Air-to-water scroll chillers

Model CGA 040 to 115
Cooling capacity: 14 - 40 kW

CG-PRC031A-GB

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Technical specifications

Standard configuration

The units belonging to CGA family are air cooled packaged water chillers, for outdoor installation, equipped with hermetic scroll compressors and axial fans, available in 6 sizes and in the following versions:

CGA water chillers with/without hydraulic module

CGA-H water chillers with hydraulic module and built in buffer tank

Hydraulic version

H: Built in water tank, water gauges and connection kit supplied loose.

Casing

Casing made with robust structure in galvanized steel. The powder paint anti-corrosive treatment over the entire frame provides long lasting resistance for outdoor installation, even in aggressive environmental conditions. Easily removable panels providing total access to components inside the machine for service and maintenance purposes.

Compressor

Compressor of scroll hermetic type. These compressors are featured from high performance with low noise and vibration levels. The high values of COP are obtained:

- By means of high volumetric efficiency in the whole operating range obtained through the continuous contact between the fix and rotating spirals which avoids the bad space and the re-expansion of the refrigerant;
- By means of low pressure losses due to the absence of suction and discharge valves and to the continuous compression;
- By means of the reduction of the heat exchanging between the suction and discharge refrigerant, thank to the complete separation of the refrigerant paths.

The acoustic features are obtained:

- For the absence of the suction and discharge valves;
- For the continuous and progressive compression process;
- For the absence of pistons which ensures the low vibrations level and pulsation of the refrigerant

The electric motor is suction cooled and equipped with automatic reset thermal protection and electric heater to prevent the dilution of the refrigerant in the oil during the periods when the unit is stopped. The terminals are contained into a box IP 54 protected.

Fans

Direct drive propeller type fans, protected to IP 54, with blades statically and dynamically balanced . The electric motors are closed type with external rotor, equipped with built-in thermal overload and suitable for outdoor installation. Insulation class F, internal protection according to VDE, suitable for a temperature operating range from -40 to +60°C. All the models are equipped with variable fan speed electronic control with the double advantage to allow the units to work with low outdoor temperature (in cooling mode only) and to reduce considerably the noise level.

User heat exchanger

Direct expansion, stainless steel AISI 316 brazed plate type, insulated externally with closed cell anti condensation material and equipped with water pressure differential switch and antifreeze protection electric heater.

Hydraulic circuit

The hydraulic circuit includes:

- Water pump.
- Expansion tank.
- Relief valve.
- Safety valve.
- Differential pressure switch.

Refrigerant circuit

The units are equipped with one refrigerant circuit entirely constructed with copper tubes, each with:

- thermostatic expansion valve;
- filter dryer;
- sight glass;
- liquid line solenoid valve;
- high pressure switches;
- low pressure switches;
- relief valve on high pressure line.

Air side heat exchanger

Condenser coils with seamless copper tubes expanded into aluminum corrugated fins. They are of high efficiency type, complete with sub cooling circuit which allows an increase of cooling capacity without an increase of the power input.

Electrical panel

Electrical control panel made in accordance with CEI 44-5/IEC 204-2 standards, with short circuit current of 10kA, mounted inside the unit, includes:

- safety locked main switch;
- fuses and contactors for compressors;
- fuses and contactors for the fans;
- fuses 220V auxiliary circuit;
- fuses 24V auxiliary circuit;
- transformer for 24Vac auxiliary circuit power supply;
- low-voltage user terminals board.

Electronic controls

The control of the unit is performed by an electronic card for dynamic parameters control, able to control independently the functionalities and to adjust the operating cycles of the unit.

The controller interface consists of a 2 line LED display and of several icons for quick interaction, interaction with the control is possible with six buttons on the sides of the display.

Through the monitoring system the user can intervene and regulate through the setting of appropriate parameters, the following settings:

- selection of the cooling fluid temperature control. This is proportional type;
- temperature set point of the cooling fluid entering the evaporator and relevant differential, for controlling the ramp of the cooled fluid;
- setting the machine and compressor counter;
- setting the minimum time to re-start a compressor;
- setting the minimum compressor on/off time schedule;
- enabling the compressor start up sequence;
- management of the on/off period of the pump on starting up and shut down of the unit;
- setting the delay time on the water differential pressure switch;
- setting the set point and differential for the management of the card controlling the speed of the connected fans.

Safety features include:

- high and low pressure switches;
- compressor, fans thermal protection;
- electric pump thermal protection;
- protection against a lack of low flow in the heat exchangers;
- freeze protection;
- modification of the operating time of the individual compressors;
- EPROM not correctly connected or not operating correctly self diagnosis;
- probe failure or not connected self diagnosis.

The alphanumerical LED display allows the parameters to be easily entered. Alarms and the functional parameters are displayed immediately.

The control interface provides:

- Monitor the analog state variables of the system (in/out water temperature, pressures on each circuit);
- Monitor the state of the compressors, capacity control valves, heaters etc.;
- Read the text and the code of the occurred alarm;
- Activation of the machine in the desired operating mode;
- Modify operating parameters by inserting the right password;
- Defrost timings;
- Antifreeze threshold.

Using the terminal with 6 keys and LED graphic display one can manage:

- change the set point of the whole unit:
- monitor the analog state variables of the system (in/out water temperature, pressures on each circuit);
- monitor the state of the compressors, capacity control valves, heaters etc.;
- read the code of the occurred alarm;
- turn on/off the whole unit and change its mode (summer/winter for the heat pumps);
- modify the following parameters by inserting the right password:
  - high/low pressure;
  - on/off compressors timings;
  - defrost timings (for the heat pumps);
  - antifreeze threshold;
  - condensation control law as a function of the instantaneous high pressure;
  - water pump pre-starting time.

There are two types of alarm:

- serious alarms that deactivate the unit, give a text alarm on the display, activate the buzzer and the general alarm output relay fitted. They are:
  - no water flow across the evaporator;
  - high/low pressure;
  - compressor thermal protection;
  - fans thermal protection;
  - temperature or pressure probe failure;
- signal-only alarms: they only give a signal text on the display and activate the buzzer and the general alarm output relay fitted on the master card. They are:
  - compressor maintenance time over limits;
  - water pump maintenance time over limits.

By contacts (included) in the control panel you can manage the unit in its basic functions in BMS:

- remote on/off selection;
- remote summer/winter selection (for the heat pump versions);
- additional water flow control (external flow switch);
- fine-setting of the setpoint using an external 4-20mA signal;
- external water pump on/off signal (for version without hydonic kit);
- on/off compressors status.

The electronic controller can be interfaced with a supervision software on a local or remote PC that uses a manufacturer:

- communication protocol, or with complex BMS systems using ModBus.

Technical specifications

Dynamic logic control

Thanks to the function DYNAMIC LOGIC CONTROL, the electronic controller can manage the differential of the inlet water temperature on the basis of the speed of its variation.

The function dLC works partially as a simulator of a water tank: in fact it allows to reduce the number of the compressor's starts. The main advantage of the function dLC is during the conditions of low load, that is:

- the compressor is switched off and the water temperature increases very slowly; in this situation the dLC is able to delay the start of the compressor by replacing itself to the thermal inertia that would be obtained from the water tank.
- the compressor is switched on and the water temperature decreases very quickly; in this situation the dLC is able to delay the compressor's switching off. In this way it is reached the same result that would be obtained from the water tank's thermal inertia.

As result the function dLC makes possible to reduce the dimensions of the water tank, with huge advantages for the footprint of the unit.

Dynamic set point

The function DYNAMIC SET POINT allows to change simultaneously the set point to achieve always the conditions of best comfort and, above all, the maximum energy saving. In fact if the outdoor temperature increases, through the function DSP it is possible:

- To increase of a certain value the set point in case it is necessary to reduce the power consumption and it is needed to ensure a difference between the indoor and outdoor temperature such to avoid health problems due to the excessive changes of temperature.
- To reduce of a certain value the set point in case it is required to compensate in such a way the excess of thermal load; of course this is a function to be used with precaution because it generates higher power consumptions and a big difference in temperature between inside and outside that could be dangerous for the health of the people that is forced for any reason to get in and out from the air conditioned room.

