

1 SPECIFICATION OF SUPPLY

1.1 GAHP AR PLUS

Water-ammonia absorption heat pump, gas-fired with natural gas, LPG or natural gas and hydrogen mixtures up to 20%, air-water version, modulating down to 46% of the nominal heat input, reversible, for hot water production up to an outlet temperature of 60 °C (65 °C at 50% of maximum thermal input) and alternatively cold water down to an outlet temperature of 3 °C, for outdoor installation.

Nominal heat output (A7W35): 38,8 kW

GUE efficiency (A7W35): 154 %

Nominal cooling output (A35W7): 16,9 kW

Heat input: 25,2 kW

Electrical power absorption nominal: 0,84 kW

Power supply: 230 V - 50 Hz single-phase

Sound power Lw (max): 79,6 dB(A)

Weight: 363 kg

Dimensions: width 918 mm, depth 1266 mm, height 1446 mm

1.2 GAHP AR PLUS S1

Water-ammonia absorption heat pump with low-noise brushless modulating fan, gas-fired with natural gas, LPG or natural gas and hydrogen mixtures up to 20%, air-water version, modulating down to 46% of the nominal heat input, reversible, for hot water production up to an outlet temperature of 60 °C (65 °C at 50% of maximum thermal input) and alternatively cold water down to an outlet temperature of 3 °C, for outdoor installation.

Nominal heat output (A7W35): 38,8 kW

GUE efficiency (A7W35): 154 %

Nominal cooling output (A35W7): 16,9 kW

Heat input: 25,2 kW

Electrical power absorption nominal: 0,77 kW

Power supply: 230 V - 50 Hz single-phase

Sound power Lw (max): 74,0 dB(A)

Sound power Lw (min): 71,0 dB(A)

Weight: 374 kg

Dimensions: width 918 mm, depth 1266 mm, height 1523 mm

2 FEATURES AND TECHNICAL DATA

2.1 FEATURES

2.1.1 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 heat exchanger, externally insulated.
- ▶ Air exchanger with finned coil, with steel pipe and aluminium fins.
- ▶ Inversion valve on the cooling circuit, for use of the appliance in heating or cooling mode.
- ▶ Automatic microprocessor-controlled finned coil defrosting

valve.

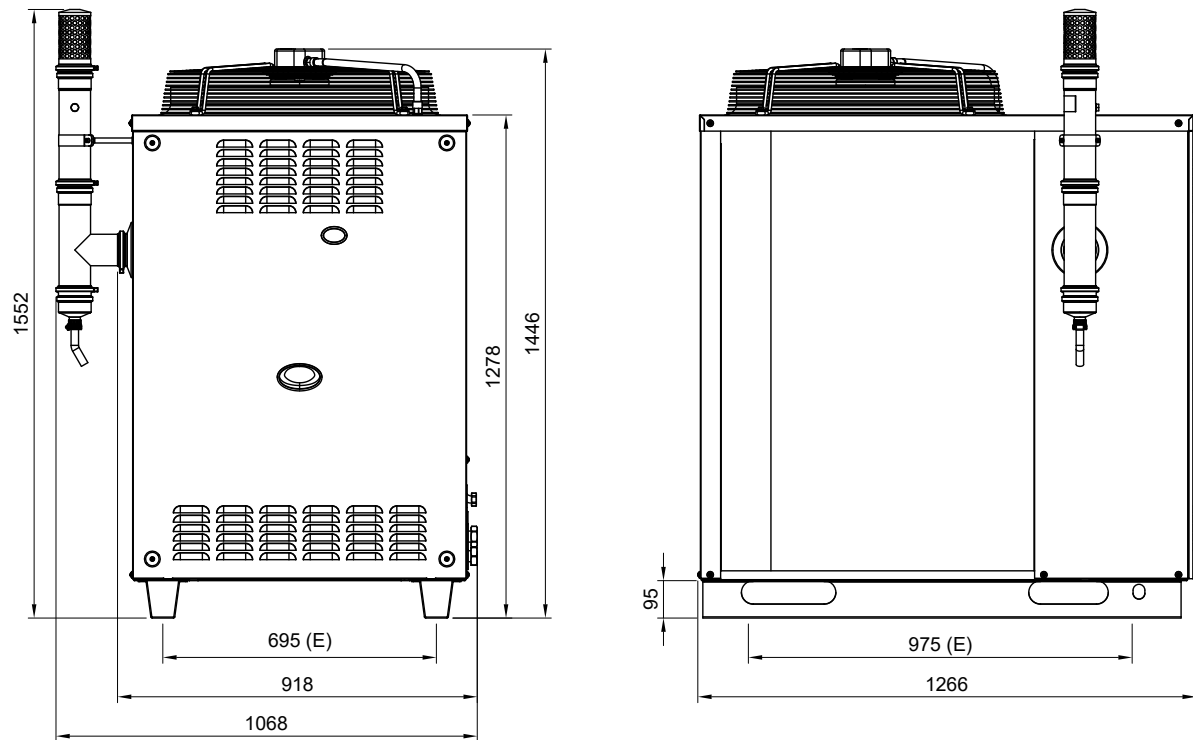
- ▶ Low power consumption refrigerant fluid oil pump.
- ▶ Modulating premix burner group from 100% to 46% of the nominal heat input.
- ▶ Standard or S1 low-noise fan (low power consumption and low noise emission).

