

# Installation, Use and Maintenance Manual

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## GAHP-A indoor

air source gas absorption heat pump for installation in  
technical room

powered by gas and renewable energies



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Code: D-LBR738

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## I INTRODUCTION



### Manual

This Manual is an integral part of the GAHP-A unit and must be handed to the end user together with the appliance.

### Recipients

This Manual is intended for:

- end user, for appropriate and safe use of the appliance;

- qualified installer, for correct appliance installation;
- planner, for specific information on the appliance.

### Control device

In order to be able to work, the GAHP-A unit needs a control device (DDC, CCP/CCI or external requests), which must be connected by the installer.

## II SYMBOLS AND DEFINITIONS

### II.1 KEY TO SYMBOLS



DANGER



WARNING



NOTE



PROCEDURE



REFERENCE (to other document)

### II.2 TERMS AND DEFINITIONS

**GAHP Appliance/Unit** = equivalent terms, both used to designate the gas powered absorption heat pump GAHP (Gas Absorption Heat Pump).

**TAC** = Technical Assistance Centre authorised by Robur.

**External request** = generic control device (e.g. thermostat, clock or any other system) equipped with a voltage-free NO contact and used as control to start/stop the GAHP unit.

**CCI Controller** (Comfort Controller Interface) = optional adjustment device Robur which lets you manage up to three modulating heat only GAHP units (A, WS, GS).

**CCP Controller** (Comfort Control Panel) = adjustment device Robur which lets you manage in modulation mode up to three GAHP units and all system components (probes, diverter/mixing valves, circulating pumps), including any integration boiler.

**DDC Control** (Direct Digital Controller) = optional Robur adjustment device to control one or more Robur appliances (GAHP heat pumps, GA chillers and AY boilers) in ON/OFF mode.

**RB100/RB200 Devices** (Robur Box) = optional interface devices complementary to DDC, which may be used to broaden its functions (heating/cooling/DHW production service demands, and control of system components such as third party generators, adjustment valves, circulating pumps, probes).

**Heat generator** = equipment (e.g. boiler, heat pump, etc..) producing heating and/or DHW.

**GUE** (Gas Utilization Efficiency) = efficiency index of gas heat pumps, equal to the ratio between the thermal energy produced and the energy of the fuel used (relative to LCV, lower calorific value).

**First start-up** = appliance commissioning operation which may only and exclusively be carried out by a TAC.

**S61/Mod10/W10 Boards** = electronic boards on the GAHP unit, to control all functions and to provide interface with other devices and with the user.

## III WARNINGS

### III.1 GENERAL AND SAFETY WARNINGS



#### Installer's qualifications

Installation must exclusively be performed by a Qualified Firm and by Skilled Personnel, with specific knowledge on heating, cooling, electrical systems and gas appliances, in compliance with the laws in force in the Country of installation.



#### Declaration of Conformity

Upon completing installation, the installing firm shall issue to the owner/client the appliance's Workmanlike Conformity Declaration, according to national/local

regulations in force and the manufacturer's instructions/provisions.



#### Misuse

The appliance must only be used for the purposes for which it has been designed. Any other use is deemed hazardous. Incorrect use may affect operation, duration and safety of the appliance. Adhere to the manufacturer's instructions.



#### Hazardous situations

- Do not start the appliance in hazardous conditions, such as: gas smell, problems with the plumbing/electrical/gas system, parts of the appliance under water

or damaged, malfunctioning, disabling or bypassing control and safety devices.

- ▶ In case of danger, request intervention by skilled personnel.
- ▶ In case of danger, switch off the electrical power and gas supplies only if this can be done in total safety.
- ▶ Do not entrust children, persons with physical, sensory or mental disabilities or persons with poor knowledge and experience with use of the appliance.



#### Gas component tightness

- ▶ Before performing any operation on gas ducting components, close the gas cock.
- ▶ Upon completing any procedure, perform the tightness test according to regulations in force.



#### Gas smell

If you smell gas:

- ▶ Do not use electrical devices such as telephones, multimeters or other equipment that may cause sparks next to the appliance.
- ▶ Shut off the gas supply by turning the cock off.
- ▶ Disconnect electrical power supply by means of the external isolation switch in the power supply electrical panel.
- ▶ Use a telephone away from the appliance to ask for intervention from skilled personnel.



#### Poisoning

- ▶ Ensure the flue gas ducts are tightness and compliant with the regulations in force.
- ▶ Upon completing any procedure, ensure components are tightness.



#### Moving parts

The appliance contains moving parts.

- ▶ Do not remove guards during operation, and in any case prior to disconnecting the power supply.



#### Burn hazard

The appliance contains very hot parts.

- ▶ Do not open the appliance and do not touch internal components before the appliance has cooled down.
- ▶ Do not touch the flue gas exhaust before it has cooled down.



#### Pressure vessels

The appliance has a sealed circuit classified as pressure vessel, the tightness of which is tested by the manufacturer.

- ▶ Do not carry out any intervention on the sealed circuit or on the appliance's valves.



#### Water-ammonia solution

The GAHP unit uses the ammonia-water absorption cycle. The water-ammonia solution is contained in the

sealed circuit. The solution is harmful for health if it is ingested, inhaled or comes in contact with the skin.

- ▶ In the event of coolant leak keep away and disconnect the power and gas supply (only if it is possible to do so with no danger).
- ▶ Request assistance from the TAC.



#### Electrocution hazard

- ▶ Disconnect the electrical power supply before any work/procedure on appliance components.
- ▶ For electrical connections exclusively use compliant components and according to the specifications provided by the manufacturer.
- ▶ Ensure the appliance cannot be accidentally switched back on.



#### Earthing

Electrical safety depends on effective earthing system, correctly connected to the appliance and installed according to the regulations in force.



#### Distance from combustible or flammable materials

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



#### Limescale and corrosion

Depending on the chemical/physical properties of the system water, limescale or corrosion may damage the appliance (Paragraph 3.7 p. 20).

- ▶ Check system tightness.
- ▶ Avoid frequent top-ups.



#### Chloride concentration

The concentration of chlorides or free chlorine in the system water must not exceed the values in Table 3.2 p. 20.



#### Aggressive substances in air

Halogenated hydrocarbons containing chlorine and fluorine compounds cause corrosion. The supply/ventilation air of the appliance must be free from aggressive substances.



#### Acid flue gas condensate

- ▶ Discharge the acid condensate of combustion flue gas, as indicated in Paragraph 3.11 p. 24, in compliance with current exhaust regulations.



#### Switching the appliance off

Disconnecting the power supply while the appliance is running may cause permanent damage to internal components.

- ▶ Except in the case of danger, do not disconnect the power supply to switch off the appliance, but always and exclusively act through the control device provided (DDC, CCP/CCI or external request).



### In the event of failure

Operations on internal components and repairs may exclusively be carried out by a TAC, only using original parts.

- ▶ In the event of failure of the appliance and/or breakage of any component, do not attempt to repair and/or restore and immediately contact the TAC.



### Routine maintenance

Proper maintenance assures the efficiency and good operation of the appliance over time.

- ▶ Maintenance must be performed according to the manufacturer's instructions (see Chapter 7 p. 35) and in compliance with current regulations.
- ▶ Appliance maintenance and repairs may only be entrusted to firms legally authorised to work on gas appliances and systems.
- ▶ Enter into a maintenance contract with an authorised specialised firm for routine maintenance and for servicing in case of need.
- ▶ Only use original parts.



### Decommissioning and disposal

If the appliance is to be disposed of, contact the manufacturer for its disposal.



### Keep the Manual

This "Installation, Use and Maintenance Manual" must always accompany the appliance and must be handed to the new owner or installer in the event of sale or removal.

## III.2 CONFORMITY

### EU Directives and standards

The absorption heat pumps of the GAHP series are certified as conforming to standard EN 12309-1 and -2 and comply with the essential requirements of the following Directives:

- ▶ Gas Directive 90/396/EEC as amended and added.
- ▶ Efficiency Directive 92/42/EEC as amended and added.
- ▶ Electromagnetic compatibility Directive 89/336/EEC as amended and added.
- ▶ Low Voltage Directive 73/23/EEC as amended and added.
- ▶ Machinery Directive 2006/42/EC.
- ▶ Pressurised Equipment Directive (PED) 97/23/EEC as amended and added.

- ▶ UNI EN 677 Specific requirements for condensing boilers with nominal heating capacity up to 70 kW.
- ▶ EN 378 Refrigerating systems and heat pumps.

### Other applicable provisions and standards

The design, installation, operation and maintenance of the systems shall be carried out in compliance with current applicable regulations, depending on the Country and location, and in accordance with the manufacturer's instructions. In particular, regulations regarding the following shall be complied with:

- ▶ Gas systems and equipment.
- ▶ Electrical systems and equipment.
- ▶ Heating and air conditioning systems, and heat pumps.
- ▶ Environmental protection and combustion products exhaust.
- ▶ Fire safety and prevention.
- ▶ Any other applicable law, standard and regulation.

## III.3 EXCLUSIONS OF LIABILITY AND WARRANTY



Any contractual or extra-contractual liability of the manufacturer for any damage caused by incorrect installation and/or improper use and/or failure to comply with regulations and with the manufacturer's directions/instructions shall be disclaimed.



In particular, the warranty on the appliance may be rendered void by the following conditions:

- ▶ Incorrect installation.
- ▶ Misuse.
- ▶ Failure to comply with the manufacturer's indications on installation, use and maintenance.
- ▶ Alteration or modification of the product or any part thereof.
- ▶ Extreme operational conditions or however outside of the operational ranges set forth by the manufacturer.
- ▶ Damages caused by external agents such as salts, chlorine, sulphur or other chemical substances contained in the installation water or present in the air of the installation site.
- ▶ Abnormal actions transmitted by the plant or installation to the appliance (mechanical stresses, pressure, vibrations, thermal dilations, power surges...).
- ▶ Accidental damages or due to force majeure.

## 1 FEATURES AND TECHNICAL DATA

### 1.1 FEATURES

#### Operation

Based on the thermodynamic water-ammonia absorption cycle ( $H_2O-NH_3$ ), the appliance produces hot water using outdoor air as a renewable energy source (cold source) and natural gas (or LPG) as primary energy.

The thermodynamic cycle takes place within a hermetically sealed circuit, in welded construction, perfectly tight, factory-tested, which does not require any maintenance or coolant top-ups.

#### Mechanical and thermo-hydraulic components

- ▶ steel sealed circuit, externally treated with epoxy paint;

- ▶ sealed combustion chamber (type C) suitable for outdoor installations;
  - ▶ metal mesh radiant burner equipped with ignition and flame detection device, controlled by an electronic control unit;
  - ▶ titanium stainless steel shell-and-tube water heat exchanger, externally insulated;
  - ▶ stainless steel, flue gas latent heat recovery exchanger;
  - ▶ air exchanger with finned coil, with steel pipe and aluminium fins;
  - ▶ automatic microprocessor-controlled finned coil automatic defrosting valve;
  - ▶ low-noise fan S(reduction of electrical consumption and reduction of sound emission).
- ▶ auxiliary W10 electronic board
  - ▶ installation water flowmeter;
  - ▶ generator limit thermostat, with manual reset;
  - ▶ flue gas temperature thermostat, with manual reset;
  - ▶ generator fin temperature sensor;
  - ▶ sealed circuit safety relief valve;
  - ▶ by-pass valve, between high and low pressure circuits;
  - ▶ ionisation flame controller;
  - ▶ gas solenoid valve with double shutter;
  - ▶ anti-icing function for water circuit;
  - ▶ condensate discharge obstruction sensor.

#### Control and safety devices

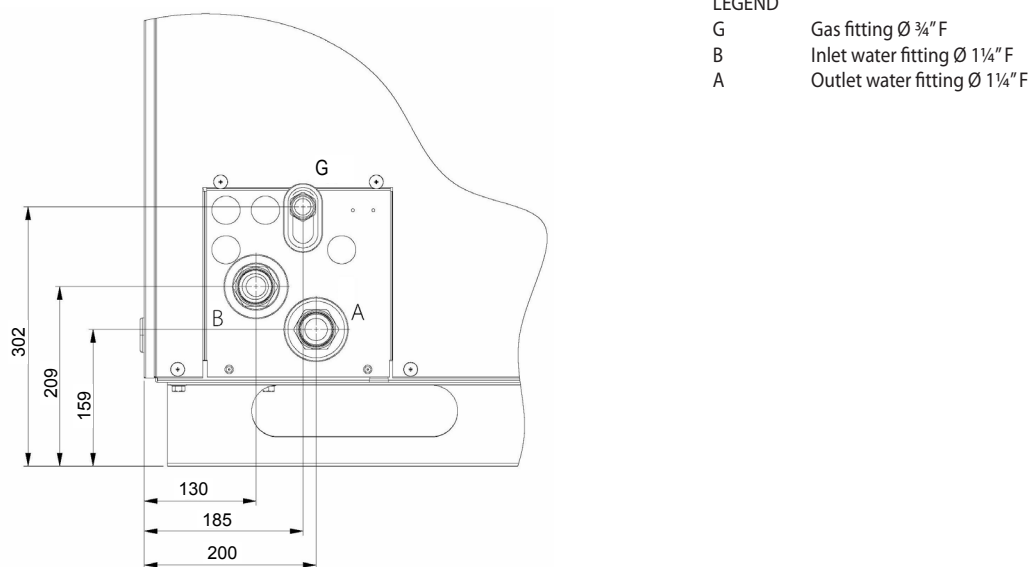
- ▶ S61 electronic board with microprocessor, LCD display and knob;
- ▶ Mod10 additional electronic board (integrated in S61);

#### Field of application

The GAHP-A unit is optimised for high temperature heating installations, with hot water up to +65°C (+70°C for DHW).

