



Leopard

User and Installation Instructions

24 BTV / v.17
24 BOV / v.17



- Wallhung gas boiler
- DHW preparation
- Power 9 - 24kW

Note: The boiler serial number is marked on the data label attached to the fascia behind the front panel. Refer to the 'Introduction' section for a description of the basic functions of the boiler. The 'User' section describes how to safely operate the boiler. The "Installation " is meant for workers of specialized companies..

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Mandatory warning for CEE countries

Warning: This appliance is designed, approved and inspected to meet the requirements of the market. The identification plate located on the inside of the appliance **certifies the origin** where the product was manufactured and the **country** for which it is intended.

If you see any exception to this rule, please contact your nearest dealer.
Thank you in advance for your assistance.

CE Mark

This boiler meets the requirements of Statutory Instrument No. 3083 The boiler (Efficiency) Regulations, and therefore is deemed to meet the requirements of Directive 92/42/EEC on the efficiency requirements for new hotwater boilers fired with liquid or gaseous fuels.

Type test for purposes of Regulation 5 certified by: Notified body 1015.
Product/production certified by: Notified body 1015.

The CE mark on this appliance shows compliance with:

1. Directive 90/396/EEC on the approximation of the laws of the Member States relating to appliances burning gaseous fuels.
2. Directive 73/23/EEC on the harmonization of the Laws of the Member States relating to the electrical equipment designed for use within certain voltage limits.
3. Directive 89/336/EEC on the approximation of the Laws of the Member States relating to electromagnetic compatibility.

Dear Customer

You have become an owner of a wall-hung combination boiler, for natural gas or LPG. The boiler 24BTV 17 with forced flue gas removal and 24BOV 17 with flue gas removal by means open chimney draught are designed for heating up the heating circuit water (CH) in central heating systems in flats, family houses,

workshops, offices, etc. and as a flow heater of domestic hot water (DHW).

We believe it will serve you to your full satisfaction – certain minimum requirements must be fulfilled to that end. That is why we are asking you to study and follow these instructions carefully.

Important notes

Please, keep the following rules in mind:

- The boiler and all accessories must be installed and used in compliance with the design, the applicable laws, technical regulations and the manufacturer's instructions.
- The boiler can only be installed in the type of environment for which it is designed.
- Only service centers authorized by the manufacturer are allowed to put the boiler into operation after installation.
- In case of defects, call a service centre authorised by the manufacturer – incompetent intervention can damage the boiler (and/or the accessories)!
- The service centre's employee who initiates the boiler operation after installation shall instruct the user about the boiler, its parts and operation.
- Check completeness of the delivery.
- Check to make sure the supplied boiler type complies with the expected manner of use.
- If you feel uncertain about any activities related to the boiler operation, look up and study all relevant information in these instructions, and follow the recommended procedure.

- Do not remove or damage any labels or markings on the boiler.
- It is not allowed to tamper with inner fitting and wiring or make changes. In case of reparation, all parts must be approved by producer of boiler.
- If the boiler is going to be switched off for a longer time, it is recommended to disconnect boiler from the electricity source and close gas valve. This recommendation is valid with reference to condition in these Instruction (e.g. the anti-freeze protection is inactivated then)
- When the life cycle of the boiler, or its parts, has expired, they should be disposed of in an environmentally friendly manner.
- Producer do not provide warranty and do not answer for damage due to infringement of:
 - conditions mentioned in these Instructions
 - valid Regulations and Standards
 - correct installation and use
 - conditions mentioned in Guarantee Certificate and Service Booklet

In practice, situations may occur in which the users must apply necessary precautions:

- Preventing the boiler from switching on (also accidental) when inspecting the chimney, flue-gas duct, water and gas piping – i.e., electricity supply to the boiler must be stopped (e.g., by unplugging) in addition to using the boiler switch;
- Stopping the boiler whenever flammable or explosive vapours appear (even if temporarily) – such as vapours of flooring glue, paints when surface finishing, gas leaks, etc.);

- If it is necessary to discharge water from the heating system, it must not be dangerously hot;
- If water has leaked from the boiler exchanger, or if the exchanger is filled with ice, no attempts to start the boiler should be made until normal operating conditions prevail.
- If there is a (whether confirmed or suspected) gas leak or stoppage in the gas supply, switching off the boiler, shutting down the gas supply and calling gasworks or a specialised service centre

Safety of life and property

- Boilers as products are checked for compliance with the following documents: EN 483, EN 437, EN 625, EN 50 165, EN 60 335-1:1997.
- The installation of this boiler must be carried out by a competent person in accordance with the relevant requirements of the current issue of:
 - the Gas Safety (Installation and Use) Regulations,
 - the Building Regulations,
 - the local water company Bylaws,
 - the Building Standards Regulation,
 - the Health and Safety at Work Act
- Besides the requirements as expressed in the above-cited documents, these Instructions for Use and the boiler documentation provided by the manufacturer are to be followed. During use, no children, drug-intoxicated or legally irresponsible persons should be allowed to tamper with the boiler.

Abbreviations used:

CH – heating circuit water,
DHW – domestic hot water.

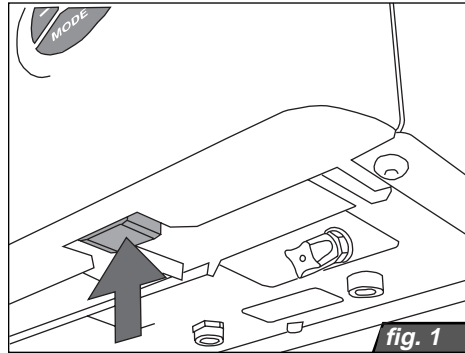
USER INSTRUCTONS

Control and Signaling

Main on/of switch

The main on/off switch (see fig.1) is on the bottom of the boiler, below the control panel.

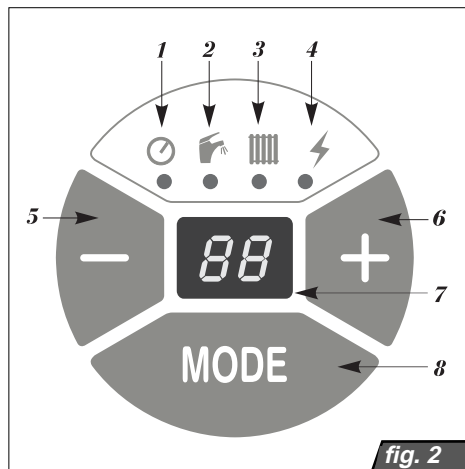
Caution: Commencing and first start of the boiler operation may only be carried out by a specialised service centre! Only turned on boiler has activated all protective function (e.g. anti-freeze protection).



Control panel

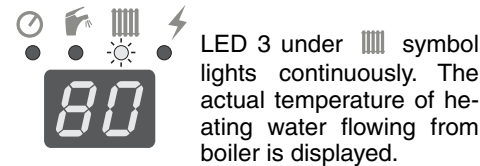
It serves for indication of actual parameters and for setting or changing required values this parameters.

- 1 - heating system pressure LED (indication of the heating water pressure)
- 2 - domestic hot water LED (indication DHW taking or domestic hot water temperature setting)
- 3 - central heating LED (indication of the heat requirement or heating temperature setting)
- 4 - fault message LED (indication of faults in boiler operation)
- 5 - decrease button (-) (decrease the setting value of parameters)
- 6 - increasing button (+) (increase the setting value of parameters)
- 7 - display (showing of pressure, temperatures, service parameters and fault messages)
- 8 - MODE button (switches between setting modes and confirms setting value of parameters)



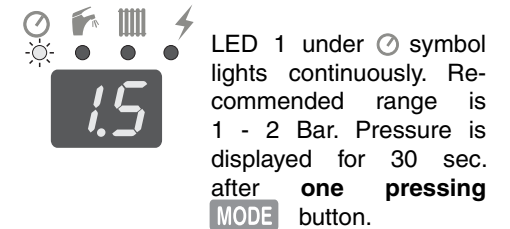
Boiler indication during ordinary operation (display mode)

Actual circuit heating water temperature indication in °C.



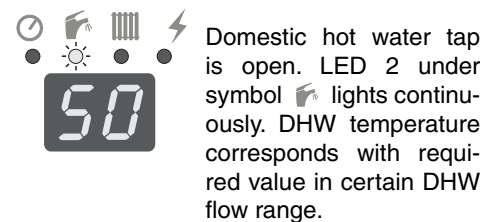
LED 3 under ☀ symbol lights continuously. The actual temperature of heating water flowing from boiler is displayed.

Water pressure in central heating system in Bar.



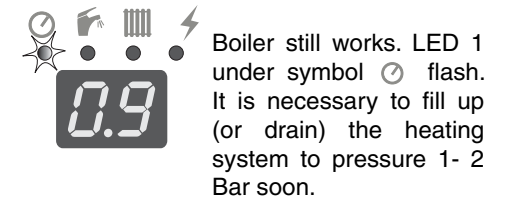
LED 1 under ⚙ symbol lights continuously. Recommended range is 1 - 2 Bar. Pressure is displayed for 30 sec. after **one pressing** MODE button.

Domestic hot water temperature indication in °C (required value).



Domestic hot water tap is open. LED 2 under 🚰 symbol lights continuously. DHW temperature corresponds with required value in certain DHW flow range.

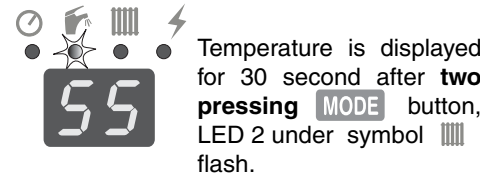
Warning on wrong pressure in heating system under value 1 Bar (or over 2,5 Bar).



Boiler still works. LED 1 under ⚙ symbol flash. It is necessary to fill up (or drain) the heating system to pressure 1- 2 Bar soon.

