

Sustainable Comfort

TWM-4[®] Series

Water-cooled Magnetic Levitation Oil Free Chiller

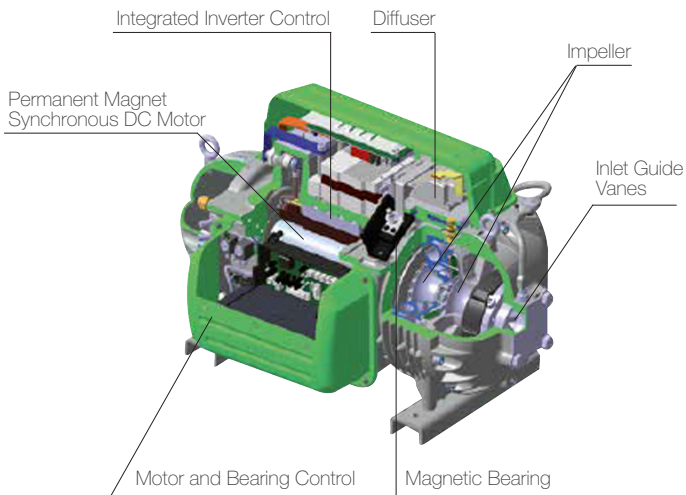
TWM-4 Series
1055-2461kW(300-700RT)



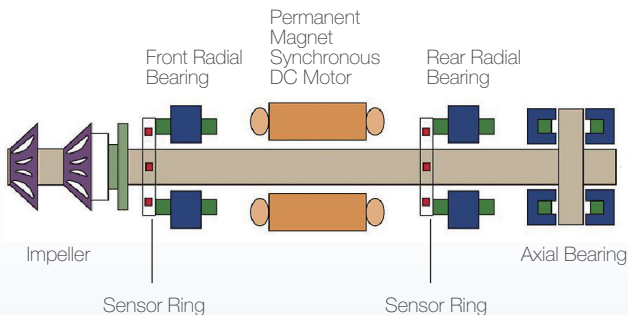
Water-cooled Magnetic Levitation Oil Free Chiller

Features and Benefits

Magnetic Levitation Oil-free Centrifugal Compressor



- Inverter driven high-efficiency magnetic levitation oil-free compressor: the compressor is designed with aerodynamic optimized two-stage centrifugal and magnetic levitation technology, high performance pulse width modulator (PWM), automatic regulation of rotation speed, which promise optimal operation and high-efficiency under both full load and part load operation.



- A significant improvement(15%) in the heat exchange can be achieved by magnetic levitation technology without oil lubrication system, contact friction and the thermal resistance caused by oil film. The reliability of unit is remarkably improved in the meanwhile and makes service convenient.
- With build-in inverter, which enables variable motor speed of compressor under part load condition, the units are able to operate effectively and with lower power consumption. Soft start-up function makes the starting current of unit low to 2A, therefore to reduce impulse on power network and decrease thermal stress of motor stator.

- Liquid refrigerant spray cooling promises stable operation of motor.
- The rotor and impeller of compressor are suspended in the magnetic field when operation. The sensor ring under the bearing keep sending real-time data to the bearing control system and adjust the position of shaft immediately to maintain its optimal running condition.
- The compressor operates without any oil, allowing its stable and low-noise operation. Furthermore, the whole system of the unit is greatly simplified because of eliminating oil system, which remarkably saves the cost of operation and maintenance.

Super-low Noise and Vibration

- High speed of compressor running, while with no mechanical contact of bearing, enables super-low noise and vibration of compressor under both part load and full load.

