



Ductable Air-Cooled Liquid Chillers Ductable Reversible Air-to-Water Heat Pumps



AQUASNAP™



Quality and Environment
Management Systems
Approval



30RBY 039-160/30RQY 039-160

Nominal cooling capacity 30RBY: 40-155 kW

Nominal cooling capacity 30RQY: 40-150 kW

Nominal heating capacity 30RQY: 40-160 kW

The new generation of Aquasnap Puron liquid chillers/air-to-water heat pumps was designed for commercial (air conditioning of offices, hotels etc.) or industrial (low-temperature process units etc.) applications.

The new Aquasnap Puron integrates the latest technological innovations:

- ozone-friendly refrigerant R410A
- scroll compressors
- low-noise fans made of a composite material
- auto-adaptive microprocessor control
- electronic expansion valve
- variable-speed pump (option)

The Aquasnap can be equipped with a hydronic module integrated into the unit chassis, limiting the installation to straightforward operations like connection of the power supply and the chilled water supply and return piping.

Features

Quiet operation

- Compressors
 - Low-noise scroll compressors with low vibration level
 - The compressor assembly is installed on an independent chassis and supported by anti-vibration mountings
 - Dynamic suction and discharge piping support, minimising vibration transmission (Carrier patent)
- Condenser (30RBSY)/air evaporator/condenser (30RQSY) section
 - Vertical condenser coils
 - Protection grilles on anti-vibration mountings to protect the heat exchanger against possible shocks (30RBSY 090-160 and 30RQSY 080-160 only).
 - Low-noise latest-generation Flying Bird IV fans, made of a composite material (Carrier patent) are now even quieter and do not generate intrusive low-frequency noise
 - Fan motor controlled by a variable-frequency controller, to allow adjustment of the fan speed in accordance with the ducting for optimised efficiency.
 - Rigid fan installation for reduced start-up noise (Carrier patent)

Easy and fast installation

- Physical features
 - Flying Bird IV fans controlled by a variable-frequency controller to provide up to 240 Pa available pressure (depending on the size) at nominal flow rate
 - Flow control in accordance with the ducting for optimised efficiency with the possibility to program a maximum supply air flow.
 - Supply air duct connection frame.
 - Suction air connection frame standard for sizes 30RBSY 039-080 and 30RQSY 039-078
 - Suction air filters optional (30RBSY 039-080 and 30RQSY 039-078 only)
 - Small unit footprint with a low height (1371 mm) for easy installation in most buildings
 - The unit is enclosed by easily removable panels, covering all components (except air heat exchanger and fans).
- Integrated hydronic module (option)
 - Centrifugal low or high-pressure water pump (as required), based on the pressure loss of the hydronic installation

Hydronic module



- Single or dual water pump (as required) with operating time balancing and automatic changeover to the back-up pump if a fault develops
- Water filter protects the water pump against circulating debris
- Pressure measurement, using two pressure transducers and allowing indication of water flow rate, water pressure and lack of water.
- High-capacity membrane expansion tank ensures pressurisation of the water circuit
- Overpressure valve, set to 4 bar
- Speed variator on the pumps (option) to ensure the correct flow rate, based on the system requirements
- Thermal insulation and frost protection down to -20°C, using an electric resistance heater (see table of options)
- Simplified electrical connections
 - A single power supply point without neutral
 - Main disconnect switch with high trip capacity
 - Transformer for safe 24 V control circuit supply included
- Fast commissioning
 - Systematic factory operation test before shipment
 - Quick-test function for step-by-step verification of the instruments, electrical components and motors

Economical operation

- Variable-speed pump (option)
 - The control algorithm adjusts the water flow rate in accordance with the actual system requirements. This saves energy and makes the flow control valve unnecessary.
- Variable-speed fan
 - Variable-speed ventilation permits adjustment to any duct type and variation of the air flow rate for maximised unit EERs and COPs under any operating conditions.
- Increased energy efficiency at part load
 - The refrigerant circuit includes several compressors connected in parallel. At part load, around 99% of the operating time, only the compressors that are absolutely necessary operate. At these conditions the compressors operating are more energy efficient, as they use the total condenser and evaporator capacity.
 - The electronic expansion device (EXV) allows operation at a lower condensing pressure (EER, COP and ESEER optimisation).
 - Dynamic superheat management for better utilisation of the water heat exchanger surface.
 - Defrost cycle optimisation (30RQSY)
- Reduced maintenance costs
 - Maintenance-free scroll compressors
 - Fast diagnosis of possible incidents and their history via the Pro-Dialog+ control
 - R410A refrigerant is easier to use than other refrigerant blends

Environmental care

- Ozone-friendly R410A refrigerant
 - Chlorine-free refrigerant of the HFC group with zero ozone depletion potential
 - High-density refrigerant, therefore less refrigerant required
 - Very efficient - gives an increased energy efficiency ratio (EER, COP and ESEER)
- Leak-tight refrigerant circuit
 - Brazed refrigerant connections for increased leak-tightness
 - Reduction of leaks due to reduced vibration levels and elimination of capillary tubes (TXVs)
 - Verification of pressure transducers and temperature sensors without transferring refrigerant charge

Supply air connection frame



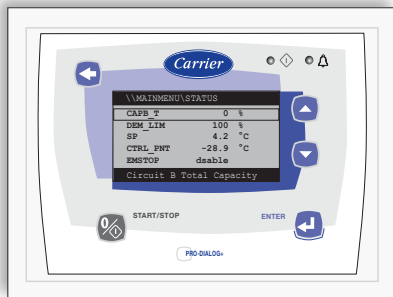
Superior reliability

- State-of-the-art concept
 - Cooperation with specialist laboratories and use of limit simulation tools (finite element calculations) for the design of the critical components, e.g. motor supports, suction/discharge piping etc.
- Auto-adaptive control
 - Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydronic circuit (Carrier patent)
 - Hydronic module with integrated pressure transducers allowing measurement of the water pressure at two points, as well as measurement of the water flow rate and detection of lack of water and pressure. This considerably reduces the risk of problems such as frost accumulation on the water heat exchanger.
 - Automatic compressor unloading in case of abnormally high condensing pressure. If an anomaly occurs (e.g. fouled air heat exchanger coil, fan failure) Aquasnap continues to operate, but at reduced capacity.
- Exceptional endurance tests
 - Corrosion resistance tests in salt mist in the laboratory
 - Accelerated ageing test on components that are submitted to continuous operation: compressor piping, fan supports
 - Transport simulation test in the laboratory on a vibrating table.

Pro-Dialog+ control

Pro-Dialog+ combines intelligence with operating simplicity. The control constantly monitors all machine parameters and precisely manages the operation of compressors, expansion devices, fans and of the water heat exchanger water pump for optimum energy efficiency.

Pro-Dialog+ interface



- Energy management
 - Seven-day internal time schedule clock: permits unit on/off control and operation at a second set point
 - Set point reset based on the outside air temperature or the return water temperature or on the water heat exchanger delta T
 - Master/slave control of two units operating in parallel with operating time equalisation and automatic change-over in case of a unit fault (accessory).
 - Change-over based on the outside air temperature
- Integrated features
 - Night mode: capacity and fan speed limitation for reduced noise level
 - With hydronic module: water pressure display and water flow rate calculation
- Ease-of-use
 - The new backlit LCD interface includes a manual control potentiometer to ensure legibility under any lighting conditions.
 - The information is displayed clearly in English, French, German, Italian and Spanish (for other languages please consult Carrier)

- The Pro-Dialog+ navigation uses intuitive tree-structure menus, similar to the Internet navigators. They are user-friendly and permit quick access to the principal operating parameters: number of compressors operating, suction/discharge pressure, compressor operating hours, set point, air temperature, entering/leaving water temperature

Carrier Comfort Network (CCN) operating mode

A simple two-wire communication bus between the RS485 port of the Aquasnap and the Carrier Comfort Network offers multiple remote control, monitoring and diagnostic possibilities. Carrier offers a vast choice of control products, specially designed to control, manage and supervise the operation of an air conditioning system. Please consult your Carrier representative for more information on these products.

Remote operating mode with dry contacts (standard)

- Start/stop: opening of this contact will shut down the unit
- Dual set point: closing of this contact activates a second set point (example: unoccupied mode)
- Water pump 1 and 2 control (contacts supplied with the hydronic module option)*: these outputs control the contactors of one or two water heat exchanger water pumps
- Alarm indication: this volt-free contact indicates the presence of a major fault that has led to the shut-down of one or two refrigerant circuits
- Demand limit 1 and 2: closing of these contacts limits the maximum unit capacity to three predefined values
- User safety: this contact can be used for any customer safety loop, closing of the contact generates a specific alarm

Remote interface (accessory)

This interface allows access to the same menus as the unit interface and can be installed up to 300 m away. This accessory includes a box that can be mounted inside the building. The power supply is provided via a 220 V/24 V transformer supplied.

Variable fan speed controller



Options and accessories

Options	No.	Description	Advantages	Use
Air heat exchanger with anti-corrosion post-treatment	2B	Coils with factory-applied Blygold Polual treatment	Improved corrosion resistance, recommended for urban, industrial and rural environments	30RBSY 039-160
Air heat exchanger with pre-treated fins	3A	Fins made of pre-treated aluminium (polyurethane or epoxy)	Improved corrosion resistance, recommended for marine environments	30RBSY/RQSY 039-160
Very low noise level	15LS	Acoustic compressor enclosure and low-speed fans	Noise emission reduction at reduced fan speed	30RBSY/RQSY 039-160
Suction filter	23B	Washable G2 efficiency filter in accordance with EN 779	Prevents pollution of the air heat exchanger	30RBSY 039-080/ 30RQSY 039-078
Soft starter	25	Electronic compressor starter	Reduced compressor start-up current	30RBSY/RQSY 039-080
Frost protection down to -20°C	42	Electric heater on the hydronic module	Hydronic module frost protection at low outside temperature	30RBSY/RQSY 039-160
High-pressure single-pump hydronic module	116B	See hydronic module chapter	Easy and fast installation	30RBSY/RQSY 039-160
High-pressure dual-pump hydronic module	116C	See hydronic module chapter	Easy and fast installation, operating safety	30RBSY/RQSY 039-160
Low-pressure single-pump hydronic module	116F	See hydronic module chapter	Easy and fast installation	30RBSY/RQSY 039-160
Low-pressure dual-pump hydronic module	116G	See hydronic module chapter	Easy and fast installation, operating safety	30RBSY/RQSY 039-160
High-pressure variable-speed single-pump hydronic module	116J	See hydronic module chapter	Easy and fast installation, power consumption reduction of the water circulation pump	30RBSY/RQSY 039-160
High-pressure variable-speed dual-pump hydronic module	116K	See hydronic module chapter	Easy and fast installation, operating safety, power consumption reduction of the water circulation pump	30RBSY/RQSY 039-160
JBus gateway	148B	Two-directional communications board, complies with JBus protocol	Easy connection by communication bus to a building management system	30RBSY/RQSY 039-160
BacNet gateway	148C	Two-directional communications board, complies with BacNet protocol	Easy connection by communication bus to a building management system	30RBSY/RQSY 039-160
LonTalk gateway	148D	Two-directional communications board, complies with LonTalk protocol	Easy connection by communication bus to a building management system	30RBSY/RQSY 039-160
Water heat exchanger screw connection sleeves	264	Inlet/outlet screw connection sleeves	Permit connection of the unit to a screw connection	30RBSY/RQSY 039-160
Welded water heat exchanger connection sleeves	266	Welded inlet/outlet connection sleeves	Permit connection of the unit to a connection other than a Victaulic connection	30RBSY/RQSY 039-160
Accessories		Description	Advantages	Use
Twinning		Unit equipped with an additional field-installed leaving water temperature sensor, allowing master/slave operation of two units connected in parallel	Operation of two units connected in parallel with operating time equalisation	30RBSY/RQSY 039-160
Remote interface		Remotely installed user interface (via communication bus).	Remote unit control up to 300 m	30RBSY/RQSY 039-160
Board for additional heating stages		Boiler or supplementary electric heat control board	Used as on/off control for boilers (Aquasmart system) or as four control stages for an electric heater. To be installed separately, requires a 400 V-3 ph-50 Hz power supply.	30RQSY 039-160
Condensate collection pan		For installation under the unit and connection to a drain	Easy draining of water (maintenance and defrost)	30RBSY 039-080/ 30RQSY 039-078

Physical data, 30RBSY

30RBSY		039	045	050	060	070	080	090	100	120	140	160
Nominal cooling capacity, standard unit*												
Power input	kW	38.3	43.5	52.0	57.5	65.2	77.7	89.8	100	118	133	155
EER	kW/kW	3.10	2.92	2.85	2.94	2.79	2.75	2.93	2.90	2.84	2.81	2.78
Eurovent class, cooling		A	A	A	A	A	A	A	A	A	A	A
Part-load performance												
ESEER	kW/kW	6.99	6.23	5.27	5.49	5.40	5.35	5.01	4.84	4.94	6.08	5.86
IPLV	kW/kW	3.88	3.94	3.99	4.13	3.89	4.10	3.63	3.70	3.93	3.90	4.09
Nominal cooling capacity, standard unit**												
Power input	kW	51.4	57.9	72.8	78.9	89.4	108	121	134	158	182	216
EER	kW/kW	3.68	3.43	3.53	3.63	3.43	3.39	3.43	3.32	3.25	3.44	3.44
Operating weight***												
Standard unit without hydronic module	kg	465	473	496	525	508	542	840	849	880	987	1050
Standard unit with hydronic module												
Single high-pressure pump	kg	495	503	526	555	538	572	872	881	916	1026	1089
Dual high-pressure pump	kg	521	528	551	580	564	598	917	926	965	1063	1126
Sound levels												
Sound power level 10 ⁻¹² W****	dB(A)	87	88	88	88	90	90	90	91	91	93	93
Sound pressure level at 10 m†	dB(A)	56	56	56	56	59	59	59	59	59	61	61
Compressors												
		Hermetic scroll compressors, 48.3 r/s										
Circuit A		2	2	2	2	2	2	3	3	3	2	2
Circuit B		-	-	-	-	-	-	-	-	-	2	2
Number of capacity stages		2	2	2	2	2	2	3	3	3	4	4
Refrigerant charge												
		R-410A										
Circuit A	kg	8.5	9.0	12.5	15.0	12.5	15.5	19.0	20.0	25.0	12.5	16.0
Circuit B	kg	-	-	-	-	-	-	-	-	-	12.5	16.0
Oil charge												
		POE SZ160 (EMKARATE RL 32 3MAF)										
Circuit A	kg	5.8	7.2	7.2	7.2	7.0	7.0	10.8	10.5	10.5	7.0	7.0
Circuit B	kg	-	-	-	-	-	-	-	-	-	7.0	7.0
Capacity control												
		Pro-Dialog +										
Minimum capacity	%	50	50	50	50	50	50	33	33	33	25	25
Condensers												
		Grooved copper tubes and aluminium fins										
Fans												
		Axial Flying Bird IV with rotating shroud										
Quantity		1	1	1	1	1	1	2	2	2	2	2
Total air flow	l/s	3800	3800	3800	3800	5300	5300	7600	7600	7600	10600	10600
Speed	r/s	16	16	16	18	18	18	16	16	16	16	16
Evaporator												
		Direct expansion, plate heat exchanger										
Water volume	l	2.6	3.0	3.3	4.0	4.8	5.6	8.7	9.9	11.3	12.4	14.7
Max. water-side operating pressure without hydronic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
With hydronic module (option)												
Single or dual pump (as selected)		Pump, Victaulic screen filter, safety valve, expansion tank, purge valves (water + air), pressure sensors										
Expansion tank volume	l	12	12	12	12	12	12	35	35	35	35	35
Expansion tank pressure††	bar	1	1	1	1	1	1	1.5	1.5	1.5	1.5	1.5
Max. water-side operating pressure	kPa	400	400	400	400	400	400	400	400	400	400	400
Water connections with/without hydronic module												
		Victaulic										
Diameter	in	2	2	2	2	2	2	2	2	2	2	2
Outside diameter	mm	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3
Chassis paint colour												
		Colour code: RAL7035										

* Standard Eurovent LCP/A/P/C/AC conditions in cooling mode: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor 0 (m² K)/W

** Standard Eurovent LCP/A/P/C/CHF conditions in cooling mode: evaporator entering/leaving water temperature 23°C/18°C, outside air temperature 35°C, evaporator fouling factor 0 (m² K)/W

*** Weight shown is a guideline only. To find out the unit refrigerant charge, please refer to the unit nameplate.

**** In accordance with ISO 9614-1 and certified by Eurovent. The values have been rounded and are for information only and not contractually binding

† For information, calculated from the sound power level Lw(A)

†† When delivered, the standard pre-inflation of the tank is not necessarily the optimal value for the system. To permit changing the water volume, change the inflation pressure to a pressure that is close to the static head of the system.