2.1.2 Control and safety devices

- ▶ Electronic board featuring a microprocessor, LCD, and knob.
- ▶ System water flowmeter.
- ▶ Generator limit thermostat, with manual reset.
- ▶ Generator fins temperature probe.
- ▶ Sealed circuit safety relief valve.
- ▶ Bypass valve, between high and low-pressure circuits.
- ▶ Ionization flame control box.
- ▶ Double shutter electric gas valve.

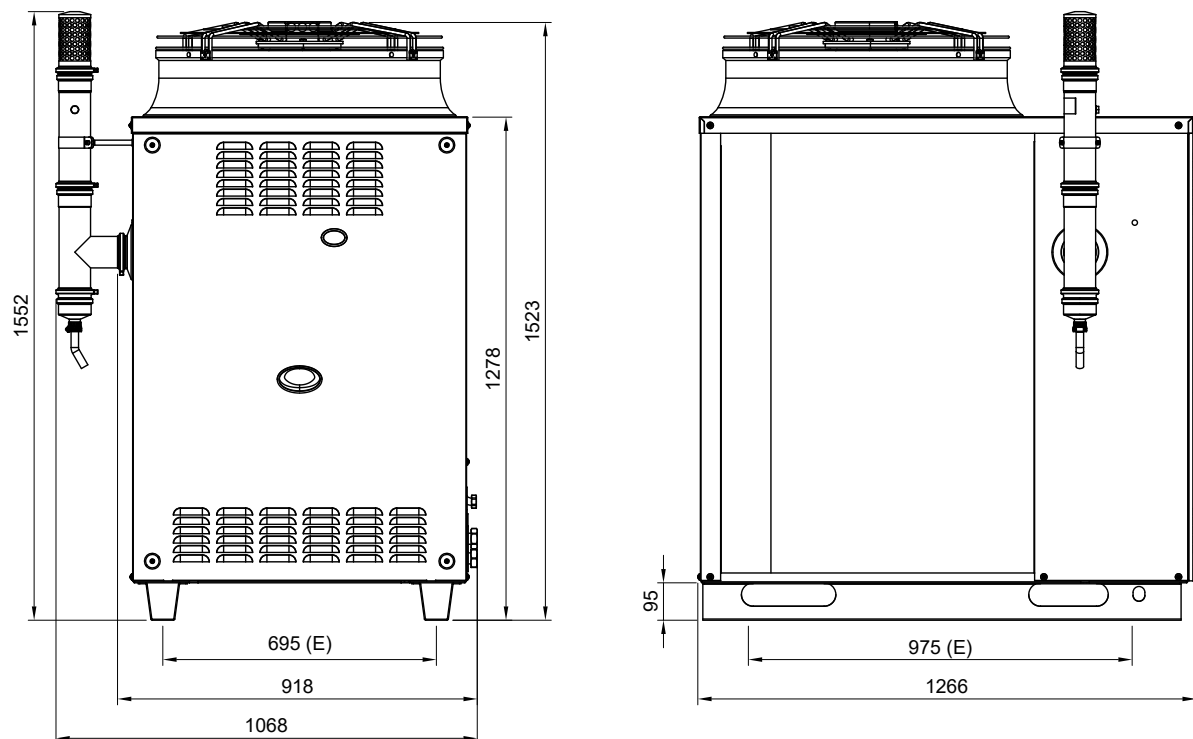
2.2 DIMENSIONS

Figure 2.1 Dimensions (standard fan)

