> BETA ECHOS
Water chiller

> BETA ECHOS/HP
Reversibile heat pump

> BETA ECHOS/ST
Water chiller with storage tank and pumps

> BETA ECHOS/DC
Chiller with heat recovery condenser

> BETA ECHOS/DS
Chiller with desuperheaters

> BETA ECHO/LN
Low noise chiller

> BETA ECHOS/SLN
Super low noise unit

> BETA ECHOS/LE
Condensing unit

EUROVENT
CERTIFIED PERFORMANCE


BLUE BOX

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TECHNICAL CHARACTERISTICS

BETA ECHOS R410A

Air-cooled water chiller with 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 5014) to provide a durable weatherproof finish. Threaded fasteners in stainless steel.

COMPRESSORS

Hermetic type orbital scroll compressors connected in tandem, 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.

FANS

Axial fans, 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 for 2-compressor models.
For 4-compressor models, 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 (4-compressor versions only);
- Display presentation of the following information:
  - Inlet and outlet water temperature;
  - Programmed temperature set-point and differentials;
  - Alarm description;
  - Compressor operating hours count;
- For 4-compressor units:
  - 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]: 400/3~/50 ±5%.

CONTROLS AND SAFETY DEVICES

- chilled water temperature probe (at evaporator inlet);
- 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 (supplied separately for models from 3.2 to 13.2) and ready-installed for models from 16.4 to 26.4.

TESTING

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

VERSIONS

- ZETA ECHOS R410A/HP: REVERSIBLE HEAT PUMP.
  In addition to the components of the base version, this model includes:
  - 4-way cycle reversing valve;
  - liquid receiver;
  - second thermostatic expansion valve;
  - liquid line solenoid valve from model 6.2 to 26.4;
  - enabling of the microprocessor for summer/winter changeover and automatic defrost, with Blue Box patented
    logic that makes it possible to optimize defrost cycle operation and duration.
- ZETA ECHOS R410A/LE: CONDENSING UNIT.
  With respect to the base unit, this unit is not equipped with evaporator, thermostatic expansion valve, or microprocessor
  controller (4-compressor models).
  Liquid receivers can be supplied as accessories.
  The solenoid valve on the liquid line is supplied as part of the standard outfit.
  The unit is supplied without refrigerant.
- ZETA ECHOS R410A/LE/HP: CONDENSING UNIT IN HEAT PUMP VERSION.
  With respect to the ZETA ECHOS/HP base unit, this unit is not equipped with evaporator, thermostatic expansion valves, or microprocessor controller (4-compressor models).
  The solenoid valve on the liquid line is supplied as part of the standard outfit. The unit is supplied without refrigerant.

HYDRAULIC MODULE OPTIONS

- ZETA ECHOS R410A/ST 2PS: UNIT WITH STORAGE TANK AND PUMPS
  In addition to the components featured on ZETA ECHOS, 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 R410A/DC: UNIT WITH HOT WATER PRODUCTION.
  In addition to the components of the base version, this unit includes a condenser for 100% rejection heat recovery on each refrigerant circuit for the production of hot water, and a liquid receiver.
  The condenser is of the brazed plate type.
  The accessory is available for sizes 3.2-13.2 "1p-2p" and for all versions without hydraulic module; it is not available for
  HP version models.
  The controller manages the activation of heat recovery automatically on the basis of the water temperature, and safety
  deactivation of the recovery condenser due to high pressure conditions.
  To maximize the potential of this accessory it is advisable to install it in conjunction with the speed regulator.
  The accessory is available for all models.
  Not available in the HP version.
- ZETA ECHOS R410A/DS: UNIT WITH DESUPERHEATERS.
  In addition to the components of the base version, this unit includes a brazed plate condenser for 20% rejection heat
  recovery on each refrigerant circuit, installed in series with the condensing coil. The accessory is available for models from
  3.2 to 13.2 and from 14.4 to 26.4 "1P-2P-1PS-2PS-S" and for all versions without hydraulic module.