Physical data, 30RQSY

30RQSY		039	045	050	060	070	078	080	090	100	120	140	160
Nominal cooling capacity, standard unit*	kW	37.5	43.8	50.1	58.0	63.1	73.0	78.1	86.1	96.5	114	130	148
Power input	kW	11.8	14.4	17.1	19.4	21.9	26.9	25.3	29.3	32.9	38.7	44.4	55.2
EER	kW/kW	3.18	3.04	2.93	2.98	2.89	2.72	3.09	2.94	2.93	2.94	2.94	2.68
Eurovent class, cooling	A	A	A	A	A	A	A	A	A	A	A	A	A
Part-load performance													
ESEER	kW/kW	7.84	6.79	6.16	5.67	5.34	4.99	7.42	5.31	5.41	6.01	5.87	5.16
IPLV	kW/kW	3.83	3.98	3.83	3.71	3.72	3.91	3.69	3.45	3.62	4.02	3.76	3.89
Nominal heating capacity, standard unit*	kW	41.6	46.4	53.1	61.3	69.5	77.4	79.2	92.2	100	116	138	158
Power input	kW	12.4	14.0	16.6	18.6	21.1	24.8	22.9	28.4	31.3	35.9	42.3	51.2
COP	kW/kW	3.36	3.31	3.20	3.30	3.30	3.12	3.46	3.24	3.20	3.23	3.26	3.08
Eurovent class, heating	A	A	A	A	A	A	A	A	A	A	A	A	A
Nominal cooling capacity, standard unit**	kW	47.0	54.9	63.8	70.7	78.2	92.2	98.0	109	119	144	162	185
Power input	kW	12.7	15.4	18.6	20.9	23.6	29.3	27.8	31.7	35.0	42.5	47.8	60.7
EER	kW/kW	3.68	3.57	3.43	3.38	3.31	3.14	3.53	3.43	3.39	3.40	3.38	3.05
Nominal heating capacity, standard unit**	kW	42.4	46.5	54.2	62.8	71.2	79.5	82.1	94.4	102	120	141	162
Power input	kW	10.3	11.3	13.5	15.1	17.4	20.8	19.2	23.2	25.8	30.1	35.0	43.0
COP	kW/kW	4.13	4.11	4.01	4.15	4.08	3.82	4.28	4.06	3.97	3.99	4.04	3.76
Operating weight***													
Standard unit without hydronic module	kg	521	528	559	573	573	580	762	930	939	994	1090	1107
Standard unit with hydronic module													
Single high-pressure pump	kg	551	558	588	602	603	610	792	961	971	1030	1129	1146
Dual high-pressure pump	kg	577	584	614	628	629	636	818	1006	1016	1078	1166	1183
Sound levels													
Sound power level 10 ⁻¹² W****	dB(A)	87	88	88	90	90	90	90	90	91	91	93	93
Sound pressure level at 10 m†	dB(A)	56	56	56	58	59	59	59	59	59	59	61	61
Compressors													
		Hermetic scroll compressors, 48.3 r/s											
Circuit A		2	2	2	2	2	2	2	3	3	3	2	2
Circuit B		-	-	-	-	-	-	-	-	-	-	2	2
Number of capacity stages		2	2	2	2	2	2	2	3	3	3	4	4
Refrigerant													
		R-410A											
Circuit A	kg	12.5	13.5	16.5	17.5	18.0	16.5	21.5	27.5	28.5	33.0	19.0	18.5
Circuit B	kg	-	-	-	-	-	-	-	-	-	-	19.0	18.5
Oil charge													
		POE SZ160 (EMKARATE RL 32 3MAF)											
Circuit A	kg	5.8	7.2	7.2	7.2	7.0	7.0	7.0	7.2	7.0	7.0	7.0	7.0
Circuit B	kg	-	-	-	-	-	-	-	-	-	-	7.0	7.0
Capacity control													
		Pro-Dialog +											
Minimum capacity	%	50	50	50	50	50	50	50	33	33	33	25	25
Air heat exchangers													
		Grooved copper tubes and aluminium fins											
Fans													
		Axial Flying Bird IV with rotating shroud											
Quantity		1	1	1	1	1	1	2	2	2	2	2	2
Total air flow	l/s	3500	3500	3500	4600	4600	4600	7000	7000	7000	7000	9200	9200
Speed	r/s	16	16	16	18	18	18	16	16	16	16	18	18
Water heat exchanger													
		Direct expansion. plate heat exchanger											
Water volume	l	2.6	3.0	4.0	4.8	4.8	5.6	8.7	8.7	9.9	11.3	12.4	14.7
Without hydronic module													
Max. water-side operating pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
With hydronic module (option)													
Single or dual pump (as selected)		Pump, Victaulic screen filter, safety valve, expansion tank, purge valves (water + air), pressure sensors											
Expansion tank volume	l	12	12	12	12	12	12	35	35	35	35	35	35
Expansion tank pressure††	bar	1	1	1	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5
Max. water-side operating pressure	kPa	400	400	400	400	400	400	400	400	400	400	400	400
Water connections with/without hydronic module													
		Victaulic											
Diameter	in	2	2	2	2	2	2	2	2	2	2	2	2
Outside diameter	mm	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3
Chassis paint colour													
		Colour code: RAL 7035											

* Standard Eurovent LCP/A/P/C/AC conditions in cooling mode: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor 0 (m² K)/W. Standard Eurovent LCP/A/P/C/AC conditions in heating mode: water heat exchanger entering/leaving water temperature 40°C/45°C, outside air dry bulb/wet bulb temperature 7°C/6°C, water heat exchanger fouling factor 0 (m² K)/W

** Standard Eurovent LCP/A/P/C/CHF conditions in cooling mode: evaporator entering/leaving water temperature 23°C/18°C, outside air temperature 35°C, evaporator fouling factor 0 (m² K)/W. Standard Eurovent LCP/A/P/C/CHF conditions in heating mode: water heat exchanger entering/leaving water temperature 30°C/35°C, outside air dry bulb/wet bulb temperature 7°C/6°C, water heat exchanger fouling factor 0 (m² K)/W

*** Weight shown is a guideline only. To find out the unit refrigerant charge, please refer to the unit nameplate.

**** In accordance with ISO 9614-1 and certified by Eurovent. The values have been rounded and are for information only and not contractually binding

† For information, calculated from the sound power level Lw(A)

†† When delivered, the standard pre-inflation of the tank is not necessarily the optimal value for the system. To permit changing the water volume, change the inflation pressure to a pressure that is close to the static head of the system.

Sound spectrum, 30RBSY/30RQSY

30RBSY radiated – standard units									
		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	87.7	88.4	85.7	82.5	76.9	71.1	dB(A)	87
045	dB	87.7	88.4	85.8	82.7	77.3	71.2	dB(A)	88
050	dB	87.7	88.4	85.8	82.7	77.1	71.4	dB(A)	88
060	dB	87.7	88.4	85.8	82.7	77.7	72.0	dB(A)	88
070	dB	90.8	91.5	88.8	85.6	80.0	75.2	dB(A)	90
080	dB	90.8	91.5	88.9	85.6	80.3	74.0	dB(A)	90
090	dB	90.7	91.4	88.8	85.6	80.3	74.4	dB(A)	90
100	dB	90.7	91.4	88.8	85.6	80.4	76.3	dB(A)	91
120	dB	90.7	91.4	88.8	85.7	80.7	74.8	dB(A)	91
140	dB	93.8	94.5	91.9	88.6	83.0	78.3	dB(A)	93
160	dB	93.8	94.5	91.9	88.6	83.3	77.0	dB(A)	93

30RBSY supply air (duct) - standard units									
		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	66.9	73.2	68.4	63.8	57.5	52.0	dB(A)	70
045	dB	66.9	73.2	68.4	63.8	57.5	52.0	dB(A)	70
050	dB	66.9	73.2	68.4	63.8	57.5	52.0	dB(A)	70
060	dB	66.9	73.2	68.4	63.8	57.5	52.0	dB(A)	70
070	dB	70.0	76.3	71.5	66.9	60.6	55.1	dB(A)	73
080	dB	70.0	76.3	71.5	66.9	60.6	55.1	dB(A)	73
090	dB	70.0	76.2	71.4	66.8	60.6	55.0	dB(A)	73
100	dB	70.0	76.2	71.4	66.8	60.6	55.0	dB(A)	73
120	dB	70.0	76.2	71.4	66.8	60.6	55.0	dB(A)	73
140	dB	73.0	79.3	74.5	69.9	63.6	58.1	dB(A)	76
160	dB	73.0	79.3	74.5	69.9	63.6	58.1	dB(A)	76

30RBSY - suction air (duct) - standard units									
		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	82.5	81.4	81.5	77.8	69.0	59.3	dB(A)	82
045	dB	82.5	81.4	81.5	77.8	69.0	59.3	dB(A)	82
050	dB	82.5	81.4	81.5	77.8	69.0	59.3	dB(A)	82
060	dB	83.4	82.6	82.8	78.7	70.3	62.1	dB(A)	83
070	dB	81.7	80.7	80.8	77.1	68.2	58.6	dB(A)	81
080	dB	81.7	80.7	80.8	77.1	68.2	58.6	dB(A)	81

30RQSY radiated – standard units									
		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	87.7	88.4	85.7	82.5	76.9	71.1	dB(A)	87
045	dB	87.7	88.4	85.8	82.7	77.3	71.2	dB(A)	88
050	dB	87.7	88.4	85.8	82.7	77.1	71.4	dB(A)	88
060	dB	90.8	91.5	88.8	85.6	80.0	73.7	dB(A)	90
070	dB	90.8	91.5	88.8	85.6	80.0	75.2	dB(A)	90
078	dB	90.8	91.5	88.9	85.6	80.3	74.0	dB(A)	90
080	dB	90.7	91.4	88.8	85.5	80.2	74.0	dB(A)	90
090	dB	90.7	91.4	88.8	85.6	80.3	74.4	dB(A)	90
100	dB	90.7	91.4	88.8	85.6	80.4	76.3	dB(A)	91
120	dB	90.7	91.4	88.8	85.7	80.7	74.8	dB(A)	91
140	dB	93.8	94.5	91.9	88.6	83.0	78.3	dB(A)	93
160	dB	93.8	94.5	91.9	88.6	83.3	77.0	dB(A)	93

30RQSY supply air (duct) - standard units									
		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	66.9	73.2	68.4	63.8	57.5	52.0	dB(A)	70
045	dB	66.9	73.2	68.4	63.8	57.5	52.0	dB(A)	70
050	dB	66.9	73.2	68.4	63.8	57.5	52.0	dB(A)	70
060	dB	66.9	73.2	68.4	63.8	57.5	52.0	dB(A)	69
070	dB	70.0	76.3	71.5	66.9	60.6	55.1	dB(A)	73
078	dB	70.0	76.3	71.5	66.9	60.6	55.1	dB(A)	73
080	dB	70.0	76.2	71.4	66.8	60.6	55.0	dB(A)	73
090	dB	70.0	76.2	71.4	66.8	60.6	55.0	dB(A)	73
100	dB	70.0	76.2	71.4	66.8	60.6	55.0	dB(A)	73
120	dB	73.0	79.3	74.5	69.9	63.6	58.1	dB(A)	76
140	dB	73.0	79.3	74.5	69.9	63.6	58.1	dB(A)	76
160	dB	73.0	79.3	74.5	69.9	63.6	58.1	dB(A)	76

30RQSY - suction air (duct) - standard units									
		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	82.5	81.4	81.5	77.8	69.0	59.3	dB(A)	82
045	dB	82.5	81.4	81.5	77.8	69.0	59.3	dB(A)	82
050	dB	83.4	82.6	82.8	78.7	70.3	62.1	dB(A)	83
060	dB	82.7	81.8	82.0	77.9	69.6	61.3	dB(A)	83
070	dB	82.7	81.8	82.0	77.9	69.6	61.3	dB(A)	83
078	dB	82.7	81.8	82.0	77.9	69.6	61.3	dB(A)	83

Electrical data and operating conditions notes:

- 30RBSY/RQSY 039-160 units have a single power connection point located immediately upstream of the main disconnect switch.
- The control box includes the following standard features:
 - a main circuit breaker / disconnect switch,
 - starter and motor protection devices for each compressor, the fans and the pump,
 - the control devices.
- Field connections:
 - All connections to the system and the electrical installations must be in full accordance with all applicable local codes.
- The Carrier 30RBSY/RQSY units are designed and built to ensure conformance with these codes. The recommendations of European standard EN 60204-1 (machine safety - electrical machine components - part 1: general regulations - corresponds to IEC 60204-1) are specifically taken into account, when designing the electrical equipment.

NOTES:

- Generally the recommendations of IEC 60364 are accepted as compliance with the requirements of the installation directives. Conformance with EN 60204-1 is the best means of ensuring compliance with the Machines Directive § 1.5.1.
- Annex B of EN 60204-1 describes the electrical characteristics used for the operation of the machines.

- The operating environment for the 30RBSY/RQSY units is specified below:
 1. Environment* - Environment as classified in EN 60721 (corresponds to IEC 60721):
 - outdoor installation*
 - ambient temperature range: -20°C to +48°C, class 4K4H
 - altitude: ≤ 2000 m
 - presence of hard solids, class 4S2 (no significant dust present)
 - presence of corrosive and polluting substances, class 4C2 (negligible)
 2. Power supply frequency variation: ± 2 Hz.
 3. The neutral (N) conductor must not be connected directly to the unit (if necessary use a transformer).
 4. Overcurrent protection of the power supply conductors is not provided with the unit.
 5. The factory-installed disconnect switch is of a type suitable for power interruption in accordance with EN 60947.
 6. The units are designed for connection to TN(S) networks (IEC 60364). For IT networks the earth connection must not be at the network earth. Provide a local earth, consult competent local organisations to complete the electrical installation.

Caution: If particular aspects of an actual installation do not conform to the conditions described above, or if there are other conditions which should be considered, always contact your local Carrier representative.

* The required protection level for this class is IP43BW (according to reference document IEC 60529). All 30RBSY/RQSY units are protected to IP44CW and fulfil this protection condition.

Electrical data, 30RBSY

30RBSY without hydronic module		039	045	050	060	070	080	090	100	120	140	160
Power circuit												
Nominal power supply	V-ph-Hz	400-3-50										
Voltage range	V	360-440										
Control circuit supply												
24 V via internal transformer												
Maximum start-up current (Un)*												
Standard unit	A	114.9	133.4	143.4	145.4	169.9	208.4	172.8	199.8	242.8	224.3	271.8
Unit with electronic starter option	A	76.9	89.4	96.4	98.4	113.9	138.4	-	-	-	-	-
Unit power factor at maximum capacity**												
0.82 0.82 0.84 0.85 0.85 0.84 0.85 0.85 0.85 0.84 0.85 0.84												
Maximum operating power input**												
kW 21.2 24.0 26.2 29.6 31.8 36.4 45.7 49.0 55.9 63.6 72.8												
Nominal unit operating current draw***												
A 30.4 33.4 37.4 42.4 45.4 57.4 66.3 70.8 88.8 90.8 114.8												
Maximum operating current draw (Un)****												
A 34.4 39.4 45.4 49.4 54.4 65.4 76.8 84.3 100.8 108.8 130.8												
Maximum operating current draw (Un-10%)†												
A 37.4 42.8 49.4 53.8 59.4 71.4 83.4 91.8 109.8 118.8 142.8												
Customer-side unit power reserve												
Customer reserve at the 24 V control power circuit												
Short-circuit stability and protection												
See table "Short-circuit stability current" below												

* Maximum instantaneous start-up current at operating limit values (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).
 ** Power input, compressors and fans, at the unit operating limits (saturated suction temperature 10°C, saturated condensing temperature 65°C) and nominal voltage of 400 V (data given on the unit nameplate).
 *** Standardised Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
 **** Maximum unit operating current at maximum unit power input and 400 V (values given on the unit nameplate).
 † Maximum unit operating current at maximum unit power input and 360 V.

Short-circuit stability current (TN system*) - standard unit (with main disconnect without fuse)

30RBSY	039	045	050	060	070	080	090	100	120	140	160
Value with unspecified upstream protection											
Short-term current at 1s - I _{cw} - kA rms	3.36	3.36	3.36	3.36	3.36	3.36	5.62	5.62	5.62	5.62	5.62
Admissible peak current - I _{pk} - kA pk	20	20	20	20	20	15	20	20	15	20	15
Max. value with upstream protection by circuit breaker											
Conditional short-circuit current I _{cc} - kA rms	40	40	40	40	40	40	40	40	40	30	30
Schneider circuit breaker - Compact series	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS160H	NS160H	NS250H
Reference No.**	29670	29670	29670	29670	29670	29670	29670	29670	30670	30670	31671

* Earthing system type
 ** If another current limitation protection system is used, its time-current and thermal constraint (I²t) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker. Contact your nearest Carrier office.
 The short-circuit stability current values above are in accordance with the TN system.

Electrical data, 30RQSY

30RQSY without hydronic module		039	045	050	060	070	078	080	090	100	120	140	160
Power circuit													
Nominal power supply	V-ph-Hz	400-3-50											
Voltage range	V	360-440											
Control circuit supply													
24 V via internal transformer													
Maximum start-up current (Un)*													
Standard unit	A	115.8	134.3	144.3	146.3	170.8	210.3	216.6	174.6	201.6	246.6	226.1	276.6
Unit with electronic starter option	A	77.8	90.2	97.3	99.3	114.8	140.3	146.6					
Unit power factor at maximum capacity**													
0.82 0.82 0.84 0.85 0.85 0.84 0.84 0.84 0.85 0.85 0.84 0.85 0.84													
Maximum operating power input**													
kW 21.4 24.2 26.4 29.8 32.0 36.6 39.4 46.1 49.4 56.3 64.0 73.2													
Nominal unit operating current draw***													
A 31.3 34.3 38.3 43.3 46.3 58.3 64.6 68.1 72.6 90.6 92.6 116.6													
Maximum operating current draw (Un)****													
A 35.3 40.3 46.3 50.3 55.3 66.3 72.6 78.6 86.1 102.6 110.6 132.6													
Maximum operating current draw (Un-10%)†													
A 38.3 43.7 50.3 54.7 60.3 72.3 78.6 85.2 93.6 111.6 120.6 145.0													
Customer-side unit power reserve													
Customer reserve at the 24 V control power circuit													
Short-circuit stability and protection													
See table "Short-circuit stability current" below													

* Maximum instantaneous start-up current at operating limit values (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).
 ** Power input, compressors and fans, at the unit operating limits (saturated suction temperature 10°C, saturated condensing temperature 65°C) and nominal voltage of 400 V (data given on the unit nameplate).
 *** Standardised Eurovent conditions: water heat exchanger entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
 **** Maximum unit operating current at maximum unit power input and 400 V (values given on the unit nameplate).
 † Maximum unit operating current at maximum unit power input and 360 V.

Short-circuit stability current (TN system*) - standard unit (main disconnect without fuse)

30RQSY	039	045	050	060	070	078	080	090	100	120	140	160
Value with unspecified upstream protection												
Short-term current at 1s - I _{cw} - kA rms	3.36	3.36	3.36	3.36	3.36	3.36	3.36	5.62	5.62	5.62	5.62	5.62
Admissible peak current - I _{pk} - kA pk	20	20	20	20	20	15	15	20	20	15	20	15
Max. value with upstream protection by circuit breaker												
Conditional short-circuit current I _{cc} - kA rms	40	40	40	40	40	40	40	40	40	40	30	30
Schneider circuit breaker - Compact series	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS160H	NS160H	NS250H
Reference No.**	29670	29670	29670	29670	29670	29670	29670	29670	29670	30670	30670	31671

* Earthing system type
 ** If another current limitation protection system is used, its time-current and thermal constraint (I²t) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker. Contact your nearest Carrier office.
 The short-circuit stability current values above are in accordance with the TN system.

Operating limits, 30RBSY

Evaporator water flow rate

30RBSY	Flow rate, l/s		Maximum dual pump**	
	Minimum	Maximum*	Low pressure***	High pressure***
039	0.9	3.0	2.9	3.4
045	0.9	3.4	3.2	3.8
050	0.9	3.7	3.3	4.0
060	0.9	4.2	3.7	4.4
070	1.0	5.0	4.1	5.0
080	1.2	5.5	4.4	5.2
090	1.3	6.8	5.1	6.2
100	1.5	7.7	6.3	6.5
120	1.7	8.5	6.5	8.0
140	2.0	10.6	7.9	8.7
160	2.3	11.2	8.2	8.9

* Maximum flow rate at a pressure drop of 100 kPa in the plate heat exchanger (unit without hydronic module).

** Maximum flow rate at an available pressure of 20 kPa (unit with low-pressure hydronic module) or 50 kPa (high-pressure module).

*** Maximum flow rate with single pump is 2 to 4% higher, depending on the size.

Operating range

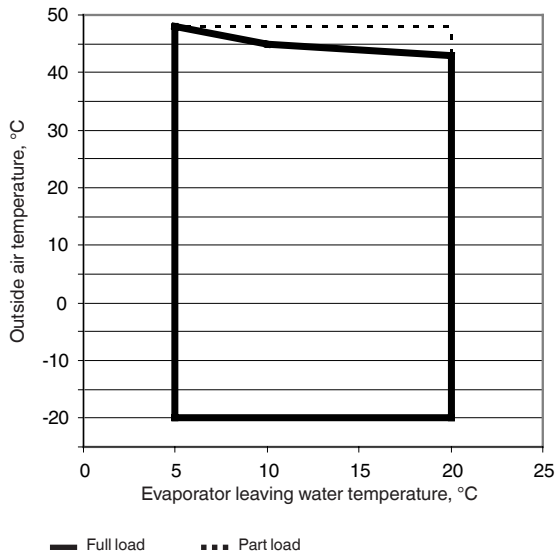
30RBSY		Minimum	Maximum
Evaporator			
Entering water temperature at start-up	°C	7.5*	30
Leaving water temperature during operation	°C	5**	20
Entering/leaving water temperature difference	K	3	10
Condenser			
Entering air temperature***	°C	-20	48

Note: Do not exceed the maximum operating temperature.

