BROCHURE

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CIATCooler LP / ILP

Installation
Operation
Commissioning
Maintenance

Contents

Water chillers and air-water heat pumps

HFC R410A

Cooling capacity: *17,7 to 193,5 kW*
Heating capacity: *21,8 to 214,0 kW*

1. Introduction

The **CIATCooler LP / ILP** cooling units and reversible heating pumps are compact outdoor air/water units.

Available in two versions:

- **STD (Standard)**
- **HEE (High Energy Efficiency)**

These units have been made for operation indoors in the production of hot and/or cold water, applicable to heating, cooling, and industry.

They are equipped with centrifugal fans (STD version) or electronic plug-fans (HEE version), plate exchangers, hermetic scroll compressors, and electronic control with microprocessors, components optimised for the R-410A refrigerant.

This range is also offered with an integrated circulation pump: **LPC / ILPC** and optionally, with a hydraulic module (attached to the unit or separate) equipped with a buffer tank.

The entire range also has the option to include a desuperheater circuit that allows for the production of hot water at a temperature greater than in the condensation circuits.

■ Series CIATCooler LP

Air-condensed water chillers.

■ Series CIATCooler ILP

Reversible heat pump units for operation in negative outdoor temperatures (greater than -15ºC WB) for water heating and chilling. Defrosting by reversing the cycle.

After manufacturing, all units are charged with refrigerant and are tested at the factory, verifying the correct operation of all their components within the operating range for which they are intended.

The units comply with European Directives: Machinery 2006/42/EC - EMC 2014/30/EU - LVD 2014/35/EU - PED 2014/68/EC (Category 2) - RoHS 2011/65/EU - Eco-design 2009/125/CE - Eco-labelling 2010/30/EU; and with Harmonised Standard: EN 378-2:2012.

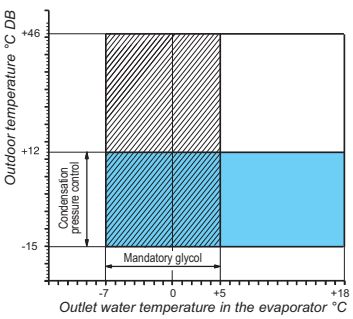
Those in charge of the installation, commissioning, operation and maintenance of the unit must know the instructions contained in this brochure and the specific technical characteristics of the installation place.

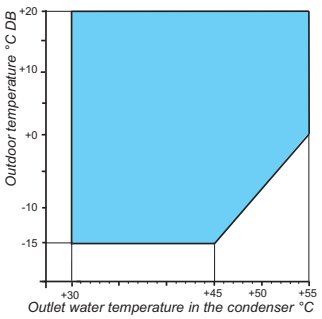
2. Operation limits

Series	Cooling mode				Heating mode			
	Air		Water (outlet T.)		Air		Water (outlet T.)	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
LP	46ºC	12ºC ①	18ºC	5ºC ②	--	--	--	--
ILP	46ºC	12ºC ①	18ºC	5ºC ②	20ºC DB	-15ºC DB	55ºC	30ºC

① With control of the condensation pressure operating up to -15ºC.

② Minimum outlet temperature. With the option of glycol water for lower temperature operation from 5ºC to -7ºC.





3. AVAILABLE CONFIGURATIONS

According to the air discharge:

- **Assembly M00**

  HORIZONTAL air discharge: models 90 to 600 (STD version) and models 90 to 360 (HEE version).

- **Assembly M01**

  VERTICAL air discharge: all models.

M00

M01

According to the type of outlet fan:

- **STD version (Standard):**

  Centrifugal fan coupling by pulleys and belts.

- **HEE version (High Energy Efficiency):**

  Variable speed electronic plug-fan.

STD

HEE

Models	STD version (Standard)	HEE version (High Energy Efficiency)
1 circuit 1 compressor	90 / 100 / 120 / 160 / 180	90 / 100 / 120 / 160 / 180
1 circuit 2 compressors	200 / 240 / 280 / 320 / 360 420 / 480 / 600	200 / 240 / 280 / 320 / 360 420 / 480 / 600
2 circuits 4 compressors	640 / 720 / 840 / 960	640 / 720

According to the components of the hydraulic circuit:

- **LP / ILP version**

  The unit incorporates only the plate exchanger.

- **LPC / ILPC version**

  In addition to the plate exchanger, the unit includes a motorpump group.

- **LPC / ILPC version with hiydraulic module**

  The unit incorporates, besides the motorpump group, a module with a thermal buffer tank.

  The module can be supplied:

  - Coupled to the LPC / ILPC unit, models 90 to 360.
  - Separate for connection on site by the installer. In this case, the minimum distance between the unit and the module is 167 mm.

Module coupled

Module separate

4. TECHNICAL CHARACTERISTICS

STD version

CIATCooler LP / ILP			90V-STD	100V-STD	120V-STD	160V-STD	180V-STD	200V-STD	240V-STD	280V-STD	320V-STD	360V-STD
Cooling capacities	Net cooling capacity ① (kW)		17,70	21,10	25,20	32,70	36,00	43,70	49,30	55,80	68,10	74,30
	Net power input ③ (kW)		7,75	9,15	10,00	12,60	14,40	18,80	19,70	22,40	24,90	28,70
	Net efficiency	EER	2,29	2,31	2,51	2,60	2,49	2,32	2,51	2,49	2,73	2,59
	Seasonal efficiency	ESEER ④	2,61	2,59	2,81	2,94	2,85	2,71	2,97	2,98	3,29	3,14
Heating capacities	Net heating capacity ② (kW)		21,80	26,10	29,70	38,30	42,60	51,60	58,50	66,90	76,60	84,80
	Net power input ③ (kW)		7,31	8,90	9,90	12,90	14,20	18,40	19,60	22,40	24,80	28,20
	Net efficiency	COP	2,97	2,94	3,00	2,97	3,01	2,80	2,99	2,98	3,08	3,01
	Seasonal efficiency ⑤ Average climate	SCOP	3,11	3,12	3,07	2,95	2,95	3,07	3,07	2,95	2,95	3,17
		ηs Heat	121%	122%	120%	115%	115%	120%	120%	115%	115%	124%
		Prated (kW)	16,77	19,19	21,82	26,33	31,31	38,59	41,71	44,94	51,08	65,47
	Seasonal efficiency ⑤ Warmer climate	SCOP	3,59	3,63	3,57	3,42	3,35	3,42	3,71	3,66	3,61	3,71
		ηs Heat	140%	142%	140%	134%	131%	134%	145%	143%	141%	145%
		Prated (kW)	12,73	14,70	16,72	24,30	27,32	34,90	39,44	42,83	47,04	58,00
Outdoor circuit centrifugal fan	Nominal air flow (m³/h)		6500	7000	10000	12200	12200	16000	20000	24400	24400	24400
	Available static pressure (mm.w.c.)		20									
	Number / turbines		1					2				
	Motor output (kW)		2,2	2,2	3,0	4,0	4,0	2 x 3,0	2 x 3,0	2 x 4,0	2 x 4,0	2 x 4,0
	Power input (kW) ⑥		1,46	1,77	2,33	2,83	2,83	4,68	4,66	5,3	5,66	5,66
	Speed (r.p.m.)		973	1027	837	734	734	1082	837	705	734	734
Indoor circuit	Nominal water flow (m³/h)		3,1	3,7	4,3	5,7	6,2	7,5	8,5	9,6	11,7	12,8
	Pressure drop (m.w.c.)		2,3	3,2	2,9	4,7	2,9	4,2	3,2	4,0	2,1	2,6
	Minimum water flow (m³/h)		2,2	2,7	3,1	4,1	4,3	4,7	6,2	7,2	8,3	8,6
	Maximum water flow (m³/h)		6,2	7,4	8,8	11,3	12,7	15,0	17,2	19,2	23,6	26,0
	Type of hydraulic connections		Gas threaded									
	Diameter of connections		1 1/4" M		1 1/2" M			2" M				
Compressor	Type		Scroll									
	No. of compressors / stages / circuits		1 / 1 / 1					2 / 2 / 1				
	Oil type		Copeland 3MAF 32 cST, Danfoss POE 160 SZ, ICI Emkarate RL 32 CF, Mobil EAL Artic 22 CC									
	Volume of oil (l)		3,0	3,3	3,3	3,3	6,2	2 x 3,3	2 x 3,3	2 x 3,3	2 x 3,3	2 x 6,2
Refrigerant	Type		R-410A									
	Global warming potential (GWP) ⑦		2.088									
	Charge (kg)		5,9	6,1	6,6	6,9	7,6	9,2	12,3	12,4	14,9	15,4
	Environment impact (tCO_2e)		12,3	12,7	13,8	14,4	15,9	19,2	25,7	25,9	31,1	32,2
Electrical characteristics	Electrical power supply		400 V / III ph / 50 Hz (±10%)									
	Power supply		3 Wires + Ground + Neutral									
Maximum absorbed current	Compressor (A)		15,2	17,3	20,5	25,4	30,5	34,6	41,0	45,9	50,8	61,0
	Fan (A)		5,0	5,0	6,9	8,9	8,9	13,8	13,8	17,8	17,8	17,8
	Control (A)		0,9	0,9	0,9	0,9	0,9	1,8	1,8	1,8	1,8	1,8
	Total (A)		21,1	23,2	28,3	35,2	40,3	50,2	56,6	65,5	70,4	80,6
Dimensions	Length (mm)		1117		1398			2113	2673			
	Width (mm)		860		860			860	860			
	Height (mm) ⑧		1447		1727			1447	1727			
Weight	Empty (kg)		302	310	372	390	388	564	644	676	710	716
	In operation (kg)		306	315	379	397	396	579	659	692	728	733

① Cooling capacity calculated in accordance with the EN-14511-2013 standard given for outlet water temperature conditions of 7ºC and 35ºC outdoor temperature.
② Heating capacity calculated in accordance with the EN-14511-2013 standard given for outlet water temperature conditions of 45ºC and 6ºC WB outdoor temperature.
③ Total power input by compressor, motorised fan and electronic control under nominal conditions, calculated in accordance with the EN-14511-2013 standard. Options are not included.
④ European Seasonal Energy Efficiency Ratio (ESEER) obtained in accordance with the calculation conditions established by the certification body EUROVENT.
⑤ Values calculated in accordance with the EN-14825-2013 standard given for bivalente temperature of -5ºC in average climate and 2ºC in warmer climate.
⑥ Energy-efficient motors IE2.
⑦ Climatic warming potential of a kilogram of fluorinated greenhouse gas in relation to a kilogram of carbon dioxide over a period of 100 years.
⑧ With the transport brackets the machine is 106 mm higher.

4. TECHNICAL CHARACTERISTICS

STD version

CIATCooler LP / ILP			420V-STD	480V-STD	600V-STD	640V-STD	720V-STD	840V-STD	960V-STD
Cooling capacities	Net cooling capacity ① (kW)		**88,80**	**97,00**	**119,00**	**134,60**	**152,30**	**177,30**	**193,50**
	Net power input ③ (kW)		33,20	37,40	48,10	50,50	60,10	66,80	76,20
	Net efficiency	EER	2,68	2,59	2,48	2,66	2,53	2,65	2,54
	Seasonal efficiency	ESEER ④	3,25	3,20	3,12	3,15	3,05	3,12	3,01
Heating capacities	Net heating capacity ② (kW)		**98,70**	**108,70**	**132,30**	**143,40**	**163,50**	**196,10**	**214,10**
	Net power input ③ (kW)		34,40	38,40	48,80	50,20	57,40	67,20	74,80
	Net efficiency	COP	2,87	2,83	2,71	2,86	2,85	2,92	2,86
	Seasonal efficiency ⑤ Average climate	SCOP	3,12	3,25	3,29	3,10	3,21	3,14	3,36
		ηs Heat	122%	127%	128%	121%	125%	123%	131%
		Prated (kW)	82,03	90,05	110,77	117,76	135,09	159,65	174,08
	Seasonal efficiency ⑤ Warmer climate	SCOP	3,54	3,70	3,73	3,46	3,62	3,64	3,81
		ηs Heat	138%	145%	146%	135%	142%	142%	149%
		Prated (kW)	70,04	76,82	94,07	100,70	114,85	135,74	147,87
Outdoor circuit centrifugal fan	Nominal air flow (m³/h)		30000	30000	37500	48000	48000	60000	60000
	Available static pressure (mm.w.c.)		20						
	Number / turbines		2		3	4			
	Motor output (kW)		2 x 5,5	2 x 5,5	3 x 4,0	4 x 4,0	4 x 4,0	4 x 5,5	4 x 5,5
	Power input (kW) ⑥		7,72	7,72	9,12	14,64	14,64	16,52	16,52
	Speed (r.p.m.)		737	737	751	940	940	771	771
Indoor circuit	Nominal water flow (m³/h)		15,4	16,8	20,6	23,3	26,3	30,6	33,5
	Pressure drop (m.w.c.)		4,1	4,9	5,6	3,9	5,1	5,2	6,1
	Minimum water flow (m³/h)		12,2	13,4	16,9	18,2	20,9	24,1	26,6
	Maximum water flow (m³/h)		31,4	34,5	42,1	48,2	54,3	63,5	69,4
	Type of hydraulic connections		Gas threaded						
	Diameter of connections		2 1/2" H						
Compressor	Type		Scroll						
	No. of compressors / stages / circuits		2 / 2 / 1			4 / 4 / 2			
	Oil type		Copeland 3MAF 32 cST, Danfoss POE 160 SZ, ICI Emkarate RL 32 CF, Mobil EAL Artic 22 CC						
	Volume of oil (l)		4,7 + 3,3	2 x 4,7	2 x 6,8	4 x 3,3	4 x 3,3	2 x (4,7 + 3,3)	4 x 4,7
Refrigerant	Type		R-410A						
	Global warming potential (GWP) ⑦		2.088						
	Charge (kg)		24,0	25,0	26,0	37,0	38,0	49,0	50,0
	Environment impact (tCO_2e)		50,1	52,2	54,3	77,3	79,3	102,3	104,4
Electrical characteristics	Electrical power supply		400 V / III ph / 50 Hz (±10%)						
	Power supply		3 Wires + Ground + Neutral						
Maximum absorbed current	Compressor (A)		67,0	73,0	89,2	101,6	122,0	134,0	146,0
	Fan (A)		23,2	23,2	26,7	35,6	35,6	46,4	46,4
	Control (A)		1,8	1,8	1,8	1,8	1,8	1,8	1,8
	Total (A)		92,0	98,0	117,7	139,0	159,4	182,2	194,2
Dimensions	Length (mm)		3400			3600		4500	
	Width (mm)		900			1150		1200	
	Height (mm) ⑧		1970			1970		1970	
Weight	Empty (kg)		1046	1122	1211	1461	1472	1949	2101
	In operation (kg)		1065	1142	1232	1493	1504	1986	2138

① Cooling capacity calculated in accordance with the EN-14511-2013 standard given for outlet water temperature conditions of 7ºC and 35ºC outdoor temperature.
② Heating capacity calculated in accordance with the EN-14511-2013 standard given for outlet water temperature conditions of 45ºC and 6ºC WB outdoor temperature.
③ Total power input by compressor, motorised fan and electronic control under nominal conditions, calculated in accordance with the EN-14511-2013 standard. Options are not included.
④ European Seasonal Energy Efficiency Ratio (ESEER) obtained in accordance with the calculation conditions established by the certification body EUROVENT.
⑤ Values calculated in accordance with the EN-14825-2013 standard given for bivalente temperature of -5ºC in average climate and 2ºC in warmer climate.
⑥ Energy-efficient motors IE2.
⑦ Climatic warming potential of a kilogram of fluorinated greenhouse gas in relation to a kilogram of carbon dioxide over a period of 100 years.
⑧ With the transport skids the machine is 120 mm higher.

4. TECHNICAL CHARACTERISTICS

STD version with pump included

CIATCooler LPC / ILPC			90V-STD	100V-STD	120V-STD	160V-STD	180V-STD	200V-STD	240V-STD	280V-STD	320V-STD	360V-STD
Cooling	Seasonal efficiency ①	ESEER	2,67	2,61	2,89	2,97	2,84	2,73	2,99	2,99	3,29	3,17
Heating	Seasonal efficiency ② Average climate	SCOP	3,24	3,13	3,10	2,95	3,06	2,96	3,10	2,95	2,96	3,02
		ηs Heat	126%	122%	121%	115%	119%	115%	121%	115%	115%	118%
		Prated (kW)	16,83	19,20	21,83	26,21	30,53	38,31	41,45	44,73	51,02	65,65
	Seasonal efficiency ② Warmer climate	SCOP	3,82	3,60	3,60	3,44	3,57	3,35	3,74	3,56	3,55	3,40
		ηs Heat	150%	141%	141%	135%	140%	131%	147%	139%	139%	133%
		Prated (kW)	12,77	14,71	16,72	24,22	27,28	34,73	39,27	42,59	46,95	58,15
Indoor circuit	Nominal water flow (m³/h)		3,1	3,7	4,3	5,7	6,2	7,5	8,5	9,6	11,7	12,8
	Pressure drop (m.w.c.)		3,1	4,2	3,8	6,2	4,5	4,9	4,1	5,1	3,5	4,3
Expansion vessel	Volume (l)		12					20				
	Filled pressure (kg/cm²)		1,5									
Buffer tank (LPC / ILPC + module)	Volume of the buffer tank (l)		100		150			225				
	Maximum water capacity of the installation ③	Water 40ºC (l) ④	700		650			1100				
		Water 50ºC (l) ⑤	410		360			625				
	Drained diameter		3/4" M					1" M				
	Anti-freeze elec. heater (standard)	Voltage	230 V / I ph									
		Output (kW)	1 kW (4,3 A)									
Dimensions	Length (mm) ⑥	LPC / ILPC	1117		1398			2113	2673			
		Module	1000		1000			1000	1000			
	Width (mm)		860		860			860	860			
	Height (mm)		1447		1727			1447	1727			
Weight	LPC / ILPC	Empty (kg)	318	328	390	408	408	586	666	700	736	741
		In operation (kg)	335	345	410	428	429	622	702	736	774	780
	Hydraulic module	Empty (kg)	139	139	161	161	161	161	169	169	169	169
		In operation (kg)	242	242	315	315	315	393	404	404	404	404

CIATCooler LPC / ILPC			420V-STD	480V-STD	600V-STD	640V-STD	720V-STD	840V-STD	960V-STD
Cooling	Seasonal efficiency ①	ESEER	3,13	3,07	3,02	3,00	2,87	3,04	2,89
Heating	Seasonal efficiency ② Average climate	SCOP	2,95	3,04	3,09	2,95	2,95	3,10	3,21
		ηs Heat	115%	119%	120%	115%	115%	121%	126%
		Prated (kW)	82,76	90,84	111,30	118,94	137,14	159,98	175,15
	Seasonal efficiency ② Warmer climate	SCOP	3,29	3,61	3,34	3,42	3,34	3,46	3,68
		ηs Heat	129%	141%	131%	134%	131%	135%	144%
		Prated (kW)	70,59	77,41	95,09	102,06	116,45	137,01	148,68
Indoor circuit	Nominal water flow (m³/h)		15,3	16,7	20,5	23,2	26,2	30,5	33,1
	Pressure drop (m.w.c.)		7,5	8,8	11,1	10,8	13,3	12,9	15,1
Expansion vessel	Volume (l)		35			50			
	Filled pressure (kg/cm²)		1,5						
Buffer tank (LPC / ILPC + module)	Volume of the buffer tank (l)		275			275		375	
	Maximum water capacity of the installation ③	Water 40ºC (l) ④	2050			3035		2985	
		Water 50ºC (l) ⑤	1210			1840		1790	
	Drained diameter		1" M						
	Anti-freeze elec. heater (standard)	Voltage	230 V / I ph						
		Output (kW)	1 kW (4,3 A)						
Dimensions	Length (mm) ⑥	LPC / ILPC	3400			3600		4500	
		Module	1000			1000		1000	
	Width (mm)		900			1150		1200	
	Height (mm)		1970			1970		1970	
Weight	LPC / ILPC	Empty (kg)	1107	1183	1272	1512	1523	2038	2189
		In operation (kg)	1169	1246	1336	1592	1603	2131	2282
	Hydraulic module	Empty (kg)	202	202	202	241	241	263	263
		In operation (kg)	486	486	486	544	544	668	668

① European Seasonal Energy Efficiency Ratio (ESEER) obtained in accordance with the calculation conditions established by the certification body EUROVENT.
② Values calculated in accordance with the EN-14825-2013 standard given for bivalente temperature of -5ºC in average climate and 2ºC in warmer climate.
③ The water capacity for the installation indicated in this table corresponds to the maximum that the installation allows based on the expansion vessel assembled on the unit. The volume of the buffer tank has been taken into account for this section. In case the capacity of the installation is greater, it is necessary to add a supplementary expansion vessel to the installation based on its volume.
④ This temperature corresponds to the temperature that the circuit may reach when the unit is stopped. This case must be considered for cooling-only units.
⑤ This temperature corresponds to the maximum temperature that the circuit may reach when operating in a heat pump.
⑥ Minimum distance between the unit and the separte hydraulic module: 167 mm.

4. TECHNICAL CHARACTERISTICS

HEE version

CIATCooler LP / ILP			90V-HEE	100V-HEE	120V-HEE	160V-HEE	180V-HEE	200V-HEE	240V-HEE	280V-HEE
Cooling capacities	**Net cooling capacity ① (kW)**		**18,40**	**21,00**	**25,50**	**31,40**	**35,70**	**42,30**	**52,30**	**58,10**
	Net power input ③ (kW)		7,20	7,95	9,10	11,50	13,60	15,50	18,20	21,20
	Net efficiency	**EER**	2,55	2,64	2,81	2,74	2,62	2,73	2,87	2,74
	Seasonal efficiency	**ESEER ④**	2,89	2,99	3,20	3,14	3,03	3,38	3,44	3,16
Heating capacities	**Net heating capacity ② (kW)**		**21,40**	**23,90**	**29,30**	**36,40**	**42,50**	**48,60**	**56,60**	**65,00**
	Net power input ③ (kW)		7,10	7,90	9,50	11,90	13,90	15,80	18,80	21,60
	Net efficiency	**COP**	3,03	3,03	3,08	3,05	3,05	3,08	3,01	3,01
	Seasonal efficiency ⑤ Average climate	**SCOP**	2,98	2,95	3,29	3,18	3,09	3,31	3,20	2,95
		ηs Heat	116%	115%	129%	124%	121%	129%	125%	115%
		Prated (kW)	15,92	17,74	21,94	26,77	30,87	34,82	45,34	50,85
	Seasonal efficiency ⑤ Warmer climate	**SCOP**	3,41	3,58	3,82	3,67	3,65	3,78	3,70	3,37
		ηs Heat	134%	140%	150%	144%	143%	148%	145%	132%
		Prated (kW)	13,09	14,68	18,01	22,41	25,89	29,78	34,74	38,86
Outdoor circuit plug-fan	**Nominal air flow (m³/h)**		6500	7000	10000	12200	14000	16000	20000	24400
	Nominal avail. static pressure (mm.w.c.)		20							
	Maximum avail. static pressure (mm.w.c.)		63,7	70,3	45,6	65,1	62,7	61,0	45,6	57,3
	Number / diameter		1 / 500		1 / 560	2 / 560				
	Motor output (kW)		2,7	2,8	3,0	2 x 3,0				2 x 4,7
	Power input (kW) ⑥		1,33	1,21	1,87	2,20	2,52	2,70	3,88	5,28
	Speed (r.p.m.)		1700	1780	1500	1500				1750
Indoor circuit	**Nominal water flow (m³/h)**		3,2	3,7	4,5	5,4	6,2	7,4	9,3	10,2
	Pressure drop (m.w.c.)		1,6	2,1	1,6	2,4	3,1	2,5	1,4	1,6
	Minimum water flow (m³/h)		2,8	2,9	3,8	4,1	4,6	5,7	6,7	7,5
	Maximum water flow (m³/h)		6,6	7,4	9,1	11,3	12,8	15,0	18,4	20,7
	Type of hydraulic connections		Gas threaded							
	Diameter of connections		1 1/4" M		1 1/2" M			2" M		
Compressor	**Type**		Scroll							
	No. of compressors / stages / circuits		1 / 1 / 1					2 / 2 / 1		
	Oil type		Copeland 3MAF 32 cST, Danfoss POE 160 SZ, ICI Emkarate RL 32 CF, Mobil EAL Artic 22 CC							
	Volume of oil (l)		3,0	3,3	3,3	3,3	6,2	2 x 3,3	2 x 3,3	2 x 3,3
Refrigerant	**Type**		R-410A							
	Global warming potential (GWP) ⑦		2.088							
	Charge (kg)		6,0	6,3	6,8	8,9	9,2	12,4	14,4	14,8
	Environment impact (tCO_2e)		12,5	13,2	14,2	18,6	19,2	25,9	30,1	30,9
Electrical characteristics	**Electrical power supply**		400 V / III ph / 50 Hz (±10%)							
	Power supply		3 Wires + Ground + Neutral							
Maximum absorbed current	**Compressor (A)**		15,2	17,3	20,5	25,4	30,5	34,6	41,0	45,9
	Fan (A)		4,2	4,3	4,6	9,2	9,2	9,2	9,2	14,6
	Control (A)		0,9	0,9	0,9	0,9	0,9	1,8	1,8	1,8
	Total (A)		20,3	22,5	26,0	35,5	40,6	45,6	52,0	62,3
Dimensions	**Length (mm)**		1117	1398		2113		2673		
	Width (mm)		860	860		860		860		
	Height (mm) ⑧		1447	1727		1447		1727		
Weight	**Empty (kg)**		294	351	368	450	455	633	656	662
	In operation (kg)		298	358	376	465	468	648	674	680

① Cooling capacity calculated in accordance with the EN-14511-2013 standard given for outlet water temperature conditions of 7ºC and 35ºC outdoor temperature.
② Heating capacity calculated in accordance with the EN-14511-2013 standard given for outlet water temperature conditions of 45ºC and 6ºC WB outdoor temperature.
③ Total power input by compressor, motorised fan and electronic control under nominal conditions, calculated in accordance with the EN-14511-2013 standard. Options are not included.
④ European Seasonal Energy Efficiency Ratio (ESEER) obtained in accordance with the calculation conditions established by the certification body EUROVENT.
⑤ Values calculated in accordance with the EN-14825-2013 standard given for bivalente temperature of -5ºC in average climate and 2ºC in warmer climate.
⑥ Motors that are more energy efficient than what is established by the ErP 2015 standard.
⑦ Climatic warming potential of a kilogram of fluorinated greenhouse gas in relation to a kilogram of carbon dioxide over a period of 100 years.
⑧ With the transport brackets the machine is 106 mm higher.

