

IST 03 C 167 - 01

NIAS



**INSTALLATION, USE AND
MAINTENANCE**



Thank you for choosing our boiler. Please read these installation and maintenance instructions with care.

Please note that the boiler must only be installed, repaired and serviced by qualified personnel.

General information for fitters, maintenance technicians and users

This INSTRUCTION MANUAL, which is an integral and indispensable part of the product, must be handed over to the user by the installer and must be kept in a safe place for future reference. The manual must accompany the boiler should it be sold or its possession transferred.

This boiler must be used for the purposes for which it has been intended. Any other use shall be considered incorrect and therefore dangerous.

The boiler must be installed in compliance with applicable laws and standards and according to the manufacturer's instructions given in this manual. Incorrect installation may cause injury to persons and/or animals and damage to property. The manufacturer shall not be held liable for any such injury and/or damage.

Damage and/or injury caused by incorrect installation or use and/or damage and/or injury due to non-observance of the manufacturer's instructions shall relieve FONDITAL from any and all contractual and extra-contractual liability.

Before installing the boiler, check that the technical data correspond to the requirements for its correct use in the system.

Check that the boiler is intact and it has not been damaged during transport and handling.

Do not install equipment which is damaged and/or faulty.

Do not obstruct the air suction and/or heat dissipation openings.

Only FONDITAL-approved accessories or optional kits must be installed.

Properly dispose of the packaging as all the materials can be recycled. The packaging must therefore be sent to specific waste management sites.

Keep the packaging out of the reach of children as it may represent a choking and suffocation hazard.

In the event of failure and/or faulty functioning, switch off the boiler. Do not attempt to make repairs: contact qualified technicians.

FONDITAL approved parts must be used for all repairs to the boiler.

Non-observance of the above requirements may jeopardize the safety of the boilers and expose people, animals and property to danger.

To guarantee efficiency and correct functioning of the equipment it is legally binding to service the boilers once a year according to the schedule indicated in the

relative section of this manual.

In the event of long periods of inactivity of the boiler, disconnect it from the power mains and close the gas tap **(Warning! In this case the boiler's electronic anti-freeze function will not be operative).**

Should there be a risk of freezing, add antifreeze: it is not advisable to empty the system as this may result in damage; use specific anti-freeze products suitable for multimetall heating systems.

IMPORTANT

If you smell gas:

- do not turn on or off electrical switches and do not turn on electrical appliances;
- do not ignite flames and do not smoke;
- close the main gas tap;
- open doors and windows;
- **contact a Service Centre, a qualified installer or the gas supply company.**

Never use flames to detect gas leaks.

WARNING

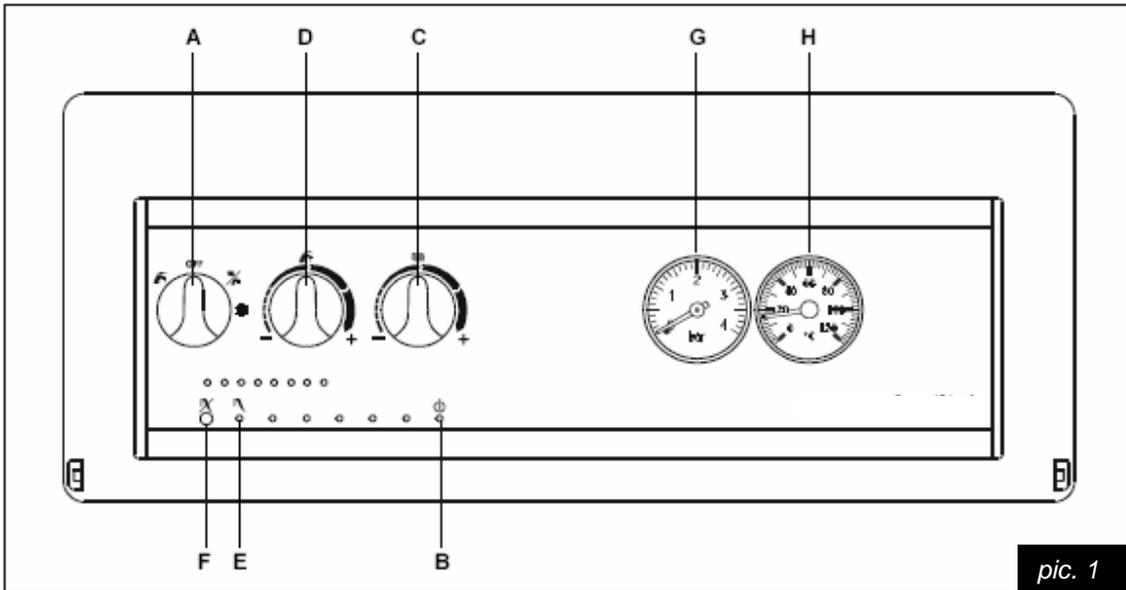
This boiler has been built for installation in the country indicated on the technical data plate: **installation in any other country may be a source of danger for people, animals and property.**

Contents

Warning	.....page 2
General information for fitters, maintenance technicians and users	.....page 3
1 Instruction for the user	.....page 5
1.1 Control panel	.....page 5
1.2 Operating the boiler	.....page 6
1.2.1 Switching on	.....page 6
1.2.2 Boiler shutdown	.....page 6
1.3 Maintenance	.....page 6
1.4 Information for the user	.....page 6
2 Technical characteristics and dimensions	.....page 8
2.1 Technical characteristics	.....page 8
2.2 Dimensions	.....page 9
2.3 Hydraulic connections	.....page 9
2.4 Technical data	.....page 10
2.5 General specifications	.....page 11
3 Instructions for the fitter	.....page 13
3.1 Installation regulations	.....page 13
3.2 Installation	.....page 13
3.2.1 Packaging	.....page 13
3.2.2 Choosing where to install the boiler	.....page 13
3.2.3 Positioning the boiler	.....page 13
3.2.4 Installing the boiler	.....page 14
3.2.5 Boiler room ventilation	.....page 15
3.2.6 Flue system	.....page 15
3.2.7 Flue system configuration	.....page 17
3.2.8 Flue system with coaxial pipes 100/60 mm diameter	.....page 18
3.2.9 Flue system with split pipes 80 mm diameter	.....page 19
3.2.10 Measuring combustion efficiency	.....page 21
3.2.11 Connection to the gas mains	.....page 22
3.2.12 Connection to the power mains	.....page 22
3.2.13 Hydraulic connection	.....page 22
3.3 Filling the system	.....page 23
3.4 Starting the boiler	.....page 24
3.4.1 Preliminary checks	.....page 24
3.4.2 Switching on/off	.....page 24
3.5 Wiring diagram	.....page 25
3.5.1 Connection diagram	.....page 25
3.6 Switching to different gas	.....page 27
3.7 Burner adjustment	.....page 28
3.8 Adjusting boiler output to the system	.....page 29
4 Testing the boiler	.....page 30
4.1 Preliminary checks	.....page 30
4.2 Turning the boiler on or off	.....page 30
5 Maintenance	.....page 30

1 Instruction for the user

1.1 Control panel



pic. 1

A = Summer/OFF/Winter/Anti-freeze selector
B = Power light

C = CH temperature regulator
D = DHW temperature regulator
E = Shutdown light

F = Reset button
G = Water pressure gauge
H = Thermometer

Summer/OFF/Winter/Anti-freeze selector (A)

This selector allows choosing the boiler mode.

When the selector is on the **Summer** position, the boiler is ready to work only for DHW production.

When the selector is on the **OFF** position, the boiler is switched off.

When the selector is on the **Winter** position, the boiler is ready to work both for heating and for DHW production.

When the selector is on the **Anti-freeze** position, the boiler is switched off but the function protecting the heating system and the water storage tank from freezing is active.

Power light (B)

The light indicates that power is being supplied to the boiler.

Central Heating temperature regulator (C)

The knob sets the heating system water temperature from a minimum value of 35°C to a maximum of 85°C.

Domestic Hot Water temperature control (D)

The knob sets the temperature of DHW stored in the tank, from a minimum value of 40°C to a maximum of 60°C.

Shutdown light (E)

The light indicates that the burner shutdown function has

been activated due to a malfunction.

Reset button (F)

Use this button to reactivate the boiler after the burner shutdown function has been activated.

Water pressure gauge (G)

The gauge shows pressure of the heating system water; the value of such pressure must not be less than 0.8/1 bar (while the boiler is cold).

Thermometer (H)

The thermometer shows temperature of the heating system water set by means of the appropriate regulator.

1.2 Operating the boiler

1.2.1 Switching on

- * open the gas tap;
- * set the power mains switch to ON;
- * set the desired boiler operating mode through switch **A** Summer/OFF/Winter/Anti-freeze; power light **B** comes on. Sselecting the **Summer** mode the boiler supplies DHW only; selecting the **Winter** mode the boiler supplies both central heating and DHW; with the **Anti-freeze** mode central heating and DHW functions are not active and the boilers is protected against freezing;
- * set the temperature value desired for the central heating through the CH regulator **C**;
- * set DHW temperature through knob **D**; if the water temperature in the storage tank is lower than the one set on the boiler, the boiler automatically heats it to the set value. **The boiler prioritizes DHW and water tank temperature holding functions to central heating function.** Control knob allows setting of temperature in a 40 °C to 60 °C range: when the knob is in middle position DHW is set to approximately 50 °C;
- * set room temperature through the ambient thermostat if available;

Warning: when starting the boiler after a long period of inactivity, particularly boilers powered by LPG, air bubbles may be present in the supply line.

Before switching on the boiler switch on another gas powered device (e.g. Light a kitchen gas appliance).

The boiler may still shut down once or twice.

If boiler shuts down use the reset button **F** to resume operation (see below).

1.2.2 Boiler shutdown

In case of malfunction the boiler automatically turns off: the shutdown light **E** on the control panel comes on. Then follow the below instructions:

- * check that the gas tap is open and that gas is flowing, for example by lighting a kitchen gas appliance;
- * if there is gas supply wait for a minute before restarting the boiler using reset button **F** if the boiler does not restart, try to reset the boiler three additional times. Should the boiler still not resume operation, call an authorised Service Centre or qualified maintenance personnel.

If the boiler shuts down frequently, **this indicates that there is a recurring malfunction.** In this case contact qualified personnel or an authorised Service Centre for maintenance.

WARNING

In order to prevent flue gas leaks, natural draught boilers are fitted with a safety device with automatic reset. When the safety device detects a leak, the boiler holds standby mode for 15 minutes.

Should the above mentioned boiler status frequently occur, the flue system is not properly functioning. In this case contact a qualified technician to check the flue system. A persistent malfunction in the flue system might put people and animals at risk.

1.3 Maintenance

The boiler must be serviced once a year.

Correct servicing ensures boiler performance, prevents environment pollution and

potential danger for people, animals and property.

The boiler must be serviced by qualified personnel. FONDITAL strongly recommends customers to refer exclusively to qualified personnel.

**The user may only clean the exterior boiler housing using domestic products .
Do not use water!**

1.4 Information for the user

The user can access only the parts of the boiler which can be reached without using tools: it is therefore forbidden to disassemble the exterior cover of the boiler and tamper with the interior parts. NO-ONE, INCLUDING QUALIFIED PERSONNEL, MAY MAKE MODIFICATIONS TO THE BOILER.

FONDITAL cannot be held liable in the event of injury to persons and animals and damage to property resulting from tampering or improper operations on the boiler.

If the boiler is inactive and disconnected from the power supply for long periods the pump might be blocked and it may be necessary to manually turn the pump rotor to resume its operation.

The above mentioned operation, which requires disassembling the boiler housing and accessing internal parts of the boiler, must be performed by qualified service personnel.

It is possible to prevent the pump from blocking by adding special filming products suitable for multi-metal systems to the water.

If the boiler is not disconnected from the mains power supply,

the pump will not block because the boiler's electronic system has an automatic anti-block function: the pump is operated for a few seconds every day.

The boiler electronic has a boiler anti-freeze function which can be chosen by means of selector **A**.

This function starts automatically as below described:

- heating system:
should the temperature of the **heating system water drop below 7 °C** the pump is automatically switched on; if the temperature drops below 5 °C the burner lights up for a maximum time of 15 minutes or until the temperature of the water in the system reaches 15 °C.

- DHW system:

when the probe inside the water storage tank detects a temperature **lower than 6 °C** the burner switches on for a maximum time of 15 minutes or until the temperature of the water in the system reaches 15 °C.

WARNING

This function is not active if the boiler is disconnected from the power and gas supply and the gas tap is closed.

The heating system can also be effectively protected against freezing by using specific anti-freeze products suitable for multi-metal systems. **Do not use car engine anti-freeze products and check the**

effectiveness of the product over time.

The boiler has a temperature and pressure gauge which allows you to check the temperature and pressure of the water in the heating system.

When the boiler is switched off the pressure of the water must be 0.8/1 bar.

If this value drops then use the pressure control tap to adjust to the correct value.

