



*Water Cooled Liquid Chiller
for indoor installation with
HFO R1234ze refrigerant*

Centrifugal Chiller HFO

WCH-iZ 230 - 450 RANGE



TECHNICAL BULLETIN



SIZE	230	270	300	350	380	420	450
COOLING CAPACITY [KW]	809	950	1070	1230	1354	1477	1600

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Clivet is taking part in the EUROVENT certification programme up to 1.500 kW. The products concerned appear in the certified products list of the EUROVENT www.eurovent-certification.com site.

Features and benefits

WCH-i: Centrifugal technology for a extremely high efficiency product

WCH-i is the new generation of Clivet water cooled liquid chillers for indoor installation, with centrifugal compressor and inverter regulation: extremely high energy efficiency, great operating reliability and maximum choice versatility, for different types of installation.

WCH-iZ

Water Cooled Liquid Chillers with centrifugal compressor and inverter regulation

- Range 810 - 1600 kW
- Horizontal back-to-back centrifugal compressor
- Falling film evaporator
- Continuous capacity control
- Seasonal efficiency up to 9.64
- Operating with +37°C of condenser inlet water temperature



WCH-i

Water Cooled Liquid Chillers with centrifugal compressor and inverter regulation

- Range 880 - 1930 kW
- Horizontal back-to-back centrifugal compressor
- Falling film evaporator
- Continuous capacity control
- Seasonal efficiency up to 9,06
- Operating with +37°C of condenser inlet water temperature



Compressor

Double stage semi-hermetic compressor with double propeller. The compressor motor is activated directly by the inverter at a speed between 13000-18000 rev / min. The rotor is made of a transmission shaft in highly resistant heat treated steel alloy. The compressor is equipped with completely coated highly resistant aluminium alloy propellers. The two closed type opposing propellers are designed to balance the axial thrust, they are dynamically balanced and tested at high speed for regular operation without vibrations. At the entrance of the first impeller is the IGV (inlet guide vane), a system of variable inclination paddles that modifies the flow upon changing the rotation speed and increases efficiency with partial unit load. IGV movement is controlled by an electrical actuator that follows the cooling load on the evaporator. The compressor motor is cooled by the circulating refrigerant, the incorporated sensors supply active thermal protection to the motor. Thanks to the refrigerant cooling, it avoids heat transmission to the mechanical part of the compressor, reducing mechanical stress and vibrations. The compressor is capable of modulating capacity from 100% to 15% in order to maintain the temperature of the water exiting the usage side constant

Inverter

Air-cooled inverter for indoor installation and 400V three-phase power supply, supplied separately and to be installed by the customer.

The inverter is equipped with:

- cooling system with forced ventilation
- user interface on board
- protection fuses
- terminal block for connection of input and output power cables
- terminal block for connecting communication cables to the unit
- over-current and over-voltage protection
- phase sequence control
- entry for emergency stop (connected to the emergency button on the unit)

Lubrication system

The lubrication system is made of the following: an oil accumulation external to the compressor, a volumetric oil pump, an oil cooling exchanger with brazed plates collected to an oil circulation line.

The following components are also included: High efficiency oil filters; Protection in case of low oil pressure; Oil heater (with incorporated thermostat); Oil level indicator; Oil pressure control with pressure gauges and thermometer, pressure transducer and temperature probe.

Evaporator

Falling film exchanger. The exchanger is made of a carbon steel sleeve. The tubes, still anchored to the tubular plate with a mechanical tube expansion, are copper, highly efficient, internally and externally striped in order to optimise thermal exchange. It is also complete with differential pressure switch protecting the water side and coating of closed cell heat insulating material, which keeps condensation from forming and heat exchange with the outside. Removable heads to allow cleaning and maintenance of the exchanger. Maximum operating pressure of the water side of the exchanger: 10 bar. Quick coupling hydraulic connection with grooved joint.

Condenser

Highly efficient shell and tube exchanger. The exchanger is made of a carbon steel sleeve. The tubes, still anchored to the tubular plate with a mechanical tube expansion, are copper, highly efficient, internally and externally striped in order to optimise thermal exchange. It is also complete with differential pressure switch protecting the water side. Removable heads to allow cleaning and maintenance of the exchanger. Maximum operating pressure of the water side of the exchanger: 10 bar. Quick coupling hydraulic connection with grooved joint.

Refrigerant circuit

Refrigerant circuit made of steel and copper, welded, brazed and factory assembled, complete with:

- metal mesh filter complete with connection for quick refrigerant charge;
 - high and low pressure transducer ;
 - Refrigerant temperature probe;
 - electronic expansion valve;
 - high pressure side safety valve (double safety valve with exchange shut-off valve);
 - low pressure side safety valve (double safety valve with exchange shut-off valve);
 - liquid line cutoff valve ;
 - intake piping thermally insulated using highly flexible closed cell elastomer insulating material ;
 - economiser with butterfly valve flow adjustment ;
 - auxiliary lines for cooling the motor and oil recovery
- The refrigerant circuit is pressure tested to check for leaks and supplied complete with the refrigerant gas charge

Electrical panel

Entirely manufactured and wired in conformity to the EN 60204 standard and equipped with microprocessor control (PLC). A touch screen graphical display is included through which it is possible to monitor all operational data and set parameters for machine adjustment.

The capacity section includes:

- terminals main power (400V/3Ph/50Hz);
- trasformatore di isolamento per l'alimentazione del circuito ausiliario (230V/24V);

The control section includes:

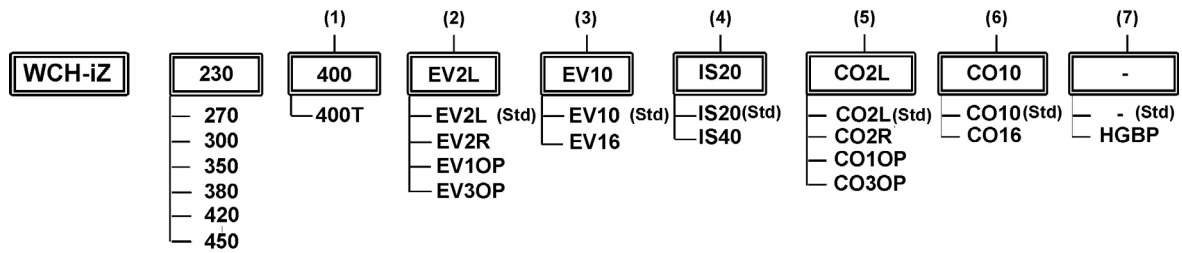
- display of water inlet/outlet temperatures on the use side and source side;
- display of refrigerant pressures and corresponding saturation temperatures in the refrigerant circuit;
- display of oil pressure in the lubrication system ;
- display of set values, malfunction codes and parameter index
- proportional-full-derivative adjustment of water temperature
- unit switching on management by local or remote;
- ON/OFF controls and alarms reset;
- daily, weekly program for unit start-up or shut-off
- water side anti-freeze protection;
- compressor protection and timer;
- self-diagnosis system immediately displaying the malfunction code;
- current display of the motor, operational hours, number of compressor start-ups;
- remote ON/OFF control ;
- relay for remoting of cumulative alarm signal ;
- display of refrigerant flow adjustment (IGV) valve position;
- customer terminal block ;
- terminal block for connection to the remote inverter;
- serial communication module for supervisor Modbus;
- Clivet eye.

All electrical cables are coloured and numbered in conformity with the electrical diagram

Testing

Unit subject to factory functional testing at the end of the production line and seal testing under pressure of refrigerant circuit piping (with nitrogen and hydrogen), before shipment. After testing, the content of humidity present is checked in order to ensure the respect of limits set by the manufacturer for various components.