To maximize the potential of this accessory it is advisable to install it in conjunction with the speed regulator.
This version is available also in the HP layout. In this case the installation must include the facility to shut off the domestic
hot water circuit during HP mode operation as indicated in the manual.

- ZETA ECHOS R410A/LN: LOW NOISE UNIT.
  L'unità, oltre ai componenti della versione base, prevede il vano compressori completamente coibentato acusticamente con
  materiale fonoassorbente e con interposto materiale fonoimpedente.
- ZETA ECHOS R410A/SLN: SUPER LOW NOISE UNIT.
  L'unità, oltre ai componenti della versione LN, prevede batterie a superficie maggiorata, FANS a velocità ridotta, regolatore di giri dei FANS.

ACCESSORIES

- REFRIGERANT CIRCUIT ACCESSORIES
  - Electronic thermostatic valve;
  - Condensing pressure control with fan speed regulator for low ambient temperature operation;
  - Dual set point (low/high temperature) with single electronic thermostatic valve. The unit's evaporator is sized on the basis
    of high temperature operation. The set-point can be changed from the keypad or, when specifically requested at the
    time of the order, via a digital input;
  - High and low pressure gauges available for all models (for 4-compressor models suction and discharge pressures can be
    read on the controller display also in the standard unit configuration);
  - Liquid receivers (standard equipment for HP, HP/LE and DC, DC/LE versions);
  - Suction and discharge valves on the compressors common line;
  - Liquid line solenoid valve (standard equipment for HP and HP/LE and LE versions);
  - Kit for low water temperatures.
- HYDRAULIC CIRCUIT ACCESSORIES
  - Anti-freeze heater for evaporator (for ST version an anti-freeze electric heater is installed also on the tank, on the piping
    and on the pump volute, which must therefore be insulated), and on recovery exchangers, if present;
  - Water side relief valve (ST version only). The valve is set to 6 bar, which corresponds to the maximum permissible working pressure value.
- ELECTRICAL ACCESSORIES
  - RS 485 serial interface supporting Carel, Modbus;
  - Power factor correction cosø≥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);
  - Volt-free contacts for unit operating status.

  The following accessories are available for four-compressor units:
  - Water outlet temperature control;
  - Mobile text message service for management of service calls;
  - 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.
- MISCELLANEOUS ACCESSORIES
  - Rubber or spring type anti-vibration mounts on the entire series from size 18.4 to 26.4;
  - Copper/copper condensing coil;
  - Copper/tinned copper condensing coil;
  - 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;
  - Timber crate packing;
  - Pallet/skid for container shipment;
  - Non-standard "RAL" paint colours.

