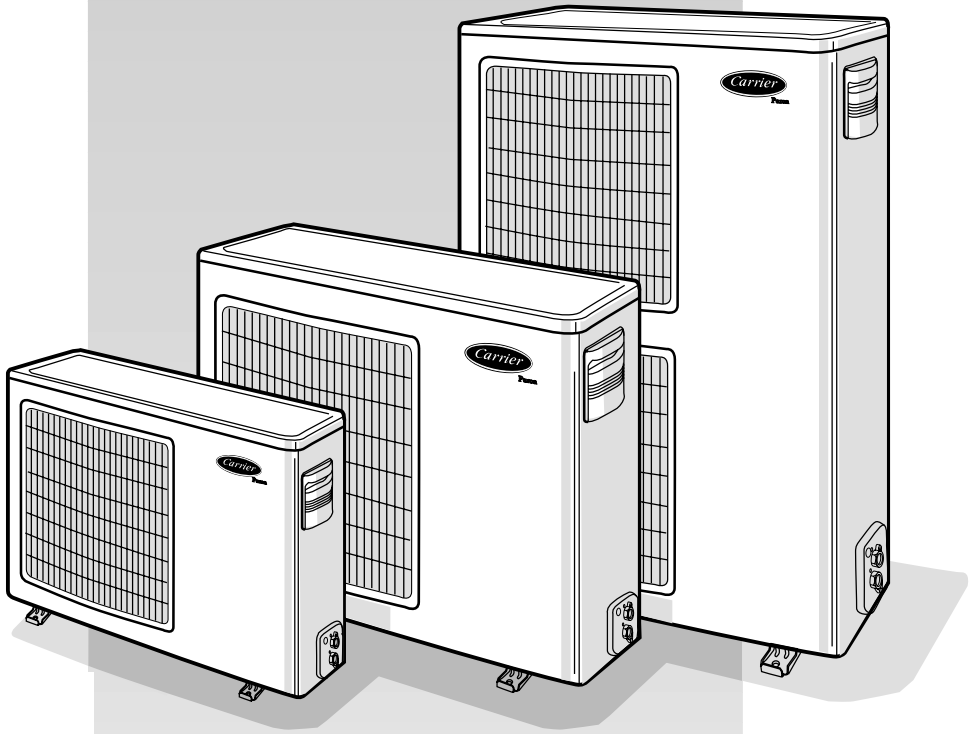
Carrier

AQUASNAP JUNIOR
30RA / 30RH



Puron

INSTALLATION MANUAL

30RA/30RH Puron
Water chillers, air-cooled with integrated hydronic section

ENGLISH

For operation and maintenance instructions of this unit as well as installation instructions of the indoor unit, refer to the relevant manuals.

Contents

ATTENTION INSTALLERS AND SERVICE TECHNICIANS!
AIR CONDITIONER WITH R-410A REFRIGERANT

- R-410A refrigerant operates at 50%-70% higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with R-410A.
- R-410A refrigerant cylinders are pink in colour.
- R-410A refrigerant cylinders have a dip tube which allows liquid to flow out of the cylinder in upright position.
- The R-410A units must be charged with refrigerant in a liquid state. Use a commercial type metering device in the manifold hose in order to vaporize the liquid refrigerant before it enters in the unit.
- R-410A, as other HFCs, is only compatible with the following oils selected by the compressor manufacturer.
- The vacuum pump is not sufficient to remove moisture from the oil.
- POE oils absorb moisture rapidly. Do not expose oil to atmosphere.
- Never open unit to atmosphere while it is under a vacuum.
- When unit must be opened for service, break vacuum with dry nitrogen and replace filter dryer.
- Do not vent R-410A into the atmosphere.

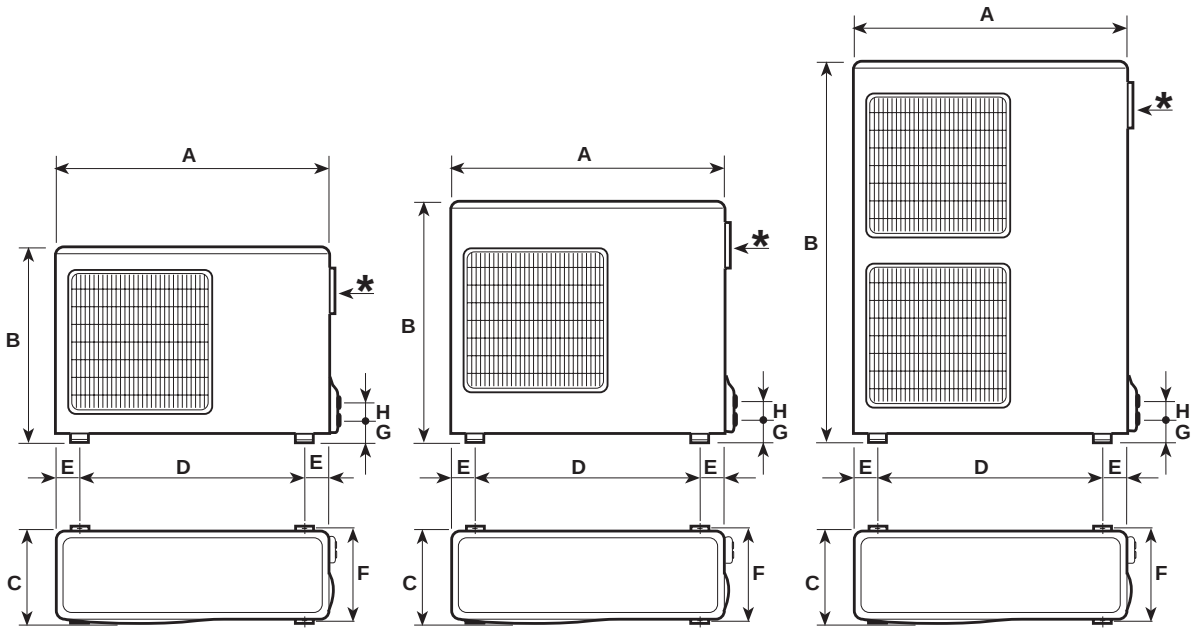
Unit size	Oil type	Quantity l	Drier already installed on liquid line of the unit
005 - 007	POE	1.12	YES
009 - 011	POE	1.25	YES
013	POE	1.95	YES

Table I

Cooling only models	Heat pump models	Power supply
30RA005---7	30RH005---7	230 V ~ 50 Hz
30RA007---7	30RH007---7	230 V ~ 50 Hz
30RA007---9	30RH007---9	400 V 3N~ 50 Hz
30RA009---9	30RH009---9	400 V 3N~ 50 Hz
30RA011---7	30RH011---7	230 V ~ 50 Hz
30RA011---9	30RH011---9	400 V 3N~ 50 Hz
30RA013---9	30RH013---9	400 V 3N~ 50 Hz

30RA/30RH Puron

Dimensions and weight



Mod. 30RA 005-007

Mod. 30RA 009
30RH 005-007-009

Mod. 30RA 011-013
30RH 011-013

* Electrical cables inlet

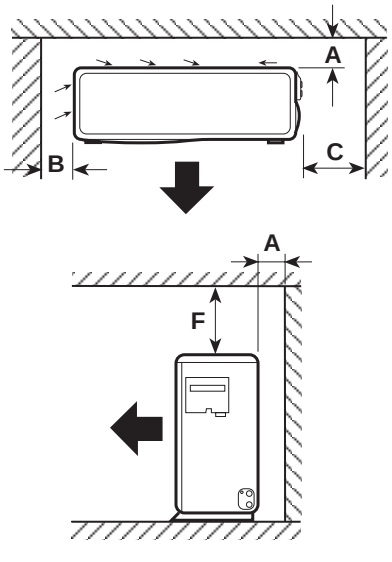
Mod.		30RA					30RH				
		005	007	009	011	013	005	007	009	011	013
A	mm	800	800	800	800	800	800	800	800	800	800
B	mm	590	590	803	1264	1264	803	803	803	1264	1264
C	mm	300	300	300	300	300	300	300	300	300	300
D	mm	508	508	508	508	508	508	508	508	508	508
E	mm	146	146	146	146	146	146	146	146	146	146
F	mm	330	330	330	330	330	330	330	330	330	330
G	mm	97	97	97	97	97	97	97	97	97	97
H	mm	157	157	157	157	157	157	157	157	157	157
	kg	71	73	85	108	118	83	85	88	112	123

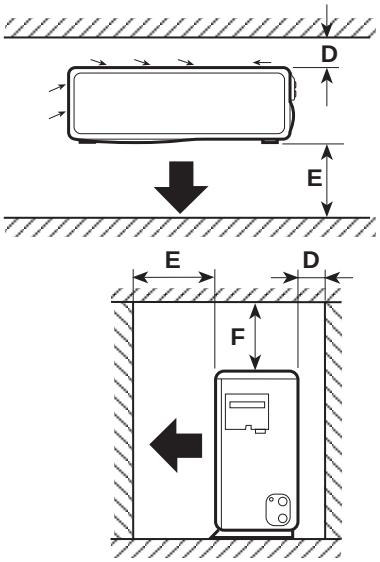
Table II: Technical data

Unit			30RA					30RH				
			005	007	009	011	013	005	007	009	011	013
Power input	Cooling	kW	2,07	2,70	3,05	3,22	4,57	2,02	2,57	2,95	3,28	4,56
	Heating	kW	—	—	—	—	—	2,24	2,93	3,4	3,72	5,03
Compressor type			SCROLL									
Water circulating pump selectable speeds		No.	3	3	3	3	3	3	3	3	3	3
Propeller fan motor - diameter		No./mm	1/370	1/370	1/370	2/370	2/370	1/370	1/370	1/370	2/370	2/370
Speed		rpm	840	1090	1030	1030	1030	890	1050	1200	1050	1200
Heat exchanger			WELDED PLATES									
Water content		l	0,66	0,85	0,94	1,22	1,50	0,66	0,85	0,94	1,22	1,50
Expansion tank capacity		l	1	1	2	2	2	1	2	3	3	3
Nitrogen charge pressure		kPa	350	350	350	350	350	350	350	350	350	350
Expansion device		#	0,043	0,052	0,058	0,061	0,065	0,046/0,042	0,055/0,046	0,054/0,047	0,062/0,055	0,065/0,060