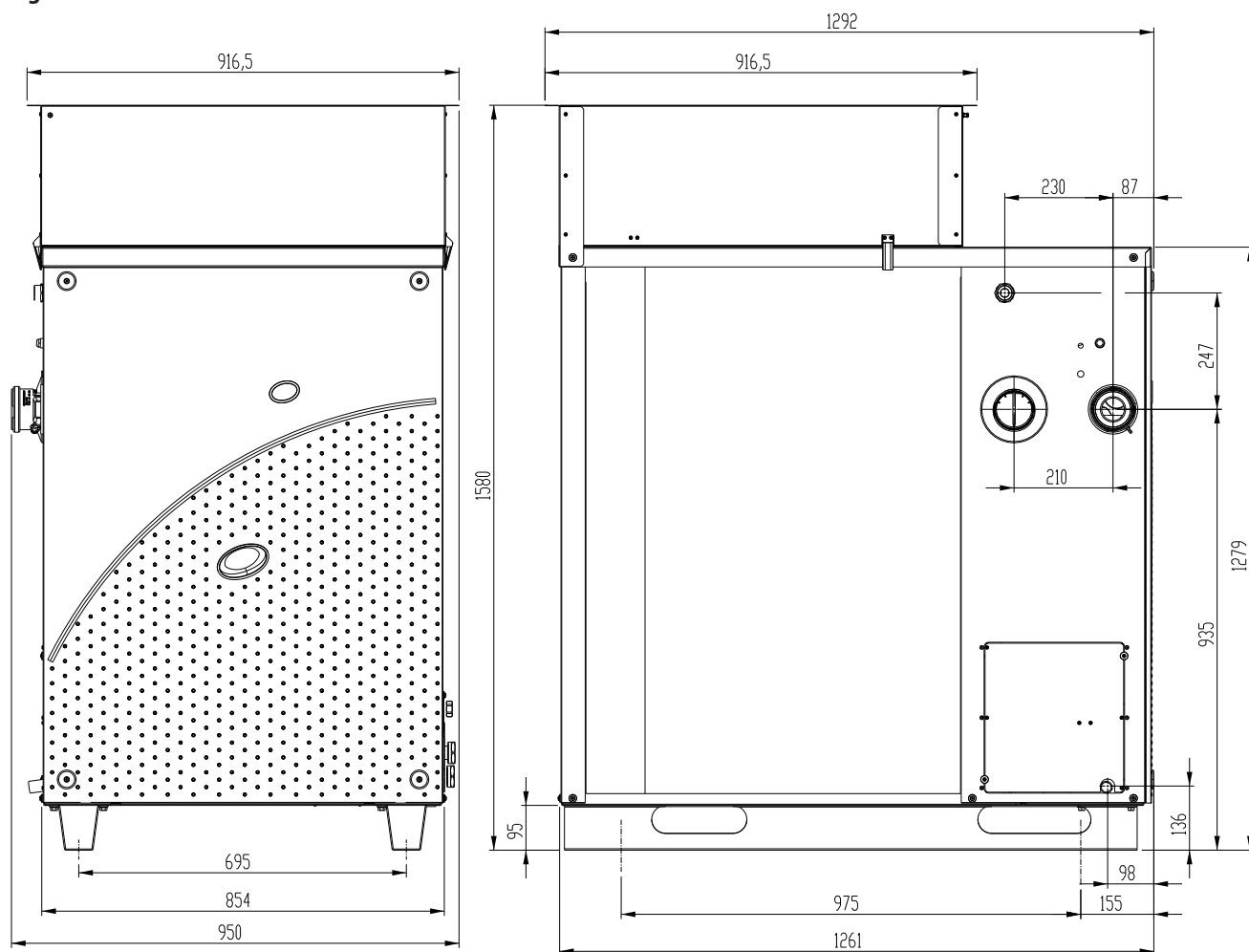
## 1.2 DIMENSIONS

Figure 1.1 – Service plate



Hydraulic/gas unions detail

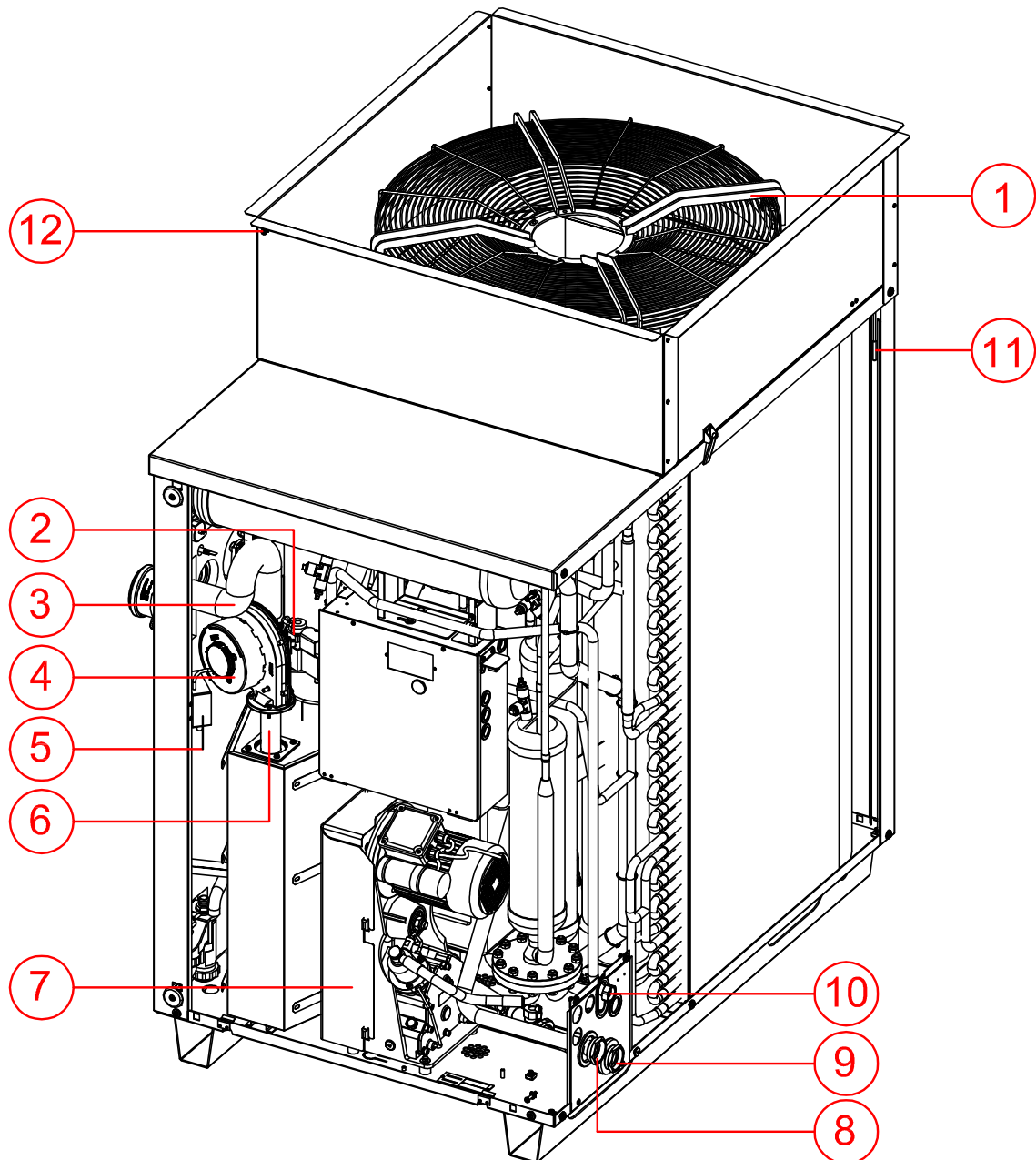
**Figure 1.2** – GAHP indoor dimensions





### 1.3 COMPONENTS

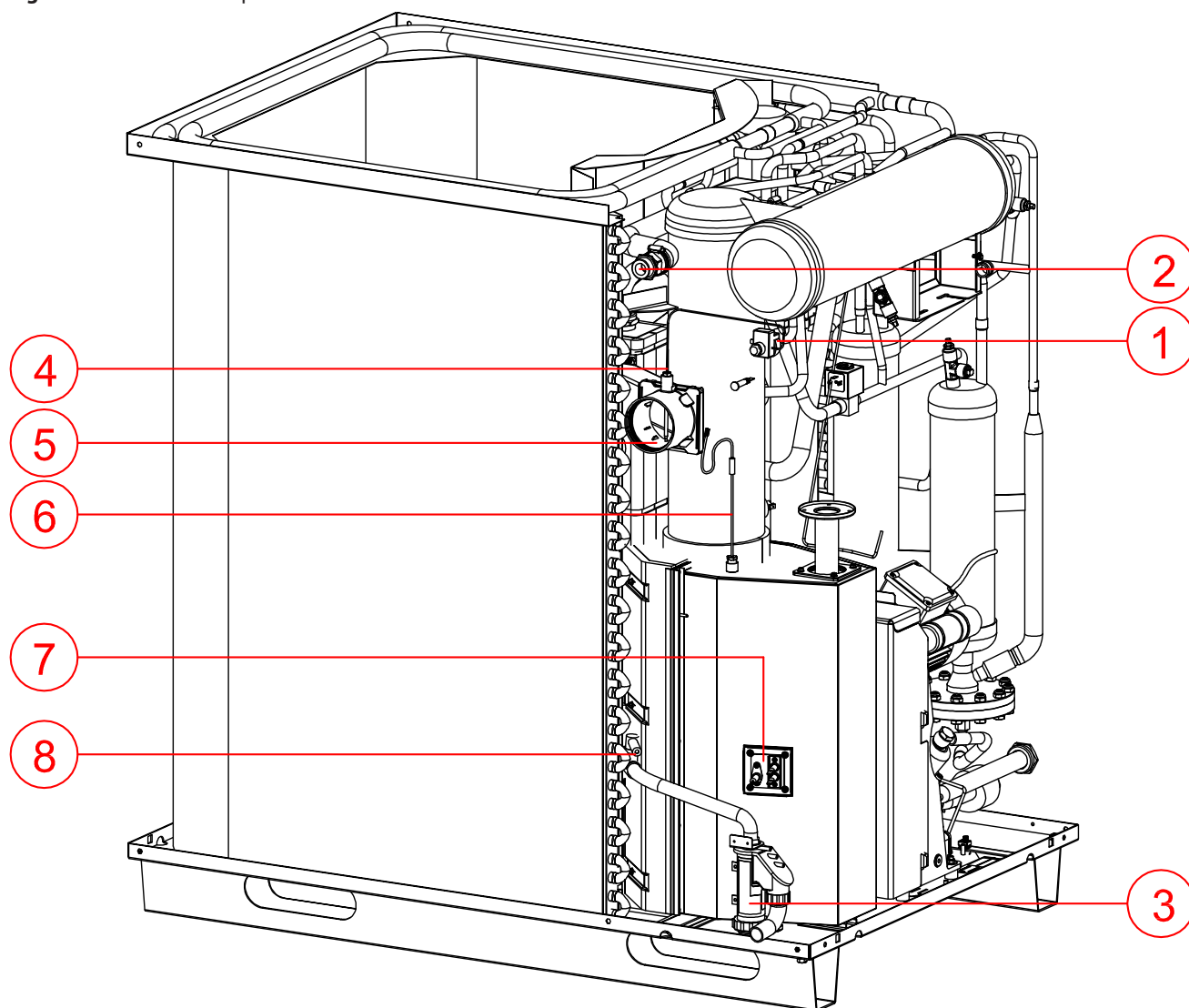
Figure 1.3 – Internal components - front view



LEGEND

- 1. Fan
- 2. Gas valve
- 3. Combustion air intake
- 4. Blower
- 5. Ignition transformer
- 6. Tmix Probe
- 7. Oil pump
- 8. Water return fitting: "G 1"¼ F
- 9. Water return fitting: "G 1"¼ F
- 10. Gas fitting
- 11. TA Probe
- 12. Air pressure intake

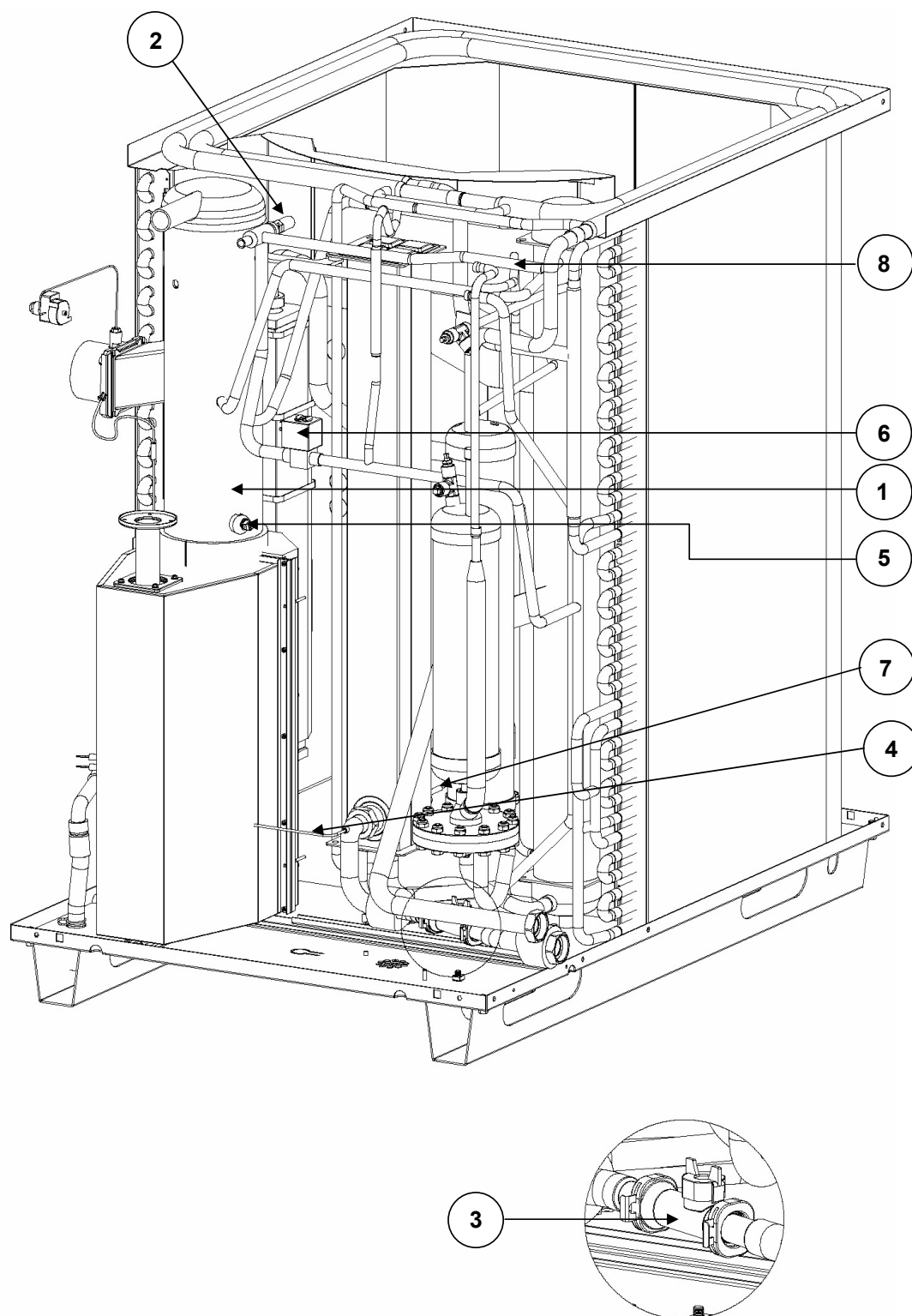
**Figure 1.4** – Internal components - left side view



LEGEND

- 1. Flue gas thermostat reset
- 2. Safety valve drain
- 3. Condensate drain siphon
- 4. Flue gas thermostat bulb
- 5. Ø 80mm flue gas drain
- 6. PT 1000 Flue gas Temperature Probe
- 7. Switch on and detection electrodes
- 8. Condensate sensor

**Figure 1.5** – Internal components - right side view

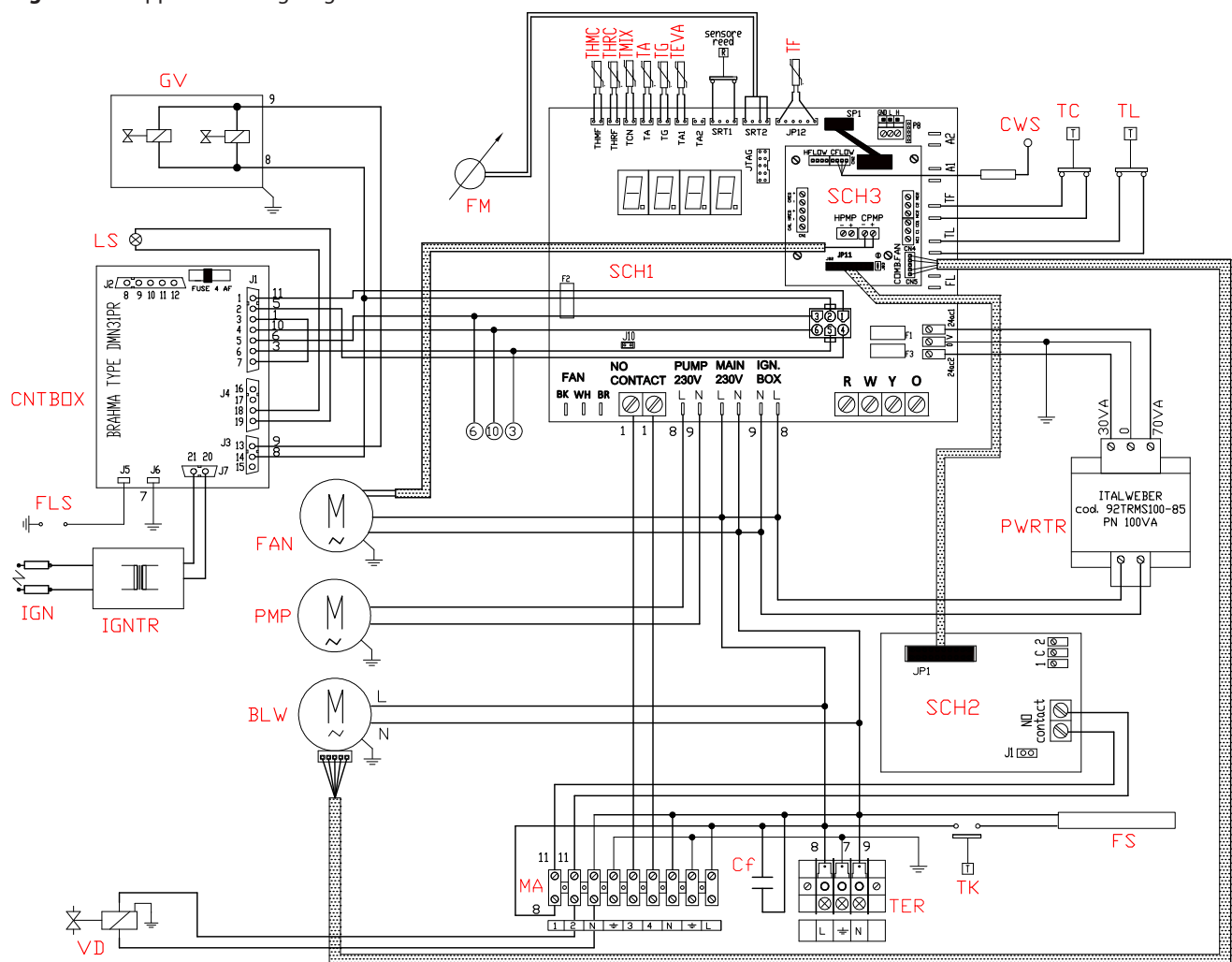


**LEGEND**

- 1. TG Probe
- 2. Safety valve
- 3. Delivery pipe flowmeter
- 4. Delivery temperature probe
- 5. Limit thermostat
- 6. Defrosting valve
- 7. Return temperature probe
- 8. Teva Probe

