1 SPECIFICATION OF SUPPLY

The Gitié ACAY group consists of a GA ACF chiller and a AY00-120 condensing boiler.
For the specifications of supply of the individual units making up the group refer to Section B05 (GA ACF) and Section B06 (AY00-120).

1.1 ACAY INTEGRATED PACKAGE FEATURES

The Gitié ACAY group is available in the following versions (Picture 2.5 *p. 4*):

- **Version /4 C0 (standard or silenced)**
- **Version /4 C1 (standard or silenced)**
- **Version /2 C0 (standard or silenced)**
- **Version /2 C1 (standard or silenced)**

In 4-pipe versions units operation may be simultaneous or independent.
The Table 1.1 *p. 1* shows the features of the various versions in detail.

Table 1.1 *Gitié ACAY package versions*

Version	Pipes	Circulating pumps	Motorised 2-way valves	Hydraulic circuits	Simultaneous operation	Fan
/4 C0	4	No	No	independent	Yes	standard
/4 C0 S	4	No	No	independent	Yes	silenced
/4 C1	4	Yes	No	independent	Yes	standard
/4 C1 S	4	Yes	No	independent	Yes	silenced
/2 C0	2	No	Yes	single	No	standard
/2 C0 S	2	No	Yes	single	No	silenced
/2 C1	2	Yes	No	single	No	standard
/2 C1 S	2	Yes	No	single	No	silenced

2 FEATURES AND TECHNICAL DATA

2.1 DIMENSIONS

Figure 2.1 *Dimensions (Standard ventilation) - Front and side view (dimensions in mm)*

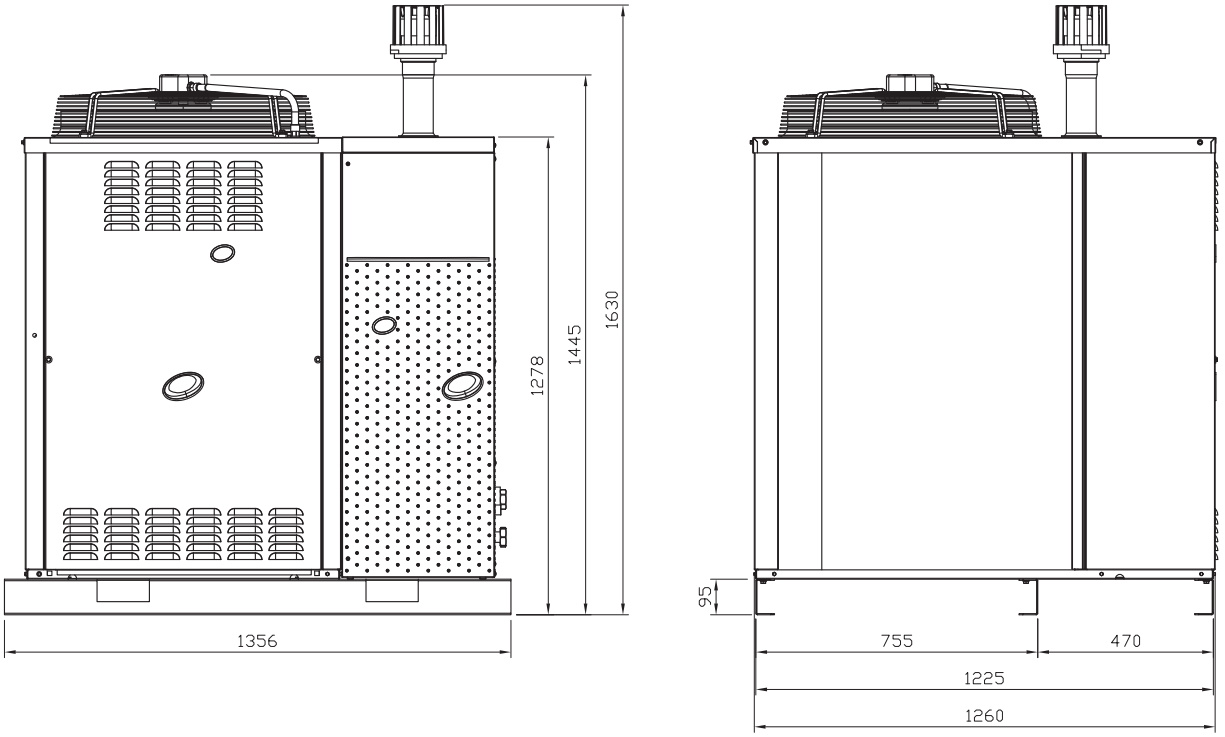


Figure 2.2 *Dimensions (Silenced ventilation) - Front and side view (dimensions in mm)*

