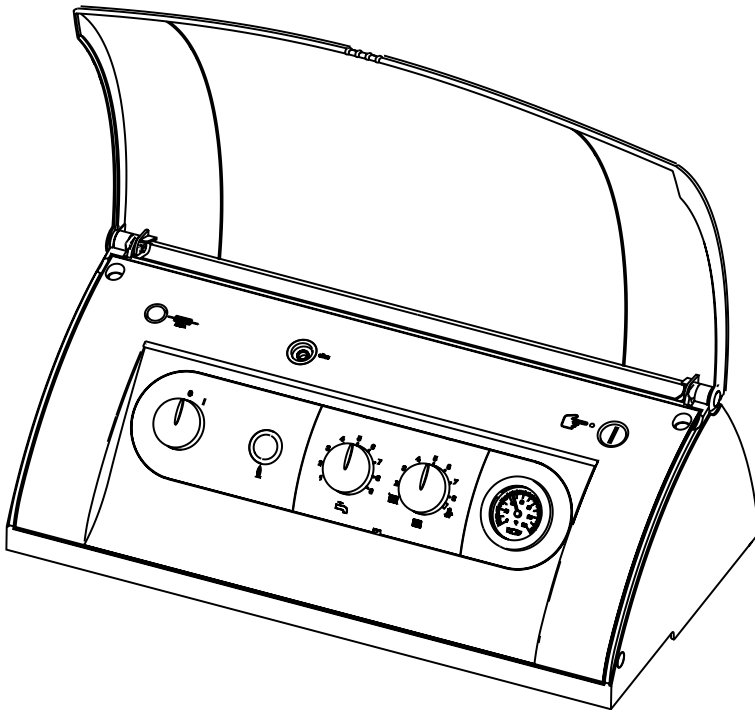


# Installation and operating instructions

## Control unit R21



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## Safety instructions

The following symbols are used in conjunction with these important instructions concerning personal safety, as well as operational reliability.



"Safety instructions" are instructions with which you must comply exactly, to prevent risks and injuries to individuals and material losses.



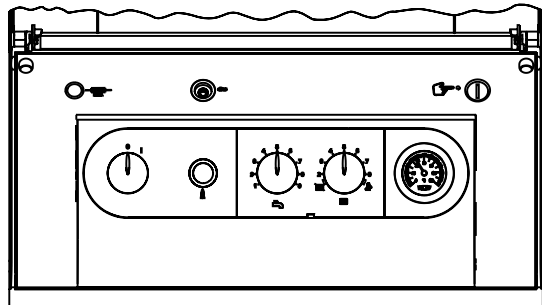
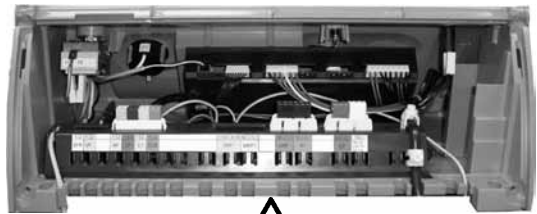
Danger due to 'live' electrical components. Switch OFF the ON / OFF switch before removing the casing.

Never touch electrical components or contacts when the ON / OFF switch is in the ON position. This results in a risk of electrocution that may lead to injury or death.

The main supply terminals are 'live' even when the ON / OFF switch is in the OFF position.

**NB**

This indicates technical instructions that you must observe to prevent material losses and boiler malfunctions.



Burner supply cable stage 1

Burner supply cable stage 2

Boiler sensor

High limit safety cut-out

Earth terminal

Thermometer



**Installation / Commissioning** The boiler control unit complies with the following regulations:

EC Directives

- 2006/95/EC                    Low Voltage Directive
- 2004/108/EC                EMC Directive

DIN / EN Standards

EN 60335-1, EN 60730-2-9, EN 14597,  
DIN 3440, EN 50165, EN 55014-1

**Observe the following regulations, rules and directives during installation:**

- The installation and commissioning of the heating system
- Regulations of local utilities
- DIN VDE 0100 Regulations regarding the installation of high voltage systems up to 1000 V
- DIN VDE 105 Operation of electrical systems
- EN 50156 Electrical equipment in combustion systems
- EN 12828 Heating systems in buildings

**Appropriate use**

The Wolf R21 control unit is designed exclusively for use in conjunction with Wolf boilers. The R21 control unit is equipped with a temperature controller/limiter and a high limit safety cut-out. The control unit regulates two-stage and modulating burners. The set boiler temperature can be adjusted between 38 - 90 °C.

The R21 control unit can be extended with a BM programming unit for weather-compensated temperature control with time program.

**Other applicable documents**

Installation and operating instructions for the boiler and all accessories used.

**Warnings**

- Never remove, bypass or disable safety and monitoring equipment.
- Only operate the system in perfect technical condition. Immediately remove / remedy any faults and damage that may impact on safety.
- Always ensure that cold water is mixed in with hot water, when the DHW temperature is set above 60 °C or when operating the pasteurisation system (65 °C) (risk of scalding).



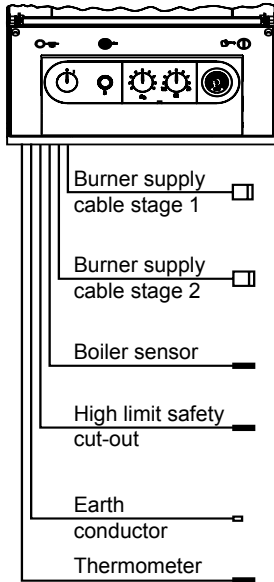
**Maintenance / Repair**

- Regularly check the perfect function of all electrical equipment.
- Only qualified personnel may remove faults or repair damage.
- Only replace faulty components or equipment with original Wolf spare parts.
- Always maintain prescribed electrical protection values (see specification).

**NB**

Any damage or loss resulting from technical modifications to Wolf control units is excluded from our liability.

## Installation



When installing this control unit ensure that sensor capillaries are neither kinked nor twisted.

Never route on-site sensor and remote control leads / cables together with mains power cables.

Implement the electrical wiring in accordance with the wiring diagram.

Open the rear control unit cover after releasing both screws.

### Burner supply cable

Guide it through the aperture in the control unit bracket (l.h. / r.h.), depending on which side the boiler door opens.

### Boiler sensor

Insert into any opening of the boiler sensor well.

### High limit safety cut-out

Insert sensor capillaries into any opening in the boiler sensor well.

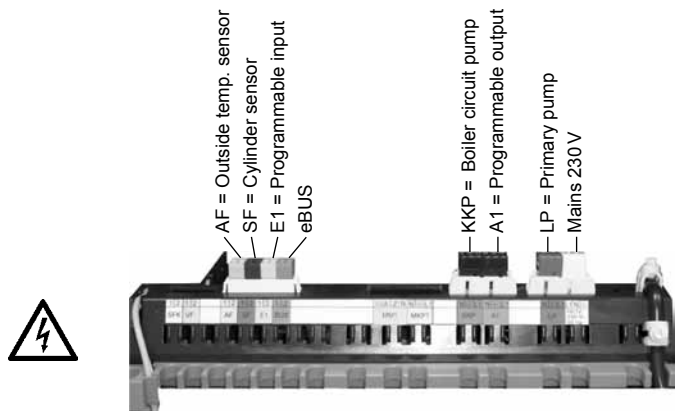
### Earth terminal

Insert into the control unit panel.

### Thermometer for boiler water temperature display

Insert into any opening of the boiler sensor well.

## Electrical work



## Info

Insert all plugs that are not used into the plug-in strip. Observe the colour coding. Insert the yellow plug together with the jumper into slot E1.

## Power supply connection

Join the power supply cable to the plug supplied. Insert the plug into the marked-up location in the plug-in connector strip, and secure the lead with its strain relief. Route the lead through the boiler back cutout.

**Pump connection**

Wolf boiler circuit and DHW cylinder primary pumps are factory-fitted with plugs. Route the lead through the boiler back cutout. Insert the plug into the marked-up locations in the plug-in connector strip, and secure the cables with their strain relief.

**A1 programmable output**

Join the cable of output A1 to the plug supplied. Insert the plug into the marked-up location in the plug-in connector strip, and secure the lead with its strain relief. Route the lead through the boiler back cutout.

