

## FORCE W FORCE W

INSTALLATION MANUAL STARTS PAGE 43



3541Q760

cod. 3541Q760 - Rev. 00 - 01/2019



CE

**EN** - INSTRUCTIONS FOR USE, INSTALLATION AND MAINTENANCE







- Read the warnings in this instruction booklet carefully since they provide important information on safe installation, use and maintenance.
- This instruction booklet is an integral and essential part of the product and must be kept with care by the user for future reference.
- If the unit is sold or transferred to another owner or if it is to be moved, always make sure the booklet stays with the boiler so that it can be consulted by the new owner and/or installer.
- Installation and maintenance must be carried out by professionally qualified personnel, according to current regulations and the manufacturer's instructions.
- Incorrect installation or inadequate maintenance can result in damage or injury. The manufacturer declines any liability for damage caused by errors in installation and use or by failure to follow the instructions provided.
- Before carrying out any cleaning or maintenance operation, disconnect the unit from the power supply using the system switch and/or the special cut-off devices.
- In case of a fault and/or poor operation, deactivate the unit and do not try to repair it or directly intervene. Contact professionally qualified personnel. Any repair/replacement of the products must only be carried out by qualified personnel using genuine parts. Failure to comply with the above can compromise the safety of the unit.
- Periodic maintenance performed by qualified personnel is essential in order to ensure proper operation of the unit.
- This unit must only be used for its intended purpose. Any other use is deemed improper and therefore hazardous.
- After unpacking, check the good condition of the contents. The packing materials are potentially hazardous and must not be left within the reach of children.
- The unit can be used by children aged at least 8 years and by persons with reduced physical, sensory or mental capabilities, or lacking experience or the necessary knowledge, only if under supervision or they have received instructions on its safe use and the related risks. Children must not play with the unit. Cleaning and maintenance intended to be done by the user can be carried out by children aged at least 8 years only if under supervision.
- In case of doubt, do not use the unit. Contact the supplier.
- The unit and its accessories must be appropriately disposed of in compliance with current regulations.
- The images given in this manual are a simplified representation of the product. In this representation there may be slight and insignificant differences with respect to the product supplied.

	This symbol indicates "CAUTION" and is placed next to all safety warnings. Strictly follow these instructions in order to avoid danger and damage to persons, animals and things
	This symbol calls attention to a note or important notice.
	This symbol, which is used on the product, packaging or documents, means that at the end of its useful life, this product must not be collected, recycled or disposed of together with domestic waste. Improper management of electric or electronic waste can lead to the leakage of hazardous substances contained in the product. For the purpose of preventing damage to health or the environment, users are kindly asked to separate this equipment from other types of waste and to ask for it to be dealt with by the municipal waste service or dealer under the conditions and according to the methods set down in national and international laws transposing the Directive 2012/19/EU.
	Separate waste collection and recycling of unused equipment helps to save natural resources and to guarantee that this waste is processed in a manner that is safe for health and the environment. For more information about how to collect electric and electronic equipment and appliances, please contact your local Council or Public Authority competent to issue the relevant permits.

**CE** The CE marking certifies that the products meet the essential requirements of the relevant directives in force.  
 The declaration of conformity may be requested from the manufacturer.

**COUNTRIES OF DESTINATION: IT - ES - RO**

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# 1. Operating instructions

## 1.1 Introduction

Dear Customer,

Thank you for choosing **FORCE W**, a **FERROLI** wall-mounted boiler featuring advanced design, cutting-edge technology, high reliability and quality construction. Please read this manual carefully, as it provides important information on safe installation, use and maintenance.

**FORCE W** is a high efficiency, low emissions **premix condensing** heat generator for heating, running on natural gas or LPG and equipped with a microprocessor control system.

The **boiler body** consists of an aluminum tube exchanger and a **premix burner** in steel, equipped with electronic ignition and ionization flame control, a modulating speed fan and a modulating gas valve.

## 1.2 Control panel

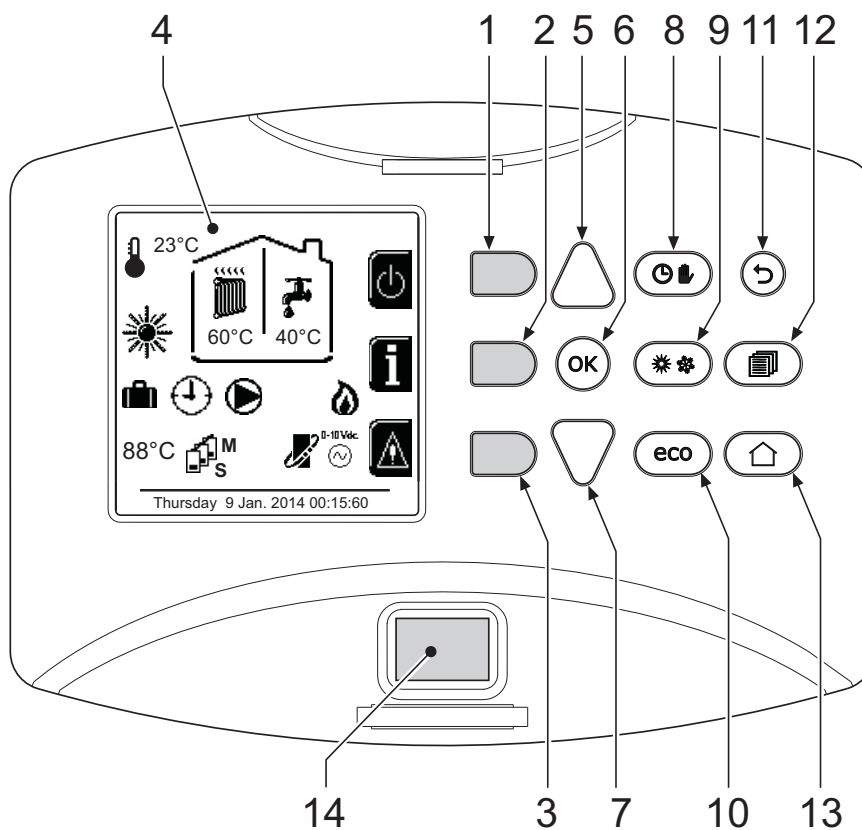


fig. 1 - Control panel

### Legend

- |  |  |
|--|--|
| 1 = Contextual button 1                        | 11 = Menu exit button                  |
| 2 = Contextual button 2                        | 12 = Main menu button                  |
| 3 = Contextual button 3                        | 13 = Home button (back to main screen) |
| 4 = Dot matrix display (example - main screen) | 14 = Main switch                       |
| 5 = Menu navigation button                     |  |
| 6 = Confirm/menu access button                 |  |
| 7 = Menu navigation button                     |  |
| 8 = Automatic/Manual Heating/DHW button        |  |
| 9 = Summer/Winter mode selection button        |  |
| 10 = Economy/Comfort mode selection button     |  |

### Contextual button

The contextual buttons (details 1, 2, 3 - fig. 1) are grey, with no screen print, and take on a different meaning depending on the menu selected. It is essential to observe the indication provided by the display (icons and text). In fig. 1 for example, using the contextual button 2 (detail 2 - fig. 1) it is possible access unit information such as: temperature of sensors, work power, etc.

### Direct buttons

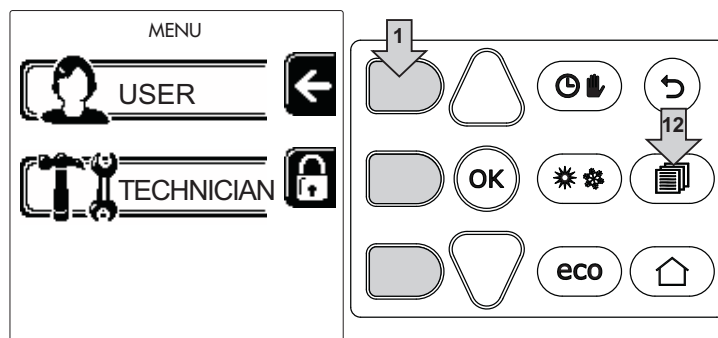
The direct buttons (details 8, 9, 10 - fig. 1) always have the same function.

### Menu/navigation buttons

The menu/navigation buttons (details 5, 6, 7, 11, 12, 13 - fig. 1) are used to navigate among the various menus implemented in the control panel.

### Menu structure














From the main screen (Home), press the Main menu button (detail 12 - fig. 1).



Access the "User" menu by pressing the contextual button 1 (detail 1 - fig. 1). Then use the "menu/navigation" buttons to access the various levels described in the following table.

USER MENU				
<b>HEATING</b>				
	Adjustment Temp		See fig. 12	
	Reduction Adjustment Temp		See fig. 13	
	Sliding Temperature	Curve1		See fig. 26
		Offset1		See fig. 27
		Outside Temp Heat Off		See page 142
		Curve2		/
	Offset2		/	
Time Program	See "Time programming" on page 137			
<b>DOMESTIC HOT WATER</b>				
	Adjustment Temp		See fig. 14	
	Reduction Adjustment Temp		See fig. 15	
	Legionella	See "Legionella programming (with optional hot water tank installed)" on page 140		
	Time Program	See "Time programming" on page 137		



HOLIDAY FUNCTION			
			See "Holiday Function" on page 140
MAINTENANCE			
		 Test mode	See fig. 58
		 Gas Type Selection	See fig. 55
		 Cascade Test Mode	
		Service Information	See "Service Information" on page 140
	Service Intervention Date	See "Service Intervention Date" on page 140	
SETTINGS			
	 Language		See fig. 7
	 Unit of Measure		/
	 Set Date		See fig. 8
	 Set Time		See fig. 9

**Indication during operation**

**Heating**

A heating demand (generated by the Room Thermostat, Remote Timer Control or 0-10 Vdc signal) is indicated by activation of the circulating pump and by the hot air above the radiator (fig. 2).

Configuration "Heating only/Double circulating pump"

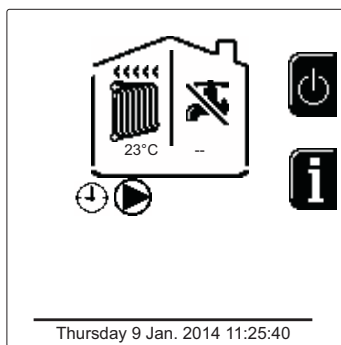


fig. 2

Configuration "Circulating pump and 3-way valve"

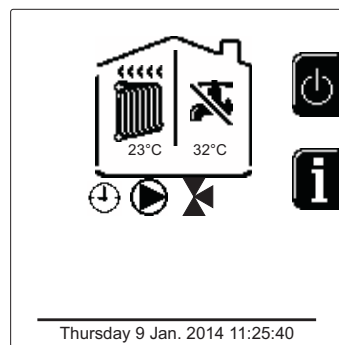


fig. 3

## DHW (with optional hot water tank installed)

A hot water tank heating demand is indicated by activation of the drop under the tap (fig. 4 and fig. 5).

Configuration “Double circulating pump”

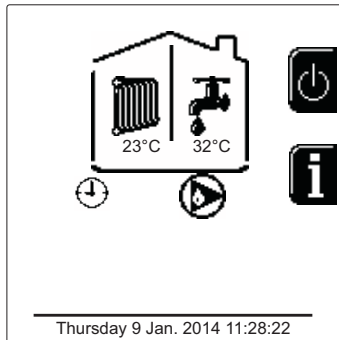


fig. 4

Configuration “Circulating pump and 3-way valve”

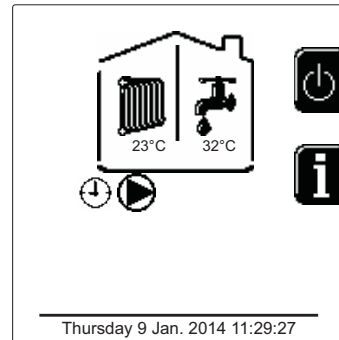


fig. 5

## Exclude hot water tank (economy)

Hot water tank temperature maintaining/heating can be excluded by the user. In case of exclusion, there will be no delivery of domestic hot water. The hot water tank can be deactivated by the user (ECO mode) by pressing the **eco/comfort button** (detail 10 - fig. 1). In ECO mode, the display activates the symbol ☹. To activate the COMFORT mode, press the **eco/comfort button** (detail 10 - fig. 1) again.

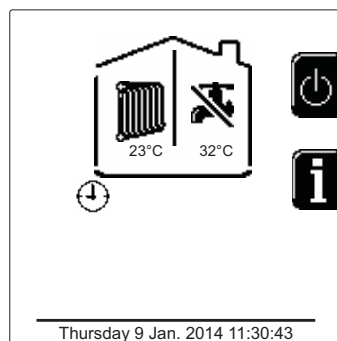


fig. 6 - Economy



**Information**

From the main screen (Home), press the contextual button 2 (detail 2 - fig. 1). Then use the "Menu Navigation" buttons to display the following values:

Heating demand	OT - OpenTherm control request
	TA - Room thermostat request
	0-10Vdc - 0-10Vdc signal request
	TA2 - Second room thermostat request
Heating circulating pump	ON/OFF
Heating 3-way valve	ON/OFF
DHW 3-way valve	ON/OFF
Standby time	ON/OFF
T Delta protection	ON/OFF
Flame Supervisor	ON/OFF
Heating sensor1	°C
Safety sensor	°C
Return sensor	°C
DHW sensor	°C
External probe	°C
Fume sensor	°C
Cascade heating sensor	°C
Fan frequency	Hz
Burner load	%
System water pressure	1.4bar = ON, 0.0 bar = OFF
Modulating circulating pump	%
Cascade modulating circulating pump	%
Ionization current	uA
Input 0-10Vdc	Vdc
Heating adjustment temperature	Setpoint (°C)
Power level adjustment 0-10Vdc	Setpoint (%)



## 1.3 Lighting and shutdown

### Boiler lighting

Press the On/Off button (detail 14 - fig. 1).

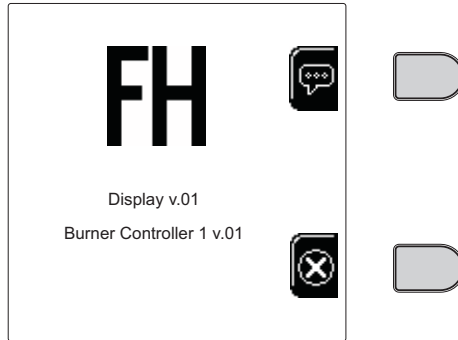


fig. 7 - Boiler lighting

Press the contextual button 1 to select the language, confirming it by pressing "OK".

Press the contextual button 3 to stop FH mode.

If none of the two selections described above is made, proceed as follows.

- For the following 300 seconds the display will show FH which identifies the heating system air venting cycle.
- The display also shows the firmware version of the cards.
- Open the gas cock ahead of the boiler.
- When the message FH disappears, the boiler is ready to operate automatically in case of a room thermostat demand.

### Settings

#### Contrast adjustment

To adjust the display contrast, press the **contextual button 2** and the **OK button together**. Then press the button ref. 5 of fig. 1 to increase the contrast or the button ref. 7 of fig. 1 to decrease it.

#### Setting the Date and Time

Reach the screen shown in fig. 8, navigating in the menu and following the path "USER MENU ➔ "Settings" ➔ "Date Setting". Press the navigation buttons 5 and 7 to select the value and modify it with the contextual buttons 1 and 2. Confirm with the OK button.

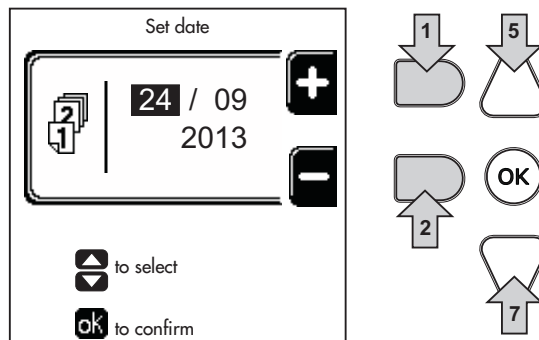


fig. 8 - Setting the Date



Reach the screen shown in fig. 9, navigating in the menu and following the path "USER MENU ➔ "Settings" ➔ "Time Setting". Press the navigation buttons 5 and 7 to select the value and modify it with the contextual buttons 1 and 2. Confirm with the OK button.

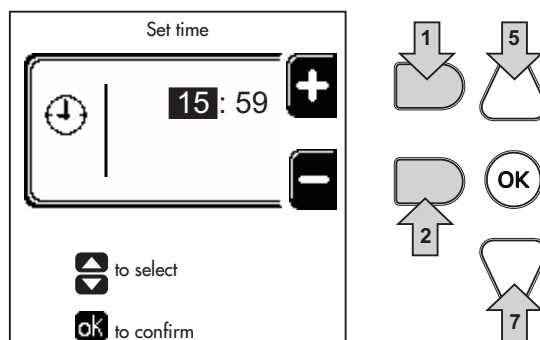


fig. 9 - Setting the Time

**Boiler shutdown**

From the main screen/Home, press the contextual button and confirm with the button .

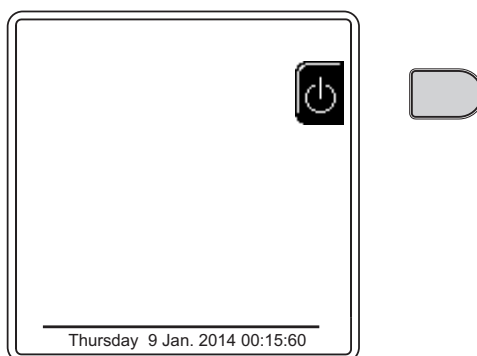


fig. 10 - Boiler shutdown

When the boiler is shut down, the PCB is still powered.

DHW mode (with optional hot water tank installed) and heating mode are disabled. The frost protection system remains activated.

To relight the boiler, press the contextual button again .

The boiler will be immediately ready to operate whenever domestic hot water is drawn (with optional hot water tank installed) or when there is a room thermostat demand.

To completely disconnect the power supply to the unit, press the button detail 14 fig. 1.



The frost protection system does not work when the power and/or gas to the unit are turned off. To avoid damage caused by freezing during long shutdowns in winter, it is advisable to drain all water from the boiler, the DHW circuit and the heating system water; or drain just the DHW circuit and add a suitable antifreeze to the heating system, as prescribed in sec. 2.3.

## 1.4 Adjustments

### Summer/Winter Switchover

Press the button (detail 9 - fig. 1) for 1 second.

The display activates the symbol **Summer**. The heating function is deactivated, whereas the possible production of domestic hot water (with optional external hot water tank) remains activated. The frost protection system remains activated.

To deactivate Summer mode, press the button (detail 9 - fig. 1) again for 1 second.

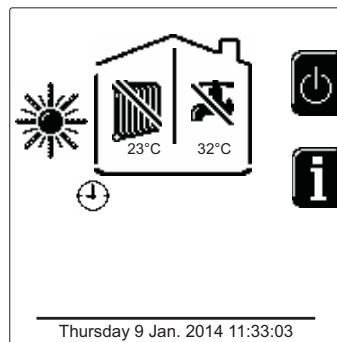


fig. 11 - Summer

### Heating temperature adjustment

Access the menu "**Adjustment Temp**" to vary the temperature from a minimum of 20°C to a maximum of 80°C. Confirm with the OK button.

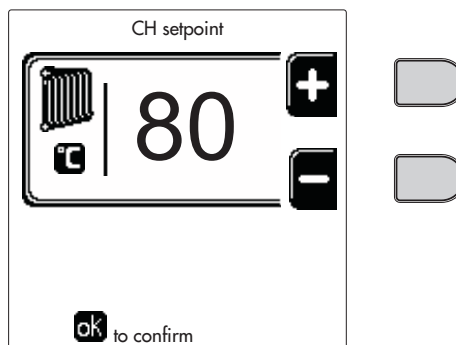


fig. 12



The boiler is sold with time program not activated. Therefore, if requested, this is the setpoint value.



