

Application guide

ECOLEAN - EAC/EAR

- Providing indoor climate comfort



ECOLEAN™

APPLICATION GUIDE

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Our company is member of the Eurovent Certification Programme, The ECOLEAN™ Lennox chillers are tested and rated in accordance with Eurovent certification program.



Our company's products comply with European standards.



The manufacturing of ECOLEAN™ answers to ISO9001 control quality system.



Lennox have been providing environmental solutions since 1895, our range of ECOLEAN™ reversible chillers continues to meet the standards that have made LENNOX a household name. Flexible design solutions to meet YOUR needs and uncompromising attention to detail. Engineered to last, simple to maintain and Quality that comes as standard. Information on local contacts at www.lennox europe.com.

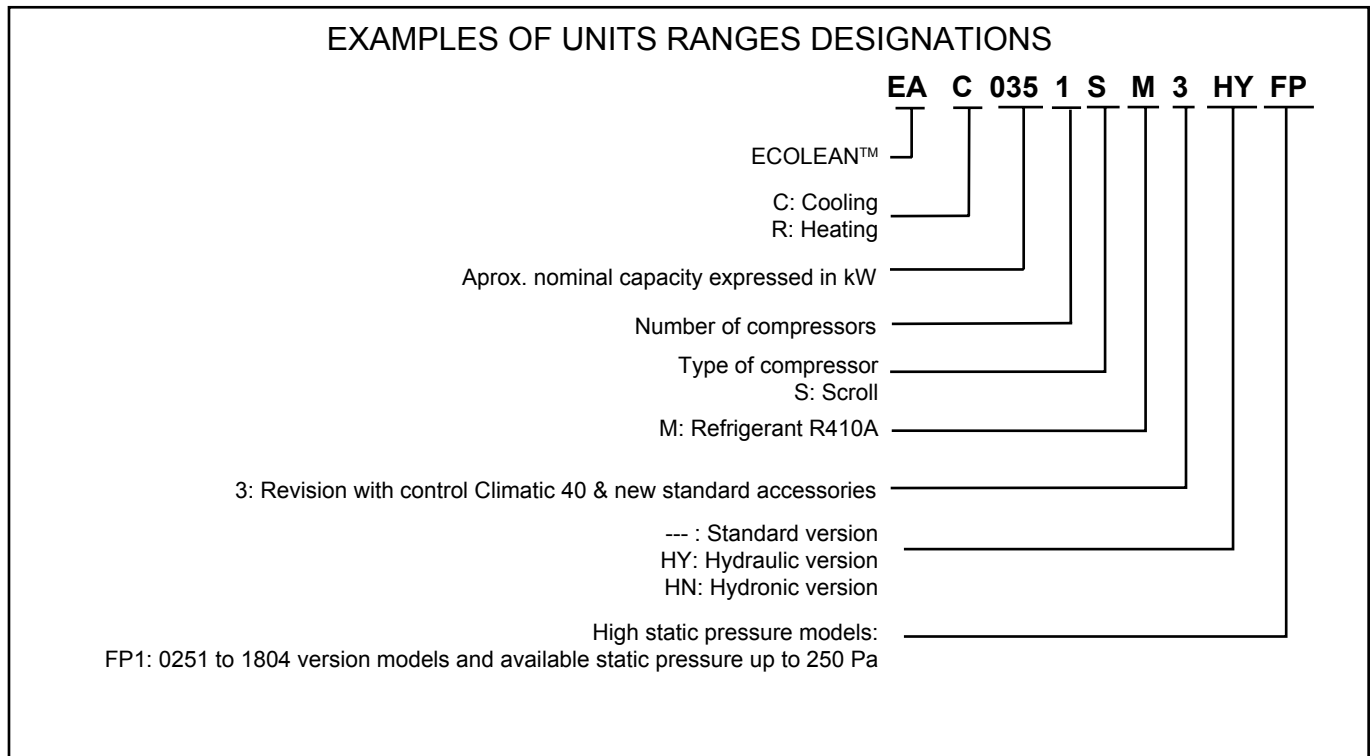
All the technical and technological information contained in this manual, including any drawing and technical descriptions provided by us, remain the property of Lennox and must not be utilised (except in the operation of this product), reproduced, issued to or made available to third parties without the prior written agreement of Lennox.

The specifications and technical characteristics in this booklet are given for information purposes. The manufacturer reserves the right to modify them without prior notice or obligation to modify in a similar manner, the equipments previously supplied.

In order to ensure conformity of finished product with the customers' order and the perfect refrigeration and electrical operation of the unit, the ECOLEAN™ chillers are systematically tested in the test station before shipping.

With low dimensions and quiet operation, the ECOLEAN™ chillers make use of the finest in technology to satisfy the strictest reliability and safety requirements.

ECOLEAN™ units are equipped with hermetic scroll type compressors.



STANDARD ACCESSORIES FITTED SUPPLIED ON THE VARIOUS VERSIONS

- STANDARD VERSION UNIT

- Piping and inlet/outlet connections.
- Main ON/OFF switch
- Dynamic set-point
- Water filter
- Flow switch

- HYDRAULIC VERSION UNIT

- Piping and inlet/outlet connections
- Water pump
- Expansion vessel
- Water filter
- Safety valve
- Manometer
- Flow switch

- HYDRONIC VERSION UNIT

- Piping and inlet/outlet connections
- Water pump
- Expansion vessel
- Water filter
- Safety valve
- Manometer
- Flow switch
- Water tank

FAN STATIC PRESSURES

- STANDARD VERSION UNIT (all models)

- Available static pressure up to 50 Pa.

- FP1 VERSION UNIT (0251 to 1804 models)

- Available static pressure up to 250 Pa.

CHASSIS

- Rigid, hot dipped galvanized chassis
- Polyester paint - Color RAL 9002
- Unit lifting and handling via the base frame

COMPRESSOR

- Scroll type
- Suction gas cooled integral motor
- Crankcase heater
- Direct on line start
- Mounted on high efficiency cellular polyurethane vibration absorbers

PLATE EXCHANGER

- Stainless steel plate brazed
- Thermal insulation by top grade 10 mm plastic foam

OUTDOOR EXCHANGER

- Expanded copper tubes and high efficiency fins

FANS

- Standard version: axial fans 700 or 900 rpm according to models, direct coupling
- FP1 version:
 - axial fans 1450 rpm, direct coupling 0251 to 0812 models
 - axial fans 900 rpm, direct coupling 1003 to 1804 models for low speed version (from 50 to 125 Pa)
 - axial fans 1450 rpm, direct coupling 1003 to 1804 models for high speed version (from 150 to 250 Pa)

REFRIGERATION CIRCUITS ACCESSORIES

Welded and hermetically sealed and including the following components:

- Thermostatic expansion valve
- Filter drier
- High-pressure switch with automatic reset
- Low-pressure switch with automatic reset (Heat pump units incorporate two of them, one for cooling cycle and other for heating cycle)
- Four-way valve (heat pump units only)
- Liquid receiver (heat pump units only)
- Pressure transducer (heat pump units only)

ELECTRICAL PANEL

- Unit wiring in compliance with standard EN 60204-1
- IP 54 water protection
- Circuit breaker protection for compressor, fan and water pump
- Compressor, fan and water pump working contactors
- Crankcase heater
- Terminal block and wiring for power supply to the unit
- Door interlocked main switch

CONTROL

- Model: Climatic™ 40
- Control and check by microprocessor
- Reading of water and refrigerant temperatures
- Reading of refrigerant pressure (heat pump units)
- Alarm signaling

- Buffer tank elimination algorithm (Lennox property)
- Diagnostic per circuit
- Adjustment of temperature set points and parameters adapted for operating conditions
- Hour counter and daily balance of operating time for each compressor by "first in/first out" permutation (units with two compressors)
- Possibility of remote alarm signals
- Antifreeze protection
- Fan speed control (0251 to 0812 models)
- Dynamic set point

DISPLAY (STANDARD) (Incorporated in the unit)



REFRIGERATING OPTIONS

- HP & LP refrigerant gauges
- Operating with low water temperature (down to -10°C)

SAFETY EQUIPMENT

- Chilled water flow switch (standard)
- Water filter (standard)
- Evaporator anti freeze heater (option necessary for ambient temperatures below +5°C under cooler operation)
- Coil guard

HYDRAULIC OPTIONS

- Water single pump (standard version unit only)
- Twin pumps (models from 0251 to 1303 only)

LOW NOISE OPTION

- Compressor noise insulation by sound-proofing jacket

ELECTRICAL OPTIONS

- Three phase protection
- Remote control panel for microprocessor controller
- Water tank electrical heater (only for Hydronic version units)
- Soft starter

OTHER OPTIONS

- Condenser coil with coated aluminium fins
- Rubber antivibration mounts, for unit installation

	<i>Standard version unit</i>	<i>Hydraulic version unit</i>	<i>Hydronic⁽¹⁾ version unit</i>
COIL TREATMENT			
Epoxy coated al fins coils treated	X	X	X
ELECTRICAL			
Soft starter	X	X	X
Three phase protection	X	X	X
Evaporator antifreeze protection	X	X	X
Tank antifreeze heater (400V/III)	Not available	Not available	X
Water tank electrical heater (400V/III) ⁽²⁾	Not available	Not available	X
REFRIGERANT CIRCUIT			
HP & LP refrigerant gauges	X	X	X
Kit low water temperature down to -10°C	X	X	X
HYDRAULIC			
Twin pump ⁽³⁾	Not available	X	X
CONTROL			
ModBus	X	X	X
Remote display (supplied loose)	X	X	X
OTHER OPTIONS			
Coils protection guards	X	X	X
Compressor noise insulation jacket	X	X	X
Anti-vibration (supplied loose)	X	X	X

X Option element.

(1) Water tank included.

(2) Only for heat pumps units.

(3) For models 0251 to 1804.

With twin pumps, water filter has to be mounted outside the unit. (1003 to 1403 models).



NOTE: All the options will be supplied and mounted in the unit, except the rubber antivibration mounts and remote controller supplied to mount in the moment of installation.

EVAPORATOR ANTI FREEZE PROTECTION

The evaporator anti freeze heater prevents the water exchange from low temperatures.

CONDENSER PROTECTION GUARDS

The condenser coil protection grill prevents light damage to the coil when shipping and when installed. It cannot protect against very heavy impacts.

THREE PHASE PROTECTION

Located at electrical box of the unit. It assures that unit will not begin operation on detection of overvoltage, undervoltage, phase reversal fault or phase failure.

HP AND LP REFRIGERANT GAUGES

Visualize the high and low pressures of the refrigerant circuit.

EPOXY COATED ALUMINIUM FIN COILS TREATED

Special protection of the aluminium condenser coil fins, to give improved protection from aggressive external environmental conditions.

REMOTE DISPLAY

It controls and shows the unit's operating, it may be installed until 100 m from the unit.

ANTI-VIBRATION

To install under the unit, to avoid transmission of vibrations, to the floor where unit is installed, while unit is operating.

COMPRESSOR NOISE INSULATION JACKET

Each compressor is fitted with a compressor acoustic jacket this provides attenuation of the compressor noise that radiates from the unit when in operation.

TWIN PUMPS KIT

(only available on Hydraulic and Hydronic versions)

It is formed by two-water pump mounted on parallel and with same characteristics as the single one. Only one pump is working the other remains on stand by.

When the water pump, which is operating cuts out, and the pump turns off, automatically starting the water pump on stand by.

It is possible to select which one of the pumps we want to be working through an external switch supplied with the kit.

With the twin pumps, the available static pressure will decrease 5% from the available static pressure with one water pump only.

SOFT STARTER

It is an electronic element, which reduces the peak compressor starting current up to 40%.

MODBUS

It is possible to connect several units with a communication system (MOD BUS Protocol).

LOW WATER TEMPERATURE

Necessary for water outlet temperatures below +5°C and down to -10°C.

TANK ANTI-FREEZE HEATER AND WATER TANK ELECTRICAL HEATER (available only for Hydronic version)

An immersion heater can be supplied complete with safety thermostat and pressure switch fitted in the buffer tank, or an anti-freeze and supplementary heater (heat pump units only).

- **Tank Anti-freeze heater:** It starts when water temperature in the buffer tank is lower than + 5°C (Not for units with low water temperature kit).

- **Water tank electrical heater:** Heat pump units only. The heater works as anti-freeze heater as explained before and as supplementary heater, when inlet warm water reaches a temperature below a value selected (example: 30 °C) through an independent thermostat included.

The power input is:

Models	0251SM to 0431SM	0472SM to 0812SM	1003SM to 1403SM	1604SM / 1804SM
Voltage	V 3~400V			
Tank anti-freeze heater	KW 2,25	2,25	6,0	9,0
Water tank electrical heater*	KW 9	12	24,0	36,0

(*) Heat pump units only

ECOLEAN STANDARD VERSION	EAC/EAR	0251SM	0291SM	0351SM	0431SM	0472SM	0552SM	0672SM	0812SM
Cooling mode									
Cooling capacity (1)	kW	22,1	25,9	32,0	37,6	44,1	50,7	63,4	75,4
Absorbed power (1)	kW	7,6	9,1	11,2	13,4	15,2	18,2	22,4	26,7
EER (1)		2,9	2,85	2,86	2,81	2,90	2,79	2,83	2,82
Heating mode (only EAR)									
Heating capacity (2)	kW	23,6	27,6	33,6	37,8	47,8	54,7	68,0	75,7
Absorbed power (2)	kW	7,87	9,2	11,2	13,0	15,9	18,6	22,7	25,9
COP (2)		3,00	3,00	3,00	2,91	3,00	2,94	3,00	2,92
Electrical data									
Power supply		400V 50Hz 3Ph + N							
Start-up intensity	A	97,4	103,7	137,7	171,7	121,4	129,1	166,7	206,1
Maximum current	A	24	25,4	29	34,4	48	50,8	58	68,8
Refrigeration circuit									
R-410A									
Number of circuits	Nr	1							
Compressor	Type	Scroll							
	Nr	1				2			
Evaporator	Type	AISI 316 stainless steel plate brazed with copper heat exchanger							
Capacity steps	%	0-100				0-55-100			
Refrigerant charge EAC / EAR	kg	5,5/5,8	6,11/6,5	8/8,7	9/10	11/11,4	12,2/12,7	16,1/16,8	18,5/19,3
Oil charge per compressor	l	3,25	3,25	3,3	3,3	2x3,25	2x3,25	2x3,3	2x3,3
Crankcase heater per compressor	W	90	90	90	90	90	90	90	90
Pressure drop									
Nominal water flow	m ³ /h	3,80	4,5	5,50	6,5	7,6	8,7	10,9	13,0
Pressure drop without water filter	kPa	51	54	30	34	32	34	40	47
Pressure drop with water filter (as optional)	kPa	69	78	60	73	50	57	71	87
Hydraulic connection									
Type		Threaded-Female							
Diameter	Inches	1 1/2" G				2" G			
Condenser fan (helicoidal)									
Nr									
Number		1				2			
Nominal air flow	m ³ /h	9750	11500	11300	11000	9750+9750	11500+11500	11300+11300	11000+11000
Total motor power input	kW	0,69	0,84	0,84	0,84	0,69+0,69	0,84+0,84	0,84+0,84	0,84+0,84
Fan speed	RPM	900							
Acoustic									
Sound power level (3)	dB(A)	75,9	78,9	78,7	78,8	78,9	81,9	81,7	81,8
Sound power level (4)	dB(A)	78	81	80	81	81	84	83	84
Dimensions									
Width	mm	1195	1195	1195	1195	1960	1960	1960	1960
Depth	mm	980	980	980	980	1195	1195	1195	1195
Height	mm	1375	1375	1375	1375	1375	1375	1375	1375
Operation weight EAC / EAR	kg	238/243	246/251	263/271	292/300	470/480	482/492	518/534	562/578

(1) All data are at Eurovent condition : Water : 12°C / 7°C - Air ambient: 35°C

(2) All data are at Eurovent condition : Water : 40°C / 45°C - Air ambient: 7°C DB / 6°C WB

(3) Sound power level with compressor jacket and low fan speed (Cooling mode conditions air ambient temperature <35°C and Heating mode conditions air ambient temperature >7°C).

(4) Sound power level at Eurovent conditions and without compressor jacket.

DATA FOR STANDARD UNITS.

FOR HYDRONIC OR HIDRAULIC VERSION SEE PAGE 26.

