Carrier

United Technologies

PRODUCT SELECTION DATA

HEAT PUMPS AND LIQUID COOLERS WITH WATER COOLED CONDENSER

- Cooling and heating application
- High energy efficiency
- Compact design
- Low sound level
- Broad field of application

30WI 700V - 2400V

AQUASNAP®

Cooling capacity: 220 - 720 kW
Heating capacity: 250 - 820 kW

The new generation of AQUASNAP 30WI water cooled heat pumps and water chillers offers an optimal solution for all heating process or cooling applications.

These units are designed to be installed in machine rooms that are protected against freezing temperatures and inclement weather.

The new range has been optimised to use ozone-friendly HFC R410A refrigerant. The use of this refrigerant guarantees compliance with the most demanding requirements for environmental protection and increased seasonal energy efficiency.

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

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Translation of the original document

RANGE

AQUASNAP 30WI

Cooling-only or heating-only models with water-cooled condenser.

Acoustic configuration:
a - STANDARD version
b - LOW NOISE version. Compressor casing
c - VERY LOW NOISE version. Casing with compressor sound insulation

DESCRIPTION

AQUASNAP series 30WI units are packaged machines supplied as standard with the following components:
- SCROLL hermetic compressors,
- Chilled water evaporator with brazed plates,
- Hot water condenser with brazed plates,
- Electrical power and remote control cabinet:
  - 400V-3ph-50Hz general electrical power supply (+10%/-10%) + earth,
  - Transformer fitted as standard on the machine for supplying the remote control circuit with 230V-1ph-50Hz,
- 30WI Control electronic control module.

The AQUASNAP 30WI range complies with the following European standards and directives:
- Machinery directive 2006/42/EC.
- Electromagnetic compatibility directive 2004/108/EC.
- EMC immunity and emissions EN 61800-3 'C3'
- Low voltage directive 2006/95/EC.
- RoHS 2011/65/EU
- Pressure equipment directive (PED) 97/23/EC
- Machinery directive EN 60-204 -1

DESIGNATION

30WI	>	cooling only or heating only version
1200	>	unit size
V	>	R410A refrigerant

DESCRIPTION OF THE MAIN COMPONENTS

■ ***Compressors***

- Hermetic SCROLL type.
- Built-in electric motor cooled by intake gases.
- Motor protected by internal winding thermostat.
- Placed on anti-vibration mounts.

■ ***Evaporator***

- Brazed plate exchanger.
- Stainless steel plates (AISI 316).
- Plate patterns optimised for high efficiency.
- Armaflex thermal insulation.

■ ***Condenser***

- Brazed plate exchanger.
- Stainless steel plates (AISI 316).
- Plate patterns optimised for high efficiency.

■ ***Refrigerating accessories***

- Dehumidifier filters with rechargeable cartridges.
- Hygroscopic sight glasses.
- Solenoid valves on refrigerant lines (700 V to 1200 V models).
- Electronic expansion valves.

■ ***Control and safety instruments***

- High and low pressure sensors.
- High pressure safety valves.
- Water temperature control sensors.
- Evaporator frost protection sensor.
- Factory-assembled evaporator water flow controller.

■ ***Electrical box***

- IP 21.
- 400V-3Ph-50 Hz power supply + Earth (+10%/-10%).
- Main safety switch with handle on front.
- Control circuit transformer.
- Circuit breaker for compressor motor.
- Compressor motor switches.
- 30WI Control microprocessor-controlled electronic control module.
- Wire numbering.
- Marking of the main electrical components.
- RAL 7035.

■ ***30WI Control electronic control module.***

The electronic control module performs the following main functions:

- Regulation of the chilled or hot water temperature
- Regulation of the water temperature based on the outdoor temperature (water law).
- Regulation for low temperature energy storage.
- Second setpoint management.
- Complete management of compressors with start-up sequence, metering and runtime balancing.
- Self-adjusting and proactive functions with adjustment of parameters on drift control.
- In-series staged capacity-reduction system on compressors based on cooling and heating demands.
- Management of compressor short cycle protection.
- Management of the machine operation limit according to outdoor temperature.
- Operating and fault status diagnostics.
- Management of a fault memory allowing a log of the last 20 incidents to be accessed, with operating readings taken when the fault occurs.
- Master/slave management of the two machines in parallel with runtime balancing and automatic changeover if a fault occurs on one machine.
- Machine time schedule.
- Display and access to the operating parameters via a multilingual LCD screen with 4 lines of 24 characters.

■ ***Remote management***

30WI Control is equipped as standard with an RS485 serial port offering a range of remote management, monitoring and diagnostic options via the communication bus.
Several contacts are available as standard, enabling the AQUASNAP 30WI to be controlled remotely by wired link:

- Automatic operation control: when this contact is open, the machine stops.
- Setpoint 1/setpoint 2 selector: when this contact is closed, a second cooling setpoint is activated (energy storage mode, for example).
- Heating/cooling mode selector: this input switches from one operating mode to another. Contact closed = heating mode.
  Contact open = cooling mode.
- Setpoint adjustable via 4-20 mA signal: this input is used to adjust the setpoint in heating or cooling mode.
- Compressor load shedding: closing the contact(s) concerned allows the power or refrigerating consumption of the machine to be limited by stopping one or more compressors.
- Water pump 1 and 2 control: these outputs control the switches for one or two water pumps.
- Fault reporting: this contact indicates the presence of a major fault which has caused one or both refrigerating circuits to stop.

■ ***Capacity control***

In-series staged power control system on the compressors:

- 4 stages for 700 V to 1600 V models.
- 6 stages for 1800 V and 2400 V models.
- 8 stages for 2100 V models.

■ ***Casing***

Casing made from RAL 7035 painted panels.

OPTIONS

Options	No.	Description	Advantages	Use
Soft starter	25	Electronic starter for the compressor	Reduced compressor start-up in-rush current	30WI 700-2400
LP/HP pressure gauges	26	Pressure gauges installed on each refrigerating circuit	Direct pressure reading without HMI	30WI 700-2400
Master/Slave	58	Unit equipped with an additional water outlet temperature sensor, to be installed on site, enabling Master/Slave operation of 2 coolers connected in parallel	Optimised operation of two chillers connected in parallel with operating time equalisation	30WI 700-2400
Compressor suction valve	92	Shut-off valve on the compressor suction piping	Easy maintenance	30WI 700-2400
Bacnet gateway	148C	Two-directional communication board using Bacnet protocol	Connects the unit by communication bus to a building management system	30WI 700-2400
Lon gateway	148D	Two-directional communication board using Lon Talk protocol	Connects the unit by communication bus to a building management system	30WI 700-2400
Bacnet/IP	149	Two-directional high-speed communication using Bacnet protocol over Ethernet network (IP)	Easy and high-speed connection by Ethernet line to a building management system. Allows access to multiple unit parameters	30WI 700-2400
Low noise level	257	Compressor casing	Noise level reduction by 3 to 6 dB(A) compared to the standard version	30WI 700-2400
Extremely low noise level	258	Compressor casing + noise insulation	Noise level reduction by 8 to 10 dB(A) compared to the standard version	30WI 700-2400
Remote control unit	275	Remote HMI	Easy remote control of the machine	30WI 700-2400
Electrical energy meter	294	Display of the instantaneous consumption (voltage, current, electrical power) and cumulative consumption (kWh). Reduction of the unit's power consumption based on a maximum electrical power configured in the controller.	Enables acquisition, surveillance and optimisation of the machine's power consumption	30WI 700-2400
Refrigerant leak detection		Refrigerant detector installed inside the compressor casing (option 257 or 258 compulsory)	Enables automatic detection of a refrigerant leak on the machine	30WI 700-2400
Phase monitor		Phase control relay mounted in the electrical cabinet	Reinforced compressor protection with monitoring of rotation direction, absence and asymmetry of phases	30WI 700-2400
Relay board with potential-free (dry) contacts		Remote information reporting board with modulating potential-free (dry) contacts for the main operating statuses and faults	Easy remote diagnostics on the machine	30WI 700-2400

EFFICIENCY UNDER PARTIAL LOAD IN COOLING MODE

Rapidly rising energy costs and awareness of the environmental impacts relating to electricity production mean that the power consumption of air conditioning equipment is becoming an increasingly important issue. A unit's energy efficiency at full load rarely represents the machine's actual efficiency since, on average, a cooler runs at full load less than 5% of the time.