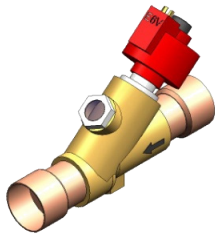


High-efficiency Evaporator and Condenser

- Patented Hybrid Counter-Flow Spray evaporator is an improved type of falling film evaporator, which overcomes the shortcomings of large refrigerant charge capacity of the flooded evaporator and unstable working conditions of the traditional falling film evaporator, and maintains the advantages of small falling film refrigerant charge, high heat exchange efficiency and stable operation of the flooded evaporator under variable working conditions.
- The condenser with special flow channel design has high heat transfer coefficient, low condensing temperature and reduced water pressure drop.
- Single circuit design for multiple compressors system improves unit part load efficiency.

Electronic Expansion Valve (EXV)

- The electronic valve is adopted to grant the ideal operation of the evaporator in all conditions.
- The fast processing of the acquired data allows a quick, fluctuation-free regulation, and therefore a highly accurate adjustment to the swings of load and ambient conditions.



Energy Conservation and Environment Protection

- Environment friendly refrigerant of HFO1234ze is adopted with ODP=0 and Ultra low GWP.
- Optimized refrigerant system for better energy saving, lower CO₂ emission and higher operation efficiency.

Stability and Reliability

- In the case of power outage, the motor becomes a generator which feeds power to the various controls and bearing actuators then until the rotor de-levitates onto the touch-down bearings.
- The design, manufacturing and test of the unit are strictly complied with AHRI、EN、UNI、JIS and GB/T18430.1 standards.
- The protection level of enclosure conforms to GB4208-2008(China GB).
- The electric system is designed according to IEC60204-1/GB5226.1 and the system meets with EMC specification.
- Performance test of the unit shall be strictly conducted before ex-work to ensure operation stability.

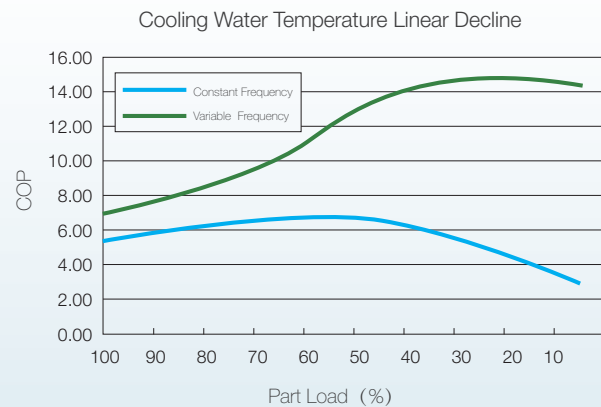
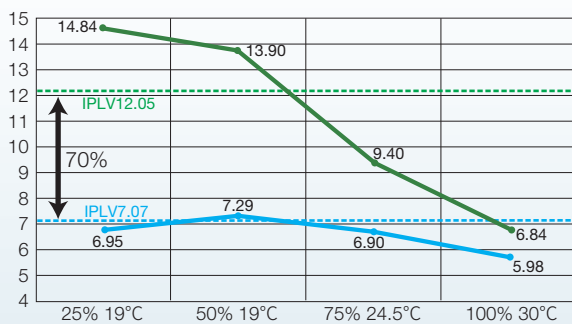
Easy Installation

- Vertically arrangement of compressor, condenser and evaporator enables compact design of the unit and small footprint.
- Refrigerant charge, commissioning and test have been done before ex-factory.
- Water pipe connection and power supply are the only work need to do on site before operation.

Excellent Part Load Performance

TWM-4 is brought in by Climaveneta with extremely outstanding performance in the chiller industry. With magnetic levitation compressor, variable frequency inverter control and oil free lubrication system, the unit has boosted with 70% of IPLV to compare with traditional chiller and less service cost.

In the transition period, the cooling water temperature decline results in additional energy saving of the unit.



Water-cooled Magnetic Levitation Oil Free Chiller

Excellent Integrated part load value

Increasingly closer attention is being paid towards the power consumption of air-conditioning equipments.

In air-conditioning systems, the chiller only works in full load for a few hours per year. For this reason, "season efficiency" is the truly determining consumption factor.

