

# technical catalogue

**zeta 2002 fc**

**36÷256 KW**

Water chillers Free-Cooling  
Air/water self-contained

**BLUE**  **BOX**  
A I R W I T H C A R E

# ZETA 2002 FREE COOLING - Water chiller

Air-cooled water chillers with hermetic scroll compressor and plate evaporator. The units feature a refrigerant circuit for each pair of compressors.

## UNIT FRAME

load-bearing frame with removable panels clad internally with expanded polyurethane soundproofing material; constructed in galvanized sheet steel coated with RAL 5014 powder paint baked at 180 °C to provide a durable weathproof finish. Threaded fasteners in stainless steel.

## COMPRESSORS

hermetic scroll type with orbital motion, connected in tandem and equipped with oil level sight glass, Klixon internal thermal protection and oil equalisation line.

The compressors are housed in a sound insulated compartment and separated from the air flow; access is provided by removable panels which allow maintenance work to be performed in safety even when the unit is in operation.

## CONDENSER

Composed of a high efficiency coil with interpenetrant rows, copper tubes and aluminium fins. The tube core is protected by a metal grille which is installed as part of the standard outfit.

## FAN UNITS

A xial fans directly coupled to a 6 pole motor with internal Klixon overload protection. Motor protection category is IP 54. The fan is equipped with a safety grille to UNI EN 294.

## EVAPORATOR

Brazed plate type in 316 AISI stainless steel. Thermal insulation is provided by closed cell expanded material. Each evaporator is equipped with a low water temperature probe for the frost protection system and each unit is equipped with a mechanical flow switch as part of the standard outfit.

## REFRIGERANT CIRCUIT

Includes: liquid cock, liquid receiver, charging connection, sight glass, filter/dryer, solenoid valve on liquid line, thermostatic expansion valve equipped with external pressure equalisation.

The high and low pressure values and relative condensation and evaporation temperatures are detected by pressure transducers that relay the signals to the controller so that they can be read directly on the display. The high pressure side of the circuit is equipped with the high pressure switches and relief valves.

## HYDRAULIC CIRCUIT

These components include:  
expansion valve, water drain cock, relief valve.

## 3-WAY VALVE

The servo-controlled 3-way valve opens or closes the flow to the water coil

## ELECTRICAL PANEL

The electrical panel includes:

- main switch;
- thermal magnetic circuit-breakers for fans and (if present) pumps; compressor fuses for the power circuit
- compressor contactors
- fans contactors
- pumps contactors (ST version)

microprocessor for control of the following functions:

- water temperature regulation
- no-frost protection
- compressor time intervals
- compressor start sequence automatic rotation

- Free Cooling function:
  - 3-way valve control
  - fan control
- alarm messages
- alarm reset
- cumulative alarm contact for remote signalling
- operating and alarm indicator LEDs

LCD display of the following information:

- water inlet and outlet temperature
- programmed temperature set-point and differential
- alarms description
- compressor operation hour counter
- number of starts of the unit and the compressors
- high and low pressure values and relative condensation and evaporation temperature values.

Electrical power supply [V / $\phi$ /Hz]: 400/3~ /50  $\pm$  5%

### **CONTROLS AND SAFETY DEVICES**

- chilled water temperature probe (located at evaporator inlet)
- low water temperature probe at the outlet of each evaporator
- high pressure switch (manual reset)
- low pressure switch (manual reset managed by controller)
- high pressure relief valve
- compressors overtemperature protection
- fans overtemperature protection
- mechanical flow switch supplied as standard on all units.
- Condensation control via SCS (Split Coil System) system for operation at low temperatures

### **TESTING**

The units are factory tested and supplied complete with oil and refrigerant.

## **HYDRAULIC MODULE OPTIONS**

### **ZETA 2002 FC /ST 2PS: unit with tank and pumps.**

In addition to the components of version ZETA 2002 FC this unit includes: insulated storage tank; two pumps with one in stand-by and automatic changeover in the event of faults; check valves; gate valves, mechanical flow switch.

Version ST is available in an additional four possible configurations:

- ST 1PS : with 1 pump and tank;
- ST 2P : with 2 pumps;
- ST S : with tank;
- ST 1P : with 1 pump.

When the tank is fitted, the length of the ZETA 2002 FC /ST unit is increased by 1 metre with respect to the length of ZETA 2002/FC units; the tank is not available for units 24.4 or 26.4.