In fact, the heat load of a building depends on numerous factors, such as the outdoor temperature, its exposure to sunlight and its occupancy.

As a result, it is more useful to consider the average energy efficiency calculated using several operation points representative of the machine's usage.

IPLV (in accordance with AHRI 550/590)

The IPLV (Integrated Part Load Value) is used to evaluate the average energy efficiency using four operating conditions defined by the AHRI (Air Conditioning, Heating and Refrigeration Institute). The IPLV is the average of the energy efficiency ratios (EER) under different operating conditions, weighted by the operating time.

Load %	Condenser water inlet temperature °C	Energy efficiency	Operating time %
100	29,4	EER_1	1
75	23,9	EER_2	42
50	18,3	EER_3	45
25	18,3	EER_4	12
$IPLV = EER_1 \times 1\% + EER_2 \times 42\% + EER_3 \times 45\% + EER_4 \times 12\%$			

Note: constant water outlet temperature is 6.67°C

ESEER (in accordance with EUROVENT)

The ESEER (European Seasonal Energy Efficiency Ratio) is used to evaluate the average energy efficiency using four operating conditions defined by Eurovent.

The ESEER is the average of the energy efficiency ratios (EER) under different operating conditions, weighted by the operating time.

Load %	Condenser water inlet temperature °C	Energy efficiency	Operating time %
100	30	EER_1	3
75	26	EER_2	33
50	22	EER_3	41
25	18	EER_4	23
$ESEER = EER_1 \times 3\% + EER_2 \times 33\% + EER_3 \times 41\% + EER_4 \times 23\%$			

Note: constant water outlet temperature is 7°C

The (**S**easonal **E**nergy **P**erformance **R**atio) (**SEPR**) measures the seasonal energy efficiency of liquid chillers for process applications by calculating the ratio between the annual process cooling demand and the chiller's annual energy demand. It takes into account the energy efficiency at each outdoor temperature for the average European climate weighted by the number of hours observed for each of these temperatures.

The **SEPR** is a new way of measuring the energy efficiency of process liquid chillers over an entire year. The new indicator provides a more realistic overview of the cooling system's energy efficiency and its actual impact on the environment (Ecodesign regulation 2015/1095)

30WI		700 V	800 V	900 V	1000 V	1100 V	1200 V	1400 V	1600 V	1800 V	2100 V	2400 V
IPLV	kW/kW	6,41	6,49	6,36	6,23	6,3	6,32	6,32	6,2	6,57	6,4	6,21
SEPR $_{-2/-8°}$ Process medium temp.*	kWh/kWh	3,99	4,10	4,04	4,08	4,01	4,01	4,26	4,29	4,56	4,69	4,67
ESEER	kW/kW	5,53	5,59	5,48	5,38	5,44	5,47	5,44	5,34	5,64	5,48	5,34

ESEER: Calculation in accordance with the conditions of EUROVENT standard EN14511

* SEPR $_{-2/-8°}$ applicable Ecodesign Regulation (EU) No. 2015/1095

EFFICIENCY UNDER PARTIAL LOAD IN HEATING MODE

The European Ecodesign directive takes into account the product's environmental impact throughout its life cycle. It defines the mandatory energy efficiency requirements for water chillers and heat pumps.

Products that do not meet the energy efficiency requirements set by the new directive will gradually be phased out of the market, forcing manufacturers to develop and offer more efficient products.

Like the SEPR relating to water chillers, the new seasonal coefficient of performance (SCOP) resulting from this new European Ecodesign directive is used to evaluate the energy efficiency of heat pumps. Until now, only the COP has been used to measure energy efficiency in heating mode.

The COP was exclusively calculated using a single measuring point, and only took into account operation at full load, which did not represent the efficiency of the heat pump over an entire heating season.

The purpose of the SCOP is to characterise the seasonal efficiency of the heat pump by taking into account the efficiency at partial load and full load established for several outdoor temperatures. The SCOP is the ratio between the building's annual heating demand and the annual electricity consumption of the heating system. It is measured in accordance with the EN14825-2013 standard based on an average reference climate that takes into account several reference temperatures between -10°C and +16°C

Primary energy evaluation

In order to compare the energy efficiency of products using different energy sources, the Ecodesign directive introduced a new seasonal energy efficiency calculation known as ηs (Greek letter eta followed by the letter "s" for seasonal) and expressed as a percentage. For heat pumps, the SCOP (final energy) value is transposed to ηs (primary energy) by taking into account a conversion coefficient of 2.5 which corresponds to the average efficiency of the electrical production and various corrections for the responsiveness of the regulation system (i = 8 for water-to-water heat pumps).

$$\eta_s\,(\%) = \frac{\text{SCOP(kW/kW)}\times 100}{2{,}5} - \sum_i \text{corrections}$$

SCOP (in accordance with EN 14825-2013)

30WI		700 V	800 V	900 V	1000 V	1100 V	1200 V	1400 V	1600 V	1800 V	2100 V	2400 V
SCOP	kW/kW	5,59	5,63	5,7	5,54	5,49	5,49	5,55	5,55	4,72	4,99	4,54
ηs	%	216	217	220	213	212	212	214	214	181	192	174

Note: Hot water 30/35 - Average climate conditions according to standard EN 14825-2013

