

1 SPECIFICATION OF SUPPLY

1.1 GAHP-AR

Water-ammonia absorption heat pump, fed with natural gas or LPG, air-water version, reversible, for hot water production up to a delivery temperature of 60 °C and alternatively cold water down to a delivery temperature of 3 °C, for outdoor installation.
 Heat output for each unit (A7W35): 37,8 kW
 GUE efficiency (A7W35): 150 %
 Cooling output for each unit (A35W7): 16,9 kW
 Heat input: 25,2 kW
 Electrical power absorption nominal: 0,84 kW
 Power supply: 230 V - 50 Hz single-phase
 Weight: 380 kg
 Dimensions: width 850 mm, depth 1240 mm, height 1445 mm

1.2 GAHP-AR S

Water-ammonia absorption heat pump with low-noise fan, fed with natural gas or LPG, air-water version, reversible, for hot water production up to a delivery temperature of 60 °C and alternatively cold water down to a delivery temperature of 3 °C, for outdoor installation.
 Heat output for each unit (A7W35): 37,8 kW
 GUE efficiency (A7W35): 150 %
 Cooling output for each unit (A35W7): 16,9 kW
 Heat input: 25,2 kW
 Electrical power absorption nominal: 0,87 kW
 Power supply: 230 V - 50 Hz single-phase
 Weight: 390 kg
 Dimensions: width 850 mm, depth 1240 mm, height 1513 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.

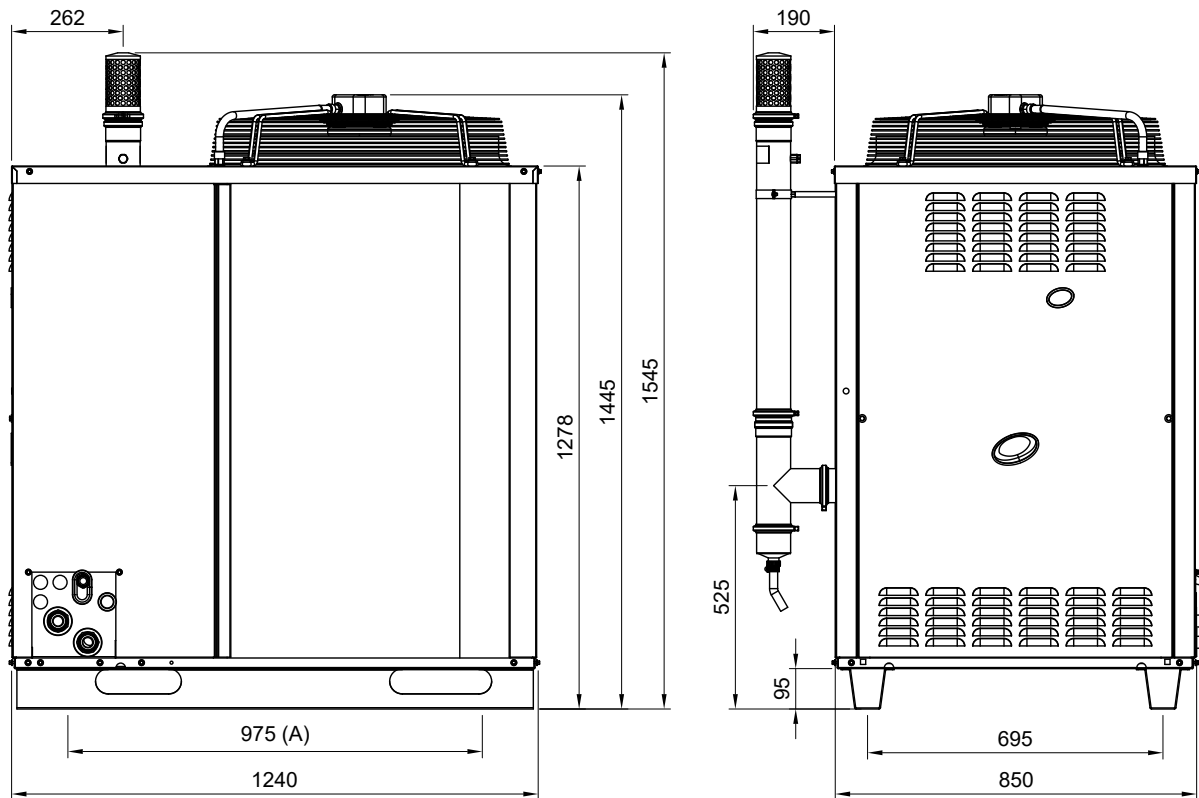
- ▶ Low power consumption refrigerant fluid oil pump.
- ▶ Variable-flow (for summer operation) microprocessor-controlled helicoidal motor-fan.

