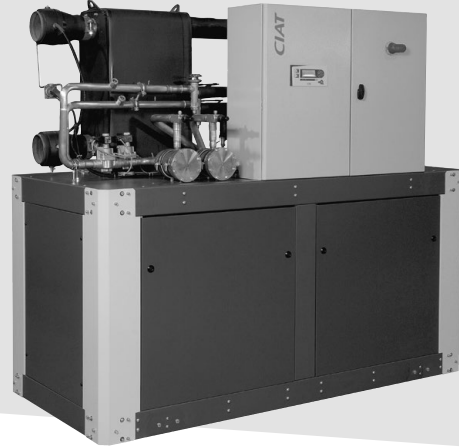




DYNACIAT POWER

Water cooled
water chillers



High energy efficiency

Compact and quiet

Scroll compressors

*High-efficiency brazed-plate
heat exchangers*

*CIAT self-adjusting
electronic control*

Cooling capacity: 220 to 720 kW

Heating capacity: 250 to 820 kW



Heating



Cooling
only



Cooling
and
heating



www.eurovent-certification.com

USE

The new generation of **DYNACIAT^{POWER}** water cooled water chillers offers an optimal solution for all heating or process cooling applications.

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

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

RANGE

DYNACIAT^{POWER} LG-LGP series

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

DYNACIAT^{POWER} LGP series

The design of the **DYNACIAT^{POWER} LGP series** heat pump range is identical to that of the **DYNACIAT^{POWER} LG series**. These machines provide solutions for the most diverse heating problems.

They can also be used in cooling mode by reversing the cycle on the hydraulic circuits.

Acoustic configuration:

- a - STANDARD version
- b - LOW NOISE version. Compressor casing
- c - XTRA LOW NOISE version. Casing with compressor acoustic insulation

DESCRIPTION

The DYNACIAT^{POWER} LG-LGP series units are monoblock machines supplied as standard with the following components:

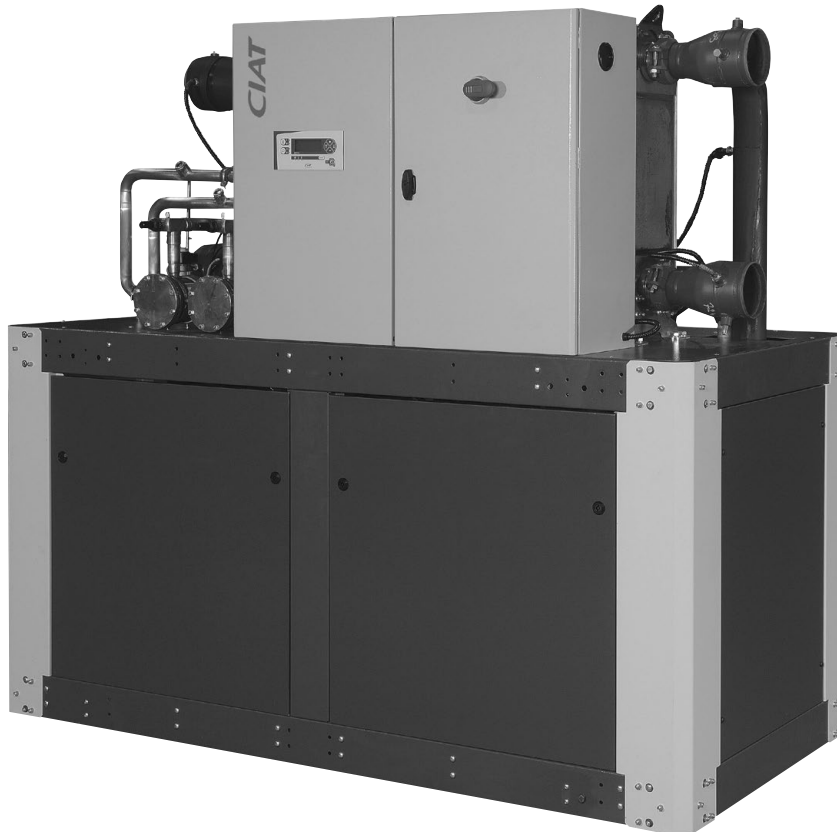
- Hermetic SCROLL compressors,
- Chilled water evaporator with brazed plates,
- Hot water condenser with brazed plates,
- Electrical power and remote control cabinet:
 - 400V-3ph-50Hz (+10%/-10%) general power supply + earth,
 - Transformer fitted as standard on the machine for supplying the remote control circuit with 230V-1ph-50Hz,
- CIAT CONNECT2 electronic control module.

The entire DYNACIAT^{POWER} range complies with the following EC directives and standards:

- Machinery directive 2006/42/EC, modified
- Electromagnetic compatibility directive 2014/30/EU, modified
- EMC Immunity and Emissions EN 61800-3 "C3"
- Low voltage directive 2014/35/EU, modified
- RoHS 2011/65/EU
- Pressure equipment directive (PED) 2014/68/EU
- Machinery directive EN-60-204-1
- Refrigeration systems and heat pumps EN 378-2

DESCRIPTION

- LG** > cooling only version **1200** > unit size
P > heating only version **V** > R410A refrigerant



**LG - LGP models 700V to 1600V
Xtra Low Noise Version**

DESCRIPTION OF THE MAIN COMPONENTS

■ Compressors

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

■ Evaporator

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

■ Condenser

- Brazed-plate exchanger.
- Stainless steel plates.
- Plate patterns optimised for high efficiency.

■ Refrigerating accessories

- Dehumidifier filters with rechargeable cartridges.
- Hygroscopic sight glasses.
- Solenoid valves on refrigerant lines (700V to 1200V models).
- Thermostatic expansion valves (700V to 1000V models).
- Electronic expansion valves (1100V to 2400V models).

■ Regulation and safety instruments

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

■ Electrics box

- IP 21.
- 400V-3Ph-50 Hz power supply + Earth (+10%/-10%).
- Disconnect switch with handle on front.
- Control circuit transformer.
- Circuit breaker for compressor motor.
- Contact switches for compressor motor.
- CONNECT2 microprocessor-controlled electronic control module.
- Wire numbering.
- Marking of the main electrical components.
- RAL 7035.

■ CONNECT2 electronic control module

The CIAT electronic control module performs the following main functions:

- Regulation of the chilled or hot water temperature
- Regulation of the water temperature based on the outdoor temperature (water law).
- Regulation for low temperature energy storage.
- Second setpoint management.
- Complete management of compressors with start-up sequence, metering and runtime balancing.

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

■ Remote management

CONNECT2 is equipped as standard with an RS485 serial port offering a range of remote management, monitoring and diagnostic options via the communication bus.

Several contacts are available as standard which enable the DYNACIAT^{POWER} to be controlled remotely by wired link:

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

■ Power control

In-series staged power control system on the compressors:

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

■ Casing

Casing made from RAL 7024 and RAL 7035 painted panels.

DESCRIPTION OF THE MAIN COMPONENTS

■ CIATM2M, the CIAT supervision solution

CIATM2M is a remote supervision solution dedicated to monitoring and controlling several CIAT machines in real time.

Advantages

- Access to the operating trend curves for analysis
- Improved energy performance
- Improved availability rate for the machines

Functions

CIATM2M will send data in real time to the supervision website, www.ciatm2m.com.

The machine operating data can be accessed from any PC, smartphone or tablet.

Any event can be configured to trigger a mail alert.

Parameters monitored:

- Overview
- Control panel for the controllers
- Events
- Temperature curves

Monthly and annual reports are available to analyse:

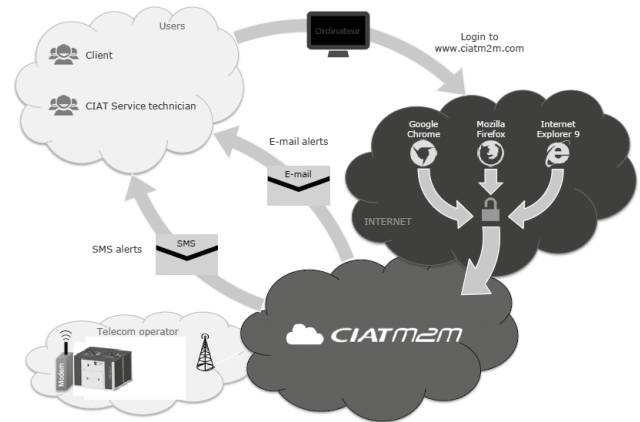
- The performance and operation of the machine
Example: operating curves and time, number of compressor start-ups, events, preventive maintenance actions to be performed, etc.

Incidents such as a drift in the measurements on a temperature sensor, incorrectly set control parameters, or even incorrect settings between one compressor stage and the other, are immediately detected, and the corrective actions put in place.

Equipment

This kit can be used on both machines which are already in use (existing inventory), and on new machines which do not have sufficient space in their electrical cabinets.