* For entering water temperatures below 7.5°C at start-up, contact Carrier.

** For low-temperature applications, where the leaving water temperature is below 5°C, a frost protection solution must be used. Please refer to option 6 for applications with a low evaporator leaving water temperature (< 5°C).

*** Ambient temperature: Please refer to option 42 for low air temperature applications (< -10°C). For transport and storage of the 30RBSY units the minimum and maximum allowable temperatures are -20°C and +48°C. It is recommended that these temperatures are used for transport by container.



Note: This operating range applies up to 130 Pa static pressure without suction air duct for sizes 070-080 and 140-160, and up to 240 Pa for all other sizes.

Operating limits, 30RQSY

Water heat exchanger water flow rate

30RQSY	Flow rate, l/s			
	Minimum	Maximum*	Maximum dual pump**	
			Low pressure***	High pressure***
039	0.9	3.0	2.9	3.4
045	0.9	3.4	3.2	3.8
050	0.9	4.2	3.7	4.4
060	0.9	5.0	4.1	5.0
070	1.0	5.0	4.1	5.0
078	1.2	5.5	4.4	5.2
080	1.2	6.8	5.1	6.2
090	1.3	6.8	5.1	6.2
100	1.5	7.7	6.3	6.5
120	1.7	8.5	6.5	8.0
140	2.0	10.6	7.9	8.7
160	2.3	11.2	8.2	8.9

* Maximum flow rate at a pressure drop of 100 kPa in the plate heat exchanger (unit without hydronic module).
 ** Maximum flow rate at an available pressure of 20 kPa (unit with low-pressure hydronic module) or 50 kPa (high-pressure module).
 *** Maximum flow rate with single pump is 2 to 4% higher, depending on the size.

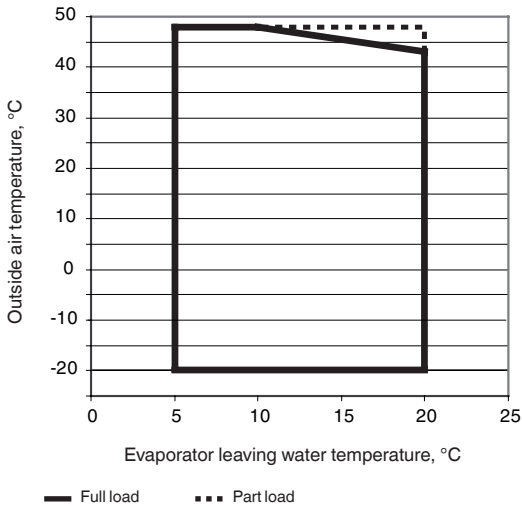
Operating range, standard unit, cooling mode

30RQSY	Minimum	Maximum
Evaporator		
Entering water temperature at start-up	°C 7.5*	30
Leaving water temperature during operation	°C 5**	20
Entering/leaving water temperature difference	K 3	10
Condenser		
Entering air temperature***	°C -20	48

Note: Do not exceed the maximum operating temperature.

* For entering water temperatures below 7.5°C at start-up, contact Carrier.
 ** For low-temperature applications, where the leaving water temperature is below 5°C, a frost protection solution must be used. Please refer to option 6 for applications with a low evaporator leaving water temperature (< 5°C).
 *** Ambient temperature: Please refer to option 42 for low air temperature applications (< -10°C). For transport and storage of the 30RQSY units the minimum and maximum allowable temperatures are -20°C and +48°C. It is recommended that these temperatures are used for transport by container.

30RQSY (cooling mode)



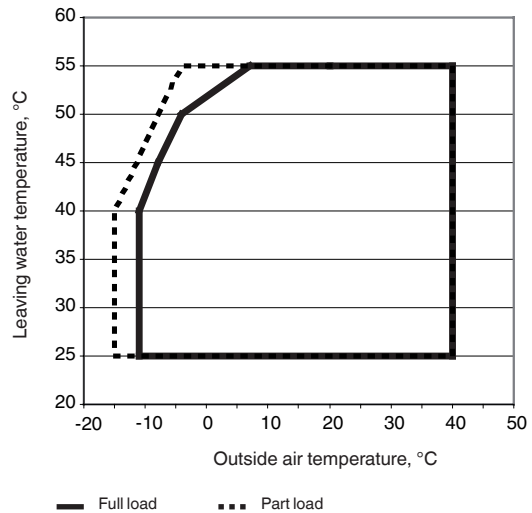
Note: This operating range applies up to 130 Pa static pressure without suction air duct for sizes 060, 070 and 078 and up to 240 Pa for all other sizes.

Operating range, standard unit, heating mode

30RQSY	Minimum	Maximum
Condenser		
Entering water temperature at start-up	°C 8	45
Leaving water temperature during operation	°C 25	55
Entering/leaving water temperature difference	K 3	10
Evaporator		
Air temperature	°C -15	40

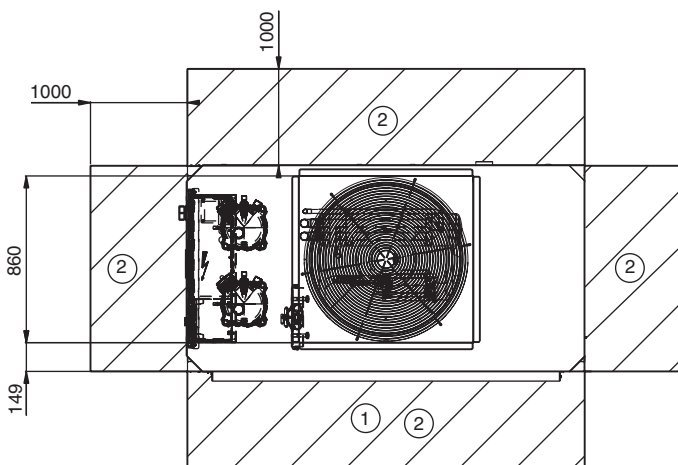
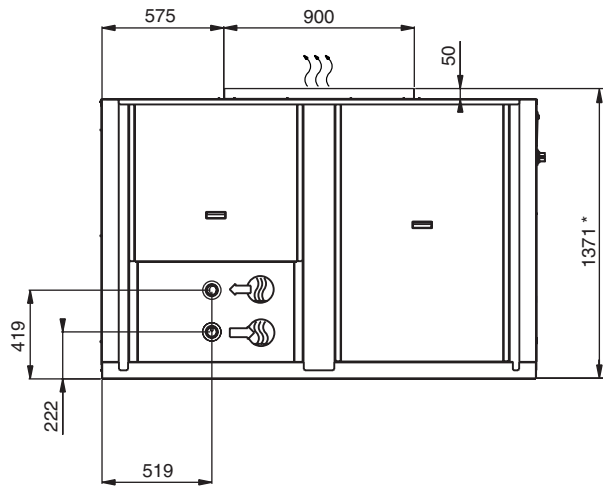
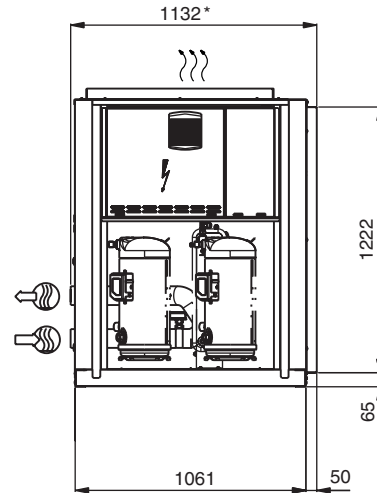
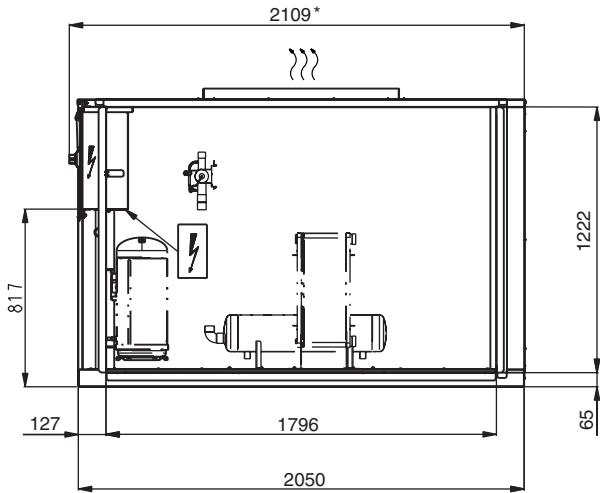
Note: Do not exceed the maximum operating temperature.

30RQSY (heating mode)








Dimensions/clearances, 30RBSY/30RQSY

30RBSY 039-050 and 070 and 30RQSY 039-045, units with and without hydronic module, without filter frame



Legend:

All dimensions are given in mm

-  Control box
-  Water inlet
-  Water outlet
- ① Required clearances for air entry
- ② Recommended space for maintenance
-  Air outlet, do not obstruct
-  Power supply inlet

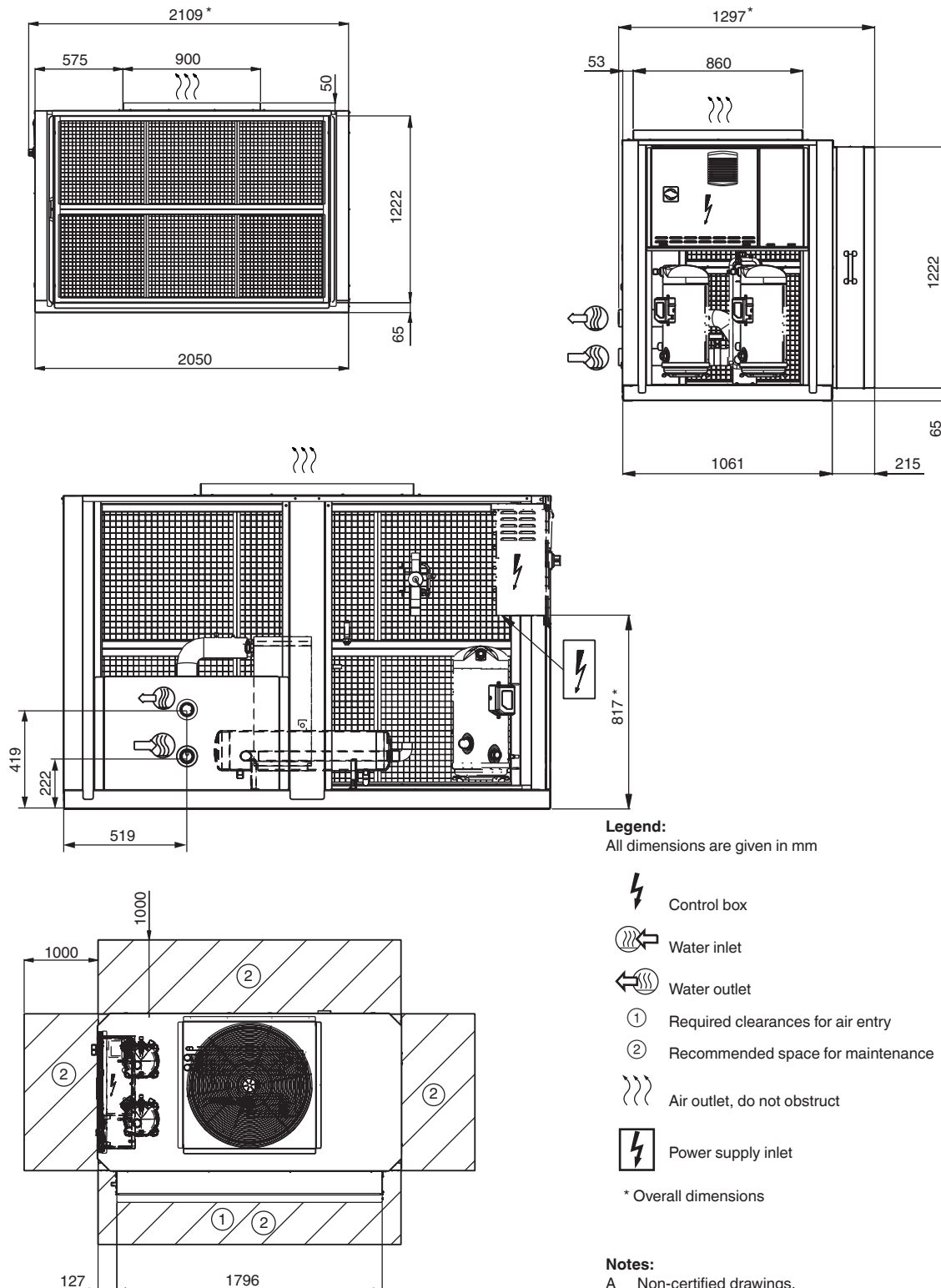
* Overall dimensions

Notes:

- A Non-certified drawings. Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both axes).
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 039-050 and 070 and 30RQSY 039-045, option 23B, units with and without hydronic module, with filter frame

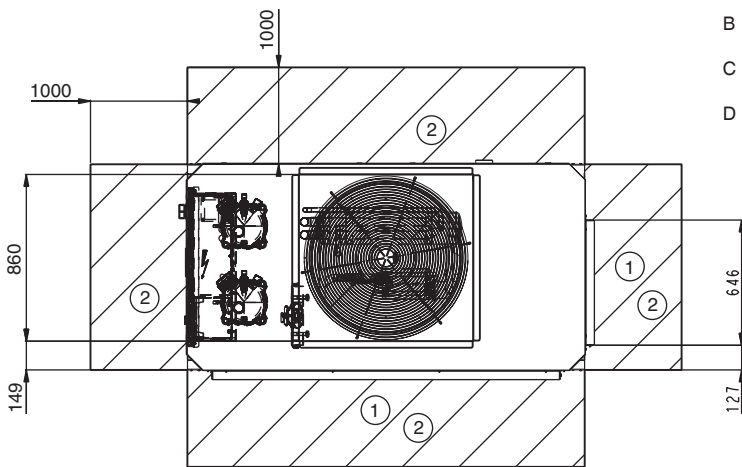
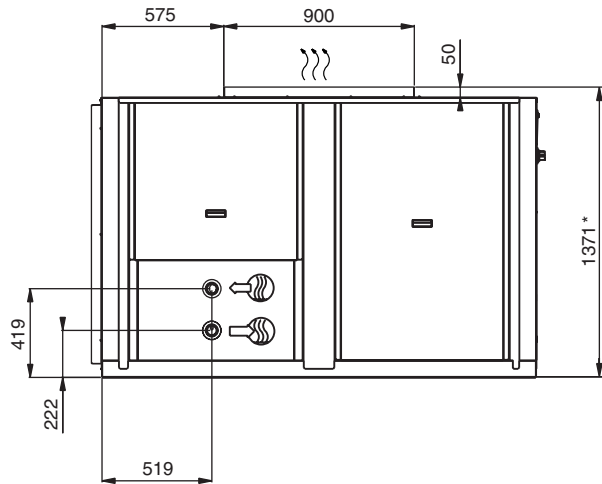
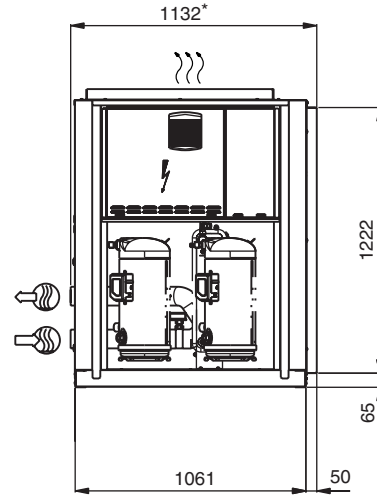
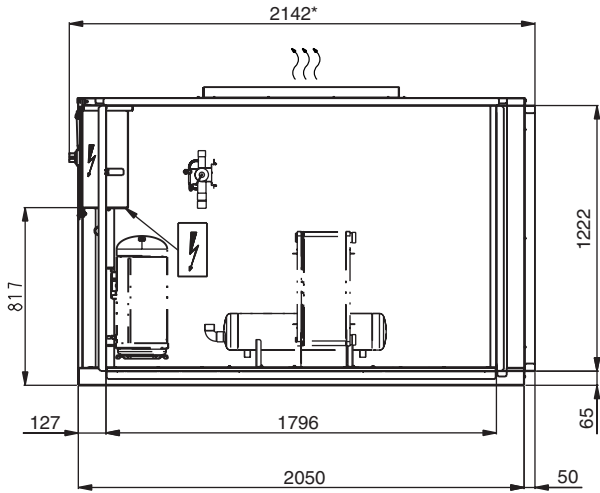


Notes:

- A Non-certified drawings. Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both axes).
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 060-080 and 30RQSY 050-078, units with and without hydronic module, without filter frame



Legend:

All dimensions are given in mm

- Control box
- Water inlet
- Water outlet
- ① Required clearances for air entry
- ② Recommended space for maintenance
- Air outlet, do not obstruct
- Power supply inlet

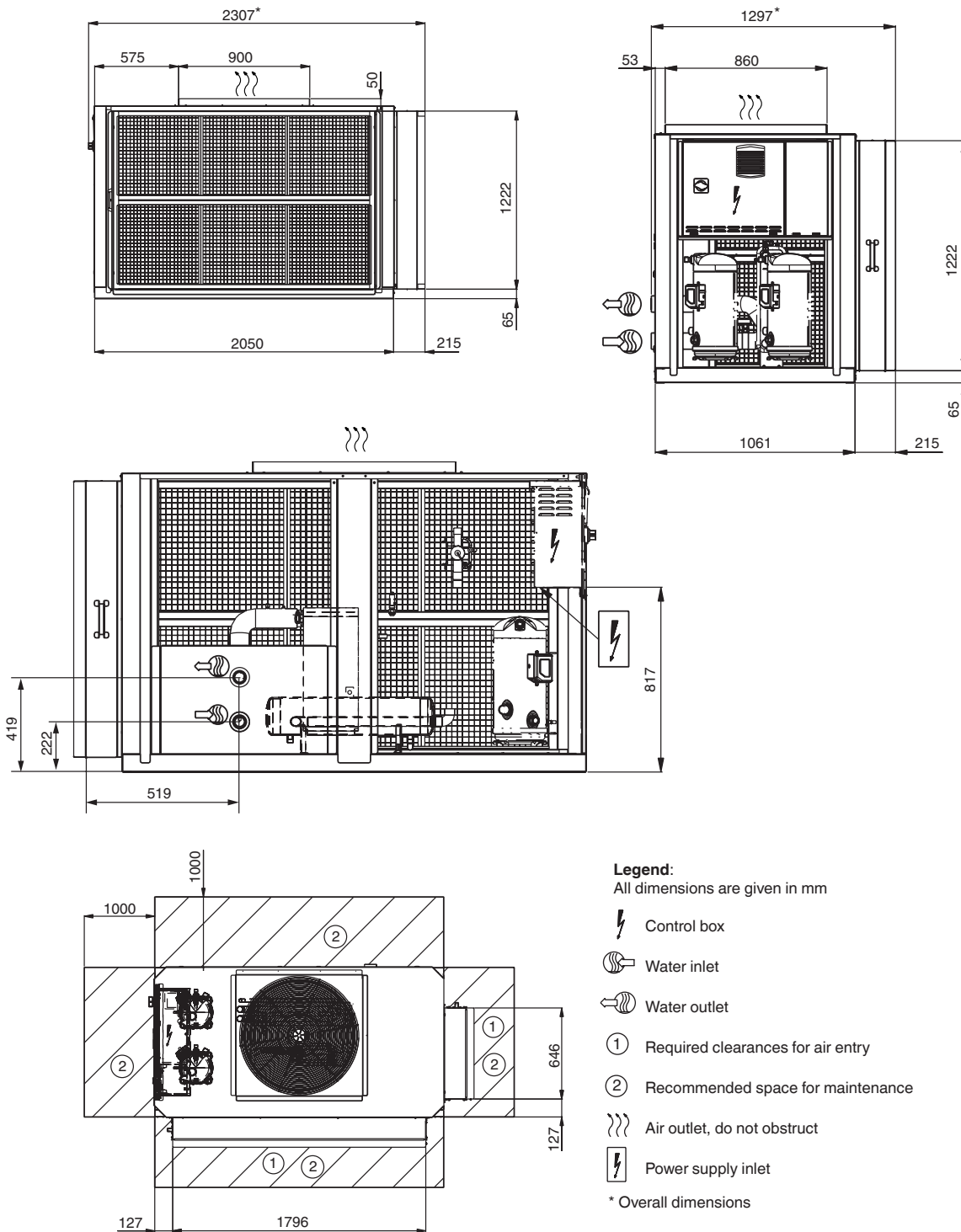
* Overall dimensions

Notes:

