



caring for the environment

Design Manual v3

Supplementary Manual For Multiple Assemblies
& Condensing Boilers

To be read in conjunction with the
GAHP-A Design Manual

39.4% renewable energy

165% heating efficiency

RTA

Multiple Assemblies, Heat Pumps

&

RTAY

Multiple Assemblies,
Heat Pumps with
Robur Condensing Boilers

powered by gas and renewable energy



AY

4 star condensation boiler
for heating

powered by gas



General Description

GAHP-A Gas Absorption Air Source Heat Pumps, factory assembled links, skid mounted for heating and DHW only. Combinations with or without condensing boilers.

For further products utilising Ground, Water or Air Source and offer cooling & heating, cooling only and cooling with recovery for "free" hot water.

Model Codes

RTA... multiple assembly with just Heat Pumps.

RTAY... multiple assembly with heat pumps & boilers refer to ESS for full codes.

HT	(High Temp, 38.3kW 65°C) or	LT	(Low Temp)
S1	(Low Noise)		
MET/NAT	(Natural Gas)	or	LPG (Butane or Propane)
AY	(Robur Condensing Boiler, 34.4kW)		

Single Units - see *GAHP-A Design Manual*

GAHP	(Gas Absorption Heat Pump)	- A	(Air Source)
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DDC - Control and Regulation of Multiple Links

Where linked multiple units are installed, the DDC offers cascade control, load sharing between units and control and prioritising of Heating & DHW.

A DDC is supplied with every multiple linked system, designed for internal mounting.

Production of domestic hot water

DHW can be provided either by a 2-pipe system as with the single GAHP-A, or utilising a 4-pipe configuration for dedicated supply. See schematics. An RB100 controller is recommended.

SPECIFICATION - Popular Link Multi-Systems GAHP Heat Pumps & GAHP Heat Pumps with a single AY Boiler

Link Options - Heat Pumps Only					
Performance & Dimensions	Unit				
Number of GAHP-LT LOW Temp Heat Pumps		2	3	4	5
Model number (abbreviated)*		RTA282LT	RTA423LT	RTA564LT	RTA705LT
Heat Output	kW	83.4	125.1	166.8	208.5
Thermal Input	kW	50.4	75.6	100.8	126
Number of GAHP-HT HIGH Temp Heat Pumps		2	3	4	5
Model number (abbreviated)*		RTA266HT	RTA399HT	RTA532HT	RTA665HT
Heat Output	kW	76.6	114.9	153.2	191.9
Thermal Input	kW	50.4	75.6	100.8	126
Dimensions					
Length (Height=1537mm, Depth=1245mm)	mm	2314	3610	4936	6490
Weight	kg	950	1410	1890	2370

Link Options - Heat Pumps with Single AY Boiler					
Performance & Dimensions	Unit				
Number of GAHP-LT LOW Temp Heat Pumps	n.	1	2	3	4
Number of AY Boilers	n.	1	1	1	1
Model number (abbreviated)*		RTAY261LT	RTAY402LT	RTAY543LT	RTAY684LT
Heat Output	kW	76.1	117.8	159.5	201.2
Thermal Input	kW	60.1	85.3	110.5	135.7
Number of GAHP-HT HIGH Temp Heat Pumps	n.	1	2	3	4
Number of AY Boilers	n.	1	1	1	1
Model number (abbreviated)*		RTAY253HT	RTAY386HT	RTAY519HT	RTAY652HT
Heat Output	kW	72.7	111	149.3	187.6
Thermal Input	kW	60.1	85.3	110.5	135.7
Height=1650mm, Depth=1245mm, Length.....	mm	2314	3382	4936	6490
Weight	kg	640	1100	1580	2220

Buffer Storage	Unit					
Number of GAHP Heat Pumps	n.	1	2	3	4	5
Recommended Volume	litres	2-300	3-500	800-1000		

* For full model number insert 00, add S1 for low noise, NAT for mains gas or LPG. Example **RTAY 00 253 HT S1 MET**

