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## TABLE OF CONTENTS

DATA PAGE FOR UNIT COMMISSIONING

PAGE 2

### 1.- GENERAL CHARACTERISTICS

PAGE

1.1.- TECHNICAL DATA	3
1.2.- ELECTRICAL DATA	4-5
1.3.- COMPONENT	6
1.4.- OPERATION LIMITS	7
1.5.-PRESSURE DROP IN THE WATER SYSTEM	8
1.6.-HYDRAULIC SYSTEM DATA	9
1.7.-SAFETY DEVICES	10-11
1.8.- PIPING DRAWINGS	12-13
1.9.- DIMENSIONS	14-16
1.10.- OPTIONALS	17-18

### 2.- INSTALLATION

PAGE

2.1.- PRELIMINARY PREPARATIONS	19
2.2.- UNIT RECEPTION	19
2.3.- INSTALLATION CLEARANCES	20
2.4.- UNIT INSTALLATION	21-23
2.5.- ELECTRICAL CONNECTIONS	24

### 3.- COMMISSIONING AND OPERATION

PAGE

3.1.- STARTING PROCEDURE	25
3.2.- STEPS TO FOLLOW FOR COMMISSIONING THE UNITS	26
3.3.- CORROSION RESISTANCE OF COPPER AND STAINLESS STEEL	27

### 4.- MAINTENANCE

PAGE

4.1.- PREVENTIVE MAINTENANCE	28
4.2.- CORRECTIVE MAINTENANCE	29
4.3.- FAILURE DIAGNOSIS	30

**DATA PAGE FOR UNIT COMMISSIONING**

UNIT: \_\_\_\_\_ SERIAL No.: \_\_\_\_\_

CONTROL PANEL IDENTIFICATION CODE \_\_\_\_\_

INSTALLATION ADDRESS: \_\_\_\_\_

INSTALLER: \_\_\_\_\_ INSTALLER TEL.: \_\_\_\_\_

INSTALLER ADDRESS: \_\_\_\_\_

DATE OF COMMISSIONING: \_\_\_\_\_

**CHECKS:**

SUPPLY VOLTAGE: \_\_\_\_\_ RATED VOLTAGE OF THE UNIT: \_\_\_\_\_

	YES	NO
UNIT ON SHOCK ABSORBERS	<input type="checkbox"/>	<input type="checkbox"/>
GENERAL POWER SUPPLY CONNECTION	<input type="checkbox"/>	<input type="checkbox"/>
CONTROL PANEL CONNECTION (OPTIONAL)	<input type="checkbox"/>	<input type="checkbox"/>
COMPRESSOR OIL LEVEL INDICATOR	<input type="checkbox"/>	<input type="checkbox"/>
HYDRAULIC CONNECTION	<input type="checkbox"/>	<input type="checkbox"/>
PURGED OF THE INSTALLATION	<input type="checkbox"/>	<input type="checkbox"/>

**DATA INPUT:**

**COLD CYCLE**

Air Input Temperature, Coil: \_\_\_\_\_ °C  
 Water Output Temperature: \_\_\_\_\_ °C  
 Water Input Temperature: \_\_\_\_\_ °C  
 High Pressure: \_\_\_\_\_  
 Low Pressure: \_\_\_\_\_

**ELECTRIC POWER CONSUMPTION (Amp.)**

Compressor 1 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Fan 1 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Compressor 2 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Fan 2 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

**HEATING CYCLE**

Air Input Temperature, Coil: \_\_\_\_\_ °C  
 Water Output Temperature: \_\_\_\_\_ °C  
 Water Input Temperature: \_\_\_\_\_ °C  
 High Pressure: \_\_\_\_\_  
 Low Pressure: \_\_\_\_\_

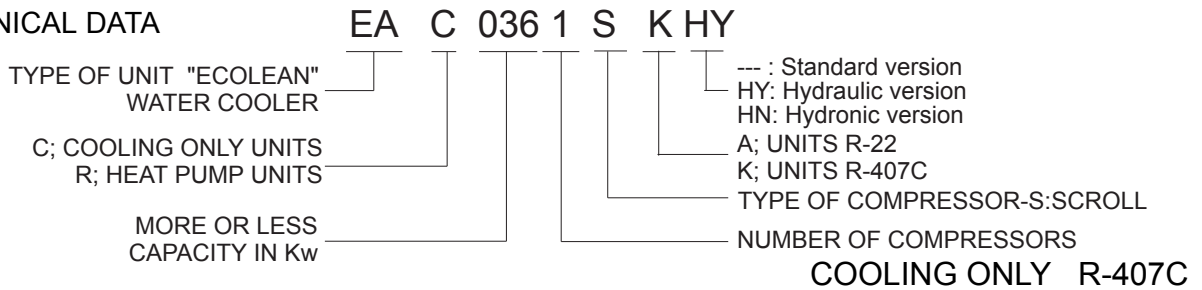
Compressor 1 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Fan 1 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Compressor 2 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Fan 2 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Options Installed: \_\_\_\_\_

Comments: \_\_\_\_\_

## 1.- GENERAL CHARACTERISTICS

### 1.1.- TECHNICAL DATA



<b>EAC MODELS</b>		0091SK	0111SK	0151SK	0191SK	0211SK	0251SK	0291SK	0351SK	0431SK	0472SK	0552SK	0672SK	0812SK
<b>Cooling capacity (*)</b>	kW.	8,5	10,5	12,5	17,0	18,5	22,5	26,0	32,0	38,5	44,0	51,0	62,5	75,0
<b>Air flow</b>	m <sup>3</sup> /h.	3500	6500	6700	6500	6300	9500	11500	11000	10500	19000	23000	22000	21000
<b>Compressor</b>	Nº/Type:	1 / Scroll					2 / Scroll							
<b>Hydraulic connections</b>		1"G	1"G	1"G	1"G	1"G	1 1/2"G	1 1/2"G	1 1/2"G	1 1/2"G	2"G	2"G	2"G	2"G
<b>Min. water rate</b>	l/h.	19,8	24,6	29,4	40,2	43,8	53,4	61,2	75,6	91,2	103,8	120,6	147,6	177,0
<b>Net. weight</b>	kg.	147	155	168	181	245	272	281	309	345	540	551	596	670
<b>Refrigerant R-407C</b>	kg.	---	---	---	---	---	---	---	---	---	---	---	---	---

### HEAT PUMP R-407C

<b>EAH MODELS</b>		0091SK	0111SK	0151SK	0191SK	0211SK	0251SK	0291SK	0351SK	0431SK	0472SK	0552SK	0672SK	0812SK
<b>Cooling capacity (*)</b>	kW.	8,5	10,5	12,5	17,0	18,5	22,5	26,0	32,0	38,5	44,0	51,0	62,5	75,0
<b>Heating capacity (**)</b>	kW.	8,7	10,7	13,0	17,6	19,9	23,8	26,7	33,4	41,3	46,6	52,3	65,4	81,0
<b>Air flow</b>	m <sup>3</sup> /h.	3500	6500	6700	6500	6300	9500	11500	11000	10500	19000	23000	22000	21000
<b>Compressor</b>	Nº/Type:	1 / Scroll					2 / Scroll							
<b>Hydraulic connections</b>		1"G	1"G	1"G	1"G	1"G	1 1/2"G	1 1/2"G	1 1/2"G	1 1/2"G	2"G	2"G	2"G	2"G
<b>Min. water rate</b>	l/h.	19,8	24,6	29,4	40,2	43,8	53,4	61,2	75,6	91,2	103,8	120,6	147,6	177,0
<b>Net. weight</b>	kg.	150	158	172	185	250	277	285	317	353	549	561	612	685
<b>Refrigerant R-407C</b>	kg.	---	---	---	---	---	---	---	---	---	---	---	---	---

### HEAT PUMP R-22

<b>EAH MODELS</b>		0091SA	0111SA	0151SA	0191SA	0211SA	0251SA	0291SA	0351SA	0431SA	0472SA	0552SA	0672SA	0812SA
<b>Cooling capacity (*)</b>	kW.	8,5	10,5	12,5	17,0	18,5	22,5	26,0	32,0	38,5	44,0	51,0	62,5	75,0
<b>Heating capacity (**)</b>	kW.	9,0	11,0	13,4	18,1	20,5	24,5	27,5	34,5	42,5	48,0	54,0	67,5	83,5
<b>Air flow</b>	m <sup>3</sup> /h.	3500	6500	6700	6500	6300	9500	11500	11000	10500	19000	23000	22000	21000
<b>Compressor</b>	Nº/Type:	1 / Scroll					2 / Scroll							
<b>Hydraulic connections</b>		1"G	1"G	1"G	1"G	1"G	1 1/2"G	1 1/2"G	1 1/2"G	1 1/2"G	2"G	2"G	2"G	2"G
<b>Min. water rate</b>	l/h.	19,8	24,6	29,4	40,2	43,8	53,4	61,2	75,6	91,2	103,8	120,6	147,6	177,0
<b>Net. weight</b>	kg.	150	158	172	185	250	277	285	317	353	549	561	612	685
<b>Refrigerant R-407C</b>	kg.	---	---	---	---	---	---	---	---	---	---	---	---	---

\* Cooling capacity: Outside temperature: 35°C / Inlet/outlet water temperature: 12/7°C

\*\* Heating capacity: Outside temperature: 7°CDB / 6°C WB / Inlet/outlet water temperature: 45/50°C

### HYDRAULIC VERSION / HYDRONIC VERSION

<b>Pump type:</b>	Multicelular centrifugal pump with one speed													
<b>Expansion vessel</b>	Capacity	5L	5L	5L	5L	5L	12L	12L	12L	12L	18L	18L	18L	18L
<b>SET PRESSURE</b>														
	Security valves	bar	3	3	3	3	3	3	3	3	3	3	3	3
	Expansion vessel	bar	4	4	4	4	4	4	4	4	4	4	4	4
<b>Inertia device (***)</b>	Capacity	50 L	50 L	50 L	50 L	50 L	75 L	75 L	75 L	75 L	100 L	100 L	100 L	100 L

\*\*\* Only in units with hydronic module

## 1.- GENERAL CHARACTERISTICS

### 1.2.- ELECTRICAL DATA

### COOLING ONLY AND HEAT PUMP UNITS R-407C

EAC / EAH MODELS		0091SK	0111SK	0151SK	0191SK	0211SK	0251SK	0291SK	0351SK	0431SK
Voltage	V/f (50 Hz)	230 V / 1 Ph								
		230 - 400V / 3 Ph								
<b>Nominal consumption</b>										
Compressor (cooling cycle)	kW	3,08	3,59	4,41	5,81	6,59	8,49	9,76	11,92	14,76
Compressor (heating cycle)	kW	3,29	3,59	4,30	5,73	6,51	8,03	8,90	11,07	14,00
Fan	kW	0,15	0,30	0,32	0,30	0,28	0,75	0,90	0,85	0,83
Total power in cooling cycle	kW	3,23	3,89	4,73	6,11	6,87	9,24	10,66	12,77	15,59
Total power in heating cycle	kW	3,08	3,89	4,62	6,03	6,79	8,78	9,80	11,92	14,83
<b>Max. absorbed intensity</b>										
Compressor	A	19,63 13,13/7,93	18,36/10,86 22,27/13,17	26,86/16,86 27,06/16,06	32,70/19,50 37,60/22,50	47,23/27,63 56,42/22,92				
Fan	A	0,70	1,40	1,49	1,40	1,30	3,50	4,20	3,97	2,88
Total current	A	20,33 13,83/8,63	19,76/12,26 23,76/14,66	28,26/18,26 28,36/17,36	36,20/23,00 41,80/26,70	51,20/31,60 59,30/35,80				
Starting current	A	101,63 81,63/47,63	89,26/52,26 117,26/68,26	177,26/103,26 176,26/101,26	226/128 241/133	299/173 351/204				

### HYDRAULIC VERSION / HYDRONIC VERSION

Water pump:		V/f (50 Hz)	230 V / 1 Ph							400 V / 3 Ph	
Nominal absorbed intensity	kW	0,49	0,49	0,49	0,72	0,72	0,72	0,72	1,0	1,0	
Max. current	A	2,3	2,3	2,3	1,4	1,4	1,4	1,4	1,7	1,7	

MODELS		EAC 0472SK	EAC 0552SK	EAC 672SK	EAC 0812SK	EAR 0472SK	EAR 0552SK	EAR 0672SK	EAR 0812SK	
Voltage	V/f (50 Hz)	230 - 400V / 3 Ph								
<b>Nominal consumption</b>										
Compressor (cooling cycle)	kW	16,81	19,32	23,60	29,22	16,81	19,32	23,60	29,22	
Compressor (heating cycle)	kW	---	---	---	---	15,90	17,62	21,92	27,72	
Fan	kW	1,50	1,80	1,70	1,66	1,50	1,80	1,70	1,66	
Total power in cooling cycle	kW	18,31	21,12	25,3	30,88	18,31	21,12	25,3	30,88	
Total power in heating cycle	kW	---	---	---	---	17,4	19,42	23,62	29,38	
<b>Max. absorbed intensity</b>										
Compressor	A	74,19/43,99 64,39/37,99	109,84/62,84 93,46/54,26	109,84/62,84 93,46/54,26	74,19/43,99 64,39/37,99	74,19/43,99 64,39/37,99	109,84/62,84 93,46/54,26	109,84/62,84 93,46/54,26	109,84/62,84 93,46/54,26	
Fan	A	7,01	8,41	7,94	7,76	7,01	8,41	7,94	7,76	
Total current	A	71,40/45,00 82,60/52,40	101,40/62,20 82,60/52,40	101,40/62,20 117,60/70,60	71,40/45,00 117,60/70,60	71,40/45,00 82,60/52,40	101,40/62,20 82,60/52,40	101,40/62,20 117,60/70,60	101,40/62,20 117,60/70,60	
Starting current	A	261,2/150 281,2/158,7	349,2/203,6 281,2/158,7	409,3/238,6 409,3/238,6	261,2/150 409,3/238,6	261,2/150 281,2/158,7	349,2/203,6 281,2/158,7	409,3/238,6 409,3/238,6	409,3/238,6 409,3/238,6	