## 1.4 ELECTRICAL WIRING DIAGRAM

Figure 1.6 – Appliance wiring diagram



### LEGEND

SCH1	Controller S61	LS	Gas valve ON indicator lamp	THMC	Hot water flow temperature probe
SCH2	W10 circuit board	GV	Gas solenoid valve	TMIX	Combustion air temperature sensor
SCH3	Mod10 circuit board	TC	Manual flue gas thermostat	TA	Ambient air temperature sensor
TER	Appliance power terminal block	TL	Generator limit thermostat	TG	Generator temperature sensor
CNTBOX	Flame controller	FM	Flowmeter	TF	Fumes temperature sensor or generator fin sensor
PWRTR	Board transformer	CWS	Condensate water sensor	TEVA	Evaporator outlet temperature sensor
BLW	Blower	VD	Defrosting valve	TK	Condensate discharge heating element thermostat
PMP	Oil pump	FAN	Fan	MA	Terminal block
IGNTR	Ignition transformer	CF	Filter capacitor	REED	Oil pump rotation sensor
IGN	Ignition electrodes	FS	Condensate drain heating element		
FLS	Flame sensor	THRC	Hot water return temperature probe		

## 1.5 ELECTRONIC BOARDS

### Electronic boards (S61+Mod10)

The unit's electrical board contains:

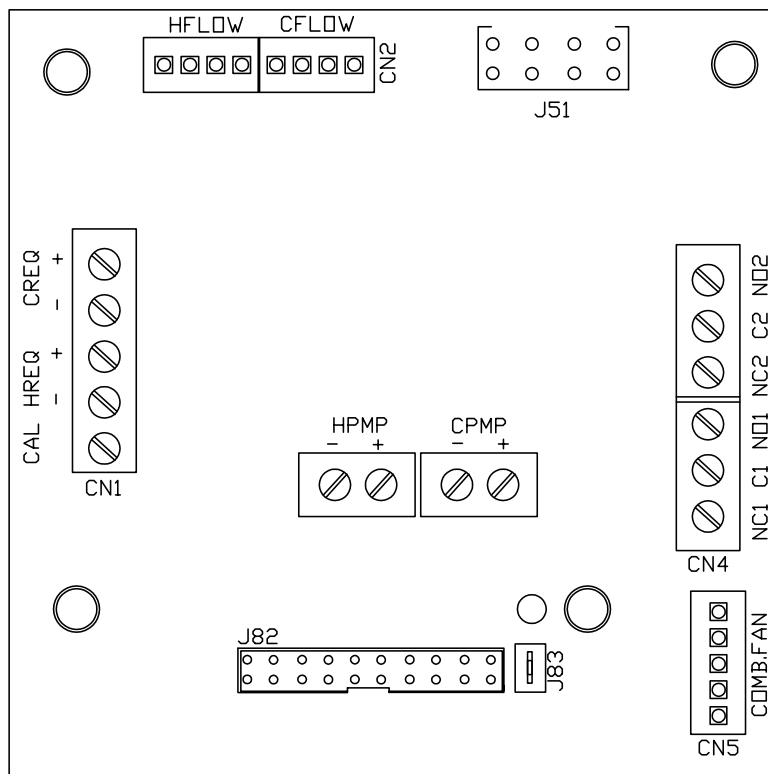
- **Electronic Board S61** (Figure 1.7 p. 13), with microprocessor, it controls the appliance and displays data, messages and operative codes. The appliance is monitored and programmed by interacting with the display and knob.
- **Auxiliary Mod10 electronic board** (Figure 1.8 p. 14), overlapping S61, it handles power modulation of the burner, fan and water circulation pump.

- **Satellite W10 electronic board** (Figure 1.9 p. 14), interconnected to the S61 board and located next to it, used to control defrosting operations of the GAHP unit.



SCH1	Controller S61	J1	CAN BUS Jumper	P8	(GND, L, H) CAN BUS connector
SCH3	Mod10 electronic board (see specific figure for further details)	J10	Jumper N.O. contact	PUMP	230V (L, N) Oil pump supply output
		J82	W10 board connector (on Mod10)	SPI	Communication port with Mod10 controller
A1, A2	Auxiliary inputs	JP10	6-pole flame controller connector		
ENC	Knob	JP12	Flue gas probe or generator fin probe input	SRT1	Oil pump rotation sensor input
F1	T 2A fuse			SRT2	Hot water flowmeter input
F2	T 10A fuse	JTAG	S61 board programming connector	TA	Ambient air temperature probe input
F3	T 2A fuse	MAIN	230V (L, N) S61 board supply input 230 Vac	TA1	Evaporator output probe input
F4	T 3,15A fuse			TA2	Not used
FAN	(BK, WH, BR) Fan output	NO CONTACT	Normally open pump contact	TCN	Combustion air temperature probe input
F55	(24V AC) board supply 24-0-24 Vac				
IGN.BOX	230 Vac Flame controller power	P7	(R, W, Y, O) Enable input	TF	Flue gas thermostat input

**Figure 1.8** – Mod10 controller

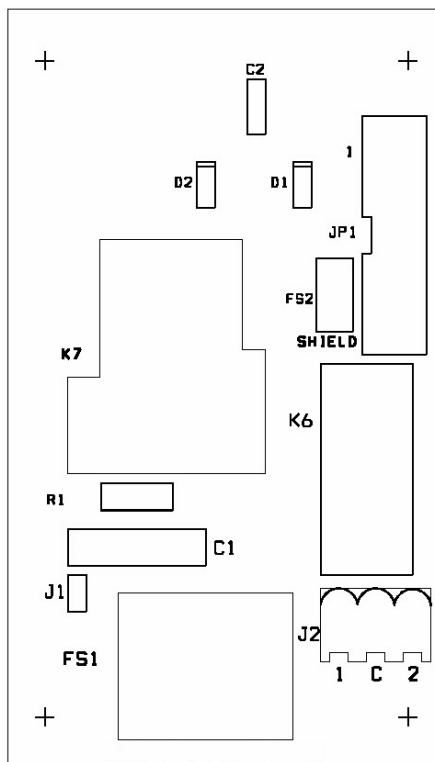


**LEGEND**

HFLOW	Not used
CFLOW	Condensation water sensor control
J51	SPI connector
HPMP	Primary circuit hot water pump control output (0-10 V)
CPMP	Low consumption fan control output (0-10V)
NC1-C1	Status indication of locking warnig/error
CN5	Blower control
J82	W10 auxiliary controller connector
J83	W10 cable shielding connection W10
CN1	Inputs 0-10V (not used)

Mod10 controller

**Figure 1.9** – W10 electronic controller



**LEGEND**

FS1	Defrosting valve contact
JP1	Communication with S61/Mod10

## 1.6 OPERATION MODE

### ON/OFF or modulating operation

The GAHP unit may work in two modes:

- mode (1) ON/OFF, i.e. On (at full power) or Off, with circulating pump at constant or variable flow;
- mode (2) MODULATING, i.e. at variable load from 50% to 100% of power, with circulating pump at variable flow.

For each mode, (1) or (2), specific control systems and devices are provided (Paragraph 1.7 p. 15).

## 1.7 CONTROLS

### Control device

The appliance may only work if it is connected to a control device, selected from:

- ▶ (1) **DDC control**
- ▶ (2) **CCP/CCI control**
- ▶ (3) **external request**

#### 1.7.1 Adjustment system (1) with DDC (GAHP unit ON/OFF)

The DDC controller is able to manage appliances, a single GAHP unit, or even several Robur GAHP/GA/AY units in cascade, only in ON/OFF mode (non modulating). For more details refer to the DDC, RB100, RB200 Manuals and the Design Manual.

### DDC Controller

The main functions are:

- ▶ adjustment and control of one (or more) Robur units of the absorption line (GAHP, GA, AY);
- ▶ parameter figures display and setting;
- ▶ hourly programming;
- ▶ climate curve control;
- ▶ diagnostics;
- ▶ reset errors;
- ▶ possibility to interface with a BMS;

DDC functionality may be widened with auxiliary Robur devices RB100 and RB200 (e.g. service requests, DHW production, Third Party generator control, probe control, system valves or circulating pumps, ...).

#### 1.7.2 Adjustment system (2) with CCP/CCI (modulating GAHP unit)

The CCP/CCI control is able to control up to 3 GAHP units in modulating mode (therefore A/WS/GS only, excluding AR/ACF/AY), plus any integration ON/OFF boiler. For additional details and diagrams refer to the CCP/CCI Manual and the Design Manual.

### CCP/CCI Control

See CCP/CCI device Manual.

#### 1.7.3 Adjustment system (3) with external request (GAHP unit ON/OFF)

The appliance may also be controlled via generic enable devices (e.g. thermostats, clocks, buttons, contactors...) fitted with voltage-free NO contact. This system only provides elementary control (on/off, with fixed set-point temperature), hence without the important functions of systems (1) and (2). It is advisable to limit its possible use only to simple applications and with a single appliance.



For connection of the selected device to the appliance's electronic board please refer to Paragraph 4.4 p. 27.

## 1.8 TECHNICAL CHARACTERISTICS

(see Table 1.1 p. 15).

**Table 1.1** – GAHP-A HT indoor technical data

			GAHP-A indoor
<b>HEATING MODE</b>			
OPERATING POINT A7W50	G.U.E. gas usage efficiency	%	152 (1)
	Thermal power	kW	38,3 (1)
OPERATING POINT A7W65	G.U.E. gas usage efficiency	%	124 (1)
	Thermal power	kW	31,1 (1)
OPERATING POINT A-7W50	G.U.E. gas usage efficiency	%	127 (1)
	Thermal power	kW	32,0 (1)
Heating capacity	Nominal (1013 mbar - 15°C)	kW	25,7
	true peak	kW	25,2
Hot water delivery temperature	maximum for heating	°C	65
	maximum for DHW	°C	70
Hot water inlet temperature	maximum heating	°C	55
	maximum for DHW	°C	60
	minimum in continuous operation (11)	°C	20
Thermal differential	nominal	°C	10
	nominal	l/h	3000
Hot water flow rate	maximum	l/h	4000
	minimum	l/h	1400
Hot water pressure loss	nominal water pressure (A7W50)	bar	0,43 (2)
Ambient air temperature (dry bulb)	maximum	°C	40
	minimum	°C	-15 (7)
<b>ELECTRICAL SPECIFICATIONS</b>			
Power supply	Voltage	V	230
	TYPE		SINGLE PHASE
	Frequency	50 Hz supply	50
Electrical power absorption	nominal	kW	0,93 (5)
	minimum	kW	0,56
Degree of protection	IP		X5D
<b>INSTALLATION DATA</b>			

			GAHP-A indoor
gas consumption	methane G20 (nominal)	m <sup>3</sup> /h	2,72 (3)
	methane G20 (min)	m <sup>3</sup> /h	1,34
	G25 (nominal)	m <sup>3</sup> /h	3,16 (9)
	G25 (min)	m <sup>3</sup> /h	1,57
	G30 (nominal)	kg/h	2,03 (4)
	G30 (min)	kg/h	0,99
	G31 (nominal)	kg/h	2,00 (4)
	G31 (min)	kg/h	0,98
NOx emission class			5
NOx emission		ppm	25
CO emission		ppm	36
Sound power L <sub>w</sub> (max)		dB(A)	75,3 (8)
Sound power L <sub>w</sub> (min)		dB(A)	72,3 (8)
Sound pressure L <sub>p</sub> at 5 metres (max)		dB(A)	53,3 (10)
Sound pressure L <sub>p</sub> at 5 metres (min)		dB(A)	50,3 (10)
Minimum storage temperature		°C	-30
Maximum water pressure in operation		bar	4
Maximum flow flue condensate		l/h	4
Maximum defrosting water flow		l/h	40
Water content inside the apparatus		l	4
Water fitting	TYPE		F
	thread	" G	1 1/4
Gas connection	TYPE		F
	thread	" G	3/4
Fume outlet	Diameter ( )	mm	80
	Residual head	Pa	80
Dimensions	width	mm	848
	depth	mm	1258
	height	mm	1587
Weight	In operation	kg	405
Required air flow		m <sup>3</sup> /h	11000
Required air flow at the maximum available head		m <sup>3</sup> /h	10000
Fan residual head		Pa	40 (5)
<b>GENERAL INFORMATION</b>			
INSTALLATION MODE			C13, C33, C 43, C53, C63, C83
REFRIGERANT FLUID	AMMONIA R717	kg	7
	WATER H2O	kg	10
MAXIMUM PRESSURE OF THE REFRIGERANT CIRCUIT		bar	32

Note:

- (1) As per standard EN12309-2  
(2) For flows other than nominal see Design Manual  
(3) PCI (G20) 34,02 MJ/m<sup>3</sup> (1013 mbar -15 °C).  
(4) PCI (G30/G31) 46,34 MJ/kg (1013 mbar -15 °C).  
(5) Value stated with free drain.  
(7) A special version is available as optional feature for operation at -30 °C.  
(8) Sound power values detected in compliance with intensimetric measurement methodology set forth by standard EN ISO 9614.  
(9) PCI (G25) 29,25 MJ/m<sup>3</sup> (1013 mbar 15 °C).  
(10) Maximum sound pressure levels in free field, with directionality factor 2, obtained from the sound power level in compliance with standard EN ISO 9614.  
(11) Under transitory conditions lower temperatures are allowed

**Table 1.2 – PED data**

			GAHP-A indoor
<b>PED data</b>			
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
MAXIMUM PRESSURE OF THE REFRIGERANT CIRCUIT		bar g	32
FILLING RATIO		kg of NH <sub>3</sub> /l	0,146
FLUID GROUP			GROUP 1°



## 2 TRANSPORT AND POSITIONING

### 2.1 WARNINGS



#### Damage from transport or installation

The manufacturer shall not be liable for any damage during appliance transport and installation.



#### On-site inspection

- Upon arrival at the site, ensure there is no transport damage on packing, metal panels or finned coil.
- After removing the packing materials, ensure the appliance is intact and complete.



#### Packing

- Only remove the packing after placing the appliance on site.
- Do not leave parts of the packing within the reach of children (plastic, polystyrene, nails...) since they are potentially dangerous.