UNIT SIZE			3.2	4.2	5.2	6.2	7.2
Cooling							
Nominal cooling capacity	(1)	kW	40,9	45,9	51,8	60,4	66,8
Total power input for cooling	(1),(2)	kW	16,7	18,8	20,4	21,5	25,1
Compressors power input	(1)	kW	12,4	14,5	17,2	18,9	22,5
EER	(1)		2,45	2,44	2,54	2,81	2,66
ESEER			4,37	4,26	4,18	4,43	3,5
Heating							
Nominal heating capacity	(3)	kW	41,6	47,4	55,5	63,4	70,9
Total power input for heating	(2),(3)	kW	17,3	19,3	20,7	22,2	26,4
Compressors power input	(3)	kW	13,0	15,0	17,5	19,6	23,9
COP	(3)		2,40	2,45	2,68	2,86	2,68
Compressors							
Type					Scroll		
Quantity / Circuits		n°/n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
Capacity steps		n°	0-50-100	0-50-100	0-50-100	0-50-100	0-50-100
Total oil charge		kg	5,2	6,5	6,5	6,5	6,6
Total refrigerant charge (CH version)		kg	6,7	6,8	9	15,8	16
Total refrigerant charge (HP version)		kg	14,8	14,9	17	18,4	18,6
Fans							
Type					Centrifughi		
Quantity		n°	1	1	1	2	2
External available pressure		Pa	50	50	50	50	50
Air flow		m^3/h	17.000	17.000	15.000	19.000	19.000
Evaporator							
Type					A piastre		
Quantity		n°	1	1	1	1	1
Water flow		l/h	7034	7893	8908	10387	11481
Pressure drop		kPa	65,0	55,7	54,8	51,1	34,0
Hydraulic module							
External available pressure	(6)	kPa	127	108	105	153	149
Tank capacity	(6)	l	200	200	200	200	200
Expansione vassel		l	5	5	5	18	18
Sound level							
Sound power value (standard unit)	(4)	dB(A)	88	89	89	89	91
Sound pressure value (standard unit)	(5)	dB(A)	71	72	72	72	74
Sound power value (LN version)	(4)	dB(A)	86	86	86	87	88
Sound pressure value (LN version)	(5)	dB(A)	69	69	69	70	71
Sound power value (SLN version)	(4)	dB(A)	84	84	84	85	86
Sound pressure value (SLN version)	(5)	dB(A)	67	67	67	68	69
Basic unit size and weights							
Length		mm	1.750	1.750	1.750	2.233	2.233
Width		mm	1.025	1.025	1.025	1.010	1.010
Height		mm	1.460	1.460	1.460	1.800	1.800
Operating weigh		kg	448	456	468	680	680

(1) Ambient air temperature 35°C; evaporator inlet/outlet water temperature 12-7 °C
(2) Total power input is sum of compressors and funs power input
(3) Ambient air temperature 7°C DB, 6°C WB; conderser inlet/outlet water temperature 40-45 °C
(4) Sound power values calculate in compliance with ISO 3744; nominal working conditions.
(5) Sound pressure values measured at 1 meters distance from the unit in free field and at nominal working conditions, in compliance with ISO 3744
(6) ST 2PS version

technical data standard unit

UNIT SIZE			8.2	9.2	10.2	12.2	13.2
Cooling							
Nominal cooling capacity	(1)	kW	83,5	93,7	104,0	117,0	125,0
Total power input for cooling	(1),(2)	kW	27,9	33,3	38,9	45,5	50,2
Compressors power input	(1)	kW	24,1	29,5	35,1	36,8	41,5
EER	(1)		2,99	2,81	2,67	2,57	2,49
ESEER			4,77	4,41	4,17	4,29	4,1
Heating							
Nominal heating capacity	(3)	kW	83,9	97,0	112,0	127,0	139,0
Total power input for heating	(2),(3)	kW	29,9	34,6	38,7	47,5	50,7
Compressors power input	(3)	kW	26,1	30,8	34,9	38,8	42,0
COP	(3)		2,80	2,80	2,89	2,67	2,74
Compressors							
Type					Scroll		
Quantity / Circuits		n°/n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
Capacity steps		n°	0-50-100	0-50-100	0-50-100	0-50-100	0-50-100
Total oil charge		kg	6,2	12,4	12,4	12,4	14,2
Total refrigerant charge (CH version)		kg	23,2	23,4	26	23,7	23,9
Total refrigerant charge (HP version)		kg	25,7	25,8	26	26	26
Fans							
Type					Centrifughi		
Quantity		n°	3	3	3	3	3
External available pressure		Pa	50	50	50	50	50
Air flow		m^3/h	28.500	28.500	28.500	36.000	36.000
Evaporator							
Type					A piastre		
Quantity		n°	1	1	1	1	1
Water flow		l/h	14359	16113	17885	20120	21496
Pressure drop		kPa	49,4	50,6	46,0	48,8	45,1
Hydraulic module							
External available pressure	(6)	kPa	123	130	108	124	108
Tank capacity	(6)	l	450	450	450	450	450
Expansione vassel		l	18	18	18	18	18
Sound level							
Sound power value (standard unit)	(4)	dB(A)	91	91	91	93	93
Sound pressure value (standard unit)	(5)	dB(A)	73	73	73	75	75
Sound power value (LN version)	(4)	dB(A)	90	90	89	90	90
Sound pressure value (LN version)	(5)	dB(A)	72	72	71	72	72
Sound power value (SLN version)	(4)	dB(A)	87	88	87	88	88
Sound pressure value (SLN version)	(5)	dB(A)	69	70	69	70	70
Basic unit size and weights							
Length		mm	3.240	3.240	3.240	3.240	3.240
Width		mm	1.119	1.119	1.119	1.119	1.119
Height		mm	1.800	1.800	1.800	1.800	1.800
Operating weigh		kg	990	996	1.004	1.072	1.106

