

Submittal Data

GA Line RTYF Series Commercial and Specialty Chiller-Heaters

2 or 4 pipe Gas Fired Absorption Chiller-Heaters

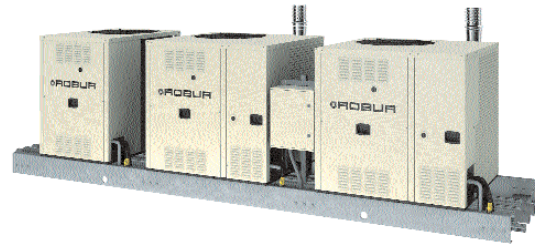
Cooling and Heating

Robur's High Efficiency Chiller-Heater links are comprised of multiple combinations of ACF60 chillers and AYF60-119 chiller-heaters. The chillers utilize an ammonia/water absorption cycle that is air-cooled; both unit types are designed for outdoor installation. The primary energy source for Robur

RTYF links is natural or propane gas resulting in minimal single-phase electrical service requirements. With no engines or mechanical compressors and only three moving parts in each unit, Robur RTYF links are a reliable and durable source of chilled water down to 37.4 °F and hot water up to 185 °F (standard version).

These environmentally friendly, commercial grade appliances offer complete flexibility for light commercial

and residential comfort air conditioning and industrial process cooling and heating applications.



Versions

The RTYF modular links are available in a standard (ST) and two specialty versions:

RTYF-ST - Standard version for climate design temperatures of 104 °F or lower; up to 25-tons of cooling and water temperatures down to 37.4 °F.

RTYF-HT - For climate design temperatures above 104 °F; up to 25-tons of cooling and water temperatures down to 41 °F.

RTYF-TK - For applications that require heavy duty use on a year round basis with operation down to 10.4 °F ambient temperature; up to 25-tons of cooling and water temperatures down to 37.4 °F. RTYF units are natural gas or LPG fired and require 208-230V 60Hz SINGLE PHASE electrical power.

Control and safety devices

The RTYF links are configured using any combination of 2 to 4 Chiller and/or Chiller-Heater modules pre-assembled and connected hydronically and electrically on a single steel rail base with single point water, gas, and electrical connections. The connections for the piping of the hydronic circuit are located on the right side of the appliance. Each module that forms part of the link has advanced technical, control and safety components.

The chiller module includes:

- S60 Electronic Control Board with integrated microprocessor, LCD display and encoder located inside the electric box; it is programmable and it controls and monitors the

- operation of the chiller;
- sealed circuit high temperature limit; located on the external wall of the generator; helps prevent overheating of the generator;
- flue gas temperature limit switch; located inside the rear portion of the combustion chamber; helps prevent overheating of the generator;
- sealed circuit safety relief valve;
- differential air pressure switch; located inside the electric box; it helps manage the combustion system by monitoring the air flowing into the air-gas mixing chamber and stopping the burner if the air flow is too low;
- ignition control box; located inside the electric box; it

- manages the combustion system controlling the burner ignition, the gas valve, the air pressure switch, the air blower and the flame sensor;
- dual gas valve;
- chilled water flow sensor; located on the return chilled water line; it monitors the water flow and helps prevent freezing of the evaporator;
- safety by-pass valve; located inside the sealed system; prevents over pressurizing the sealed system;
- antifreeze function for hydronic system; together with the flow switch, this electronic function, programmed into the microprocessor, helps prevent freezing of the evaporator;

• temperature probes; located both on the sealed system and on the water lines; they monitor functional parameters of the unit.

The heater module is controlled and monitored by the chiller module's electronic control board through an electronic card situated on the heater.

The heater module includes:
 • flue gas temperature limit switch; located inside the rear portion of the combustion chamber; helps

to prevent overheating of the water heat exchanger;
 • high temperature limit switch; located on the outlet water line; helps to prevent overheating of the water heat exchanger;
 • safety relief valve; located on the outlet water line; it controls the water pressure inside the hydronic system;
 • differential air pressure switch; located inside the electric box; it helps manage the combustion system controlling the air flowing into the air-gas

mixing chamber and stopping the burner if the flow is too low;
 • ignition control box; located inside the electric box; it manages the combustion system controlling the burner ignition, the gas valve, the air pressure switch, the air blower and the flame sensor;
 • dual gas valve;
 • differential hot water flow switch; located between the water lines; it monitors the hot water flow and helps prevent the overheating of

the water heat exchanger;
 • water temperature sensors; they are located on the water lines and monitor the water temperatures.