**Outside temperature sensor  
(accessory)**

Join the on-site lead of the outside temperature sensor with the plug supplied. Insert the plug into the marked-up location in the plug-in connector strip, and secure the lead with its strain relief. Route the lead through the boiler back cutout. Fit the outside temperature sensor to the north or northeast wall, 2 to 2.5m above ground level.

**Cylinder sensor  
(accessory)**

Push the DHW cylinder sensor (accessory) into the cylinder sensor well. Route the lead through the boiler back cutout. Insert the plug into the marked-up location in the plug-in connector strip, and secure the lead with its strain relief.

**E1 programmable input**

Join the cable of input E1 to the plug supplied. Insert the plug into the marked-up location in the plug-in connector strip, and secure the lead with its strain relief. Route the lead through the boiler back cutout.  
The mating plug with its wire jumper must be plugged in if no accessories are connected to E1.

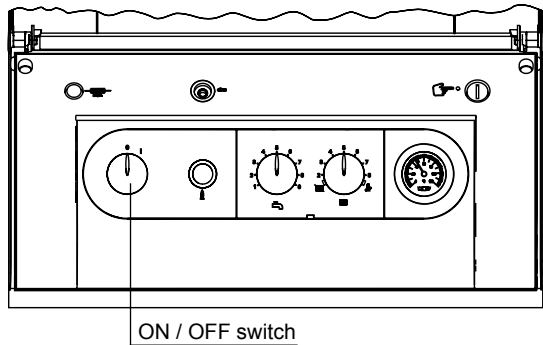
**eBUS accessories**

Remote control, radio clock module, radio clock module with outside temperature sensor, receiver for wireless outside temperature sensor and wireless analogue remote control.  
Join the on-site accessory cable to the green plug supplied (designated eBUS). Insert the plug into the marked-up location in the plug-in connector strip, and secure the lead with its strain relief. Route the lead through the boiler back cutout.

**Note:**

If several eBUS accessories are to be connected simultaneously, connect these in parallel at the eBUS terminal.

Switch ON the system ON / OFF switch at the control unit.



The heating system starts to operate with the factory settings as soon as the ON / OFF switch at the control unit is switched ON.

**Note:**

The factory settings of the control unit represent empirical values. Subject to system or equipment level, control parameters other than those chosen at the factory can be selected. Make changes via the Wolf control accessories or via a PC / laptop with Wolf control software. All factory settings are stored in a non-volatile memory.



During commissioning, the control unit automatically recognises any connected cylinder and / or outside temperature sensor.

The outside temperature sensor is logged off by disconnection and by switching the supply voltage OFF and ON again.

**NB**

You can log off the cylinder sensor by disconnecting and resetting (control unit).

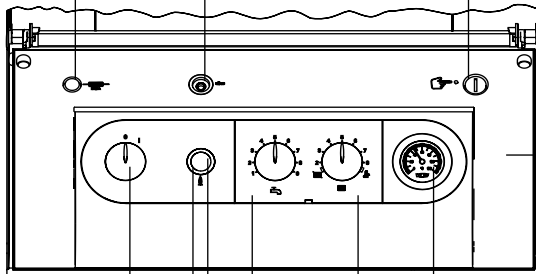
The boiler sensor cannot be logged off.

In conjunction with a cascade module, the first boiler must be set to BUS address 1.

Fine-wire fuse M 6.3A

eBUS connection  
for PC / Laptop

High limit safety cut-out  
Operation only by heating  
contractors



Control  
unit top

ON / OFF switch

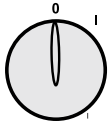
Thermometer

Illuminated signal ring

Heating water temperature selection

Reset button

DHW temperature selection



### ON / OFF switch

The boiler control unit is OFF in position 0. There is no frost protection.



### Illuminated signal ring as status indicator

Display	Explanation
Flashing green	Standby (power supply ON, no heat demand)
Constant green light	Heat demand: pump running, burner OFF
Flashing yellow	Emissions test mode
Constant yellow light	Burner ON, flame steady
Flashing red	Fault

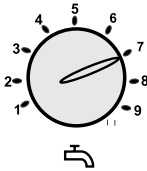




## Reset button

1. Resets all parameters to their factory settings.
  - The operating mode switch must be set to **O** (OFF).
  - Press and hold down the reset button whilst setting the operating mode switch to **I** (ON).
  - Keep holding down the reset button for at least 2 seconds after the system has started.
  
2. For resetting the oil combustion unit (only in conjunction with the relevant Wolf components).
  - In case of a burner fault the oil combustion unit is reset via a reset relay that is activated by pressing the reset key.

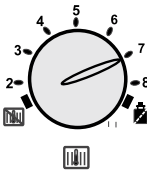
Note: Reset gas fired boilers in case of a burner fault directly at the gas combustion unit, i.e. through an opening in the silencer hood.



## DHW temperature selection (rotary selector)

When boilers are combined with a DHW cylinder, setting 1 – 9 corresponds to a cylinder temperature of 15 – 60 °C.

The adjustment made at the DHW temperature selector is ineffective when the system is used in conjunction with a digital room temperature controller or a weather-compensated controller. The temperature will then be selected at the controller (accessory).



## Heating water temperature selection (rotary selector)

The setting range 2 – 8 corresponds to a heating water temperature of 50 to 75 °C (factory setting).

The setting on the heating water thermostat becomes ineffective when the system is used in conjunction with a digital room thermostat or a weather-compensated controller. (Exception: Emissions test mode).

The heating water temperature is calculated from the controller setting.




## Winter mode (position 2 to 8)



In winter mode, the boiler heats to the temperature selected at the heating water temperature controller. According to the pump operating mode, the circulation pump operates constantly (factory setting) or only in parallel with the burner activation / run-on period.

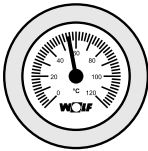


## Summer mode

The winter mode is disabled and summer mode is enabled by rotating the heating water temperature selector into position . Summer mode (heating OFF) means, only DHW heating. Frost protection for the heating system and pump anti-seizing protection, however, remain enabled.

**Emissions test mode**

The emissions test mode is enabled by rotating the heating water temperature selector to . Any previous burner cycle block will be cancelled. The signal ring flashes yellow. The heating system will operate at maximum output and tries to hold a mean constant boiler water temperature of 60 °C. Only the burner will operate, i.e. the pump is OFF, if the boiler water temperature is lower than 60 °C. The boiler circuit pump will be started when the boiler water temperature exceeds 60 °C. The DHW cylinder primary pump only runs until the set DHW temperature has been reached. The burner is switched OFF when the max. boiler water temperature has been reached, if the heating energy supplied cannot be transferred. The emissions test mode terminates either after 15 minutes or automatically, if the maximum flow temperature has been exceeded. For a repeat activation, turn the heating water temperature selector first anti-clockwise and then back into position .

**Thermometer**

to display the current heating water temperature

**Fine-wire fuse**

M 6.3A to protect the control PCB

**eBUS connection**

for data transfer between the control unit and a PC/laptop with the "Software set for boiler control units" (accessory)

**High limit safety cut-out STB**

factory-set to 120 °C; adjustable to 100 °C or 110 °C, if required.

**Anti-seizing pump protection** The anti-seizing pump protection is generally activated at 12:00 h (midday). For this purpose, the heating circuit pump will operate for approx. 10 seconds. Then, the cylinder primary pumps and the DHW circulation pump (if installed) will run for 20 seconds. This prevents components from seizing up. The burner will be switched OFF for approx. two minutes if it is operating when the anti-seizing pump protection is enabled.

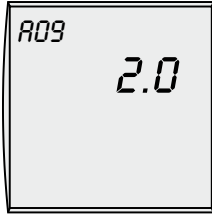
The control parameters can only be modified or displayed via Wolf control accessories with eBUS capability. For procedures, check the operating instructions of the relevant accessories.