LINK TECHNICAL CHARACTERISTICS		LINK COMPOSITION					
Connections and Noise	Unit						
Number of GAHP Heat Pumps	n.	1	2	3	4	5	
Number of AY Boilers	n.	1 to 5	0 to 5	0 to 5	0 to 4	0	
NUM. OF TOTAL LINK UNITS	n.	2 to 6	2 to 7	3 to 8	4 to 8	5	
Power supply (voltage, type - frequency)		400 V 3N - 50 Hz					
Gas fitting dia	Inches	1 1/2" F					
Water fitting (out/in) dia. (2)	Inches	2" M					
Condensation discharge fitting dia. (2)	Inches	1" F					
Sound pressure level at 10 metres	Maximum	dB(A)	54	55	57	58	59
	Minimum	dB(A)	49	50	52	53	54

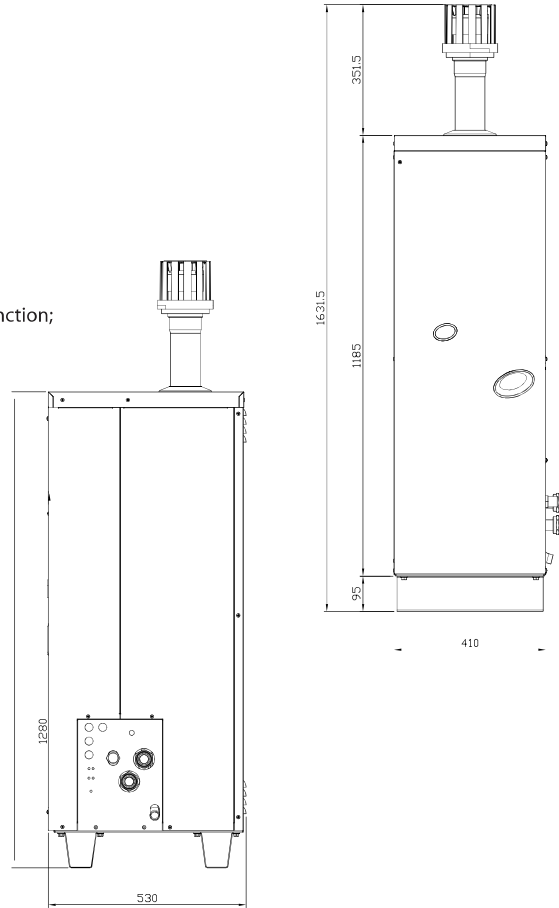
Condensing Boiler Model AY00-120 or "AY"

A high efficiency gas condensing boiler with modulating control (regulated by control of the nominal gas flow (nominal thermal input)).

The appliance, which can produce hot water up to 80°C, is suited to installation in all hot water production systems for heating, sanitary use (ACS), process needs, air handlers, etc.

Supplied with the following-

- premixed multigas burner with low NO_x and CO emissions;
- stainless steel plate exchanger, acting as a hydraulic separator;
- AY10 microprocessor controller with LCD display and control knob
- S70 controller
- ionisation-based flame controller;
- gas solenoid valve with double shutter;
- system water antifreeze function;
- internal circuit antifreeze function;
- automatically resettable water temperature limiting thermostat;
- single-use fumes limiting thermostat (thermal cutout);
- system circuit water differential pressure switch (PD1);
- internal circuit water differential pressure switch (PD2) with anti-sticking function;
- overpressure valve on internal circuit, set to trip at 3 bar;
- internal circuit expansion tank;
- automatic and manual air bleeds on the internal circuit;
- fumes pipe with terminal, for type B53P configuration.
- condensate discharge siphon (with antifreeze function);
- anti-freezing thermostat used for the activation of the heating element on the condensate drain.