- 1 transportable cabinet
- 1 wall-mounted antenna

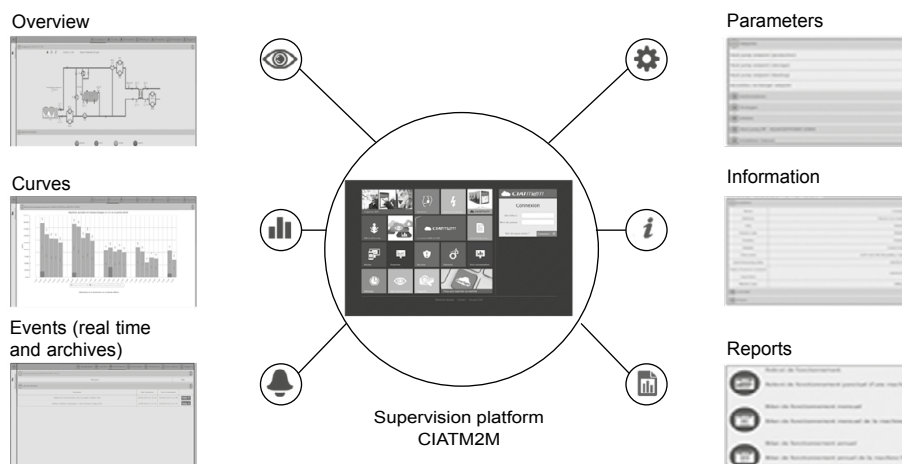


CIATM2M kit contents

- 1 GPRS / 3G modem
- 1 SIM card
- 1 24 VDC power supply
- 1 power protection device
- 1 GSM antenna
- Rail mounting
- Enclosed casing to protect the equipment during transport
- Packing box for cable routing (bus, power supply, Ethernet)

Compatibility

Up to three machines per CIATM2M kit



STANDARD EQUIPMENT/AVAILABLE OPTIONS

DYNACIAT ^{POWER} LG-LGP	700V à 2400V
Low-temperature glycol/water mix (0°C to -12°C)	●
Safety switch	●
Control circuit transformer	●
Electrical cabinet wire numbers	●
RS485 communication interface	●
Water flow controller	●
Master/slave control of two machines	●
ETHERNET gateway MODBUS	●
Electronic expansion valve ⁽¹⁾	▲
Low Noise version (compressor casing)	▲
Xtra Low Noise version (compressor casing with acoustic insulation)	▲
Compressor intake shut-off valves	▲
Soft start	▲
Electrical energy meter	▲
Water filter on evaporator and condenser	■
Phase controller (reversal, loss, asymmetry)	■
Anti-vibration mounts	■
Flexible hydraulic couplings on evaporator and condenser	■
Relay board with dry contacts	■
LONWORKS/BACNET gateway	■

● Supplied as standard ▲ Factory-mounted option ■ Option supplied as a kit
 (1) Standard equipment for 1100V to 2400V models

SEASONAL PERFORMANCE, COOLING MODE

Most central air conditioning systems installed in the tertiary sector in Europe use water chillers to provide refrigeration.

Analyses of installed systems show that the heat load varies from season to season and that a water chiller operates at reduced capacity for the majority of the time.

The efficiency under partial load is therefore essential when choosing a water chiller. It is with this in mind that the new DYNACIAT^{POWER} range was designed. In particular, the entire range uses R410A refrigerant which, thanks to its thermodynamic performance, makes it possible to obtain much higher seasonal efficiency ratings.

The **(Seasonal Energy Efficiency Ratio) (SEER)** measures the seasonal energy efficiency of liquid chillers **for comfort applications** by calculating the ratio between the annual cooling demand of the building and the chiller's annual energy demand. It takes into account the energy efficiency for each outdoor temperature weighted by the number of hours observed for each of these temperatures, using actual climate data.

The **SEER** is a new way of measuring the energy efficiency of liquid chillers for **comfort applications** over an entire year. The new indicator provides a more realistic overview of the cooling system's energy efficiency and its actual impact on the environment. (Ecodesign regulation 2016/2281).

As its compressors are connected in parallel on the same refrigerating circuit, the DYNACIAT^{POWER} easily and efficiently adjusts the cooling capacity to the system's needs. The self-adjusting Connect Touch control anticipates variations in load and starts only the number of compressors needed. This ensures optimum operation of the compressors and guarantees energy efficiency for the majority of the system's life.

The **(Seasonal Energy Performance Ratio) (SEPR)** measures the seasonal energy efficiency of liquid chillers for process applications by calculating the ratio between the annual process cooling demand and the chiller's annual energy demand. It takes into account the energy efficiency at each outdoor temperature for the average European climate weighted by the number of hours observed for each of these temperatures.

The **SEPR** is a new way of measuring the energy efficiency of process liquid chillers over an entire year. The new indicator provides a more realistic overview of the cooling system's energy efficiency and its actual impact on the environment (Ecodesign regulation 2015/1095 and 2016/2281).

SEASONAL PERFORMANCE, HEATING MODE

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

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

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

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

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

■ Primary energy evaluation

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

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

The minimum seasonal efficiency requirements to be met by low temperature heat pumps, set by the standard, are as follows:

$\eta_s = 125\%$, which is a minimum SCOP of 3.33 valid from September 2017.

The DYNACIAT^{POWER} complies with the European Ecodesign 2017 directive, offering SCOP values greater than 3.33 across the entire range.

TECHNICAL SPECIFICATIONS

DYNACIAT ^{POWER} LG			700V	800V	900V	1000V	1100V	1200V	1400V	1600V	1800V	2100V	2400V	
Heating														
Standard unit Seasonal energy efficiency**	HA1	SCOP _{30/35°C}	kW / kW	5,59	5,63	5,7	5,54	5,49	5,49	5,55	5,55	4,72	4,99	4,54
		η _{s heat} _{30/35°C}	%	216	217	220	213	212	212	214	214	181	192	174
		P _{rated}	kW	258	296	333	375	412	451	521	580	687	754	869
Cooling														
Standard unit Full load performances*	CA1	Net cooling capacity	kW	217	251	288	327	356	385	443	499	582	657	713
		Net power input	kW	48,2	55,2	64,2	73	79,2	85,6	97,4	110,4	125	146	168
		EER	kW / kW	4,5	4,55	4,48	4,48	4,49	4,5	4,55	4,52	4,6	4,51	4,24
Standard unit Seasonal energy efficiency***		SEPR _{-2/-8°C}	kWh/kWh	3,99	4,1	4,04	4,08	4,01	4,01	4,26	4,29	4,56	4,69	4,67
		SEER _{12/7°C}	kW / kW	5,78	5,96	5,88	5,73	5,73	5,68	5,81	5,67	5,53	5,46	5,23
		Comfort Low temp.	kW / kW	5,78	5,96	5,88	5,73	5,73	5,68	5,81	5,67	5,53	5,46	5,23
Standard unit		Lw / Lp ⁽¹⁾	dB(A)	89/57	90/58	90/58	89/57	90/58	91/59	95/63	96/64	93/61	95/63	97/65
Unit + Low Noise option		Lw / Lp ⁽¹⁾	dB(A)	84/52	85/53	85/53	86/54	87/55	88/56	90/58	91/59	89/57	90/58	91/59
Unit + Xtra Low Noise		Lw / Lp ⁽¹⁾	dB(A)	79/47	80/48	80/48	80/48	81/49	82/50	85/53	86/54	85/53	86/54	87/55
Refrigerating circuit														
Refrigerant (GWP)		R410 (GWP=2088)												
Number		2												
Refrigerant circuit 1		kg	13,5	15,5	16,4	17	19,7	21,3	21,5	23	31	33	34	
Refrigerant circuit 2		kg	14	15	16,4	17,2	19,7	21,3	21	22	31	34	34	
Tonne of CO ₂ equivalent		TCO ₂ Eq	57,42	63,68	68,49	71,41	82,27	88,95	88,74	93,96	129,46	139,9	141,98	
Compressor														
Type		Hermetic SCROLL - 2900 rpm												
Number		4												
Start-up mode		Direct in line in series												
		Number of stages	6	4	6	4	6	4	6	4	6	8	6	
Capacity control		%	100-78-71-50-28-21-0	100-75-50-25-0	100-78-71-50-28-21-0	100-75-50-25-0	100-78-71-50-28-21-0	100-75-50-25-0	100-78-71-50-28-21-0	100-75-50-25-0	100-83-66-50-33-16-0	100-84-66-48-36-30-18-15-0	100-83-66-50-33-16-0	
Type of oil for R410A		Polyolester POE 160SZ (32cP)												
Oil capacity per circuit		l	6,7 + 6,7	6,7 + 6,7	6,7 + 6,7	6,7 + 6,7	6,7 + 7,2	7,2 + 7,2	6,3 + 6,3	6,3 + 6,3	3 x 6,3	3 x 6,3	3 x 6,3	
Evaporator														
Type/Number		Braze-plate heat exchanger/ 1												
Water capacity		l	20	23	26	29	32	37	50	57	64	77		
Hydraulic connection		Ø	VICTAULIC DN100			VICTAULIC DN125			VICTAULIC DN150					
Max. pressure, water end		bar	10 bars											
Min/max water flow rate		m ³ /h	22 / 70	26 / 81	29 / 92	33 / 105	35 / 113	38 / 124	44 / 137	51 / 151	61 / 150	68 / 150	74 / 150	

* In accordance with standard EN14511-3:2013.
 ** In accordance with standard EN14825:2016, average climate
 *** With EG 30%.
 HA1 Heating mode conditions: Water heat exchanger water entering/leaving temperature 30°C/35°C, outside air temperature tdb/twb = 7°C db/6°C wb, evaporator fouling factor 0 m². k/W.
 CA1 Cooling mode conditions: evaporator water inlet/outlet temperature 12 °C/7 °C, outdoor air temperature 35 °C, evaporator fouling factor 0 m². k/W
η_{s heat}_{30/35°C} & SCOP_{30/35°C} Values in bold comply with Ecodesign Regulation (EU) No. 813/2013 for Heating applications.
SEER_{12/7°C} Values calculated according to EN14825:2016.
SEPR_{-2/-8°C} Values in bold comply with Ecodesign Regulation (EU) No. 2015/1095 for Process application
 (1) Lw : overall power level in accordance with standard ISO3744
 Lp : overall pressure level at 10 metres in a free field calculated using the formula Lp=LW-10logS