WARNING

After adjusting the pressure, close the tap without over-tightening it. If the tap is not closed properly the pressure could rise, resulting in the safety valve intervention and water outflow.

2 Technical characteristics and dimensions

2.1 Technical characteristics

NIAS is a gas boiler with atmospheric gas burner and water storage tank; it is available in the following versions:

24 24 kW heat output;
28 28 kW heat output;

TN natural draught open combustion chamber;
TFS forced draught, sealed combustion chamber;

All versions have electronic ignition.

Models in the **NIAS** series:

NIAS BTN 24 open combustion chamber, natural draught, electronic ignition;

NIAS BTFS 24 sealed combustion chamber, forced draught, electronic ignition;

NIAS BTN 28 open combustion chamber, natural draught, electronic ignition;

NIAS BTFS 28 sealed combustion chamber, forced draught, electronic ignition;

NIAS boilers comply with the following EEC directives:

Gas directive 90/396/EEC dated 29 June 1990;
Yield Directive 92/42 EEC dated 21 May 1992;
EMC Directive 89/336/EEC dated 3 May 1989 amended by Directive 92/31/EEC dated 28 April 1992;
European Community's Low Voltage Directive 73/23/EEC dated 19 February 1973 amended by Directive 93/68/EEC dated 22 July 1993;

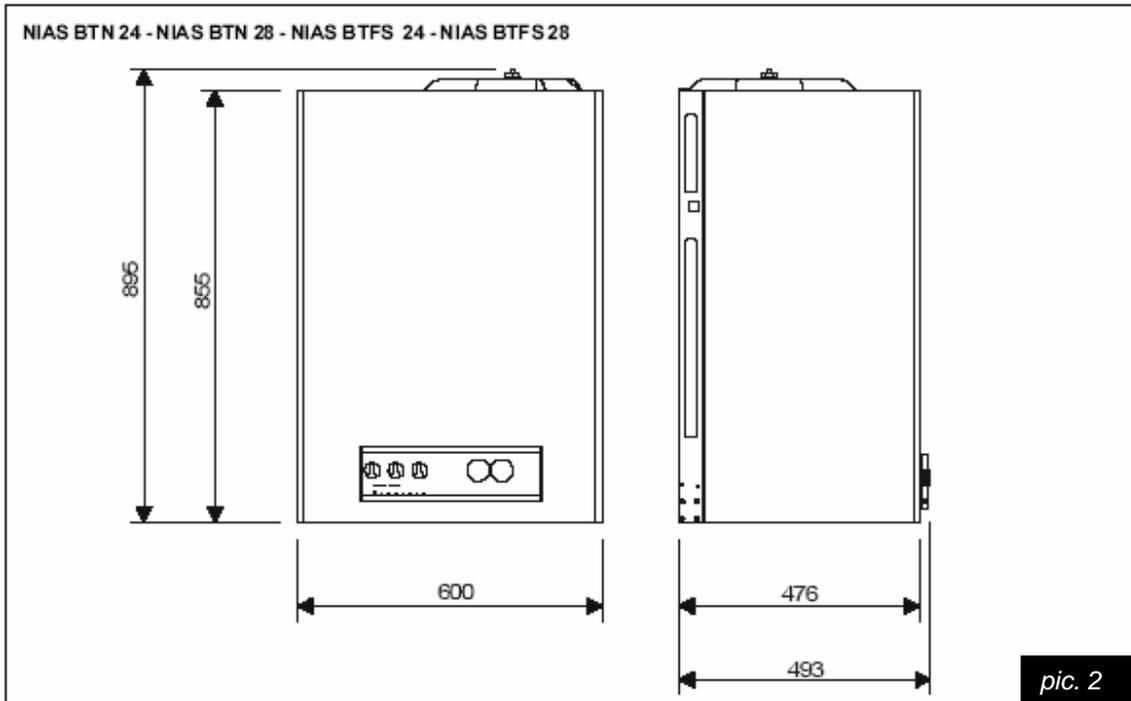
NIAS boilers are equipped with safety features, according to applicable laws.

The main technical features of **NIAS** boilers are below summarized.

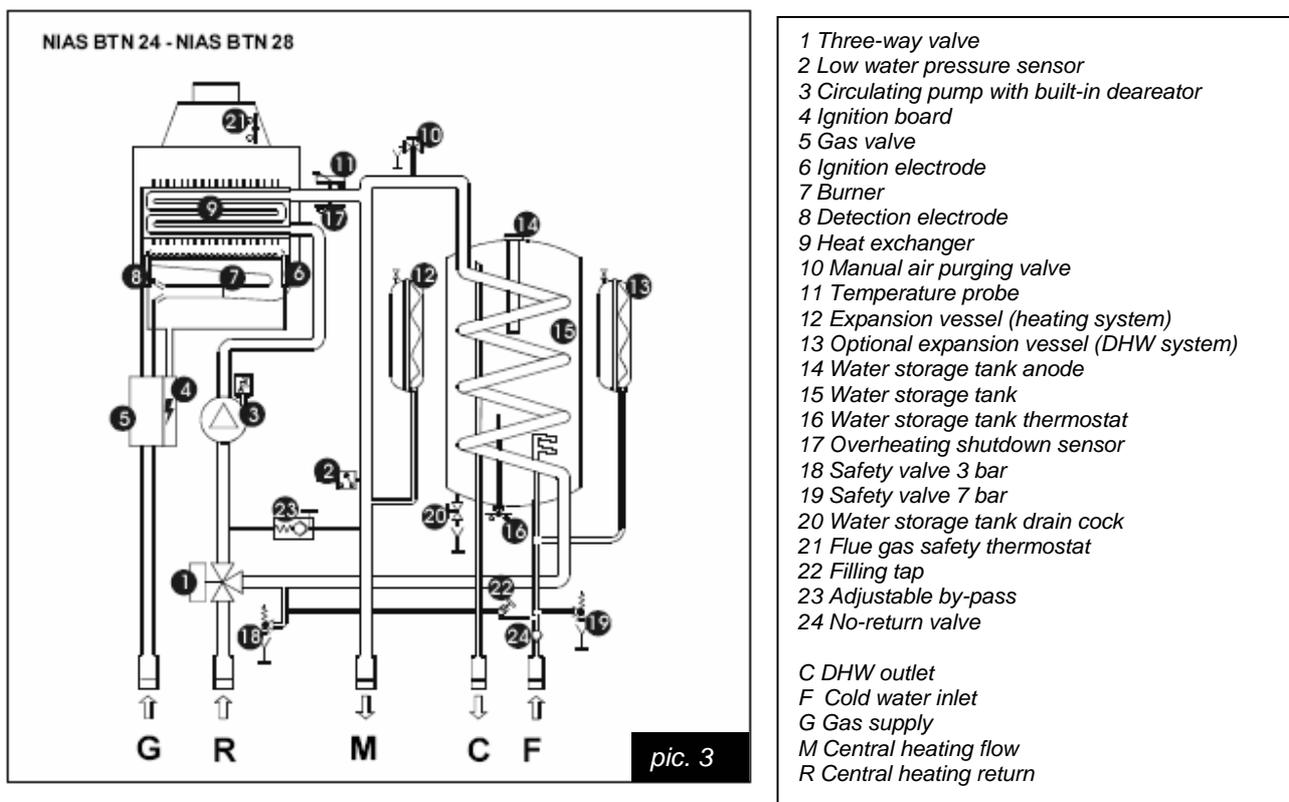
- * High performance copper heat exchanger;
- * Vertical enamelled water storage tank, 60 l capacity with helicoidal steel coil heat exchanger;
- * Sacrificial magnesium anode;
- * Electronic ignition;
- * Electronic flame modulation;

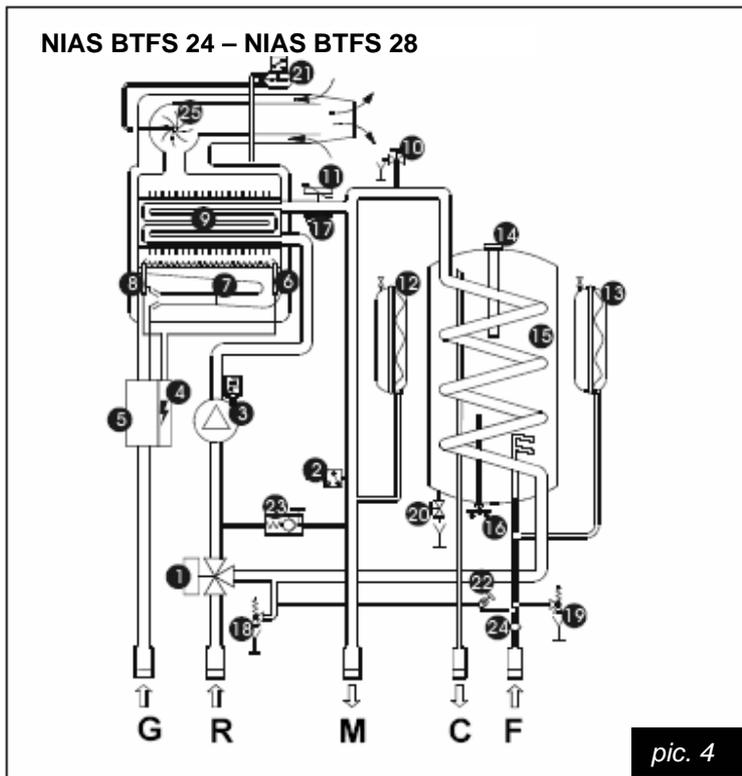
- * Adjustable heat output control (CH only)
- * Adjustable minimum heat output control;
- * Ignition train electronic adjustment;
- * Night temperature reduction function;
- * Anti-freeze function;
- * Priority switch for DHW;
- * Pump anti-locking function;
- * Pump post-circulation function both in CH and DHW systems;
- * Safety limit thermostat (105 °C);
- * Motorized three way valve;
- * Three-speed circulating pump with deaerator;
- * Manual air purging valve for system filling;
- * 7.5 liter expansion vessel;
- * Water inlet tap;
- * Low water pressure safety switch;
- * **IPX4D** protection class control panel;
- * Thermometer;
- * Pressure gauge;
- * Power supply and emergency shutdown lights;
- * DHW temperature regulator (40/60 °C);
- * CH temperature regulator (35/85 °C).
- * Reset button;
- * Summer/OFF/Winter/Anti-freeze boiler selector;
- * Boiler installation template.

2.2 Dimensions



2.3 Hydraulic connections





- 1 Three-way thermostatic valve
 - 2 Low water pressure sensor
 - 3 Circulating pump with built-in deareator
 - 4 Ignition board
 - 5 Gas valve
 - 6 Ignition electrode
 - 7 Burner
 - 8 Detection electrode
 - 9 Heat exchanger
 - 10 Manual air purging valve
 - 11 Temperature probe
 - 12 Expansion vessel (heating system)
 - 13 Optional expansion vessel (DHW system)
 - 14 Water storage tank anode
 - 15 Water storage tank
 - 16 Water storage tank thermostat
 - 17 Overheating shutdown sensor
 - 18 Safety valve 3 bar
 - 19 Safety valve 7 bar
 - 20 Water storage tank drain cock
 - 21 Flue gas safety thermostat
 - 22 Filling tap
 - 23 Adjustable by-pass
 - 24 No-return valve
 - 25 Flue fan
- C DHW flow
 F Cold water inlet
 G Gas supply
 M Central heating flow
 R Central heating return

2.4 Technical data

Burner pressures indicated in the following table must be checked after the boiler has been operating for 3 minutes.

BOILER MODEL	HEAT OUPUT (kW)	HEAT INPUT (kW)	BURNER PRESSURE (mbar)		
			Natural gas	Butane	Propane
NIAS 24 BTN	23.8	12.5 – 26.5	2.9 – 12.3	5.3 – 23.5	7.1 – 30.3
NIAS 24 BTFS	24.0	12.5 – 26.5	3.2 – 13.2	5.8 – 25.1	7.6 – 32.2

DHW production by 45 °C Δt = 7,6 lts/min.

DHW production by 40 °C Δt = 8,6 lts/min.

45 °C DHW supply during the first 10 minutes (storage tank water 60 °C – cold water 10 °C) = 116 l

DHW production by 35 °C Δt = 9,8lts/min.

DHW production by 30 °C Δt = 11,4 lts/min.

BOILER MODEL	HEAT OUPUT (kW)	HEAT INPUT (kW)	BURNER PRESSURE (mbar)		
			Natural gas	Butane	Propane
NIAS 28 BTN	28.2	13.5 – 31.0	3.0 – 13.7	4.9 – 26.8	6.9 – 34.6
NIAS 28 BTFS	28.3	13.5 – 31.0	2.8 – 13.3	5.1 – 27.3	6.8 – 35.2

DHW production by 45 °C Δt = 8.9 lts/min.

DHW production by 40 °C Δt = 10 lts/min.

45 °C DHW supply during the first 10 minutes (storage tank water 60 °C – cold water 10 °C) = 135 l

DHW production by 35 °C Δt = 11.5 lts/min.