STANDARD VERSION Cooling Performance Ratings⁽¹⁾			RTYF 120-119 ST	RTYF 120-238 ST	RTYF 180-119 ST	RTYF 180-238 ST	RTYF 180-357 ST	RTYF 240-119 ST	RTYF 240-238 ST	RTYF 240-357 ST	RTYF 240-476 ST
Cooling capacity ⁽²⁾	BTU/h		121,000	121,000	181,500	181,500	181,500	242,000	242,000	242,000	242,000
Gas input	BTU/h		189,800	189,800	284,700	284,700	284,700	379,600	379,600	379,600	379,600
Ambient operating temperature	maximum	°F	120	120	120	120	120	120	120	120	120
	minimum	°F	32	32	32	32	32	32	32	32	32
Chilled water temperature	maximum inlet	°F	113	113	113	113	113	113	113	113	113
	minimum outlet	°F	37,4	37,4	37,4	37,4	37,4	37,4	37,4	37,4	37,4

STANDARD VERSION Heating Performance Ratings⁽¹⁾			ST	ST	ST	ST	ST	ST	ST	ST	ST
Heating capacity	nominal	BTU/h	110,900	221,800	110,900	221,800	332,700	110,900	221,800	332,700	443,600
Gas input	nominal	BTU/h	129,00	258,000	129,000	258,000	387,000	129,000	258,000	387,00	516,000
Ambient operating temperature	maximum	°F	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6
	minimum	°F	-20	-20	-20	-20	-20	-20	-20	-20	-20
Hot water temperature	maximum inlet	°F	167	167	167	167	167	167	167	167	167
	maximum outlet	°F	185	185	185	185	185	185	185	185	185

HT VERSION Cooling Performance Ratings⁽¹⁾			HT	HT	HT	HT	HT	HT	HT	HT	HT
Cooling capacity ⁽²⁾	BTU/h		116,800	116,800	175,200	175,200	175,200	233,600	233,600	233,600	233,600
Gas input	BTU/h		189,800	189,800	284,700	284,700	284,700	379,600	379,600	379,600	379,600
Ambient operating temperature	maximum	°F	131	131	131	131	131	131	131	131	131
	minimum	°F	32	32	32	32	32	32	32	32	32
Chilled water temperature	maximum inlet	°F	113	113	113	113	113	113	113	113	113
	minimum outlet	°F	41	41	41	41	41	41	41	41	41

HT VERSION Heating Performance Ratings⁽¹⁾			HT	HT	HT	HT	HT	HT	HT	HT	HT
Heating capacity	nominal	BTU/h	110,900	221,800	110,900	221,800	332,700	110,900	221,800	332,700	443,600
Gas input	nominal	BTU/h	129,00	258,000	129,000	258,000	387,000	129,000	258,000	387,00	516,000
Ambient operating temperature	maximum	°F	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6
	minimum	°F	-20	-20	-20	-20	-20	-20	-20	-20	-20
Hot water temperature	maximum inlet	°F	167	167	167	167	167	167	167	167	167
	maximum outlet	°F	185	185	185	185	185	185	185	185	185

TK VERSION Cooling Performance Ratings ⁽¹⁾			RTYF 120-119 TK	RTYF 120-238 TK	RTYF 180-119 TK	RTYF 180-238 TK	RTYF 180-357 TK	RTYF 240-119 TK	RTYF 240-238 TK	RTYF 240-357 TK	RTYF 240-476 TK
Cooling capacity ⁽²⁾	BTU/h		121,000	121,000	181,500	181,500	181,500	242,000	242,000	242,000	242,000
Gas input	BTU/h		189,800	189,800	284,700	284,700	284,700	379,600	379,600	379,600	379,600
Ambient operating temperature	maximum	°F	120	120	120	120	120	120	120	120	120
	minimum	°F	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Chilled water temperature	maximum inlet	°F	113	113	113	113	113	113	113	113	113
	minimum outlet	°F	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4

