



Water-cooled water chillers

DYNACIAT POWER



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 and cooling

USE

The new generation of DYNACIAT^{POWER} water-cooled water chillers provides an optimal solution to all cooling and heating applications in private and public offices, healthcare facilities, commercial premises, hotels and apartment buildings.

They are designed to be installed in equipment rooms that are protected against freezing temperatures and inclement weather.

This new range is optimised to run with the ozone-friendly HFC refrigerant **R410A** and thereby meet the most demanding environmental protection and high seasonal energy efficiency (ESEER) requirements.

RANGE

DYNACIAT^{POWER} **LG-LGP series**

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

DYNACIAT^{POWER} **LG-LGP series**

The design of DYNACIAT^{POWER} LGP water-to-water heat pumps is identical to that of DYNACIAT^{POWER} **LG** heat pumps. These heat pumps solve the most varied heating problems and, when the flow of water is reversed, can be used to provide cooling.

Acoustic configuration

- a - STANDARD version
- b - LOW NOISE version
Encased compressors
- c - XTRA LOW NOISE version
Encased compressors with sound insulation



DESCRIPTION

DYNACIAT^{POWER} **LG-LGP** heat pumps are packaged units that are delivered as standard with the following components:

- hermetic scroll compressors
- brazed-plate chilled-water evaporator
- brazed-plate hot-water condenser
- power and remote-control electrical cabinet:
 - main power supply (400 V/3-ph/50 Hz (+10%/-10%) + earth)
 - transformer fitted as standard to provide 230 V/1-ph/50 Hz power to the remote control circuit
- CIAT CONNECT 2 electronic control unit

The entire DYNACIAT^{POWER} range conforms to standards EN 60204 and EN 378-2 and to the following European directives:

- Machinery (98/37/EC)
- EMC (2004/108/EEC)
- Low voltage (2006/95/EC)
- Pressure equipment (97/23/EC), category 2 for the 700V to 1000V - 1400V to 1800V models.
category 3 for the 1100V-1200V - 2100V-2400V models

DESCRIPTION

LG > cooling-only version **1200** > unit size

P > heating-only version **V** > R410A refrigerant



**700-1600V LG-LGP models
Xtra Low Noise version**



MAIN COMPONENTS

■ Compressors

- Hermetic scroll type
- Built-in electric motor cooled by suction gases
- Motor protected by internal winding thermostat
- Anti-vibration mounts

■ Evaporator

- Brazed-plate heat exchanger
- AISI 316 stainless steel plates
- Plate pattern for optimised high efficiency
- Armaflex thermal insulation

■ Condenser

- Brazed-plate heat exchanger
- AISI 316 stainless steel plates
- Plate pattern for high efficiency optimisation

■ Refrigeration accessories

- Filter dryers with refillable cartridges
- Hygroscopic sight glasses
- Solenoid valves on liquid refrigerant lines (700-1200V models)
- Thermostatic expansion valves (700-1600V models)
- Electronic expansion valves (1800-2400V models)

■ Regulation and safety devices

- Low and high pressure sensors
- High pressure safety valves
- Water temperature control sensors
- Evaporator frost protection sensor
- Evaporator flow switch (factory fitted)

■ Electrics box

- IP21
- 400 V/3-ph/50 Hz power supply with earth (-10%/+10%)
- Main safety switch with handle on front
- Control circuit transformer
- Compressor motor circuit breaker
- Compressor motor contactors
- CONNECT 2 microprocessor-controlled electronic control unit
- Wire numbering
- Identification of the main electrical components
- RAL 7035

■ CONNECT 2 electronic control unit

The CIAT electronic control unit offers the following features:

- Control of chilled water or hot water temperatures
- Water temperature control based on the outdoor temperature (water law)
- Control for low temperature energy storage
- Second setpoint management
- Complete management of compressors with start-up sequence, timer and runtime balancing
- Self-adjusting and proactive functions with adjustment of parameter drift control
- Series-staged reduction of the compressors' power consumption based on cooling or heating demands

- Compressor short-cycle management
- Machine operating limit managed based on the outdoor temperature
- Operating state and fault diagnostics
- Fault memory logs the last 20 faults and issues an operating reading report when faults occur
- Master/slave management of two parallel-connected machines with runtime balancing and automatic changeover in the event of a machine fault
- Programmable machine operation times
- Multilingual LCD (4 lines of 24 characters each) for displaying and accessing operating parameters

■ Remote management

CONNECT 2 is equipped as standard with an RS485 serial port that allows many remote management, supervision and diagnostics possibilities over a communication bus. Several contacts are available as standard for controlling DYNACIAT^{POWER} remotely over a wired connection:

- Automatic operation control: the machine shuts off when the contact opens.
- Setpoint 1/setpoint 2: a second cooling setpoint is activated when this contact closes (e.g. energy storage mode)
- HEATING/COOLING mode selection: this input is used to switch between operating modes.

Contact closed = HEATING mode

Contact open = COOLING mode

- Setpoint adjustable via 4-20 mA signal: this input is used to adjust the HEATING or COOLING setpoint
- Compressor load shedding: closing the relevant contact(s) turns off one or more compressors and thus lowers the machine's electricity or refrigerant consumption
- Water pump 1 and 2 control: these outputs control the contactors of one or two water pumps
- Fault signalling: this contact indicates that a major fault has occurred and caused one or both refrigerating circuits to turn off

■ Power control

Series-staged control of the compressors' power consumption

- Four stages for 700-1600V models
- Six stages for 1800V and 2400V models
- Eight stages for 2100V models

■ Frame

Frame made of painted metal panels (RAL 7024 and RAL 7035).



STANDARD EQUIPMENT/AVAILABLE OPTIONS

| DYNACIAT ^{POWER} LG-LGP | 700V to 2400V |
|--|---------------|
| Safety switch | ● |
| Control circuit transformer | ● |
| Electrical cabinet wire numbers | ● |
| RS485 communication interface | ● |
| Water flow switch | ● |
| Master/slave management of two machines | ● |
| Electronic expansion valve (1) | ▲ |
| Low Noise version (encased compressors) | ▲ |
| Xtra Low Noise version (encased compressors with sound insulation) | ▲ |
| Compressor intake shut-off valves | ▲ |
| Low-temperature glycol/water mix (0°C to -12°C) | ▲ |
| Soft start | ▲ |
| Water filter (evaporator and condenser) | ■ |
| Phase controller (reversal, loss, asymmetry, over and under voltage) | ■ |
| Anti-vibration mounts | ■ |
| Flexible hydraulic couplings on evaporator and condenser | ■ |
| Remote control unit (remote control console) | ■ |
| Relay board with dry contacts | ■ |
| MultiCONNECT multi-unit management system | ■ |
| LonWorks gateway | ■ |
| Ethernet gateway | ■ |

● Supplied as standard

▲ Factory-fitted option

■ Option supplied as a kit

(1) Standard equipment for models 1800V to 2400V



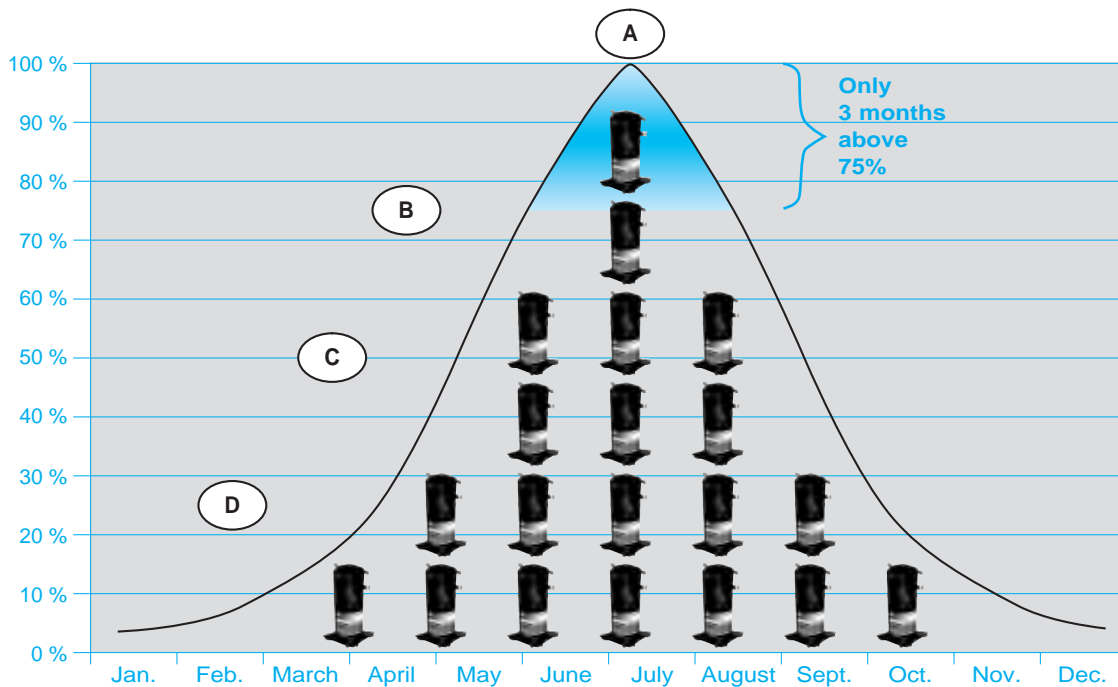
SEASONAL PERFORMANCE

Most centralised air-conditioning systems used in the service industry in Europe use water chillers to produce cold.