(1) Ambient air temperature 35°C; evaporator inlet/outlet water temperature 12-7 °C
(2) Total power input is sum of compressors and funs power input
(3) Ambient air temperature 7°C DB, 6°C WB; conderser inlet/outlet water temperature 40-45 °C
(4) Sound power values calculate in compliance with ISO 3744; nominal working conditions.
(5) Sound pressure values measured at 1 meters distance from the unit in free field and at nominal working conditions, in compliance with ISO 3744
(6) ST 2PS version

UNIT SIZE			15.2	16.2	14.4	16.4	18.4
Cooling							
Nominal cooling capacity	(1)	kW	138,0	147,0	135,0	158,0	188,0
Total power input for cooling	(1),(2)	kW	56,7	62,0	52,3	57,9	65,7
Compressors power input	(1)	kW	50,4	55,7	46,0	51,6	57,3
EER	(1)		2,43	2,37	2,58	2,73	2,86
ESEER			3,67	3,66	3,93	4,37	4,56
Heating							
Nominal heating capacity	(3)	kW	152,0	161,2	144,4	162,0	199,0
Total power input for heating	(2),(3)	kW	58,8	62,3	54,1	58,0	69,4
Compressors power input	(3)	kW	52,5	56,0	47,8	51,7	61,0
COP	(3)		2,59	2,59	2,67	2,79	2,87
Compressors							
Type					Scroll		
Quantity / Circuits		n°/n°	2 / 1	2 / 1	4 / 2	4 / 2	4 / 2
Capacity steps		n°	0-50-100	0-50-100	0-25-50-75-100	0-25-50-75-100	0-25-50-75-100
Total oil charge		kg	14	14,5	14	16	24,8
Total refrigerant charge (CH version)		kg	30	31	31	31	41
Total refrigerant charge (HP version)		kg	35	36	36	36	48
Fans							
Type					Centrifughi		
Quantity		n°	3	3	3	3	4
External available pressure		Pa	50	50	50	50	50
Air flow		m^3/h	40.000	40.000	40.000	40.000	57.000
Evaporator							
Type					A piastre		
Quantity		n°	1	1	2	2	2
Water flow		l/h	23732	25279	23216	27171	32330
Pressure drop		kPa	47,8	43,5	34,4	52,4	62,5
Hydraulic module							
External available pressure	(6)	kPa	97	151	107	129	143
Tank capacity	(6)	l	340	340	340	340	700
Expansione vassel		l	18	18	18	18	18
Sound level							
Sound power value (standard unit)	(4)	dB(A)	93	93	94	95	95
Sound pressure value (standard unit)	(5)	dB(A)	75	75	76	77	76
Sound power value (LN version)	(4)	dB(A)	91	91	92	92	95
Sound pressure value (LN version)	(5)	dB(A)	73	73	74	74	76
Sound power value (SLN version)	(4)	dB(A)	89	89	90	90	91
Sound pressure value (SLN version)	(5)	dB(A)	71	71	72	72	72
Basic unit size and weights							
Length		mm	3.240	3.240	3.240	3.240	4.240
Width		mm	1.120	1.120	1.120	1.120	1.120
Height		mm	2.300	2.300	2.300	2.300	2.300
Operating weigh		kg	1.414	1.503	1.350	1.522	1.815

