



# THEA<sup>++</sup> MR/MN CR/CN

Wall-mounted condensing boiler



# Kondens

ITALIAN DESIGN





**THEA\*\* MANUAL**  
**VERS. 11/2020 - REV. 0**

## TABLE OF CONTENTS

<b>General requirements</b>	<b>2</b>	-Filling the system	19
-EC conformity declaration	2	-Connecting the condensate line	19
-General information	2	-Connection to the mains gas supply	20
<b>Use and operation</b>	<b>3</b>	-Connection to the mains electrical system	21
-Description of the boiler	3	-Combustion gas evacuation system: compatible applications	22
-Components	3	-Combustion gas evacuation system: installation	23
-Ignition	4	-Air intake and combustion gas evacuation system: important information	25
-Interface description	4	<b>Adjustment and maintenance</b>	<b>26</b>
-Stand-by Main menu	5	-Preliminary maintenance operations	26
-Operation Main menu	6	-General maintenance operations	26
-Season selection	7	-Service function	26
-Temperature regulation	7	-Data plate	28
-Information menu	8	-Power adjustment	28
-Operation with room thermostat	10	-Testing the gas supply dynamic pressure	29
-Operation with outdoor probe	10	- Heating power adjustment	30
-Operation with cronothermostat Open-therm	10	-Analysis - Checking and regulating combustion	31
-Special functions	11	-Changing gas type	32
-Faults	12	-Accessing the configuration menu	33
-Fault codes table	13	-Configuration menu	35
<b>Installation</b>	<b>14</b>	-Installation	37
-Operation diagram	14	-Installation and configuration of external temperature sensor	38
-Three-way boiler diagram	14	-Configuring the climate curve from those available	39
-Electrical wiring diagram	15	-Special functions	40
-Graphs for the head available to the system	16	-Thermostat post circulation/ventilation function	41
-Installation	16	- Deaeration function	41
-Fastening the boiler to the wall	17	-Technical Data sheet	41
-Layout of connections	18		
-Plumbing the boiler	18		
-Connecting filling tap for central heating only boilers	19		

## GENERAL REQUIREMENTS

### EC CONFORMITY DECLARATION (ACCORDING TO ISO/IEC 17050-1)

G20 Engineering srl established in Loc. Campogrande, 13 - Carpaneto Piacentino whose processes of design, manufacturing and after-sales service are in compliance with requirements of UNI EN ISO 9001:2008 - DECLARES that THEA boilers are in compliance with European Directives and with European Delegates regulations.

Chief Executive *Marco Rapaccjoli*



CE CERTIFICATES ARE AVAILABLE ON OUR WEBSITE [www.produzionecaldaie.it](http://www.produzionecaldaie.it)

### GENERAL INFORMATION

This manual, supplied with every boiler, should be considered as an integral component as it contains instructions for the correct, safe and appropriate installation, use and maintenance of the system.

The manual must always be kept by the user of the boiler and made available for the installation and/or maintenance technicians to consult. It must also accompany the boiler if it should be moved or otherwise transferred.

The manufacturer shall not be held responsible for any damage caused by failure to follow the instructions contained in this manual, nor:

If the boiler is used for purposes other than those for which it was built.

If any part or circuit of the boiler is modified.

If accessories or kits not approved by the manufacturer are installed.

If ordinary and extraordinary maintenance is not performed by qualified personnel.

If applicable technical and legal requirements have not been observed during installation and maintenance of the boiler.

#### WARNING!

If the boiler should cease to function or not function correctly, deactivate it immediately by turning it off and then shutting off the gas supply. Do not attempt any repairs or direct work on the boiler.

Only personnel with the necessary qualifications and licenses must perform maintenance on the boiler. Any repairs must be performed using only original parts and accessories.

#### SYMBOLS USED IN THE MANUAL:



Advice, suggestion, note



Important information, indications of methods and operations which could compromise correct operation of the boiler and create a hazard.

## DESCRIPTION OF THE BOILER

The range of THEA wall-hung boilers is updated to the TheA++ model. A perfect, powerful, reliable, ecological machine, equipped with a condensing high efficiency heat exchanger, entirely made in Italy.

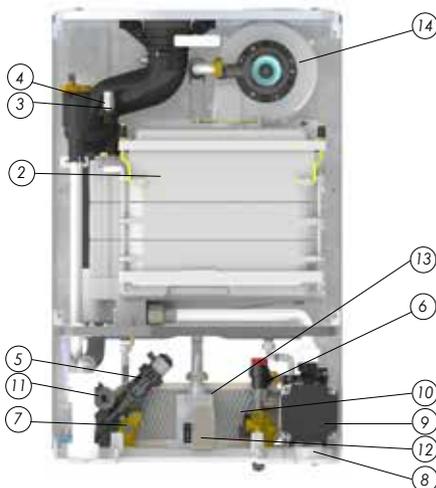
Compared to the previous version, we have updated the electronics and the user interface, making it more elegant and intuitive, while keeping the boiler's performance unchanged.

Pict. 1



## COMPONENTS

Fig. 2

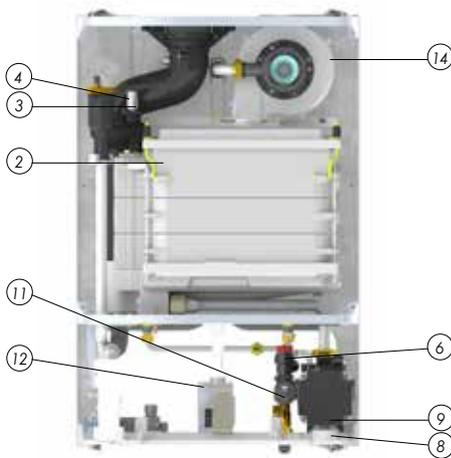


### THEA++ MR CR KONDENS

- 2) HEAT EXCHANGER
- 3) SAFETY SENSOR
- 4) CH PROBE
- 5) 3WAY GROUP
- 6) SAFETY VALVE
- 7) DHW IMMERSION PROBE
- 8) PRESSURE GAUGE
- 9) CIRCULATOR UNIT
- 10) DHW PRIORITY DEVICE
- 11) PRESSURE TRANSMITTERS
- 12) GAS VALVE
- 13) SECONDARY HEAT EXCHANGER
- 14) FAN

Pict. 3

## THEA\*\* MN CR KONDENS



- 2) MAIN HEAT EXCHANGER
- 3) SAFETY SENSOR
- 4) CH PROBE
- 5) -
- 6) SAFETY VALVE
- 7) -
- 8) PRESSURE GAUGE
- 9) CIRCULATOR UNIT
- 10) -
- 11) PRESSURE TRANSMITTER
- 12) GAS VALVE
- 13) -
- 14) FAN

## IGNITION

Turn on the boiler's electrical supply at the switch, which must be installed on the power supply line to the boiler. The LCD display (with blue backlight) will turn on immediately, showing the two-digit software version number loaded on the microprocessor for a few seconds, while an automatic check is performed on the conditions of the system and installed devices. When this stage has finished, if no faults are present, the last page of the MAIN MENU to be stored is displayed on the LCD (the one being displayed when the power was turned off).



1. ON/OFF BUTTON
2. SUMMER/WINTER BUTTON
3. RESET BUTTON
4. INFORMATION/CONFIGURATION BUTTON
5. DHW TEMPERATURE DECREASE
6. DHW TEMPERATURE INCREASE
7. CH TEMPERATURE DECREASE
8. CH TEMPERATURE INCREASE

## INTERFACE DESCRIPTION

The interface allowing all operating parameters to be selected and modified as well as their relative values to be displayed is extremely simple. It is composed of a large backlit LCD which displays all symbols necessary for communicating the boiler's status in a simple

and immediate way, together with a series of buttons which are matched unequivocally to a specific function indicated on the display. Consult the relevant sections to get explanations on the symbols and the possible operating modes.

## “STAND-BY” MAIN MENU

When the boiler is turned on, two operating modes are possible. These constitute the MAIN MENU from which it is possible to set any operating mode required or view the boiler status at any time. The characteristics of the possible options for each of the MAIN MENU pages are given below:

### Page 1 – STAND-BY (Pict. 5.1)

In this mode the device is powered on but all functions regarding the supply of domestic hot water or central heating are inactive. In this mode the central heating system pressure is displayed (in boilers with pressure transmitter) and the MAIN MENU can be entered by pressing button 1; to go back to the starting page (STAND-BY) press button 1 again (Pict. 5.2)

By pressing button 4, the **INFORMATION MENU** is accessed; to go back to the starting page, press button 4 again (Pict. 5.3)

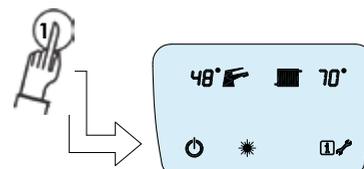
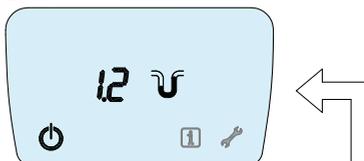
Consult the relevant chapters for menu exploring and menu functions: “FUNCTION”, “INSTALLER MENU”.

When in the STAND-BY mode, all fault indication modes remain active as do **the main maintenance functions for the diverter valve (when fitted) and the circulator unit together with the ANTI-FROST function.**

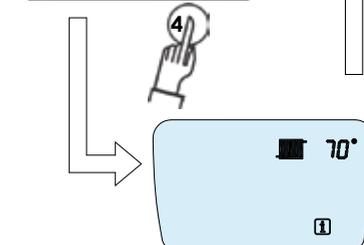
Pict. 5.1



Pict. 5.2



Pict. 5.3



**In standby/off mode the boiler is inactive but its electricity supply is still connected!**

## “OPERATION” MAIN MENU

The OPERATION page is the main page which is always displayed during normal operation of the boiler. Symbols regarding the following items are always displayed on this page:

### Boilers with domestic hot water production

- The selected season.
- The DHW temperature set.
- The temperature of the water in the CH circuit.
- The INFORMATION menu access symbol.
- The INSTALLER menu access symbol.
- The standby/off menu access symbol. (Pict. 6.1)

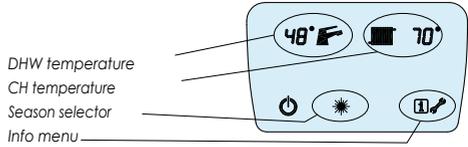
When the burner is lit and running in order to produce domestic hot water, the tap symbol flashes and the temperature of the supplied domestic hot water is displayed. During heating of the central heating circuit water, the radiator symbol flashes alternatively to the C.H. temperature: in both cases, the flame symbol is always displayed (Pict. 6.2). Based on whether devices such as the pressure sensor, external temperature sensor and OT timer thermostat are installed, the following are displayed, respectively: the pressure of the central heating circuit with relative symbol, the external sensor present symbol and the OT timer thermostat present symbol. (Pict. 6.3).

### Central-heating only boilers

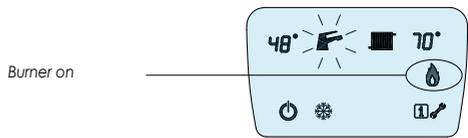
- The temperature of the water in the CH circuit.
- The INFORMATION menu access symbol.
- The INSTALLER menu access symbol.
- The standby/off menu access symbol. (Pict. 6.4)

When the burner is operating the flame signal is displayed with the radiator symbol flashing (Pict. 6.5). Based on whether devices such as the pressure sensor, external temperature sensor and OT timer thermostat are installed, the following are displayed respectively: the pressure of the central heating circuit with relative symbol and the OT timer thermostat present symbol. (Pict. 6.6).

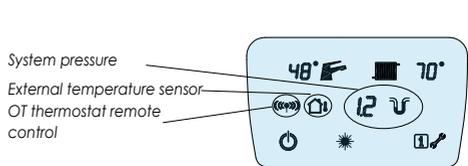
Pict. 6.1



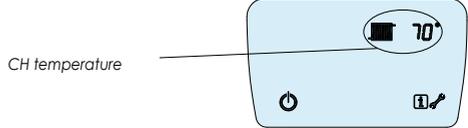
Pict. 6.2



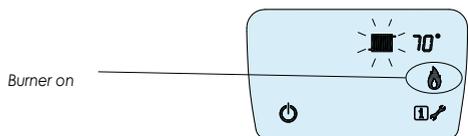
Pict. 6.3



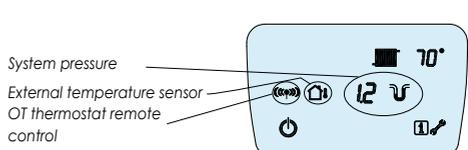
Pict. 6.4



Pict. 6.5



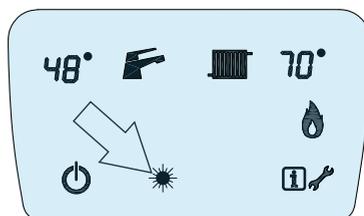
Pict. 6.6



## SEASON SELECTION

The boiler has two operating modes, which depend on the basic configuration, in response to the external temperature or the user requirements. These modes can be selected from the OPERATION page: *Pict. 7.1*

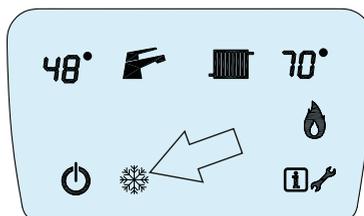
- **Boilers with domestic hot water production**  
**SUMMER** mode deactivates all central heating functions, maintaining only domestic hot water production. When the boiler is in this mode the SUN symbol is displayed on the function page (Pict. 7.1).