Accessories regulations and certifications

Options

- Compressors sound jackets
- Soft - starter
- Control panel electric heater with thermostat
- Phase failure protection relay
- Epoxy coated condensing coils

Accessories

- Remote control panel
- Communication card RS485
- Flow switch
- Automatic water filling
- Water strainer
- Water gauges
- Rubber anti vibration mounts

Reference standards

THE PRESSURE EQUIPMENT DIRECTIVE (97/23/EC).
UNI EN ISO 3744 ACOUSTIC REGULATION.
UNI-EN-ISO 9001:2008: QUALITY MANAGEMENT SYSTEMS.
LOW VOLTAGE DIRECTIVE (LVD) 2006/95/EC.
MACHINERY DIRECTIVE 2006/42/EC.
DIRECTIVE FOR ELECTROMAGNETIC COMPATIBILITY 2004/108/CE.
CEI-EN 60204-1 DIRECTIVE (CEI44-5; CEI EN 62061) MACHINERY SAFETY – ELECTRIC MACHINERY – EQUIPMENTS.
ERP DIRECTIVE (ENERGY-RELATED-PRODUCTS ECODESIGN 2009/125/CE).
UNI EN 14511-1-2-3-4 TESTING CONDITIONS.

Certifications

PED RELEASED FROM IMQ SPA - NOTIFIED BODY FOR REGULATION 97/23/EC (NO. 0051) ACCORDING TO THE FOLLOWING STATEMENTS:

- DECLARATION OF QUALITY SYSTEM APPROVAL - FORM H1 (QUALITY ASSURANCE WITH DESIGN CONTROL AND MONITORING OF FINAL CHECK DETAIL): CERTIFICATE N. PEC-0051-1105003.
- CERTIFICATES OF EXAMINATION OF THE PROJECT N. 0051-PEC-1105004/05/06/07/08.

QUALITY CERTIFICATION ACCORDING TO THE STANDARD UNI EN ISO 9001:2008 ISSUED BY CSQ (ACCREDITED BY ACCREDIA).
PERFORMANCE CERTIFICATION OF THE UNIT WITH THE PRESENCE OF RINA SPA DURING THE TESTING PROCESS (OPTIONAL).
GOST CERTIFICATION - (OPTIONAL) FOR PRESSURE RECIPIENTS OF THE RUSSIAN FEDERATION.

Technical data

General technical data

MODEL		CGA 040	CGA 060	CGA 070	CGA 080	CGA 105	CGA 115
Total capacity	kW	14,6	20,9	23,7	29,0	36,6	40,4
Compressors power input	kW	4,6	6,5	8,0	8,6	10,9	12,8
Total EER		3,00	2,93	2,77	2,96	3,03	2,90
ESEER		3,43	3,25	3,11	3,27	3,38	3,19
COMPRESSORS							
Number of compressors	n	1	1	1	1	1	1
Refrigerant circuits	n	1	1	1	1	1	1
Part load	n	1	1	1	1	1	1
Refrigerant charge	kg	4,8	5,7	5,9	6,1	8,8	10,5
Oil charge	kg	1,8	3,3	3,3	3,3	6,2	6,2
WATER EXCHANGER							
Water flow	m³/h	2,5	3,6	4,1	5,0	6,3	6,9
Water pressure drop	kPa	48	33	42	19	30	37
HYDRONIC MODULE							
Pump available head pressure	kPa	42	103	75	131	93	69
Water tank (optional)	l	40	60	60	80	80	80
Expansion vessel (optional)	l	1	1	1	1	1	1
FANS							
Fans number	n	2	1	1	2	2	2
Air flow	m³/h	5770	7768	7768	15950	14819	14819
Power input for each fan	kW	0,13	0,60	0,60	0,60	0,60	0,60
Absorbed current for each fan	A	0,59	2,62	2,62	2,62	2,62	2,62
SOUND LEVEL							
Sound power level (ISO 3744)	dB(A)	75,5	72,0	73,0	74,0	74,5	81,0
Sound pressure level at 5 m (ISO 3744)	dB(A)	49,5	45,9	46,9	47,8	48,3	54,8
Sound pressure level at 10 m (ISO 3744)	dB(A)	44,1	40,5	41,5	42,4	42,9	49,4
DIMENSIONS AND WEIGHT							
Length	mm	1125	1465	1465	1671	1671	1671
Depth	mm	440	560	560	560	560	560
Height	mm	1444	1448	1448	1687	1687	1687
Weight	kg	168	246	255	288	291	301

Cooling: Outdoor air temperature 35°C; Chilled water temperature 12/7°C.
Water flow rate and sound pressure levels refer to summer period.

Cooling capacity performances

Twout			CGA 040						CGA 060					
			Outdoor air temperature						Outdoor air temperature					
			25	30	32	35	40	42	25	30	32	35	40	42
6	Pf	kW	16,1	15,2	14,8	14,2	13,1	12,7	23,0	21,7	21,2	20,3	18,9	18,3
	Pa	kW	3,6	4,1	4,3	4,6	5,1	5,3	5,4	5,9	6,1	6,5	7,2	7,4
	qw	m³/h	2,76	2,60	2,53	2,43	2,25	2,18	3,95	3,72	3,63	3,48	3,24	3,14
	dpw	kPa	58,8	52,3	49,7	45,7	39,2	36,6	40,0	35,5	33,8	31,1	26,9	25,2
7	Pf	kW	16,5	15,6	15,2	14,6	13,5	13,0	23,7	22,3	21,7	20,9	19,4	18,8
	Pa	kW	3,7	4,1	4,3	4,6	5,1	5,4	5,4	5,9	6,2	6,5	7,2	7,5
	qw	m³/h	2,83	2,67	2,60	2,50	2,31	2,24	4,06	3,83	3,73	3,58	3,33	3,22
	dpw	kPa	62,1	55,3	52,5	48,3	41,4	38,7	42,3	37,6	35,7	32,9	28,4	26,6
8	Pf	kW	17,0	16,0	15,6	15,0	13,9	13,4	24,3	22,9	22,3	21,4	19,9	19,3
	Pa	kW	3,7	4,1	4,3	4,6	5,2	5,4	5,4	6,0	6,2	6,6	7,3	7,6
	qw	m³/h	2,91	2,75	2,68	2,57	2,38	2,30	4,17	3,93	3,83	3,68	3,42	3,31
	dpw	kPa	65,6	58,4	55,4	51,0	43,8	40,9	44,7	39,7	37,7	34,7	30,0	28,1
9	Pf	kW	17,4	16,4	16,0	15,4	14,2	13,8	25,0	23,5	22,9	22,0	20,4	19,8
	Pa	kW	3,7	4,2	4,4	4,7	5,2	5,4	5,5	6,0	6,3	6,6	7,3	7,6
	qw	m³/h	2,99	2,82	2,75	2,64	2,45	2,36	4,29	4,04	3,94	3,78	3,51	3,40
	dpw	kPa	69,3	61,6	58,5	53,8	46,3	43,3	47,2	41,9	39,8	36,7	31,6	29,6
10	Pf	kW	17,9	16,9	16,4	15,8	14,6	14,1	25,6	24,2	23,5	22,6	21,0	20,3
	Pa	kW	3,8	4,2	4,4	4,7	5,2	5,5	5,5	6,1	6,3	6,7	7,4	7,7
	qw	m³/h	3,08	2,90	2,83	2,71	2,52	2,43	4,41	4,16	4,05	3,89	3,61	3,49
	dpw	kPa	73,2	65,1	61,8	56,9	49,0	45,8	49,9	44,3	42,0	38,7	33,4	31,3
11	Pf	kW	18,3	17,3	16,9	16,2	15,0	14,5	26,3	24,8	24,2	23,2	21,5	20,8
	Pa	kW	3,8	4,2	4,4	4,7	5,3	5,5	5,6	6,1	6,4	6,7	7,5	7,8
	qw	m³/h	3,16	2,98	2,90	2,79	2,59	2,50	4,54	4,27	4,16	3,99	3,71	3,59
	dpw	kPa	77,4	68,8	65,3	60,1	51,8	48,4	52,8	46,8	44,4	40,9	35,3	33,0