## **ACCESSORY VERSIONS**

### **ZETA 2002 FC /LN: low noise unit**

In addition to the components of version ZETA 2002/FC the low noise unit includes: galvanised sheet steel compressor compartment with full sound insulation using sound absorption material in expanded polyurethane and expanded polyurethane with an intermediate layer of high acoustic impedance material, applied to the sides of the compartment.

## REFRIGERANT CIRCUIT ACCESSORIES:

- **Dual set-point.**

With double thermostatic valves + solenoid valves. On all units two set-points can be programmed, and switching between the two is possible via the keypad or digital input; the type of selection must be specified at the time of order.

Switching of the thermostatic valves is always automatic, in accordance with the water temperature

- **Pressure gauges.**

Available for all models. Note however that the suction and discharge pressure values are read by transducers that relay the results to the controller display.

- **Compressor suction and discharge cocks.**

## HYDRAULIC CIRCUIT ACCESSORIES

- **Outlet water temperature control.**

Available for all models.

- **3-way modulating valve.**

For control of the free cooling output at low air temperatures

## ELECTRICAL ACCESSORIES

- **Serial interface:**

The serial interface is RS485 with Modbus protocol; the following optional protocols are available on request: Carel; Echelon in version RS485 or in version FTT10

- **Power factor correction  $\cos \phi \geq 0.9$  at nominal operating conditions**

- **Single volt-free contacts for function controls**

- **Set-point variable with remote signal (0-1V, 0-10V, 0-4mA, 0-20mA).**

Available on all models in the range

- **Remote user terminal (in addition to the standard terminal)**

## VARIOUS ACCESSORIES

- **Rubber antivibration mounts.**  
Available for all models in the series
- **Spring type antivibration mounts.**  
Available for models from 18.4 to 26.4
- **Timber crate packing.**
- **Pallet/skid for shipment in a container.**
- **Mesh coil guard with metallic filter.**  
Standard equipment on models from 12.2 to 26.4.
- **Anticorrosion treatment of coils for use in aggressive environments.**
- **Non-standard "RAL" paint colours.**