Eurovent certified values

TECHNICAL SPECIFICATIONS

DYNACIAT ^{POWER} LG		700V	800V	900V	1000V	1100V	1200V	1400V	1600V	1800V	2100V	2400V	
Water condenser													
Type/ Number		Brazed-plate heat exchanger/ 1											
Water capacity	l	23	26	29	32	37	40	55	61	73	77	77	
Hydraulic connection	Ø	VICTAULIC DN100			VICTAULIC DN125				VICTAULIC DN150				
Max. pressure, water end	bar	10 bars											
Min/max water flow rate	m ³ /h	19/ 64	22/ 74	25/ 84	28/ 95	31/ 103	33/ 112	38/ 129	43/ 143	52/ 150	59/ 150	66/ 163	
Dimensions													
Length	mm	2099					2499			3350			
Width	mm	996											
Height	mm	1869					1887			1970			
Weight													
Weight (empty)	kg	1044	1156	1189	1312	1363	1425	1613	1708	2284	2376	2418	
Weight in operation	kg	1088	1205	1246	1378	1436	1510	1713	1818	2472	2588	2637	
Max. storage temperature	°C	+50°C											

ELECTRICAL DATA

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

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

PERFORMANCE

R410A	LG LGP	Evaporator water outlet temperature (°C)	°C	CONDENSER WATER OUTLET TEMPERATURE (°C)																	
				30			35			40			45			50			55		
				Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW
700V	Brine obligatory	-12	99	40,7	140	96	45,7	142	90	50,4	140	83	56,4	139							
		-10	112	40,9	153	106	45,9	152	98	50,6	149	91	56,6	147							
		-8	122	41,1	163	115	45,8	161	108	50,8	159	99	56,8	156	91	63,5	154				
		-4	143	41,2	184	136	46,0	182	127	51,0	178	118	57,0	175	109	63,7	172	98	69,8	168	
		0	173	41,4	215	165	46,1	211	155	51,2	206	144	57,2	202	133	63,9	197	121	71,0	192	
		2	187	41,6	228	177	46,3	224	167	51,5	219	156	57,4	214	144	64,1	209	133	71,2	204	
	Pure water	5	214	41,8	256	205	46,4	251	193	51,6	245	181	57,7	238	168	64,2	232	154	71,4	225	
		7	230	42,0	272	218	46,6	265	207	51,8	258	195	57,5	252	181	64,4	245	167	71,6	238	
		12	272	42,7	315	260	47,2	307	246	52,4	298	232	58,1	290	217	64,7	281	200	72,1	272	
		15	299	43,2	342	285	47,7	333	270	52,8	323	255	58,6	313	239	65,0	304	221	72,4	293	
		18	327	43,7	371	312	48,1	361	297	53,2	350	280	58,9	339	262	65,3	327	243	72,7	315	
		800V	Brine obligatory	-12	114	46,1	160	113	49,7	163	105	57,8	163	97	64,8	162					
	-10			132	46,3	178	124	49,9	174	115	58,0	173	106	65,0	171						
	-8			142	46,6	189	135	52,1	187	126	58,2	184	117	65,2	182	106	73,3	180			
-4	166			46,8	213	158	52,3	210	148	58,5	207	138	65,7	203	127	73,5	200	115	82,3	197	
0	194			47,0	241	184	52,5	237	173	58,8	232	162	65,9	228	149	73,8	223	136	82,6	219	
2	209			47,2	257	199	52,7	252	187	59,0	246	174	66,0	240	161	74,0	235	147	82,9	230	
Pure water	5		248	47,6	296	237	53,0	290	223	59,3	282	209	66,2	276	195	74,2	269	179	83,0	262	
	7		265	47,9	313	252	53,3	305	239	59,5	299	225	66,4	291	209	74,3	283	192	83,2	276	
	12		316	49,0	365	300	54,2	354	284	60,1	344	268	66,8	335	250	74,5	325	232	83,4	315	
	15		344	49,8	394	329	54,9	384	312	60,7	373	295	67,3	362	276	74,9	351	255	83,6	339	
	18		377	50,6	428	361	55,5	416	342	61,3	403	323	67,8	391	302	75,4	377	281	83,9	365	
	900V		Brine obligatory	-12	136	53,8	190	129	59,8	189	121	66,8	188	112	74,1	186					
-10				150	54,1	204	141	60,1	201	132	67,0	199	122	74,4	196						
-8				162	54,4	217	154	60,3	214	144	66,9	211	133	74,7	207	122	82,8	204			
-4		189		54,7	244	180	60,7	241	169	67,4	237	158	74,9	232	145	83,1	228	132	92,8	224	
0		229		55,2	284	218	61,2	280	206	67,8	274	191	75,4	267	177	84,2	261	161	93,7	255	
2		246		55,5	301	234	61,5	295	221	68,2	289	207	75,7	283	191	84,4	275	174	94,1	268	
Pure water		5	282	55,7	337	269	61,6	331	255	68,3	323	239	75,9	315	222	84,7	306	203	94,3	298	
		7	302	56,0	358	289	62,0	351	273	68,6	341	256	76,1	332	239	84,5	323	218	94,5	313	
		12	353	57,0	410	341	62,8	404	323	69,5	393	305	76,9	382	285	85,2	370	263	94,6	358	
		15	392	57,6	450	374	63,4	437	355	70,0	425	335	77,4	413	313	85,6	399	290	95,0	385	
		18	429	58,3	487	410	64,0	474	390	70,4	460	368	77,7	446	344	86,1	430	319	95,4	414	
		1000V	Brine obligatory	-12	151	60,6	211	147	66,7	214	140	73,7	213	129	81,2	210					
-10				169	61,2	230	160	67,5	228	150	74,3	225	140	82,0	222						
-8				183	61,6	244	174	67,9	241	163	74,9	238	151	82,9	234	139	91,6	231			
-4	213			62,4	275	203	68,8	272	191	75,9	267	178	84,0	262	164	93,0	256	148	103,2	251	
0	256			63,0	319	245	69,9	314	231	77,0	308	216	85,0	301	199	94,4	293	181	104,7	285	
2	277			63,4	341	264	70,1	334	248	77,6	326	232	85,2	317	215	94,7	309	195	105,0	300	
Pure water	5		316	63,7	380	305	70,1	375	289	77,3	366	269	85,5	355	249	95,2	344	228	105,3	333	
	7		342	63,8	406	328	70,3	398	309	77,7	387	290	85,7	376	269	94,9	364	245	105,7	351	
	12		405	64,8	470	388	71,2	459	368	78,4	446	347	86,5	433	324	95,6	419	298	105,8	404	
	15		446	65,0	512	426	71,4	498	404	79,0	483	381	87,0	468	356	96,0	452	328	106,3	435	
	18		488	65,6	554	466	72,0	538	444	79,1	523	419	87,1	506	392	96,2	488	361	107,0	468	

Cc: Acceptable gross cooling capacity for temperature difference, based on operating limits
 Pi: Compressors gross power input
 Hc: Gross acceptable heating capacity for temperature difference, based on operating limits