TK VERSION Heating Performance Ratings ⁽¹⁾			TK	TK	TK	TK	TK	TK	TK	TK	TK
Heating capacity	nominal	BTU/h	110,900	221,800	110,900	221,800	332,700	110,900	221,800	332,700	443,600
Gas input	nominal	BTU/h	129,000	258,000	129,000	258,000	387,000	129,000	258,000	387,000	516,000
Ambient operating temperature	maximum	°F	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6
	minimum	°F	-20	-20	-20	-20	-20	-20	-20	-20	-20
Hot water temperature	maximum inlet	°F	167	167	167	167	167	167	167	167	167
	maximum outlet	°F	185	185	185	185	185	185	185	185	185

ELECTRICAL RATINGS

Required voltage, 60 Hz, single phase ⁽³⁾	V	208 - 230									
Operating consumption per single chiller / heater ⁽⁴⁾	kW	0.75 / 0.076									
MCA (Minimum Circuit Ampacity)	A	16	16	24	24	24	32	32	32	32	32
MOP (Maximum Overcurrent Protection)	A	21.8	21.8	32.7	32.7	32.7	43.6	43.6	43.6	43.6	43.6

PHISICAL DATA

Please contact Robur Corporation for equipment Dimensions

⁽¹⁾ All illustrations and specifications contained herein are based on the latest information available at the time of publication.

⁽²⁾ Cooling capacity at standard conditions of 95 °F ambient temperature. Chilled water outlet temperature 45 °F, chilled water inlet temperature 55 °F.

⁽³⁾ Units are factory-wired for 208-230 volts operation.

⁽⁴⁾ May vary by ± 10% as function of both power supply and electrical motor input tolerance.

Due to continuous product innovation and development, Robur reserves the right to change product specifications without prior notice.

STANDARD VERSION - COOLING CAPACITY (BTU/h)

External ambient operating temperature	Outlet chilled water temperature			
	37.4 °F	41.0 °F	44.6 °F	48.2 °F
32 °F	59,307	59,912	61,123	62,323
41 °F	59,307	59,912	61,123	62,333
50 °F	59,307	59,912	61,123	62,323
59 °F	59,307	59,912	61,123	62,333
68 °F	59,307	59,912	61,123	62,323
77 °F	58,701	59,912	61,123	62,333
86 °F	54,465	59,307	61,123	62,333
95 °F	40,546	52,650	60,517	61,727
104 °F	--	--	53,255	56,281
113 °F	--	--	40,546	47,203
120 °F	--	--	--	39,336

HT VERSION - COOLING CAPACITY (BTU/h)

External ambient operating temperature	Outlet chilled water temperature				
	41.0 °F	44.6 °F	50.0 °F	54.5 °F	57.2 °F
32.0 °F	59,637	59,637	59,637	59,637	60,222
35.6 °F	59,637	59,637	59,637	59,637	60,222
39.2 °F	59,637	59,637	59,637	59,637	60,222
42.8 °F	59,637	59,637	59,637	59,637	60,222
46.4 °F	59,637	59,637	59,637	59,637	60,222
50.0 °F	59,637	59,637	59,637	59,637	60,222
53.6 °F	59,637	59,637	59,637	59,637	60,222
57.2 °F	59,637	59,637	59,637	59,637	60,222
60.8 °F	59,637	59,637	59,637	59,637	60,222
64.4 °F	59,637	59,637	59,637	59,637	60,222
68.0 °F	59,637	59,637	59,637	59,637	60,222
71.6 °F	59,637	59,637	59,637	59,637	60,222
75.2 °F	59,637	59,637	59,637	59,637	60,222
78.8 °F	59,053	59,637	59,637	59,637	60,222
82.4 °F	59,053	59,637	59,637	59,637	60,222
86.0 °F	59,053	59,637	59,637	59,637	60,222
89.6 °F	57,883	59,637	59,637	59,637	60,222
93.2 °F	56,129	59,053	59,053	59,053	59,637
95.0 °F	54,960	58,368	58,468	59,053	59,637
96.8 °F	53,791	57,883	58,468	58,468	59,637
100.4 °F	50,867	56,714	57,883	57,883	59,053
104.0 °F	47,944	54,375	56,714	57,299	58,468
107.6 °F	--	51,452	54,960	56,714	57,883
111.2 °F	--	47,944	53,206	55,545	56,714
114.8 °F	--	--	50,282	53,791	55,545
118.4 °F	--	--	46,774	50,867	53,206
131.0 °F	--	--	--	47,359	50,282