- **WINTER** mode, in which all central heating and domestic hot water production functions are active. When the boiler is in this mode the SNOWFLAKE symbol is displayed on the function page (Pict. 7.2).

- To select the desired mode, press button 2.

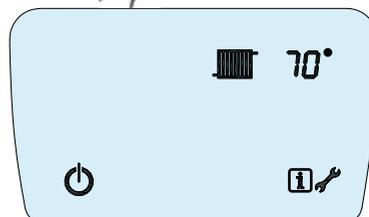
*Pict. 7.2*



### Central-heating only boilers

The season selection option is not available in central heating only boilers. The device can therefore be in standby (Pict. 7.1) or else operational, ready to supply the only SERVICE which it has been manufactured for (Pict. 7.3).

*Pict. 7.3*



## TEMPERATURE REGULATION

### Appliances for DHW production

It is possible to adjust DHW temperature and CH water temperature; the set temperature value is reached and maintained during requests, thus allowing the required comfort in both cases. The temperature supplied for both modes is shown continuously on the display near the relevant symbol when the functions are active: the radiator for CH, the tap for DHW.

During the waiting periods, the DHW temperature displayed is the set one.

### DHW temperature adjustment

Press one of the two buttons located above the tap symbol (5-6); the set and displayed temperature value starts flashing, then to increase the DHW temperature, press button (6). Each press will increase temperature by 1°C. To decrease DHW temperature press button (5). Each press will decrease temperature by 1°C.

Once the desired temperature value has been identified, do not press keys 5 and 6 anymore; the new heating fluid temperature value flashes for 5 seconds and is automatically stored and shown on the display. The DHW temperature values that can be set range from a minimum of 30°C to a maximum of 60°C.

### Setting CH temperature

Press one of the two buttons upon the tap symbol (7-8). The numbers indicating the temperature flash, then press the  button (8) to increase the temperature of CH. Each time this button is pressed, an increase by 1°C is obtained. In order to decrease the CH temperature, press the  button (7). Each time this button is pressed, a decrease by 1°C is obtained.

Once the needed temperature value is set, do not press the (7-8) buttons anymore. The new CH temperature value will flash for 5 seconds, then it will be stored and displayed.

The CH temperature values depend on the type of installation.

For boilers used for high temperature systems, the temperature range is 50°C – 80°C, while for the ones used for low temperature systems, the temperature range is 27°C – 55°C.

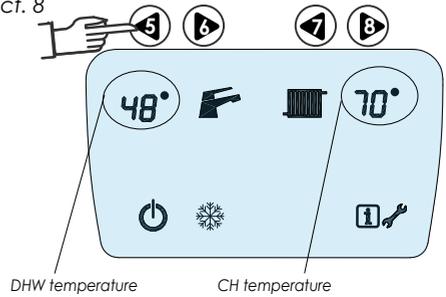
### Setting heating temperature

If the "Summer" mode is active (the sun symbol is displayed), the device for modifying the CH temperature is disabled.

### Boilers for central heating only

Only the temperature value for the single option which can be viewed on the display can be adjusted in central heating only boilers. Setting the central heating temperature is performed as previously described.

Pict. 8



**THE USE OF TOO HIGH DHW TEMPERATURES CAUSES THE PREMATURE WEAR OF THE DHW HEAT EXCHANGER.**

**ASK YOUR AREA INSTALLER FOR INFORMATION ON THE TYPE OF SYSTEM CONNECTED AND RESPECTIVE ADJUSTMENTS**

## INFORMATION MENU

Accessing the INFORMATION MENU allows various important parameters regarding the boiler adjustments and status to be viewed, allowing the state determining its operation to be known at any time. The displayed parameters cannot be modified.

To access the menu pages, press BUTTON 4. The menu can be accessed both when the boiler is in stand-by and when it is operating.

### Selecting the menu pages

In order to visualize the values of all the INFORMATION MENU parameters, after activating the initial page which

immediately displays the central heating temperature, press the button  (6) to scroll forward the pages and press the button  (5) to scroll backward the pages.

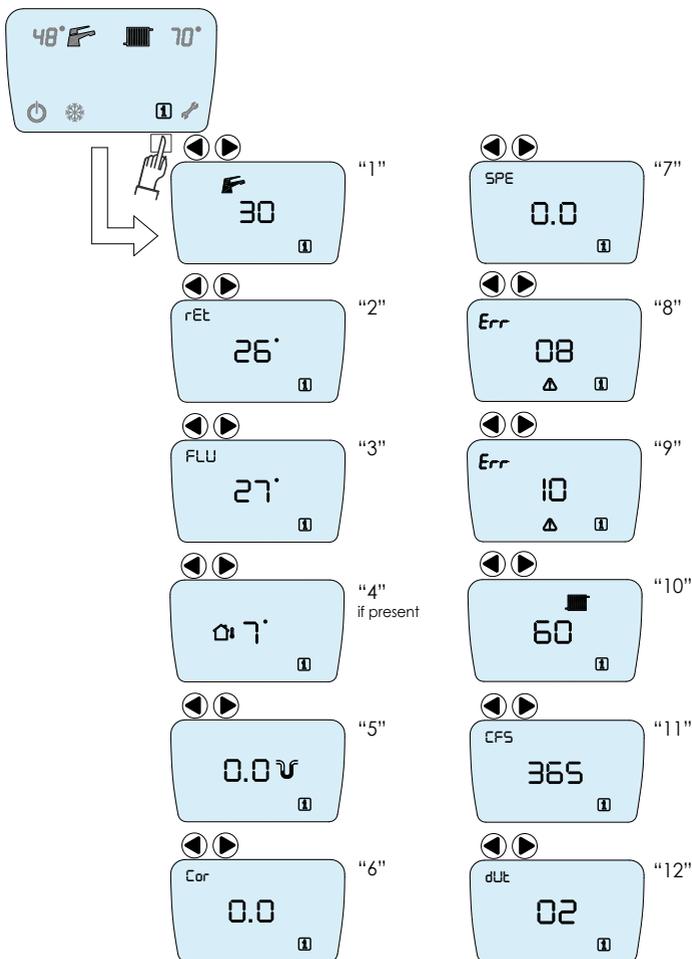
The exit from the menu pages can be automatic after 60 seconds of inactivity, or it can be activated by pressing any key; once you have chosen to end the display, this will return to the menu page active when accessing the INFORMATION MENU.





**\* REQUEST INFORMATION ON CONNECTED DEVICES FROM AREA AUTHORISED INSTALLER**

Pict. 9



Information menu list	
1	DHW temperature
2	Return sensor temperature
3	Flue gas probe temperature
4	External sensor temperature (if present)
5	CH circuit pressure
6	Ionization current
7	Fan speed
8	Last fault code
9	Second to last fault code
10	CH temperature
11	Days to ordinary maintenance expiration
12	Circulator Feedback

## OPERATION WITH ROOM THERMOSTAT

Operation with room thermostat  
In compliance with current legislation on energy saving, it is **MANDATORY** to connect the appliance to a room thermostat for optimal regulation and maintenance of the room temperature



**REQUEST INFORMATION ON INSTALLATION OF THE EXTERNAL SENSOR AND OPTIMAL REGULATION OF THE BOILER FROM YOUR AREA AUTHORISED INSTALLER.**

## OPERATION WITH OUTDOOR PROBE

The boiler can be connected to an **OUTDOOR** probe. In this mode, the boiler is able to adjust the CH water temperature automatically, according to the temperature detected by the probe positioned appropriately outside the building. The regulation takes place automatically by obtaining the CH water temperatures from a special preloaded mathematical function; by modifying appropriate parameters, different "climatic curves" can be selected, making it possible to optimize the appliance for a specific climatic zone or seasonal period. However, it is possible to make a personalized adjustment of the CH water temperature; by increasing or decreasing the value of the CH temperature,

an adaptation of the same (compensated temperature) is obtained according to the selected climatic curve.



**REQUEST INFORMATION ON INSTALLATION OF THE EXTERNAL SENSOR AND OPTIMAL REGULATION OF THE BOILER FROM YOUR AREA AUTHORISED INSTALLER.**

## OPERATION WITH CRONOTHERMOSTAT ECO CRONO OPEN-THERM

The "ECO CRONO" programmable chronothermostat Open-Therm (O.T.) can be used for optimal and even more economical management of temperatures in domestic environments. The "ECO CRONO" allows all main boiler functions to be managed remotely, allowing it to be fully managed from a different room to that where the boiler is installed. "ECO CRONO" can also be used to schedule daily and weekly room temperatures and manage reduced demand periods (holidays, anti-frost and

maintenance modes).  
To connect ECO CRONO O.T. use the cable labeled "TA" for which the appliance is already set up (the same set up for the room thermostat).

Refer to the instructions for correct installation and use of the "ECO CRONO" thermostat.

**To activate the O.T. communication it is necessary to select the corresponding parameter P13.**



**REQUEST INFORMATION ON INSTALLATION OF THE EXTERNAL SENSOR AND OPTIMAL REGULATION OF THE BOILER FROM YOUR AREA AUTHORISED INSTALLER.**

## SPECIAL FUNCTIONS

- **Heating system Anti-frost function (all models)**

The anti-frost function is always active and prevents the heating system water from freezing.

If the heating circuit water temperature probe detects a too low water temperature, the circulating pump starts and the burner ignites at the minimum power.

The function remains active until the set temperature is reached, in order to prevent the heating system water from freezing.

- **Instant DHW exchanger pre-heating**

This function can be activated exclusively on models which are prepared and configured to instantly obtain domestic hot water; this function allows to keep the DHW exchanger at a temperature which is close to the set one. The activation of this function may improve the boiler's performance on the DHW request.

- **Comfort zone**

The boiler may be prepared in a way to heat several zones in different ways.

This, for instance, allows to easily divide a single housing unit into different comfort sectors



**ALWAYS LEAVE THE BOILER POWERED ON AND THE SHUT-OFF VALVES OPEN, IF THE SYSTEM IS EXPECTED TO BE SUBJECT TO VERY COLD TEMPERATURES.**

**THIS FUNCTION DOES NOT GRANT TO PREVENT THE HEATING SYSTEM FROM FREEZING, SINCE IT DEPENDS ON THE BOILER CONTINUOUS ELECTRIC POWER AND GAS SUPPLY.**

**FOR INFORMATION ABOUT CONFIGURING THE BOILER TO PROTECT IT FROM FREEZING, ASK THE AUTHORIZED AREA INSTALLER.**



**FOR INFORMATION ABOUT CONFIGURING THE DHW TEMPERATURE, ASK THE AUTHORIZED AREA INSTALLER.**



**ACTIVATING THIS FUNCTION MAY CAUSE THE EARLY DETERIORATION OF THE DHW EXCHANGER AND A HIGHER GAS CONSUMPTION.**

**FOR INFORMATION ABOUT THE CORRECT FUNCTION CONFIGURATION, ASK THE AUTHORIZED AREA INSTALLER .**

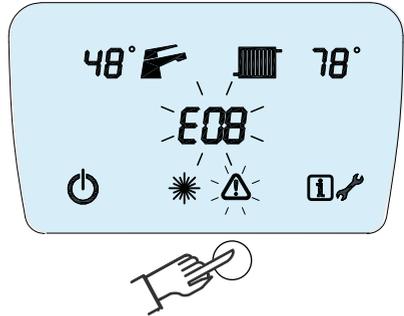
## FAULTS

All functions supported by the boiler are managed by a microprocessor-based system which, aside from allowing the system to run perfectly in order to maintain the greatest level of comfort possible, constantly monitors the functional parameters, ensuring they fall within the necessary safety interval by a wide margin, and therefore that all devices present are functioning perfectly.

Whenever the malfunction of any component or conditions which could compromise safe operation of the system are detected, the microprocessor system places the device into a limited operation mode or even completely prevents it from operating. The microprocessor system is able to detect and issue warnings for the main fault conditions to allow the system to be brought back to normal conditions as soon as possible. Fault warnings are given on the LCD display. The malfunction is detected and an intermittent warning displayed immediately, consisting of a number preceded by the error symbol E and by the relevant fault symbol (Pict. 10). Faults are displayed on any screen of the main menu.

Conditions causing transitory faults are possible. Many of these are recognized and cause a temporary block which is automatically reset once the condition causing the fault has stopped. Some of these provide for the possibility to attempt to restore operation manually.

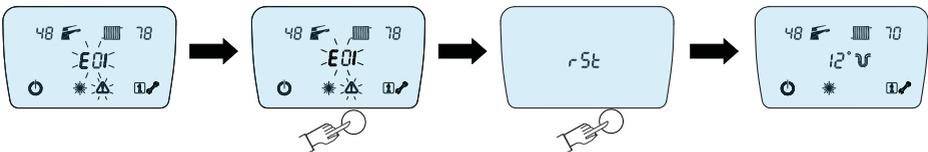
Pict. 10



### Manual error reset, recovery attempt

To manually reset the system following a fault condition, press the button 3: the RST symbol (reset) will be displayed on the LCD display. Press button 3 again (Pict. 11). The microprocessor will attempt to recover the system by resetting all the conditions presumed to have caused the fault. If the operation is successful the boiler will return to normal operation; if not, the error code causing the malfunction will be displayed again.

