

# ZETA ECHOS FC

Air/water chiller with integrated free-cooling 44÷144 kW



## General

Air/Water free-cooling chillers with axial fans and hermetic scroll compressors.

## Configurations

LN: Low sound level

NG: Without glycol

Optional pump-/tank module

## Quick facts

- ▶ Eco-friendly cooling
- ▶ High EER
- ▶ Patented innovation
- ▶ Efficient energy performance
- ▶ Advanced software
- ▶ Years of dependability

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## TECHNICAL CHARACTERISTICS

### ZETA ECHOS FC

Air-cooled water chiller with free-cooling, hermetic scroll compressors and plate evaporators.

The features of the standard units are as follows:

### UNIT FRAME

Self-supporting frame with removable panels clad with expanded polyurethane sound-absorbing matting, made of galvanised sheet steel with 180°C baked-on polyester powder coating (Colour RAL 7035/5017) to provide a durable weatherproof finish.

Threaded fasteners in stainless steel.

### COMPRESSORS

Hermetic type orbital scroll compressors connected in parallel, equipped with an oil level sight glass, thermal protection by means of an internal Klixon cut-out and oil equalisation line.

The compressors, which are housed in a sound insulated compartment and separated from the air flow, are accessible by removing specific panels that allow maintenance work to be carried out while the system is running.

### CONDENSERS

Composed of a high efficiency coil with staggered pattern rows of copper tubes and aluminium fins.

### The finned core is protected by a grille with metal mesh filter supplied as standard.

### FREE COOLING

Made up from an interpenetrating coil with rows with copper pipes and high-efficiency aluminium fins.

The finned core is protected by a grille with metal mesh filter supplied as standard.

A unique ventilating section cools the condensing coil and the free-cooling coil, which are positioned in parallel on opposite sides of the unit. The air flow is managed automatically by a microprocessor that controls the opening of motorised shutters positioned facing the coils and regulates the rotation speed of the fans. When the conditions make it suitable, the free-cooler shutter is opened, the fans

are made to turn at maximum speed and condensation is controlled by modulating the opening of the condenser shutter. Otherwise, the free-cooler shutter remains closed, that of the condenser completely open and condensation is controlled by regulating the rotation speed of the fans.

### FANS

Axial fans with rev. regulator for slave application, designed to optimise efficiency and reduce noise emissions, directly coupled to a 6-pole motor with internal Klixon overload protection. Motor protection rating is IP 54. The fan is equipped with a safety grille in compliance with UNI EN 294.

### EVAPORATOR

Stainless steel 316 AISI brazed plate exchanger, thermally insulated by means of a jacket in closed cell expanded material.

Each evaporator is equipped with a freeze protection temperature probe and each unit is equipped with a mechanical flow switch as part of the standard outfit.

The use of plate type heat exchangers makes for:

- Improved COP/EER;
- Reduced refrigerant charge in the circuit;
- Reduced unit weight and dimensions;
- Easier maintenance.

### REFRIGERANT CIRCUIT

The refrigerant circuit includes: liquid line shut-off valve, charge connection, liquid line sight glass, filter dryer, thermostatic expansion valve with external pressure equalisation, high and low pressure switches, and relief valve.

The high and low pressure values and relative condensing and evaporating temperature values are detected by means of pressure transducers which enable the relative data to be read on the controller display. Note that the high pressure side is anyway equipped with high pressure switches and relief valves.

### ELECTRICAL PANEL

The electrical panel includes:

- Main circuit breaker;
- Fuses to protect control and power circuits;
- Circuit breakers for pumps (if present);
- Compressor contactors;
- Fan contactors;
- Pump contactors (ST version);
- Microprocessor to control the following functions:
  - Water temperature regulation with measurement of inlet temperature;
  - Freeze protection;
  - Compressor time intervals;
  - Compressor start sequence and automatic lead/lag selection;
  - Alarm signalling;
  - Alarm reset;
  - Capacity control;
  - Cumulative potential-free contact for remote alarm;
  - Forcing of capacity step control due to arrival at pressure limit;
  - Alarm history;
- Display presentation of the following information:
  - Inlet and outlet water temperature;
  - Programmed temperature set-point and differentials;
  - Alarm description;
  - Compressor operating hours count;
  - number of starts of unit and compressors;
  - high and low pressure values and relative condensing and evaporating temperature values;
  - black box function;

Electrical power supply [V/f/Hz]: 400/3N~/50 ±5% model from 3.2 to 10.2,

## 400/3~/50 ±5% models from 12.2 to 13.2.

### CONTROLS AND SAFETY DEVICES

- chilled water temperature probe (at evaporator inlet);
- inlet water temperature control probe
- room air temperature control probe
- freeze protection probe at the outlet of each evaporator;
- high pressure switch with manual reset;
- safety low pressure switch with manual reset managed by controller;
- high pressure relief valve;
- compressor overtemperature protection;
- fans overtemperature protection;
- mechanical flow switch supplied as part of the standard outfit for models from 3.2 to 13.2

### TESTING

The units are subjected to a factory test and supplied complete with oil and refrigerant.

### VERSIONS

#### HYDRAULIC MODULE OPTIONS

#### ZETA ECHOS FC /ST 2PS:

##### **Unit with storage tank and pumps**

In addition to the components featured on ZETA ECHOS FC, this model includes:

- insulated storage tank;
- two water pumps, one of which in stand-by with automatic changeover in case of faults;
- expansion vessel;
- check valves;
- gate valves.

Version ST is available in a further four configurations:

ST 1PS:with one pump and tank;

ST 1P:with one pump and without tank;

ST 2P:with 2 pumps without tank;

#### **ST S:with tank without pumps.**

#### ACCESSORY VERSIONS

#### ZETA ECHOS FC /LN:

##### **Low noise unit.**

As well as the components of the basic version, the unit also envisions the compressors compartment which is completely noise insulated using sound-absorbant and sound-proof materials.

#### **ZETA ECHOS FC /NG:**

##### **No glycol unit**

As well as the components of the basic version, the unit, envisions a further water-water heat exchanger that allows to confine the mixture of water and glycol in a closed circuit inside the machine. Once the mixture is cooled, it is sent to the

above-mentioned heat exchanger where it absorbs heat from the water coming from the utilities circuit.

### ACCESSORIES

#### REFRIGERANT CIRCUIT ACCESSORIES

- Electronic thermostatic valve;
- High and low pressure manometers
- Liquid receivers;
- Suction and discharge valves on the compressors common line;
- Kit for low water temperatures.

#### HYDRAULIC CIRCUIT ACCESSORIES

- 3-way modulating valve (not available in the NG version).

#### ELECTRICAL ACCESSORIES

- EC fans;
- RS 485 serial interface supporting Carel, Modbus;
- Power factor correction  $\cos\phi \geq 0.9$  at nominal operating conditions; on the IP 55 unit exterior panel (electrical power supply to be provided by the installer directly from the main power line). The accessory is combined with volt-free contacts for unit operating status;
- Remote user terminal panel (in addition to the standard terminal);
- Individual voltage/free functioning contacts (compressor, fan and pump if installed)
- Water outlet temperature control;
- Set-point modification with remote signal (0-1V, 0-10V, 0-20mA, 4-20mA);
  - RS 485 serial interface supporting Carel, Modbus;
  - Echelon and Bacnet, combinable also with Johnson and Trend supervision;
- Soft starter: to restrict compressor peak current.
- Inverter for management of the FC water coil side pump (only for NG version)

#### MISCELLANEOUS ACCESSORIES

- Rubber anti-vibration mounts;
- Pre-painted aluminium condensing coil;
- Condensing coil with passivation treatment of aluminium and polyurethane based top coat. The treatment is composed of two coats, the first of which is an aluminium passivating primer while the second is a polyurethane-based top coat. The product features excellent corrosion resistance and is able to withstand almost all adverse weather and atmospheric conditions. For installations in coastal environments subject to salt spray, rural or industrial area and cities;
- Pre-assembled execution;
- Timber crate packing;
- Pallet/skid for container shipment;
- Non-standard "RAL" paint colours.