DHW production by 30 °C Δt = 13.4 lts/min.

2.5 General specifications

Equipment category		I12H3+
Burner nozzles (BTN 24 \ BTFS 24)	n°	13
Burner nozzles (BTN 28 \ BTFS 28)	n°	15
Minimum central heating circuit flow	l/min	7.5
Minimum central heating working pressure	bar	0.5
Maximum central heating working pressure	bar	3
Minimum DHW working pressure	bar	0.5
Maximum DHW working pressure	bar	7
Water storage tank capacity	l	60
Power supply - Voltage / Frequency	V-Hz	230 – 50
Fuse on the power mains	A (F)	4
Maximum absorbed power BTN 24 \ BTN 28	W	110
Maximum absorbed power BTFS 24 \ BTFS 28	W	165
Net weight BTN 24 \ BTN 28	kg	72.5
Net weight BTFS 24 \ BTFS 28	kg	78
<hr/>		
Natural gas consumption BTN 24 \ BTFS 24 (*)	m ³ /h	min 1.32 – max 2.80
Butane consumption BTN 24 \ BTFS 24	kg/h	min 0.98 – max 2.09
Propane consumption BTN 24 \ BTFS 24	kg/h	min 0.97 – max 2.05
<hr/>		
Natural gas consumption BTN 28 \ BTFS 28 (*)	m ³ /h	min 1.43 – max 3.28
Butane consumption BTN 28 \ BTFS 28	kg/h	min 1.06 – max 2.44
Propane consumption BTN 28 \ BTFS 28	kg/h	min 1.04 – max 2.41
<hr/>		
Maximum CH working temperature	°C	89
Maximum DHW working temperature	°C	64
Expansion vessel capacity	l	7.5
Maximum system capacity (**)	l	138

(*) At 15 °C – 1013 mbar

(**) Calculated for maximum temperature of 90 °C

NIAS BTN 24

Heat dispersion from the boiler casing		max input	min. input	30% red. load
Boiler installed indoor	%	1.9	3.5	
Boiler installed outdoor	%	3.0	4.54	
Boiler installed in a boiler room	%	2.2	3.9	
Chimney loss with burner in function	%	7.2	9.5	
Flue gas mass	g/s	19.8	18.1	
Flue - air temperature	°C	86.9		
CO ₂	%	4.9		
Boiler efficiency	%	89.81		88.78

NIAS BTFS 24

Heat dispersion from the boiler casing		max input	min. input	30% red. load
Boiler installed indoor	%	1.45	0.8	
Boiler installed outdoor	%	1.85	1.09	
Boiler installed in a boiler room	%	1.6	0.85	
Chimney loss with burner in function	%	7.7	11.1	
Flue gas mass	g/s	16.5	17.7	
Flue – air temperature	°C	108.8		
CO ₂	%	5.9		
Boiler efficiency	%	90.45		88.36

NIAS BTN 28

Heat dispersion from the boiler casing		max input	min. input	30% red. load
Boiler installed indoor	%	1.0	0.78	
Boiler installed outdoor	%	1.59	0.97	
Boiler installed in a boiler room	%	1.3	0.82	
Chimney loss with burner in function	%	7.2	10.2	
Flue gas mass flow	g/s	22.2	19.4	
Flue - air temperature	°C	92.1		
CO ₂	%	5.3		
Boiler efficiency	%	91.21		90.11

NIAS BTFS 28

Heat dispersion from the boiler casing		max input	min. input	30% red. load
Boiler installed indoor	%	1.04	1.42	
Boiler installed outdoor	%	1.53	1.80	
Boiler installed in a boiler room	%	1.23	1.6	
Chimney loss with burner in function	%	7.0	12.1	
Flue gas mass	g/s	17.6	17.4	
Flue – air temperature	°C	114.1		
CO ₂	%	6.9		
Boiler efficiency	%	91.47		89.58

3 Instructions for the fitter

3.1 Installation regulations

NIAS is an II2H3+ class boiler which must be installed in compliance with **applicable country standards, laws and regulations.**

3.2 Installation

3.2.1 Packaging

NIAS is packaged and delivered in a strong cardboard box on wooden pallet. Once the boiler has been unpacked check the boiler is undamaged. The packaging material can be recycled and it must be disposed of accordingly. Keep the packaging out of the reach of children as it may represent a choking and suffocation hazard.

FONDITAL cannot be held liable for injury to persons and animals or damage to property resulting from non-observance of the above.

The packaging contains:

- copper pipe kit for hydraulic connection of the boiler to heating system, water system and gas mains,

- metal template for boiler wall-hanging and system connecting,
- installation, use and maintenance handbook,
- 4 screws with dowels for boiler wall-hanging,
- for **BTF5** models only: flue diaphragm.

3.2.2 Choosing where to install the boiler

When choosing the position of the boiler:

- refer to instructions given in the "Flue system" section,
- remember that it is advisable to leave a space of 50 mm on each side of the boiler to facilitate maintenance operations,
- check wall sturdiness,
- avoid fixing the boiler to thin partitions,
- avoid installing the boiler above appliances which might affect boiler operation (E.G. kitchen appliances emitting greasy steam, washing machines etc.),
- avoid installing natural draught boilers in corrosive vapor or dusty air areas like hairdressers', laundrettes etc. as boiler components life span might be considerably shorter than average,
- leave a 350 mm space between the upper part of the

boiler and the ceiling in order to facilitate replacement of the water tank magnesium anode: this condition is respected when between the axe of the fixing holes of the bracket supporting the boiler and the ceiling the distance is 436 mm.

3.2.3 Positioning the boiler

Each boiler package includes a metal template. It allows for CH, DHW and gas mains connection locating when hydraulic system piping is being laid out before boiler is yet to be physically installed.

Use the lower part of the template to mark the exact location of gas supply, cold water inlet pipe, DHW flow, CH flow and return.

Since temperature of wall on which the boiler is installed and temperature of coaxial flue system are lower than 60°C, it is not necessary to keep a minimum safe distance between boiler and temperature sensible surface wall.

Boilers with split duct flue system: place insulating material between temperature sensible surface wall and flue system.

3.2.5 Boiler room ventilation

BTN 24 and **BTN 28** models have an open combustion chamber and have been built for flue exhaust connection to a chimney while combustion air is taken **directly from the room in which the boiler is installed.**

The boiler must be installed in an appropriate room according to applicable standards and laws **which shall be considered as having been transcribed in full in this manual.**

BTFS 28 and **BTFS 28** models have a sealed combustion chamber with reference to the environment in which they are installed, so no special measures need be taken as regards ventilation for the combustion air.

This is also valid for the room the boiler will be installed in.

The boiler must be installed in a suitable room pursuant to applicable standards and laws **which shall be considered as having been incorporated in full in this manual.**

3.2.6 Flue system

The boiler must be installed exclusively by Qualified personnel in compliance with all

local standards and laws applicable in the country of installation **which shall be considered as having been transcribed in full in this manual.**

NATURAL DRAUGHT BOILER

Connection to the chimney

The chimney is indispensable for the correct functioning of the boiler; it must therefore conform to the following requirements:

- it must be made by waterproof material and be resistant to the temperature of flue gas and relative condensate;
- it must have appropriate mechanical strength and low thermal conductivity;
- it must be perfectly sealed to prevent cooling due to parasite air inlets;
- it must be as vertical as possible and the end section must have a roof top which ensures efficient and constant removal of the combustion products;
- the chimney section must be large at least as the boiler's anti-wind gust device; for chimneys with a square or rectangular section, the internal section must be 10% larger than the section of the connecting duct to the boiler's anti-wind gust device;
- starting from the anti-wind gust device, the duct fitting must have a vertical section of

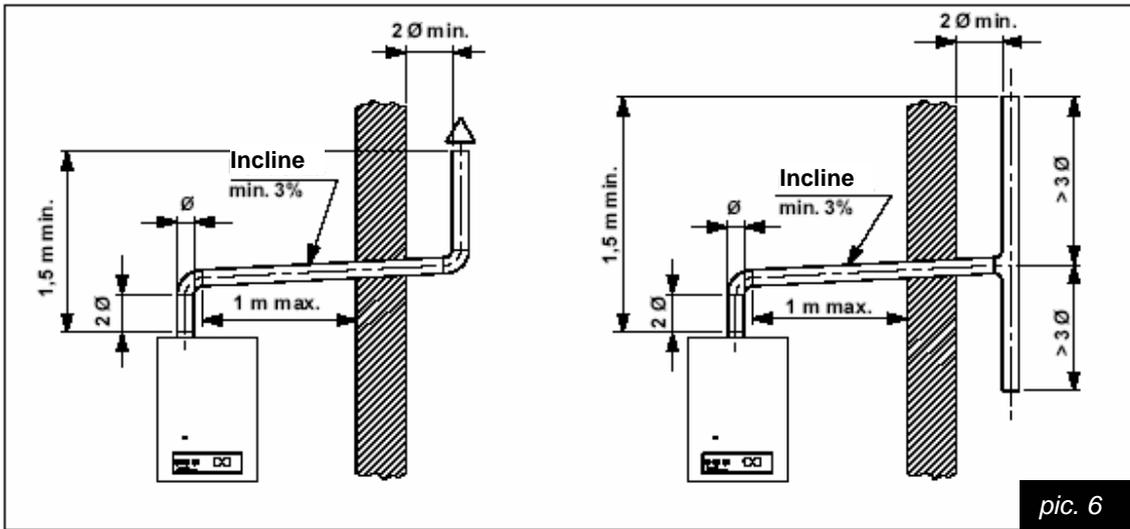
more than twice the diameter before joining the chimney.

Direct emission into the atmosphere

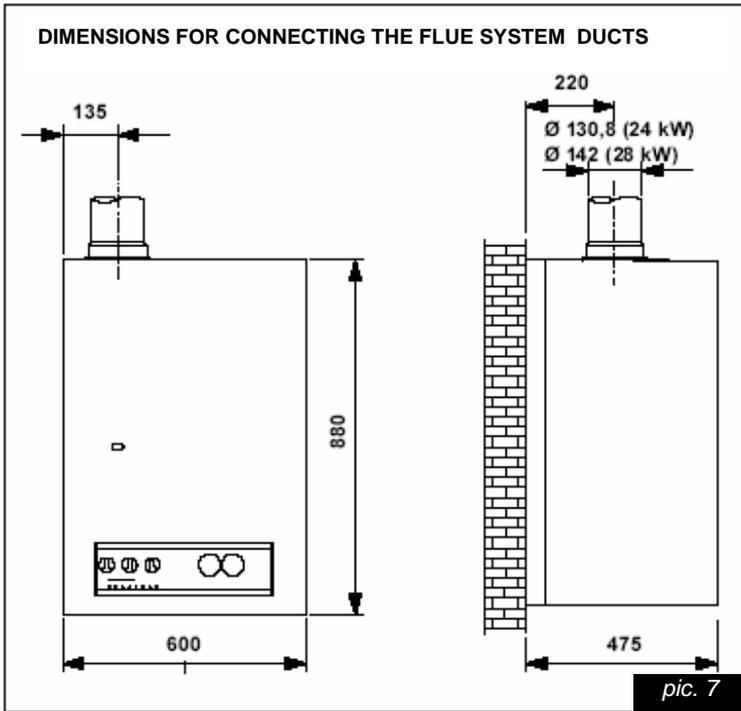
Natural draught boilers can discharge combustion products directly into the atmosphere using a duct which goes through the outside walls of the building connected to a flue outlet terminal.

The outlet duct must also comply with the following requirements:

- the sub-horizontal part inside the building must be as short as possible (no more than 1.000 mm);
- for boilers with vertical outlets, such as **BTN 24** and **BTN 24** models, there must be no more than 2 direction changes;
- it must receive the discharge from a single boiler;
- the part going through the wall must be protected by a sheath duct; the part of the sheath duct facing the inside of the building must be closed and the part facing outwards must be open;
- the final section, on which the draught outlet will be fixed, must protrude from the wall of the building for a length of at least twice the diameter of the duct;
- the draught outlet must overlap the connection to the boiler exhaust duct connection by at least 1.5 metres (see pic. 6).



pic. 6



pic. 7

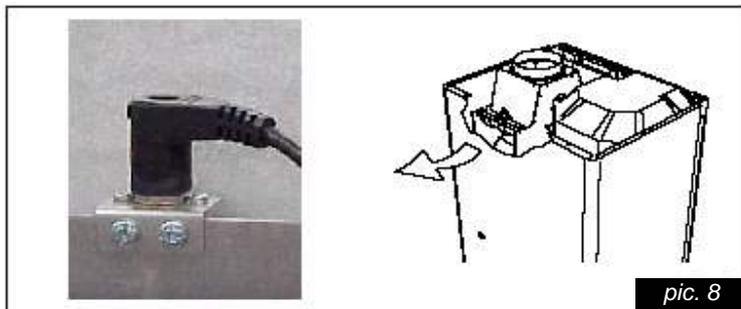
WARNING:

The boiler is fitted with an automatic safety reset device as protection against leakage of combustion products inside the building. The device includes an automatic bi-metallic reset thermostat (pic. 8) mounted on the anti wind gust cover. After 15 minutes the boiler will automatically restart.