Unit capacities and power input (compressor and conventional pump watts) are based on:

cooling: outdoor air temperature 35°C d.b.; 24°C w.b., / water temperature - leaving 7°C / entering 12°C Eurovent 6/C/003-1998, CEN/TC113/WG5 N 4
heating: outdoor air temperature 7°C d.b.; 6°C w.b., / entering water temperature 40°C, leaving water temperature 45°C Eurovent 6/C/003-1998





Mod.		30RA 005 - 007	30RA 009 - 011 - 013 30RH 005 - 007 - 009- 011 - 013
A	mm	100	100
B	mm	250	250
C	mm	500	500
D	mm	50	100
E	mm	470	670
F	mm	400	400

Table III: Electrical data

Unit		30RA							30RH						
		005	007	007	009	011	011	013	005	007	007	009	011	011	013
Power supply	V - ph - Hz	230-1-50	230-1-50	400-3-50	400-3-50	230-1-50	400-3-50	400-3-50	230-1-50	230-1-50	400-3-50	400-3-50	230-1-50	400-3-50	400-3-50
Maximum power input*	kW	2,9	3,8	3,6	4,3	4,3	4,4	6,3	2,85	4	3,9	4,3	5,18	4,9	6,73
Locked rotor amps	LRA	58	82	35	40	97	48	64	58	82	35	40	97	48	64
Full load amps	FLA	11	13,5	5	6	17,5	8	9	11	13,5	5,5	6	17,5	8	9
Delayed fuses (class gL) power supply protection	A	20	25	10	10	30	12	16	20	25	10	10	30	12	16
Section of the power supply conductors	mm^2	3 x 2,5	3 x 2,5	5 x 2,5	5 x 2,5	3 x 4,0	5 x 2,5	5 x 2,5	3 x 2,5	3 x 2,5	5 x 2,5	5 x 2,5	3 x 4,0	5 x 2,5	5 x 2,5
Delayed fuses (class gL) auxiliary circuit protection	A	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Compressor															
Capacitor	µF/V	40/450	50/450	-	-	60/450	-	-	40/450	50/450	-	-	60/450	-	-
Water circulating pump (230-1-50)															
Current input	A	0,3	0,3	0,3	0,5	0,9	0,9	0,97	0,3	0,5	0,5	0,5	0,9	0,9	0,97
Capacitor	µF/V	3/400	3/400	3/400	4/400	7/400	7/400	7/400	3/400	4/400	4/400	4/400	7/400	7/400	7/400
Fan motor (230-1-50)															
Current input	A	0,5	0,94	0,94	0,9	1,8	1,8	1,8	0,5	0,94	0,94	0,9	1,8	1,8	1,8
Capacitor	µF/V	2,5/450	4/450	4/450	4/450	4/450	4/450	4/450	2,5/450	4/450	4/450	3/450	4/450	4/450	3/450
Compressor crankcase heater (230-1-50)	W	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Current input	A	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11

Note:
The main supply connecting cable must be H07 RN-F (or higher) type, synthetic rubber insulation with Neoprene coating, according to EN 60335-1 and HD277.S1 codes.
Interlocks with the pumps or other accessories have to be inserted as shown in the notes on the wiring diagram
* Maximum unit power input with maximum load and non-compliant supply voltage.

Table IV: Control and safety device settings

		open	closed
Refrigerant circuit high pressure switch	kPa	4206	2996
Water circuit safety valve	kPa	300	---
Freeze-up protection	°C	2.7	*
Compressor first start delay	sec	60	
Compressor start delay (OFF-ON)	sec	90	
Compressor anti-cycling protection (OFF-ON)	cycle/h	12	

* When the compressor start delay has elapsed, the unit automatically restarts, if the leaving water temperature is above 2.7°C.

Table V: Water flow / System water content

Unit 30 RA/RH		Mod.	005	007	009	011	013
Water flow	l/s	Nominal	0.25	0.31	0.37	0.46	0.54
System water content	l	Min.	17	22	27	32	41
		30RH Max.	30	45	65	65	65
		30RA Max.	50	50	100	100	100
Maximum operating pressure		kPa	300	300	300	300	300
Charge pressure before operation		kPa	120	120	120	120	120
Maximum height difference allowed with water at 50°C		m	20	20	20	20	20

Note:
Minimum head pressure
The minimum inlet head pressure at maximum water flow and a water temperature of 50°C should be 13 kPa (about 1.3 mWG).
This precaution prevents cavitation noise and damage to the bearings due to low water flow and insufficient bearing lubrication.

Table VI: Water content copper piping

Diameter-mm outside	inside	litres / metre
14	12	0.11
16	14	0.15
18	16	0.20
22	20	0.31
28	25	0.49
35	32	0.80

Table VII: Water content steel piping

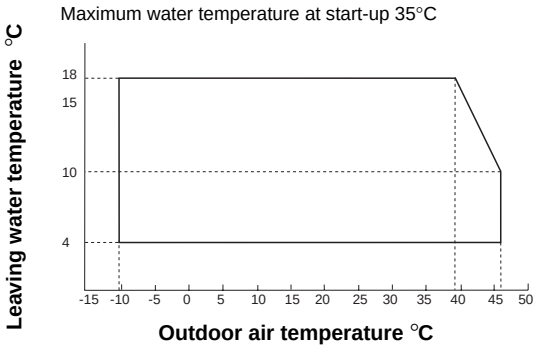
Diameter outside inches	inside mm	litres / metre
3/8 Gas	12.7	0.13
1/2 Gas	16.3	0.21
3/4 Gas	21.7	0.37
1 Gas	27.4	0.59

Table VIII: Operating limits

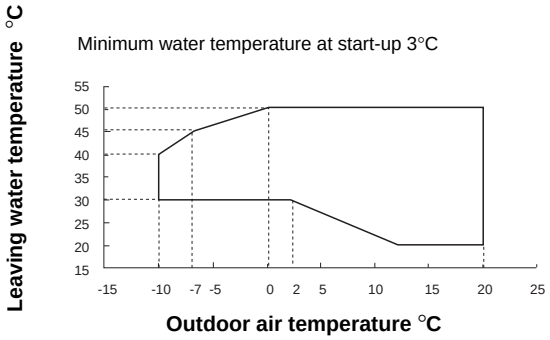
			Min	Max
Power supply :	230 - 1 - 50	V	198	264
	400 - 3 - 50	V	342	462

* **ATTENTION:**
For outside temperatures below 0° C, mix the correct amount of antifreeze with the water.

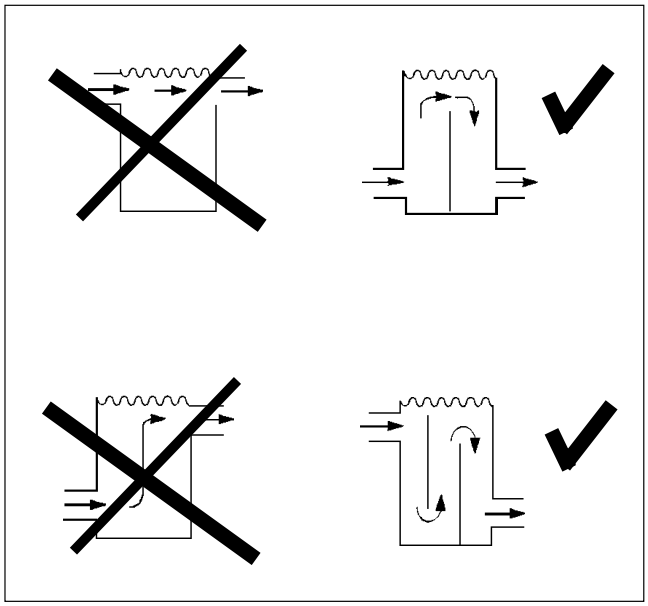
Operating range - cooling



Operating range - heating



Important note:
Use of the buffes tank is not obligatory.
It may be necessary to use it to reach the minimum volumes shown in table V.
Refer to the following example for the buffes tank:



Unit installation

R-410A unit operate at higher pressures than standard R-22 units. Do not use R-22 service equipment or components of units for R-410A equipment.

Read this instruction manual thoroughly before starting the installation.

- **This unit complies with low-voltage (EEC/73/23) and electro-magnetic compatibility (EEC/89/336) directives.**
- The installation must be carried out by a qualified installer.
- Follow all current national safety code requirements. In particular ensure that a properly sized and connected ground wire is in place.
- Check that voltage and frequency of the main power supply are those required; the available power must be adequate to operate any other possible appliances connected to the same line. Also ensure that national safety code requirements have been followed for the main supply circuit.
- After installation thoroughly test the system operation and explain all chiller functions to the owner.
- Leave this manual with the owner for consultation during future periodic maintenance.
- The chiller and its components must be periodically inspected to check for loose, damaged or broken parts. If these faults are found and not eliminated, the unit could cause physical injury and damage to goods and property.

IMPORTANT:
During the unit installation first make the water connections and then electrical connections. If unit is removed first disconnect electrical cables, then water connections.

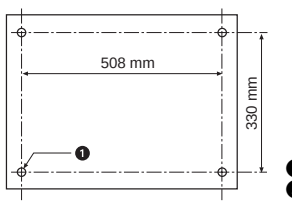
WARNING:
Disconnect the main power supply switch before servicing the system or handling any internal parts of the unit.