TECHNICAL SPECIFICATIONS

30WI			700 V	800 V	900 V	1000 V	1100 V	1200 V	1400 V	1600 V	1800 V	2100 V	2400 V
Version Standard Low Noise Very Low Noise	Cooling capacity(1)	kW	217	251	288	327	356	385	443	499	582	657	713
	Input power(1)	kW	48,2	55,2	64,2	73	79,2	85,6	97,4	110,4	125	146	168
	EER(1)	kW/kW	4,5	4,55	4,48	4,48	4,49	4,50	4,55	4,52	4,66	4,51	4,24
	SEPR $_{-2/-8°}$ Process medium temp.*	kWh/kWh	3,99	4,10	4,04	4,08	4,01	4,01	4,26	4,29	4,56	4,69	4,67
	ESEER	kW/kW	5,53	5,59	5,48	5,38	5,44	5,47	5,44	5,34	5,64	5,48	5,34
	Net Seasonal Coefficient of Performance (SCOP)(2)	kW/kW	5,59	5,63	5,7	5,54	5,49	5,49	5,55	5,55	4,72	4,99	4,54
	ηs heat	%	216	217	220	213	212	212	214	214	181	192	174
	Prated	kW	257,76	296,29	332,64	375,45	411,63	451,4	520,6	580,25	687,35	754,11	868,65
	Lw / Lp - standard(3)	dB(A)	89 / 57	90 / 58	90 / 58	89 / 57	90 / 58	91 / 59	95 / 63	96 / 64	93 / 61	95 / 63	97 / 65
	Lw / Lp Low Noise(3)	dB(A)	84 / 52	85 / 53	85 / 53	86 / 54	87 / 55	88 / 56	90 / 58	91 / 59	89 / 57	90 / 58	91 / 59
	Lw / Lp Very Low Noise(3)	dB(A)	79 / 47	80 / 48	80 / 48	80 / 48	81 / 49	82 / 50	85 / 53	86 / 54	85 / 53	86 / 54	87 / 55
Refrigerating circuit	Refrigerant (GWP)		R410 (GWP=2088)										
	Number		2										
	Refrigerant circuit 1	kg	13,5	15,5	16,4	17	19,7	21,3	21,5	23	31	33	34
	Refrigerant circuit 2	kg	14	15	16,4	17,2	19,7	21,3	21	22	31	34	34
	Tonne of CO_2 equivalent	TCO_2Eq	57,42	63,68	68,49	71,41	82,27	88,95	88,74	93,96	129,46	139,9	141,98
Compressor	Type		Hermetic scroll (- 2900 rpm)										
	Number		4	4	4	4	4	4	4	4	6	6	6
	Start-up mode		Direct in line in series										
	Number of stages		6	4	6	4	6	4	6	4	6	8	6
	Capacity control %		100-78-71-50-28-21-0	100-75-50-25-0	100-78-71-50-28-21-0	100-75-50-25-0	100-78-71-50-28-21-0	100-75-50-25-0	100-78-71-50-28-21-0	100-75-50-25-0	100-83-66-50-33-16-0	100-84-66-48-36-30-18-15-0	100-83-66-50-33-16-0
	Type of oil for R410A		Polyolester POE										
	Oil load per circuit	l	6.7+6.7	6.7+6.7	6.7+6.7	6.7+6.7	6.7+7.2	7.2+7.2	6.3+6.3	6.3+6.3	3x6.3	3x6.3	3x6.3
Evaporator	Type		Brazed-plate heat exchanger										
	Number		1										
	Water capacity	l	20	23	26	29	32	37	50	57	64	77	77
	Victaulic connection	Ø	DN100	DN100	DN100	DN125	DN125	DN125	DN125	DN125	DN150	DN150	DN150
	Max. pressure, water end	bar	10 bar										
	Min/max water flow	m^3/h	22/70	26/81	29/92	33/105	35/113	38/124	44/137	51/151	61/150	68/150	74/150
Water-cooled condenser	Type		Brazed-plate heat exchanger										
	Number		1										
	Water capacity	l	23	26	29	32	37	40	55	61	73	77	77
	Victaulic connection	Ø	DN100	DN100	DN100	DN125	DN125	DN125	DN125	DN125	DN150	DN150	DN150
	Max. pressure, water end	bar	10 bar										
	Min/max water flow	m^3/h	19/64	22/74	25/84	28/95	31/103	33/112	38/129	43/143	52/150	59/150	66/163
Dimensions	Length	mm	2099	2099	2099	2099	2099	2099	2499	2499	3350	3350	3350
	Width	mm	996										
	Height	mm	1869	1869	1869	1869	1869	1869	1887	1887	1970	1970	1970
Weight	Weight (empty)	kg	1044	1156	1189	1312	1363	1425	1613	1708	2284	2376	2418
	Weight in operation	kg	1088	1205	1246	1378	1436	1510	1713	1818	2472	2588	2637
Max. storage temperature		°C	+50°C										

* SEPR $_{-2/-8°}$ applicable Ecodesign Regulation (EU) No. 2015/1095

(1) Chilled water 12°C / 7°C and hot water 30°C / 35°C according to standard EN 1411-3:2013

(2) Hot water 30°C/35°C - Average climate conditions according to standard EN 14825-2013

(3) Lw: overall sound power level as per ISO3744
Lp: overall pressure level at 10 metres in a free field calculated using the formula Lp=Lw-10logS

ELECTRICAL SPECIFICATIONS

30WI		700 V	800 V	900 V	1000 V	1100 V	1200 V	1400 V	1600 V	1800 V	2100 V	2400 V
		COMPRESSOR										
Voltage	V	400V - 3Ph - 50Hz (+10/- 10%)										
Maximum nominal current	A	140	160	182	205	218	232	266	295	356	399	443
Starting current(1)	A	316	334	391	414	480	494	586	615	607	720	763
Starting current with Soft Start option(1)	A	230	248	287	310	352	366	429	458	483	562	605
		REMOTE CONTROL AUXILIARY CIRCUIT										
Voltage	V	230V - 1Ph - 50Hz (+10/- 10%)										
Maximum nominal current	A	0,8	0,8	0,8	0,8	0,8	0,8	1,3	1,3	1,3	1,3	1,3
Transformer capacity	VA	160	160	160	160	160	160	250	250	250	250	250
Machine protection rating		IP 21										

(1) Starting current of largest compressor + maximum current of other compressors under full load
Cable selection nominal current = sum of maximum nominal currents in above tables

SOUND LEVELS

STANDARD version (without noise insulation on compressors)

■ ***Sound power level ref 2 x 10^{-12} Pa ±3 dB (Lw)***

30WI	SOUND POWER LEVEL SPECTRUM (dB)						Overall power level dB(A)
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	
700 V	75	78	84	80	84	80	89
800 V	77	78	83	81	87	81	90
900 V	76	77	86	82	85	80	90
1000 V	75	75	88	83	82	78	89
1100 V	77	82	89	85	82	78	90
1200 V	78	84	90	87	81	77	91
1400 V	82	90	85	90	91	85	95
1600 V	82	90	85	91	92	87	96
1800 V	90	89	91	88	86	83	93
2100 V	90	90	90	91	89	84	95
2400 V	90	90	90	92	91	85	97

■ ***Sound pressure level ref 2 x 10^{-5} Pa ±3 dB (Lp)***

Measurement conditions: free field, 10 metres from machine, 1.50 metres from ground, directivity 2.

30WI	SOUND POWER LEVEL SPECTRUM (dB)						Overall power level dB(A)
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	
700 V	43	46	52	48	52	48	57
800 V	45	46	51	49	55	49	58
900 V	44	45	54	50	53	48	58
1000 V	43	43	56	51	50	46	57
1100 V	45	50	57	53	50	46	58
1200 V	46	52	58	55	49	45	59
1400 V	50	58	53	58	59	53	63
1600 V	50	58	53	59	60	53	64
1800 V	58	57	59	56	54	51	61
2100 V	58	58	58	59	57	52	63
2400 V	58	58	58	60	59	53	65

N.B.: Sound pressure levels depend on the installation conditions of each system. As such, the levels listed here are given for information only. Only the sound power levels are comparable and certified.

SOUND LEVELS

LOW NOISE version (compressor casing)

■ ***Sound power level ref 2 x 10^{-12} Pa ±3 dB (Lw)***

30WI	SOUND POWER LEVEL SPECTRUM (dB)						Overall power level dB(A)
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	
700 V	80	78	83	76	77	74	84
800 V	82	78	82	76	79	76	85
900 V	81	77	85	77	78	74	85
1000 V	80	75	87	78	75	73	86
1100 V	82	82	88	81	74	72	87
1200 V	83	84	89	82	74	71	88
1400 V	87	90	84	85	83	80	90
1600 V	87	90	84	87	85	81	91
1800 V	89	87	87	81	80	79	89
2100 V	89	88	87	84	82	80	90
2400 V	89	88	87	86	84	80	91

■ ***Sound pressure level ref 2 x 10^{-5} Pa ±3 dB (Lp)***

Measurement conditions: free field, 10 metres from machine, 1.50 metres from ground, directivity 2.

30WI	SOUND POWER LEVEL SPECTRUM (dB)						Overall power level dB(A)
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	
700 V	48	46	51	44	45	42	52
800 V	50	46	50	44	47	44	53
900 V	49	45	53	45	46	42	53
1000 V	48	43	55	46	43	41	54
1100 V	50	50	56	49	42	40	55
1200 V	51	52	57	50	42	39	56
1400 V	55	58	52	53	51	48	58
1600 V	55	58	52	55	53	49	59
1800 V	57	55	55	49	48	47	57
2100 V	57	56	55	52	50	48	58
2400 V	57	56	55	54	52	48	59

N.B.: Sound pressure levels depend on the installation conditions of each system. As such, the levels listed here are given for information only. Only the sound power levels are comparable and certified.

