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06 - 2016

DYNACIAT LG - LGP

DYNACIAT power LG - LGP

Instruction manual

CIAT

3 RECEIPT OF GOODS

3.1 Checking the equipment

Check the unit for any damage or missing components upon delivery.
Note any damaged or missing parts on the delivery slip.

IMPORTANT:
You must notify the carrier of any damage and/or missing parts by registered letter within three days of the delivery date.
Furthermore, ensure the unit is not stored in an outdoor location exposed to the elements.

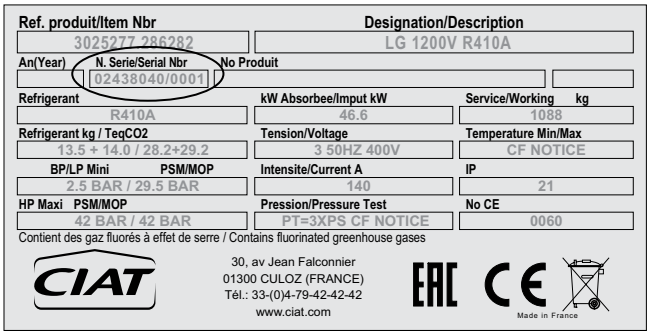
3.2 Identifying the equipment

• Name plate:
Each unit has a manufacturer's name plate (A) bearing the unit's identification number (serial number) and description.

Make sure this information matches that on the order.
Markings (data plate, punch marks, labels) must remain visible. They must not be altered, removed or modified.

Key:

- **Désignation/Description :** Unit type.
- **An(Year) :** Year manufactured
- **N° série/Serial Nbr :** Production number (please state this number in all correspondence)
- **Refrigerant :** Refrigerant fluid type.
- **Refrigerant kg/TeqCO2:** Refrigerant content in kg and in tonnes of CO2 equivalent
- **BP/LP Mini / PSM/MOP :** For the low pressure circuit:
  - BP/LP. Mini = Minimum operating pressure in bar.
  - PSM/MOP = Maximum permissible pressure in bar. (OP as per PED 2014/68/E)
- **HP Maxi PSM/MOP :** For the high pressure circuit:
  - HP. Maxi = Maximum operating pressure in bar.
  - PSM/MOP = Maximum permissible pressure in bar. (OP as per PED 2014/68/E)
- **kW Absorbee/Input kW :** Power input in kW.
- **Tension/Voltage :** Power supply.
- **Intensite/Current A :** Nominal current in A.
- **Pression/Pressure Test :** See § "Pressure and temperature" on the previous page
- **Service/Working kg** : Operating weight of the unit, in kg.
- **Temperatures Min/Max** : See § "Pressure and temperature" on the previous page.
- **IP** : Machine electrical protection rating.
- **No CE** : Notified Body number.



Ref. produit/Item Nbr		Designation/Description	
3025277 286282		LG 1200V R410A	
An(Year)	N. Serie/Serial Nbr	No Produit	
	02438040/0001		
Refrigerant		kW Absorbee/Imput kW	Service/Working kg
R410A		46.6	1088
Refrigerant kg / TeqCO2		Tension/Voltage	Temperature Min/Max
13.5 + 14.0 / 28.2+29.2		3 50HZ 400V	CF NOTICE
BP/LP Mini	PSM/MOP	Intensite/Current A	IP
2.5 BAR / 29.5 BAR		140	21
HP Maxi	PSM/MOP	Pression/Pressure Test	No CE
42 BAR / 42 BAR		PT=3XPS CF NOTICE	0060

Contient des gaz fluorés à effet de serre / Contains fluorinated greenhouse gases

CIAT
30, av Jean Falconnier
01300 CULOZ (FRANCE)
Tél.: 33-(0)4-79-42-42-42
www.ciat.com
Made in France

Please include the identification number in all correspondence with CIAT.

4 SAFETY INSTRUCTIONS

To avoid any risk of accident during installation, start-up and adjustments, the following equipment specifics must be taken into account:

- Pressurised refrigerant circuits
- presence of refrigerant
- Presence of electrical voltage

Only experienced and qualified persons may work on such equipment.

The recommendations and instructions in this manual and on each drawing provided with the unit must be followed.

