DIDACTIC MANUAL

FAMILY:	Wall-hung atmospheric boilers
GROUP:	Instantaneous type with Forced Draught
MODELS:	***Delfis-Antea*** *Mono-thermal*
VERSIONS:	Indoor and built-in installation
PART NO.:	AST 14 C 261/00

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BRAND NAME

NOVA FLORIDA

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SECT. 1

TECHNICAL CHARACTERISTICS

1.1 MODELS

Mono-thermal Delfis-Antea CTFS 24

ABBREVIATION KEY:

C : combined
TFS : forced draught, sealed chamber

MAIN CHARACTERISTICS:

Mono-thermal DELFIS-ANTEA **CTFS 24**: atmospheric boiler for indoor installation, combined instantaneous, with production of domestic hot water + heating, forced draught, sealed chamber, mono-thermal with plate exchanger;

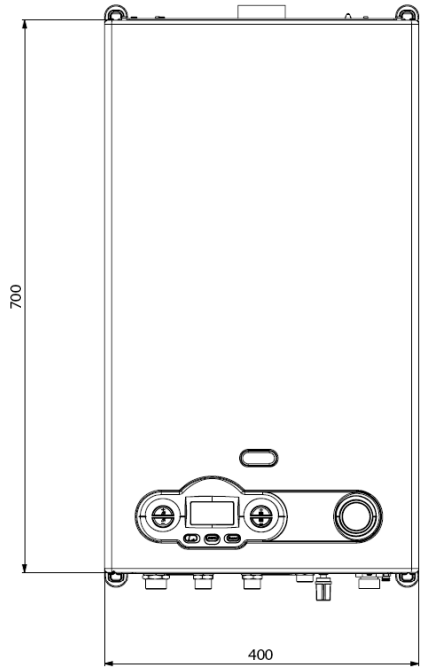
1.2 OVERALL DIMENSIONS

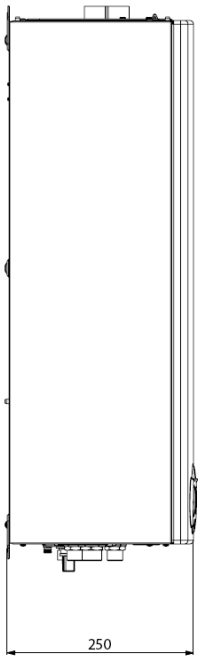
Height H = 700 mm

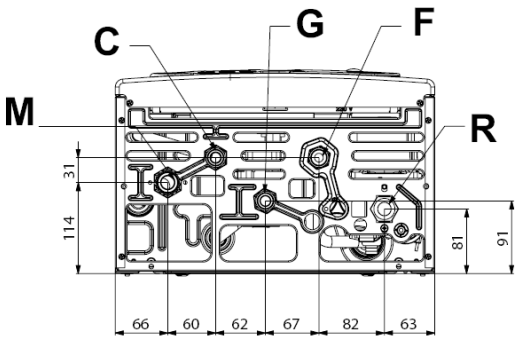
Width L = 400 mm

Depth D = 250 mm

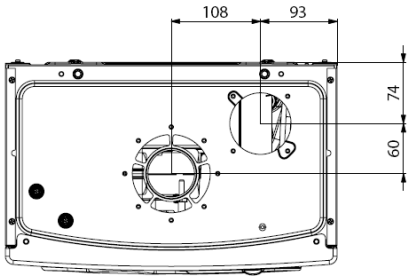
INDOOR INSTALLATION





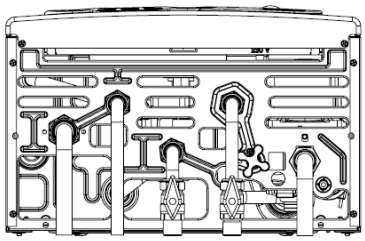


vista dall'alto

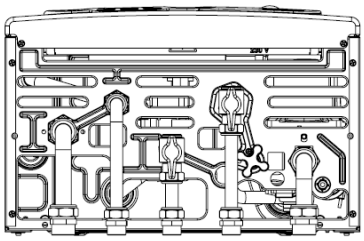


vista dal basso

G Ingresso gas (1/2")
M Mandata impianto riscaldamento (3/4")
C Uscita acqua calda sanitaria (1/2")
F Ingresso acqua fredda (1/2")
R Ritorno impianto riscaldamento (3/4")



Quote per attacchi con kit idraulico base (optional)



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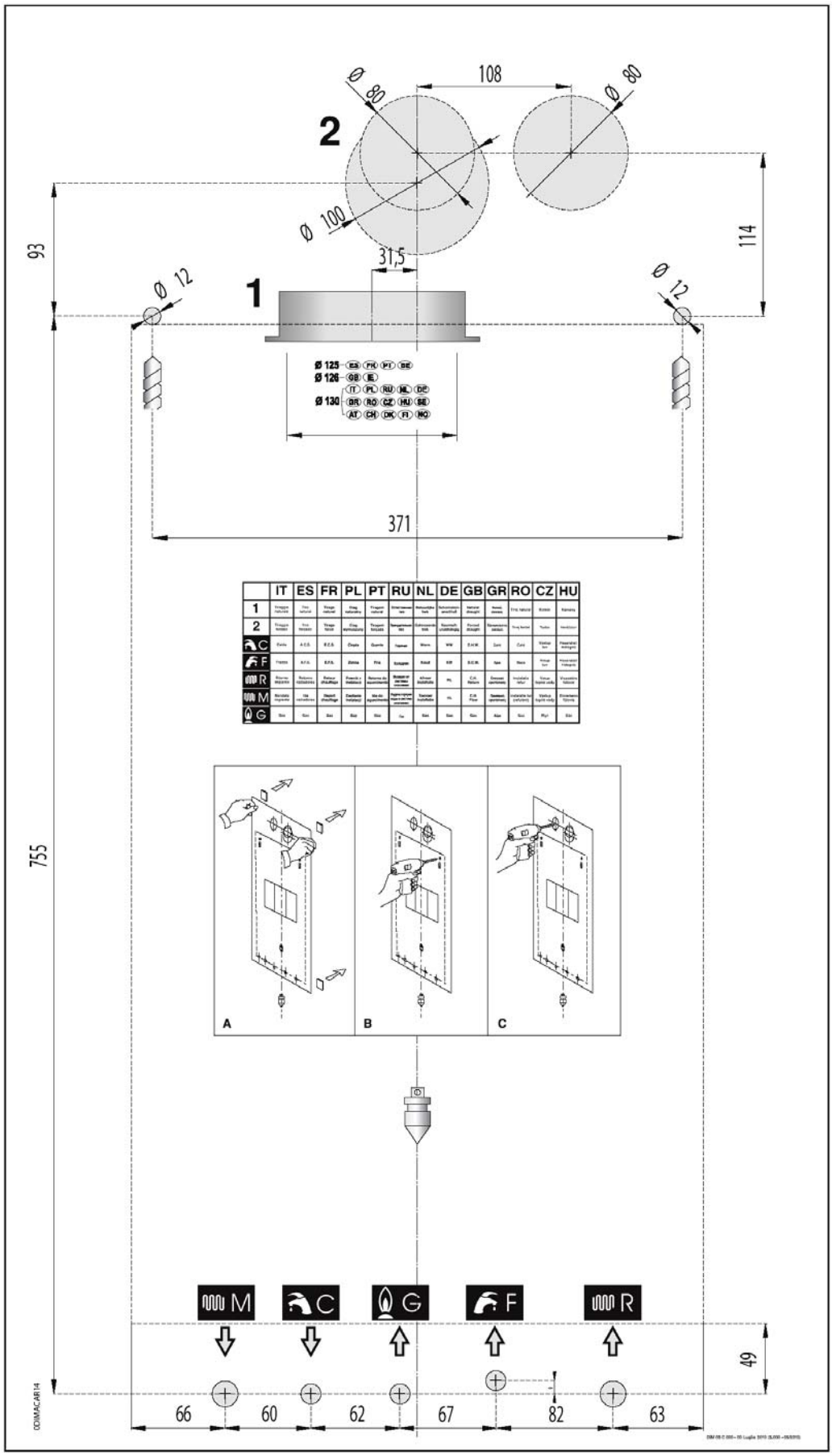
INSTALLATION TEMPLATE



	IT	ES	FR	PL	PT	RU	NL	DE	GB	GR	RO	CZ	HU
1													
2													
C													
F													
R													
M													
G													

1.3 TECHNICAL SPECIFICATIONS

General Characteristics

		CTFS 24
Operating parameters		
Equipment category		II2H3+
Burner nozzles	no.	11
Minimum CH circuit flow rate	l/h	550
CH circuit min. and max. pressure	bar	0.5 and 3
DHW circuit min. and max. pressure	bar	0.5 and 8
DHW specific flow rate (Δt 30°C)	l/min	11.1
ON/OFF triggering temperature due to overheating	°C	105 and 90
Air pressure switch ON/OFF pressure	Pa	45 and 35
Central heating setting range	°C	35 ÷ 78
Maximum CH working temperature	°C	78 + 5
DHW setting range	°C	35 ÷ 57
Maximum DHW working temperature	°C	57 + 5
Total capacity of expansion vessel	l	7
Maximum recommended system capacity (**)	l	100
Nominal electrical data		
Power supply: Voltage/Frequency	V - Hz	230-50
Power mains supply fuse	-	5x20mm 3.15 AF
Electric cabinet protection degree	IP	X4D
Max. absorbed power	W	98
Electric power in standby condition	W	< 2
Overall dimensions and connections		
Height	mm	700
Width	mm	400
Depth	mm	250
Net weight (without packaging)	Kg	25.0
Gas connection	-	G ½
Flow and return connection	-	G ¾
Cold water and hot domestic water connection	-	G ½
Consumption		
Natural gas consumption (*)	m^3/h	2.7
Butane gas consumption (*)	kg/h	2.0
Propane gas consumption (*)	kg/h	1.98
Operating characteristics		
Type of ignition	-	Electronic
Flame surveillance	-	Ionisation
Recommended ionisation current	µA	2
Type of detection	-	Non-polarised
Ignition attempt at "cold" system	No.	5
Max. number of resume attempts from remote	No.	5

(*) Value related to 15°C - 1013 mbar condition
(**) Maximum water temperature at 83°C, tank preloaded at 1 bar

Design data and flue sizing

CTFS 24

		Pmax.	*Pmin.*	*Load at 30 %*
Casing heat loss	%	1.01	2.04	-
Flue system heat loss with burner on	%	5.89	10.26	-
Flue (natural gas) mass flow	g/s	14.18	15.21	-
Flue gas temp. – air temp.	°C	98	79	-
CO2 value (natural gas - butane gas - propane)	%	6.8/8.0 – 7.7	3.0/3.6 – 3.5	-
Boiler efficiency rating	%	93.0	88.7	90.4
Efficiency rating (according to 92/42/EC)	-	★★★		
Nox emission class	-	3		

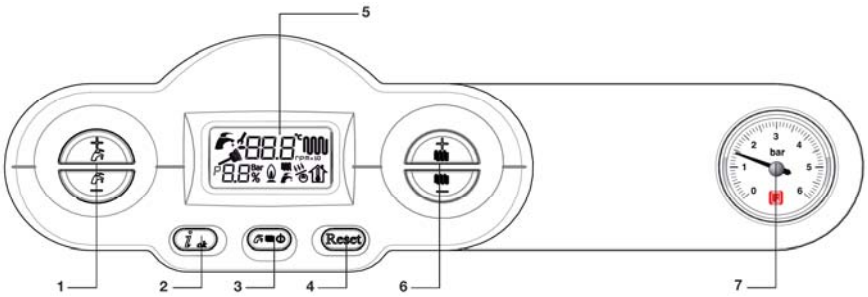
Settings

CTFS 24

	Heat capacity	*Heat output MIN-MAX*	*Supply pressure*	*Diameter Nozzles*	*Burner pressure MIN-MAX*
	(kW)	(kW)	(mbar)	(mm)	(mbar)
Natural gas G20	25.5	11.1 – 23.7	20	1.35	3.1 – 11.8
butane gas G30	25.5	11.1 – 23.7	29	0.78	7.2 – 29.0
propane gas G31	25.5	11.1 – 23.7	37	0.78	9.6 – 36.6

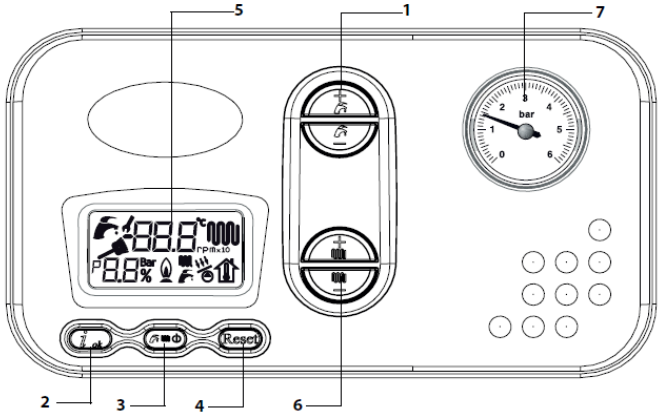
SECT. 2
CONTROL PANEL AND DIAGNOSTICS

2.1 USER'S INTERFACE



1. Set domestic hot water temperature

These keys are used to set (increase or decrease) the domestic hot water temperature within a range from 35°C to 57°C.



2. Recall information and confirm parameters

This key is used to scroll the sequence of the values of some parameters (see following paragraphs). It is also used to access and confirm the edited parameters setting.

3. Select boiler state

Press this key to set the following functions:
SUMMER :
Boiler produces domestic hot water, only.
WINTER :
Boiler provides both central heating and domestic hot water.
CENTRAL HEATING ONLY :
Boiler provides central heating water only.
STANDBY ***OFF***:
Boiler in standby mode: central heating and DHW functions are disabled.

4. Resume boiler function

This key enables to resume boiler operation after a shut-down.

5. LCD Display

The LCD shows the boiler status and operation information (see the following paragraph).

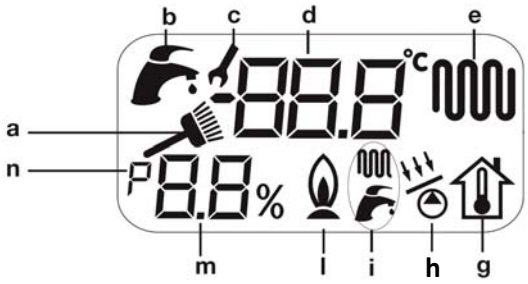
6. Set central heating water temperature

Without external probe, this key is used to set the water temperature value of the heating system between a minimum value of 35°C and a maximum value of 45°C (*reduced range*) or 78°C (*standard range*). With external probe, instead, it is used to set the fictitious temperature (see paragraph about thermoregulation).

7. Water pressure gauge

This shows the pressure of the water in the heating system.

2.2 LCD



a. Flue cleaning function indicator
It illuminates flashing when the flue cleaning function is enabled by pressing keys **2** and **4**at the same time (see previous paragraph). When this function is ON, boiler flow temperature and the current supplied to the modulation coil are displayed.

b. DHW indicator
This comes on when the boiler is in DHW mode.
It flashes when setting the DHW temperature with the keys **1** (see previous paragraph).

c. Parameter editing indicator
It comes on when entering into the parameter setting mode (in this case the symbol n turns on at the same time **n**).

d. First alphanumeric indicator
Alphanumeric values indicating:
- flow water temperature during "heating" function;
- central heating water temperature setting;
- domestic hot water temperature during the "DHW" function;
- domestic hot water temperature setting;
- boiler status;
- boiler diagnosis.

e. Central heating indicator
This comes on when the boiler is in CH mode.
Flashes when setting the CH temperature with adjuster **6** (see previous paragraph).

g. Fictitious room temperature indicator
When an external probe is installed, this indicator flashes when the fictitious room temperature is set via buttons **6**.

h. Solar pump enabling indicator
This icon illuminates every time the solar pump is enabled only by adding the supplementary board to manage the solar plant.

i. Boiler status indicator
The icons indicate the operating modes enabled:
SUMMER: only the icon is lit
SUMMER and WINTER: both icons are lit
CENTRAL HEATING ONLY: only the icon is lit

l. Flame lighting indicator
It turns on upon detecting burner flame lighting.

m. Second alphanumeric indicator
Figures to view and edit parameters.
It indicates the working burner current power rate.

n. Parameter indicator
It turns on when entering the parameter programming mode.

2.3 BOILER STATUS AND FAULT CODES

Normal operation

Boiler in STANDBY mode.	
Boiler in SUMMER mode. *No active function*. The flow temperature is displayed	
Boiler in SUMMER or WINTER mode. *No active function*. The flow temperature is displayed	
Boiler in CENTRAL HEATING ONLY mode. *No active function*. The flow temperature is displayed	
Boiler in SUMMER mode *DHW function active* with flame lit. The hot domestic water temperature and the burner power rate percentage are displayed.	
Boiler in SUMMER or WINTER mode. *DHW function active* with flame lit. The hot domestic water temperature and the burner power rate percentage are displayed.	
Boiler in SUMMER or WINTER mode. *CH function active* with flame lit. The flow temperature and the burner power rate percentage are displayed.	
Boiler in WINTER mode. *CH function active* with flame lit. The flow temperature and the burner power rate percentage are displayed.	

Malfunction, errors to be reset by user and self-resettable faults

The display indicates the fault through the relevant error code (see following table). Some of such faults can be reset by the user pressing the "rest" key (r), some others are self-resettable (a):

Boiler shut-down due to missing flame (r)	
Boiler shut-down due to double flow probe triggering (r)	
Boiler shut-down due to flue gas pressure switch triggering (r)	
Boiler shut-down due to low water pressure switch triggering (a)	
Boiler shut-down due to double flow probe fault (a)	
Boiler shut-down due to DHW probe fault (a)	
External probe fault (a)	
Solar collector probe fault (SCS) (a)	
Solar valve probe fault (SVS) (a)	
Solar water heater probe fault (SBS) (a)	
Remote control connection fault (a)	
Triggering of safety thermostat in mixed zone 2 (a)	
Mixed zone flow probe fault (a) (with indication of the zone number)	
Communication failure between supplementary boards (a)	
Hydraulic configuration not allowed(a)	
Shut-down due to fan safety circuit hardware fault	

Shut-down due to gas valve safety circuit hardware fault	
Air pressure switch recognition failure	
Modulation coil fault (a)	
Max. number of reset attempts from remote reached (r)	

NOTE: *The board is able to count and store the boiler's latest five faults (both resettable and self-resettable). View them by scrolling the parameters from P51 to P55.*

The display back-lighting works as follows:

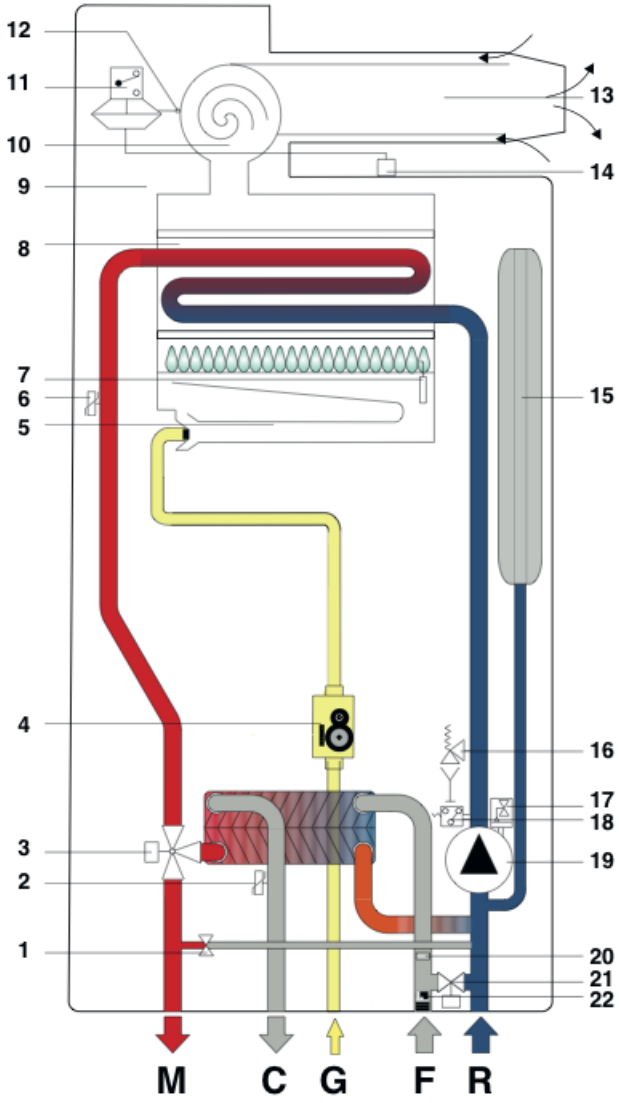
- illuminates steadily when the boiler keys are enabled;
- It illuminates flashing (3 seconds ON and 2 OFF) when a shut-down or a fault occurs.