## ZETA ECHOS FC - TECHNICAL DATA

Unit size		3.2	4.2	5.2	6.2	7.2
<b>Cooling (Gross values)</b>						
Nominal cooling capacity	(1) kW	45,1	50,7	58,0	68,2	75,3
Total power input for cooling	(1),(2) kW	13,0	15,0	17,8	19,3	23,4
EER	(1)	3,48	3,37	3,27	3,54	3,23
ESEER		4,67	4,53	4,37	4,65	4,37
<b>Cooling (EN 14511 values)</b>						
Nominal cooling capacity	(1),(9)	44,51	50,08	57,37	67,45	74,53
EER	(1),(9)	3,29	3,20	3,11	3,37	3,09
<b>Free-Cooling</b>						
Nominal cooling capacity	(3) kW	31,0	32,9	34,5	44,9	46,0
Pressure drop on free-cooling coil	kPa	11,4	14,7	18,6	21,2	25,3
TFT - Total Free-cooling Temperature	°C	0,7	-0,4	-1,9	-0,2	-1,4

## ZETA ECHOS FC /NG - TECHNICAL DATA

Unit size		3.2	4.2	5.2	6.2	7.2
<b>Cooling</b>						
Nominal cooling capacity	(1) kW	46,0	51,7	59,1	69,4	76,6
Total power input for cooling	(1),(2) kW	13,0	15,1	17,9	19,4	23,5
EER	(1)	3,53	3,41	3,31	3,58	3,26
ESEER		4,67	4,53	4,37	4,65	4,37
<b>Free-Cooling</b>						
Nominal cooling capacity	(3) kW	21,7	23,0	23,8	31,0	31,9
Pressure drop on free-cooling coil	kPa	31,2	32,0	34,0	14,5	15,2
TFT - Total Free-cooling Temperature	°C	-2,7	-3,7	-5,0	-3,4	-4,5
<b>Compressors</b>						
Type	(3) kW			Scroll		
Quantity / Circuits	kPa	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
Capacity steps		0-50-100	0-50-100	0-50-100	0-50-100	0-50-100
Total oil charge		5,2	6,5	6,5	6,5	6,6
Total refrigerant charge	°C	9,0	9,0	10,5	16,0	16,0
<b>Fans</b>						
Type				Assiali		
Quantity	n°	2	2	2	2	2
Air flow	m³/h	17.427	17.427	16.023	19.513	19.513
<b>Evaporator</b>						
Type				Piastre		
Quantity	n°	1	1	1	1	1
Water flow	l/h	8.610	9.690	11.110	13.030	14.420
Pressure drop	kPa	69,1	66,8	61,6	45,5	55,0
<b>Hydraulic module</b>						
External available pressure	(6),(7) kPa	171	160	145	174	148
External available pressure	(6),(8) kPa	160	146	128	154	124
Tank capacity	(6) l	165	165	165	200	200
Expansion vessel	l	18	18	18	18	18
<b>Sound level</b>						
Sound power value (standard unit)	(4) dB(A)	83	83	83	83	84
Sound pressure value (standard unit)	(5) dB(A)	51	51	51	51	52
Sound power value (LN version)	(4) dB(A)	81	81	81	81	82
Sound pressure value (LN version)	(5) dB(A)	49	49	49	49	50
<b>Basic unit size and weights</b>						
Length	mm	2590	2590	2590	3250	3250
Width	mm	1337	1337	1337	1334	1334
Height	mm	1400	1400	1400	1740	1740
Operating weight	kg	921	927	959	1168	1182

(1)Ambient air temperature 30°C; evaporator inlet/outlet water temperature 10-15 °C

(2)Total power input is sum of compressors and fans power input

(3)Ambient air temperature 5°C; evaporator inlet fluid temperature 15 °C; Glycol at 30%

(4)Sound power values calculate in compliance with ISO 3744

(5)Sound pressure values measured at 10 meters distance from the unit in free field and at nominal working conditions, in compliance with ISO 3744

(6)ST 2PS version (7)With free-cooling inactive (8)With free-cooling active (9)Values in compliance with EN 14511-3:2011

## ZETA ECHOS FC - TECHNICAL DATA

Unit size		8.2	9.2	10.2	12.2	13.2
<b>Cooling (Gross values)</b>						
Nominal cooling capacity	(1) kW	89,7	102,6	113,9	132,3	144,4
Total power input for cooling	(1),(2) kW	24,8	30,3	36,3	41,6	47,9
EER	(1)	3,62	3,39	3,14	3,18	3,01
ESEER		4,99	4,63	4,37	4,45	4,26
<b>Cooling (EN 14511 values)</b>						
Nominal cooling capacity	(1),(9)	88,77	101,60	112,81	131,05	143,10
EER	(1),(9)	3,46	3,25	3,02	3,06	2,91
<b>Free-Cooling</b>						
Nominal cooling capacity	(3) kW	65,0	66,7	67,8	81,7	82,8
Pressure drop on free-cooling coil	kPa	23,0	29,2	35,1	45,6	53,3
TFT - Total Free-cooling Temperature	°C	1,2	-0,4	-1,7	-1,2	-2,4

## ZETA ECHOS FC /NG - TECHNICAL DATA

Unit size		8.2	9.2	10.2	12.2	13.2
<b>Cooling</b>						
Nominal cooling capacity	(1) kW	91,4	104,5	115,9	134,7	147,0
Total power input for cooling	(1),(2) kW	24,9	30,4	36,5	41,8	48,2
EER	(1)	3,67	3,43	3,17	3,22	3,05
ESEER		4,99	4,63	4,37	4,45	4,26
<b>Free-Cooling</b>						
Nominal cooling capacity	(3) kW	45,0	46,2	47,1	56,7	57,5
Pressure drop on free-cooling coil	kPa	17,1	17,3	18,2	21,3	22,6
TFT - Total Free-cooling Temperature	°C	-2,0	-3,6	-4,8	-4,5	-5,5
<b>Compressors</b>						
Type	(3) kW			Scroll		
Quantity / Circuits	kPa	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
Capacity steps		0-50-100	0-50-100	0-50-100	0-50-100	0-50-100
Total oil charge		6,2	12,4	12,4	12,4	14,2
Total refrigerant charge	°C	24,0	24,0	24,0	24,0	24,0
<b>Fans</b>						
Type				Assiali		
Quantity	n°	3	3	3	2	2
Air flow	m³/h	29.089	29.089	29.089	40.087	40.087
<b>Evaporator</b>						
Type				Piastre		
Quantity	n°	1	1	1	1	1
Water flow	l/h	17.130	19.610	21.800	25.290	27.630
Pressure drop	kPa	62,9	61,5	64,8	69,0	67,4
<b>Hydraulic module</b>						
External available pressure	(6),(7) kPa	191	174	190	165	151
External available pressure	(6),(8) kPa	168	145	156	120	98
Tank capacity	(6) l	200	200	200	200	200
Expansion vessel	l	18	18	18	18	18
<b>Sound level</b>						
Sound power value (standard unit)	(4) dB(A)	85	86	86	87	87
Sound pressure value (standard unit)	(5) dB(A)	53	54	54	55	55
Sound power value (LN version)	(4) dB(A)	83	84	84	85	85
Sound pressure value (LN version)	(5) dB(A)	51	52	52	53	53
<b>Basic unit size and weights</b>						
Length	mm	4200	4200	4200	4200	4200
Width	mm	1434	1434	1434	1434	1434
Height	mm	1740	1740	1740	1880	1880
Operating weight	kg	1524	1538	1546	1650	1690

(1)Ambient air temperature 30°C; evaporator inlet/outlet water temperature 10-15 °C

(2)Total power input is sum of compressors and fans power input

(3)Ambient air temperature 5°C; evaporator inlet fluid temperature 15 °C; Glycol at 30%

(4)Sound power values calculate in compliance with ISO 3744

(5)Sound pressure values measured at 10 meters distance from the unit in free field and at nominal working conditions, in compliance with ISO 3744

(6)ST 2PS version (7)With free-cooling inactive (8)With free-cooling active (9)Values in compliance with EN 14511-3:2011

## ZETA ECHOS FC - ELECTRICAL DATA

Unit size			3.2	4.2	5.2	6.2	7.2
Maximum absorbed power	(1),(3)	kW	19,2 (21,5)	21,4 (23,7)	24,8 (27,1)	27,6 (29,9)	34,2 (36,5)
Full load current	(2),(3)	A	35,2 (40,0)	40,8 (45,6)	47,4 (52,2)	52,0 (56,8)	56,8 (61,6)
Maximum starting current	(4)	A	122 (127)	134 (139)	145 (150)	147 (152)	171 (176)
Maximum starting current with soft-starter	(4)	A	81,2 (86)	90,0 (95)	97,5 (102)	99,8 (105)	115,4 (120)
Fan motor nominal power		n° x kW	2 x 0,6				
Fan motor nominal current		n° x A	2 x 3,0				
Pump motor nominal power		kW	2,3	2,3	2,3	2,3	2,3
Pump motor nominal current		A	4,8	4,8	4,8	4,8	4,8
Power supply		V/ph/Hz			400/3N~/50 ±5%		
Control power supply		V/ph/Hz			230/1~/50 ±5%		