ECOLEAN STANDARD VERSION	EAC/EAR	1003SM	1103SM	1203SM	1303SM	1403SM	1604SM	1804SM	
Cooling mode									
Cooling capacity (1)	kW	88,2	102	112	126	139	149	174	
Absorbed power (1)	kW	31,2	35,3	40,1	43,9	48,3	54,1	60	
EER (1)		2,83	2,9	2,79	2,86	2,87	2,76	2,9	
Heating mode (only EAR)									
Heating capacity (2)	kW	95,0	108	118	130,4	143	159	180	
Absorbed power (2)	kW	31,2	36	39,3	44,5	48,2	53	61	
COP (2)		3,05	3,00	3,00	2,92	2,97	3,00	2,95	
Electrical data									
Power supply		400V 50Hz 3Ph + N							
Start-up intensity	A	High	217,1	225,9	248,9	290,4	301,2	269,3	302,9
		Low	215,3	223,3	246,3	287	297,8	265,9	299,3
Maximum current	A	High	79,8	88,6	97,6	107,7	118,5	132	151,6
		Low	78	86	95	104,3	115,1	128,6	148
Refrigeration circuit									
Number of circuits	Nr	2							
Compressor	Type	Scroll							
	Nr	3				4			
Evaporator	Type	AISI 316 stainless steel plate brazed with copper heat exchanger							
Capacity steps	%	0-30-75-100				0-30-60-80-100			
Refrigerant charge EAC/EAR	kg	21,8/ 22,7	25,3/ 26,3	26,7/ 27,9	29,7/ 31	33,7/ 35,1	36,2/ 37,7	42,1/ 43,9	
Oil charge per compressor	l	2x3,25 +3,3	3x3,3	2x3,3 +4,7	2x3,3 +6,8	2x3,3 +6,8	4x3,3	2x4,7+ 2x6,8	
Crankcase heater per compressor	W	3x90	3x90	2x90+120	2x90+ 120	2x90+ 150	4x90	2x90+ 2x120	
Pressure drop									
Nominal water flow	m ³ /h	15,2	17,6	19,2	21,6	23,9	25,7	29,9	
Pressure drop without water filter	kPa	32	38	43	48	53	44	52	
Pressure drop with water filter (as optional)	kPa	41	50	61	70	80	62	76	
Hydraulic connection									
Type		Threaded-Female							
Diameter	Inches	2 1/2" G				3" G			
Condenser fan (helicoïdal)									
Number	Nr	2						4	
Nominal air flow	m ³ /h	High	18100+ 18100	22700+ 18100	22700+ 18100	22700+ 22700	22500+ 27500	23500+ 23500	28600+ 28600
		Low	15000+ 15000	18000+ 15000	18000+ 15000	18000+ 18000	17500+ 18000	18500+ 18500	22600+ 22600
Total motor power input	kW	High	1,05+ 1,05	2+ 1,05	2+ 1,05	2+2	2+2	2+2	2,1+2,1
		Low	0,77+ 0,77	1,25+ 0,77	1,25+ 0,77	1,25+ 1,25	1,25+ 1,25	1,25+ 1,25	1,54+ 1,54
Fan speed	RPM	High	700+ 700	900+ 700	900+ 700	900+ 900	900+ 900	900+ 900	700+700+ 700+700
		Low	550+ 550	700+ 550	700+ 550	700+ 700	700+ 700	700+ 700	550+550+ 550+550
Acoustic									
Sound power level (3)	dB(A)	76,9	78,3	79,3	81,1	81,2	80	80,5	
Sound power level (4)	dB(A)	85	87	88	90	90	89	89	
Dimensions									
Width	mm	2250	2250	2250	2250	2250	2250	2250	
Depth	mm	1420	1420	1420	1420	1420	2300	2300	
Height	mm	1875	1875	1875	1875	1875	1975	1975	
Operation weight EAC / EAR	kg	640/ 663	809/ 831	938/ 964	990/ 1016	1019/ 1045	1148/ 1167	1483/ 1503	

(1) All data are at Eurovent condition:

Water : 12°C / 7°C - Air ambient: 35°C

(2) All data are at Eurovent condition:

Water : 40°C / 45°C - Air ambient: 7°C DB / 6°C WB

(3) Sound power level with compressor jacket and low fan speed (Cooling mode conditions air ambient temperature <35°C and Heating mode conditions air ambient temperature >7°C).

(4) Sound power level at Eurovent conditions and without compressor jacket.

DATA FOR STANDARD UNITS FOR HYDRONIC OR HIDRAULIC VERSION SEE PAGE 26.

To find out the performances for units installed with air ducts, apply the following coefficients for capacity and consumption, over the performance tables of standard fan units without ducts (see pages 9-10):

COOLING MODE

		Version	Models	Available static pressure Pa	Maximum ambient temperature °C	Minimum ambient temperature °C	Correction coefficient cooling capacity	Correction coefficient consumption ⁽¹⁾	
AIR AVAILABLE STATIC PRESSURE UP TO	50 Pa	STANDARD	0251SM to 1804SM	30	44	---	0,95	1,06	
				50	40	---	0,89	1,16	
	125 Pa	FP1	0251SM to 1003SM	50	48	-15	1	1	
				75	45		0,947	1,078	
				100	41		0,923	1,122	
				125	37		0,878	1,22	
		FP1 (low speed)	1103SM to 1804SM	50	46		0,964	1,072	
				75	43		0,935	1,094	
	100			39	0,9		1,171		
	250 Pa	FP1 (high speed)	1003SM to 1804SM	125	37		0,856	1,269	
				150	49		1,01	0,98	
				200	46		0,97	1,037	
				250	43			0,94	1,099

HEATING MODE

		Version	Models	Available static pressure Pa	Minimum ambient temperature °C	Correction coefficient heating capacity	Correction coefficient consumption ⁽¹⁾
AIR AVAILABLE STATIC PRESSURE UP TO	50 Pa	STANDARD	0251SM to 1804SM	30	-10	0,94	1,02
				50	-8	0,89	1,03
	125 Pa	FP1	0251SM to 1003SM	50	-12	1	1
				75	-10	0,94	1,02
				100	-8	0,89	1,03
	250 Pa	FP1 (high speed)	1003SM to 1804SM	125	-6	0,87	1,04
				150	-12	1,01	0,99
				200	-10	1	1
					250	-8	0,94

(1) After applying correction coefficient consumption is needed to add the following power input to get total power consumption.

EXTRA POWER COMSUPTION												
Models	0251SM	0291SM	0351SM	0431SM	0472SM	0552SM	0672SM	0812SM	1003SM	1103SM 1203SM	1303SM to 1604SM	1804SM
FP1 (low speed)	1,01	0,86	0,81	0,81	2,02	1,72	1,62	1,62	2,9	1,95	1	5,8
FP1 (high speed)	-								7,2	6,25	5,3	14,4

According Eurovent conditions

PERFORMANCES FOR UNITS WITH LOW WATER TEMPERATURE KIT (OPTION)



⚠ If the water outlet temperature is likely to drop below 5°C, it is very important to use glycol anti-freeze

CAPACITY TABLES WITH 30% ETHYLENEGLYCOL

The amount of anti-freeze required will vary depending on the water outlet temperature see page 27 for % ethylene based on minimum ambient temperature or water outlet temperature.

Air inlet		28				30				32				35				40				45				48							
Water outlet	MODELS	Pc	Pe(c)	Wf	Dp	Pc	Pe(c)	Wf	Dp	Pc	Pe(c)	Wf	Dp	Pc	Pe(c)	Wf	Dp	Pc	Pe(c)	Wf	Dp	Pc	Pe(c)	Wf	Dp	Pc	Pe(c)	Wf	Dp	Pc	Pe(c)	Wf	Dp
		kW	kW	m³/h	kPa	kW	kW	m³/h	kPa	kW	kW	m³/h	kPa	kW	kW	m³/h	kPa	kW	kW	m³/h	kPa	kW	kW	m³/h	kPa	kW	kW	m³/h	kPa	kW	kW	m³/h	kPa
-10	0251 SM	12,4	6,3	2,3	21	12,1	6,5	2,3	20	11,8	6,8	2,2	19	11,3	7,2	2,1	18	10,4	7,9	1,9	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	-5	0251 SM	15,3	6,4	2,9	29	15,0	6,6	2,8	28	14,6	6,9	2,7	27	14,1	7,2	2,6	25	13,0	7,9	2,4	22	11,8	8,8	2,2	19	11,0	9,3	2,1	17			
		0	0251 SM	18,4	6,5	3,4	40	18,0	6,8	3,3	39	17,6	7,0	3,3	37	17,0	7,37	3,2	35	15,2	9,4	2,8	30	13,6	10,4	2,5	24	12,5	11,1	2,3	21		
			5	0251 SM	21,6	6,7	4,0	53	21,2	6,9	4,0	52	20,8	7,2	3,9	50	20,1	7,6	3,8	47	18,9	8,3	3,5	42	17,5	9,1	3,3	37	16,6	9,6	3,1	34	
				10	0251 SM	25,1	6,9	4,7	69	24,7	7,1	4,6	67	24,2	7,4	4,5	65	23,5	7,8	4,4	61	22,1	8,5	4,1	55	20,6	9,3	3,8	49	19,7	9,9	3,7	45

Pc: Cooling capacity in kW
Pe(c): Total power input in kW (compressor and fan motor)
Wf: Water flow in m³ per hour
Dp: Water pressure drop in kPa.

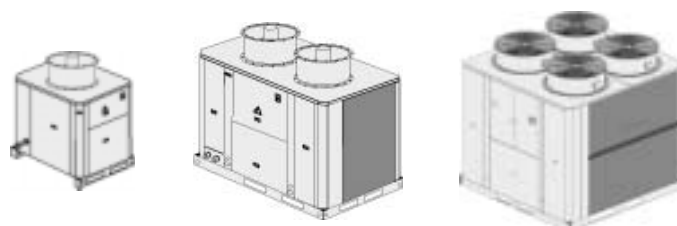
STANDARD FAN UNITS



MODELS	0251SM	0291SM	0351SM	0431SM	0472SM	0552SM	0672SM	0812SM	
Fan type	Axial - Direct coupling				900 rpm		Monofase 230V		
Fan number	1				2				
Air flow rate	m ³ /h	9750	11500	11300	11000	9750+9750	11500+11500	11300+11300	11000+11000
Power input	kW	0,69	0,84	0,84	0,84	0,69+0,69	0,84+0,84	0,84+0,84	0,84+0,84

MODELS	1003SM	1103SM	1203SM	1303SM	1403SM	1604SM	1804SM		
Fan type	Axial - Direct coupling				Trifase 400V				
Fan number	2						4		
Air flow rate	m ³ /h	High	18100+18100	22700+18100	22700+18100	22700+22700	22500+22700	23500+23500	28600+28600
		Low	15000+15000	18000+15000	18000+15000	18000+18000	17500+18000	18500+18500	22600+22600
Power input	kW	High	1,05+1,05	2+1,05	2+1,05	2+2	2+2	2+2	2,1+2,1
		Low	0,77+0,77	1,25+0,77	1,25+0,77	1,25+1,25	1,25+1,25	1,25+1,25	1,54+1,54
Fan speed	rpm	High	700+700	900+700	900+700	900+900	900+900	900+900	700+700+700+700
		Low	550+550	700+550	700+550	700+700	700+700	700+700	550+550+550+550

HIGH STATIC FAN PRESSURE UNITS



AIR AVAILABLE STATIC PRESSURE UP TO 250 Pa - FP1 VERSION

MODELS	0251SM	0291SM	0351SM	0431SM	0472SM	0552SM	0672SM	0812SM	1003SM to 1403SM	1604SM	1804SM			
Fan type	Axial - Direct coupling 1450 rpm 1-230V								Axial - Direct coupling 900 rpm (Low speed) 3-400V					
Fan number	1				2				4					
Available static pressure Pa	50	Air flow rate	m ³ /h	11500	11500	11000	10500	23000	23000	22000	21000	19000 +19000	21000 +21000	28000 +28000
		Power input	kW	1,7	1,7	1,65	1,65	3,4	3,4	3,3	3,3	5	5	10
	75	Air flow rate	m ³ /h	9600	9600	9200	8800	19200	19200	18400	17600	18000 +18000	19000 +19000	24000 +24000
		Power input	kW	1,65	1,65	1,6	1,6	3,3	3,3	3,2	3,2	5,1	5,1	10,2
	100	Air flow rate	m ³ /h	8500	8500	8100	7700	17000	17000	16200	15400	17000 +17000	17000 +17000	22000 +22000
		Power input	kW	1,6	1,6	1,55	1,55	3,2	3,2	3,1	3,1	5,2	5,2	10,4
	125	Air flow rate	m ³ /h	7200	7200	6900	6600	14400	14400	13800	13200	15000 +15000	16000 +16000	20000 +20000
		Power input	kW	1,55	1,55	1,5	1,5	3,1	3,1	3	3	5,3	5,3	10,6
Fan type									Axial "short case" - Direct coupling 1450 rpm (High speed) 3-400V					
Fan number									2		4			
Available static pressure Pa	150	Air flow rate	m ³ /h									22000 +22000	24000 +24000	34000 +34000
		Power input	kW									9,2	9,2	18,4
	200	Air flow rate	m ³ /h									20000 +20000	22000 +22000	28000 +28000
		Power input	kW									9,3	9,3	18,6
	250	Air flow rate	m ³ /h									18000 +18000	19000 +19000	24000 +24000
		Power input	kW									9,4	9,4	18,8

STANDARD FAN UNITS



MODELS		0251SM	0291SM	0351SM	0431SM	0472SM	0552SM	0672SM	0812SM
Maximum power (kW)		10,79	12,64	16,39	17,74	21,58	25,28	32,78	35,48
Maximum Current (A)	Trifase+neutro 400V	24,00	25,40	29,00	34,40	48,00	50,80	58,00	68,80
LRC (A)	Trifase+neutro 400V	114	121,4	161,4	201,4	138	146,8	190,4	235,8
Starting current (A) (*)	Trifase+neutro 400V	97,4	103,7	137,7	171,7	121,4	129,1	166,7	206,1

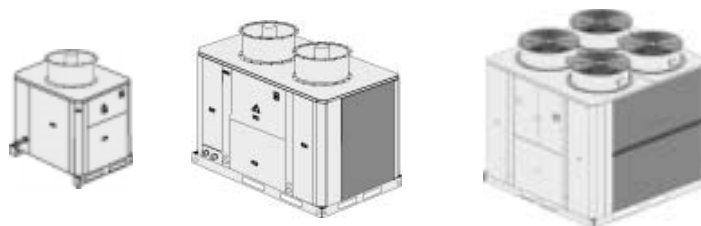
MODELS		1003SM	1103SM	1203SM	1303SM	1403SM	1604SM	1804SM
Maximum power (kW)	High	42,6	51,1	56,7	62,3	54,8	71,6	83,0
	Low	42,0	50,0	55,6	60,8	53,3	70,1	81,9
Maximum Current (A)	Trifase+neutro 400V High	79,8	88,6	97,6	107,7	118,5	132,0	151,6
	Low	78,0	86,0	95,0	104,3	115,1	128,6	148,0
LRC (A)	Trifase+neutro 400V High	246,8	255,6	282,6	331,2	342,0	299,0	336,6
	Low	245,0	253,0	280,0	327,8	338,6	295,6	333,0
Starting current (A) (*)	Trifase+neutro 400V High	217,1	225,9	248,8	290,4	301,2	269,3	302,9
	Low	215,3	223,3	246,3	287,0	297,8	265,9	299,3

Not included water pump consumptions of the Hydronic or Hydraulic version (see page 26).

Maximum power calculated for compressor operation at +12,5/65°C.

(*) Starting current 2 cycles later from compressor starts (4 msec).

HIGH STATIC FAN PRESSURE UNITS



FP1 VERSIONS

MODELS		0251SM	0291SM	0351SM	0431SM	0472SM	0552SM	0672SM	0812SM
Maximum power (kW)	3N~400V	11,8	13,5	17,2	18,6	23,6	27,0	34,4	37,1
Maximum Current (A)	3N~400V	29,0	30,0	33,6	39,0	58,0	60,0	67,2	78,0
LRC (A)	3N~400V	119,0	126,0	166,0	206,0	148,0	156,0	199,6	245,0
Starting current (A) (*)	3N~400V	102,4	108,3	142,3	176,3	131,3	138,3	175,9	215,3

Low speed

MODELS		1003SM	1103SM	1203SM	1303SM	1403SM	1604SM	1804SM
Maximum power (kW)	3N~400V	45,5	53,0	58,6	63,3	55,8	72,6	88,8
Maximum Current (A)	3N~400V	84,6	91,8	100,8	109,3	120,1	133,6	161,2
LRC (A)	3N~400V	251,6	258,8	285,8	332,8	343,6	300,6	346,2
Starting current (A) (*)	3N~400V	221,9	229,1	252,1	292,0	302,8	270,9	312,4

High speed

MODELS		1003SM	1103SM	1203SM	1303SM	1403SM	1604SM	1804SM
Maximum power (kW)	3N~400V	49,8	57,3	62,9	67,6	60,1	76,9	97,4
Maximum Current (A)	3N~400V	91,2	98,4	107,4	115,9	126,7	140,2	174,4
LRC (A)	3N~400V	258,2	265,4	292,4	339,4	350,2	307,2	359,4
Starting current (A) (*)	3N~400V	228,5	235,7	258,6	298,6	309,4	277,5	325,7

Not included water pump consumptions of the Hydronic or Hydraulic version (see page 26).

Maximum power calculated for compressor operation at +12,5/65°C.

(*) Starting current 2 cycles later from compressor starts (4 msec).