**Parameter overview** (Settings and functions on the following pages)

Parameters		Setting range	Factory setting
<i>AD9</i>	Frost protection limit	-20 to +10°C	+2°C
<i>AD10</i>	Parallel DHW operation	0 / 1	0
<i>AD14</i>	Maximum DHW temperature	60 to 80°C	65°C
<i>HGD1</i>	Burner switching differential (dynamic)	5 to 30K	15K
<i>HGD6</i>	Pump operating mode	0 / 1 / 2	0
<i>HGD7</i>	Boiler circuit pump run-on time	0 to 30 min	3 min
<i>HGD8</i>	Maximum limit, boiler circuit TV-max.	40 to 90°C	75°C
<i>HGD9</i>	Burner cycle block	1 to 30 min	4 min
<i>HG13</i>	Programmable input E1	1 to 11	1
<i>HG14</i>	Programmable output A1	0 to 14	0
<i>HG15</i>	Cylinder hysteresis	1 to 30K	5K
<i>HG19</i>	Cylinder primary pump run-on time	0 to 10 min	3 min
<i>HG20</i>	Max. cylinder heating time	0 to 5h	2h
<i>HG21</i>	Minimum boiler water temperature TK-min.*	38 to 90°C	50°C
<i>HG22</i>	Maximum boiler water temperature TK-max.	50 to 90°C	80°C
<i>HG24</i>	DHW sensor operating mode	1 / 2 / 3	1
<i>HG25</i>	Excess boiler temp. during cylinder heating	0 to 40K	10K
<i>HG26</i>	Boiler soft start	0 / 1	1
<i>HG27</i>	Burner stages for DHW cylinder heating	1 / 2	2
<i>HG28</i>	Burner operating mode	1 to 4 1 = single stage 2 = two stage 3 = modulating 4 = no function	2
<i>HG29</i>	Modulation lockout	0 to 20 min	10 min
<i>HG30</i>	Dynamic modulation	5 to 50K	20K
<i>HG31</i>	Blocking time burner stage 2	0 to 40 min	1 min
<i>HG32</i>	Return temperature raising facility **	0 to 70°C	30°C
<i>HG33</i>	Hysteresis time	1 to 30 min	10 min
<i>HG34</i>	eBUS feed	0 / 1 / 2	2
<i>HG35</i>	0 – 5V input for telecontrol system	0 / 1	0
<i>HG36</i>	Modulation runtime	10 to 600s	60s
<i>HG50</i>	Test functions	1 to 8	-
<i>HG10</i>	Display Multi-function input E1	-50 sensor short circuit or contact closed -60 sensor lead break or contact open Actual temperature header sensor HG13 = 7 Actual temperature return sensor HG13 = 11	

\* may be set to 38°C for operation with pressure jet gas burners

\*\* set to 40°C for pressure jet gas burners

**Frost protection limit  
Parameter A09**

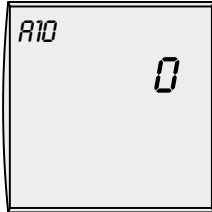
Factory setting: 2 °C  
Setting range: -20 to +10 °C

Individual settings: \_\_\_\_\_

The boiler circuit pump operates constantly if the outside temperature stays below the selected value. The burner starts and heats the boiler at least to TK-min., if the boiler water temperature falls below +5 °C.

**Note:**

Only change the factory setting if you can ensure that the heating system and its components will not freeze up at low outside temperatures.

**Parallel DHW operation  
Parameter A10**

Factory setting: 0  
Setting range: 0 / 1

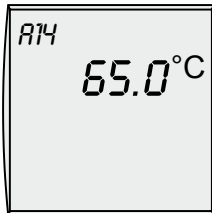
Individual settings: \_\_\_\_\_

The boiler circuit pump is switched OFF during DHW cylinder heating with **DHW priority (0)**. The boiler energy will then be used exclusively for heating the DHW cylinder. The cylinder primary pump will only start, if the boiler water temperature is 5 °C higher than the actual cylinder temperature. The burner shuts down and the heating circuit pump is started, as soon as the cylinder has reached its set temperature. The cylinder primary pump runs on for the time selected under parameter HG19 (cylinder primary pump run-on time).

The heating circuit pump continues to operate in **parallel DHW mode (1)**. The cylinder primary pump starts, if the boiler water temperature is 5 °C warmer than the cylinder temperature. The cylinder is fully heated up when the cylinder has reached the selected water temperature. The cylinder primary pump runs on for the maximum period selected under parameter HG19 (cylinder primary pump run-on time).

**Note**

In the parallel DHW mode (1), the heating circuit can temporarily be operated at a higher temperature.

**Maximum DHW  
temperature  
Parameter A14**

Factory setting: 65 °C  
Setting range: 60 to 80 °C

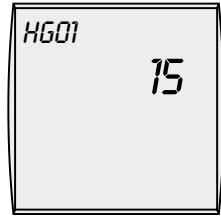
Individual settings: \_\_\_\_\_

This temperature can be enabled at 80 °C, if for commercial reasons a higher DHW temperature is required.

If pasteurisation has been activated (BM), the DHW cylinder will be heated to the selected maximum DHW temperature during the first cylinder heating of the day.

**NB**

Take adequate measures to prevent scalding. Parameter HG22 (maximum boiler water temperature) should be set at least 5K higher than the selected maximum DHW temperature.

**Burner switching differential (dynamic)****Parameter HG01**

Factory setting: 15 K  
Setting range: 5 to 30 K

Individual settings: \_\_\_\_\_

The burner switching differential regulates the burner temperature within a set range by switching the burner ON and OFF. The higher the ON / OFF temperature differential, the higher the boiler water temperature fluctuation around the set value, resulting in longer burner runtimes and vice versa. Longer burner runtimes protect the environment and extend the service life of wearing parts.

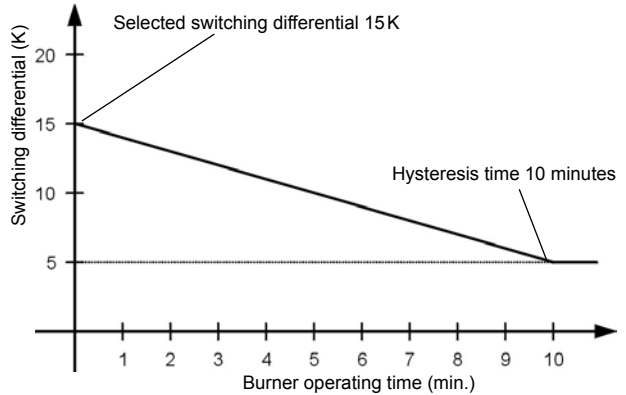
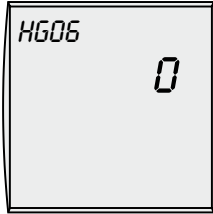


Fig.:

Time sequence of the dynamic burner switching differential for a user-defined burner switching differential of 15 K and a selected hysteresis time (parameter HG33) of 10 minutes.

## Pump operating mode Parameter HG06



Factory setting: 0  
Setting range: 0 / 1 / 2

Individual settings: \_\_\_\_\_

### Pump operating mode 0: Heating circuit pump for heating systems without cascade control and without low loss header

The heating circuit pump runs constantly when there is a heat demand. The heating circuit pump will be switched OFF during DHW heating, if DHW priority has been selected.

### Pump operating mode 1: Feed pump for heating systems with cascade control and / or low loss header

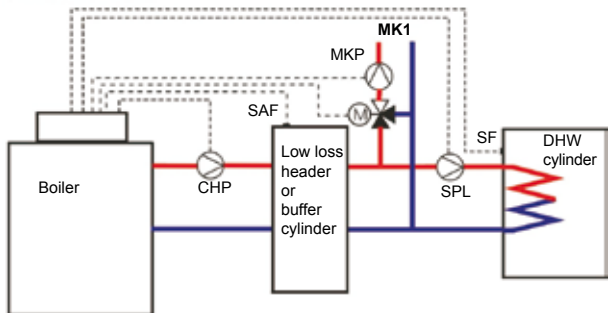
Heating circuit pump becomes the feed pump. The header sensor affects the heating operation as well as the cylinder heating. The feed pump runs only when there is a burner demand. Pump run-on in accordance with parameter HG07.

Soft starting: At  $TK_{ist} < TK_{min}$  (38 °C) feed pump "OFF".  
MKP and cylinder primary pump continue to run with soft starting.

Note: Pump run-on should be increased from 3 min to 15 min.  
Parameter HG13 must be set to 7.

