



The company, the key values,
the awards and certifications p. 2



The Robur strategy p. 5



The absorption technology
efficiency evolution p. 7



What is a Robur heat pump? p. 9



Robur heat pumps
and renewable energy sources p. 10



Competitive advantages
of Robur heat pumps p. 11



The value of the experience:
the Robur references p. 16



Gas absorption heat pumps and chillers
+ renewable energies, condensing boilers
p. 20



Customized groups upon request p. 43



Heating system with gas absorption heat pump +
renewable energies p. 56

Integrated heating solutions
with gas absorption heat pumps + renewable energies



The right choice can make the difference

A responsible purchase behaviour may have
a great influence on our way of life.

Consider that a product consumes
tons of oil during its whole life cycle,
generating pollution that the forest cannot rebalance.

That's why, when choosing a good,
we take a great responsibility.

Even the choice for the heating system may have a big impact.

To all who choose responsibly,
Robur offers high efficiency heating systems
with low environmental impact,
and moreover concepts, data and facts
to spread the culture of energy efficiency
and environmental protection.

Benito Guerra - Robur S.p.A. Chairman

Mission

Robur is dedicated to dynamic progression
in research, development and promotion of safe,
environmentally-friendly, and energy-efficient products,
through the commitment and caring
of its employees and partners

Vision

Robur turns THE LOVE FOR BEAUTY AND WELL-MADE THINGS
into innovative heating and cooling systems
that are especially designed and developed
to answer the specific needs of Man

7 pillars

Sharing values
Training
Quality
Innovation
Service
Social Responsibility
Testimony

Robur awards and certifications



1995 - ISO 9001 Certification

2000 - First Prize Italian Quality Award

2001 - Robur is the first ISO 9001:2000 (Vision 2000) certified company in Europe in HVAC sector



2003 - Special Prize Winner of "European Quality Award"

- Robur GAHPs were included in the recommended designs group of the Environment Friendly Innovation Award

- Robur, with its reversible Gas Absorption Heat Pumps, claimed the Technological Innovation Award

2004 - Benito Guerra, chairman of Robur, received a nomination as finalist in the "Quality of life" category of the National Businessman of the Year Award, promoted by Ernst & Young



2005 - ISO 14001: 2004 Certification

- CSA Certification (USA)

2006 - Honourable mention at AHR Expo Innovation Award sponsored by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers - USA)

2007 - Mentioned as best product category for gas-fired heat pumps as part of the "Impresa Ambiente" Prize

- Special mention in Enterprise Prize for Innovation promoted by Confindustria

2008 - Gas heat pumps E³ won the honourable mention of the HVAC&R Innovation Prize sponsored by Costruire Impianti.



- ROBUR Test Laboratories by California Energy Commission (CEC)

- Gas Absorption Heat Pumps performances are tested by VDE and DVGW-Forschungsstelle

2009 - Special mention in the catagori Energy Efficiency – Development Prize 2009 by the Foundation Sustainable Development and Ecomondo

Reasons for a choice

Key points of Robur strategy since 1991

HVAC Technology (Heating, Ventilation and Air Conditioning)	CONDENSING BOILER + SOLAR TH	HYBRID BOILER +EHP	AIR/WATER SOURCE EHP	GROUND SOURCE EHP	MICRO-CHP	FUELL CELLS	GAS ABSORPTION HEAT PUMPS + RES GAHP
Renewable source	Approx. 10-15%	Only partial use of RES ⁽¹⁾ ⁽²⁾	Only partial use of RES ⁽¹⁾ ⁽²⁾	Only partial use of RES ⁽¹⁾	NO	NO	Up to 40%
Proven Reliability	YES	YES	YES	YES	NO	NO	YES
Use available grid (power plants)	YES	YES	300k EHP = 1GW (one extra power plant) ⁽³⁾	300k EHP = 1GW (one extra power plant) ⁽³⁾	YES	YES	YES
Environmental sustainability	YES	Refrigerant global warming impact ⁽⁴⁾	Refrigerant global warming impact ⁽⁴⁾	Refrigerant global warming impact ⁽⁴⁾	YES	YES	YES
Integrated solution (heating + cooling)	NO	YES	YES	YES	NO	NO	YES
Sustainability w/o subsidies	YES	YES	YES	Partial ⁽⁵⁾	NO	NO	YES
Limited compliance with criteria	Compliant with criteria		NOT compliant with criteria				

NOTES: Efficiency on primary energy (LHV).

⁽¹⁾ Efficiency on primary energy decreases below 100% when water outlet temperature is above 50°C.

⁽²⁾ Efficiency on primary energy decreases below 100% when outdoor temperature is below 0°C.

⁽³⁾ Large scale application of EHP requires the upgrade of distribution grid.

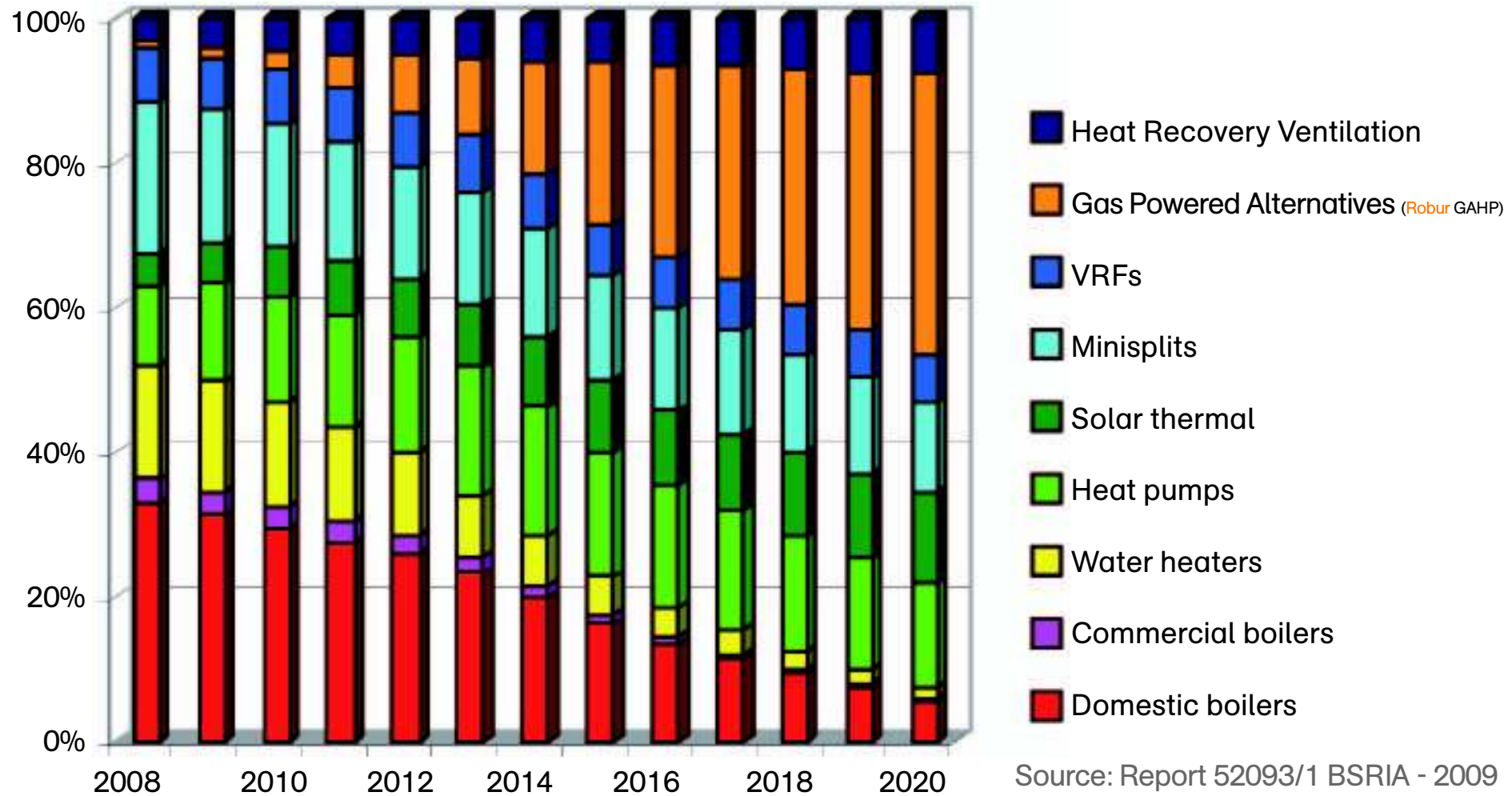
⁽⁴⁾ Refrigerants are phasing out due to EU restrictions.

⁽⁵⁾ High cost of drilling affects the application of ground source systems.

Tests by well-known research institutes

In the 90ies Robur made the choice to develop the GAHP technology for the HVAC market. This choice resulted to be long-

sighted as confirmed also by one of BSRIA's scenarios of the next 10 year HVAC market.



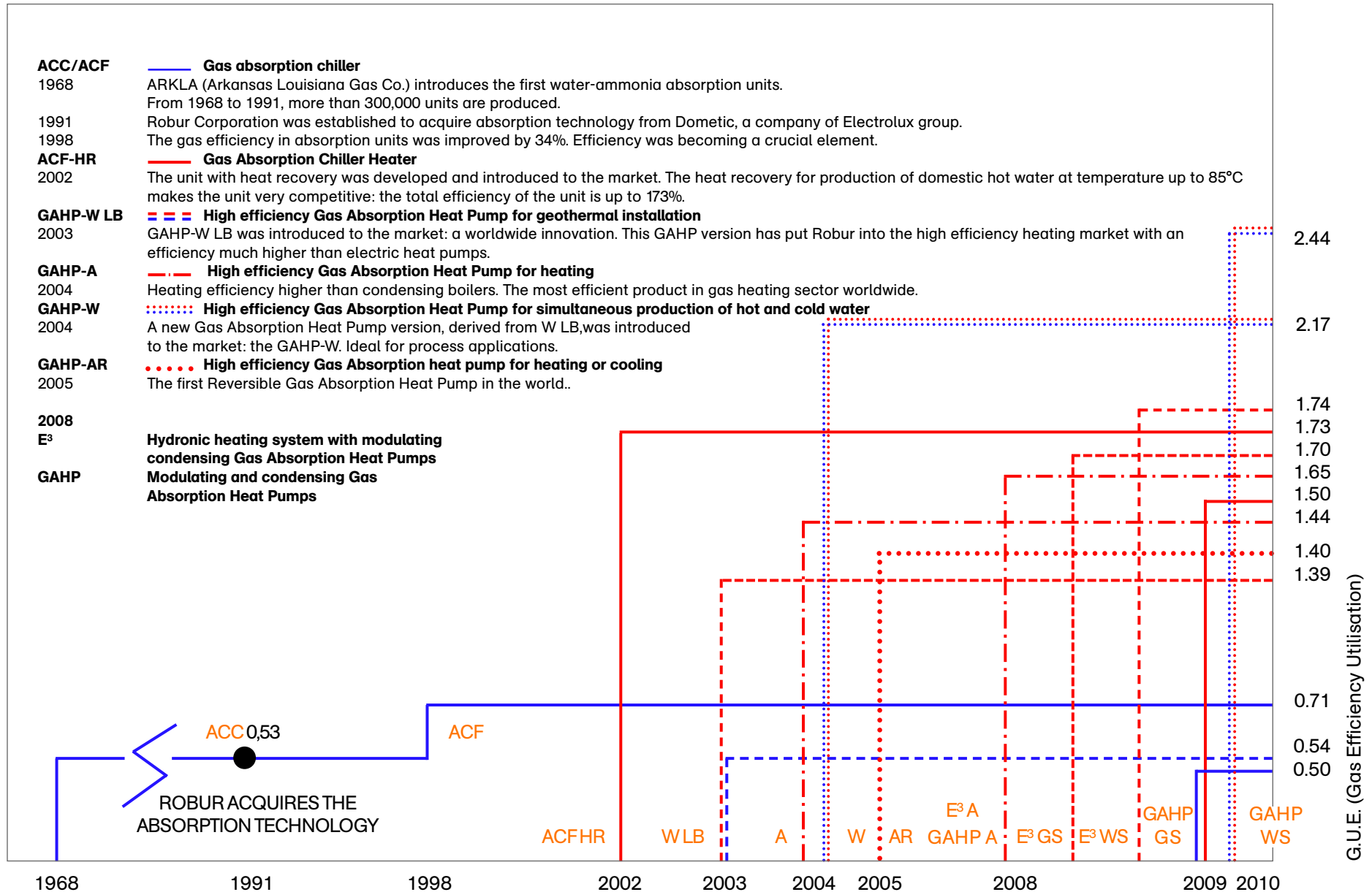
Source: Report 52093/1 BSRIA - 2009

- Data indicated represent market Value (not Volume) of a "Gas favoured" scenario, which was developed alongside a set of different scenarios as part of a Scenario Planning Project 52093/1 by BSRIA".
- "Gas alternatives" include micro CHP, Fuel Cells, Gas Absorption and Gas Engine Heat Pumps.
- Issued July 2009 based on 2008 data.

- "Overall trend biased towards Germany and UK, due to more available information on those countries at the time of the Scenario Planning Project".

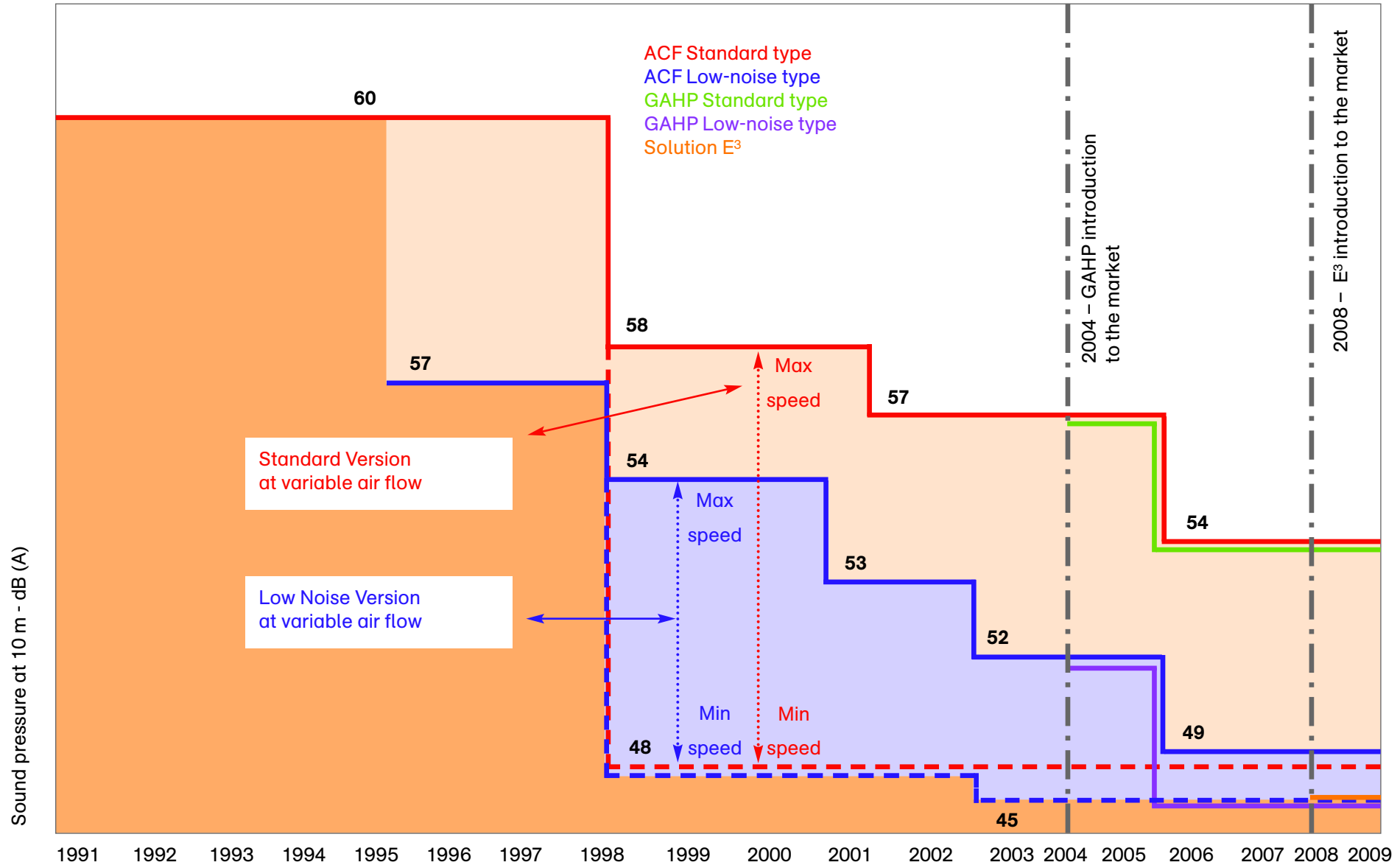
Absorption technology efficiency evolution

A key technology with great potential for innovation



Robur's continuous investment in R&D is one of the key success factors

Sound pressure reduction of the absorption systems



Gas absorption heat pumps + ground, water and air renewable energy sources

GAHP (Gas Absorption Heat Pump)

The perfect blend of the two most common heating technologies



ADVANTAGES

Condensing boiler

- Natural gas fired
- DHW supply
- Only 1/10 of electricity consumption in comparison to electrical heat pumps

ADVANTAGES

Electric heat pump

- Use of renewable source energy with efficiency over 100% (Gross calorific value)
- Cooling mode also available



MINUS

Condensing boiler

- No use of renewable energy
- Efficiency lower than 100% (Gross calorific value)

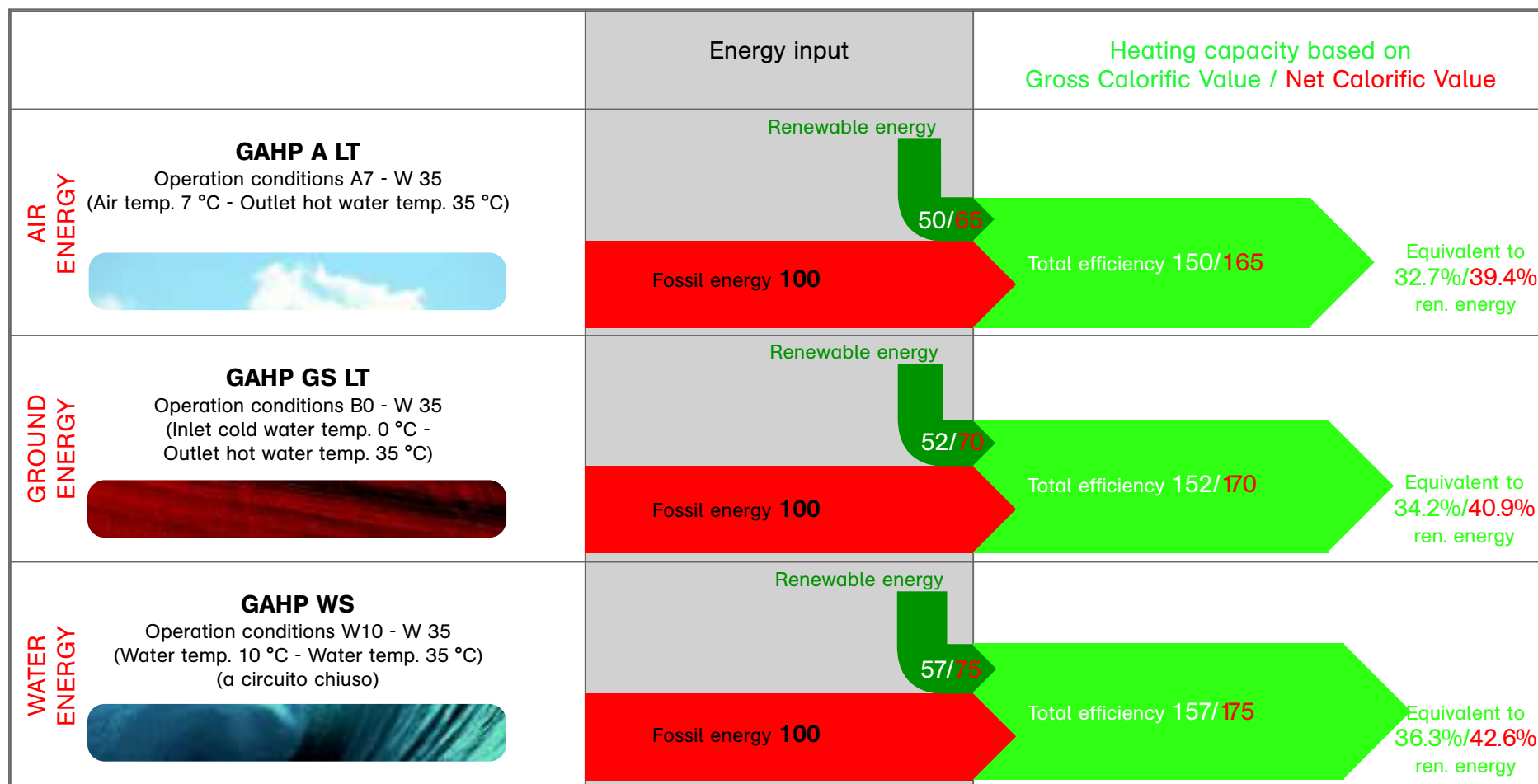
MINUS

Electric heat pump

- High electrical demand
- Borehole length double than GAHP
- Use of HFC fluids harmful for the environment



Efficiency and renewable energy utilisation in gas absorption heat pumps



GAHP (Gas Absorption Heat Pump): A (Air Source), GS (Ground Source), WS (Water Source)
 LT (Low Temperature)

More <http://www.robur.com/technology/robur-gahp-winning-advantages/res-utilisation.html>

ROBUR GAHP
Gas Absorption Heat Pumps
using up to 40%
of renewable energy sources

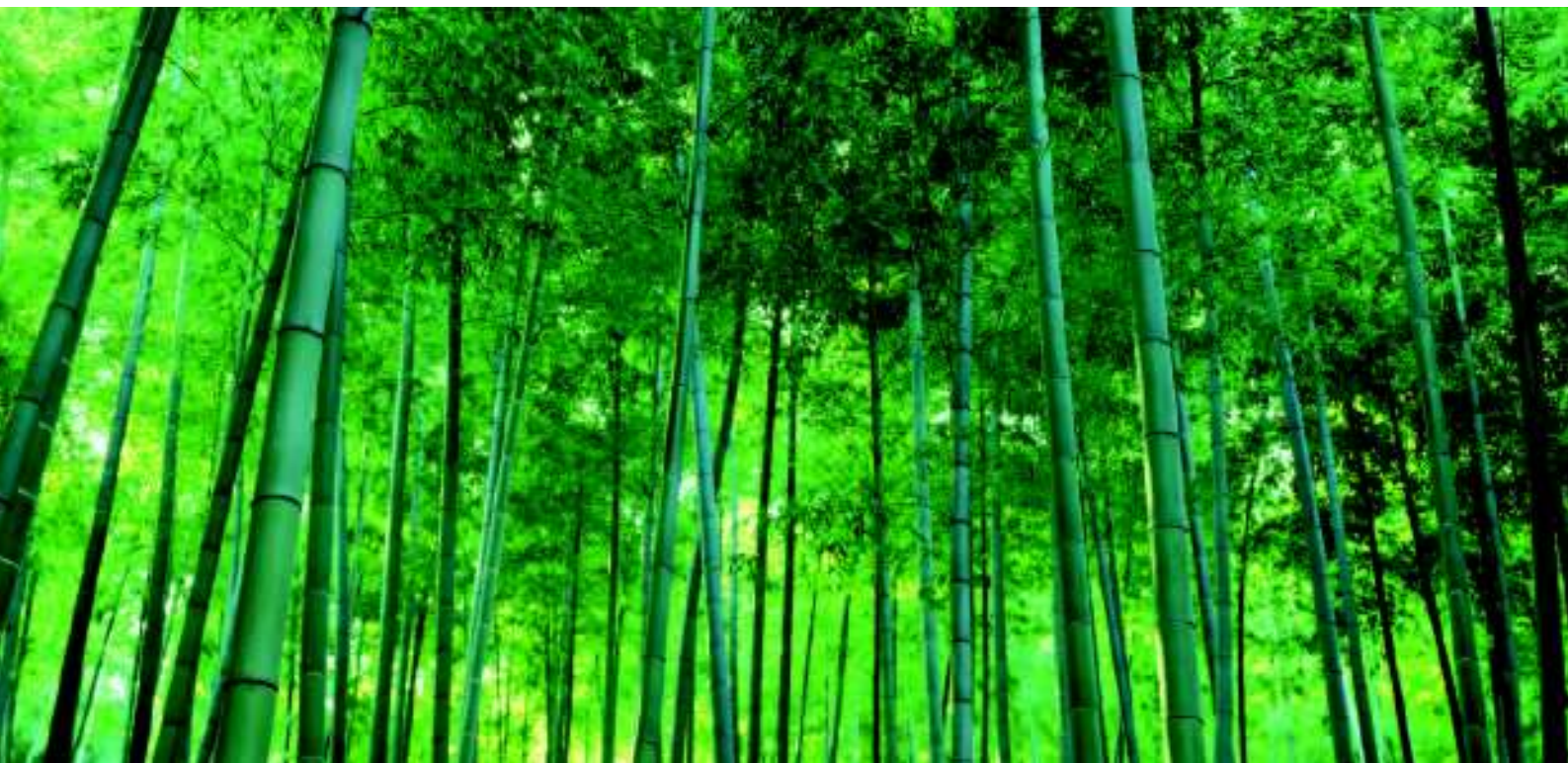
- Environmentally friendly using natural gas + renewable energy sources
- Cost and energy savings
- Increase in property value
- The ideal integration into existing or new installations

ROBUR GAHP Gas Absorption Heat Pumps are environmentally friendly using natural gas + renewable energy sources

With a GAHP,
every year 4.2 Tons of CO₂ emissions are saved,
which are equivalent to those absorbed by 599 trees
or those produced by 2 green cars;
every year 1.6 TOE are saved.