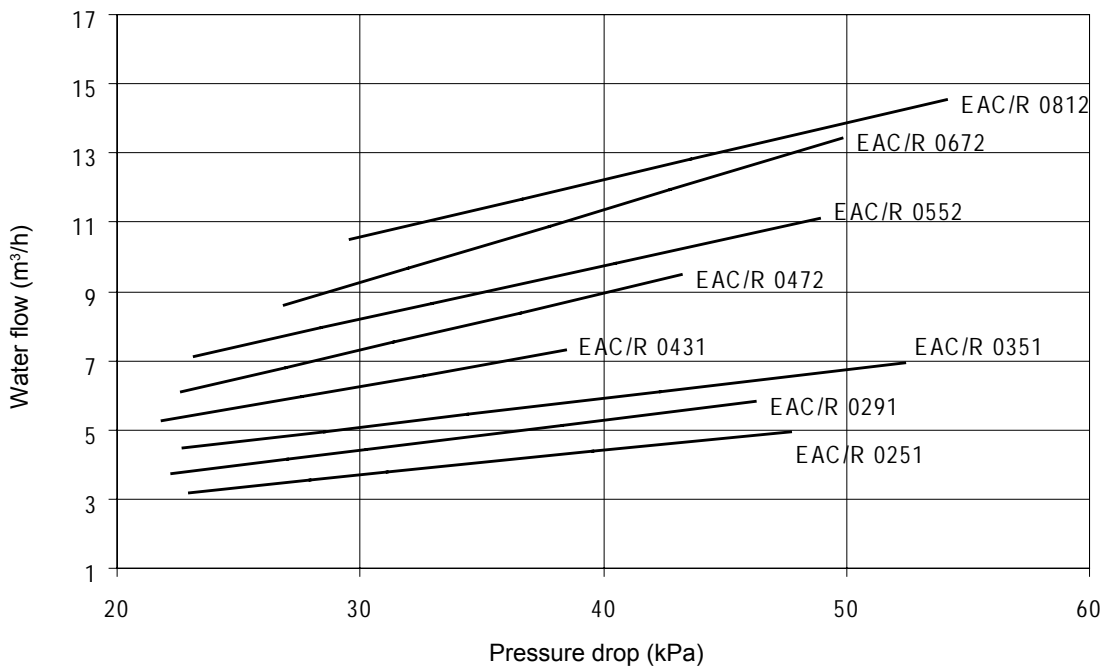


INSTALLATION ADVISE

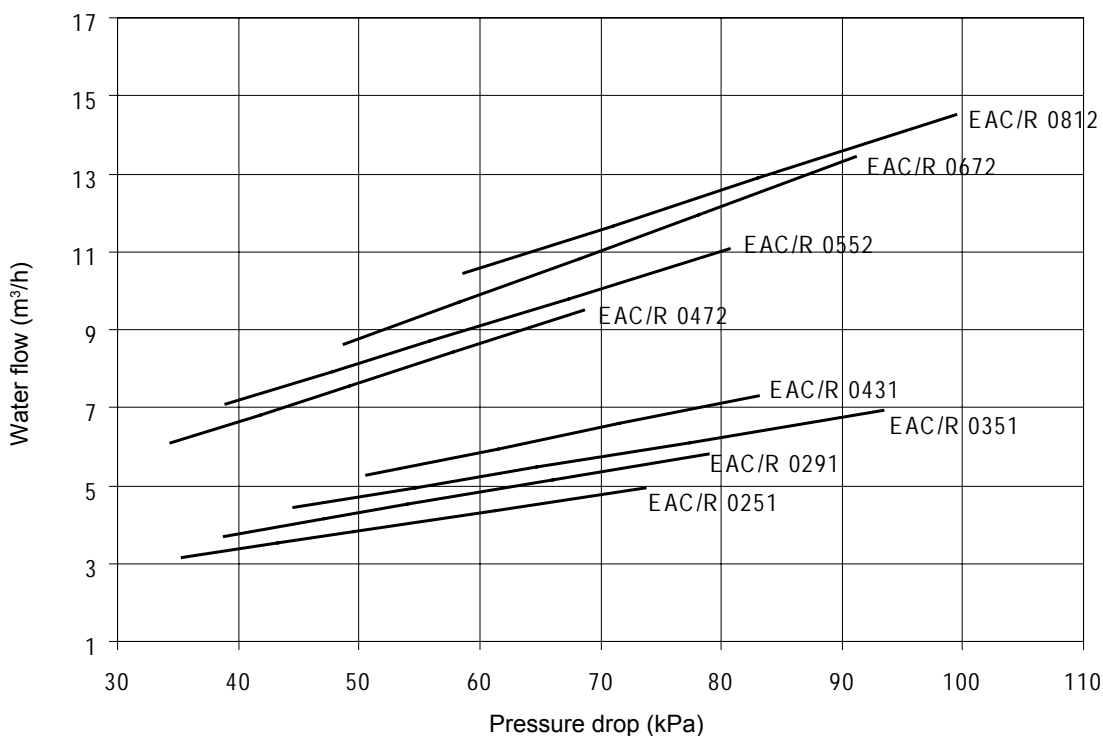
The units **MUST** be fitted with a water filter at the inlet to the unit (trapping any particles with a diameter greater than 1 mm.)

MODELS EAC / EAR 0251SM TO 0812SM

PRESSURE DROP WITHOUT FILTER



PRESSURE DROP + WATER FILTER (*)



(*) Option in standard version, included in Hydronic and Hydraulic version.

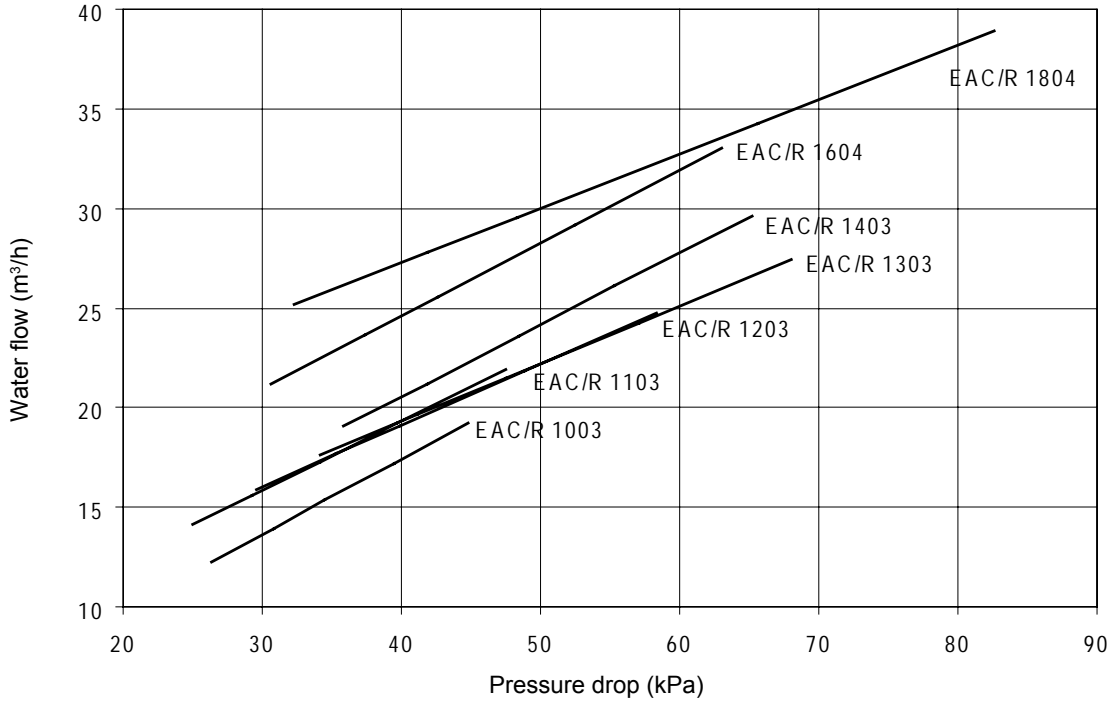


INSTALLATION ADVISE

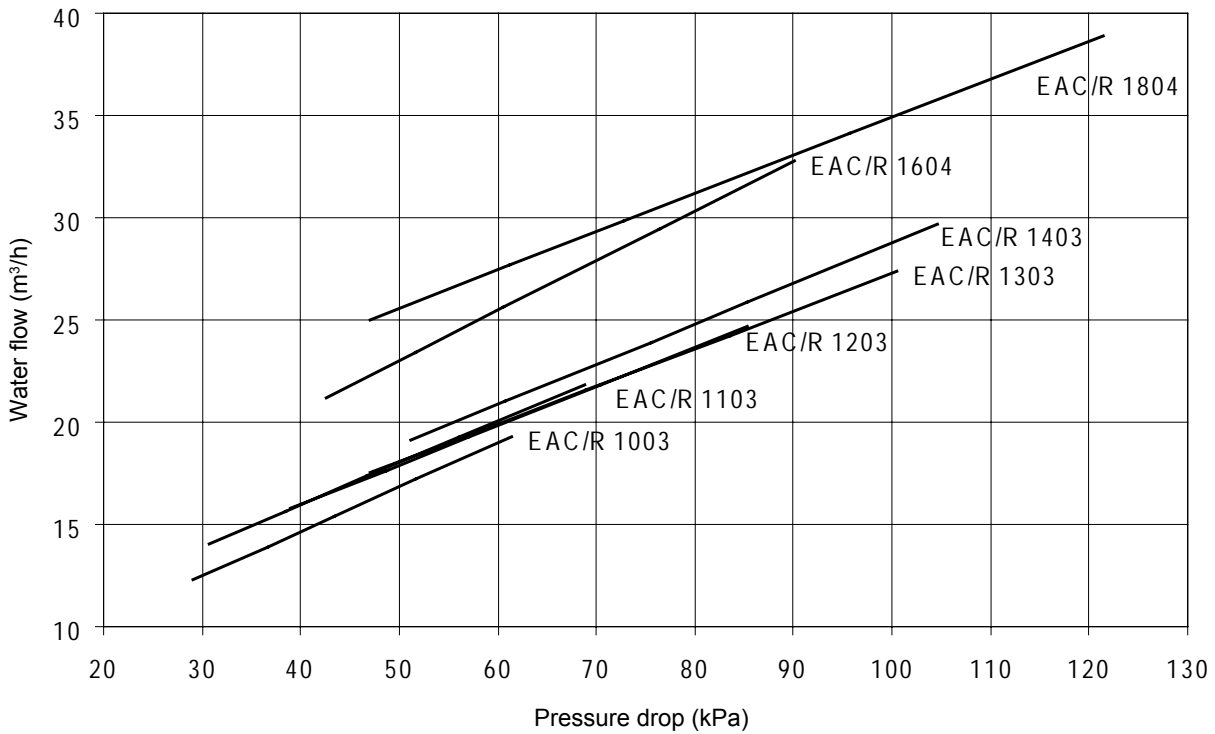
The units **MUST** be fitted with a water filter at the inlet to the unit (trapping any particles with a diameter greater than 1 mm.)

MODELS EAC / EAR 1003SM TO 1804SM

PRESSURE DROP WITHOUT FILTER

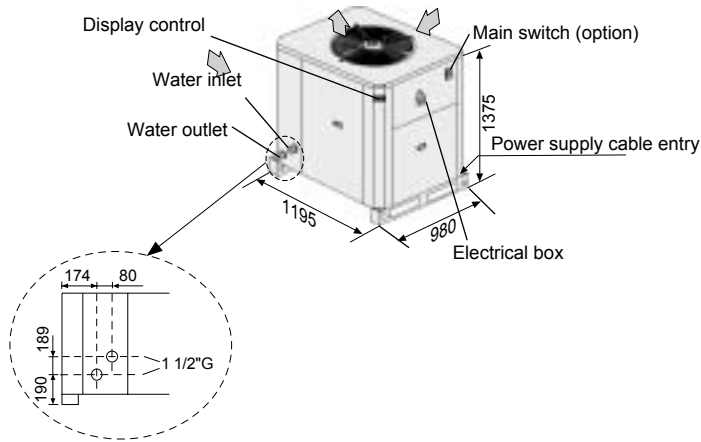


PRESSURE DROP + WATER FILTER (*)

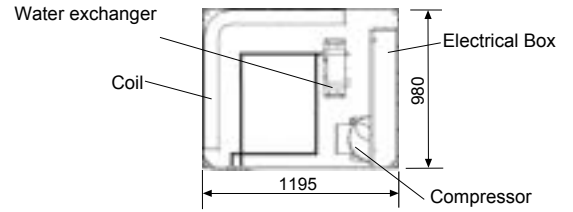


(*) Option in standard version, included in Hydronic and Hydraulic version.

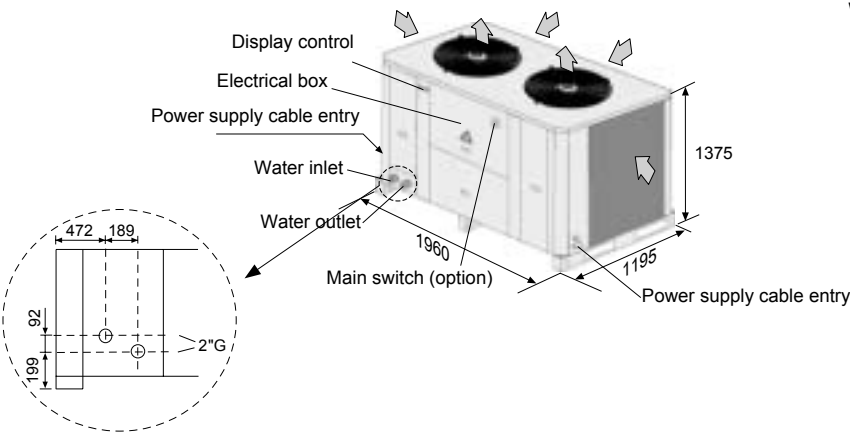
1 EAC/EAR 0251SM-0291SM-0351SM-0431SM



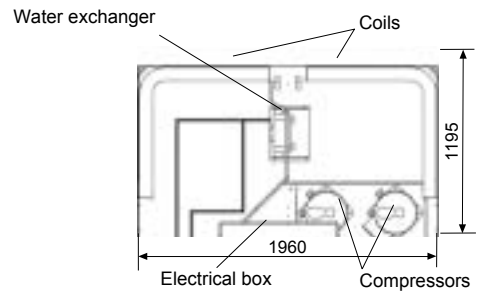
1 COMPONENT POSITION STANDARD VERSION UNIT



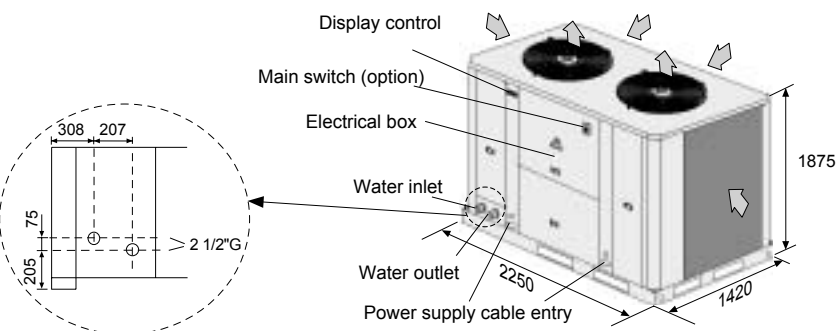
2 EAC/EAR 0472SM-0552SM-0672SM-0812SM



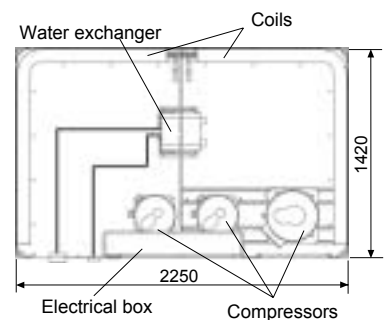
2 COMPONENT POSITION STANDARD VERSION UNIT



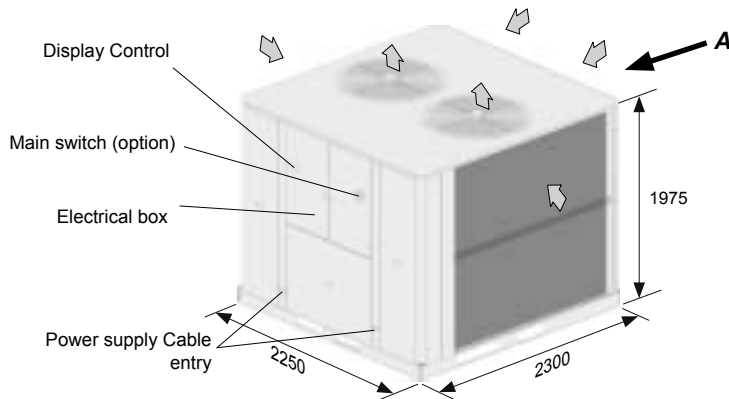
3 EAC/EAR 1003SM-1103SM-1203SM-1303SM-1403SM



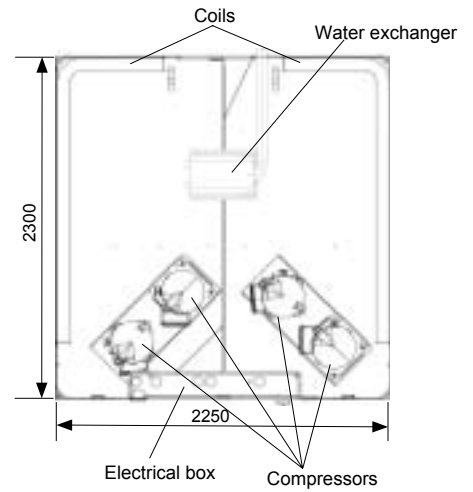
3 COMPONENT POSITION STANDARD VERSION UNIT



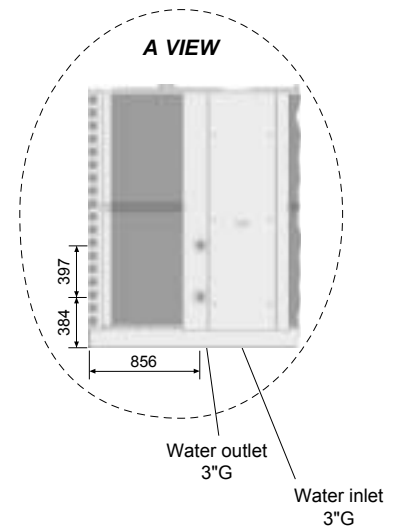
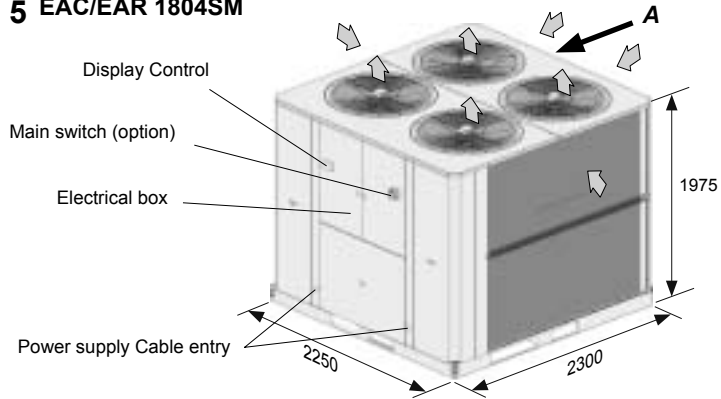
4 EAC/EAR 1604SM