**Heating temperature reduction**

Access the menu “**Reduction Adjustment Temp**” to vary the temperature from a minimum of 0°C to a maximum of 50°. Confirm with the OK button.

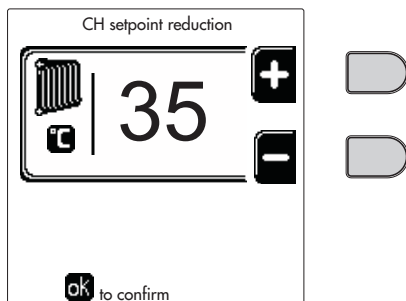



fig. 13

 This parameter is used only if time programming is activated. See \*\*\* 'Time programming' on page 137 \*\*\*

**DHW temperature reduction adjustment (with optional hot water tank installed)**

Access the menu “**Adjustment Temp**” to vary the temperature from a minimum of 10°C to a maximum of 65°C. Confirm with the OK button.

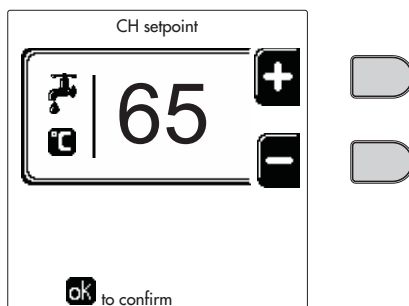



fig. 14

 The boiler is sold with time program not activated. Therefore, if requested, this is the setpoint value.

**DHW temperature reduction (with optional hot water tank installed)**

Access the menu “**Reduction Adjustment Temp**” to vary the temperature from a minimum of 0°C to a maximum of 50°C. Confirm with the OK button.

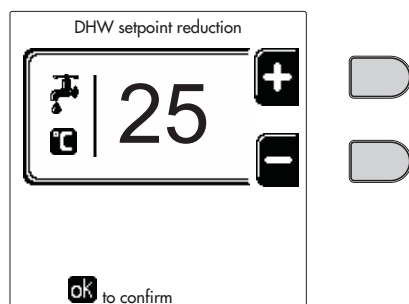



fig. 15

 This parameter is used only if time programming is activated. See \*\*\* 'Time programming' on page 137 \*\*\*

## Time programming

Programming the time is done in the same way both for heating and for DHW; the two programs are independent.

To program **Heating** access the "Time Program" menu following the path "USER MENU ➔ "HEATING" ➔ "Time Program".

To program **Domestic hot water (DHW)** access the "Time Program" menu following the path "USER MENU ➔ "DOMESTIC HOT WATER" ➔ "Time Program".

Choose the desired type of programming and follow the instructions given below.

Select the day (fig. 16) or the interval of days to be programmed (fig. 17) and confirm with the **OK** button.

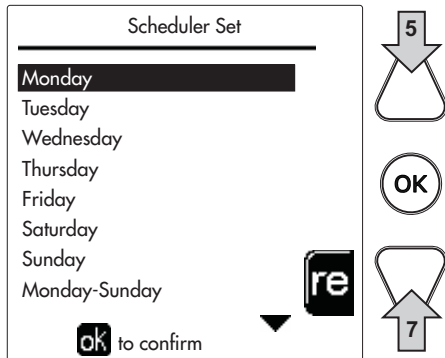


fig. 16

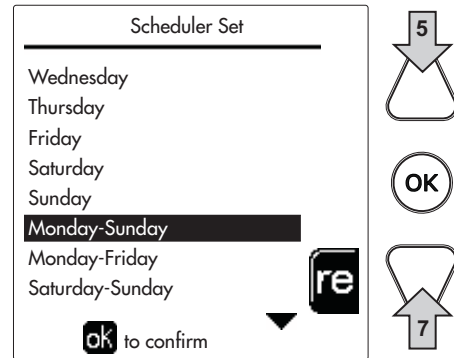


fig. 17

The program is weekly, which means that 6 independent time bands can be set for each day of the week (fig. 18); 4 options can be selected for each time band:

- **ON**. In case of a Heating/DHW demand, the boiler works at the set Heating/DHW (fig. 12/fig. 14) Adjustment Temperature.
- **+**. In case of a Heating/DHW demand, the boiler works at the Reduced Adjustment Temperature. The Reduced temperature is obtained by subtracting the Reduction Adjustment Temperature value (fig. 13/fig. 15) from the set Heating/DHW Adjustment Temperature (fig. 12/fig. 14).
- **OFF**. In case of a Heating/DHW demand, the boiler will not activate the Heating/DHW mode.
- **-- : -- OFF**. Time band disabled.

The boiler is sold with time program not activated. In fact, every day it will be programmed from 00:00h to 24:00h in ON mode (fig. 18).

First, set the start time of the first time band (fig. 18) using the contextual buttons 1 and 2.

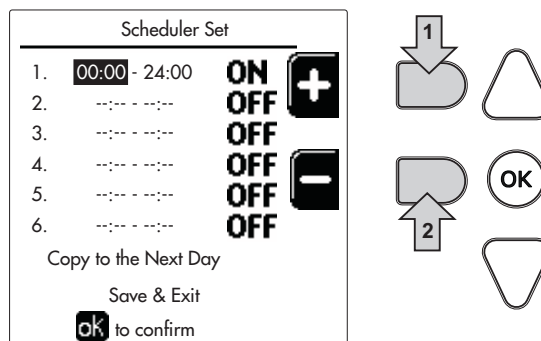


fig. 18



Press the navigation button 7 to move to the end time of the first time band (fig. 19) and set it to the desired value using the contextual buttons 1 and 2.

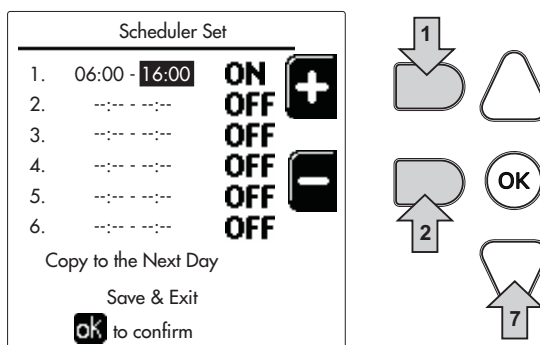


fig. 19

Press the navigation button 7 and use the contextual buttons 1 and 2 to set the work mode during the first time band (fig. 20)

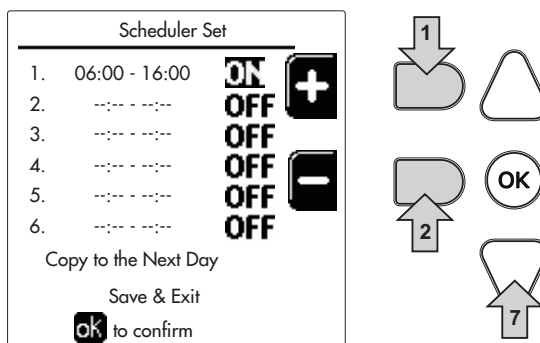


fig. 20

Then, press the navigation button 7 to set (if necessary) the next time bands (fig. 21, fig. 22 and fig. 23).

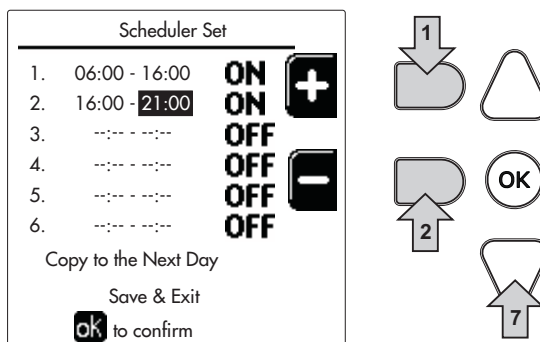


fig. 21

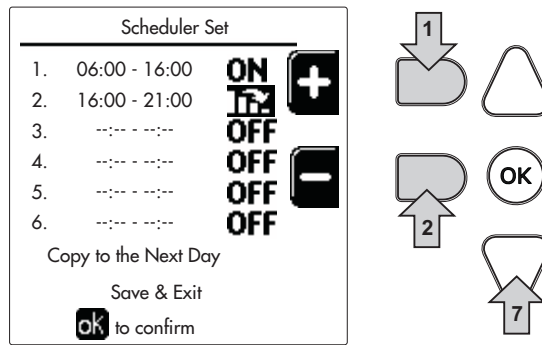


fig. 22

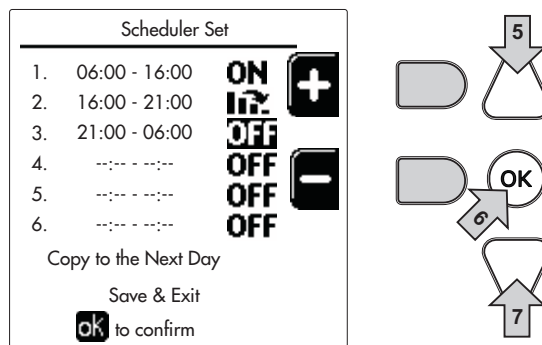


fig. 23

When the day has been programmed, press the OK button; the item "Save & exit" will be automatically selected (fig. 24). Use the navigation buttons 5 and 7 to change the previous settings, or press OK to confirm: in this case the display will again show the day (fig. 16) or the interval of days to be programmed (fig. 17). The same procedure can therefore be followed to complete the desired weekly program.

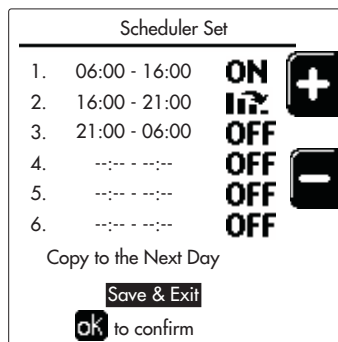



fig. 24

To program the next day in the same way, select "Copy to next day" and press OK to confirm (fig. 24).

 To reset the time program to the default values, press the **contextual button 3** in the **Time Program menu** (fig. 25) and confirm with **OK**.

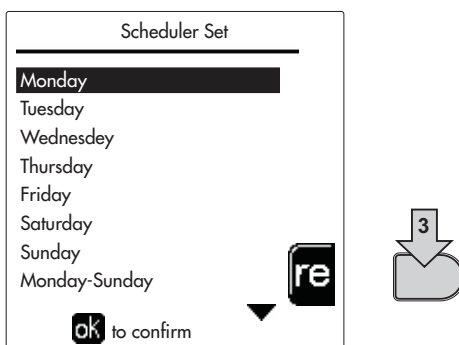



fig. 25

 The two Heating and DHW time programs are independent even in case of resetting to default values.

**Legionella programming (with optional hot water tank installed)**

This function must be activated by enabling an installer parameter.

Access the "Legionella" menu through the path "USER MENU ➡ "DOMESTIC HOT WATER" ➡ "Legionella" to set:



- **Antilegionella Day.** Defines the day of the week during which the function will be activated.
- **Time of Antilegionella Day.** Defines the function start time.
- **Antilegionella Duration.** Defines the duration (in minutes) of the function.
- **Antilegionella Adjustment Temp..** Defines the DHW Adjustment temperature during the function.

**Holiday Function**

Access the "HOLIDAY FUNCTION" menu through the path "USER MENU ➡ "HOLIDAY FUNCTION" to set:

- Holiday start date.
- Holiday end date.

The display can activate two types of icons:

-  - The Holiday function is programmed but not yet active.
-  - The Holiday function is in progress. The boiler will behave as if Summer mode and Economy mode were active (with optional hot water tank installed).  
The frost protection and Legionella functions will remain active (if activated).

**Service Intervention Date**

This informs when the alert of programmed maintenance by the technician will be activated. It does not represent an alarm or a fault but just a notice. After that date, whenever the Main menu is accessed, the boiler will activate a screen indicating that programmed maintenance is due.

**Service Information**

This information shows the telephone number to contact in case of assistance (if programmed by the technician).

**Room temperature adjustment (with optional room thermostat)**

Using the room thermostat, set the temperature required in the rooms.

**Room temperature adjustment (with optional remote timer control)**

Using the remote timer control, set the temperature desired in the rooms. The boiler unit will set the system water according to the required room temperature. For information on the remote timer control, please refer to its user's manual.



## Sliding temperature

When an external probe (optional) is installed, the corresponding symbol of the outside temperature is activated on the control panel display. The boiler adjustment system works with "Sliding Temperature". In this mode, the temperature of the heating system is adjusted according to the outside weather conditions, to ensure a high level of comfort and energy saving throughout the year. In particular, as the outside temperature increases, the system delivery temperature decreases according to a specific "compensation curve".

With Sliding Temperature adjustment, the "Heating adjustment" temperature becomes the maximum system delivery temperature. It is advisable to set a maximum value to allow system adjustment throughout its useful operating range.

The boiler must be adjusted at the time of installation by qualified personnel. Adjustments can in any case be made by the user to improve comfort.

## Compensation curve and curve offset

Access the Sliding Temperature menu. Adjust the required curve from 1 to 10 according to the characteristic (fig. 28) through the parameter "Curve1" and confirm with the OK button.

By setting the curve to 0, the sliding temperature adjustment is disabled.

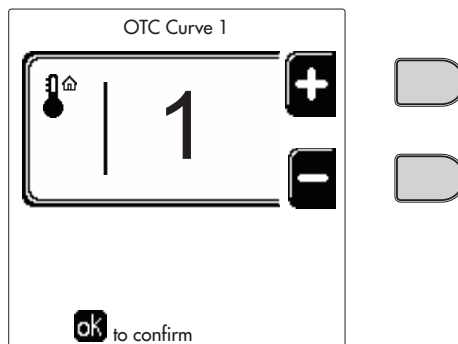


fig. 26 - Compensation curve

Adjust the parallel offset of the curves from 20 to 60 °C (fig. 29), through the parameter "Offset1" and confirm with the OK button.

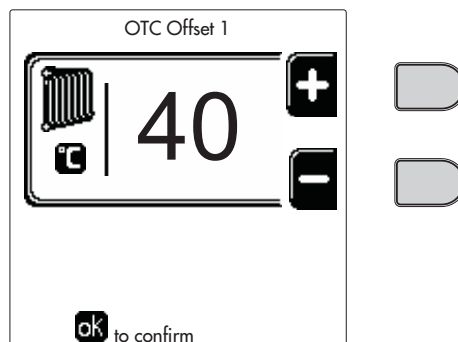


fig. 27 - Curve parallel offset



If the room temperature is lower than the required value, it is advisable to set a higher order curve and vice versa. Proceed by increasing or decreasing in steps of one and check the result in the room.

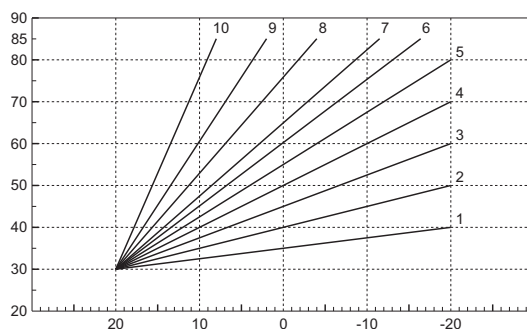


fig. 28 - Compensation curves

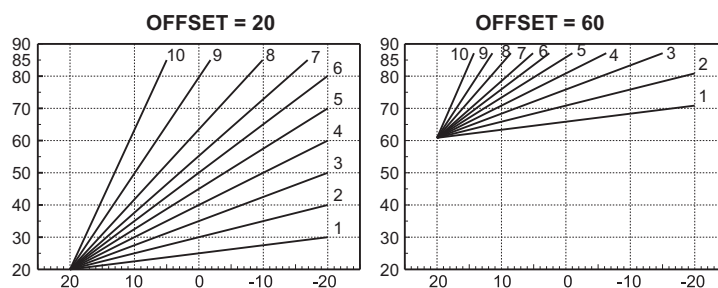


fig. 29 - Example of parallel offset of compensation curves

This parameter is used only if time programming has been activated. See \*\*\* 'Time programming' on page 137 \*\*\*

**Outside Temperature Heating OFF**

Access the “Out Temp Heat Off” to activate the function: between 7°C and 30°C.

If activated, this function will deactivate the heating demand whenever the temperature measured by the external probe is higher than the programmed value.

The heating demand will be reactivated as soon as the temperature measured by the external probe is lower than the programmed value.

**Adjustments from remote timer control**

If the Remote Timer Control (optional) is connected to the boiler, the above adjustments are managed according to that given in table 1.

Table. 1

<b>Heating temperature adjustment</b>	The adjustment can be made from the Remote Timer Control menu and the boiler control panel.
<b>DHW temperature adjustment (with optional hot water tank installed)</b>	The adjustment can be made from the Remote Timer Control menu and the boiler control panel.
<b>Summer/Winter Switchover</b>	Summer mode has priority over a possible Remote Timer Control heating demand.
<b>Eco/Comfort selection (with optional hot water tank installed)</b>	On disabling DHW from the Remote Timer Control menu, the boiler will select the Economy mode. In this condition, the button detail 10 - fig. 1 on the boiler panel is disabled.
	On enabling DHW from the Remote Timer Control menu, the boiler will select the Comfort mode. In this condition, with the button detail 10 - fig. 1 on the boiler panel it is possible to select one of two modes.
<b>Sliding Temperature</b>	Both the Remote Timer Control and the boiler card manage Sliding Temperature adjustment: Sliding Temperature overrides the boiler card.

## System water pressure adjustment

The filling pressure with the system cold must be approx. 1.0 bar. If the system pressure falls to values below minimum, the boiler card will activate **fault 37 and the number of the module** (fig. 30).

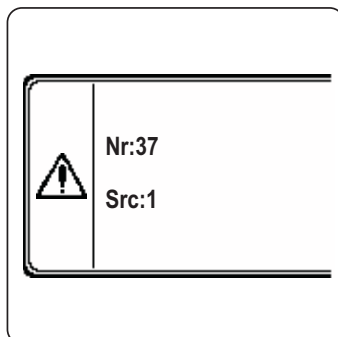



fig. 30 - Module 1 insufficient system pressure fault

 Once the system pressure is restored, the boiler will activate the 300-second air venting cycle indicated on the display by FH.




## 2. Installation

### 2.1 General Instructions

BOILER INSTALLATION MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL, IN ACCORDANCE WITH ALL THE INSTRUCTIONS GIVEN IN THIS TECHNICAL MANUAL, THE PROVISIONS OF CURRENT LAW, THE PRESCRIPTIONS OF NATIONAL AND LOCAL STANDARDS AND THE RULES OF PROPER WORKMANSHIP.

### 2.2 Place of installation

The generator must be installed in a suitable room with ventilation openings towards the outside in conformity with current regulations. If there are several burners or exhausters that can work together in the same room, the ventilation openings must be sized for simultaneous operation of all the units. The place of installation must be free of flammable materials or objects, corrosive gases, powders or volatile substances. The room must be dry and not exposed to rain, snow or frost.

 If the unit is enclosed in a cabinet or mounted alongside, there must be sufficient space for removing the casing and for normal maintenance activities

### 2.3 Plumbing connections

#### Important

The heating capacity of the unit must be previously established by calculating the building's heat requirement according to current regulations. The system must be provided with all the components for correct and regular operation. In particular, provide for all the protection and safety devices required by current regulations for the complete modular generator. They must be installed on the hot water circuit delivery piping, immediately after the last module, within a distance of not more than 0.5 m. and with no shutoff devices in between. The unit is not supplied with an expansion tank; its connection must therefore be carried out by the Installer.