SECT. 3

HYDRAULIC DIAGRAMS AND COMPONENTS

3.1 HYDRAULIC DIAGRAM

CTFS



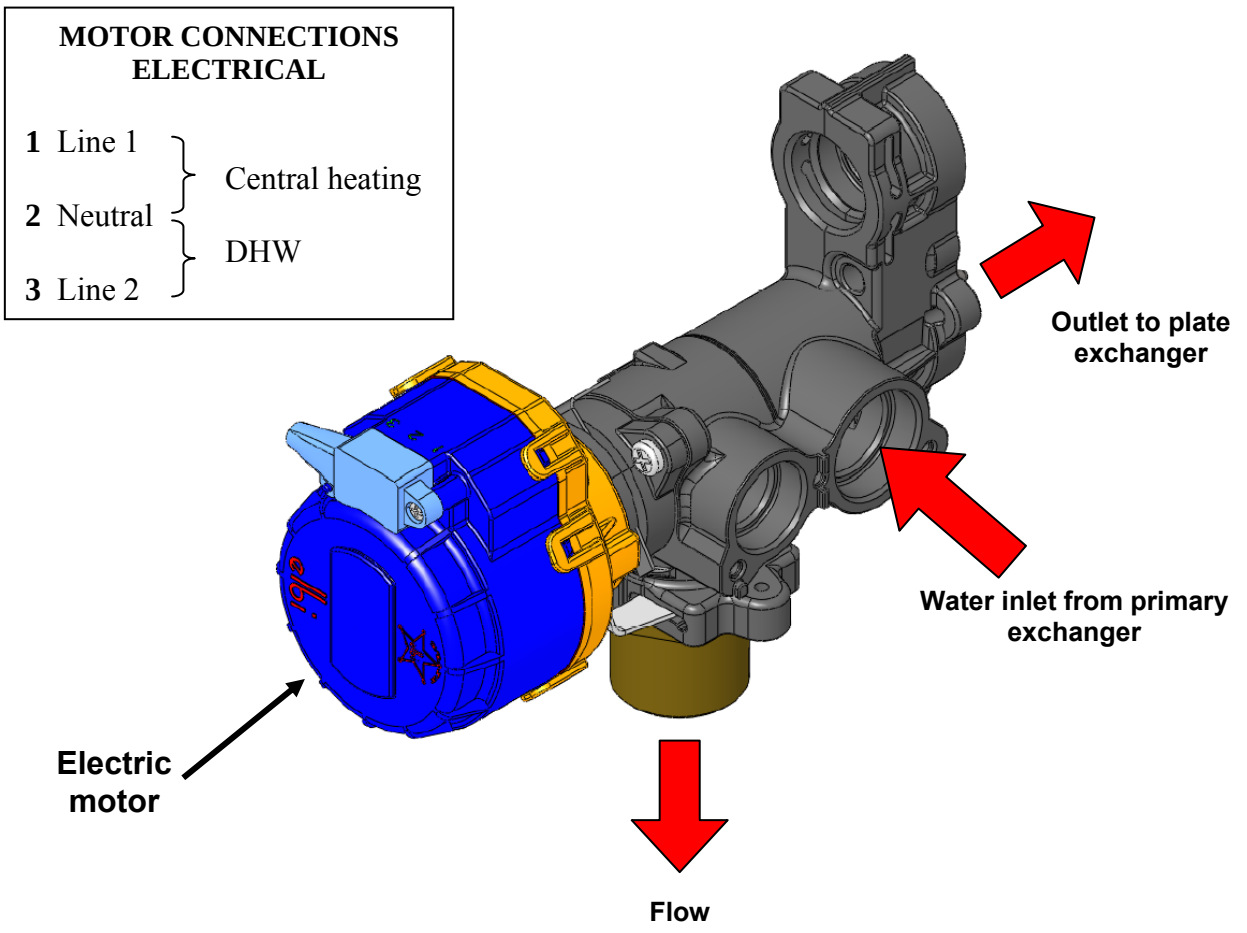
1. Automatic by-pass
2. DHW probe
3. Motorised 3-way valve
4. Modulating gas valve
5. Burner
6. CH temperature probe
7. Ignition/detection electrode
8. Mono-thermal exchanger
9. Sealed combustion chamber
10. Flue gas extractor fan
11. Flue gas circuit safety pressure switch
12. Pressure measurement point on flue gas duct
13. Air intake and flue gas venting pipe
14. Pressure measurement point on flue gas duct
15. Expansion tank
16. 3-bar safety valve
17. Deaerator
18. Minimum pressure switch
19. Circulation pump
20. 10l/min flow rate limiting device
21. Filler cock
22. Cold water flow switch with filter

M CH system flow
C Hot water outlet
G Gas inlet
F Cold water inlet
R CH system return

3.2 HYDRAULIC UNIT

MOTORISED THREE-WAY VALVE

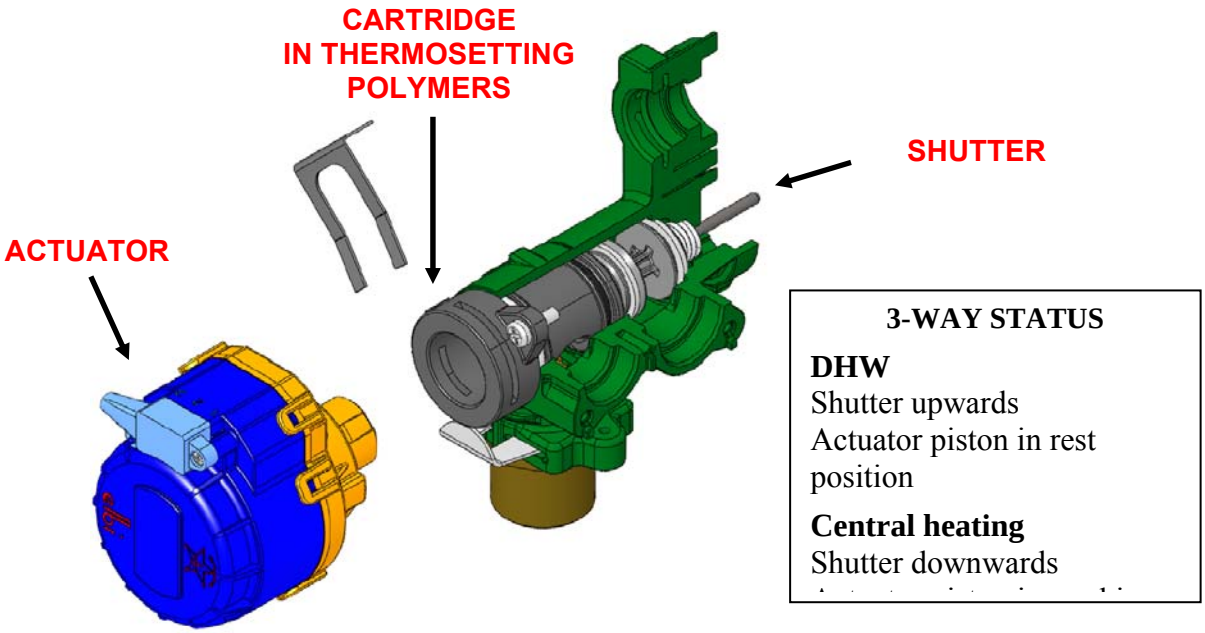
The boiler uses a three-way valve to divert the water flow coming from the primary exchanger into another pipe, in particular it diverts the water into the secondary (plate) exchanger, where heat will be transferred to the DHW.
This valve consists of one main three-way body, one plastic (thermosetting polymer) cartridge, and one electric motor (actuator) to move the internal shutter.



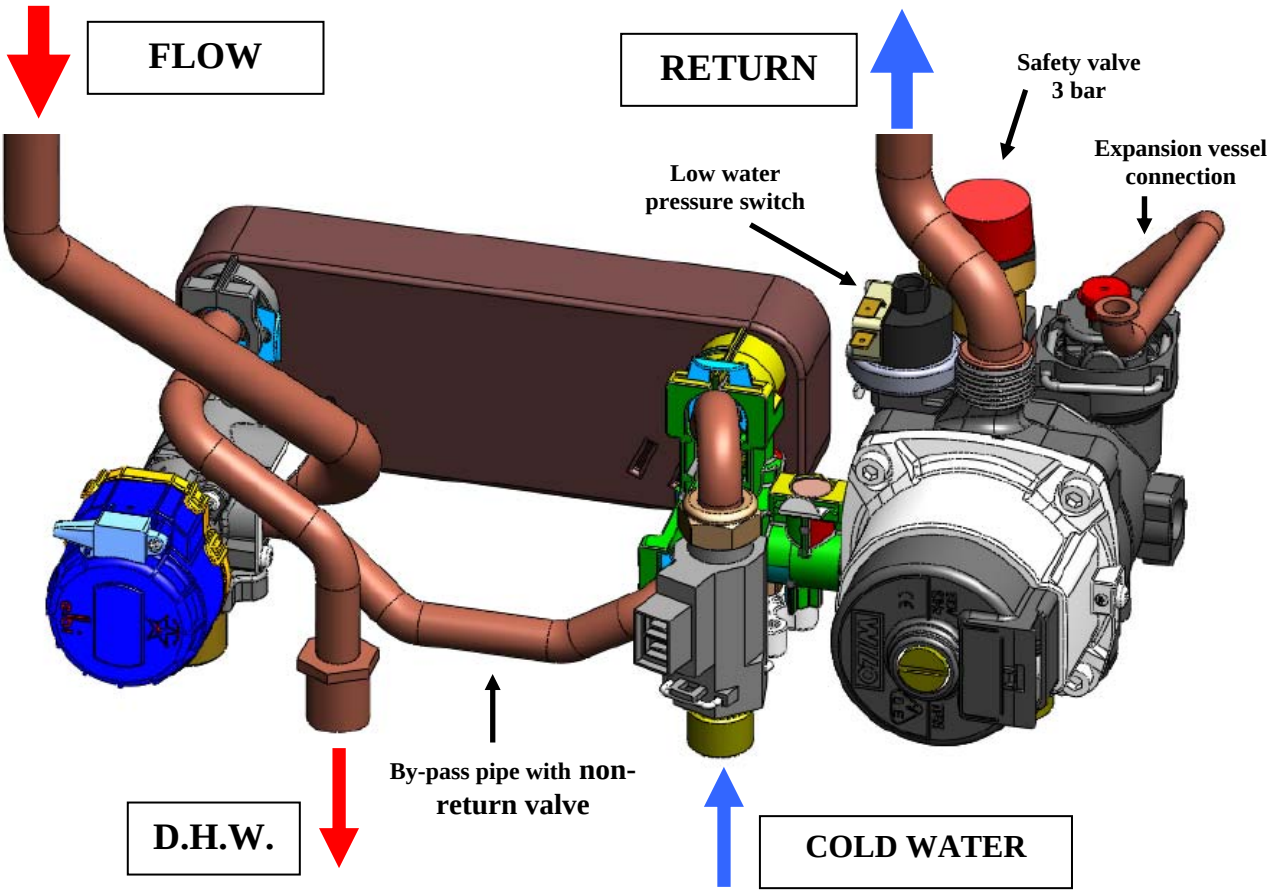
The secondary exchanger is fixed by the three-way valve and another unit made of thermosetting polymers connecting the cold water inlet pipe to the rest of the hydraulic system.
The plate exchanger consists of 12 plates made of stainless steel and the high production of domestic hot water is guaranteed by the horizontal expansion of the exchanger itself.
When hot domestic water is required, the cold water coming from the hot domestic water system passes through the flow switch setting the boiler to "DHW" mode. Then the three-way valve diverts the hot water coming from the primary exchanger into the secondary one so that it can transfer its heat to the plates for the instantaneous production of domestic hot water.

N.B. In rest condition, the three-way valve is in DHW mode position.

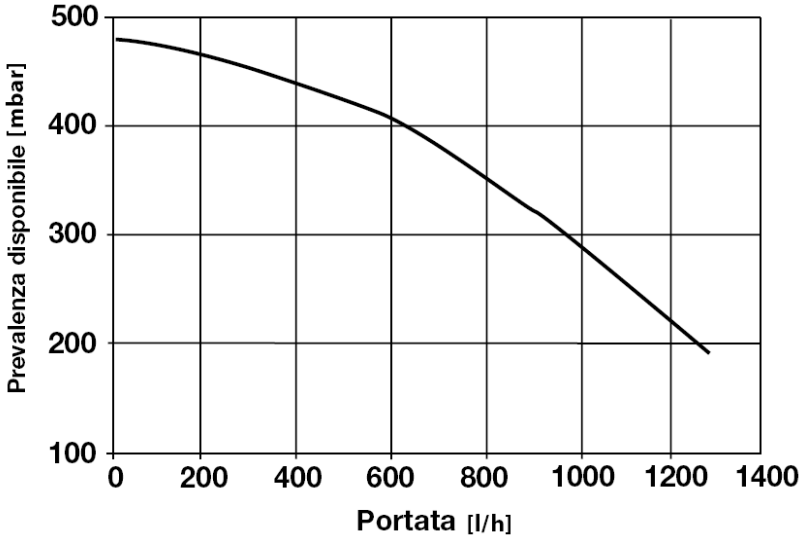
Three-way valve section:



The boiler is fitted with an internal automatic by-pass with non-return valve, whose opening threshold is 400 mBar.
In case of load losses in the system due to thermostatic valve triggering, the by-pass ensures a minimum flow rate inside the primary exchanger. The function of the by-pass is to protect the primary exchanger from overtemperatures due to poor water flow.



One of the main factors which has helped to minimise the dimensions of the compact boiler consists in the collocation of the hydraulic unit. All components in "contact" with the water have been put together inside the circulation pump volute, including the 3-bar safety valve, low water pressure switch and the filler cock unit.
As can be noted from the diagram below regarding the residual head values, the circulation pump is at a fixed speed:



Maximum head: 5 m
Max. operating pressure: 6 bar
Max. circulation temperature:

DHW FLOW SWITCH

The domestic hot water flow switch features a magnet switch whose position determines the minimum quantity of hot domestic water necessary to start the boiler (3 l/min ON and 1 l/min OFF). If the request of DHW does not exceed such value the micro-switch does not close the contact and inhibits the boiler starting to avoid the boiling risk.
A flow rate limiting device (flow regulator) is placed at the flow switch outlet. The former determines the litres/minute that can be drawn at Δt 30K:

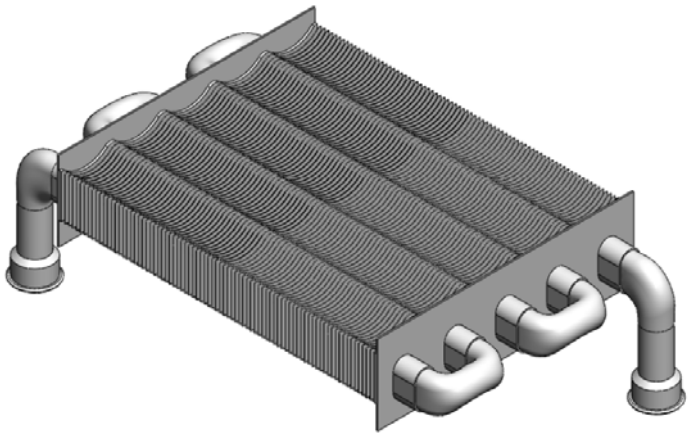
Flow regulator:

- 24 kW, 10 l/min regulator

3.3 HEAT EXCHANGERS

PRIMARY EXCHANGER

It is made up of a set of copper pipes, connected to each other in a way to create a "coil". The finning improves the efficiency of the heat exchange between the water flowing inside, the heat developed by the burner flame and the hot combustion flue gases.
The heat exchanger and the pipes are connected by means of special clips. Hydraulic sealing by pressure is ensured by O-rings applied to the specific pipes.



Warning: to replace the heat exchanger, proceed as follows:

- remove combustion chamber front panel;
- remove the expansion tank;
- remove fan and flue gas hood;
- release the retaining clips;
- pull the exchanger upward to replace it;
- refit all components, lubricate O-ring with care.

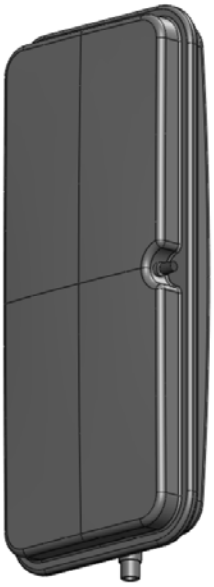
SECONDARY EXCHANGER

It is made up of a number of overlaying metal plates. In the spaces between the plates, the hot water coming from the CH circuit and the DHW system cold water flow simultaneously in separate circuits.
The hot water will transfer its heat to the DHW system cold water. Therefore, at the outlet, the DHW will be warmer and the CH water (primary circuit) will be cooler.

12 plates

3.4 EXPANSION TANK

An increase in heating water temperature inside a closed circuit corresponds to an increase in the water volume. As no further space is available, the increase will affect the pressure and not the volume. If pressure value exceeds safety valve triggering point, this latter will open and discharge water from the system. This problem is prevented thanks to an expansion vessel positioned inside circuit; vessel houses an air diaphragm to be used to balance this overpressure.



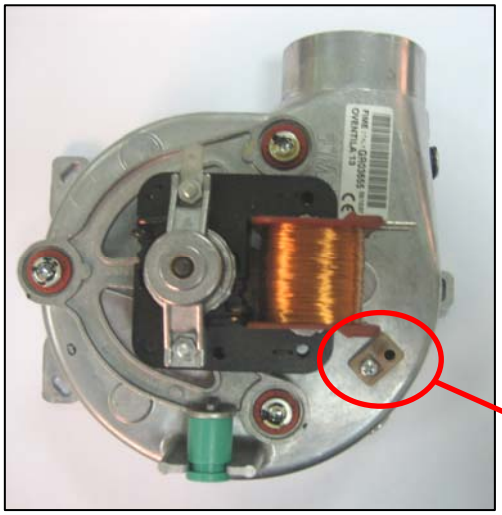
The expansion tank is placed vertically on the right side of the boiler.

