Carrier

30RQ 262-522

Reversible Air-to-Water Heat Pumps with Integrated Hydronic Module

Nominal cooling capacity 240-465 kW
Nominal heating capacity 270-560 kW

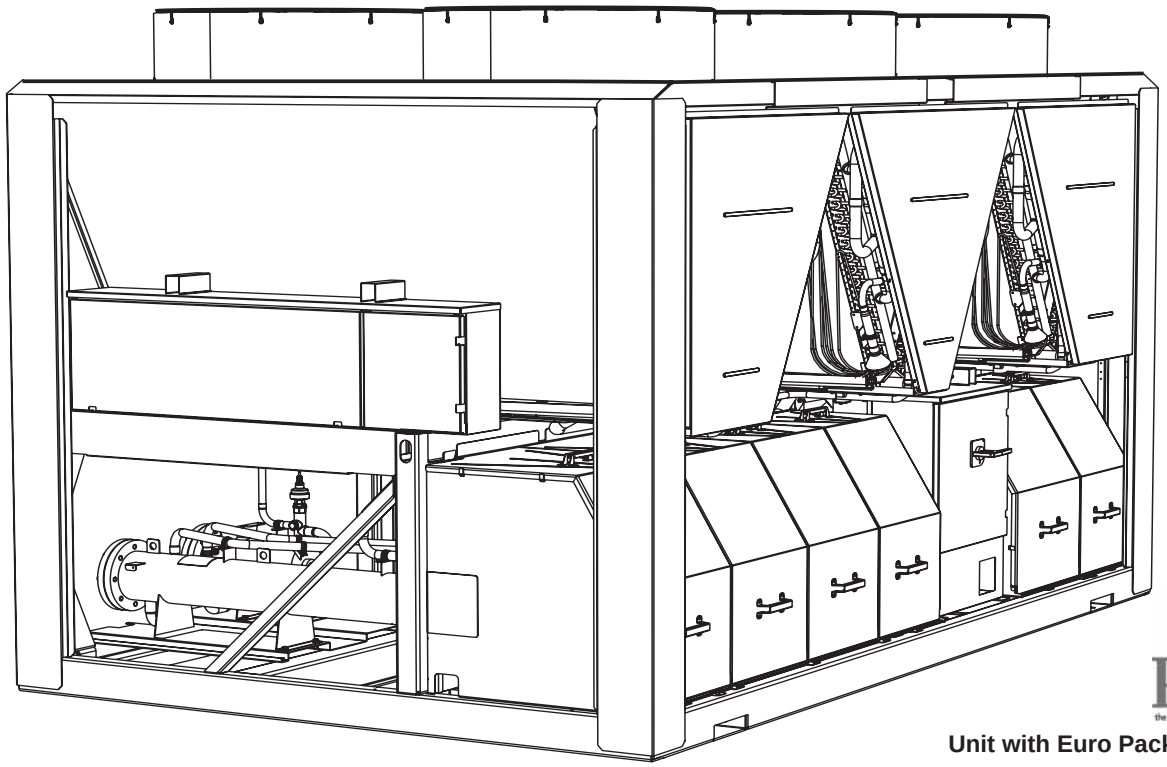
50 Hz

PRO-DIALOG PLUS

AQUASNAP™ with PURON® refrigerant

EUROVENT CERTIFIED PERFORMANCE

Carrier is participating in the Eurovent Certification Programme. Products are as listed in the Eurovent Directory of Certified Products.



Puron the environmentally sound refrigerant

Unit with Euro Pack option shown

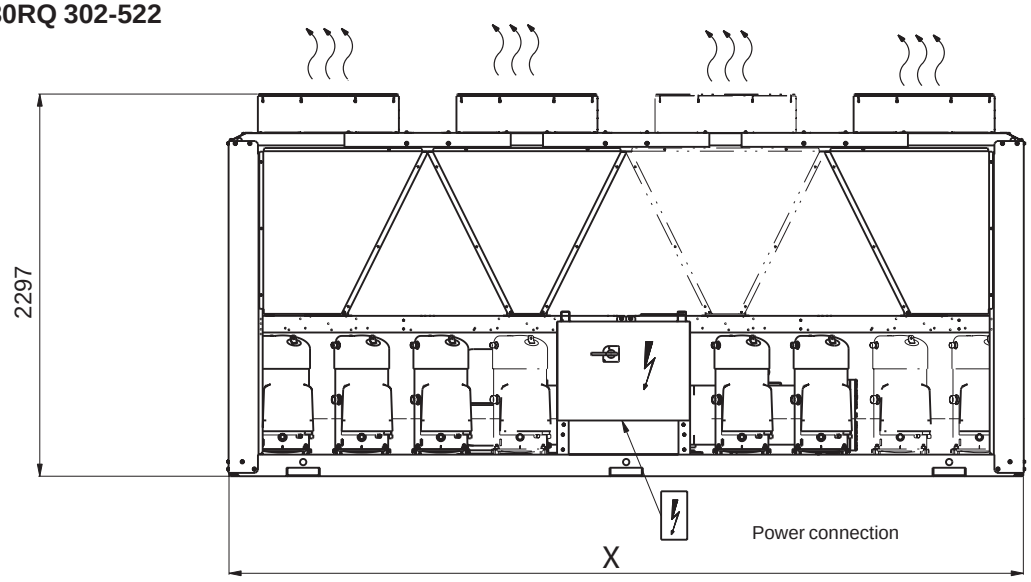
Installation, operation and maintenance instructions