SOUND LEVELS

VERY LOW NOISE version (compressor casing with noise insulation)

■ ***Sound power level ref 2 x 10^{-12} Pa ±3 dB (Lw)***

30WI	SOUND POWER LEVEL SPECTRUM (dB)						Overall power level dB(A)
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	
700 V	78	75	76	67	73	72	79
800 V	79	75	75	68	75	73	80
900 V	79	74	78	69	74	72	80
1000 V	78	73	80	70	71	70	80
1100 V	79	79	81	72	70	70	81
1200 V	80	81	82	74	70	69	82
1400 V	84	87	77	77	79	77	85
1600 V	84	88	77	78	81	79	86
1800 V	87	84	84	76	75	75	85
2100 V	88	84	83	79	78	76	86
2400 V	89	84	83	81	79	77	87

■ ***Sound pressure level ref 2 x 10^{-5} Pa ±3 dB (Lp)***

Measurement conditions: free field, 10 metres from machine, 1.50 metres from ground, directivity 2.

30WI	SOUND POWER LEVEL SPECTRUM (dB)						Overall power level dB(A)
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	
700 V	46	43	44	65	41	40	47
800 V	47	43	43	36	43	41	48
900 V	47	42	46	37	42	40	48
1000 V	46	41	48	38	39	38	48
1100 V	47	47	49	40	38	38	49
1200 V	48	49	50	42	38	37	50
1400 V	52	55	45	45	47	45	53
1600 V	52	56	45	46	49	47	54
1800 V	55	52	52	44	43	43	53
2100 V	56	52	51	47	46	44	54
2400 V	57	52	51	49	47	45	55

N.B.: Sound pressure levels depend on the installation conditions of each system. As such, the levels listed here are given for information only. Only the sound power levels are comparable and certified.

EVAPORATOR LIMITS

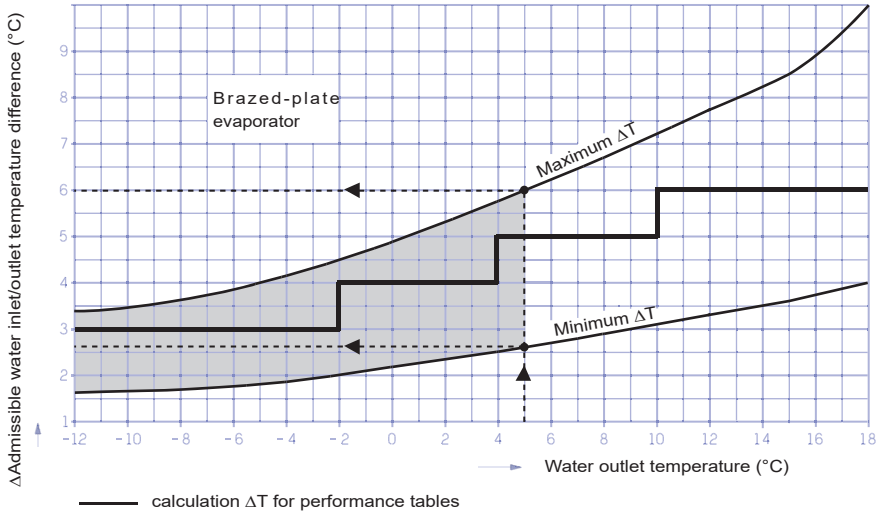
The curves show the minimum and maximum allowable temperature differences for chilled water or glycol/water solution based on the outlet temperature.

Example:

For a water outlet temperature of +5°C

- the minimum difference is 2.6°C, which gives a water temperature of 7.6 / 5°C
- the maximum difference is 6°C, which gives a water temperature of 11 / 5°C

If the temperature difference calculated is outside the two curves, contact us.



CONDENSER LIMITS

AQUASNAP	30WI
Minimum ΔT (°C)	5
Maximum ΔT (°C)	10

IMPORTANT: To ensure that units operate correctly, especially during the start-up phases, with a condenser cold water loop, a device must be fitted to ensure a minimum condenser fluid inlet temperature of 20°C is reached very quickly (e.g. 3-way valve).

CORRECTION COEFFICIENTS FOR ETHYLENE GLYCOL

■ ***Evaporator – Condenser***

% volume concentration of ethylene glycol	Multiplier correction factor		
	Cooling capacity	Water flow rate	Pressure drops
10	0,99	1,05	1,05
20	0,985	1,10	1,10
30	0,98	1,15	1,15
40	0,97	1,20	1,23

■ ***Glycol concentration required***

Volume concentration in %		0	10	20	30	40
Ethylene glycol	Freezing point °C	0	-4	-10	-18	-27
	Minimum water outlet °C	5	+3	-1	-7	-14
Propylene glycol	Freezing point °C	0	-4	-9	-16	-25
	Minimum water outlet °C	5	+4	+1	-4	-9

MINIMUM CHILLED WATER VOLUME (COOLING MODE)

The 30WI Control is equipped with anticipation logic making it highly flexible in adjusting operation to changes in parameters, particularly on hydraulic systems with low water volumes.

By adjusting compressor runtimes, it prevents short cycle protection cycles from starting and, in most cases, eliminates the need for a buffer tank.

30WI	700 V	800 V	900 V	1000 V	1100 V	1200 V	1400 V	1600 V	1800 V	2100 V	2400 V
Min. system capacity (litres)	636	880	844	1146	1043	1346	1286	1735	1262	1336	1595

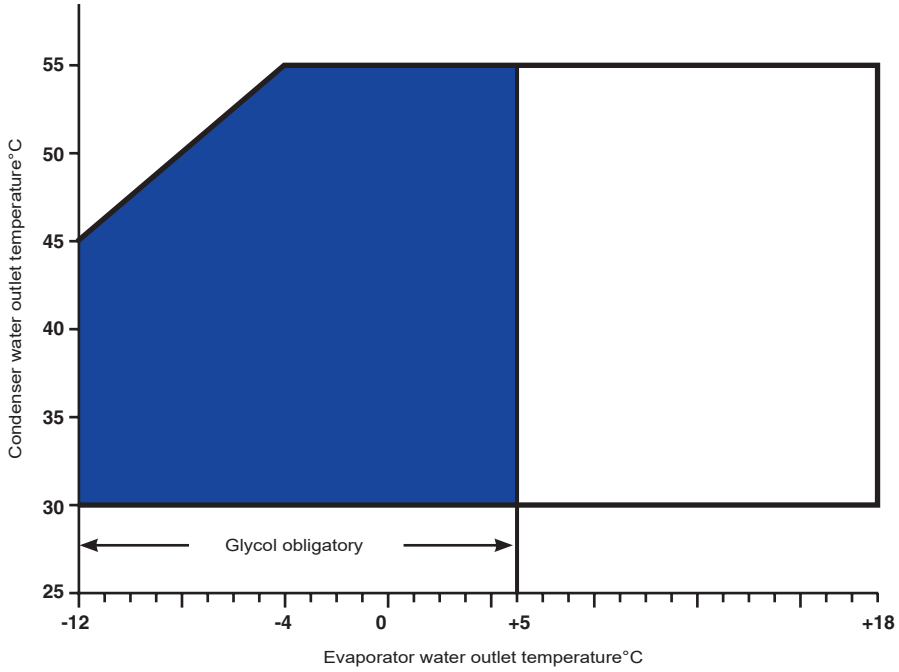
Note: The minimum volumes of chilled water are calculated for the following conditions:
- chilled water temperature in evaporator: 12°C / 7°C
- water temperature in condenser: 30°C / 35°C

The calculation of the minimum water volume is given for EUROVENT rated conditions, in cooling mode only.
This value is applicable for most air conditioning applications (unit with fan coil units)

Note:
For installations running with a low volume of water (assembly with air handling unit) or for industrial processes, the buffer tank is a required component.

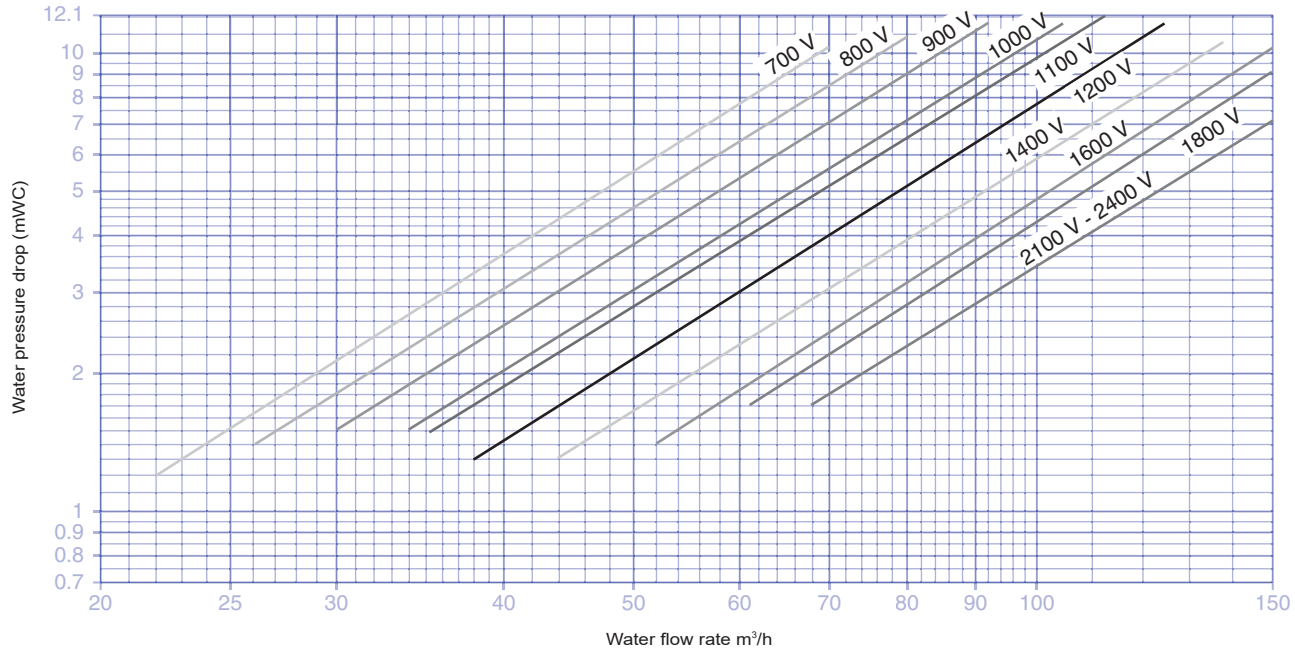
OPERATING RANGE

■ ***30WI***

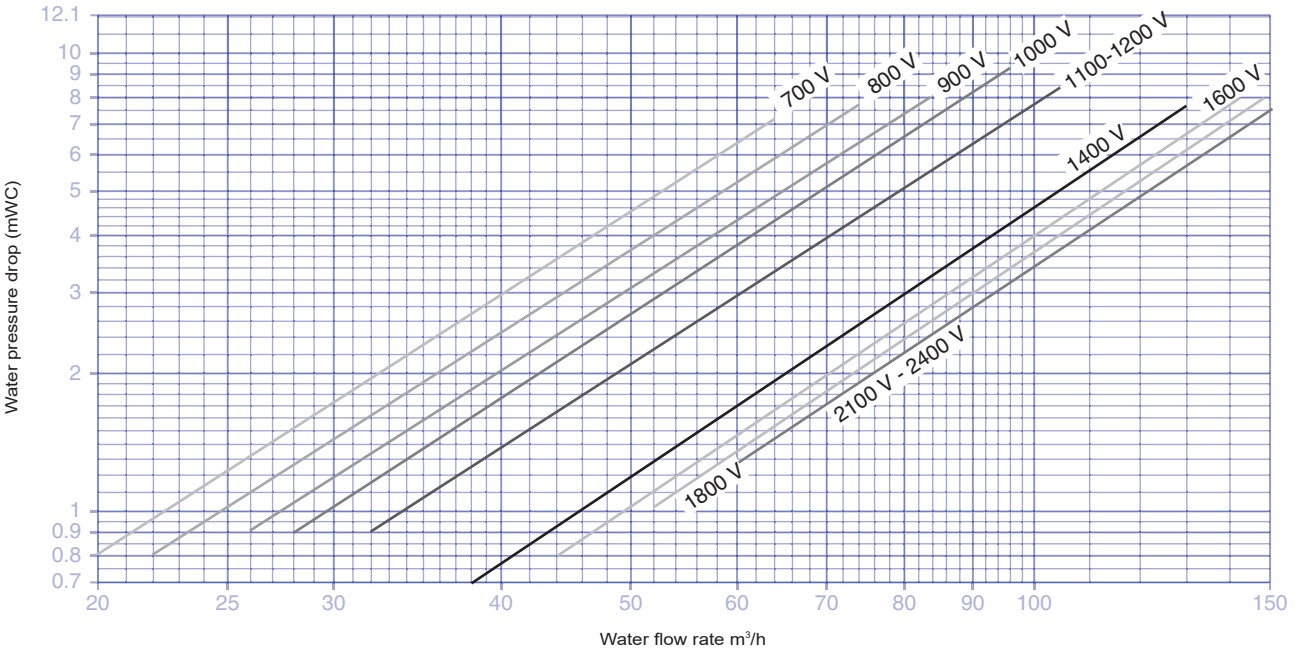


HYDRAULIC SPECIFICATIONS

■ ***Water pressure drop: 30WI evaporator***



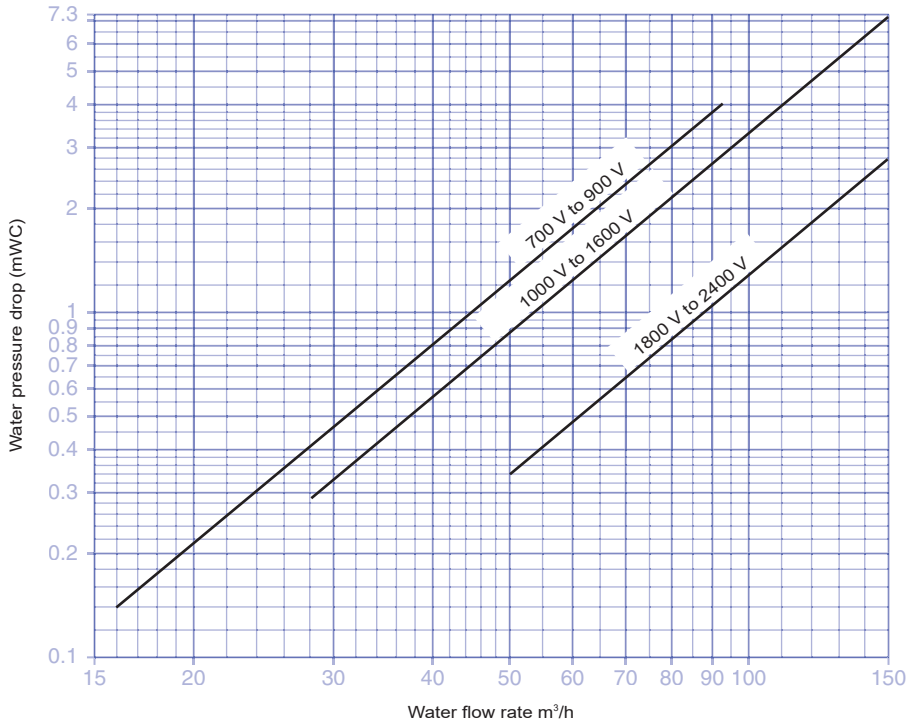
■ ***Water pressure drop: 30WI condenser***



Do not extrapolate the curves. Always stay within minimum and maximum flow rate values.