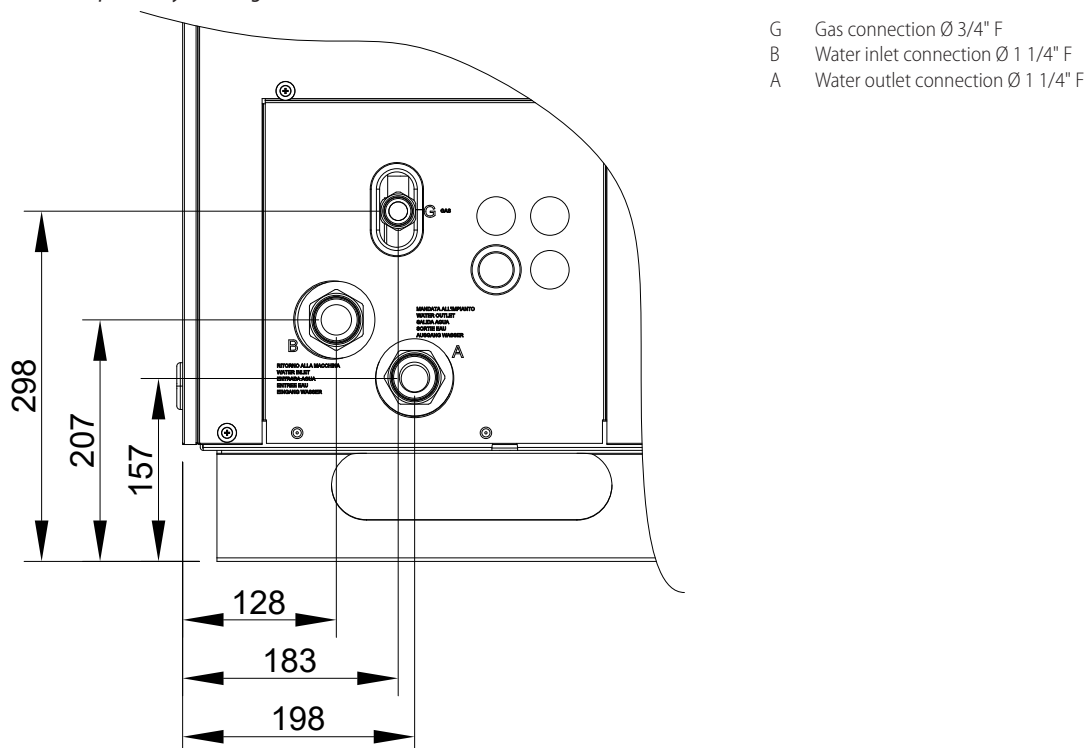


E Centre distance of holes for vibration damper supports

Figure 2.2 Dimensions (low-noise fan)



E Centre distance of holes for vibration damper supports

Figure 2.3 Service plate - Hydraulic/gas connections detail

2.3 CONTROLS

Control device

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

- DDC panel
- External request

2.3.1 DDC panel

The DDC control panel can manage one or more Robur appliances in modulating mode (GA heat pumps, GAHP boilers) or ON/OFF mode (AY chillers).

DDC control panel functionality may be extended with auxilia-

ry Robur devices RB100 and RB200 (e.g. service requests, DHW production, third party generator control, probe control, system valves or water pumps,...).



For more details see Section C01.11.

2.3.2 External request

The appliance can also be controlled by a generic request device (e.g. thermostat, timer, switch, contactor...) fitted with a voltage-free NO contact. This system only allows basic control (on/off, with a fixed setpoint temperature), thus lacking essential system functions of the DDC control panel. We recommend using it only for simple applications and with a single appliance.