Unit size			8.2	9.2	10.2	12.2	13.2
Maximum absorbed power	(1),(3)	kW	38,8 (41,8)	45,9 (48,9)	53,0 (56,0)	61,6 (64,6)	68,0 (71,0)
Full load current	(2),(3)	A	69,6 (75,8)	75,8 (82,0)	82,0 (88,2)	89,1 (95,3)	97,2 (103,4)
Maximum starting current	(4)	A	213 (219)	264 (270)	271 (277)	317 (323)	325 (331)
Maximum starting current with soft-starter	(4)	A	143,7 (150)	174,3 (181)	180,5 (187)	207,7 (214)	215,8 (222)
Fan motor nominal power		n° x kW	3 x 0,6	3 x 0,6	3 x 0,6	2 x 2,0	2 x 2,0
Fan motor nominal current		n° x A	3 x 3,0	3 x 3,0	3 x 3,0	2 x 4,0	2 x 4,0
Pump motor nominal power		kW	3,0	3,0	3,0	3,0	3,0
Pump motor nominal current		A	6,2	6,2	6,2	6,2	6,2
Power supply		V/ph/Hz			400/3N~/50 ±5%		
Control power supply		V/ph/Hz			230/1~/50 ±5%		

(1)Mains power supply to allow unit operation

(2)Maximum current before safety cut-outs stop the unit. This value is never exceeded and must be used to size the electrical supply cables and relevant safety devices (refer to electrical wiring diagram supplied with the unit)

(3)Values in brackets refer to ST version units (units with storage tank and pumps or units with exclusively pumps)

(4)Maximum starting current calculated considering the bigger size compressor starting current plus the maximum absorbed power of the other electrical devices (pumps, fans)

## ZETA ECHOS FC - COOLING CAPACITY

Model	Ta [°C]	AMBIENT AIR TEMPERATURE [°C]									
		25		30		35		40		45	
		Pf	Pe	Pf	Pe	Pf	Pe	Pf	Pe	Pf	Pe
3.2	5	40,23	9,96	37,98	11,13	35,53	12,47	32,88	13,98	30,01	15,7
	6	41,42	10,04	39,13	11,21	36,63	12,55	33,92	14,07	30,99	15,79
	7	42,66	10,12	40,33	11,3	<b>37,78</b>	<b>12,64</b>	35,02	14,16	31,98	15,88
	8	43,9	10,21	41,52	11,39	38,91	12,73	36,07	14,25	32,99	15,97
	9	45,18	10,3	42,74	11,48	40,07	12,82	37,16	14,34	34,01	16,07
	10	46,47	10,4	43,97	11,58	41,24	12,92	38,26	14,44	35,04	16,17
4.2	5	45,38	11,72	42,94	13,04	40,29	14,56	37,37	16,33	34,12	18,39
	6	46,69	11,83	44,19	13,15	41,49	14,68	38,51	16,45	35,22	18,51
	7	48,04	11,95	45,49	13,27	<b>42,74</b>	<b>14,8</b>	39,72	16,57	36,33	18,63
	8	49,41	12,07	46,79	13,39	43,97	14,92	40,87	16,7	37,45	18,75
	9	50,81	12,2	48,12	13,52	45,22	15,05	42,06	16,83	38,58	18,88
	10	52,21	12,33	49,45	13,66	46,48	15,19	43,25	16,97	39,7	19,02
5.2	5	52,31	14	49,19	15,66	45,81	17,54	42,15	19,68	38,21	22,1
	6	53,8	14,13	50,62	15,79	47,16	17,68	43,42	19,82	39,39	22,25
	7	55,34	14,26	52,1	15,93	<b>48,57</b>	<b>17,83</b>	44,77	19,98	40,58	22,4
	8	56,9	14,4	53,58	16,08	49,96	17,98	46,04	20,13	41,8	22,55
	9	58,5	14,55	55,1	16,23	51,39	18,13	47,37	20,28	43,03	22,71
	10	60,1	14,7	56,62	16,38	52,82	18,29	48,71	20,44	44,25	22,88
6.2	5	61,25	15,53	57,86	17,24	54,14	19,18	50,1	21,38	45,7	23,89
	6	62,99	15,66	59,52	17,36	55,73	19,31	51,59	21,52	47,09	24,02
	7	64,79	15,78	61,26	17,5	<b>57,4</b>	<b>19,45</b>	53,19	21,66	48,51	24,16
	8	66,6	15,92	62,98	17,63	59,01	19,58	54,67	21,8	49,94	24,31
	9	68,46	16,05	64,75	17,77	60,69	19,73	56,24	21,94	51,38	24,45
	10	70,32	16,19	66,53	17,91	62,37	19,87	57,8	22,09	52,83	24,61
7.2	5	67,86	18,89	63,98	20,86	59,78	23,12	55,22	25,73	50,3	28,75
	6	69,79	19,09	65,8	21,07	61,48	23,34	56,8	25,95	51,75	28,98
	7	71,78	19,29	67,68	21,28	<b>63,25</b>	<b>23,56</b>	58,46	26,19	53,29	29,24
	8	73,88	19,51	69,59	21,5	65,02	23,8	60,08	26,44	54,74	29,48
	9	75,9	19,72	71,53	21,73	66,83	24,04	61,75	26,69	56,25	29,74
	10	77,96	19,94	73,49	21,97	68,64	24,29	63,42	26,95	57,77	30,01

Ta: temperature of external air, dry bulb [°C]

Pf: cooling capacity [kW]

Pe: compressors power input [kW]

## ZETA ECHOS FC - COOLING CAPACITY

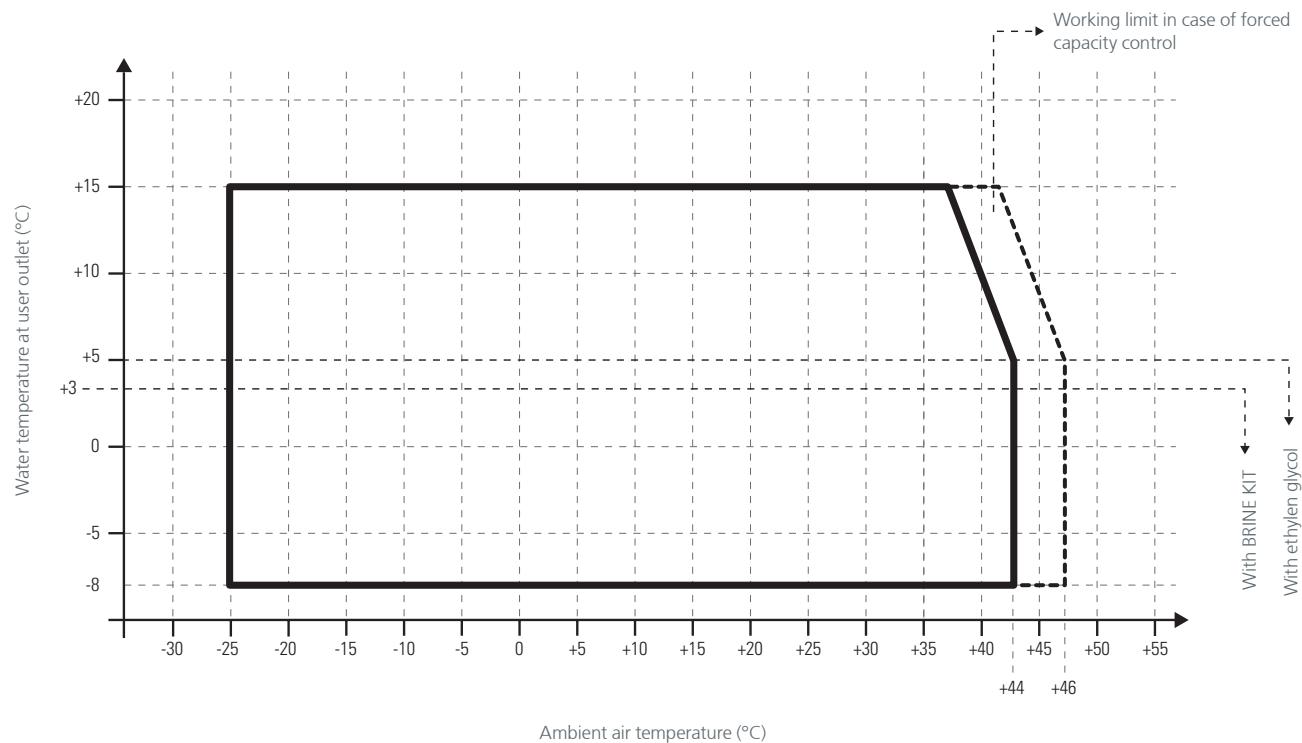
Model	Ta [°C]	AMBIENT AIR TEMPERATURE [°C]									
		25		30		35		40		45	
		Pf	Pe	Pf	Pe	Pf	Pe	Pf	Pe	Pf	Pe
8.2	5	79,74	19,87	75,38	21,96	70,82	24,31	65,98	26,99	60,84	30,02
	6	82,07	20	77,68	22,09	73,01	24,46	68,05	27,14	62,78	30,18
	7	84,54	20,14	80,04	22,24	75,27	24,62	70,21	27,3	64,83	30,35
	8	87,14	20,28	82,59	22,4	77,61	24,78	72,38	27,47	66,84	30,52
	9	89,69	20,43	84,95	22,55	79,94	24,95	74,6	27,65	68,92	30,7
	10	92,33	20,58	87,48	22,72	82,32	25,12	76,85	27,83	71,02	30,89
9.2	5	91,81	24,38	86,6	27,06	81,16	30,09	75,35	33,51	69,15	37,36
	6	94,42	24,58	89,17	27,27	83,58	30,31	77,63	33,74	71,27	37,61
	7	97,19	24,78	91,81	27,49	86,09	30,55	80	33,99	73,51	37,88
	8	100,09	25	94,61	27,73	88,64	30,79	82,38	34,25	75,69	38,14
	9	102,94	25,22	97,27	27,95	91,24	31,04	84,81	34,51	77,94	38,42
	10	105,88	25,45	100,06	28,2	93,87	31,29	87,26	34,78	80,2	38,71
10.2	5	102,62	29,32	96,59	32,65	90,25	36,4	83,47	40,61	76,19	45,32
	6	105,46	29,59	99,36	32,94	92,86	36,71	85,9	40,95	78,42	45,69
	7	108,46	29,88	102,2	33,25	95,54	37,04	88,41	41,3	80,76	46,08
	8	111,59	30,18	105,2	33,57	98,4	37,4	90,93	41,66	83,05	46,47
	9	114,66	30,48	108,09	33,89	101,05	37,73	93,52	42,04	85,41	46,87
	10	117,87	30,8	111,09	34,22	103,85	38,08	96,11	42,41	87,77	47,27
12.2	5	118,54	32,64	112,04	36,08	104,94	39,94	97,41	44,27	89,3	49,13
	6	121,86	32,9	115,2	36,36	108,01	40,25	100,28	44,6	91,96	49,48
	7	125,37	33,17	118,53	36,66	111,17	40,56	103,25	44,94	94,72	49,85
	8	129,03	33,47	122,03	36,97	114,52	40,9	106,26	45,29	97,48	50,22
	9	132,69	33,76	125,47	37,28	117,7	41,23	109,33	45,65	100,31	50,61
	10	136,44	34,07	129,02	37,6	121,03	41,57	112,43	46,01	103,16	50,99
13.2	5	129,95	38,25	122,56	42,1	114,45	46,38	105,82	51,17	96,55	56,5
	6	133,56	38,56	125,96	42,43	117,75	46,75	108,9	51,56	99,38	56,91
	7	137,36	38,89	129,56	42,79	121,14	47,13	112,07	51,96	102,33	57,34
	8	141,32	39,24	133,34	43,16	124,74	47,53	115,29	52,37	105,27	57,77
	9	145,28	39,59	137,05	43,53	128,15	47,92	118,57	52,79	108,27	58,22
	10	149,34	39,95	140,86	43,91	131,72	48,32	121,87	53,22	111,29	58,66