4/5 COMPONENT POSITION STANDARD VERSION UNIT

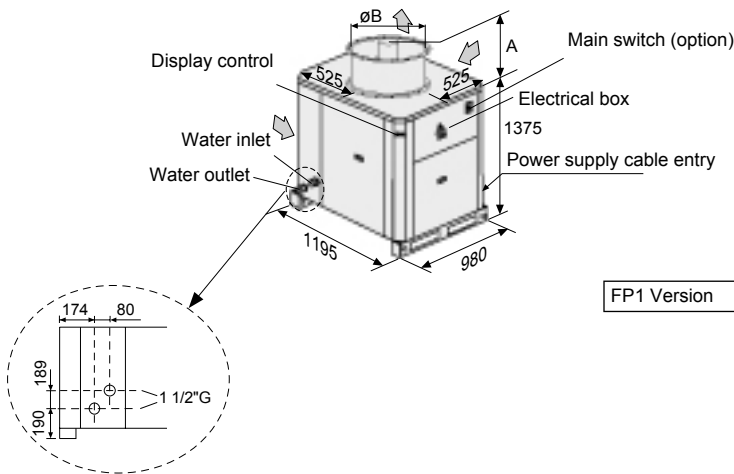


5 EAC/EAR 1804SM

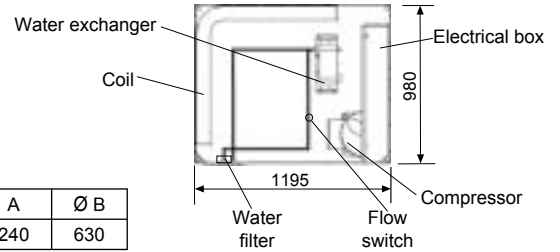


1 EAC/EAR 0251SM-0291SM-0351SM-0431SM FP1

1 COMPONENT POSITION STANDARD VERSION UNIT

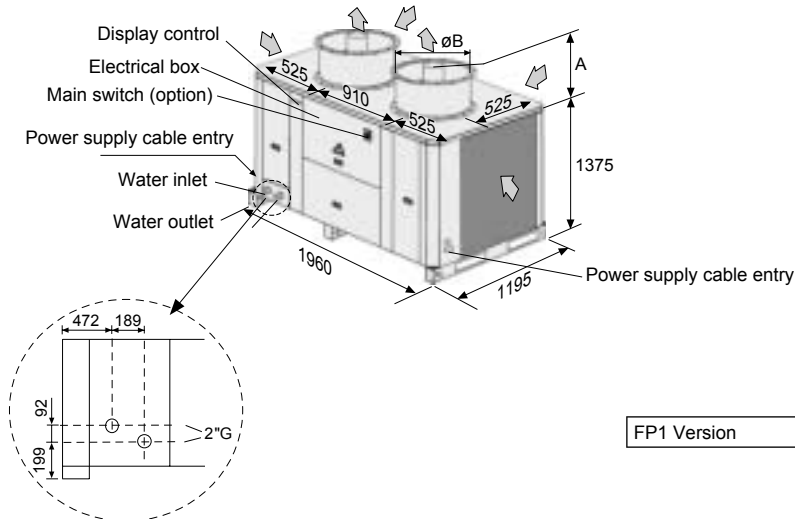


	A	Ø B
FP1 Version	240	630

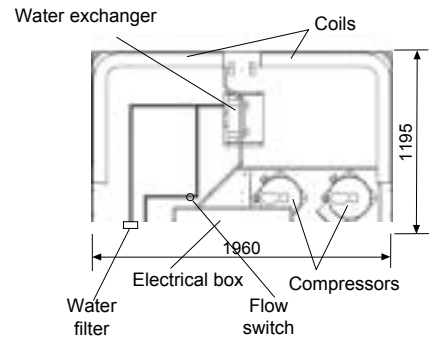


2 EAC/EAR 0472SM-0552SM-0672SM-0812SM FP1

2 COMPONENT POSITION STANDARD VERSION UNIT

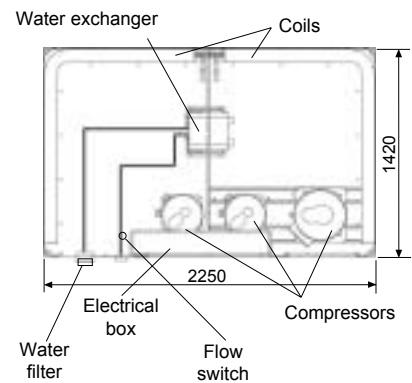
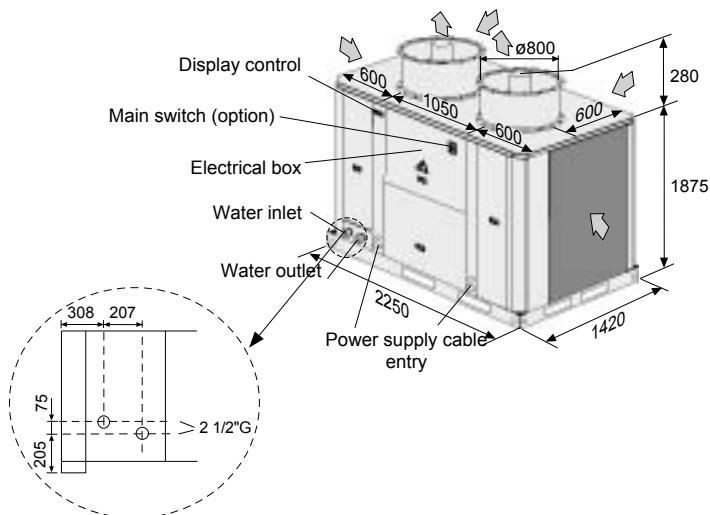


	A	Ø B
FP1 Version	240	630

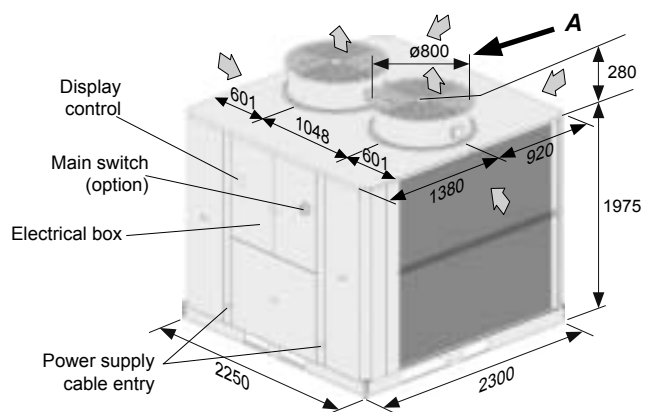


3 EAC/EAR 1003SM-1103SM-1203SM-1303SM-1403SM FP1

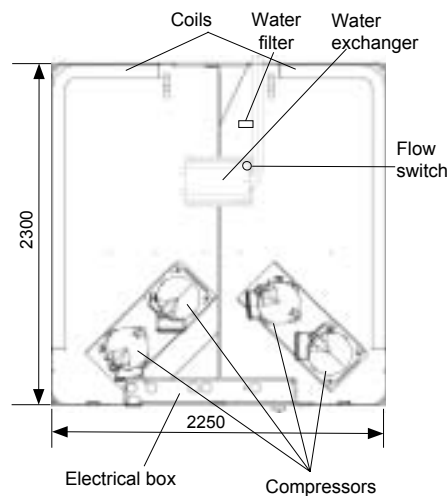
3 COMPONENT POSITION STANDARD VERSION UNIT



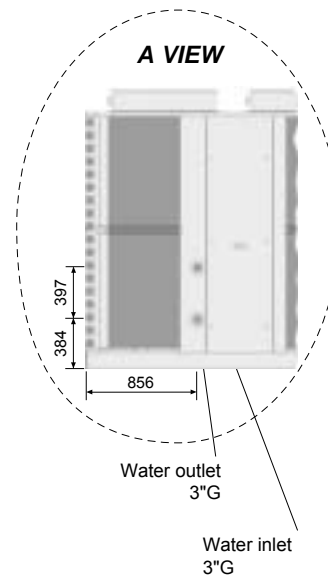
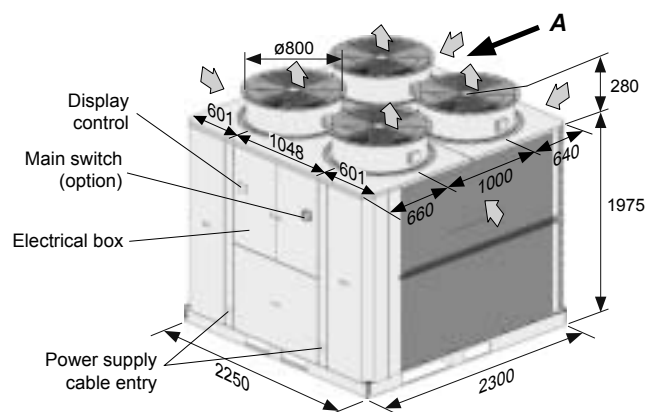
4 EAC/EAR 1604SM FP1

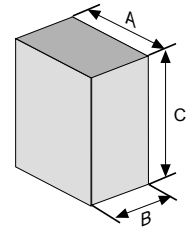


4/5 COMPONENT POSITION STANDARD VERSION UNIT



5 EAC/EAR 1804SM FP1





STANDARD FAN UNITS

MODELS EAC / EAR		0251 SM	0291 SM	0351 SM	0431 SM	0472 SM	0552 SM	0672 SM	0812 SM	1003 SM	1103 SM	1203 SM	1303 SM	1403 SM	1604 SM	1804 SM
A - Width	mm	1195	1195	1195	1195	1960	1960	1960	1960	2250	2250	2250	2250	2250	2250	2250
B - Depth	mm	980	980	980	980	1195	1195	1195	1195	1420	1420	1420	1420	1420	2300	2300
C - Height	mm	1375	1375	1375	1375	1375	1375	1375	1375	1875	1875	1875	1875	1875	1975	1975
Operating weight (*) Kg	EAC	238	246	263	292	470	482	518	562	640	809	938	990	1019	1148	1483
	EAR	243	251	271	300	480	492	534	578	663	831	964	1016	1045	1167	1503

(*) Not included Hydronic or Hydraulic version (see page 26).

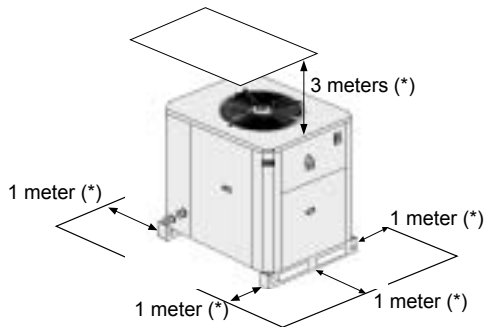
HIGH STATIC FAN PRESSURE UNITS

MODELS EAC / EAR		0251 SM	0291 SM	0351 SM	0431 SM	0472 SM	0552 SM	0672 SM	0812 SM	1003 SM	1103 SM	1203 SM	1303 SM	1403 SM	1604 SM	1804 SM
A - Width	mm	1195	1195	1195	1195	1960	1960	1960	1960	2250	2250	2250	2250	2250	2250	2250
B - Depth	mm	980	980	980	980	1195	1195	1195	1195	1420	1420	1420	1420	1420	2300	2300
C - Height	FP1 mm	1615	1615	1615	1615	1615	1615	1615	1615	2155	2155	2155	2155	2155	2255	2255
Operating weight (*)	EAC FP1 kg	253	261	278	297	500	512	548	592	680	849	978	1030	1059	1188	1563
	EAR FP1 kg	258	266	286	305	510	522	564	608	703	871	1004	1056	1085	1207	1583

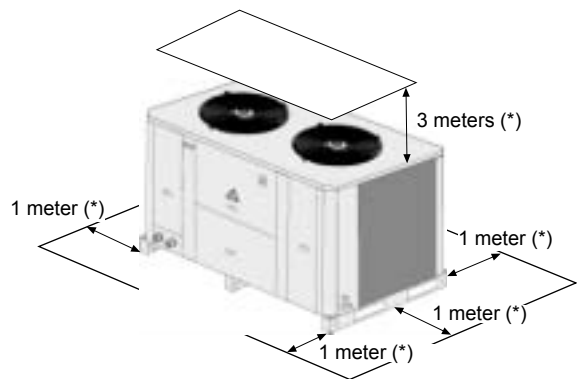
(*) Not included Hydronic or Hydraulic version (see page 26).

SERVICE AREAS

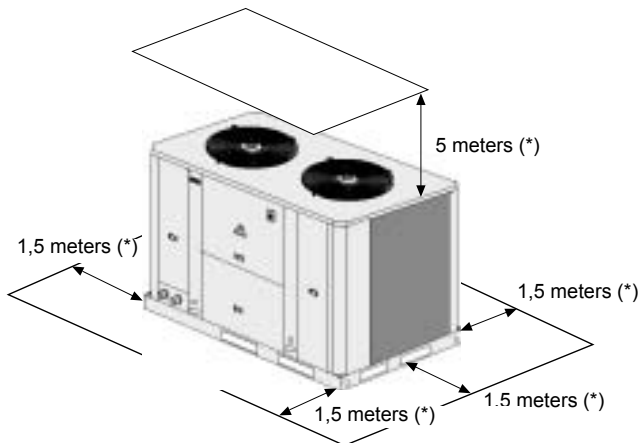
EAC/EAR 0251SM-0291SM-0351SM-0431SM



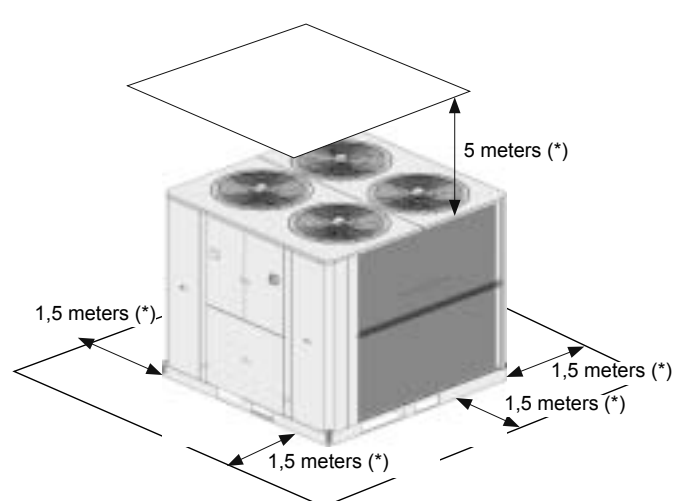
EAC/EAR 0472SM-0552SM-0672SM-0812SM



EAC/EAR 1003SM-1103SM-1203SM-1303SM-1403SM



EAC/EAR 1604SM-1804SM



(*) Keep this space free around the unit for installation, for all unit versions

STANDARD FAN UNITS

EAC EAR	Spectrum per octave band (dBA)								Global sound power Lw dB(A)	Sound pressure at 10m. (dBA)	
	Hz	125	250	500	1000	2000	4000	8000			
0251SM	(1)	73	69	69	66	71	67	61	75	47	
	(2)	73	69	71	69	73	69	61	77	49	
0291SM	(1)	80	72	73	74	73	65	65	78	50	
	(2)	80	72	74	75	76	70	65	81	53	
0351SM	(1)	80	72	73	74	73	65	62	78	50	
	(2)	80	72	73	75	75	68	62	80	52	
0431SM	(1)	80	72	73	74	73	65	62	78	50	
	(2)	80	72	73	75	75	68	62	80	52	
0472SM	(1)	76	72	72	69	74	70	64	78	50	
	(2)	76	72	74	72	76	73	64	80	52	
0552SM	(1)	83	75	76	77	76	68	68	81	53	
	(2)	83	75	77	78	79	73	68	84	56	
0672SM	(1)	83	75	76	77	76	68	65	81	53	
	(2)	83	75	76	78	78	71	65	83	55	
0812SM	(1)	83	75	76	77	76	68	65	81	53	
	(2)	83	75	76	78	78	71	65	83	55	
1003SM	Low speed	(1)	70	68	69	72	71	62	67	76	48
		(2)	70	68	73	76	78	73	67	82	54
	High speed	(1)	76	73	75	78	76	65	67	82	54
		(2)	76	73	76	79	80	73	67	84	56
1103SM	Low speed	(1)	73	70	72	75	71	62	63	78	50
		(2)	73	70	74	78	77	71	63	82	54
	High speed	(1)	81	78	78	81	80	74	66	86	58
		(2)	81	78	78	82	82	75	66	87	59
1203SM	Low speed	(1)	73	70	72	75	74	63	63	79	51
		(2)	73	71	75	79	81	73	63	84	56
	High speed	(1)	81	78	78	81	81	74	66	86	58
		(2)	81	78	79	83	83	76	66	88	60
1303SM	Low speed	(1)	75	72	74	77	75	65	68	81	53
		(2)	75	73	76	81	83	76	68	87	59
	High speed	(1)	84	80	80	83	83	77	70	88	60
		(2)	84	80	80	85	86	79	70	90	62
1403SM	Low speed	(1)	75	72	74	77	76	65	68	81	53
		(2)	75	73	76	82	83	76	68	87	59
	High speed	(1)	84	80	80	83	83	77	70	88	60
		(2)	84	80	80	85	86	79	70	90	62
1604SM	Low speed	(1)	75	72	74	77	73	64	65	80	52
		(2)	75	72	75	80	79	72	65	84	56
	High speed	(1)	84	80	80	83	83	77	68	88	60
		(2)	84	80	80	84	84	78	68	89	61
1804SM	Low speed	(1)	73	71	72	75	76	64	65	80	52
		(2)	73	72	76	81	83	75	65	87	59
	High speed	(1)	79	76	78	81	80	68	66	85	57
		(2)	79	77	79	83	84	75	66	88	60

(1) The above data shows noise levels **with** compressor isolation (option).