TK VERSION - COOLING CAPACITY (BTU/h)

External ambient operating temperature	Outlet chilled water temperature			
	37.4 °F	41.0 °F	44.6 °F	48.2 °F
10.4 °F	71,410	71,410	72,015	72,620
17.6 °F	70,805	70,805	71,410	72,015
24.8 °F	70,200	70,200	70,200	71,410
32.0 °F	69,595	69,595	69,595	70,200
39.2 °F	68,989	68,989	68,989	69,595
46.4 °F	67,779	68,384	68,384	68,989
53.6 °F	67,779	67,779	67,779	68,384
60.8 °F	67,174	67,174	67,779	67,779
68.0 °F	65,964	65,964	67,174	67,174
75.2 °F	64,148	64,148	66,569	66,569
82.4 °F	59,307	61,727	65,358	65,358
89.6 °F	51,439	57,491	62,938	64,148
95.0 °F	41,757	52,650	60,517	62,333
100.4 °F	--	--	56,886	59,912
107.6 °F	--	--	50,229	55,070
113.0 °F	--	--	--	49,624
120.0 °F	--	--	--	42,057

PRESSURE DROP - CHILLER SIDE - 4 PIPE VERSIONS

Standard, HT, TK versions

Pressure drop (ft _{w.c.})																			
3.25	3.67	4.11	4.56	5.02	5.50	5.99	6.50	7.02	7.56	8.11	8.67	9.11 ¹	9.25	9.67 ²	9.85	10.46	11.08	11.72	12.38
6.60	7.04	7.48	7.93	8.37	8.81	9.25	9.69	10.13	10.57	11.01	11.45	11.78	11.89	12.20	12.33	12.77	13.21	13.65	14.09
Water flow (GPM)																			

1 HT version nominal values
 2 ST, TK versions nominal values

PRESSURE DROP - HEATER SIDE - 4 PIPE VERSIONS

Standard, HT, TK versions

Pressure drop (ft _{w.c.})																							
0.65	1.42	2.18	2.95	3.71	4.48	5.24	6.00	6.77	7.53	8.30 ¹	9.06	9.83	10.59	11.36	12.12	12.89	13.65	14.42	15.18	15.95	16.71	17.48	18.24
4.40	4.84	5.28	5.72	6.16	6.60	7.04	7.48	7.93	8.37	8.81	9.25	9.69	10.13	10.57	11.01	11.45	11.89	12.33	12.77	13.21	13.65	14.09	14.53
Water flow (GPM)																							

1 nominal values

PRESSURE DROP - 2 PIPE VERSIONS

In 2 pipe type AYF60-119 units the correct pressure drop is the one of the heater module of the unit.

Standard, HT, TK versions (max = heater side)

Pressure drop (ft _{w.c.})																									
0.74	1.67	2.60	3.52	4.45	5.37	6.30	7.22	8.15	9.08	10.00	10.93	11.85	12.78	13.70	14.63	15.56	16.25 ¹	16.48	17.13 ²	17.41	18.33	19.26	20.18	21.11	22.04
4.40	4.84	5.28	5.72	6.16	6.60	7.04	7.48	7.93	8.37	8.81	9.25	9.69	10.13	10.57	11.01	11.45	11.78	11.89	12.20	12.33	12.77	13.21	13.65	14.09	14.53
Water flow (GPM)																									

1 HT version nominal values
 2 ST, TK versions nominal values

APPROXIMATE WATER FREEZING POINT TEMPERATURE

Percentage of monoethylene glycol	10	15	20	25	30	35	40
Water freezing point temperature (°F)	26.6	23.0	17.6	10.4	5.0	-4.0	-13.0
Percentage of increase in pressure drops	-	6	8	10	12	14	16
Loss of efficiency of unit (%)	-	0.5	1	2	2.5	3	4

The numbers provided in this table are approximate and you must refer to the glycol manufacturer's instructions for additional instructions and amount of glycol required based on expected ambient conditions.

Supporting base

Always position the appliance on a flat level surface that is made of fireproof material and able to sustain the weight of the appliance itself.

