

## 1 SPECIFICATION OF SUPPLY

### 1.1 ACAY35/4

Integrated package consisting of a water-ammonia absorption chiller, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and a modulating condensing boiler with sealed chamber, effective power 33,4 kW, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C, suitable for outdoor installation and equipped with independent high head water pumps for each of the appliances comprising it, in a 4-pipe plumbing configuration (separate water circuits for chiller and boiler).

Operating point 80/60: effective power 33,4 kW

Heat input (heating): 34,0 kW

Cooling output for each unit (A35W7): 17,7 kW

Heat input (cooling): 25,0 kW

Electrical power absorption nominal: 1,17 kW

Power supply: 230 V - 50 Hz single-phase

Weight: 447 kg

Dimensions: width 1425 mm, depth 1238 mm, height 1445 mm

### 1.2 ACAY35/4 S

Integrated package consisting of a water-ammonia absorption chiller with low-noise fan, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and a modulating condensing boiler with sealed chamber, effective power 33,4 kW, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C, suitable for outdoor installation and equipped with independent high head water pumps for each of the appliances comprising it, in a 4-pipe plumbing configuration (separate water circuits for chiller and boiler).

Operating point 80/60: effective power 33,4 kW

Heat input (heating): 34,0 kW

Cooling output for each unit (A35W7): 17,7 kW

Heat input (cooling): 25,0 kW

Electrical power absorption nominal: 1,22 kW

Power supply: 230 V - 50 Hz single-phase

Weight: 457 kg

Dimensions: width 1425 mm, depth 1238 mm, height 1513 mm

### 1.3 ACAY35/2

Integrated package consisting of a water-ammonia absorption chiller, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and a modulating condensing boiler with sealed chamber, effective power 33,4 kW, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C, suitable for outdoor installation and equipped with independent high head water pumps for each of the appliances comprising it, in a 2-pipe plumbing configuration (single water circuit for chiller and boiler).

Operating point 80/60: effective power 33,4 kW

Heat input (heating): 34,0 kW

Cooling output for each unit (A35W7): 17,7 kW

Heat input (cooling): 25,0 kW

Electrical power absorption nominal: 0,95 kW

Power supply: 230 V - 50 Hz single-phase

Weight: 447 kg

Dimensions: width 1425 mm, depth 1238 mm, height 1445 mm

### 1.4 ACAY35/2 S

Integrated package consisting of a water-ammonia absorption chiller with low-noise fan, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and a modulating condensing boiler with sealed chamber, effective power 33,4 kW, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C, suitable for outdoor installation and equipped with independent high head water pumps for each of the appliances comprising it, in a 2-pipe plumbing configuration (single water circuit for chiller and boiler).

Operating point 80/60: effective power 33,4 kW

Heat input (heating): 34,0 kW

Cooling output for each unit (A35W7): 17,7 kW

Heat input (cooling): 25,0 kW

Electrical power absorption nominal: 1,00 kW

Power supply: 230 V - 50 Hz single-phase

Weight: 457 kg

Dimensions: width 1425 mm, depth 1238 mm, height 1513 mm

### 1.5 ACAY50/4

Integrated package consisting of a water-ammonia absorption chiller, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and a modulating condensing boiler with sealed chamber, effective power 49,2 kW, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C, suitable for outdoor installation and equipped with independent high head water pumps for each of the appliances comprising it, in a 4-pipe plumbing configuration (separate water circuits for chiller and boiler).

Operating point 80/60: effective power 49,2 kW

Heat input (heating): 50,0 kW

Cooling output for each unit (A35W7): 17,7 kW

Heat input (cooling): 25,0 kW

Electrical power absorption nominal: 1,20 kW

Power supply: 230 V - 50 Hz single-phase

Weight: 457 kg

Dimensions: width 1425 mm, depth 1238 mm, height 1445 mm

### 1.6 ACAY50/4 S

Integrated package consisting of a water-ammonia absorption chiller with low-noise fan, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and a modulating condensing boiler with sealed chamber, effective power 49,2 kW, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C, suitable for outdoor installation and equipped with independent high head water pumps for each of the appliances comprising it, in a 4-pipe plumbing configuration (separate water circuits for chiller and boiler).

Operating point 80/60: effective power 49,2 kW

Heat input (heating): 50,0 kW

Cooling output for each unit (A35W7): 17,7 kW

Heat input (cooling): 25,0 kW

Electrical power absorption nominal: 1,25 kW

Power supply: 230 V - 50 Hz single-phase

Weight: 467 kg

Dimensions: width 1425 mm, depth 1238 mm, height 1513 mm

## 1.7 ACAY50/2

Integrated package consisting of a water-ammonia absorption chiller, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and a modulating condensing boiler with sealed chamber, effective power 49,2 kW, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C, suitable for outdoor installation and equipped with independent high head water pumps for each of the appliances comprising it, in a 2-pipe plumbing configuration (single water circuit for chiller and boiler).

Operating point 80/60: effective power 49,2 kW

Heat input (heating): 50,0 kW

Cooling output for each unit (A35W7): 17,7 kW

Heat input (cooling): 25,0 kW

Electrical power absorption nominal: 0,95 kW

Power supply: 230 V - 50 Hz single-phase

Weight: 457 kg

Dimensions: width 1425 mm, depth 1238 mm, height 1445 mm

## 1.8 ACAY50/2 S

Integrated package consisting of a water-ammonia absorption chiller with low-noise fan, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and a modulating condensing boiler with sealed chamber, effective power 49,2 kW, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C, suitable for outdoor installation and equipped with independent high head water pumps for each of the appliances comprising it, in a 2-pipe plumbing configuration (single water circuit for chiller and boiler).

