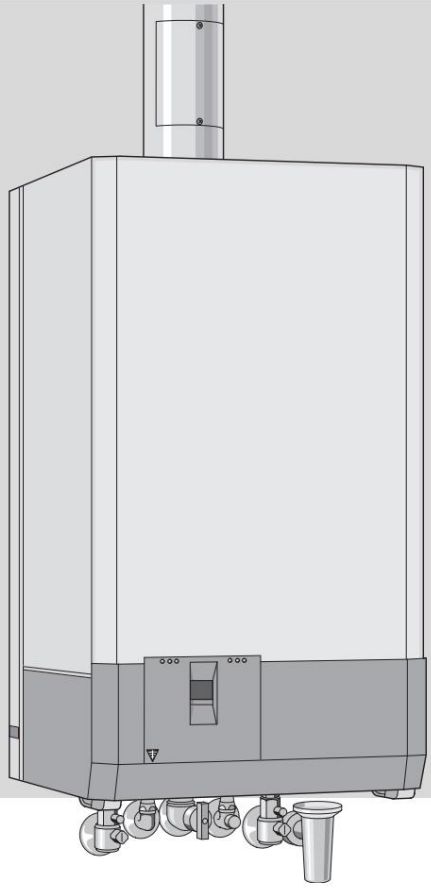
Forced draft gas boiler
JUNKERS EUROSTAR



ZWE 24 / 28-4 MFA ...

JUNKERS
Grupul Bosch

content

Operating safety instructions

The smell of gauze:

B Turn off the gas valve (see page 16).

B The windows open.

B Electric switches do not operate.

B Extinguish open fires.

B Immediately call the Gas Distribution Authority and the authorized service company from outside.

The smell of burning gas:

B Switch off the appliance (see page 17).

B The windows and doors open.

B The authorized specialist company is notified.

Installation, modification of the appliance

B The appliance must only be installed or modified by an authorized specialist.

B Do not modify the flue gas components.

B **When venting according to B33:** Do not close or reduce the ventilation openings in doors, windows and walls. When using sealed windows, the supply of air required for combustion must be ensured.

Maintenance

B **Recommendations for the beneficiary** of the contract maintenance must be completed by a specialized company, authorized by ISCIR and the device must be checked annually.

B The beneficiary is responsible for the safety of the plant and for adapting the installation to the least possible environmental pollution.

B Only original spare parts will be used!

Flammable and potentially explosive materials

B Flammable materials (paper, thinner, paint, etc.) should not be stored near the machine.

Burning air and room air

B The air required for combustion and the room air must be free of aggressive substances (eg halide hydrocarbons or fluorine bonds). This prevents corrosion.

Beneficiary information

B The beneficiary must be informed of the operation of the plant and must be informed of the operating conditions.

B Beneficiaries must be warned that they are not allowed to make changes to the machine.

Explanation of symbols

The safety instructions will be marked with a warning triangle, which is gray.

The words below indicate the seriousness of the hazard in the event of failure to take action.

• **Caution** means the possibility of minor malfunctions.

• **Warning** means the possibility of minor injuries to service personnel or serious damage to the plant.

• **Danger** means the possibility of serious injury to service personnel. In particularly serious cases there is a danger of death.

The indications in the text will be marked with the adjacent symbol. They will be delimited by text in horizontal lines below and above the text.

The instructions contain important information in cases where there is no danger of personal injury or damage to the plant.

1 Power plant information

1.1 Declaration of conformity with the EU construction model

This plant complies with the applicable European requirements and regulations 90/396 / EEC, 92 / 42 / EWG, 73/23 / EWG, 89/336 / EWG and of the construction models described in the EU construction model verification certificate.

Meets the requirements of low temperature boilers.

Nr. ID al prod. ZWE 24/ 28-4 MFA	CE-0085 AS 0001
ZWE Category 24-4 **ZWE 28-4**	II2H 3+ I2H
Device type	C42, C32, C12, C82

Tab. 1

1.2 Overview of types

ZWE 24-4 MF A23		
ZWE 24-4 MF A31		
ZWE 28-4 MF A23		

Tab. 2

FROM Central heating appliance
W Instant domestic hot water preparation
AND Euro appliances series
24 Heating power 24 kW
28 Heating power 28 kW
-4 Generation
MF Multifunction display
A Forced Circulation
23 Gas methane type H
31 GPL

The index shows the gas family according to EN 437:

Index Wobbe Index		Gas family
23	12.7 - 15.2 kWh/m3	Natural gas and oil, group 2H
31	20.2 - 24.1 kWh/m3	Propan/Butan Group 3+

Tab. 3

1.3 Delivery kit

- Gas central heating for central heating
- Clamping materials (screws with related accessories)
- Device documentation
- Connection plate (optional, extra charge).

1.4 Description of the device

- Forced wall mounting device (except C82)
- Domestic hot water heat exchanger
- Bus compatible Bosch Heatronic system, with multifunction display)
- Continuously modulated power
- Electronic ignition
- Full safety, via Heatronic, with ionisation monitoring and magnetic valve, according to EN 298
- Temperature limiter, in 24 V electrical circuit
- Automatic deaerator at the pump, manual deaerator at the expansion vessel
- Expansion tank
- Temperature sensor and thermostat for the heating system
- Domestic hot water thermostat
- DHW priority
- No minimum flow of water is required for circulation
- Antifreeze system for the heating circuit
- Possibility of decreasing the heating power, with the simultaneous maintenance of the maximum power on the domestic hot water circuit
- Circulation pump anti-lock system
- Pressure gauge for heating circuit pressure
- Double exhaust gas / air pipe required for combustion combustion and CO2 / CO measuring nozzle.

1.5 Accessories (see also price list)

- Accessory for 80/110 flue gas exhaust
- Accessory for flue gas 80/80
- Temperature controller with outdoor probe
- Room thermostat
- Programmer clock
- Transformation set on another type of gas
- Mounting sets with mounting plate for horizontal mounting systems for vertical mounting systems of the brand Junkers (replacement of old appliances)
- Mounting sets with mounting plate for horizontal mounting systems for horizontal mounting systems of the Vulcano brand (replacement of old appliances).

1.6 Dimensions

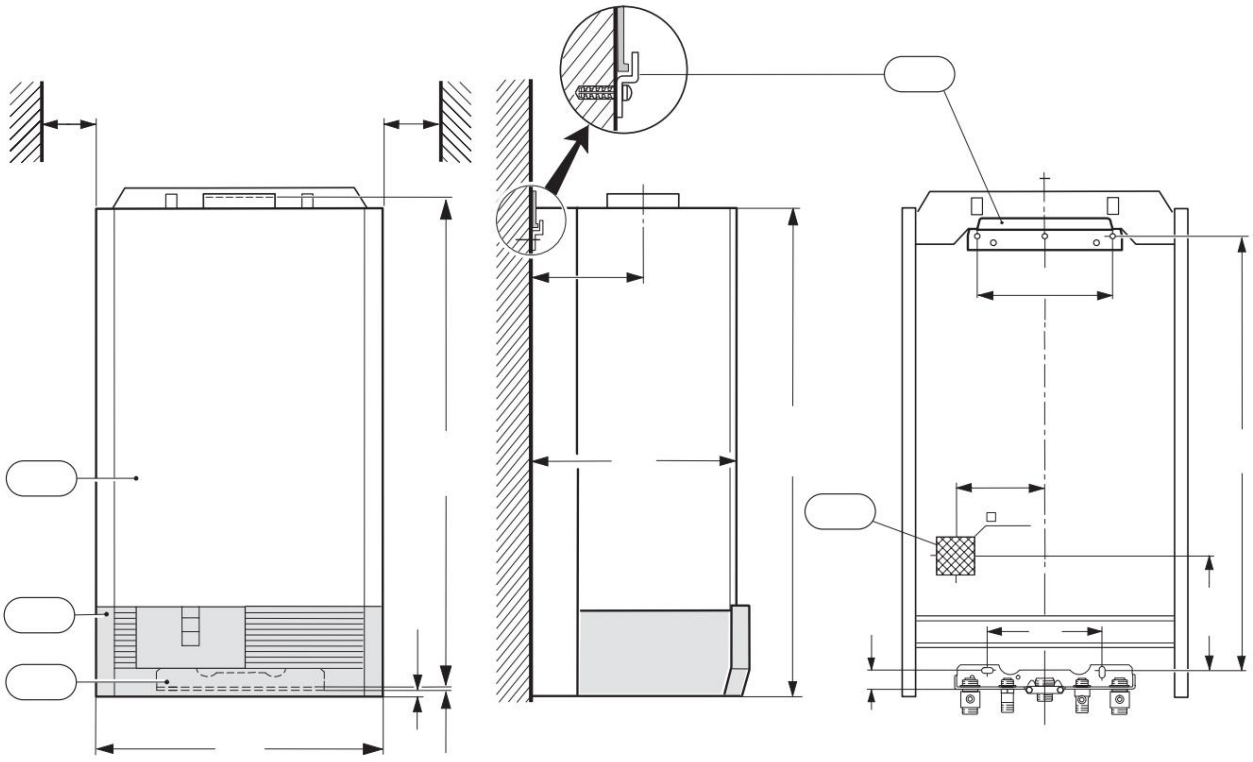


Fig. 1

13 Connection plate
101 Manta
103 Flap
320 Clamping rail
338 Wall outlet for electrical cables

1.7 Construction of the plant / principle scheme

1.7.1 ZWE 24/28 -4 MFA ...

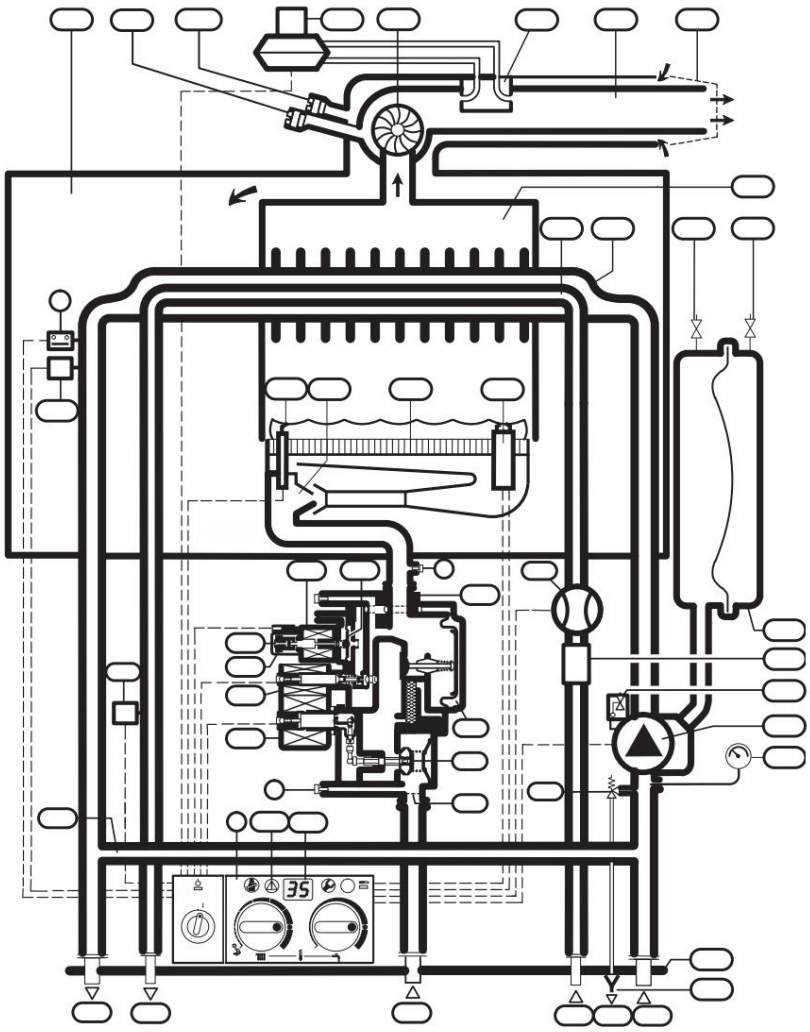


Fig. 2

Nozzle pressure measuring nozzle
Bosch Heatronic

Heat exchanger temperature limiter

3 4 6 6.3 Temperature probe for domestic hot water

7 Inlet pressure measuring nozzle
8.1 Manometer

11 Bypass line
13 Connection plate

14 Funnel siphon

15 Safety valve (for heating circuit)

18 Circulation pump
20 Expansion vessel
26 Nitrogen filling valve
27.1 Automatic deaerator

27.2 Manual deaerator

29 Nozzle

30 Burner

32 Ionization electrode

33 Ignition electrode

34 Domestic hot water pipe
35 Heat exchanger **36** Flow
temperature sensor

43 Heating tour

44 Domestic hot water
45 Gas

46 Cold water

47 Heating return

48 Drain

52 Ventil magnetic 1

52.1 Ventil magnetic 2

53 Gas pressure regulator

55 Gas filter

56 Gas valve **57** Main
valve diaphragm

61 Emergency key

63 Maximum gas flow adjustment screw
64 Minimum gas flow adjustment screw
68 Continuously modulated magnetic valve
69 Adjusting valve
93 Water filter flow regulator