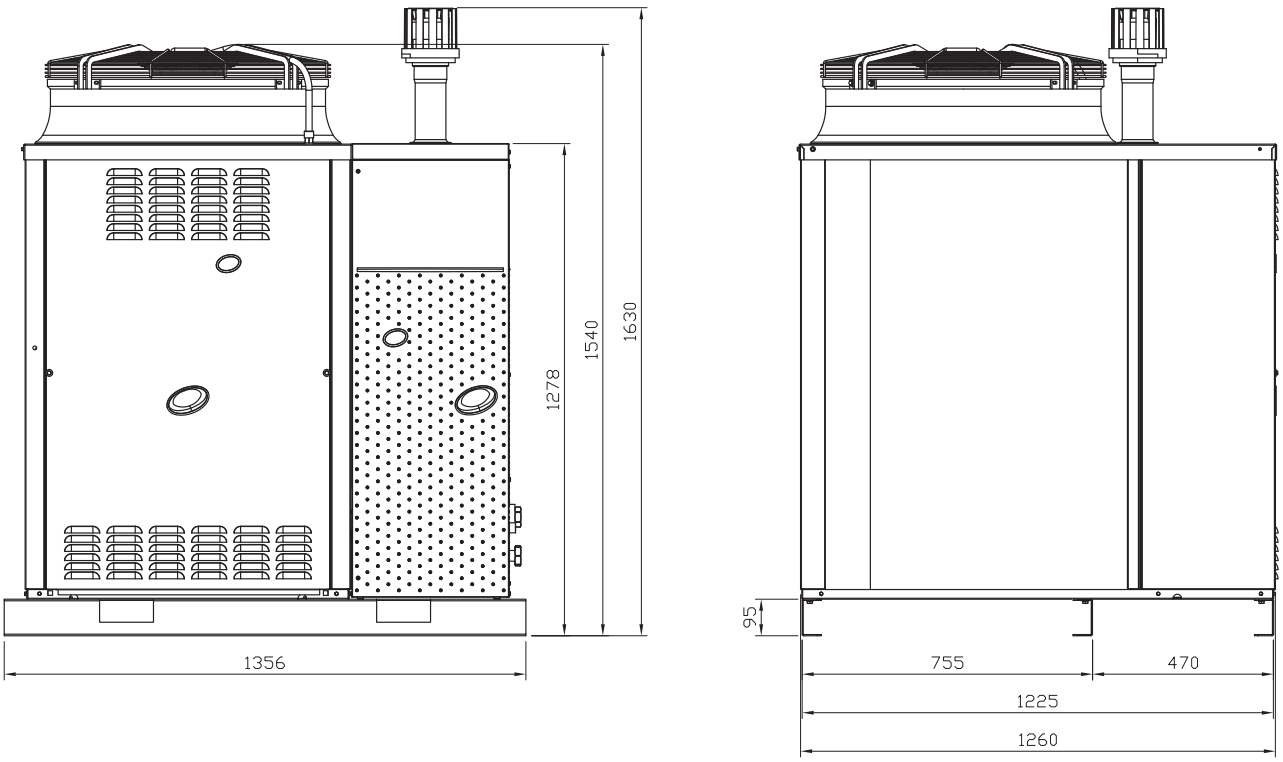
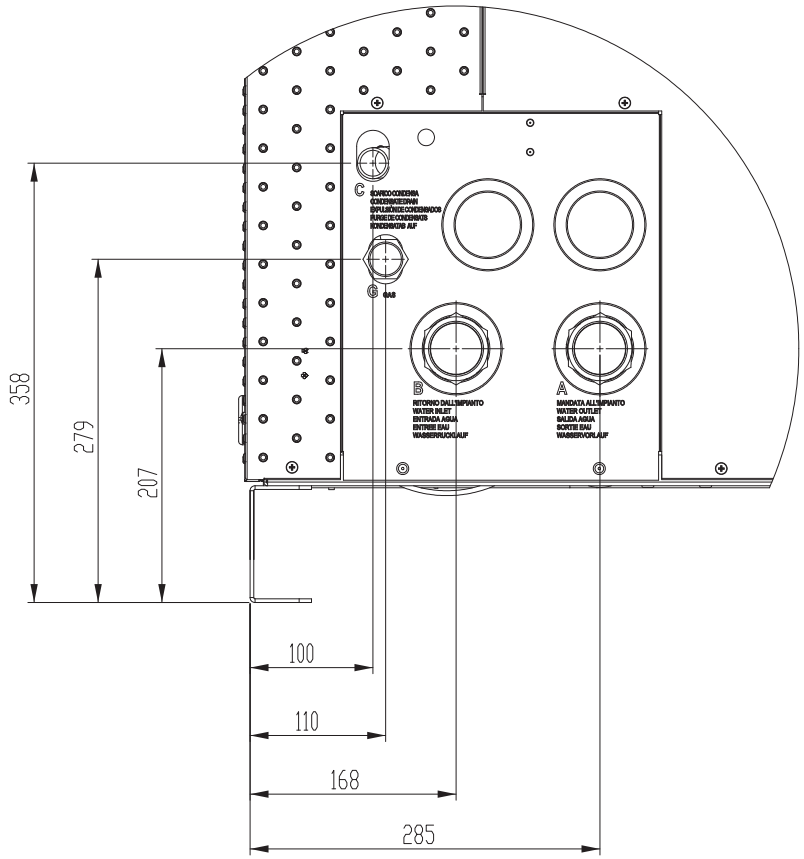
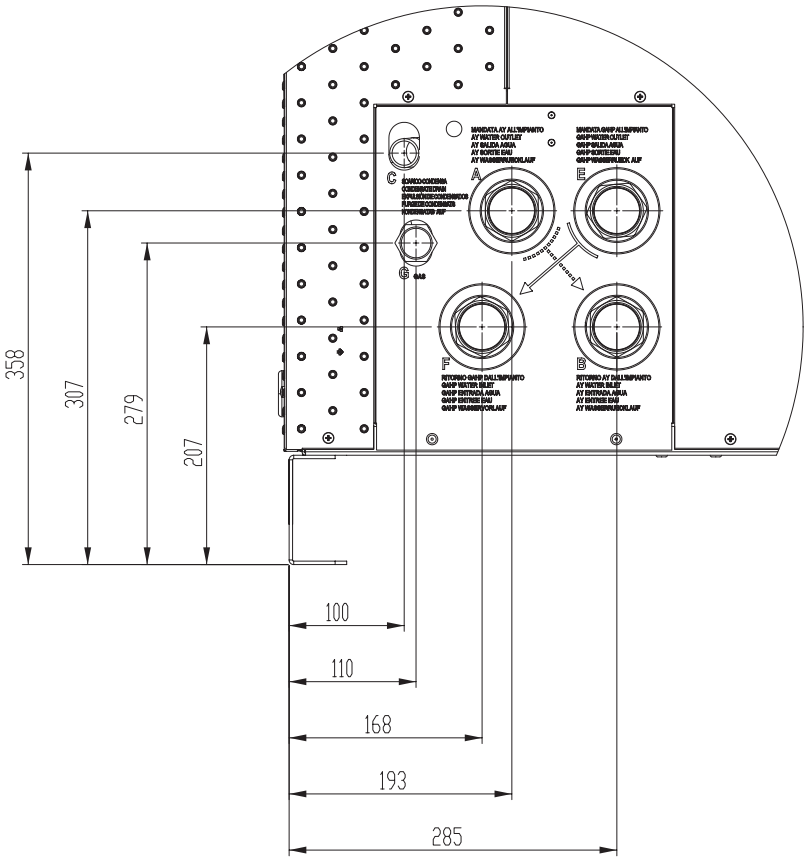


Figure 2.3 *Service plate 2-pipe group (KIT/2 C0 and C1) - Detail of water/gas fittings*



A Outlet water fitting Ø 1 1/2"F
B Inlet water fitting Ø 1 1/2"F
C Boiler condensate drain AY00-120
G Gas fitting Ø 3/4"M