The valuation indices have been adopted that consider usage in part load conditions as IPLV in the United States and China.

IPLV(@AHRI) up to 12.23

IPLV (AHRI)

$$\text{IPLV} = 0.01 \times A + 0.42 \times B + 0.45 \times C + 0.12 \times D$$

Evaporator leaving at 6.7 °C (constant), condenser water (inlet) at 29.4 °C (100% load—A), 23.9 °C (75% load—B), 18.3 °C (50% load—C), 18.3 °C (25% load—D).

IPLV (China GB)

$$\text{IPLV} = 0.023 \times A + 0.415 \times B + 0.461 \times C + 0.101 \times D$$

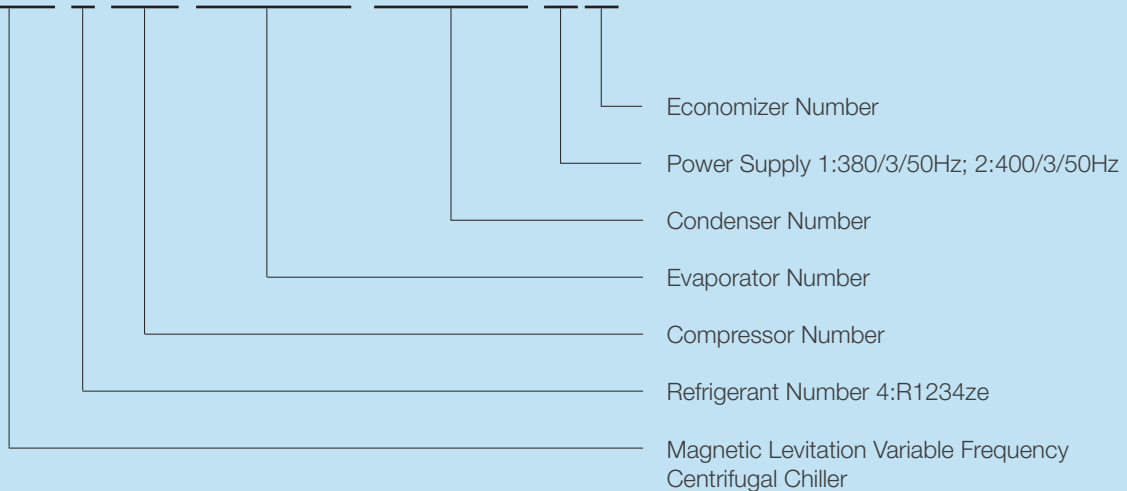
Evaporator leaving at 7 °C (constant), condenser water (inlet) at 30 °C (100% load—A), 26 °C (75% load—B), 23 °C (50% load—C), 19 °C (25% load—D).

According GB19577-2015 Standard: TWM-4 Whole Series Energy

First Class Efficiency

Nomenclature

TWM-4-TL4-EF26AQ1-CZ26AQ1-2-E



ALL-ROUND SUSTAINABILITY



TWM-4 is the result of CLIMAVENETA Systems' extensive approach to sustainability.

Achieving outstanding performance and ensuring long-term sustainability are challenges that modern HVAC systems need to tackle.

Increasing concerns about the global warming impact of chillers and heat pumps is driving new regulatory policies

to push towards even more efficient units with the lowest carbon footprint.

Today, an all-round approach is the only way to effectively reduce the Total Equivalent Warming Impact (TEWI).

Fully committed to support the creation of a greener tomorrow, CLIMAVENETA Systems designed TWM-4, a complete chiller range optimized for HFO refrigerant R1234ze, with nearly zero environmental impact.

Combining brilliant annual efficiency with the use of a low GWP refrigerant, TWM-4 tackles both the indirect (due to the primary energy consumption) and the direct global warming impact, thus resulting the perfect choice for any new, forward-looking cooling system.