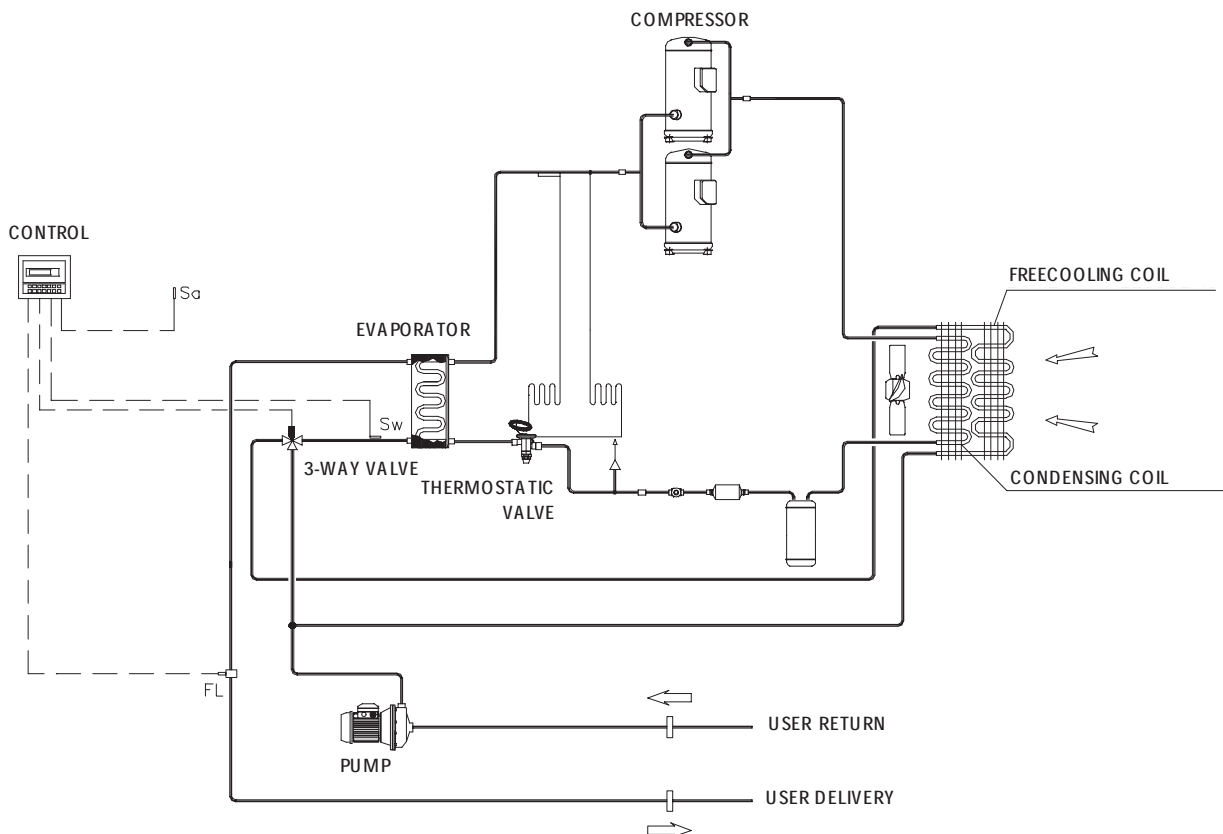
## Free Cooling by Blue Box

### ZETA 2002 Free Cooling water chiller

Blue Box FREE COOLING units have been designed to meet the increasing demands for energy saving and reduce operating costs of chiller machines that operate for extended periods in the year, at ambient temperatures below 10 °C.

With energy saving the priority, the control activates the operating mode that corresponds to readings of the temperature probes on ambient air and reference water.

In fact the Free Cooling coil is placed in series with the plate type evaporator of the cooling circuit, and a servocontrolled 3-way valve enables bypass of the same coil when its efficiency is reduced due to changes in the condition of the ambient air.



Another strong point of the Free Cooling range is the SCS (Split Coil System) control that guarantees control of condensation pressure also at low ambient air temperatures without influencing fan air flow, thereby enabling simultaneous operation of the free resource (ambient air) and that provided by the cooling cycle. This minimises the energy spent by the compression system, while guaranteeing the required load.

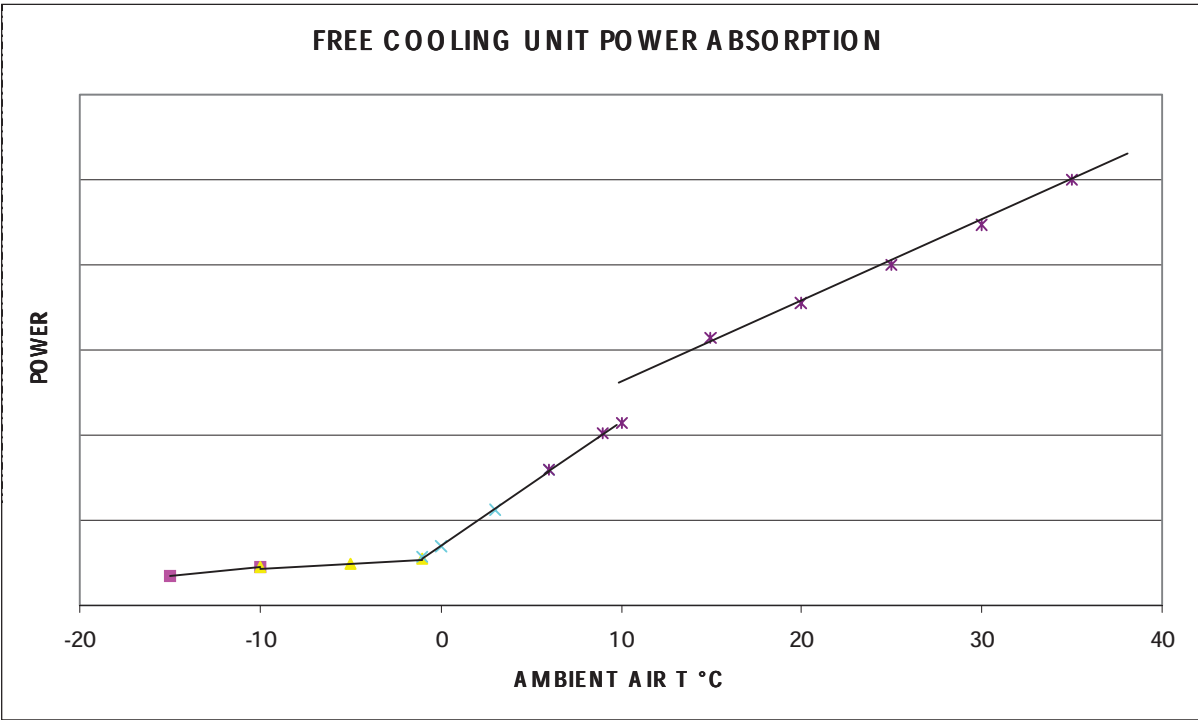
**OPERATION**

**Power absorption according to the ambient air temperature at constant cooling output**

The graph illustrates the power absorption according to the ambient air temperature while maintaining constant cooling output

When the ambient conditions allow it, the Free Cooling coil enables cooling of the secondary fluid by means of ambient air, thus reducing use of the compressors when temperatures fall.

