

GAHP Line | RTA Series

Gas Fire Absorption Heat Pump Modular configurations

Submittal Data

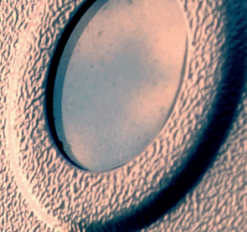


Heating with a unique gas fired high efficiency unit.

Robur GAHP-A is **the first air-source water-ammonia absorption heat pump**. By using natural gas as the primary energy source it supplies **hot water up to 140 °F**. The right choice for heating systems where the most efficient gas appliance available is desired. With a **gas efficiency at rated conditions of 129%**, this unit is suitable for raising the average efficiency of traditional boiler heating systems, a Robur GAHP-A unit in conjunction with a standard heating unit will **raise the average overall heating system efficiency up to approximately 112-122%**.

The GAHP-A unit offers a wide variety of convenient applications:

- High efficiency hot waterheating systems for **light commercial, industrial, residential and multi-family buildings;**
- any system where hot water, **up to 140 °F, is required;**
- any system that **has continuous hot water demands or 24 hour industrial requirements;**
- **reliable and efficient Domestic Hot Water production (DHW).**



 **РОБУР**

GAHP-A



In brief

Use

Heating

Type

Air to water

Heat transfer fluid

Water

Heating capacity

From 247,000 to 617,500 Btu/h

Renewable energy percentage contributing to the total heat output

38

Heating efficiency

129%

Outlet water temperature

140 °F

Main applications

High efficiency medium-low temperature hydronic heating systems: radiant panels, fan coils, swimming pools, industrial heating and residential DHW.

Main advantage

Savings up to 40% in heating operational costs in comparison with the best gas boilers, due to the energy recovered from a renewable source (air)

Additional advantages

- Single Phase Power.
- This unit may be linked to lower performance boilers to raise total system efficiency.
- High Efficiency recovering part of the thermal energy from the outdoor air.
- The prevailing use of gas reduces the need of electric power by approximately 87% in comparison with electric compression units (4.5 electric kW for 617,500 Btu/h heating).
- Complete flexibility for capacity control. Robur units may be combined for greater heating capacity, modularity and redundancy.
- Minimal Electrical Panel requirements.
- For application requiring standby power, the electric generator size and electric output will be lower.
- No Comfort Reduction during Defrosting Cycles: the unit supplies about 50% of its rated heating capacity.
- Remote management and staging by Direct Digital Controller (DDC - Optional). One DDC can manage up to 16 Heat Pump modules on a common water loop.
- High Reliability due to few moving parts inside the unit.
- Easy Maintenance, similar to gas fired boilers.
- No Use of Harmful Refrigerants.
- Outdoor Installation. Save valuable indoor space usually required for a mechanical room.

Features

- **Patented absorption cycle.**
- **Air source evaporator** with single row aluminium fin coil.
- **Pre-mixed gas burner.** Stainless steel multiple gas type with ignitor and flame sensor device controlled by an electronic ignition control.
- **Microprocessor control.** Printed resin electronic circuit with LED display. Ensures optimum operation of the absorption cooling process while allowing easy access of unit data for preventative maintenance and diagnostics.
- **Optional Direct Digital Controller (DDC).** A single device to fully manage and control Robur units.
- **Built-in safety and control devices.**

Technical Data

PERFORMANCE RATINGS - HEATING ⁽¹⁾

			RTA 00-240	RTA 00-360	RTA 00-480	RTA 00-600
Heating capacity ⁽²⁾		Btu/h	247,000	370,500	494,000	617,500
Gas input		Btu/h	191,000	286,500	382,000	477,500
Ambient operating temperature	maximum	°F	113	113	113	113
	minimum	°F	-20	-20	-20	-20
Hot water temperature	maximum outlet (to hydronic system)	°F	140	140	140	140
	maximum inlet (to unit)	°F	122	122	122	122
Hot water flow	nominal	GPM	27.2	40.8	54.4	27.2
Internal pressure drop at nominal hot water flow		psig	4.3	4.3	4.3	4.3