2.4 TECHNICAL DATA

Table 2.1 GAHP AR Plus technical data

				GAHP AR Plus	GAHP AR Plus S1
Heating mode					
Seasonal space heating energy efficiency class (ErP)	medium-temperature application (55 °C)		-	A+	
	low-temperature application (35 °C)		-	A	A+
Nominal heat output	Outdoor temperature/Water outlet temperature	A7W35	kW	38,8	
GUE efficiency	Outdoor temperature/Water outlet temperature	A7W35	%	154	
Heat input	nominal (1013 mbar - 15 °C)		kW	25,7	
	real		kW	25,2	

- (1) In transient operation, lower temperatures are allowed.
- (2) For flows other than nominal see Design Manual, Pressure losses Paragraph.
- (3) As an option, a version for operation down to -30 °C is available.
- (4) To be set (on demand) during the first start-up. Default Minimum Temperature = 4,5 °C.
- (5) ±10% depending on power voltage and absorption tolerance of electric motors.
- (6) Sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614.
- (7) Maximum sound pressure levels in free field, with directivity factor 2, obtained from the sound power level in compliance with standard EN ISO 9614. Data referred to 50 °C outlet temperature.
- (8) Sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614. Data referred to 50 °C outlet temperature.
- (9) Maximum sound pressure levels in free field, with directivity factor 2, obtained from the sound power level in compliance with standard EN ISO 9614.
- (10) Overall dimensions excluding flue gas exhaust.
- (11) Tolerance ±5%.

				GAHP AR Plus	GAHP AR Plus S1
Hot water outlet temperature	maximum for heating		°C	60	
	maximum for DHW		°C	65	
Hot water inlet temperature	maximum for heating		°C	50	
	maximum for DHW		°C	60	
	minimum temperature in continuous operation		°C	30 (1)	
Heating water flow	nominal		l/h	3040	
	maximum		l/h	3500	
	minimum		l/h	2500	
Water pressure drop in heating mode	at nominal water flow		bar	0,29 (2)	
Outdoor temperature (dry bulb)	maximum		°C	40	
	minimum		°C	-15 (3)	
Cooling mode					
Nominal cooling output	Outdoor temperature/Water outlet temperature	A35W7	kW	16,9	
GUE efficiency	Outdoor temperature/Water outlet temperature	A35W7	%	67	
Cold water temperature (outlet)	minimum		°C	3 (4)	
Cold water temperature (inlet)	maximum		°C	45	
	minimum		°C	8	
Cold water flow	nominal		l/h	2900	
	maximum		l/h	3500	
	minimum		l/h	2500	
Internal pressure drop	at nominal water flow		bar	0,31 (2)	
Outdoor temperature	maximum		°C	45	
	minimum		°C	0	
Electrical specifications					
Power supply	voltage		V	230	
	type		-	single-phase	
	frequency		Hz	50	
Electrical power absorption	nominal		kW	0,84	0,77 (5)
	minimum		kW	-	0,50 (5)
Degree of protection	IP		-	25	
Installation data					
Gas consumption	G20 natural gas (nominal)		m³/h	2,72	
	G25 (nominal)		m³/h	3,16	
	G25.1 (nominal)		m³/h	3,16	
	G25.3 (nominal)		m³/h	3,09	
	G27 (nominal)		m³/h	3,32	
	G2.350 (nominal)		m³/h	3,78	
	G30 (nominal)		kg/h	2,03	
	G31 (nominal)		kg/h	2,00	
NO _x emission class			-	6	
Sound power L _w (max)			dB(A)	79,6 (6)	74,0 (7)
Sound power L _w (min)			dB(A)	-	71,0 (8)
sound pressure L _p at 5 metres (max)			dB(A)	57,6 (9)	52,0 (7)
sound pressure L _p at 5 metres (min)			dB(A)	-	49,0 (7)
maximum water pressure in operation			bar	4,0	
water content inside the appliance			l	3	
Water fitting	type		-	F	
	thread		"	1 1/4	
Gas connection	type		-	F	
	thread		"	3/4	
Flue gas exhaust	diameter (Ø)		mm	80	
	residual head		Pa	90	
type of installation			-	B23P, B33, B53P	

(1) In transient operation, lower temperatures are allowed.

(2) For flows other than nominal see Design Manual, Pressure losses Paragraph.