The environmental impact of the refrigerants is measured by two parameters:

ODP: Ozone Depletion Potential

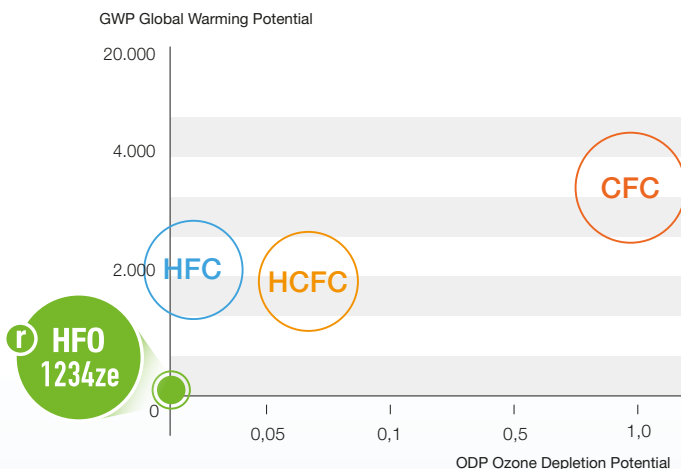
GWP: Global Warming Potential

While in the past the focus was on reducing ODP values to 0, new regulations encourage Member States to work harder on GWP.

The path to a greener world

Starting from the 70s, several international agreements have been made to drive the industry towards eco-friendly refrigerants.

The last crucial step was taken in 2016, when the Kigali Amendment to the Montreal Protocol was passed, paving the way for the global phasedown of HFCs.



1977 World Plan of Action on the Ozone Layer

1987 Montreal Protocol

1997 Kyoto Protocol

2006 EU F-gas regulation

2016 Kigali Amendment to The Montreal Protocol

Water-cooled Magnetic Levitation Oil Free Chiller

Advanced W3000 Touch Control System

The brand-new W3000 touch control system features friendly user interface, excellent control, strong expansion ability and compatibility.

Color LCD Display

The touch screen is embedded in the unit for convenient operation and well protection. The automatic control by the computer realizes unattended operation.

TFT LCD touch screen can display data and parameter adjustment in various languages and menus. According to the tradition of Climaveneta, the status and parameters of the compressor are visually displayed individually to make sure the operating status clear at a glance.



W3000 Touch Control System

Unit Control and Operation Management

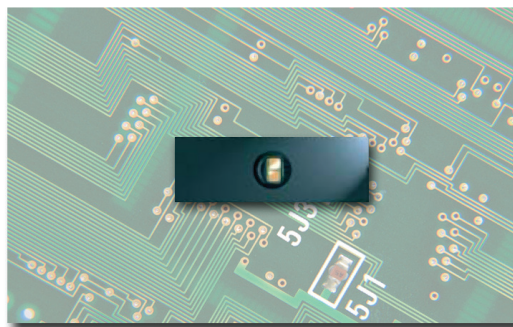
The advanced microcomputer intelligent control system of W3000 contains specially designed control algorithm of Climaveneta. It highlights the energy efficiency and reliability of the unit. The balanced running time of FIFO compressor prolongs the life of machine. The automatic adjustment of the output load makes the machine more energy saving. Combining with the load shedding system of the compressor, 25-100% stepless adjustment can be achieved and settings of the operating parameters can be adjusted, which is adaptable to different environments. The temperature and pressure protection using analog measurement can predict and prevent failure and increase reliability. Various expansion accessories are available, such as remote and group control.

Network Communication and Building Management Control

The chiller supports BMS connection and can provide MODBUS, LONWORKS, BACNET communication protocols with RS485 serial interface.

Fault Protection, Alarm and Analysis Capabilities

The microcomputer intelligent controller contains perfect functions of fault protection, alarm, recording and analysis. It has protection functions of high/low pressure switch, lack of phase, reverse phase, overload, overcurrent, overheat, exhaust temperature, water flow, frost and so on. The controller also achieves fault recording and alarm display. The unique "Black Box" fault recording and analyzing system can record 400 failures and more than 200 field data before each failure. It can diagnose and remove faults rapidly to improve the technical support ability. By connecting to the Climaveneta remote service program, it can find potential failures before they occur and take proper preventive treatments.