5,800* Gas Absorption Heat Pumps
with Self-Sustainable Renewable Energy
save 9,280 TEP every year
and the emissions of 24,360 Tons of CO₂,
which is equivalent to the emissions of 11,600 green cars
or those absorbed by 3,500,000 trees
covering a surface of 49,009,218 sqm

* Updated on 30st June 2011



Let the sun shine 24 hours a day,
365 days a year!

Make it possible with Robur heating systems

Self-sustainable

Renewable

Energy

Every unit using 1 kW of natural gas
adds 0.5 kW of renewable energy,
24-hours-a-day available.



GAHP: Gas absorption heat pump
using up to 40%
of renewable energy sources

Geothermal, water and air type available

This can be used only when you need it,
thus avoiding unnecessary integration systems
and/or unnecessary heat disposal (in summer).

Note: to produce 0.5 kW of energy the installation of approx. 1m² solar thermal collectors is necessary.

ROBUR GAHP

Gas Absorption Heat Pumps

saving cost and energy

GAHP technology
can provide significant savings up to 40% on heating costs,
making GAHP a smart and beneficial investment
with a payback time of
2 to 4 years.

More <http://www.robur.com/technology/gahp-reasons-for-a-choice/cost-and-energy-savings.html>

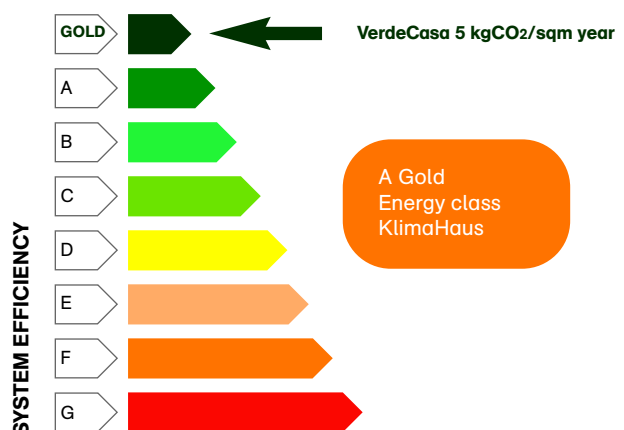
ROBUR GAHP

Gas Absorption Heat Pumps

increasing property value

GAHP's are the most profitable investment
to increase the value of the building; upgrading the heating system
only and with a small investment per square meter,
the building performance rating will increase.

MFH SPF Verde Casa, Spinetta Marengo (Alessandria), Italy



More <http://www.robur.com/technology/gahp-reasons-for-a-choice/increase-in-property-value.html>

ROBUR GAHP

Gas Absorption Heat Pumps

are the ideal integration of
new installations or existing buildings

Open up **A NEW WAY** for solar thermal energy...
Increase the rate
of Self-sustainable Renewable Energy
thanks to the integration with
Robur Gas Absorption Heat Pumps

Solar thermal energy provides
20% of renewable energy of annual heating demand

80% can be integrated with:



Condensing boiler:
no use of renewable energy



Renewable energy rate 20%

Gas Absorption Heat Pump
provides up to **29% of renewable**
energy (36.3% on 80% di
integration = 29%)



Renewable energy rate 49%
20% from solar thermal energy
29% from Gas Absorption Heat Pump



The value of the experience: Robur references

MFH 2 MW Project - Netherlands



Robur solutions, combined with a number of other high efficiency technologies, provided an overall annual saving of over 530,000 m³ of natural gas compared to the previous traditional heating system.

Domaine La Coquillade Hotel - France



Agrifood market Alexandria - Romania



More <http://www.robur.com/references/>

Kindergarten - Oberkochen, Germany



Aquamarien - Marienberg, Germany



Michael von Jung school - Kirchdorf, Germany



Edeka Riedel, Bad Wiessee - Germany



Pastor Braune Haus - Berlin, Germany



Southern Connecticut Gas Utility - USA



Department of Sanitation, NY - USA



The modularity of Robur solutions allows to follow the variations in the building's energy loads, with extremely high reliability for the air conditioning system, thus ensuring constant comfort.

Residence Benny Farm - Canada



Kelly Residence, CT - USA



Engineering Department,
Municipality of Milan, Italy



Robur chiller units reduce the need for electricity by up to 88% compared to a traditional electrical system.

Printworks Grafiche Antiga, Treviso, Italy



Manus cooperative, Bolzano, Italy



RAI Television, Milan, Italy



Holiday Inn, Mozzo (Bergamo), Italy



Winery Fattoria Selvapiana, Florence, Italy



The design competence and technical advice provided by Robur supported the customer in making the right choice and the most efficient use of air conditioning solutions.

Carrefour, Cusago (Milan) Italy



Hotel Methis, Padua, Italy



Würth Italia, Egna (Bolzano), Italy



Chamber of commerce, Padua, Italy



MFH, Milan, Italy



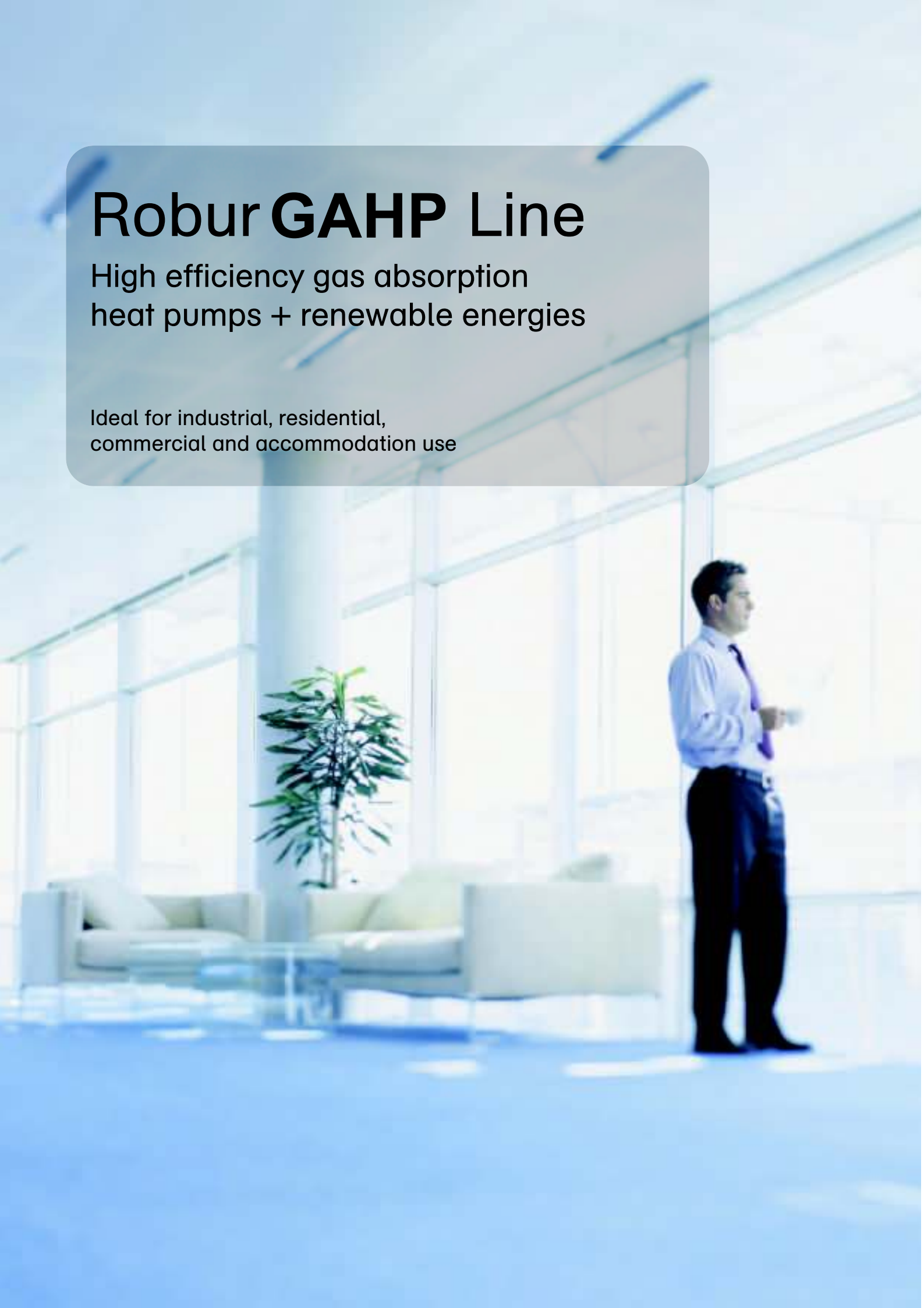
School, Sulbiate (Monza-Brianza), Italy



Robur **GAHP** Line

High efficiency gas absorption
heat pumps + renewable energies

Ideal for industrial, residential,
commercial and accommodation use



A complete range of products fired by gas for heating, cooling, refrigeration and domestic hot water supply.












The GAHP line offers a wide

range of gas absorption heat pumps + air, ground or water source renewable energy, absorption chillers (with or without heat recovery) and

condensing boilers designed for every heating and cooling requirements under different operating conditions.

Every unit is available in several

versions according to the type of installation and the performances required.

TYPE	OPERATION			
	HEATING	COOLING	DHW	SIMULTANEOUS HOT AND COLD WATER PRODUCTION
GAHP-A Air source condensing gas absorption heat pump				
GAHP-GS Ground source condensing gas absorption heat pump				
GAHP-WS Water source condensing gas absorption heat pump				 simultaneous
GAHP-AR Reversible gas absorption heat pump				



Modulating heat pump, for outdoor installation, for the production of hot water up to 65 °C (70 °C for DHW). Guarantees up to 165% efficiency, thanks to the use of air source renewable energy.

High efficiency condensing gas absorption heat pumps + air source renewable energy for heating

GAHP Line A - RTA Series

Advantages

- Up to 32.7% utilisation of air source renewable energy.
- Designed to exceed peak efficiencies of 165%, guaranteeing up to 32.7% reductions in annual heating costs and in CO₂ emissions compared to the best condensing boilers.
- The most beneficial heating system to enhance the energy qualification of buildings because it permits a considerable promotion of the building's energy classification with the consequent increase in the value of the building.
- Increases the total efficiency of the heating system when it is combined or integrated with boilers with a lower energy performance.
- Ensures efficiency levels in excess of 145% even at -7 °C, so it is also used in especially cold climates.

- Its polluting emissions are lower than the limits set by the Blue Angel certification (www.blauer-engel.de).
- Guarantees constant performance, against the external temperature: between -10 °C and 10 °C, providing a heating capacity of more than 32.5 kW at all times (HT version). It thus avoids activating back-up systems (boilers and electrical heaters), which reduce the seasonal performance coefficients and hence increase consumption.
- It uses traditional polypropylene flues, exploiting condensation. The high pressure of the combustion system (up to 80 Pa) enables the extension of the vent to more than 20 m.

Applications

- Ideal for heating industrial, commercial, accommodation and tertiary utilities.

The models

- HT: for the production of water at high temperature (for retrofitted radiator systems);
- LT: optimized to produce hot water at low temperature (new systems with radiant panels or fan coils).
- On request GAHP-A units can be pre-assembled as links with the same units (RTA Series) or with other units (see p. 44).



			GAHP-A HT	GAHP-A LT
HEATING OPERATION MODE ⁽¹⁾				
Working point A7/W35	G.U.E. (gas utilization efficiency) *	%	- -	165
	heating capacity	kW	- -	41.6
Working point A7/W50	G.U.E. (gas utilization efficiency)	%	152	- -
	heating capacity	kW	38.3	- -
Nominal water flow rate ($\Delta T = 10^\circ\text{C}$)		m ³ /h	3.0	3.0
Nominal water pressure loss (A7/W50)		kPa	30	30
Maximum outlet water temperature heating/DHW		°C	65/70	55/70
Maximum inlet water temperature heating/DHW		°C	55/60	45/60
Outdoor operating temperature (dry bulb)	maximum	°C	45	45
	minimum ⁽²⁾	°C	-20	-20

BURNER CHARACTERISTICS

Thermal input (actual)		kW	25.2	25.2
Gas consumption (actual)	natural gas G20 ⁽³⁾	m ³ /h	2.67	2.67
	GPL G30/G31 ⁽⁴⁾	kg/h	1.99/1.96	1.99/1.96

ELECTRICAL CHARACTERISTICS

Voltage		230 V – 50 Hz		
Nominal electrical power ⁽⁵⁾	standard version	kW	0.90	0.90
	low noise version	kW	1.09	1.09

INSTALLATION DETAILS

Operational Weight	standard version	kg	390	390
	low noise version	kg	400	400
Sound pressure at 10 metres ⁽⁶⁾	standard version	dB(A)	54	54
	low noise version	dB(A)	45	45
Connections	water	" F	1 1/4	1 1/4
	gas	" F	3/4	3/4
	exhaust flue pipe	mm	80	80
Residual flue pressure		Pa	80	80
Dimensions	width	mm	854	854
	depth	mm	1,256	1,256
	height (standard version)	mm	1,281	1,281
	height (low noise version)	mm	1,540	1,540
Electrical degree of protection		IP	X5D	X5D

Pre-assembled model RTA	Units	Heating capacity kW	Dimensions w/d/h mm	Weight kg
RTA 00-266 HT S CC	n. 2 GAHP A HT S	76.6	2,314 x 1,245 x 1,650	970
RTA 00-399 HT S CC	n. 3 GAHP A HT S	114.9	3,610 x 1,245 x 1,650	1,435
RTA 00-532 HT S CC	n. 4 GAHP A HT S	153.2	4,936 x 1,245 x 1,650	1,920
RTA 00-665 HT S CC	n. 5 GAHP A HT S	191.5	6,490 x 1,245 x 1,650	2,395
RTA 00-282 LT S CC	n. 2 GAHP A LT S	83.2	2,314 x 1,245 x 1,650	970
RTA 00-423 LT S CC	n. 3 GAHP A LT S	124.8	3,610 x 1,245 x 1,650	1,435
RTA 00-564 LT S CC	n. 4 GAHP A LT S	166.4	4,936 x 1,245 x 1,650	1,920
RTA 00-705 LT S CC	n. 5 GAHP A LT S	208.0	6,490 x 1,245 x 1,650	2,395

Multiple pre-assembled links RTA HT or LT are available with or without circulators and in standard or low noise version. On request, GAHP-A units can be pre-assembled with other units (gas heat pumps, gas chillers and gas condensing boilers), to create multiple assemblies configured on demand for heating, cooling and DHW production.

⁽¹⁾ Nominal conditions according to EN 12309-2.

⁽²⁾ In case of operation at -30 °C, the GAHP-A requires the winter kit (optional). Operating condition without winter kit: -20 °C

⁽³⁾ PCI 34.02 MJ/m³ (9.45 kWh/m³) at 15 °C - 1013 mbar.

⁽⁴⁾ PCI 46.34 MJ/kg (12.87 kWh/kg) at 15 °C - 1013 mbar.

⁽⁵⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical

motors power consumption.

⁽⁶⁾ Free field, at the front, direction factor 2.

* Equivalent COP: 4.12 calculated on energy conversion factor of 2.5.

Note: The dimensions of the unit above mentioned refer to the unit without flue exhaust pipe.



Modulating heat pump, for indoor installation, for the production of hot water up to 65 °C (70 °C for DHW). Guarantees more than 170% efficiency, thanks to the use of ground source renewable energy.

Condensing gas absorption heat pump + ground source renewable energy for heating GAHP Line GS - RTGS Series

Advantages

- Up to 34.7% utilisation of ground source renewable energy.
- Exceeds peak efficiencies of 170%, guaranteeing up to 34.7% reductions in annual heating costs and in CO₂ emissions compared to condensing boilers.
- Reduction in investment costs for geothermal loops can be higher than 50%.
- Its polluting emissions are lower than the limits set by the Blue Angel certification

(www.blauer-engel.de).

- The high pressure of the combustion system (up to 80 Pa) enables the extension of the polypropylene vent to more than 20 m.
- It reduces electricity consumption to a minimum, thanks to the prevalent use of gas. To produce more than 40 thermal kW the unit electrical power consumption is less than 0.5 kW.
- It permits a considerable promotion of the building's energy classification with the

consequent increase in the value of the building.

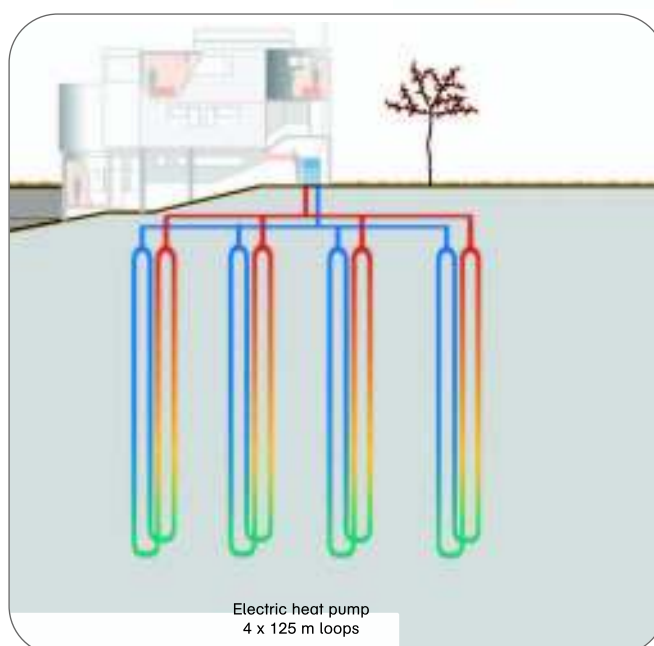
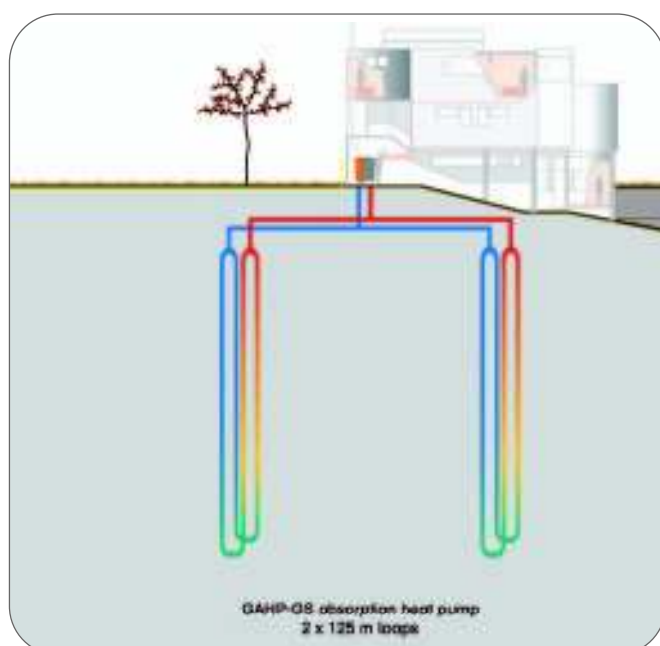
Applications

- Ideal for heating industrial, commercial, accommodation and tertiary utilities in geothermal applications. Ability to supply cooling as free-cooling mode (unit off) or in geothermal applications with active cooling (unit on).

Versions

- HT: for the production of water at high temperature

- LT: optimized to produce hot water at low temperature (new systems with radiant panels or fan coils).



With GAHP-GS absorption heat pump reduction in investment costs for geothermal loops can be higher than 50%.

			GAHP-GS HT	GAHP-GS LT
HEATING OPERATION MODE				
Working point B0/W35	G.U.E. (gas utilization efficiency) *	%	- -	170
	heating capacity	kW	- -	42.6
	capacity recovered from renewable source	kW	- -	17
Working point B0/W50	G.U.E. (gas utilization efficiency)	%	149	- -
	heating capacity	kW	37.6	- -
	capacity recovered from renewable source	kW	12.6	- -
Nominal water flow rate ($\Delta T = 10\text{ }^{\circ}\text{C}$)		m ³ /h	3.17	3.25
Nominal water pressure loss (B0/W50)		kPa	49	49
Maximum outlet water temperature for heating/DHW		°C	65/70	55/70
Maximum inlet water temperature for heating/DHW		°C	55/60	45/60
BURNER CHARACTERISTICS				
Thermal input (actual)		kW	25.2	25.2
Gas consumption (actual)	natural gas G20 ⁽¹⁾	m ³ /h	2.67	2.67
	LPG G31/G30 ⁽²⁾	kg/h	1.99/1.96	1.99/1.96
ELECTRICAL CHARACTERISTICS				
Voltage			230 V – 50 Hz	
Nominal electrical power ⁽³⁾		kW	0.47	0.47
INSTALLATION DETAILS				
Operational Weight		kg	300	300
Sound pressure at 10 metres ⁽⁴⁾		dB(A)	39	39
Connections	water	" F	1 1/4	1 1/4
	gas	" F	3/4	3/4
	flue exhaust pipe	mm	80	80
Residual flue pressure		Pa	80	80
Dimensions	width	mm	848	848
	depth	mm	690	690
	height	mm	1,278	1,278
Electrical degree of protection		IP	X5D	X5D

GAHP GS units are available also in pre-assembled links (RTGS).

⁽¹⁾ PCI 34.02 MJ/m³ (9,45 kWh/m³) at 15 °C - 1013 mbar.

⁽²⁾ PCI 46.34 MJ/kg (12,87 kWh/kg) at 15 °C - 1013 mbar.

⁽³⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical motors power consumption.

⁽⁴⁾ Free field, at the front, direction factor 2. The values refer to the maximum measured.

Note: The capacity above mentioned is also the capacity available for cooling. For any further information, please refer to design manual.

* Equivalent COP: 4.25 calculated on energy conversion factor of 2.5.

Modulating heat pump, for indoor installation,
for the simultaneous production of hot water up to 65 °C (70 °C for DHW).
Guarantees more than 175% efficiency, thanks to the use of water source
renewable energy.

Condensing gas absorption heat pump
+ **water source** renewable energy
for heating and cooling

GAHP Line WS- RTWS Series

Advantages

- Up to 36.3% utilisation of water source renewable energy.
- Exceeds peak efficiencies of 175%, guaranteeing up to 36.3% reductions in annual heating costs.
- It reduces electricity consumption to a minimum, thanks to the prevalent use of gas. To produce more than 43 kWt and 17 kWc, it consumes less than 0.5 kW of electricity.
- Its polluting emissions are lower than the limits set by the Blue Angel certification

(www.blauer-engel.de).

- The high pressure of the combustion system (up to 80 Pa) enables the extension of the polypropylene vent to more than 20 m.
- It permits a considerable promotion of the building's energy classification with the consequent increase in the value of the building.

Applications

- Heating and air conditioning systems with an energy source available for recovery (preheating of DHW).