TECHNICAL DATA - Single AY

DIMENSIONS AND WEIGHT			
Size	width	mm	410
	height	mm	1280
	depth	mm	530
Weight		kg	71
PRESSURE DROP OF A SINGLE AY00-120 CONDENSING UNIT			
Water flow rate	WATER TEMPERATURE		
	[l/h]	20°C	
		[bar]	
1008			0,066
1198			0,085
1398			0,106
1608			0,136
1801			0,165
2007			0,204
2199			0,234
2400			0,269
2601			0,312
2797			0,353
2958			0,395
3000			0,406
3201			0,469

Technical Data (Contd)

			AY00-120
OPERATION WHEN HEATING			
Thermal capacity	Nominal (1013 mbar - 15°C)	kW	34,9
	MEAN	kW	21.5
	MIN	kW	8.0
OPERATING POINT: Tm80/Tr60 and nominal thermal capacity	Available power	kW	34.4
	Efficiency	%	98.6
OPERATING POINT: Tm80/Tr60 and minimal thermal capacity	Efficiency	%	97.3
OPERATING POINT: Tm70/Tr50 and nominal thermal capacity	Efficiency	%	100,6
Efficiency classes			****
NOx emission class			5
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
Hot water flow rate	nominal	l/h	2950
	maximum	l/h	3200
	minimum	l/h	1500
Hot water pressure drop	at nominal water flow	bar	0,395
Ambient air temperature (dry bulb)	maximum	°C	45
	minimum	°C	-20
gas consumption	methane G20 (nominal)	m ³ /h	3.69
	methane G20 (MIN)	m ³ /h	0.85
	G25 (nominal)	m ³ /h	4,35
	G25 (MIN)	m ³ /h	1,00
	G30 (nominal)	kg/h	2.75
	G30 (MIN)	kg/h	0.63
	G31 (nominal)	kg/h	2.71
	G31 (MIN)	kg/h	0.62
THERMAL EFFICIENCIES			
Efficiency at MEAN thermal capacity Tm80/Tr60		%	98.3
Efficiency at MIN thermal capacity Tm80/Tr60		%	97.3
Efficiency at nominal thermal capacity Tm50/Tr30		%	104.6
Efficiency at 30% of nominal thermal capacity Tr=30°C		%	107.5
Efficiency at 30% of nominal thermal capacity Tr=47°C		%	100.3
Operational heat loss to jacket		kW	0,15
Operational heat loss to jacket		%	0.44
Operational heat loss to flue		kW	0,86
Operational heat loss to flue		%	2.54
Heat loss in off mode		kW	0,058
Heat loss in off mode		%	0,2
ELECTRICAL SPECIFICATIONS			
Power supply	Voltage	V	230
	TYPE		single-phase
	Frequency	50 Hz supply	50
Electrical power absorption	nominal	kW	0.185
Degree of protection	IP		X5D
INSTALLATION DATA			
Minimum storage temperature		°C	-30
Maximum operating pressure		bar	3
Water content inside the apparatus	HOT SIDE	l	1,0
	TYPE		F
Water fitting	thread	" G	1 1/4
	TYPE		M
Gas fitting	thread	" G	3/4
	Type of installation		B23P-B33-B53P-C13-C33-C43-C53-C63-C83
Fume outlet	Diameter (Ø)	mm	80
	Residual head	Pa	100
	Product configuration		B53P

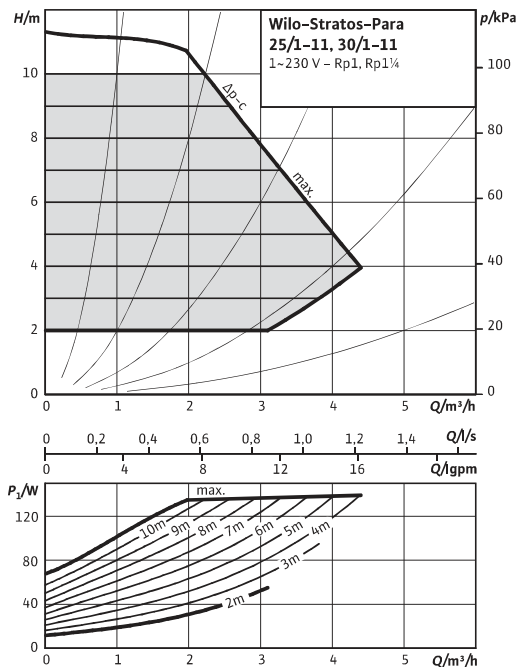
Circulating Pumps (accessories)

Linked systems may be supplied with no pumps (SC), or complete with standard (CV) or high head (CW) configurations. To maintain efficiency in partial load conditions, it is recommended that a pump is installed for EACH heat pump in the link.