220 Wind protection

221 Flue gas piping

224 Differential pressure probe
226 Ventilator

228 Differential pressure switch

229 Waterproof chamber

234 Flue gas measuring nozzle

234.1 Combustion nozzle required for combustion

317 Multifunction display
411 Combustion Chamber

413 Domestic hot water flow sensor (turbine)

1.8 Electrical connections

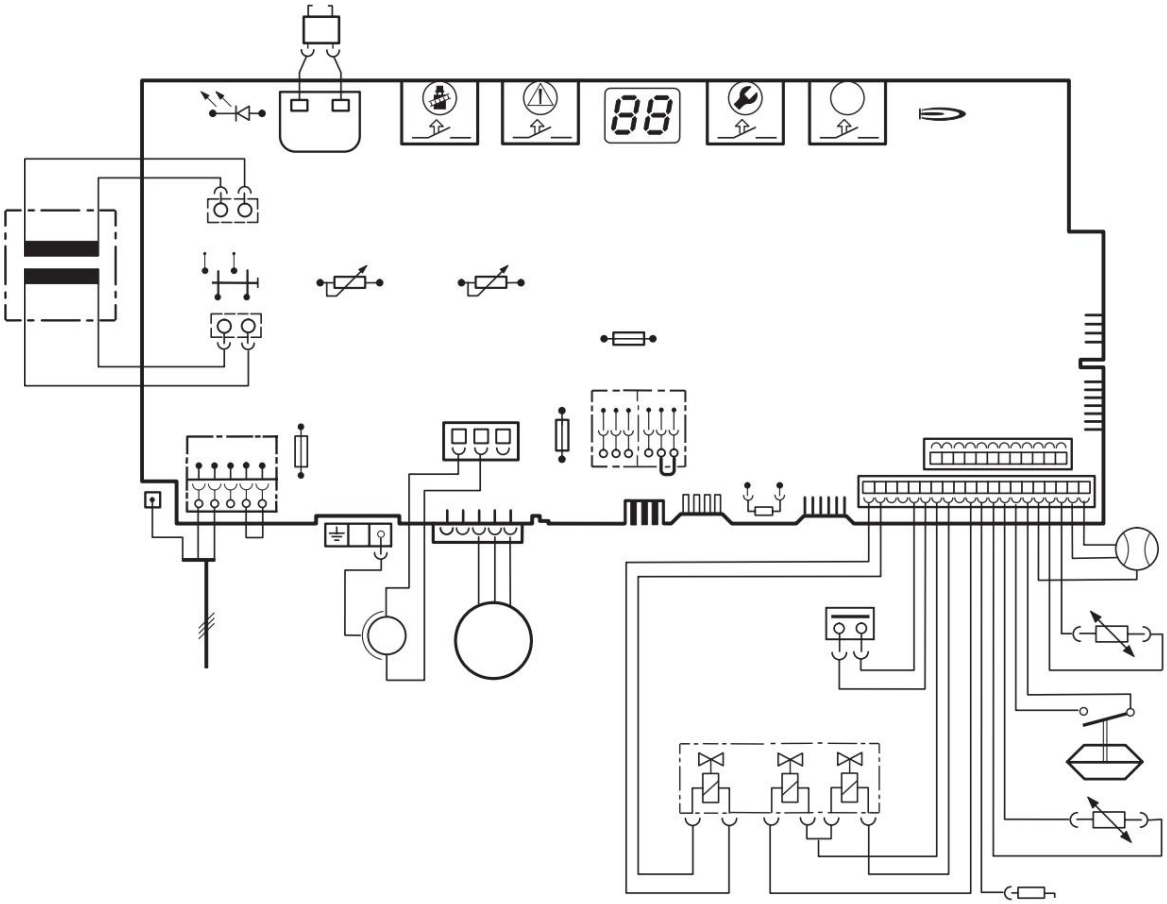


Fig. 3

Ignition transformer
Heat exchanger temperature limiter

4.1 6 6.3 Temperature probe for domestic hot water
18 Circulation pump
32 Ionization electrode
33 Ignition electrode
36 Flow temperature probe
52 Ventil magnetic 1
52.1 Ventil magnetic 2
56 Gas valve **61**
Emergency key
68 Continuously modulated magnetic valve
135 Main switch
136 Thermostat for heating
151 Safety T 2.5 A, 230 Vac
153 Transformer
161 Points
226 Ventilator
228 Differential pressure switch
300 Coded plug
302 Connection for protective connection
303 NTC boiler strip
310 Thermostat for domestic hot water
312 Safety T 1.6 A
313 Safety T 0.5 A
314 Electronic controller regulator TA 211 E
315 Thermostat Strip
317 Display multifunc ional
318 Timer clock ruler
319 Boiler thermostat strip
325 Electronic board
328 230 VAC strip
328.1 Points
329 LSM strip
363 Burner operation control LED
364 Voltage control LED
365 Mower key
366 Service key
367 "ECO" key
413 Domestic hot water flow sensor (turbine)

1.9Technical data

	Unit of measurement	ZWE 24-4		ZWE 28-4
		"23" gas methane (G 20)	"31" GPL (G 31)	"23" gas methane (G 20)
Rated payload max.	kW	24,0	24,0	28,0
Rated thermal output max. the focus	kW	26,7	26,7	31,1
Minimum useful thermal power	kW	7,9	7,9	9,2
Minimum thermal power at the hearth	kW	8,8	8,8	10,3
Gas consumption				
"23" gas methane (G 20) "31"	m3/h	2,8		3,3
butane (G 30) / propane (G 31)	kg/h		2,1	
Permissible dynamic gas pressure				
"23" gas methane (G 20) "31"	mbar	18 - 24		18 - 24
butane (G 30) / propane (G 31)	mbar		28 - 37	
Expansion vessel				
Preload pressure	bar	0,5		
volume		8		
Useful volume		4,2		
Heating				
Nominal heating volume		1,3		
Maximum flow temperature		87		
Minimum flow temperature	ÿC ÿC	45		
Maximum allowable working pressure (heating)	bar	3		
Minimum working pressure (heating)	bar	0,5		
Domestic hot water				
ACM		0,6		
Minimum flow	l/min	2		
Maximum flow	l/min	10 - 12		
Output temperature	ÿC	40 - 60		
Maximum allowable pressure	bar	10		
Minimum pressure required	bar	0,2		
Specific flow	l/min	11,9		
Average flue gas values according to DIN 4705				
Flue gas flow at rated power	kg/h	58	59	66
Flue gas temperature at maximum / minimum power	ÿC	140/90	140/90	140/90
CO2 at maximum power	%	5	6,24	5,2
CO2 at minimum power	%	1,7	1,8	1,6
Chimney connection	mm	Ø 80/110		
NOx class		2		
Electrical connection				
blood	Vca	230		
Frequency	Hz	50		
The power:				
Pump in position 1	In	120		
Pump in position 2	In	140		
Pump in position 3	In	160		
Protection class	IP	X 4 D		
Thermostat connection		24-V continuous adjustment		
Diverse				
Weight (without packaging)	kg	53		
Height	mm	850		
Width	mm	512		
Depth	mm	360		

Tab. 4

2 Prescriptions

The following requirements and regulations must be observed:

• **Construction legislation**

Norm for the design and execution of natural gas supply systems **I 6-98**

Norm for the design and execution of electrical installations, at the consumer, with voltages up to 1000 V **I 7-98**

Norm for the design and execution of sanitary installations **I 9-94**

Norm for the design and execution of central heating installations **I 13-94**

Norm for the operation of central heating installations **I13 / 1-96**

Norm for the design and execution of LPG supply systems **I 31-99**

Regulations for the operation and maintenance of liquefied petroleum gas **installations I 33-99**

Technical requirements for the chemical regime of steam and hot water generators **C 18-85**

Technical requirements for the design, execution, installation, installation, operation, repair and inspection of low-pressure steam boilers and hot water boilers **C 31-84**

Fire safety regulations for buildings **P 118-99.**

3 Installation

Danger: explosion!
B Before performing work on
gas components, always turn off
the power valve
with gas.

Installation, connection of the current, connection to the gas installation and flue gas discharge, as well as commissioning must be carried out only by specialized and authorized companies.

3.1 Important information

B Before installation, the necessary approvals must be obtained from the gas distribution company and the sewing company.

B The appliance shall only be fitted in a closed heating system in accordance with DIN 4751, Part 3.

B Installations with open expansion vessels will be transformed into closed systems.

B For high power installations: the appliance will be connected via a hydraulic separator to the existing pipeline.

BA does not use heaters or pipes galvanized. This prevents the formation of gas.

B When using a room thermostat: Do not install a thermostatic valve on the radiator in the room where the room thermostat is installed.

B To prevent noise in the system:
install an overpressure valve (accessory no. 687) or, in the case of two - tube systems, a three - way valve to the farthest radiator.

B The boiler can be used for pipe installations from material plastic (P.E.R.).

BA is equipped with each radiator with a deaerator (manual or automatic), also use filling and draining valves at the lowest points of the installation.

No thinner or aromatic hydrocarbons should be used for cleaning.

B The use of Varidos 1 + 1 (Schilling Chemie) or Cillit HS corrosion protection is permitted.

3.2 Choice of location

Location requirements

DVGW-TRGI regulations must be observed for installations up to 50 kW, and TRF regulations must be observed for LPG appliances.

BA complies with the rules and regulations specific to the countries in which the devices are installed.

B The minimum mounting distances and the dimensions of the vents must always be observed. 1.

Air required for combustion

To prevent corrosion, the air required for combustion must be free of aggressive substances.

Halogenated hydrocarbons containing chlorine and fluorine bonds are considered as corrosive substances.

They may be present, for example, in thinners, paints, adhesives, fuels and cleaning agents.

Temperature at the boiler surface

The maximum temperature at the boiler surface is below 85ÿC. Therefore, no special protection measures are required for flammable and mobile building materials. However, the special requirements of the countries in which the devices are installed must be observed.

LPG installations or located below ground level

The plant complies with the requirements of TRF 1996, paragraph 7.7, at ground level. We recommend mounting a solenoid valve so that LPG is supplied only during heat demand.

3.3 Mounting the clamping rail and the connection plate

The location of the appliance shall be determined in such a way that the following restrictions are met:

- Maximum distance from all surface unevenness, such as hoses, pipes, niches, etc.
- Access conditions for all works maintenance etc. (keep the minimum distance of 50 mm around the boiler as far as possible).

A clearance of 200 mm below the control panel is required to remove the control panel.

