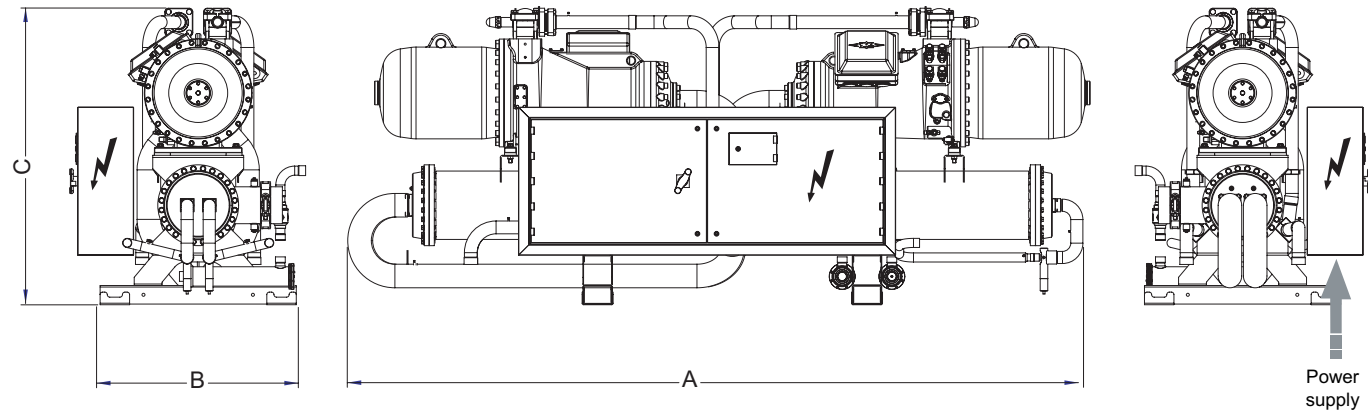


### Spazio minimo operativo e pesi



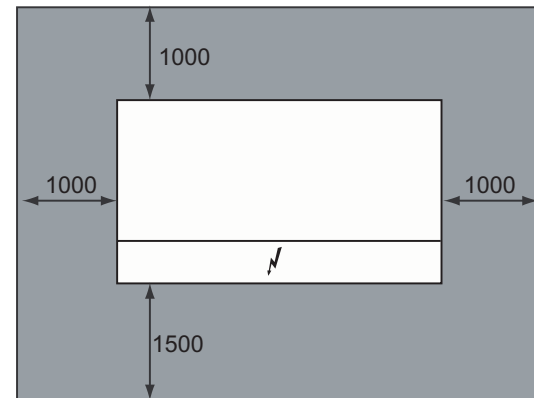
Model	360.1	420.1	480.1	540.1	600.1	710.2	820.2	950.2	1100.2	1200.2	UM
Shipping weight	1487	2022	2061	2112	2297	2709	3788	3806	3971	4051	kg
Operating weight	1593	2187	2220	2265	2567	2909	4141	4149	4296	4366	kg
A	1100	1100	1100	1100	1100	1350	1350	1350	1350	1350	mm
B	1600	1600	1600	1600	1600	1850	2000	2000	2000	2000	mm
C	3900	3900	3900	3900	3900	4400	4400	4400	4400	4400	mm
IN - OUT EVAP.	DN125	DN150	DN150	DN150	DN200	DN150	DN200	DN200	DN200	DN200	VICTAULIC

### Minimum space required for operation

Refer to the figure alongside for the dimensions of the unit. To correctly install the unit, comply with the measurements for the free area that must be left around the machine, as shown in the figure.

**NOTE:** Allow for a clear area of not less than 1 meter above unit.

The functional areas must be doubled if multiple units are installed.