Standard (CV). Electrical consumption at 3000 l/h, 6M head; 170W

Wilo-Stratos PARA 25/1-11

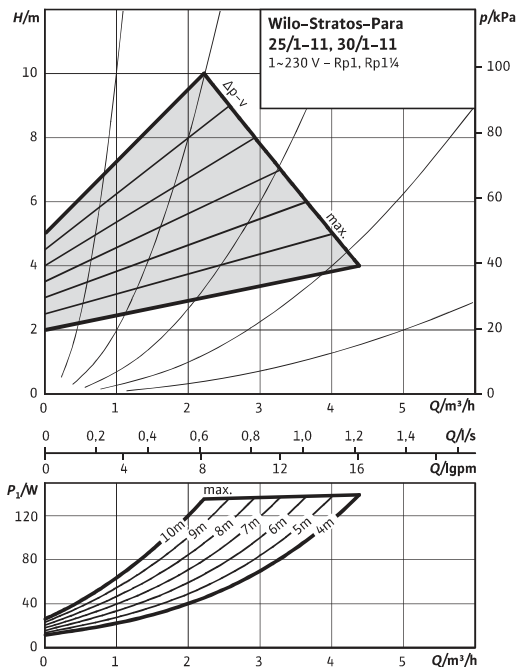
Δp -c (constant)



Tolerances of each curve according to EN 1151-1:2006

Wilo-Stratos PARA 25/1-11

Δp -v (variable)

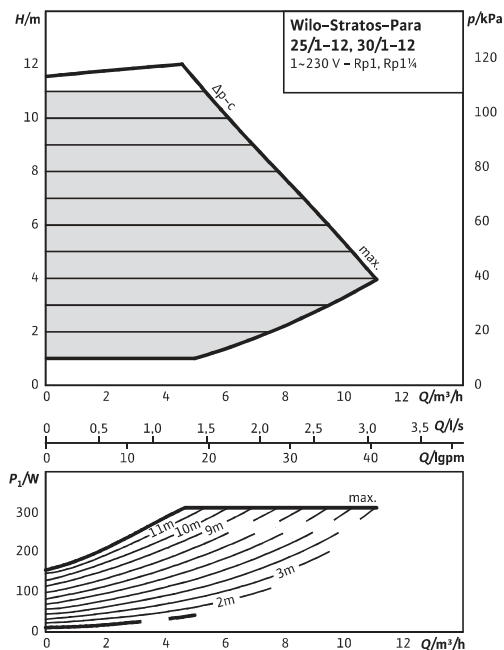


Tolerances of each curve according to EN 1151-1:2006

High Head (CW). Electrical consumption at 3500 l/h, 10M head; 300W

Wilo-Stratos PARA 30/1-12

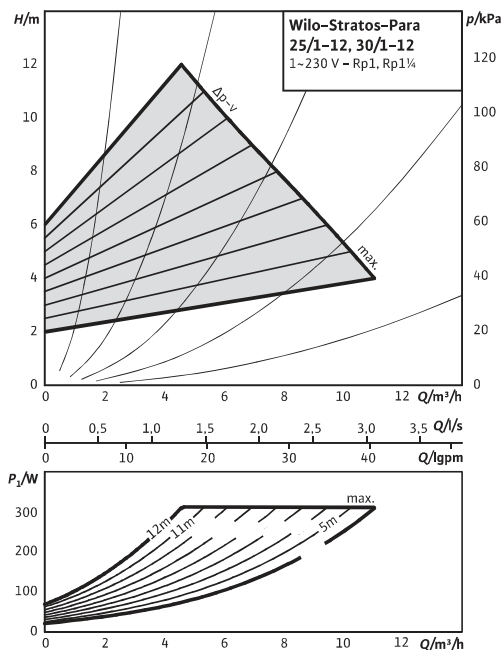
Δp -c (constant)