Ta: temperature of external air, dry bulb [°C]

Pf: cooling capacity [kW]

Pe: compressors power input [kW]

## OPERATING LIMITS COOLING - ZETA ECHOS FC



THE WATER TEMPERATURE GRADIENT FOR ALL VERSIONS MUST BE BETWEEN: min:4 °C max: 7°C

## SOUND LEVEL- ZETA ECHOS FC

Model	OCTAVE BANDS [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp		
<b>3.2</b>	83	51	86	54	81	49	79	47	79	47	73	41	68	36	57	25	83	51
<b>4.2</b>	83	51	87	55	81	49	81	49	79	47	73	41	70	38	57	25	83	51
<b>5.2</b>	83	51	87	55	81	49	81	49	79	47	73	41	70	38	57	25	83	51
<b>6.2</b>	83	51	87	55	81	49	81	49	79	47	73	41	70	38	57	25	83	51
<b>7.2</b>	84	52	88	56	82	50	82	50	80	48	74	42	71	39	58	26	84	52
<b>8.2</b>	85	53	89	57	83	51	83	51	81	49	75	43	72	40	60	28	85	53
<b>9.2</b>	85	53	89	57	83	51	83	51	82	50	76	44	72	40	60	28	86	54
<b>10.2</b>	85	53	89	57	83	51	83	51	82	50	76	44	72	40	60	28	86	54
<b>12.2</b>	86	54	90	58	84	52	84	52	83	51	77	45	73	41	61	29	87	55
<b>13.2</b>	86	54	90	58	84	52	84	52	83	51	77	45	73	41	61	29	87	55

## SOUND LEVEL- ZETA ECHOS FC/LN

Model	OCTAVE BANDS [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp		
<b>3.2</b>	101	69	82	50	77	45	76	44	76	44	70	38	65	33	54	22	81	49
<b>4.2</b>	101	69	83	51	77	45	77	45	76	44	70	38	66	34	54	22	81	49
<b>5.2</b>	101	69	83	51	77	45	77	45	76	44	70	38	66	34	54	22	81	49
<b>6.2</b>	101	69	83	51	77	45	77	45	76	44	70	38	66	34	54	22	81	49
<b>7.2</b>	102	70	84	52	78	46	78	46	77	45	71	39	68	36	56	24	82	50
<b>8.2</b>	103	71	85	53	79	47	79	47	78	46	72	40	69	37	57	25	83	51
<b>9.2</b>	103	71	86	54	80	48	80	48	79	47	73	41	69	37	57	25	84	52
<b>10.2</b>	103	71	86	54	80	48	80	48	79	47	73	41	69	37	57	25	84	52
<b>12.2</b>	104	72	87	55	81	49	81	49	80	48	74	42	70	38	58	26	85	53
<b>13.2</b>	104	72	87	55	81	49	81	49	80	48	74	42	70	38	58	26	85	53

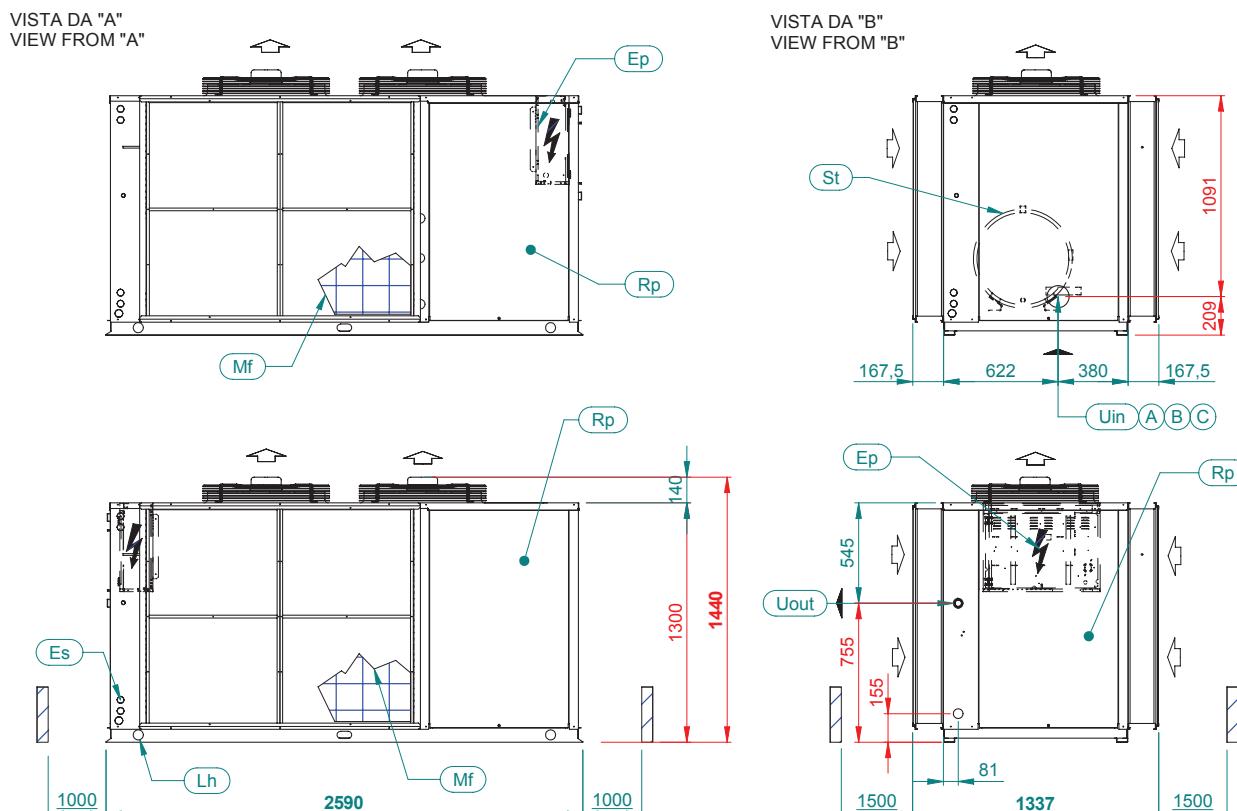
Lw: sound power values in free field conditions are calculated in accordance with ISO 3744; nominal working conditions.