Hanging on the wall

B The mounting template must be placed in the desired place on the wall and fixed to it.

B Drill holes for screws (Ø 8 mm).

B Drill a hole in the wall for the piping evacuation.

> The mounting template is removed before mounting the mounting rail, fitting board, and fittings.

B Secure the retaining rail with the two screws and dowels, which are also supplied.

B Attach the connection plate to the wall with the supplied dowels and screws.

B Check the position of the rail and the connection plate and tighten the screws.

Gas and water connection

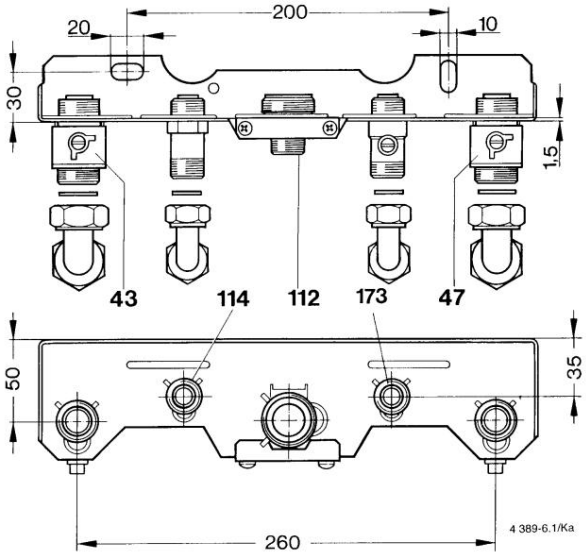


FIG. 4 Connection

43 Heating tour
47 Heating return
112 Gas connection
114 Domestic hot water connection (1/2 ")
173 Cold water connection

3.4 Installation of pipes

3.4.1 Domestic hot water

If all valves are closed, the static pressure must not exceed 10 bar.

Otherwise:

B A pressure limiter is fitted to the system.

If the installation has a non-return valve or a pressure limiter at the domestic water inlet:

B a safety kit is fitted which provides a connection to a visible drain system in the event of an overpressure in the circuit.

The hot water pipes and fittings are placed in such a way that, depending on the existing supply pressure, there is a loss of water flow at all points of its collection.

3.4.2 Heating system

Heating system safety valve

It is intended to protect the heating system and the appliance from possible overpressure. From the factory, the safety valve comes into operation when the circuit pressure reaches the value of about 3 bar.

3.4.3 Gas connection

The gas line must be located and dimensioned in such a way as to ensure the supply of gas to all appliances connected to it.

3.5 Mounting the device

> **Caution:** Damage to the installation may occur due to debris left over from installation.
>
> B Wash the mains to remove debris.

B Remove the packaging, following the instructions on the.

Take off your coat

> For reasons of electrical safety, the jacket is secured with a screw against unauthorized disassembly (safety on the electrical side).
>
> B The jacket must always be fastened with this screw.

B Remove the right side locking screw.

B Set aside the cloak, pulling it forward.

B Set aside the cloak, pulling it forward.

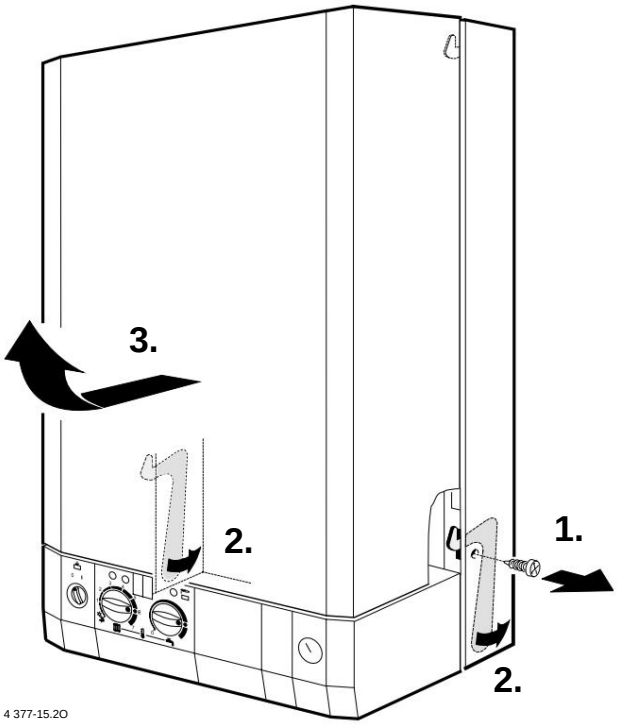


Fig. 5

Catch preparation

B All corks must be removed
protection on all connections and the original supplied gaskets are placed.

Attaching the appliance

B Place the appliance on the connection board.

B Lift the appliance and hang it on the rail.

B Check that the seals are in the correct position, then tighten the pipe connections with the Dutch nuts.

Installation of flue gas accessories

Only aluminum pipes should be used to prevent corrosion. The pipes must be sealed.

B Select the aperture according to the accessory documentation.

B The boiler switches off.

B Take off your coat.

B Remove the combustion chamber cover.

B Remove the electrical connection (226.1) from ventilator.

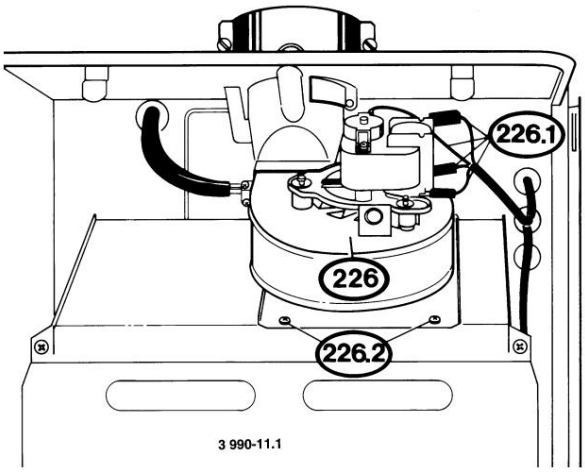


Fig. 6

B Remove the retaining screws (226.2) and remove the fan (226).

B Remove the circulation screws
fan (226) and the corresponding rolling diaphragm (1.3) is attached to the direction of absorption of the fan (226).

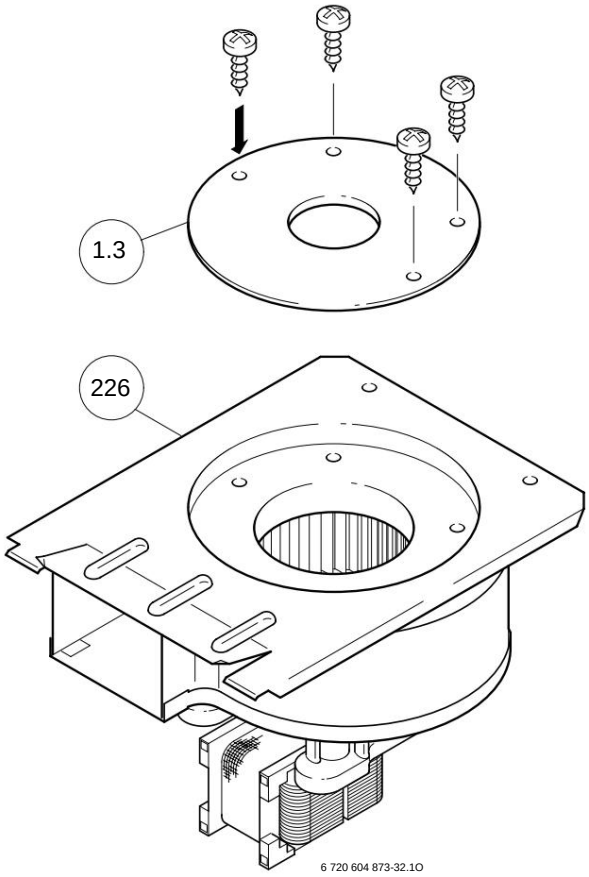


Fig. 7

B Fit the corresponding reduction plate (1.7) to the fan (226).

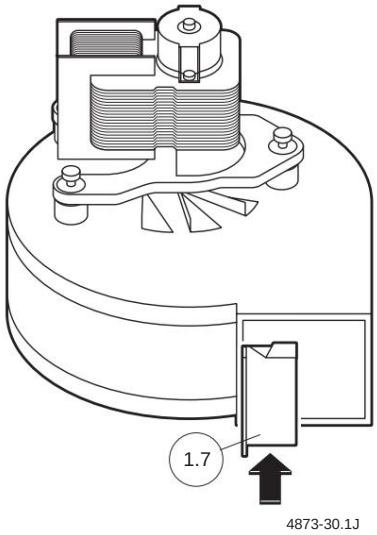


Fig. 8

B Install the fan (226) in the boiler.

B Tighten the combustion chamber cover with the screws.

B Mount the housing and secure it with screws.

B Attach the flue gas attachment.

B The flue gas accessory is provided.

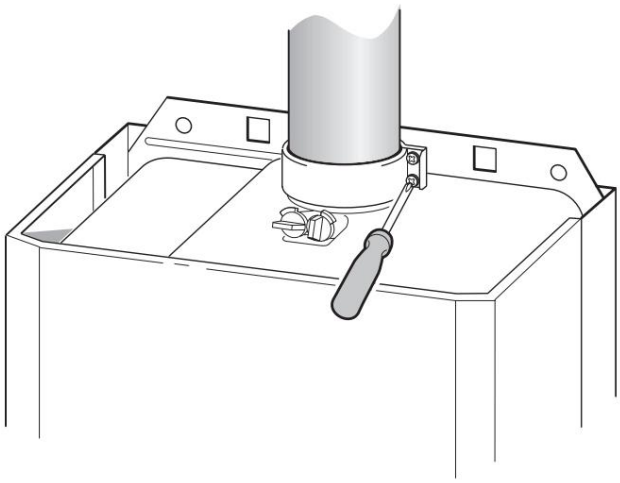


Fig. 9

3.6 Checking the connections

Water connections

B Open the cold water tap and fill hot water circuit (check pressure: max. 10 bar).

B Flow valves open and return the connection plate and fill the heating system.

B Ventilate the appliance with the deaerator manual.

B Check all boiler joints for leaks.

Ventilation of the heating system

A manual deaerator **27.1** is mounted on the expansion vessel and an automatic deaerator **27.2** is additionally located on the pump .

B Fill the heating system to a pressure of 1 to 2 bar.

B Both deaerators open, the system is ventilated.

B Both deaerators close.

B Refill the heating system to a pressure of 1 to 2 bar.

Gas pipeline

B Close the gas valve to protect the gas valve from damage due to overpressure (maximum pressure 150 mbar).

B Check the gas system.

B Depressurization is performed.

Flue gas evacuation

B Check the final part of the exhaust pipe and the wind protection and at the same time check the free passage of the flue gas.

4 Electrical connections

Danger: electric shock!

B Always switch off the voltage (fuses, LS switch) before working on the electrical components.

All adjustment, control and safety components are connected and checked at the factory.

B The cable must be left at least 50 cm outside the wall.

B For protection against water resulting from splash (IP): Choose the cable passage hole according to its diameter, Fig. 12.

B For biphasic networks (IT network): Install a resistor (code 8 900 431 516) between the - N conductor and the connection of the protective conductor, in order to achieve a sufficient ionization current.

4.1 Connecting the device

The electrical connections must comply with the regulations in force for household electrical installations.

B Earthing is required.

B The electrical connections are made through a separation system with a distance of min. 3 mm between contact elements (eg fuses, LS switches).

• For protection against water resulting from splash (IP): Choose the cable entry hole according to its diameter (see Fig. 12).