Patented Black Box

Technological Choices (Options)

Fast Restart

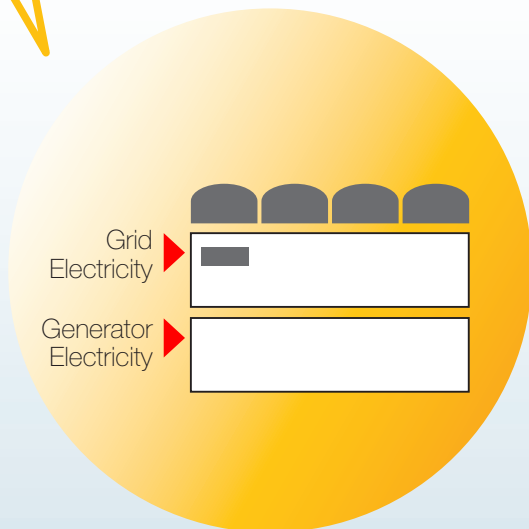
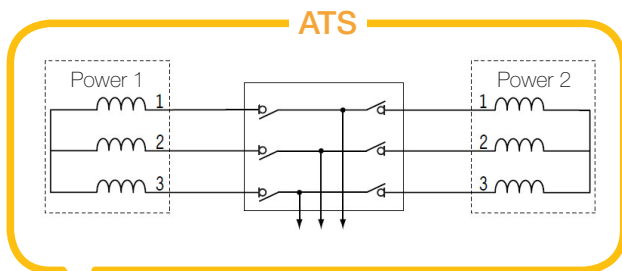
The management of fast restart allows to minimize downtime in case of power failure, through accelerating software selfdiagnose time, water pump start delay, pre-condensing time and compressor start time, meanwhile keeping all the necessary unit safety.

This option requires an external UPS power supply provided by customer.



Double Power Supply

This accessory entails the substitution of two separate power supply with ATS.