It is absolutely forbidden to tamper with and/or exclude the safety device.

If the boiler shuts down frequently, check the flue outlet duct. This duct may be obstructed or may be unsuitable for the discharge of flue gas into the atmosphere.

FONDITAL shall not be held responsible for damage resulting in incorrect installation, use, modification of the boilers or for non-observance of the instructions provided by the manufacturer or applicable installation standards for the product.



pic. 8

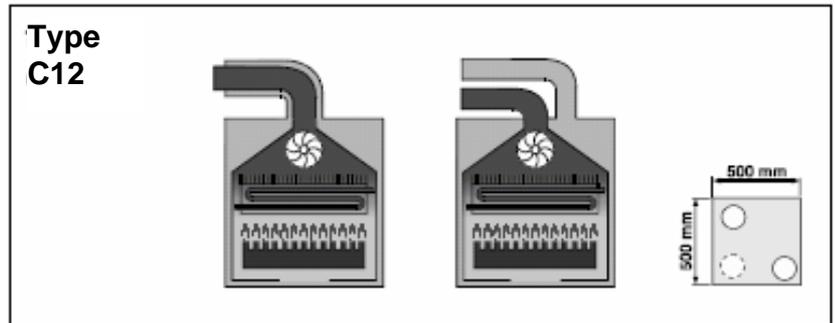
FORCED DRAUGHT BOILER

The distances of boiler vent terminals on walls must comply with standards and laws applicable in the country of installation **which shall be considered as having been transcribed in full in this manual.**

3.2.7 Flue system configuration

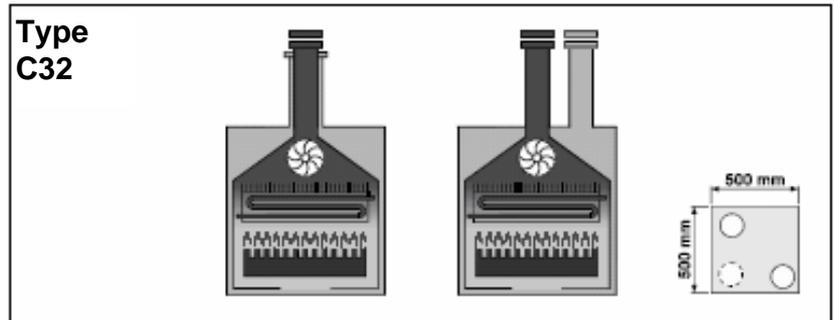
C12 Boiler connected to horizontal air intake and outlet ducts directly into the atmosphere using coaxial or split ducts.

The distance between the air intake duct and the flue gas outlet duct must be at least 250 mm (see pic. 15) and both end sections must be located within a 500 by 500 mm surface area.



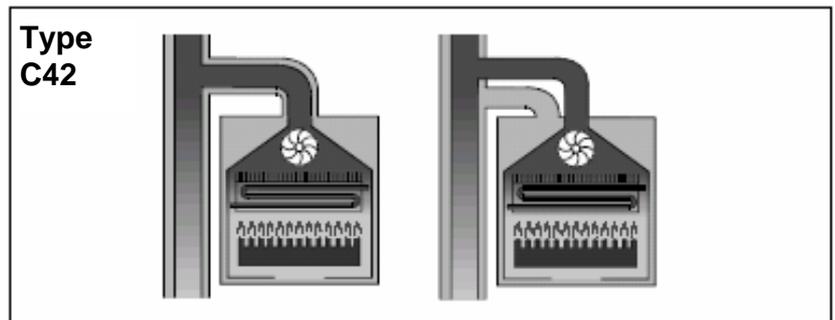
C32 Boiler connected to vertical air intake and outlet ducts directly into the atmosphere using coaxial or split ducts.

The distance between the air intake duct and the flue gas outlet duct must be at least 250 mm (see pic. 15) and both end sections must be located within a 500 by 500 mm surface area.



C42 Boiler connected to collective chimneys including two ducts, one for the air intake for combustion and the other for the discharge of the combustion products, through coaxial or split ducts.

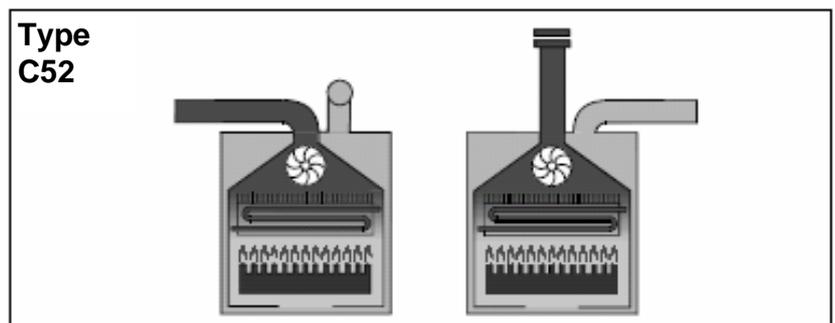
The chimney must comply with applicable law provisions.



C52 Boiler connected to separate combustion air intake and outlet ducts.

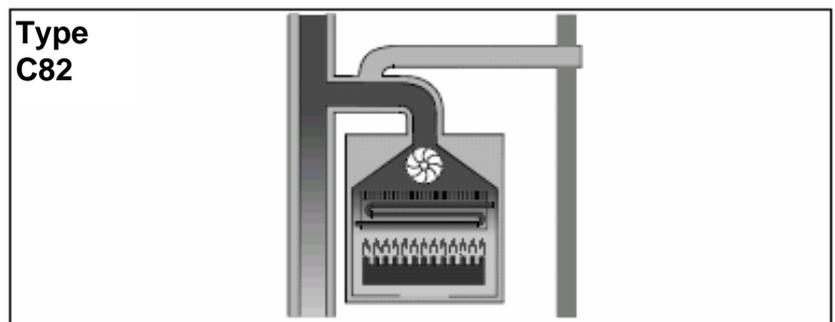
These ducts can discharge into areas at different pressure values.

Split ducts external terminals must not be located on two directly facing walls.



C82 Boiler connected to a duct for conveying combustion air and an individual or collective chimney for discharging the flue gas.

The chimney must comply with applicable law provisions.



3.2.8 Flue system with coaxial pipes 100/60 mm diameter (Type A accessories)

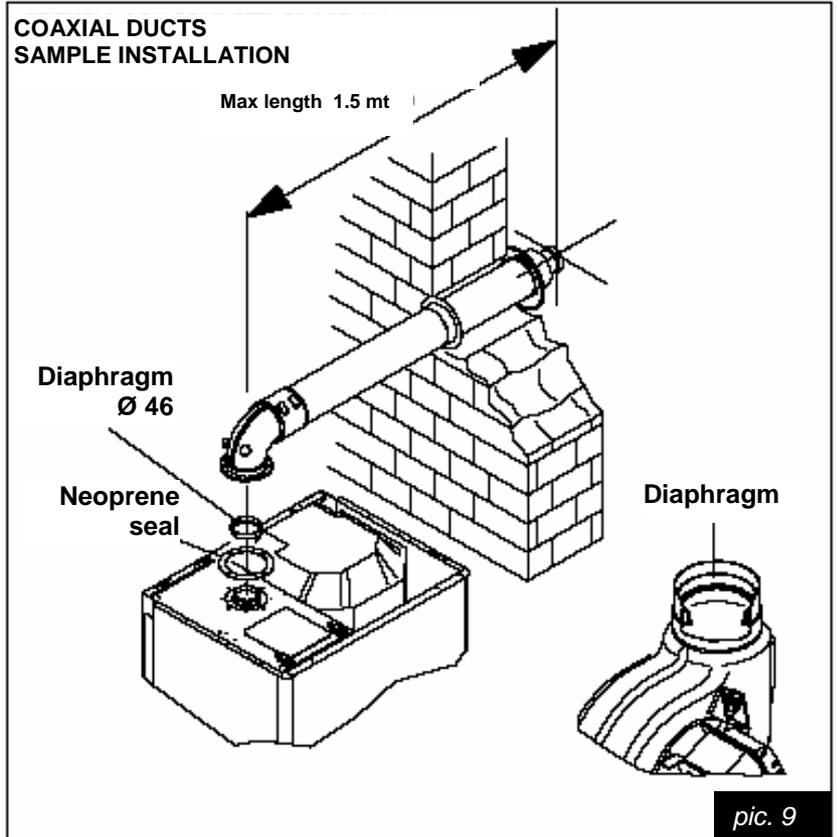
Type C12

Minimum length of horizontal coaxial ducts is **0.5 meters**. Maximum allowable length of horizontal coaxial ducts is **3 meters**; for each elbow after the first, the maximum allowable length must be reduced by 1 meter. Moreover, the duct must have a downward dip of 1% towards the outlet point to prevent rain water from getting into the duct.

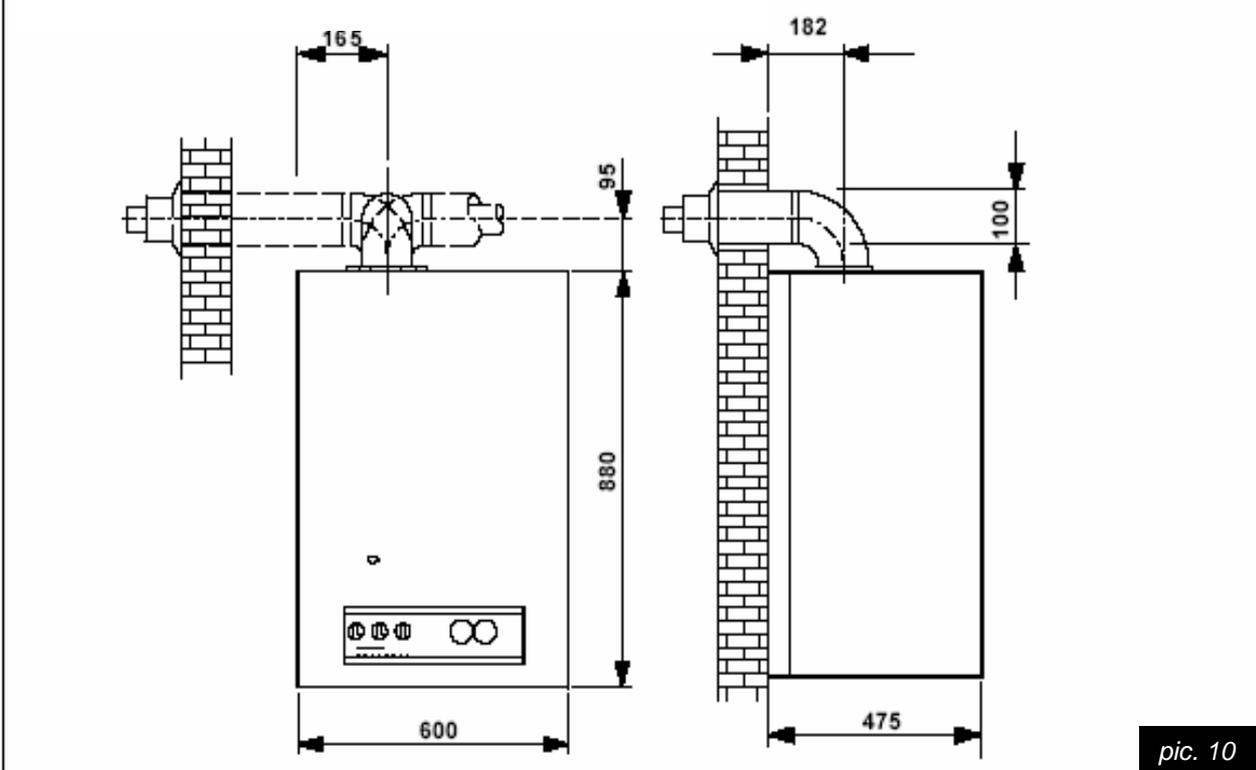
Type C32

Minimum length of vertical coaxial ducts is **0.5 meters**. Maximum allowable length of vertical coaxial ducts is **4 meters** including the chimney; for each additional elbow after the first, the maximum allowable length must be reduced by 1 meter.