Hydraulic scheme:

- ZUP = Feed pump
- SPL = Cylinder primary pump
- PLP = Buffer primary pump
- SF = Cylinder sensor
- SAF = Header sensor
- MK1 = Mixer circuit
- MKP = Mixer circuit pump



### Pump operating mode 2:

#### Buffer primary pump for BSP cylinder

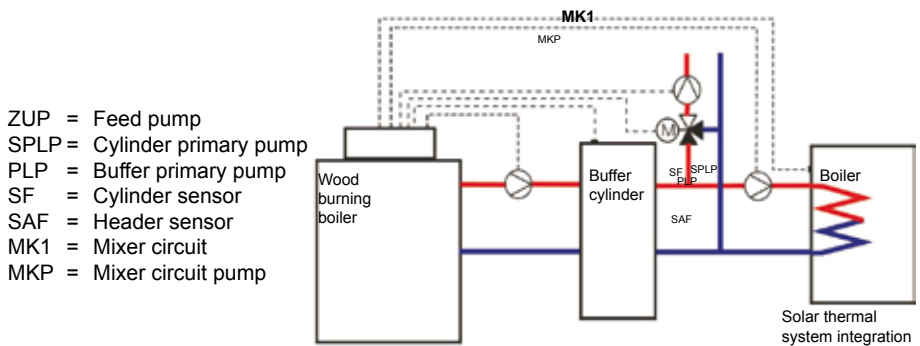
The header sensor (buffer) only affects the heating operation. In case of cylinder heating, the reference temperature is provided by the internal boiler sensor. In heating mode, the buffer primary pump runs only when there is a burner demand. Pump run-on in accordance with parameter HG07.

Soft starting: Soft starting: At  $TK_{ist} < TK_{min}$  (38 °C) buffer primary pump and cylinder primary pump "OFF".

Note: Pump run-on should be increased from 3 min to 15 min.

Parameter HG13 must be set to 7.

Hydraulic scheme:

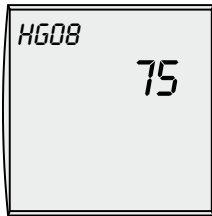


**Boiler circuit pump  
run-on time****Parameter HG07**

Factory setting: 3 min  
Setting range: 0 to 30 min

Individual settings: \_\_\_\_\_

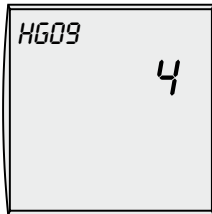
Subject to there being no heat demand from the heating circuits, the boiler circuit pump will run-on in accordance with the set time, to prevent a boiler safety shutdown at high temperatures.

**Maximum limit, boiler  
circuit TV-max.****Parameter HG08**

Factory setting: 75 °C  
Setting range: 30 to 90 °C

Individual settings: \_\_\_\_\_

This function limits the boiler water temperature upwards in heating mode, and the burner shuts down. This parameter has no function during cylinder heating, and the boiler water temperature may also be higher during this time. "Reheating effects" can result in the temperature being exceeded a little.

**Burner cycle block****Parameter HG09**

Factory setting: 4 min  
Setting range: 1 to 30 min

Individual settings: \_\_\_\_\_

Each time the burner is shut down in heating mode, it will be blocked for the duration of the burner cycle block.

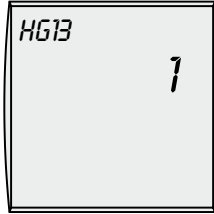
The burner cycle block is reset by switching the ON / OFF switch OFF and ON or by briefly pressing the reset button.

Exception: Emissions test mode, cascade mode and cylinder heating



### Programmable input E1

#### Parameter HG13



Factory setting: 1  
Setting range: 1 to 11

Individual settings: \_\_\_\_\_

The functions of input E1 can only be scanned and adjusted with Wolf control accessories with eBUS capability.

The following functions can be allocated to input E1:

No.	Explanation
1	<p>Room thermostat</p> <p>With open input E1, heating operation will be blocked (summer mode), independent of any digital Wolf control accessories.</p> <p>Exception: Remote controlled heating circuits</p>
2	<p>Maximum thermostat</p> <p>To enable the burner, input E1 must be closed. The burner will remain blocked for as long as the contact is open, even in emissions test mode, cascade mode and for DHW and central heating frost protection mode.</p>
3	N / A
4	N / A
5	<p>Flue gas damper / ventilation air damper</p> <p>Function monitoring of the flue gas damper/ventilation air damper with zero volt contact. Closed contact required for burner enabling in central heating, DHW, cascade and emissions test mode.</p> <p><b>Important: A1 (HG14 = 7) must be programmed for flue gas damper / ventilation air damper function.</b></p>
6	<p>DHW circulation pushbutton (on site)</p> <p>After activating this pushbutton, the DHW circulation pump is operated for 5 minutes, independent of the time program or the position of the program selector (BM).</p> <p><b>Important: In any case, output A1 must be programmed to setting 13.</b></p>

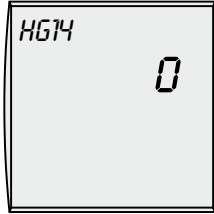
**NB**

Never use input E1 for the connection of safety equipment (e.g. second high limit safety cut-out, low water indicator, safety pressure limiter). For this connection, see the boiler installation instructions.

The following functions can be allocated to input E1:

No.	Explanation
7	<p>Header sensor (low loss header or buffer)</p> <p>The control of the boiler water temperature in heating mode and during cylinder heating depends on the configuration of parameter HG06.</p> <p>The boiler water temperature sensor continues to monitor the minimum and maximum boiler water temperatures.</p>
8	<p>Burner block</p> <p>The heating circuit and cylinder primary pumps operate in standard mode, but without soft start. The burner is enabled during emissions test mode and frost protection (switching output 1 if HG14 = 12, diverter valve has been programmed).</p>
9	N / A
10	<p>External burner demand, input E1 closed (e.g. air heater, swimming pool demand, second cylinder heating via thermostat)</p> <p>The set boiler water temperature is set to the maximum boiler water temperature minus 5K limited by the maximum flow temperature. Heating circuit and cylinder primary pump in standard mode.</p> <p><b>Important: In any case, output A1 must be programmed to setting 14.</b></p>
11	<p>Return sensor</p> <p>Only in conjunction with parameter HG32 (return temperature raising).</p> <p><b>Important: In any case, output A1 must be programmed to setting 12.</b></p>

**Programmable  
Output A1  
Parameter HG14**



Factory setting: 0  
Setting range: 0 to 14

Individual settings: \_\_\_\_\_

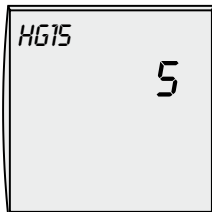
The following functions can be allocated to output A1:

No.	Explanation
0	No function Output A1 will not be switched.
1	DHW circulation pump 100% Output A1 is switched by control accessories (BM), if DHW circulation has been enabled. Output A1 is constantly enabled when no accessory controller is installed.
2	DHW circulation pump 50% The output A1 is switched by control accessories (BM) in cycles of 5 minutes ON and 5 minutes OFF, if DHW circulation has been enabled. Output A1 constantly cycled in 5 minute cycles when no accessory controller is installed.
3	DHW circulation pump 20% The output A1 is switched by control accessories (BM) in cycles of 2 minutes ON and 8 minutes OFF, if DHW circulation has been enabled. Output A1 is constantly cycled when no accessory controller is installed.
4	Alarm output Output A1 is switched after a fault and expiry of 4 minutes.
5	Flame detector Output A1 is switched after a flame has been recognised (voltage at input B4).
6	N / A
7	Flue gas damper / ventilation air damper Output A1 is closed before each burner start. Feedback is checked via input E1, (HG13 = 5). If input E1 does not close, the burner will not start, and after two minutes FC 8 will be generated. <b>Important: Input E1 must be programmed as flue gas damper/ventilation air damper.</b>
8	External venting Output A1 is switched inverse to the burner. Switching OFF external ventilation (e.g. extractor fan) during burner operation is only required, if the boiler is operated as an open flue system.
9	Supply valve Output A1 is switched with the burner demand.
10	N / A

The following functions can be allocated to output A1:

No.	Explanation
11	Feed pump Output A1 is switched at every heat demand (heating circuit or cylinder heating).
12	Output A1 is switched if the return temperature is lower than the selected return temperature raising value (parameter HG32). <b>Important: Input E1 must, in any case, be programmed to setting 11 or if an external burner block input E1 (HG13 = 8) has been programmed.</b>
13	DHW circulation pump Output A1 is switched for 5 minutes after a pushbutton has been activated (pulse input E1). <b>Important: In any case, input E1 must be programmed to setting 6.</b>
14	Output A1 ON Output A1 is switched if input E1 is closed (external burner demand). <b>Important: In any case, input E1 must be programmed to setting 10.</b>

### Cylinder hysteresis Parameter HG15



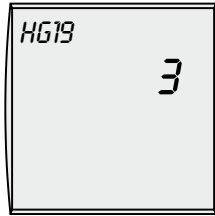
Factory setting: 5K  
Setting range: 1 to 30K

Individual settings: \_\_\_\_\_

The cylinder hysteresis regulates the start and stop points for cylinder heating. The higher the ON / OFF temperature differential, the higher the cylinder temperature fluctuation around the set cylinder temperature.