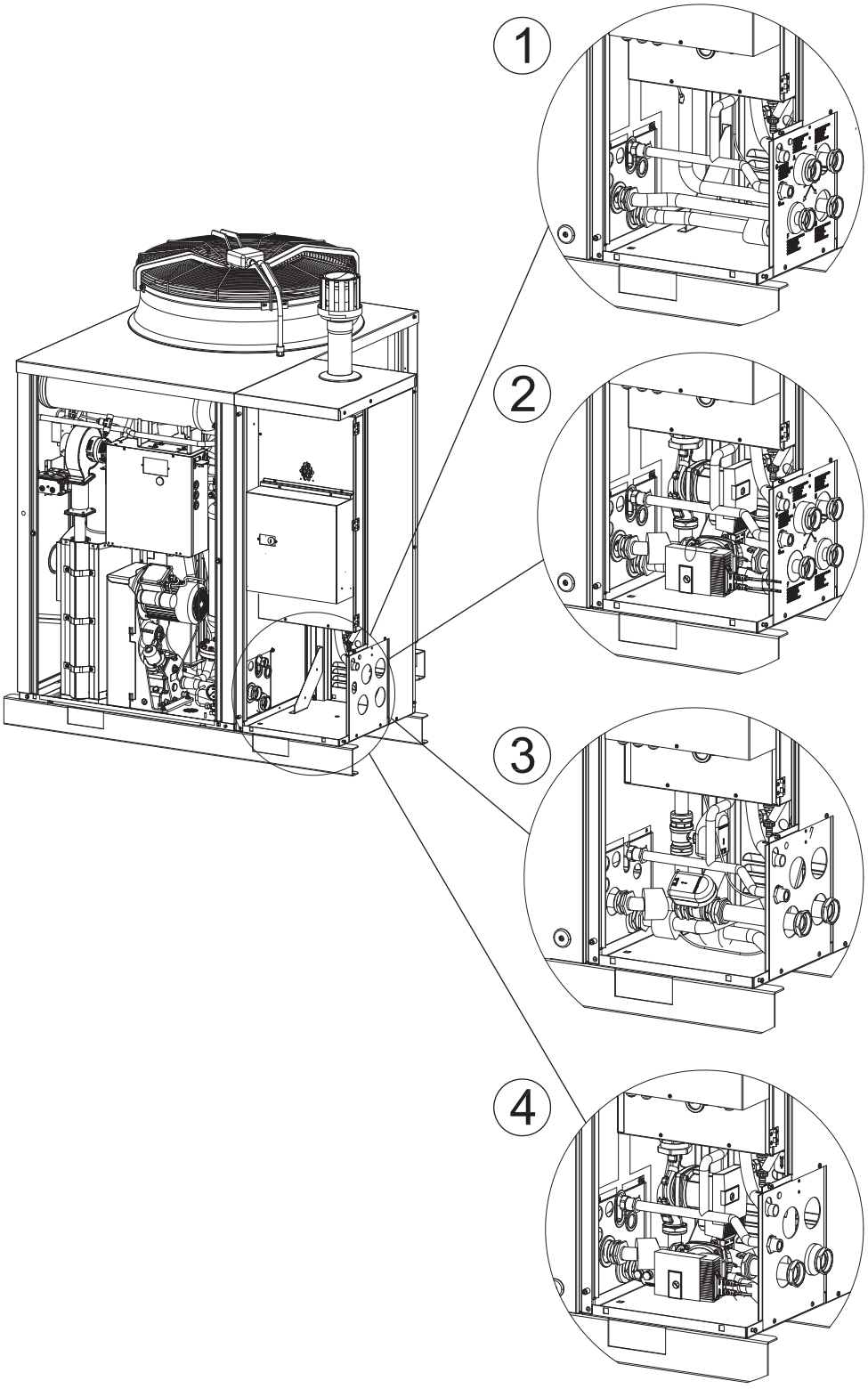
Figure 2.4 *Service plate 4-pipe group (base version and KIT/4 C1) - Detail of water/gas fittings*



A AY - Water outlet fitting Ø 1 1/4"F
B AY - Water inlet fitting Ø 1 1/4"F
C Boiler condensate drain AY00-120
E GAHP/GA - Water outlet fitting Ø 1 1/4"F
F GAHP/GA - Water inlet fitting Ø 1 1/4"F
G Gas fitting Ø 3/4"M

2.2 VERSIONS

Figure 2.5 *Version components*



1 BASE version (2 independent circuits without circulating pumps)
2 Kit/4 C1 (2 independent circuits with on board circulating pumps)
3 Kit/2 C0 (single circuit with two 2-way motorised valves)
4 Kit/2 C1 (single circuit with on board circulating pumps)

2.3 OPERATION MODE

The Gitié ACAY unit may only work in the ON/OFF mode, i.e. ON (at full power) or OFF, with circulating pump at constant flow.

2.4 CONTROLS

Control device

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

- ► (1) **pre-configured DDC control**
- ► (2) **external enables**

2.4.1 Adjustment system (1) with pre-configured DDC control

The DDC controller is able to control the appliances, a single GAHP unit, or even several Robur GAHP/GA/AY units in cascade, only in ON/OFF mode (non modulating). For more information see Section C1.12.

2.4.2 Adjustment system (2) - control with external enables

The appliance may also be controlled via generic enable devices (e.g. thermostats, clocks, buttons, contactors...) fitted with voltage-free NO contacts. This system only provides elementary control (on/off, with fixed set-point temperature), without the important functions of system (1). Control of the cascade between GAHP/GA and AY00-120 is left to the user.