Twout			CGA 070						CGA 080					
			Outdoor air temperature						Outdoor air temperature					
			25	30	32	35	40	42	25	30	32	35	40	42
6	Pf	kW	26,3	24,7	24,1	23,1	21,4	20,6	32,0	30,2	29,4	28,2	26,3	25,4
	Pa	kW	6,5	7,1	7,4	7,9	8,7	9,1	7,0	7,7	8,0	8,5	9,4	9,8
	qw	m³/h	4,51	4,24	4,13	3,96	3,67	3,54	5,49	5,18	5,05	4,84	4,50	4,36
	dpw	kPa	51,7	45,7	43,3	39,7	34,1	31,8	23,1	20,6	19,6	18,0	15,6	14,6
7	Pf	kW	27,0	25,4	24,7	23,7	22,0	21,2	32,9	31,0	30,2	29,0	26,9	26,1
	Pa	kW	6,5	7,2	7,5	8,0	8,8	9,2	7,1	7,8	8,1	8,6	9,5	9,9
	qw	m³/h	4,64	4,36	4,25	4,07	3,77	3,64	5,65	5,32	5,19	4,98	4,62	4,48
	dpw	kPa	54,6	48,3	45,7	42,0	36,0	33,6	24,5	21,7	20,6	19,0	16,4	15,4
8	Pf	kW	27,8	26,1	25,4	24,4	22,5	21,8	33,8	31,8	31,0	29,8	27,7	26,8
	Pa	kW	6,6	7,3	7,6	8,0	8,9	9,2	7,1	7,9	8,2	8,7	9,6	10,0
	qw	m³/h	4,77	4,48	4,36	4,18	3,87	3,74	5,80	5,47	5,33	5,11	4,75	4,59
	dpw	kPa	57,7	51,0	48,3	44,3	38,0	35,4	25,8	22,9	21,8	20,0	17,3	16,2
9	Pf	kW	28,5	26,8	26,1	25,0	23,1	22,3	34,7	32,7	31,8	30,5	28,4	27,4
	Pa	kW	6,7	7,3	7,6	8,1	9,0	9,3	7,2	7,9	8,2	8,7	9,6	10,0
	qw	m³/h	4,90	4,61	4,48	4,30	3,97	3,84	5,96	5,61	5,47	5,25	4,87	4,71
	dpw	kPa	61,0	53,8	50,9	46,8	40,0	37,3	27,3	24,2	23,0	21,1	18,2	17,1
10	Pf	kW	29,3	27,5	26,8	25,7	23,7	22,9	35,6	33,5	32,7	31,3	29,1	28,1
	Pa	kW	6,7	7,4	7,7	8,2	9,0	9,4	7,3	8,0	8,3	8,8	9,7	10,1
	qw	m³/h	5,04	4,74	4,61	4,42	4,08	3,94	6,13	5,77	5,62	5,39	5,01	4,84
	dpw	kPa	64,5	56,9	53,9	49,5	42,3	39,4	28,8	25,6	24,3	22,3	19,2	18,0
11	Pf	kW	30,1	28,3	27,5	26,3	24,3	23,5	36,5	34,4	33,5	32,2	29,8	28,9
	Pa	kW	6,8	7,5	7,8	8,2	9,1	9,5	7,3	8,1	8,4	8,9	9,8	10,2
	qw	m³/h	5,19	4,87	4,74	4,54	4,20	4,05	6,30	5,93	5,78	5,54	5,14	4,97
	dpw	kPa	68,2	60,1	56,9	52,3	44,7	41,6	30,4	27,0	25,6	23,6	20,3	19,0

Twout = Leaving water temperature (°C); **Pf** = Cooling capacity (kW); **Pa** = Compressors power input (kW); **qw** = Water flow (m³/h); **dpw** = Pressure drop (kPa).

Technical data

Cooling capacity performances

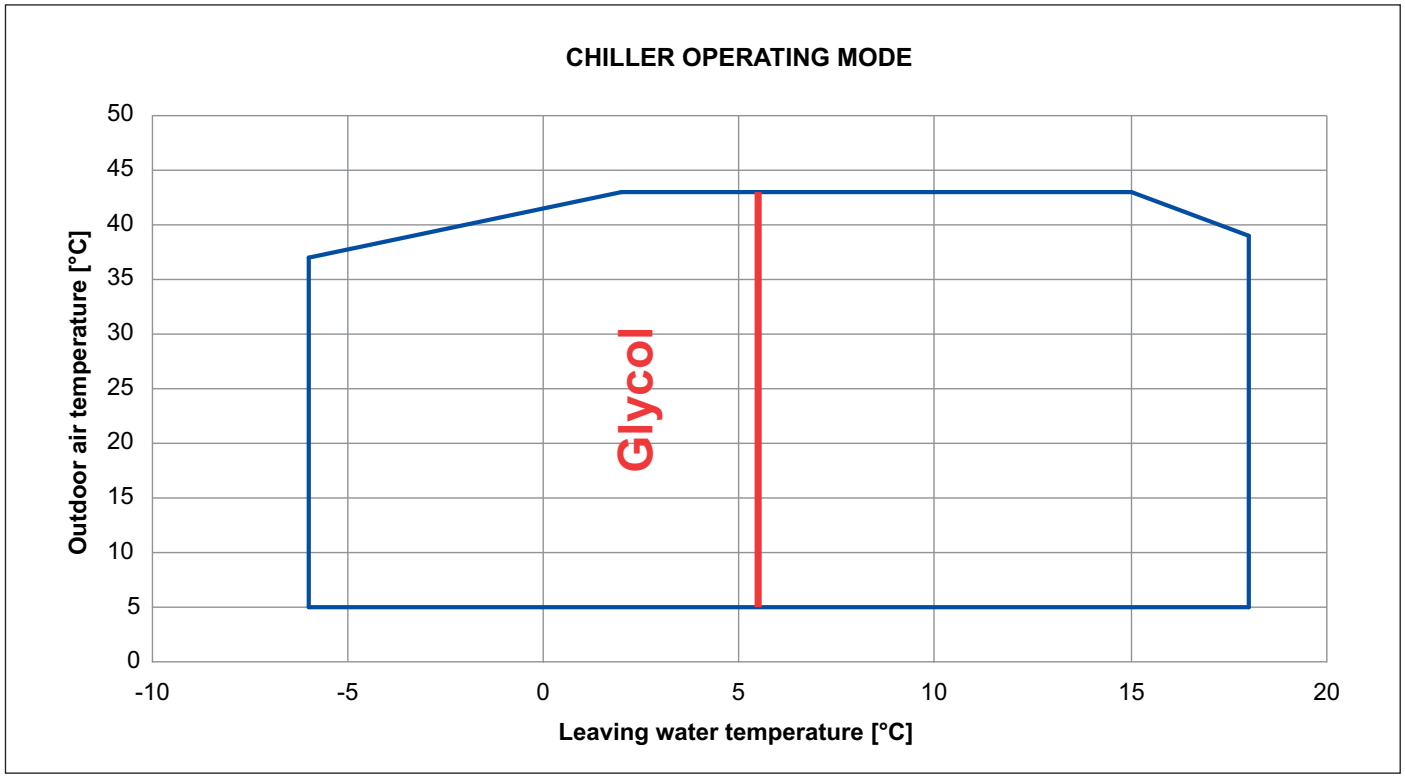
Twout			CGA 105						CGA 115					
			Outdoor air temperature						Outdoor air temperature					
			25	30	32	35	40	42	25	30	32	35	40	42
6	**Pf**	kW	40,4	38,1	37,2	35,7	33,1	32,0	44,6	42,1	41,1	39,4	36,6	35,5
	Pa	kW	8,8	9,7	10,2	10,8	12,0	12,6	10,6	11,5	12,0	12,6	13,9	14,5
	qw	m³/h	6,92	6,54	6,38	6,12	5,68	5,49	7,65	7,22	7,04	6,76	6,28	6,08
	dpw	kPa	36,8	32,8	31,2	28,7	24,7	23,2	44,5	39,6	37,7	34,7	30,0	28,1
7	**Pf**	kW	41,5	39,2	38,2	36,6	34,0	32,9	45,8	43,2	42,1	40,4	37,6	36,4
	Pa	kW	8,9	9,8	10,2	10,9	12,1	12,7	10,6	11,6	12,1	12,8	14,0	14,6
	qw	m³/h	7,11	6,72	6,55	6,28	5,83	5,64	7,86	7,42	7,23	6,94	6,45	6,24
	dpw	kPa	38,8	34,6	32,9	30,3	26,1	24,4	47,0	41,8	39,7	36,6	31,6	29,6
8	**Pf**	kW	42,6	40,2	39,2	37,6	34,9	33,7	47,0	44,4	43,2	41,5	38,5	37,3
	Pa	kW	9,0	9,9	10,3	11,0	12,2	12,8	10,7	11,7	12,2	12,9	14,1	14,7
	qw	m³/h	7,31	6,90	6,73	6,45	5,99	5,79	8,08	7,62	7,42	7,12	6,62	6,40
	dpw	kPa	41,0	36,5	34,7	32,0	27,5	25,7	49,6	44,1	41,9	38,6	33,3	31,1
9	**Pf**	kW	43,7	41,3	40,2	38,6	35,8	34,6	48,3	45,5	44,3	42,6	39,5	38,2
	Pa	kW	9,0	10,0	10,4	11,1	12,3	12,8	10,8	11,8	12,3	13,0	14,3	14,8
	qw	m³/h	7,51	7,09	6,91	6,62	6,14	5,94	8,29	7,82	7,62	7,31	6,79	6,56
	dpw	kPa	43,3	38,5	36,6	33,7	29,0	27,1	52,3	46,4	44,1	40,6	35,0	32,7
10	**Pf**	kW	44,9	42,3	41,2	39,6	36,7	35,5	49,5	46,7	45,5	43,6	40,5	39,1
	Pa	kW	9,1	10,1	10,5	11,1	12,4	12,9	10,9	12,0	12,4	13,1	14,4	15,0
	qw	m³/h	7,72	7,28	7,10	6,81	6,31	6,10	8,52	8,03	7,82	7,51	6,97	6,74
	dpw	kPa	45,7	40,7	38,7	35,6	30,6	28,6	55,2	49,0	46,5	42,8	36,9	34,5
11	**Pf**	kW	46,0	43,4	42,3	40,6	37,6	36,3	50,8	47,9	46,6	44,7	41,5	40,1
	Pa	kW	9,2	10,1	10,6	11,2	12,5	13,0	11,0	12,1	12,5	13,2	14,5	15,1
	qw	m³/h	7,93	7,48	7,29	6,99	6,48	6,26	8,76	8,25	8,03	7,71	7,15	6,91
	dpw	kPa	48,3	43,0	40,8	37,5	32,3	30,1	58,3	51,7	49,1	45,2	38,9	36,3