Pict. 11



**IF A FAULT IS NOT SOLVED AFTER 2 MANUAL RESET ATTEMPTS THEN THE AUTHORISED TECHNICAL ASSISTANCE CENTRE MUST BE CALLED.  
TAMPERING WITH ANY DEVICE MAY BE DANGEROUS AND ANNULS EVERY WARRANTY CONDITIONS.**

## FAULTS CODE TABLE

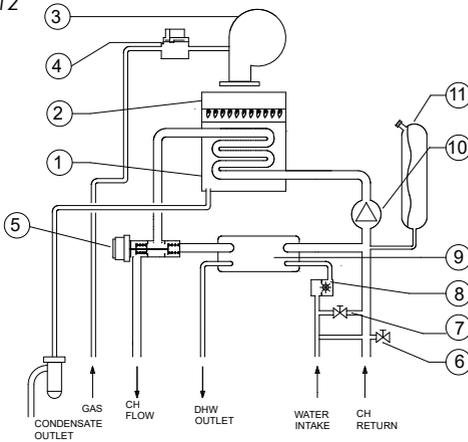
Codice	Causa possibile	Compartamento	Azioni possibili
E01	Ignition failed	Boiler locked	Check gas presence Check gas line pressure Check ignition/detection electrodes Check electronic cable Check igniter
E03	Heating system temperature sensor fault	Boiler locked	Replace DHW sensor
E04	Domestic hot water system temperature sensor fault	DHW supplied in provisional mode Heating functions	Replace CH sensor
E06	High temperature detected by heating system sensor	Device in stand-by Normal DHW supply	Wait for automatic unlocking Check pressure to CH system
E08	Central heating system pressure too low	Boiler locked	Check pressure to CH system
E09	Over-temperature safety probe intervention	Boiler locked	Perform reset maneuver Contact technical support
E10	Central heating system pressure too HIGH (> 2.7 bar)	Boiler locked	Check pump functioning
E11	Pressure transmitter failure	Boiler locked	Check integrity of connection Replace pressure transmitter
E12	Remote control reset used-up	Boiler locked	Reset system Switch off power
E13	SYSTEM error	Boiler locked	Reset system Switch off power Replace electronic board
E17	Exhaust probe damaged or Exhaust overtemperature	Boiler locked	Reset the system or replace the probe
E23*	Fault on external temperature sensor	Resumption of operation without external sensor	Check position of external probe Check communication line Replace external sensor
E24	Return probe damaged	The boiler continues to operate with circulator always at maximum power	Replace the probe
E25	Central heating system temperature too low freezing risk	Boiler locked	If possible reset normal functioning conditions
E28*	Water cylinder / water heater probe failure	Boiler locked	Replace probe
E31	Faulty safety probe	Boiler locked	Replace the probe
E60	Circulator PWM error	Circulator always at maximum power	Check wiring Replace the circulator
E61	Temporary circulator failure	The circulator works in emergency mode	Wait for normal conditions to be restored or replace the circulator
E62	Circulator failure	Boiler locked	Replace circulator
E75	Failure communication between electronic board and display board	Boiler locked	Reset system Switch off power Replace electronic board
E88	Failure OPEN THERM COMMUNICATION	Boiler locked	Check connection between boiler and Open Therm
E99	Parameter configuration error	Boiler locked	Check and reconfigure the parameters

\*can be displayed only if the relative devices are installed

## OPERATION DIAGRAM

COMBINATION: DOMESTIC HOT WATER + CENTRAL HEATING

Pict. 12

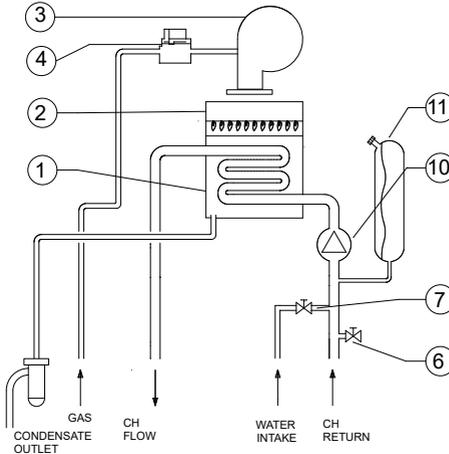


- 1) Primary heat exchanger
- 2) Burner
- 3) Fan
- 4) Gas valve
- 5) Three-way valve
- 6) Safety valve
- 7) Filling loop cock
- 8) Hot water priority turbine
- 9) Secondary heat exchanger
- 10) Circulator unit
- 11) Expansion tank

## OPERATION DIAGRAM

CENTRAL HEATING ONLY

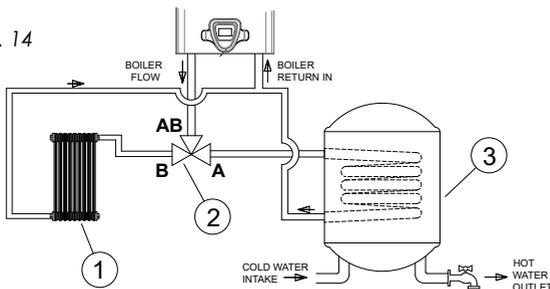
Pict. 13



- 1) Primary heat exchanger
- 2) Burner
- 3) Fan
- 4) Gas valve
- 5) -
- 6) Safety valve
- 7) Filling loop cock
- 8) -
- 9) -
- 10) Circulator unit
- 11) Expansion tank

## THREE-WAY BOILER OPERATION DIAGRAM

Pict. 14

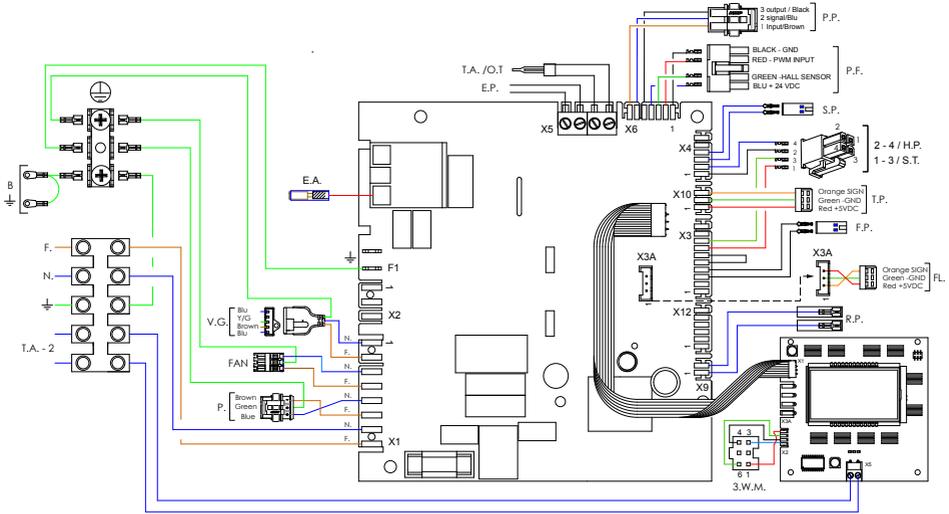


- 1) Central heating circuit
- 2) Three-way valve
- 3) Boiler

# ELECTRICAL WIRING DIAGRAM

COMBINATION: DOMESTIC HOT WATER + CENTRAL HEATING

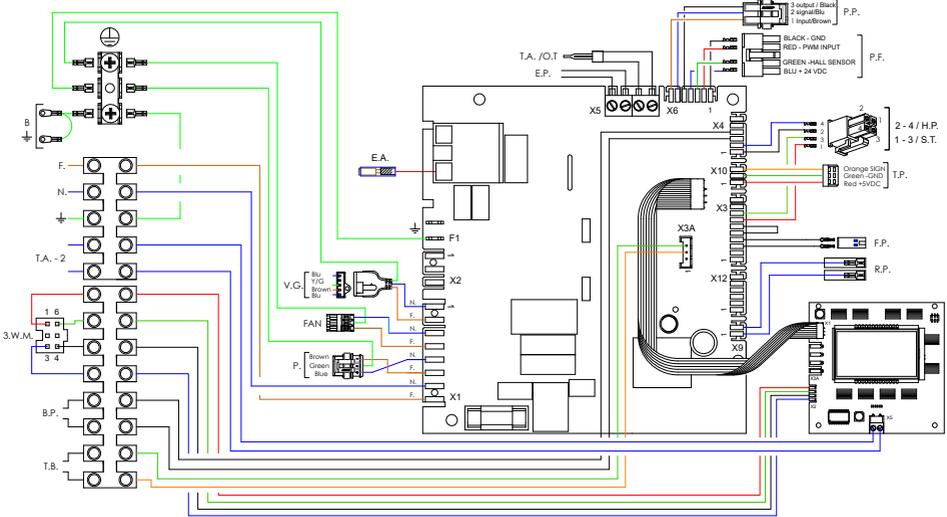
Pict. 15



# ELECTRICAL WIRING DIAGRAM

CENTRAL HEATING ONLY

Pict. 16

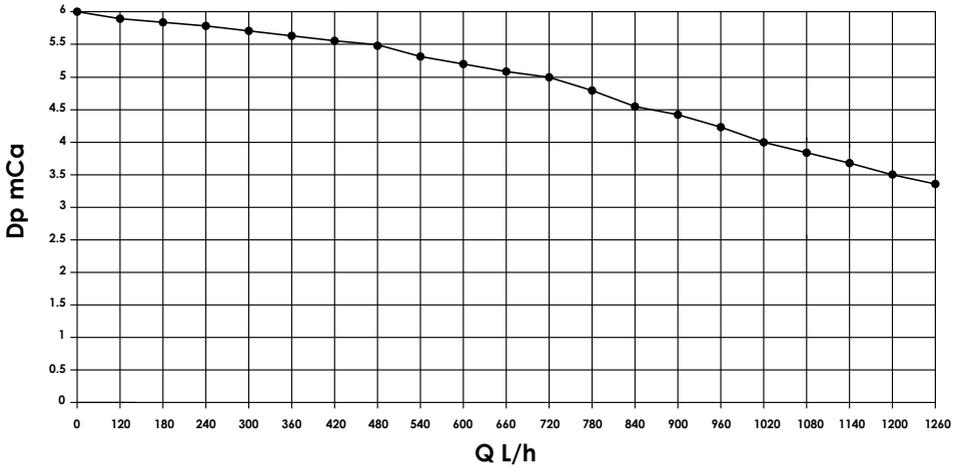


List of connections TheA++ MR/MN CR/CN

3.W.M.	3way Valve	FAN	Fan	N.	Neutral	S.P.	DHW Probe	T.B.	Storage Tank Thermostat
B.	Boiler Earth	FL.	Flow Switch	P.	Circulating Pump	S.T.	Safety Probe	V.G.	Gas Valve
E.A.	Ignition Electrode	F.P.	Exhaust Probe	P.F.	Fan PWM	T.P.	Pressure Transmitter	B.P.	Water Heater Probe
E.P.	Outdoor Probe	H.P.	CH Probe	P.P.	Pump PWM	T.A./O.T.	Room Thermostat/ Open Therm		
F.	Phase	M.V.G.	Gas Valve Modulator	R.P.	Return Probe	T.A. - 2	Zone 2 Room Thermostat		

## GRAPHS FOR THE HEAD AVAILABLE TO THE SYSTEM

Pict. 17



## INSTALLATION

### Use:

The boiler has been constructed according to current technical standards and the most stringent safety rules. Despite this, improper use may endanger persons and property as well as damaging the boiler itself.

**This boiler has been designed as a thermal generator for closed-loop central heating systems and for the production of domestic hot water.**

**This boiler is only for heating water to a temperature below that of boiling point at atmospheric temperature.**

**Any use different from those outlined herein is to be considered improper. The manufacturer/supplier declines any responsibility for damage or injury caused by improper use.**

Use of the boiler according to its design also means respecting the instructions given in the operation and maintenance manuals and observing the general inspection and maintenance conditions.

### General requirements

• Installation must only be performed by qualified and licensed personnel. They also assume responsibility for correct installation, adjustment and commissioning.

Adjustment, maintenance and repair of the boiler must only be performed by qualified and authorised personnel.

• Do not install the boiler in environments containing dust or strong vapours.

The presence of substances such as fluorine, chlorine, sulphur etc. (e.g. vapours from sprays, solvents or detergents, paints, adhesives or fuels) may cause the boiler's components or combustion gas evacuation system to corrode and become damaged.

Avoid installing the boiler directly in commercial/industrial premises (e.g. hair salons, painting/carpentry workshops, cleaning companies etc.).

• The boiler must be installed in ventilated premises.

• Install the device respecting the minimum distances and spaces in Pict. 18 (also when installing inside an enclosure).

• Mount the boiler on a solid wall.

• Ensure that there are no depressions which could cause the boiler to stand out from the wall.

• Ensure you do not drill into tracked cables or piping when drilling.