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

The sound level of the discharge and intake fans is given in the relative technical data table.

## DIMENSIONAL DRAWING

## ZETA ECHOS FC 3.2 - 5.2



## CONFIGURAZIONI IDRAULICHE/HYDRAULIC CONFIGURATIONS

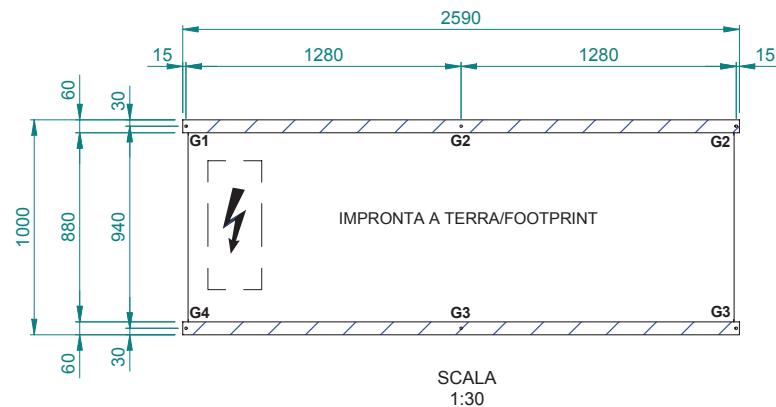
- (A) SENZA MODULO IDRAULICO  
WITHOUT HYDRAULIC MODULE
- (B) MODULO IDRAULICO ST1P-ST2P  
HYDRAULIC MODULE ST1P-ST2P
- (C) MODULO IDRAULICO ST1PS-ST2PS-STS  
HYDRAULIC MODULE ST1PS-ST2PS-STS

St	SERBATTOIO DI ACCUMULO STORAGE TANK	Pu	POMPA PUMP	Uin	Uout
	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW	Ep	QUADRO ELETTRICO ELECTRICAL PANEL	(A)	G 2" F
Rp	PANNELLO ASPORTABILE REMOVABLE PANEL	Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET	(B)-(C)	G 1 1/4" M
Mf	FILTRI METALLICI METALLIC FILTER	Uin	INGRESSO ACQUA UTILIZZO USER WATER INLET		
	SPAZI DI INSTALLAZIONE CLEARANCES	Uout	USCITA ACQUA UTILIZZO USER WATER OUTLET	Lh	FORI DI SOLLEVAMENTO LIFTING HOLES

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## DIMENSIONAL DRAWING

### ZETA ECHOS FC 3.2 - 5.2



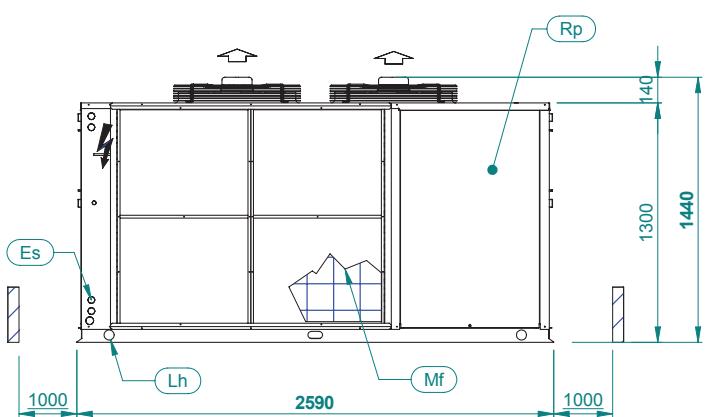
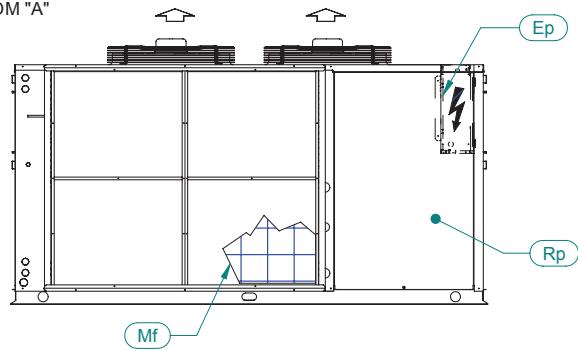
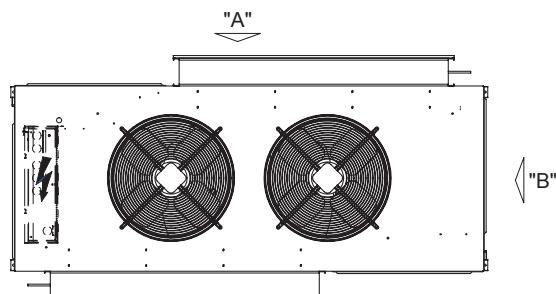
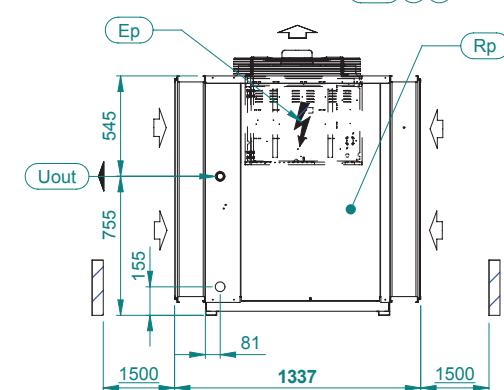
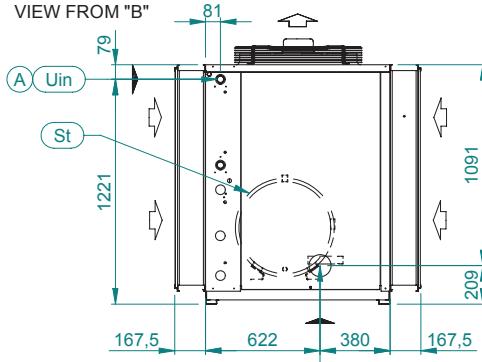
MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA ECHOS FC 3.2	870	923	252	118	105	225
ZETA ECHOS FC 4.2	873	927	253	117	106	228
ZETA ECHOS FC 5.2	904	958	266	118	107	242
ZETA ECHOS FC-ST 1P-2P 3.2	912	970	251	130	117	225
ZETA ECHOS FC-ST 1P-2P 4.2	916	975	253	130	117	228
ZETA ECHOS FC-ST 1P-2P 5.2	947	1006	266	130	119	242
ZETA ECHOS FC-ST 1PS-2PS 3.2	963	1186	282	162	155	270
ZETA ECHOS FC-ST 1PS-2PS 4.2	964	1188	283	161	155	273
ZETA ECHOS FC-ST 1PS-2PS 5.2	997	1221	296	162	157	287

Fh	FORI DI FISSAGGIO FIXING HOLES	Ø12
G..	PUNTI DI APPOGGIO ANTIVIBRANTI VIBRATION DAMPER FOOT HOLDS	

A49991D

## DIMENSIONAL DRAWING

## ZETA ECHOS FC 3.2 - 5.2 NO GLICOLE

VISTA DA "A"  
VIEW FROM "A"VISTA DA "B"  
VIEW FROM "B"

## CONFIGURAZIONI IDRAULICHE/HYDRAULIC CONFIGURATIONS

- (A)** SENZA MODULO IDRAULICO  
WITHOUT HYDRAULIC MODULE
- (B)** MODULO IDRAULICO ST1P-ST2P  
HYDRAULIC MODULE ST1P-ST2P
- (C)** MODULO IDRAULICO ST1PS-ST2PS-STS  
HYDRAULIC MODULE ST1PS-ST2PS-STS

St	SERBATTOIO DI ACCUMULO STORAGE TANK
	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW
Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
Mf	FILTRI METALLICI METALLIC FILTER
	SPAZI DI INSTALLAZIONE CLEARANCES

Pu	POMPA PUMP
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET
Uin	INGRESSO ACQUA UTILIZZO USER WATER INLET
Uout	USCITA ACQUA UTILIZZO USER WATER OUTLET

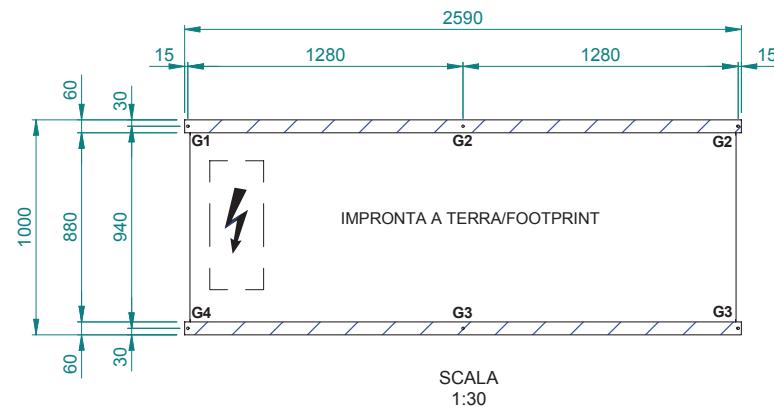
Uin		Uout
(A)	(B)-(C)	
G 1 1/4" M	G 2" F	G 1 1/4" M