Twout = Leaving water temperature (°C); **Pf** = Cooling capacity (kW); **Pa** = Compressors power input (kW); **qw** = Water flow (m³/h); **dpw** = Pressure drop (kPa).

Operating range

Operating mode	Ta		Tw out	
	Min	Max	Min	Max
Cooling	5	43	-6	18

Ta = Outdoor air temperature (°C)
Tw out = Leaving water temperature (°C)



Scaling correction schedules

Ethylene glycol correction schedule

% Ethylene glycol weight		5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature	°C	-2	-3,9	-6,5	-8,9	-11,8	-15,6	-19	-23,4
Suggested security limit	°C	3	1	-1	-4	-6	-10	-14	-19
Cooling capacity coefficient	-	0,995	0,99	0,985	0,981	0,977	0,974	0,971	0,968
Power input coefficient	-	0,997	0,993	0,99	0,988	0,986	0,984	0,982	0,981
Flow rate coefficient	-	1,003	1,01	1,02	1,033	1,05	1,072	1,095	1,124
Pressure drop coefficient	-	1,029	1,06	1,09	1,118	1,149	1,182	1,211	1,243

In order to calculate performance with glycoled solutions multiply main sizes by respective coefficients.

Glycol percentage depending on freezing temperature

% glycol according to the freezing temperature						
Freezing temperature	**0°C**	**-5°C**	**-10°C**	**-15°C**	**-20°C**	**-25°C**
% Ethylene glycol	5%	12%	20%	28%	35%	40%
Flow rate coefficient	1,02	1,033	1,05	1,072	1,095	1,124

In order to calculate performance with glycoled solutions multiply main sizes by respective coefficients.

Scaling correction table

Fouling Factor	Plate heat exchanger		
F.F. [m^2°C*W]	A1	B1	Tmin
0	1	1	0
1,80E-05	1	1	0
4,40E-05	1	1	0
8,80E-05	0,96	0,99	0,7
1,32E-04	0,94	0,99	1
1,72E-04	0,93	0,98	1,5

A factor = Capacity correction factor
B factor = Compressor power input correction factor
Tmin = Minimum evaporator outlet water temperature increase
T max = Maximum condenser outlet water temperature descrease

Hydraulic data

Water flow and pressure drop

Size	Cooling mode			
	V	K	Q min	Q max
	[m^3]		[m3/h]	[m3/h]
CGA 040	0,1	8748	2,0	2,7
CGA 060	0,2	2489	3,2	4,3
CGA 070	0,2	2048	3,6	4,9
CGA 080	0,2	744	4,2	6,0
CGA 105	0,2	746	5,4	7,6
CGA 115	0,3	750	6,0	8,3

V: recommended water content of the plant with dT 5°C on the heat exchanger
Q min: minimum water flow to the heat exchanger
Q max: maximum water flow to the heat exchanger
dpw = K·Q² / 1000

Q = 0,86 P/ T
P: Cooling capacity [kW]
t: T at the heat exchanger (min = 3, max = 8) [°C]
dpw: Pressure drop [kPa]

Hydraulic module

The units of the CGA family are all equipped with hydraulic module made by water pump and all major hydraulic components for an easier installation, with reduced time, cost and space.
In addition they can also be equipped with an optional water tank complete with a base frame that can be placed underneath the unit, provided together with water gauges and a connection kit. The installation of the water tank is at customer care.

Hydraulic version::

H: Built in water tank, water gauges and connection kit supplied loose.

Pumps kit

Circulators and Centrifugal pumps with built-in thermal overload protection.
Electrical motor with minimum protection index IP 44, with minimum insulating category F and with CE conformity.

Buffer tank

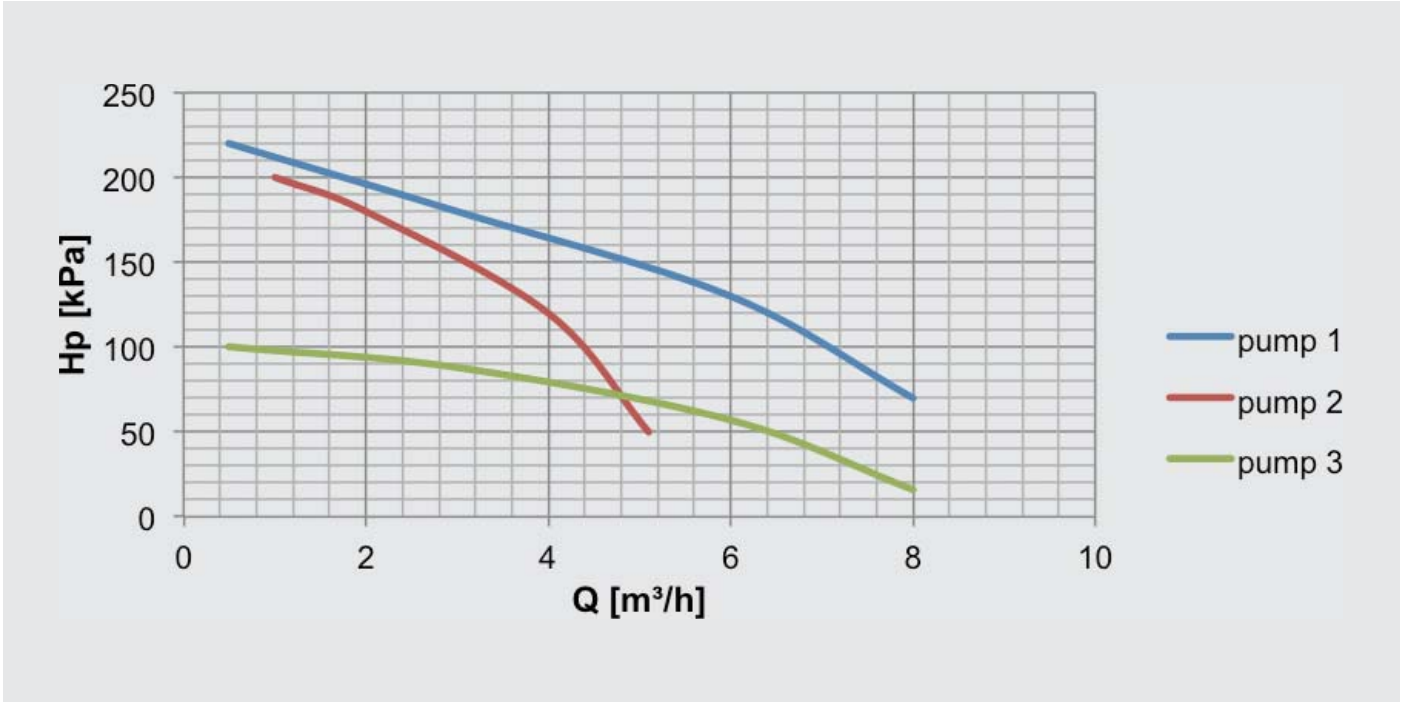
This is made from steel sheet and welded end caps made from the mold or by shaping. Finishing with anti-corrosion treatment and painting.
The thermal and condensation insulation is protected by a water and scratch-resistant external coating. The test carried out individually with a test pressure of 6 bar guarantees a max working pressure up to 3,5 bar.