2.5 TECHNICAL CHARACTERISTICS

2.5.1 ACAY Integrated package technical specifications

Table 2.1 *Technical data Gitié ACAY*

			ACAY/4 C0	ACAY/4 C1	ACAY/2 C0	ACAY/2 C1	ACAY/4 C0 S	ACAY/4 C1 S	ACAY/2 C0 S	ACAY/2 C1 S
Heating mode										
Heating capacity	nominal (1013 mbar - 15 °C)	kW	34,9							
Ambient air temperature (dry bulb)	maximum	°C	45							
	minimum	°C	-20							
Heating water flow	maximum	l/h	3200							
	nominal	l/h	2950							
	minimum	l/h	1500							
Pressure loss at nominal flow rate	version /4 C0 AY120	bar	0,40	-			0,40	-		
	version /2 C0	bar	-		0,56	-			0,56	-
Residual pressure head at nominal flow rate	version /4 C1 AY120	bar	-	0,60	-			0,60	-	
	version /2 C1	bar	-			0,52	-			0,52
Operation in conditioning mode										
Heating capacity	nominal (1013 mbar - 15 °C)	kW	25,3							
	real	kW	25,0							
External air temperature	maximum	°C	45							
	minimum	°C	0							
Water flow rate	maximum	l/h	3500							
	nominal	l/h	2770							
	minimum	l/h	2500							
Pressure loss at nominal flow rate	version /4 C0 ACF	bar	0,29	-			0,29	-		
	version /2 C0	bar	-		0,56	-			0,56	-
Residual pressure head at nominal flow rate	version /4 C1 ACF	bar	-	0,68	-			0,68	-	
	version /2 C1	bar	-			0,52	-			0,52
Electrical specifications										
Power supply	voltage	V	230							
	type	-	single-phase							
	frequency	50 Hz supply	50							
Electrical power absorption	nominal	kW	1,00 (1)	1,38 (1)	1,00 (1)	1,38 (1)	1,05 (1)	1,43 (1)	1,05 (1)	1,43 (1)
Degree of protection	IP	-	X5D							
Installation data										
Gas consumption	G20 (maximum)	m^3/h	6,4 (2)							
	G25 (maximum)	m^3/h	7,5 (3)							
	G30 (maximum)	kg/h	4,7 (4)							
	G30 (maximum)	kg/h	4,7 (4)							
Water fitting	delivery/inlet	"F	1 1/4		1 1/2		1 1/4		1 1/2	
Gas connection	thread	"M	3/4							

(1) ±10% depending on power voltage and absorption tolerance of electric motors.
(2) PCI (G20) 34,02 MJ/m^3 (15 °C - 1013 mbar).
(3) PCI (G25) 29,25 MJ/m^3 (15 °C - 1013 mbar).
(4) PCI (G30/G31) 46,34 MJ/kg (15 °C - 1013 mbar).
(5) Sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614.
(6) Maximum sound pressure levels in free field, with directionality factor 2.

			ACAY/4 C0	ACAY/4 C1	ACAY/2 C0	ACAY/2 C1	ACAY/4 C0 S	ACAY/4 C1 S	ACAY/2 C0 S	ACAY/2 C1 S
Dimensions	width	mm	1356							
	depth	mm	1260							
	height	mm	1630							
Weight	in operation	kg	440	465	440	465	460	485	460	485
Sound power L_w (max)		dB(A)	82,1 (5)				76,1 (5)			
Sound pressure L_p at 5 metres (max)		dB(A)	60,1 (6)				54,1 (6)			
Minimum storage temperature		°C	-30							
Maximum water pressure in operation		bar	4							
Water content inside the apparatus		l	6							

(1) ±10% depending on power voltage and absorption tolerance of electric motors.
(2) PCI (G20) 34,02 MJ/m³ (15 °C - 1013 mbar).
(3) PCI (G25) 29,25 MJ/m³ (15 °C - 1013 mbar).
(4) PCI (G30/G31) 46,34 MJ/kg (15 °C - 1013 mbar).
(5) Sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614.
(6) Maximum sound pressure levels in free field, with directionality factor 2.

2.5.2 GA ACF unit technical data

Table 2.2 *GA ACF unit technical data*

			ACF 60-00
Operation in conditioning mode			
Operating point A35W7	cooling output	kW	17,72 (1)
	G.U.E. gas usage efficiency	%	71
Heating capacity	nominal (1013 mbar - 15 °C)	kW	25,3
	real	kW	25,0
Cold water temperature (inlet)	maximum	°C	45
	minimum	°C	8
Installation data			
NO_x emission class		-	4
NO_x emission		ppm	56,0
CO emission		ppm	17,0
General information			
Cooling fluid	ammonia R717	kg	6,8
	water H_2O	kg	10,0
Maximum pressure of the cooling circuit		bar	32
PED data			
Components under pression	generator	l	18,6
	leveling chamber	l	11,5
	evaporator	l	3,7
	cooling absorber solution	l	6,3
	solution pump	l	3,3
Test pressure (in air)		bar g	55
Filling ratio		kg of NH_3/l	0,157
Fluid group		-	1°

(1) As per standard EN12309.

2.5.3 AY00-120 Unit technical data

Table 2.3 *Technical specifications AY00-120*

				AY00-120
Heating mode				
Operating point 80/60	Nominal thermal capacity	effective power	kW	34,4
	Minimal thermal capacity	efficiency	%	97,3
	Nominal thermal capacity	efficiency	%	98,6
	Mean thermal capacity	efficiency	%	98,3
Operating point 70/50	Nominal thermal capacity	efficiency	%	100,6
Operating point 50/30	Nominal thermal capacity	efficiency	%	104,6
Operating point Tr = 30 °C	Thermal capacity 30%	efficiency	%	107,5
Operating point Tr = 47 °C	Thermal capacity 30%	efficiency	%	100,3
Heating capacity	nominal (1013 mbar - 15 °C)		kW	34,9
	average		kW	21,5
	minimum		kW	8,0

			AY00-120
Hot water delivery temperature	maximum	°C	80
	minimum	°C	25
	nominal	°C	60
Hot water return temperature	maximum	°C	70
	minimum	°C	20
	nominal	°C	50
Efficiency class			****
Heat loss	to jacket in operation	kW	0,15
	to jacket in operation	%	0,44
	to flue in operation	kW	0,86
	to flue in operation	%	2,54
	in off mode	kW	0,058
	in off mode	%	0,17
Installation data			
NO_x emission class		-	5
NO_x emission		ppm	19,5
CO emission		ppm	8,4
Maximum flow flue condensate		l/h	5,5
Fume outlet	diameter (Ø)	mm	80
	residual head	Pa	100
Type of installation		-	B32P, B33, B35P, C13, C33, C34, C53, C63, C83

2.5.4 Pressure drop table

Table 2.4 *GA ACF ACF standard, HR, TK, HT pressure drop*

Water flow rate	Vector fluid temperature at outlet	
	3 °C	7 °C
	Bar	Bar
2600 l/h	0,27	0,26
2900 l/h	0,33	0,31
3500 l/h	0,48	0,46

The data refer to operation with no glycol in water.