Do not use the water system pipes to earth electrical appliances.

Before installation, flush all the pipes of the system thoroughly to remove any residuals or impurities that could affect proper operation of the unit.



Also, a filter must be installed on the system return piping to prevent impurities or sludge from the system clogging and damaging the heat generators.

The filter must be installed when replacing generators in existing systems. The manufacturer declines any liability for damage caused to the generator by failure to install or inadequate installation of this filter.

Carry out the relevant connections according to the diagram in sec. 4.1 and the symbols on the unit.

## High-efficiency circulating pump (optional)

The factory setting is suitable for all installations; however a different operation strategy can be set with the speed selector (see fig. 31), depending on the characteristics of the system.

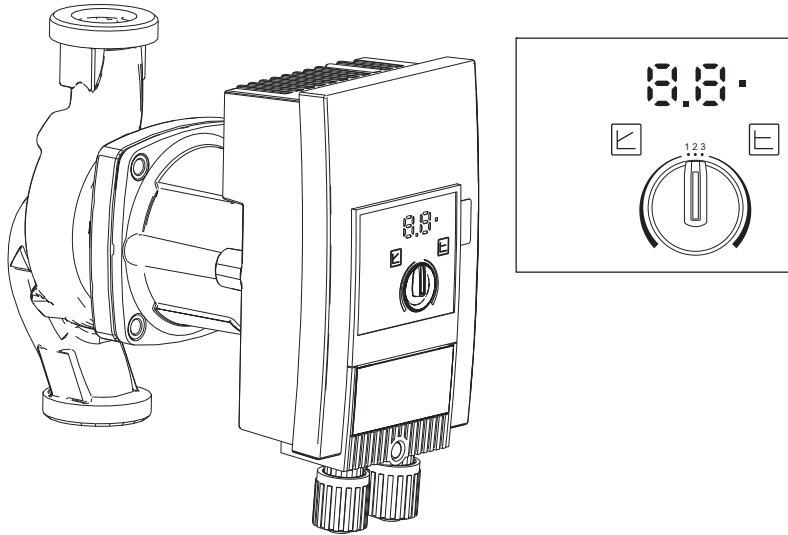
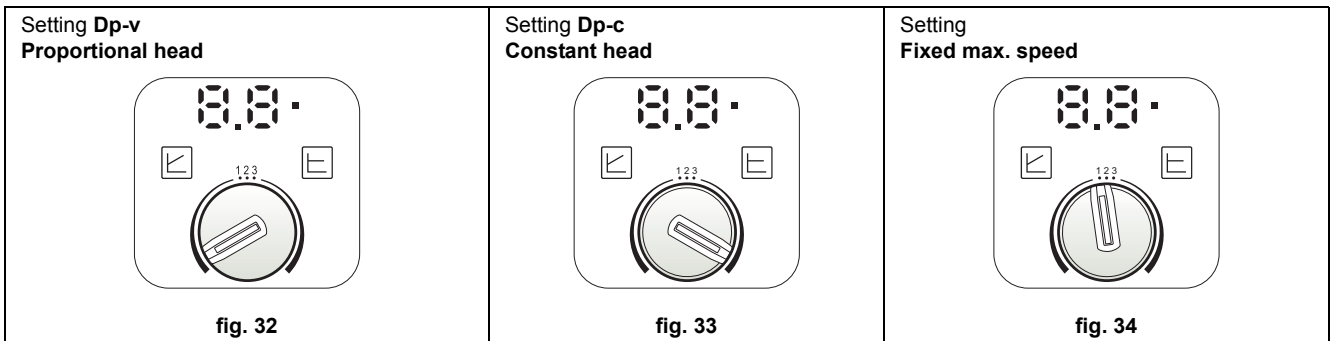


fig. 31



### - Proportional Head Dp-v setting (fig. 32)

The circulating pump head will be automatically reduced with the decrease in flow rate required by the system. This setting is optimum for systems with radiators (2 pipes or single pipe) and/or thermostatic valves.

The strong points are the reduction in power consumption with the decrease in system demand and reduction of noise in radiators and/or thermostatic valves. The operating range is from minimum **2** to maximum **7** or **10** depending on the circulating pump model installed.

### - Constant Head Dp-c setting (fig. 33)

The circulating pump head will remain constant with the decrease in flow rate required by the system. This setting is optimum for all floor systems or old systems with large pipes.

In addition to reduced power consumption, in floor systems all the circuits will be balanced for the same head loss. The operating range is from minimum **0.5** to maximum **7** or **10** depending on the circulating pump model installed.

### - Fixed max. speed setting (fig. 34)

The circulating pump does not modulate its power. It will always work at the speed set with the selector. The circulating pump can be set to 3 speeds: **1** (Minimum speed), **2** (Average speed) and **3** (Maximum speed).

The operating principle is that of conventional circulating pumps (with a reduction in power consumption compared to them).

**System water characteristics**



**FORCE W** boilers are suitable for installation in heating systems with non-significant entry of oxygen (ref. systems "case I" EN14868). A physical separator (e.g. plate heat exchanger) must be provided in systems with continuous entry of oxygen (e.g. underfloor systems without antidiffusion pipes or open vessel), or intermittent (less than 20% of system water content).

The water within a heating system must have the characteristics required by UNI 8065, and comply with laws and regulations in force and the provisions of EN14868 (protection of metallic materials against corrosion).

The filling water (first filling and subsequent replenishments) must be potable, clear, with the hardness indicated in the table below and treated with chemical conditioners that prevent encrustations, corrosive or aggressive phenomena on metals and plastics, the formation of gas, and the proliferation of bacterial or microbial masses in low temperature systems.

The water contained in the system must be checked periodically (at least twice a year during the seasons of use, as required by UNI8065) and possibly have a clear appearance and must comply with the limits given in the following table.

WATER PARAMETER	EXISTING SYSTEM	NEW SYSTEM
Total filling water hardness (°F)	<10	<10
Total system water hardness (°F)	<15	<10
PH	7 < Ph < 8	
Copper Cu (mg/l)	Cu < 0.5 mg/l	
Iron Fe (mg/l)	Fe < 0.5 mg/l	
Chlorides (mg/l)	Cl < 050 mg/l	
Conductivity (µS/cm)	< 600 µS/cm*	
Sulfates	< 100 mg/l	
Nitrates	< 100 mg/l	

\* With the use of the conditioners listed below, the limit rises **1200 µS/cm**.

It must contain chemical conditioners in a concentration sufficient (180 ml/l) to protect the system for at least one year. Bacterial or microbial loads must not be present in low temperature systems.

Chemical conditioners must ensure complete deoxygenation of the water, contain specific protection for yellow metals (copper and its alloys), anti-fouling agents for scale, neutral pH stabilizers and, in low-temperature systems, specific biocides for use in heating systems.

## Chemical conditioners:

Products that can be purchased from our Authorized Technical Assistance network	Alternative products	Description
LIFE PLUS	X100	General protection
LIFE DUE	X200	Noise reduction
BIO KILL	X700	Sanitizing and biocidal
PROGLI	X500	General protection and frost protection
Products with equivalent characteristics may be used		

The unit is equipped with a frost protection system that activates the boiler in heating mode when the system delivery water temperature falls below 6°C. The device is not active if the power and/or gas supply to the unit is turned off. If necessary, for system protection use a suitable antifreeze liquid that meets the same requirements as set out above and provided for by UNI 8065.

In the presence of adequate chemical/physical system and feed water treatments and related high cyclicity controls able to ensure the required parameters, for industrial process applications the product can be installed in open-vessel systems with vessel hydrostatic height able to ensure compliance with the minimum operating pressure indicated in the product technical specifications.

**Failure to comply with the above regulations will result in non-recognition of the warranty.**

**To ensure the reliability and proper operation of the boilers, install a mechanical filter in the loading circuit and a sludge remover/de-aerator in the system.**

### Antifreeze system, antifreeze fluids, additives and inhibitors

The boiler is equipped with an antifreeze system that turns on the boiler in heating mode when the system delivery water temperature falls under 6°C. The device will not come on if the electricity and/or gas supply to the unit are cut off. If it becomes necessary, it is permissible to use antifreeze fluid, additives and inhibitors only if the manufacturer of these fluids or additives guarantees they are suitable for this use and cause no damage to the heat exchanger or other components and/or materials of the boiler unit and system. It is prohibited to use generic antifreeze fluid, additives or inhibitors that are not expressly suited for use in heating systems and compatible with the materials of the boiler unit and system.



**Optional kits**

The following kits are available on request:

**code 042070X0 - HIGH EFFICIENCY CIRCULATING PUMP KIT- 7m. (A - fig. 35)**

**code 042071X0 - HIGH EFFICIENCY CIRCULATING PUMP KIT- 10m. (A - fig. 35)**

**code 042072X0 - PLUMBING KIT**

The Kit 042072X0 contains:

- 1 NON-RETURN VALVE - Female 1"1/2 (B - fig. 35)**
- 2 3-Way FAUCET - Female 1"1/2 (C - fig. 35)**

It enables shutting off (for maintenance operations) in conformity with **ISPESL** requirements and can be used as a local shutoff for the connection of several units in bank. The third way must be connected to an atmospheric discharge manifold. In this way, with the valve in the "open" position, the boiler exchanger is connected to the delivery manifold; and in the "closed" position, through the third way, the exchanger communicates with the atmospheric discharge manifold. This valve therefore also acts as a boiler discharge.

- 3 FAUCET Male/Female 1"1/2 (D - fig. 35)**

In combination with the 3-way valve described above, it enables shutting off (for maintenance operations) in conformity with **ISPESL** requirements and can be used as a local shutoff for the connection of several units in bank.

- 4 CONNECTION NIPPLE 1"1/2 (E - fig. 35)**

In combination with the 3-way valve described above, it enables shutting off (for maintenance operations) in conformity with **ISPESL** requirements and can be used as a local shutoff for the connection of several units in bank.

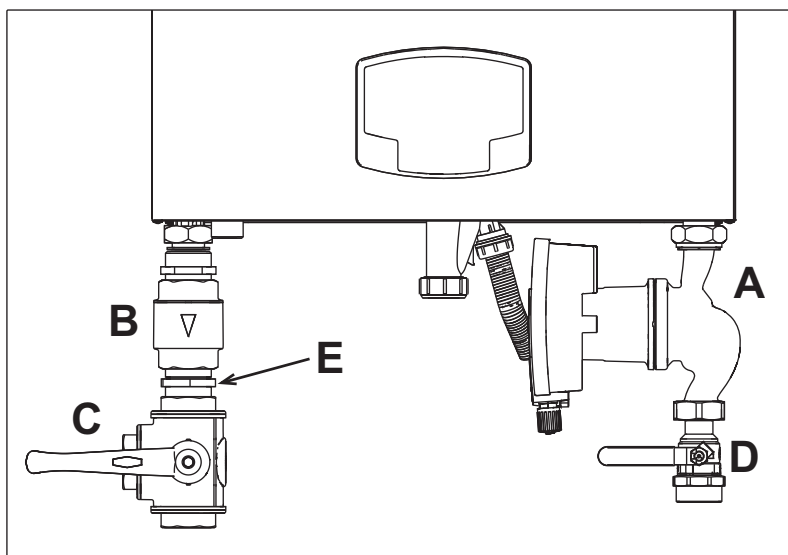


fig. 35- Boiler with installed kits



## Hydraulic circuit examples

In the examples described below, the checking/change of some parameters may be required.

To do this it is necessary to access the Technical menu.

From the Home page, press the main Menu button (detail 12 - fig. 1).

Access the "Technical" menu by pressing the contextual button 2 (detail 2 - fig. 1).

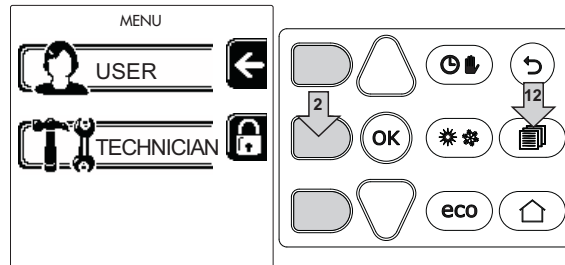


fig. 36

Enter the code "4 1 8" with contextual buttons 1 and 2. Confirm each number with the OK button.

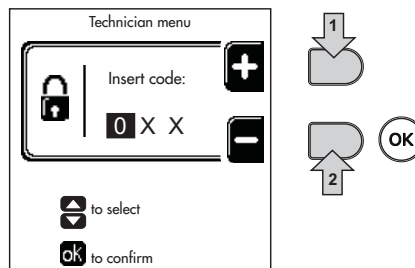


fig. 37

Press the OK button to access the Parameters Menu.

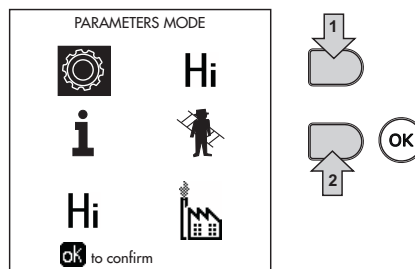


fig. 38

Access the "Configuration Menu" or "System Type Menu" according to the parameter to be modified as given in each hydraulic circuit example.

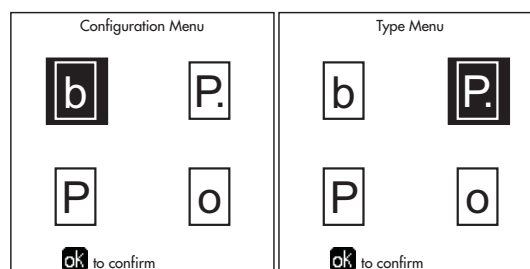


fig. 39



Two direct heating circuits

- Schematic diagram

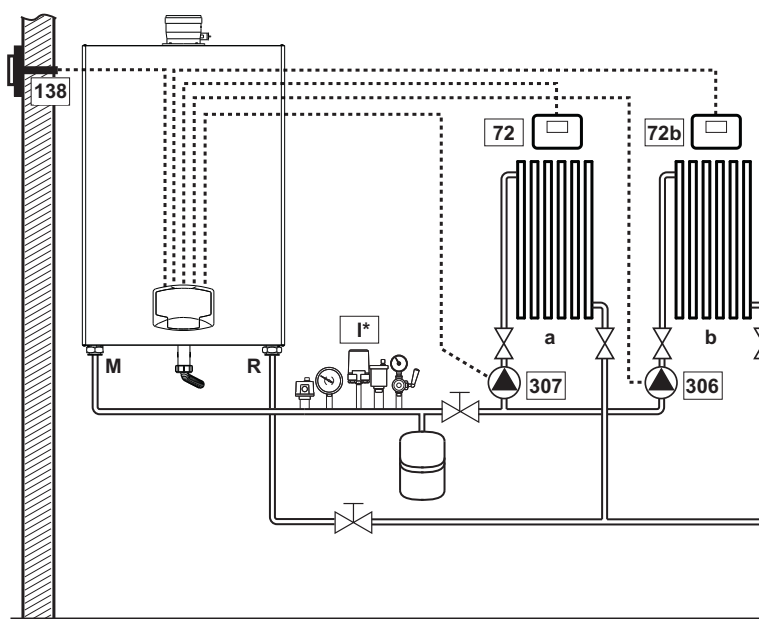


fig. 40

- Electrical connections

After installation, carry out the necessary electrical connections as shown in the wiring diagram. Then configure the controller as described in the specific section.

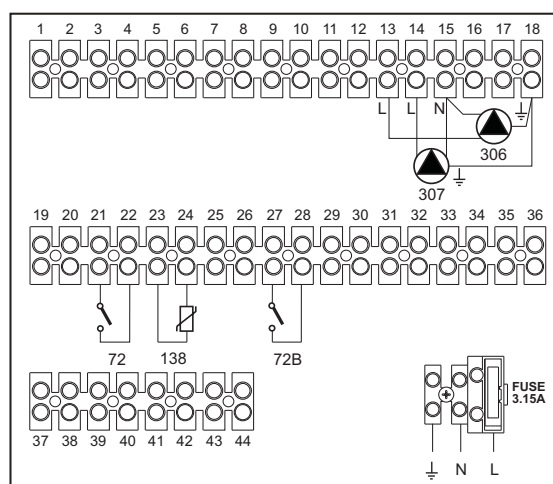


fig. 41

Legend

- |   |                            |
|---|----------------------------|
| <b>72</b> 1st zone (direct) room thermostat                   | <b>a</b> 1st zone (direct) |
| <b>72b</b> 2nd zone (direct) room thermostat                  | <b>b</b> 2nd zone (direct) |
| <b>138</b> External probe                                     | <b>M</b> Delivery          |
| <b>307</b> 1st zone (direct) circulating pump                 | <b>R</b> Return            |
| <b>306</b> 2nd zone (direct) circulating pump                 |                            |
| <b>I*</b> ISPEL safety devices (when required - not supplied) |                            |

To manage the sliding temperature it is necessary to purchase the external probe accessory code 013018X0

## - Parameters

Each system requires a different parameterization. Follow the access procedure given below.

### “System Type Menu”

Change parameter **P.01** of the “System Type Menu” to **4**.

## - Optional functions

As well as the electrical connections of the previous figure (required for this system configuration) there are options that do not require settings.

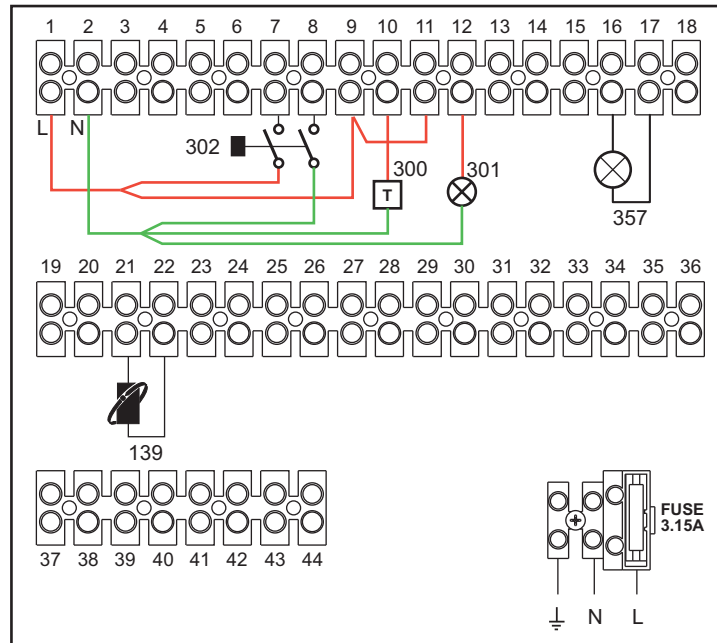


fig. 42

### Legend

- 139** Remote Control: it can be installed in place of 72 to manage the request of the 1st zone (direct)
- 300** Burner On indication (voltage-free output): the example shows the connection of an hour counter at 230Vac
- 301** Fault indication (voltage-free contact output): the example shows the connection of a lamp at 230Vac
- 302** Remote reset input (230Vac): the example shows the connection of a double-pole switch at 230Vac, allowing the resetting of a block type fault
- 357** Fault indication (230Vac): the example shows the connection of a lamp at 230Vac

One direct heating circuit and one DHW circuit with circulating pump

- Schematic diagram

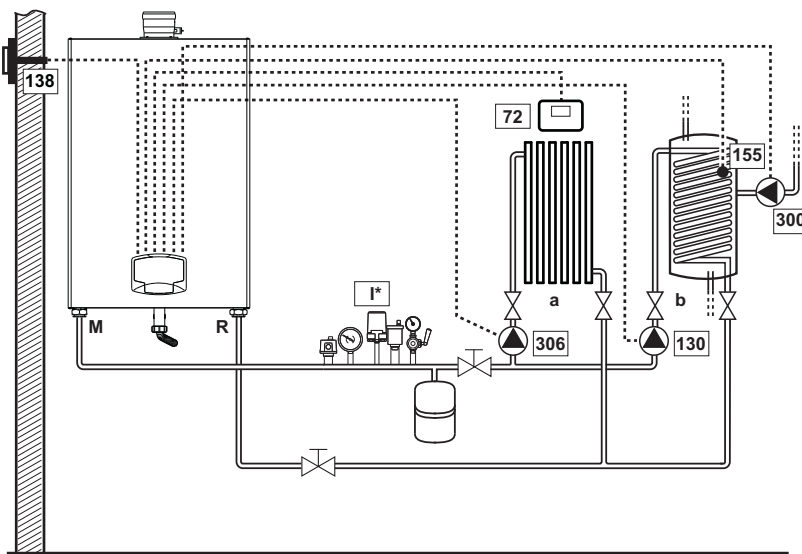


fig. 43

- Electrical connections

After installation, carry out the necessary electrical connections as shown in the wiring diagram.

