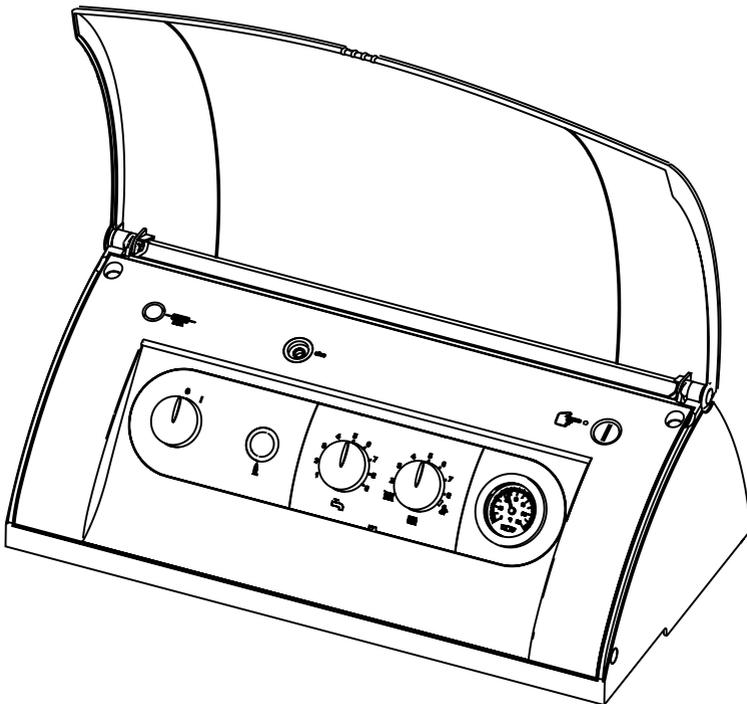


Installation and operating instructions

Control unit R1



Safety instructions	3
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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 injury and material losses.



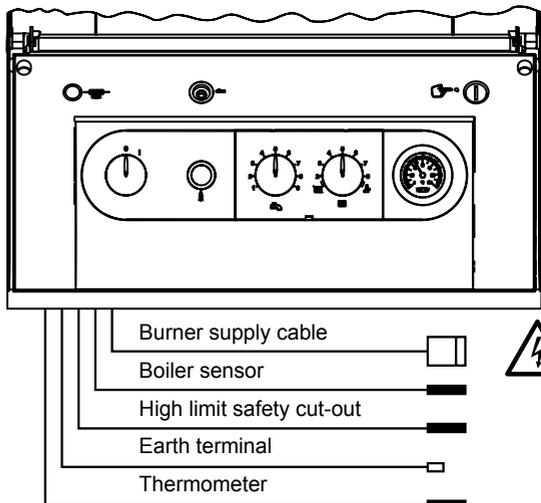
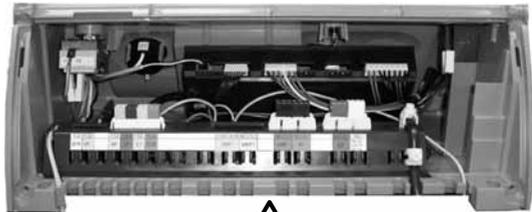
Danger through 'live' electrical components.
NB Switch OFF the ON / OFF switch before removing the casing.

Never touch electrical components or contacts when the ON / OFF switch is in the ON position. This brings a risk of electrocution, which may result in 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 which you must observe to prevent material losses and boiler malfunctions.



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

EC Directives

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

DIN / EN Standards

EN 60335-1, EN 60730-2-9, EN 14597,
DIN 3440, EN 50165, EN 55014-1**Regarding the installation, observe the following regulations, rules and directives.**

- The installation and commissioning of the heating system
- Local EMC regulations
- DIN VDE 0100 Regulations regarding the installation of high voltage systems up to 1000 V
- DIN VDE 105 Operation of electrical systems
- EN50156 Electrical equipment in combustion systems
- EN 12828 Heating systems in buildings

Appropriate use

The Wolf R1 control unit is designed exclusively for use in conjunction with Wolf boilers. The R1 control unit is equipped with a temperature controller/limiter and a high limit safety cut-out. The control unit regulates single stage burners. The set boiler temperature can be selected between 38 - 90 °C. The R1 control unit can be extended with a BM programming unit for weather-compensated temperature control with time program.

Other applicable documents

Boiler installation and operating instructions.
Instructions for 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 which 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).

