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Wood chip boiler 200 kW

Operation

ETA Heiztechnik
Gewerbepark 1
A-4716 Hofkirchen an der Trattnach
Tel: +43 (0) 7734 / 22 88 -0
Fax: +43 (0) 7734 / 22 88 -22
info@eta.co.at
www.eta.co.at

Contents

1 General information

Copyright

Subject to technical alterations

We reserve the right to make technical modifications without notice. Printing and typesetting errors or changes of any kind made in the interim are not cause for claims. Individual configurations depicted or described here are only optionally available. In the event of contradictions between individual documents regarding delivery scope, the information in our current price list applies.

Explanation of symbols

 Instructions and information

Layout of safety instructions

 **SIGNAL WORD!**

Type and source of danger

Possible effects

- Measures for avoiding the danger

Types of safety instruction

 **CAUTION!**

On non-compliance with this safety instruction, there is a risk of material damage.

 **WARNING!**

On non-compliance with this safety instruction, there is a risk of physical injury.

 **DANGER!**

On non-compliance with this safety instruction, there is a risk of major physical injury.

2 Preface

Dear Customer,

This user manual provides important information and instructions, to ensure safe and satisfactory operation of your product.

Please take the time to look through it.

Warranty and guarantee

You should also read the "Conditions for warranty, guarantee, liability" (see page 8) carefully. As a rule, these conditions will be satisfied by a professional heating technician. Nevertheless, inform the technician of our warranty conditions. All of the requirements we impose are intended to prevent damage that neither you nor we wish to occur.

Read the user manual

Please read the user manual carefully before starting up the system. This is the only way to ensure that you can operate your new boiler efficiently and with minimum environmental impact.

Take advantage of the knowledge and skills of an expert

Only allow an expert to assemble, install and commission the equipment and carry out the basic boiler settings. Insist on receiving an explanation and training on how your new boiler functions and how to operate and maintain it.

Extended warranty

We grant an extended warranty if the product is commissioned by an authorised partner company or by our own customer service.

In this connection, please note the warranty conditions applicable at the time of purchase.

Service agreement

You can ensure the best care for your heating system by taking out a service agreement with one of our certified contractors or our own customer service.

Remote control of the boiler via the internet

The remote control enables you to operate your ETA boiler remotely via your own network (VNC Viewer) or the internet <www.meinETA.at> using a PC, smartphone or tablet, as though you were standing right in front of the ETAtouch control system of your ETA boiler.

For details, see operating manual "meinETA communication platform".

A LAN cable is required for the connection from the ETAtouch control system to the internet modem.

For details see the boiler installation instructions.

3 Warranty, guarantee and liability

Requirements

We can only accept liability for the function of our products if they are correctly installed and operated. This is only possible if the conditions below are complied with.

Maximum of 2,000 hours at full load per year

The boiler described in this user manual may only be used for heating and producing hot water, with no more than 2,000 full-load hours annually.

Installation in a dry room

For set-up, a dry room is required. In particular, only condensation dryers may be used as clothes dryers in the same room.

Observe local building and fire safety regulations

Local building and fire safety regulations must be observed.

Suitable fuels

- Wood chips according ISO 17225-4:2014, quality classes A1/A2/B1/B2, size P16S-P31S, maximum water content 35% (M35)
- Wood pellets according ISO 17225-2:2014, quality class A1, ENplus-A1
- Shavings and swarf briquets according ISO 17225-3:2014, quality classes A1/A2/B
- Miscanthus-wood chips according ÖNORM C 4000 and C 4001
- In germany: fuel classes 4/5a according 1. BImSchV. Use fuel classes 5/6/7/8 only after consultation with company ETA.

Operation with unsuitable fuels, in particular high-slag pellets from grain waste, for example, or corrosive fuels such as miscanthus fertilised with potassium chloride, is prohibited.

Ensure supply air is free from aggressive substances

The air supplied to the boiler must be free from aggressive substances such as chlorine and fluorine from solvents, cleaning agents, adhesives and propellants, or ammonia from cleaning agents, to prevent corrosion of the boiler and chimney.

Only fill with softened water

Water is the intended heat-transfer medium. For special anti-frost requirements, up to 30% glycol may be added. Softened water is required for the initial fill-up of the heating system and for refilling after repairs. Addition of hard water should be minimised to limit limescale build-up in the boiler.

For the initial fill-up, the lime content of all water in the heating system may not exceed the value of 30,000 lt°dH (system volume in litres multiplied by the hardness in degrees of German hardness).

pH value between 8 and 9

The pH value of water used to fill the heating system must be between 8 and 9.

Use a sufficient number of shut-off valves

Set enough shut-off valves to avoid bleeding large amounts of water during repairs. Any leaks in the system must be repaired at once.

Install safety valve and thermal relief valve

A safety valve (triggered at 3 bar) as protection against excess pressure and a thermal relief valve (triggered at 97 °C) to protect against overheating must be installed by the contractor.

Provide a sufficiently large expansion tank or a pressure maintaining device

To prevent air from being drawn in while the system is cooling, the heating system professional must provide a sufficiently large expansion tank or a pressure maintaining device.

Open expansion tanks must not be used.

Sufficient power

Operation at lower power than the lowest power specified on the type plate is not permitted.

Expanding the control system

Only components provided by us may be used for expanding the control system, unless these are generally available standard devices, such as thermostats.

Regularly perform cleaning and maintenance

Cleaning and maintaining the product is essential. The required steps and intervals are either contained in this documentation or included as a separate document.

Repairs

Repairs are only permitted using spare parts provided by us. The only exceptions are commonly available standard parts such as electrical fuses or fastening materials, provided such parts have the necessary features and do not compromise the safety of the system.

Proper installation

The installing contractor is liable for proper installation according to the corresponding installation instructions and the relevant rules and safety regulations. If you as customer have installed the heating system partly or entirely without relevant training and in particular without up-to-date practical experience, without having the installation checked by a trained and responsible expert, we exclude defects in our delivery and consequential damages resulting from this cause from our warranty, guarantee and liability.

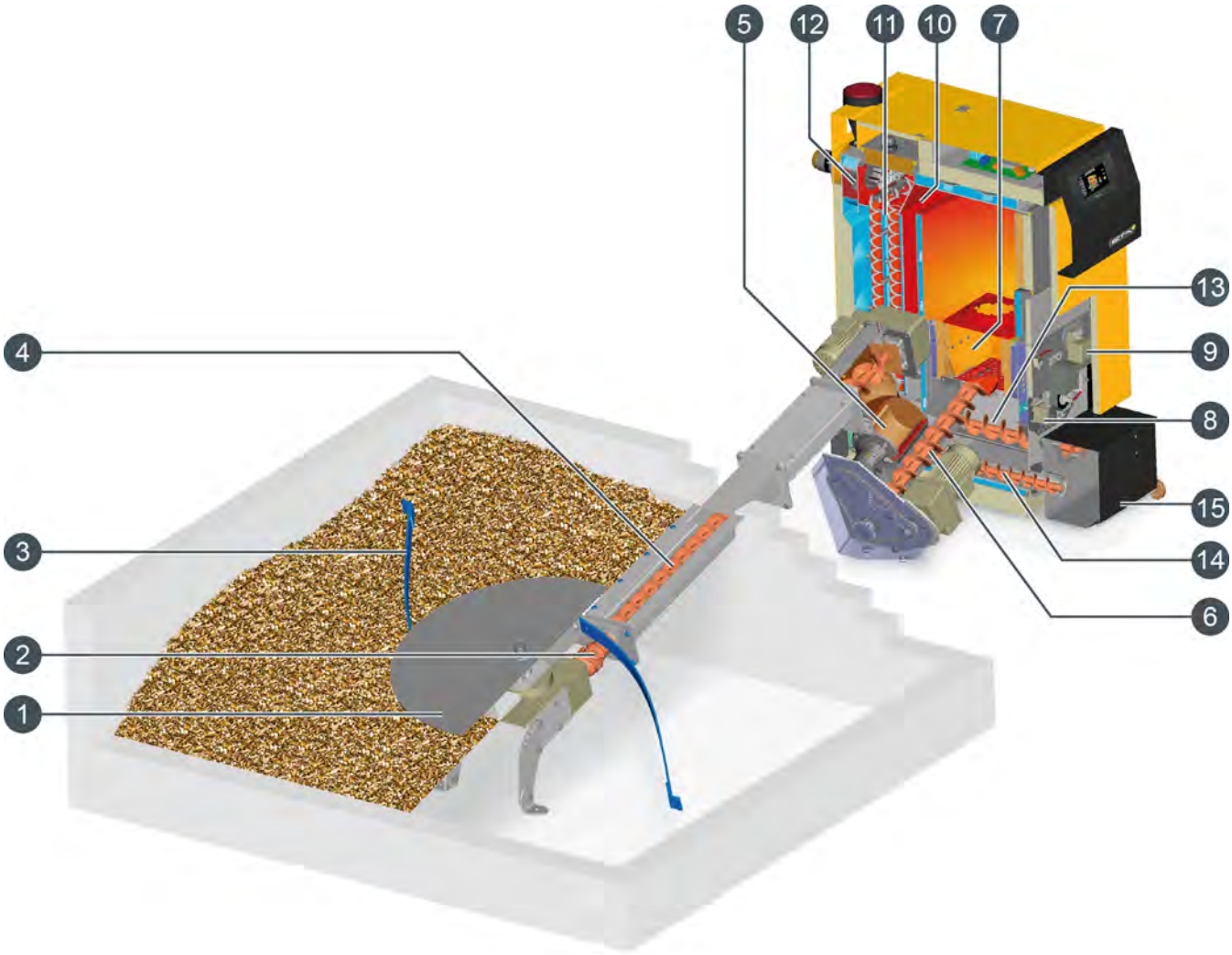
Repair of defects

For repairs of defects carried out by the customer or by a third party, ETA shall only bear the costs or remain obligated by warranty if this work was approved in writing in advance by the customer service of ETA Heiztechnik GmbH.

No tampering with boiler safety devices

Boiler safety devices such as those mentioned below must not be tampered with: Temperature monitoring and control devices, safety temperature limiters, safety valves and thermal discharge valves.

4 Boiler functionality



1 Agitator plate
2 Clutch
3 Flat springs
4 Discharge screw
5 Rotary valve
6 Stoker screw
7 Combustion chamber
8 Actuator for primary air
9 Actuator for secondary air
10 Downdraught channel
11 Heat exchanger with turbulators
12 Draught fan
13 Ash screw under tilting grate
14 Heat exchanger ash screw
15 Ash box

Spring arms adjust to load

The wood chips are transported to the discharge screw by the floor agitator. The spring arms adjust themselves to the load above them. If the bunker is full, the floor agitator is subjected to a heavy load and the spring arms are pressed against the agitator plate, reducing the force needed to turn the agitator and thus the electricity consumption. As the bunker empties, the spring arms extend toward the wall and clear out the bunker.

Floor agitator must turn during filling

To prevent the spring arms from being stuck in an extended position under the pile of wood chips, the floor agitator must be turning during filling. To this end, press [MEAS.] to force the boiler into operation.

Discharge screw torque control

The power consumption of the motors is monitored so that any sluggishness in the conveyor screws is registered immediately. This triggers the screws to run briefly in reverse, up to three times if necessary. The

floor agitator is simultaneously decoupled via the clutch so the motor's power is exclusively available for unblocking the screw. Jammed pieces of wood or even stones can be easily loosened this way so fuel transport can resume.

Maximum protection against burn-back

The airtight one-chamber rotary valve keeps the combustion chamber safely separated from the fuel deposit in all operating modes. No hot gas can enter the fuel conveying system and ignition of the wood chips is impossible. This is the most reliable burn-back protection possible. Individual pieces of wood that are too long cannot bring the fuel conveying system to a halt. They are cut off by a hardened blade on the edge of the rotary valve chamber.

Optimised ignition

After short breaks in combustion, the refractory-lined combustion chamber remains hot enough that any new fuel which is fed in can be ignited by the remaining embers. The ignition fan only needs to be activated after long periods without combustion. To save electricity, the ignition fan is deactivated immediately after successful ignition, which is recognised by the lambda probe and exhaust temperature.

Hot combustion chamber with tilting grate

The wood chips are pushed onto the side of the grate by the stoker screw. A refractory-lined combustion chamber ensures a clean fire with high burnout temperature. At intervals that depend on the output level, the grate is tilted by 90° after a controlled ember burnout in order to automatically remove ash and foreign bodies from the combustion chamber. Until the next time the grate is tipped, the ash remains under the grate and can burn out before it is transported by the ash screw to the detachable ash box.

Combustion breaks with minimal heat loss

The fire can be regulated between minimum and maximum output. In autumn and spring, when heating loads are smaller, the output is regulated by pauses in combustion. To avoid a build-up of smouldering tar in the boiler and chimney during these pauses, the fire undergoes a controlled burnout. Closing the primary and secondary air flaps ensures that no air can flow through the boiler in standby, thus preventing unused heat from being drawn into the flue.

Optimum fuel efficiency with lambda control

Gasification of the wood (output) can be controlled via the flow of primary air. Through use of the lambda-controlled secondary air, combustion is kept clean and highly efficient.

A lack of air means there is not enough oxygen for complete combustion. On the other hand, too much air also results in incomplete combustion as it cools the fire. Below 700 °C, not all of the wood gas is burned. Excessive air also draws too much heat out of the boiler unused. The lambda probe ensures optimum combustion and maximum fuel utilisation in everyday operation.

Turbulent heat exchanger with cleaning

After complete combustion, the hot gas flows into the cold section of the boiler, where it transfers its heat to the boiler water. First it flows smoothly through a downdraught channel for ash sedimentation and then turbulently through the heat exchanger tubes, which are equipped with turbulators. The more turbulent the flow, the more the gas comes into contact with the tube walls, thus ensuring maximum transfer of heat to the boiler water. This ensures low exhaust temperatures and high efficiency.

During cleaning (grate tipping) the turbulators are also moved to scrape the flue ash from the heat exchanger tubes. The ash is transported to the ash box by an ash screw.

Underpressure for maximum safety

A draught fan at the boiler outlet causes underpressure throughout the boiler, thus ensuring high operational safety without risk of deflagration and burn-back. The airtight one-chamber rotary valve makes the usual combustion air fan unnecessary. The required air is drawn into the combustion chamber through the regulated primary and secondary air flaps as a result of the underpressure within the boiler.

5 Emission measurement

Why measure emissions?

It is a requirement for the carbon monoxide (CO) emissions of every boiler to be measured periodically. In Germany, this periodic measurement must also include a dust measurement.

There are several aspects of this that could go wrong, resulting in incorrect measurements even though the boiler fully and consistently complies with these limits when operating in accordance with the relevant standards.

Notes on emission measurement in Germany

In accordance with the provisions of "BImSchV," lower limit values for the emission measurement in Germany apply to all new heating system installations starting 1 January 2015. Notes on compliance are found under 12 "Low-emission operation".

Clean the boiler 3 - 5 days before the emission measurement

Thoroughly clean the boiler and flue pipe 3 - 5 days before the emission measurement. Once this is complete, heating can resume as usual.

This delay between cleaning and measurement is necessary in order to allow dust disturbed during cleaning to settle again. If the chimney sweep measures unsettled dust, the dust reading will be higher than normal and thus inaccurate.

CAUTION!

▶ Under no circumstances clean the boiler and flue pipe on the day of the measurement!

Ensure sufficient heat consumption

Open all radiator valves and turn radiator thermostats to maximum.

Perform emission measurement

1. For emission measurement, the boiler must be switched off with the [On/Off] button.

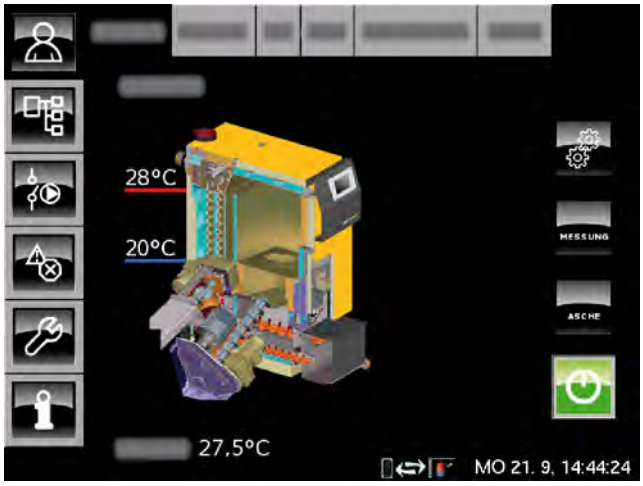


Fig. 5-1: Boiler switched on

2. In the boiler overview, click on the [MEAS.] button. A settings window appears for the emission measurement.

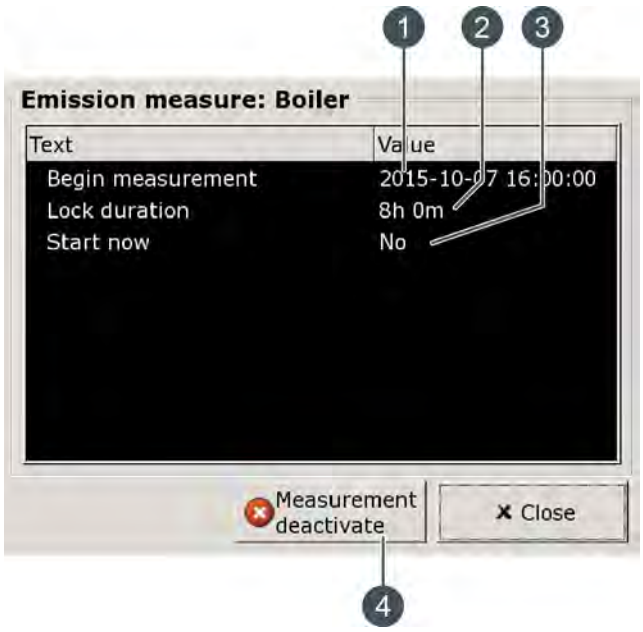


Fig. 5-2: Settings window

1 Date and time of the planned measurement

2 Duration of the lock before the measurement

3 Start measurement immediately with selection [Yes]

4 Cancel emission measurement or delete entered values

In the settings window, the date and the time of the emission measurement agreed (with the chimney sweep) is entered. Also (if required) the duration

[Lock duration] can be adjusted. This relates to the set time of the measurement. During this period no heating operation will be started, so that the heating system has time to cool down.

Example: If a time of 17:00 is set for the emission measurement and at [Lock duration] 8 h, heating will end at 09:00 .

3. Once the time for the emission measurement is set, the settings window is closed. Button [MEAS.] now illuminates orange. The control system automatically starts heating on time, so that the measurement can be carried out at the set time.

   The remaining time until the measuring time is displayed in the orange lit button [MEAS.]. The consumers must decrease the heat in the meantime.

Fig. 5-3: Preparation for emission measurement

If the emission measurement should be started immediately, this also takes place in the settings window. To do this, for parameter [Start now] set the selection to [Yes].

4. As soon as the boiler is ready for the emission measurement, a corresponding message appears on the screen.

   The [MEAS.] button is now illuminated green and a countdown (3 hours for testing with full load) is displayed. The emission measurement is to be carried out during this period.

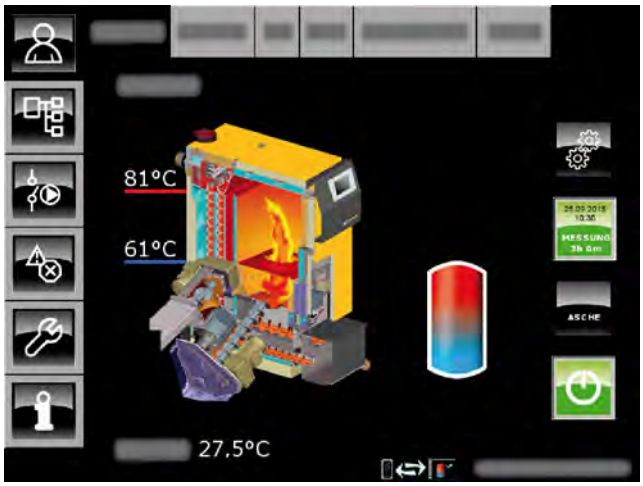


Fig. 5-4: Ready for emission measurement

5. Switch the boiler back to normal mode after the emission measurement. To do this, open the settings window and press the [Measurementde-activate] button. If you do not press this button, the boiler will automatically switch back to normal mode after some time.

6 Safety

6.1 General information

Operation only by trained personnel

The product may be operated by trained adults only. Training may be provided by the heating technician or our customer service. Please read the associated documentation carefully in order to avoid errors during operation and maintenance.

The product may not be operated by persons with impaired physical, sensory, or mental capabilities. Persons who lack experience and knowledge as well as children may not operate, clean, or maintain the product.

Keep children away from the fuel store and storeroom

In fuel stores for wood chips, in particular, there is a danger that a hollow space may form above the agitator. Children playing on the pile of wood chips, or careless adults, could fall in and get buried or caught up in the discharge screw.

Keep fire extinguishers in a clearly visible location

In Austria, the minimum requirement is an ABC powder extinguisher with 6 kg. An AB foam extinguisher with 9 litres, which produces less damage when used, is preferable. The fire extinguisher should be kept outside the boiler room, visible and easily accessible.

In Germany and Switzerland, fire extinguishers are not required for heating systems in private residences. In spite of this, we recommend having one in the house.

Storage of ash

The ash must be kept in non-flammable containers with covers. Do not put hot ash in the waste bin due to risk of fire.

6.2 Safety devices

Pump safety run, automatic heat dissipation at overtemperature

If the boiler temperature exceeds 90°C (factory setting) for any reason, the pump safety run will start. All heating pumps and boiler pumps that are connected to the boiler control are switched on to dissipate heat from the boiler.

This action prevents the boiler temperature from rising any more and activating further safety devices such as the safety temperature limiter and thermal discharge valve. The pump safety run is displayed on the screen as operating mode [Heat dissipation].

The heat dissipation is limited by the maximum flow temperature set in the heating circuits and the target hot water temperature.

Install thermal emergency cooling valve against overheating

The safety heat exchanger built into the boiler must be connected by the heating technician to the house's cold water supply via a thermal relief valve (opening temperature 97 °C) to protect the boiler against overheating if the pump fails. The minimum pressure in the cold water pipe must be 2 bar.

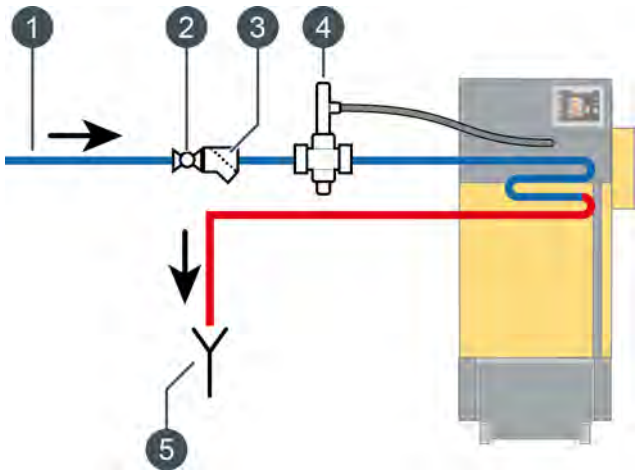


Fig. 6-1: Thermal emergency cooling valve

1 Cold water connection
2 Isolating valve; remove hand wheel
3 Strainer
4 Thermal emergency cooling valve
5 Visible outlet to sewer

The cold water supply must be connected to the upper connector of the safety heat exchanger; the lower connector serves as an outlet to the sewer. To prevent the supply line from being shut off accidentally, remove the levers from shut-off valves or the hand wheels from valves and hang them there with a piece of wire.

The discharge must have an easily visible flow path so malfunctions can be recognised. Direct the discharged water to the sewer via a siphon funnel or at least with a pipe into the ground so that nobody can be scalded if the valve is activated.

Even for cold water coming from a domestic well with its own pump, a thermal emergency cooling valve must be installed on the boiler. With a generously dimensioned air vessel, enough water for cooling will come even if there is a power failure. If the electricity supply is very uncertain, a dedicated air vessel for the thermal emergency cooling valve is required.

Safety shutdown by safety temperature limiter

For additional safety against boiler overheating, a safety temperature limiter is built into the boiler. When a boiler temperature of 105°C (tolerance 100 to 106°C) is reached, the power supply to the draught fan and the fuel intake is interrupted. If the boiler temperature decreases below 70°C again, the safety temperature limiter can be manually released for a restart of the boiler.

Install safety valve against overpressure

A safety valve with 3 bar opening pressure must be installed on the boiler. No shut-off valve may be installed between the boiler and the safety valve. If solar or other heat sources provide energy to the buffer storage tank via a heat exchanger, a safety valve (3 bar maximum) is also required on the buffer storage tank.

Normally an expansion tank that is too small or defective, or blocked heating lines, are the cause for activation of the safety valve. The safety valve must be on the boiler at the top of the flow in order to discharge heat in an emergency. Only this way can it reduce pressure by blowing out hot water and steam.

DANGER!

Safety valve outlet

The safety valve outlet must be directed to the ground in a pipe so nobody is endangered by hot water or steam.

- ▶ The safety valve outlet must be directed to the sewer via a clearly visible, open route (siphon funnel) so that malfunctions, especially a failure of the safety valve to close, can be recognised. If no sewer connection is available, the outlet must be directed to the ground in a pipe.

7 Changing the fuel

Switch off boiler via mains switch

WARNING!

- Switch off the electricity to the boiler via the mains switch. This prevents injuries caused by switching the boiler on inadvertently.

Setting the firebed level sensor

The better the fuel, the smaller the amount needed on the tilting grate. Therefore, when the fuel is changed, the position of the firebed level sensor must also be changed. The sensor is behind the cover at the front of the boiler.

The settings for the various fuels are provided under 7.2 "Settings".

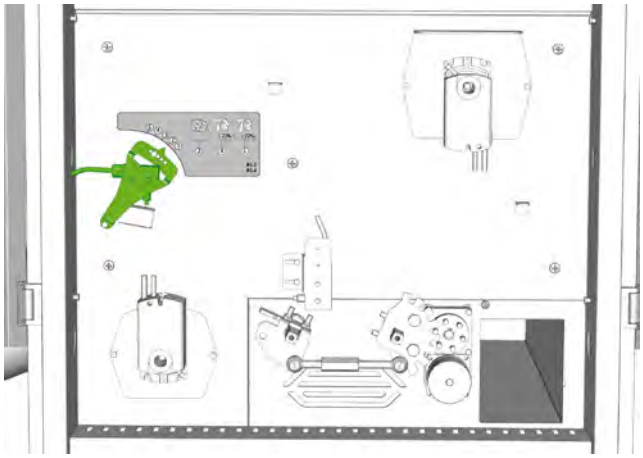
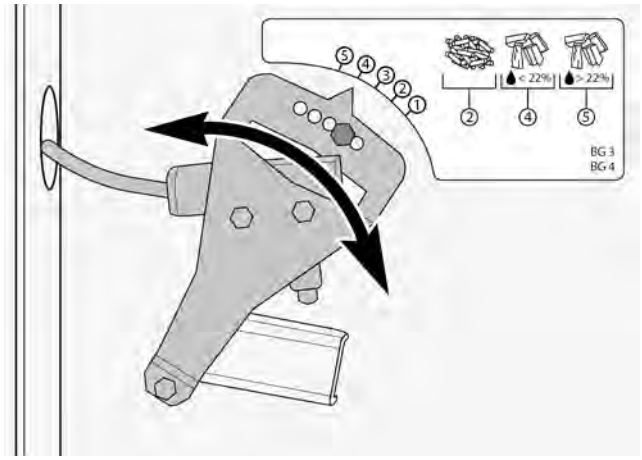


Fig. 7-1: Firebed level sensor

To adjust the position, loosen the screw, turn the firebed level sensor and fix it in place with the screw.



Enable flue gas recirculation for pellets and miscanthus

For very dry fuels such as pellets, carpentry waste, miscanthus or wood chips with water content under 15%, the optional flue gas recirculation is needed in order to lower the combustion temperature.

Flue gas recirculation must be enabled for the fuels mentioned above. This is done by turning the shut-off plug. Then the flue gas can flow into the combustion chamber.

Loosen the 4 screws on the housing and remove the shut-off plug.

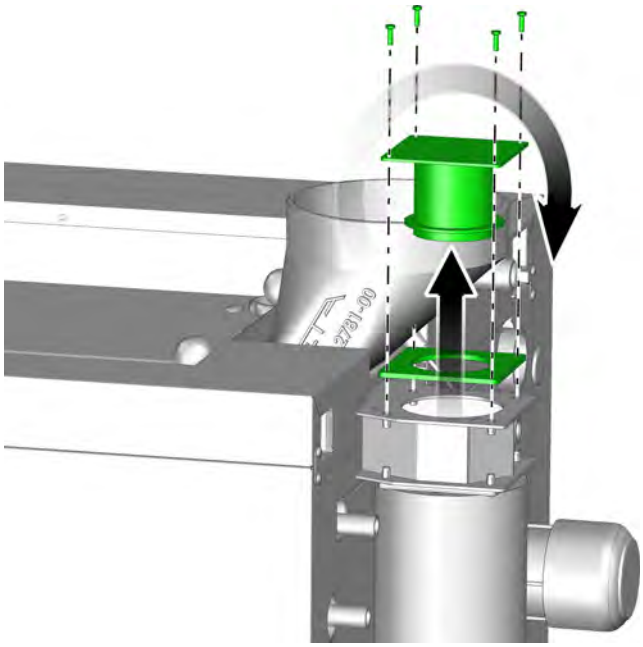


Fig. 7-2: Removing the shut-off plug

Inspect the seal on the shut-off plug and replace it if necessary.