Unit configuration



(1) Supply voltage

400T - Supply voltage 400/3/50 (standard)

(2) Evaporator

EV2L - Two-pass evaporator and left connections (standard)

EV2R - Two-pass evaporator and right connections

EV10P - One-pass evaporator and opposing connections

EV30P - Three-pass evaporator and opposing connections

(3) Evaporator water pressure

EV10 - Evaporator water pressure 10 bar (standard)

EV16 - Evaporator water pressure 16 bar

(4) Evaporator insulation

IS20 - 20 mm thickness insulation for evaporator (standard)

IS40 - 40 mm thickness insulation for evaporator

(5) Condenser

CO2L - Two pass condenser and left connections (standard)

CO2R - Two pass condenser and right connections

CO10P - One pass condenser and opposing connections

CO30P - Three pass condenser and opposing connections

(6) Condenser water pressure

CO10 - Condenser water pressure 10 bar (standard)

CO16 - Condenser water pressure 16 bar

(7) Hot gas by pass

(-) not required (standard)

HGBP - Hot gas by pass

EV2R Two-pass evaporator and right connections

Falling film exchanger.

Complete with differential pressure switch protecting the water side and coating of closed cell with a thickness of 20mm. Removable heads to allow cleaning and maintenance of the exchanger. Maximum operating pressure of the water side of the exchanger: 10 bar. Quick coupling hydraulic connection with grooved joint with exits to the right of the control panel.

EV10P One-pass evaporator and opposing connections

Falling film exchanger.

In case the project evaporator flow is higher than the nominal standard unit flow (i.e. ΔT between input and output $< 4K$), you must use a single pass evaporator on the water side. In this configuration the input connection of the water will be in the standard location (left hovering in front of the control panel) while the output will be on the other side.

EV30P Three-pass evaporator and opposing connections

Falling film exchanger.

In case the project evaporator flow is below than the nominal standard unit flow ($>7K$ ΔT between input and output), you must use a three pass evaporator on the water side. In this configuration the input connection of the water will be in the standard location (left hovering in front of the control panel) while the output will be on the other side.

CO2R Two-pass condenser and right connections

Highly efficient shell and tube exchanger.

Complete with differential pressure switch protecting the water side. Removable heads to allow cleaning and maintenance of the exchanger. Maximum operating pressure of the water side of the exchanger: 10 bar. Quick coupling hydraulic connection with grooved joint, with exits to the right of the control panel.

CO10P One pass condenser and opposing connections

Highly efficient shell and tube exchanger.

In case the project condenser flow is higher than the nominal standard unit flow ($<4K$ ΔT between input and output), you must use a single pass condenser on the water side. In this configuration the input connection of the water will be in the standard location (left hovering in front of the control panel) while the output will be on the other side.

CO30P Three pass condenser and opposing connections

Highly efficient shell and tube exchanger.

In case the project condenser flow is below than the nominal standard unit flow ($>7K$ ΔT between input and output), you must use a three steps condenser on the water side. In this configuration the input connection of the water will be in the standard location (left hovering in front of the control panel) while the output will be on the other side.

HGBP Hot gas by pass

The unit is supplied with a motorised ball valve installed on board. The valve is positioned on the refrigerant side between condenser and evaporator, and its function is to bypass part of the refrigerant, in case a partialisation of the capacity, below the one allowed by the standard unit, is requested.

It also provides additional protection against surges, in case the temperature of the condensation water is beyond the operating limits

 Surge is a situation of operating instability, it happens when there is high pressure ratio and low speed. Refrigerant flow through impeller is interrupted and comes back to the suction.

Built-in options

EV16	Evaporator water pressure 16 bar Falling film evaporator sized for a maximum operating pressure water side of 16 bar.
IS40	40 mm thickness insulation for evaporator Increased evaporator insulation with thickness of 40 mm. Ideal solution in case of water production at low temperatures (< 5°C) or for conditions of high air temperature and high humidity.
CO16	Condenser water pressure 16 bar Shell and tube condenser sized for a maximum operating pressure water side of 16 bar
CSIC	Shielded cables for connecting the inverter to the compressor: length 4.5 meters If the inverter is installed near the unit, Clivet can supply a cable kit for the connection between inverter and compressor. The cables are shielded, 4.5 meters long and already equipped with terminals to allow connection of the compressor to the inverter. They are sized for the specific application, considering the characteristics of the inverter and the electric motor of the compressor and for an ambient temperature below 45°C. The cables are sent already connected to the terminals in the electrical termination box of the compressor. The connection to the inverter must be made on site after its placement, by the Customer.
RPR	Refrigerant leak detector Leak detector device built-in installed, it detects leaks of the internal refrigeration circuit.

AMRX

Rubber antivibration mounts

Mat in thermoplastic elastomer composed of 4 inner layers. Hardness 45 ShA, thickness 37.5 mm.

Thermoplastic Elastomer is ideal for temperature range -45° C to 110° C

It has a high resistance to aging, pollutants, hydrocarbons, saline mists, UV rays and detergents and is composed of recyclable material.

High degree of thermal and electrical insulation..

AMMX

Spring antivibration mounts

The spring antivibration mounts must be fixed to the heat exchanger support plates are used to dampen the vibrations produced by the unit by reducing the noise transmitted to the structures. They consist of:

n° 7 springs in harmonic steel UNI EN 10270-1 SH with surface protected by cathoretic treatment.

n° 2 “plate” containment bodies made of 5 mm thick galvanized steel plates, coated with thermoplastic with high mechanical resistance, injection molded. The contact surfaces of the plates have deformable non-slip reliefs, which allow the anti-vibration mount to stand for friction. The springs are fixed with a special adhesive in the relative seats provided on the plates.

N° 1 galvanized steel screw jack to record the level of suspended machine in various points of support.

AMMSX

Anti-seismic spring antivibration mounts

The anti-seismic spring antivibration mounts be secured to the support plates of the exchangers. The containment structure is designed to ensure high resistance to multi-directional forces acting on the surface of the suspended unit in case of earthquakes. They consist of:

n° 4 springs in harmonic steel UNI EN 10270-1 SH with surface protected by cathoretic treatment

n° 8 nylon discs that block the spring to the structure and prevent metal contact

n° 2 rubber side seals to prevent metallic contact between base and cover insulation and ensure continuity even in the presence of axial thrusts

n° 2 TCEI M16 side safety screws, to lock the cover to the base guides and prevent the spring from coming out

n° 1 screw and nut M24 1 to record the fee of the suspended machine

n° 1 intermediate plate to evenly distribute the load on the springs

n° 1 base and 1 cover made of sandblasted Fe420 steel, protected by cathoretic treatment and epoxy powder coated

n° 1 neoprene pad applied to the base, which features deformable slip, allowing the vibration station by friction

2VBYX

ON/OFF motorized by-pass valve

The by-pass valve is supplied separately and must be installed between the water inlet and outlet on the condenser side. If the source water temperature falls below the operating limits (<19 ° C in input) it is possible to use the by-pass valve to reduce the effective water flow to the condenser by raising the pressure of condensation and keeping the unit running.

QSGX

Main switch cabinet: shipped separately

Since the inverter chiller unit consists of two separate power supplies (on-board electrical panel and inverter), it is necessary to provide a main switch to allow the interruption of the power supply to the whole system.

Clivet can provide an electrical panel with main switch specially designed according to the power consumption of the unit.

This panel is supplied separately and must be installed on site by the Customer.

CCSQX

Cables kit for connecting the main switch to the inverter and to the unit control box

If the QSGX option is selected (Panel with main switch), Clivet can supply a cable kit for connecting the main switch to the inverter and to the unit electrical panel.

The cables are specially designed according to the absorption characteristics of the electrical panel and the inverters are equipped with terminals and are of sufficient length to allow the positioning of main switch at the side of the inverter.

The connection cables kit also includes a steel support for positioning the main switch..