- A Non-certified drawings.
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both axes).
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 060-080 and 30RQSY 050-078, option 23B, units with and without hydronic module, with filter frame

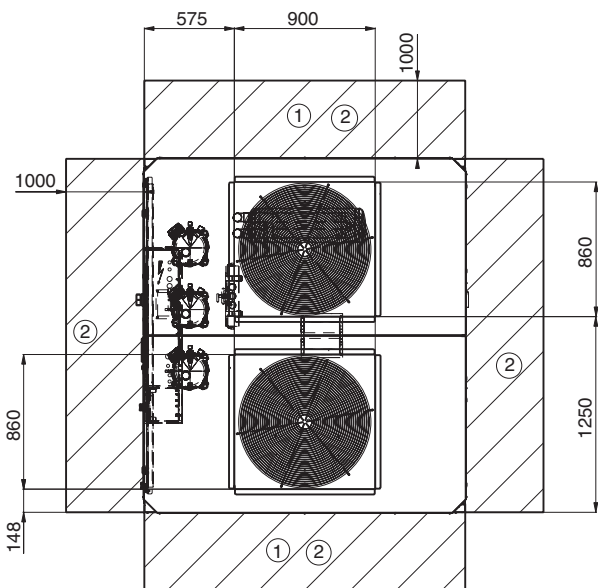
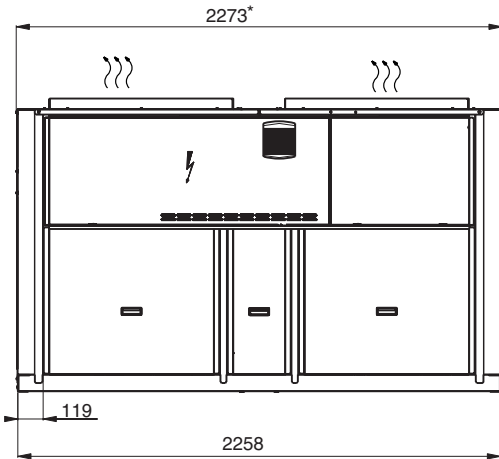
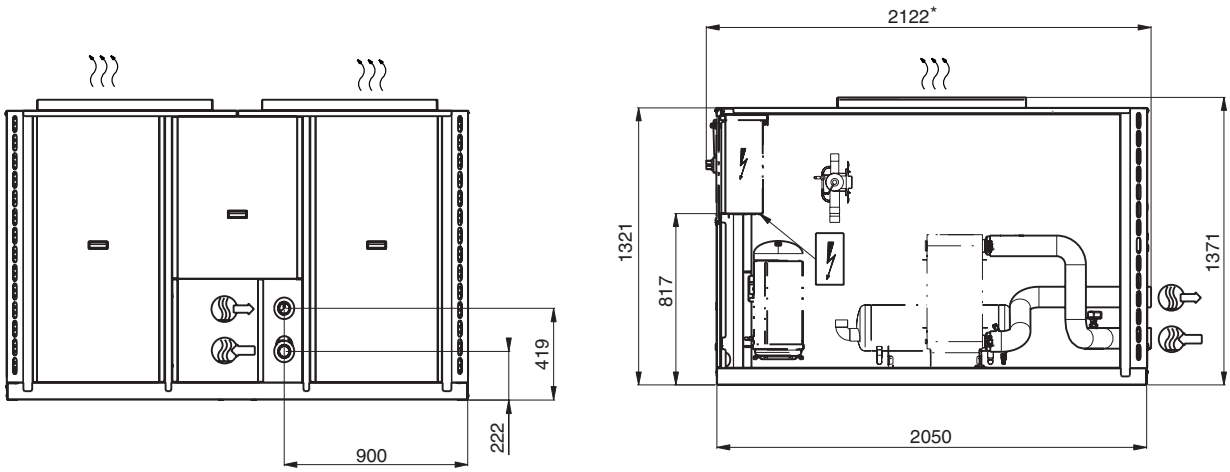


Notes:

- A Non-certified drawings. Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both axes).
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 090-120 and 30RQSY 080-120, units with and without hydronic module



Legend:

All dimensions are given in mm

Control box

Water inlet

Water outlet

① Required clearances for air entry

② Recommended space for maintenance

))) Air outlet, do not obstruct

Power supply inlet

* Overall dimensions

Notes:

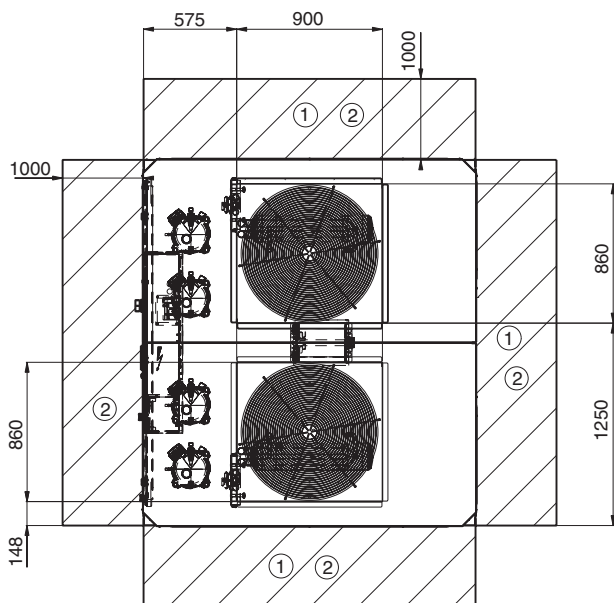
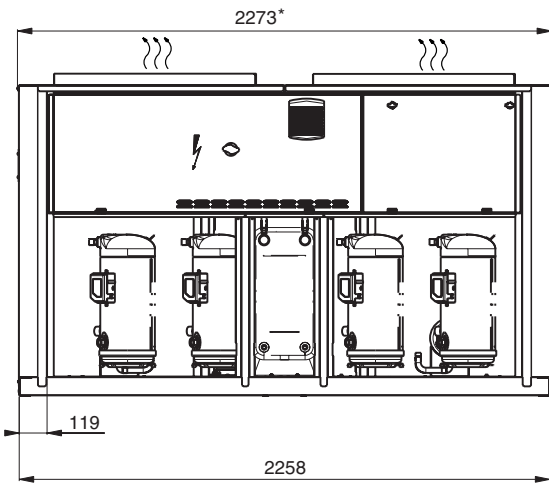
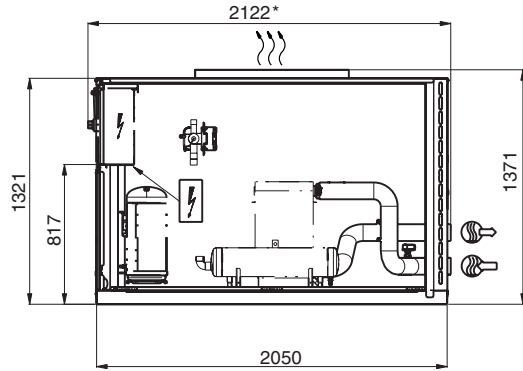
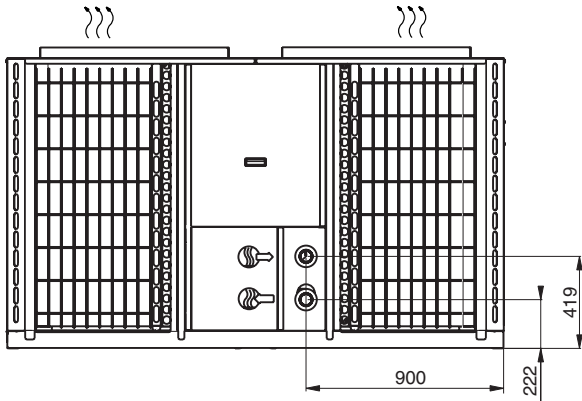
A Non-certified drawings.

Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

B The unit must be installed level (less than 2 mm per metre deviation in both axes).

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 140-160 and 30RQSY 140-160, units with and without hydronic module



Legend:
All dimensions are given in mm

- Control box
 - Water inlet
 - Water outlet
 - ① Required clearances for air entry
 - ② Recommended space for maintenance
 -))) Air outlet, do not obstruct
 - Power supply inlet
- * Overall dimensions

Notes:

- A Non-certified drawings. Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- B The unit must be installed level (less than 2 mm per metre deviation in both axes).

Part load performances

With the rapid increase in energy costs and the care about environmental impacts of electricity production, the power consumption of air conditioning equipment has become an important topic. The energy efficiency of a unit at full load is rarely representative of the actual performance of the units, as on average a unit works less than 5% of the time at full load.

The heat load of a building depends on many factors, such as the outside air temperature, the exposure to the sun and its occupation.

Consequently it is preferable to use the seasonal energy efficiency, calculated at several operating points that are representative for the unit utilisation.

Part load performances in accordance with Eurovent, 30RBSY 039-160

30RBSY	LOAD %	CAP kW	UNIT kW	EER kW/kW	ESEER kW/kW
039	100	38.3	12.4	3.10	6.99
	75	28.7	7.11	4.04	
	50	19.2	3.36	5.70	
	25	9.58	0.68	14.04	
045	100	43.5	14.9	2.92	6.23
	75	32.6	8.34	3.91	
	50	21.7	3.93	5.53	
	25	10.9	0.97	11.26	
050	100	52.0	18.2	2.85	5.27
	75	39.0	10.3	3.77	
	50	26.0	5.10	5.10	
	25	13.0	1.62	8.05	
060	100	57.5	19.5	2.94	5.49
	75	43.1	10.9	3.94	
	50	28.7	5.41	5.31	
	25	14.4	1.72	8.36	
070	100	65.2	23.3	2.79	5.40
	75	48.9	12.8	3.82	
	50	32.6	6.24	5.22	
	25	16.3	1.96	8.32	
080	100	77.7	28.3	2.75	5.35
	75	58.3	15.8	3.69	
	50	38.9	7.48	5.19	
	25	19.4	2.32	8.36	
090	100	89.8	30.6	2.93	5.01
	75	67.3	16.6	4.06	
	50	44.9	9.5	4.73	
	25	22.4	3.15	7.13	
100	100	100.4	34.7	2.90	4.84
	75	75.3	18.1	4.16	
	50	50.2	10.7	4.70	
	25	25.1	3.96	6.34	
120	100	118	41.4	2.84	4.94
	75	88.3	21.8	4.05	
	50	58.8	12.4	4.76	
	25	29.4	4.31	6.83	
140	100	133	47.2	2.81	6.08
	75	100	25.9	3.85	
	50	66.3	12.2	5.42	
	25	33.2	3.05	10.87	
160	100	155	55.8	2.78	5.86
	75	116	30.9	3.76	
	50	77.6	14.6	5.32	
	25	38.8	3.79	10.24	

Legend

Load % - Unit heat load
 Cap kW - Cooling capacity
 Unit kW - Unit power input
 EER - Cooling capacity kW/unit power input kW

ESEER (EUROVENT)

The ESEER (European seasonal energy efficiency ratio) permits evaluation of the average energy efficiency at part load, based on four operating conditions defined by Eurovent. The ESEER is the average value of energy efficiency ratios (EER) at different operating conditions, weighted by the operating time.

ESEER (European seasonal energy efficiency ratio)

Load %	Air temperature °C	Energy efficiency	Operating time, %
100	35	EER ₁	3
75	30	EER ₂	33
50	25	EER ₃	41
25	20	EER ₄	23

$$ESEER = EER_1 \times 3\% + EER_2 \times 33\% + EER_3 \times 41\% + EER_4 \times 23\%$$

Note: Constant leaving water temperature = 7°C.

Part load performances in accordance with Eurovent, 30RQSY 039-160

30RQSY	LOAD %	CAP kW	UNIT kW	EER kW/kW	ESEER kW/kW
039	100	37.5	12.0	3.12	6.52
	75	28.1	7.04	3.99	
	50	18.7	3.41	5.49	
	25	9.37	0.75	12.42	
045	100	43.8	14.6	2.99	6.02
	75	32.8	8.36	3.93	
	50	21.9	4.01	5.46	
	25	10.9	1.05	10.43	
050	100	50.1	17.4	2.88	5.45
	75	37.6	10.0	3.75	
	50	25.1	4.85	5.16	
	25	12.5	1.43	8.76	
060	100	58.0	19.4	2.99	5.79
	75	43.5	11.3	3.86	
	50	29.0	5.54	5.23	
	25	14.5	1.46	9.92	
070	100	63.1	22.0	2.88	5.21
	75	47.3	12.6	3.76	
	50	31.6	6.29	5.02	
	25	15.8	1.99	7.92	
078	100	73.0	26.8	2.72	5.05
	75	54.8	15.2	3.60	
	50	36.5	7.47	4.89	
	25	18.3	2.37	7.71	
080	100	78.1	25.9	3.02	6.01
	75	58.5	15.2	3.86	
	50	39.0	7.5	5.22	
	25	19.5	1.79	10.90	
090	100	86.1	29.8	2.89	4.90
	75	64.6	16.8	3.85	
	50	43.1	9.4	4.58	
	25	21.5	2.97	7.24	
100	100	96.5	33.3	2.90	5.04
	75	72.3	18.1	3.99	
	50	48.2	10.1	4.79	
	25	24.1	3.32	7.26	
120	100	114	39.3	2.90	5.43
	75	85.4	21.2	4.03	
	50	57.0	11.3	5.03	
	25	28.5	3.36	8.47	
140	100	130	44.5	2.93	5.77
	75	98	25.8	3.79	
	50	65.2	12.7	5.14	
	25	32.6	3.24	10.08	
160	100	148	54.6	2.71	5.58
	75	111	30.8	3.61	
	50	74.0	14.6	5.07	
	25	37.0	3.82	9.70	