In the case of units with pressure equipment or components, we recommend that you contact your professional organisation for information on the regulations that apply to operators or owners of pressure equipment or components. The specifications of this equipment or components are given on the name plate or in the regulatory documentation provided with the product.

A fire protection device is fitted as standard on the units.

IMPORTANT:
Before working on the unit, ensure the power has been disconnected at the main disconnect switch in the unit's electrical cabinet.

5 MACHINE COMPLIANCE

Refer to the document entitled "Declaration of conformity" supplied with your equipment.

6 WARRANTY

The warranty is effective for a period of 12 months from the date the unit is first commissioned into service provided said date occurs within three months of the invoice date.
It is effective for a period of 15 months from the unit invoice date in all other cases.

NOTE: Refer to our general terms and conditions of sale for further information.

7 UNIT LOCATION

These units are typically used for refrigeration and are not required to withstand earthquakes. Earthquake resistance has therefore not been checked.

Before setting up the unit in its intended location, the installer must check the following points:

- These units are designed to be installed and stored inside a machine room that is sheltered from frost and the elements. Failure to do so will incur the loss of the manufacturer's warranty.
- The surface area of the ground or structure must be strong enough to bear the unit's weight.
- The unit must be perfectly level.
- There must be sufficient free space around and above the unit to allow servicing and maintenance (see dimensional drawing provided with unit).
- The room housing the unit must comply with the requirements of regulation EN 378-3 and other specifications applicable at the installation site.
- The selected location must not be liable to flooding.

Provisions must be made for the drainage of defrosting water.

- Sound level:
  - Our units are designed to operate quietly.
  - In the installation design, you must take into account the interior environment for radiated noise and the building type for airborne and solid-borne noise transmission.
  - To ensure vibrations transmitted by solid materials are reduced as much as possible, it is strongly recommended to fit anti-vibration mounts between the unit support and frame (see the section on anti-vibration mounts), as well as flexible couplings on the hydraulic piping.
  - Have an analysis carried out by an acoustics engineer.

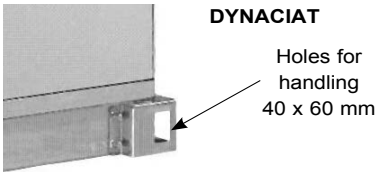
IMPORTANT: The ambient temperature must not exceed 50°C during the unit's off cycles.

8 HANDLING AND POSITIONING

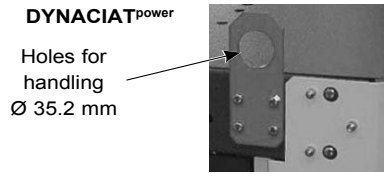
To raise the unit, attach the slings to the designated handling holes.
The data relating to the centre of gravity and the position of the anchorage points are given on the dimensional drawing.

Detailed view of the anchorage point for handling

DYNACIAT



DYNACIAT^{power}



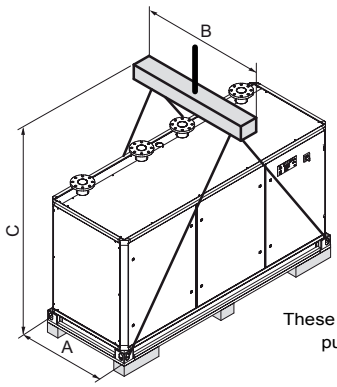
The unit can be handled with a forklift truck (check the maximum permissible load of the forklift).
In this case, it is important that the necessary precautions be taken to avoid the unit sliding on the forks of the forklift. You must observe the instructions given on the label affixed to the unit. Failure to observe these instructions may result in the unit tipping over and causing physical injury.

WARNING:

- Attach the slings only to the anchorage points intended for this purpose and which are designated on the unit.
- Use slings with a suitable lifting capacity and follow the lifting instructions on the drawings provided with the unit.
- Caution: the centre of gravity is not necessarily at the middle of the unit and the forces applied to the slings are not always identical.
- Raise and set down the unit carefully. Take care not to tilt it by more than 15°, as this could adversely affect its operation.
- To avoid damaging the casing, use textile slings with shackles.
- Use a frame with an adjustable centre of gravity to keep the slings away from the top of the unit.
- Always protect the unit casing (panels, posts, front access door) from damage during handling. Only the base frame is designed to withstand handling.
- Safety when lifting can only be guaranteed if all these instructions are followed.