(2) The above data shows noise levels **without** compressor isolation.

For units: EAC/EAR 1003SM to 1804SM.

- **Low speed:** - For ambient temperatures lower than +35°C and unit working on cooling mode.
- For ambient temperatures higher than +7°C and unit working on heating mode.

- **High speed:** - For ambient temperatures higher than +35°C and unit working on cooling mode.
- For ambient temperatures lower than +7°C and unit working on heating mode.

Global sound power level measured in compliance with ISO standard 3744 and according Eurovent standards.

Sound pressure in dB(A) calculated at 10 m, in a free field on a reflecting surface, is given as a guide only and with a directivity of +/- 3 dBA.

Only the sound power spectrum and the global sound power value are used in determining pressure characteristics on site.

HIGH STATIC PRESSURE UNITS (WITHOUT AIR DUCT)

EAC / EAR		Spectrum per octave band (dBA)								Global sound power Lw dB(A)
		Hz	125	250	500	1000	2000	4000	8000	
FP1 VERSION	0251SM	(1)	60	69	78	82	80	75	67	85
		(2)	60	69	78	82	80	75	67	85
	0291SM	(1)	60	69	78	82	80	75	68	85
		(2)	60	69	78	82	81	76	68	86
	0351SM	(1)	60	69	78	82	80	75	67	85
		(2)	60	69	78	82	80	75	67	86
	0431SM	(1)	60	69	78	82	80	75	67	85
		(2)	60	69	78	82	80	75	67	86
0472SM	(1)	63	72	81	85	83	78	70	88	
	(2)	63	72	81	85	83	78	70	88	
0552SM	(1)	63	72	81	85	83	78	71	88	
	(2)	63	72	81	85	84	79	71	89	
0672SM	(1)	63	72	81	85	83	78	70	88	
	(2)	63	72	81	85	83	78	70	89	
0812SM	(1)	63	72	81	85	83	78	70	88	
	(2)	63	72	81	85	83	78	70	89	
FP1 VERSION (low speed)	1003SM	(1)	84	80	80	83	79	72	69	86
		(2)	84	80	80	84	81	75	69	87
	1103SM	(1)	84	80	79	83	79	72	68	86
		(2)	84	80	80	84	81	74	68	87
	1203SM	(1)	84	80	80	83	80	72	68	86
		(2)	84	80	80	84	83	75	68	88
	1303SM	(1)	84	80	80	83	80	72	70	87
		(2)	84	80	80	85	84	77	70	89
1403SM	(1)	84	80	80	83	80	72	70	87	
	(2)	84	80	80	85	84	77	70	89	
1604SM	(1)	84	80	80	83	79	72	68	86	
	(2)	84	80	80	84	82	74	68	87	
1804SM	(1)	87	83	83	86	83	75	70	89	
	(2)	87	83	83	87	86	78	70	91	
FP1 VERSION (high speed)	1003SM	(1)	96	93	91	93	89	86	81	96
		(2)	96	93	91	93	89	86	81	97
	1103SM	(1)	96	93	91	93	89	86	81	96
		(2)	96	93	91	93	89	86	81	96
	1203SM	(1)	96	93	91	93	89	86	81	96
		(2)	96	93	91	93	89	86	81	97
	1303SM	(1)	96	93	91	93	89	86	82	96
		(2)	96	93	91	93	90	86	82	97
1403SM	(1)	96	93	91	93	89	86	82	96	
	(2)	96	93	91	93	90	86	82	97	
1604SM	(1)	96	93	91	93	89	86	91	96	
	(2)	96	93	91	93	89	86	81	97	
1804SM	(1)	99	96	94	96	92	89	84	99	
	(2)	99	96	94	96	92	89	84	100	

(1) The above data shows noise levels **with** compressor isolation (option).

(2) The above data shows noise levels **without** compressor isolation.

For units: EAC/EAR 1003SM to 1804SM.

- **Low speed:** - For ambient temperatures lower than +35°C and unit working on cooling mode.
- For ambient temperatures higher than +7°C and unit working on heating mode.

- **High speed:** - For ambient temperatures higher than +35°C and unit working on cooling mode.
- For ambient temperatures lower than +7°C and unit working on heating mode.

- Global sound power level measured in compliance with ISO standard 3744 and according Eurovent standards.

- The data table above, are calculated for units operating on cooling or heating mode.

- The above data shows sound power level data (Lw) calculated without air ducts on the installation.

The final sound pressure level for the installation, will be decreased, once the ducts will be installed, and depends on material and dimensions of them.

STANDARD FAN UNITS WITHOUT AIR DUCTS

COOLING MODE

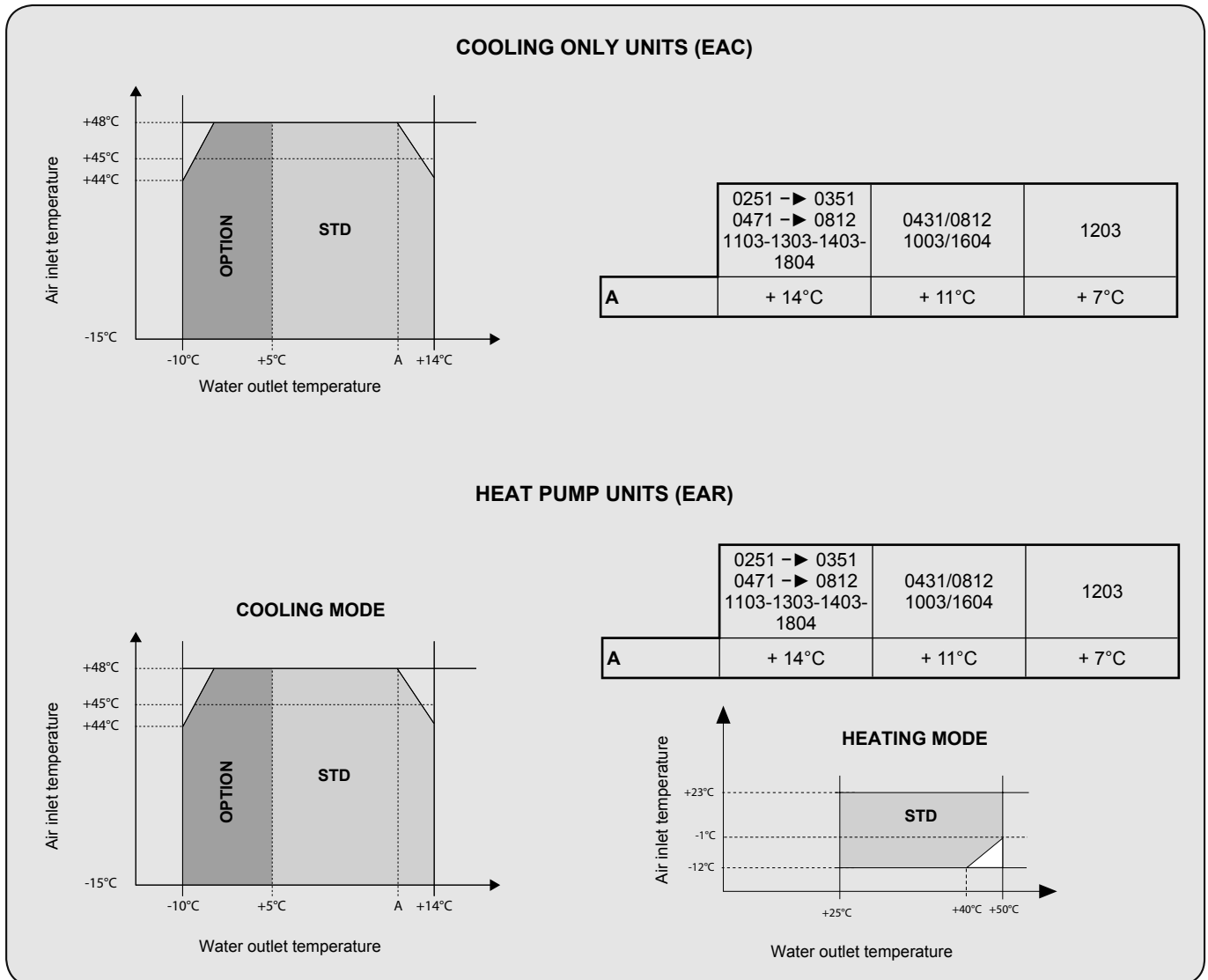
MODELS EAC / EAR	0251SM ▶ 0431 SM		0472 SM ▶ 0812 SM		1003 SM ▶ 1804 SM	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
Outlet chilled water temperature	+5 °C	+14 °C	+5 °C	+14 °C	+5 °C	+14 °C
Inlet chilled water temperature	+10 °C	+22 °C	+9 °C	+22 °C	+8 °C	+22 °C
Air inlet temperature	-15 °C	+ 48 °C	-15 °C	+ 48 °C	-15 °C	+ 48 °C

NOTE: With outdoor temperatures below +5°C, add glycol

HEATING MODE

MODELS EAR	0251SM ▶ 1804SM	
	MINIMUM	MAXIMUM
Hot water outlet temperature (operation)	+25 °C	+50 °C
Hot water inlet temperature (start)	+10 °C	+43 °C
Difference hot water inlet / outlet	+3 °C	+8 °C
Air inlet temperature	-12 °C	+23 °C

OUTSIDE THESE VALUES, PLEASE CONSULT US



NOTE: With outdoor temperatures below +5°C, add glycol.

FAN UNITS WITH AIR DUCTS

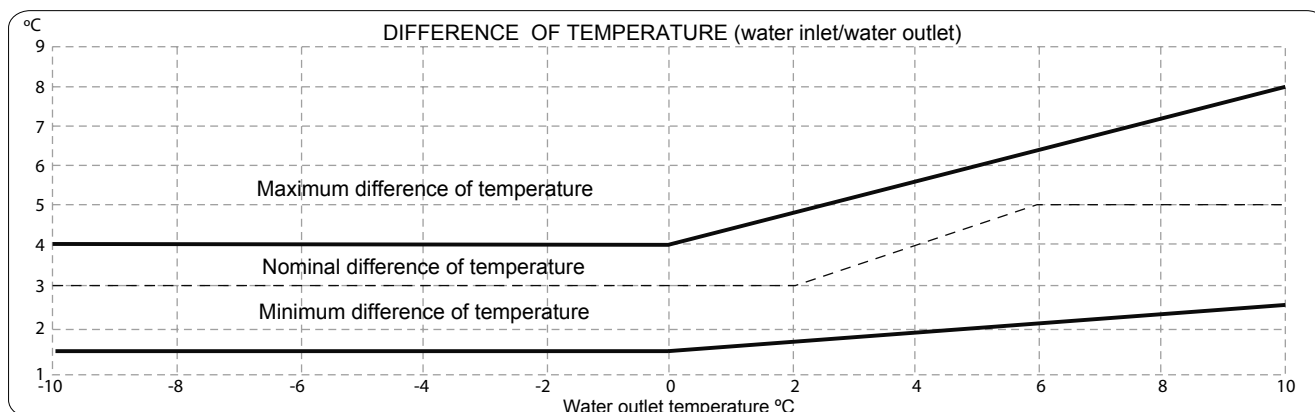
COOLING MODE

		Version	Models	Available static pressure Pa	Maximum ambient temperature °C	Minimum ambient temperature °C
AIR AVAILABLE STATIC PRESSURE UP TO	50 Pa	STANDARD	0251SM → 1804SM	30	44	---
				50	40	---
	125 Pa	FP1	0251SM → 1003SM	50	48	-15°C
				75	45	
				100	41	
				125	37	
		FP1 (low speed)	1103SM → 1804SM	50	46	-15°C
				75	43	
	250 Pa	FP1 (high speed)	1103SM → 1804SM	100	39	-15°C
				125	37	
				150	49	
				200	46	
				250	43	

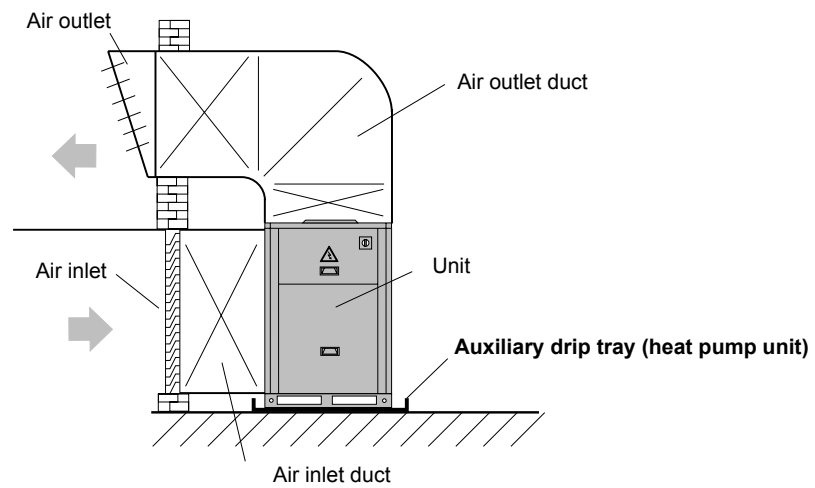
HEATING MODE

		Version	Models	Available static pressure Pa	Minimum ambient temperature °C
AIR AVAILABLE STATIC PRESSURE UP TO	50 Pa	STANDARD	0251SM → 1804SM	30	-10
				50	-8
	125 Pa	FP1	0251SM → 1003SM	50	-12
				75	-10
				100	-8
				125	-6
	250 Pa	FP1 (high speed)	1103SM → 1804SM	150	-12
				200	-10
				250	-8

UNITS WITH LOW WATER TEMPERATURE KIT (OPTION)



LOCATION INSIDE



For location inside, keep in mind following advice:

-In heat pump units during defrost cycle, the units produce a great amount of water melting the ice off coils. If you wish to drain the water, an auxiliary drip tray, should to be installed below the unit to collect and carry out water where desired.

-Air duct installation:

If air duct has been installed, the operating limits get reduced (see operation limits section in this manual).

CONTENTS

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Hydraulic version unit equipment and dimensional data	32
Hydronic version unit equipment and dimensional data	36

DESCRIPTION

- All hydraulic accessories are integrated in the standard unit casing

COMPONENTS: HYDRONIC VERSION:

- Water tank
- Water pump
- Expansion vessel
- Water filter
- Safety valve
- Manometer
- Flow switch

HYDRAULIC VERSION:

- Water pump
- Expansion vessel
- Water filter
- Safety valve
- Manometer
- Flow switch



TECHNICAL DATA

MODELS EAC / EAR HY - HN		0251SM	0291SM	0351SM	0431SM	0472SM	0552 SM	0672SM	0812SM	
Expansion vessel	Capacity	12				18				
	Maximum pressure	4				4				
Available static pressure (nominal water flow)		kPa	151	131	146	97	129	115	168	110
water flow rater nominal		l/s	1,06	1,24	1,53	1,80	2,11	2,42	3,03	3,60
Weight (add to the unit weght)	Hydraulic version	kg	16	16	17	17	23	23	24	24
	Hydronic version	kg	47	47	48	48	55	55	57	57
Hydraulic connections		inches	1 1/2"G				2"G			
Water tank (1)		l	75	75	75	75	100	100	100	100

MODELS EAC / EAR HY - HN		1003SM	1103SM	1203SM	1303SM	1403SM	1604SM	1804SM		
Expansion vessel	Capacity	35					50			
	Maximum pressure	4					4			
Available static pressure (nominal water flow)		kPa	186	176	155	132	119	116	140	
water flow rater nominal		l/s	4,21	4,89	5,34	6,01	6,63	7,13	8,31	
Weight (add to the unit weght)	Hydraulic version	kg	26	26	26	26	29	27	45	
	Hydronic version	kg	81	81	81	81	84	97	115	
Hydraulic connections		inches	2 1/2"G					3"G		
Water tank (1)		l	240	240	240	240	240	350	350	

(1) Only for units with Hydronic version

SINGLE PUMP

MODELS EAC / EAR HY - HN		0251SM	0291SM	0351SM	0431SM	0472SM	0552 SM	0672SM	0812SM	
Pump		Horizontal multistage centrifugal pump								
Type		Horizontal multistage centrifugal pump								
Voltage		3-400V								
Absorbed power		kW	0,72	0,72	1,10	1,10	1,17	1,17	1,55	1,55
Maximum current		A	1,4	1,4	1,7	1,7	1,7	1,7	2,8	2,8

MODELS EAC / EAR HY - HN		1003SM	1103SM	1203SM	1303SM	1403SM	1604SM	1804SM	
Pump		Horizontal multistage centrifugal pump							
Type		Horizontal multistage centrifugal pump							
Voltage		3-400V							
Absorbed power		kW	2,45	2,45	2,45	2,45	2,93	2,93	3,7
Maximum current		A	4,95	4,95	4,95	4,95	4,8	4,8	6,8

OPERATING PRINCIPLES



The ECOLEAN™ system comprises a water cooler or air/water pump combined with a series of hydraulic accessories obtaining the Hydraulic or Hydronic version.

COMPONENTS:

HYDRONIC VERSION:

1,2,3,4,5,6,7,8,9,10,11,12.

HYDRAULIC VERSION:

1,4,5,6,7,8,9,10,11,12.