Pict. 18



## FASTENING THE BOILER TO THE WALL

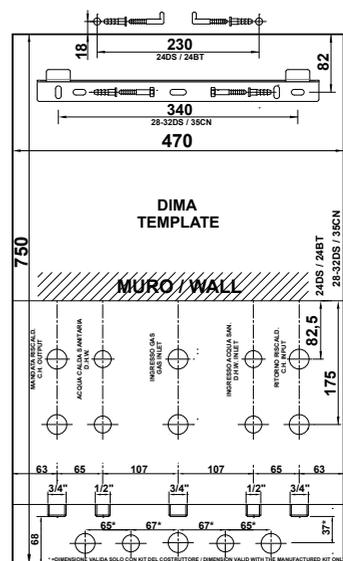
Attach the cardboard template giving the connection and fastening schemes to the wall, paying attention to the boiler dimensions and necessary clearances. (Pict. 19)

- Use a suitable bit to drill the holes indicated by the two wall plug symbols on the template.
- Remove the template; insert the two wall plugs in the previously prepared holes, then hang the boiler, inserting the hooks of the plugs in the specific holes.



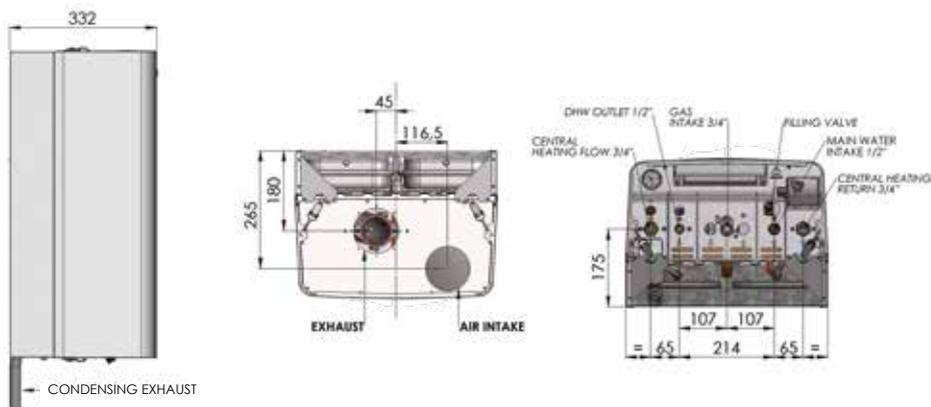
**Fasten the template so that its axis coincides perfectly with that of the boiler.**

Pict. 19



## LAYOUT OF CONNECTIONS

Pict. 20



## PLUMBING THE BOILER IN

Connect the water and central heating pipes to the boiler, respecting the positions and distances indicated (Pict. 20); take particular care when connecting pipes to ensure they are not placed under pressure in order to minimise the danger of future leaks. Use appropriate tools and procedures for tightening.



• THE MANUFACTURER ASSUMES NO RESPONSIBILITY FOR DAMAGE CAUSED TO PERSONS OR PROPERTY DUE TO OPERATION OF THE SAFETY VALVE DO NOT USE THE PLUMBING PIPEWORK CONNECTIONS AS EARTH POINTS FOR ELECTRICAL EQUIPMENT.



Flush thoroughly before connecting the pipes to ensure that any impurities present in the piping and radiators are completely removed.



Connect the safety valve outlet so that its operation would not cause any damage to persons or property

- Use piping of not less than 1/2" diameter
- Ensure that the line is always at atmospheric pressure by using suitable traps (do not connect pipes directly to the valve outlet)
- Connect the safety valve outlet line to the household grey water drainage system
- Apply suitable protection to the drainage line – the water carried in it may be at high temperatures

## WARNING!!!

PROTECT THE PRIMARY HEAT EXCHANGER BY THE USE OF THE CORROSION INHIBITOR FLUID EXCLUSIVELY SUPPLIED BY THE MANUFACTURER. OTHERWISE THE HEAT EXCHANGER WARRANTY SHALL DECAY.

- Idraterm p.100 In 1% sol. For high temperature systems
- Idraterm p.140 In 1% sol. For low temperature systems

## CONNECTING FILLING TAP FOR CENTRAL HEATING ONLY BOILERS

In order to fill the system, it is sufficient to connect the supplied ball valve to the 1/2" DHW intake and connect this to a water pipe.



Pict. 21

Filling ball valve

## FILLING THE SYSTEM

When all of the boiler connections have been plumbed in, it is possible to proceed to fill the central heating circuit. Perform the operation slowly to help all air bleed out of the system. When filling, check all the internal and external parts of the system to make sure they are perfectly tight.

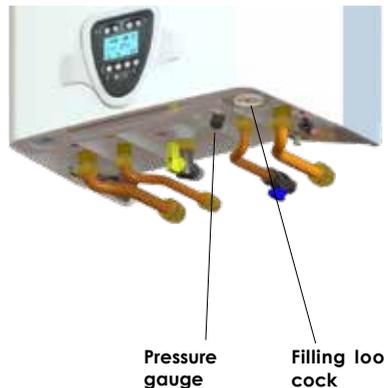
- Open the bleed valves on the radiators.
- Gradually open the filling loop cock Pict. 22, ensuring that any automatic air bleed valves installed on the system are working correctly.
- Close the radiator bleed valves as soon as water starts to come out.
- Check on the boiler pressure gauge that a pressure of between 1.3 and 1.6 bar has been reached.
- Close the filling loop.



Pict. 22

**Perform the filling and topping up of the system with the boiler completely off and all parts at ambient temperature.**

**Always close the filling loop cock once you have finished the operation.**



## CONNECTING THE CONDENSATE LINE

The TheA++ boiler is already fitted with a condensate trap to avoid the combustion products entering the environment it is installed in.

The boiler's connection to the condensate line must be inspectable and must drain into the household waste-water drainage system with a minimum fall specified by applicable regulations. There must be no points where standing water can form and no narrowing which could impede the flow.

An open type connection must be used

to ensure that any formation of ice in the drainage system does not impede the condensate flow. Pict. 23 shows how to connect the trap to the household drainage system.

**The installer shall be responsible for installing a condensate neutralisation system if necessary.**



The installer shall be responsible for installing a condensate neutralisation system if necessary.



A check and possible cleaning of the siphon and the condensation drainage system is recommended at least once a year.

Fig. 23



## CONNECTION THE MAINS GAS SUPPLY

Before connecting the boiler to the mains gas, check that it is designed to function with the available type of gas. Thoroughly flush all the gas pipes to remove any residues which could compromise correct operation of the boiler.

Pict. 24

The gas supply must be connected to the boiler intake (Pict. 24), following all applicable regulations. Rigid metal piping or continuous-wall stainless-steel hose must be used and a shut-off valve must be connected before the boiler.

Check that the flow rate from the line from the gas meter is sufficient to support the simultaneous use of all equipment connected to it. Check that there is no significant drop in pressure along the distribution line from the gas meter; pipes of sufficient diameter must therefore be used to satisfy this requirement.



Mains gas intake



**Check that all devices necessary for creating and limiting the maximum permissible pressure of the relative gas are installed in the system before opening the boiler's gas connection. Do not use the gas supply pipework connections as earth points for electrical equipment.**



**Always install a gas shut-off valve before the device. This must have a YELLOW valve handle and must be placed in a position which allows full access to it.**

## CONNECTION TO THE MAINS ELECTRICAL SYSTEM

The safety of the appliance is also achieved when it is correctly connected to an electrical distribution system carried out in accordance with current regulations; and in particular when it is connected to an effective earthing system.

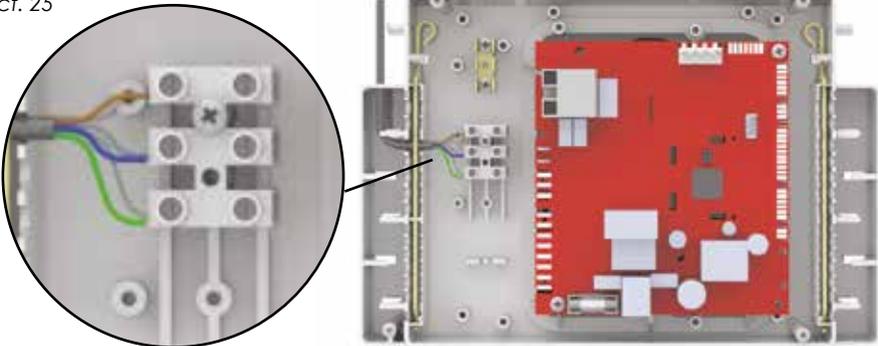
The appliance is equipped with a pre-wired three-pole cable for unplugged connection to the power line. The connection to the mains must be made with a fixed connection and equipped with a bipolar switch whose contacts have an opening of at least 3 mm. It is important to respect the polarity (LINE: brown cable / NEUTRAL: blue cable / EARTH: yellow-green cable) in the connections to the power line. When installing or replacing the power cable, the earth conductor must be left 2 cm longer than the others. In case it is necessary to completely replace the pre-wired power cable, it is necessary to access the electronic board compartment:

- disconnect the appliance's power supply using the upstream switch.

- remove the lower cover by unscrewing the four locking screws and turn the instrument panel to the open position.
- remove the rear cover of the box by unscrewing the 4 fixing screws.
- locate the terminal board on the side of the electronic board (Pict. 25) and disconnect the line, neutral and ground poles of the pre-wired cable; remove the cable.
- wire the respective poles of the new conductor respecting the positions.
- close the rear cover, locking it with the relevant screws.
- return the panel to its working position and reposition the lower protection.

**For connecting or replacing conductors, use H05VV -F, H05VVH2-F CEI EN 60228 or better rated cable.**

Pict. 25



**A qualified electrician should check the suitability of the protective earth system. The manufacturer is not responsible for any damage caused by the lack of a suitable system earth. Check that the electrical connection is sufficient to satisfy the boiler's maximum power consumption, indicated on the boiler plate.**



**Extensions, adaptors or gang sockets must not be used when connecting the device to the mains electrical system.**

## COMBUSTION GAS EVACUATION SYSTEM: COMPATIBLE APPLICATIONS

The boiler is a type C room-sealed fan-assisted device; the air intake and flue must be connected to a combustion gas evacuation/air intake system. The types of permissible air intake and combustion gas evacuation (flue) systems are listed on the technical data plate and summarised below:

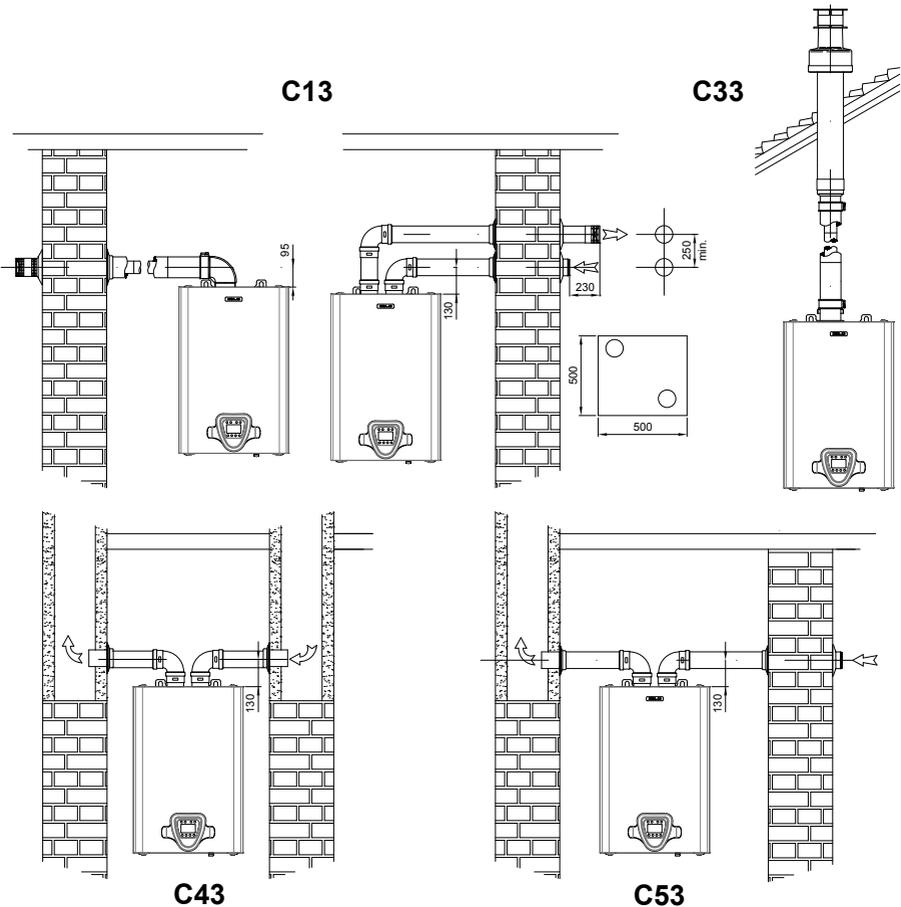
- **C13** concentric wall flue. The pipes may also be split, but the outlets must be exposed to similar wind conditions.
- **C33** concentric vertical flue (with the same specifications as type C13).

- **C43** combustion gas evacuation and air intake in separate common flues, but which are exposed to similar wind conditions.

- **C53** separate horizontal or vertical flues, in any case in areas exposed to different pressures.

- **C63** combustion gas evacuation and air intake performed with pipes sold and certified separately.

Pict. 26



## COMBUSTION GAS EVACUATION SYSTEM: INSTALLATION

The boiler, based on its UNI 7129 classification, can be connected to **COAXIAL** and **SPLIT** intake and flue evacuation systems.