Turn the shut-off plug, insert the seal and fasten the shut-off plug.

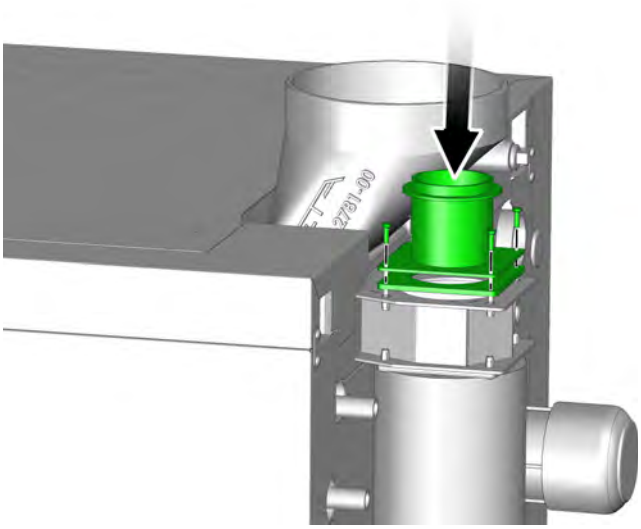


Fig. 7-3: Enabling flue gas recirculation

When using wood chips with less than 15% water content, enable flue gas recirculation and manually set [Flue gas recirculation] to [Yes] in the control system; see 8.2.3.2 "Flue gas recirculation". For wood chips with more than 15% water content, flue gas recirculation remains disabled.

Setting the fuel type in the control system

The control system provides a selection of different fuels. For each one different values are stored for the combustion and de-ashing. If the fuel is changed, the new fuel must also be set in the control system. If the water content and density are known, these parameters must also be adjusted.

Changing the fuel, density and water content in the control system is described in 8.2.3.1 "Fuel".

7.1 Slag

What is slag?

Slag is liquified ash of combusted fuel. Liquefaction occurs when the combustion temperature in the boiler reaches the ash melting point of the fuel.

Slag clogs the openings in the grate and prevents the flow of air. As a result, the combustion temperature increases, which further promotes the formation of slag. This causes increased wear of the combustion chamber, the grate, and its de-ashing parts as well as faults and unnecessary additional maintenance demands.

How does slag form?

The ash melting point of wood is approximately 1100 °C. The combustion temperature of the boiler (with good quality wood chips) is approximately 900 °C. Since the combustion temperature is lower than the ash melting point of the fuel, no slag will form.

The ash melting point of miscanthus and impurities like needles, leaves, soil, dirt, and rotten fuel is approximately 800 °C. Therefore, a high level of impurities will lead to the formation of slag.

Optional flue gas recirculation is one way to avoid the formation of slag. Flue gas recirculation directs a portion of the flue gas back into the combustion chamber, reducing the combustion temperature. As a result, the ash melting point of the fuel is no longer reached, greatly reducing the formation of slag.

Causes of slag

The causes of slag can be divided into the following categories:

Characteristics of the fuel

- Wood chips and miscanthus containing a high level of ash, contaminants (soil, sand, stones), a high proportion of bark or leaves and needles.
- Pellets and bark pellets that contain a high proportion of ash.

Improper operation and maintenance of the boiler.

- Leaks in the boiler caused by improperly sealed maintenance openings.
- Unsealed Lambda probe, defective seals on the ash box, flue gas recirculation.
- Boiler and flue gas recirculation not regularly cleaned, or flue gas recirculation does not work due to high flue draught.

Incorrect control system settings

- Incorrect fuel settings
- De-ashing interval too long.

Generally speaking, the darker the wood chips, the higher the proportion of dirt that will cause slag.

When the fuel causes slag

If pieces of slag are found in the ash box, then this is usually caused by the fuel's ash content. Therefore, the boiler must be de-ashed more often. This is done by shortening the de-ashing interval; see page 30.

An excessive flue draught can also cause slag by reducing the effectiveness of the flue gas recirculation. If the flue draught is over 15 Pa, a draught limiter is

required, or a nozzle on the chimney opening with which higher exit velocities and better lift for the flue gas are achieved.

Remedies for slag

If slag appears, the following measures can be used as remedies:

- Shorten the de-ashing interval by 50% (use button  in the boiler overview).
- Raise the residual oxygen content O_2 in the boiler settings (use button  in boiler overview).
- Install flue gas recirculation on the boiler
- Check firebed level sensor, see 7.2 "Settings".

In any case, the de-ashing interval must be adjusted. As an additional measure, the residual oxygen content can be briefly raised. However, if would be preferable to change the fuel or to retrofit the optional flue gas recirculation in order to sustainably lower the combustion temperature.

Increase residual oxygen content

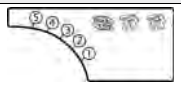
In the boiler overview, click on the  button . Enter the desired increase at parameter [Increase O2 target value] in the settings window. This depends on the water content of the wood chips, see following table.

Water content of wood chips	Increase by
< 15%	1.5 - 2.0%
15 - 25%	0.5 - 1.0%
> 25%	no increase

Tab. 7-1: Increase of residual oxygen content

If the increase does not improve the situation with respect to slag formation, flue gas recirculation should be retrofitted in order to sustainably lower the combustion temperature.

7.2 Settings

Adaptations for HACK 200 kW	Fuel	Pellets		Wood chips						Carpentry material		Miscanthus[a]	
	Water content	< 15%		< 15%		15 - 25%		25 - 35%		< 15%		< 20%	
	Ash/dust content	low	high	low	high	low	high	low	high	low	high	low	high
 Software parameters [Fuel]		[Pellets]		[Woodchips]						[Woodchips]		[Miscanthus]	
Firebed level sensor													
 Position		2		4				5		4		5	
De-ashing interval (boiler with buffer storage tank)													
 Software parameters	[De-ash after min.]	140 kg	50 kg	70 kg	18 kg	70 kg	18 kg	70 kg	18 kg	35 kg	18 kg	35 kg	10 kg
	[De-ash after max.]	230 kg	173 kg	155 kg	78 kg	155 kg	78 kg	155 kg	78 kg	155 kg	78 kg	80 kg	24 kg
De-ashing interval (boiler without buffer storage tank)													
 Software parameters	[De-ash after min.]	140 kg	99 kg	70 kg	35 kg	70 kg	35 kg	70 kg	56 kg	70 kg	35 kg	35 kg	10 kg
	[De-ash after max.]	230 kg	173 kg	155 kg	78 kg	155 kg	78 kg	155 kg	78 kg	155 kg	78 kg	80 kg	24 kg
Boiler with flue gas recirculation installed													
 Software parameters [Flue gas recirculation]		[Yes]		[Yes]		[Yes] (recom-mended)		[Yes]		[No]		[Yes]	
 Flue gas recirculation status		Open		Open		Open (recom-mended)		Open		Closed		Open	
Boiler without flue gas recirculation													
 Software parameters [Flue gas recirculation]		[No]											

a. Reduced max. output: 150 kW

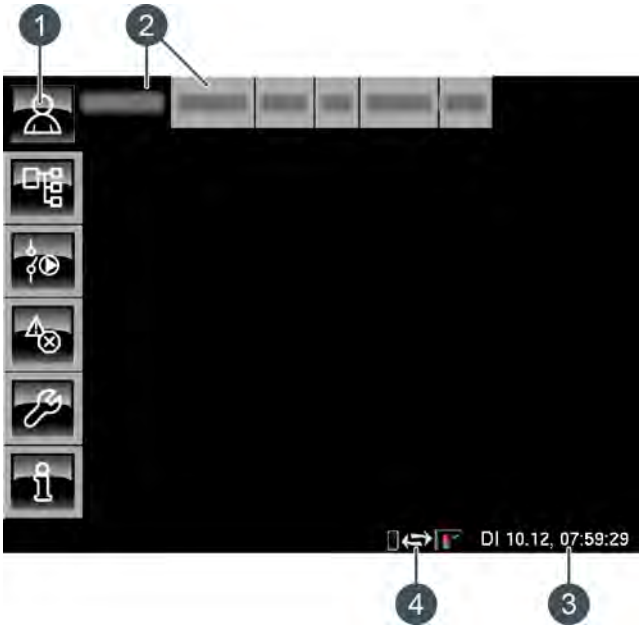
8 Operation

8.1 User interface

8.1.1 Overview

Touchscreen user interface

The touchscreen only displays function blocks that are required and configured to work with your heating system.



1 Menu buttons
2 Heating system function blocks
3 Date and time
4 Remote control (meinETA)

Overview

Displays an overview screen of the selected function block.

Text menu

Allows you to change parameters of the selected function block.

I/O menu

Enables a specialist to assign inputs and outputs and manually operate the outputs of the selected function block.

Messages

Messages of the selected function block (notifications, warnings or errors)

Toolbox

Toolbox for the specialist.

Help

Displays additional information for a parameter selected in the text menu. If additional information is available, the symbol in the button changes to .

8.1.2 Setting the date and time

Explanation

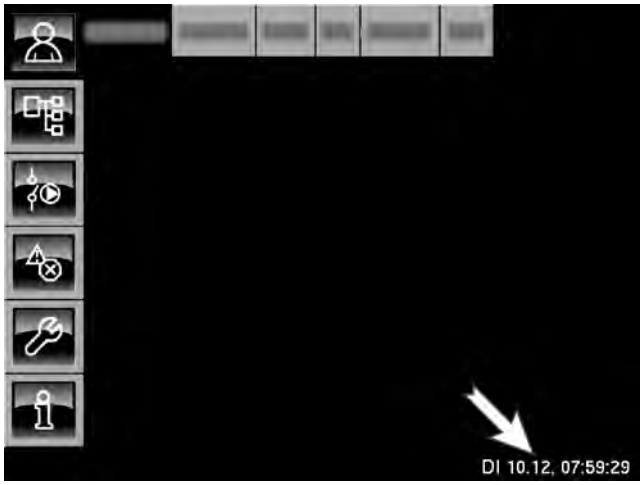
The ETAtouch control system allows you to adjust the date and time to suit your respective time zone.

The date and time are factory-set to Central European Time (UTC+01:00).

Changing the date and time

Press the button to open the function block overview screen.

Tap on the date or time at the bottom right-hand corner of the touchscreen.



A settings screen opens:

By tapping on [Day:], [Month:], [Year:] or [Time:], you can select the parameter that you wish to change.

Enter the new value and press [Accept] to save.

8.1.3 Changing the names of function blocks

Renaming function blocks

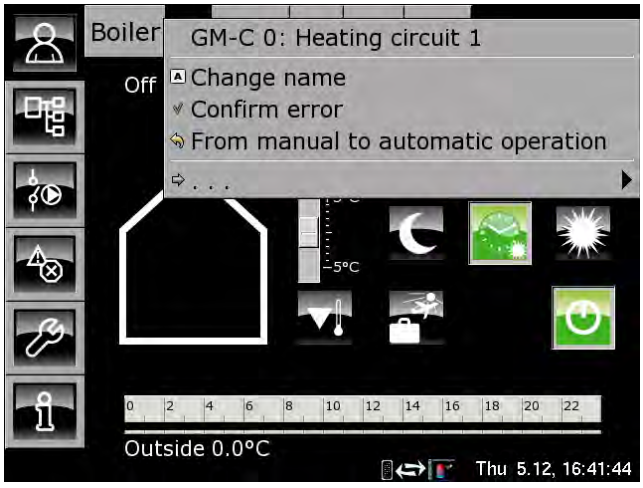
You can individually adapt the names of function blocks to make them easier for you to recognise.

If you are changing the names of function blocks, bear in mind that they should be kept short. This will make the touchscreen clearer.

Changing a name

Tap [HC] twice to rename this function block.

A small menu window opens:



Tap [Change name].

A keypad is displayed:

Enter the new name and press [Accept] to save.

To cancel the process and keep the original name, press [Cancel].

8.1.4 Text menu navigation

Using the text menu

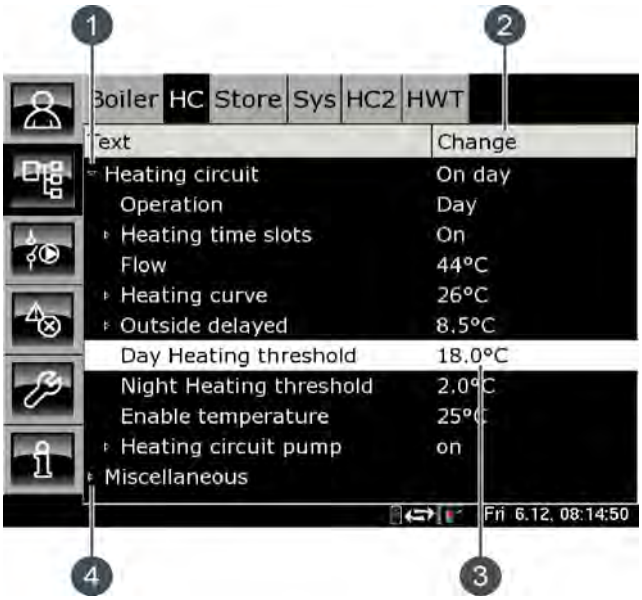
For each function block, there is a text menu. In this window, the available parameters are displayed and can be changed if necessary.

If additional information is available for a selected parameter, the symbol in the button changes to . This additional information is displayed when you press the button.

Only modify parameters if you know what their function is. Before any changes, read the relevant section of the user manual or configuration manual, or the additional information displayed when you press . If you cannot find sufficient information about a parameter, please consult a specialist.

Text menu overview screen

Press the button and [HC], for example, to open the text menu of this function block.



1 Submenu opens
2 [Value] or [Change]
3 Selected parameter
4 Submenu is available

Modifying parameters

Example: Change the [Day heat. lim.] parameter in the [HC] function block.

First, press [HC] to select the function block.

Press to switch to the function block's text menu. The parameter can be found under:

Heating circuit
Day heat. lim.

It is possible to modify certain parameters in order to adapt the heating system to your needs. When you select a parameter that can be changed, the [Value] field changes to the [Change] button.

Press the [Change] button or tap the parameter twice to open a settings window:

1 Name of the parameter
2 Factory settings
3 Adjustment range (minimum and maximum value)

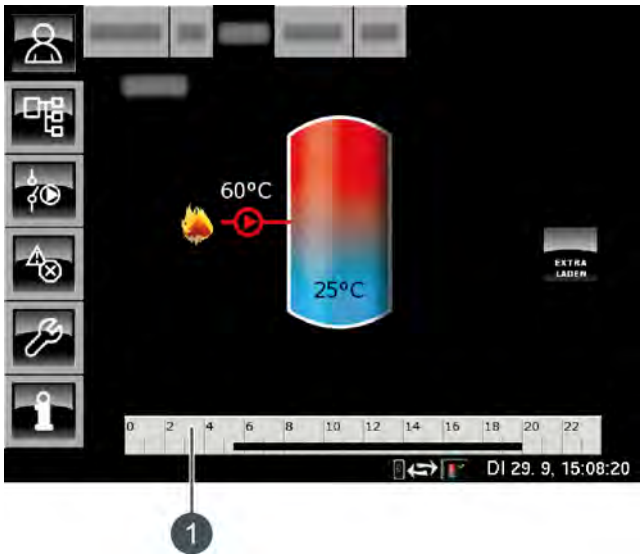
Enter the new value and press the [Accept] button to save.

Press the button to return to the overview window of the function block.

8.1.5 Setting a time window

Setting time window and temperatures

The time window is set with the timer for charging the tank (for example for accumulator tank and hot water tank), or the operating times (for example for the heating circuit).



1 Timer to set a time window

Setting a time window and the hot water temperature for the hot water tank will be described in the following. This example applies accordingly for all other function blocks with timers.

To set the charging times, tap the timer in the overview. An overview opens.

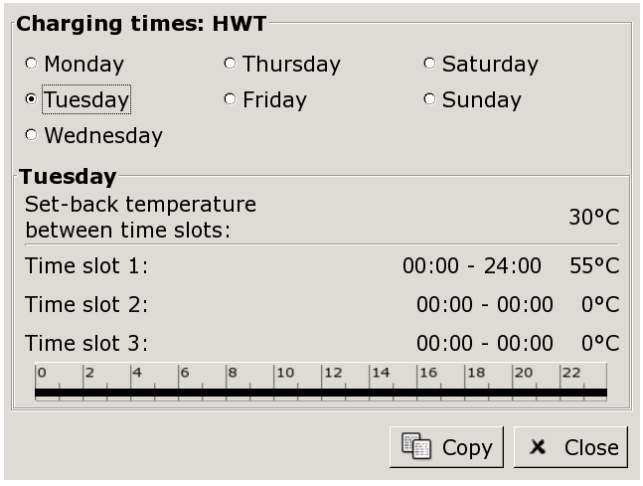


Fig. 8-1: Overview

Set the individual time windows and temperatures by tapping the lines [Time slot 1:], [Time slot 2:], [Time slot 3:] and [Set-back temperature between time slots:]. A settings window appears after tapping.

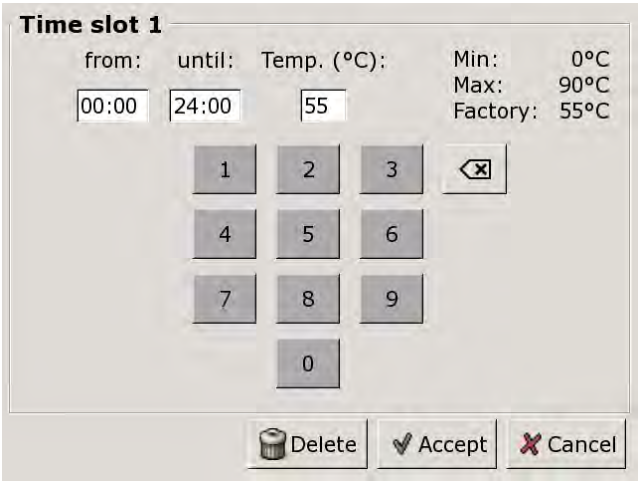


Fig. 8-2: Settings window

Enter the time window and desired temperature and press [Accept] to save. Set the further time windows the same way.

Press the [Delete] button to delete a set time window and restore the factory settings.

Copying time windows

After you have set the time windows, you can copy them for other days of the week. To do this, tap the [Copy] button in the overview screen.

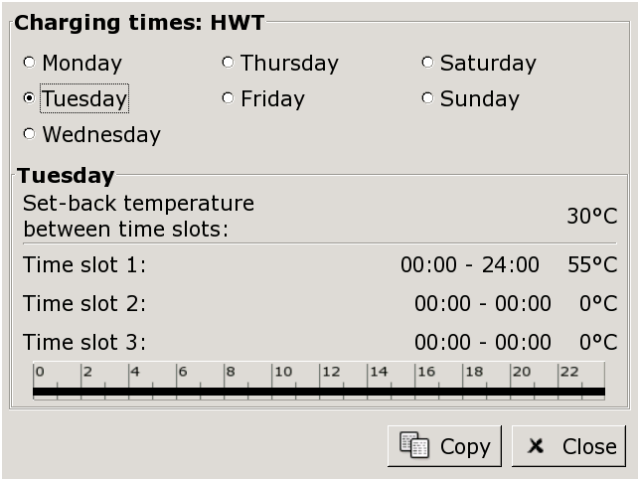


Fig. 8-3: Overview

A screen opens showing the individual days of the week.

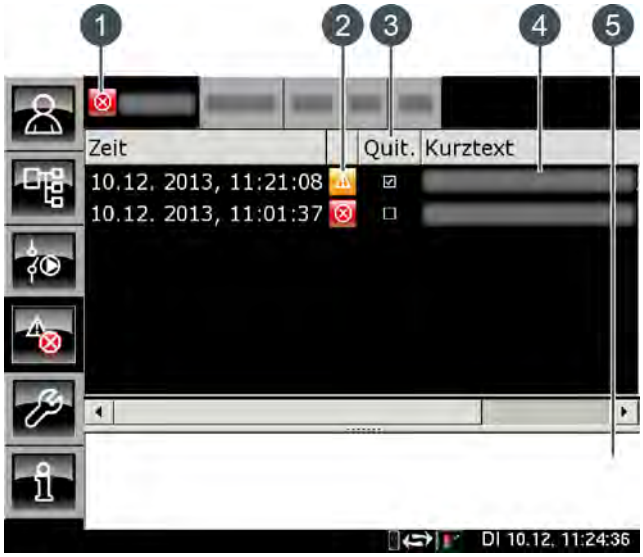
Fig. 8-4: Copying time windows

Make your selection and press the [Accept] button to save.

8.1.6 Messages

Overview of messages

Press the button to go to the messages overview of the selected function block.



1 Symbol for the highest priority type of all occurred messages

2 Symbol for the type of individual message

3 Button for acknowledging a message

4 Brief description of the message

5 Detailed description of the message

In the event of an error, alarm or warning in a function block, the symbol of the button changes.

The possible states are:

- No messages present
- There is a warning
- There is an error or alarm

Types of message

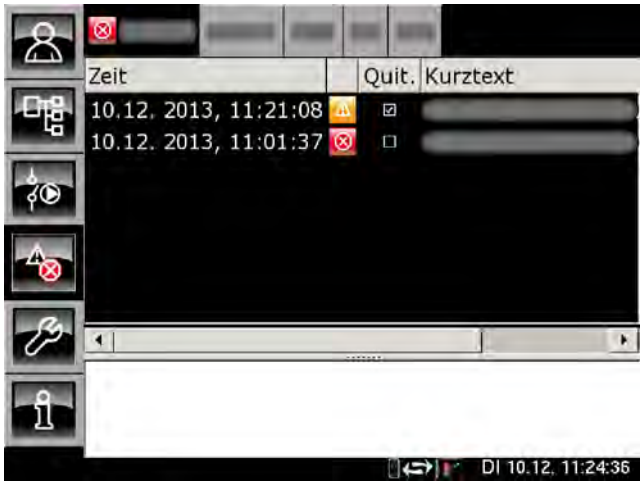
- Notification
  A notification does not interrupt operation, and therefore no acknowledgement is required. Notifications inform the user, for example, that pump anti-blocking protection has been activated.
- Warning
  A warning is displayed on failure of a function that is not absolutely essential for continued operation. It can be acknowledged before the cause of failure is remedied. However, it will continue to be displayed until the cause has actually been dealt with.
- Error, alarm
  An error or alarm stops operation. Some of these can be acknowledged before the cause of the problem is remedied. However, they will continue to be displayed until the cause has actually been dealt with.

Other errors and alarms can only be acknowledged after the cause has successfully been remedied. You can then delete these messages with the [Confirm later] button.

Once an error or alarm has been resolved and acknowledged, you must restart the boiler or the affected heating circuit by pressing the [On/Off] button.

Acknowledging an error

Press the button to open the message window of the selected function block.



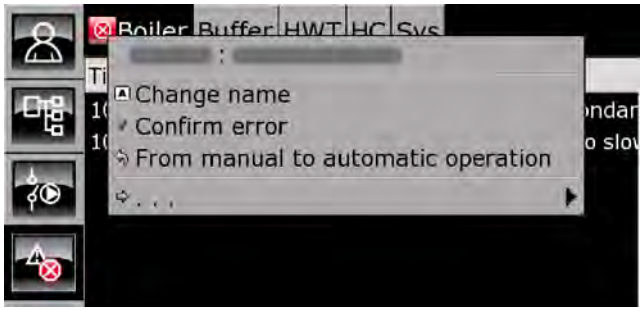
Select the message that you wish to acknowledge.

When you press [Conf.] or tap the row twice, a notice appears.

Press [OK] to acknowledge the message and delete it from the list.

Acknowledging all errors

Tap [Boiler] twice to acknowledge all errors for this function block. A small menu window opens. Tap on the [Confirm error] field in this window.



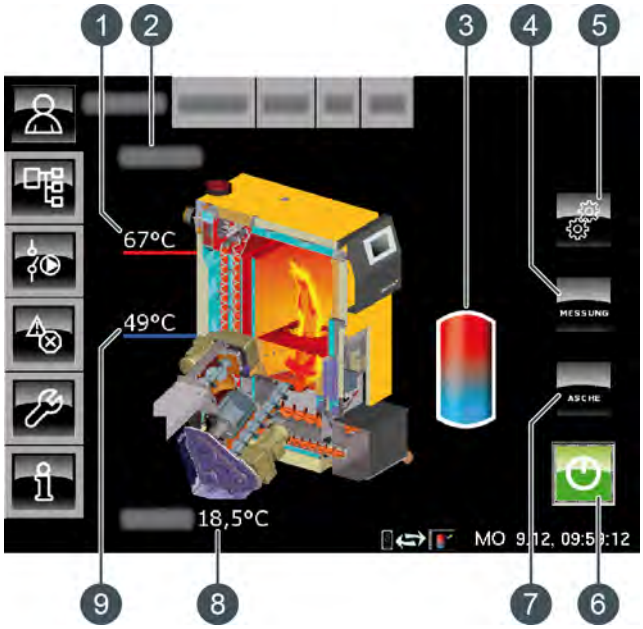
8.2 Function block [Boiler]

8.2.1 Overview

Boiler overview

Press the button and [Boiler] to open the boiler overview window.

Switching the boiler on and off, additional de-ashing as well as emission measurement are all detailed in this overview.



1 Boiler temperature
2 Operating status
3 Buffer
4 [MEAS.] key
5 Boiler settings
6 [On/Off] key
7 [ASH] key
8 Outside temperature
9 Return temperature

[On/Off] button

This button switches the boiler on and off. If the boiler is on, this button appears green .

[MEAS.] button

A setting window for the emissions measurement of the boiler will open by clicking this button. Here, you can set a time for the emissions measurement, or it can be started immediately.

[ASH] button

This button starts boiler de-ashing. If the boiler is in operation, burnout first takes place when this button is pressed, and de-ashing only after this. If the boiler is switched off or on standby, de-ashing can be started straight away.

Boiler settings

Pressing this key brings up a settings window to adjust the de-ashing interval of the boiler and the residual oxygen content. These adjustments can also be made in the text menu.

Buffer storage tank charging

This symbol is displayed next to the boiler as soon as it supplies heat to the buffer.

Boiler functionality

Press the [On/Off] button to switch the boiler on and off. When the boiler is switched on, heating starts as soon as there is demand from the connected consumers (either the buffer, the heating circuits or the hot water tank).

The control system calculates the required boiler temperature based on the flow temperatures demanded by the consumers. If the boiler is supplying heat to the buffer, the symbol appears in the overview window.

The minimum running time for a boiler heating phase is 10 minutes. If there is no more demand from the consumers after that time, the boiler stops heating with a burnout. The operating mode changes to [Ember burnout] and then to [Ready].

Boiler de-ashing takes place within a configurable interval; see page 30.
De-ashing can also be disabled for a time, e.g. to prevent the boiler from de-ashing at night; see page 30.

After an adjustable amount of fuel is consumed, a reminder to empty the ash box can be issued; see page 30.

8.2.2 Operating modes

Switched off

The boiler is off. The [On/Off] button in the overview screen lights up red.

Warm Start

An attempt is made to ignite the fuel without the electrical ignition using only the heat stored in the combustion chamber.

Igniting

The fuel is ignited using the electrical ignition.

Heating

The boiler is in heating mode and is channelling heat to the consumers.

Ember burnout

At the end of the heating phase, the fuel that is still on the grate is burnt off. No more fuel is fed into the boiler.

Ashbox missing

The ash box is not connected to the boiler.

Ready

When ember burnout is complete, the still switched-on boiler is in standby waiting for a heating demand.

De-ash

The boiler is de-ashing.

Malfunction during ash removal

The ash screw has been switched off due to excessive current consumption. This may be due to a full ash box or blockage of the ash screw by foreign objects.

Malfunction

A malfunction has occurred, preventing the boiler from heating. The cause can be found in the list of error messages.

Ember burnout due to a malfunction

The current heating phase has ended with ember burnout due to a malfunction.

Ember burnout due to external locking

Due to an external lockout (Stop command), the current heating phase has ended with ember burnout.

Locked

Heating not possible, as the boiler has been locked externally (Stop command).

Calibrating lambda probe

The lambda probe is undergoing automatic calibration. It is not possible for the unit to heat whilst in this mode.

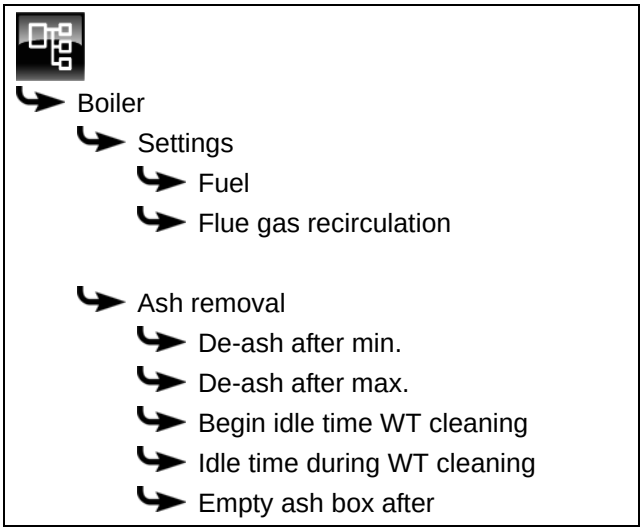
emptying Stoker

When the heating phase is over, the fuel feed runs empty in order to empty the stoker.