- The manufacturer declines any liability for damage resulting from modifications or errors in the electrical or water connections.
- Failure to observe the installation instructions or use of the unit under conditions other than those indicated in Table VIII “Operating limits”, will immediately void the unit warranty.
- Failure to observe electric safety codes may cause a fire hazard in case of short circuits.
- Inspect equipment for damage due to improper transportation or handling: file an immediate claim with the shipping company. Do not install or use damaged units.
- In case of any malfunctioning turn the unit off, disconnect the mains power supply and contact a qualified service engineer.
- This unit contains R-410A refrigerant, a substance that does not deplet the ozone layer.
- **All manufacturing and packaging materials used for your new chiller are compatible with the environment and can be recycled.**
- Dispose of the packaging material in accordance with local requirements.
- This unit contains refrigerant that must be disposed of in a proper manner. When disposing of the unit after its operational life, remove it carefully. The unit must then be delivered to an appropriate disposal center or to the original equipment dealer.
- When lifting the unit, never use hooks inserted into the side handles, always use special equipment (e.g. lifting devices, trolleys, etc.).
- Carefully recover refrigerant within this unit before final disposal or when servicing. Never vent refrigerant to atmosphere. Use approved recovery equipment for R-410A refrigerant. Do not use equipment for R-22 refrigerant.

Choosing the installation site

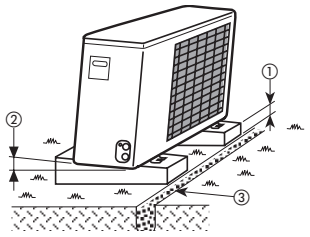
Positions to avoid:
- Exposed to direct sun.
- Too close to sources of heat radiation, vapour or flammable gas.
- Particularly dusty areas.

Recommendations:
- Choose a position protected from opposing winds.
- Choose a position sheltered from direct sun.
- Choose an area where air outlet and unit noise will not bother your neighbours. We advise inserting anti-vibration supports.
- Choose a position that allows for the clearances required.
- Floor structure should be adequately strong to support unit weight and minimize vibration transmission.
- Consider a position which will not obstruct passageways or doors.



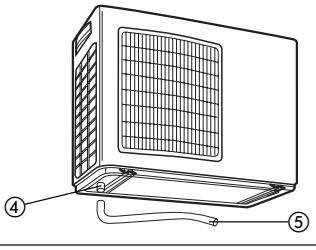
❶ 4 Ø 8 mm pins.
❷ Protrusion height from the support surface max. 20 mm.

Fix the unit with locally purchased bolts countersunk in the base to prevent overturning in case of strong winds.



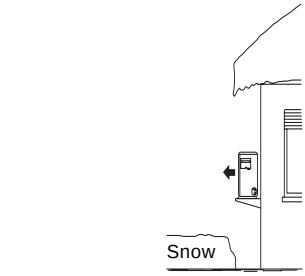
① 100 mm min.
② 20 mm gradient.
③ Gravel-filled trench

- For heat pump models, unit must be adequately raised above the ground surface.



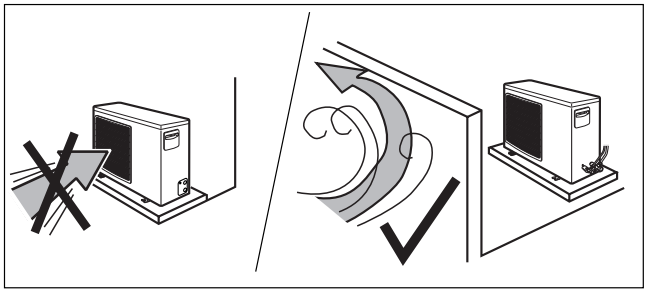
④ Drain connection
⑤ Vinyl pipe

- To empty the condensate water to a drain while operating in heating mode, use the drain connection underneath on the left of the pan and use a vinyl pipe with a 16 mm internal diameter. This must not be used at temperatures lower than 0°C.

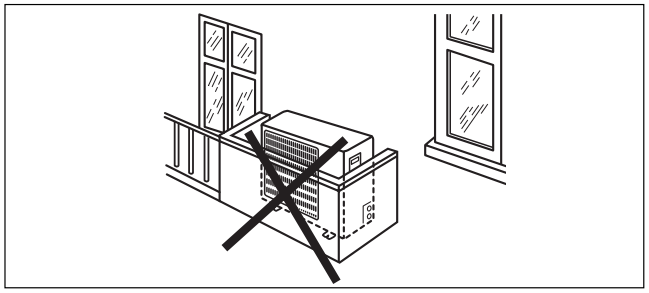


- If the unit is installed in areas where heavy snowfalls may occur, it is necessary to raise its level at least 200 mm above the usual snow level or alternatively to use the outdoor unit bracket kit.

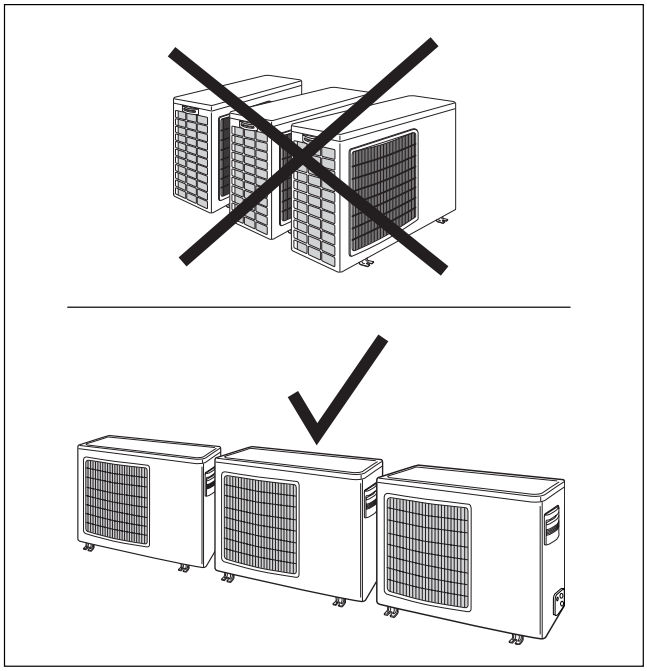
Warnings: avoid....



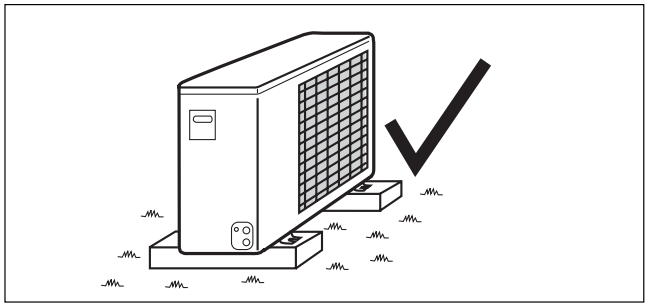
Predominant head winds.



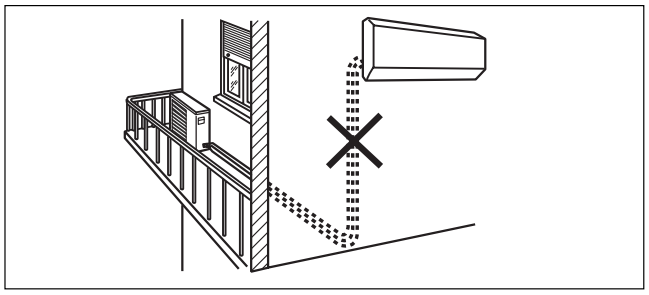
Any obstruction of the unit air outlet and intake or any obstacle that is too close (see minimum clearances required).



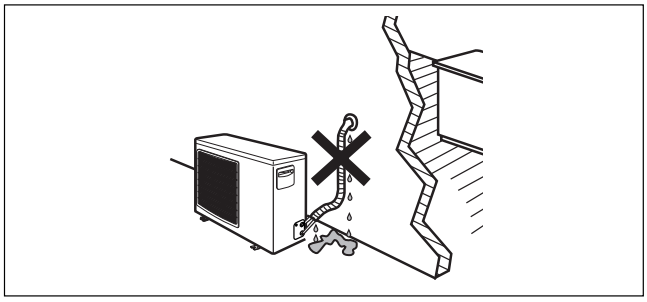
Multiple unit installation with units facing each other.



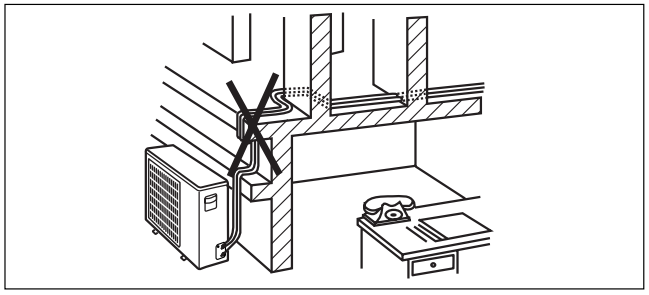
Installation on grassy ground or soft surfaces (in these cases a solid foundation must be included).



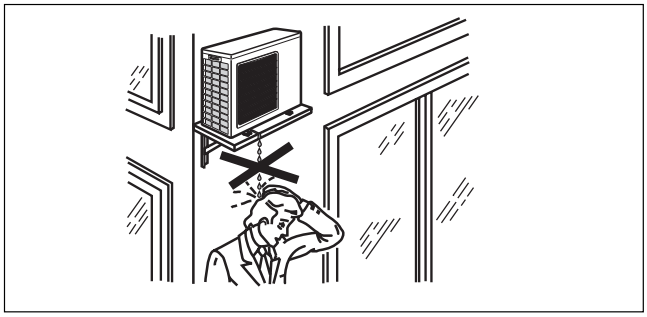
Excessive height difference or excessive distance between chiller and fan coil units.