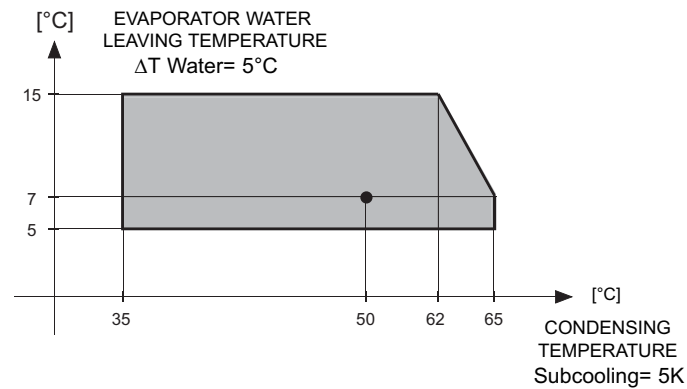


### Operating limits

The graph gives the operating ranges within which correct operation of the units is guaranteed.

Use of the units in conditions differing from those indicated will void the warranty with which the product is supplied.

The limit values of the thermal gradient of the water in the unit are given below.



Water thermal gradient*		EVAPORATOR
Minimum	°C	4
Maximum	°C	8

\* : Verify that water flow rate is inside the limits.

The manufacturer declines all responsibility for any inaccuracies in this manual due to printing or typing errors. The manufacturer reserves the right to modify the products contents in this catalogue without previous notice.

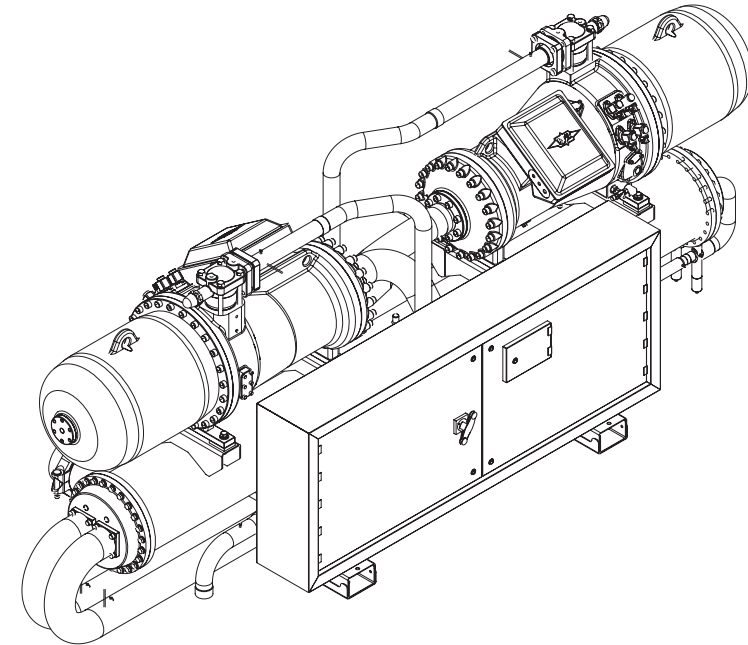
## WATER CHILLERS WITH SCREW COMPRESSORS WITHOUT CONDENSERS

### 360.1 ÷ 1200.2

Code: BTP00378

Revision: 00

Data: 09/12/08



## SERIES RVW WITHOUT CONDENSERS

### PRESENTATION OF UNIT

This new series of water chillers (condenserless) is based on **10 models** with cooling capacity from **314 to 1048 kW** and has been designed to meet the demands of global markets in the medium-big power industrial and commercial plants.

Units are compact and highly configurable built to fit different types of plants so to meet the needs of highly qualified engineers.

The units are suitable for indoor installation and, as standard, are equipped with bearing structure made of adequately thick coated and galvanized sheet metal where are fastened the the evaporator, the electrical panel and the compressors. This layout allows an uniform weight distribution and an easy maintenance. The basement of the unit is designed and made to allow an easy and quick handling of the unit in order to minimise the cost for installation.

All fastening components are made of stainless and/or galvanized steel.

When the units were designed, particular attention was also paid to sound emission in our endeavour

to comply with the increasingly more restrictive laws governing acoustic pollution. To reduce the noise emission the units can be equipped with an acoustic box for the compressors: this device allows a noise reduction of 4-5 dB.