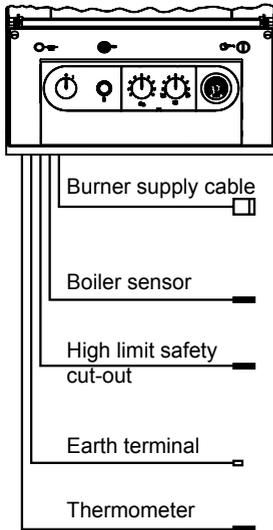
Maintenance / Repair

- 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.), subject to the side to which 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.

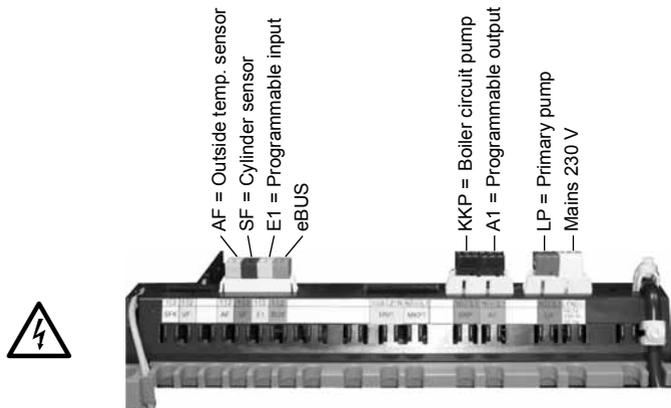
Earth terminal

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.

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 cable with its strain relief. Route the cable through the boiler back cutout.

Pump connection

Wolf boiler circuit and DHW cylinder primary pumps are factory-fitted with plugs. Route the cable 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 cable with its strain relief. Route the cable 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.

**DHW 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 with the plug supplied. Insert the plug into the marked-up location in the plug-in connector strip, and secure the cable with its strain relief. Route the cable through the boiler back cutout.

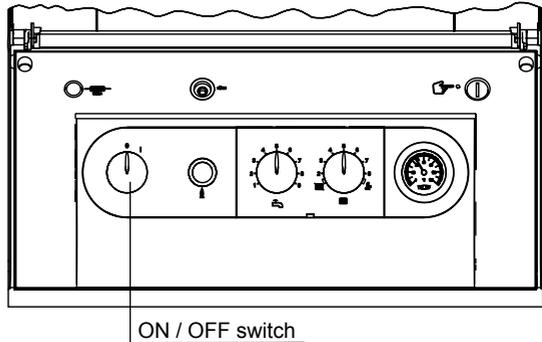
eBUS accessories

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

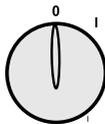
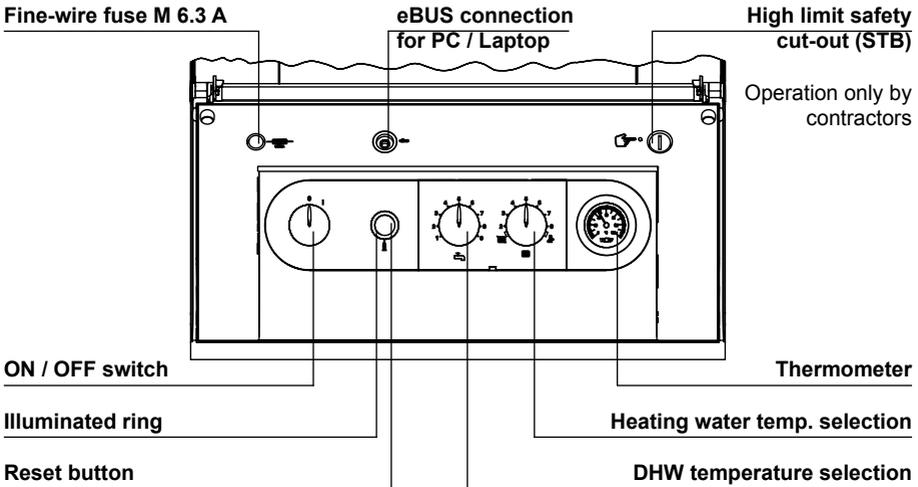


The system will not be protected against frost if no outside temperature sensor is connected; only the boiler is frost protected.

You can log off the cylinder sensor by disconnecting and resetting.

NB

The boiler sensor cannot be logged off.