Then configure the controller as described in the specific section.

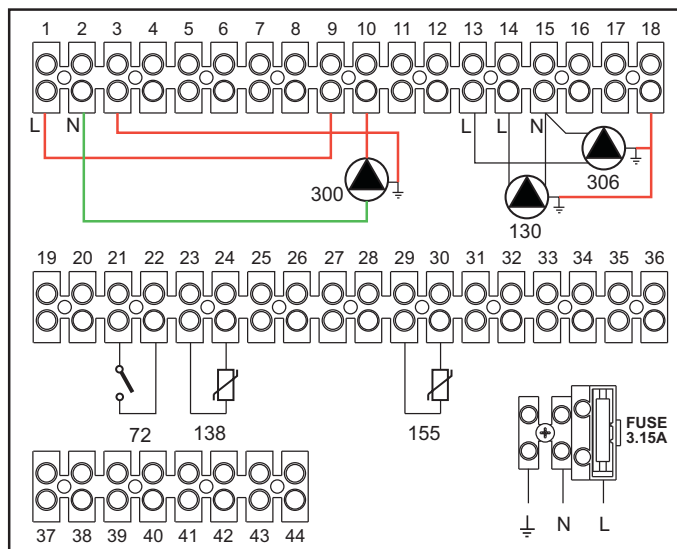


fig. 44

Legend

- |     |  |   |                        |
|-----|--|---|------------------------|
| 72  | 1st zone (direct) room thermostat                    | a | 1st zone (direct)      |
| 130 | Hot water tank circulating pump                      | b | Hot water tank circuit |
| 138 | External probe                                       | M | Delivery               |
| 155 | Hot water tank probe                                 | R | Return                 |
| 300 | Legionella protection circulating pump               |   |                        |
| 306 | 1st zone (direct) circulating pump                   |   |                        |
| I*  | ISPESL safety devices (when required - not supplied) |   |                        |

To manage the sliding temperature it is necessary to purchase the external probe accessory code 013018X0
If a hot water tank probe (not supplied) is used, it is necessary to purchase the NTC probe accessory code 1KWMA11W (2 mt.) or code 043005X0 (5 mt.)
If a hot water tank thermostat (not supplied) is used, it is necessary to purchase the accessory kit code 013017X0 (to be connected in place of the Hot Water Tank Probe)

### - Parameters

Each system requires a different parameterization. Follow the access procedure given below.

#### “Configuration - Parameters Menu”

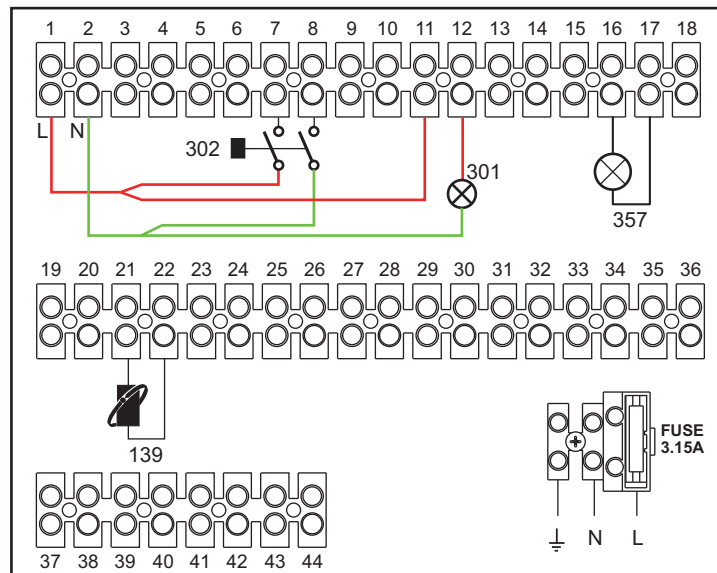
Check/Change parameter **b02** of the “Transparent Parameters Menu” to **8**.

Check/Change parameter **b08** of the “Transparent Parameters Menu” to **1**.

Check/Change parameter **b04, b05 and b06** of the "Transparent Parameter Menu" according to the values given in the table \*\*\* 'Configuration - Parameters Menu' on page 166 \*\*\*.

### - Optional Functions

As well as the electrical connections of the previous figure (required for this system configuration) there are options that do not require settings.



#### Legend

- 139** Remote Control: it can be installed in place of 72 to manage the request of the 1st zone (direct)
- 301** Fault indication (voltage-free contact output): the example shows the connection of a lamp at 230Vac
- 302** Remote reset input (230Vac): the example shows the connection of a double-pole switch at 230Vac, allowing the resetting of a block type fault
- 357** Fault indication (230Vac): the example shows the connection of a lamp at 230Vac



**A direct heating circuit and a DHW circuit with diverter valve (3-wire)**

**- Schematic diagram**

Use diverter valves with 3 wires: 230V OPENING PHAS - 230V CLOSING PHASE - NEUTRAL with switching times (from all closed to all open) of not more than 90 seconds.

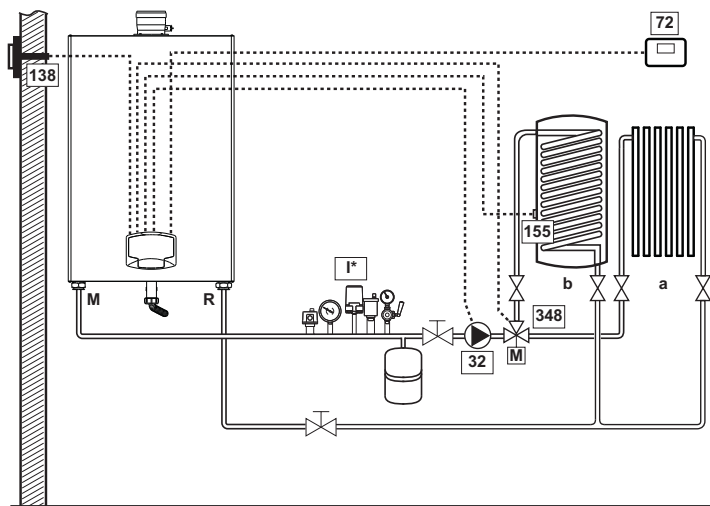


fig. 45

**- Electrical connections**

After installation, carry out the necessary electrical connections as shown in the wiring diagram. Then configure the controller as described in the specific section.

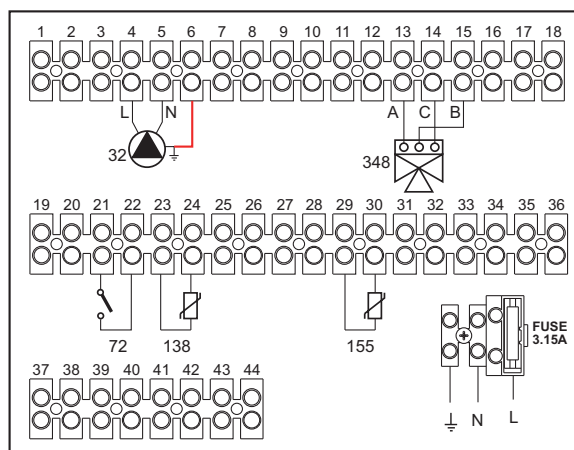


fig. 46

**Legend**

- |   |                                 |
|---|---------------------------------|
| <b>32</b> Heating circulating pump                            | <b>a</b> 1st zone (direct)      |
| <b>72</b> 1st zone (direct) room thermostat                   | <b>b</b> Hot water tank circuit |
| <b>138</b> External probe                                     | <b>M</b> Delivery               |
| <b>155</b> Hot water tank probe                               | <b>R</b> Return                 |
| <b>348</b> 3-way valve (3-wire)                               |                                 |
| <b>A</b> = OPENING PHASE                                      |                                 |
| <b>B</b> = NEUTRAL  |                                 |
| <b>C</b> = CLOSING PHASE                                      |                                 |
| <b>I*</b> ISPEL safety devices (when required - not supplied) |                                 |

To manage the sliding temperature it is necessary to purchase the external probe accessory code 013018X0
If a hot water tank probe (not supplied) is used, it is necessary to purchase the NTC probe accessory code 1KWMA11W (2 mt.) or code 043005X0 (5 mt.)
If a hot water tank thermostat (not supplied) is used, it is necessary to purchase the accessory kit code 013017X0 (to be connected in place of the Hot Water Tank Probe)

### - Parameters

Each system requires a different parameterization. Follow the access procedure given below.

#### “Configuration - Parameters Menu”

Check/Change parameter **b02** of the “Configuration - Parameters Menu” to **9**.

Check/Change parameter **b04**, **b05** and **b06** of the "Configuration - Parameters Menu" according to the values given in the table \*\*\* 'Configuration - Parameters Menu' on page 166 \*\*\*.

### - Optional functions

As well as the electrical connections of the previous figure (required for this system configuration) there are options that do not require settings.

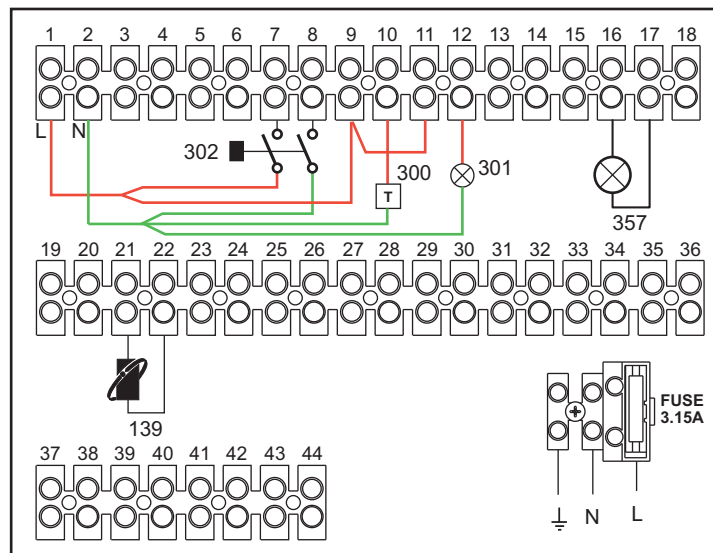


fig. 47

### Legend

- 139** Remote Control: it can be installed in place of 72 to manage the request of the 1st zone (direct)
- 300** Burner On indication (voltage-free output): the example shows the connection of an hour counter at 230Vac
- 301** Fault indication (voltage-free contact output): the example shows the connection of a lamp at 230Vac
- 302** Remote reset input (230Vac): the example shows the connection of a double-pole switch at 230Vac, allowing the resetting of a block type fault
- 357** Fault indication (230Vac): the example shows the connection of a lamp at 230Vac

**Two mixed heating circuits, one direct heating circuit and one DHW circuit with circulating pump**

**- Schematic diagram**

The **zone control card FZ4B** can manage different types of systems. An example is given.  
 Use diverter valves with 3 wires: 230V OPENING PHASE - 230V CLOSING PHASE - NEUTRAL  
 with switching times (from all closed to all open) of not more than 180 seconds.

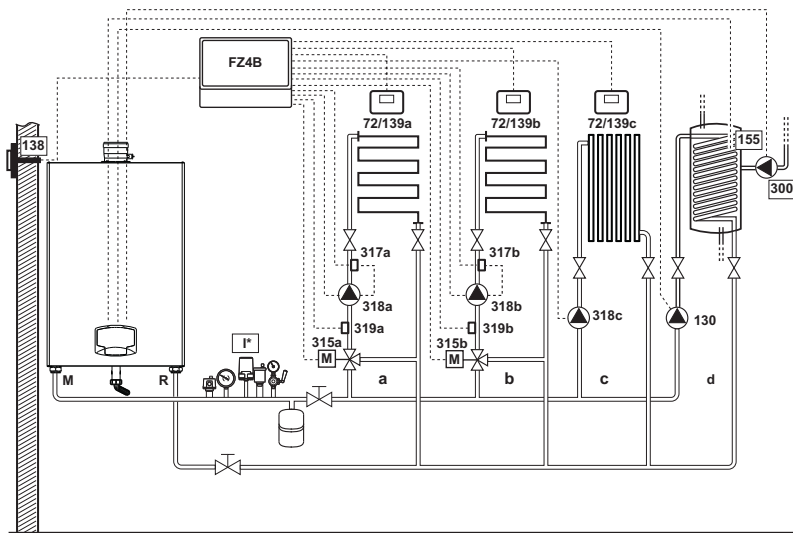


fig. 48

**- Electrical connections**

After installation, carry out the necessary electrical connections as shown in the wiring diagram.  
 Then configure the controller as described in the specific section.

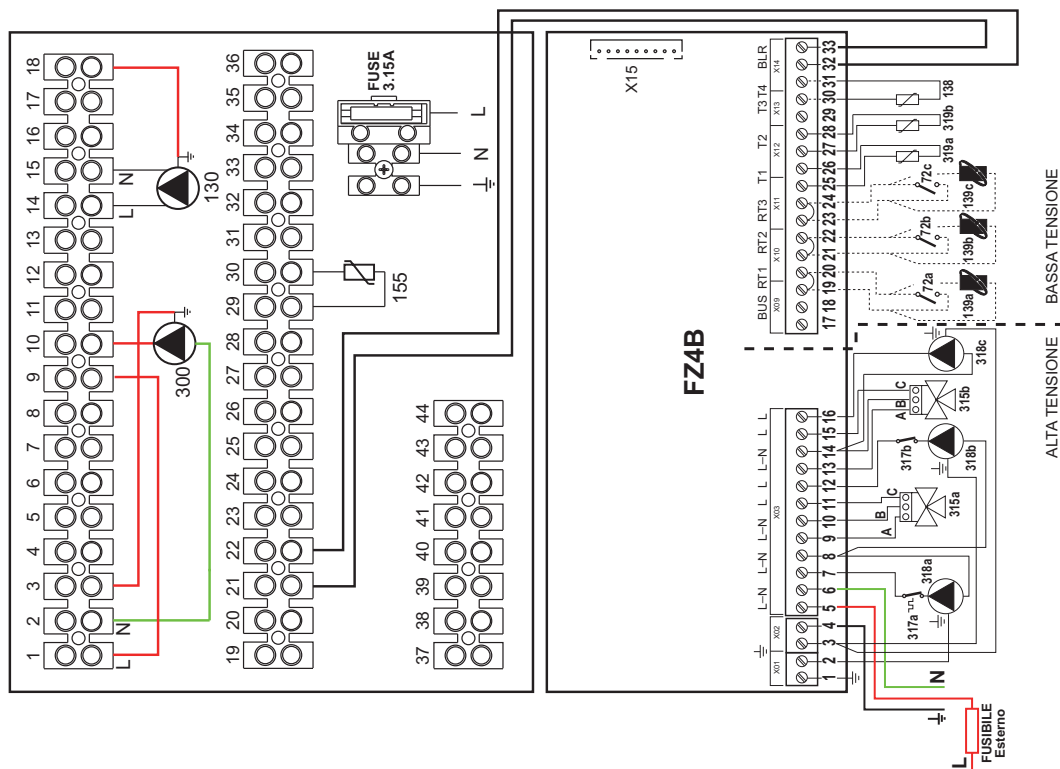


fig. 49



## Legend

<b>72a</b>	1st zone (mixed) room thermostat	<b>317a</b>	1st zone (mixed) safety thermostat
<b>72b</b>	2nd zone (mixed) room thermostat	<b>317b</b>	2nd zone (mixed) safety thermostat
<b>72c</b>	3rd zone (direct) room thermostat	<b>318a</b>	1st zone (mixed) circulating pump
<b>130</b>	Hot water tank circulating pump	<b>318b</b>	2nd zone (mixed) circulating pump
<b>138</b>	External probe	<b>318c</b>	3rd zone (direct) circulating pump
<b>139a</b>	1st zone (mixed) Remote Timer Control	<b>319a</b>	1st zone (mixed) delivery sensor
<b>139b</b>	2nd zone (mixed) Remote Timer Control	<b>319b</b>	2nd zone (mixed) delivery sensor
<b>139c</b>	3rd zone (direct) Remote Timer Control	<b>M</b>	Delivery
<b>155</b>	Hot water tank probe	<b>R</b>	Return
<b>300</b>	Legionella protection circulating pump		
<b>315a</b>	1st zone (mixed) mixing valve	<b>a</b>	1st zone (mixed)
	<b>A</b> = OPENING PHASE	<b>b</b>	2nd zone (mixed)
	<b>B</b> = NEUTRAL	<b>c</b>	3rd zone (direct)
	<b>C</b> = CLOSING PHASE	<b>d</b>	Hot water tank circuit
<b>315b</b>	2nd zone (mixed) mixing valve		
	<b>A</b> = OPENING PHASE		
	<b>B</b> = NEUTRAL		
	<b>C</b> = CLOSING PHASE		
<b>I*</b>	ISPESL safety devices (when required - not supplied)		

**To manage the sliding temperature it is necessary to purchase the external probe accessory code 013018X0**

**If a hot water tank probe (not supplied) is used, it is necessary to purchase the NTC probe accessory code 1KWMA11W (2 mt.) or code 043005X0 (5 mt.)**

**If a hot water tank thermostat (not supplied) is used, it is necessary to purchase the accessory kit code 013017X0 (to be connected in place of the Hot Water Tank Probe)**

## - Parameters

Each system requires a different parameterization. Follow the access procedure given below.

### “Configuration - Parameters Menu”

Check/Change parameter **b02** of the “Configuration - Parameters Menu” to **9**.

Check/Change parameter **b08** of the “Configuration - Parameters Menu” to **1**.

Check/Change parameter **b04, b05 and b06** of the "Configuration - Parameters Menu" according to the values given in the table \*\*\* 'Configuration - Parameters Menu' on page 166 \*\*\*.

## - Parameters FZ4B

See relevant manual in Kit.



**- Optional functions**

As well as the electrical connections of the previous figure (required for this system configuration) there are options that do not require settings.