Analyses of installed systems show that heat load varies from season to season and that a water chiller operates primarily at **reduced capacity**.

The **European Seasonal Energy Efficiency Ratio (ESEER)** measures the seasonal efficiency of water chillers by taking into account their efficiency under partial load using formulas created by the **European certification body Eurovent**.

Seasonal heat load variations



$$ESEER = A \times EER100\% + B \times EER75\% + C \times EER50\% + D \times EER25\%$$

A, B, C and D are weighting factors pertaining to a unit's running time based on its load

The ESEER design conditions for WATER-cooled water chillers are as follows:

| Unit load | Condenser water inlet temperature | Chilled water mode | Weighting factor |
|-----------|-----------------------------------|--------------------|------------------|
| 100% | 30°C | 12°C/7°C (*) | A = 0.03 |
| 75% | 26°C | 10.8°C/7°C (*) | B = 0.33 |
| 50% | 22°C | 9.5°C/7°C (*) | C = 0.41 |
| 25% | 18°C | 8.3°C/7°C (*) | D = 0.23 |

(*) **Water flow rate = Water flow rate at 100%**

The efficiency under partial load is therefore essential when choosing a water chiller. It is with this in mind that CIAT designed new DYNACIAT^{POWER} range. In particular, CIAT made the conscious choice to use **R410A**, a refrigerant that has a high thermodynamic efficiency and makes it possible to achieve very high **ESEERs**.

As its compressors are connected in parallel on the refrigeration circuit, DYNACIAT^{POWER} easily and efficiently adjusts the cooling capacity to the system's needs. The self-adjusting **CONNECT 2** control anticipates variations in load and turns on only the number of compressors needed. The compressors operate at optimum performance, energy efficiency is extremely high all year-round and, as a result, the system continues to save energy for most of its life.



TECHNICAL CHARACTERISTICS

| DYNACIAT ^{POWER} | | 700V | 800V | 900V | 1000V | 1100V | 1200V | 1400V | 1600V | 1800V | 2100V | 2400V | | |
|---|-----------------------------------|----------------------------|----------------------|----------------|----------------------|-----------------|----------------------|----------------|----------------------|-----------------|----------------------|----------------------------|----------------------|--|
| Standard Low Noise Xtra Low Noise Versions | Cooling capacity (1) kW | kW | 218 | 252 | 289 | 328 | 357 | 386 | 444 | 500 | 584 | 659 | 716 | |
| | Input power (2) kW | kW | 46.6 | 53.3 | 62 | 70.3 | 76.5 | 82.6 | 94.4 | 107 | 120.2 | 140 | 161.2 | |
| | EER/ESEER | | 4.68/6.1 | 4.73/6.17 | 4.66/6.05 | 4.67/5.94 | 4.67/6 | 4.67/6.04 | 4.7/6.01 | 4.67/5.9 | 4.86/6.22 | 4.71/6.04 | 4.45/5.89 | |
| | Lw/Lp Standard (3) dB(A) | dB(A) | 89 / 57 | 90 / 58 | 89 / 57 | 90 / 58 | 91 / 59 | 95/63 | 96/64 | 93/61 | 95/63 | 97/65 | | |
| | Lw / Lp Low Noise (3) | dB(A) | 84 / 52 | 85 / 53 | 86 / 54 | 87 / 55 | 88 / 56 | 90/58 | 91/59 | 89/57 | 90/58 | 91/59 | | |
| | Lw / Lp Xtra Low Noise (3) | dB(A) | 79 / 47 | 80 / 48 | | | 81 / 49 | 82 / 50 | 85/53 | 86/54 | 85/53 | 86/54 | 87/55 | |
| Refrigeration circuit | Refrigerant (GWP) | R410A (1720) | | | | | | | | | | | | |
| | Quantity | 2 | | | | | | | | | | | | |
| Compressor | Type | Hermetic scroll (2900 rpm) | | | | | | | | | | | | |
| | Quantity | 4 | | | | | | 6 | | | | | | |
| | Start-up mode | Direct in line in series | | | | | | | | | | | | |
| | Capacity control | Stages | 6 | 4 | 6 | 4 | 6 | 4 | 6 | 4 | 6 | 8 | 6 | |
| | | % | 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 | |
| | R410A in circ. | 1 (kg) | 12.5 | 14 | 16 | 18 | 20 | 21.5 | 21 | 23 | 27 | 27 | 34 | |
| | R410A in circ. | 2 (kg) | 12.5 | 14 | 16 | 18 | 20 | 21.5 | 20 | 22 | 27 | 34 | 34 | |
| | Oil type for R410A | POE - 160SZ | | | | | | POE - 3MAF | | | | | | |
| | Oil capacity per circuit (litres) | | 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 | 3x6.3 | 3x6.3 | 3x6.3 | |
| | Evaporator | Type | Brazed plates | | | | | | | | | | | |
| Quantity | | 1 | | | | | | | | | | | | |
| Water capacity (litres) | | 20 | 23 | 26 | 29 | 32 | 37 | 50 | 57 | 64 | 77 | 77 | | |
| Hydraulic connections | | VICTAULIC DN100 | | | | VICTAULIC DN125 | | | | VICTAULIC DN150 | | | | |
| Max. press. water end | | 10 Bars | | | | | | | | | | | | |
| 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 | |
| Water-cooled condenser | Type | Brazed plates | | | | | | | | | | | | |
| | Quantity | 1 | | | | | | | | | | | | |
| | Water capacity (litres) | 23 | 26 | 29 | 32 | 37 | 40 | 55 | 61 | 73 | 77 | 77 | | |
| | Hydraulic connections | VICTAULIC DN100 | | | | VICTAULIC DN125 | | | | VICTAULIC DN150 | | | | |
| | Max. press. water end | 10 Bars | | | | | | | | | | | | |
| | 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 | 66/153 | |
| Dimensions | Length | mm | 2099 | | | | | 2499 | | | 3350 | | | |
| | Width | mm | 996 | | | | | 996 | | | 996 | | | |
| | Height | mm | 1869 | | | | | 1887 | | | 1970 | | | |
| Weight | Weight (empty) | kg | 1044 | 1156 | 1189 | 1312 | 1363 | 1425 | 1613 | 1708 | 2284 | 2376 | 2418 | |
| | Weight (filled) | kg | 1088 | 1205 | 1246 | 1378 | 1436 | 1510 | 1713 | 1818 | 2472 | 2588 | 2637 | |

(1) Cooling capacity for a chilled water temperature of 12°C/7°C and a condenser hot water temperature range of 30°C/35°C

(2) Compressor power input

(3) Lw : Overall sound power level

Lp: Total sound pressure level measured at 10 metres in a free field in accordance with ISO 3744. The sound pressure levels are calculated using the formula $L_p = L_w - 10 \log S$



Water-cooled water chillers

ELECTRICAL SPECIFICATIONS

| DYNACIAT ^{POWER} | 700V | 800V | 900V | 1000V | 1100V | 1200V | 1400V | 1600V | 1800V | 2100V | 2400V |
|---|-------------------------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| COMPRESSOR | | | | | | | | | | | |
| Tension V | 400V - 300Ph - 50Hz (+/- 10%) | | | | | | | | | | |
| Starting current (1) (A) | 140 | 160 | 182 | 205 | 218 | 232 | 266 | 295 | 356 | 399 | 443 |
| IStarting 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 (2) | | | | | | | | | | | |
| Tension V | 230V - 1Ph - 50Hz (+/- 10%) | | | | | | | | | | |
| Maximum rated current (A) | 0.8 | | | | | | 1.3 | | | | |
| Transformer power (VA) | 160 | | | | | | 250 | | | | |
| Indice de protection machine | IP 21 | | | | | | | | | | |