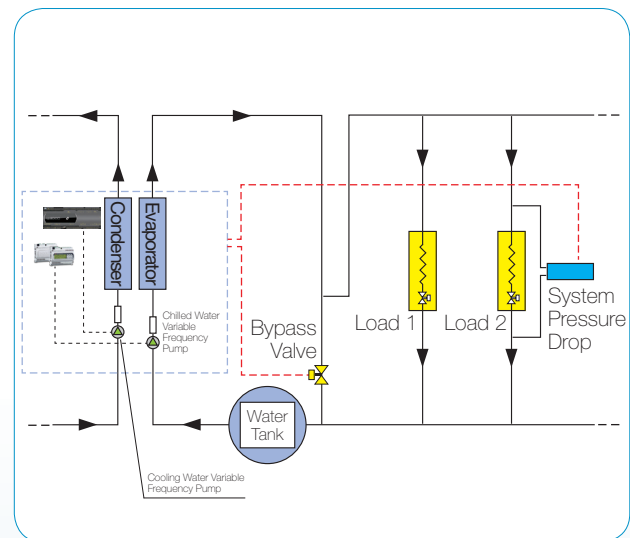


Chilled Water Variable Flow Control



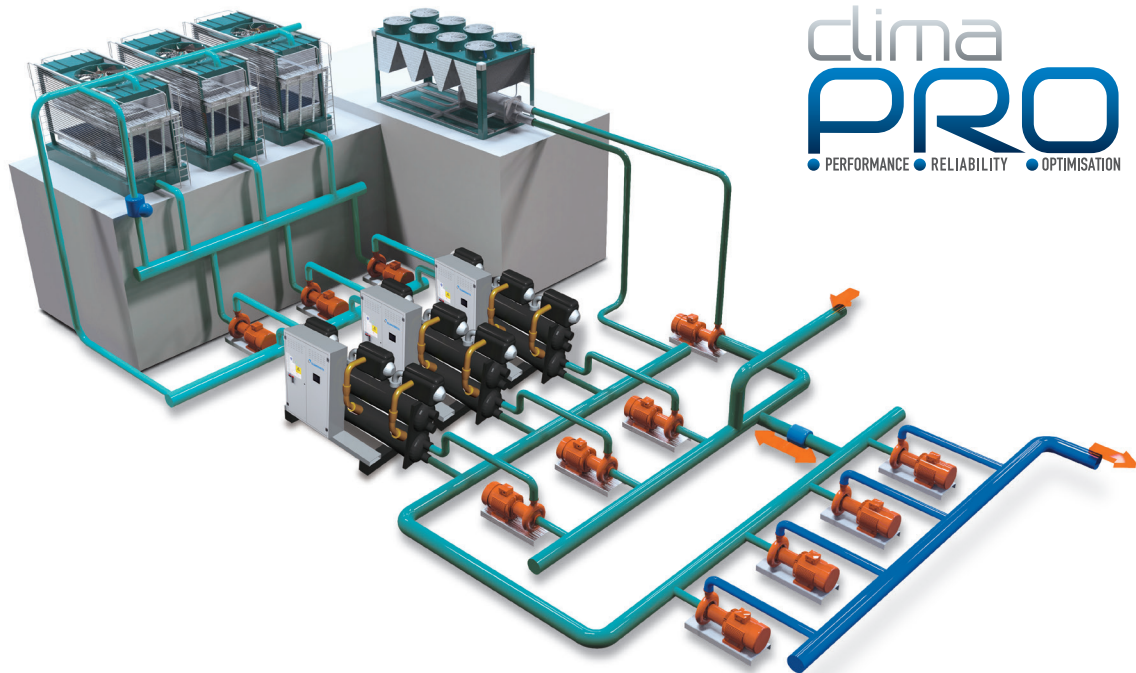
Extended module of variable flow control function enables chilled water variable frequency pump and pipe valve on-off control.

The control of chilled water side variable frequency pump, according to terminal side load, ensures lowest pump consumption.



Water-cooled Magnetic Levitation Oil Free Chiller

ClimaPRO Plant Room Optimization Group Control System (Option)



Microprocessor Control Features

Microprocessor	W3000	Microprocessor	W3000
Remote on/off with external volt-free contact	√	Energy limit function	OPT
Multi-language menu	√	Manual control	√
Phase sequence relay	√	ModBus communication protocol	OPT
Cumulative fault alarm	√	BACnet communication protocol	OPT
Alarms code function	√	LonWorks communication protocol	OPT
"BLACK BOX" alarm events record	√	Pump control	OPT
Self-test when power on	√	Backup pump control	OPT
Daily/weekly programming control	Par.	Water temp. regulation by external signal (4-20mA)	OPT
Evaporator inlet/outlet water temp. display	√	Remote relay control	OPT
Compressor/unit alarms display	√	Local/remote network monitor (FWS)	OPT
General unit alarms display	√	Remote secondary temp. control	OPT
Entering water temp. ratio control	√	Set-point regulation from external signal (0-5V)	OPT
Start/stop operating timer	Par.	Compressor run-timer, time balance & FIFO	√
Double set-point timer	Par.	Compressor start scheduling	√
"Pump-Down" when stopped	√		

√ Standard OPT available on request Par. available by modifying a value of the configuration parameters