Cooling capacities, 30RBSY at 160 Pa available pressure

30RBSY 039-160

LWT °C	Condenser entering air temperature, °C																									
	25				30				35				40				45									
	CAP kW	COMP kW	UNIT kW	COOL l/s	COOL kPa	CAP kW	COMP kW	UNIT kW	COOL l/s	COOL kPa	CAP kW	COMP kW	UNIT kW	COOL l/s	COOL kPa	CAP kW	COMP kW	UNIT kW	COOL l/s	COOL kPa	CAP kW	COMP kW	UNIT kW	COOL l/s	COOL kPa	
039	5	39.5	10.2	12.2	1.88	46.0	37.9	11.1	13.1	1.81	42.2	36.2	12.2	14.2	1.72	38.2	33.9	13.4	15.4	1.62	33.5	31.4	15.0	16.9	1.50	28.5
045		45.0	11.8	13.9	2.14	56.7	43.3	13.2	15.2	2.06	53.1	40.9	14.6	16.7	1.95	47.9	37.7	16.1	18.1	1.79	41.5	34.2	17.7	19.7	1.63	35.1
050		54.5	14.4	16.6	2.59	68.8	51.9	15.8	18.1	2.47	62.7	48.6	17.4	19.6	2.32	55.7	45.0	19.4	21.5	2.14	48.2	40.8	21.5	23.7	1.94	40.2
060		60.1	15.7	17.7	2.86	69.3	57.4	17.5	19.5	2.73	63.7	53.5	19.4	21.3	2.55	55.9	49.1	21.4	23.4	2.34	47.8	44.3	23.8	25.7	2.11	39.6
070		69.9	18.9	21.8	3.33	70.8	66.1	20.6	23.5	3.15	63.9	61.7	22.5	25.3	2.94	56.3	57.0	24.6	27.4	2.71	48.4	51.6	26.8	29.6	2.46	40.2
080		82.3	23.3	26.2	3.92	77.7	77.8	25.2	28.1	3.71	69.4	72.9	27.3	30.2	3.47	60.8	67.7	29.7	32.5	3.22	52.2	61.9	32.3	35.1	2.95	43.6
090		93.9	27.8	28.5	4.47	58.2	89.8	26.3	31.0	4.27	53.3	84.2	29.0	33.7	4.01	47.0	77.9	31.9	36.5	3.71	40.8	71.0	35.2	39.7	3.38	34.2
100		106	27.4	32.0	5.05	60.8	101	29.9	34.6	4.79	55.3	94.3	32.8	37.4	4.49	49.0	87.4	36.0	40.6	4.16	42.6	79.6	39.4	43.8	3.79	35.9
120		125	33.8	38.2	5.93	69.7	118	36.3	40.7	5.62	62.8	111	39.1	44.4	5.28	55.6	103	42.2	46.4	4.92	48.5	94.7	46.1	50.2	4.51	40.8
140		141	38.0	43.8	6.73	73.6	134	41.4	47.2	6.37	66.4	125	45.3	51.0	5.95	58.3	115	49.6	55.3	5.49	50.0	104	54.3	59.9	4.97	41.3
160		164	46.0	51.6	7.81	81.5	155	49.8	55.5	7.39	73.0	145	54.1	59.6	6.93	64.4	135	58.9	64.5	6.42	55.5	123	64.4	69.8	5.88	46.7
039	7	41.8	10.5	12.5	2.00	51.2	40.1	11.4	13.4	1.92	47.0	38.2	12.4	14.4	1.82	42.5	35.9	13.7	15.7	1.71	37.2	33.2	15.2	17.2	1.58	31.7
045		47.6	12.1	14.1	2.27	62.0	45.9	13.4	15.5	2.19	58.1	43.3	14.9	16.9	2.07	52.5	40.0	16.4	18.4	1.91	45.6	36.4	17.9	19.9	1.74	38.6
050		58.3	14.9	17.2	2.78	77.1	55.4	16.4	18.6	2.64	70.2	51.9	18.0	20.2	2.48	62.2	48.1	19.8	22.0	2.29	53.9	43.7	21.8	23.9	2.08	45.2
060		64.4	16.0	18.0	3.07	77.8	61.5	17.8	19.7	2.93	71.5	57.3	19.7	21.6	2.73	62.9	52.7	21.7	23.7	2.51	53.8	47.6	24.1	26.0	2.27	44.7
070		73.8	19.5	22.4	3.52	77.5	69.7	21.2	24.1	3.33	69.8	65.1	23.1	26.0	3.11	61.4	60.0	25.2	28.1	2.86	52.7	54.3	27.4	30.2	2.59	43.8
080		87.6	24.2	27.0	4.18	87.2	82.8	26.1	29.0	3.95	77.7	77.6	28.2	31.1	3.70	68.3	72.0	30.6	33.4	3.43	58.6	66.0	33.3	36.0	3.15	49.1
090		99.6	24.3	29.1	4.75	64.2	95.2	26.9	31.6	4.54	59.0	89.4	29.6	34.3	4.26	52.3	82.8	32.6	37.2	3.95	45.2	75.6	35.9	40.4	3.60	38.1
100		112	28.2	32.8	5.36	67.1	107	30.7	35.4	5.08	60.8	99.9	33.7	38.3	4.76	53.9	92.5	36.9	41.4	4.41	46.8	84.3	40.3	44.8	4.02	39.4
120		132	35.3	39.7	6.28	76.8	125	38.0	42.3	5.94	68.9	117	40.8	45.1	5.58	61.0	109	44.0	48.2	5.20	53.1	100	47.3	51.4	4.78	45.1
140		150	39.3	45.1	7.15	81.6	142	42.8	48.5	6.76	73.4	132	46.7	52.4	6.31	64.3	122	51.0	56.7	5.82	55.1	110	55.5	61.0	5.27	45.6
160		175	47.5	53.1	8.33	91.1	165	51.4	57.1	7.87	81.6	155	55.7	61.3	7.38	72.0	144	60.6	66.2	6.85	62.1	131	66.0	71.5	6.27	52.2
039	10	45.4	10.9	12.9	2.17	59.8	43.6	11.8	13.8	2.08	54.9	41.5	12.9	14.8	1.98	49.5	39.0	14.2	16.1	1.86	43.4	36.1	15.7	17.6	1.72	37.0
045		51.7	12.5	14.6	2.47	70.5	49.9	13.9	15.9	2.38	66.2	47.0	15.4	17.4	2.25	59.7	43.5	16.8	18.8	2.08	52.0	39.7	18.3	20.3	1.90	44.3
050		64.3	15.8	18.0	3.07	90.9	61.0	17.3	19.5	2.91	82.5	57.1	19.0	21.1	2.73	73.0	52.9	20.8	22.9	2.53	63.3	48.1	22.6	24.8	2.30	53.1
060		70.9	16.5	18.4	3.39	91.5	67.7	18.2	20.2	3.24	84.0	63.3	20.1	22.1	3.02	74.2	58.4	22.2	24.1	2.79	64.0	52.9	24.6	26.5	2.53	53.4
070		80.6	20.2	23.1	3.85	89.8	75.9	22.1	25.0	3.63	80.5	70.6	24.2	27.1	3.37	70.3	65.0	26.3	29.2	3.11	60.2	58.8	28.5	31.3	2.81	50.0
080		95.9	25.0	27.9	4.58	103	90.6	27.2	30.1	4.33	91.8	84.8	29.7	32.5	4.05	80.4	78.7	32.1	34.9	3.76	69.1	72.2	34.7	37.5	3.45	58.0
090		109	25.3	30.1	5.18	74.4	104	28.0	32.7	4.96	68.3	97.3	30.7	35.4	4.65	60.5	90.2	33.7	38.3	4.31	52.4	82.5	37.0	41.5	3.94	44.3
100		122	29.4	34.1	5.84	77.1	116	32.0	36.7	5.53	69.7	108	35.1	39.7	5.18	61.8	100	38.3	42.8	4.80	53.6	91.5	41.7	46.2	4.37	45.1
120		143	36.7	41.0	6.82	88.6	135	39.7	44.0	6.45	79.3	127	43.2	47.5	6.04	69.9	117	46.8	51.1	5.61	60.5	108	50.1	54.3	5.15	51.3
140		164	41.0	46.7	7.83	95.2	154	44.9	50.7	7.38	85.0	144	49.0	54.7	6.88	74.4	133	53.3	59.0	6.33	63.5	120	57.7	63.3	5.73	52.4
160		191	49.3	55.0	9.14	107	181	53.8	59.4	8.64	96.0	170	58.5	64.0	8.10	84.7	157	63.4	68.9	7.52	73.3	144	68.8	74.2	6.89	61.7

Legend:
 LWT Leaving water temperature
 CAP kW Cooling capacity
 COMP kW Compressor power input
 UNIT kW Gross unit power input (compressors, fans and control circuit)
 COOL l/s Evaporator water flow rate
 COOL kPa Evaporator pressure drop

Application data:
 Standard units, refrigerant: R410A
 Evaporator temperature rise: 5 K
 Evaporator fluid: chilled water
 Fouling factor: 0.18 x 10⁻⁴ (m² K)/W
 Performances in accordance with EN 14511

Cooling capacities, 30RBSY at 160 Pa available pressure (cont.)

30RBSY 039-160

LWT		Condenser entering air temperature, °C																								
		25			30			35			40			45												
°C	CAP kW	COMP kW	UNIT kW	COOL l/s	COOL kPa	CAP kW	COMP kW	UNIT kW	COOL l/s	COOL kPa	CAP kW	COMP kW	UNIT kW	COOL l/s	COOL kPa	CAP kW	COMP kW	UNIT kW	COOL l/s	COOL kPa						
039	15	51.8	11.5	13.5	2.48	76.8	49.8	12.5	14.5	2.38	70.5	47.4	13.6	15.6	2.27	63.6	44.4	14.9	16.9	2.13	55.7	41.1	16.5	18.4	1.97	47.3
045		58.9	13.3	15.4	2.82	86.6	56.9	14.8	16.8	2.72	81.4	53.5	16.3	18.3	2.56	73.1	49.4	17.6	19.6	2.37	63.5	45.2	19.2	21.1	2.17	54.4
050		75.0	16.4	18.7	3.59	118.1	71.2	18.1	20.3	3.41	107	66.6	20.0	22.2	3.19	94.6	61.4	22.1	24.3	2.94	81.6	32.9	9.8	11.9	1.58	25.6
060		81.2	17.5	19.4	3.89	114.4	77.7	19.2	21.2	3.72	105	72.8	21.1	23.0	3.49	93.7	67.5	23.1	25.1	3.23	81.5	61.7	25.4	27.3	2.96	69.1
070		93.3	21.1	24.0	4.47	115.3	88.0	23.0	25.9	4.22	104	81.8	25.3	28.1	3.92	90.3	74.9	27.8	30.6	3.59	76.6	42.1	12.2	15.0	2.02	26.1
080		111	26.1	29.0	5.33	136	105	28.5	31.3	5.04	122	98.7	31.0	33.8	4.73	107	91.6	33.8	36.6	4.39	91.8	50.2	14.0	16.8	2.40	27.0
090		124	27.2	31.9	5.95	93.8	119	29.9	34.6	5.68	85.9	111	32.7	37.4	5.32	76.0	103	35.7	40.4	4.94	65.9	94.5	39.1	43.7	4.52	55.8
100		140	31.9	36.5	6.69	96.2	132	34.6	39.2	6.32	86.5	124	37.6	42.2	5.91	76.6	114	40.8	45.4	5.47	66.2	81.3	25.3	29.8	3.89	35.3
120		162	39.1	43.4	7.77	111	153	42.2	46.5	7.34	99.3	144	45.7	50.0	6.88	87.5	133	49.5	53.8	6.38	75.5	95.1	30.4	34.6	4.55	39.1
140		190	42.7	48.5	9.08	123	179	46.7	52.4	8.57	110	167	51.3	57.1	7.98	95.8	153	56.5	62.2	7.31	81.0	85.8	24.8	30.4	4.11	27.0
160		222	51.6	57.2	10.6	140	210	56.1	61.8	10.0	125	197	61.1	66.7	9.43	111	183	66.7	72.3	8.76	95.9	99.4	29.6	35.1	4.76	29.0
039	18	56.0	12.0	14.0	2.69	89.1	53.8	12.9	14.9	2.58	81.7	51.2	14.1	16.0	2.45	73.7	48.0	15.4	17.3	2.30	64.5	44.4	16.9	18.8	2.13	54.8
045		63.4	13.9	15.9	3.04	97.3	61.2	15.4	17.4	2.93	91.3	57.6	16.9	18.9	2.76	82.1	53.2	18.2	20.2	2.55	71.3	48.7	19.7	21.7	2.33	61.0
050		81.6	16.9	19.1	3.91	136	77.6	18.5	20.7	3.72	124	72.7	20.4	22.6	3.49	110	67.1	22.5	24.7	3.22	94.8	35.9	9.9	12.0	1.72	29.6
060		87.9	18.2	20.1	4.21	130	84.0	20.0	21.9	4.03	120	78.7	21.8	23.8	3.78	107	73.0	23.9	25.8	3.50	92.7	38.7	11.1	13.0	1.85	28.8
070		102	21.7	24.6	4.87	133	96.0	23.6	26.5	4.60	120	89.2	25.9	28.7	4.28	105	81.8	28.4	31.2	3.92	88.9	45.9	12.5	15.3	2.20	30.2
080		122	26.9	29.8	5.83	161	115	29.3	32.1	5.51	143	108	31.8	34.7	5.17	126	100	34.6	37.4	4.80	108	55.2	14.4	17.2	2.64	32.3
090		135	28.5	33.3	6.45	107	128	31.3	36.0	6.14	98	120	34.1	38.8	5.75	86.5	111	37.1	41.8	5.34	75.1	78.3	23.1	27.6	3.75	38.5
100		151	33.5	38.2	7.22	109	142	36.2	40.9	6.81	98	133	39.3	44.0	6.38	86.6	95.4	23.9	28.4	4.57	46.8	88.3	26.0	30.5	4.23	40.6
120		175	40.7	45.0	8.38	126	165	43.9	48.2	7.91	113	155	47.4	51.7	7.41	99.3	112	28.7	32.9	5.37	53.0	103	31.1	35.3	4.96	45.3
140		206	44.0	49.7	9.89	142	195	47.9	53.6	9.35	127	181	52.5	58.2	8.70	111	166	57.6	63.3	7.98	94.3	93.6	25.3	30.9	4.49	31.4
160		242	53.0	58.6	11.6	163	229	57.7	63.3	11.0	147	215	62.7	68.3	10.3	130	200	68.3	73.9	9.58	112	108.2	30.4	35.8	5.18	33.7

Legend:

- LWT Leaving water temperature
- CAP kW Cooling capacity
- COMP kW Compressor power input
- UNIT kW Gross unit power input (compressors, fans and control circuit)
- COOL l/s Evaporator water flow rate
- COOL kPa Evaporator pressure drop

Application data:

- Standard units, refrigerant: R410A
- Evaporator temperature rise: 5 K
- Evaporator fluid: chilled water
- Fouling factor: 0.18×10^{-4} (m² K)/W
- Performances in accordance with EN 14511

Cooling capacities, 30RQSY at 160 Pa available pressure

30RQSY 039-160

LWT °C		Condenser entering air temperature, °C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
		25			30			35			40			45																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
CAP	COMP	UNIT	COOL	COOL	COOL	CAP	COMP	UNIT	COOL	COOL	COOL	CAP	COMP	UNIT	COOL	COOL	COOL	CAP	COMP	UNIT	COOL	COOL	CAP	COMP	UNIT	COOL	COOL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
kW	kW	kW	l/s	kPa	°C	kW	kW	kW	l/s	kPa	°C	kW	kW	kW	l/s	kPa	°C	kW	kW	kW	l/s	kPa	°C	kW	kW	kW	l/s	kPa	°C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
039	5	38.7	9.93	11.9	1.84	43.6	37.1	10.8	12.7	1.76	39.8	35.2	11.9	13.8	1.68	35.8	32.9	13.1	15.0	1.57	31.1	30.2	14.6	16.5	1.44	26.1	045	45.0	11.7	13.6	2.14	52.6	43.4	14.5	16.4	1.95	44.5	37.7	15.9	17.8	1.79	38.4	34.1	17.5	19.4	1.62	32.3	050	52.5	13.9	16.1	2.50	51.0	50.0	15.4	17.5	2.38	46.6	47.0	17.0	19.2	2.24	41.7	43.7	18.9	21.0	2.08	36.4	39.8	21.0	23.1	1.90	30.8	060	60.2	15.7	18.4	2.87	51.1	57.6	17.2	20.0	2.74	47.0	54.4	19.1	21.8	2.59	42.2	50.2	21.0	23.8	2.39	36.4	45.7	23.2	25.9	2.17	30.5	070	65.9	17.8	20.6	3.14	62.6	62.9	19.5	22.3	2.99	57.3	59.1	21.5	24.2	2.82	51.1	54.8	23.7	26.4	2.61	44.4	49.9	26.1	28.8	2.38	37.2	080	76.6	22.2	24.9	3.65	62.7	72.7	24.2	26.9	3.46	56.4	68.3	26.4	29.0	3.25	49.7	63.5	28.9	31.6	3.02	42.9	58.2	29.8	34.3	3.00	26.6	090	81.6	21.0	25.6	3.89	43.5	77.6	22.8	27.4	3.69	39.9	73.1	24.9	29.4	3.48	35.3	68.3	27.2	31.7	3.25	31.0	62.9	29.8	34.3	3.00	26.6	100	89.5	23.3	28.0	4.26	54.1	85.6	25.8	30.4	4.08	49.7	80.4	28.5	33.1	3.83	44.1	74.1	31.5	36.1	3.53	37.8	67.4	34.8	39.4	3.21	31.6	120	101	26.7	31.1	4.83	60.2	96.4	29.2	33.7	4.59	54.9	90.3	32.1	36.5	4.30	48.6	83.5	35.3	39.7	3.98	42.1	75.8	38.8	43.1	3.61	35.2	140	120	32.4	36.7	5.70	65.7	113	35.2	39.5	5.40	59.3	107	38.3	42.5	5.08	52.5	99.3	42.0	46.1	4.73	45.6	91.2	46.1	50.2	4.34	38.7	160	136	36.1	41.6	6.49	70.5	130	39.6	45.1	6.19	64.3	122	43.5	48.9	5.82	57.2	113	48.0	53.4	5.40	49.5	103	52.9	58.3	4.92	41.5	140	156	45.2	50.6	7.42	75.9	148	49.2	54.5	7.03	68.3	139	53.6	58.9	6.60	60.4	129	58.8	64.0	6.14	52.3	118	64.6	69.7	5.63	44.2	039	7	41.1	10.1	12.1	1.96	48.8	39.4	11.0	12.9	1.88	44.6	37.4	12.1	14.0	1.78	40.1	35.0	13.3	15.2	1.67	34.9	32.2	14.8	16.7	1.53	29.4	045	47.9	11.9	13.8	2.28	58.0	46.2	13.2	15.1	2.20	54.5	43.7	14.7	16.6	2.08	49.3	40.2	16.2	18.1	1.92	42.6	36.5	17.7	19.6	1.74	35.9	050	55.6	14.2	16.4	2.65	56.1	53.0	15.7	17.8	2.53	51.4	49.9	17.3	19.4	2.38	46.0	46.4	19.2	21.3	2.21	40.3	42.5	21.3	23.4	2.02	34.2	060	64.0	16.0	18.8	3.05	56.5	61.2	17.6	20.3	2.92	52.1	57.8	19.4	22.2	2.76	46.9	53.5	21.4	24.1	2.55	40.5	48.8	23.6	26.3	2.33	34.1	070	70.1	18.2	21.0	3.34	69.5	66.9	19.9	22.7	3.19	63.6	62.9	21.9	24.6	3.00	56.8	58.4	24.1	26.8	2.78	49.3	53.2	26.5	29.2	2.53	41.4	078	81.5	22.7	25.4	3.89	70.4	77.4	24.8	27.4	3.69	63.3	72.8	26.9	29.6	3.47	55.9	67.7	29.5	32.1	3.23	48.2	62.0	32.3	34.9	2.96	40.4	080	86.7	21.5	26.1	4.13	48.2	82.5	23.4	28.0	3.93	43.9	77.7	25.4	30.0	3.71	39.2	72.6	27.8	32.3	3.46	34.5	67.0	30.4	34.9	3.19	29.6	090	95.4	23.8	28.5	4.55	60.4	91.3	26.3	30.9	4.35	55.5	85.8	29.1	33.7	4.09	49.3	79.2	32.1	36.6	3.78	42.4	72.1	35.4	39.9	3.44	35.5	100	108	27.4	31.8	5.15	67.0	103	29.9	34.4	4.89	60.9	96.1	32.8	37.2	4.58	53.9	88.9	36.1	40.4	4.24	46.7	80.8	39.6	43.8	3.85	39.1	120	127	33.2	37.5	6.06	73.1	121	36.1	40.3	5.40	58.5	113	42.9	47.0	5.03	50.9	97.0	46.9	51.0	4.63	43.2	140	145	36.9	42.4	6.91	78.3	138	40.4	45.9	6.20	63.6	121	48.9	54.3	5.75	55.1	110	53.8	59.1	5.24	46.2	160	166	46.3	51.7	7.90	84.6	157	50.4	55.7	7.48	76.1	147	54.8	60.1	6.54	58.4	137	60.0	65.2	6.00	49.3	039	10	44.9	10.5	12.4	2.14	57.9	43.0	11.3	13.3	2.05	52.8	40.8	12.4	14.3	1.95	47.4	38.2	13.7	15.6	1.82	41.3	35.2	15.2	17.0	1.68	34.8	045	52.4	12.2	14.1	2.50	67.0	50.6	13.5	15.5	2.42	63.0	47.9	15.0	16.9	2.29	57.2	44.2	16.5	18.4	2.11	49.6	40.2	18.1	20.0	1.92	42.0	050	60.4	14.7	16.8	2.88	64.3	57.7	16.1	18.3	2.75	59.0	54.4	17.8	19.9	2.60	53.0	50.7	19.7	21.8	2.42	46.5	46.4	21.8	23.9	2.22	39.6	060	69.9	16.5	19.3	3.34	65.7	67.0	18.2	20.9	3.20	60.6	63.3	20.1	22.8	3.02	54.6	58.6	22.1	24.8	2.80	47.3	53.5	24.3	26.9	2.56	39.9	070	76.8	18.9	21.6	3.67	81.0	73.2	20.6	23.3	3.50	74.2	68.9	22.5	25.3	3.29	66.2	63.9	24.8	27.5	3.05	57.6	58.3	27.2	29.9	2.78	48.4	078	89.3	23.5	26.2	4.26	83.3	84.8	25.6	28.3	4.05	75.0	79.8	27.9	30.5	3.81	66.2	74.2	30.4	33.1	3.54	57.3	68.1	33.2	35.8	3.25	48.1	080	94.8	22.3	26.9	4.53	56.2	90.2	24.2	28.8	4.31	51.2	85.1	26.3	30.9	4.06	45.8	79.5	28.7	33.2	3.80	40.2	73.3	31.3	35.7	3.50	34.6	090	105	24.5	29.2	4.99	70.6	100	27.1	31.7	4.78	65.0	94.1	29.9	34.5	4.49	57.8	87.1	32.9	37.5	4.16	50.0	79.5	36.3	40.8	3.80	42.0	100	119	28.2	32.6	5.67	78.4	113	30.8	35.3	5.38	71.2	105	33.9	38.3	5.03	62.8	97.3	37.2	41.6	4.65	54.3	88.4	40.7	45.0	4.22	45.4	120	139	34.4	38.6	6.64	85.7	132	37.4	41.6	6.30	77.2	124	40.6	44.8	5.92	68.6	115	44.3	48.5	5.52	59.7	106	48.3	52.4	5.07	50.6	140	158	38.1	43.7	7.57	91.4	151	41.7	47.2	7.22	83.5	142	45.6	51.1	6.79	74.3	132	50.2	55.6	6.30	64.4	120	55.2	60.5	5.75	54.1	160	181	48.1	53.5	8.64	99.1	172	52.3	57.6	8.19	89.2	161	56.8	62.1	7.70	79.0	150	62.0	67.2	7.16	68.5	138	67.7	72.8	6.58	58.0

Legend:
 LWT Leaving water temperature
 CAP kW Cooling capacity
 COMP kW Compressor power input
 UNIT kW Gross unit power input (compressors, fans and control circuit)
 COOL l/s Evaporator water flow rate
 COOL kPa Evaporator pressure drop

Application data:
 Standard units, refrigerant: R410A
 Evaporator temperature rise: 5 K
 Evaporator fluid: chilled water
 Fouling factor: 0.18 x 10⁻⁴ (m² K/W)
 Performances in accordance with EN 14511

Cooling capacities, 30RQSY at 160 Pa available pressure (cont.)