### HYDRAULIC VERSION / HYDRONIC VERSION

Water pump:		V/f (50 Hz)	400 V / 3 Ph						
Nominal absorbed intensity	kW	1,17	1,17	1,55	1,55	1,17	1,17	1,55	1,55
Max. current	A	2,1	2,1	2,8	2,8	2,1	2,1	2,8	2,8

## 1.- GENERAL CHARACTERISTICS

### 1.2.- ELECTRICAL DATA.

### HEAT PUMP UNITS R-22

EAH MODELS		0091SA	0111SA	0151SA	0191SA	0211SA
Voltage	V/f (50 Hz)	230 V / 1 Ph				
		230 - 400V / 1 Ph				
<b>Nominal consumption</b>						
Compressor (cooling cycle)	kW	2,80	3,27	4,02	5,29	6,00
Compressor (heating cycle)	kW	2,71	3,31	3,98	5,29	6,01
Fan	kW	0,15	0,30	0,32	0,30	0,28
Total power in cooling cycle	kW	2,95	3,57	4,34	5,59	6,28
Total power in heating cycle	kW	2,86	3,61	4,30	5,59	6,29
<b>Max. absorbed intensity</b>		19,63	18,36/10,86		26,86/16,86	
Compressor	A	13,13/7,93		22,27/13,17		27,06/16,06
Fan	A	0,70	1,40	1,49	1,40	1,30
Total current	A	20,33 13,83/8,63	19,76/12,26	23,76/14,66	28,26/18,26	28,36/17,36
<b>Starting current</b>	<b>A</b>	101,63 81,63/47,63	89,26/52,26	117,26/ 68,26	177,26/103,26	176,26/101,26

### HYDRAULIC VERSION / HYDRONIC VERSION

Water pump:	Voltaje	V/f (50 Hz)	230 V / 1 Ph			400 V / 3 Ph	
<b>Nominal absorbed intensity</b>		<b>kW</b>	0,49	0,49	0,49	0,72	0,72
<b>Max. current</b>		<b>A</b>	2,3	2,3	2,3	1,4	1,4

EAH MODELS		0251SA	0291SA	0351SA	0431SA	0472SA	0552SA	0672SA	0812SA
Voltage	V/f (50 Hz)	230 - 400V / 1 Ph							
<b>Nominal consumption</b>									
Compressor (cooling cycle)	kW	7,73	8,89	10,86	13,44	15,31	17,60	21,49	26,62
Compressor (heating cycle)	kW	7,41	8,21	10,22	12,92	14,67	16,26	20,23	25,58
Fan	kW	0,75	0,90	0,85	0,83	1,50	1,80	1,70	1,66
Total power in cooling cycle	kW	8,48	9,79	11,71	14,27	16,81	19,40	23,19	28,28
Total power in heating cycle	kW	8,16	9,11	11,07	13,75	16,17	18,06	21,93	27,24
<b>Max. absorbed intensity</b>		32,70/19,50	47,23/27,63		64,39/37,99		93,46/54,26		
Compressor	A	37,60/22,50		56,42/22,92		74,19/43,99		109,84/62,84	
Fan	A	3,50	4,20	3,97	2,88	1,50	1,80	1,70	1,66
Total current	A	36,20/23,00 41,80/26,70	51,20/31,60	59,30/35,80	71,40/45,00	82,60/52,40	101,40/62,20	117,60/70,60	
<b>Starting current</b>	<b>A</b>	226/128 241/133	299/173	351/204	261,2/150	281,2/158,7	349,2/203,6	409,3/238,6	

### HYDRAULIC VERSION / HYDRONIC VERSION

Water pump:	V/f (50 Hz)	400 V / 3 Ph							
<b>Nominal absorbed intensity</b>	<b>kW</b>	0,72	0,72	1,0	1,0	1,17	1,17	1,55	1,55
<b>Max. current</b>	<b>A</b>	1,4	1,4	1,7	1,7	2,1	2,1	2,8	2,8

## 1.- GENERAL CHARACTERISTICS

### 1.3.- COMPONENT

The Ecolean system comprises a water cooler or air/water pump combined with a series of hydraulic accessories obtaining the hydraulic or hydronic version.

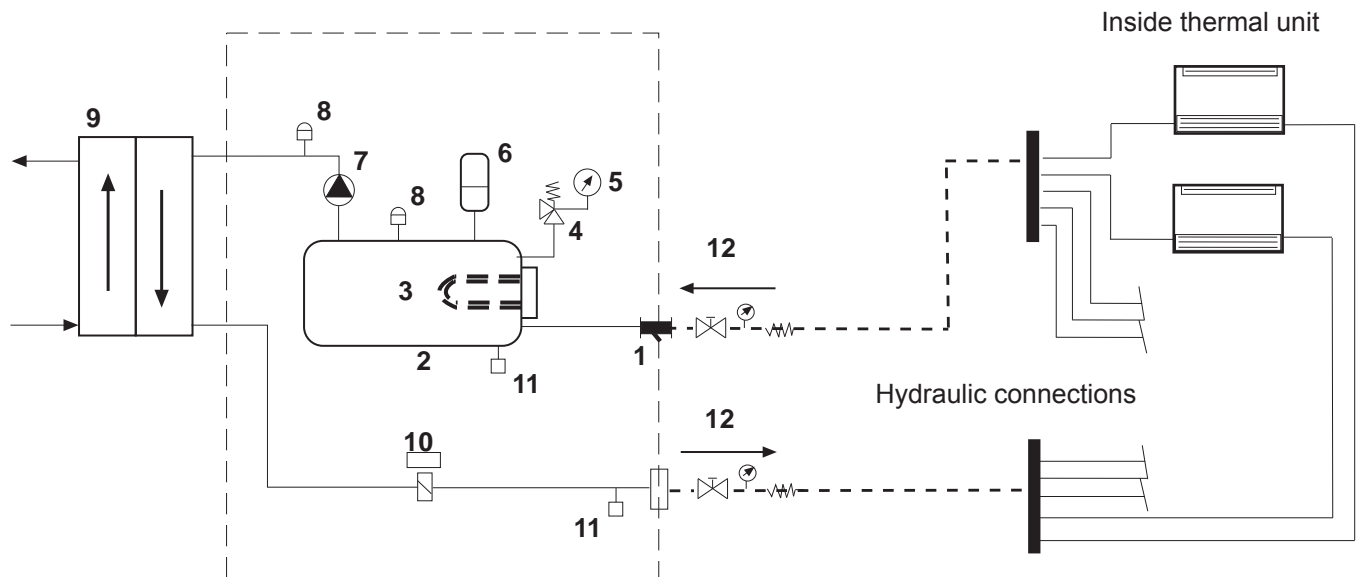
COMPONENT:

HYDRONIC VERSION: 1,2,3,4,5,6,7,8,9,10, 11

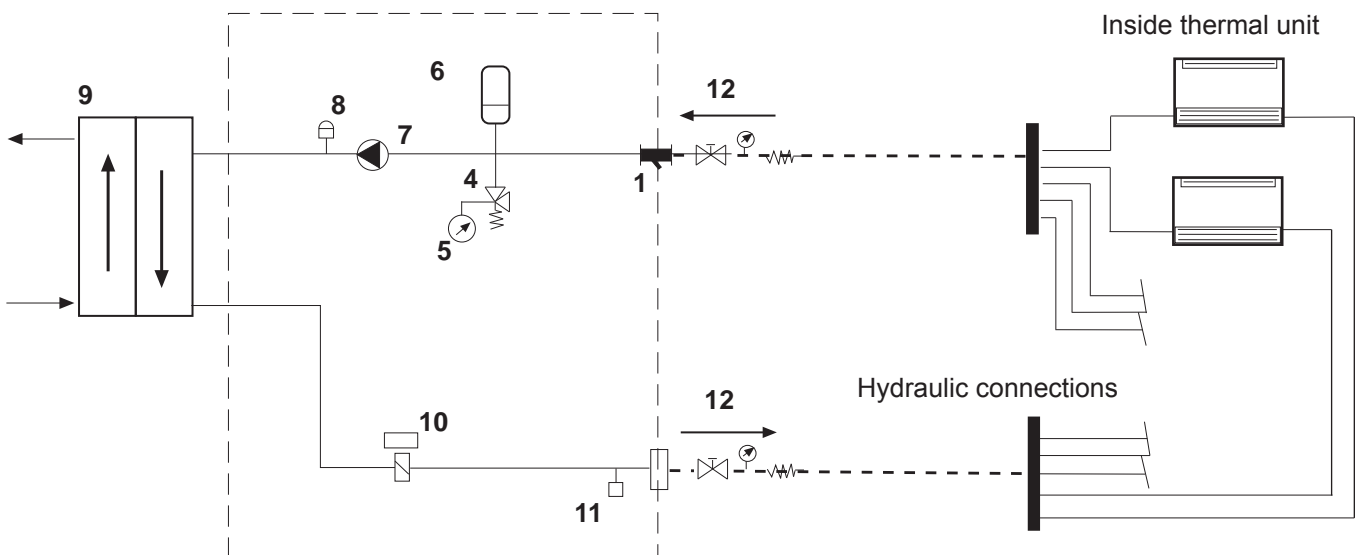
HYDRAULIC VERSION: 1,4,5,6,7,8,9,10,11

- |                                   |                     |
|-----------------------------------|---------------------|
| 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.- Cut off valve  |

### HYDRONIC VERSION



### HYDRAULIC VERSION



## 1.- GENERAL CHARACTERISTICS

### 1.4.- OPERATION LIMITS

#### COOLING OPERATION

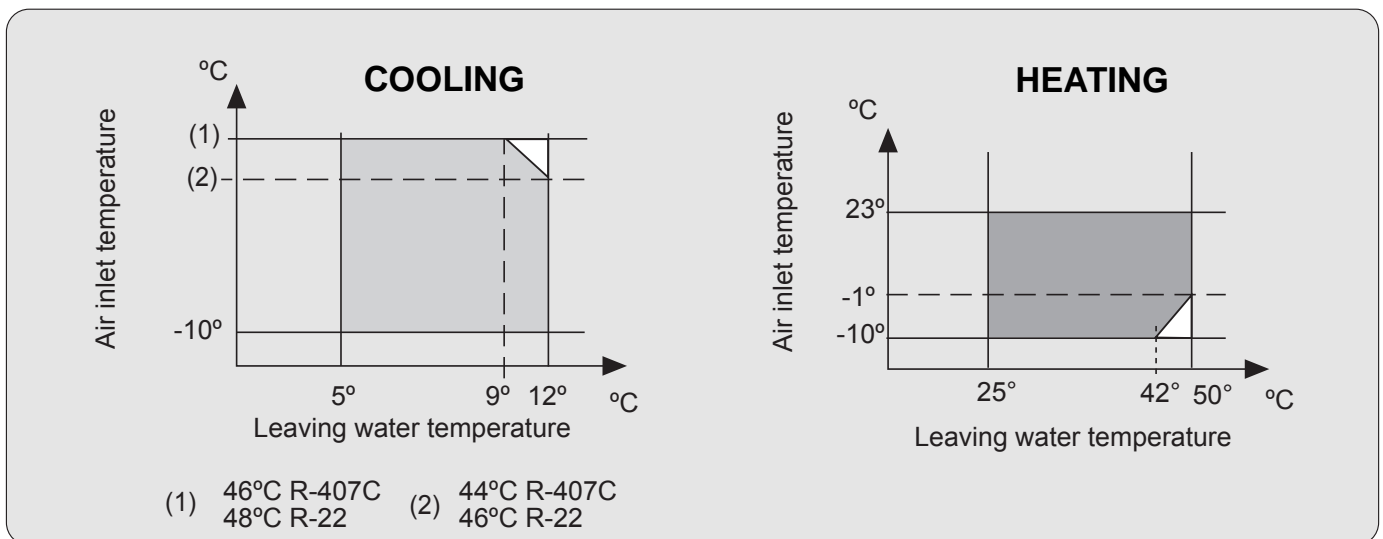
TYPE	EAC / EAR	0091S	0111S	0151S	0191S	0211S	0251S	0291S	0351S	0431S	0472S	0552S	0672S	0812S
Leaving chilled water temperature		Minimum : +5°C Maximum : +12°C												
Chilled water entering temperature		Minimum : +10 °C Maximum : +17°C												
Air inlet temperature	R-407C	Minimum : -10°C Maximum : +46°C												
	R-22	Minimum : -10°C Maximum : +48°C												

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

#### HEATING OPERATION

TYPE	EAR	0091S	0111S	0151S	0191S	0211S	0251S	0291S	0351S	0431S	0472S	0552S	0672S	0812S
Hot water leaving temperature (operation)		Minimum : +25°C Maximum : +50°C												
Hot water entering temperature (start)		Minimum : +10 °C Maximum : +43°C												
Differenced hot water inlet/outlet		Minimum : +3°C Maximum : +8°C												
Air inlet temperature		Minimum : -10°C Maximum : +23°C												

OUTSIDE THESE VALUES, PLEASE CONSULT US.