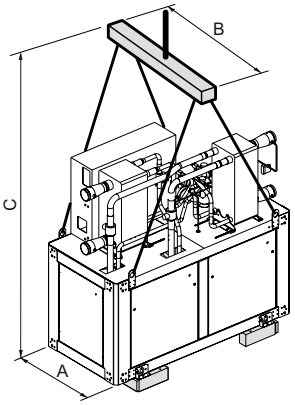
Otherwise, there is a risk of damage to the equipment and personal injury.

DYNACIAT



These diagrams are provided for illustrative purposes only. Always refer to the pictograms on the unit

DYNACIAT^{power}

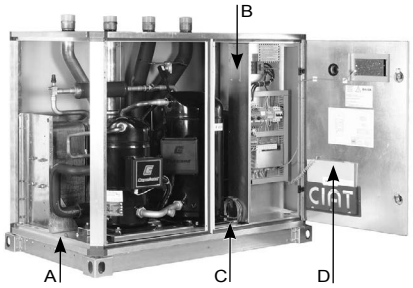


DYNACIAT LG - LGP	120V	150V	200V	240V	300V	350V	400V	500V	540V	600V
A	883									
B	1100									
C	1700									

DYNACIAT^{power} LG - LGP	700V	800V	900V	1000V	1100V	1200V	1400V	1600V	1800V	2100V	2400V
A	996										
B	1400										
C	2580						2930		2860		

Weight (empty), see section 9.1.1

For the **DYNACIAT**, once the unit is put into position, the locking bolts must be removed (see photo below).



A = Transport screw (red), must be removed before commissioning.
B = Electrical supply plate.
C = Outdoor temperature sensor (length 6 m) / necessary for determining water properties according to climatic conditions.
D = Documents that must be read before switching on for the first time

EN

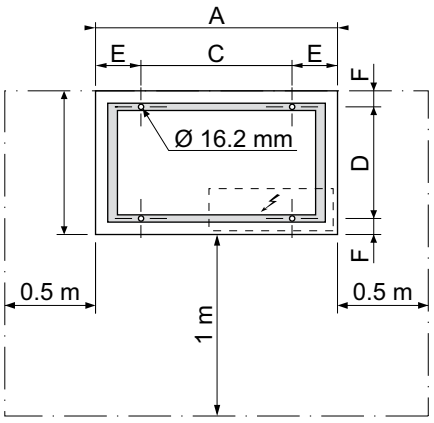
9 LOCATION

9.1 Location of the unit

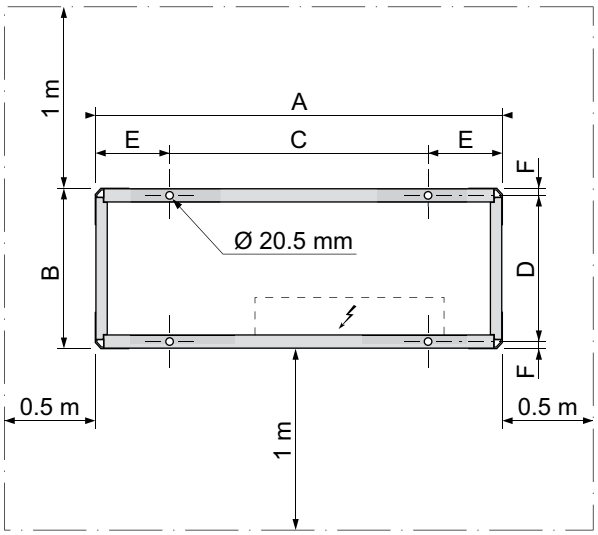
9.1.1 Dimensions and ground mounting of the frame

The frame may be affixed to the ground. (Mounts with studs not supplied by CIAT). The hardness is to be defined according to the unit's weight and centre of gravity.

DYNACIAT



DYNACIAT^{power}



Free space to be maintained to allow sufficient room for maintenance of the unit.
It is important that the units are installed with the necessary clearances.