Operating point 80/60: effective power 49,2 kW

Heat input (heating): 50,0 kW

Cooling output for each unit (A35W7): 17,7 kW

Heat input (cooling): 25,0 kW

Electrical power absorption nominal: 1,00 kW

Power supply: 230 V - 50 Hz single-phase

Weight: 467 kg

Dimensions: width 1425 mm, depth 1238 mm, height 1513 mm

## 2 FEATURES

### 2.1 FEATURES

The Gitié 2.0 ACAY package consists of a GA ACF gas absorption chiller and a AY 35 (ACAY35) or AY 50 (ACAY50) condensing boiler.

Each of the units making up the package is equipped with an independent high head water pump.

For each of the versions (Table 2.1 p. 2), the gas absorption

chiller is available with a standard or low-noise fan.

In all 4-pipe versions, the operation of the units can always be simultaneous or independent. In all 2-pipe versions, the operation of the units can only be alternating.

The 2-pipe versions (with a single hydraulic circuit) are equipped with check valves serving each of the units making up the Gitié 2.0 ACAY package.

**Table 2.1** Gitié ACAY package versions

Version	Boiler	Pipes	Hydraulic circuits	Simultaneous operation	Fan
ACAY35/4	AY 35	4	independent	Yes	standard
ACAY35/4 S	AY 35	4	independent	Yes	low-noise S
ACAY35/2	AY 35	2	single	No	standard
ACAY35/2 S	AY 35	2	single	No	low-noise S
ACAY50/4	AY 50	4	independent	Yes	standard
ACAY50/4 S	AY 50	4	independent	Yes	low-noise S
ACAY50/2	AY 50	2	single	No	standard
ACAY50/2 S	AY 50	2	single	No	low-noise S

#### 2.1.1 GA ACF Unit features

##### 2.1.1.1 Operation

Based on the thermodynamic water-ammonia absorption cycle (H<sub>2</sub>O–NH<sub>3</sub>), the appliance produces chilled water using natural gas (or LPG) as primary energy source and dissipating heat directly to the outdoor air.

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.

The GA ACF unit, for cooling systems, is able to provide chilled water down to 3 °C.

##### 2.1.1.2 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 electrodes and flame detection, managed by an electronic flame control box.
- ▶ Titanium stainless steel shell-and-tube water exchanger (evaporator), externally insulated.

- ▶ Air exchanger (condenser) with finned coil, with steel pipe and aluminium fins.
- ▶ Low power consumption refrigerant fluid oil pump.
- ▶ Variable-flow microprocessor-controlled helicoidal motor-fan.
- ▶ Standard or low noise S fan.

##### 2.1.1.3 Control and safety devices

- ▶ S61 electronic board with microprocessor, LCD display and knob.
- ▶ Circuit water flow switch.
- ▶ Generator limit thermostat, with manual reset.
- ▶ Automatically resettable flue gas thermostat.
- ▶ Differential flue gas pressure switch on the combustion circuit.
- ▶ Sealed circuit safety relief valve.
- ▶ Bypass valve, between high and low-pressure circuits.
- ▶ Ionization flame control box.
- ▶ Double shutter electric gas valve.

### 2.1.2 AY unit features

#### 2.1.2.1 Operation

The AY appliances are outdoor condensing boilers capable of producing hot water up to 88 °C.

There are two models that can be part of the Gitié ACAY unit: AY 35 and AY 50.

#### 2.1.2.2 Mechanical and thermo-hydraulic components

- ▶ Integrated spiral single tube stainless steel heat exchanger.
- ▶ Premix modulating burner with 1:9 ratio (AY 35), 1:10 (AY 50).
- ▶ Automatic air vent valve.
- ▶ High efficiency water pump.
- ▶ System drain tap.