(1) Starting current of largest compressor + maximum current of other compressors under full load
 Rated current for selecting cables = sum of maximum rated currents in above tables



Water-cooled water chillers

DYNACIAT POWER

PERFORMANCE

| R410A | LG LGP | Evaporator water outlet temperature (°C) | CONDENSER WATER OUTLET TEMPERATURE (°C) | | | | | | | | | | | | | | | | | | |
|------------|----------------------------|--|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| | | | 30 | | | 35 | | | 40 | | | 45 | | | 50 | | | 55 | | | |
| | | | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | |
| 700V | Glycol/water mix mandatory | -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 | Glycol/water mix mandatory | -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 | | Glycol/water mix mandatory | -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 | Glycol/water mix mandatory | -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 cooling capacity for temperature difference, based on operating limits

Pi: Compressor power input

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

EN 14511 and EUROVENT conditions

Low temperature option mandatory



Water-cooled water chillers

PERFORMANCE

DYNACIAT POWER

| R410A | LG LGP | Evaporator water outlet temperature (°C) | CONDENSER WATER OUTLET TEMPERATURE (°C) | | | | | | | | | | | | | | | | | |
|-------|----------------------------|--|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | | 30 | | | 35 | | | 40 | | | 45 | | | 50 | | | 55 | | |
| | | | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW |
| 1100V | Glycol/water mix mandatory | -12 | 160 | 65.5 | 225 | 161 | 72.2 | 233 | 151 | 79.6 | 231 | 141 | 88.0 | 229 | | | | | | |
| | | -10 | 184 | 66.0 | 250 | 175 | 72.8 | 248 | 164 | 80.4 | 244 | 153 | 88.8 | 241 | | | | | | |
| | | -8 | 199 | 66.4 | 266 | 189 | 73.2 | 263 | 178 | 81.0 | 259 | 165 | 89.6 | 255 | 152 | 99.3 | 252 | | | |
| | | -4 | 232 | 67.3 | 299 | 221 | 74.3 | 295 | 208 | 82.0 | 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 |
| | Pure water | 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 |
| | | 5 | 345 | 69.0 | 414 | 330 | 76.1 | 406 | 311 | 84.2 | 395 | 292 | 93.3 | 385 | 271 | 103.0 | 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 | 114.0 | 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 | 95.0 | 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 | Glycol/water mix mandatory | -12 | 176 | 70.3 | 246 | 174 | 77.5 | 252 | 165 | 85.7 | 250 | 139 | 95.0 | 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 | 88.0 | 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 |
| | Pure water | 2 | 325 | 73.9 | 399 | 309 | 82.0 | 391 | 292 | 90.3 | 382 | 273 | 99.6 | 373 | 252 | 110.4 | 362 | 230 | 122.6 | 352 |
| | | 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 | Glycol/water mix mandatory | -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 |
| | Pure water | 2 | 380 | 84 | 464 | 362 | 91.9 | 454 | 342 | 100.9 | 443 | 320 | 111.2 | 431 | 297 | 123.4 | 420 | 271 | 137.6 | 409 |
| | | 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 | Glycol/water mix mandatory | -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 |
| | Pure water | 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 |
| | | 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 cooling capacity for temperature difference, based on operating limits

Pi: Compressor power input

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

EN 14511 and EUROVENT conditions

Low temperature option mandatory



Water-cooled water chillers

DYNACIAT POWER

PERFORMANCE

| R410A | LG LGP | Evaporator water outlet temperature (°C) | CONDENSER WATER OUTLET TEMPERATURE (°C) | | | | | | | | | | | | | | | | | | |
|------------|----------------------------|--|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| | | | 30 | | | 35 | | | 40 | | | 45 | | | 50 | | | 55 | | | |
| | | | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | Cc kW | Pi kW | Hc kW | |
| 1800V | Glycol/water mix mandatory | -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 | Glycol/water mix mandatory | -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 | | Glycol/water mix mandatory | -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 cooling capacity for temperature difference, based on operating limits

Pi: Compressor power input

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

EN 14511 and EUROVENT conditions

Low temperature option mandatory



Water-cooled water chillers

NOISE LEVELS

STANDARD version (without compressor sound insulation)

■ Sound power levels (Lw) (ref. 2×10^{-12} Pi ± 3 dB)

| DYNACIAT ^{POWER} | SOUND POWER LEVEL SPECTRUM (dB) | | | | | | Overall sound 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 levels (Lp) (ref. 2×10^{-5} Pi ± 3 dB)

| DYNACIAT ^{POWER} | SOUND PRESSURE SPECTRUM (dB) | | | | | | Overall sound pressure 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 |

Sound pressure levels calculated in accordance with ISO 3744: $L_p = L_w - 10 \log S$, in a free field and at a distance of 10 metres from the machine.

Sound pressure levels vary with site conditions. The values given are for guidance only. We remind you that only sound power levels are comparable and certified.



NOISE LEVELS

LOW NOISE version (encased compressors)

■ Sound power levels (Lw) (ref. 2×10^{-12} Pi ± 3 dB)

| DYNACIAT ^{POWER} | SOUND POWER LEVEL SPECTRUM (dB) | | | | | | Overall sound 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 levels (Lp) (ref. 2×10^{-5} Pi ± 3 dB)

| DYNACIAT ^{POWER} | SOUND PRESSURE SPECTRUM (dB) | | | | | | Overall sound pressure 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 |

Sound pressure levels calculated in accordance with ISO 3744: $L_p = L_w - 10 \log S$, in a free field and at a distance of 10 metres from the machine.

Sound pressure levels vary with site conditions. The values given are for guidance only. We remind you that only sound power levels are comparable and certified.



Water-cooled water chillers

NOISE LEVELS

XTRA LOW NOISE version (encased compressors with sound insulation)

■ Sound power levels (Lw) (ref. 2×10^{-12} Pi ± 3 dB)

| DYNACIAT ^{POWER} | SOUND POWER LEVEL SPECTRUM (dB) | | | | | | Overall sound 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 levels (Lp) (ref. 2×10^{-5} Pi ± 3 dB)

| DYNACIAT ^{POWER} | SOUND PRESSURE SPECTRUM (dB) | | | | | | Overall sound pressure 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 |

Sound pressure levels calculated in accordance with ISO 3744: $L_p = L_w - 10 \log S$, in a free field and at a distance of 10 metres from the machine.

Sound pressure levels vary with site conditions. The values given are for guidance only. We remind you that only sound power levels are comparable and certified.



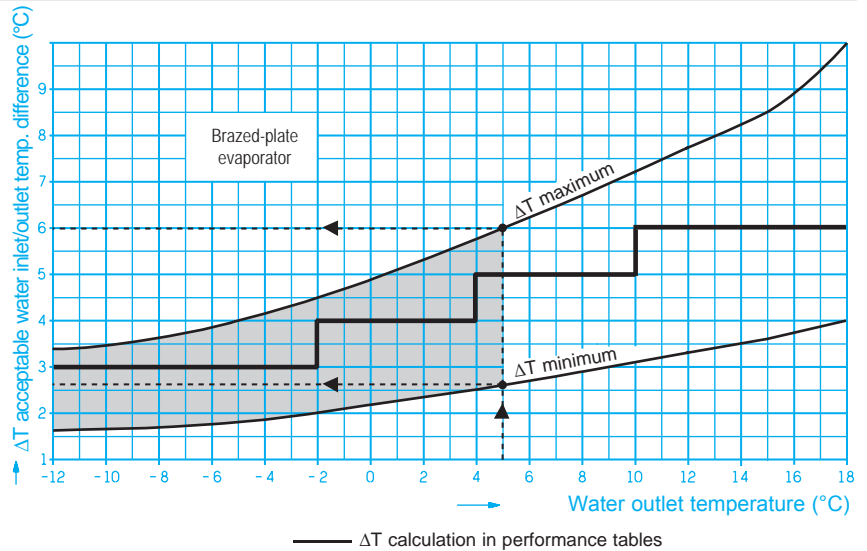
EVAPORATOR LIMITS

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, giving a water temperature range of 7.6°C/5°C
- the maximum difference is 6°C, giving a water temperature range of 11°C/5°C

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



CONDENSER LIMITS

| DYNACIAT ^{POWER} | LG - LGP |
|---------------------------|----------|
| minimum ΔT (°C) | 5 |
| maximum ΔT (°C) | 10 |

IMPORTANT: In order to allow the units to operate correctly, particularly during start-up while the condenser loop is cold, a device for warming up the fluid very quickly so that it is at least 20°C when it enters the condenser must be installed (e.g. three-way valve).