• The following cable types are recommended:
- NYM-I 3 x 1.5 mm2
- HO5VV-F 3 x 0.75 mm2 (may not be used near bathtubs or showers; range 1 and 2 according to VDE 0100, part 701)
- HO5VV-F 3 x 1.0 mm2 (cannot be used in the proximity of bathtubs or showers; domain 1 and 2, according to VDE 0100, part 701).

Opening the control panel

B Pull the mask down and remove it.

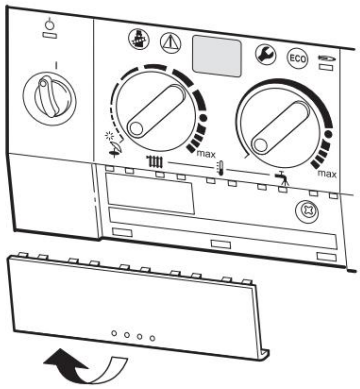


Fig. 10

B Loosen the screw and pull the cover forward to remove it.

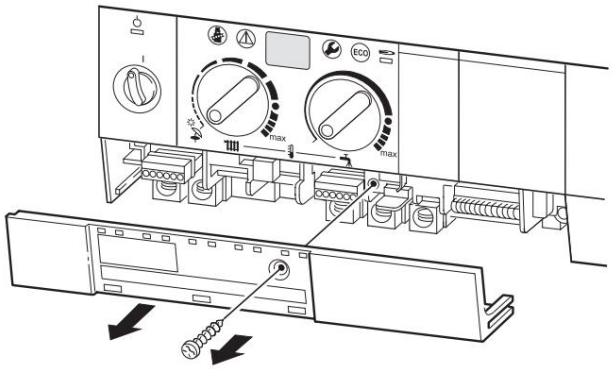


Fig. 11

B Cut the stuffing box according to the diameter cable.

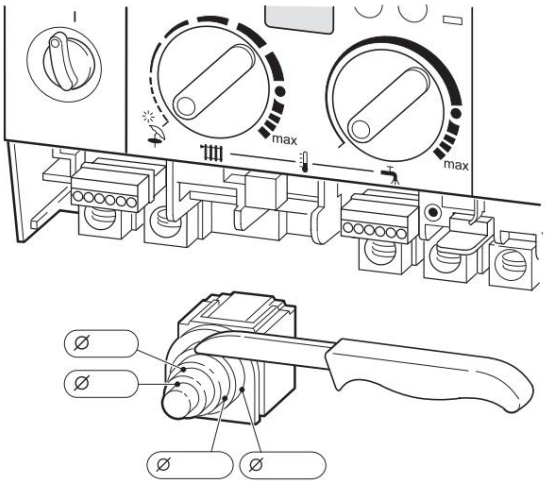


Fig. 12

B Insert the cable through the hole in the stuffing box and make the connections, according to Fig. 13.

B Secure the mains cable with the gland.
The grounding wire must be undisturbed while the other cables have already been laid.

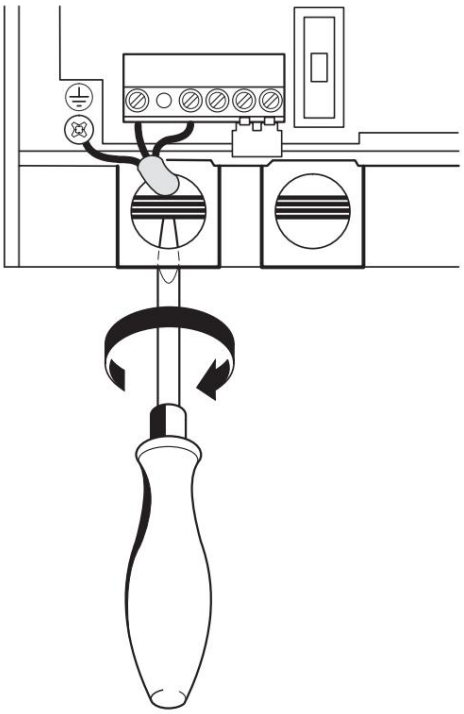


Fig. 13

4.2 Connecting the room thermostat, remote control and programming clocks

Electronic regulator with external probe TA 211 E

B Install according to the installation instructions of the appliance.

Continuously modulated room thermostat at 24 V

B TR 100, TR 200 are mounted according to the scheme of lower:

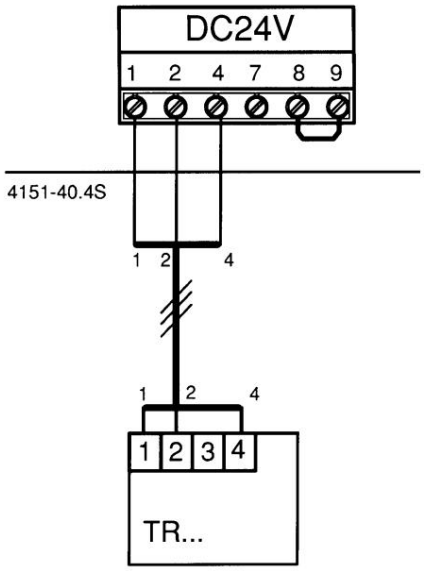


Fig. 14

Remote controls and programming clocks

B Telecomenzile TF 20, TW 2, TFQ 2 T/W sau the DT 1, DT 2 programming watches are installed in accordance with the installation instructions of the respective devices.

5 Commissioning

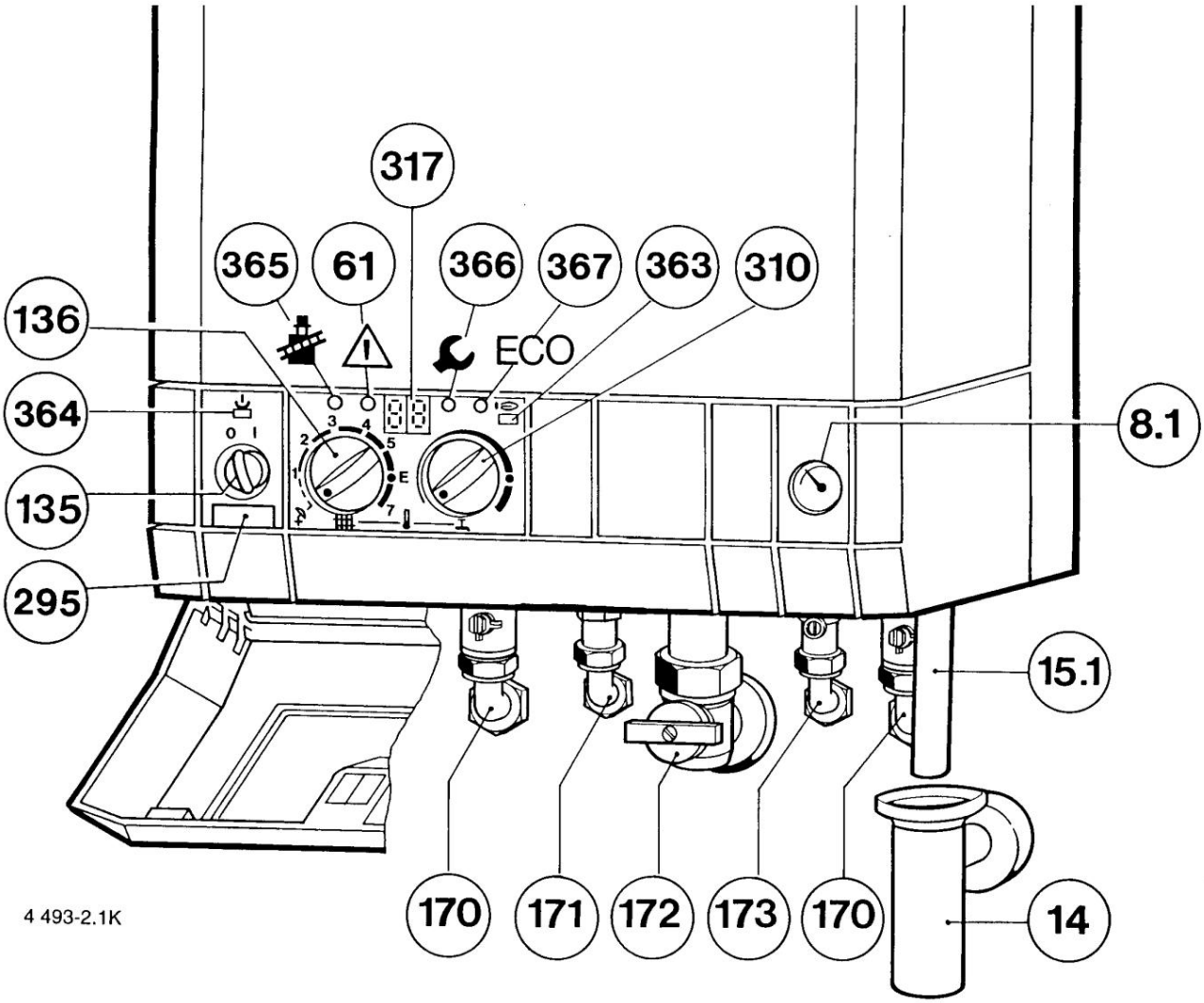


Fig. 15

8.1 Manometer
14 Funnel siphon
15.1 Exhaust pipe
61 Emergency key
135 Main switch
136 Thermostat for heating
170 Flow and return valves
171 Elbow for domestic hot water
172 Gas tap (closed)
173 Cold water connection
295 Device label
310 Thermostat for domestic hot water
317 Multifunction display
363 Burner operation control LED
364 Voltage control LED
365 Mower key
366 Service key
367 "ECO" key

After commissioning, a commissioning report must be completed (page 36).

5.1 Before commissioning

Warning: Do not operate the boiler without water; otherwise the appliance may be damaged!

B Do not use the boiler without water.
B Do not open the gas supply valve before filling the system with water.

B Open the cold water tap (173) and vent the domestic hot water pipe.

B The preload pressure of the expansion vessel is correlated with the static height of the heating system (see 19).

B The radiator valves open.

B The shut-off valves (170) open.

B Slowly fill the heating system until the pressure reaches 1-2 bar.

B Ventilate the radiators.

B The automatic deaerator (27.1) opens and the manual deaerator on the expansion vessel (27.2), which corresponds to the heating circuit and closes again after venting.

B Refill the system to a pressure of 1-2 bar.

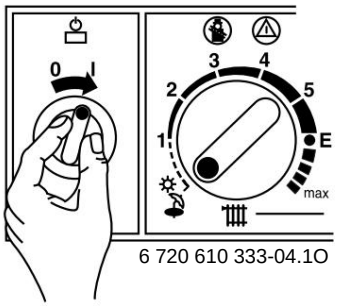
B Check that the type of gas indicated on the boiler label corresponds to the one that supplies the appliance.

B Open the gas valve (172).

5.2 Switching the boiler on / off

Switching

B Turn the main switch to position (I).
The green control LED lights up and the display will show the flow temperature of the heating circuit.



6 720 610 333-04.1O

Fig. 16

After starting, it will be displayed on the display for approx. 10 s **P1, P2** or **P3 .**

stop

B Turn the main switch to position (0).
The green LED goes out, the programmer clock will switch to power from its internal battery.

Danger: electric shock!

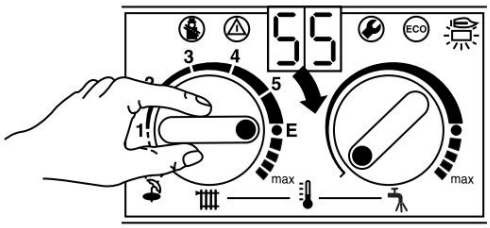
B Always switch off the voltage (fuses, LS switch) before working on the electrical components.

5.3 Switching on the heating

B Turn the heating circuit thermostat knob to a desired flow temperature value:

- low flow temperature: position **E** (approx. 75 ° C)
- flow temperature up to 90ÿC: **max** (see page 19, “Canceling low flow temperatures”).

When the burner is running, the red LED lights up.