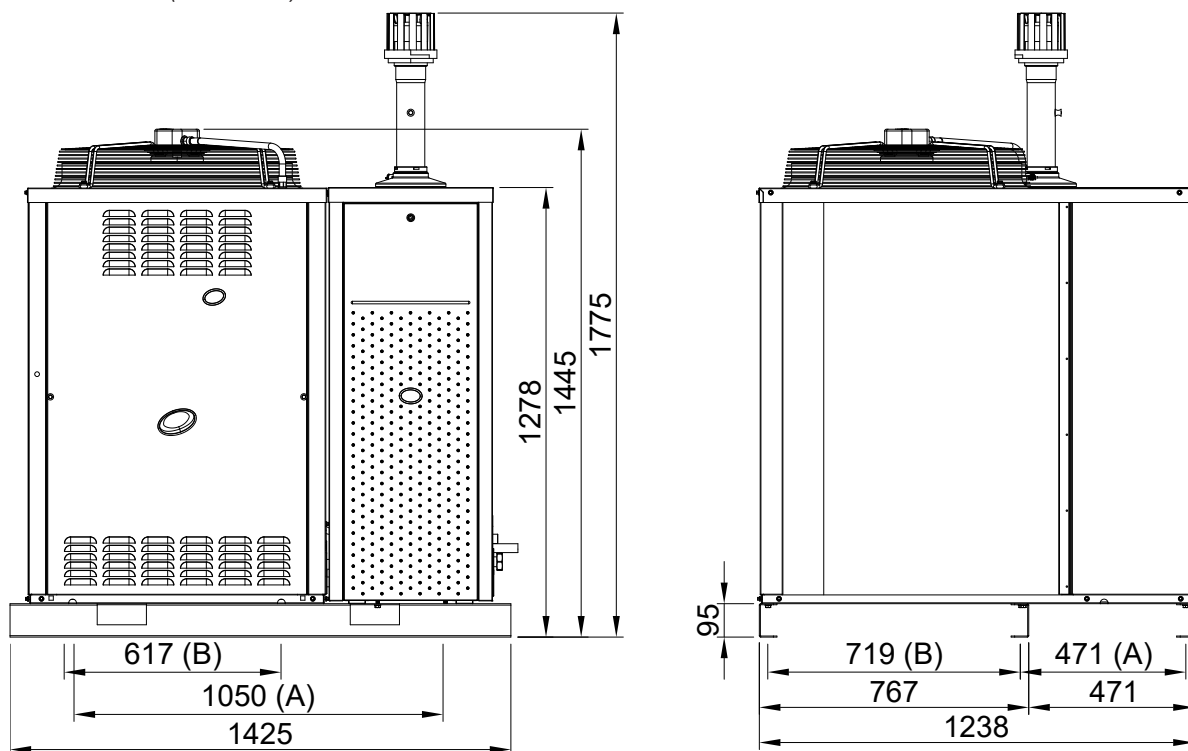
- ▶ Water temperature probes.
- ▶ Condensate drain siphon.
- ▶ Flue gas exhaust duct with relevant terminal, for type B53P configuration.

#### 2.1.2.3 Control and safety devices

- ▶ Flue safety thermal fuse.
- ▶ Gas solenoid valve.
- ▶ Safety thermostat.
- ▶ Safety valve.
- ▶ Water differential pressure switch.
- ▶ Expansion tank.
- ▶ Outdoor temperature probe.

## 2.2 DIMENSIONS

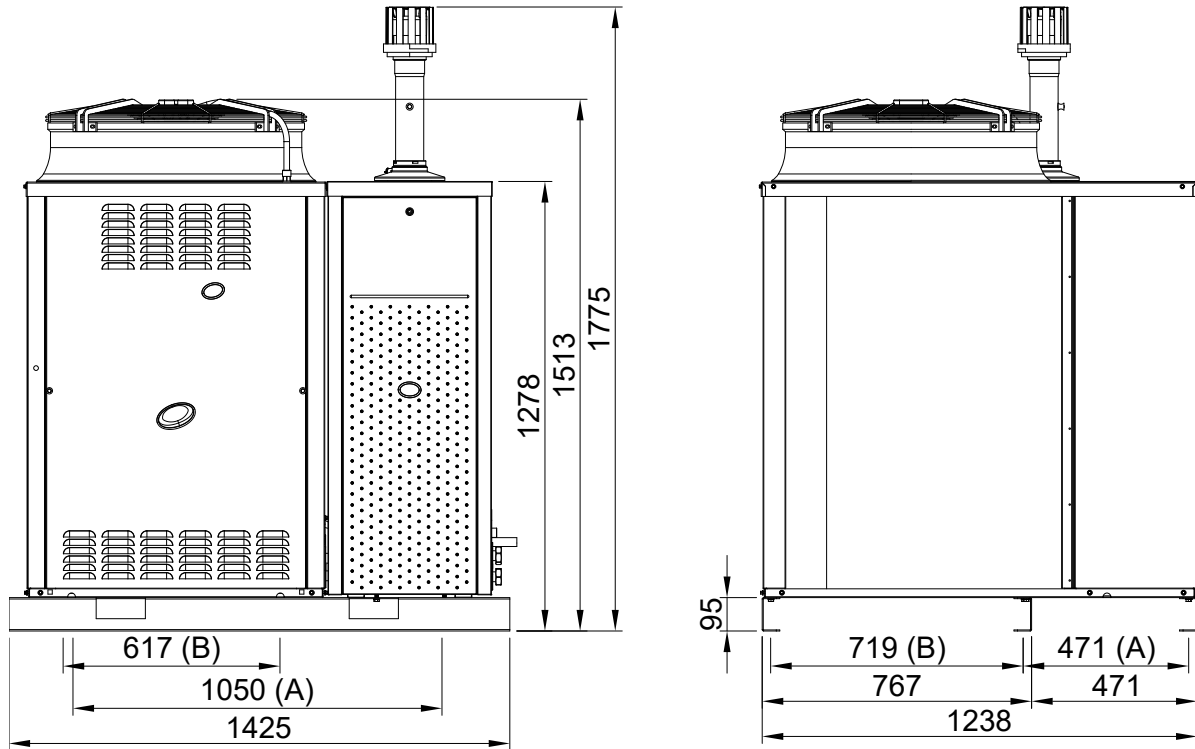
Figure 2.1 Dimensions (standard fan)