Hydronic accessories on request

- "Y" water strainer (sold separately), consists of body and stainless steel mesh, with replaceable filter through the inspection cap.
- Automatic water filling (sold separately).

Hydraulic data

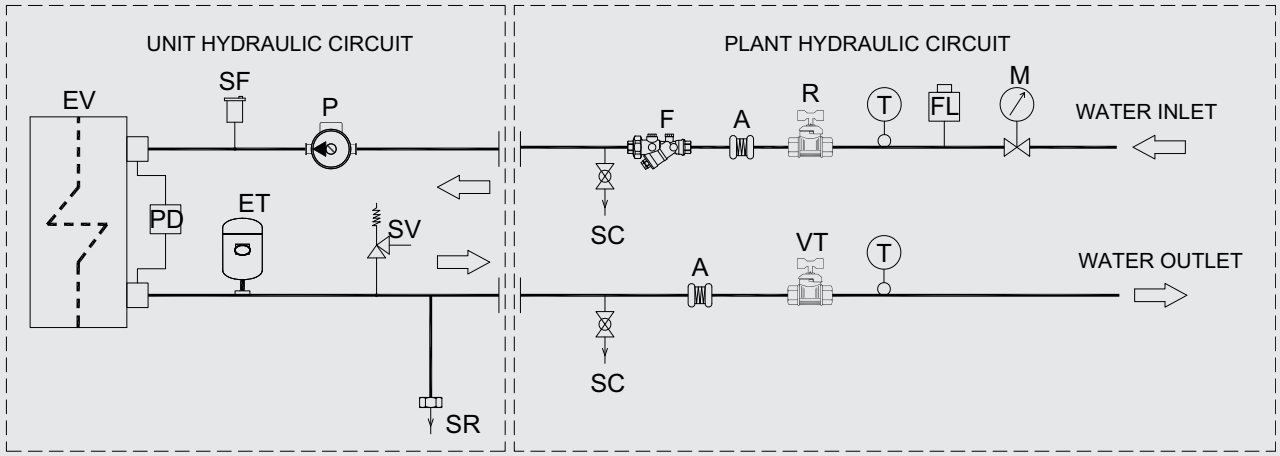
Hydraulic module



Model	Pf	qw	dpw	Ref. curve	Expan-sion vessel	F.L.I.	F.L.A.	Hp	Hu
	[kW]	[m³/h]	[kPa]		[l]	[kW]	[A]	[kPa]	[kPa]
CGA 040	14,6	2,5	48	pump 1	1	0,18	0,65	91	43
CGA 060	20,9	3,6	33	pump 2	1	0,55	1,65	136	103
CGA 070	23,7	4,1	42	pump 2	1	0,55	1,65	117	75
CGA 080	29,0	5,0	19	pump 3	1	0,55	1,65	150	131
CGA 105	36,6	6,3	30	pump 3	1	0,55	1,65	123	93
CGA 115	40,4	6,9	37	pump 3	1	0,55	1,65	106,0	69

LEGENDA:
Pf Cooling capacity (kW)
qw Water flow (m³/h)
dpw Pressure drop (kPa)
F.L.I. Full load electrical power
F.L.A. Full load operating current
Hp Pump head pressure
Hu Available pressure

Hydraulic sketch



M	GAUGE	F	WATER STRAINER	PD	WATER DIFFERENTIAL PRESSURE
FL	FLOW SWITCH	SC	DISCHARGE VALVE	ET	EXPANSION VESSEL
T	THERMOMETER	P	PUMP	SC	SAFETY VALVE
R	SHUT OFF VALVE	SF	RELIEF VALVE	SR	DISCHARGE / FILLING CAP
A	ANTIVIBRATION	EV	EVAPORATOR	VT	CALIBRATION VALVE

Electrical data

MOD.	Compressors			Fan motors		Pump		TOTAL			MAX VALUE		
	F.L.I.	F.L.A.	L.R.A.	E.P.	O.C.	F.L.I.	F.L.A.	F.L.I.	F.L.A.	S.A.	F.L.I.	F.L.A.	S.A.
	kW	A	A	kW	A	kW	A	kW	A	A	kW	A	A
CGA 040	4,6	8,2	71,0	0,3	1,2	0,2	0,7	5,0	10,0	72,8	5,6	10,8	72,8
CGA 060	6,5	12,0	98,0	0,6	2,6	0,6	1,7	7,7	16,2	102,3	13,7	26,3	102,3
CGA 070	8,0	14,3	142,0	0,6	2,6	0,6	1,7	9,1	18,6	146,3	15,4	29,3	146,3
CGA 080	8,6	15,9	142,0	1,2	5,2	0,6	1,7	10,3	22,7	148,9	18,3	35,9	148,9
CGA 105	10,9	18,9	158,0	1,2	5,2	0,6	1,7	12,6	25,8	164,9	21,8	41,9	164,9
CGA 115	12,8	23,2	197,0	1,2	5,2	0,6	1,7	14,5	30,1	203,9	22,3	42,9	203,9

Electrical data referred to 400V - 3PH+N-50Hz: Maximum operating admitted conditions: 10%; Maximum phase unbalance: 3%.

FLI Full load power input at the conditions of the selection.
FLA Full load current at the conditions of the selection.
SA Inrush current (sum of LRA of the biggest compressor, current of the other compressors, total current of the fans).
LRA Locked rotor amperes for the biggest compressor.
FLImax Full load power input at the worst conditions for compressors and fans (at the limit of the unit envelope).
FLAmax Full load current at the worst conditions for compressors and fans (at the limit of the unit envelope).
Samax Inrush current (sum of LRA of the biggest compressor, current of the other compressors calculated at the worst conditions, total current of the fans).
(1) maximum operating admitted conditions by the compressors manufacturer.
(2) data referred to biggest compressor for units with different compressors.

Acoustic data

Standard version

Model	Octave bands (Hz)								Lw dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level (dB)								
CGA 040	53,4	49,4	44,8	40,6	38,2	53,4	35,9	24,9	75,5
CGA 060	49,9	45,9	41,3	37,1	34,7	49,9	32,4	21,4	72,0
CGA 070	50,9	46,9	42,3	38,1	35,7	50,9	33,4	22,4	73,0
CGA 080	51,8	47,8	43,2	39,0	36,6	51,8	34,3	23,3	74,0
CGA 105	52,3	48,3	43,7	39,5	37,1	52,3	34,8	23,8	74,5
CGA 115	58,8	54,8	50,2	46,0	43,6	58,8	41,3	30,3	81,0

The following table refers to units equipped with compressors sound jackets (optional)

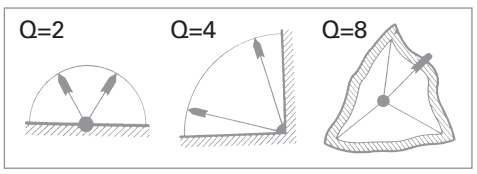
Model	Octave bands (Hz)								Lw dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level (dB)								
CGA 040	49,9	45,9	41,3	37,1	34,7	49,9	32,4	21,4	72,0
CGA 060	46,9	42,9	38,3	34,1	31,7	46,9	29,4	18,4	69,0
CGA 070	47,9	43,9	39,3	35,1	32,7	47,9	30,4	19,4	70,0
CGA 080	48,8	44,8	40,2	36,0	33,6	48,8	31,3	20,3	71,0
CGA 105	49,3	45,3	40,7	36,5	34,1	49,3	31,8	20,8	71,5
CGA 115	55,8	51,8	47,2	43,0	40,6	55,8	38,3	27,3	78,0

Sound power level full load

Operating conditions:
Evaporator water temp. in/out 12°/7°C - outdoor temp. 35°C.

Testing point:
Average sound pressure levels calculated according to ISO 3744 at 10 mt distance from unit.