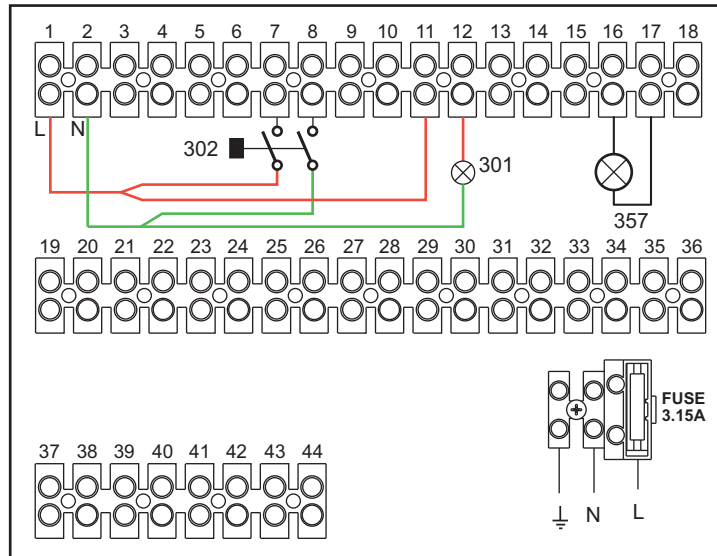



fig. 50



**Legend**

- 301** Fault indication (voltage-free contact output): the example shows the connection of a lamp at 230Vac
- 302** Remote reset input (230Vac): the example shows the connection of a double-pole switch at 230Vac, allowing the resetting of a block type fault
- 357** Fault indication (230Vac): the example shows the connection of a lamp at 230Vac

## 2.4 Gas connection


-  Before carrying out the connection, make sure the unit is arranged for operation with the type of fuel available and carefully clean all the pipes of the gas system to remove any residues that could affect proper boiler operation.

The gas must be connected to the relevant connection (see fig. 49, fig. 50 is fig. 51) in conformity with the current standards, with a rigid metal pipe or with a continuous surface flexible s/steel tube, installing a gas cock between the system and boiler. Make sure all the gas connections are tight. The gas meter capacity must be suitable for the simultaneous use of all the units connected to it. The diameter of the gas pipe leaving the boiler does not determine the diameter of the pipe between the unit and the meter; it must be chosen according to its length and pressure losses, in conformity with the current standards.


-  Do not use the gas pipes to earth electrical appliances.
-  In case of connection in cascade, make sure to install a fuel shutoff valve externally with respect to the modules.

## 2.5 Electrical connections


### IMPORTANT

-  **BEFORE CARRYING OUT ANY OPERATION THAT REQUIRES REMOVING THE CASING, DISCONNECT THE BOILER FROM THE ELECTRIC MAINS WITH THE MAIN SWITCH.**


**NEVER TOUCH THE ELECTRICAL COMPONENTS OR CONTACTS WITH THE MAIN SWITCH TURNED ON! DANGER OF ELECTRIC SHOCK WITH RISK OF INJURY OR DEATH!**

-  The unit must be connected to an efficient grounding system in accordance with applicable safety regulations. Have the efficiency and suitability of the grounding system checked by professionally qualified personnel; the Manufacturer declines any liability for damage caused by failure to earth the system.

The boiler is prewired and provided with a three-pole cable, without a plug, for connection to the electric line. The connections to the grid must be made with a permanent connection and equipped with a bipolar switch whose contacts have a minimum opening of at least 3 mm, interposing fuses of max. 3A between the boiler and the line. Make sure to respect the polarities (LINE: brown wire / NEUTRAL: blue wire / GROUND: yellow-green wire) in the connections to the electric line.

-  The unit's supply cable **MUST NOT BE REPLACED BY THE USER. If the cable gets damaged, turn the unit off and have the cable replaced only by professionally qualified personnel.** In case of replacement, only use cable "HAR H05 VV-F" 3x0.75 mm<sup>2</sup> with max. external diameter of 8 mm.

### Room thermostat (optional)

-  CAUTION: The room thermostat must have clean contacts. **CONNECTING 230 V. TO THE TERMINALS OF THE ROOM THERMOSTAT WILL IRREPARABLY DAMAGE THE ELECTRONIC CARD.**

When connecting a remote timer control or a timer switch, do not take the power supply for these devices from their cut-out contacts. Their power supply must be taken with a direct connection from the mains or with batteries, depending on the kind of device.



**External probe (optional)**

Connect the probe to the respective terminals. The maximum permissible length of the electric cable connecting the boiler - external probe is 50 m. A common 2-wire cable can be used. The external probe should preferably be installed on the North, North-West wall or on the wall facing most of the main living-room. The probe must never be exposed to the early morning sun, and in general (as far as possible) it should not be exposed to direct sunlight; protect it if necessary. In any case, the probe must not be installed near windows, doors, vents, flues or heat sources that could affect the reading.

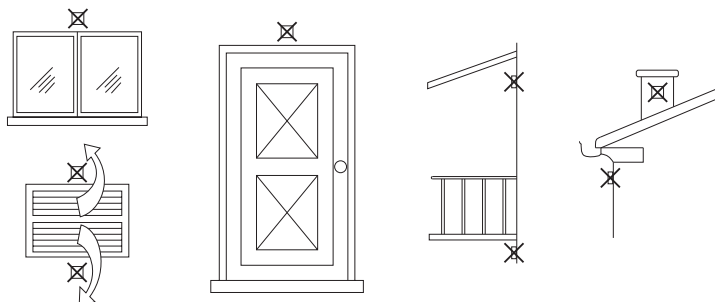


fig. 51 - Inadvisable positioning of external probe

**Accessing the electrical terminal block**

The electrical terminal block can be accessed after removing the front panel. Make the electrical connections as shown in the wiring diagram at fig. 73 and fig. 74.

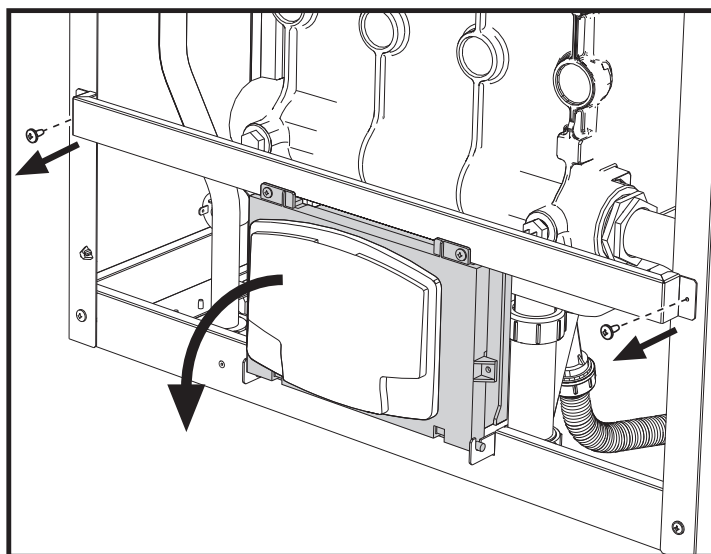


fig. 52- Electrical terminal block



The output relay of the heating circulating pump (**32** of fig. 73 and fig. 74) has a capacity of **8A@230Vac**.

The output relays of the diverter valve (**95** of fig. 73 and fig. 74) have a capacity of **5A@230Vac**.

In case of loads with higher absorption, supporting relays with respective additional protection must be installed.

2.6 Fume ducts



**THE BOILER MUST BE INSTALLED IN PLACES THAT MEET THE FUNDAMENTAL REQUIREMENTS FOR VENTILATION. OTHERWISE THERE IS A DANGER OF SUFFOCATION OR INTOXICATION.**

**READ THE INSTALLATION AND MAINTENANCE INSTRUCTIONS BEFORE INSTALLING THE UNIT.**

**ALSO FOLLOW THE DESIGN INSTRUCTIONS.**

**IN CASE OF PRESSURES ABOVE 200 Pa INSIDE THE FUME EXHAUST PIPES, CLASS "H1" FLUES MUST BE USED.**

**Important**

The unit is a B23-type with combustion air drawn from the place of installation, and fume exhaust by means of a fan (operation with flue pressurised), and must be connected to one of the discharge systems indicated below. Before proceeding with installation, check and carefully comply with the local regulations and provisions. Also, comply with the provisions on the positioning of wall and/or roof terminals and the minimum distances from windows, walls, ventilation openings, etc.

Manifold, ducts and flue must be suitably sized, designed and made in compliance with the current regulations. They must be made of suitable materials, i.e. resistant to heat and corrosion, smooth on the inside and tight. In particular, joints must be condensate proof. Also, provide for adequate condensate drainage points, connected to a trap to prevent the condensate formed in the flues from running into the generators.

**Connection with separate pipes**

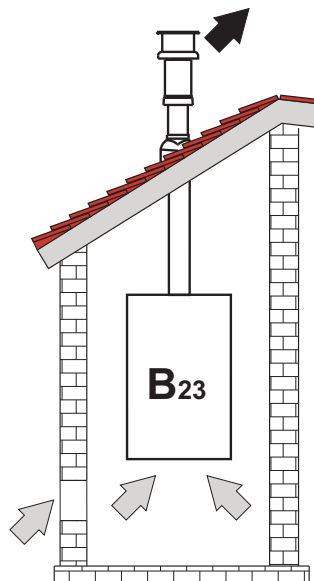


fig. 53- Examples of connection with separate pipes (⇨ = Air / ⇨ = Fumes)

Before installation, make sure the maximum permissible length has not been exceeded, by means of a simple calculation:

1. Establish the layout of the system of split flues, including accessories and outlet terminals.
2. Consult table 3 and identify the losses in  $m_{eq}$  (equivalent meters) of every component, according to the installation position.
3. Check that the sum total of losses is less than or equal to the maximum permissible length in table 2.

**Table. 2- Max. length separate ducts**

	Separate ducts
Max. permissible length	20 $m_{eq}$

Table. 3- Accessories

				Losses in $m_{eq}$		
				Air intake	Fume exhaust	
					Vertical	Horizontal
Ø 100	PIPE	1 m M/F	041073X0	1.0	1.6	2.0
		0.5 m M/F	041072X0			
	BEND					
		90° M/F	041077X0	1.5	2.0	
	TERMINAL					
		Antiwind discharge terminal	1KWMA29K			

### 2.7 Condensate drain connection

The boiler has a trap to drain condensate. Proceed as follows for assembly.

1. Secure the trap.
2. Before connecting the hose to the discharge system, fill the siphon with water.
3. Connect the hose from the trap to the condensate drain system.



**ATTENTION: THE UNIT MUST NEVER BE OPERATED WITH THE TRAP EMPTY!**

**OTHERWISE THERE IS A DANGER OF SUFFOCATION DUE TO THE EMISSION OF COMBUSTION FUMES.**

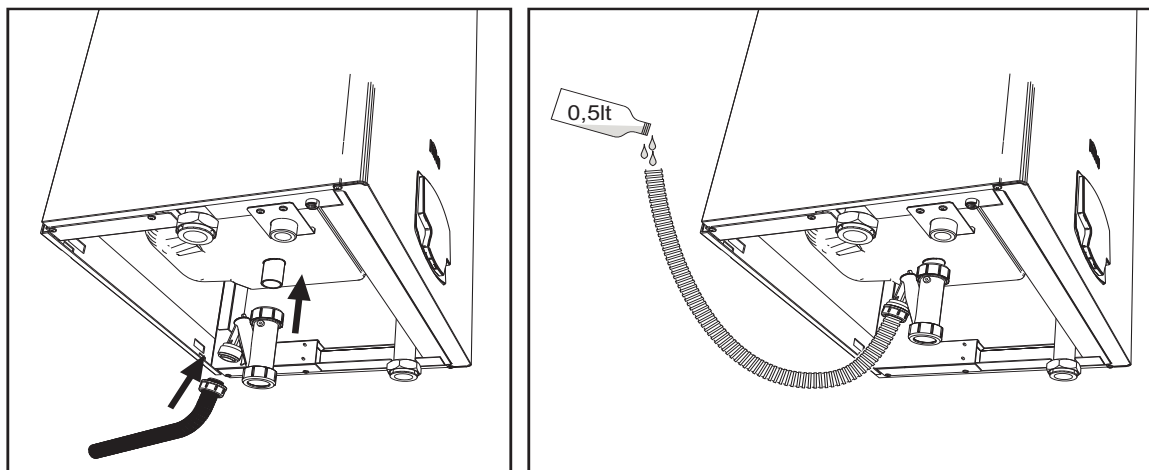


fig. 54- Condensate drain connection

## 3. Service and maintenance

All adjustment, conversion, commissioning and maintenance operations described below must only be carried out by Qualified Personnel (meeting the professional technical requirements of current regulations) such as the personnel of the Local After-Sales Technical Service.

**FERROLI** declines any liability for damage and/or injury caused by unqualified and unauthorized persons tampering with the unit.

### 3.1 Adjustments

#### Gas conversion

The unit can run on natural gas or LPG and is factory-set for use with one of these two gases, as clearly shown on the packing and on the data plate. Whenever a different gas to that for which the unit is set has to be used, the special conversion kit will be required, proceeding as follows:

1. Disconnect the power supply to the boiler.
2. Remove the panels.
3. Detach the electrical connections from the gas valve controller.
4. Undo the fastening screws "E" and remove the gas valve.
5. Replace the gas nozzle "F", positioning it inside the gasket "G". with that contained in the conversion kit. Refit the parts and check tightness.
6. Modify the parameter for the type of gas as described below.

Reach the screen shown in fig. 55, navigating in the menu and following the path "USER MENU ➔ Maintenance ➔ Test Mode ➔ Gas Type Selection". Press the contextual buttons 1 and 2 to select the type of gas. Confirm with the OK button.

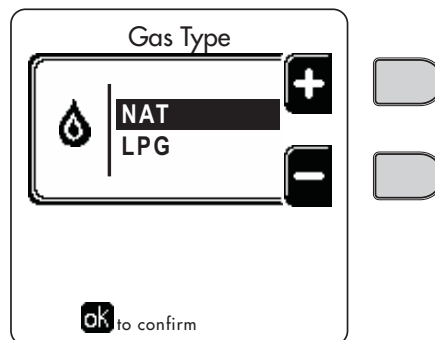


fig. 55 - Gas type selection

7. Apply the label, contained in the conversion kit, near the data plate.
8. Using a combustion analyzer connected to the boiler fume outlet, make sure the CO<sub>2</sub> content in the fumes, with the boiler operating at max. and min. output, complies with that given in the technical data table for the corresponding type of gas.



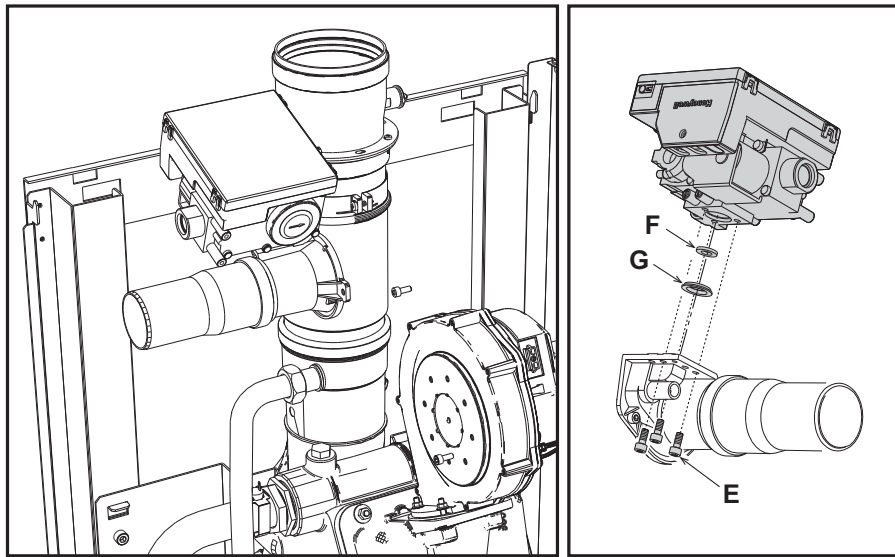


fig. 56- Models FORCE W 60 and FORCE W 80

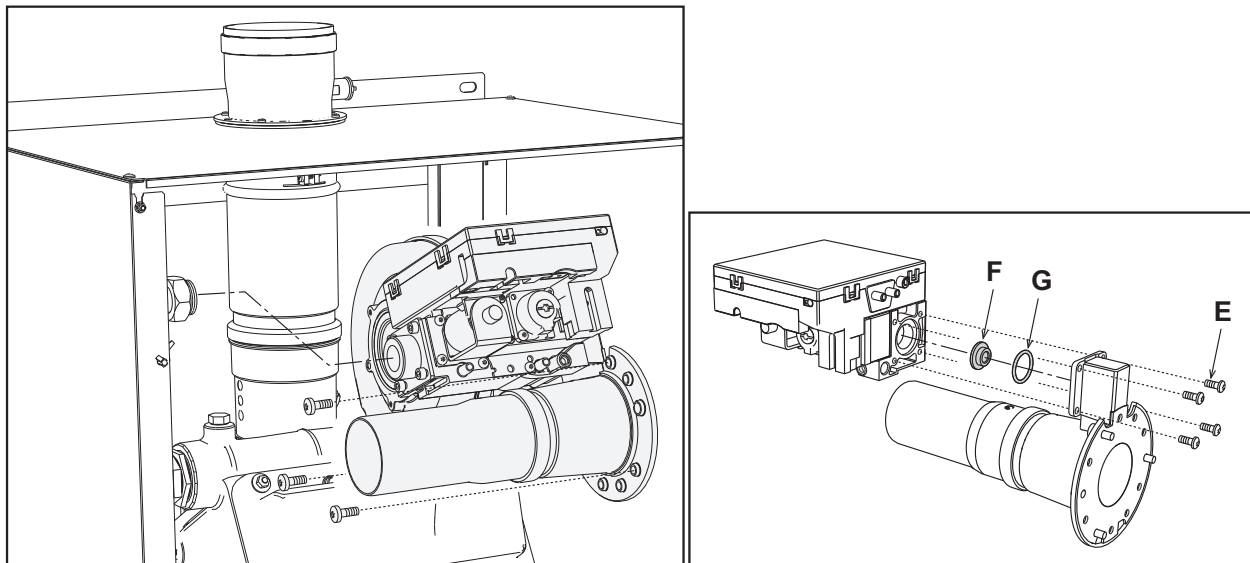


fig. 57- Models FORCE W 99, FORCE W 120 and FORCE W 150



## TEST mode activation

Reach the screen shown in fig. 58, navigating the following menu path: "USER MENU ➔ Maintenance ➔ Test Mode ➔ Test mode".

The boiler will light, gradually reaching the maximum heating power (Range Rated) set as described in the next section. The display will show the actual heating power and that set.

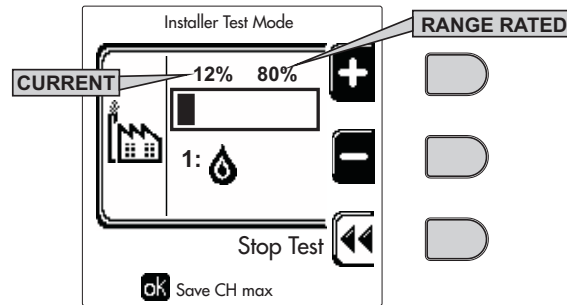


fig. 58 - Test mode (example heating power = 80%)

Press the contextual buttons 1 and 2 to increase the maximum power.

To deactivate the TEST mode, press the contextual button 3.

The TEST mode is automatically disabled in any case after 15 minutes.

After activating test mode, to exit the TEST make sure to deactivate the function, only by pressing the contextual button "Stop Test".

### DO NOT TURN OFF THE BOILER ELECTRICALLY DURING THE TEST.

If that happens, when the power is switched on again the system does not recognise deactivation of the TEST, and starts working as though still in TEST mode and not as a normal heating demand.

## Heating Capacity Adjustment (RANGE RATED)

This is a "RANGE RATED" boiler (according to EN 483) and can be adjusted to the system's thermal requirement by setting the maximum heating capacity for operation in heating mode, as follows:

- Put the boiler in TEST mode (see sec. 3.1).
- Press the **contextual buttons 1 and 2** to increase or decrease the heating capacity (minimum = 00 - maximum = 100). See the diagram "Heating Capacity Adjustment" (fig. 59).
- By pressing the **OK button** (detail 6 - fig. 1) the maximum heating capacity will remain that just set. Exit TEST mode (see sec. 3.1).