(3) As an option, a version for operation down to -30 °C is available.

(4) To be set (on demand) during the first start-up. Default Minimum Temperature = 4,5 °C.

(5) ±10% depending on power voltage and absorption tolerance of electric motors.

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

(7) Maximum sound pressure levels in free field, with directivity factor 2, obtained from the sound power level in compliance with standard EN ISO 9614. Data referred to 50 °C outlet temperature.

(8) Sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614. Data referred to 50 °C outlet temperature.

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

(10) Overall dimensions excluding flue gas exhaust.

(11) Tolerance ±5%.

			GAHP AR Plus	GAHP AR Plus S1
Dimensions	width	mm	918 (10)	
	depth	mm	1266	
	height	mm	1446 (10)	1523 (10)
	Packing	width	930	
		height	1446	1523
		depth	1300	
Weight	in operation	kg	363	374
	gross (including packaging)	kg	361	372
Maximum air flow of the fan		m ³ /h	11000	
fan residual head		Pa	-	40
General information				
Refrigerating fluid (11)	ammonia R717	kg	7,6	
	water H ₂ O	kg	10,0	
maximum pressure of the refrigerating circuit		bar	32	

- (1) In transient operation, lower temperatures are allowed.
 (2) For flows other than nominal see Design Manual, Pressure losses Paragraph.
 (3) As an option, a version for operation down to -30 °C is available.
 (4) To be set (on demand) during the first start-up. Default Minimum Temperature = 4,5 °C.
 (5) ±10% depending on power voltage and absorption tolerance of electric motors.
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 (9) Maximum sound pressure levels in free field, with directivity factor 2, obtained from the sound power level in compliance with standard EN ISO 9614.
 (10) Overall dimensions excluding flue gas exhaust.
 (11) Tolerance ±5%.

2.4.1 Pressure drops

2.4.1.1 Heating

Table 2.2 GAHP AR Plus pressure drops in heating mode

Hot water flow	Heat transfer fluid temperature at outlet		
	35 °C	50 °C	60 °C
	bar	bar	bar
2500 l/h	0,22	0,21	0,20
3000 l/h	0,30	0,29	0,28
3500 l/h	0,40	0,38	-

2.4.1.2 Cooling

Table 2.3 GAHP AR Plus pressure drops in cooling mode

Cold water flow	Heat transfer fluid temperature at outlet		
	3 °C	7 °C	10 °C
	bar	bar	bar
2500 l/h	0,26	0,24	0,23
3000 l/h	0,35	0,33	0,32
3500 l/h	0,48	0,46	0,45

The data refer to operation with no glycol in water.

2.4.2 Performances

2.4.2.1 Heating

Table 2.4 p. 5 shows the heat output at full load and stable operation, depending on the hot water delivery temperature to the system and outdoor temperature.

Table 2.4 GAHP AR Plus heat output

Outdoor temperature	Water delivery temperature						
	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C (1)
	kW	kW	kW	kW	kW	kW	kW
-22 °C	26,2	25,5	24,7	24,6	24,4	-	-
-20 °C	26,8	26,0	25,2	25,0	24,8	-	-
-15 °C	28,2	27,3	26,4	26,0	25,7	-	-
-14 °C	28,5	27,5	26,6	26,2	25,9	-	-
-13 °C	28,8	27,8	26,9	26,5	26,0	-	-
-12 °C	29,1	28,1	27,1	26,7	26,3	-	-
-11 °C	29,4	28,4	27,4	27,0	26,5	-	-
-10 °C	29,7	28,8	27,8	27,3	26,7	26,5	-
-9 °C	30,4	29,4	28,3	27,8	27,2	27,0	-
-8 °C	31,1	30,0	28,8	28,3	27,7	27,5	-
-7 °C	31,8	30,6	29,5	28,9	28,2	28,0	10,0
-6 °C	32,2	31,1	30,1	29,3	28,6	28,2	10,1
-5 °C	32,7	31,7	30,6	29,8	29,0	28,5	10,1
-4 °C	33,1	32,2	31,2	30,3	29,3	28,7	10,2
-3 °C	33,5	32,7	31,8	30,7	29,7	28,9	10,3
-2 °C	34,0	33,2	32,4	31,2	30,0	29,1	10,4
-1 °C	34,4	33,7	33,0	31,7	30,3	29,3	10,5
0 °C	34,9	34,3	33,6	32,2	30,7	29,6	10,6
1 °C	35,4	34,8	34,2	32,7	31,1	29,9	10,7
2 °C	35,8	35,3	34,8	33,2	31,5	30,2	10,8
3 °C	36,3	35,8	35,4	33,7	32,0	30,7	10,9