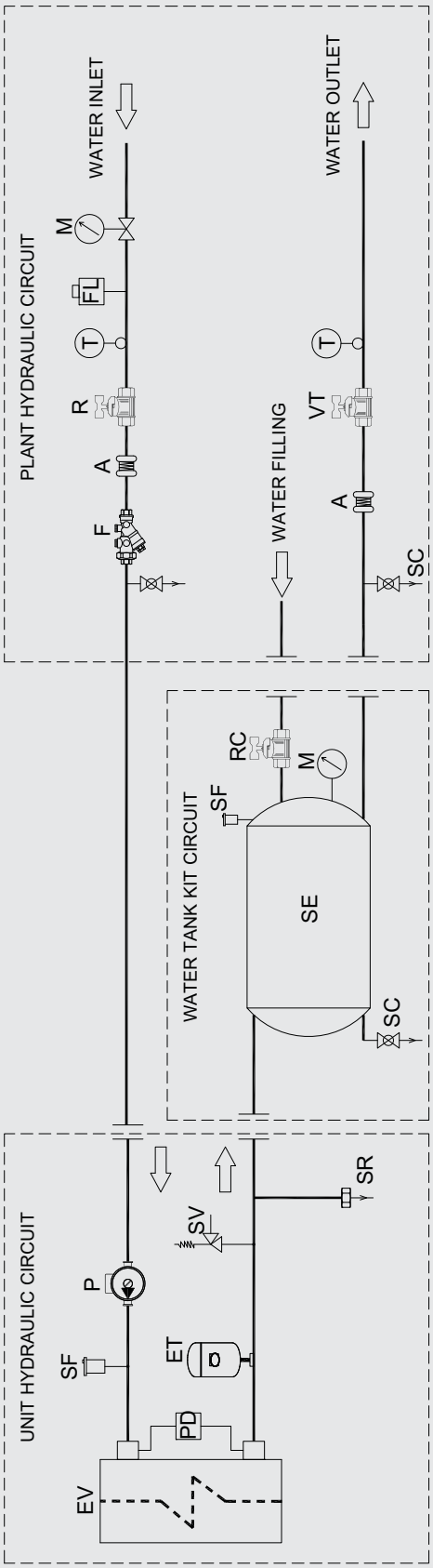
Measurement conditions:
Free field on reflecting surface (Q factor Q=2).



- For units installed in the presence of 2 reflecting surfaces (Q factor Q=4) 3 dB have to be added at values above mentioned.
- For units installed in the presence of 3 reflecting surfaces (Q factor Q=8) 6 dB have to be added at values above mentioned.
- For units installed at a certain height from the ground, the sound energy coming out from the bottom of the unit leads an increase of the noise pressure level of around 3 dB.

Sound emission values in octave bands are shown just as an indication and they are not to be considered as a commitment.
Sound pressure values, according to ISO 3744 standards and in observance of EUROVENT certification program, are the only ones to be used for every calculation to make a prevision of the sound pressure level at the operating conditions.
The sound pressure level data are not binding. For a more precise value please refer to the sound power level.