Table 2.5 *Pressure drop AY*

Water flow rate	Outlet water temperature
	20 °C
	Bar
2007 l/h	0,20
2400 l/h	0,27
3000 l/h	0,41

2.5.5 Performance table

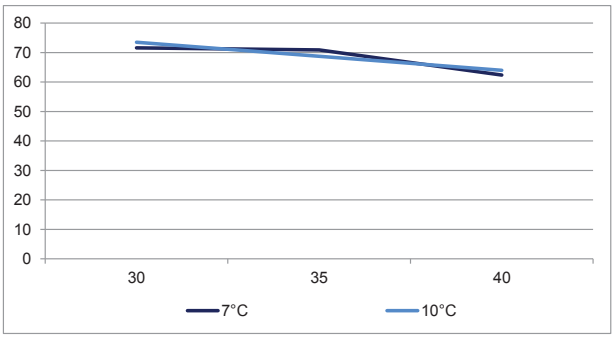
Table 2.6 *p. 7* shows the unitary cooling power at full load and stable operation, depending on cold water outlet temperature to the system and outdoor temperature, for the single GA ACF unit.
For AY00-120 see Table 2.3 *p. 6*.
Please consider that, according to the actual heating or cooling request, the unit may often need to operate under partial load conditions and in non stationary operation.

Table 2.6 *GA ACF standard cooling power for each unit*

External air temperature	Water delivery temperature	
	7 °C	10 °C
	KW	KW
30 °C	17,9	18,4
35 °C	17,7	17,2
40 °C	15,6	16,0
45 °C	11,9	14,8

Picture 2.6 *p. 7* shows the GUE trend at full load in conditioning mode and in stable operation for two representative delivery temperatures for GA ACF unit.
Please consider that, according to the actual heating or cooling request, the unit may often need to operate under partial load conditions and in non stationary operation.

Figure 2.6 *GA ACF standard GUE*



In abscissa the outdoor temperature
In ordinate the full load GUE rate

3 DESIGN

Compliance with installation standards

Design and 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.

Design and installation must also comply with the manufacturer's provisions.

3.1 PLUMBING DESIGN

Please refer to Section C1.04.

3.2 FUEL GAS SUPPLY

Please refer to Section C1.09.

3.3 GA ACF UNIT COMBUSTION PRODUCTS EXHAUST

The GA ACF units have no flue gas exhaust.

3.4 AY00-120 UNIT COMBUSTION PRODUCTS EXHAUST

Compliance with standards

The appliance is approved for connection to a combustion products exhaust duct for the types shown in Table 2.3 *p. 6*.

3.4.1 Flue gas exhaust connection

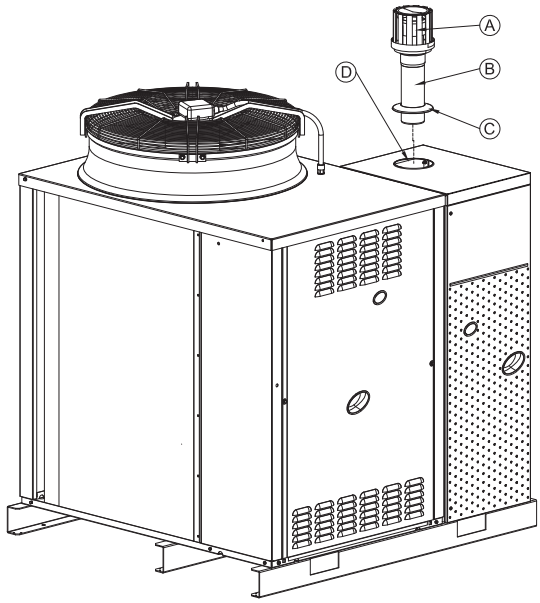
► Ø 80 mm
in the upper part (Figure 3.1 *p. 8*).

3.4.2 Flue gas exhaust kit

The appliance is supplied with flue gas exhaust kit, to be fitted by the installer, including (Figure 3.1 *p. 8*):

► 1 terminal;
► 1 extension pipe Ø 80 mm, length 209 mm;
► 1 rain cover;

Figure 3.1 *Fume outlet*



A Terminal
B Pipe
C Rain cover
D Flanged fitting

3.5 COMBUSTION PRODUCTS EXHAUST THROUGH THE FLUE

If necessary, the appliance may be connected to a flue.

► The GA ACF units have no flue gas exhaust.
► For flue sizing please refer to the specification sheet in Section C1.10.
► If several AY00-120 modules are connected to a single flue, it is obligatory to install a flap valve on the exhaust of each.
► 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.

In case the flap valves are installed outside, an appropriate UV ray protection must be assured (if the valve is constructed in plastic material) as well as protection from potential winter freezing of condensate backflow into the siphon.

3.6 FLUE GAS CONDENSATE DISCHARGE

The AY00-120 unit is a condensing boiler which therefore produces condensation water from combustion fumes.

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 (Table 2.3 *p. 6*).

Do not use gutters to discharge the condensate

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

3.6.1 AY00-120 Unit flue gas condensate fitting

The connection for flue gas condensate discharge is located on the right side of the appliance at the service plate (Figure 2.3 *p. 3* and Figure 2.4 *p. 3*).

- ► The condensate discharge pipe must be connected to a suitable discharge manifold.
- ► The junction between the pipe and the manifold must remain visible.

3.6.2 Flue gas condensate discharge manifold

To make the condensate discharge manifold:

- ► Size the ducts for maximum condensation capacity (Table 2.3 *p. 6*).
- ► 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 icing.
- ► Dilute, if possible, with domestic waste water (e.g. bathrooms, washing machines, dish washers...), basic and neutralising.