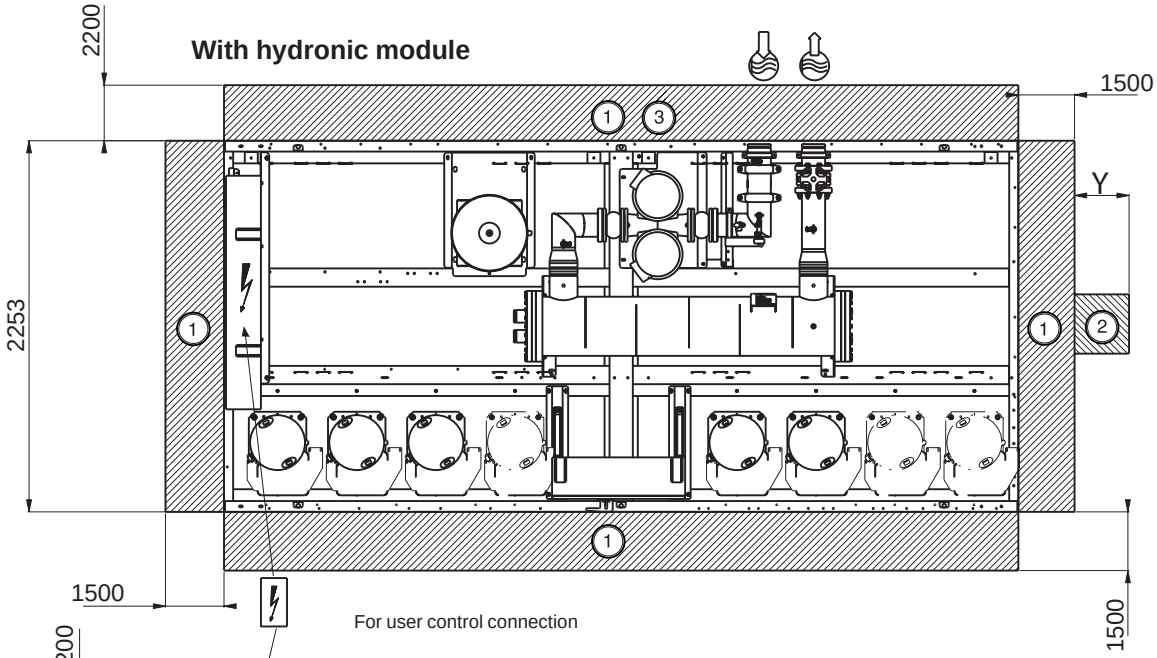
LLOYD'S REGISTER QUALITY ASSURANCE ISO9001 · UKAS QUALITY MANAGEMENT 001

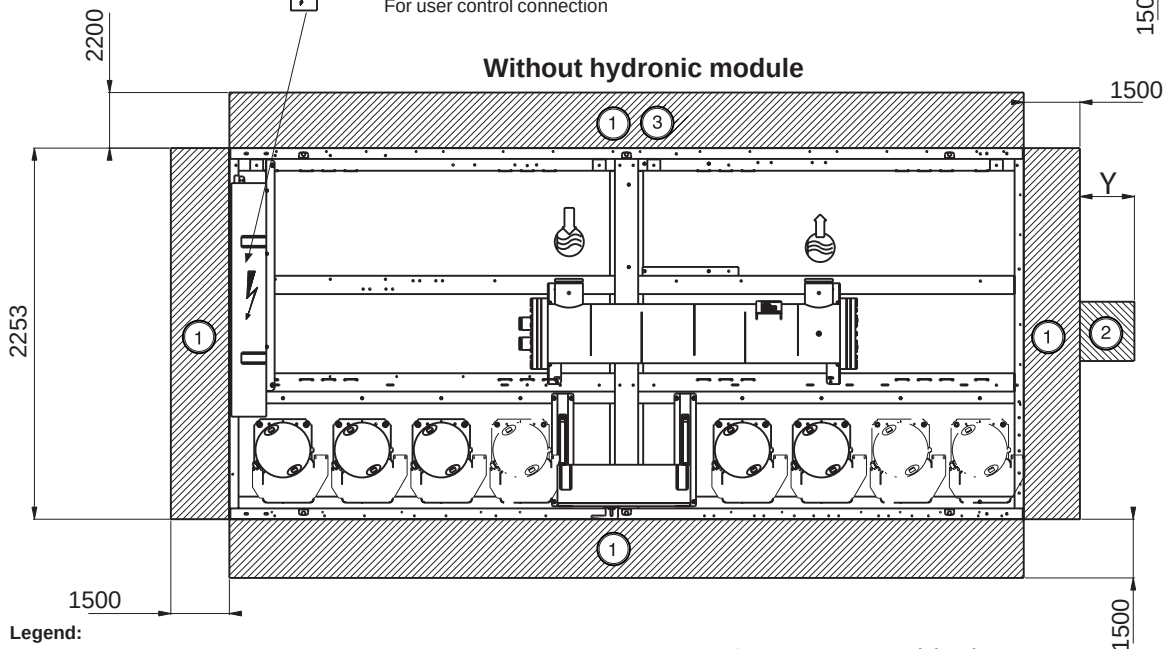
Quality Management System Approval

3.2 - 30RQ 302-522

30RQ	X	Y
302-402	3604	200
432-522	4798	0







Legend:

1. Clearances required for maintenance and air flow
2. Clearances recommended for heat exchanger tube removal
3. Clearances recommended for heat exchanger removal

Water inlet

Water outlet

Air outlet, do not obstruct

NOTE: Non-contractual drawings.

When designing an installation, refer to the certified dimensional drawings, available on request.

For the positioning of the fixing points, weight distribution and centre of gravity coordinates.