Tolerances of each curve according to EN 1151-1:2006

Wilo-Stratos PARA 30/1-12

Δp -v (variable)

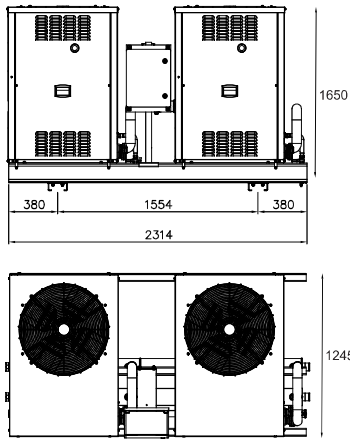


Tolerances of each curve according to EN 1151-1:2006

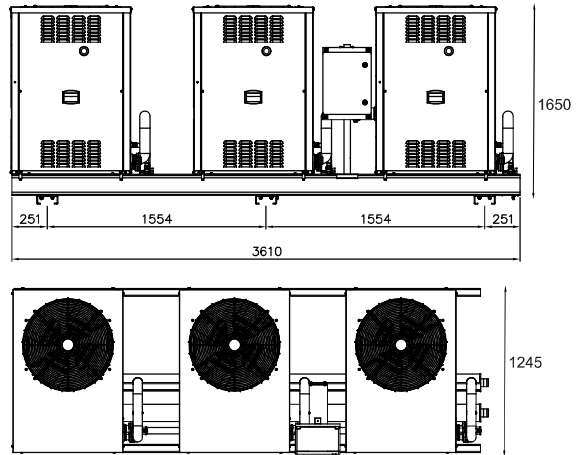
More information at www.wilo.co.uk, product is "Stratos-Para Z range"

Overall Dimensions

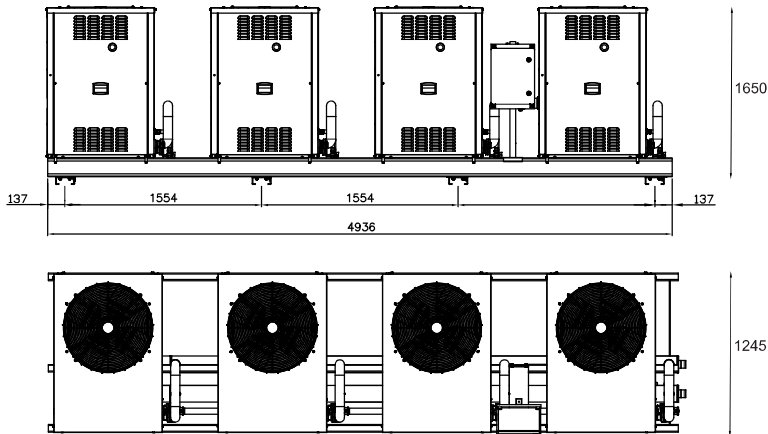
Preassembled GAHP (with 2 units)



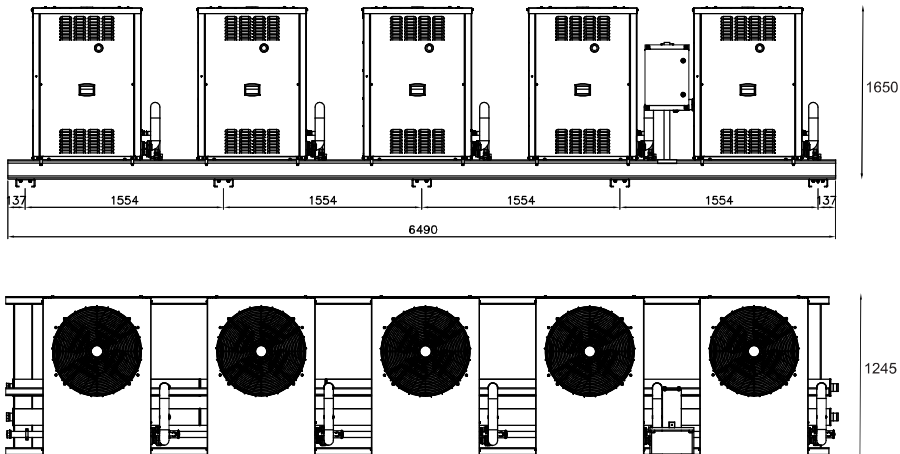
Preassembled GAHP (with 3 units)