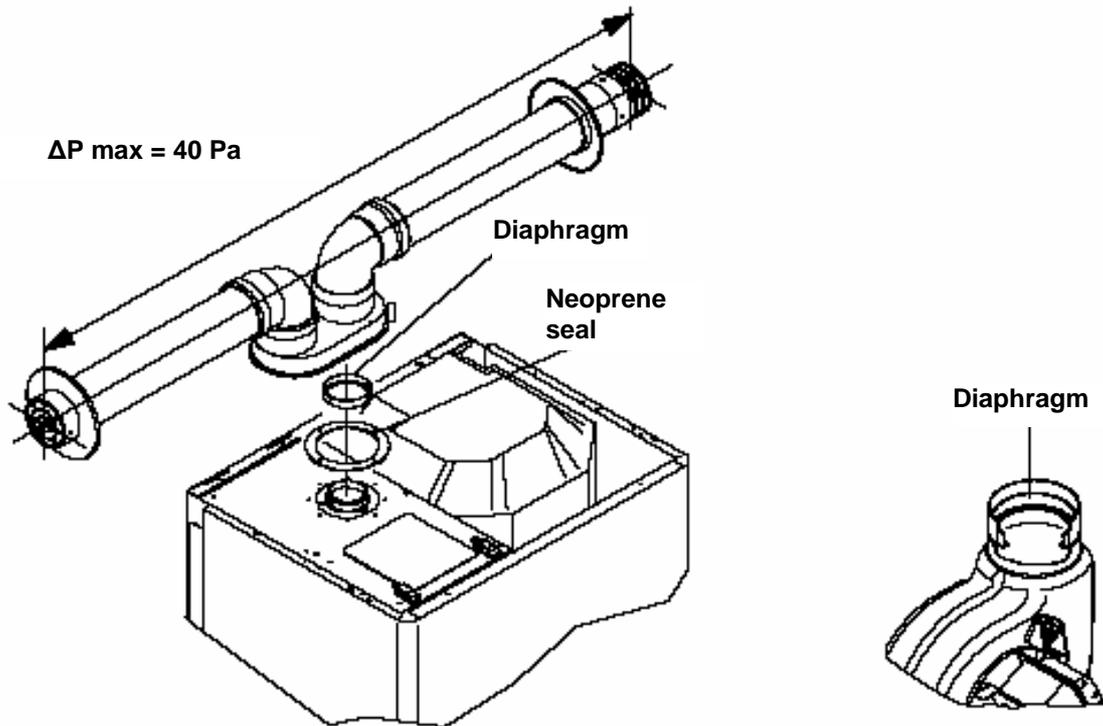
In installations using coaxial pipes of 0.5 m to 1.5 m install the 46 mm diaphragm as shown in picture 9.



COAXIAL FLUE SYSTEM DISTANCES



SPLIT DUCTS FLUE SYSTEM INSTALLATION SAMPLE



pic. 11

3.2.9 Flue system with split pipes 80 mm diameter (type B accessories)

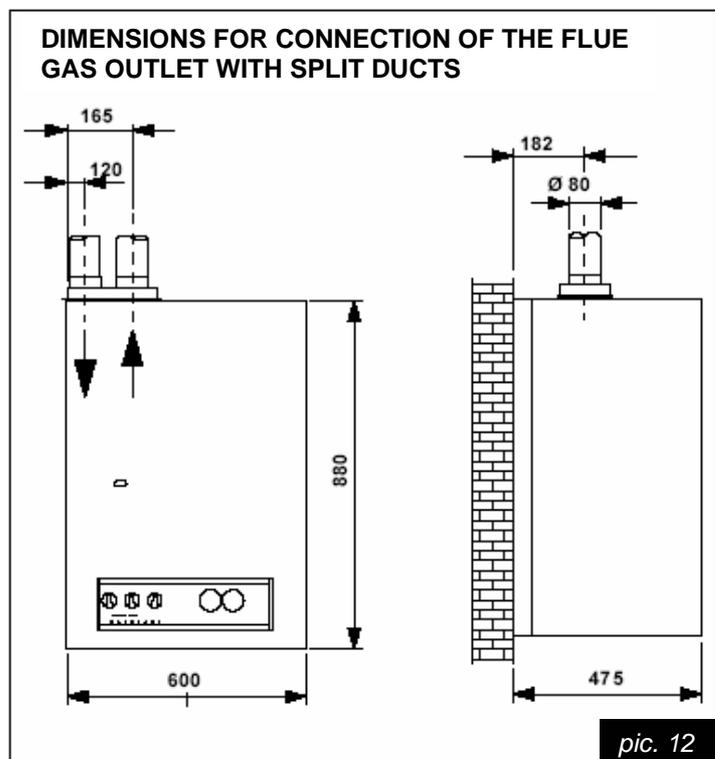
NB: Maximum flue system load loss, according to installation, must correspond to values indicated below.

For flue system with a load loss value not exceeding 40 Pa, the 44mm diaphragm in BTFS 28 model and the 46 mm diaphragm in BTFS 24 model must be installed as shown in pic. 11 (diaphragms are supplied with boiler).

IMPORTANT

Should flue system cross walls and/or infrastructure or if it easily accessible, it is mandatory to install an appropriate thermal insulation.

During the boiler functioning the duct can reach very high temperatures (more than 120 °C).



pic. 12

Configurations relative to Ø 80 split pipe flue system

Sample No. 1 (pic. 13)

Air intake and flue gas outlet from two outside facing perimeter walls.

Maximum allowable load loss: **80 Pa**

Sample No. 2 (pic. 14)

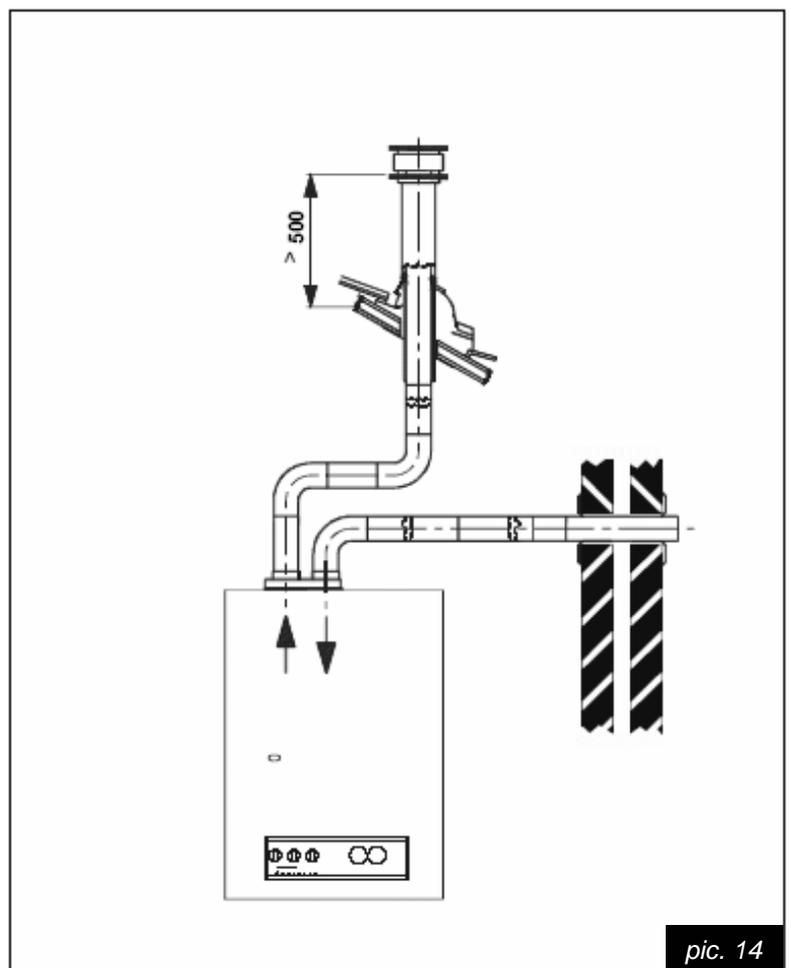
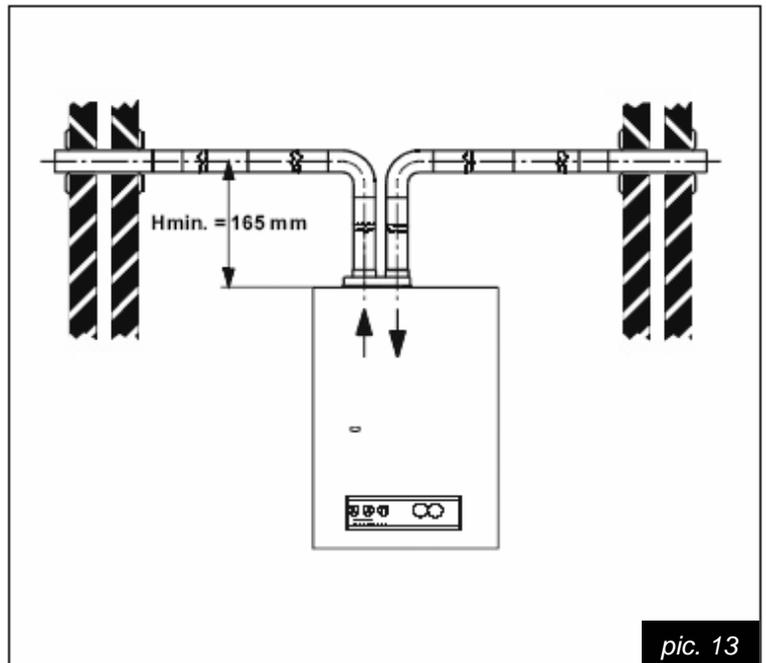
Air intake from perimeter wall and flue gas roof outlet.

Maximum allowable load loss: **80 Pa**

Sample No. 3 (pic. 15)

Air intake from perimeter wall and flue gas outlet from the same outside perimeter wall.

Maximum allowable load loss: **80 Pa**



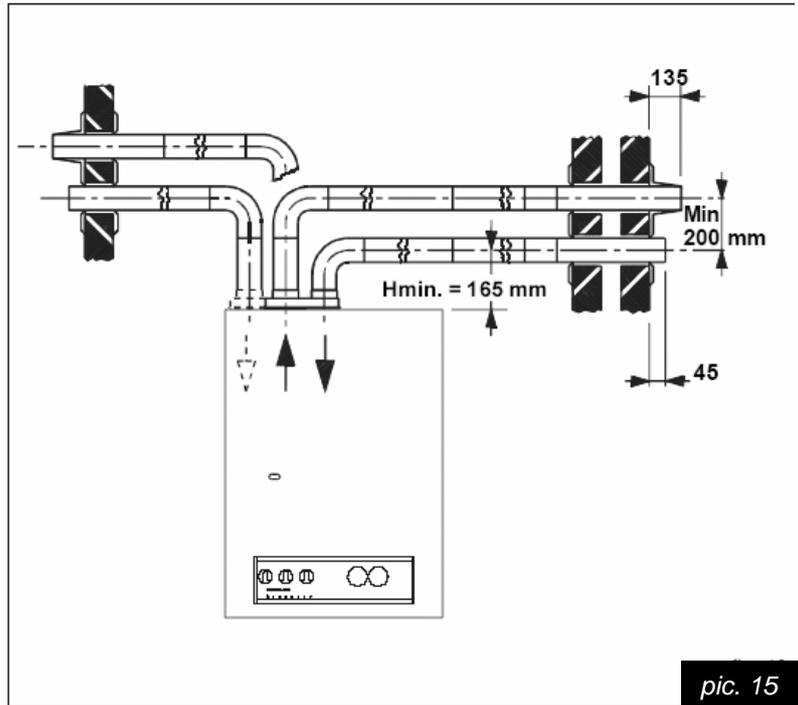
Calculation of load losses for split pipe flue system

- for each metre of duct Ø 80 (both air intake and flue gas outlet) the load loss is 2 Pa;
- for each Ø 80 90° elbow with wide radius (Radius=Diameter), the load loss is 4 Pa;
- for the Ø 80 L = 0.5 m horizontal air intake terminal, the load loss is 3 Pa;
- for the Ø 80 L = 0.6 m horizontal outlet section, the load loss is 5 Pa;
- for the Ø 80 splitting device the load loss is 12 Pa.

NB: The above mentioned values refer to installations made using FONDITAL approved spare part non-flexible and smooth ducts.

Calculation sample:

- 26 mt Ø 80 pipe x 2 = **52 Pa**
- 2 Ø 80 wide radius 90° elbows x 4 = **8 Pa**
- splitting device Ø 80 = **12 Pa**
- horizontal Ø 80 air intake terminal = **3 Pa**
- horizontal Ø 80 outlet terminal = **5 Pa**
- Tot. load loss = 80 Pa**



pic. 15

3.2.10 Measuring combustion efficiency

**(Type A accessories)
Coaxial ducts**

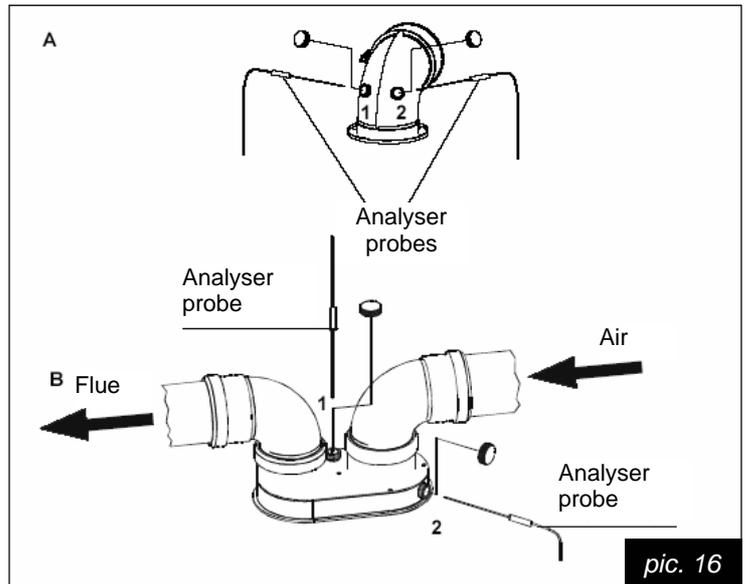
To determine combustion efficiency the following measurements must be made:
 - combustion air measurement in hole 2 (see pic. 16).
 - flue gas temperature and CO₂ measurement in hole 1 (see pic. 16).