(1) Ambient air temperature 35°C; evaporator inlet/outlet water temperature 12-7 °C
(2) Total power input is sum of compressors and funs power input
(3) Ambient air temperature 7°C DB, 6°C WB; conderser inlet/outlet water temperature 40-45 °C
(4) Sound power values calculate in compliance with ISO 3744; nominal working conditions.
(5) Sound pressure values measured at 1 meters distance from the unit in free field and at nominal working conditions, in compliance with ISO 3744
(6) ST 2PS version

UNIT SIZE			20.4	24.4	26.4	30.4	33.4
Cooling							
Nominal cooling capacity	(1)	kW	211,0	231,0	250,0	279,2	302,3
Total power input for cooling	(1),(2)	kW	78,1	85,9	96,4	115,9	132,6
Compressors power input	(1)	kW	67,3	75,1	85,6	103,4	110,1
EER	(1)		2,70	2,69	2,59	2,41	2,28
ESEER			4,4	4,24	4,1	4,14	4,57
Riscaldamento							
Nominal heating capacity	(3)	kW	226,0	244,0	268,0	301,5	326,6
Total power input for heating	(2),(3)	kW	79,9	87,5	94,6	113,3	131,3
Compressors power input	(3)	kW	69,1	76,7	83,8	100,8	108,8
COP	(3)		2,83	2,79	2,83	2,66	2,49
Compressors							
Type					Scroll		
Quantity / Circuits		n°/n°	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2
Capacity steps		n°	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
Total oil charge		kg	24,8	28,4	32	28	29
Total refrigerant charge (CH version)		kg	41,4	41,6	42	54	54
Total refrigerant charge (HP version)		kg	48	48	48	61	61
Fans							
Type					Centrifughi		
Quantity		n°	4	4	4	5	5
External available pressure		Pa	50	50	50	50	50
Air flow		m^3/h	58.950	70.000	70.000	78.000	89.000
Evaporator							
Type					A piastre		
Quantity		n°	2	2	2	2	2
Water flow		l/h	36285	39725	42992	48014	51986
Pressure drop		kPa	62,4	67,2	66,2	34,2	40,0
Hydraulic module							
External available pressure	(6)	kPa	110	163	138	183	158
Tank capacity	(6)	l	700	700	700	-	-
Expansione vassel		l	18	18	18	-	-
Sound level							
Sound power value (standard unit)	(4)	dB(A)	97	97	97	99	100
Sound pressure value (standard unit)	(5)	dB(A)	78	78	78	80	81
Sound power value (LN version)	(4)	dB(A)	95	95	95	96	97
Sound pressure value (LN version)	(5)	dB(A)	76	76	76	77	78
Sound power value (SLN version)	(4)	dB(A)	92	92	92	93	94
Sound pressure value (SLN version)	(5)	dB(A)	73	73	73	74	75
Basic unit size and weights							
Length		mm	4.240	4.240	4.240	5.240	5.240
Width		mm	1.120	1.120	1.120	1.120	1.120
Height		mm	2.300	2.300	2.300	2.300	2.300
Operating weigh		kg	1.830	1.900	1.991	2.332	2.376

(1) Ambient air temperature 35°C; evaporator inlet/outlet water temperature 12-7 °C
(2) Total power input is sum of compressors and funs power input
(3) Ambient air temperature 7°C DB, 6°C WB; conderser inlet/outlet water temperature 40-45 °C
(4) Sound power values calculate in compliance with ISO 3744; nominal working conditions.
(5) Sound pressure values measured at 1 meters distance from the unit in free field and at nominal working conditions, in compliance with ISO 3744
(6) ST 2PS version