#### Weight

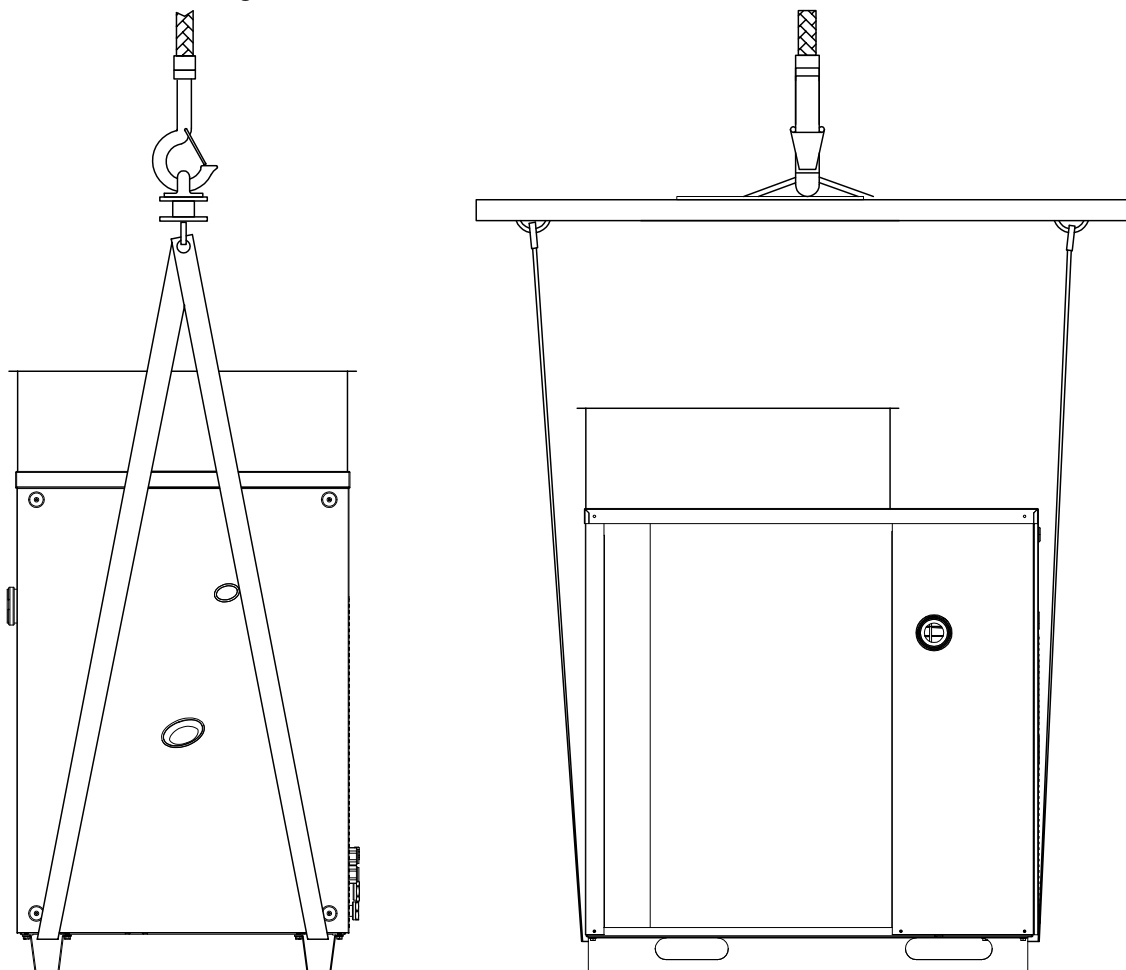
- The crane and lifting equipment must be suitable for the load.
- Do not stand under suspended loads.

### 2.2 HANDLING

#### Handling and lifting

- Always handle the appliance in its packing, as delivered by the factory.
- To lift the appliance use straps or slings inserted in the holes of the base (Figure 2.1 p. 17).
- Use lifting beams to avoid damaging the outer panels and finned coil (Figure 2.1 p. 17).
- Comply with safety regulations at the installation site.

Figure 2.1 – Instruction for lifting





In the event of handling with forklift or pallet truck, comply with the handling instructions shown on the packing.

### 2.3 INSTALLATION PREMISES

The installation premises must meet all requirements set forth by laws, standards and regulations of the Country and place of installation concerning gas appliances and cooling appliances



Do not install inside a room that has no aeration openings.



#### GAHP-A Unit ventilation

The atherothermal appliance requires aerated premises for regular air flow into the finned coil. The air exhaust above the fan mouth must be ducted outside in order to prevent air recirculation towards the aeration openings. Incorrect ventilation may affect efficiency and cause damage to the appliance. The manufacturer shall not be liable for any incorrect choices of the installation premises and setting.



#### Other appliances

Any other gas appliances in the room must necessarily be type C.

#### Features of the installation premises

- ▶ The room must have permanent aeration vents whose surface must be sufficient for regular air flow to the finned coil (11000 m<sup>3</sup>/h)
- ▶ The appliance's flue gas exhaust must be ducted to the outside. The appliance's flue must not be immediately close to openings or air intakes of buildings, and must comply with environmental regulations.
- ▶ The combustion air intake must be ducted from the outside.

#### Defrosting water drainage



In winter, it is normal for frost to form on the finned coil and for the appliance to perform defrosting cycles.

- ▶ To prevent overflowing and damage provide for a defrosting water drainage system.

#### Acoustic issues

- ▶ Pre-emptively assess the appliance's sound impact inside the room and to the next rooms and the outside.

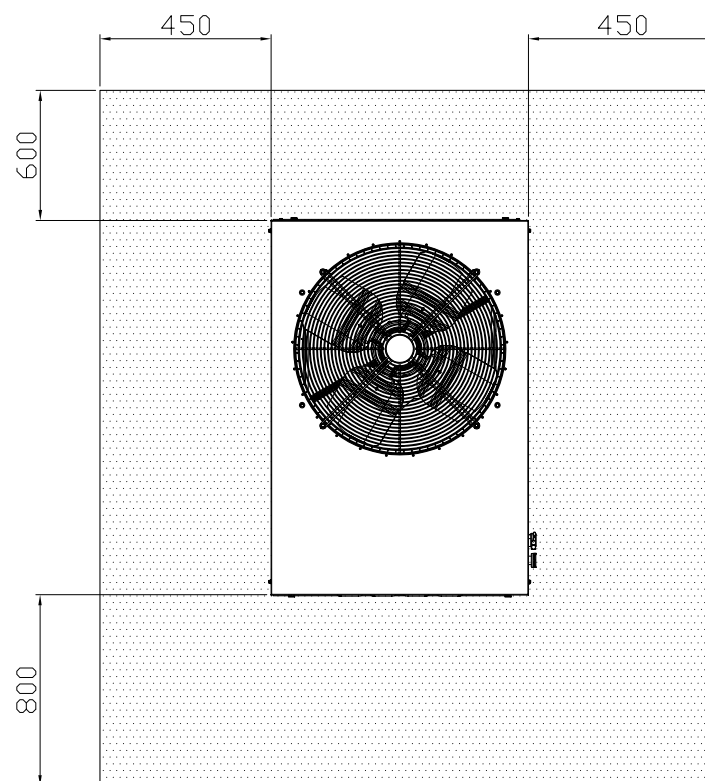
#### Distances from combustible or flammable materials

- ▶ Keep the appliance away from combustible or flammable materials or components, in compliance with applicable regulations.

#### Clearances around the appliance

The **minimum clearance distances** shown in Figure 2.2 p. 18 (bar any stricter regulations) are required for safety, operation and maintenance.

Figure 2.2 – Clearances



#### Flooring of the utilities room

- ▶ Place the appliance on a levelled flat surface made of fire-proof material and able to withstand its weight.

#### Anti vibration mountings

Although the appliance's vibrations are minimal, resonance phenomena might occur.

- Use anti-vibration mountings.

- Also provide anti-vibration connections between the appliance and water and gas pipes.

## 3 HEATING ENGINEER

### 3.1 WARNINGS



#### General warnings

Read the warnings in Chapter III p. 4, providing important information on regulations and on safety.



#### Compliance with installation standards

Installation must comply with applicable regulations in force, based on the installation Country and site, in matters of safety, design, implementation and maintenance of:

- heating systems;
- cooling systems;
- gas systems;
- flue gas exhaust;
- flue gas condensate discharge.



Installation must also comply with the manufacturer's provisions.

### 3.2 INSTALLATION

#### Primary and secondary circuit

- In many cases it is advisable to divide the hydraulic system into two parts, primary and secondary circuit, uncoupled by a hydraulic separator, or possibly by a tank that also acts as inertial volume/thermal inertia.

#### Constant or variable water flow

The GAHP unit may work with constant or variable water flow, regardless of the ON/OFF or modulating operative mode.

System and components must be designed and installed consistently.

#### Minimum water content

High thermal inertia is conducive to efficient appliance operation. Very short ON/OFF cycles are to be avoided.

- If necessary, provide for an inertial volume, to be suitably sized (see design manual).

### 3.3 HYDRAULIC CONNECTIONS

#### Plumbing fittings

on the right, at the bottom, **connection plate** (Figure 1.1 p. 7).

- **A** (= out) **1"1/4 F** - WATER OUTPUT (m = delivery to the system);
- **B** (= in) **1"1/4 F** - WATER INPUT (r = return from the system).

#### Hydraulic pipes, materials and features

- Use pipes for heating/cooling systems, protected from weathering, insulated for thermal dispersion.



#### Pipe washing

- Before connecting the appliance, accurately clean the water and gas piping and any other system component, removing any residue.

#### Minimum components of primary plumbing circuit

- Always provide, near the appliance:

- on water piping, both output and input (m/r)
- 2 ANTIVIBRATION JOINTS on water fittings;
- 2 PRESSURE GAUGES;
- 2 ISOLATION BALL VALVES;

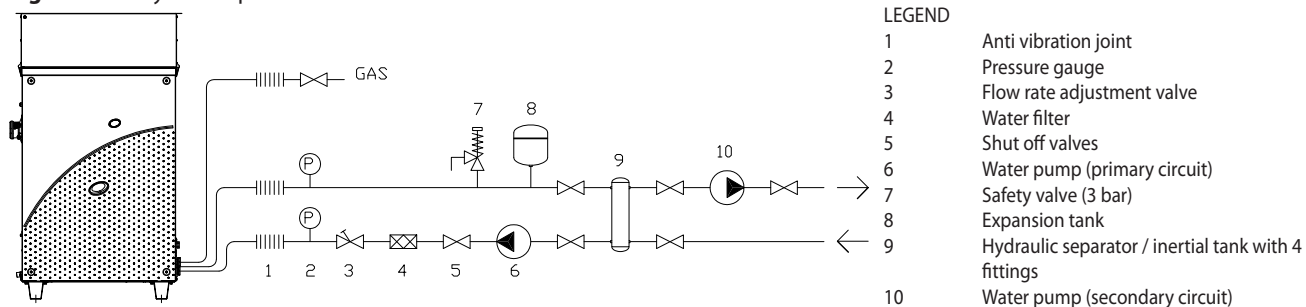
on the input water piping (r)

- 1 DIRT SEPARATOR FILTER
- 1 FLOW ADJUSTMENT VALVE, if the circulating pump is constant flow;
- 1 WATER CIRCULATION PUMP, towards the appliance;

on the output water piping (m)

- 1 SAFETY VALVE (3 bar);
- 1 EXPANSION TANK of the individual unit.

Figure 3.1 – Hydraulic plan



### 3.4 WATER CIRCULATION PUMP

The circulation pump (flow and head) must be selected and installed based on pressure losses of plumbing/primary circuit (piping + components + exchange terminals + appliance). For the appliance's pressure losses refer to Table 1.1 p. 15 and Design Manual.

#### (1) CONSTANT FLOW circulating pump

The primary circulating pump must be obligatorily controlled by the appliance's electronic board (S61) (see Paragraph 1.5 p. 12).

#### (2) VARIABLE FLOW circulating pump

For variable flow operation, use of a Wilo Stratos Para pump is obligatory, supplied as accessory on demand, to be connected to the Mod10 electronic board (see Paragraph 1.5 p. 12). Any other type of pump will give constant flow. Refer to the Design Manual for the features of the Wilo Stratos Para pump.

### 3.5 ANTI-ICING FUNCTION

#### Active anti-icing self-protection

The appliance is equipped with an active antifreeze self-protection system to prevent icing. The anti-icing function (activated by default) automatically starts the primary circulation pump and, if required, the burner too, when the outside temperature approaches zero.



#### Electrical and gas continuity

The active anti-icing self-protection is only effective if the power and gas supplies are assured. Otherwise, anti-icing liquid might be required.

**Table 3.1** – Technical data for filling the hydraulic circuit

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%

### 3.7 SYSTEM WATER QUALITY



#### Responsibility of the user/operator/installer

The installer, operator and user must assure system water quality (Table 3.2 p. 20). Failure to comply with the manufacturer's guidelines may affect operation, integrity and life of the appliance, voiding the warranty.

**Table 3.2** – Chemical and physical parameters of water

CHEMICAL AND PHYSICAL PARAMETERS OF WATER IN HEATING/COOLING SYSTEMS		
PARAMETER	UNIT OF MEASUREMENT	ALLOWABLE RANGE
pH	\	>7 <sup>(1)</sup>
Chlorides	mg/l	< 125 <sup>(2)</sup>
Total hardness (CaCO <sub>3</sub> )	°f	< 15
	°d	< 8,4
Iron	mg/kg	< 0,5 <sup>(3)</sup>
Copper	mg/kg	< 0,1 <sup>(3)</sup>
Aluminium	mg/l	< 1
Langelier's index	\	0-0,4

### 3.6 ANTI-ICING LIQUID



#### Precautions with glycol

The manufacturer disclaims any liability for any damage caused by improper glycol use.

- ▶ Always check product suitability and its expiry date with the glycol supplier. Periodically check the product's preservation state.
- ▶ Do not use car-grade anti-icing liquid (without inhibitors), nor zinc-coated piping and fittings (incompatible with glycol).
- ▶ Glycol modifies the physical properties of water (density, viscosity, specific heat...). Size the piping, circulation pump and thermal generators accordingly.
- ▶ With automatic system water filling, a periodic check of the glycol content is required.



#### With high glycol percentage (> 20...30%)

If the glycol percentage is  $\geq 30\%$  (for ethylene glycol) or  $\geq 20\%$  (for propylene glycol) the TAC must be alerted before first start-up.

#### Type of anti-icing glycol

**Inhibited type glycol** is recommended to prevent oxidation phenomena.

#### Glycol effects

The Table 3.1 p. 20 shows, indicatively, the effects of using a glycol depending on its %.

CHEMICAL AND PHYSICAL PARAMETERS OF WATER IN HEATING/COOLING SYSTEMS		
PARAMETER	UNIT OF MEASUREMENT	ALLOWABLE RANGE
<b>HARMFUL SUBSTANCES</b>		
Free chlorine	mg/l	< 0,2 <sup>(3)</sup>
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

#### System water features

Free chlorine or water hardness may damage the appliance. Adhere to the chemical-physical parameters in Table 3.2 p. 20 and the regulations on water treatment for residential and industrial heating systems.

#### Water topping up

The chemical-physical properties of the system's water may alter over time, resulting in poor operation or excessive topping up.

- ▶ Ensure there are no leaks in the installation.
- ▶ Periodically check the chemical-physical parameters of the water, particularly in case of automatic topping up.



### Chemical conditioning and washing

Water treatment/conditioning or system washing carried out carelessly may result in risks for the appliance, the system, the environment and health.

- ▶ Contact specialised firms or professionals for water treatment or system washing.
- ▶ Check compatibility of treatment or washing products with operating conditions.
- ▶ Do not use aggressive substances for stainless steel or copper.
- ▶ Do not leave washing residues.

## 3.8 INSTALLATION FILLING



How to fill up the system

After completing all water, electrical and gas connections:

1. Pressurise (at least 1.5 bar) and vent the hydraulic circuit.
2. Let water flow (with appliance off).
3. Check and clean the filter on the inlet pipe.

4. Repeat items 1, 2 and 3. until the pressure has stabilised (at least 1.5 bar).

## 3.9 FUEL GAS SUPPLY

### Gas connection

#### ▶ 3/4" F

on the right, at the bottom, **connection plate** (Figure 1.1 p. 7).

- ▶ Install an anti-vibration connection between the appliance and the gas piping.
- ▶ Perform connection in compliance with applicable regulations.

### Mandatory shut-off valve

- ▶ Provide a gas shut-off valve (manual) on the gas supply line, to isolate the appliance when required.

### Gas pipes sizing

The gas pipes must not cause excessive load losses and, consequently, insufficient gas pressure for the appliance.

### Supply gas pressure

The appliance's gas supply pressure, both static and dynamic, must comply with Table 3.3 p. 21, with tolerance  $\pm 15\%$ .