Tank capacity: 7 litres

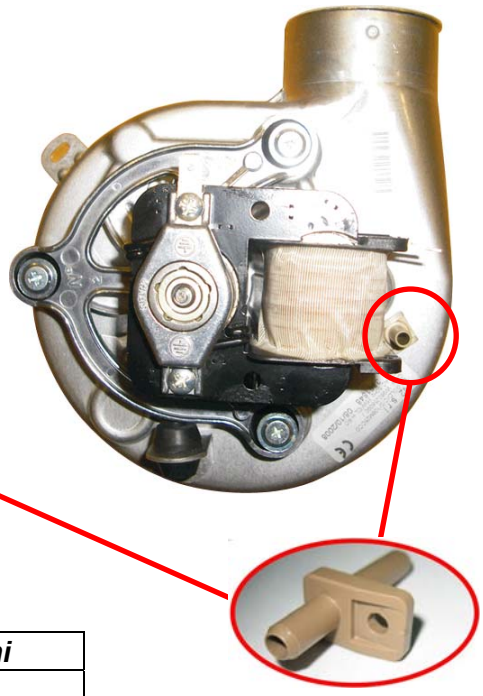
3.5 FLUE GAS FAN

The flue gas fan is of asynchronous type and is fitted with a Pitot plastic pipe, which limits the condensate build up on the fan pressure measurement point and is approved for operating with the following models:

FIME



NATALINI



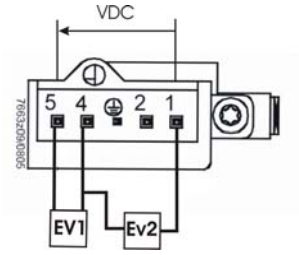
Technical characteristics:

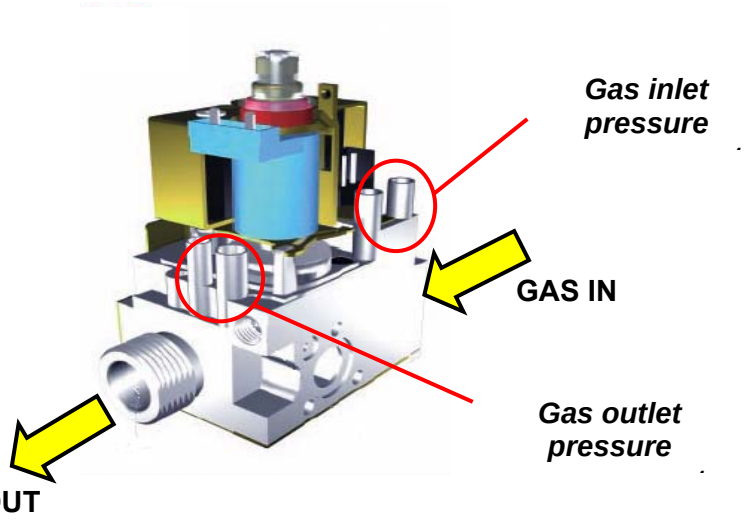
	Fime	***Natalini***
Power supply	230 Vac	
Power	38 W	35 W
Worm screw	Die-cast	Sheet metal

3.6 GAS VALVE

The boiler is approved for operating with gas valve, model SIT 845:

ELECTRICAL CONNECTIONS
*SOLENOID VALVES **EV1** and **EV2***





Gas valve characteristics	
EV1 and EV2 safety coil operating power supply	230 VAC 50 Hz
EV1 operating current	40 mA
EV2 operating current	12 mA
EV1 supply pin	4 - 5
EV2 supply pin	4 - 1
Modulation coil operating power supply	17 VDC
Max. operating pressure	60 mbar
Working temperature	-15 / 60°C
Modulation parameters	
Current of gas modulation coil at maximum output	**120** (natural gas) / **170** (LPG) mADC
Current of gas modulation coil at minimum output	**20** (natural gas) / **30** (LPG) mADC
Current of gas modulation coil at the end of the ignition ramp	80% of maximum current
Current of gas modulation coil at the end of the heating rising ramp	At maximum CH output (P7)
Coils	
Safety coil interchangeability	Yes
EV1 resistance value	~ 1600 Ohm
EV2 resistance value	~ 6.77 KOhm
Modulation coil resistance value	~ 78 Ohm

The valve features a compensation pressure point connected to the combustion chamber through a silicone pipe.
Valve thus knows the pressure on nozzles and can supply the correct quantity of gas even in case of overpressure or vacuum inside the chamber.
For example, upon ignition when fan is activated, a vacuum develops inside the combustion chamber. Thanks to this pressure point, valve decreases nozzle pressure so as to balance any exceeding gas supply due to vacuum.

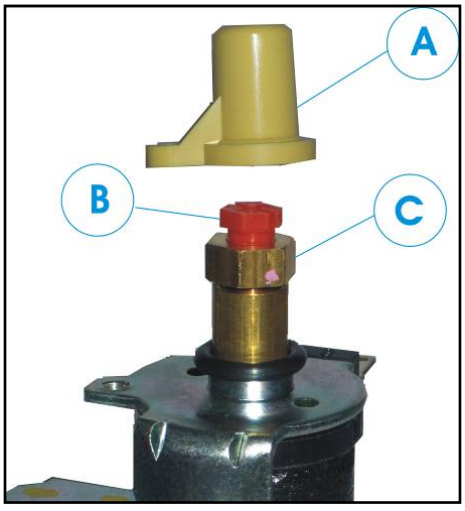
SECT. 4

GAS SETTING AND PARAMETERS

4.1 GAS VALVE SETTING

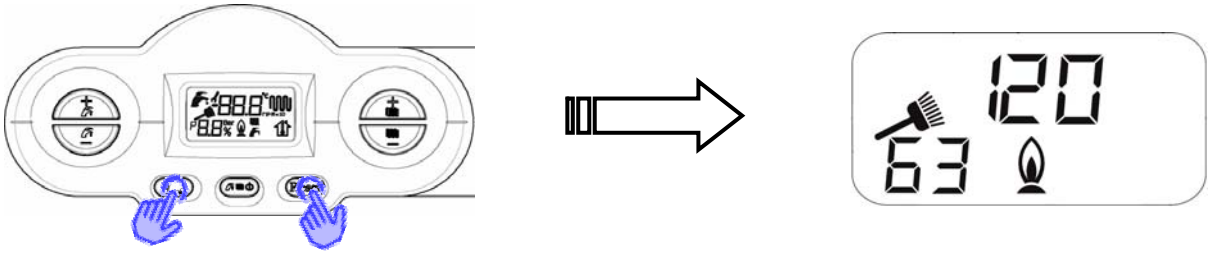
To set the gas valve, proceed as follows:

- **check supply *static* pressure** by means of the inlet pressure measurement point **E** referring to the "setting" table on page 9, according to the type of fuel used (pressure values lower than requested do not guarantee proper boiler operation);
- check that the **heating maximum output** set with the parameter **P7** is **100%** (to view or edit this parameter, refer to the sequence described in the "parameter editing" paragraph, on page 25);
- switch heating system on with the ambient thermostat;
- ignite boiler in the "***flue cleaning***" mode (see following paragraph);
- with the pressure gauge in the inlet pressure measurement point **E,** check supply ***dynamic* system pressure** while the boiler is working (in case the pressure is too low, boiler proper operation is not guaranteed);
- remove the plastic cover protecting the adjustment screws at the top of the modulation coil;
- then connect the pressure gauge to the gas outlet pressure measurement point **D** after closing the inlet pressure measurement point;
- turn the maximum output screw **C** to increase (screw in) or decrease (loosen) the **maximum pressure**, making reference to the "setting" table on page 9;
- electrically disconnect one of modulation coil connectors to operate the boiler at the minimum output;
- adjust the **minimum pressure** by turning the screw **B** of the gas valve (while holding the external screw **C**). Make reference to the "setting" table;
- re-connect connector to modulation coil and check maximum pressure again;
- disconnect the pressure gauge and check for any gas leakage both on the pressure measuring points and on the gas valve connection fly nuts;
- refit protection cover;
- quit the "flue cleaning" function by pressing the "**reset**" key;
- in case parameter **P7** has been edited, set the correct value again;
- switch the heating system off with the ambient thermostat.

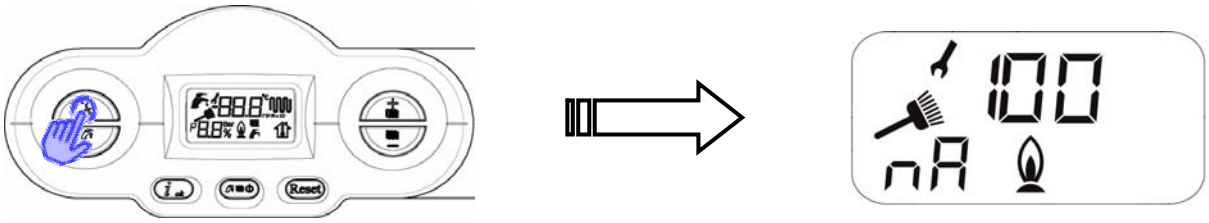


4.2 FLUE CLEANING FUNCTION

The boiler features a flue cleaning function which must be used to measure combustion efficiency during operation and to set the burner.
This function can be enabled only in the HEATING + DOMESTIC HOT WATER operating mode. To enable it, **press keys "*info*" and "*reset*" at the same time, and keep them pressed for three seconds**. Now the boiler performs the ignition sequence and then operates at the burner **maximum output** set by parameter **P7**.
The display will show simultaneously the current (mA) supplied to the modulation coil, the flow temperature, the lit flame symbol with burner on, the "broom" symbol to indicate that the flue cleaning function is active:



Use the "**+**" or "**- *DHW***" keys to change the value of the **current supplied to the modulation coil**, from the minimum to the maximum value according to parameter P7. In this case, the display will show the wrench symbol (parameter editing indicator) and the value of the current supplied to the modulation coil being edited:



This operation is useful when setting the boiler combustion with closed casing. The desired output is set by pressing the DHW keys.
The current supplied to the modulation coil at the minimum and at the maximum output values according to the gas used are given below:

	max [mA]	**min** [mA]
Natural gas	120	20
LPG	170	30

Release the "+" or "- *DHW*" keys to return to the previous page showing the current at the modulation coil and the flow temperature.
The burner is switched off when the temperature detected by the flow probe exceeds 90°C and switched on again when reaching 70°C.
During such function the pump is supplied with power, the three-way valve switches to the heating position, and the multifunction relay is energised with parameter P17=1 (*remote relay*) or P17=3 (*heating relay*).
The function automatically stops after 15 minutes, or by pressing the "*reset*" key, or setting a mode different from the "*CH+DHW*" one.

4.3 GAS CONVERSION

Boilers are manufactured to run on the type of gas (natural gas or LPG) specifically required upon purchase order placing, and any conversion shall be made by qualified personnel.

During gas conversion, proceed as follows:

- make sure to work with the boiler disconnected from the electric power supply;
- remove combustion chamber front panel;
- remove burner upper part concerning gas ramps;
- remove burner nozzles and replace them with new ones having a diameter suitable for the new gas type (see "setting" paragraph on page 9).
  WARNING: it is mandatory to fit the copper gaskets supplied along with the conversion kit;
- refit burner and combustion chamber;
- supply the boiler with power;
- access parameter setting page, and set the P0 parameter to the value corresponding to the type of gas used (refer to the illustrated sequence on "Parameter editing" on page 25):

  P0 → 1 = natural gas P0 → 0 = LPG
- gas valve can now be set (paragraph 4.1).

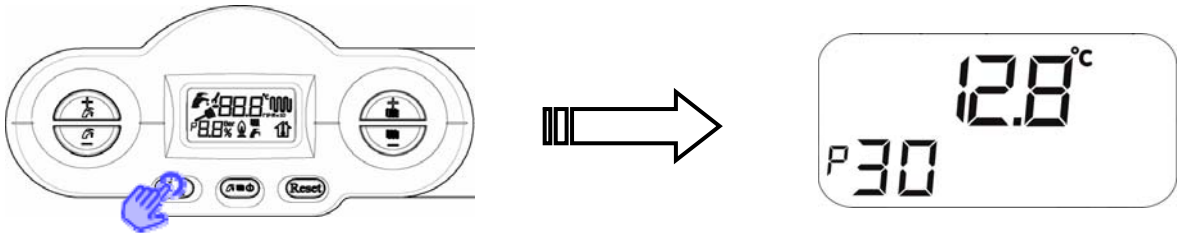
N.B. "**Polidoro**" burners feature as a standard nozzles without copper washers. It is mandatory to fit them during conversion. Failure to do so may affect the proper sealing.

4.4 PARAMETERS

The boards house a memory with a series of parameters to be accessed for displaying purposes only, or to be edited for boiler perfect setting based on the system used. These parameters can be directly accessed from user's interface, or through the remote control. In the latter case, it is possible to access only up to the 29th parameter.

Displaying parameter

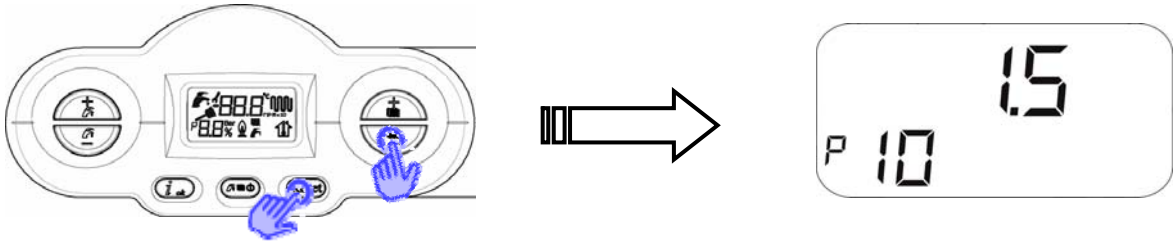
Press the "*info*" key several times to scroll in sequence the values of the parameters for displaying purposes only (from P30 to P57), such as the temperatures detected by the connected probes, the faults memory, etc.



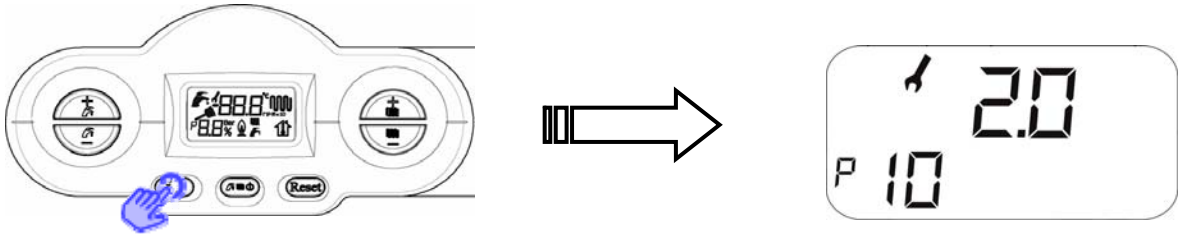
To quit the displaying function, simply press "*reset*". Display will anyway go back to the starting screen 30 seconds after key has been pressed.

TECHNICAL parameter editing

If keys "*reset*" and "- *heating*" are pressed together for three seconds, you will access the parameter setting mode.
Use keys "*+/- heating*", to select the desired parameter:



Press "OK" to confirm that parameter value must be edited; the adjustable wrench symbol indicates that parameter value can be edited using keys "*+/- heating*":



To confirm parameter value editing, press "*OK*".
Scroll the parameter list to edit other values, or press "*reset*" to quit the setting function.

Parameter list

Parameter	*Range*	*Default values*	*Notes*
P0 Boiler output selection *(selection of "current-output" curve)*	0 ÷ 5	1	**0** = 24 kW LPG **1** = 24 kW natural gas **2** = not allowed **3** = not allowed **4** = not allowed **5** = not allowed
P3 Boiler type selection	1 ÷ 3	1	**1** = combined instantaneous **2** = CH only **3** = with water heater
P6 Ignition power setting	0 to 100%	0	**0** = operation with ignition ramp; **≠ 0,** ignition power identical to set power
P7 CH maximum output	10 to 100 %	100	**10** = minimum output **100** = maximum output
P10 Heating curve	0 ÷ 300 (1=100)	150	With external probe: *Low temp. from 0 to 0.8* *High temp. from 1 to 3* Without external probe: Value < 1, reduced range (low temperature)

	P11 Heating thermostat timing	0 to 10 min	4	
	P12 CH power rising ramp timer	0 to 10 min	1	
	P13 Timer for CH post-circulation, freeze protection and flue cleaning function	30 to 180 s	30	
	P14 "Solar" DHW thermostat setting	0 ÷ 1	0	**0** = normal **1** = solar
	P15 Water hammer protection delay, configurable	0 to 10 s	0	
	P16 Ambient thermostat reading delay / OT	0 to 199 s	0	
	P17 Multifunction relay setting	0 ÷ 3	0	**0** = shut-down and fault **1** = remote relay/TA1 **3** = request TA2
Solar par. *(with supplementary solar board to manage a "complex" solar plant")*	**P19** Water heater set-point setting range	10 ÷ 90 °C	60 °C	
	P20 ΔT ON (diff. for solar pump switch-on)	1 ÷ 30 °C	6 °C	
	P21 ΔT OFF (diff. for solar pump switch-off)	1 ÷ 30 °C	3 °C	
	P22 Maximum collector temperature	80 ÷ 140 °C	120 °C	
	P23 Minimum collector temperature	0 ÷ 95 °C	25 °C	
	P24 Solar collector anti-freeze	0 ÷ 1	0	**0** = anti-freeze not enabled **1** = anti-freeze enabled
	P25 Solar load forcing	Not available for this application		
	P26 Enabling of water heater cooling	0 ÷ 1	0	**0** = disabled **1** = enabled
	P27 Heating timer reset temperature	35 ÷ 78 °C	*P10<1 (low temp.) = 35°C* *P10≥1 (high temp.) = 40°C*	
	P28 Selection of hydraulic control	0 ÷ 1	0	**0** = pump + deviating valve **1** = double pump
	P29 Default parameters setting except for P0, P17 and P28	0 ÷ 1	0	**0** = OFF **1** = default parameters
Displaying only	**P30** Display of external temperature			It can be displayed with connected external probe only
	P31 Flow temp. displaying			
	P32 Display of calculated nominal flow *(fictitious)*temperature			
	P33 Display of flow temperature set-point for zone 2			It can be displayed with a connected zone board only

Displaying only	**P34** Display of current flow temperature for zone 2			It can be displayed with a connected zone board only
	P36 Display of flow temperature set-point for zone 3			It can be displayed with two connected zone boards
	P37 Display of current flow temperature for zone 3			It can be displayed with two connected zone boards
	P39 Display of flow temperature set-point for zone 4			It can be displayed with three connected zone boards
	P40 Display of current flow temperature for zone 4			It can be displayed with three connected zone boards
	P42 Plate DHW temp. displaying			
	P44 Boiler temp. displaying			
	P46 Display of solar collector temperature			Visible only with connected *solar probes* to manage solar plants through the supplementary board
	P47 Display of solar water heater temperature			
	P48 Display of solar valve temperature			
	P50 Display of boiler type	X, Y, Z		X = P0 value Y = P17 value Z = P18 value
	P51 Boiler last shut-down displaying	Fault code		
	P52 Boiler second last shut-down displaying	Fault code		
	P53 Boiler third last shut-down displaying	Fault code		
	P54 Boiler fourth last shut-down displaying	Fault code		
	P55 Boiler fifth last shut-down displaying	Fault code		
	P56 No. of faults since last reset			
	P57 Board use month displaying	Counting based on the board micro-switch daily reset. 30 reset operations correspond to one month.		
P60 Number of supplementary boards connected to the mother board (zone + solar)		0 ÷ 4	0	Max. 4 boards, three zone boards and a solar board
P61 Ambient thermostats and remote		00 ÷ 02	00	**00** = remote control zone2; Ta2 zone1; **01** = Ta1 zone2; Ta2

association			zone1; **02** = Ta2 zone2; remote control zone1;

P62 Selection of zone 2 curve	0 ÷ 3	0.6	It can be set only with connected zone board. Without external probe: value < 1, reduced range (low temperature)
P63 Zone 2 set-point selection (fictitious temp.)	5 ÷ 35 °C	20°C	It can be set only with one connected zone board. Without external probe: Fixed flow set-point
P66 Selection of zone 3 curve	0 ÷ 3	0.6	It can be set only with two connected zone boards Without external probe: value < 1, reduced range (low temperature)
P67 Zone 3 set-point selection (fictitious temp.)	5 ÷ 35 °C	20°C	It can be set only with two connected zone boards Without external probe: Fixed flow set-point
P70 Selection of zone 4 curve	0 ÷ 3	0.6	It can be set only with three connected zone boards Without external probe: value < 1, reduced range (low temperature)
P71 Zone 4 set-point selection (fictitious temp.)	5 ÷ 35 °C	20°C	It can be set only with three connected zone boards Without external probe: Fixed flow set-point
P74 Low temperature zone mixer valve opening time	0 to 300 s	140 s	It can be set only with a zone board connected.
P75 Rise in nominal boiler temperature with zone board	0 ÷ 35 °C	5 °C	
P76 Thermal discharge enabling with supplementary board	0 ÷ 1	0	**0** = disabled **1** = enabled
System check **P80** Multifunction relay forcing	0 ÷ 1	0	**0** = standard function **1** = relay energised
P81 Zone 2 pump relay forcing	0 ÷ 1	0	**0** = standard function **1** = relay energised
P82 Zone 2 mixing valve forcing	0 ÷ 2	0	**0** = standard function **1** = force opening **2** = force closing
P84 Zone 3 pump relay forcing	0 ÷ 1	0	**0** = standard function **1** = relay energised
P85 Zone 3 mixing valve forcing	0 ÷ 2	0	**0** = standard function **1** = force opening **2** = force closing
P87 Zone 4 pump relay forcing	0 ÷ 1	0	**0** = standard function **1** = relay energised

	P88 Zone 4 mixing valve forcing	0 ÷ 2	0	**0** = standard function **1** = force opening **2** = force closing
	P91 Solar board pump relay forcing	0 ÷ 1	0	**0** = standard function **1** = relay energised

System check	**P92** Solar board valve relay forcing - opening	0 ÷ 1	0	**0** = standard function **1** = relay energised
	P93 Solar board valve relay forcing - closing	0 ÷ 1	0	**0** = standard function **1** = relay energised
P95 Shut-down from P51 to P56 displaying reset		0 ÷ 1	0	**1** = shut-down reset
P96 Maximum current to modulation coil *(point C of curve)*		0 to 170 mA	According to P0	See modulation diagrams on page 31
P97 Minimum current to modulation coil *(point B of curve)*		0 to 170 mA	According to P0	

SECT. 5
OPERATING LOGIC

5.1 MAIN GENERAL CHARACTERISTICS

- Function priority;
- Boiler type selection;
- Automatic flame control;
- Ignition with ramp at pre-set power;
- DHW priority;
- DHW modulation;
- Ambient thermostat;
- Adjustable CH maximum output;
- Temperature range pre-selection;
- Heating modulation;
- Ambient thermostat timer (antifast);
- Thermoregulation with external probe;
- Programmable multifunction relay;
- Presetting for OpenTherm Remote Control;
- Presetting for connection to supplementary boards;
- Temperature probe integrity check;
- Gas proportional modulation coil integrity check;
- Anti-seize function;
- Post-ventilation function;
- Pump post-circulation function;
- Anti-freeze function;
- Safety devices and functions;

FUNCTION PRIORITY

The following table shows main function enabling priorities in case of simultaneous request of two or more functions.