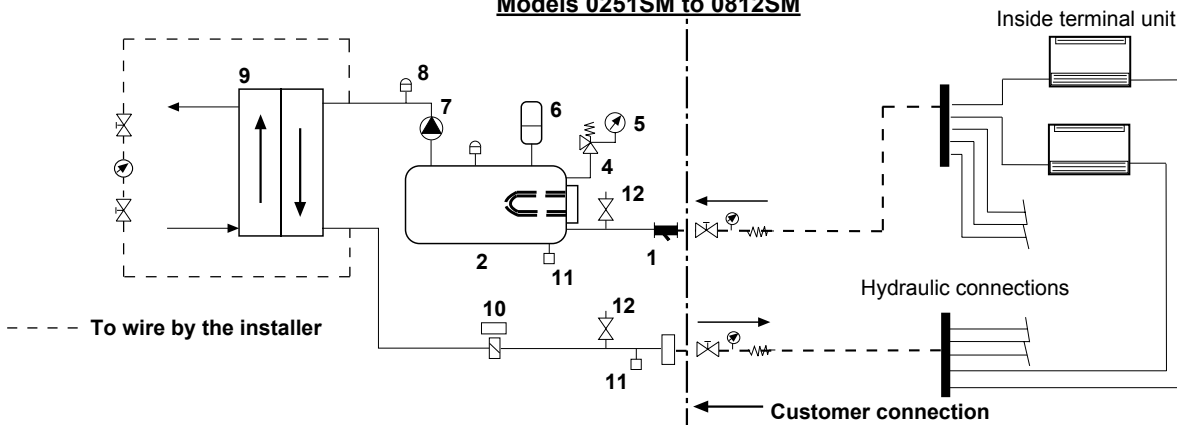
STANDARD VERSION:

1,8,9,10,12.

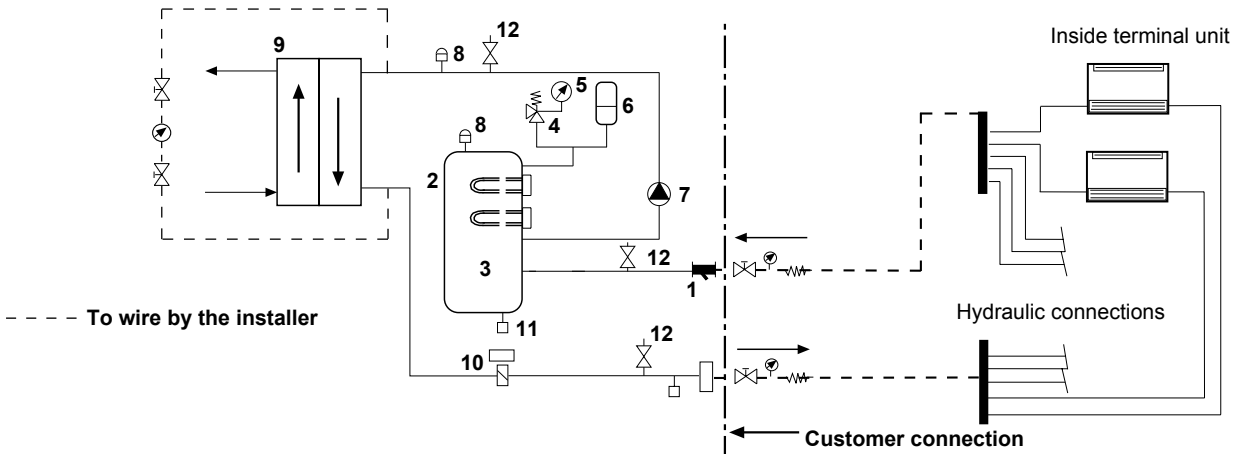
- | | |
|----------------------------------|---------------------------|
| 1. Detachable water filter | 7. Water pump |
| 2. Water tank | 8. Air purge valve |
| 3. Water tank heater (in option) | 9. Plate exchanger |
| 4. Safety valve | 10. Flow switch |
| 5. Manometer | 11. Drain valve |
| 6. Expansion vessel | 12. Pressure check points |

HYDRONIC VERSION (HN)

Models 0251SM to 0812SM

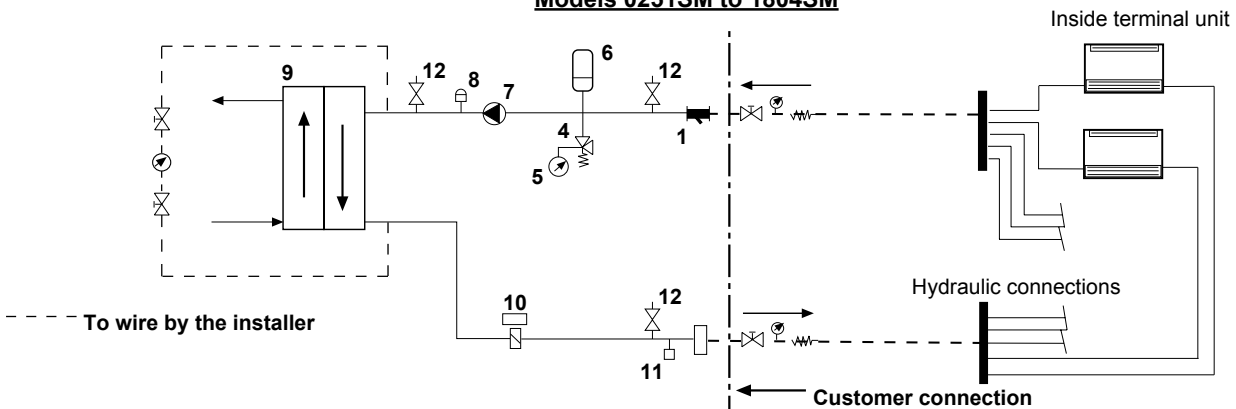


Models 1003SM to 1804SM



HYDRAULIC VERSION (HY) AND STANDARD

Models 0251SM to 1804SM



AVAILABLE STATIC PRESSURE OF THE UNIT



WATER FLOW AND AVAILABLE STATIC PRESSURE (Factory supplied; standard water pump and filter).

MODELS		EAC / EAR 0251SM					EAC / EAR 0291SM					EAC / EAR 0351SM				
		Water flow	l/s	0,88	0,99	1,06	1,22	1,37	1,03	1,16	1,24	1,43	1,61	1,22	1,38	1,53
	m ³ /h	3,16	3,56	3,80	4,40	4,95	3,72	4,18	4,45	5,16	5,81	4,40	4,95	5,50	6,12	6,88
Available static pressure	kPa	186	166	151	131	114	167	147	131	111	91	208	176	146	112	72

MODELS		EAC / EAR 0431SM				EAC / EAR 0472SM					EAC / EAR 0552SM					
		Water flow	l/s	1,47	1,66	1,80	2,04	1,68	1,89	2,11	2,34	2,63	1,96	2,21	2,42	2,73
	m ³ /h	5,30	5,96	6,47	7,36	6,05	6,81	7,59	8,41	9,46	7,07	7,96	8,72	9,82	11,05	
Available static pressure	kPa	160	131	97	51	157	143	129	115	100	142	129	115	97	74	

MODELS		EAC / EAR 0672SM					EAC / EAR 0812SM				EAC / EAR 1003SM					
		Water flow	l/s	2,39	2,69	3,03	3,32	3,73	2,89	3,25	3,60	4,01	3,44	3,87	4,21	4,78
	m ³ /h	8,60	9,68	10,90	11,94	13,44	10,39	11,69	12,98	14,43	12,38	13,93	15,17	17,20	19,35	
Available static pressure	kPa	228	197	168	137	100	186	152	110	54	210	198	186	171	152	

MODELS		EAC / EAR 1103SM					EAC / EAR 1203SM					EAC / EAR 1303SM				
		Water flow	l/s	3,86	4,34	4,89	5,36	6,03	4,38	4,92	5,34	6,08	6,84	4,85	5,46	6,01
	m ³ /h	13,90	15,63	17,61	19,30	21,72	15,76	17,72	19,23	21,88	24,62	17,48	19,66	21,62	24,27	27,31
Available static pressure	kPa	204	191	176	158	133	190	172	155	130	99	175	154	132	103	65

MODELS		EAC / EAR 1403SM					EAC / EAR 1604SM					EAC / EAR 1804SM				
		Water flow	l/s	5,24	5,90	6,63	7,27	8,19	5,85	6,58	7,13	8,12	9,14	6,88	7,74	8,31
	m ³ /h	18,86	21,22	23,87	26,17	29,48	21,06	23,69	25,66	29,22	32,90	24,77	27,86	29,93	34,37	38,70
Available static pressure	kPa	167	146	119	97	62	156	136	116	86	57	199	177	140	104	58

NOTE: The flow data indicated in table are between a minimum and a maximum water flow.
With the twin pumps kit, the available static pressure will decrease 5% from the data shown above.

Unit conversion :

Pressure 1kPa = 1/9,8 m.c.a. = 0,01 bar
 1 bar = 10 m.c.a. = 100 kPa

GLYCOL SOLUTION UNIT



If the outside temperature where the system is to be installed or the water outlet temperature is likely to drop below 5°C, it is very important to use glycol anti-freeze.

The amount of anti-freeze required will vary depending on the minimum ambient temperature or the water outlet temperature. When the percentage of glycol increases the standard pump flow decreases, the pressure drop increases and the cooling and thermal capacities drop. As a result the minimum flow must be multiplied by the coefficient shown in the table:

Minimum ambient temperature or water outlet temperature	Ethylene glycol %	Pressure drop	Water flow	Power input	Capacities	
					Cool	Heat
From +5°C to 0°C	10%	1,05	1,02	0,997	0,995	0,994
From 0°C to -5°C	20%	1,10	1,05	0,996	0,985	0,993
From -5°C to -5°C	30%	1,15	1,08	0,995	0,975	0,99
From -10°C to -15°C	35%	1,18	1,10	0,994	0,965	0,987

Example: 10 % glycol in EAC 0251SMHN
 Pressure drop: 175 x 1,05

Minimum flow: 3,16 m³/h x 1,02
 System capacity x 0,99

WATER FLOW VOLUME

MINIMUM WATER FLOW

The installation must never operate with less than the minimum water flow (see table above), this will cause:

- i. - Freezing the water heat exchanger.
- ii. - Contamination of the heat exchanger.

MAXIMUM WATER FLOW

See maximum water flow, (see table above). Always assure the minimum ΔT to the exchanger of 3°C.

MINIMUM WATER VOLUME IN THE INSTALLATION

Thanks to a specific control algorithm and anti-short compressor cycling control, ECOLEAN™ can work with minimum water loop volume as defined here below. This can eliminate the need for a buffer tank in most of air-conditioning applications (e.g. ECOLEAN™ application with fan-coil units):

V_{mini} = 3 liters / kW

Important note: In case ECOLEAN™ is used in air-conditioning applications with a short water system (e.g. ECOLEAN™ application with air handling units) or in case ECOLEAN™ is used for industrial process cooling, it is mandatory to use a buffer tank (EAC HN version). For heat-pump applications, we do recommended to use a buffer tank (EAR HN version) to keep constant water temperature during defrost cycle. Additionally, ECOLEAN™ can be delivered with additional electric heaters fitted into the buffer tank to meet heating demand in case of very low outdoor air temperature.

MAXIMUM WATER VOLUME IN THE INSTALLATION

The units with Hydronic or Hydraulic module include a expansion vessel. The table below details the maximum water volume in the system.

If the water volume in the system is greater than that detailed in the table. it will be necessary to add additional expansion vessel(s). The system design must allow for water expansion and contraction.

MODELS	0251SM ▶ 0431SM	0472SM ▶ 0812SM	1003SM ▶ 1403SM	1604SM - 1804SM
SOLUTION	Water volume in liters			
WATER	550	850	1600	2250
WATER + 10% GYT	400	650	1225	1725
WATER + 20% GYT	350	475	1075	1500
WATER + 30% GYT	300	450	925	1300
WATER + 35% GYT	225	325	700	1000

WATER TANK HEATER (AN OPTION)

The option for Antifreeze protection on the buffer tank includes on cooling only units a immersion heater with safety thermostat. On heat pump units only when fitted with a buffer tank it is possible to have anti freeze plus supplemental water heater this includes immersion heater with safety thermostat and a adjustable heater thermostat.

Tank anti-freeze heater: It starts when water temperature in the buffer tank is lower than + 5 °C (Not for units with low water temperature kit).

Water tank electrical heater: heat pump units only. The heater works as anti-freeze heater as explained before and as supplementary heater, when inlet warm water reaches a temperature below a value selected (example: 30 °C) through an independent thermostat included.

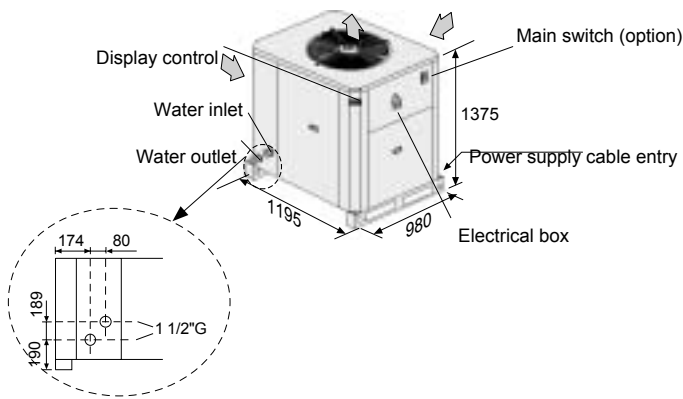
Power consumption is:

MODELS		0251SM ▶ 0431SM	0472SM ▶ 0812SM	1003SM ▶ 1403SM	1604SM - 1804SM
Voltage	V	3~400V			
Tank anti-freeze heater	KW	2,25	2,25	6,0	9
Water tank electrical heater*	KW	9	12	24,0	36,0

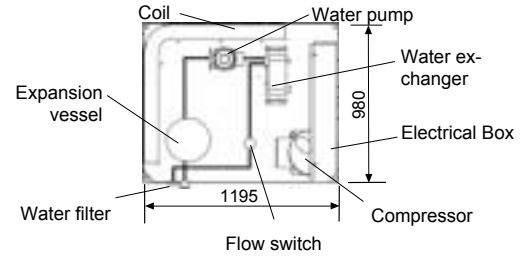
(*) Heat pump units only

(HYDRAULIC VERSION)

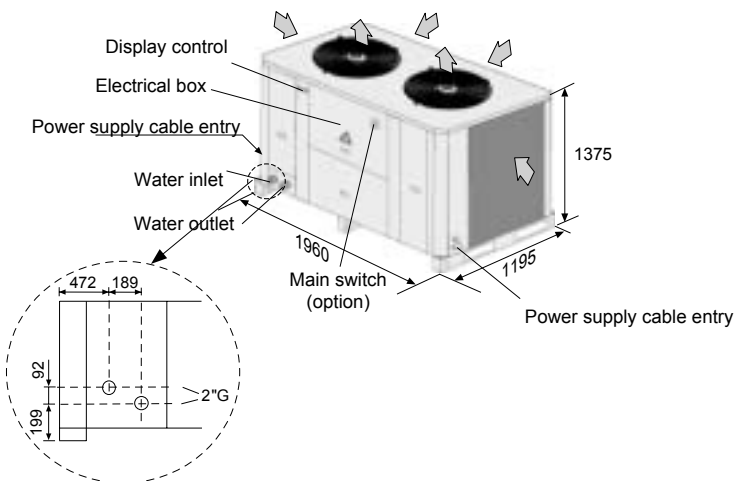
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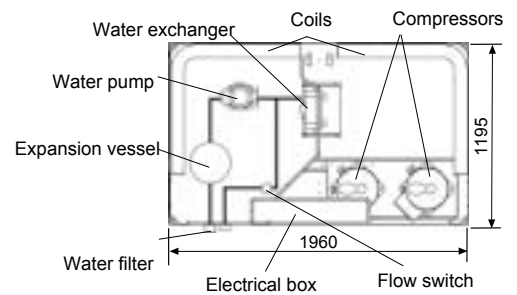
1 COMPONENT POSITION HYDRAULIC VERSION UNIT