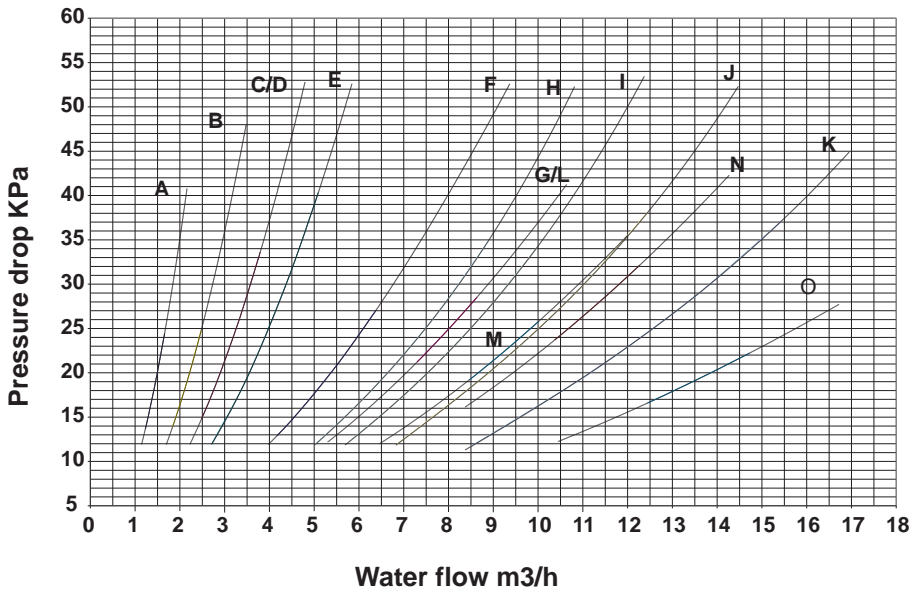
NOTE: With foreign outdoor temperatures below +5°C, add glycol

The unit incorporates as standard a fan speed control, which allow the unit to operate at very low outside temperatures, until -10°C.

# 1.- GENERAL CHARACTERISTICS

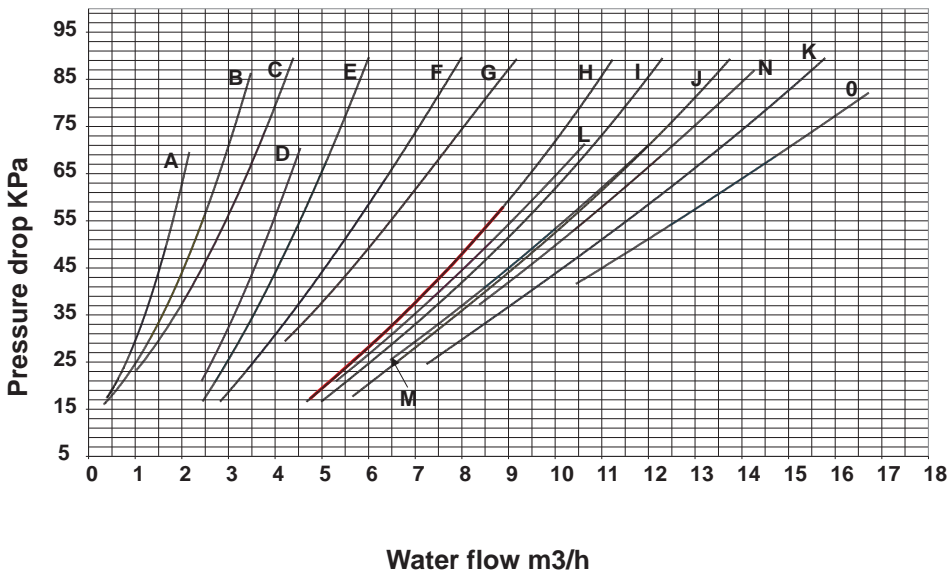
## 1.5.-PRESSURE DROP IN THE WATER SYSTEM

**PRESSURE DROP IN WATER EXCHANGER (BASIC UNIT)**



Unit	Curve
EAC/EAR 0091S	A
EAC/EAR 0111S	A
EAC/EAR 0151S	B
EAC/EAR 0191S	B
EAC/EAR 0211S	C
EAC/EAR 0251S	D
EAC/EAR 0291S	E
EAC/EAR 0351S	F
EAC/EAR 0431S	G
EAC 0472S	L
EAR 0472S	H
EAC 0552S	M
EAR 0552S	I
EAC 0672S	N
EAR 0672S	J
EAC 0812S	O
EAR 0812S	K

**PRESSURE DROP WATER EXCHANGER+WATER FILTER (\*)**



**INSTALLATION ADVISE**

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

(\*) Optional in basic version and series in hydronic and hydraulic version.



## 1.- GENERAL CHARACTERISTICS

### 1.6.-HYDRAULIC SYSTEM DATA.

WATER FLOW AND AVAILABLE STATIC PRESSURE (with standard water pump, factory supplied)

	MODEL	EAC / EAR 009 1S K-A					EAC / EAR 011 1S K-A					EAC / EAR 015 1S K-A				
Water flow	l/s	0,33	0,37	0,41	0,45	0,49	0,41	0,45	0,49	0,53	0,60	0,49	0,53	0,57	0,61	0,72
	m3/h	1,19	1,33	1,48	1,62	1,76	1,48	1,62	1,76	1,91	2,16	1,76	1,91	2,05	2,20	2,59
Available static pressure	kPa	222	215	208	193	182	204	193	178	166	153	200	186	181	170	140

	MODEL	EAC / EAR 019 1S K-A					EAC / EAR 021 1S K-A					EAC / EAR 025 1S K-A				
Water flow	l/s	0,67	0,71	0,75	0,79	0,97	0,73	0,77	0,81	0,85	1,06	0,89	0,99	1,09	1,19	1,29
	m3/h	2,41	2,56	2,70	2,84	3,49	2,63	2,77	2,92	3,06	3,82	3,20	3,56	3,92	4,28	4,64
Available static pressure	kPa	181	175	168	160	139	184	176	165	155	128	182	162	143	132	115

	MODEL	EAC / EAR 029 1S K-A					EAC / EAR 035 1S K-A					EAC / EAR 043 1S K-A				
Water flow	l/s	1,02	1,12	1,22	1,32	1,49	1,26	1,36	1,46	1,56	1,83	1,52	1,62	1,72	1,82	2,21
	m3/h	3,67	4,03	4,39	4,75	5,36	4,54	4,90	5,26	5,62	6,59	5,57	5,83	6,19	6,55	7,96
Available static pressure	kPa	168	155	139	120	102	208	192	178	148	108	167	141	135	119	25

	MODEL	EAR 047 2S K-A					EAR 055 2S K-A					EAR 067 2S K-A				
Water flow	l/s	1,73	1,93	2,13	2,32	2,52	2,01	2,21	2,41	2,60	2,92	2,46	2,66	2,86	3,05	3,58
	m3/h	6,23	6,94	7,65	8,36	9,07	7,24	7,95	8,66	9,37	10,51	8,86	9,57	10,28	10,99	12,89
Available static pressure	kPa	164	149	138	123	113	151	141	132	116	97	227	213	192	169	119

	MODEL	EAR 081 2S K-A					EAC 047 2S K					EAC 055 2S K				
Water flow	l/s	2,95	3,15	3,35	3,54	4,30	1,73	1,93	2,13	2,32	2,52	2,01	2,21	2,41	2,60	2,92
	m3/h	10,62	11,33	12,04	12,75	15,48	6,23	6,94	7,65	8,36	9,07	7,24	7,95	8,66	9,37	10,51
Available static pressure	kPa	199	185	169	139	42	166	151	140	130	118	154	145	137	119	108

	MODEL	EAC 067 2S K					EAC 081 2S K				
Water flow	l/s	2,46	2,66	2,86	3,05	3,58	2,95	3,15	3,35	3,54	4,30
	m3/h	8,86	9,57	10,28	10,99	12,89	10,62	11,33	12,04	12,75	15,48
Available static pressure	kPa	229	214	195	173	126	205	192	177	148	55

NOTE: The flow data indicated in table are between a minimum and a maximum water flow.

Unit conversion

Pressure 1KPa = 1/9,8 m.c.a. = 0,01 bar □

1 bar = 10 m.c.a. = 100 kPa

#### MINIMUM WATER FLOW

The installation never must operate with less than the minimum water flow to the minimal (see table). since this can cause: □

- i. - Ice at the water exchanger □
- ii. -The water exchanger gets dirty.

#### MAXIMUM WATER FLOW

See maximum water flow, indicated in table. Furthermore always it must assure a minimal  $\Delta T$  to the exchanger of 3K..

#### MAXIMUM WATER VOLUME IN THE INSTALLATION.

The units with hydronic or hydraulic module include a expansion vessel, which limit the volume in the installation. The table indicate, maximum water volume.

Type	009/021	025/043	047/081
Solution	Water volume in liters	Water volume in liters	Water volume in liters
Water	225	550	850
Water + 10% gyt	175	400	650
Water + 20% gyt	150	350	575
Water + 30% gyt	125	300	450

In case the water volume of the installation may be superior hat he indicated on the table, is necessary to add another expansion vessel.

## 1.- GENERAL CHARACTERISTICS

### 1.7.-SAFETY DEVICES



**It is strictly forbidden to change or remove a safety device.**

When a safety device is activated, qualified personnel must control the unit and rectify the problem.

**Note:** Before resetting a safety device, the cause of the problem must be found and rectified before the unit can be restarted.

The Hydron system contains various safety devices. These devices can be divided into three groups:

- 1.- Electrical safety devices
- 2.- Cooling system safety devices
- 3.- Water system safety devices

They protect the unit's operation under both normal and abnormal conditions.

#### ELECTRICAL SAFETY DEVICES

The control system is protected against overloads and short circuits by a magnetic-thermal switch. The compressor is also protected against overloads and short circuits by an internal safety device and the external thermal relay. When the current drops below the set level these devices are automatically enabled, except for the thermal relay which is manually enabled. The fan motors are also protected by an internal device. If the motor coil temperature reaches a set value, the isolator cuts the control circuit.

#### Units

ADJUSTMENTS		0091S	0111S	0151S	0191S	0211S	0251S	0291S	0351S	0431S	0472S	0552S	0672S	0812S
Compressor fuses	A (230)I	1X32	--	--	--	--	--	--	--	--	--	--	--	--
	A (230)III	3X20	3X25	3X25	3X32	3X40	3X40	3X50	3X62	3X80	6x40	6x50	6x63	6x80
	A (400)III	3X10	3x16	3x16	3x20	3x20	3x25	3x25	3x32	3x40	6x25	6x25	6x32	6x40
Water pump fuses	A (230)I	1x6	1x6	1x6	3x6	3x6	3x6	3x6	3x6	3x6	3x6	3x6	3x6	3x6
Fan fuses	A (230)I	--	--	--	--	--	--	--	--	--	1x16	1x16	1x16	1x16

#### COOLING SYSTEM SAFETY DEVICES

##### Pressure switches

To avoid high pressure in the cooling system liable to damage the unit, a high pressure switch, an electric (Push RESET in the controller to reset) safety device located in the top part of the cooling system, is incorporated. An automatic (electrical reset, if 2 sets in 1 hour occurs) low pressure switch in the bottom section of the system prevents the unit from operating under excessive low pressure conditions. The heating pump coolers have two low pressure switches because the minimum pressure in heating mode is much lower than in cooling mode. The low pressure switches are fitted with a time delay.

ADJUSTMENTS		Units	(*)
High switch pressostat	set	bar	27,5
	reset	bar	22
Low switch pressostat cool cycle	set	bar	2,7
	reset	bar	3,2
High switch pressostat heat cycle	set	bar	0,5
	reset	bar	1,5
Low switch pressostat temporizador		minutes	2'

(\*) Values for all models

## 1.- GENERAL CHARACTERISTICS

### 1.7.-SAFETY DEVICES

#### **WATER SYSTEM SAFETY DEVICES (Included in units with hydraulic or hydronic module)**

These units contains various safety devices, in order to avoid the water reaches low temperatures so it may cause a damage to the system.

##### **1.- Flow switch (optional for basic unit).**

Stop the unit if water flow is under limits. Operating with water flow under limits is completely forbidden.

##### **2.- Water filter (optional for basic unit).**

the water filter protect the unit against particules getting inside the circuit. The units must be fitted with a water filter



IT IS NECCESARY FIT A WATER FILTER IN THE INLET WATER OF THE UNIT

##### **3.- Anti-freeze protection:**

This protection is activated by the control of the unit.

It comes on when the outlet water temperature probe (ST2), located inside the water interchanger, measures +5°C and get's off when the outlet water temperature reaches to +6°C again.

When the protection is activated occurs as follow:

If the unit is on STAND-BY as the operating mode: the water pump goes on, the same happen with electrical heater of water interchanger and electrical heater of water tank (if included)



NO TURN OFF THE UNIT, DURING A LOW PERIOD OF TIME WITHOUT USING THE UNIT, INSTEAD OF THIS SELECT STAND-BY AS THE UNIT'S OPERATING MODE, SO THE UNIT IS PROTECTED BY THE ANTI-FREEZE SAFETY DEVICE.