The units can produce cold water from 5 to 23°C. They can be equipped with 1 or 2 independent refrigerant circuits, each of which has a semi-hermetic **TWINSREW** compressor featuring a 25 to 100% control capacity device. They are equipped with an asynchronous three-phase motor (400V-3-50Hz) with aluminium squirrel-cage rotor, pre-engineered for part-winding or star-delta starting (so as to reduce the current input during the starting phase to the minimum) and are protected by a chain of thermistors buried in the stator windings (controlled by an electronic module with the function to prevent the reverse rotation of the single compressors) and fuses housed in the electric panel. The standard outfit includes an efficient oil separator complete with electric heater (activated when the compressor stops). To widen

the field of application to an even greater extent, some models are equipped with a liquid injection system controlled by the electronic controller so that use only occurs when effectively necessary.

As part of the standard supply, they are positioned on rubber vibration dampers to reduce the vibrations transmitted to the base of the unit.

As standard, the evaporator is insulated with 10mm flexible closed-cell foam that forms barrier to prevent the formation of condensation and heat exchanges towards the outside. Standard supply also includes a differential water pressure switch built into the water supply circuit to avoid the risk of freezing if the water flow is shut off for some reason and as standard is equipped with VICTAULIC water connections. The evaporator is fed by an electronic expansion valve that allows the exploitation of the evaporator

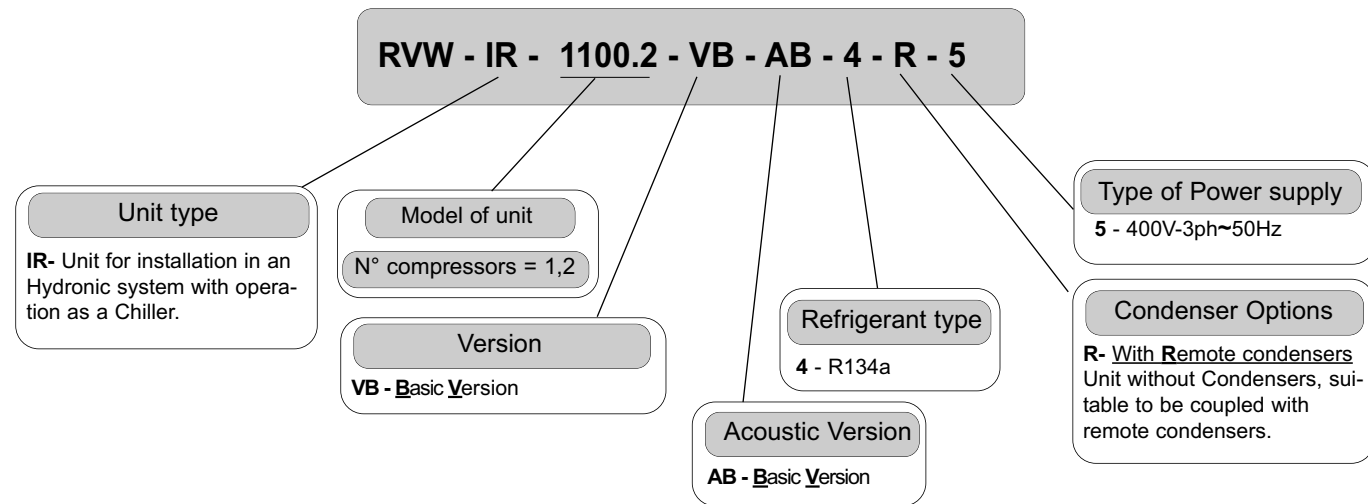
surface thus increasing the efficiency of the system in all working conditions (25 to 100% for single compressor units, 13 to 100% for double compressors units) so achieving the optimal seasonal energy efficiency.

As standard, the units are equipped with electric panel for setting and controls with a door-locking main circuit-breaker, controller with micro-processor plus LCD with 4 lines of 20 characters, refrigerant circuit made with copper pipes, complete with low and high pressure switch (automatic and manual reset), safety valves (according to PED), Dehydrator filter with replaceable core, discharge and liquid shutoff valves, low and high pressure transducers, compressor oil, charge of NITROGEN (in order to avoid entrance of air into the refrigerant circuit), Discharge and Liquid shut-off valves. Copper Pipe connections (discharge and liquid) lines.