4. TECHNICAL CHARACTERISTICS

HEE version HEE

CIATCooler LP / ILP			320V-HEE	360V-HEE	420V-HEE	480V-HEE	600V-HEE	640V-HEE	720V-HEE
Cooling capacities	Net cooling capacity ① (kW)		**67,50**	**76,80**	**89,90**	**99,20**	**122,70**	**134,50**	**154,10**
	Net power input ③ (kW)		24,10	28,20	31,90	36,40	46,10	48,50	56,70
	Net efficiency	EER	2,81	2,72	2,82	2,73	2,66	2,77	2,72
	Seasonal efficiency	ESEER ④	3,41	3,38	3,55	3,48	3,37	3,37	3,34
Heating capacities	Net heating capacity ② (kW)		**75,40**	**86,30**	**99,60**	**109,30**	**133,60**	**150,80**	**172,00**
	Net power input ③ (kW)		24,50	28,50	32,10	36,00	44,80	48,50	55,70
	Net efficiency	COP	3,08	3,03	3,11	3,03	2,98	3,11	3,09
	Seasonal efficiency ⑤ Average climate	SCOP	3,31	3,10	3,23	3,17	3,13	3,18	3,30
		ηs Heat	129%	121%	126%	124%	122%	124%	129%
		Prated (kW)	61,19	62,56	71,89	91,68	96,42	108,74	124,22
	Seasonal efficiency ⑤ Warmer climate	SCOP	3,77	3,65	3,83	3,79	3,69	3,67	3,79
		ηs Heat	148%	143%	150%	149%	145%	144%	149%
		Prated (kW)	46,83	51,58	59,40	71,82	78,98	89,89	102,42
Outdoor circuit plug-fan	Nominal air flow (m^3/h)		24400	24400	30000	30000	34000	48000	48000
	Nominal avail. static pressure (mm.w.c.)		20						
	Maximum avail. static pressure (mm.w.c.)		66,9	66,9	60,9	60,6	64,4	62,9	62,9
	Number / diameter		2 / 560		3 / 560			4 / 560	
	Motor output (kW)		2 x 4,7		3 x 3,0		3 x 4,7	4 x 4,7	
	Power input (kW) ⑥		4,78	4,78	5,37	5,37	6,72	10,08	10,08
	Speed (r.p.m.)		1750		1500		1750	1750	
Indoor circuit	Nominal water flow (m^3/h)		11,7	13,3	15,6	17,2	21,0	23,2	26,5
	Pressure drop (m.w.c.)		2,7	3,4	4,2	4,9	5,9	3,0	3,9
	Minimum water flow (m^3/h)		9,1	10,7	12,2	13,5	17,4	18,1	21,2
	Maximum water flow (m^3/h)		23,6	26,8	31,7	34,9	42,8	47,5	54,3
	Type of hydraulic connections		Gas threaded						
	Diameter of connections		2 1/2" F						
Compressor	Type		Scroll						
	No. of compressors / stages / circuits		2 / 2 / 1					4 / 4 / 2	
	Oil type		Copeland 3MAF 32 cST, Danfoss POE 160 SZ, ICI Emkarate RL 32 CF, Mobil EAL Artic 22 CC						
	Volume of oil (l)		2 x 3,3	2 x 3,3	4,7 + 3,3	2 x 4,7	2 x 6,8	4 x 3,3	4 x 3,3
Refrigerant	Type		R-410A						
	Global warming potential (GWP) ⑦		2.088						
	Charge (kg)		24,0	24,0	36,0	36,0	37,0	48,0	49,0
	Environment impact (tCO_2e)		50,1	50,1	75,2	75,2	77,3	100,2	102,3
Electrical characteristics	Electrical power supply		400 V / III ph / 50 Hz (±10%)						
	Power supply		3 Wires + Ground + Neutral						
Maximum absorbed current	Compressor (A)		50,8	61,0	67,0	73,0	89,2	101,6	122,0
	Fan (A)		14,6	14,6	13,8	13,8	21,9	29,2	29,2
	Control (A)		1,8	1,8	1,8	1,8	1,8	1,8	1,8
	Total (A)		67,2	77,4	82,6	88,6	112,9	132,6	153,0
Dimensions	Length (mm)		3400		3600			4500	
	Width (mm)		900		1150			1200	
	Height (mm) ⑧		1970		1970			1970	
Weight	Empty (kg)		942	948	1263	1339	1420	1713	1724
	In operation (kg)		961	966	1285	1361	1444	1749	1761

① Cooling capacity calculated in accordance with the EN-14511-2013 standard given for outlet water temperature conditions of 7ºC and 35ºC outdoor temperature.
② Heating capacity calculated in accordance with the EN-14511-2013 standard given for outlet water temperature conditions of 45ºC and 6ºC WB outdoor temperature.
③ Total power input by compressor, motorised fan and electronic control under nominal conditions, calculated in accordance with the EN-14511-2013 standard. Options are not included.
④ European Seasonal Energy Efficiency Ratio (ESEER) obtained in accordance with the calculation conditions established by the certification body EUROVENT.
⑤ Values calculated in accordance with the EN-14825-2013 standard given for bivalente temperature of -5ºC in average climate and 2ºC in warmer climate.
⑥ Motors that are more energy efficient than what is established by the ErP 2015 standard.
⑦ Climatic warming potential of a kilogram of fluorinated greenhouse gas in relation to a kilogram of carbon dioxide over a period of 100 years.
⑧ With the transpor skids the machine is 120 mm higher.

4. TECHNICAL CHARACTERISTICS

HEE version with pump included

CIATCooler LPC / ILPC			90V-HEE	100V-HEE	120V-HEE	160V-HEE	180V-HEE	200V-HEE	240V-HEE	280V-HEE
Cooling	Seasonal efficiency ①	ESEER	2,95	3,00	3,22	3,17	3,02	3,39	3,44	3,15
Heating	Seasonal efficiency ② Average climate	SCOP	3,12	2,95	3,33	3,20	3,08	3,34	3,24	3,08
		ηs Heat	122%	115%	130%	125%	120%	131%	126%	120%
		Prated (kW)	15,75	17,51	21,70	26,39	30,36	34,52	45,31	52,33
	Seasonal efficiency ② Warmer climate	SCOP	3,64	3,56	3,77	3,67	3,60	3,77	3,76	3,54
		ηs Heat	143%	139%	148%	144%	141%	148%	147%	139%
		Prated (kW)	13,12	14,69	18,05	22,40	25,83	29,71	34,73	38,82
Indoor circuit	Nominal water flow (m³/h)		3,2	3,7	4,5	5,4	6,2	7,4	9,3	10,2
	Pressure drop (m.w.c.)		2,3	3,1	2,5	3,5	4,6	3,1	2,2	2,6
Expansion vessel	Volume (l)		12					20		
	Filled pressure (kg/cm²)		1,5							
Buffer tank (LPC / ILPC + module)	Volume of the buffer tank (l)		100		150			225		
	Maximum water capacity of the installation ③	Water 40ºC (l) ④	700		650			1100		
		Water 50ºC (l) ⑤	410		360			625		
	Drained diameter		3/4" M					1" M		
	Anti-freeze elec. heater (standard)	Voltage	230 V / I ph							
		Output (kW)	1 (4,3A)							
Dimensions	Length (mm) ⑥	LPC / ILPC	1117	1398		2113		2673		
		Module	1000	1000		1000		1000		
	Width (mm)		860	860		860		860		
	Height (mm)		1447	1727		1447		1727		
Weight	LPC / ILPC	Empty (kg)	310	370	386	469	476	654	678	686
		In operation (kg)	327	390	408	497	503	690	717	724
	Hydraulic module	Empty (kg)	138	151	161	154	154	169	169	169
		In operation (kg)	242	256	315	307	310	404	404	404

CIATCooler LPC / ILPC			320V-HEE	360V-HEE	420V-HEE	480V-HEE	600V-HEE	640V-HEE	720V-HEE
Cooling	Seasonal efficiency ①	ESEER	3,19	3,20	3,40	3,30	3,24	3,30	3,27
Heating	Seasonal efficiency ② Average climate	SCOP	3,19	3,09	2,96	3,36	3,24	3,11	3,05
		ηs Heat	124%	120%	115%	132%	126%	121%	119%
		Prated (kW)	55,66	63,89	74,33	97,30	99,47	112,13	128,57
	Seasonal efficiency ② Warmer climate	SCOP	3,73	3,54	3,54	3,35	3,35	3,62	3,67
		ηs Heat	146%	139%	139%	131%	131%	142%	144%
		Prated (kW)	46,66	51,61	60,07	73,24	80,05	91,09	103,23
Indoor circuit	Nominal water flow (m³/h)		11,7	13,3	15,6	17,2	21,0	23,2	26,5
	Pressure drop (m.w.c.)		5,0	6,2	9,3	11,3	11,4	10,3	13,6
Expansion vessel	Volume (l)		35		50				
	Filled pressure (kg/cm²)		1,5						
Buffer tank (LPC / ILPC + module)	Volume of the buffer tank (l)		225		275				
	Maximum water capacity of the installation ③	Water 40ºC (l) ④	2100		3035				
		Water 50ºC (l) ⑤	1260		1840				
	Drained diameter		1" M						
	Anti-freeze elec. heater (standard)	Voltage	230 V / I ph						
		Output (kW)	1 kW (4,3 A)						
Dimensions	Length (mm) ⑥	LPC / ILPC	3400		3600			4500	
		Module	1000		1000			1000	
	Width (mm)		900		1150			1200	
	Height (mm)		1970		1970			1970	
Weight	LPC / ILPC	Empty (kg)	979	985	1324	1400	1481	1782	1793
		In operation (kg)	1028	1034	1391	1467	1550	1863	1875
	Hydraulic module	Empty (kg)	193	193	225	225	225	236	236
		In operation (kg)	424	424	508	508	508	523	523

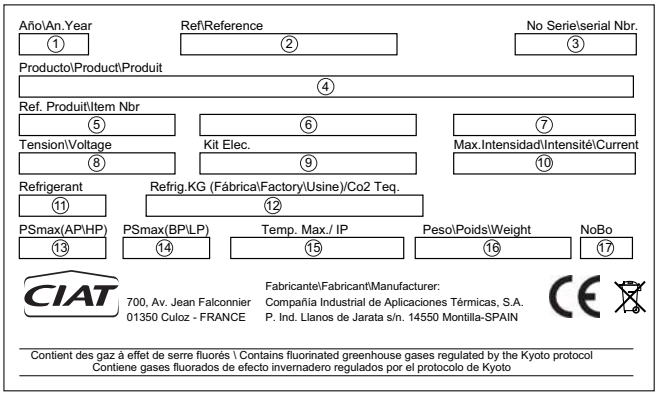
① European Seasonal Energy Efficiency Ratio (ESEER) obtained in accordance with the calculation conditions established by the certification body EUROVENT.
② Values calculated in accordance with the EN-14825-2013 standard given for bivalente temperature of -5ºC in average climate and 2ºC in warmer climate.
③ The water capacity for the installation indicated in this table corresponds to the maximum that the installation allows based on the expansion vessel assembled on the unit. The volume of the buffer tank has been taken into account for this section. In case the capacity of the installation is greater, it is necessary to add a supplementary expansion vessel to the installation based on its volume.
④ This temperature corresponds to the temperature that the circuit may reach when the unit is stopped. This case must be considered for cooling-only units.
⑤ This temperature corresponds to the maximum temperature that the circuit may reach when operating in a heat pump.
⑥ Minimum distance between the unit and the separate hydraulic module: 167mm. In models 640 and 720: 187mm.

5. Unit identification

Check the condition of the equipment upon delivery.

Check that the details on the label, the packing and the data plate match the order. If equipment has been damaged, or there is a shortfall in delivery, notify accordingly.

All units bear, legibly and indelibly, a data plate located in a prime space, as appears in the attached image: Check that this plate matches the correct model.



Legend

① Year of manufacture
② Commercial product name
③ Serial number
④ Description of the product
⑤ Purchase order number
⑥ Sales order number
⑦ Work order number
⑧ Power supply
⑨ Power output of the auxiliary electrical heaters kit (optional) (kW)
⑩ Maximum absorbed current under full load (A) (including the electrical kit)
⑪ Type of refrigerant
⑫ Refrigerant content (kg) and Environment impact (CO_2 Teq.)
⑬ Maximum service pressure in the high pressure side (R-410A = 42 bar)
⑭ Maximum service pressure in the low pressure side (R-410A = 24 bar)
⑮ Maximum operating temperature (refer to “Opration limits”)
Maximum shipment and storage temperature: +50ºC
Electrical protection rating: IP54
⑯ Operation weight (kg) (empty weight + fluid + refrigerant)
⑰ Notified Body number for surveillance of the Pressure Equipment Directive

Note: The serial number must be used in all correspondence regarding the unit.

6. Safety advice

To avoid any risk of accident during installation, commissioning or maintenance, it is obligatory to take into consideration the following specifications for the units: refrigerated circuits under pressure, refrigerant presence, electrical voltage presence and implantation place.

Because of all of this, only qualified and experienced personnel can perform maintenance tasks or unit repairs.

It is required to follow the recommendations and instructions in the maintenance brochures, the labels, and the specific instructions.

It is necessary to comply with the norms and regulations in effect. It is recommended to consult the competent authorities regarding the applicable regulations for users of units or components under pressure. The characteristics of these units or components are included on the plates of characteristics or in the regulatory documentation provided with the product.

The compressor and line surfaces can reach temperatures above 100ºC causing burns to the body. In the same fashion, under certain conditions these surfaces can reach very cold temperatures that can cause freezing risks.

Use safety goggles and gloves on the job. Be careful with sharp parts or elements in the unit.

Caution: Before intervening in the unit, verify that the main power to the unit is cut off. An electric shock can cause personal damage.

Note: In order to recycle these units follow the stipulations of Directive 2012/19/EU on *Waste electrical and electronic equipment* (WEEE).

Refrigerant leaks:

A periodical check must be performed for refrigerant gas leaks as per Regulation (CE) Nº517/2014 over **certain greenhouse effect fluoride gases.** Please, consult the frequency of checks in chapter of “Maintenance”.

These units work with refrigerant gas **R-410A**.

Components of the R-410A	R-32	R-125
Chemical formula	CH2F2	CHF2CF3
Weight ratio	50%	50%
Unitary global warming potential (GWP)	675	3.500
Global warming potential (GWP)	2.088	

In case of a leak:

- Toxicity: According to ASHRAE 34, R-410A belongs to the A1/A1 group, i.e. with high safety both in the mix and also in the case of a leak.
- Although it is not toxic, in case of a leak to atmospheric pressure the liquid phase evaporates. The resulting vapours are heavier than air and can displace the technician local air. In case of an accidental discharge in a closed enclosure, fans must be used to eliminate said vapours.
- Although the R-410A is not flammable, when in contact with a flame o hot spot it can decompose in fluorhydric acid HF and fluophosgene COF_2 highly toxic and corrosive.
- To detect leaks, an electronic leak detector, an ultraviolet lamp or soapy water must be used . Flame detectors do not help.

Important: Immediately repair any refrigerant leak, using a recovery unit specific for R-410A that avoids a possible mixture of refrigerants and/or oils.

7. Transport

During the transportation, the unit must be immobilised in order to avoid displacements or damages.

The unit must be handled carefully in order to avoid imperfections, using adapted and standardised tools. We recommend:

- For transport in a container, one must be selected that has an easy load and unload to the installation location.
- Do not dispose of the brackets or skids for transporting (according to the model) until the unit is not in its final location.
- Please see the weight and the gravity centre coordinates of each model stated in the following section.
- Models 90 to 360 (STD version) and models 90 to 280 (HEE version) can be handled with a forklift truck, taking all necessary precautions to avoid sliding of the unit on the truck's fork.

Important: it's strictly forbidden to manipulate models 420 to 960 (STD version) and models 320 to 720 (HEE version) with a forklift truck, especially by the long side of the machine.

- For lifting using a crane, cloth slings with rings of the appropriate strength will be preferably used. These slings will be hooked onto the two mounting holes located on each crossbar.

  If chains are used instead of slings, these must be separated by means of a strut or structure with a length exceeding the width of the machine to avoid damaging the bodywork.

  Models 420 to 960 (STD version) and models 320 to 720 (HEE version), include two grips for hooking other two slings in the middle of the crossbar, due to its length (see image).

Note: The central grips stands out 74mm.

Attention: Ensure that the units with lifting grips are properly tightened before attaching the slings.

After the placing of the unit, it is recommended to remove the grips, as they can be a hindrance for maintenance. Put them back in case of unit transport.

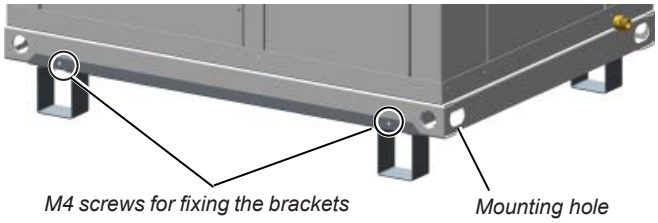
Placement on site

Once the unit is discharged, it must be freed from the the brackets or skids for transporting, so that the inserts available for the silent-blocks can be accessed.

Transport brackets

Transport brackets are availables for models 90 to 360 (STD version) and models 90 to 280 (HEE version) and their hydraulic modules..

Each bracket is fixed to the crossbar using 2 M4 screws. Height of the bracket = 106 mm



Transport skids

Skids for transporting in container are availables for models 420 to 960 (STD version) and models 320 to 720 (HEE version) and their hydraulic modules.

These skids allow the dragging of the unit and facilitate both transport and step through the doors to its final location.

Each skid is fixed to the crossbar with 2 screws M10.

Height of the skid = 120 mm

In the case of the separate hydraulic module, skids protrude 30 mm on each side.

No. of skids per crossbar	CIATCooler LP / LPC
3	STD: 420 to 720
	HEE: 320 to 600
4	STD: 840 to 960
	HEE: 640 to 720
2	Hydraulic module

Centre of gravity coordinates

The unit must be lifted and fixed with care and without inclination (maximum inclination 15º), since it could harm its operation.

LP / ILP	Centre of gravity (mm)			Weight (empty) (kg)
	X	Y	Z	
90V-STD	453	384	528	302
100V-STD	488	398	576	310
120V-STD	625	399	676	372
160V-STD	619	400	666	390
180V-STD	625	397	674	388
200V-STD	930	427	575	564
240V-STD	1162	424	680	644
280V-STD	1162	423	680	676
320V-STD	1189	420	665	710
360V-STD	1184	420	672	716
420V-STD	1556	424	765	1046
480V-STD	1488	412	754	1122
600V-STD	1452	394	782	1211
640V-STD	1821	509	784	1461
720V-STD	1820	509	784	1472
840V-STD	2271	544	772	1949
960V-STD	2272	548	762	2101

LPC / ILPC	Centre of gravity (mm)			Weight (empty) (kg)
	X	Y	Z	
90V-STD	517	396	577	306
100V-STD	515	402	574	315
120V-STD	645	402	673	379
160V-STD	639	402	663	397
180V-STD	646	400	669	396
200V-STD	969	430	576	579
240V-STD	1199	425	680	659
280V-STD	1199	425	677	692
320V-STD	1225	422	664	728
360V-STD	1220	422	670	733
420V-STD	1630	415	741	1107
480V-STD	1562	405	734	1183
600V-STD	1521	389	762	1272
640V-STD	1823	514	769	1512
720V-STD	1823	514	768	1523
840V-STD	2287	558	754	2038
960V-STD	2285	544	746	2189

Indep. hydraulic module	Centre of gravity (mm)			Weight (empty) (kg)
	X	Y	Z	
90V-STD	498	448	486	139
100V-STD	498	448	486	139
120V-STD	498	452	608	161
160V-STD	498	452	608	161
180V-STD	498	452	608	161
200V-STD	579	457	573	161
240V-STD	577	456	613	169
280V-STD	577	456	613	169
320V-STD	577	456	613	169
360V-STD	577	456	613	169
420V-STD	498	445	784	202
480V-STD	498	445	784	202
600V-STD	498	445	784	202
640V-STD	494	583	781	241
720V-STD	494	583	781	241
840V-STD	492	600	841	263
960V-STD	492	600	841	263

Indep. hydraulic module	Centre of gravity (mm)			Weight (empty) (kg)
	X	Y	Z	
90V-HEE	488	448	496	138
100V-HEE	490	447	559	151
120V-HEE	490	452	616	161
160V-HEE	488	454	568	154
180V-HEE	488	454	568	154
200V-HEE	569	456	621	169
240V-HEE	569	456	621	169
280V-HEE	569	456	621	169
320V-HEE	498	445	784	193
360V-HEE	498	445	784	193
420V-HEE	494	583	781	225
480V-HEE	494	583	781	225
600V-HEE	494	583	781	225
640V-HEE	492	600	841	236
720V-HEE	492	600	841	236

LP / ILP	Centre of gravity (mm)			Weight (empty) (kg)
	X	Y	Z	
90V-HEE	502	422	614	294
100V-HEE	569	417	673	351
120V-HEE	628	426	742	368
160V-HEE	940	435	573	450
180V-HEE	936	434	579	455
200V-HEE	1161	440	646	633
240V-HEE	1203	436	646	656
280V-HEE	1198	435	642	662
320V-HEE	1560	441	810	942
360V-HEE	1562	414	818	948
420V-HEE	1619	553	849	1263
480V-HEE	1551	537	837	1339
600V-HEE	1522	527	830	1420
640V-HEE	2274	564	847	1713
720V-HEE	2274	564	846	1724

LPC / ILPC	Centre of gravity (mm)			Weight (empty) (kg)
	X	Y	Z	
90V-HEE	538	427	599	310
100V-HEE	638	418	623	370
120V-HEE	696	427	674	386
160V-HEE	975	436	570	469
180V-HEE	972	436	575	476
200V-HEE	1221	441	635	654
240V-HEE	1257	437	636	678
280V-HEE	1252	436	634	686
320V-HEE	1614	431	794	979
360V-HEE	1616	431	802	985
420V-HEE	1689	538	829	1324
480V-HEE	1620	524	819	1400
600V-HEE	1589	515	813	1481
640V-HEE	2284	569	827	1782
720V-HEE	2284	569	826	1793

LPC / ILPC + hydrau. module	Centre of gravity (mm)			Weight (empty) (kg)
	X	Y	Z	
90V-STD	871	405	540	452
100V-STD	848	408	566	466
120V-STD	1013	409	673	548
160V-STD	997	409	666	566
180V-STD	1001	407	670	566
200V-STD	1337	428	577	742
240V-STD	1610	425	678	829
280V-STD	1609	425	676	863
320V-STD	1611	422	665	899
360V-STD	1605	422	670	904

LPC / ILPC + hydrau. module	Centre of gravity (mm)			Weight (empty) (kg)
	X	Y	Z	
90V-HEE	847	426	584	448
100V-HEE	913	420	629	521
120V-HEE	984	427	668	547
160V-HEE	1385	434	572	623
180V-HEE	1381	434	576	630
200V-HEE	1645	438	641	823
240V-HEE	1660	436	644	847
280V-HEE	1653	435	642	855

LP / ILP
LPC / ILPC

LPC / ILPC + module

8. Location and assembling

Location designation

Before moving the unit, it must be checked that all panels are fastened in place. Lift and lower with care.

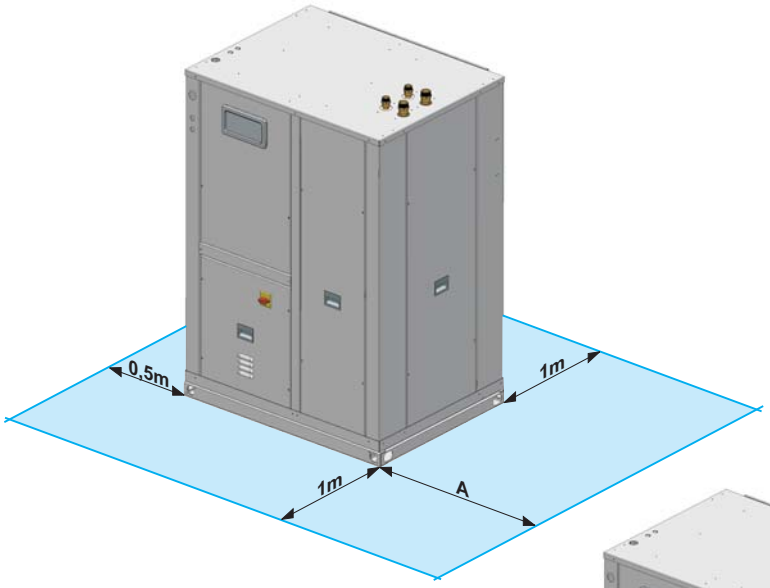
When choosing the location, whatever may be the selected fashion, the following precautions have to be taken into consideration:

- It is mandatory to comply with norm EN 378-3 on Safety and Environmental Requirements. Part 3: "In situ" installation and protection to people.
- Foresee appropriate damping devices in all the installation so that noise and vibration transmission is avoided (refer to the “Anchorage for antivibrators”).
- Check that the unit is perfectly levelled.
- It is necessary to check that the surface of the floor or the structure supports the weight of the unit (please, consult the weight of the unit in the section “Anchorage for antivibrators”).
- The area where the unit will be located must be perfectly accessible for cleaning and maintenance operations (check minimum free space for maintenance). Leave enough space for air circulation around the unit.

Since it is a unit designed to work indoors, some specific installation norms must be followed:

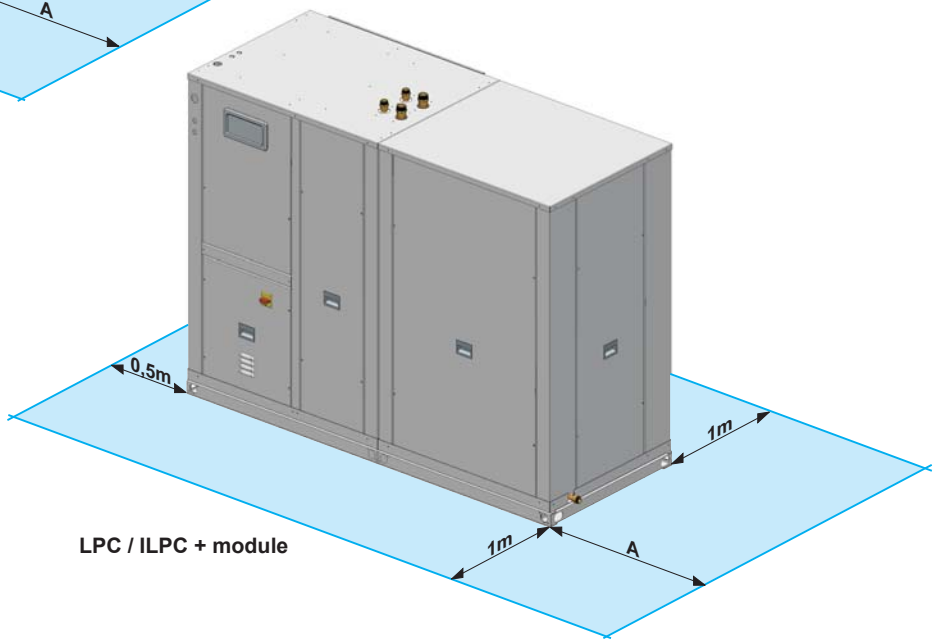
- Ensure that the location of the outlet and return grilles does not generate air recirculation.
- Check that there are no obstructions in the air outlet and return grille slats due to being tightly closed.