General technical data

Performance

SIZE			230	270	300	350	380	420	450
Cooling									
Cooling capacity	(1)	kW	809	950	1070	1230	1354	1477	1600
Compressor power input	(1)	kW	139	162	178	204	218	239	262
Total power input	(2)	kW	140	164	179	205	220	241	263
EER	(1)	-	5,77	5,80	5,97	6,00	6,17	6,14	6,07
Water flow-rate user side/cold	(1)	l/s	38,6	45,3	51,0	58,6	64,6	70,4	76,3
User side pressure drop/cold	(1)	kPa	40,7	54,1	48,1	47,4	44,6	52,1	49,5
Water flow-rate source side/hot	(1)	l/s	45,3	53,1	59,6	68,4	75,1	81,9	88,9
Source side pressure drop/hot	(1)	kPa	39,4	39,5	28,4	36,4	35,0	40,9	40,2
Cooling capacity (EN14511:2018)	(3)	kW	808	949	1069	1229	1353	1476	1599
Total power input (EN 14511:2018)	(3)	kW	144	169	184	211	226	249	272
EER (EN 14511:2018)	(3)	-	5,61	5,61	5,81	5,82	5,99	5,93	5,88
SEER	(4)	-	8,00	8,49	8,49	8,90	9,30	9,48	9,64
SEPR	(5)	-	8,72	8,62	9,22	9,28	9,59	9,52	9,48
Cooling capacity (AHRI 550/590)	(6)	kW	809	950	1070	1230	1354	1477	1600
Total power input (AHRI 550/590)	(6)	kW	138	162	177	203	218	239	262
COP _R	(6)	-	5,85	5,86	6,05	6,06	6,22	6,19	6,11
IPLV	(6)	-	9,11	9,50	9,37	9,80	10,23	10,47	10,61

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign LOT21 Contains fluorinated greenhouse gases (GWP 7).

1. Data referred to the following conditions: Evaporator water temperature = 12/7 °C. Condenser water temperature = 30/35°C. Evaporator fouling factor = $0,44 \times 10^{(-4)}$ m² K/W
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers.
3. Data compliant to Standard EN 14511:2018 referred to the following conditions: Evaporator water temperature = 12/7 °C. Condenser water temperature = 30/35 °C
4. Data compliant to Standard EN14825:2018
5. Data compliant according to EU regulation 2016/2281
6. Data compliant to Standard AHRI 550/590 referred to the following conditions: Evaporator water temperature =12,22 °C / 6,7 °C. Water flow-rate 0,043 l/s per kW. Condenser water temperature 29,44 °C /34,61 °C. Evaporator fouling factor = $0,18 \times 10^{(-4)}$ m² K/W

Electrical data

Supply voltage 400/3/50+N

SIZE		230	270	300	350	380	420	450
F.L.A. Full load current at max admissible conditions								
F.L.A. - Total	[A]	249	292	319	366	392	430	471
F.L.I. Full load power input at max admissible conditions								
F.L.I. - Total	[kW]	161	188	205	235	252	276	303
M.I.C. Maximum inrush current								
M.I.C. - Value	[A]	249	292	319	366	392	430	471

Maximum Phase Unbalance: 2%.

Power supply: 400/3/50 Hz +/-10%

Electrical data refer to standard units; according to the installed accessories, the data can suffer light variations.

Construction

SIZE		230	270	300	350	380	420	450
Compressor								
Compressor type	(1)				CFGi			
Refrigerant					R-1234ze			
N° compressor	Nr				1			
Nominal capacity	HP	268	268	375	375	375	375	422
Std capacity steps	(2)	15%-100%	15%-100%	15%-100%	15%-100%	15%-100%	15%-100%	15%-100%
Oil charge	l	40	40	40	40	40	40	40
Refrigerant charge	kg	210	210	225	225	310	310	330
Refrigerant circuits	Nr				1			
Internal exchanger / Evaporator								
Type of exchanger	(3)				FF			
N° of exchanger	Nr				1			
Water content	l	240	240	270	300	370	370	400
Minimum system water content	l	4700	5500	6100	7100	7800	8500	9100
External exchanger/ Condenser								
Type of exchanger	(4)				S&T			
N° exchangers	Nr				1			
Water content	l	249	317	349	433	515	558	650
Connections								
Evaporator water connections	-	8"	8"	8"	8"	10"	10"	10"
Condenser water connections	-	8"	8"	10"	10"	10"	10"	10"
Power supply								
Standard power supply	V	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50

1. CFGi = Centrifugal compressor regulated by inverter
2. Modulation refers to the conditions: Evaporator water temperature = 12/7°C, condenser water temperature = 30/35°C, with option HGBP.
3. FF = falling film exchanger
4. S&T = shell and tube exchanger

Sound levels

SIZE	Sound power level								Sound pressure level DB(A)	Sound power level DB(A)
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000		
230	79	78	82	84	85	92	96	84	79	99
270	82	89	86	89	90	93	98	86	82	101
300	78	81	82	81	82	90	96	83	79	99
350	79	78	82	84	84	92	95	84	79	99
380	82	88	86	89	90	93	98	86	82	101
420	80	87	85	87	88	92	97	84	80	100
450	81	87	85	88	89	92	97	85	81	100

Sound levels refer to full load units, in test nominal conditions. The sound pressure level refers to 1 m. from the standard unit outer surface operating in open field. Measurements are carried out according to the UNI EN ISO 9614-2 standard, in compliance with the EUROVENT 8/1 certification.
Data referred to the following conditions: Evaporator water temperature=12/7°C; Condenser water temperature = 30/35°C.

General technical data

Admissible water flow rates

Min. (Qmin) and max. (Qmax) water flow-rates admissibles for the correct unit operation.

SIZE			230	270	300	350	380	420	450
Condenser	Qmin	[l/s]	25,1	29,1	34,3	38,7	42,5	44,8	50,4
	Qmax	[l/s]	54,7	54,7	97,2	97,2	97,2	97,2	138,9
Evaporator	Qmin	[l/s]	21,0	21,0	25,2	29,4	33,6	33,6	37,8
	Qmax	[l/s]	54,6	54,6	65,5	76,4	87,4	87,4	98,3

Fouling Correction Factors

SIZE	External exchanger (condenser)		Internal exchanger (evaporator)	
M2 C / W	F1	FK1	F2	FK2
0.44 X 10 (-4)	1,0	1,0	1,0	1,0
0.88 X 10 (-4)	0,97	0,99	0,97	1,08
1.76 X 10 (-4)	0,94	0,98	0,92	1,05

F1 = Cooling power correction factor

FK1 = Compressor power input correction factor

F2 = Cooling power correction factor

FK2 = Compressor power input correction factor

Correction factors for glycol use

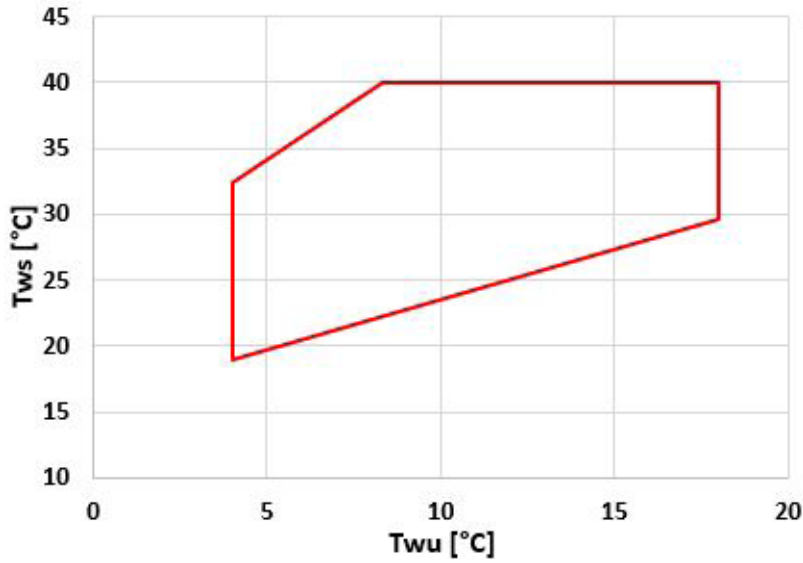
% ethylene glycol by weight		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19	-23,4	-27,8	-32,7
Safety temperature	°C	3	1	-1	-4	-6	-10	-14	-19	-23,8	-29,4
Evaporator cooling Capacity Factor	-	0,995	0,989	0,983	0,977	0,971	0,964	0,956	0,949	0,941	0,933
Internal exchanger compressor power input Factor	-	0,998	0,997	0,995	0,994	0,992	0,990	0,989	0,987	0,986	0,984
Evaporator pressure drop Factor	-	1,041	1,085	1,131	1,180	1,231	1,285	1,341	1,400	1,461	1,525
Condenser cooling Capacity Factor	-	0,998	0,996	0,994	0,992	0,990	0,988	0,986	0,984	0,982	0,980
Condenser compressor power input Factor	-	1,003	1,006	1,009	1,012	1,015	1,018	1,021	1,024	1,027	1,030
Condenser pressure drop Factor	-	1,037	1,077	1,118	1,162	1,208	1,257	1,307	1,360	1,415	1,473