All dimensions are in mm

4 - PHYSICAL DATA - 30RQ

30RQ		262	302	342	372	402	432	462	522
Nominal cooling capacity*	kW	243	275	310	331	366	389	430	465
Total power input, cooling mode*	kW	98	106	122	125	146	150	166	192
Nominal heating capacity**	kW	273	307	344	364	413	450	510	560
Total power input, heating mode**	kW	95	110	123	126	148	158	180	201
Sound levels 10^{-12} W†	**dB(A)**								
Unit with Euro Pack option		89	90	90	91	91	92	92	92
Standard unit		91	92	92	93	93	94	94	94
Operating weight***									
Standard unit with Euro Pack option	kg	2619	3285	3481	3544	3718	4328	4530	4704
Standard unit with Euro Pack option and high-pressure dual-pump hydronic module option	kg	2864	3590	3786	3889	4063	4673	4945	5119
Unit without options****	kg	2429	3045	3241	3284	3458	4028	4210	4384
Refrigerant		R-410A							
Circuit A	kg	27	41	41	53	54	54	53	54
Circuit B	kg	27	27	27	32	32	47	53	53
Compressors		Hermetic scroll 48.3 r/s							
Circuit A		2	3	3	4	4	4	4	4
Circuit B		2	2	2	2	2	3	4	4
No. of control stages		4	5	5	6	6	7	8	8
Minimum capacity	%	25	18	20	15	17	13	11	13
Control		PRO-DIALOG Plus							
Air heat exchangers		Grooved copper tubes and aluminium fins							
Fans		Axial FLYING BIRD 4 with rotating shroud							
Quantity		4	5	5	6	6	7	8	8
Total air flow	l/s	18056	22569	22569	27083	27083	31597	36111	36111
Speed	r/s	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
Water heat exchangers		Direct-expansion, two circuits, shell-and-tube							
Water volume	l	110	110	125	113	113	113	113	113
Max. water-side operating pressure without hydronic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000
Hydronic module (option)		Pump, Victaulic screen filter, safety valve, expansion tank, pressure gauge, purge valves (water and air) and water flow control valves							
Water pump		Centrifugal, monocell, 48.3 r/s, low or high pressure (as required), single or dual pump							
Quantity		1	1	1	1	1	1	1	1
Expansion tank volume	l	50	80	80	80	80	80	80	80
Max. water-side operating pressure with hydronic module	kPa	400	400	400	400	400	400	400	400
Water connections without hydronic module		Victaulic							
Connections	in.	4	4	4	6	6	6	6	6
Outside tube diameter	mm	114.3	114.3	114.3	168.3	168.3	168.3	168.3	168.3
Water connections with hydronic module		Victaulic							
Connections	in.	4	4	4	5	5	5	5	5
Outside tube diameter	mm	114.3	114.3	114.3	139.7	139.7	139.7	139.7	139.7

* Standardised Eurovent conditions: water heat exchanger entering/leaving water temperature 12°C/7°C, outside air temperature 35°C, water heat exchanger fouling factor 0.000018 m^2 K/W (rounded values, for information only).

** Standardised Eurovent conditions: water heat exchanger entering/leaving water temperature 40°C/45°C, outside air temperature 7°C, 87% rh (rounded values, for information only).

*** Weights are for guidance only. To find out the unit refrigerant charge, please refer to the unit name plate.

**** Standard unit: Base unit without Euro Pack option and hydronic module.

† In accordance with ISO 9614-1 and Eurovent certified (rounded values, for information only).

5 - ELECTRICAL DATA - 30RQ

30RQ		262	302	342	372	402	432	462	522
Power circuit									
Nominal power supply	V-ph-Hz	400-3-50							
Voltage range	V	360-440							
Control circuit supply		24 V, via internal transformer							
Nominal unit current draw*									
Circuit A + B (one power supply)	A	167	185	209	219	251	269	302	334
Maximum unit power input**									
Circuit A + B (one power supply)	kW	127	140	159	166	191	204	229	255
Unit power factor at max. capacity**		0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Maximum unit current draw (Un-10%)***									
Circuit A + B (one power supply)	A	239	263	299	311	359	383	430	478
Max. operating current (Un)******									
Circuit A + B (one power supply)	A	219	241	274	285	329	351	394	438
Max. start-up current, standard unit (Un)†									
Circuit A + B†	A	426	448	481	492	536	558	601	645
Max. start-up current, unit with soft starter (Un)†									
Circuit A + B†	A	356	378	411	433	466	489	521	575

* Standardised Eurovent conditions: water heat exchanger entering/leaving water temperature 12°C/7°C, outside air temperature 35°C
** Power input of the compressor(s) + fan(s) at maximum unit operating conditions saturated suction temperature 10°C, saturated condensing temperature 65°C at 400 V nominal voltage (Values given on the unit name plate).
*** Maximum unit operating current at maximum unit power input and 380 V.
**** Maximum unit operating current at maximum unit power input and 400 V (Values given on the unit name plate).
† Maximum instantaneous starting current at operating limit values (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).

Fan motor electrical data: current draw used in the tables above – units at Eurovent conditions and 50°C ambient air temperature around the motor at 400 V: 3.8 A, start-up current 20 A, power input 1.75 kW. These values are indicated on the motor name plate.