Water temperature setting

Domestic hot water temperature setting in °C.

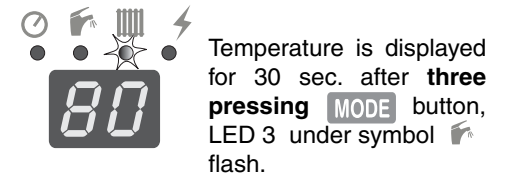


Temperature is displayed for 30 second after **two pressing** MODE button, LED 2 under symbol 🚰 flash.

Buttons - + set domestic water temperature to following values: 35, 37, 38, 39, 40, 41, 44, 47, 50, 55, 60°C. Setting symbol -- means no preparation domestic hot water.

Setting value are saved into memory after next pressing MODE button (if it's not confirmed until 30 sec., the previous setting is saved again)

Circuit heating water temperature setting in °C.



Temperature is displayed for 30 sec. after **three pressing** MODE button, LED 3 under symbol ☀ flash.

Buttons - + set central heating water temperature to following values: 38, 40, 42, 45, 50, 55, 60, 65, 70, 75, 80°C. Setting symbol -- switches central heating off (SUMMER adjustment).

Setting value are saved into memory after next pressing MODE button (if it's not confirmed until 30 sec., the previous setting is saved again).

Fault messages

Loss of circuit heating water - F0



Pressure is under 0,7 Bar. Boiler is switched off, LED 1 and LED 4 under symbols ☹ and ⚡ flashes. After filling system up to 1- 2 Bar the boiler automatically starts. For filling can be used refilling valve at the bottom of boiler (see fig. 4). If fault is frequent, call service centre.

No flame - F1



Boiler is switched off, for example by reason of gas supply failure. LED 4 under symbol ⚡ flash. Boiler can be restarted by switching off and on (from position „I“ to position „0“ and again to position „I“ by mains on/off switch). If fault is frequent, call service centre.

Other boiler faults (from F2 to F8)



Boiler switched off itself. LED 4 under symbol ⚡ flash. It is necessary to call service centre.

Boiler memory fault - F9



Boiler works, but possibility changes in setting exists. LED 3 under symbol ☹ lights continuously. Switch the boiler off and on (from position „I“ to position „0“ and again to position „I“ by mains on/off switch). Then check boiler parameters (see Water temperature setting). Let check the boiler setting by service centre occasionally.

Boiler Start and Switch-Off

Note: The preparation for and commencing of the boiler operation may only be carried out by a specialised service centre!

Before starting the boiler when it has been put into operation, check the following facts:

- The power cord must be plugged into the socket.
- The gas valve that feeds the boiler must be open.
- The water pressure in the heating system should be between 1 and 2 bar
Now the boiler is ready to be started.

Boiler start

Set the mains on/off switch to the “on” position (“I”). Display light up.

Note: In case of safety switch-off due to extinction of flame or the flue thermostat reaction (version 24 BOV) LED 4 under symbol ⚡ starts flash. Boiler can be unblocking by switching the boiler off and on (from position „I“ to position „0“ and again to position „I“ by mains on/off switch).

In case of safety switch-off due to overheat thermostat Led 4 under symbol ⚡ flash too, but boiler can be unblocking only by service centre and this act is not guarantee repair.

Warning: The boiler must not be operated if the safety elements (e.g. overheat thermostat, flue thermostat) are disabled or replaced with elements different from those specified by the manufacturer.

Boiler switch-off

Set the mains on/off switch to the “off” position (“0”).

If the boiler is going to be switched off for a longer time, it is recommended to disconnect boiler from the electricity source and close gas valve. This must be done with reference to ambient temperature, because there is the risk of freezing boiler and system in frost weather.

Setting SUMMER mode (only DHW)

- Start the boiler;
- Select “--” for CH temperature as described under Control and Signalling (CH temperature setting);
- Activate the basic state by MODE button.

Setting WINTER mode (CH + DHW)

- Start the boiler;
- Select the CH temperature instead of “--” as described under Control and Signalling (CH temperature setting);
- Activate the basic state by MODE button

Boiler Regulation

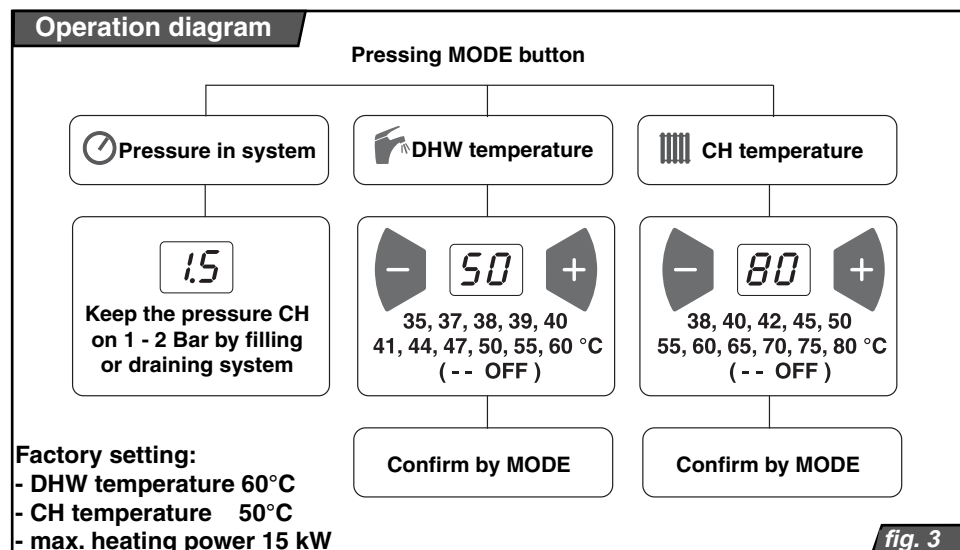
Operation without a room thermostat

Boiler keeps CH temperature on setting value. The room thermostat is not connected; its contacts must be interconnected (by utilizing a jumper).

- Set the desired temperature value as described under Control and Signalling (CH temperature setting);

Operation with a room thermostat

Boiler keeps CH temperature on setting value, with breaks in operation dependent upon the temperature in the room in which the thermostat is installed. The radiator in that room must not be equipped with a thermostatic valve head. The settings are the same as the operation without the room thermostat, but the jumper is removed and the room thermostat is connected to the contacts.



Note: Circuit heating water temperature must be set on value, that ensure sufficient heat supply to heated space in case of low outside temperature.

Protective features of the boiler

Anti-freeze protection of the system

The boiler has build-in protection against freezing water in boiler (no in whole heating system or DHW pipes). The boiler is always started if the CH temperature is below 4°C and works until CH temperature reaches 8°C. This protection is independent on room thermostat or SUMMER mode (CH water temperature setting --)

Pump protection

The pump is automatically switched on for a short time (approximately 30 sec.) if it has not been operated for 24 hours – thus clogging by sludge sedimentation in the pump's bearings is prevented.

Anti-cycling function

This function restrict too repeated starts of boiler to heating system and it is useful especially in smaller heating system, when required heating power is smaller than minimal boiler's thermal power output. Next start is delayed in range from 1min 30 sec to 5 min.

Overheating protection

If the CH temperature is higher than the pre-set value of 80°C, the pump is always switched on and continuously operated. If temperature further increases, safety thermostat shut boiler down, and thermostat must be unblocked by service centre.

Heating power setting

Boiler's power factory setting is 15 kW to heating system. The maximal power 23 kW is always available for preparing DHW. Only service centre authorized by manufacturer can change heating power in accordance with requirement of heating system.

In case water loss the boiler shut down too, but it will be reactivated automatically when the pressure increases again.

Disconnected boiler from el. source

Should the boiler be disconnected from the electricity source for a long time (continuously for one month or longer), it should be regularly reconnected and switched on (at least once a month). If the pump is blocked, always call a specialised service centre. Repairs of the pump caused by impurities in the heating system are not covered by the boiler's warranty.

Warning: The protective functions are only active if the boiler is plugged into the electrical grid socket and the main switch is on (in the "I" position).

Stoppage and recovery of electricity supply

If there is a stoppage in electricity supply, the boiler is switched off. When the electricity supply is recovered, the boiler will switch on, without a loss of the parameters.

If the **F1** fault message is shown on the display after the electricity supply recovery, turn mains on/off switch from position „I“ to position „0“ and again to position „I“ (see Control and Signalling).

If the boiler does not restart, the overheat device may need resetting by a specialised service centre.

Pump after-running

The pump after-running is standardly set from factory on 45 sec after shutdown of boiler by room thermostat. If no room thermostat is used, the pump runs continuously.

Above-mentioned adjustment can be changed on the 45 second pump running after burner stop. This is recommended in case regulation without room thermostat

Caution: The changes of the pump after-running can make only competent person authorised by the manufacturer.

Safety valve

The boiler is equipped with a safety valve. **DO NOT TOUCH THE SAFETY VALVE!** If water is leaking from the valve, switch the boiler off, unplug it and call a specialised service centre. Only qualified persons are allowed to fill the boiler with water or discharge water from the boiler. If there is a repeated drop of pressure, discuss the defect with your service centre.

Servicing and maintenance

Refilling water to heating system

Caution: The boiler is installed as part of a sealed system which must only be drained and filled by a competent person. Common user can fill and drain boiler in order to keep the heating water pressure in recommended range 1-2 bar.

When refilling, follow these conditions:

- The pressure of the water source must be higher than that of the water in the heating system;
- The temperature in CH has to be lower than 30°C.
- Recommended water pressure in cold boiler (to 30°C) is in range from 1 to 2 bar.

Air flow rate safety device (for version 24BTV with forced flue gas removal)

If an obstruction, even partial, of the flue occurs, the built in safety system of the boiler will turn the boiler off. The boiler will be ready to operate when the fault has been cleared.