3.7 ELECTRICAL AND CONTROL CONNECTIONS

3.7.1 Warnings

Earthing

- The appliance must be connected to an effective earthing system, installed in compliance with regulations in force.
- 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

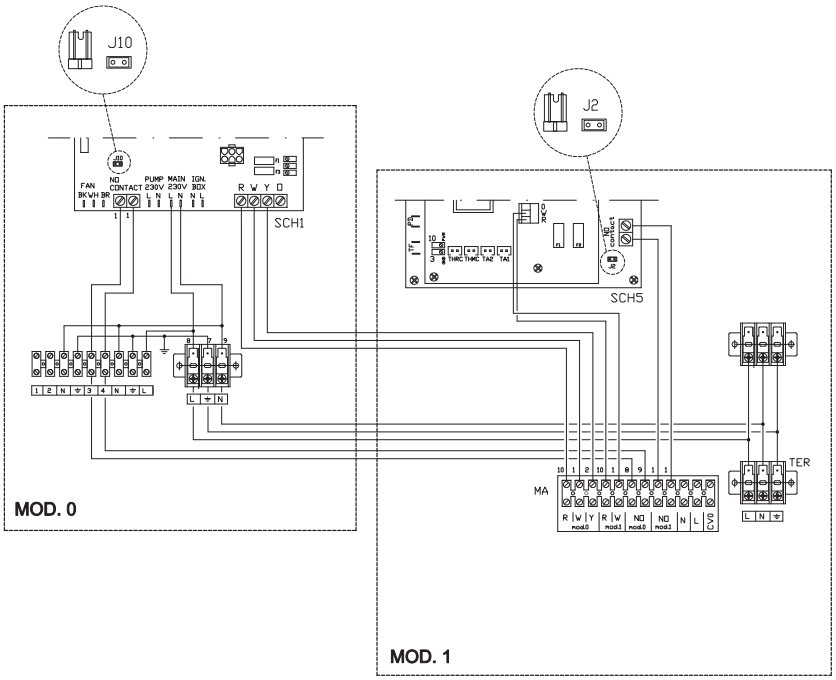
- Never use the external isolation switch (GS) to turn the appliance on and off, since it may be damaged in the long run (occasional black outs are tolerated).
- To turn the appliance on and off, exclusively use the suitably provided control device (DDC or external enable).

Control of water circulation pumps

In C0 versions the water circulation pumps of the hydraulic circuit must mandatorily be controlled by the unit's electronic boards. It is not admissible to start/stop circulating pumps with no enable from the appliance.

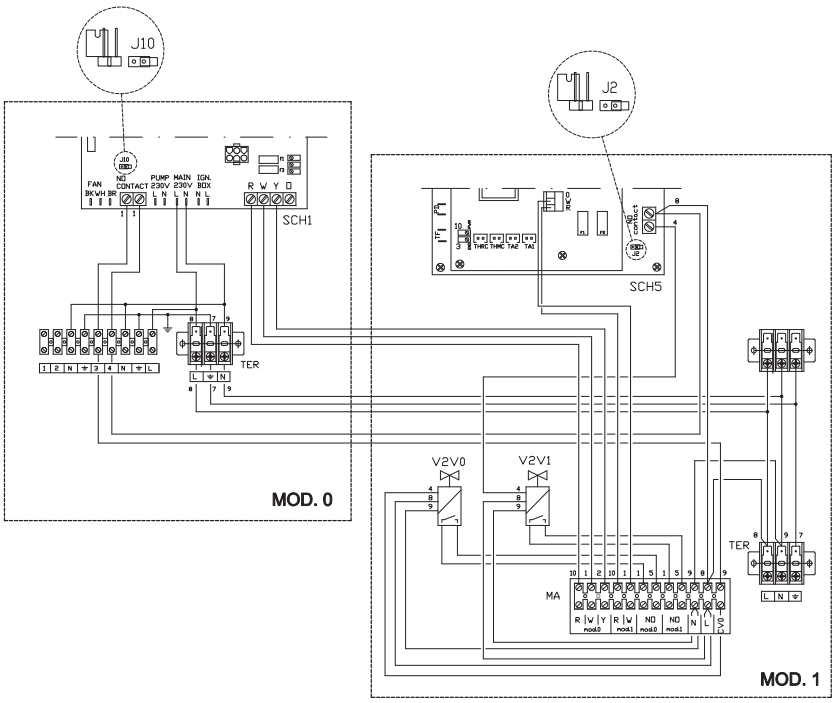
3.7.2 Wiring diagrams

Figure 3.2 *Gitié package wiring diagram - base version*



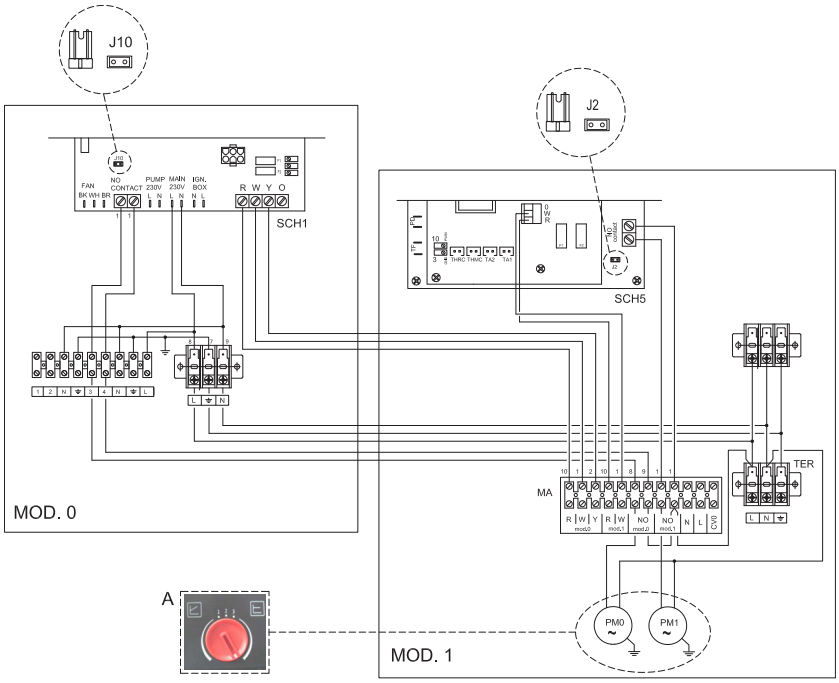
MA Terminal block
MOD.0 GAHP or ACF unit
MOD.1 unit AY00-120
SCH1 electronic board S61
SCH5 electronic boards S70+AY10
TER unit power supply terminal box
J2-J10 control jumpers of system water pumps ("closed")