5.1 - Short-circuit stability current

Short-circuit stability current (TN system)*		262	302	342	372	402	432	462	522
Unit without main disconnect									
With fuses upstream - maximum fuse values assigned									
Circuits A and B	A gL/gG	500	500	500	500	500	630/500	630/500	630/500
With fuses upstream - rms value									
Circuits A and B	kA	70	70	70	70	70	60/70	60/70	60/70
Unit with optional main disconnect without fuse									
Without fuse - short-time current (1s) rms value/peak									
Circuits A and B	kA/kA	13/26	13/26	13/26	13/26	13/26	15/30	15/30	15/30
With fuses upstream - maximum fuse values assigned									
Circuits A and B	gL/gG A	400	400	400	400	400	500	630	630
With fuses upstream - rms value									
Circuits A and B	kA	50	50	50	50	50	50	50	50
Unit with optional main disconnect with fuse									
Short-circuit stability current increased with fuses - maximum fuse values assigned									
Circuits A and B	gL/gG A kA	250	315	315	400	400	400	630	630
Short-circuit stability current increased with fuses - rms value									
Circuits A and B	gL/gG A kA	50	50	50	50	50	50	50	50

* Type of system earthing

IT system:
The short circuit current stability values given above for the TN system are also valid for IT for units 30RQ 302 to 522.
For units 30RQ 262 modifications are required.

6 - APPLICATION DATA

6.1 - Unit operating range

Cooling mode			
Water heat exchanger (evaporator)		**Minimum**	**Maximum**
Entering water temperature at start-up	°C	6.8*	30
Leaving water temperature during operation	°C	5	15
Entering water temperature at shut-down	°C	-	60
Air heat exchanger (condenser)**			
Air entering temperature	°C	0	46
Available static presssure	Pa	0	0
Heating mode			
Water heat exchanger (condenser)		**Minimum**	**Maximum**
Entering water temperature at start-up	°C	8	45
Leaving water temperature during operation	°C	20	50
Entering water temperature at shut-down	°C	3	60
Air heat exchanger (evaporator)			
Air entering temperature**	°C	-10	35

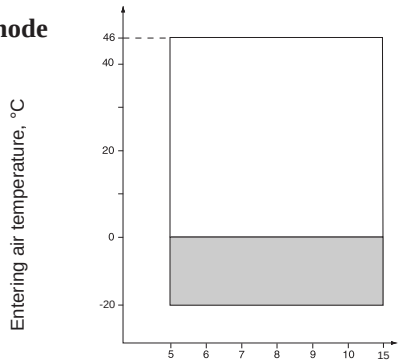
Notes:
Do not exceed the maximum operating temperature.

* For applications requiring a temperature below 6.8°C, please contact Carrier SCS.

** For operation down to -20°C the unit must be equipped with option 28 (winter operation). In addition the unit must either be equipped with the frost protection option or the water loop must be protected by the installer by adding a frost protection solution.
Maximum outside temperatures: During storage and transport the minimum and maximum temperatures must not exceed -20°C and +48°C. It is recommended to observe these temperatures during transport by container.

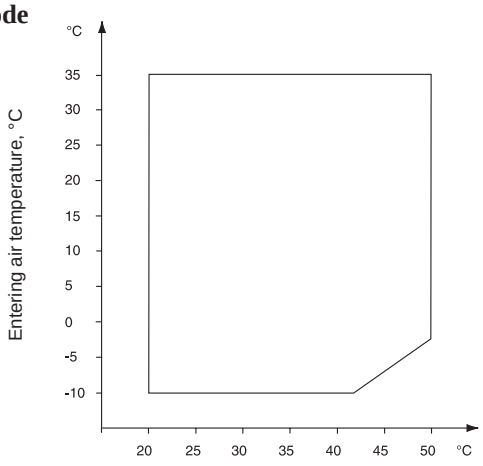
Operating range 30RQ

Cooling mode



Leaving water heat exchanger water temperature, °C

Heating mode



Leaving air heat exchanger water temperature, °C

Note: Water heat exchanger and air heat exchanger ΔT = 5 K

Legend:

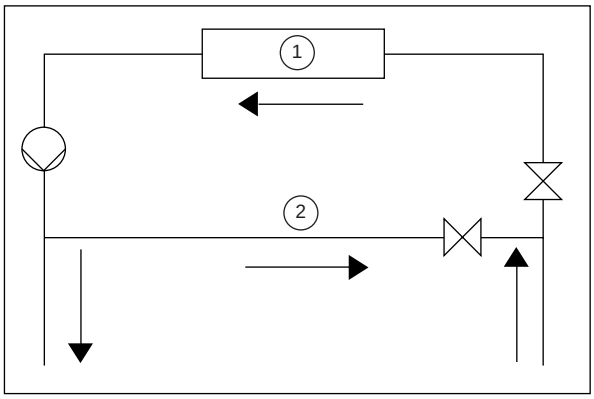
Standard unit operating at full load.

Operating range for units equipped with option 28 "Winter operation": Moreover the unit must either be equipped with the water heat exchanger frost protection option or the water loop must be protected against frost by the installer, using an anti-freeze solution.

ATTENTION: Option 28 "Winter operation"
If the outside temperature is below -10°C and the unit has been switched off for more than 4 hours, it is necessary to wait 2 hours after the unit has been switched on again to allow the frequency converter to warm up.

6.2 - Minimum chilled water flow (units without hydronic module)

The minimum chilled water flow is shown in the table on the next page. If the system flow is less than this, the water heat exchanger flow can be recirculated, as shown in the diagram.

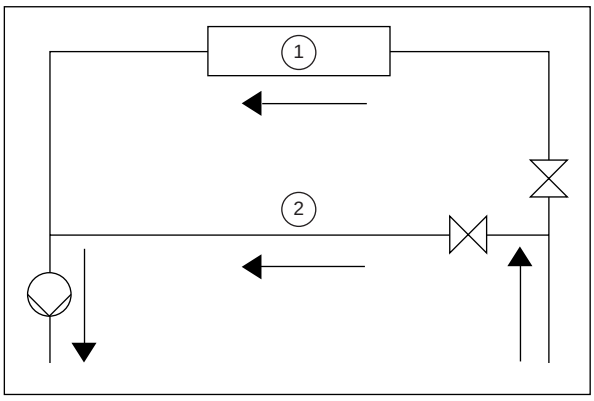


Legend
1 Water heat exchanger
2 Recirculation

6.3 - Maximum chilled water flow (units without hydronic module)

The maximum chilled water flow is shown in the table on the next page. If the system flow exceeds the maximum value, it can be bypassed as shown in the diagram.