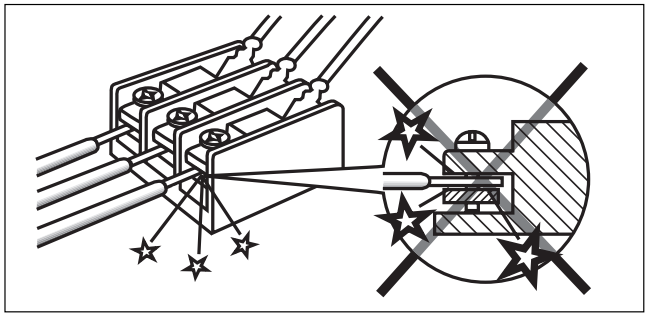
Insulating the connecting pipes only partially, which will cause dripping.



Unnecessary turns and bends in the connecting pipes.

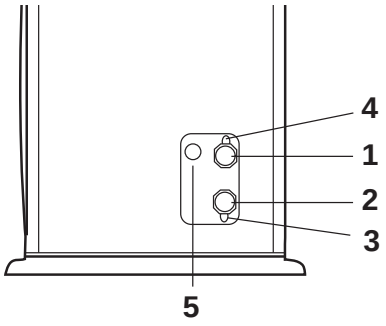


Dripping into passageways.



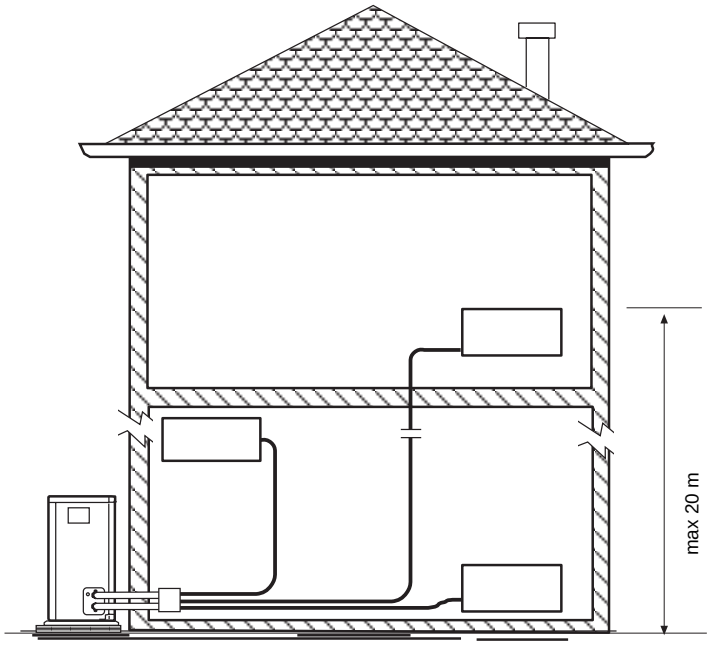
Any slack in the electrical connections.

Water connections



1 Unit water inlet Ø 1” F Gas
2 Unit water outlet Ø 1” F Gas
3 Drain
4 Air purge
5 Drain safety valve Ø 1/2” F Gas

Difference in height between water chiller and highest system point



Water circuit: recommended wiring

* The automatic air vent must be located at the highest point of the circuit.

1. Brazed plate heat exchanger
2. Closed expansion tank
3. Circulating pump
4. Flow switch
7. Temperature sensor
8. Safety valve
9. 30RA/RH unit
10. Leaving water
11. Return water
12. Filter 10 mesh/cm²
14. Water drain connection (chiller)

Field supplied piping

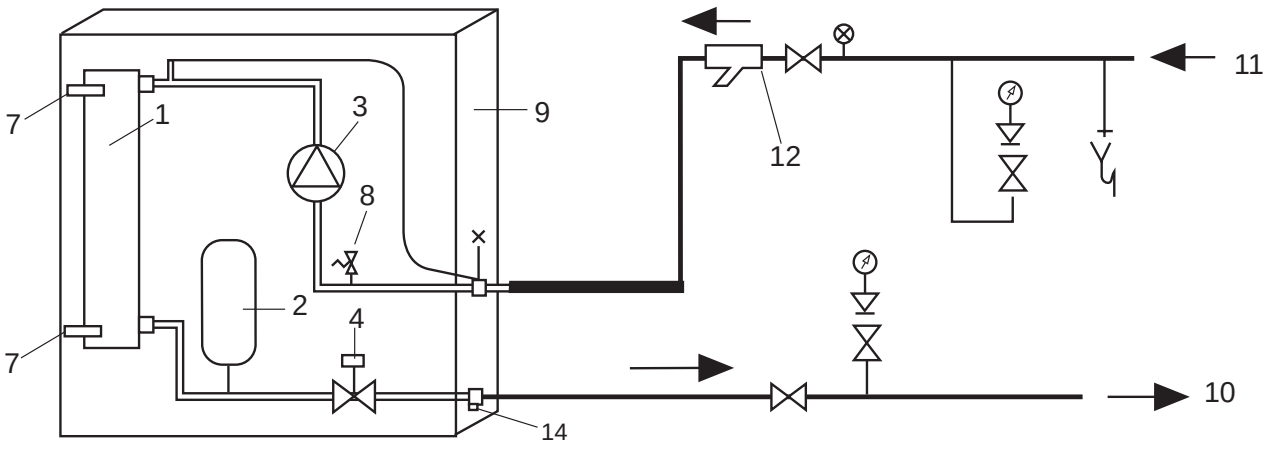
Manual air vent

Automatic air vent*

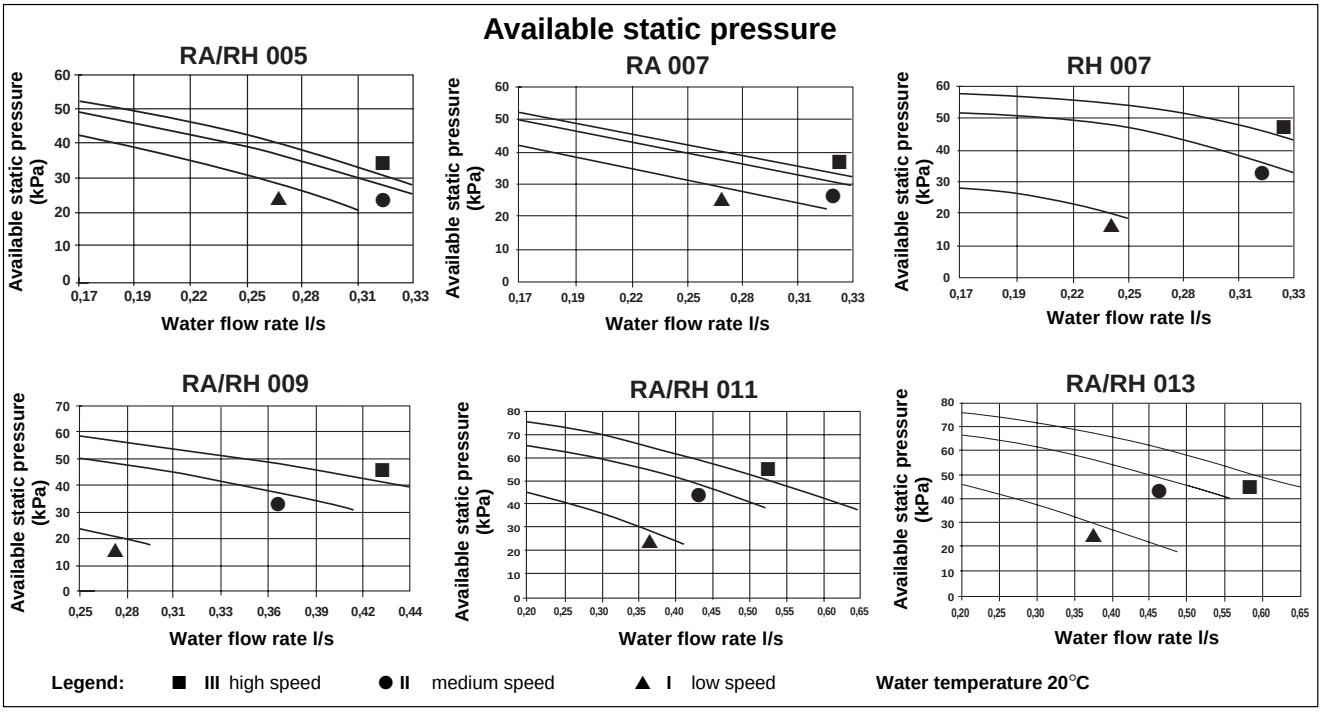
Water drain / circuit drain

Shut-off valve

Pressure gauge



30RA/30RH Puron
Connections and water circuits



Correction factors for ethylene glycol

Ethylene glycol	10%	20%	30%	40%
Freezing temperature	–4°C	–9°C	–15°C	–23°C
Capacity	0.996	0.991	0.983	0.974
Power input	0.990	0.978	0.964	1.008
Water flow rate	1.000	0.979	0.979	1.025
Pressure drop	1.003	1.010	1.020	1.033

Connections and water circuits

- The hydraulic circuit must be designed to ensure a steady water flow through the evaporator at any time.
- The water pipes in the circuit must be well supported and firmly fastened to ensure that they do not put a strain on the connections to the unit.
- Water inlet and outlet are identified by a tag.
- Air purge and water drain are located at the inlet and outlet connections and are closed by appropriate plugs.
- Pipes must have shut-off valves to permit emptying of the heat exchanger without draining the whole system, as suggested in the diagram.

Control of a boiler

With a PRO-Dialog configuration, the unit (if it is in heating mode) can control the start-up of a boiler via the mother board output signal (see Service Interface Manual).
If the boiler is operating, the unit water pump is stopped.

The boiler output is activated:

– in 30RA units, by selecting heating mode

– in 30RH units, by selecting heating mode with the unit in fault condition or with the unit operating at very low outdoor temperature (see Service Interface Manual).

Water circulating pump

A single-phase, three-speed water circulating pump, to be selected at installation, is installed inside the unit.
The water circulating pump, can be fitted with a water system resistor (pressure drop) as indicated in the diagrams, keeping water flow at the correct values.
If the system pressure drop is higher then the pump available head, water flow to the unit and unit performances are reduced.