Figure 3.3 *Gitié package wiring diagram with KIT/2 C0*



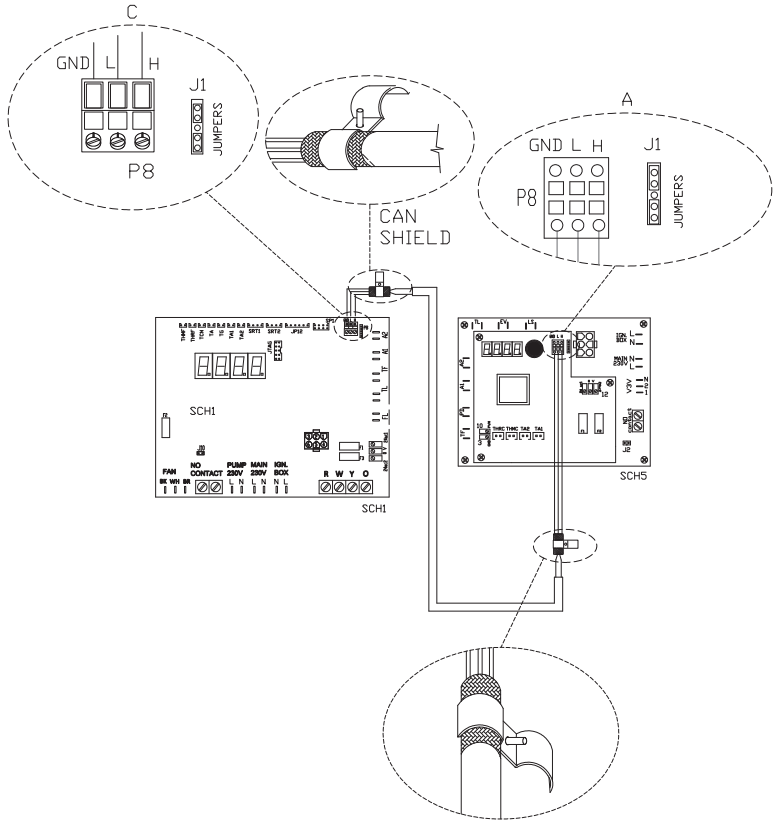
MOD.0 GAHP or ACF unit
MOD.1 unit AY00-120
SCH1 electronic board S61
SCH5 electronic boards S70+AY10
TER unit power supply terminal box
J2-J10 control jumpers of system water pump ("open")
MA connection terminal block
V2V0-V2V1 motorised valves

Figure 3.4 *Gitié package wiring diagram with KIT/2 C1 or with KIT/4 C1*



MOD.0 GAHP or ACF unit
MOD.1 unit AY00-120
SCH1 electronic board S61
SCH5 electronic boards S70+AY10
TER unit power supply terminal box
J2-J10 control jumpers of system water pumps ("closed")
MA connection terminal block
PM0-PM1 system water pumps
A Position of pumps flow rate adjustment screw

Figure 3.5 *CAN connection between AY10 board and S61 (pre-wired in the factory)*



SCH5 electronic board S70+AY10
SCH1 electronic board S61
J1 Jumpers CAN-BUS on AY10 board and S61 board
A terminal node connection - (3 wires; J1 jumpers = "closed")
C terminal node connection - (3 wires; J1 jumpers = "closed")
H,L,GND data signal wires (ref. cables table)

3.7.3 Electrical systems

Electrical connections must provide:

- (a) power supply;
- (b) control system.

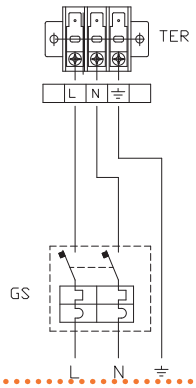
3.7.4 Electrical power supply

Power supply line

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

- ► 1 three-pole cable type FG7(O)R 3Gx1.5;
- ► 1 two-pole switch with 2 8A type T fuses, (GS) or 1 10A magnetothermic breaker.

Figure 3.6 *Appliance connection to the mains power supply (230V 1N - 50 Hz)*



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

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

3.7.5 Set-up and control

Control systems, options (1) (2)

Two separate adjustment systems are provided, each with specific features, components and diagrams (see Paragraph 2.4 *p. 5*):

- ► System (1), with **DDC control** (with CAN-BUS connection).
- ► System (2), with **external enables**.

Control with DDC

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 control device.

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, AY00-120, Gitié, ...) 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 controller is connected to the appliance through the CAN-BUS signal cable, shielded, compliant to Table 3.1 *p. 12* (admissible types and maximum distances).

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

Table 3.1 *CAN BUS cables type*

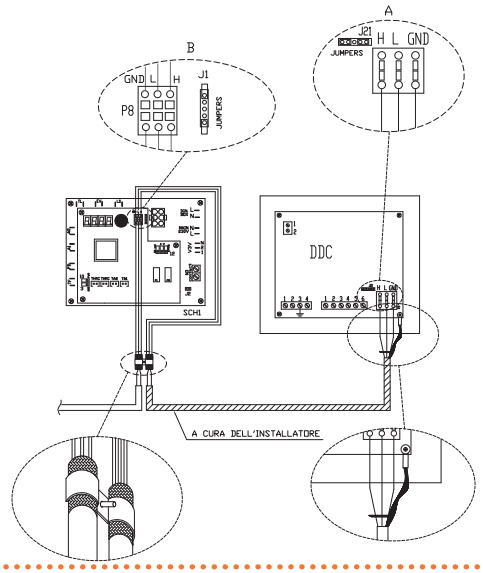
CABLE NAME	SIGNALS / COLOR			MAX LENGTH	Note
Robur					Ordering Code OCVO008
ROBUR NETBUS	H= BLACK	L= WHITE	GND= BROWN	450 m	
Honeywell SDS 1620					In all cases the fourth conductor should not be used
BELDEN 3086A	H= BLACK	L= WHITE	GND= BROWN	450 m	
TURCK type 530					
DeviceNet Mid Cable					
TURCK type 5711	H= BLUE	L= WHITE	GND= BLACK	450 m	
Honeywell SDS 2022					
TURCK type 531	H= BLACK	L= WHITE	GND= BROWN	200 m	

How to connect the CAN BUS cable to the package

To connect the CAN-BUS cable to the AY10 electronic board, located in the Electrical Panel inside the AY00-120 unit, Picture 3.7 *p. 13*, Details A and B:

1. Access the Electrical Board of the appliance according to the Procedure 3.7.3 *p. 11*);
2. Connect the CAN-BUS cable to terminals GND + L and H (shielding/earthing + two signal conductors) of the AY10 board;
3. Place the Jumper J1, of the AY10 board, OPEN;
4. Connect the DDC to the CAN-BUS cable to terminals GND + L and H (shielding/earthing + two signal conductors) of the DDC;
5. The CAN connection between the AY10 board and the S61 board is pre-wired (Picture 3.8 *p. 13*);

Figure 3.7 *CAN-BUS connection between Gitié and DDC*



DDC Direct Digital Control
SCH5 electronic board S70+AY10
J1 Jumpers CAN-BUS on AY10 board
J21 Jumper CAN-BUS in board DDC
A terminal node connection - (3 wires; J21 jumpers = "closed")
B intermediate node connection - (3 wires; J1 jumpers ="open")
H,L,GND data signal wires (ref. cables table)

Control with external enables

(System (2), see also Paragraph 2.4 *p. 5*).
For each external request to be provided, it is required to arrange:
► request device (e.g. thermostat, clock, button, ...) fitted with a voltage-free NO contact.