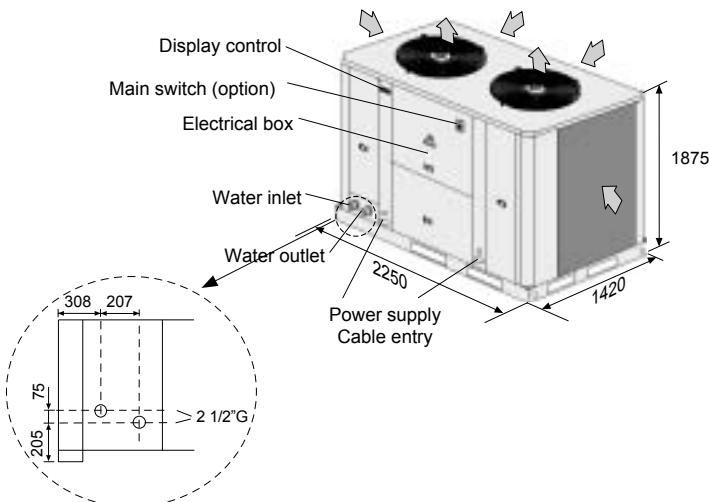
2 EAC/EAR 0472SM-0552SM-0672SM-0812SM



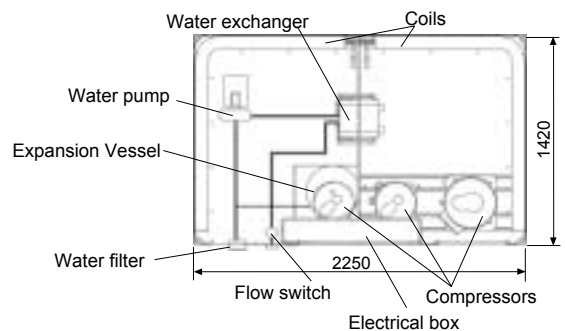
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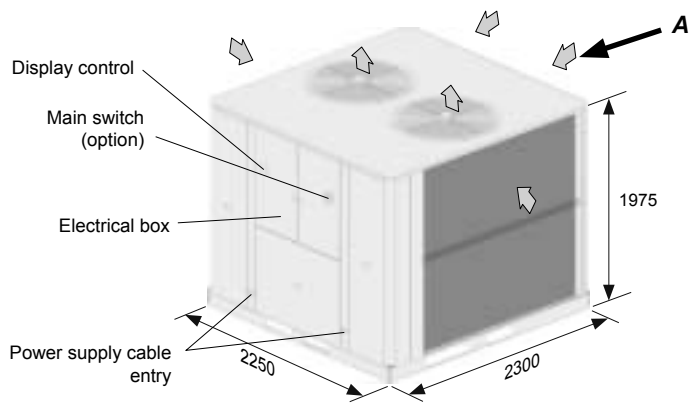
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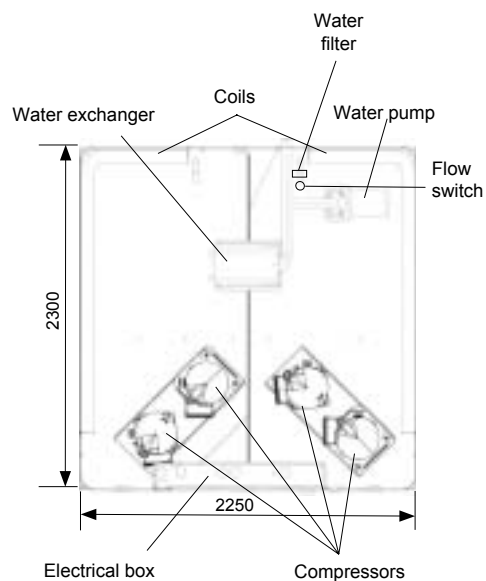
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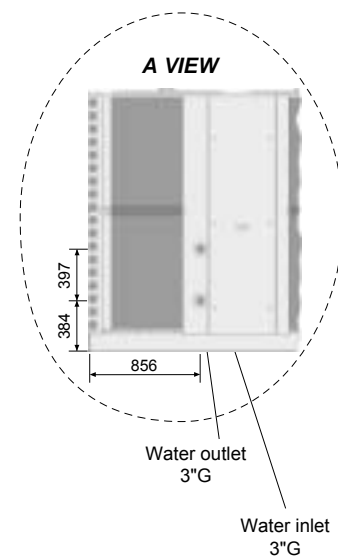
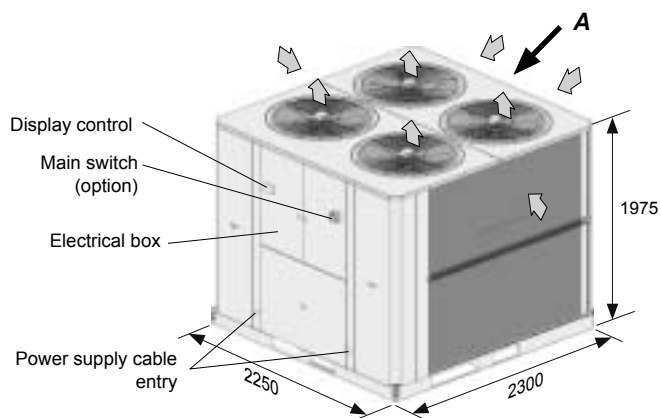
4 EAC/EAR 1604SM



**4/5 COMPONENT POSITION
HYDRAULIC VERSION UNIT**



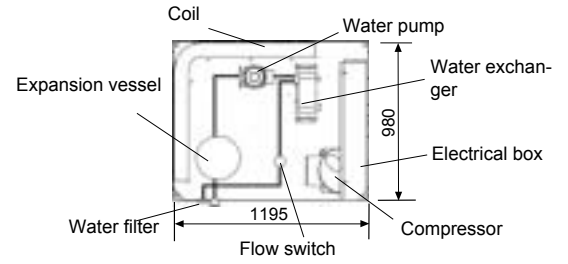
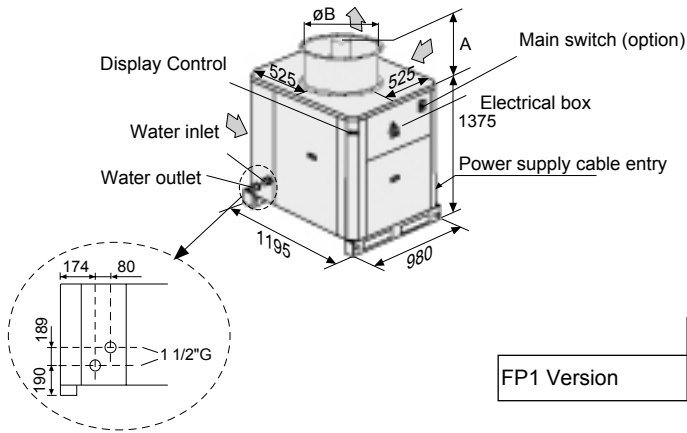
5 EAC/EAR 1804SM



(HYDRAULIC VERSION)

1 EAC/EAR 0251SM-0291SM-0351SM-0431SM FP1

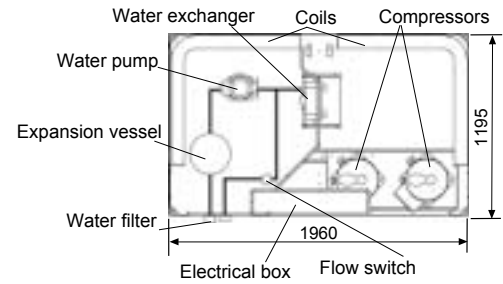
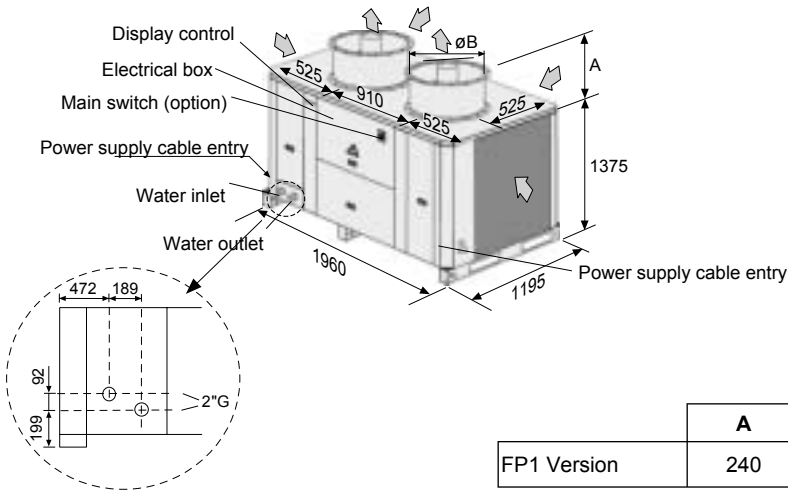
1 COMPONENT POSITION HYDRAULIC VERSION UNIT



	A	øB
FP1 Version	240	630

2 EAC/EAR 0472SM-0552SM-0672SM-0812SM FP1

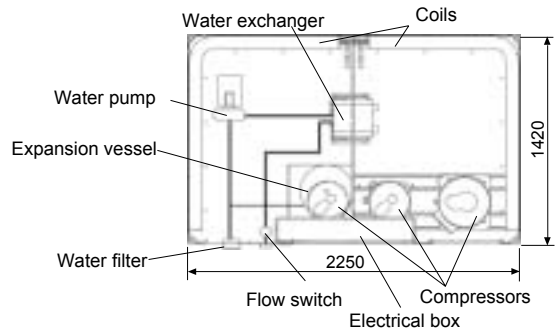
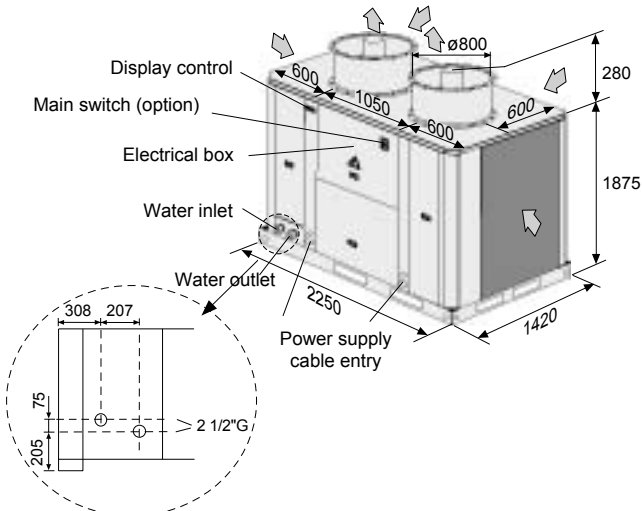
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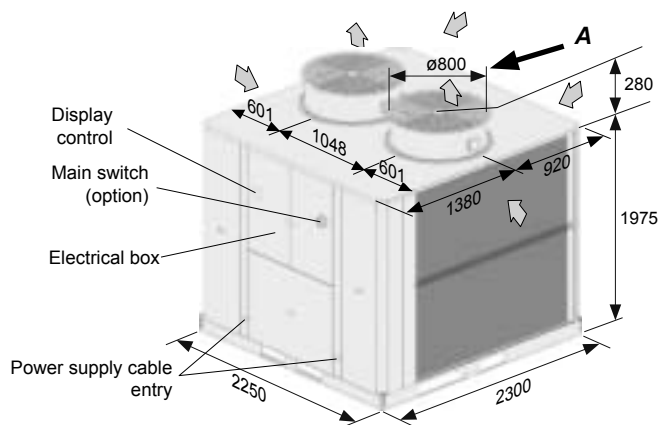
	A	øB
FP1 Version	240	630

3 EAC/EAR 1003SM-1103SM-1203SM-1303SM-1403SM FP1

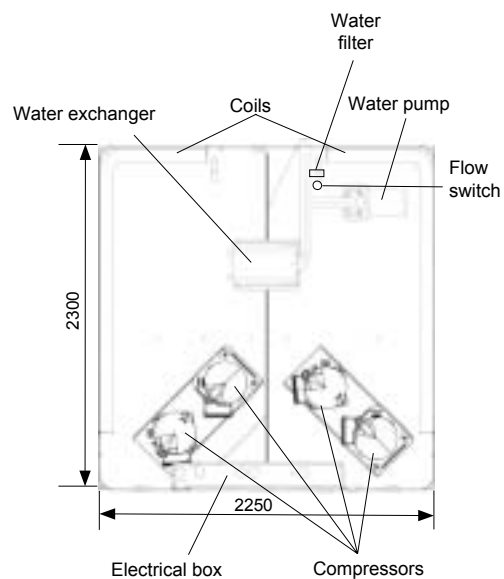
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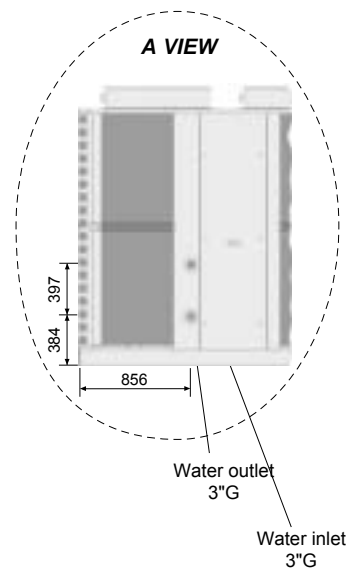
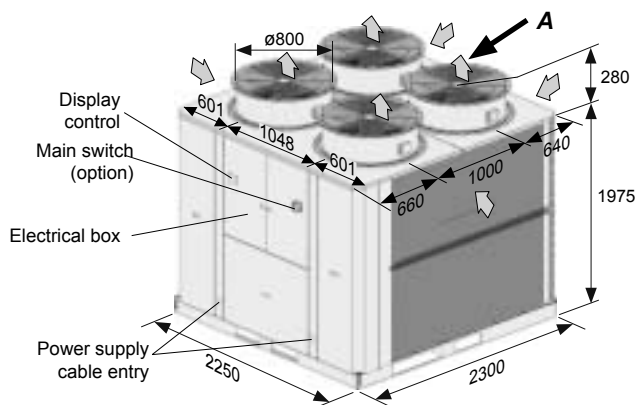
4 EAC/EAR 1604SM FP1



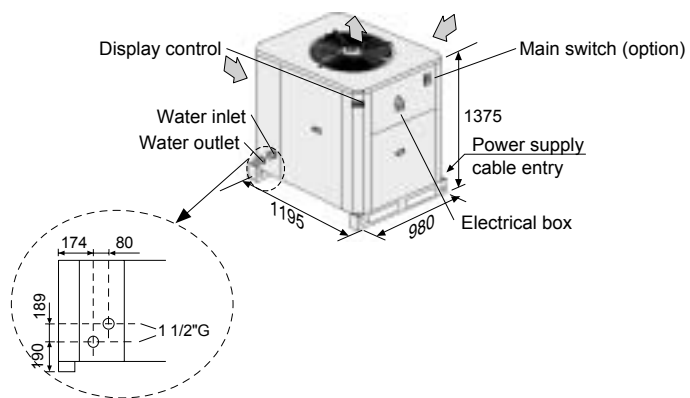
**4/5 COMPONENT POSITION
HYDRAULIC VERSION UNIT**



5 EAC/EAR 1804SM FP1

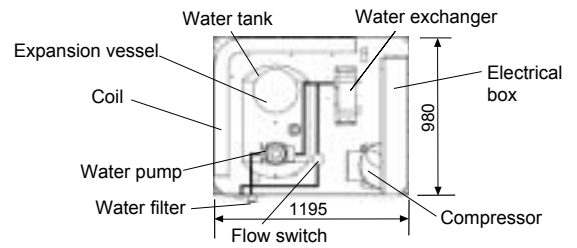


1 EAC/EAR 0251SM-0291SM-0351SM-0431SM

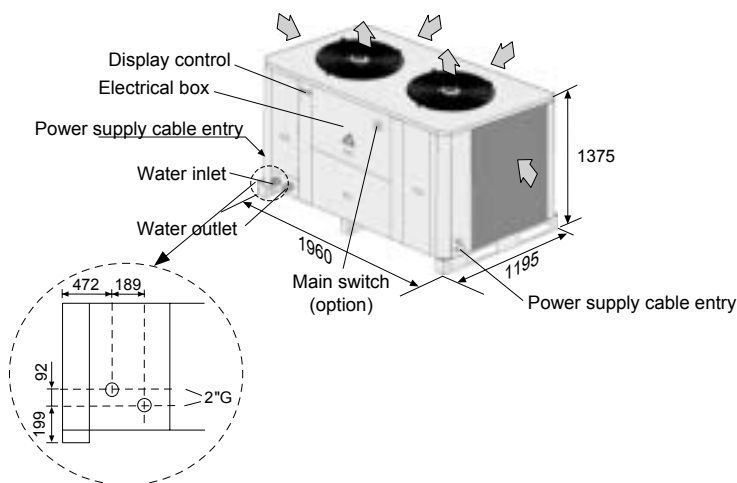


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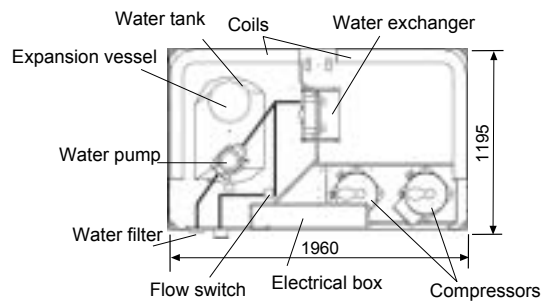
**1 COMPONENT POSITION
HYDRONIC VERSION UNIT**