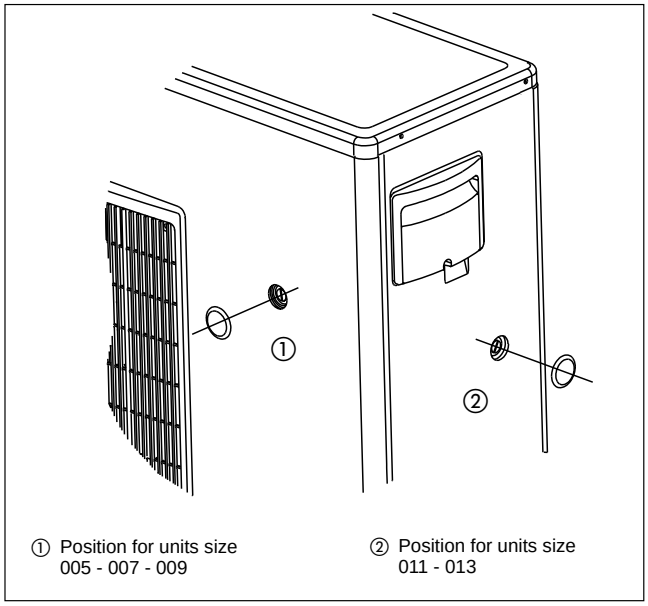
To reduce to minimum system pressure drop it is necessary:

- to reduce number of bends;
- to avoid elbow bends;
- to reduce the system extension to a minimum;
- to use pipes of the correct diameter.

To avoid possible damage due to water freezing, it is recommended to install the water refill system inside the building.

It is recommend:

- to fit a replaceable filter of at least 10 mesh/cm^2 in the water inlet, especially with welded joint iron pipes.
  Water changes or additions should be reduced, if possible, as they contribute to oxidation and to calcium deposit formation.
  If the unit is not used for a long period, rotor shaft seizure can occur; the user should unblock the rotor:
- switch off the system;
- remove the rubber plug from the panel (NOT available in the versions 30RA005 / 30RA005H / 30RA007 / 30RA007H / 30RA007-9 / 30RA007H9);
- unscrew the air purge cap on the pump;
- insert a screwdriver in the slot and turn the rotor shaft;
- reassemble the air purge cap;
- put the rubber plug back on the panel;
- switch on the system.



① Position for units size 005 - 007 - 009

② Position for units size 011 - 013

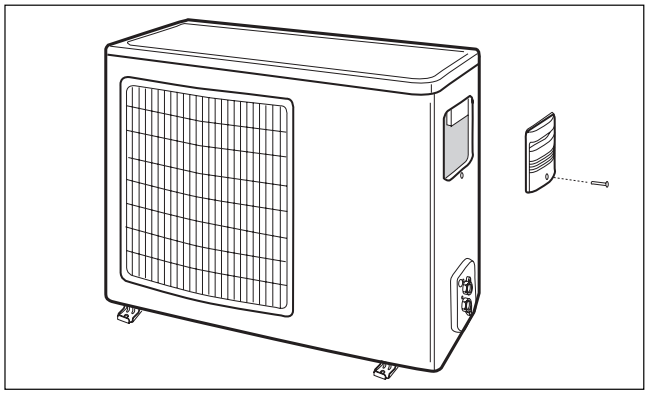
The control can pilot an external pump with a current input of up to 8 Ampere.
It is recommended to disconnect the internal pump, replacing it with a tube.

WARNING:
The minimum inlet pressure to the pump at maximum water flow should be 13 kPa at the maximum supply water temperature (50°C).
This precaution avoids cavitation noise and damage to the pump bearings due to lack of water flow and poor lubrication of the bearings.

Flow switch
The flow switch in the outlet line to the pump stops the compressor operation in case of:

- pump failure;
- water circulation cut-off;
- presence of air un the system.

Electrical connections



Remove electric box cover.
Connect the wires to the terminals according to the wiring diagram and firmly tighten.

- The characteristics of the available power supply must correspond to the unit nameplate specifications.
- The voltage must be within the limits indicated in the technical data table.
- The imbalance between voltage phases must always be less than 2%.

- **WARNING**:
  If the unit operates at a voltage outside the limits given in Table VIII or with a phase imbalance above 2%, this constitutes improper use and may affect the warranty.
  If the phase imbalance is higher than 2%, contact the local electricity board immediately.

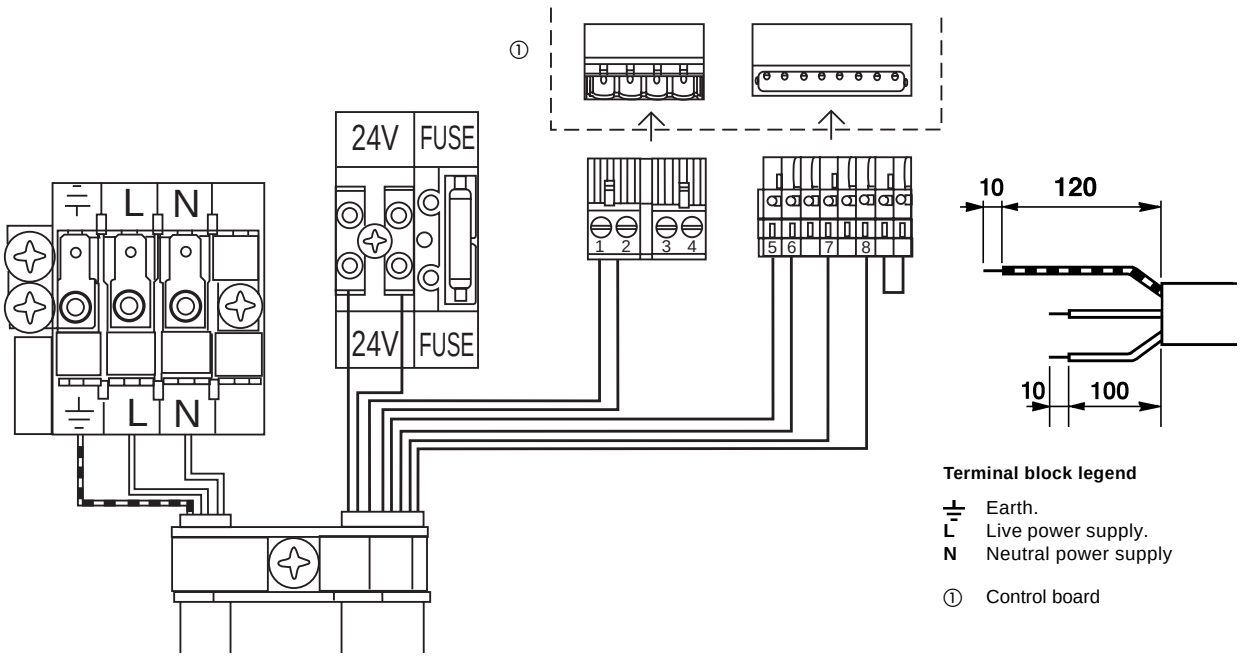
- Electric wiring must be in accordance with data indicated in this manual and the wiring diagram and conform to applicable local and national regulations.
- Ensure that mains supply connection is made through a switch that disconnects all poles, with contact gap of a least 3 mm.
- The mains supply connecting cable must be H07 RN-F (or higher) type, synthetic rubber insulation with Neoprene coating, according to EN 60335-1 and HD277.S1 codes.

IMPORTANT:
- **Make earth connection prior to any other electrical connections.**

- **Earthing is required by law.**
  The installer must earth the unit using the terminal marked with the international earthing symbol.
- **Before connecting the supply cable to the line, locate line (L), lines (L1-L2-L3) and neutral N. Then make connections, as indicated in the wiring diagram.**
  WARNING:
  The supply line of three-phase units must be three-phase plus neutral. Omission of the neutral N line could damage the single-phase supplies.
- The wiring diagram for the electrical supply to remote controls/ interlocks is inside the unit, glued under the cover.
- See Table III for cables sizes and dimensions of the electrical devices.

Power circuit supply
- The power circuit supply (three-phase plus neutral) must be connected to the correct terminals (see wiring diagram).
- The auxiliary circuit supply is directly taken from one phase and neutral and it is proteced by fuse "F".
- If the electrical supply cables L1 (R), L2 (S), L3 (T) are connected in an incorrect sequence, the power supply is interrupted after a few seconds by the control, which goes into alarm status preventing the incorrect compressor rotation.

Note:
After connections have been completed, replace electric box cover.



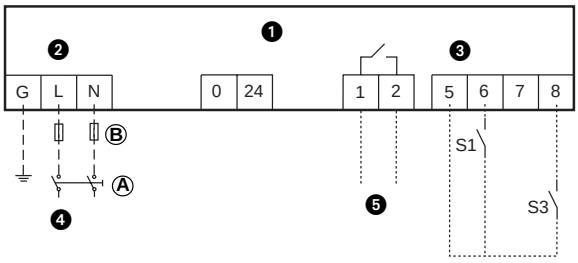
Terminal block legend

⏚ Earth.
L Live power supply.
N Neutral power supply

① Control board

Unit without accessory AQUASNAP JUNIOR remote control

30RA



❶ Unit electrical panel
❷ Terminal blocks
❸ Electronic board connectors
❹ Power supply 230 V 1ph 50 Hz
❺ Available for remote alarm (3 A @ 24 V ac max.)

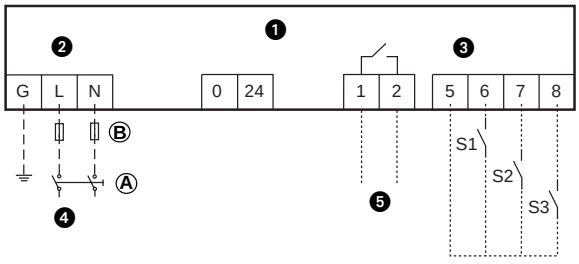
Ⓐ Main switch
Ⓑ Time-delay fuse or circuit breaker (see table III "Electrical data").