Working point W10/W35	G.U.E. (gas utilization efficiency) *	%	175
	heating capacity	kW	43.9
	capacity recovered from renewable source	kW	17.6
Working point W10/W50	G.U.E. (gas utilization efficiency)	%	165
	heating capacity	kW	41.6
	capacity recovered from renewable source	kW	16.6
Nominal water flow rate ($\Delta T = 10\text{ }^{\circ}\text{C}$)		m ³ /h	3.57
Nominal water pressure loss (W10/W50)		kPa	57
Maximum outlet water temperature for heating/DHW		°C	65/70
Maximum inlet water temperature for heating/DHW		°C	55/60

BURNER CHARACTERISTICS

Thermal input (actual)		kW	25.2
Gas consumption (actual)	natural gas G20 ⁽¹⁾	m ³ /h	2.67
	LPG G30/G31 ⁽²⁾	kg/h	1.99/1.96

ELECTRICAL CHARACTERISTICS

Voltage		230 V – 50 Hz	
Nominal electrical power ⁽³⁾		kW	0.47

INSTALLATION DETAILS

Operational Weight		kg	300
Sound pressure at 10 metres ⁽⁴⁾		dB(A)	39
Connections	water	" F	1 1/4
	gas	" F	3/4
	flue exhaust pipe	mm	80
Residual flue pressure		Pa	80
Dimensions	width	mm	848
	depth	mm	690
	height	mm	1,278
Electrical degree of protection		IP	X5D

GAHP WS units are available also in pre-assembled links (RTWS).

Simultaneous use: efficiency levels of 244%.

Advantages

- Simultaneous production of hot water up to 65 °C and cold water down to 3 °C.
- Overall efficiencies of more than 244% in case of

simultaneous use.

- External sources are not required, thus reducing installation and operational costs.

Applications

- Systems that simultaneously require heating and cooling (hospitals, manufacturing process or liquid-ring-based air conditioning systems).

Working point W10/W35	overall efficiency	%	244
	heating capacity	kW	43.9
	cooling capacity	kW	17.6
Working point W10/W50	overall efficiency	%	231
	heating capacity	kW	41.6
	cooling capacity	kW	16.6

⁽¹⁾ PCI 34.02 MJ/m³ (9,45 kWh/m³) at 15 °C - 1013 mbar.

⁽²⁾ PCI 46.34 MJ/kg (12,87 kWh/kg) at 15 °C - 1013 mbar.

⁽³⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical motors power consumption.

⁽⁴⁾ Free field, at the front, direction factor 2. The values refer to the maximum measured.

Note: The capacity above mentioned is also the capacity available for cooling. For any further information, please refer to design manual.

* Equivalent COP: 4.37 calculated on energy conversion factor of 2.5.



Reversible heat pump, for outdoor installation, for the production of hot water up to 60 °C or cold water down to 3°C. Guarantees efficiency up to 149%, thanks to the use of air source renewable energy.

High efficiency gas absorption heat pump +
air source renewable energy
for heating and cooling

GAHP Line AR - RTAR Series

Advantages

- Up to 25.3% utilisation of air source renewable energy.
- Designed to exceed peak efficiencies of 149%, guaranteeing up to 25.3% reductions in annual heating costs and in CO₂ emissions compared to the best condensing boilers.
- The most beneficial heating system to enhance the energy qualification of buildings, because it permits a considerable promotion of the building's energy classification with the consequent increase in the value of the building.
- Also designed for cooling purposes, using gas as fuel.
- Reduces electricity requirements up to 86% (0.9 kWe for 35.3 kW of heating capacity or 16.9 kW of cooling capacity) compared to traditional electrical systems, thanks to the prevalent use of gas.
- Ensures efficiency levels in excess of 130% even at -7 °C, so it is also used in especially cold climates.

Applications

- Ideal for heating and cooling industrial, commercial, accommodation and tertiary utilities.
- On request GAHP-AR units can be pre-assembled as links with the same units (RTAR Series) or with other units (see p. 44).



Example of GAHP-AR application in winter and summer operation for radiant panels, fan coils, indirect production of DHW.

GAHP-AR

HEATING OPERATION MODE ⁽¹⁾

Working point A7/W35	GUE (gas utilization efficiency) *	%	149
	heating capacity	kW	37.5
Working point A7/W50	GUE (gas utilization efficiency)	%	140
	heating capacity	kW	35.3
Nominal water flow rate ($\Delta T = 10^\circ\text{C}$)		m ³ /h	3.04
Nominal water pressure loss (A7/W50)		kPa	29
Maximum outlet water temperature ($\Delta T = 10^\circ\text{C}$)		°C	60
Inlet water temperature max/min		°C	50/20
Ambient operating temperature (dry bulb) max/min		°C	35/-20

COOLING OPERATION MODE ⁽¹⁾

Working point A35/W7	GUE (gas utilization efficiency)	%	67
	cooling capacity	kW	16.9
Nominal water flow rate ($\Delta T = 5^\circ\text{C}$)		m ³ /h	2.9
Nominal water capacity pressure loss (A35/W7)		kPa	31
Minimum outlet water temperature		°C	3
Inlet water temperature max/min		°C	45/6
Ambient operating temperature (dry bulb) max/min		°C	45/0

BURNER CHARACTERISTICS

Thermal input (actual)		kW	25.2
Gas consumption (actual)	natural gas G20 ⁽²⁾	m ³ /h	2.67
	LPG G30/G31 ⁽³⁾	kg/h	1.96

ELECTRICAL CHARACTERISTICS

Voltage		230 V – 50 Hz	
Nominal electrical power ⁽⁴⁾	standard version	kW	0.9
	low noise version	kW	0.93

INSTALLATION DETAILS

Operational Weight	standard version	kg	380
	low noise version	kg	390
Sound pressure at 10 metres ⁽⁵⁾	standard version	dB(A)	54
	low noise version	dB(A)	49
Connections	water	" F	1 1/4
	gas	" F	3/4
	flue exhaust pipe	mm	80
Dimensions	width	mm	850
	depth	mm	1,230
	height (standard version)	mm	1,290
	height (low noise version)	mm	1,540
Electrical degree of protection		IP	X5D

Pre-assembled model RTAR	Units	Heating - cooling capacity kW	Dimensions w/d/h mm	Weight kg
RTAR 116-240 S CC	n. 2 GAHP AR S	75.0 - 33.8	2,314 x 1,245 x 1,650	970
RTAR 174-360 S CC	n. 3 GAHP AR S	112.5 - 50.7	3,610 x 1,245 x 1,650	1,435
RTAR 232-480 S CC	n. 4 GAHP AR S	150.0 - 67.6	4,936 x 1,245 x 1,650	1,920
RTAR 290-600 S CC	n. 5 GAHP AR S	187.5 - 84.5	6,490 x 1,245 x 1,650	2,395

Multiple pre-assembled links RTAR are available with or without circulators and in standard or low noise version. On request, GAHP-AR units can be pre-assembled with other units (gas heat pumps, gas chillers and gas condensing boilers), to create multiple assemblies configured on demand for heating, cooling and DHW production.

⁽¹⁾ Nominal conditions according to EN 12309-2.

⁽²⁾ PCI 34.02 MJ/m³ (9.45 kWh/m³) at 15 °C - 1013 mbar.

⁽³⁾ PCI 46.34 MJ/kg (12.87 kWh/kg) at 15 °C - 1013 mbar.

⁽⁴⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical motors power consumption.

⁽⁵⁾ Free field, at the front, direction factor 2.




* Equivalent COP: 3.72 calculated on energy conversion factor of 2.5.

Note: The above data refer to the standard versions with circulating pumps. For the low noise version, with or without water circulating pumps, please contact the Robur sales network.

Robur GA Line

Gas-fired absorption chillers and chiller-heaters
with low electricity consumption

Ideal for commercial, accommodation and industrial use

TYPE	OPERATION	
	COOLING	DHW WITH HEAT RECOVERY
GA ACF-HR Gas absorption chiller with heat recovery		
GA ACF Gas absorption chiller		



Chiller-heater, for outdoor installation, for the production of cold water down to 3 °C and simultaneously free hot water up to 80 °C.

Gas absorption chiller-heater for cooling with heat recovery for the production of hot water

GA Line ACF - RTCF Series HR Version

Advantages

- Production of hot water for free during cooling operation.
- Extremely low electricity consumption: saving up to 88% of electricity compared with a traditional electrical system, thus requiring neither additional energy nor upgrading or modification of the electrical cabin.
- Complete system flexibility and modularity, ensuring continuity of service and

providing the cooling output according to seasonal demands (multiple links RTCF HR available on request).

Applications

- Cooling systems where hot water production for domestic use is required (hotels, hospitals, swimming pools, etc.).
- Post-heating circuits with A.H.U.
- On request ACF HR units can be pre-assembled as links with the same units (RTCF HR Series) or with other units (see p. 44).



Example of GA-HR application with reversible GAHP-AR heat pump in summer operation for fan coils and indirect DHW production.



ACF 60-72 HR

COOLING OPERATION MODE

Working point A35/W7 ⁽¹⁾	GUE (gas utilization efficiency)	%	72
	cooling capacity with heat recovery	kW	17.93
Nominal water flow rate ($\Delta T = 5,5\text{ }^{\circ}\text{C}$)		m ³ /h	2.77
Nominal water capacity pressure loss		kPa	29
Minimum outlet water temperature		°C	3
Inlet water temperature	max	°C	45
	min	°C	6
Ambient operating temperature	max	°C	45
	min	°C	0

HEAT RECOVERY SYSTEM CHARACTERISTICS

Nominal heating capacity		kW	21
Nominal water flow rate		m ³ /h	1
Hot water inlet temperature	max	°C	70
	min	°C	10

BURNER CHARACTERISTICS

Thermal input (actual)		kW	25.0
Gas consumption (actual)	natural gas G20 ⁽²⁾	m ³ /h	2.65
	LPG G30/G31 ⁽³⁾	kg/h	1.94

ELECTRICAL CHARACTERISTICS

Voltage		230 V – 50 Hz	
Nominal electrical power ⁽⁴⁾⁽⁵⁾	standard version	kW	0.82
	low noise version	kW	0.87

INSTALLATION DETAILS

Operational Weight	standard version	kg	370
	low noise version	kg	390
Sound pressure at 10 metres ⁽⁶⁾	standard version	dB(A)	54
	low noise version	dB(A)	49
Connections	water	" F	1 1/4
	gas	" F	3/4
Dimensions	width	mm	850
	depth	mm	1,230
	height (standard version)	mm	1,290
	height (low noise version)	mm	1,540
Electrical degree of protection		IP	X5D

Pre-assembled model RTCF HR	Units	Heating capacity recovery kW	Cooling capacity kW	Dimensions w/d/h mm	Weight kg
RTCF 120-144 HR S SM	n. 2 ACF 60-72 HR S	42.0	35.8	2,314 x 1,245 x 1,650	970
RTCF 180-216 HR S SM	n. 3 ACF 60-72 HR S	63.0	53.7	3,610 x 1,245 x 1,650	1,435
RTCF 240-288 HR S SM	n. 4 ACF 60-72 HR S	84.0	71.7	4,936 x 1,245 x 1,650	1,920
RTCF 300-360 HR S SM	n. 5 ACF 60-72 HR S	105.0	89.6	6,490 x 1,245 x 1,650	2,395

Multiple pre-assembled links RTCF HR are available with or without circulators and in standard or low noise version. On request, ACF60-72 HR units can be pre-assembled with other units (gas heat pumps, gas chillers and gas condensing boilers), to create pre-assembled units for heating, cooling and DHW production.

⁽¹⁾ Operating point under nominal conditions according to EN 12309-2.

⁽²⁾ PCI 34.02 MJ/m³ (9,45 kWh/m³) at 15 °C - 1013 mbar.

⁽³⁾ PCI 46.34 MJ/kg (12,87 kWh/kg) at 15 °C - 1013 mbar.

⁽⁴⁾ A reduction in the fan revolutions (air flow) is envisaged for ambient operating temperatures of less than 33 °C. This leads to a further reduction in electricity consumption levels.

⁽⁵⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical motors power consumption.

⁽⁶⁾ Free field, at the front, direction factor 2. The values refer to the maximum measured.

Note: For multiple units, please contact the Robur sales network. For any further information about heat recovery systems, please see design manual.



Chiller and chiller links, for outdoor installation,
for the production of cold water down to 3 °C.
Reduces electricity needs by up to 88%.

Gas absorption chiller and chiller links for cooling

GA Line ACF - RTCF Series

Advantages

- Extremely low electricity consumption: saving up to 86% of electricity compared with a traditional electrical system, thus requiring neither additional energy nor upgrading or modification of the electrical cabin.
- Independent and modular, it ensures constant performance for cooling only as and when needed.
- Thanks to the use of an almost

static refrigeration cycle, the performance levels remain unchanged over time and regular refill and disposal of refrigerant is not required.

Applications

- Cooling for commercial, accommodation and industrial use.
- On request ACF units can be pre-assembled as links with the same units (RTCF Series) or with other units (see p. 44).



COOLING OPERATION MODE

Working point A35/W7 ⁽¹⁾	GUE (gas utilization efficiency)	%	71
	cooling capacity	kW	17.72
Nominal water flow rate ($\Delta T = 5,5\text{ }^{\circ}\text{C}$)		m ³ /h	2.77
Nominal water pressure loss		kPa	29
Minimum outlet water temperature		°C	3
Inlet water temperature	max	°C	45
	min	°C	6
Ambient operating temperature	max	°C	45
	min	°C	0

BURNER CHARACTERISTICS

Thermal input (actual)		kW	25.0
Gas consumption (actual)	natural gas G20 ⁽²⁾	m ³ /h	2.65
	LPG G30/G31 ⁽³⁾	kg/h	1.94

ELECTRICAL CHARACTERISTICS

Voltage		230 V – 50 Hz	
Nominal electrical power ⁽⁴⁾⁽⁵⁾	standard version	kW	0.82
	low noise version	kW	0.87

INSTALLATION DETAILS

Operational Weight	standard version	kg	340
	low noise version	kg	360
Sound pressure at 10 metres ⁽⁶⁾	standard version	dB(A)	54
	low noise version	dB (A)	49
Connections	water	"	1 1/4 F
	gas	" F	3/4
Dimensions	width	mm	850
	depth	mm	1,230
	height (standard version)	mm	1,290
	height (low noise version)	mm	1,540
Electrical degree of protection		IP	X5D

Pre-assembled model RTCF	Units	Cooling capacity kW	Dimensions w/d/h mm	Weight kg
RTCF 120-00 S CC	n. 2 ACF 60-00 S	35.4	2,314 x 1,245 x 1,650	970
RTCF 180-00 S CC	n. 3 ACF 60-00 S	53.2	3,610 x 1,245 x 1,650	1,435
RTCF 240-00 S CC	n. 4 ACF 60-00 S	70.9	4,936 x 1,245 x 1,650	1,920
RTCF 300-00 S CC	n. 5 ACF 60-00 S	88.6	6,490 x 1,245 x 1,650	2,395

Multiple pre-assembled links RTCF are available with or without circulators and in standard or low noise version. On request, ACF60-00 units can be pre-assembled with other units (gas heat pumps, gas chillers and gas condensing boilers), to create multiple assemblies configured on demand for heating, cooling and DHW production.

⁽¹⁾ Operating point under nominal conditions according to EN12309-2.

⁽²⁾ PCI 34.02 MJ/m³ (9,45 kWh/m³) at 15 °C - 1013 mbar.

⁽³⁾ PCI 46.34 MJ/kg (12,87 kWh/kg) at 15 °C - 1013 mbar.

⁽⁴⁾ A reduction in the fan revolutions (air flow) is envisaged for ambient operating temperatures of less than 33 °C. This leads to a further reduction in electricity consumption levels.

⁽⁵⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical motors power consumption.




⁽⁶⁾ Free field, at the front, direction factor 2. The values refer to the maximum measured.

Note: The data specified refer to the versions with water circulating pumps. For those versions without water circulating pumps, please contact the Robur sales network.

GA Line *Special Versions*

Gas absorption chillers and chiller-heaters
with low electricity consumption

Ideal for commercial, accommodation and industrial use

TYPE	OPERATION	REFRIGERATION	PROCESS APPLICATIONS	AIR CONDITIONING IN HOT CLIMATES
GA ACF-TK Gas absorption chiller for process applications				
GA ACF-HT Gas absorption chiller for cooling in hot climates				
GA ACF-LB Gas absorption chiller for refrigeration				



Chiller and chiller links, for outdoor installation,
for the production of cold water.

Reduces electricity needs by up to 88%.

Gas absorption chiller and chiller links for process applications, cooling in hot climates and refrigeration

GA Line ACF - RTCF Series TK, HT, LB Version

Advantages

- Extremely low electricity consumption: saving up to 86% of electricity compared with a traditional electrical system, thus requiring neither additional energy nor upgrading or modification of the electrical cabin.
- Independent and modular, it ensures constant performance for air conditioning only as and when needed.
- Thanks to the use of an almost static refrigeration cycle, the performance levels remain unchanged over time and regular refill and disposal of refrigerant is not required.

TK Version applications

- Cooling in industrial process applications.
- Cooling of controlled temperature rooms throughout the year (data reading rooms, computer rooms, laboratories).
- Cooling of rooms with high heat gains that require cooling even during cold seasons.
- Cooling in greenhouses for the intensive cultivation of mushrooms.
- Cooling in rooms used for medium/long-term maturing of cheese.

HT Version applications

- Cooling of residential, commercial and industrial environments with an external air temperature up to 50 °C.

LB Version applications

- Refrigeration of low-temperature environments for the food industries, where it is necessary to maintain temperatures inside the room in compliance with health and hygiene regulations.
- Refrigeration of cold rooms and counters for food preservation.
- Process refrigeration in systems requiring negative fluid temperatures.
- Ice storage systems, for the storage of cooling energy during periods of low energy needs.

- On request ACF units can be pre-assembled as links with the same units (RTCF TK, HT and LB Series).



ACF
60-00
TK**COOLING OPERATION MODE**

Working point A35/W7 ⁽¹⁾	GUE (gas utilization efficiency)	%	71
	cooling capacity	kW	17.72
Nominal water flow rate ($\Delta T = 5,5\text{ }^{\circ}\text{C}$)		m ³ /h	2.77
Nominal water pressure loss		kPa	29
Minimum outlet water temperature		°C	3
Inlet water temperature	max	°C	45
	min	°C	6
Ambient operating temperature	max	°C	45
	min	°C	-12

BURNER CHARACTERISTICS

Thermal input (actual)		kW	25.0
Gas consumption (actual)	natural gas G20 ⁽²⁾	m ³ /h	2.65
	LPG G30/G31 ⁽³⁾	kg/h	1.94

ELECTRICAL CHARACTERISTICS

Voltage		230 V – 50 Hz	
Nominal electrical power ⁽⁴⁾⁽⁵⁾	standard version	kW	0.90
	low noise version	kW	0.93

INSTALLATION DETAILS

Operational Weight	standard version	kg	350
	low noise version	kg	380
Antifreeze operating temperature		°C	2
Sound pressure at 10 metres ⁽⁶⁾	standard version	dB(A)	54
	low noise version	dB (A)	49
Connections	water	" F	1 1/4
	gas	" F	3/4
Dimensions	width	mm	850
	depth	mm	1,230
	height (standard version)	mm	1,290
	height (low noise version)	mm	1,540
Electrical degree of protection		IP	X5D

Pre-assembled model RTCF TK	Units	Cooling capacity kW	Dimensions w/d/h mm	Weight kg
RTCF 120-00 TK S CC	n. 2 ACF 60-00 TK S	35.4	2,314 x 1,245 x 1,650	970
RTCF 180-00 TK S CC	n. 3 ACF 60-00 TK S	53.2	3,610 x 1,245 x 1,650	1,435
RTCF 240-00 TK S CC	n. 4 ACF 60-00 TK S	70.9	4,936 x 1,245 x 1,650	1,920
RTCF 300-00 TK S CC	n. 5 ACF 60-00 TK S	88.6	6,490 x 1,245 x 1,650	2,395

Multiple pre-assembled links RTCF TK are available with or without circulators and in standard or low noise version.

⁽¹⁾ Operating point under nominal conditions according to EN12309-2.

⁽²⁾ PCI 34.02 MJ/m³ (9,45 kWh/m³) at 15 °C - 1013 mbar.

⁽³⁾ PCI 46.34 MJ/kg (12,87 kWh/kg) at 15 °C - 1013 mbar.

⁽⁴⁾ A reduction in the fan revolutions (air flow) is envisaged for ambient operating temperatures of less than 33 °C. This leads to a further reduction in electricity consumption levels.

⁽⁵⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical motors power consumption.

⁽⁶⁾ Free field, at the front, direction factor 2. The values refer to the maximum measured.

Note: The data specified refer to the versions with water circulating pumps. For those versions without water circulating pumps, please contact the Robur sales network.

**COOLING OPERATION MODE**

Working point A35/W7 ⁽¹⁾	GUE (gas utilization efficiency)	%	68
	cooling capacity	kW	17.12
Nominal water flow rate ($\Delta T = 5,5\text{ }^{\circ}\text{C}$)		m ³ /h	2.67
Nominal water pressure loss		kPa	27
Minimum outlet water temperature		°C	5
Inlet water temperature	max	°C	45
	min	°C	6
Ambient operating temperature	max	°C	50
	min	°C	0

BURNER CHARACTERISTICS

Thermal input (actual)		kW	25.0
Gas consumption (actual)	natural gas G20 ⁽²⁾	m ³ /h	2.65
	LPG G30/G31 ⁽³⁾	kg/h	1.94

ELECTRICAL CHARACTERISTICS

Voltage		230 V – 50 Hz	
Nominal electrical power ⁽⁴⁾⁽⁵⁾	standard version	kW	0.90
	low noise version	kW	0.93

INSTALLATION DETAILS

Operational Weight	standard version	kg	350
	low noise version	kg	380
Sound pressure at 10 metres ⁽⁶⁾	standard version	dB(A)	54
	low noise version	dB(A)	49
Connections	water	" F	1 1/4
	gas	" F	3/4
	width	mm	850
Dimensions	depth	mm	1.230
	height (standard version)	mm	1.290
	height (low noise version)	mm	1.540
Electrical degree of protection		IP	X5D

Pre-assembled model RTCF HT	Units	Cooling capacity kW	Dimensions w/d/h mm	Weight kg
RTCF 120-00 HT S CC	n. 2 ACF 60-00 HT S	34.2	2,314 x 1,245 x 1,650	970
RTCF 180-00 HT S CC	n. 3 ACF 60-00 HT S	51.4	3,610 x 1,245 x 1,650	1,435
RTCF 240-00 HT S CC	n. 4 ACF 60-00 HT S	68.5	4,936 x 1,245 x 1,650	1,920
RTCF 300-00 HT S CC	n. 5 ACF 60-00 HT S	85.6	6,490 x 1,245 x 1,650	2,395

Multiple pre-assembled links RTCF HT are available with or without circulators and in standard or low noise version.

⁽¹⁾ Operating point under nominal conditions: external air 35 °C - water outlet 72 °C - water inlet 12.7 °C according to EN12309-2

⁽²⁾ PCI 34.02 MJ/m³ (9,45 kWh/m³) at 15 °C - 1013 mbar.

⁽³⁾ PCI 46.34 MJ/kg (12,87 kWh/kg) at 15 °C - 1013 mbar.

⁽⁴⁾ A reduction in the fan revolutions (air flow) is envisaged for ambient operating temperatures of less than 33 °C. This leads to a further reduction in electricity consumption levels.

⁽⁵⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical

⁽⁶⁾ Free field, at the front, direction factor 2. The values refer to the maximum measured.

Note: The data specified refer to the versions with water circulating pumps. For those versions without water circulating pumps, please contact the Robur sales network.