Preassembled (with 4 units)



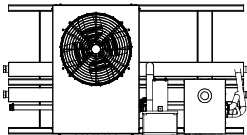
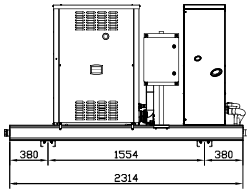
Preassembled (with 5 units)



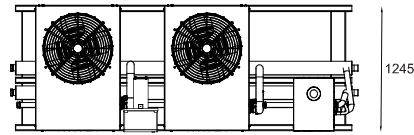
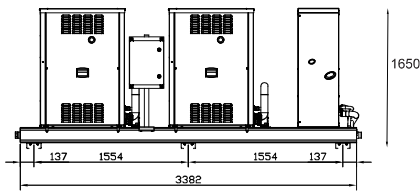
Overall Dimensions

Preassembled GAHP with Single AY Boiler

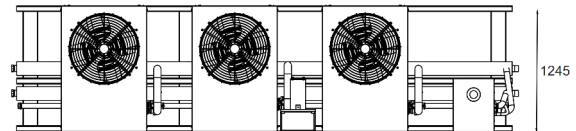
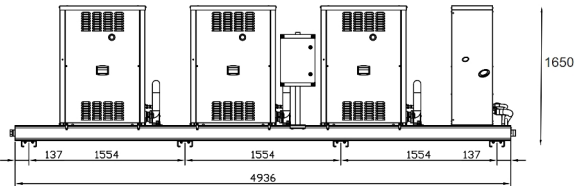
1 GAHP + 1AY



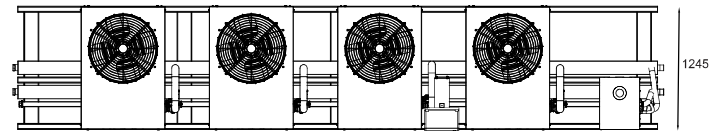
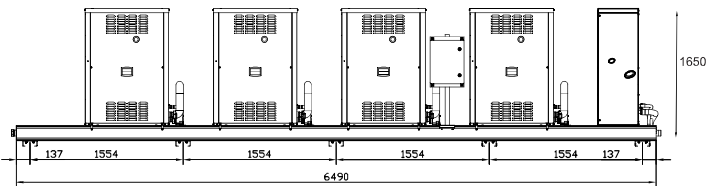
2 GAHP + 1AY



