

Installation, use and maintenance manual

GAHP Line AR Series

Air-Water reversible absorption heat pumps for heating and cooling medium-large areas

powered by gas and renewable energy



Revision: H

Code: D-LBR270

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1 PREFACE

This "Installation, use and maintenance manual" is a guide to the installation and operation of the gas absorption reversible heat pump of the GAHP Line AR Series.

This manual is specifically intended for:

- final users for the operation of the appliance according to their own requirements;
- Installation technicians (hydraulic and electrical) for a correct installation of the appliance.

The manual also contains:

- a section that describes all the operations necessary for the "first start-up" and for the "gas change" of the appliance, as well as the main maintenance operations;
- an "ACCESSORIES" section with a description of accessories available and their respective reference codes;
- (IN CASE) one or more APPENDIX sections in which are reported some "specific" information for a particular country.

Definitions, meaning of terms and icons

APPLIANCE: this term indicates the gas absorption reversible heat pump of the GAHP Line AR Series.

CCI: "Comfort Control Interface" device. Not applicable.

DDC: digital control panel (Direct Digital Controller).

TAC: Technical Assistance Centre (authorised by Robur S.p.A.).

ACS: sanitary (domestic) hot water.

UTA: air handler.

The **icons** used in the manual have the following meanings:



= DANGER



= WARNING



= NOTE



= START OF OPERATING PROCEDURE



= REFERENCE to another part of the manual or other document

2 SAFETY WARNINGS



Packing items (plastic bags, polystyrene foam, nails, etc.) must be kept out of the reach of children, as they are potentially dangerous.



The appliance must only be used for the purposes for which it has been designed. Any other use is considered inappropriate and therefore dangerous. The manufacturer does not accept any contractual or extra-contractual liability for any damage caused by improper use of the appliance.



The appliance is not intended to be used by persons (including children) whose physical, sensory and mental capacities are impaired, or who lack the necessary experience and knowledge, unless they are supervised or instructed in its use by persons responsible for their safety. Children must be supervised to ensure that they do not play with the appliance.



The unit uses a water/ammoniac absorption cycle for hot/cold water production. The ammoniac is in water solution inside a sealed circuit tested for tightness by the manufacturer. In case of coolant leaks, switch off the electrical power and gas supplies only if this can be done in total safety. Contact your Authorised Service Centre.



Frequent topping up of the hydraulic with water can result in damage due to scale and corrosion, depending on the quality of the water being used. Make sure the system is water tight and that the expansion tank is operational.



Concentrations of chlorides or free chlorine in the circuit above the values given in Table 5.1 Chemical and physical parameters of water → 25 will damage the unit's water/ammonia exchanger.



Close the gas supply before working on the gas circuit. On completing work on the gas circuit, check for leakages as required by established regulations.



Do not operate the appliance if dangerous conditions exist: odour of gas in the grid or near the appliance; problems with the electrical/gas grid or hydraulic circuit; parts of the appliance submerged in water or otherwise damaged; controls or safety components bypassed or defective. In these cases, ask for assistance to professionally qualified personnel.



If you smell gas:

- do not use electrical devices such as telephones, multimeters or other equipment that can cause sparks next to the appliance;
- shut off gas supply closing the isolation valve;
- cut off electrical power opening the main breaker upstream of the appliance (to be provided by the electrical installer in an appropriate panel);

- ask for assistance to professionally qualified personnel from a telephone distant from the appliance.



Moving parts, also during the appliance's start-up and shut-down cycles. Do not remove guards. Make sure the appliance cannot be started up inadvertently.



POISONING HAZARD

Make sure the flue gas components are tight and compliant with established regulations. After any intervention on these parts, check for tightness.



BURN HAZARD

The appliance contains numerous hot parts. Do not open up the appliance or touch the fumes outlet pipe. If necessary, contact your Technical Assistance Centre.



The appliance has a sealed circuit classified as pressure equipment, i.e. with internal pressure higher than atmospheric pressure. The fluids contained in the sealed circuits are harmful if swallowed or inhaled, or if they come into contact with the skin. Do not carry out any operation on the sealed circuit or on its valves.



ELECTROCUTION HAZARD

- Use only approved components for the electrical connections, as specified by the manufacturer.
- Disconnect the electrical power supply before working on the appliance's internal electrical equipment (electrical panel, motors, control board, etc.).
- Make sure the appliance cannot be started up inadvertently.



The electrical safety of the appliance is ensured only when it is correctly connected to an efficient grounding system, compliant with current safety regulations.



DAMAGE DUE TO AGGRESSIVE SUBSTANCES IN THE AIR SUPPLY

Hydrogenated hydrocarbons, which contain chlorine and fluorine compounds, will increase the corrosion of the unit.

Make sure the air supply is free of aggressive substances.



EXPLOSIVE/FLAMMABLE MATERIALS HAZARD

Do not use or store flammable materials (paper, solvents, paint, etc.) in the vicinity of the appliance.



RECOMMENDATION. Stipulate a maintenance contract with an authorised specialist contractor for the annual inspection of the appliance and maintenance when needed. Maintenance and repairs may only be done by a contractor legally authorised to work on gas appliances and equipment. Use only original spare parts.

3 OVERVIEW AND TECHNICAL FEATURES

In this section you will find general information, hints on the operating principle of the appliance and its manufacturing features. This section also contains technical data and dimensional drawings of the appliance.

3.1 GENERAL INFORMATION

This manual is an integral and essential part of the product and must be delivered to the user together with the appliance.

Conformity to CE standards

The gas absorption reversible heat pumps of the GAHP Line AR Series are certified as conforming to EC standard and comply with the essential requirements of the following Directives:

- Gas Directive 90/396/EEC and subsequent modifications and additions.
- Efficiency Directive 92/42/EEC and subsequent modifications and additions.
- Electromagnetic Compatibility Directive 89/336/EEC and subsequent modifications and additions.
- Low Voltage Directive 89/336/EEC and subsequent modifications and additions.
- Pressurised Equipment Directive 97/23/EEC and subsequent modifications and additions.

Information regarding the above EC certifications is given in Paragraph 3.4 TECHNICAL DATA → 11 as well as on the Nameplate of the appliance itself.

Installation and regulatory references

When the appliance arrives at the installation site, before beginning the stages required to move it in order to position it on the site, perform a visual check to ascertain that there are no evident signs of breakage or damage to the packaging or to the external panels, which would be signs that damage occurred during transport.



Packing materials must be removed only after the appliance has been positioned on site. After removing the packing materials, ensure that the appliance is intact and complete.

Installation of the appliance may only be carried out by professionally qualified personnel by i.e. firms qualified according to the current legislation of the country of installation.



"Professionally qualified personnel" means personnel with specific technical competence in the sector of heating/cooling installations and gas appliances.


Installation of the appliance must be carried out in compliance with current local and national regulations regarding the design, installation and maintenance of heating and cooling plants in accordance with the manufacturer's instructions.

In particular, current regulations regarding the following aspects must be respected:

- Gas equipment.
- Electrical equipment.
- Refrigeration plants and heat pumps.
- Every other standard and regulation concerning the installation of equipment for summer and winter air conditioning using gas fuel.

The manufacturer does not accept any contractual or extra-contractual liability for any damage caused by errors in installation and/or failure to observe the abovementioned regulations and the instructions supplied by the manufacturer itself.

Once the appliance is installed

-  The installer must provide the owner with a Declaration stating that the installation has been completed in compliance with state-of-the-art practices, current national and local regulations, and recommendations by the manufacturer.

Before contacting your authorised Robur Technical Assistance Centre (TAC) for the initial activation, the firm must ensure that:

- the electricity and gas mains specifications correspond to the specifications on the nameplate;
- the pressure of the gas supplied falls within the range of values specified by the manufacturer;
- the gas supplied to the appliance is of the type for which it is designed;
- the gas supply system and water distribution system are sealed;
- the gas and electricity supply systems are correctly rated for the capacity required by the appliance and that they are equipped with all safety and control devices prescribed by current regulations.




Check that no safety and control devices are excluded, by-passed or not properly working.

Initial activation procedure

The entire procedure for the first activation of the appliance must be carried out exclusively by an authorized Robur Technical Assistance Centre (TAC) and according to the instructions supplied by the manufacturer.

To carry out entire procedure correctly, follow the instructions in Paragraph 7.1 PROCEDURE FOR FIRST START UP → 57.

-  Contact your local Authorised Robur Technical Assistance Centre (TAC). To find out who your local TAC is, contact Robur S.p.A. (tel. +39 035 888.111). **The guarantee could be voided if the initial activation is not carried out (and validated) by a Robur TAC.**

Operation and maintenance of the appliance

To ensure the correct **operation** of the appliance and to avoid failures, control of the switching on and off of the appliance must be carried out exclusively via a switch located on the on/off command circuit.

If the appliance is to be connected to a Direct Digital Controller (DDC, available as an accessory), control of activating and deactivating the appliance must be performed exclusively through the DDC itself.



In conditions of correct operation of the appliance, it absolutely must not be switched on and off by removing power upstream from the on/off commands (DDC or other switch) before having operated these first and waiting for the shutdown cycle to end (approximately 7 minutes).

If the appliance fails to operate correctly, with the consequent indication of the Machine code, follow the instructions of Paragraph 9.1 OVERVIEW AND OPERATING CODES/ TROUBLESHOOTING → 66.



In the event of failure of the appliance and/or breakage of any component, do not attempt to repair and/or restore operation; proceed as follows:

- deactivate the appliance immediately (if permitted and if no condition of danger exists) by starting the shutdown cycle via the CCP (or DDC or consent switch) and waiting for it to terminate (approximately 7 minutes);
- disconnect the appliance from the gas and electricity mains, cutting off gas supply by means of the appropriate valve and the power supply by means of the external circuit breaker provided by the electrical system installation technician on the appropriate panel.

If it is decided not to use the appliance for a prolonged period, disconnect the appliance following the instructions provided in Paragraph 4.5 PROLONGED PERIODS OF DISUSE → 20.

Correct routine **maintenance** ensures the efficiency and good operation of the appliance over time.

Carry out maintenance operations according to the instructions supplied by the manufacturer.

For maintenance of the appliance's internal components, contact a Robur TAC or qualified technician; for other maintenance requirements, see Paragraph 7.2 MAINTENANCE → 61.

Any repair of the appliance must be carried out by an authorised Robur Technical Assistance Centre (TAC), using only original parts.



Failure to observe the indications given above may compromise the operation and safety of the appliance, and may invalidate its guarantee, if active.

If the appliance is to be disposed of, contact Robur S.p.A. for its correct disposal.



If the appliance is to be sold or transferred to another owner, ensure that this "Installation, use and maintenance manual" is handed over to the new owner and installation technician.

3.2 NOTES ON OPERATION OF THE APPLIANCE

The appliance powered by 230 V 1N 50 Hz electrical power - .

During operation, combustion products are exhausted via the discharge terminal at the left side of the appliance, with outlet in a vertical position.

Control and management of operation of the appliance occurs via the on-board electronics through the microprocessor control board (see Figure 4.1 → 16).

Control and management of operation of the appliance may also take place via the Direct Digital Controller (see Figure 3.1 CCI/DDC → 10) available as an accessory.

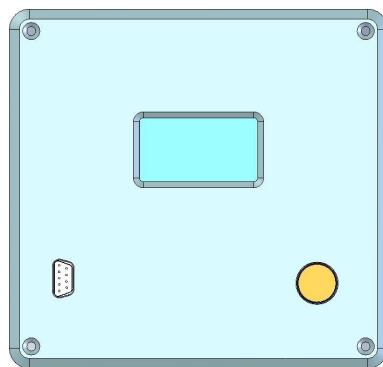


For instructions regarding the use, configuration and programming of the DDC, refer to the two manuals supplied with the unit.



DDC configuration/programming operations must be carried out by an authorised Robur Technical Assistance Centre (TAC) during initial activation procedures and according to the instructions supplied by the manufacturer.

Figure 3.1 – CCI/DDC



Description and general characteristics

The appliance is able to produce hot water to +60°C or chilled water to a temperature of 3°C, operating at extremely high efficiency in heat pump mode.

The appliance is supplied with helicoidal motor-fan or available in reduced-noise versions ("S", with helicoidal motor-fan with larger blades) for reduced noise emissions.

Operating principle

- When operating in **cooling mode** (in summer) the appliance operates as an absorption chiller, and the heat, taken away from the cooled environment via the HYDRAULIC CIRCUIT, is dissipated towards the outside via the air-cooled FINNED COIL.
- When operating in **heating mode** (in winter) the appliance makes use of the absorption cooling cycle to recover heat from the outside environment via the FINNED COIL which, added to the heat produced by the combustion of natural/L.P.G. gas, is transferred into the EXCHANGER and then into the environment to be heated, ensuring efficiency of 140 % (under nominal conditions).



The appliance is not designed for performing frequent inversions of functional mode (heating / cooling). 100 inversions per year is the maximum permitted, not to be exceeded.

3.3 TECHNICAL MANUFACTURING CHARACTERISTICS

The appliance is supplied with the following technical manufacturing characteristics, control and safety components:

- Steel sealed circuit, treated on the outside with epoxy paint;
- Multigas pre-mixing burner equipped with ignition and flame detection managed by an electronic control unit;
- Air-based heat exchanger with single-position finned coil, manufactured in steel tubing and aluminium fins;
- Titanium stainless steel tube bundle water exchanger, with external insulation;
- Inversion valve on the cooling circuit, for use of the appliance in heating or cooling mode;
- Automatic two-way microprocessor-controlled defrosting valve, allowing the finned coil to be defrosted;
- Variable-flow microprocessor-controlled helicoidal motor-fan (summer operation).

Control and safety components

- S61 electronic board with microprocessor integrated with LCD display and encoder (in Figure 4.1 → 16).

- Satellite electronic board AR11 (in Figure 4.2 → 16).
- Plant water flowmeter.
- Sealed circuit high temperature limit thermostat, with manual reset.
- Differential exhaust gas manostat on the combustion circuit.
- Automatically resettable exhaust gas temperature thermostat.
- Sealed circuit safety relief valve.
- Safety by-pass valve, between high and low pressure parts of the sealed circuit.
- Antifreeze functions for hydraulic circuit.
- Ionization flame control box.
- Double shutter electric gas valve.
- Direct Digital Controller (DDC) with LCD display and encoder (in Figure 3.1 CCI/ DDC → 10).

3.4 TECHNICAL DATA

Table 3.1 – Technical characteristics

			GAHP-AR S		GAHP-AR	
OPERATION WHEN HEATING						
G.U.E. gas usage efficiency		%	140 (1)			
Thermal capacity		Nominal (1013 mbar - 15°C)	kW	25,70		
Hot water delivery temperature		maximum	°C	60		
		nominal	°C	50		
Hot water return temperature		maximum	°C	50		
		minimum temperature in continuous operation**	°C	20		
Thermal power		nominal	kW	35,30 (1)		
Hot water flow rate		nominal (Delta T = 10 °C)	l/h	3040		
		maximum	l/h	5000		
		minimum	l/h	1400		
Hot water pressure drop		at nominal water flow	bar	0,29 (2)		
Ambient air temperature (dry bulb)		nominal	°C	7		
		maximum	°C	35		
		minimum	°C	-20		
OPERATING IN COOLING MODE						
G.U.E. gas usage efficiency		%	67 (1)			
Cooling output			kW	16,90 (1)		
Water flow rate		nominal (Delta T = 5 °C)	l/h	2900		
		maximum	l/h	3200		
		minimum	l/h	2500		
Internal pressure drop		at nominal water flow	bar	0,31 (2)		
External air temperature		nominal	°C	35		
		maximum	°C	45		
		minimum	°C	0		
Inlet cold water temperature		maximum	°C	45		
		minimum	°C	6		
ELECTRICAL SPECIFICATIONS						
Power supply		Voltage	V	230		
		TYPE		single-phase		
		Frequency	50 Hz supply	50		
Electrical power absorption		nominal	kW	0,93 (6)	0,90 (6)	
Degree of protection		IP		X5D		
INSTALLATION DATA						
gas consumption		methane G20 (nominal)	m3/h	2,72 (3)		
		G25 (nominal)	m3/h	3,16 (5)		
		G30 (nominal)	kg/h	2,03 (4)		
		G31 (nominal)	kg/h	2,00 (4)		
NOx emission class				5 (9)		
NOx emission			ppm	30 (9)(10)		
CO emission			ppm	23 (9)(10)		
Level of acoustic pressure at 10 meters (maximum)			dB(A)	49 (7)	54 (7)	
Maximum operating pressure			bar	4		
Water content inside the apparatus			l	3		

			GAHP-AR S	GAHP-AR
Water fitting	TYPE		F	
	thread	" G	1"1/4	
Gas fitting	TYPE		F	
	thread	" G	3/4"	
Fume outlet	Diameter ()	mm	80	
Size	width	mm	850	
	height	mm	1540 (8)	1290 (8)
	depth	mm	1230	
Weight	In operation	kg	390	380
GENERAL INFORMATION				
INSTALLATION MODE			B23, B53	
COOLING FLUID	AMMONIA R717	kg	7,5	
	WATER H2O	kg	10,0	
MAXIMUM PRESSURE OF THE COOLING CIRCUIT		bar	35	

** in transient operation, lower temperatures are allowed

Notes:

1. As per EN12309-2 evaluated on actual thermal capacity. For operating conditions other than nominal, refer to the Design Manual.
2. For flow rates different from the nominal refer to the Design Manual.
3. PCI 34.02 MJ/m³ (1013 mbar – 15 °C).
4. PCI 46.34 MJ/kg (1013 mbar – 15 °C).
5. PCI 29.25 MJ/m³ (1013 mbar – 15 °C).
6. ± 10% depending on power voltage and absorption tolerance of electric motors.
7. Free field, frontal, directionality factor 2.
8. Overall dimensions excluding fumes pipes (see Figure 3.2 GAHP-AR dimensions → 13).
9. All values measured with G20 (natural gas) as reference gas.
10. NO_x and CO values are measured referring to EN 483 (combustion values at 0% O₂).

PED characteristics

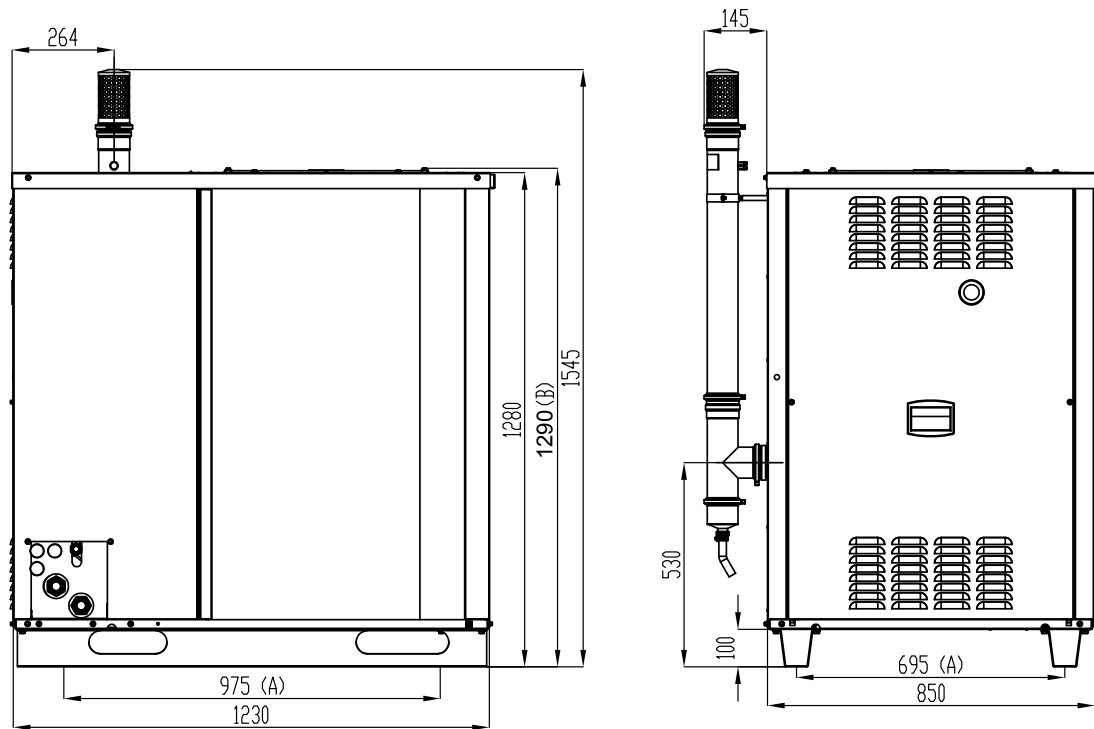
The technical characteristics given below regard the parameters required by the Pressure Equipment Directive (PED) for the sealed circuit present on each appliance.

Table 3.2 – PED data

			GAHP-AR S	GAHP-AR
PED data				
COMPONENTS UNDER PRESSURE	Generator	l	18,6	
	Leveling chamber	l	11,5	
	Evaporator	l	3,7	
	Cooling volume transformer	l	4,5	
	Cooling absorber solution	l	6,3	
	Solution pump	l	3,3	
TEST PRESSURE (IN AIR)		bar g	55	
SAFETY VALVE PRESSURE CALIBRATION		bar g	35	
FILLING RATIO		kg of NH ₃ /l	0,157	
"SEALED SYSTEM" TARE		kg	245	
FLUID GROUP			GROUP 1°	

3.5 DIMENSIONS AND SERVICE PANEL

Figure 3.2 – GAHP-AR dimensions

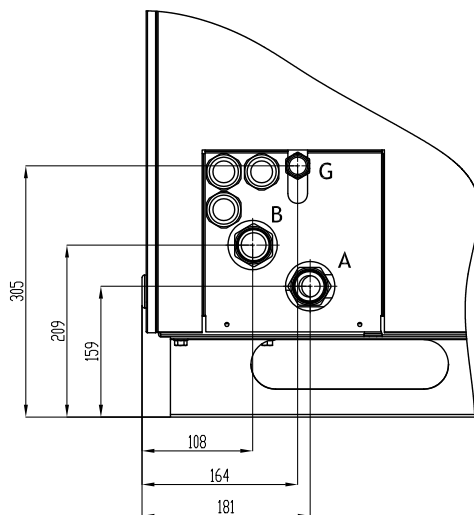


LEGEND

- A Position of holes for fixing of anti-vibration joints
- B H = 1545 mm for "S" version (reduced-noise)

Front and right side views (dimensions in mm)

Figure 3.3 – GAHP-AR service plate



LEGEND

- G Gas connection D. 3/4" F
- A Outlet water D. 1-1/4" F
- B Inlet water D. 1-1/4" F

Detail of hydraulic and gas connections (dimensions in mm)

4 NORMAL OPERATION

In this section you will find all the indications necessary for the activation, regulation and control of operation of the appliance via the controller present in the electrical panel.

4.1 START UP (AND SHUT DOWN)



Efficient operation and long life of the appliance depend largely on its correct use!

Before activating the appliance, check that:

- the gas valve is open;
- the appliance is powered electrically: the general electrical switch (GS) must be in the «ON» position;
- the installation technician has ensured that the hydraulic circuit is supplied in the correct conditions.

If these conditions are satisfied, it is possible to proceed with activation.



If the appliance is connected to a DDC running in controller mode, the appliance is started up and controlled exclusively by the DDC.

If the appliance is not connected to a DDC, it may be activated and deactivated only by means of the on/off commands provided by the electrical installation technician.

According to requirements, these on/off commands may be:

- An on/off switch for activation and deactivation of the appliance. This switch may be an on/off button, an ambient thermostat, a programmable timer, or one or more clean contacts controlled by another process;
- A summer/winter selector switch, for selecting the operating mode of the appliance (cooling or heating).



For details about the type of on/off command installed, contact the plant's electrical installation technician.

Start up

Select the operating mode required (cooling or heating) by means of the summer/winter selector switch, if the mode desired is not already selected.

Switch on the appliance by means of the on/off command (placing it in the "ON" position).



During operation of the appliance, the summer/winter switch (from summer to winter operation and vice versa, or so-called "cycle inversion") may require a maximum of 11 minutes from the time this inversion is invoked by the user.

Shut down

Switch off the appliance via the on/off command (placing it in the "OFF" position).



The shutdown cycle takes approximately 7 minutes to complete.



The on/off commands are essential. Do not switch the appliance on or off by connecting it to or disconnecting it from the power supply directly, as this may be a source of danger and in any case damage the appliance or the plants connected to it.



For instructions regarding the use of the DDC, refer to the two manuals supplied with it, and in particular: "Final user manual - manual 2"

Visualising and clearing of operating codes

Operating codes can be generated by the controller or by the DDC.

The operating codes generated by the controller are visualised on its display and may also be visualised on the display of the DDC (if fitted).

Operating codes generated by the controller can be reset with the controller itself or from the DDC (if fitted or where possible).

If these codes arise, it is necessary to follow the instructions in Paragraph 9.1 OVERVIEW AND OPERATING CODES/TROUBLESHOOTING → 66.