Lh	FORI DI SOLLEVAMENTO LIFTING HOLES
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A4C883A

## DIMENSIONAL DRAWING

### ZETA ECHOS FC 3.2 - 5.2 NO GLICOLE



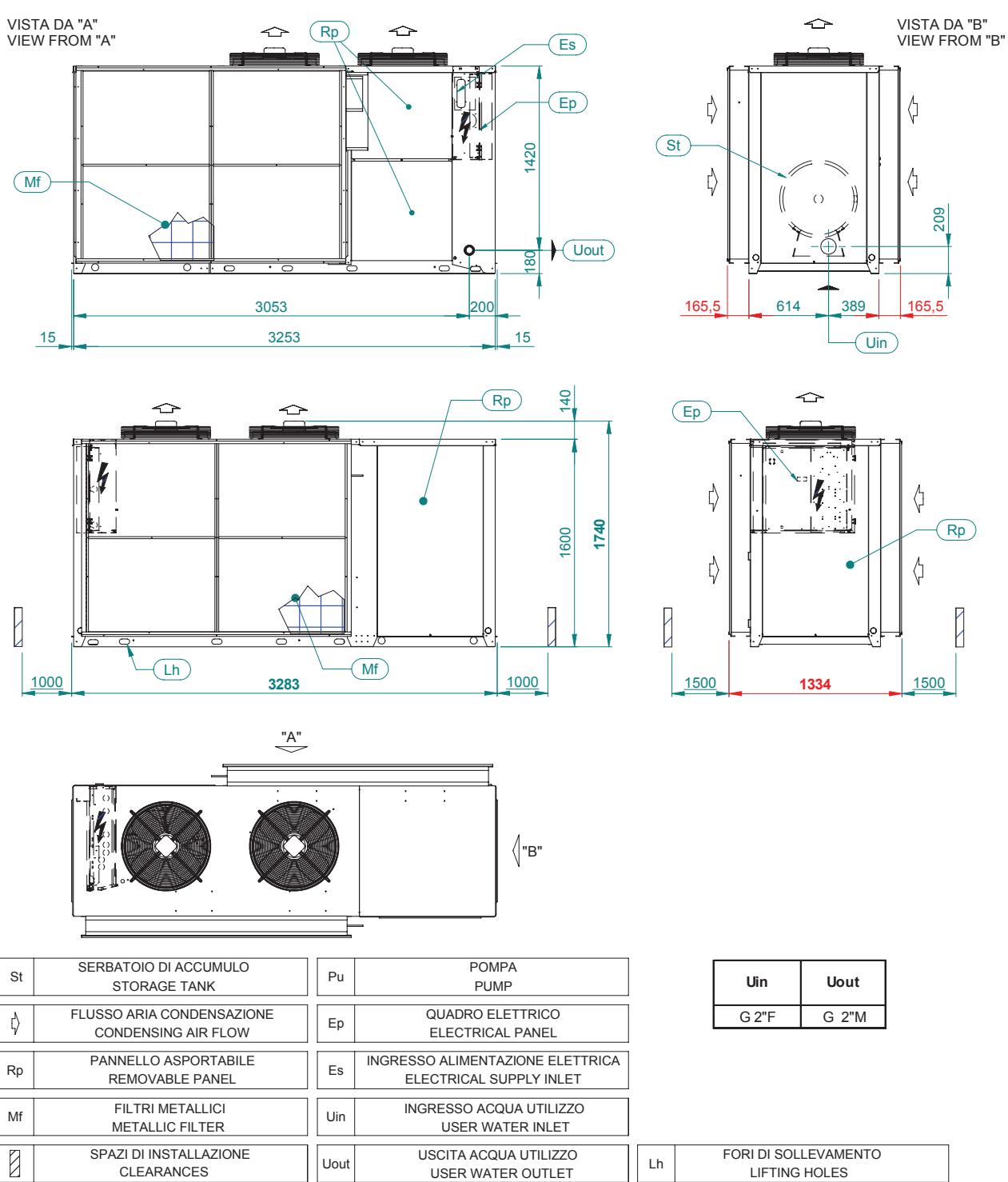
MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA ECHOS FC-NG 3.2	911	968	247	134	118	217
ZETA ECHOS FC-NG 4.2	917	974	248	134	119	220
ZETA ECHOS FC-NG 5.2	950	1008	261	136	121	233
ZETA ECHOS FC-NG-ST 1P-2P 3.2	952	1014	240	140	133	228
ZETA ECHOS FC-NG-ST 1P-2P 4.2	960	1022	241	140	135	231
ZETA ECHOS FC-NG-ST 1P-2P 5.2	993	1056	253	142	137	245
ZETA ECHOS FC-NG-ST 1PS-2PS 3.2	998	1225	271	170	171	272
ZETA ECHOS FC-NG-ST 1PS-2PS 4.2	1004	1231	272	170	172	275
ZETA ECHOS FC-NG-ST 1PS-2PS 5.2	1035	1263	284	171	174	289