The "coaxial" system is composed of a single pipe containing both the flue and intake pipes on the same axis. The system provides for all components necessary for completing the line, including changes of direction, straight

sections of various lengths, connections to the boiler and outside terminals as well as all necessary seals. Below is a list of compatible components with their relative characteristics:

### COAXIAL SYSTEM 60/100 mm diameter

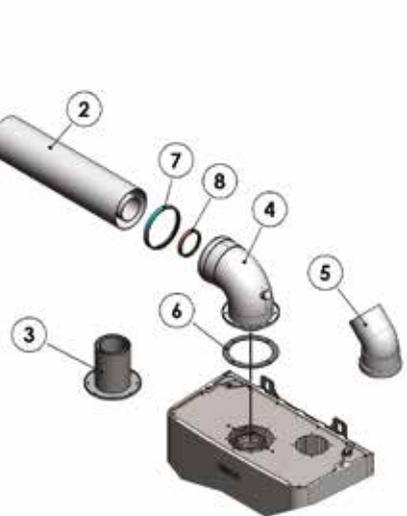
No.	Description	Pressure drop (Pa)	Equivalent length m
1	Terminal L.990	25	2.8
2	Extension L.1000 M-F	6	1
3	Vertical flanged coupling M	15	2.2
4	90° bend M-F	7	1.3
5	Bend 45°	6	1
6	Neoprene gasket ø 128		
7	Intake gasket ø 100		
8	Flue evacuation gasket ø 60		

Pict. 28

The large pressure drops which characterise this system limit its length. The maximum possible length therefore depends on the components used to create the line and can be determined by adding the "Equivalent lengths" for each individual component used (excluding the initial 90° elbow) listed in the "COAXIAL SYSTEM" table.

### IT IS ESSENTIAL NOT TO EXCEED THE MAXIMUM PERMISSIBLE LENGTH!

**Consult the maximum length values listed in the "FLUE TECHNICAL CHARACTERISTICS SUMMARY" on page 23 for COAXIAL systems relative to the type of device installed.**



The "split" flue system is composed of one pipe for combustion gas evacuation connected to the fan outlet and one for the air intake connected to the hole on the roof of the sealed chamber. The system provides for all components necessary for completing the line, including changes of direction, straight

sections of various lengths, connections to the boiler and outside terminals as well as all necessary seals, for both pipes. Below is a list of compatible components with their relative characteristics:

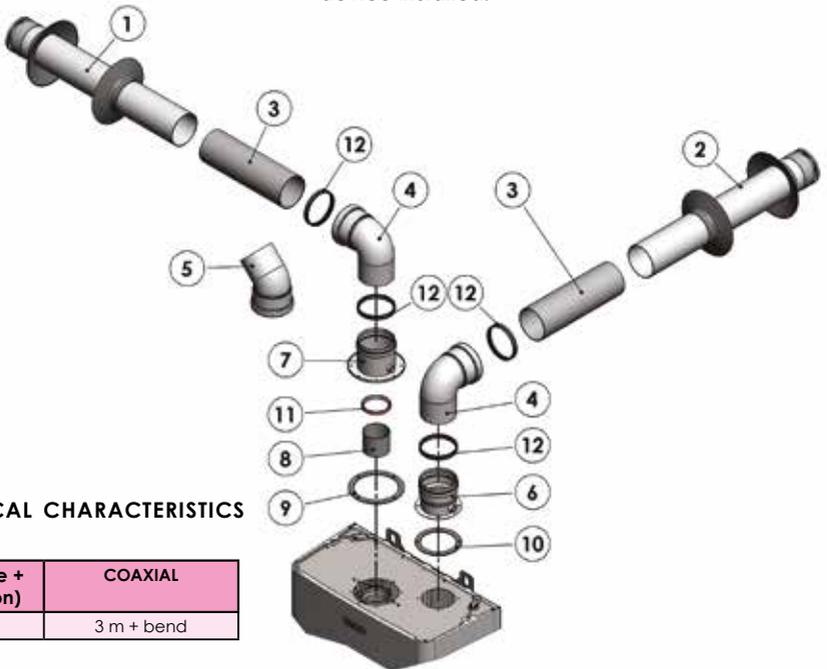
**SPLIT SYSTEM 80 mm diameter:**

No.	Description	Pressure drop (Pa)	Equivalent length mt
1	Intake terminal L.950	15	0.8
2	Flue evacuation terminal L.990	3.5	1.5
3	Extension M-F L.1000	3	1
4	90° bend M-F	14	3
5	45° bend M-F	7	1.3
6	Intake adaptor $\varnothing$ 80		
7	Flue evacuation adaptor $\varnothing$ 80		
8	L50 $\varnothing$ 60 flue evacuation connection		
9	Neoprene gasket $\varnothing$ 128		
10	Neoprene gasket $\varnothing$ 100		
11	Collar gasket $\varnothing$ 60		
12	Gasket $\varnothing$ 80		

The maximum possible length therefore depends on the components used to create the line and can be determined by adding the "Equivalent lengths" for each individual component for both the intake and evacuation lines listed in the "SPLIT SYSTEM" table.

**IT IS ESSENTIAL NOT TO EXCEED THE MAXIMUM PERMISSIBLE PRESSURE DROP FOR THE DUCTS (air intake + flue evacuation)!**  
**Consult the maximum PRESSURE DROP values listed in the "FLUE TECHNICAL CHARACTERISTICS SUMMARY" for SPLIT systems relative to the power and type of device installed.**

Pict. 29



**FLUE TECHNICAL CHARACTERISTICS SUMMARY**

SPLIT (air intake + flue evacuation)	COAXIAL
dp ≤ 160 PA	3 m + bend

## AIR INTAKE AND COMBUSTION GAS EVACUATION SYSTEM: IMPORTANT INFORMATION



**FOLLOW APPLICABLE LEGISLATION AND REGULATIONS TO THE LETTER.**

**INSTALL AIR INTAKE AND FLUE EVACUATION SYSTEMS CONFORMING TO THE SPECIFICATIONS GIVEN ON THE TECHNICAL DATA PLATE AND OBSERVE ANY LIMITATIONS ARISING FROM APPLICABLE LEGISLATION AND REGULATIONS TO THE LETTER.**

**ONLY USE APPROVED COMPONENTS FOR AIR INTAKE AND COMBUSTION GAS EVACUATION SYSTEMS WHICH ARE OF THE CORRECT DIMENSIONS AND PURPOSELY DESIGNED AND MANUFACTURED FOR THE PURPOSE.**

**FOLLOW INSTALLATION INSTRUCTIONS TO THE LETTER.**

**INSULATE ANY FLUE SECTIONS WHICH WILL BE EXPOSED TO LOW TEMPERATURES.**

**WHENEVER NECESSARY, PLACE APPROPRIATE CONDENSATE TRAPS ON THE FLUE EVACUATION LINE:**

**Ensure the following before commissioning the boiler:**

- **THAT THE FLUE EVACUATION AND AIR INTAKE LINES ARE PERFECTLY SEALED.**
- **THAT THEY ARE CORRECTLY POSITIONED AND FASTENED.**
- **THAT THERE ARE NO MECHANICAL, THERMAL OR CHEMICAL STRESSES ON THE LINES WHICH COULD EVEN MOMENTARILY COMPROMISE THEIR INTEGRITY.**

**INSTALL SYSTEMS TO ABSORB ANY THERMAL EXPANSION WHEN THE SECTIONS OF FLUE DUCTING ARE LONGER THAN THE MINIMUM SPECIFIED LENGTHS.**

## All maintenance operations MUST BE PERFORMED BY QUALIFIED PERSONNEL.

These operations must also be performed in full compliance with all applicable legislation and regulations. The boiler should

be inspected by a qualified technician at the end of every heating season (winter) and whenever else it is considered necessary in order to keep it in optimum operating condition.

## PRELIMINARY MAINTENANCE OPERATIONS

- Declaration of conformity check.
- Check the log book.
- Check that the INSTRUCTION MANUAL is present.
- Visual check of the installation (in conformity with applicable regulations).
- Visual check of the flue system.
- Check that combustion gases are being properly evacuated.

## GENERAL MAINTENANCE OPERATIONS

- Clean any deposits on the heat-exchanger fins.
- Remove any oxidation on the burner.
- Check that the boiler ignites, turns off and functions correctly.
- Visual check for leaks in gas and water pipes and unions.
- Check that the safety devices are operational.
- Check that the boiler's control and regulation devices are functioning correctly.
- Check that the combustion gas evacuation device and/or duct is in good condition and operating correctly.
- Perform a visual check that the safety valve outlet is not blocked.
- Check hydraulic system static pressure.



**If any components of the boiler require replacement, original spare parts supplied by the manufacturer must be used. Use of other components could compromise correct operation of the device. The manufacturer declines any responsibility for consequences linked to the use of non-original spare parts.**

**At the end of the maintenance procedure a report must be prepared and left with the owner. This must contain the findings of the inspection, any work performed and any recommendations.**

## SERVICE FUNCTION

This function allows the boiler to be run at minimum and maximum power conditions during maintenance and adjustment operations, independently of the room thermostat signals.

**The boiler installation must be completed before activating the "SERVICE" function. Before activating this function check that all conditions specified in the "Commissioning" chapter have been satisfied.**

**Activating the function:**

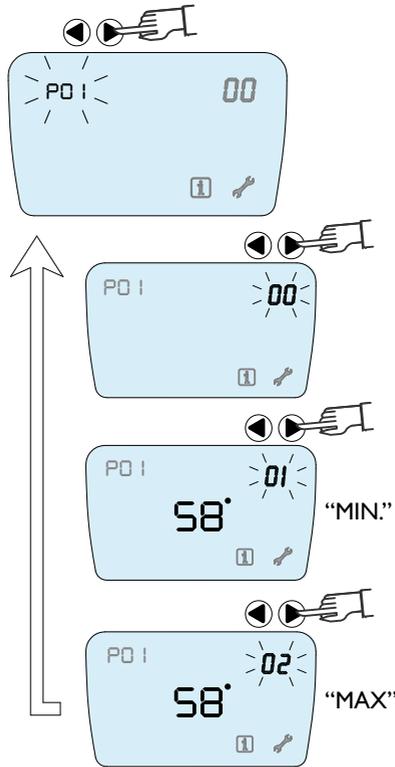
**To activate the function it is necessary to access the installer MENU and activate the**

**relative modes from the dedicated page. In order to access the INSTALLER MENU, refer to the corresponding chapter (page 32).**

Enter the "PARAMETER MENU" and select page "P6" by using the buttons 6. Press one of the two buttons upon the digits displayed next to the relevant page. The value will begin to flash. Press button 8 to increase the displayed value and button 7 to decrease it.

P01	00 = deactivated	01 = minimum power	02 = maximum power
-----	------------------	--------------------	--------------------

Pict. 30



**IF ANY COMPONENTS OF THE BOILER REQUIRE REPLACEMENT, ORIGINAL SPARE PARTS SUPPLIED BY THE MANUFACTURER MUST BE USED. USE OF OTHER COMPONENTS COULD COMPROMISE CORRECT OPERATION OF THE DEVICE. THE MANUFACTURER DECLINES ANY RESPONSIBILITY FOR CONSEQUENCES LINKED TO THE USE OF NON-ORIGINAL SPARE PARTS.**

**AT THE END OF THE MAINTENANCE PROCEDURE A REPORT MUST BE PREPARED AND LEFT WITH THE OWNER. THIS MUST CONTAIN THE FINDINGS OF THE INSPECTION, ANY WORK PERFORMED AND ANY RECOMMENDATIONS.**

**If the function remains activated for long periods of time an increase in pressure may occur in correspondence with the system's terminals.**

**All safety measures are active when in SERVICE mode, in particular those for the control of the maximum temperature in the central heating circuit via the flow temperature sensor; on reaching 80°C the function is suspended.**

The function is exited automatically after 20 minutes of permanence, or by assigning the value "00" to parameter P1, which returns the device to normal functions.

## DATA PLATE

Pict. 31 - DATA PLATE

Boiler type: <b>A</b> Serial number: <b>B</b> Code: <b>C</b> Country of destination: <b>D</b> Manufacturer: <b>E</b> Gas: <b>F</b>	Cat.: <b>0</b> Type: <b>G</b> Date: <b>H</b> PIN Code: <b>I</b> Nox class: <b>J</b>	CE	
..... Natural gas G20 ..... G31 C.H. Circuit	Flow L/a (m <sup>3</sup> /h) L/a (kg/h)	Pressure L/b (mbar) L/b (mbar)	Pressure min/max L/c (mbar) L/c (mbar)
Thermal power Useful load Useful load in condensing Pressure	M (kW min.) N (kW min.) P (bar)	M/a (kW max) N/a (kW max) O (kW max) Work temperature: Q(C°)	
D.H.W. Circuit Thermal load: Specific flow Δt25: Work Pressure:	R (kW min.) S (l/min.) T (bar)	R/a (kW max) Work Temperature: U(C°)	
IP protection rate: Work Temperature:	W Y(C°)	Electric power: X(W) Power supply: Z	

**0**= Supervisory body  
**A**= Type of boiler  
**B**= Boiler model  
**C**= Serial Number  
**D**= Code  
**E**= Country of destination  
**F**= Manufacturer  
**G**= Category  
**H**= Approved types of exhaust exchange configuration  
**I**= Date of production  
**J**= P.I.N. product identification number  
**K**= NOx Class  
**L**= Set by gas type  
**L/a**= Load  
**L/b**= Supply nominal pressure  
**L/c**= Pressure min/max  
**M**= Thermal load min  
**M/a**= Thermal load max  
**N**= Useful load min  
**N/a**= Useful load max  
**O**= Useful load in condensing  
**P**= C.H. work pressure  
**Q**= C.H. work temperature  
**R**= D.H.W. thermal load if different from M min.  
**R/a**= D.H.W. thermal load if different from M/a max  
**S**= A.C.S. specific flow rate according to EN625-EN13203-1  
**T**= D.H.W. work pressure  
**U**= D.H.W. work temperature  
**W**= IP protection rate  
**X**= Gas consumption  
**Y**= Operating temperature  
**Z**= Power supply

## POWER ADJUSTMENT

When supplied, the boiler is already set up to function optimally with a specific type of gas, which can be identified by consulting the technical data plate present on the rear of the instrument panel.