2.1.2 Control and safety devices

- ▶ S61 electronic board with microprocessor, LCD display and knob.
- ▶ Auxiliary AR11 electronic board.
- ▶ Circuit water flow switch.
- ▶ Generator limit thermostat, with manual reset.
- ▶ Generator fins temperature probe.
- ▶ Differential air 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.

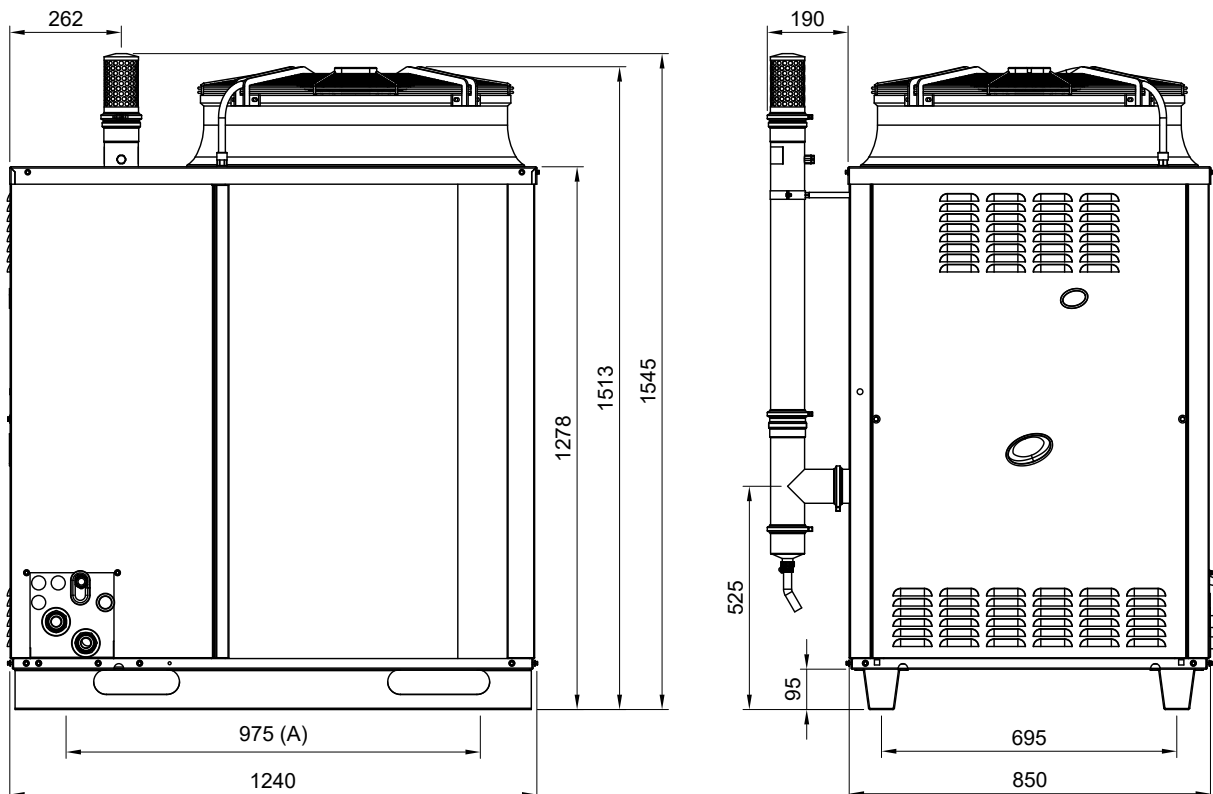
2.2 DIMENSIONS

Figure 2.1 Dimensions (standard fan)