Fh	FORI DI FISSAGGIO FIXING HOLES	Ø12
G..	PUNTI DI APPOGGIO ANTIVIBRANTI VIBRATION DAMPER FOOT HOLDS	

A4C883A

## DIMENSIONAL DRAWING

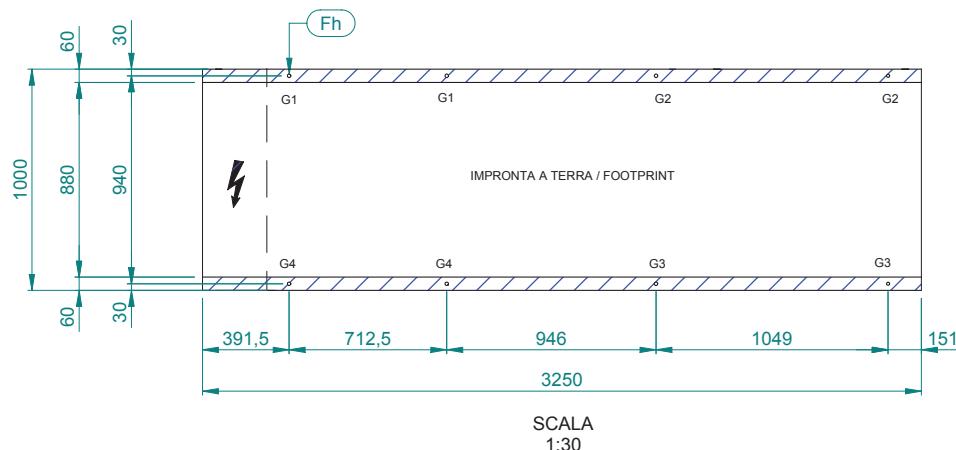
## ZETA ECHOS FC 6.2 - 7.2



A49993C

## DIMENSIONAL DRAWING

## ZETA ECHOS FC 6.2 - 7.2



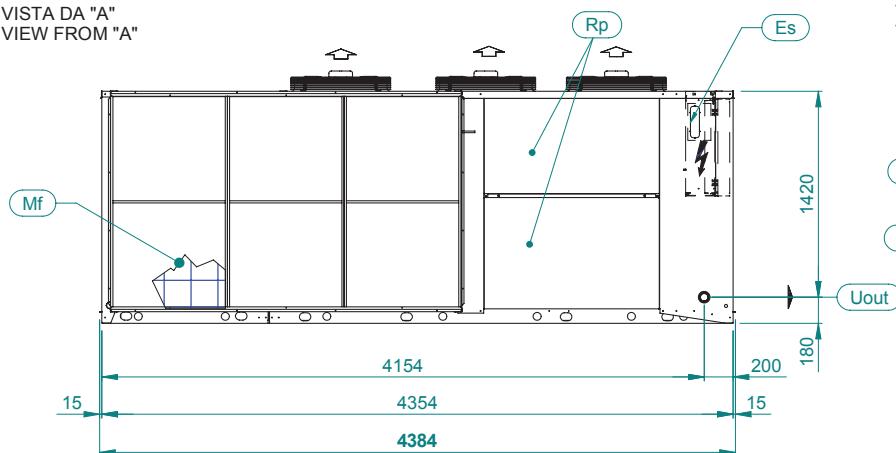
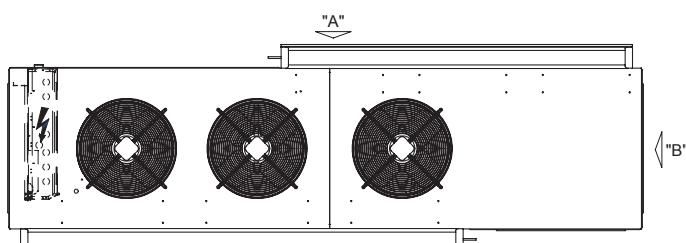
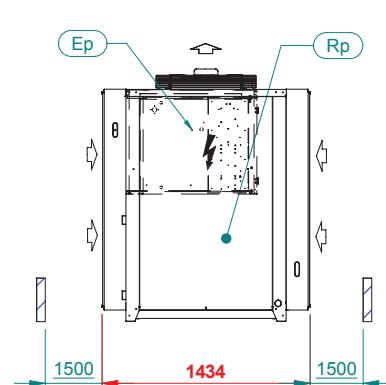
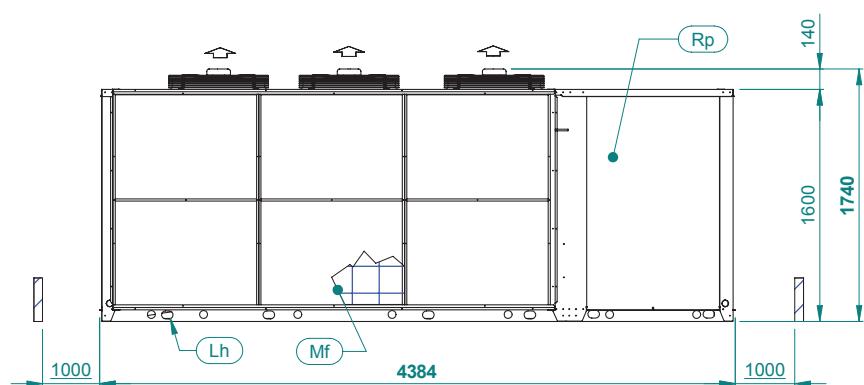
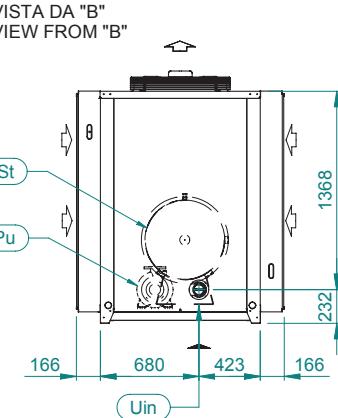
MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA ECHOS FC 6.2	1111,7	1168	218	87	80	199
ZETA ECHOS FC 7.2	1125,7	1182	220	87	80	204
ZETA ECHOS FC-ST 1P-2P 6.2	1159,7	1224	216	105	95	196
ZETA ECHOS FC-ST 1P-2P 7.2	1173,7	1238	219	104	95	201
ZETA ECHOS FC-ST 1PS-2PS 6.2	1243,7	1500	262	142	122	224
ZETA ECHOS FC-ST 1PS-2PS 7.2	1255,7	1512	264	141	122	229
ZETA ECHOS FC-NOG 6.2	1174,7	1240	215	97	96	212
ZETA ECHOS FC-NOG 7.2	1190,2	1256	217	96	97	218
ZETA ECHOS FC-NOG-ST 1P-2P 6.2	1220,7	1294	214	114	111	208
ZETA ECHOS FC-NOG-ST 1P-2P 7.2	1240,2	1314	217	114	112	214
ZETA ECHOS FC-NOG-ST 1PS-2PS 6.2	1304,7	1570	260	151	138	236
ZETA ECHOS FC-NOG-ST 1PS-2PS 7.2	1322,2	1588	262	151	139	242

Fh	FORI DI FISSAGGIO FIXING HOLES	Ø18
G..	PUNTI DI APPOGGIO ANTIVIBRANTI VIBRATION DAMPER FOOT HOLDS	

A49993C

## DIMENSIONAL DRAWING

## ZETA ECHOS FC 8.2 - 10.2

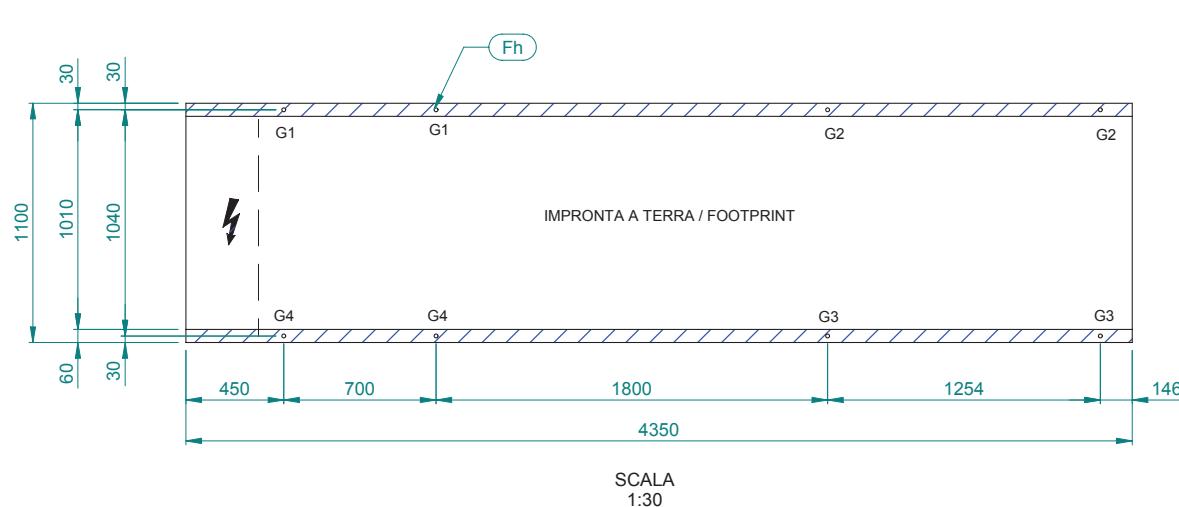
VISTA DA "A"  
VIEW FROM "A"VISTA DA "B"  
VIEW FROM "B"

St	SERBATOIO DI ACCUMULO STORAGE TANK
Pu	POMPA PUMP
Lh	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET
Mf	FILTRI METALLICI METALLIC FILTER
Uin	INGRESSO ACQUA UTILIZZO USER WATER INLET
Uout	USCITA ACQUA UTILIZZO USER WATER OUTLET
Lh	SPAZI DI INSTALLAZIONE CLEARANCES