- If the unit is operating on cooling mode: Feed the electrical heater of water tank, the electrical heater of the water interchanger, and activates the hot gas injection valve (if the unit incorporates this optionals)

- If the unit is operating on heating mode:

Feed the electrical heater of water tank and the electrical heater of the water interchanger (if the unit incorporates this optionals)

##### **4.- Anti-freeze alarm.**

This alarm activates when the outlet water temperature probe (ST2) measures a value lower than +3°C, as a consequence the unit goes off. The alarm could be reset when outlet water temperature reaches +8 °C.

### **OTHER PROTECTIONS**

#### **Crank case heater compressor.**

Located around compressor, this protection is activated during the period, the compressor stops, so keep the compressor oil temperature on adecuatted conditions, protecting from the refrigerant into the compressor oil cabinet.

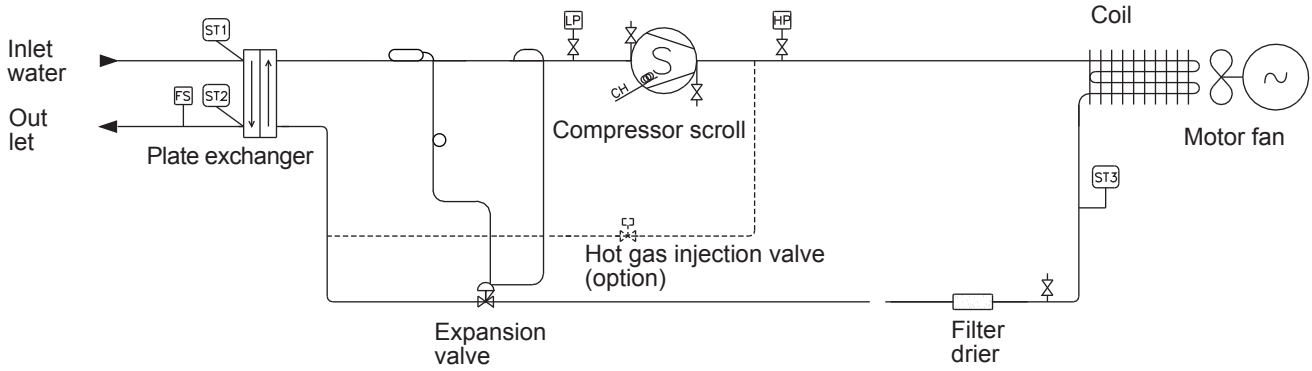


DO NOT TURN OFF THE UNIT OFF, SO THIS PROTECTION CAN OPERATES

# 1.- GENERAL CHARACTERISTICS

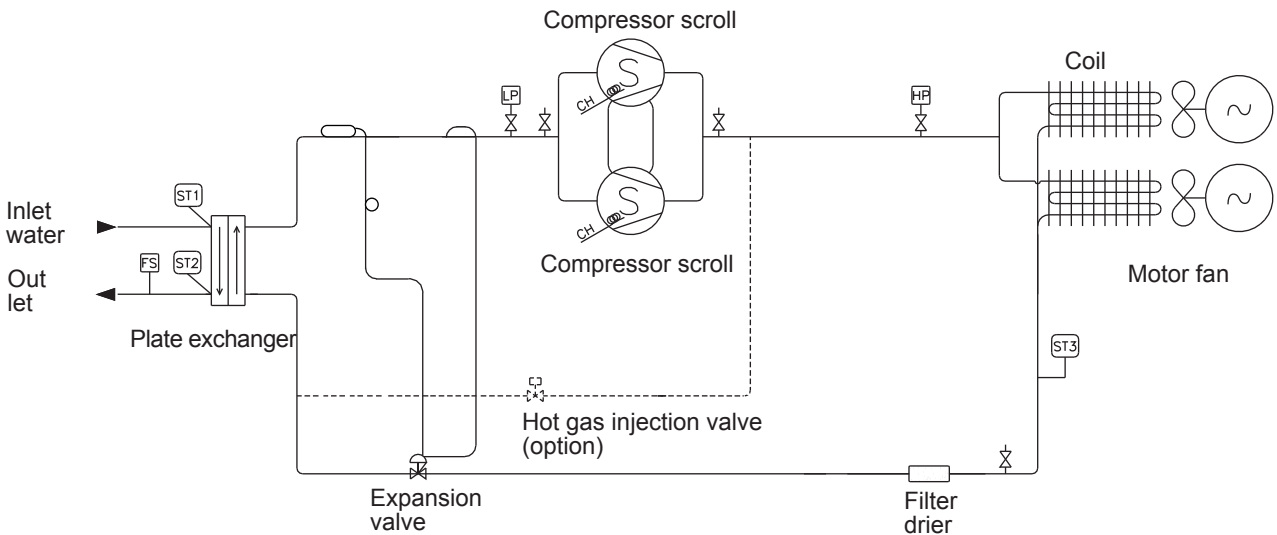
## 1.8.-PIPING DRAWINGS

### COOLING ONLY UNITS EAC 0091S A 0431S



- ⊗ Pressure gauge
- FS Flow switch (option in basic version)
- ST1 Inlet water probe (inlet water regulation)
- ST2 Outlet water probe (anti-freeze protection)
- ST3 Coil probe (fan speed regulation)
- LP Low switch pressostat
- HP High switch pressostat
- CH Crank case heater

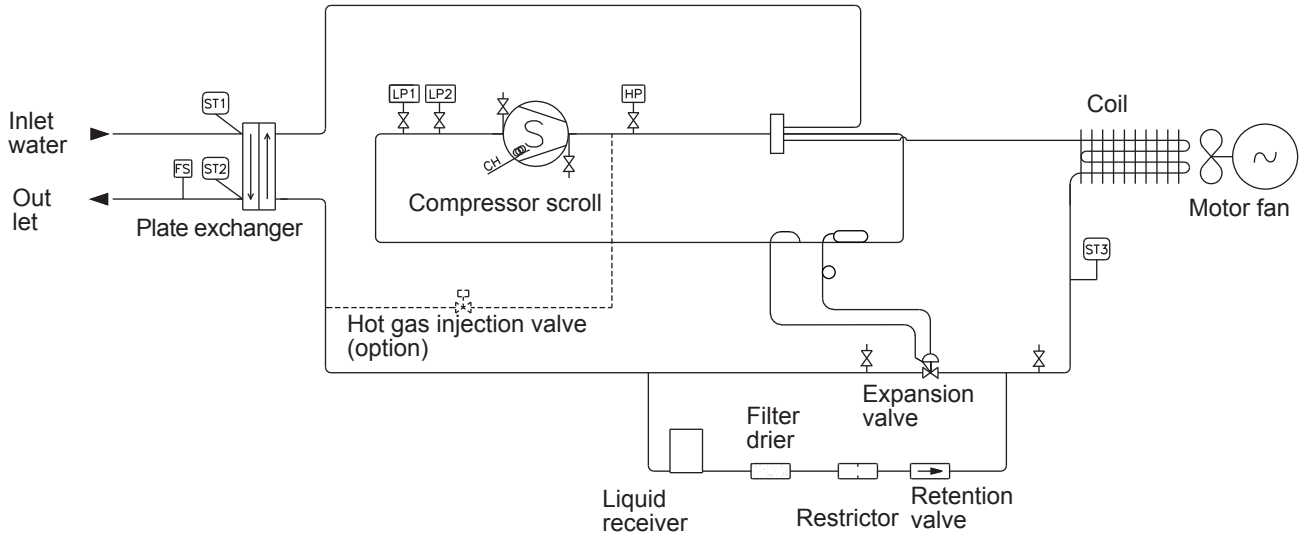
### COOLING ONLY UNITS EAC 0472S A 0812S



# 1.- GENERAL CHARACTERISTICS

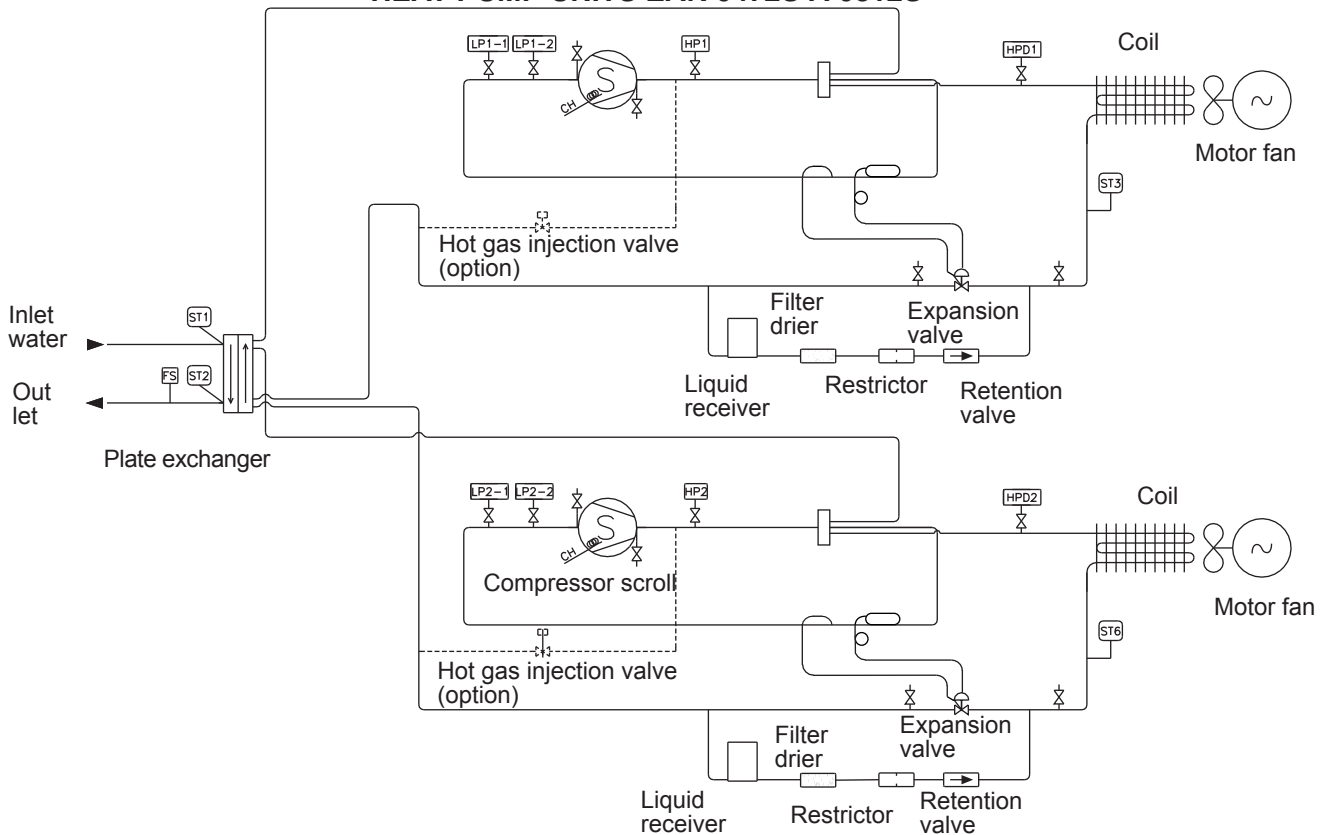
## 1.8.-PIPING DRAWINGS

### HEAT PUMP UNITS EAR 0091S A 0431S



- |  |   |  |   |
|--|---|--|---|
|  | Pressure gauge  |  | Low switch pressostat cooling cycle circuit 1 |
|  | Flow switch (option in basic version)                                   |  | Low switch pressostat heating cycle circuit 1 |
|  | Inlet water probe (inlet water regulation)                              |  | Low switch pressostat cooling cycle circuit 2 |
|  | Outlet water probe (anti-freeze protection)                             |  | Low switch pressostat heating cycle circuit 2 |
|  | Coil probe circuit 1 (fan speed regulation and defrost heat pump units) |  | High switch pressostat                        |
|  | Coil probe circuit 2 (fan speed regulation and defrost heat pump units) |  | High switch pressostat circuit 1              |
|  | Low switch pressostat cooling cycle                                     |  | High switch pressostat circuit 2              |
|  | Low switch pressostat heating cycle                                     |  | End defrost pressostat circuit 1              |
|  | Crank case heater   |  | End defrost pressostat circuit 2              |