30RQSY 039-160

LWT		Condenser entering air temperature, °C																								
		25				30				35				40				45								
°C	LWT	CAP	COMP	UNIT	COOL	COOL	CAP	COMP	UNIT	COOL	COOL	CAP	COMP	UNIT	COOL	COOL	CAP	COMP	UNIT	COOL	COOL					
		kW	kW	kW	l/s	kPa	kW	kW	kW	l/s	kPa	kW	kW	kW	l/s	kPa	kW	kW	kW	l/s	kPa	kPa				
039	15	51.9	11.1	13.0	2.48	76.3	49.7	12.0	13.9	2.38	69.7	46.9	13.0	14.9	2.25	61.8	43.5	14.2	16.1	2.08	52.8	39.6	15.7	17.5	1.90	43.4
045		60.5	12.7	14.7	2.89	84.1	58.3	14.1	16.1	2.79	77.6	54.9	15.6	17.6	2.63	69.8	50.3	17.1	19.0	2.41	59.7	45.4	18.6	20.5	2.17	49.9
050		69.2	15.5	17.6	3.31	80.5	66.3	17.0	19.1	3.17	74.2	62.6	18.7	20.8	2.99	66.8	58.4	20.7	22.8	2.80	58.9	53.3	22.7	24.8	2.55	49.7
060		78.8	17.4	20.2	3.77	80.2	75.2	19.1	21.8	3.60	73.4	70.6	20.9	23.7	3.38	65.3	65.0	22.9	25.6	3.11	56.0	59.0	25.1	27.8	2.82	46.7
070		88.3	20.1	22.8	4.23	103	83.7	21.8	24.5	4.00	92.7	78.1	23.6	26.3	3.74	81.6	72.0	25.8	28.5	3.44	70.0	65.1	28.2	30.9	3.11	58.0
078		103	24.9	27.6	4.95	109	98.2	27.1	29.8	4.70	98.5	92.2	29.4	32.1	4.41	86.7	85.1	31.9	34.5	4.07	73.7	77.4	34.6	37.2	3.70	60.8
080		109	23.7	28.3	5.23	71.6	104	25.7	30.4	4.97	65.2	97.9	27.9	32.4	4.69	58.3	90.8	30.2	34.7	4.35	50.5	83.2	32.7	37.2	3.98	42.8
090		121	26.0	30.7	5.79	90.7	116	28.7	33.3	5.55	83.7	109	31.4	36.0	5.20	74.0	99.9	34.4	39.0	4.78	63.2	90.5	37.7	42.2	4.33	52.4
100		135	29.3	33.7	6.44	96.3	127	31.9	36.3	6.09	87.0	118	34.9	39.3	5.67	76.1	109	38.4	42.7	5.20	64.9	97.5	42.1	46.4	4.67	53.2
120		160	36.4	40.6	7.67	110	152	39.5	43.7	7.27	99.3	143	42.8	47.0	6.85	88.3	133	46.6	50.7	6.38	76.9	122	50.6	54.7	5.83	64.5
140		182	40.4	45.9	8.72	116	173	43.8	49.3	8.28	105	161	47.7	53.2	7.73	92.3	149	52.3	57.7	7.13	79.1	135	57.1	62.5	6.45	65.4
160		209	51.4	56.7	9.98	128	198	55.7	61.0	9.46	115	185	60.3	65.6	8.86	101	171	65.3	70.5	8.18	86.3	156	70.7	75.9	7.46	72.1
039	18	52.1	11.1	13.0	2.50	75.8	49.7	12.0	13.9	2.38	68.6	46.9	13.0	14.9	2.25	60.9	43.6	14.2	16.1	2.09	52.1	39.7	15.7	17.6	1.90	43.0
045		60.4	12.7	14.7	2.90	82.7	58.3	14.1	16.1	2.79	77.6	54.9	15.6	17.6	2.63	69.8	50.3	17.1	19.0	2.41	59.7	45.4	18.6	20.5	2.17	49.9
050		71.7	15.7	17.8	3.44	84.6	68.2	17.2	19.3	3.27	77.0	63.8	18.8	21.0	3.06	68.2	58.9	20.8	22.9	2.82	58.9	53.4	22.8	24.9	2.56	49.2
060		78.8	17.4	20.2	3.77	78.9	75.1	19.1	21.8	3.60	72.2	70.7	21.0	23.7	3.39	64.4	65.1	23.0	25.7	3.12	55.3	59.2	25.1	27.8	2.84	46.2
070		88.3	20.1	22.9	4.23	101	83.7	21.8	24.5	4.01	91.4	78.2	23.7	26.4	3.75	80.5	72.1	25.9	28.6	3.45	69.1	65.3	28.3	30.9	3.13	57.5
078		105	25.0	27.7	5.02	111	98.7	27.2	29.9	4.73	98.1	92.2	29.4	32.1	4.42	85.4	85.2	32.0	34.6	4.08	72.8	77.6	34.7	37.3	3.72	60.2
080		111	23.8	28.5	5.30	72.3	105	25.8	30.4	5.01	64.9	97.9	27.9	32.5	4.69	57.4	90.9	30.3	34.8	4.36	49.9	83.4	32.8	37.3	3.99	42.3
090		122	26.2	30.8	5.84	90.8	116	28.7	33.4	5.57	82.9	109	31.5	36.1	5.21	72.9	100	34.4	39.0	4.79	62.3	90.7	37.8	42.3	4.34	51.8
100		134	29.3	33.7	6.44	94.8	127	31.9	36.3	6.10	85.7	119	34.9	39.3	5.68	75.1	109	38.4	42.8	5.22	64.2	97.8	42.2	46.5	4.69	52.7
120		163	36.7	41.0	7.83	113	154	39.8	44.0	7.39	101	144	43.0	47.2	6.91	88.4	134	46.7	50.9	6.40	76.1	122	50.7	54.8	5.85	63.9
140		182	40.4	45.9	8.72	114	173	43.9	49.4	8.28	103	162	47.8	53.3	7.74	91.1	149	52.4	57.8	7.14	78.1	135	57.3	62.6	6.47	64.7
160		210	51.6	57.0	10.1	128	198	55.8	61.1	9.49	114	185	60.4	65.6	8.87	99.5	171	65.4	70.7	8.21	85.5	156	70.9	76.1	7.49	71.4

Legend:

- LWT Leaving water temperature
- CAP kW Cooling capacity
- COMP kW Compressor power input
- UNIT kW Gross unit power input (compressors, fans and control circuit)
- COOL l/s Evaporator water flow rate
- COOL kPa Evaporator pressure drop

Application data:

- Standard units, refrigerant: R410A
- Evaporator temperature rise: 5 K
- Evaporator fluid: chilled water
- Fouling factor: 0.18 x 10⁻⁴ (m² K/W)
- Performances in accordance with EN 14511

Heating capacities, 30RQSY at 160 Pa available pressure

30RQSY 039-160

LWT °C	Condenser entering air temperature, °C (db/wb)																	
	-15 (-16)			-7 (-8)			0 (-1)			7 (6)			15 (12.5)					
	CAP kW	COMP kW	UNIT kW	COND l/s	COND kPa	COND kPa	CAP kW	COMP kW	UNIT kW	COND l/s	COND kPa	COND kPa	CAP kW	COMP kW	UNIT kW	COND l/s	COND kPa	
039 30	24.7	8.79	11.3	1.19	1.19	1.19	29.8	8.88	11.4	1.43	22.3	1.72	32.5	42.8	9.25	11.6	2.06	47.2
045	26.9	9.85	12.3	1.29	19.5	19.5	32.7	9.86	12.3	1.57	27.5	1.88	37.8	46.7	10.1	12.4	2.24	51.5
050	30.7	11.3	14.4	1.48	17.6	17.6	38.0	11.5	14.5	1.82	25.9	2.20	36.6	54.7	11.8	14.7	2.63	50.7
060	35.5	12.8	16.0	1.71	18.1	18.1	43.9	13.1	16.2	2.11	27.0	2.55	38.3	63.3	13.6	16.6	3.04	53.4
070	40.6	14.2	17.5	1.95	21.6	21.6	49.7	14.7	17.9	2.39	31.5	2.88	44.6	71.7	15.6	18.7	3.44	62.4
078	45.4	17.0	20.2	2.18	20.4	20.4	55.8	17.6	20.7	2.68	31.1	3.23	45.4	80.5	18.9	21.9	3.87	65.3
080	46.2	16.2	20.8	2.22	14.4	14.4	57.2	16.9	21.3	2.75	21.5	3.33	31.0	83.3	18.1	22.4	4.00	43.8
090	53.4	19.5	24.8	2.57	17.6	17.6	66.1	19.9	25.1	3.17	26.3	3.83	37.4	95.0	20.5	25.5	4.57	52.3
100	41.3	14.3	19.4	1.98	9.6	9.6	71.9	22.1	27.2	3.45	26.9	4.14	37.6	103	23.0	28.0	4.95	52.2
120	67.9	25.0	29.7	3.26	20.6	20.6	83.9	26.0	30.6	4.03	31.1	4.88	45.1	122	28.1	32.5	5.85	64.3
140	80.9	28.7	35.1	3.88	23.4	23.4	98.7	29.7	36.0	4.74	34.3	5.70	48.7	142	31.4	37.5	6.82	68.7
160	89.9	16.8	23.6	2.40	7.30	7.30	114	35.5	42.2	5.46	36.5	6.58	52.7	164	38.3	44.8	7.87	74.9
039 35	25.0	9.81	12.3	1.20	15.1	15.1	29.9	9.75	12.2	1.44	21.9	1.71	31.5	42.4	10.1	12.4	2.04	45.3
045	27.4	11.3	13.8	1.32	19.6	19.6	33.0	11.0	13.5	1.59	27.3	1.89	37.1	46.5	11.1	13.5	2.24	50.0
050	30.8	12.7	15.7	1.48	17.3	17.3	37.9	12.8	15.8	1.82	25.2	2.19	35.3	54.2	13.0	15.9	2.61	48.8
060	35.4	14.2	17.4	1.70	17.6	17.6	43.8	14.5	17.6	2.11	26.2	2.53	37.0	62.8	14.9	17.9	3.02	51.4
070	40.8	15.7	18.9	1.96	21.3	21.3	49.8	16.2	19.4	2.40	30.9	2.87	43.3	71.2	17.1	20.2	3.42	60.2
078	45.6	18.9	22.1	2.19	20.2	20.2	55.6	19.3	22.4	2.67	30.1	3.21	43.6	79.5	20.5	23.6	3.83	62.3
080	46.1	17.9	22.4	2.22	14.0	14.0	56.6	18.4	22.8	2.72	20.6	3.29	29.5	82.1	19.6	23.9	3.95	41.7
090	53.2	21.6	26.8	2.56	17.0	17.0	65.7	22.0	27.1	3.16	25.5	3.81	36.1	94.4	22.6	27.6	4.54	50.5
100	41.4	15.7	20.9	1.99	9.5	9.5	72.0	24.4	29.5	3.47	26.4	4.14	36.6	102	25.3	30.2	4.93	50.5
120	67.8	27.7	32.3	3.26	20.1	20.1	83.1	28.4	32.9	4.00	29.9	4.82	43.0	120	30.4	34.8	5.78	61.1
140	81.4	31.6	38.1	3.91	23.2	23.2	98.9	32.7	39.0	4.76	33.6	5.69	47.4	141	34.3	40.4	6.79	66.3
160	92.6	38.0	44.8	4.46	24.0	24.0	113	38.9	45.6	5.44	35.4	6.53	50.6	162	41.6	48.0	7.79	71.6
039 40	25.5	11.4	13.9	1.23	15.4	15.4	30.0	10.8	13.3	1.45	21.6	1.71	30.7	42.0	11.0	13.4	2.02	43.6
045	27.6	13.3	15.8	1.33	19.5	19.5	33.3	12.4	14.8	1.60	27.1	1.90	36.8	46.6	12.4	14.7	2.24	49.1
050	30.9	14.2	17.3	1.49	17.0	17.0	37.8	14.4	17.3	1.82	24.6	2.18	34.3	53.8	14.5	17.3	2.59	47.0
060	35.0	15.8	19.0	1.69	16.9	16.9	43.5	16.1	19.2	2.09	25.3	2.52	35.9	62.3	16.5	19.5	3.00	49.6
070	40.9	17.2	20.4	1.97	21.0	21.0	49.8	17.9	21.0	2.40	30.2	2.86	42.0	70.5	18.8	21.9	3.40	57.9
078	46.1	21.2	24.4	2.22	20.2	20.2	55.5	21.3	24.5	2.68	29.4	3.19	42.0	78.5	22.4	25.4	3.78	59.4
080	46.3	20.0	24.6	2.23	13.8	13.8	56.3	20.3	24.7	2.71	19.9	3.25	28.2	80.7	21.3	25.6	3.89	39.5
090	52.7	23.9	29.2	2.54	16.4	16.4	65.4	24.5	29.6	3.15	24.7	3.79	35.0	93.5	25.0	30.0	4.50	48.6
100	59.2	26.0	31.1	2.85	18.0	18.0	72.0	26.9	32.0	3.47	25.8	4.13	35.6	102	27.8	32.7	4.89	48.7
120	68.2	31.0	35.6	3.29	19.9	19.9	82.7	31.4	35.9	3.98	28.9	4.77	41.2	118	33.2	37.6	5.69	58.0
140	81.6	34.8	41.3	3.93	22.8	22.8	98.9	36.1	42.4	4.76	32.9	5.68	46.0	140	37.7	43.8	6.73	63.7
160	93.7	42.8	49.6	4.51	24.0	24.0	113	43.1	49.8	5.45	34.7	6.49	48.9	160	45.4	51.8	7.71	68.5

Legend:
 LWT Leaving water temperature
 CAP kW Heating capacity
 COMP kW Compressor power input
 UNIT kW Gross unit power input (compressors, fans and control circuit)
 COND l/s Condenser water flow rate
 COND kPa Condenser pressure drop

Application data:
 Standard units, refrigerant: R410A
 Condenser temperature rise: 5 K
 Condenser fluid: water
 Fouling factor: 0.18 x 10⁻⁴ (m² K/W)
 Performances in accordance with EN 14511

Heating capacities, 30RQSY at 160 Pa available pressure (cont.)

30RQSY 039-160

LWT °C		Condenser entering air temperature, °C (db/wb)																						
		-15 (-16)				-7 (-8)				0 (-1)				7 (6)				15 (12.5)						
		CAP kW	COMP kW	UNIT kW	COND l/s	CAP kW	COMP kW	UNIT kW	COND l/s	CAP kW	COMP kW	UNIT kW	COND l/s	CAP kW	COMP kW	UNIT kW	COND l/s	CAP kW	COMP kW	UNIT kW	COND l/s	CAP kW	COMP kW	UNIT kW
039	45	-	-	-	-	30.2	12.2	14.7	1.46	21.4	12.2	14.5	1.71	29.8	41.6	12.2	14.6	2.01	41.8	48.8	12.4	14.7	2.35	58.2
045		-	-	-	-	33.1	14.0	16.5	1.60	26.4	39.3	13.8	1.90	35.7	46.4	13.8	16.2	2.24	47.8	54.5	13.9	16.2	2.63	63.6
050		-	-	-	-	37.8	16.1	19.1	1.82	24.1	44.9	16.1	2.17	33.1	53.1	16.1	19.0	2.56	45.0	62.6	16.2	19.0	3.02	60.9
060		-	-	-	-	42.8	17.9	21.0	2.06	24.1	51.5	18.1	2.48	34.1	61.3	18.3	21.3	2.96	47.1	72.3	18.5	21.5	3.49	64.3
070		-	-	-	-	49.5	19.8	22.9	2.39	29.3	58.8	20.3	2.84	40.5	69.5	20.8	23.8	3.36	55.4	82.0	21.4	24.4	3.96	75.4
078		-	-	-	-	55.6	23.8	27.0	2.68	28.9	65.6	24.0	3.17	40.5	77.4	24.6	27.6	3.74	56.7	91.4	25.3	28.3	4.41	79.3
080		-	-	-	-	55.9	22.5	27.0	2.70	19.4	66.6	22.8	3.22	27.0	79.2	23.3	27.6	3.82	37.4	93.8	23.9	28.2	4.52	51.5
090		-	-	-	-	64.4	27.2	32.3	3.11	23.5	77.5	27.6	3.74	33.4	92.2	27.8	32.8	4.45	46.4	109	28.1	33.0	5.26	63.6
100		-	-	-	-	71.7	29.8	34.9	3.46	25.1	85.0	30.4	4.10	34.3	100	30.8	35.7	4.84	46.7	118	31.1	36.0	5.71	63.3
120		-	-	-	-	82.4	34.9	39.5	3.98	28.2	97.9	35.5	3.99	39.4	116	36.3	40.7	5.60	55.0	137	37.4	41.7	6.62	76.1
140		-	-	-	-	98.5	40.0	46.3	4.75	32.0	117	41.0	47.2	5.63	138	41.6	47.7	6.65	60.8	163	42.1	48.1	7.85	83.5
160		-	-	-	-	113	48.2	54.9	5.47	34.1	134	48.7	55.3	6.46	158	49.7	56.2	7.62	65.4	187	51.2	57.5	9.00	90.7
039	50	-	-	-	-	35.3	13.7	16.1	1.71	29.2	41.1	13.6	1.99	40.0	47.8	13.7	16.0	2.31	40.0	53.4	15.5	17.8	2.58	60.2
045		-	-	-	-	38.6	15.4	17.8	1.87	34.0	45.5	15.4	2.20	45.3	52.4	18.0	20.9	2.53	43.1	61.3	18.0	20.8	2.96	57.6
050		-	-	-	-	44.6	18.1	21.1	2.16	32.1	52.4	20.2	2.44	32.2	59.9	20.4	23.4	2.89	44.3	70.3	20.6	23.5	3.40	59.8
060		-	-	-	-	50.5	20.2	23.3	2.44	32.2	58.1	22.6	2.81	38.9	68.3	23.1	26.1	3.30	52.5	80.0	23.6	26.6	3.87	70.6
070		-	-	-	-	58.1	26.7	29.8	2.81	39.3	65.3	26.7	3.15	39.3	76.3	27.1	30.1	3.69	54.0	89.4	27.7	30.7	4.32	74.5
080		-	-	-	-	65.3	26.7	29.8	3.18	25.8	65.8	25.3	29.7	31.8	77.6	25.6	29.9	3.75	35.3	91.3	26.2	30.4	4.41	48.1
090		-	-	-	-	76.0	30.7	35.7	3.67	31.5	76.0	30.7	3.67	31.5	90.1	31.0	35.9	4.35	43.6	106	31.3	36.1	5.13	59.3
100		-	-	-	-	84.1	33.8	38.8	4.07	33.1	84.1	33.8	38.8	4.07	98.7	34.2	39.1	4.77	44.5	116	34.5	39.3	5.60	59.7
120		-	-	-	-	96.9	39.4	43.9	4.68	37.9	96.9	39.4	43.9	4.68	114	40.0	44.4	5.51	52.1	134	40.9	45.2	6.46	71.1
140		-	-	-	-	115	45.5	51.7	5.58	42.6	115	45.5	51.7	5.58	135	46.2	52.3	6.54	57.7	159	46.5	52.4	7.67	78.2
160		-	-	-	-	133	54.3	60.8	6.44	46.0	133	54.3	60.8	6.44	156	54.8	61.3	7.53	62.5	183	56.0	62.3	8.84	85.6