For maximum chilled water flow rate

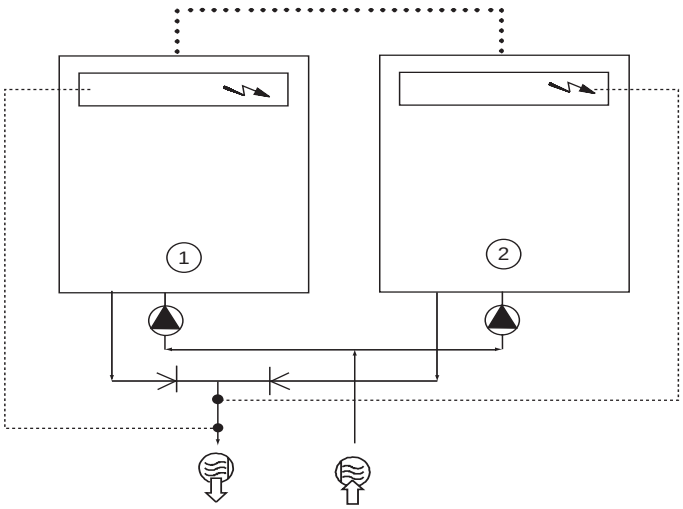


Legend
1 Water heat exchanger
2 Bypass

All parameters, required for the master/slave function must be configured using the Service Configuration menu. All remote controls of the master/slave assembly (start/stop, set point, load shedding etc.) are controlled by the unit configured as master and must only be applied to the master unit.

Each unit controls its own water pump. If there is only one common pump, in cases with variable flow, isolation valves must be installed on each unit. They will be activated at the opening and closing by the control of each unit (in this case the valves are controlled using the dedicated water pump outputs). See the 30RB/RQ Pro-Dialog Plus Control IOM for a more detailed explanation.

30RQ with configuration: leaving water control



Legend

1 Master unit
2 Slave unit

Control boxes of the master and slave units

Water inlet

Water outlet

Water pumps for each unit (included as standard for units with hydronic module)

Additional sensors for leaving water control, to be connected to channel 1 of the slave boards of each master and slave unit

CCN communication bus

Connection of two additional sensors

8.6 - Supplementary electric resistance heaters

To permit staging of the capacity reduction of the heat pump at low ambient temperatures, as shown in the diagram below, it is possible to install supplementary electric heaters in the leaving water line. Their capacity can compensate for the capacity drop of the heat pump.

These heaters can be controlled via an electronic card mounted on a board (accessory).

Four outputs are available to control the heater contactors (not supplied with the board), permitting gradual compensation of the heat pump capacity reduction.

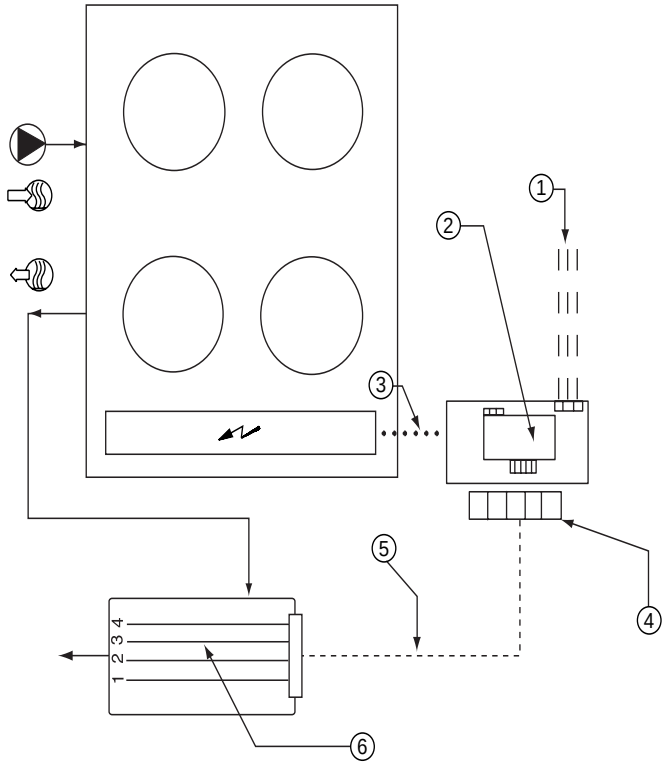
These outputs are configurable to obtain a choice of two, three or four stages. The last stage will only be activated after a shut-down of the heat pump following a fault condition (safety device).

In the diagram below “example of additional electric heaters” the capacity of the four heaters is the same as the capacity of the heat pump at 7°C outdoor air temperature.

This requires only a 400 V-3 ph-50 Hz power supply source, as well as a connection to the unit via a communication bus.

For the required configuration of the stages consult the 30RB/RQ Pro-Dialog Plus Control IOM.