8.2.3 Text menu

Adjustable parameters

In function block [Boiler], switch to the text menu with the button.



Detailed descriptions of the parameters are provided below.

8.2.3.1 Fuel

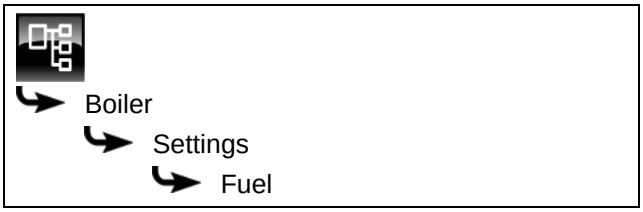
Explanation [Fuel]

This parameter sets the type of fuel used. The control system contains appropriate values for each type of fuel, to ensure optimum combustion and ash removal.

This parameter is factory-set to [Woodchips].

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

If the fuel is set to [Pellets] or [Miscanthus], the setting for flue gas recirculation is automatically changed to [Yes].
If the fuel is [Woodchips], the [No] setting is made automatically.

If you know the water content and density of the fuel you are using, you must also adjust these two parameters. You can find them in the same submenu.

8.2.3.2 Flue gas recirculation

Explanation of [Flue gas recirculation]

When the fuel setting is changed in the control system, the status of the flue gas recirculation is adjusted automatically.

If the fuel is set to [Pellets] or [Miscanthus], the setting for flue gas recirculation is changed to [Yes].
If the fuel is [Woodchips], the setting is [No].

However, if wood chips with less than 15% water content are used, the [Yes] setting must be made manually.

Checking the setting

The parameter can be found under:

Boiler
Settings
Flue gas recirculation

8.2.3.3 Boiler de-ashing interval

Explanation of [De-ash after min.] and [De-ash after max.]

The boiler's de-ashing interval is set with the [De-ash after min.] and [De-ash after max.] parameters. The boiler de-ashes within the range specified by these two parameters.

Different fuel qualities require different de-ashing intervals. This is why the de-ashing interval needs to be adjusted.

Changing the de-ashing interval

Open the settings by pressing the button in boiler overview. A settings window will open. Select the desired parameter in this. Enter the new value and press [Accept] to save.

The de-ashing interval can also be changed in the text menu. The parameters can be found under:

Boiler
Ash removal
De-ash after min.
De-ash after max.

The de-ashing interval may only be modified after consultation with a specialist or ETA customer service.

8.2.3.4 Setting the idle time for heat exchanger de-ashing

Explanation of [Begin idle time WT cleaning] and [Idle time during WT cleaning]

The [Idle time during WT cleaning] parameter is used to select the duration of the idle time for heat exchanger de-ashing.

The start time for the idle time is set with the [Begin idle time WT cleaning] parameter.

The factory settings are 10 hours for the duration and 9:00 PM for the start time.

Setting the heat exchanger idle time

The parameters can be found under:

Boiler
Ash removal
Begin idle time WT cleaning
Idle time during WT cleaning

Select the parameter and press the [Change] button. A settings window will open.

Enter the duration or start time and press [Accept] to save.

8.2.3.5 Empty ash box after

Explanation [Empty ash box after]

This parameter is used to set the amount of fuel to be consumed before a reminder to empty the ash box is displayed on the screen.

The factory setting for this value is 0 kg, so the reminder does not appear.

Modifying parameters

The parameter can be found under:

Boiler
Ash removal
Empty ash box after

Select the parameter and press the [Change] button. A settings window will open.

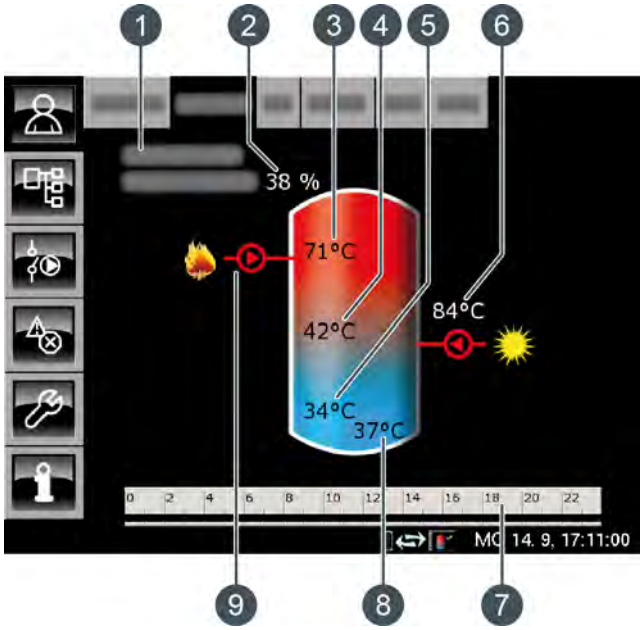
Enter the value and press the [Accept] button to save.

8.3 [Buffer] function block

8.3.1 Overview

Buffer storage tank overview screen

Press the button and [Buffer] to open the overview screen of the buffer storage tank. Here the current temperatures, operating mode and charging status are displayed.



1 Operating condition
2 Buffer charging status
3 Temperature: [Buffer top]
4 Temperature: [Buffer middle]
5 Temperature: [Buffer bottom]
6 Charging by solar heating system, temperature [Collector]
7 Timer: [BufferChrgTimes]
8 Temperature: [Buffer bottom Solar]
9 Charging by boiler

Buffer charging status

By means of the 3 temperature sensors on the buffer, the current charging status is determined and displayed in the overview screen.

A charging status of 0% means that the buffer has only been charged to the configured [Return from consumers] temperature, or lower.
100% means that the buffer has been charged up to the currently required [Buffer target] temperature.

Charging by boiler

This symbol is displayed when the buffer is being charged by the boiler.

If a combination tank is installed, the symbol is shown at the top of the buffer when the hot water rapid charge function is active. If the buffer is charged below the hot water section, the symbol appears in the centre of the buffer.

Charging by the solar heating system

Optional: for solar heating system

This symbol indicates that the tank is being charged by the connected solar heating system. The displayed temperature corresponds to the temperature of the collector.

Timer [BufferChrgTimes]

This timer displays the configured charging times for the current day for charging the buffer. These time windows are displayed as a black bar in the timer.

This timer only applies to the charging of the buffer storage tank, not for a solar heating system, if one is connected.

Timer [HW charging times]

Optional: for [Combin. tank]

With a combination tank, this timer displays the configured charging times for charging the hot water on the current day. These time windows are displayed as a black bar in the timer.

[Extra charge] button

Optional: for [Combin. tank]

With a combination tank, this button enables the hot water section to be charged to the configured hot water temperature outside the set time slot if the temperature has dropped below [Switch-on diff.].

How the buffer storage tank works

You can set different time slots inside which the boiler can charge the buffer (see page 36). Inside a time slot, the control system establishes the required buffer temperature [Buffer target] based on the current demand from the consumers (heating circuit, hot water tank...).

By means of the 3 temperature sensors on the buffer, the current charging status is determined and displayed in the overview screen.

The buffer is charged by the boiler until the current [Buffer top] temperature has exceeded the required [Buffer target] temperature, and the configurable [Buff. bottom off] temperature (see page 38) has also been exceeded. The operating state of the buffer then changes to [Charged].

If there is no demand from consumers, inside the set time slot the buffer is charged to the configurable minimum temperature [Buffer top min.] (see page 37).

Buffer with solar heating system

Optional: only for [Solar charging]

The additional temperature [Buffer bottom Solar] is displayed at the bottom of the overview screen, in the buffer storage tank.

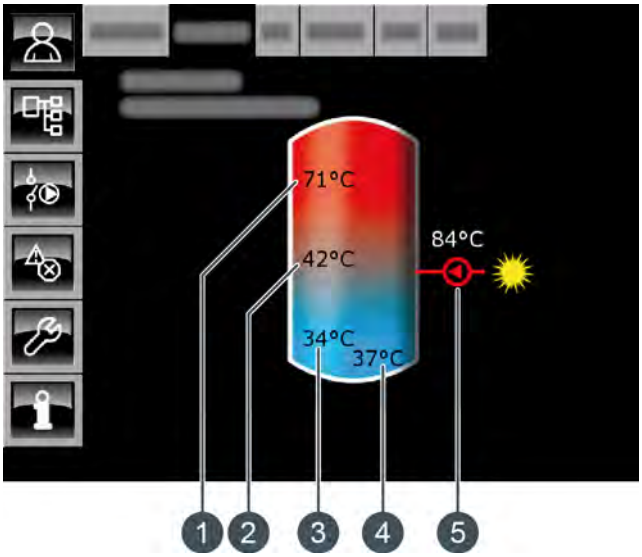


Fig. 8-5: Buffer with solar heating system

1 Temperature [Buffer top]
2 Temperature [Buffer middle]
3 Temperature [Buffer bottom]
4 Temperature [Buffer bottom Solar]
5 Charging by solar heating system, temperature [Collector]

Solar charging of the buffer is controlled by switching the solar panel pump on and off. Solar charging begins as soon as the [Collector] temperature is 5°C higher than the [Buffer bottom Solar] temperature. The solar charging symbol  appears in the overview screen.

If the [Collector] temperature falls below the [Buffer bottom Solar], solar charging ends with the solar panel pump switching off.

The configurable [Buffer bottom max] temperature sets the limit for buffer charging by the solar heating system to prevent the buffer from overheating (see page 40).

The [Solar prio.] function enables the solar heating system to charge the buffer without the boiler being started, inside 2 configurable time slots (see page 40).

Buffer with solar heating system and stratified charging valve

Optional: only with [Solar charging] and [... additional solar charging in buffer middle]

The two temperatures [Buffer top Solar] and [Buffer bottom Solar] are displayed in the overview screen.

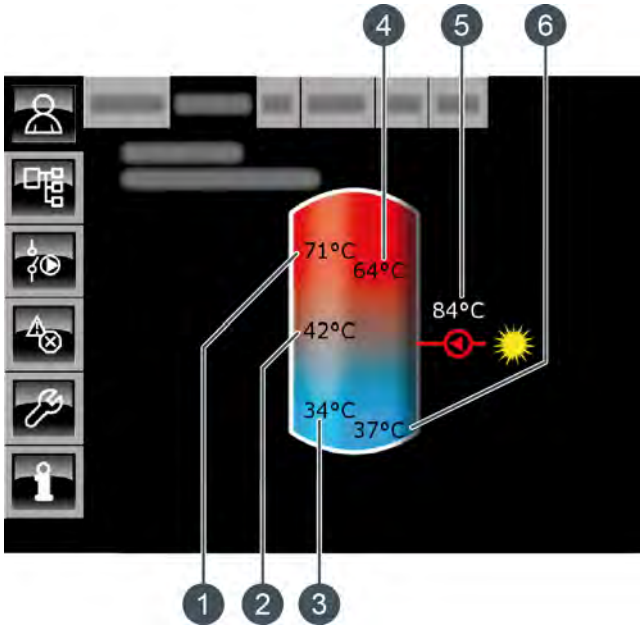


Fig. 8-6: Buffer with solar heating system and stratified charging valve

1 Temperature [Buffer top]
2 Temperature [Buffer middle]
3 Temperature [Buffer bottom]
4 Temperature [Buffer top Solar]
5 Charging by solar heating system, temperature [Collector]
6 Temperature [Buffer bottom Solar]

The stratified charging valve on the buffer storage tank switches solar charging between [Buffer bottom] and [Buffer top]. During this process, the [Buffer top Solar] and [Buffer bottom Solar] temperatures are continuously compared with the current [Collector] temperature.

The solar charging symbol is shown at the top or centre of the buffer, depending on which part of the buffer is currently being charged.

Combination tank (buffer with integrated hot water tank or coil)

Optional: for [Combin. tank]

If a combination tank (i.e. a buffer with integrated hot water tank or internal water heat exchanger) is installed, the hot water temperature is shown in the overview screen in the upper part of the buffer.

Additionally, a second timer [HW charging times] is displayed, which is used to set the hot water temperatures and charging times (see page 36). The [Extra charge] button is also displayed, for charging hot water outside the time slots.

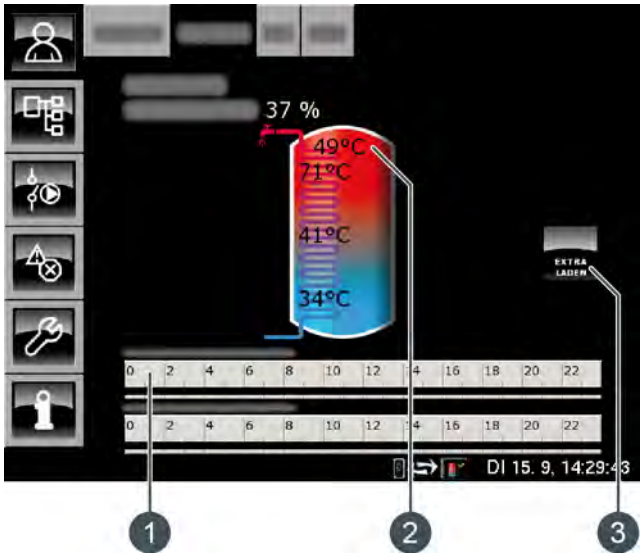


Fig. 8-7: Combination tank

1 Timer [HW charging times]
2 Temperature [Hot water tank]
3 [Extra charge] button

The configurable [Switch-on diff.] parameter additionally allows you to determine how far the current [Hot water tank] temperature can drop before the hot water tank again demands heat from the buffer (see page 41).

8.3.2 Operating modes

Charged

The buffer is charged to the required [Buffer target] temperature, and the [Buffer bottom] temperature sensor has exceeded the configurable [Buff. bottom off] temperature once.

Demand

The buffer is demanding heat from the heat producer.

Chrg.

The boiler is supplying heat to the buffer.

FreezeProt

A temperature sensor in the tank has fallen below the [FreezeProt] temperature.

The frost protection limit is factory-set to 5°C.

ResidHeat

After the boiler heating phase, its residual heat is conveyed to the tank.

Heat dissipation

The tank is being charged to discharge excess heat from the boiler.

Sensor error

A temperature sensor is faulty. You can find this temperature sensor in the message list by pressing the button.

Timer off

There is demand by the tank, but the current time is outside the time slot configured in the timer. The tank is therefore not charged.

Extra hot water charge

The [Extra charge] button has been pressed to activate extra charging outside a time slot when a combination tank is installed.

Solar prio.

Solar priority has been activated, and tank charging by the boiler is disabled. The current time is inside a configured time slot for solar priority, and the current outside temperature is higher than the set temperature [Min. out. temp. Solar prio.].

ChargeBuffer

The combination tank is demanding heat from the boiler.

Charge hot water

Only the hot water section of the combination tank is demanding heat. Only the upper section of the combination tank is being charged.

Solar heat diss.

Excess heat is being taken from a buffer that is being charged by a solar heating system.

8.3.3 Operation

Setting the accumulator tank charging times

With the [BufferChrgTimes] timer, you can set 3 different time windows for the accumulator tank for each day of the week. The accumulator tank is only charged by the boiler within a time window. The sole exception is the [Heat dissipation] operating condition.

To set the charging times, tap the [BufferChrgTimes] timer in the overview. A screen opens.

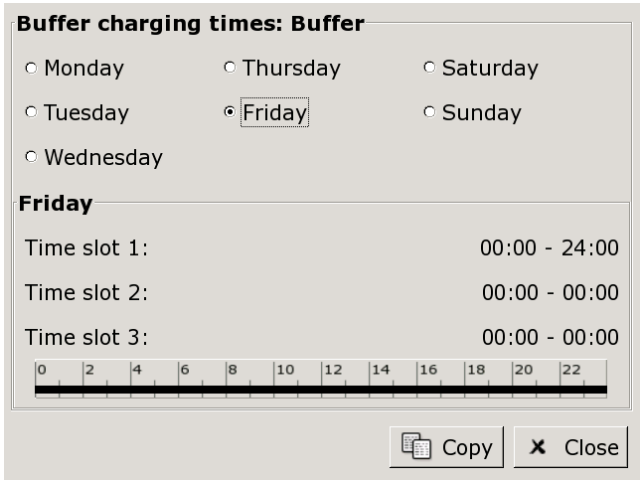


Fig. 8-8: Overview screen of set charging times

You can find further details about setting the time window in chapter 8.1.5 "Setting a time window".

Setting charging times and temperature for hot water with a combination tank

With the combination tank, the additional [HW charging times] timer is used to set 3 different time windows and temperatures for the hot water for each day of the week.

Within a time window, the hot water is charged to the set temperature. Outside a time window, the hot water is charged to the set temperature [Set-back temperature between time slots:].

To set the charging times, tap the [HW charging times] timer in the overview. A screen opens.

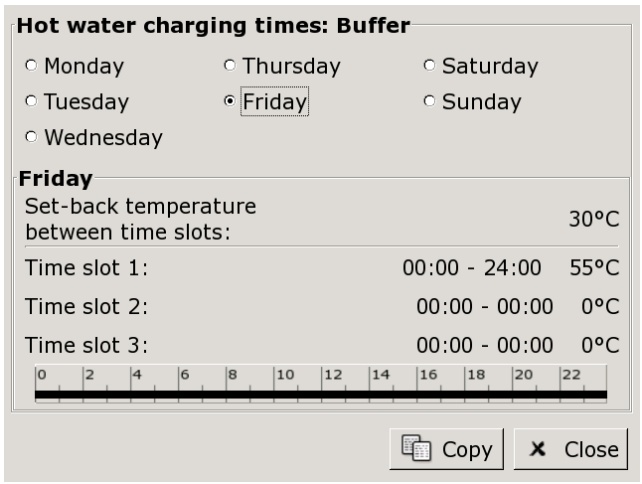


Fig. 8-9: Overview of hot water charging times

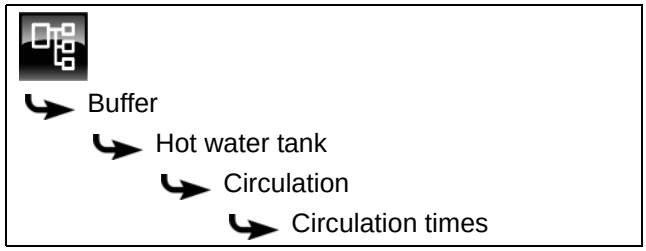
You can find further details about setting the time window in chapter 8.1.5 "Setting a time window".

Setting circulation times with combination tank

Optional: only for combination tank with circulation pump

With a combination tank, the settings of the circulation times are made in the text menu. You can set 3 different time windows for the circulation times of the circulation pump for each day of the week.

Press  to switch to the function block's text menu. The time windows are in:



The individual weekdays are listed.

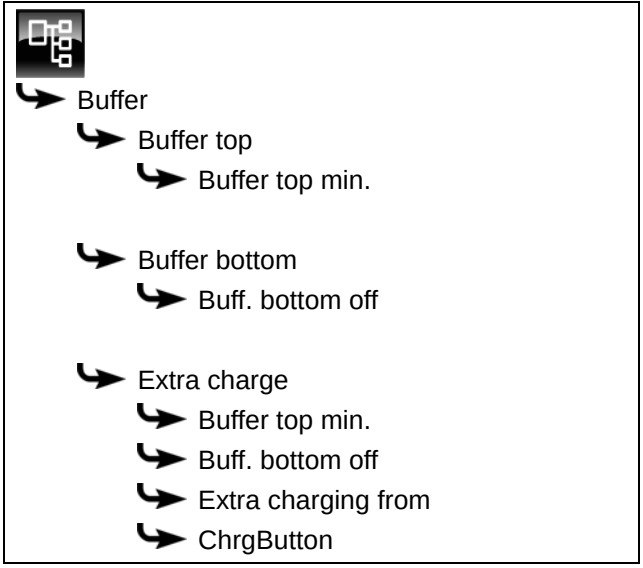
Select a weekday and in the submenu select the desired time window [Time slot 1], [Time slot 2] or [Time slot 3]. Press [Change] to open the settings window.

Set the circulation times to be as short as possible to ensure good buffer stratification and prevent limescale build-up.

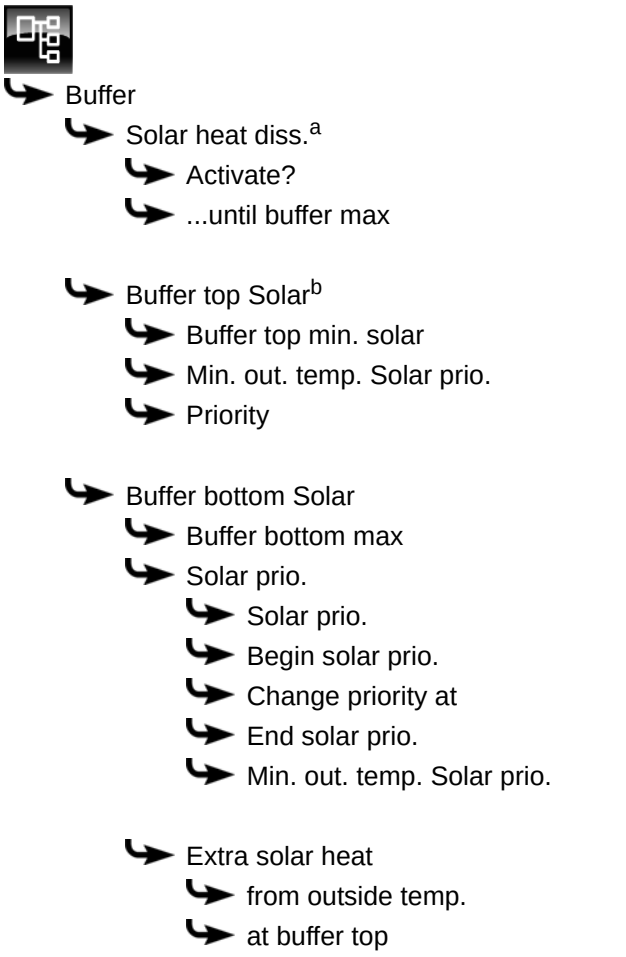
8.3.4 Text menu

Adjustable parameters

The following parameters can be configured for the basic function in the buffer text menu.



If a solar heating system is additionally connected to the buffer, further parameters can be set.

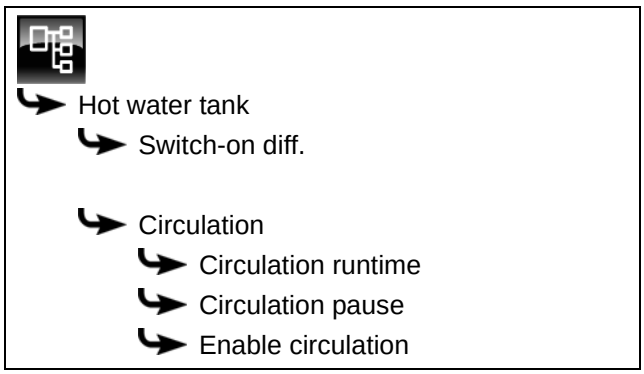


a. Only visible with several buffer storage tanks and solar heating system

b. Only visible with solar heating system and buffer with 2 internal coils

c. Only for solar heating systems with switchover between several tanks

If the buffer is implemented as a combination tank, further parameters can be set.



Detailed descriptions of the parameters are provided below.

8.3.4.6 Buffer top min.

Explanation of [Buffer top min.]

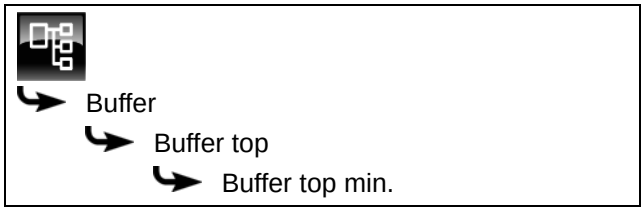
This parameter defines the minimum temperature of the buffer storage tank inside the configured time slot.

This parameter is factory-set to 10°C. The higher this temperature is set, the larger the heat reserve in the buffer. At the same time, however, higher temperatures in the buffer also reduce the solar yield, because the buffer is kept at the [Buffer top min.] temperature using energy from the boiler, even if there is no demand from the consumers.

The factory setting can remain unchanged, as long as all components of the heating system are controlled by the ETA control system. A higher value is required if peaks in output have to be covered, or very fast heat availability is needed.

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.3.4.7 Buff. bottom off

Explanation of [Buff. bottom off]

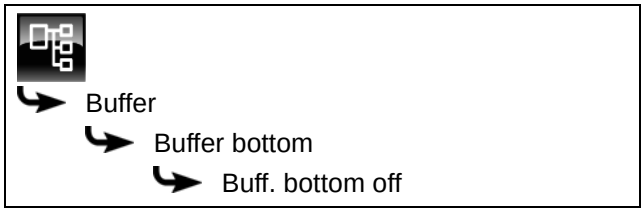
This parameter ends charging of the buffer storage tank by the boiler. As soon as the [Buffer bottom] temperature sensor in the buffer storage tank has exceeded the configured [Buff. bottom off] temperature, charging of the buffer by the boiler is stopped.

This parameter is factory-set to 40°C. The value should be at least 5 - 10°C above the average return temperature of the consumers, but no more than 70°C.

A high [Buff. bottom off] temperature reduces the number of boiler starts and improves boiler running time.

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.3.4.8 Function [Extra charge]

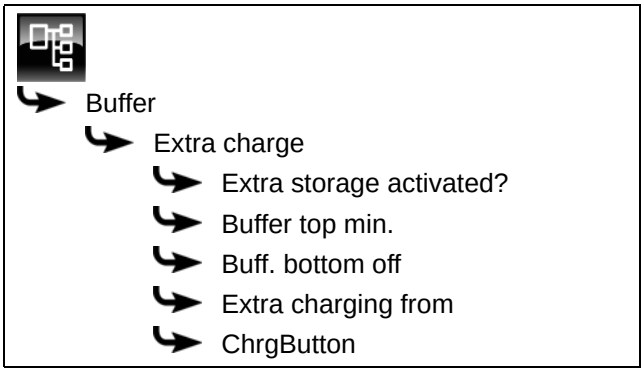
Explanation of the [Extra charge] function

This function defines a daily point in time for the buffer (=[Extra charging from]) to charge the buffer additionally. This charging is done independently of the actual consumer requirements and independently of the set time windows.
A separate minimum temperature [Buffer top min.] and shutdown temperature [Buff. bottom off] can be set for this charge. Charging ends as soon as the buffer reaches these temperatures.

The function is deactivated if one of the two temperatures is set to "0".

Setting the function

The parameters can be found under:



At first, set the parameter [Extra storage activated?] to [Yes], than the other parameters will be displayed.

Select temperatures [Buffer top min.], [Buff. bottom off] and the time [Extra charging from] and press [Change]. In the settings window, set the desired values and save them with [Accept].

To immediately start this additional buffer charge, simply set parameter [ChrgButton] to [On].

8.3.4.9 Solar heat diss.

Explanation of the [Solar heat diss.] function

Optional: Only for several buffer storage tanks and solar heating system

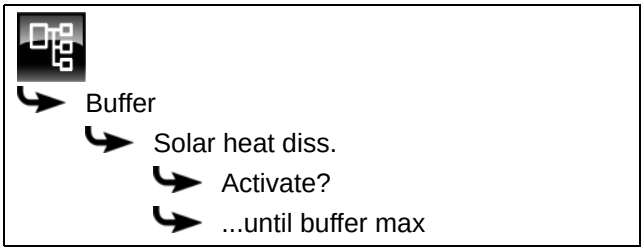
This function defines whether the selected buffer may take up excess solar heat from a buffer charged by the solar heating system.

If you set the function with the [Activate?] parameter set to [Yes], this buffer takes up the solar excess. This buffer is then charged up to the configured maximum temperature [...until buffer max].

As the factory setting, this function is switched off and the maximum temperature [...until buffer max] is limited to 70°C .

Activating the function

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

8.3.4.10 Priority of the upper and lower sections

Explanation of [Priority]

Optional: Only with solar heating system and buffer with 2 internal coils

This parameter sets the priority of the top and bottom sections of the buffer for solar charging. A high priority means that this section will be charged by the solar heating system first. A low priority means that it will be charged last.

The priority for the top section is factory-set to [High], and to [Middle] for the bottom section.

Modifying parameters

The priority for the top section is under:


Buffer
Buffer top Solar
Priority

Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

Set the priority for the bottom section of the buffer in the same way. You will find this in:


Buffer
Buffer bottom Solar
Priority

8.3.4.11 Buffer top min. solar

Explanation of [Buffer top min. solar]

Optional: Only for solar heating panels with stratified charging

With stratified charging by the solar heating system, this sets a minimum temperature for the top section of the buffer.
This way, solar charging only takes place in the top section once the solar panel is at least 7°C warmer than [Buffer top min. solar].

However, this minimum temperature only applies if the conditions for stratified charging are satisfied. If they are not, solar charging is switched to the bottom section of the buffer, to make use of the solar energy.

This parameter is factory-set to 30°C.

Modifying parameters

The parameter can be found under:


Buffer
Buffer top Solar
Buffer top min. solar

Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.3.4.12 Min. out. temp. Solar prio.