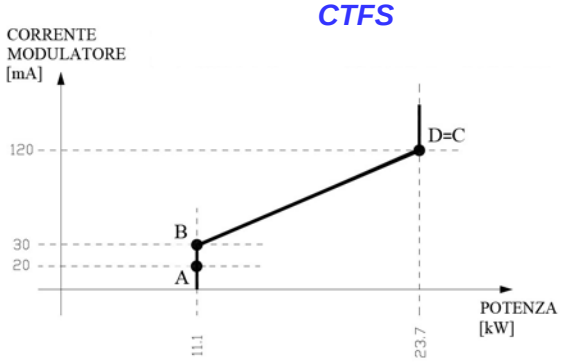
Priority	Status
1	Shut-down status (pump only freeze protection mode and pump anti-seize functions can anyway be performed)
2	Flue cleaning
3	DHW request
4	DHW anti-freeze
5	Heating request in "DHW + CH" mode
6	Heating anti-freeze both in "DHW" and "DHW + CH" modes
7	Post-circulation
8	Pump anti-seize function
9	Waiting for a request

BOILER TYPE SELECTION

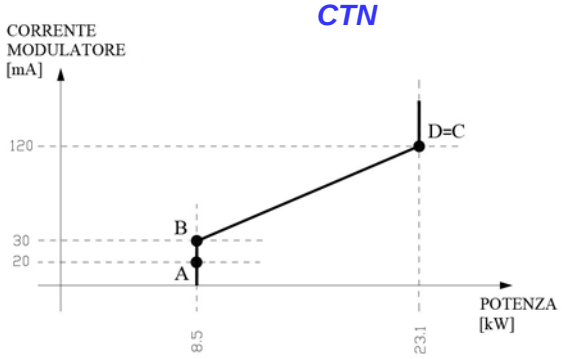
Natural gas or LPG configuration
This selection is obtained by setting parameter P0 (see previous section) to select the "*current-output*" curve to be applied to the gas proportional modulation coil in order to achieve the correct modulation:

P0=1 *(24 kW natural gas):*

CTFS

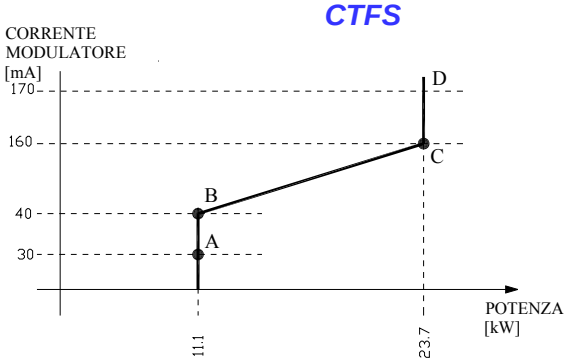


CTN

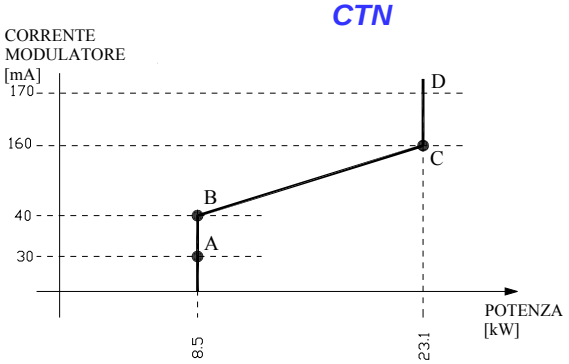


P0=0 *(24 kW LPG):*

CTFS



CTN



Warning: *the "current-output" curve can be modified by moving point B through parameter P96 and point C through parameter P95.*

CTFS Configuration (forced draught)

The type of boiler (sealed chamber or open chamber) is automatically recognised each time the board is supplied with power. The board attempts to read the inputs dedicated to the air pressure switch. During such phase, "CHA" will appear on the boiler display and upon the following recognition (which must take place within the first two minutes) the following message will be displayed for 5 seconds:

= SEALED CHAMBER

Warning: during the combustion chamber type recognition step, no request is performed. In case of wrong self-recognition, see the specific paragraph on page 55.

Boiler type configuration

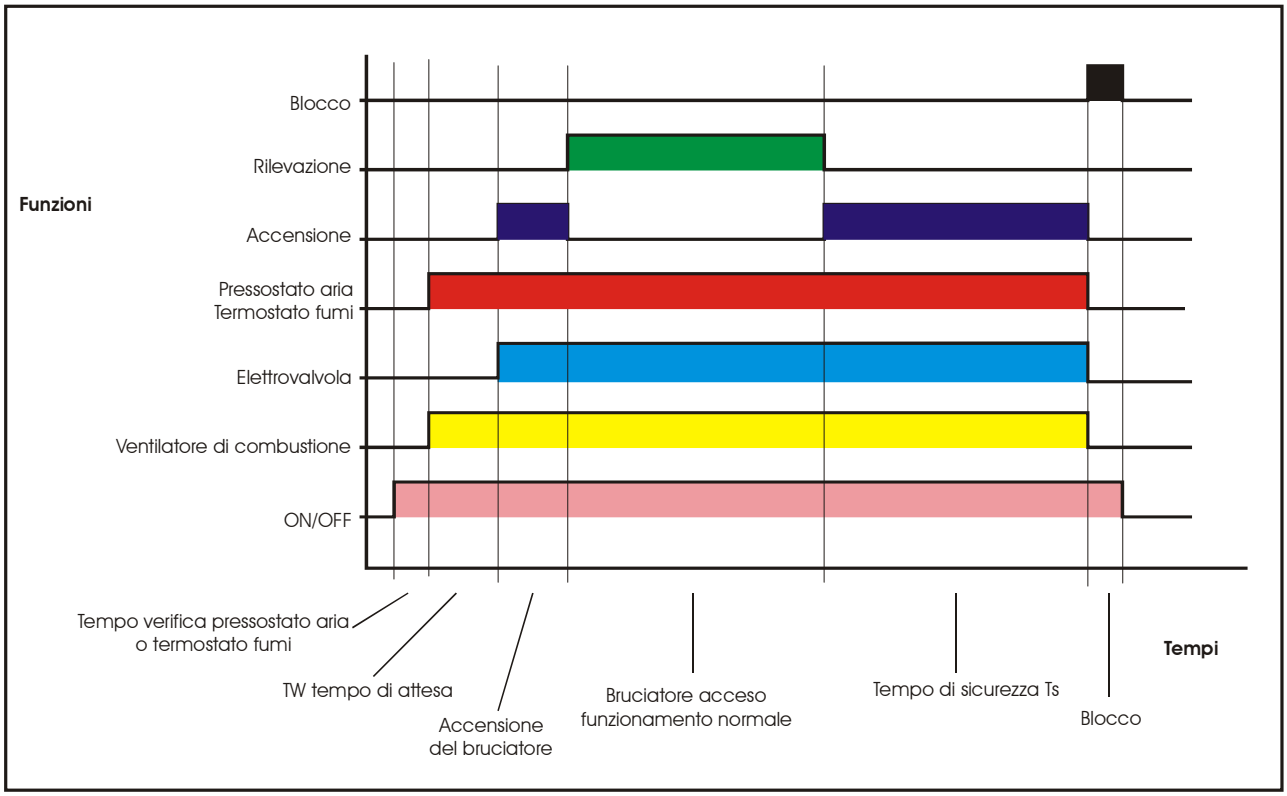
This board is pre-set to manage 3 different types of boiler configurations, depending on the setting of parameter P3:

P3 = 1 → *combined instantaneous, plates* (model C)
P3 = 2 → *CH only* (not available)
P3 = 3 → *with water heater* (not available)

AUTOMATIC FLAME CONTROL

The device is always enabled and constantly performs self-check functions.
Upon an operation request, the fan is supplied with power after checking that the air pressure switch is in rest condition. As soon as the air pressure switch enabling is output, the flame control device starts measuring the waiting time TW (1.5 seconds); after such time, gas valve and igniter will be energised for a maximum safety time TS (10 seconds). If a flame is detected within such time, the gas valve is kept open (energised) and the igniter is cut-out.

Hereinafter is boiler operation logical diagram:



In case no flame is detected during an **ignition** attempt, the automatic flame control will repeat the ignition sequence, performing up to **5 ignition attempts**, with a 10-second ventilation cycle to flush the chamber after each attempt.
In case of flame detection, even if just for a moment, only one ignition attempt will be performed.
The *flame control shut-down* will be activated if no flame is detected within the TS safety time since the last ignition attempt, or if a parasitic flame (while the gas valve is not energised) is detected for over one minute. After 5 seconds, reset the shut-down status by pressing the “reset” key on the boiler board or on the remote control.

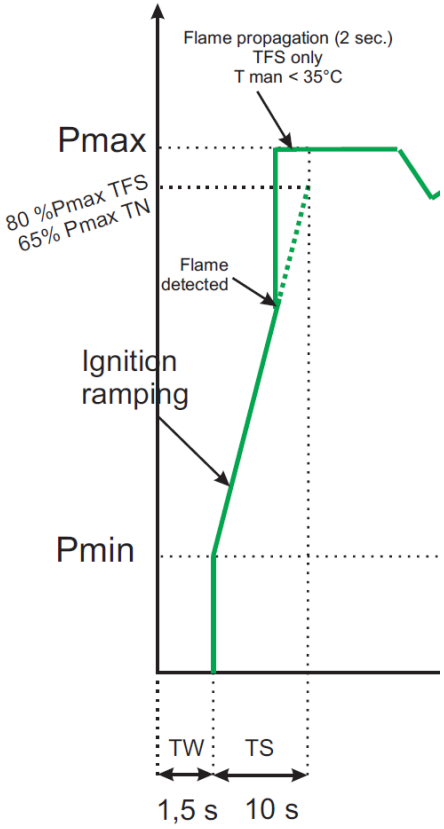
WARNING: with the remote control maximum five reset attempts are allowed. Then it will be necessary to reset the alarms directly on the boiler.

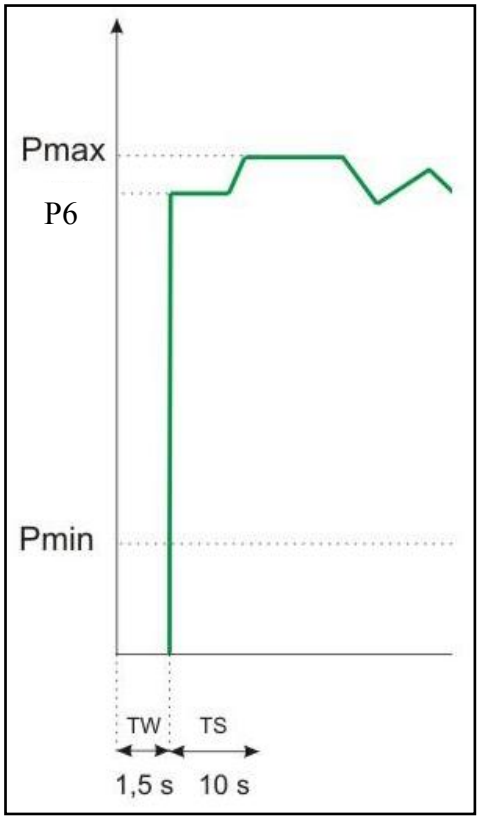
IGNITION WITH RAMP AT PRE-SET POWER

Boiler ignition mode is selected with parameter P6 (default setting is 0):

P6=0 → Ignition with ramp

Upon every operation request entailing burner ignition, burner will be ignited with a current ramp to modulation coil changing from the initial to the final value within 10 seconds. The initial value corresponds to the minimum current supplied to the modulation coil (30 mA for LPG and 20 mA for natural gas), whereas the final value is 80% of the maximum current (170 mA for LPG and 120 mA for natural gas). The ignition ramp ends one second after the *flame control* has detected the flame.
Flame propagation will now take place if temperature is below 35 °C, i.e. the modulation coil will be supplied with current for maximum two seconds. At the end of the flame propagation phase, boiler will start operating normally and igniter will be cut out two seconds after flame detection or one second before TS safety time runs out.





P6≠0 → Ignition at pre-set and adjustable power

Upon every operation request entailing burner ignition, burner will be ignited by supplying the modulation coil with a pre-set current, equal to parameter P6 value. Once flame is detected, the following flame propagation phase, which lasts 2 seconds, will be started, proceeding then with the modulation output.
Igniter will be cut out two seconds after flame detection or one second before TS safety time runs out.

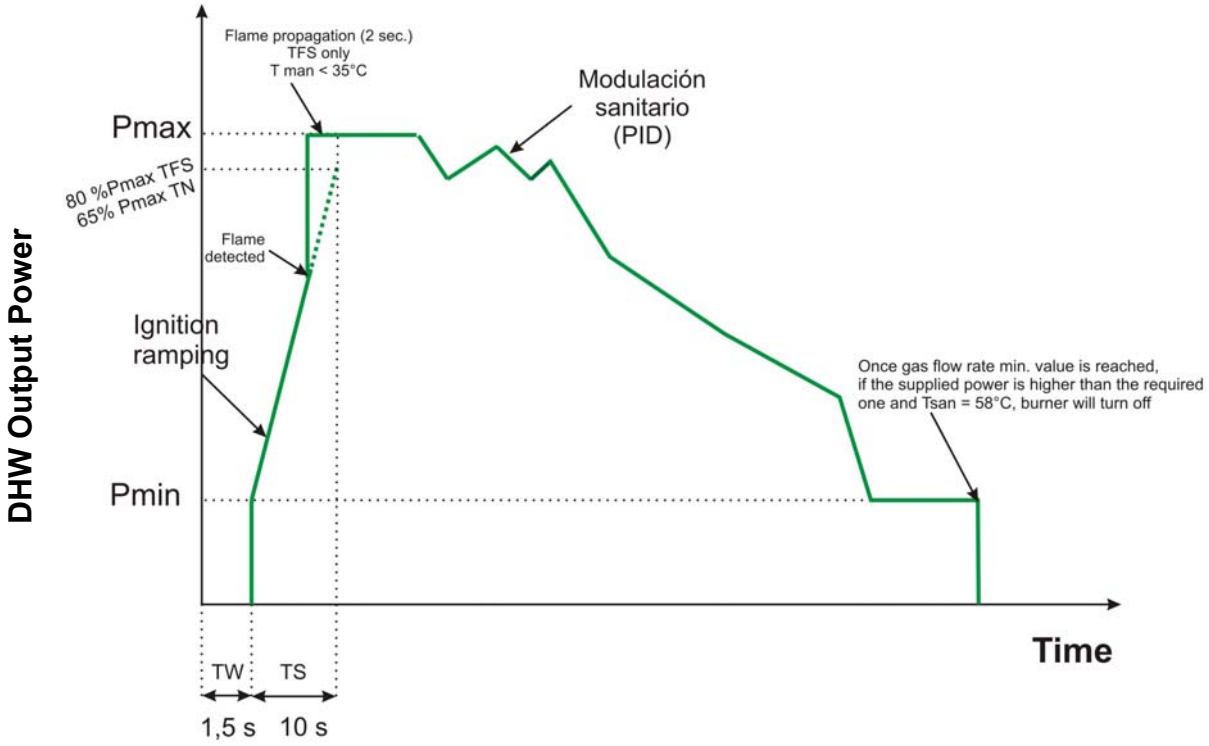
DHW PRIORITY

With boiler running in “DHW” or “DHW + CH” mode, DHW flow switch electric contact closing will originate a DHW operation request, thus starting modulation.
Such request can be delayed in order to avoid events deriving from the water hammer through parameter P15 (max. 10 seconds).
The sequence finishes when the electric contact is open again, enabling the subsequent pump post-circulation.

DHW MODULATION

Upon closing up of pressure switch electric contact, if the water temperature read by the domestic hot water NTC probe is lower than the set-point value + 3°C (*plate DHW thermostat triggering temperature ON*), the burner ignition sequence is started with the automatic flame control enabling.
Immediately after burner ignition, gas flow rate corresponds to flame modulation value which, thanks to a PID-type action, allows to reach and maintain the set DHW temperature.
In case of poor heat output by the plate exchanger due to possible clogging and consequent overtemperature of the primary body, another PID type adjustment of the flow is added to the DHW modulation. Such operation occurs at a flow temperature higher than 81°C and disables when the flow temperature falls below 75°C. In presence of double modulation, the gas flow rate supplied to the burner corresponds to the lowest of the two calculated modulation values.

Modulation with P6=0



During DHW modulation, once the min. gas flow rate is reached and with the supplied output above the required one, the burner is switched off when DHW temperature reaches the + 5°C set-point value. After burner switching off, whilst the operation request is still present, burner will be ignited again when the temperature falls below the usual + 3°C set-point.
During the first 20 seconds when the DHW is being drawn, to avoid boiler continuous “switch on/off", the maximum temperature allowed by the DHW probe to switch off the burner is set to 15°C higher than the set-point, whereas to switch it on again the temperature must fall below the + 8°C set-point.

Warning: the burner is switched off also in case the flow probe detects a value of 85°C and then ignited again (with the request still present) only upon reaching 80°C.

Plate DHW modulation temperatures:

- DHW temperature setting range: ***35 °C ÷ 57 °C***
- DHW thermostat triggering temperature OFF = set point + *5°C*
- DHW thermostat triggering temperature ON = set point + *3°C*
- DHW thermostat triggering temp. initial draw (first 20 sec) OFF = *set point + 15° C*
- DHW thermostat triggering temp. initial draw (first 20 sec) ON = *set point + 8° C*
- Flow water thermostat triggering temperature with plate DHW mode: *OFF 85° C*
- Flow water thermostat triggering temperature with plate DHW mode: *ON 80° C*
- Flow water PID triggering temperature with DHW mode: *81° C*
- Flow water PID deactivating temperature with DHW mode: *75° C*

N.B. *In case the boiler is combined with a solar plant with instantaneous-type integration, it is recommended to set parameter P14 to 1. This increases the modulation range avoiding boiler hunting (start and stop) with inlet temperature very close to the set-point. In such case the limit temperatures are as follows*:

- DHW thermostat triggering temp. OFF with instantaneous solar integr.: *set-point + 10° C*
- DHW thermostat triggering temp. ON with instantaneous solar integr.: *set-point + 9° C*

AMBIENT THERMOSTAT

With the boiler set on the "CH" or "DHW + CH" operating mode, the closing of ambient thermostat electric contact or a heating request from the remote control will originate a heating request, thus starting CH modulation.
WARNING: with parameter P16 it is possible to delay the ambient thermostat or the remote control reading to allow the zone valves to open before the boiler pump starts (from 0 to 199 seconds).

ADJUSTABLE HEATING MAXIMUM OUTPUT

During operation in CH mode, the maximum power supplied to the burner is equal to the one set by parameter P7.
This parameter represents the percentage (default 100%) of maximum admissible current supplied to the modulation coil *(120 mA for natural gas and 170 mA for LPG)*.