Legend:

LWT Leaving water temperature
 CAP kW Heating capacity
 COMP kW Compressor power input
 UNIT kW Gross unit power input (compressors, fans and control circuit)
 COND l/s Condenser water flow rate
 COND kPa Condenser pressure drop

Application data:

Standard units, refrigerant: R410A
 Condenser temperature rise: 5 K
 Condenser fluid: water
 Fouling factor: 0.18×10^{-4} (m² K)/W
 Performances in accordance with EN 14511

Air pressure drop

Selection of a ductable unit

The 30RBSY and 30RQSY ranges are designed for indoor installation in a plant room. For this type of installation the cold or hot air leaving the air-cooled air heat exchangers is discharged by the fans to the outside of the building, using a duct system.

The units are equipped with fans with available pressure, designed to operate with air discharge ducts with maximum pressure drops of 180 Pa or 240 Pa on certain sizes.

To compensate for these pressure drops this range of ductable units equipped with variable-speed fans with a maximum speed of 19 r/s.

In the cooling mode, the full-load or part-load speed is controlled by a patented algorithm that permanently optimises the condensing temperature to ensure the best unit energy efficiency (EER) whatever the operating conditions and pressure drops of the system ductwork.

In the heating mode, the full-load or part-load speed of each circuit is fixed and at the configured maximum (range configurable from 12 r/s to 19 r/s) based on the constraints and characteristics of the installation site. The maximum configured speed applies to both the heating and cooling mode.

Each refrigerant circuit (A and B) must have a separate ducting system to prevent any air recycling between the air heat exchangers of the different refrigerant circuits.

To collect the defrost water from the coils in the heating mode, 30RQSY units must be installed on an appropriate surface to permit efficient condensate drainage and evacuation and to prevent any risk of flooding at the site. A condensate collection pan is available for 30RBSY 039-080 and 30RQSY 039-078 units.

Selection based on the pressure drop

The cooling and heating capacities are given for an available pressure of 160 Pa and for a unit without filter.

To calculate the performances at other pressure drops please use the correction factors below.

Cooling mode

30RBSY 039-060/30RBSY 090-120 and 30RQSY 039-050/30RQSY 080-120

Duct pressure drop	Fan speed, r/s	Power input coefficient	Cooling capacity coefficient
0	12.00	0.943	1.019
50	13.33	0.962	1.012
100	14.66	0.980	1.006
130	15.46	0.990	1.003
160	16.26	1.000	1.000
200	17.31	1.012	0.998
240	18.36	1.023	0.996

30RBSY 070-080/30RBSY 140-160 and 30RQSY 060-078/30RQSY 140-160

Duct pressure drop	Fan speed, r/s	Power input coefficient	Cooling capacity coefficient
0	15.83	0.929	1.018
50	16.81	0.944	1.016
100	17.78	0.964	1.014
130	18.36	0.978	1.011
160	18.36	1.000	1.000
180	18.36	1.019	0.991

Heating mode

30RQSY 039-050/30RQSY 080-120

Duct pressure drop	Fan speed, r/s	Power input coefficient	Heating capacity coefficient
0	18.36	0.990	1.016
50	18.36	0.990	1.012
100	18.36	0.990	1.009
130	18.36	1.000	1.005
160	18.36	1.000	1.000
200	18.36	1.000	0.994
240	18.36	1.010	0.981

30RQSY 060-078/30RQSY 140-160

Duct pressure drop	Fan speed, r/s	Power input coefficient	Heating capacity coefficient
0	18.36	1.000	1.026
50	18.36	1.000	1.020
100	18.36	1.000	1.011
130	18.36	1.000	1.007
160	18.36	1.000	1.000
180	18.36	1.001	0.993

Note:

Pressure drop, clean filter = 6 Pa
 Pressure drop, dirty filter = 12 Pa

Hydronic module (option 116)

This module is equipped with pressure transducers to optimise unit operation at the hydronic level.

The hydronic module option reduces the installation time. The unit is factory-equipped with the main hydronic components required for the system: screen filter, water pump, expansion tank, safety valve and water pressure transducers.

The pressure transducers allow the Pro-Dialog+ control to:

- display the available pressure at the unit outlet and the static system pressure
- calculate the instantaneous flow rate, using an algorithm that integrates the unit characteristics
- integrate the system and water pump protection devices (lack of water, water pressure, water flow rate etc.)

Several water pump types are available: primary single or dual low-pressure pump or single or dual high-pressure pump.

An automatic pump start-up algorithm protects the heat exchanger and the hydronic module piping against frost down to -10°C outside temperature, if the water heat exchanger frost protection option is installed. If necessary increased frost protection down to -20°C is possible by adding heaters to the hydronic module piping (see option 42).

The hydronic module option is integrated into the unit without increasing its dimensions and saves the space normally used for the water pump.

Physical and electrical data, 30RBSY/RQSY

30RBSY/RQSY - units with hydronic module		039	045	050	060	070	078†	080	090	100	120	140	160
Operating weight*													
Single pump (30RBSY)	kg	488	496	519	545	531	-	562	867	877	912	1021	1085
Dual pump (30RBSY)	kg	514	522	545	571	557	-	588	912	922	960	1058	1122
Single pump (30RQSY)	kg	535	543	569	582	582	590	778	927	935	995	1099	1117
Dual pump (30RQSY)	kg	561	569	594	608	608	616	804	972	980	1043	1136	1127
Hydronic module													
Expansion tank volume	l	12	12	12	12	12	12	12	35	35	35	35	35
Maximum operating pressure	kPa	400	400	400	400	400	400	400	400	400	400	400	400
Water filter		Victaulic screen filter											
Low-pressure single and dual pumps													
Water pump		Pump, Victaulic screen filter, safety valve, expansion tank, purge valves (water and air), pressure sensors											
Shaft power input	kW	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	1.26	1.26	1.90	1.90
Power input**	kW	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.50	1.50	2.30	2.30
Nominal operating current draw	A	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.9	3.0	3.8	4.0
Maximum current draw at 400 V***	A	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	3.1	3.1	4.3	4.3
High-pressure single and dual pumps													
Water pump		Pump, Victaulic screen filter, safety valve, expansion tank, purge valves (water and air), pressure sensors											
Shaft power input	kW	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	2.56	2.56	2.56
Power input**	kW	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	3.00	3.00	3.00
Nominal operating current draw	A	3.1	3.2	3.2	3.3	3.3	3.4	3.4	3.5	3.6	5.0	5.1	5.3
Maximum current draw at 400 V***	A	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	5.8	5.8	5.8
Water connections (with hydronic module)													
Diameter	in	Victaulic											
Outside diameter	mm	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3

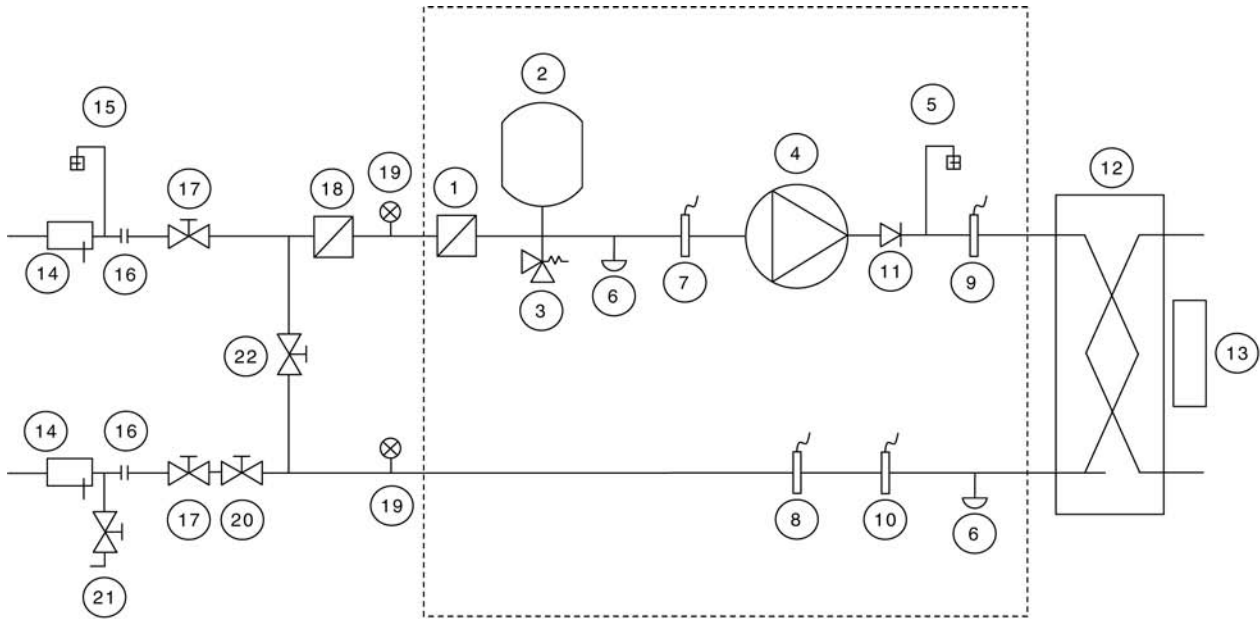
* Weight shown is a guideline only. To find out the unit refrigerant charge, please refer to the unit nameplate.

** To obtain the maximum power input of a unit with hydronic module, add the maximum unit power input to the pump power input (**).

*** To obtain the maximum current draw of a unit with hydronic module, add the maximum unit current draw to the pump current draw (**).

† 30RQSY only

Typical hydronic circuit diagram



Legend

Components of the unit and hydronic module

- 1 Victaulic screen filter
- 2 Expansion tank
- 3 Safety valve
- 4 Available pressure pump
Note: x 1 for a single pump, x 2 for a dual pump
- 5 Air purge
- 6 Water drain valve
Note: A second valve is located on the heat exchanger leaving piping
- 7 Pressure sensor
Note: Gives pump suction pressure information (see installation manual)
- 8 Temperature sensor
Note: Gives heat exchanger leaving temperature information (see installation manual)
- 9 Temperature sensor
Note: Gives heat exchanger entering temperature information (see installation manual)
- 10 Pressure sensor
Note: Gives unit leaving pressure information (see installation manual)
- 11 Check valve
Note: x 2 for a dual pump, not provided for a single pump
- 12 Plate heat exchanger
- 13 Water heat exchanger frost protection heater

Installation components

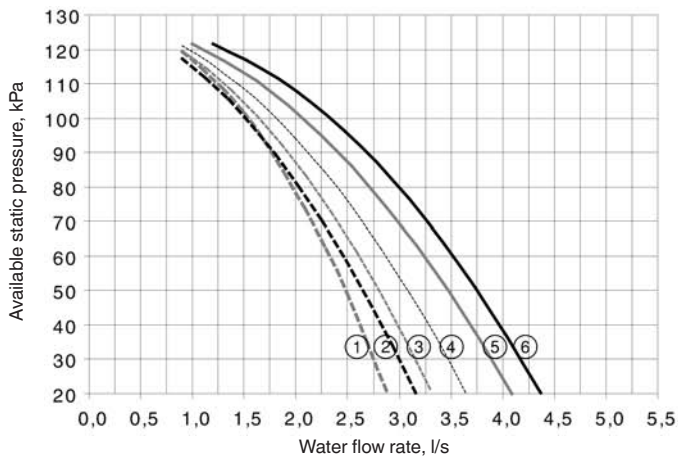
- 14 Temperature probe well
- 15 Air vent
- 16 Flexible connection
- 17 Shut-off valve
- 18 Screen filter (obligatory for a unit without hydronic module)
- 19 Pressure gauge
- 20 Water flow control valve
Note: Not necessary for a hydronic module with a variable-speed pump
- 21 Charge valve
- 22 Frost protection bypass valve (when shut-off valves [17] are closed during winter)

Notes:

- Units without hydronic module are equipped with a flow switch and two temperature sensors (8 and 9).
- The pressure sensors are installed on connections without Schrader valve.
- Depressurise and empty the system before any intervention.

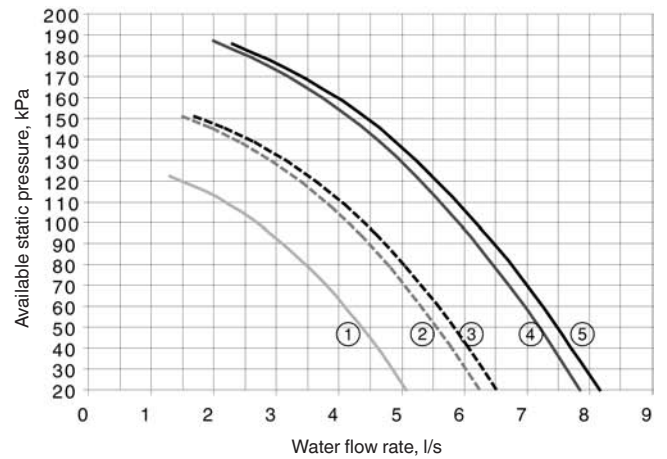
Available static system pressure, 30RBSY

Low-pressure pump



Legend

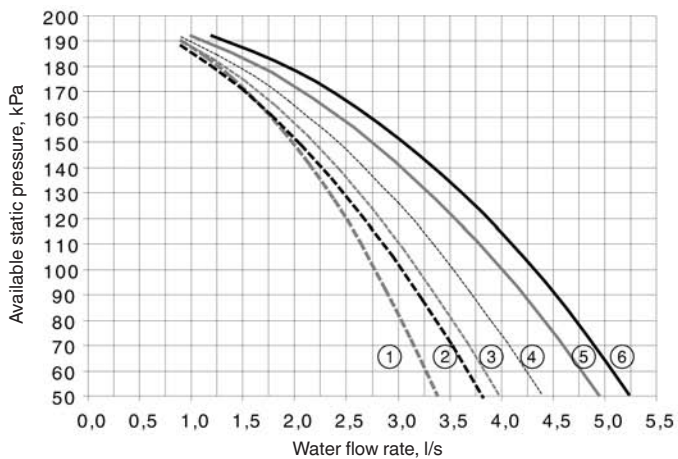
- 1. 30RBSY 039
- 2. 30RBSY 045
- 3. 30RBSY 050
- 4. 30RBSY 060
- 5. 30RBSY 070
- 6. 30RBSY 080



Legend

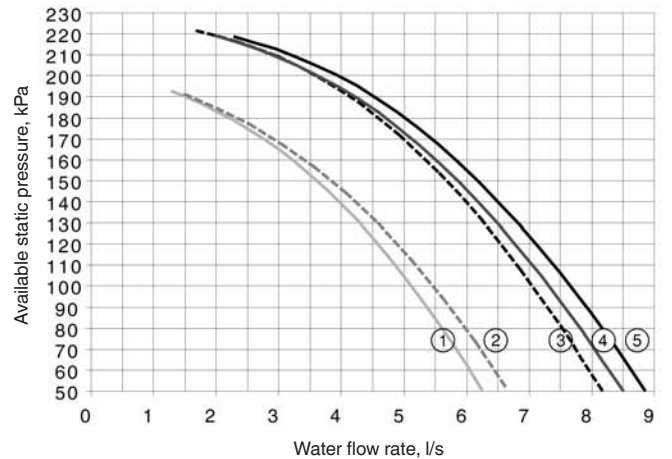
- 1. 30RBSY 090
- 2. 30RBSY 100
- 3. 30RBSY 120
- 4. 30RBSY 140
- 5. 30RBSY 160

High-pressure pump



Legend

- 1. 30RBSY 039
- 2. 30RBSY 045
- 3. 30RBSY 050
- 4. 30RBSY 060
- 5. 30RBSY 070
- 6. 30RBSY 080

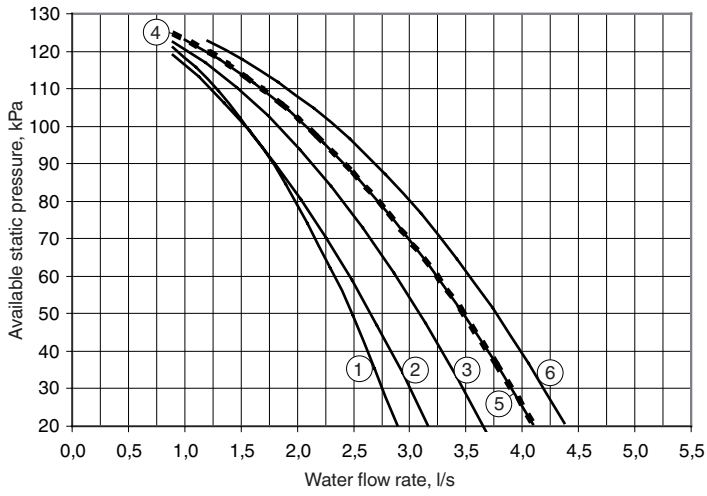


Legend

- 1. 30RBSY 090
- 2. 30RBSY 100
- 3. 30RBSY 120
- 4. 30RBSY 140
- 5. 30RBSY 160

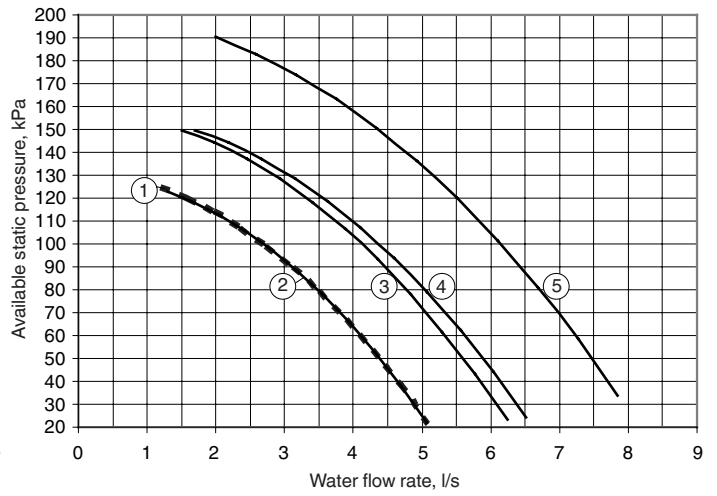
Available static system pressure, 30RQSY