Overload and control device calibrations

		Intervention	Reset	Value
High pressure alarm (gas side)	[kPa]	730	-	-
Low pressure alarm (gas side)	[kPa]	140	-	-
Antifreeze protection	[°C]	-	-	3
High pressure safety valve (gas side)	[kPa]	-	-	1280
Low pressure safety valve (gas side)	[kPa]	-	-	1280
Max no. of compressor starts per hour	[n°]	-	-	4
Differential pressure switch	[kPa]	13	18	-
Max pressure (water side)	[kPa]	-	-	1000

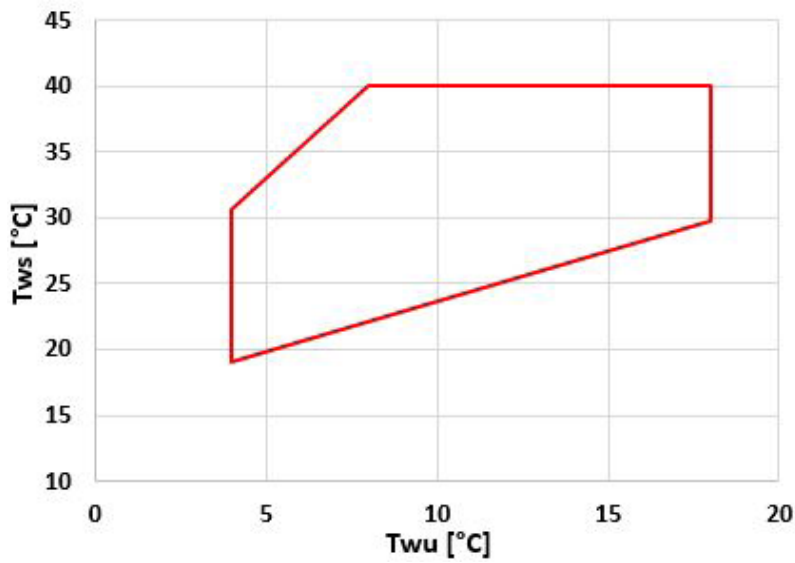
Operating range

Size 230 - 270



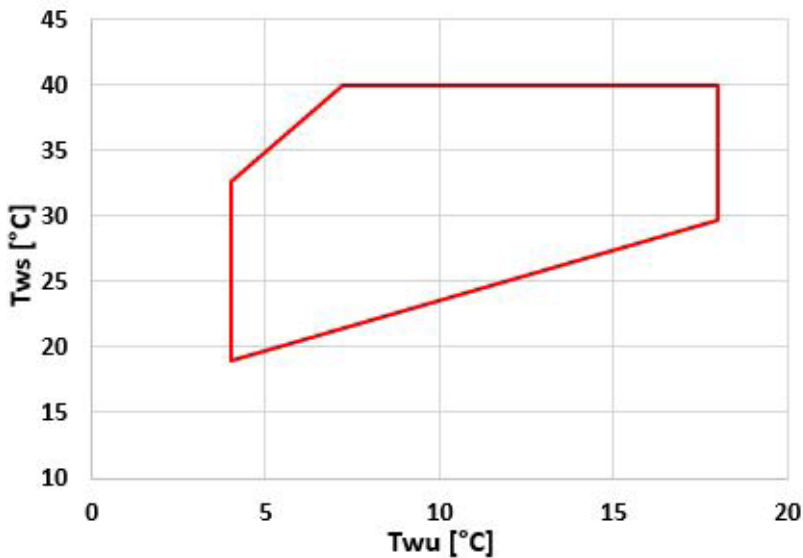
Twu [°C] = Evaporator leaving water temperature
TwS [°C] = Condenser leaving water temperature

Size 300 - 350 - 380 - 420



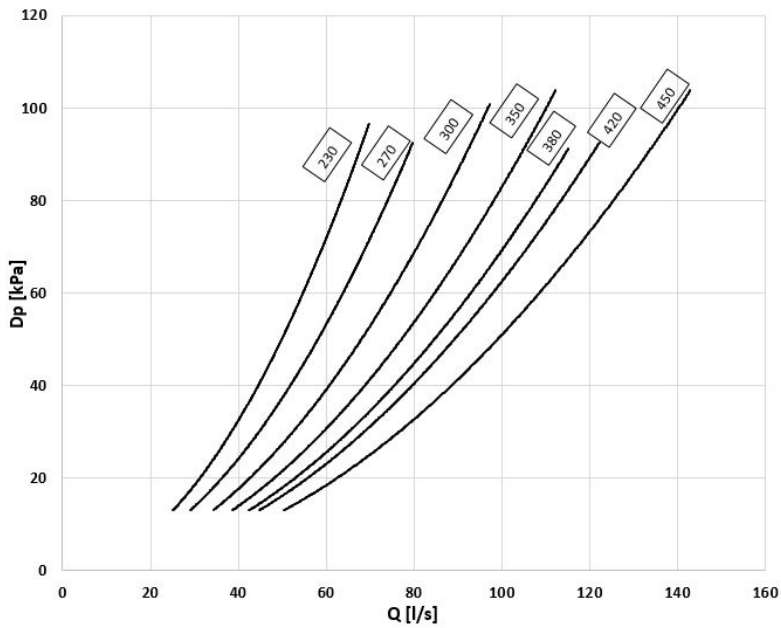
Twu [°C] = Evaporator leaving water temperature
TwS [°C] = Condenser leaving water temperature

Size 450



Twu [°C] = Evaporator leaving water temperature
TwS [°C] = Condenser leaving water temperature

Condenser pressure drops



Pressure drops on the water side are calculated considering an average water temperature of 30°C.

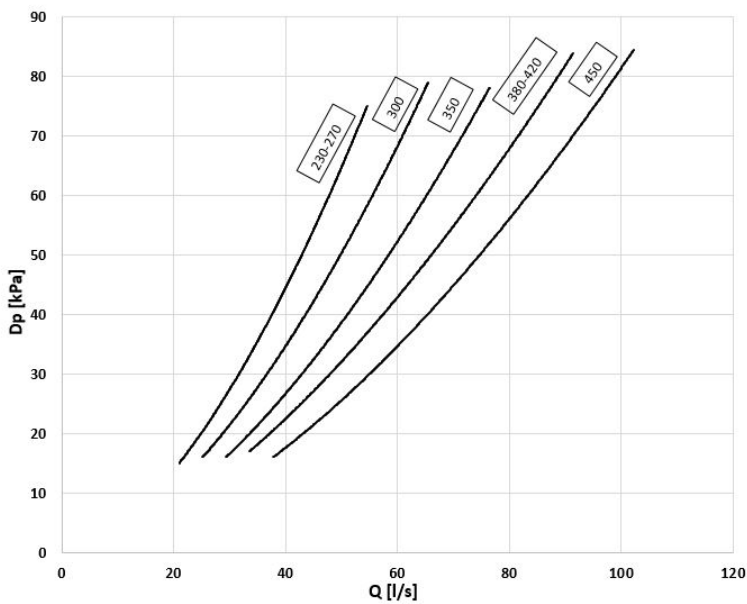
Q = water flow-rate (l/s)
DP = pressure drop [kPa]

The water flow rate must be calculated with the following formula

$$Q [l/s] = kWf / (4,186 \times DT)$$

kWf = Cooling capacity in kW
DT = Temperature difference between entering / leaving water

Evaporator pressure drops



Pressure drops on the water side are calculated considering an average water temperature of 30°C.