TEMPERATURE RANGE PRE-SELECTION

With parameter P10, without any external probe, it is possible to set two ranges (standard or reduced) in order to adjust the flow water by means of the boiler keys or the remote control:

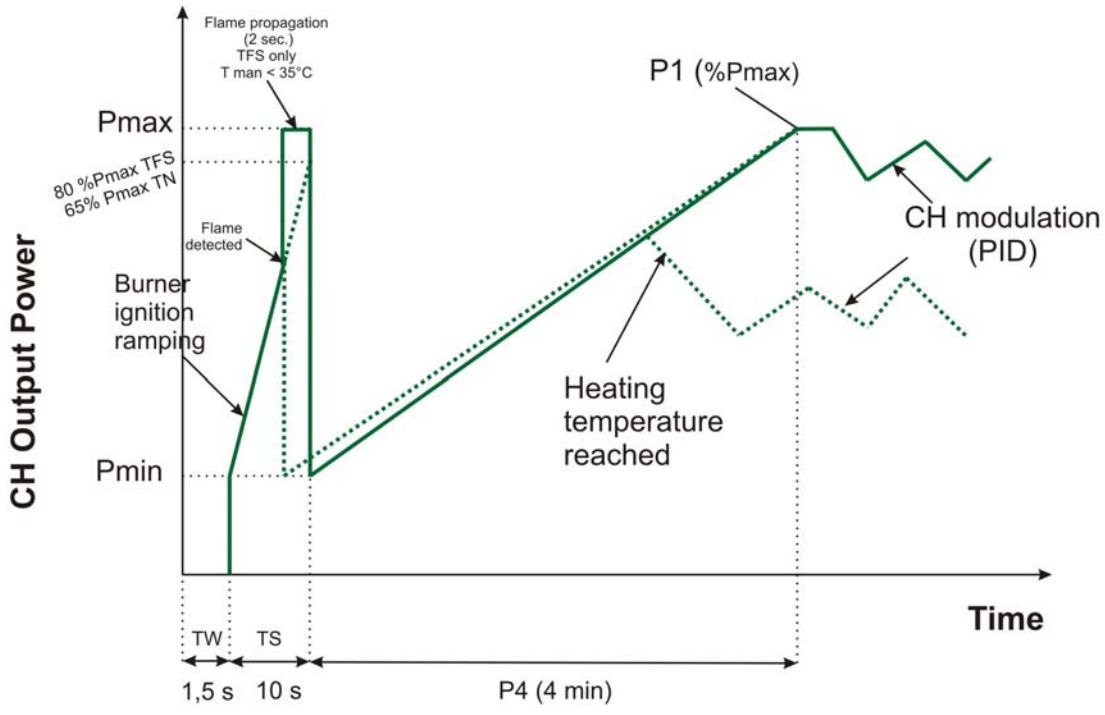
P10 < 1 → heating temperature reduced range: 35 ÷ 45°C
P10 ≥ 1 → heating temperature standard range: 35 ÷ 78°C

Using an external probe instead, such parameter corresponds to the thermoregulation curve selection (refer to paragraph “Thermoregulation with external probe”).

CH MODULATION

Upon closing of ambient thermostat electric contact, if the water temperature read by the flow NTC probe is lower than the set temperature value, the burner ignition sequence is started with the automatic flame control enabling.
At the end of the ignition sequence, gas flow rate goes to its minimum value and then reaches the value set by parameter P7 (maximum heating output) with a ramp duration equal to the heating output rising ramp timing which can be set by parameter P12 (default - one minute).
From now on, the flow water temperature will constantly be read and the rising ramp will be stopped with a PID-type action upon reaching the set temperature, in order to maintain the selected flow temperature.

Modulation with P6=0



Upon reaching the minimum gas flow rate (Pmin), if the power supplied is still higher than requested, the burner will be switched off as soon as a flow temperature higher than the set temperature is reached (set-point +5°C in case of a standard range and set-point +2°C at a reduced range). The burner is switched off and measuring of burner deactivation time starts (see following section about "*Ambient thermostat timer*").

During the heating phase:

- with **P28 = 0** (*pump and deviating valve*), the pump is supplied with power and the deviating valve is in CH position;
- with **P28 = 1** (*heating pump and DHW pump*), the heating pump is supplied with power whereas the DHW pump is off;
- with **P17 = 1** (multifunction relay in *remote relay/TA1*), the relay is energised in response to a request from the remote control or from TA1 and returns to the rest condition upon a DHW request or in case the boiler is switched OFF or to DHW ONLY mode;
- with **P17 = 3** (multifunction relay in *TA2 request*), the relay is energised in response to a request from TA2 and returns to the rest condition upon a DHW request or in case the boiler is switched OFF or to DHW ONLY mode;

During the operation in heating mode, upon any DHW request, the latter has higher priority and forces the interruption of the function in progress.

Heating modulation temperature - standard range (P10≥1):

- CH temperature setting range: *35÷78°C*
- CH thermostat triggering temperature OFF = *set-point + 5° C*
- CH thermostat triggering temperature ON = *set-point + 0° C*
- Heating thermostat timer (antifast) - can be set through P11: *0÷10 min, default 4 min with Tflow > P27*
- CH thermostat timer reset temperature through parameter P27: *35÷78°C, default 40°C*
- Heating output rising ramp timing by means of parameter P12: *0÷10 min, default 1 min*

Heating modulation temperature reduced range (P10<1):

- Heating temperature setting reduced range: *35÷45°C*
- Reduced CH thermostat triggering temperature OFF = *set-point + 2° C*
- Reduced CH thermostat triggering temperature ON = *set-point - 2° C*
- Heating thermostat timer (antifast) - can be set through P11: *0÷10 min, default 4 min with Tflow > P27*
- CH thermostat timer reset temperature through parameter P27: *35°C fixed*
- Heating output rising ramp timing by means of parameter P12: *0÷10 min, default 1 min*

The **set-point** depends on the setting of the heating temperature through the boiler keys or the temperature set through remote control.

AMBIENT THERMOSTAT TIMER (ANTIFAST)

During modulation in heating mode, after burner switching off, wait 240 sec (parameter P11). After that, if the flow temperature is lower than the “set-point”, the burner is switched on again.

The heating thermostat timer is reset:

- upon a DHW request;
- at the end of a heating request;
- selecting the “standby” or “DHW” mode or resetting the boiler;
- if the flow water temperature value falls below the parameter P27 (40°C with standard range, or 35°C with reduced range).

THERMOREGULATION WITH EXTERNAL PROBE

The external temperature probe to be connected will automatically modify the heating flow water temperature according to:

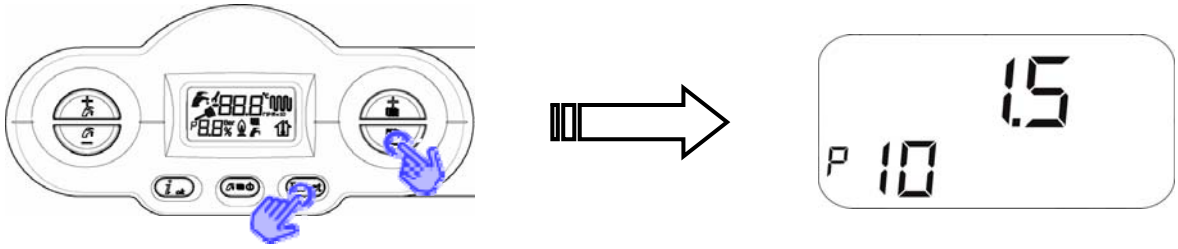
- the measured external temperature;
- the thermoregulation curve selected;
- the selected fictitious ambient temperature.

The thermoregulation **curve** is selected by means of parameter **P10** (value from 0 to 3), whereas the **fictitious ambient temperature** is selected with the “**heating**” keys.
The board independently detects the presence of the external temperature probe and enables the thermoregulation function, by keeping the flow temperature within the heating temperature pre-selection range (35 °C ÷ 78 °C or 35 °C ÷ 45 °C).
If both the external probe and the remote control are present, assuming that the remote control is able to set and carry out its own thermoregulation, the modulation board transmits the external temperature value to the remote control, and if the heating request is determined by the same control, this will determine the flow temperature according to its thermoregulation curve and to the room temperature previously set.
Otherwise, if the heating request comes simultaneously from the remote control and the amb. T. contact closing, both the remote control and the modulation board independently calculate the flow temperature according to relevant thermoregulation curves and set ambient temperatures. The highest of the two flow temperature values will be used.

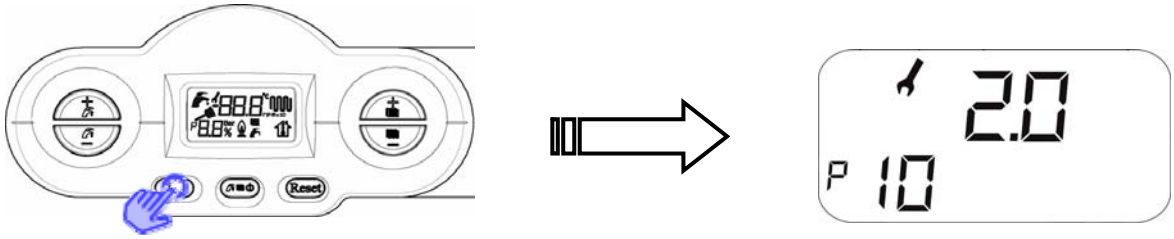
Thermoregulation curve setting

If keys “*reset*” and “- *heating*” are pressed together for three seconds, you will access the parameter setting mode.

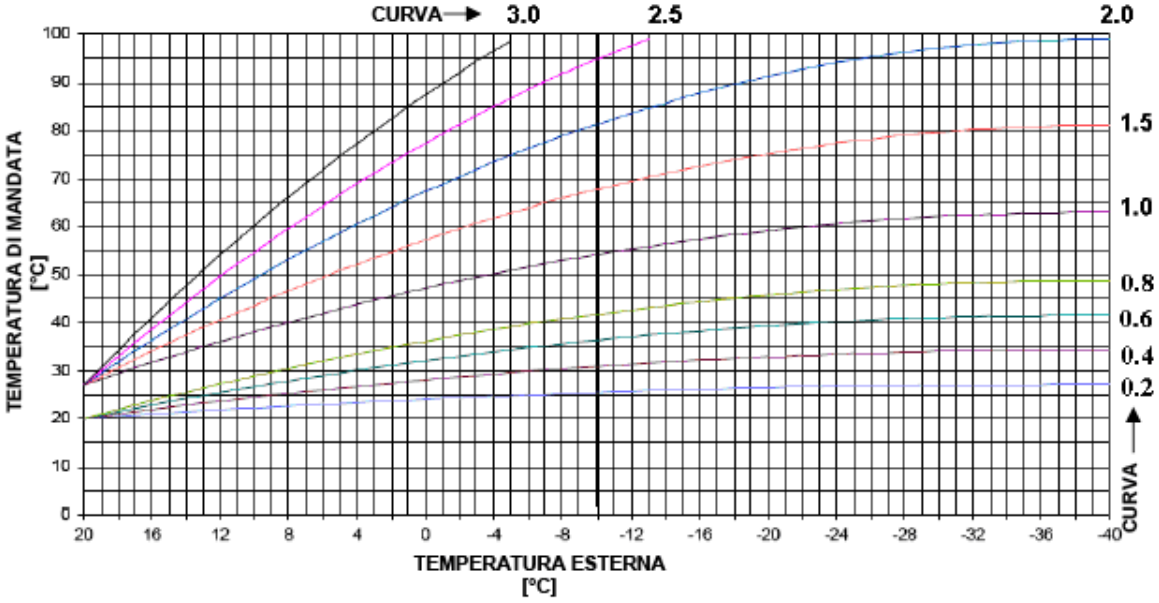
Use keys “*+/- heating*”, to select parameter P10:



Press “OK” to confirm that parameter value has to be edited; the wrench symbol indicates that parameter value can be edited using keys “*+/- heating*”:



- **For high temperature systems** *(radiators),* we recommend setting parameter P10 to a value between 1 and 2.
- **For low temperature systems** *(floor)*, it is recommended to set parameter P10 to a value between 0.2 and 0.8.



Then confirm the modification of the parameter value by pressing “*ok*” and quit the setting with the “*reset*” key.

Warning, the curves given in the diagram refer to a request of a “*fictitious ambient temperature*” of 20°C. In case of different fictitious temperature, all curves will be shifted in a parallel translation with subsequent increase or decrease of the calculated flow temperature.

Curves can be chosen proceeding either roughly and approximately or using a simple mathematical formula. In either case, it will be necessary to check the temperature changes so as to correct and choose the proper curve accurately.

In the former case you will simply need to take an actual value of external temperature and associate the desired flow value to it. Then choose the most appropriate curve.

Example:

at an external temp. of -4°C, a flow of 62°C is preferable; **curve: 1.5**

In the second case use the following formula:

$$\textbf{CURVE} = \frac{\text{Tmax} - 20}{20 - \text{Testmin}}$$

Where, Tmax is the maximum flow temperature and Textmin is the minimum external temperature.

Example:

Low temperature:

Tmax = 44°C
Text = -10°C

$$\textbf{CURVE} = \frac{44 - 20}{20 - (-10)}$$

P10 curve = 0.8

High temperature:

Tmax = 70°C
Text = -10°C

$$\textbf{CURVE} = \frac{70 - 20}{20 - (-10)}$$

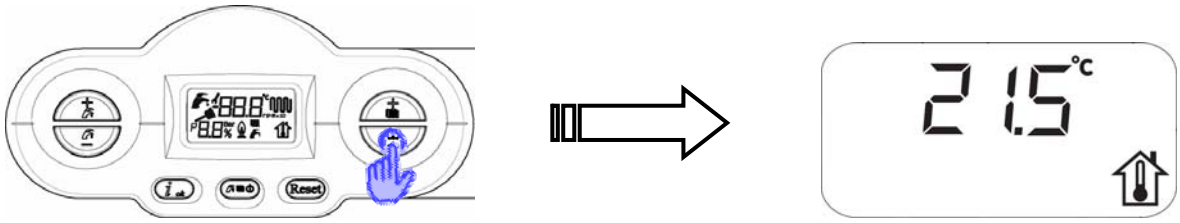
P10 curve = 1.7

Checking the thermoregulation curve setting

It takes time to choose the best curve. Consider the following suggestions:

- If upon external temperature decrease the ambient temperature increases, it is necessary to set a curve with a lower slope, i.e. a lower curve;
- if upon external temperature decrease the ambient temperature decreases, it is necessary to set a curve with a higher slope, i.e. a higher curve;
- Lastly, if the ambient temperature remains constant upon changing of the external temperature, the curve is correct.

If the ambient temperature is constant but different from the desired value it is necessary to translate the curve. This occurs automatically by pressing the "*+/- heating*" keys on the boiler panel. In fact, with an external probe installed, such keys do not adjust the flow temperature but the fictitious desired one in a room ranging from 5°C to 30°C.



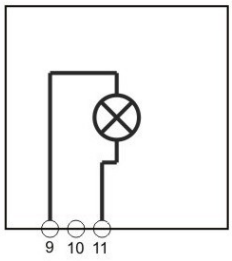
We recommend to set a value between 20°C and 25°C, or at least similar to the one set by means of thermostat.

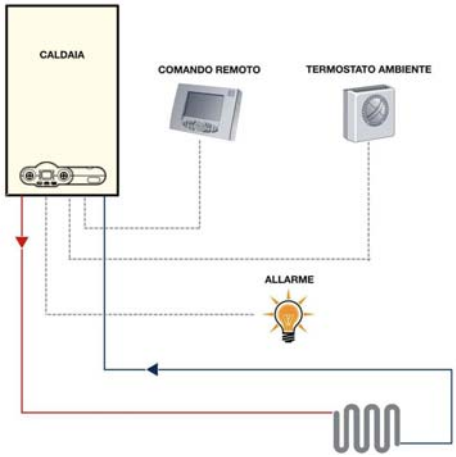
PROGRAMMABLE MULTIFUNCTION RELAY

The boiler is fitted with a multifunction relay which can be associated to a different function by setting parameter P17:

- **P17=0 Alarm reference**
  Upon each shut-down or fault the relay is energised:

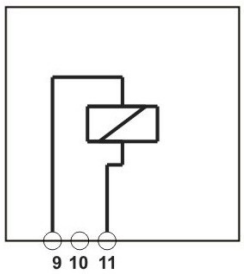
Electrical connections:

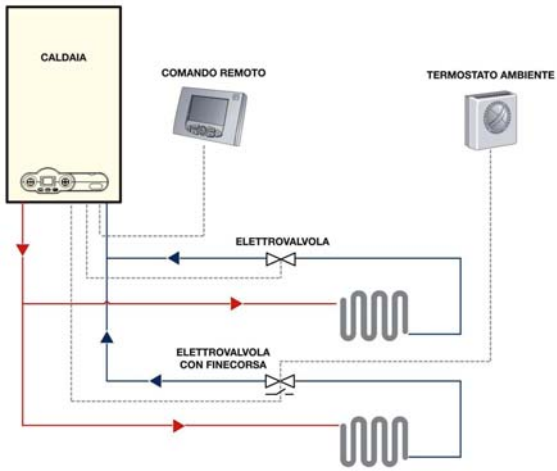




- **P17=1 Remote control reference**
  Upon each request by the remote control (or TA1), the relay is excited:

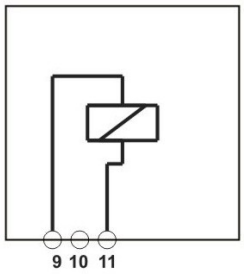
Electrical connections:

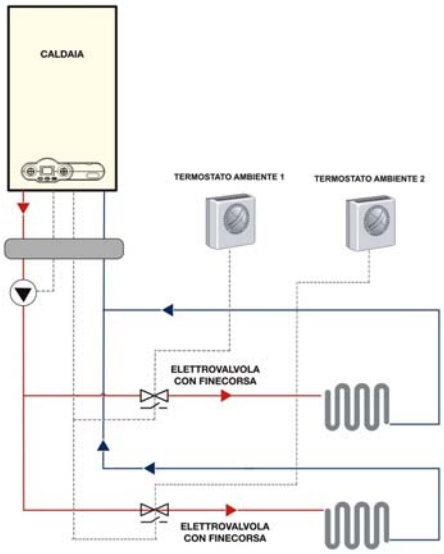




- **P17=3 Ambient thermostat reference**
  Upon each request by the ambient thermostat TA2, the relay is excited:

Electrical connections:





OPENTHERM REMOTE CONTROL PRE-SETTING

The board is provided with an internal interface that allows the connection of an OpenTherm protocol-based remote control. This latter, besides serving as an ambient thermostat for its zone, allows to set some of the boiler main parameters.
Connect the remote control to the board with two non-polarised conductors. When the connection is done, “Con” will appear on the boiler LCD display. ***Instead of the remote control, an ambient thermostat connection*** (clean contact) is arranged: when closed for more than 10 seconds, it generates a heating request for the zone managed by the remote control. The request stops when the contact remains open for more than one second. When the remote control is not connected and/or does not communicate, all settings are made from the boiler. Board and remote control communicate in each operating mode: DHW, DHW+CH, CH or STANDBY.
A communication loss will entail the continuous attempt to restore it but, after 1 minute, the board will resume operation in local mode until connection is restored. In this case the system temporarily ignores the heating request that could be generated by a possible contact connected on opentherm. When the connection is active, remote control has a priority over boiler switch, and it enables/disables DHW and CH functions.
The remote control can request the boiler and display the flow, DHW, external probe temperatures, the temperatures set for DHW and heating, the current modulation level, as well as the error code. It can also display the different operation states (DHW, heating, flame lighting, fault presence or shut-down) and it can reset the boiler after a shut-down for no more than 5 times in 24 hours.

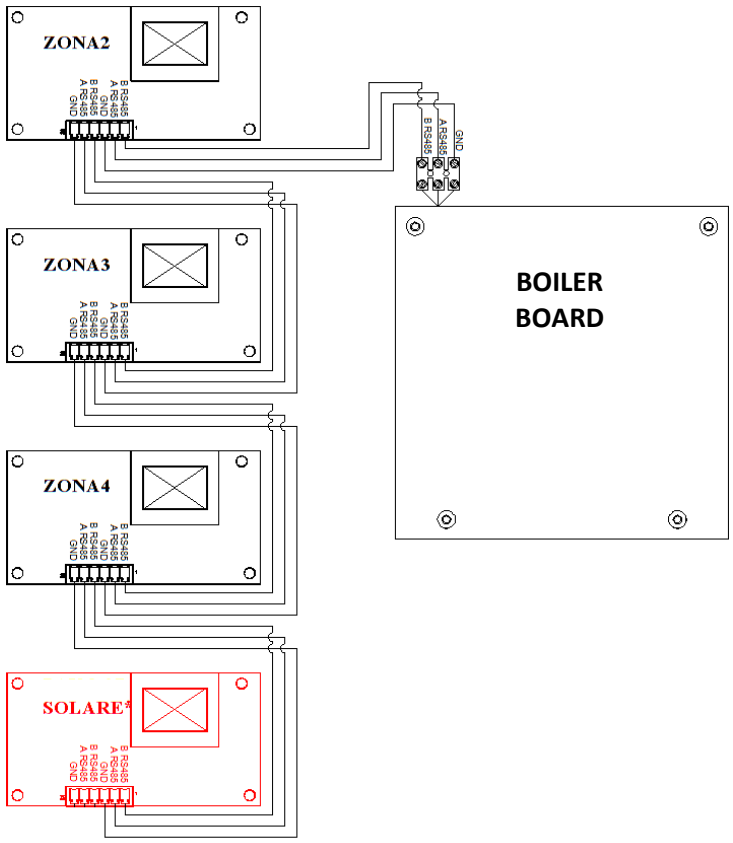
Warning: the remote control allows access only to the first 29 parameters.