All the units are accurately built and tested individually.

All units can be equipped with a larger series of accessories or options described in the following pages.

## Code identification



## Monitoring system

### The main functions of the monitoring system are:

Temperature regulation of the water produced by the unit, operating hour counting for compressors and pump/s, operating hour, balancing for compressors and pumps, start-up timing, parameter entry digitized via the keyboard, alarm diagnosis.

**Functions associated with the digital inputs:** low and high pressure, high discharge temperature, correct electric power phase presence-sequence, thermal protection for compressors, thermal protection for pump, differential water pressure switch, remote controlled ON/OFF commands, switching mode (summer-winter)

**Functions associated with the digital outputs:** compressor control, solenoid valves for compressor control capacity, liquid injection solenoid valve control, water pump/s control, electric antifreeze heater (accessory), general alarm (can be remote controlled).

**Functions associated with the analog inputs:** evaporator water inlet and outlet temperatures, condenser water outlet temperature (only for IW units) discharge temperature.

Suction and discharge pressure, discharge temperature probe

**Functions associated with the analog outputs:** 4-20 mA to manage 3 way valves for condensing pressure control

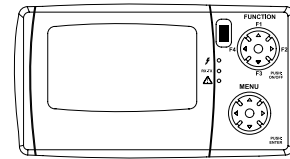
### Moreover the controller allows

- Alarm history (max 50m alarms managed with FIFO logic)
- Time scheduling (daily and weekly)
- Precise control of the water leaving temperature
- Prevention of the block of the unit: In case of critical conditions the machine does not stop but is able to regulate itself and provide the maximum power that can be generated in those conditions with the compressors working inside the admissible limits.

Demand Limit by Digital Input and/or by Analog Input (4-20mA)

Dinamic Setpoint by Analog Input (4-20mA): for instance by an outdoor temperature probe for the climate control

Second Set Point by Digital Input  
Connection to BMS (supervision systems) through serial port RS 485 and MODBUS protocol



## Accessories and options

**NOTE:** The accessories can be of the following type:

**(M):** only installed in the factory.

**(F):** supplied for installation by the customer.

**CC (F):** Compressor Soundproofing Box It is made of hot galvanised steel sheet of adequate thickness, with internal acoustic insulation, and externally painted with polyester powders able to resist the atmospheric agents over time.

**MAP (F) Storage and Pumping Module** (Storage on the Delivery or Storage on Return). The purpose of the storage and pumping module is to lower the number of compressor surges, increasing the amount of water in the system and, thus, its thermal inertia. It consists of a base made of galvanized and painted sheet metal and aluminium sheet panelling suitable for outdoor installation.

Designed for connection alongside the chiller, the accessory comprises an insulated carbon steel tank, a single or double centrifugal pump with on-off valves, an electric power panel, expansion tank, safety valve, air vent, pressure gauge and filling and draining valves.

**RAG (M) Antifreeze heating element** for Pumping Module Water tank.

**FLS (M) Evaporator Water paddle** flow switch.

**RAG (M) Antifreeze Electrical Heater element** for Evaporator.

**GM (M) Pressure gauge unit.** This consists of low pressure gauges and high pressure gauges (one low and one high pressure gauge for each circuit).

**AVG (F) Rubber vibration dampers.** Consisting of 4 rubber vibration dampers, they reduce the mechanical vibrations generated by the compressor during their normal operation, that are then transmitted to the bearing surface of the machine. The insulation degree provided by the vibration dampers is about 90%.

**RB(M) Compressor suction shut-off valve.**

**IEM (M): High thickness evaporator insulation** with 19mm flexible closed cell foam.

**RC – Remote Condensers.** It is possible to supply several types of remote condensers following different project specification as for instance different noise levels, coils with coated or copper fins, ecc. For major details contact our sales office.

**CR (F) Remote Control.** Repeats the functions of the control system installed in the unit, thus allowing this latter to be controlled at a distance (up to 100 m) from the unit.