Terminal block legend, single-phase models

⏚ Earth.
L Live power supply.
N Neutral power supply.
S1 ON/OFF switch
S2 HEAT/COOL switch
S3 Dual SET-POINT switch (standard/economy)

NOTE:
The contact rating must be greater than > 20 mA @ 24 V ac.

30RH

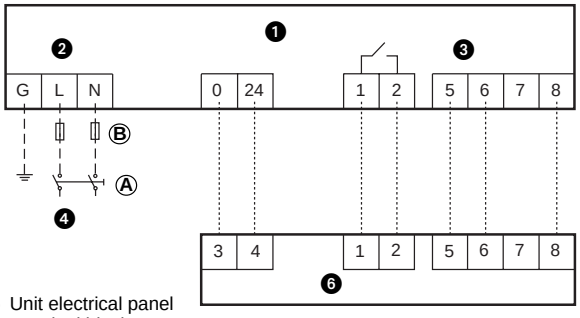


❶ Unit electrical panel
❷ Terminal blocks
❸ Electronic board connectors
❹ Power supply 230 V 1ph 50 Hz
❺ Available for remote alarm (3 A @ 24 V ac max.)

Ⓐ Main switch
Ⓑ Time-delay fuse or circuit breaker (see table III "Electrical data").

Unit with accessory AQUASNAP JUNIOR remote control

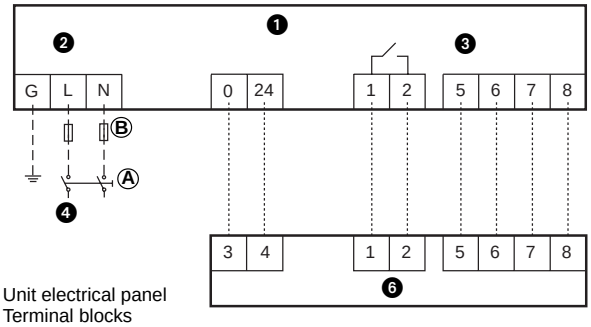
30RA



❶ Unit electrical panel
❷ Terminal blocks
❸ Electronic board connectors
❹ Power supply 230 V 1ph 50 Hz
❻ AQUASNAP JUNIOR remote control

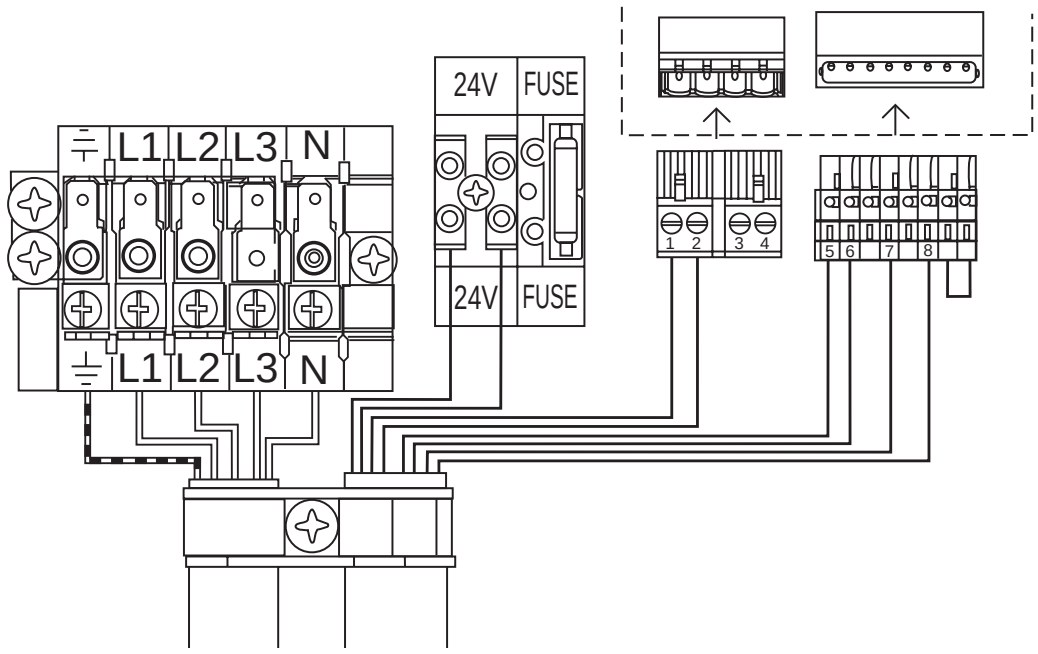
Ⓐ Main switch
Ⓑ Time-delay fuse or circuit breaker (see table III "Electrical data").

30RH



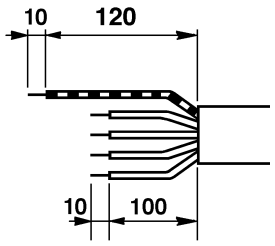
❶ Unit electrical panel
❷ Terminal blocks
❸ Electronic board connectors
❹ Power supply 230 V 1ph 50 Hz
❻ AQUASNAP JUNIOR remote control

Ⓐ Main switch
Ⓑ Time-delay fuse or circuit breaker (see table III "Electrical data").



Terminal block legend, three-phase models

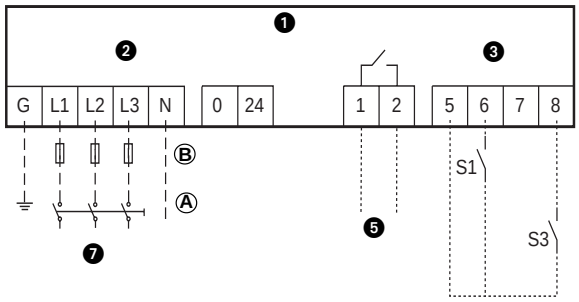
⏚ Earth.
L Live power supply.
L1 Live power supply.
L2 Live power supply.
L3 Live power supply.
N Neutral power supply.
S1 ON/OFF switch
S2 HEAT/COOL switch
S3 Dual SET-POINT switch (standard/economy)



NOTE:
The contact rating must be greater than > 20 mA @ 24 V ac.

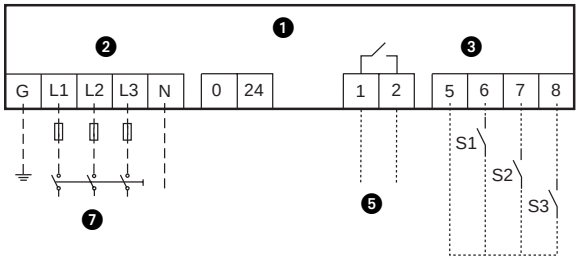
Unit without accessory AQUASNAP JUNIOR remote control

30RA



❶ Unit electrical panel
❷ Terminal blocks
❸ Electronic board connectors
❼ Power supply 400 V 3N~ 50 Hz
❺ Available for remote alarm (3 A @ 24 V ac max.)
Ⓐ Main switch
Ⓑ Time-delay fuse or circuit breaker (see table III "Electrical data").

30RH

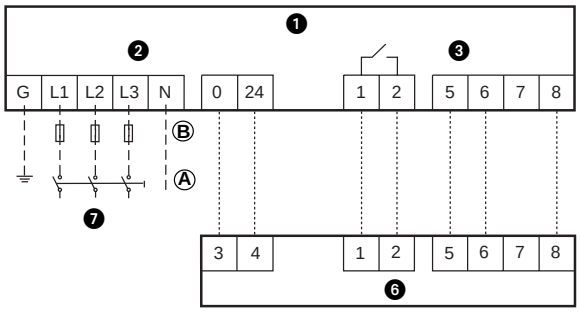


❶ Unit electrical panel
❷ Terminal blocks
❸ Electronic board connectors
❼ Power supply 400 V 3N~ 50 Hz
❺ Available for remote alarm (3 A @ 24 V ac max.)
Ⓐ Main switch
Ⓑ Time-delay fuse or circuit breaker (see table III "Electrical data").

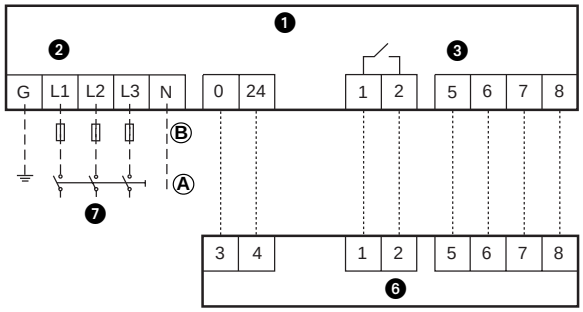
Electrical connections - three-phase models

Unit with accessory AQUASNAP JUNIOR remote control

30RA



30RH



❶ Unit electrical panel
❷ Terminal blocks
❸ Electronic board connectors
❼ Power supply 400 V 3N~ 50 Hz
❻ AQUASNAP JUNIOR remote control
Ⓐ Main switch
Ⓑ Time-delay fuse or circuit breaker (see table III "Electrical data").

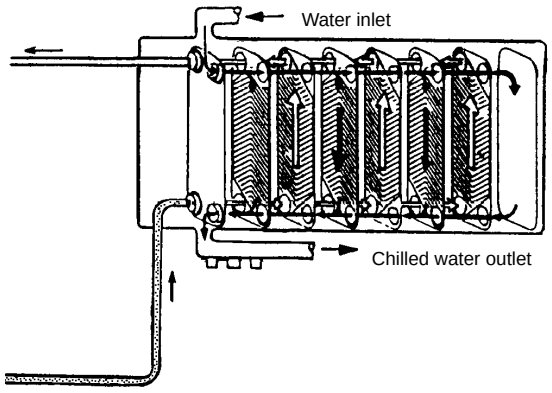
Terminal box legend, three-phase models

⏚ Earth.
L Live power supply.
L1 Live power supply.
L2 Live power supply.
L3 Live power supply.
N Neutral power supply.