Q = water flow-rate (l/s)
DP = pressure drop [kPa]

The water flow rate must be calculated with the following formula

$$Q [l/s] = kWf / (4,186 \times DT)$$

kWf = Cooling capacity in kW
DT = Temperature difference between entering / leaving water

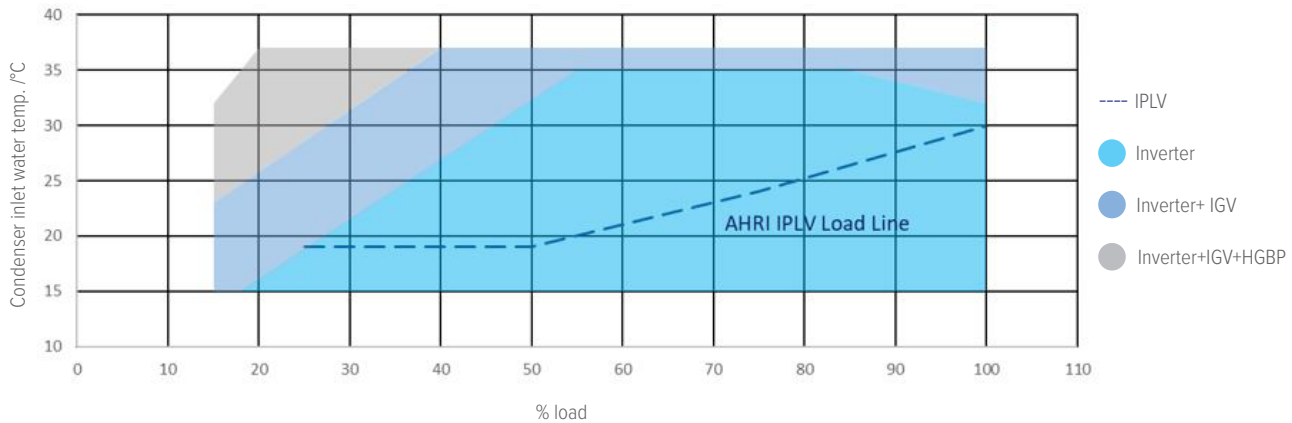
⚠ To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical strainer that must be placed on the water input line. It is a device compulsory for the correct unit operation.

⚠ If the mechanical strainer is selected and installed by the Customer, it is forbidden the use of filters with the mesh pitch higher than 1,6 mm, because they can cause a bad unit operation and also its serious damaging.

Adjusting the capacity and operating range

Capacity control is done by combining two adjustments:

1. inverter frequency
2. IGV opening / closing (Inlet Guide Vane) a variable angle blading system at the compressor inlet. Generally the adjustment is made by means of an inverter by varying the rotational speed of the compressor. When it is no longer possible to reduce capacity, reducing the frequency of the inverter, the unit starts to change the position of the IGV reduces the flow of refrigerant in the suction. When you switch the compressor the IGV is partially closed and the frequency of the inverter is at minimum to reduce inrush current. The compressor start ramp is to open the IGV and further increasing compressor rotation speed.
3. HGBP opening / closing (Hot Gas By Pass) (Optional): a motorised ball valve positioned on the refrigerant side between condenser and evaporator. If it's required a 15% minimum modulation, it is possible to select the HGBP option, which allows to further reduce the capacity by bypassing a part of the refrigerant between the condenser and the evaporator.



Maximum inlet water temperature on the source side: +37 °C

* Evaporator water outlet temperature 7 °C

Inverter

The inverter is equipped with an air cooling system, observe the spaces of respect indicated in the dimensional pages.

For the correct operation of the inverter, it is necessary to guarantee an air temperature inside the technical room below +43 °C.

The maximum heat rejection by the inverter is 2% of the maximum power input at full load.

Hydraulic connections

For the correct operation of the unit it is necessary to provide the installation of the following components (both on the user side and source side):

- Water filter: must be installed immediately at the entrance of the unit, in an easily accessible position for cleaning.
- Flow switch: must be provided in order to guarantee the unit stop in case of lack of water circulation.

Consult the installation and owner's manual for installation specifications.

Electrical connections

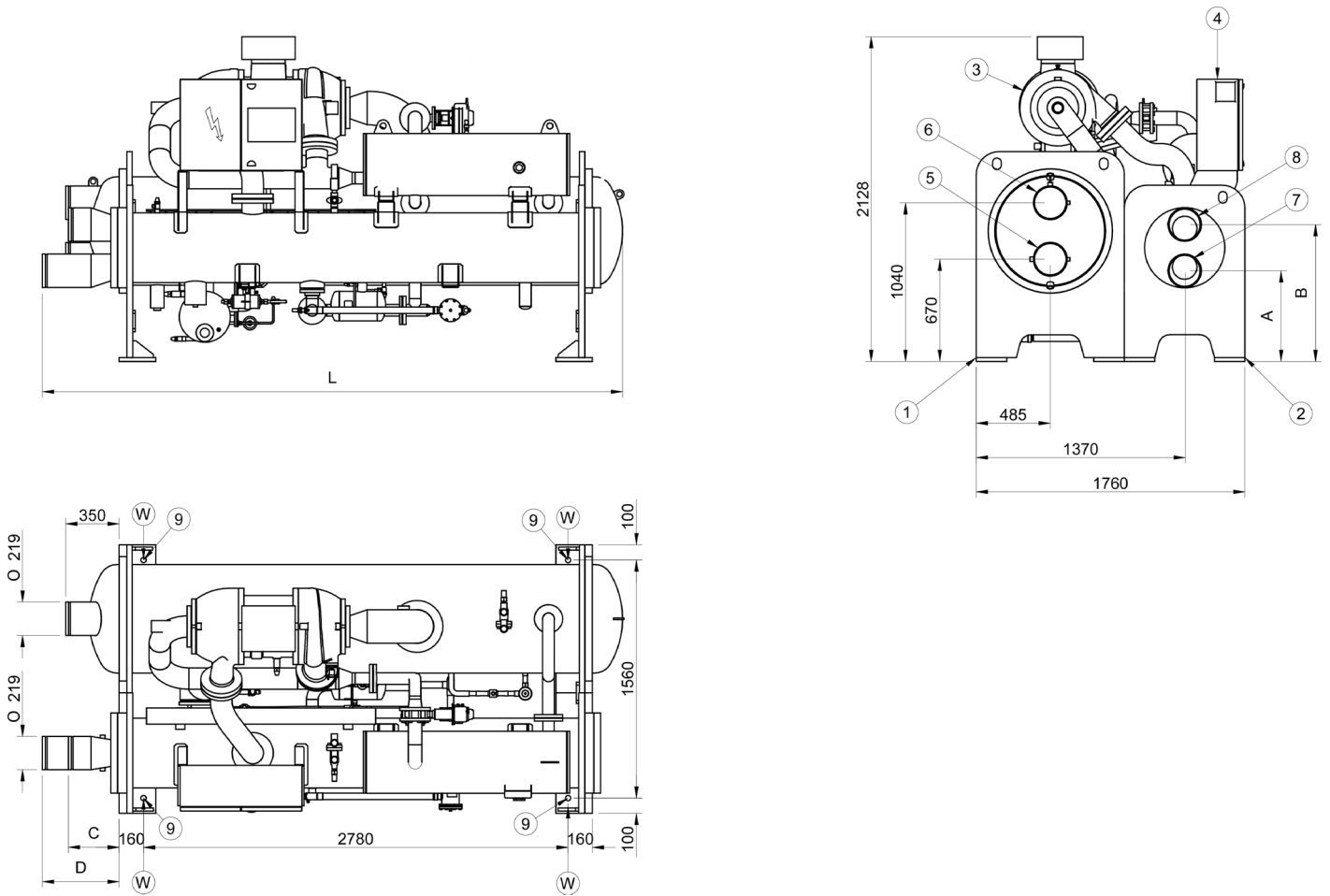
Since the inverter chiller unit consists of two separate power supplies (on-board electrical panel and inverter), it is necessary to provide a main switch to allow the interruption of the power supply to the whole system.