Example: Set cylinder temperature 60 °C  
Cylinder hysteresis 5K

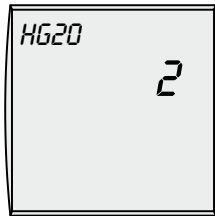
Cylinder heating commences at 55 °C and ends at 60 °C.

**Cylinder primary pump run-on time****Parameter HG19**

Factory setting: 3 min  
Setting range: 0 to 10 min

Individual settings: \_\_\_\_\_

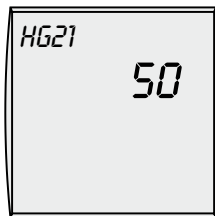
After completing the cylinder heating (the cylinder has reached the set temperature), the cylinder primary pump will run on up to the maximum set run-on time. The cylinder primary pump will switch OFF prematurely if, during the run-on time, the boiler water temperature has fallen to a differential between boiler and cylinder water temperature of 5K, to prevent the boiler cooling down too severely.

**Max. cylinder heating time****Parameter HG20**

Factory setting: 2h  
Setting range: 0 to 5h

Individual settings: \_\_\_\_\_

Cylinder heating commences as soon as the cylinder temperature sensor demands heat. The heating circuit pump would be constantly switched OFF, if the boiler was undersized, the cylinder was scaled-up, or if DHW was constantly drawn off during DHW priority mode. The accommodation cools down severely. An option enables a max. cylinder heating time to be specified to limit this effect. The control unit reverts to heating mode, when the set cylinder heating time has expired and cycles in the selected rhythm between heating and cylinder heating mode, irrespective of whether the cylinder has reached its set temperature or not. This function remains enabled even in parallel mode (parameter A10 set to 1). It is only disabled if it is set to 0. Set this parameter to 0 in heating systems with a high DHW consumption, e.g. hotels, sports facilities etc.

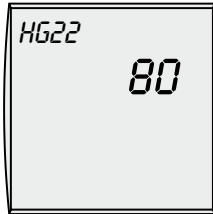
**Minimum boiler water temperature TK-min.****Parameter HG21**

Factory setting: 50 °C  
Setting range: 38 to 90 °C

Individual settings: \_\_\_\_\_

The control unit is equipped with an electronic boiler thermostat, with an adjustable minimum switch-ON temperature. The burner is switched ON subject to the cycle block if this temperature is not achieved when there is heat demand. The minimum boiler water temperature TK-min. is not necessarily achieved either, when there is no heat demand.

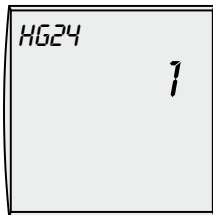
**Note:** This parameter may be set to 38 °C when using a pressure-jet oil burner.

**Maximum boiler water temperature TK-max.****Parameter HG22**

Factory setting: 80 °C  
 Setting range: 50 to 90 °C

Individual settings: \_\_\_\_\_

The control unit is equipped with an electronic boiler thermostat, with an adjustable maximum shutdown temperature (maximum boiler water temperature). The burner is switched OFF if this temperature is exceeded. The burner will be started again, when the boiler water temperature has fallen by as much as the burner switching differential. The boiler circuit pump will also be started in "summer mode", if the boiler water temperature falls below 95 °C (possible reheat effect). This prevents an overheating of the boiler.

**DHW sensor operating mode****Parameter HG24**

Factory setting: 1  
 Setting range: 1 to 3

Individual settings: \_\_\_\_\_

Using the DHW sensor operating mode, three separate modes can be applied to the DHW sensor input.

**Operating mode 1** is the factory setting for the cylinder heating mode with electronic cylinder temperature sensors (accessories).

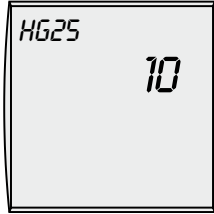
**Operating mode 2** is designed for electronically controlled cylinder heating with cylinder temperature sensor and an additional external thermostat demand. In this case, the external thermostat (zero volt) will be wired on site parallel to the electronic cylinder temperature sensor. Cylinder heating will be implemented as standard for as long as the external thermostat demands no heat (contact open). The boiler circuit and cylinder primary pump are activated when the external thermostat demands heat (contact closed). The burner heats the boiler with maximum output to TK-max. Contactor control provided on site must ensure that an external pump transfers the heat to the external consumer (e.g. air heater, swimming pool). Even in standby mode, the thermostat demand has priority over all other heat demands.

**Operating mode 3** is designed to switch the cylinder primary pump with an external thermostat or electronic cylinder temperature sensors, but without soft start. The cylinder primary pump also operates if the actual boiler temperature is lower than the DHW temperature. The external thermostat is connected with zero volt at the cylinder sensor terminal (SF). This enables the DHW cylinder primary pump output to be used to control the DHW cylinder or for other purposes. The switching time program for cylinder heating (programming module) remains enabled even if it only operates as a thermostat. The burner heats the boiler to the set cylinder temperature + excess boiler temperature during cylinder heating.

Sensor input closed: Pump ON  
 Sensor input open: Pump OFF

**Note:**

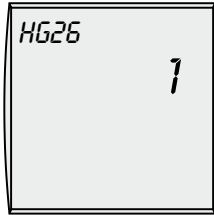
After changing the sensor operating mode, switch the system first OFF and then ON again.

**Boiler overtemperature during DHW cylinder heating**  
**Parameter HG25**

Factory setting: 10K  
Setting range: 0 to 40K

Individual settings: \_\_\_\_\_

The excess temperature differential between the cylinder temperature and the boiler water temperature during cylinder heating is selected with parameter HG25. The boiler water temperature continues to be limited by the maximum boiler water temperature (parameter HG22). This ensures that, even in spring and autumn, the boiler water temperature is higher than the cylinder temperature, thereby ensuring short heating times. The heating circuit pump starts automatically for a limited time, to prevent the high limit safety cut-out being triggered, if the boiler water temperature exceeds 95 °C in summer mode, whilst the cylinder is being heated.

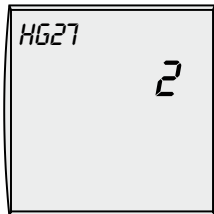
**Boiler soft start**  
**Parameter HG26**

Factory setting: 1  
Setting range: 0 / 1

Individual settings: \_\_\_\_\_

The optional boiler soft start protects the boiler against corrosion that can occur when the boiler is heated from a cold state, i.e. through condensate separation in the dew point range. The boiler circuit pump will be switched OFF, if the boiler water temperature falls 2K below the set value TK-min. The pump will be enabled when the boiler water temperature has exceeded the minimum limit TK-min.

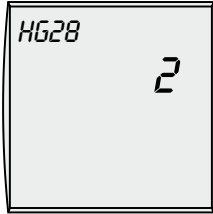
TK-min. cannot be achieved and the heating circuit and cylinder primary pumps remain OFF, if the burner is blocked by an "external safety circuit" (e.g. flue gas thermostat on solid fuel boilers).