Minimum free space for commissioning and maintenance operations



LP / ILP / LPC / ILPC

CIATCooler LP / ILP / LPC / ILPC		A (m)
90V-STD to 100V-STD	90V-HEE	1,2
120V-STD to 180V-STD	100V-HEE to 120V-HEE	1,5
200V-STD	160V-HEE to 180V-HEE	1,2
240V-STD to 360V-STD	200V-HEE to 280V-HEE	1,5
420V-STD to 600V-STD	320V-HEE to 360V-HEE	1,8
640V-STD to 720V-STD	420V-HEE to 600V-HEE	1,9
840V-STD to 960V-STD	640V-HEE to 720V-HEE	2,4



LPC / ILPC + module

Anchorage for antivibrators: STD version

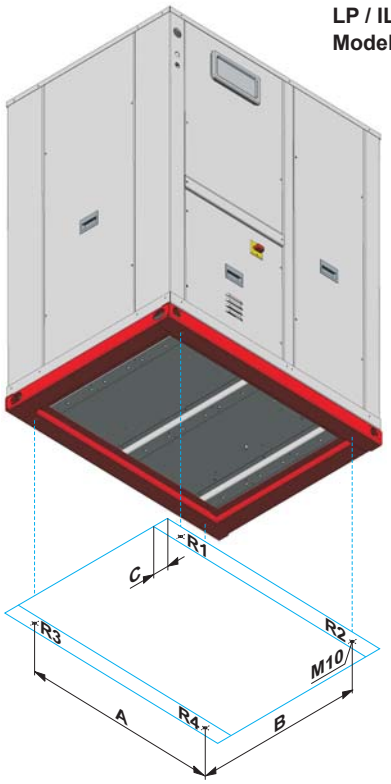
LP / ILP	Distances (mm)			Reactions in the supports (kg)				
	A	B	C	Weight in service	R1	R2	R3	R4
90V-STD	896	760	65	306	66	101	87	52
100V-STD	896	760	65	315	69	93	84	60
120V-STD	1166	760	65	379	89	112	101	77
160V-STD	1166	760	65	397	92	119	107	79
180V-STD	1166	760	65	396	93	119	105	79
200V-STD	1892	760	65	579	121	162	166	127
240V-STD	2452	760	65	659	140	187	190	142
280V-STD	2452	760	65	692	147	197	199	149
320V-STD	2452	760	65	728	160	205	204	159
360V-STD	2452	760	65	733	161	207	206	159

LPC / ILPC	Distances (mm)			Reactions in the supports (kg)				
	A	B	C	Weight in service	R1	R2	R3	R4
90V-STD	896	760	65	335	81	97	86	71
100V-STD	896	760	65	345	82	99	90	73
120V-STD	1166	760	65	410	99	117	107	87
160V-STD	1166	760	65	428	102	124	113	90
180V-STD	1166	760	65	429	104	123	111	91
200V-STD	1892	760	65	622	137	167	174	144
240V-STD	2452	760	65	702	154	194	197	157
280V-STD	2452	760	65	736	161	203	207	165
320V-STD	2452	760	65	774	175	211	212	176
360V-STD	2452	760	65	780	176	214	214	176

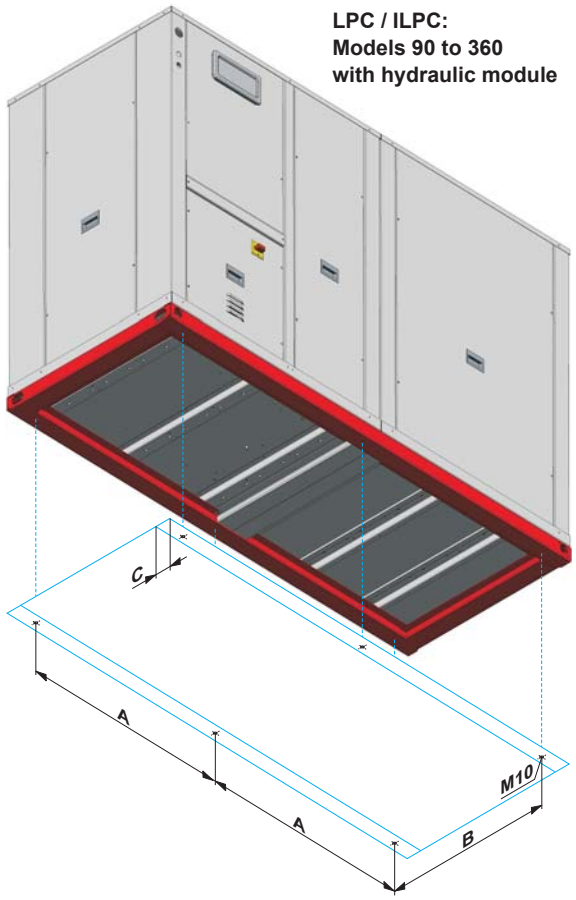
LPC / ILPC + hydraulic module	Distances (mm)			Reactions in the supports (kg)						
	A	B	C	Weight in service	R1	R2	R3	R4	R5	R6
90V-STD	948	760	65	577	51	142	108	43	134	100
100V-STD	948	760	65	587	47	144	112	40	137	106
120V-STD	1085	760	65	726	67	178	130	59	170	121
160V-STD	1085	760	65	744	66	183	136	58	174	127
180V-STD	1085	760	65	745	68	183	136	58	174	126
200V-STD	1446	760	65	1015	91	240	168	97	246	173
240V-STD	1726	760	65	1105	106	263	178	110	266	182
280V-STD	1726	760	65	1139	110	271	184	113	274	188
320V-STD	1726	760	65	1178	115	282	192	116	282	192
360V-STD	1726	760	65	1183	115	283	193	115	283	194

Note: all the anchorings are rivet nut types.

LP / ILP / LPC / ILPC: Models 90 to 360



LPC / ILPC: Models 90 to 360 with hydraulic module

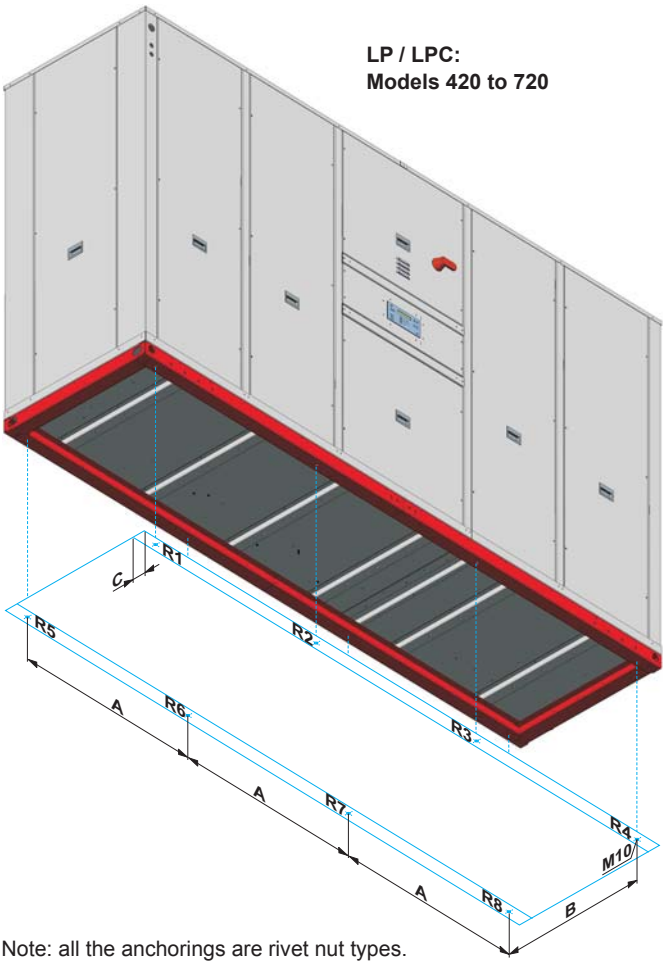


Anchorage for antivibrators: version STD (...continued)

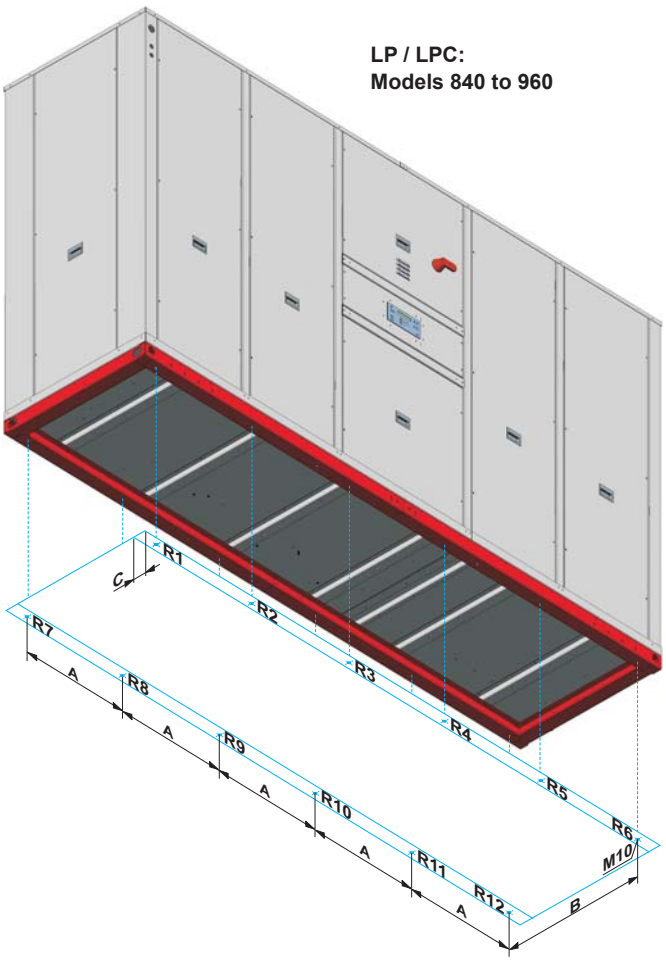
LP / ILP	Distances (mm)			Reactions in the supports (kg)												
	A	B	C	Weight in service	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
420V-STD	817	1060	65	1065	127	197	149	95	110	180	131	77	--	--	--	--
480V-STD	817	1060	65	1142	148	227	151	97	121	201	125	71	--	--	--	--
600V-STD	817	1060	65	1232	172	263	163	105	128	219	120	62	--	--	--	--
640V-STD	1067	1127	65	1493	161	255	265	167	110	204	214	117	--	--	--	--
720V-STD	1067	1127	65	1504	162	257	267	169	111	206	216	117	--	--	--	--
840V-STD	1117	856	65	1986	148	167	175	180	182	170	140	157	165	170	172	162
960V-STD	1117	856	65	2138	158	178	187	192	194	182	152	170	179	184	186	176

LPC / ILPC	Distances (mm)			Reactions in the supports (kg)												
	A	B	C	Weight in service	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
420V-STD	817	1060	65	1169	133	205	180	116	108	181	155	91	--	--	--	--
480V-STD	817	1060	65	1246	155	236	182	119	120	202	148	84	--	--	--	--
600V-STD	817	1060	65	1336	178	272	194	127	127	220	142	75	--	--	--	--
640V-STD	1067	1127	65	1592	169	269	281	177	119	219	231	127	--	--	--	--
720V-STD	1067	1127	65	1603	170	271	283	178	120	221	233	128	--	--	--	--
840V-STD	1117	856	65	2131	152	172	182	189	192	181	151	171	181	188	192	181
960V-STD	1117	856	65	2282	167	190	200	207	211	198	159	178	189	196	199	189

LP / LPC:
Models 420 to 720



LP / LPC:
Models 840 to 960

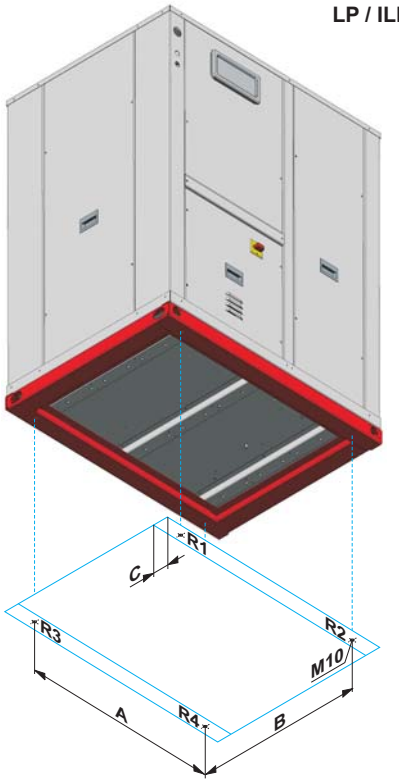


Note: all the anchorings are rivet nut types.

Anchorage for antivibrators: HEE version

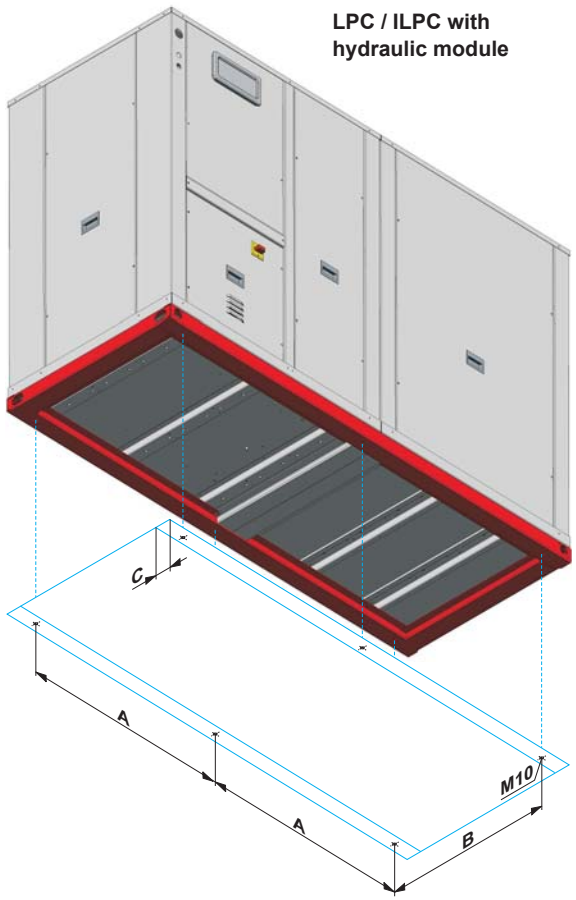
LP / ILP	Distances (mm)			Reactions in the supports (kg)				
	A	B	C	Weight in service	R1	R2	R3	R4
90V-HEE	896	760	65	298	64	100	85	50
100V-HEE	1166	760	65	358	63	127	116	52
120V-HEE	1166	760	65	376	88	112	100	77
160V-HEE	1892	760	65	465	69	177	163	56
180V-HEE	1892	760	65	468	71	178	163	56
200V-HEE	2452	760	65	648	106	213	218	111
240V-HEE	2452	760	65	674	143	191	194	146
280V-HEE	2452	760	65	680	145	193	195	146

LP / ILP / LPC / ILPC



LPC / ILPC	Distances (mm)			Reactions in the supports (kg)				
	A	B	C	Weight in service	R1	R2	R3	R4
90V-HEE	896	760	65	327	77	84	87	79
100V-HEE	1166	760	65	390	88	109	107	86
120V-HEE	1166	760	65	408	100	101	104	103
160V-HEE	1892	760	65	497	109	130	140	118
180V-HEE	1892	760	65	503	110	132	142	119
200V-HEE	2452	760	65	690	147	180	198	165
240V-HEE	2452	760	65	717	160	183	198	175
280V-HEE	2452	760	65	724	162	187	200	175

LPC / ILPC with
hydraulic module



LPC / ILPC + module	Distances (mm)			Reactions in the supports (kg)						
	A	B	C	Weight in service	R1	R2	R3	R4	R5	R6
90V-HEE	948	760	65	569	41	135	105	43	137	107
100V-HEE	1085	760	65	646	42	155	127	41	154	126
120V-HEE	1085	760	65	723	57	171	128	60	175	132
160V-HEE	1446	760	65	804	76	188	124	85	197	133
180V-HEE	1446	760	65	813	77	190	126	86	199	135
200V-HEE	1726	760	65	1094	104	254	165	120	270	181
240V-HEE	1726	760	65	1120	110	261	167	124	275	182
280V-HEE	1726	760	65	1128	110	264	170	124	277	184

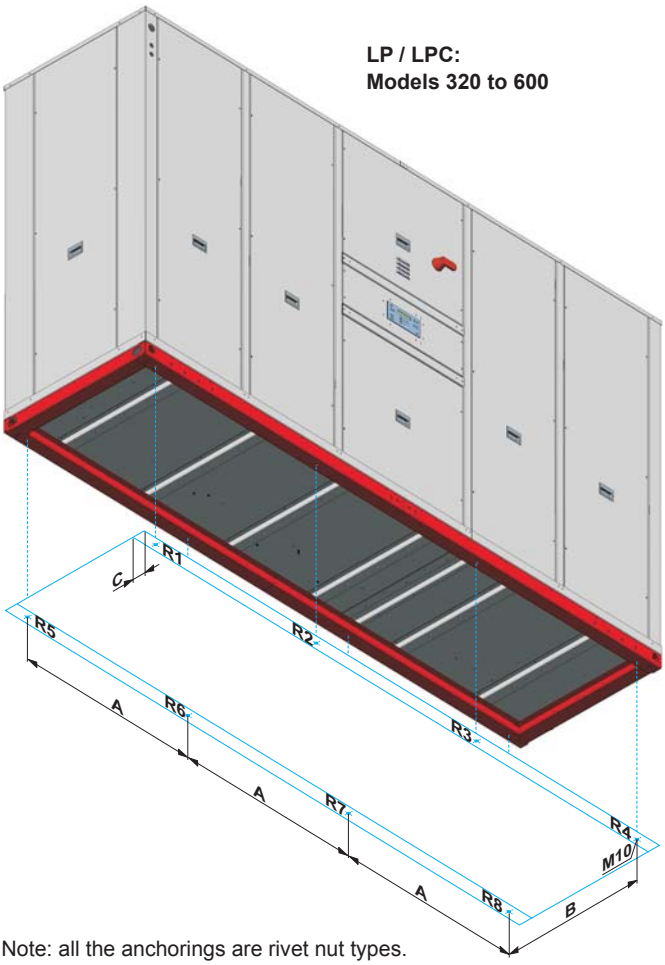
Note: all the anchorings are rivet nut types.

Anchorage for antivibrators: HEE version (...continued)

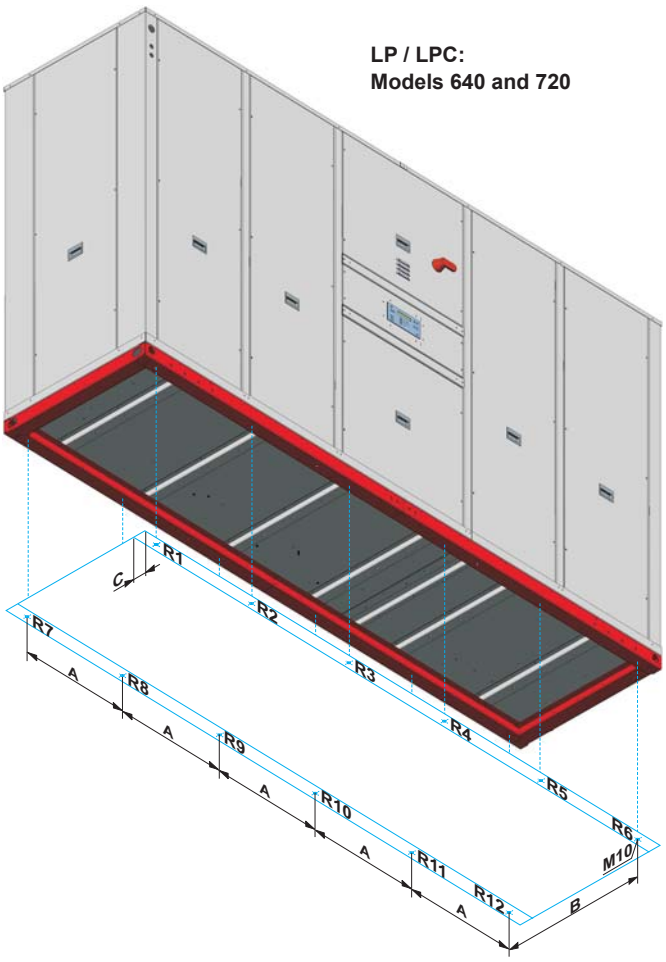
LP / ILP	Distances (mm)			Reactions in the supports (kg)												
	A	B	C	Weight in service	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
320V-HEE	817	1060	65	961	109	172	130	81	104	167	124	75	--	--	--	--
360V-HEE	817	1060	65	966	117	180	139	89	96	159	118	68	--	--	--	--
420V-HEE	1067	1127	65	1285	153	239	170	107	139	226	157	94	--	--	--	--
480V-HEE	1067	1127	65	1361	176	272	172	109	152	248	147	85	--	--	--	--
600V-HEE	1067	1127	65	1444	194	298	179	115	162	266	147	83	--	--	--	--
640V-HEE	1117	856	65	1749	127	141	148	152	154	145	129	144	151	155	157	148
720V-HEE	1117	856	65	1761	128	142	149	153	155	146	130	145	152	156	158	149

LPC / ILPC	Distances (mm)			Reactions in the supports (kg)												
	A	B	C	Weight in service	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
320V-HEE	817	1060	65	1028	114	178	151	95	102	166	139	83	--	--	--	--
360V-HEE	817	1060	65	1034	114	179	152	96	102	167	140	84	--	--	--	--
420V-HEE	1067	1127	65	1391	161	249	204	130	136	225	180	106	--	--	--	--
480V-HEE	1067	1127	65	1467	184	283	205	132	149	248	169	97	--	--	--	--
600V-HEE	1067	1127	65	1550	203	309	212	138	159	266	169	95	--	--	--	--
640V-HEE	1117	856	65	1863	132	148	155	161	163	155	137	154	162	167	169	160
720V-HEE	1117	856	65	1875	133	149	156	162	164	156	138	155	163	168	170	161

LP / LPC:
Models 320 to 600



LP / LPC:
Models 640 and 720

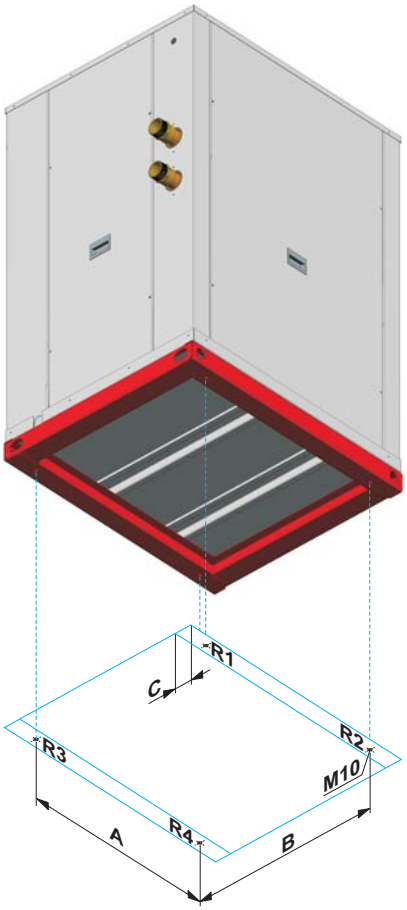


Note: all the anchorings are rivet nut types.

Anchorage for antivibrators: separate hydraulic module

Hydraulic module	Distances (mm)			Reactions in the supports (kg)				
	A	B	C	Weight in service	R1	R2	R3	R4
90V-STD / 100V-STD	790	700	65	242	56	54	65	67
120V-STD / 160V-STD / 180V-STD	790	700	65	315	73	70	85	88
200V-STD	790	700	65	393	69	106	128	91
240V-STD / 280V-STD / 320V-STD / 360V-STD	790	700	65	404	72	108	130	93
420V-STD / 480V-STD / 600V-STD	825	817	65	486	124	122	119	121
640V-STD / 720V-STD	825	1067	65	544	136	132	136	140
840V-STD / 960V-STD	825	1117	65	668	175	170	159	164

Hydraulic module	Distances (mm)			Reactions in the supports (kg)				
	A	B	C	Weight in service	R1	R2	R3	R4
90V-HEE	790	700	65	242	58	53	63	68
100V-HEE	790	700	65	255	61	56	67	72
120V-HEE	790	700	65	315	74	68	83	89
160V-HEE	790	700	65	307	72	66	81	88
180V-HEE	790	700	65	310	73	66	82	89
200V-HEE / 240V-HEE / 280V-HEE	790	700	65	404	74	106	128	96
320V-HEE / 360V-HEE	825	817	65	424	108	107	104	105
420V-HEE / 480V-HEE / 600V-HEE	825	1067	65	508	127	123	127	131
640V-HEE / 720V-HEE	825	1117	65	523	137	133	125	129



Note: all the anchorings are rivet nut types.

Sound levels

These CIATCooler units have been designed to operate with a low sound level.

In any case, in the design of the installation, it must be taken into consideration:

- the outdoor environment for the acoustic radiation,
- the type of building for the noise transmitted in the air,
- the solid elements for the vibration transmission.

To reduce the transmissions through solid matter to the maximum, we recommend installing:

- shock absorbers between the floor or structure and the frame of the unit.
- flexible connections in the hydraulic tubes.

If necessary, an acoustic technician must commission a study.

Unit sound power level

Measurement conditions: ducted discharge and return. For nominal operating conditions EN 14511 – COOLING and HEATING modes.

Acoustic power reference: 10E-12 W, tolerance of ±3 dB (partial charge of ±4 dB).

Important: Models 90 to 360 with acoustic insulating cover as standard (Low Noise version).