Clivet can provide an electrical panel with main switch specially designed according to the power consumption of the unit (option QSGX). This panel is supplied separately and must be installed on site by the Customer.

Dimensional unit

SIZE 230 - 270

DAACN0001_00
Data/Date 10/07/2020



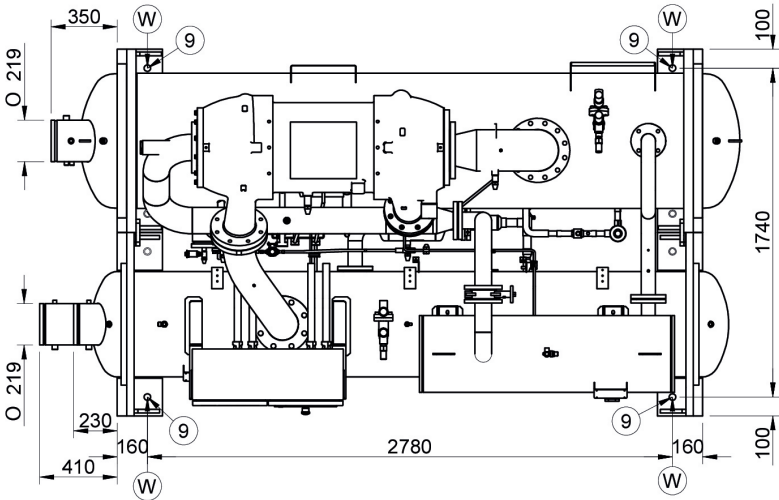
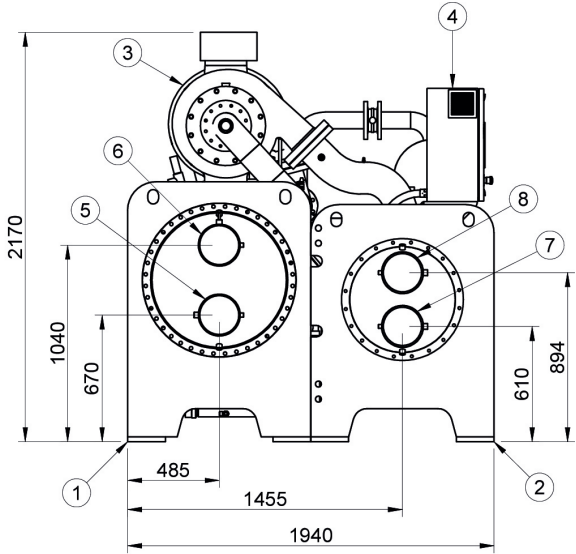
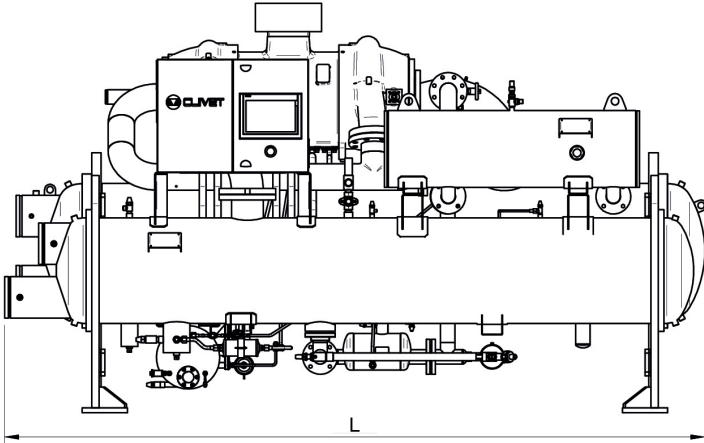
1. Evaporator
2. Condenser
3. Compressor
4. Electrical panel
5. Water inlet user side
6. Water outlet user side
7. Water inlet source side
8. Water outlet source side
9. Unit fixing holes $\varnothing 35$

SIZE		230	270
Lenght	mm	3820	3870
Depth	mm	1760	1760
Height	mm	2128	2128
Operating weight	kg	5700	5785
Shipping weight	kg	5185	5185

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

SIZE 300 - 350

DAACN0002_00
Data/Date 10/07/2020



- 1. Evaporator
- 2. Condenser
- 3. Compressor
- 4. Electrical panel
- 5. Water inlet user side
- 6. Water outlet user side
- 7. Water inlet source side
- 8. Water outlet source side
- 9. Unit fixing holes Ø35

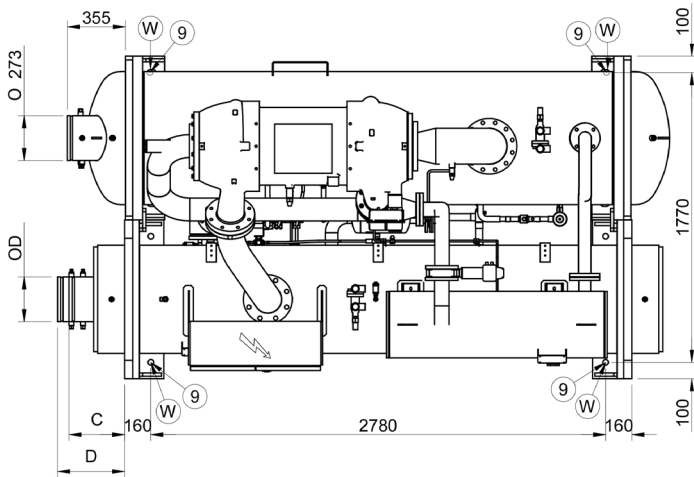
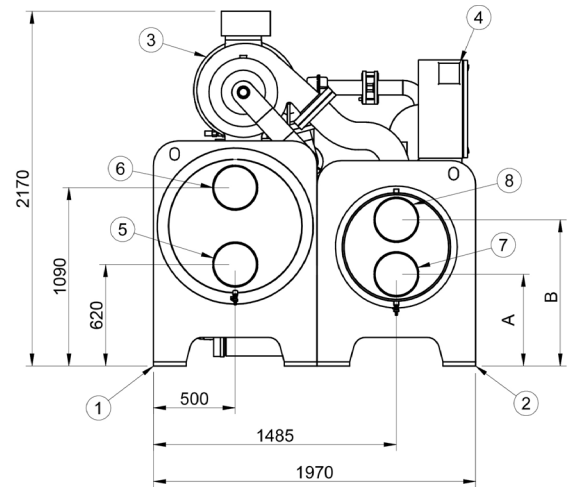
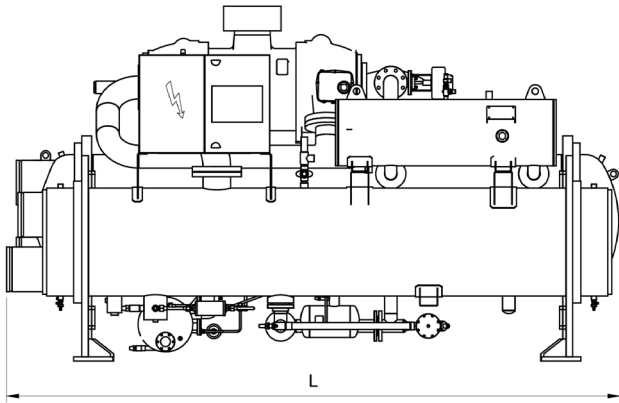
SIZE		300	350
Lenght	mm	3770	3770
Depth	mm	1940	1940
Height	mm	2170	2170
Operating weight	kg	6269	6469
Shipping weight	kg	5600	5700