Standard air conditioning condition
 Process application standard conditions

PERFORMANCE

R410A	LG LGP	Evaporator water outlet temperature (°C)	°C	CONDENSER WATER OUTLET TEMPERATURE (°C)																	
				30			35			40			45			50			55		
				Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW
1100V	Brine obligatory	-12	160	65,5	225	161	72,2	233	151	79,6	231	141	88	229							
		-10	184	66	250	175	72,8	248	164	80,4	244	153	88,8	241							
		-8	199	66,4	266	189	73,2	263	178	81	259	165	89,6	255	152	99,3	252				
		-4	232	67,3	299	221	74,3	295	208	82	290	194	90,7	285	179	100,6	279	162	111,9	274	
		0	278	68,5	347	266	75,5	342	251	83,4	334	234	92,1	326	216	102,1	318	197	113,3	310	
		2	301	68,6	370	286	75,8	362	270	83,9	354	252	92,6	345	233	102,7	336	212	113,9	326	
	Pure water	5	345	69	414	330	76,1	406	311	84,2	395	292	93,3	385	271	103	374	245	113,6	359	
		7	370	69,4	439	357	76,5	434	333	84,4	418	313	93,1	407	291	103,1	394	265	114	379	
		12	437	70,5	508	417	77,6	495	396	85,4	482	373	94,2	467	348	103,9	452	321	114,9	436	
		15	480	70,8	551	457	78,3	536	435	86,2	521	409	95	504	384	104,4	488	353	115,8	469	
		18	525	71,5	597	502	78,7	580	477	86,6	563	451	95,1	546	419	105,6	525	387	116,7	504	
		1200V	Brine obligatory	-12	176	70,3	246	174	77,5	252	165	85,7	250	139	95	234					
	-10			199	70,8	270	189	78,2	268	178	86,4	264	166	95,6	261						
	-8			216	71,2	287	205	78,6	284	193	86,9	280	179	96,4	276	165	106,9	272			
-4	251			72,2	323	239	79,7	319	225	88	313	210	97,5	307	194	108,2	302	176	120,5	297	
0	300			73,6	374	288	81,3	369	272	89,5	361	254	98,8	353	235	109,4	344	214	121,9	335	
2	325			73,9	399	309	82	391	292	90,3	382	273	99,6	373	252	110,4	362	230	122,6	352	
Pure water	5		373	74,4	447	358	82,1	440	338	90,8	429	316	100,1	416	291	111,5	403	266	123,6	390	
	7		403	75,1	478	386	82,6	469	363	91,2	454	340	100,5	440	315	110,9	426	286	123,8	410	
	12		475	76,3	551	457	84,1	541	432	92,6	525	407	101,9	509	379	112,4	492	350	124,1	474	
	15		526	76,8	603	500	85,1	585	474	93,7	568	446	103,1	549	416	113,6	529	384	125,4	509	
	18		574	77,6	652	548	85,6	634	520	94,2	615	490	103,6	594	457	114,5	571	420	126,6	547	
	1400V		Brine obligatory	-12	210	77,6	288	203	86,3	289	191	95,9	287	177	106,9	284					
-10				231	78,7	310	220	87,1	307	207	96,9	304	193	108,1	301						
-8				250	79,7	330	238	88	326	224	97,6	322	209	108,8	318	191	121,6	313			
-4		292		80,8	373	280	88,9	369	262	98,8	361	245	109,6	355	226	122	348	203	136	339	
0		351		82,9	434	337	90,9	428	318	100,2	418	297	110,8	408	275	122,9	398	252	137,1	389	
2		380		84	464	362	91,9	454	342	100,9	443	320	111,2	431	297	123,4	420	271	137,6	409	
Pure water		5	430	85,5	516	415	93,4	508	393	102,3	495	368	113	481	342	124,7	467	314	138,3	452	
		7	465	86,6	552	444	94,4	538	419	103,2	522	395	113,3	508	368	124,9	493	337	139	476	
		12	548	88,7	637	526	96,5	623	497	105,8	603	468	115,7	584	436	127,2	563	403	140,3	543	
		15	603	90,1	693	576	97,9	674	546	106,6	653	515	116,5	632	482	127,8	610	444	141,1	585	
		18	661	91,6	753	630	99,4	729	598	108,1	706	564	117,9	682	528	129,1	657	489	141,8	631	
		1600V	Brine obligatory	-12	233	86,7	320	231	95,7	327	218	105,9	324	203	117,8	321					
-10				263	88,4	352	250	97,2	348	236	107,4	343	221	119,3	340						
-8				286	89,9	376	272	98,5	371	256	108,7	364	238	120,7	359	217	134,5	352			
-4	330			91,9	422	315	100,5	416	295	111	406	277	122,9	400	256	136,7	393	229	151	380	
0	398			94,6	493	380	103,1	483	359	112,9	471	336	124,1	460	311	137,3	448	283	152	435	
2	426			95,7	522	407	104,1	511	385	113,8	499	360	125,2	485	334	138,2	472	306	153,5	459	
Pure water	5		482	97,9	580	465	106,4	571	440	116	556	414	126,7	540	385	139,5	524	353	154,2	507	
	7		520	98,8	619	500	107	607	469	117	586	441	127,9	569	411	140,4	551	378	154,9	533	
	12		609	101,6	711	586	110	696	557	119,3	676	524	129,9	654	489	142	630	451	155,9	607	
	15		672	102,6	774	643	110,9	754	609	120,5	730	573	131,2	704	536	143,2	679	495	156,8	652	
	18		733	103,9	837	701	112,2	813	667	121,4	788	630	131,8	762	589	143,4	733	546	157,8	704	

Cc: Acceptable gross cooling capacity for temperature difference, based on operating limits
 Pi: Compressors gross power input
 Hc: Gross acceptable heating capacity for temperature difference, based on operating limits

Standard air conditioning condition
 Process application standard conditions

PERFORMANCE

R410A	LG LGP	Evaporator water outlet temperature (°C)	°C	CONDENSER WATER OUTLET TEMPERATURE (°C)																	
				30			35			40			45			50			55		
				Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW	Pf kW	Pa kW	Pc kW
1800V	Brine obligatory	-12	252	100,9	352	261	112,4	374	248	125,3	373	231	139	370							
		-10	302	101,5	404	287	112,9	400	271	125,9	397	254	139,5	393							
		-8	329	101,9	431	313	113,2	426	295	126,1	421	277	139,9	416	256	157,2	414				
		-4	386	103,1	489	369	114	483	348	126,4	475	327	140,4	467	304	156,5	461	280	174,8	455	
		0	465	105,2	570	447	116	563	422	128,6	550	396	142,4	538	369	158	527	341	175,5	517	
		2	502	106,4	608	479	117	596	454	129,1	583	427	142,7	570	397	158,9	556	367	176,4	543	
	Pure water	5	561	108	669	546	119	665	517	131,1	648	488	144,8	632	456	160,1	616	423	177,5	600	
		7	613	109,3	722	584	120,2	705	553	132,1	685	521	145,9	667	488	161,3	649	453	178,6	631	
		12	726	112,2	838	694	122,8	816	657	134,9	792	619	148,6	768	580	164,4	744	538	181,9	720	
		15	798	114,2	912	761	124,8	886	723	136,8	859	681	150,6	832	638	166,2	804	593	184,1	777	
		18	873	116,1	989	834	126,8	961	792	138,9	931	748	152,7	900	701	168,4	869	650	186,2	837	
		2100V	Brine obligatory	-12	310	115,9	426	305	128,1	433	288	142,5	430	268	158,7	427					
	-10			348	116,8	465	332	129	461	313	142,9	456	293	159	452						
	-8			377	118	495	360	130	490	340	143,8	483	318	159,6	478	294	177,7	472			
	-4			440	120,3	561	421	132	553	398	145,8	543	373	161,4	534	347	179,2	526	316	199,5	516
	0			524	123,3	647	503	135	638	476	148,2	624	447	163,3	611	417	180,6	598	385	200,4	585
	2			566	124,5	690	539	136,2	675	511	149,6	660	480	164,6	645	448	181,7	630	414	201,3	615
	Pure water		5	642	127	769	616	138,7	755	584	151,8	736	549	166,8	715	512	183,8	696	473	203	676
7			691	128,4	820	659	140	800	624	153,1	777	587	168,1	755	548	185	733	507	204	711	
12			818	132	950	783	143,5	926	741	156,5	898	699	171,3	871	654	188,1	842	605	207,3	813	
15			899	133,9	1032	858	145,5	1003	814	158,4	973	768	173,1	941	718	189,9	908	666	209,1	875	
18			990	136,1	1126	937	147,3	1084	892	160,4	1052	842	175	1017	788	191,7	980	731	210,8	942	
2400V			Brine obligatory	-12	352	129,8	482	347	142,7	490	328	157,8	486	305	175,7	481					
	-10	396		131,3	527	378	144	522	357	158,9	515	334	176,3	510							
	-8	428		133,3	561	408	145,9	554	385	160,6	546	361	177,6	539	332	197,5	530				
	-4	496		136,8	633	475	149,3	624	448	164,4	613	420	181,1	602	391	200,6	592	354	222,7	576	
	0	590		141,4	731	564	154,1	719	536	168,4	704	505	184,7	690	470	203,6	674	433	225,2	658	
	2	631		142,9	774	604	155,7	759	572	170,1	742	539	186,4	726	504	205,2	709	465	226,5	691	
	Pure water	5	717	146,1	863	685	158,6	844	650	172,9	823	612	189,1	801	571	207,6	778	528	229,1	757	
		7	767	147,7	915	716	161,2	878	693	174,3	868	653	190,5	844	610	209,1	819	564	229,9	794	
		12	900	151,3	1052	863	164	1027	818	178	996	772	193,9	966	721	212	933	667	232,8	900	
		15	985	153,4	1138	944	166	1110	898	180	1078	847	195,6	1042	793	213,5	1006	733	234	967	
		18	1078	155,4	1234	1033	167,9	1201	982	181,8	1164	927	197,3	1125	868	214,8	1082	805	235	1040	

Cc: Acceptable gross cooling capacity for temperature difference, based on operating limits

Pi: Compressors gross power input

Hc: Gross acceptable heating capacity for temperature difference, based on operating limits

Standard air conditioning condition

Process application standard conditions

SOUND LEVELS

STANDARD version (without noise insulation on compressors)

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

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

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

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

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

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

SOUND LEVELS

LOW NOISE version (compressor casing)

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

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

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

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

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

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

SOUND LEVELS

XTRA LOW NOISE version (compressor casing with noise insulation)

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

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

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

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

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

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

EVAPORATOR LIMITS

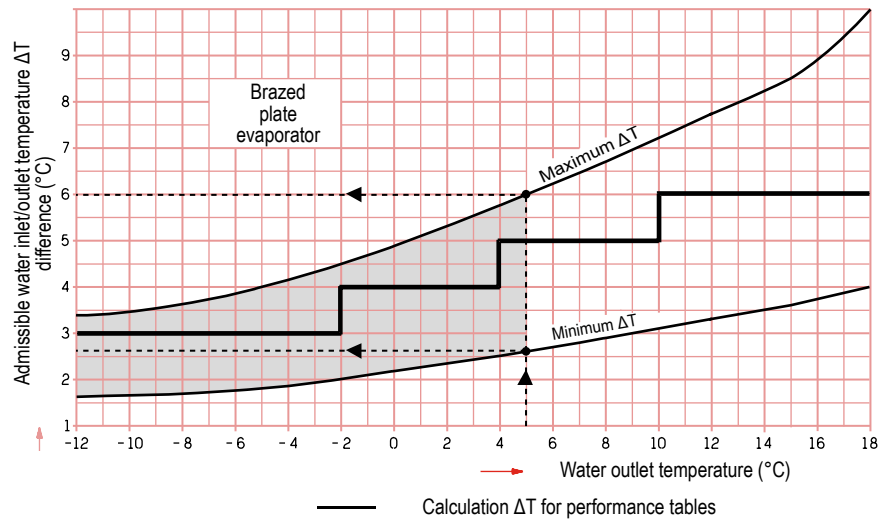
The curves show the minimum and maximum allowable temperature differences for chilled water or glycol/water solution based on the outlet temperature.

Example:

For a water outlet temperature of +5°C

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

For temperature differences not included between the two curves, please contact us.