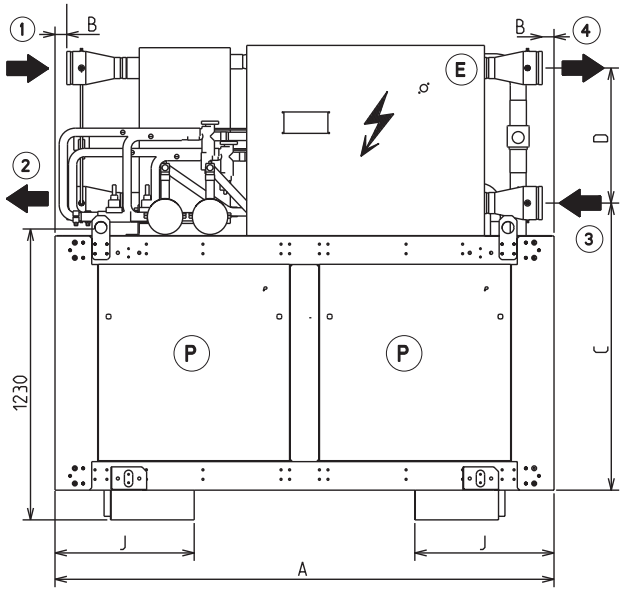
HYDRAULIC SPECIFICATIONS

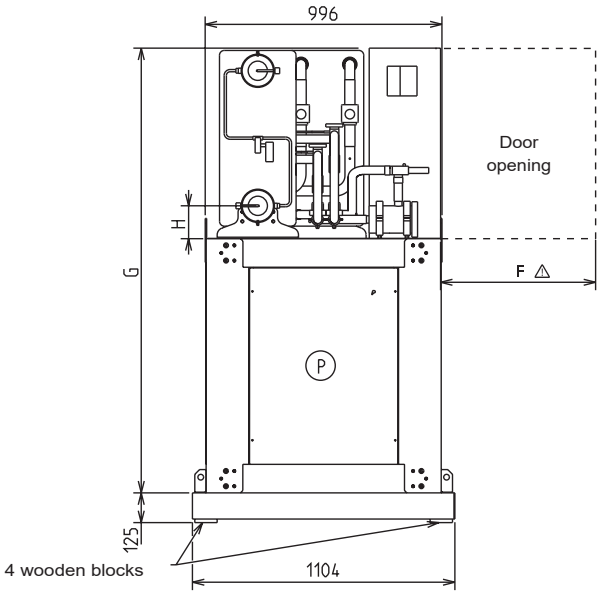
■ ***Water pressure drop: evaporator filter and condenser***

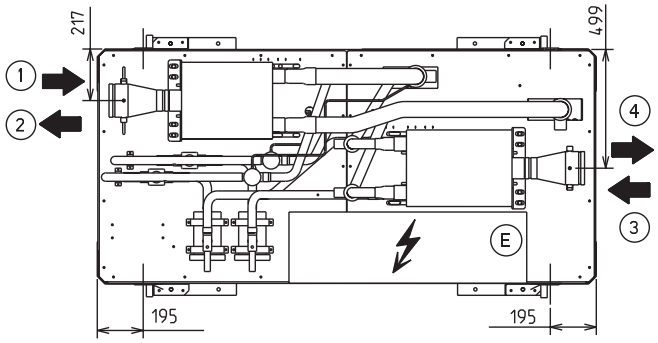


DIMENSIONS

■ ***700 V to 1600 V models***







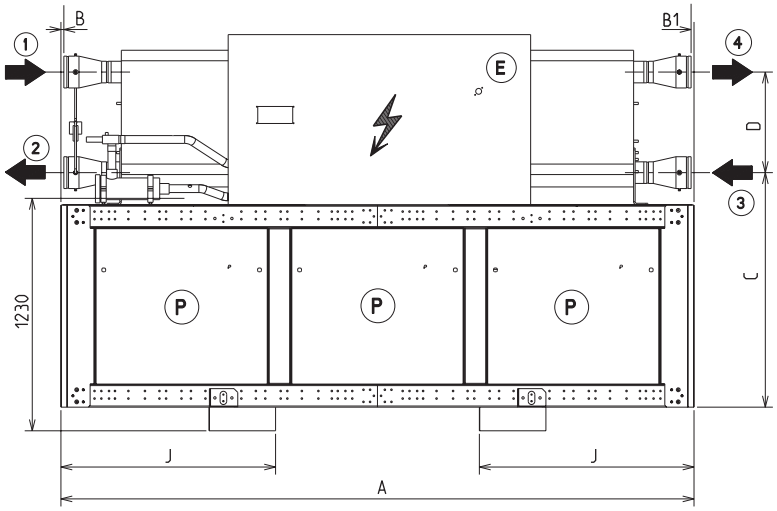
(E) Electrical connection on the side

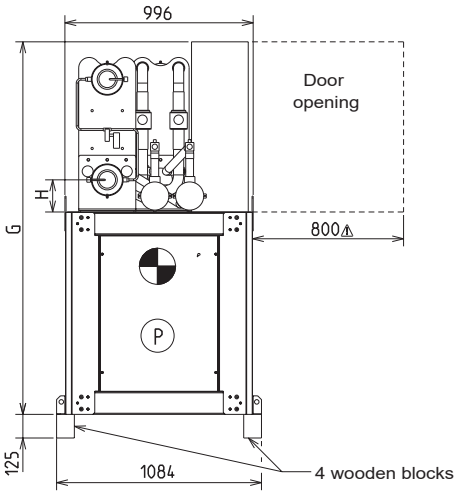
(P) Noise insulation panels option

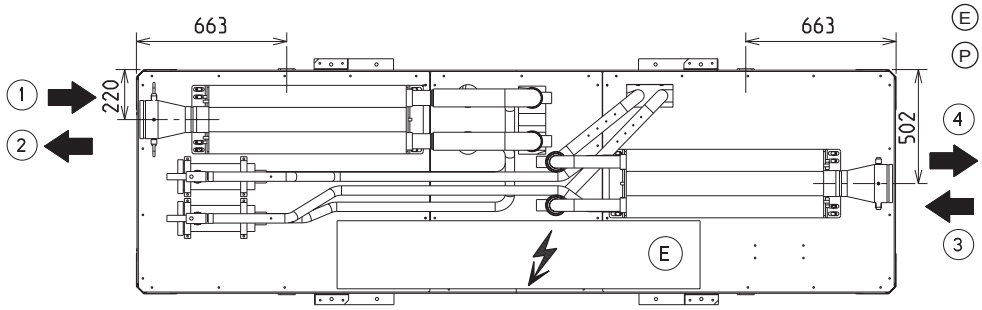
Models	Dimensions (mm)								Chilled water		Hot water		Weight (kg)	
	A	B	C	D	F	G	H	J	Inlet 1	Outlet 2	Inlet 3	Outlet 4	empty	in operation
700 V	2099	49	1207	568	1000	1869	137	585	VICTAULIC DN 100				1044	1088
800 V	2099	49	1207	568	1000	1869	137	585					1156	1205
900 V	2099	49	1207	568	1000	1869	137	585					1189	1246
1000 V	2099	49	1207	568	1000	1869	137	585	VICTAULIC DN 125				1312	1378
1100 V	2099	49	1207	568	1000	1869	137	585					1363	1436
1200 V	2099	49	1207	568	1000	1869	137	585					1425	1510
1400 V	2499	60	1240	532	600	1887	170	715					1613	1713
1600 V	2499	60	1240	532	600	1887	170	715					1708	1818