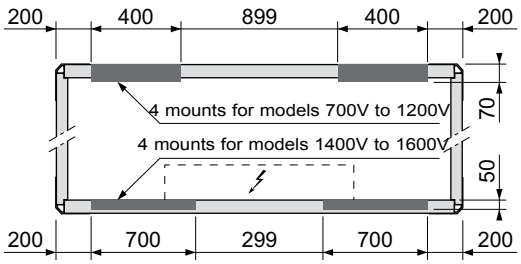
DYNACIAT LG - LGP		120V	150V	200V	240V	300V	350V	400V	500V	540V	600V
A		798		1492						2380	
B		883		883						883	
C		526		920						1808	
D		763		763						763	
E		136		286						286	
F		60		60						60	
Empty weight	Kg	230	300	385	390	590	620	665	735	930	1125
Operating weight	Kg	240	312	400	406	617	650	703	780	990	1190

DYNACIAT^{power} LG - LGP		700V	800V	900V	1000V	1100V	1200V	1400V	1600V	1800V	2100V	2400V
A		2099						2499		3350		
B		984						984		984		
C		1271						1671		2366		
D		916						916		916		
E		414						414		492		
F		34						34		34		
Empty weight	Kg	1044	1156	1189	1312	1363	1425	1613	1708	2284	2376	2418
Operating weight	Kg	1088	1205	1246	1378	1436	1510	1713	1818	2472	2588	2637

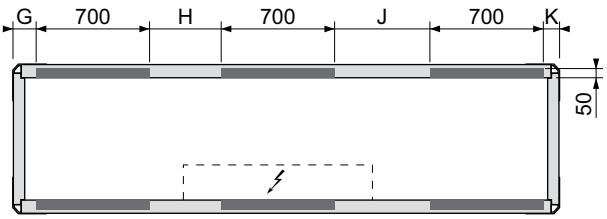
9.1.2 Anti-vibration mounts (supplied as standard for DYNACIAT, optional for DYNACIAT^{power})

Anti-vibration mounts must be installed beneath the unit in the case of applications with extremely low vibrations.
DYNACIAT models are designed for “noiseless” assembly using the mounts in machine’s frame.
For DYNACIAT^{power} models, the mounts must be placed at the locations illustrated below.

DYNACIAT^{power} 700V to 1600V



DYNACIAT^{power} 1800V to 2400V



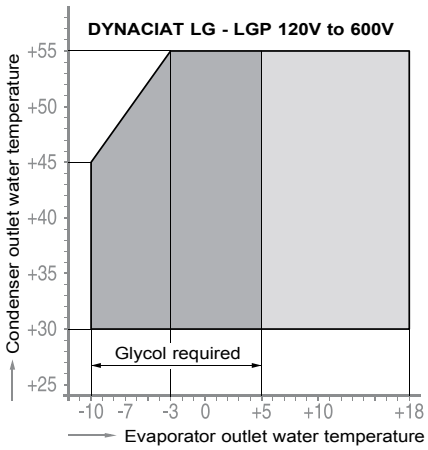
DYNACIAT^{power} LG - LGP	G	H	J	K
1800V	100	440	585	125
2100V	100	585	440	125
2400V	125	440	585	100

10 OPERATING LIMIT

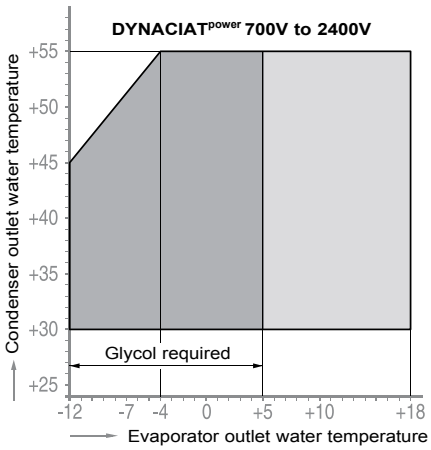
10.1 Operating range.

The graph below represents the area of application (under full load) of the units.

DYNACIAT LG - LGP 120V to 600V



DYNACIAT^{power} 700V to 2400V



10.2 Condenser limit.

DYNACIAT et DYNACIAT^{power}	LG	LGP
Water cooled condenser ΔMin. T °C / ΔMax. T °C	Yes – 5 / 10 **The customer must do everything possible to ensure a minimum water inlet temperature of 25°C on the condenser side.**	
Without condenser / Condensation temperature Min. °C / Max. °C	No	
Evaporator ΔMin.T °C / ΔMax. T °C	Variable according to water outlet temperature. See evaporator limit curves	