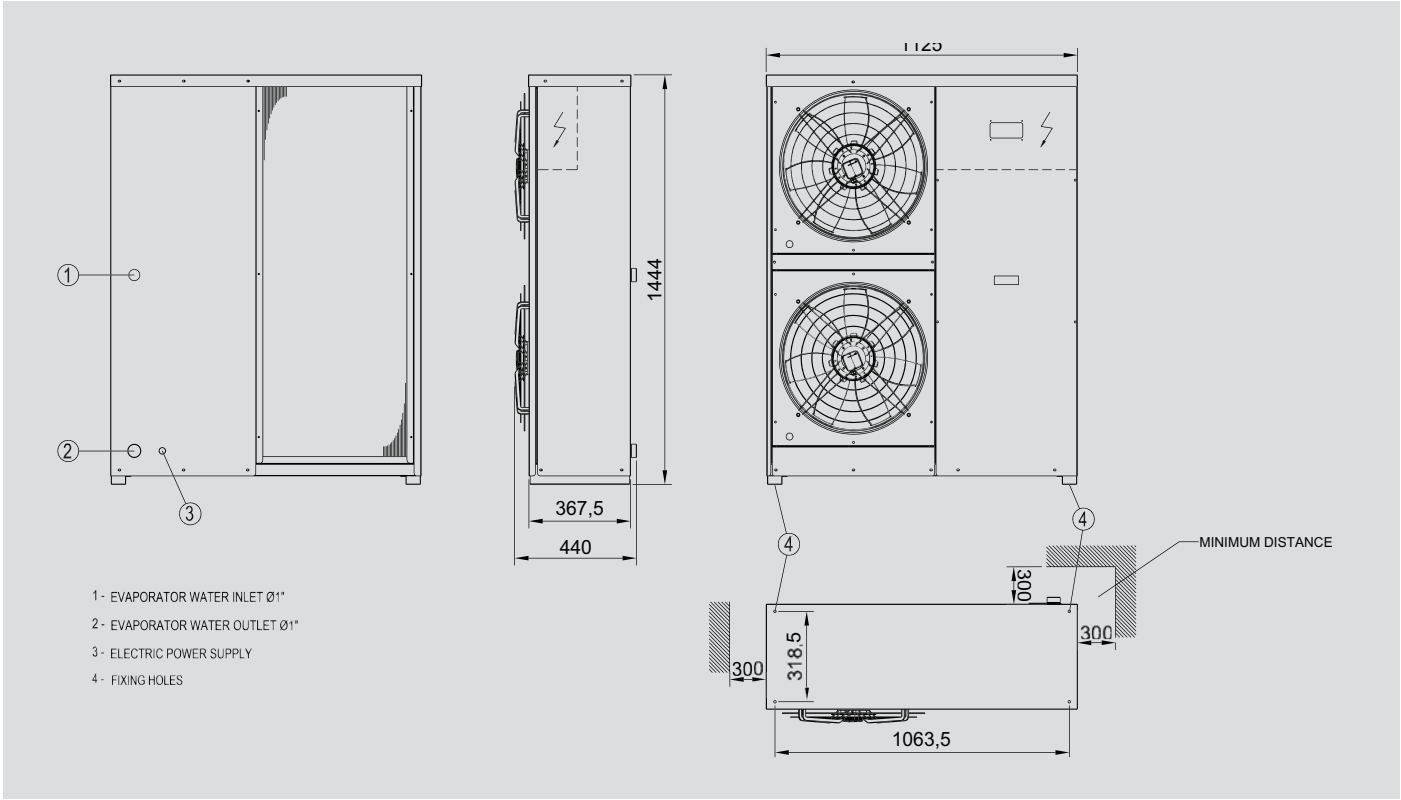
Installation sketch



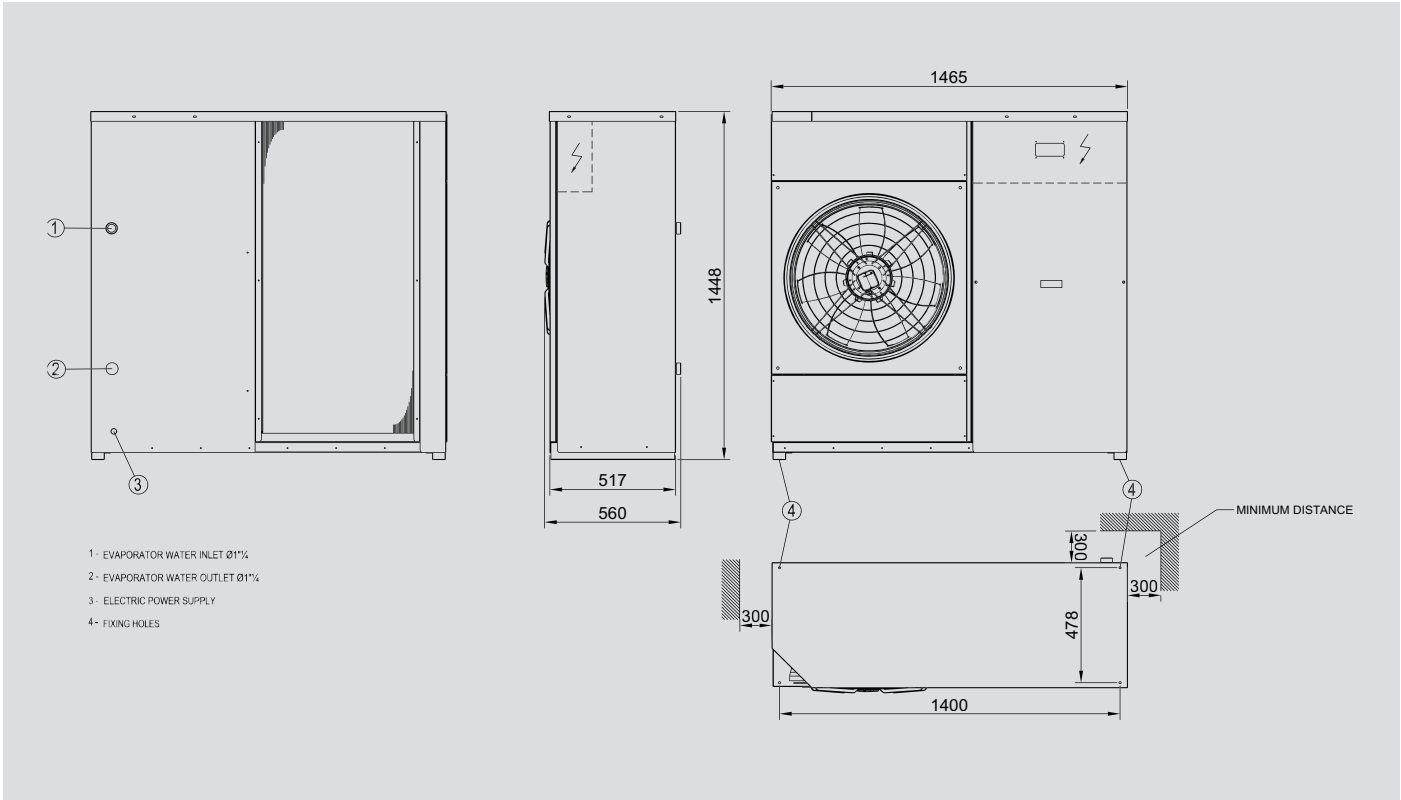
M GAUGE
FL FLOW SWITCH
T THERMOMETER
R SHUT OFF VALVE
A ANTIVIBRATION
F WATER STRAINER
SC DISCHARGE VALVE
P PUMP
SF RELIEF VALVE
EV EVAPORATOR
PD WATER DIFFERENTIAL PRESSURE
ET EXPANSION VESSEL
SC SAFETY VALVE
SR DISCHARGE / FILLING CAP
VT CALIBRATION VALVE
SE WATER TANK
RC FILLING VALVE