**It is in any case ALWAYS necessary to check the following before running the device:**

### Commissioning

- That the device has been correctly located and installed in a location satisfying all the manufacturer's requirements as well as any applicable legislation and regulations.
- That the boiler is correctly plumbed in.
- That the central heating circuit is filled with water at a suitable pressure.
- That the central heating circuit and all the boiler's hydraulic connections are perfectly tight.
- That the boiler is connected to the mains electrical supply according to the electrical code and any other applicable regulations.
- That the boiler is connected to the combustion exhaust system in accordance with all applicable legislation and regulations and that the manufacturer's

specifications and compatible methods listed on the technical data plate (Pict. 31) are respected. Also check the presence, if necessary, of appropriate diaphragms (page 26). **Failure to carry out these checks may make the boiler's operation extremely dangerous to the health of people and animals.**

- That the gas supplied by the mains network connected to the boiler corresponds to that indicated on the data plate and for which the boiler is set up.

**Running the boiler on gas which is incompatible with the specifications on the boiler data plate can prove extremely dangerous to people and property as well as causing irreparable damage to the device itself.**

- That the entire gas distribution line both inside and outside the building, as well as inside the boiler, where applicable, is tested for tightness.

- That the gas line meets all applicable legislation and regulations, in particular: That a gas shut-off valve is installed immediately before the boiler. This must have a YELLOW maneuver handwheel in a visible position without any obstacle that might compromise even partially the maneuver.

## TESTING THE GAS SUPPLY DYNAMIC PRESSURE:

- Remove the iron cover by loosening the 4 fastening clips.
- Free up access to the gas valve by rotating the instrument panel to the open position (Pict. 31).
- Loosen the screw holding the pressure outlet upstream of the regulator and connect it with silicone tubing to the + input of a differential manometer with an appropriate range (at least 0 - 50 mbar), leaving the second input free if present – (Pict. 33).
- Turn on the gas supply by opening the shut-off valve located on the meter and open the gas cock before the boiler.
- Use the SERVICE function to bring the boiler to maximum power.
- Measure the gas pressure before the regulator (dynamic mains supply pressure).
- Check that the value measured with the manometer falls within the max-min interval given in the "Dynamic mains supply pressure" table for the specific type of gas.

Pict. 32



**Whenever dynamic pressures below the specified minimum levels should be found:**

- Check that there are no kinks, blocks or other impediments to the normal gas flow in the gas supply line to the boiler.
- Check that the diameter of piping used for the gas supply line is sufficient and constant along the whole length.
- Check that there are no elements in the supply line which could lead to excessive pressure drops, e.g. too many bends, changes of direction, excessively long or countersloping sections etc.
- Consult the gas company on the specified minimum supply pressure values.

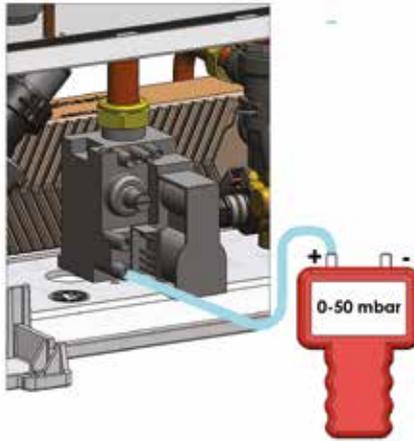


**Whenever dynamic pressures above the specified maximum values should be found:**

- Install a suitable pressure reducer/regulator on the gas supply line before the boiler.
- Adjust the dynamic pressure of the gas via the regulator, if already present.

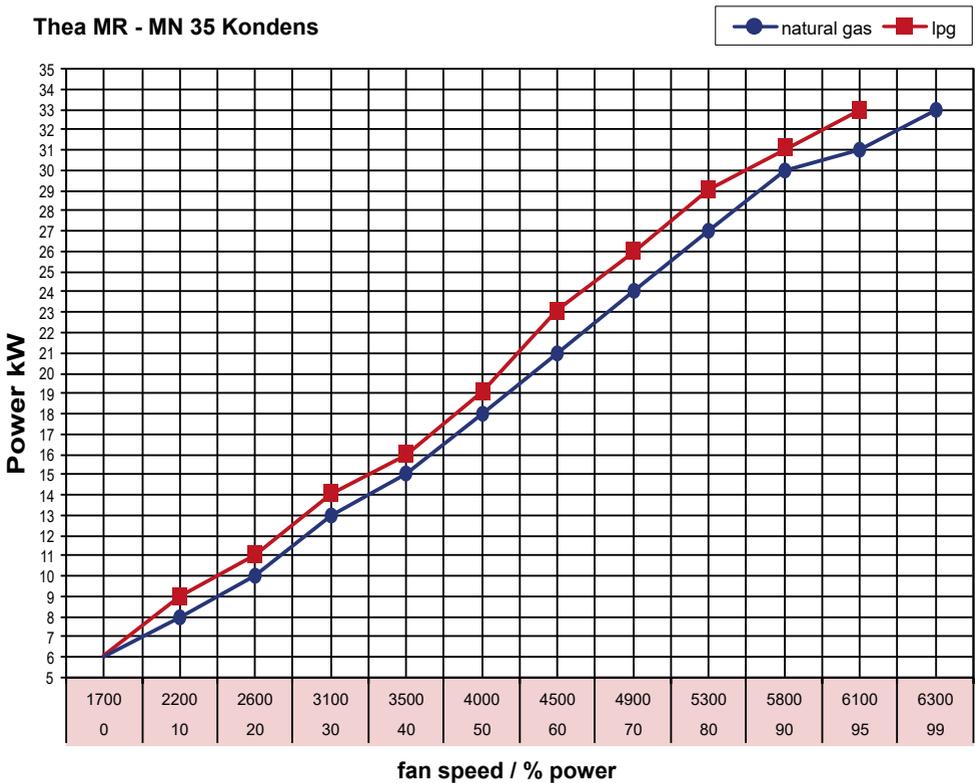
DYNAMIC PRESSURE mbar (MAINS)			
G20 (NATURAL GAS)		G31 (PROPANE)	
min	max	min	max
17	25	25	37

Pict. 33



## HEATING POWER ADJUSTMENT

Thea MR - MN 35 Kondens



## ANALYSIS - CHECKING AND REGULATING COMBUSTION

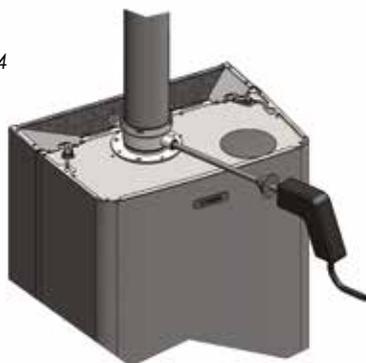
The boiler comes already calibrated and tested for the requested type of gas, however it is advisable to check that the type of gas supplied in the mains and the supply pressure are correct. If this should not be the case, follow the procedures described in this section.

It may be necessary to repeat the maximum and minimum adjustment twice to obtain correct regulation.

### MAXIMUM POWER:

- Use the SERVICE function to bring the boiler to maximum power.
- Insert the combustion analyser probe in the inspection outlet provided in the flue (Pict. 33).
- After the boiler has been running for 2-3 minutes, run the analysis and check that the CO<sub>2</sub> measured by the analyser corresponds to the value indicated in the table for maximum power.
- If the CO<sub>2</sub> does not correspond, regulate with screw "N" (Pict. 34) of the ratio adjuster until the specified CO<sub>2</sub> value is obtained. Turn clockwise to decrease the CO<sub>2</sub> value, anticlockwise to increase it.

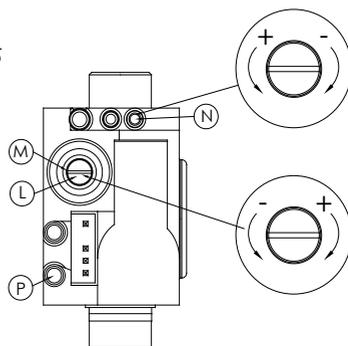
Pict. 34



### MINIMUM POWER:

- Use the SERVICE function to bring the boiler to minimum power.
- Wait a few seconds for the ignition phase to complete and the boiler to bring itself to minimum power.
- After the boiler has been running for 2-3 minutes, run the analysis and check that the CO<sub>2</sub> measured by the analyser corresponds to the value indicated in the table for maximum power.
- If the CO<sub>2</sub> value does not correspond, regulate with screw "M" (Pict. 35) of the ratio adjuster after removing the protective cover "L" until the specified CO<sub>2</sub> value is obtained. Turn clockwise to increase the CO<sub>2</sub> value, anticlockwise to decrease it.

Pict. 35



### CO<sub>2</sub> VALUES TABLE

	UdM	NATURAL GAS G20	LPG G31
		35 KW	35 KW
CO <sub>2</sub> max power	%	9,2 + 0,1 - 0	10,3 + 0,1 - 0
CO <sub>2</sub> min power	%	9 + 0,1 - 0	10 + 0,1 - 0
Minimum mains pressure	mbar	17	29
Maximum mains pressure	mbar	25	37



### WARNING!

#### After finishing the gas supply pressure tests:

- Disable the SERVICE function.
- Place the device in stand-by (off).
- Disconnect the micromanometer connected before the gas regulator.
- **TIGHTEN THE PRESSURE OUTLET SCREW UNTIL IT SEALS.**
- Press the gas valve regulation screws cover closed.
- Return the instrument panel to its operating position, fastening if necessary.
- Refit the lower cover, fastening it with the screws.

## CHANGING GAS TYPE

When necessary, it is possible to modify the boiler to run on types of gas which are supported but which the boiler was not set up for in the factory.

This modification concerns in particular the change from NG (natural gas) to LPG (butane

/ propane) and vice versa.

In order to perform this change the boiler's basic configuration must be modified to that necessary to support the supplied type of gas.



### CONVERSIONS MUST ALWAYS BE PERFORMED BY QUALIFIED PERSONNEL

Proceed as follows to change the system:

#### CHANGING FROM NATURAL GAS (NG) TO LPG

- CONFIGURING THE SOFTWARE
- REGULATING COMBUSTION
- APPLY LABEL B1 ON THE GAS VALVE AFTER REMOVING THE OLD LABEL

#### CHANGING FROM LPG TO NG

- CONFIGURING THE SOFTWARE
- REGULATING COMBUSTION
- APPLY LABEL B2 ON THE GAS VALVE AFTER REMOVING THE OLD LABEL

#### CONFIGURING THE SOFTWARE FOR FUEL ADAPTATION:

To adapt the gas regulation valve driver:

- ACCESS THE CONFIGURATION MENU (ACCESS OR MODIFICATION MODE ON PAGE 35) AND DISPLAY THE VALUE OF PARAMETER A01;
- MODIFY THE PARAMETER ACCORDING TO THE GAS DISTRIBUTED AND FOR WHICH THE TRANSFORMATION HAS BEEN MADE,

No.	Gas type	Parameter
A01	Natural gas	0
	LPG	1
A13	Natural gas	14
A14	LPG	22

<b>APPLIANCE CONVERTED : G31 TO GAS</b>	Conversion performed on date <u>  /  /  </u> Signature of service _____		SET ACCORDING TO: <b>GPL G30 - G31</b>
<b>APPLIANCE CONVERTED : G20 TO GAS</b>	Conversion performed on date <u>  /  /  </u> Signature of service _____		SET ACCORDING TO: <b>METANO G20</b>
SET ACCORDING TO: <b>METANO G20</b>	To be returned to G20 Engineering with a copy of the warranty certificate and/or Appendix G of 1st commissioning Converted to: <input type="checkbox"/> G20 <input type="checkbox"/> GPL on <u>  /  /  </u> Signature of service: _____		SET ACCORDING TO: <b>GPL G30 - G31</b>

USING THE VALUES SHOWN IN THE TABLE;  
 -ADJUST THE VALUES OF PARAMETER A13 / A14 as per chart B.