In this way, on decrease of the ambient air temperature, the power absorption is reduced accordingly through to use of fans only.



# SERIES

The chillers in the Free Cooling ZETA 2002 FC series are available in various sizes with capacities from 38 a 256 kW in the following models:



- ZETA 2002 FC            cooling only
- ZETA 2002 FC ST      unit with tank and pumps
- ZETA 2002 FC LN      low noise unit

Model designations consist in two numbers:



## ZETA 2002 FC 18.4

Indicates the model \_\_\_\_\_ number of compressors

The model, serial number, characteristics, power supply, etc. are shown by means of decals on the unit.

		Via Enrico Mattei, 20 35028 Piove di Sacco (PD) ITALY Tel. +039.049.9716300	 1 3 7 0
condizionamento			
Modello/Model Modell/Modèle	Matricola/Seriai number Matrikel/Matricule		
Tensione-Fasi-Frequenza Voltage-Phases-Frequency Spannung-Phases-Frequenz Tension-Phases-Fréquence	Tensione circuiti ausiliari Auxiliary circuit voltage Steuerspannung Tension circuits auxiliaires		
Corrente massima assorbita Max absorbed current Maximalstromverbrauch Courant maxi absorbée	Corrente massima di spunto Max starting current Max. Anlaufstrom Courant maxi démarrage	A	A
Tipo refrigerante Refrigerant type Kältemittel Typ Type de refrigerant	IP quadro elettrico IP electrical board IP E-Schrank IP tableau électrique		
Numero circuiti refrigerante Refrigerant circuit number Anzahl des Kältemittelkreislaufes Numero circuits refrigerant	Press. massima circuito refriger. Max. Refrigerant circuit pressure Max. Druck Kältekreislauf Pression maxi circuit refrigerant	kPa bar	
Press. massima circuito idraulico Max. Hydraulic circuit pressure Max. Druck im Hydraul. Kreislauf Pression maxi circuit hydraulique	Data di produzione Manufacturing date Erstellungsdatum Date de fabrication	kPa bar	
Carica refrigerante per circuito (kg) / Refrigerant charge per circuit (kg) Kältemittelfüllung Kreislauf (kg) / Charge de refrigerant chaque circuit (kg)			
C1	C2	C3	C4

MODELLO MODELE MODEL -TYP  MATRICOLA - MATRICULE SERIAL NO. - SERIENUMMER
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	Via Enrico Mattei, 20 35028 Piove di Sacco (PD) ITALY Tel. +039.049.9716300	 1 3 7 0
condizionamento		
MODELLO - MODELE - MODEL - TYP  MATRICOLA - MATRICULE - SERIAL NO. - SERIENUMMER  REFRIGERANTE - REFRIGERANT - KÄLTEMITTEL - REFRIGERANT		

MODELLO MATRICOLA REFRIGERANTE ESECUZIONE SECONDO NORMATIVE SCHEMA ELETTRICO SCHEMA FRIGORIFERO SCHEMA IDRAULICO DISEGNO MECCANICO
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# TECHNICAL DATA