Chimney draft control system (for version 24BOV with flue gas removal by means open chimney draught)

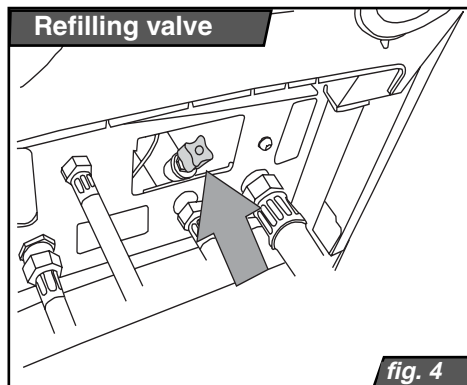
If the chimney draught is impaired or blocked, gas supply is stopped and the boiler is automatically shut down and it will light up fault **F1** display on the control panel. The boiler can be start after cooling up the flue-gas safety thermostat by turning the mains on/off switch from position „I“ to position „0“ and again to position „I“.

Note: If the pressure in the water mains were the same or lower than that in the heating system, there would be a risk of heating water entering the water mains, which must not be allowed. The risk is lowered by installing a backflow valve on the water-supply pipe in boiler.

The manufacturer is not liable for any damages caused by tampering with the refilling or draining valve or failures to adhere to the above conditions. No damages or defects so caused are covered by the boiler's warranty.

Refilling procedure:

- Check if the power cord is plugged into the socket and the gas valve that feeds the boiler is open. The main on/of switch is in position „I“.
- Press MODE button to display pressure in heating system. If the pressure is under 0,7 bar, LED under symbol  flash.
- Slowly open the refilling valve and simultaneously watch the pressure increase on the display. Pressure is displayed only 30 second after pressing MODE button. The valve is opened counter-clockwise, closed clockwise.
- Fill the system to pressure 1 - 2 bar.
- When the desired pressure is achieved, shut the valve (without applying excessive force) and check that the water pressure is not growing (which would occur if the valve were not closed properly).



Warranty conditions

The warranty on boilers is provided as specified in the Guarantee Certificate, Service Booklet and under conditions specified in these Instructions for Use and Instructions for Installation (in chapters Introduction, Boiler installation).

Too high pressure in central heating system:

If it's necessary to reduce pressure in CH or drain the boiler, can be used the tap at the bottom of boiler (see fig. 12 in Installation instruction) Water in CH has to be cold (max. 30°C), DHW setting and heating setting have to be '---'. Be careful during draining to prevent damages caused by water flowing from boiler.

Caution: The frequent water loss indicates the water escape from system. Too small pressure in cold system together with too high pressure in warm system indicates too much water in system or little air in expansion vessel. Call service centre soon.

Cleaning

The boiler can be cleaned with a wet cloth and then dried and polished with a dry cloth. Never use any abrasives or thinners.

Caution: Before cleaning switch the boiler off by mains on/off switch (to position „0“)

Maintenance and inspections

Checks and maintenance on the boiler should be regular, at least once a year. Such inspections are not covered by the warranty. The Service Booklet contains a checklist for such inspections, that can provide only service centre authorised by manufacturer.

Technical parameters 24 BOV

Category	II _{2H3P}	
Design	B _{11BS}	
Ignition	electronic	
Gas	G20	G31
Max. thermal power input	25.5	25.5
Min thermal power input	.kW 10.0	10.0
Max. thermal power output	.kW 23,0	23.0
Min. thermal power output	.kW 8.5	8.5
Efficiency	%	
	90	
Gas consumption (Q max / Q min)	2,72/1,08 m ³ /h	2,11/0.89 kg/h
Noise level (1m from boiler, at a height of 1.5 m)	.dB(A) up to 55	
Nox class	3	
Gas pressure		
Input pressure	mbar 20	37
Pressure on burner max/min	mbar 12/2,2	35,5/6,9
Nozzle diameter	mm 1,2	0,7
Heating		
Max. working pressure	.bar	3
Min. working pressure	.bar	0,8
Recommended working pressure	.bar	1 - 2
Temperature range	.°C	38 – 80
Expansion vessel	litre	5
Max. quantity of water in heating circuit	litre	70
Max. pressure in expansion vessel	.bar	3
Domestic hot water (DHW)		
Max. input pressure	.bar	6
Min. input pressure	.bar	1
Min. water flowrate	litre per min	2.7
Adjustable temperature range	.°C	35 – 60
Flowrate at 25°C temperature increase	litre per min	12.5
30°C temperature increase	litre per min	10.8
35°C temperature increase	litre per min	8.8
Electrical data		
El. voltage / frequency	V/Hz	230 / 50
El. power input	W	95
El. protection class	IP	45
El. current	A	0.5
Connections		
Heating water in/out	G 3/4"	
DHW in/out	G 1/2"	
Gas	G 1/2"	
Flue		
Flue diameter	mm	125
Flue gas temperature	.°C	95-120
Required chimney draft	Pa	2
Weight flowrate – flue gas	.g/s	20
Dimensions		
Height / Width / Depth	mm	740 / 410 / 320
Weight	kg	33

fig. 6

Technical parameters 24 BTV

Category	II _{2H3P}	
Design	C ₁₂ , C ₃₂ , C ₄₂ , C ₅₂ , C ₆₂ , C ₈₂	electronic
Ignition	electronic	
Gas	G20	G31
Max. thermal power input	25.0	25.0
Min thermal power input	kW 10.5	10.5
Max. thermal power output	kW 23.0	23.0
Min. thermal power output	kW 8.5	8.5
Efficiency Q _{nom}	91	
Gas consumption (Q max / Q min)	2,64/1,1 m ³ /h	2,1/0.89 kg/h
Noise level (1m from boiler, at a height of 1.5 m) .dB(A)	up to 55	
Nox class	3	

Gas pressure

Input pressure	mbar	20	37
Pressure on burner max/min	mbar	12/2,2	35,5/6,9
Nozzle diameter	mm	1,2	0,7

Heating

Max. working pressure	bar	3
Min. working pressure	bar	0,8
Recommended working pressure	bar	1 - 2
Temperature range	°C	38 – 80
Expansion vessel	litre	5
Max. quantity of water in heating circuit	litre	70
Max. pressure in expansion vessel	bar	3

Domestic hot water (DHW)

Max. input pressure	bar	6
Min. input pressure	bar	1
Min. water flowrate	litre per min	2.7
Adjustable temperature range	°C	35 – 60
Flowrate at 25°C temperature increase	litre per min	12.5
30°C temperature increase	litre per min	10.8
35°C temperature increase	litre per min	8.8

Electrical data

El. voltage / frequency	V/Hz	230 / 50
El. power input	W	135
El. protection class	IP	45
El. current	A	0.6

Connections

Heating water in/out	G 3/4"
DHW in/out	G 1/2"
Gas	G 1/2"

Flue gas and air ducts

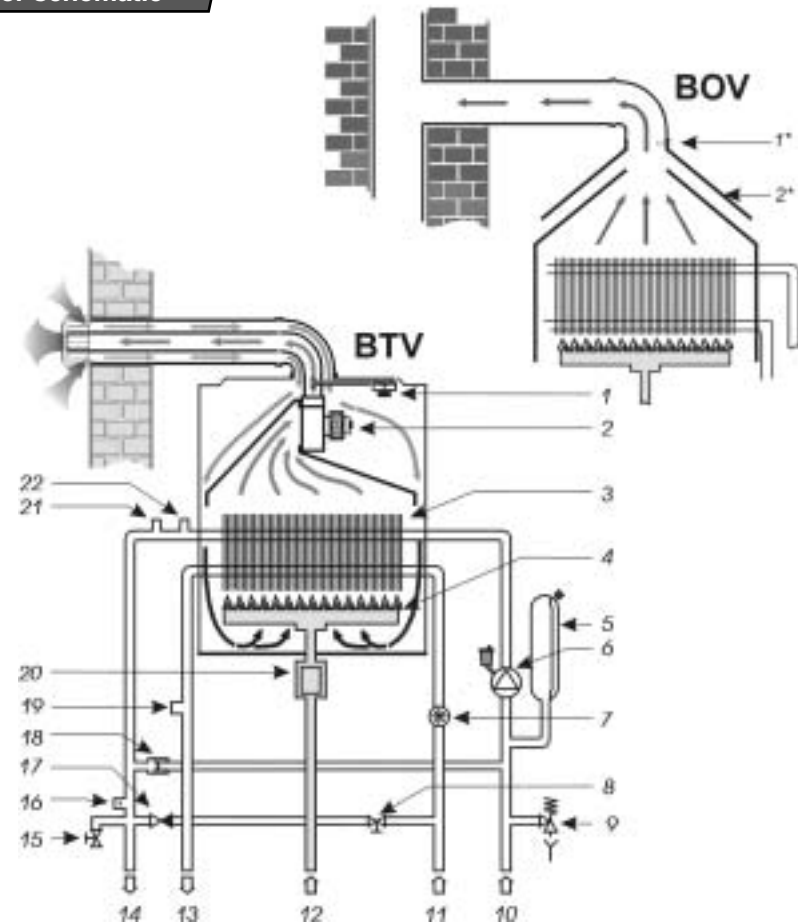
Flue duct / air inlet	mm	100/60 (80/80)
Max length of coaxial ducts 100/60	equivalent m	4
Max length of separate ducts 80/80	equivalent m	10
Flue gas temperature	°C	115-145
Weight flowrate – flue gas	g/s	18

Dimensions

Height / Width / Depth	mm	740 / 410 / 320
Weight	kg	37

fig. 5

Boiler schematic



- | | |
|---|----------------------------|
| 1. manostat | 11. DHW inlet |
| 1* chimney draft control system (flue thermostat) | 12. gas inlet |
| 2. fan | 13. DHW outlet |
| 2* draught damper | 14. CH outlet |
| 3. heat exchanger | 15. drain valve |
| 4. burner | 16. pressure sensor |
| 5. expansion vessel | 17. backflow valve |
| 6. pump | 18. By-pass |
| 7. DHW flow rate sensor | 19. DHW temperature sensor |
| 8. water refilling valve | 20. Gas valve |
| 9. safety valve | 21. CH temperature sensor |
| 10. CH inlet | 22. overheat thermostat |

fig. 7

INSTALLATION INSTRUCTIONS

Introduction

24 BTV/BOV is compatible with all common types of heating water systems and radiators.

24 BTV/BOV boiler can be put into operation only by an authorised installer in compliance with valid regulations. A network of the manufacturer's contractual service centres provides installation, maintenance and repairs.