**Burner stages for DHW cylinder heating**  
**Parameter HG27**

Factory setting: 2  
Setting range: 1 to 2

Individual settings: \_\_\_\_\_

This parameter enables you to select whether, with a two stage burner, the system should be operated only with the first burner stage or with both burner stages whilst heating the DHW cylinder.

**Burner operating mode  
Parameter HG28**

Factory setting: 2  
Setting range: 1 to 4

**Individual settings:** \_\_\_\_\_

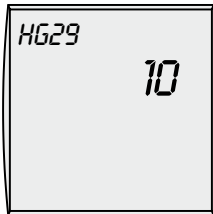
You can select any boiler operating mode. Control units are set in the factory for two-stage burner operation.

Setting 1: Single stage operation

Setting 2: Two-stage burner operation

Setting 3: Modulating burner operation

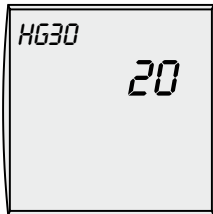
Setting 4: No function

**Modulation lockout  
Parameter HG29**

Factory setting: 10 min.  
Setting range: 0 to 20 min.

**Individual settings:** \_\_\_\_\_

If the burner starts after a period out of use, it will generally start with a minimum output set by the burner manufacturer. A period can be defined by entering the modulating lockout time, during which no modulation takes place even if a demand arises.

**Dynamic modulation  
Parameter HG30**

Factory setting: 20K  
Setting range: 5 to 50K

**Individual settings:** \_\_\_\_\_

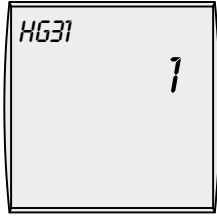
The proportional range determines the temperature window for the respective set value control variable (flow temperature), within which the system applies modulating burner control. Outside this range, the actuator is either permanently open or closed, subject to the direction of the deviation. Adjust the proportional range so that a stable burner regulation is ensured. For short hysteresis times (e.g. 2 min), select a wide temperature window (e.g. 40K). Select a narrower temperature window (e.g. 10K) for longer hysteresis times (e.g. >10 min).

The factory setting is a value drawn from experience and should not be altered without checking the actual burner operating time.

**Note:** Ranges set too tightly lead to frequent burner cycling; ranges set too wide lead to greater flow temperature fluctuations.



## Blocking time burner stage 2 Parameter HG31



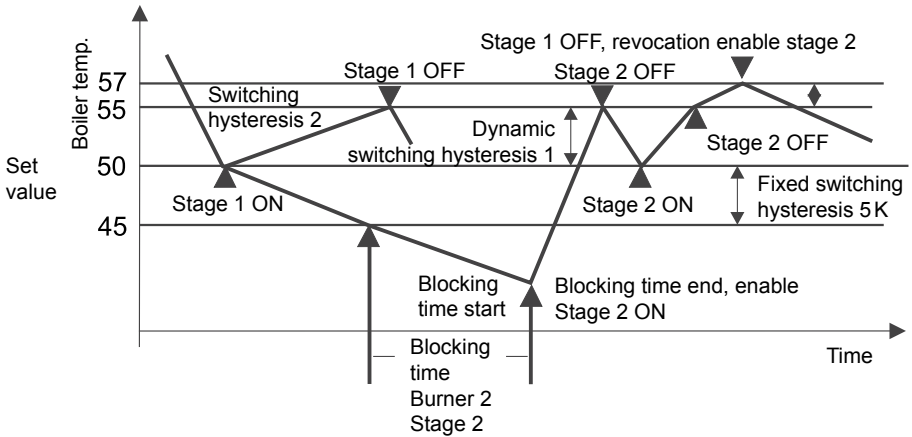
Factory setting: 1 min.  
Setting range: 0 to 40 min.

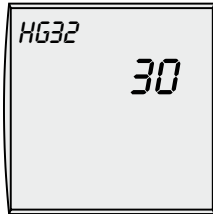
Individual settings: \_\_\_\_\_

Burner stage 2 is started as soon as it is enabled. It will be switched OFF when the temperature has been reached (set temperature + dynamic hysteresis 1). Once the second stage has been enabled, it will be started as soon as the actual temperature has either fallen below or reached the set temperature. Enabling is removed when burner stage 1 is shut down.

$$\text{Dynam. hysteresis burner stage 2} = \frac{\text{Dynam. hysteresis burner stage 1}}{2}$$

## Blocking time burner stage 2 Diagram



**Raising the return temperature****Parameter HG32**

Factory setting: 30  
Setting range: 0 to 70 °C

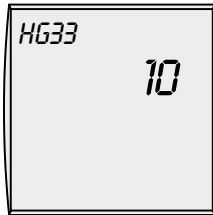
Individual settings: \_\_\_\_\_

Ensure the return temperature is raised in heating systems with a water content greater than 20 l / kW output.

For boilers with a pressure-jet oil burner or atmospheric gas burner, the minimum return temperature is 30 °C, for boilers with pressure-jet gas burner 40 °C.

When the boiler return temperature falls below the set return temperature raising threshold, the flow volume is mixed by starting the bypass pump.

**Note:** Set parameter HG13 to 11 and parameter HG14 to 12.

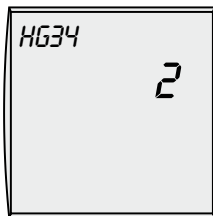
**Hysteresis time****Parameter HG33**

Factory setting: 10 min.  
Setting range: 1 to 30 min.

Individual settings: \_\_\_\_\_

The control unit is equipped with a dynamic burner switching differential to optimise the selected burner switching differential at various boiler loads. This function corrects the selected burner switching differential (parameter HG01) through load-dependent burner runtimes. The burner switching differential is reduced to a minimum value of 5 K, if the burner operating time increases up to the selected hysteresis time. This makes the selected burner switching differential effective at low boiler loads (rapid heat-up = short burner runtime). This effectively prevents short burner runtimes and cycling. With longer burner runtimes (high heat demand), the switching differential will be reduced to 5K. This prevents the boiler being heated to unnecessarily high temperatures and optimises the energy consumption of the heating system.

This function prevents short burner runtimes and frequent cycling. This protects the environment and minimises wear.

**eBUS feed****Parameter HG34**

Factory setting: 2  
Setting range: 0 / 1 / 2

Individual settings: \_\_\_\_\_

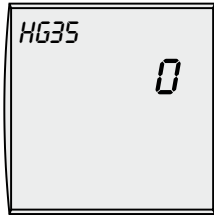
Parameter HG34 enables the selection of three types of eBUS feed.

The settings have the following meaning:

- 0 → eBUS feed switched OFF
- 1 → eBUS feed switched ON
- 2 → automatic eBUS feed

### 0 - 5V input for telecontrol system

#### Parameter HG35



Factory setting: 0  
Setting range: 0 / 1

Individual settings: \_\_\_\_\_

#### Note:

Prior to connecting the telecontrol system, set parameter HG35 to 1 and also set system parameter A06 (set an external sensor) to 0. Switch OFF the mains power, connect the telecontrol system to plug "AF". Switch the mains power ON again. Otherwise an outside temperature sensor could already be detected at low voltage → FC15.

Parameter HG35 enables a switching of the 0 - 5V input for a telecontrol system.

The settings have the following meaning:

#### 0 → External sensor connection

During commissioning the control unit checks whether and where an outside temperature sensor is connected.

#### 1 → 0 - 5V input (no outside temperature sensor connected)

The voltage signal at the 0 - 5V input is used as command variable for defaulting the set header - boiler water temperature.

(Independent of the setting of the program selector on the BM).

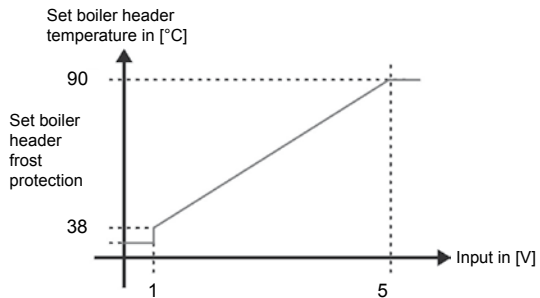
Limiting the set flow temperature by  $TV_{max}$  or  $TK_{max}$ .

The boiler circuit pump becomes the feed pump.