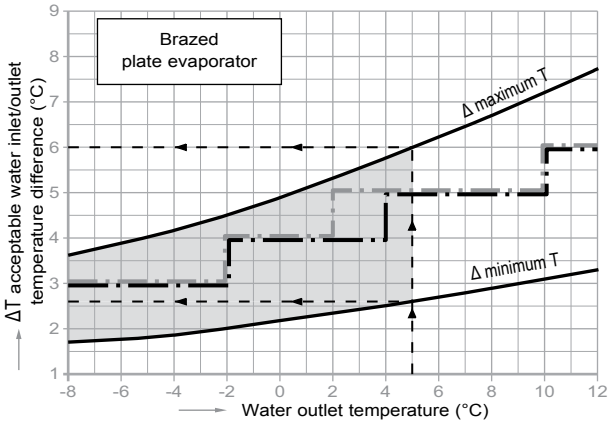
10.3 Evaporator Limit

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

DYNACIAT
DYNACIAT^{power}

Example:
For a water outlet temperature of +5°C
• Δ minimum T 2.6 °C, which gives a water temperature of 7.6 / 5 °C
• Δ maximum T 6 °C, which gives a water temperature of 11 / 5 °C

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



10.4 Minimum/maximum water flow rates

The flow rates in the exchangers must be maintained between the values given below.

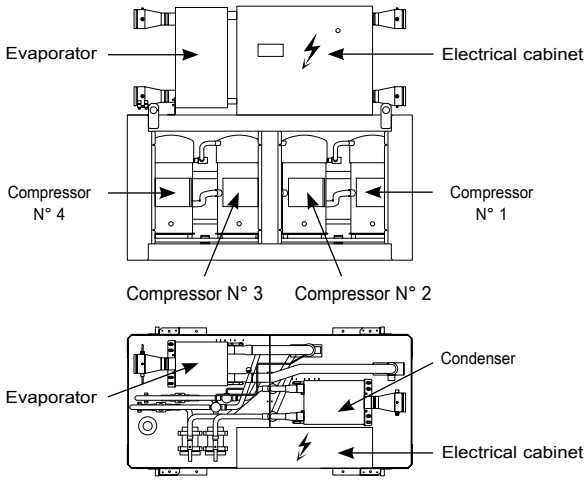
DYNACIAT LG - LGP		120V	150V	200V	240V	300V	350V	400V	500V	540V	600V
Evaporator	min. m^3/h	3.5	4.8	6.2	7	9.5	10.9	12.4	15.2	16.4	19.1
	max. m^3/h	11.2	14.6	19.8	22.2	29.2	34	38.4	47.5	51.1	58.4
Condenser	min. m^3/h	3.1	4.1	5.4	6.1	8.2	9.4	10.7	13.1	14.3	16.3
	max. m^3/h	8.5	11.1	15.1	17	22.3	26	29.4	35	39.1	44.6

DYNACIAT^{power} LG - LGP		700V	800V	900V	1000V	1100V	1200V	1400V	1600V	1800V	2100V	2400V
Evaporator	min. m^3/h	22	26	29	33	35	38	44	51	61	68	74
	max. m^3/h	70	81	92	105	113	124	137	151	150	150	150
Condenser	min. m^3/h	19	22	25	28	31	33	38	43	52	59	66
	max. m^3/h	64	74	84	95	103	112	129	143	150	150	153

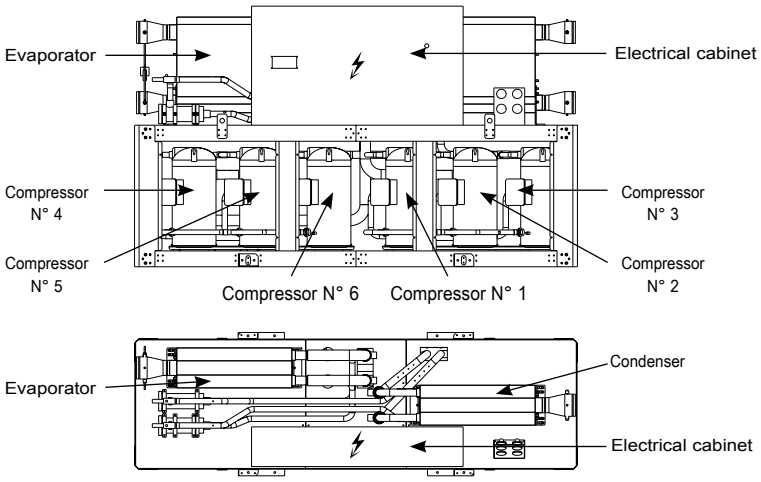
EN

11 LOCATION OF THE MAIN COMPONENTS

DYNACIAT^{power} 700V to 1600V



DYNACIAT^{power} 1800V to 2400V



12 MAIN COMPONENTS OF THE REFRIGERATING CIRCUIT

Compressor

The **DYNACIAT LG, LGP** and **DYNACIAT^{power}** units use hermetically sealed SCROLL compressors.