ACF
60-00
LB**COOLING OPERATION MODE**

Working point A35/W-5 ⁽¹⁾	GUE (gas utilization efficiency)	%	53
	cooling capacity	kW	13.3
Nominal water flow rate ($\Delta T = 5,5\text{ °C}$)		m ³ /h	2.6
Nominal water pressure loss (+ 40% glycol antifreeze)		kPa	42
Minimum outlet water temperature		°C	-10
Inlet water temperature	max	°C	45
	min	°C	-5
Ambient operating temperature	max	°C	45
	min	°C	0

BURNER CHARACTERISTICS

Thermal input (actual)		kW	25.0
Gas consumption (actual)	natural gas G20 ⁽²⁾	m ³ /h	2.65
	LPG G30/G31 ⁽³⁾	kg/h	1.94

ELECTRICAL CHARACTERISTICS

Voltage		230 V – 50 Hz	
Nominal electrical power ⁽⁴⁾⁽⁵⁾	standard version	kW	0.90
	low noise version	kW	0.93

INSTALLATION DETAILS

Operational Weight	standard version	kg	350
	low noise version	kg	380
Antifreeze operating temperature		°C	-12
Sound pressure at 10 metres ⁽⁶⁾	standard version	dB(A)	54
	low noise version	dB (A)	49
Connections	water	" F	1 1/4
	gas	" F	3/4
Dimensions	width	mm	850
	depth	mm	1,230
	height (standard version)	mm	1,290
	height (low noise version)	mm	1,540
Electrical degree of protection		IP	X5D

Pre-assembled model RTCF LB	Units	Cooling capacity kW	Dimensions w/d/h mm	Weight kg
RTCF 120-00 LB S CC	n. 2 ACF 60-00 LB S	26.6	2,314 x 1,245 x 1,650	970
RTCF 180-00 LB S CC	n. 3 ACF 60-00 LB S	39.9	3,610 x 1,245 x 1,650	1,435
RTCF 240-00 LB S CC	n. 4 ACF 60-00 LB S	53.2	4,936 x 1,245 x 1,650	1,920
RTCF 300-00 LB S CC	n. 5 ACF 60-00 LB S	66.5	6,490 x 1,245 x 1,650	2,395

Multiple pre-assembled links RTCF LB are available with or without circulators and in standard or low noise version.

⁽¹⁾ Operating point under nominal conditions: external air 35 °C - water outlet 7.2 °C - water inlet 12.7 °C according to EN12309-2

⁽²⁾ PCI 34.02 MJ/m³ (9,45 kWh/m³) at 15 °C - 1013 mbar.

⁽³⁾ PCI 46.34 MJ/kg (12,87 kWh/kg) at 15 °C - 1013 mbar.

⁽⁴⁾ A reduction in the fan revolutions (air flow) is envisaged for ambient operating temperatures of less than 33 °C. This leads to a further reduction in electricity consumption levels.

⁽⁵⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical

motors power consumption.

⁽⁶⁾ Free field, at the front, direction factor 2. The values refer to the maximum measured.

Note: The data specified refer to the versions with water circulating pumps. For those versions without water circulating pumps, please contact the Robur sales network. The circulating pumps supply at nominal conditions a residual pressure head of 20 kPa.



AY *Condensing* Line

Gas condensing boiler and
condensing boiler links

Ideal complement to GAHP
heat pumps and GA chillers



Condensing boiler and condensing boiler links (★ ★ ★ ★),
floor-standing and for outdoor installation,
for the production of hot water up to 80 °C.

Gas condensing boiler and condensing boiler links for heating

AY - RTY Condensing Line

Advantages

- Controlled size for easier, quicker, and more economic transportation, handling and installation.
- Can be hydraulically and electrically coupled to a single modular heating unit operating in cascade.

Applications

- Heating and production of hot water up to 80 °C.
- Ideal complement to Robur gas absorption chillers and heat pumps, in particular to:
 - support them in supply to the A.H.U.;
 - complete the heating of domestic hot water production;
 - provide peak power when climatic or economic conditions demand it.

Versions

- On request AY units can be pre-assembled as links with the same units (RTY Series) or with other units (see p. 44).



		AY 00-120	
Nominal heating input		kW	34.9
Nominal heating capacity ⁽¹⁾		kW	34.4
Gas consumption	natural gas G20	m ³ /h	3.69
	LPG G30/G31	kg/h	2.75
Efficiency	100% ⁽²⁾		104.6
	100% ⁽¹⁾		98.6
Nominal water flow rate		l/h	1,900
Nominal pressure loss		kPa	18.4
Maximum operating pressure		bar	3
Voltage		230 V – 50 Hz	
Nominal electrical power ⁽³⁾		W	185
Ambient temperature operating range		-20/45 °C	
Connections	water	"	1 1/4
	gas	"	3/4
Weight		kg	71
Dimensions	width	mm	398
	depth	mm	525
	height	mm	1,280

Pre-assembled model RTY	Units	Heating capacity kW	Dimensions w/d/h mm	Weight kg
RTY00-240 CC	n. 2 AY00-120	68.8	1,828 x 1,245 x 1,395	310
RTY00-360 CC	n. 3 AY00-120	103.2	1,828 x 1,245 x 1,395	415
RTY00-480 CC	n. 4 AY00-120	137.6	2,314 x 1,245 x 1,395	506
RTY00-600 CC	n. 5 AY00-120	172.0	2,314 x 1,245 x 1,395	645

Multiple pre-assembled links RTY are available with or without circulators and in standard or low noise version. On request, AY60-00 units can be pre-assembled with other units (gas heat pumps, gas chillers and gas condensing boilers), to create multiple assemblies configured on demand for heating, cooling and DHW production.

⁽¹⁾ Characteristics under nominal conditions: water delivery 80 °C and water return 60 °C.

⁽²⁾ Characteristics under nominal conditions: water delivery 50 °C and water return 30 °C.

⁽³⁾ ± 10% depending on the power supply voltage and on the tolerance of the electrical motors power consumption.

Multiple assemblies configured on demand

Gas absorption units
for heating, cooling
and DHW production


Ideal for industrial, commercial and accommodation use



Multiple assemblies configured on demand

Absorption heating-cooling modules can be pre-assembled on a single underbase rack to make assemblies specifically configured on demand consisting of a combination of one or more heat pumps, chillers with or without heat recovery and condensing boilers.

Here follow some examples:

EXAMPLES	COMPOSITION OF THE MULTIPLE ASSEMBLY CONFIGURED ON DEMAND					OPERATION MODE			
	Air source condensing gas absorption heat pump GAHP-A	Air source reversible gas absorption heat pump GAHP-AR	gas absorption chiller with heat recovery GA ACF60-00 HR	Gas absorption chiller GA ACF60-00	Gas condensing boiler AY 00-120 Condensing	HEATING	COOLING	DHW WITH HEAT RECOVERY	DHW
ASSEMBLY RTRH p. 45		✓ + ✓			✓ + ✓				
ASSEMBLY RTAH p. 46		✓ + ✓							
ASSEMBLY RTRC p. 47		✓ + ✓		✓ + ✓					
ASSEMBLY RTCR p. 48		✓ + ✓		✓					
ASSEMBLY RTYR p. 49		✓ + ✓			✓				
ASSEMBLY RTYH p. 50			✓ + ✓ + ✓						
ASSEMBLY RTHF p. 51			✓ + ✓						
ASSEMBLY RTYF p. 52				✓ + ✓					
ASSEMBLY RTAY p. 53	✓ + ✓				✓				

✓ = 1 or more Robur units

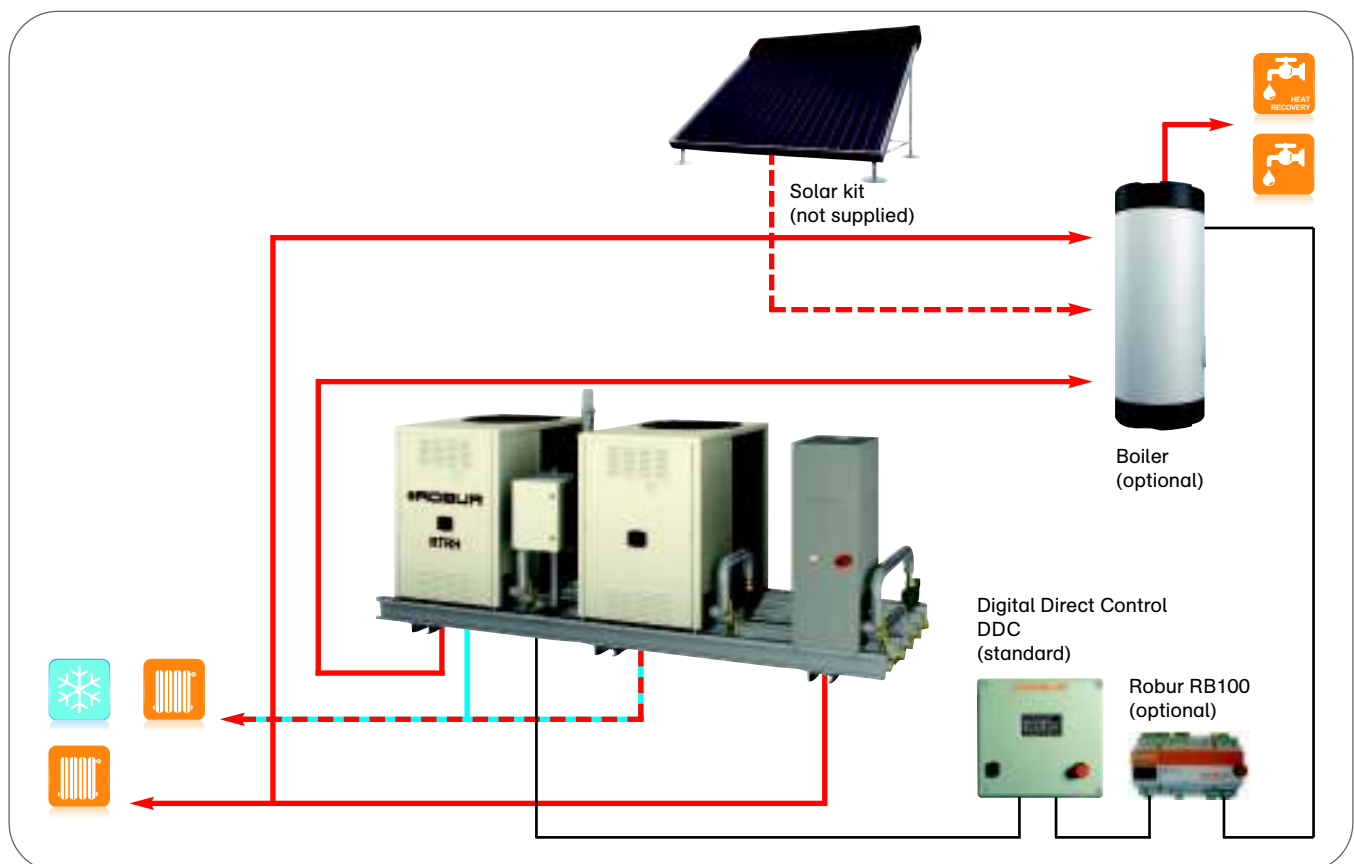


The RTRH assembly consists of one or more reversible gas absorption heat pumps, one or more gas absorption chillers with heat recovery and one or more gas condensing boilers.

Gas absorption assembly for heating, cooling with heat recovery and DHW production throughout the year **RTRH Series**

Advantages

- Ensures efficiency levels up to 149% guaranteeing up to 40% reduction in annual heating costs compared to the best condensing boilers.
- Reduces electricity requirements by up to 86% compared to traditional electrical systems, thanks to the prevalent use of gas.
- Produces DHW for free in cooling mode.
- Enables the most efficient heating and cooling performances, matching the variable seasonal loads by means of the plant interface for heating curve management when supported by heating controller.
- Easy integration with solar (not supplied) for DHW production throughout the year.
- Available in the 4 or 6 pipes version.



Model	Units	Heating capacity kW	Cooling capacity kW
RTRH118-312/6 HR SM	1 AR + 1 ACF HR + 1 AY00-120	92.9	34.8

Example of composition of heating and cooling, 6 pipes version, with standard circulation pumps (S) on heating and cooling circuits and high-head pumps (M) on recovery circuit. Different compositions are possible in order to make heating-cooling assemblies matching the different heating-cooling needs of each installation.



The RTAH assembly consists of one or more reversible gas absorption heat pumps and one or more gas absorption chillers with heat recovery.

Gas absorption assembly for heating, cooling with indirect production of DHW RTAH Series

Advantages

- Ensures efficiency levels up to 149% guaranteeing up to 40% reduction in annual heating costs compared to the best condensing boilers.
- Supply DHW for free in cooling

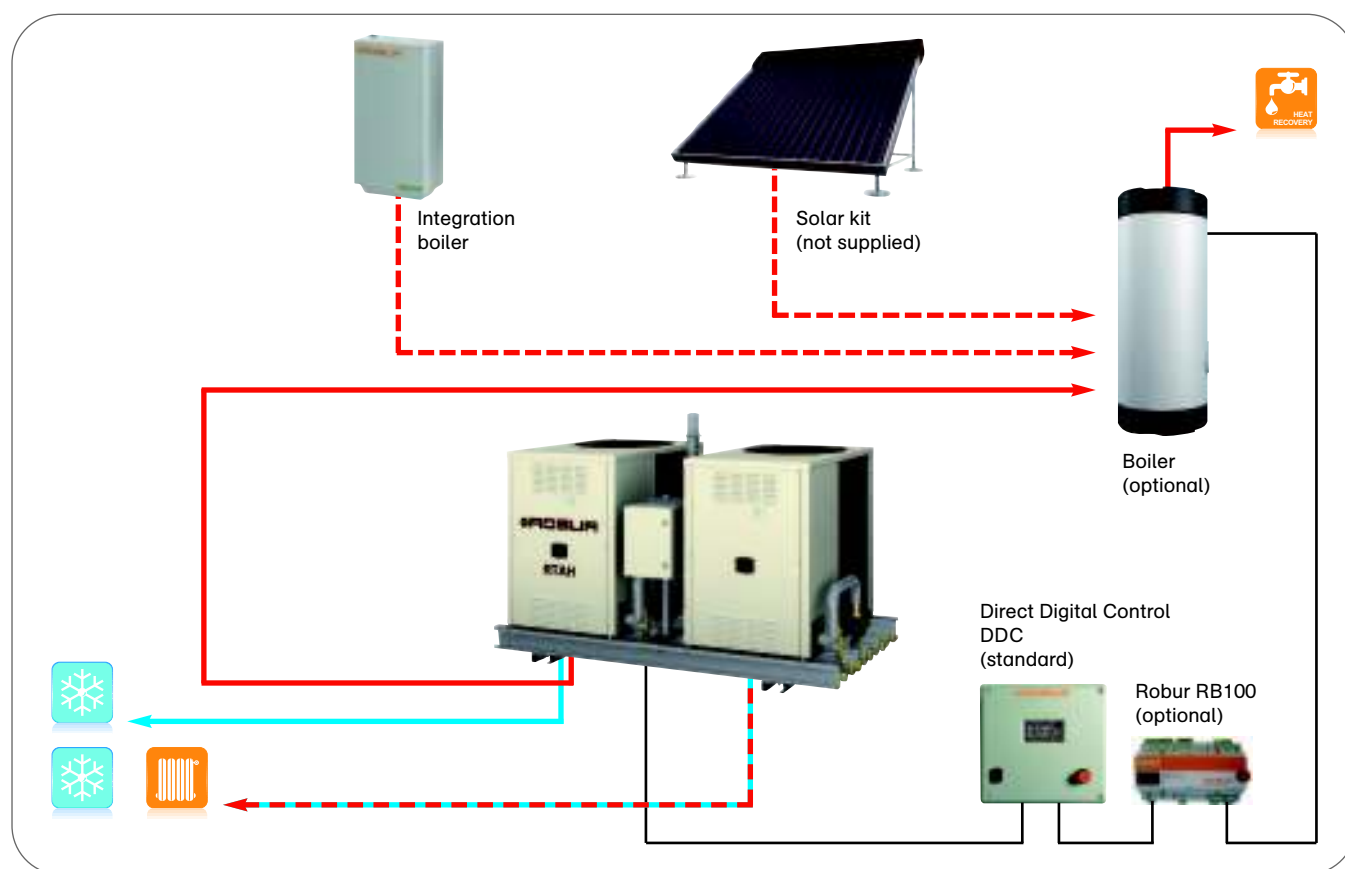
mode and reduces electricity requirements by up to 86% compared to traditional electrical systems, thanks to the prevalent use of gas.

- Enables the most efficient heating and cooling

performances, matching the variable seasonal loads by means of the plant interface for heating curve management when supported by heating controller.

- Easy integration with solar (not

supplied) and traditional or condensing boiler for DHW production throughout the year.



Model	Units	Heating Capacity kW	Cooling capacity kW
RTAH118-192/4 HR SM	n. 1 AR + n. 1 ACF HR	58.5	34.8

Example of composition for heating and cooling, 4 pipes version, with standard circulation pumps (S) on heating and cooling circuits and high-head pumps (M) on recovery circuit. Different compositions are possible, in order to make heating-cooling assemblies matching the different heating-cooling needs of each installation.



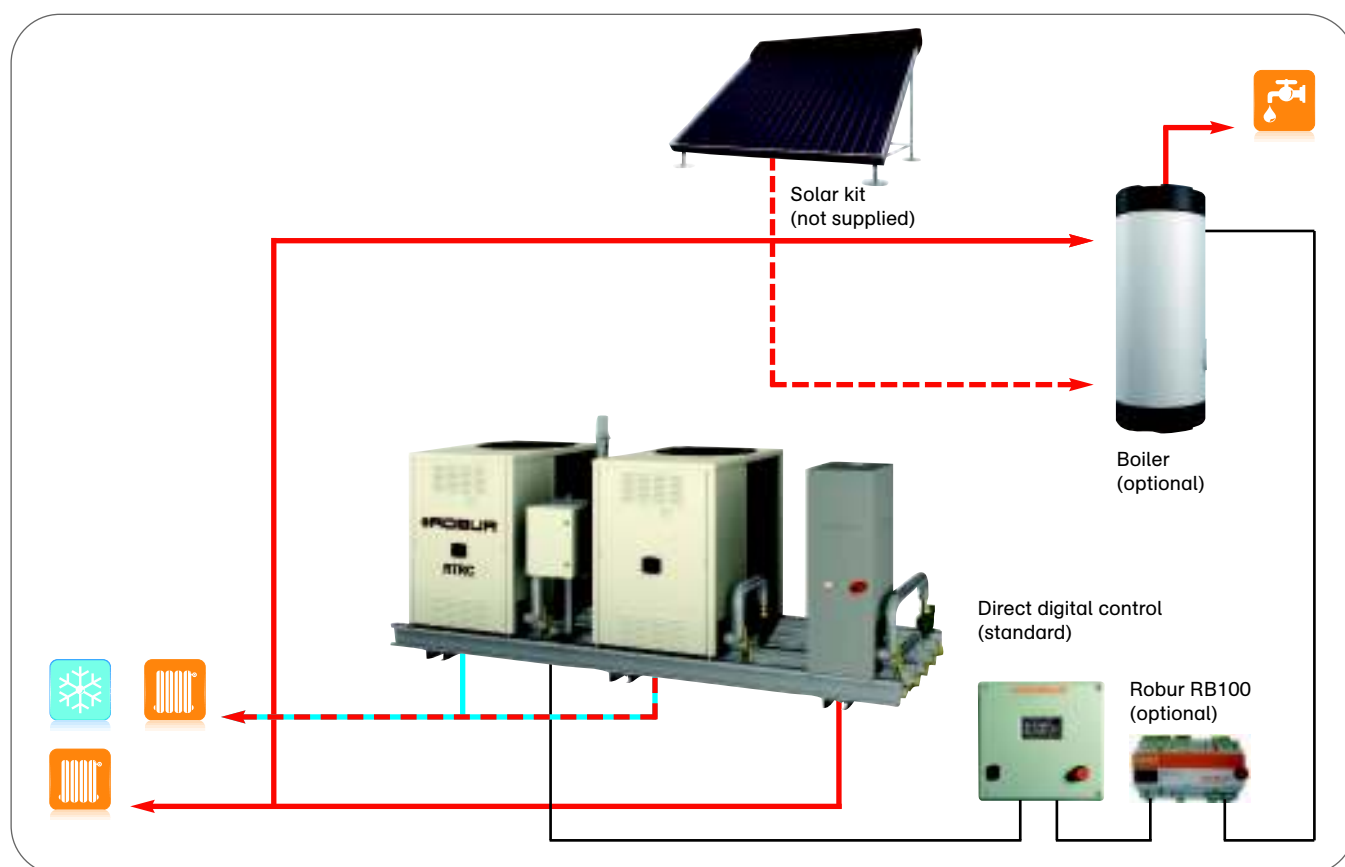
The RTRC assembly consists of one or more reversible gas absorption heat pumps, one or more gas absorption chillers and one or more condensing boilers.

Gas absorption assembly for heating, cooling and DHW production throughout the year

RTRC Series

Advantages

- Ensures efficiency levels up to 149% guaranteeing up to 40% reduction in annual heating costs compared to the best condensing boilers.
- Reduces electricity requirements by up to 86% compared to traditional electrical systems, thanks to the prevalent use of gas.
- Enables the most efficient heating and cooling performances, matching the variable seasonal loads by means of the plant interface for heating curve management when supported by heating controller.
- Easy integration with solar and traditional or condensing boiler for DHW production throughout the year.
- Available in the 4 or 6 pipes version.



Model	Units	Heating capacity kW	Cooling capacity kW
RTRC118-240 CC	n.1 AR + n.1 ACF + n.1 AY00-120	71.9	34.6

Example of composition for heating and cooling with independent circulation pumps per each module. Different compositions are possible, in order to make heating-cooling assemblies matching the different heating-cooling needs of each installation.



The RTCR assembly consists of one or more reversible gas absorption heat pumps and one or more gas absorption chillers.

Gas absorption assembly for heating and cooling

RTCR Series

Advantages

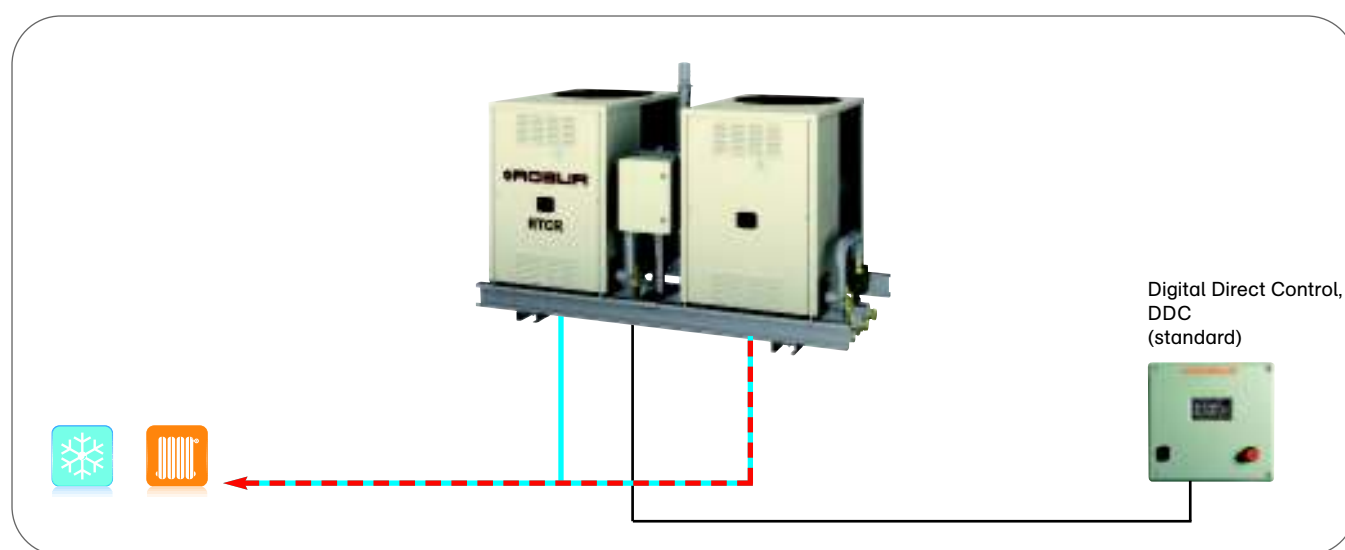
- Ensures efficiency levels up to 149% guaranteeing up to 40% reduction in annual heating costs compared to the best condensing boilers.
- Reduces electricity requirements by up to 86% compared to traditional electrical systems, thanks to the prevalent use of gas.
- Enables the most efficient heating and cooling

performances, matching the variable seasonal loads by means of the plant interface for heating curve management when supported by heating controller.

- Available in the 4 or 6 pipes version.

Applications

- Ideal for use in which is required a balancing of heating and cooling power needs..



Model	Units	Heating capacity kW	Cooling capacity kW
RTCR118-120 CC	n. 1 AR + n. 1 ACF	37.5	34.6

Example of composition for heating and cooling with independent circulation pumps per each module. Different compositions are possible, in order to make heating-cooling assemblies matching the different heating-cooling needs of each installation.