Explanation of [Min. out. temp. Solar prio.]

This parameter sets the minimum value for the outside temperature, so that one of the conditions for solar priority and stratified charging of the buffer storage tank is satisfied.

This value is factory-set to 10°C.

Modifying parameters

The parameter can be found under:


Buffer
Buffer top Solar
Min. out. temp. Solar prio.

or also in:


Buffer
Buffer bottom Solar
Solar prio.
Min. out. temp. Solar prio.

Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.3.4.13 Buffer bottom max

Explanation of [Buffer bottom max]

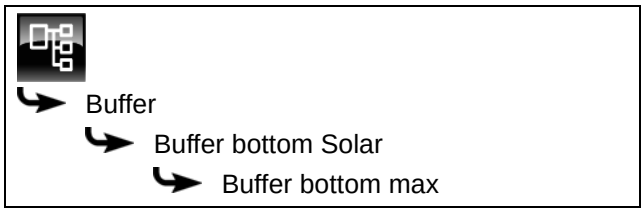
Optional: Only with solar heating systems

This switch-off temperature can only be set when the solar heating system is charging the buffer. This configurable temperature sets a threshold for how much the buffer can be charged by the solar heating system, in order to prevent the buffer from overheating. If the [Buffer bottom Solar] temperature sensor reaches the configured [Buffer bottom max] temperature, the solar panel pump of the solar heating system is switched off.

This parameter is factory-set to 90°C.

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.3.4.14 Solar prio.

Explanation of [Begin solar prio.], [Change priority at] and [End solar prio.]

Optional: Only with solar heating systems

These parameters set the time slots for the [Solar prio.] function.

The first time slot lasts from [Begin solar prio.] to [Change priority at]. The second time slot begins with [Change priority at] and ends with [End solar prio.].

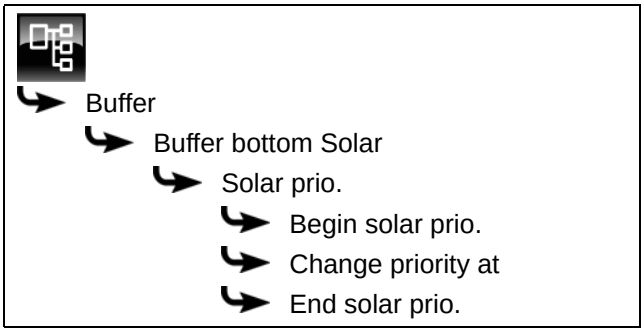
Outside the 2 time slots, the boiler can charge the buffer at any time.

Set the start of solar priority before the first time slot of the heating circuit and hot water tank. Otherwise, the boiler may start beforehand, in order to charge the heating circuit or hot water tank.

During the configured times for solar priority, it may happen that the heating circuits or the hot water are not supplied with sufficient heat.

Setting a time window

The parameters for setting the 2 time windows are in:



Select the parameter and press the [Change] button. A settings window will open.

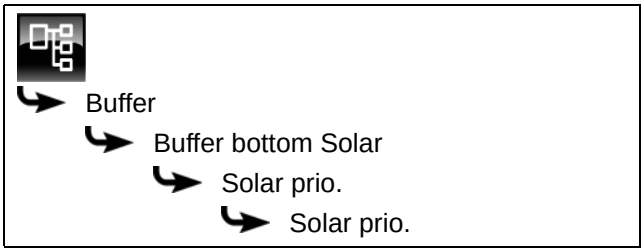
Enter the value and press the [Accept] button to save.

Set the start of solar priority before the first time window of the heating circuit and hot water tank. Otherwise, the boiler may start beforehand, in order to charge the heating circuit or hot water tank.

During the configured priority times, it may be the case that the heating circuits or the hot water are not supplied with sufficient heat.

Switch function on or off

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

8.3.4.15 Extra solar heat

Explanation of [Extra solar heat]

Optional: Only with solar heating systems

This function defines whether the buffer storage tank may convey this excess heat from the solar heating system to other consumers, even if they do not currently require any heat.

The following conditions must be met in order for the excess solar heat to be passed on in this way:

- The outside temperature must have exceeded the configurable value [from outside temp.] (factory setting 10°C).

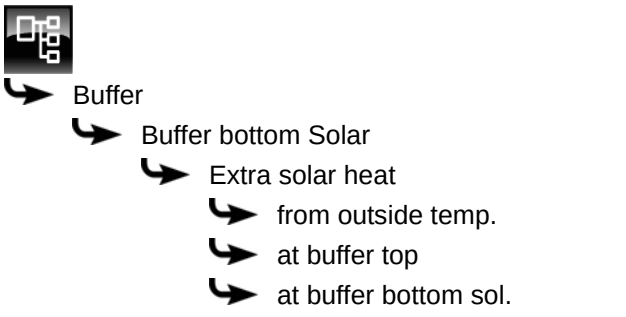
- The [Buffer top] temperature in the buffer must have exceeded the configurable value of [at buffer top] (factory setting 100°C).
- The [Buffer bottom Solar] temperature in the buffer must have exceeded the configurable value of [at buffer bottom sol.] (factory setting 50°C).
- In the function block for the hot water tank, heating circuits or other buffer storage tanks. the [Solar heat diss.] parameter must be set to [Yes], so that the buffer can request these consumers to take on the excess solar heat.

The parameters [from outside temp.], [at buffer top] and [at buffer bottom sol.] can be configured in the buffer text menu.

The [Solar heat diss.] parameter can be configured in the text menu of the [HW] or [HC] function block.

Changing the conditions

The parameters can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.3.4.16 Priority of the buffer

Explanation of [Priority]

Optional: Only for solar heating systems with switchover between several tanks

This parameter sets the priority for solar charging of the buffer. A high priority means that this tank will be charged by the solar heating system first. A low priority means that it will be charged last.

The priority for the buffer is factory-set to [Middle].

Modifying parameters

The parameter can be found under:

Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

8.3.4.17 Switch-on diff.

Explanation of [Switch-on diff.]

Optional: only with combination tank

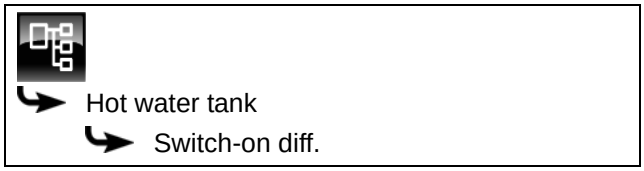
With a combination tank, this parameter regulates how far the current [Hot water tank] temperature can fall before the hot water tank again demands heat from the boiler.

The factory setting for this parameter is 15 °C. The current [Hot water tank] temperature may therefore fall 15 °C from the [Hot water tank target] value. The combination tank does not demand heat from the boiler unless this happens.

With a combination tank, this value can be set to approximately 5 °C to 8 °C if the amount of hot water is insufficient.

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.3.4.18 Circulation runtime

Optional: only for combination tank with circulation pump

Explanation of [Circulation runtime]

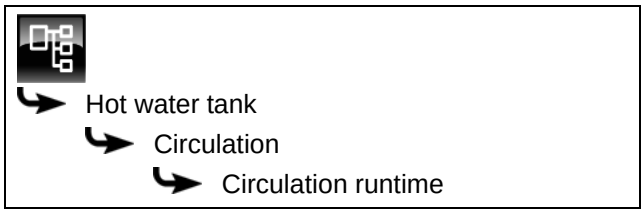
Optional: Only with circulation pump

This parameter sets the duration for operation of the circulation pump after it has been started. This period is only valid inside the set time slot.

After the set period has expired, the circulation pump is switched off for the configurable duration of the [Circulation pause] parameter.

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.3.4.19 Circulation pause

Optional: only for combination tank with circulation pump

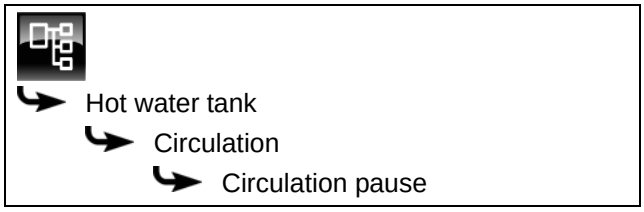
Explanation of [Circulation pause]

Optional: Only with circulation pump

This parameter sets the period (pause) after a circulation pump operating phase. The control system can only restart the circulation pump after this time has elapsed. This pause is only valid inside the set time slot.

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.3.4.20 Enable circulation

Optional: only for combination tank with circulation pump

Explanation of [Enable circulation]

Optional: Only with circulation pump

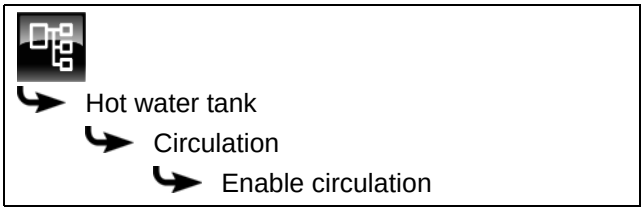
This parameter defines the minimum temperature of the hot water tank for starting the circulation pump. The circulation pump only starts once the hot water tank has exceeded this temperature.

This value is factory-set to 40°C.

Modifying parameters

The [Service] access level is required to perform modifications.

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

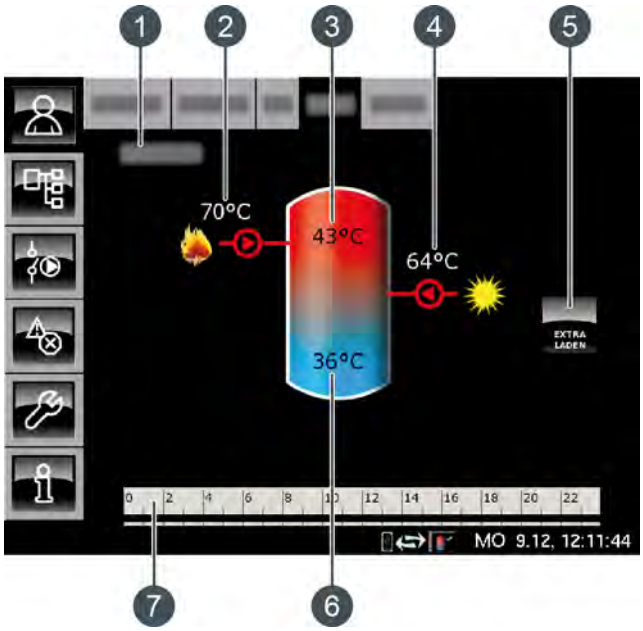
Enter the value and press the [Accept] button to save.

8.4 [Hot water tank] function block

8.4.1 Overview

Hot water tank overview screen

Press the button and [HW] to open the hot water tank overview screen. Here, the current temperatures and operating mode are displayed.



1 Operating mode
2 Charging by boiler
3 Temperature: Hot water
4 Charging by solar heating system
5 [Extra charge] button
6 Temperature: Hot water tank bottom
7 Timer: ChrgTimes

[Extra charge] button

This button causes the hot water tank to be charged to the highest set temperature of all time slots and days of the week if the temperature has dropped below [Switch-on diff.], ignoring the current time slot.

Charging by boiler or buffer

This symbol is displayed when the hot water tank is being charged by the boiler or buffer.
The displayed temperature is the [Boiler] or [Buffer top] temperature.

Charging by the solar heating system

Optional: for solar heating system

This symbol indicates that the tank is being charged by the connected solar heating system. The displayed temperature corresponds to the temperature of the collector.

Hot water tank with solar heating system

Solar charging of the hot water tank is controlled by the solar panel pump switching on and off. Solar charging begins as soon as the [Collector] temperature is 7°C higher than the [Hot water tank bottom] temperature. The solar charging symbol  appears in the overview screen.

If the difference between the [Collector] and [Hot water tank bottom] temperatures is less than the threshold value of 3°C, solar charging stops.

Timer [HW charging times]

This timer displays the set charging times of the current day for charging the hot water tank. These time windows are displayed as a black bar in the timer.

Timer [Circulation times]

Optional: for [Circulation pump]

This timer displays the set times of the current day to operate the circulation pump. These time windows are displayed as a black bar in the timer.

Lower part of hot water tank

Optional: For [Hot water tank bottom] or [Solar]

The temperature in the lower part of the hot water tank is only displayed if the additional temperature sensor [Hot water tank bottom] is installed.

How the hot water tank works

You can set different time slots and temperatures for each day of the week for charging the hot water tank. Inside a time slot, the hot water tank is charged to the configured temperature (see page 46).

Charging commences as soon as the current [Hot water] temperature is below the temperature set in the timer by the configurable value [Switch-on diff.]. The hot water tank then demands heat from the buffer or boiler.
Charging ends as soon as the current [Hot water] temperature has reached the temperature set in the timer. The operating mode then changes to [Charged].

If an additional temperature sensor [Hot water tank bottom] is installed for the lower part of the hot water tank, charging ends as soon as this sensor has reached the configurable temperature [HW bottom off].

If you also wish to charge the hot water tank outside the time slot, press the [Extra charge] button.

If a circulation pump is configured for the hot water, a second timer [Circulation times] is displayed for setting the operating times.

8.4.2 Operating modes

Demand

The hot water tank demands heat from the buffer or boiler. If the boiler is switched on and the buffer is unable to deliver sufficient heat, the boiler switches to heating mode.

Chrg.

The hot water tank is being charged by the boiler or buffer.

Extra charge

The [Extra charge] was pressed for charging the hot water tank outside the set time slots.

Delay

The charging pump of the hot water tank continues running briefly to discharge excess heat from the boiler.

Charged

The hot water tank has reached the set temperature [Hot water tank target].

Heat dissipation

The tank is being charged to discharge excess heat from the boiler.

FreezeProt

A temperature sensor in the tank has fallen below the [FreezeProt] temperature.

The frost protection limit is factory-set to 5°C.

Sensor error

A temperature sensor is faulty. You can find this temperature sensor in the message list by pressing the button.

Timer off

There is demand by the tank, but the current time is outside the time slot configured in the timer. The tank is therefore not charged.

Solar prio.

Solar priority has been activated, and tank charging by the boiler is disabled. The current time is inside a configured time slot for solar priority, and the current outside temperature is higher than the set temperature [Min. out. temp. Solar prio.].

Solar heat diss.

Excess heat is being taken from a buffer that is being charged by a solar heating system.

8.4.3 Operation

Set charging times and temperatures for the hot water tank

The [HW charging times] timer enables you to configure 3 different time windows and temperatures for the hot water tank for each day of the week.

Within a time window, the hot water is charged to the set temperature. Outside a time window, the hot water is charged to the set temperature [Set-back temperature between time slots:].

The [Switch-on diff.] is also taken into consideration for the set temperature [Set-back temperature between time slots:].

To set the charging times, tap the [HW charging times] timer in the overview. A screen opens.

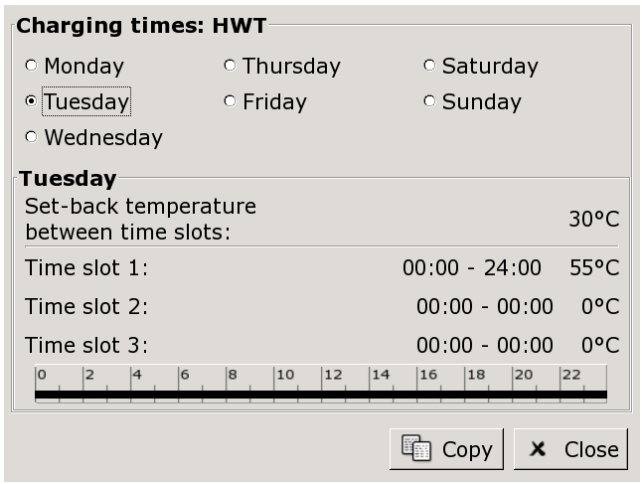


Fig. 8-10: Overview of hot water charging times

You can find further details about setting the time window in chapter 8.1.5 "Setting a time window".

Setting circulation times for the circulation pump

With the [Circulation times] timer, you can set 3 different time windows for the circulation times of the circulation pump for each day of the week.

To set the circulation times, tap the [Circulation times] timer in the overview screen. A screen opens.

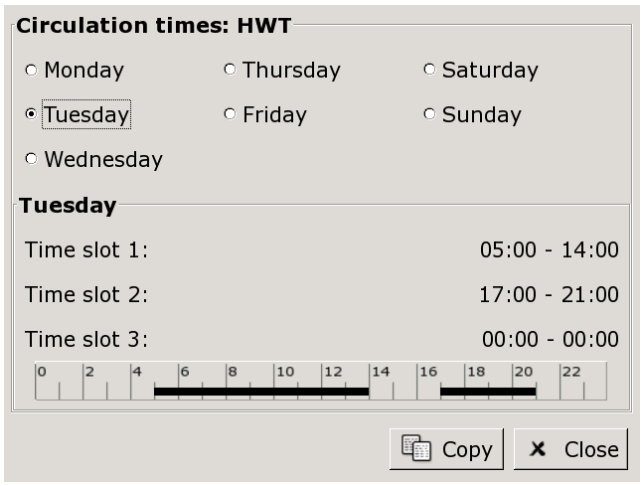


Fig. 8-11: Overview of circulation times

Set the circulation times to be as short as possible to ensure good buffer stratification and prevent limescale build-up.

You can find further details about setting the time window in chapter 8.1.5 "Setting a time window".

8.4.4 Text menu

Adjustable parameters

In function block [HW], switch to the text menu with the button.

- Hot water tank
  - Switch-on diff.
  - HW bottom off[a]
  - Solar heat diss.[b]
  - Priority[c]
- Circulation[d]
  - Circulation runtime
  - Circulation pause

a. Only visible with additional temperature sensor

b. Only visible for buffers with solar heating system

c. Only visible for solar heating systems with switchover between several tanks

d. Only visible with additional circulation pump

Detailed descriptions of the parameters are provided below.

8.4.4.21 Switch-on diff.

Explanation of [Switch-on diff.]

This parameter regulates how far the current [Hot water tank] temperature can fall before the hot water tank again demands heat from the buffer or boiler.

This parameter is factory-set to 15°C. The current [Hot water tank] temperature may therefore fall 15°C below the value [Hot water tank target] set in the time slot. The hot water tank only demands heat from the buffer or boiler when this happens.

Modifying parameters

The parameter can be found under:

- Hot water tank
  - Switch-on diff.

Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.4.4.22 HW bottom off

Explanation of [HW bottom off]

Optional: Only with additional [Hot water tank bottom] temperature sensor

This parameter defines when charging of the hot water tank will end.

As soon as the additional [Hot water tank bottom] temperature sensor in the hot water tank reaches the adjustable [HW bottom off] temperature, charging of the hot water tank ends.

This parameter is factory-set to 10°C.

Modifying parameters

The parameter can be found under:

- Hot water tank
  - HW bottom off

Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.4.4.23 Solar heat diss.

Explanation of [Solar heat diss.]

Optional: Only for buffers with solar heating system

This parameter defines whether the hot water tank may take excess solar heat from the buffer.
If this parameter is set to [Yes], the hot water tank takes the solar excess up to the maximum temperature [Hot water tank max.].

This parameter is factory-set to [No].
You must check the conditions for the [Extra solar heat] function in the text menu of the [Buffer] function block.

Modifying parameters

The parameter can be found under:

- Hot water tank
  - Solar heat diss.

Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

8.4.4.24 Priority

Explanation of [Priority]

Optional: Only for solar heating systems with switchover between several tanks

This parameter sets the priority for solar charging of the hot water tank. A high priority means that this tank will be charged by the solar heating system first. A low priority means that it will be charged last.

The priority for the hot water tank is factory-set to [High].

Modifying parameters

The parameter can be found under:


Hot water tank
Priority

Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

8.4.4.25 Circulation runtime

Explanation of [Circulation runtime]

Optional: Only with circulation pump

This parameter sets the duration for operation of the circulation pump after it has been started. This period is only valid inside the set time slot.

After the set period has expired, the circulation pump is switched off for the configurable duration of the [Circulation pause] parameter.

Modifying parameters

The parameter can be found under:


Circulation
Circulation runtime

Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.4.4.26 Circulation pause

Explanation of [Circulation pause]

Optional: Only with circulation pump

This parameter sets the period (pause) after a circulation pump operating phase. The control system can only restart the circulation pump after this time has elapsed. This pause is only valid inside the set time slot.

Modifying parameters

The parameter can be found under:


Circulation
Circulation pause

Select the parameter and press the [Change] button. A settings window will open.

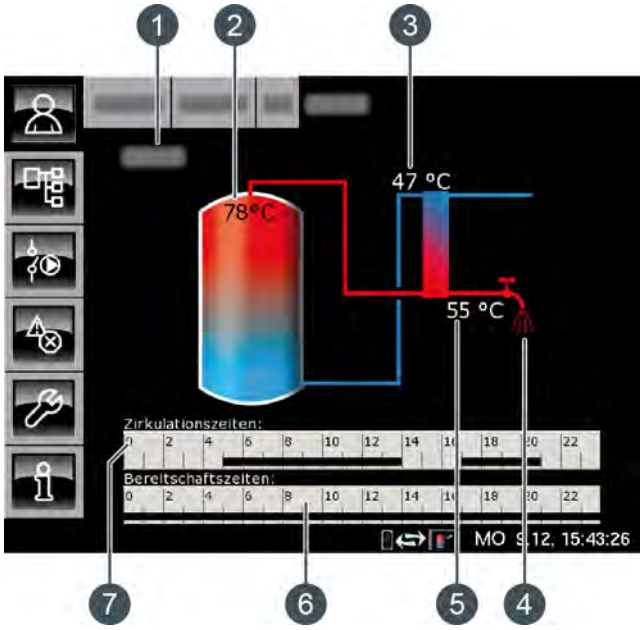
Enter the value and press the [Accept] button to save.

8.5 [Fresh water module] 2 pumps function block

8.5.1 Overview

Overview of the fresh water module (2 pumps)

You can return to the overview by pressing and [FWM].



1 Operating condition
2 Temperature [Buffer top]
3 Temperature [Primary return]
4 Display of hot water uptake
5 Temperature [Hot water]
6 Timer [Stand-by times]
This only appears if the hot water temperature is not set via the potentiometer (option [Target value can be set with rotary knob] is deactivated).
7 Timer [Circulation times]
This only appears if a circulation pump is installed and the [Self-learning] function is deactivated.

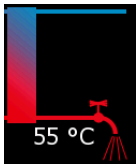
Function of the fresh water module

The desired hot water temperature is set with the potentiometer on the fresh water module. If during the configuration option [Target value can be set with rotary knob] is deactivated, the [Stand-by times] timer appears in the overview. With this you can set different time windows and hot water temperatures for every day of the week.
Inside these time windows, the upper part of the buffer is maintained at no lower than the configured hot water temperature. Outside the set time windows, the hot water is maintained at the lowest configured temperature of the 3 time slots, provided that the buffer is sufficiently hot.

If a circulation pump is installed for the hot water, it will be put into operation as "self-learning" by default. This means that the hot water taps of the last 2 weeks are stored. The operating times of the current day will be calculated from this and the circulation pump is started accordingly.
If this function is turned off, in the overview the timer [Circulation times] appears for manual setting of the operating times.

After commissioning, no more data is available for the "self-learning" circulation. That is why an operating period of about 4 weeks is required in the beginning, so that the control system can save sufficient data.

Heat exchanger

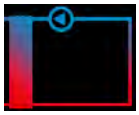


The tap symbol next to the heat exchanger is only displayed if the fresh water module is feeding hot water into the water mains. The temperature shown next to this is the temperature of the hot water currently being supplied.

If no hot water is being supplied, the heat exchanger is shown blue all the way through.

Circulation pump in operation

Optional: for [Circulation pump]



The pump symbol next to the heat exchanger appears when the circulation pump for hot water is in operation.

Timer [Stand-by times]

This is only displayed if option [Target value can be set with rotary knob] is deactivated

This timer displays the set charging times of the current day for charging the hot water tank. These time windows are displayed as a black bar in the timer.

Timer [Circulation times]

This only appears if a circulation pump is installed and the [Self-learning] function is deactivated.

This timer displays the set times of the current day to operate the circulation pump. These time windows are displayed as a black bar in the timer.

8.5.2 Operating modes

Ready

No hot water is currently being taken.

Working

Hot water is currently being supplied.

Buffer cold

Hot water is being supplied, but the buffer is not hot enough to reach the configured hot water temperature.

Primary return too warm

Hot water is being supplied, but the configured hot water temperature is being reduced because the [Primary return] temperature in the heat exchanger of the fresh water module is too high.

Malfunction

There is a fault in a temperature sensor of the fresh water module.

Circulation

The circulation pump is in operation.

Venting

The controller has found air in the fresh water module and automatic venting is in operation. For this, both pumps are operated at full speed for a short period of time to remove the air from the fresh water module. This can also take place multiple times sequentially.

Emergency operation

The fresh water module is in emergency mode because the admixing pump is defective. Currently, hot water is being delivered but it is only being produced with the buffer pump.

Without the admixing pump, calcification protection of the heat exchangers it not guaranteed. Protracted emergency mode can therefore calcify the heat exchanger.

Ready (Emergency operation)

The fresh water module is in emergency mode because the admixing pump is defective.

Without the admixing pump, calcification protection of the heat exchangers it not guaranteed. Protracted emergency mode can therefore calcify the heat exchanger.

8.5.3 Operation

Setting charging times and temperatures of the fresh water module

With the [Stand-by times] timer, you can set different time windows and hot water temperatures for the fresh water module for each day of the week.

Within these time windows, the upper part of the accumulator tank is maintained at no less than the set hot water temperature.
Outside the set time windows, the hot water is maintained at the lowest set temperature of the 3 time windows, provided that the accumulator tank is sufficiently hot.

To set the charging times and temperatures, tap the overview screen on the [Stand-by times]  timer. A screen opens.

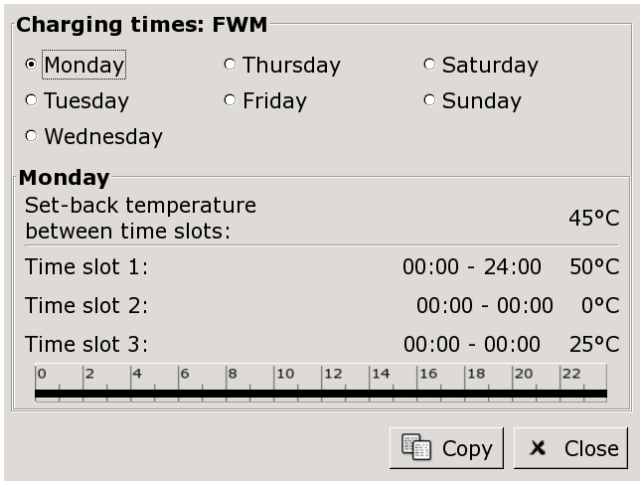


Fig. 8-12: Overview of hot water charging times

Set the hot water temperature as low as possible to prevent limescale build-up.

You can find further details about setting the time window in chapter 8.1.5 "Setting a time window".

Setting circulation times for the circulation pump

With the [Circulation times] timer, you can set 3 different time windows for the circulation times of the circulation pump for each day of the week.

To set the circulation times, tap the [Circulation times] timer in the overview screen. A screen opens.

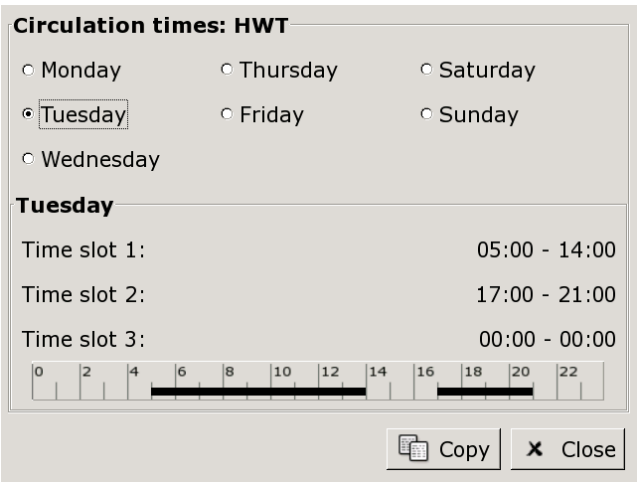


Fig. 8-13: Overview of circulation times

Set the circulation times to be as short as possible to ensure good buffer stratification and prevent limescale build-up.

You can find further details about setting the time window in chapter 8.1.5 "Setting a time window".

8.5.4 Text menu

Adjustable parameters

In function block [FWM], switch to the text menu with the button.

- Hot water
  - Automatic venting
  - Emergency operation only with buffer pump
- Circulation
  - Self-learning
  - Circulation runtime
  - Circulation pause

Detailed descriptions of the parameters are provided below.

8.5.4.27 Function Automatic venting

Explanation of [Automatic venting]

This function attempts to remove introduced air from the fresh water module automatically.
If the function is activated and the controller detects air intake, both pumps are operated at full speed for a short period of time to remove the air from the fresh water module. This can also take place multiple times sequentially.

This function is activated by default. During venting, the hot water can briefly be hotter than the target temperature set.

Modifying parameters

The parameter can be found under:

- Hot water
  - Automatic venting

Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

8.5.4.28 Function Emergency operation only with buffer pump

Explanation of the [Emergency operation only with buffer pump] function

Emergency operation of the fresh water module can be activated with this function if the admixing pump is defective.
If it is activated, water heating is only provided by the buffer pump. Without the admixing pump, calcification protection of the heat exchangers is not guaranteed Protracted emergency mode can therefore calcify the heat exchanger.