(1) Thermal input reduced to 50%

Outdoor temperature	Water delivery temperature						
	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C(1)
	kW	kW	kW	kW	kW	kW	kW
4 °C	37,0	36,5	36,0	34,3	32,5	31,2	11,1
5 °C	37,7	37,2	36,7	34,9	33,1	31,8	11,2
6 °C	38,3	37,8	37,3	35,5	33,7	32,5	11,4
7 °C	38,8	38,3	37,8	36,0	34,3	33,0	11,6
8 °C	39,2	38,7	38,2	36,4	34,7	33,5	11,8
9 °C	39,4	38,9	38,4	36,7	35,1	34,1	12,1
10 °C	39,6	39,1	38,6	37,0	35,5	34,6	12,3
11 °C	39,7	39,2	38,7	37,2	35,8	35,0	12,6
12 °C	39,8	39,3	38,8	37,4	36,0	35,3	12,7
13 °C	39,9	39,4	38,9	37,6	36,2	35,5	12,8
14 °C	40,0	39,5	39,0	37,7	36,5	35,7	12,9
15 °C	40,1	39,6	39,1	37,9	36,7	35,9	13,0
20 °C	40,3	39,8	39,3	38,3	37,3	36,5	13,2
25 °C	40,4	39,9	39,4	38,6	37,8	37,3	13,5
30 °C	40,6	40,1	39,6	38,8	38,1	37,5	13,6
35 °C	40,6	40,1	39,6	38,8	38,1	37,5	13,7

(1) Thermal input reduced to 50%

Table 2.5 p. 6 shows the GUE at full load and stable operation in heating mode, depending on the hot water delivery temperature to the system and outdoor temperature.

Table 2.5 GUE GAHP AR Plus in heating mode

Outdoor temperature	Water delivery temperature						
	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C(1)
-22 °C	104	101	98	98	97	-	-
-20 °C	106	103	100	99	99	-	-
-15 °C	112	108	105	103	102	-	-
-14 °C	113	109	106	104	103	-	-
-13 °C	114	110	107	105	103	-	-
-12 °C	115	112	108	106	104	-	-
-11 °C	117	113	109	107	105	-	-
-10 °C	118	114	110	108	106	105	-
-9 °C	121	117	112	110	108	107	-
-8 °C	123	119	114	112	110	109	-
-7 °C	126	122	117	115	112	111	79
-6 °C	128	124	119	116	114	112	80
-5 °C	130	126	122	118	115	113	81
-4 °C	131	128	124	120	116	114	81
-3 °C	133	130	126	122	118	115	82
-2 °C	135	132	129	124	119	116	83
-1 °C	137	134	131	126	120	116	84
0 °C	139	136	133	128	122	117	84
1 °C	140	138	136	130	123	119	85
2 °C	142	140	138	132	125	120	86
3 °C	144	142	140	134	127	122	87
4 °C	147	145	143	136	129	124	88
5 °C	150	148	146	139	132	126	89
6 °C	152	150	148	141	134	129	91
7 °C	154	152	150	143	136	131	92
8 °C	155	153	151	145	138	133	94
9 °C	156	154	152	146	139	135	96
10 °C	157	155	153	147	141	137	98
11 °C	158	156	154	148	142	139	100
12 °C	158	156	154	149	143	140	101
13 °C	158	156	154	149	144	141	102
14 °C	159	157	155	150	145	142	103
15 °C	159	157	155	150	146	142	103
20 °C	160	158	156	152	148	145	105
25 °C	161	159	157	153	150	148	107
30 °C	161	159	157	154	151	149	108
35 °C	161	159	157	154	151	149	109

(1) Thermal input reduced to 50%



Please consider that, according to the actual heating

load, the appliance may often need to operate under

partial load conditions and in non-stationary operation.