A Centre distance of holes for front vibration damper supports

B Centre distance of holes for rear vibration damper supports

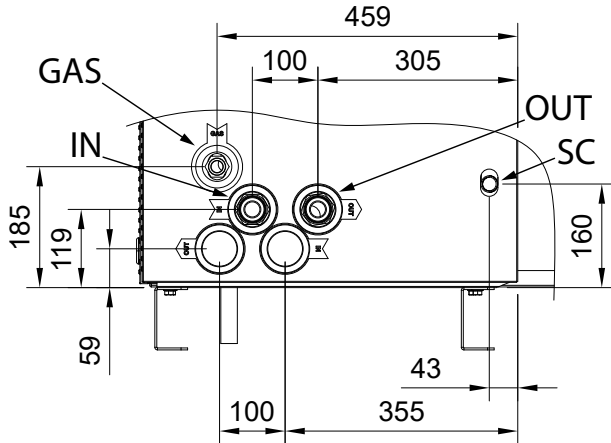
Figure 2.2 Dimensions (low-noise fan)



A Centre distance of holes for front vibration damper supports

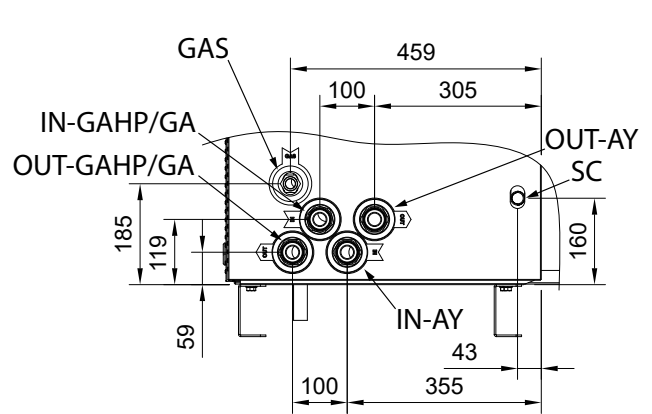
B Centre distance of holes for rear vibration damper supports

Figure 2.3 Gitié /2 service plate - Hydraulic/gas connections detail



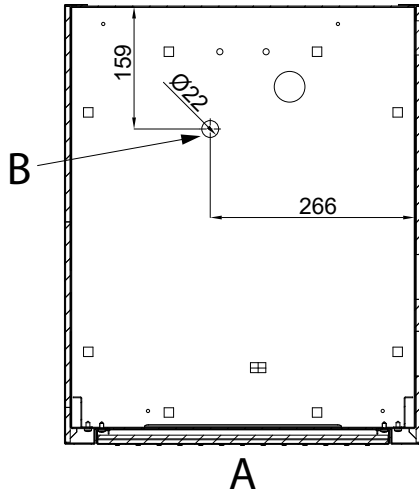
- OUT Water outlet connection Ø 1 1/4" F
- IN Water inlet connection Ø 1 1/4" F
- SC AY condensate drain connection (outside diameter 25 mm, inside 21 mm)
- GAS Gas connection Ø 3/4" M

Figure 2.4 Gitié /4 service plate - Hydraulic/gas connections detail



- OUT-AY AY water outlet connection Ø 1 1/4" F
- IN-AY AY water inlet connection Ø 1 1/4" F
- OUT-GAHPGA GAHP/GA water outlet connection Ø 1 1/4" F
- IN-GAHP/GA GAHP/GA water inlet connection Ø 1 1/4" F
- SC AY condensate drain connection (outside diameter 25 mm, inside 21 mm)
- GAS Gas connection Ø 3/4" M

Figure 2.5 Service plate - Detail of bottom plate



- A AY front panel
- B Boiler safety valve drain outside Ø 20 mm, inside Ø 14 mm

### 2.3 CONTROLS

#### Control device

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

1. DDC control
2. external requests

#### 2.3.1 DDC Controller

The DDC control is able to manage one or more Robur appliances

#### 2.4.2 AY 35

in ON/OFF mode (GAHP heat pumps, GA chillers) or modulating mode (AY boilers).

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



For more details see Section C01.11.

#### 2.3.2 External requests

The appliance may also be controlled via generic request devices (e.g. thermostats, clocks, buttons, contactors...) fitted with **voltage-free NO contacts**. This system only provides elementary control, without some of the important functions of DDC control. Control of the cascade between GAHP/GA and AY is dependent on the opening/closing of the requests to the units making up the Gitié 2.0 ACAY (GA ACF and AY boiler). The AY boiler retains the possibility of operating in power modulation.