**BEFORE COMMISSIONING THE NEWLY CONFIGURED BOILER IT IS NECESSARY TO CHECK THE GAS SUPPLY PRESSURE BEFORE THE BOILER AND MEASURE AND ADJUST THE GAS PRESSURE AT THE BURNER. REFER TO THE PRESSURE VALUES AND PROCEDURES GIVEN FOR EACH SPECIFIC GAS IN THE "TESTING THE GAS SUPPLY DYNAMIC PRESSURE:" CHAPTER (Page 28).**

**Complete the change by attaching the label A1/A2 indicating the change to the new type of gas for which the boiler has now been configured, near the technical data plate located on the rear instrument panel cover.**

#### COMBUSTION ADJUSTMENT:

Adjust the combustion as described on page XXX, chapter "Analysis-verification of

combustion regulation". If necessary, check and adjust the ignition speed by modifying the parameter "A15" for LPG or "A16" for CNG.

## ACCESSING THE CONFIGURATION MENU

È possibile visualizzare informazioni o effettuare la configurazione completa dell'apparecchio accedendo alle pagine del **MENÙ CONFIGURAZIONE**. L'accesso al "**MENÙ CONFIGURAZIONE**" oltre a riportare a display

informazioni di presenza e stato della maggior parte dei dispositivi, permette la modifica dei parametri di configurazione influenzando conseguentemente ed in maniera sostanziale il funzionamento dell'apparecchio.



**ACCESS TO THE "CONFIGURATION MENU" IS EXCLUSIVELY RESERVED FOR TECHNICIANS WITH THE NECESSARY QUALIFICATIONS AND LICENSES ARBITRARY MODIFICATION OF ANY PARAMETER CAN CAUSE MALFUNCTIONING OF AND DAMAGE TO THE BOILER, AS WELL AS CREATING A DANGEROUS SITUATION FOR PERSONS AND PROPERTY.**

### Accessing the Menu pages:

Keep button "4" pressed for more than 5 seconds; on release the letter "P" and the number "00" will appear on the left of the display and the relative value on the right (Pict. 36).

### Selecting a page within the Menu:

The information into the menus are organized by pages corresponding to a code that uniquely identifies a parameter and the corresponding value. To select a menu page, scroll through the pages using buttons "5" and "6".

**Information can be viewed or the complete configuration of the device can be performed by accessing the pages of the CONFIGURATION MENU. In addition to displaying information on the presence and status of most devices, accessing the CONFIGURATION MENU allows the modification of the configuration parameters, consequently and substantially influencing the operation of the device.**

### Changing the parameters value:

The modification of the value of a certain parameter can be carried out only after entering the installer password.

Accessing the installer menu via password (Pict.38):

Access the configuration menu by pressing button "4" for more than 5 seconds; when released, the wording "P00" will appear. By pressing button "5" the words "Cod" will appear and then "----"; enter the first value by pressing buttons "7" - "8"; confirm by pressing button "6"; now enter the second and third value in sequence. Once the code "**198**" has been fully entered, confirm using button "6". Access to modify all parameters has now been obtained. Select the parameter using buttons "5" and "6"; modify the values using buttons "7" and "8"; button "8" to increase and / or "7" to decrease. To store the value, press button "6".

To exit without saving, reset the desired value, press button "6" to return to page modification and press button "8" or wait for automatically return to the main menu.

Fig. 36

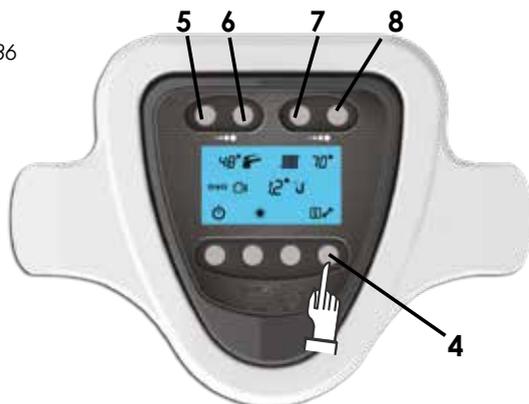


Fig. 37

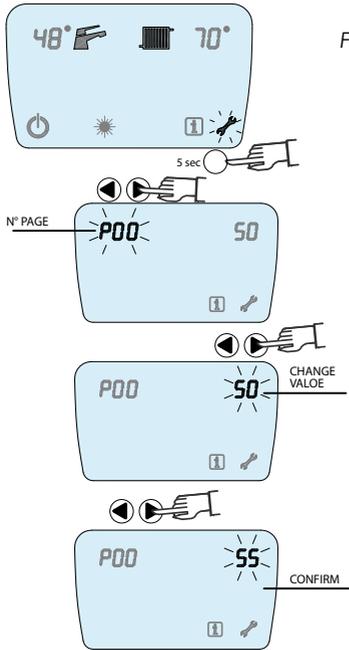
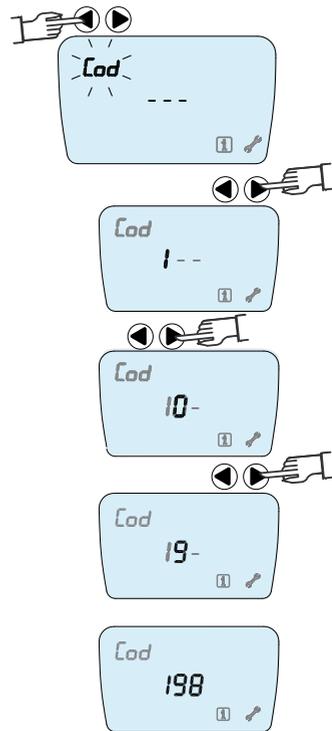


Fig. 38



THE DESCRIPTIONS AND VALUES GIVEN IN THE TABLE BELOW ARE ONLY TO BE USED WHEN IT IS NECESSARY TO CHECK THE CONFIGURATION. MODIFICATION OF THE PARAMETERS CAN CAUSE THE BOILER TO MALFUNCTION AND BE DAMAGED OR DESTROYED.

## CONFIGURATION MENU

Pagina	Descrizione	Min	Max	Default
P0	ALL PARAMETER MODIFICATION ENABLE CODE	0-99 INSTAL.		198
P1	SERVICE FUNCTION	0 = deactivated 1= minimum power 2= maximum power		0
P2	RESET SERVICE	1 = boiler power day/hour timer reset		
P3	Deaeration program	0 = deactivated	1 = activated	1
P4	Ramp CH (minutes)	0	10	1
P5	Anti frequent ignition parameter min	0	255	3
P6	Plate heat exchanger preheating	0 = deactivated	1 = activated	0
P7	DHW preheating offset (minutes)	0	10	3
P8	Minimum water flow	0 = deactivated	1 = activated	1
P9	Delay time for activation of DHW request (seconds)	0	10	0
P10	Anti-water hammer function in diverter valve switching	0 = deactivated	1 = activated	1
P11	Activation external probe	0 = deactivated	1 = activated	0
P12	"K" climate curve parameter	10	30	10
P13	Selection T.A. or O.T.	0 = T.A.	1 = O.T.	0
P14	Anti-legionella function activation	0 = deactivated	1 = activated	1
P15	Loading / unloading function	0 = deactivated	1 = activated	1

Pagina	Descrizione	Min	Max	Default
A00	Boiler type setting	0 = combination with plate heat exchanger 1 = combination with DHW storage tank 2 = central heating only		0 MR/CR 1 MN/CN
A01	Gas type setting	0 Natural gas	1 LPG	0
A11	Modulating circulating pump	0 = deactivated	1 = activated	1
A12	System type	1 = High temperature	2 = Low temperature	1
A13	Burner ignition power % with NATURAL GAS supply	0	99	14
A14	Burner ignition power % with LPG supply	0	99	22
A15	Burner maximum power % with LPG	0	99	99
A16	Burner maximum power % with natural gas supply	0	99	99
A17	"Post circulation" time sec in CH	0	99	60
A18	Post circ. time in DHW sec.	0	99	60
A19	"Post ventilation" time sec	0	99	10

Pag	Descrizione	Min	Max	Default
A20	"Post ventilation" time sec in DHW	0	99	10
A21	$\Delta$ burner ignition in CH mode ° C	-10	+10	-5
A22	$\Delta$ burner shutdown in CH mode ° C	-10	+10	+5
A23	$\Delta$ burner ignition in DHW mode ° C	-10	+10	0
A24	$\Delta$ burner shutdown in DHW mode ° C	-10	+10	+4
A25	$\Delta$ T prim in DHW emergency ° C	0	+30	10
A26	Water tank temperature detection	0 = ntc probe	1 = thermostat	0
A27	Water tank preparing temperature ° C	+50	+80	80
A28	$\Delta$ water tank ignition preparing temperature ° C	-10	+10	-5
A29	$\Delta$ water tank shutdown preparing temperature ° C	-10	+10	0
A30	System maximum pressure (bar)	20	40	25
A31	System minimum pressure (bar)	5	11	5
A32	$\Delta$ t CH modulating circulator ° C	5	35	20
A33	Circulator minimum PWM in CH mode % RPM	20	60	50
A34	Circulator maximum PWM in CH mode % RPM	65	100	100
A35	Feedback on circulator PWM	0 (deactivated)	1 (activated)	0
A36	Anti-legionella days frequency	1	30	7
A37	Anti-legionella temperature ° C	60	85	60
A38	Anti-legionella temperature holding time (minutes)	5	30	15
A39	230V diverter valve setting	0 = enabled zone 2° htermostat	1 = enabled in DHW	0

Some parameters may not be visible, depending on the type of boiler configuration.

## INSTALLATION

It is recommended, and in many cases mandatory, to connect the boiler to a device which monitors and regulates the temperature in the areas served by the boiler itself. The purpose of this device is to create the maximum comfort and maximum energy savings possible.

### “AREA 1”

The main heating area can be managed both by a thermostat, and by a remote control electronic device (Open-Therm). The appliance is supplied with TA Thermostatic Control configuration; in order to **activate the Open-Therm control, it is necessary to modify the state of parameter “P13” from “0” into “1” (see chapter concerning “ACCESSING PARAMETERS”)**.

For the correct installation of Room Thermostat or Open-Therm, refer to the instructions supplied by the thermostat manufacturer.

To connect the Room Thermostat or Open-Therm to the boiler it is possible to use the supplied two-core cable labelled “TA”.

The connection to the boiler PCB is the same both for the Thermostat control and for the Open-Therm (see wire scheme at page 15, Connection x6).

### “AREA 2”

A second heating area can be directly managed. The PCB installed on the boiler has got a second active door where the relevant room thermostat can be connected to (Pict.37).

The thermostat activates the circulating pump and allows the burner ignition. The water temperature is the same as the one set on the display and cannot be different in the two areas.

The second area only supports not powered thermostat control devices.

Although one water temperature only is available for both areas, their respective activation/deactivation is independent.

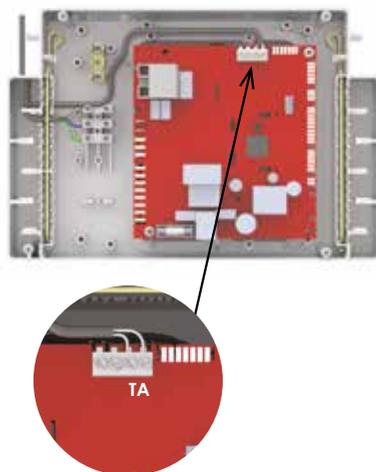
It is possible to combine to the “calls” of the main area a 230Vac control device that can commute any zone valves located on the main circuit so that, in a simple and inexpensive way, the two areas are

prevented from interacting with each other.

Whenever necessary, replace the “TA” cable and connect it directly to the slot present in the PCB case as follows:

- Power the boiler off
- Remove the boiler iron cover by unscrewing the 4 fastening clips
- Rotate the instrument panel in “Open” position
- Remove the rear instrument panel cover by unscrewing the 4 screws
- Identify the two-pole terminal board located on the left-hand side of the PCB. Disconnect any cable which may be present by loosening the terminal screws and remove it completely
- Connect the wires from the thermostat cable to their respective slots (Pict. 39)
- Run the cable and hold it in position with the cable grip at the edge of the case
- Position the cable, running it under the cable gripping tabs on the side of the case
- Close the case cover with the 4 screws, paying attention that all the cables running out of the case are correctly positioned
- Return the electrical panel to the operational position (with the visible display)

Fig. 39



**COMPLETELY DISCONNECT THE DEVICE FROM THE ELECTRICITY SUPPLY BEFORE PERFORMING ANY OPERATION. USE THERMOSTATS COMPATIBLE WITH THE BOILER.**

## INSTALLATION OF OUTDOOR TEMPERATURE SENSOR

### Type and positioning:

Use an NTC 10K\_β 3977 pre-wired sensor with protective cover.

Position the sensor outside the area to be heated facing NORTH/NORTH WEST, or in any case in a position with minimal exposure to direct sunlight and air currents (corridors, crawl spaces etc.). Fasten the sensor to a wooden or masonry structure which is thermally insulating, avoiding fixing it directly in contact with metal structures and surfaces

(guttering, arches, frames etc.). Avoid the sensor being even partially immersed in water, ideally ensuring it does not come into direct contact with ice formations, either. Where possible, install the sensor in an area protected (e.g. under roof overhang) or partially protected from bad weather, ensuring it is at least 3 - 4 m from the ground. The pre-wired sensor can be installed for all boilers.