## R407C refrigerant

MODEL ZETA 2002 FC		3.2	4.2	5.2	6.2	7.2
<b>Cooling (*)</b>						
Nominal capacity	kW	36,7	43,6	50,2	59,8	66,9
Evaporator water flow rate	l/s	1,92	2,28	2,62	3,12	3,49
	l/h	6.902	8.195	9.426	11.233	12.564
Hydraulic circuit pressure drop	kPa	55,3	77,7	81,6	90,3	85,8
<b>Free Cooling (**)</b>						
Nominal capacity	kW	31,90	33,10	34,00	49,60	50,80
Pressure drop	kPa	65	91	99	102	100
Available pressure (***)	kPa	156	121	164	139	123
<b>Compressors</b>		scroll				
Quantity	n	2	2	2	2	2
Refrigerant circuits	n	1	1	1	1	1
Cooling mode input power (*)	kW	11,7	14,4	17,1	18,7	21,7
Capacity steps	%	0-50-100	0-50-100	0-50-100	0-50-100	0-50-100
<b>Condenser cooling fans</b>		axial				
Total air flow	m <sup>3</sup> /s	3,94	3,94	3,94	6,00	6,00
	m <sup>3</sup> /h	14.200	14.200	14.200	21.600	21.600
Fan motor power	n x kW	2 x 0,6	2 x 0,6	2 x 0,6	3 x 0,6	3 x 0,6
Nominal speed	RPM	860				
Motor power supply	V/Ph/Hz	230~/50				
<b>Refrigerant charge</b>						
Chiller version	kg	1 x 22	1 x 22	1 x 22	1 x 32	1 x 32
<b>Oil</b>						
Oil contents	l	2 x 3,3	2 x 3,25	2 x 3,8	1 x 4 + 1 x 3,8	2 x 4
Oil brand	Maneurop					
Oil type	160 SZ					
<b>Evaporator</b>		plate type				
Exchanger water contents	l	3,6	3,6	4,2	4,2	5,2
Water side max. working pressure	bar	30				
<b>Dimensions and weights</b>						
Length	mm	2.233	2.233	2.233	3.234	3.234
Depth	mm	1.180	1.180	1.180	1.281	1.281
Height	mm	1.740	1.740	1.740	1.740	1.740
Shipping weight	kg	819	835	845	1.102	1.120

(\*) Cooling: ambient air temperature 32 °C; water-glycol solution temperature 30% evaporator inlet/outlet 12-7 °C;

(\*\*) Free cooling: ambient air temperature 5 °C; water-glycol solution temperature 30% unit inlet 15 °C.

(\*\*\*) Valid only for units with pumps.



# TECHNICAL DATA

## R407C refrigerant

MODEL ZETA 2002 FC		8.2	9.2	10.2	12.2	13.2	
<b>Cooling <sup>(*)</sup></b>							
Nominal capacity	kW	76,3	90,7	103	116,7	128	
Evaporator water flow rate	l/s	3,99	4,73	5,38	6,09	6,68	
	l/h	14.346	17.041	19.350	21.924	24.057	
Hydraulic circuit pressure drop	kPa	92,2	83,7	64,8	64,5	72,3	
<b>Free Cooling <sup>(**)</sup></b>							
Nominal capacity	kW	52,1	66,9	68,5	90,9	92,7	
Pressure drop	kPa	109,6	107,2	94,3	84,7	96	
Available pressure <sup>(***)</sup>	kPa	125	119	117	141	119	
<b>Compressors</b>		type	scroll				
Quantity	n	2	2	2	2	2	
Refrigerant circuits	n	1	1	1	1	1	
Cooling mode input power <sup>(*)</sup>	kW	25,6	29,8	35,1	38,2	42,4	
Capacity steps	%	0-50-100	0-50-100	0-50-100	0-50-100	0-50-100	
<b>Condenser cooling fans</b>		type	axial				
Total air flow	m <sup>3</sup> /s	6	8,861	8,833	12,442	12,442	
	m <sup>3</sup> /h	21.600	31.900	31.800	44.790	44.790	
Fan motor power	n x kW	3 x 0,6	2 x 2,0	2 x 2,0	3 x 2,0	3 x 2,0	
Nominal speed	RPM	860	880	880	880	880	
Motor power supply	V/Ph/Hz	230/- /50					
<b>Refrigerant charge</b>		kg	1 x 32	1 x 32	1 x 32	1 x 45	1 x 46
<b>Oil</b>		l	2 x 6,6	1 x 8 + 1 x 6,6	2 x 8	2 x 8	2 x 8
Oil brand		Maneurop					
Oil type		160 SZ					
<b>Evaporator</b>		type	plate type				
Exchanger water contents	l	6,3	7,3	8,4	9,4	10,5	
Water side max. working pressure	bar	30					
<b>Dimensions and weights</b>							
Length	mm	3.234	3.234	3.234	3.234	3.234	
Depth	mm	1.281	1.281	1.281	1.351	1.351	
Height	mm	1.740	1.880	1.880	2.380	2.380	
Shipping weight	kg	1.142	1.211	1.272	1.532	1.537	

(\*) Cooling: ambient air temperature 32 °C; water-glycol mixture temperature 30% evaporator inlet/outlet 12-7 °C;

(\*\*) Free cooling: ambient air temperature 5 °C; water-glycol mixture temperature 30% unit inlet 15 °C.