Make these measurements when the boiler is functioning.

**(Type B accessories)
Split ducts**

To determine the combustion efficiency the following measurements must be made:
 - combustion air measurement in hole 2 (see pic. 16).
 - flue gas temperature and CO₂ measurement in hole 1 (see pic. 16).

Make these measurements when the boiler is functioning.



pic. 16

3.2.11 Connection to the gas mains

Gas supply pipe section must be equal or larger than boiler's (see pic. 5).

Refer to applicable installation standards and laws. They shall be considered as incorporated in full in this manual.

In brand new gas supply circuit, before supplying any gas or connecting the gas meter to the premises it is mandatory to check for leaks.

If any part of the system is concealed the leak test must be carried out before the pipes are covered.

The leak test must not be conducted using fuel gas: use air or nitrogen.

When gas is flowing in the pipes, gas leaks should never be detected using an open flame device.

Use appropriate products readily available on the market.

3.2.12 Connection to the power mains

NIAS boiler comes with triple poled wiring for power mains connection. One end is already connected to the electronic board and protected against tearing by a fairlead.

The boiler must be connected to **230V-50Hz** power mains.

Make sure phase, neutral and ground connections follow indications in this manual.

When installing the boiler comply with applicable standards which shall be considered fully incorporated in this manual.

A bipolar switch, with 3 mm minimum distance between the

contacts, in an easy-to-reach position, must be installed near the boiler to enable interruption of the power supply and to ensure maintenance operations to be carried out safely.

The power mains line to the boiler must be protected by a differential thermal-magnetic switch with the adequate interruption power.

Power mains must be properly earthed.

The above is an indispensable safety requirement and is to be verified prior to operating the boiler; in case of doubt, ask for a professionally qualified technician to check the electrical system.

Replacement of power mains connecting wiring

Should it be necessary to replace the wiring, always use FONDITAL approved spare part.

FONDITAL shall not be held liable for damage on injury caused by failure to properly earth the power mains.

Gas lines, DHW and CH pipes are not suitable for earthing purposes.

3.2.13 Hydraulic connections

Before connecting the boiler it is advisable the pipes to be cleaned in order to remove any alien material that could damage or clogging boiler components such as the pump and exchanger.

CENTRAL HEATING

Central heating flow and return must be connected to the its ¾" connections marked **M** and **R** in pic. 5.

When size dimensioning the central heating pipes, it is crucial to include load losses induced by radiators, presence of thermostatic valves, radiator cut-off valves and the general configuration of the central heating system.

Between central heating flow pipe and return pipe a by-pass is

installed. It allows a minimum circulation of water, e.g. when all thermostatic valves installed on radiators have closed.

The by-pass circulation prevents boiler from overheating.

By-pass is manually adjustable (see pic. 18).

DOMESTIC HOT WATER

Dhw flow and water mains inlet pipes must be connected to the its ½" connections, marked **C** and **F** in pic. 5.

Water mains pressure shall never exceed 7 bar (higher pressure must be counter-acted through a pressure reducer).

It is advisable to limit DHW pressure to 3 / 4 bar.

Hardness of water increases frequency of service to coil exchanger.

WARNING

Should water hardness be far above average, it is advisable to install a water softener device. Water showing 20°F or more hardness should be treated.

WARNING

Due to its pH value, water supplied from normal water softeners may not be compatible with some components of the heating system.

WARNING

We recommend that the discharge of the safety valve mounted in the boiler be conveyed into the sewer. If this precaution is not taken, activation of the safety valve may result in flooding of the room where the boiler is installed.

FONDITAL shall not be held responsible for damage caused by non-observance of this technical precaution.

3.3 Filling the system

After completion of all hydraulic connections the central heating is ready for loading.

Water filling operation must be performed as follows:

- open the air vents of the radiators and check that the automatic air vent in the boiler is functioning;
- gradually open the boiler water mains inlet tap and check operation of all automatic air vents installed in the system;
- close the air vents on the radiators as soon as water comes out;
- check water pressure gauge on boiler and do not exceed 0.8/1bar;
- close the water mains inlet tap and purge any air still in the system through the radiator air vents;
- switch the boiler on and wait for central heating system to reach working temperature. Stop the pump and purge any left air;
- let the system cool down and then adjust water pressure gauge to 0.8/1 bar.

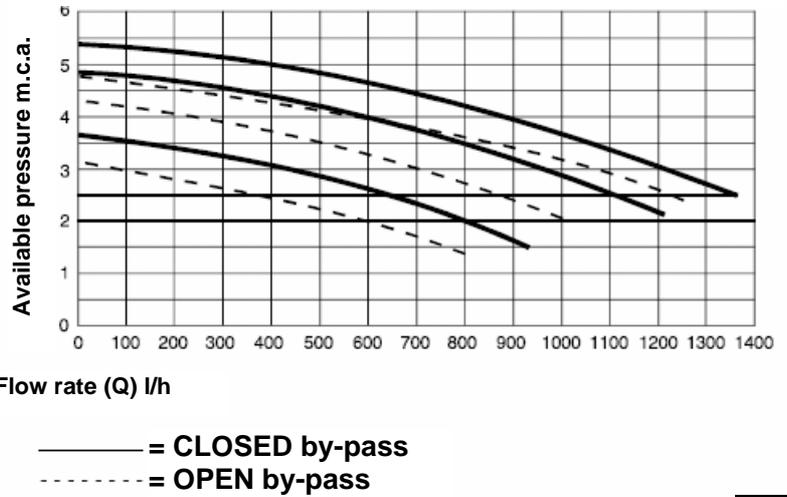
WARNING

For best performance, safe, trouble-free and long lasting operation of boiler and its components, in order to minimise energy consumption, thus complying with standards and laws, it is essential to treat the water using specific products compatible with multi-metal systems.

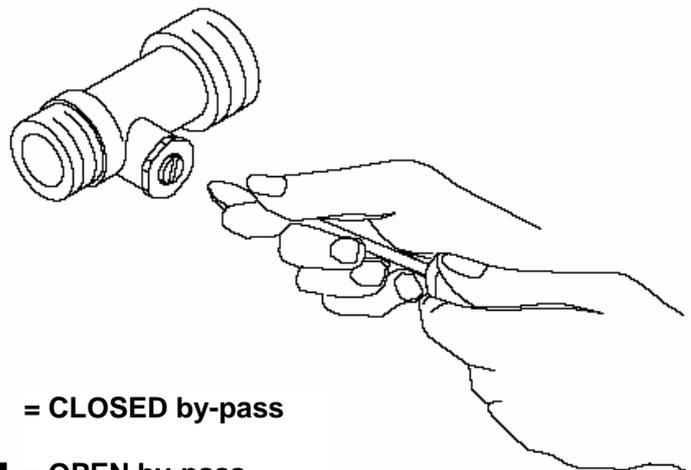
WARNING

Low water pressure safety switch prevents burner to ignite when water pressure is lower than 0.4 / 0.6 bar. Water pressure in central heating system must be set to 0.8 / 1bar; if lower, restore pressure through water mains inlet tap on the boiler (pic. 20).

DIAGRAM OF FLOW RATE/PRESSURE AVAILABLE FOR THE INSTALLATION

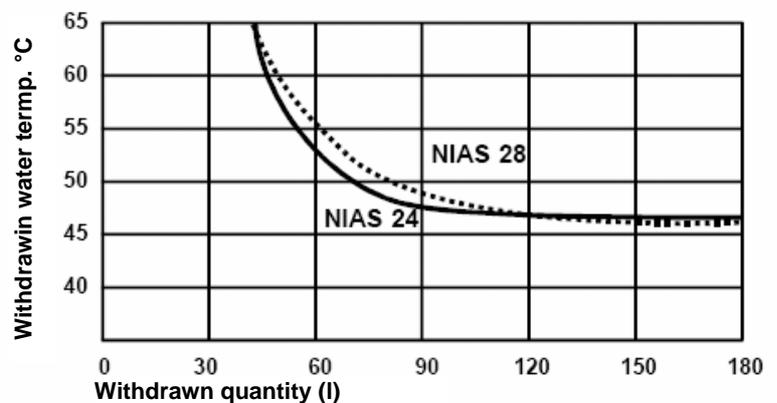


pic. 17



pic. 18

DHW PRODUCTION



Water mains temperature = 15 °C
 12 l/min DHW withdrawal

pic. 19

WARNING

Should water pressure drop below minimum, the boiler stands-by of 15 minutes. Boiler operation can be restored by means of the main switch.

Water pressure adjustment must be performed when the system is cold. Use thermo-manometer gauge on the boiler to check pressure in the system.

IMPORTANT: After a period of inactivity the pump could be blocked.

Before switching on the boiler it may be necessary to start the pump as follows: loosen the protective screw on the pump motor housing, insert a screwdriver in the hole and then manually rotate the pump shaft clockwise (pic. 21).

After restoring pump operation, tighten the protective screw and check for water leaks.

WARNING

When removing the pump protective screw a little water may leak out. Before replacing the cover of the boiler dry any wet surfaces.

3.4 Starting the boiler

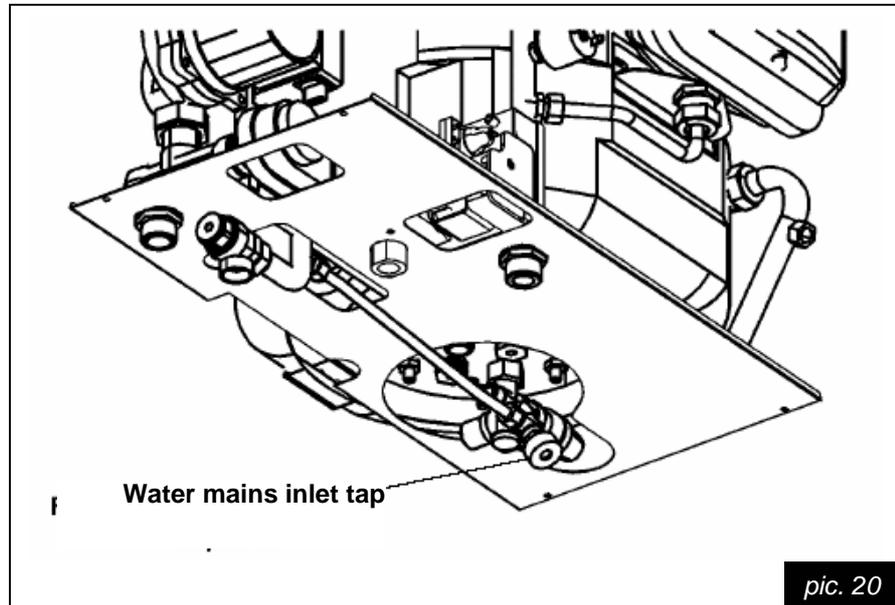
3.4.1 Preliminary checks

Before starting the boiler verify the following:

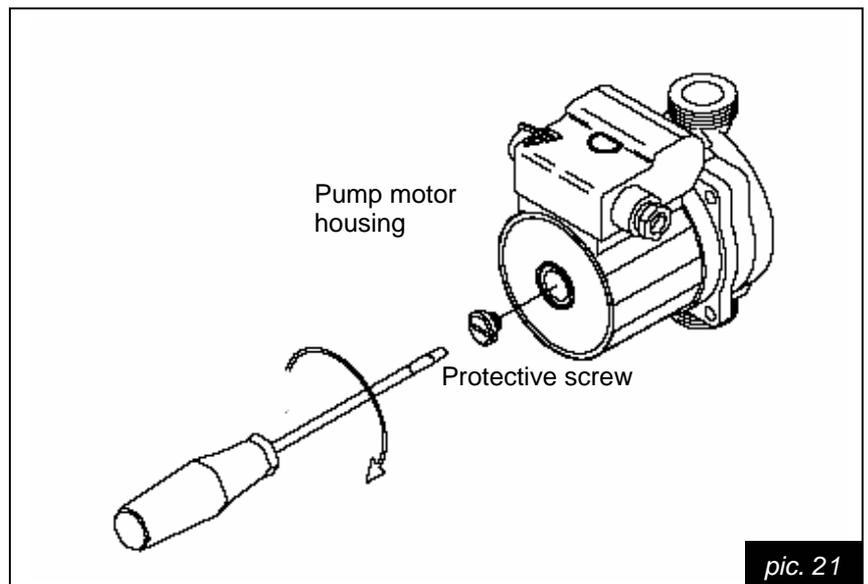
- correct installation of flue gas outlet duct and the end section: **when the boiler is switched on check for flue gas leakage from pipe connection seals;**
- power supply to boiler must be 230 V- 50 Hz;
- system is correctly filled with water pressure at the hydrometer 0.8/1 bar;
- any cut-off taps in the system must be open;
- gas type supply matches gas type for which the boiler has been calibrated: otherwise, convert the boiler to the gas type available (see section: "SWITCHING TO OTHER GASES"): **this operation must be performed by qualified technicians;**
- the gas supply tap is open;
- there are no gas leaks;
- the external mains switch is on;
- the boiler's safety valve is not locked;
- there are no water leaks.