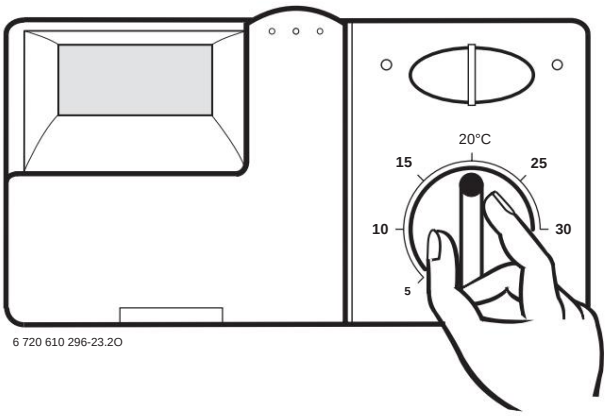


6 720 610 333-05.1O

Fig. 17

5.4 Temperature regulation

B Set the room thermostat (TR ..) to the desired temperature.

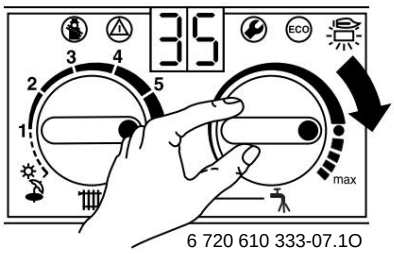


6 720 610 296-23.2O

Fig. 18

5.5 Domestic hot water temperature

The domestic hot water temperature can be adjusted by button The set temperature approx. 40ÿC and 60ÿC the display.



6 720 610 333-07.1O

Fig. 19

Button position	Water temperature
Maximum left	approx. 40ÿC
	approx. 55ÿC
Maximum right	approx. 60ÿC

Tab. 5

ECO key

By pressing the key and holding it for a short time in this position, the switch between **comfort** and **ECO operating modes is performed.**

Comfort mode, key does not light (factory setting)

In the heat exchanger, the water is kept **permanently** at a certain temperature. Therefore, the time to obtain hot water is reduced.
Because of this, the burner starts from time to time for a short time, even if there is no demand for domestic hot water.

ECO mode, the key lights up

In the heat exchanger, the water is **not permanently** maintained at the same temperature. When the tap is opened, the water will start to heat up to the desired temperature.

5.6 Operation during summer (domestic hot water only)

In the case of the electronic regulator with probe exterior

B **Do** not change the position of the control panel thermostat knob.

At a certain outside temperature, the controller automatically switches off the circulation pump and the heating mode.

In the case of the room thermostat

B The boiler thermostat knob rotates to the left, to the end.
The heating mode is switched off. For this mode, only domestic hot water production is activated. The power supply of the room thermostat or chronothermostat remains switched on.

5.7 Frost protection

B Leave the heating on.

-or

B Mix water from the heating system with FSK antifreeze, Schilling Chemie (22% -55%) or glycerin N, BASF (Glythermin) (20% -62%) or Antifrogen N, Hoechst / Ticona (20% -40%).

5.8 Faults

You can find an overview of the faults in the table on page 33.

Malfunctions may occur during operation.

The display will show a fault code and the key may flash.

If the key blinking:

B Press and hold the key until the display will display.
The boiler resumes its working mode and the display will show the flow temperature.

If the key does not flash:

B Stop, then restart the boiler.
The boiler resumes its working mode and the flow temperature is displayed.

If the fault code reappears:

B Call the specialist service company and report the fault.

5.9Protection against pump blockage

This function prevents the circulation pump from locking in the event of a longer period of inactivity.

After each stop of the pump, a timer is activated which starts the circulation pump for a few minutes, every 24 hours of non-operation.

6 Individual adjustment

6.1 Mechanical adjustment

6.1.1 Checking the size of the expansion vessel with membrane

The following diagram makes it possible to assess, broadly speaking, whether the existing expansion vessel is sufficient or an additional expansion vessel is required (no floor heating).

For the represented curves, the following conditions were observed:

- 1% of the pre-existing water in the expansion vessel or 20% of the nominal value of the nominal volume in the expansion vessel
- the pressure difference for the safety valve is 0.5 bar, according to the regulations
- vessel preload pressure expansion corresponds to the static height of the installation above the appliance
- maximum working pressure: 3 bar.

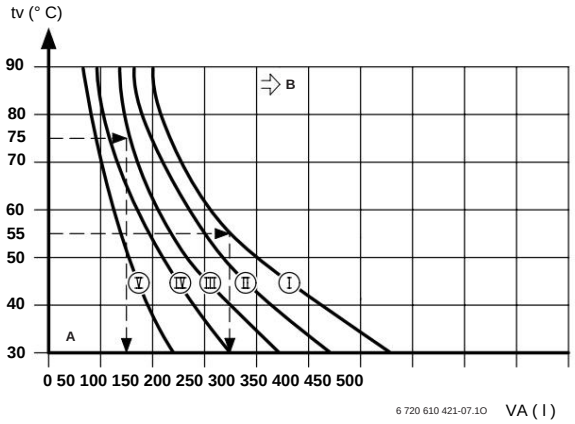


Fig. 20

I Preload pressure 0.2 bar
II Preload pressure 0.5 bar
III Preload pressure 0.75 bar
IV Preload pressure 1.0 bar
IN Preload pressure 1.3 bar
A Field of work of the expansion vessel
B Requires an additional **vV** expansion vessel
The temperature is reasonable
VA The volume, in liters, of the installation

B In case of extreme situations: Set the size of the expansion vessel according to the regulations.

B If the point of intersection is to the right of the curve: Install an additional expansion vessel.

6.1.2 Adjusting the flow temperature

The flow temperature can be adjusted in the range of 45ÿC and approx. 90 ° C.

Limiting the maximum flow temperature

Thermostat knob position E. is limited from the factory to This corresponds to a maximum flow temperature of 75ÿC.

It is not necessary to adjust the heating power to the calculated heat demand.

Canceling the maximum flow temperature limit

For heating systems that require higher flow temperatures, the limitation may be canceled.

B Remove the yellow button from the button thermostat with a screwdriver.

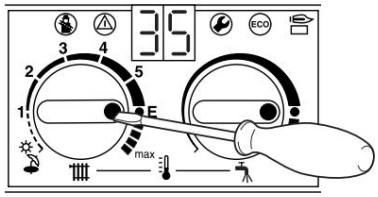


Fig. 21

B Insert the yellow button again, but rotate 180ÿ (the point should be inwards).
The flow temperature is no longer limited.

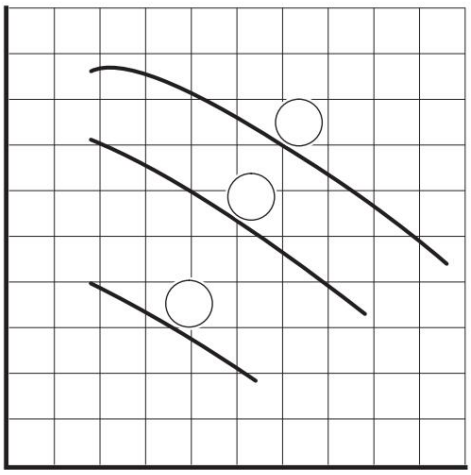
The position	The temperature is reasonable
1	approx. 45ÿC
2	approx. 51ÿC
3	approx. 57ÿC
4	approx. 63ÿC
5	approx. 69ÿC
AND	**approx. 75ÿC**
max	approx. 87ÿC

Tab. 6

6.1.3 Changing the pump operating curve

If several series pumps have been installed (one after the other), a hydraulic separation between them is required.

B The pump speed changes from the gearbox knob its terminals.



!

Fig. 22

' Pump operation curve for position I
II Pump operation curve for position II
III Pump operation curve for position III
H Pumping height
Q Pump flow

6.2 Setting parameters using the Bosch Heatronic system

6.2.1 Using the Bosch Heatronic system

Bosch Heatronic makes it possible to adjust, program and check several functions of the boiler.

This presentation summarizes the functions required for commissioning.

A detailed description can be found in the Service Notebook of the service specialist.

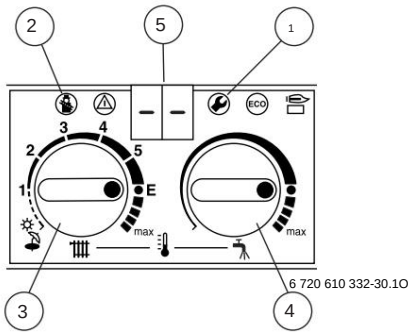


FIG. 23 Control Overview

Service key
1 Mower key
2 Heating circuit thermostat knob
3 Domestic hot water thermostat knob
4 5 Display

Choice of service function:

Note the positions of the thermostat buttons and. After making the adjustments, return the thermostat knobs to their original positions.

Service functions are divided into two levels: **level 1** includes service functions **up to 4.9,** and **level 2** includes service functions **from 5.0.**

B To select a level 1 service function: press and hold the key until the display shows **= =**

B To select level 2 service functions press and hold the keys at the same time, and hold them until the display appears **= =**

B Turn the service function thermostat knob to choose a

Service function	Index	see page
How the pump works	**2.2**	21
Stop time	**2.4**	22
Maximum flow temperature	**2.5**	22
Connection gap	**2.6**	23
Maximum heating power	**5.0**	23

Tab. 7

Value adjustment

B To adjust a value, turn the thermostat knob.

B Write down the value in the commissioning report (page 36).

Storing value

B Level 1: Press and hold the key until **[]** appears on the display .

B Level 2: Press and hold the keys at the same time until appears on the display.

After completing all settings

B Turn the thermostat knobs to the values as well as initials.

6.2.2 Choosing the operating mode of the pump in heating operating mode (service function 2.2)

When a temperature controller is connected to an external probe, the boiler automatically switches to the 3 operating mode of the pump.

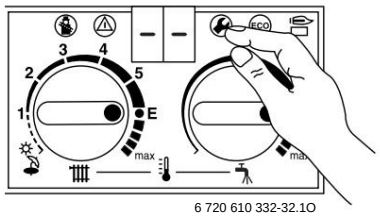
The working modes are:

- **Operating mode 1** for control units without any auxiliary control device.
  The pump is controlled by the boiler operating thermostat.

- **Operating mode 2 (factory set)** for room thermostat installations.
  The boiler operating thermostat will only switch off the gas valve and the pump will continue to run.
  The room thermostat switches off both the gas valve and the pump.
  The pump runs for another 3 minutes.

- **Operating mode 3** for installations with temperature controller with outdoor probe.
  The regulator stops the pump. When operating in summer, the pump only runs when domestic hot water is required.

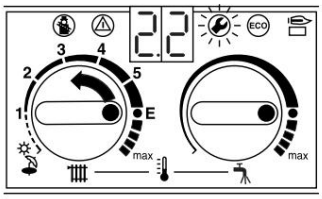
B Press the key on and keep it that way until the display appears **- -**
The key flashes.



6 720 610 332-32.1O

Fig. 24

B Turn the thermostat knob until **2.2** appears on the display .
After a while, the display will show how the pump works.



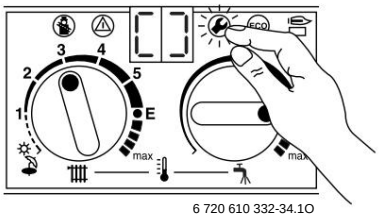
6 720 610 332-33.1O

Fig. 25

B Turn the thermostat knob until
the display shows the desired index, between **1** and **3 .**
The display and the key flash.

B Write down the value in the commissioning report (page 36).

B Press the display and keep it that way until key **[ ]** appears.
The working mode has been saved.



6 720 610 332-34.1O

Fig. 26

B Turn the thermostat knobs to the values as well as initials.
The display shows the flow temperature again.