Oil

The compressor is lubricated with a polyester oil, (POE) type 160SZ for the **DYNACIAT^{power}** 700V to 1200V. This oil will be 3MAF type (32 cSt) for **DYNACIAT LG - LGP** and **DYNACIAT^{power}** 1400V to 2400V.

If necessary, top up the compressors with ICI Emkarate RL 32 CF oil or Mobil EAL Arctic 22 CC oil if no 3MAF is available for R410A models.

Refrigerant

The **DYNACIAT LG, LGP** 120V to 600V and **DYNACIAT^{power}** 700V to 2400V operate with R410A.

The Global Warming Potential (GWP) is 2088 GWP for R410A in compliance with norm EN378-1

Exchangers

With the **DYNACIAT**, the evaporators and condensers are single-circuit brazed-plate heat exchangers.

With the **DYNACIAT^{power}**, the evaporators and condensers are double-circuit brazed-plate heat exchangers.

The evaporators are insulated with 10 mm thick polyurethane foam. 19 mm insulation is available as an option (standard fitment for operation with low temperature glycol water below 0 °C).

The heat transfer fluid must be filtered and internal inspections must be carried out.

Repairs or modifications of any kind to the plate heat exchangers are prohibited. Only replacement of the heat exchanger with another original heat exchanger and by a qualified technician is authorised.

If the heat exchanger is replaced, this must be noted in the maintenance booklet.

Thermostatic expansion valve

The expansion valves have a thermostatic charge (MOP) allowing the maximum possible evaporation pressure to be obtained in order to protect the compressor.

Every unit is fitted with packaged hermetically-sealed thermostatic expansion valves that are set in the factory to maintain superheat of 5 to 7°C under all operating conditions.

Dryer

All units are fitted as standard with a dryer filter (on the **DYNACIAT^{power}** the filter unit has a replaceable element) whose role is to keep the refrigerating circuit clean and free of moisture. The dryer filter consists of aluminium oxide and a molecular sieve that neutralises any acids in the refrigeration circuit.

Liquid sight glass

Located on the liquid line just after the filter dryer, the liquid sight glass is used to monitor the charge in the unit and to check for moisture in the circuit. Bubbles in the sight glass mean that the refrigerant load is insufficient or that non-condensable gases are in the refrigeration circuit. If the sight glass indicator paper changes colour, there is moisture in the circuit.

Warning: Some of the sight glasses may turn yellow when the machine is powered off as their sensitivity is affected by the fluid temperature.

The sight glasses should return to green after the unit has been operating for a few hours.

If the sight glasses remain yellow, there is excessive moisture in the circuit.

A specialist intervention is required.