This function is set to [No] by default.

Modifying parameters

The [Service] access level is required to perform modifications.

The parameter can be found under:


Hot water
Emergency operation only with buffer pump

Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

8.5.4.29 Function Self-learning

Explanation of the [Self-learning] function

With this function, the operating times of the circulation pump of the last 2 weeks are saved. The operating times of the current day are calculated based on this and the circulation pump will be put into operation accordingly.

This function is set to [Yes] at the factory. If [No] is set, the timer appears for manual setting of the operating times in the overview.

Modifying parameters

The parameter can be found under:


Circulation
Self-learning

Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

8.5.4.30 Circulation runtime

Explanation of [Circulation runtime]

Optional: Only with circulation pump

This parameter sets the duration for operation of the circulation pump after it has been started. This period is only valid inside the set time slot.

After the set period has expired, the circulation pump is switched off for the configurable duration of the [Circulation pause] parameter.

Modifying parameters

The parameter can be found under:


Circulation
Circulation runtime

Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.5.4.31 Circulation pause

Explanation of [Circulation pause]

Optional: Only with circulation pump

This parameter sets the period (pause) after a circulation pump operating phase. The control system can only restart the circulation pump after this time has elapsed. This pause is only valid inside the set time slot.

Modifying parameters

The parameter can be found under:


Circulation
Circulation pause

Select the parameter and press the [Change] button. A settings window will open.

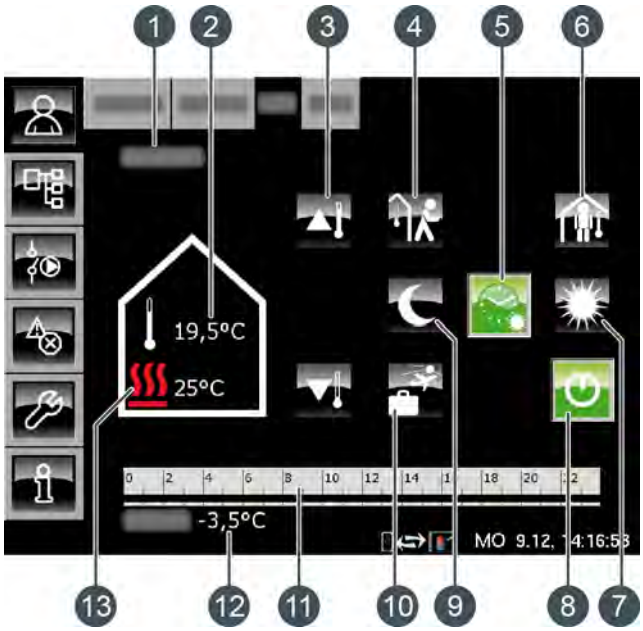
Enter the value and press the [Accept] button to save.

8.6 [Heating circuit] function block

8.6.1 Overview

Heating circuit overview screen

Press the button and [HC] to open the heating circuit overview screen. Each heating circuit can be adjusted in its own function block.



1 Operating mode
2 Current room temperature (only with the [Analogue RmSensor] or [Digital room sensor] option)
3 Slider
4 [away] button
5 [Auto] button
6 [home] button
7 [Day] button
8 [On/Off] button
9 [Night] button
10 [Holiday] button
11 [Heat times] timer
12 Outside temperature
13 [Flow] temperature

How the heating circuit works

Press [On/Off] to switch the selected heating circuit on or off. If the heating circuit is on, this button lights up green .

With the [Heat times] timer, you can set 3 different time slots for each day of the week (see page 59). These time slots are displayed as a black bar in the timer.

Press the [Day], [Auto] or [Night] buttons to swap between the different modes. The selected button then lights up green.

The slider adjusts the flow temperature of the heating circuit, and therefore the room temperature.

[Day] mode

Inside a time slot set with the [Heat times] timer, the heating circuit is in [Day] mode.

If a room sensor is installed, in this mode the heating circuit is set to the highest room temperature configured in the timer for the current day.
If there is no room sensor, the heating circuit runs using the [Day] heating curve.

[Night] mode

Outside a time slot set with the [Heat times] timer, the heating circuit is in [Night] mode.

If a room sensor is installed, in this mode the heating circuit is set to the reduced room temperature [Set-back temperature between time slots:] configured in the timer for the current day.
If there is no room sensor, the heating circuit runs using the [Night] heating curve.

[On/Off] button

This button switches the heating circuit on and off. If the heating circuit is in operation, this button appears green .

Automatic mode [Auto]

This button switches the heating circuit to automatic mode [Auto]. Here, the time slot configured in the [Heat times] timer is used to automatically toggle between the [Day] (inside a time slot) and [Night] (outside a time slot) modes.

The symbol in the button changes depending on whether the heating circuit is currently inside or outside the configured time slot.

= inside a time slot

= outside a time slot

[Day] continuous operation

This button causes the heating circuit to run continuously in [Day] mode, and the time slots set in the [Heat times] timer are ignored.

[Night] continuous operation

This button causes the heating circuit to run continuously in [Night] mode, and the time slots set in the [Heat times] timer are ignored.

Current room temperature

Optional: Only with [Analogue RmSensor] or [Digital room sensor].

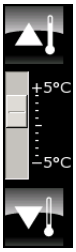
The installed room sensor displays the current, measured room temperature.

[Flow] temperature

The symbol only appears when the heating circuit is switched on.

The current [Flow] temperature for the heating circuit is displayed.

Slider



The slider adjusts the desired room temperature in the range +/- 5°C. You can increase or reduce the room temperature in increments of 0.5°C using the  and  buttons.

If a room sensor is installed, when you press the  and  buttons the target room temperature is displayed instead of the scale.

[Heat times] timer

This timer displays the configured time slot for the [Day] mode of the current day of the week. These time slots are displayed as a black bar in the timer.

[Holiday] mode

This button defines a period of time for switching the selected heating circuit to [Night] mode. The heating circuit is then switched to the lowest temperature configured in the [Heat times] timer.

[home] mode

This function is only available in [Auto] mode. This button switches the heating circuit to [Day] mode until the next configured time slot, ignoring the current set time slot.

Pressing [home] outside a time slot immediately switches the heating circuit to [Day] mode.

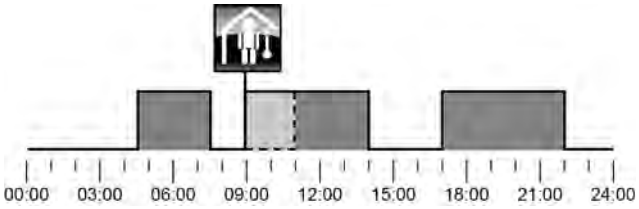


Fig. 8-14: Outside a time slot

Pressing [home] inside a time slot causes the next reduced temperature mode to be skipped.

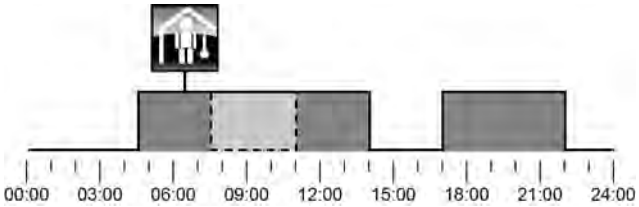


Fig. 8-15: Inside a time slot

[away] mode

This function is only available in [Auto] mode. This button switches the heating circuit to [Night] mode until the next configured time slot, ignoring the current set time slot.

Pressing [away] inside a time slot immediately switches the heating circuit to [Night] mode until the next time slot begins.

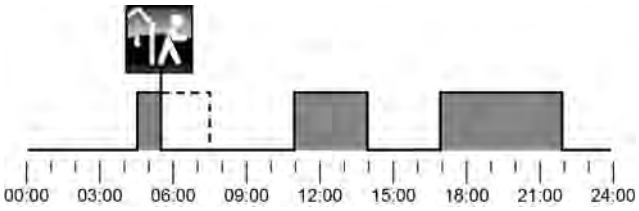


Fig. 8-16: Inside a time slot

Pressing [away] outside a time slot causes the next configured time slot to be skipped.

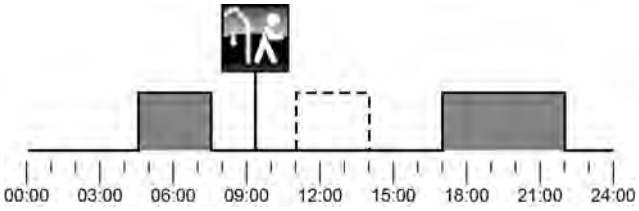


Fig. 8-17: Outside a time slot

8.6.2 Operating modes

Day on

The heating circuit is inside a time slot configured with the [Heat times] timer.

Night on

The heating circuit is outside a time slot configured with the [Heat times] timer.

Holiday on

The heating circuit is inside a holiday period configured with the [Holiday]  button. This mode continues until the end of the configured holiday period.

Enable off

The heating circuit is switched off because the [Boiler] temperature or [Buffer top] is below the required [Enable temperature] temperature.

Day tgt. off

The heating circuit is switched off because the [HeatCurve] temperature calculated on the basis of the [Day] heating curve is either below the room temperature measured by the room sensor, or below the [Off if HeatCurve below] temperature.

If no room sensor is installed, the heating circuit is switched off because the calculated [HeatCurve] temperature is below the required [Off if HeatCurve below] temperature.

Night tgt. off

The heating circuit is switched off because the [HeatCurve] temperature calculated on the basis of the [Night] heating curve is either below the room temperature measured by the room sensor, or below the [Off if HeatCurve below] temperature.

If no room sensor is installed, the heating circuit is switched off because the calculated [HeatCurve] temperature is below the required [Off if HeatCurve below] temperature.

H-day tgt. off

The heating circuit is inside a period configured with the [Holiday]  button. The heating circuit is switched off because the [HeatCurve] temperature calculated on the basis of the [Night] heating curve is either below the room temperature measured by the room sensor, or below the [Off if HeatCurve below] temperature.

If no room sensor is installed, the heating circuit is switched off because the calculated [HeatCurve] temperature is below the required [Off if HeatCurve below] temperature.

Room day off

The heating circuit is within a time slot, but switched off. The current room temperature is higher than the room temperature configured in the [Heat times] timer.

Room night off

The heating circuit is outside a configured time slot, and switched off. The current room temperature is higher than the room temperature configured in the [Heat times] timer.

H-day room off

The heating circuit is inside a period configured with the [Holiday]  button, but switched off. For the current room temperature is higher than the [Set-back temperature between time slots:] temperature configured in the [Heat times] timer.

Day heat. lim. off

The heating circuit is switched off because the current outside temperature is higher than the configured [Day heat. lim.] temperature.

Night heat. lim. off

The heating circuit is switched off because the current outside temperature is higher than the configured [Set-back heat limit] temperature.

H-day heat. lim. off

The heating circuit is inside a period configured with the [Holiday]  button, but switched off. For the current outside temperature is higher than the [Set-back temperature between time slots:] temperature configured in the [Heat times] timer.

Summer off

The heating circuit is switched off with the [On/Off]  button. The only active functions are frost protection, and the pumps' anti-blocking protection, which runs at midday every Saturday.

HW off

The heating circuit is switched off for hot water charging.

RoomFreezeProt on

The heating circuit is in operation because the current room temperature is below the [RoomFreezeProtLimit] temperature.

FlowFreezeProt on

The heating circuit is in operation because the current [Flow] temperature is below the [Flow freeze prot. limit] temperature.

ResidHeat on

The heating circuit does not supply any heat and the pump only continues running briefly, to discharge heat from the boiler.

HeatDiss on

The heating circuit is in operation because the boiler is running at overtemperature. The heating circuit is running at maximum temperature [Flow max].

Screed on

The heating circuit is in operation because the screed drying program is running.

Sensor error on

The heating circuit is in operation, even though the flow temperature sensor has a malfunction. It is running at a lower flow temperature to ensure frost protection.

Solar heat diss.

Excess heat is being taken from a buffer that is being charged by a solar heating system.

Locked off

The heating circuit was switched off by an external signal (= "locked").

8.6.3 The heating curve

Description of the heating curve

The heating curve regulates the flow temperature for the heating circuit. Each heating circuit has its own heating curve, as underfloor heating requires different settings from radiators.

The heating curve is defined by the two configurable parameters [Flow at -10°C] and [Flow at +10°C]. The result is a line: the [Day] heating curve. Based on the heating curve, the control system calculates the currently required flow temperature for the heating circuit in [Day] mode, depending on the current outside temperature. For example, an outside temperature of +3°C would result in a flow temperature of 45°C (see diagram below).

If a room sensor is installed for the heating circuit, the flow temperature calculated on the basis of the heating curve is corrected. The actual flow temperature will then differ from the calculated value.

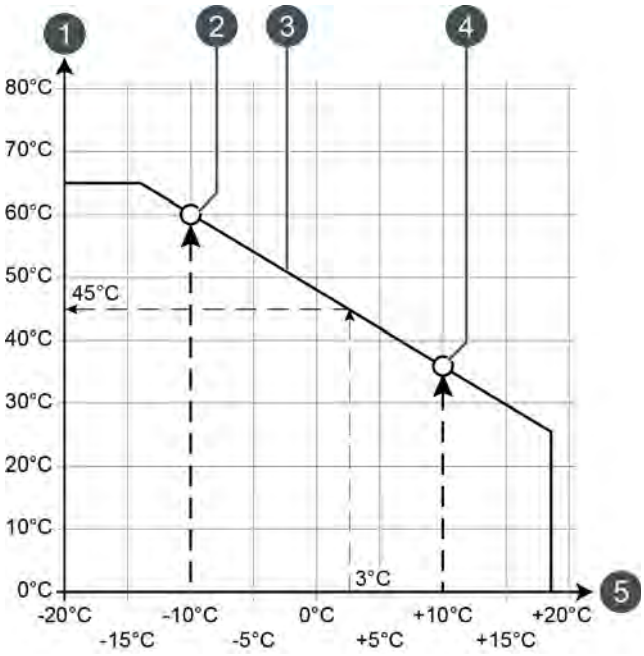


Fig. 8-18: [Day] heating curve

1 Flow temperature scale
2 Configurable parameter [Flow at -10°C]
3 [Day] heating curve
4 Configurable parameter [Flow at +10°C]
5 Outside temperature scale

The heating curve for [Night] mode is determined by a parallel shift of the [Day] heating curve. This shift is set via the [Set-back] parameter (see page 60).

The flow temperature for [Night] mode is determined on the basis of the outside temperature and the [Night] heating curve.

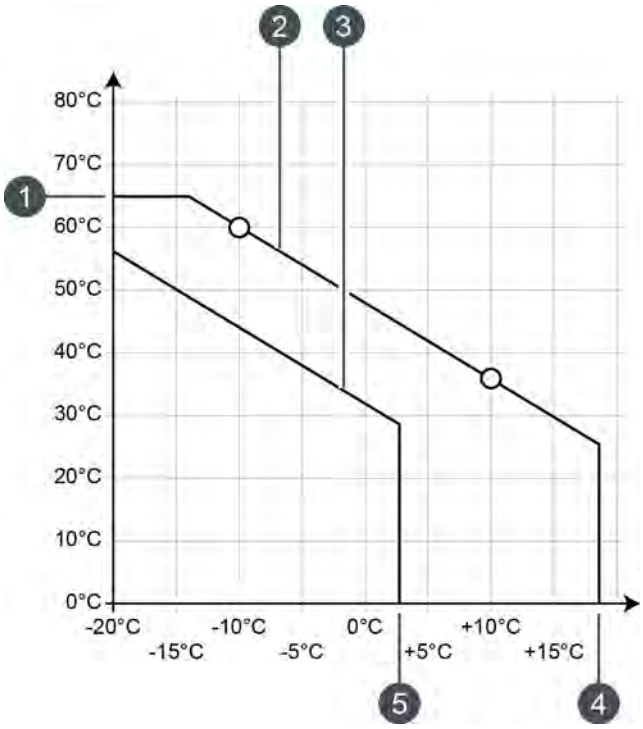


Fig. 8-19: [Night] heating curve

1 [Flow max]
2 [Day] heating curve
3 [Night] heating curve
4 [Day heat. lim.]
5 [Set-back heat limit]

If the current outside temperature exceeds the configured [Day heat. lim.] temperature in [Day] mode, the heating circuit is shut off. The same applies to [Night] mode, if the outside temperature exceeds the [Set-back heat limit] temperature. To set these parameters, see page 61.

The [Flow max] parameter determines the maximum flow temperature for the heating circuit, to protect it from overheating. The factory setting is 45°C for underfloor heating, and 65°C for radiators.

Adjusting the heating curve

If the heating circuit is always too hot or too cold in [Day] mode, you must adjust the heating curve. Do this by adjusting parameters [Flow at -10°C] and [Flow at +10°C].

Only ever make minor adjustments to these parameters: never more than 2°C for underfloor heating, and 4°C for radiators. You may need to adapt the heating curve again after a couple of days, but if you do it in small increments, it is more precise and energy efficient.

If the heating circuit is always too hot or too cold in [Day] mode in the transitional period (in spring or autumn), only reduce or increase the [Flow at +10°C] parameter.

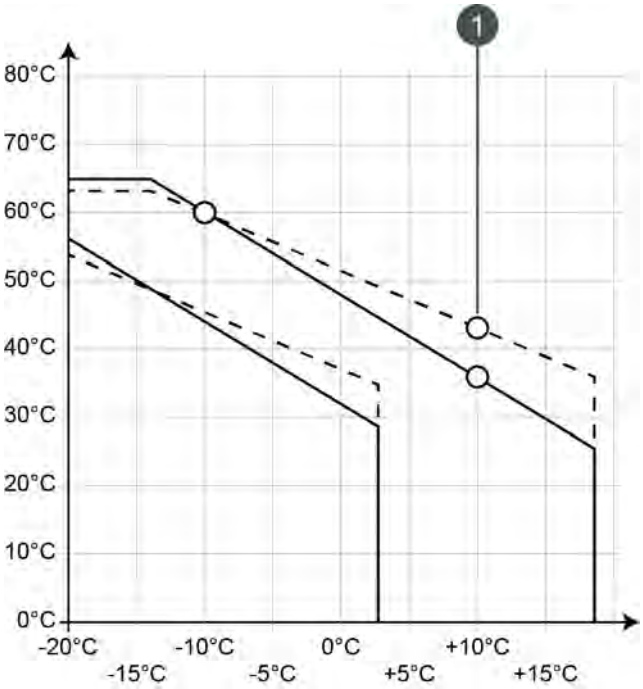


Fig. 8-20: Adjusting the heating curve in the transitional period

1 [Flow at +10°C]

If the heating circuit is always too hot or too cold in [Day] mode in the winter, only reduce or increase the [Flow at -10°C] parameter.

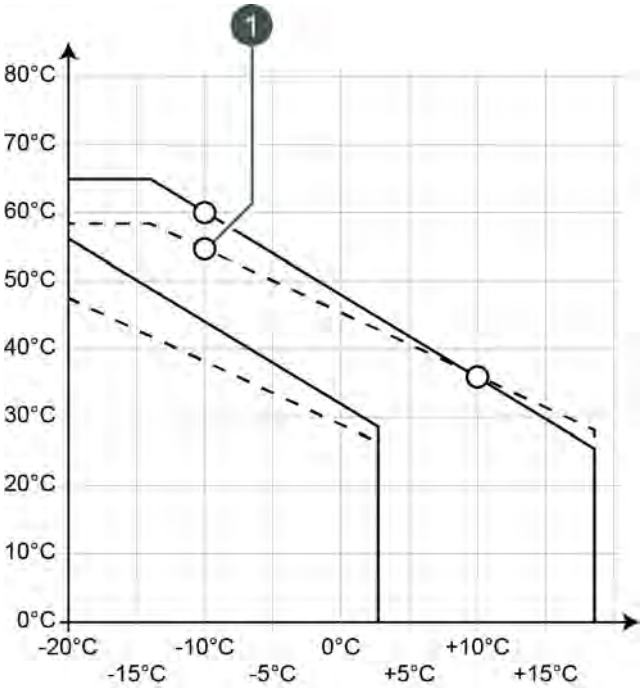


Fig. 8-21: Adjusting the heating curve in the winter

1 [Flow at -10°C]

You can change the parameters [Flow at -10°C] and [Flow at +10°C] in the text menu of the heating circuit in question, see page 60.

If the heating circuit is always too hot or too cold in [Night] mode, you only have to adjust the [Set-back] parameter, see page 60.

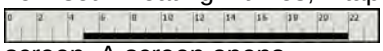
8.6.4 Operation

Setting heating times and room temperatures

With the [Heat times] timer, you can set 3 different time windows for the heating circuit for each day of the week.

Within a time window, the heating circuit is in [Day] mode. Outside a time window, it is in [Night] mode.

If a room sensor is installed, the room temperature can be adjusted within a time window. Likewise, the reduced room temperature [Set-back temperature between time slots:] can be adjusted outside the time window for each day of the week.

To set heating times, tap the [Heat times]  timer in the overview screen. A screen opens.

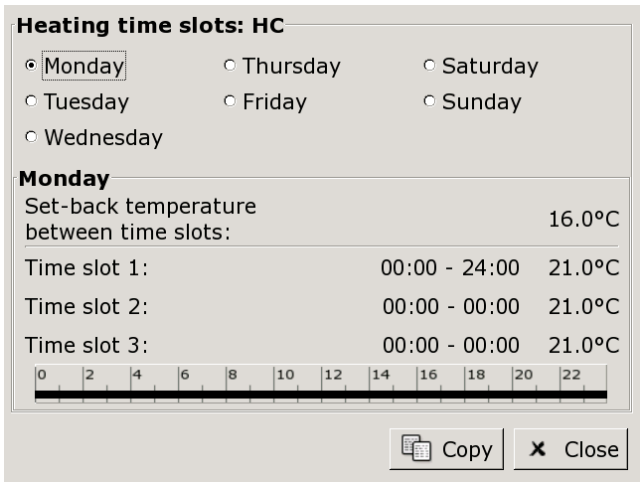


Fig. 8-22: Overview of heating times if a room sensor is installed

You can find further details about setting the time window in chapter 8.1.5 "Setting a time window".

Holiday setting function

When you press the [Holiday]  button, you can define a period during which the selected heating circuit is switched to [Night] mode. The heating circuit is then set to the lowest temperature [Set-back temperature between time slots:] configured in the [Heat times] timer.

To set this function, tap the [Holiday]  button in the overview screen.

A settings screen opens:

Fig. 8-23: Setting the start of the holiday

Enter the date and time for the start of the holiday. Press the button to enter the end of the holiday.

Finally, press [Accept] to save your entries. The heating circuits overview screen appears.

8.6.5 Text menu

Adjustable parameters

Select the respective heating circuit [HC], [HC2]... and press the button to switch to the text menu.

- Heating circuit
  - HeatCurve
    - Flow at -10°C
    - Flow at +10°C
    - Set-back
  - Day heat. lim.
  - Set-back heat limit
  - Solar heat diss.

Detailed descriptions of the parameters are provided below.

8.6.5.32 Flow at -10°C and Flow at +10°C

Explanation of [Flow at -10°C] and [Flow at +10°C]

The two adjustable parameters [Flow at -10°C] and [Flow at +10°C] are used to define the [Day] heating curve.

Based on the current outside temperature , the control system uses the heating curve to calculate the currently required flow temperature for the heating circuit in [Day] mode.

Modifying parameters

The parameters can be found under:

- Heating circuit
  - HeatCurve
    - Flow at -10°C
    - Flow at +10°C

Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.6.5.33 Set-back

Explanation of [Set-back]

This parameter is used to set the parallel shift of the [Day] heating curve, in order to determine the [Night] heating curve.

This parameter is factory-set to 3°C for underfloor heating and 15°C for radiators.
Only make minor changes to this parameter, because when walls cool down too much, dramatically higher air temperatures are required to heat the room. Any energy savings will then be lost.

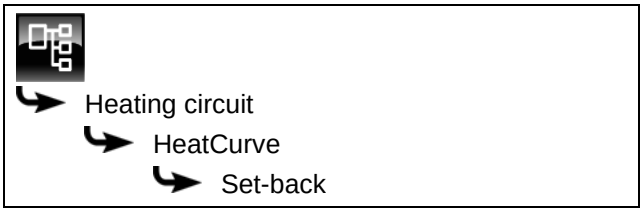
The following figures are a guide, depending on the configured temperature [Flow at -10°C] and the design of the heating circuit:

Temperature	Radiators		
Flow at -10°C	40°C	60°C	80°C
Set-back	5 - 8°C	10-15°C	15-22°C

Temperature	Underfloor heating	
Flow at -10°C	30°C	40°C
Set-back	3°C	5°C

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.6.5.34 Day heat. lim. and Set-back heat limit

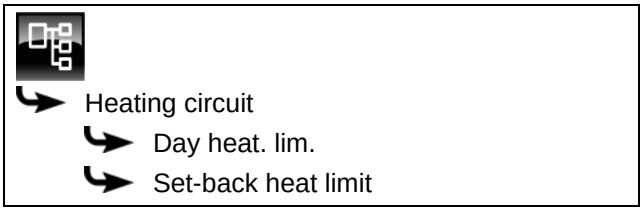
Explanation of [Day heat. lim.] and [Set-back heat limit]

The [Day heat. lim.] and [Set-back heat limit] parameters are used to set outside temperatures at which the selected heating circuit is shut off in [Day] or [Night] mode.

The [Day heat. lim.] parameter is factory-set to 18°C and the [Set-back heat limit] parameter to 2°C.

Modifying parameters

The parameters can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.6.5.35 Solar heat diss.

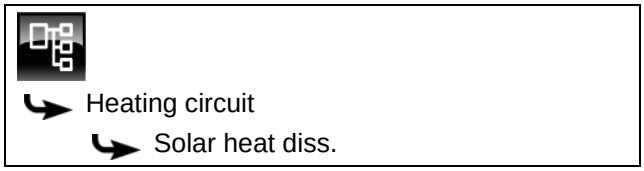
Explanation of [Solar heat diss.]

This parameter defines whether the selected heating circuit may use excess solar heat from the buffer.
If this parameter is set to [Yes], this heating circuit takes on the solar excess. The heating circuit switches itself on and a heating curve is calculated as if for an outside temperature of 0°C.

This parameter is factory-set to [No].
You must check the conditions for the [Extra solar heat] function in the text menu of the [Buffer] function block.

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Make your selection and press the [Accept] button to save.

8.7 [Solar] function block

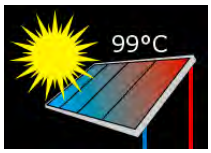
8.7.1 Overview

Versions of solar heating system

Press the button and [Solar] to open the solar heating system overview screen.

The ETAtouch control system is compatible with a great many versions, for enabling the integration of a solar heating system. The various versions are described below.

Solar heating system in operation



This symbol appears while the solar heating system is in operation and is supplying heat. The displayed temperature is the [Collector] temperature.

If the solar panel is displayed on its own without the lines, the solar heating system is switched off.

Priority of the tank or section

The number of stars indicates the configured priority of the tank or section.

3 stars indicate the highest priority. This tank or section is charged by the solar heating system first. One star denotes the lowest priority, so this tank or section is charged last.

If no stars are displayed, this tank or section is already sufficiently charged.

You can set the priority for each tank or section in the text menu of the relevant function block. So, for the buffer, use the buffer text menu.

Solar heating system with one tank

Only one tank is shown in the overview screen, regardless of whether the solar heating system is charging the buffer, the hot water tank or a solar tank (e.g., pool).
The temperature displayed in the tank is [Buffer bottom Solar] for a buffer, [Hot water tank bottom] for a hot water tank and [Current consumer temp.] for a solar tank.

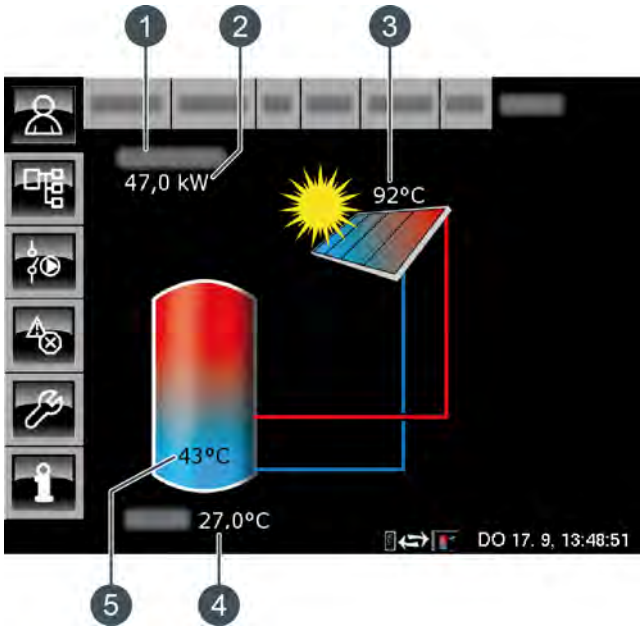


Fig. 8-24: Solar heating system with one tank

1 Operating condition
2 Current output of the solar heating system (only if a heat flow meter is installed)
3 Temperature [Collector]
4 Outside temperature
5 Temperature of tank [Tank 1 bottom]

Control system:

The solar heating system is controlled by switching the collector pump on and off. This is switched on as soon as the collector has exceeded the minimum temperature [Collector min] and is warmer by the difference [Switch-on diff.] (factory setting 7 °C) than the tank being charged.
The speed of the collector pump is controlled in such a way that the collector supplies a temperature that is higher than the current tank temperature by the configurable offset [Target collector diff.].

