE ERROR / ALARM (password protected): Output Composite error / Alarm

#### By pressing the button:

- „On/Off“: The equipment is switched on/off
- „F1“: (→E) changes into menu „AGGREGATE-TEST INPUT“
- „F2“: The bar is pushed up
- „F3“: The bar is pushed down
- „F4“: The value can be modified



## 9.5 Aggregate-Test Input (E)

<b>E01</b>	<b>0</b>		<b>FS 20</b>
<b>E02</b>	<b>X</b>		<b>1</b>
<b>E03</b>	<b>100</b>	<b>%</b>	
<b>E04</b>	<b>9.0</b>	<b>O2%</b>	
<b>E05</b>	<b>X</b>		
<b>→ S</b>	<b>↑</b>	<b>↓</b>	<b>→ A</b>
<b>F1</b>	<b>F2</b>	<b>F3</b>	<b>F4</b>

	<b>DESCRIPTION</b>
E01	STL (password protected) Input Safety temperature limiter (STL) Switch-off
E02	DOOR SWITCH (password protected) Input door switch
E03	ROTARY SPEED (password protected) Input of suction speed in %
E04	O2 (password protected) Input of actual O2 values in %
E05	HEC MONITORING (password protected) Input Heat exchanger cleaning - monitoring

### By pressing the button:

- „On/Off“: The equipment is switched on/off
- „F1“: (→S) changes into menu „STATUS“ and deactivates AGGREGATE-TEST
- „F2“: The bar is pushed up
- „F3“: The bar is pushed down
- „F4“: (→A) changes into menu „AGGREGATE-TEST OUTPUT“

## 10 FAULT REPORTS AND THEIR CORRECTION



You should always take particular note of the safety instructions!

For all faults arising the fault must first be rectified and then re-set by switching on again. Should several faults arise at the same time, these are displayed in the order they arose.

Fault reporting on the display	Composite error/ Alarm	Possible cause?	Suggestions for rectifying
Fault 01 <i>F:Checksum</i>	X	Checksum not correct	Replace control
Fault 02 <i>F:Adjustmentdata HZS 621/622</i>	X	Checksum not correct	Replace control
Fault 03 <i>F:Adjustmentdat HZS 631</i>	X	Comparison of data not correct	Replace control
Fault 04 <i>F:STL</i>	X	Mains voltage faulty <ul style="list-style-type: none"> <li>• Safety temperature limiter (STL) has gone off</li> </ul>	Let the system cool off and leave the STL.
Fault 05 <i>F:Boiler temperature</i>	X	Broken sensor for boiler temperature	Replace the boiler sensor
Fault 06 <i>F:CAN-failure</i>	X	Failure at transmission via CAN Bus	Check CAN-connection (Cabeling)
Fault 07 <i>F:EEProm</i>	X	Error at writing / reading at EEPROM	Replace control
Fault 08 <i>F:Stack HZS 621/622</i>	X	Overflow from the stack pointer	Replace control
Fault 09 <i>F:Stack HZS 631</i>	X	Overflow from the stack pointer	Replace control
Fault 10 <i>F:Fluegas temperature</i>	X	Broken sensor for flue temperature PT1000	Replace flue temperature probe
Fault 11 <i>F:Lambda calibration</i>	X	Fault in lambda calibration Lambda value is outside the defined range.	Carry out calibration again or renew the lambda probe
Fault 12 <i>F:Suction speed</i>	X	<ul style="list-style-type: none"> <li>• Suction blower speed monitoring fault</li> <li>• false number of pulses</li> </ul>	Check suction and speed feedback
Fault 13 <i>Door contact</i>		Door is open	Information only – No failure
Fault 14 <i>F:Ready</i>		Boiler temperature above boiler maximum (90°C) <ul style="list-style-type: none"> <li>• Boiler loaded with too much wood</li> <li>• Return flow pump or return flow mixer defective</li> <li>• Buffer storage construction too small</li> </ul>	<ul style="list-style-type: none"> <li>• Put in less wood</li> <li>• Renew return flow pump or return flow mixer</li> <li>• Increase buffer volumes</li> </ul>
Fault 15 <i>F:Lambda probe</i>	X	Lambda probe is defective or out of line	Renew lambda probe and /or check clamping.
Fault 16 <i>F:Backflow sensor</i>	X	Broken sensor for return flow temperature	Replace return flow temperature sensor