CIATCooler LP / ILP		90V-STD	100V-STD	120V-STD	160V-STD	180V-STD	200V-STD	240V-STD	280V-STD	320V-STD	360V-STD	420V-STD	480V-STD	600V-STD	640V-STD	720V-STD	840V-STD	960V-STD
Without isolation	63 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	88,8	88,8	88,9	92,4	92,4	92,6	92,6
	125 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	88,6	88,6	88,7	92,2	92,2	92,4	92,4
	250 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	85,2	85,2	85,3	88,8	88,8	89,0	89,0
	500 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	83,1	83,1	83,2	86,7	86,7	86,9	86,9
	1000 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	80,1	80,1	80,2	83,7	83,7	83,9	83,9
	2000 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	77,2	77,1	77,3	80,7	80,7	81,0	81,0
	4000 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	74,2	74,2	74,3	77,8	77,8	78,0	78,0
	8000 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	67,1	67,1	67,2	70,7	70,7	70,9	70,9
	Total dB(A)	--	--	--	--	--	--	--	--	--	--	85,7	85,7	85,8	89,3	89,3	89,5	89,5
With isolation (Low Noise)	63 Hz dB(lin)	73,8	74,2	74,4	74,4	74,4	76,5	80,8	79,7	79,6	79,6	84,1	84,1	84,2	87,7	87,7	87,9	87,9
	125 Hz dB(lin)	73,2	73,6	73,8	73,8	73,8	75,9	80,2	79,1	79	79	83,5	83,5	83,6	87,1	87,1	87,3	87,3
	250 Hz dB(lin)	70,2	70,6	70,8	70,8	70,8	72,9	77,2	76,1	76	76	80,5	80,5	80,6	84,1	84,1	84,3	84,3
	500 Hz dB(lin)	65,3	65,7	65,9	65,9	65,9	68	72,3	71,2	71,1	71,1	75,6	75,6	75,7	79,2	79,2	79,4	79,4
	1000 Hz dB(lin)	63	63,4	63,6	63,6	63,6	65,7	70	68,9	68,8	68,8	73,3	73,3	73,4	76,9	76,9	77,1	77,1
	2000 Hz dB(lin)	62,2	62,6	62,8	62,8	62,8	64,9	69,2	68,1	68	68	72,5	72,5	72,6	76,1	76,1	76,3	76,3
	4000 Hz dB(lin)	58,2	58,6	58,8	58,8	58,8	60,9	65,2	64,1	64	64	68,5	68,5	68,6	72,1	72,1	72,3	72,3
	8000 Hz dB(lin)	49,3	49,7	49,9	49,9	49,9	52	56,3	55,2	55,1	55,1	59,6	59,6	59,7	63,2	63,2	63,4	63,4
	Total dB(A)	69,4	69,8	70,0	70,0	70,0	72,1	76,4	75,3	75,2	75,2	79,7	79,7	79,8	83,3	83,3	83,5	83,5

CIATCooler LP / ILP		90V-HEE	100V-HEE	120V-HEE	160V-HEE	180V-HEE	200V-HEE	240V-HEE	280V-HEE	320V-HEE	360V-HEE	420V-HEE	480V-HEE	600V-HEE	640V-HEE	720V-HEE
Without isolation	63 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	86,3	86,3	90,8	93	93
	125 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	86,1	86,1	90,6	92,8	92,8
	250 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	82,7	82,7	87,2	89,4	89,4
	500 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	80,6	80,6	85,1	87,3	87,3
	1000 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	77,6	77,6	82,1	84,3	84,3
	2000 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	74,6	74,6	79,2	81,3	81,3
	4000 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	71,7	71,7	76,2	78,4	78,4
	8000 Hz dB(lin)	--	--	--	--	--	--	--	--	--	--	64,6	64,6	69,1	71,3	71,3
	Total dB(A)	--	--	--	--	--	--	--	--	--	--	83,2	83,2	87,7	89,9	89,9
With isolation (Low Noise)	63 Hz dB(lin)	71,1	73,0	73,1	73,1	73,1	73,8	77,8	80,9	81,2	81,2	80,3	80,3	84,8	87,0	87,0
	125 Hz dB(lin)	70,9	72,8	72,9	72,9	72,9	73,6	77,6	80,7	81,0	81,0	80,1	80,1	84,6	86,8	86,8
	250 Hz dB(lin)	67,5	69,4	69,5	69,5	69,5	70,2	74,2	77,3	77,6	77,6	76,7	76,7	81,2	83,4	83,4
	500 Hz dB(lin)	65,4	67,3	67,4	67,4	67,4	68,1	72,1	75,2	75,5	75,5	74,6	74,6	79,1	81,3	81,3
	1000 Hz dB(lin)	62,4	64,3	64,4	64,4	64,4	65,1	69,1	72,2	72,5	72,5	71,6	71,6	76,1	78,3	78,3
	2000 Hz dB(lin)	59,5	61,3	61,5	61,5	61,4	62,2	66,1	69,3	69,6	69,6	68,6	68,6	73,2	75,3	75,3
	4000 Hz dB(lin)	56,5	58,4	58,5	58,5	58,5	59,2	63,2	66,3	66,6	66,6	65,7	65,7	70,2	72,4	72,4
	8000 Hz dB(lin)	49,4	51,3	51,4	51,4	51,4	52,1	56,1	59,2	59,5	59,5	58,6	58,6	63,1	65,3	65,3
	Total dB(A)	68,0	69,9	70,0	70,0	70,0	70,7	74,7	77,8	78,1	78,1	77,2	77,2	81,7	83,9	83,9

Sound pressure level

Measurement conditions: in a clear field, measured at a distance of 10 metres, directivity 2 and at 1,5 metres from the ground.

CIATCooler LP / ILP		90V-STD	100V-STD	120V-STD	160V-STD	180V-STD	200V-STD	240V-STD	280V-STD	320V-STD	360V-STD	420V-STD	480V-STD	600V-STD	640V-STD	720V-STD	840V-STD	960V-STD
Without isolation	dB(A)	--	--	--	--	--	--	--	--	--	--	53,8	53,8	53,9	57,3	57,3	57,4	57,4
With isolation	dB(A)	38,0	38,4	38,4	38,4	38,4	40,5	44,7	43,6	43,5	43,5	47,8	47,8	47,9	51,3	51,3	51,4	51,4

CIATCooler LP / ILP		90V-HEE	100V-HEE	120V-HEE	160V-HEE	180V-HEE	200V-HEE	240V-HEE	280V-HEE	320V-HEE	360V-HEE	420V-HEE	480V-HEE	600V-HEE	640V-HEE	720V-HEE
Without isolation	dB(A)	--	--	--	--	--	--	--	--	--	--	51,2	51,2	55,8	57,8	57,8
With isolation	dB(A)	36,6	38,3	38,4	38,4	38,4	39,0	42,9	46,1	46,2	46,2	45,2	45,2	49,8	51,8	51,8

Note: The sound pressure level depends on the installation conditions and, as such, is only indicated as a guide. Values obtained according to standard ISO 3744.

9. Checking before commissioning

NOTE: Under no circumstance should the unit be started without having read the brochure completely.

Electrical connections

■ Installation norms

In order to establish the unit's electric power supply (cable inlet, calculation of the lead section, protections etc.), refer to:

- The information supplied in this document (table of technical characteristics).
- Data plate.
- The wiring diagram and the legend supplied with the unit.
- The electronic control brochure which is supplied with the unit.
- The regulations and norms in force which regulate the installation of air-conditioning units and electric receivers.

The electric power supply of the unit must be sized in accordance with the maximum power input by the unit taking into account all the options it features (if necessary, refer to the technical brochure).

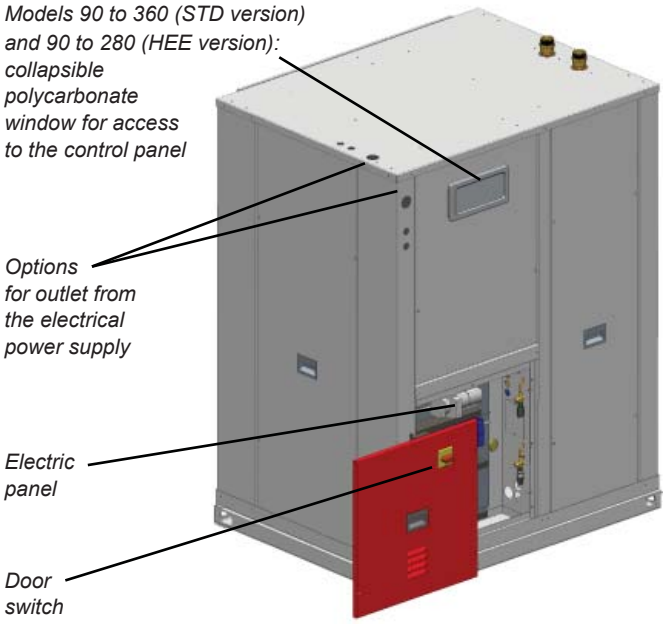
Verify that electrical power corresponds to the one on the data plate and that the voltage remains constant.

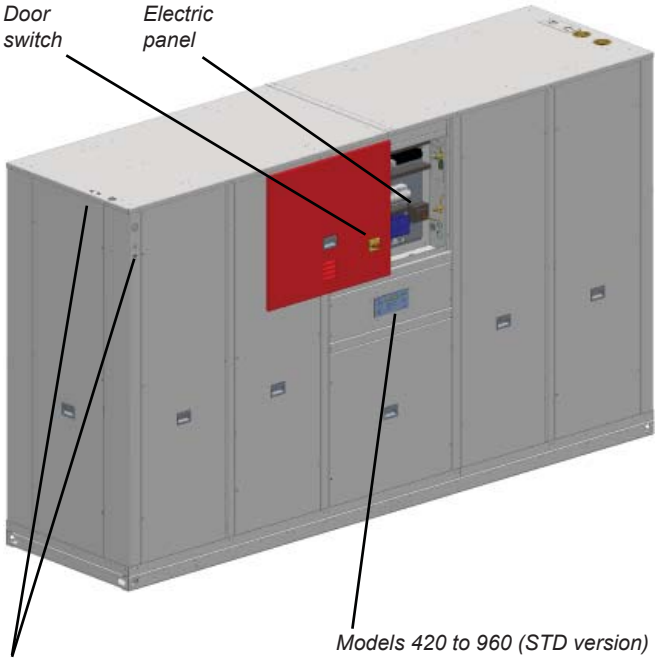
Check that the electrical connections are correct and tight (an electrical diagram is included with each unit, along with its legend).

Note: All connections in the site are the responsibility of the installer. These connections are always made as per the current regulation.

To prevent electrical shocks, make all electrical connections before energizing the unit. Check that the automatic switch is closed. Omitting this can cause personal damage. Make the ground connection before any other electrical connection.

The installer must fix line protection elements according to the effective legislation.





Options for outlet from the electrical power supply

Models 420 to 960 (STD version) and 320 to 720 (HEE version): CONNECT2 panel control

■ CONNECT2 electronic control

System built out of a control board and a local control panel and display.

Main functions:

- Control of the water's temperature.
- Possibility of three types of control:
  * Deviation in the water return (default).
  * PIDT in the water outlet.
  * Control based on the outdoor temperature.
- Control of the operating parameters.
- Diagnosis of operating faults.
- Memorisation of errors in case of short-circuiting.
- Automatic management and equalisation of operating time of the compressors (multi-compressors).
- Possibility of remote control (on/off, modification of the setpoint temperature, operating state, general alarm) through a remote control (optional)
- Possibility of remote reporting of the operating states and errors through an interface module (optional).

Note: for more detailed information on these controls, please refer to their brochures.

■ Connection of remote-controlled functions

Important : all contacts must be good quality and free from any polarity.

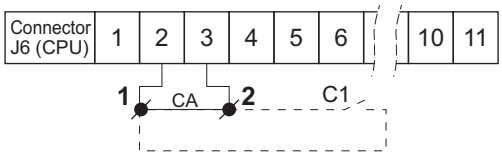
- **Remote on/off**

  Remove the bridge from terminals 1-2 of the terminal board (located in the electric panel) and connect a C1 contact.

  * Open contact → stopped unit.

  * Closed contact → unit ready to operate.

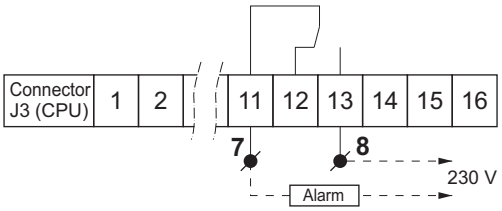
  * Characteristics of the input: 24 Vdc - 15 mA.



- **General failure alarm**

  Connect the general failure indicator or alarm between terminals 7-8.

  Characteristics of the output: 250 Vac - 2 A.



- **Control of the circulation pump (LP/ILP models)**

  Terminals 17-18: thermal contact connection for the pump (remove the bridge).

  Characteristics of the output: 250 Vac - 2 A.

  Terminal 9: connection of the pump contact.

  Terminal 10: connection of the buffer tank heater contact.

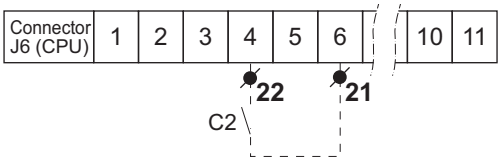
- **Selection of setpoint 1/setpoint 2**

  Connect a C2 contact between terminals 21-22.

  * Open contact → COOLING mode operation.

  * Closed contact → HEATING mode operation.

  * Characteristics of the input: 24 Vdc - 15 mA.



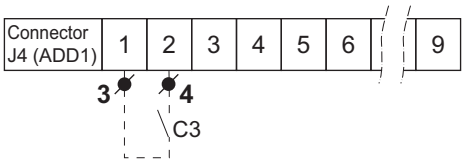
- **Selection of cooling/heating mode (heat pump models)**

  Connect a C3 contact between terminals 3-4 of the ADD1 terminal board plate.

  * Open contact → COOLING mode operation.

  * Closed contact → HEATING mode operation.

  * Characteristics of the input: 24 Vdc - 15 mA.



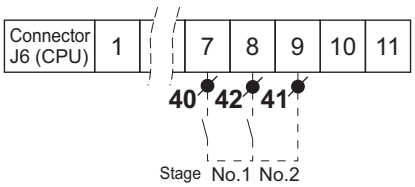
- **Disconnection of power stages (2-compressor models)**

  Connect one contact for compressor no. 1 between terminals 40-41 and another contact for compressor no. 2 between terminals 42-41.

  * Open contact → normal operation.

  * Closed contact → disconnected compressor.

  * Characteristics of the input: 24 Vdc - 15 mA.



Condensate drain connection

- In LP / LPC units, the condensate drain pan includes a a bronze, bleeding trunk for draining condensates.
  - Mod. 90 to 360 (STD version) & 90 to 280 (HEE version): 3/4" M
  - Mod. 420 to 960 (STD version) & 320 to 720 (HEE version): 1 1/4" M
- The optional hydraulic module for LPC units, incorporates a bronze, bleeding trunk for draining from the buffer tank.
  - Mod. 90 to 180 (STD version) & 90 to 180 (HEE version): 3/4" M
  - Mod. 200 to 960 (STD version) & 200 to 720 (HEE version): 1" M
- Models in which the module can be sent coupled to the unit, this will be the only bleeding trunk for draining condensates and draining from the buffer tank.
  - Mod. 90 to 180 (STD version) & 90 to 180 (HEE version): 3/4" M
  - Mod. 200 to 360 (STD version) & 200 to 280 (HEE version): 1" M

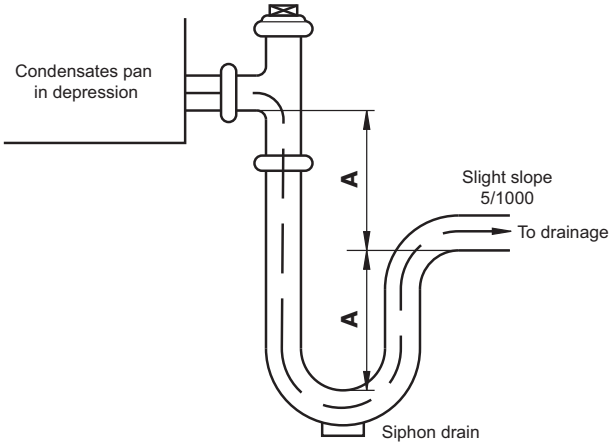
Attention: With low outdoor temperatures, the electrical heater-based anti-freeze protection option for the pan is recommended. Mandatory when outdoor temperatures are below 3°C.

Siphon installation norms

All water drain tubes must be provided with a siphon to avoid bad smell and water spills.

- ***Pan in overpressure:*** It is installed to avoid the access through the drain piping of bad smells.
- ***Pan in underpressure:*** Water must be suctioned from the pan because of the depression with respect to the motorfan assembly.

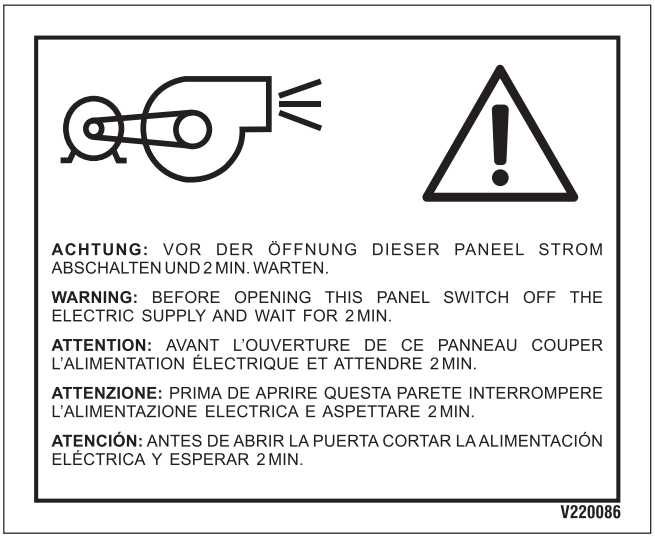
  Perform the siphon assembly as per the scheme of the attached starting diagram:
  - For the correct siphon design, the "A" height must be at least twice that of the underpressure (mm.w.c) where the condensate pan is placed.
  - Check that the condensate outlet is not clogged.
  - The drain piping must be slightly sloped to ease circulation towards the drain.
  - The original diameter of the piping must be respected. No reduction can be made.
  - With outdoor temperatures which are lower than 0°C, the necessary precautions must be taken to prevent the water in the drain ducts from freezing.



Check the connection air tightness.

Checks in the centrifugal fans: STD version

- Before commissioning, check the blade rotation direction and that the axis turns without strokes nor vibrations
- Once running, check the operation conditions: pressures, flows and consumptions.
- The coupling of characteristic curves of the fan and the room is very important, so that the flows and pressures provided to the duct network are as required.



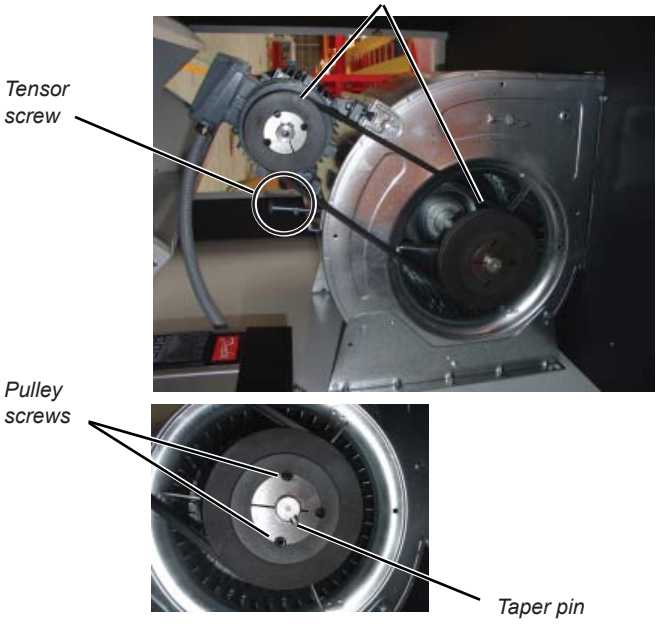
Pulley and belt calibration

Centrifugal motorfans are coupled with pulleys and belts. In this type of fans, the following must be taken into consideration:

- The pulleys must be on the same plane, so it is important to check them with the help of a ruler or a laser aligner.
- In case they are not aligned, remove the pulley screws, remove the pulley and, after removing the taper pin, it can be slid over the axle (this action can be performed both in the motor as well as in the fan).
- After fixing the pulleys on the same plane, the belt tension is made by tightening the tensor screw.
- The belt tension must be checked after 24 hours of motor operation.

Attention: Before performing these operations, it is necessary to verify that the unit is disconnected from mains.

Pulleys must stay on the same plane



Air ducts connections

For units designed for installation indoors with ducted outlet and return in the outdoor circuit, it is advisable to have the following recommendations:

- Curves in the fan discharge outlet(s) must be avoided. It is recommendable to have a straight section of duct measuring approximately 1 metre. If it is not possible, they must be as smooth as possible, using indoor deflectors when the duct is of large dimensions.
- When making the ducts, direction sharp changes must be avoided since they can generate occasional pressure drops, which affect the available pressure and the flow. The location of discharge and aspiration grilles must be studied carefully to avoid the air recirculation and the transmission and generation of noises to the interior.
- No matter the type of ducts type to use, these must be insulated and must not be composed of materials that propagate fire nor expel toxic gases in the event of a fire. The internal surfaces must be smooth and should not pollute the air that circulates within them. In any case, the effective legislation about this issue must be respected.
- Flexible connections must be made between the ducts and the unit that avoid the noise and vibration transmission.

Attention: In models with double air volume (2 circuits) are required two separate air ducts.

■ Flexible connections

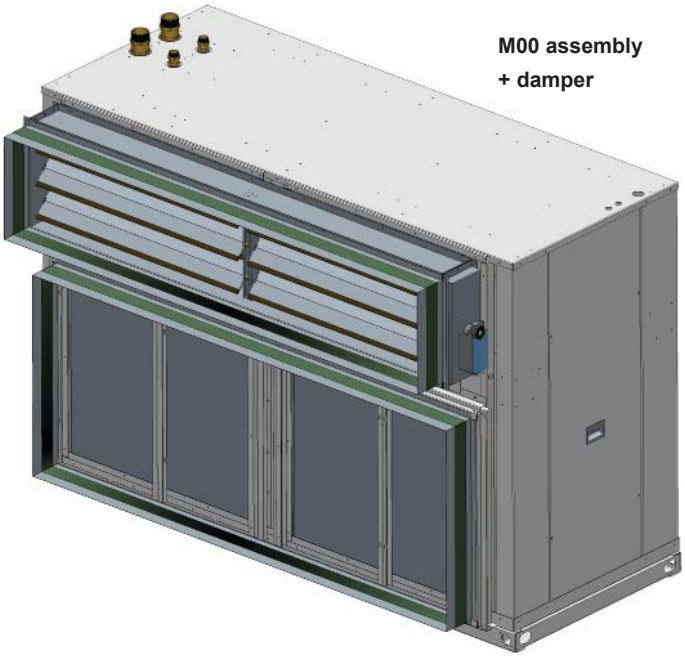
Optionally, CIATCooler units can be sent with flexible connections for outlet and return air.

The dimensions of the ducts can be referred to in the technical brochure for these units.

M00 assembly

In case of asking together for flexible connections and damper for condensation pressure control (optional for version STD), discharge flexible ducts are attached to to the above mentioned damper.

If it is removed the damper for installation on duct, it is necessary to maintain the frame for reconnecting the flexible connections.



M00 assembly + damper

CIATCooler	Assembly	Width (mm)		
		Unit	Flexible connections	Damper
90V-STD to 360V-STD	M00	860	132	150
420V-STD to 600V-STD		900	152	150 (*)
90V-STD to 360V-STD	M01	860	132	150 (*)
420V-STD to 600V-STD		900	152	150 (*)
640V-STD to 720V-STD		1150	152	150 (*)
840V-STD to 960V-STD		1200	152	150 (*)

(*) The damper incorporates a frame (60 mm width) to fit the damper to the fan(s) outlet. Without flexible connections this frame may be removed for duct installation.

Models 640 to 960 (STD version) and 640 to 720 (HEE version) feature 2 flexible ducts both in discharge and return air.

M01 assembly

Hydraulic connections

■ Installation water volume

Minimum installation volume

The electronic control for these units incorporates an auto-adaptive control for the compressor operating time based on the time set for anti-short-cycle.

This control reduces the number of times the compressor is started up and permanently adjusts the system's thermal inertia, favouring the reduction of the minimum volume of water in the installation. The size of the buffer tank can also be decreased since the unit will be stopped for less time.

CIATCooler	Minimum volume (l)	Minimum flow (l)	Maximum flow (l)
90V-STD	101	2,2	6,2
100V-STD	120	2,7	7,4
120V-STD	143	3,1	8,8
160V-STD	187	4,1	11,3
180V-STD	204	4,3	12,7
200V-STD	123	4,7	15,0
240V-STD	138	6,2	17,2
280V-STD	156	7,2	19,2
320V-STD	189	8,3	23,6
360V-STD	207	8,6	26,0
420V-STD	248	12,2	31,4
480V-STD	271	13,4	34,5
600V-STD	333	16,9	42,1
640V-STD	185	18,2	48,2
720V-STD	210	20,9	54,3
840V-STD	244	24,1	63,5
960V-STD	265	26,6	69,4

CIATCooler	Minimum volume (l)	Minimum flow (l)	Maximum flow (l)
90V-HEE	107	2,8	6,7
100V-HEE	132	2,9	8,1
120V-HEE	152	3,8	9,5
160V-HEE	189	3,7	11,7
180V-HEE	210	4,0	12,8
200V-HEE	129	5,7	16,2
240V-HEE	152	6,5	19,3
280V-HEE	172	7,6	21,4
320V-HEE	187	9,1	23,6
360V-HEE	214	10,7	26,8
420V-HEE	251	12,2	31,7
480V-HEE	278	13,5	34,9
600V-HEE	344	17,4	42,8
640V-HEE	183	18,1	47,5
720V-HEE	211	21,2	54,3

The calculation of the minimum water volume has been done for nominal EUROVENT conditions, only in cooling mode. This value is applicable for the majority of refrigeration applications (group with fan-coil units).

Note: The buffer tank is indispensable in installations that operate with a reduced volume of water (group with an air handling unit) or for industrial processes. For applications with a heat pump, it is recommended that the buffer tank be used in order to maintain a stable temperature during the defrosting cycles.

Maximum installation volume

The water capacity for the installation obtained from this equation corresponds to the maximum that the installation allows based on the expansion vessel assembled.

$$V_{INST} = \frac{V_{vessel} \cdot (P_f - P_i)}{(V_2 - V_1) \cdot P_f}$$

Where:

V_{inst} Installation volume (l)

V_{inst} Expansion vessel volume (l)

V_1 Initial volume of 1kg of water (at water temperature with the machine stopped)

V_2 Final volume of 1kg of water (at water temp. with the machine at normal speed)

P_f Final network pressure (safety valve pressure in bars + 1)

P_i Initial network pressure (absolute filling pressure of the installation in bars)

Note: If the hydraulic circuit has a buffer tank, its volume must be taken into account for this calculation.

- **Volume occupied by 1kg of water at different temperatures:**

Temperature (ºC)	Volume (l)	Temperature (ºC)	Volume (l)
0	1,00013	50	1,0121
4	1,00000	60	1,0171
10	1,00027	70	1,0227
20	1,00177	80	1,0290
30	1,00435	90	1,0359
40	1,00782	100	1,0434

Maximum volume of water in an installation with a hydraulic module:

LPC + module		90V-STD 100V-STD	120V-STD 160V-STD 180V-STD	200V-STD 240V-STD 280V-STD 320V-STD 360V-STD
		90V-HEE 100V-HEE	120V-HEE 160V-HEE 180V-HEE	200V-HEE 240V-HEE 280V-HEE
Expansion vessel (l)		12	12	20
Buffer tank (l)		100	150	225
Max. volume ①	Water 40ºC (l) ②	700	650	1100
	Water 50ºC (l) ③	410	360	625

LPC + module		420V-STD 480V-STD 600V-STD	640V-STD 720V-STD	840V-STD 960V-STD
		320V-HEE 360V-HEE	420V-HEE 480V-HEE 600V-HEE	640V-HEE 720V-HEE
Expansion vessel (l)		35	50	50
Buffer tank (l)		275	275	375
Max. volume ①	Water 40ºC (l) ②	2050	3035	2985
	Water 50ºC (l) ③	1210	1840	1790

① The water capacity for the installation indicated in this table corresponds to the maximum that the installation allows based on the expansion vessel assembled on the unit. The volume of the buffer tank has been taken into account for this section. In case the capacity of the installation is greater, it is necessary to add a supplementary expansion vessel to the installation based on its volume.