3.4.2 Switching on/off

To switch the boiler on and off follow the indications in the "**Users' Instructions**".



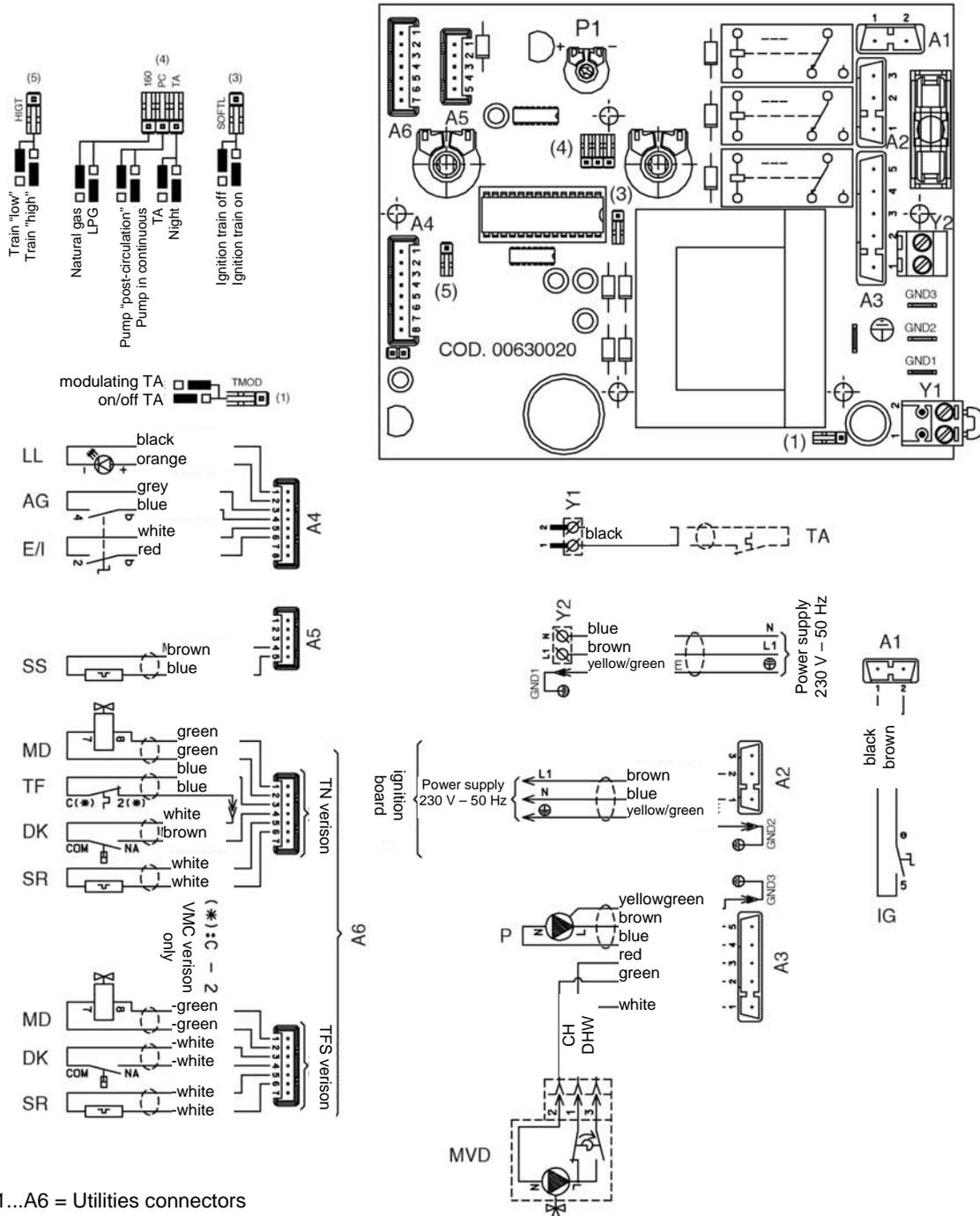
pic. 20



pic. 21

3.5 Wiring diagram

3.5.1 Practical connection diagram / Modulation board – NIAS BTN/BTFS 24-28

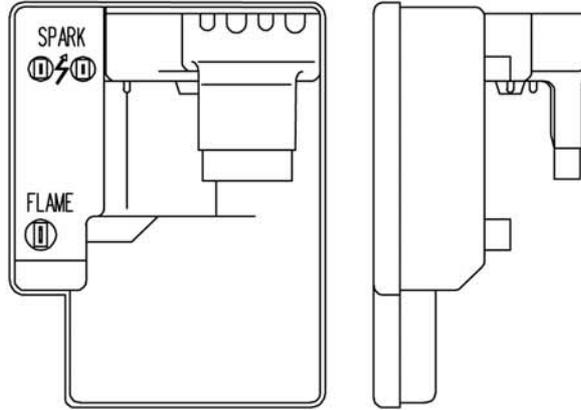


- A1...A6 = Utilities connectors
- AG = Anti-freeze
- DK = Low water pressure safety switch
- E/I = Summer/Winter switch
- IG = Main switch
- LL = Power on light
- MD = Modulation coil
- MVD = Three-way valve motor

- P = Pump
- P1 = CH output regulator (factory-set)
- SR = CH probe
- SS = DHW probe
- TA = Room thermostat (optional)
- TF = Flue gas thermostat

pic. 22

CONNECTION LAYOUT / IGNITION BOARD – NIAS BTN/BTFS 24-28

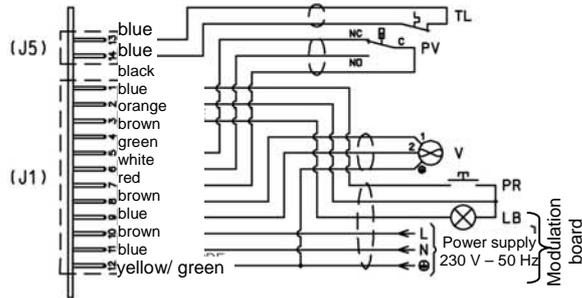
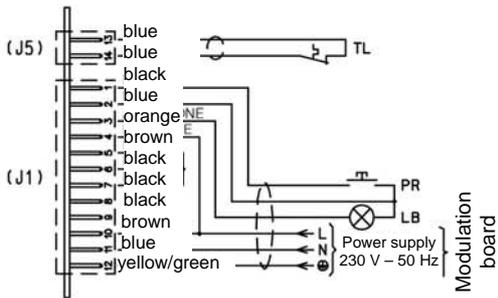


CONNECTION LAYOUT

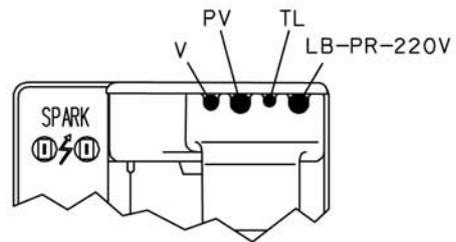
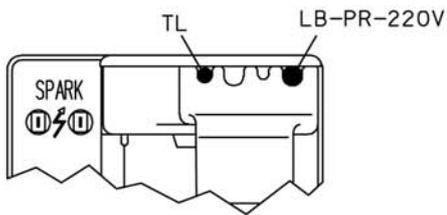
NIAS BTN 24 - 28

NIAS BTFS 24 - 28

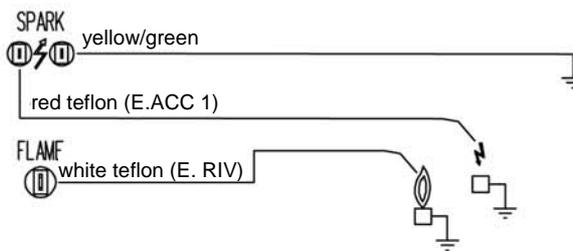
CONNECTIONS



POWER OUTLETS



ELECTRODES



pic. 23

**CH PROBE (SR) AND DHW PROBE (SS)
TEMPERATURE RELATED RESISTANCE VALUES**

T °C	0	1	2	3	4	5	6	7	8	9
0	33242	51534	29925	28409	26980	25633	24361	23161	22028	20958
10	19947	18992	18088	17233	16425	15659	14934	14247	13596	12979
20	12394	11839	11313	10813	10338	9888	9459	9052	8665	8297
30	7947	7614	7297	6995	6707	6433	6171	5922	5685	5458
40	5242	5036	4839	4651	4471	4300	4136	3979	3829	3685
50	3548	3417	3291	3171	3056	2945	2840	2738	2641	2548
60	2459	2373	2291	2212	2136	2063	1994	1926	1862	1800
70	1740	1683	1628	1576	1524	1475	1428	1383	1339	1297
80	1256	1217	1180	1143	1109	1075	1042	1011	981	952
90	923	896	870	845	820	797	774	752	730	710
100	690	671	652	634	617	600	584	568	553	538

Relation between temperature (°C) and nominal resistance (Ohm) of the CH probe SR and the DHW probe SS

E.g.: 25 °C water, nominal resistance is 9888 Oh
90 °C water, nominal resistance is 923 Ohm

3.6 Switching to different gases

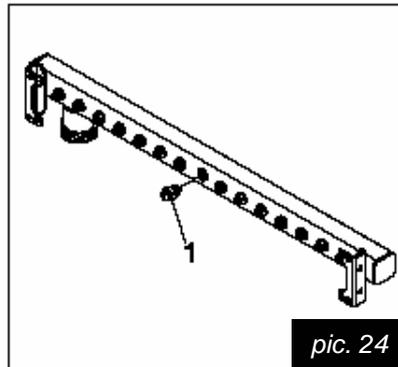
NIAS boilers are factory-set according to gas type requested.

Any later conversion must be performed by qualified technicians. **FONDITAL** conversion kit (supplied with boiler) must be installed. For conversion and adjustment instruction see below.

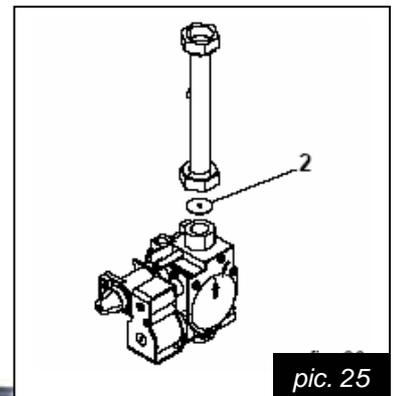
Converting boiler from one type of gas to another:

- remove the main burner;
- remove nozzles - "1" in pic. 24 - of main burner (13 nozzles on 24 kW models, 15 nozzles on 28 kW models) (see pic.24) and replace them with those corresponding to the new type of gas. Check "NOZZLES - PRESSURES" chart for nozzle size;
- install (LPG 24 kW model conversion only) or remove (natural gas conversion only) diaphragm **2** at the outlet of the gas valve (see pic. 25);
- re-install main burner;
- position the jumper on the modulation board in the electrical panel as shown in pic. 26;
- check the pressure value upstream the gas valve (see "NOZZLES - PRESSURES" chart) and adjust the pressure of the burner as indicated in the "BURNER ADJUSTMENT" section;
- check that the burner is functioning properly;
- **check that there are no gas leaks.**

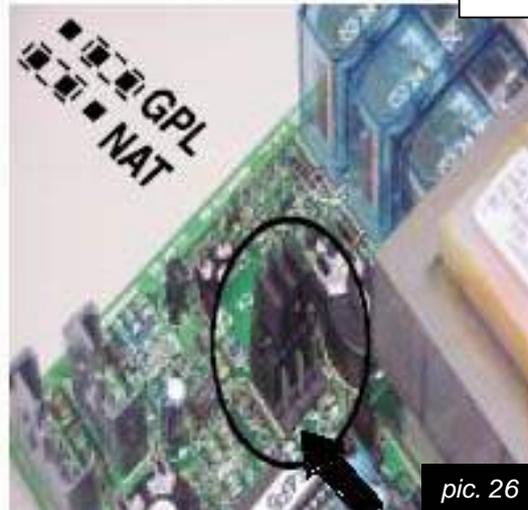
When the conversion process is completed, fill in the label supplied with the kit with the information required and stick it onto the boiler alongside the rating plate.



pic. 24



pic. 25



pic. 26

NIAS BTN 24

PRESSURES – NOZZLES CHART

Type of gas	Supply pressure (mbar)	nozzle Ø (mm)	diaphragm Ø (mm)	Burner pressure (mbar)	
				Min	Max
Natural gas	20	1.20	-	2.9	12.3
Butane	28	0.77	4.9	5.3	23.5
Propane	37	0.77	4.9	7.1	30.3

NIAS BTFS 24

Type of gas	Supply pressure (mbar)	nozzle Ø (mm)	diaphragm Ø (mm)	Burner pressure (mbar)	
				Min	Max
Natural gas	20	1.20	-	3.2	13.2
Butane	28	0.77	5.1	5.8	25.1
Propane	37	0.77	5.1	7.6	32.2

NIAS BTN 28

Type of gas	Supply pressure (mbar)	nozzle Ø (mm)	diaphragm Ø (mm)	Burner pressure (mbar)	
				Min	Max
Natural gas	20	1.20	-	3.0	13.7
Butane	28	0.75	-	4.9	26.8
Propane	37	0.75	-	6.9	34.6

NIAS BTFS 28

Type of gas	Supply pressure (mbar)	nozzle Ø (mm)	diaphragm Ø (mm)	Burner pressure (mbar)	
				Min	Max
Natural gas	20	1.20	-	2.8	13.3
Butane	28	0.75	-	5.1	27.3
Propane	37	0.75	-	6.8	35.2

3.7 Burner adjustment

All the instructions below must be solely performed by **qualified technicians**.