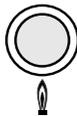
ON / OFF switch

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



Illuminated signal ring as status indicator

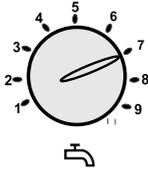
Display	Explanation
Flashing green	Standby (power supply ON, no heat demand)
Constant green light	Heat demand: pump running, burner OFF
Flashing yellow	Emissions test mode
Constant yellow light	Burner ON, flame steady
Flashing red	Fault



Reset button

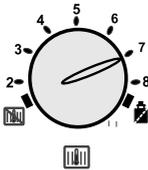
- Resets all parameters to their factory settings.
 - The operating mode switch must be set to **0** (OFF).
 - Press and hold down the reset button whilst setting the operating mode switch to **I** (ON).
 - Keep holding down the reset button for at least 2 seconds after the system has started.
- For 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 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 38 to 75 °C (factory setting).

The adjustment at the heating water temperature controller is ineffective when the system is used in conjunction with a digital room temperature controller 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 not operate in weather-compensated mode, when the emission test has been enabled. Instead it operates 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 6.3 A to protect the control PCB.

**eBUS connection**

for data transfer between the control unit and the PC / laptop with the software set for boiler control units (accessory).

**High limit safety cut-out STB**

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

Anti-seizing pump protection

In summer mode, the circulation pump operates for approx. 10 seconds after a maximum idle period of 24 hours. Then, the cylinder primary pump and the DHW circulation pump (if installed) will run for 20 seconds. This prevents the pump 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.

NB Modifications must only be carried out by a recognised heating contractor or by the Wolf customer service.

NB Incorrect operation can lead to system faults. Please note when adjusting parameter A09 (frost protection / outside temperature), that frost protection is no longer safeguarded if you set temperatures lower than 0 °C. This can result in damage to the heating system and all its components (e.g. pipes, radiators, etc.).

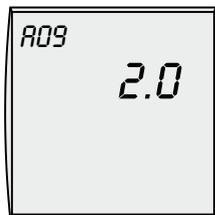
Parameter overview

(Settings and functions on the following pages)

Parameter		Setting range	Factory setting
A09	Frost protection level	-20 to +10 °C	+2 °C
A10	Parallel DHW operation	0 / 1	0
A14	Maximum DHW temperature	60 to 80 °C	65 °C
HG01	Burner switching differential (dynamic)	5 to 30 K	15 K
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 30 K	5 K
HG19	Cylinder primary pump run-on time	0 to 10 min	3 min
HG20	Max. cylinder heating time	0 to 5 h	2 h
HG21	Minimum boiler water temperature TK-min. *	38 to 90 °C	38 °C
HG22	Maximum boiler water temperature TK-max.	50 to 90 °C	80 °C
HG24	DHW sensor operating mode	1 / 2 / 3	1
HG25	Boiler excess temperature during DHW cylinder heating	0 to 40 K	10 K
HG26	Boiler soft start	0 / 1	1
HG32	Return temperature raising **	0 to 70 °C	30 °C
HG33	Hysteresis time	1 to 30 min	10 min
HG34	eBUS feed	0 / 1 / 2	2
HG35	0 - 5 V input for telecontrol system	0 / 1	0
HG50	Test functions	1 to 5	-
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	

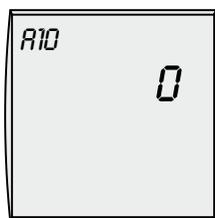
* set to 50 °C for pressure jet gas burners

** 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 setting: _____

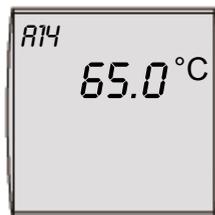
**Parallel DHW operation
Parameter A10**

Factory setting: 0
Setting range: 0 / 1

Individual setting: _____

NB

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: _____

NB

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

The boiler circuit pump operates constantly if the outside temperature stays below the selected value. The burner starts and heats the boiler to a min. of 38 °C, 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.

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

Factory setting: 15 K

Setting range: 5 to 30 K

Individual setting: _____

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

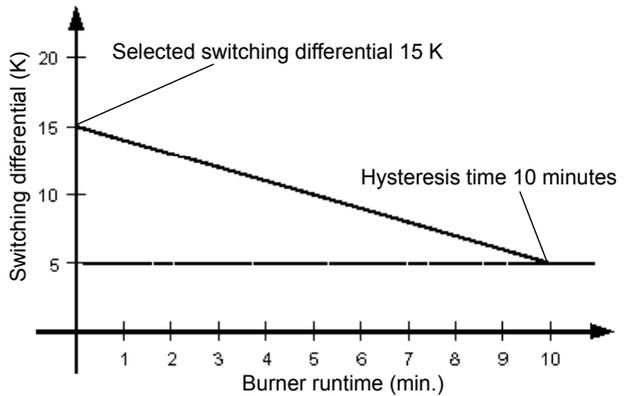
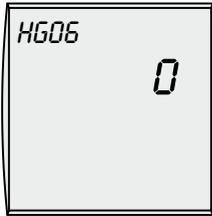