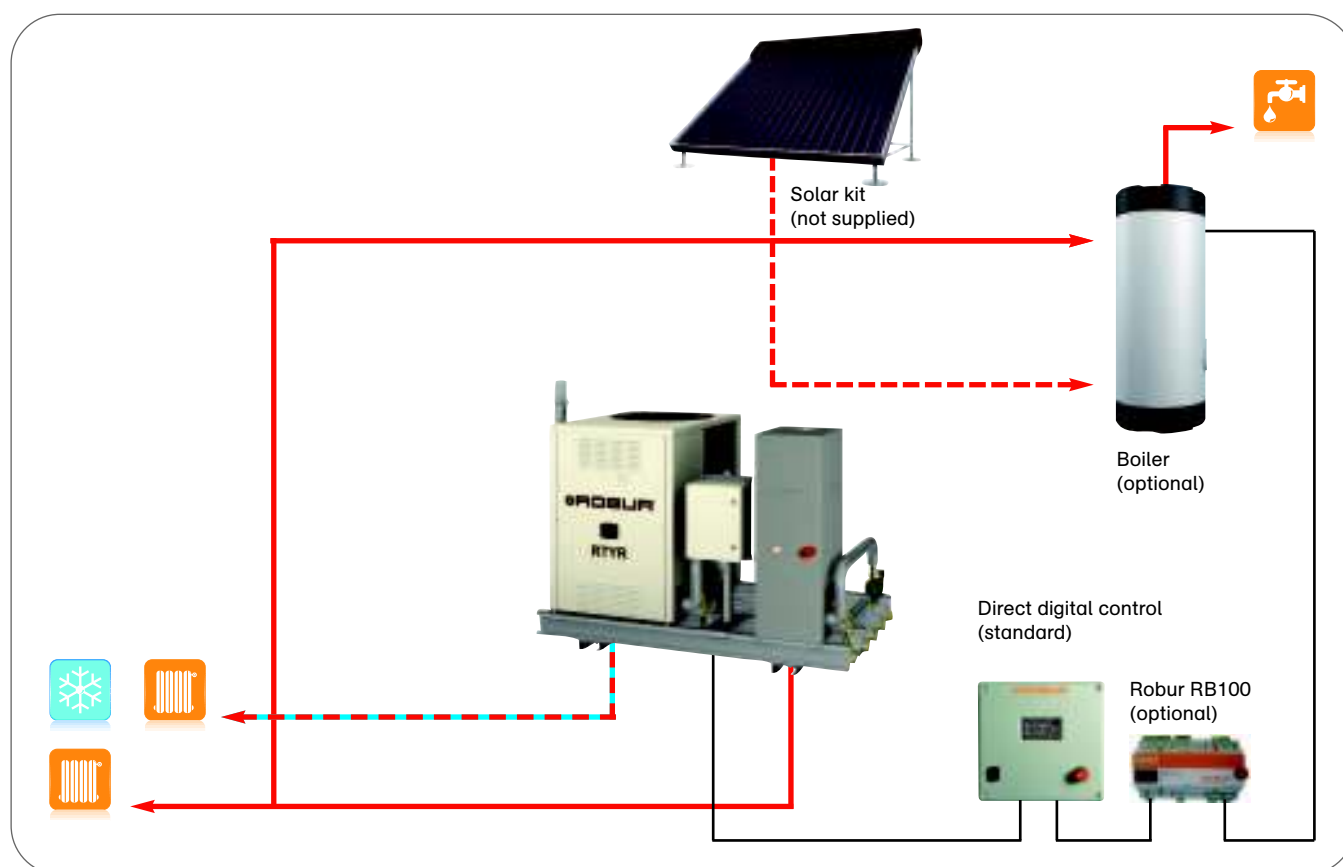


The RTYR assembly consists of one or more reversible gas absorption heat pumps and one or more condensing boilers.

Gas absorption assembly for heating or cooling and DHW production **RTYR Series**

Advantages

- Ensures efficiency levels up to 149% guaranteeing up to 40% reduction in annual heating costs compared to the best condensing boilers.
- Reduces electricity requirements by up to 86% compared to traditional electrical systems, thanks to the prevalent use of gas.
- Enables the most efficient heating and cooling performances, matching the variable seasonal loads by means of the plant interface for heating curve management when supported by heating controller.
- Easy integration with solar (not supplied) and traditional or condensing boiler for DHW production throughout the year.
- Available in the 4 or 6 pipes version.



Model	Units	Heating capacity kW	Cooling capacity kW
RTYR58-240 CC	n. 1 AR + n. 1 AY00-120	71.9	16.9

Example of composition for heating and cooling with independent circulation pumps per each module. Different compositions are possible, in order to make heating-cooling assemblies matching the different heating-cooling needs of each installation.



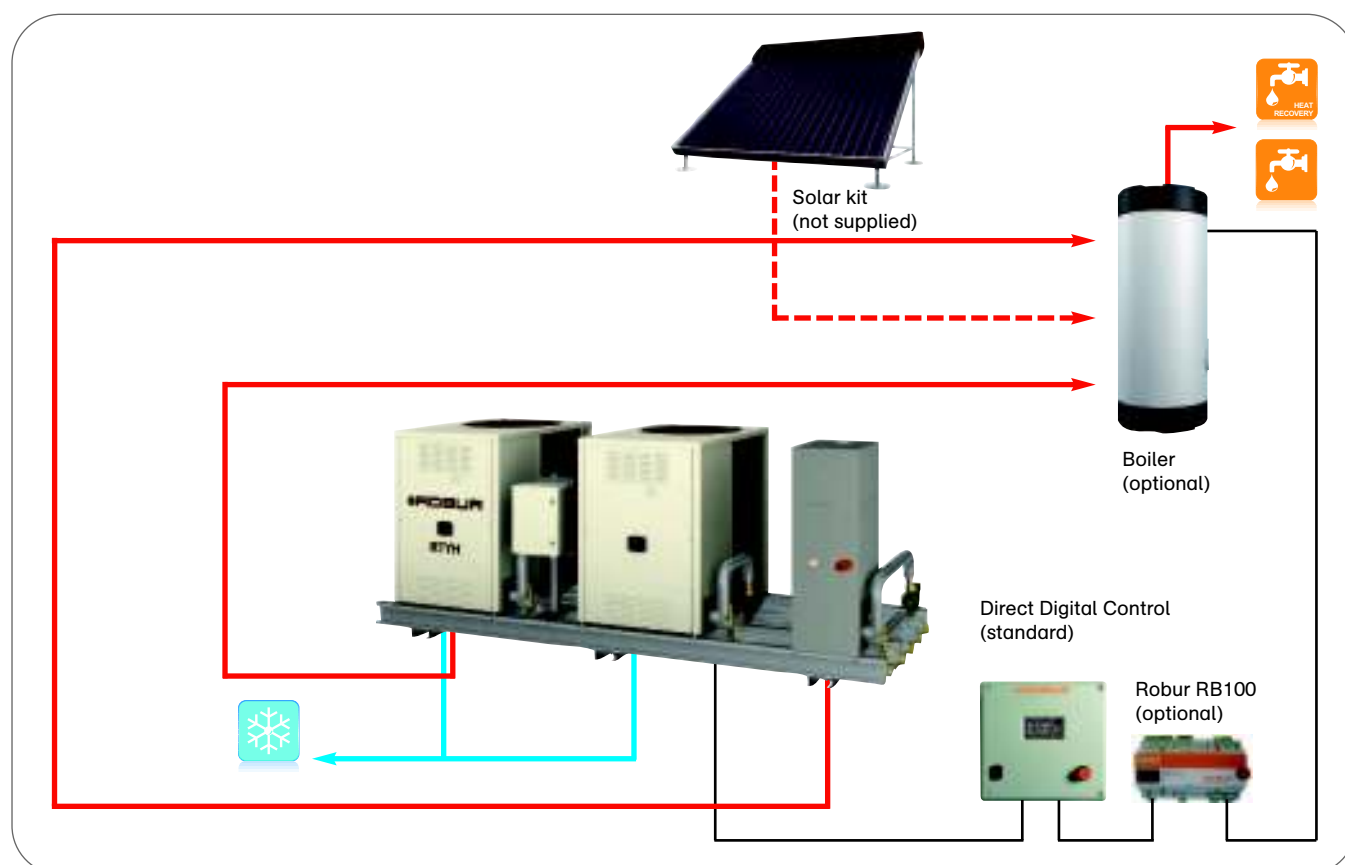
The RTYH assembly consists of one or more gas absorption chillers, one or more gas absorption chillers with heat recovery and one or more condensing boilers.

Gas absorption assembly for cooling and DHW production in heat recovery mode

RTYH Series

Advantages

- Reduces electricity requirements by up to 86% compared to traditional electrical systems, thanks to the prevalent use of gas.
- Provide DHW for free during cooling season.
- Enables the most efficient cooling performances, matching with the variable seasonal loads by means of the plant interface for heating curve management when supported by heating controller.
- Easy integration with solar and traditional or condensing boiler for DHW production throughout the year.
- Available in the 4 or 6 pipes version.



Model	Units	Heating capacity kW	Cooling capacity kW
RTYH120-192/6 SM	1 ACF + 1 ACF HR + 1 AY00-120	55.4	35.6

Example of composition for heating and cooling, 6 pipes version, with standard circulation pumps (S) on heating and cooling circuits and high-head pumps (M) on recovery circuit. Different compositions are possible, in order to make heating-cooling assemblies matching the different heating-cooling needs of each installation.



The RTHF assembly consists of one or more gas absorption chillers and one or more gas absorption chillers with heat recovery.

Gas absorption cooling assembly for cooling and DHW production in heat recovery mode

RTHF Series

Advantages

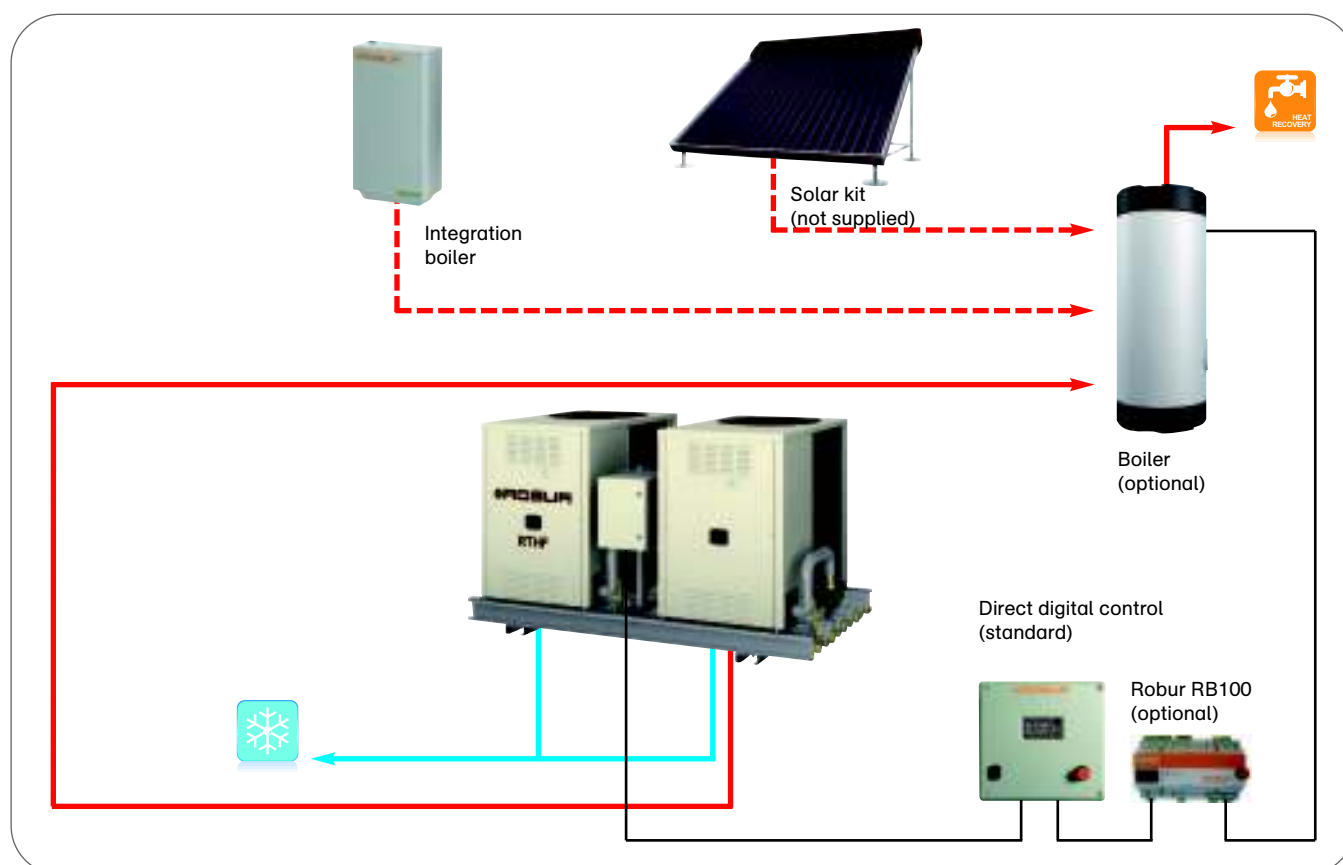
- Reduces electricity requirements by up to 86% compared to traditional electrical systems, thanks to the prevalent use of gas.

- Provide DHW for free during cooling season.
- Enables the most efficient cooling performances, matching the variable seasonal loads by means of

the plant interface for heating curve management when supported by heating controller.

- Easy integration with solar (not supplied) and traditional or

condensing boiler for DHW production throughout the year.



Model	Units	Heating capacity (recovery) kW	Cooling capacity kW
RTHF120-72/4 HR SM	n. 1 ACF + n. 1 ACF HR	21.0	35.6

Example of composition for heating and cooling, 4 pipes version, with standard circulation pumps (S) on heating and cooling circuits and high-head pumps (M) on recovery circuit. Different compositions are possible, in order to make heating-cooling assemblies matching the different heating-cooling needs of each installation.



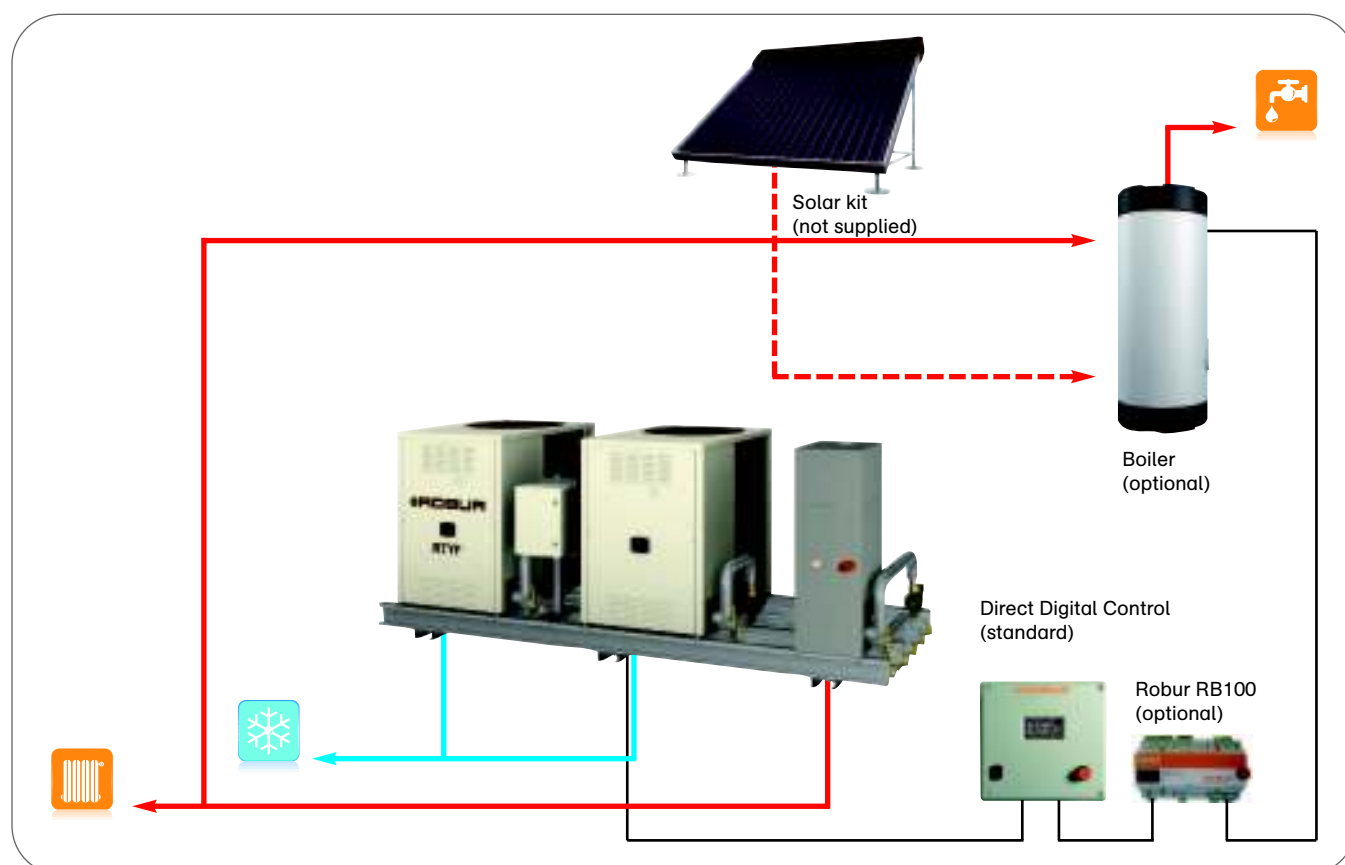
The RTYF assembly consists of one or more gas absorption chillers and one or more condensing boilers.

Gas absorption assembly for cooling, heating and DHW production throughout the year

RTYF Series

Advantages

- Reduces electricity requirements by up to 86% compared to traditional electrical systems, thanks to the prevalent use of gas.
- Enables the most efficient heating and cooling performances, matching the variable seasonal loads by means of the plant interface for heating curve management when supported by heating controller.
- Easy integration with solar (not supplied) and traditional or condensing boiler for DHW production throughout the year.
- Available in the 4 or 6 pipes version.



Model	Units	Heating capacity kW	Cooling capacity kW
RTYF120-120 CC	n. 2 ACF + n. 1 AY00-120	34.4	35.4

Example of composition for heating and cooling with independent circulation pumps per each module. Different compositions are possible, in order to make heating-cooling assemblies matching the different heating-cooling needs of each installation.



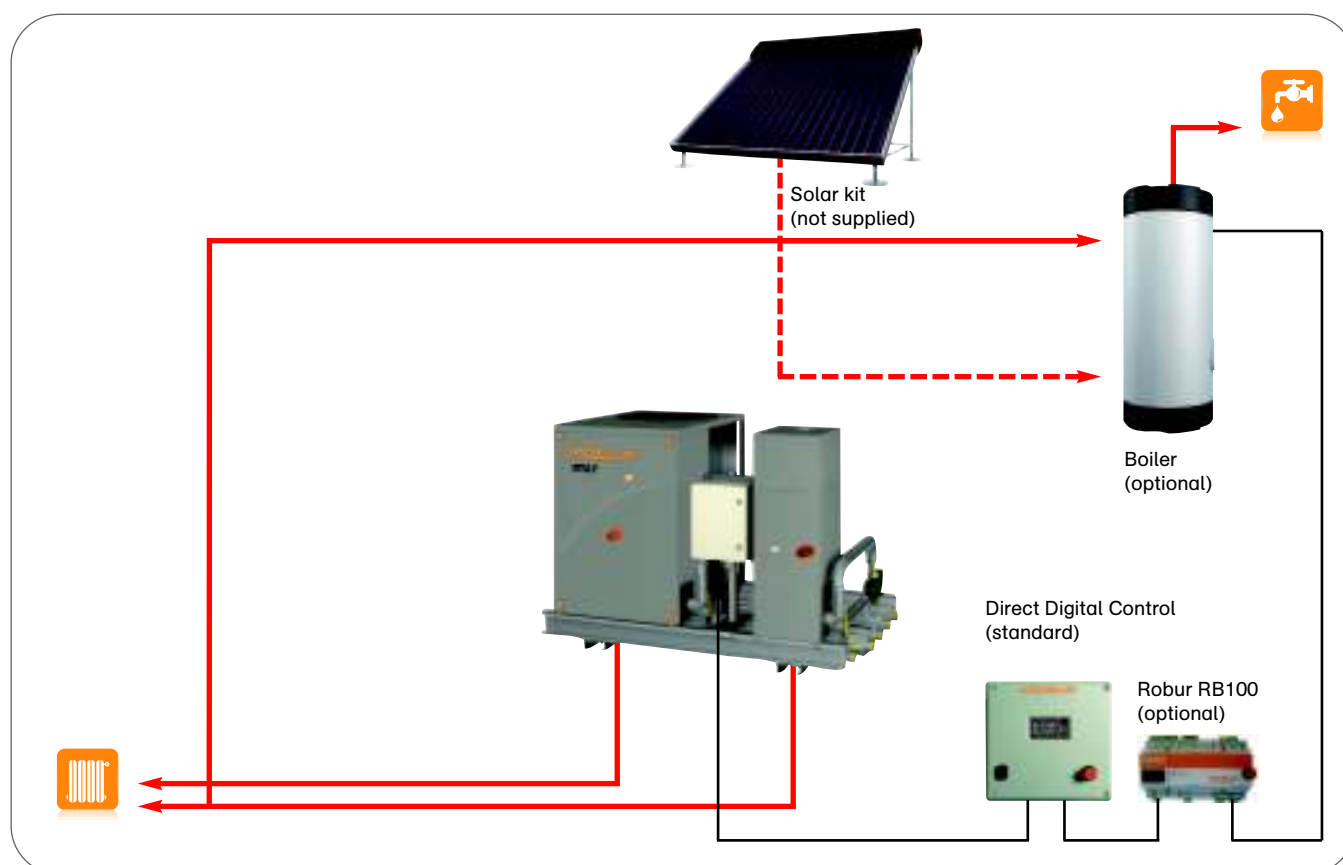
The RTAY assembly consists of one or more condensing gas absorption heat pumps and one or more condensing boilers.

Gas absorption assembly for heating and DHW production throughout the year

RTAY Series

Advantages

- Exceeds peak efficiencies of 152%, guaranteeing up to 40% reductions in annual heating costs and in CO₂ emissions compared to condensing boilers.
- Enables the most efficient heating and cooling performances, matching the variable seasonal loads by means of the plant interface for heating curve management when supported by heating controller.
- Increases the total efficiency of the heating system when it is combined or integrated with boilers with a lower energy performance.
- Easy integration with solar (not supplied) and traditional or condensing boiler for DHW production throughout the year.
- Available in the 4 or 6 pipes version.



Model	Units	Heating capacity kW	Cooling capacity kW
RTAY00-253 HT CC	n. 1 A HT + n. 1 AY00-120	72.7	-

Example of composition for heating modules with independent circulation pumps per each module. Different compositions are possible, in order to make heating-cooling assemblies matching the different heating-cooling needs of each installation.

ROBUR UNITS CODE MATRIX

(for decoding multiple assemblies)

RTRH 1										SERIES	CODE	UNITS					
										RTA	FGAA	A					
										RTAR	FGAR	AR					
										RTGS	FGGS	GS					
										RTWS	FGWS	WS					
										RTCF	FGCF	ACF					
										RTY	FYYC	AY					
										RTRH	FHRY	HR - AR - AY					
										RTAH	FHAR	HR - AR					
										RTRC	FFRY	AR - ACF - AY					
										RTCR	FARC	AR - ACF					
										RTYR	FARY	AR - AY					
										RTYH	FHFY	HR - ACF - AY					
										RTHF	FHCH	HR - ACF					
										RTYF	FGFY	ACF - AY					
										RTAY	FAAY	A - AY					
118 2										COOLING CAPACITY			UNIT	CAPACITY			
										ACF			60				
										ACF HR			60				
										GAHP-AR			58				
										GAHP-A HT			0				
										GAHP-A LT			0				
										AY			0				
312 3										HEATING CAPACITY			UNIT	CAPACITY	UNIT	CAPACITY	
										ACF	0	GAHP-GS HT	128				
										ACF HR	72	GAHP-GS LT	145				
										GAHP-AR	120	GAHP-WS	142				
										GAHP-A HT	133						
										GAHP-A LT	141						
										AY	120						
/6 4										PIPES		DESCRIPTION					
										2 pipes							
										4 pipes		/4					
										4+2 pipes (HR+AY)		/6					
HR 5										TYPE		DESCRIPTION					
										GAHP-AR							
										AY							
										ACF							
										ACF TK		TK					
										ACF LB		LB					
										ACF HR		HR					
										ACF HT		HT					
										GAHP-A HT		HT					
										GAHP-A LT		LT					
S 6										VERSION		DESCRIPTION					
										standard							
										low noise		S					
MET/NAT 7										GAS		DESCRIPTION					
										G20		MET/NAT					
										G25		G25					
										GPL/LPG		GPL/LPG					
ITA 8										COUNTRY	DESCRIPTION	COUNTRY	DESCRIPTION				
										Italy	ITA	Croatia	KR				
										Germany	DE	Spain	ES				
										Switzerland	CH	United Kingdom	UK				
										Austria	AT	Belgium	BE				
										France	FR	Netherlands	NL				
S CIRC. PUMP 9										TYPE		DESCRIPTION					
												LINK WITHOUT HR		LINK WITH HR			
												hot/cold side		hot/cold side		recovery side	
										standard		CC		S		S	
										high head		CM		M		M	
										no circ. pump		SC		N		N	
10										UNIT/TANK FUTURE EXSTENSION			DESCRIPTION				
										not arranged							
													GAHP-A LT/HT		A		
										ACF			B				
										GAHP-AR			B				
										ACF HR			C				
										AY			D				
										ACF HR +AY			E				
										ACF + AY			F				
										GAHP-AR + AY			F				
										GAHP-A + AY			G				
										200 l boiler			J				
										300 l boiler			K				
1	2	3	4	5	6	7	8	9	10	= FIELD							
RTRH	118	312	/6	HR	S	MET/NAT	ITA	SM		Example: unit consisting of nr. 1 GAHP-AR, nr. 1 ACF-HR and nr. 1 AY Condensing, with 6 pipes (2 for the recovery from ACF HR unit)and with standard circulation pumps for heating and cooling and high head pumps recovery side. The unit is supplied for operating with natural gas G20.							

GAHP, GA, AY and Multiple Assemblies

Line accessories

	Component
	<p>Direct Digital Control (supplied as standard for pre-assembled links)</p> <p>A single device to adjust, control and completely manage the unit's operation.</p> <p>Functions include:</p> <ul style="list-style-type: none"> • allows the management of up to 16 modules (individual or pre-assembled) connected on the same hydraulic circuit and up to 48 modules, if connected to another two panels; • programming of operation in cooling and/or heating on 4 time bands with differentiated water temperatures; • control of the system's hot and cold inlet and outlet water temperatures; • cascade control with advanced algorithm; • set point control with sliding temperature, thanks to the climate curve function (with optional outdoor probe); • ability to have the system switched on and off through an external control device; • visual and acoustic signalling of operating alarms for each individual unit; • chronological display of alarms triggered; • designed for connection to remove signalling systems; • supports Mod-Bus RTU communication protocol for interface with BMS (building management systems).
	<p>Outdoor temperature probe for weather curve</p> <p>This probe is to be connected to the DDC or to the RSI (Integrate System Controller) and it allows the units to operate in the weather curve mode, that is adjusting the set-point of the outlet water temperature, both in heating and cooling, not to a fixed value but in relation to the outdoor temperature, detected by this outdoor temperature probe.</p>
	<p>Can bus cable connection</p> <p>For the connection between the Direct Digital Control and the Robur units.</p>
	<p>WISE (Web Invisible Service Employee)</p> <p>WISE is the remote communication system that manages, controls and supervises Robur systems fitted with a Direct Digital Control remotely.</p>
	<p>RoburBox100 (system control interface)</p> <p>RB100 (RoburBox100) is the system control interface for systems made up of Robur chiller-heater units and/or absorption heat pumps fitted with Direct Digital Control (DDC). The device is designed to carry out three separate functions:</p> <ul style="list-style-type: none"> • interface in between the DDC and any external control devices such as regulators (even centralised), electronic thermostats, clean contacts, to give them the ability to control the enabling or disabling of hydronic circuits and of setting default set points for the water temperature; • processing of a maximum of four requests; one for cooling, one for heating and two for DHW production; • interface for switching the 3-way valves, such as those for switching from cooling to heating typically located in annual cycle systems with 2-pipe water distribution.
	<p>CCI Comfort Control Interface</p> <p>The CCI panel can control and modulate the power output of one or more GAHP-A, GAHP-GS and GAHP-WS, up to a maximum of three units. This in order to adjust the thermal output in accordance to the requirements coming from an external electronic regulator (0-10 Volt signal). CCI is then an interface panel, alternative to the DDC, connected to an outdoor temperature adjusting system, such as the RSI regulator for example.</p>
	<p>RSI Integrate System Controller</p> <p>This regulator controls the heating and cooling installation by the management of its different components. In detail it can:</p> <ul style="list-style-type: none"> • send the modulating signal of the thermal output of the GAHP group to the CCI panel; • activate an external boiler as an integration of the heating system; • manage the DHW preparation; • manage priorities for GAHPs, boilers and other possible thermal integrations; • adjust the water set-point according to the outdoor temperature (weather curve mode).
	<p>Kit for outdoor installation GS-WS</p> <p>This kit allows to make the GAHP-GS and GAHP-WS quickly and easily suitable for outdoor installation, without additional sheltering.</p>
	<p>Circulation pump</p> <p>According to the installation characteristics and regulation settings, several different circulating pumps are made available, with fixed and modulating water flow.</p>
	<p>Exhaust gas kit for GS/WS units</p> <p>Exhaust gas kits for GS/WS units (indoor installation) are available and they allow connection of 2 or 3 units to a single exhaust flue system and to a single combustion air duct.</p>
	<p>Winter kit for condensing boilers AY 00-120</p> <p>This kit extends the operation of the boiler to an outdoor temperature of -30°C through dedicated thermo-regulating and heating devices to be fittable also on boilers already installed.</p>



E³ Robur

The most efficient heating system
with condensing gas absorption heat pumps
available in air, geothermal
and water source versions

E³ Robur heat pump heats spaces and indirectly
produces domestic hot water with efficiencies
higher than 170%

E³ is a complete heating system with:

- absorption heat pumps: for the highest Efficiency;
- electronic circulation pumps: for energy and financial savings in the management and distribution systems;
- the control system: to ensure Efficiency, Economy and Ecology.

E³ The system

E³ is a system designed for heating and DHW production. E³ system has been designed to obtain outstanding energy performance, integrating and optimizing both the heat production (by means of hot water at the temperature most suitable for any specific operating condition), and the control and distribution system of the installation. E³ is

therefore a high efficiency system, composed by:

- modulating gas absorption heat pump fired by gas + renewable energies (available in air, geothermal and water source versions);
- hot water distribution system (Comfort Control Panel) with electronic-controlled high efficiency modulating pumps;
- integrated control system

(Comfort Control Panel) managing all the components of the installations with evolved strategies.

E³ is available in 13 pre-designed configurations, specifically developed for any installation and operation. The 13 solutions include, beyond gas absorption heat pumps for heat generation, also the main components of the installation,

in order to ensure the maximum overall efficiency.

The versions

- **E³ A:** heating system including up to three gas absorption **heat pumps + air renewable energy**. E³ A systems are available in 6 different solutions to meet every requirement of heating, DHW production, primary circuit management or one or more distribution and solar integration secondary circuits management, with control

system and climate curve. The technical characteristics of the heat pumps included in E³ A solutions are the same as low-noise GAHP-A version (see p. 22).

- **E³ GS or E³ WS:** heating system including up to 3 gas absorption heat pumps + **ground or water renewable energy**. E³ GS or WS systems are available in 7 different solutions to meet every

requirement of heating, DHW production, primary circuit management or one or more distribution and solar integration secondary circuits management, with control system and climate curve. The technical characteristics of the heat pumps included in E³ GS or E³ WS solutions are the same as the GAHP-GS or WS versions (see p. 24 and 26).



Example of E³ A absorption heat pump with AY 120 Condensing boiler with radiant panels, fan-coils for heating and DHW production.



Example of E³ GS absorption heat pumps with geothermal loops with radiant panels, fan-coils for heating and DHW production.

The control system enables the perfect integration of the entire heating system, optimizing overall efficiency.

The overall efficiency of a heating system also depends on the effectiveness of measurement and control system. With the aim of delivering the maximum environmental comfort whilst minimizing the energy consumed, Robur has created Comfort Control Panel, making it possible to integrate the operation of the entire heating system maximizing the

overall efficiency.

Comfort Control Panel is capable of managing:

- up to 3 heat pumps E³;
- the load on the E³ heat pumps with a climatic curve;
- the monitoring of all units parameters;
- the circulation pumps;
- secondary distribution to different zones;
- the production of domestic hot water;
- the anti-legionella cycle;
- the integration with boilers;
- the integration with solar panels;
- free-cooling;
- the interface with a modem for remote assistance.



The interaction between E³ Robur heat pumps and modulating circulation pumps translates into total electricity savings up to 40%.

European legislation identifies the total primary energy need as the parameter to calculate the building's energy performance.

The reduction in the system's electrical consumption, for the same performance, translates immediately into a benefit in primary energy consumption.

The electronic pumps guarantee high hydraulic efficiency, low electricity consumption and reliability.

Robur has developed an integrated distribution system capable of controlling the circulation pumps according to the thermal load.

The interaction between E³ absorption heat pumps and Wilo circulation pumps also enables management of the modulation phases, adjusting the output temperature according to the climatic curve. All this translates into total electricity savings up to 40%.



E³ A air - Solution 1

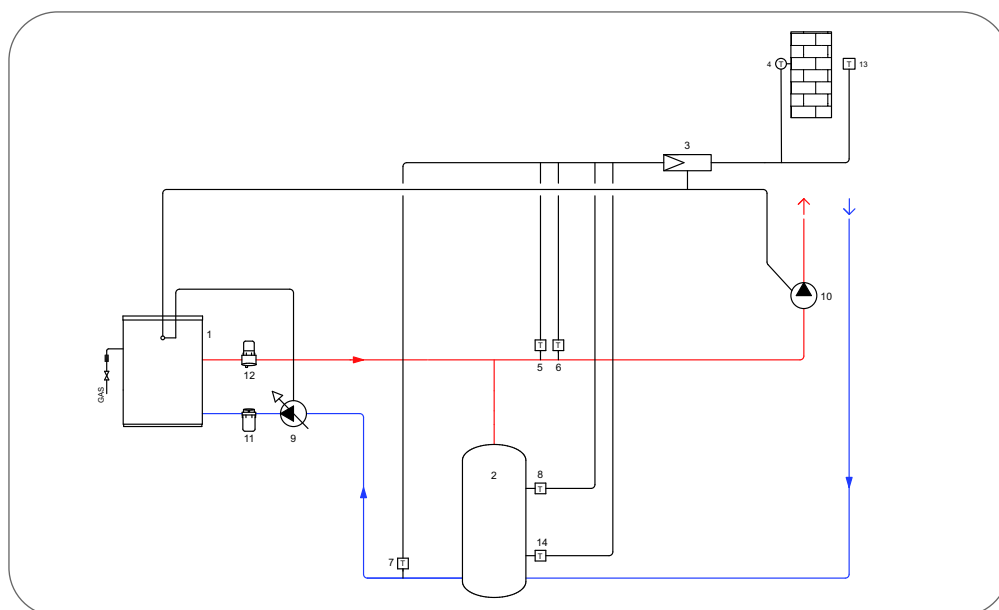
Single-zone heating system with compensation of the outlet temperature (weather curve).

Applications

- Centralized heating systems for medium-sized and large or multi-family buildings, with a single zone and a single type of terminal.
- Industrial heating systems, with a single zone and a single type of terminal.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-A heat pump.
- CCP control system.
- Pumps on the primary and secondary circuit.
- External temperature probe.



Note: The high temperature section is a feature of the GAHP-A HT only. The above scheme is not valid for real installation purposes.

Position	Code	Component	Quantity
--	FE3A000001	E ³ A air - Solution 1	--
1	FQMH00112A	GAHP-A HT S modulating gas absorption heat pump	1
2	OSRB000	300 l inertial tank with three connectors	1
3	OQLT013	Comfort Control Panel	1
4	OSND003	External climate probe	1
5	OSND004	Secondary circuit output interface temperature probe	1
6	OSND004	Secondary circuit output regulator temperature probe	1
7	OSND004	Primary circuit return temperature probe	1
8	OSND004	Inertial tank temperature probe	1
9	OPMP004	Variable speed pump for primary circuit	1
10	OPMP005	Circulation pump for flow distribution (no mixed)	1
11	OFLT014	1 1/4" sludge remover filter	1
12	OFLT010	1 1/4" air remover	1
13	ODSP004	Room thermostat	1
14	OSND004	Inertial tank temperature probe	1



E³ A air - Solution 2

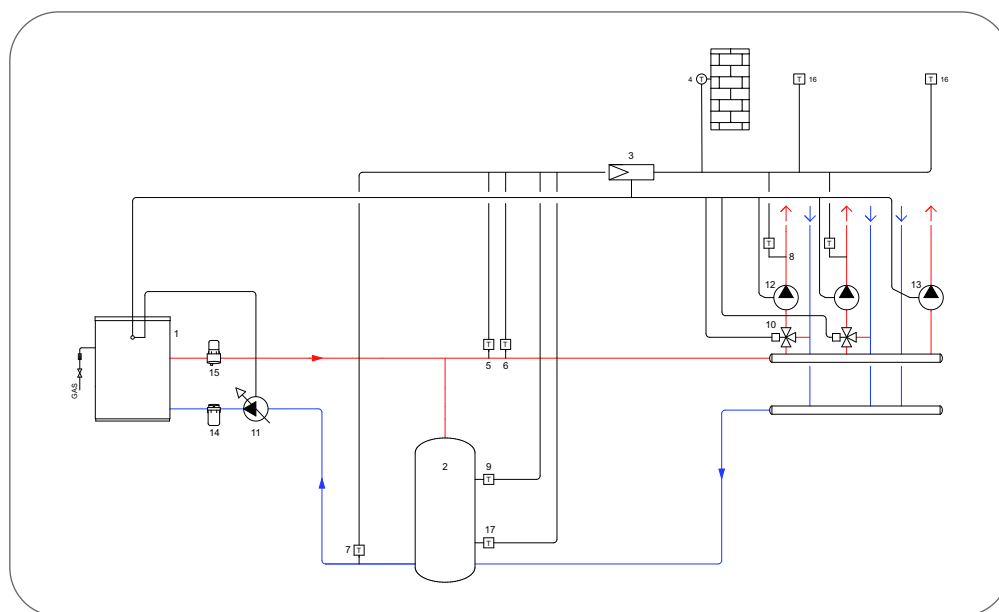
Multi-zone heating system with compensation of the outlet temperature (weather curve).

Applications

- Centralized heating systems for medium-sized and large or multi-family buildings, with differentiated zones and different types of terminal.
- Industrial heating systems, with differentiated zones and different types of terminal.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-A heat pump.
- CCP control system.
- Circulation pumps on the primary circuit and on secondary circuits.
- External temperature probe.



Note: The high temperature section is a feature of the GAHP-A HT only. The above scheme is not valid for real installation purposes.

Position	Code	Component	Quantity
--	FE3A000002	E ³ A air - Solution 2	--
1	FQMH00112A	GAHP-A HT S modulating gas absorption heat pump	1
2	OSRB000	300 l inertial tank with three connectors	1
3	OQLT013	Comfort Control Panel	1
4	OSND003	External climate probe	1
5	OSND004	Secondary circuit output interface temperature probes	1
6	OSND004	Secondary circuit output regulator temperature probes	1
7	OSND004	Primary circuit return temperature probes	1
8	OSND004	System flow distribution output temperature probes	2
9	OSND004	Inertial tank temperature probe	1
10	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
11	OPMP004	Variable speed pump for primary circuit	1
12	OPMP005	Circulation pump for system flow distribution	2
13	OPMP005	Circulation pump for flow distribution (no mixed)	1
14	OFLT014	1 1/4" sludge remover filter	1
15	OFLT010	1 1/4" air remover	1
16	ODSP004	Room thermostat	2
17	OSND004	Inertial tank temperature probe	1

E³ A air - Solution 3

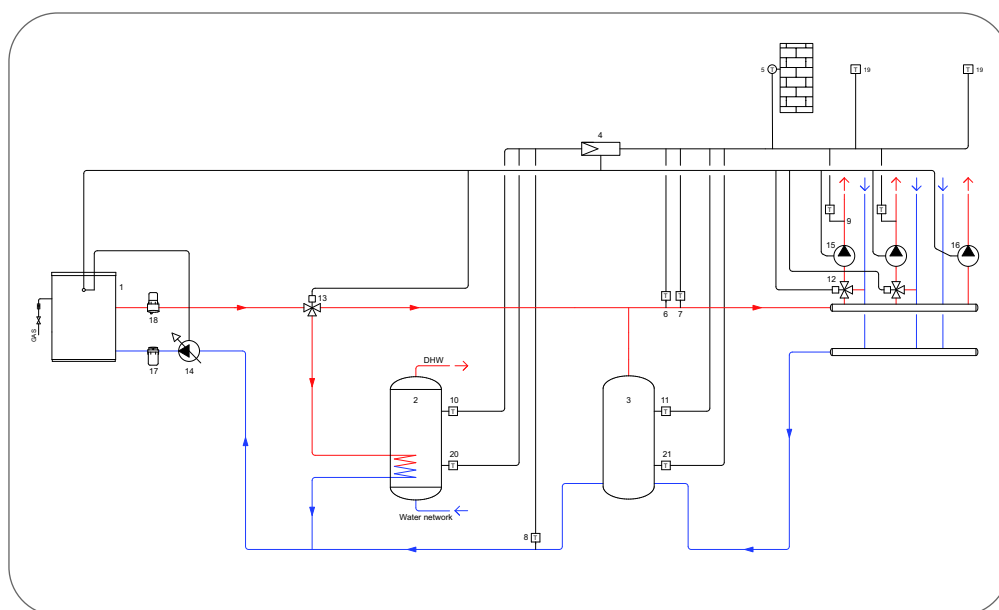
Multi-zone heating system with compensation of the outlet temperature (weather curve) and production of domestic hot water.

Applications

- Centralized heating systems for medium-sized and large residential buildings or industrial buildings, with differentiated zones and different types of terminal and with the production of domestic hot water.
- Retrofits of the types of installation indicated above

Components of the system

- GAHP-A heat pump.
- Comfort Control Panel.
- Circulation pumps on the primary circuit and on secondary circuits.
- Storage tank with larger coil.
- External temperature probe.



Note: The high temperature section is a feature of the GAHP-A HT only.
The above scheme is not valid for real installation purposes.

Position	Code	Component	Quantity
--	FE3A000003	E ³ A air - Solution 3	--
1	FQMH00112A	GAHP-A HT S modulating gas absorption heat pump	1
2	OSRB005	500 l storage tank for preparation of domestic hot water	1
3	OSRB000	300 l inertial tank with three connectors	1
4	OQLT013	Comfort Control Panel	1
5	OSND003	External climate probe	1
6	OSND004	Secondary circuit output interface temperature probe	1
7	OSND004	Secondary circuit output regulator temperature probe	1
8	OSND004	Primary circuit return temperature probe	1
9	OSND004	System flow distribution output temperature probe	2
10	OSND004	Domestic hot water storage tank temperature probe	1
11	OSND004	Inertial tank temperature probe	1
12	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
13	OVLV002	Three-way deviator valve for heating DHW and E ³	1
	OBBN000	On-off electromechanical actuator	
14	OPMP004	Variable speed pump for primary circuit	1
15	OPMP005	Circulation pump for system flow distribution	2
16	OPMP005	Circulation pump for flow distribution in unmixed system	1
17	OFLT014	1 1/4" sludge remover filter	1
18	OFLT010	1 1/4" air remover	1
19	ODSP004	Room thermostat	2
20	OSND004	Domestic hot water storage tank temperature probe	1
21	OSND004	Inertial tank temperature probe	1



E³ A air - Solution 4

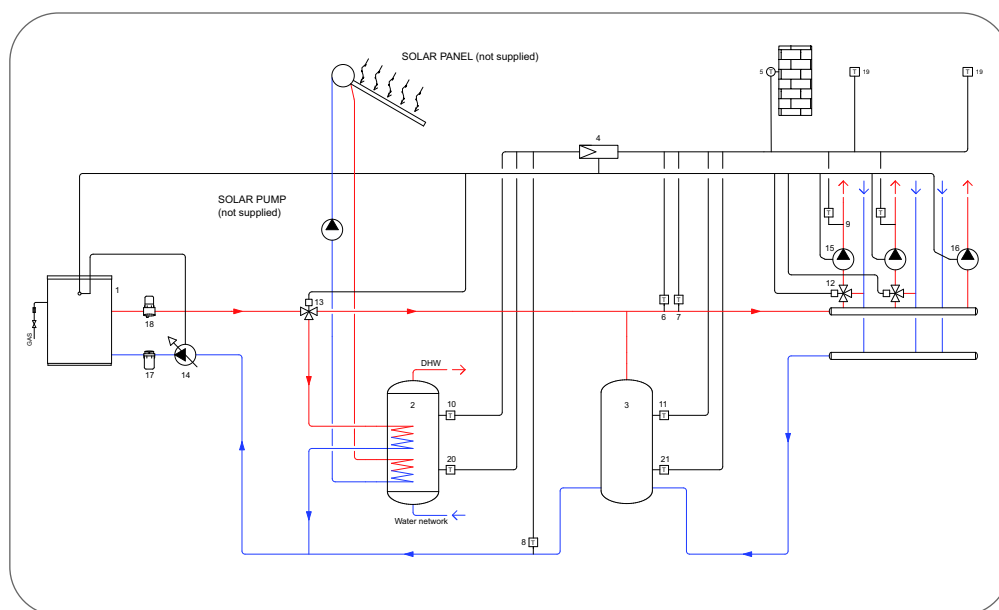
Multi-zone heating system with compensation of the outlet temperature (weather curve), production of domestic hot water, integration with solar panel.

Applications

- Centralized heating systems for medium-sized and large residential buildings or industrial buildings, with differentiated zones and different types of terminal, with the production of domestic hot water and integrated with solar collectors.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-A heat pump.
- CCP control system.
- Circulation pumps on the primary circuit and on secondary circuits.
- Storage tank with double coil.
- External temperature probe.



Note: The high temperature section is a feature only of the GAHP-A HT.
The above scheme is not valid for real installation purposes.