6.2.3 Changing the stop time (service function 2.4)

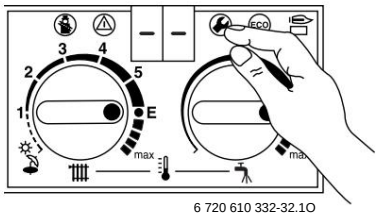
The off time can be set from 0 to 15 minutes (factory setting: 3 minutes).

The shortest possible shutdown time is 1 minute (recommended for single tube installations).

At 0, the stop time is locked.

> When switching on a temperature controller with an external probe, no change in the switch-off time is required.
>
> The controller will optimize this time.

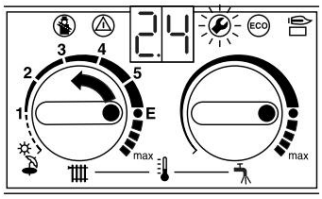
B Press the key on and keep it that way until the display appears **- -**
The key flashes.



6 720 610 332-32.1O

Fig. 27

B Turn the thermostat knob until **2.4** appears on the display .
After a while, the display will show the saved stop time.



6 720 610 332-39.1O

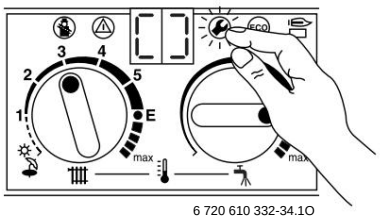
Fig. 28

B Turn the thermostat knob until
The display shows the desired stop time, between **0** and **15 .**

The display and the key flash.

B Write down the value in the commissioning report (page 36).

B Press the display and keep it that way until key **[ ]** appears.
The working mode has been saved.



6 720 610 332-34.1O

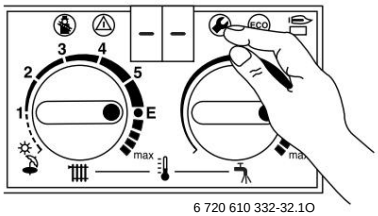
Fig. 29

B Turn the thermostat knobs to the value as well initials.
The display shows the flow temperature again.

6.2.4 Setting the maximum flow temperature (service function 2.5)

The maximum flow temperature can be set between 45ўC and approx. 90ўC (factory set).

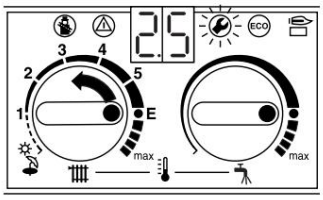
B Press the key on and keep it that way until the display appears **- -**
The key flashes.



6 720 610 332-32.1O

Fig. 30

B Turn the thermostat knob until **2.5** appears on the display .
After a short time, the display will show the maximum stored flow temperature.



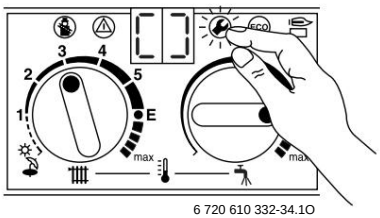
6 720 610 332-42.1O

Fig. 31

B Turn the thermostat knob until
The display shows the maximum desired temperature on the tour, between **45** and about **90 .**
The display and the key flash.

B Write down the value in the commissioning report (page 36).

B Press the display and keep it that way until key **[ ]** appears.
The working mode has been saved.



6 720 610 332-34.1O

Fig. 32

B Turn the thermostat knobs to the value as well initials.
The display shows the flow temperature again.

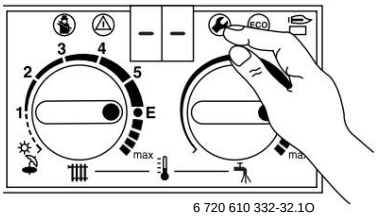
6.2.5 Setting the connection deviation (ÿt) (service function 2.6)

When connecting a temperature controller with an external probe, the connection gap is taken over by the controller.
No setting required on the device.

The connection deviation is the permissible difference from the reference temperature on the flow. It can be set in 1 K steps. The setting range is between 0 and 30 K (factory setting: 0 K). The minimum flow temperature is 45ÿC.

B Switch off the switch-off time (setting **0.,** see service function 2.4).

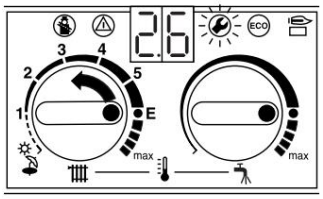
B Press the key and keep it that way until on the display appears
- - The key flashes.



6 720 610 332-32.1O

Fig. 33

B Turn the thermostat knob until **2.6** appears on the display .
After a while, the display will show the saved connection gap.



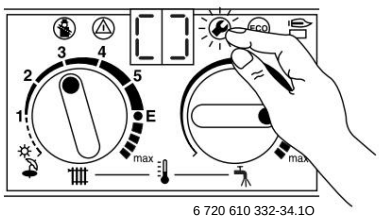
6 720 610 332-45.1O

Fig. 34

B Turn the thermostat knob until
The display shows the desired connection deviation, between **0** and **30 .**
The display and the key flash.

B Write down the value in the commissioning report (page 36).

B Press the display and keep it that way until key **[ ]** appears.
The working mode has been saved.



6 720 610 332-34.1O

Fig. 35

B Turn the thermostat knobs to the values as well initials.
The display shows the flow temperature again.

6.2.6 Setting the maximum heating power (service function 5.0)

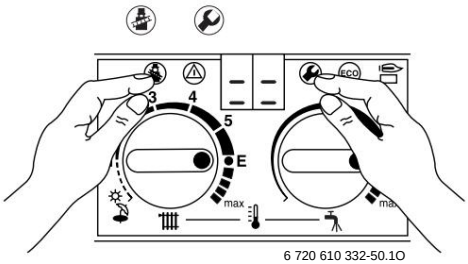
Some Gas Distribution Companies charge a basic price, which depends on the power of the plant.

The heating power can be set between the minimum thermal power and the maximum rated thermal power, at the specific value of the heat demand.

And in the case of low maximum heating power, the maximum useful thermal power for domestic hot water is at the disposal of the beneficiary.

The factory setting of the maximum heating power is the maximum rated thermal power, which is shown on the display as **99.**

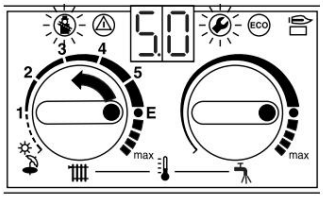
B Press and hold the and keys at the same time until **= =** and flashing keys appear on the display.



6 720 610 332-50.1O

Fig. 36

B Turn the thermostat knob until **5.0** appears on the display.
After a short time, the display will show, as a percentage, the maximum stored heating power **(99.** = rated power).



6 720 610 332-51.1O

Fig. 37

B Depending on the heating power expressed in kW, extract the corresponding index from the adjustment tables (see page 34 or 35).

B Turn the thermostat knob until the desired index appears on the display.
The display and the keys flash.

B Measure the gas flow and compare it with the value in the table next to the desired index. In case of differences, correct the index!

B Write down the value in the commissioning report (page 36).

B Press and hold the and keys at the same time until **[]** appears on the display .
The working mode has been saved.

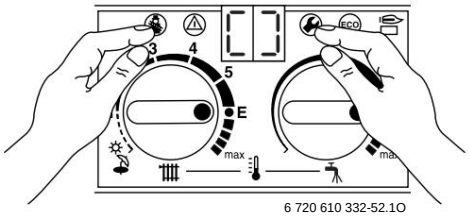


Fig. 38

B Turn the thermostat knobs to the values as well initials.
The display shows the flow temperature again.

6.2.7 Reading values in the Bosch Heatronic system

In the case of a repair, the reinstallation of the values is considerably simplified.

B Read the set values (see table 8) and enter them in the commissioning report.

After reading:

B Turn the thermostat knob to the initial value.

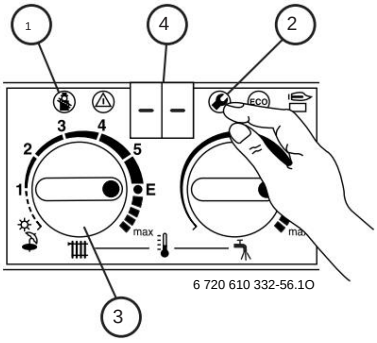


Fig. 39

Service function		How to read?		
How the pump works	**2.2**	Press and hold (2) until (4) indicates **- -** Wait until (4) **indicates 00.** or **01.**	(Turn (3) until (4) indicates **2.2.** Wait until (4) indicates a number. Write down the number.	Press and hold (2) until (4) indicates **- -**
Shutdown time **2.4**			Turn (3) until (4) shows **2.4.** Wait until (4) indicates a number. Write down the number.	
Maximum flow temperature	**2.5**		Turn (3) until (4) shows **2.5.** Wait until (4) indicates a number. Write down the number.	
Connection gap	**2.6**		Turn (3) until (4) indicates **2.6.** Wait until (4) indicates a number. Write down the number.	
Maximum heating power	**5.0**	Press and hold (1) and (2) until (4) indicates **= =** Wait until (4) indicates **0.**	(Rotate (3) until (4) indicates **5.0.** Wait until (4) indicates a number. Write down the number.	Press and hold (1) and (2) until (4) indicates **= =**

Tab. 8

7 Gas adjustment, depending on its type

7.1 Gas regulation

In particular, after switching to another type of gas, the gas flow must be checked or adjusted for the minimum power and the maximum maximum heating power.

The following settings are made at the factory:

- **Methane gas: Methane** gas appliances are set and factory sealed for an index value
  Wobbe of 14.9 kWh / m3 and a dynamic pressure of 20 mbar.
- **LPG: LPG** appliances are factory adjusted and sealed in accordance with the dynamic pressure on the appliance label.

The rated thermal input can be adjusted using the nozzle pressure method or the volumetric method. A U-tube manometer is required for both methods.

The nozzle pressure method is faster and is therefore preferable.

7.1.1 Preparation

B Remove the jacket (see removing the jacket).

B Remove the two control panel screws and fold it down.

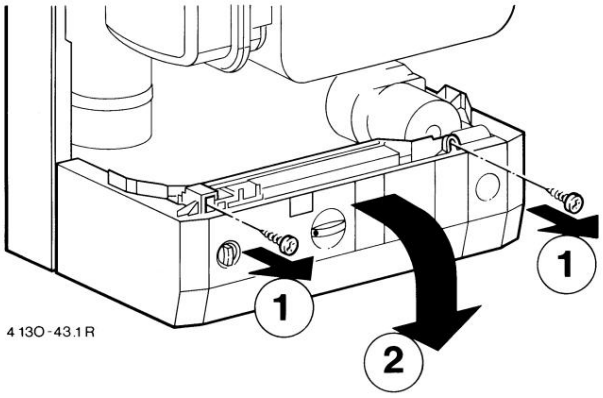


Fig. 40

B Turn the thermostat knob until **2.0** appears on the display.
After a short time, the display will show the stored operating mode **(0.** = normal operating mode).