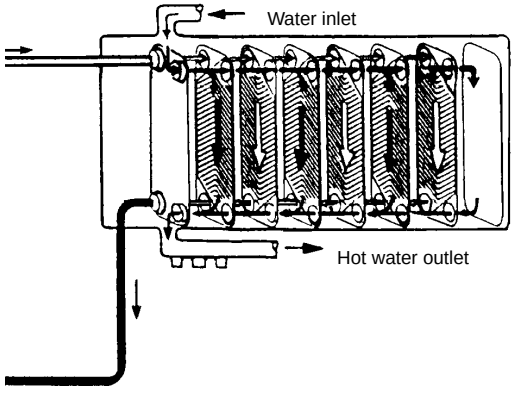
❶ Unit electrical panel
❷ Terminal blocks
❸ Electronic board connectors
❼ Power supply 400 V 3N~ 50 Hz
❻ AQUASNAP JUNIOR remote control
Main switch
Time-delay fuse or circuit breaker (see table III "Electrical data").

Water - refrigerant heat exchanger

Evaporator



Condenser



Refrigerant Gas | Liquid + Gas | Liquid

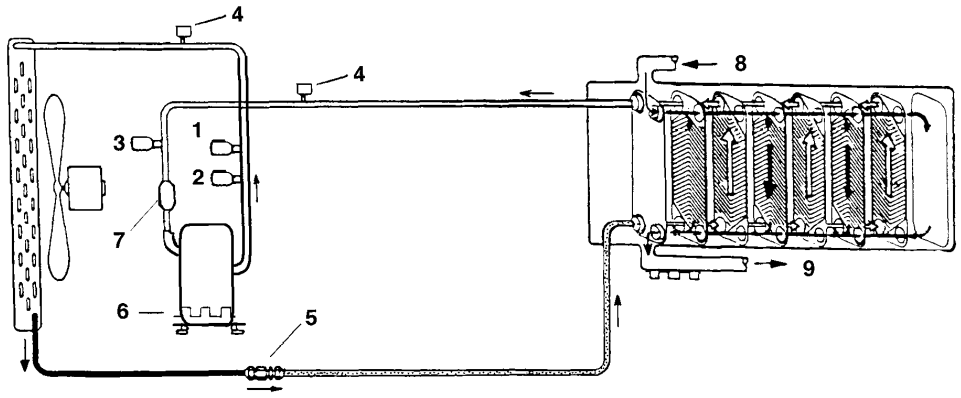
- The unit includes a brazed plate water-refrigerant heat exchanger.
  In the 30RA model the heat exchanger operates as a refrigerant expansion evaporator whereas in 30RH units it operates as an evaporator in the summer cycle and as a water-cooled refrigerant condenser in winter cycle.
- Check if characteristics of the water in the refrigerant circuit are correct. If necessary, treat water as appropriate.

CAUTION: In winter water frost may damage the unit.

To avoid freeze-up of the water contained in the system, one of the following precautions must be taken during the winter cycle:

- drain the water from the system, using the drains in the lower part of the unit,
  or
- add the correct percentage of glycol to the water circuit.

Flow diagram for cooling only units



1. High pressure transducer
2. High pressure switch
3. Low pressure transducer
4. Pressure service port
5. Accurater expansion device
6. Crankcase heater
7. Suction accumulator
8. Water inlet
9. Chilled water outlet
10. Hot water outlet
11. Reversing valve

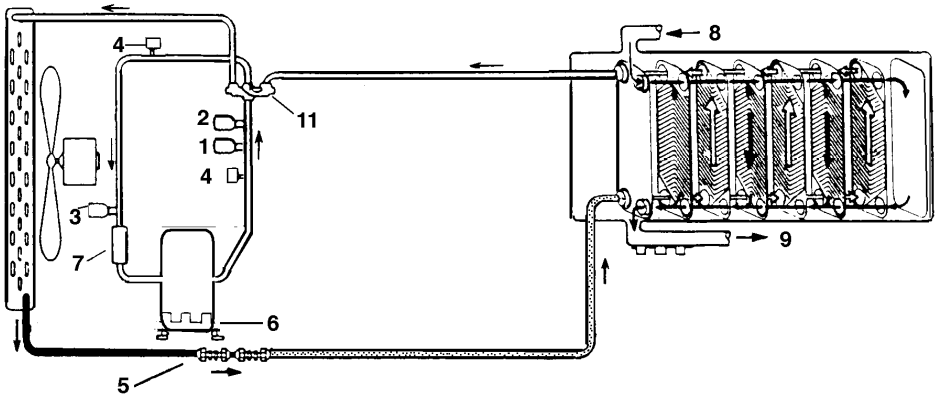
Refrigerant R-410A

Gas

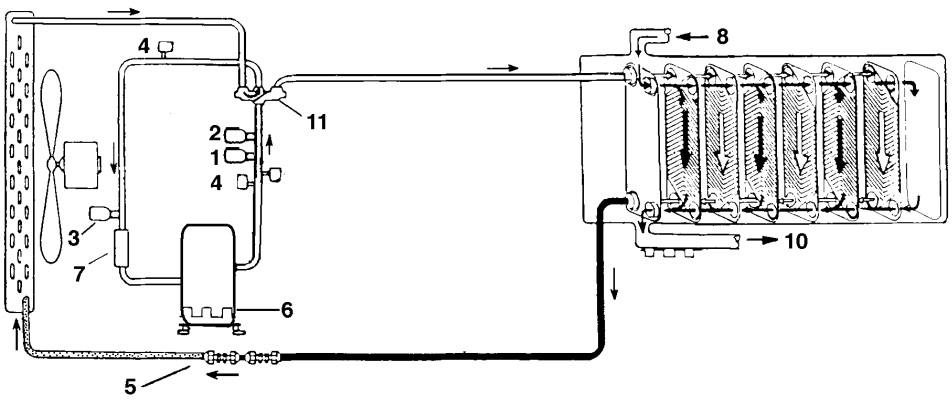
Liquid + Gas

Liquid

Flow diagram for heat pump units: cooling cycle



Flow diagram for heat pump units: heating cycle



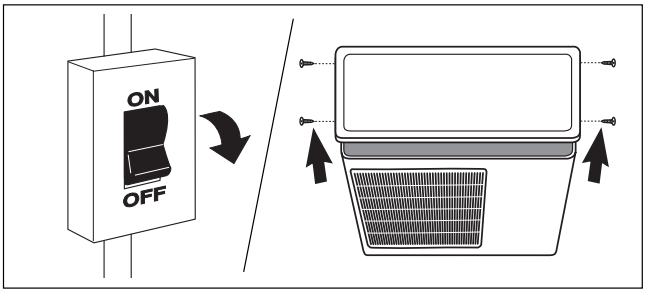
Check the refrigerant charge

- This check becomes necessary after any refrigerant leak or after the refrigeration circuit has been switched off to replace a component.
- The best method to correctly charge refrigerant is to completely empty the refrigerant circuit using refrigerant recovery equipment.
  Then charge the exact quantity of refrigerant according to the data shown on the unit nameplate. This can be done with charging equipment of the “Dial-a-charge” type.
- To empty the refrigerant circuit, the refrigerant recovery equipment has to be connected to the high pressure side and low pressure side service ports simultaneously (1/2” UNF, 20 threads/inch).
- **R-410A refrigerant cylinders contain a dip tube which allows liquid refrigerant to flow from the cylinder in an upright position. Charge R-410A units with cylinder in upright position and a commercial-type metering device in the manifold hose in order to vaporize the liquid refrigerant before it enters the unit. Charge refrigerant into the suction line.**
- The above method must be used for heat pump systems operating in heating, as operating difficulty in the winter season (iced outdoor coil) impedes stable operating conditions.
  Hence the refrigerant charge must be checked.
  In cooling only systems, or heat pumps operating in the cooling mode, the refrigerant charge check can be carried out using the superheating method; this is only possible, if the ambient temperature is above 15°C.

Unit maintenance

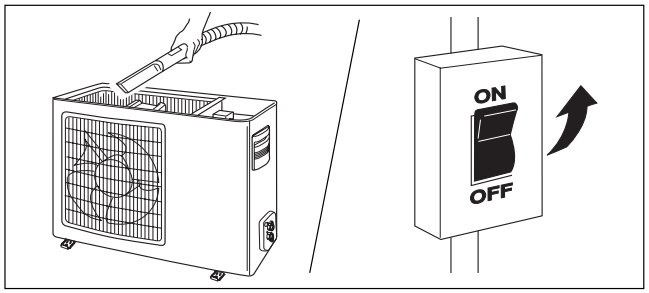
The following maintenance operations must be carried out by qualified personnel.

Cleaning the coil
When necessary, proceed as follows for more careful cleaning of the coil:



Switch the mains supply OFF.

Remove unit top cover by losening holding screws and lifting the cover.



Carefully clean the coil with a vacuum cleaner.
Also clean the inside of the fan compartment with a vacuum cleaner.
Replace the unit cover and tighten the screws.

After long shutdown periods and at commissioning:

Energize the system by putting the main switch to ON without starting the unit.
(The control must be in the OFF position for at least 12 hours before the initial start up).
Do not disconnect the main switch during the unit operating season.

Control and safety devices

1. Compressor winding protection
Automatic reset.
This is activated when the temperature of the winding or the the compressor power input exceed the set limits.

2. Freeze-up protection
This protection device is controlled by the Pro-Dialog Junior control using the water heat exchanger leaving temperature. This safety device interrupts unit operation and shows an alarm code on the display.

3. Cooling control setpoint
This parameter is regulated by the control and factory set to an entering water temperature of 12°C.
The second set point default value is 14°C and it can be selected via the Service Interface.

4. Heating control setpoint
This parameter is regulated by the control and factory set to an entering water temperature of 40°C.