### 2.4 PRESSURE DROPS

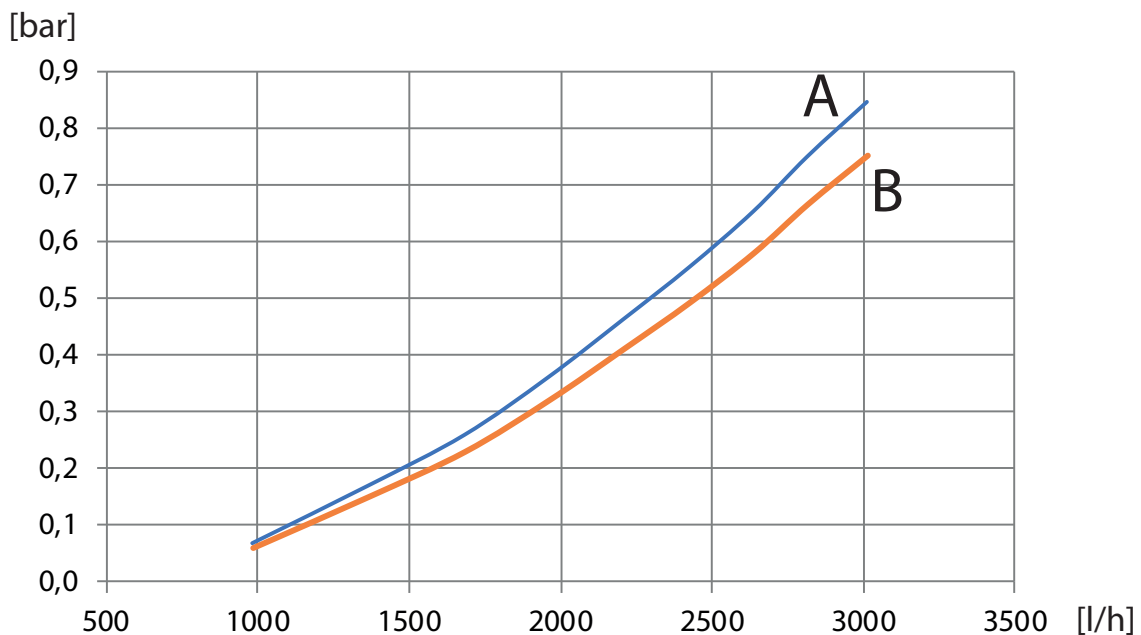
#### 2.4.1 GA ACF

Table 2.2 GA ACF, HR, TK, HT pressure drop

Cold water flow	Heat transfer fluid temperature at outlet	
	3 °C bar	7 °C 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.

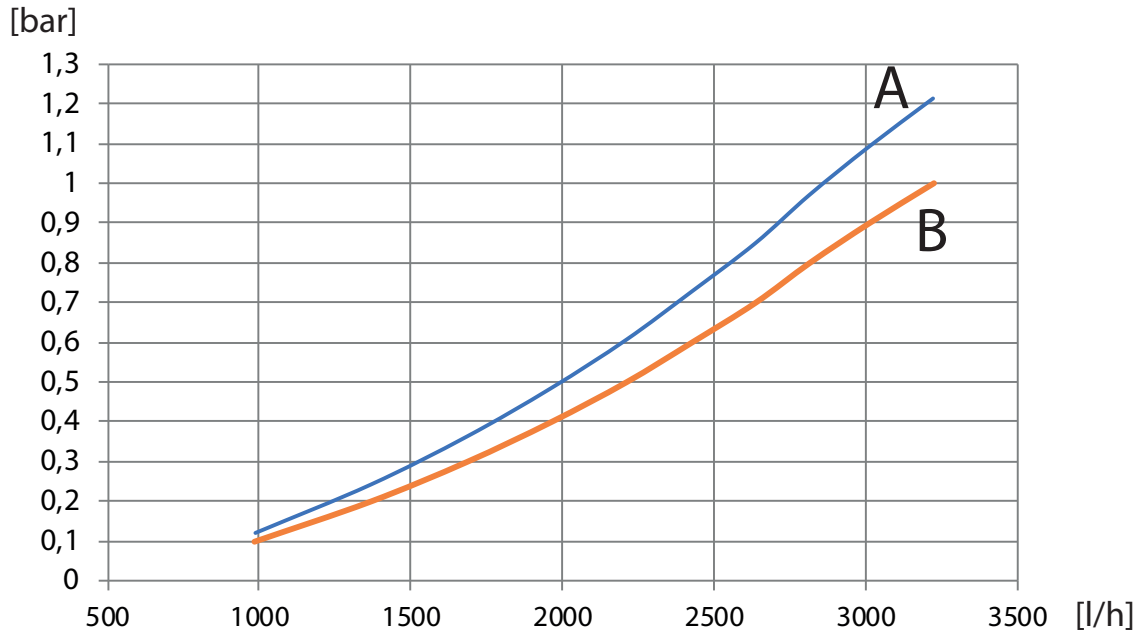
Figure 2.6 Available head and pressure drop of the boiler



- A Boiler pressure drop with 20% glycol water
- B Boiler pressure drop with no glycol in water