The boiler is designed for operation in a normal environment (temperatures between +5 and +40°C, humidity up to 85%, depending on the temperature).

The boiler is suitable for installations in residential and social rooms as regards the noise level.

The heating-circuit water must comply with the relevant Standard (it must not be acidic, i.e., its pH must be above 7, and the carbonate hardness must be as low as possible).

Use of anti-freeze mixtures is not recommended, since they have properties unsuitable for boiler operation. These specifically include: reduction of heat transmission to the heating circuit, high thermal expansion of volume, aging, deterioration of rubber parts. Even if no other solution for preventing the system from freezing has been found, consequent failures to meet the operational parameters and/or defects caused by the use of the anti-freeze mixtures will not be covered by the warranty.

Prior to the final assembly, the heating-circuit pipes should be flushed by pressure water, several times. For older circuits (that have already been in use) the flushing

stream direction must be opposite to that of the heating water.

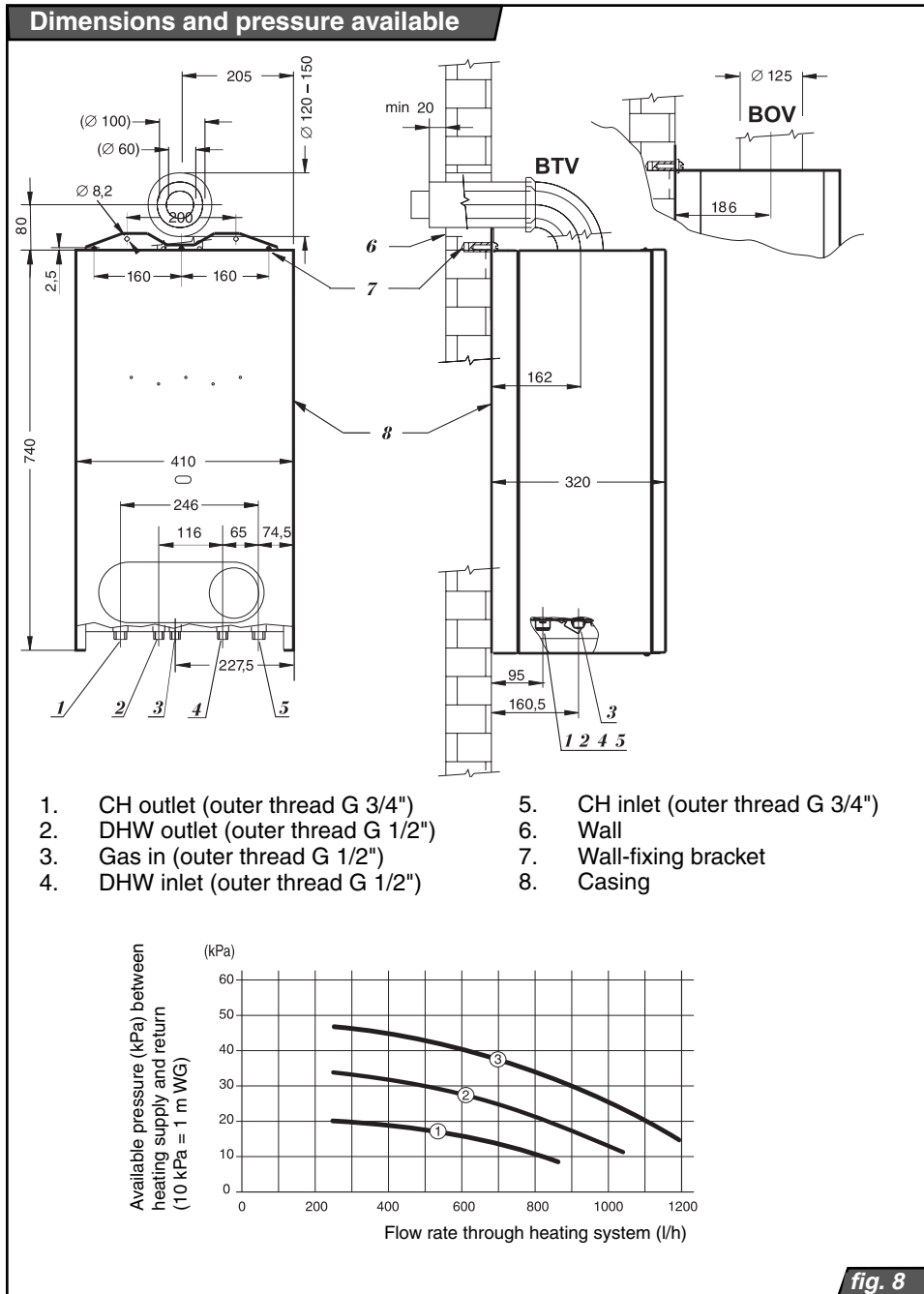
Installation of a sludge separator is recommended in the incoming branch of heating water. The design of the separator should enable regular removal of sludge without necessity to discharge large quantities of heating water. The sludge separator can be combined with a filter; however, a filter itself is not sufficient protection. Both the filter and the separator should be regularly checked and cleaned.

The relevant standards provide requirements for the water quality: if the sum of calcium and magnesium concentrations is above 1.8 mmol/litre, other "non-chemical" measures should be taken against scaling (such as protection by magnetic or electrostatic field).

The warranty does not cover mechanical defects caused by foreign bodies and impurities (e.g., a clogged exchanger or pump).

Working temperature of the upper parts of the boiler (especially the top and side panels) may be up to 50°C higher than the ambient temperature. The clearance from flammable materials (such as chipboard, polyurethane, polystyrene, polyethylene, expanded PVC, synthetic fibre, cellulose, asphalt board, rubber, etc.) must secure temperature these materials under 80°C.

The minimum handling space around the boiler should be such that easy and safe work with bare hands and/or with tools be possible.



For the 24 BTV flue-gas is removed and combustion air is brought in by a special double duct. Double-duct routes can be completed from the standard parts supplied by the manufacturer for virtually any situation. The route must be designed to enable removal of condensed flue vapours out of the duct. Special condensate-discharge elements can be used for that purpose. If any defects are caused by the condensation, they will not be covered by the warranty. Due to the variability of local conditions, the double duct elements are not included in the delivery or in the boiler's price. Principles for completion of the routes – see. chapter “Air and flue ducts.”

For the 24 BOV flue-gas is removed by means open chimney draught. Minimal required chimney draught in steady stage is 2 Pa. Connection to the chimney is via a connecting flue pipe with diameter corresponding to flue outlet on the boiler (125 mm). Installation of both the boiler and the connecting flue pipes with chimney must comply with valid standards. The standard's requirements prevent appearance of adversary effects, such as excessive cooling of the flue gases, penetration of the chimney wall by humidity, and variability of chimney draught which would affect the boiler operation in an undesirable manner. The connecting flue pipes are not included in the boiler delivery.

Caution: Elements reducing the chimney draught (such as various exchangers for using the residual heat) are prohibited from being inserted in the connecting flue pipe.

The 24 BOV takes combustion air from the space around it. There must be possibility of direct space ventilation and sufficient combustion air supplies comply with valid standards.

Delivery completeness

BTV /BOV boiler is delivered in assembled state and functionally tested.

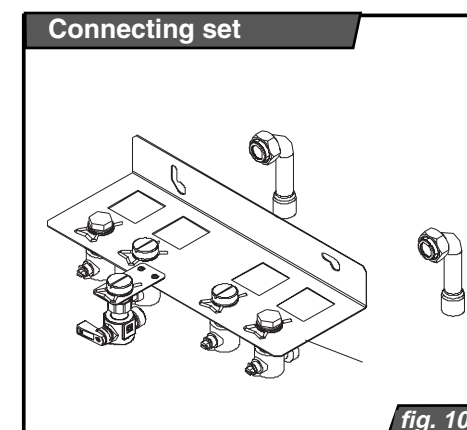
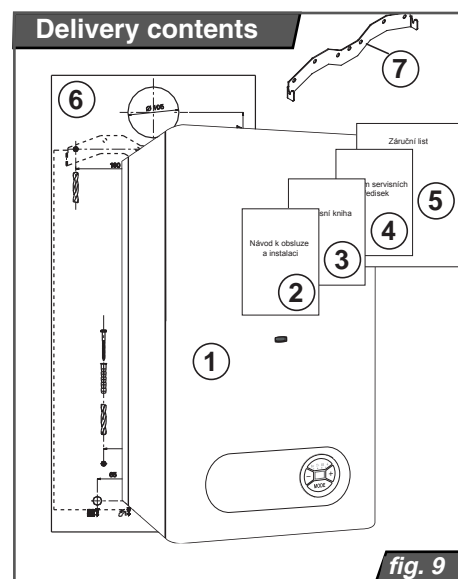
Delivery contains (see fig. 9):

1. Boiler
2. User and installation instruction
3. Service book
4. List of Service centres
5. Certificate of Warranty
6. Template
7. Drawbar for hanging of boiler

Additional accessories

Following accessories can be ordered according to various requirements;