Fig.:

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

Individual setting: _____

**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**

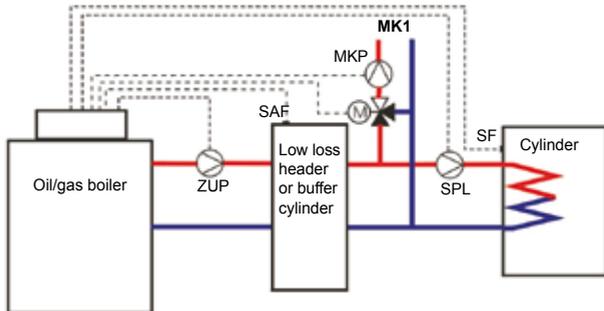
Heating circuit pump becomes the feed pump.
The header sensor affects the heating operation as well as cylinder heating. The feed pump runs only when there is a burner demand. Pump run-on in accordance with parameter HG07.

Soft starting: At $TK_{1st} < TK_{min}$ (38 °C) feed pump "OFF".
MKP and cylinder primary pump continue to run with soft starting.

Note: Increase the pump run-on time from 3 min to 15 min.
Set the parameter HG13 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

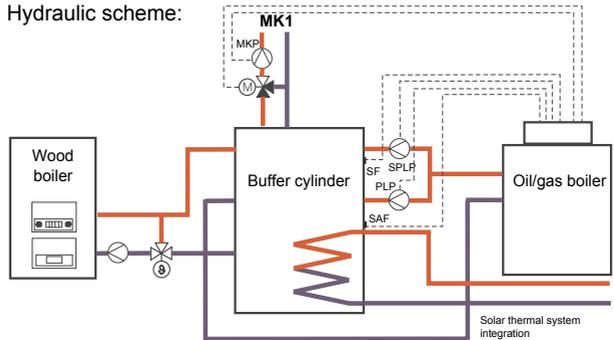
The header sensor (buffer) only affects the heating operation. In case of cylinder heating, the reference temperature is provided by the internal boiler sensor. In heating mode, the buffer primary pump runs only when there is a burner demand. Pump run-on in accordance with parameter HG07.

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

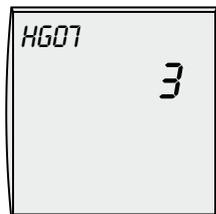
Note: Increase the pump run-on time from 3 min to 15 min.
Set the parameter HG13 to 7.

Hydraulic scheme:

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

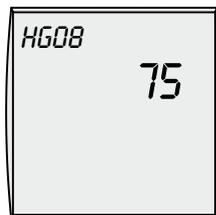


**Run-on time
Boiler circuit pump
Parameter HG07**



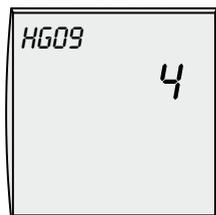
Factory setting: 3 min
Setting range: 0 to 30 min

**Maximum limit
Boiler circuit TV-max.
Parameter HG08**



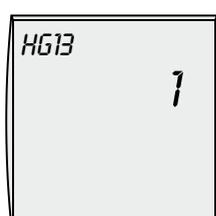
Factory setting: 75 °C
Setting range: 30 to 90 °C

**Burner cycle block
Parameter HG09**



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

**Programmable input E1
Parameter HG13**



Factory setting: 1
Setting range: 1 to 11

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.

Individual setting: _____

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. "Re-heating effects" can result in the temperature being exceeded a little.

Individual setting: _____

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.

Individual setting: _____

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	Room thermostat With open input E1, heating operation will be blocked (summer mode), independent of any digital Wolf control accessories. Exception: Remote controlled heating circuits

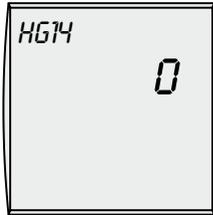
No.	Explanation
2	Maximum thermostat To enable the burner, input E1 must be closed. The burner will remain blocked for as long as the contact is open, even in emissions test mode, cascade mode and for DHW and central heating frost protection mode.
3	N / A
4	N / A
5	Flue gas damper / ventilation air damper Function monitoring of the flue gas damper/ ventilation air damper with floating contact. Closed contact Condition for burner enable in central heating, DHW, cascade and emissions test mode. Important: A1 (HG 14 = 7) must be programmed for flue gas damper / ventilation air damper function.
6	DHW circulation push button (on site) After activating this button, the DHW circulation pump is operated for 5 minutes, independent of the time program or the position of the program selector (BM). Important: In any case, output A1 must be programmed to setting 13.