Typical accessory installation diagram

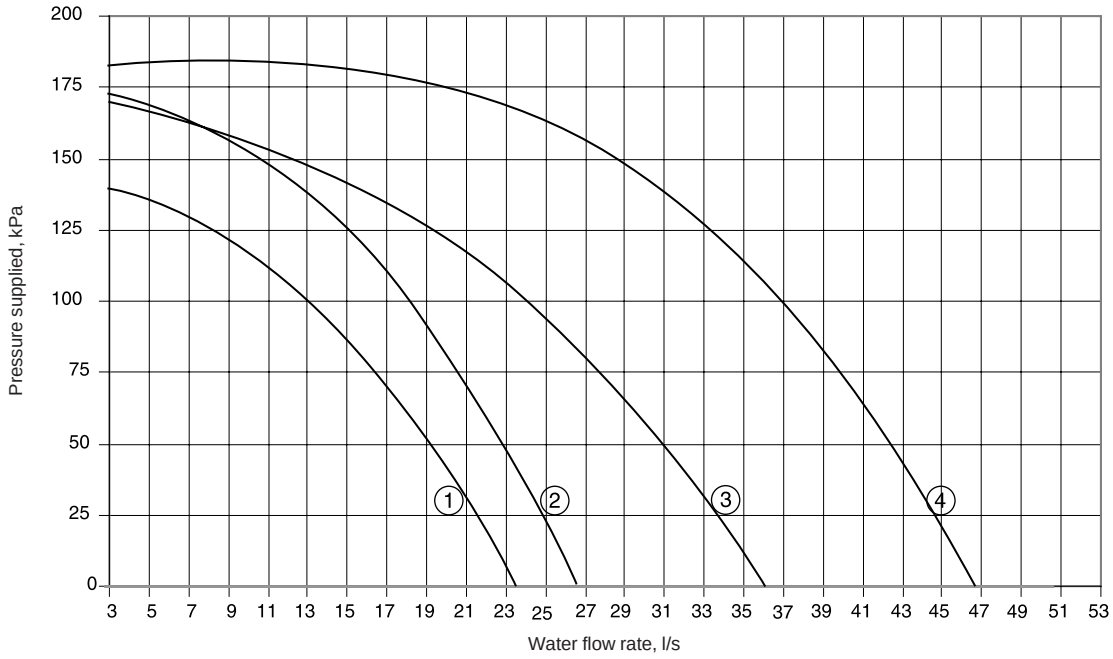


Legend

1 Electric heater power supply 400 V-3 ph-50 Hz
2 Accessory control board for four additional electric heaters
3 Internal communication bus
4 Heater stage control contactors
5 Power supply for additional heaters
6 Supplementary electric resistance heaters