CORRECTION FACTORS 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 |

■ Required glycol concentration

| Volume percent concentration | | 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 |



Water-cooled water chillers

MINIMUM VOLUME OF CHILLED WATER (COOLING MODE)

The CONNECT 2 control unit uses anticipatory logic to allow a wide range flexibility in adjusting operation to parameter drift, particularly in systems with low water volumes.

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

| DYNACIAT ^{POWER} LG-LGP | 700V | 800V | 900V | 1000V | 1100V | 1200V | 1400V | 1600V | 1800V | 2100V | 2400V |
|-------------------------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Min. system capacity (litres) | 636 | 880 | 844 | 1146 | 1043 | 1346 | 1286 | 1735 | 1262 | 1336 | 1595 |

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

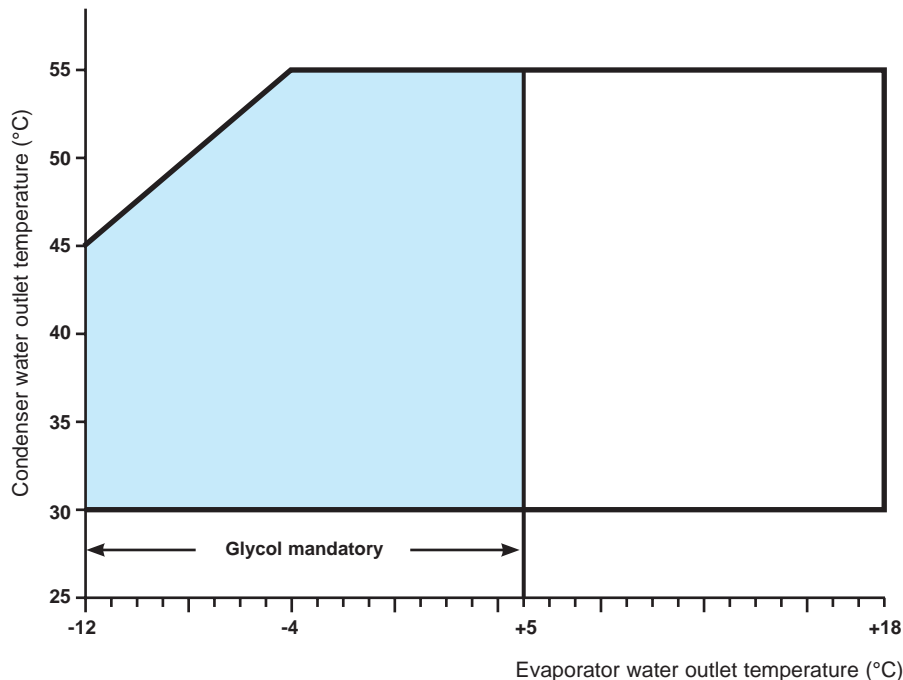
- evaporator chilled water temperature range: 12°C/7°C
- condenser water temperature range: 30°C/35°C

Note:

A buffer tank may be installed on systems used in industrial processes that may require highly stable water temperatures or on systems with highly fluctuating heat loads.