**DO NOT USE SENSORS DIFFERENT FROM THOSE SPECIFIED, AS THIS COULD RESULT IN MALFUNCTIONING OF, DAMAGE TO AND EVEN DESTRUCTION OF THE BOILER.**

### Wiring:

Connect the sensor with insulated, dual-core cable with sheath of 5 – 6 mm diameter and conductor diameter of between 1 and 1.5

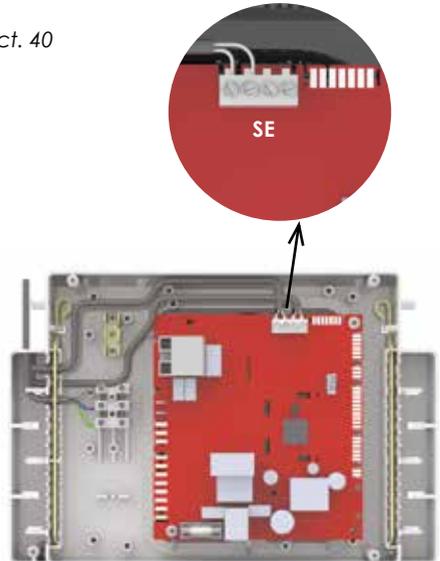
mm; the maximum recommended length is 40 - 50 m

Wire the cable from the sensor to the correct slot (x5) in the terminal block inside the PCB panel.



**COMPLETELY CUT THE POWER SUPPLY TO THE BOILER BY TURNING IT OFF AT ITS DEDICATED SWITCH**

- Remove the iron cover by loosening the 4 fastening clips *Pict. 40*
- Rotate the instrument panel to the open position
- Remove the rear instrument panel cover by unscrewing the 4 screws
- Identify the terminals next to the PCB
- Connect the wires of the sensor cable to their respective slots (x5) (Pict. 40).
- Run the cable and hold it in position with the cable grip at the edge of the case
- Position the cable, running it under the cable gripping tabs on the side of the case
- Close the case cover with the 4 screws, paying attention that all the cables running out of the case are correctly positioned
- Return the electrical panel to the operational position



## OUTDOOR TEMPERATURE SENSOR CONFIGURATION

Accessing the configuration menu (see page 35) : enter the password to enable parameter modification and change parameter "P11" from 0 to 1.

## CONFIGURING THE CLIMATE CURVE FROM THOSE AVAILABLE

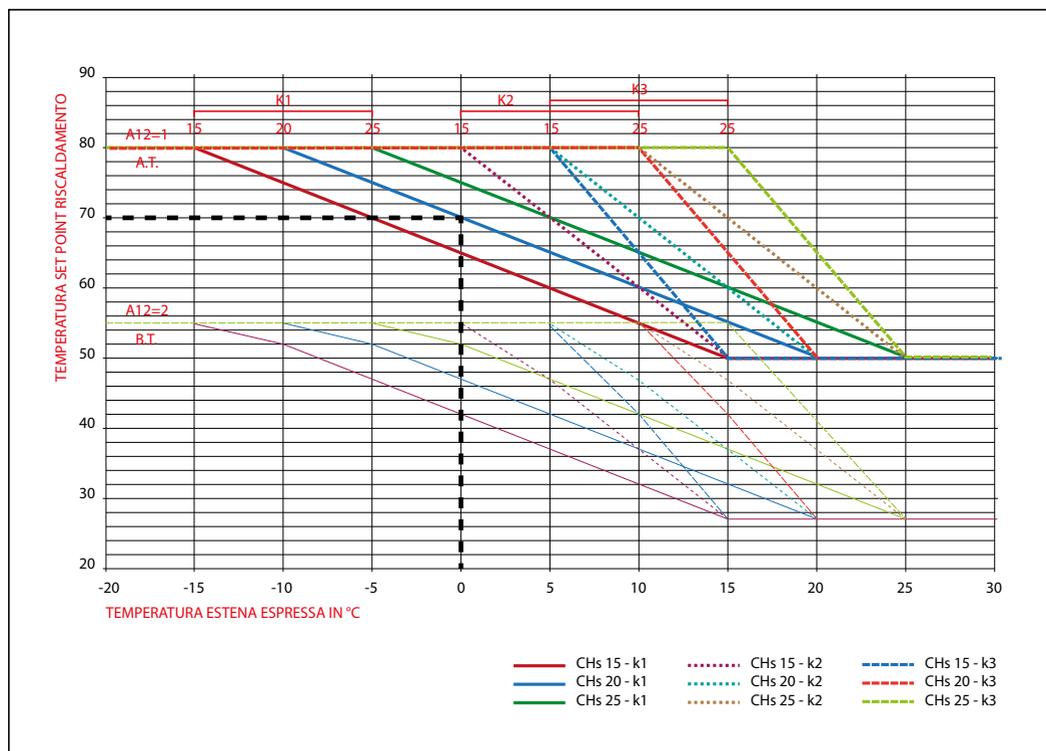
Operation in external sensor mode makes the boiler heat the water in the central heating circuit to a temperature which depends on the temperature measured by the external sensor, in other words the temperature outside the heated building. Running in external sensor mode automates the boiler's response to climatic variations, allowing a high level of home comfort to be maintained while making

significant savings in gas consumption.

It is possible to adapt the boiler's response based on the climatic conditions present by configuring the slope of the climate curve via the corresponding parameter on page P12 It's also possible by pressing buttons "C" and "D" (these lose the function of increasing and decreasing CH temperature) to make a further improvement of climate curve variable from 15 to 25.

The configuration of parameter P12 è indicated in the graph (Pict.41)

Pict. 41



### Example

With an external temperature of 0°C a CH flow temperature of 70°C is needed, it's necessary to:

- Set P12 parameter value to 10 (K1)
- Adjust by pressing "C" and "D" buttons the value to 20

## SPECIAL FUNCTION

### ANTI-FROST:

This function is always active, whatever mode the boiler is in.

In order to allow this function to fulfil its purpose, the device must be:

- Turned on
- Connected to the mains gas supply
- The shut-off valves on the central heating circuit must be open
- The shut-off valve on the gas supply line must be open
- No fault conditions must be present

If the temperature measured by the sensor on the central heating flow circuit is  $< 4^{\circ}\text{C}$ , circulation is activated, the diverter valve (when present) switched to the CH circuit and the burner lit at minimum power.

When the temperature measured by the sensor reaches  $35^{\circ}\text{C}$ , the function is deactivated by turning off the burner and restoring the previous conditions.

Also for DHW circuit, the antifrost function activates at  $4^{\circ}$  temperature and deactivates  $10^{\circ}$ .



**THIS FUNCTION DOES NOT GUARANTEE COMPLETE AND CERTAIN PROTECTION OF THE SYSTEM FROM TOTAL OR PARTIAL FREEZING!**



**WHEN CONSIDERED NECESSARY, AND WHEN THE SYSTEM IS CERTAIN TO BE EXPOSED TO LOW TEMPERATURES, IT IS POSSIBLE TO ADD ANTIFREEZE TO THE CENTRAL HEATING CIRCUIT.**



**ONLY USE ANTIFREEZE WHICH IS COMPATIBLE WITH THE CENTRAL HEATING SYSTEM DEVICES AND EQUIPMENT. CAREFULLY FOLLOW THE INSTRUCTIONS FOR USE.**

### CIRCULATOR DEVICE/DIVERTER VALVE ANTI-LOCK FUNCTION:

The function is active when the boiler is in "SUMMER" or "STANDBY / OFF" modes

In order to allow this function to fulfil its purpose, the device must be:

- Turned on
- The shut-off valves on the central heating circuit must be open
- No fault conditions must be present

The function is activated if there are no requests to the boiler in the previous 24 hours. The function stops the devices from locking up, which is possible after long periods of inactivity, by switching the diverter valve (when present) to the central heating circuit and running the circulator device for a predetermined time (35 sec).

### ANTI FREQUENT IGNITION FUNCTION:

This function is active when the boiler is in heating mode (season selector A on winter) and parameter P5 in the "CONFIGURATION" menu is enabled. The function does not allow unnecessarily frequent ignitions to satisfy heating requests when the system water temperature is near that set by the selector. The parameter P5 is set to 0 when the function is not enabled and can have a value up to 255 indicating the wait time in minutes between one ignition and the next.

## THERMOSTAT POST CIRCULATION/VENTILATION FUNCTION

### **In winter mode:**

In order to prevent an overheat stress, in case at the end of a CH request the heat exchanger temperature is too high, a heat disposal function by circulator pump ignition is activated.

This function remains active until the temperature values of heat exchanger decrease. This function is displayed by E06 flashing.

### **In summer mode:**

In order to prevent an overheat stress, in case at the end of a DHW intake the heat exchanger temperature is too high, a heat disposal function by circulator pump and fan ignition is activated.

This function remains active until the temperature values of heat exchanger decrease. This function is displayed by E06 flashing.

## DEAERATION FUNCTION

Following each ignition consequent to a power disconnection, boiler starts automatically the circulator pump; this activates ignition cycles in CH and in DHW to remove residual air in the CH circuit.

**THIS FUNCTION MAY BE DISABLED BY "P3" PARAMETER**

## TECHNICAL DATA SHEET

DATI TECNICI	U.M.	TheA++ MR/CR Kondens	TheA++ MN/CN Kondens
Category		I12H3P	I12H3P
Type		C13 C33 C43 C53 C83	C13 C33 C43 C53 C83
Nominal load	kW	34,8	34,8
Minimum nominal load	kW	5,29	5,29
Maximum load (80°/60°)	kW	33,49	33,49
Minimum load (80°/60°)	kW	5,12	5,12
Maximum load in condensing (50°/30°)	kW	36,3	36,3
Minimum load in condensing (50°/30°)	kW	5,65	5,65
Max efficiency (80°/60°)	%	96,2	96,2
Min efficiency (80°/60°)	%	96,7	96,7
Max efficiency in condensing (50°/30°)	%	105	105
Efficiency at partial nominal load (50°/30°)	%	106,9	106,9
Max exhaust temperature*	°C	64	64
Mass flow rate	g/s	15,9	15,9
Min. Mass flow rate	g/s	2,52	2,52
Heat loss from chimney when burner off	%	0,18	0,18
Heat loss from chimney when burner off	%	3,16	3,16
Heat loss from chimney when burner on (max power)	%	2,2	2,2
Heat loss from boiler surface area (Max power)	%	0,6	0,6
Heat loss from boiler surface area (Min Power)	%	1,1	1,1
NOx class		6	6
Max available pressure exhaust+suction (0,5 Ø 80 mm separate pipes)	Pa	119	119
DHW nominal load	KW	34,8	/
Min. DHW nominal load	KW	5,29	/
CH min/max operating pressure	bar	0,8/3	0,8/3
Power supply	Volt -Hz	230-50	230-50
Maximum absorbed electric power	W	170	170
IP rating	IP	x4D	x4D
Expansion vessel		2x6 lt	2x6 lt
Expansion vessel pre-charge	bar	1	1
Max DHW pressure	bar	6	/
Min. DHW pressure	bar	0,5	/
DHW flow rate at $\Delta t$ 35°C	l/min	13,9	/
DHW min. flow rate	l/min	1,6	/
DHW flow limiter	l/min	/	/

FUEL		TheA <sup>++</sup> MR/CR Kondens	TheA <sup>++</sup> MN/CN Kondens
Gas Consumption at Nominal Load	G20 m/h 3	3,68	3,68
	G31 k/gh	2,67	2,67
Gas Consumption at minimum Load	G20 m/h 3	0,56	0,56
	G31 k/gh	0,43	0,43

TECHNICAL PARAMETERS ACCORDING TO ERP (812/2013)				
			TheA <sup>++</sup> MR/CR Kondens	TheA <sup>++</sup> MN/CN Kondens
Energy Season Efficiency Class for Room Heating	-	-	A	A
Nominal Load	PNominal	kW	35	35
Energy Season Efficiency for Room Heating	$\eta_s$	%	93	93
HEAT LOAD				
At Nominal Load and High Temperature	P4	kW	33,49	33,49
At 30% Nominal Load and Low Temperature	P1	kW	11,5	11,5
EFFICIENCY				
At Nominal Load and High Temperature	$\eta_4$	%	86,7	86,7
At 30% Nominal Load and Low Temperature	$\eta_1$	%	96,3	96,3
AUXILIARY POWER CONSUMPTION				
Full load	elmax	kW	0,0605	0,0605
Partial load	elmin	kW	0,02138	0,02138
Stand-by	PSB	kW	0,002	0,002
OTHER PARAMETERS				
Heat Loss in Stand-by mode	Pstby	kW	0,06	0,06
Power Consumption of pilot flame	QHE	GJ	104	104
Annual Power Consumption	LWA	dB	49	49
Inner Sound Power Level	NOx	mg/kWh	37	37
FOR COMBI BOILERS				
Declared Load Profile	-	-	XL	/
Hot Water Power Efficiency	Qelec	kWh	0,301	/
Annual Power Consumption	AEC	kWh	66	/
Annual Gas Consumption	$\eta_{vh}$	%	83	/
Daily Power Consumption	Qfuel	kWh	23,95	/
Daily Gas Consumption	AFC	GJ	18	/
Contact: KLEINE KESSEL, Via Solferino 55/E, 25122 Brescia, tel. sede operativa +39 0523 850513 <a href="http://www.produzionecaldaie.it">www.produzionecaldaie.it</a>				







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