(\*\*\*) Valid only for units with pumps.

# TECHNICAL DATA

## R407C refrigerant

MODEL ZETA 2002 FC		16.4	18.4	20.4	24.4	26.4
<b>Cooling (*)</b>						
Nominal capacity	kW	154,9	181,3	207,4	231,7	256
Evaporator water flow rate	l/s	8,09	9,47	10,83	12,10	13,37
	l/h	29.118	34.081	38.979	43.547	48.114
Hydraulic circuit pressure drop	kPa	71,3	62	71,6	71	81,3
<b>Free Cooling (**)</b>						
Nominal capacity	kW	108,5	120,2	123,5	148,1	159,3
Pressure drop	kPa	77,8	70,5	82,4	87,9	101,3
Available pressure (***)	kPa	97	106	154	125	86
<b>Compressors</b>						
	type	scroll				
Quantity	n	4	4	4	4	4
Refrigerant circuits	n	2	2	2	2	2
Cooling mode input power (*)	kW	50,1	59,7	69,4	77,1	84,9
Capacity steps	%	0-25-50- 75-100	0-25-50- 75-100	0-25-50- 75-100	0-25-50- 75-100	0-25-50- 75-100
<b>Condenser cooling fans</b>						
	type	axial				
Total air flow	m <sup>3</sup> /s	14,417	16,444	16,444	18,889	20,875
	m <sup>3</sup> /h	51900	59200	59200	68000	75150
Fan motor power	n x kW	3 x 2,0	4 x 2,0	4 x 2,0	4 x 2,0	5 x 2,0
Nominal speed	RPM	880				
Motor power supply	V/Ph/Hz	400/3~/50				
<b>Refrigerant charge</b>						
Chiller version	kg	2 x 30	2 x 30	2 x 30	2 x 38	2 x 38
<b>Oil</b>						
Oil contents	l	4 x 6,6	2 x 8 + 2 x 6,6	4 x 8	4 x 8	4 x 8
Oil brand		Maneurop				
Oil type		160 SZ				
<b>Evaporator</b>						
	type	plate type				
Exchanger water contents	l	6,3	7,3	8,4	9,4	10,5
Water side max. working pressure	bar	30				
<b>Dimensions and weights</b>						
Length	mm	4.234	4.234	4.234	5.234	5.234
Depth	mm	1.351	1.351	1.351	1.351	1.351
Height	mm	2.380	2.380	2.380	2.380	2.380
Shipping weight	kg	1.806	1.960	2.079	2.333	2.363

(\*) Cooling: ambient air temperature 32 °C; water-glycol mixture temperature 30% evaporator inlet/outlet 12-7 °C;

(\*\*) Free cooling: ambient air temperature 5 °C; water-glycol mixture temperature 30% unit inlet 15 °C.

(\*\*\*) Valid only for units with pumps.

# TECHNICAL DATA - ELECTRICAL CHARACTERISTICS AND COMPONENTS

## R407C refrigerant

MODEL ZETA 2002		3.2	4.2	5.2	6.2	7.2
Maximum input power <sup>(1)</sup>	kW	17,6	20,6	25,6	29,1	32
	kW	(19,1)	(22,1)	(27,1)	(30,6)	(33,5)
Maximum peak current	A	120,4	155,4	150,4	208,1	218,1
	A	(124,7)	(159,7)	(154,7)	(212,4)	(222,4)
Maximum input current <sup>(2)</sup>	A	39,4	45,4	55,4	68,1	78,1
	A	(43,7)	(49,7)	(59,7)	(72,4)	(82,4)
Fan motor nominal power	n x kW	2 x 0,6	2 x 0,6	2 x 0,6	3 x 0,6	3 x 0,6
Fan motor rated current	n x A	2 x 2,7	2 x 2,7	2 x 2,7	3 x 2,7	3 x 2,7
Pump motor nominal power	kW	(1 x 1,5)	(1 x 1,5)	(1 x 1,5)	(1 x 1,5)	(1 x 1,5)
Pump motor rated current	A	(1 x 4,3)	(1 x 4,3)	(1 x 4,3)	(1 x 4,3)	(1 x 4,3)
Electrical power supply	V/Ph/Hz	400/3N~/50 ±5%				
Control circuits power supply	V/Ph/Hz	230~/50				
Controller power supply	V/Ph/Hz	24/1/50				
Condenser fans power supply	V/Ph/Hz	230~/50				
ST units pumps power supply	V/Ph/Hz	400/3/50				