2.4.3 AY 50

Figure 2.7 Pressure drop AY 50 and AY 100

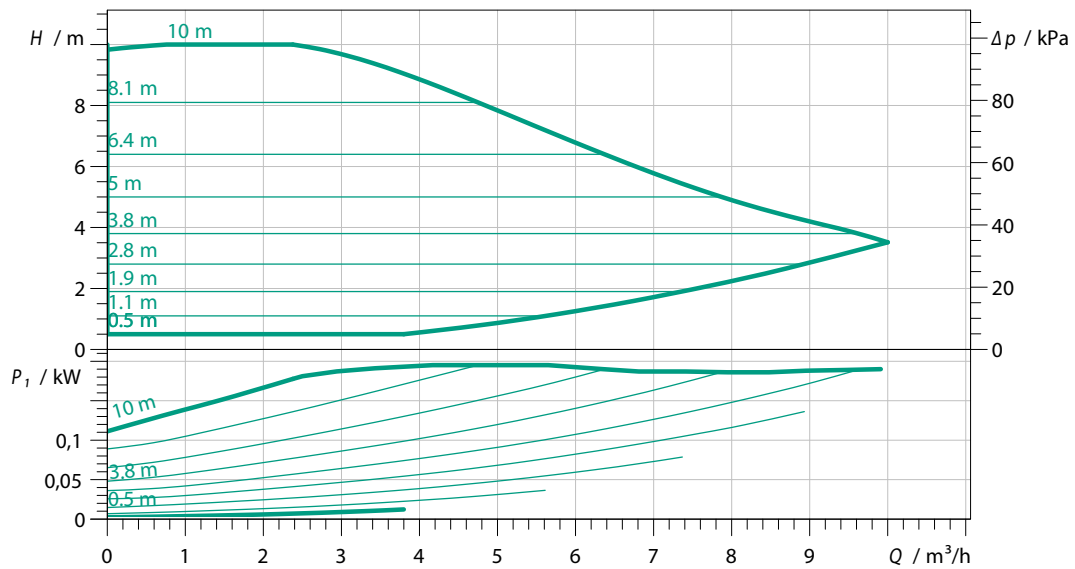


A Boiler pressure drop with 35% glycol water

B Boiler pressure drop with no glycol in water

2.5 CIRCULATING PUMP CHARACTERISTIC CURVES

Figure 2.8 Oversized pressure head circulating pump characteristic curves



2.6 PERFORMANCES

temperature to the system and outdoor temperature.

2.6.1 Heating

Refer to Paragraph 3.1 p. 8.

2.6.2 Cooling

Table 2.3 p. 7 shows the cooling output at full load and in stable operation, depending on the cold water delivery

**Table 2.3** Gitié ACAY cooling output

Outdoor 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

Table 2.4 p. 7 shows the GUE at full load and stable operation in cooling mode, depending on the cold water delivery temperature to the system and outdoor temperature.

**Table 2.4** Gitié ACAY cooling efficiency

Outdoor temperature	Water delivery temperature	
	7 °C	10 °C
	%	%
30 °C	72	73
35 °C	71	69
40 °C	62	64
45 °C	47	59



Please consider that, according to the actual cooling request, the unit may often need to operate under partial load conditions and in non stationary operation.

## 2.7 INAIL SAFETY APPLIANCES

The kit is only available on appliances intended for the Italian market.

### 3 TECHNICAL DATA

#### 3.1 ACAY INTEGRATED PACKAGE TECHNICAL DATA

Table 3.1 Gitié ACAY technical data

Heating operation		ACAY35/2	ACAY35/2 S	ACAY35/4	ACAY35/4 S	ACAY50/2	ACAY50/2 S	ACAY50/4	ACAY50/4 S
Heat input	real		34,0						50,0
	minimum		4,1						5,0
Operating point 80/60	efficiency		98,2						98,4
	effective power		33,4						49,2
Operating point 50/30	Nominal heat input		106,4						106,8
Operating point Tr = 47 °C	Heat input 30%		102,1						102,8
Operating point Tr = 30 °C	Heat input 30%		108,6						108,8
Heat losses	with burner off		0,03						0,05
	to flue in operation		2,40						2,10
	to casing in operation		0,25						0,10
Water flow rate 4 pipes	nominal (AY)		2600						2350
	minimum (AY)		1200						1500
Water flow rate 2 pipes	nominal		2600						2350
	minimum		1200						1500
Pressure drop heating mode	AY								0,57 (1)
Residual pressure head at nominal flow rate	version /4 AY				0,44				
	version /2						0,42		0,44
Hot water outlet temperature	maximum for heating								88
	maximum for DHW								88
Hot water inlet temperature	maximum for heating								70
	maximum for DHW								70
Outdoor temperature (dry bulb)	maximum								45
	minimum								-25
<b>Cooling mode</b>									
Heat input	real								25,0
Cooling output for each unit	Outdoor temperature/ Water outlet temperature								17,7
GUE efficiency	Outdoor temperature/ Water outlet temperature								71
Cold water temperature (outlet)	minimum								3

(1) For flows other than nominal see design manual, Paragraph "Pressure losses".

(2) Maximum sound pressure levels in free field, with directivity factor 2, obtained from the sound power level in compliance with standard EN ISO 9614.

(3) Sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614.