For a description of the operating codes generated by the electronic board and how to reset them, refer to the list of operating codes contained in Table 9.1 TABLE OF OPERATING CODES generated by the S61 electronic board (firmware version 3.021) → 66.



The controller (see Figure 4.1 → 16) is located inside the electrical panel of the appliance and the display may be viewed through the viewing hole on the front panel of the unit itself.

The Machine Codes generated by the DDC may only be viewed on the display of the DDC and may be cleared only through the DDC.

Operating codes generated by the electronic board during the start-up of the appliance

If the appliance remains inactive for a prolonged period, it is possible that air is present in the gas pipes. In this case, activation fails and the appliance reports the operating code: "u_12" - flame controller arrest (temporary) (see Table 9.1 TABLE OF OPERATING CODES generated by the S61 electronic board (firmware version 3.021) → 66) and after a brief interval the appliance automatically launches the start up procedure again.

If code (u_12) is signalled 3 times on successive activation attempts, the code persists, the appliance locks out the flame controller and displays the following operating code: "E_12" - flame controller arrest (see Table 9.1 TABLE OF OPERATING CODES generated by the S61 electronic board (firmware version 3.021) → 66). In this case reset is not automatic.

To restore operation of the appliance, carry out a reset of the flame control unit via menu 2 of the controller: the procedure is illustrated in Paragraph 4.3 RESET OPERATIONS AND MANUAL DEFROSTING → 18. After it is reset, the appliance will make a new attempt to activate.

If the appliance locks out several times, contact a Robur TAC by calling the office *Technical Service* of Robur S.p.A. (tel. 035 888.111).

When activation is successful, the appliance is managed by the on-board controller (see following paragraph).

4.2 ON-BOARD ELECTRONICS



The following descriptions refer to the S61 controller with firmware version 3.021.

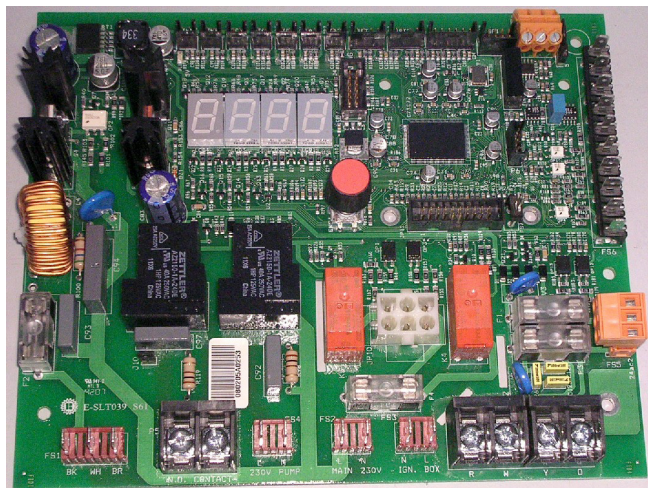
The appliance is fitted with an S61 microprocessor controller interconnected with an AR11 satellite board, located on the side of the S60 board itself.

The S61 controller controls the appliance and displays data, messages and operating codes. Programming, control and monitoring of the appliance take place by interacting

with the display and knob. The CAN BUS port connects one or several appliances to the Comfort Control Panel.

The AR11 satellite board is used for connecting the inversion valve and the defrosting valve.

Figure 4.1

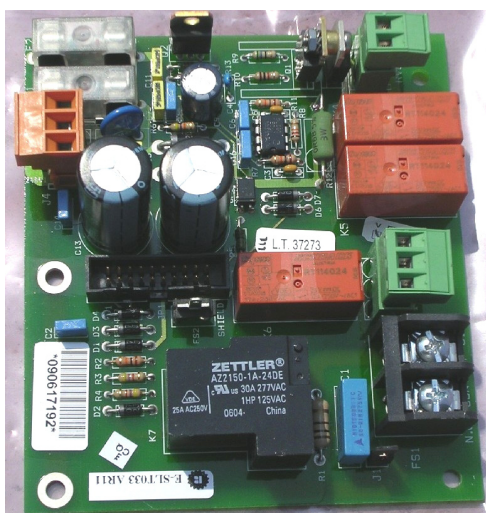


LEGEND

Controller S61
(in every unit)

Electronic board S61

Figure 4.2



LEGEND

Satellite controller AR11
(only in GAHP-AR unit)

Electronic board AR11

With appliance connected to a DDC: if the DDC in controller mode, activation and deactivation of the appliance must be carried out exclusively via DDC; if the DDC in "monitor" mode, control of the switching on and off must be carried out exclusively via the switches fitted by the electrical installation technician.



For instructions regarding the use of the DDC, refer to the two manuals supplied with it, and in particular: "Final user manual - manual 2"

Description of menu of S61 controller

The parameters and settings of the appliance are grouped in the menus shown on the controller's display:

Table 4.1 – Menu of electronic board

MENU	MENU DESCRIPTION	THE DISPLAY SHOWS
Menu 0	VIEW DATA (TEMPERATURE, VOLTAGE, PUMP SPEED, ECC...)	0.
Menu 1	VIEW ALL PARAMETERS	1.
Menu 2	ENTER ACTIONS	2.
Menu 3	USER SETTINGS (THERMOSTATING, SET-POINT, T. DIFFERENTIAL)	3.
Menu 4	INSTALLATION TECHNICIAN SETTINGS	4.
Menu 5	TECHNICAL ASSISTANCE CENTRE SETTINGS	5.
Menu 6	TECHNICAL ASSISTANCE CENTRE SETTINGS (MACHINE TYPE)	6.
Menu 7	VIEW DIGITAL INPUTS	7.
Menu 8	(MENU NOT USED)	8.
E	EXIT MENU	E.

Menu list of electronic board

Menus 0, 1 and 7 are Viewing Menus: they only allow the information displayed to be read, and not modified. Menu 0 shows the appliance operating data in real time. Menu 1 shows the parameters that characterise the operation of the appliance and their current values.



Menu 7 is to be used ONLY by the Robur TAC.

To view the information contained in these menus, proceed as illustrated in the procedure explained below: HOW TO ACCESS THE MENUS.

Menu 2 is an execution menu: it allows the operations of resetting the flame control unit, error reset and the manual defrosting command to be performed.

To perform these procedures, see Paragraph 4.3 RESET OPERATIONS AND MANUAL DEFROSTING → 18

Menu 3 is a settings menu: it allows the values displayed to be set. The correct values of these parameters, for optimum performance of the appliance with the plant to be used connected, have already been set during installation. In any case, to set new values for the parameters, see Paragraph 5.7 PROGRAMMING OF HYDRAULIC PARAMETERS → 32

Menus 4, 5, 6 and 7 exclusively concern the installation technician and Robur's authorized Technical Assistance Centre.

Menu 8 may currently be selected, but not used.

Display and knob

The controller's display can be viewed through the glass of the viewing aperture on the front panel of the appliance.

Upon activation, all display's LED's light up, and then the name of the controller displays. Subsequently (if the on/off command switch is set to ON), the appliance begins to operate.

During correct operation the display shows, alternately, the following information: outlet water temperature, inlet water temperature, and the difference between the two water temperatures (see Table 4.2 Operating information → 17 where is displayed an example of a operating cooling mode).

Table 4.2 – Operating information

OPERATING MODE: COOLING	
PARAMETER	THE DISPLAY SHOWS
Cold inlet water temperature	12.0
Cold outlet water temperature	7.0
Differential temperature (outlet - inlet)	5.0

Example of data visualised on display: water temperature and differential

If there are operating problems, the display shows, sequentially, the operating codes corresponding to the problem detected. A list of these codes with their description and the

procedure to follow to bring the appliance back to correct operation is provided in Paragraph 9.1 OVERVIEW AND OPERATING CODES/TROUBLESHOOTING → 66.

The knob is used to display or set parameters, or to execute actions/commands (e.g.: a function or reset), when permitted.

HOW TO ACCESS THE MENUS

- To use the knob with the special key supplied with the appliance:



You will need: the appliance's electrical power switches set to "ON"; the controller's display sequentially shows the operating data (temperature, delta T°) regarding the current mode (e.g.: heating) and any active operating codes ("u/E...").

1. Remove the front panel by removing the fixing screws.
2. Remove the cover of the electrical panel to access the knob.
3. Use the special key through the hole to operate the knob and access the controller's menus and parameters.
4. To display the menus just press the knob once: the display shows the first menu: "0." (= menu 0).
5. The display shows "0.". To display the other menus, turn the knob clockwise; The display will read, in order: "1.", "2.", "3.", "4.", "5.", "6.", "7.", "8." and "E" (see 4.1 Menu of electronic board → 17).
6. To display the parameters in a given menu (for example, menu 0), turn the knob until it displays the menu in question (in the example: "0.") and press the knob: the display will show the first of the menu's parameters, in this example "0.0" or "0.40" (= menu 0, parameter "0" or "40").
7. In the same way: **turn** the knob to scroll through content (menus, parameters, actions), **press** the knob to select/confirm the content (access a menu, display/set a parameter, execute an action, quit or return to the previous level). For example, to quit the menus, turn the knob to scroll through menus "0.", "1.", "2." etc. until the controller displays the quit screen "E"; now press the knob to quit.



In the case of menus 0 and 1, the user can view any parameter. For how to access to menu 2, refer to Paragraph 4.3 RESET OPERATIONS AND MANUAL DEFROSTING → 18. To set the parameters of menu 3, refer to Paragraph 5.7 PROGRAMMING OF HYDRAULIC PARAMETERS → 32. The other menus are not for the User: the information in these menus is dealt with in the sections dedicated to the installation technician or Robur TAC.



The special key allows the knob of the electronic board to be operated without opening the cover of the electrical panel, so that operators are protected from live components. When the necessary settings have been completed, put away the special key, replace the cap on the aperture of the electrical panel and refit the front panel of the appliance.

4.3 RESET OPERATIONS AND MANUAL DEFROSTING

There are several possible reasons why the appliance may have error status and therefore its operation arrested; such an error situation does not necessarily correspond to damage or malfunction on the part of the appliance. The cause that has generated the error may be temporary: for example, presence of air in the gas supply line or temporary power failure.

The appliance can be reset with S61 controller menu 2, or the DDC (if present) (in this latter cases, refer to their documentation).

Reset appliance controller

The items available in menu 2 through which it is possible to perform the actions permitted are: 0 (execution of flame control unit reset) and 1 (execution of board error reset); selecting E quits the menu (see Table 4.3 Menu 2 → 19).



For regulatory reasons, the flame controller reset is in a dedicated menu (2. 0).

Table 4.3 – Menu 2

MENU OPTION	NECESSARY TO	SHOWN ON DISPLAY AS
0	Reset flame controller arrest	2. 0
1	Reset altri errori	2. 1
22	Manual defrost	2. 22
E	(EXIT MENU)	2. E

Menu reset operation and manual defrosting

ACTION 0: reset flame controller arrest; this may be used when the appliance is first activated, see Paragraph 4.1 START UP (AND SHUT DOWN) → 14; or after a long period of disuse, see Paragraph 4.5 PROLONGED PERIODS OF DISUSE → 20.



You will need: access to the electrical panel, see Paragraph "Display and knob".

To reset the flame control unit select menu 2, as indicated in the Paragraph "Accessing the Menus"; then proceed as follows:

1. The display shows : 2. press the knob to access the menu. The display initially shows item 2. 0.
2. Press the knob to display the flashing reset request:
3. Press the knob again to reset the flame controller. The reset request stops flashing, and the again display shows 2. 0. The reset operation has been performed.
4. To quit the menu, turn the knob clockwise until the 2 is displayed. Now press the knob to return to menu selection: 2.
5. To exit the menu selection and return to the normal visualisation of the parameters of the appliance, turn the knob clockwise until E displays; press the knob to quit.

ACTION 1: reset other errors; this is required to reset any warnings and errors that may occur during operation of the appliance.



You will need: access to the electrical panel, see Paragraph "Display and knob".

To reset the controller errors, select menu 2, as indicated in the Paragraph "Accessing the Menus"; Then:

1. The display shows: 2. press the knob to access the menu. The display initially shows item 2. 0.
2. Turn the knob clockwise to display item 2. 1.
3. Press the knob to display the flashing reset request:
4. Press the knob again to perform a board error reset. The reset request stops flashing, and the again display shows 2. 1. The reset operation has been performed.
5. To quit the menu, turn the knob clockwise until the 2 is displayed. Now press the knob to return to menu selection: 2.
6. To exit the menu selection and return to the normal visualisation of the parameters of the appliance, turn the knob clockwise until E displays; press the knob to quit.

ACTION 22: manual defrosting; The execution of the manual defrosting command, provided that the conditions exist (these are verified electronically), allows the fan coil to be defrosted, overriding software control regarding the timing of this operation.

Defrosting mode is managed automatically by the on-board electronics and is activated only under specific operating conditions (the on-board electronics verify the appropriate requirements).



You will need: access to the electrical panel, see Paragraph "Display and knob".

To execute the manual defrosting command, select menu 2, as indicated in the Paragraph "Accessing the Menus"; then:

1. The display shows: 2. press the knob to access the menu. The display initially shows item 2. 0.
2. Turn the knob clockwise to display item 2. 22.
3. Press the knob to display the manual defrosting request: deFr.
4. Press the knob again to execute the command. The manual defrosting request stops flashing, and the again display shows 2. 22. The manual defrosting operation has been performed (if the appropriate requirements are satisfied).
5. To quit the menu, turn the knob clockwise until the 2 is displayed. Now press the knob to return to menu selection: 2.
6. To exit the menu selection and return to the normal visualisation of the parameters of the appliance, turn the knob clockwise until E displays; press the knob to quit.

4.4 OPERATING SETTINGS

The operations described require basic knowledge of the plant installed and of the S61 controller fitted to the appliance; before proceeding, you must acquire this information, Paragraph 4.2 ON-BOARD ELECTRONICS → 15.



At the moment of installation, the appliance is set up by the installation technician for best operation according to the type of plant installed. Subsequently it is possible to modify the operating parameters, but this is not recommended if not in possession of the necessary knowledge and experience in order to do so. In any case, to set new operating parameters for the appliance see Paragraph 5.7 PROGRAMMING OF HYDRAULIC PARAMETERS → 32.

4.5 PROLONGED PERIODS OF DISUSE

When the appliance is to be inactive for a long period, it is necessary to disconnect the appliance before the period of disuse and reconnect it before it is used again.

To carry out these operations, contact a reputable hydraulic system installation technician.

Disconnecting the appliance



You will need: the appliance connected to the power/gas supply Necessary equipment and materials.

1. if the appliance is in operation, switch it off with the CCP or DDC (if present) or the consent switch and wait for the shutdown cycle to terminate completely (approximately 7 minutes).
2. Scollegare l'apparecchio dalla rete elettrica, mettendo in posizione OFF l'interruttore generale (vedi particolare GS di Figura 6.4 Electrical wiring diagram → 38 predisposto dall'installatore in apposito quadro.
3. Close the gas valve.



Do not leave the appliance connected to power and gas supply if it is expected to remain inactive for a long period.

If you wish to disconnect the appliance during the winter, one of the following two conditions must be met:

1. make sure that the hydraulic plant connected to the appliance contains an adequate percentage of glycol antifreeze (see Paragraph 5.5 FILLING OF HYDRAULIC CIRCUIT → 30 and Table 5.3 Technical data for filling the hydraulic circuit → 31);
2. activate the antifreeze function, which runs the circulation pumps and the appliance under 6°C. To do this, contact your hydraulic system installation technician. This function requires the appliance to be ALWAYS powered up (electricity and gas) and power failures excluded. **Otherwise the manufacturer declines all contractual and extra-contractual liability for consequent damage.**

Connecting the appliance before it is used again (to be carried out by the installation technician)

Before starting this procedure, the hydraulic system installation technician must:

- ascertain whether the appliance requires any maintenance operations (contact your authorised Robur Technical Assistance Centre or consult Paragraph 7.2 MAINTENANCE → 61);
- check that the water content of the plant is correct; if necessary, top up the circuit to at least the minimum quantity (see Paragraph 5.5 FILLING OF HYDRAULIC CIRCUIT → 30);
- if necessary, add inhibited monoethylene glycol antifreeze (free of impurities) in a quantity in proportion to the MINIMUM winter temperature in the area of installation (see Table 5.3 Technical data for filling the hydraulic circuit → 31);
- bring the plant to the correct pressure, making sure that the pressure of the water in the plant is not less than 1 bar and not over 2 bar;



In case of winter seasonal switch-off or long period of stopping, we suggest to not empty the hydraulic circuit: in that case possible oxidation process can occur. This oxidation process could damage both the hydraulic system and also the Robur heat pump. It's important to verify that no leakages occur in the hydraulic circuit that may empty part of the system. The above recommendation is necessary in order to avoid to fill continuously with water that may imply the additional introduction of oxygen and the consequent dilution of the used inhibitor, for ex glycol. In case of presence of glycol, Robur advises to use inhibited glycol. Galvanized pipes are not recommended, as they are not compatible with glycol.



You will need: the appliance disconnected from the electricity/gas supply

1. open the plant gas supply valve to the appliance and make sure that there is no smell of gas (indicating possible leaks);
2. If no smell of gas is detected, connect the appliance to the electricity supply mains via the external circuit breaker provided by the installation technician in the appropriate panel (set the "GS" circuit breaker to the "ON" position, see Figure 6.4 Electrical wiring diagram → 38);
3. power up the Comfort Control Panel or DDC (if present);
4. check that the hydraulic circuit is charged;
5. Switch on the appliance with the Comfort Control Panel or DDC (if present).

5 HYDRAULIC INSTALLATION

In this section you will find all the instructions necessary for the hydraulic installation.



Before realizing hydraulic system and gas supply for the appliance, the professionally qualified personnel is advised to read Paragraph 3.1 GENERAL INFORMATION → 7, providing important recommendations about safety and references to current regulations.

5.1 GENERAL INSTALLATION PRINCIPLES



Prior to installation, carry out careful internal cleaning of all pipes and every other component to be used both on the hydraulic plant and the fuel supply plant, in order to remove any residues that may compromise operation of the appliance.

Installation of the appliance must be carried out in compliance with current regulations regarding design, installation and maintenance of heating and cooling plants and must be undertaken by professionally qualified personnel in accordance with the manufacturer's instructions.

During the installation stage, observe the following indications:

- Check that there is an adequate mains gas supply, in accordance with the manufacturer's specifications; for the correct supply pressure, refer to Paragraph 5.4 GAS SUPPLY → 29.
- The appliance must be installed on the outside of buildings, in an area in which air circulates naturally and which does not require any particular protection from weather phenomena. **In no case must the appliance be installed inside a room.**
- No obstruction or overhanging structure (protruding roofs, eaves, balconies, ledges, trees) must obstruct either the air flowing from the top part of the appliance, or the exhaust fumes outlet.
- The appliance must be installed in such a way that the exhaust fumes outlet is not in the immediate vicinity of any external air inlets of a building (respect current regulations regarding the exhaust fumes outlet).
- Do not install the appliance close to flues, chimneys or other similar structures, in order to prevent hot or polluted air from being drawn by the fan through the condenser. In order to function correctly the appliance must use clean air from the environment.
- If the appliance is installed near buildings, make sure it is not on the dripping line from gutters or similar.
- A cut-off valve and vibration damping coupling must be fitted on the gas supply.
- Fit antivibration joints on the hydraulic connections to prevent vibrations from the appliance from being transmitted to the circuit.

5.2 POSITION OF THE APPLIANCE

Lifting the appliance and placing it in position

Do not remove packaging during handling on the installation site.



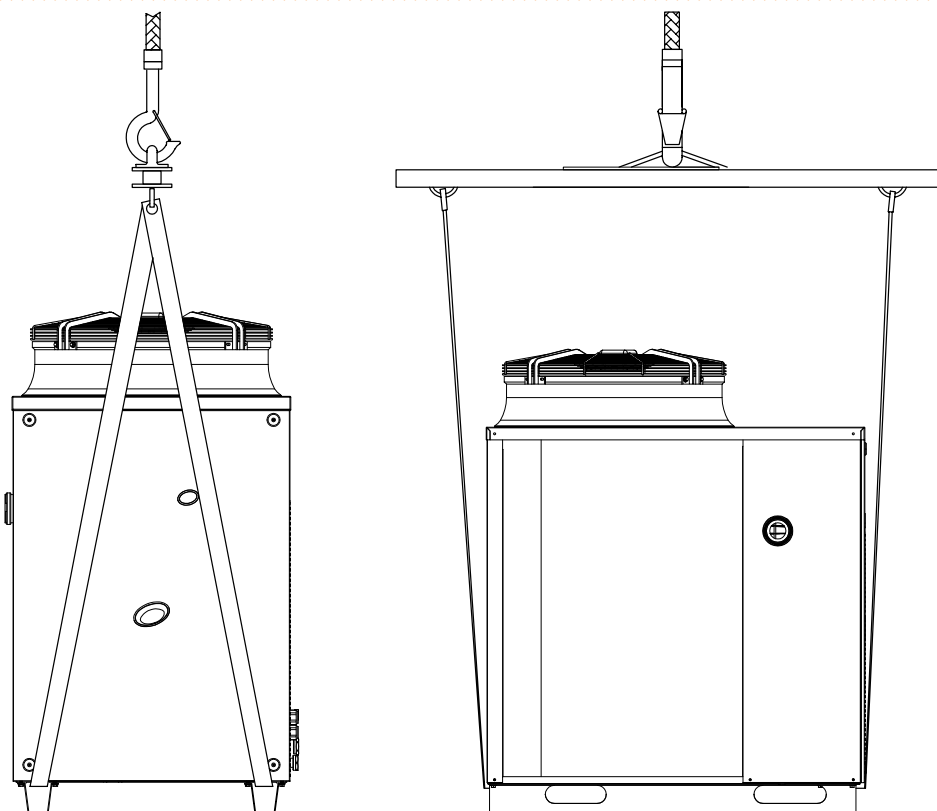
Packing must only be removed upon final installation.

If the appliance has to be lifted, connect two cables to the holes provided on the base and use suspension and spacer bars to prevent the cables of the hoist from damaging the panels while the appliance is moved (see Figure 5.1 Instruction for lifting → 23).



The hoist and all accessory equipment (braces, cables, bars) must be of adequate dimensions in relation to the load to be lifted. **The manufacturer cannot be held responsible for any damage that occurs during the setting up of the appliance.**

Figure 5.1 – Instruction for lifting



The appliance can be installed at ground level, or on a terrace or roof (if they are able to sustain its "dimensions" and "weight"). **The appliance must be installed in an area which is always accessible.**



The dimensions and weight of the appliance are given in Paragraph 3.4 TECHNICAL DATA → 11.

Supporting base

Always place the appliance on a levelled flat surface made of fireproof material and able to support the weight of the appliance.



During winter operation, the appliance, on the basis of temperature and humidity conditions of the outside air, can carry out defrosting cycles that cause the layer of frost/ice on the fan coil to melt. Take this possibility into consideration, adopting appropriate measures (for example: a "containing" step and channelling of water into a suitable drain) in order to prevent "uncontrolled" spread of water around the appliance and the consequent risk that a layer of ice will form (with the danger of falls on the part of passing people). **The manufacturer may not be held responsible for any damage arising from the failure to observe this warning.**

- **Installation at ground level**

If a horizontal base is not available (see also "Supports and levelling"), it is necessary to create a flat level base in concrete at least 100-150 mm larger than the dimensions of the base of the appliance on each side.

For the dimensions refer to the tables in Paragraph 3.4 TECHNICAL DATA → 11.

Provide a containing step and a suitable drainage channel for the defrosting water.

- **Installation on a terrace or roof**

Position the appliance on a levelled flat surface made of fireproof material (see also "Supports and levelling").

The structure of the building must be able to sustain the weight of the appliance added to that of the supporting base.

For the weight refer to the tables in Paragraph 3.4 TECHNICAL DATA → 11.

Provide a containing step and a suitable drainage channel for the defrosting water.

Although the appliance produces vibrations of limited intensity, the use of antivibration mounts (available as accessories) is strongly recommended in such cases of installation on roofs or terraces in which resonance phenomena may arise.

In addition, it is advisable to use flexible connections (anti-vibration joints) between the appliance and the hydraulic and gas supply pipes.



Avoid placing the appliance on the roof directly above locals requiring quietness.

Supports and levelling

The appliance must be correctly levelled by placing a spirit level on the upper part.

If necessary, level the appliance with metal shimming; do not use wooden spacers as these deteriorate quickly.

CLEARANCES AND WARNINGS

Position the appliance so as to maintain **minimum clearances** from combustible surfaces, walls or other appliances, as illustrated in Figure 5.2 Clearances → 25.



Minimum clearances are required for maintenance accessibility.