After setting the desired heating capacity, write the value on the sticker provided and place it on the boiler under the data plate. For subsequent checks and adjustments, refer to the set value.

**THE HEATING CAPACITY ADJUSTMENT THUS MADE ENSURES THE EFFICIENCY VALUES DECLARED AT cap. 4.4 "Technical data table"**

### Heating capacity adjustment diagram

A = kW - B = Electronic Board Parameter

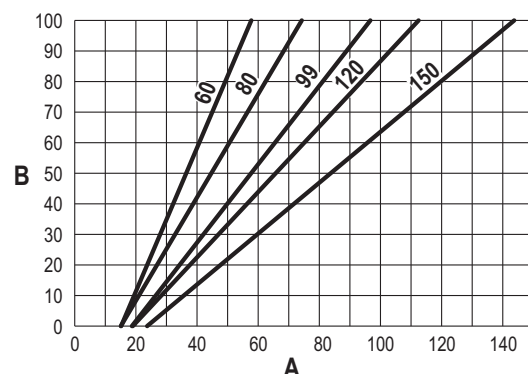


fig. 59

## TECHNICAL MENU

**ONLY QUALIFIED PERSONNEL CAN ACCESS THE SERVICE MENU AND MODIFY PARAMETERS.**

The Technical Menu can only be accessed after entering the code 4 1 8. It is valid for 15 minutes.

### Configuration - Parameters Menu

16 parameters are available, indicated by the letter “b”, which are not modifiable from Remote Timer Control.

**Table. 4- Parameters - Configuration**

Parameter	Description	Range	FORCE W 60	FORCE W 80	FORCE W 99	FORCE W 120	FORCE W 150
b01	Gas type selection	Natural Gas/LPG	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
b02	Boiler type selection	1-9	7	7	7	7	7
b03	System water pressure protection selection	0=Pressure switch 1=Flow switch 1 sec. 2=Flow switch 3 sec. 3=Flow switch 5 sec. 4=Flow switch 10 sec. 5=Pressure transducer	0	0	0	0	0
b04	Fan max. frequency in DHW	0-255 Hz	150 Hz	190 Hz	195 Hz	225 Hz	240 Hz
b05	Fan max. frequency in heating	0-255 Hz	150 Hz	190 Hz	195 Hz	225 Hz	240 Hz
b06	Fan min. frequency in DHW/heating	0-255 Hz	50 Hz	50 Hz	45 Hz	45 Hz	50 Hz
b07	Fan min. Frequency Offset	0-255 Hz	40 Hz	40 Hz	40 Hz	40 Hz	40 Hz
b08	Variable output Relay operation selection	0=Burner lit 1=Legionella pump 2=Boiler room ventilation 3=Motor-operated shutoff valve	0	0	0	0	0
b09	Post-Ventilation	0-120 seconds	30	30	30	30	30
b10	Boiler room pre-ventilation	1-15 minutes	1	1	1	1	1
b11	Boiler room post-ventilation	1-15 minutes	1	1	1	1	1
b12	Fume sensor	OFF = Deactivated, ON = Enabled	ON	ON	ON	ON	ON
b13	Not implemented	--	--	--	--	--	--
b14	Fumes Max Temperature	0-125°C	110	110	110	110	110
b15	Fan type selection	--	--	--	--	--	--
b16	Pump antiblock operation time	0-20 seconds	5	5	5	5	5

### Notes

- Parameters with more than one description vary their function and/or range in relation to the setting of the parameter given in brackets.
- Parameters with more than one description are reset to the default value if the parameter given in brackets is modified.

## Parameters Menu - Transparent Parameters

31 parameters are available, indicated by the letter “P”, which are not modifiable from Remote Timer Control.

**Table. 5- Parameters - Transparent**

Parameter	Description	Range	FORCE W 60	FORCE W 80	FORCE W 99	FORCE W 120	FORCE W 150
P01	Ignition power	0-100%	30	30	30	30	30
P02	Heating ramp	1-10°C/minute	1	1	1	1	1
P03	Virtual set point min. temperature	20-80°C	20	20	20	20	20
P04	Heating standby time	0-10 minutes	4	4	4	4	4
P05	Heating Post-Circulation	0-255 minutes	3	3	3	3	3
P06	Pump operation	0-3 Operation strategy	0	0	0	0	
P07	Modulating pump min. speed	0-100%	30	30	30	30	30
P08	Modulating pump start speed	0-100%	75	75	75	75	75
P09	Modulating pump max. speed	30-100%	100	100	100	100	100
P10	Pump deactivation temperature during Post-Circulation	0-100°C	35	35	35	35	35
P11	Pump activation hysteresis temperature during Post-Circulation	0-20°C	5	5	5	5	5
P12	Heating user min. setpoint	10-90°C	20	20	20	20	20
P13	Heating user max. setpoint	20-90°C	80	80	80	80	80
P14	Max. output in heating	0-100%	80	80	80	80	80
P15	DHW ramp	1-10°C/min	5	5	5	5	5
P16	DHW standby time	0-255 seconds	120	120	120	120	120
P17	DHW pump Post-Circulation	0-255 seconds	30	30	30	30	30
P18	Not implemented	--	--	--	--	--	--
P19	Not implemented	--	--	--	--	--	--
P20	Max. output in DHW	0-100%	80%	80%	80%	80%	
P21	Not implemented	--	--	--	--	--	--
P22	Not implemented	--	--	--	--	--	--
P23	Not implemented	--	--	--	--	--	--
P24	Fan frequency in standby mode	0-255 Hz	0	0	0	0	0
P25	Modulating pump adjustment temperature	0-60°C	20	20	20	20	20
P26	Primary exchanger protection temperature	0-80°C	35	35	35	35	35
P27	System min. pressure value	--	--	--	--	--	
P28	System nominal pressure value	--	--	--	--	--	
P29	Exchanger protection activation	0 = No F43, 1-15 = 1-15°C/second	0=No F43	0=No F43		0=No F43	
P30	Heating hysteresis after ignition	6-30°C	10	10	10	10	10
P31	Timer for heating hysteresis after ignition	0-180 seconds	60	60	60	60	60

### Notes

- Parameters with more than one description vary their function and/or range in relation to the setting of the parameter given in brackets.
- Parameters with more than one description are reset to the default value if the parameter given in brackets is modified.
- The Maximum Heating Power parameter can also be modified in Test Mode.



## System Type - Parameters Menu

23 parameters are available, indicated by the letter "P." which are not modifiable from Remote Timer Control.

Parameter	Description	Range	FORCE W 60	FORCE W 80	FORCE W 99	FORCE W 120	FORCE W 150
P.01	Heating request selection	0-5	0	0	0	0	0
P.02	Cascade sensor selection	0=Disabled, 1 or 2=Enabled	0	0	0	0	0
P.03	No function	0-1	0	0	0	0	0
P.04	3-way valve time	0-255 seconds	0	0	0	0	0
P.05	Activation timer*	0-255 minutes	1	1	1	1	1
P.06	Deactivation timer*	0-255 minutes	5	5	5	5	5
P.07	Activation power*	0-100%	70	70	70	70	70
P.08	Deactivation power*	0-100%	25	25	25	25	25
P.09	Hydraulic separator function	OFF = Disabled, ON = Enabled	OFF	OFF	OFF	OFF	OFF
P.10	System filling function	OFF = Disabled, ON = Enabled	OFF	OFF	OFF	OFF	OFF
P.11	3-way valve selection	2/3 = 2 or 3 wires 2 = 2 wires	2/3	2/3	2/3	2/3	2/3
P.12	0-10Vdc Heating OFF voltage (Temperature Control)**	0.1-10 Vdc	2.5	2.5	2.5	2.5	2.5
P.13	0-10Vdc Heating ON voltage (Temperature Control)**	0.1-10 Vdc	3.0	3.0	3.0	3.0	3.0
P.14	0-10Vdc Max. voltage (Temperature Control)**	0.1-10 Vdc	10	10	10	10	10
P.15	0-10Vdc Min. temperature (Temperature Control)**	0-100°C	20	20	20	20	20
P.16	0-10Vdc Max. temperature (Temperature Control)**	0-100°C	90	90	90	90	90
P.17	0-10Vdc Heating OFF voltage (Power Control)**	0.1-10 Vdc	2.5	2.5	2.5	2.5	2.5
P.18	0-10Vdc Heating ON voltage (Power Control)**	0.1-10 Vdc	3.0	3.0	3.0	3.0	3.0
P.19	0-10Vdc Max. power (Power Control)**	0.1-10 Vdc	10	10	10	10	10
P.20	0-10Vdc Min. power (Power Control)**	0-100%	0	0	0	0	0
P.21	0-10Vdc Max. power (Power Control)**	0-100%	100	100	100	100	100
P.22	Enable DHW Slave boiler (Autocascade)	OFF = Disabled, ON = Enabled	OFF	OFF	OFF	OFF	OFF
P.23	Continuous comfort Slave boiler (AX5200SQ)	OFF = Disabled, ON = Enabled	OFF	OFF	OFF	OFF	OFF

### Notes

- \* These parameters are active only when two controllers are connected to a single display ACP01.
- \*\* These parameters are active only when the system operates with input 0-10Vdc.

## 3.2 Commissioning



Checks to be done at first lighting, and after all maintenance operations that involved disconnection from the systems or work on safety devices or parts of the boiler:

### Before lighting the boiler

- Open any on-off valves between the boiler and the systems.
- Check the tightness of the gas system, proceeding with caution and using a soap and water solution to detect any leaks in connections.
- Check correct prefilling of the expansion tank (ref. sec. 4.4).
- Fill the water system and make sure all air contained in the boiler and the system has been vented, by opening the air vent valve on the boiler and any vent valves on the system.
- Fill the condensate trap and check correct connection of the condensate elimination system.
- Make sure there are no water leaks in the system, DHW circuits, connections or boiler.
- Check correct connection of the electrical system and efficiency of the earthing system
- Make sure the gas pressure value for heating is that required.
- Make sure there are no flammable liquids or materials in the immediate vicinity of the boiler



**IF THE ABOVE INSTRUCTIONS ARE NOT OBSERVED THERE MAY BE RISK OF SUFFOCATION OR POISONING DUE TO GAS OR FUMES ESCAPING; DANGER OF FIRE OR EXPLOSION. ALSO, THERE MAY BE A RISK OF ELECTRIC SHOCK OR FLOODING THE ROOM.**

### Checks during operation

- Turn the unit on as described in sec. 1.3.
- Make sure the fuel circuit and water systems are tight.
- Check the efficiency of the flue and air-fume ducts while the boiler is working.
- Check the correct tightness and functionality of the condensate elimination system and trap.
- Make sure the water is circulating properly between the boiler and the systems.
- Make sure the gas valve modulates correctly in the heating and domestic hot water production phases.
- Check proper boiler lighting by doing several tests, turning it on and off with the room thermostat or remote control.
- Using a combustion analyser connected to the boiler fume outlet, check that the CO<sub>2</sub> content in the fumes, with the boiler operating at max. and min. output, corresponds to that given in the technical data table for the corresponding type of gas.
- Make sure the fuel consumption indicated on the meter matches that given in the technical data table on sec. 4.4.
- Check the correct programming of the parameters and carry out any necessary customization (compensation curve, power, temperatures, etc.).



### 3.3 Maintenance

**IMPORTANT**



**ALL MAINTENANCE WORK AND REPLACEMENTS MUST BE CARRIED OUT BY SKILLED QUALIFIED PERSONNEL.**

**Before carrying out any operation inside the boiler, disconnect the power and close the gas cock upstream. Otherwise there may be a danger of explosion, electric shock, suffocation or poisoning.**

**Periodical check**

To ensure lasting proper operation of the unit, it is necessary to have an annual inspection carried out by qualified personnel, providing for the following:

- Heat exchanger check and cleaning with suitable products if dirty or clogged. The exchanger can be cleaned only when its temperature is under 40°C. Clean only with suitable products approved by the manufacturer, e.g.:

**ALU CLEANGEL**

**BIO HALL LIQUID**

- Check and cleaning (if necessary) of burner (do not use chemical products or wire brushes).
- Check and cleaning of electrodes, which must be free of deposits and properly positioned.
- Check of gaskets and seals (burner, sealed chamber, etc.).
- Check and cleaning of sludge remover filters and system filters.
- Check, cleaning and filling of condensate drain traps.
- Check of wiring, contacts, electrical actuators.
- Check and cleaning of generator air inlets and boiler room air intakes.
- Check and cleaning of fume evacuation duct-manifold-flue system.
- Check of expansion tank and precharge.
- Check of correct and stable system water pressure, ensuring conformity with the required working pressure.



The use of automatic filling systems for reinstatement of operating conditions must provide for adequate treatment of the water (see \*\*\* 'System water characteristics' on page 146 \*\*\*)

- check of heating system water chemical and physical parameters (see \*\*\* 'System water characteristics' on page 146 \*\*\*)
- water and gas system tightness check
- check of correct and stable gas supply pressure to the plant (20 mbar for operation with natural gas); any fluctuations or pressure drops below the declared value can create malfunctioning and stops with need for manual resetting.
- check of correct burner ignition and operation of control and safety devices (gas valve, flow meter, thermostats, etc.)
- check of circulating pump operation, freeing them when necessary
- fume analysis and check of combustion parameters



The boiler casing, control panel and aesthetic parts can be cleaned with a damp, soft cloth, if necessary soaked in soapy water. Do not use abrasive detergents and solvents.

## Opening the front panel



**Some internal components of the boiler can reach high temperatures able to cause severe burns. Before carrying out any operation, allow these components to cool or, alternatively, wear appropriate gloves.**

To open the boiler casing:

1. Undo the screws **A** (see fig. 60).
2. Pull the panel **B**.

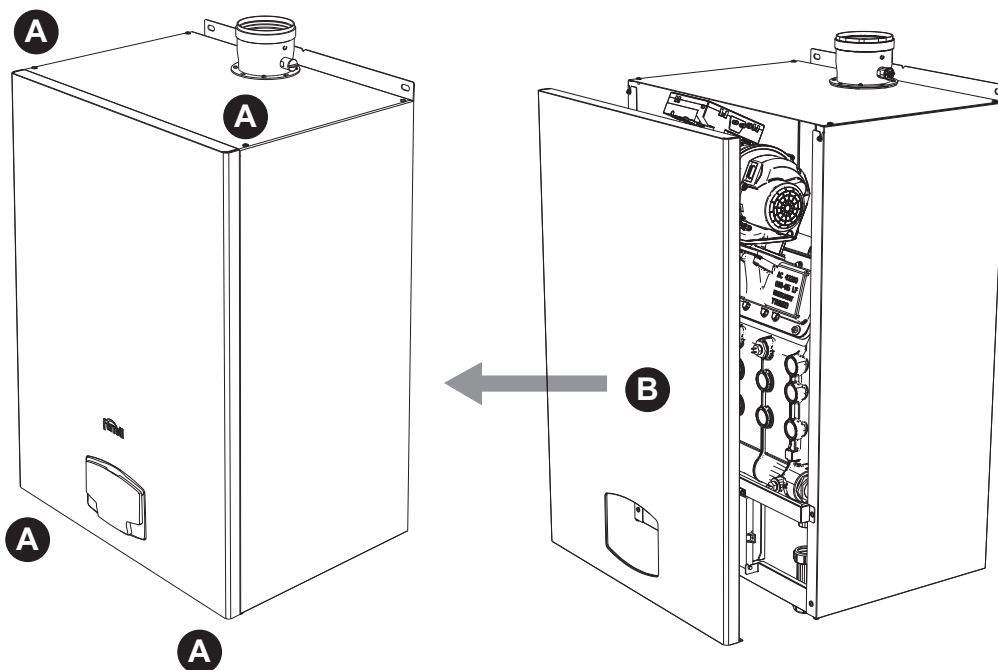


fig. 60- Front panel opening

Proceed in reverse order to refit the front panel. Make sure it is correctly hooked to the upper fastenings and is correctly positioned at the sides.



### 3.4 Troubleshooting

#### Diagnostics

The boiler is equipped with an advanced self-diagnosis system. In the case of a boiler fault, the display will light up, indicating the fault code and, in case of connection in cascade, the number of the module.

There are faults that cause permanent shutdown (marked by the symbol **OK** to reset): to restore operation, just press the **OK button** for 1 second or **RESET** on the remote timer control (optional) if installed; if the boiler fails to start, the fault must be eliminated first.

Other faults cause temporary shutdowns which are automatically reset as soon as the value returns within the boiler's normal working range.

#### Table of faults

**Table. 6 - List of faults**

Fault code	Fault	Possible cause	Cure
<b>A01</b>	No burner ignition	No gas	Check the regular gas flow to the boiler and that the air has been eliminated from the pipes
		Ignition/detection electrode fault	Check the wiring of the electrode and that it is correctly positioned and free of any deposits
		Faulty gas valve	Check the gas valve and replace it if necessary
		Insufficient gas supply pressure	Check the gas supply pressure
		Trap blocked	Check the trap and clean it if necessary
		Faulty ignition transformer (only models Prodotto 220 C and Prodotto 320 C)	Check and replace it if necessary
<b>A02</b>	Flame present signal with burner off	Electrode fault	Check the ionization electrode wiring
		Card fault	Check the card
<b>A03</b>	Overtemperature protection intervention	Heating sensor damaged	Check the correct positioning and operation of the heating sensor
		No water circulation in the system	Check the circulating pump
		Air in the system	Vent the system
<b>A04</b>	Fume extraction duct safety device intervention	Fault F07 generated 3 times in the last 24 hours	See fault F07
<b>A05</b>	Fan protection activated	Fault F15 generated for 1 hour (consecutive)	See fault F15
<b>A06</b>	No flame after ignition stage (6 times in 4 minutes)	Ionization electrode fault	Check the position of the ionization electrode and replace it if necessary
		Flame unstable	Check the burner
		Gas valve Offset fault	Check the Offset adjustment at minimum power
		air/fume ducts obstructed	Remove the obstruction from the flue, fume extraction ducts and air inlet and terminals
<b>F07</b>	High fume temperature	Flue partially obstructed or insufficient	Check the efficiency of the flue, fume extraction ducts and outlet terminal
		Fume sensor position	Check the correct positioning and operation of the fume sensor
<b>F10</b>	Delivery sensor 1 fault	Sensor damaged	Check the wiring or replace the sensor
		Wiring shorted	
		Wiring disconnected	
<b>F11</b>	Return sensor fault	Sensor damaged	Check the wiring or replace the sensor
		Wiring shorted	
		Wiring disconnected	



Fault code	Fault	Possible cause	Cure
F12	DHW sensor fault	Sensor damaged	Check the wiring or replace the sensor
		Wiring shorted	
		Wiring disconnected	
F13	Fume sensor fault	Sensor damaged	Check the wiring or replace the sensor
		Wiring shorted	
		Wiring disconnected	
F14	Delivery sensor 2 fault	Sensor damaged	Check the wiring or replace the sensor
		Wiring shorted	
		Wiring disconnected	
F15	Fan fault	No 230V power supply	Check the 3-pin connector wiring
		Tachometric signal interrupted	Check the 5-pin connector wiring
		Fan damaged	Check the fan
F26	RESET button on controller on gas valve, fault.	RESET button on controller fitted on gas valve blocked or faulty.	Check the RESET button and replace the controller on the gas valve if necessary.
F34	Supply voltage under 170V	Electric mains trouble	Check the electrical system
F35	Faulty mains frequency	Electric mains trouble	Check the electrical system
F37	Pressure switch contact open	Low system pressure	Check the system water pressure
F39	External probe fault	Probe damaged or wiring shorted	Check the wiring or replace the sensor
		Probe disconnected after activating the sliding temperature	Reconnect the external probe or disable the sliding temperature
A41	Sensor positioning	Delivery sensor disconnected from the pipe	Check the correct positioning and operation of the heating sensor
A42	Heating sensor fault	Sensor damaged	Replace the sensor
F50	Cascade temperature sensor fault	Sensor damaged	Check the wiring or replace the sensor
		Wiring shorted	
		Wiring disconnected	
F52	Heating sensor fault	Sensor damaged	Replace the sensor
A61	Controller fault	Controller internal error	Check the ground connection and replace the controller if necessary.
A62	No communication between controller and gas valve	Controller not connected	Connect the controller to the gas valve
		Valve damaged	Replace the valve
A63 A64 A65 F66	Controller fault	Controller internal error	Check the ground connection and replace the controller if necessary
F99	No communication between controller and display	Wiring disconnected	Check the wiring of the 6 wires between controller and display