1. Connecting set, supply number XXXX (see fig. 10)
2. Flue gas and air ducts 100/60 for BTV version e.g.:
 - S5D-1000 Horizontal set (elbow with flange 90°, 1m horizontal terminal), supply number 7194
 - K1D Elbow 90°, supply number 2842
 - T1D-1000 Extension 1m, supply number 2825
 - S3 Vertical terminal, supply n. 2805
 - Z1 Condensate retainer, supply n. 2857
3. Flue gas and air ducts 80/80 for BTV version e.g.:
 - S2 Air-flue duct set (separator, 2x elbow 90°, 2x 1m horizontal terminal) , supply n. 2803
 - K2A Elbow 90°, supply n.
 - T2 Extension 1m, supply n. 2819
 - S4 Vertical terminal, supply n. 2809
 - Z2 Condensate retainer, supply n. 2858



Connection set contain:

- 1x assembly platform
- 2x CH stop valve G 3/4" including gasket
- 2x Heating system connections - pipe diameter 22 mm
- 2x DHW stop valve G 1/2" including gasket
- 1x gas stop valve G 1/2" including gasket
- 1x template
- 1x drawbar for hanging of boiler
- 3x bolts including wall plug

Boiler installation

Heating system

Rated diameters of pipes are determined in the usual manner, depending on the pump characteristic curve. The piping is determined by the requirements for the system in question, not by the boiler's maximum power output. Nevertheless, the piping must provide for a 20°C temperature difference between the incoming and outgoing CH and the minimum flow rate 500 litres per hour.

The pipes' layout must be such that no bubbles form in the system and purging is facilitated. Purging valves should be situated at all high points of the system and on each radiator. It is absolutely necessary to flush the system before the new boiler installation and remove impurities from heating system.

The heating system's hydraulic pressure (measured at the boiler) should be at least 1 bar (corresponding to 10 m of water column). The recommended pressure range is from 1 to 2 bar. The expansion vessel is suitable for max.70 litres of heating water (for temperature 80°C).

Thermostatic valve heads can be used on the radiators. If the boiler is controlled by a room thermostat, the thermostatic valve heads should not be installed in the room where the room thermostat is.

The boiler may be connected to the heating circuit by flexible elements (hoses) during reconstructions, if necessary because of the layout, etc. Such hoses must have parameters suitable for the purpose, should be as short as possible, protected from damages caused by mechanical load and chemical agents, and replacement must always be arranged prior to the end of the life-cycle and/or deterioration of their parameters (according to their manufacturer's instructions).

Note: after connecting of boiler to heating system remove plastic stoppers which are placed in boiler outlets.

DHW system

The DHW pressure should be between 1 and 6 bars; if it is higher, a reduction valve must be installed. In areas with very hard water, suitable measures for softening should be applied.

It is recommended to install CH, DHW and gas stop valves on the pipes near the boiler.

For easy connecting of boiler is used the special connecting set with stop valves (see Fig. 10).

Boiler hanging

The boiler is hung on the wall on two bolts, with minimum diameter of 6 mm. Suitable washers must be placed under the bolt heads. The connecting fittings have outer threads. All necessary distances are shown in the figure of connecting dimensions (fig.8).

Boiler connecting

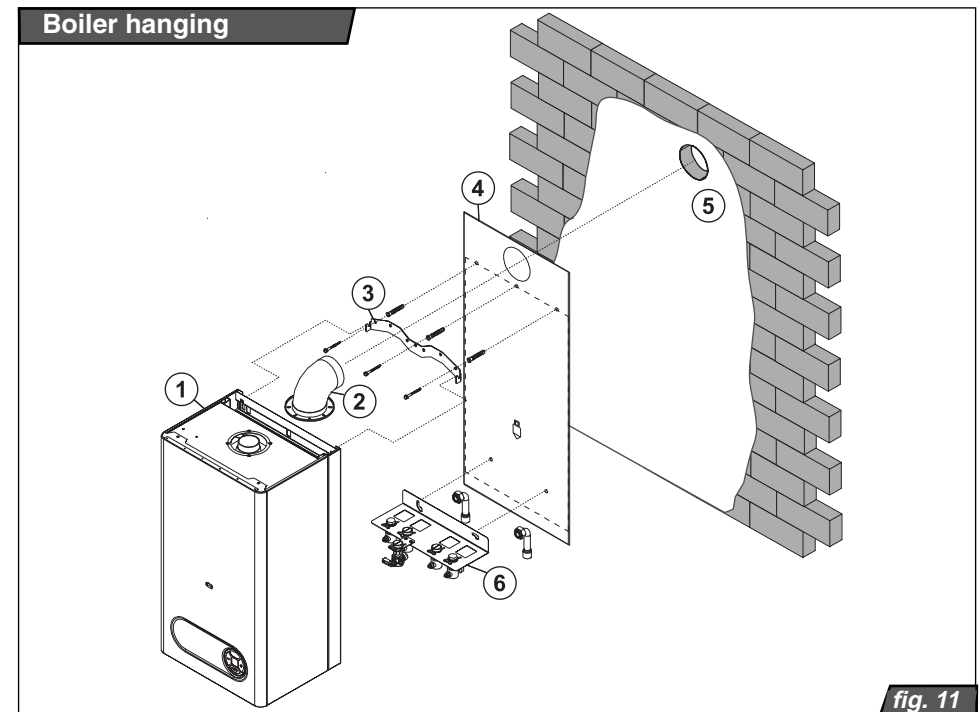
It is recommended to install CH, DHW and gas stop valves on the pipes near the boiler.

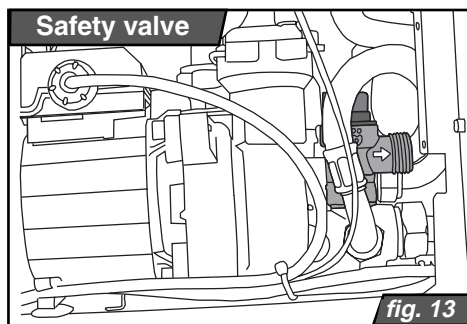
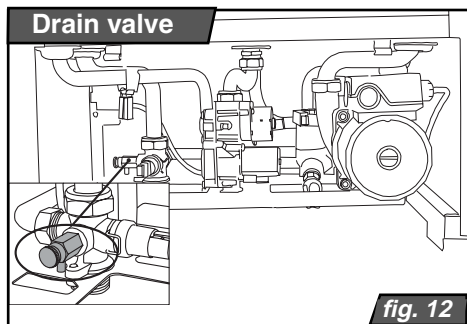
The connection fittings on the boiler must not be affected by any pressures or forces from the piping – in other words, all dimensions and distances of the connected pipes must be accurate, both

mutually and from the wall and floor. For this end is supplied special connecting set (see Fig. 10).

On the hydraulic set at the boiler's bottom, the following elements are situated: safety valve, relief valve and discharge valve.

The boiler should be connected to the heating system such that it is possible to discharge water only from the boiler if it is necessary for repairs.





Boiler filling and draining

Water filling into / draining from the heating system and the related steps (purging, setting the expansion vessel) are not covered by the warranty.

Small quantities of water can be refilled into the boiler by the refilling valve.

The drain valve is designed to reduce water pressure in the boiler before repairs. Only partial discharge of water from the boiler can be achieved via the drain valve.

Filling/draining valves should be installed at suitable points of the system for complete discharge of water from the boiler or the entire heating system.

Basic conditions and procedure of filling and draining are described in User instructions. In addition must be open the little cap on deaerating valve (on pump), checked pressure in expansion vessel and deaerated whole heating system.

Safety valve

On the hydraulic set at the boiler's bottom is situated safety valve (see fig. 13). The safety valve outlet may release hot water or steam (if the safety pressure limit is exceeded).