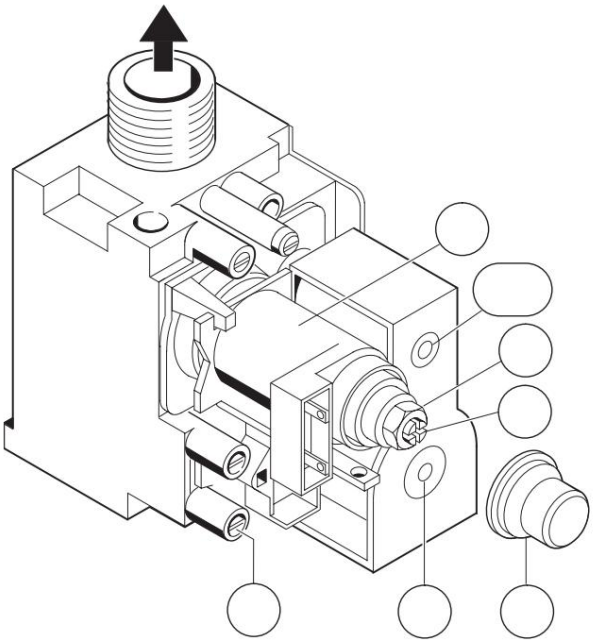


Fig. 41

7 Dynamic inlet pressure measuring nozzle
52 Safety magnetic valve
52.1 Safety magnetic valve
63 Maximum gas pressure adjustment screw
64 Minimum gas pressure regulating screw
65 Cover **68**
Continuously modulated magnetic valve

7.1.2 Nozzle pressure method

Nozzle pressure at maximum useful thermal power

B Press the key and keep it that way until on the display appears
- - The key flashes.

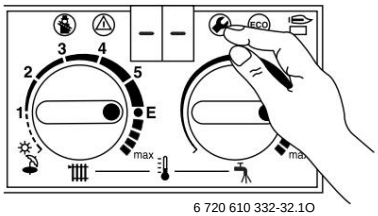


Fig. 42

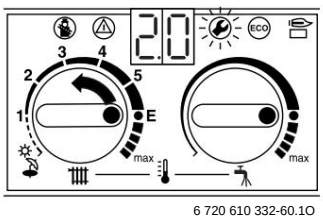
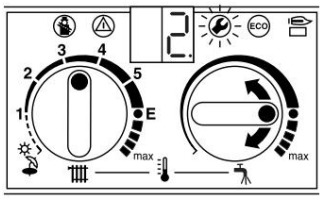


Fig. 43

B Turn the thermostat knob until **2.** (= maximum rated thermal output (domestic hot water)) appears on the display).

The display and the key flash.



6 720 610 332-61.1O

Fig. 44

B Loosen the sealing screw (3) and attach the U-tube pressure gauge to the measuring nozzle.

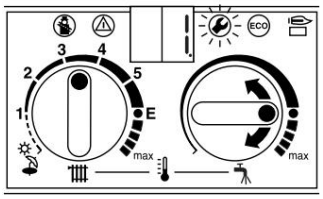
B Remove the sealed cover (Fig. 41) from the two gas adjusting screws.

B Extract the pressure from the table on page 34 "Max" at the nozzle (mbar). Adjust the nozzle pressure with the adjusting screw (63). Turning to the right means more gas, and turning to the left means less gas.

Nozzle pressure at minimum useful thermal power (Domestic hot water)

B Turn the thermostat knob counterclockwise until **1.** (= min. Useful heat output) appears on the display.

Display and key blink.



6 720 610 332-63.1O

Fig. 45

B Extract the pressure from the table on page 34 "Min (domestic hot water)" at the nozzles (mbar). Adjust the nozzle pressure with the adjusting screw (64).

B Check the set values min. and max. and, if necessary, correct them.

Dynamic inlet pressure

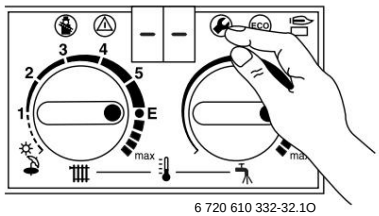
B Switch off the boiler, close the gas valve, remove the U-tube pressure gauge and tighten the sealing screw (3).

B Loosen the sealing screw (7) and attach the U-tube pressure gauge to the measuring nozzle.

B Open the gas valve and switch on the boiler.

B Press the key and keep it that way until on the display appears

- - The key flashes.

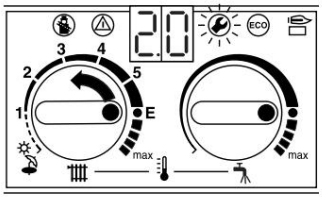


6 720 610 332-32.1O

Fig. 46

B Turn the thermostat knob until **2.0** appears on the display.

After a short time, the display will show the stored operating mode **(0.** = normal operating mode).

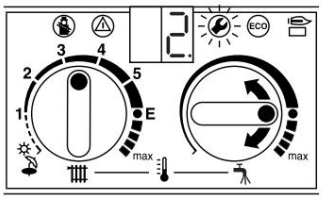


6 720 610 332-60.1O

Fig. 47

B Turn the thermostat knob until **2.** (= maximum rated thermal output (domestic hot water)) appears on the display).

The display and the key flash.



6 720 610 332-61.1O

Fig. 48

B Check the pressure in dynamic mode.

- for methane gas it must be between 18 and 24 mbar. - the LPG must be the one on the appliance label.

At dynamic pressures of methane gas below 18 or above 24 mbar, neither regulation nor commissioning is permitted.
The cause must first be detected and then the anomaly remedied. If this is not possible, the gas supply to the plant is stopped and the Gas Distribution Authority is notified.

Reinstalling the normal working mode

B Turn the thermostat knob all the way to the left until **0.** (= normal operating mode) appears on the display.

Display and key blink.

B Press the key and keep it that way until on the display appears
- - The key flashes.

B Turn the thermostat knobs to the value as well initials.
The display shows the flow temperature again.

B If you are dissatisfied with the shape or color of the flame, check the nozzles.

B Switch off the boiler, close the gas valve, remove the U-tube pressure gauge and tighten the sealing screw (7).

B Replace the cover over the gas adjusting screws and seal it.

7.1.3 Volumetric method

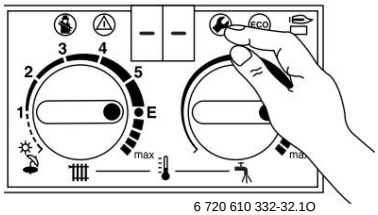
When refueling with a LPG / air mixture, during the maximum consumption time, the regulation must be checked using the nozzle pressure method.

B The values of the Wobbe index (WO), the calorific value (PC) and the lower calorific value (PCI) of the gas must be requested from the Local Gas Distribution Authority.

i In order to be able to make the adjustment, the boiler must be operated for more than 5 minutes.

Flow rate at maximum useful thermal power

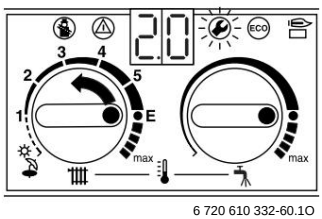
B Press the key and keep it that way until on the display appears
- - The key flashes.



6 720 610 332-32.1O

Fig. 49

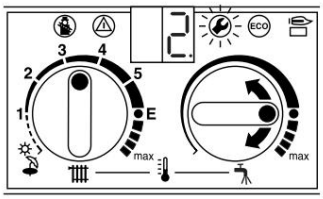
B Turn the thermostat knob until **2.0** appears on the display.
After a short time, the display will show the stored operating mode **(0.** = normal operating mode).



6 720 610 332-60.1O

Fig. 50

B Turn the thermostat knob until **2.** (= maximum rated thermal output (domestic hot water)) appears on the display).
The display and the key flash.



6 720 610 332-61.1O

Fig. 51

B Loosen the sealing screw (3) and attach the U-tube pressure gauge to the measuring nozzle.

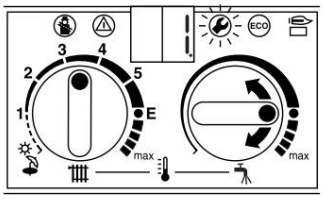
B Remove the sealed cover (Fig. 41) from the two gas adjusting screws.

B Extract the “max” gas flow (l / min) from the table on page 35. Adjust the nozzle pressure with the adjusting screw (63) following the instructions on the gas meter. Turning to the right means more gas, and turning to the left means less gas.

Flow rate at minimum useful thermal power (Domestic hot water)

B Turn the thermostat knob counterclockwise until **1.** (= min. Useful heat output) appears on the display.

Display and key blink.



6 720 610 332-63.1O

Fig. 52

B Extract the “min (domestic hot water)” gas flow (l / min) from the table on page 35. Adjust the nozzle pressure with the adjusting screw (64).

B Check the set values min. and max. and, if necessary, correct them.

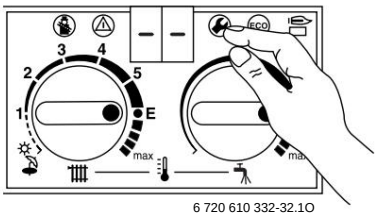
Dynamic inlet pressure

B Switch off the boiler and close the gas valve.

B Loosen the sealing screw (7) and attach the U-tube pressure gauge to the measuring nozzle.

B Open the gas valve and switch on the boiler.

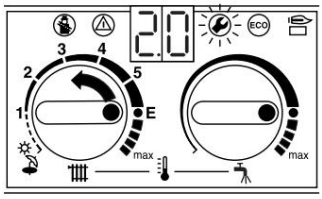
B Press the key and keep it that way until on the display appears
- - The key flashes.



6 720 610 332-32.1O

Fig. 53

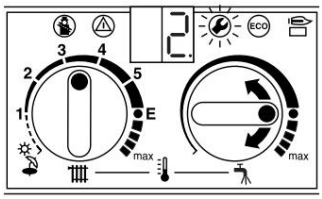
B Turn the thermostat knob until **2.0** appears on the display.
After a short time, the display will show the stored operating mode **(0.** = normal operating mode).



6 720 610 332-60.1O

Fig. 54

B Turn the thermostat knob until **2.** (= maximum rated thermal output (domestic hot water)) appears on the display).
The display and the key flash.



6 720 610 332-61.1O

Fig. 55

B Check the pressure in dynamic mode.
- for methane gas it must be between 18 and 24 mbar. - the LPG must be the one on the appliance label.

At dynamic pressures of methane gas below 18 or above 24 mbar, neither regulation nor commissioning is permitted.
The cause must first be detected and then the anomaly remedied. If this is not possible, the gas supply to the plant is stopped and the Gas Distribution Authority is notified.

Reinstalling the normal working mode

B Turn the thermostat knob all the way to the left until **0.** (= normal operating mode) appears on the display.

Display and key blink.

B Press the key and keep it that way until on the display appears
- - The key flashes.

B Turn the thermostat knobs to the values as well initials.
The display shows the flow temperature again.

B If you are dissatisfied with the shape or color of the flame, check the nozzles.

B Switch off the boiler, close the gas valve, remove the U-tube pressure gauge and tighten the sealing screw (7).

B Replace the cover over the gas adjusting screws and seal it.

7.2 Transformation to another type of gas

When transforming the appliance into a different type of gas than the one for which it was intended, it is necessary to purchase a transformation kit.

The instructions accompanying the transformer set must be observed.

From the type of gas	On the type of gas	Transformation set
23	31	7 719 002 138
21	23	7 719 002 141

Tab. 9

B Turn the main switch to position (0).

B Close the gas supply valve.

B Remove the jacket (see removing the jacket).

B Remove the combustion chamber cover.

B Remove the burner.

B Remove the gas manifold.

B Replace the nozzles (29).

B Mounting is done in the opposite direction of disassembly.

B Open the control panel, see chapter Removing the cover).

B Replace the coded plug.