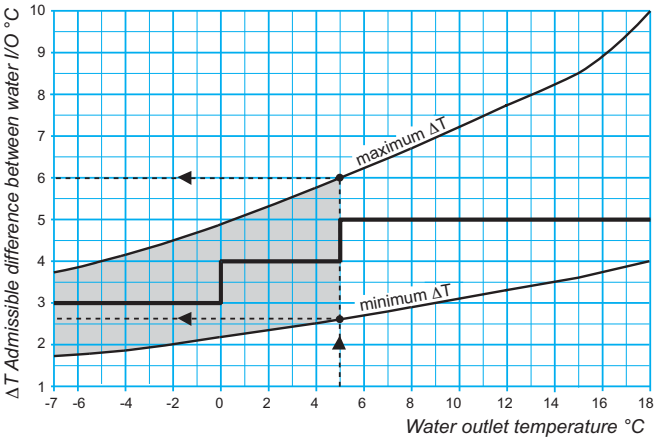
② This temperature corresponds to the temperature that the circuit may reach when the unit is stopped. This case must be considered for cooling-only units.

③ This temperature corresponds to the maximum temperature that the circuit may reach when operating in a heat pump.

■ Evaporator operating limits

The curves represent the minimum and maximum admissible temperature increases based on the outlet (discharge) temperature, for both pure water and glycol water. For temperature changes that are not listed between the curves, please consult.

The minimum outlet temperature for the unit will be +5ºC with pure water and -7ºC with glycol water.



- *Example*

  For an outlet water temperature of +5ºC:

  Minimum Δtemp.: 2,6ºC → T. condition 7,6ºC / 5ºC

  Maximum Δtemp.: 6,0ºC → T. condition 11ºC / 5ºC

■ Anti-freeze protection with glycol water

If a pure product is used for dilution in order to protect the hydraulic circuit, the following instructions must be followed:

- Do not introduce any of the pure anti-freezing product separately and then the water in the installation.
- Always prepare the water mixture + anti-freeze + corrosion inhibitor at the correct dosage prior to introducing it into the installation.

Procedure:

- At minimum, a complete rinsing of the hydraulic installation must be performed.
- After the final rinsing, the installation must be completely drained.
- Introduce the water/anti-freeze/inhibitor mixture and increase the pressure with a hydraulic pump.

  We recommend using a filling device with a non-return valve for compliance with the domestic anti-contamination standards. The device must never in any case be connected to the city network if the additives used in the hydraulic circuit are not approved by the Ministry of Sanitation in the country of installation.
- Completely purge the installation.
- Circulate the mixture throughout the entire installation for a minimum of 2 hours prior to starting up the unit.
- Check the final dosage obtained with a densimeter or refractometer.
- Check the pH obtained with pH paper strips or a pH metre.
- Place a label in a visible place that indicates:
  * the presence of anti-freeze in the installation,
  * the name of the product and the supplier,
  * the dosage and the pH as of the time the unit is started up.

If more amount is needed, it must be exactly the same mixture as the product initially used.

The following table and curves feature the minimum glycol percentages required for the installation in accordance with the freezing point.

The pumps that incorporate the LPC / ILPC units can work with any concentration of mono-ethylene glycol, albeit with a reduction in the available pressure due to the variation of water flow. The pump must be changed for mono-propylene glycol (upon request).

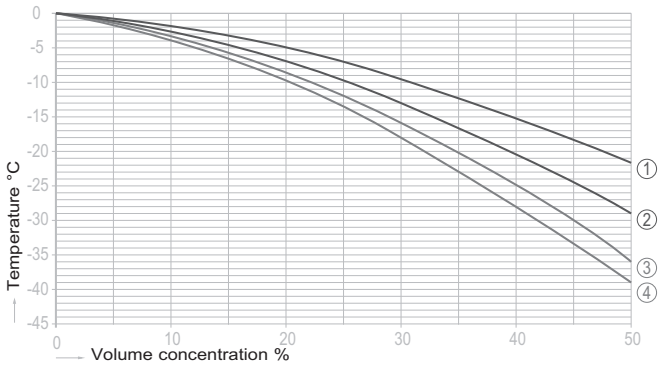
Warning: the glycol concentration must keep the fluid at least 6°C below the outlet water temperature foreseen in the evaporator in order to allow a correct adjustment of the evaporator's minimum pressure regulation. If the concentration is below the necessary amount, there is a risk of freezing. On the other hand, any excess of concentration entails a decrease in performance.

Required glycol concentration

Concentration	%	0	10	20	30	40	50
Mono-ethylene glycol (MEG)	ºC	0	-3	-7	-13	-20	-29
Mono-propylene glycol (MPEG)	ºC	0	-2	-5	-10	-15	-21

Note: The values are offered as a guide according to the standard characteristics of the MEG. These may vary based on the MEG manufacturer, which is why it is necessary to consult the manufacturer data in order to guarantee protection up to the desired temperature.

Minimum freezing and usage temperature graphs



Minimum usage temperature:

① - Mono-propylene glycol

② - Mono-ethylene glycol

Freezing temperature:

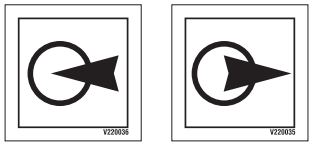
③ - Mono-propylene glycol

④ - Mono-ethylene glycol

Installation hydraulic diagram

The design of the hydraulic circuit must observe the operating conditions (flows - pressure drops).

- The direction of water circulation must be observed as indicated on the stickers on the unit.



- The diameters of the unit hydraulic connections can be referred to in the next table:

CIATCooler	Ø hydraulic connections
90V-STD al 100V-STD 90V-HEE al 100V-HEE	1 1/4" M
120V-STD al 180V-STD 120V-HEEal 180V-HEE	1 1/2" M
200V-STD al 360V-STD 200V-HEE al 280V-HEE	2" M
420V-STD al 960V-STD 320V-HEE al 720V-HEE	2 1/2" H

- It is advisable to use flexible hoses for connecting the piping to the unit in order to reduce the transmission of vibrations to the building to the greatest degree. It is mandatory to assemble hoses if the unit is installed over shock absorbers. Optionally, a flexible hydraulic connections kit can be supplied.
- The pipe layouts must be set out with the lowest possible number of bends to minimise pressure drops. The pipes must be correctly supported to prevent exerting excessive force on the unit connections.
- Before insulating the tubes and charging the system perform a preliminary check to verify that there are no drops in the installation.
- The pipes must be carefully insulated to prevent leaks and condensation. Ensure that the material used is steam barrier type. Otherwise, cover the insulation using appropriate protection.
- The water must be analysed and the circuit must be set out according to the results. If necessary, an expert in water treatment must be consulted (see section on corrosion behaviour).
- **In installations to open circuits, if it is not possible to maintain the water conditions within the values indicated in the corrosion behaviour table featured, it will be necessary to install an exchanger that separates the unit circuit from the circuit of the water circuit to be dealt with by using materials compatible with these characteristics, whether stainless steel or titanium.**
- Plan the anti-freeze protection for the installation when the outdoor temperature is low: water with anti-freeze, thermal insulation of the hydraulic circuit, electrical heaters in the hydraulic circuit, draining from the installation when the unit does not work, etc.

• LP / ILP version

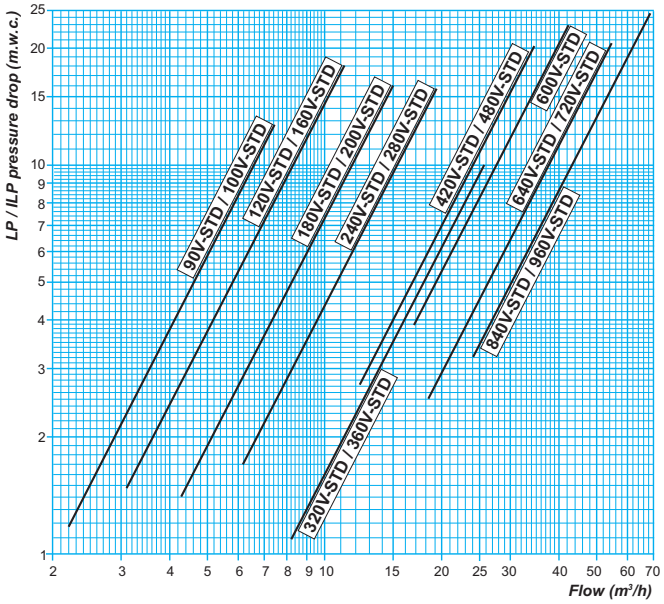
In this case the engineer must set up the complete hydraulic circuit with all the components: thermal buffer tank, motorised pump group, expansion vessel, safety, regulation, cut-off and draining valves, air bleeder valve, etc.

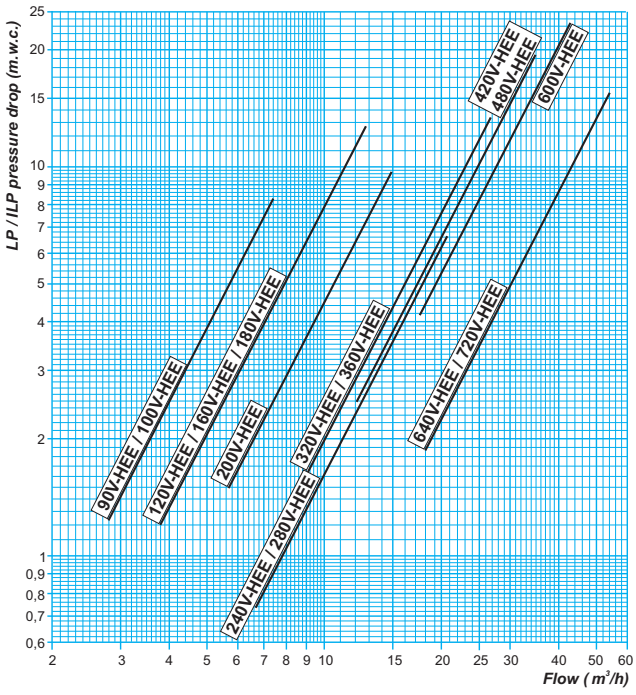
Note: optionally, a kit with cut-off and water regulation valves can be supplied.

It is also necessary to install a filter in the hydraulic power supply to the unit in order to prevent clogging of the plate exchanger. Non-compliance with this recommendation can cause reduced flow which can lead to freezing and breaking of the exchanger.

Optionally, a kit with a stainless steel mesh filter (500 microns) can be supplied.

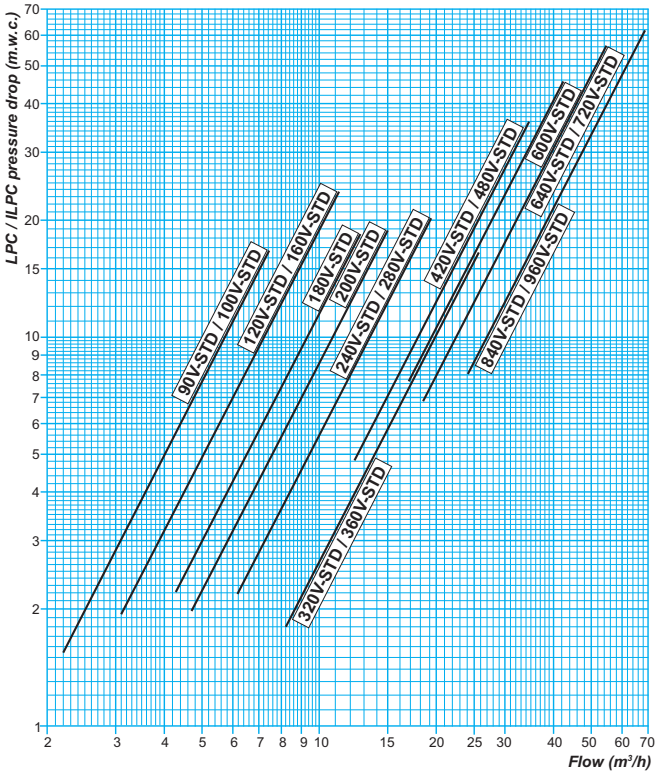
Both at the inlet and the outlet of the unit, install thermal pressure gauges which enable supervising the operation of the installation, or at least plan the installation of these.

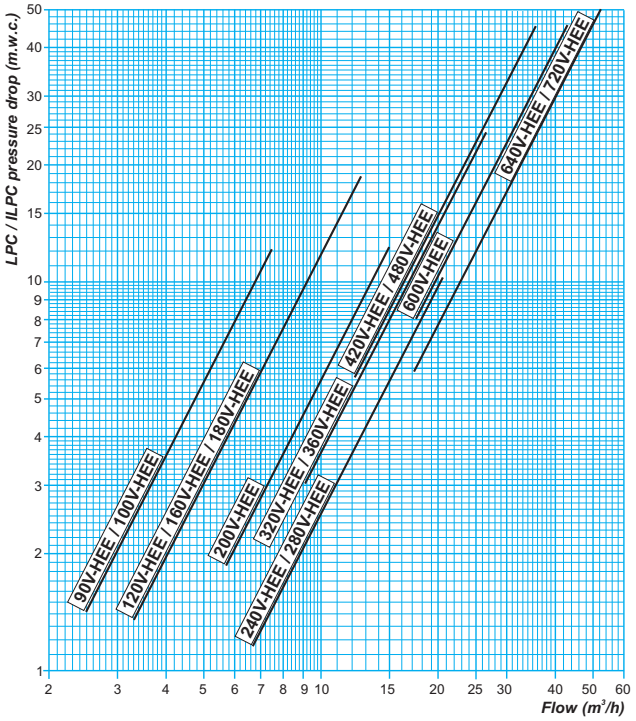




- **LPC/ILPC version (circulation pump included)**

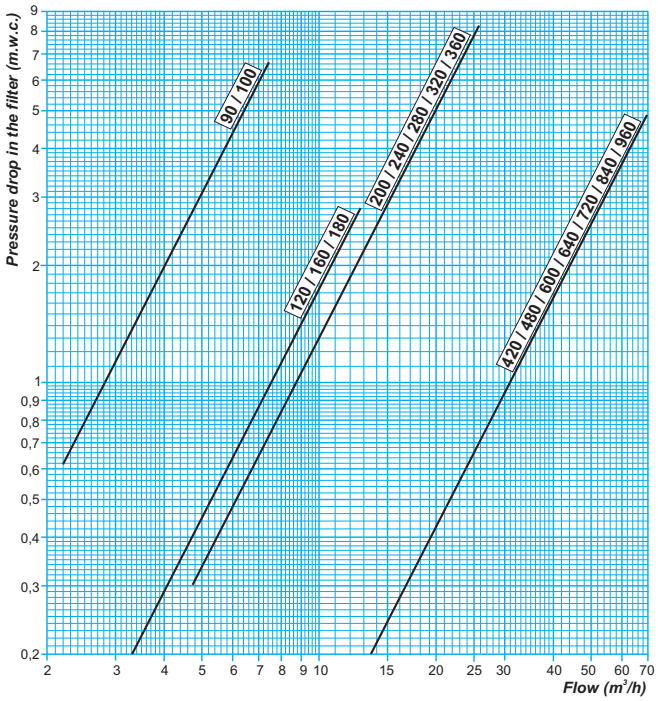
These units include a motorised pump group made up of: centrifugal circulation pump, closed expansion vessel, safety valve with a tare value of 4 bar, draining valve, and automatic air bleeder valve (from model 200V-STD and 160V-HEE).





A kit with a stainless steel mesh filter (500 microns) is also supplied for installation by the installer. **It is also necessary to install this filter in the hydraulic power supply to the unit in order to prevent clogging of the plate exchanger.**

The following graph represents the pressure drop for that filter:



The engineer must prepare the other accessories for completion of the hydraulic circuit: thermal buffer tank, air bleeder valve (in models 90 to 180), regulation, cut-off and draining valves, thermal pressure gauges, etc.

- **LPC/ILPC version with hydraulic module**

In addition to the previously described motorised pump group, these units include a module with a thermal insulation tank made of black stainless steel, painted and thermally insulated, with an electric tank heater.

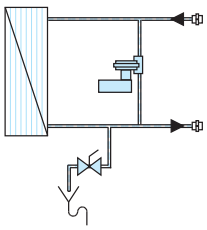
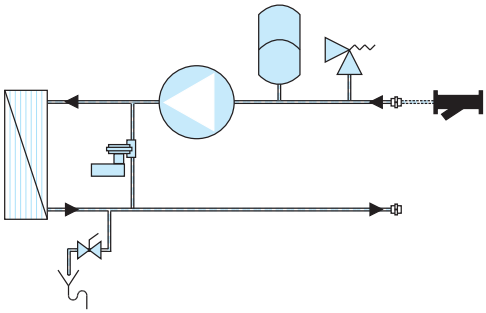
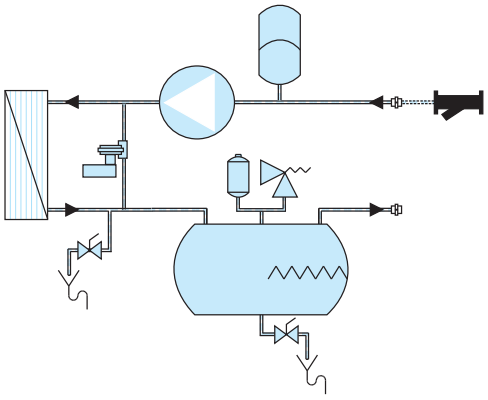
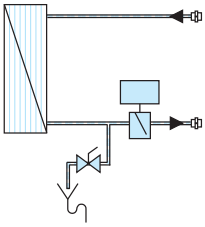
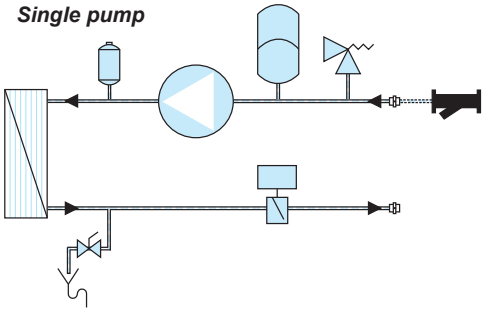
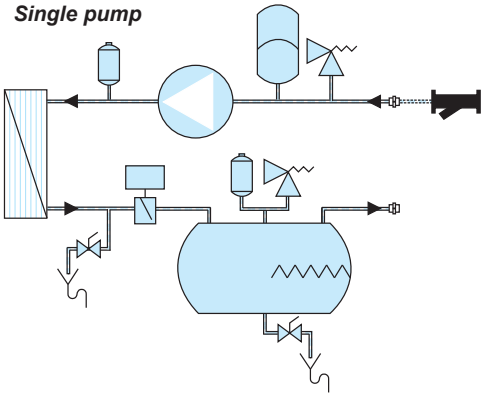
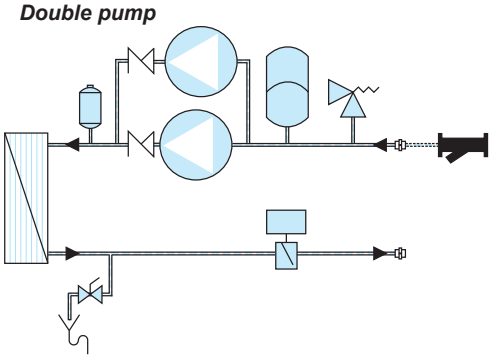
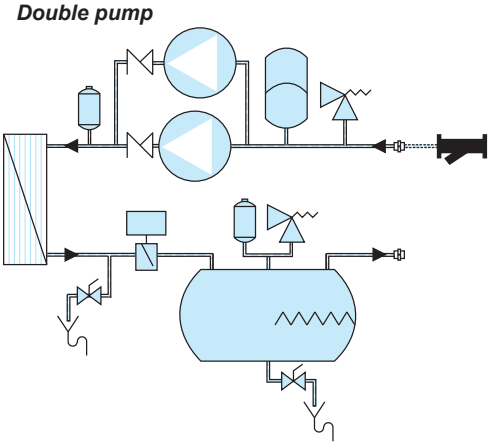
The module can be supplied:

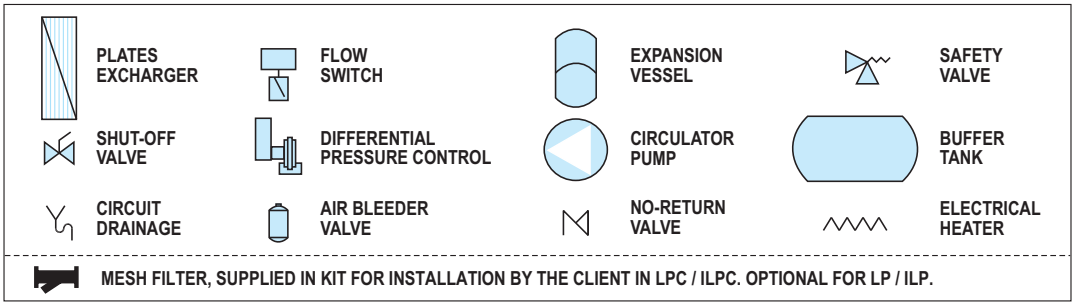
- Coupled to the LPC / ILPC unit, models 90 to 360 (STD version) and models 90 to 280 (HEE version).
- Separate for connection on site by the installer. The diameters of the hydraulic connections between unit and module can be referred to in the next table:

Separate module	Ø connections on module side	Ø connections on unit side
90V-STD to 100V-STD **90V-HEE to 100V-HEE**	1 1/4" M	1 1/4" H
120V-STD to 180V-STD **120V-HEE to 180V-HEE**	1 1/2" M	1 1/2" H
200V-STD to 600V-STD **200V-HEE to 360V-HEE**	2" M	2" H
640V-STD to 960V-STD **420V-HEE to 720V-HEE**	2 1/2" M	2 1/2" H

Note: in this case is posible to supply in the kit flexible hydraulic connections of 500 mm (for more detail, please refer to the "separate hydraulic module" of chapter 10.

■ Schematic diagram of the hydraulic circuit

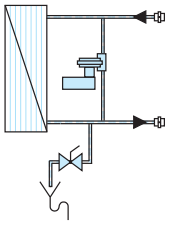
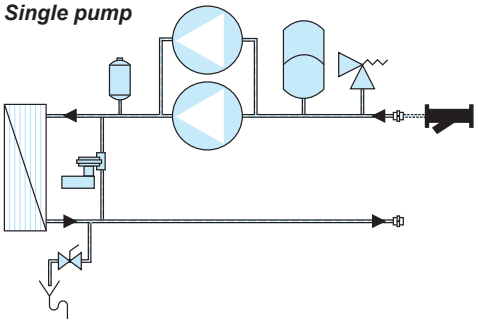
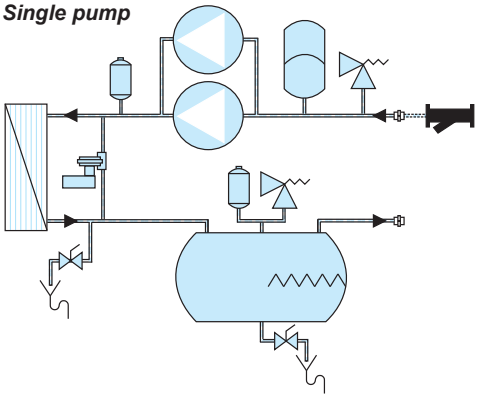
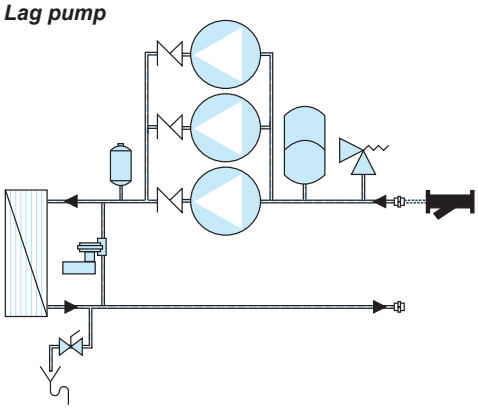
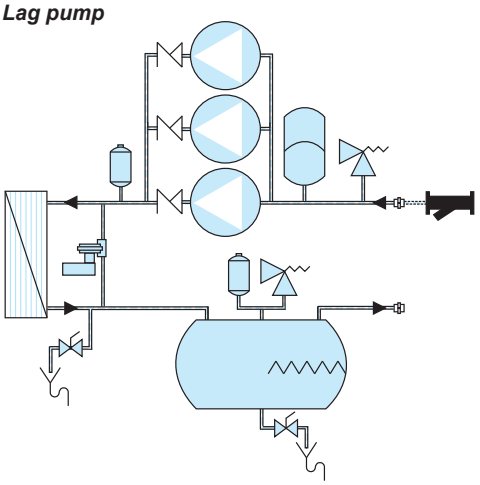
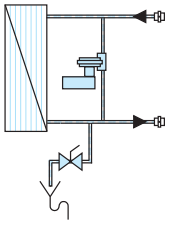
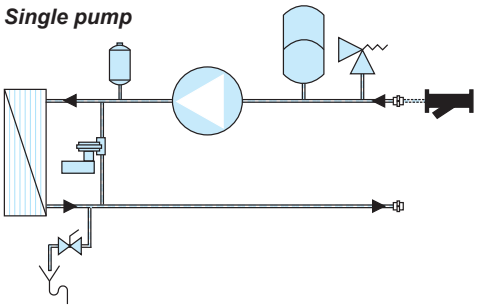
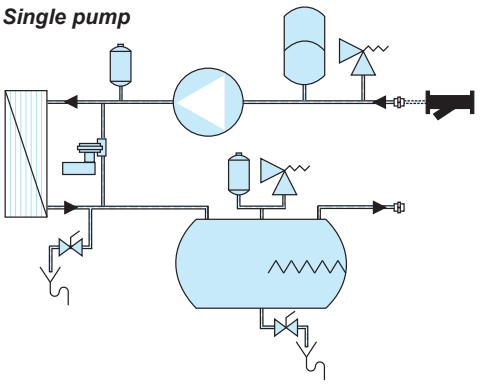
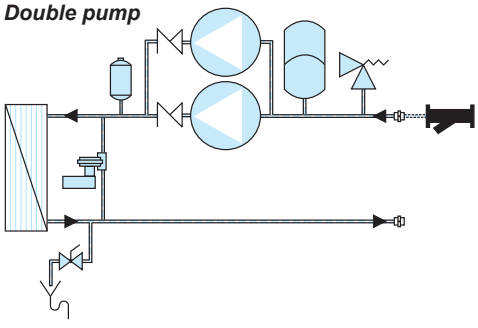
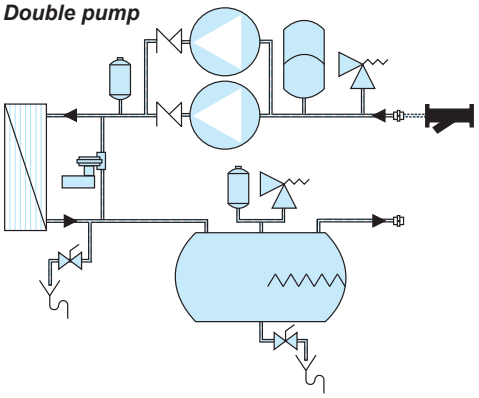
	LP / ILP	LPC / ILPC with pump	LPC / ILPC with hydraulic module
90V-STD 100V-STD 120V-STD 160V-STD 180V-STD 90V-HEE 100V-HEE 120V-HEE 160V-HEE 180V-HEE			
200V-STD 240V-STD 280V-STD 320V-STD 360V-STD 200V-HEE 240V-HEE 280V-HEE 320V-HEE 360V-HEE		*Single pump* 	*Single pump*  *Double pump* 	*Double pump* 



Cut-off and water regulation valves, as well as flexible hydraulic connections, can also be supplied in the kit.