Gas connection

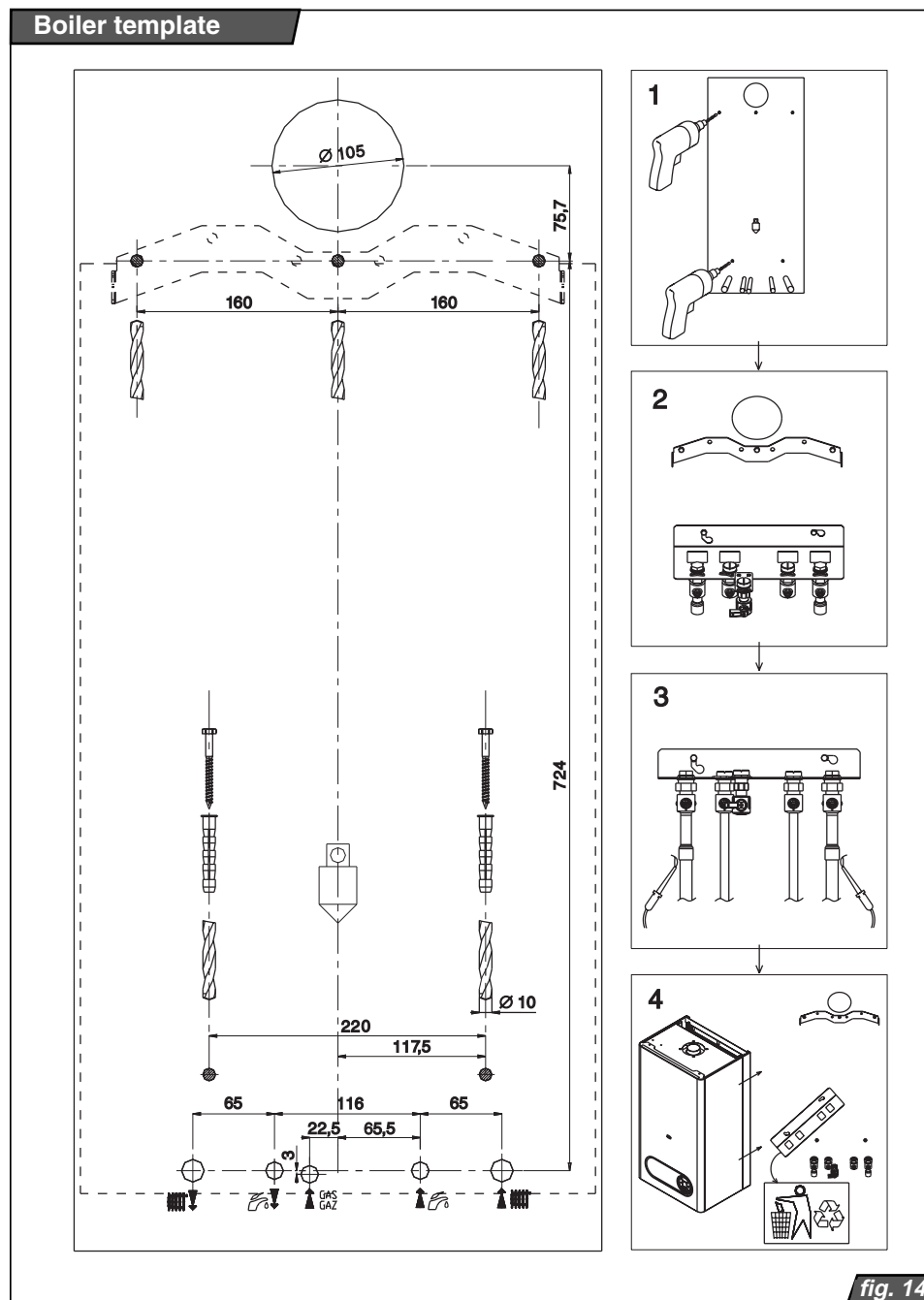
The 24 BTV/BOV - G20 model is designed for natural gas, with 2.0 kPa rated pressure in the network and the calorific value of 9 to 10 kWh/m³. The internal gas piping and the gas meter must be dimensioned for all gas appliances of the respective user. The boiler's connection branch's rated inner diameter should be at least DN 1/2", but one degree higher (DN 3/4") is recommended.

The 24 BTV/BOV - G30 model is designed for LPG, whose calorific value is between 12.3 and 13.0 kWh per kg. Operation using portable cylinders would be problematic, due to both sufficient volume and handling of the cylinders; hence a prerequisite for the operation is installation of an LPG tank near the heated premises and filling of the tank by an organisation authorised for such activities.

Sufficient supply of LPG from the tank to the boiler (and other gas appliances, if any) is part of the design and delivery of the LPG tank. For LPG boilers, a pressure-control (reduction) valve should provide the pressure of exactly 3.7 kPa (37 mbar).

Gas piping in buildings must fulfill the valid requirements.

Note: for connecting of gas valve must be always used union nut and gasket directly placed on gas valve !!!.



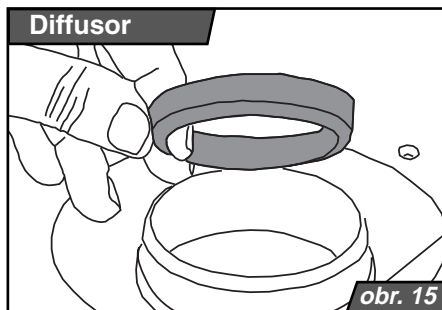
Flue gas and air ducts

For 24 BTV, the air input and flue gas output goes through a special double duct. The sufficient distance must be ensured between the flue gas duct and the flammable materials to prevent the increasing temperature of these materials over 80°C. Horizontal segments of the duct are laid with a slope, so that condensate flows into an opening to the outside (or to special condensate discharge elements). it is possible to slightly deviate from the direction at the elbow-to-straight-piece connection. Vertical segments of the flue duct must always be equipped with special condensate discharge elements.

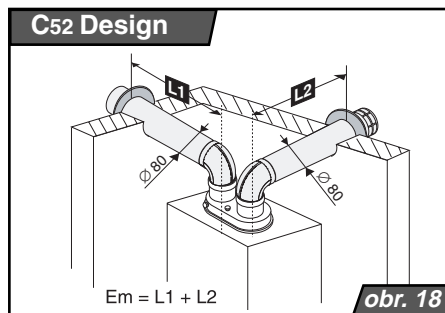
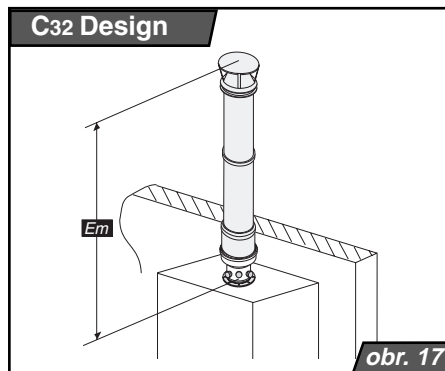
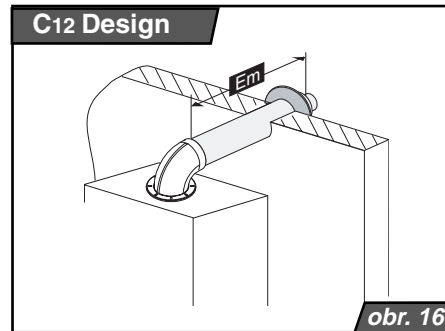
Maximum length and kinds of flue design

The maximum length of a concentric and separate double duct route is in table.

Warning: if the length of the concentric double duct is more than 2 Em (separate ducts more than 4 Em), the flue diffuser must be taken out of the fan mouth.



flue duct diameter	min. length	max. length with diffuser	max. length without diffuser
100 / 60	1,5 Em	2 Em	4 Em
80 / 80	2 Em	6 Em	18 Em



The most frequent kinds of flue design are illustrated on fig. 16, 17 and 18. The boiler 24 BTV can be used for next following designs:

- C42 design - connecting to common chimney
- C62 design - connecting to separately approved and sold ducts.
- C82 design - air duct leads combustion air from outdoor environment and flue gas duct are connected to chimney.

External vent of horizontal ducts on the façade should be at least:

- 2 m above ground level at publicly accessible places (0.4 m at other places);
- 0.5 m from sides of windows and other ventilation openings (grilles) or doors;
- above the top edge of windows, grilles and doors;
- 1 m below window level, never below grilles;
- at depth of R (see Fig.19) below overhanging parts (e.g., roofs, balconies).

Minimum span between external vents:

- 1 m horizontal
- 2 m vertical

The external vent should always be oriented to the open space (not to doors, windows or grilles). If this requirement cannot be met, the minimum distances must be preserved as follows:

- opposite – between the façade with the external vent and a façade parallel to it:
 - 2 m – if the opposite façade has no windows or grilles;
 - 1 m – if neither façade has any windows or grilles in it;
 - 4 m – if there are windows or grilles (or external vents) in both façades
- in corners – between the external vent axis and the façade parallel to it:
 - 2 m – if there are any windows, grilles or doors in the façade;
 - 0.5 m – if there are none.

- Corners smaller than 0.5 m are ignored. All the distances are understood from the external vent axis to the outer edge of the respective window, grille or door.

Special instances

The external vent may also be closer below an overhanging part, provided it is equipped with a protruding part of the duct, whose length at least reaches to the circle of radius "R" – see. fig 19. .

External vent into a shaft leading to the open space is possible, if the cross-section area of the shaft is at least 1.25 m² along its length and there are no doors, windows, grilles or other flue ducts into the shaft

Vertical external vent – to the roof

Roof vents must be at least 0.4 m from each other and from air-conditioning outlets/intakes. Its protruding part must reach above a snow layer 40 cm thick (if it were lying on the roof).

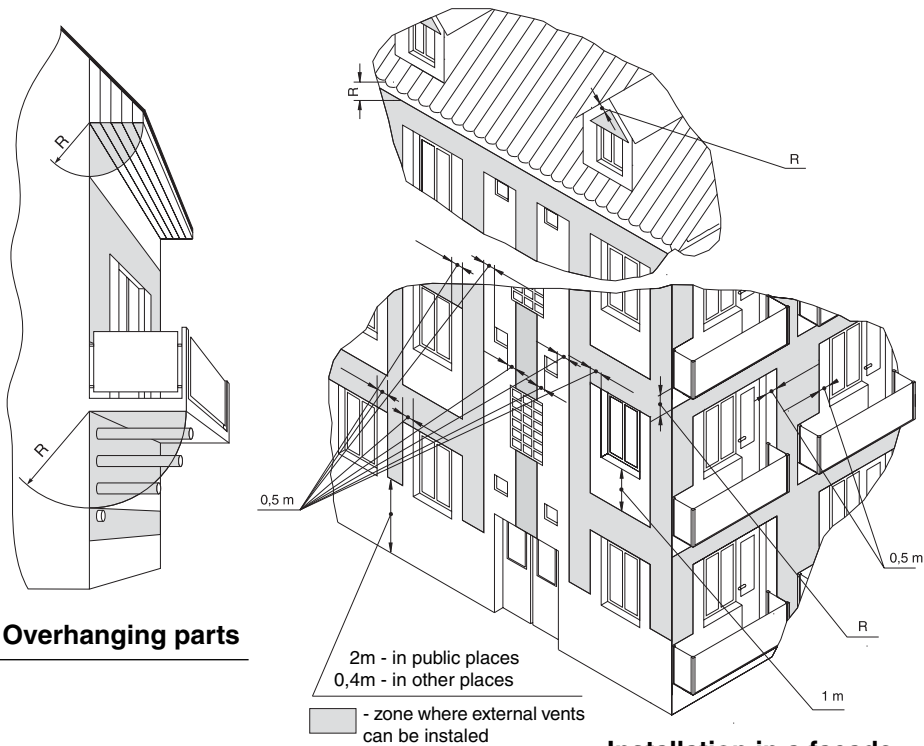
Safety precautions

Flue ducts must not be vented into spaces:

- with a risk of explosion;
 - internal (attic, corridor, stairwell, etc.);
 - that can be closed, such as passages, etc.
 - below ground level (even if open) such as tunnels, subways, etc.
- If an air intake is separately installed, its location must be assessed similar to the above rules.

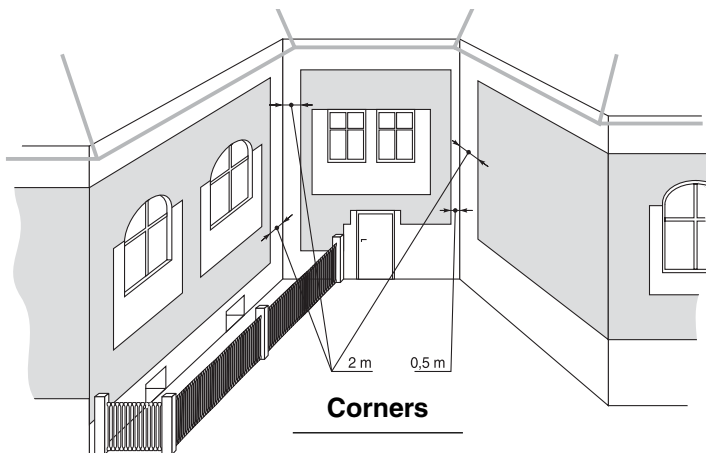
The opening for the duct passage through a wall should be bored with sufficient extra clearance (approx. 120 to 150 mm) and the duct must be sealed inside of it the sealing flameproof materials – such as mortar, gypsum, etc. Passages through walls or ceilings made of flammable materials must comply with the valid standard.

External vents - Illustration



Overhanging parts

Installation in a façade



Corners

fig. 19

Example of horizontal double-duct flue

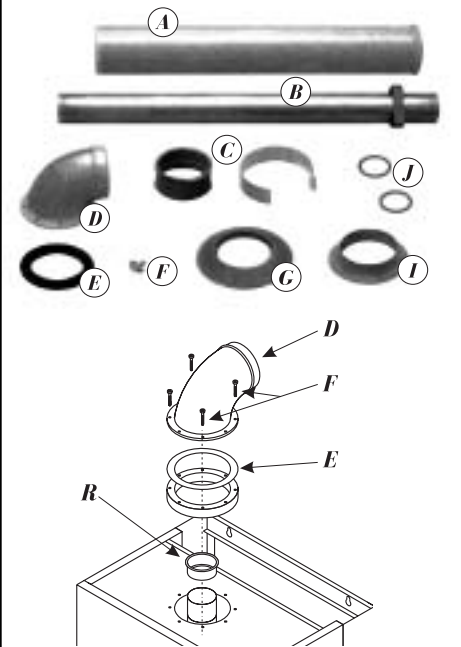
- A Outside casing – air part
- B Inside casing – flue gas part
- C Collar and clip
- D Elbow with flange
- E Sealing
- F Bolts
- G Outer sealing ring (rubber)
- I Inner sealing ring (plastic)
- J O-ring

- Apply the seal (E) to the bottom part of the elbow (D);
 - Carefully insert the O-rings (J) into the upper and lower parts inside the elbow;
 - Attach the elbow to the boiler – be careful to connect the inside part to the boiler's outlet properly;
 - Put the rubber sealing ring (G) on the air duct (A);
 - Push the completed duct section through the wall opening so that the (G) ring is aligned with the outside surface of the wall;
 - Place the collar and clip onto the duct and elbow; check proper sealing of both inside and outside sections of the duct;
- Note: The maximum horizontal length is 1 elbow plus 3 m (4 equivalent metres) – if the horizontal route's equivalent length is more than 2 m, the diffuser (R) must be removed from the fan (see Fig. 15).
- Secure the elbow's flange using the bolts;
- Note: If you have to shorten the straight part, always cut the same length from both the outside and inside elements. Always cut at the end opposite to the external vent.

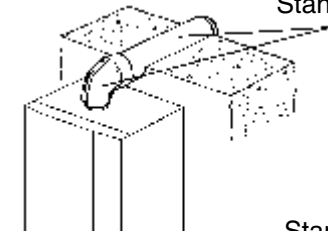
Example accessories:

- Horizontal set 1 m
- Horizontal set 0.75 m
- Coaxial extension duct (1 m)
- Coaxial elbow 90°

Horizontal flue - Illustration



Standard set



Standard set

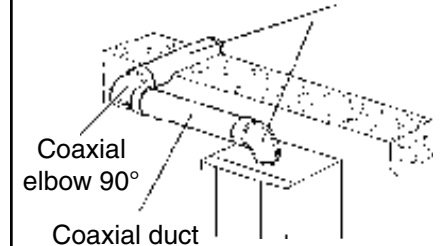


fig. 20

Example of a vertical double-duct flue

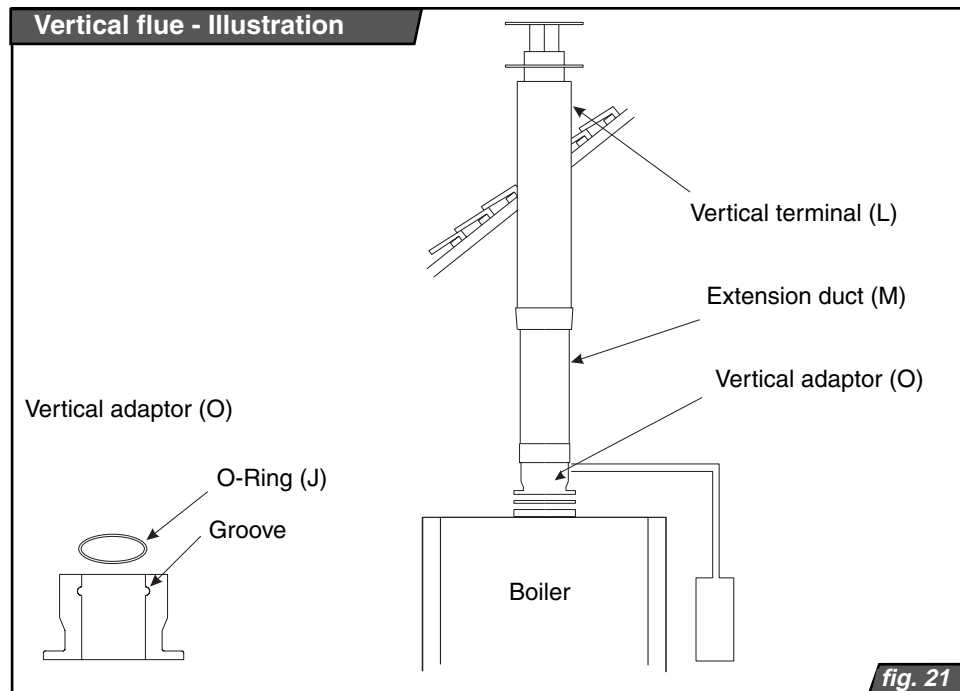
Example of a vertical duct route

- Apply the seal to the coaxial vertical adaptor (O);
- Carefully insert the O- ring (J) into the inside part of the vertical adaptor;
- Put the vertical adaptor on the boiler's and fan's outlets;
- Insert the coaxial extension (M) into the vertical adaptor;
- For passage through the roof cover, use either special roof tiles (so-called "ventilation tiles") or a roof flashing custom-made by a tinsmith;
- The coaxial extension duct protruding above the roof should be terminated with a coaxial ("Meindinger") head. Instead of the extension duct and head, a vertical terminal (L) is better to use as the nicer top part.

- Attach a condensate-drainage part (tube, hose, etc. – not included in the delivery) to the condensate outlet of the vertical adaptor;

Example accessories:

- Coaxial vertical element (O)
- Coaxial extension duct (1 m) (M)
- Vertical terminal (L)



Electrical part

Electrical connection of the boiler to the power grid is by three-wire cord without plug. The socket for the plug must comply with the relevant standard and have the grounding pin connected to a PE or PEN cable (yellow-green).

The boiler must be connected to the protective grounding wire; the electrical plug in the socket must always be accessible without obstacles. Use of adaptor plugs, extension cords, etc. is prohibited. The boiler is protected by tube fuse 125 mA/250V placed on PCB.

Only a person with adequate electrical-engineering qualifications can be allowed to install the socket and the thermostat (thermostat installation requires utilization of the boiler's internal electric cabling); the same requirements apply to servicing the electric part. Before any work commences on the electrical part, the boiler's cord must be unplugged.

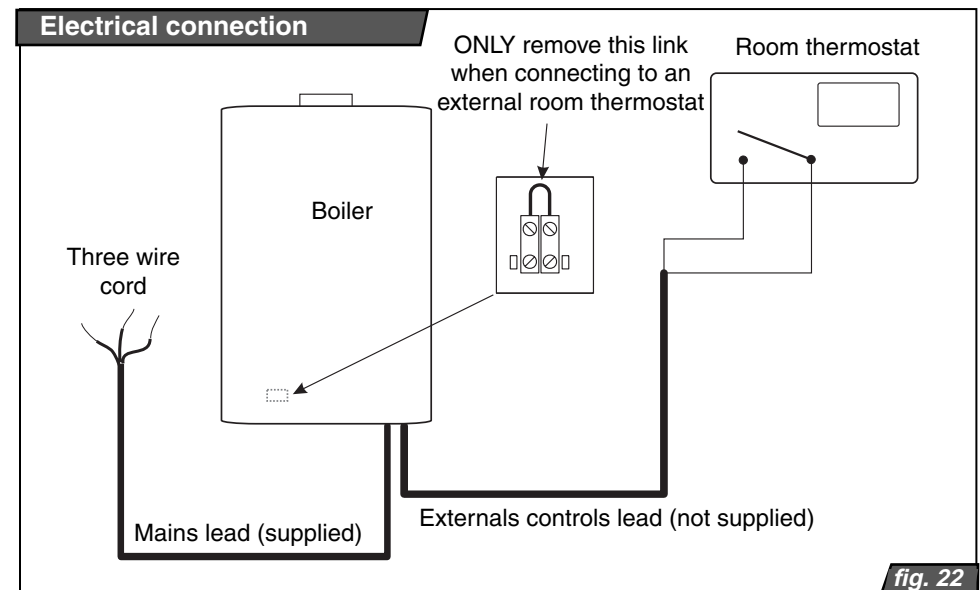
Only no-voltage thermostats or regulators can be used for regulating the boiler, i.e., they must not bring in any foreign voltage.