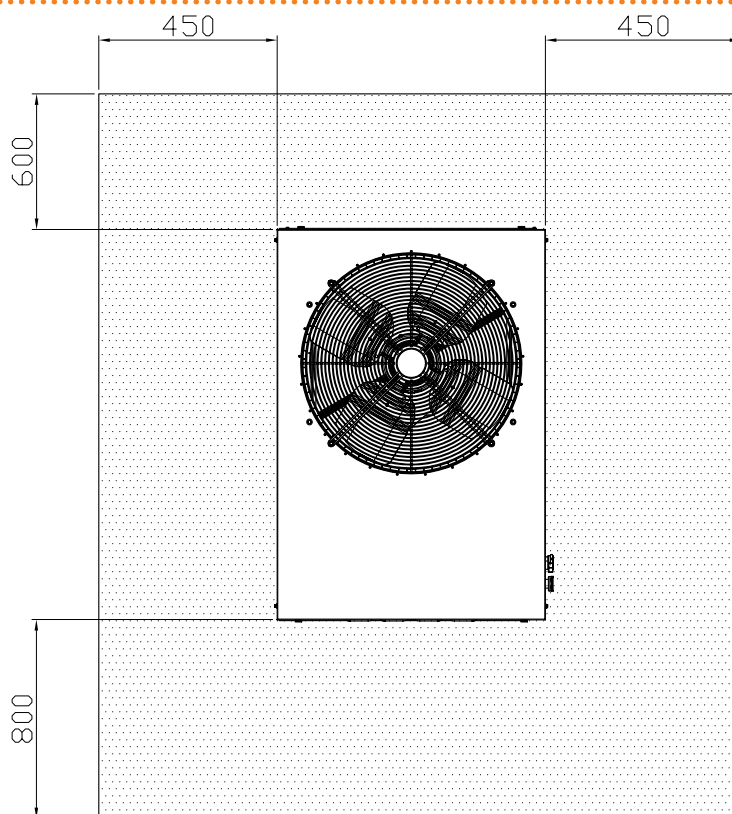
The fumes outlet terminals must be installed in such a way that they do not allow the fumes to collect or return to the circuit in the unit's installation area. The outlet terminal must be constructed in conformity with established regulations.

Do not install any cover or obstruction to the evacuation of the air issuing from the fan.

When deciding on the installation position, especially if multiple units are used, consider that each unit requires 11,000 m³/h of air for the coil. Make sure that the installation and position allow for sufficient air flow to the coil and prevent recirculation, which would reduce efficiency and shut-down the appliance of the units and force them to switch off.

Position the appliance preferably out of range of rooms and/or environments where strict silence is required, such as bedrooms, meeting rooms, etc.

Evaluate the acoustic impact of the appliance on the basis of the installation site: avoid locating the appliance in positions (corners of buildings, etc.) that could amplify the noise it produces (reverb effect).

Figure 5.2 – Clearances


5.3 HYDRAULIC CONNECTIONS

General indications

- The hydraulic plant may be created using pipes in stainless steel, black steel, copper or crosslinked polyethylene suitable for heating and cooling plants. All water pipes and connections must be adequately insulated in accordance with current norms, to prevent heat dispersion and the formation of condensate.
- If glycol antifreeze is to be used (see Paragraph 5.5 FILLING OF HYDRAULIC CIRCUIT → 30), DO NOT USE galvanised pipes or pipe fittings as they are subject to potential corrosion phenomena when glycol is present.
- If using rigid pipes, use vibration damping couplings at the water and gas connections on the appliance's service plate to prevent vibration.

As other hydronic appliances, Robur heating and cooling systems operate with grid-water of good quality. In order to prevent any possible problem of operation or reliability caused by filling or top-up water, please refer to codes and norms about water treatment for thermo-hydraulic installations in civil or industrial applications. Parameters indicated in Table 5.1 Chemical and physical parameters of water → 25 must be complied with.

Table 5.1 – Chemical and physical parameters of water

CHEMICAL AND PHYSICAL PARAMETERS OF WATER IN HEATING/COOLING SYSTEMS		
PARAMETER	UNIT OF MEASUREMENT	ALLOWABLE RANGE
pH	\	>7 ⁽¹⁾
Chlorides	mg/l	< 125 ⁽²⁾
Total hardness (CaCO ₃)	°f	< 15
Iron	mg/kg	< 0,5 ⁽³⁾
Copper	mg/kg	< 0,1 ⁽³⁾
Aluminium	mg/l	< 1
Langelier's index	\	0-0,4
HARMFUL SUBSTANCES		

CHEMICAL AND PHYSICAL PARAMETERS OF WATER IN HEATING/COOLING SYSTEMS

PARAMETER	UNIT OF MEASUREMENT	ALLOWABLE RANGE
Free chlorine	mg/l	< 0,2 ⁽³⁾
Fluorides	mg/l	< 1
Sulphides		ABSENT

1 with aluminium or light alloys radiators, pH must also be lower than 8 (in compliance with applicable rules)

2 value referred to the maximum water temperature of 80 °C

3 in compliance with applicable rules

Water quality can be measured through parameters like acidity, hardness, conductivity, chlorides content, chlorine content, iron content and the like.



The presence of free chlorine in the water, in particular, can jeopardize parts of the installation and Robur units. Therefore, please make sure that free chlorine content and total hardness are compliant with the allowable ranges reported in Table 5.1 Chemical and physical parameters of water → 25.

The way the installation is operated can be the cause of possible degradation of water quality.

Moreover, abnormally massive water top-up or reintegration can cause a drift of chemical or physical above-mentioned parameters. Reintegration should not exceed 5% per year of the total amount of water. It is advised to check regularly the water quality, especially in case of automatic or periodic top-up.

In case water treatment is needed, this operation should be carried out by a professional or competent person, following strictly the instructions by the manufacturer or supplier of the chemical substances for the treatment, since dangers could arise for health, for the environment and for Robur appliances.

Several products for water treatment are available on the market.

Robur does not perform detailed market surveys. Therefore Robur suggests to contact Companies which are specialized in water treatments. They will be able to suggest the best way how to proceed according to the type of installation.

In case washing of the pipes is needed, this operation should be carried out by a professional or competent person, following strictly the instructions by the manufacturer or supplier of the chemical substances for the washing, avoiding the use of substances aggressive for stainless steel or containing/releasing free chlorine.

Please make sure the pipes are properly rinsed in order to remove any residue of chemical substances from the pipes.

Robur is not liable for ensuring that water quality is always compliant with what reported in Table 5.1 Chemical and physical parameters of water → 25. Non-compliance with indications above may jeopardize the proper operation, integrity and reliability of Robur appliances, invalidating the warranty.

For any further detail, please contact directly Robur S.p.A. (tel.+39 035.888.111).

The components described below, to be fitted in proximity to the appliance, are illustrated in the typical hydraulic plant schemes in Figures 5.3 → 28 and 5.4 → 29.

- VIBRATION DAMPING COUPLINGS
- PRESSURE GAUGES (range 0-3 bar).
- FLOW REGULATION VALVE (shutter or balancing).
- WATER FILTER with mesh MIN 0.7 mm and MAX 1 mm.
- BALL CHECK VALVE (also to be fitted on the gas supply line).
- 3 BAR SAFETY VALVE installed in the appliance outlet water pipe.
- EXPANSION TANK (for individual appliance) installed in the appliance water outlet pipe.
- PLANT EXPANSION TANK installed in the appliance inlet water pipe.



The appliance is not equipped with an expansion tank: therefore it is necessary to install a suitable expansion tank, sized in relation to the maximum heat excursion and maximum operating pressure of the water of the plant (see figures for reference mentioned above).

- **PLANT WATER CIRCULATION PUMP:** located on the water inlet pipe of the appliance, flowing towards the plant, and selected with characteristics that satisfy the requirements of the plant.
- **WATER CIRCULATION PUMP for single appliance:** located on the appliance water inlet pipe (primary side), flowing towards the appliance, and selected with characteristics that satisfy the requirements of the plant. Note: Provide in any case a plant water circulation pump (secondary side), flowing towards the plant and chosen with characteristics that meet the plant's requirements.
- **HYDRAULIC SEPARATOR** complete with air bleeder valve and drain tap.
- **PLANT FILLING SYSTEM:** if automatic filling systems are used, a seasonal check of the percentage of monoethylene glycol in the plant is recommended.



Antifreeze

To prevent the water freezing in the circuit, the appliance is equipped with an antifreeze function.

The antifreeze function, already factory activated on every unit, work only on "active" modules.

The antifreeze function protects the system circuit against freezing; starts the external water circulation pump (if the pump is controlled by the appliance) and if necessary, for hot modules, can also start the corresponding burner (if necessary and where requested: see Paragraph 9.1 OVERVIEW AND OPERATING CODES/TROUBLESHOOTING → 66, code u_51 and u_79).

The antifreeze function can be deactivated by adding an adequate amount of anti-freezing glycole in the hydraulic circuit.



Active and passive modules

If the appliances are not controlled by a DDC:

in the "only cold", "only hot" and 4 pipe type (hot and cold) appliances, modules are always "Active" modules;

In the 2 pipe type (hot or cold), the "Active" module is the one that operated the last shutting-off cycle; the other module will be the "Passive" module.

If the appliances are controlled by a DDC:

if the DDC manages a 2 pipe type plant (only hot, or only cold), or a 4 pipe type plant (hot and cold): the modules of the appliance are always all "Active" modules;

if the DDC manages a 2 pipe type plant (hot or cold): the "Active" module of the appliances is determined by the function set on the DDC. As an example, if on the DDC is set the heating function, all the hot modules managed by the DDC will be the "Active" modules of the appliance. All the cold modules managed by the same DDC will instead be the "Passive" modules of the appliance.



It is therefore necessary to ensure a continuous supply of electricity and gas to the appliance throughout the whole of the winter period. If it is not possible to ensure a continuous supply of electricity and gas to the appliance, use glycol antifreeze of the inhibited monoethylene type.

If glycol antifreeze is to be used in the hydraulic circuit, DO NOT USE galvanised pipes and connections.

(Consult the notes on "Possible use of glycol antifreeze" contained in Paragraph 5.5 FILLING OF HYDRAULIC CIRCUIT → 30 and in any case the technical specifications of the glycol to be used.)

The sizing of the pipes and pump must guarantee the nominal water flow rate that is necessary for the correct operation of the appliance (for calculation of internal pressure drops in the appliance, refer to the Paragraph 3.4 TECHNICAL DATA → 11).



The operations necessary for initial activation or regulation of the appliance and of the Direct Digital Controller must only be carried out by an authorised Robur Technical Assistance Centre (TAC). These operations are described in Paragraph 7 INITIAL ACTIVATION AND MAINTENANCE → 57).



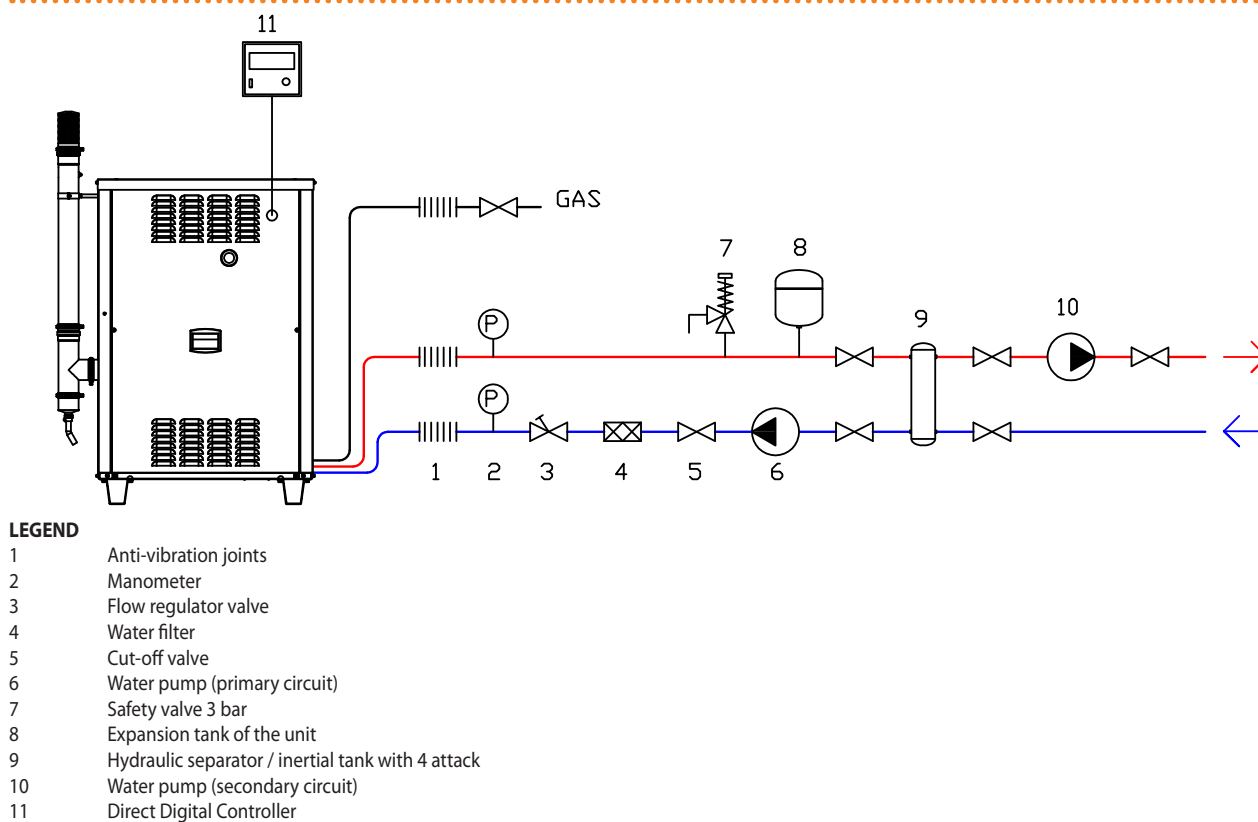
The products' guarantee is void if initial activation is not carried out by a Robur TAC.

Figure 5.3 → 28 and 5.4 → 29 below are two examples of typical hydraulic plants for a single appliance and for 2 appliances.



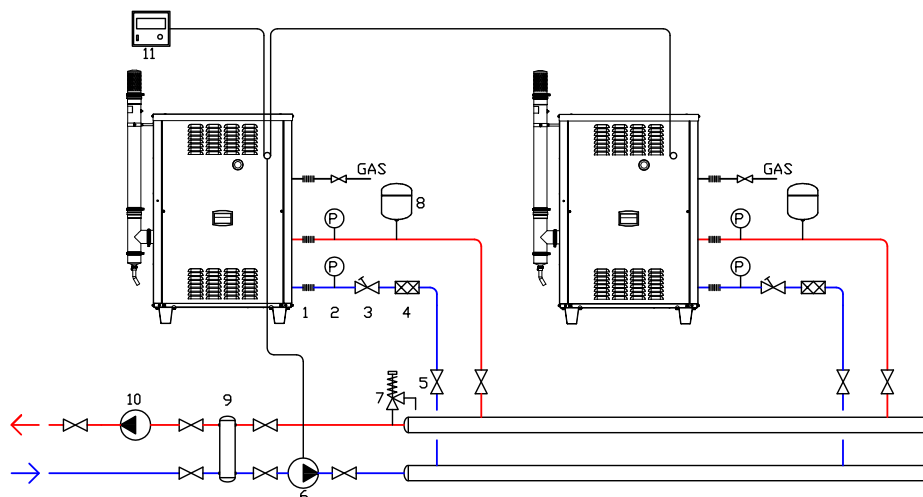
For further information or technical support in this regard, contact Robur S.p.A.'s Presales Office (tel. 035 888111).

Figure 5.3



Example of hydraulic plant diagram for connection of 1 appliance

Figure 5.4



LEGEND

- 1 Anti-vibration joints
- 2 Manometer
- 3 Flow regulator valve
- 4 Water filter
- 5 Cut-off valve
- 6 Water pump (primary circuit)
- 7 Safety valve 3 bar
- 8 Expansion tank of the unit
- 9 Hydraulic separator / inertial tank with 4 attack
- 10 Water pump (secondary circuit)
- 11 Direct Digital Controller

Example of hydraulic plant diagram for connection of 2 appliances

5.4 GAS SUPPLY

The installation of gas supply pipes must be compliant with current regulations and norms.

The gas supply pressure must be in the range given in Table 5.2 Network gas pressure → 30.



Supplying gas to the appliance at pressures higher than those indicated above can damage the gas valve, resulting in dangerous situations.

LPG systems must be equipped with a first stage pressure reducer close to the LPG storage tank, in order to reduce the gas pressure to 1,5 bar, and a second stage pressure reducer, close to the unit, in order to reduce pressure from 1,5 bar to the value in agreement with the gas network pressure of the country of installation (see Table 5.2 Network gas pressure → 30).



Exemple for the Italian market: for the G30 gas, from 1.5 bar to 0.030 bar (30mbar); for the G31 gas, from 1.5 bar to 0.030 bar (30mbar).



LPG may cause corrosion; piping and fitting materials must be resistant to this corrosion.

Vertical gas pipes must be equipped with a siphon and provided with a drain for the condensate that may form inside the pipe during cold periods. It may also be necessary to insulate the gas pipe to prevent the formation of excessive condensate.



In any case, provide an isolation valve (ball valve) on the gas supply line, to isolate the appliance when required.

Table 5.2 – Network gas pressure

GAHP-AR; GAHP-A		Gas supply pressure			
Product categories	Countries of destination	G20 [mbar]	G25 [mbar]	G30 [mbar]	G31 [mbar]
II _{2H3B/P}	BG, CZ, DK, EE, FI, GR, LT, LV, NO, IT, RO, SE, SK, SI, TR	20		30	30
	AT, CH, CZ	20		50	50
	HU	25		30	30
II _{2H3P}	BG, EE, ES, GB, IE, LT, LV, PT, SK, SI	20			37
II _{2ELL3B/P}	DE	20	20	50	50
II _{2ES3P}	FR	20	25		37
II _{2E3P}	LU	20			50
II _{2L3B/P}	NL		25	50	50
II _{2E3B/P}	PL	20		36	36
II _{2E/P}		20			36
I _{3P}	IS				30
I _{3B/P}	CY, MT			30	30
I _{3B}	MT			30	
I _{2E(R)B; I_{3P}}	BE	20	25		50

For data regarding hourly fuel consumption of the appliance, refer to Paragraph 3.4 TECHNICAL DATA → 11.

5.5 FILLING OF HYDRAULIC CIRCUIT

After having completed all hydraulic, gas and electrical connections, the installer can proceed filling the hydraulic circuit, observing the following steps:

- Activate the automatic air vent valves on the system circuit.
- Fill the hydraulic circuit, ensuring the minimum water content in the plant, and adding, if necessary, to the plant water (free of impurities) a quantity of monoethylene glycol in proportion with the minimum winter temperature in the installation zone (see table 5.3 Technical data for filling the hydraulic circuit → 31).
- Bring the plant to the correct pressure, making sure that the pressure of the water in the plant is not less than 1 bar and not over 2 bar.



To facilitate the operation of bleeding air from the hydraulic circuit, the appliance is equipped with an additional manual air bleeding valve.

Possible use of glycol antifreeze

Glycols, normally used to lower the freezing point of water, are substances in an intermediate state of oxidation which, in the presence of oxidising agents such as oxygen, are transformed into corresponding acids.

This transformation into acids increases the corrosive nature of the fluid contained in the circuit. For this reason, mixtures that are commercially available almost always contain inhibiting substances that are able to control the pH of the solution.

A necessary condition for the oxidation of the glycol, and therefore its degradation, is the presence of an oxidising agent such as oxygen.

In closed circuits in which no replenishment of water, and therefore of oxygen, occurs over the course of time, once the oxygen initially present has reacted, the degenerative phenomenon of glycol is hugely inhibited.

Most circuits, however, are of the non-sealed type, and therefore receive a more or less continuous supply of oxygen.

Therefore it is essential, whatever type of glycol is in question, to verify that it is adequately inhibited and that the necessary checks are regularly performed during its entire period of use.



Antifreeze liquids for cars, which do not contain inhibiting components, are not recommended for cooling and heating plants. **The manufacturer does not accept any contractual or extra-contractual liability for damage caused by the use or incorrect disposal of glycol antifreeze.**

It is equally important to recall that the use of monoethylene glycol modifies the thermophysical characteristics of the water in the plant, and in particular its density, viscosity and average specific heat. Always check the date of expiry and/or degradation of the product with the supplier.

Table 5.3 Technical data for filling the hydraulic circuit → 31 gives the approximate freezing temperature of the water and consequent increased drop in pressure of the appliance and of the circuit of the plant, according to the percentage of monoethylene glycol. This table should be borne in mind when sizing the pipes and water circulator: for pressure drop calculations, see the data in paragraph 3.4 TECHNICAL DATA → 11).

Nevertheless, it is advisable to consult the technical specifications of the monoethylene glycol used. If automatic loading systems are used, a seasonal check of the quantity of glycol present in the plant is also necessary.

Table 5.3 – Technical data for filling the hydraulic circuit

% of MONOETHYLENE GLYCOL	10	15	20	25	30	35	40
WATER-GLYCOL MIXTURE FREEZING TEMPERATURE	-3°C	-5°C	-8°C	-12°C	-15°C	-20°C	-25°C
PERCENTAGE OF INCREASE IN PRESSURE DROPS	--	6%	8%	10%	12%	14%	16%
LOSS OF EFFICIENCY OF UNIT	--	0,5%	1%	2%	2,5%	3%	4%

5.6 EXHAUST FLUE GAS

The appliance is approved for the connection of the combustion product exhaust pipes, present on each single unit, to a flue linked directly to the outside.

Each single unit is provided with a connection of Ø 80 mm (equipped with a suitable seal) located on the left side (see Figure 5.5 → 32) and outlet in a vertical position.

If the type of installation and/or current regulations require the canalisation of combustion products, for the sizing of the flue duct for combustion products, refer to the Design Manual.

The appliance is complete with an exhaust duct kit, to be fitted by the installer.

The exhaust duct kit consists of (see Figure 5.5 → 32):

- N. 1 exhaust air pipe Ø 80mm (length 750 mm);
- N. 1 "T" connector;
- N. 1 condensate trap;
- N. 1 terminal;
- N. 1 clamp for fixing pipe to left side panel;
- N. 4 hoseclamps;
- N. 1 hose adaptor and condensate drain pipe in silicone rubber.

To assemble and fit the external exhaust air duct installation kit, for each single unit of the appliance, proceed as follows:

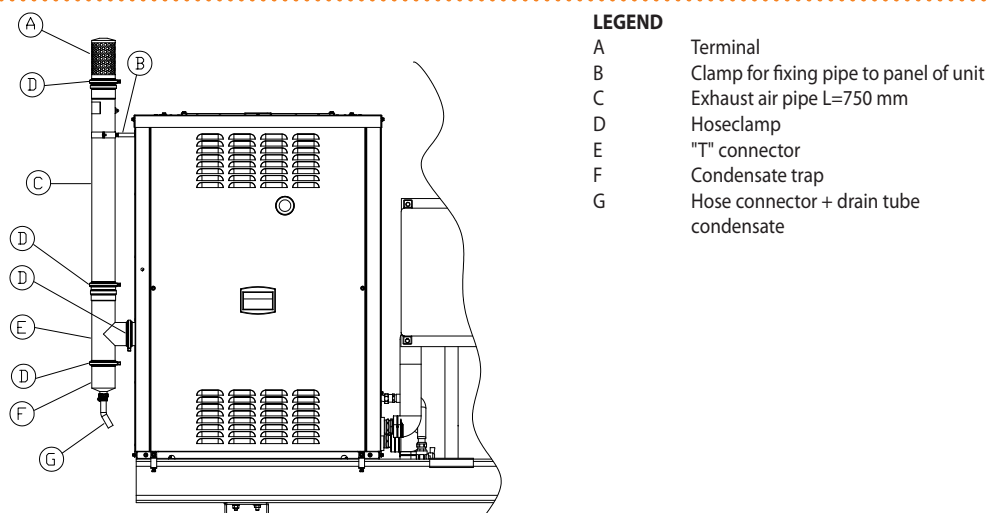


You will need: the appliance positioned in its installation site

1. position the clamp for fixing the pipe, with the relative metallic spacer, to the upper part of the side panel of the unit, which comes supplied with a suitable hole;

2. using N. 1 hoseclamp, fit the condensate trap to the T connector, then fit the latter to the exhaust air pipe (Ø 80 mm) of the appliance and fix using a hoseclamp
3. using N. 1 hoseclamp, fit the exhaust air pipe (length 750 mm) to the "T" connector;
4. fasten the drain pipe with the clamp previously fixed to the side panel of the unit;
5. position the exhaust terminal and fix it with N. 1 hoseclamp;
6. fix the hose adaptor, condensate drain pipe and the relative silicon tube;
7. complete the operation, checking carefully that all components are correctly fixed in place.

Figure 5.5



Components of exhaust air duct kit

5.7 PROGRAMMING OF HYDRAULIC PARAMETERS



The hydraulic parameters can be set according to the procedure described in this paragraph only when the appliance is not connected to a DDC.



If the appliance is connected to a DDC, follow the instructions given in the DDC manuals exclusively.

To configure the hydraulic parameters, access menu 3 of the controller.



For the use of the controller, refer to procedure "HOW TO ACCESS THE MENUS" in Paragraph 4.2 ON-BOARD ELECTRONICS → 15.

Table 5.4 Parameters for hydraulic configuration → 32 gives the three parameters used for hydraulic configuration.

Table 5.4 – Parameters for hydraulic configuration

HYDRAULIC PARAMETER	THE DISPLAY SHOWS
Select cold water thermostating	3. 73
Cold water set-point	3. 75
Cold water temperature differential	3. 76
Hot water thermostat control selection	3.160
Hot water setpoint	3.161
Hot water temperature differential	3.162
(EXIT MENU)	3. E

Menu 3 parameters.

Description of parameters

- *Water thermostating*: parameters "73" and "160". These parameters may have two values, "0" or "1". Value "0" indicates that the appliance's "activation/deactivation" temperature is to be read by the water probe at the appliance's INLET. Value "1" indicates that the appliance's "activation/deactivation" temperature is to be read by the water probe at the appliance's OUTLET.
- *Water set-point*: parameters "75" and "161". These parameters set the water temperature that, when reached, causes the appliance to be deactivated.
- *Water differential*: parameters "76" and "162". These parameters represent an interval in degrees that, when added to the set-point, defines the temperature at which the appliance is reactivated.

Operation in cooling mode:

The appliance functions by cooling the water until it reaches the *set-point Temperature*. At this point it switches off. The temperature of the water rises until it reaches the temperature corresponding to *Set-point + differential*. When this is reached the appliance switches on again.

For example, if we set the following values:

- *Thermostating*: "0" (= reading from temperature probe outlet water).
- *Set-point*: +7.0 °C.
- *Differential*: 2.0 °C.

The appliance will behave as follows:

1. the water in the plant cools down (cooling);
2. the outlet water temperature reaches +7 °C (= setpoint);
3. The appliance switches off;
4. the water in the plant, slowly, rise (transfers cold to the room);
5. the outlet water temperature reaches +9 °C (= setpoint + differential);
6. the appliance turns back on: cooling starts again. The cycle is repeated.

Heating mode:

The appliance heats the water until it reaches the *setpoint* temperature. The appliance then switches off. This means that the water temperature slowly drops to the *setpoint + differential* temperature. At this point, the appliance turns back on.

For example, if we set the following values:

- *Thermostat control*: "0" (= read INTAKE water temperature).
- *Setpoint*: +40.0 °C.
- *Differential*: -2.0 °C.

The appliance will behave as follows:

1. the water temperature rises (heating);
2. the intake water temperature reaches +40 °C (= setpoint);
3. The appliance switches off;
4. the system water temperature slowly drops (loses heat to the environment);
5. the intake water temperature reaches +38 °C (= setpoint + differential);
6. the appliance turns back on: heating starts again. The cycle is repeated.

The following instructions give a detailed description of how to configure the hydraulic parameters in menu 3 (or menu 4) on the machine's controller.

Hydraulic parameter settings



You will need: the controller's display sequentially shows the operating data (temperature, delta T°) regarding the current mode (e.g.: heating). Special key provided with the appliance.

1. See procedure "HOW TO ACCESS THE MENUS" (Paragraph 4.2 ON-BOARD ELECTRONICS → 15) and proceed as described in steps "1" to "5".
2. The display will now flash "0.". Turn the knob until menu 3 displays (the display shows "3.") or menu 4 (the display shows "4.").
 - For example: to set the parameters of menu 3:
 1. The display shows "3.". Press the knob to access menu: the display will show the first of the menu's parameters: "3. 73" or "3.160" (= menu 3, parameter "73" or "160").
 2. The display shows "3. 73" or "3.160". Press the knob to access the value: the display shows the preset value (e.g. "1"), flashing, to indicate that it can be modified.
 3. Press again to confirm "1" (= outlet water thermostat control); to modify the value, turn the knob until "0" displays: press to confirm "0" (= intake water thermostat control).
 4. The display now shows the current parameter "3.73" or "3.160" again: the parameter has been set to its new value.
 5. Turn the knob to display the next parameter. The display shows "3. 75" or "3.161". Press the knob to access the value: the display shows the preset value (e.g. "60"), flashing, to indicate that it can be modified.
 6. Press again to confirm "60" (= water temperature setpoint); to modify the value, turn the knob until the desired value displays (e.g. "40"): press again to confirm "40" (= water temperature setpoint);
 7. The display now shows the current parameter "3.75" or "3.161" again: the parameter has been set to its new value.
 8. Turn the knob to display the next parameter. The display shows: "3.76" or "3.162". To access a parameter, press the knob: the display shows the preset value (e.g. "-10"), flashing, to indicate that it can be modified.
 9. Press again to confirm "-10" (= water temperature differential); to modify the value, turn the knob until the desired value displays (e.g. "-2"): Press again to confirm "-2" (= water temperature differential).
 10. At this point, the display shows the current parameter "3. 76" or "3.162" again: the parameter has been set to its new value.
 11. To quit menu 3, turn the knob clockwise until the quit screen displays: "E". The display shows "3.". "E": press the knob. The display will now show the current menu "3.". To exit the menu selection screen, turn the knob clockwise until "E" displays: press to confirm.



The controller's display now sequentially shows, as at the beginning, the operating data (temperature, delta T°) regarding the current mode (e.g.: heating).



To modify a parameter in menu 4, to access the menu (installation technician only) you are first prompted for a password. For the password, contact the Robur TAC or *Technical Service Department* of Robur S.p.A. (035.888111).



The special key allows the knob of the electronic board to be operated without opening the cover of the electrical panel, so that operators are protected from live components. When the necessary settings have been completed, put away the special key, replace the cap on the aperture of the electrical panel and refit the front panel of the appliance.

6 ELECTRICAL INSTALLATION

This section illustrates the operations to perform for the correct electrical installation of the appliance, and contains electrical diagrams that may be of use in the event of maintenance operations.



Before proceeding with operations to create the electrical plant of the appliance, the professionally qualified personnel concerned are advised to read Paragraph 3.1 GENERAL INFORMATION → 7: it provides important information regarding installation safety and references to current norms.

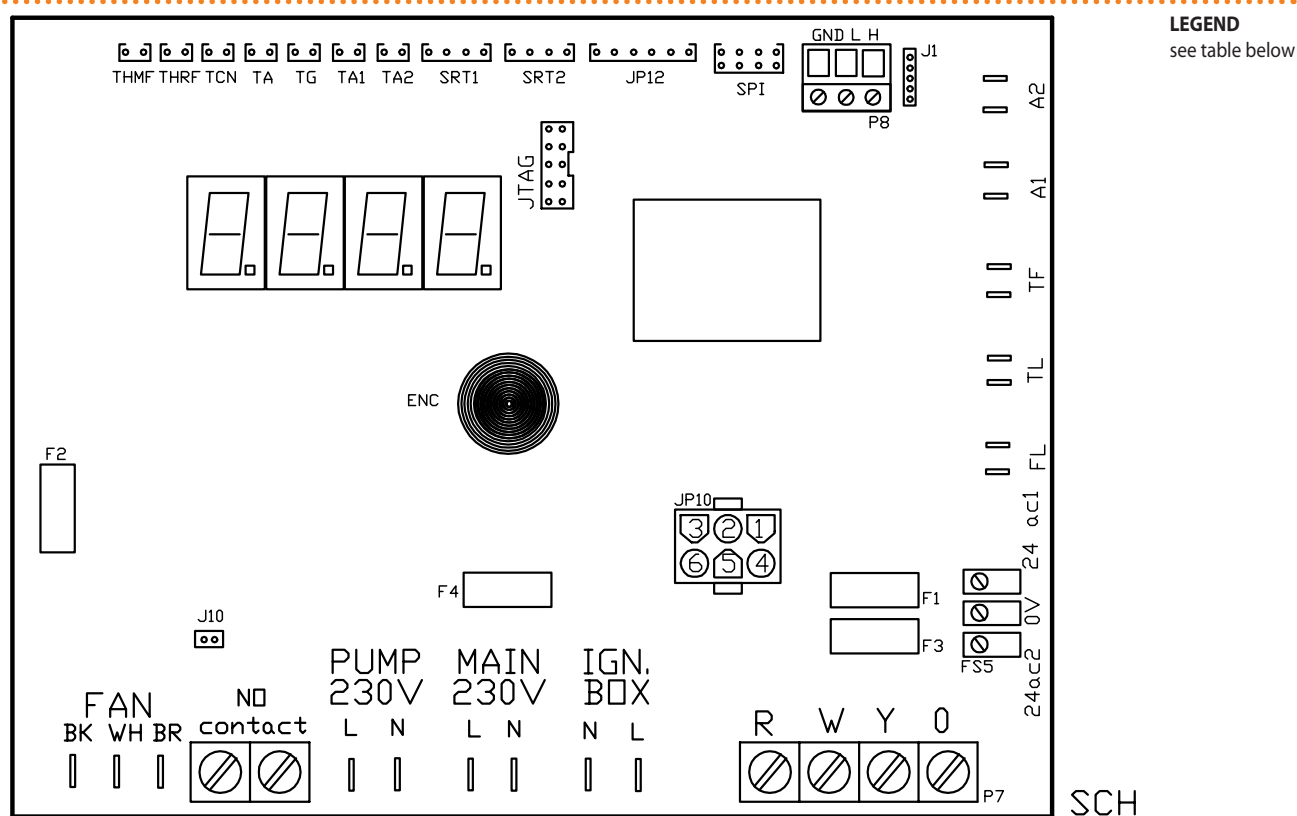


Before making the electrical connections or any checks, make sure that work is not carried out on live elements.

Figure 6.1 Electronic board S61 → 35 and Table 6.1 Controller component S61 → 35 detail the S61 controller's inputs and outputs. The supplementary controller AR11 is shown in detail in Figure 6.2 Controller type AR11 → 36.

Figure 6.3 → 37 detail plant of the appliance.

Figure 6.1 – Electronic board S61



Main components of the on-board controller.

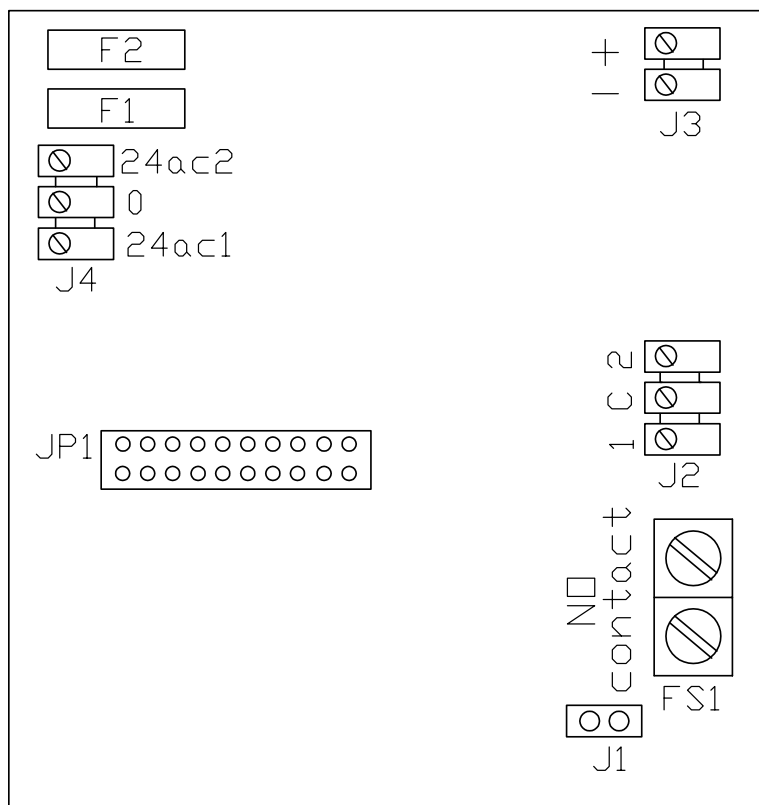
Table 6.1 – Controller component S61

CODE	DESCRIPTION
SCH	Electronic board S61
THMF	Cold water delivery temperature probe input
THRF	Cold water return temperature probe input
TCN	Outlet condensator temperature probe input
TA	Ambient temperature probe input
TG	Generator temperature probe input (inlet condensator)
TA1	Not used
TA2	Not used

SRT1	Hydraulic pump rotation sensor input
SRT2	Not used
JP12	Not used
SPI	Not used
P8 (GND, L, H)	CAN BUS connector
J1	CAN BUS jumper
A1, A2	Auxiliary inputs (not used)
TF	Fumes thermostat input
TL	Generator limit thermostat input
FL	Flow switch input
FS5 (24V AC)	Controller power 24 V AC
P7 (R, W, Y, o)	Consent inputs
IGN.BOX (L, N)	Flame controller power 230 V AC
MAIN 230V (L, N)	S61 controller power 230 V AC
PUMP 230V (L, N)	Hydraulic pump power output
N.O. Contact	Pump contact, N.O.
J10	circuit water circulator controller jumper
FAN (BK, WH, BR)	Cooling fan output
JTAG	S61 controller programming connector
ENC	Knob
JP10	6-pole flame controller connector
F1	Fuse T 2A
F2	Fuse F 10A
F3	Fuse T 2A
F4	Fuse T 3,15A

Controller component legend.

Figure 6.2 – Controller type AR11

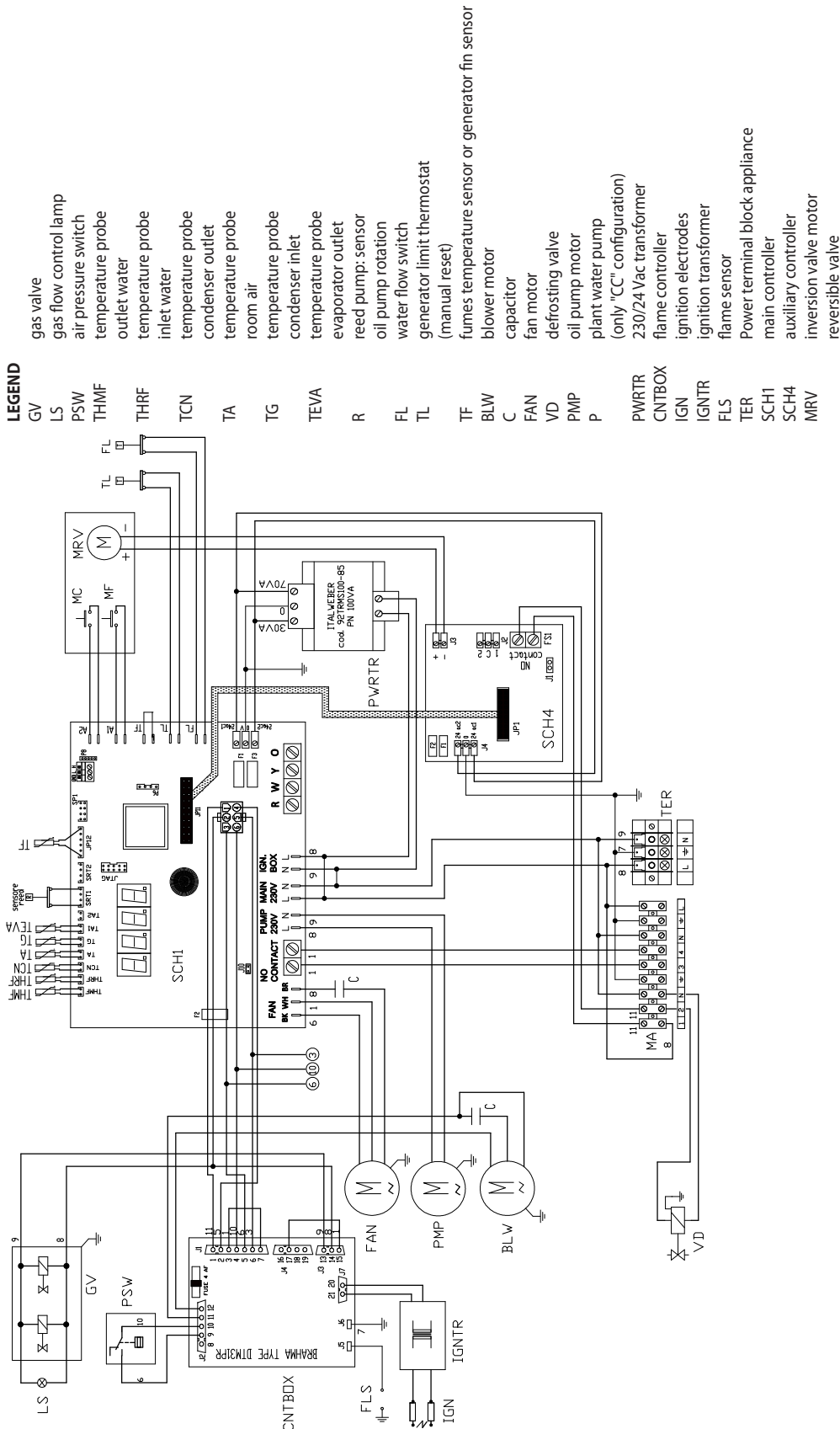


LEGEND

F1	Fuse 2A T
F2	Fuse 2A T
JP1	AR11 auxiliary controller connector
J1	Jumper N.O. contact
J2	Display appliance state
J3	Reversible valve motor power
J4	Controller power
FS1	Defrosting valve N.O. contact

Main components of the auxiliary controller AR11

Figure 6.3



Schema elettrico singola unità (GAHP-AR) costituente l'apparecchio.

6.1 CONNECTING THE APPLIANCE TO THE MAINS

The examples of connection of the appliance to the mains in this paragraph refer to:

- single appliance plants

- multiple appliance plants

SINGLE APPLIANCE PLANTS

The appliance must be connected to a 230 V 1N - 50 Hz power supply, as follows (see example in Figure 6.4 Electrical wiring diagram → 38):



You will need: the appliance connected hydraulically; external electrical panel configured by the installation technician. Necessary equipment and materials.



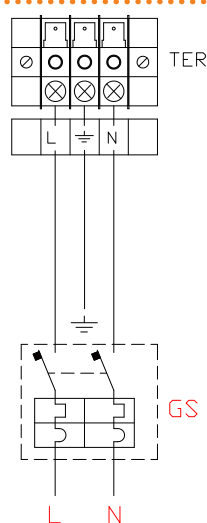
Make sure that the electrical panel configured by the technician is equipped with a 2 pole circuit breaker with minimum air gap of 3 mm, and two 5A type T fuses.

1. Remove the appliance's front panel and open the electrical panel by removing the bolts securing it.
2. Prepare a cable of the FG7(O)R 3Gx1.5 type for the power supply to the appliance.
3. Locate, inside the electric panel of the appliance, the "TER" terminal and make the connection as shown in the example.
4. On completion, restore the appliance to its fully assembled condition.



The insertion of relays or other electrical components inside the General Electrical Panel of the appliance is not permitted. **Do not activate the appliance if the hydraulic plant has not been filled.**

Figure 6.4 – Electrical wiring diagram



LEGEND

TER	terminal board
L	phase
N	neutral
Components NOT SUPPLIED	
GS	general switch

Example of connection of appliance to 230 V 1N - 50 Hz electricity supply



Disconnect the appliance from the electrical power supply via the external disconnecting switch only after having performed the shutdown cycle (via the DDC) and having waited for it to terminate (approximately 7 minutes).



Make sure the ground cable is longer than the live cables. In this way it will be the last wire to be pulled away if the mains cable should accidentally be pulled, and will thus guarantee the ground connection. **Do not use gas pipes to ground electrical appliances.**



A wiring error, as well as impeding the correct operation of the appliance, could also damage the electrical apparatus that it contains.

MULTIPLE APPLIANCE PLANTS

The appliance must be connected to a 230 V 1N - 50 Hz power supply, as follows (see example in Figure 6.5 connection to electrical mains (230 V 1N - 50 Hz) → 39):



You will need: the appliances hydraulically connected; the external electrical panel configured by the installation technician. Necessary equipment and materials.



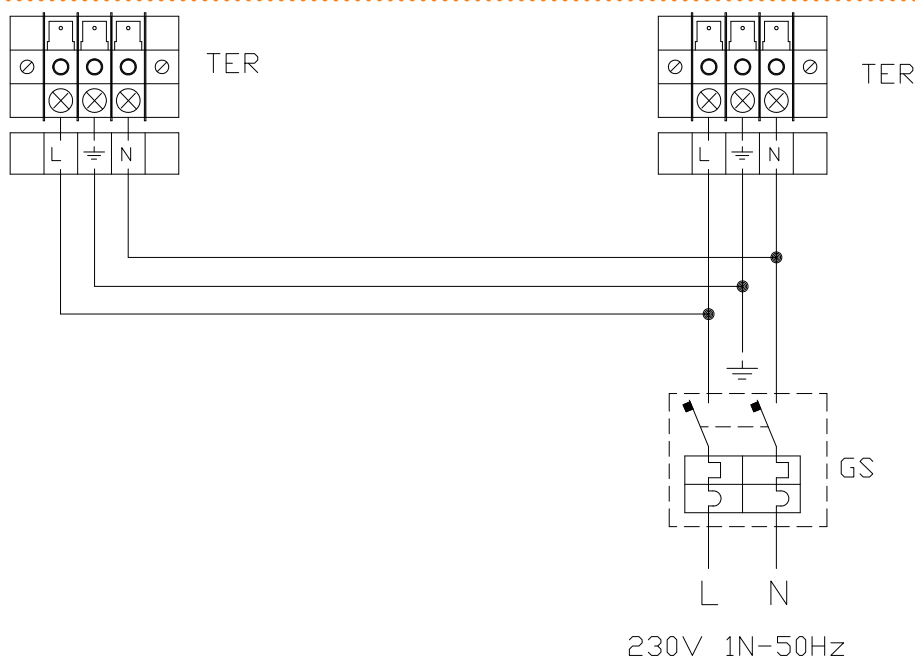
Make sure that the electrical panel configured by the technician is equipped with a 2 pole circuit breaker with minimum air gap of 3 mm, and two type T fuses of suitable rating.

1. On each appliance, remove the front panel and open the electrical panel by removing the bolts securing it.
2. For each appliance, provide a FG7(O)R 3Gx1.5 type cable.
3. Identify, inside the electric panel of the appliance, the "TER" terminal and make the connection as shown in the example.
4. On completion, restore the appliances to their fully assembled condition.



The insertion of relays or other electrical components inside the General Electrical Panel of the appliance is not permitted. **Do not activate the appliance if the hydraulic plant has not been filled.**

Figure 6.5 – connection to electrical mains (230 V 1N - 50 Hz)



LEGEND

TER terminal board
L phase
N neutral
Components NOT SUPPLIED
GS general switch

Example of connection of more than one appliance to the mains.



Disconnect the appliance from the electrical power supply via the external disconnecting switch only after having performed the shutdown cycle (via the DDC) and having waited for it to terminate (approximately 7 minutes).



Make sure the ground cable is longer than the live cables. In this way it will be the last wire to be pulled away if the mains cable should accidentally be pulled, and will thus guarantee the ground connection. **Do not use gas pipes to ground electrical appliances.**



A wiring error, as well as impeding the correct operation of the appliance, could also damage the electrical apparatus that it contains.

6.2 ELECTRICAL CONNECTIONS FOR THE SYSTEM CIRCULATOR



The primary circulation pump/s must be controlled by the S61 board, or directly (via "N.O. contact" contacts) or indirectly ("OR" use of said contacts by BMS type external systems). Otherwise, the primary circulation pump/s must be running permanently.

CONNECTION FOR CONTROLLING INDEPENDENT CIRCULATORS

This connection applies to hydraulic circuits which have a primary circuit circulator for each appliance (independent circulators) installed on the plant. For example: 1 circulator/1 appliance; 5 circulators/5 appliances.

In such cases, for each appliance it may be sufficient to install a single-phase water circulator (230 V AC), with power absorption less than 700 W.

To make the circulator-appliance connections, proceed as follows (references to Figure 6.6 Electrical wiring diagram → 41):



You will need: the appliance connected hydraulically; monophase water pump (230 Vac), with power less than 700 W; predisposed external electric panel. Necessary equipment and materials.



Make sure that the external electrical panel is equipped with a power switch (2-pole) with suitable protection equipment (fuses).

1. Remove the appliance's front panel and open the electrical panel by removing the bolts securing it.
2. Prepare a suitable cable for the connection.
3. Locate, inside the electric panel of the appliance, the "NO Contact" terminals on the controller (SCH), and hook up as shown in the example.



Make sure the ground cable is longer than the live cables. In this way it will be the last wire to be pulled away if the mains cable should accidentally be pulled, and will thus guarantee the ground connection. **Do not use gas pipes to ground electrical appliances.**



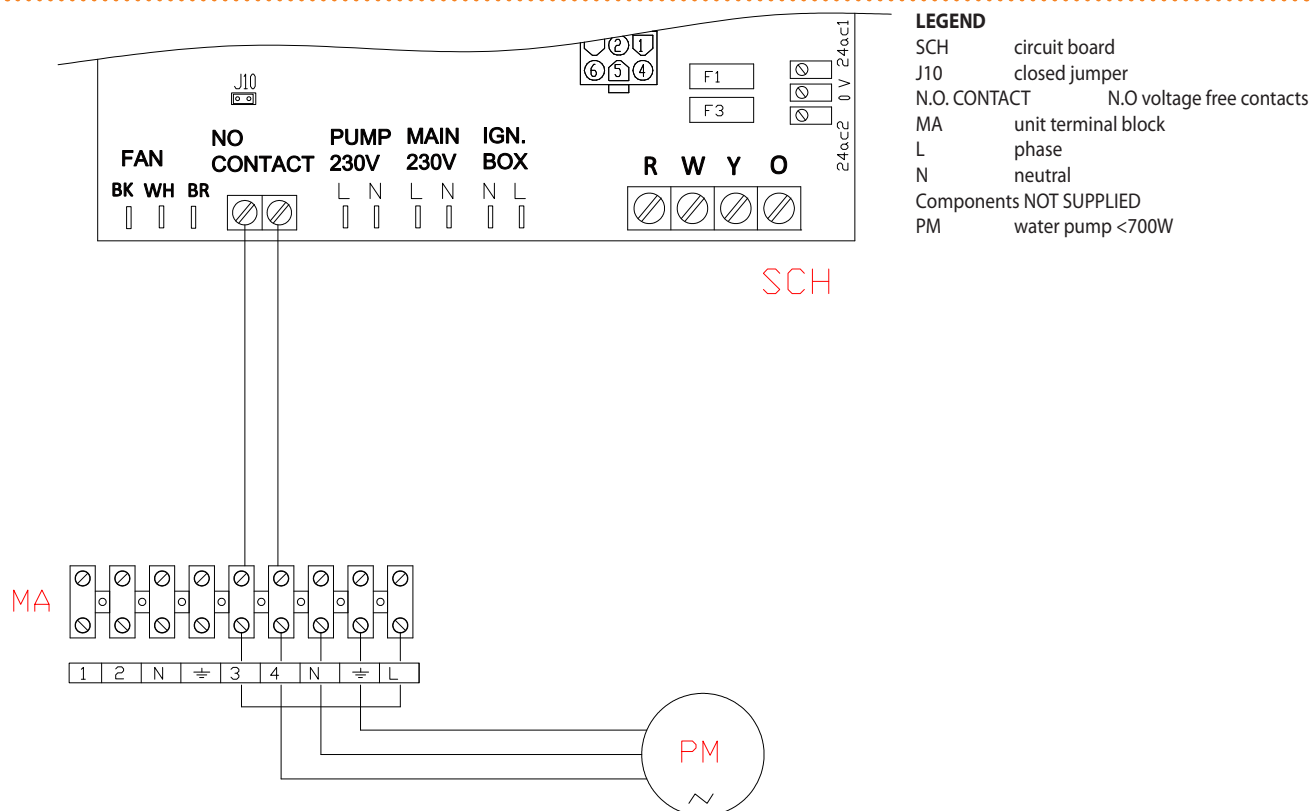
A wiring error, as well as impeding the correct operation of the appliance, could also damage the electrical apparatus that it contains.



The "NO Contact" terminals are no voltage contacts with maximum power capacity of 700 W. These contacts control the circulator shutdown delay (7 minutes after appliance shutdown). Check the position of jumper "J10", as follows:

1. Locate, on the appliance's controller (SCH), jumper "J10" (bottom right, below the "NO Contact" contacts) and make sure that it is set as shown in detail "A" (jumper closed) of the figure.
2. On completion, restore the appliance to its fully assembled condition.

Figure 6.6 – Electrical wiring diagram



Example of pump/appliance electrical connection with 230 Vac pump (with absorbed power of < 700 W), controlled directly by the appliance.



If the circulator's power is equal to or greater than 700 W, the installation technician must make the following modifications (see figure):

- (point 3) <<... make the connections as shown in the example, but installing a relay for the control of the pump, managed via NO-contact>>. Then:
- (point 4) <<Locate...and open the jumper "J10" positioning it as shown in detail "A" (jumper open) of the Figure 6.7 Electrical wiring diagram → 43>>.



Fit the relay inside the external electrical panel provided by the installation technician.



The insertion of relays or other electrical components inside the General Electrical Panel of the appliance is not permitted. **Do not activate the appliance if the hydraulic plant has not been filled.**

CONNECTIONS FOR CONTROLLING A SHARED CIRCULATOR

This connection applies to hydraulic circuits which have a single primary circuit circulator for multiple appliance (shared circulator) installed on the plant. For example: 1 circulator/3 appliances.

In such cases, a three-phase water circulator (400 V AC) may be required.



The choice of water circulator depends on the number of appliances being served as the specifications of the system (water flow rate, head, etc.) which are determined during the design process. Always follow the specifications of the system design documentation.



The following procedure refers to Figure 6.7 Electrical wiring diagram → 43, which gives an example of a three-phase circulator (400 V AC) connection.

To make the circulator-appliance connection, proceed as follows (references to Figure 6.7 Electrical wiring diagram → 43):



You will need: the appliances hydraulically connected; water circulator in line with the system specifications (e.g.: three-phase/400 V AC); external electrical panel configured by the installation technician. Necessary equipment and materials.



Make sure that the external electrical panel is equipped with a power switch (4-pole) with suitable motor thermal switch, a secondary SELV safety transformer and control relay.

1. On each appliance, remove the front panel and open the electrical panel by removing the bolts securing it.
2. Prepare a suitable cable for the connection.
3. Locate, inside the electric panel of the appliance, the "NO Contact" terminals on the controller (SCH), and hook up as shown in the Figure.



Make sure the ground cable is longer than the live cables. In this way it will be the last wire to be pulled away if the mains cable should accidentally be pulled, and will thus guarantee the ground connection. **Do not use gas pipes to ground electrical appliances.**



A wiring error, as well as impeding the correct operation of the appliance, could also damage the electrical apparatus that it contains.



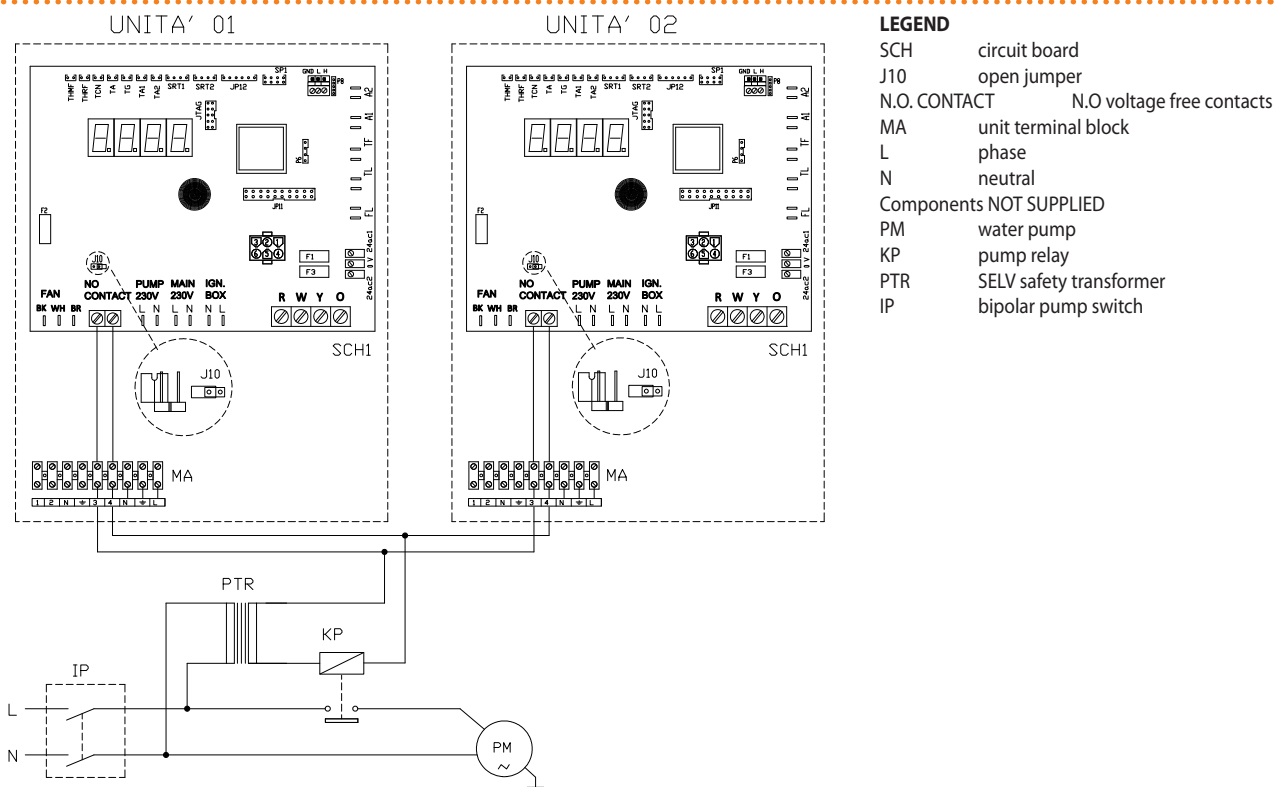
The "NO Contact" terminals are no voltage contacts with maximum power capacity of 700 W. These contacts control the circulator shutdown delay (7 minutes after appliance shutdown). Check the position of jumper "J10", as follows:

1. Locate, on the appliance's controller (SCH), jumper "J10" (bottom left, below the "NO Contact" contacts) and make sure that it is set as shown in detail "A" (jumper opened) of the figure.
2. On completion, restore the appliances to their fully assembled condition.



The insertion of relays or other electrical components inside the General Electrical Panel of the appliance is not permitted. **Do not activate the appliance if the hydraulic plant has not been filled.**

Figure 6.7 – Electrical wiring diagram



Example of pump/appliance electrical connection with 230 Vac pump, controlled directly by the appliance through a relay and a SELV safety transformer

6.3 CONNECTIONS FOR CONSENT SWITCH OPERATION

To operate, the appliance requires:

- heating/cooling selector (W/Y) for selection of the operating mode (heating or cooling);
- On/Off command (CS) for switched on and off.



The consent switch (installation technician) can be an on/off switch, ambient thermostat, programmable timer, or other such device.

To make the connection, proceed as follows (references to Figure 6.8 → 44):



You will need: the appliance connected hydraulically. Necessary equipment and materials.

1. Remove the appliance's front panel and open the electrical panel by removing the bolts securing it.
2. Prepare a suitable cable for the connection.
3. Locate, on the appliance's electrical panel, the consent terminals "R,W,Y,0" (connector "P7") on the controller S61, and make the connections between the consent switch (CS), heating/cooling selector (W/Y) and the R, W and Y terminals as shown in the figure.



For the appliance to operate correctly, it is always necessary to provide specific heating/cooling selector or on/off commands. Do not use the general mains external disconnecting switch (GS) to switch the appliance on or off.

1. On completion, restore the appliance to its fully assembled condition.

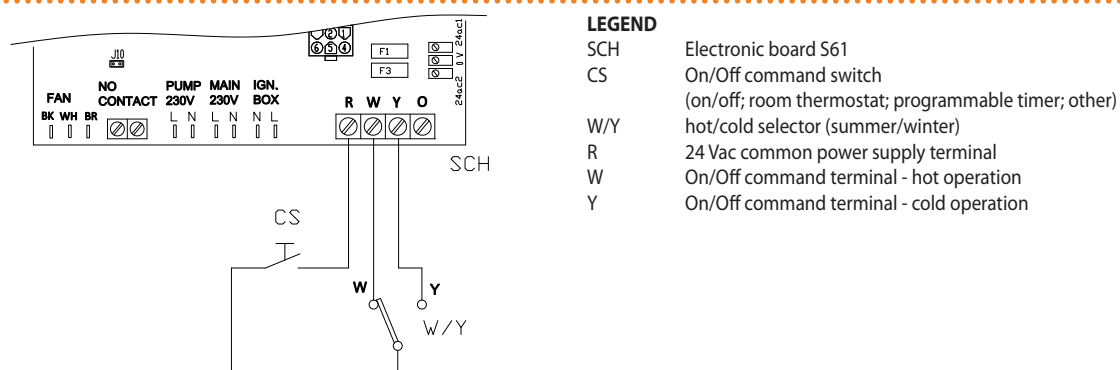


The insertion of relays or other electrical components inside the General Electrical Panel of the appliance is not permitted. **Do not activate the appliance if the hydraulic plant has not been filled.**



If you intend to use a DDC, available as an accessory, refer to Paragraph 6.4 USE OF THE DIRECT DIGITAL CONTROLLER → 44.

Figure 6.8



Example of electrical connection of on/off commands.

6.4 USE OF THE DIRECT DIGITAL CONTROLLER

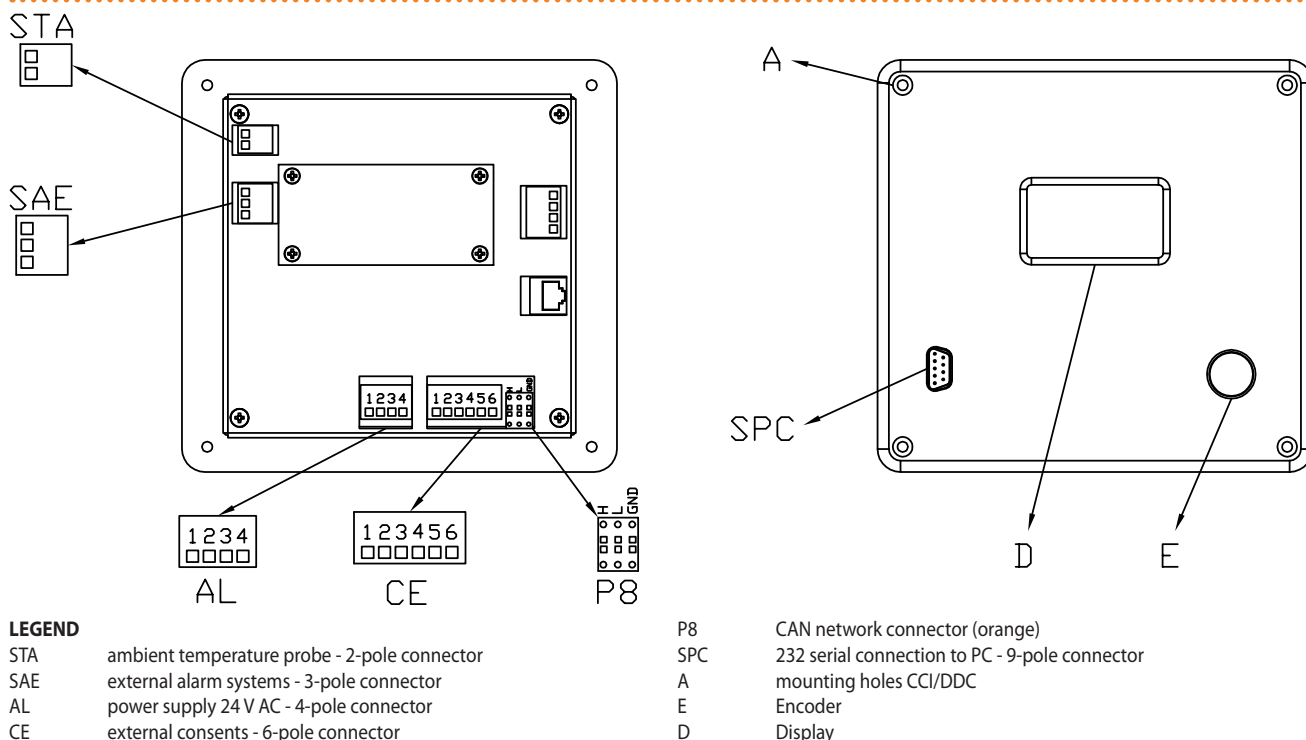
This paragraph is dedicated to the installation of the Direct Digital Controller (DDC). It gives full information on the installation and connection of the device to the appliances. Proceed as follows (qualified installation technician only):

- 1) How to fit the Direct Digital Controller (DDC).
- 2) How to supply power to the Direct Digital Controller (DDC).
- 3) How to connect the Direct Digital Controller (DDC) to the appliance.

Figure 6.9 CCI/DDC → 45 gives rear and front views of the DDC along with its electrical connections. The following connectors are required:

- 4 pole connector (part reference "AL") for 24 V AC power.
- 6 pole CAN BUS connector (part reference "P8") for connecting the DDC with the appliance.

Figure 6.9 – CCI/DDC



Front and rear views with detail of electrical connections.



For instructions regarding other connections (optional: to be done by the electrical installation technician in accordance with the user's requirements) and, in general, for the DDC installation and user instructions, see the two booklets in question.



Before installing the DDC, disconnect the appliance from its power supply with the power switch in its electrical panel.

1) How to fit the Direct Digital Controller (DDC)

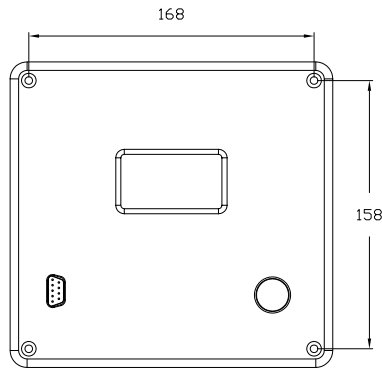
The DDC in indoor installations must be applied to a panel as follows (see Figure 6.10 → 46):



You will need: the appliance and the DDC disconnected from the electricity supply. Necessary equipment and materials.

1. Make a rectangular opening 155 mm wide and 151 mm high;
2. Locate the DDC on this hole and mark the 4 points where the holes are to be made to fix it. See the figure.
3. Drill no. 4 holes of dia. 4 mm.
4. Proceed with the operation of making fast the DDC on the opening of the panel using the screws and nuts supplied.

Figure 6.10



LEGEND

Holes for mounting CCI/DDC's to panel

horizontal: 168 mm

vertical: 158 mm

Centre distances of mounting holes for CCI/DDC.



The DDC's operating temperature range is 0 - 50 °C. If the temperature of the room where the DDC is installed falls below zero, it continues to operate correctly to -10 °C. However, its LCD display may not be able to display data.

2) How to supply power to the Direct Digital Controller (DDC)



The DDC requires a low voltage power supply (24 V) with 230/24 V AC, 50/60 Hz safety transformer; the minimum power requirement is 20 VA.

To power the DDC (off a transformer located in an external panel), proceed as follows (see example in Figure 6.11 CCI/DDC - electric supply → 47):



You will need: the appliance disconnected from the electricity supply; the external electrical panel configured by the installation technician. Necessary equipment and materials.



Make sure that the external electrical panel is equipped with a 230/24 V AC - 50/60 Hz safety transformer, of at least 20 VA power.

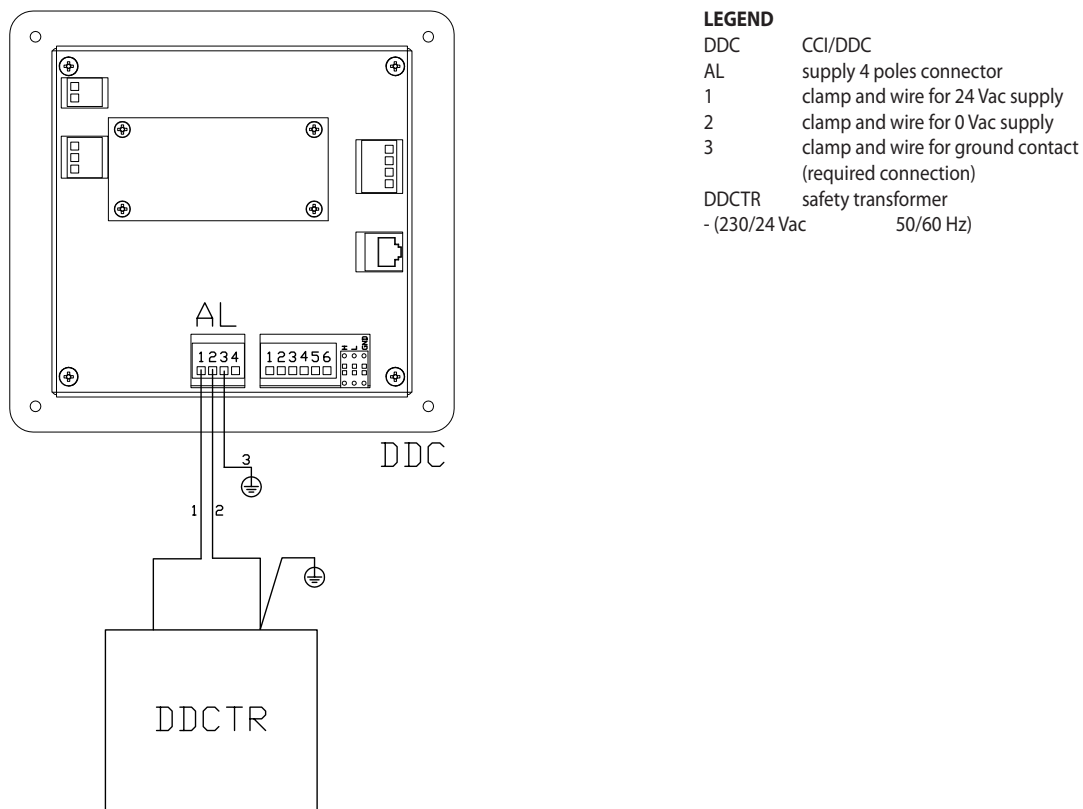
1. Remove the DDC's back panel by undoing the 4 bolts securing it (detail "A" - Figure 6.9 CCI/DDC → 45).
2. Use an electrical power cord (minimum cross section: 2x0.75 mm²).
3. Pass the power cord (DDC side) through the hole in the DDC's cover and hook up as shown in the example, with the following polarities: *terminal 1* = 24 V; *terminal 2* = 0 V; *terminal 3* = ground.



Terminal 3 of the DDC's 4-pole connector (AL) must be, in any case, connected to a ground plant ($r \leq 0,1 \Omega$). Terminal 2 of the DDC is connected internally to *terminal 3*, and is thus also connected to ground. Make the grounding connection on the transformer terminal connected to terminal 2 of the DDC. if the transformer already has one wire grounded, it must be connected to this terminal.

1. On completion, close the DDC's back panel with the 4 bolts.

Figure 6.11 – CCI/DDC - electric supply



CCI/DDC electric supply from external transformer.



If the CAN BUS cable has already been connected to the DDC (next procedure "3) How to connect the Direct Digital Controller (DDC) to the appliance"), take care with the 4 mm CAN BUS cable shielding eyelet (or two eyelets): use the retainer screw next to the CAN BUS socket (bottom right) to secure the eyelet (or both eyelets) as shown in Figure 6.14 Connection from CAN BUS to connector P8 → 49.



The DDC is equipped with a backup battery which retains the memory settings in case of power failure. **The battery has a service life of around 7 years**, after which it must be replaced by the Robur TAC.

3) How to connect the Direct Digital Controller (DDC) to the appliance

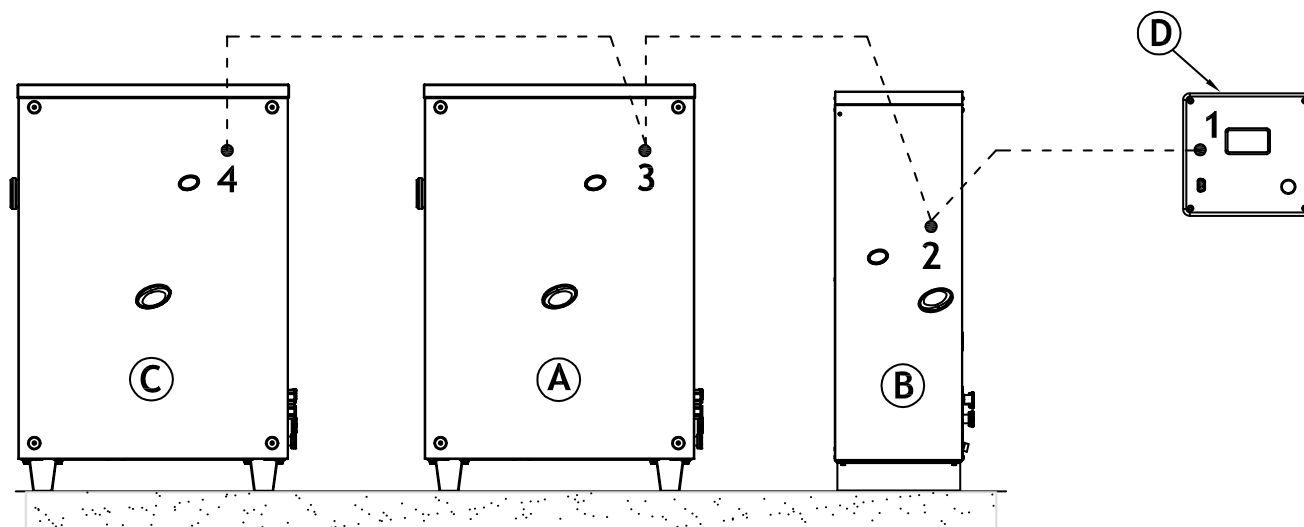
The appliance and the DDC communicate with each other via the **CAN network** (*data network*), which is characterised by a number of *nodes*, connected by the *CAN BUS cable*.



By a *node* of the *data network* we mean any device (DDC, appliance or individual module) connected to it. Each network consists of 2 *terminal nodes* and, if required, a certain number of *intermediate nodes*. A device is considered to be a *terminal node* when it is connected to only one other device. A device is considered to be an *intermediate node* when it is connected to two other devices. Appliances, individual modules and DDC's may act equally as terminal or intermediate nodes. See Figure 6.12 CAN network → 48.

The CAN network can link together a maximum of: 3 DDC's, each of which is in turn connected to 16 *hot only* modules + 16 *cold only* modules or 16 *hot/cold* modules.

Figure 6.12 – CAN network



LEGEND

A appliance (GA/GAHP)
B appliance (AY)
C appliance (GA/GAHP)
D DDC

1 CAN-BUS network terminal node
2 CAN-BUS network intermediate node
3 CAN-BUS network intermediate node
4 CAN-BUS network terminal node

Example of network with 4 nodes (1 DDC + 3 appliances).

> CHARACTERISTICS OF THE CAN BUS CABLE

The CAN bus cable must meet the Honeywell SDS standard.

The following table gives details of some types of CAN bus cable, grouped according to the maximum distance covered by each single type.

Table 6.2 – CAN BUS cables type

CABLE NAME	SIGNAL / COLOR			MAX LENGTH	Note
Robur					Ordering Code O-CVO008
ROBUR NETBUS	H= BLACK	L= WHITE	GND= BROWN	450 m	
Honeywell SDS 1620					In all cases the fourth conductor should not be used
BELDEN 3086A	H= BLACK	L= WHITE	GND= BROWN	450 m	
TURCK type 530					
DeviceNet Mid Cable					
TURCK type 5711	H= BLUE	L= WHITE	GND= BLACK	450 m	
Honeywell SDS 2022					
TURCK type 531	H= BLACK	L= WHITE	GND= BROWN	200 m	

Example types of cables used to connect the CAN network.



For overall distances to cover of ≤ 200 m and networks with a maximum of 6 nodes (a typical example: 1 DDC + 5 devices), a simple **3 x 0.75 mm²** shielded cable may be used.

As shown in Table 6.2 CAN BUS cables type → 48, the CAN connection requires a CAN bus cable with 3 wires. If the available cable has more than 3 coloured wires, use the wires with the colours indicated in 6.2 CAN BUS cables type → 48 and cut the remaining ones.



The ROBUR NETBUS cable is available as an accessory (see Section 8 ACCESSORIES → 65).

> CONNECTION PROCEDURE

Instructions for the specific operations to be carried out for the connection of the CAN bus cable follow:

- Step A: connect the CAN BUS cable to the DDC.
- Phase B: connect the CAN BUS cable to the appliance.

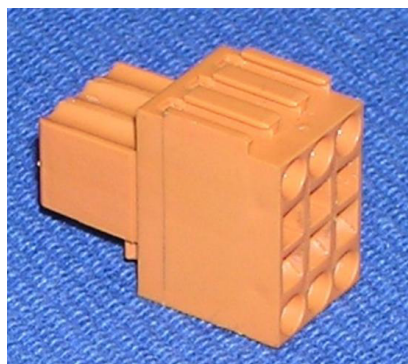


The two steps must be done in both cases illustrated in Figure 6.18 Connexion câble CAN BUS for plants with one unit → 53(wiring diagram for 1 DDC connected to a single appliance) and Figure 6.19 Connexion câble CAN BUS for plants with more unit → 54 (wiring diagram for 1 DDC connected to multiple appliances).

Step A: connect the CAN BUS cable to the DDC

The CAN bus cable connects to the specific orange connector supplied with the DDC, as shown in Figure 6.13 → 49.

Figure 6.13

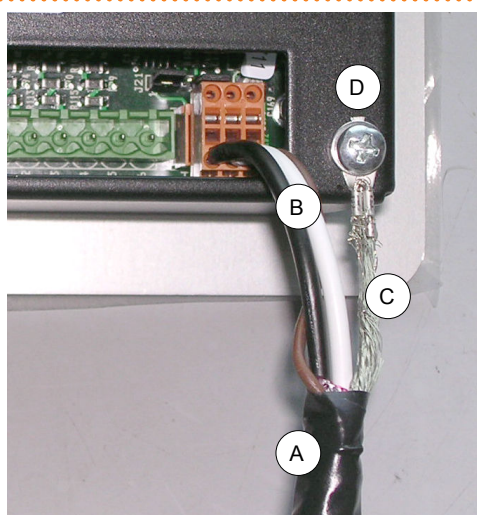


Orange connector for CAN-BUS connection to CCI/DDC (supplied with CCI/DDC).



The DDC is equipped with jumpers that must be moved in order to take on the configurations of *terminal node* and *intermediate node* (Figure 6.15 detail wires and jumpers J21 - terminal/intermediate node CCI/DDC → 50). The DDC is supplied with the jumpers CLOSED (detail "A" Figure 6.15 detail wires and jumpers J21 - terminal/intermediate node CCI/DDC → 50).

Figure 6.14 – Connection from CAN BUS to connector P8



LEGEND

- A Insulating tape to protect board/shield
- B CAN BUS cable wires
- C CAN bus cable shield
- D terminal and screw for fixing

Connection detail of cable CAN BUS.

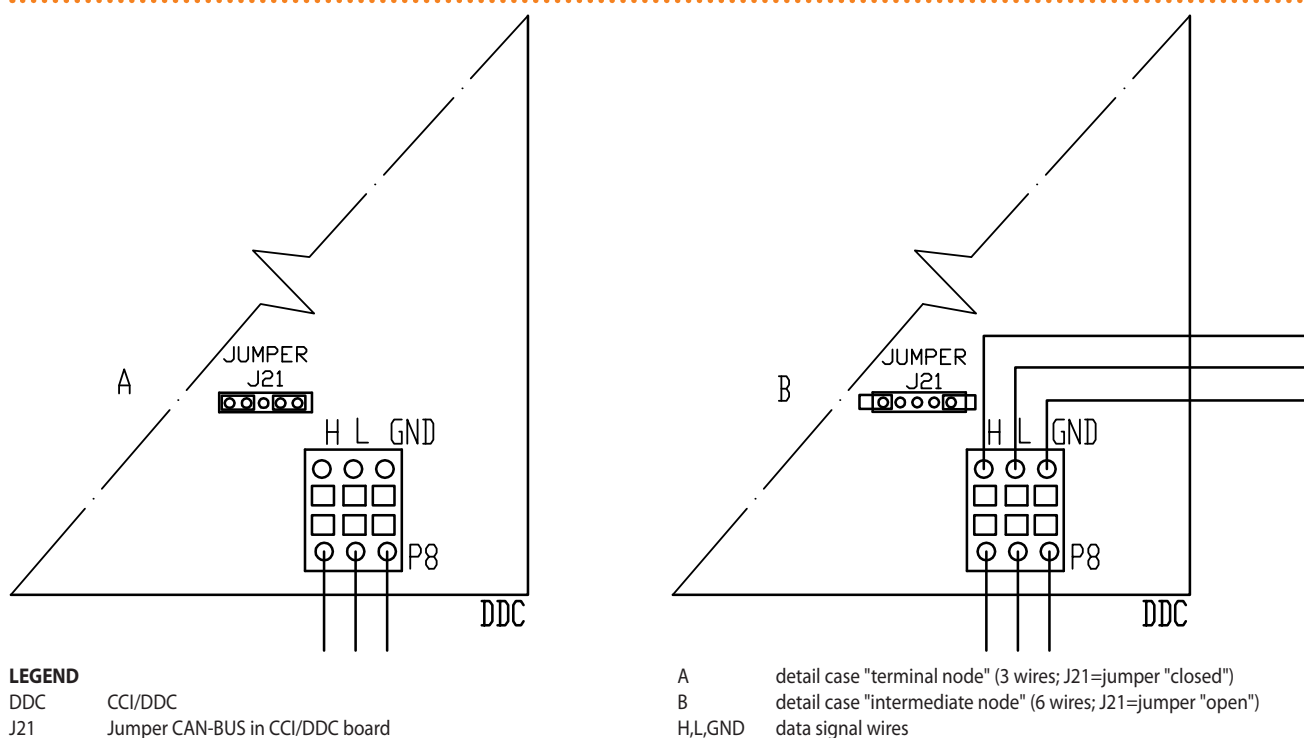
To connect a CAN BUS cable to a DDC, proceed as follows (references in Figure 6.15 detail wires and jumpers J21 - terminal/intermediate node CCI/DDC → 50):



You will need: DDC not powered up. Necessary equipment and materials.

1. Depending on the type of node being configured, set the DDC's jumpers as shown in detail "A" or detail "B" in the figure. If necessary, open the DDC's back panel (4 bolts); after the jumpers have been correctly positioned, close the cover again and retighten the 4 bolts;
- if the DDC is an **intermediate node** on the network (with no. 6 wires in the orange connector): set the jumpers as shown in detail "B" of the figure: Jumpers OPEN;
- if the DDC is a **terminal node** on the network (with no. 3 wires in the orange connector): set the jumpers as shown in detail "A" of the figure: Jumpers CLOSED.

Figure 6.15 – detail wires and jumpers J21 - terminal/intermediate node CCI/DDC



Detail terminal and intermediate node: jumpers position J21: "closed" - "open".

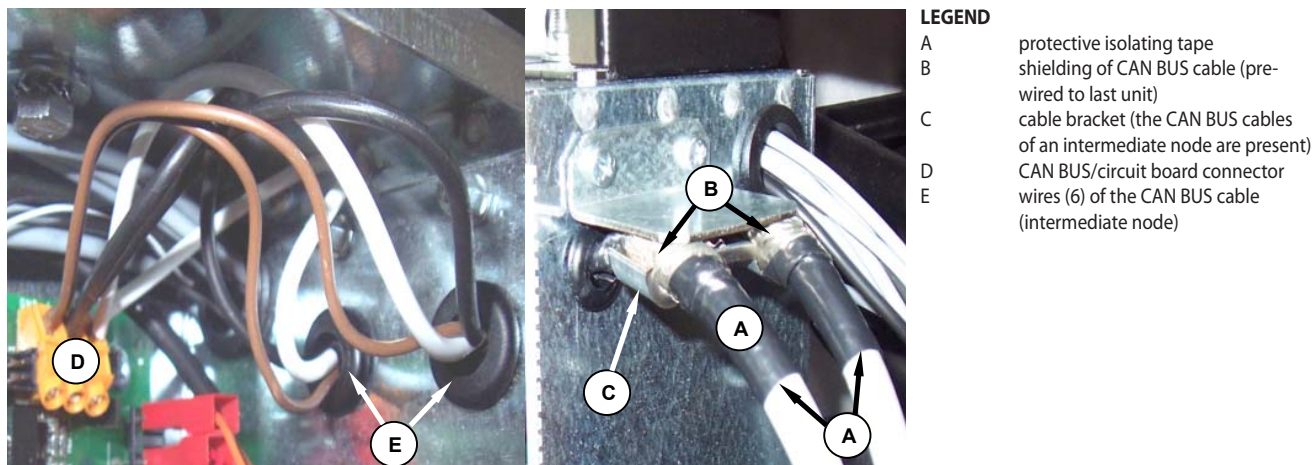
1. Prepare the orange connector (remove from envelope).
2. Cut a length of cable, long enough to allow it to be installed without kinking.
3. Having chosen one end of the length of cable, remove the sheath from a length of approximately 70-80 mm, taking care not to cut the wires contained inside, the shielding (metallic shield and/or aluminium sheet) and, if present, the bare connector in contact with the shield and the wires contained within.
4. Roll the shielding and connect it to a 4-mm eyelet terminal, as illustrated in Figure 6.14 Connection from CAN BUS to connector P8 → 49, details C and D. Now proceed as follows:
5. Connect the three coloured wires to the orange connector, as shown in detail "A" in the figure. Observe the terminal markings L, H, GND (on the DDC at the base of the socket "P8") which are given both in Table 6.2 CAN BUS cables type → 48, and in the figure:
 - if the DDC is an **intermediate node** on the network: carry out also point 6;
 - if the DDC is a **terminal node** on the network, skip step 6 and go directly to step 7.
6. **Intermediate nodes only:** repeat the operations from step "1" to step "4" for the other length of CAN bus cable required. Now proceed with step "5" and, to connect the cable to orange connector, refer to detail "B" in the figure. Then proceed to point "7".

7. Fit the orange connector, with the wires attached, first through the slot in the DDC's cover and then into the socket on the DDC itself.
8. Use the rear cover bolts located near the CAN BUS socket to secure the 4-mm eyelet (or 2 eyelets) (detail D, Figure 6.14 Connection from CAN BUS to connector P8 → 49). The cable should be secured against pulling out.

Phase B: connect the CAN BUS cable to the appliance

The CAN BUS cable must be connected to the orange socket on the machine's on-board controller (see detail "D" in Figure 6.16 CAN BUS cable connection → 51).

Figure 6.16 – CAN BUS cable connection



Example of a single CAN bus cable connected to the board

To connect the CAN BUS cable to the DDC, proceed as follows (references in Figure 6.16 CAN BUS cable connection → 51):

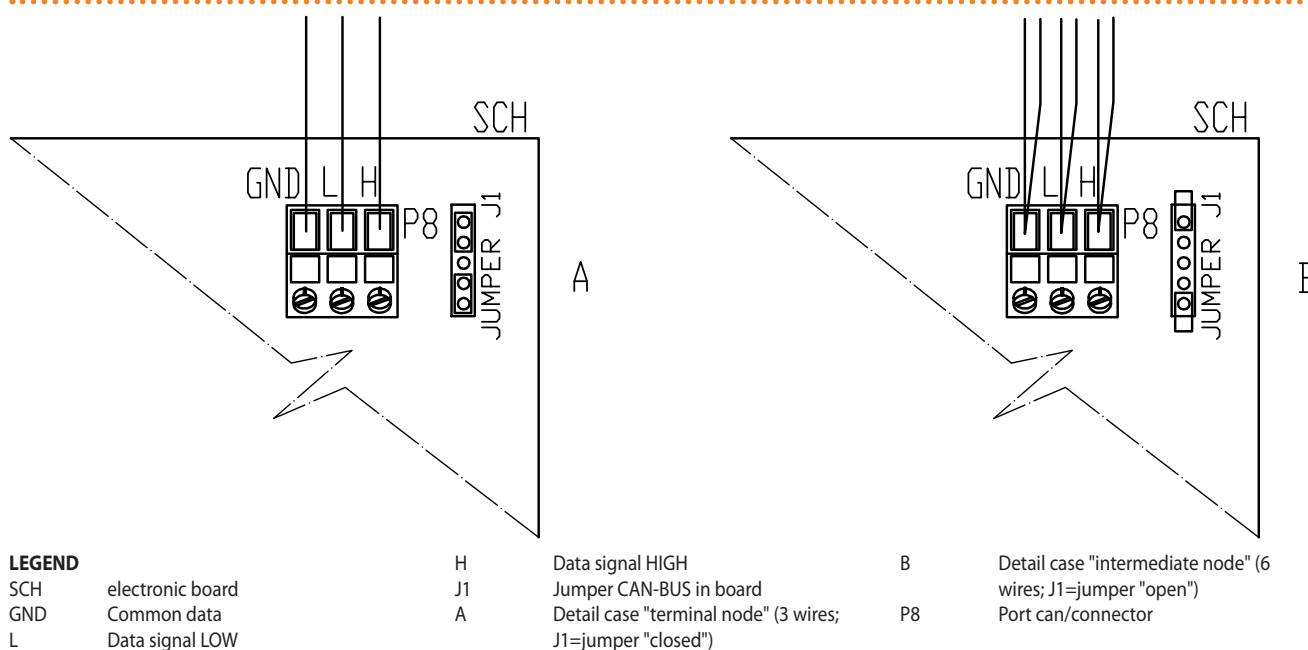


You will need: appliance not powered up. Necessary equipment and materials.

1. Remove the front panel of the appliance and the cover of the electrical panel.
2. Cut a length of cable, long enough to allow it to be installed without kinking.
3. Having chosen one end of the length of cable, remove the sheath from a length of approximately 70-80 mm, taking care not to cut the wires contained inside, the shielding (metallic shield and/or aluminium sheet) and, if present, the bare connector in contact with the shield and the wires contained within.
4. If the cable is too thin to be held in place in the cable holder bracket (detail C), make it thicker by wrapping insulating tape around it on the sheath in the area adjacent to the stripped part (to an approximate diameter of 12-13 mm).
5. Pull back the shielding in the sheathe; apply electrician's tape to the end of the shielding as pulled back (detail A).
6. Connect the three coloured wires to the orange connector, as shown in detail "A" in Figure 6.17 Electrical wiring diagram → 52. Observe the terminal markings L, H, GND (on the board at the base of the socket "P8") which are given both in Table 6.2 CAN BUS cables type → 48, and in Figure 6.17 Electrical wiring diagram → 52:
 - if the appliance is an **intermediate node** on the network, also complete step 7;
 - if the appliance is a **terminal node** skip directly to step 8.
7. **Intermediate nodes only:** repeat the operations from step 3 to step 5 for the other length of CAN bus cable required. Now proceed with step 6 and, to connect the cable to "P8" connector, refer to detail "B" in the figure 6.17 Electrical wiring diagram → 52. Then proceed to point 8.

8. Fix the CAN BUS cable (or two cables, according to the type of node being connected) to the cable fixing bracket so that the rolled-back sheathing makes solid contact with the metal bracket. The cable should be secured against pulling out.
9. Now, depending on the type of node being configured, set the jumpers on the appliance's controller as shown in detail "A" or detail "B" in Figure 6.17 Electrical wiring diagram → 52. Proceed as follows:
 - If the appliance is an **intermediate node** on the network (with no. 6 wires in the orange connector): set the jumpers as shown in detail "B" of the figure: Jumpers OPEN.
 - If the appliance is a **terminal node** on the network (with no. 3 wires in the orange connector): set the jumpers as shown in detail "A" of the figure: Jumpers CLOSED.

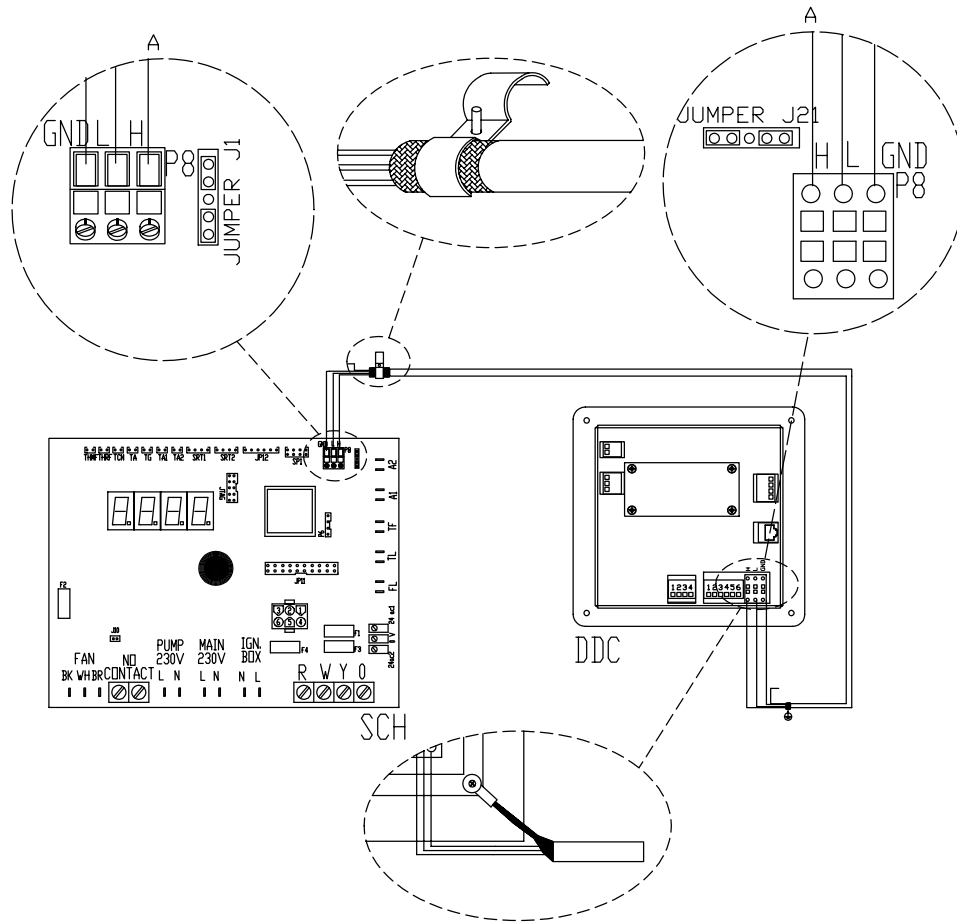
Figure 6.17 – Electrical wiring diagram



Connection cable CAN BUS to electronic board: detail A case "terminal node", detail B case "intermediate node"

10. Now close the electrical panel and refit the front panel of the appliance.

Figure 6.18 – Connexion câble CAN BUS for plants with one unit

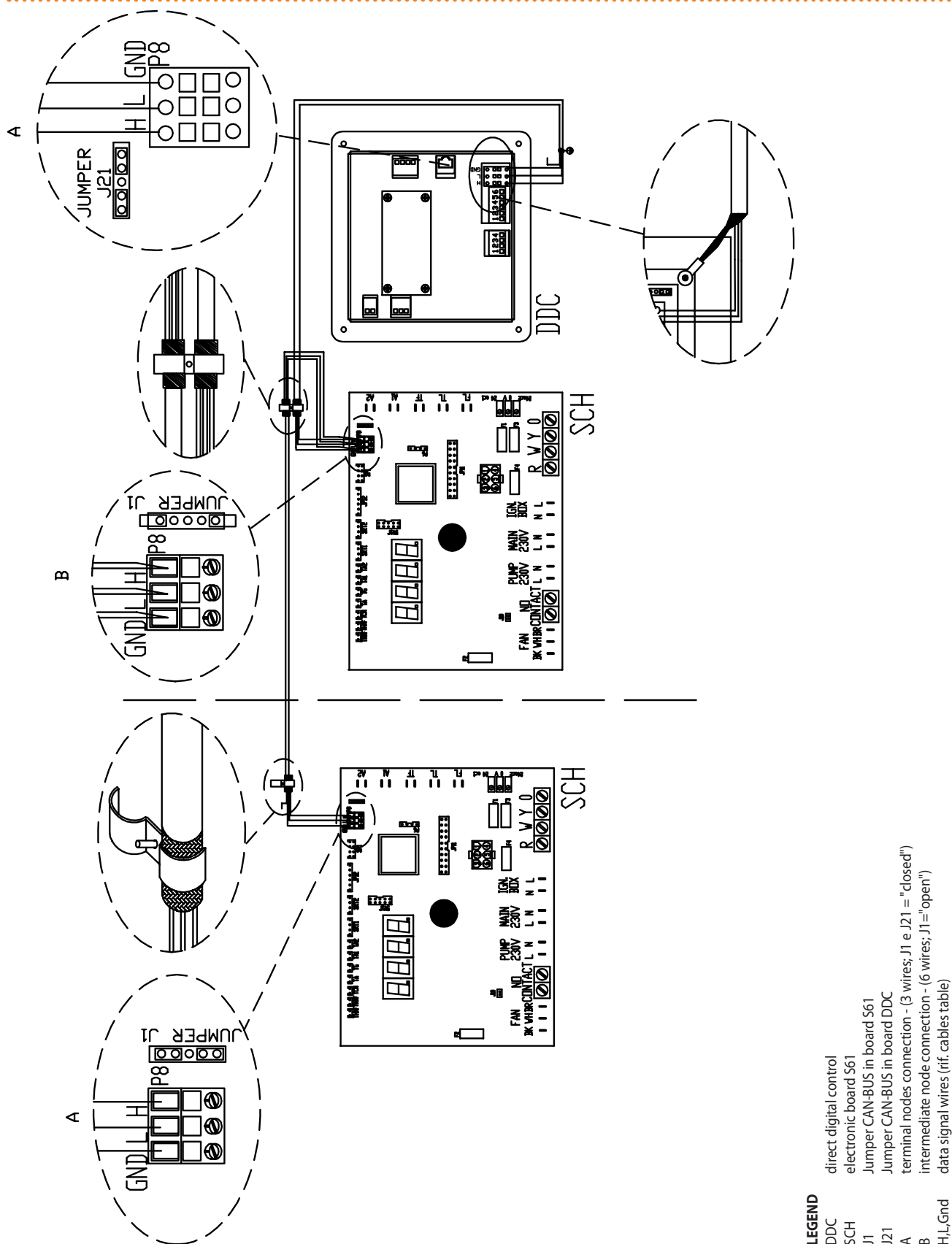


LEGEND

- DDC direct digital control
- SCH electronic board S61
- J1 Jumper CAN-BUS in board S61
- J21 Jumper CAN-BUS in board DDC
- A terminal nodes connection - (3 wires; J1 e J21 = "closed")
- H,L,GND data signal wires (rif. cables table)

Connexion câble CAN BUS between one DDC and one unit

Figure 6.19 – Connexion câble CAN BUS for plants with more unit



Connexion câble CAN BUS between one DDC and more unit

6.5 HOW TO RESET THE FLAME CONTROLLER FROM REMOTE

The flame controller reset can be controlled remotely by installing a button (not supplied) to the flame controller inside the unit's electrical panel.