When the tank has reached its maximum temperature, or if the collector is only warmer by the offset [Switch-off diff.] (factory setting 5 °C) than the tank, the collector pump is switched off.

The maximum temperature is factory-set to 90 °C for the buffer [Buffer bottom max] and 60 °C for the hot water tank [Hot water tank max.].

Solar heating system with several tanks

If the solar heating system is charging more than one tank - buffer and hot water tank, for example - these are shown in the overview screen. The lines always lead to the tank that is currently being charged.

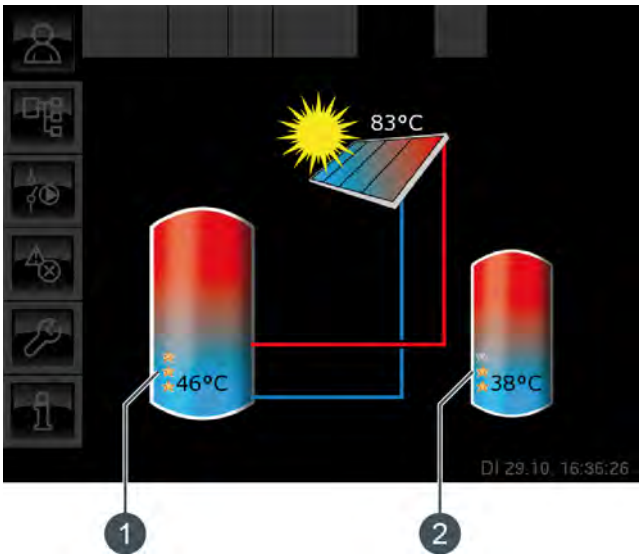


Fig. 8-25: Solar heating system with 2 tanks

1 Priority and temperature of the first tank

2 Priority and temperature of the second tank

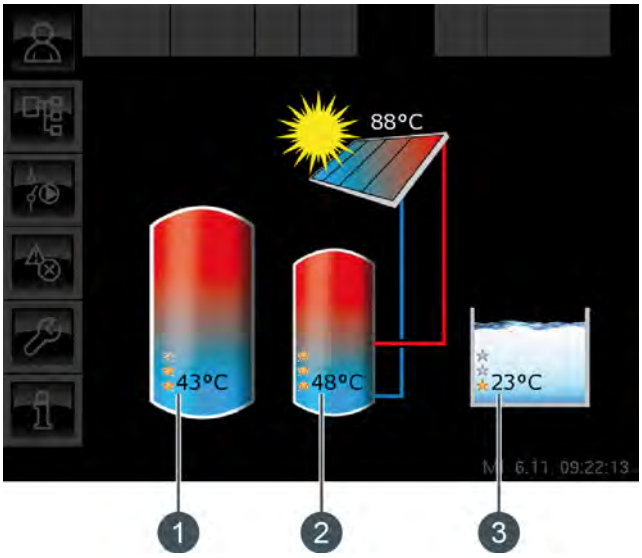


Fig. 8-26: Solar heating system with 3 tanks

1 Priority and temperature of the first tank

2 Priority and temperature of the second tank

3 Priority and temperature of the third tank (here, the [Sol. tank] function block)

Switching between tanks:

The collector pump is switched on as soon as the collector has exceeded the minimum temperature [Collector min] and is warmer by the difference [Switch-on diff.] (factory setting 7°C) than the temperature of the tank with the highest priority.

The sequence for switching from one tank to another is based on the configured priorities. The tank with the highest priority is charged first.

If the solar power is not sufficient for charging the tank with the highest priority (= collector is only warmer by the difference [Switch-off diff.] (factory setting 5 °C) than the tank currently requiring charging), the tank with the next highest priority is charged after the minimum time has elapsed (factory setting 20 minutes).

If the solar power increases once more, after the minimum time has elapsed solar charging switches back to the tank with the higher priority. This ensures that the tank with the highest priority is always charged first.

Uniform charging of tanks without consideration of individual priorities is also possible. However, the [Service] permission is required for this. Then you can use the [Changeover if diff. >] parameter in the solar heating system text menu to configure the temperature difference between the tanks.

Solar heating system for buffer with 2 coils

In the overview screen, the temperatures and configured priorities of the top and bottom sections are displayed.
The collector lines lead to the top or bottom section of the buffer, depending on which section is currently being charged.

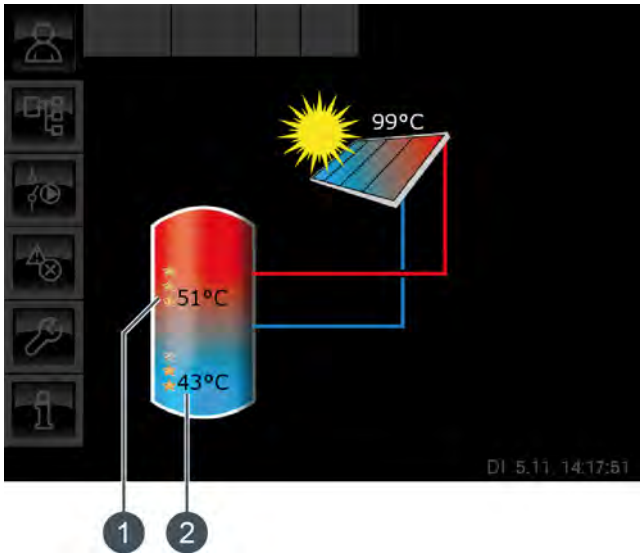


Fig. 8-27: Buffer with 2 coils

1 Temperature [Tank 1 top] and priority of top section
2 Temperature [Tank 1 bottom] and priority of bottom section

The [Tank 1 top] temperature corresponds to [Buffer top Solar] and temperature [Tank 1 bottom] corresponds to [Buffer bottom Solar].

Stratified charging via the solar heating system:

The purpose of stratified charging is to produce a sufficiently high temperature in the top part of the buffer, so that the boiler does not have to start up to provide hot water treatment.

A dedicated target temperature [Buffer target solar] is available for controlling stratified charging. You can find this in the buffer text menu under [Buffer] -> [Buffer top Solar] -> [Buffer target solar].
It is based on the current demand of the consumer or the minimum temperature [Buffer top min. solar].

Stratified charging takes place when the following three conditions are met:

- The boiler is not in operation
- The outside temperature is above 10 °C (factory setting [Min. out. temp. Solar prio.], see page 39)
- Temperature [Tank 1 top] is lower than [Buffer target solar]

The top section has the highest priority by default and is therefore charged first. As long as the [Tank 1 top] temperature is lower than [Buffer target solar], only the top section is charged.
If the solar heating system is supplying too little heat, the collector pump is switched off. It is restarted when the collector has exceeded the minimum temperature [Collector min] and is warmer by the difference [Switch-on diff.] (factory setting 7 °C) than [Buffer top Solar].

Once the top section has been charged up to the target temperature [Buffer target solar], solar charging takes place in the bottom section.
If the [Tank 1 top] temperature falls below the target temperature [Buffer target solar], the top section is charged once more.

The [Buffer top min. solar] parameter is used to set a minimum temperature for the top section of the buffer, see page 39.
This way, solar charging only takes place in the top section once the collector is warmer by the difference [Switch-on diff.] (factory setting 7 °C) than [Buffer top min. solar]. Up until this time, the bottom section of the buffer is charged.

If one of the above conditions is not satisfied, stratified charging does not take place in the top section, and only the bottom section of the buffer is charged.

Solar heating system with external heat exchanger

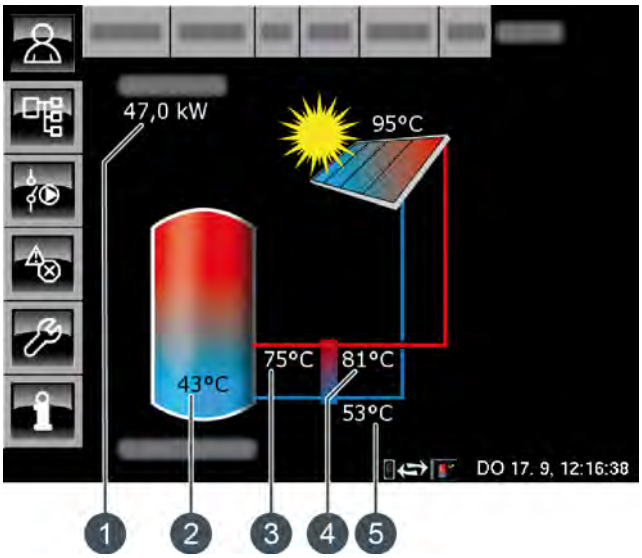


Fig. 8-28: Solar heating system with external heat exchanger

1 Current output of the solar heating system (only if a heat flow meter is installed)

2 Temperature of tank [Tank 1 bottom]

3 Temperature: [Secondary flow]

4 Temperature: [Solar flow] (only if a heat flow meter is installed)

5 Temperature: [Solar return]

Control system:

The collector pump is switched on as soon as the collector has exceeded the minimum temperature [Collector min] and is warmer by the difference [Switch-on diff.] (factory setting 7 °C) than the tank being charged.

The speed of the collector pump is controlled in such a way that the collector supplies a temperature that is higher than the current tank temperature by the configurable offset [Target collector diff.].

If the collector pump is in operation, the secondary pump starts up. This pump tries to adjust the temperature difference between collector and secondary flow (of the heat exchanger) to the temperature difference between the return of the solar heating system and the tank. This is achieved by changing the speed of the secondary pump.

When the tank has reached its maximum temperature, or if the collector is only warmer by the offset [Switch-off diff.] (factory setting 5 °C) than the tank, the collector pump is switched off.

Solar heating system with external heat exchanger and stratified charging valve

The lines of the heat exchanger always lead to the section of the buffer that is currently being charged. The set priorities are displayed at the section which is currently charged.

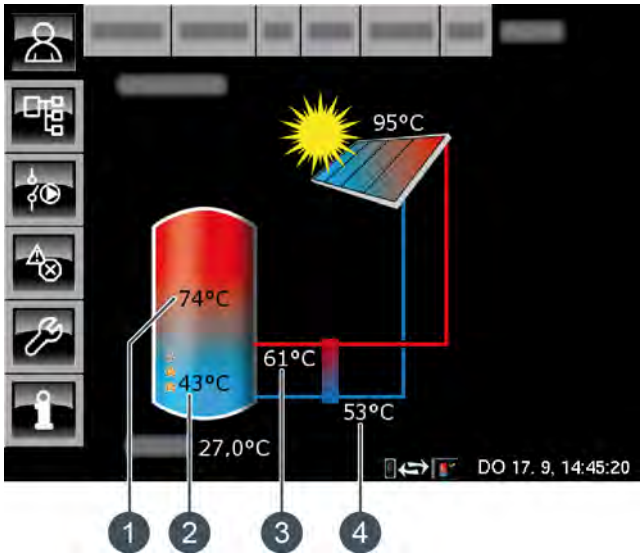


Fig. 8-29: External heat exchanger with stratified charging valve

1 Temperature [Tank 1 top]

2 Temperature [Tank 1 bottom] and priority of bottom section

3 [Secondary flow]

4 [Solar return]

The [Tank 1 top] temperature corresponds to [Buffer top Solar] and temperature [Tank 1 bottom] corresponds to [Buffer bottom Solar].

Stratified charging via the solar heating system:

The purpose of stratified charging is to produce a sufficiently high temperature in the top part of the buffer, so that the boiler does not have to start up to provide hot water treatment.

A dedicated target temperature [Buffer target solar] is available for controlling stratified charging. You can find this in the buffer text menu under [Buffer] -> [Buffer top Solar] -> [Buffer target solar]. It is based on the current demand of consumers and the minimum temperature [Buffer top min. solar].

Stratified charging takes place when the following three conditions are met:

- The boiler is not in operation
- The outside temperature is above 10 °C (factory setting [Min. out. temp. Solar prio.], see page 39)
- Temperature [Tank 1 top] is lower than [Buffer target solar]

The top section has the highest priority by default and is therefore charged first. As long as the [Tank 1 top] temperature is lower than [Buffer target solar], only the top section is charged.
If the solar heating system is supplying too little heat, the collector pump is switched off. It is restarted when the collector has exceeded the minimum temperature [Collector min] and is warmer by the difference [Switch-on diff.] (factory setting 7 °C) than [Buffer top Solar].

Once the top section has been charged to the target temperature [Buffer target solar], solar charging takes place in the bottom section.
After this, stratified charging is controlled based on the [Secondary flow] temperature. If this is at least 2 °C warmer than [Tank 1 top], the top section of the buffer is charged. If the [Secondary flow] temperature is colder than [Tank 1 top], the bottom section of the buffer is charged.

If the [Tank 1 top] temperature falls below the target temperature [Buffer target solar], the top section is charged once more.

The [Buffer top min. solar] parameter is used to set a minimum temperature for the top section of the buffer, see page 39.
This way, solar charging only takes place in the top section once the collector is warmer by the difference [Switch-on diff.] (factory setting 7 °C) than [Buffer top min. solar]. Up until this time, the bottom section of the buffer is charged.

Solar heating system with two solar panels

Both solar panels are always shown in the overview screen. If the second solar panel is also supplying heat, the lines to the tank are displayed for this panel.

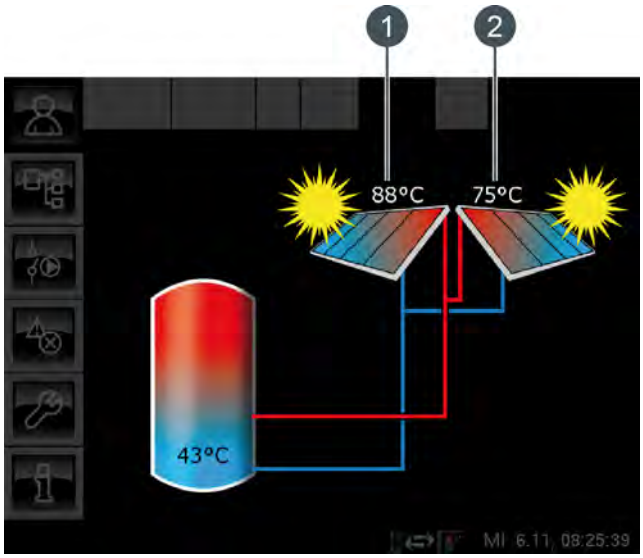


Fig. 8-30: Solar heating system with two solar panels

1 Solar panel 1
2 Solar panel 2

8.7.2 Operating modes

Solar panel temp. too low

The solar heating system is switched off because the solar panel is colder than the temperature in the tank. With a buffer, the [Buffer bottom Solar] temperature is compared. With a hot water tank, it is the [Hot water tank bottom] temperature.

Tank charged

The solar heating system is switched off because the connected tanks are completely charged. The buffer has reached the [Buffer bottom max] temperature (factory setting 90°C), or the hot water tank has reached the [Hot water tank max.] temperature (factory setting 60°C).

Solar panel temp. too high

The solar heating system is switched off because the solar panel has exceeded the configured maximum temperature [Collector max] (factory setting 120°C).

Working

The solar heating system is in operation.

Delay

The solar heating system is switched off, but the secondary pump still continues running briefly.

Emer. op.

There is a fault in the [Secondary flow] or [Solar return] temperature sensor. The solar heating system remains in operation, but is controlled only by the temperature of the solar panel.

Malfunction

There is a fault in the solar panel temperature sensor. The solar heating system is therefore switched off.

8.7.3 Text menu

8.7.3.36 Collector min

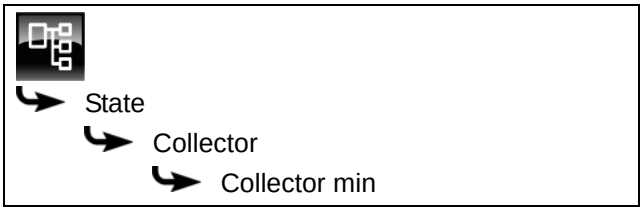
Explanation [Collector min]

This parameter sets the minimum temperature for starting the solar panel pump. The solar panel pump can only be started once the solar panel has exceeded this temperature.

Do not set this temperature too high, to ensure that heat can already be supplied to pre-heat the tank even when there is little sunlight. The ideal range is between 30-50°C. This parameter is factory-set to 30°C.

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.7.3.37 Target collector diff.

Explanation [Target collector diff.]

This parameter sets the desired temperature difference between the solar panel and the connected tank (buffer or hot water tank). This temperature difference is controlled by adjusting the speed of the solar panel pump.

This parameter is factory-set to 10°C.

If the buffer is being charged by the solar heating system, the temperature of the solar panel [Collector] is compared with the buffer temperature [Buffer bottom Solar]. If the hot water tank is being charged, the [Hot water tank bottom] temperature is compared.

A **high temperature difference** results in a low speed of the solar panel pump. This way, a smaller quantity of water is conveyed through the solar panel. The water remains in the solar panel for a longer time, and therefore produces a higher working temperature in the panel. Consequently, a higher hot water temperature is achieved, but there are also more losses from the solar panel.

A **low temperature difference** results in a higher speed of the solar panel pump. A larger quantity of water is therefore conveyed through the solar panel. The water remains in the solar panel for a short time, and so also becomes less hot. The working temperature of the solar panel is therefore lower, but there are fewer losses via the solar panel.

Modifying parameters

The parameter can be found under:


State
Collector pump
Target collector diff.

Select the parameter and press the [Change] button. A settings window will open.

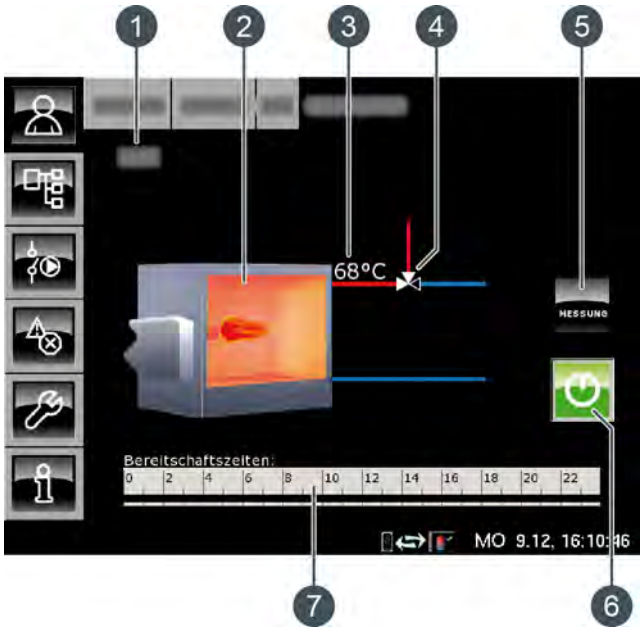
Enter the value and press the [Accept] button to save.

8.8 [Aux.boiler] function block

8.8.1 Overview

Auxiliary boiler overview

Press and [Aux.boiler] to open the auxiliary boiler overview window.



1 Operating mode
2 Auxiliary boiler
3 [AuxBoilerTemp] temperature
4 Diverter valve (only with [Diverter valve] option)
5 [MEAS.] button
6 [On/Off] button
7 [Stand-by times] timer

Various tasks of the auxiliary boiler

An additional auxiliary boiler in the heating system serves either to cover peak loads in the heating system, or as fail-safe for the main heat producer (for example: boiler or another buffer).

Auxiliary boiler to cover peak loads:

- This auxiliary boiler has a separate charging pump and can supply the consumer (e.g. buffer) with heat at the same time as the main heat producer (e.g. boiler).

  The auxiliary boiler is only activated by the control system if the ETA heating boiler is unable to meet the required output. For heating systems with a buffer, the aux. boiler is put into operation as soon as the ETA heating boiler has not reached the required temperature [Buffer target]. For heating systems without a buffer, if the ETA heating boiler has not reached the required temperature [Boiler tgt.].

  The icon for the auxiliary boiler pump is displayed in the overview as soon as it's in operation. This is started by the ETA control system if the aux. boiler temperature is higher than the enabling temperature of the charging pump [Enable Aux-BoilChargePump]. In addition, the auxiliary boiler temperature must be greater than the temperature of the consumer to be charged by at least the configured [Thermostat diff.] difference.

Aux. boiler as fail-safe for the main heat producer:

- Through the changeover valve between main heat producer and aux. boiler, the consumers are supplied either by the main heat producer or the aux. boiler. If the main heat producer is switched off or a malfunction is present, the changeover valve changes to the aux. boiler to meet the heat requirements of the consumer.

  A changeover valve is displayed in the overview screen with a red and blue line. The red line indicates the heat producer that is currently supplying heat to the consumers. The blue line indicates the heat producer that is disabled. Switching from one heat producer to another only happens when the temperature of the auxiliary boiler exceeds the configured enabling temperature [Enable diverter valve] of the changeover valve. Only then does the changeover valve route the heat from the hotter heat producer to the consumers.

Auxiliary boiler functionality

Use the [On/Off] button to enable or disable the auxiliary boiler for the ETA control system. If the auxiliary boiler is enabled (button lit up green), the ETA control system can activate it when needed, but only within the configured times of operation.

After a demand for the auxiliary boiler by the ETA control system, the start of the auxiliary boiler can be delayed with the adjustable [Start lag] parameter; see page 72.

The [Stand-by times] timer is used to set the charging times for the auxiliary boiler; see page 72.

The [MEAS.] button switches the auxiliary boiler to emission measuring mode.

[MEAS.] button

This button operates the auxiliary boiler for a period of 30 minutes for the emission measurement. When the 30 minutes are over, the auxiliary boiler automatically switches back to normal operation.

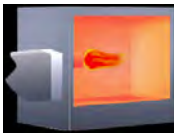
[On/Off] button

This button enables and disables the auxiliary boiler. If the auxiliary boiler is enabled, this button appears green  .

Timer [Stand-by times]

This timer shows the configured time slots for auxiliary boiler stand-by for the current day of the week. These time windows are displayed as a black bar in the timer.

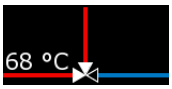
Auxiliary boiler



The flame in the auxiliary boiler is displayed when it is enabled in the ETA control system.

Changeover valve

Optional: only for [Diverter valve]



The red line indicates which heat producer (auxiliary boiler or ETA boiler) is currently supplying heat to the consumers. The blue line indicates the heat producer that is disabled and is not currently supplying any heat.

Auxiliary boiler charging pump

Optional: only for [Aux.boiler charging pump]

This symbol is displayed when the auxiliary boiler charging pump is in operation.

8.8.2 Operating modes

Off

The auxiliary boiler has been disabled with the  button (switched off), so it cannot be put into operation by the ETA control system.

Ready

The auxiliary boiler is enabled and within the configured stand-by times.

On

The auxiliary boiler is in operation and is supplying heat to the heating system.

Measurement

The auxiliary boiler is in emission measuring mode for the duration of 30 minutes.

Malfunction

There is a fault in a temperature sensor.

Wait delay

A delay was set for operation of the auxiliary boiler. The auxiliary boiler waits for the configured duration of the delay ([Start lag] parameter). If there is still a demand by the ETA control system after this period ends, then the auxiliary boiler will begin operation.

Locked

The ETA control system has disabled the auxiliary boiler so that it cannot be in operation simultaneously with the boiler.

Timer off

The current time is outside the configured stand-by times.

Overtemperature

The auxiliary boiler's temperature has exceeded the configured [AuxBoilerMax] temperature and the auxiliary boiler will therefore be switched off.

8.8.3 Operation

Setting auxiliary boiler stand-by times

The [Stand-by times] timer can be used to set 3 different time windows for auxiliary boiler stand-by for each day of the week.

To set the stand-by times, tap the [Stand-by times]  timer in the overview window. A screen opens.

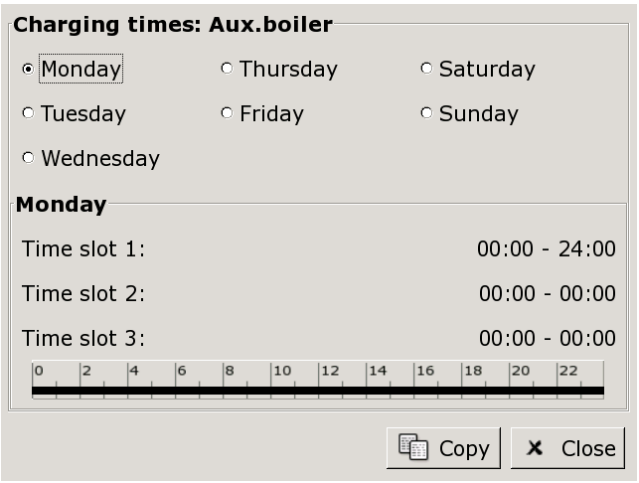


Fig. 8-31: Overview of stand-by times

You can find further details about setting the time window in chapter 8.1.5 "Setting a time window".

8.8.4 Text menu

8.8.4.38 Start lag

Explanation of [Start lag]

This parameter is used to set the duration of a delay in the operation of the auxiliary boiler after the ETA control system has demanded it.

If there is still a demand by the ETA control system after this period ends, then the auxiliary boiler will begin operation.

Modifying parameters

The parameter can be found under:

Aux.boiler
Settings
Start lag

Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

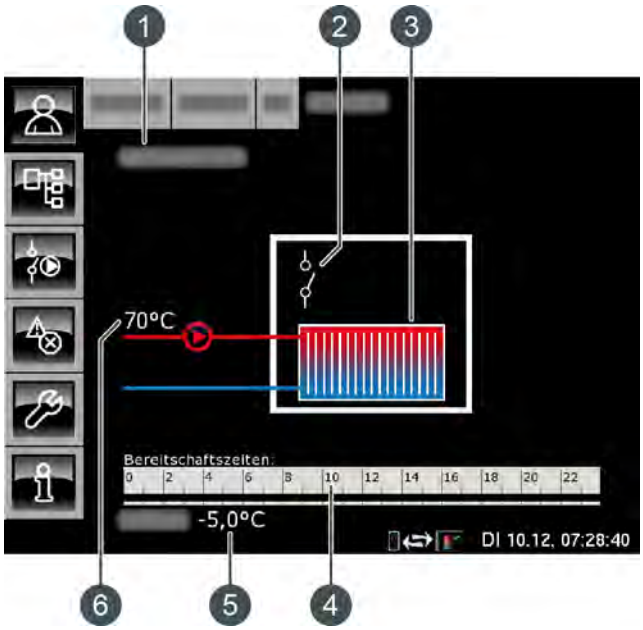
8.9 [External heat demand] function block

8.9.1 Overview

External heat demand overview

Press the button and [ExtDem] to open the external heat demand overview.

With this function block, an external control system can demand heat from the ETA heating system.



1 Operating mode
2 Switch
3 External heat consumer
4 [Stand-by times] timer
5 Outside temperature
6 Temperature of ETA heating system

External heat demand function

With the [Stand-by times] timer, for each day of the week different time slots and the temperature needed by the external heat consumer can be configured.

Within the time slots, the external heat consumer can demand heat from the buffer. If the buffer is colder than the temperature demanded by the heat consumer, the ETA boiler is activated.

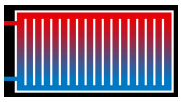
The pump for charging the external heat consumer only starts when the temperature available from the heating system is higher than the adjustable enable temperature [Enable temperature]; see page 76.

If the external heat consumer is connected to the [GM-C2] circuit board, the output or temperature required by the heat consumer can be communicated to the ETA control system via an analogue signal (0-10 V or 4-20 mA).

Timer [Stand-by times]

This timer shows the configured time slots for external heat consumer stand-by for the current day of the week. These time windows are displayed as a black bar in the timer.

External heat consumer



This symbol represents the external heat consumer. If the top section is shown in red, the consumer is currently being supplied with heat.

If the consumer is entirely blue, no heat is being supplied to it.

Switch

This symbol indicates whether the heat consumer is currently demanding heat from the heating system.

If the switch is open there is currently no demand by the heat consumer. If the switch is closed the external consumer is demanding heat from the heating system.

External charging pump

This symbol appears when the external heat consumer's charging pump is in operation. The displayed temperature is the buffer's [Buffer top] temperature.

8.9.2 Operating modes

Off

There is no demand from the external heat consumer.

Demand

The external heat consumer is demanding heat from the heating system.

Delay

The external heat consumer is switched off and the pump is running for the configured duration [Delay time].

Heat dissipation

The external heat consumer is being charged to dissipate the excess heat from the boiler.

FreezeProt

The current outside temperature is lower than the configured [FreezeProt] temperature of the external heat consumer.

To protect the consumer, the external charging pump is switched on. It will remain in operation until the outside temperature is at least 2 °C higher than the [FreezeProt] temperature setting.

The factory setting for the freeze protection threshold is +5 °C outside temperature to protect consumers at risk from freezing (such as air heat exchangers).
If there is no freezing risk for the connected consumers, the freeze protection limit can be set lower.

Timer off

There is a demand by the external heat consumer, but the current time is outside the time slot configured in the timer so the external heat consumer will not be charged.

Working

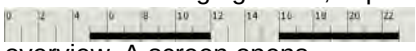
The external heat consumer is being supplied with heat by the heating system.