■ Schematic diagram of the hydraulic circuit (...continued)

<table>
<tr><th></th><th>LP</th><th>LPC with pump</th><th>LPC with hydraulic module</th></tr>
<tr><td rowspan="2">420V-STD
480V-STD
600V-STD
640V-STD
720V-STD

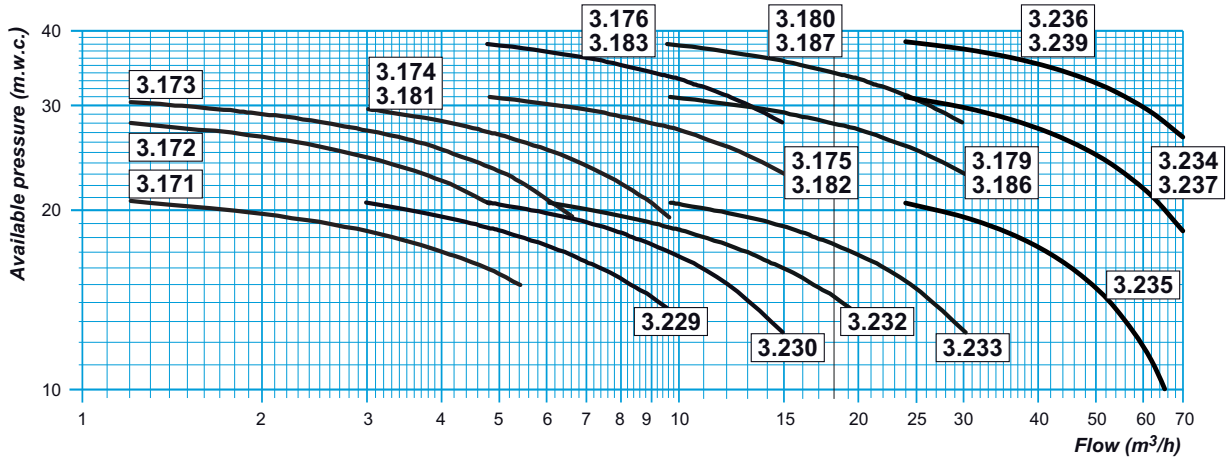
420V-HEE
480V-HEE
600V-HEE
640V-HEE
720V-HEE</td><td rowspan="2">  </td><td>Single pump
  </td><td>Single pump
  </td></tr>
<tr><td>Lag pump
  </td><td>Lag pump
  </td></tr>
<tr><td rowspan="2">840V-STD
960V-STD</td><td rowspan="2">  </td><td>Single pump
  </td><td>Single pump
  </td></tr>
<tr><td>Double pump
  </td><td>Double pump
  </td></tr>
</table>

Water chillers and air-water heat pumps

■ Circulation pumps available for LPC / ILPC

CIATCooler LPC / ILPC		90V-STD	100V-STD	120V-STD	160V-STD	180V-STD	200V-STD	240V-STD	280V-STD	320V-STD	360V-STD	420V-STD	480V-STD	600V-STD	640V-STD	720V-STD	840V-STD	960V-STD
		90V-HEE	100V-HEE	120V-HEE	160V-HEE	180V-HEE	200V-HEE	240V-HEE	280V-HEE	320V-HEE	360V-HEE	420V-HEE	480V-HEE	600V-HEE	640V-HEE	720V-HEE	--	
Standard	No. single pump	3.171	3.172	3.172	3.173	3.174	3.174	3.174	3.175	3.175	3.175	3.179	3.179	3.179	3.179	3.179	3.234	3.234
	No. double pump ①	--	--	--	--	--	3.181	3.181	3.182	3.182	3.182	3.186	3.186	3.186	3.186	3.186	3.237	3.237
High-pressure (optional)	No. single pump	3.173	3.173	3.174	3.174	3.175	3.176	3.176	3.176	3.176	3.176	3.180	3.180	3.180	3.180	3.180	3.236	3.236
	No. double pump ①	--	--	--	--	--	3.183	3.183	3.183	3.183	3.183	3.187	3.187	3.187	3.187	3.187	3.239	3.239
Low-pressure (optional)	No. single pump	--	3.171	3.171	3.171 (*)	3.229	3.229	3.229	3.229	3.230	3.230	3.232	3.232	3.233	3.233	--	3.235	3.235

① Double or lag pump depend on the model.
② Not available for the 160V-HEE model.



Note: These pumps can operate with glycol water (mono-ethylene glycol), although with a reduction of the available pressure (due to the flow variation with glycol water). The correction coefficients for operation with glycol water can be referred to in the technical brochure for CIATCooler units.

■ Corrosion behaviour

Water content	Concentration (mg/l)	AISI 316	Copper
Organic substances		+	0
Electrical conductivity	< 500 µS/cm	+	+
	> 500 µS/cm	+	-
NH_3	< 2	+	+
	2 - 20	+	0
	> 20	+	-
Chlorides *	< 300	+	+
	> 300	0	+
Sulphites, chloride-free	< 5	0	+
	> 5	0/-	0
Iron in solution	< 10	+	+
	> 10	+	0
Free carbonic acid	< 20	+	0
	20 - 50	+	-
	50	+	-
Manganese in solution	< 1	+	+
	> 1	+	0
pH value	< 6	0	+
	6 - 9	0/+	+
	> 9	+	0
Oxygen	< 2	+	+
	> 2	+	+
Sulphates	< 70	+	+
	70 - 300	+	0
	> 300	-	-

The units' hydraulic circuits are made of copper pipes. The exchanger plates are made of AISI-316 stainless steel, and the material used for soldering the plates is copper.

The following table indicates corrosion behaviour for copper and the AISI-316 stainless steel with regard to water with different compositions. Values outside these ranges can cause corrosion problems in the hydraulic circuit and in particular in the plate exchangers.

It is recommended that the water filling the hydraulic circuits be filtered and treated, if necessary.

Note: For open-circuit installations, if it is not possible to maintain the water conditions within the values indicated in the previous table, it will be necessary to install an exchanger that separates the unit's circuit from the water circuit to be treated by using materials compatible with these characteristics, whether stainless steel or titanium.

* *Max. 60ºC*
\+ *Good resistance under normal conditions.*
0 There may be corrosion problems, especially if other factors intervene.
\- *Not advisable.*

10. Safety elements

Low pressure safety device

This safety device performs the appropriate control based on the measurement of a low-pressure electronic sensor.

High pressure pressostat

Connected to the compressor discharge, it will stop its operation when the pressure at that point reaches the setpoint. Disconnects at 42 bar and It's reset manually.

Liquid receiver safety valve

The heat pump models 320 to 960 (STD version) and 200 to 720 (HEE version) include a safety valve in the liquid receiver. Valve tare value at 45 bar.

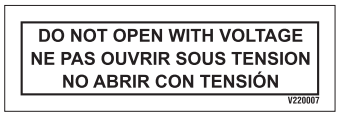
Caution: Avoid the valve triggering direction.

Magnetothermal protection switches line

They are located at the beginning of the power lines for the compressor (s) and motor fan(s) to protect them.

Main door switch

By using a mechanical device, it impedes access to the electric panel when the unit is with voltage.



Automatic switch in the control circuit

Magnetothermal switch that protects the operation circuit against continuous surges as well as against high currents of short duration (short circuits).

Water circulation pump control

For units that include a circulation pump, the electronic control times its disconnection after the unit is disconnected.

The electronic control also activates a safety device in the event of pump failure which detains the operation of the unit.

Water safety valve

LPC/ILPC units include a safety valve with a tare value of 4 bar (see hydraulic diagrams) in the hydraulic circuit.

Water circulation control

A circulation control device, differential pressostat or flow switch, depends on the model, detains the operation of the unit when it does not detect water circulation (please refer to the "Schematic diagrams of the hydraulic circuit").

Anti-freeze protection with heaters (optional)

Anti-freeze protection with flexible electrical heaters around the pipe lines of the hydraulic circuit to avoid their freezing. This optional is recommended with negative temperatures.

Water anti-freeze protection

This safety device is built into the electronic control. This is activated in COOLING mode when the water outlet temperature is lower than the set value. This causes the outdoor fan, the compressor and the electrical tank heater connection to be stopped (in LPC/ILPC models with a hydraulic module).

Note: For operation with glycol water: please consult.

Refrigerant anti-freeze protection

This safety device is built into the units' electronic control. It is activated when, working in COOLING mode, the indoor refrigerant temperature is lower than the setpoint value. This causes the outdoor fan, the compressor and the electrical tank heater connection to be stopped (in LPC/ILPC models with a hydraulic module).

Defrost control

This control's mission is to eliminate the ice that might possible form on the outdoor coil when the unit is working in HEAT CYCLE.

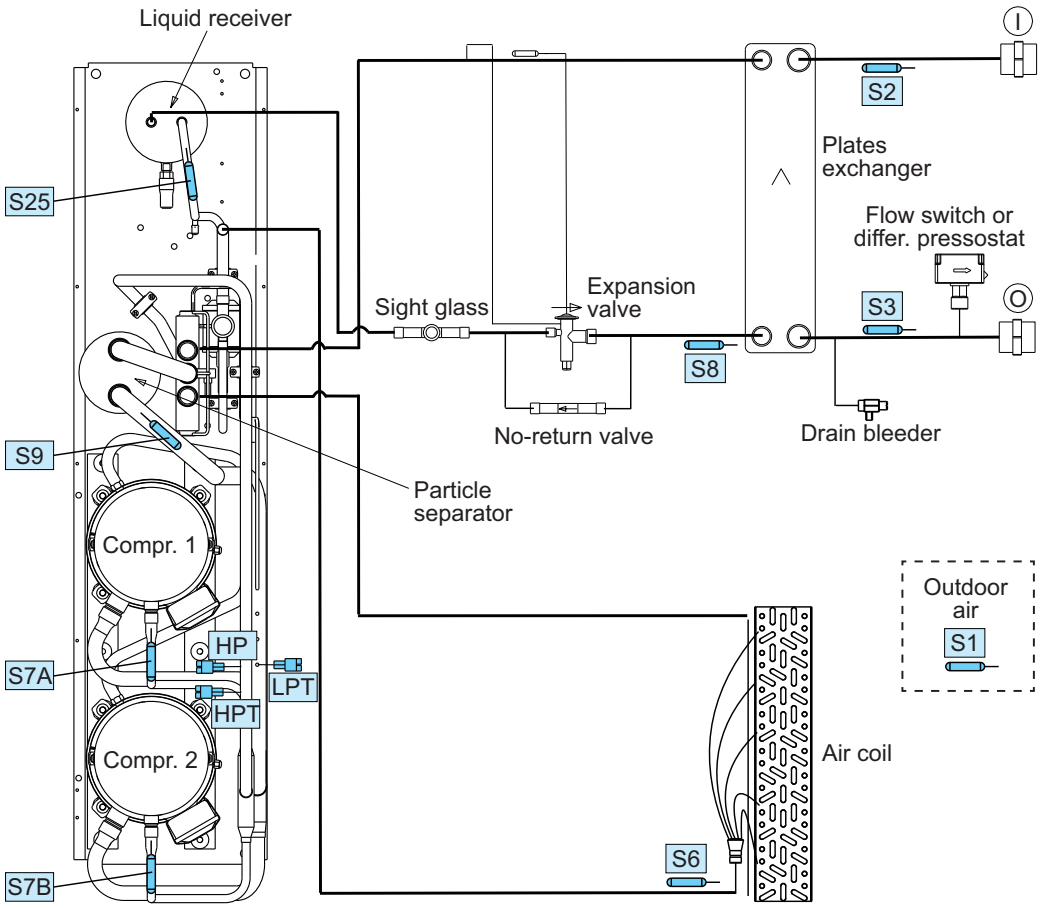
The control runs a defrost cycle when, after the fixed time has elapsed for the compressor working, the temperature measured at the defrost probe is below the one set for its beginning. In the defrost operation, the outdoor fan(s) is(are) stopped and the cycle inversion valve triggers the operation in cooling MODE. Next the tank heater is connected (in LPC/ILPC models with a hydraulic module) and, if necessary, the outdoor fans are connected.

Safeties at the compressor

The scroll type compressor that these units as standard have the following safeties:

- Non-return valve built into the compressor.
- Thermal protection in the compressor, which stops the operation of the motor when there is excessive heating.
- Protection of the compressor discharge temperature by means of a discharge probe.

Location of the control and safety elements



CONNECT2 control		Location	
Device	**Adjustment**	**Circuit 1**	**Circuit 2**
Outdoor temperature probe	CONNECT2	S1	
Inlet water exchanger probe	CONNECT2	S2	
Outlet water exchanger probe	CONNECT2	S3	S10
Outdoor coil probe	CONNECT2	S6a,b	S13a,b
Compressor 1 discharge probe	CONNECT2	S7A*	S12A
Compressor 2 discharge probe	CONNECT2	S7B*	S12B
Exchanger anti-freeze refrigerant probe	CONNECT2	S8	S14
Aspiration probe	CONNECT2	S9	S15
Refrigerant liquid probe	CONNECT2	S25	S26
High-pressure transducer	CONNECT2	HPT	HPT
Low-pressure transducer	CONNECT2	LPT	LPT
High-pressure pressostat	42 bar	HP	HP
Liquid receiver safety valve (heat pumps from 320V-STD and 200V-HEE)	45 bar	Vs	Vs
Safety valve in the hydraulic circuit (LPC models)	4 bar	Vs	

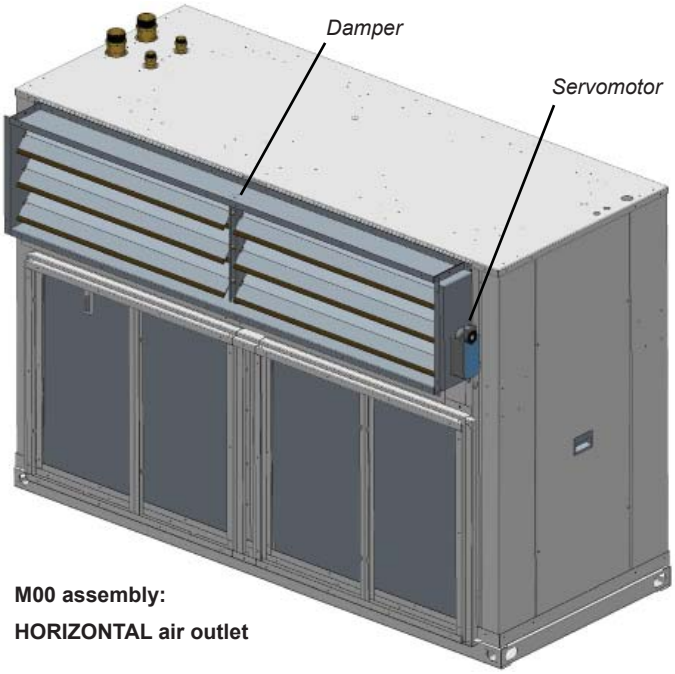
* S7 in units with only one compressor

11. Options

Condensation pressure control

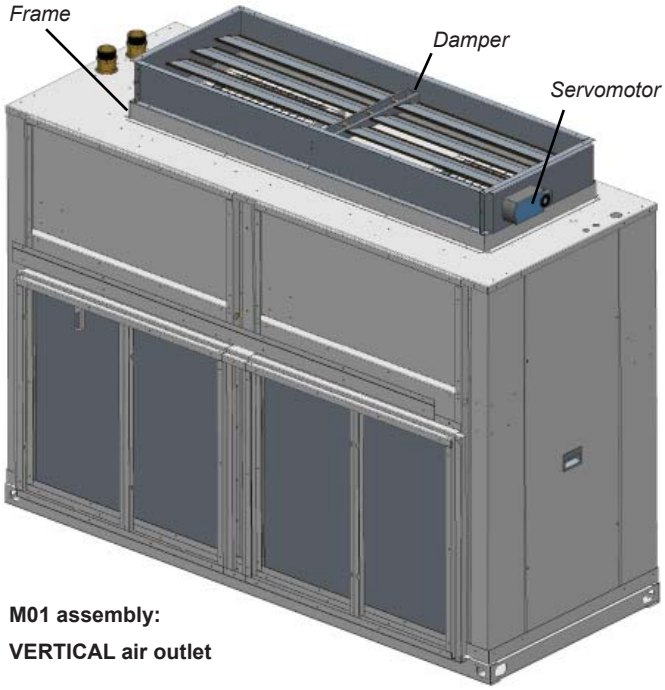
In units with the **STD version** that work in cooling with an outdoor temperature lower than 12ºC, the condensation pressure control allowing an "all seasons" operation (up to -15ºC) is mandatory.

In units with centrifugal fan a check is performed per motorized damper in the fan outlet. A servomotor opens or closes the damper depending on the proportional signal 0-10V received from the electronic control system (during the operation of the fan).



M00 assembly:

HORIZONTAL air outlet



M01 assembly:

VERTICAL air outlet

CIATCooler	Assembly	No. of dampers	Servos per damper	Damper width
90V-STD to 360V-STD	M00	1	1	150
420V-STD to 600V-STD		1	2	150 (*)
90V-STD a 360V-STD	M01	1	1	150 (*)
420V-STD a 600V-STD		1	2	150 (*)
640V-STD a 960V-STD		2	1	150 (*)

(*) The damper incorporates a frame (60 mm width) to fit the damper to the fan(s) outlet.

The motorized damper is mounted on the air discharge panel of the machine. This in order to allow the operation test in the factory, with all the necesary presetting during the test of the CATCooler unit at the end of the production line.

However, in accordance with the code of practice as regards aeraulic installation, we recommend a remote installation of the damper, at a distance approximately equal to 3xDe (equivalent diamenter) of the discharge air duct diameter.

This stipulation is the only one allowing a best operation of the motorized damper with a homogeneous flow of the air.

In order to remove the damper it is necessary to unscrew from the CIATCooler unit and disconnect the electrical suply of the servomotor.

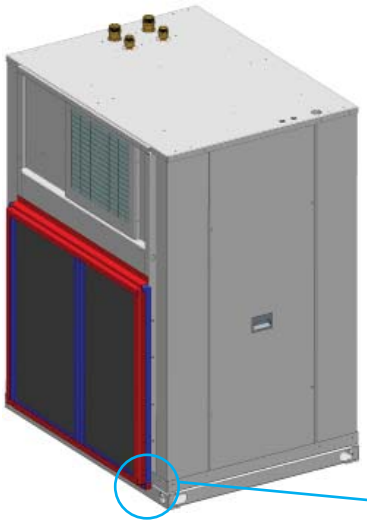
In case of asking together for flexible connections and damper for condensation pressure control (optional for version STD), discharge flexible ducts are attached to to the above mentioned damper. If it is removed the damper for installation on duct, it is necessary to maintain the frame for reconnecting the flexible connections. Without flexible connections this frame may be removed.

Air filter

These units can include a frame with gravimetric filters in the air return to the unit. The frame is assembled on a profile made of moveable steel metal which can be removed.

The filters frame is removable, and upon request, it is possible to supply the frame separately with the CIATCooler unit, to be joined on site.

The frame dimensions can be referred to in the technical brochure for CIATCooler units.



Frame width = 53 mm

Filters are moved by lifting the tab and dragging

Separate hydraulic module

A hydraulic module can be coupled to units with LPC / ILPC version. This one includes a thermal buffer tank made of black stainless steel, painted, and thermally insulated.

The module can be supplied:

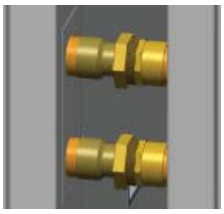
- Coupled to the LPC / ILPC unit, models 90 to 360 (STD version) and 90 to 280 (HEE version).
- Separate for connection on site by the installer. The diameters of the hydraulic connections between the unit and the module are:

Separate module	Ø connections on module side	Ø connections on unit side
90V-STD to 100V-STD 90V-HEE to 100V-HEE	1 1/4" M	1 1/4" H
120V-STD to 180V-STD 120V-HEE to 180V-HEE	1 1/2" M	1 1/2" H
200V-STD to 600V-STD 200V-HEE to 360V-HEE	2" M	2" H
640V-STD to 960V-STD 420V-HEE to 720V-HEE	2 1/2" M	2 1/2" H

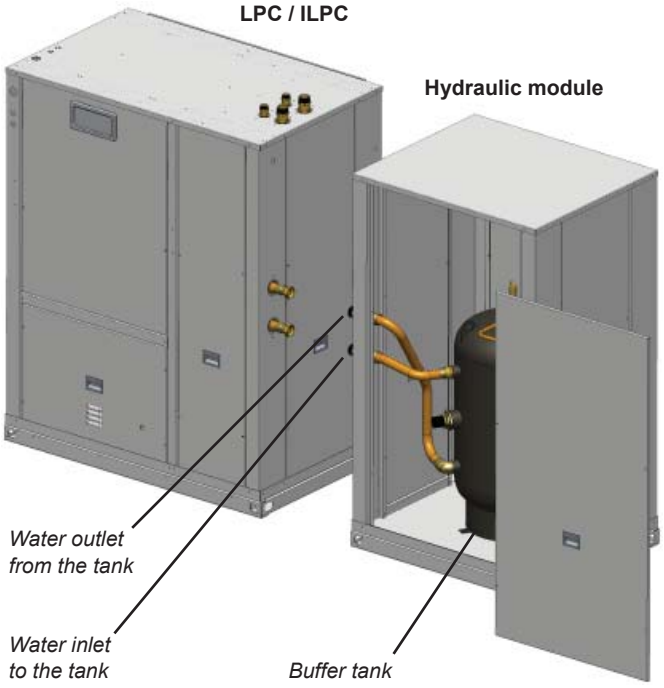
Minimum distance between the unit and the separate module: 167mm. In models 640V-720V-HEE: 187mm.

In this case, the flexible connections of 500 mm are recommended (option).

Note: In order that the unit with hydraulic module could incorporate the option of antifreeze protection with flexible electric heaters on the hydraulic circuit piping, the module must be coupled to the unit, or in the case of separate, do not add additional elements in the threaded connections between module and unit, and isolate these connections.



Therefore, antifreeze protection on piping is not compatible with flexible hydraulic connections.



Wiring of the buffer electric support

The buffer tank includes an anti-freeze electrical heater (1kW). Optionally, in heat pump units, this heater can be replaced by a support heater in 1 to 4 stages.

With separate hydraulic module, the installer must perform the wiring from this module to the electric panel of the machine.

* 1 power stage: the terminal block for connecting the electrical heater to the unit are located in a box inside the module, on the same pillar that the hydraulic connections.
  - Anti-freeze electrical heater (1 kW):
    230V / I ph → 2-wire + ground
  - Support electrical heater (3 to 12 kW):
    400 V / III ph → 3-wire + ground

* 2 to 4 power stage (24 to 48 kW): the module incorporates an auxiliary electric panel, 3-wire power supply (door switch) + ground + 6 to 8-wire (2 to 4 stages) in a terminal block for connection of electrical heaters (see wiring diagram).

Coil protection grille

The CIATCooler units can include a protection grille for the coil. This grille is fixed by modules in the holes made for this purpose in the unit supports.

Cooling recovery circuit

The system consists in a hot water supplying by an heat recovery system on the compressor(s) discharge gas, on an auxiliary desuperheater exchanger.

On an heat pump model, the optional desuperheater can be used whatever the running mode, COOLING or HEATING.

This optional equipment is only available on request, and factory mounted.

■ Operating mode

The heat recovery is possible only if the unit is running, on COOLING mode or on HEAT PUMP mode.

For the same cooling or heating capacity, the desuperheater system allows a free heating of hot water with a reduction of the total input power of the unit.

■ Principle and precaution of hydraulic connection

In order to allow the unit to start up and to run under good conditions, the circuit must be as short as possible, and the water flow of the desuperheater must start slowly to normal operating condition, with a water flow equal to 10% of its standard value, and must be calculated for a hot water inlet temperature of +50°C.

Thus, it is recommended to have a hydraulic diagram making it possible to obtain very quickly a hot water at the inlet of the desuperheater (3 ways valve + controller + temperature sensor on the exchanger water inlet).

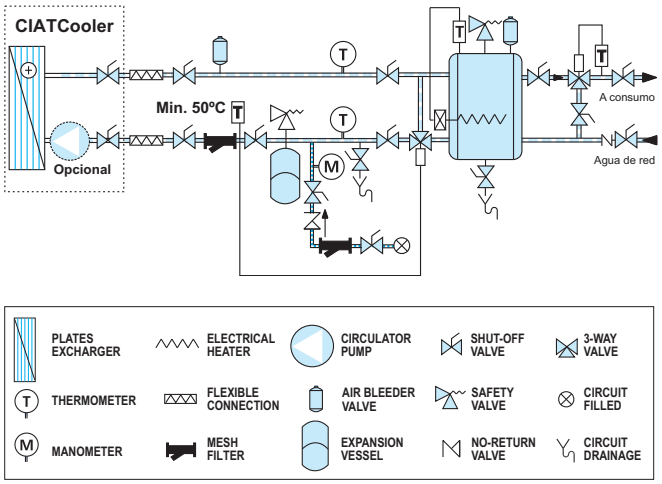
The controller set point must be adjusted to +50°C minimum.

The recovery circuit must be done in accordance with the standards in force and plan all of the necessary elements in a closed circuit: circulation pump (optionally supplied), expansion vessel, safety valve, mesh filter, filler, drainer, bleeders, thermometers, pressure gauges and cut-off and insulation valves.

The circulation pump can only work in a closed circuit. The command is performed from a thermostat located on the unit.

Attention: a detailed attention must carried with the selection of the expansion tank, because the recovery water circuit can reach the temperature of 120°C in the event of stopping of the circulator or non hot water consumption.

- Install heating elements on all pipes that could be exposed to freezing temperatures.