Table 3.3 – Network gas pressure

Product categories	Countries of destination	Gas supply pressure						
		G20 [mbar]	G25 [mbar]	G30 [mbar]	G31 [mbar]	G25.1 [mbar]	G27 [mbar]	G2,350 [mbar]
II <sub>2H3B/P</sub>	AL, BG, CY, CZ, DK, EE, FI, GR, HR, IT, LT, MK, NO, RO, SE, SI, SK, TR	20		30	30			
	AT, CH	20		50	50			
II <sub>2H3P</sub>	AL, BG, CZ, ES, GB, HR, IE, IT, LT, MK, PT, SI, SK, TR	20			37			
	RO	20			30			
II <sub>2ELL3B/P</sub>	DE	20	20	50	50			
II <sub>2E33P</sub>	FR	20	25		37			
II <sub>2HS3B/P</sub>	HU	25		30	30	25		
II <sub>2E3P</sub>	LU	20			50			
II <sub>2L3B/P</sub>	NL		25	50	50			
II <sub>2E3B/P</sub>	PL	20		37	37			
II <sub>2ELwL3B/P</sub>		20		37	37		20	13
II <sub>2ELwL3P</sub>		20			37		20	13
I <sub>2E(S);13P</sub>	BE	20	25		37			
I <sub>3P</sub>	IS				30			
I <sub>2H</sub>	LV	20						
I <sub>3B/P</sub>	MT			30	30			
I <sub>3B</sub>				30				



Non compliant gas pressure (Table 3.3 p. 21) may damage the appliance and be hazardous.

### Vertical pipes and condensate

- ▶ Vertical gas pipes must be fitted with siphon and discharge of the condensate that may form inside the pipe.
- ▶ If necessary, insulate the piping.

### LPG pressure reducers

With LPG the following must be installed:

- ▶ a first stage pressure reducer, close to the liquid gas tank;
- ▶ a second stage pressure reducer, close to the appliance.

## 3.10 COMBUSTION PRODUCTS EXHAUST



### Compliance with standards

The appliance is approved for connection to a type C combustion products exhaust duct for the sub-types shown in Table 1.1 p. 15.

### Flue gas exhaust connection

- ▶ Ø 80 mm (with gasket), on the left, at the top (Figure 1.2 p. 8).

### Combustion air intake fitting

- ▶ Ø 80 mm (with gasket),

on the left, at the top (Figure 1.2 p. 8).

#### Fume outlet

Some possible configurations are shown in the Figures 3.2 p. 22, 3.3 p. 23,

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**Figure 3.2** – Type C53 split wall flue gas exhaust

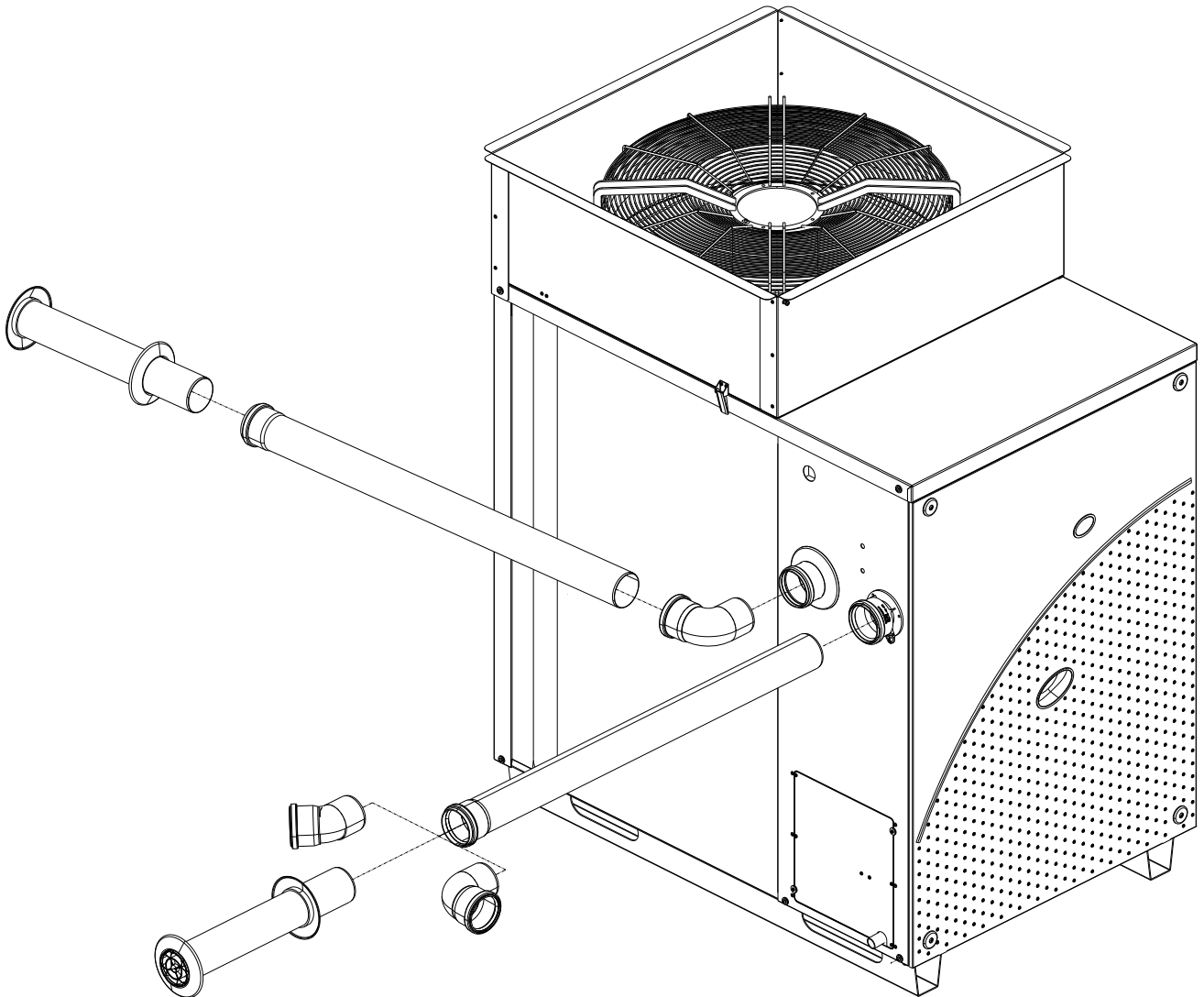
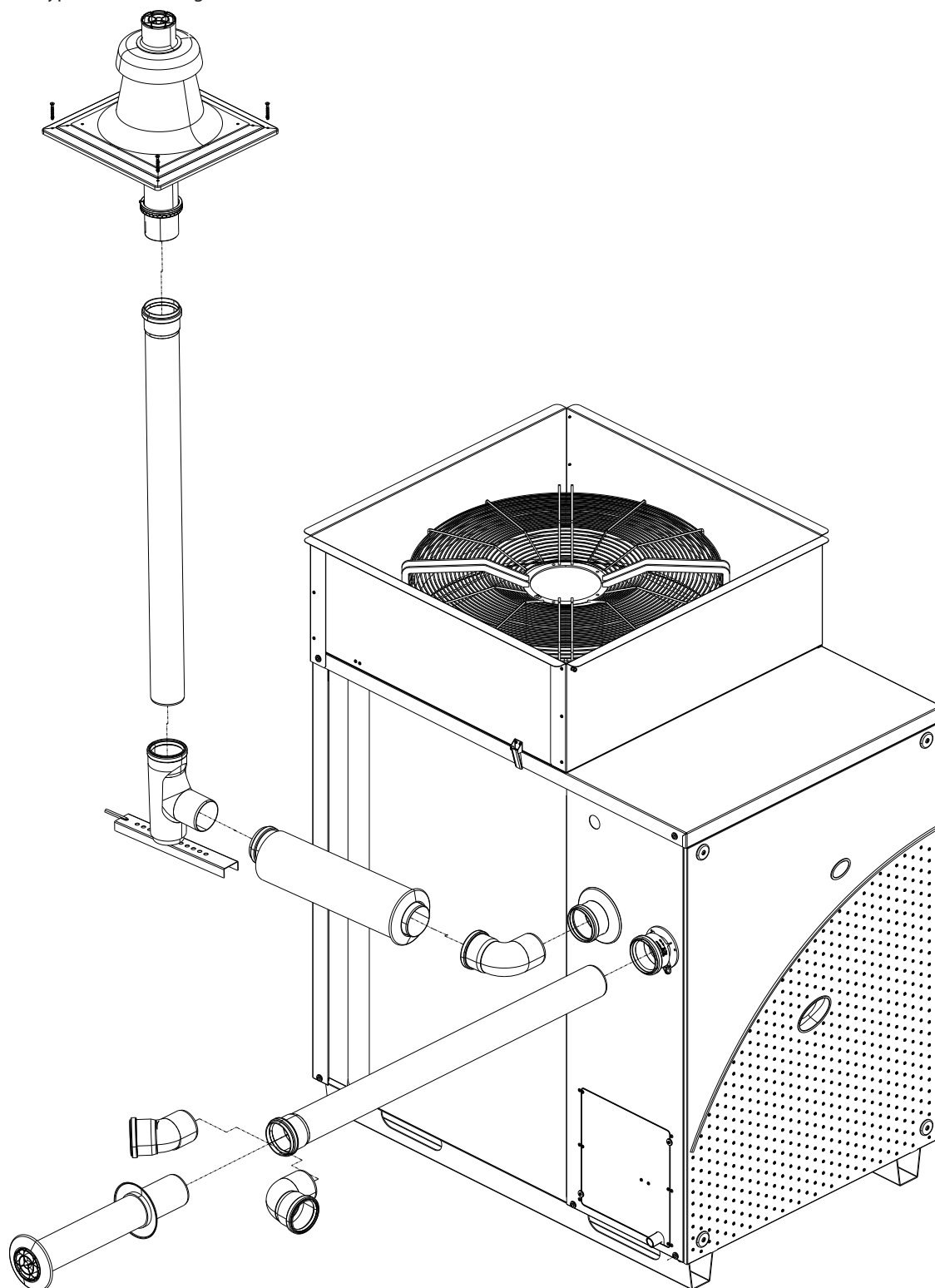


Figure 3.3 – Type C53 roof flue gas exhaust



#### Flue

- It is not admissible to connect several appliances to a single flue, but each appliance must have its own separate flue.
- To size the flue refer to Table 3.4 p. 24 and Design Manual.
- The flue must be designed, sized, tested and constructed by a skilled form, with materials and

components complying with the regulations in force in the country of installation.

- Always provide a socket for flue gas analysis, in an accessible position.



**Table 3.4** – Fumes temperature and flow

Gas type	Heating capacity	CO <sub>2</sub> (%)	TF (C°)	Fumes flow (kg/h)	Residual head (Pa)
G20	Nominal	9,10	65	42	80
	Minimum	8,90	46	21	80
G25	Nominal	9,10	63,6	42	80
	Minimum	8,90	45,7	21	80
G25.1	Nominal	10,10	65	45	80
	Minimum	9,60	46	23	80
G27	Nominal	9,0	64	42	80
	Minimum	8,5	46	21	80
G2.350	Nominal	9,00	62,7	42	80
	Minimum	8,70	46,8	22	80
G30	Nominal	10,40	65	43	80
	Minimum	10,10	46	22	80
G31	Nominal	9,10	65	48	80
	Minimum	8,90	46	24	80

### 3.11 FLUE GAS CONDENSATE DISCHARGE

The GAHP-A unit is a condensing appliance and therefore produces condensation water from combustion flue gases.



#### Condensate acidity and exhaust regulations

The flue gas condensate contains aggressive acid substances. Refer to applicable regulations in force for condensate exhaust and disposal.

- ▶ If required, install an acidity neutraliser of adequate capacity.



#### Do not use gutters to discharge the condensate

Do not discharge the fume condensate water in gutters, due to the risk of materials corrosion and ice formation.

#### Flue gas condensate connection

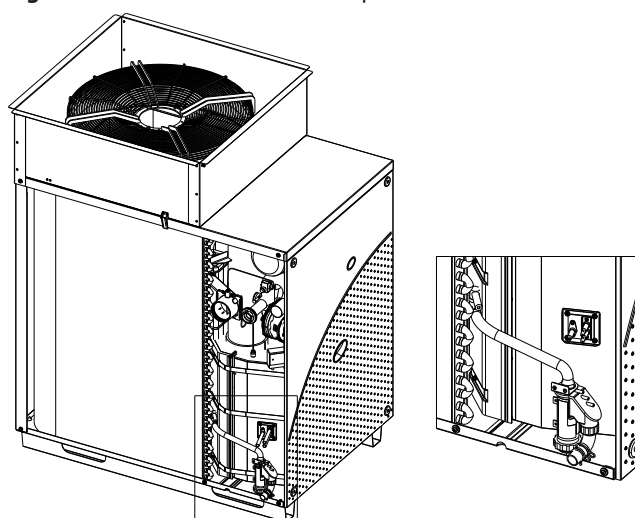
The fitting for flue gas condensate drain is located on the left side of the appliance (Figure 3.4 p. 24), accessible by removing the suitable hatch.

- ▶ The distance L between the sleeve and the base must not exceed 110 mm.
- ▶ The corrugated condensate discharge pipe must be connected to a suitable discharge manifold.
- ▶ The junction between the pipe and the manifold must remain visible.

#### Flue gas condensate discharge manifold

To make the condensate discharge manifold:

- ▶ Size the ducts for maximum condensation capacity (Table 1.1 p. 15).
- ▶ Use plastic materials resistant to acidity pH 3-5.
- ▶ Provide for min. 1% slope, i.e. 1 cm for each m of the length (otherwise a booster pump is required).
- ▶ Prevent freezing.
- ▶ Dilute, if possible, with domestic waste water (e.g. bathrooms, washing machines, dish washers...), basic and neutralising.

**Figure 3.4** – Condensate drain component

### 3.12 DEFROSTING WATER DRAINAGE



#### Defrosting

In winter, frost may form on the finned coil and the appliance performs defrosting cycles.

#### Collection basin and drainage system

- ▶ Provide for a collection basin or containment rim and a discharge system of the defrosting water, to avoid overflowing, icing and damage.

### 3.13 SAFETY VALVE DRAIN



The safety valve drain must be obligatorily ducted outside. Failure to comply with this provision jeopardises first switch on.



Do not install any shut off device on the exhaust duct between the safety valve and the outside exhaust.



### Safety valve drain ducting

The exhaust ducting, made in steel pipes (do not use copper or its alloys) must have the features set out in the Table 3.5 p. 25

**Table 3.5** – Safety valve drain ducting

Diameter	DN	Maximum length (m)
1" 1/4	32	30
2"	50	60



#### How to make the safety valve drain ducting

1. Remove the plastic cover on the appliance's left side panel.
2. Connect the drain duct, which must have an initial straight section of at least 30 cm, to the outlet;

3. Fasten the pipe to the nut on the safety valve outlet, taking care to place the Teflon seal supplied with the appliance in between;
4. Place the drain terminal outside the room, away from doors, windows and aeration vents, and at such a height that any coolant leaks cannot be inhaled by any people.

## 3.14 FAN AIR DUCTING

### Air duct

The appliance is fitted with a flange for connecting to a fan outlet air duct.

- Arrange removable fitting/bellows between the air duct and the appliance's flange, for fan maintenance operations.
- A pressure socket is provided to measure the pressure differential (see Figure 1.3 p. 9).

# 4 ELECTRICAL INSTALLER

## 4.1 WARNINGS



### General warnings

Read the warnings in Chapter III p. 4, providing important information on regulations and on safety.



### Compliance with installation standards

Installation must comply with applicable regulations in force, based on the installation Country and site, in matters of safety, design, implementation and maintenance of electrical systems.



Installation must also comply with the manufacturer's provisions.



### Live components

- After placing the appliance in the final position, and prior to making electrical connections, ensure not to work on live components.



### Earthing

- After placing the appliance in the final position, and prior to making electrical connections, ensure not to work on live components.
- It is forbidden to use gas pipes as earthing.



### Cable segregation

Keep power cables physically separate from signal ones.



### Do not use the power supply switch to turn the appliance on/off.

- Never use the external isolation switch (GS) to turn the appliance on and off, since it may be damaged in the long run (occasional black outs are tolerated).

- To turn the appliance on and off, exclusively use the suitably provided control device (DDC, CCP/CCI or external request).