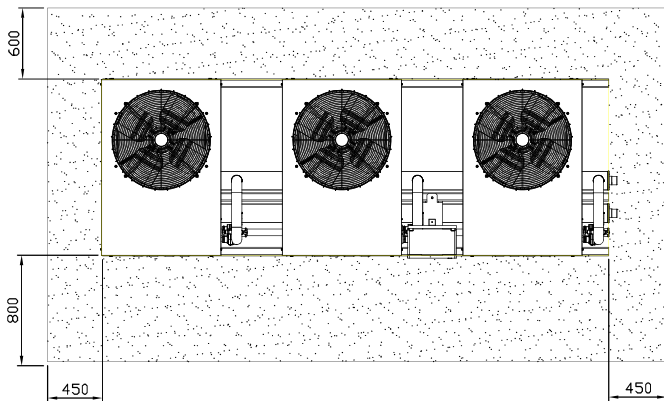
3 GAHP + 1AY



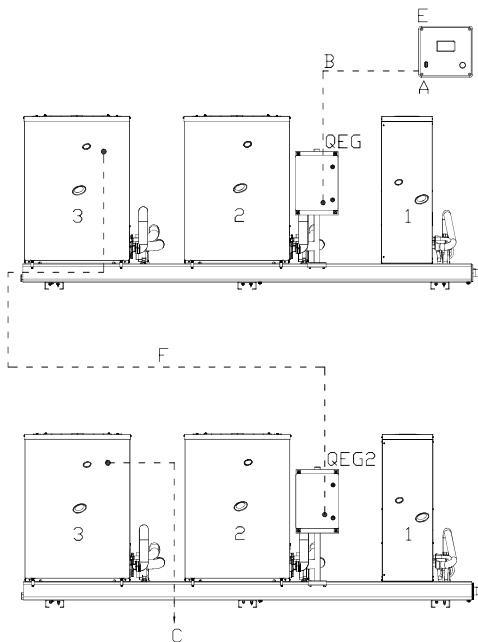
4 GAHP + 1AY



Recommended Clearances (all assemblies)



"CAN BUS" Cable



LEGEND

- A terminal node connection to CCI/DDC
- B CAN-BUS cable (not supplied - see table)
- C terminal node on last unit (prewired)
- QEG1 appliance 1 general electrical panel
- QEG2 appliance 2 general electrical panel
- E CCI/DDC
- F CAN-BUS cable (not supplied - see table)
- 3 last unit of appliances (with "ID00")

Example of CAN network with 7 nodes (1 CCI/DDC + 2 appliances connected on a single hydraulic circuit).

The communication cable (hashed line above) connects DDC controller to GAHP system/s.
Specification and maximum lengths in the table below.

CABLE NAME	SIGNAL / COLOR			MAX LENGTH	Note	
Robur						
ROBUR NETBUS	H= BLACK	L= WHITE	GND= BROWN	450 m	Ordering Code O-CVO008	
Honeywell SDS 1620						
BELDEN 3086A	H= BLACK	L= WHITE	GND= BROWN	450 m	In all cases the fourth conductor should not be used	
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		

Allow 6 Metres for the internal wiring of each GAHP heat pump.

If the total run is under 200M, then a simple 3 x 0.75mm² shielded cable may be used

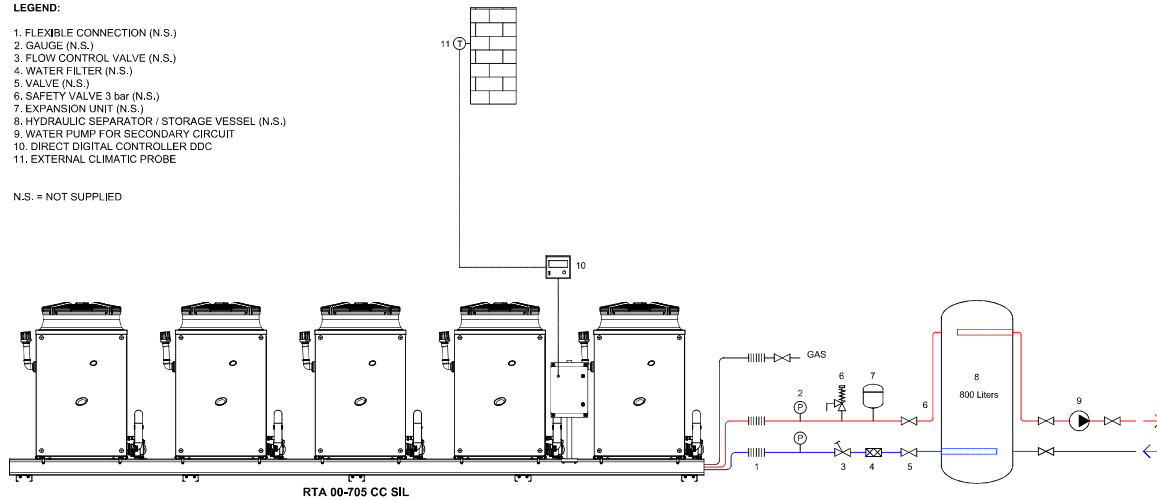
Hydraulic Sketches (examples)