How to connect external enables

Connection of external requests is effected on the terminal block located in the Electrical Panel inside the AY00-120 unit.

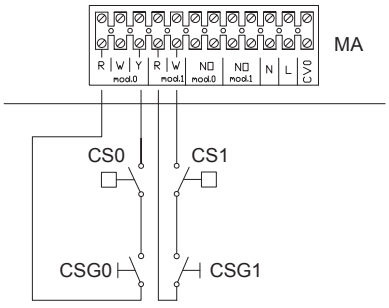
4-pipe versions

Should you wish the enables of the two units to be independent follow the connection diagram shown in Picture 3.8 *p. 13*.
Should you wish the enables of the two units to be separate follow the connection diagram shown in Figure 3.9 *p. 13*.

2-pipe versions

Should you wish the enables of the two units to be separate follow the connection diagram shown in Figure 3.9 *p. 13*.

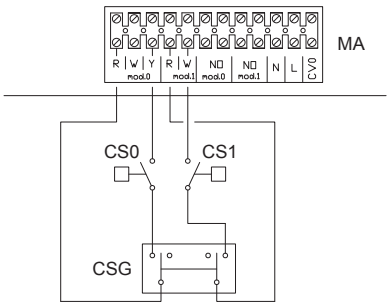
Figure 3.8 *Diagram of independent external enables connection (4-pipe versions)*



MA unit terminal block

Components NOT SUPPLIED
CSG0 cold general enable
CSG1 general hot enable
CS0 GA ACF cold enable
CS1 heating request AY00-120

Figure 3.9 *Diagram of alternated external enables connection (2 and 4-pipe versions)*



MA unit terminal block

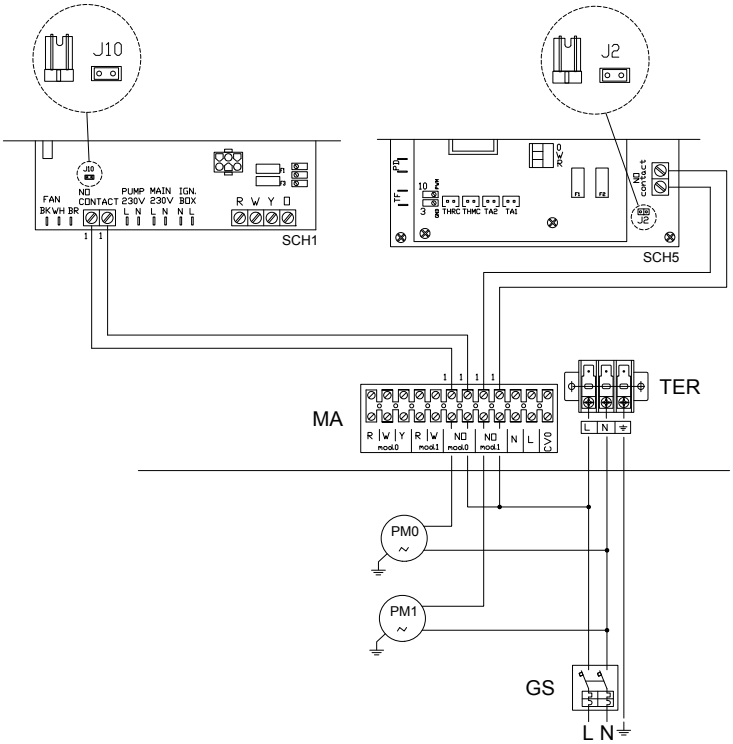
Components NOT SUPPLIED
CSG general enable
CS0 GA ACF cold enable
CS1 heating request AY00-120

3.7.6 Water circulation pumps (versions C0)

System water pumps will be controlled at constant flow.

4-pipe versions

Figure 3.10 *System pump connection diagram Gitié package BASE version (P < 700 W)*



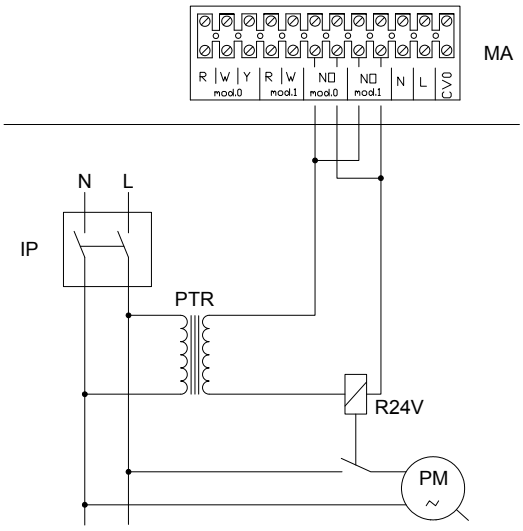
SCH1 electronic board S61
SCH5 electronic boards S70+AY10
MA unit terminal block
J2-J10 control jumpers of system water pumps ("closed")

Components NOT SUPPLIED
PM0 water pump (P < 700 W) unit GAHP or ACF
PM1 water pump (P < 700 W) AY00-120 unit
GS general switch

The diagram in Figure 3.10 *p. 14* is for pumps < 700 W. For pumps > 700 W it is necessary to add a control relay and arrange Jumpers J10 and J2 OPEN.

2-pipe versions

Figure 3.11 *System pump connection diagram Gitié package 2 pipe version (KIT/2 C0)*



MA unit terminal block

Components NOT SUPPLIED
PM water pump
IP two-pole switch
PTR safety transformer SELV
R24V pump control relay