The minimum requirements for the regulator's contacts: 24 V / 0.1 A, A.C.

The room thermostat is connected to the boiler with a two-wire cable, with copper wires of a recommended cross-section between 0.5 and 1.5 mm²

The connecting cables of the room thermostat should not be led parallel to other cables or through premises with high-power electric motors (or electric welding machines., etc.)

The terminal board for connections of the room thermostat is inside the boiler, on the bottom. It is accessible after removing the front cover panel and tilting the control panel out.



24 BTV - Electrical diagram

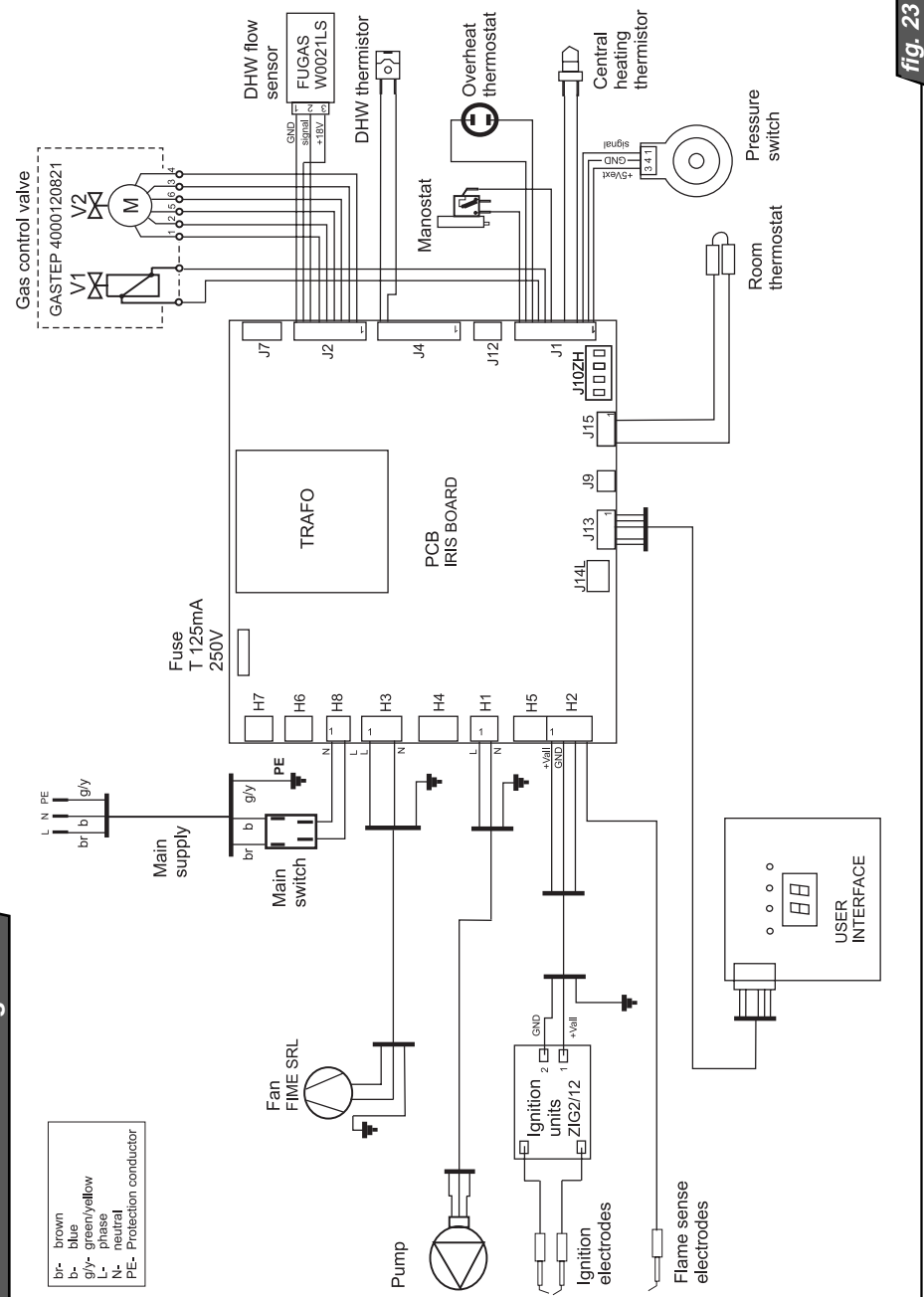


fig. 23

24 BOV - Electrical diagram

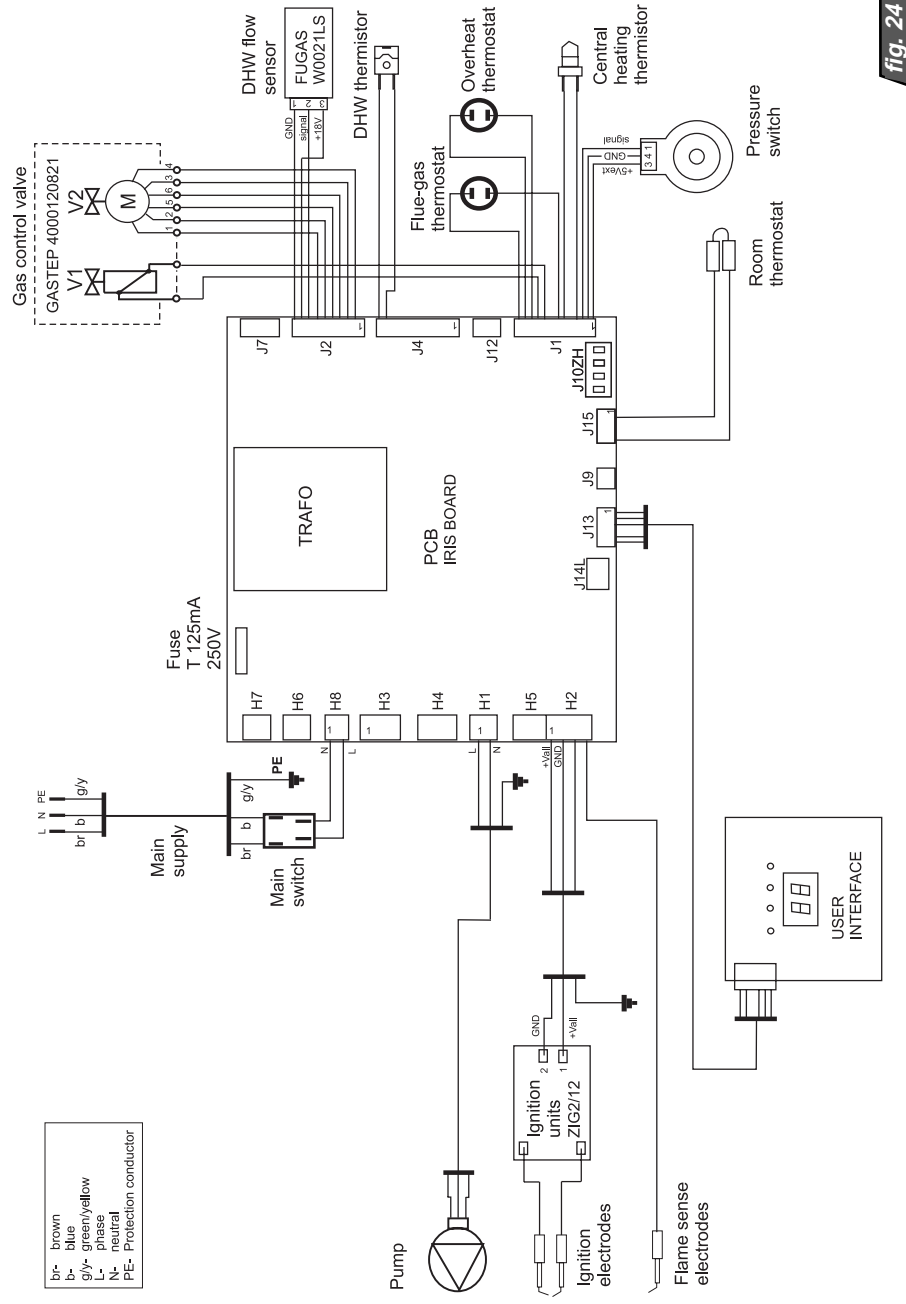


fig. 24

Conversion to LPG

Boiler 24 BTV/BOV is standardly supplied in the version for the combustion of natural gas. If the combustion LPG is required, it is necessary replace gas valve and burner platform and then set the boiler to specified parameters. Conversion must only be carried out by a competent person, authorised by the manufacturer. Gas valve and burner platform are part of Conversion set. This set contains all needful parts and Instructions for conversion.



Leopard

User and Installation Instructions

24 BTV / v.17
24 BOV / v.17



- Wallhung gas boiler
- DHW preparation
- Power 9 - 24kW



Linea.isy

**Wallhung gas boiler
User and Installation Instructions**

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