Connect the button as instructed below.



You will need: the appliance disconnected from the electricity supply

1. The cable required to connect the reset button must be $3 \times 0.75 \text{ mm}^2$.
2. Cut a suitable length of cable.
3. Connect the cable to the blind terminals A (see Figure 6.20 Button connection for flame controller reset → 56).



The blind terminals are hidden on the right inside the cable tray. To extract them, remove the cover of the tray, slide the cables out of the provided slots, and carefully close the tray again.

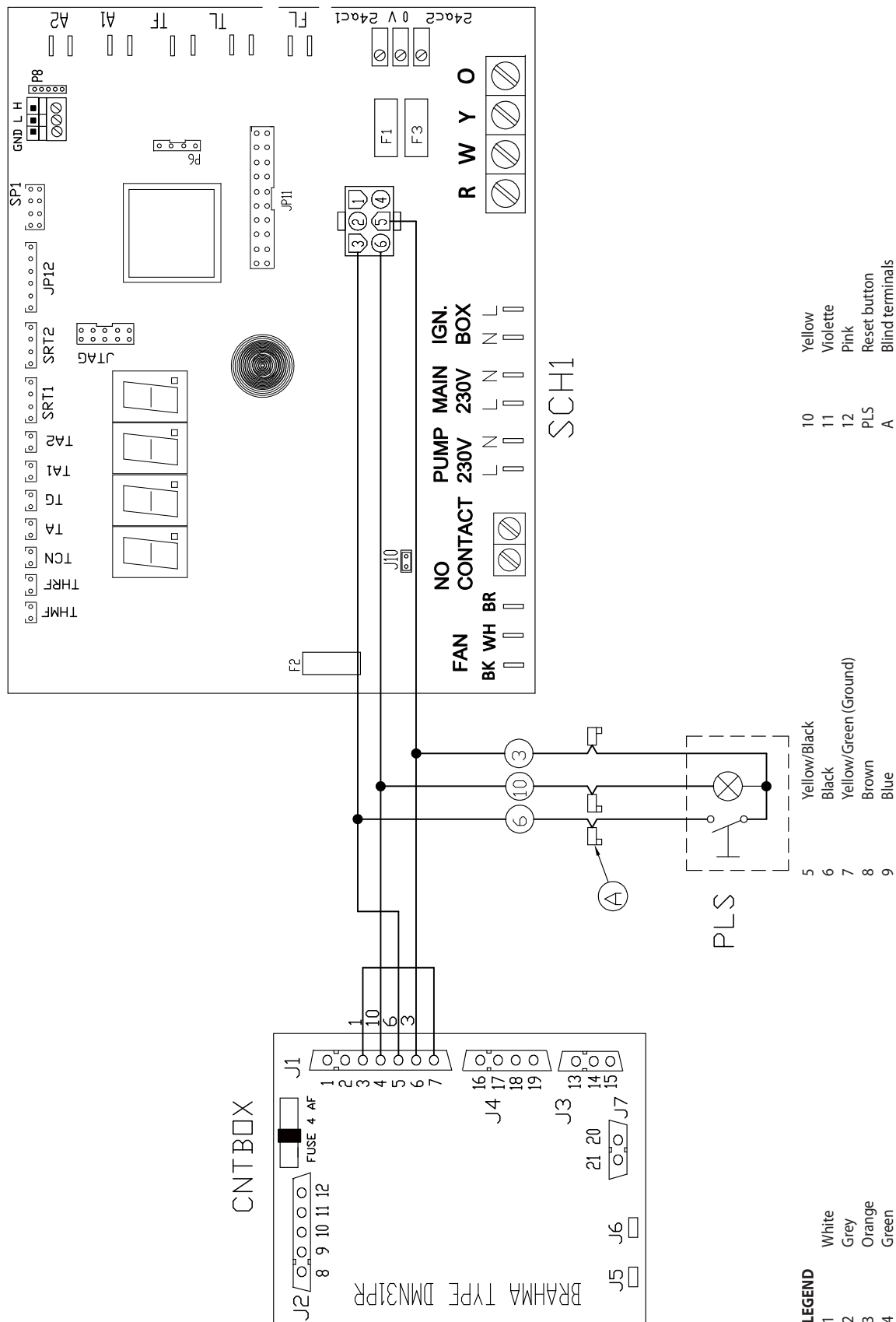


The cable may not be longer than 20 metres.



Incorrect wiring of the reset button may damage the component irreparably. Check the cabling carefully before powering the unit.

Figure 6.20 – Button connection for flame controller reset



7 INITIAL ACTIVATION AND MAINTENANCE

In this section you will find the following information:

- Indications required by the authorized Robur Technical Assistance Centre (TAC) in order to carry out the entire procedure of first start-up of the appliance (see Paragraph 7.1 PROCEDURE FOR FIRST START UP → 57) and of the Direct Digital Controller (DDC, see the two books supplied with and dedicated to it).



The entire procedure for initial activation of the appliance consists in carrying out the following (main) operating stages:

- preliminary verification of plant compliance;
- regulation of gas flow to the burners and switching on of the appliance;
- regulation of the operating parameters of the appliance via on-board electronic board (or via a DDC, if the appliance is connected to a DDC).
- Indications regarding maintenance operations of the appliance (Paragraph 7.2 MAINTENANCE → 61): general observations and warnings; general indications regarding checks, controls and cleaning operations to perform.

At the end of the section you will find instructions for changing the type of gas (an operation for technical assistance).



Before proceeding with the operations described in this section, the installation technician concerned is invited to read Paragraph 3.1 GENERAL INFORMATION → 7. For the stages of checking the switching on and off of the appliance, it is necessary to refer to Paragraph 4.1 START UP (AND SHUT DOWN) → 14. If the appliance is connected to a DDC (and the DDC is in controller mode), for the phases of activation and deactivation of the appliance it is necessary to refer to the two books dedicated to the DDC itself.

7.1 PROCEDURE FOR FIRST START UP



The entire procedure for the initial activation of the appliance must only be carried out by an authorised Robur Technical Assistance Centre (TAC). The product's guarantee may be void if the procedure is not carried out by a Robur TAC.

Efficient operation and long life of the appliance depend largely on its correct use:

- correct installation;
- correct use.

Before leaving the factory, the appliance has been thoroughly tested.

In order to be able to carry out the entire procedure for the initial activation of the appliance, it is necessary to perform the following operations in order:

- preliminary verification of plant compliance;
- regulation of gas flow to the burners and switching on of the appliance;
- regulation of plant operating parameters according to the user's requirements.

Preliminary checks of the installation compliance

The Robur TAC technician must:

- check that the whole plant has been manufactured in accordance with its design, following the instructions supplied by the manufacturer and respecting current legislation.
(The design must have been drawn up by a qualified self-employed professional person);

- check personally that all of the connections (hydraulic/gas and electrical) of the appliance (and of the Direct Digital Controller, if connected to the appliance) have been made correctly;
- check that the necessary conditions for plant compliance effectively exist (as per the declaration consigned to the user by the qualified firm that has carried out installation of the appliance).



The Declaration of Conformity CERTIFIES that the installation is compliant with current regulations. This Declaration is a **mandatory** document and as such it must be provided by the installer to the owner.

- Check that the water pressure and flow in the hydraulic circuit and the static gas supply network pressure are correct, as indicated by the manufacturer.

If all the conditions listed above exist, the TAC can proceed with the operations, performing the "initial activation" of the appliance.

If any non-compliance is found during the preliminary checks, the authorized technician may choose not to proceed with the "first start up".

In this case, the Robur TAC technician must:

- advise the user/installation technician of any installation anomaly;
- inform the user/installation technician of any situation that is deemed to be hazardous for the appliance and for people;
- inform of any missing documentation relative to the plant;
- Indicate, in relation to the reports made, any corrective measures to be taken on the plant which the installation technician will have to carry out in order to proceed with the operation of "initial activation".



It is the responsibility of the user/installation technician to carry out any corrective measures on the plant indicated by the authorized technician. After such corrective measures have been completed, the authorized technician will assess the plant again. At this point, if safety and compliance conditions are judged satisfactory, the authorized technician must carry out the "first start up".



Plant situations that are hazardous for people and for the appliance.

If one of the following hazardous situations arises, the TAC must not carry out the "initial activation":

- appliance installed indoors;
- appliance installed close to combustible substances or surfaces or in any case in conditions of bad accessibility or not allowing safe maintenance operations;
- control of switching on and off of the appliance not via the DDC but via the external switch connecting the appliance to the power supply mains ("GS", fitted by the electrical installation technician on a suitable panel);
- damages or failures of the appliance due to transportation or installation;
- smell of gas due to probable leaks from the plant itself and in any case all situations that are due to non-compliant plants, considered (after on-site evaluations) potentially hazardous.



Anomalous plant situations. If one of the following situations exists, the TAC may carry out the "initial activation" at its discretion, but the appliance will be left off until conditions dictated by the manufacturer are restored:

- installations (not potentially hazardous) not carried out according to sound workmanship practices, installations (not potentially hazardous) not complying with current national and local regulations;
- installations (not potentially hazardous) not carried out according to good workmanship practices, not complying with the instructions provided by the manufacturer;
- installations that can cause operational troubles on the appliance.

Regulation of gas flow to the burners and switching on of the appliance

To carry out the initial activation of the appliance, it is necessary to perform the operations described below, proceeding according to the following sequential order.

1. Open the gas supply tap to the plant and ascertain that there is no smell of gas (indicating possible leaks);
2. Close the gas tap and check the static gas mains pressure (as per the specific Procedure "*Regulation of gas flow*" set out further on: from point 1 to point 6).
3. Prepare the units of the appliance for the operation of regulation of gas (as per the specific procedure described further on: from point 7 to point 9).
4. Start the appliance electrically:
 - Make sure one final time that there is no smell of gas;
 - switch the external disconnecting switch (GS) of the mains power supply (provided by the electrical system installation technician on a suitable panel) moving it to the "ON" position.
5. Start up the DDC electrically, if the DDC is not powered by the internal transformer of the general electrical panel of the appliance (point 10 of the specific procedure; for this operation, see the specific manual for the installation technician - book 1)
6. Carry out activation of the appliance via the on/off commands (or via the DDC, if connected) (point 11 of the specific procedure; if the appliance is connected to the DDC, for this operation consult the specific final user manual - book 2).
7. Proceed with regulation of the gas pressure to the burner of the appliance (as in the specific procedure set out further on: from point 13 onwards).
8. Check the dynamic gas mains pressure (if possible on the appliance that is furthest from the point where the plant is connected to the mains) by performing the following points in order:
 - connect the manometer (points 1 and 2);
 - start the appliance again (points 11 and 12);
 - read the dynamic mains pressure on the manometer and check that this value satisfies the requirements of point 4 (see also Table 5.2 Network gas pressure → 30).
9. Carry out the regulation of the operating parameters of the plant.



In the first start-up stage, on the display of the controller of the appliance (and/or on the display of the DDC, if connected), an operating code might be visualized. If the operating code is generated by the controller of the appliance, see the list of codes in tables of Paragraph 9.1 OVERVIEW AND OPERATING CODES/TROUBLESHOOTING → 66; if the operating code is generated by the DDC, see the list of codes given in the "installation technician manual - book 1" of the DDC (supplied with the unit).



Successful first start-up ONLY certifies the correct operation of the appliance (and of the DDC, if connected). It does NOT certify that the plant complies with current regulations.

Regulation of gas flow



In the phase of initial activation of the appliance, regulation of gas flow to the burners of the units of the appliance must be carried out exclusively by an authorised Robur Technical Assistance Centre (TAC). In this phase, NEITHER the user NOR the installation technician is authorised to perform such operations, and could invalidate the guarantee of the appliance

The appliance is supplied with all of its units already regulated for the type of gas for which the appliance itself is set up. The type of gas for which the appliance is set up can be identified from the adhesive label located on the unit's electric panel.

During the first start-up procedure it is in any case necessary to perform checking and regulation of pressure at the burner of all units of the appliance.

proceed as follows, referring to the parameters indicated in Table 7.1 → 61 and Figure 7.1 → 61:



You will need: the appliance connected to the gas and electricity supply, switched off, with the gas valve closed and the front panel removed.

Operations to check the static gas mains pressure:

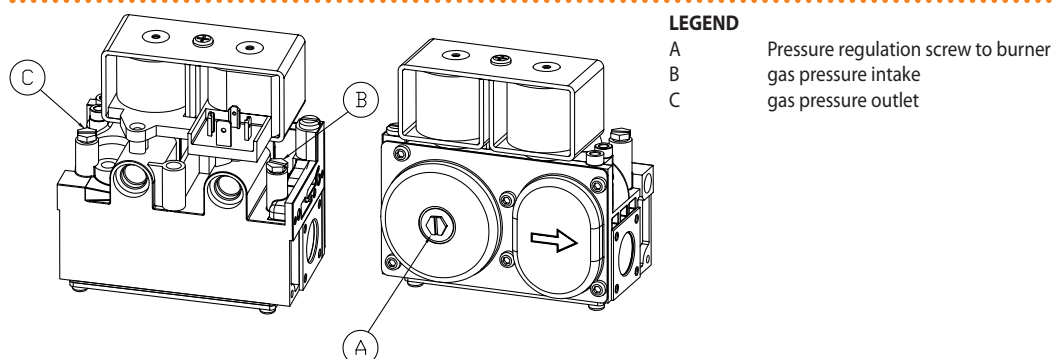
1. Unscrew the fixing screw of the gas pressure intake, detail B in Figure 7.1 → 61.
2. Connect the manometer to the gas intake (mains pressure).
3. Open the gas valve.
4. Read the value of the **static network pressure** on the manometer and check that the value read is equal to that stated in Table 5.2 Network gas pressure → 30 (with tolerance $\pm 15\%$).
5. Close the gas valve.
6. Remove the manometer and retighten the fixing screw of the gas pressure intake.

Operations to regulate the gas flow:

7. With gas valve closed, unscrew the fixing screw of the gas pressure outlet (detail C, Figure 7.1 → 61).
8. Connect the manometer to the gas pressure outlet.
9. Open the gas valve.
10. Supply electrical power to the appliance (and to the DDC, if connected).
11. Start the appliance via the on/off commands (or via the DDC, if connected and in controller mode).
12. Wait for the burner to ignite. If ignition fails at the first attempt, the flame control unit makes three further attempts. If the burner fails to ignite at the fourth attempt, the flame control system is arrested. In this case, reset the flame control unit via the electronic board (or the DDC, if connected) and repeat point 11 until successful ignition of the burner is achieved.
13. With the burner lit, check the pressure indicated by the manometer against the pressure indicated in Table 7.1 → 61.
14. If necessary, regulate the gas pressure: keep the burner lit and the manometer connected; remove the protective cap of screw A (detail A, Figure 7.1 → 61); turn screw A of the gas valve (detail A, Figure 7.1 → 61), clockwise to increase the pressure or anticlockwise to decrease it, until the pressure indicated in Table 7.1 → 61; at the end of the operation, replace the protective cap of screw A.
15. Switch off the appliance via the on/off commands (or via the DDC, if connected and in controller mode).

16. Remove the manometer and retighten the fixing screw of the gas pressure intake (detail C, Figure 7.1 → 61).
17. Check for possible leaks on the gas network with a solution of soap and water.

Figure 7.1



Valvola GAS (SIT 830)

Table 7.1

TYPE OF GAS	G20	G25	G30	G31
PRESSURE AT BURNER	6,9 mbar	10,0 mbar	13,0 mbar	16,5 mbar
AIR DIAPHRAGM	33,0 mm	33,0 mm	32,2 mm	32,2 mm
NOZZLE DIAMETER	5,3 mm	5,3 mm	3,3 mm	3,3 mm

Gas pressure at burner, air diaphragm and nozzle diameter

Regulation of operating parameters of the plant

Regulation of operating parameters of the plant occurs via the electronic board (see Paragraph 5.7 PROGRAMMING OF HYDRAULIC PARAMETERS → 32) or via the DDC (if connected)



If the appliance is connected to a Direct Digital Controller (DDC), for operations regarding the regulation of plant operating parameters according to the user's requirements, refer to the DDC's manual (final user manual - book 2) supplied with it.

7.2 MAINTENANCE

Correct maintenance prevents problems, guarantees maximum operating efficiency of the appliance and allows running costs to be contained.



The maintenance operations described in this paragraph must be performed exclusively by the serviceman in charge of the plant or by an authorized CAT Robur.



Any operation that regards internal components of units of the appliance must be carried out by an authorized Robur Technical Assistance Centre (TAC), according to the instructions supplied by the manufacturer.



The "efficiency check" and every other "check and maintenance operation" (see Table 7.2 → 62 and 7.3 → 62), **must be performed with a frequency in agreement to current law** or, if more restrictive, in respect of what requested by the planner (builder of the system) or by the manufacturer of the unit.



The liability of CHECKING THE EFFICIENCY AS A FUNCTION OF THE SYSTEM, OF THE FUEL IN USE AND OF THE THERMAL POWER, to be carried out with the purpose of containing the energy consumption, **is in charge to the responsible of the system.**



Before any maintenance operation, switch off the appliance by means of the permissive contacts (or by means of DDC/CCP) and wait for the completion of the shut-down cycle. When the appliance is off, switch off power supply and gas supply (according to anti-icing settings), opening the electrical breaker and closing the gas isolation valve.

GUIDELINES FOR THE PREVENTIVE MAINTENANCE OPERATIONS

In Table 7.2 → 62 are reported the **guidelines** for the preventive maintenance operations.



If the unit is subject to particularly heavy duty (for example in process plants or in other conditions of continuous operation), **these maintenance operations must be more frequent.**

Table 7.2

GUIDELINES FOR THE PREVENTIVE MAINTENANCE OPERATIONS					
Check of the unit	GAHP-A	GAHP-GS/WS	AY	ACF	GAHP-AR
Visually check of the general condition of the unit and of its air heat exchanger. ⁽¹⁾	√	√	√	√	√
Check the correct operation of the device used for monitoring the water flow	√	√	√	√	√
Check the % value of CO ₂	√	√	√		
check gas pressure to the burners				√	√
Check that the condensate discharge is clean (clear the condensate discharge hole of any blockages) [If necessary, frequency of the maintenance operation must be increased]	√	√	√		
Replace the belts after 6 years or 12,000 hours of operation	√	√		√	√
Check/restore the pressure of the primary hydronic circuit			√		
Check/restore the air pressure inside of the expansion vessel of the primary hydronic circuit			√		
Check every CCI or DDC⁽²⁾	DDC or CCI				
Check that the plant is able to achieve the setpoint temperature			√		
Download the historical events			√		

1 It is suggested the cleaning of the air heat exchanger once every 4 years [the optimal frequency of this operation is in any case a consequence of the installation site].

2 Check that the plant is able to achieve the setpoint temperature.

ORDINARY SCHEDULED MAINTENANCE

Perform the following operations at least **once every 2 years.**



If the unit is subject to particularly heavy duty (for example in process plants or in other conditions of continuous operation), **these maintenance operations must be more frequent.**

Table 7.3

SCHEDULED MAINTENANCE OPERATIONS	TO BE PERFORMED AT LEAST ONE EVERY TWO YEARS				
Check of the unit	GAHP-A	GAHP-GS/WS	AY	ACF	GAHP-AR
Clean the combustion chamber	√	√	√	√	√
Clean the burner	√	√	√	√	√
Clean the electrodes of ignition and flame sensing	√	√	√	√	√
Check that the condensate discharge is clean (clear the condensate discharge hole of any blockages)	√	√	√		
Replace the silicone gasket			√		



In Section 5 HYDRAULIC INSTALLATION → 22 are reported **suggestions related to the hydraulic plant.**

7.3 CHANGE OF GAS TYPE



This operation must be carried out exclusively by an authorised Robur Technical Assistance Centre (TAC).

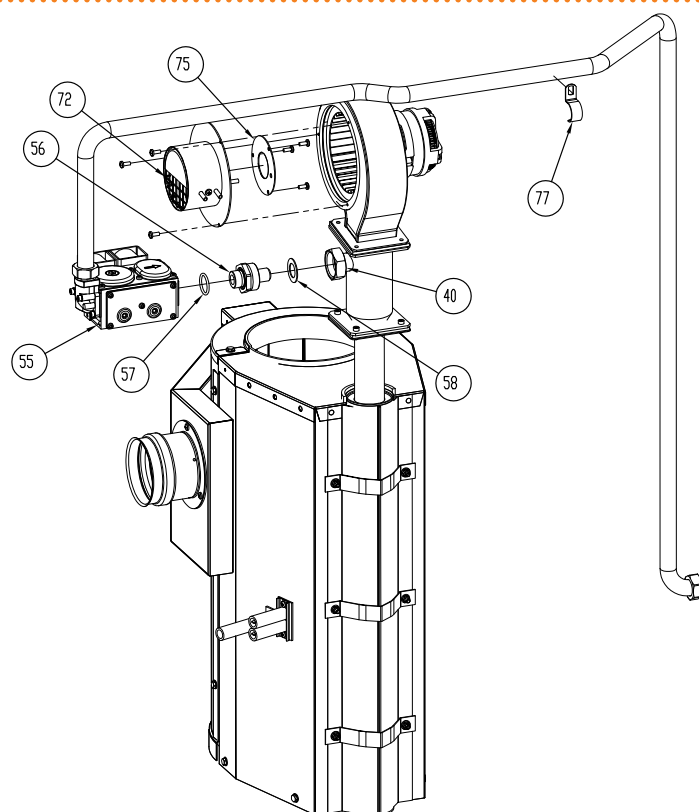
If the appliance is to be used with a type of gas other than that indicated on the adhesive label located on the air-gas mixing group, switch off the appliance, shut off its power and gas supplies and proceed as follows (see Figure 7.2 CHANGE OF GAS TYPE → 64):



You will need: the appliance switched off and disconnected from the gas/electricity supplies

1. remove the front panel and front left panel of the appliance;
2. unscrew the fixing screw of the gas supply pipe above the electrical panel of the appliance (see Pos. 77);
3. unscrew the hexagonal nut that connects the brass nozzle to the air/gas mixer (see Pos. 40); use a number 36 spanner for this purpose;
4. unscrew and replace the nozzle removed (Pos. 56) with one of a suitable diameter for the gas that is to be used, positioning the new o-ring seal (Pos. 57) (supplied) between electrovalve and nozzle; use a number 34 spanner for this purpose;
5. remove the combustion air suction inlet from the aspirator (Pos. 72); For this operation, unscrew the three screws that fix the combustion air suction inlet; Use a Phillips-head screwdriver;
6. remove the diaphragm (Pos. 75) by unscrewing the 3 fixing screws the combustion air suction inlet and replace it with the diaphragm supplied with the gas change kit, taking care to centre the manostat sensor in the specific hole on the diaphragm itself;
7. refit the combustion air suction inlet (Pos. 72), taking care to position the new gasket (supplied) correctly: during this operation, rotate the nozzle so that the crescent-shaped shield is repositioned in the top half (i.e. as prior to disassembly);
8. reconnect the brass nozzle (Pos. 56) to the mixer, tightening the hexagonal nut (Pos. 40), taking care to position the new circular seal (Pos. 58), supplied with the kit, correctly;
9. retighten the fixing screw of the gas supply pipe above the electrical panel of the appliance (Pos. 77);
10. supply gas and electricity to the appliance, and reactivate the appliance;
11. regulate the gas pressure to the appliance so that it is the same as that indicated in Table 7.1 → 61 for the gas that is to be used, following the instructions given in Procedure "*Regulation of gas flow*" on Paragraph 7.1 PROCEDURE FOR FIRST START UP → 57; then replace the sticker indicating the type of gas for which the appliance was set up with one that indicates the new type of gas used;
12. complete the gas change operation by checking that all gas pipe connections, including those that are not directly affected by the current procedure, are correctly sealed (use a solution of soap and water or another suitable means for this purpose).
13. refit the front left panel and finally the front panel.

Figure 7.2 – CHANGE OF GAS TYPE



LEGEND

40	fixing nozzle metal ring
55	gas valve
56	nozzle
57	o-ring
58	gasket
72	air inlet blower
75	air diaphragm
77	fixing gas pipe

Diagram of reference for the "gas change"

8 ACCESSORIES

This section contains a list of the accessories that are available for the installation and use of the appliance. To order these accessories, contact Robur S.p.A. on +39.035.888111.