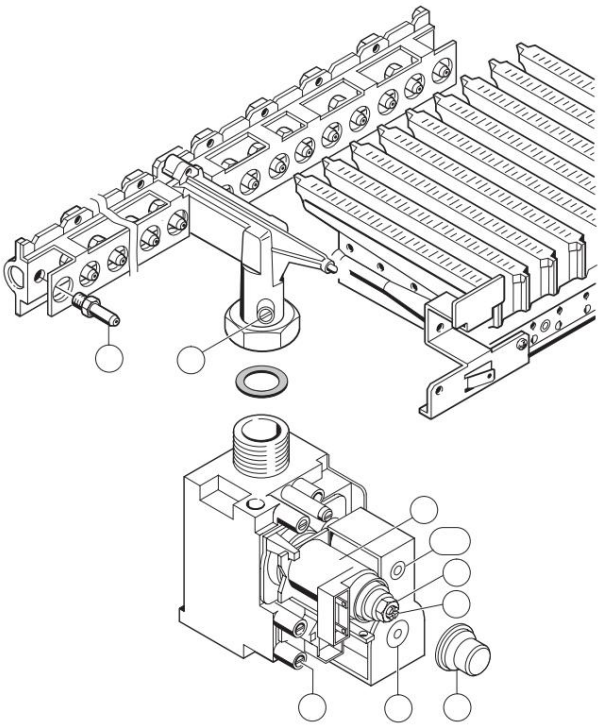


Fig. 56

3 Nozzle pressure measuring nozzle **7** Dynamic inlet pressure measuring nozzle
29 Nozzle
52 Safety magnetic valve
52.1 Safety magnetic valve
63 Maximum gas pressure adjustment screw
64 Minimum gas pressure regulating screw
65 Cover **68** Continuously modulated magnetic valve

After conversion to another type of gas: B

Switch on the boiler and make the adjustments according to Chapter 7.1.

8 Maintenance

Danger: electric shock!
B Always switch off the voltage (fuses, LS switch) before working on the electrical components.

B Maintenance may only be carried out by a specialist company authorized to do so.

B Only original spare parts can be used.

B Disassembled gaskets and O-rings must be removed replaced with new ones.

8.1 Revision works

The heat exchanger

B Check the heat exchanger if it is dirty.

If the heat exchanger needs to be cleaned:

B Close the shut-off valves.

B Empty the appliance.

B Remove the temperature limiter (6) and the probe flow temperature (36).

B Remove the heat exchanger.

B Wash the exchanger with a strong jet of water.

B When the heat exchanger becomes more dirty, dip it in the hot water containing the detergents with the slats, then wash it thoroughly and rinse it.

Checking the heat exchanger for leaks:

a pressure of max. 4 bar.

burner

B The burner must be checked annually and, if necessary, cleaned.

If the burner needs to be cleaned:

B Close the gas supply valve.

B Remove the ignition electrode and the ignition electrode ionization.

B Brush the electrode tips with a brush.

B Brush the slots and air vents on the injector nozzles with a brush.

B If the burner is heavily soiled with grease, slag, etc., disassemble it and soak it in water containing detergents, then rinse.

Danger: Gas leaks!
B Burner gasket needs to be replaced after each disassembly!

Domestic hot water pipes

If the desired outlet temperature is no longer reached:

B Remove the heat exchanger.

B Remove limescale deposits as follows:

- use commercially available cleaners and an electric limestone cleaning pump.

- connect the pump to the domestic hot water connections of the heat exchanger.

Expansion vessel

B Remove the pressure from the appliance.

B Check the expansion vessel and, if necessary, replace the air cushion with approx. 1 bar.

B Correlate the preload pressure of the expansion vessel with the static height of the system.

Safety, adjustment and control elements

B Check the operation of all safety, adjustment and control elements.

B Replace the ionization electrode every 3 years.

Spare parts

B Order according to the spare parts list, specifying their name and code.

Vaseline for maintenance

B Only use the following Vaseline:

- for components in contact with water: Unisilkon L 641 (8 709 918 413)
- for threads: HFt 1 v 5 (8 709 918 010).

8.2 Flue gas measurement

B Press the and keep it that way until display key **- -** The "mower" operating mode is now activated. The key flashes and the display shows the flow temperature.

You have 15 minutes to make the measurements. After that, the “mower” operating mode is automatically deactivated and returns to normal operation.

B Remove plug (234) from flue gas measuring nozzle.

B Insert the probe probe as far as it will go into the flue gas measuring nozzle and seal the hole.

B Measure CO, CO2 and flue gas temperature values.

B Put the plug back on the measuring nozzle.

B Remove the plug (234/1) from the inlet nozzle
air required for combustion.

B Insert the probe 35 mm into the nozzle and seal the measuring hole.

B Measure the air temperature required for combustion.

B Put the plug back on the measuring nozzle.
If the desired flue gas values have not been obtained, you must clean the burner and heat exchanger, then check the rolling diaphragm and flue pipe.

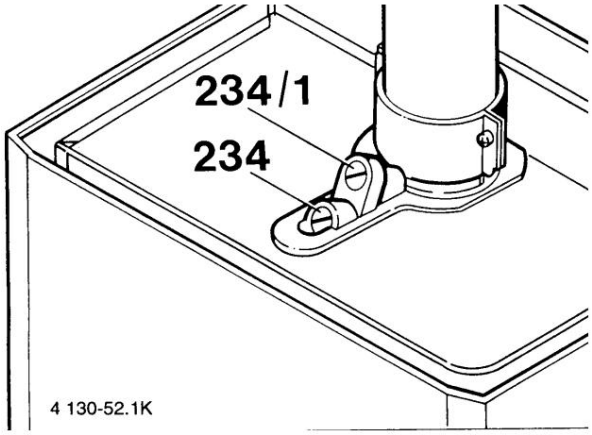


Fig. 57

234 Flue gas measuring nozzle
234/1 Combustion nozzle

B Refit the plug.

B Press and hold the key until the display shows **- -** The key turns off and the display shows the flow temperature.

8.3 Emptying the heating system

Domestic hot water circuit

B Close the cold water inlet valve in
apparatus.

B All domestic hot water taps supplied by the boiler are opened.

Heating circuit

B Empty the radiators.

B The boiler is emptied by opening the valve on the return of the heating circuit.

Connect a hose to the drain valve so that the water drains to a well-established place.

9Anexÿ

9.1 Defect codes

Display	Description	Directions
A7	The domestic hot water temperature probe has interruptions or short circuits.	Check the probe and the connecting cable.
AC	There is no electrical connection between the inserted auxiliary module and Heatronic.	Check the connection cable between the module and Heatronic.
Ad	The boiler probe is defective	Check the probe and the connecting cable.
b1	The coded plug.	The coded plug is inserted correctly, respectively it is measured and possibly replaced.
C1	Differential pressure switch disconnected during operation	Check the differential pressure switch and exhaust pipe
C4	The differential pressure switch does not switch off in idle mode	Check the differential pressure switch
C6	The pressure switch does not connect	Check the differential pressure switch and exhaust pipe
CC	The external probe of TA 'is interrupted.	Check the outer probe and the connecting cable.
d1	There is no response signal from LSM.	Check the LSM wiring. The underfloor heating limiter has switched off.
E0	Internal defect on the electronic board.	Check that the plug contacts, the RAM ignition cables, and the Bus module are securely fastened, and if necessary, replace the electronic board or the Bus module.
E2	The flow temperature probe is interrupted or short-circuited.	Check the probe and the connecting cable.
E9	STB temperature limiter disconnected. Ventilate the boiler.	check the NTC probe on the flow, the pump, as well as the fuses on the electronic board.
EA	There is no ionization current.	Is the gas tap open? Check the dynamic gas pressure, ignition electrode and cable, ionization electrode and cable, exhaust pipe and CO2 .
F7	False ionization signal.	Check the ionization electrode cable for cracks or cuts. Check that the control panel of the Heatronic system is damp; if so, then it dries.
FA	Ionization current remains after the gas valve is disconnected.	Check the gas valve and its connecting cables.

Tab. 10

9.2 Nozzle gas pressure setting values for ZWE 24 / 28-4 MFA.

	Display	Index Wobbe kWh/m3 Puterea kW (tturret = 80/60ÿC)	"23" Gas methane G20 13,5 13,8 14,2 14,5 15,0 15,2 15,6 Gas pressure (mbar)	"31" GPL G31 25,6 Gas pressure (mbar)
ZWE 24	30	8,0	1,4 1,4 1,3 — 1,2 1,2 1,1 — 1,1	2,6
	35	8,5	1,6 1,5 1,5 1,4 1,3 1,3 1,2	3,2
	45	10,9	2,7 2,6 2,4 2,3 2,2 2,1 2,0	5,4
	55	13,3	4,0 3,8 3,6 3,5 3,3 3,2 3,0	8,0
	65	15,8	5,6 5,4 5,1 — 4,9 4,6 4,4 4,2	11,3
	75	18,0	7,4 7,1 6,7 6,5 6,0 5,9 5,6	14,9
	85	20,4	9,6 9,2 8,7 8,3 7,8 7,6 7,2	19,1
	95	22,9	12,0 11,5 10,9 10,4 9,7 9,5 9,0	24,0
	99	24,0	13,3 12,7 12,0 11,5 10,8 10,5 9,9	26,5
Nozzle index			110	69
ZWE 28	30	8,0	1,2 1,1 — 1,0 1,0 0,9 0,9 0,9	
	35	9,9	1,8 1,7 1,6 1,5 1,4 1,4 1,3	
	45	12,7	2,9 2,8 2,6 2,5 2,4 2,3 2,2	
	55	15,6	4,4 4,2 3,9 3,8 3,5 3,4 3,3	
	65	18,3	6,1 — 5,8 5,5 5,3 4,9 4,8 4,6	
	75	21,1	8,1 — 7,8 7,3 7,0 6,6 6,4 6,1	
	85	23,8	10,4 10,0 9,4 9,0 8,4 8,2 7,8	
	95	26,5	13,0 12,4 11,7 11,3 10,5 10,3 9,7	
	99	28,0	14,4 13,8 13,1 12,5 11,7 11,4 10,8	
Nozzle index			115	

Tab. 11

kWh/m3	13,49	13,84	14,19	14,54	14,89	15,24	15,58	22,56	25,59
MJ/m3	48,57	49,82	51,08	52,34	53,59	54,85	56,10	81,22	92,22
kcal/m3	11600	11900	12200	12500	12800	13100	13400	19400	22000

Tab. 12

9.3 Gas flow (l / min)

	Display	PC (kWh/m3) PCI (kWh/m3) KW power	"23" Gas methane G20 9,3 9,8 10,2 10,7 11,2 11,6 12,1 12,6 13,0 7,9 8,3 8,7 9,1 9,5 9,9 10,3 10,7 11,0 Gas flow (l / min)
ZWE 24	30	8,0	19 18 17 16 15 15 14 14 13
	35	8,5	20 19 18 17 16 16 15 15 14
	45	10,9	25 24 23 22 21 20 19 19 18
	55	13,3	31 30 28 27 26 25 24 23 22
	65	15,8	37 35 33 32 30 30 28 27 26
	75	18,0	42 40 38 37 35 34 32 31 30
	85	20,4	48 46 44 42 40 38 37 35 34
	95	22,9	53 51 49 47 45 43 41 40 38
	99	24,0	56 54 51 49 47 45 43 42 40
ZWE 28	30	8,0	19 18 17 16 15 15 14 14 13
	35	9,9	23 22 21 20 19 18 18 17 16
	45	12,7	30 28 27 26 25 24 23 22 21
	55	15,6	36 34 33 31 30 29 28 27 26
	65	18,3	43 41 39 37 36 34 33 32 30
	75	21,1	50 47 45 43 41 40 38 36 35
	85	23,8	56 53 51 48 46 45 43 41 40
	95	26,5	62 59 57 54 52 50 48 46 44
	99	28	66 63 60 57 55 52 50 49 47

Tab. 13

kWh/m3	PC=	9,30	9,77	10,23	10,70	11,16	11,63	12,10	12,56	13,03	
kWh/m3	PCI=	7,91	8,35	8,72	9,13	9,54	9,89	10,29	10,70	11,05	
MJ/m3	PC=	33,49	35,17	36,84	38,52	40,19	41,87	43,54	45,22	46,89	
MJ/m3	PCI=	28,47	29,94	31,40	32,87	34,33	35,59	37,05	38,52	39,77	
kcal/m3	PC=	8000	8400	8800	9200	9600	10000	10400	10800	11200	

Tab. 14