**CSF (M) Voltage monitor and sequence meter.** The device enables control of the correct sequence of power phases and the lack of any phases. It also ensures that the unit works within  $\pm 10\%$  the rated voltage (MIN=360 V - RATED=400V - MAX=440V).

It blocks the unit if the voltage is outside the limits provided for the condensation pressure inside the correct operating limits.

**INT (M) RS485 Serial interface,** for communication with the MOD-BUS protocol.

**OP (F) Programmer Clock,** applied to the remote ON/OFF function.

### Electrical options

For power supply voltage different from 400V-3ph~50Hz contact our Sales Office.

## Common specification

Mod.	360.1	420.1	480.1	540.1	600.1	710.2	820.2	950.2	1100.2	1200.2	UM
Power supply	400 $\pm$ 10% - 3 - 50										V - ph - Hz
Refrigerant	R134a										Type
Refrigerant circuits	1					2					N°
Control capacity	25 + 100					13 + 100					%

## Technical data

COOLING MODE											
Cooling capacity <sup>(1)</sup>	314	361	423	475	524	627	723	846	950	1048	kW
Compressor power input <sup>(1)</sup>	90.4	103	121	137	151	181	207	243	274	301	kW
EER	3.47	3.50	3.48	3.47	3.48	3.46	3.50	3.48	3.47	3.48	W/W
ESEER	4.02	4.06	4.05	4.06	4.09	4.09	4.15	4.13	4.14	4.16	W/W
Evaporator Water flow rate <sup>(1)</sup>	15.0	17.3	20.2	22.7	25.0	30.0	34.5	40.4	45.4	50.1	l/s
Evaporator Water pressure drop <sup>(1)</sup>	46	44	55	43	54	52	45	57	59	45	kPa

## Compressor specifications

Type	TWINSCREW / 25 - 100 %										-		
Starting mode	PW	STAR-DELTA					PW	STAR-DELTA					-
Quantity	1					2					N°		

## Evaporator specifications

Type	Shell and tube										Tipo
Quantity	1										N°
Maximum pressure H <sub>2</sub> O	1000										kPa
Maximum operating pressure	1650										kPa
Water capacity	106	165	159	153	270	200	353	343	325	315	dm <sup>3</sup>

## Electrical specifications

Model	360.1	420.1	480.1	540.1	600.1	710.2	820.2	950.2	1100.2	1200.2	UM
FLA Maximum power input	211	232	270	309	340	422	464	540	618	680	A
FLI Maximum Power Input	129	144	169	190	209	257	287	339	380	418	kW
MIC Maximum surge current	665	436	465	586	650	876	668	735	895	990	A

## Noise level<sup>(2)</sup>

SWL Sound power level	97	98	98	98	98	99	100	100	100	100	dB(A)
SWL Sound power level with CC	92	93	93	94	94	94	95	95	96	96	dB(A)
SPL Sound pressure at 1 meter	79	80	80	80	80	80	81	81	81	81	dB(A)
SPL Sound pressure at 1 meter with CC	74	75	75	76	76	75	76	76	77	77	dB(A)

(1): **Cooling Mode** The data refer to: Evaporator Water temperature: inlet: 12°C - outlet: 7°C, Condensing temperature= 50°C, Subcooling = 5K.

(2) The noise levels refer to units operating in cooling mode at the nominal condition.

CC Compressor Soundproofing Box

SWL = Sound power levels, with reference to 2x10<sup>-12</sup> W.

The **Total** sound power level in **dB(A)** measured in compliance with **ISO 9614** standards, is according to the **Eurovent** certification program and exclusively refers to the **Total Sound Power** in **dB(A)**, which is therefore the only binding acoustic specification (the values of the Octave bands in the table are indicative).

SPL = Sound pressure levels, with reference to 2x10<sup>-5</sup> Pa.

The sound pressure levels are values calculated by applying the **ISO-3744 relation (Eurovent 8/1)** and refer to a distance of 1 meter away from the external surface of units operating in the open field with directivity factor 2 and the units operating in nominal conditions in the cooling mode.