Table 8.1 – Appliance accessories

ACCESSORIES			
Name	Description	Code	Notes
FINNED COIL FILTER kit for unit	Blocks impurities present in air drawn in through the fan coil and makes it easier to clean	O-FLT004	Use one kit for each appliance. E.g.: RTCF 180-00 = 3 KIT
ANTIVIBRATION MOUNT KIT for base: RTCF 120-00	Kit consisting of 4 anti-vibration feet, to be fixed in the holes already provided on the beams of the base	O-NTV008	For the position of the fixing holes, see the Paragraph of dimensions
ANTIVIBRATION MOUNT KIT for base: RTCF 180-00	Kit consisting of 6 anti-vibration feet, to be fixed in the holes already provided on the beams of the base	O-NTV009	For the position of the fixing holes, see the Paragraph of dimensions
ANTIVIBRATION MOUNT KIT for base: RTCF 240-00	Kit consisting of 8 anti-vibration feet, to be fixed in the holes already provided on the beams of the base	O-NTV010	For the position of the fixing holes, see the Paragraph of dimensions
ANTIVIBRATION MOUNT KIT for base: RTCF 300-00	Kit consisting of 10 anti-vibration feet, to be fixed in the holes already provided on the beams of the base	O-NTV011	For the position of the fixing holes, see the Paragraph of dimensions
HYDRAULIC SEPARATOR	Separator to balance hydraulic circuits; with automatic air outlet, outlet valve and insulation	O-SPR000	Water flow rate max 15 m ³ /h.
Direct Digital Controller (DDC)	Provides remote control of one or more units.	O-CRM007	N.1 DDC for max 16 unit on the same plant. NB: for links n. 1 DDC already it is supplied
RB100	Controller for handling sliding temperatures and remote ACS production.	O-DSP001	Can be used in combination with the DDC.
WISE (Web Invisible Service Employee)	Communications system for remote handling, control and supervision of installation.	O-DSP000	Can be used in combination with the DDC. The WISE unit has an integral antenna; 1 RS232 serial cable; 1 cable with telephone jack; 1 CD-ROM.
Robur "NETBUS" CAN BUS CABLE	Cable for data communication networks: for network connection between DCC and appliance.	O-CVO008	Maximum length: 450 m (for details, see the electrical connections section).

9 OPERATING CODES/TROUBLESHOOTING

9.1 OVERVIEW AND OPERATING CODES/TROUBLESHOOTING

If, during the operation of the appliance, the display of the controller of the appliance (or also of the display of the Direct Digital Controller, if connected) signals an operating code, it is necessary to:

- make a note of the indications shown on the display;
- consult the (specific) list of the operating codes;



For the operating codes generated by the controller of the appliance, refer to Table 9.1 TABLE OF OPERATING CODES generated by the S61 electronic board (firmware version 3.021) → 66. If the appliance is connected to a DDC, a list of the operating codes generated by the DDC is provided in the DDC's manual (see "installation technician manual - manual 1").

- carry out the instructions contained in it scrupulously (contact your Authorised Robur Technical Assistance Centre when instructed to do so).

If, after performing these operations, the appliance does not start, first carry out the following simple checks:

- ensure that the external disconnecting switch fitted by the electrical installation technician on a suitable panel (see Section 6 ELECTRICAL INSTALLATION → 35) is set to ON;
- check that the consent switches (see Paragraph 6.3 CONNECTIONS FOR CONSENT SWITCH OPERATION → 43) or the DDC (if connected and in controller mode) are set for operation of the appliance;
- check that the gas supply valve is open;
- determine that no further indications are given on the display.

At this point, if the appliance still does not start:

- refrain from proceeding by trial and error; instead request the direct assistance of an authorised Robur Technical Assistance Centre (TAC), informing it of the Machine Code that has arisen;
- disconnect the appliance from the gas and electricity supply, cutting off the gas supply by means of the appropriate tap and electrical power via the external master power switch. Wait for the TAC staff to arrive.



For how to reset the machine operating code with the on-board controller, refer to Paragraph 4.3 RESET OPERATIONS AND MANUAL DEFROSTING → 18.

We list below the operating codes generated by the appliance's controller (firmware version 3.021). The following codes can also be displayed by the DDC, if connected.

Table 9.1 – TABLE OF OPERATING CODES generated by the S61 electronic board (firmware version 3.021)

CODES	DESCRIPTION	TRIP CONDITIONS	RESET METHOD
E 600	FAULT ON RESET CIRCUIT OF FLAME CONTROL UNIT	Fault on reset circuit of flame control unit.	Contact authorised Technical Assistance.
u 601	GENERATOR LIMIT TEMPERATURE THERMOSTAT	High temperature detected by limit thermostat on body of generator	Acknowledge the thermostat manually: reset will be automatic as soon as fault condition is over.
E 601	GENERATOR LIMIT TEMPERATURE THERMOSTAT	u_01 code active for 1 hour, or u_01 code generated 3 times in 2 hours of operation.	Contact authorised Technical Assistance.
u 602	FUMES THERMOSTAT	High temperature detected by exhaust fumes thermostat	Reset occurs automatically when the condition that generated the code ceases
E 602	FUMES THERMOSTAT	u_02 code active for 1 hour, or u_02 code generated 3 times in 2 hours of operation.	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If codes u_02 and/or E_02 occur again, contact authorised TAC.
u 603	COLD WATER ANTIFREEZE THERMOSTAT	Low temperature detected by cold outlet water sensor.	Reset occurs automatically when the condition that generated the code ceases, with hysteresis of 2 °C.

u 604	INADEQUATE VENTILATION / CONDENSER OVERHEATING	(TCN - TA) values > limit set.	Reset occurs automatically 20 minutes after the Code is generated.
E 604	INADEQUATE VENTILATION / CONDENSER OVERHEATING	u_04 code generated twice in 2 hours of operation.	Carry out appropriate checks. Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
E 605	HIGH AMBIENT TEMPERATURE	HIGH temperature detected by ambient temperature sensor.	Reset occurs automatically when the condition that generated the code ceases.
E 606	LOW AMBIENT TEMPERATURE	LOW temperature detected by ambient temperature sensor.	Reset occurs automatically when the condition that generated the code ceases.
u 607	HIGH CONDENSER INLET TEMPERATURE	High temperature detected by condenser inlet temperature sensor (T> limit set: menu 1, parameter 66)	Reset occurs automatically when the condition that generated the code ceases.
E 607	HIGH CONDENSER INLET TEMPERATURE	u_07 code active for 2 hours, or u_07 code generated 12 times in 2 hours of operation.	Carry out appropriate checks. Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
E 608	FLAME CONTROL UNIT ERROR	E_12 on unit and condenser inlet temperature increasing by over 10 °C within 1 hour.	Carry out appropriate checks. Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
u 610	WATER FLOWMETER: Insufficient water flow	Insufficient water flow (the circulator is on and the flowmeter is open).	Reset occurs automatically when correct water flow is restored.
E 610	WATER FLOWMETER: Insufficient water flow	Code u_10 is generated 5 times since appliance was powered, or code u_10 is active for 2 hour.	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
u 611	INSUFFICIENT ROTATION OF OIL PRESSURE PUMP	Insufficient rotation of oil pressure pump.	Reset occurs automatically 20 minutes after the code is generated.
E 611	INSUFFICIENT ROTATION OF OIL PRESSURE PUMP	u_11 code generated twice in 2 hours of operation.	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
u 612	FLAME CONTROL UNIT ARREST	Failure to ignite burner.	Reset occurs automatically when the solenoid valve opens again (new ignition attempt), or if the code persists for 5 minutes.
E 612	FLAME CONTROL UNIT ARREST	Flame arrest signal.	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 0). If the code persists, contact authorised TAC.
E 616	OUTLET WATER TEMPERATURE SENSOR DEFECTIVE	Fault (interruption or short circuit) on outlet water temperature sensor.	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
E 617	COLD INLET WATER TEMPERATURE SENSOR DEFECTIVE	Fault (interruption or short circuit) on condenser outlet temperature sensor.	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
E 618	CONDENSER OUTLET TEMPERATURE SENSOR DEFECTIVE	Fault (interruption or short circuit) on condenser outlet temperature sensor	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1), moreover the code is reset during the "cold - hot" transition, too. In "Heating mode" the code is not managed. If the code persists, contact authorised TAC.
E 620	CONDENSER INLET TEMPERATURE SENSOR DEFECTIVE	Fault (interruption or short circuit) on condenser inlet temperature sensor.	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
E 626	GENERATOR FIN TEMPERATURE SENSOR	Generator fin temperature sensor	Reset may be performed from the controller (or from the S61 board via menu 2, parameter 21). If the code persists, contact authorised Technical Assistance.
E 628	GAS SOLENOID VALVE EXCITED DURING FLAME CONTROLLER ARREST	The flame controller is arrested (E_12) but the gas solenoid valve is excited. In this case the flame controller is de-excited (E_12 resets).	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
u 629	GAS SOLENOID VALVE WITHOUT ELECTRICAL POWER	Gas solenoid valve is off for 5 seconds (with central flame control unit on).	Reset occurs automatically if the gas solenoid valve switches on again within 10 minutes (with central flame control unit on).
E 629	GAS SOLENOID VALVE WITHOUT ELECTRICAL POWER	Code u_29 is active for more than 10 minutes (with flame controller unit on).	Carry out appropriate checks. Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
E 644	EVAPORATOR TEMPERATURE SENSOR FAULT	Fault (interruption or short circuit) on evaporator temperature sensor	In "Heating mode", reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1), moreover the code is reset during the "hot - cold" transition, too. In "Cooling mode" the code is not managed. If the code persists, contact authorised TAC.
u 646	HOT INLET WATER TEMPERATURE TOO HIGH	Hot inlet water temperature higher than upper operating limit of the appliance (if the appliance is in operation).	Resets automatically if, with the circulator on, the cause resolves or (with circulator off) 20 minutes after generation of code.
u 647	LOW HOT WATER TEMPERATURE	Hot water temperature lower than lower operating limit of the appliance (if the appliance is in operation).	Reset occurs automatically when cause resolves or 430 seconds after the code is generated.
E 647	LOW HOT WATER TEMPERATURE	u_47 code generated 3 times in 1 hour of operation of the circulator.	In "Heating mode", occurs automatically when the condition that generated the code ceases; moreover the code is reset during the hot - cold transition, too. In "Cooling mode" the code is not managed. If codes occur again, contact authorised TAC.
u 648	HOT WATER DIFFERENTIAL TEMPERATURE TOO HIGH	High hot water differential temperature.	Reset occurs automatically 20 minutes after the operating code is generated.
E 648	HOT WATER DIFFERENTIAL TEMPERATURE TOO HIGH	u_48 code generated twice in 2 hours of operation.	In "Heating mode", reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1), moreover the code is reset during the "hot - cold" transition, too. In "Cooling mode" the code is not managed. If the code persists, contact authorised TAC.
E 649	SATELLITE BOARD NOT PRESENT	Satellite board not present.	Reset occurs automatically when the condition that generated the code ceases.

u 651	ANTIFREEZE FUNCTION ACTIVATED - COLD SIDE Activation takes place only if the plant water circulator is off and the antifreeze function is enabled (see menu 1, parameter 77).	Inlet or outlet water temperature of the cold module falls below 4°C (the code generated signals that the antifreeze function has been activated). In this case the antifreeze function activates the plant water circulator.	Reset (deactivation of antifreeze function) occurs automatically when, with only the circulator on, the inlet and outlet water temperatures return to over 5°C (in this case the circulator switches off), or if the function itself is disabled.
u 652	DEFROSTING FUNCTION ACTIVATED	Defrosting function activated. Defrosting is activated if at least 90 minutes has passed since the last defrosting (or 180 minutes if temperature is inferior of -5°C), if the flame control unit has been on for at least 15 minutes, and if room temperature, temperature of hot inlet water and of the evaporator require its execution.	The Code clears automatically when execution of defrosting ends.
E 654	INVERSION: OPPOSITE	With valve not active, the end-of-range microswitch is actuated (i.e. is open electrically) on the other side to that expected by the board.	Reset occurs automatically if, after a new transition, the microswitch status emerges to be correct. If the Code persists, contact authorised TAC.
E 655	INVERSION: UNKNOWN	With valve not active, neither of the two end-of-range microswitches is actuated (i.e. they are both closed electrically).	Reset occurs automatically if, after a new transition, the microswitch status emerges to be correct. If the Code persists, contact authorised TAC.
E 656	INVERSION: UNCERTAIN	With valve not active, both of the two end-of-range microswitches are actuated (i.e. are both open electrically).	Reset occurs automatically if, after a new transition, the microswitch status emerges to be correct. If the Code persists, contact authorised TAC.
u 678	OUTLET HOT WATER TEMPERATURE TOO HIGH	Outlet hot water temperature too high	Reset occurs automatically when the condition that generated the code ceases; moreover the code is reset during the hot - cold transition, too. In "Cooling mode" the code is not managed.
u 679	ANTIFREEZE FUNCTION ACTIVATED - HEATING MODULE Activation takes place only if the hot module is off and the antifreeze function is enabled (see menu 1, parameter 163).	Antifreeze function activated (with function enabled: see menu 1, item 163; and only with machine off). In this case the antifreeze function activates the plant water circulator. If this temperature falls further to below 3 °C, the function also activates the flame controller.	Resets automatically (defrost function disabled) if, with only the circulator operating, the hot water inlet/outlet temperature rises above 5°C (at which point the circulator switches off); or, if also the flame controller is on, when the temperature reaches 18 °C (in this case the flame controller and then the circulator switch off).
u 680	INCOMPLETE PARAMETERS	Incomplete parameters.	The code remains until operating parameters are entered and completed. Contact authorised TAC. If the board is replaced, Code E_80 may appear; this means that the unit's characterisation parameters have not been set.
E 680	INVALID PARAMETERS	Invalid parameters or damage to parameter memory.	Reset occurs automatically when correct parameters are entered. If the code persists, contact authorised TAC: if the parameters are incorrect, it is necessary to enter and complete the unit operating and characterisation parameters; if the memory is damaged, the controller must be replaced.
u 681	INVALID BANK 1 PARAMETERS	Invalid Bank 1 data - Bank 2 data OK	Reset occurs automatically 5 seconds after the code is generated.
u 682	INVALID BANK 2 PARAMETERS	Invalid Bank 2 data - Bank 1 data OK	Reset occurs automatically 5 seconds after the code is generated.
E 681	INVALID BANK 1 PARAMETERS	Invalid Bank 1 data - Bank 2 data OK	Reset may be performed from the DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
E 682	INVALID BANK 2 PARAMETERS	Invalid Bank 2 data - Bank 1 data OK	Reset may be performed from the DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
u 683	RY and RW CONTACTS ACTIVATED SIMULTANEOUSLY	Both RY and RW contacts are simultaneously closed.	The Code clears automatically when at least one of the two contacts opens.
E 684	FAULTY TRANSFORMER CONNECTION OR 24 V AC FUSES	Damage to one of the 2 24-0-24 V AC transformer fuses, or one of 24-0-24 V AC wires to the board not supplying current.	Check fuses and 24-0-24 V AC electrical power connections on the controller. Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists or occurs again, contact authorised TAC.
E 685	INCORRECT MODULE TYPES (from menu 6)	The set module type (from menu 6) does not correspond to the one managed by the controller.	Reset occurs automatically when correct parameters are entered. If the code persists, contact authorised Technical Assistance.
E 686	MEMORY TEST UNSUCCESSFUL	Processor error.	Contact authorised Technical Assistance.
E 687	MEMORY TEST UNSUCCESSFUL	Processor error.	Contact authorised Technical Assistance.
E 688	MEMORY TEST UNSUCCESSFUL	Processor error.	Contact authorised Technical Assistance.
E 689	MEMORY TEST UNSUCCESSFUL	Processor error.	Contact authorised Technical Assistance.
E 690	AMBIENT TEMPERATURE SENSOR DEFECTIVE	Interruption or short circuit of ambient temperature sensor.	Reset may be performed from the CCI/DDC (or from the S61 board via menu 2, parameter 1). If the code persists, contact authorised TAC.
E 691	CONTROLLER DEFECTIVE	One of the following is absent: serial number of board, hardware version code or encryption key written during board test.	Contact authorised Technical Assistance.

GAHP-AR: operating codes generated by electronic board (displayed also by DDC).

DECLARATION OF CONFORMITY

Figure 1



EC - DECLARATION OF CONFORMITY



Manufacturer : Robur S.p.A.

Address : Via Parigi 4/6

City, Country : Verdellino/Zingonia 24040 (Bg), Italy

This is to declare that the ROBUR Gas Absorption Heat Pump (GAHP) are in conformity with the following EC-Directives:

2006/42/EC Machinery Directive with subsequent amendments and integrations.

2004/108/EC Electromagnetic Compatibility with subsequent amendments and integrations.
Tested and examined according to the following norms: EN55014-1, EN55014-2, EN61000-3-2, EN61000-3-3, EN62233.

2006/95/EC Low Voltage Directive with subsequent amendments and integrations.
Tested and examined according to the following norms: EN50165, EN60335-2-102, EN60335-1.

2009/142/EC Gas Appliance Directive with subsequent amendments and integrations.
Tested and examined according to the following norms: EN 12309-1, EN 12309-2, EN 483.
As proved with EC certification number 0964, issued by KIWA Italia S.p.A Via G. Carducci, 5 Milan-Italy

97/23/EC Pressure Equipment Directive with subsequent amendments and integrations.
As proved with EC Certification number 1370 of all the components under pressure of the III° category, issued by BUREAU VERITAS Italia S.p.A. Viale Monza, 261 Milan-Italy

Jvan Benzoni

R&D Director
Robur S.p.A.



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Robur S.p.A. tecnologie avanzate per la climatizzazione advanced heating and cooling technologies www.robur.it robur@robur.it
via Parigi 4/6 24040 Verdellino/Zingonia (BG) Italy T +39 035 888111 F +39 035 884165 capitale sociale € 2.028.000,00 i.v. iscritta al Registro
Imprese di Bergamo n. 154968 codice fiscale/partita iva 00373210160 V.A.T. code IT 00373210160 società soggetta all'attività di direzione e
coordinamento di Fin Robur S.p.A. di Benito Guerra & C.

Figure 2



Dichiarazione di Conformita' n°:
Declaration of Conformity n°:
Déclaration de conformité n°:
Konformitätserklärung N°:
Declaración de Conformidad n°:
Verklaring van conformiteit n°:

Zingonia, li/den 14/12/2011

IT

Con la presente si dichiara che i circuiti a pressione:

1. del Refrigeratore d'acqua a gas ad Assorbimento prodotto da ROBUR S.p.A., **serie GA**: ACF60-00 (standard e versioni speciali);
2. delle Pompe di Calore a gas ad Assorbimento prodotte da ROBUR S.p.A., **serie GAHP**: GS, WS, A, AR (standard e versioni speciali); **serie GAS HP**: G, W, A (standard e versioni speciali);

rispondono ai requisiti richiesti dalla Direttiva sulle attrezzature a pressione 97/23/CE (PED) come comprovato dal Certificato CE di Valutazione di Conformità nell'Insieme:

- MODULO H, Garanzia Qualità Totale, numero **CE-1370-PED-H-ROB001-10-ITA**

Rilasciato da:

BUREAU VERITAS ITALIA S.p.A.
Viale Monza 261
20126 Milano - Italy

Si precisa che tali circuiti sono dotati di una valvola di sicurezza (pressione di taratura 35 bar) conforme ai requisiti della stessa Direttiva 97/23/CE (PED).

D-FGL073 rev.F 11 MCM SDC 030 del 14/12/2011

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Robur Spa tecnologie avanzate per la climatizzazione advanced heating and cooling technologies www.robur.it robur@robur.it
via Parigi 4/6 24040 Verdellino/Zingonia (Bg) Italy T +39 035 888111 F +39 035 884165

Figure 3

UK

We hereby declare that:

1. pressurized circuit of the Gas Absorption Chiller manufactured by ROBUR S.p.A., **series GA:** ACF60-00 (standard and special versions);
2. pressurized circuit of the Gas Absorption Heat Pump manufactured by ROBUR S.p.A., **series GAHP:** GS, WS, A, AR (standard and special versions); **series GAS HP:** G, W, A (standard and special versions);

comply with Pressure Equipment Directive 97/23/EC (PED) requirements, as proofed with EC Certification of all the components under pressure:

- MODULE H for "Total Quality Assurance", number **CE-1370-PED-H-ROB001-10-ITA**

Issued by:

BUREAU VERITAS ITALIA S.p.A.
Viale Monza 261
20126 Milan- Italy

In particular, these circuits are equipped with one safety valve (pressure gauge set at 35 bar) conforming to the requirements of 97/23/EC (PED) Directive.

FR

Nous déclarons par la présente que les circuits hermétiques pressurisés:

1. des unités à Absorption à gaz fabriquées par la Société ROBUR S.p.A., **série GA:** ACF60-00 (standard et versions spéciales);
2. des Pompes à Chaleur à Absorption à gaz fabriquées par la société ROBUR S.p.A., **série GAHP:** GS, WS, A, AR (standard et versions spéciales); **série GAS HP:** G, W, A (standard et versions spéciales);

répondent à la Directive sur les appareils sous pression 97/23/EC (PED) comme d'après le Certificat CE d'Evaluation de l'Ensemble sous Pression:

- MODULE H, "GARANTIE QUALITE TOTALE", numéro **CE-1370-PED-H-ROB001-10-ITA**

Délivré par:

BUREAU VERITAS ITALIA S.p.A.
Viale Monza 261
20126 Milano - Italy

Nous précisons que ces circuits sont équipés d'une soupape de sécurité (pression de réglage 35 bar) conformément à la Directive 97/23/EC (PED).

DE

Hiermit erklären wir, daß die hermetischen Kreisläufe:

1. der Gasbefeuerte Absorptionskältemaschine , produziert durch ROBUR S.p.A., **Typ GA:** ACF60-00 (Standard und in den verschiedenen Ausführungen);
2. der Gasabsorptionswärmepumpe, produziert durch ROBUR S.p.A., **Typ GAHP:** GS, WS, A, AR (Standard und in den verschiedenen Ausführungen); **Typ GAS HP:** G, W, A (Standard und in den verschiedenen Ausführungen);

den Anforderungen der Druckbehälterverordnung 97/23/EC (PED) entsprechen und hiermit die EC Zertifizierung erfüllen im Ganzen:

- MODUL H, umfassende Qualitätssicherung **CE-1370-PED-H-ROB001-10-ITA**

Ausgestellt von:

BUREAU VERITAS ITALIA S.p.A.
Viale Monza 261
20126 Milano - Italy

Hiermit möchten wir klarstellen , daß diese Behälter mit einem Sicherheitsventil (Eichungsdruck 35 bar) nach 97/23/EC (PED) Verordnung ausgerüstet sind.

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via Parigi 4/6 24040 Verdellino/Zingonia (Bg) Italy T +39 035 888111 F +39 035 884165

Figure 4



ES

Por la presente certificamos que los circuitos herméticos presurizado:

- 1) de las Máquinas de Absorción con gas fabricadas por la Empresa ROBUR S.p.A., **serie GA:** ACF60-00 (Standard y versiones especiales);
- 2) de las bombas de calor por ciclo de absorción con gas fabricadas por la Empresa ROBUR S.p.A., **serie GAHP:** GS, WS, A, AR (Standard y versiones especiales); **serie GAS HP:** G, W, A (Standard y versiones especiales);

se adaptan a la Directiva 97/23/EC (PED) sobre aparatos a presión, y han sido probados conforme al procedimiento EC en conjunto:

- MODULO H, control de aseguramiento de calidad total, número **CE-1370-PED-H-ROB001-10-ITA**

Efectuados por:

BUREAU VERITAS ITALIA S.p.A.
Viale Monza 261
20126 Milano - Italy

Se precisa que estos circuitos están equipados de una válvula de seguridad (presión de calibración 35 bar) conforme a lo establecido en la Directiva 97/23/EC (PED).

NL

Hierbij verklaren wij dat de drukcircuitten:

- 1) van de GasAbsorptie Koelers geproduceerd door ROBUR S.p.A., **serie GA:** ACF60-00 (standaard e speciale versies);
- 2) van de Gasabsorptiewarmtepomp geproduceerd door ROBUR S.p.A., **serie GAHP:** GS, WS, A, AR (standaard en speciale versies); **serie GAS HP:** G, W, A (standaard en speciale versies);

voldoen aan de voorwaarden van de Pressure Equipment Directive 97/23/EC (PED), zoals gecertificeerd door EC Certificaat voor alle componenten onder druk:

- Module H, Totale Qualiteits Garantie, nummer **CE-1370-PED-H-ROB001-10-ITA**
Gepubliceerd door:

BUREAU VERITAS ITALIA S.p.A.
Viale Monza 261
20126 Milaan-Italie

In het bijzonder is dit circuit uitgerust met een veiligheidsventiel (drukmeter op 35 bar) volgens de eisen van de 97/23/EC (PED) richtlijn.

ROBUR S.p.A.
Ing. Davide Schiavon
Quality and Safety Manager

D-FGL073 rev.F 11 MCM SDC 030 del 14/12/2011

coscienza ecologica caring for the environment

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Robur is dedicated to dynamic progression
in research, development and promotion
of safe, environmentally-friendly, energy-efficiency products,
through the commitment and caring
of its employees and partners.

Robur Mission



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