DIMENSIONS

■ *1800 V to 2400 V models*







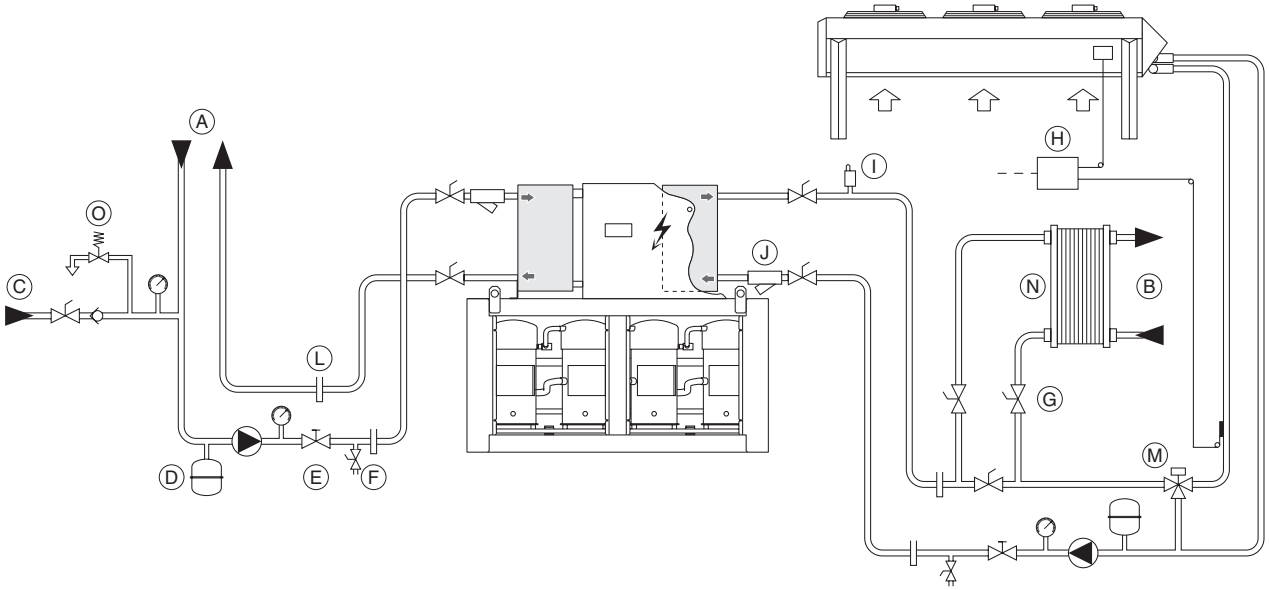
(E) Electrical connection on the side

(P) Noise insulation panels option

Models	Dimensions (mm)								Chilled water		Hot water		Weight (kg)	
	A	B	B1	C	D	G	H	J	Inlet 1	Outlet 2	Inlet 1	Outlet 2	empty	in operation
1800 V	3350	63	63	1240	532	1970	170	1135	VICTAULIC DN 150				2284	2472
2100 V	3350	15	15	1240	532	1970	170	1135					2376	2588
2400 V	3350	15	15	1240	532	1970	170	1135					2418	2637

COOLING SCHEMATIC INSTALLATION DIAGRAM

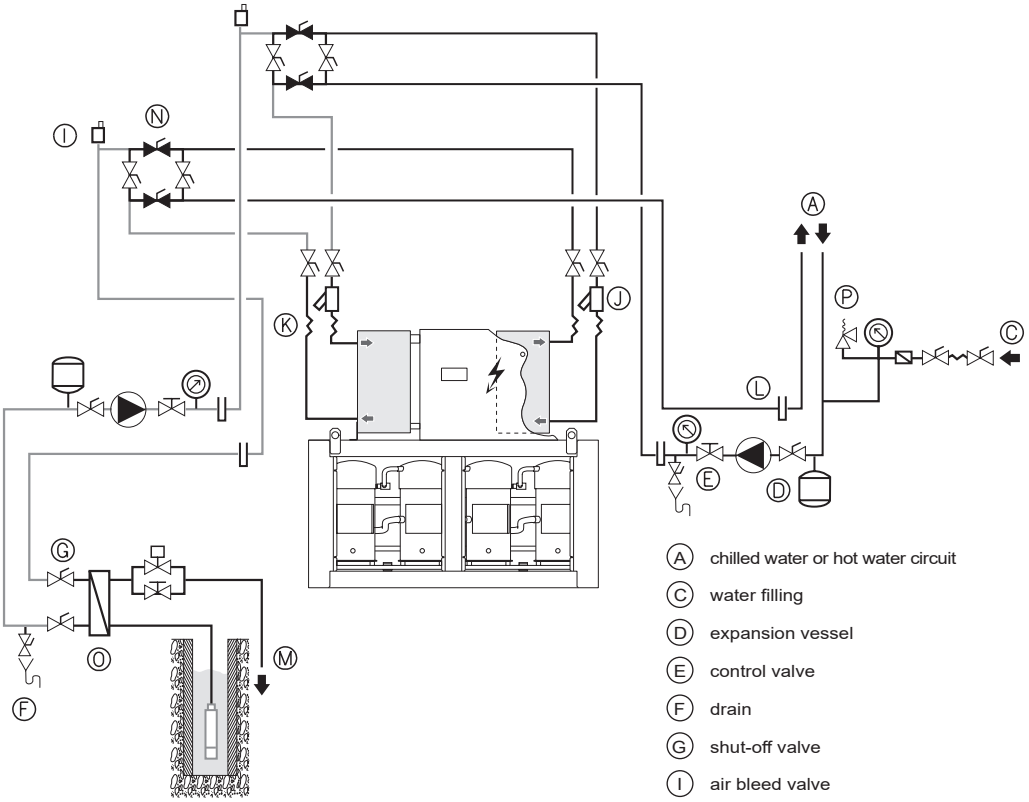
■ ***Cooling installation with drycooler***



- (A) Chilled water circuit
- (B) Recovery water circuit
- (C) Water top-up
- (D) Expansion tank
- (E) Control valve
- (F) Drain
- (G) Shut-off valve
- (H) Temperature controller
- (I) Air purge
- (J) Water filter (mandatory)
- (L) Temperature probe well
- (M) 3-way hydraulic valve
- (N) Cleanable exchanger
- (O) Safety relief valve