### Control of water circulation pump

The water circulation pump of the hydraulic/primary circuit must mandatorily be controlled by the unit's electronic boards (S61 + Mod10). It is not admissible to start/stop the circulating pump with no enable from the appliance.

## 4.2 ELECTRICAL SYSTEMS

Electrical connections must provide:

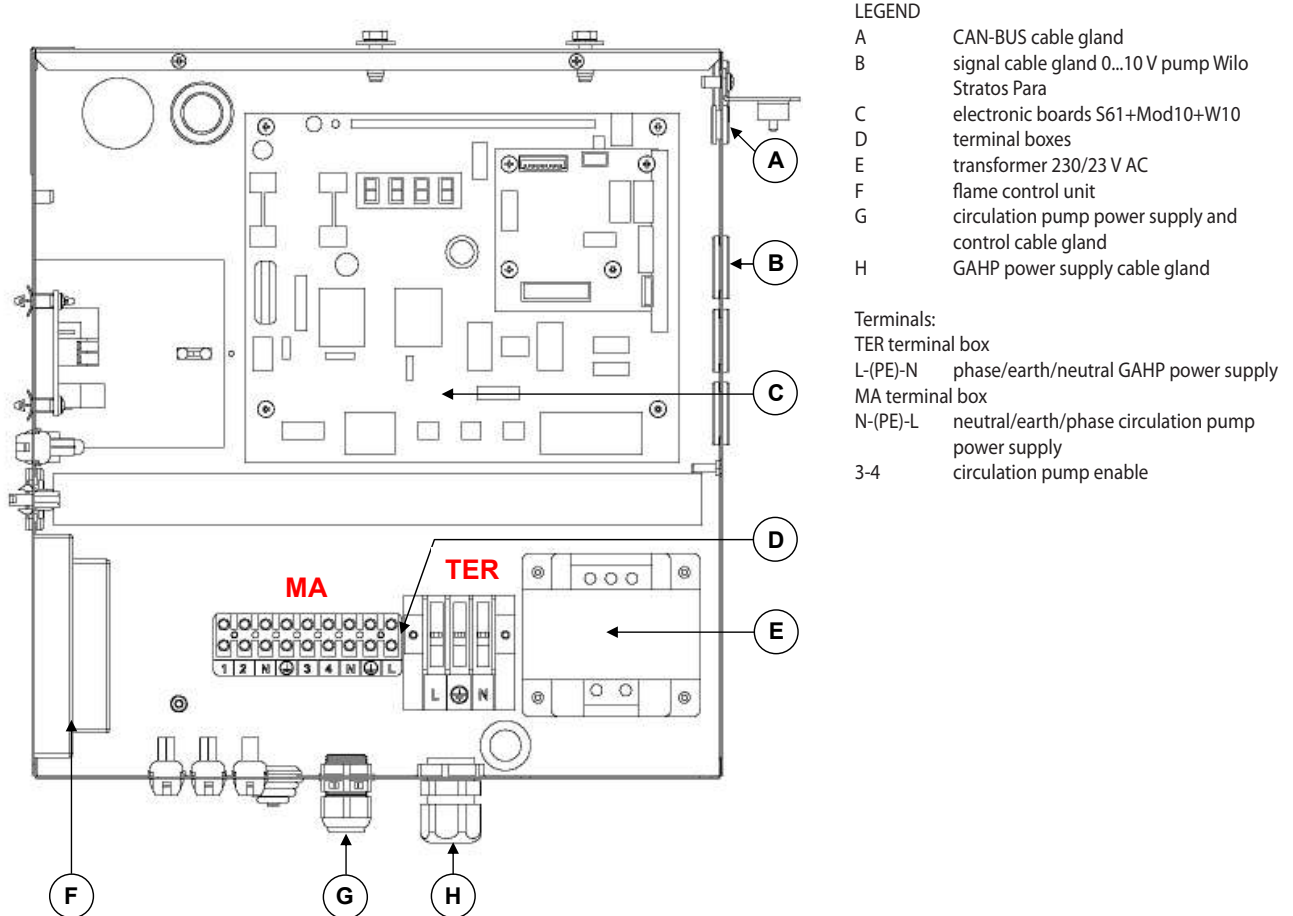
- (a) power supply (Paragraph 4.3 p. 26);
- (b) control system (Paragraph 1.5 p. 12).



### How to perform connections

All electrical connections must be made in the appliance's Electrical Board (Figure 4.1 p. 26):

1. Ensure the appliance's Electrical Panel is not live.
2. Remove the front panel of the appliance and the cover of the Electrical Board.
3. Run the cables through the suitable holes in the Connection Plate.
4. Run the cables through the suitable cable glands in the Electrical Board.
5. Identify the appropriate connection terminals.
6. Perform the connections.
7. Close the Electrical Panel and fit the front panel back on.

**Figure 4.1** – Electrical Panel GAHP-A


### 4.3 ELECTRICAL POWER SUPPLY

#### Power supply line

Provide (by the installer) a protected single phase line (230 V 1-N 50 Hz) with:

- ▶ **1 three-core cable** type **FG7(O)R 3Gx1,5**;
- ▶ **1 two-pole switch** with two **5A** type **T** fuses, (GS) or **one 10A magnetothermic breaker**.



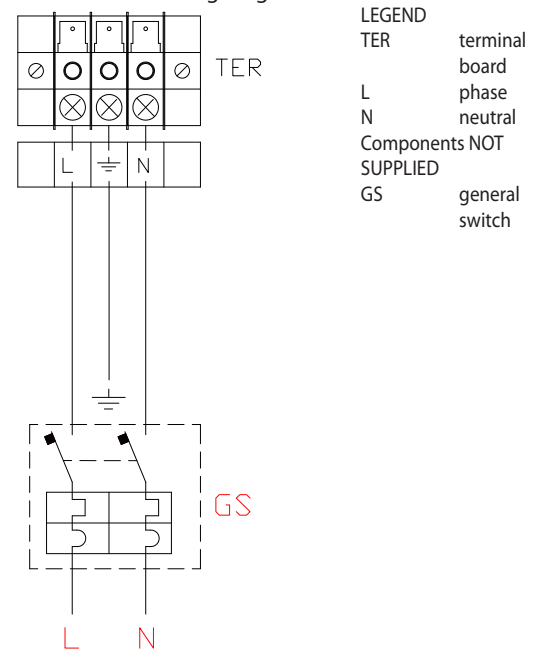
The switches must also provide disconnector capability, with min contact opening 4 mm.



#### How to connect the power supply

To connect the three-pole power supply cable (Figure 4.2 p. 26):

1. Access the Electrical Board of the appliance according to the Procedure 4.2 p. 25.
2. Connect the three lead-in wires to the terminal (TER) in the electrical panel on the machine.
3. Provide the earth lead-in wire longer than live ones (last to be torn in the event of accidental pulling).

**Figure 4.2** – Electrical wiring diagram


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

## 4.4 SET-UP AND CONTROL

### Control systems, options (1) (2) (3)

Three separate adjustment systems are provided, each with specific features, components and diagrams (see 4.4 p. 28, 4.5 p. 29):

- ▶ System (1), with **DDC control** (with CAN-BUS connection).
- ▶ System (2), with **CCP/CCI control** (with CAN-BUS connection).
- ▶ System (3), with an **external request**.

### CAN-BUS communication network

The CAN-BUS communication network, implemented with the cable of the same name, makes it possible to connect and

remotely control one or more Robur appliances with the DDC or CCP/CCI control devices.

It entails a certain number of serial nodes, distinguished in:

- ▶ intermediate nodes, in variable number;
- ▶ terminal nodes, always and only two (beginning and end);

Each component of the Robur system, appliance (GAHP, GA, AY, ...) or control device (DDC, RB100, RB200, CCI, ...), corresponds to a node, connected to two more elements (if it is an intermediate node) or to just one other element (if it is a terminal node) through two/one CAN-BUS cable section/s, forming an open linear communication network (never star or loop-shaped).

### CAN-BUS signal cable

The DDC or CCP/CCI controllers are connected to the appliance through the CAN-BUS signal cable, shielded, compliant to Table 4.1 p. 27 (admissible types and maximum distances).

**Table 4.1** – CAN BUS cables type

CABLE NAME	SIGNAL / COLOR			MAX LENGTH	Note
Robur					Ordering Code OCV0008
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	

For lengths  $\leq 200$  m and max 4 nodes (e.g. 1 DDC + 3 GAHP), a simple 3x0.75 mm shielded cable may even be used.

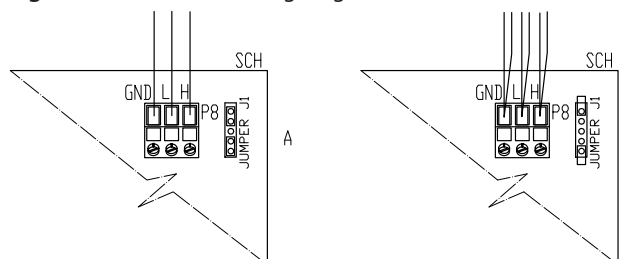


### How to connect the CAN BUS cable to the appliance

To connect the CAN-BUS cable to the S61 electronic board (Paragraph 1.5 p. 12), located in the Electrical Panel inside the unit, (Figure 4.3 p. 27 and 4.4 p. 28):

1. Access the Electrical Board of the appliance according to the Procedure 4.2 p. 25);
2. Connect the CAN-BUS cable to terminals GND, L and H (shielding/earthing + two signal conductors);
3. Place the CLOSED J10 Jumpers (Detail A) if the node is terminal (one connected CAN-BUS cable section only), or OPEN (Detail B) if the node is intermediate (two connected CAN-BUS cable sections);
4. Connect the DDC or the CCP/CCI to the CAN-BUS cable according to the instructions in the following Paragraphs and the DDC or CCP/CCI Manuals.

**Figure 4.3** – Electrical wiring diagram



#### LEGEND

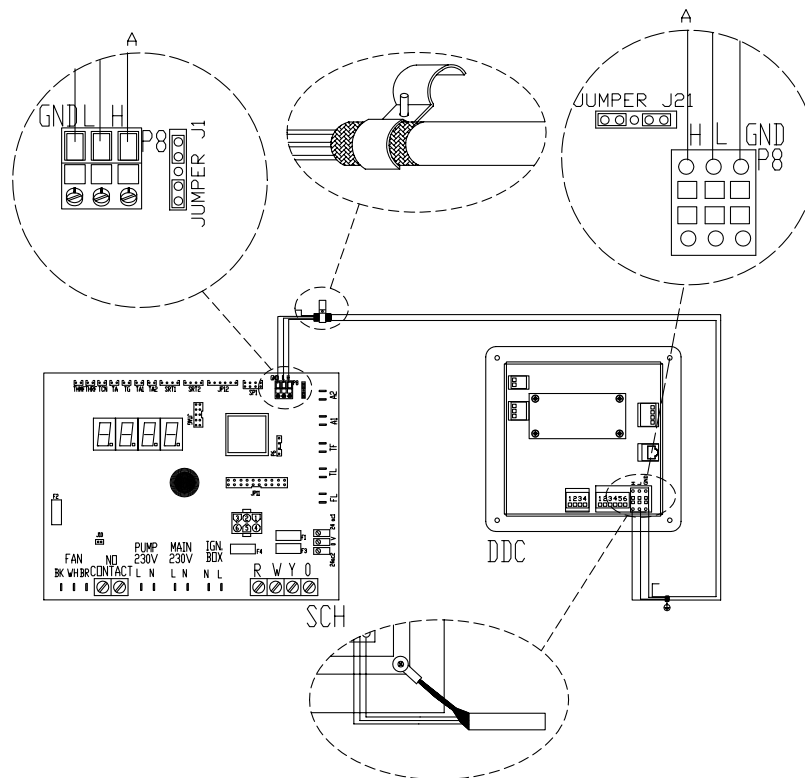
SCH	electronic board
GND	Common data
L	Data signal LOW
H	Data signal HIGH
J1	Jumper CAN-BUS in board
A	Detail case "terminal node" (3 wires; J1=jumper "closed")
B	Detail case "intermediate node" (6 wires; J1=jumper "open")
P8	Port can/connector

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

### GAHP Configuration (S61) + DDC or CCP/CCI

(Systems (1) and (2) see also Paragraph 1.7 p. 15)

**Figure 4.4** – 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)

#### External request

(System (3) see also Paragraph 1.7 p. 15)

It is required to arrange:

- request device (e.g. thermostat, clock, button, ...) fitted with a voltage-free NO contact.

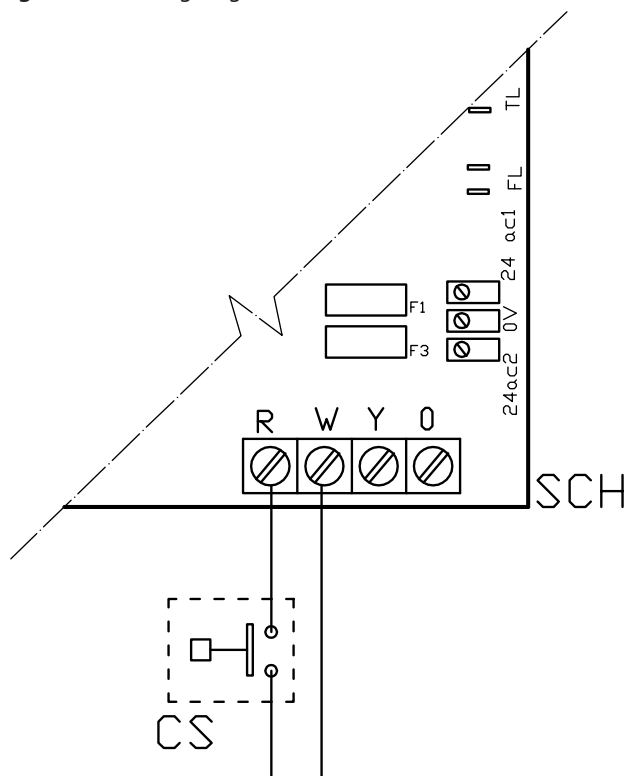


#### How to connect the external request

Connection of external request is effected on the S61 board located in the Electrical Panel inside the unit (Figure 4.5 p. 29):

1. Access the Electrical Board of the appliance according to the Procedure 4.2 p. 25.
2. connect the voltage free contact of the external device, through two conductor wires, to **terminals R and W** (respectively: common 24 V AC and heating enable) of electronic board S61 (Detail CS)

**Figure 4.5** – Wiring diagram, external enable connection



#### 4.5 WATER CIRCULATION PUMP

#### 4.5.1 Option (1) CONSTANT FLOW circulating pump

It must be mandatorily controlled from the S61 electronic board. The diagram in Figure 4.6 p. 29 is for pumps < 700 W. For pumps > 700 W it is required to add a control relay and arrange Jumper J10 OPEN.