Fault reporting on the display	Composite error/ Alarm	Possible cause?	Suggestions for rectifying
Fault 17 <i>F:Backflow Parameter</i>	X	Return flow target temperature could not be reached during operation	Check return flow bypass
Fault 18 <i>F:Buffer-lower</i>	X	Broken sensor for lower buffer temperature	Lower buffer temperature – replace sensor
Fault 19 <i>F:Buffer-top</i>	X	Broken sensor for top buffer temperature	Top buffer temperature – renew sensor
Fault 21 <i>F:Lighting up</i>	X	At lighting up the boiler has not reached the flue temperature threshold in the prescribed time <ul style="list-style-type: none"> <li>• Too coarse material used</li> <li>• Too moist wood used</li> <li>• Burner plate holes blocked</li> </ul>	<ul style="list-style-type: none"> <li>• Use kindling</li> <li>• Use dry wood</li> <li>• Clean burner plate holes</li> </ul>
Fault 22 <i>F:Re-heating</i>	X	At lighting up the boiler has not reached the flue temperature threshold in the prescribed time <ul style="list-style-type: none"> <li>• Too coarse material used</li> <li>• Too moist wood used</li> <li>• Burner plate holes blocked</li> </ul>	<ul style="list-style-type: none"> <li>• Use kindling</li> <li>• Use dry wood</li> <li>• Clean burner plate holes</li> </ul>
Fault 23 <i>F:HEC-Monitoring</i>	X	<ul style="list-style-type: none"> <li>• Fault with HEC monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Check the heat exchanger pipes. Clean manually in case of soiling (see chapter 6 page 13)</li> <li>• Check HEC-Motor and limit switch</li> </ul>
Fault 24 <i>F:Excess temperature</i>		Excess temperature! Boiler temperature above boiler maximum: <ul style="list-style-type: none"> <li>• Flow parameters set at too high capacity</li> <li>• Boiler maximum set too high</li> <li>• Defective return flow pump or return flow mixer</li> <li>• Buffer storage designed too small</li> </ul>	<ul style="list-style-type: none"> <li>• Correct the fuel values</li> <li>• Boiler maximum set too high</li> </ul> Replace return flow pump or return flow mixer
Fault 25 <i>F:Frost protection</i>		Frost protection mode	Information only – no error
Fault 26 <i>F:Block protection</i>		Blocking protection is carried out	Information only – no error
Fault 27 <i>F:CLEANING !!!</i>		The installation has exceeded 1000 operation hours!	<ul style="list-style-type: none"> <li>• Process maintenance (Clean heat exchanger – see chapter 6 page 13)</li> </ul> To acknowledge this fault press <ol style="list-style-type: none"> <li>1 Press the On-/Off-button while the</li> <li>2 Installation is in condition UNIT OFF (1)</li> </ol>

Other possible faults	Cause	Corrective actions
Boiler capacity too low	The calorific value of the used fuel is too low. The moisture of the fuel is higher than 25%.	<ul style="list-style-type: none"> <li>■ Use required fuel at required moisture</li> </ul>
	The operating conditions were not observed.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>
	The exhaust gas collector or the exhaust system is leaking.	<ul style="list-style-type: none"> <li>■ Check test openings and exhaust ports and if necessary seal them</li> </ul>
	The boiler capacity is for the application too small.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>
	Supply air is missing.	<ul style="list-style-type: none"> <li>■ Provide for sufficient fresh air</li> <li>■ Call for Service</li> </ul>
	The door seals are defect.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>
	The exhaust gas collector and the combustion chamber are dirty, so very little heat transfer is available.	<ul style="list-style-type: none"> <li>■ Clean the boiler</li> </ul>
	Incorrect air intake	<ul style="list-style-type: none"> <li>■ Check the tightness of the test openings and doors</li> </ul>
Dust deposits on or near the cleaning cap.	The cleaning cap is not closed correctly or the seals are leaking.	<ul style="list-style-type: none"> <li>■ Close the cleaning cap correctly</li> <li>■ Call for service</li> </ul>
Excessively condensate is formed in the filling room of the boiler.	Excessive boiler performance at low heat consumption (induced draft fan does not rotate).	<ul style="list-style-type: none"> <li>■ Insert less fuel</li> <li>■ Correct inadequate heat consumption of the heating system</li> </ul>
	The fuel is incorrect or too moist.	<ul style="list-style-type: none"> <li>■ Use required fuel</li> </ul>
	The boiler water temperature is too low.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>
<p>Induced draft fan does not rotate or is too loud.</p> <p><b>Attention!</b></p> <p>A fan which is not in operation leads to incomplete combustion and tar deposits.</p>	<p>Only when fan is not in operation:</p> <p>The maximum boiler temperature or exhaust temperature is reached.</p>	<ul style="list-style-type: none"> <li>■ No fault! Boiler is operating properly. Induced draft fan starts when you open the filling door. Too much fuel.</li> </ul>
	Blower motor is defect.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>
	The door switch is in the wrong position or defective.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>