Pump ON with burner demand.

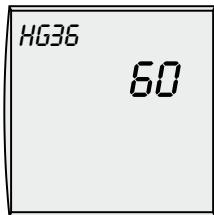
Pump run-on in accordance with parameter HG07.

Depending on the transfer function (see diagram), the set temperature is calculated subject to the input voltage.



### Runtime modulation (only required in conjunction with KM cascade module)

#### Parameter HG36



Factory setting: 60  
Setting range: 10s to 600s

Individual settings: \_\_\_\_\_

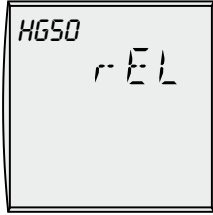
This parameter switches the servomotor (modulating burner) in accordance with the modulation level.

Modulation level = 50% →  
Servomotor regulated for 30 s

Increase of the modulation level from 50% to 60% →  
Servomotor regulated for 6 s

Please note:

The servomotor runtime from minimum output to maximum output must be determined and set accordingly at parameter HG36.

**TEST functions**

These test functions enable you to check the following control unit outputs.

rEL1	Heating circuit pump	ON
rEL2	Cylinder primary pump	ON
rEL3	Output A1	ON
rEL4	Reset relay	ON
rEL5	Burner T1 / T2	ON
rEL6	No function	
rEL7	Burner stage 1 T6 / T7	ON
rEL8	Burner stage 2 T6 / T8	ON

**STB test**

The maximum boiler water temperature limit TK-max. is disabled by holding down the reset button when the control unit is switched ON. The boiler heats to the selected temperature of the high limit safety cut-out and locks out. This enables you to check the correct function of the high limit safety cut-out.

**Reset**

Exception:  
Parameter HG08 and  
Parameter HG22 are not  
reset.

Observe the following steps to implement a reset:

- The operating mode switch must be set to **O** (OFF).
- Press and hold down the reset button whilst setting the operating mode switch to **I** (ON).
- Keep holding down the reset button for at least 2 seconds after the system has started.

All parameters (individual settings) are returned to their factory settings by a reset (only control units without BM).

**Cascade operation**

In conjunction with the KM cascade controller, between 1 and 4 R21 control units can be linked up.

Communication is realised via the two-wire BUS. Each boiler has an eBUS address assigned. The KM provides each boiler with the modulation level (0...100%) and an enable command, upon which every boiler should operate.

The R21 starts as soon as the KM issues a modulation level greater than 0. Cylinder heating continues in the R21. The emissions test operation can only be enabled via the heating potentiometer at the R21.

Example:

Stage 1 start Modulation level > 0%  
Stage 2 start Modulation level > 50%

Stage 1 stop Modulation level = 0%  
Stage 2 stop Modulation level = 50%

After the burner has been shut down there will be **no more** cycling block.

In cascade mode (modulation level >0) the boiler circuit pump automatically becomes the feed pump.

If modulation level > 0 then pump will be ON.

**Setting the eBUS address  
at the Wolf boilers**

When operating several boilers (number of boilers >1) in conjunction with a cascade module, set the eBUS address of each boiler in accordance with the table below.

Boiler	BUS address	Rotary selector position DHW	Illuminated ring indication
without KM	0	6	flashing green (factory setting)
1	1*	1	flashing red
2	2	2	flashing yellow
3	3	3	flashing yellow/red
4	4	4	flashing yellow/green

\* In conjunction with a cascade module, the first boiler must be set to BUS address 1.

**BUS address setting**

Reset button

Temperature selection DHW

Hold down the reset button; after 5 seconds, the corresponding flashing code will be displayed (see table). Select the corresponding address with the DHW temperature rotary selector. Then release the reset button again.

The assignment of gas fired boilers or BUS addresses (1), (2), (3) and (4) must be made on-site. Allocate each BUS address only once.

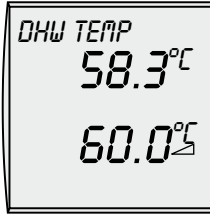
**Note:** If only one BUS subscriber (boiler or KM) is isolated from the power supply, then stop and start all subscribers via a system switch.

The operating mode can only be displayed at the BM programming module. For procedures, check the operating instructions of the programming module BM.

**Operating mode** (display on the BM programming module)

Status HG	Explanation	Notes
0	Standby	
1	Emissions test mode	max.15 min.
3	Heat demand (heating mode)	
5	Heat demand with cycle block	
6	Cycle block	see HG09
7	Frost protection - central heating	see A 09
8	Soft start	see HG26
15	Cylinder operation	for boilers
16	Frost protection	< + 5K
17	Pump run-on, cylinder	see HG19
20	Parallel DHW mode	see A 10
21	Max. cylinder heating time exceeded	see HG20, MI 09
22	Sensor operating mode 2, contact closed	see HG24
23	Sensor operating mode 3, contact closed	see HG24

**Info key displays**  
(display on the BM  
programming module)  
Example:

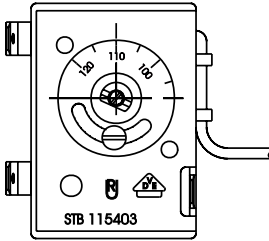


Display	Description
* <i>DHW TEMP</i>	Actual heating water temperature (°C) Set heating water temperature (°C)
* <i>SOLAR DHW 1</i>	Actual DHW temperature in solar cylinder 1 (°C)
* <i>DHW SOL 24H</i>	Maximum temperature, solar cylinder sensor 1 (°C) Minimum temperature, solar cylinder sensor 1 (°C)
* <i>COLLECTOR 1</i>	Collector temperature collector array 1, solar thermal system (°C)
* <i>COLLECT 24H</i>	Max. temp. collector array 1, solar thermal system (°C) Min. temp. collector array 1, solar thermal system (°C)
* <i>RETURN</i>	Return temperature, solar thermal system (°C)
* <i>FLOW RATE</i>	Flow rate, solar circuit (l/min)
* <i>SOLAR DHW 2</i>	Actual DHW temperature in solar cylinder 2 (°C)
* <i>DHW SOL 24H</i>	Maximum temperature, solar cylinder sensor 2 (°C) Minimum temperature, solar cylinder sensor 2 (°C)
* <i>COLLECTOR 2</i>	Collector temperature collector array 2, solar thermal system (°C)
* <i>COLLECT 24H</i>	Max. temp. collector array 2, solar thermal system (°C) Min. temp. collector array 2, solar thermal system (°C)
* <i>OPERATION H 1</i>	Hours run, solar circuit pump 1 (h) **
* <i>OPERATION H 2</i>	Hours run, solar circuit pump 2 (h) **
* <i>SOL. OUTPUT</i>	Current output, solar thermal system (kW)
* <i>OUTPUT 24H</i>	Current (day) yield, solar thermal system (kWh) **
* <i>OUTPUT KWH</i>	Total yield, solar thermal system (kWh) **
* <i>OUTPUT MWH</i>	Total yield, solar thermal system (MWh) **
* <i>SOL STATUS 1</i>	DHW heating, solar cylinder 1 Pasteurisation, solar cylinder 1 (0 = not successful / 1 = successful)
* <i>SOL STATUS 2</i>	DHW heating, solar cylinder 2 Pasteurisation, solar cylinder 2 (0 = not successful / 1 = successful)
<i>OUT TEMP</i>	Outside temperature (°C)
<i>ES AVERAGE</i>	Adjusted outside temperature (°C)
<i>ES MAX MIN</i>	Maximum outside temperature (°C; 0 to 24h) Minimum outside temperature (°C; 0 to 24h)
<i>ROOM TEMP</i>	Actual room temperature (°C) Set room temperature (°C)
* <i>ROOM TEMP 1</i> (room temp 2-7)	Actual room temperature, mixer circuit 1 (2-7) (°C) Set room temperature, mixer circuit 1 (2-7) (°C)
<i>MODE HC</i>	Operating mode - heating circuit (sun, moon, standby)
* <i>HEADER TEMP</i>	Actual header temperature (°C) Set header temperature (°C)
<i>BOILER TEMP</i>	Actual boiler temperature (°C) Set boiler temperature (°C)
* <i>MIXER 1</i> (mixer 2-7)	Actual mixer temperature 1 (2-7) (°C) Set mixer temperature 1 (2-7) (°C) Operating mode, mixer circuit (sun, moon, standby)
<i>RETURN</i>	Actual return temperature (°C)
<i>STATUS HG</i>	Boiler status
<i>BURNER RUN H</i>	Burner hours run
<i>BURNER START</i>	No of burner starts

\* No values are displayed for modules that are not connected (mixer module MM, cascade module KM, solar module SM).