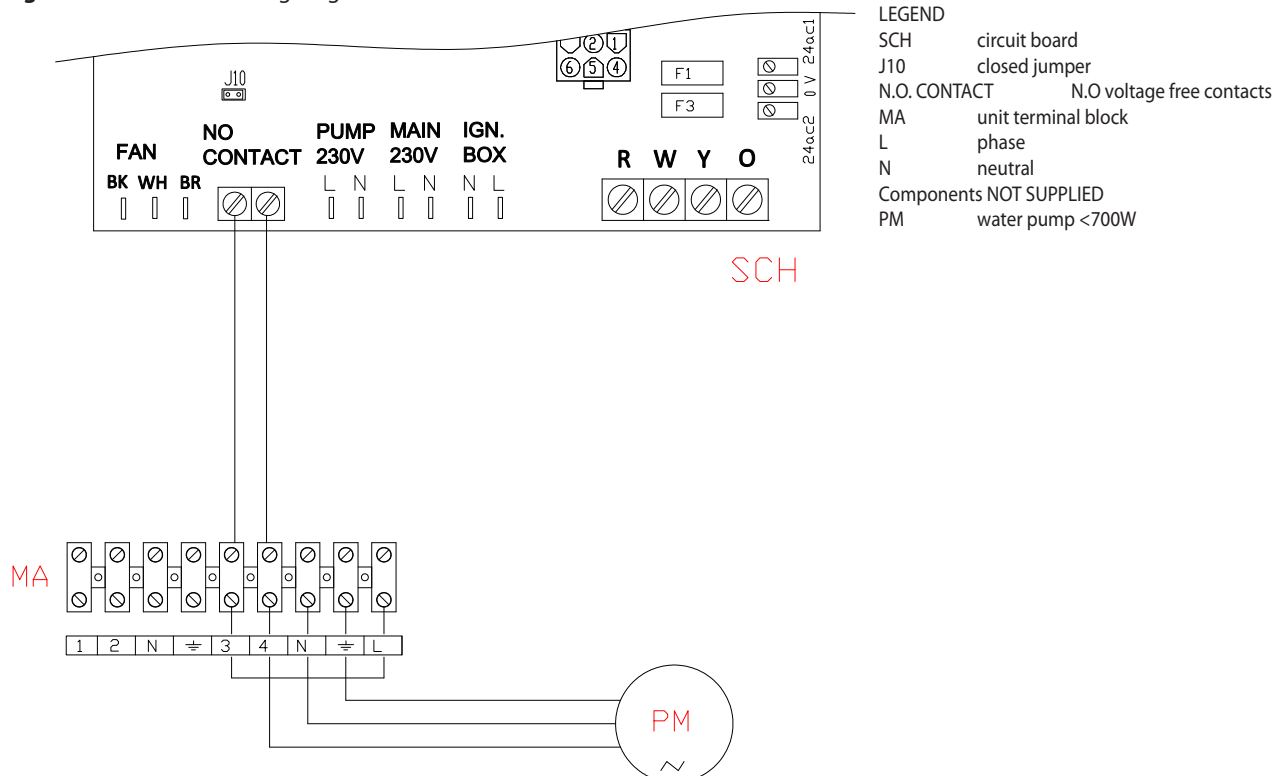


### How to connect the CONSTANT FLOW circulating pump

Access the Electrical Board of the appliance according to the Procedure 4.2 p. 25

1. connect board S61, to terminals 3-4 of terminal board (MA);
2. Jumper J10 CLOSED.

**Figure 4.6 – Electrical wiring diagram**



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

#### 4.5.2 Option (2) VARIABLE FLOW circulating pump

It must be mandatorily controlled from the Mod10 electronic board (built into the S61).



##### How to connect the VARIABLE FLOW circulating pump

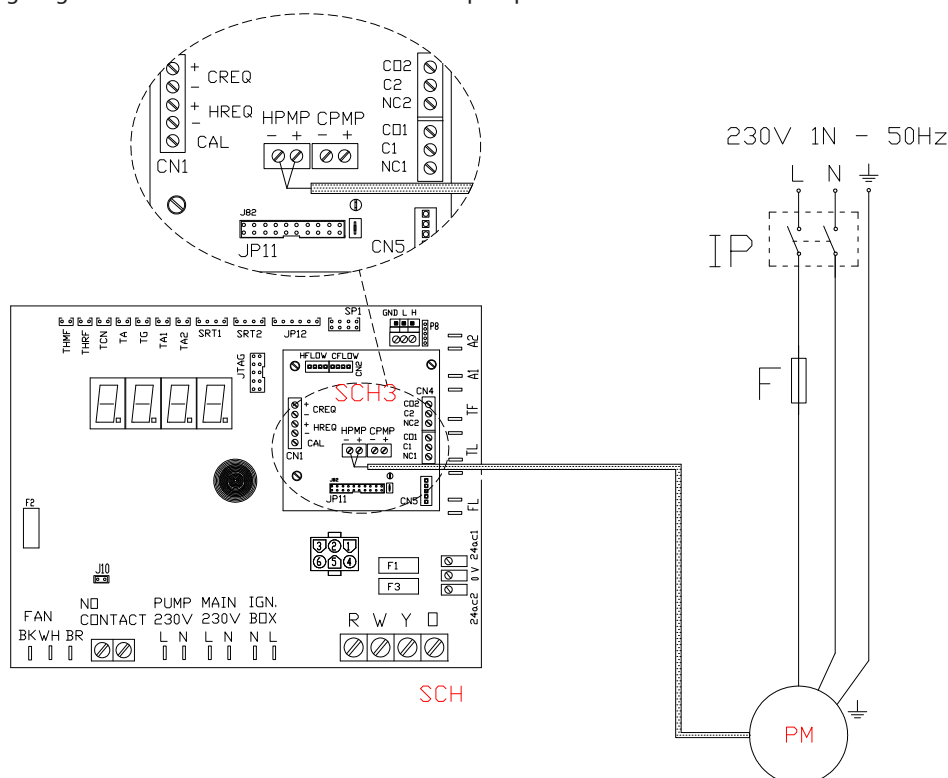
The Wilo Stratos Para pump is already standard supplied with the power supply cable and signal cable, both 1.5m long.

For longer distances, use respectively cable FG7 3Gx1.5mm<sup>2</sup> m and shielded cable 2x0.75 mm<sup>2</sup> suitable for 0-10V signal.

To connect the Wilo Stratos Para pump (Figure 4.7 p. 30 J 45 or 4.8 p. 31 J 46)

1. Connect the brown wire of the pump to terminal "-" HPMP of the Mod10 board, and the white wire of the pump to terminal "+" HPMP of the Mod10 board.
2. Isolate the black wire and the blue one.
3. Protect the pump's supply line with a double pole switch with 2 A delayed fuse (Detail IP, Figure 4.7 p. 30 J 45), or connect it directly to the terminals inside the appliance's Electrical Board (Detail MA, Figure 4.8 p. 31 J 46).

**Figure 4.7** – Wiring diagram for connection of Wilo variable rate pumps



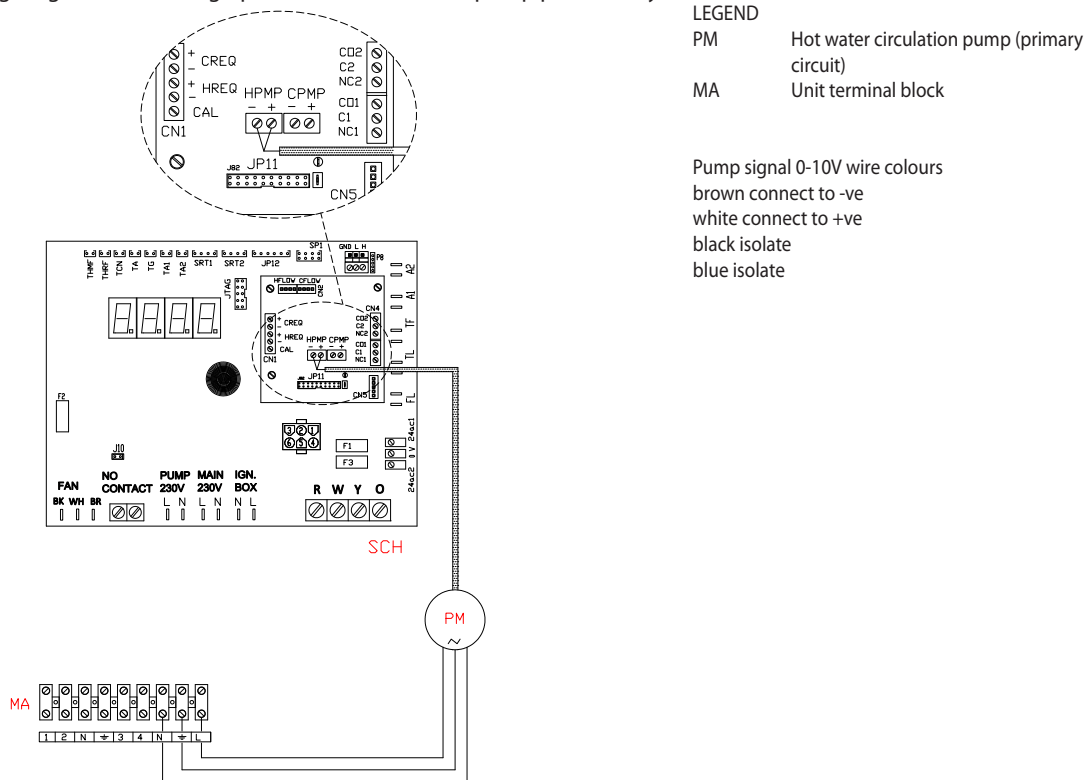
##### LEGEND

- IP Bipolar pump power switch  
F Fuse  
PM Hot water circulation pump (primary circuit)

##### Pump signal 0-10V wire colours

- brown connect to -ve  
white connect to +ve  
black isolate  
blue isolate

Wiring diagram for connection of Wilo variable rate pumps

**Figure 4.8** – Wiring diagram for hooking up the Wilo variable rate pump powered by the unit

Wiring diagram for hooking up the Wilo variable rate pump powered by the unit

## 5 FIRST START-UP



First start-up entails checking/adjusting the combustion parameters and may only be carried out by a TAC-Robur. NEITHER the user NOR the installation technician is authorised to perform such operations, under penalty of voiding the warranty.

### 5.1 PRELIMINARY CHECKS

#### Preliminary checks for First start-up

Upon completing installation, before contacting the TAC the installer must check:

- ▶ water-heating, electrical and gas systems suitable for the required capacities and equipped with all safety and control devices required by the regulations in force;
- ▶ absence of leaks in the water and gas systems;
- ▶ type of gas for which the appliance is designed (methane or LPG);
- ▶ supply gas pressure complying with the values of Table 3.3 p. 21, with max tolerance  $\pm 15\%$ ;
- ▶ Power supply mains complying with the appliance's rating plate data;
- ▶ appliance correctly installed, according to the manufacturer's instructions;
- ▶ system installed in a workmanlike manner, according to national and local regulations.

#### Abnormal or hazardous installation situations

Should any abnormal or hazardous installation situations be found, the TAC shall not perform First start-up and the appliance shall not be commissioned.

These situations may be:

- ▶ appliance installed inside a room that has no sufficiently wide aeration vents;
- ▶ appliance installations other than type C;
- ▶ failed compliance with minimum clearances;
- ▶ insufficient distance from combustible or flammable materials;
- ▶ conditions that do not warrant access and maintenance in safety;
- ▶ appliance switched on/off with the main switch, instead of the control device provided (DDC, CCP/CCI or external request);
- ▶ appliance defects or faults caused during transport or installation;
- ▶ gas smell;
- ▶ non-compliant mains gas pressure;
- ▶ non-compliant flue gas exhaust;
- ▶ all situations that may involve operation abnormalities or are potentially hazardous.



**Non-compliant system and corrective actions**

Should the TAC find any non conformities, the user/installer is bound to perform any corrective procedures required by the TAC.

After performing the remedial actions (the installer's responsibility), if the TAC deems that safety and conformity conditions are in place, "First start-up" may be effected.

## 6 NORMAL OPERATION

This section is for the end user.

### 6.1 WARNINGS

**General warnings**

Prior to using the appliance carefully read the warnings in Chapter III p. 4, providing important information on regulations and on safety.

**First start-up by TAC**

First start-up may exclusively be carried out by a Robur TAC (Chapter 5 p. 31).

**Never power the appliance off while it is running**

NEVER power the appliance off while it is running (except in the event of danger, Chapter III p. 4), since the appliance or system might be damaged.

### 6.2 SWITCH ON AND OFF

**Routine switching on/off**

The appliance may exclusively be switched on/off by means of the suitably provided control device (DDC, CCP/CCI or external requests).

**Do not Switch On/Off with the power supply switch**

Do not switch the appliance on/off with the power supply switch. This may be harmful and dangerous for the appliance and for the system.

**Inspections before switching on**

Before switching on the appliance, ensure that:

- ▶ gas cock open;
- ▶ appliance electrical power supply (main switch (GS) ON);
- ▶ DDC or CCP/CCI power supply (if present);
- ▶ water circuit ready.

**How to switch on/off**

- ▶ If the appliance is controlled by a DDC or by a CCP/CCI (systems (1) and (2) see Paragraph 1.7 p. 15), refer to the respective manuals.
- ▶ If the appliance is controlled by external request (e.g. thermostat, clock, button, ... with voltage-free NO contact), (system (3) see Paragraph 1.7 p. 15), the appliance is switched on/off by the ON/OFF positions of the external control device.

After switching on with the control, in normal operating conditions, the appliance starts/stops automatically according to the

user's thermal needs, supplying hot water at the programmed temperature.



Although the external request is in the "ON" position, this does not mean the appliance will start immediately, but it will only start when there are actual service demands.

### 6.3 MESSAGES ON THE DISPLAY

**4 digit display**

The S61 board of the appliance (Paragraph 1.5 p. 12, Figure 6.1 p. 33) is fitted with a 4-digit display, visible through the sight glass of the front panel.

- ▶ When the appliance is powered on, all the LEDs switch on for 3 sec, then the S61 board name is displayed.
- ▶ After another 15 sec, the appliance is ready to operate.

**Signals in normal operation**

- ▶ During normal operation, water temperature values alternate on the display: output, input and the difference between the two.

**Signals in the event of fault**

In the event of fault the display blinks indicating an operational code (first letter on the display: "E" = error, or "U" = warning)

- ▶ If it is only a temporary warning, the appliance may continue working.
- ▶ If it is a permanent error or warning the appliance stops (Table 8.1 p. 36).

### 6.4 ELECTRONIC ADJUSTMENT ON THE MACHINE – MENUS AND PARAMETERS OF THE S61 BOARD

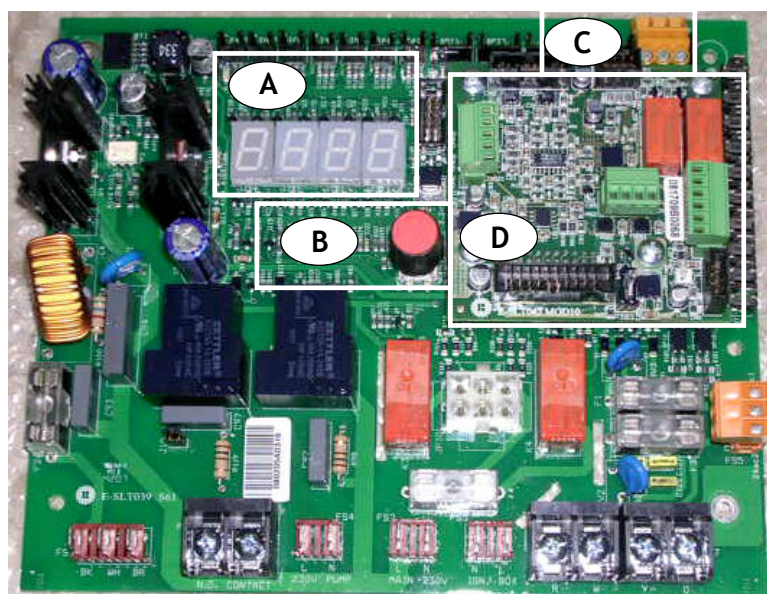
**Firmware**

The instructions on the use of the S61 electronic board concern the **firmware version 3.028**.



## The appliance's electronic board (S61)

Figure 6.1 – GAHP unit electronic board



### LEGEND

- A 4 digit display
- B Knob
- C CAN port
- D Mod10 controller

S61 + Mod10

### Display

The 4-digit display of the S61 board (Detail A Figure 6.1 p. 33) is as follows:

- ▶ the first digit on the left, green) indicates the menu number (e.g. "0.", "1.", "2.", ... "8.");
- ▶ the **last three digits** (on the right, red) indicate a **code** or a **value for a parameter, among those included in the selected menu** (e.g. "\_6" "\_20", "161").

(e.g. menu+parameter "1.\_6", "2.\_20", "3.161").

### Knob

One of the following actions may be done with the S61 board knob (Detail B in Figure 6.1 p. 33):

- ▶ Enter the menu list (by pressing the first time);
- ▶ Scroll the menu list, or a series of parameters in a menu (by turning);
- ▶ Select a menu or a parameter (by pressing);
- ▶ Modify and confirm the setting of a parameter (turning and pressing);
- ▶ Execute a command (by pressing);
- ▶ Exit a menu and go back to the higher level by selecting the letter "E" which is displayed at the end of the menu list or of a series of parameters in a menu.

The letter "E" is displayed at the end of the menu list or of a series of parameters in a menu, and indicates the exit to go back to the higher level by pressing the knob.