ELECTRICAL RATINGS ⁽³⁾

Required voltage, 60 Hz, single phase ⁽⁴⁾	V	208 - 230			
Operating consumption ⁽³⁾	kW	1.8	2.7	3.6	4.5

PHYSICAL DATA ⁽¹⁾

Operating weight	pounds	2,086	3,144	4,027	5,242
Hot Water Supply and Return	FPT	2"	2"	2"	2"
Gas Inlet Connections	FPT	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Dimensions	width	inches	49	49	49
	length	inches	102	153	204
	height	inches	53 1/4	53 1/4	53 1/4

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

⁽²⁾Heating capacity at standard conditions of 44.6 °F ambient temperature. Hot water outlet temperature 122 °F, hot water inlet temperature 104 °F.

⁽³⁾May vary by ± 10% as function of both power supply and electrical motor input tolerance.

⁽⁴⁾Modular links are factory-wired for 208-230 volts operation.

⁽⁵⁾Factory piped to accommodate nominal hot water flow rate. For greater flow rates contact Robur for custom pipe sizing.

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

Optional DDC

- One Robur DDC can control up to 16 units working on a common hydronic loop or up to 48 units on a common loop when connected to two additional Robur DDCs.
- Programmable time scheduling.
- Monitoring of inlet and outlet water temperatures.
- Sequence step control of multiple units (Staging).
- Equalizes run time of individual modules.
- Visual and audible alarm for each module.
- Constant display of the system operating parameters.
- Logging and displaying of fault events.
- General fault and burner lockout signal for remote connection.



Heating mode capacity (kBtu/hr)

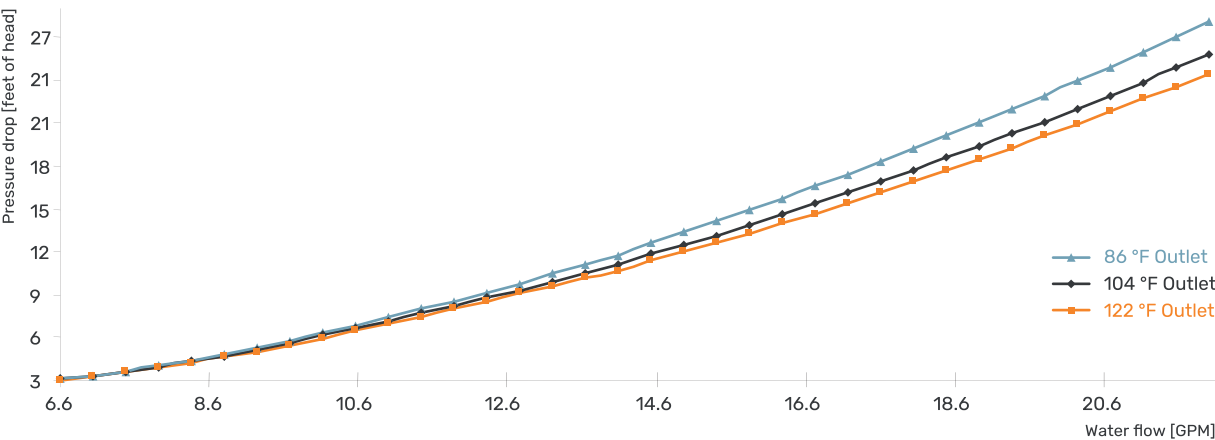
External ambient temperature	Outlet hot water temperature °F / °C			
	86°F / 30°C	113°F / 45°C	122°F / 50°C	140°F / 60°C
-20°F / -29°C	1.02 COP - 97,600 BTU/h	.93 COP - 88,700 BTU/h	.89 COP - 85,000 BTU/h	.88 COP - 83,600 BTU/h
-13°F / -25°C	1.03 COP - 98,600 BTU/h	.94 COP - 89,700 BTU/h	.90 COP - 86,000 BTU/h	.89 COP - 84,600 BTU/h
-4°F / -20°C	1.04 COP - 99,600 BTU/h	.95 COP - 90,800 BTU/h	.91 COP - 87,000 BTU/h	.90 COP - 85,600 BTU/h
5°F / -15°C	1.07 COP - 102,000 BTU/h	.98 COP - 93,500 BTU/h	.94 COP - 90,100 BTU/h	.93 COP - 88,400 BTU/h
14°F / -10°C	1.21 COP - 111,600 BTU/h	1.07 COP - 102,400 BTU/h	1.00 COP - 95,900 BTU/h	.97 COP - 92,800 BTU/h
19.4°F / -7°C	1.23 COP - 117,000 BTU/h	1.13 COP - 108,200 BTU/h	1.05 COP - 100,000 BTU/h	1.01 COP - 96,200 BTU/h
35.6°F / 2°C	1.33 COP - 126,900 BTU/h	1.28 COP - 122,200 BTU/h	1.19 COP - 114,000 BTU/h	1.11 COP - 105,800 BTU/h
44.6°F / 7°C	1.39 COP - 132,400 BTU/h	1.37 COP - 130,700 BTU/h	1.29 COP - 123,500 BTU/h	1.21 COP - 115,300 BTU/h
50°F / 10°C	1.41 COP - 134,800 BTU/h	1.41 COP - 134,400 BTU/h	1.34 COP - 128,000 BTU/h	1.26 COP - 120,100 BTU/h
59°F / 15°C	1.43 COP - 136,500 BTU/h	1.43 COP - 136,500 BTU/h	1.38 COP - 132,000 BTU/h	1.29 COP - 123,500 BTU/h
66°F / 20°C	1.45 COP - 138,200 BTU/h	1.45 COP - 138,200 BTU/h	1.40 COP - 133,800 BTU/h	1.33 COP - 127,300 BTU/h
77°F / 25°C	1.46 COP - 139,200 BTU/h	1.46 COP - 139,200 BTU/h	1.41 COP - 134,800 BTU/h	1.34 COP - 128,000 BTU/h

Nominal Value in orange type.

Pressure drop | heating mode

Water flow rate GPM	Outlet water temperature		
	122.0°F	104.0°F	86.0°F
	ft of head	ft of head	ft of head
6.60	3.05	3.08	3.15
7.04	3.30	3.32	3.35
7.48	3.58	3.62	3.65
7.93	3.89	3.98	4.05
8.37	4.25	4.35	4.42
8.81	4.64	4.76	4.86
9.25	5.05	5.19	5.28
9.69	5.50	5.66	5.77
10.13	5.96	6.18	6.29
10.57	6.45	6.66	6.83
11.01	6.95	7.16	7.39
11.45	7.47	7.68	7.97
11.89	7.99	8.21	8.57
12.33	8.52	8.76	9.18
12.77	9.06	9.32	9.80
13.21	9.59	9.90	10.43
13.65	10.12	10.50	11.07
14.09	10.64	11.11	11.72

Water flow rate GPM	Outlet water temperature		
	122.0°F	104.0°F	86.0°F
	ft of head	ft of head	ft of head
14.53	11.36	11.81	12.60
14.97	11.98	12.48	13.35
15.41	12.63	13.17	14.12
15.85	13.29	13.87	14.91
16.29	13.97	14.60	15.72
16.73	14.67	15.35	16.55
17.17	15.39	16.11	17.40
17.61	16.1	16.90	18.27
18.05	16.88	17.70	19.16
18.49	17.65	18.53	20.07
18.93	18.44	19.37	21.00
19.37	19.25	20.23	21.94
19.81	20.08	21.11	22.91
20.25	20.92	22.01	23.90
20.69	21.78	22.93	24.90
21.13	22.66	23.87	25.93
21.57	23.56	24.82	26.97
22.01	24.48	25.80	28.03



Antifreeze liquid

To ensure the correct operation of the unit and to avoid water freezing, add antifreeze glycol to the system water as needed for the minimum external temperature of the installation zone (See table below).