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional unit

SIZE 380 - 420 - 450

DAACN0003_00
Data/Date 10/07/2020



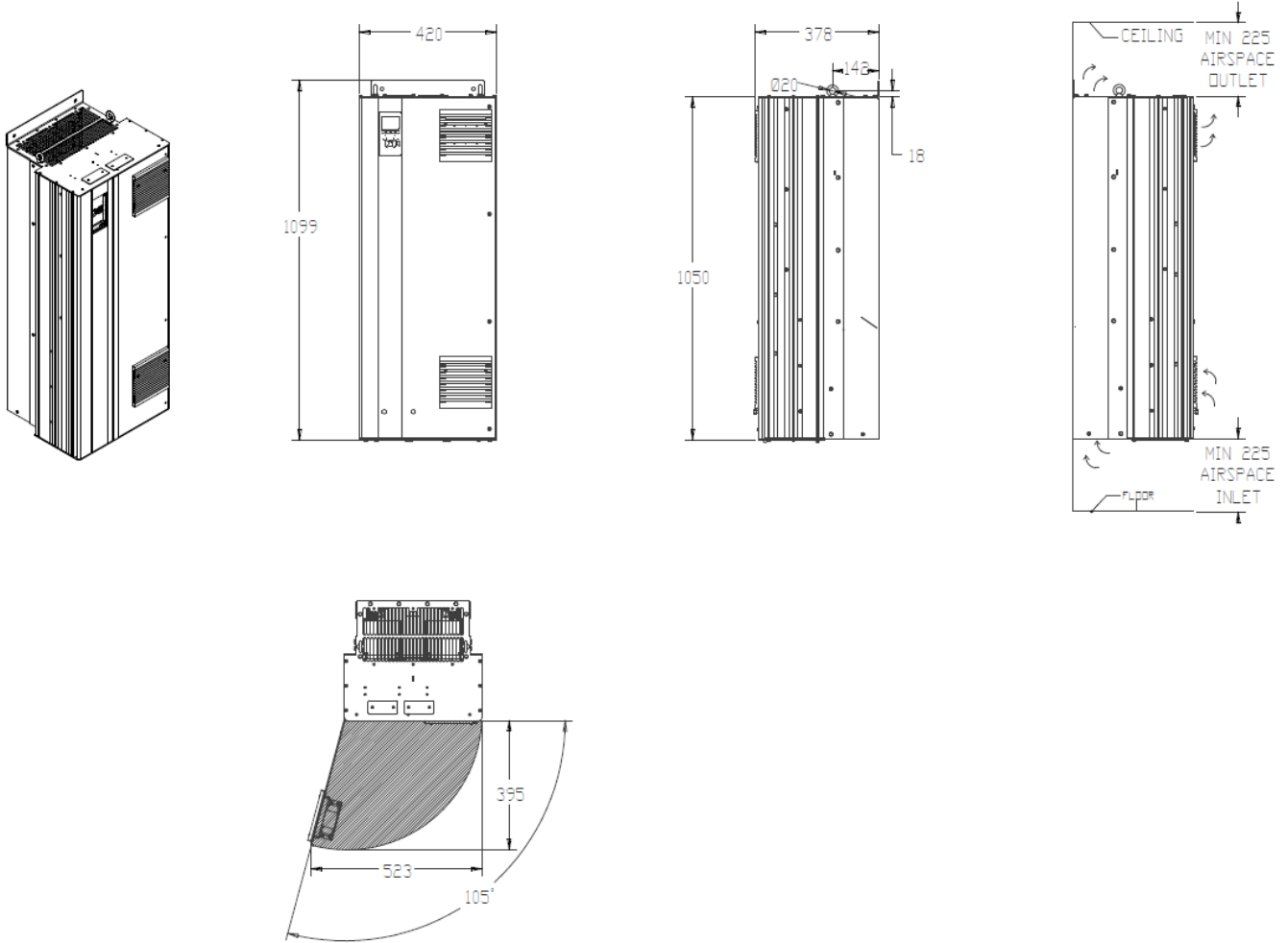
1. Evaporator
2. Condenser
3. Compressor
4. Electrical panel
5. Water inlet user side
6. Water outlet user side
7. Water inlet source side
8. Water outlet source side
9. Unit fixing holes $\varnothing 35$

SIZE		380	420	450
Lenght	mm	3770	3810	3810
Depth	mm	1970	1970	1970
Height	mm	2170	2170	2170
Operating weight	kg	7546	7546	7648
Shipping weight	kg	6853	6853	6925

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional inverter

SIZE 230 - 270 - 300 - 350 - 380 - 420

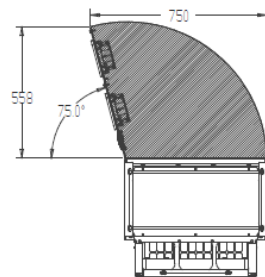
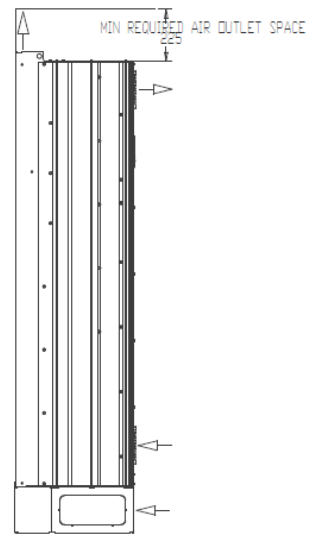
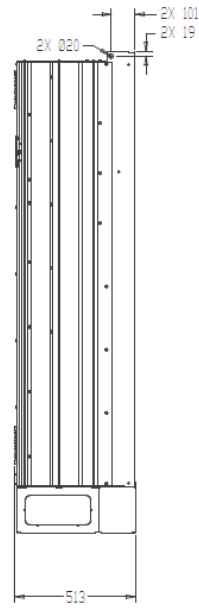
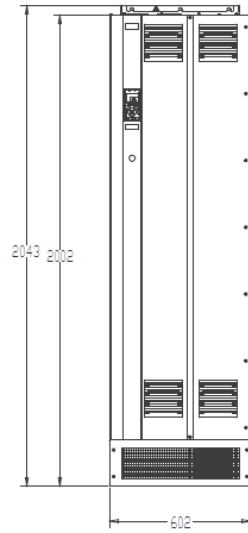
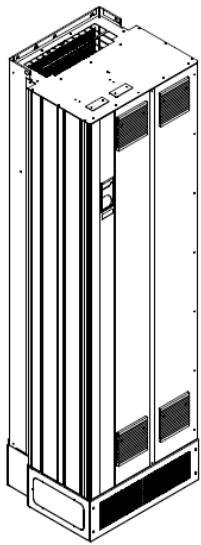


SIZE		230	270	300	350	380	420
Length	mm	420	420	420	420	420	420
Depth	mm	378	378	378	378	378	378
Height	mm	1100	1100	1100	1100	1100	1100
Operating weight	kg	125	125	125	125	125	125