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

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). In this connection, see the boiler installation instructions.

Programmable output A1
Parameter HG14



Factory setting: 0
Setting range: 0 to 14

Individual setting: _____

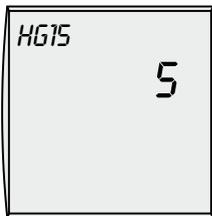
The functions of output A1 can only be scanned and adjusted with Wolf control accessories with eBUS capability.

The following functions can be allocated to output A1:

No.	Explanation
0	N / A No control of output A1.
1	DHW circulation pump 100% The output A1 is controlled 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 controlled by control accessories (BM) in cycles of 5 minutes ON and 5 minutes OFF, if DHW circulation has been enabled. Output A1 is constantly cycled in 5 minute cycles when no accessory controller is installed.
3	DHW circulation pump 20% The output A1 is controlled by control accessories (BM) in cycles of 2 minutes ON and 8 minutes OFF, if DHW circulation has been enabled. Output A1 cycles constantly when no accessory controller is installed.
4	Alarm output Output A1 is controlled after a fault and expiry of 4 minutes.
5	Flame detector Output A1 is controlled after a flame has been recognised.
6	N / A
7	Flue gas damper / ventilation air damper Output A1 is closed before the burner starts. Feedback is checked via input E1 (HG 13 = 5). If input E1 does not close, the burner will not start, and after two minutes FC 8 will be generated. Important: Input E1 must be programmed as flue gas/ventilation air damper.
8	External venting Output A1 is controlled inverted to the burner. Switching OFF external ventilation (e.g. extractor fan) during burner operation is only required, if the boiler is operated as open flue system.
9	Supply valve Output A1 is controlled after a flame has been recognised.
10	N / A
11	Feed pump Output A1 is controlled at every heat demand (heating circuit or cylinder heating).

No.	Explanation
12	<p>Bypass pump for return temperature raising Output A1 is controlled if the return temperature is lower than the selected return temperature raising value (parameter HG32).</p> <p>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.</p>
13	<p>DHW circulation pump Output A1 is controlled for 5 minutes after a pushbutton has been activated (pulse input E1).</p> <p>Important: In any case, input E1 must be programmed to setting 6.</p>
14	<p>Output A1 ON Output A1 is controlled if input E1 is closed (external burner demand).</p> <p>Important: In any case, input E1 must be programmed to setting 10.</p>

Cylinder hysteresis Parameter HG15



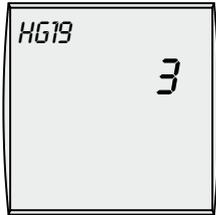
Factory setting: 5 K
Setting range: 1 to 30 K

Individual setting: _____

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 5 K

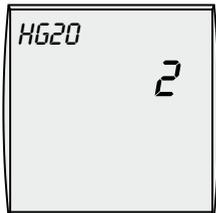
Cylinder heating commences at 55 °C and ends at 60 °C.

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

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

Individual setting: _____

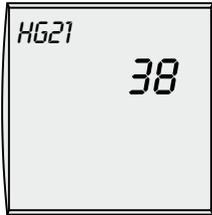
After completing the cylinder heating (the cylinder has reached the set temperature), the cylinder primary pump will run on up to the maximum set run-on time. The cylinder primary pump will switch OFF prematurely if, during the run-on time, the boiler water temperature has fallen to a differential between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

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

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

Individual setting: _____

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.

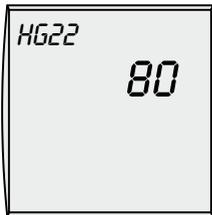
Minimum boiler water temperature TK-min.**Parameter HG21**

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

Individual setting: _____

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 heat is demanded. The minimum boiler water temperature TK-min. is also not necessarily achieved when there is no heat demand.

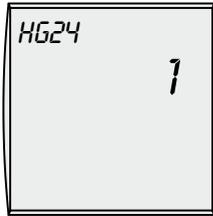
Note: Set this parameter to 50 °C when using a pressure-jet gas burner.

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

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

Individual setting: _____

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 re-heat effect). This prevents an overheating of the boiler.