2.4.2.2 Cooling

Table 2.6 p. 7 shows the cooling output at full load and in stable operation, depending on the cold water delivery temperature to the system and outdoor temperature.

Table 2.6 GAHP AR Plus cooling output

Outdoor temperature	Water delivery temperature	
	7 °C	10 °C
	kW	kW
30 °C	17,8	18,1
35 °C	16,9	17,4
40 °C	15,0	16,0
45 °C	-	13,5

Table 2.7 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 2.7 GUE GAHP AR Plus in cooling mode

Outdoor temperature	Water delivery temperature	
	7 °C	10 °C
	%	%
30 °C	71	72
35 °C	67	69
40 °C	60	63
45 °C	-	54



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

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 drain



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

3.1 APPLIANCE POSITIONING



Please refer to Section C01.02.

3.2 PLUMBING DESIGN



Please refer to Section C01.03.

3.3 WATER PUMP

The circulation pump (flow and head) must be selected and installed based on pressure drops of plumbing/primary circuit (piping + components + exchange terminals + appliance).

For the appliance pressure drops refer to Table 2.2 p. 5 (in heating mode) and to Table 2.3 p. 5 (in cooling mode).



Please refer to Section C01.04 for the characteristics of the pumps available as Robur optional.

3.4 SYSTEM WATER QUALITY



Please refer to Section C01.05.

3.5 ANTIFREEZE PROTECTION



Please refer to Section C01.06.

3.6 FUEL GAS SUPPLY



Please refer to Section C01.08.

3.7 FLUE GAS EXHAUST



Compliance with standards

The appliance is approved for connection to a combustion products exhaust duct for the types shown in Table 2.1 p. 3.

3.7.1 Flue gas exhaust connection

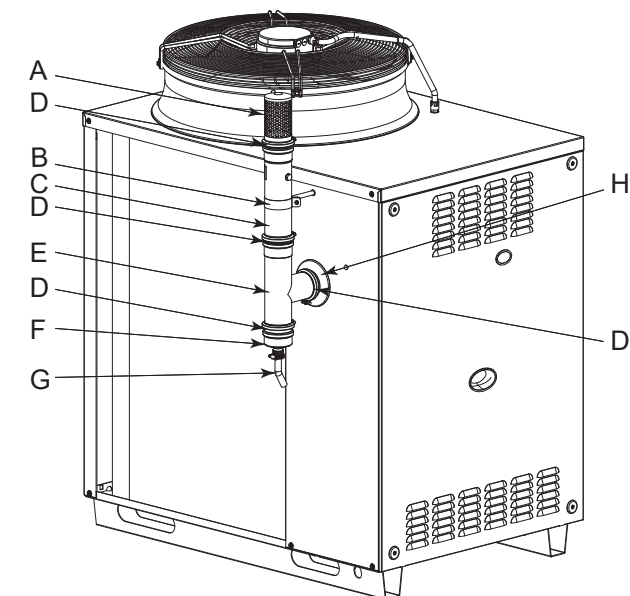
Ø 80 mm (with gasket), on the left, at the top (Figure 3.1 p. 8).

3.7.2 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. Ø 80 mm flue gas exhaust pipe, length 350 mm (C)
1. "T" connector (E)
1. condensate trap (F)
1. terminal (A)
1. clamp for fixing pipe (B) to left side panel
4. pipe clamps (D)
1. hose holder and condensate drain hose (G)

Figure 3.1 Components of flue gas exhaust kit



A	Terminal	E	T connector
B	Pipe clamp	F	Condensate trap
C	Flue gas exhaust pipe, length 350 mm	G	Hose adaptor + condensate drain pipe
D	Pipe clamp	H	Rain cover

3.7.3 Possible flue

If required, the appliance may be connected to a flue of appropriate type for non-condensing appliances.



For more details see Section C01.09.

3.8 FLUE GAS CONDENSATE DRAIN



Please refer to Section C01.09.

3.9 ELECTRICAL AND CONTROL CONNECTIONS



Please refer to Section C01.10.

3.10 EXAMPLE DIAGRAMS



Please refer to Section C01.13.

3.11 ACOUSTIC



Please refer to Section C01.14.