A minimum concentration of 10% by volume of ethylene glycol (or 15% propylene glycol) is required in all heating and cooling applications, including warm regions and even if the water circuit is to be drained during winter months. This is necessary to protect the unit's heat exchanger from freezing during light load operating conditions or off periods. Otherwise, damage to the heat exchanger will result.

Always use glycol that is permanently inhibited. Do not use automotive antifreeze.

Precautions with glycol

The manufacturer disclaims any liability for any damage caused by improper glycol use. Always check product suitability and its expiry date with the glycol supplier. Periodically check the product's preservation state. Do not use zinc-coated piping and fittings (incompatible with glycol).

Glycol modifies the physical properties of water (density, viscosity, specific heat...).

Size the piping, circulation pump and thermal generators accordingly. With automatic system water filling, a yearly check of the glycol content is required.

Type of antifreeze glycol

Inhibited type glycol is recommended to prevent oxidation phenomena.

Glycol effects

The table below shows, indicatively, the effects of using a glycol depending on its %.

Technical data for filling the hydraulic circuit

Propylene glycol correction factors

Percent propylene glycol	15%	20%	25%	30%	35%	40%	50%
Approximate freezing point in °F	24	18	15	9	5	-5	-30
Capacity factor multiplier ⁽¹⁾	0.992	0.986	0.972	0.960	0.950	0.928	0.878
Pressure drop multiplier ⁽²⁾	1.04	1.08	1.13	1.21	1.26	1.47	2.79

Ethylene glycol correction factors

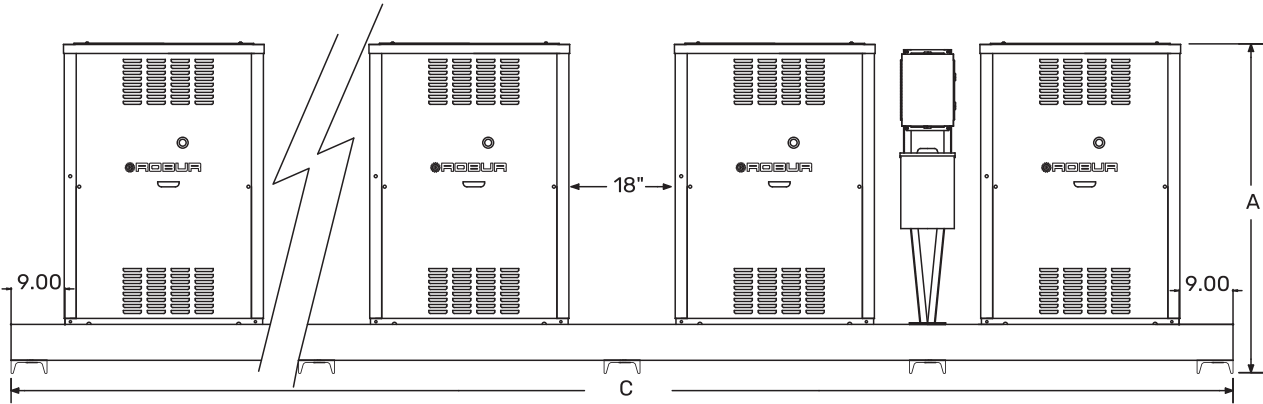
Percent ethylene glycol	10%	15%	20%	25%	30%	35%	40%
Approximate freezing point in °F	25	21	17	11	5	0	-10
Capacity factor multiplier ⁽¹⁾	0.98	0.96	0.95	0.93	0.92	0.91	0.89
Pressure drop multiplier ⁽²⁾	1.08	1.11	1.16	1.21	1.27	1.32	1.38

⁽¹⁾ At standard ARI 590 conditions: 54 °F entering fluid temperature, 44 °F leaving fluid temperature, 95 °F ambient temperature, 0.0005 fouling.

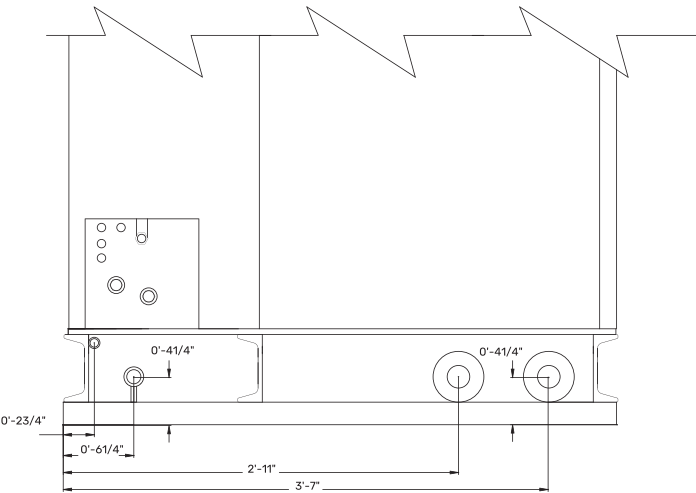
⁽²⁾ Pressure drops may vary with individual glycol manufacturer's products. The information provided for pressure drop is typical but installing contractor / project engineer is responsible for verification of pressure drop correction based on specifications of glycol used.

RTA piping connections

RTA DIMENSIONS



RTA PIPING CONNECTIONS



Model	A	B depth (not shown)	C	Approximate Weight (lb)	
				shipping	operating
RTA120	53.25	49.0	102.5	2,042	2,086
RTA180	53.25	49.0	154.5	3,084	3,144
RTA240	53.25	49.0	206.0	3,765	4,027
RTA300	53.25	49.0	257.5	5,120	5,242

Clearances

- Area required for service and condenser air: minimum clearance of 18" on sides; 36" front and 24" rear.
- Vertical condenser discharge air must not be obstructed by over-hanging objects.
- Keep unit clear of building roof drip line or gutters.
- Other clearance limitations may apply in specialty applications.
- For outdoor installation only. Note: protect water circuit to the lowest expected ambient temperature (a minimum concentration of 20% inhibited permanent antifreeze is required).

Location

The RTA Series package must be installed outdoors in an area of free natural air circulation. Installation inside a room is not allowed. There must be a minimum clearance of 4 foot horizontally from electric meters, gas meters, regulators, and relief equipment. In no case should the equipment be located above or below these items unless a 4 feet horizontal distance is maintained. The units can be installed at ground level, on a platform or on the roof (If the structure is capable of supporting its weight). The noise generated by the fan during operation is not excessive. However, avoid locating the unit in an area close to sleeping quarters or neighbouring buildings. Installation in building corners, where air turbulence can take place and the equipment noise can be amplified (reverberation), is to be avoided. Around the unit a free and natural air space is to be provided to allow proper intake of the air needed for unit cooling and for servicing. The minimum clearance from walls, obstructions and other units must be as follows:

- right/left sides: 18 inches;
- rear side: 24 inches;
- front side & control box 36 inches.

There MUST NOT be any obstructions or structural overhangs (roof edges, balconies) over the top of the unit. The re-circulation of the air discharged from the fans must be avoided. Otherwise, poor unit performance will result. When the unit is installed near buildings, keep the unit away from the roof edge drip line. In no case should the unit be placed near any external air intakes of the building. For installation on balconies or roofs, the unit must not be located in close proximity of chimney flues, outlets and other such vents. It is important that the unit not be installed in such a manner that hot or contaminated air will be drawn into the air intakes of the unit. Check local codes for required minimum installation distances.

Ground installation

Ground level units must be supported on a level concrete pad thick enough to prevent shifting. Thickness shall be determined by local soil conditions. Pad should be slightly larger than the unit's rail structure (6 inches on each side is recommended). Do not allow the concrete pad to touch the building foundation or structure. Unit operational noise and vibration can be transmitted inside if pad is allowed to come in contact with building.

Roof / Terrace installation

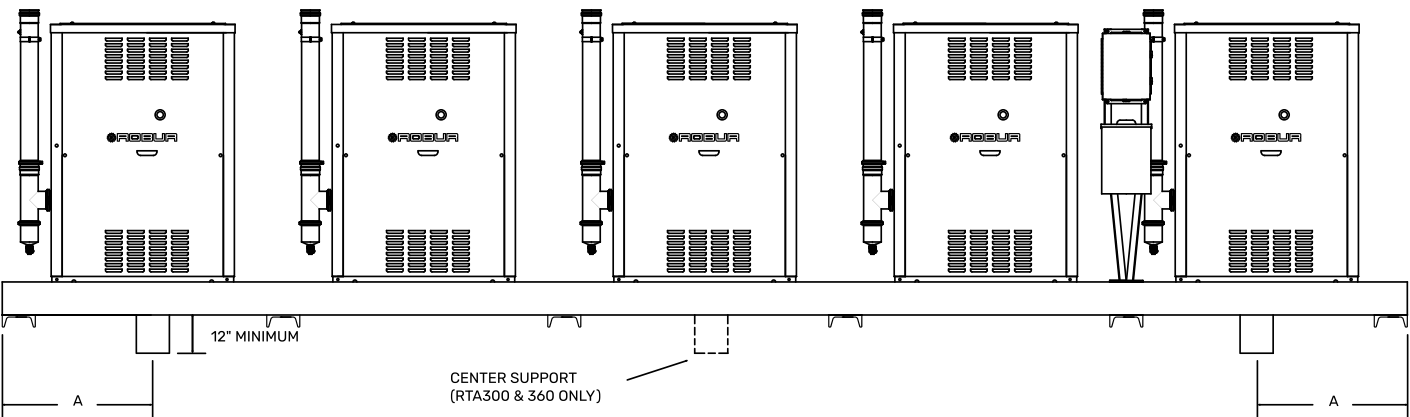
The building structure/roof joists must be capable of supporting both the unit and any structural base weight. Check operating weight for your particular model in "RTA Dimensions" section of this document. Provide for a gangway all around the unit for maintenance purposes. Clearances must be respected for roof installations as well. Installation on roofs directly above sleeping quarters should be avoided if possible. If not possible, special consideration must be given to the transmission characteristics of the building structure, the use of vibration isolators under the equipment (acoustically insulated bases) and approved flexible connections (vibration dampening pipe fittings) between the unit and the system piping is recommended. Observe all local and State codes.

Handling and rigging

Care must be used in rigging the unit for hoisting. Keep in mind that the units weight between 2,000 and 5,000 pounds and that rough handling or dropping might cause damage to the unit or result in injury to personnel handling the unit. The cables or chains for hoisting should be chosen to support the weight. Attach hoist lines to channel bases and use spreader bars to prevent hoist lines from damaging unit panels, condenser coils and fins. The center of gravity from horizontal standpoint will be toward the center and front of the unit. When final positioning of unit, push or pry against base rails only. Complete Handling and Rigging instructions are provided with the unit upon shipping.

RTA piping connections

RTA SUPPORT DIAGRAM



Locations of supports

	RTA120	RTA180	RTA240	RTA300
A	0"-12"	18"-30"	18"-30"	12"-24"

Additional product & application information

The RTA Series includes closed water heat exchangers in each module. The water loop will be pressurized and require an expansion tank and an air bleed installed at the highest point in the water loop. A concentration of permanent inhibited antifreeze/glycol must be added 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 will result in possible freezing of the water in the units' heat exchanger during mild weather or shoulder seasons. This freezing condition will result in improper water flow through the unit and may ultimately damage the units' heat exchanger. RTA links do not include a water-circulating pump. A pump must be sized and obtained locally for your particular application. Remember, when sizing the pump, each module has a nominal flow rate of approx. 13 GPM with an internal pressure drop of 4.3 psig. This flow rate must be provided to each module in the multiple unit configuration. 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. The installer must ensure that the water pump and the RTA unit 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 link's control box may be used for this purpose if the pump's amp draw does not exceed 4 amps. See RTA Specification and Installation Manual 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 loop. In addition, water piping must include necessary fittings to properly fill the loop with a water/antifreeze mixture.



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