OPERATING RANGE

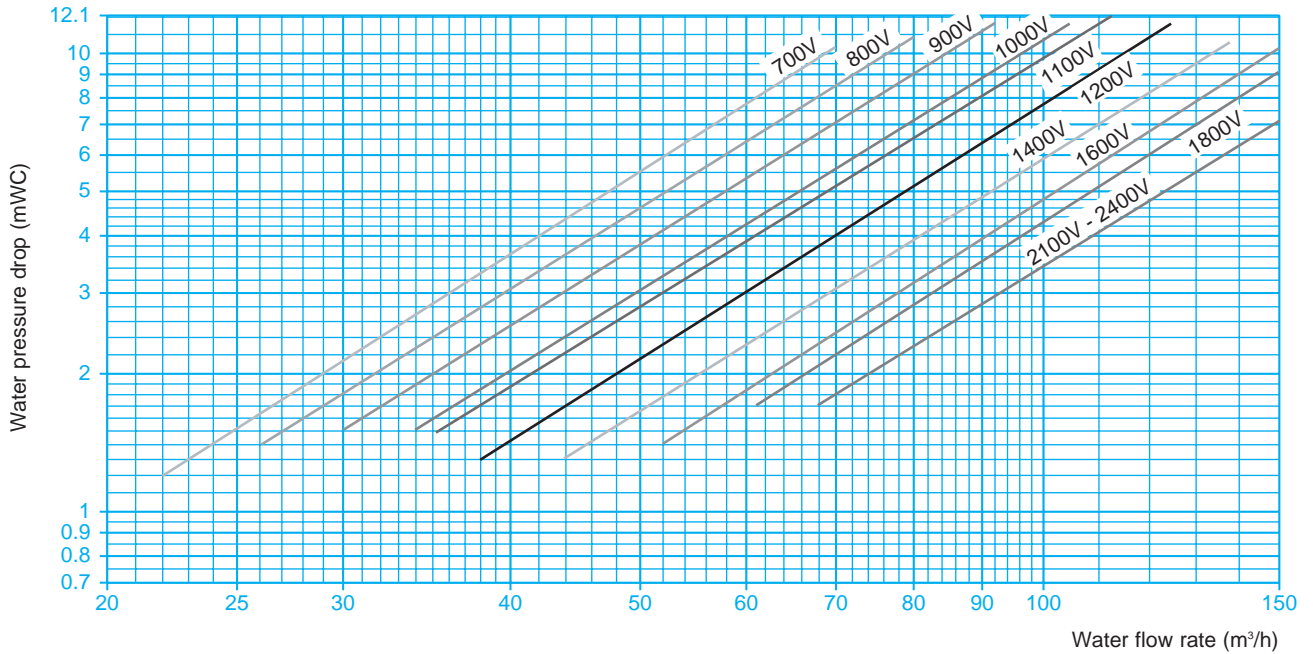
■ DYNACIAT^{POWER} LG-LGP



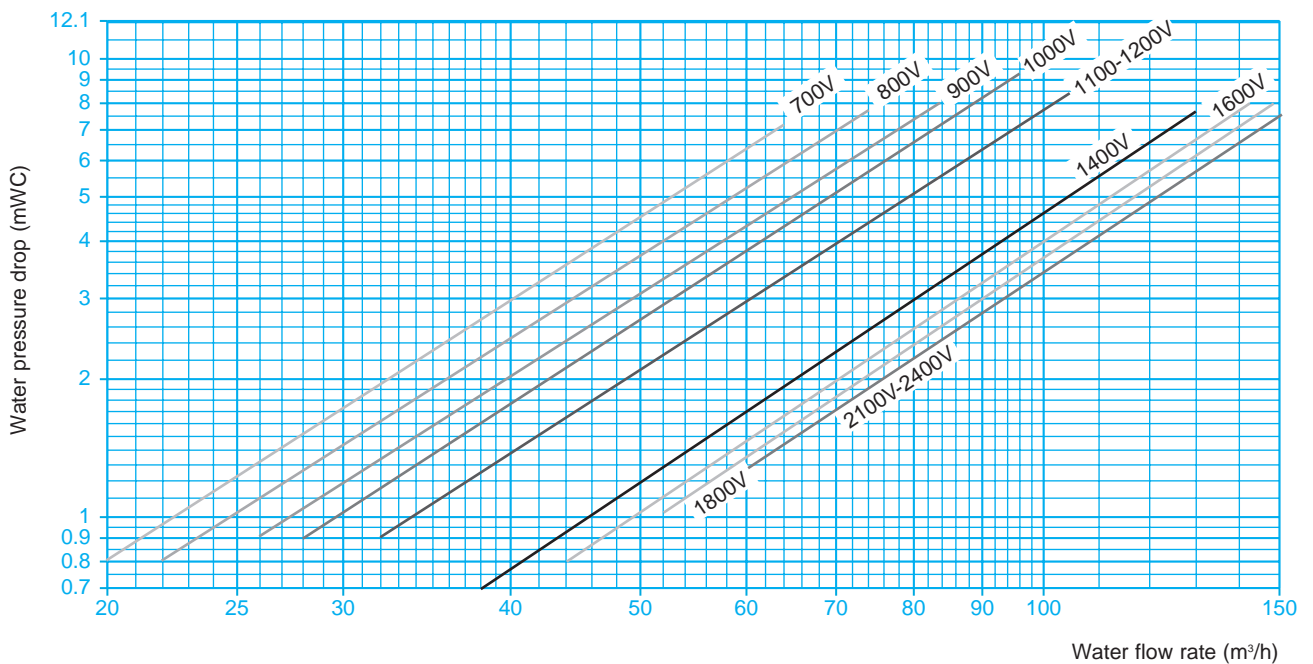


HYDRAULIC SPECIFICATIONS

■ Water pressure drop in the DYNACIAT^{POWER} LG-LGP evaporator



■ Water pressure drop in the DYNACIAT^{POWER} LG-LGP condenser

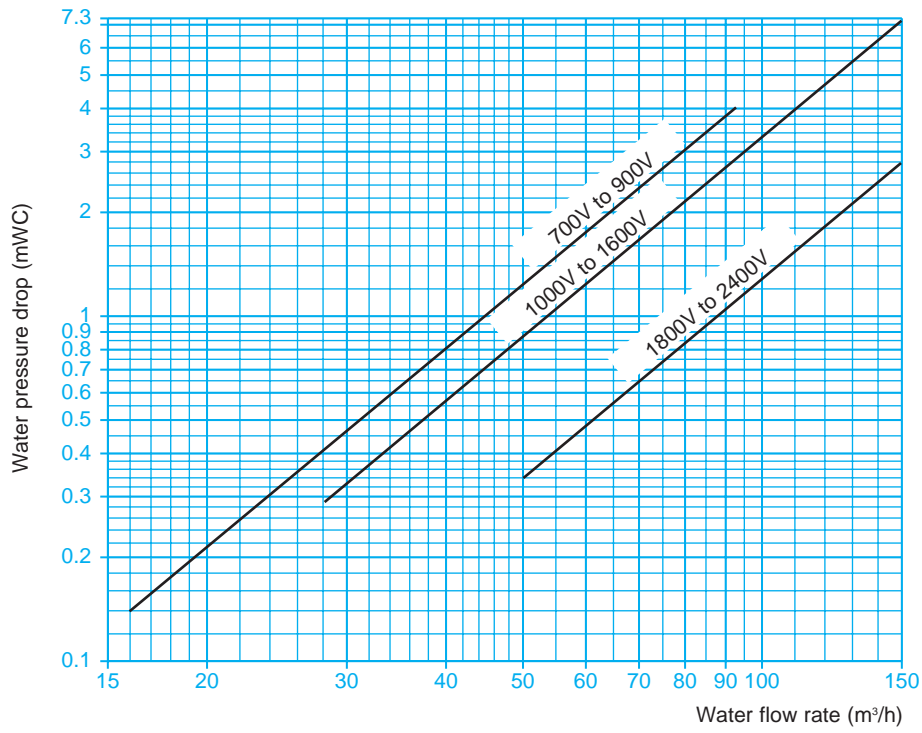


Do not extrapolate the curves. Always stay within minimum and maximum flow rate values.



Water-cooled water chillers

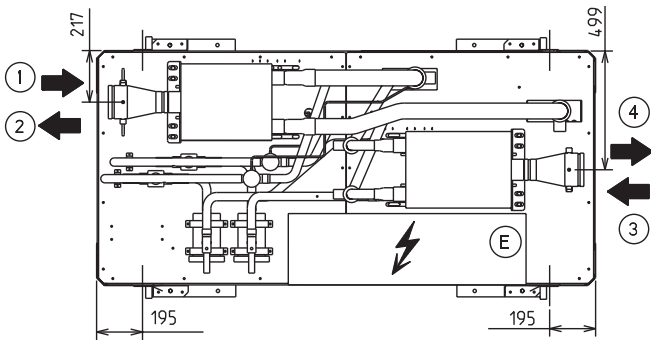
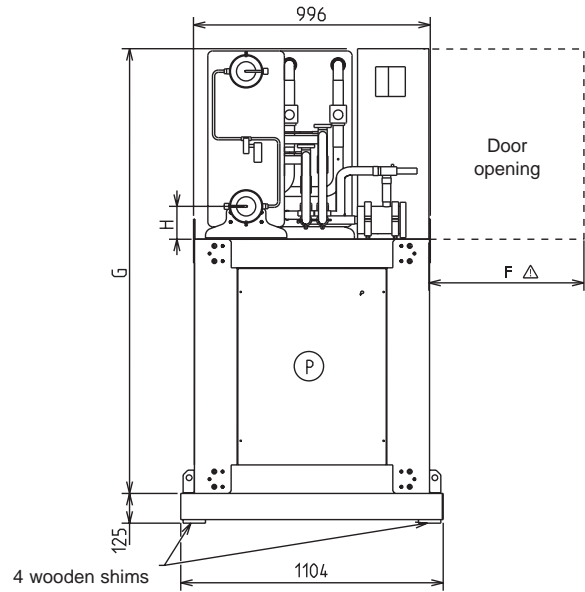
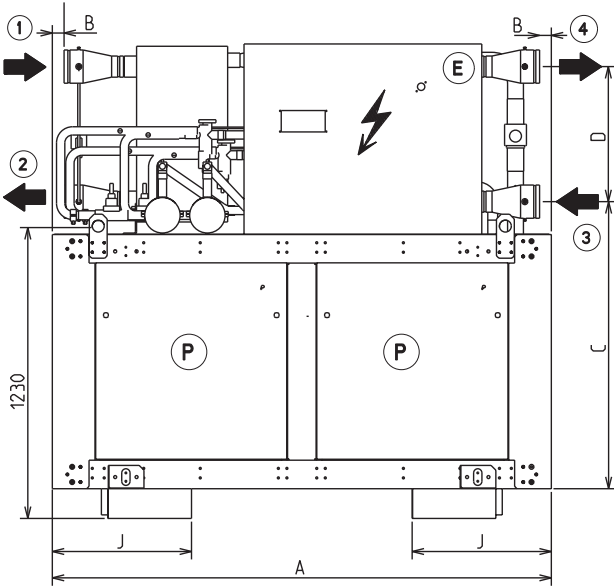
- Water pressure drop, evaporator and condenser filter