Low-pressure pump



Legend

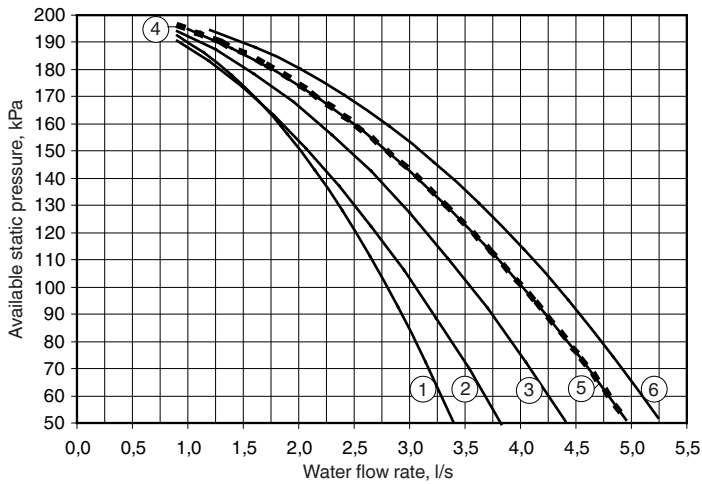
- 1. 30RQSY 039
- 2. 30RQSY 045
- 3. 30RQSY 050
- 4. 30RQSY 060
- 5. 30RQSY 070
- 6. 30RQSY 078



Legend

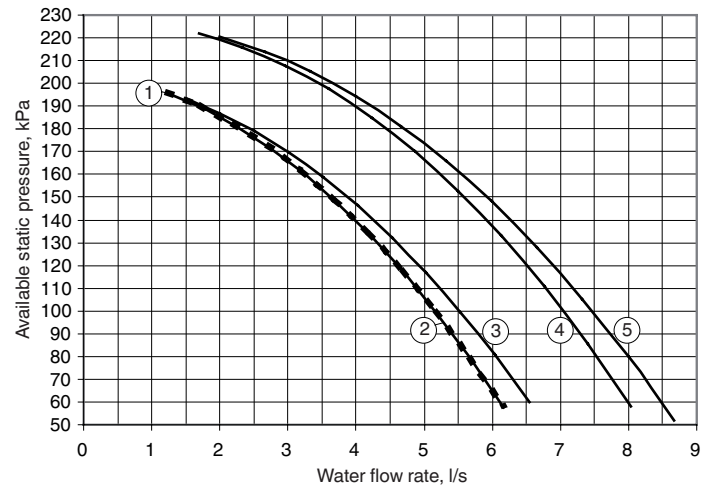
- 1. 30RQSY 080
- 2. 30RQSY 090
- 3. 30RQSY 100
- 4. 30RQSY 120
- 5. 30RQSY 140

High-pressure pump



Legend

- 1. 30RQSY 039
- 2. 30RQSY 045
- 3. 30RQSY 050
- 4. 30RQSY 060
- 5. 30RQSY 070
- 6. 30RQSY 078



Legend

- 1. 30RQSY 080
- 2. 30RQSY 090
- 3. 30RQSY 100
- 4. 30RQSY 120
- 5. 30RQSY 140

Variable water flow system (VWF)

Variable water flow is a hydronic control function package that permits control of the water flow rate.

The VWF not only ensures control at full load, a specific Carrier algorithm linked to an electronic frequency converter also continuously modulates the flow rate to minimise pump consumption at full load as well as part load.

The hydronic module includes pressure transducers that permit intelligent measurement of the water flow rate and real-time display on the Pro-Dialog+ interface. All adjustments can be made directly on the interface, speeding up start-up and maintenance.

As VWF acts directly on the pump, the system no longer requires the control valve at the unit outlet. However, for applications with two-way valves a bypass system must be kept to guarantee the minimum flow rate.

Operating logic

■ Full-load set point

The flow rate control at full load uses the Pro-Dialog+ interface, reducing the pump speed. This first control saves energy that would normally be dissipated in the control valve. For example, if the pressure supplied by the pump is reduced by 20% the power consumption of the pump is reduced by the same ratio, compared to a traditional installation.

■ Operating mode at part load

Pro-Dialog+ includes two part-load operating modes:

- Constant outlet pressure control
- Constant delta T control.

1 – Constant unit outlet pressure control

The control continuously acts on the pump speed to ensure a constant outlet pressure.

This solution is suitable for installations with two-way valves. When these close, the water speed will accelerate in the system branches that are still open. For a fixed-speed pump this results in an unnecessary increase of the pressure at the pump outlet.

The outlet pressure control mode ensures that each circuit branch always has a uniform supply, without unnecessary energy waste.

In industrial processes such as plastic injection moulding, this solution ensures that each terminal unit has the correct pressure supply.

2 – Constant delta T control

The VWF algorithm maintains a constant delta T no matter what the unit load, reducing the flow rate to the minimum.

This solution can be used for systems with two-way or three-way valves and achieves higher energy savings than the “Constant unit outlet pressure control” mode. It is suitable for the majority of comfort applications.

Energy saving simulation

On the following pages you will find a comparative study of full-load and part-load energy consumption with and without the use of VWF.

Example using model 30RBSY 100

- System with delta T = 5 K
- Internal unit pressure drops = 52 kPa
- The circuit includes 40 terminal units equipped with valves
- Pressure drop, terminal units with valves = 50 kPa
- Average pressure drop in the distribution system = 50 kPa
- Required system pressure = 100 kPa
- Part load = 25% of the valves closed

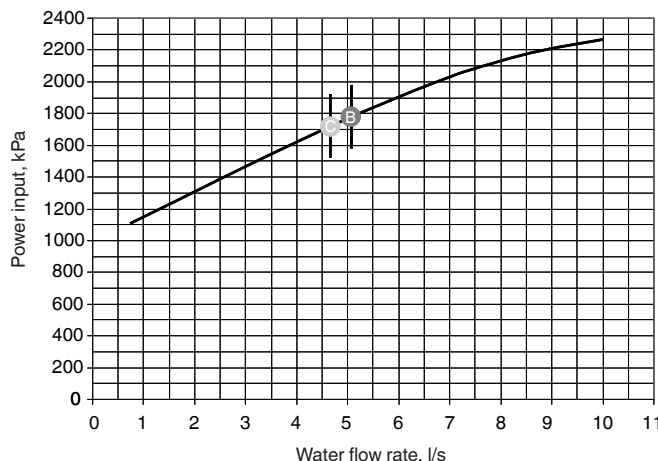
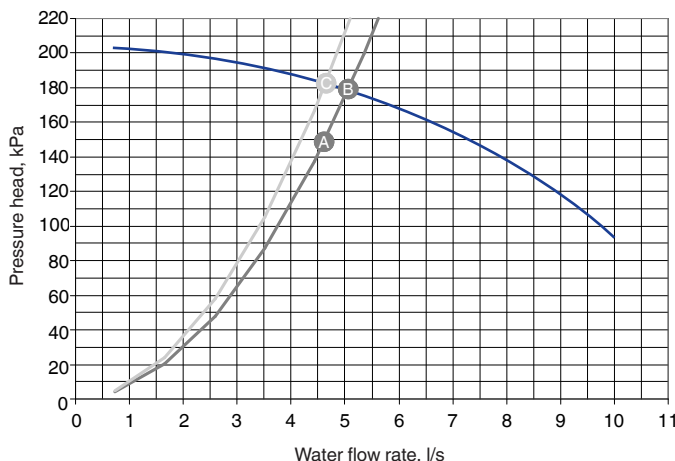
■ Full load consumption

1 – Fixed-speed pump (without VWF)

In order to settle the system at a correct delta T and flow rate at full load, the control valve at the unit outlet must be adjusted to obtain a pressure drop of 32 kPa after the unit. The impact on the energy consumption is not measurable.

- A = Ideal operating point
- B = Flow rate/pressure without control
- C = Flow rate/pressure after control

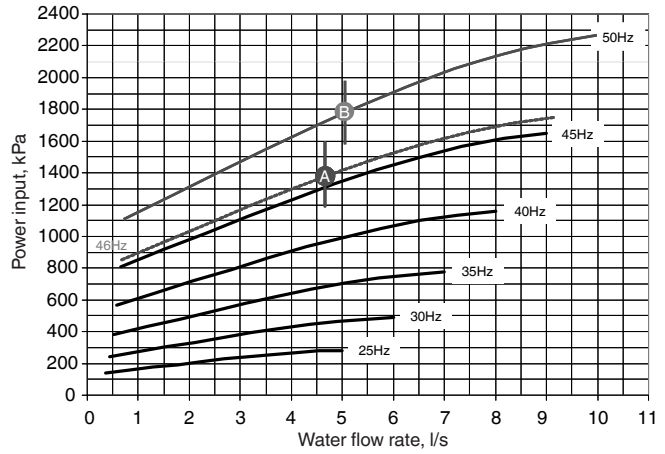
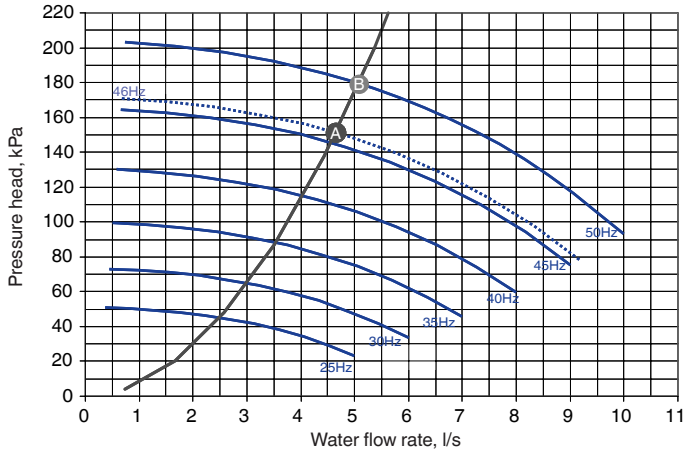
Curves, pump pressure head and power input/water flow rate (fixed speed)



2 – VWF system

The flow rate control uses the Pro-Dialog+ interface to modify the rotational speed of the pump. The reduction in consumption is more significant (20%) as both flow rate and pressure at the pump outlet are affected.

Curves, pump pressure head and power input/water flow rate (with VWF)



■ Consumption at part load and 25% of the valves closed

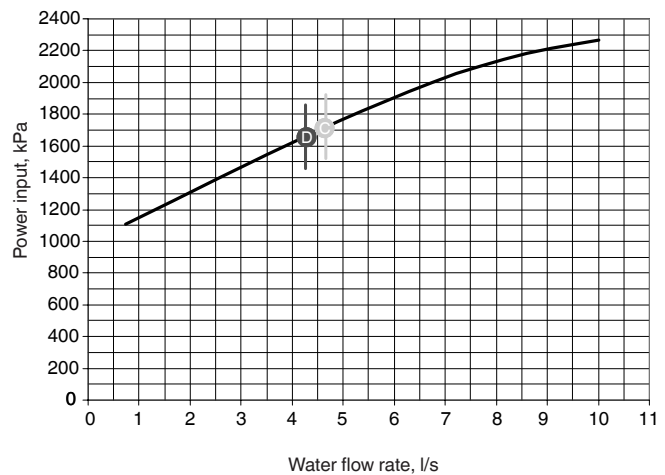
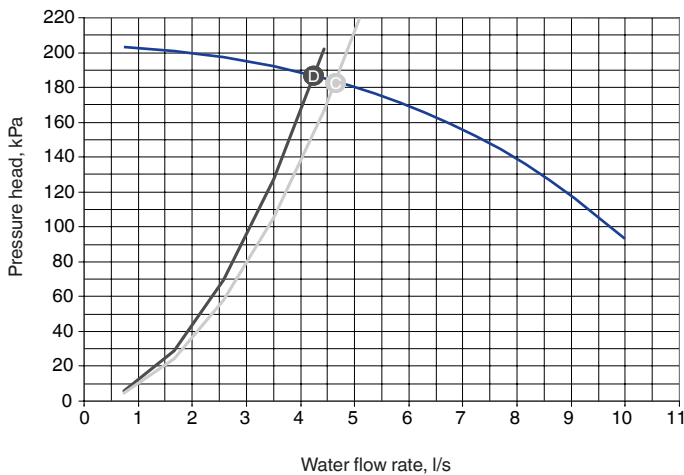
1 – Fixed-speed pump (without VWF)

Closing the two-way valves modifies the system pressure which will in turn affect the flow rate, but will only reduce the energy consumption of the pump by 3%.

With a three-way valve the variation is not measurable.

- C = Flow rate/pressure after control
- D = Flow rate/pressure with 25% of the two-way valves closed.

Curves, pump pressure head and power input/water flow rate (fixed speed)



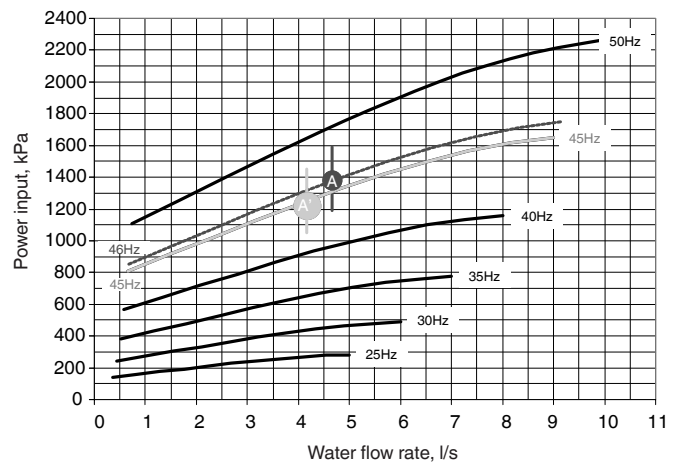
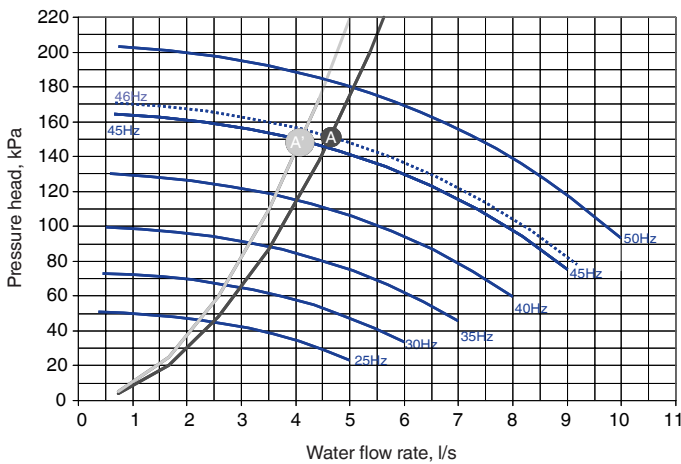
2 – VWF system

Constant unit outlet pressure control mode

- A = Flow rate/pressure at full load
- A' = Flow rate/pressure at part load with two-way valves

Note: Three-way valves have no or little impact on the flow rate and the pressure.

Curves, pressure head and power input/water flow rate, pumps with VWF and constant pressure

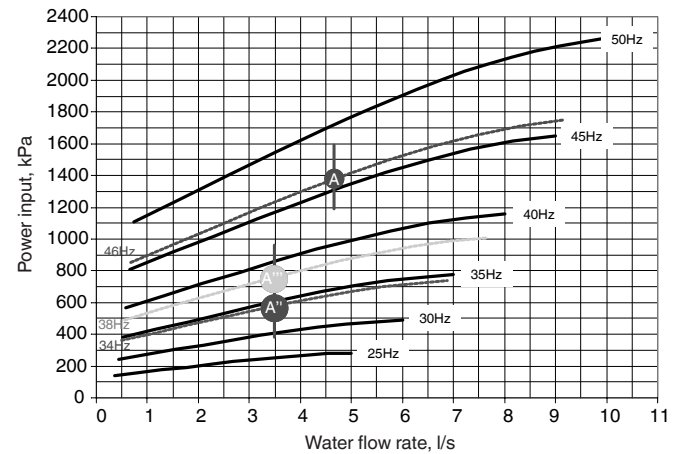
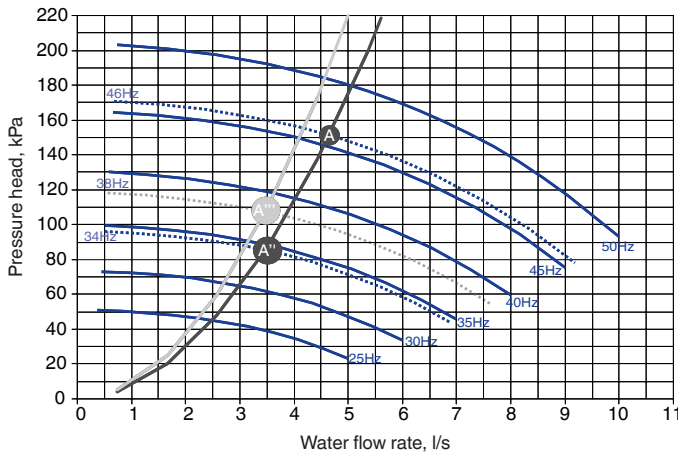


Constant delta T control mode

- A = Flow rate/pressure at full load
- A'' = Flow rate/pressure at part load with three-way valves
- A''' = Flow rate/pressure at part load with two-way valves

This solution allows the most significant energy savings, as the VWF continuously acts not only on the flow rate, but also on the pressure, both with two-way and three-way valves.

Curves, pressure head and power input/water flow rate, pumps with VWF and constant delta T



Energy consumption for this example

30RBSY system with 2-way valves	Full load	Part load
Fixed speed	1720 W (100%)	1660 W (97%)
VWF system		
Pressure control	1380 W (80%)	1250 W (73%)
Delta T control	1380 W (80%)	760 W (44%)

30RBSY system with 3-way valves	Full load	Part load
Fixed speed	1720 W (100%)	1720 W (100%)
VWF system		
Pressure control	1380 W (80%)	1380 W (80%)
Delta T control	1380 W (80%)	580 W (34%)

Carrier is participating in the Eurovent Certification Programme for liquid chilling packages. Products are as listed in the Eurovent Directory of Certified Products or on the Internet site www.eurovent-certification.com.



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