Boilers are factory adjusted and tested.

Changes in the type of gas or adaptation to new supply network conditions require adjustment of the gas valve.

Gas valve adjustment must be performed as follows:

A) Maximum power regulation

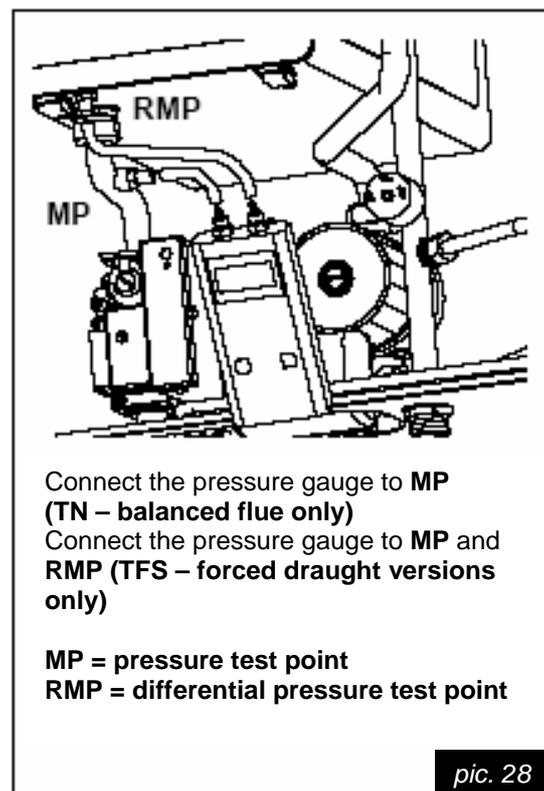
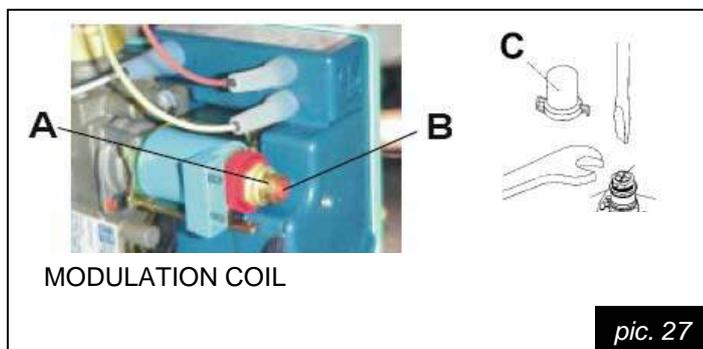
- check the value of the supply pressure (see table NOZZLES - PRESSURES);
- remove cover **C** which protects the regulation screws of the pressure regulator (pic. 27), located on top of the modulation coil;
- set the CH water temperature to maximum;
- connect a U-shaped pressure gauge following instructions shown in pic. 28;
- set the heat power regulator **P1** (see pic. 22-29) to the maximum by turning it **CLOCKWISE**;
- set the summer/OFF/winter/anti-freeze switch to winter;
- check that the room thermostat contact **TA** is closed;
- turn nut **A** (external) clockwise to increase and anti-clockwise to decrease pressure.

B) Minimum power regulation

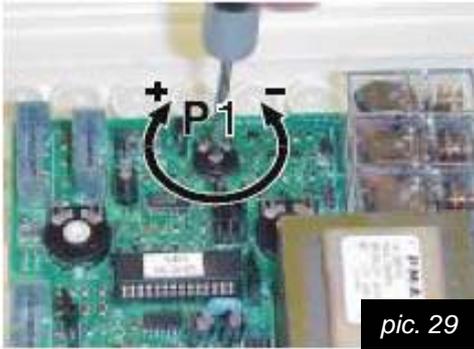
- disconnect power from modulation coil on gas valve;
- switch the burner on, check that "MINIMUM" pressure is set according to "NOZZLES - PRESSURES" chart;
- adjust if needed by holding nut **A** still and turning screw **B** by means of a 10mm screwdriver (**CLOCKWISE** to increase pressure or **ANTI-CLOCKWISE** to decrease);
- restore power to modulation coil on gas valve.

C) Final operations

- check minimum and maximum pressures of gas valve;
- adjust as necessary;
- install plastic cover **C**;
- close all gas pressure test points;
- **check for gas leaks.**



3.8 Adjusting boiler output to the system



Connect a manometer for burner pressure as shown in pic. 28 (**PROCEED ONLY IF BOILER IS COLD**), select winter (CH and DHW) function, turn the boiler on and follow the instructions below:

- wait approx. 120 seconds for boiler to reach working pressure;
- check pressure and verify boiler power adequacy according to heating system requirements;
- should boiler power not be adequate, adjust P1 on modulation board (clockwise to increase gas pressure, anti-clockwise to decrease gas pressure)

Please note that the boiler has an automatic modulation function enabling it to self adapt to the heating system requirements.

P1 adjusts max gas pressure to the burner and consequently the boiler heat output.

Burner gas pressure / boiler heat output chart (pic. 30)

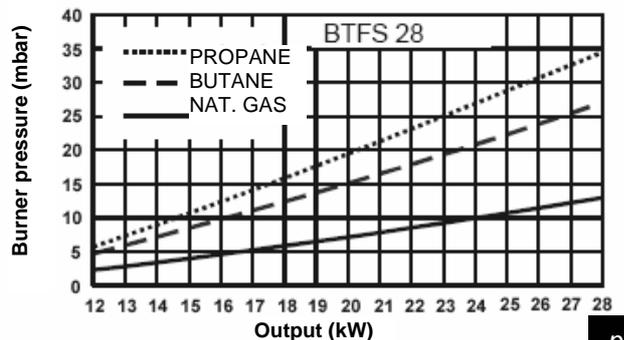
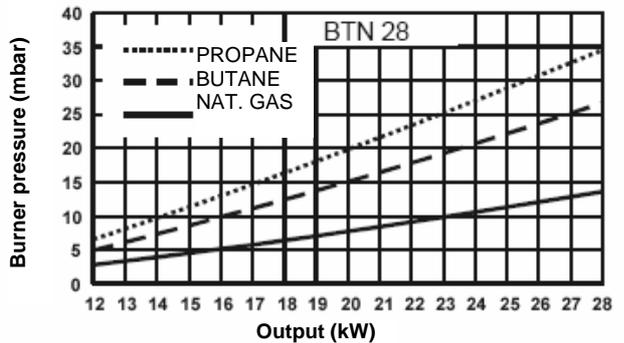
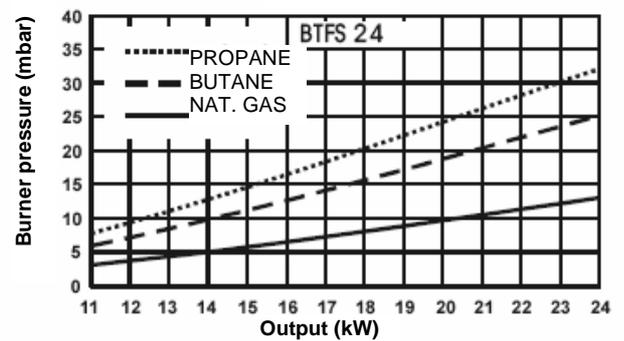
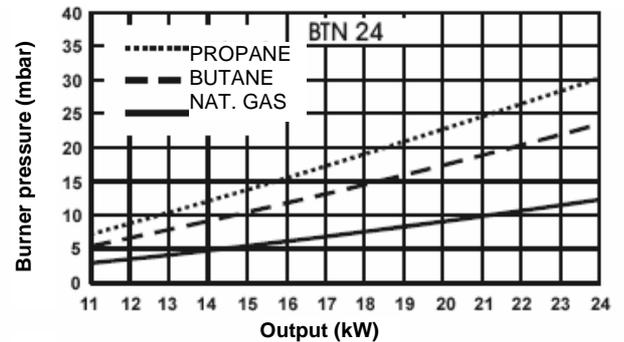
Assuming the heating system requirement is 18 kW, pic. 30 chart indicates burner gas pressures to ensure proper boiler output:

Sample 1 - natural gas-powered boiler: adjust **P1** to 7.5 mbar on 24 TN - balanced flue - version and 7.7 mbar on 24 TFS - forced draught - version.

Sample 2 – butane-powered boiler: adjust **P1** to 14.8 mbar on 24 TN - balanced flue - version boiler and 15.2 mbar on 24 TFS - forced draught - version.

Sample 3 – propane-powered boiler: adjust **P1** to 19 mbar on 24 TN - balanced flue -version and 20 mbar on 24 TFS - forced draught - version.

BURNER GAS PRESSURE / BOILER HEAT OUTPUT CHART



pic. 30

4 Boiler test

Boiler test (or new boiler first operation) must be performed exclusively by qualified personnel.

4.1 Preliminary checks

Before carrying out any test (or starting the boiler for the first time), perform the following checks:

- the installation must comply with applicable laws;
- the flue gas outlet duct and the end section are installed in compliance with instructions: **when the boiler is switched on there must be no leakage of combustion products from any of the seals;**
- power supply is 230 V - 50 Hz;
- system is loaded (water pressure gauge reads 0.8/1 bar);
- cut-off valves on the system pipes are open;
- gas mains supply according to boiler factory-set gas: in case of discrepancy, convert the boiler to the gas type available, see "SWITCHING TO DIFFERENT GASES" section in this manual;
- gas mains tap is open;
- no gas leaks are detected;
- boiler is electrically powered;
- boiler safety valve is not locked;
- no water leaks are detected.

Should boiler not be installed complying with applicable standards and laws, do not start it and notify immediately the central heating system supervisor.

4.2 Turning the boiler on or off

Follow the "Users' Instructions" for boiler on and off procedure.

5 Maintenance

Boiler must be yearly serviced to ensure efficient and trouble-free operation.

Maintenance (or repair) operations must be performed exclusively by qualified personnel.

Disconnect the boiler from power mains before beginning any maintenance procedure either involving replacement of components and/or internal cleaning.

Maintenance list

Routine maintenance must include **the following checks:**

- boiler integrity ;
- leakage of the boiler's gas circuit and gas mains network;
- boiler gas supply pressure;
- minimum and maximum gas pressures to the boiler nozzles;
- boiler ignition;
- boiler combustion parameters through flue gas analysis (to be performed on a two-year basis if boiler is individually installed. Annually to cascade-installed boilers);
- general condition and leak check of flue system including anti-wind gust device (BTN - balanced flue - model);
- absence of flue gas reflux into the premises and correct exhaust of flue gas (BTN – balanced flue - model);
- condition of safety thermostat installed on the anti-wind gust device (BTN – balanced flue - model);
- air pressure switch (BTFS – forced draught - model);

- general condition of the boiler safety devices;
- water leaks and scaling of boiler connections;
- efficiency of the CH safety valve;
- efficiency of the DHW safety valve;
- expansion vessel working pressure;
- water pressure switch efficiency;
- magnesium anode efficiency.

And the following cleaning operations:

- general internal cleaning;
- gas nozzles;
- air intake and flue gas outlet circuit (BTFS – forced draught - model);
- anti-wind gust device (BTN – balanced flue - model);
- room ventilation grille if available (BTN – balanced flue - model);
- heat exchanger (flue gas side).

In case of new boiler first operation, also check:

- boiler room characteristics according to boiler requirements;
- room ventilation grilles, if available (BTN – balanced flue - model);
- flue system dimensions, diameters and lengths of ducts;
- correct installation of the boiler in compliance with the instructions in this manual.

Should the boiler not be installed according to this manual operating requirements, if there is no immediate danger or hazard to people, animals and property, notify, both verbally and in writing, the system supervisor.

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