		ACAY35/2	ACAY35/2 S	ACAY35/4	ACAY35/4 S	ACAY50/2	ACAY50/2 S	ACAY50/4	ACAY50/4 S
<b>Cold water temperature (inlet)</b>	maximum				45				
	minimum				8				
<b>Cold water flow</b>	nominal				2770				
	minimum				2500				
<b>Pressure drop cooling mode</b>	GAHP/GA				0,29 (1)				
<b>Residual pressure head at nominal flow rate</b>	version /4 ACF			0,72					0,72
	version /2	0,70				0,70			
<b>Outdoor temperature</b>	maximum				45				
	minimum				0				
<b>Electrical specifications</b>									
<b>Power supply</b>	voltage				230				
	type				single-phase				
<b>Electrical power absorption</b>	frequency				50				
	nominal	0,95	1,00	1,17	1,22	0,95	1,00	1,20	1,25
<b>Degree of protection</b>	IP				25				
<b>Installation data</b>									
<b>Gas consumption</b>	G20 natural gas (nominal)		628						7,97
	G25 (nominal)		7,29						9,26
	G30 (nominal)		4,65						5,91
	G31 (nominal)		4,61						5,85
<b>Dimensions</b>	width				1425				
	height	1445	1513	1445	1513	1445	1513	1445	1513
	depth				1238				
<b>Gas connection</b>	thread				3/4				
	type				M				
<b>Water fitting</b>	thread				1 1/4				
	type				F				
<b>Type of installation (boiler)</b>	type of installation				B23, B23P, B33, B53				
<b>Boiler flue gas exhaust</b>	diameter (Ø)				80				
	residual head								
<b>Weight</b>	in operation	447	457	447	457	457	467	457	467
	minimum storage temperature				-30				
<b>sound pressure L<sub>p</sub> at 5 metres (max)</b>	sound pressure L <sub>p</sub> at 5 metres (max)	57,6 (2)	53,0 (2)	57,6 (3)	53,0 (3)	57,6 (3)	53,0 (3)	57,6 (3)	53,0 (3)
	sound power L <sub>w</sub> (max)	79,6 (3)	75,0 (3)	79,6 (3)	75,0 (3)	79,6 (3)	75,0 (3)	79,6 (3)	75,0 (3)
<b>expansion tank volume</b>	l				10				
<b>maximum flow rate of boiler flue gas condensate</b>	l/h		3,4						5,0
<b>maximum water pressure in operation</b>	bar				3,0				
<b>water content inside the appliance</b>	l		11						14
<b>NO<sub>x</sub> emission class</b>	AY								6

(1) For flows other than nominal see design manual, Paragraph "Pressure losses".  
 (2) Maximum sound pressure levels in free field, with directivity factor 2, obtained from the sound power level in compliance with standard EN ISO 9614.  
 (3) Sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614.

## 4 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 drain

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

### 4.1 APPLIANCE POSITIONING



Please refer to Section C01.02.

### 4.2 PLUMBING DESIGN



Please refer to Section C01.03.

### 4.3 WATER PUMP

Appliances in the Gitié 2.0 range are equipped with high head water pumps, already mounted and wired, the characteristic curve of which is shown in Figure 2.8 p. 6. Pressure drops within the appliance are given in Paragraph 2.4 p. 5.

### 4.4 SYSTEM WATER QUALITY



Please refer to Section C01.05.

### 4.5 ANTIFREEZE PROTECTION



Please refer to Section C01.06.

### 4.6 FUEL GAS SUPPLY



Please refer to Section C01.08.

### 4.7 COMBUSTION PRODUCTS EXHAUST



#### Installation types

The appliance is approved for connection to a combustion products exhaust duct for the types shown in Paragraph 3.1 p. 8.

#### 4.7.1 GA ACF

The GA ACF units have no flue gas exhaust.

#### 4.7.2 AY

##### 4.7.2.1 Flue gas exhaust connection

Ø 80 mm (with gasket), at the top (Figure 4.1 p. 10).

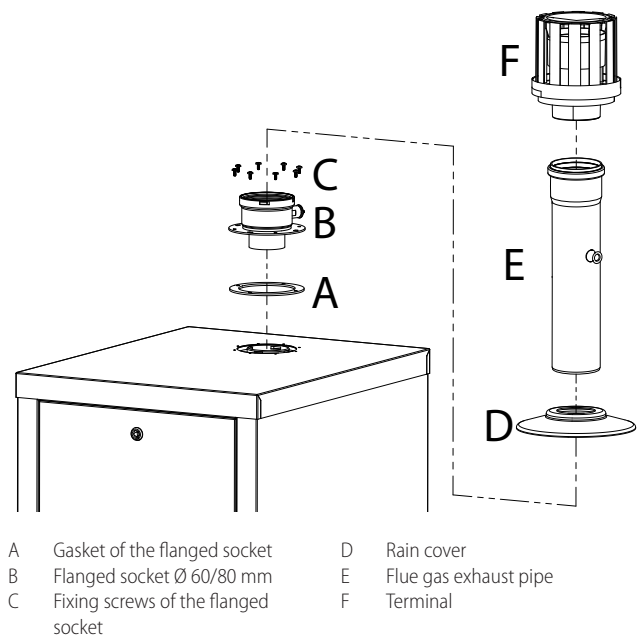
The rain cover, supplied, must be mounted on the flue gas exhaust pipe to protect the internal components of the boiler (detail E, Figure 4.1 p. 10).

The combustion air is drawn from the outside of the casing by means of special louvres.

##### 4.7.2.2 Flue gas exhaust kit

The appliance, supplied in B53P configuration, is standard supplied with a DN80 flue gas kit, to be set up by the installer.

**Figure 4.1** Flue gas exhaust kit



##### 4.7.2.3 Possible flue

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



For more details see Section C01.09.

### 4.8 FLUE GAS CONDENSATE DRAIN



Please refer to Section C01.09.