**DHW sensor mode
Parameter HG24**

Factory setting: 1
Setting range: 1 to 3

Individual setting: _____

Note:

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

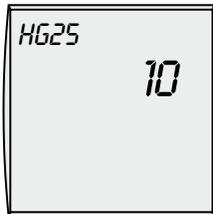
Using the DHW sensor operating mode, three separate modes can be applied to the DHW sensor input.

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 also for an 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 at 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 control the cylinder primary pump with an external thermostat or electronic cylinder temperature sensor, however 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 when it operates only as thermostat. The burner heats the boiler to the set cylinder temperature + excess boiler temperature during cylinder heating.

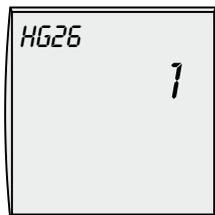
Sensor input closed:	Pump ON
Sensor input open:	Pump OFF

**Boiler excess temperature
during cylinder heating
Parameter HG25**

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

Individual setting: _____

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.

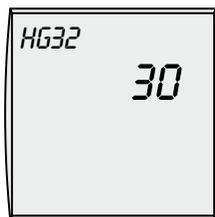
**Boiler soft start
Parameter HG26**

Factory setting: 1
Setting range: 0 / 1

Individual setting: _____

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 2 K below the set value TK-min. The pump will be enabled when the boiler water temperature has exceeded the minimum limit TK-min.

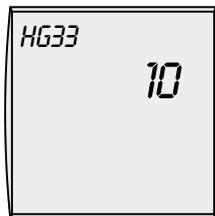
TK-min. cannot be achieved and the heating circuit and cylinder primary pumps remain OFF, if the burner is blocked through external safety circuits (e.g. flue gas thermostat on solid fuel boilers).

**Raising the return
temperature
Parameter HG32**

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

Individual setting: _____

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.

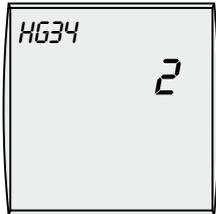
**Hysteresis time
Parameter HG33**

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

Individual setting: _____

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 5 K. This prevents the boiler being heated to unnecessarily high temperatures. This 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 setting: _____

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 - 5 V input for telecontrol system Parameter HG35



Factory setting: 0
Setting range: 0 / 1

Individual settings: _____

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

The settings have the following meaning:

0 → Outside temperature sensor connection

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

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

The voltage signal at the 0 - 5 V input is used as control variable for defaulting the set header boiler water temperature (independent of the setting of the programming selector at the BM).

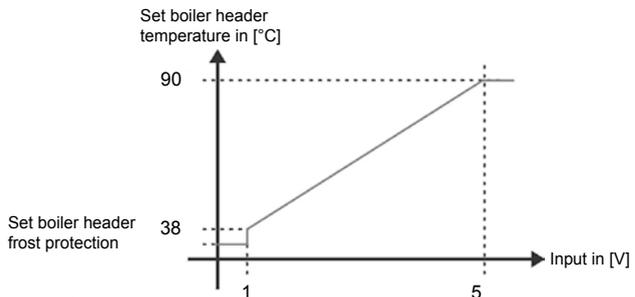
Limiting the set flow temperature by TV_{max} or TK_{max} .

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.



Note:

Prior to connecting the telecontrol system, set parameter HG35 to 1. Set system parameter A06 (setting the 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 → FC 15.

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	ON
rEL6	N / A	
rEL7	N / A	
rEL8	N / A	

High limit safety cut-out 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 perfect function of the high limit safety cut-out.

Reset

Observe the following steps to implement a reset:

- The ON / OFF 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.

The operating mode can only be displayed via WOLF control accessories with eBUS capability. For procedures, check the operating instructions of the relevant accessories.

Operating mode

(display on the BM programming module)

Status HG	Explanation	Notes
0	Standby	
1	Emission test mode	max. 15 min.
3	Heat demand (heating mode)	
5	Heat demand with cycle block	
6	Cycle block	see HG09
7	Frost protection - heating	see A 09
8	Soft start	see HG26
15	Cylinder mode	for boilers
16	Frost protection - cylinder	< + 5 K
17	Pump run-on - cylinder	see HG19
20	Parallel cylinder 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

The temperature (set / actual temperature) can only be displayed via Wolf-control accessories with eBUS capability. For procedures, check the operating instructions of the relevant accessories.