Technical Parameters

Model	Cooling capacity		Power Input	FullLoad COP	IPLV	FullLoad Current	Evaporator		Condenser		Refrigerant Charge	Electric Parameters		
	RT	kW					Flow Rate	Pressure Drop	Flow Rate	Pressure Drop		F.L.I	FLA	S.A
TWM4-TL3-EG35AQ2-CF35AQ2-E	300	1055	155.1	6.80	11.38	248.1	45.4	36.0	55.9	51.5	250	300	510	2
TWM4-TL3-EH40AQ2-CG40AQ2-E	350	1231	181.9	6.77	11.80	290.8	52.9	34.4	65.3	49.2	310	300	510	2
TWM4-TL4-EF26AQ1-CZ26AQ1-E	400	1406	204.7	6.87	11.49	327.4	60.5	20.5	74.5	26.7	290	400	680	2
TWM4-TL4-EF35AQ1-CZ35AQ1-E	450	1582	230.9	6.85	11.84	369.3	68.0	35.0	83.8	45.6	350	400	680	2
TWM4-TL4-EH35AQ1-CF35AQ1-E	500	1758	256.6	6.85	12.23	410.4	75.6	22.1	93.2	31.6	440	400	680	2
TWM4-TL6-EG35AQ1-CF35BQ1-E	600	2110	307.3	6.87	11.56	491.5	90.7	48.6	111.8	54.7	420	600	1020	2
TWM4-TL6-EH35BQ1-CG35AQ1-E	700	2461	357.7	6.88	12.00	572.1	105.8	31.8	130.3	45.4	510	600	1020	2

Remarks:

- Standard Cooling Condition: Chilled water (in/out)=12.2/6.7 C ; Condenser water (in/out)=29.4/34.6 C ;
- IPLV is measured according to AHRI Standard 550/590;
- Standard water side pressure of evaporator and condenser is 1.0MPa. 1.6MPa or 2.0MPa is optional.
- F.L.I Full load power input at max admissible condition
FLA Full load current ampere at max admissible condition
Supply power 400V-3Ph-50Hz(60Hz)/or 380V-3Ph-50Hz

Range of voltage fluctuation: 10%
Range of voltage unbalance: 3%

The rated power and current are based on the rated working condition. The maximum data is the theoretical limit value. When making wiring and power distribution, the data in the table are as reference. The energy limit function shall be selected as option while the power supply is insufficient.



Global Headquarter

Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A.
36061 BASSANO DEL GRAPPA (VICENZA) ITALIA - VIA SARSON 57/C
TEL: +39 / 0424 509 500 (r.a.) FAX: +39 / 0424 509 509
E-mail: <https://www.melcohit.com>

Asia Pacific Headquarter

Climaveneta Chat Union Refrigeration Equipment (Shanghai) CO., LTD
NO. 88 BAIYUN ROAD XINGHUO DEVELOPING ZONE, SHANGHAI, CHINA
TEL: +86-21-57505566 FAX: +86-21-57505797
E-mail: <http://www.climaveneta.com.cn>

Hongkong Branch

ROOM 2003, CCT TELECOM BUILDING, 11 WO SHING STREET, FOTAN, SHATIN, N.T., HONGKONG
TEL: +852-26871755 FAX: +85-2-26873078
Website: <https://www.jinchat.com>

Vietnam Branch

6th floor, Room 6.6B, Etown 2, 364 Cong Hoa, Ward 13, Tan Binh Dist, Ho Chi Minh, Vietnam
TEL: 08-6262-9966 Fax: 08-6262-9977
Website: <https://www.climaveneta.com.cn>

Malaysia Branch

A-4-3, GARDEN SHOPPE ONE CITY, JALAN USJ 25/1, 47650 SUBANG JAYA, SELANGOR DARUL EHSAN
TEL: +603 8081 8558 FAX: +603 8081 9558
Website: <https://www.jinchat.com>

Myanmar Branch

ROOM 501, 5TH FLOOR, SALOMON BUSINESS CENTER, NO 244/A, U WISARA ROAD, BAHAN TOWNSHIP, YANGON
Tel: +951535098 Ext: 501
Website: <https://www.climaveneta.com.cn>