PRESETTING FOR CONNECTION TO SUPPLEMENTARY BOARDS

One or more supplementary board(s) ((max 4)) can be connected to the boiler board for the management of a zone system and of a solar plant.
In particular, besides the multifunction relay that can control the high temperature direct zone (TA1), it is possible to install up to three supplementary boards for controlling the equivalent number of mixed zones and one more board for managing a "*complex*"solar plant.
WARNING: the electric panel of the boiler is pre-set for housing only one supplementary board. In the case of complex plants, where several boards need to be installed, these must be located outside the boiler, arranging a special electric panel.

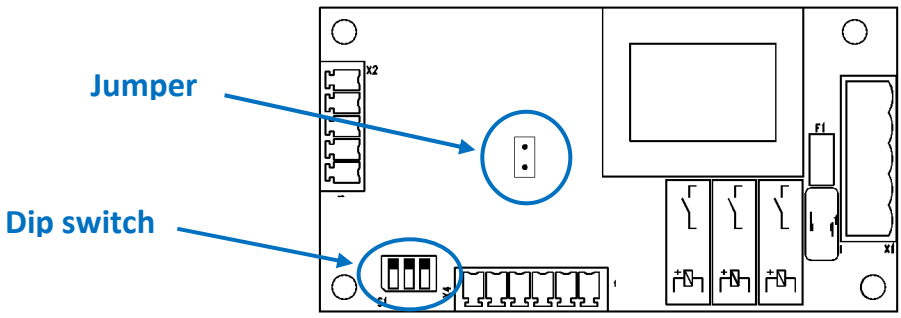
RS 485 Connection and setting

Regardless of the number of boards used, each of them must be connected to the boiler board in a cascade-type connection through an RS485 connection as shown in the image hereinafter:



Both boiler board and relevant supplementary boards are fitted with a**jumper** whose function is to close the RS 485 communication line in case of problems in the transmission of data between the boards due to very long connection lines or to electromagnetic disturbances.

Leave only the jumper on the last board in the cascade. All the other jumpers must be "kept open", including the jumper on the boiler board.



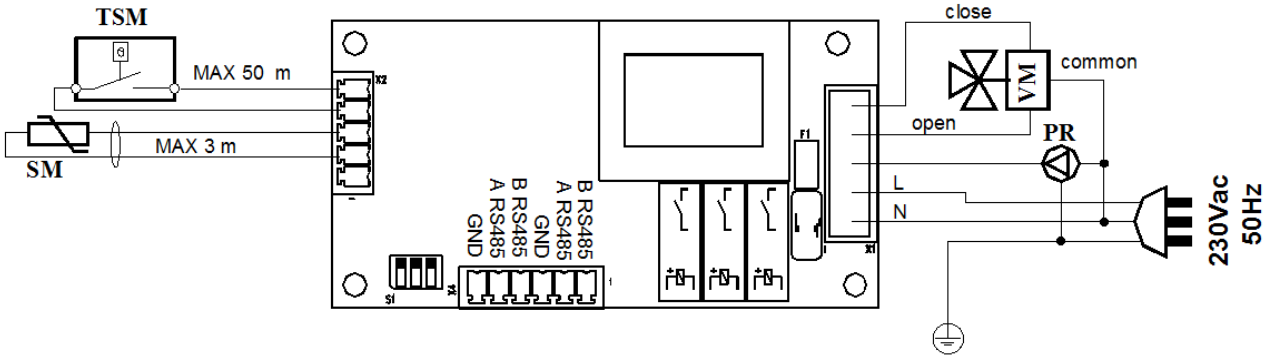
OFF-OFF-OFF:	ZONA MISCELATA2
OFF-ON-OFF:	ZONA MISCELATA3
ON-OFF-OFF:	ZONA MISCELATA4
ON-ON-OFF:	SOLARE COMPLESSO

Each supplementary board must be addressed with dip switches on it, so as to associate the supplementary board to the relevant zone or solar plant to be managed.
Of the three dip switches, only the first two are used for the setting (the third one must be left "down", i.e. OFF).

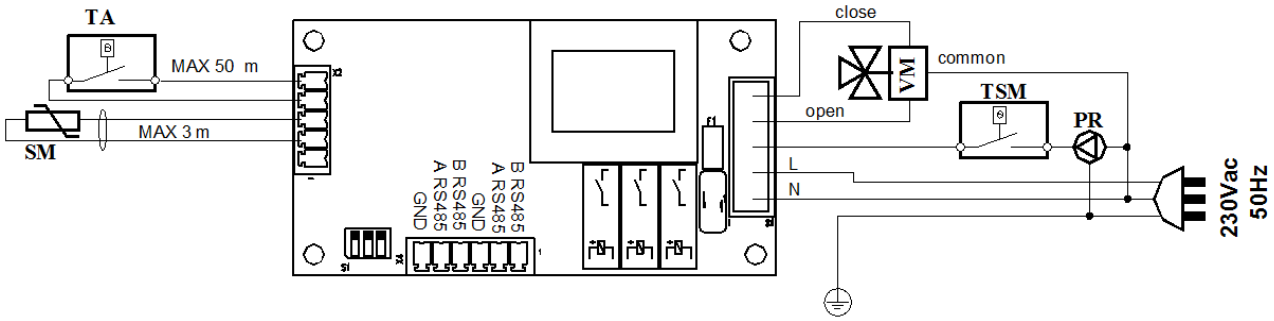
Wiring diagrams

The heating zones 1 and 2 can be controlled by remote control (TA1) or ambient thermostat (TA2) that can be connected to the boiler boards, whereas zones 3 and 4 are activated by the ambient thermostat directly connected to the relevant zone board. Zones 3 and 4 can not manage the safety thermostat on flow line (TSM) which therefore is to be connected in series to the pump power supply and cannot be signalled as a fault.
Whereas, as far as solar plant connections are concerned, the solar collector probe (SCS) and the solar water heater probe (SBS) are on the boiler board, while the connection of the solar valve probe (SVS) is on the supplementary board.

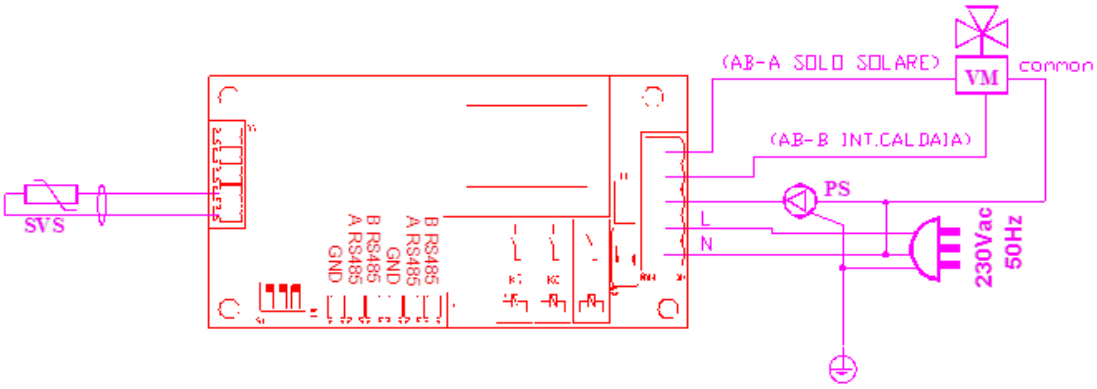
Zone 2



Zone 3 and 4



Solar



The zone board is further supplied with a bi-colour LED with the following indications:

- *Green steady* → pump enabled;
- *Red quick flashing* → valve opening;
- *Red slow flashing* → valve closing;
- *Green flashing* → boards with no request;
- *Red flashing slow-slow (1s on, 1s off)* → faulty communication with boiler board;
- *Red steady* → zone 2 safety thermostat open;
- *Red steady + green steady* → flow probe fault with error E36 on the boiler display;

Zone setting

The zones are set with the relevant zone configuration by means of the dip switches on the zone board (see previous paragraph), and then indicating on the boiler board how many supplementary boards are connected through parameter P60 setting (max. 4).
In case of zone 1 and 2 management different than the standard one (remote control associated with zone 2 and ambient thermostat with zone 1), change the coupling using parameter P61.

It is now possible to access the parameter programming for each single zone:

Zone 1:
parameter P10 setting to set the thermoregulation curve (with external probe) or the operation range (without external probe).
Adjustment through heating key of the fictitious ambient temperature (with external probe) or of the flow value at fixed point (without external probe) according to the

selected range. Parameter P32 displays the calculated flow temperature, whereas parameter P31 the current one detected by the boiler probe.

Zone 2:
parameter P62 setting to set the thermoregulation curve (with external probe) or the operation range (without external probe).
Adjustment through parameter P63 of the fictitious ambient temperature (with external probe) or of the flow value at fixed point (without external probe) according to the selected range. Parameter P33 displays the calculated flow temperature, whereas parameter P34 the current one detected by the boiler probe.

Warning: *with remote control for managing zones 1 or 2, the boiler board communicates to the remote control the minimum and maximum flow limit according to the curve set by the relevant parameter (reduced or standard range), whereas the setting at fixed point (without external probe) or of the fictitious temperature (with external probe) must be carried out with the remote control.*

Zone 3:
parameter P66 setting to set the thermoregulation curve (with external probe) or the operation range (without external probe). Adjustment through parameter P67 of the fictitious ambient temperature (with external probe) or of the flow value at fixed point (without external probe) according to the selected range. Parameter P36 displays the calculated flow temperature, whereas parameter P37 the current one detected by the boiler probe.

Zone 4:
parameter P70 setting to set the thermoregulation curve (with external probe) or the operation range (without external probe). Adjustment through parameter P71 of the fictitious ambient temperature (with external probe) or of the flow value at fixed point (without external probe) according to the selected range. Parameter P39 displays the calculated flow temperature, whereas parameter P40 the current one detected by the boiler probe.

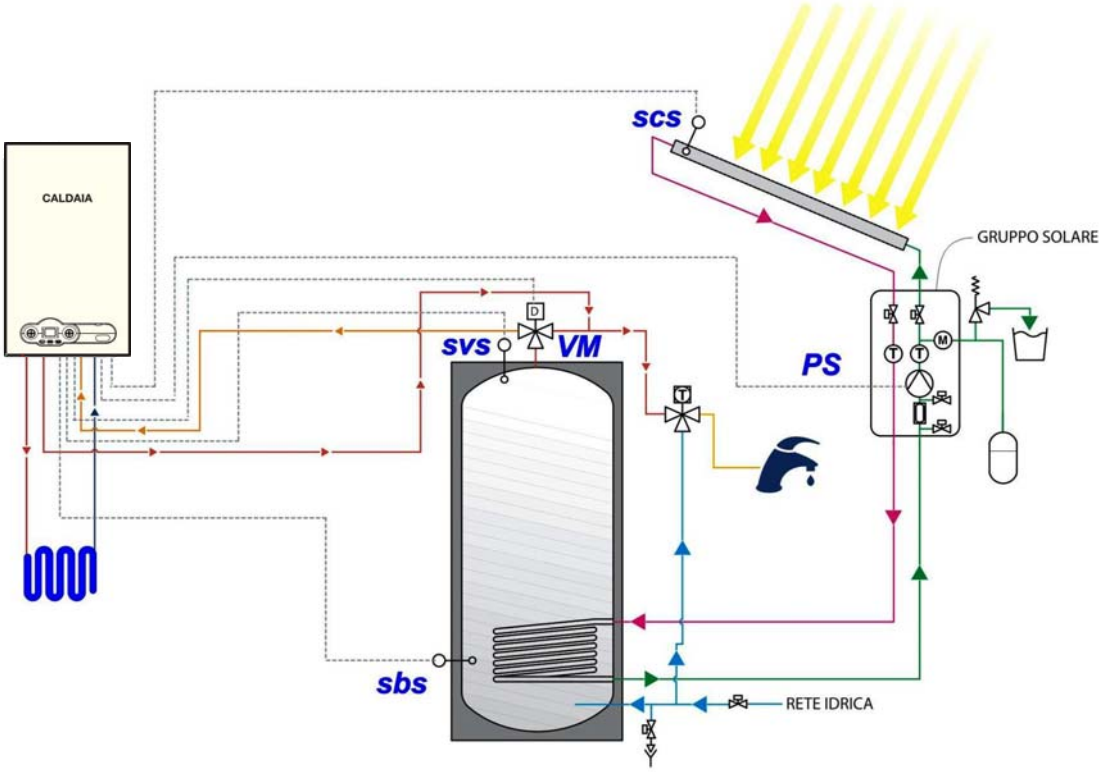
NOTE: *with heat requests from different zones at the same time, the boiler flow set-point corresponds to the highest of the calculated values. The flow set-point required by the mixed zones is equal to the value calculated by the thermoregulation. When it comes to the set-point for the mixed zones, otherwise, the value displayed by P75 (default 5°C) is increased to the thermoregulation algorithm in order to avoid failures deriving from the hydraulic circuit breaker presence.*
When domestic hot water is drawn, heating requests are interrupted and then re-activated when domestic hot water draw is finished.
CH functions are disabled when the boiler is in the OFF or SUMMER ONLY modes.

Solar mode programming

The solar board allows to manage "*complex*" solar plants. It is moreover possible to manage two solar charges (pump + deviating valve) at the same time.

The only complex solar plant to be managed by the supplementary board with an instantaneous-type boiler (P3=1), is the one designed for heating the solar storage in a forced circulation system through the *pump* ***PS*** and for the instantaneous integration in the boiler for DHW through the *deviating valve* ***VM***.

Plant diagram is shown below:



Water heater filling function (*pomp ON*)

Boiler temperature is set with parameter P19, which corresponds to a value ranging from 10 to 90°C (default 60°C).
Solar pump PS is enabled in the following conditions:

- *Tsvs < P19 - 2°C*
  and
- *Tscs – Tsbs > ΔT ON (P20)*
  and
- *Tscs > Tmin pump collector ON (P23)*
  and
- *Tscs < Tmax pump collector ON (P22 - 5°C)*

Where *Tsvs* is the temperature detected by the upper solar water heater probe, *Tsbs* the one detected by the lower probe, and *Tscs* is the temperature detected by the solar collector probe.

Water heater filling function (*pump OFF*)

Solar pump PS is disabled in the following conditions:

- *Tsvs > P19*
  or
- *Tscs – Tsbs < ΔT OFF (P21)*
  or

- *Tscs < Tmin solar collector OFF (P23 - 5°C)*
  or
- *Tscs > Tmax solar collector OFF (P22)*

***Warning**: in case of solar valve probe SVS fault, the deviating valve is enabled in solar-only mode, while the water heater filling is managed according to the same logic, taking into account the solar water heater probe SBS instead of the faulty one.*

Boiler integration function

The function consists in properly controlling the motorised valve VM and in activating the boiler burner only if the solar water heater temperature is not sufficient to fulfil the request for operation.
The VM valve remains in the rest condition (boiler integration) when the temperature detected by the SVS probe is lower than the *DHW set-point temperature - 2°C.* Instead, it is supplied with power (solar-only mode) when the solar water heater probe temperature reaches the *DHW set-point* set in the boiler, or in case of probe fault.
When the VM valve is in solar-only mode, the boiler will not perform the DHW function.

***Warning**: said function is active only if either the "DHW + CH", or the "CH-ONLY" or "DHW-ONLY" mode is selected in the boiler. With boiler in OFF mode, the VM valve remains constantly supplied with power.*

Collector heat transfer function

This function prevents solar collectors from remaining in a stagnation state for a long time, which would expose them to high risk of thermal stress, when solar water heater temperature is reached. For this reason solar pump PS is reactivated according to the following logic:

Tscs > (P22 - 10°C)
and
Tsvs < 95°C

and stopped when one of the following conditions occurs:

Tscs < (P22 -12°C)
or
Tsvs ≥ 95°C

Besides, the function is disabled with Tscs > P22 and re-activated with Tscs < P22 minus 5°C.

***Warning**: said function is active only if either the "DHW + CH", or the "CH-ONLY "or "DHW-ONLY" mode is selected in the boiler, whereas it is not active in case of solar valve probe SVS fault.*

Water heater cooling function

This function consists in cooling water heater down to the set-point value by transferring excess heat from the boiler to the solar collector. This occurs only if the

solar water heater exceeds the set-point temperature following the activation of the *"heat transfer*" function.
If the remote control is not connected, the *"water heater cooling*" function is always enabled, otherwise it is enabled only from 00.00 to 6.00.
Solar pump (PSOL) enabling condition for water heater cooling:

Tsvs > P19 + 2°C
and
Tscs < Tsbs - ΔT ON (P20)

The function stops when the PSOL is switched off at the following conditions:

Tsvs < P19
or
Tscs > Tsvs - ΔT OFF (P21)

***Warning**: said function is active only if either the "DHW + CH", or the "CH-ONLY "or "DHW-ONLY" mode is selected in the boiler, whereas it is not active in case of solar valve probe SVS fault.*
*To enable the function, it is moreover necessary to set parameter **P26** to **1**.*

Solar collector freeze protection function

The function is enabled by setting parameter **P24** to **1**. In this way, when the temperature read by the collector probe is lower than 4°C, the solar pump PSOL is activated until the temperature reaches 5°C.

Solar functions characteristics

Each time the solar pump becomes operational, its active state will be signalled by the icon on the boiler display.
In case of fault of the solar water heater probe (SBS) or of the solar collector probe (SCS), the solar pump is immediately switched off and the fault is reported through the boiler board interface and the remote control (if connected) with the relevant error codes (E28 and E24 respectively). In case of solar valve probe (SVS) fault, otherwise, the deviating valve is enabled in "*solar-only*" mode showing the fault E27.

It is moreover possible to force the solar charges during maintenance by setting parameters P91, P92 and P93. In this way, the supplementary board relays are energised until such parameter is restored.

Supplementary board characteristics

Power supply	230 Vac -15/+10% 50Hz
Load output	230 Vac, 1° max
Flow probe	NTC 10 kOhm @25°C B3435 Max. 3 metres
Solar probe	PT1000 Max. 100 metres
Flow probe operation correct range	-5°C +120°C
Solar probe operation correct range	-40°C +290°C
Mixing valve disabling range for reached set-point	Set+1.5°C / Set-2°C
Mixing valve opening total timer	From 0 to 300 s (P74)
Initial closing timer with powered board	P74 + 40 s

Request end closing timer	P74 + 20 s
Post-circulation timer	From boiler with P13
Circulation pump anti-seizing timer	3 s each 24 hours
Anti-freeze function timer	15 min
Anti-freeze triggering temperature	< 5 °C

TEMPERATURE PROBE INTEGRITY CHECK

The system checks for any faults in the probes connected to the modulation board, signalling any detected faults with the relevant error code. The failure condition occurs when probe is not supplied with power (except for the external probe), or when it detects a temperature value outside probe correct operating range:

- ***Double flow probe (E05)*** fault: the burner is immediately switched off whereas the fan is still supplied with power.
  The pump circulates water until the fault is reset, with deviating valve in heating position, if before the fault a heating, flow-return anti-freeze, flue cleaning request was present, or if the boiler does not feature any request.
  The pump circulates with deviating valve in DHW position only if before the fault there was a request in DHW or DHW anti-freeze mode.

  With P17=1 and P17=3 (multifunction relay), the relay remains energised until the fault is reset in case a heating, flow-return anti-freeze, flue cleaning request, or no requests were present.