Position	Code	Component	Quantity
--	FE3A000004	E ³ A air - Solution 4	--
1	FQMH00112A	GAHP-A HT S gas modulating absorption heat pump	1
2	OSRB006	500 l storage tank for preparation of domestic hot water	1
3	OSRB000	300 l inertial tank with three connectors	1
4	OQLT013	Comfort Control Panel	1
5	OSND003	External climate probe	1
6	OSND004	Secondary circuit output interface temperature probe	1
7	OSND004	Secondary circuit output regulator temperature probe	1
8	OSND004	Primary circuit return temperature probe	1
9	OSND004	System flow distribution output temperature probe	2
10	OSND004	Domestic hot water storage tank temperature probe	1
11	OSND004	Inertial tank temperature probe	1
12	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
13	OVLV002	Three-way deviator valve for heating DHW and E ³	1
	OBBN000	On-off electromechanical actuator	
14	OPMP004	Variable speed pump for primary circuit	1
15	OPMP005	Circulation pump for system flow distribution	2
16	OPMP005	Circulation pump for flow distribution in unmixed system	1
17	OFLT014	1 1/4" sludge remover filter	1
18	OFLT010	1 1/4" air remover	1
19	ODSP004	Room thermostat	2
20	OSND004	Domestic hot water storage tank temperature probe	1
21	OSND004	Inertial tank temperature probe	1



E³ A air - Solution 5

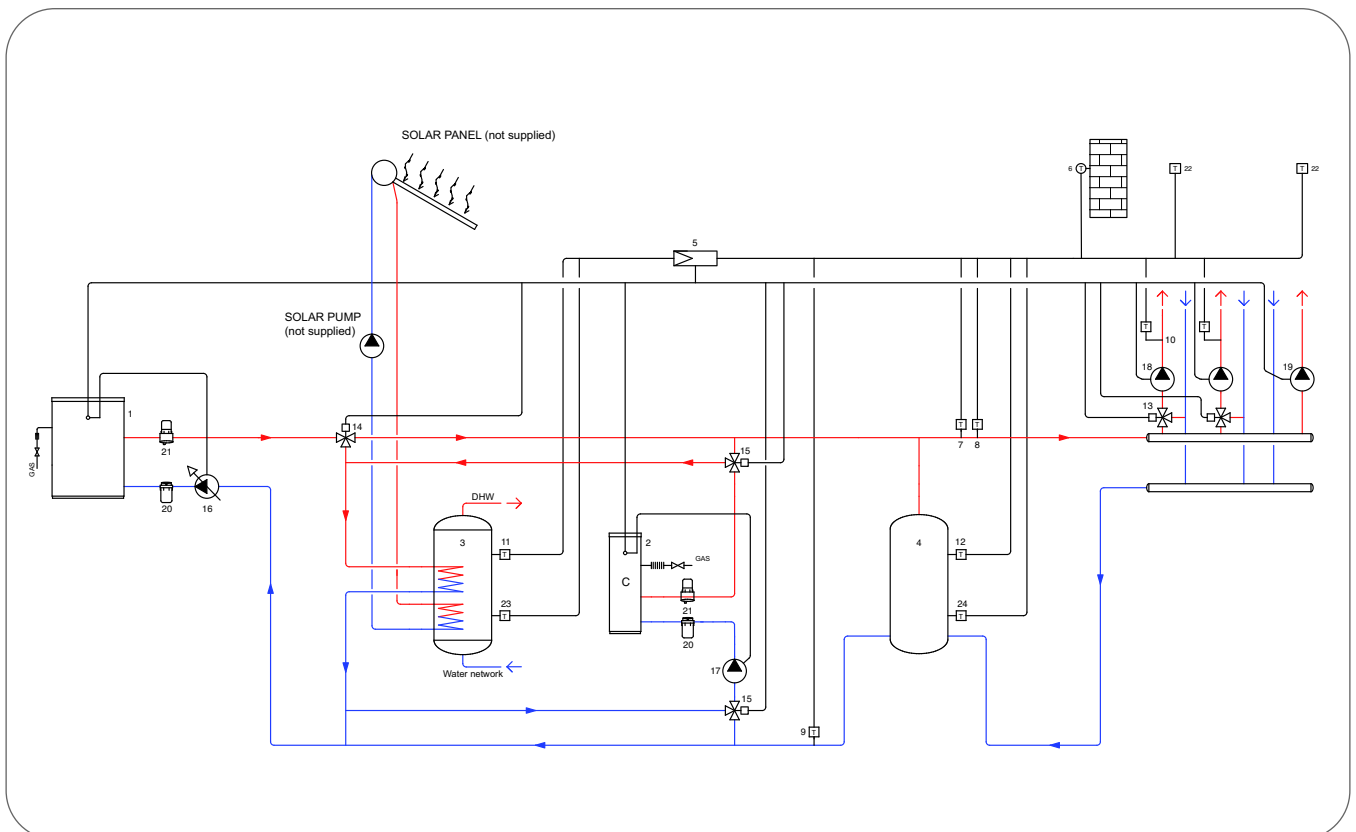
Multi-zone heating system with compensation of the outlet temperature (weather curve), production of domestic hot water, integration with solar panel, back-up boiler.

Applications

- Centralized heating systems for medium-sized and large residential buildings or industrial buildings, with differentiated zones and different types of terminal, with the production of domestic hot water, integrated with solar panel and with back-up boiler.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-A heat pump.
- Comfort Control Panel.
- Circulation pumps on the primary circuit and on secondary circuits.
- Storage tank with double coil.
- AY Condensing back-up boiler.
- External temperature probe.



Note: The high temperature section is a feature of the GAHP-A HT only.
The above scheme is not valid for real installation purposes.



E³ A air - Solution 6

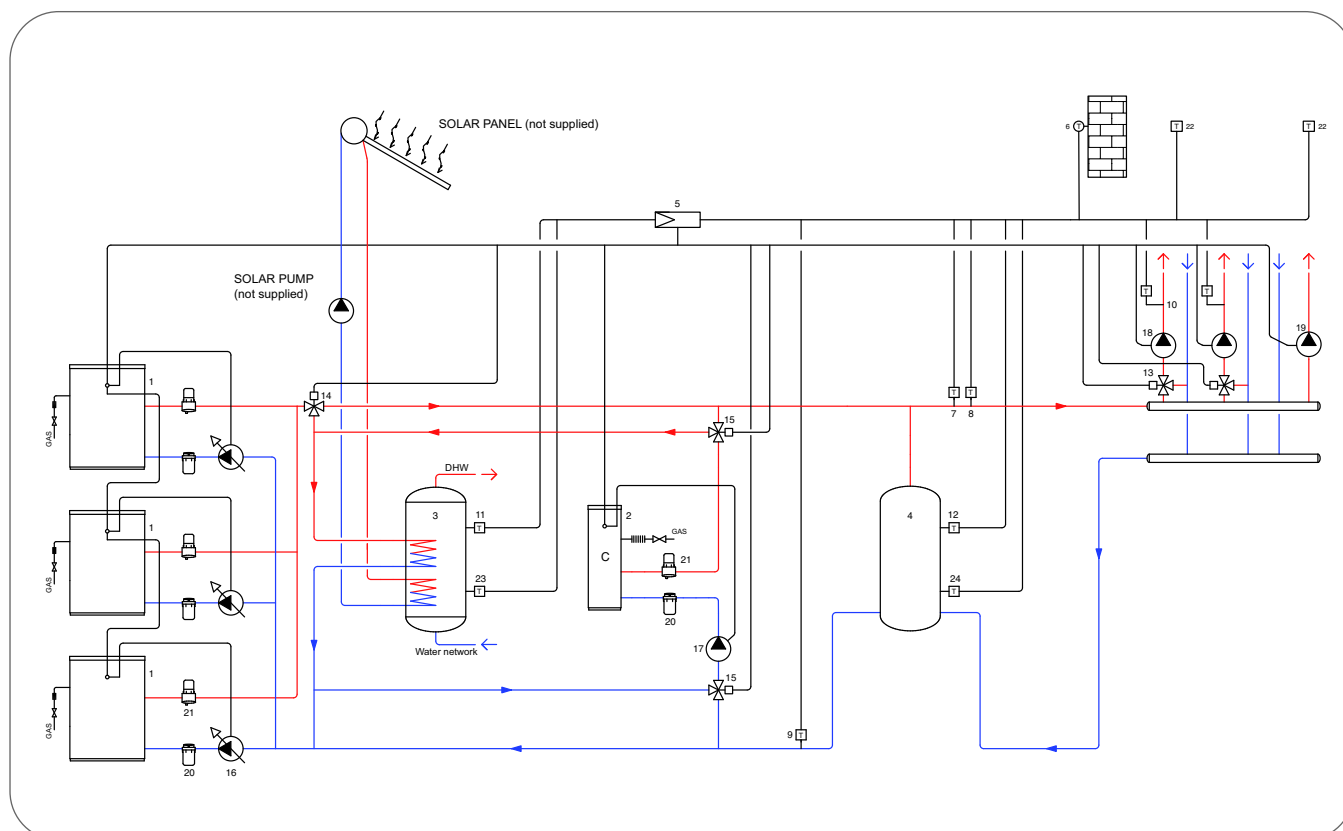
Modular unit and multi-zone heating system with compensation of the outlet temperature (weather curve), production of domestic hot water, integration with solar panel, back-up boiler.

Applications

- Centralized heating systems for large residential or industrial buildings, with differentiated zones and different types of terminal, with the production of domestic hot water, integrated with solar panel and with back-up boiler.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-A heat pumps.
- CCP control system.
- Circulation pumps on the primary circuit and on secondary circuits.
- Storage tank with double coil.
- AY Condensing back-up boiler.
- External temperature probe.



Note: The high temperature section is a feature of the GAHP-A HT only.
The above scheme is not valid for real installation purposes.

Position	Code	Component	Quantity
--	FE3A000005	E³ A air - Solution 5	--
1	FQMH00112A	GAHP-A HT S modulating gas absorption heat pump	1
2	F00G00111A	AY 00-120 condensing boiler	1
3	OSRB006	500 l storage tank for preparation of domestic hot water	1
4	OSRB000	300 l inertial tank with three connectors	1
5	OQLT013	Comfort Control Panel	1
6	OSND003	External climate probe	1
7	OSND004	Secondary circuit output interface temperature probe	1
8	OSND004	Secondary circuit output regulator temperature probe	1
9	OSND004	Primary circuit return temperature probe	1
10	OSND004	System flow distribution output temperature probe	2
11	OSND004	Domestic hot water storage tank temperature probe	1
12	OSND004	Inertial tank temperature probe	1
13	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
	OVLV002	Three-way deviator valve for heating DHW and E³	1
14	OBBN000	On-off electromechanical actuator	
	OVLV002	Three-way deviator valve for heating DHW from boiler	2
15	OBBN000	On-off electromechanical actuator	
16	OPMP004	Variable speed pump for primary circuit	1
17	OPMP004	Fixed speed pump for boiler circuit	1
18	OPMP005	Circulation pump for system flow distribution	2
19	OPMP005	Circulation pump for flow distribution (no mixed)	1
20	OFLT014	1 1/4" sludge remover filter	2
21	OFLT010	1 1/4" air remover	2
22	ODSP004	Room thermostat	2
23	OSND004	Domestic hot water storage tank temperature probe	1
24	OSND004	Inertial tank temperature probe	1

Position	Code	Component	Quantity
--	FE3A000006	E³ A air - Solution 6	--
1	FQMH00112A	GAHP-A HT S modulating gas absorption heat pump	3
2	F00G00111A	AY 00-120 condensing boiler	1
3	OSRB007	750 l storage tank for preparation of domestic hot water	1
4	OSRB002	800 l inertial tank with three connectors	1
5	OQLT013	Comfort Control Panel	1
6	OSND003	External climate probe	1
7	OSND004	Secondary circuit output interface temperature probe	1
8	OSND004	Secondary circuit output regulator temperature probe	1
9	OSND004	Primary circuit return temperature probe	1
10	OSND004	System flow distribution output temperature probe	2
11	OSND004	Domestic hot water storage tank temperature probe	1
12	OSND004	Inertial tank temperature probe	1
13	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
	OVLV002	Three-way deviator valve for heating DHW and E³	1
14	OBBN000	On-off electromechanical actuator	
	OVLV002	Three-way deviator valve for heating DHW from boiler	2
15	OBBN000	On-off electromechanical actuator	
16	OPMP004	Variable speed pump for primary circuit	3
17	OPMP004	Fixed speed pump for boiler circuit	1
18	OPMP005	Circulation pump for system flow distribution	2
19	OPMP005	Circulation pump for flow distribution (no mixed)	1
20	OFLT014	1 1/4" sludge remover filter	4
21	OFLT010	1 1/4" air remover	4
22	ODSP004	Room thermostat	2
23	OSND004	Domestic hot water storage tank temperature probe	1
24	OSND004	Inertial tank temperature probe	1



E³ GS geothermal - Solution 7

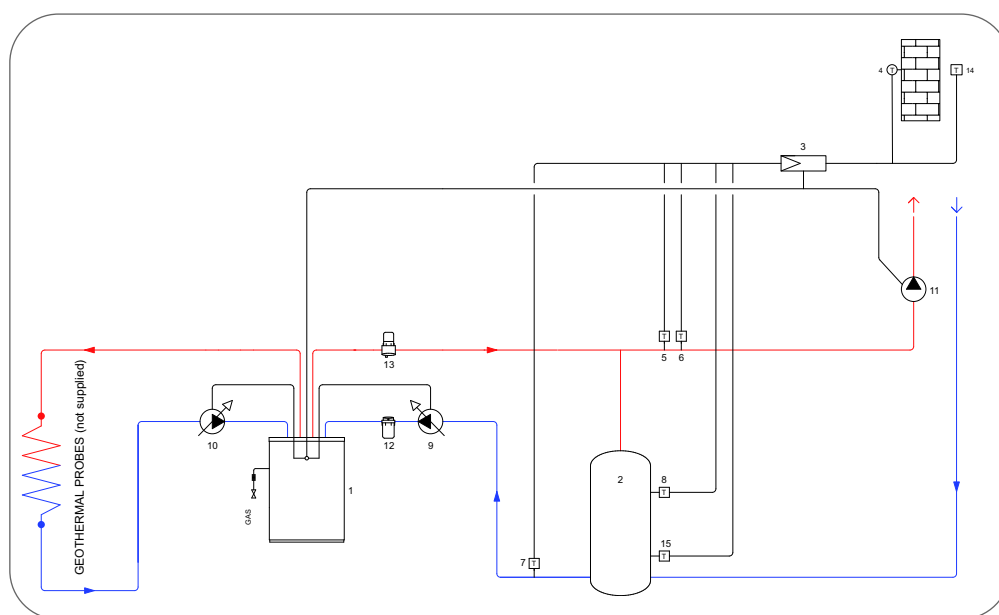
Single-zone heating system with compensation of the outlet temperature (weather curve).

Applications

- Centralized systems for heating medium-sized and large or multi-family buildings, with a single zone and a single type of terminal.
- Industrial heating systems, with a single zone and a single type of terminal
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-GS or GAHP-WS heat pump.
- CCP control system.
- Circulation pumps on the primary circuit and on secondary circuits.
- External temperature probe.



Note: The above scheme is not valid for real installation purposes. It's an example of a GAHP-GS HT geothermal heat pump plant.

Position	Code	Component	Quantity
--	FE3GS00007	E ³ GS geothermal - Solution 7	--
1	FEMH00111A	GAHP-GS HT modulating gas absorption heat pump	1
2	OSRB000	300 l inertial tank with three connectors	1
3	OQLT013	Comfort Control Panel	1
4	OSND003	External climate probe	1
5	OSND004	Secondary circuit output interface temperature probe	1
6	OSND004	Secondary circuit output regulator temperature probe	1
7	OSND004	Primary circuit return temperature probe	1
8	OSND004	Inertial tank temperature probe	1
9	OPMP004	Variable speed pump for primary circuit	1
10	OPMP004	Fixed speed pump for loop circuit	1
11	OPMP005	Circulation pump for flow distribution (no mixed)	1
12	OFLT014	1 1/4" sludge remover filter	1
13	OFLT010	1 1/4" air remover	1
14	ODSP004	Room thermostat	1
15	OSND004	Inertial tank temperature probe	1

Note: The above solution is valid using also GAHP-WS (for information contact Robur sales network).

E³ GS geothermal - Solution 8

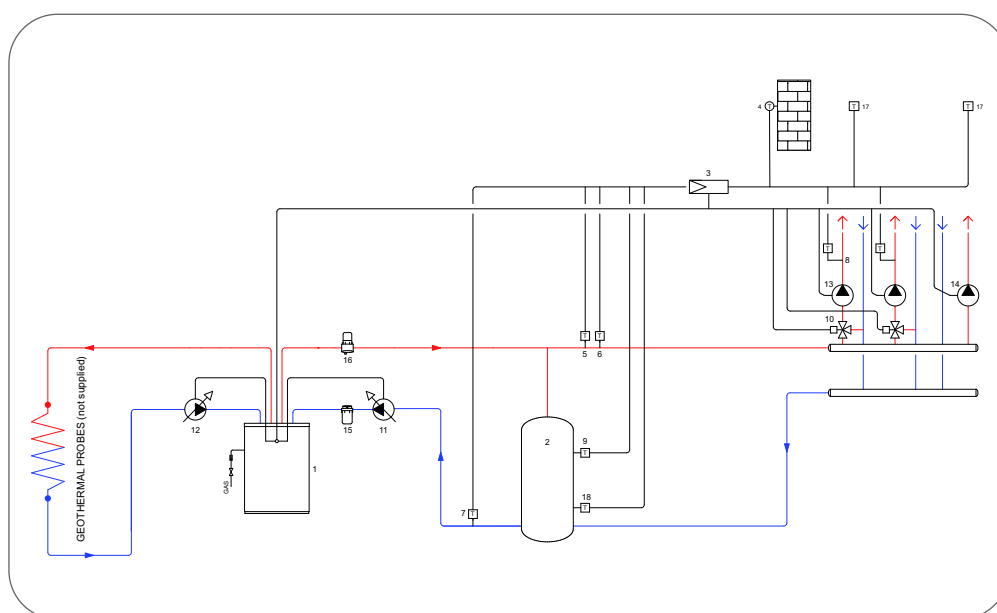
Multi-zone heating system with compensation of the outlet temperature (weather curve).

Applications

- Centralized heating systems for medium-sized and large or multi-family buildings, with differentiated zones and different types of terminal.
- Industrial heating systems, with differentiated zones and different types of terminals.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-GS or GAHP-WS heat pump.
- Comfort Control Panel.
- Circulation pumps on the primary circuit and on secondary circuits.
- External temperature probe.



Note: The above scheme is not valid for real installation purposes. It's an example of a GAHP-GS HT geothermal heat pump plant.

Position	Code	Component	Quantity
--	FE3GS00008	E ³ GS geothermal - Soluzion 8	--
1	FEMH00111A	GAHP-GS HT modulating gas absorption heat pump	1
2	OSRB000	300 l inertial tank with three connectors	1
3	OQLT013	Comfort Control Panel	1
4	OSND003	External climate probe	1
5	OSND004	Secondary circuit output interface temperature probe	1
6	OSND004	Secondary circuit output regulator temperature probe	1
7	OSND004	Primary circuit return temperature probe	1
8	OSND004	System flow distribution output temperature probe	2
9	OSND004	Inertial tank temperature probe	1
10	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
11	OPMP004	Variable speed pump for primary circuit	1
12	OPMP004	Fixed speed pump for loop circuit	1
13	OPMP005	Circulation pump for system flow distribution	2
14	OPMP005	Circulation pump for flow distribution (no mixed)	1
15	OFLT014	1 1/4" sludge remover filter	1
16	OFLT010	1 1/4" air remover	1
17	ODSP004	Room thermostat	2
18	OSND004	Inertial tank temperature probe	1

Note: The above solution is valid using also GAHP-WS (for information contact Robur sales network).



E³ GS geothermal - Solution 9

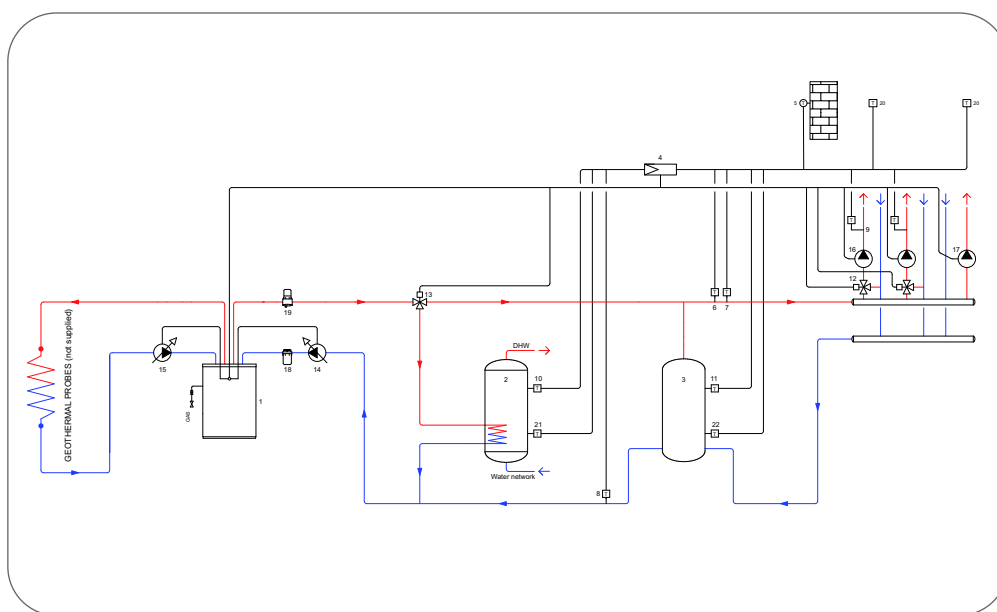
Multi-zone heating system with compensation of the outlet temperature (weather curve) and production of domestic hot water.

Applications

- Centralized heating systems for medium-sized and large residential buildings or industrial buildings, with differentiated zones and different types of terminals and with the production of domestic hot water.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-GS or GAHP-WS heat pump.
- CCP control system.
- Circulation pumps on the primary circuit and on secondary circuits.
- Storage tank with larger coil.
- External temperature probe.



Note: The above scheme is not valid for real installation purposes. It's an example of a GAHP-GS HT geothermal heat pump plant.

Position	Code	Component	Quantity
--	FE3GS00009	E ³ GS geothermal - Solution 9	--
1	FEMH00111A	GAHP-GS HT modulating gas absorption heat pump	1
2	OSRB005	500 l storage tank for preparation of domestic hot water	1
3	OSRB000	300 l inertial tank with three connectors	1
4	OQLT013	Comfort Control Panel	1
5	OSND003	External climate probe	1
6	OSND004	Secondary circuit output interface temperature probe	1
7	OSND004	Secondary circuit output regulator temperature probe	1
8	OSND004	Primary circuit return temperature probe	1
9	OSND004	System flow distribution output temperature probe	2
10	OSND004	Domestic hot water storage tank temperature probe	1
11	OSND004	Inertial tank temperature probe	1
12	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
13	OVLV002	Three-way deviator valve for heating DHW from E ³	1
	OBBN000	On-off electromechanical actuator	
14	OPMP004	Variable speed pump for primary circuit	1
15	OPMP004	Fixed speed pump for loop circuit	1
16	OPMP005	Circulation pump for system flow distribution	2
17	OPMP005	Circulation pump for flow distribution (no mixed)	1
18	OFLT014	1 1/4" sludge remover filter1	
19	OFLT010	1 1/4" air remover	1
20	ODSP004	Room thermostat	2
21	OSND004	Domestic hot water storage tank temperature probe	1
22	OSND004	Inertial tank temperature probe	1

Note: The above solution is valid using also GAHP-WS (for information contact Robur sales network).



E³ GS geothermal - Solution 10

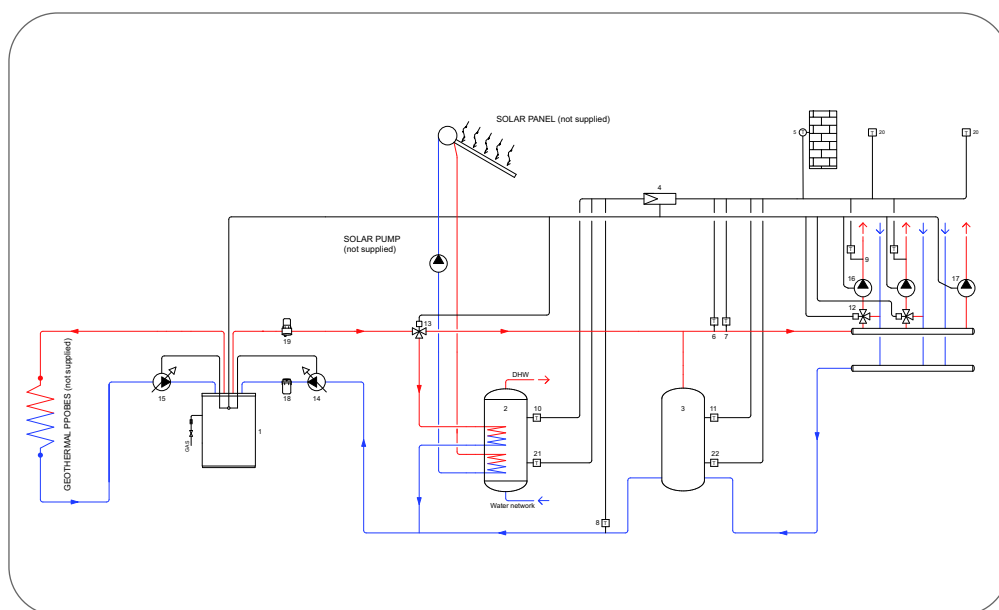
Multi-zone heating system with compensation of the outlet temperature (weather curve), production of domestic hot water, integration with solar panel.

Applications

- Centralized heating systems for medium-sized and large residential buildings or industrial buildings, with differentiated zones and different types of terminals, with the production of domestic hot water and integrated with solar collectors.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-GS or GAHP-WS heat pump.
- CCP control system.
- Circulation pumps on the primary circuit and on secondary circuits.
- Storage tank with double coil.
- External temperature probe.



Note: The above scheme is not valid for real installation purposes. It's an example of a GAHP-GS HT geothermal heat pump plant.