CONDENSER LIMITS

DYNACIATPOWER	LG - LGP
Minimum ΔT °C	5
Maximum ΔT °C	10

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

CORRECTION COEFFICIENTS FOR ETHYLENE GLYCOL

■ Evaporator – Condenser

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

■ Glycol concentration required

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

MINIMUM CHILLED WATER VOLUME (COOLING MODE)

The CONNECT 2 control is equipped with anticipation logic making it highly flexible in adjusting operation to changes in parameters, particularly on hydraulic systems with low water volumes.

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

DYNACIATPOWER LG-LGP	700V	800V	900V	1000V	1100V	1200V	1400V	1600V	1800V	2100V	2400V
Min. volume Installation (litres)	636	880	844	1146	1043	1346	1286	1735	1262	1336	1595

NB: The minimum volumes of chilled water are calculated for the following conditions:

- chilled water temperature in evaporator: 12°C/7°C
- condenser water temperature: 30°C/35°C

The calculation of the minimum water volume is given for EUROVENT rated conditions, in cooling mode only.

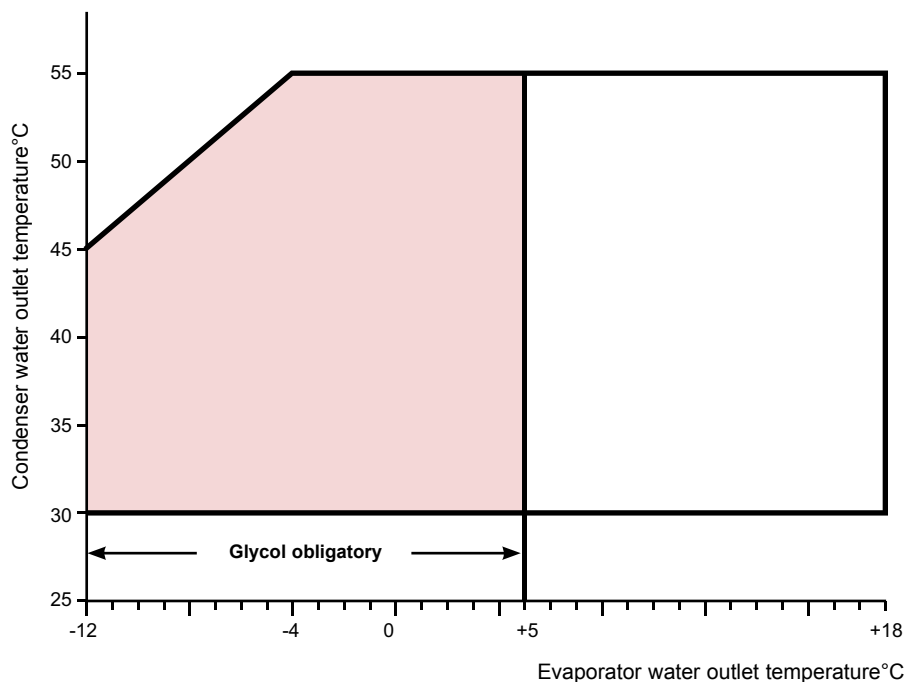
This value is applicable for most air conditioning applications (unit with fan coil units)

Note:

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

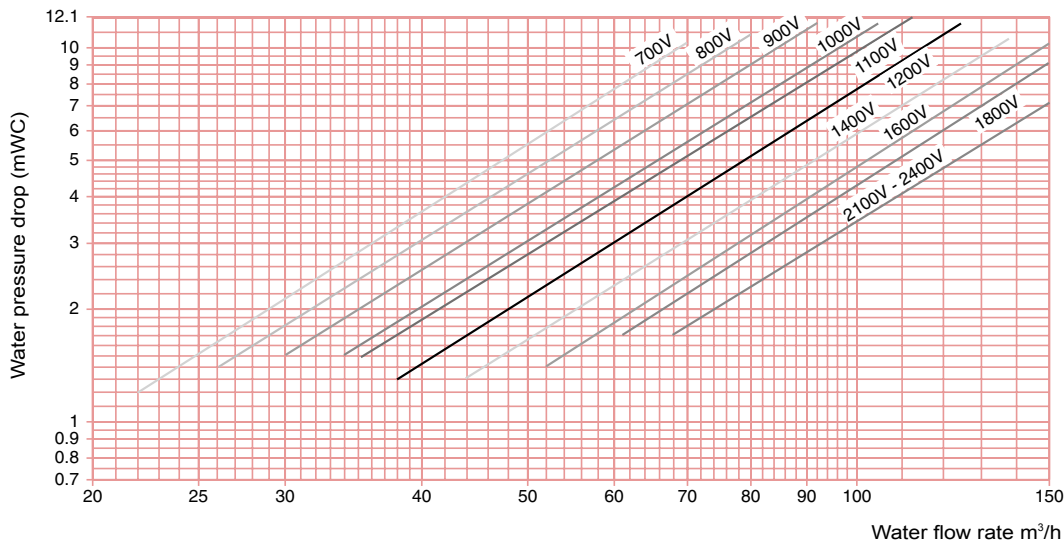
OPERATING RANGE

■ DYNACIAT^{POWER} LG-LGP

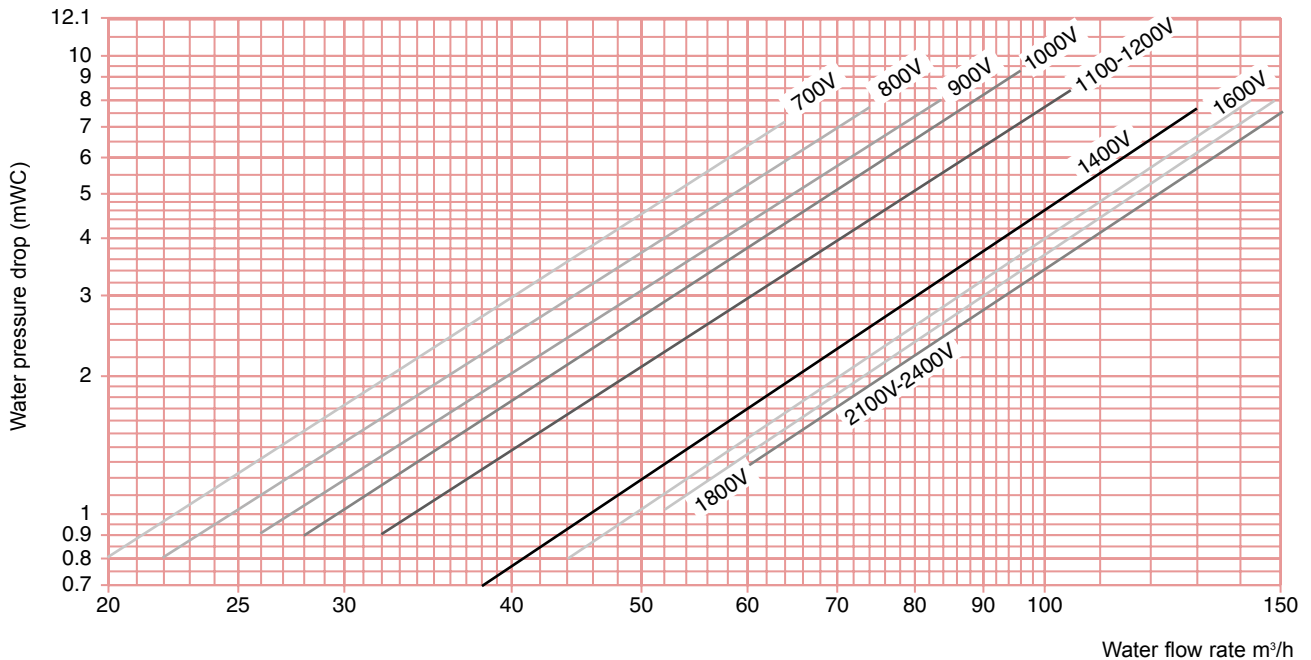


HYDRAULIC SPECIFICATIONS

■ DYNACIAT^{POWER} LG-LGP evaporator water pressure drop



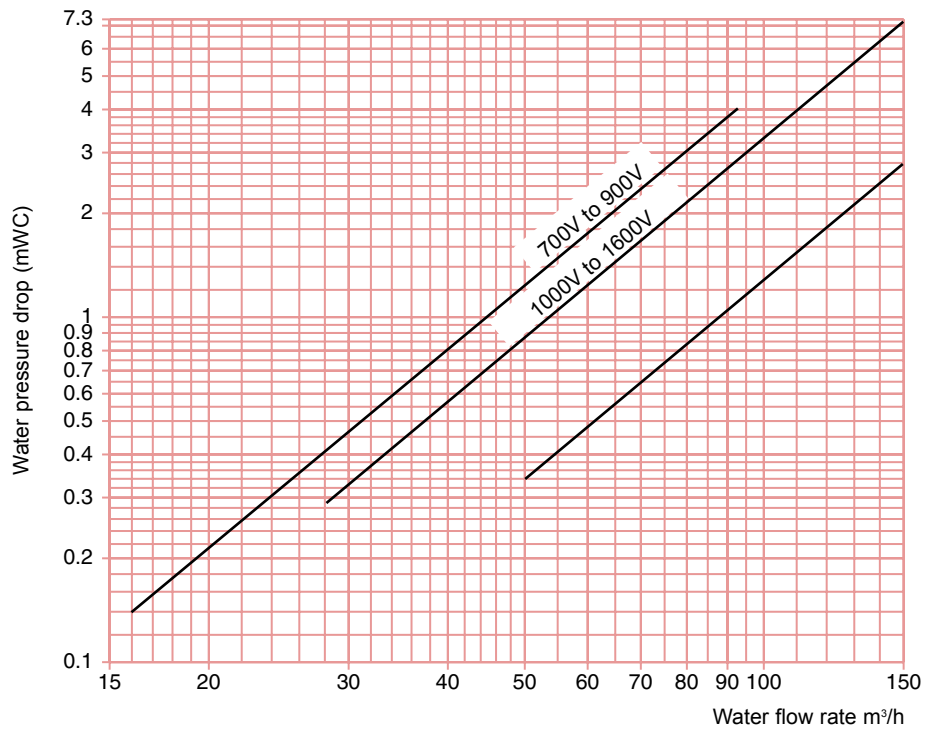
■ DYNACIAT^{POWER} LG-LGP condenser water pressure drop