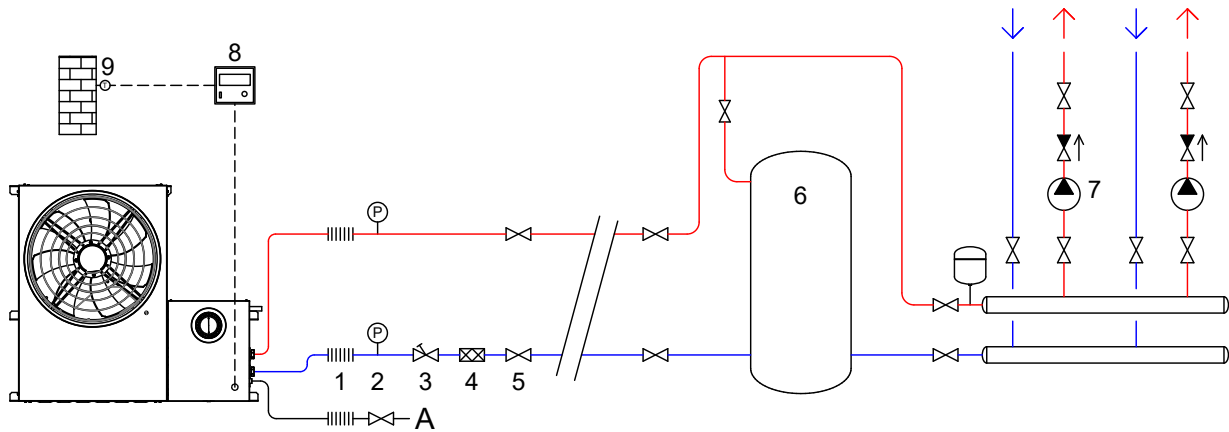
### 4.9 ELECTRICAL AND CONTROL CONNECTIONS



Please refer to Section C01.10.

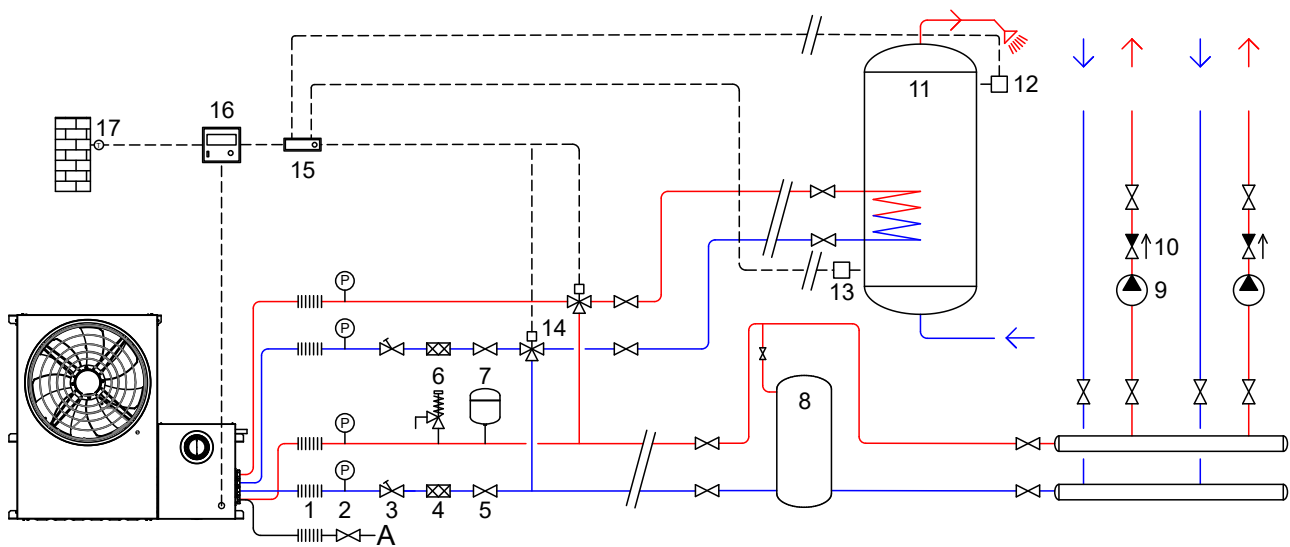
### 4.10 EXAMPLE DIAGRAMS

Figure 4.2 Hydraulic diagram Gitié ACAY /2



- |                             |   |                             |
|-----------------------------|---|-----------------------------|
| 1 Anti-vibration connection | 5 Shut-off valve                        | 9 Outdoor temperature probe |
| 2 Pressure gauge            | 6 Buffer tank (and hydraulic separator) | A Gas connection            |
| 3 Flow regulation valve     | 7 Heating/Cooling circuit water pump    |                             |
| 4 Sludge filter             | 8 DDC panel                             |                             |

Figure 4.3 Hydraulic diagram Gitié ACAY /4



- |                                    |  |                                  |
|------------------------------------|--|----------------------------------|
| 1 Anti-vibration connection        | 8 Buffer tank (and hydraulic separator)            | Legionella function              |
| 2 Pressure gauge                   | 9 Check valve                                      | 14 3-way diverter valves for DHW |
| 3 Flow regulation valve            | 10 Heating/Cooling circuit water pump              | 15 RB100 device                  |
| 4 Sludge filter                    | 11 DHW buffer tank                                 | 16 DDC panel                     |
| 5 Shut-off valve                   | 12 Thermostat with adjustable differential for DHW | 17 Outdoor temperature probe     |
| 6 Safety valve (GAHP/GA circuit)   | 13 Thermostat with adjustable differential for     | A Gas connection                 |
| 7 Expansion tank (GAHP/GA circuit) |  |                                  |

### 4.11 ACOUSTIC



Please refer to Section C01.14.