## 4. Technical data and characteristics

### Key of figures cap. 4 "Technical data and characteristics"

<b>7</b>	Gas inlet
<b>10</b>	System delivery
<b>11</b>	System return
<b>16</b>	Fan
<b>32</b>	Heating circulating pump (not supplied)
<b>34</b>	Heating temperature sensor
<b>36</b>	Automatic air vent
<b>44</b>	Gas valve
<b>72</b>	Room thermostat (not supplied)
<b>72b</b>	Second room thermostat (not supplied)
<b>95</b>	3-way valve - 2 wires (not supplied)
	<b>A</b> = Heating phase
	<b>B</b> = Neutral
<b>98</b>	Switch
<b>114</b>	Water pressure switch
<b>130</b>	DHW circulating pump (not supplied)
<b>138</b>	External probe (not supplied)
<b>139</b>	Remote timer control (not supplied)
<b>154</b>	Condensate drain pipe
<b>155</b>	Hot water tank temperature probe (not supplied)
<b>186</b>	Return sensor
<b>188</b>	Ignition/Ionization electrode
<b>191</b>	Fume temperature sensor
<b>193</b>	Trap
<b>196</b>	Condensate tray
<b>256</b>	Modulating heating circulating pump signal
<b>298</b>	Cascade temperature sensor (not supplied)
<b>299</b>	Input 0-10 Vdc
<b>300</b>	Burner lit contact (voltage-free contact)
<b>301</b>	Fault contact (voltage-free contact)
<b>302</b>	Remote reset input (230 Volt)
<b>306</b>	Heating system circulating pump (not supplied)
<b>307</b>	Heating system second circulating pump (not supplied)
<b>348</b>	3-way valve - 3 wires (not supplied)
	<b>A</b> = Heating phase
	<b>B</b> = Neutral
	<b>C</b> = DHW phase
<b>357</b>	Faulty contact (230 Vac)
<b>361</b>	Cascade connection of next module
<b>362</b>	Cascade connection of previous module
<b>363</b>	MODBUS communication
<b>374</b>	Aluminum heat exchanger
<b>388</b>	Safety sensor
<b>A6</b>	Condensate discharge connection

## 4.1 Dimensions and connections

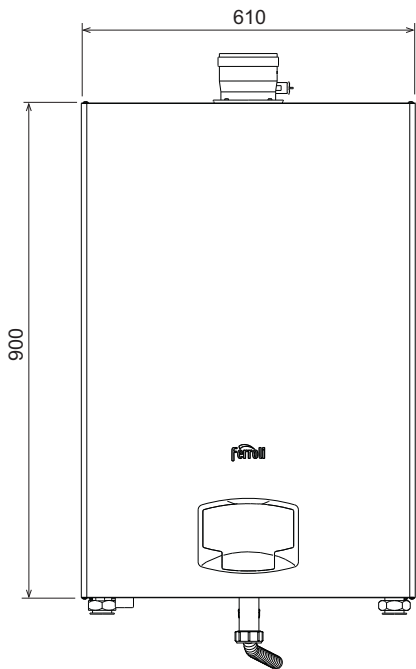


fig. 61- Front view

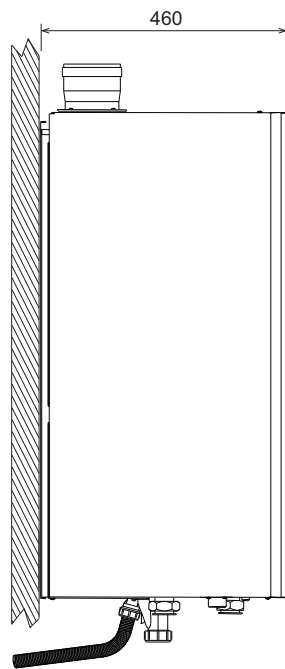


fig. 62- Side view

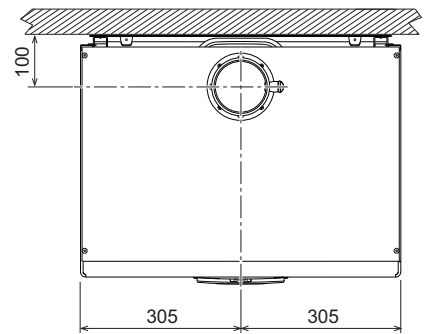


fig. 63- Top view

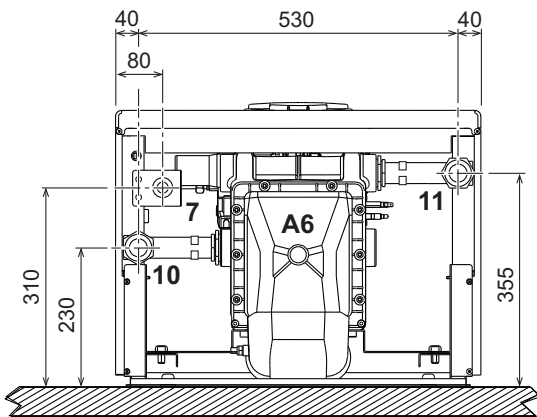


fig. 64- Bottom view - model FORCE W 60 and FORCE W 80

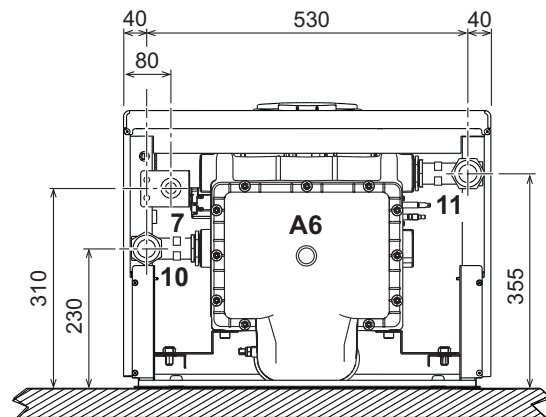


fig. 65- Bottom view - model FORCE W 99 and FORCE W 120

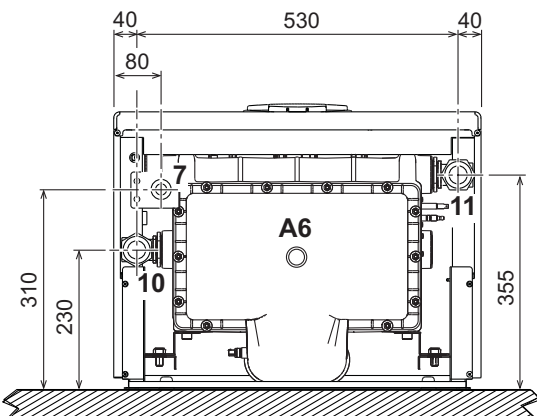


fig. 66- Bottom view - model FORCE W 150



4.2 General view

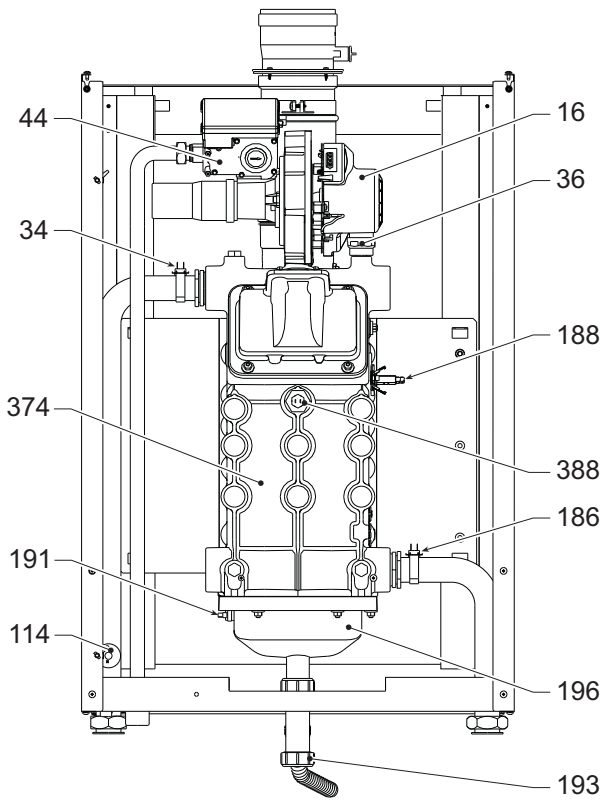


fig. 67- General view - model FORCE W 60 and FORCE W 80

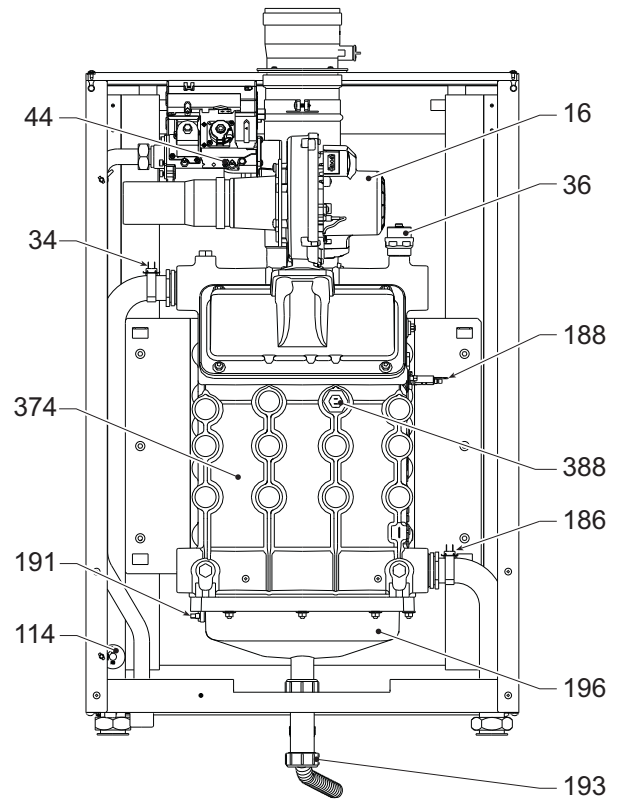


fig. 68- General view - model FORCE W 99 and FORCE W 120

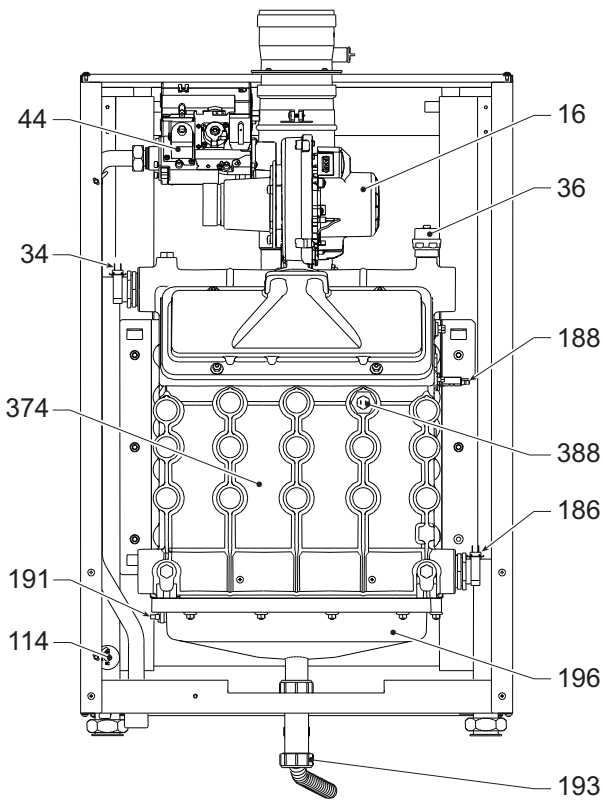


fig. 69- General view - model FORCE W 150

## 4.3 Hydraulic circuit

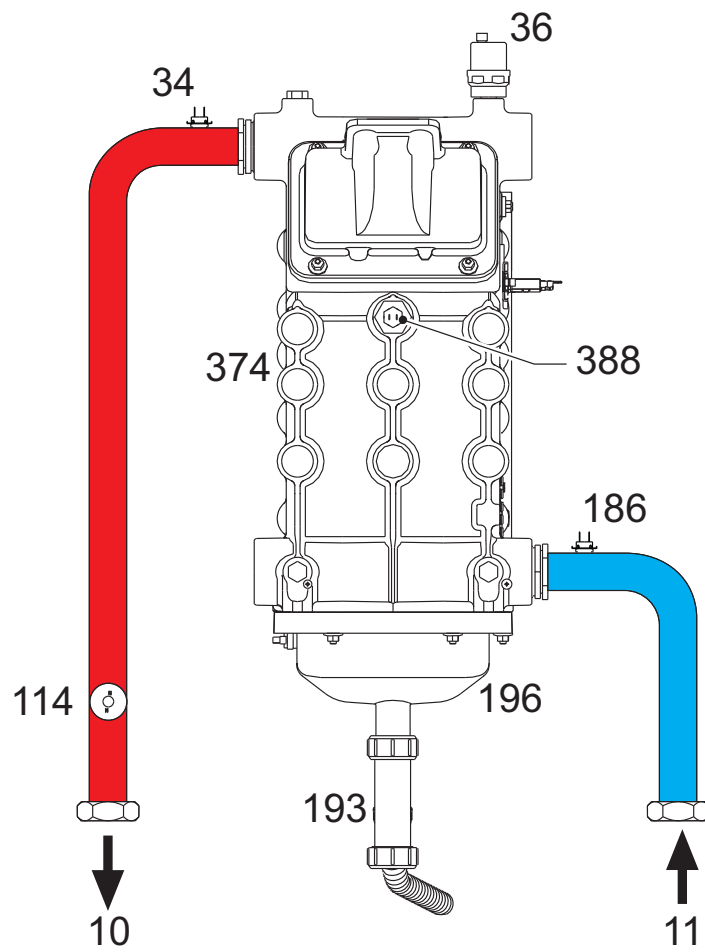


fig. 70- Hydraulic circuit



## 4.4 Technical data table

The column on the right gives the abbreviation used on the data plate.

Model		FORCE W 60	FORCE W 80	FORCE W 99	FORCE W 120	FORCE W 150		
PRODUCT IDENTIFICATION CODES		OMDLAAWA	OMDLCAWA	OMDLDAWA	OMDLEAWA	OMDLFAWA		
COUNTRIES OF DESTINATION		IT - ES - RO						
GAS CATEGORY		I12H3BP (IT-ES-RO)						
Max. heating capacity	kW	58.0	74.4	96.6	113.0	143.0	(Q)	
Min. heating capacity	kW	15.0	15.0	19.0	19.0	24.0	(Q)	
Max. Heat Output in heating (80/60 °C)	kW	57.0	72.9	94.7	110.5	140.0	(P)	
Min. Heat Output in heating (80/60 °C)	kW	14.7	14.7	18.7	18.7	23.6	(P)	
Max. Heat Output in heating (50/30 °C)	kW	60.8	77.0	100.0	117.0	148.0	(P)	
Min. Heat Output in heating (50/30 °C)	kW	16.3	16.3	20.5	20.5	25.9	(P)	
Efficiency Pmax (80/60 °C)	%	98.3	98.0	98.0	97.8	97.8		
Efficiency Pmin (80/60 °C)	%	98.3	98.3	98.3	98.3	98.3		
Efficiency Pmax (50/30 °C)	%	104.8	103.5	103.5	103.5	103.5		
Efficiency Pmin (50/30 °C)	%	108.5	108.5	108.0	108.0	108.0		
Efficiency 30%	%	108.6	108.6	108.1	108.1	108.1		
NOx emissions class	-	6						(NOx)
Fume temperature Pmax (80/60 °C)	°C	64	70	71	72	73		
Fume temperature Pmin (80/60 °C)	°C	60	60	60	60	60		
Fume temperature Pmax (50/30 °C)	°C	44	48	53	54	54		
Fume temperature Pmin (50/30 °C)	°C	30	30	30	30	30		
Fume flow rate Pmax	g/s	26	34	44	51	65		
Fume flow rate Pmin	g/s	7	7	9	9	11		
Gas nozzle G20	Ø	8.5	8.5	9.4	9.4	9.4		
Gas supply pressure G20	mbar	20	20	20	20	20		
Max. gas flow G20	m <sup>3</sup> /h	6.14	7.87	10.22	11.96	15.13		
Min. gas flow G20	m <sup>3</sup> /h	1.59	1.59	2.01	2.01	2.54		
CO <sub>2</sub> max G20	%	9.3	9.3	9.3	9.3	9.3		
CO <sub>2</sub> min G20	%	8.9	8.9	8.9	8.9	8.9		
Gas nozzle G31	Ø	6.4	6.4	7.2	7.2	7.2		
Gas supply pressure G31	mbar	37	37	37	37	37		
Max. gas flow G31	kg/h	4.51	5.78	7.51	8.78	11.11		
Min. gas flow G31	kg/h	1.17	1.17	1.48	1.48	1.86		
CO <sub>2</sub> max G31	%	10.5	10.5	10.5	10.5	10.5		
CO <sub>2</sub> min G31	%	10.0	10.0	10.0	10.0	10.0		
Max. working pressure in heating	bar	6	6	6	6	6	(PMS)	
Min. working pressure in heating	bar	0.8	0.8	0.8	0.8	0.8		
Max. heating temperature	°C	95	95	95	95	95	(tmax)	
Heating water content	liters	4.2	4.2	5.6	5.6	6.7	(H <sub>2</sub> O)	
Protection rating	IP	IPX4D						
Power supply voltage	V/Hz	230/50						
Electrical power input	W	60	93	120	175	250		
Empty weight	kg	54	54	63	63	73		
Type of unit		B <sub>23</sub>						
PIN CE		0085						

**These boilers can work correctly with a minimum flow rate of 0 liters/h.**

## 4.5 ErP tables

### ErP product fiche

#### MODEL: FORCE W 60

<b>Trademark: FERROLI</b>			
Condensing boiler: YES			
Low-temperature boiler (**): YES			
B1 Boiler: NO			
Combination heater: NO			
Cogeneration space heater: NO			
Item	Symbol	Unit	Value
<b>Seasonal space heating energy efficiency class (from A++ to G)</b>			
Seasonal space heating energy efficiency class (from A++ to G)			A
Rated heat output	Pn	kW	57
Seasonal space heating energy efficiency	$\eta_s$	%	93
<b>Useful heat out put</b>			
Useful heat output at rated heat output and high-temperature regime (*)	P4	kW	57,0
Useful heat output at 30% of rated heat output and low-temperature regime (**)	P1	kW	11,9
<b>Useful efficiency</b>			
Useful efficiency at rated heat output and high-temperature regime (*)	$\eta_4$	%	88,5
Useful efficiency at 30% of rated heat output and low-temperature regime (**)	$\eta_1$	%	97,8
<b>Auxiliary electricity consumption</b>			
At full load	elmax	kW	0,060
At part load	elmin	kW	0,025
In standby mode	PSB	kW	0,003
<b>Other items</b>			
Standby heat loss	Pstby	kW	0,140
Ignition burner power consumption	Pign	kW	0,000
Annual energy consumption	QHE	GJ	111
Sound power level	LWA	dB	61
Emissions of nitrogen oxides	NOx	mg/kWh	50

(\*) High-temperature regime means 60°C return temperature at heater inlet and 80°C feed temperature at heater outlet.