- ***Plate DHW probe (E06)***: fault: with a request in DHW mode, the burner is not activated (if it was ON it is switched OFF) and the pump is activated as long as the request persists. At the end of the request, if no other requests are present, the system performs a 30-second post-circulation cycle. This circulation occurs even without operating request.
  With operating request in heating, flow anti-freeze, or flue cleaning function, the standard management operations of the request are ensured.
  If the fault is reset, the system restores the standard operation.

  Resistance values (Ω) of NTC flow probes and of plate DHW at the different temperatures:

Probe calibration: ***10k Ohm at 25°C***

T°C	0	2	4	6	8
0	27203	24979	22959	21122	19451
10	17928	16539	15271	14113	13054
20	12084	11196	10382	9634	8948
30	8317	7736	7202	6709	6254
40	5835	5448	5090	4758	4452
50	4168	3904	3660	3433	3222
60	3026	2844	2674	2516	2369
70	2232	2104	1984	1872	1767
80	1670	1578	1492	1412	1336
90	1266	1199	1137	1079	1023

Correct operating range: *from -20 to +120°C, general tolerance: +/- 3°C*

- ***Solar probes (E24, E27, E28) fault:*** in case of fault of the solar water heater probe (SBS) or of the solar collector probe (SCS), the solar pump is immediately switched off.
  In case of fault of the solar valve probe (SVS), the deviating valve is enabled in "*solar only*" mode ans the "*heat transfer*" and "*water heater cooling*" functions are disabled. In such case, the "*boiler filling*" function is anyway ensured, taking into consideration the solar water heater probe SBS.
  The usual management operations are guaranteed for all requests made, except for requests referring to "solar" operation.

  Resistance values (Ω) of the solar probes PT1000 at the different temperatures:

  Probe calibration: ***1KOhm at 0°C***

Temperature °C	Resistance Ω	Temperature °C	Resistance Ω
-20	922	**60**	1232
-10	961	**70**	1270
0	**1000**	**80**	1309
10	1039	**90**	1347
20	1078	**100**	1385
30	1118	**110**	1422
40	1155	**120**	1460
50	1194	**130**	1499

  Correct operation range: from *-40°C to +290°C, general tolerance: +/- 3°C*.

- ***External probe (E23)*** fault: each operation request in heating mode entailing the burner ignition is carried out ignoring the calculation algorithm: the curve value is used to determine the operation range (standard or reduced) with set-point corresponding to the set one.

  Correct operating range: *from -40 to +50°C, general tolerance: +/- 3°C.*

Warning: if the boiler or the remote control is in "OFF" mode, the fault is only signalled, whereas all the other boiler control elements (gas valve, fan, pumps, three-way valve, multifunction relay) remain in the rest position.

GAS PROPORTIONAL MODULATION COIL INTEGRITY CHECK.

The system checks the gas proportional modulation coil for faults (error E76) in case of modulation coil not being supplied with power or short-circuited. If this fault occurs, all the standard boiler functions are anyway performed with the burner working at minimum output.
The faulty modulation coil signal is interrupted when its electric parameters return within the preset limits.

ANTI-SEIZE FUNCTION

Boiler pump and deviating valve

The electronic board calculates the time elapsed since pump disabling; if this time is equal to 24 hours, both the pump and the valve will be enabled again for 30 seconds.
During the pump anti-seizing function the burner remains off and upon each activation of the pump for any request the timer is reset.
Any operation request in CH, DHW or freeze protection functions will have higher priority, and thus the function in progress will be forced to end in order to carry out such request.

Multifunction relay

The multifunction relay carries out the anti-seize operation as indicated in the previous paragraph only if it is set as pump or valve (P17=1, P17=2 and P17=3).
In case it is set to signal faults and errors (P17=0) the relay does not carry out the anti-seize operation.

POST-VENTILATION FUNCTION.

Upon burner switching off, the fan is still supplied with power for **10 seconds**, regardless of boiler operating mode.
Moreover, a post-ventilation cycle is started when the temperature read by the flow probe reaches 95°C and is stopped when the temperature falls below 90°C.

Any operation request during CH, DHW, anti-freeze, flue cleaning functions will have higher priority and thus the ventilation function in progress will be forced to end in order to carry out such request.

PUMP POST-CIRCULATION FUNCTION

At the end of a heating, anti-freeze or flue cleaning request, the burner (if ON) is immediately switched off, whereas the pump continues to be supplied with power for 30 seconds (time that can be set by means of parameter P13). The same applies to the multifunction relay with P17=1 or P17=3 at the end of each request by the remote control or the associated ambient thermostat.
At the end of an operation request in plate DHW mode, the pump is still supplied with power for 30 seconds, with deviating valve switched to DHW mode.

With no operation request, if the water temperature detected by the flow NTC probe is higher than 78 °C, the pump remains supplied with power until the flow temperature falls below such value. In this case the deviating valve is switched to heating mode.

Any operation request during CH, DHW, anti-freeze, flue cleaning mode will have higher priority, and thus the post-circulation function in progress will be forced to end in order to carry out such request.

FREEZE PROTECTION FUNCTION

Flow

A flow NTC probe measures the water temperature inside the boiler and if it falls below 5°C it generates an operation request in flow anti-freeze mode, with consequent burner ignition.
At the end of the ignition sequence, the output rate supplied to burner will be forced to the minimum value.
The operation request in flow anti-freeze mode ends when the flow temperature exceeds 30°C or when reaching an operation time of 15 minutes with flow temperature above 5°C.

Any operation request in heating mode or DHW has higher priority, and forces the interruption of the function in progress.

During a flow anti-freeze operation the boiler pump is activated, whereas the three-way valve switches to heating position.
With P17 equal to 1 or 3, also the multifunction relay is energised.

In case of flame control shut-down and impossibility to ignite the burner, the anti-freeze function activates a pump circulation cycle with active multifunction relay (if P17=1 or P17=3).

Warning, the freeze protection function does not protect the CH system but the boiler only.

Summary of operation thresholds:

DESCRIPTION	ON	OFF
Flow freeze protection function	5°C	30°C (or after 15' of operation)
Temperature general tolerance	± 3°C	

Plate DHW

The DHW NTC probe measures the DHW temperature and if it falls below la temperatura di 5°C it generates an operation request in DHW freeze protection mode. The pump is activated and after a 30 sec. waiting time, the burner ignites with output forced to the minimum value.

During a DHW anti-freeze operation the temperature detected by the flow probe is constantly checked, and in case it reaches 60°C the burner is switched off. The burner ignites again if the operation request in anti-freeze mode is still present and the flow temperature is lower than 60°C.
The operation request in DHW anti-freeze mode ends when the DHW temperature exceeds 10°C or when reaching an operation time of 15 minutes with DHW temperature above 5°C.

Any operation request in DHW mode has higher priority, and forces the interruption of the function in progress.
During a DHW anti-freeze operation, the pump is supplied with power, the electric deviating valve is in DHW position and the multifunction relay is in rest condition.

In case of flame control shut-down and impossibility to ignite the burner, the DHW anti-freeze function will anyway carry out a pump circulation cycle.

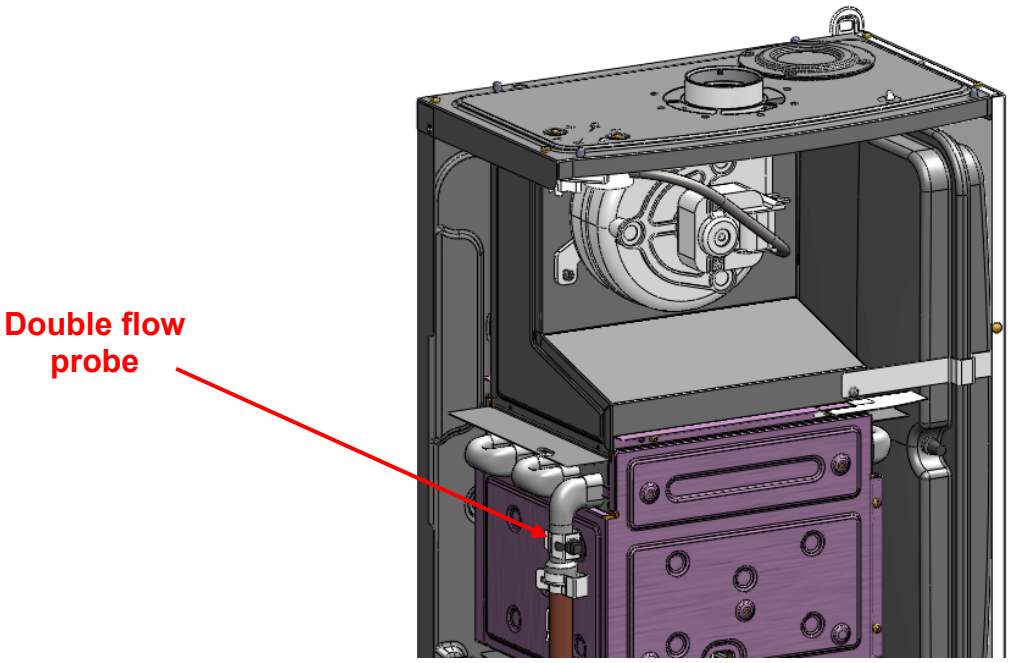
Summary of operation thresholds:

DESCRIPTION	ON	OFF
DHW freeze protection function	5°C	10°C (or after 15' of operation, or if the flow temperature is > 60°C)
Temperature general tolerance	± 3°C	

SAFETY DEVICES AND FUNCTIONS

Double flow probe (E02 shut-down)
The overtemperature check is carried out by the double probe placed on the flow pipe in place of the standard safety contact thermostat.
When reaching 105°C, the gas valve power supply is immediately interrupted, with consequent indication of error E02 on the display.
Use the "*reset*" key to reset when the flow temperature reaches 90°C.

In case of E02 shut-down:
The fan performs a 10-second post-ventilation cycle and the boiler can be reset within that time.
The pump performs a post-circulation cycle with deviating valve in heating position if before the shut-down there was a heating, flow-return anti-freeze, or flue cleaning function request. Instead, the post-circulation cycle with deviating valve in DHW mode is performed if a DHW request or a DHW anti-freeze request had been launched before the shut-down.
With P17=1 or P17=3, the multifunction relay performs a post-circulation cycle only if it was energised before the shut-down.



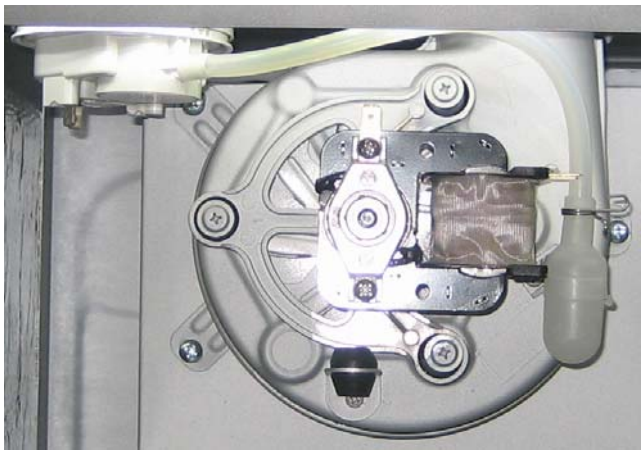
Air pressure switch (E03 shut-down)

The air pressure switch, fitted only in the forced draught models, is a normally open contact connected in series with the gas valve, and is directly managed by the automatic flame control. Its function is to detect a proper pressure difference in two different points of the boiler and is directly managed by the electronic board.

The pressure switch contact must be open before fan is supplied with power and closed when it starts working. At the end of the request, when the fan is no more supplied with power, the contact must re-open. Therefore, the board double-checks the contact opening, one check is performed at the initial and one at the final phase.

When the pressure switch is open, the gas valve cannot be supplied with power.

After 10 seconds since powering the combustion fan, if the pressure switch contact is still open, a volatile shut-down signal is generated. Said signal does not need to be reset. The same shut-down signal is generated if the pressure switch is in a wrong position or in a waiting status. The boiler will enter a non-volatile shut-down mode only if the pressure switch is in a wrong position for more than one minute and must be reset.



Differential pressure switch: **45/35 Pascal** Max. output=1500 Pa

Low water pressure switch (E04 shut-down)

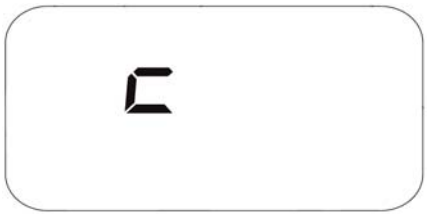
The water pressure switch is constantly checked. If it is open (with pressure lower than 0.5 bar), a signal of insufficient pressure (E04) is sent, the pump is immediately disabled and the operation requests are ignored.

Even the multifunction relay power supply is interrupted (if selected with P17=1 or P17=3).

If the pressure switch contact closes, the standard operation is restored.

Boiler combustion chamber automatic recognition (E72 shut-down)

The type of boiler (forced draught or natural draught) is automatically recognised each time the board is supplied with power. The board attempts to read the inputs dedicated to the air pressure switch. During such phase, “CHA” will appear on the boiler display and upon the following recognition (which must take place within the first two minutes) the following message will be displayed for 5 seconds:



If for any reason the board is not able to detect the presence of the air pressure switch, the E72 fault will be signalled. To reset this shut-down status, power off and back on to start a new self-recognition cycle.

Warning: during the combustion chamber type recognition step, no request is performed.

3-bar safety valve

This valve is installed on CH water pipe, and checks that pressure does not exceed 3 bar as this condition would entail boiler inner problems.
Should valve read a pressure higher than the allowed limit, it will open to discharge water outside.

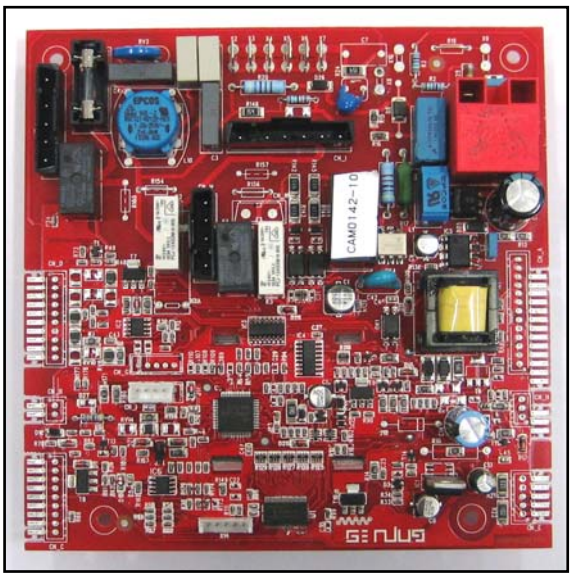
SECT. 6
ELECTRICAL SYSTEM

6.1 ELECTRONIC BOARD

Spare part numbers: **6SCHEMOD29**

Board characteristics

Operating voltage: from 170 Vac to 300 Vac
Power supply frequency: 45 – 66 Hz
Protection class: IP00
Protection fuse: 5x20mm 3.15AF
Ionisation current: 1.2 µA
Flame detection method: ionisation
Type of detection: non-polarised

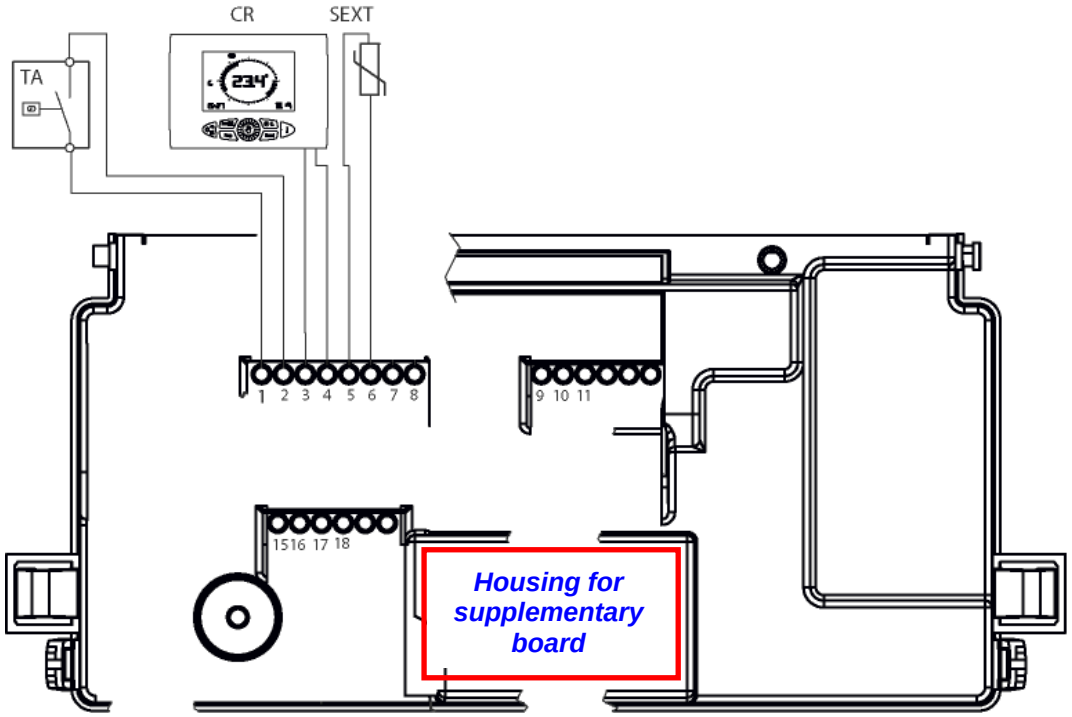


LCD display characteristics (board back)

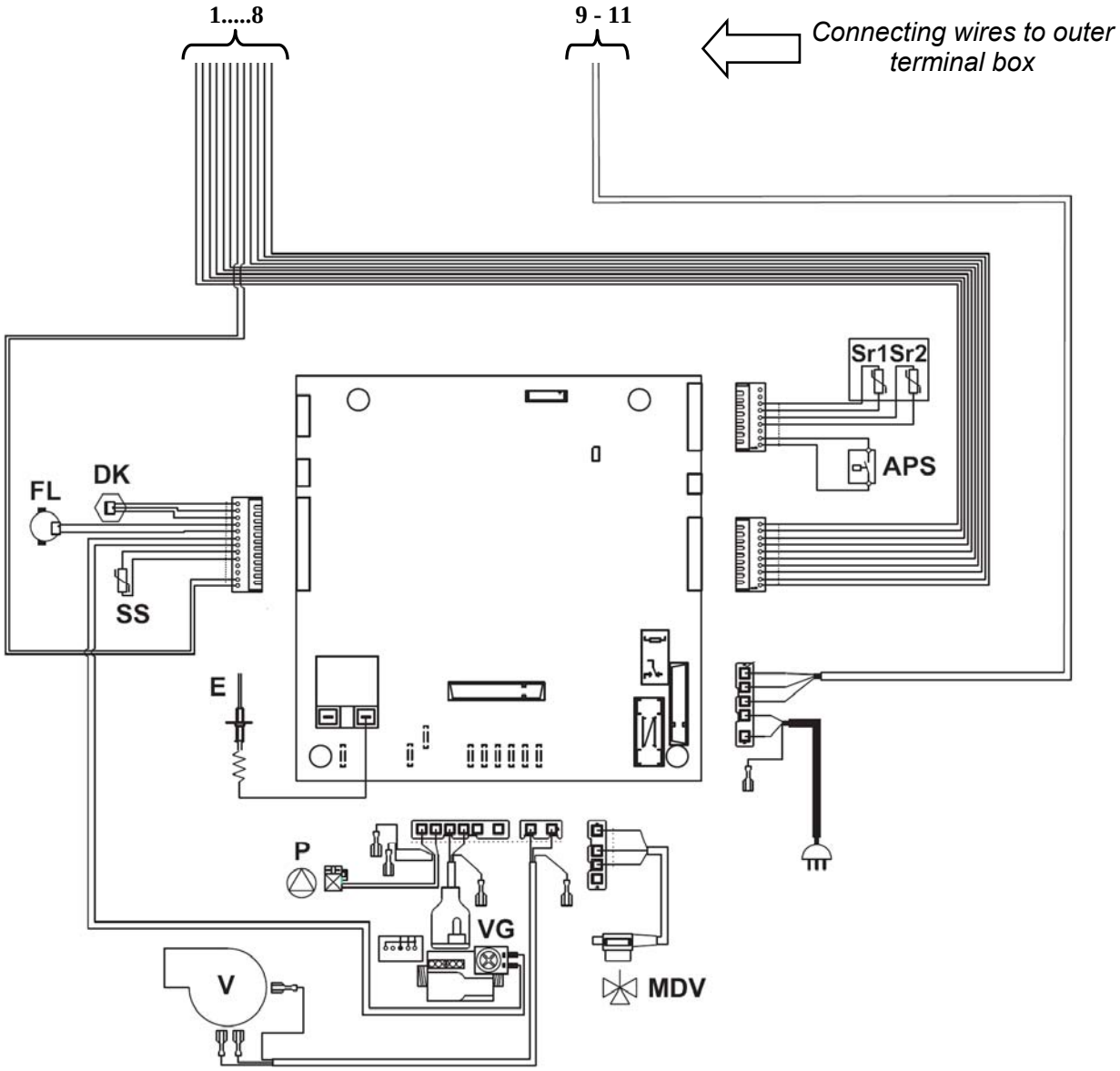
No. of digits: 5 (3+2)
Back-lighting: yes
Background: green

6.2 ELECTRICAL CONNECTIONS

All the electrical connections are ensured through the numbered terminal box located on the back side of the electric panel. The supplementary boards are housed inside the board seat.