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

HYDRAULIC SPECIFICATIONS

■ Condenser and evaporator filter water pressure drop



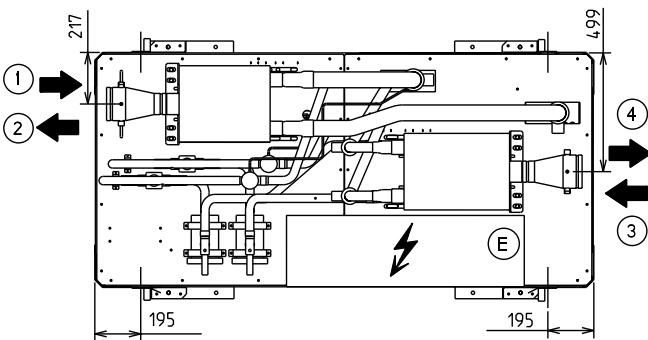
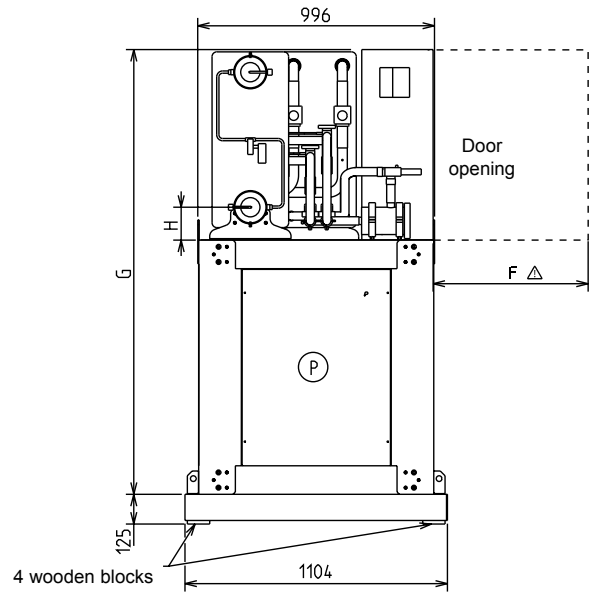
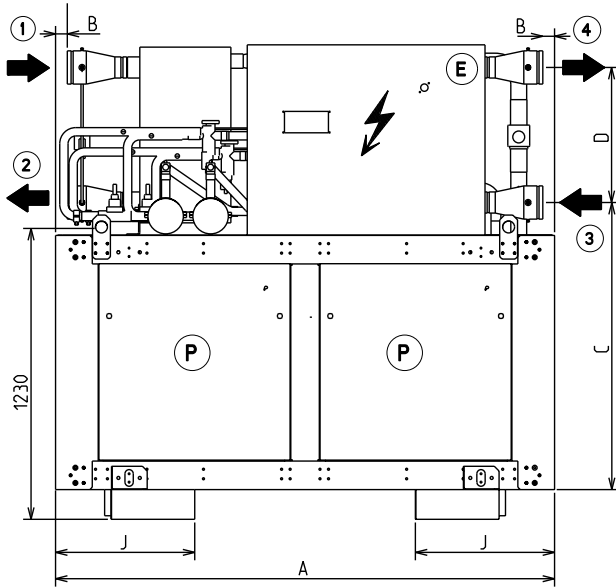