Dimensional drawings and weights

CGA 040

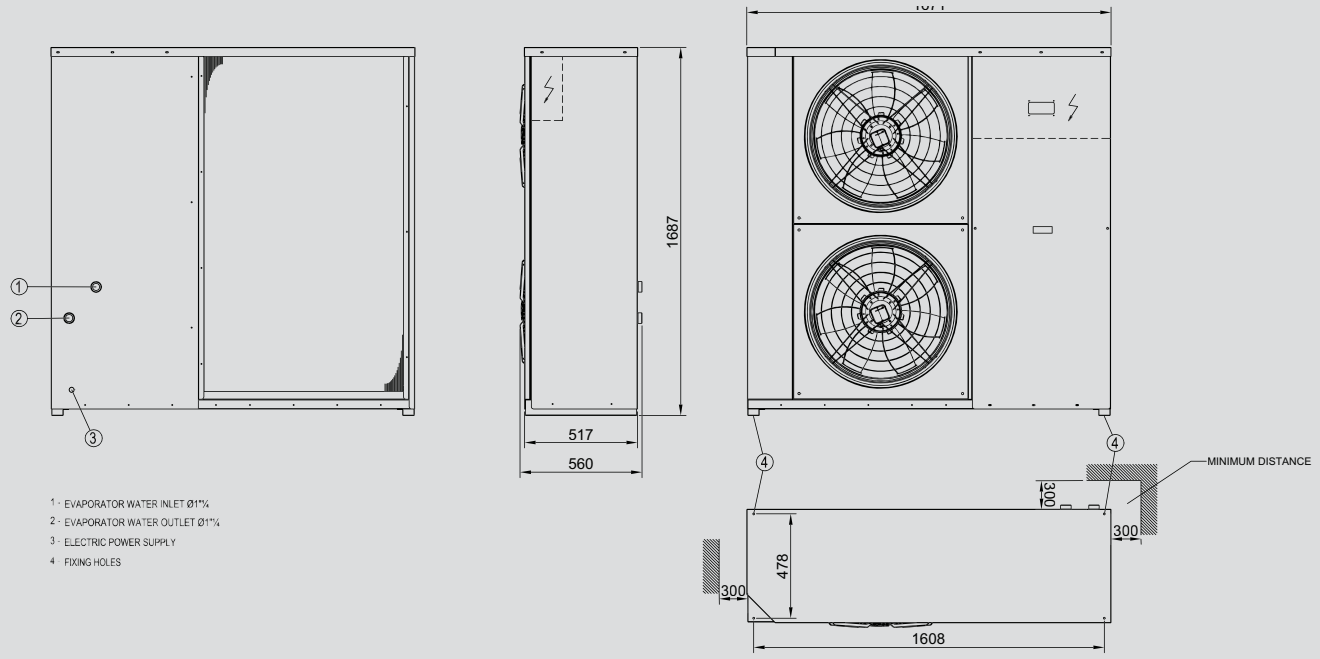


CGA 060 - 070

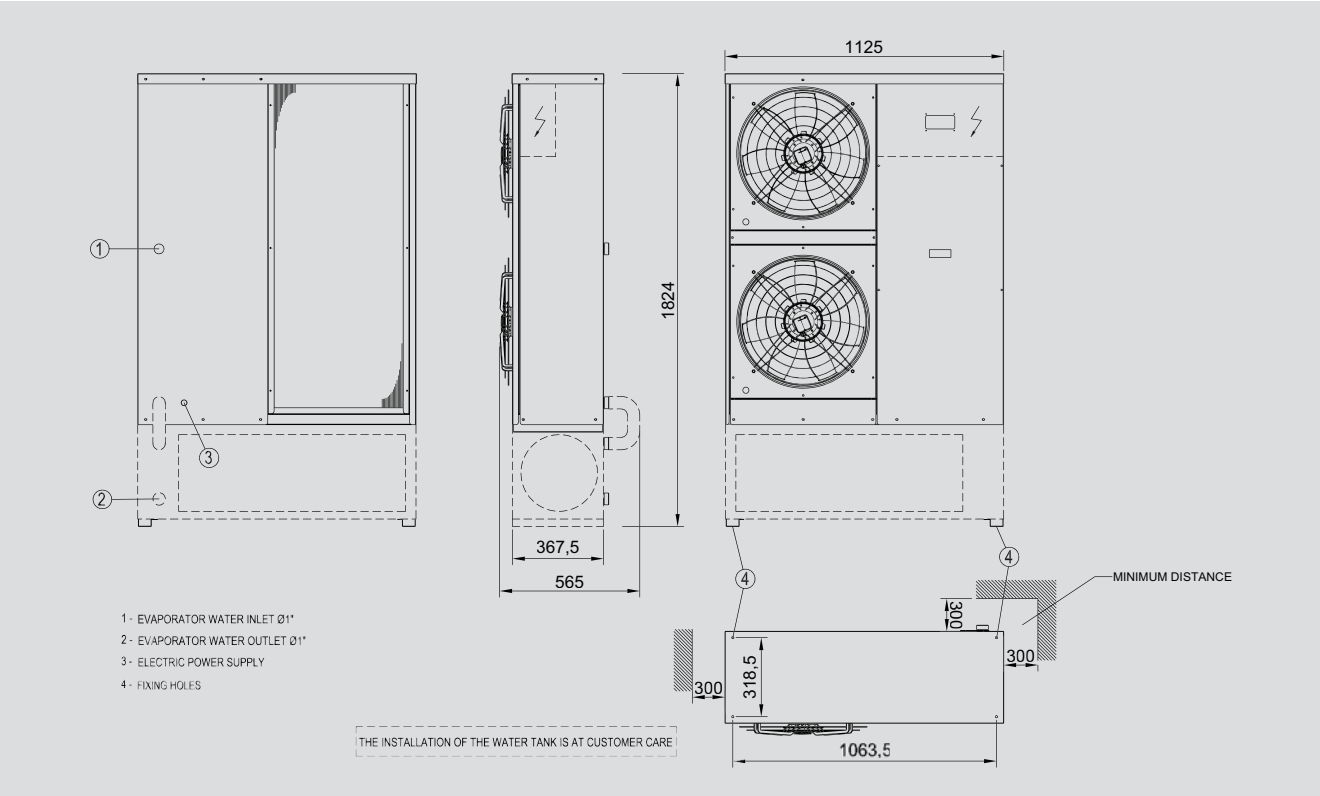


Dimensional drawings and weights

CGA 080 - 105

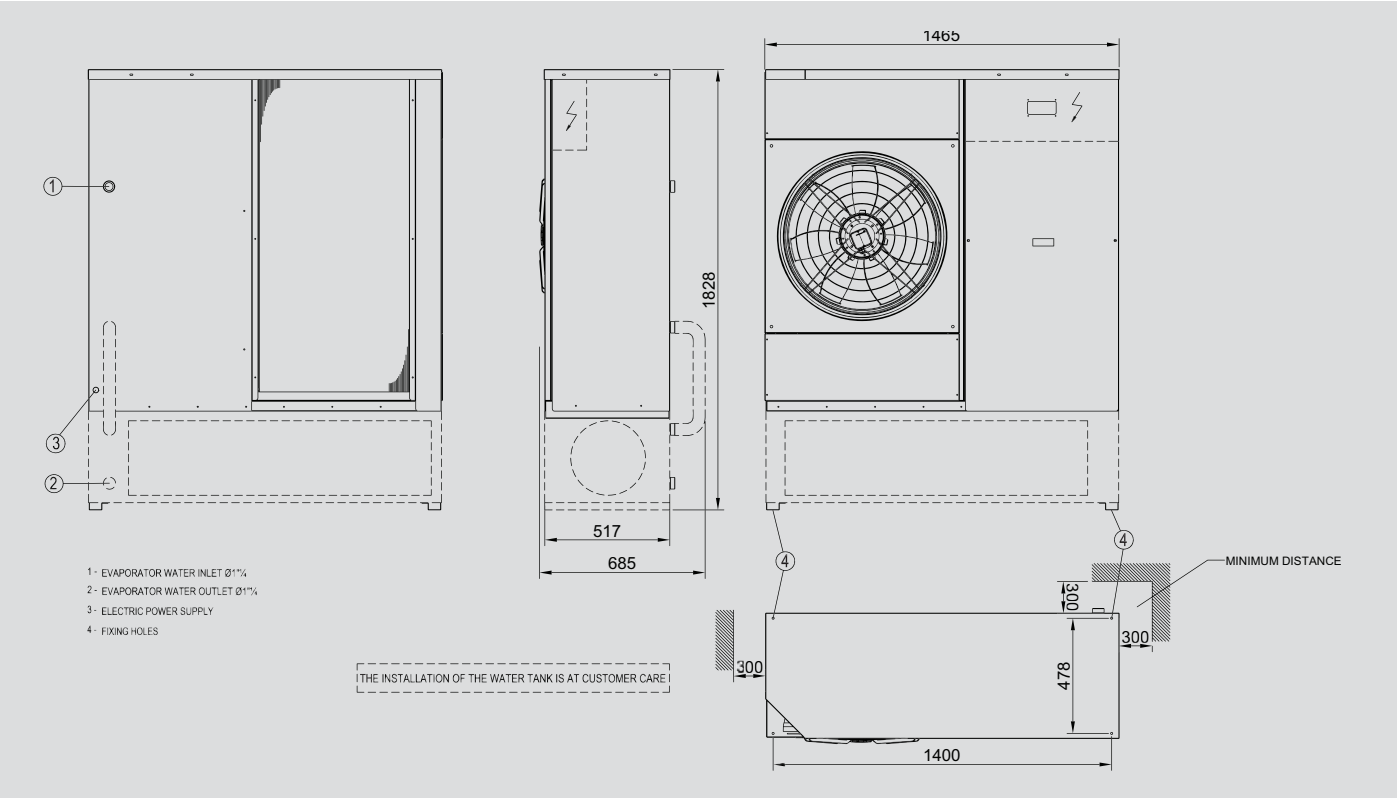


CGA 115

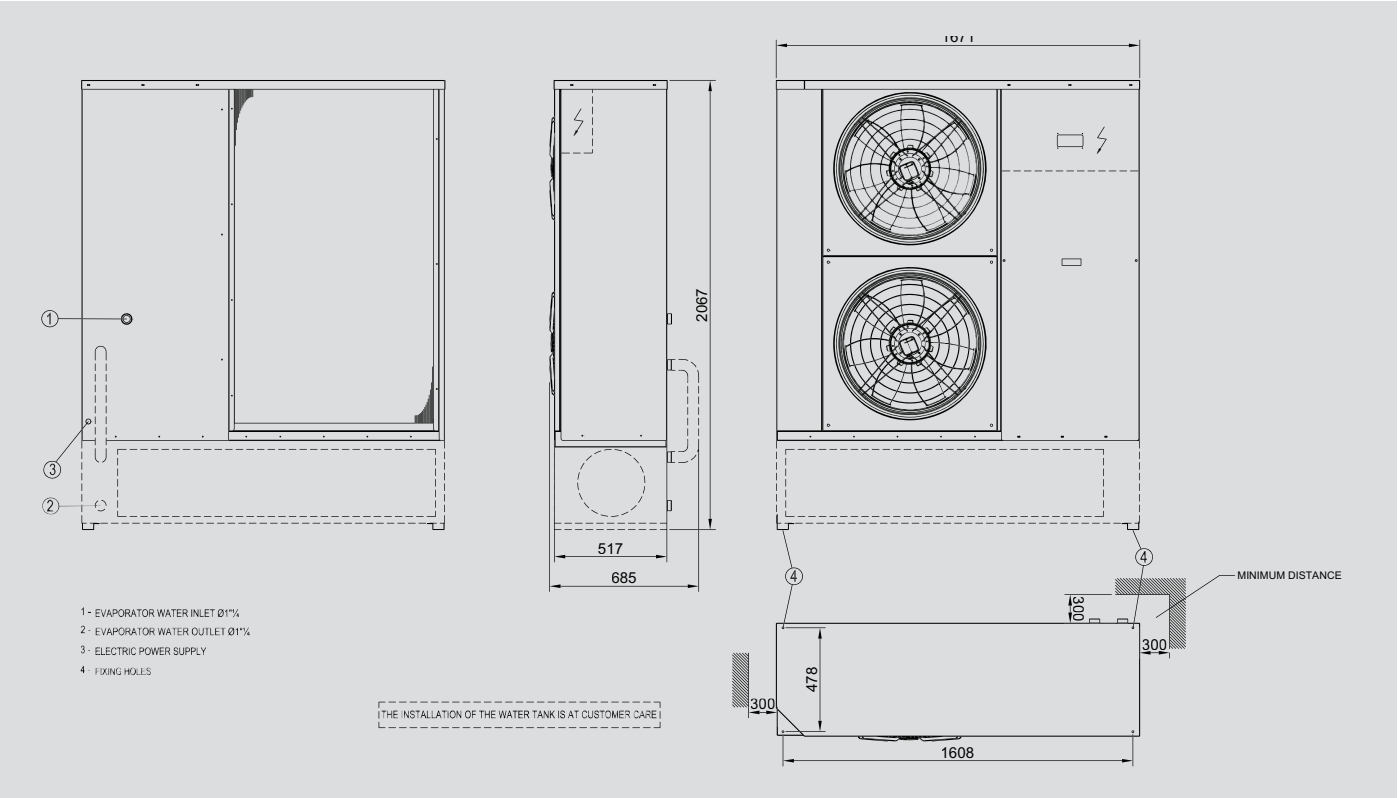


Dimensional drawings and weights

CGA 060 - 070 - H



CGA 080 - 115 H



Dimensional drawings and weights

Operation weights

MODEL			CGA 040	CGA 060	CGA 070	CGA 080	CGA 105	CGA 115
Basic Version		kg	168	246	255	288	291	301
Additional weight								
Built-in water tank	H	kg	70	96	96	135	135	135

Shipping weights

MODEL			CGA 040	CGA 060	CGA 070	CGA 080	CGA 105	CGA 115
Basic Version		kg	163	241	249	282	285	293
Additional weight								
Built-in water tank	H	kg	30	36	36	55	55	55

Tubes diameters

MODEL		TYPE	CGA 040	CGA 060	CGA 070	CGA 080	CGA 105	CGA 115
④ - ⑤	C	Ø G.M.	1"	1"¼	1"¼	1"¼	1"¼	1"¼

④ Water inlet evaporator
⑤ Water outlet evaporator

Notes

Notes

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