6.3 WIRING DIAGRAM



Key:

DK:	water pressure switch	**V**:	fan
FL:	flow switch	**VG**:	gas valve
SS:	NTC 10 KOhm DHW probe	**MDV**:	motorised deviating valve
E:	ignition/detection electrode	**APS**:	air pressure switch
P:	boiler circulation pump	**Sr1Sr2**:	NTC 10K Ohm double flow probe

Connections to be made by the installer (ON OUTER TERMINAL BOX):

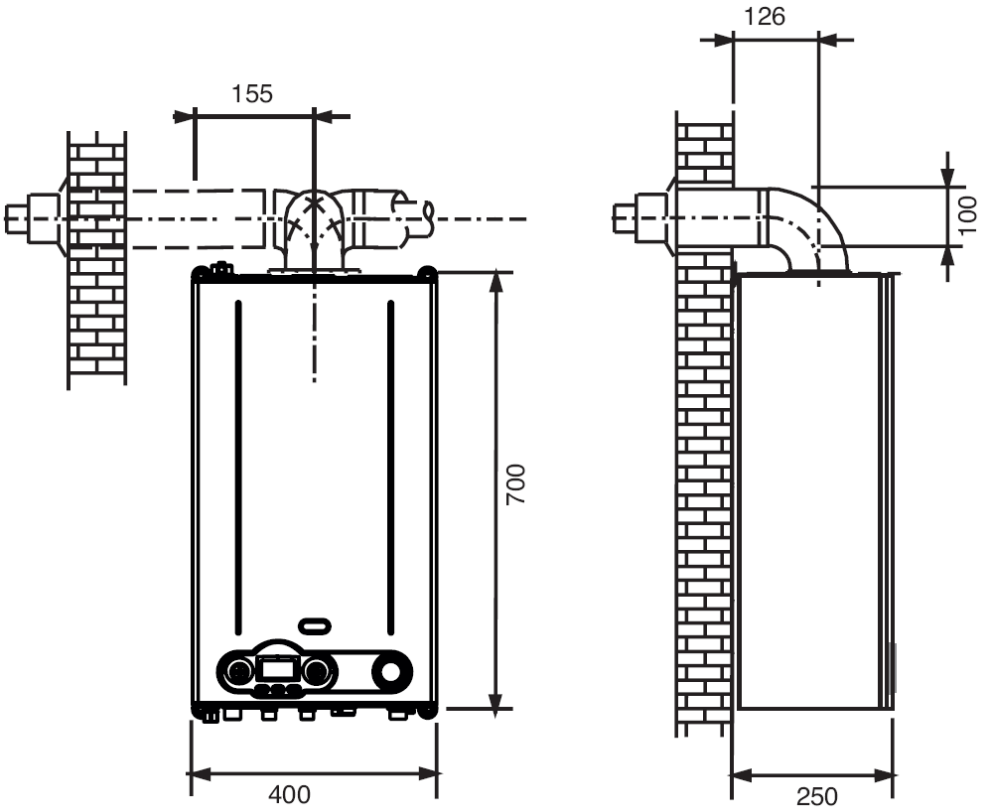
TA (pins 1 and 2): ambient thermostat (clean contact free from potential)
OT (pins 3 and 4): remote control (L≤30m)
SEXT (pins 5 and 6): external probe (10K Ohm at 25°C B3977 L≤100m)
Multifunction relay: pin **9**: phase, normally open
pin **10**: phase, normally closed
pin **11**: neutral

SECT. 7
VENT DUCTS AND PIPES

For intake/flue gas vent lines use only original ducts designed for the specific boiler (as per manufacturer's specifications).

7.1 100/60 CO-AXIAL AIR/VENT DUCTS

Dimensions for connection of flue gas duct to co-axial pipes



Type C12 horizontal vent

The minimum permissible length of horizontal coaxial pipes is 1 metre, excluding the first elbow connected to the boiler.
Maximum permissible length of horizontal coaxial pipes is 6 metres, not counting the first elbow connected to the boiler.
For each additional 90°elbow the maximum permissible length must be reduced by 1 meter, whereas for the 45° elbow it must be reduced by 0.5 meters. In addition to that, the duct is to have a 1% slope toward the exit direction, in order to prevent rainwater entering it.

Flue gas vent diaphragms:

Pipe length (m)	Flue gas vent diaphragm diameter [mm]
$1 \leq L < 2$*	Ø 39.8
$2 \leq L < 3$*	Ø 41
$3 \leq L \leq 6$*	Ø 44

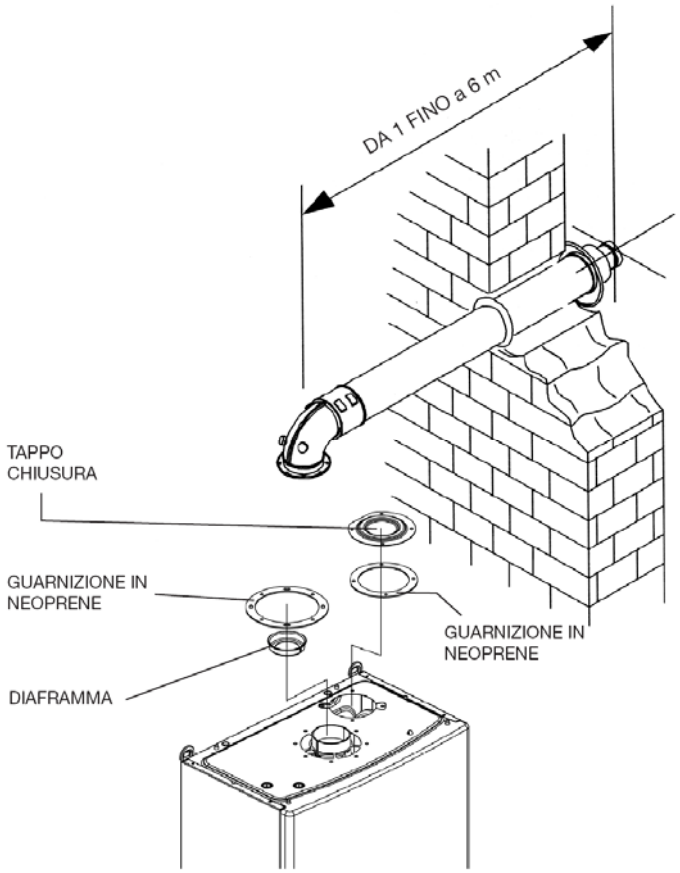
* Excluding the first elbow

Type C32 vertical vent

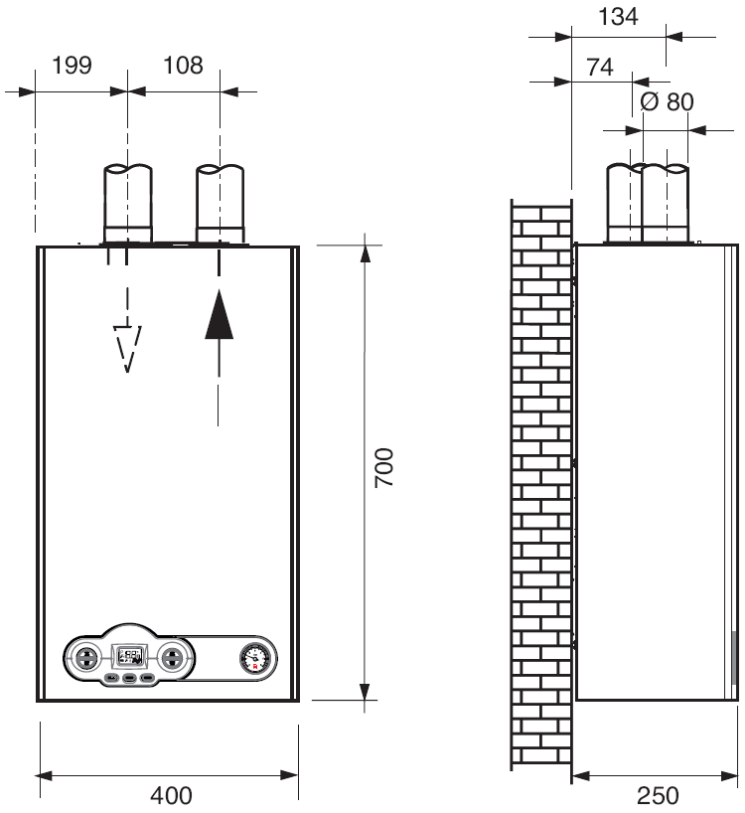
Minimum permissible length for vertical coaxial pipes is one metre, equal to the length of the flue.
Maximum permissible length for vertical coaxial pipes is 6 metres, including the chimney.
For each additional 90° elbow, maximum permissible length is to be reduced by 1 metre, whereas for the 45° one by 0.5 metres. Roof vent terminal is equivalent to 1.5 metres of pipe.

Flue gas vent diaphragms:

Pipe length (m)	Flue gas vent diaphragm diameter [mm]
1 ≤ L < 3	Ø 39.8
2 ≤ L < 3	Ø 41
3 ≤ L ≤ 6	Ø 44



7.2 80/80 SPLIT AIR/VENT DUCTS



Type C12 - C32 - C42 – C52 – C82

AIR INTAKE
Minimum permissible length of air intake pipe is 1 meter.
Each wide radius 90° air-intake duct elbow (R=D) is equivalent to a 0.8 metres long straight pipe section.
Each wide radius 90° air-intake duct elbow (R=D) is equivalent to a 1.6 metres long straight pipe section.

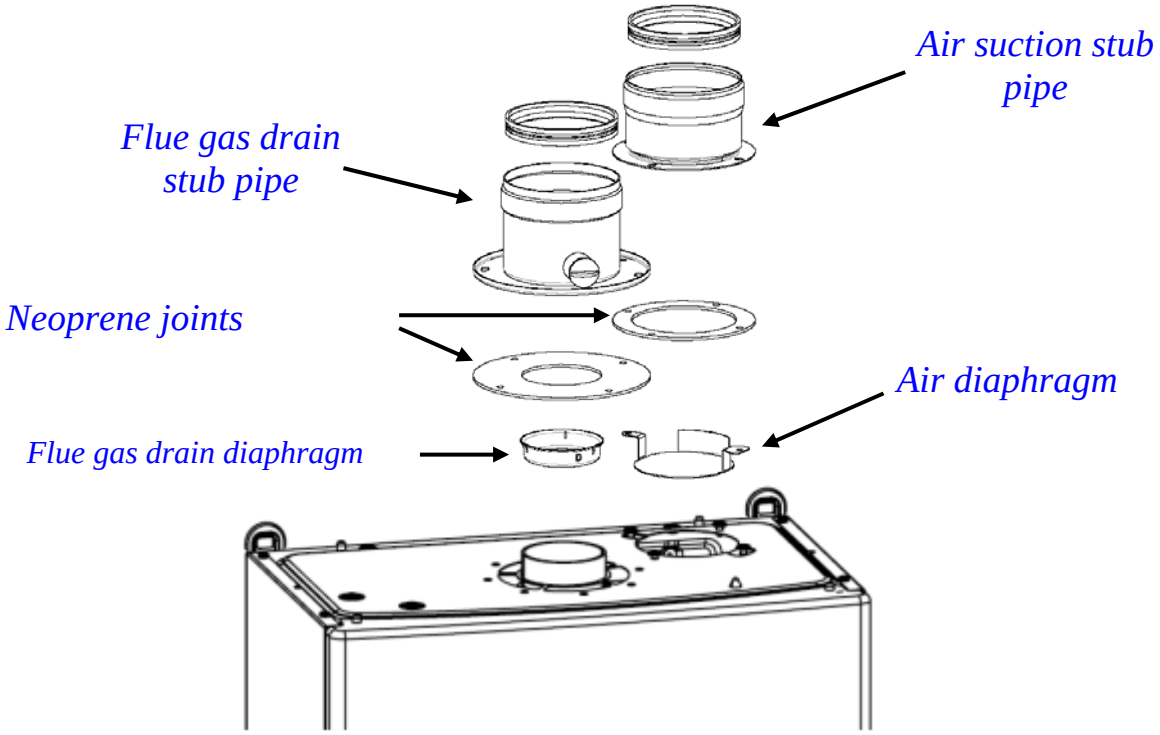
FLUE GAS VENT
Minimum permissible length of vent pipe is 0.5 meters.
Each wide radius 90° vent duct elbow (R=D) is equivalent to 1.3 metres.
Each wide radius 90° vent duct elbow (R=D) is equivalent to a 2.7 metres long straight pipe section.

Air diaphragms:

Base splitter kit	Pipes total length [m]	Flue gas vent diaphragm diameter [mm]
0SDOPPIA11	$0.5 \leq L \leq 26$*	Ø 44
	$26 \leq L \leq 40$*	Ø 49
	< 47	-

* excluding the first elbow on vent pipe

Base splitter kit **0SDOPPIA11**:



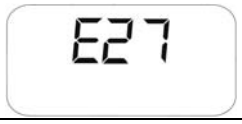
WARNING: the air diaphragm is supplied with the splitter kit.

80/80 split duct load loss table

Part	Vent	Intake
1m extension	1	0.6
0.5m extension	0.5	0.3
90° elbow	1.3	0.8
90° Elbow - narrow radius	2.7	1.6
45° elbow	2.3	1.3
Elbow with flue gas measurement point	2.7	1.6
Wall vent terminal	4.3	-
Roof vent terminal	4.3	-
Vertical stub pipe	0.1	0.1
Vertical condensate drain	2.7	-
Horizontal condensate drain	0.3	-
Chinese-type vertical vent terminal	4.7	-
Suction opening	-	2.5
Split vent duct flue	5.6	4.1

TABLE OF TECHNICAL FAULTS

Boiler Status	Malfunction	Probable cause	Solution
Boiler shut-down, picture flashes: 	Burner does not ignite	Gas supply fault	Check gas pressure. Check gas supply cock or gas network safety valve intervention.
		Gas valve is disconnected	Re-connect it
		Gas valve is faulty	Replace it
		The board is faulty	Replace it
	Burner does not ignite: no spark.	Ignition relay is faulty.	Replace the electrode.
		Ignition transformer faulty.	Replace the ignition transformer.
		Electronic board does not ignite. It is faulty	Replace electronic board.
	Burner ignites for a few seconds and goes off	Electronic board does not detect flame: inverted phase and neutral	Verify correct neutral and phase connection sequence.
		Detection electrode cable interrupted	Re-connect or replace cable
		Flame detection electrode is faulty	Replace the electrode.
		Electronic board does not detect flame: it is faulty	Replace the board
		Ignition heat input setting is too low	Increase it
		Minimum heat input is not set correctly	Check burner setting
Boiler shut-down, picture flashes: 	Flow double probe check has been triggered	Water does not flow in the system (thermostatic valves might have shut or system stopcocks might be closed) and the by-pass valve is not operating	Check system status and by-pass valve
		Circulation pump is blocked or faulty	Check the circulation pump.
		Double flow probe faulty.	Check probe values.
Boiler shut-down, picture flashes: 	Flue gas pressure switch triggering	Combustion air intake is insufficient or flue gas vent is difficult	Check air intake/flue gas vent ducts: clean or replace as necessary.
		Flue gas pressure switch is faulty	Check flue gas pressure switch: replace it if faulty
		Silicone pipe of flue gas pressure switch clogged or not connected	Connect or clean pipe as necessary
		Fan is faulty	Replace it
Boiler shut-down, picture flashes: 	CH system water pressure is low	Low water inside heating system	Fill up system
		Leaks in the CH system	Check system

Boiler shut-down, picture flashes: 	Double flow probe fault	One of the two probes is disconnected or in short-circuit	Reconnect or replace it
		The difference between the temperatures detected by the double probe is higher than 5°C	Replace the probe
Boiler shut-down, picture flashes: 	DHW probe is not working	Disconnected or short-circuited probe	Reconnect or replace it
Boiler is not supplying DHW	DHW flow switch is not working	System insufficient pressure or flow rate	Check system Check condition of flow switch filter
		DHW flow switch probe is faulty or disconnected	Connect or replace it
Boiler shut-down, picture flashes: 	External probe is not working (*error signalling occurs only when a heating request is active*)	Disconnected or faulty probe	Reconnect or replace it
Boiler shut-down, picture flashes: 	Solar collector probe SCS fault *(connected to boiler board)*	Disconnected or faulty probe	Reconnect or replace it
		Probe detects a value lying outside the admissible range	Make sure the probe is of PT1000 type
Boiler shut-down, picture flashes: 	Solar collector probe SVS fault *(connected to solar supplementary board)*	Disconnected or faulty probe	Reconnect or replace it
		Probe detects a value lying outside the admissible range	Make sure the probe is of PT1000 type

Boiler shut-down, picture flashes: 	Solar water heater probe SBS fault *(connected to boiler board)*	Disconnected or faulty probe	Reconnect or replace it
		Probe detects a value lying outside the admissible range	Make sure the probe is of PT1000 type
Boiler shut-down, on remote control picture flashes: 	The boiler does not communicate with the Remote Control	The connection with the Remote Control is interrupted.	Check the Remote Control connections (wiring longer than 5 meters must be shielded)
		Remote control is faulty	Replace the Remote Control
Boiler shut-down, picture flashes: 	Safety thermostat triggering in mixed zone 2	Faulty or disconnected safety thermostat	Replace it or reconnect cables
		Too high flow temperature	Check boiler settings or mixing valve correct operation
Boiler shut-down, picture flashes: 	Flow probe fault in mixed zone *(with indication of the zone number)*	Disconnected or faulty probe	Reconnect or replace it
		Probe detects a value lying outside the admissible range	Make sure the probe is of NTC type
Boiler shut-down, picture flashes: 	Communication failure between main board and supplementary boards	The main board does not find all supplementary boards or finds more than the ones actually connected	Check parameter P60 value. It must correspond to the number of supplementary board(s) used
Boiler shut-down, picture flashes: 	Hydraulic configuration not allowed	The main board does not recognise the probes for correct operation	Check the P3 board configuration parameter
Boiler shut-down, picture flashes: 	Safety circuit hardware fault *(fan relay)*		Replace main board

Boiler shut-down, picture flashes: 	Safety circuit hardware fault *(fan relay)*		Replace main board
Boiler shut-down, picture flashes: 	Safety circuit hardware fault *(gas valve relay)*		Replace main board
Boiler shut-down, picture flashes: 	Boiler combustion chamber recognition failure	Combustion air intake is insufficient or flue gas vent is difficult	Check air intake/flue gas vent ducts: clean or replace as necessary.
		Flue gas pressure switch is faulty	Check flue gas pressure switch: replace it if faulty
		Silicone pipe of flue gas pressure switch clogged or not connected	Connect or clean pipe as necessary
		Fan is faulty	Replace it
Boiler shut-down, picture flashes: 	Gas valve modulation coil fault	Connection of electronic board to the gas valve modulation coil non correct or missing	Check electrical connections
		Gas valve modulation coil is faulty	Replace the gas valve
Boiler shut-down, picture flashes: 	Max. number of reset attempts from remote control reached	Presence of one error that can not be reset	Work directly on the boiler

IF NONE OF THESE HYPOTHESES IS VALID, FAILURE IS ORIGINATED BY MAIN ELECTRONIC BOARD. YOU CAN JUST CHECK CONNECTIONS OR CHANGE THE BOARD.

FONDITAL GROUP

Delfis-Antea Mono-thermal Technic Manual

Customer Service Department

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