DIMENSIONS

■ 700-1600V models



E Electrical connections on side

P Optional sound insulating panels

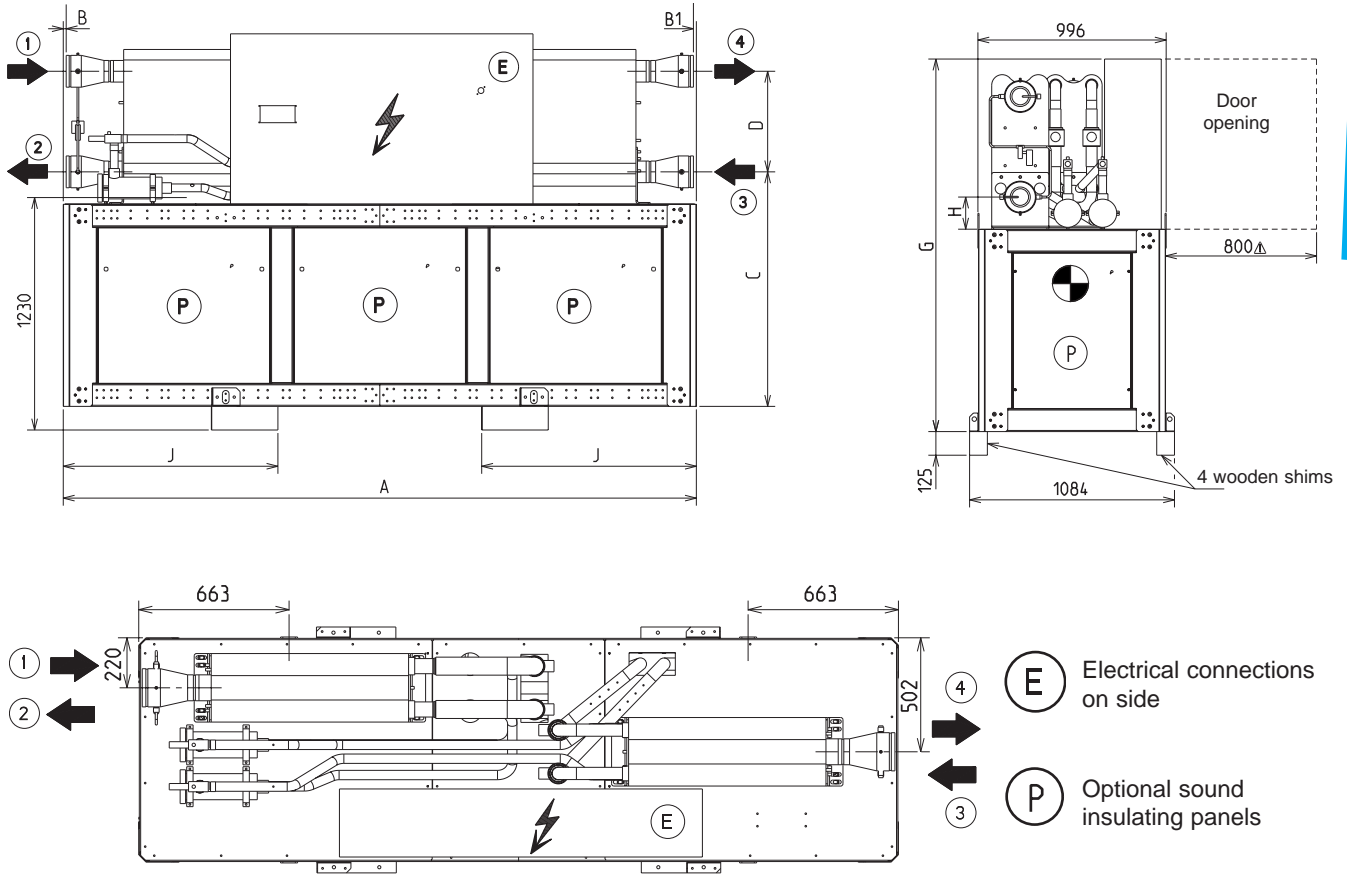
| Models | Dimensions (mm) | | | | | | | | Chilled water | | Hot water | | Weight (kg) | |
|--------|----------------------|------|------|------|-----|------|------|-----|----------------------|----------------------|----------------------|----------------------|-------------|--------------|
| | A | B | C | D | F | G | H | J | In 1 | Out 2 | In 3 | Out 4 | empty | in operation |
| | 700V | 2099 | 49 | 1207 | 568 | 1000 | 1869 | 137 | 585 | VICTAULIC DN100 PN16 | | VICTAULIC DN100 PN16 | | 1044 |
| 800V | VICTAULIC DN100 PN16 | | | | | | | | | VICTAULIC DN100 PN16 | | 1156 | 1205 | |
| 900V | VICTAULIC DN100 PN16 | | | | | | | | | VICTAULIC DN100 PN16 | | 1189 | 1246 | |
| 1000V | VICTAULIC DN125 PN16 | | | | | | | | | VICTAULIC DN125 PN16 | | 1312 | 1378 | |
| 1100V | VICTAULIC DN125 PN16 | | | | | | | | | VICTAULIC DN125 PN16 | | 1363 | 1436 | |
| 1200V | VICTAULIC DN125 PN16 | | | | | | | | | VICTAULIC DN125 PN16 | | 1425 | 1510 | |
| 1400V | 2499 | 60 | 1240 | 532 | 600 | 1887 | 170 | 715 | VICTAULIC DN125 PN16 | | VICTAULIC DN125 PN16 | | 1613 | 1713 |
| 1600V | | | | | | | | | VICTAULIC DN125 PN16 | | VICTAULIC DN125 PN16 | | 1708 | 1818 |



Water-cooled water chillers

DIMENSIONS

■ 1800-2400V models

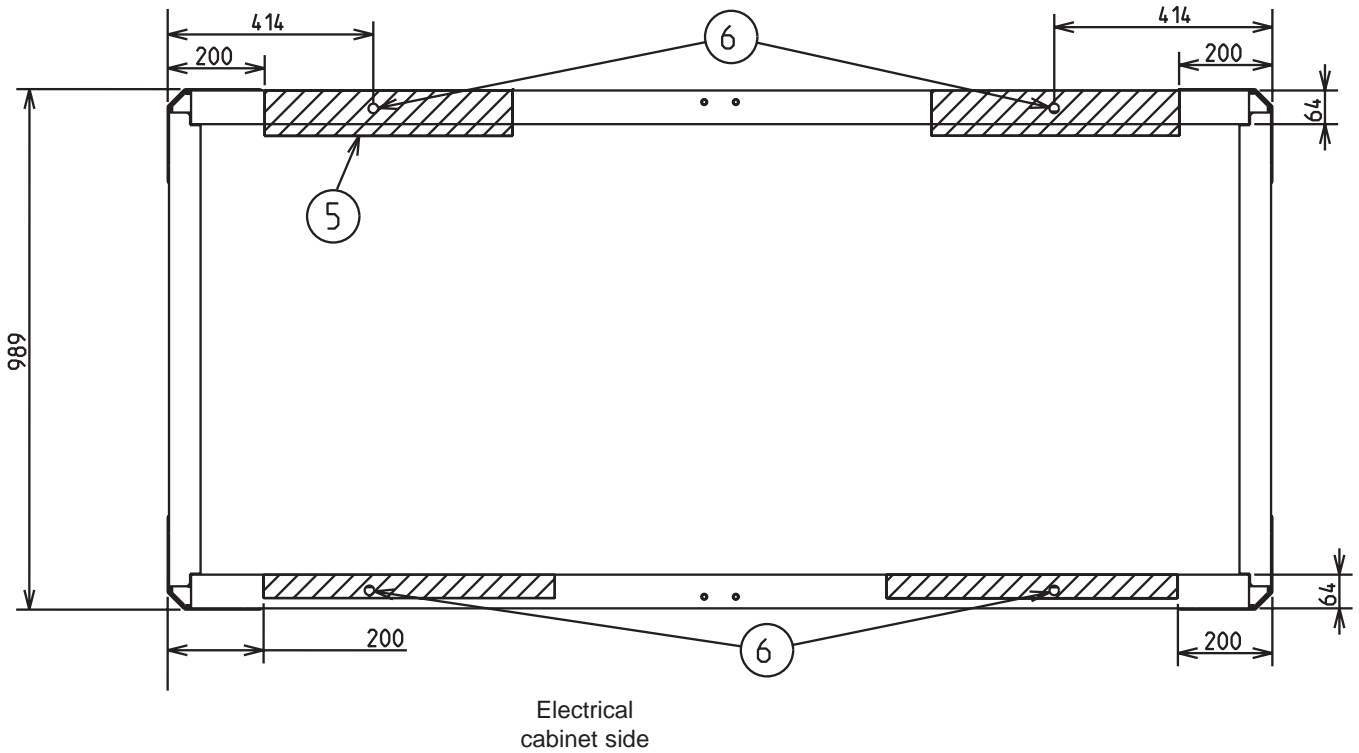


| Models | Dimensions (mm) | | | | | | | | Chilled water | | Hot water | | Weight (kg) | |
|--------|-----------------|-----|----|------|-----|------|-----|------|---------------------------|---------------------------|---------------------------|---------------------------|-------------|--------------|
| | A | B | B1 | C | D | G | H | J | In 1 | Out 2 | In 1 | Out 2 | empty | in operation |
| 1800V | 3350 | 159 | 63 | 1240 | 532 | 1970 | 170 | 1135 | VICTAULIC DN 150 PN 16 | VICTAULIC DN 150 PN 16 | VICTAULIC DN 150 PN 16 | VICTAULIC DN 150 PN 16 | 2284 | 2472 |
| 2100V | | 15 | 15 | | | | | | | | | | 2376 | 2588 |
| 2400V | | | | | | | | | | | | | 2418 | 2637 |

ANTI-VIBRATION MOUNTS (OPTIONAL)

Anti-vibration mounts must be installed beneath the unit for applications that generate extremely low vibrations. The mounts must be placed at the locations illustrated below.