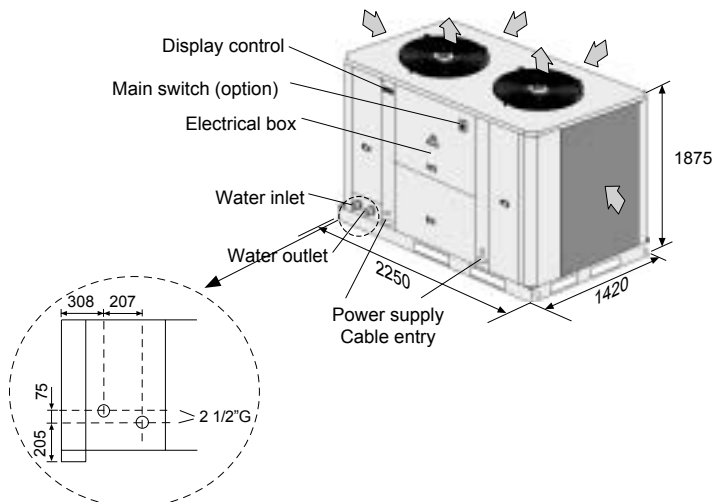
2 EAC/EAR 0472SM-0552SM-0672SM-0812SM



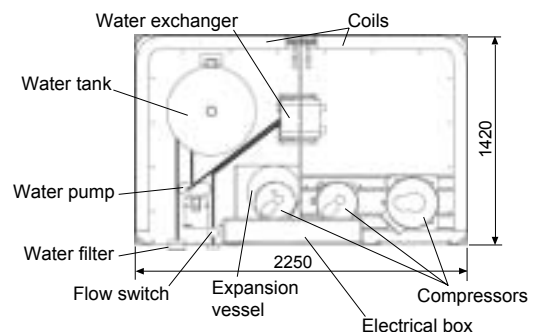
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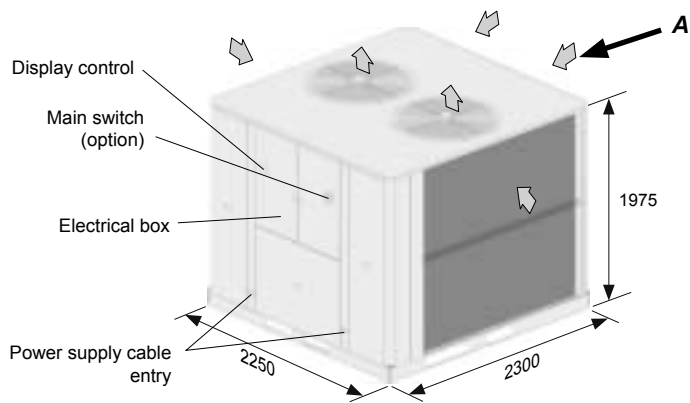
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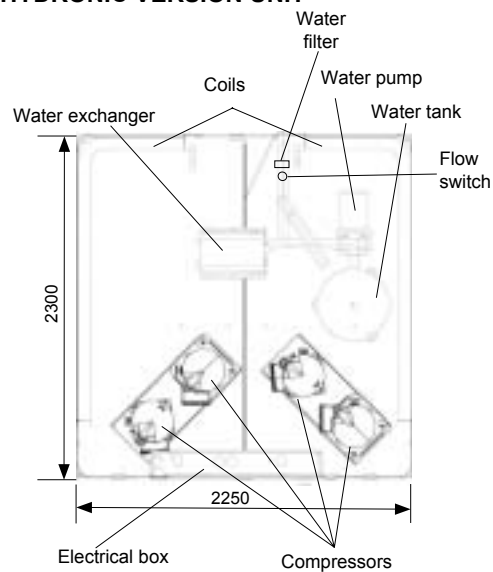
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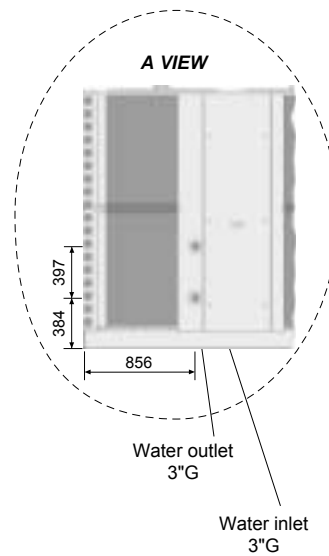
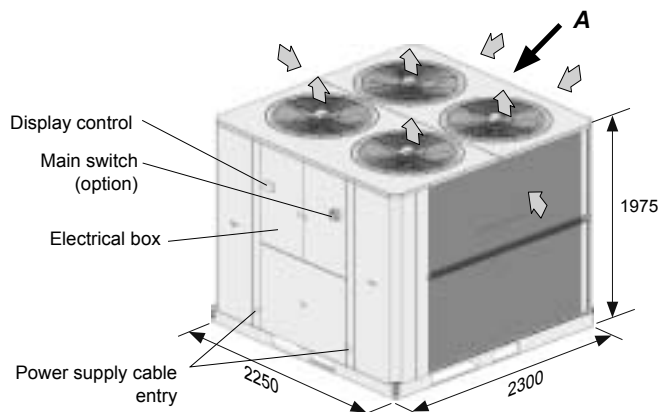
4 EAC/EAR 1604SM



**4/5 COMPONENT POSITION
HYDRONIC VERSION UNIT**



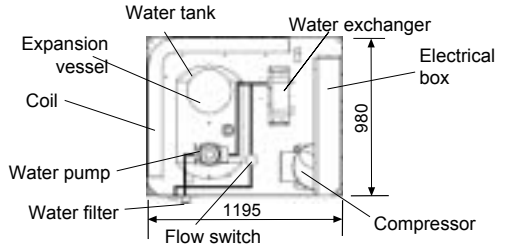
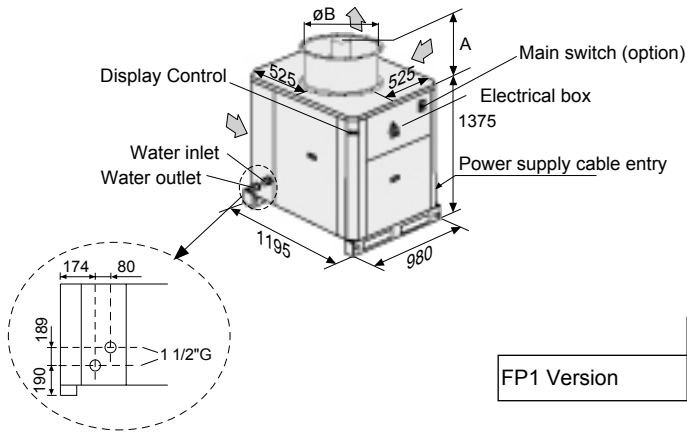
5 EAC/EAR 1804SM



(HYDRONIC VERSION)

1 EAC/EAR 0251SM-0291SM-0351SM-0431SM FP1

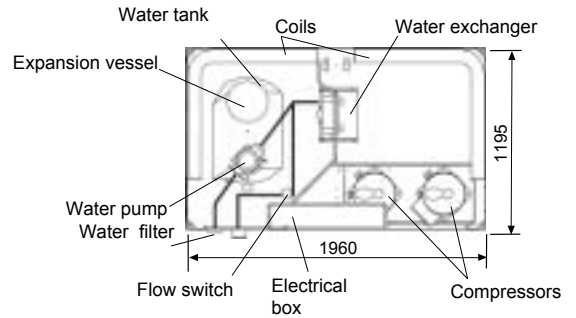
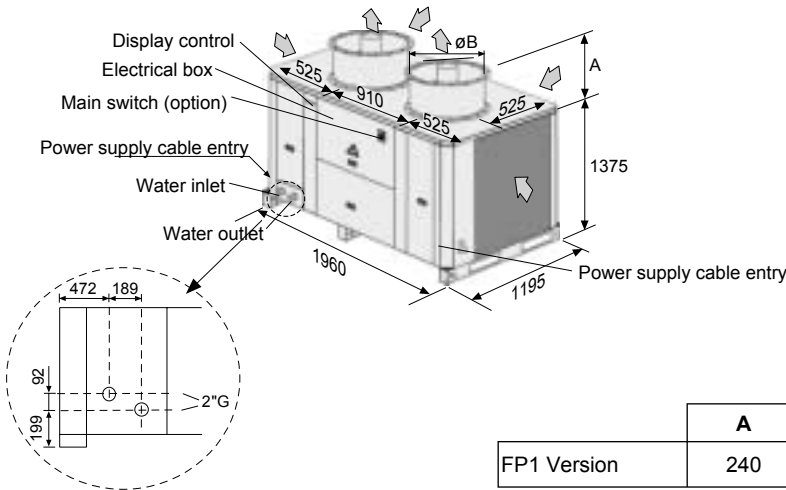
1 COMPONENT POSITION
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	A	øB
FP1 Version	240	630

2 EAC/EAR 0472SM-0552SM-0672SM-0812SM FP1

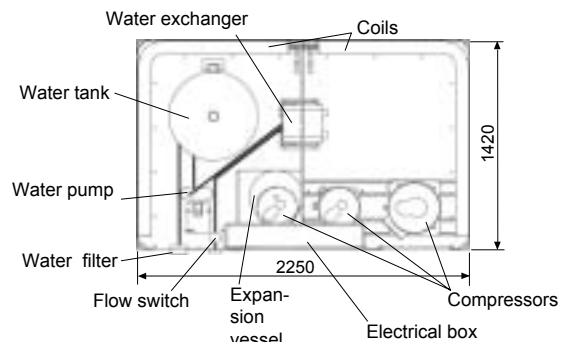
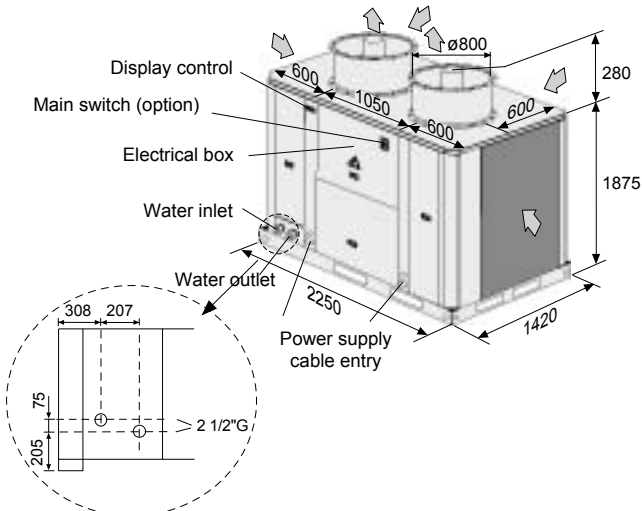
2 COMPONENT POSITION
HYDRONIC VERSION UNIT



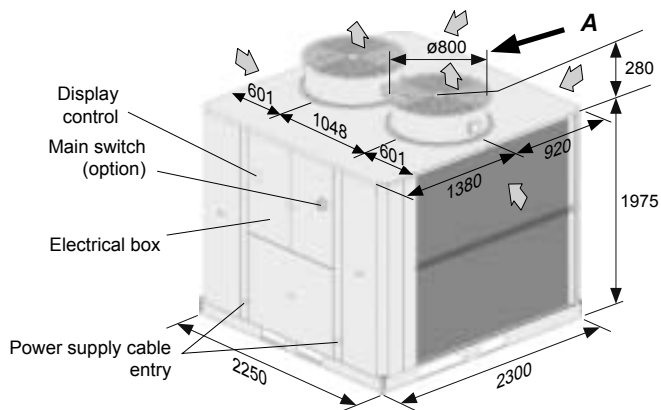
	A	øB
FP1 Version	240	630

3 EAC/EAR 1003SM-1103SM-1203SM-1303SM-1403SM FP1

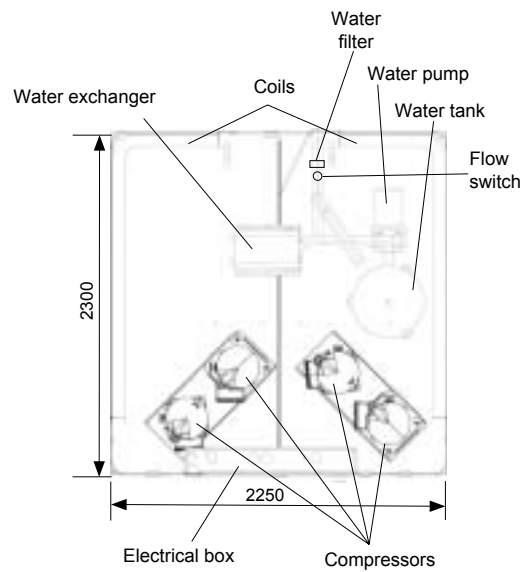
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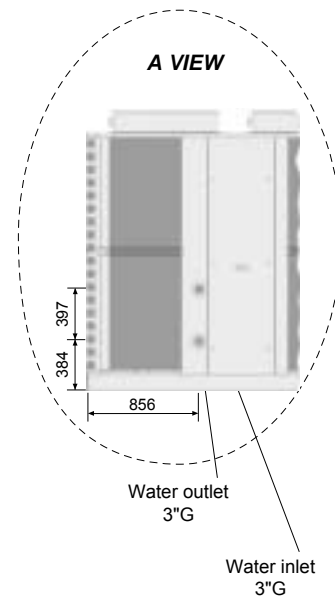
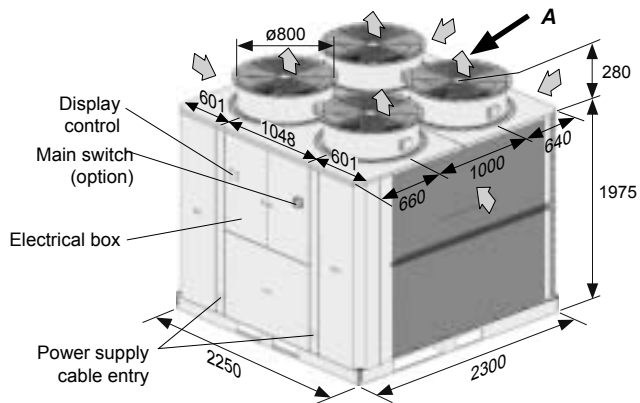
4 EAC/EAR 1604SM FP1



4/5 COMPONENT POSITION HYDRONIC VERSION UNIT



5 EAC/EAR 1804SM FP1



ECOLEAN™ Technical specification

To supply and install, where specified in the project n° unit(s) air-cooled water chiller with cooling capacity of kW, to cool m³/sec. of water from°C to working with °C ambient temperature.

The unit should work with electricity at V. 3ph. 50Hz.

The electrical power absorbed should not overcome kW.

The units COP will be at least at the working conditions of the project.

Part load COP will be at least at the working conditions of the project.

For the units with 1, 2, 3 or 4 compressors, the chillers will have (1) or (2) independent refrigerant circuits, with the respective electronic microprocessor will allow the starting of the compressors and the control of the chiller. Each chiller will be factory assembled on a robust base frame made of coated steel. The panels will be coated steel panels protected by an epoxy coated paint. The unit will be tested at full load in the factory at the nominal working conditions and water temperatures.

Before shipment a full refrigerant leak test will be held to avoid any losses, and the units will be filled with oil and refrigerant.

General

Units are leak and pressure-tested at 43 bars high side and 25 bars low side, and then evacuated and charged. Packaged units ship with a full operating charge of oil and refrigerant. Unit panels, structural elements, and control boxes are constructed of 1.5 to 6mm galvanized sheet metal. The chiller is constructed on a solid rugged base frame constructed of steel beams welded together to form a ridged base. The base is structurally able to carry the unit weight and is torsion ally ridged with no vibrating sections. The base is hot dipped galvanised for corrosion protection. The chiller is lifted, moved and mounted via the base frame that contains mounting and lifting points as standard. Unit panels, control boxes and the structural-steel base are finished with baked-on powder paint. The unit is painted to RAL 9002 as standard. The units must be constructed to meet European norms and standards specifically EN 60204-1, NR 2037/2000, ISO9001, & Eurovent certification performance standards.

Compressors

All units will have direct driven hermetic Scroll compressors. The scroll compressor axial seal will be achieved by floating tip seals the radial seal is achieved via a micro cushion of oil. The scroll components will be able to disengage in the event of liquid carry over. The compressor motors will be suction gas cooled and have thermal overload device. The operating limits of the compressor motors will allow for +/- 10% of the nameplate voltage. The compressors are mounted on vibration isolation pads to reduce noise transmission.

Evaporator

The evaporator is brazed plate type designed, tested, and stamped in accordance with the appropriate pressure-vessel code approval. The evaporator is designed for a waterside working pressure of 10 bars and refrigerant side 45 bars. Water connections are grooved stubs for simple site connection. The evaporator includes an automatic air vent, a drain, and fittings for temperature control sensors, and is insulated with 13 mm (1/2 inch) (K-0.26). Option evaporator heaters are provided to protect the evaporator from freezing at ambient temperatures down to -20°C. The evaporator is designed to operate with a flow detection device. The evaporator will have independent refrigerant circuits. The evaporator should be protected from debris and a water filter is standard on all versions.

Condenser coil

The condenser coils are constructed with internally enhanced seamless copper tubes having a "L" configuration and making this unit compact and highly efficiency.

Condenser fans

The condenser fans are direct drive vertical discharge helical type with multiple aerofoil blades for higher efficiencies and lower noise The fan blade will be of the sickle end type mounted in a bell mouth orifice, except for FP versions which are centrifugal ones. The air discharge is vertical and each fan will be coupled to the electrical motor, supplied as standard to IP54/IP55 class "F" insulation with 6 or 8 poles according to models except for FP1 unit versions which is 4 poles and capable to work to ambient temperatures of -40°C to +70°C max humidity 80%. The fans are direct driven via a single phase motor except for unit models EAC/EAR 1003S to 1804S driven via a three phase motor with permanently lubricated ball bearings. The single phase motors are designed for external operation with the possibility with regulation speed via unit control.

The three phase motors are designed with two speeds.

Control panel

Field power connection, controls interlock terminals, and unit control system shall be centrally located in a weatherproof cabinet accessible through a lockable door. All 3-phase connections shall be fully shrouded to prevent accidental contact. Power and starting controls shall include lockable individual fuses and contactors for each compressor winding and fan motors. Operating and safety controls shall be via a microprocessor controller plus thermal protection for compressor and fan motors; high and low pressure cut-out switch (for each refrigerant circuit). Standard single point power connections include main three-phase power plus neutral to the compressors, condenser fans and control power transformer. All internal cables must be mounted on cable tray and tied. The chillers will have full earth bonding between isolated metal parts.

Control & capacity regulation

Standard Controller

The standard control module is a weatherproof digital display. The display shows up to 4 numeric or letter sequences. In addition to the digital display there are functional leds to denote unit operation. Control interface will be via push button and menu screens for simple use.

All alarms and faults are shown via the display

Functions:

- Remote stop start (remote connection by others)
- Flow switch (remote connection by others)
- Heat or cool operation selection
- Compressor overload Alarm
- High pressure Alarm
- Low pressure Alarm
- Operating hours compressors
- Operating hours Pump
- Compressor sequencing to match operating hours
- Condenser fan control
- Chilled water pump
- Freeze protection
- Chilled water set point control
- Alarm counter to go from auto reset to manual reset
- Self-diagnostic
- Password protection of settings
- Remote display option
- Hours run

Refrigerant piping

Each refrigerant circuit shall include a factory insulated suction line, a refrigerant filter drier, sensor indicator, liquid line, and thermostatic expansion valve. All refrigerant pipework are clamped to prevent vibration. The refrigerant lines should contain independent Schrader valve test points for maintenance.



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