8.9.3 Operation

Set charging times and temperatures for the external heat consumer

With the [Stand-by times] timer, you can set different time windows and temperatures for the external heat consumer for each day of the week.

Within these time windows, the heat consumer can demand heat from the heating system.

To set the charging times, tap the [Stand-by times]  timer in the overview. A screen opens.

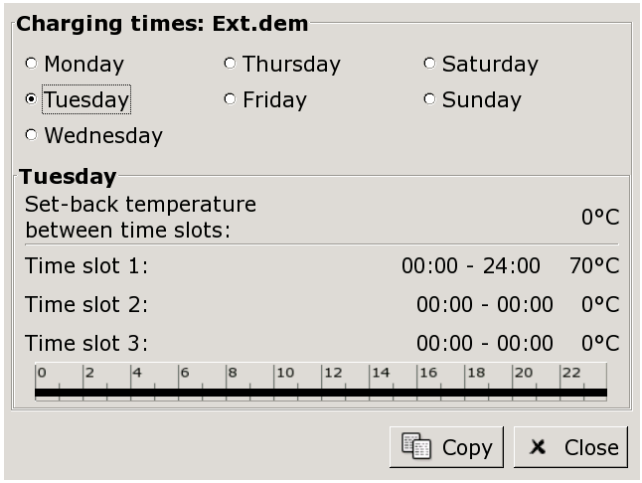


Fig. 8-32: Overview of stand-by times

You can find further details about setting the time window in chapter 8.1.5 "Setting a time window".

8.9.4 Text menu

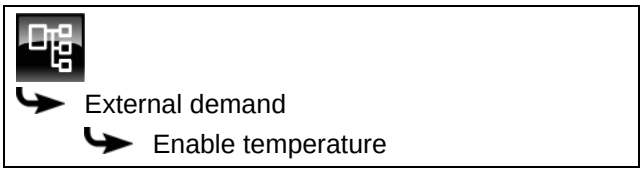
8.9.4.39 Enable temperature

Explanation of [Enable temperature]

This parameter is used to set the minimum temperature of the heating system for starting the charging pump of the external heat consumer.

Modifying parameters

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.9.4.40 FreezeProt

Explanation of [FreezeProt]

This parameter is used to set the freeze protection limit for the consumer controlled with the external heat demand.

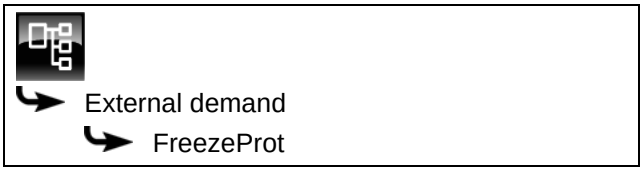
If the outside temperature falls below this value, the external charging pump will be turned on to protect the consumer. It will remain in operation until the outside temperature is at least 2 °C higher than the [Freeze-Prot] temperature setting.

The factory setting for the freeze protection threshold is +5 °C outside temperature to protect consumers at risk from freezing (such as air heat exchangers).
If there is no freezing risk for the connected consumers, the freeze protection limit can be set lower.

Modifying parameters

The [Service] access level is required to perform modifications.

The parameter can be found under:



Select the parameter and press the [Change] button. A settings window will open.

Enter the value and press the [Accept] button to save.

8.10 [Heating pipeline] function block

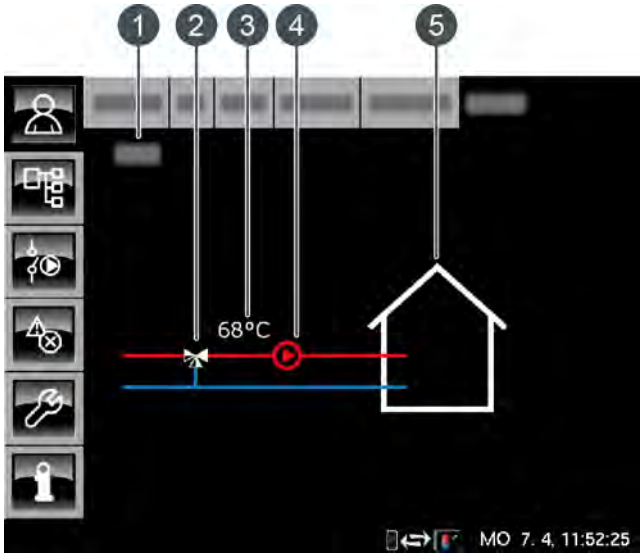
8.10.1 Overview

Overview of heating pipeline

Press the button and [Pipel] to open the heating pipeline overview.

A heating pipeline is defined as a connection between a heat producer and a consumer with an additional pump and optional mixing valve.
Example: Boiler and consumer are in different and widely separated buildings.

With this function block, a heating substation can also be used for withdrawing heat in a district heating network; see page 78.



1 Operating mode
2 Heating pipeline mixing valve (only with [Pipeline mixing valve] option)
3 Current flow temperature (only with the [Pipeline mixing valve] option)
4 Heating pipeline pump
5 Heating pipeline consumers

How the heating pipeline works

The heat is supplied to the connected consumers (buffer, heating circuits, hot water tank, etc.) via the heating pipeline with the heating pipeline pump.

When the heating pipeline is in operation, the upper line (=flow) is shown in red and the symbol for the heating pipeline is displayed.
If the heating pipeline is not in operation, both lines are shown in blue.

If a mixing valve is installed in the heating pipeline, it is shown in the overview with the currently measured flow temperature. With the heating pipeline mixing valve, only the required temperature is supplied to the consumers, making the heating pipeline's heat loss considerably lower and improving the stratification in the buffer.

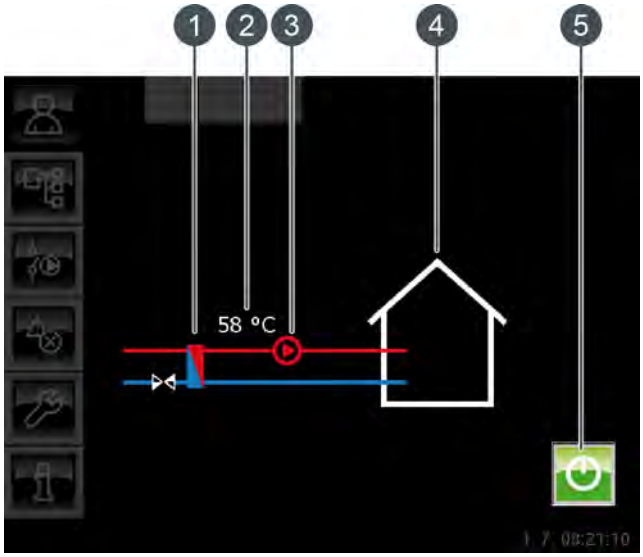
Overview of heating substation

With the [Transfer station] option this function block is used to control a heating substation in a district heating network.

A heating substation is defined as a plate heat exchanger with a primary valve.

This function block is then the heat producer for the connected consumers such as heating circuits, buffers, hot water tanks, etc.

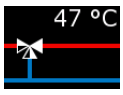
When head is supplied to consumers from the heating substation, the upper line (=flow) is shown in red. The symbol for the heating pipeline pump and the current flow temperature are displayed.
If the heating substation is not in operation, both lines are shown in blue.



1 Heating substation's heat exchanger
2 Current flow temperature [Curr. temp.]
3 Heating pipeline pump
4 Heating substation's consumer
5 [On/Off] button to switch heating substation on/off

Heating pipeline mixing valve

Optional: only for [Pipeline mixing valve]



When the heating pipeline is in operation, the upper line is shown in red and the currently measured flow temperature is displayed. When it is not in operation, only the mixing valve symbol is displayed and both lines are shown in blue.

Heating pipeline pump

This symbol appears when the external heating pipeline pump is in operation.

Heating pipeline consumers

This symbol represents the heating pipeline's connected consumers.

8.10.2Operating modes

Off

There is no demand from the consumers.

On

Heat is being supplied to the connected consumers.

FreezeProt

The current outside temperature is lower than the configured temperature [FreezeProt] of the heating pipeline.

To protect the consumers, the transmission pump is switched on. It will remain in operation until the outside temperature is at least 2 °C higher than the [Freeze-Prot] temperature setting.

The factory setting for the frost protection limit is -20 °C.

Heat dissipation

The heating pipeline pump is started in order to dissipate the boiler's excess heat by charging the heating pipeline's consumers.

Malfunction

There is a fault in a temperature sensor.

8.11 [Special conveyor] function block

8.11.1 Overview

Special conveyor overview

Press the button and [SpConv] to open the special conveyor overview.

This function block is used with wood chip boilers to control special versions of fuel conveyor systems. For example:

- Silo conveyor system
- Double agitator (two agitators supply one boiler)
- Intermediate conveyor screw (several conveyor screws in series)

Up to 1.1 kW of drive power are controlled by the conveyors in this function block. This covers all ETA conveyors.
Conveyors with a higher drive power are controlled in the [Ext. conveyor] ([ExtConv]) function block.

If several conveyors are installed (as in a double agitator), each is shown in its own function block ([SpConv] and [SpConv2]).

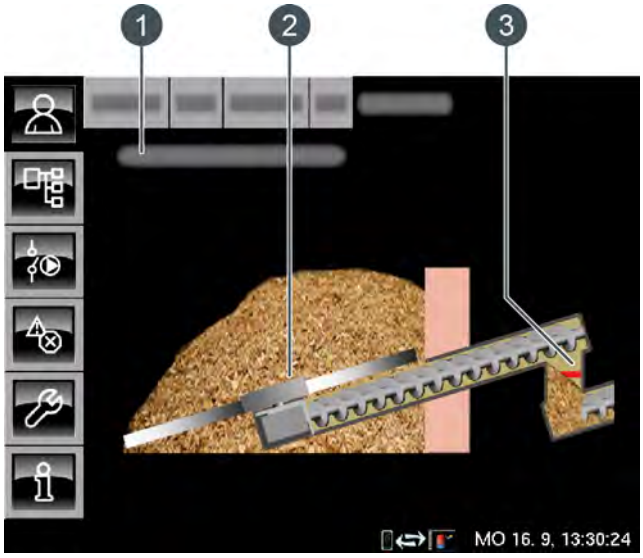


Fig. 8-33: Special conveyor overview

1 Operating mode
2 Agitator
3 Light barrier (only with [Light barrier in drop chute] option)

The agitator and the screw are shown in green as soon as they begin to transport fuel. They are displayed in grey when not in operation or when the screw is turning in reverse in order to remove a blockage.

To control the fuel conveying system, a light barrier is supplied ex-works for the drop chute.
If the drop chute is filled with enough fuel, the light barrier is interrupted and displayed in red in the overview. If the light barrier is displayed in green, there is no fuel or insufficient fuel in the drop chute.

Intermediate conveyor screw overview

When several conveyor screws in series are used to transport fuel to the boiler, they are referred to as intermediate conveyor screws.
Every individual intermediate conveyor screw is shown in its own function block [SpConv1], [SpConv2]...

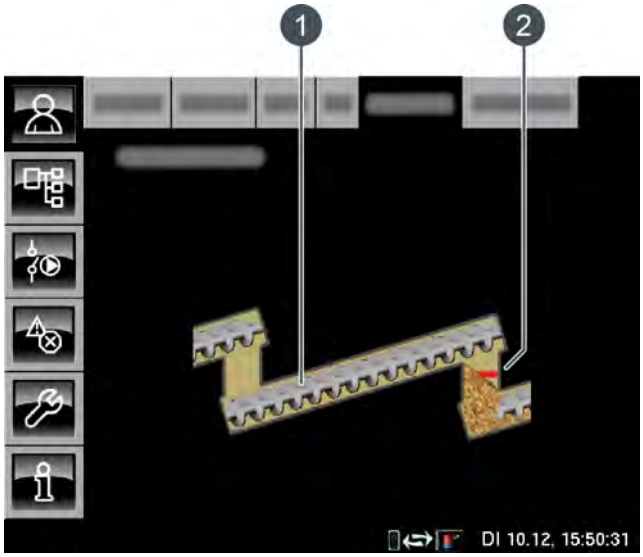


Fig. 8-34: Intermediate conveyor screw overview

1 Intermediate conveyor screw
2 Light barrier (only with [Light barrier in drop chute] option)

The intermediate conveyor screw appears green when it is turning in the discharge direction. The intermediate conveyor screw is shown in grey when not in operation or if it is turning against the discharge direction in order to remove a blockage.

A light barrier is also supplied with the intermediate conveyor screw ex-works for controlling the fuel transport.
If the drop chute is filled with enough fuel, the light barrier is interrupted and displayed in red in the overview. If the light barrier is displayed in green, there is no fuel or insufficient fuel in the drop chute.

Double agitator overview

When two agitators transport the fuel to a discharge screw and from there to the boiler, the configuration is called a double agitator.
Each agitator is shown in its own function block [SpConv] and [SpConv2].

The two agitators take it in turns to supply the boiler with fuel. In order to ensure that the fuel deposit is emptied at a steady rate, the system switches between the two agitators automatically.

Use the [On/Off] button in the overview to switch off an agitator (button then shines red). Then the other agitator takes over the fuel transport.

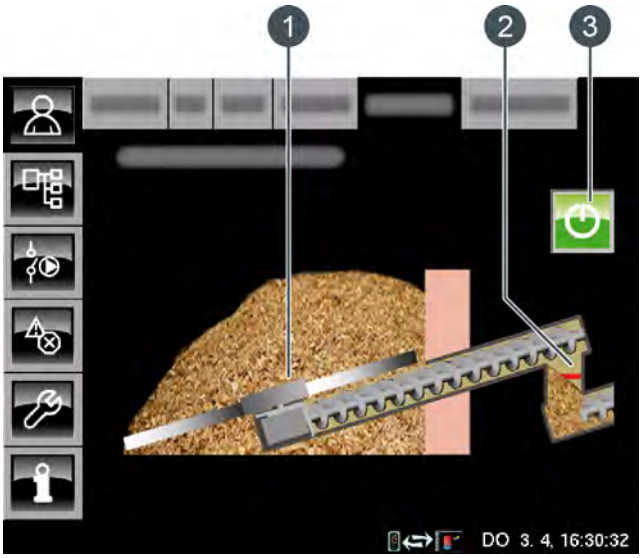


Fig. 8-35: Double agitator overview

1 Agitator
2 Light barrier (only with [Light barrier in drop chute] option)
3 [On/Off] button for switching off this agitator

The agitator and the screw are shown in green as soon as they begin to transport fuel. They are displayed in grey when not in operation or when the screw is turning in reverse in order to remove a blockage.

A light barrier for the drop chute is supplied ex-works for controlling the fuel conveying system. If the drop chute is filled with enough fuel, the light barrier is interrupted and displayed in red in the overview. If the light barrier is displayed in green, there is no fuel or insufficient fuel in the drop chute.

8.11.2 Operating modes

Self-check

The conveyor drive is performing a self-check.

Ready

The conveyor is not in operation, and there is no demand for fuel.

Full

There is sufficient fuel in the drop chute. The light barrier is interrupted.

Convey

The conveyor is in operation and is conveying fuel.

Self-check malf.

A malfunction has occurred during the self-check.

Conveyor malf.

The conveyor drive has a malfunction.

Drop chute open

The sensor on the drop chute has been triggered, maybe due to overfilling.

Safety device interrupted

The safety chain, e.g. water shortage alert, emergency stop, safety temperature limiter, rotary valve maintenance cover, etc. has been broken. Heating is blocked and cannot be resumed.

8.11.3 Text menu

8.11.3.41 Switch. time (for double agitator)

Explanation

This parameter sets the length of time for which an agitator is in operation to supply fuel. After this time, a switch to the second agitator follows automatically.

The factory setting is 5 hours.

Modifying parameters

You can find this parameter in function block [Boiler].

The parameter can be found under:


Boiler
Intermediate conveyor screw
Double agitator
Switch. time

Select the parameter and press the [Change] button. A settings window will open.

Enter the duration and press [Accept] to save.

8.12 [External conveyor] function block

8.12.1 Overview

External conveyor overview

Press the button and [ExtConv] to open the external conveyor overview.

This function block is used with wood chip boilers to control existing fuel conveyor systems. For example:

- Silo conveyor system
- Double agitator (two agitators supply one boiler)
- Intermediate conveyor screw (several conveyor screws in series)

Conveyors with a drive power greater than 1.1 kW are controlled in this function block.
Conveyors with a drive power up to 1.1 kW are controlled in the [Special conveyor] ([SpConv]) function block.

If several conveyors are installed (as in a double agitator), each is shown in its own function block ([ExtConv] and [ExtConv2]).

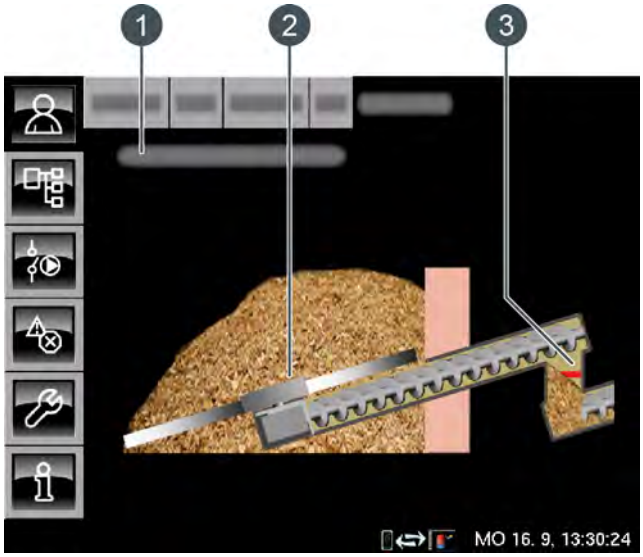


Fig. 8-36: External conveyor overview

1 Operating mode
2 Agitator
3 Light barrier (only with [Light barrier in drop chute] option)

The agitator and the screw are shown in green as soon as they begin to transport fuel. They are displayed in grey when not in operation or when the screw is turning in reverse in order to remove a blockage.

For controlling the fuel conveying system, an optional light barrier is available. If it has been installed, it is shown in the drop chute.
If the drop chute is filled with enough fuel, the light barrier is interrupted and displayed in red in the overview. If the light barrier is displayed in green, there is no fuel or insufficient fuel in the drop chute.

Intermediate conveyor screw overview

When several conveyor screws in series are used to transport fuel to the boiler, they are referred to as intermediate conveyor screws.
Every individual intermediate conveyor screw is shown in its own function block [ExtConv1], [ExtConv2]...

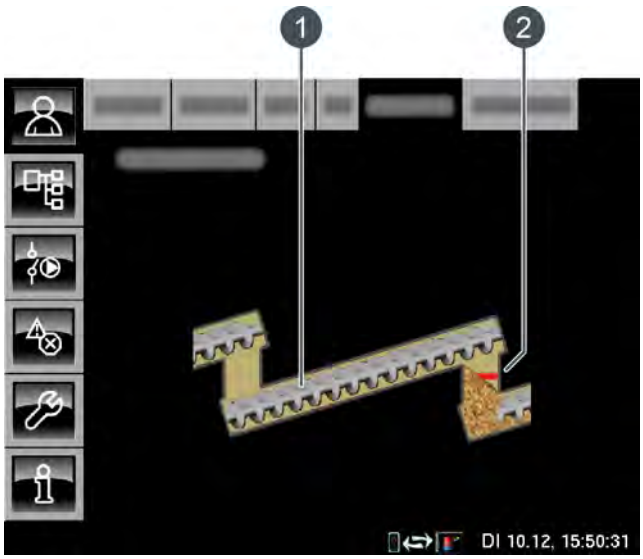


Fig. 8-37: Intermediate conveyor screw overview

1 Intermediate conveyor screw
2 Light barrier (only with [Light barrier in drop chute] option)

The intermediate conveyor screw appears green when it is turning in the discharge direction. The intermediate conveyor screw is shown in grey when not in operation or if it is turning against the discharge direction in order to remove a blockage.

An optional light barrier is also supplied with the intermediate conveyor screw for controlling the fuel transport. If it has been installed, it is shown in the drop chute.
If the drop chute is filled with enough fuel, the light barrier is interrupted and displayed in red in the overview. If the light barrier is displayed in green, there is no fuel or insufficient fuel in the drop chute.

Double agitator overview

When two agitators transport the fuel to a discharge screw and from there to the boiler, the configuration is called a double agitator.
Each agitator is shown in its own function block [ExtConv] and [ExtConv2].

The two agitators take it in turns to supply the boiler with fuel. In order to ensure that the fuel deposit is emptied at a steady rate, the system switches between the two agitators automatically.

Use the [On/Off] button in the overview to switch off an agitator (button then shines red). Then the other agitator takes over the fuel transport.

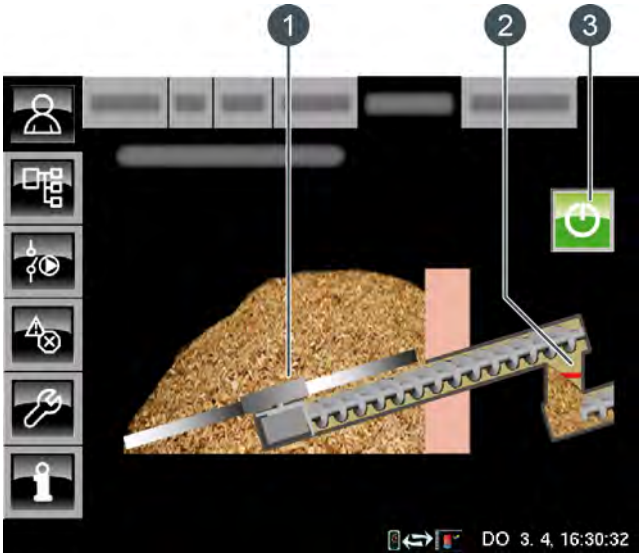


Fig. 8-38: Double agitator overview

1 Agitator

2 Light barrier (only with [Light barrier in drop chute] option)

3 [On/Off] button for switching off this agitator

The agitator and the screw are shown in green as soon as they begin to transport fuel. They are displayed in grey when not in operation or when the screw is turning in reverse in order to remove a blockage.

For controlling the fuel conveying system, an optional light barrier is available. If it has been installed, it is shown in the drop chute.
If the drop chute is filled with enough fuel, the light barrier is interrupted and displayed in red in the overview. If the light barrier is displayed in green, there is no fuel or insufficient fuel in the drop chute.

8.12.2 Operating modes

Ready

The conveyor is not in operation, and there is no demand for fuel.

Full

There is sufficient fuel in the drop chute. The light barrier is interrupted.

Convey

The conveyor is in operation and is conveying fuel.

Conveyor malf.

The conveyor drive has a malfunction.

8.12.3 Text menu

8.12.3.42 Switch. time (for double agitator)

Explanation

This parameter sets the length of time for which an agitator is in operation to supply fuel. After this time, a switch to the second agitator follows automatically.

The factory setting is 5 hours.

Modifying parameters

You can find this parameter in function block [Boiler].

The parameter can be found under:

Boiler
Intermediate conveyor screw
Double agitator
Switch. time

Select the parameter and press the [Change] button. A settings window will open.

Enter the duration and press [Accept] to save.

8.13 [Agitator] function block

8.13.1 Overview

Agitator overview

Press the button and [Agitator] to open the agitator overview.

This function block is used to control an agitator without conveyor screws and with a separate drive. An example is when an agitator supplies fuel to two boilers (double screw agitator).
The separate driver only drives the agitator with the flat springs. The discharge screws of the two boilers are operated by their controller. When one of the boilers demands fuel, the agitator starts up.

The filling level of the agitator is controlled by the [Light barrier for fill level measure top] and [Light barrier for fill level measure bottom] options when the agitator is filled by a conveyor.

The agitator is shown in the overview. It is shown in green as soon as it is in operation. Otherwise it shown in grey.

Fig. 8-39: Agitator overview

1 Operating mode
2 Agitator
3 Light barrier (only with [Light barrier for fill level measure top] option)
4 Light barrier (only with [Light barrier for fill level measure bottom] option)
5 [EMPTY] button (only with [Light barrier for fill level measure top] or [Light barrier for fill level measure bottom] options)
6 [On/Off] button to enable or disable the agitator

Agitator functionality

Press the [On/Off] button to enable or switch off the agitator. If the agitator is enabled (button shines green) the ETA boiler can activate it when needed. If the agitator is switched off, the boiler switches to [Locked] mode and cannot start heating.

The agitator is only put into operation by the ETA boiler when the boiler needs fuel.

[On/Off] button

This button enables and disables the agitator. If the agitator is enabled, this button appears green .

[EMPTY] button

Optional: only with [Light barrier for fill level measure top] or [Light barrier for fill level measure bottom]

Pressing this button blocks the fuel supply to the agitator, causing the agitator to be emptied. If the button has been pressed, it will shine green. Press the button again to enable the agitator again.

8.13.2 Operating modes

Self-check

The conveyor drive is performing a self-check.

Off

The agitator has been disabled with the button, so it cannot be put into operation by the ETA boiler.

Ready

The agitator is not in operation and there is no demand for fuel.

Rotate

The agitator is in operation and is conveying fuel.

Wait for self-check

The self-check of the drive could not be performed because the safety chain was interrupted.

Safety device interrupted

The safety chain, e.g. water shortage alert, emergency stop, safety temperature limiter, rotary valve maintenance cover, etc. has been broken. Heating is blocked and cannot be resumed.

Self-check error

The agitator drive's self-check has failed.

Stirrer error

The agitator's drive has a fault.

9 Filling the storage room

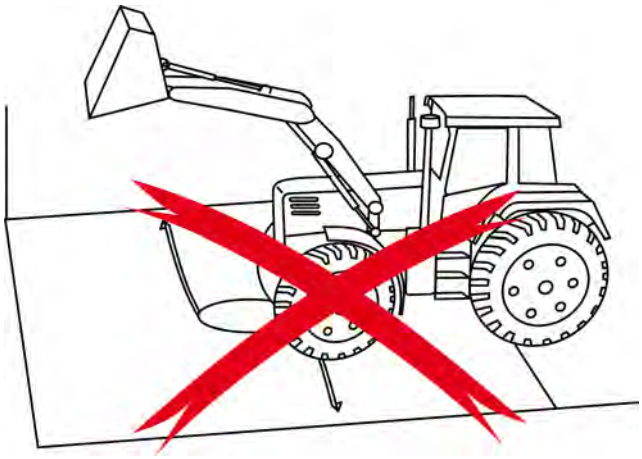
Before filling the fuel store

Before filling, the conveyor and boiler must be fully assembled and connected.

Perform a visual inspection

Before filling the fuel store, perform a visual inspection of the conveyor to identify any damage or foreign objects.

Never drive over the floor agitator



Floor agitator must be turning while filling

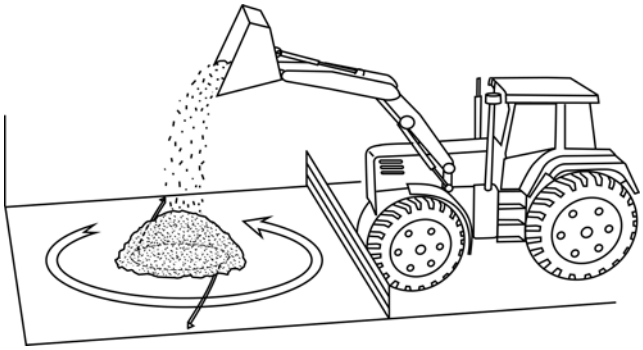
The floor agitator must be turning while the fuel store is being filled. When the fuel store is empty, the floor agitator's spring arms are extended. If the spring arms are covered with fuel in this position, they will be trapped and the floor agitator will no longer be able to turn.

The rotation of the floor agitator starts by pressing the button [MEAS.] in the boiler overview window. A settings window appears. In this, set the [Start now] parameter to [Yes] This switches the boiler to emission measurement mode and transports the fuel to the boiler.

After filling, switch the boiler back to normal mode. To do this, open the settings window with the [MEAS.] button and press the [Measurementdeactivate] button. If you do not press this button, the boiler will automatically switch back to normal mode after some time.

Start filling in the centre

Start filling the fuel store from the centre of the floor agitator outward. If the floor agitator is filled from the side, the rotating spring arm slices through the wood chips and then speeds up in the still empty part of the fuel store.



If the fuel store is filled through a hole from above, the fuel must be fed onto the rotating floor agitator slowly. The floor agitator can be damaged if a dumper load is poured on "in one go" from a height of 3 or possibly even 6 m.

The maximum fill height of the fuel depends on the fuel, or its weight:

- Pellets up to 2.0 m
- Wood chips up to 5.0 m

10 Rectifying problems

Malfunctions in fuel transport

The drives for transport of the fuel are monitored by the control system. If the discharge screw or the stoker screw is blocked, the control system tries to unblock the screw by reversing it.
If the blockage persists after 3 attempts to remove it, an error message is displayed. The boiler starts an ember burnout and then switches to [Malfunction] mode. As long as the blockage persists, the boiler can no longer be switched on.

In the case of an error message with "current draw too high", a single large piece of wood or a foreign object is often blocking the discharge screw.
An error message with "overload" or "motor protection" indicates wood chips that are too fine or too long are interfering with the discharge screw. That overloads the drive, which is switched off by the motor protection.