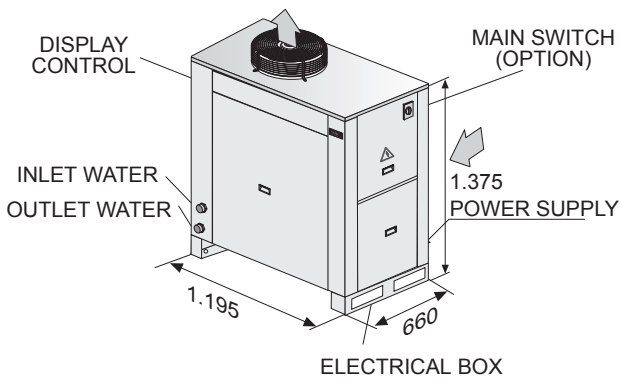
### HEAT PUMP UNITS EAR 0472S A 0812S



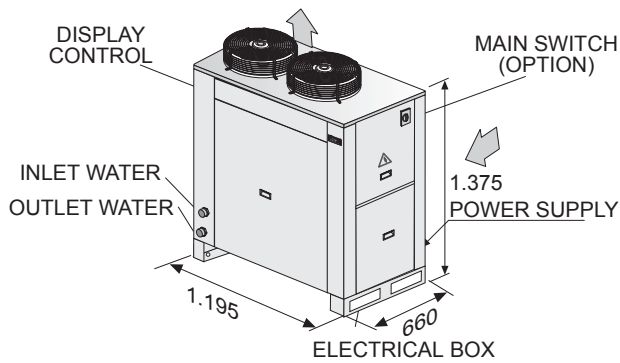
# 1.- GENERAL CHARACTERISTICS

## 1.9.- DIMENSIONS

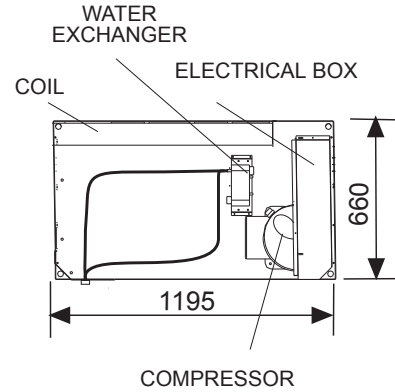
**EAC/EAR  
0091S**



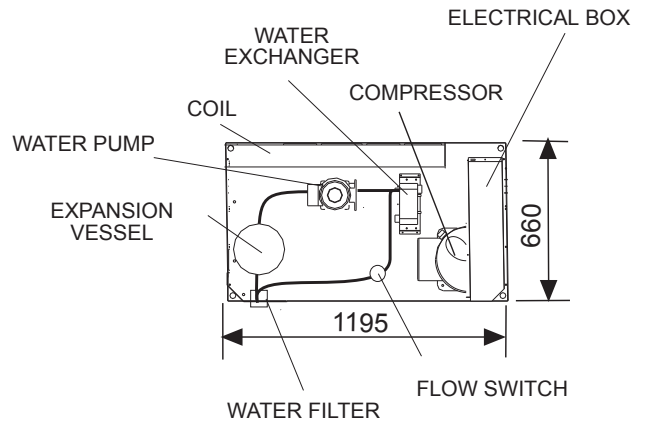
**EAC/EAR  
0111S-0151S-0191S-0211S**



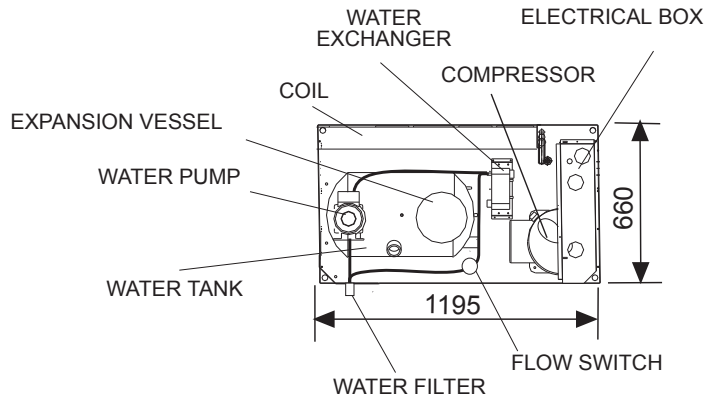
**COMPONENT DISPOSITION  
STANDARD UNIT**



**COMPONENT DISPOSITION  
STANDARD UNIT WITH  
HYDRAULIC MODULE**



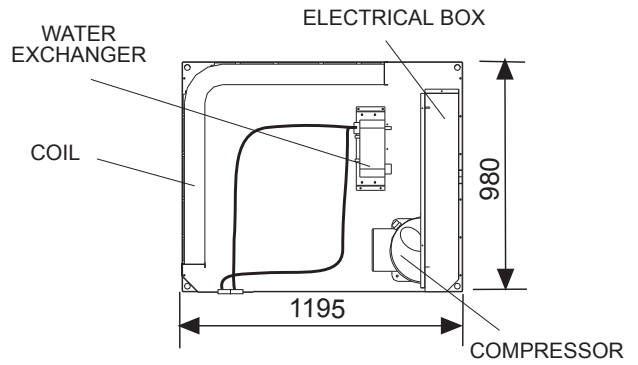
**COMPONENT DISPOSITION  
STANDARD UNIT WITH  
HYDRONIC MODULE**



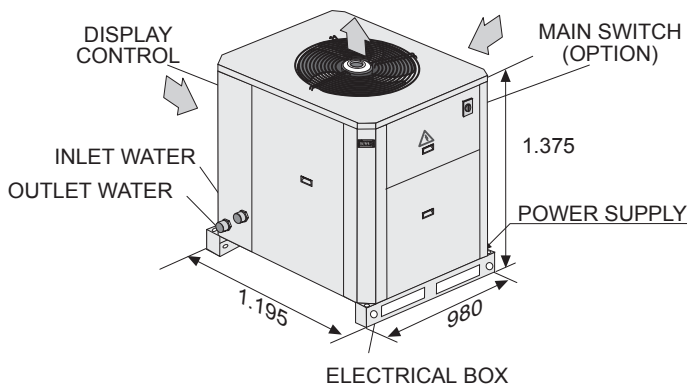
# 1.- GENERAL CHARACTERISTICS

## 1.9.- DIMENSIONS

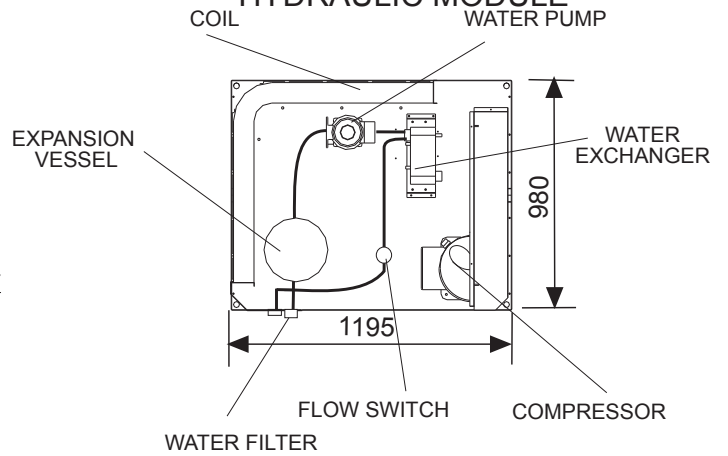
### COMPONENT DISPOSITION STANDARD UNIT



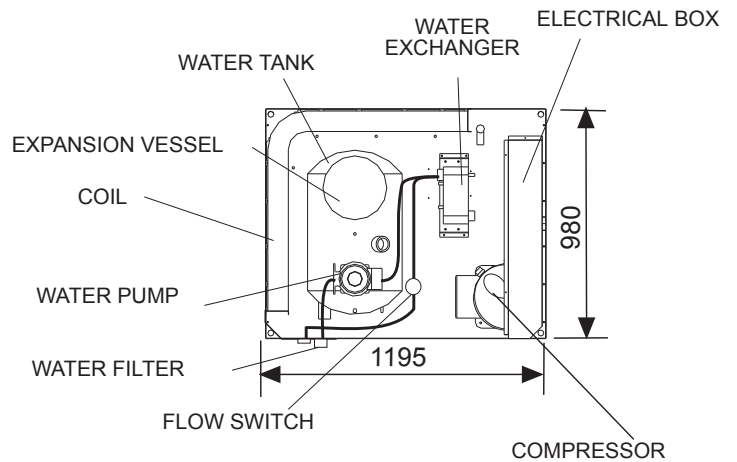
### EAC/EAR 0251S-0291S-0351S-0431S



### COMPONENT DISPOSITION STANDARD UNIT WITH HYDRAULIC MODULE

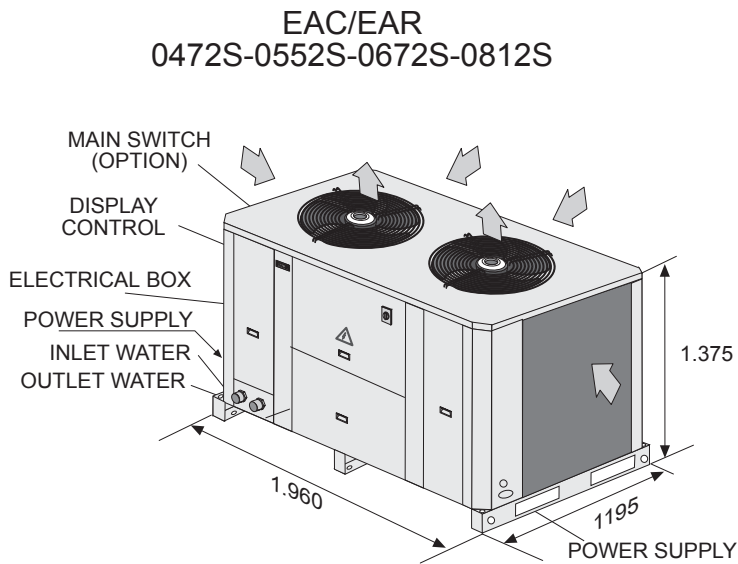


### COMPONENT DISPOSITION STANDARD UNIT WITH HYDRONIC MODULE

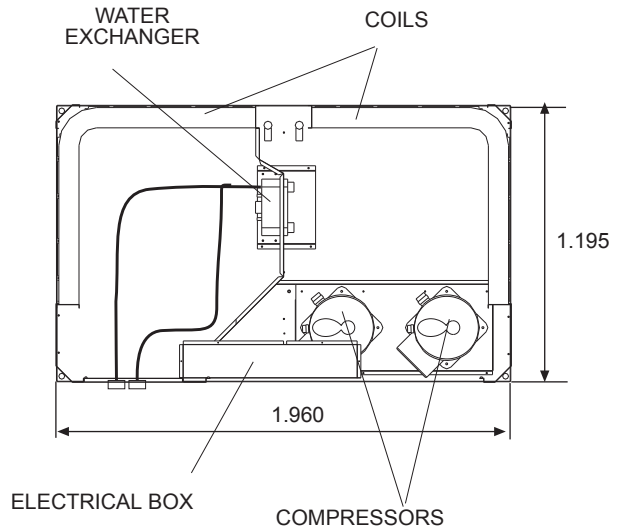


# 1.- GENERAL CHARACTERISTICS

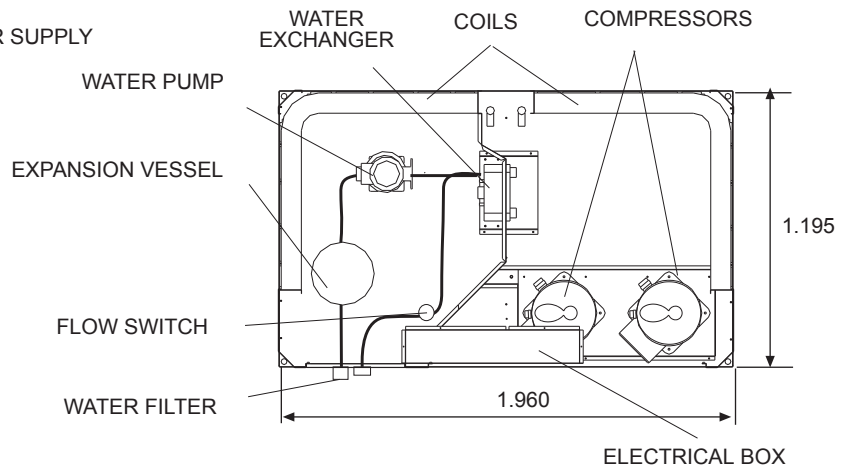
## 1.9.- DIMENSIONS



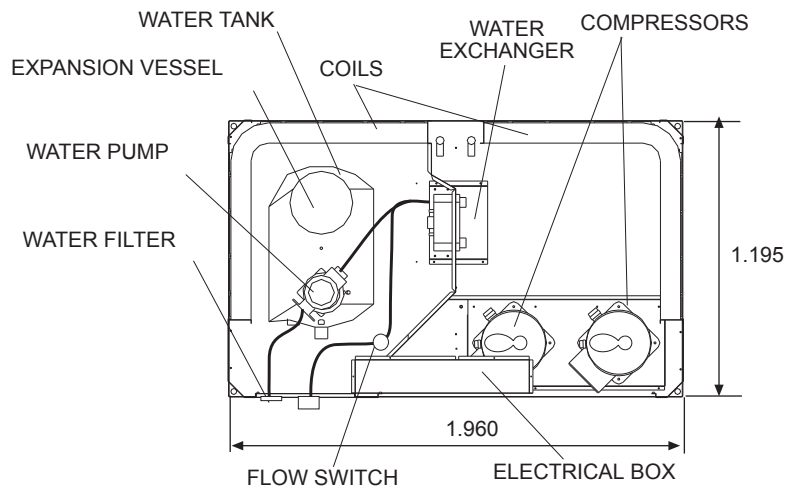
**COMPONENT DISPOSITION  
STANDARD UNIT**



**COMPONENT DISPOSITION  
STANDARD UNIT WITH  
HYDRAULIC MODULE**



**COMPONENT DISPOSITION  
STANDARD UNIT WITH  
HYDRONIC MODULE**





## 1.- GENERAL CHARACTERISTICS

### 1.10.- OPTIONALS

	Unit basic version	Unit hydraulic version	Unit hydronic version (1)
Main switch	X	X	X
Pack Flow switch + Water filter	X	Included	Included
Pack Water exchange heater + Protection grill coil	X	X	X
Hot gas injection valve	X	X	X
Protection grill coil	X	X	X
Three phases detected	X	X	X
Gauges	X	X	X
Precoated coil	X	X	X
Remote controller	X	X	X
Cut off water valves	X	X	X
Rubbers dampers	X	X	X
Kit low noise	X	X	X
Water pump	X	Included	Included
Water tank electrical heater	not available	not available	X

X Optional element

(1) Water tank included



NOTE: All the optional will be supplied and mounted in the unit, except the water filter, cut off valves, Rubber dampers and remote controller supplied to mount in the moment of installation.