Other possible faults	Cause	Corrective actions
Short burning time	Incorrect or fuel with too low calorific value (e.g. softwood)	<ul style="list-style-type: none"> <li>■ Use required fuel or hardwood</li> </ul>
	The feed pressure (flue draft) is too high.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>
Boiler pulsates	Too much fuel gas, which cannot be burned and removed	<ul style="list-style-type: none"> <li>■ Check fuel dimensions</li> <li>■ Call for service</li> </ul>
	Incorrect air intake	<ul style="list-style-type: none"> <li>■ Check the tightness of the test openings and doors</li> <li>■ In case of leakage, call for service</li> </ul>
Too long loading of the buffer	The boiler capacity is for the application too small.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>
	The hydraulic system is faulty.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>
	The heating behaviour is faulty.	<ul style="list-style-type: none"> <li>■ Adjust the heating behaviour to the heat demand</li> </ul>
Excessively condensate is formed in the chimney.	The chimney insulation is insufficient.	<ul style="list-style-type: none"> <li>■ Call for service</li> </ul>
	The exhaust gas collector or the exhaust system is leaking.	<ul style="list-style-type: none"> <li>■ Check test openings and exhaust ports and if necessary seal them</li> </ul>
Cracks in the firebricks	<p>The components contain a certain amount of residual moisture.</p> <p>(Note: Minor edge abrasion, surface abrasion, crack formation etc. does not lead to malfunction and therefore does not constitute a warranty)</p>	<ul style="list-style-type: none"> <li>■ For wide cracks or broken out pieces, which extend to the boiler construction: Call for service</li> </ul>

## 11 EMISSION MEASUREMENT



Boiler – and construction damage by insufficient heat consumption.

An insufficient heat consumption leads to a shutdown of the ID-fan, to a triggering of the thermal flow protection and maybe to a boiler damage.

- Provide adequate heat consumption during boiler operation for emission measurement

### 11.1 Measurement notes

The emission measurement, hereinafter called measurement, is carried out with clean, uncontaminated and dry log wood. The fuel must correspond to the properties (length, size, humidity, etc.) which are specified in this documentation. During the measurement, no disturbance of the combustion process may occur.

Disturbances of the combustion process are:

- Dirty (e.g. treated, painted, earthed bond) or wet log wood
- Opening of the boiler doors
- Poking of the combustion material
- Shutdown of the ID-fan

The mentioned faults are reflected in the measurement result, distort it and perhaps lead to a loss of the operating licence. We recommend that the boiler is cleaned thoroughly 1 to 3 days before.

### 11.2 Measurement preparation

The measurement must be performed on a measuring opening in a straight flue gas pipe. The distance from the flue gas connection to the measuring opening must be twice of the flue gas pipe diameter. Bows and bends in the flue gas pipe, between the flue gas connection and the measurement opening, distort the measurement result.

The following conditions must be met for the emission measurement:

- Enough combustion air
- Enough suitable fuel
- Enough heat consumption

### 11.3 Establish measurement condition (continuous operating state)

- Heat up the boiler according to the documentation
- Create a firebed with a sufficient amount of wood (about ¼ pad)
- Burn off the fuel pad
- Make sure that the operating conditions are met:
  - Minimum back flow temperature 60°C
  - Flue draft is always in the permitted range
  - Chimney draw controller is set to the correct value according to the installation instructions
  - Flue gas temperature is in the permitted range
- Load the boiler according to the installation instructions with the maximum permissible amount of fuel.
- Wait at least 5 minutes till the combustion process has built up and the following described steady state is reached:
  - Buffer loading pump is permanently in operation (Switch on temperature)
  - Permanent boiler temperature at least 70°C
  - Flue gas temperature moves within the permitted range

### 11.4 Measurement performance

The measurement must be carried out in an undisturbed continuous operation over 15 minutes in the core flow of the flue gas. The measurement must be performed with an instrument, which can form an average from the measurement process. Alternatively an approximate value can be formed. For this purpose, 15 consecutive one-minute measurements must be performed, from which an average is calculated.



- The displayed flue gas temperature on the control device of the boiler must not correspond with the flue gas temperature of the measurement opening. As the flue gas temperature of the boiler control is often measured at a different point, the temperatures can vary considerable.

## 12 EC-DECLARATION OF CONFORMITY



Manufacturer address: **HERZ Energietechnik GmbH**  
**Herzstraße 1, 7423 Pinkafeld**  
**Österreich/Austria**

Declaration of machine: **HERZ firestar Lambda**

Type: **HERZ firestar Lambda 18**  
**HERZ firestar Lambda 20**  
**HERZ firestar Lambda 30**  
**HERZ firestar Lambda 40**

Machine type: **Log boiler**

We declare herewith, that the above described machine / the above described product complies with the corresponding regulations of the following EC-Directives. The conformity is verified by the complete compliance with the following standards.

EU – directive	Standard
<b>2006/95/EG</b> Low tension units decree	EN – 60335 – 1 / A2:06 EN – 60335 – 2-102
<b>2004/108/EG</b> Electromagnetic compatibility	IEC 61000 – 6 3/4:07 IEC 61000 – 6 1/2:05
<b>2006/42/EG</b> Machine Guideline	ISO 14121 EN 13849-1
<b>305/2011</b> Construction Products Guideline	EN – 303 - 5 TRVB H 118
<b>97/23/EG</b> Pressure equipment	EN 287-1

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Pinkafeld, January 2013

**DI Dr. Morteza Fesharaki – managing director**

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# 14 NOTES

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