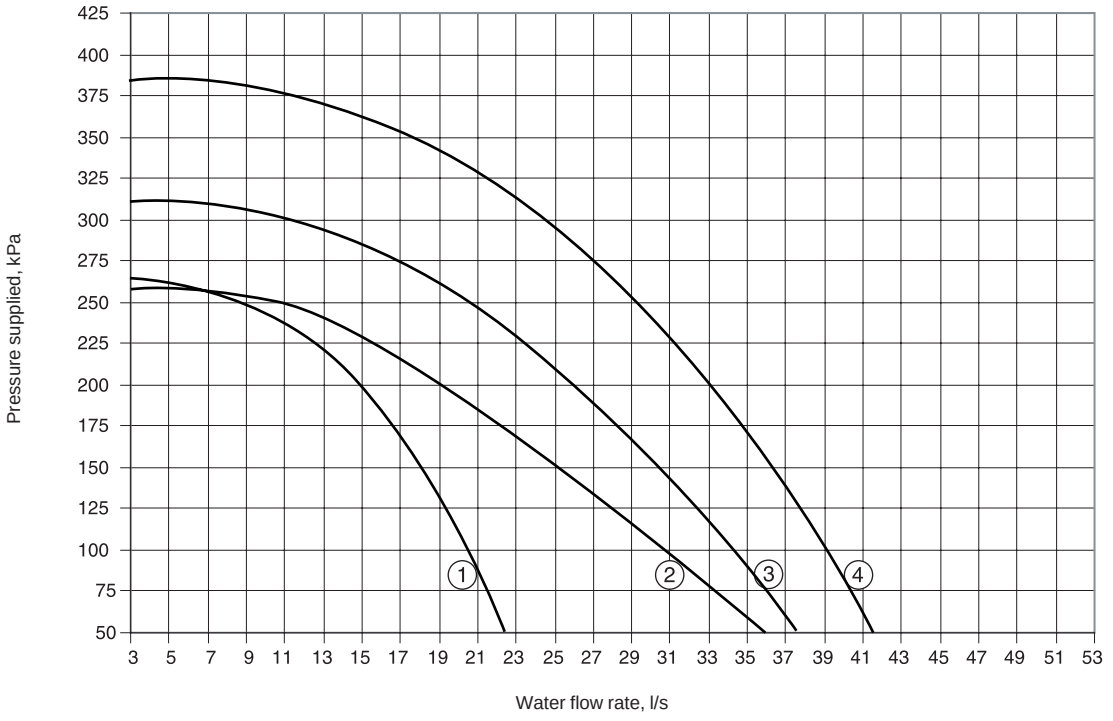
9.2 - Pump pressure/flow rate curves

Low-pressure pumps



Legend
1 30RQ 262
2 30RQ 302-342
3 30RQ 372-402-432
4 30RQ 462-522

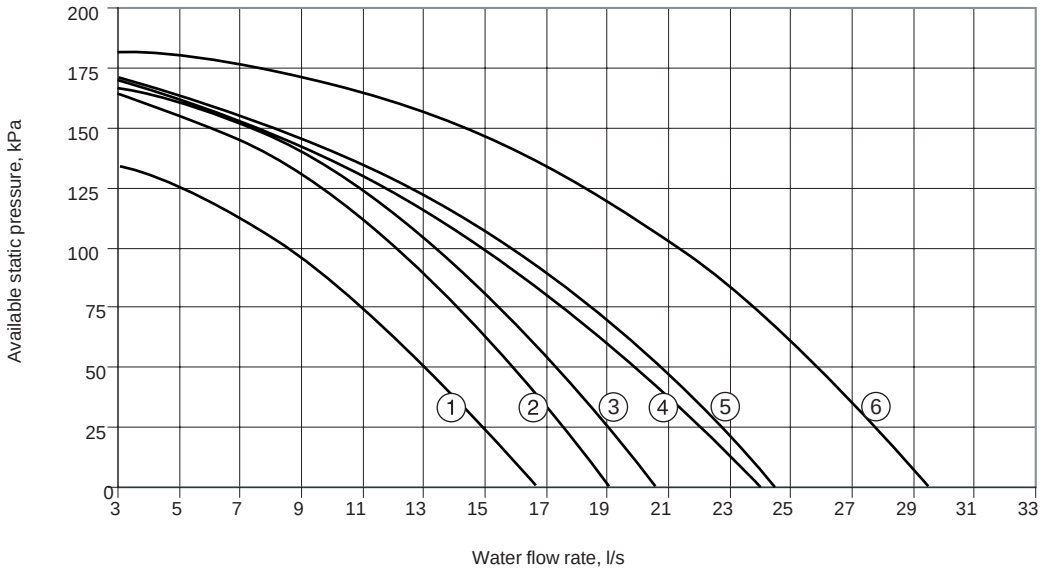
High-pressure pumps



Legend
1 30RQ 262
2 30RQ 302-342
3 30RQ 372-402-432
4 30RQ 462-522

9.3 - Available static system pressure

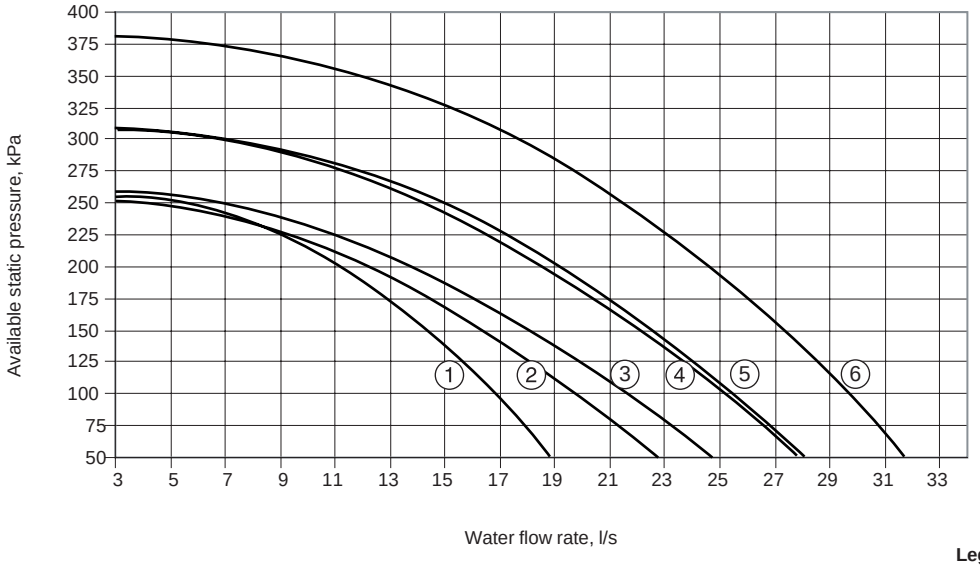
Low-pressure pumps



Legend

1 30RQ 262
2 30RQ 302
3 30RQ 342
4 30RQ 372
5 30RQ 402-432
6 30RQ 462-522

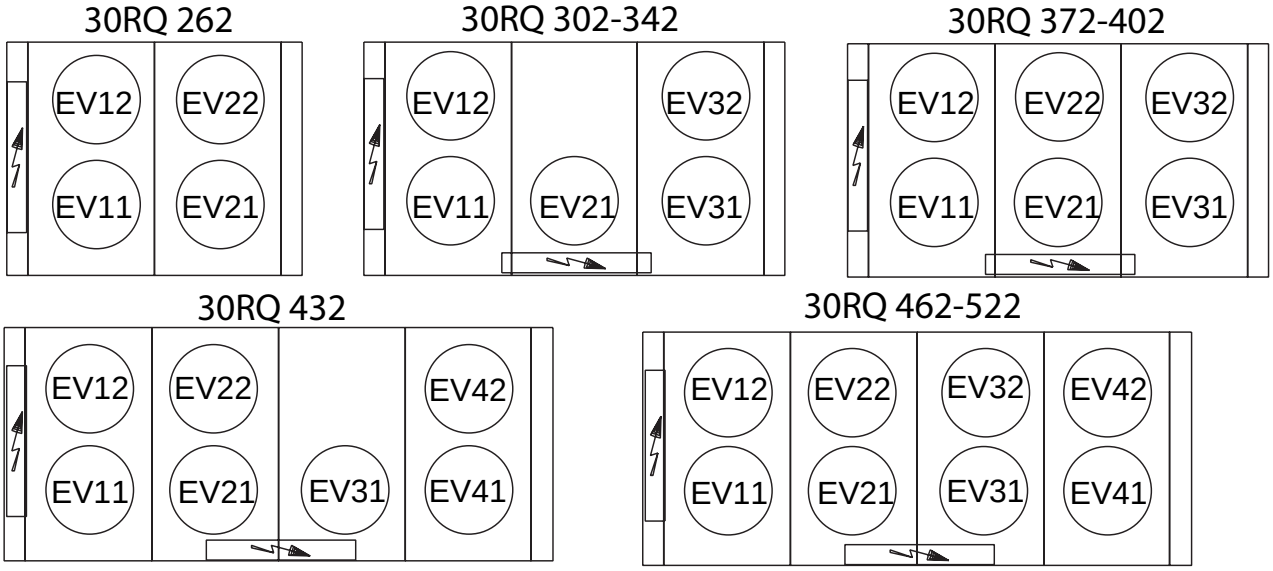
High-pressure pumps



Legend

1 30RQ 262
2 30RQ 302
3 30RQ 342
4 30RQ 372
5 30RQ 402-432
6 30RQ 462-522

10.11 - Fan arrangement



10.12 - Fan stages

Standard unit 30RQ		Stage 1	Stage 2	Stage 3	Stage 4	Option 28 Variable on
262	**Circuit A**	EV11	EV11 + EV12			EV11
	Circuit B	EV21	EV21 + EV22			EV21
302-342	**Circuit A**	EV11	EV11 + EV21	EV11 + EV21 + EV12		EV11
	Circuit B	EV31	EV31 + EV32			EV31
372-402	**Circuit A**	EV11	EV11 + EV21	EV11 + EV21 + EV12	EV11 + EV21 + EV12 + EV22	EV11
	Circuit B	EV31	EV31 + EV32			EV31
432	**Circuit A**	EV11	EV11 + EV21	EV11 + EV21 + EV12	EV11 + EV21 + EV12 + EV22	EV11
	Circuit B	EV41	EV41 + EV31	EV41 + EV31 + EV42		EV41
462-522	**Circuit A**	EV11	EV11 + EV21	EV11 + EV21 + EV12	EV11 + EV21 + EV12 + EV22	EV11
	Circuit B	EV31	EV31 + EV41	EV31 + EV41 + EV32	EV31 + EV41 + EV32 + EV42	EV31

12.6 - Air heat exchanger

We recommend, that finned coils are inspected regularly to check the degree of fouling. This depends on the environment where the unit is installed, and will be worse in urban and industrial installations and near trees that shed their leaves.

For coil cleaning, two maintenance levels are used, based on the AFNOR X60-010 standard:

Level 1

- If the air heat exchangers are fouled, clean them gently in a vertical direction, using a brush.

  Only work on air heat exchangers with the fans switched off.

  For this type of operation switch off the HVAC unit if service considerations allow this.

  Clean air heat exchangers guarantee optimal operation of your HVAC unit. This cleaning is necessary when the air heat exchangers begin to become fouled. The frequency of cleaning depends on the season and location of the HVAC unit (ventilated, wooded, dusty area, etc.).

Level 2

- Clean the coil, using appropriate products.

We recommend TOTALINE products for coil cleaning:
Part No. P902 DT 05EE: traditional cleaning method
Part No. P902 CL 05EE: cleaning and degreasing.

These products have a neutral pH value, do not contain phosphates, are not harmful to the human body, and can be disposed of through the public drainage system.

Depending on the degree of fouling both products can be used diluted or undiluted.