(\*\*) Low temperature means for condensing boilers 30°C, for low-temperature boilers 37°C and for other heaters 50°C return temperature (at heater inlet).

## ErP product fiche

### MODEL: FORCE W 80

<b>Trademark: FERROLI</b>			
Condensing boiler: YES			
Low-temperature boiler (**): YES			
B1 Boiler: NO			
Combination heater: NO			
Cogeneration space heater: NO			
Item	Symbol	Unit	Value
Rated heat output	Pn	kW	73
Seasonal space heating energy efficiency	$\eta_s$	%	93
<b>Useful heat out put</b>			
Useful heat output at rated heat output and high-temperature regime (*)	P4	kW	72,9
Useful heat output at 30% of rated heat output and low-temperature regime (**)	P1	kW	14,6
<b>Useful efficiency</b>			
Useful efficiency at rated heat output and high-temperature regime (*)	$\eta_4$	%	88,2
Useful efficiency at 30% of rated heat output and low-temperature regime (**)	$\eta_1$	%	97,8
<b>Auxiliary electricity consumption</b>			
At full load	elmax	kW	0,093
At part load	elmin	kW	0,025
In standby mode	PSB	kW	0,003
<b>Other items</b>			
Standby heat loss	Pstby	kW	0,140
Ignition burner power consumption	Pign	kW	0,000
Annual energy consumption	QHE	GJ	136
Sound power level	LWA	dB	62
Emissions of nitrogen oxides	NOx	mg/kWh	54

(\*) High-temperature regime means 60°C return temperature at heater inlet and 80°C feed temperature at heater outlet.

(\*\*) Low temperature means for condensing boilers 30°C, for low-temperature boilers 37°C and for other heaters 50°C return temperature (at heater inlet).



## ErP product fiche

### MODEL: FORCE W 99

<b>Trademark: FERROLI</b>			
Condensing boiler: YES			
Low-temperature boiler (**): YES			
B1 Boiler: NO			
Combination heater: NO			
Cogeneration space heater: NO			
Item	Symbol	Unit	Value
Rated heat output	$P_n$	kW	95
Seasonal space heating energy efficiency	$\eta_s$	%	93
<b>Useful heat out put</b>			
Useful heat output at rated heat output and high-temperature regime (*)	$P_4$	kW	94,7
Useful heat output at 30% of rated heat output and low-temperature regime (**)	$P_1$	kW	18,7
<b>Useful efficiency</b>			
Useful efficiency at rated heat output and high-temperature regime (*)	$\eta_4$	%	88,2
Useful efficiency at 30% of rated heat output and low-temperature regime (**)	$\eta_1$	%	97,3
<b>Auxiliary electricity consumption</b>			
At full load	$el_{max}$	kW	0,120
At part load	$el_{min}$	kW	0,021
In standby mode	$PSB$	kW	0,003
<b>Other items</b>			
Standby heat loss	$P_{stby}$	kW	0,170
Ignition burner power consumption	$P_{ign}$	kW	0,000
Annual energy consumption	$Q_{HE}$	GJ	177
Sound power level	$LWA$	dB	63
Emissions of nitrogen oxides	$NO_x$	mg/kWh	39

(\*) High-temperature regime means 60°C return temperature at heater inlet and 80°C feed temperature at heater outlet.

(\*\*) Low temperature means for condensing boilers 30°C, for low-temperature boilers 37°C and for other heaters 50°C return temperature (at heater inlet).

## ErP product fiche

### MODEL: FORCE W 120

<b>Trademark: FERROLI</b>			
Condensing boiler: YES			
Low-temperature boiler (**): YES			
B1 Boiler: NO			
Combination heater: NO			
Cogeneration space heater: NO			
Item	Symbol	Unit	Value
Rated heat output	$P_n$	kW	111
Seasonal space heating energy efficiency	$\eta_s$	%	93
<b>Useful heat out put</b>			
Useful heat output at rated heat output and high-temperature regime (*)	$P_4$	kW	110,5
Useful heat output at 30% of rated heat output and low-temperature regime (**)	$P_1$	kW	21,4
<b>Useful efficiency</b>			
Useful efficiency at rated heat output and high-temperature regime (*)	$\eta_4$	%	88,1
Useful efficiency at 30% of rated heat output and low-temperature regime (**)	$\eta_1$	%	97,3
<b>Auxiliary electricity consumption</b>			
At full load	$e_{lmax}$	kW	0,175
At part load	$e_{lmin}$	kW	0,021
In standby mode	$PSB$	kW	0,003
<b>Other items</b>			
Standby heat loss	$P_{stby}$	kW	0,170
Ignition burner power consumption	$P_{ign}$	kW	0,000
Annual energy consumption	$QHE$	GJ	201
Sound power level	$LWA$	dB	64
Emissions of nitrogen oxides	$NO_x$	mg/kWh	38

(\*) High-temperature regime means 60°C return temperature at heater inlet and 80°C feed temperature at heater outlet.

(\*\*) Low temperature means for condensing boilers 30°C, for low-temperature boilers 37°C and for other heaters 50°C return temperature (at heater inlet).

## ErP product fiche

### MODEL: FORCE W 150

<b>Trademark: FERROLI</b>			
Condensing boiler: YES			
Low-temperature boiler (**): YES			
B1 Boiler: NO			
Combination heater: NO			
Cogeneration space heater: NO			
Item	Symbol	Unit	Value
Rated heat output	$P_n$	kW	140
Seasonal space heating energy efficiency	$\eta_s$	%	93
<b>Useful heat out put</b>			
Useful heat output at rated heat output and high-temperature regime (*)	$P_4$	kW	140,0
Useful heat output at 30% of rated heat output and low-temperature regime (**)	$P_1$	kW	27,1
<b>Useful efficiency</b>			
Useful efficiency at rated heat output and high-temperature regime (*)	$\eta_4$	%	88,1
Useful efficiency at 30% of rated heat output and low-temperature regime (**)	$\eta_1$	%	97,3
<b>Auxiliary electricity consumption</b>			
At full load	$el_{max}$	kW	0,250
At part load	$el_{min}$	kW	0,022
In standby mode	$PSB$	kW	0,003
<b>Other items</b>			
Standby heat loss	$P_{stby}$	kW	0,190
Ignition burner power consumption	$P_{ign}$	kW	0,000
Annual energy consumption	$QHE$	GJ	255
Sound power level	$LWA$	dB	68
Emissions of nitrogen oxides	$NO_x$	mg/kWh	40

(\*) High-temperature regime means 60°C return temperature at heater inlet and 80°C feed temperature at heater outlet.

(\*\*) Low temperature means for condensing boilers 30°C, for low-temperature boilers 37°C and for other heaters 50°C return temperature (at heater inlet).

### 4.6 Diagrams

Pressure loss

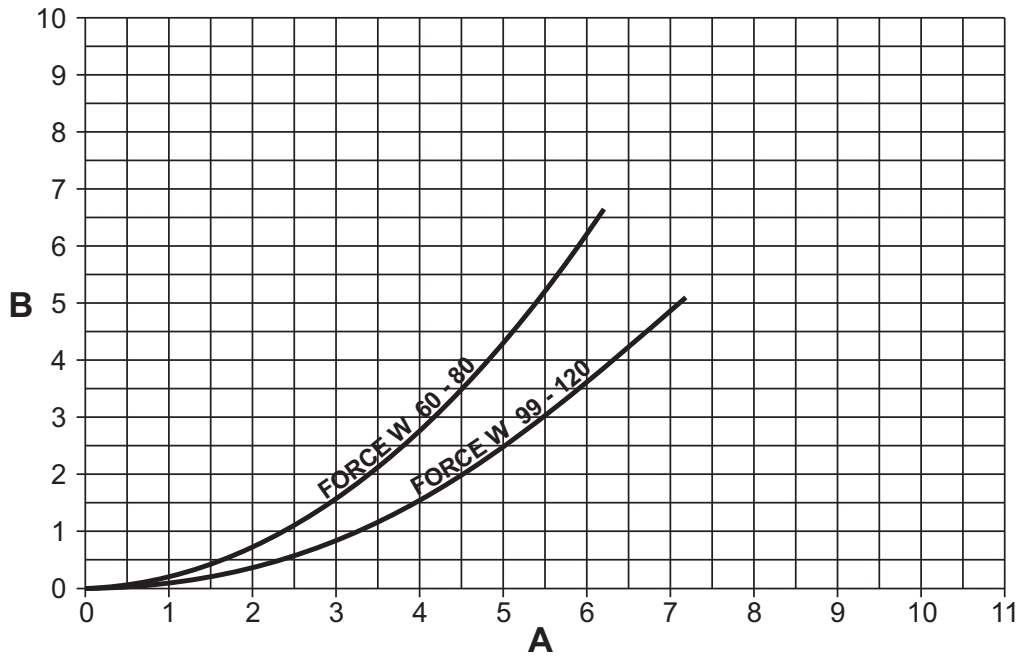


fig. 71- Pressure loss diagram - models FORCE W 60 - FORCE W 80 - FORCE W 99 - FORCE W 120

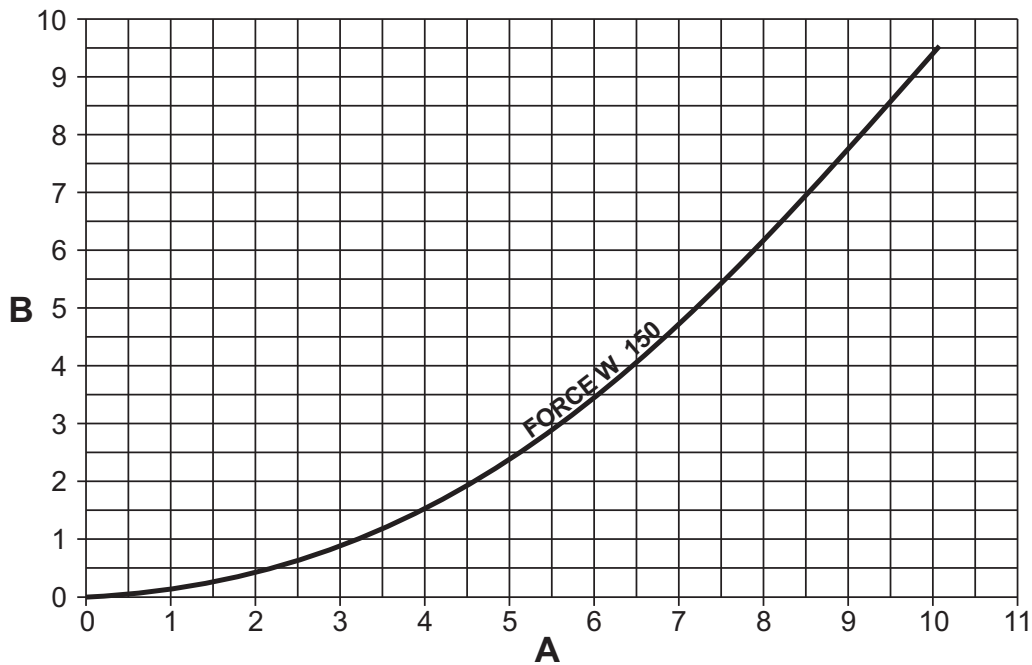


fig. 72- Pressure loss diagram - models FORCE W 150

A Delivery - m<sup>3</sup>/h  
 B m H<sub>2</sub>O

## 4.7 Wiring diagrams

**ATTENTION:** Remove the jumper on the terminal block before connecting the room thermostat or remote timer control.

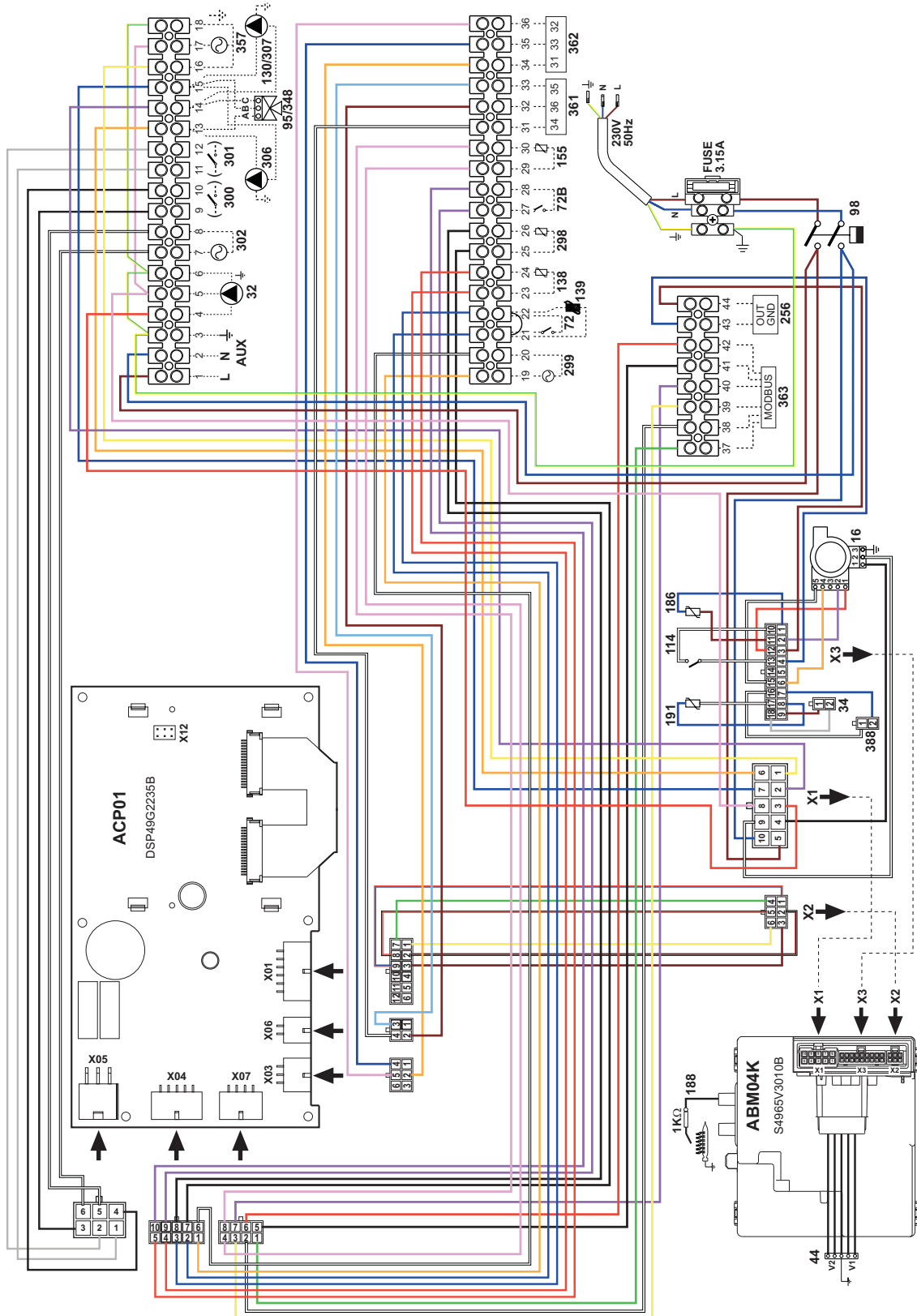


fig. 73- Wiring diagram - models FORCE W 60 and FORCE W 80



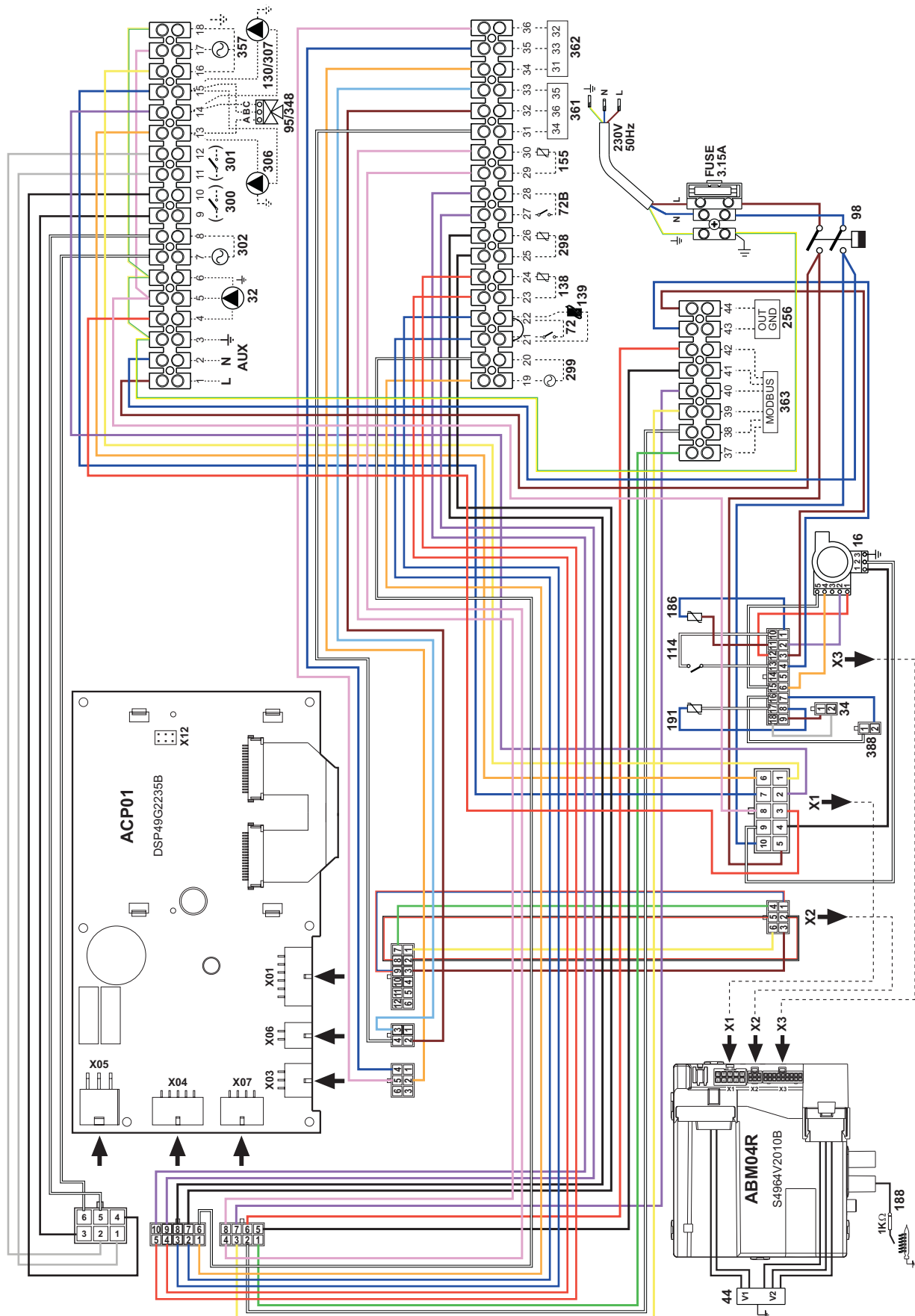


fig. 74- Wiring diagram - models FORCE W 99, FORCE W 120 and FORCE W 150

The logo for Ferroli features the word "ferroli" in a bold, lowercase, sans-serif font. A grey, curved graphic element arches over the top of the letters "e" and "r".

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