DYNACIAT POWER

Water cooled
water chillers

DIMENSIONS

■ 700V to 1600V models



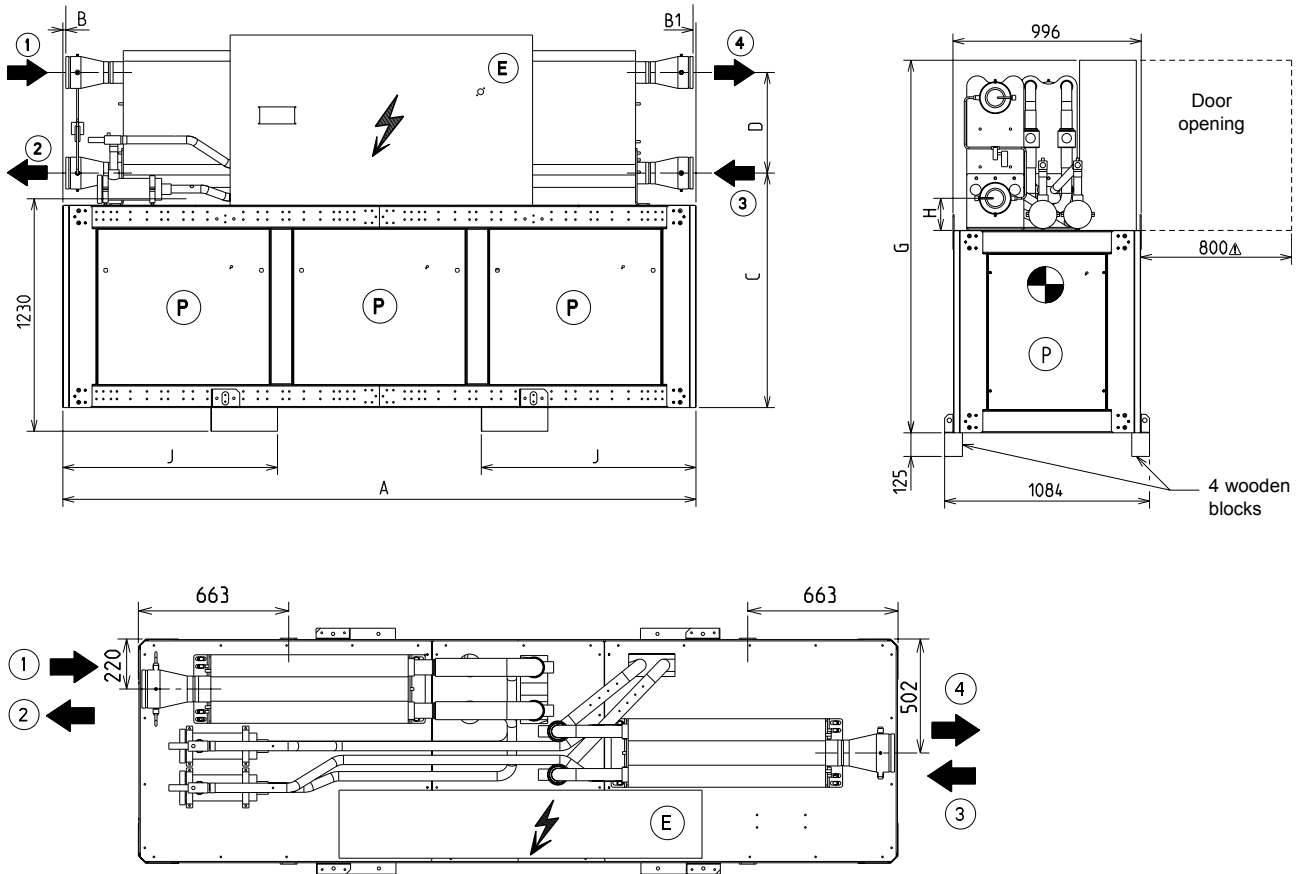
(E) Electrical connection on the side

(P) Noise insulation panels option

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

DIMENSIONS

■ 1800V to 2400V models



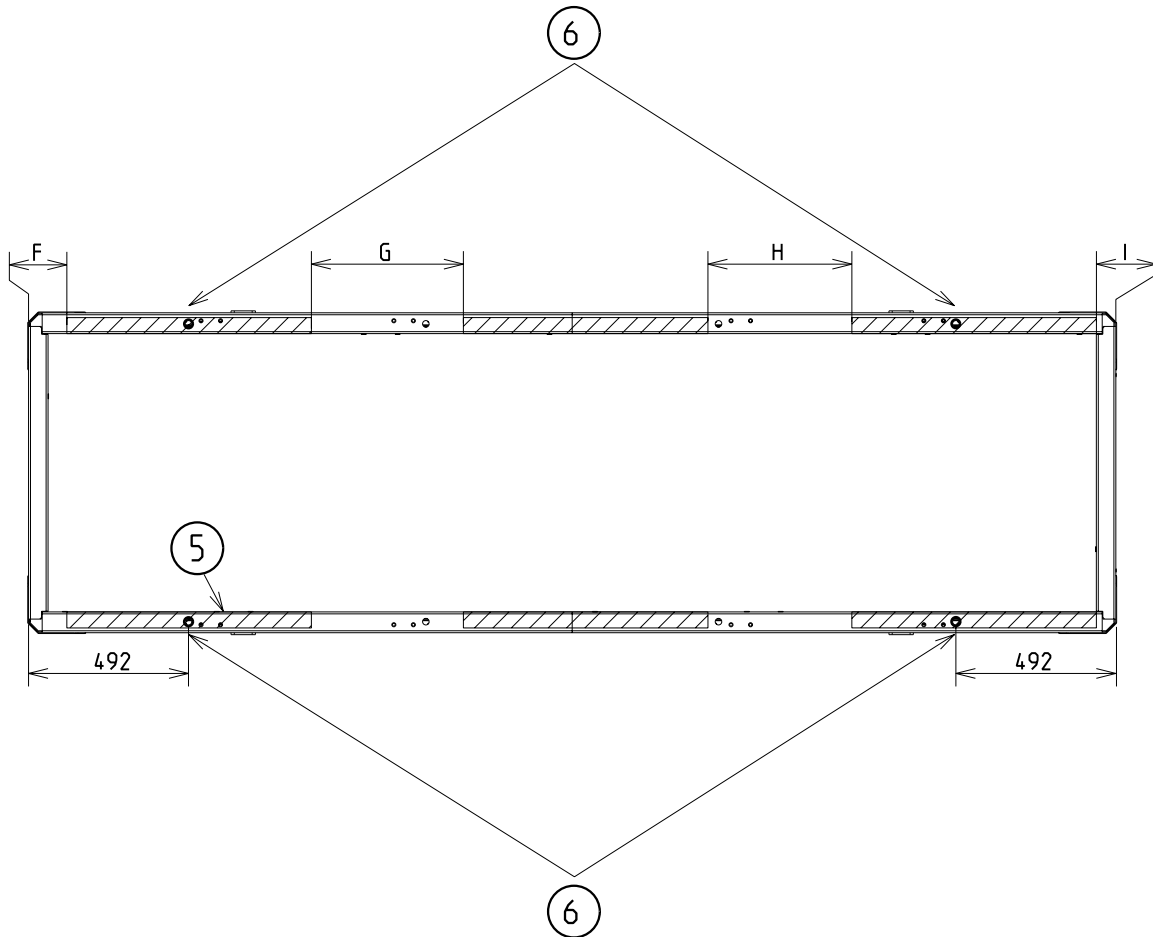
(E) Electrical connection on the side

(P) Noise insulation panels option

Models	Dimensions (mm)								Chilled water		Hot water		Weight (kg)	
	A	B	B1	C	D	G	H	J	Input 1	Outlet 2	Input 1	Outlet 2	empty	in operation
1800V	3350	159	63	1240	532	1970	170	1135	VICTAULIC DN 150	VICTAULIC DN 150			2284	2472
2100V		15	15										2376	2588
2400V													2418	2637

ANTI-VIBRATION MOUNTS (OPTION)

■ 1800V to 2400V models



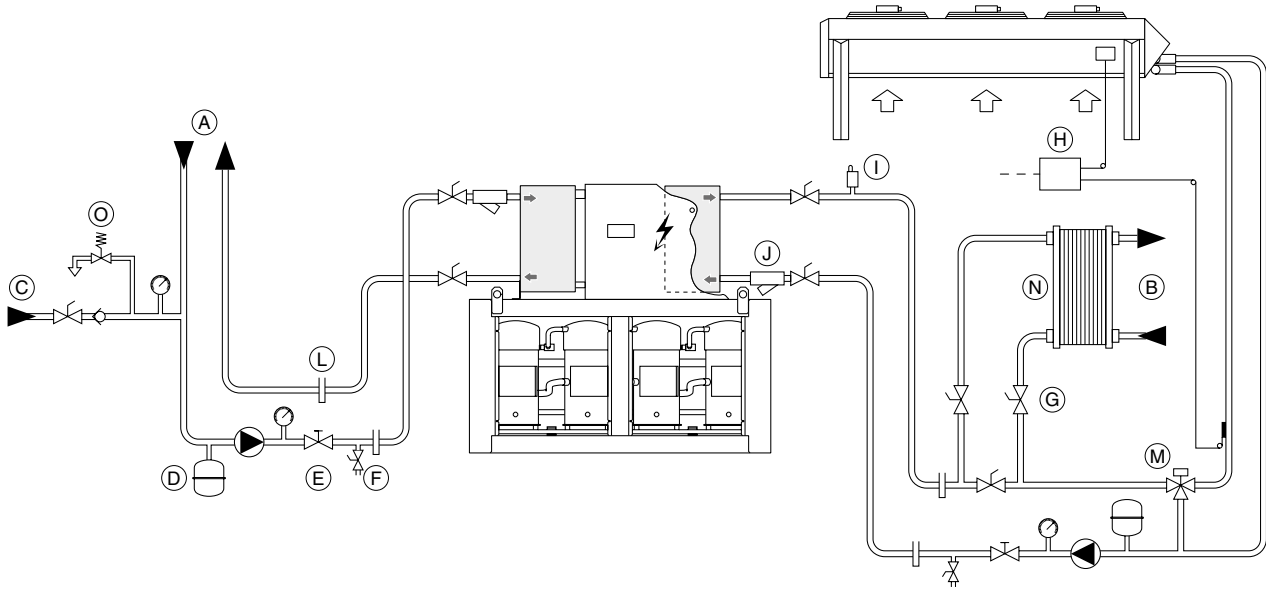
⑤ 6 SYLOMER anti-vibration mounts

⑥ 4 holes for floor mounting

Models	Dimensions (mm)							
	F	G	H	I	⑤			⑥
					Length	Width	thickness	Ø
1800V	100	440	585	125	700	50	25	20,2
2100V	100	585	440	125				
2400V	125	440	585	100				

COOLING SCHEMATIC INSTALLATION DIAGRAM

■ Cooling installation with drycooler



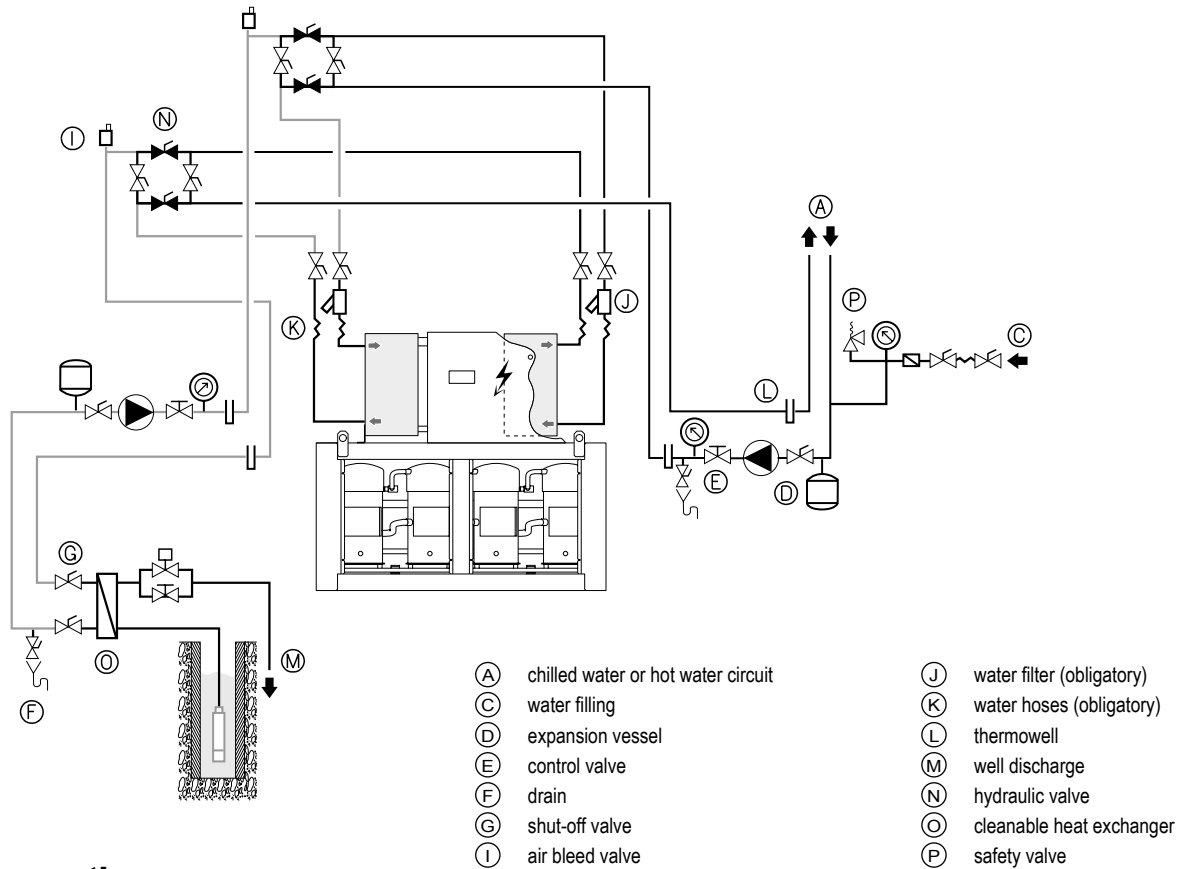
- Ⓐ Chilled water circuit
- Ⓑ Recovery water circuit
- Ⓒ Water top-up
- Ⓓ Expansion vessel
- Ⓔ Control valve

- Ⓕ Drain
- Ⓖ Shut-off valve
- Ⓗ Temperature controller
- Ⓘ Air purge
- ⓵ Water filter (obligatory)