\*\* This value can be reset to 0 by holding down the rotary selector for at least 10 seconds.

### Adjustment of the high limit safety cut-out (STB)



The high limit safety cut-out is factory-set to 120 °C. If required, the high limit safety cut-out can be changed to 100 °C or 110 °C.

Disconnect the control unit from its power supply.

Undo two screws from the control unit top and pivot the top forward.

Undo the clamping screw. Adjust the setting disc to 100 °C or 110 °C in accordance with the scale and retighten the clamping screw.

Re-assemble in reverse order.

**NB** The maximum boiler water temperature (TK-max.) must not be set to 90 °C, if the high limit safety cut-out has been adjusted to 100 °C.





Wolf recommends you complete the settings report carefully and keep it safe to enable a quick solution to be found during service and in case of a full reset.

Parameters		Setting range	Factory setting	Individual settings
R09	Frost protection limit	-20 to +10 °C	+2 °C	
R10	Parallel DHW operation	0 / 1	0	
R14	Maximum DHW temperature	60 to 80 °C	65 °C	
HG01	Burner switching differential (dynamic)	5 to 30K	15K	
HG06	Pump operating mode	0 / 1 / 2	0	
HG07	Boiler circuit pump run-on time	0 to 30 min	3 min	
HG08	Maximum limit, boiler circuit TV-max.	40 to 90 °C	75 °C	
HG09	Burner cycle block	1 to 30 min	4 min	
HG13	Programmable input E1	1 to 11	1	
HG14	Programmable output A1	0 to 14	0	
HG15	Cylinder hysteresis	1 to 30K	5K	
HG19	Cylinder primary pump run-on time	0 to 10 min	3 min	
HG20	Max. cylinder heating time	0 to 5h	2h	
HG21	Minimum boiler water temp. TK-min.*	38 to 90 °C	50 °C	
HG22	Maximum boiler water temp. TK-max.	50 to 90 °C	80 °C	
HG24	DHW sensor operating mode	1 / 2 / 3	1	
HG25	Boiler overtemperature during DHW cylinder heating	0 to 40K	10K	
HG26	Boiler soft start	0 / 1	1	
HG27	Burner stages for DHW cylinder heating	1 / 2	2	
HG28	Burner operating mode	1 to 4 1 = single stage 2 = two stage 3 = modulating 4 = no function	2	
HG29	Modulation lockout	0 to 20 min	10 min	
HG30	Dynamic modulation	5 to 50K	20K	
HG31	Blocking time burner stage 2	0 to 40 min	1 min	
HG32	Return temperature raising facility **	0 to 70 °C	30 °C	
HG33	Hysteresis time	1 to 30 min	10 min	
HG34	eBUS feed	0 / 1 / 2	2	
HG35	0 – 5V feed for telecontrol system	0 / 1	0	
HG36	Modulation runtime	10 to 600s	60s	
HG50	Test functions	1 to 8	-	
HG70	Display Multi-function input E1	-50 sensor short circuit or contact closed -60 sensor lead break or contact open Actual temperature header sensor HG13 = 7 Actual temperature return sensor HG13 = 11		

\* may be set to 38 °C for operation with pressure jet gas burners

\*\* set to 40 °C for pressure jet gas burners

**NTC  
Sensor resistances**Boiler sensor, cylinder sensor, outside temperature sensor,  
return sensor, header sensor

Temp. °C	Resist. Ω	Temp. °C	Resist. Ω	Temp. °C	Resist. Ω	Temp. °C	Resist. Ω
-21	51393	14	8233	49	1870	84	552
-20	48487	15	7857	50	1800	85	535
-19	45762	16	7501	51	1733	86	519
-18	43207	17	7162	52	1669	87	503
-17	40810	18	6841	53	1608	88	487
-16	38560	19	6536	54	1549	89	472
-15	36447	20	6247	55	1493	90	458
-14	34463	21	5972	56	1438	91	444
-13	32599	22	5710	57	1387	92	431
-12	30846	23	5461	58	1337	93	418
-11	29198	24	5225	59	1289	94	406
-10	27648	25	5000	60	1244	95	393
-9	26189	26	4786	61	1200	96	382
-8	24816	27	4582	62	1158	97	371
-7	23523	28	4388	63	1117	98	360
-6	22305	29	4204	64	1078	99	349
-5	21157	30	4028	65	1041	100	339
-4	20075	31	3860	66	1005	101	330
-3	19054	32	3701	67	971	102	320
-2	18091	33	3549	68	938	103	311
-1	17183	34	3403	69	906	104	302
0	16325	35	3265	70	876	105	294
1	15515	36	3133	71	846	106	285
2	14750	37	3007	72	818	107	277
3	14027	38	2887	73	791	108	270
4	13344	39	2772	74	765	109	262
5	12697	40	2662	75	740	110	255
6	12086	41	2558	76	716	111	248
7	11508	42	2458	77	693	112	241
8	10961	43	2362	78	670	113	235
9	10442	44	2271	79	670	114	228
10	9952	45	2183	80	628	115	222
11	9487	46	2100	81	608	116	216
12	9046	47	2020	82	589	117	211
13	8629	48	1944	83	570	118	205

**Specification**

Supply voltage:	230 V $\pm$ 10%
Rated frequency:	50-60 Hz
Appliance fuse:	max. 6.3A / medium slow
Power consumption:	5 VA (control unit and accessories, excl. burner and pumps, standby)
Breaking capacity, pumps and burner stages:	each 230 V / 4(2)A acc. to EN 60730, part 1
Permiss. ambient temp:	0...50 °C
Storage temperature:	-20 to +60 °C
Data memory:	EEPROM (non-volatile)

If a fault is indicated by the signal ring of the control unit flashing red, a fault code is displayed via the Wolf-control accessory with eBUS capability that allows cause and effect to be allocated using the following table.

No.	Fault	Cause	Effect / Remedy
1	TB excess temperature	The external temperature limiter has shut down the system	Burner OFF, HC pumps ON Request a service
4	Burner fault	No flame established during the burner start	Burner OFF, HC pumps ON Press reset at the automatic combustion controller or on the control unit; no success after repeated attempts, request a service
6	DHW Excess temperature	The boiler water temperature has exceeded the DHW limit (e.g. 95 °C)	Burner OFF, HC pumps ON Request a service
8	Flue gas damper / ventilation air damper does not move	Flue gas damper / ventilation air damper or its feedback faulty	Burner OFF, pump ON
12	Boiler sensor faulty	The boiler water temperature sensor or sensor lead is faulty	Burner OFF, HC pumps ON; request a service
14	Cylinder sensor faulty	The DHW temperature sensor or sensor lead is faulty	For heating mode: no effect; cylinder primary pump and heating circuit pump cycle alternately 1 hour ON, 1 hour OFF; request a service
15	Outside temperature sensor faulty	The outside temperature sensor is faulty (short circuit or lead break)	Effect as for outside temperature below frost protection limit; request a service
40	Fault maximum thermostat, system pressure switch	The system pressure switch or the maximum thermostat has responded	Burner OFF, pump OFF
52	Max. cylinder heating time exceeded	Cylinder heating takes longer than permitted	Alternating cylinder heating and central heating mode
79	Multi-function sensor fault (header sensor)	The header sensor is faulty (short circuit or lead break)	Regulate to the set boiler water temp.; no effect on the boiler operation; request a service
79	Multi-function sensor fault (return sensor)	The return temperature sensor is faulty (short circuit or lead break)	No effect on the boiler operation; bypass pump continues to run; request a service
81	EEPROM fault	Internal appliance fault	Request a service
91	Fault eBUS parameter	One BUS address was allocated more than once	Request a service
98	Fault, resistor plug R21	The resistor plug is faulty or was removed	Burner OFF, pumps ON (master reset → control unit R1)

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