■ 700-1600V models



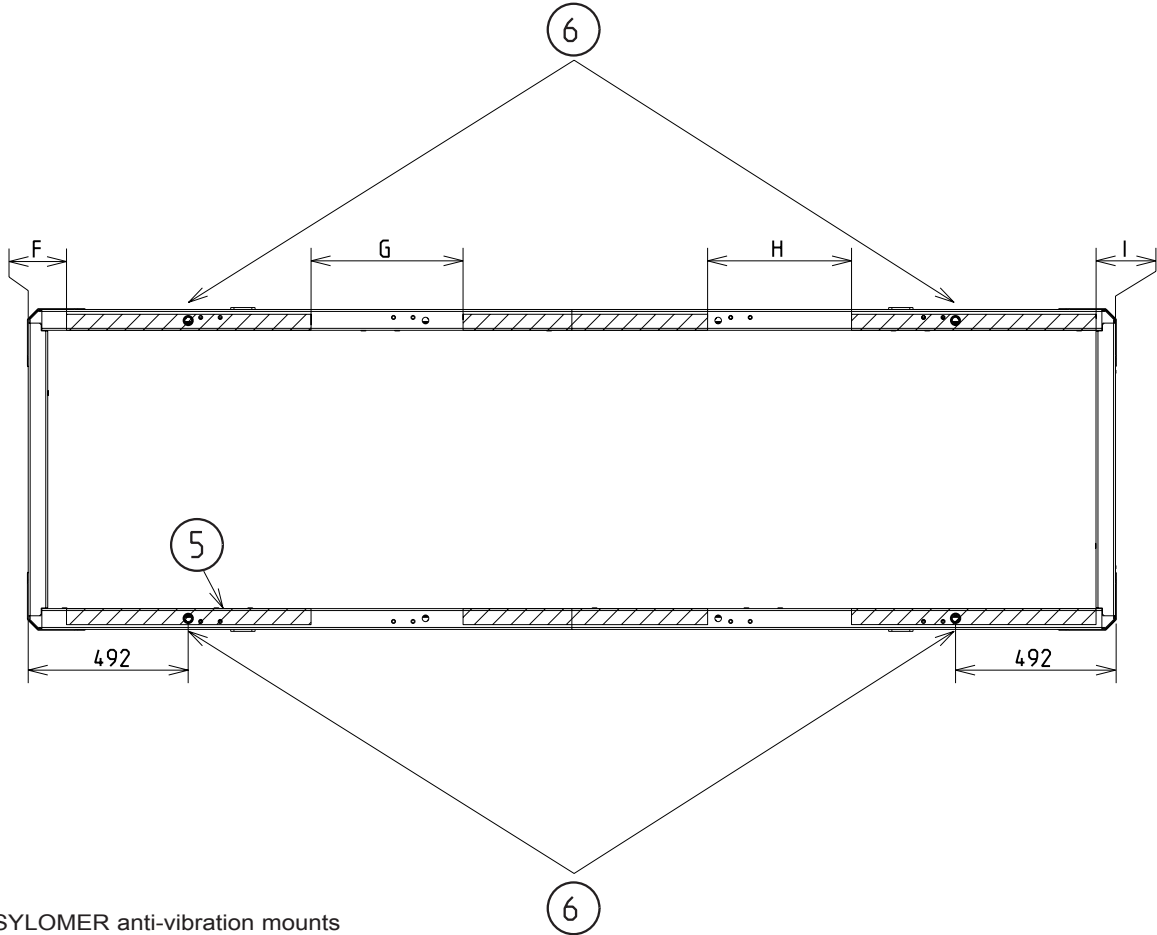
⑤ 4 SYLOMER anti-vibration mounts

⑥ 4 floor mounting holes

| Models | Dimensions (in mm) | | | |
|---------------|--------------------|-------|-----------|------|
| | ⑤ | | | ⑥ |
| | Length | Width | Thickness | Dia. |
| 700V to 1200V | 400 | 70 | 25 | 20.2 |
| 1400V - 1600V | 700 | 50 | 25 | |

ANTI-VIBRATION MOUNTS (OPTIONAL)

■ 1800V to 2400V models



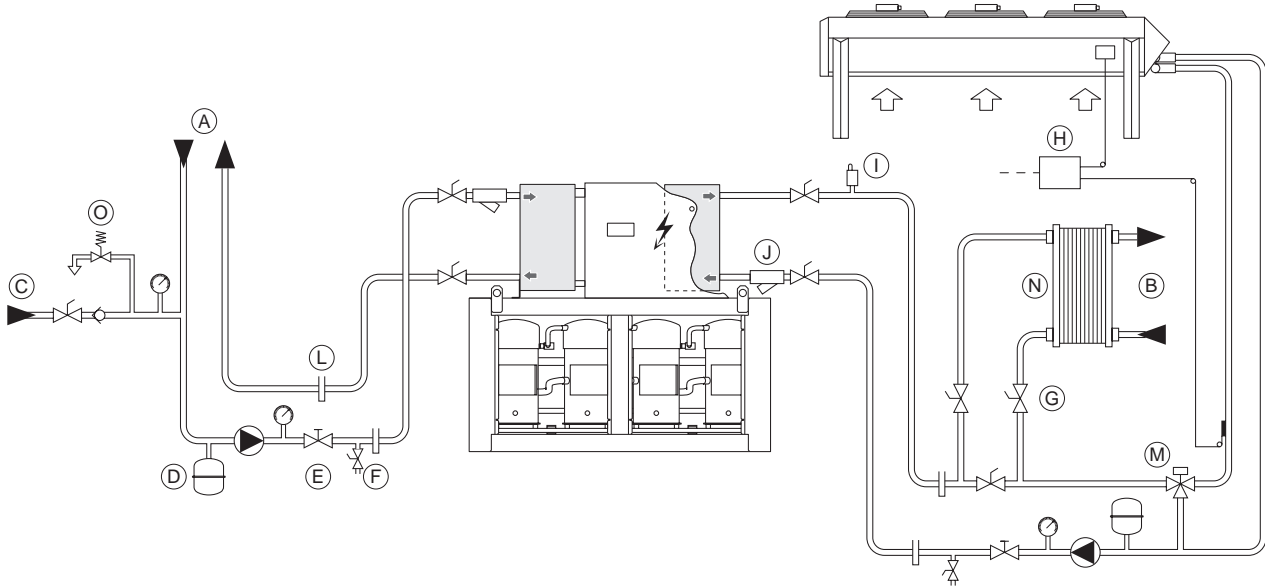
⑤ 6 SYLOMER anti-vibration mounts

⑥ 4 floor mounting holes

| Models | Dimensions (in 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 SYSTEM PIPING DIAGRAM

■ Installation en froid avec aéroréfrigérant



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

- Ⓕ Drain
- Ⓖ Shut-off valve
- Ⓗ Temperature controller
- Ⓘ Air bleed valve
- Ⓣ Water filter (mandatory)

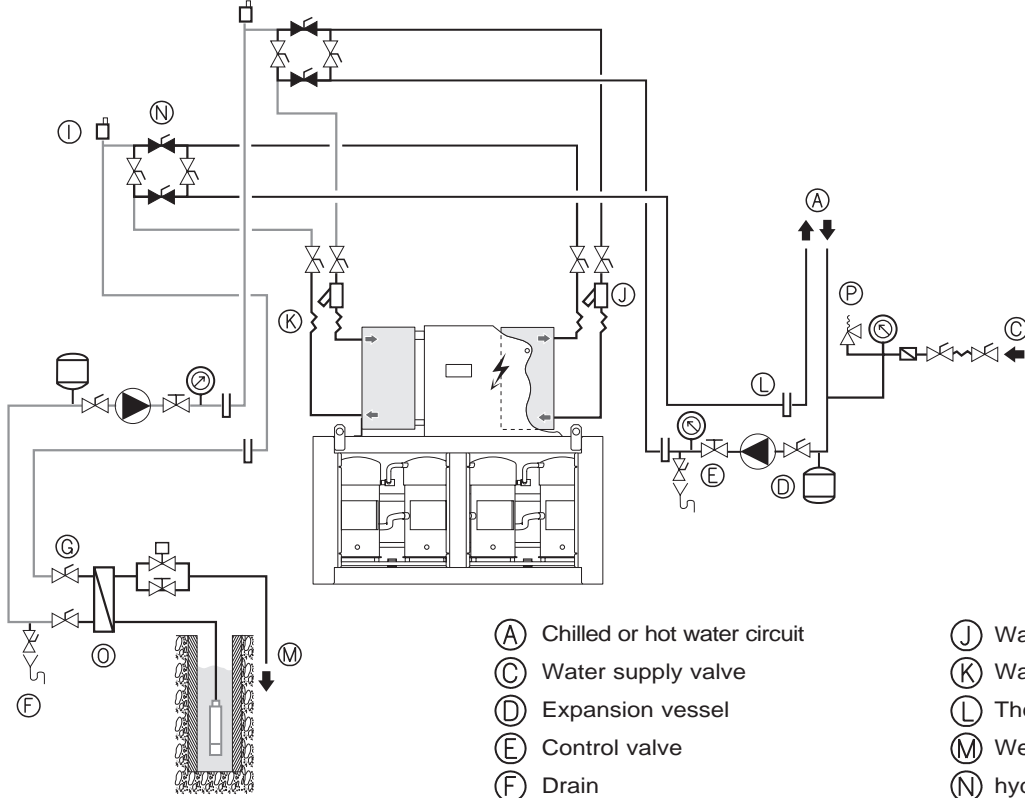
- Ⓛ Thermowell
- Ⓜ 3-way hydraulic valve
- Ⓝ Cleanable heat exchanger
- Ⓞ Safety valve