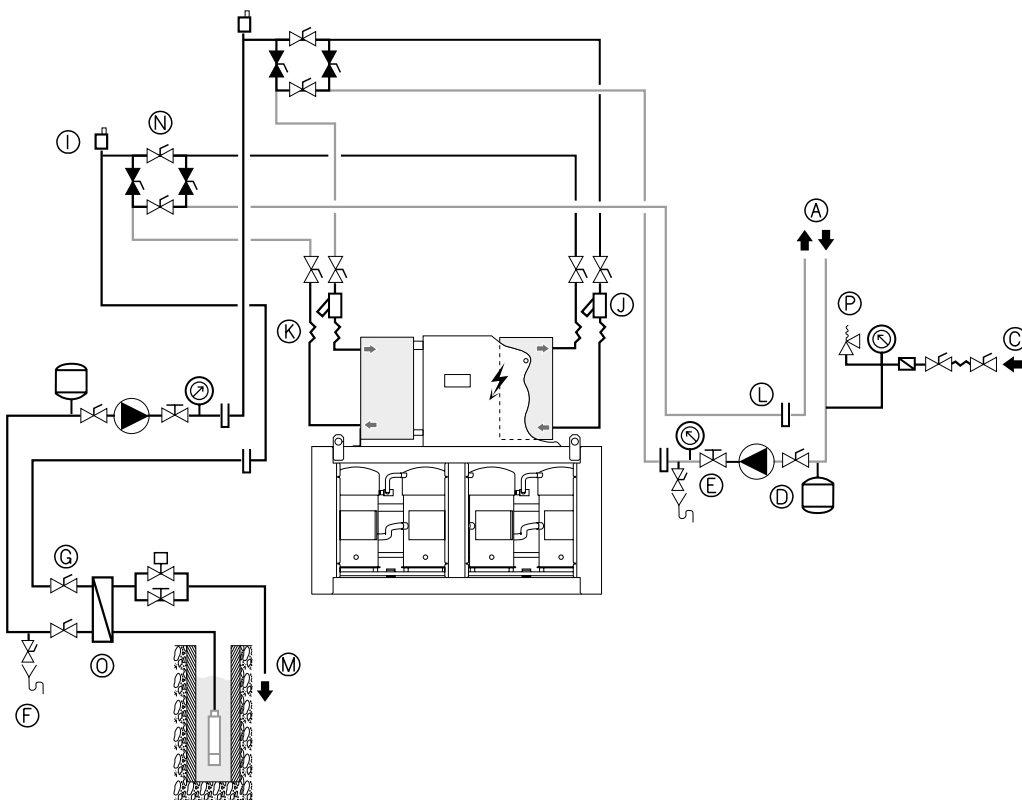
- Ⓛ Thermowell
- Ⓜ 3-way hydraulic valve
- Ⓝ Cleanable exchanger
- Ⓞ Safety valve

HEATING AND COOLING SCHEMATIC INSTALLATION DIAGRAM

■ Cooling operation



■ Heating operation



INSTALLATION RECOMMENDATIONS

■ Water quality criteria to be respected

Warning: *It is essential that an 800-micron water filter be placed on the unit's water inlet during installation.*

The quality of the water used has a direct impact on the correct and compliant operation of the machine and its service life. This is particularly true if the water used clogs or corrodes components or promotes the growth of algae or micro-organisms.

The water must be tested to determine whether it is suitable for the unit.

It is also tested to determine whether chemical treatment is necessary and will suffice to make it of acceptable quality.

The results of the analysis must confirm whether the site's water is compatible with the various materials used on the CIAT unit's circuit:

- 99.9% copper tubes brazed with copper and silver,
- threaded bronze couplings or flat steel flanges, depending on the unit model,
- plate heat exchangers and AISI 316/DIN 1.4401 stainless steel connections brazed with copper and silver.

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

Lifting and handling operations.

■ Lifting and handling operations

The utmost safety precautions must be taken when lifting and handling the unit.

Always follow the lifting diagram affixed to the unit and in the user manual (Installation, Operation, Commissioning and Maintenance).

Before attempting to lift the unit, make sure the path leading to its intended location is free from obstacles.

Always keep the unit vertical when moving it. Never tip it or lie it on its side.

■ Choosing a location for the unit

DYNACIAT POWER units are designed for installation in a machine room.

Precautions should be taken to protect it from freezing temperatures.

Special attention should be paid to ensure sufficient free space (including at the top) to allow maintenance.

The unit must be placed on a perfectly level, fireproof surface strong enough to support it when ready for operation.

Noise pollution from auxiliary equipment such as pumps should be studied thoroughly.

Depending on the room and its structure, potential noise transmission routes should be studied, with assistance from an acoustical engineer if necessary, before installing the unit.

Flexible couplings must be placed over pipes (available as options).

■ Machine room ventilation

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

■ Fitting accessories supplied separately

A number of optional accessories may be delivered separately and installed on the unit on site.

Always follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance).

■ Electrical connections

Always follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance).

All information concerning electrical connections is stated on the wiring diagrams provided with the unit. Always follow this information to the letter.

Electrical connections must be made in accordance with best current practices and applicable standards and regulations.

Electrical cable connections to be made on-site:

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

It should be noted that the unit's electrical system is not protected against lightning strikes.

Therefore, devices to protect against transient voltage surges must be installed on the system, and inside the power supply unit on site.

INSTALLATION RECOMMENDATIONS

■ Pipe connections

Always follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance).

All pipes must be correctly aligned and slope toward the system's drain valve.

Pipes must be installed and connected to allow sufficient access to the panels and fitted with heat insulation.

Pipe mountings and clamps must be separate to avoid vibrations and ensure no pressure is placed on the unit.

Water flow shut-off and control valves must be fitted when the unit is installed.

Pipe connections to be made on-site:

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

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

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

Warning:

- **Pressure in the water circuits below 4 bar.**
- **Place the expansion vessel before the pump.**
- **Do not place any valves on the expansion vessel.**
- **Make sure the water circulation pumps are placed directly at the exchanger inlets.**
- **Make sure the pressure of the water drawn in by the circulation pumps is greater than or equal to the required minimum NPSH, particularly if the water circuits are "open".**
- **test the water quality criteria in accordance with the relevant technical requirements.**
- **Take the necessary precautions to protect the unit and hydraulic system from freezing temperatures (e.g. allow for the possibility of draining the unit). If glycol is added to prevent freezing, check its type and concentration before system start-up.**
- **before making any final hydraulic connections, flush the pipes with clean water to remove any debris in the network.**

■ System start-up

Units must be commissioned by CIAT or a CIAT-authorized firm.

Always follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance).

List of system start-up checks (non-exhaustive):

- Correct positioning of unit
- Power supply protections
- Phases and direction of rotation
- Wiring connections on unit
- Direction of water circulation in unit
- Cleanliness of water circuit
- Water flow rate at specified value
- Pressure in the refrigerating circuit
- Direction of rotation of compressors
- Water pressure drops and flow rates
- Operating readings.

■ Maintenance operations

Specific preventive maintenance operations must be carried out regularly on the units by

CIAT-authorized firms.

The operating parameters are read and noted on a "CHECK LIST" form to be returned to CIAT.

To do this, always refer to and follow the instructions in the user manual (Installation, Operation, Commissioning and Maintenance).

You must take out a maintenance contract with a CIAT-approved refrigeration equipment specialist. Such a contract is required even during the warranty period.

DRYCOOLERS

CIAT **OPERA** and **VEXTRA** series drycoolers are compatible with **DYNACIAT^{POWER} LG** units with water cooled condensers
Available in a wide range of sizes and with several ventilation speeds, the **OPERA** and **VEXTRA** can be adapted to the sizing and acoustic constraints of each site

Opera



Vextra



CONNECT 2 CONTROL

USER-FRIENDLY INTERFACE CONSOLE

- LCD display (4 lines of 24 characters each)
- Pressure and temperature readings
- Diagnosis of fault and operating statuses
- Master/slave control of two machines in parallel
- Fault memory management
- Pump management
- Remote control
- Time schedules



PRODUCT FUNCTIONALITY

POTENTIAL-FREE (DRY) CONTACTS AVAILABLE AS STANDARD

Inputs:

- Automatic pump and machine control
- Selection of setpoints 1 / 2
- Setpoint adjustable by 4-20 mA signal
- Heating/cooling mode selection
- Compressor load shedding

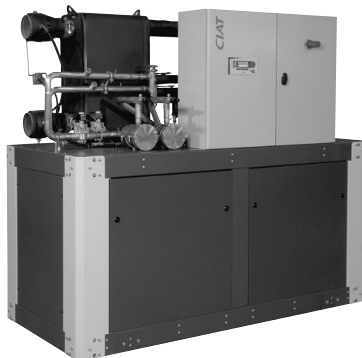
Outlets:

- General fault reporting
- Fault reporting on each circuit
- Pump control

Additional outlets available as options:

- Water flow fault
- Frost protection fault
- Pump fault
- Compressor lubrication fault
- Fan fault
- Low and high pressure fault
- Compressor overheating fault
- Discharge temperature fault
- Compressor operating status

Via potential-free
(dry) contact



Customer CMS
COMMUNICATION

Via BUS
communication

OUTLET AS STANDARD

- Open MODBUS-JBUS RS 485 protocol (standard)
- MODBUS-ETHERNET TC/IP protocol (standard)
- LONWORKS protocol (option)
- BACNET protocol (option)

CIAT SYSTEM FUNCTIONALITY

Communication with Hysys system (generator, transmitter, air handling unit), controlled by an Easy CIATControl or Smart CIATControl touch tablet.

- **Logging** of consumption data and temperatures
- **Optimal Water[®]**: optimisation of producer performance based on building requirements
- **Optimal Stop and Start**: optimisation of the building restart time

Communication with CIAT Energy pool controlled by Power'Control.

Integrated Power'Control:

- Energy optimisation of refrigeration and heating using several generators,
- Manages free cooling capacity
- Uses heat recovery to supply domestic hot water.

Smart CIATControl



Power'Control



This document is not legally binding. As part of its continuous drive to improve its equipment, CIAT reserves the right to make any technical modifications without prior notice.
Ref. : NA 19.679A

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