#### MAIN SWITCH

located at the electrical box of the unit.

#### PACK FLOW SWITCH + WATER FILTER ( Included on hydraulic and hydronic versions)

The folw switch stops the unit if water flow is lower than the minimum.

#### PACK WATER EXCHANGE HEATER + PROTECTION GRILL COIL.

The water exchange heater prevents the water exchange from low temperatures.

The protection grill coil prevent coils from beats when traveling or during operating.

#### HOT GAS INJECTION VALVE

Inject hot gas to water exchange when water temperature is too low. Is advisable to use when outside ambient temperature is bellow + 5 °C. It is activated through the control of the unit (+ 5 °C water temperature gets ON/ + 6 °C water temperature gets OFF).

#### THREE PHASES DETECTED

Located at the electrical box of the unit, it assures that unit will not start if connection phases of compressor.

#### GAUGES

Visualize the high and low pressures of the refrigerant circuit.

#### PRECOATED COIL

Special protection of the aluminum fin, to prevent it from aggressive ambient.

#### REMOTE CONTROLLER

Controls and visualizes the unit's operating, it may be installed until 50 m from the unit.

## 1.- GENERAL CHARACTERISTICS

### 1.9.- OPTIONALS

#### CUT OFF WATER VALVES:

to fit at inlet and outlet water of the unit. Isolating the unit from water circuit, so service and maintenance of the unit will be easier.

#### RUBBER DAMPERS:

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

#### COMPRESSOR LOW NOISE:

Though an isolating material around the compressor, produce an attenuation of the noise for the unit.

WATER PUMP (included on hydraulic and hydronic versions).

**ANTI-FREEZE HEATER AND SUPPLEMENTARY:** An immersion heater can be supplied complete with safety thermostat and pressostat fitted in the buffer tank, or an anti-freeze and supplementary heater ( heat pump units only).

**Anti-freeze heater:** cooling only and heat pump units. It starts when water temperature in the buffer tank is lower than + 5 °C

**Anti-freeze and supplementary 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 valve selected (example; 30 °C through a independent thermostat included.

Power consumption is:

Type	009/021	025/043	047/081
Voltage <input type="checkbox"/> v.	230/I		
	230/III - 400/III		
Anti-freeze heater <input type="checkbox"/> kW.	2,25	2,25	2,25
anti-freeze and supplementary heater* <input type="checkbox"/> kW.	6	9	12

(\*) Only in heat pump units

## 2.- INSTALLATION

### 2.1.- PRELIMINARY PREPARATIONS



**All INSTALLATION, SERVICE and MAINTENANCE operations must be carried out by QUALIFIED PERSONNEL.**

The unit must be transported in a HORIZONTAL POSITION on its metal bedplate profiles . Any other position may cause serious damage to the machine.

When the unit is received, it should be checked to assure that there are no bumps or other damage, following the instructions on the packaging. If there is damage, the unit may be rejected by notifying the LENNOX Distribution Department and reporting why the machine is unacceptable on the transport agent's delivery notice. Any later complaint or claim made to the LENNOX Distribution Department, for this type of anomaly, cannot be considered under the Guarantee.

Sufficient space must be allowed to facilitate placement of the unit. The unit may be mounted outdoors. There should be NO possibility of flooding if floor mounted.



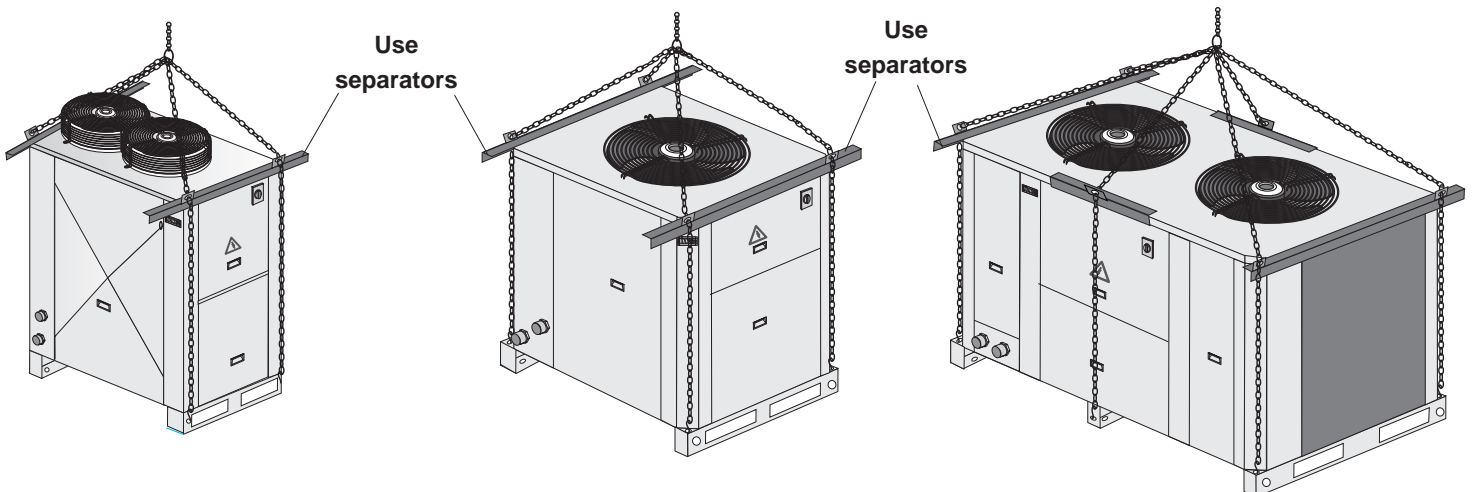
**When positioning the unit, be sure that the Rating Plate will always be visible since this data will be necessary to assure proper maintenance.**

It is advisable to unpack the unit at the place where the unit is going to be installed, to avoid damages during manage.

### 2.2.- UNIT RECEPTION

#### How to hoist the unit

If unloading and placement require the use of a crane, then secure the suspension cables as shown in the figure.

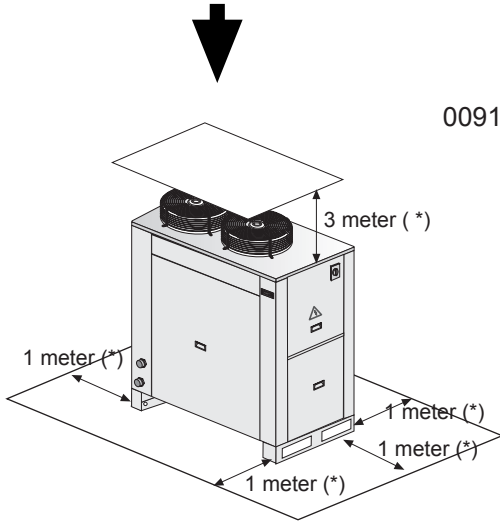


## 2.- INSTALLATION

### 2.3.- INSTALLATION CLEARANCES

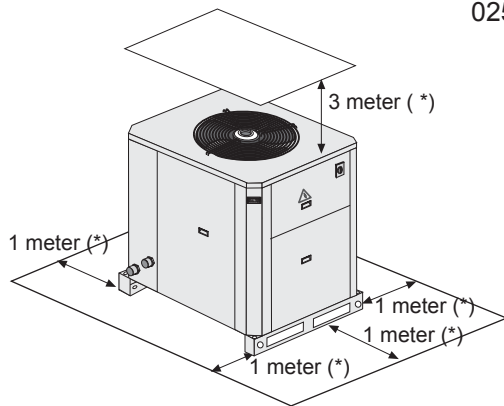
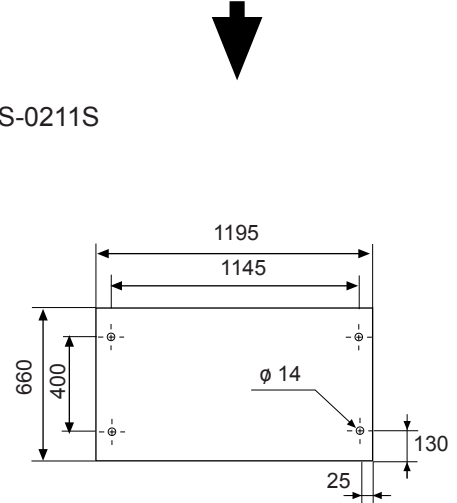
(\*) Clearance around the unit for service and maintenance.

#### INSTALLATION CLEARANCES

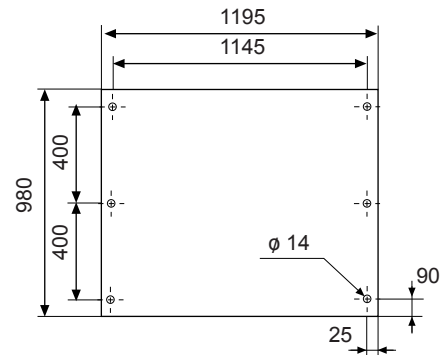


EAC/EAR  
0091S-0111S-0151S-0191S-0211S

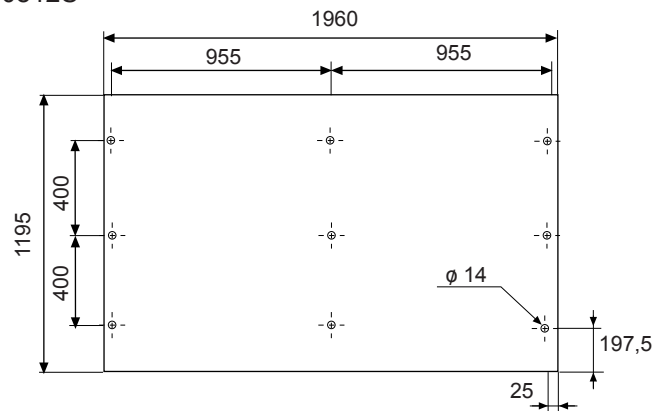
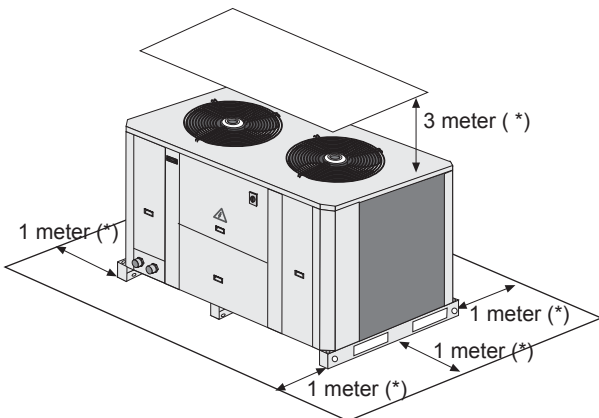
#### MOUNTING PLATES



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



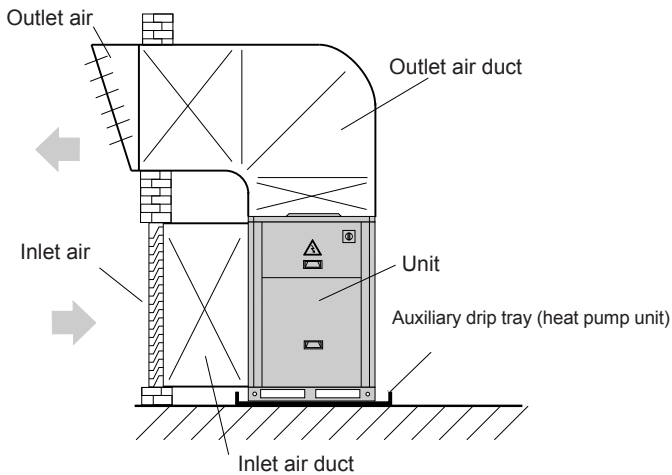
EAC/EAR  
0472S-0552S-0672S-0812S



Cotas en mm

## 2.- INSTALLATION

### 2.4.- UNIT INSTALLATION



#### LOCATION INSIDE

For location inside, keep in mind following advises:

-In heat pump units during defrost cycle, the units produce a great amount of water melting the ice of coils.

If you wish to displacement the water, an auxiliary drop tray, should to be installed behind the unit to collect and carry out water where desired.

-Air duct installation.

If air duct has been installed, the operating limits get reduced as follow.