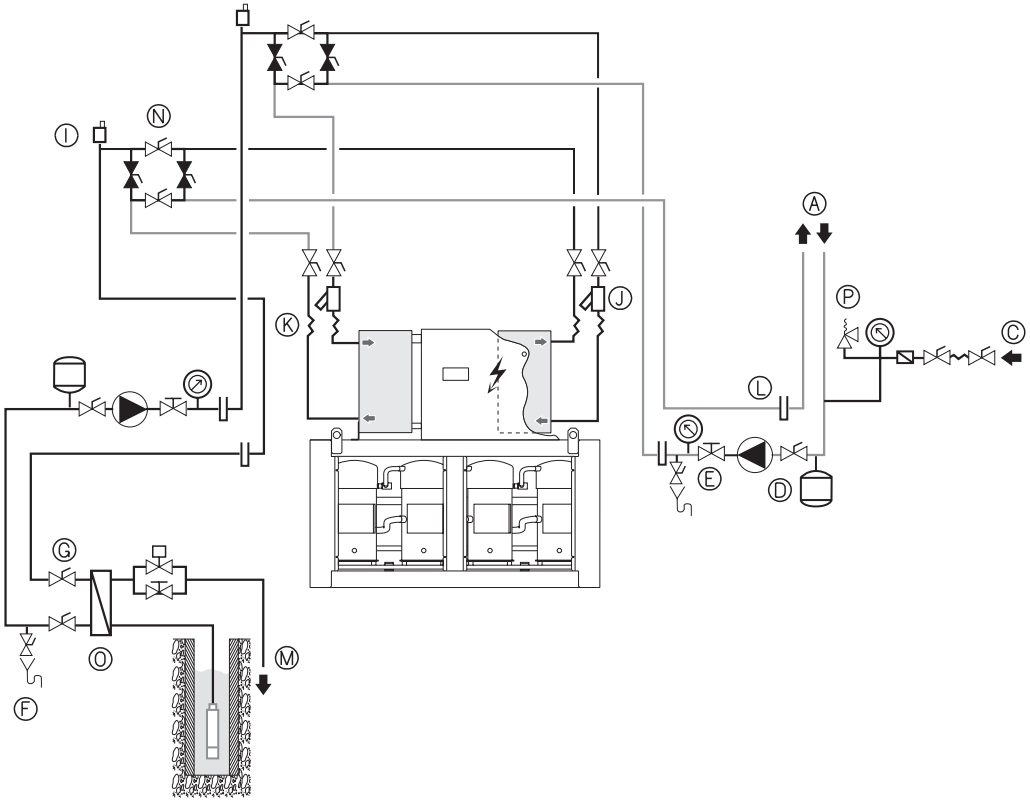
HEATING AND COOLING SCHEMATIC INSTALLATION DIAGRAM

■ ***Cooling operation***



Ⓐ chilled water or hot water circuit
Ⓒ water filling
Ⓓ expansion vessel
Ⓔ control valve
Ⓕ drain
Ⓖ shut-off valve
Ⓘ air bleed valve
Ⓙ water filter (mandatory)
Ⓚ water hoses (mandatory)
Ⓛ thermowell
Ⓜ well discharge
Ⓝ hydraulic valve
Ⓞ cleanable heat exchanger
Ⓟ safety valve

■ ***Heating operation***



INSTALLATION RECOMMENDATIONS

■ *Water quality criteria to be respected*

Warning: It is essential that an 800-micron water filter be placed on the unit's water inlet during installation.
The quality of the water used has a direct impact on the correct and compliant operation of the machine and its service life. This is particularly true if the water used clogs or corrodes components or promotes the growth of algae or micro-organisms.
The water must be tested to determine whether it is suitable for the unit.
It is also tested to determine whether chemical treatment is necessary and will suffice to make it of acceptable quality.
The results of the analysis must confirm whether the site's water is compatible with the various materials used on the unit's circuit:

- 99.9% copper tubes brazed with copper and silver,
- threaded bronze couplings or flat steel flanges, depending on the unit model,
- plate heat exchangers and stainless steel connections brazed with copper and silver.

Warning: failure to follow these instructions will result in the immediate voiding of the unit's warranty.
Lifting and handling.

■ *Lifting and handling*

The utmost safety precautions must be taken when lifting and handling the unit.
Always follow the lifting diagram affixed to the unit and in the user manual (Installation, Operation, Commissioning and Maintenance)
Before attempting to lift the unit, make sure the path leading to its intended location is free from obstacles.
Always keep the unit vertical when moving it. Never tip it or lie it on its side.

■ *Choosing a location for the unit*

Units designed for installation in a machine room.
Precautions should be taken to protect it from freezing temperatures.
Special attention should be paid to ensure sufficient free space (including at the top) to allow maintenance.
The unit must be placed on a perfectly level, fireproof surface strong enough to support it when ready for operation.
Noise pollution from auxiliary equipment such as pumps should be studied thoroughly.
Depending on the room and its structure, potential noise transmission routes should be studied, with assistance from an acoustical engineer if necessary, before installing the unit.
Flexible couplings must be placed over pipes (available as options).

■ *Machine room ventilation*

According to the regulations in force in the place in which the machine is to be installed, the machine room must comply with certain ventilation rules for fresh air to ensure there is no risk of discomfort or hazard in the event of a refrigerant leak.

■ *Fitting accessories supplied separately*

A number of optional accessories may be delivered separately and installed on the unit on site. Always follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance).

■ *Electrical connections*

Always follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance)
All information concerning electrical connections is stated on the wiring diagrams provided with the unit. Always follow this information to the letter.
Electrical connections must be made in accordance with best current practices and applicable standards and regulations.
Electrical cable connections to be made on site:

- electrical power supply to unit
- contacts available as standard enabling the machine to be controlled remotely (optional).

It should be noted that the unit's electrical system is not protected against lightning strikes.
Therefore devices to protect against transient voltage surges must be installed on the system and inside the power supply unit.

■ *Pipe connections*

Always follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance)
All pipes must be correctly aligned and slope toward the system's drain valve.
Pipes must be installed to allow sufficient access to the panels and fitted with heat insulation.
Pipe mountings and clamps must be separate to avoid vibrations and ensure no pressure is placed on the unit.
Water flow shut-off and control valves must be fitted when the unit is installed.

Pipe connections to be made on site:

- water supply with pressure-reducing valve
- evaporator, condenser and drain

Accessories essential to any hydraulic circuit must also be installed, such as:

- a thermostatically controlled valve for controlling the flow rate of cooling water placed at the condenser water inlet or outlet.
- water expansion tank
- drain nozzles at pipe low points
- exchanger shut-off valves equipped with filters
- air vents at pipe high points
- check the system's water capacity (install a buffer water tank if necessary)
- flexible couplings on exchanger inlets and outlets
- thermometers on each water inlet and outlet to allow all the necessary checks during commissioning and maintenance.

Warning:

- pressure in the water circuits below 4 bar.
- place the expansion tank upstream of the pump.
- do not place any valves on the expansion tank.
- make sure the water circulation pumps are placed directly at the exchanger inlets.
- make sure the pressure of the water drawn in by the circulation pumps is greater than or equal to the required minimum NPSH, particularly if the hydraulic circuits are "open".
- test the water quality criteria in accordance with the relevant technical requirements.

INSTALLATION RECOMMENDATIONS

- take the necessary precautions to protect the unit and hydraulic system from freezing temperatures (e.g. allow for the possibility of draining the unit). If glycol is added to prevent freezing, check its type and concentration before system start-up.
- before making any final hydraulic connections, flush the pipes with clean water to remove any debris in the network

■ ***Commissioning***

The manufacturer or a manufacturer-approved firm must perform system start-up on the units.
Always follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance)
List of system start-up checks (non-exhaustive):

- correct positioning of unit
- power supply protections
- phases and direction of rotation
- wiring connections on unit
- direction of water circulation in unit
- cleanliness of hydraulic circuit
- water flow rate at specified value
- pressure in the refrigeration circuit
- direction of rotation of compressors
- water pressure drops and flow rates
- operating readings.

■ ***Maintenance operations***

Specific preventive maintenance operations must be carried out regularly on the unit by
manufacturer-approved firms.
The operating parameters are read and noted on a "CHECK LIST" form to be returned to the manufacturer.
To do this, always refer to and follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance).
You must take out a maintenance contract with a manufacturer-approved refrigeration equipment specialist. Such a contract is required even during the warranty period.

DRYCOOLERS

09PE and 09VE series drycoolers are compatible with **AQUASNAP 30WI** water cooled condenser units

Available in a wide range of sizes and ventilation speeds, the 09PE and 09VE are compatible with dimensional and acoustic constraints on all sites.

09PE

09VE

Quality and Environment
Management Systems
Approval

Order No.: 10136, 10.2017 - Supersedes order No.: 10136, 02.2016

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Printed in the European Union.