Before eliminating the blockage, switch off the boiler with the mains switch. The maintenance covers can be opened when eliminating the blockage.

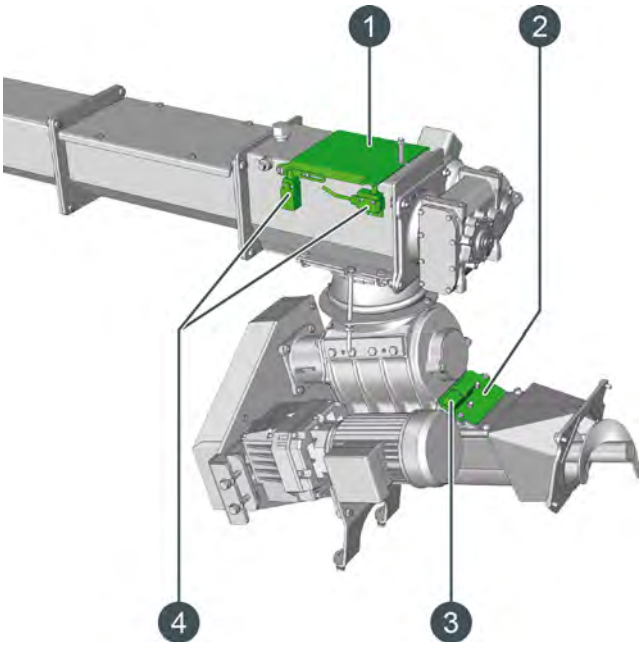


Fig. 10-1: Access for eliminating blockage

1 Drop chute maintenance cover
2 Rotary valve maintenance cover
3 Safety switch for rotary valve maintenance cover
4 Drop chute safety switch

After removing the blockage, replace the covers and switch the boiler back on with the mains switch.

Ash screw jammed

If the ash screw is stuck, a corresponding warning will be displayed on the screen. The most common cause of a blockage is a full ash bin, So first check to see how full the ash bins are and empty them.

If the ash bin is not full, then it can be assumed that a foreign object is blocking the ash screw.

In this case, stop heating by pressing the [On/Off] button in the boiler overview window. Only perform the further steps after the [Switched off] status is displayed.

Detach the ash bins from the boiler and check the visible part of the ash screw. The foreign object may already be found at the end of the ash screw, where it can be removed.

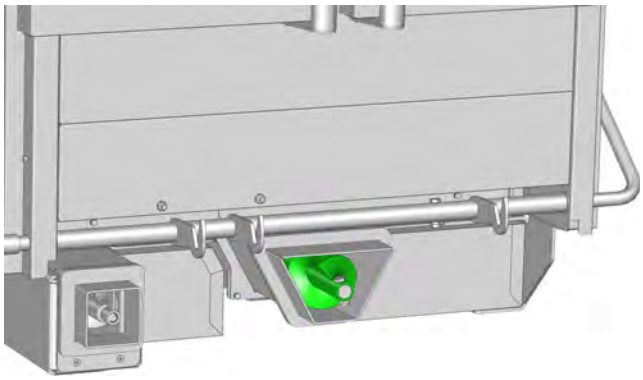


Fig. 10-2: Tilting grate ash screw

If no foreign object is visible, it is probably in the combustion chamber under the tilting grate.

The grate cannot be tilted by hand. Tipping is done by starting de-ashing with the [ASH] button. The grate tilts and remains in this position for approximately 15 seconds.

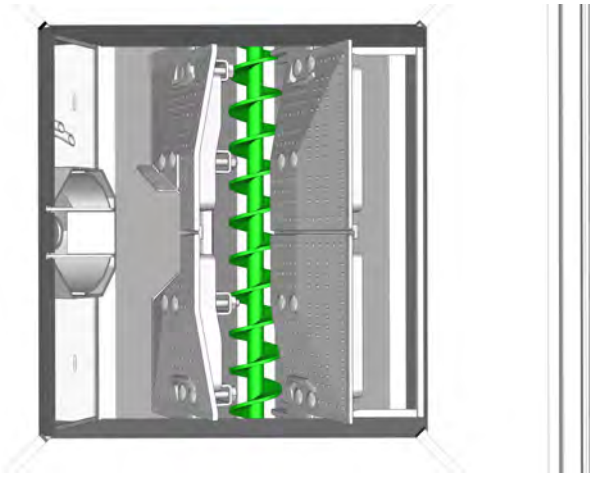
WARNING!

Danger of crushing due to tilting grate

▶ When the grate is tilted, switch off the boiler with the mains switch. This causes the grate to remain in this position so injuries are prevented.

Remove both combustion chamber covers from the combustion chamber.

Now the ash screw under the grate is accessible and the foreign object can be removed.



After removing the foreign object, replace the combustion chamber covers and reattach the ash bins to the boiler.

For a final check, switch the boiler back on with the mains switch and press [ASH] to perform de-ashing.

Removing the ash screw

If the ash screw is jammed or the foreign object cannot be removed, the ash screw must be removed.

Stop heating by pressing [On/Off] in the boiler overview window. As soon as the [Switched off] status is displayed, switch off the boiler with the mains switch.

Detach the ash bins from the boiler and remove the M8 screw that secures the ash screw.

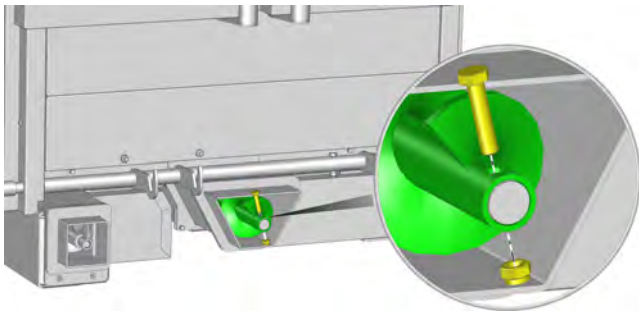


Fig. 10-3: Removing the screw

The ash screw is now loosened from its shaft and can be extracted from the ash duct by turning it anti-clockwise.

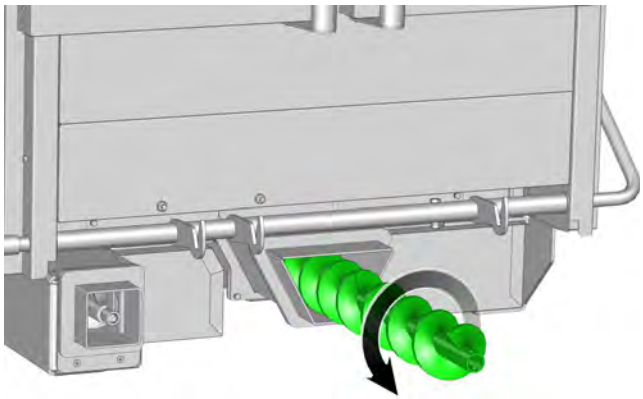


Fig. 10-4: Unscrewing the ash screw

Remove the ash or the foreign object from the ash duct.

Then insert the ash screw again and secure it with the M8 screw.

Replace the ash bins and switch on the boiler with the mains switch.

To check, start de-ashing by pressing [ASH].

11 Information on fuel

11.1 Suitable fuels

The amount of ash depends on the fuel

Ash is the non-flammable residue from the wood. It consists of minerals such as calcium and potassium without which life cannot exist, but also soil, sand and stones, i.e. impurities in the fuel.

Wood chip, with its very low bark content, has an ash content of approximately 0.5 %. The bark itself has an ash content of nearly 4 %. In practice, there is always soil and sand stuck to the bark.

Fuel from crops has a very high potassium content. The ash content is in the range 3 to 6%.

Wood residues with a high proportion of fine branches and needles is extremely dense in storage, is poorly ventilated and does not dry. Frequently, this material already begins to rot at the timber storage site. With this process of decomposition, the heating value diminishes and the ash content rises.

How often ash waste containers have to be emptied depends on the heat capacity of the boiler and the quality of the fuel (ash content, heating value, etc..).

The preferred fuel is coarse wood chips with a low fine content

The length of the individual wood chips should be between 30 and 50 mm, to ensure that air can circulate well among the stored chips, water can escape from the pile and the tendency to rot and turn mouldy is minimal.

If the fine content (sawdust, bark, needles, soil, sand) is too high, it can obstruct the airways. Water evaporates inside the warm wood chip pile. If the vapour cannot escape, it will condense in the upper part of the heap. Some of the wood chips will then rot and turn to compost with no heating value.

Avoid green, moist wood chips

Only wood chips that are sufficiently dry (water content below 25%) can be stored in a concrete bunker without problems. Moist, coarsely chopped chips stored in an open hall exposed to the wind quickly reach a water content under 35%.

Be especially careful with waste wood

When waste wood is on offer, it may be rotten with no heating value; only buy waste wood by weight and with limited water content (25% maximum). Also ensure that the wood contains no contaminants. The applicable laws only allow the use of untreated wood without foreign substances for heating purposes.

Wood-processing facilities may burn chipboard if it contains no halogens or wood preservatives.

Binding agents containing chlorine used to frequently be used in wood products. if these are burned in a boiler without appropriate cleaning of the flue gas, contaminants detrimental to health will be emitted. Apart from this, a very high chlorine content will have a severe negative effect on the life of the boiler.

Only burn wood products or painted, coated or varnished wood if you are sure these contain no wood preservatives, organohalogen compounds or heavy metals.

Nails and stones

Nails and stones will hardly bring the boiler to a halt, but they cause increased wear on the screws and the blades in the rotary valve.

Impurities in the fuel

Impurities in the fuel result in a higher ash content and are frequently responsible for a lower ash melting point. If the ash melting point is exceeded, the ash fuses (slag formation). It is therefore in the plant operator's interests to keep impurities to a minimum.

Types of wood chips

The best quality wood chips are finely chopped hardwood, without bark, with low dust content and a water content below 20%. With the highest heating value and the lowest storage volume requirement, this would be the optimum fuel for any boiler.

Fine wood chips can be made from dry wood, enabling a higher storage density.

Even if wood is stored dry, the energy content wanes, and the heating value of dry wood decreases by 10% over 10 years.

Wood chips from dry branches and shrubbery cuttings have higher bark content and usually also large amounts of dirt and decayed material. Resulting in more ash.
If they were chopped from dry wood, there will be no storage problems and the reduction in boiler output is low.

Forest-
chopped wood chips from fresh branches are not fit f or storage and reduce the achievable boiler output si gnificantly.

Wood that has been stored in damp conditions for a long time (10 years) has lost up to 50% of its heating value.
Chips from such wood significantly reduce the achievable boiler output.

The final product from wet wood is compost, which can be disposed of in a refuse incinerator but can hardly be burned in a normal boiler.
Ensure good ventilation during storage.
The higher the water content of the wood, the more coarsely it should be chopped.
Never store more than a year's supply of wood chips (round logs can be stored more easily and densely).

Be very careful where wood chips from waste wood are on offer at especially low prices; the fraction of decayed material and perhaps also the amount of foreign objects (nails, wood preservatives, sand, stones) can be very high.

11.2 Moist fuel

Decay and mould

Up to a water content of approx. 25%, the water is bound up in the wood fibres. Above 25%, water is found between the fibre cells in cavities and capillary vessels. This unbound water is a habitat for, and also a basis for the reproduction of, microbes and fungi, which can penetrate the tree through wounds in the wood structure, particularly cuts or breaks. These microbes convert cellulose and lignin into the basic building blocks carbon dioxide and water. The wood rots, hollows out and becomes brittle, ultimately losing all of its heating value.

When a tree is felled, the race between drying and decay begins. As the water content decreases, the living conditions for microbes worsen until they die off when the water content drops below 25%. The faster the drying process, the more heating value remains in the wood.

For thin branches, the microbes have a very large contact surface in relation to the wood volume. No matter how neatly the branches are stacked, losses in heating value over 25% are the rule (and considerably more in wet weather). This is why forestry businesses don't even take part in this race when branches are smaller than 3 to 5 cm; instead, the material is left behind as nutrient material for the forest.

Easy recognition of moist or dry wood

Even through professionals who work daily with wood chips only trust the oven test for measurements of the exact water content, there is still a very simple way to distinguish moist from dry. Chips that feel dry in the hand have a water content below 25% and can be stored without problems. If they feel wet, the water content is sure to be above 35%.

If the wood chips are dark brown, light and already crumbly, then you are holding rotten wood in your hands, wood that has already lost the majority of its heating value. From such "compost" you can expect only problems, but not boiler output.

Do not store moist wood chips without ventilation

Wood chips can only be stored without ventilation (for example in a concrete cellar) if their water content is no more than 30%.

If moist wood chips from a sawmill are to be used anyway, then no more than three weeks' supply should ever be kept in an unventilated bunker. An air inlet and an outlet fan can remove water vapour and at least limit mould growth.

Store moist wood chips in an open hall

During the decay process, moist wood chips release heat that drives out water. Wet areas form on the surface, and rising water vapour may also be visible. If the wind is given the chance to transport the water away, coarse wood chips will dry while decay and fungi will stay within acceptable limits.

Best is a flying roof separate from living and working quarters, which keeps rain out but lets the wind work unhindered. At least one side of the storage hall should be completely open. Additional openings in all other walls improve the storage conditions.

11.3 Drying and chopping wood chips

Coarse wood chips with minimal fine content dry fastest

Coarse chips (chopped with sharp blades!!!) dry faster with less loss of material due to the improved air circulation. Fill heights between 4 and 6 m have proven effective. This height is also safe as regards self-ignition, which only becomes a danger at heights of 8 m or more.

Even when coarsely chopped, very moist and green material (leaves and needles) and bark have a high fine content (typical and unavoidable features of shrubbery cuttings and delimbing material) and higher biological activity, and allow only minimal air circulation. In spite of higher self-heating, the low air circulation slows the drying process and material loss is considerably higher.

Dry like hay on a hard surface

For your own use, spread out moist wood chips in a layer 10 cm thick on an asphalt or concrete surface on hot summer days. Good results can also be had on sunny autumn days if you turn the chips over several times. Two days are usually enough to attain a water content below 30%, making the chips fit for storage even under poor conditions.

Drying in a covered mesh enclosure

When building a new wood chip storage facility, roofed storage containers with mesh walls should be considered for air-drying of moist chips. A windy location is important. Southward orientation can help with drying even in winter. The height of the container depends on the height of the front end loader needed for filling. The lowest wall element must be removable to allow removal of the wood chips. The depth can be up to 2 m. Drying time is 4 to 8 months and a water content below 20% is attainable.

Artificial ventilation

In spite of a few elaborate pilot projects with solar energy, drying with heated air blown into the store via channels in its floor has not proven itself very economical thus far. The energy costs for drying often exceed the achievable increase in heating value.

Dry wood before chopping, fell in winter and chop in summer

It is much easier to dry the wood before chopping it. With interim storage before chopping in summer, a water content below 30% can be reached, ensuring problem-free storage for the wood chips.

The decision whether to dry entire trees, or trunks and branches separately depends largely on the accessibility of the forest and the harvesting methods. Here are a few tips for orientation:

- Well-ventilated piles, trunks with bark removed, or entire trees dry faster and better. Sun helps, and wind is indispensable for drying.
- Softwood should be felled no later than December and stored at least 50 m from the forest due to the risk of beetles.
- If the first regeneration felling is done for softwood in September, the wood will no longer be infested by beetles in the spring. It can be left in the forest without delimbing and chopped as entire trees in summer.

Leave green branches in the forest as nutrients

Leave green branches and treetops in the forest; as fuel they are only "air and water". As valuable nutrients, they should remain in the forest.

11.4 Water content

Using an oven to determine water content

A kilogram of wood chips is spread out on a baking sheet and dried in an oven for 6 to 12 hours at 101 to 104°C. To be certain of a temperature over 100°C in a typical electric oven in spite of the inexact thermostat, you can set it to 110°C, but no higher as the wood will begin outgassing even at slightly higher temperatures. Fine and very moist pieces will need to be turned a few times. The difference in weight between the moist test material and the dry material corresponds to the water content.

Longer interim storage of samples can falsify their water content.

Take samples after transport

A pile of wood chips has 10 to 30% more water content in the upper layers than in the middle. The material is mixed by the loading and unloading process during transport. By taking about a litre from 5 different places at a depth of at least 20 cm (never from the surface) in each load, you can get a good average with low error.

Taking the test quantity from the total sample

From several transport loads, you will get more than 1 kg of test material. To obtain a smaller quantity, mix the material by rebuilding the pile, always emptying the shovel over the top of the pile so that the material is distributed over its entire surface. Then flatten the pile and remove the two opposing quarters from it. Repeat the mixing and removal process until you have two batches of test material of 1 kg each, 1 kg for the buyer, who usually determines the water content in the oven, and 1 kg for the seller as a control sample. The volume for one kilogram is around 3 litres for wet, heavy wood chips and as much as 5 litres for very dry and light material.

Water content and moisture

Water content has become the established measurement for wood used for generating energy; in the lumber business, the wood's moisture is usually stated.

$$\text{Water content (\%)} = \frac{\text{water in the wood (kg)} \times 100}{\text{total weight of wood (kg)}}$$

$$\text{Moisture content (\%)} = \frac{\text{water in the wood (kg)} \times 100}{\text{dry weight of the wood (kg)}}$$

$$\text{Water content (\%)} = \frac{\text{moisture (\%)} \times 100}{100\% + \text{moisture (\%)}}$$

11.5 Judging the quality

Judging the quality	
Criterion	**Comments**
Ash content	Contaminated material burns poorly and is often a sign of decayed or dirty wood chips.
Large pieces	Fuel may contain individual, large pieces up to 20 cm long. They are cut by the blade in the rotary valve. The majority of wood chip pieces should not be longer than 5 cm to reliably prevent blockages in the fuel conveying system.
Dirt	Soil and sand cause slag formation on the grate and result in more effort spent on cleaning d ue to a lower ash melting point.
Green leaves and needles	A layer of chips from green branches with leaves or needles can cause a blockage in a pile of chips on which rising moisture condenses, resulting in decay and mould.
Metal, stones	Even though the boiler cannot be brought to a halt by nails and small stones, such foreign ma terials should be avoided in wood chips because they cause increased wear in the fuel conve ying system.

Judging quality when buying in loose cubic metres			
Criterion	**Comments**	**Effect on heating value**	
Water content	The lower the water content, the higher the heating value. In addition, under a water content of 25% the wood shrinks. So a cubic metre with 20% water content, contains approx. 3% more wood than a cubic metre wit h 30% water content. The water content is given as a percentage of the total weight.	20% 30% 35% 40%	+6% 0% -2,5% -4%
Chip size	The more finely the material is chopped, the more material fits i n a cubic metre.	P16S P31S	+0% -16%
Kind of wood	Hardwood is denser and heavier and thus has a higher heat con tent per cubic metre.	Hornbeam, black loc ust	+53%
		Beech	+44%
		Oak, ash	+40%
		Birch, maple	+25%
		Pine, larch	+19%
		Spruce, alder	0%
		Fir, willow	-6%
		Poplar	-19%
Bark content	The lighter in colour the wood chips are, the lower their bark con tent. Wood chips from small branches or wood chips with bark from s awmills have a high bark content with high ash content and usu ally also higher dirt content. This results in more effort spent on cleaning.	without bark	+5%
		10% bark	0%
		30% bark	-10%
Small branches	Wood chips from small branches usually have a high degree of decay.	Small branches	-25%

Judging quality when buying by the kilogram			
Criterion	**Comments**	**Effect on heating value**	
Water content	The lower the water content, the higher the heating value. The water content is given as a percentage of the total weight.	20% 30% 35% 40%	+12% 0% -12% -20%
Chip size	The chip size has no effect on the heating value per kilogram		

Judging quality when buying by the kilogram			
Criterion	**Comments**	**Effect on heating value**	
Kind of wood	Heavy hardwood, when dried, has about 5% less heating value than softwood, and about 6% less when moist. Light hardwood, when dried, has 6% less heating value than softwood and 7% less when moist.	Softwood Hardwood	0% -5% to -7%
Bark content	The bark content has little influence on the heating value per kil ogram, but a high bark content means a higher ash content and more time spent on cleaning.		
Small branches	Wood chips from small branches usually have a high degree of decay.	Small branches	-25%

11.6 Other fuels

Other fuels	
Pellets	Pellets have a higher fuel density and can only be burned with flue gas recirculation. Pellets are always sold by weight. The heating value of hardwood pellets (4.60 kWh/kg) is about 6% less than that of softwood pellets (4.9 kWh/kg).
Miscanthus	The heating value is the same as for air-dried softwood; best bought by weight. Since its ash has a very low sintering point, flue gas recirculation is required to prevent slag formation. To reduce boiler corrosion, ensure that chlorine-free fertiliser (potassium sulphate instead of potassium chloride) is used. Regardless of whether it is chopped or made into pellets, miscanthus needs a very large combustion chamber, so for size 35/50 a maximum heating output of 35 kW can be reached, for size 70/90 a maximum of 63 kW, for size 130 a maximum of 95 kW and for size 200 a maximum of 140 kW.
Old wood	Wood kept in dry storage loses only the volatile components (about 10% of the heating value). Wood stored in moist storage decays (cold oxidation process) to the point of total loss of heating value.
Wood shavings	The heating value per cubic metre varies widely and is around 30 to 60% less than that of wood chips (with 30% water content) from the same wood. Since wood shavings are usually air-dried (15% to 20% water content), they are best bought by weight. Wood chips from some types of hardwood cause rapid wear on the combustion chamber's fire clay. With wood shavings, the full rated output of the boiler cannot be reached.
Sawdust	The heating value per loose cubic metre is between 25 and 50% less than that of wood chips (with 30% water content) from the same wood. Sawdust is best bought by weight, after determination of its water content. Dry sawdust from joineries can be burned, but not fresh (moist) sawdust from sawmills.
Chipboard	Chipboard waste can be used if it is free from formaldehyde and wood preservatives, and is not coated with PVC. However, this is only allowed with an official permit, which is usually only granted on a case-by-case basis to wood-processing facilities.
Demolition wood	Only wood that is free of halogens and wood preservatives may be burned. The fraction of rotten wood is often high, and the heating value low, and it is often contaminated with dust, metal and stones.

11.7 Heating value

Heating values of fuels

	Heating value based on weight		Cubic metre (rm) [a]				Loose cubic metre (srm) [b]							
			Round logs		Logs		Wood chips P16S				Wood chips P31S			
			Weight		Heating value		Weight		Heating value		Weight		Heating value	
Water content	**15%**	**30%**	**15%**	**30%**	**15%**	**30%**	**15%**	**30%**	**15%**	**30%**	**15%**	**30%**	**15%**	**30%**
Unit	**kWh/kg**	**kWh/kg**	**kg/rm**	**kg/rm**	**kWh/rm**	**kWh/rm**	**kg/srm**	**kg/srm**	**kWh/srm**	**kWh/srm**	**kg/srm**	**kg/srm**	**kWh/srm**	**kWh/srm**
Softwood			1 rm = 0.65 fm [c]		1 rm = 0.56 fm [c]		1 srm = 0.40 fm [c]				1 rm = 0.33 fm [c]			
Fir	4.40	3.51	1270	1170	1100	1010	178	208	780	720	148	171	650	600
Spruce	4.49	3.58	1380	1260	1190	1090	189	218	850	780	157	181	710	650
Douglas fir	4.43	3.53	1480	1360	1280	1170	206	237	910	840	172	198	760	700
Pine	4.32	3.44	1630	1490	1400	1290	232	267	1000	920	193	223	830	770
Larch	4.27	3.39	1660	1520	1430	1310	239	275	1020	930	199	229	850	780
Hardwood			1 rm = 0.59 fm [c]		1 rm = 0.50 fm [c]		1 srm = 0.40 fm [c]				1 rm = 0.33 fm [c]			
Poplar	3.99	3.16	1020	930	870	790	174	200	690	630	145	167	580	530
Willow	3.76	2.97	1200	1100	1020	930	217	250	810	740	181	208	680	620
Alder	4.06	3.23	1270	1160	1080	990	212	245	860	790	177	204	720	660
Maple	4.04	3.21	1550	1420	1310	1200	260	300	1050	960	217	250	880	800
Birch	4.01	3.18	1570	1430	1330	1210	265	305	1060	970	221	254	890	810
Ash	4.10	3.25	1760	1610	1490	1390	291	335	1190	1090	242	279	990	910
Beech	4.13	3.28	1800	1640	1520	1390	295	340	1220	1110	246	283	1020	930
Hornbeam	4.06	3.23	1920	1760	1630	1490	321	369	1300	1190	267	308	1090	990
Black locust	4.11	3.27	1920	1760	1630	1490	317	365	1300	1190	264	304	1090	990

a. A cubic metre (rm) corresponds to 1 m³ layered round logs/logs (1 m length) with air gaps.

b. A loose cubic metre (srm) corresponds to 1 m³ of loosely dumped wood chips.

c. A solid cubic metre (fm) corresponds to 1 m³ wood without air gaps.

12 Low-emission operation

Notes on complying with limit values in Germany after 1 January 2015

In accordance with the provisions of "BImSchV," lower limit values for the emission measurement in Germany apply to all new heating system installations starting 1 January 2015. In particular, compliance with the new dust limit value of 20 mg/m³ can lead to problems in practice.

It was determined under laboratory conditions in testing centres that the ETA boiler complies with the new limit values. To be fair, however, it should be noted that high-quality fuels were used and the heating system operated under optimal conditions. Things look different in practice. Low-quality fuels are often used, which represents a problem for the dust limit value.

Fuels used for testing

The following fuels were used as test fuel for emission measurements and approval of the boiler:

- Conifer wood chips without bark according to ISO 17225-4 with the designation "P31S M25 F05 A0.5"
- Pellets according to ISO 17225-2 with the designation "D06 M10 A0.5"

The ash content of the fuel is an indicator for the dust emission

According to the current state of science, dust emissions from complete combustion are inorganic components in the fuel, so-called aerosol formers. Studies by renowned research institutes have clearly demonstrated that the aerosol formers present in the fuel (e.g., potassium, calcium, sulphur, chlorine, sodium, zinc, silicon, phosphorous...) are released in relatively fixed proportions. Accordingly, the level of dust emissions is determined by the proportions of these aerosol formers in the fuel.

The situation is made difficult by the fact that the percentage of aerosol formers in the wood depends on many factors (tree species, soil condition, season…). Even different parts of the tree (trunk, branches, core/sapwood) can demonstrate stark fluctuations.

In practice, the ash content of the fuel has proven to be a good indicator of the percentage of aerosol formers. In order to operate the system with the lowest possible dust emissions, a properly maintained condition as well as high-quality fuels with the lowest possible ash content (barks, impurities, leaves, needles...) are indispensable.

Dear customer!

Your boiler is labelled with the "Blauen Engel" to show that it is an environmentally friendly boiler. With this in mind, please note the following for efficient and low-emission operation of your heating system:

1) The installation and adjustment of the heating system must be performed only by qualified and trained personnel.
2) Use only the fuels specified by us in the user manual (in the warranty conditions). This is the only way to ensure low-emission, economical and problem-free operation of your heating system.
3) Perform the maintenance and cleaning procedures recommended by us on your heating system at regular intervals. In this way, you can ensure that your heating system and its safety features will work effectively to provide efficient and low-emission operation. You can get the best care for your heating system by signing a service contract.
4) Your boiler is adjustable within an output range between 30% and 100% of its rated output. To avoid unnecessary emissions in low-output operation, the systems should be operated as much as possible in the mid to high-output range (adjusted to the heating requirement). Please do not use any heating controller that is separate from the boiler control. Use the heating circuit control integrated in the boiler control in combination with a room sensor.
5) From an energy perspective, a buffer storage tank and a combination with a solar heating system are recommended. This ensures efficient and low-emission operation of your heating system.

The Clean Air Act 1993 and Smoke Control Areas

Under the Clean Air Act local authorities may declare the whole or part of the district of the authority to be a smoke control area. It is an offence to emit smoke from a chimney of a building, from a furnace or from any fixed boiler if located in a designated smoke control area. It is also an offence to acquire an "unauthorised fuel" for use within a smoke control area unless it is used in an "exempt" appliance ("exempted" from the controls which generally apply in the smoke control area).

The Secretary of State for Environment, Food and Rural Affairs has powers under the Act to authorise smokeless fuels or exempt appliances for use in smoke control areas in England. In Scotland and Wales this power rests with Ministers in the devolved

administrations for those countries. Separate legislation, the Clean Air (Northern Ireland) Order 1981, applies in Northern Ireland. Therefore it is a requirement that fuels burnt or obtained for use in smoke control areas have been "authorised" in Regulations and that appliances used to burn solid fuel in those areas (other than "authorised" fuels) have been exempted by an Order made and signed by the Secretary of State or Minister in the devolved administrations.

The ETA HACK 20, 25, 35, 45, 50, 70, 90, 130 and 200 kW boiler has been recommended as suitable for use in smoke control areas when burning wood chips G20 to G50 with a maximum water content of 35% (per ÖNORM M7133) or P16 to P45 with a maximum water content of 35% (EN14961-4) and with an optionally available flue gas recirculation, wood pellets according to EN14961-2 class A1, EN plus class A1 or DINplus.

Further information on the requirements of the Clean Air Act can be found here:
http://smokecontrol.defra.gov.uk/

Your local authority is responsible for implementing the Clean Air Act 1993 including designation and supervision of smoke control areas and you can contact them for details of Clean Air Act requirements.