- *Installation at ground level:* if a horizontal base is not available, it is necessary to create a flat level base in concrete that is at least 4-6" larger than the dimensions on each side of appliance's base dimensions. Provide a small containing step and suitable drainage channel for water.
- *Installation on terrace or roof:* position the appliance on a flat level surface that is made of fireproof material. The structure of the building

must be able to sustain the weight of the appliance and that of the supporting base. Although the appliance produces only moderate vibrations, the use of anti-vibration supports is recommended in those applications where sound may resonate. In addition, the use of flexible connections (anti-vibration joints) between the appliance and the hydronic and gas supply lines are recommended.

Avoid positioning the appliance directly above rest areas or other areas that are sound sensitive.

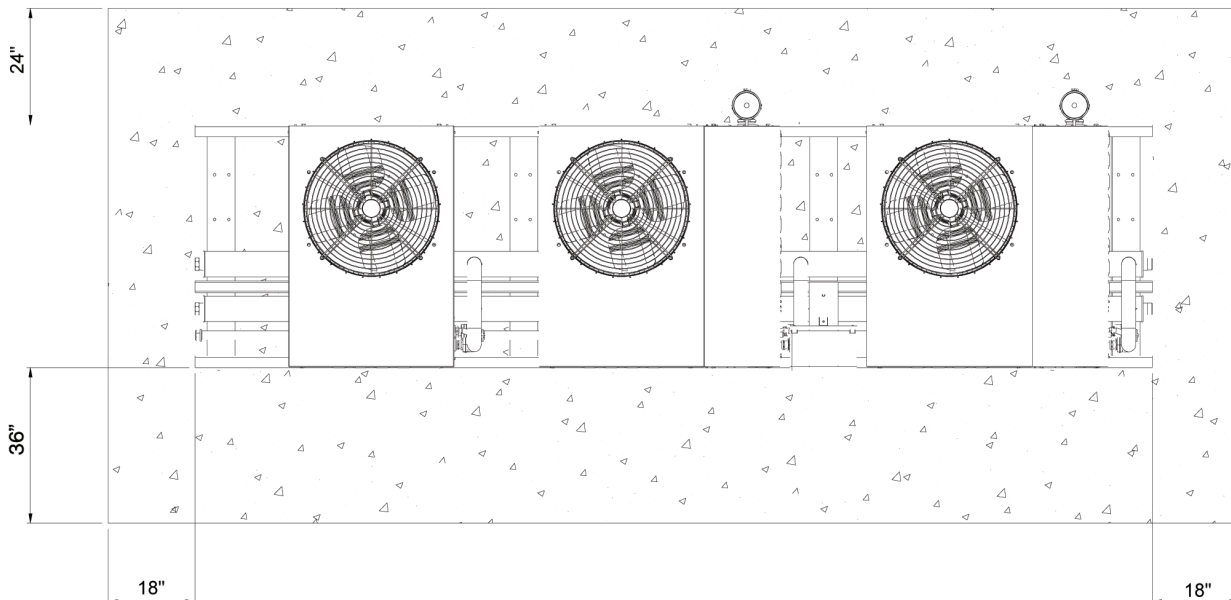
Supports and leveling

The appliance must be correctly leveled by placing a level on the upper part of the appliance. If necessary, level the appliance with metal spacers, placing them appropriately in relation to the mounts. Do not use wooden spacers as these degrade quickly.

Clearances

Position the appliance so as to maintain minimum clearances from combustible surfaces, walls or other appliances. Minimum clearances are necessary to allow for proper air flow and for servicing.

Observe all local and State codes.



Hydronic and application information

The appliance is not equipped with an expansion tank: it is therefore necessary to install a suitable expansion tank, sized in relation to the maximum heat range and the maximum operating pressure of the water in the plant; an air bleed installed at the highest point in the water loop is also required. The appliance includes a feature that is capable of starting the water pump to allow water circulation to try and prevent freezing. A concentration of permanent inhibited

antifreeze/glycol should be added as well to the water loop to prevent freezing in your particular region. A minimum 20% concentration is required in all regions. Operating the unit with no antifreeze could result in freezing the water in the chiller modules' evaporator during mild weather or light cooling load conditions. This freezing condition would result in improper water flow through the unit and may ultimately damage the chiller modules' evaporator. RTYF systems do not include water-circulating pump(s). Pump(s) must be sized and

obtained locally for your particular application. Properly size the pump(s) according to the correct water flow and pressure drops of the appliance. Also account for the additional pressure drop of the water piping, fittings, antifreeze concentration and coil(s) in the water loop when sizing the pump(s). The installer must ensure that the water pump(s) and the appliance start at the same time. Also, the pump must continue to run during the units' cycle down period (600 seconds after the opening of the control