Water-cooled water chillers

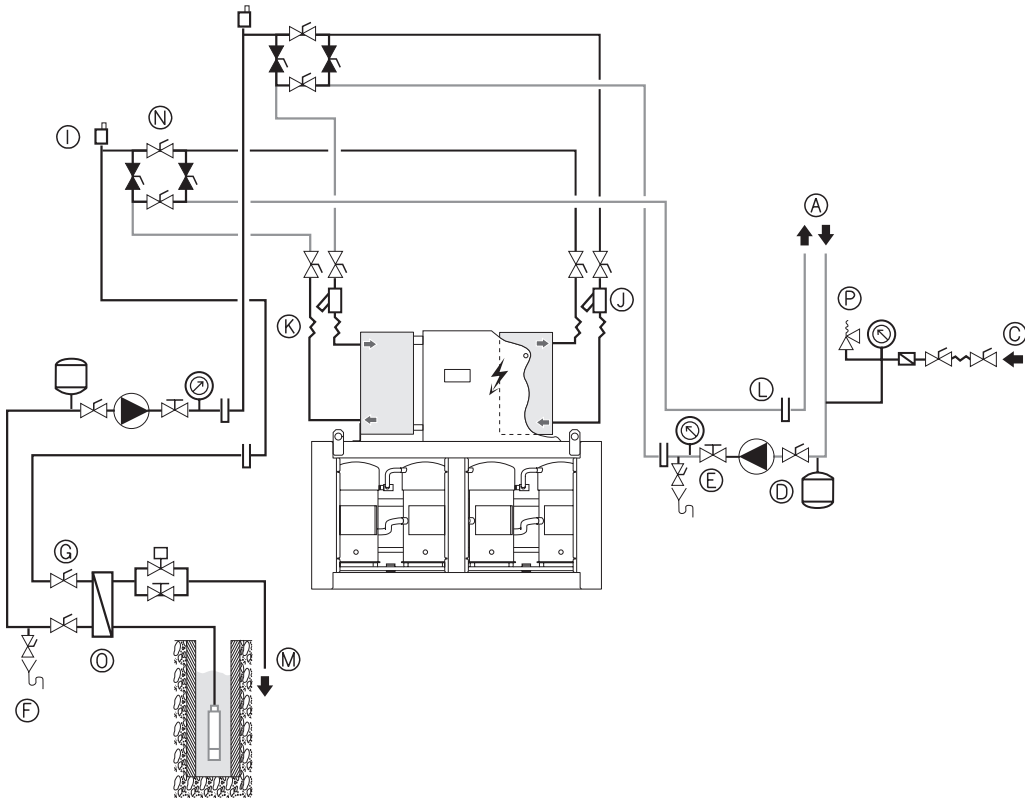
COOLING AND HEATING SYSTEM PIPING DIAGRAM

■ Cooling



- (A) Chilled or hot water circuit
- (C) Water supply valve
- (D) Expansion vessel
- (E) Control valve
- (F) Drain
- (G) Shut-off valve
- (I) Air bleed valve
- (J) Water filter (mandatory)
- (K) Water hoses (mandatory)
- (L) Thermowell
- (M) Well discharge
- (N) hydraulic valve
- (O) Cleanable heat exchanger
- (P) Safety valve

■ Heating





INSTALLATION RECOMMENDATIONS

■ Water quality requirements

Important: an 800 micron water filter must be placed on the unit's water inlet during installation.

The quality of the water used has a direct impact on the correct operation of the unit and its service life. This holds particularly true if the water used may clog or corrode components or promote the growth of algae or microorganisms.

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

Determine whether or not chemical treatment is necessary and sufficient to bring the water to an acceptable quality.

The results of the test must confirm whether the water is compatible with the following materials used on the 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.

Important: failure to follow these instructions will result in the immediate voiding of the unit warranty.

■ Lifting and handling

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

Always follow the lifting diagram on the unit and in the installation, operation, commissioning and maintenance manual.

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 place it on its side.

■ Location

DYNACIAT^{POWER} units are designed for installation inside equipment rooms.

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 once charged.

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

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).

■ Equipment room ventilation

Local regulations may require a supply of fresh air inside equipment rooms to prevent the build-up of unpleasant or hazardous vapours in the event of a refrigerant leak.

■ Installation of accessories delivered separately

A number of optional accessories may be delivered separately and installed on the unit at its location.

Always follow the instructions in the installation, operation, commissioning and maintenance manual.

■ Electrical connections

Always follow the instructions in the installation, operation, commissioning and maintenance manual.

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

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

Electrical connections to be made on site:

- the unit's electrical power supply
- contacts available as standard for controlling the machine remotely (optional)

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

Components to protect against transient voltage surges must be installed on the system and inside the electrical power supply unit.



INSTALLATION RECOMMENDATIONS

■ Pipe connections

Always follow the instructions in the installation, operation, commissioning and maintenance manual.

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

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

Pipe hangers and clamps must be separate to avoid vibrations and placing pressure on the unit.

Water 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

The following are a few examples of accessories essential to any hydraulic system and which must also be installed:

- thermostatic valve on the condenser water inlet or outlet to regulate the flow of cooling water.
- 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 start-up and maintenance.

Important:

- 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 in accordance with the relevant technical requirements.
- Protect the unit and hydraulic system from freezing temperatures (such as by including a drain. If glycol is added to prevent freezing, check its type and concentration beforehand.
- Before making any final hydraulic connections, flush the pipes with clean water to remove any impurities from the system.

■ Start-up

The units must be commissioned by CIAT or a CIAT-approved contractor.

Always follow the instructions in the installation, operation, commissioning and maintenance manual.

Partial list of precommissioning checks:

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



■ Maintenance

Specific preventive maintenance operations must be regularly performed on the unit by CIAT-approved firms.

Read the operating parameters and note them down on a checklist to be sent to CIAT.

Refer to and follow the installation, operation, commissioning and maintenance manual when doing so.

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

DRY COOLERS

CIAT's **OPERA** and **VEXTRA** dry coolers are compatible with DYNACIAT^{POWER} **LG** water-cooled water chillers.

OPERA et **VEXTRA** are available in a wide selection of sizes and with various fan speeds to meet the size and acoustic requirements of any site.

OPERA



VEXTRA





Water-cooled water chillers

CONNECT 2 CONTROL



USER-FRIENDLY INTERFACE CONSOLE

- Multi-lingual LCD (4 lines of 24 characters each)
- Reading of pressures and temperatures
- Operating state and fault diagnostics
- Master/Slave management of two parallel-connected machines
- Fault memory management
- Pump management
- Programmable operation times

Voltage-free contact card:

- Inputs:
- Automatic operation control
 - Selection of setpoints 1 and 2
 - Setpoint adjustable via a 4-20 mA signal
 - Heating/cooling mode selection
 - Compressor load shedding

- Output:
- General fault signalling
 - Pump control

RS-485 OUTPUT AS STANDARD

- Open Modbus/Jbus protocol (standard)
- LonWorks protocol (option)
- Ethernet gateway (optional)

RELAY BOARD (OPTION)

Available outputs:

- Water flow rate fault
- Frost protection fault
- Pump fault
- Fan fault (air-to-water unit)
- Low and high pressure fault
- Compressor safety fault
- Discharge temperature fault
- Compressor operation status

REMOTE CONTROL UNIT (OPTION)

Operation and design same as console in room

MULTICONNECT MULTI-UNIT MANAGEMENT (OPTION)

Main functions available:

- Management of up to eight units on a single water loop
- Management in COOLING mode (water chiller) or HEATING mode (heat pump)
- Management of chilled-water or hot-water pumps
- Centralised management of a backup unit
- Unit load shedding
- Programmable system operation times
- Energy storage mode management
- Unit running time balancing
- Modbus/Jbus protocol RS485 output for BMS link

This document is non-contractual. As part of its policy of continual product improvement, CIAT reserves the right to make any technical modification it feels appropriate without prior notification.

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OHSAS 18001