18 TECHNICAL AND ELECTRICAL SPECIFICATIONS

DYNACIAT LG - LGP		120V	150V	200V	240V	300V	350V	400V	500V	540V	600V
Net cooling capacity ①	kW	34.50	45.30	61.10	68.60	90.90	104.70	118.90	146.501	158.90	181.90
Net absorbed power ③	kW	8,00	10,30	13,90	16.20	20.30	23.60	26.90	33.80	36.10	40.10
Net EER efficiency ④		4.29	4.40	4.40	4.23	4.48	4.43	4.42	4.33	4.40	4.53
Net ESEER efficiency ④		4.63	4.69	5.23	4.99	4.97	4.98	5.02	4.80	4.99	5.06
Net heating capacity ②	kW	40.50	53.40	71.50	80.60	107.00	122.40	140.00	173.00	187.00	213.30
Net absorbed power ③	kW	10.10	12.90	17.70	20.30	25.30	29.10	33.20	41.40	45.10	50.20
EER efficiency ④		4.02	4.13	4.04	3.98	4.22	4.20	4.21	4.17	4.13	4.25
Sound power level ⑤	dB(A)	67.0	70.0	69.0	70.0	73.0	74.0	75.0	76.0	75.0	76.0
Compressor											
Type		Hermetic SCROLL (2900 rpm)									
Quantity		1		2						4	
Start-up mode		Direct in line in series									
Refrigerant oil type		POE 3MAF (32CST)									
Oil capacity	l. (circ. 1)	3.25	4.14	6.50	6.50	8.28	8.84	9.76	11.24	8.28	8.28
	l. (circ. 2)		-	-	-	-	-	-	-	6.50	8.28
Number of refrigerating circuits		1								2	
Refrigerant		R410A (GWP = 2088)									
Refrigerant charge (1 circ.) ou (circ.1 and circ. 2)	kg	3.3	3.8	6.8	7.1	9.9	11	13.7	16.1	7.3 + 9.5	9.9 + 9.9
CO2 equivalent tonne	tCO2Eq	6.89	7.93	14.19	14.82	20.67	22.96	28.60	33.61	35.07	41.34
Power control	Stages	1		2			3		2	4	
	%	100-0		100-50-0			100-57-43-0	100-63-37-0	100-50-0	100-72-50-22-0	100-75-50-25-0
Evaporator											
Number and type		1 brazed plate heat exchanger									
Water content	l	2.7	3.6	4.8	5.3	9.9	11.3	12.8	15.7	15.2	19.8
Min / max water outlet temperature	°C	-10 °C / +18 °C									
Minimum/maximum water flow rate	m^3/h	3.5/11.2	4.8/14.6	6.2/19.8	7.0/22.2	9.5/29.2	10.9/34.0	12.4/38.4	15.2/47.5	16.4/51.1	19.1/58.4
Water connections	Ø	G 1" 1/2		G 1"1/2		G 2"		G 2"1/2		DN 80 PN 16	
Minimum system diameter	Ø	DN 50				DN 65				DN 80	
Max service pressure	bar	10 bar water side									
Water cooled condenser											
Number and type		1 brazed plate heat exchanger									
Water content	l	3.0	4.1	5.1	5.8	8.0	9.4	11.1	15.2	13.8	16.0
Min / max water outlet temperature	°C	+30 °C / +55 °C									
Minimum/maximum water flow rate	m^3/h	3.1/8.5	4.1/11.1	5.4/15.1	6.1/17.0	8.2/22.3	9.4/26.0	10.7/29.4	13.1/35.0	14.3/39.1	16.3/44.6
Water connections	Ø	G 1"1/2				G 2"		G 2"1/2		DN 80 PN 16	
Max service pressure	bar	10 bar water side									
Dimensions and weight											
Storage temperature	°C	See section 1 Introduction									
Min water volume	l.	226	299	197	222	292	286	279	454	217	274
Operating height ⑥	mm	1201									
Length	mm	798		1492						2380	
Depth	mm	883									
Weight (empty)	kg	230	300	385	390	590	620	665	735	930	1125
Weight in working order	kg	240	312	400	406	617	650	703	780	990	1190
Electrical supply											
Compressor voltage	ph/Hz/V	3 / 50 Hz / 400 V (+10 % / -10 %)									
Machine protection rating		IP 22									
Electrics box protection rating		IP 22									
Max. rated current	A	23.2	30.2	42.2	46.2	60.2	66.2	76.0	91.8	106.2	120.2
Starting current	A	137.0	174.0	139.0	160.0	204.0	255.0	302.0	317.8	250.0	264.0
Starting current, Soft Start option	A	70.0	60.0	76.0	93.0	90.0	167.0	194.0	210.0	136.0	150.0
Breaking capacity	kA	50									
Max. wire cross-section	mm^2	50					95				
Control circuit voltage	ph/Hz/V	1 / 50Hz / 230V (+10 % / -10 %) - Transformer assembled									

① Cooling capacities for chilled water temperature +12°C / +7°C and condenser hot water temperature +30°C / +35°C
② Heating capacities for hot water temperature +40°C / +45°C and condenser hot water temperature +12°C / +7°C
③ Compressor net power input
④ COP performance, EER or ESEER efficiency values
⑤ LW: Overall power level, as per ISO standard 3744
⑥ Height excluding handling mounts

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