Set / actual values
(display on the BM
programming module)

Display	Name
<i>DHW TEMP</i>	Actual cylinder temperature Set cylinder temperature
<i>OUT TEMP</i>	Outside temperature
<i>ES AVERAGE</i>	Average outside temperature
<i>ES MAX MIN</i>	Maximum outside temperature (0 to 24 h) Minimum outside temperature (0 to 24 h)
<i>ROOM TEMP</i>	Actual room temperature Set room temperature
<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 water temperature Set boiler water temperature
<i>RETURN</i>	Actual return temperature
<i>STATUS HG</i>	Boiler status
<i>BURN RUN H</i>	Burner hours run
<i>BURN START</i>	Boiler burner starts

Setting the eBUS address for cascade mode

When operating several boilers (up to 4 control units R1) in conjunction with a cascade controller KM, adjust the eBUS address of the boilers in accordance with the table, below.

You adjust the eBUS address by holding down the reset button with the system operating. After 5 seconds, the corresponding flashing code appears (in accordance with the table) at the signal ring. Select the corresponding eBUS address with the DHW temperature rotary selector. Your selection of the required eBUS address is saved by releasing the reset button.

Boiler in cascade mode	eBUS address	Position rotary selector DHW temp. selection	Display signal ring
individual boiler*			green flashing*
1	1	1	red flashing
2	2	2	yellow flashing
3	3	3	yellow / red flashing
4	4	4	yellow / green flashing

* Factory setting (individual boiler without cascade mode)

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

BUS address setting



Reset button

Temperature selection DHW

The assignment of gas 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.

Cascade operation

In conjunction with the KM cascade controller, between 1 and 4 R1 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 must operate.

The R1 starts as soon as the KM issues a modulation level greater than 0. Cylinder heating continues in the R1. The emissions test operation can only be enabled via the heating rotary selector at the R1.

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 ON.

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

Parameter		Setting range	Factory setting	Individual setting
R09	Frost protection level	-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 30 K	15 K	
HG06	Pump operating mode	0 / 1 / 2	0	
HG07	Run-on time Boiler circuit pump	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	5 K	
HG19	Run-on time Cylinder primary pump	0 to 10 min	3 min	
HG20	Max. cylinder heating time	0 to 5 h	2 h	
HG21	Minimum boiler water * temperature TK-min.	38 to 90 °C	38 °C	
HG22	Maximum boiler water temperature TK-max.	50 to 90 °C	80 °C	
HG24	DHW sensor operating mode	1 / 2 / 3	1	
HG25	Excess boiler temperature during cylinder heating	0 to 40 K	10 K	
HG26	Boiler soft start	0 / 1	1	
HG32	Return temperature raising **	0 to 70 °C	30 °C	
HG33	Hysteresis time	1 to 30 min	10 min	
HG34	eBUS feed	0 / 1 / 2	2	
HG35	0 - 5 V input for telecontrol system	0 / 1	0	
HG50	Test functions	1 to 5	-	
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		

* set to 50 °C for pressure jet gas burners

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

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

The high limit safety cut-out (STB) is factory-set to 110 °C. If required, it can be changed over to 100 °C.

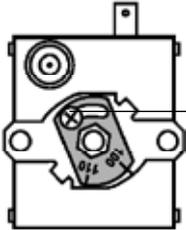
Such changes are irreversible.

Disconnect the control unit from its power supply.

Remove cap.

Remove the cover from the high limit safety cut-out.

Release the high limit safety cut-out fixing screws.



Release the fixing screws of the control unit front cover and pivot forward.

Remove the high limit safety cut-out.