For normal maintenance routines we recommend using 1 kg of the concentrated product, diluted to 10%, to treat a coil surface of 2 m^2. This process can either be carried out using a high-pressure spray gun in the low-pressure position. With pressurised cleaning methods care should be taken not to damage the coil fins. The spraying of the coil must be done:

- in the direction of the fins
- in the opposite direction of the air flow direction
- with a large diffuser (25-30°)
- at a minimum distance of 300 mm from the coil.

The two cleaning products can be used for any of the following coil finishes: Cu/Al, Cu/Al with Italcoat protection.

It is not necessary to rinse the coil, as the products used are pH neutral. To ensure that the coil is perfectly clean, we recommend rinsing with a low water flow rate. The pH value of the water used should be between 7 and 8.

WARNING: Never use pressurized water without a large diffuser. Do not use high-pressure cleaners!

Concentrated and/or rotating water jets are strictly forbidden.

Never use a fluid with a temperature above 45°C to clean the air heat exchangers.

Correct and frequent cleaning (approximately every three months) will prevent 2/3 of the corrosion problems.

Protect the control box during cleaning operations.

12.7 - Water heat exchanger maintenance

Check that:

- the insulating foam is intact and securely in place.
- the cooler heaters are operating, secure and correctly positioned.
- the water-side connections are clean and show no sign of leakage.

12.8 - Characteristics of R-410A

See the table below.
Saturated temperatures based on the relative pressure (in kPa).

Temp. °C*	Relative pressure, kPa	Temp. °C*	Relative pressure, kPa
-20	297	25	1552
-19	312	26	1596
-18	328	27	1641
-17	345	28	1687
-16	361	29	1734
-15	379	30	1781
-14	397	31	1830
-13	415	32	1880
-12	434	33	1930
-11	453	34	1981
-10	473	35	2034
-9	493	36	2087
-8	514	37	2142
-7	535	38	2197
-6	557	39	2253
-5	579	40	2311
-4	602	41	2369
-3	626	42	2429
-2	650	43	2490
-1	674	44	2551
0	700	45	2614
1	726	46	2678
2	752	47	2744
3	779	48	2810
4	807	49	2878
5	835	50	2947
6	864	51	3017
7	894	52	3088
8	924	53	3161
9	956	54	3234
10	987	55	3310
11	1020	56	3386
12	1053	57	3464
13	1087	58	3543
14	1121	59	3624
15	1156	60	3706
16	1192	61	3789
17	1229	62	3874
18	1267	63	3961
19	1305	64	4049
20	1344	65	4138
21	1384	66	4229
22	1425	67	4322
23	1467	68	4416
24	1509	69	4512
		70	4610

* Saturated temperature

Aquasnap Puron units use high-pressure R-410A refrigerant (the unit service pressure is above 40 bar, the pressure at 35°C air temperature is 50% higher than for R-22). Special equipment must be used when working on the refrigerant circuit (pressure gauge, charge transfer, etc.).