### Menus and Parameters

The menus may be display only (functional data or parameters), display and setting (parameters) or control (reset)

**Menu for the user** (but for the installer and TAC as well)

- ▶ the menu "0.", display only, for functional data detected in real time;
- ▶ the menu "1.", display only, for current values of appliance parameters;

- ▶ menu "2.", control, to execute flame control unit reset operations, reset errors (Paragraph 6.6 p. 34);
- ▶ menu "3.", display and setting, to set the value of some system parameters (e.g. water set point temperature); the values are initialised by the TAC at First Switch-On.

It is accessed without password.

**Menu for the installer or TAC** (not accessible to the user)

- ▶ Menu "4.", "5." and "6." are password-protected. These are specific sections, exclusively intended for skilled personnel (installer or TAC). For information see the technical Assistant Manual.
- ▶ Menu "7." is display only and intended for the manufacturer.
- ▶ Menu "8." is empty, it may be selected but not used.



### Special key for the knob

- ▶ To access the menus and parameters of the S61 board, use the special standard supplied key, fastened on the gas pipe above the Electrical Panel. The key allows the knob to be operated through the suitable hole in the Electrical Panel cover, operating safely away from live components.
- ▶ Always keep the key for future uses.



### How to access the Menus and Parameters

Before Starting:

- (1) Power supply switch "ON";
- (2) Display of the S61 board showing in sequence the detected water temperature data (if the appliance is in normal operation), or the flashing malfunction and failure codes (if the appliance is in failure).

To access the menus and parameters of the S61 board, proceed as follows (see also Figure 6.1 p. 33):

1. Remove the front panel by removing the fixing screws.

2. Remove the cover of the electrical board to access the S61 board knob.
  3. Act on the knob by means of the special key through the suitable hole.
  4. Press the knob once to display the menus: the first menu is displayed, "0." (= menu 0).
  5. Turn the knob clockwise to scroll down and display the other/subsequent menus; the menu numbers will be displayed in order, "1.", "2.", ... , "6." ... or "E" (= exit).
  6. Select the menu of interest (e.g. display "2.\_\_\_\_" = menu 2) by pressing the knob; the first parameter code will be displayed, in menu order (e.g. display "2.\_20" = parameter 20 in menu 2).
  7. Turn the knob clockwise to scroll down the other parameters in the menu; the codes will be displayed in order (e.g. display "2.\_20", "2.\_21", ... "2.\_25" = parameters 20, 21, ... 25 in menu 2), or letter "E" (= exit) at the end of the list. "
  8. Select the parameter of interest (e.g. with code 161 in menu 3) by pressing the knob; the figure previously assigned to the parameter will be displayed, read only or to be set (e.g. the figure "45" for parameter 161 in menu 3 = water temperature set-point at 45 °C); if instead of a figure/setting it is a command, a flashing code is displayed (e.g. "reS1" for the flame block reset command).
  9. Press the knob to reconfirm the figure; or rotate the knob to modify the figure, and press at the end to confirm or set the new figure; if however, it is a matter of controlling an appliance operation, press the knob to execute it.
  10. To exit a parameter menu or the menu list and go back to the higher level, turn the knob to display the letter "E" for exit, then press the knob again.
  11. Place the cover back on the electrical panel opening and fit the appliance's front panel back on.
- °C); to reconfirm the pre-existing value press the knob again, otherwise go to point 3.
3. Turn the knob to modify the value, increasing or decreasing it, and press it to set the new value;
  4. Exit menu 3, and from the menu list, by selecting and pressing letter "E" twice, and go back to the normal display of detected temperature data.



#### Do not modify complex settings

Specific technical and system knowledge is required for complex settings. Contact a TAC.

## 6.6 RESTARTING A LOCKED-OUT UNIT - RESET

### Fault signals on the display

In the event of locked-down appliance, an operational code flashes on the display (first green figure on the left, letter "U" = warning or "E" = error).

- To restart the appliance you must know and perform the procedure concerning the issue signalled and identified by the code (Paragraph 8.1 p. 36).
- Only act if you are familiar with the issue and with the procedure (technical expertise and professional qualifications might be required).
- If you do not know the code, the problem, or the procedure, or you do not have sufficient skills, and in any case of doubt, contact the TAC.

### Locked-down appliance

An external intervention (reset or repair) is required due to an appliance fault or problem with the system.

- A reset may be enough for a temporary and provisional anomaly.
- For a fault or breakdown, alert the maintenance technician or TAC.

### Reset

There are two options for resetting a fault:

(1) If the appliance is connected to a DDC or to a CCP/CCI you may act through the control device, as described in the relevant manual.

(2) You may act directly from the S61 board as described below (if the appliance is controlled with external request, this is the only option).



### How to perform reset from the S61 board

To perform the reset directly from the S61 board:

1. Access Menu 2 under Parameter "\_20", to reset flame block (Error E412), or Parameter "\_21", for any other generic reset, turning and pressing the knob; "2.\_20"/"2.\_21" must be displayed (procedure Paragraph 6.4 p. 32);
2. Press the knob to display the flashing reset request (e.g. "reS1" to reset flame block).
3. Press the knob again (the second time) to perform the reset; the reset request stops flashing, then "2.\_XX" is displayed again (e.g. "2.\_20"). The reset operation has been performed.
4. Exit menu 2 and the menu list, by selecting and pressing letter "E" twice, and go back to the normal display of detected temperature data.

## 6.5 MODIFYING SETTINGS



### Modify the settings through the DDC or CCP/CCI

If the appliance is connected to the DDC or to the CCP/CCI control, refer to the relevant manual to modify settings.

### How to raise/lower the water temperature set-point

The water temperature set-point establishes the delivery temperature to the system (water output from the appliance), or return from the system (water input in the appliance). The temperature is pre-set by the TAC upon First Switch-On.



If the appliance is not connected to a DDC or CCP/CCI control, to raise/lower the water temperature set-point with the S61 board, proceed as follows:

1. Access menu 3 under parameter 161 (= water temperature set-point) by rotating and pressing the knob; "3.161" must be displayed (procedure Paragraph 6.4 p. 32);
2. Display the parameter value by pressing the knob; the previously set value is displayed (from 10 to 65

## 6.7 EFFICIENCY

For increased appliance efficiency:

- Keep the finned coil clean;
- Adjust the maximum water temperature to the actual system requirements;
- Reduce repeated switch-ons to the minimum (low loads);
- Program appliance activation for actual periods of use;
- Keep water and air filters on plumbing and ventilation systems clean.

## 7 MAINTENANCE

### 7.1 WARNINGS



Correct maintenance prevents problems, assures efficiency and keeps running costs low.



Maintenance operations described herein may exclusively be performed by the TAC or skilled maintenance technician.



Any operation on internal components may exclusively be performed by the TAC.



Before performing any operation, switch off the appliance by means of the control device (DDC, CCP/CCI or external request) and wait for the end of the switching off cycle, then disconnect power and gas supply, by acting on the electrical disconnecter and gas cock.



The efficiency checks and every other "check and maintenance operation" (see Tables 7.1 p. 35 and 7.2 p. 35) must be performed with a frequency according to current regulations or, if more restrictive, according to the provisions set forth by the manufacturer, installer or TAC.



Responsibility for efficiency checks, to be carried out for the aims of restricting energy consumption, lies with the system manager.



#### Heavy-duty use

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

### 7.2 PRE-EMPTIVE MAINTENANCE

- For pre-emptive maintenance, comply with the recommendations in Table 7.1 p. 35.

Table 7.1

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 <sub>2</sub>	√	√	√		
check gas pressure to the burners				√	√
Check that the condensate discharge is clean [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 for every DDC or CCI	DDC or CCI				
Check that the plant is able to achieve the setpoint temperature	√				
Download the hystorical 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].

### 7.3 SCHEDULED ROUTINE MAINTENANCE

- For scheduled routine maintenance, perform the operations in Table 7.2 p. 35, at least once every 2 years.

Table 7.2

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	√	√	√	√	√

SCHEDULED MAINTENANCE OPERATIONS	TO BE PERFORMED AT LEAST ONE EVERY TWO YEARS				
Check that the condensate discharge is clean	√	√	√		
Replace the silicone gasket between the front plate and the exchanger			√		

\*Only in case the analysis of combustion products is non-compliant

## 7.4 PERIODS OF INACTIVITY



### Avoid emptying the water system

Emptying the system may cause damage due to corrosion of the water pipes.



### Deactivate the system in winter

Should you intend to stop the appliance in the winter season, ensure at least one of the following conditions:

1. anti-icing function active (Paragraph 3.5 p. 20);
2. sufficient anti-icing glycol (Paragraph 3.6 p. 20).

### Prolonged periods of inactivity

- Should you foresee to leave the appliance inactive for a long period of time, disconnect it from the electrical and gas mains. These operations must be performed by Qualified Personnel.



### How to deactivate the appliance for long periods of time

1. Switch the appliance off (Paragraph 6.2 p. 32).
2. Only when the appliance is completely off, power it off with the main switch/disconnector switch (Detail GS in Figure 4.2 p. 26).
3. Close the gas valve

4. If necessary, add water with glycol (if the appliance is disconnected from the power and gas mains, the active anti-icing protection is missing, Paragraph 3.5 p. 20).



### How to reactivate the appliance after long periods of inactivity

Before reactivating the appliance, the operator/maintenance technician of the system must first of all:

- Check whether any maintenance operations are required (contact the TAC; see Paragraphs 7.2 p. 35 and 7.3 p. 35).
- Check content and quality of the water in the system, and if necessary top it up (Paragraphs 3.8 p. 21, 3.7 p. 20 and 3.6 p. 20 ).
- Ensure the flue gas exhaust duct is not obstructed, and that the condensate drain is clean.

After completing the above checks:

1. Open the gas cock and ensure there are no leaks; should gas smell be noticed, close the gas cock again, do not switch any electrical devices on and request intervention by Skilled Personnel.
2. Power on with the main power supply switch (GS, Figure 4.2 p. 26).
3. Switch on the appliance by means of the provided control device (DDC, CCP/CCI or external request, Paragraph 4.4 p. 27).

## 8 DIAGNOSTICS

### 8.1 OPERATIVE CODES

**Table 8.1** – Operative Codes

CODES	DESCRIPTION	Warning (u)	Error (E)
400	FAULT ON RESET CIRCUIT OF FLAME CONTROL UNIT	NA	Power cycle the appliance. If the code persists, shows up again or in case of doubt, contact the TAC.
401	GENERATOR LIMIT THERMOSTAT TRIP	Contact authorised Technical Assistance	
402	FLUE GAS THERMOSTAT TRIP	Contact authorised Technical Assistance	
405	AMBIENT TEMPERATURE EXCEEDING OPERATIVE LIMITS	NA	Reset is automatic when the triggering condition ceases.
406	AMBIENT TEMPERATURE LOWER THAN OPERATIVE LIMITS	Non-blocking Warning (informative code). The code is reset automatically when the triggering condition ceases.	NA
407	GENERATOR TEMPERATURE HIGH	Reset is automatic when the triggering condition ceases.	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
408	FLAME CONTROL UNIT ERROR	NA	Contact authorised Technical Assistance
410	INSUFFICIENT WATER FLOW	Reset is automatic when the triggering condition ceases.	Check and clean water filters on the system. Check for air in the system. Check water flow pump. Power cycle the appliance. Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.



CODES	DESCRIPTION	Warning (u)	Error (E)
411	INSUFFICIENT ROTATION OF OIL PUMP	Reset occurs automatically 20 minutes after the code is generated.	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
412	FLAME CONTROLLER UNIT ARREST	Reset is automatic up to 4 attempts (in about 5 minutes).	Gas supply check. Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 20). If the code persists or in case of doubt, contact the TAC.
416	FAULTY HOT OUTLET WATER TEMPERATURE PROBE	NA	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
417	FAULTY HOT OUTLET WATER INLET TEMPERATURE PROBE	NA	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
420	FAULTY GENERATOR TEMPERATURE PROBE	NA	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
422	FAULTY WATER FLOWMETER	NA	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
423	FAULTY AIR/GAS MIXTURE TEMPERATURE PROBE	NA	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
424	FUMES TEMPERATURE SENSOR FAULT	Reset is automatic when the triggering condition ceases.	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
425	CONDENSATE DISCHARGE CLOGGED	NA	Check and clean condensate discharge. Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
426	GENERATOR FIN TEMPERATURE SENSOR MALFUNCTION	Reset is automatic when the triggering condition ceases.	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
428	GAS SOLENOID VALVE EXCITED DURING FLAME CONTROLLER ARREST	NA	Power off the appliance. Contact authorised Technical Assistance.
429	GAS SOLENOID VALVE WITHOUT ELECTRICAL POWER	Reset occurs automatically if the gas solenoid valve switches on again within 10 minutes (with central flame control unit on).	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
430	GENERATOR FINS TEMPERATURE HIGH	Reset is automatic when the triggering condition ceases.	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
431	WATER TEMPERATURE EXCEEDING OPERATIVE LIMITS	Check configuration of other heat generators on the system. Check water flow. Check system thermal load. Reset is automatic when the triggering condition ceases.	NA
434	POSSIBLE SOURCE ANOMALY	Check if the fan is rotating freely. Contact the TAC.	NA
436	BLOWER FAULT	Reset occurs automatically 20 minutes after the code is generated.	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
437	LOW AIR-GAS MIXTURE TEMPERATURE	NA	Reset is automatic when the triggering condition ceases.
444	FAULTY EVAPORATOR TEMPERATURE PROBE	NA	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
446	HIGH HOT INLET WATER TEMPERATURE	Check configuration of other heat generators on the system. Reset is automatic and occurs if the generating condition ceases with circulating pump on or 20 minutes after the code is generated with circulating pump off.	NA
447	HOT INLET WATER TEMPERATURE LOWER THAN OPERATIVE LIMITS	Reset occurs automatically when the generating cause resolves or 430 seconds after the code is generated.	Reset occurs automatically when the condition that generated the code ceases. If the code shows up again or in case of doubt contact the TAC.
448	HIGH HOT WATER DIFFERENTIAL TEMPERATURE	Check water flow. Reset occurs automatically 20 minutes after the code is generated.	Reset occurs automatically when the condition that generated the code ceases. If the code shows up again or in case of doubt contact the TAC.

CODES	DESCRIPTION	Warning (u)	Error (E)
449	SATELLITE BOARD NOT PRESENT	NA	Contact authorised Technical Assistance.
452	DEFROSTING FUNCTION ACTIVATED	Non-blocking Warning (informative code). The code clears automatically when execution of defrosting ends.	NA
453	WATER FLOW IN THE PASSIVE HOT MODULE	Reset is automatic when the triggering condition ceases.	NA
478	HIGH HOT OUTLET WATER TEMPERATURE	Reset is automatic when the triggering condition ceases.	NA
479	DEFROST FUNCTION ACTIVATED	Non-blocking Warning (informative code). The code clears automatically when anti-icing function execution ends.	NA
80/480	INCOMPLETE OR INVALID PARAMETERS	Contact authorised Technical Assistance.	
481	INVALID P0 PARAMETERS	Reset is automatic when the triggering condition ceases.	Contact authorised Technical Assistance.
482	INVALID P1 PARAMETERS	Reset is automatic when the triggering condition ceases.	Contact authorised Technical Assistance.
484	FAULTY TRANSFORMER CONNECTION OR 24 V AC FUSES	NA	Contact authorised Technical Assistance.
485	INCORRECT MODULE TYPES	NA	Contact authorised Technical Assistance.
486	FAULTY BOARD, ROM	NA	Contact authorised Technical Assistance.
487	FAULTY BOARD, pRAM	NA	Contact authorised Technical Assistance.
488	FAULTY BOARD, xRAM	NA	Contact authorised Technical Assistance.
489	FAULTY BOARD, REG.	NA	Contact authorised Technical Assistance.
490	FAULTY AMBIENT TEMPERATURE PROBE	NA	Reset may be performed from the DDC/CCI or from the S61 board (menu 2, parameter 21). If the code persists, shows up again or in case of doubt, contact the TAC.
491	CONTROLLER DEFECTIVE	NA	Contact authorised Technical Assistance.

NA = non applicable

## APPENDICES

### 1 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. Via Miramare, 15 Milan-Italy

Jvan Benzoni  
R&D Director  
Robur S.p.A.

coscienza ecologica caring for the environment

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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.

## Robur mission

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.



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