#### MAXIMUM INLET AIR TEMPERATURE AN COEFFICIENTS FOR CORRECTION OF COOLING CAPACITY AND CONSUMPTION FOR COOLING UNIT AND HEAT PUMP UNITS ON COOLING CYCLE

	Available static pressure Pa	Description	R-407C models			R-22 models		
			0091S 0211S	0251S 0431S	0472S 0812S	0091S 0211S	0251S 0431S	0472S 0812S
UNIT WITH AIR DUCT	0	Maximum ambient temperature °C	46	46	46	48	48	48
		Correction coefficient capacity	1,00	1,00	1,00	1,00	1,00	1,00
		Correction coefficient consumption	1,00	1,00	1,00	1,00	1,00	1,00
UNIT WITHOUT AIR DUCT	30	Maximum ambient temperature °C	43	42	42	46	45	45
		Correction coefficient capacity	0,95	0,95	0,95	0,97	0,96	0,96
		Correction coefficient consumption	1,06	1,06	1,06	1,04	1,06	1,06
	50	Maximum ambient temperature °C	40	38	38	44	43	43
		Correction coefficient capacity	0,91	0,89	0,89	0,94	0,93	0,93
		Correction coefficient consumption	1,12	1,16	1,16	1,08	1,10	1,10

Apply the coefficients on the capacities and consumption showed on the application guide.

#### MINIMUM INLET AIR TEMPERATURE AN COEFFICIENTS FOR CORRECTION OF COOLING CAPACITY AND CONSUMPTION FOR COOLING UNIT AND HEAT PUMP UNITS ON HEATING CYCLE

	Available static pressure Pa	Description	R-407C models			R-22 models		
			0091S 0211S	0251S 0431S	0472S 0812S	0091S 0211S	0251S 0431S	0472S 0812S
UNIT WITH AIR DUCT	0	Maximum ambient temperature °C	-10	-10	-10	-10	-10	-10
		Correction coefficient capacity	1,00	1,00	1,00	1,00	1,00	1,00
		Correction coefficient consumption	1,00	1,00	1,00	1,00	1,00	1,00
UNIT WITHOUT AIR DUCT	30	Maximum ambient temperature °C	-8	-8	-8	-8	-8	-8
		Correction coefficient capacity	0,94	0,94	0,94	0,94	0,94	0,94
		Correction coefficient consumption	1,01	1,02	1,02	1,01	1,02	1,02
	50	Maximum ambient temperature °C	-6	-6	-6	-6	-6	-6
		Correction coefficient capacity	0,89	0,89	0,89	0,89	0,89	0,89
		Correction coefficient consumption	1,03	1,03	1,03	1,03	1,03	1,03

Apply the coefficients on the capacities and consumption showed on the application guide.

---

## 2.- INSTALLATION

### 2.4.- UNIT INSTALLATION

- 1.- The ECOLEAN unit must be installed outside.
- 2.- See the minimum clearance diagrams for access - air supply to the batteries in the heating section of the unit. (see page 15)
- 3.- Assemble the unit on a resistant base, preferably concrete. To prevent vibrations the concrete base should not come into contact with the building's foundations.
- 4.- It is advisable to assemble the unit on shock absorbers.
- 5.- During heating mode (heating pump coolers) ice forms in the coils. The defrost process is activated during heating mode in heat pump units, when the outside temperature is low and the outdoor coil could become frozen.

To melt the ice the defrost function will switch the unit to cooling operation for a short period.. When the evaporation temperature starts to drop a defrost period sets in to provide sufficient heat transfer. During defrosting the ice melts from the batteries. As a result the ice contains water which must be removed



If the outside temperature in the area where the unit, is to be installed is likely to drop below 0°C, it may necessary to install a electrical heater, below the coils, which avoid the causing of ice in the coil.

- 6.- The water flow during cooling must be the same as during heating.
- 7.- Fit a water filter in the unit inlet



It is obligatory to install a mesh filter in units not equipped with hydronic or hydraulic module  
The step of the mesh should not be superior to 1 mm.

- 8.- Use a decalcifying agent if necessary.
- 9.- the inlet water to the circuit has to be done up ward, with purges opens, to prevent air bag to be formed.

## 2.- INSTALLATION

### 2.4.- UNIT INSTALLATION

#### IMPORTANT



If the outside temperature in the area where the hydron system, cooling unit or heating pump is to be installed is likely to drop below 0°C, it is very important to take the following precautions, to avoid that water in the circuit get freeze, that may produce damage to the component.

-If unit has to work under low outside temperatures:

- \* Do not disconnect power supply. in order that water pump starts when detects water temperatures below +5 °C.
- \* If the outside temperature in the area where the system, cooling unit or heating pump is to be installed is likely to drop below 5 °C, it is very important to use glycol anti -freeze. The amount of antifreeze required will vary depending on the minimum ambient 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.

MIN. AMBIENT TEMPERATURE	% ETILENGLYCOL	PRESSUER DROP	WATER RATE	CAPACITY
-5° C	10 %	1,07	1,02	0,97
-10° C	20 %	1,12	1,05	0,95
-16° C	30 %	1,20	1,08	0,93

Also is advisable to use a heater on water exchange "auto-trace heater".

Do not damage the various elements such as exchangers, piping, devices etc. and damage the installation.

#### OPTION

An immersion heater can be supplied complete with safety thermostat and pressostat fitted in the buffer tank of the cooling only chiller. A similar option is available for heat pump versions with the added advantage of a supplementary heating source.

- 10.-For cooler or heating pump units the hydraulic system component settings such as pump, inertia device, expansion device, safety valve etc. must be calculated and entered.
- 11.-See pressure drop of the unit, and add to piping pressure drop, to obtain the total pressure drop of the system.
- 12.-When the measurements are correct install a pressure reducing valve to provide sufficient pressure for the water pump to compensate for the loss of power.

## 2.- INSTALLATION

### 2.5.- ELECTRICAL CONNECTIONS



- BEFORE MAKING ANY ELECTRICAL CONNECTIONS, BE SURE THAT ALL CIRCUIT BREAKERS ARE OPEN.
- IN ORDER TO CARRY OUT THE ELECTRICAL CONNECTIONS, FOLLOW THE ELECTRICAL DIAGRAM SUPPLIED WITH THE UNIT.

POWER SUPPLY	230V SINGLE PHASE UNITS		230V THREE-PHASE UNITS		400V THREE-PHASE UNITS	
	 1N ~ 230V - 50 Hz + PE		 3 ~ 230V - 50 Hz + PE		 3N ~ 400V - 50 Hz + PE	
UNIT MODEL	NUMBER OF WIRES X SECTION					
	Without AEC	With AEC	Without AEC	With AEC	Without AEC	With AEC
0091S	3 x 4 mm <sup>2</sup>	3 x 4 mm <sup>2</sup>	4 x 4 mm <sup>2</sup>	4 x 6 mm <sup>2</sup>	5 x 2,5 mm <sup>2</sup>	5 x 4 mm <sup>2</sup>
0111S	---	---	4 x 4 mm <sup>2</sup>	4 x 6 mm <sup>2</sup>	5 x 2,5 mm <sup>2</sup>	5 x 4 mm <sup>2</sup>
0151S	---	---	4 x 6 mm <sup>2</sup>	4 x 10 mm <sup>2</sup>	5 x 4 mm <sup>2</sup>	5 x 4 mm <sup>2</sup>
0191S	---	---	4 x 10 mm <sup>2</sup>	4 x 10 mm <sup>2</sup>	5 x 4 mm <sup>2</sup>	5 x 4 mm <sup>2</sup>
0211S	---	---	4 x 10 mm <sup>2</sup>	4 x 10 mm <sup>2</sup>	5 x 4 mm <sup>2</sup>	5 x 4 mm <sup>2</sup>
0251S	---	---	4 x 10 mm <sup>2</sup>	4 x 10 mm <sup>2</sup>	5 x 4 mm <sup>2</sup>	5 x 6 mm <sup>2</sup>
0291S	---	---	4 x 10 mm <sup>2</sup>	4 x 16 mm <sup>2</sup>	5 x 6 mm <sup>2</sup>	5 x 10 mm <sup>2</sup>
0351S	---	---	4 x 16 mm <sup>2</sup>	4 x 25 mm <sup>2</sup>	5 x 10 mm <sup>2</sup>	5 x 10 mm <sup>2</sup>
0431S	---	---	4 x 16 mm <sup>2</sup>	4 x 25 mm <sup>2</sup>	5 x 10 mm <sup>2</sup>	5 x 10 mm <sup>2</sup>
0472S	---	---	4 x 25 mm <sup>2</sup>	4 x 35 mm <sup>2</sup>	5 x 10 mm <sup>2</sup>	5 x 16 mm <sup>2</sup>
0552S	---	---	4 x 25 mm <sup>2</sup>	4 x 35 mm <sup>2</sup>	5 x 16 mm <sup>2</sup>	5 x 16 mm <sup>2</sup>
0672S	---	---	4 x 35 mm <sup>2</sup>	4 x 50 mm <sup>2</sup>	5 x 16 mm <sup>2</sup>	5 x 25 mm <sup>2</sup>
0812S	---	---	4 x 50 mm <sup>2</sup>	4 x 50 mm <sup>2</sup>	5 x 16 mm <sup>2</sup>	5 x 25 mm <sup>2</sup>

- AEC: Auxiliary Electric Coil
- The sections has been calculated to a distance no superior o 50m and a low supply of 10V  
Do not start the unit if the drop is greater than this.
- The wiring and circuit breakers to be mounted in the installation must comply with the Regulations in force.
- Ground wires must be properly connected and have a greater length than the phase wires.

#### VOLTAGE OPERATION LIMITS

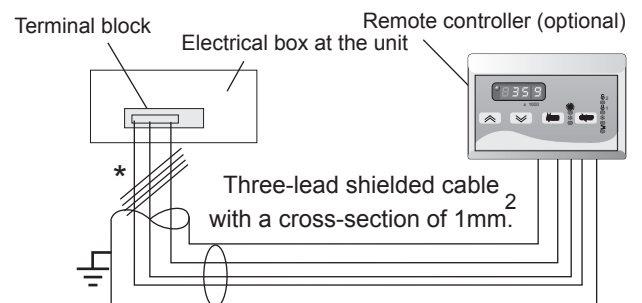
MODELS	VOLTAGE	LIMIT
009	230 V-1Ph-50Hz	198-264 V -1Ph- 50Hz
009-011-015-019	230 V-3Ph-50Hz	180-242 V -3Ph- 50Hz
	400 V-3Ph-50Hz	342-462 V -3Ph- 50Hz
019-021-025-029-035-043-047-055-067-081	230 V-3Ph-50Hz	180-242 V -3Ph- 50Hz
	400 V-3Ph-50Hz	342-462 V -3Ph- 50Hz

A remote controller is offered as an option.

To install this optional remote controller proceeded as follow:

- Connect exactly as indicated in electrical diagram
- The wire should not exceed 50 m.

**The three cables for connection from the keypad to the power board must be kept separate from other cables, using an individual cable channel; and use shielded cables, with a cross-section of 1 mm<sup>2</sup>.**



\*Connection to be made by user  
MAXIMUM LENGTH 50m



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## 3.- COMMISSIONING AND OPERATION

### 3.2.- STEPS TO FOLLOW FOR COMMISSIONING THE UNITS

#### PRE-START

Before commissioning the unit check the following:

- 1.- Check that the voltage is the same as the rated voltage on the specification plate.
  - 2.- Check that the supply to the control system is connected in accordance with the electrical diagram.  
(if incorporates).
  - 3.- Check that the main switch is ON (if incorporates).
  - 4.- Make sure that the water connections are correct and have not been altered, as this can result in incorrect operation the flow divider will not operate if the connections are mixed
  - 5.- Check that the fan can rotate freely..
  - 6.- Check the water pump's direction of rotation.
  - 7.- Check for air in the water system. Bleed if necessary.
  - 8.- The compressor must not be started until the cabinet heater has been running for at least 8 hours.
- The compressor has a single phase electric heating element to assure a separation between the Refrigerant and the oil in the housing. This heater is activated when the compressor is off and stops working when the compressor is on.  
About eight hours before start up or after a long shutdown period, voltage should be supplied to the unit so that this heater will be activated.
  - Check that the compressor starts after two minutes.
  - Select cool or heat as the operating mode at the control unit.
  - When the compressor starts the fans rotate at maximum speed for a short time. They then either rotate in accordance with the condensation temperature



REMEMBER THAT THE COMPRESSOR IS A SCROLL TYPE COMPRESSOR:

**Before unit start, should be checked that the compressor rotate on the correct direction, thought a three phase protection. Scroll type compressors only compress in one direction of the rotation. Single phase models are always started up in the proper direction; however, the three phase models, turn in either direction depending on the order of the power supply phases. Therefore, it is essential that the phase connection for scroll-type three-phase compressors be carried out correctly (the correct direction of rotation can be checked when the pressure on the suction side decreases and the pressure on the discharge side increases when the compressor is activated). If the connection is wrong, the rotation will be reversed causing a high noise level and a reduction in the amount of current consumed. If this occurs, the compressor's internal protection system will kick in shutting down the unit. The solution is to disconnect, switch the wires between two of the phases and connect the three again).**

- Occasionally when compressor stops and starts there is a metallic noise because of spiral compressor with no consequence.
- Check compressor oil level, sight glass included (on the sides of the compressor, the level should be between 1/4 and 3/4 in the sight glass, while during operation the level should be between 3/4 and full).
- Connect high and low pressure gauges and check that operating pressure values are normal.
- Measure electrical consumption for the unit and check that it is near what is indicated on the Rating Plate.
- Check the electrical consumption of the compressor and the fans with what is specified in the physical data sheets.
- In the case of a Heat Pump unit, make a cycle change on the Control Panel checking that the 4-way valves make the change correctly. Check the pressure values in the new cycle.
- **Remember the low pressure switch is reset automatically and the high pressure switch is reset electronically.**
- **Remember that low pressostat is automatic reset, if has 3 cuts in one hour, it comes to be a manual reset, thought the control of the unit.**

### 3.- COMMISSIONING AND OPERATION

#### 3.2.- CHECKING THE WATER FLOW RATE

It is very important that the unit operates at the correct flow rate. It is highly dangerous to leave the unit operating at a low flow rate as this could result in serious damage to components as well as the water exchanger. On the other hand, if the unit operates at too high a flow rate, this will also hinder optimum performance. The best way of determining the operating flow rate is to measure the temperature difference between the inlet and outlet water.