Position	Code	Component	Quantity
--	FE3GS00010	E ³ GS geothermal - Solution 10	--
1	FEMH00111A	GAHP-GS HT modulating gas absorption heat pump	1
2	OSRB006	500 l storage tank for preparation of domestic hot water	1
3	OSRB000	300 l inertial tank with three connectors	1
4	OQLT013	Comfort Control Panel	1
5	OSND003	External climate probe	1
6	OSND004	Secondary circuit output interface temperature probe	1
7	OSND004	Secondary circuit output regulator temperature probe	1
8	OSND004	Primary circuit return temperature probe	1
9	OSND004	System flow distribution output temperature probe	2
10	OSND004	Domestic hot water storage tank temperature probe	1
11	OSND004	Inertial tank temperature probe	1
12	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
13	OVLV002	Three-way deviator valve for heating DHW from E ³	1
	OBBN000	On-off electromechanical actuator	
14	OPMP004	Variable speed pump for primary circuit	1
15	OPMP004	Fixed speed pump for loop circuit	1
16	OPMP005	Circulation pump for system flow distribution	2
17	OPMP005	Circulation pump for flow distribution (no mixed)	1
18	OFLT014	1 1/4" sludge remover filter	1
19	OFLT010	1 1/4" air remover	1
20	ODSP004	Room thermostat	2
21	OSND004	Domestic hot water storage tank temperature probe	1
22	OSND004	Inertial tank temperature probe	1

Note: The above solution is valid using also GAHP-WS (for information contact Robur sales network).



E³ GS geothermal - Solution 11

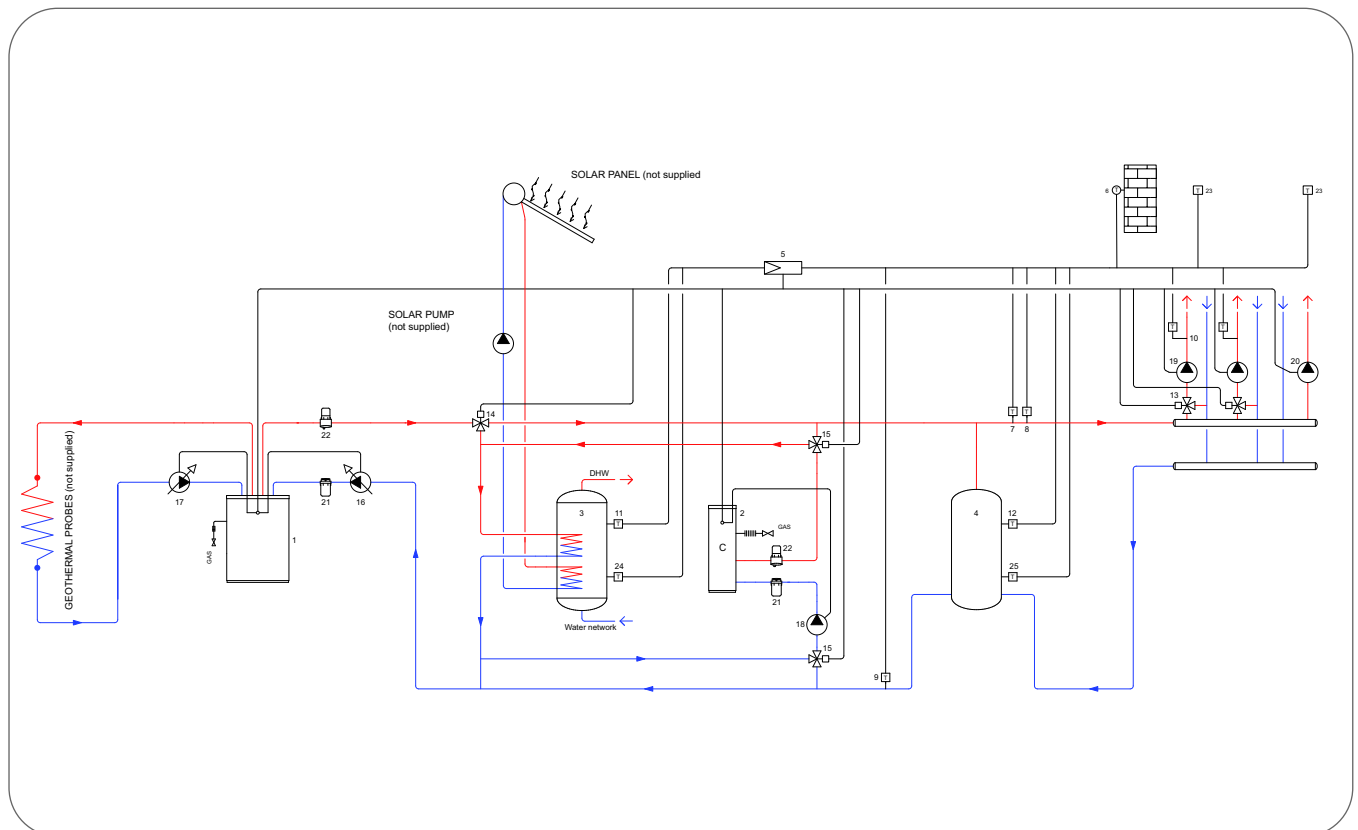
Multi-zone heating system with compensation of the outlet temperature (weather curve), production of domestic hot water, integration with solar panel, back-up boiler.

Applications

- Centralized heating systems for medium-sized and large residential buildings or industrial buildings, with differentiated zones and different types of terminals, with the production of domestic hot water, integrated with solar collectors and with back-up boiler.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-GS or GAHP-WS heat pump.
- Comfort Control Panel.
- Circulation pumps on the primary circuit and on secondary circuits.
- Storage tank with double coil.
- AY Condensing boiler.
- External temperature probe.



Note: The above scheme is not valid for real installation purposes. It's an example of a GAHP-GS HT geothermal heat pump plant.



E³ GS geothermal - Solution 12

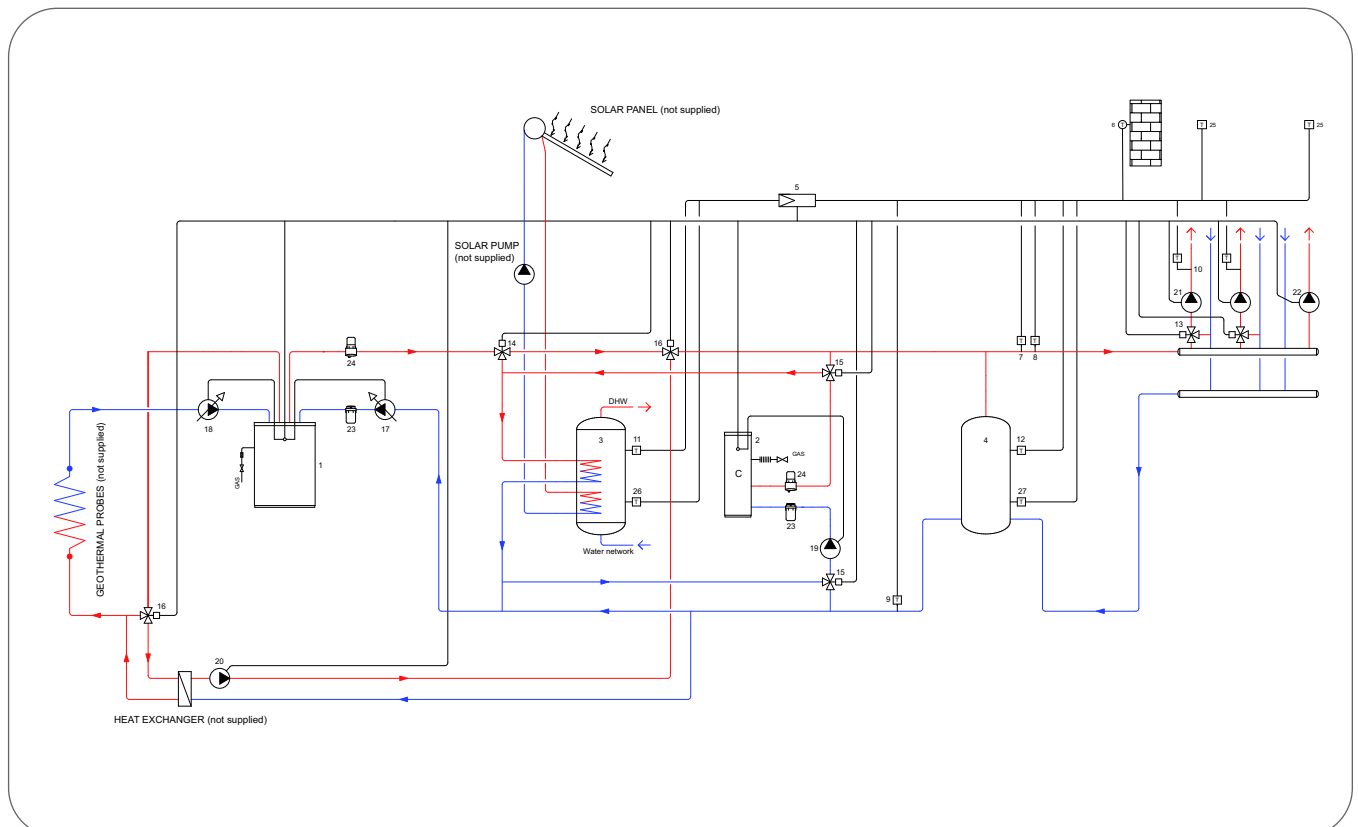
Multi-zone heating system with compensation of the outlet temperature (weather curve), production of domestic hot water, integration with solar panel, back-up boiler, free cooling.

Applications

- Centralized heating systems for medium-sized and large residential buildings or industrial buildings, with differentiated zones and different types of terminals, with the production of domestic hot water, integrated with solar collectors and with back-up boiler. Free cooling.
- Retrofits of the types of installation indicated above.

Components of the system

- GAHP-GS or GAHP-WS heat pump.
- External temperature probe.
- Comfort Control Panel.
- Circulation pumps on the primary circuit and on secondary circuits.
- Storage tank with double coil.
- AY Condensing boiler.
- Plate exchanger for free cooling circuit with circulation pump.



Note: The above scheme is not valid for real installation purposes. It's an example of a GAHP-GS HT geothermal heat pump plant.

Position	Code	Component	Quantity
--	FE3GS00011	E ³ GS geothermal - Solution 11	--
1	FEMH00111A	GAHP-GS HT modulating gas absorption heat pump	1
2	F00G00111A	AY 00-120 Robur Condensing gas boiler	1
3	OSRB006	500 l storage tank for preparation of domestic hot water	1
4	OSRB000	300 l inertial tank with three connectors	1
5	OQLT013	Comfort Control Panel	1
6	OSND003	External climate probe	1
7	OSND004	Secondary circuit output interface temperature probe	1
8	OSND004	Secondary circuit output regulator temperature probe	1
9	OSND004	Primary circuit return temperature probe	1
10	OSND004	System flow distribution output temperature probe	2
11	OSND004	Domestic hot water storage tank temperature probe	1
12	OSND004	Inertial tank temperature probe	1
13	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
14	OVLV002	Three-way deviator valve for heating DHW from E ³	1
	OBBN000	On-off electromechanical actuator	
15	OVLV002	Three-way deviator valve for heating DHW from boiler	2
	OBBN000	On-off electromechanical actuator	
16	OPMP004	Variable speed pump for primary circuit	1
17	OPMP004	Fixed speed pump for loop circuit	1
18	OPMP004	Fixed speed pump for boiler circuit	1
19	OPMP005	Circulation pump for system flow distribution	2
20	OPMP005	Circulation pump for flow distribution (no mixed)	1
21	OFLT014	1 1/4" sludge remover filter	2
22	OFLT010	1 1/4" air remover	2
23	ODSP004	Room thermostat	2
24	OSND004	Domestic hot water storage tank temperature probe	1
25	OSND004	Inertial tank temperature probe	1

Position	Code	Component	Quantity
--	FE3GS00012	E ³ GS geothermal - Solution 12	--
1	FEMH00111A	GAHP-GS HT modulating gas absorption heat pump	1
2	F00G00111A	AY 00-120 Robur Condensing gas boiler	1
3	OSRB006	500 l storage tank for preparation of domestic hot water	1
4	OSRB000	300 l inertial tank with three connectors	1
5	OQLT013	Comfort Control Panel	1
6	OSND003	External climate probe	1
7	OSND004	Secondary circuit output interface temperature probe	1
8	OSND004	Secondary circuit output regulator temperature probe	1
9	OSND004	Primary circuit return temperature probe	1
10	OSND004	System flow distribution output temperature probe	2
11	OSND004	Domestic hot water storage tank temperature probe	1
12	OSND004	Inertial tank temperature probe	1
13	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
14	OVLV002	Three-way deviator valve for heating DHW from E ³	1
	OBBN000	On-off electromechanical actuator	
15	OVLV002	Three-way deviator valve for heating DHW from boiler	2
	OBBN000	On-off electromechanical actuator	
16	OVLV002	Three-way deviator valve for actuation of free-cooling function	2
	OBBN000	On-off electromechanical actuator	
17	OPMP004	Variable speed pump for primary circuit	1
18	OPMP004	Fixed speed pump for loop circuit	1
19	OPMP004	Fixed speed pump for boiler circuit	1
20	OPMP004	Circulation pump for free-cooling circuit	1
21	OPMP005	Circulation pump for system flow distribution	2
22	OPMP005	Circulation pump for flow distribution (no mixed)	1
23	OFLT014	1 1/4" sludge remover filter	2
24	OFLT010	1 1/4" air remover	2
25	ODSP004	Room thermostat	2
26	OSND004	Domestic hot water storage tank temperature probe	1
27	OSND004	Inertial tank temperature probe	1

Note: The above solution is valid using also GAHP-WS (for information contact Robur sales network).



E³ GS geothermal - Solution 13

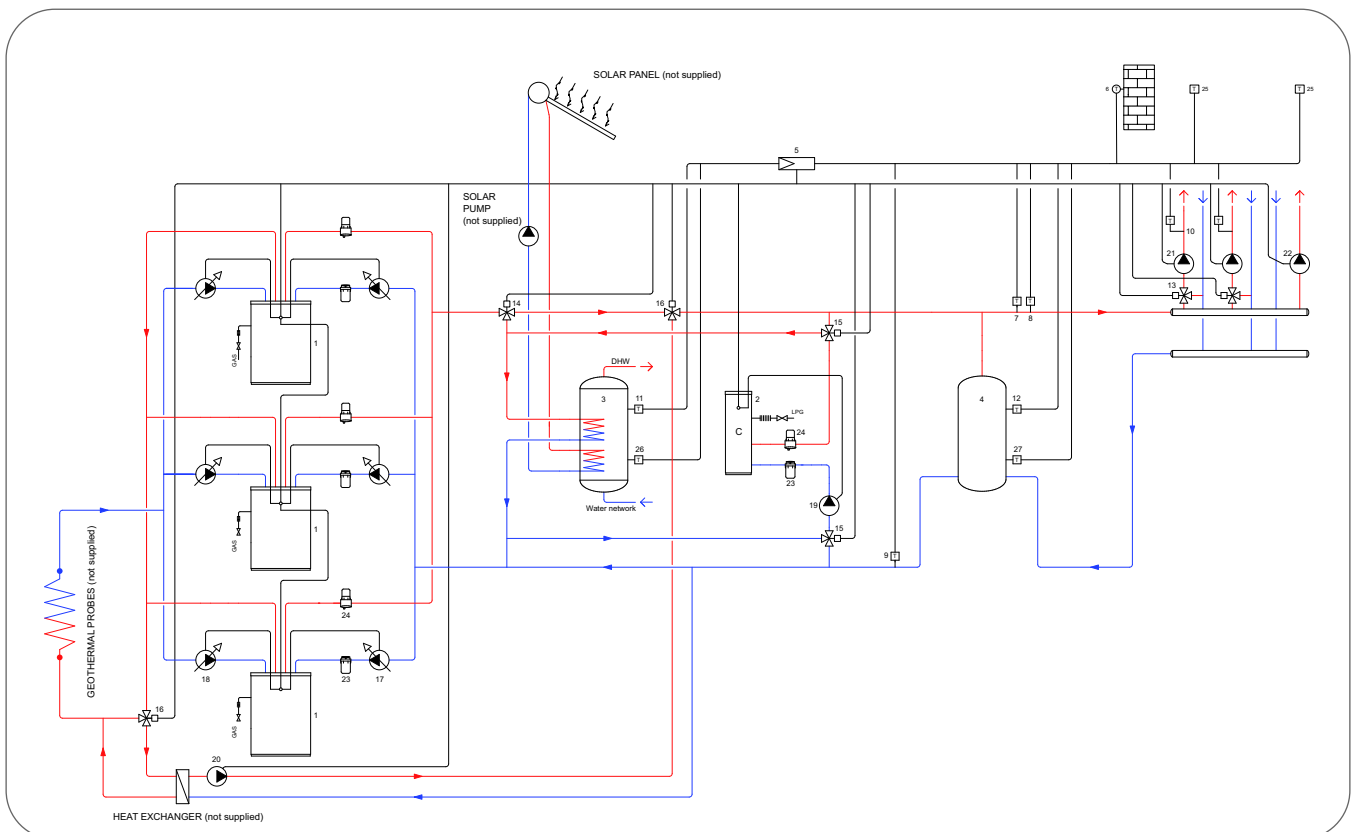
Modular unit and multi-zone heating system with compensation of the outlet temperature (weather curve), production of domestic hot water, integration with solar panel, back-up boiler, free cooling.

Applications

- Centralized heating systems for medium-sized and large residential buildings or industrial buildings, with differentiated zones and different types of terminals, with the production of domestic hot water, integrated with solar collectors and with back-up boiler. Free cooling.
- Retrofits of the types of installation indicated above.

Components of the system

- E³ GS o E³ WS heat pump.
- CCP control system.
- Circulation pumps on the primary circuit and on secondary circuits.
- Storage tank with double coil.
- AY Condensing boiler.
- Plate exchanger for free cooling circuit with circulation pump.
- External temperature probe.



Note: The above scheme is not valid for real installation purposes. It's an example of a E³ GS HT geothermal heat pump plant.









Position	Code	Component	Quantity
--	FE3GS00013	E ³ GS geothermal - Solution 13	--
1	FEMH00111A	GAHP-GS HT modulating gas absorption heat pump	3
2	F00G00111A	AY 00-120 condensing gas boiler	1
3	OSRB007	750 l storage tank for preparation of domestic hot water	1
4	OSRB002	800 l inertial tank with three connectors	1
5	OQLT013	Comfort Control Panel	1
6	OSND003	External climate probe	1
7	OSND004	Secondary circuit output interface temperature probe	1
8	OSND004	Secondary circuit output regulator temperature probe	1
9	OSND004	Primary circuit return temperature probe	1
10	OSND004	System flow distribution output temperature probe	2
11	OSND004	Domestic hot water storage tank temperature probe	1
12	OSND004	Inertial tank temperature probe	1
13	OVLV006	DN32 Kvs16 three-way mixer valve for system flow distribution	2
	OBBN001	3-point modulating electromechanical actuator	
14	OVLV002	Three-way deviator valve for heating DHW from E ³	1
	OBBN000	On-off electromechanical actuator	
15	OVLV002	Three-way deviator valve for heating DHW from boiler	2
	OBBN000	On-off electromechanical actuator	
16	OVLV002	Three-way deviator valve for actuation of free-cooling function	2
	OBBN000	On-off electromechanical actuator	
17	OPMP004	Variable speed pump for primary circuit	3
18	OPMP004	Fixed speed pump for loop circuit	3
19	OPMP004	Fixed speed pump for boiler circuit	1
20	OPMP004	Circulation pump for free-cooling circuit	1
21	OPMP005	Circulation pump for system flow distribution	2
22	OPMP005	Circulation pump for flow distribution (no mixed)	1
23	OFLT014	1 1/4" sludge remover filter	4
24	OFLT010	1 1/4" air remover	4
25	ODSP004	Room thermostat	2
26	OSND004	Domestic hot water storage tank temperature probe	1
27	OSND004	Inertial tank temperature probe	1

Note: The above solution is valid using also GAHP-WS (for information contact Robur sales network).

E³ accessories

The 13 E³ solutions include one or more GAHP gas absorption heat pumps and a wide range of preselected accessories, according to the requirements. Every component (see from p. 59 to p. 74) is available with its own code.

GAHP units E³ systems components

	Component
	Zone valves complete with actuator Zone valve and three-way valve to be used to complete the secondary circuit.
	Air separator and sludge remover filters to care for the system and protect it from downtime and/or malfunctions due to the presence of excess of air or dirt.
	Mosè hydraulic separator to balance hydraulic circuits, complete with automatic air discharge valve, water discharge valve and insulation.
	Flow regulator valve to allow the correct hydraulic balance, adjusting the flow rate during heating and cooling and therefore the optimal distribution of heating and cooling energy.
	Thermal flywheel for hot water storage, external painted, uncoated on the inside complete with soft polyurethane insulation.
	DHW preparation tanks Tanks with cathodic protection, internally treated according to UNI10025, equipped by enhanced exchange coil pipe and available in the versions with or without additional coil for solar integration.
	Condensation pump to be connected to the water condensation discharge.
	Safety valve exhaust kit for GAHP GS and WS Kit to duct the safety valve exhaust outdoor, to be used for GS/WS units installed indoor.
	Anti-vibration support kit consisting of a series of elastic rubber or spring feet to install under the unit base.

Air Handler Line

Indoor air handler
for heating and cooling

Ideal complement
to GAHP heat pumps
and GA chillers

Indoor free-blowing air handler wall mounted for heating and cooling of medium-sized and large settings.

Air handler for heating and cooling

Air Handler Line

Advantages

- Control the air flow through two-speed ventilation.
- Adapting the air flow to the installation conditions, through the front grid with individually adjustable fins.

Applications

Suitable for installation in medium to large settings such as:

- exhibitions;
- supermarkets;
- showroom;
- craft workshops;
- industrial buildings;
- factory buildings;
- medium to large settings requiring summer and winter cooling.

Versions

- CL air handler can be connected to Robur hot water production appliances (boilers and GAHP-A absorption heat pumps) and to any other system for the production of hot water.
- CR fan heaters can be connected to Robur hot and cold water production appliances (chiller-heater units and absorption heat pumps) and to any other system for the production of hot and cold water.



TECHNICAL DATA

			CL	CR
Heating capacity		kW	20.38 ⁽¹⁾	29.12 ⁽²⁾
Cooling capacity		kW	--	21.21 ⁽³⁾
Air flow max/min		m³/h	4,000/2,850	4,900/3,800
Sound pressure at 6 metres max/min speed		dB(A)	54/48	56/51
Nominal electrical power		kW	0.25	0.45
Diameter of water connections		" M	3/4	1
Operational Weight		kg	45	110
Dimensions	width	mm	1,040	1,614
	depth	mm	510	670
	height	mm	690	744

⁽¹⁾ Air flow rate 4,000 m³/h, water outlet 50 °C, water inlet 40 °C, water flow rate 1.829 m³/h, air inlet temperature 15 °C.

⁽²⁾ Air flow rate 4,900 m³/h, water outlet 50 °C, water inlet 40 °C, water flow rate 2.509 m³/h,

air inlet temperature 15 °C.

⁽³⁾ Air flow rate 4,900 m³/h, water outlet 7 °C, water inlet 12 °C, water flow rate 3.648 m³/h, air inlet temperature 15 °R.H. 50%.

Accessories for the Air Handler Line

Remote controls

with ON/OFF switch, summer/winter mode selector with 2-speed fan.

Ambient thermostat

for summer and winter temperature adjustment.

Robur Pre-Sales Service

Provides design, technical and normative support to ensure choice and the most efficient use of Robur solutions.

T +39 035 888 312 presales@robur.it

Robur Technical Support

A network of specialised service centres approved by Robur ensures effective, fast and safe support for pre-testing, commissioning and maintenance of the system.

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Robur produces



Hydronic heating systems with condensing absorption heat pump + renewable energy for heating, for heating and cooling. Available for geothermal systems too.



Condensing absorption heat pumps, fired by gas + renewable energy, for heating, heating and cooling. Available for geothermal systems too.



Low electrical consumption gas fired absorption chillers and chiller-heaters for cooling, heating, refrigeration and process applications.



Gas fired condensing modular boilers for outdoor installation for heating.



Combined heating systems with gas fired boiler and air heater, including condensing systems, for installation sites under legislative restrictions.



Wall-mounted gas fired heaters, even condensing, for heating commercial and industrial spaces.



Evaporative air coolers ideal for medium-sized and large buildings.



Individual forced draught gas fired radiators for heating small and medium-sized spaces.

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

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