MODEL ZETA 2002		8.2	9.2	10.2	12.2	13.2
Maximum input power <sup>(1)</sup>	kW	38	45,4	50,6	57,6	62,6
	kW	(39,5)	(47,6)	(52,8)	(59,8)	(64,8)
Maximum peak current	A	218,1	258	273	332	351
	A	(222,4)	(263,3)	(278,3)	(337,3)	(356,3)
Maximum input current <sup>(2)</sup>	A	78,1	93	108	131	150
	A	(82,4)	(98,3)	(113,3)	(136,3)	(155,3)
Fan motor nominal power	n x kW	3 x 0,6	2 x 2,0	2 x 2,0	3 x 2,0	3 x 2,0
Fan motor rated current	n x A	3 x 2,7	2 x 4,0	2 x 4,0	3 x 4,0	3 x 4,0
Pump motor nominal power	kW	(1 x 1,5)	(1 x 2,2)	(1 x 2,2)	(1 x 2,2)	(1 x 2,2)
Pump motor rated current	A	(1 x 4,3)	(1 x 5,3)	(1 x 5,3)	(1 x 5,3)	(1 x 5,3)
Electrical power supply	V/Ph/Hz	400/3N~/50	400/3~/50 ±5%			
Control circuits power supply	V/Ph/Hz	230~/50				
Controller power supply	V/Ph/Hz	24/1/50				
Condenser fans power supply	V/Ph/Hz	230~/50				
ST units pumps power supply	V/Ph/Hz	400/3/50				

(1) electrical power to be available from the mains network when the unit is running.

(2) current at which the unit's internal protections trip. Unit maximum input current. This value is never exceeded and must be used for sizing of the lines and the relative protections (refer to the electrical drawing supplied with the unit).

The values in parentheses refer to ST version units (units with storage tank) and units with pumps only.

## TECHNICAL DATA - ELECTRICAL CHARACTERISTICS AND COMPONENTS

### R407C refrigerant

<b>MODEL ZETA 2002</b>		<b>16.4</b>	<b>18.4</b>	<b>20.4</b>	<b>24.4</b>	<b>26.4</b>
Maximum input power <sup>(1)</sup>	kW	78,4	90,8	101,2	111,2	123,2
	kW	(82,4)	(94,8)	(106,7)	(116,7)	(128,7)
Maximum peak current	A	292	351	381	455	497
	A	(301,5)	(360,5)	(393,0)	(467,0)	(509,0)
Maximum input current <sup>(2)</sup>	A	152	186	216	254	296
	A	(161,5)	(195,5)	(228,0)	(266,0)	(308,0)
Fan motor nominal power	n x kW	3 x 2,0	4 x 2,0	4 x 2,0	4 x 2,0	5 x 2,0
Fan motor rated current	n x A	3 x 4,0	4 x 4,0	4 x 4,0	4 x 4,0	5 x 4,0
Pump motor nominal power	kW	(1 x 4,0)	(1 x 4,0)	(1 x 5,5)	(1 x 5,5)	(1 x 5,5)
Pump motor rated current	A	(1 x 9,5)	(1 x 9,5)	(1 x 12,0)	(1 x 12,0)	(1 x 12,0)
Electrical power supply	V/Ph/Hz	400/3~/50 ±5%				
Control circuits power supply	V/Ph/Hz	230/-/50				
Controller power supply	V/Ph/Hz	24/1/50				
Condenser fans power supply	V/Ph/Hz	230/-/50				
ST units pumps power supply	V/Ph/Hz	400/3/50				

(1) electrical power to be available from the mains network when the unit is running.

(2) current at which the unit's internal protections trip. Unit maximum input current. This value is never exceeded and must be used for sizing of the lines and the relative protections (refer to the electrical drawing supplied with the unit).

The values in parentheses refer to ST version units (units with storage tank) and units with pumps only.