GAHPs Serving Buffer Tank for Heating

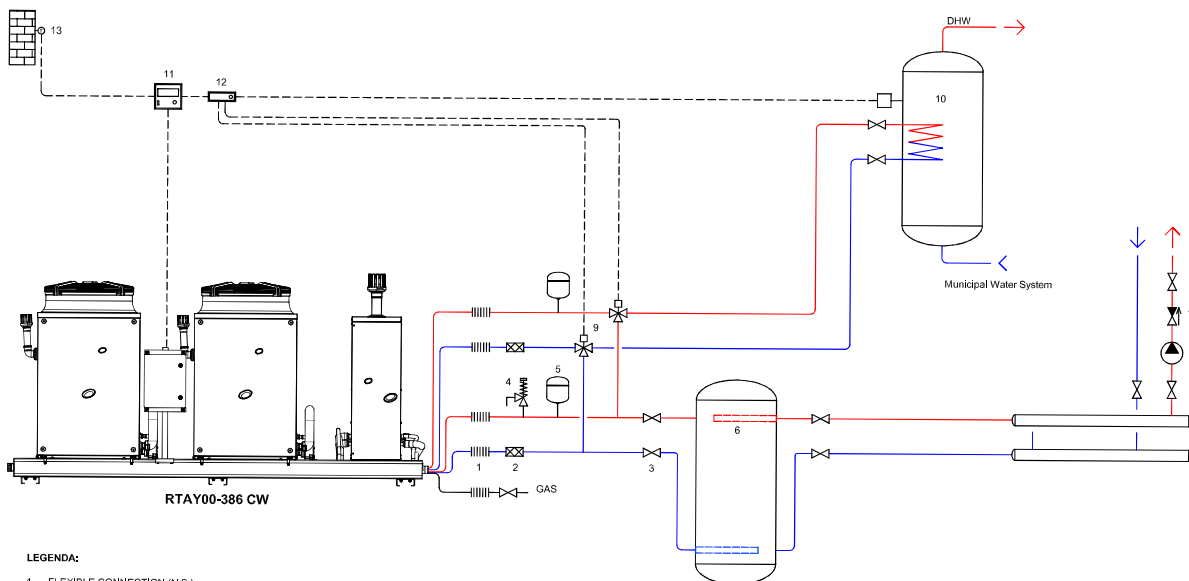
LEGEND:

1. FLEXIBLE CONNECTION (N.S.)
2. GAUGE (N.S.)
3. FLOW CONTROL VALVE (N.S.)
4. WATER FILTER (N.S.)
5. VALVE (N.S.)
6. SAFETY VALVE 3 bar (N.S.)
7. EXPANSION UNIT (N.S.)
8. HYDRAULIC SEPARATOR / STORAGE VESSEL (N.S.)
9. WATER PUMP FOR SECONDARY CIRCUIT
10. DIRECT DIGITAL CONTROLLER DDC
11. EXTERNAL CLIMATIC PROBE

N.S. = NOT SUPPLIED



GAHPs with AY Boiler for Heating & DHW



LEGENDA:

1. FLEXIBLE CONNECTION (N.S.)
2. WATER FILTER (N.S.)
3. VALVE (N.S.)
4. SAFETY VALVE 3 bar (N.S.)
5. EXPANSION UNIT (N.S.)
6. HYDRAULIC SEPARATOR / STORAGE VESSEL (N.S.)
7. NON-RETURN VALVE
8. WATER PUMP for Heating secondary circuit (N.S.)
9. THREE-WAY DIVERTING VALVE (N.S.)
10. DHW STORAGE VESSEL (N.S.)
11. DIRECT DIGITAL CONTROLLER DDC
12. RB100 Interface System for DHW and Legionella managing
13. CLIMATIC PROBE



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www.roburheatpumps.co.uk



Environmental Site Supplies Ltd

sales@roburheatpumps.co.uk
020 8641 2346