#### Checking the water flow rate (it is vital to measure the thermal peak).

For nominal and minimum water flow the difference between the inlet and outlet water temperature should be 5K (cooling and heating pump units in cooling cycle only) for an inlet temperature of 12°C, an outlet temperature of 7°C and an outside temperature of 35°C. If these conditions change, the unit capacity will also change and as a result for nominal flow the difference between the inlet and outlet water temperatures will vary slightly from 5K as can be seen in the following table, based on nominal flow rate.

		$\Delta T$ ( inlet water temp. - outlet water temp.)						
		Outside temperature °C						
Water output °C		15	20	25	30	35	40	45
7		6,1	5,8	5,5	5,3	5,0	4,7	4,4
9		6,5	6,2	5,9	5,6	5,3	5,0	4,7
11		7,0	6,7	6,4	6,0	5,7	5,4	5,0

If the unit must be started in the cooling cycle and if you wish to operate at nominal cooling rate, the following shows the approximate differences between the inlet and outlet water temperatures for the various conditions

		$\Delta T$ ( inlet water temp. - outlet water temp.)				
		Outside temperature °C W.B.				
Water output °C		-6	0	6	12	18
35		4,5	5,5	6,5	7,5	8,5
50		4	5	6	7	8

**Note:** The unit control system displays the inlet and outlet water temperature to be displayed. See the Control Description section.

Check that the correct water pump has been selected, taking into account the loss of pressure in the hydraulic system. It is dangerous to let the unit run at a low rate and any faults which may result will not be covered under warranty.

Do not start up the air conditioning units or the fan coils until the water temperature reaches the set temperature or use an automatic control device which cancels the air conditioning unit operation if the installation is not properly set.

When everything is operating normally, take a reading of all the data and **fill out the Commissioning Sheet.**

### 3.- COMMISSIONING AND OPERATION

#### 3.3.- CORROSION RESISTANCE OF COPPER AND STAINLESS STEEL OF PLATES EXCHANGER (WATER EXCHANGER)

ASPECT TO MEASURE AN ANALYZE OVER THE WATER IN THE CIRCUIT.

The resistance guide below is an attempt of give a picture of the corrosion resistance of the stainless steel of the type AISI 316 and pure copper in the water, to a number of important chemical factors. The actual corrosion is however a very complex process influenced by many factors in combination. This table is therefore a considerable simplification and should not be overvalued.

Explanations: □

+ Good resistance under normal conditions □

0 Corrosion problems can occur especially when the factors are valued as 0

WATER CONTAINING	CONCENTRATION mg/l ó ppm	AISI 316	COPPER
Alcanity (HCNO <sub>3</sub> )	<70	+	0
	70-300	+	+
	>300	+	0
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	<70	+	+
	70-300	+	-
	>300	0	-
HCO <sub>3</sub> / SO <sub>4</sub> <sup>2-</sup>	>1.0	+	+
	<1.0	+	-
Electrical conductivity	<10 μS/cm	+	0
	10-500 μS/cm	+	+
	>500 μS/cm	+	0
pH	<6.0	0	0
	6.0-7.5	0/+	0
	7.5-9.0	+	+
	>9.0	+	0
Ammonium (NH <sub>3</sub> )	<2	+	+
	2-20	+	0
	>20	+	-
Chloroides (Cl <sup>-</sup> )	<300	+	+
	>300	0	0
Free chlorine (Cl <sub>2</sub> )	<1	+	+
	1-5	+	0
	>5	0/+	-
Hydrogen sulfide (H <sub>2</sub> S)	<0.05	+	+
	>0.05	+	-
Free (aggressive) Carbon Dioxide (CO <sub>2</sub> )	<5	+	+
	5-20	+	0
	>20	+	-
Total hardness (°dH)	4.0-8.5	+	+
Nitrate (NO <sub>3</sub> )	<100	+	+
	>100	+	0
Iron (Fe)	<0.2	+	+
	>0.2	+	0
Aluminum (Al)	<0.2	+	+
	>0.2	+	0
Manganese (Mn)	<0.1	+	+
	>0.1	+	0

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## 4.- MAINTENANCE

### 4.1.- PREVENTIVE MAINTENANCE



PREVENTIVE MAINTENANCE PREVENTS COSTLY REPAIRS.

We recommend regular and thorough servicing of the Refac cooler. It is therefore advisable to ask your dealer about maintenance contracts. Check maintenance of the following points (depending on the operating conditions maintenance every 6 months may be necessary).

#### --GENERAL STATE OF THE CASING :

Furniture, paint, deterioration due to bumps, rust spots, leveling and supporting, state of the shock absorbers, if installed, screwed panels, etc.

#### - ELECTRICAL CONNECTIONS :

State of hoses, tightness of screws, grounding, current draw of the compressor and fans and checking that the unit is receiving the correct voltage.

#### - COOLING CIRCUIT :

Check that pressure values are correct and that there are no leaks. Check that there is no damage to the pipe insulation, that the state of the batteries is correct and that there are no chips or clogs retained by the air flow, etc.

#### - COMPRESSOR :

Inspect the oil level, if sight glass is present.

Inspect the state of the silent block fixtures.

#### - FANS :

Check that fans turn freely and in the correct direction without excessive noises.

#### - CONTROL :

Check Set Points and normal operation.

#### - WATER

If the installation contains anti-freeze, regularly check the state of the anti-freeze as well as the cleanliness of the water.

#### - WATER FILTER

Clean the inlet water filter if necessary.

#### - EVAPORADOR

Prove the general isolation state and tightness of the water connections.

## 4.- MAINTENANCE

### 4.2.- CORRECTIVE MAINTENANCE

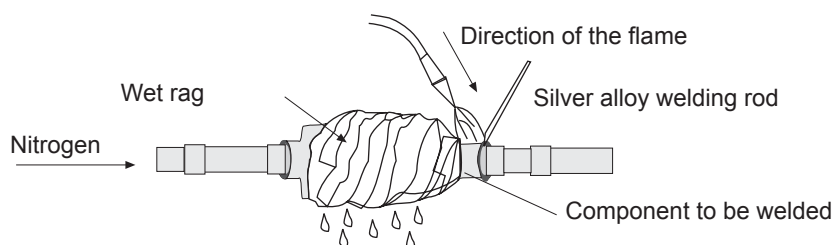


#### IMPORTANT

MAKE SURE THAT THE UNIT IS COMPLETELY DISCONNECTED FROM THE POWER SUPPLY WHEN CARRYING OUT ANY TYPE OF WORK ON THE MACHINE

If some component in the cooling circuit must be replaced, follow these recommendations:

- Always use original replacement parts.
- Remove the entire refrigerant charge from the unit from through the schrader valves. Create a slight vacuum as a safety measure.
- Regulation prohibits the release on the refrigerant into the atmosphere.
- If cuts must be made in the pipe work, use pipe cutters. Do not use saws or any other tools that produce filings.
- All brazing must be carried out in a nitrogen atmosphere to prevent corrosion from forming.
- Use silver alloy brazing rod.
- Take special care that the flame from the torch is aimed in the opposite direction from the component to be welded and is covered with a wet rag in order to avoid overheating.



- Take very special care if 4-way check valves are to be replaced since these have internal components that are very heat-sensitive such as plastic, teflon, etc.
- If a compressor must be replaced, disconnect it electrically and un-braze the suction and discharge lines. Remove the securing screws and replace the old compressor with the new one. Check that the new compressor has the correct oil charge, screw it to the base and connect the lines and electrical connections.
- Carry out the vacuum above and below through the schrader valves of the outdoor unit until -750 mm Hg is reached. Once this level of vacuum has been reached, keep the pump in operation for at least one hour. **DO NOT USE THE COMPRESSOR AS A VACUUM PUMP.**
- Charge the unit with refrigerant according to the data on the Rating Plate for the unit and **check that there are no leaks.**



#### PRECAUTIONS TO BE TAKEN IN THE USE OF R-407C Refrigerant

If R-407C Refrigerant is used in the unit, the following precautions characteristic of this gas should be taken:

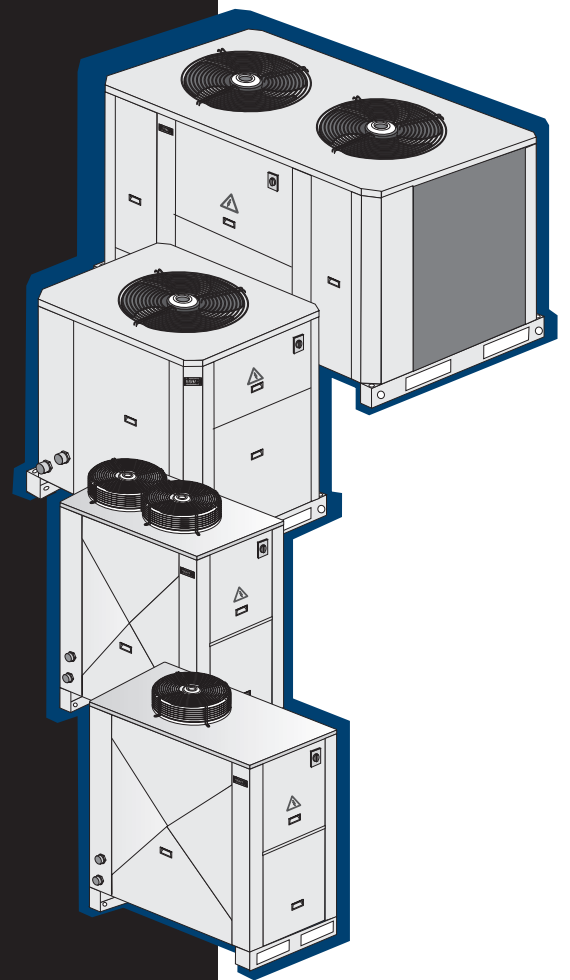
- The Vacuum Pump must have a Check Valve or Solenoid Valve.
- Pressure Gauges and Hoses for the exclusive use with R-407C Refrigerant should be used.
- The charge should be carried out in the Liquid Phase.
- Always use scales to weight-in charge
- Use the Leak Detector exclusive for R-407C Refrigerant.
- Do not use mineral oil, only synthetic oil to ream, expand or make connections.
- Keep pipes capped before using them and be very thorough about any possible dirt (dust, filings, burrs, etc.).
- When there is a leak, gather what is left of the charge, create a vacuum in the unit and completely recharge with new R-407C Refrigerant.
- Brazing should always be carried out in a nitrogen atmosphere.
- Reamers should always be well sharpened.
- The refrigerant bottle must contains at least 10 % of the total amount .

## 4.- MAINTENANCE

### 4.3.- FAILURE DIAGNOSIS

PROBLEM	CAUSE	ACTION
The unit does not start after the last start	<ul style="list-style-type: none"> <li>* Disconnected supply</li> <li>* Main switch set to STOP.</li> <li>* No water flow.</li> <li>* Fusses are broken</li> <li>* Low electrical supply</li> <li>* One of the safety devices has been activated</li> <li>* Compressor fault</li> <li>* Low water temperature</li> </ul>	<ul style="list-style-type: none"> <li>* Check electrical supply.</li> <li>* Connect main switch.</li> <li>* Start water pump (and check air in system)</li> <li>* Check voltage.</li> <li>* Check antifreeze thermostat</li> <li>* Check high/low pressure switch.</li> <li>* Change compressor</li> <li>* Create demand for cooling.</li> </ul>
The fan does not work (although the compressor is operating)	<ul style="list-style-type: none"> <li>* Internal safety device open.</li> <li>* Bad connection.</li> <li>* Poor condensation control</li> </ul>	<ul style="list-style-type: none"> <li>* Let the motor cool.</li> <li>* Connect properly.</li> <li>* Check operation</li> </ul>
The compressor stops when the high pressure switch is cut off	<ul style="list-style-type: none"> <li>* Battery blocked</li> <li>* Unit operating outside of limiting</li> <li>* Abnormal operation of the fans</li> </ul>	<ul style="list-style-type: none"> <li>* Maintain battery</li> <li>* Check the ventilators</li> </ul>
The compressor stops when the low pressure switch is cut off	<ul style="list-style-type: none"> <li>* Insufficient R-22 charge</li> <li>* The water exchanger is blocked (water side)</li> <li>* No water flow</li> </ul>	<ul style="list-style-type: none"> <li>* Check the R-22 charge</li> <li>* Maintain the exchanger</li> <li>* Check that there is sufficient water flow</li> </ul>
The oil level in the compressor is very low	<ul style="list-style-type: none"> <li>* The cabinet heater is not working</li> </ul>	<ul style="list-style-type: none"> <li>* Replace the cabinet heater and fill up with oil.</li> </ul>
High noise level of compressor and high and low pressures are abnormal	<ul style="list-style-type: none"> <li>* Phase connection for compressor power supply incorrectly</li> </ul>	<ul style="list-style-type: none"> <li>* Switch the wires between two of the phases of compressor power supply.</li> </ul>

**OPERATION, SERVICE  
&  
INSTALLATION MANUAL**



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