# SOUND POWER AND PRESSURE LEVELS

## STANDARD UNIT

ZETA 2002 FC	Octave band [Hz]																Total	
	63		125		250		500		1000		2000		4000		8000			
	dB		dB		dB		dB		dB		dB		dB		dB			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp
3.2	96	64	87	55	81	49	80	48	79	47	73	41	70	38	61	29	83	51
4.2	97	65	88	56	82	50	80	48	79	47	74	42	70	38	61	29	83	51
5.2	97	65	88	56	82	50	80	48	79	47	74	42	70	38	61	29	83	51
6.2	99	67	90	58	84	52	82	50	81	49	76	44	72	40	63	31	85	53
7.2	99	67	90	58	84	52	82	50	81	49	76	44	73	41	63	31	86	54
8.2	100	68	91	59	85	53	83	51	82	50	77	45	73	41	64	32	86	54
9.2	101	69	92	60	86	54	84	52	83	51	78	46	74	42	65	33	88	56
10.2	101	69	92	60	86	54	84	52	83	51	78	46	75	43	65	33	88	56
12.2	102	70	93	61	87	55	85	53	84	52	79	47	76	44	66	34	89	57
13.2	102	70	93	61	87	55	85	53	84	52	79	47	75	43	66	34	89	57
16.4	105	73	97	65	90	58	89	57	88	56	82	50	79	47	70	38	92	60
18.4	106	74	97	65	91	59	89	57	88	56	83	51	79	47	70	38	93	61
20.4	106	74	97	65	91	59	90	58	89	57	83	51	80	48	71	39	93	61
24.4	107	75	98	66	92	60	90	58	89	57	84	52	80	48	71	39	94	62
26.4	108	76	99	67	93	61	91	59	90	58	85	53	81	49	72	40	95	63

## LOW NOISE UNITS

ZETA 2002 FC	Octave band [Hz]																Total	
	63		125		250		500		1000		2000		4000		8000			
	dB		dB		dB		dB		dB		dB		dB		dB			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp
3.2	93	61	85	53	78	46	77	45	76	44	70	38	67	35	58	26	80	48
4.2	94	62	85	53	79	47	77	45	76	44	71	39	67	35	58	26	80	48
5.2	94	62	85	53	79	47	77	45	76	44	71	39	67	35	58	26	81	49
6.2	96	64	87	55	81	49	79	47	78	46	73	41	69	37	60	28	82	50
7.2	96	64	87	55	81	49	79	47	78	46	73	41	69	37	60	28	83	51
8.2	98	66	89	57	83	51	81	49	80	48	75	43	71	39	62	30	85	53
9.2	98	66	89	57	83	51	82	50	81	49	75	43	72	40	63	31	85	53
10.2	99	67	90	58	84	52	83	51	81	49	76	44	73	41	64	32	86	54
12.2	99	67	90	58	84	52	83	51	82	50	76	44	73	41	64	32	86	54
13.2	99	67	90	58	84	52	83	51	82	50	76	44	73	41	64	32	86	54
16.4	103	71	95	63	89	57	87	55	86	54	81	49	77	45	68	36	90	58
18.4	103	71	95	63	89	57	87	55	86	54	81	49	77	45	68	36	90	58
20.4	104	72	95	63	89	57	88	56	87	55	81	49	78	46	69	37	91	59
24.4	106	74	97	65	91	59	89	57	88	56	83	51	79	47	70	38	93	61
26.4	105	73	97	65	91	59	89	57	88	56	83	51	79	47	70	38	92	60

Lw: sound power values calculate in compliance with ISO 3744; nominal conditions

Lp : sound pressure values measured at 10 meters distance from the unit in free field and at nominal working conditions, in compliance with ISO 3744

**TABLE 2 - FREEZING POINT FOR WATER-GLYCOL MIXTURES**

LIQUID OUTLET TEMPERATURE OR MINIMUM AMBIENT TEMPERATURE (°C)	+0°	-5°	-10°	-15°	-20°	-25°	-30°	-35°	-40°
FREEZING POINT (°C)	-5°	-10°	-15°	-20°	-25°	-30°	-35°	-40°	-45°
ANTIFREEZE	% BY WEIGHT								
ETHYLENE GLYCOL	6	22	30	36	41	46	50	53	56
PROPYLENE GLYCOL	15	25	33	39	44	48	51	54	57
METHANOL	8	14	20	26	30	34	38	41	45
CALCIUM CHLORIDE	9	14	18	21	24	26	27	28	30
TEMPER -20	T -20°C					---			
TEMPER -40	T -40°C							---	
TEMPER -60	T -60°C								
TIFOXITE	40		50	60	63	69	73	---	
FREEZIUM	10	20	25	30	34	37	40	43	45
PEKASOL 50	50		59	68	75	81	86	90	---



**In the case of ST version with glycol contents greater than 30% pumps with special seals must be requested at the time of the order.**