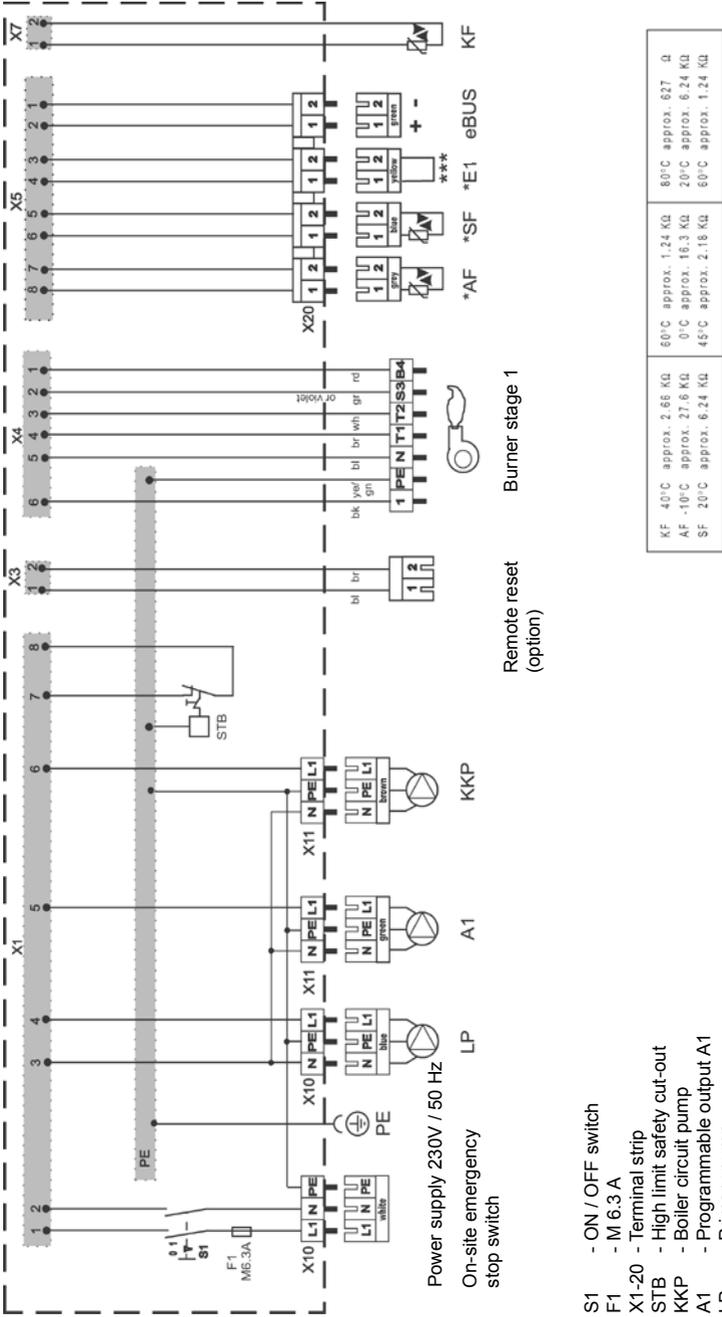
Release the clamping screw. Adjust the setting disc to 100 °C in accordance with the scale and retighten the clamping screw.

Reassemble in reverse order.

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

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

Temp. °C	Resist. Ohm	Temp. °C	Resist. Ohm	Temp. °C	Resist. Ohm	Temp. °C	Resist. Ohm
-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	649	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



* Accessories
 ** Remove jumper when using the programmable input E1 (parameter HG 13).

Specification

Supply voltage:	230 V ± 10%
Rated frequency:	50-60 Hz
Device fuse:	Max. 6.3 A / medium slow
Power consumption:	5 VA (control unit and accessories, excluding burner and pumps, standby)
Breaking capacity, pumps:	Each 230 V / 4(2)A acc. to EN 60730, part 1
Ambient temp.:	0...50 °C
Storage temperature:	-20 to 60 °C
Data memory:	EEPROM

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.

This list of fault messages is designed to allow your heating contractor to trace the fault more easily.

No.	Fault	Cause	Effect / Remedy
1	TB excess temperature	The external temperature limiter has shut down the system	Burner OFF, pump ON Request a service
4	Burner fault	During the burner start no flame was established	Burner OFF, pump ON Press the reset button at the combustion controller or the control unit. If the fault cannot be removed by pressing the reset button several times, request a service.
6	TW excess temperature	The boiler water temperature has exceeded the limit for TW (e.g. 95 °C)	Burner OFF, pump ON Request a service
8	Flue gas/ventilation air damper does not move	Flue gas damper / ventilation air damper or its feedback faulty	Burner OFF, pump ON
12	Boiler sensor faulty	Boiler temperature sensor or lead faulty	Burner OFF, pump ON Request a service
14	Cylinder sensor faulty	Sensor for the DHW temperature or for the lead faulty	For heating mode: No effect Cylinder primary pump and heating circuit pump cycle alternately 1 h ON, 1 h OFF Request a service
40	Fault maximum thermostat, system pressure limiter	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
15	Outside temperature sensor faulty	Sensor for the outside temperature faulty (short circuit or break)	Effect as per outside temperature below frost protection limit Request a service
79	Fault multi-function sensor (central sensor)	Central sensor faulty (short circuit or break)	Control unit at set boiler water temp. No effect on the boiler operation Request a service
79	Fault multi-function sensor (return sensor)	Sensor for the return sensor faulty (short circuit or break)	No effect on the boiler operation bypass pump continues to run Request a service
81	Fault EEPROM	Internal equipment fault	Request a service
91	Fault eBUS parameter	One BUS address was allocated more than once	Request a service