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional inverter

SIZE 450

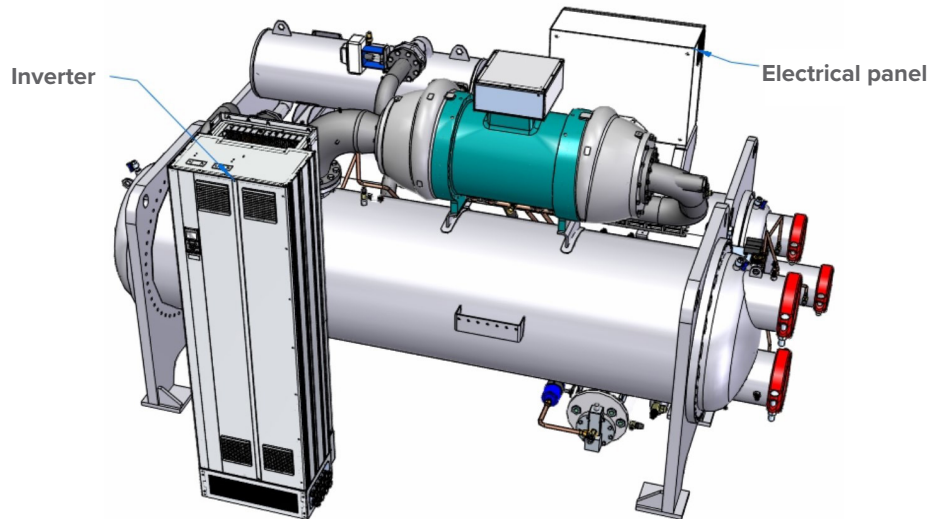


SIZE		450
Length	mm	602
Depth	mm	514
Height	mm	2043
Operating weight	kg	300

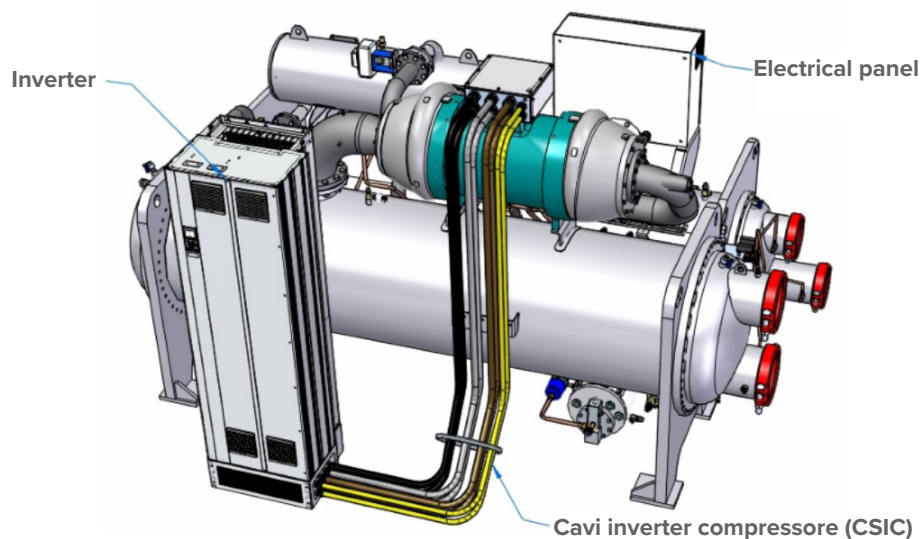
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

The WCH-iZ centrifugal chillers are supplied complete with the refrigerant gas charge and are composed of the unit and inverter supplied separately. The inverter must be positioned at a maximum distance of 10 meters from the unit (cable length). Consult the installation and owner's manual for sizing the connection cables.

Clivet recommends positioning the inverter as shown in the following figure

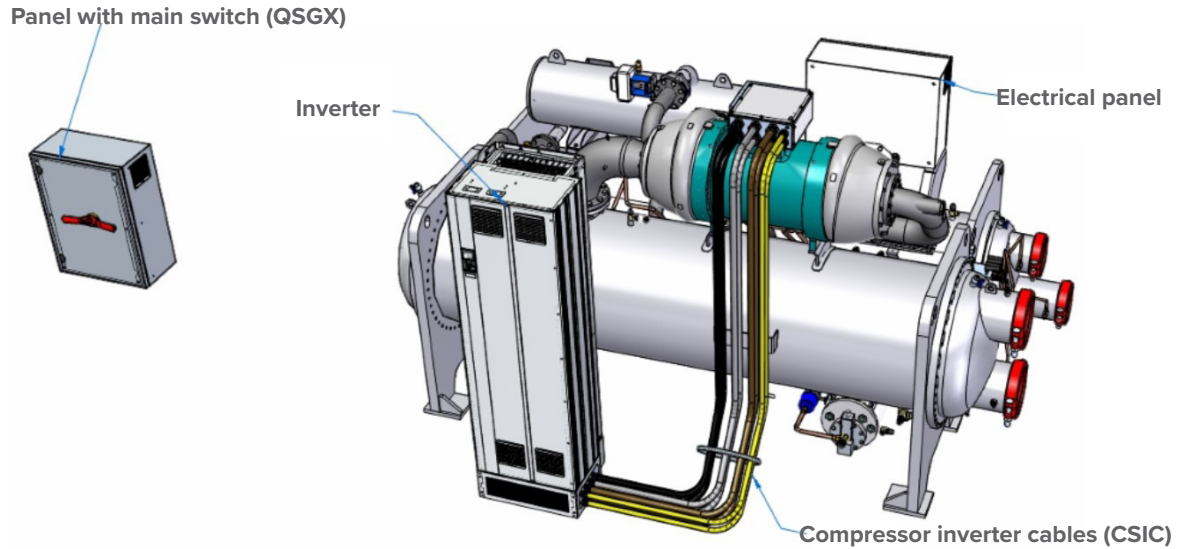


Clivet can supply a cable kit for the connection between inverter and compressor. The cables are shielded, 4.5 meters long (CSIC option). The cables are sent already connected to the terminals in the electrical termination box of the compressor. The connection to the inverter must be made on site after its placement, by the Customer.



Installation

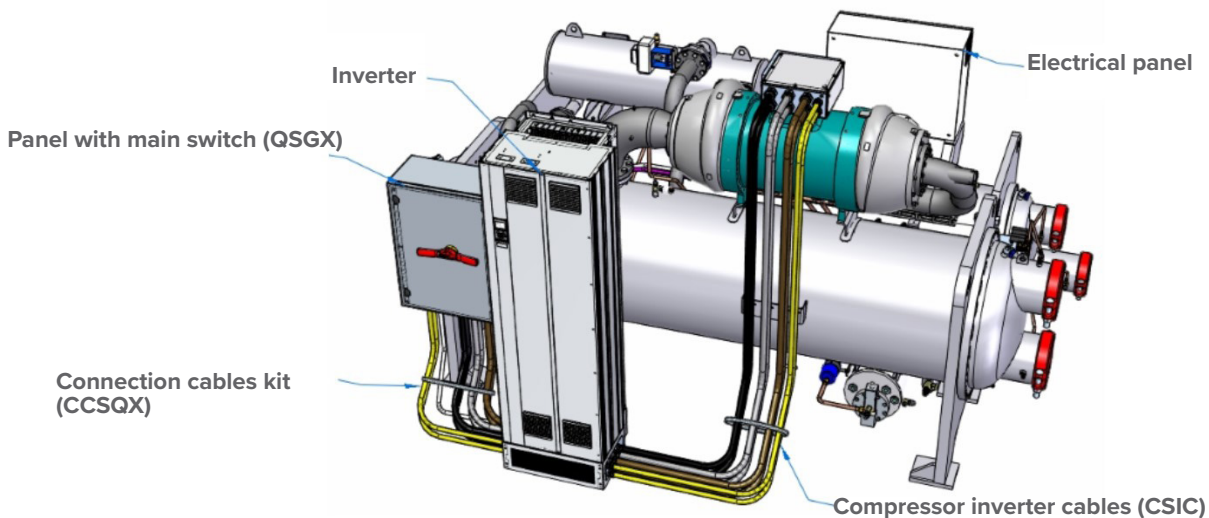
Since the inverter chiller unit consists of two separate power supplies (on-board electrical panel and inverter), it is necessary to provide a main switch to allow the interruption of the power supply to the whole system. Clivet can provide an electrical panel with main switch specially designed according to the power consumption of the unit. This panel is supplied separately and must be installed on site by the Customer.



If QSGX option is selected (Panel with main switch), Clivet can supply a cable kit for connecting the main switch to the inverter and to the unit electrical panel (option CCSQX).

The cables are specially designed according to the absorption characteristics of the electrical panel and the inverters, are equipped with terminals and are of sufficient length to allow the positioning of main switch at the side of the inverter as shown in the following figure.

The connection cables kit also includes a steel support for positioning the main switch.

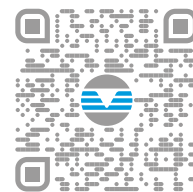


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