5. High pressure switch HIP
Installed on the supply piping, set to 42 bar, with manual electric reset.

6. Low suction temperature protection
Automatic/manual reset (after 6 automatic cycles) based on the pressure transducer signal installed on the compressor suction lines.

7. High pressure protection
Automatic/manual reset (after 6 automatic cycles) based on the pressure transducer signal installed on the compressor discharge lines.

8. Water flow switch FS
Installed on the water outlet to the heat-exchanger, does not permit compressor and pump operation if there is no water flow.

9. Defrost cycle
This operates only if ice is present on the heat exchanger during heat pump operation.
This function can be operated by the control.

10. Solid state head pressure controller
Changes the fan speed according to the condensing temperature. Is controlled by the Pro-Dialog Junior control and permits unit operation up to the specified temperature limits, optimising the condensing temperature.

The electronic control on the machine continuously monitors its operation. In the event of a malfunction, it activates a relay whose contact generates a coded alarm signal sending ON/OFF signals to the remote control and switching on the alarm LED.
Some alarm conditions are automatically reset, others require the intervention of the operator to search for the fault, remove its cause and switch the unit back on.

Manual resetting of alarm conditions

Manual resetting of alarm conditions is performed using the remote ON/OFF button by simply switching OFF and then ON again or opening and closing S1 switch (see electrical connections page 11).

WARNING: manual resetting causes the definitive loss of the alarm code; therefore, before a manual reset, check the code according to the instruction reported and remove its cause.

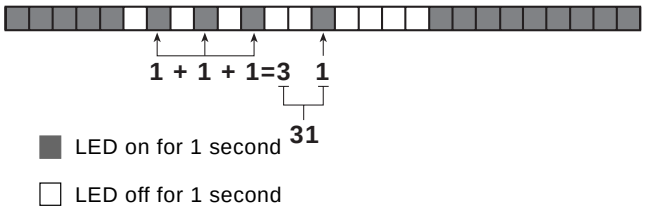
N.B. Temporary power supply failure to a unit in an alarm condition does not reset the unit.

Alarm codification

The alarm code generated by a failure, is shown to the operator one time only, and the unit remains in alarm status. To have the alarm code shown again, press the ECO button on the remote control.

The alarm codification is based on the binary two-digit code X1 and X2, as follows:
the first figure X1 flashes at 1 second intervals until it reaches the number corresponding to the first digit, after a pause of 2 seconds, second figure X2 starts to flash, again with 1 second intervals until the number corresponding to the second is reached (only for two-digit codes).

Alarm code 31 with persistent alarm condition



To have the alarm code shown again, press the ECO button on the remote control.
By pressing the ON/OFF button, the unit is turned OFF and the alarm code is shown again. To restart the unit, remove the alarm cause and press the ON/OFF button again.

The following list describes the possible cause for each alarm code:

Alarm code	Description	Control action	Alarm reset method	Probable cause
1	Compressor fault	Compressor stopped	Manual	Compressor overheated
2	Leaving water temperature probe fault	Unit stopped	Automatic	Sensor out of range, probe wire interruption or sensor fault
3	Entering water temperature probe fault	Unit stopped	Automatic	Sensor out of range, probe wire interruption or sensor fault
4	Defrost probe fault	Unit stopped	Automatic	Sensor out of range, probe wire interruption or sensor fault
5	Air temperature probe fault	Unit stopped	Automatic	Sensor out of range, probe wire interruption or sensor fault
6	High pressure transducer fault	Unit stopped	Automatic	Transducer out of range, incorrect transducer voltage transducer wire interrupted or transducer fault
11	Low pressure transducer fault	Unit stopped	Automatic	Transducer out of range, incorrect transducer voltage transducer wire interrupted or transducer fault
12	Additional CCN clock/board fault	Unit stopped	Automatic if the board is recognised again	Board defect
13	Low refrigerant pressure in the circuit	Unit stopped	Automatic/ Manual	Lack of refrigerant in the circuit, blocked refrigerant filter or low pressure transducer fault
14	High refrigerant pressure in the circuit	Unit stopped	Manual	Fan fault, coil obstructed, high outdoor air temperature
15	High pressure safety switch / reverse compressor rotation	Unit stopped	Manual	The safety pressure switch has not been reset after the last alarm, incorrect compressor connection
16	Plate exchanger anti-freeze protection	Unit stopped	Automatic/ Manual	Low water flow rate entering or leaving water probe fault
21	Repeated attainment of low suction temperature in cooling (more than six times)	Unit stopped	Automatic	Low pressure transducer fault, refrigerant filter blocked or lack of refrigerant in the circuit
22	Repeated attainment of high pressure condition in cooling (more than six times)	Unit stopped	Automatic	High pressure transducer fault high air temperature, high entering water temperature
23	Repeated attainment of high discharge temperature in heating	Unit stopped	Automatic	Low water flow rate entering or leaving water probe fault
24	Repeated attainment of low suction temperature in heating	Unit stopped	Automatic	Low pressure transducer fault, refrigerant filter blocked or lack of refrigerant in the circuit
25	Low entering water temperature in heating	Unit stopped	Automatic	Entering water temperature too low, entering or leaving water probe fault
26	Outdoor interblock fault	Unit stopped	Manual	Flowswitch tripped or fault, air in the water circuit
31	CCN emergency shut-down	Unit stopped	Automatic	Network control
32	Loss of communication with the Flotronic or Chiller System Manager	The unit operates in local mode	Automatic	CCN bus wiring defect or fault in the system
33	Maintenance service request	Unit stopped	Manual	–

Troubleshooting

Unit compressor and fan will not start:
- Unit not energized; check the mains power connections.
- Mains switch OFF; check and put in the ON position.
- Main switch fuses have blown; replace.
- Wait for 2 minutes; compressor cycling protection is on.
- Pressure switch open; check and eliminate cause.
- Mains voltage too low.
- Electrical connections loose or wrong; check and repair.

Compressor will not start, but unit fan is running:
- Electrical connections of compressor loose or wrong; check and repair.
- Compressor burnt out, seized or protection device open; check for the cause and replace compressor if necessary.
- Run capacitor faulty (single-phase models); replace.

Compressor starts, but stops due to its overtemperature protection (other than stops caused by the normal operation of the thermostat):
- Wrong refrigerant charge (excessive or low) or air or other non-condensable gases in the circuit; drain refrigerant (see note 1), evacuate and recharge.
- Mains voltage wrong (too high or too low).
- Condenser coil obstructed; remove obstructions.
- Fan off; check cause and repair.
- Run capacitor faulty; check and replace.
- Indoor unit thermostat faulty; replace.
- Refrigerant circuit clogged; check and remove obstructions.
- Reversing valve faulty in heat pump models; replace.
- Expansion device clogged or covered with ice; drain refrigerant (see note 1), evacuate and recharge.

Compressor runs continuously:
- Unit selected too small for actual air conditioning needs.
- Water temperature selection too low (if in cooling) or too high (if in heating, for heat pump models); check temperature selection.
- Refrigerant charge low; check and add refrigerant.
- Outdoor unit fan faulty; replace.
- Air or other non-condensable gases in the circuit; drain refrigerant (see note 1), evacuate and recharge.
- Obstruction in the air intake or dirty indoor unit filters; remove obstruction or clean filter.

Frequent ice build-up on coil (during heating with heat pump units):
- Fan stopped; check cause and repair.
- Wrong electrical connections on defrost circuit; check electrical connections and repair.

Discharge pressure too high:
- Coil dirty or obstructed; clean or remove obstructions.
- Water flow rate is insufficient or the pump is faulty (during heating); replace.
- Refrigerant charge too high; drain some refrigerant (see note 1).
- Air or other non-condensable gases in the circuit; drain refrigerant (see note 1), evacuate and recharge.

Discharge pressure too low:
- Refrigerant charge too low; add refrigerant.
- Coil dirty or obstructed; clean or remove obstructions.
- Water filter dirty; clean filter.

Suction pressure too high:
- Internal high pressure relief valve open; check for cause and repair.
- Refrigerant charge too high; drain some refrigerant (see note 1).
- Reversing valve (on heat pump models) faulty or internal leak; replace.

Suction pressure too low:
- Refrigerant charge too low; add refrigerant.
- Evaporator coil (indoor or outdoor in case of heat pump models) covered with ice; see the following points.
- Air circulation on the evaporator unit not sufficient; check for the cause and repair.
- Expansion device or suction line clogged: check and repair.
- Fan does not stop during defrost periods (when heating with heat pump models); check electrical connections.
- Defective defrost probe (heating with heat pump models); replace.
- Contact between tube and defrost probe (heating with heat pump models) faulty; check and repair.

Fan cycling due to its overtemperature protection:
- Fan capacitor faulty; replace.
- Electrical connections loose; check connections.
- Fan bearing seized; check and repair.
- Expansion device clogged or covered with ice; drain refrigerant (see note 1), evacuate and recharge.

Note 1:
Do not release refrigerant to the atmosphere; use refrigerant recovery equipment.

Guide for the owner

When installation and tests are completed explain the Operation and Maintenance Manual to the owner, with particular attention to the main operating modes of the air conditioner, such as:

- Turning the unit on and off.
- Control functions.

In the event of a fault or malfunctioning, check the error code shown on the remote control or at the LED on the board in the chiller control panel.

Table IX: Accessories

Description	Part number	Mod. 30 RA/RH					
		005	007	009	011	013	
AQUASNAP JUNIOR remote controller	30RAJ9002	●	●	●	●	●	
Aquasmart control	CEAS430408-01SA	●	●	●	●	●	
Service interface (1)	30RAJ9003	●	●	●	●	●	
Mechanical water filter	30RAJ9004	●	●	●	●	●	
CCN clock board	X30RA20J010	●	●	●	●	●	

NOTE (1): Exclusively for service use

Via R. Sanzio, 9 - 20058 Villasanta (MI) Italy - Tel. 039/3636.1

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