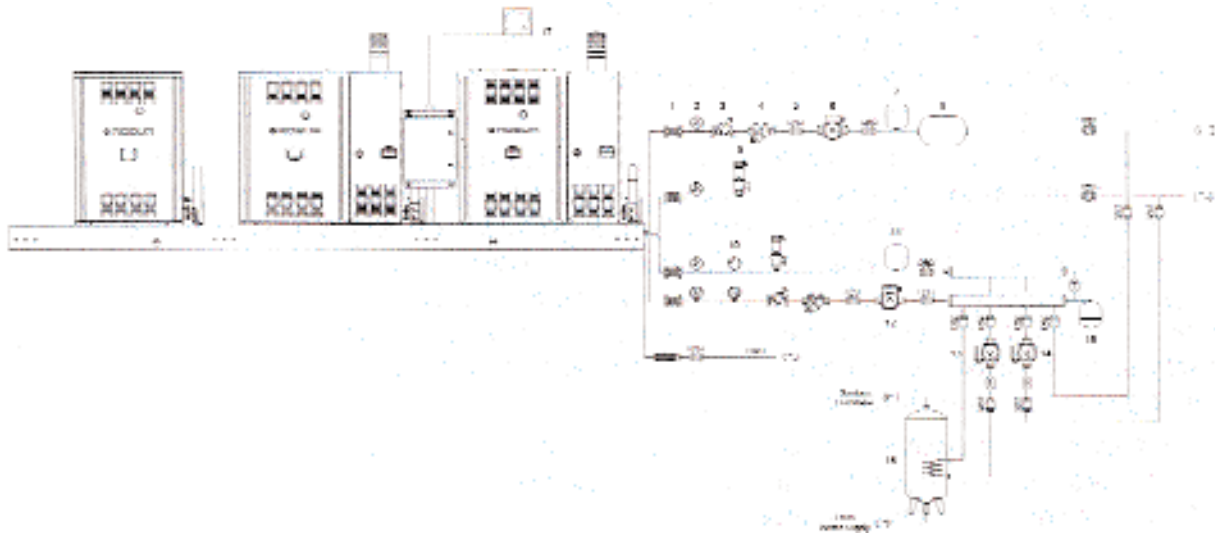
switch). Contacts in the appliance control box may be used for this purpose if the pump's amp draw does not exceed 4 amps. Contact Robur Corporation for additional information. As indicated above, the water loop must contain a properly sized expansion tank and an air bleed must be installed at the highest point of the water loop. In addition, water piping must include necessary fittings to properly fill the loop with a water/antifreeze mixture.

RTYF HYDRONIC SYSTEM: Typical Installation Arrangement for 2-pipe RTYF (External Components not included with Robur Unit)



- | | |
|--------------------------------|------------------------------|
| 1 Antivibration flexible hoses | 6 Circulating water pump |
| 2 Pressure gauge | 7 Water storage |
| 3 Flow regulating valve | 8 safety valve |
| 4 Water filter | 9 Expansion tank |
| 5 Shut-off valve | 10 DDC (optional from Robur) |

**RTYF HYDRONIC SYSTEM: Typical Installation Arrangement for 4-pipe RTYF
(External Components not included with Robur Unit)**



- | | | | |
|--------------------------------|--|---|------------------------------|
| 1 Antivibration flexible hoses | 7 Expansion tank | water pump | tank |
| 2 Pressure gauge | 8 Water storage | 13 Secondary side domestic hot water circulating pump | 16 Domestic hot water boiler |
| 3 Flow regulating valve | 9 Safety valve | 14 Secondary side heating water circulating pump | 17 DDC (optional from Robur) |
| 4 Water filter | 10 Thermometers | | |
| 5 Shut-off valve | 11 Primary side hot water expansion tank | | |
| 6 Circulating water pump | 12 Primary side hot water circulating | 15 Secondary side hot water expansion | |