■ Technical characteristics of the recovery circuit with the STD version

CIATCooler		90V-STD	100V-STD	120V-STD	160V-STD	180V-STD	200V-STD	240V-STD	280V-STD	320V-STD	360V-STD	420V-STD	480V-STD	600V-STD	640V-STD	720V-STD	840V-STD	960V-STD
Recovery capacity ① (kW)		4,4	5,2	6,2	8,1	8,9	10,8	12,2	13,8	16,8	18,3	21,9	23,9	29,4	33,2	37,7	43,9	47,5
Nominal water flow (m^3/h)		0,38	0,45	0,53	0,70	0,76	0,93	1,05	1,18	1,44	1,58	1,88	2,06	2,53	2,85	3,24	3,77	4,08
Pressure drop (m.w.c.)		0,06	0,09	0,17	0,30	0,36	0,53	0,67	0,32	0,48	0,57	1,15	1,38	2,08	1,33	2,31	3,13	3,74
Cooling capacity (kW)		17,8	21,3	25,3	33,0	36,2	44,0	49,6	56,1	68,3	74,6	89,3	97,6	119,7	135,2	153,1	178,2	194,5
Power input (kW)		6,8	7,9	8,6	10,8	12,7	15,6	17,0	19,5	21,7	25,5	28,1	32,2	42,3	40,5	49,9	56,0	65,3
Hydraulic connections	Type	Threaded																
	Diameter	1" M										1 1/4" H						
Pump (optional)	Type	Humid rotor										Dry rotor						
	Number	1																
	Motor output (kW)	0,05										0,25						
	Maximum absorbed current (A)	0,4										2,0						
	Avail. pressure (m.w.c.) (max. pump speed) ②	5,54	5,45	5,35	5,15	5,07	4,85	4,69	4,49	4,11	3,90	11,18	11,03	10,61	10,32	9,47	8,88	8,47
Additional weight	Recovery circuit (kg)	5,3	5,3	6,8	6,8	6,8	10,7	11,6	11,6	11,6	11,6	21,9	22,0	21,9	57,7	56,1	59,4	59,6
	Pump (optional) (kg)	3,2										14,6						

① Capacity recovered by the desuperheater circuit for nominal conditions and recovery water at 50/60ºC.

② Models 90 to 360, the change of speed of the pump is made by a button that changes color according to the selected speed (blue: low; green: medium; yellow: high).

Water chillers and air-water heat pumps

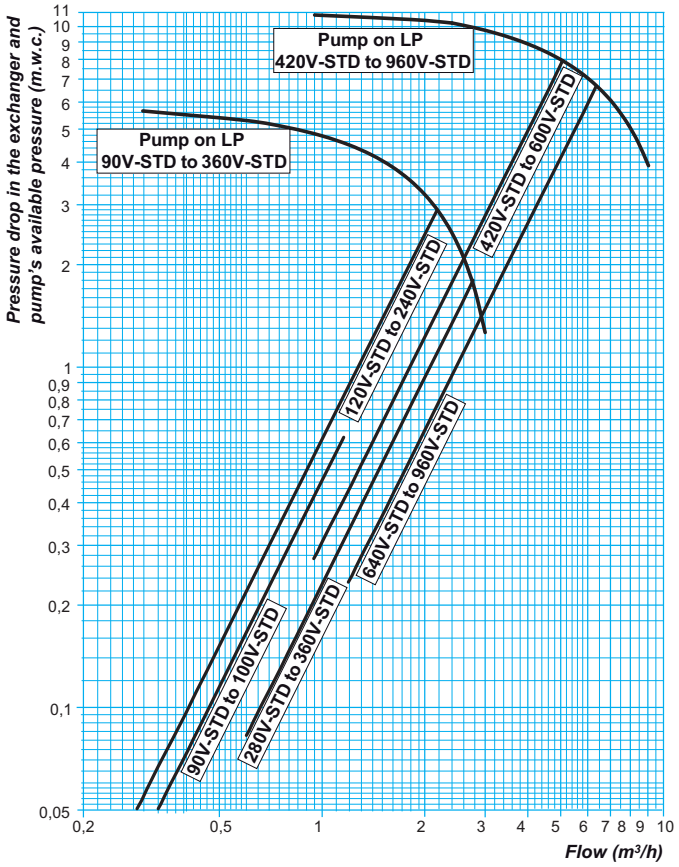
■ Technical characteristics of the recovery circuit with the HEE version

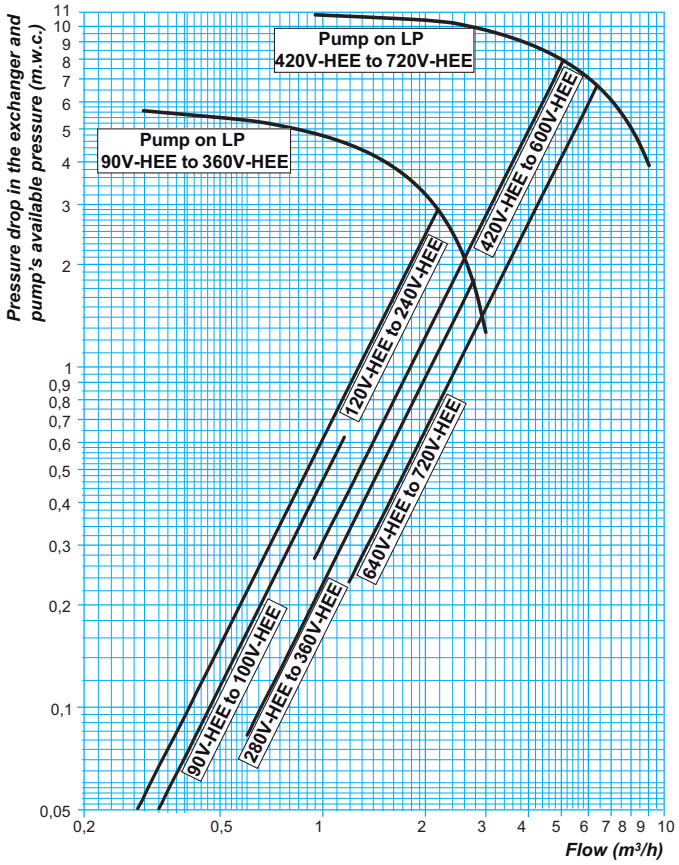
CIATCooler LP / ILP		90V-HEE	100V-HEE	120V-HEE	160V-HEE	180V-HEE	200V-HEE	240V-HEE	280V-HEE	320V-HEE	360V-HEE	420V-HEE	480V-HEE	600V-HEE	640V-HEE	720V-HEE
Recovery capacity ① (kW)		4,5	5,2	6,3	7,7	8,8	10,4	12,9	14,3	16,6	18,9	22,2	24,5	30,3	33,1	38,0
Nominal water flow (m³/h)		0,39	0,44	0,54	0,67	0,76	0,90	1,11	1,23	1,43	1,63	1,91	2,11	2,61	2,85	3,27
Pressure drop (m.w.c.)		0,07	0,09	0,18	0,27	0,35	0,49	0,75	0,35	0,47	0,61	1,18	1,44	2,21	1,33	1,75
Cooling capacity (kW)		18,5	21,1	25,6	31,6	35,8	42,5	52,4	58,3	67,8	77,1	90,4	99,8	123,5	135,0	154,7
Power input (kW)		6,2	7,1	7,8	10,0	11,9	13,8	15,7	17,6	20,7	24,8	28,3	32,7	41,2	41,6	49,6
Hydraulic connections	Type	Threaded														
	Diameter	1" M										1 1/4" F				
Pump (optional)	Type	Humid rotor										Dry rotor				
	Number	1														
	Motor output (kW)	0,05										0,25				
	Maximum absorbed current (A)	0,4										2,0				
	Avail. pressure (m.w.c.) (max. pump speed) ②	5,52	5,46	5,34	5,19	5,07	4,89	4,60	4,42	4,12	3,81	11,16	10,99	10,54	10,32	9,93
Additional weight	Recovery circuit (kg)	5,3	5,3	6,8	6,8	6,8	10,7	11,6	11,6	11,6	11,6	21,9	22,0	21,9	57,7	56,1
	Pump (optional) (kg)	3,2										14,6				

① Capacity recovered by the desuperheater circuit for nominal conditions and recovery water at 50/60°C.

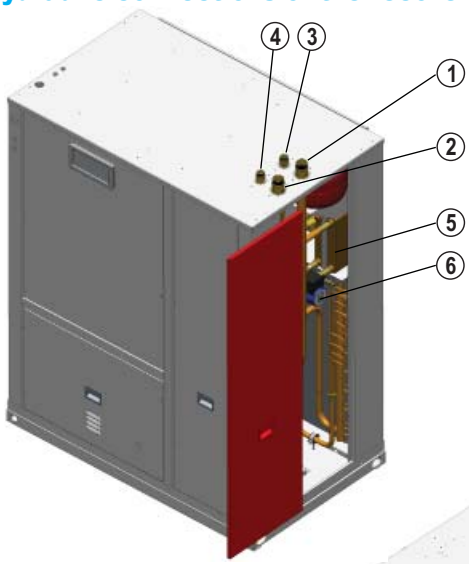
② Models 90 to 360, the change of speed of the pump is made by a button that changes color according to the selected speed (blue: low; green: medium; yellow: high).

■ Pressure drop of the recovery circuit and pump's available pressure

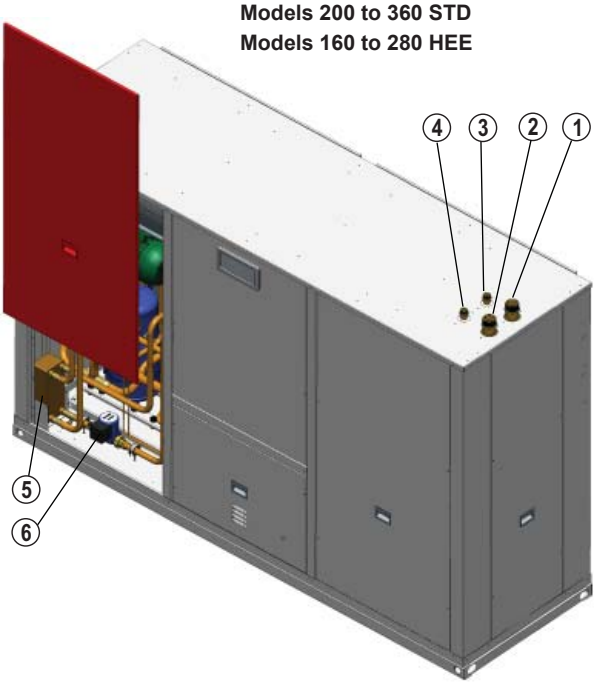




■ Hydraulic connections of the recovery circuit

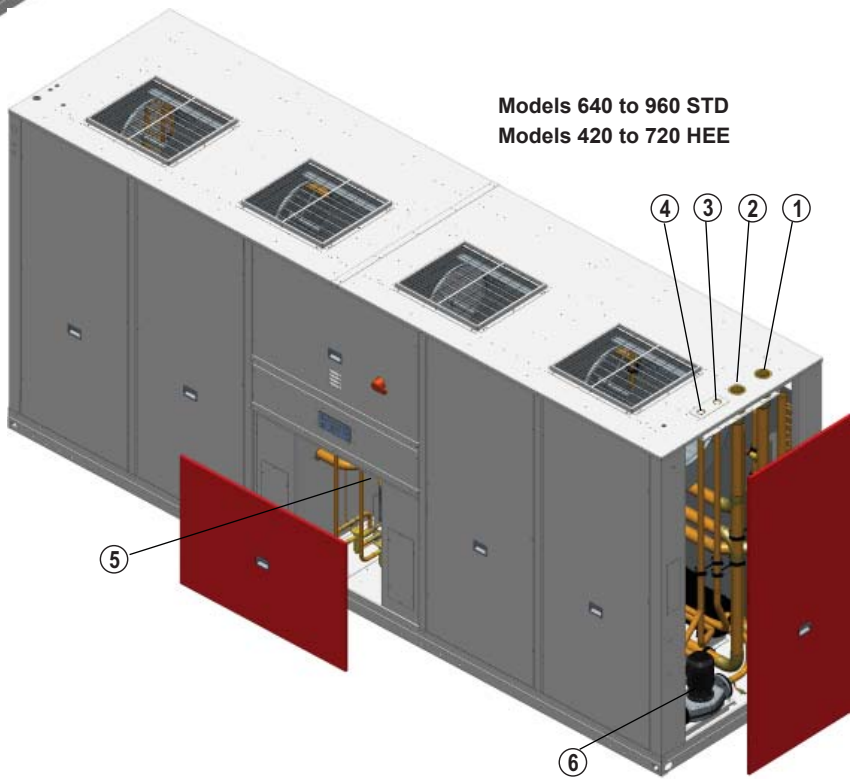


Models 90 to 180 STD
Models 90 to 180 HEE



Models 200 to 360 STD
Models 160 to 280 HEE

Models 420 to 600 STD
Models 320 to 360 HEE



Models 640 to 960 STD
Models 420 to 720 HEE

LEGEND	
①	Water inlet to the indoor circuit
②	Water outlet from the indoor circuit
③	Water outlet from the recovery circuit
④	Water inlet to the recovery circuit
⑤	Plate exchanger
⑥	Circulation pump (optional)

Notes:

- *In models 640 to 960 (STD version) and 420 to 720 (HEE version) with circulation pump in the recovery circuit and hydraulic module (optional), should be free space between the unit and the module for access to the pump.*
- *In models 640 to 960 (STD version) and 420 to 720 (HEE version), access instructions to the recovery exchanger are explained in the chapter "Maintenance".*

12. COMMISSIONING

Checks prior to commissioning

- It is advisable to make a complete sketch of the installation including the location of the unit and all the components used in the hydraulic circuit (cut-off and safety valves, water filter, circulation pump, buffer tank, etc.). It will be very useful for maintenance and repairs in the installation.
- Verify the absence of any leaks of the refrigerant.
- The following must be verified:
  - That the electrical power supply remains constant and that it corresponds to that featured on the unit data plate.
  - That the electric installation has been carried out according to the electric wiring diagram provided with the unit (consult the chapter on “Checking before commissioning”).
  - The correct connection of the sensors supplied with the unit.
  - That they are no cables close to heat sources.
- Once the above verifications have been carried out, the control circuit is supplied with voltage by the automatic control switch. It is necessary to leave the compressor crankcase heater with voltage for 24 hours before starting the compressor.

WICHTIG: WIEDERBEHEIZUNG DER OLWANNE

BEIDER ERSTEN INBETRIEBSETRUNZ ORDER NACH EINER LANGEN STROMUNTER-BRECHUNG BRINGEN SIE DIE MASCHINE UNTER SPANNUNG 24 STRUNDERLANG BEVOR SIE DEN(DIE) KOMPRESSOR(EN) EINSCHALTEN KOENNEN.

IMPORTANT: CRANKCASE HEATING

FOR THE FIRSTSTART OR AFTER ALONG TIME OUT OF VOLTAGE PUT THE MACHINE ON LIVE 24 HOURS BEFORE TO ALLOW THE COMPRESSOR(S) STARTING

IMPORTANT: SURCHAUFFE CARTER D’HUILE

AU PREMIER DÉMARRAGE OU APRÈS UNE ABSCENCE DE COURANT PROLONGÉE, METTRE LA MACHINE SOUS TENSION 24 HEURES AVANT D’AUTORISER LE DÉMARRAGE DU(DES) COMPRESSEUR(S).

IMPORTANTE: RISCALDARE IL CARTER DELL’OLIO

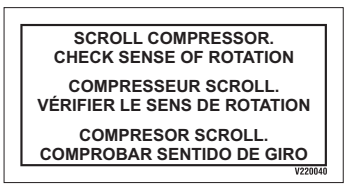
AL PRIMO AVVIAMENTO U DOPO UNA INTERRUZIONE PROLUNGATA DELLA ALIMENTAZIONE ELETTRICA, LASCIARE LA MACCINA SOTTO TENSIONE PER 24 ORE PRIMA DI AUTORIZZARE L’AVVIAMENTO DEL(DEI) COMPRESSORE(I).

IMPORTANTE: RECALENTAMIENTO DE ACEITE DEL CÁRTER

ANTES DEL PRIMER ARRANQUE O DESPUÉS DE UNA AUSENCIA DE CORRIENTE POR UN LARGO PERIODO DE TIEMPO, CONVIENE QUE LA UNIDAD ESTÉ CONECTADA UN MÍNIMO DE 24 HORAS.

V220084

- All CIATCooler models are equipped with scroll type compressors and have a phase control relay. Verify that they turn in the correct direction and, if not, reverse the power wires.



Adjustment of the water flow

- The filling of the hydraulic circuit is then carried out:
  - Open the water circuit valves and ensure that the water circulates around the exchanger with the pump in service.
  - Bleed the air in the hydraulic circuit.
  - Verify the operation of the water circulation controller and the cold/hot water control.
- Factory set configuration:
  - Thermal jump: 5ºC
  - COOLING mode operation: 12ºC / 7ºC
  - HEATING mode operation: 40ºC / 45ºC

  Operation is recommended with the emitters closed.

  Note: other control values are allowed once the verified flow and temperatures remain within the operational limits of the unit.
- The total pressure drop in the installation is not known precisely at start-up, such that it is necessary to adjust the water flow with the regulation valve in order to obtain the desired nominal flow.
- Thanks to the pressure drop generated in the hydraulic network, this regulation valve allows the network’s pressure/flow curve to be overlapped with the pump’s pressure/flow curve, thereby obtaining the nominal flow corresponding to the desired operating point.
- The reading of the pressure drop in the plate exchanger (which is obtained by connecting two pressure gauges on the unit’s inlet and outlet) will be used as a means of control and adjustment of the nominal flow of water in the installation.
- Next the following procedure must be performed:
  - Totally open up the regulation valve.
  - Leave the pump running for 2 hours in order to eliminate any possible solid particles present in the circuit.
  - Read the pressure drop of the plate exchanger when starting up the pump and 2 hours later.
  - If the pressure drop has decreased, this means that the mesh filter is obstructed; it must be disassembled and cleaned.
  - Repeat until the obstruction is eliminated from the filter.
  - Once the circuit is free of contaminating elements, read the pressure drop of the plate exchanger and compare it with the theoretical pressure drop of the selection.

    If the value is greater than the theoretical value, the flow is too high. The pump offers too high of a flow from the point of view of the installation’s pressure drop. In that case, close the regulation valve one revolution and read the new pressure drop. Perform a successive approximation by closing the regulation valve until the nominal flow is obtained at the desired operating point.

    On the contrary, if the network’s pressure drop is too high with regards to the available static pressure offered by the pump, the resulting water flow will be reduced and the temperature difference between the inlet and outlet of the exchanger will be more significant, which is why it will be necessary to minimize the pressure drops.

■ Control of the refrigerant load

- When starting the compressor(s), check the subcooling and overheating and thus verify is the refrigerant load is appropriate to the operation conditions.

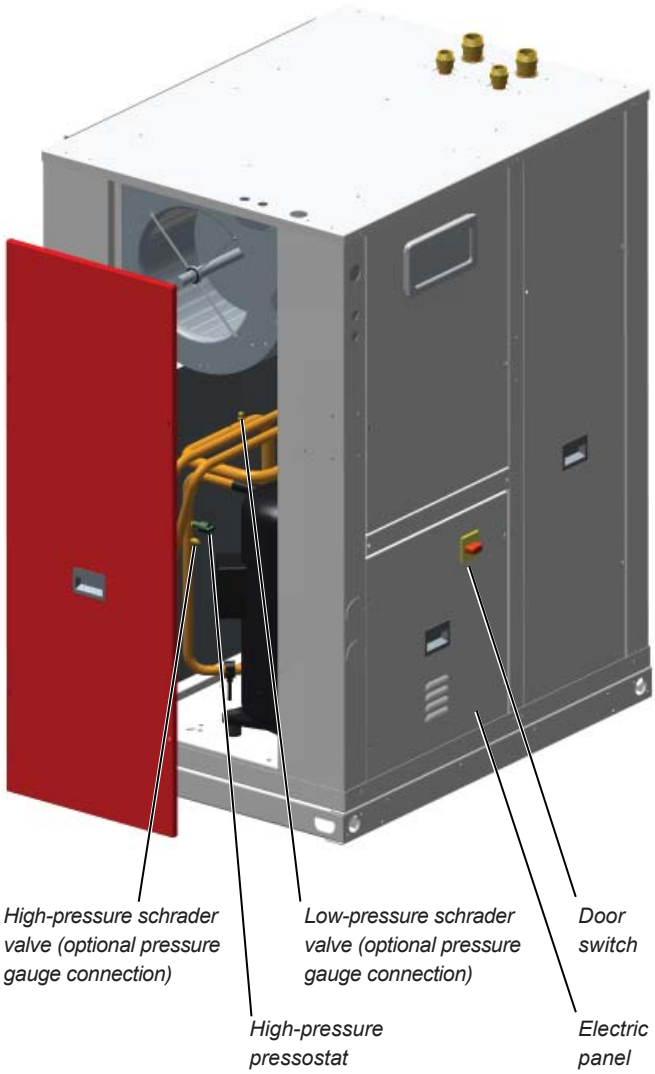
R 410A

- If the refrigerant load is lower than required, the suction pressure will be rather lower than normal, and overheating when suctioning from the compressors will be high. This can cause an interruption in operation due to activation of the refrigerant load safety device.

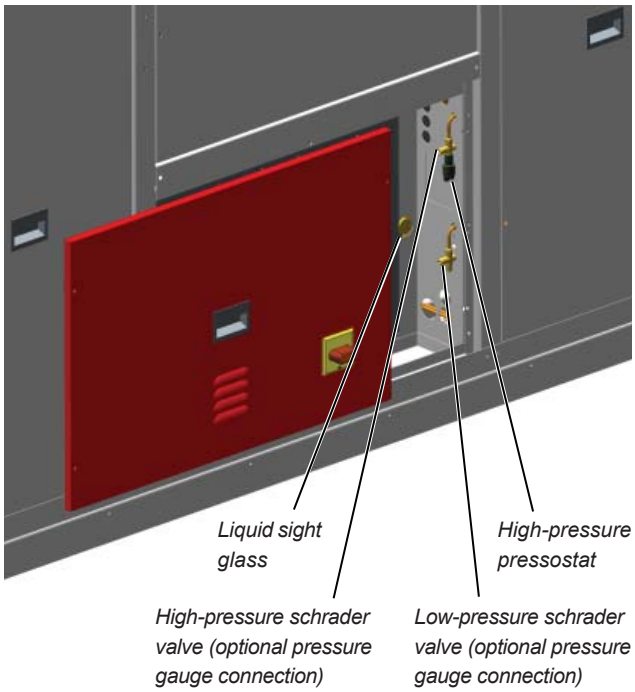
  To adjust the refrigerant load, a schrader valve is built into the unit on the liquid line.

  If the refrigerant load is insufficient, the liquid sight glass (available from the model 200) will not be clean and gas bubbles will appear as foam. The liquid sight glass is accessed through the access panel to the electric panel.

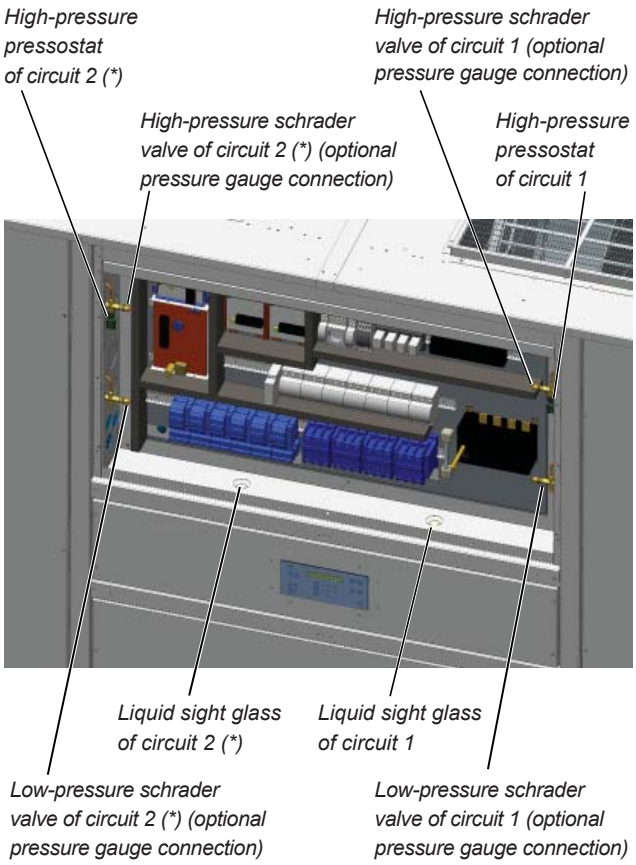
Models 90 to 180 STD / Models 90 to 180 HEE



Models 200 to 360 STD / Models 200 to 280 HEE

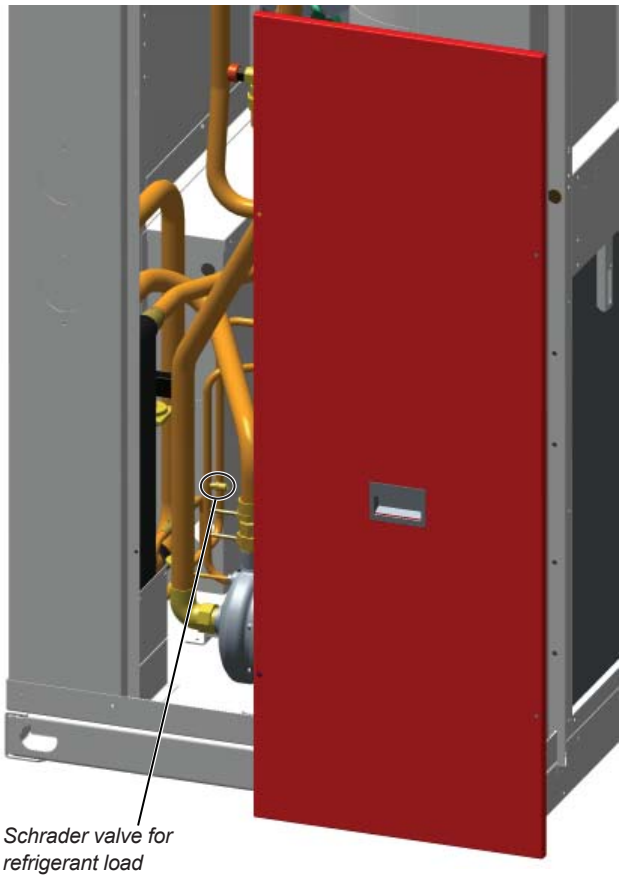


Models 420 to 960 STD / Models 320 to 720 HEE



(*) "Circuit 2" only in models 640 to 960 (STD version) and 640 to 720 (HEE version).

- Verify the absence of any leaks of the refrigerant. In the event of a leak:
  - Completely empty the unit using a specific recovery unit for R-410A and repair the leak.
  - Next, reload the gas into the unit according to load data provided in the technical characteristics table and in the unit's data plate.
  - Add the refrigerant via the schrader valve of the liquid line, whilst the compressor is in operation, monitoring the pressures should there be any anomaly.



Schrader valve for refrigerant load

Possible problems at commissioning

All indications given in this brochure must be respected and complied with to guarantee a correct operation of the units.

Next, several possible operation problems are stated which could happen if the conditions of the commissioning are not appropriate.

- Insufficient water flow. Very high temperature differences between water inlet into and outlet from the unit caused by:
  - Insufficient air bleeding.
  - Small water circulation pump or anti-clockwise rotation.
  - Other situations which may prevent correct water circulation.
- Insufficient thermal charge in the installation. The limiting operating values are quickly reached by:
  - Incorrect operation of the emissions system (fan coils, air conditioning exchangers, etc.).
- Air recirculation in the unit, originated by some obstacle in the air aspiration or supply.

Operational checks

Check the unit operation by verifying the electronic control and the safety devices.