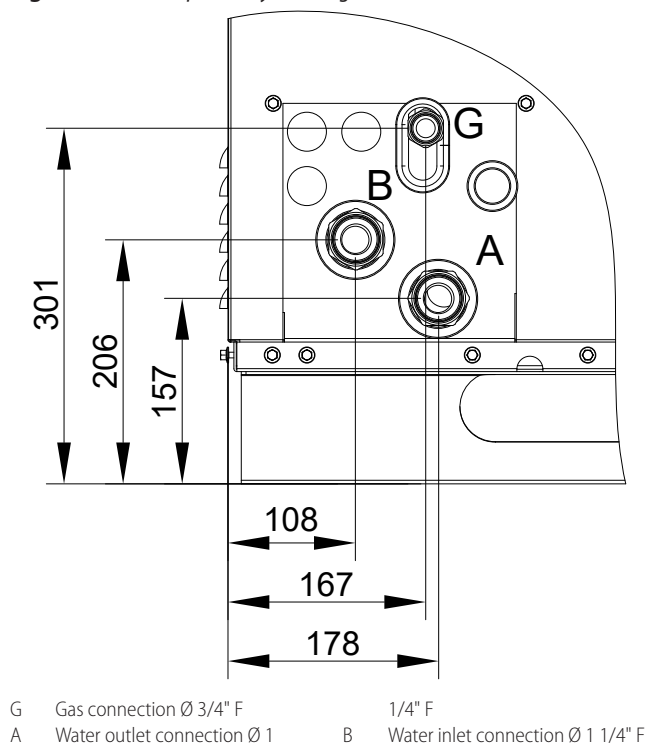
A Centre distance of holes for vibration damper supports

Figure 2.2 Dimensions (low-noise fan)



A 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:

1. DDC control
2. external request

2.3.1 DDC Controller

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

The appliance may also be controlled via generic enable devices (e.g. thermostat, timer, switch, contactor...) fitted with voltage-free NO contact. This system only provides elementary control (on/off, with fixed setpoint temperature), hence without the important functions of the DDC control. It is advisable to possibly limit its use to simple applications only and with a single appliance.

2.4 TECHNICAL DATA

Table 2.1 GAHP-AR technical data

		GAHP-AR	GAHP-AR S
Heating operation			
Seasonal space heating energy efficiency class (ErP)	medium-temperature application (55 °C)	-	A+
	low-temperature application (35 °C)	-	A
Heat output for each unit	Outdoor temperature/Water outlet temperature	A7W35 kW	37,8
		A7W50 kW	35,3
GUE efficiency	Outdoor temperature/Water outlet temperature	A7W35 %	150
		A7W50 %	140
Heat input	nominal (1013 mbar - 15 °C)	kW	25,7
	real	kW	25,2
Hot water outlet temperature	maximum	°C	60
	nominal	°C	50
Hot water inlet temperature	maximum	°C	50
	minimum temperature in continuous operation	°C	30 (1)
Thermal leap	nominal	°C	10
	nominal	l/h	3040
Heating water flow	maximum	l/h	3500
	minimum	l/h	2500
	at nominal water flow	bar	0,29 (2)
Outdoor temperature (dry bulb)	nominal	°C	7
	maximum	°C	35
	minimum	°C	-20
Cooling mode			
Cooling output for each unit	Outdoor temperature/Water outlet temperature	A35W7 kW	16,9
GUE efficiency	Outdoor temperature/Water outlet temperature	A35W7 %	67
Cold water temperature (inlet)	maximum	°C	45
	minimum	°C	8

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

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

(3) \pm 10% according to the power supply voltage and tolerance on electrical motors consumption. Measured at outdoor temperature of 30 °C.

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

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

(6) Overall dimensions excluding flue gas exhaust.

			GAHP-AR	GAHP-AR S
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	nominal	°C	35	
	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 (3)	0,87 (3)
Degree of protection	IP	-	X5D	
Installation data				
Gas consumption	G20 natural gas (nominal)	m ³ /h	2,72	
	G25 (nominal)	m ³ /h	3,16	
	G27 (nominal)	m ³ /h	3,32	
	G2.350 (nominal)	m ³ /h	3,78	
	G30 (nominal)	kg/h	2,03	
	G31 (nominal)	kg/h	2,00	
NO_x emission class		-	5	
sound power L_w (max)		dB(A)	79,6 (4)	75,0 (4)
sound pressure L_p at 5 metres (max)		dB(A)	57,6 (5)	53,0 (5)
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	12	
type of installation		-	B23, B53	
Dimensions	width	mm	850	
	depth	mm	1240	
	height	mm	1445 (6)	1513 (6)
Weight	in operation	kg	380	390
General information				
Refrigerating fluid	ammonia R717	kg	7,1	
	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) ±10% according to the power supply voltage and tolerance on electrical motors consumption. Measured at outdoor temperature of 30 °C.
- (4) Sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614.
- (5) Maximum sound pressure levels in free field, with directivity factor 2, obtained from the sound power level in compliance with standard EN ISO 9614.
- (6) Overall dimensions excluding flue gas exhaust.

2.4.1 Pressure drops

2.4.1.1 Heating

Table 2.2 Pressure drop GAHP-AR 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 Pressure drop GAHP-AR 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 for a single unit at full load and in stable operation, depending on hot water delivery temperature to the system and outdoor temperature.

Table 2.4 GAHP-AR heat output for each unit

Outdoor temperature	Water delivery temperature					
	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C
	kW	kW	kW	kW	kW	kW
-20 °C	26,5	25,7	24,9	24,9	24,6	24,3
-15 °C	27,7	27,0	26,2	25,8	25,5	25,1
-10 °C	29,8	28,8	27,7	27,0	26,7	26,4
-5 °C	32,6	31,6	30,6	29,2	28,8	28,4
0 °C	34,9	34,2	33,6	31,4	30,5	29,6
5 °C	37,0	36,7	36,4	34,1	32,9	31,8
7 °C	37,8	37,6	37,5	35,3	34,2	33,0
10 °C	38,5	38,5	38,4	36,4	35,5	34,5
15 °C	39,2	39,2	39,1	37,6	36,7	35,8

Table 2.5 p. 5 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 heating

Outdoor temperature	Water delivery temperature					
	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C
	%	%	%	%	%	%
-20 °C	105	102	99	99	98	96
-15 °C	110	107	104	102	101	100
-10 °C	118	114	110	107	106	105
-5 °C	129	125	121	116	114	113
0 °C	138	136	133	124	121	117
5 °C	147	146	145	135	131	126
7 °C	150	149	149	140	136	131
10 °C	153	153	152	144	141	137
15 °C	156	155	155	149	146	142



Please consider that, according to the actual heating request, 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. 5 shows the unitary cooling output at full load and in stable operation, depending on cold water delivery temperature to the system and outdoor temperature.

Table 2.6 GAHP-AR cooling output for each unit

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. 5 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 cooling

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 request, the unit 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. 4 (in heating mode) and to Table 2.3 p. 4 (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 COMBUSTION PRODUCTS EXHAUST



Compliance with standards

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

3.7.1 Flue gas exhaust connection

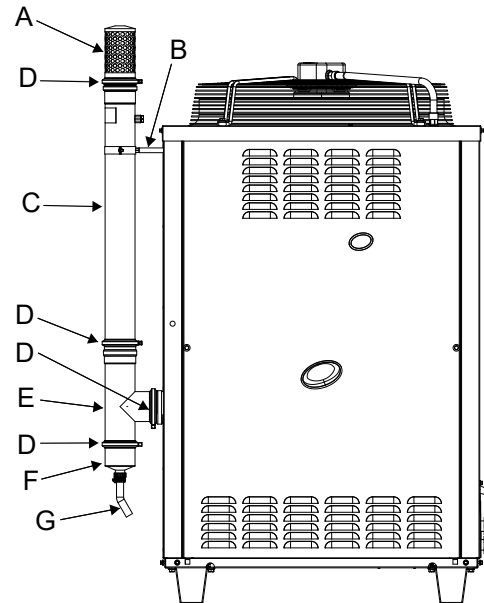
Ø 80 mm (with gasket), on the left, at the bottom (Figure 3.1 p. 6).

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. 6):

- ▶ 1 Ø 80 mm flue gas exhaust pipe, length 750 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 condensate drain hose fitting and silicone hose (G)

Figure 3.1 Components of flue gas exhaust kit



A	Terminal	E	T connector
B	Pipe clamp	F	Condensate drain
C	Exhaust pipe L = 750 mm	G	Hose adaptor + condensate drain pipe
D	Pipe clamp		

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.