Uin 8.2-9.2	Uin 10.2	Uout
G 2°F	G 2 1/2°F	G 2" M


## DIMENSIONAL DRAWING

## ZETA ECHOS FC 8.2 - 10.2



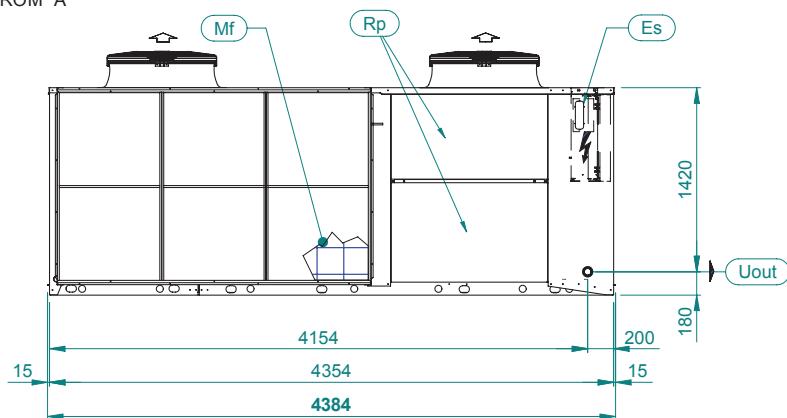
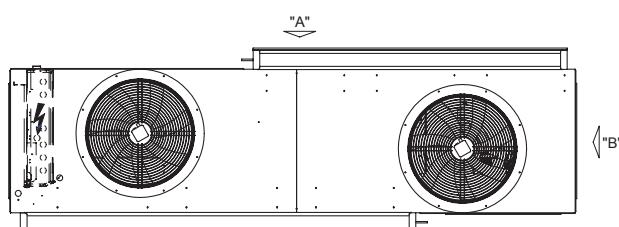
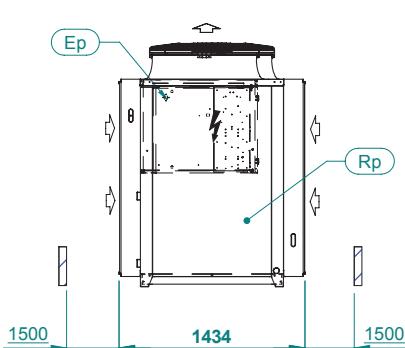
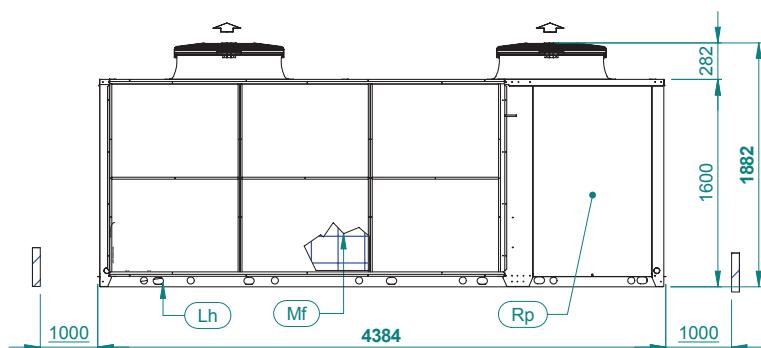
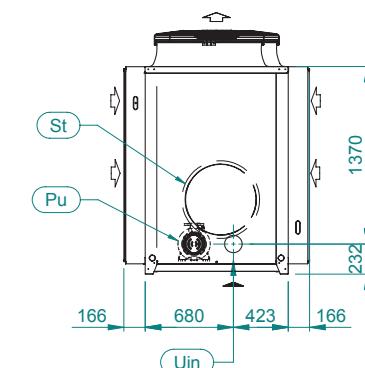
MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA ECHOS FC 8.2	1457,5	1524	272	132	117	241
ZETA ECHOS FC 9.2	1470,5	1538	277	133	116	243
ZETA ECHOS FC 10.2	1478	1546	280	133	116	244
ZETA ECHOS FC-ST 1P-2P 8.2	1556,5	1648	268	171	150	235
ZETA ECHOS FC-ST 1P-2P 9.2	1569,5	1662	273	172	149	237
ZETA ECHOS FC-ST 1P-2P 10.2	1587	1680	276	175	151	238
ZETA ECHOS FC-ST 1PS-2PS 8.2	1642,5	1934	297	217	191	262
ZETA ECHOS FC-ST 1PS-2PS 9.2	1655,5	1948	302	218	190	264
ZETA ECHOS FC-ST 1PS-2PS 10.2	1673	1966	305	221	192	265
ZETA ECHOS FC-NOG 8.2	1530,5	1608	274	137	131	262
ZETA ECHOS FC-NOG 9.2	1552	1632	279	138	132	267
ZETA ECHOS FC-NOG 10.2	1562	1644	282	138	132	270
ZETA ECHOS FC-NOG-ST 1P-2P 8.2	1631,5	1734	271	175	165	256
ZETA ECHOS FC-NOG-ST 1P-2P 9.2	1651	1756	276	176	166	260
ZETA ECHOS FC-NOG-ST 1P-2P 10.2	1672	1780	279	179	169	263
ZETA ECHOS FC-NOG-ST 1PS-2PS 8.2	1715,5	2018	300	220	207	282
ZETA ECHOS FC-NOG-ST 1PS-2PS 9.2	1733	2038	305	221	207	286
ZETA ECHOS FC-NOG-ST 1PS-2PS 10.2	1759	2066	309	225	210	289

Fh	FORI DI FISSAGGIO FIXING HOLES	Ø18
G..	PUNTI DI APPOGGIO ANTIVIBRANTI VIBRATION DAMPER FOOT HOLDS	

A4A002C

## DIMENSIONAL DRAWING

## ZETA ECHOS FC 12.2 - 13.2

VISTA DA "A"  
VIEW FROM "A"VISTA DA "B"  
VIEW FROM "B"

St	SERBATARIO DI ACCUMULO STORAGE TANK
⋮	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW
Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
Mf	FILTRI METALLICI METALLIC FILTER
⋮	SPAZI DI INSTALLAZIONE CLEARANCES

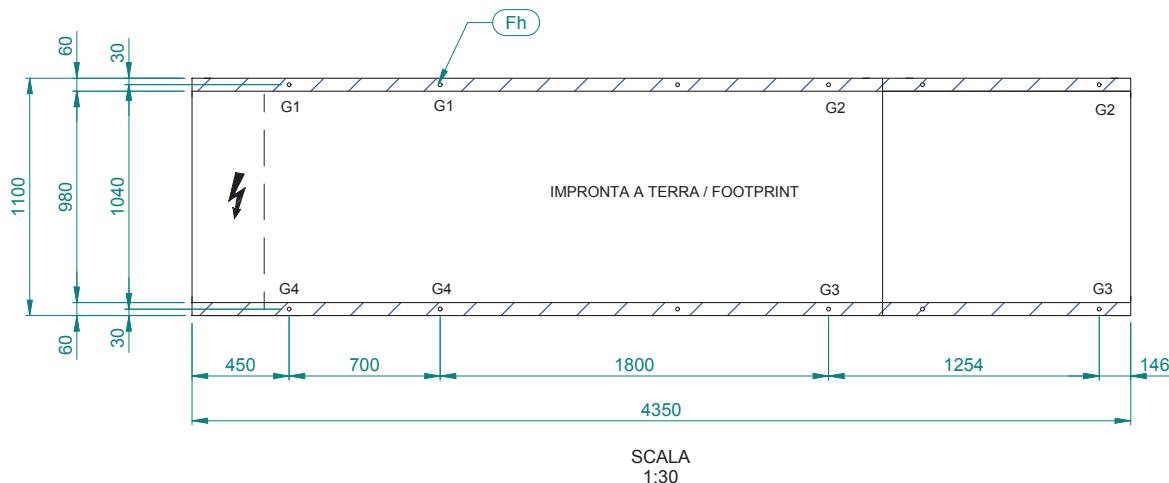
Pu	POMPA PUMP
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET
Uin	INGRESSO ACQUA UTILIZZO USER WATER INLET
Uout	USCITA ACQUA UTILIZZO USER WATER OUTLET

Uin	Uout
G 2"1/2F	G 2"1M
Lh	FORI DI SOLLEVAMENTO LIFTING HOLES

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## DIMENSIONAL DRAWING

### ZETA ECHOS FC 12.2 - 13.2



MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA ECHOS FC 12.2	1581	1650	307	143	119	256
ZETA ECHOS FC 13.2	1620	1690	322	143	117	263
ZETA ECHOS FC-ST 1P-2P 12.2	1701	1800	301	191	158	250
ZETA ECHOS FC-ST 1P-2P 13.2	1738	1838	316	191	155	257
ZETA ECHOS FC-ST 1PS-2PS 12.2	1774	2068	333	231	193	277
ZETA ECHOS FC-ST 1PS-2PS 13.2	1825	2120	347	235	193	285
ZETA ECHOS FC-NOG 12.2	1672	1756	290	167	154	267
ZETA ECHOS FC-NOG 13.2	1717,5	1804	304	169	153	276
ZETA ECHOS FC-NOG-ST 1P-2P 12.2	1794	1908	286	214	194	260
ZETA ECHOS FC-NOG-ST 1P-2P 13.2	1837,5	1954	300	216	193	268
ZETA ECHOS FC-NOG-ST 1PS-2PS 12.2	1867	2176	318	254	229	287
ZETA ECHOS FC-NOG-ST 1PS-2PS 13.2	1922,5	2234	332	259	231	295

Fh	FORI DI FISSAGGIO FIXING HOLES	Ø18
G..	PUNTI DI APPOGGIO ANTIVIBRANTI VIBRATION DAMPER FOOT HOLDS	

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## INSTALLATIONS RECOMMENDATIONS

### LOCATION

Strictly allow clearances as indicated in the catalogue.

Please check that there isn't any obstructions on the suction of the finned coil and on the discharge of the fans

Locate the unit in order to be compatible with environmental requirements (sound level, integration into the site, etc.).

### ELECTRICAL CONNECTIONS

Check the wiring diagram enclosed with the unit, in which are always present all the instructions necessary to the electrical connections.

Supply the unit at least 12 hours before start-up, in order to turn crankcase heaters on. Do not disconnect electrical supply during temporary stop periods (i.e. weekends).

Before opening the main switch, stop the unit by acting on the suitable running switches or, if lacking, on the remote control.

Before servicing the inner components, disconnect electrical supply by opening the main switch.

The electric supply line must be equipped with an automatic circuit breaker (to be provided by the installer).

### HYDRAULIC CONNECTIONS

Carefully vent the system, with pump turned off, by acting on the vent valves. This procedure is fundamental: little air bubbles can freeze the evaporator causing the general failure of the system.

Drain the system during seasonal stops (wintertime) or use proper mixtures with low freezing point. In case of temporary stop periods an electric heater should be installed on the evaporator and hydraulic circuit.

Install the hydraulic circuit including all the components indicated in the recommended hydraulic circuit diagrams (expansion vessel, flow switch, strainer, storage tank, vent valves, shut off valves, flexible connections, etc.).

Connect the flow switch, which is furnished on all units, not fitted. Follow the instructions enclosed with the units.

### START UP AND MAINTENANCE OPERATIONS

Strictly follow what reported in use and maintenance manual. All these operations must be carried on by trained personnel only.



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