It is also recommendable to create a report, taking note of the date, which includes the following information:

- the nominal voltage,
- current absorbed by the compressors, fans and other electrical components,
- significant temperatures in the cooling circuit (see attached table),
- other aspects considered interesting such as alarms detected by the electronic control of the unit.

The recording of these parameters whilst the unit is running allows controlling the installation performance and it is the best possible way to avoid breakdowns since the analysis of these data makes early detection of anomalies possible or the provision of the necessary means available to ensure that they do not take place.

Cooling MODE			
Compressor	Suction pressure	bar	
	Suction temperature (1)	ºC	
	Condensation pressure	bar	
	Condensation temperature (2)	ºC	
Air condenser	Gas inlet temperature	ºC	
	Liquid outlet temperature (3)	ºC	
	Air inlet temperature	ºC	
	Outdoor temperature	ºC	
	Air outlet temperature	ºC	
Water evaporator	Water inlet temperature	ºC	
	Water outlet temperature	ºC	
	Liquid inlet temperature	ºC	
	Evaporator outlet temperature (4)	ºC	
Subcooling (2) - (3)		ºC	
Overheating (4) - (1)		ºC	

Heating MODE			
Compressor	Suction pressure	bar	
	Suction temperature (1)	ºC	
	Condensation pressure	bar	
	Condensation temperature (2)	ºC	
Air evaporator	Liquid inlet temperature	ºC	
	Gas outlet temperature (4)	ºC	
	Air inlet temperature	ºC	
	Outdoor temperature	ºC	
	Air outlet temperature	ºC	
Water condenser	Water inlet temperature	ºC	
	Water outlet temperature	ºC	
	Gas inlet temperature	ºC	
	Liquid outlet temperature (3)	ºC	
Subcooling (2) - (3)		ºC	
Overheating (4) - (1)		ºC	

13. MAINTENANCE

The minimal maintenance operations and their periodicity will be made according to the national regulations.

Any intervention on the electric cooling components must be made by a qualified and authorized technician.

Technicians who intervene with the unit must use the necessary safety equipment (gloves, goggles, insulating clothing, safety shoes, etc.). Furthermore, if working around sources of significant noise, we recommend the use of noise-dampening headgear.

Caution: Before intervening in the unit, cut off main power.

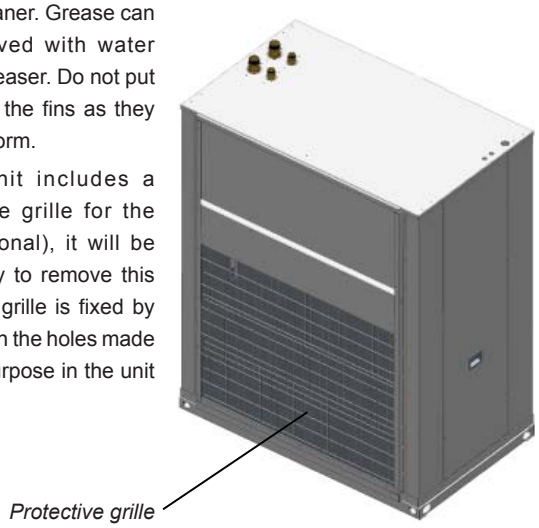
■ Recommendations

- Do not lean on the unit. A platform must be used to work on a level.
- Do not lean on the copper refrigerant tubes.
- Keep the unit clean.
- Keep the space surrounding the unit clean and cleared in order to avoid accidents and ensure the proper ventilation of the coil.
- Perform a visual (remains of water or oil below or around the unit) and auditory inspection of the entire installation.
- In general, a corrosion control must be performed on the metallic parts of the unit (frame, bodywork, exchangers, electric panel, etc.).
- Check that the insulation foam is not unstuck or torn.
- All the electric connection states must be checked as well, as well as the air tightness of the different circuits.

Next, some recommendations are stated for performing the maintenance and cleaning of the unit's components:

Air coil

- Check that the coil is free from dust and grease.
- Cleaning the accumulated dust on the coil can be performed with a vacuum cleaner perpendicular to the fins or with a low-pressure water cleaner. Grease can be removed with water with degreaser. Do not put stress on the fins as they could deform.
- If the unit includes a protective grille for the coil (optional), it will be necessary to remove this one. The grille is fixed by modules in the holes made for this purpose in the unit supports.



Liquid sight glass (available from the model 200)

This sight glass, located on the liquid line, after the dehydrating filter, enables controlling the refrigerant load and the presence of moisture in the circuit. The presence of bubbles in the indicator means that the refrigerant fluid load is insufficient (see chapter 4 "Technical characteristics") or that there are non-condensable products in the cooling circuit. The presence of moisture is characterised by the change in colour of the control paper located on the sight glass.

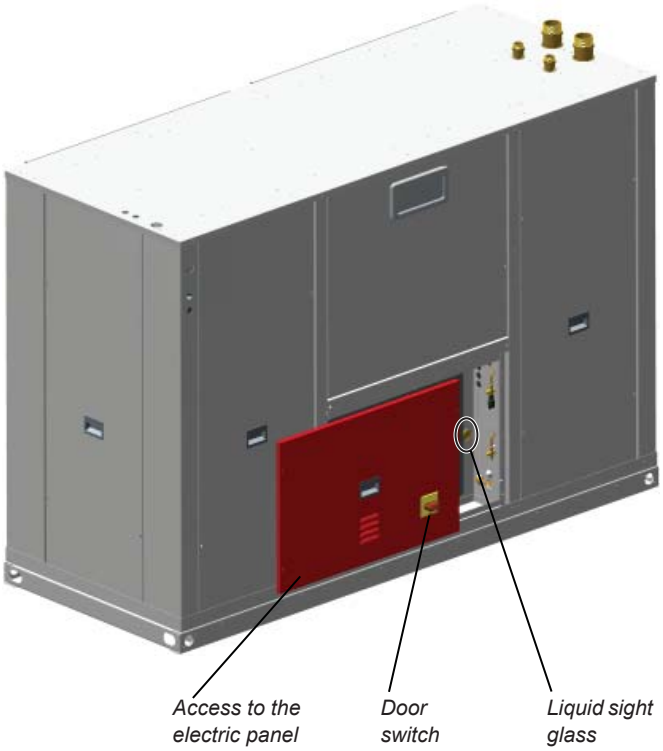
On CIATCooler units, the liquid sight glass is accessed via the electric panel access panel (please, consult the section “refrigerant charge load”).

Warning:

If the unit stops, certain indicators may appear in yellow; the change in colour is due to the sensitivity, which depends on the temperature of the fluid.

These will change to green after a few hours of the unit operating.

If the indicators remain yellow, that will indicate the presence of excessive humidity in the circuit. This will require the presence of a specialist.



Dehydrating filter

- The filter function is to keep the cooling circuit clean and without humidity, neutralising the acids that can be found in the cooling circuit.
- Verify dirt measuring the difference in temperature at the piping level, at the inlet and at the outlet of the dehydrant.
- If necessary, replace.

Mesh filter

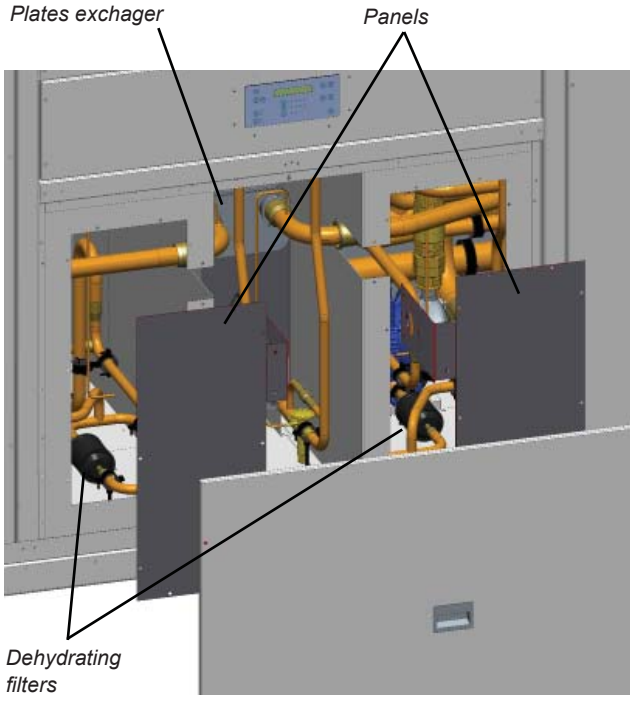
- **It is also necessary to install a filter in the hydraulic power supply to the unit in order to prevent clogging of the plate exchanger.**
- For LPC/ILPC units, a kit with a stainless steel mesh filter (500 microns) is also supplied for installation by the installer. Optionally, this filter can be supplied for LP/ILP units.
- The filtering mesh must be removed and cleaned in order to clean the filter.

Plate exchanger

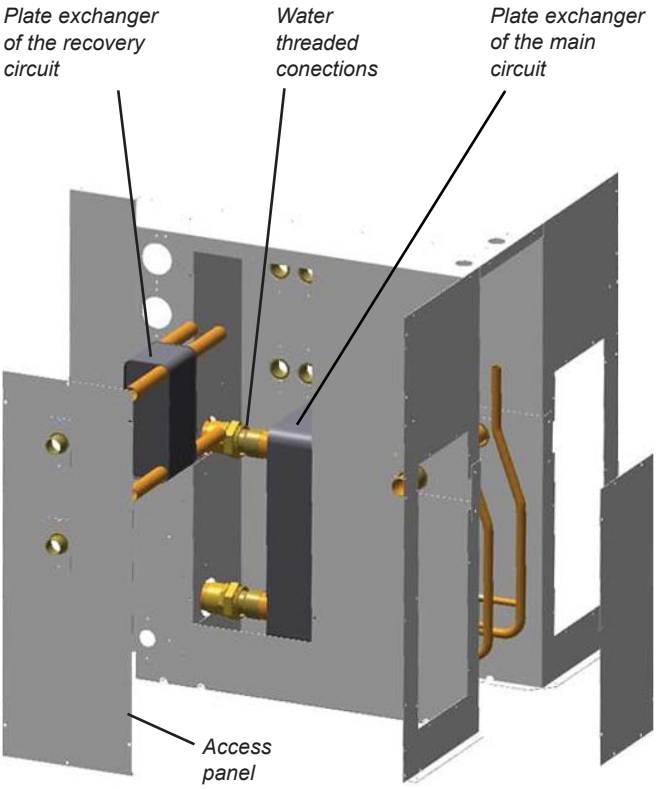
- The exchangers are fitted with thermal insulation. Check that the foam is not unstuck or broken.
- The water quality and the pressure drop must be verified at the exchanger level. After verifying the mesh filter condition, if necessary, the exchanger must be cleaned. To this end, a weak solution of phosphoric acid 5% must be circulated using the high pressure pump. During optimum cleaning, the cleaning solution flow must, as a minimum, be 1,5 times the working flow, preferably in the inverse circulation mode. This must be followed by thorough rinsing with water to remove any acidic residues. It is advisable to circulate a solution 1%-2% of sodium hydroxide prior to the last rinsing in order to ensure that the acid has been neutralised.
- Any repair or modification to the plate exchanger is prohibited. It can only be replaced by an original part.

- **Access to the plates exchangers both the main circuit and the recovery circuit in models 640 to 960 STD and 420 to 720 HEE:**

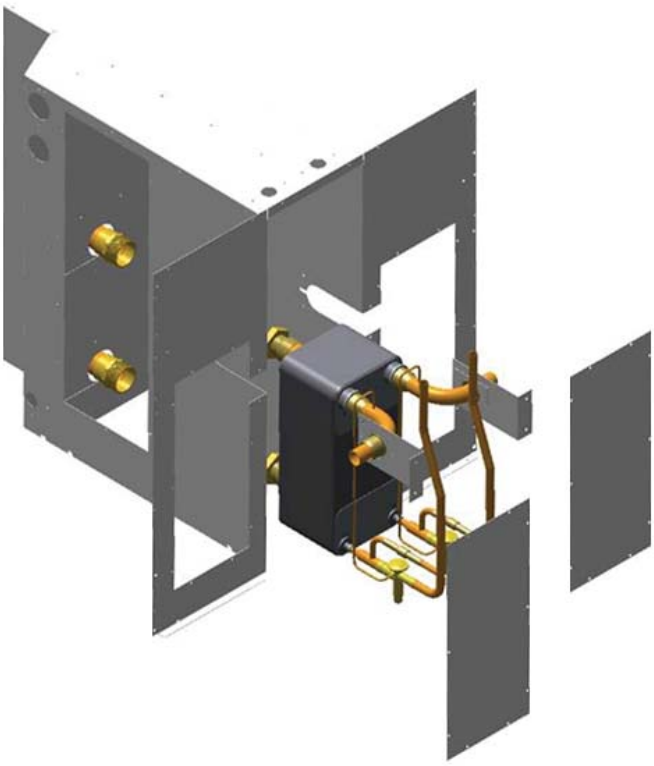
  Because it is a dual plates exchanger, is it located in the central area of the unit, on the axis of symmetry of the two circuits. If the exchanger have to be replaced, the two panels indicated in this image must be removed.



- To be able to unscrew the water connections of the exchanger, the unit incorporates another movable panel which is accessed by the door on the left side of the above door. By registering also accessed the recovery exchanger.



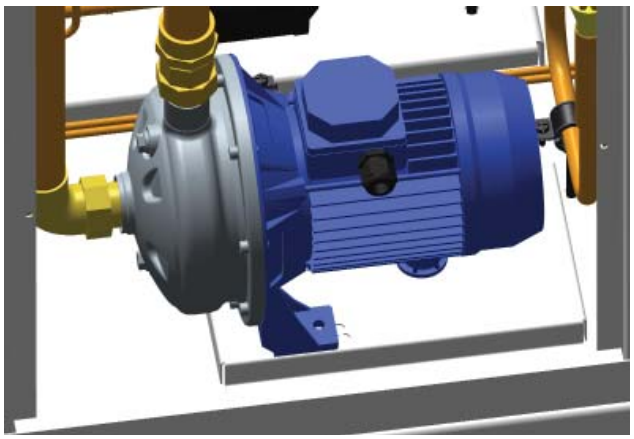
In the following image it is possible to observe the plate exchanger of the main circuit extracted .



Pump

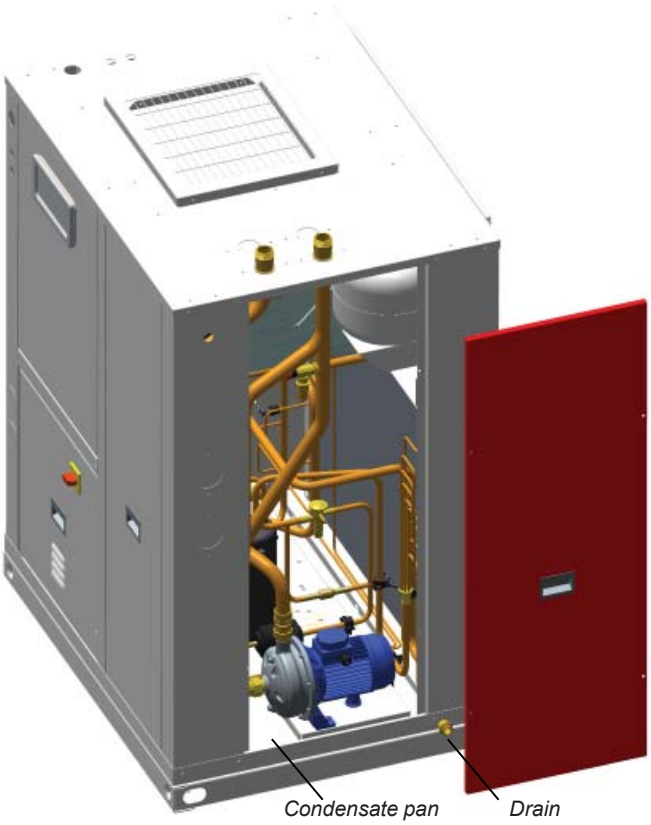
In the case of pump replacement:

- Disconnect the unit from power supply.
- Disconnect electrically the pump.
- Empty completely of water from the hydraulic circuit.
- Loosen the fittings of the 2 pipes.
- Remove the two screws fixing the pump and replace it.



Condensate drain pan

- Check that the condensate pan is clean.
- Check that the drain is not clogged.
- Cleaning of the pan can be done with water and non-abrasive detergent.



Centrifugal fan (STD version)

- Verify that the turbine and the motor remain clean.
- Foresee having a spare belt set for the fans.
- The motors and the fans have bearings that have been lubricated and sealed and, thus, do not need further lubrication (except in the case of fans with a reinforced shaft).

Servomotor (optional)

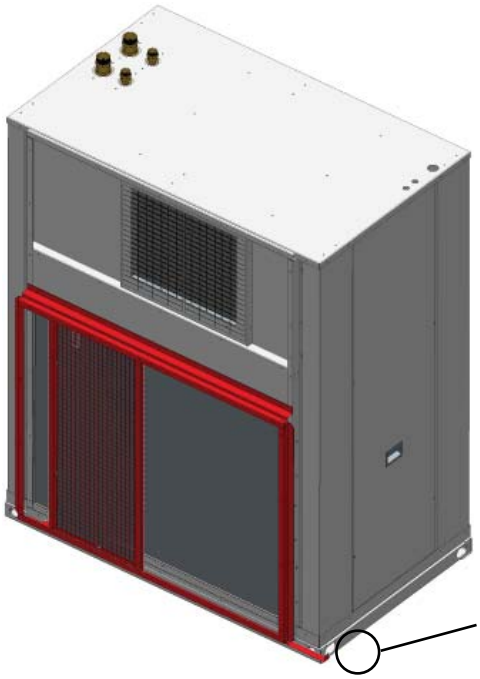
In CIATCooler units with a condensation pressure regulation damper (in the STD version), it is advisable to check the state of the servomotor.

Note: The damper in models 420V-STD to 600V-STD incorporates 2 sevomotors (one on each side).

Filter in the return air (optional)

- Clean usually. Depending on the installation conditions, the filter aspect must be examined to define the cleaning periodicity.
- Gravimetric filters: Cleaning the filtering mesh can be done with a household vacuum cleaner, or by submerging it in water.

CIATCooler	Number of frames	Number of cell
90V-STD to 100V-STD	1	2
120V-STD to 180V-STD	1	3
200V-STD	2	4
240V-STD to 600V-STD	2	6
640V-STD to 960V-STD	2	16
90V-HEE	1	2
100V-HEE to 120V-HEE	1	3
160V-HEE to 180V-HEE	2	4
200V-HEE to 360V-HEE	2	6
420V-HEE to 720V-HEE	2	16



Compressor

In the case of compressor replacement:

- Disconnect the unit from power supply.
- Completely empty the load of refrigerant using a specific recovery unit for R-410A
- Disconnect electrically the compresor.
- Carefully unscrew the suction and discharge piping.
- The compressor is fixed onto the platform with 4 screws Ø 8 mm. Unscrew the fixings.
- Place the new compressor and check that it has a sufficient oil charge.

  Warning: when tightening the compressor screws, please consult the maximum torque that can be applied.

  If a torque wrench is not available, tighten them until noticing resistance, then tighten the screws by turning them 3/4 of a revolution.
- Screw the suction and discharge piping.
- Connect the compressor in accordance with the circuit diagram.
- Make vacuum and next, reload the gas into the unit according to load data provided in the technical characteristics table and in the unit's data plate.

Oil

Oils used for cooling machines do not post any threat to one's health if used while following the usage guidelines:

- Avoid any unnecessary manipulation of the elements covered in oil. Use protection creams.
- Oils are flammable and must be stored and handled with precaution. "Disposable" rags or towels used for cleaning must be kept away from open flames and must be discarded by using the appropriate procedure.
- Jugs must be kept closed. Avoid using oil from an already-open jug kept in poor conditions.

Both the oil type as well as the volume needed for each model are stated in the characteristics table in chapter 4.

- Check the oil level and aspect. In case of a colour change, check the oil quality using a contamination test.
- In the case of the presence of acid, water or metallic particles, replace the affected circuit oil, as well as the dehydrant filter.
- In the event of an oil charge change, only new oil will be used, which will be identical to the original oil and taken from a jug tightly closed until the moment of the charge.

Refrigerant

Only qualified personnel must perform a periodic tightness control, in accordance with the regulation (CE) **Nº 517/2014.**

- The frequency of checks is no longer related to the load of refrigerant but to its global warming potential:

  Load kg x GWP = t CO2e

  Carbon dioxide equivalency (t CO2e) is a quantity that describes, for a given mixture and amount of greenhouse gas, the amount in tonnes of CO2 that would have the same global warming potential (GWP).

  Please, consult data of carbon dioxide equivalency (t CO2e) provided in the technical characteristics table (chapter 4).
- Operators shall ensure that the unit is checked for leaks ad minima according to the following frequency:
  - t CO2e < 5 ..... not subjected
  - t CO2e 5 to 50 ..... every year
  - t CO2e 50 to 500 ... every 6 months
  - t CO2e > 500 ..... every 3 months
- Where a leakage detection system has been installed the frequency of checks is halved.

Note: Never forget that the cooling systems contain liquids and vapours under pressure. The service pressure of R-410A is approximately 1.5 higher than that of R-407C.

- All necessary precautions must be taken during the partial opening of the cooling circuit. This opening entails the discharge of a certain amount of refrigerant to the atmosphere. It is essential to limit this quantity of lost refrigerant to a minimum by pumping and isolating the charge in some other part of the circuit.
- The refrigerant fluid at low temperature can cause inflammatory injuries similar to burns when contacting the skin or eyes. Always use safety goggles, gloves, etc. when opening ducts that may contain liquids.
- The refrigerant in excess must be stored in appropriate containers and the amount of refrigerant stored at the technical rooms must be limited.
- Refrigerant barrels and deposits must be handled with precaution and visible warning signs must be placed to attract attention over the risks of intoxication, fire and explosion linked to the refrigerant.
- At the end of its useful life, the refrigerant must be retrieved and recycled as per the current regulations.

14. Control and analysis of breakdowns

Symptom	Cause	Solution
Evaporation pressure very high in relation with the air or water inlet	a) Charge excess b) High water temperature c) Compressor suction not air tight d) Cycle reversing valve in middle position	a) Collect refrigerant b) Verify overheating c) Verify compressor state and replace d) Check that the valve is not clogged. Replace if necessary
Very low condensation pressure	a) Gas lack b) Low water temperature c) Compressor suction not air tight d) Cycle inversion valve in middle position e) Liquid circuit plugging	a) Search for leaks, complete charge b) Wait for regular speed c) Verify compressor state and replace d) Check that the valve is not clogged. Replace if necessary e) Verify the dehydrating filter and expansion valve
Condensation pressure very high in relation to the air or water outlet, high pressure pressostat cut-off	a) Air or water flow insufficient b) Air or water inlet temperature very high c) Dirty condenser (does not exchange) d) Much refrigerant load (flooded condenser) e) The condenser fan is broken down f) Air in the cooling circuit	a) Verify the air or water circuits (flow, filter cleanliness etc.) b) Verify the control thermostat readjustment c) Clean it d) Collect refrigerant e) Repair f) Make vacuum and load
Evaporation pressure too low (low pressostat cut-off)	a) Low flow in evaporator. Air recirculation b) Frozen evaporator c) Liquid line as different temperatures at filter inlet and outlet d) Gas lack e) Very low condensation pressure f) Evaporator fan broken down	a) Verify the air or water circuits (flow, filter cleanliness etc.) b) Verify defrost c) Replace filter d) Search for leaks, complete charge e) Temperature of air or water in condenser very low (air or water flow very high), adjust flow f) Repair
Compressor does not start, does not make noise (humming)	a) No power b) The contacts of a control element are open c) Timing of anti cycle short does not allow the starting d) Open contact e) Contactor coil burnt f) Indoor Klixon open	a) Check differential, fuses b) Verify the safety chain of the electronic control c) Verify electronic control d) Replace e) Replace f) Wait for reactivation, verify intensity absorbed
Compressor does not start, motor sounds intermittently	a) Electrical power supply very low b) Power cable disconnected	a) Control line voltage and locate voltage drop b) Verify connections
Repeated compressor starts and stops	a) Because of high pressure b) Control differential too short (short cycle) c) Insufficient gas, cut-off because of low pressure d) Dirty or frosted evaporator e) The evaporator fan does not work, cuts off the low pressostat f) Expansion valve damaged or clogged by impurities (cuts off low pressostat) g) Dehydrating filter clogged (cuts off low safety)	a) Verify charge b) Increase differential c) Search for leak, reload unit d) Clean, verify evaporator air circuit e) Replace or repair f) Replace, as well as filter g) Replace
The compressor makes a noise	a) Loose attachment b) Oil lack c) Compressor noise	a) Fix b) Add oil to recommended level c) Replace
Noisy operation	a) Unit installed without antivibration protection	a) Place base over shock absorbers
Cycle reversing is not carried out: - No defrosting - Does not change winter - summer cycles	a) Electrical fault b) Inversion valve coil defective c) Defrost method not working d) Cycle inversion valve in middle position e) Control fault	a) Locate and repair b) Replace c) Verify parameters d) Tap with running compressor Replace if necessary e) Locate and repair

Annex I: Quick overview of the installation

Air-cooled chillers / air-water heat pumps

Installer _____ Telephone _____

Responsible for installation and/or commissioning _____

Installation / work reference _____

Address _____

Unit	Unit model	Serial number	Date for commissioning

Installation sketch and units location

Electrical connections

POWER ..... YES ☐ NO ☐

- Provisional voltage _____ V Available power_____kW
- Final Voltage _____ V + T + N
- Line protection type

Fuse ☐ ☐ **A** Curve_____

Automatic ☐ ☐ **A** Curve_____

☐ ☐

CONTROL YES NO

- On / off external control ..... ☐ ☐
- Cooling / heating external selector (only if necessary) ..... ☐ ☐
- Unit operation circuit interlock / circulation pumps ..... ☐ ☐

Unit with voltage from _____ day _____ hour_____

Connections and components of the hydraulic circuit

YES NO

- Unit connections ..... ☐ ☐
- Cut-off valves ..... ☐ ☐
- Circuit: Open ☐ Closed ☐
- Operating nominal pressure _____ kg/cm^2
- Buffer tank_____litres and/or circuit water total capacity _____ litres
- Expansion vessel and safety valve ..... ☐ ☐
- Air drain done ..... ☐ ☐
- Flow controller checking ..... ☐ ☐
- Hydraulic circuit cleaning ..... ☐ ☐
- **Water filter at the unit inlet (Mesh for particles ∅ > 0.5 mm)** ..... ☐ ☐
- Thermometers at the inlet and outlet of the unit ..... ☐ ☐
- Constant water flow in unit _____m3/h
- Circulation pump. Primary (unit) ..... ☐ ☐
- Circulation pump. Secundary (emission system) ..... ☐ ☐
- Emission control system: Two ways ..... ☐ ☐
  Three ways ..... ☐ ☐
- Manometers reading (m.w.c.)

Pump: Suction _____Discharge _____ Diff _____

Unit: Inlet_____Outlet_____ Diff _____

YES NO

- Complete operation emission system (air-conditioner, fan-coil, etc) ☐ ☐

Observations

- Date _____ Signed: