

Zeta Rev

40÷233 kW



General

Chillers and reversible units with hermetic scroll compressors and plate heat exchanger. Extended range, versatile applications.

Configurations

HP: reversible heat pump version

HE: high efficiency version

SLN: super low noise version

LE: motocondensing execution

/LN: silenced unit

/DS: execution featuring a desuperheater

/DC: execution with recovery condenser

Strengths

- ▶ Chiller with low refrigerant charge
- ▶ Intelligent management of defrost cycles: Anti-Ice Circuit
- ▶ Night Shift function for noise control (option)
- ▶ BlueThink advanced control with integrated web server. Multilogic function and Blueeye® supervision system. (options)
- ▶ Flowzer: inverter driven pumps (options)



Zeta Rev

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Zeta Rev

Chillers and reversible units with hermetic scroll compressors and plate heat exchanger. Extended range, versatile applications.

STRUCTURE

The structure of the unit is made of galvanized sheet-iron coated with polyester powder in RAL 5017/7035 at 180°C, which makes it highly resistant to weather conditions.

The structure is a load-bearing frame, with removable panning lined with sound absorbing expanded polyurethane matting.

All screws and bolts are stainless steel.

REFRIGERANT

The unit is charged with refrigerant R410A, with GWP=2088 (value at 100 years).

COMPRESSORS

The compressors are hermetic orbiting spiral scroll compressors connected in tandem. They are provided with thermal overload protection by internal Klixon® or external Kriwan© module (depending on the model) and with oil equalization line. All the compressors are fitted as standard with crankcase heater.

The compressors are enclosed in a dedicated technical compartment, which can be accessed by removing the panning to allow maintenance operations to be carried out even with units running.

SOURCE-SIDE HEAT EXCHANGER

(for chiller unit)

The exchangers are made with microchannel aluminium coils.

Thanks to continuous research in the alloys field, and sophisticated production methods, microchannel coils are made using specific aluminium alloys for the tubes and for the fins. This allows the effects of galvanic corrosion to be drastically reduced to always ensure protection of the tubes that confine the refrigerant. Tubes and fins are also subjected to SilFLUX coating processes (or equivalent) or have zinc added to further increase their corrosion resistance.

The use of microchannel coils, as opposed to conventional copper/aluminium coils, reduces the total weight of the unit and reduces the refrigerant charge.

Options are available for installation in environments with a particularly aggressive atmosphere or in coastal or highly industrialized areas. See section: "Description of accessories".

(for HP units)

The exchangers are made with finned pack coils with copper tubes and aluminium fins.

At the base of each coil, there is an Anti-Ice Circuit: this helps to prevent ice formation in the lower part of the coil and therefore allows the unit to operate even with extremely harsh temperatures and with high humidity levels.

The Anti-Ice Circuit is shut off by a solenoid valve managed by the controller of the unit to ensure this is running only when the coils work as evaporator and only when the external air temperature makes it really necessary.

Options are available for installation in environments with a particularly aggressive atmosphere or in coastal or highly industrialized areas. See section: "Description of accessories".

FANS

The fans are axial fans, directly coupled to a 6-pole electric motor, with integrated thermal overload protection (Klixon®) and IP 54 protection rating.

The fan includes the shroud, designed to optimize its efficiency and reduce noise emission to a minimum, and the safety guard.

For standard efficiency models from 3.2 to 10.2 and for HE and SLN version models from 3.2 to 7.2, the unit is fitted as standard with condensing control with fan speed adjuster. For the other models, condensing control by steps or condensing control with fan speed adjuster are available as alternative options.

USER-SIDE HEAT EXCHANGER

The exchanger is a braze-welded stainless steel plate heat exchanger, insulated with a shroud of closed-cell insulating material.

For dual circuit models, the unit uses two heat exchangers already manifolded inside the unit and therefore with a single hydraulic connection.

The exchanger is also equipped with thermostat-controlled anti-freeze heater to protect it from ice formation when the unit is not running.

REFRIGERANT CIRCUIT

Each refrigerant circuit of the basic unit (cooling only) comprises:

- valve on the liquid line
- charging valves
- liquid sight glass
- replaceable solid cartridge dehydrator filter (except for sizes 3.2, 4.2 and 5.2 where the filter is a weld-on filter)
- thermostatic expansion valve with pressure equalization
- high and low pressure switches

The pipes of the circuit and the exchanger are insulated with extruded closed-cell expanded elastomer.

As an accessory, all the units can be fitted with an electronic expansion valve that allows machine stability to be reached more quickly and better superheating control than the mechanical expansion valve, to maximize the use of the evaporator in all load conditions.

ELECTRICAL CONTROL PANEL

The electrical control panel is made in a painted galvanized sheet-iron box with forced ventilation and IP54 protection rating.

The electrical control panel of the basic unit comprises:

- main disconnect switch
- automatic circuit breakers for compressors with fixed calibration
- fuses for protecting the fans and auxiliary circuits
- fan contactors
- phase-cutting fan speed adjuster
- thermal magnetic circuit breakers for pumps (if present)
- phase monitor
- potential-free general alarm contacts
- single potential free operating contacts for compressors, fans and pumps (when present)
- digital input for general ON/OFF
- summer/winter selection by digital input (only for HP units)
- external air temperature probe
- microprocessor controller with display accessible from the outside

All the electrical cables inside the panel are numbered and the terminal board dedicated to the customer's connections is coloured orange so that it can be quickly identified in the panel.

The power supply of the unit is 400V/3~+N/50Hz for the following models:

- Zeta Rev from size 3.2 up to size 10.2
- Zeta Rev HE from size 3.2 up to size 7.2
- Zeta Rev SLN from size 3.2 up to size 7.2

The power supply of the unit is 400V/3~/50Hz for the following models:

- Zeta Rev from size 12.2 up to size 24.4
- Zeta Rev HE from size 8.2 up to size 16.4
- Zeta Rev SLN from size 8.2 to 16.4 from size 8.2 up to size 16.4

CONTROL BLUETHINK

The unit is supplied as standard with parametric control. The advanced control can be requested as accessory.

Main controller functions parametric

The control allows the following functions:

- water temperature adjustment, with control of the water entering the user-side heat exchanger
- freeze protection
- compressor timings
- automatic rotation of compressor starting sequence
- recording of the alarm log
- RS485 serial port with Modbus protocol
- digital input for general ON/OFF
- digital input for Summer/Winter selection (only for HP units)

For further details on available functions and on displayed information, refer to the specific documentation of the controller.

By default, the serial connections present as standard are enabled only for reading from BMS. Enabling of writing from BMS is to be requested when ordering.

Main controller functions advanced

The control allows the following functions:

- water temperature adjustment, with control of the water entering the user-side heat exchanger
- freeze protection
- compressor timings
- automatic rotation of compressor starting sequence
- recording of the log of all machine inputs, outputs and states
- automatic rotation of compressor starting sequence
- recording of the alarm log
- RS485 serial port with Modbus protocol
- Ethernet serial port with Modbus protocol and integrated web server preloaded web page
- digital input for general ON/OFF
- digital input for Summer/Winter selection (only for HP units)

For further details on available functions and on displayed information, refer to the specific documentation of the controller.

By default, the serial connections present as standard are enabled only for reading from BMS. Enabling of writing from BMS is to be requested when ordering.

Main functions of the webserver (only for units with advanced control)

As standard, the Bluethink controller integrates a webserver with a preloaded web page that is accessed via password.

The web page allows the following functions to be carried out (some of these are available only for users with advanced level rights):

- display of the main functions of the unit such as unit serial n°, size, refrigerant
- display of the general status of the machine: water inlet and outlet temperatures, external air temperature, mode (chiller or heat pump), evaporating and condensing pressures, suction and discharge temperatures
- display of the status of compressors, pumps, expansion valves
- display in real time of the graphs of the main quantities
- display of the graphs of logged quantities
- display of alarm log
- management of users on several levels
- remote ON/OFF
- remote set point change
- remote time band change
- remote summer winter mode selection (only for HP units)

Human-Machine Interface

The control has a graphic display that allows the following information to be displayed:

- water inlet and outlet temperature
- set temperature and differential set points
- description of alarms
- hour meter of operation and number of start-ups of the unit, the compressors and the pumps (if present)
- high and low pressure values, and relevant condensing and evaporating temperatures
- external air temperature
- superheating at compressor suction.

Management of defrost cycles

(only for HP units)

For defrost management, the control of the unit uses a sliding intervention threshold, depending on the pressures inside the unit and the external air temperature. By putting together all this information, the control can identify the presence of ice on the coil and activates the defrosting sequence only when necessary, so as to maximize the energy efficiency of the unit.

Sliding management of the defrost threshold ensures that, as the absolute humidity of outdoor air decreases, the frequency of the defrost cycles gradually decreases because they are carried out only when the ice formed on the coil actually penalizes performance.

The defrost cycle is fully automatic and is carried out using a patented defrost system (patent n° 1335232): during the initial stage, a defrost is carried out by cycle reversal with fans stopped. When the frost on the coil has melted sufficiently, reverse ventilation is activated, that is, with air flow in the opposite direction to that of normal operation, so as to facilitate the ejection of condensed water and detached ice. When the coil is clean, ventilation is reversed again and the unit resumes operation in heat pump mode.

In addition, the Anti-Ice Circuit helps to prevent ice formation in the lower part of the coil and so allows the unit to operate even with extremely harsh temperatures and with high humidity levels.

The combination of defrost cycle management with sliding intervention threshold, patented defrost system and Anti-Ice Circuit allows the number and duration of defrost cycles to be optimized and reduced to a minimum.

CONTROLS AND SAFETY DEVICES

All the units are fitted with the following control and safety components:

- user-side water temperature probe
- antifreeze probe on the user side heat exchanger
- high pressure switch with manual reset
- low pressure safety device with automatic reset, for a limited number of occurrences, managed by the controller
- compressor overtemperature protection
- fan overtemperature protection
- mechanical paddle flow switch (supplied loose)

TESTING

All units are factory-tested and supplied complete with oil and refrigerant, except for the LE and LE/HP versions that are charged with nitrogen.

VERSIONS

Alongside the basic version of the unit, there are various versions that differ in efficiency and noise levels.

HE: high efficiency unit

The high efficiency units use larger coils than the basic unit, in order to increase the ratio between exchange surfaces and capacity of the compressors. This allows all models to achieve high efficiency levels: in chiller configuration, SEER up to 4.02; in heat pump configuration (HE/HP), SCOP up to 3.59.

SLN: super low noise unit

The SLN version units use a soundproofed compressor compartment, oversize coils compared to the standard efficiency unit and fans with speed adjuster and reduced air flow rate. The speed reduction of the fans is such that, under nominal operating conditions, the air flow rate and noise level are lower than those of the basic version of the unit.

In any case, the use of the speed adjuster to reduce the air flow rate allows rotation of the fans at maximum speed when external air temperature conditions are particularly critical and therefore guarantees the same operating limits as the high efficiency version.

Also, for SLN/HP version units working in heat pump mode, the fans always operate at 100% speed and therefore guarantee the same performance levels as the high efficiency versions.

LE: unit with remote user-side heat exchanger

The LE version units are without user-side heat exchanger and thermostatic expansion valve (to be positioned on the remote heat exchanger).

The units are supplied with:

- standard solenoid valve on the liquid line
- without refrigerant charge and charged with nitrogen
- weld-on refrigerant connections closed with copper plugs

Zeta Rev Industrial

Units from the Zeta Rev Industrial series are duly designed for industrial applications where the requirements in terms of available head to the hydronic circuit exceed the standards of the base units.

The units are standardly supplied with:

- a hydraulic module with a 3 bar pump and a tank
- a connection for manual filling of the hydraulic circuit
- a water pressure meter on the pump drain line

For further information on this range, refer to the selection programme and/or contact BlueBox after-sales service.

OPTIONS

/HP: reversible heat pump

The /HP units comprise (for each refrigerant circuit):

- 4-way reversing valve
- fluid accumulator
- second electronic expansion valve.
- Anti-Ice Circuit at the base of each coil

The Anti-Ice Circuit helps to prevent ice formation in the lower part of the coil and therefore allows the unit to operate even with extremely harsh temperatures and with high humidity levels.

For defrost management, the control of the unit uses a sliding intervention threshold, depending on the pressures inside the unit and the external air temperature. By putting together all this information, the control can identify the presence of ice on the coil and activates the defrosting sequence only when necessary, so as to maximize the energy efficiency of the unit.

Sliding management of the defrost threshold ensures that, as the absolute humidity of outdoor air decreases, the frequency of the defrost cycles gradually decreases because they are carried out only when the ice formed on the coil actually penalizes performance.

The defrost cycle is fully automatic and is carried out using a patented defrost system: during the initial stage, a defrost is carried out by cycle reversal with fans stopped. When the frost on the coil has melted sufficiently, reverse ventilation is activated, that is, with air flow in the opposite direction to that of normal operation, so as to facilitate the ejection of condensation water and detached ice. When the coil is clean, ventilation is reversed again and the unit resumes operation in heat pump mode.

The combination of defrost cycle management with sliding intervention threshold, patented defrost system and Anti-Ice Circuit allows the number and duration of defrost cycles to be optimized and reduced to a minimum.

Summer/winter switching can be done from the control keypad, digital input or BMS (requires write enabling).

/DC: unit with total recovery condenser

In addition to the set-up of a chiller only unit, /DC units comprise:

- a heat recovery condenser for recovering 100% of the condensation heat on each refrigerant circuit. The exchanger is a brazed plate heat exchanger; for dual circuit units, the heat exchangers are to be manifolded outside the unit (by the customer)
- temperature probe at the inlet of the heat recovery heat exchanger; for dual circuit units, the probe is supplied with the unit and is to be positioned on the heat exchanger inlet manifold (by the customer)
- liquid receiver for each refrigerant circuit with system for emptying the refrigerant from the condensing coil
- potential free contact in the electrical control panel for activation of recovery.

When required by the system, through the closing of a contact, the control automatically manages activation of recovery. Recovery management is carried out through a control on the temperature of the return water. The control also automatically manages safety deactivation of recovery if the condensing pressure becomes too high, and changes to using the condensing coils.

This option is not available for /HP units

/DS: unit with desuperheater

/DS units comprise (for each refrigerant circuit) an exchanger for condensation heat recovery of up to 20% (depending on size, version and operating conditions), placed in series with the condensing coil. The exchanger is a braze-welded plate heat exchanger. For multi-circuit units, the exchangers are to be manifolded outside the unit (by the customer).

The desuperheater can be used during operation in cooling mode. However, it can also be used in heating mode on condition that the following measures are taken:

- a valve (either 2- or 3-way) must be installed on the desuperheater water circuit;
- the valve must be monitored using a temperature control system;
- the valve must be operated to regulate the temperature of the input water into the desuperheater = IWTds.

First, enter the unit heating setpoint, which corresponds to the temperature of water delivered to the heating unit = LWTu_Heating. Then set the condition below:

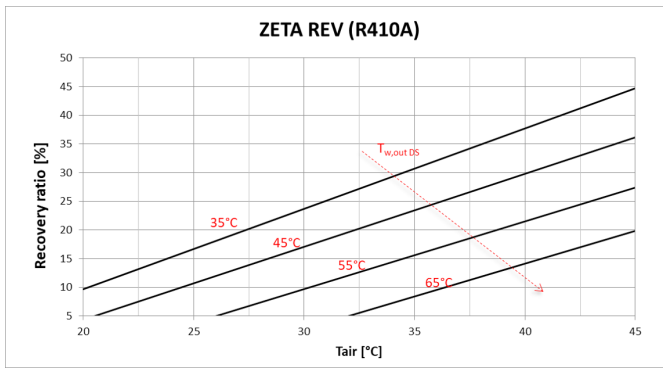
- $IWTds > LWTu_Heating + 10 [K]$

The valve, the control systems and their installation, setup operations, etc. are the responsibility of the client. If heat recovery is not required during operation in heat pump mode, or where the above requirements are not met, the water circuit of the desuperheater must be shut off. Desuperheater operation in heat pump mode reduces the heating capacity transferred from the unit to the user's hydronic circuit. When a desuperheater is fitted, irrespective of it running in either cooling or heating mode, the max. temperature of water delivered to the heating unit (LWTu_Heating) is reduced, as described in the section "Operating limits".

Condensation heat recovery is a function of size, version and operating conditions.

The percentage of recovered heat is calculated as the ratio between recovered heat flow to the desuperheater and the heat flow to the condenser under nominal conditions, therefore evaporator inlet-outlet water temperature 12-7°C.

In the following graph, a constant temperature delta of 5°C between water inlet and outlet at the heat recovery heat exchanger has been considered.



To maximize the use of the accessory and optimize machine operation, combination with the speed adjuster of the fans or with the EC fans is recommended.

/LN: silenced unit

In the unit with /LN option, all the compressors are enclosed in a compartment that is fully soundproofed with sound absorbing material and soundproofing material.

HYDRAULIC MODULES

All units can be fitted with hydraulic module in various configurations:

- /1P: hydraulic module with one pump
- /2P: hydraulic module with two pumps
- /1PS: hydraulic module with one pump and buffer tank
- /2PS: hydraulic module with two pumps and buffer tank

All the above-mentioned modules have pumps with standard discharge head.

The following are also available:

- modules /1Pr, /2Pr, /1PrS e /2PrS that have pumps with reduced available discharge head
- modules /1PM, /2PM, /1PMS and /2PMS that have pumps with increased available discharge head
- modules /1PG, /2PG, /1PGS and /2PGS that have pumps suitable for operating with glycol up to 50%

Hydraulic modules with one pump have:

- one pump
- an expansion vessel

Hydraulic modules with two pumps have:

- two pumps
- a check valve on the delivery side of each pump
- an expansion vessel

In the version with 2 pumps, these are always with one on standby while the other is working. Switching over between the pumps is automatic and is done by time (to balance the hours of operation of each one) or in the event of failure.

Units for industrial applications (Zeta Rev Industrial) are supplied in series with a 3 bar pump and an inertial tank.

Hydraulic modules with tank also have:

- a gate valve at the inlet of the pump or the suction manifold
- a tank with drain valve and air valve

Refer to the table of configurations that are not possible to check for availability of specific set-ups.

All the hydraulic circuit components are fully insulated, except for:

- drain valves
- venting valves
- tank plugs
- safety valves
- expansion vessel
- probe pockets

TECHNICAL SPECIFICATIONS

ZETA REV

			3.2	4.2	5.2	6.2	7.2	8.2	9.2	10.2	12.2
ZETA REV											
Cooling											
Refrigeration capacity	(1)	kW	40,4	45,3	52,9	59,6	66,7	80,9	92,8	101,9	116,2
Total absorbed power	(1)	kW	13,9	16,7	20,2	20,7	24,4	26,5	31,1	36,1	41,6
EER	(1)		2,91	2,71	2,62	2,88	2,73	3,06	2,98	2,82	2,79
Eurovent efficiency class	(1)		B	C	D	C	C	B	B	C	C
ESEER	(8)		4,15	4,11	4,07	4,19	4,09	4,2	4,25	4,12	4,03
ZETA REV /HP											
Cooling											
Refrigeration capacity	(1)	kW	39,8	44,7	52,3	58,6	65,8	80,1	90,3	98	113,9
Total absorbed power	(1)	kW	14,2	17	19,9	21,2	24,8	27,2	32,2	38	42,7
EER	(1)		2,81	2,63	2,63	2,77	2,66	2,95	2,8	2,58	2,67
Eurovent efficiency class	(1)		C	D	D	C	D	B	C	D	D
ESEER			4,08	4,07	4,08	4,11	4,05	4,13	4,16	4,05	3,96
Heating											
Heating capacity	(2)	kW	42,1	47,1	55,4	63,2	70,1	83,7	94,7	104,2	121,7
Total absorbed power	(2)	kW	13,6	15,7	18,1	20	22	26,3	29,8	33,4	39,2
COP	(2)		3,08	3	3,06	3,16	3,18	3,19	3,18	3,12	3,1
Eurovent efficiency class	(2)		B	C	B	B	B	B	B	B	B
Compressors											
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(7)	%	50%	50%	50%	50%	50%	50%	43%	50%	44%
Refrigerant charge CH (MCHX)	(3)	kg	3,7	5,5	5,5	6	6	9,5	10	10	11,5
Refrigerant charge CH (Cu/Al)	(3)	kg	6	7	8,8	10,5	10,5	16	17	17	18
Refrigerant charge HP	(3)	kg	10	11,5	12	20,5	20,5	28,5	29	29	30
Fans											
Quantity		n°	2	2	2	2	2	3	3	3	2
Total air flow rate CH (MCHX)		m³/h	18000	18000	17000	19000	19000	28000	28000	28000	39000
Total air flow rate HP		m³/h	16000	16000	15000	18000	18000	26000	26000	26000	36000
User-side heat exchanger											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	7	8	9	10	12	14	16	18	20
Pressure drop CH	(1)	kPa	38	33	33	42	22	33	28	34	34
Water flow rate HP	(1)	m³/h	7	8	9	10	11	14	16	17	20
Pressure drop HP	(1)	kPa	35	31	32	40	21	31	26	30	32
Noise levels											
Sound power level cooling	(4)	dB(A)	78	79	79	80	81	82	83	84	86
Sound power level heating	(5)	dB(A)	78	79	79	80	81	82	83	84	86
Sound pressure level cooling	(6)	dB(A)	46	48	48	48	49	50	51	52	54
Sound power level of vers. LN cooling	(4)	dB(A)	76	77	77	78	79	80	81	82	84
Sound power level of vers. LN heating	(5)	dB(A)	76	77	77	78	79	80	81	82	84
Sound pressure level of vers. LN cooling	(6)	dB(A)	44	46	46	46	47	48	49	50	52
Dimensions and weights**											
Length		mm	1750	1750	1750	2200	2200	3200	3200	3200	3200
Depth		mm	1000	1000	1000	1000	1000	1100	1100	1100	1100
Height		mm	1400	1400	1400	1740	1740	1740	1740	1740	1880
Operating weight		kg	413	425	426	560	586	802	814	826	968

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils

- (1) External air temperature of 35°C and user-side heat exchanger water inlet-outlet temperature of 12-7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.
- (4) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.
- (6) Values obtained from the sound power level (conditions: note 4), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

ZETA REV

			13.2	15.2	16.2	14.4	16.4	18.4	20.4	24.4
ZETA REV										
Cooling										
Refrigeration capacity	(1)	kW	125,1	146,2	159,1	136,8	153,4	189,3	207,7	233,3
Total absorbed power	(1)	kW	47,9	53	61,8	47,4	58,1	62,2	72	82,9
EER	(1)		2,61	2,76	2,58	2,89	2,64	3,04	2,88	2,81
Eurovent efficiency class	(1)		D	C	D	C	D	B	C	C
ESEER	(8)		3,86	4,03	3,92	4,21	4,11	4,28	4,22	4,18
ZETA REV /HP										
Cooling										
Refrigeration capacity	(1)	kW	122,7	141,5	153,1	132,3	148,1	182,5	198,8	224,1
Total absorbed power	(1)	kW	49	55,1	64,5	49,3	60,3	65,1	76	86,7
EER	(1)		2,51	2,57	2,37	2,69	2,45	2,81	2,62	2,58
Eurovent efficiency class	(1)		D	D	E	D	E	C	D	D
ESEER			3,79	3,92	3,8	4,15	4,05	3,95	3,83	3,84
Heating										
Heating capacity	(2)	kW	132,8	153,2	168,4	143,3	162,3	194,3	211,9	237,8
Total absorbed power	(2)	kW	43,4	49	54,7	45	52,1	61	68,2	78,1
COP	(2)		3,06	3,13	3,08	3,18	3,12	3,18	3,11	3,04
Eurovent efficiency class	(2)		B	B	B	B	B	B	B	B
Compressors										
Compressors/Circuits		n°/n°	2/1	2/1	2/1	4/2	4/2	4/2	4/2	4/2
Minimum capacity reduction step	(7)	%	50%	45%	50%	25%	25%	21%	25%	22%
Refrigerant charge CH (MCHX)	(3)	kg	11,5	15	15	16	18	19,5	19,5	21
Refrigerant charge CH (Cu/Al)	(3)	kg	18	26	26	29	31	35	35	40
Refrigerant charge HP	(3)	kg	30	44	44	48	50	64	64	67
Fans										
Quantity		n°	2	2	2	2	2	3	3	4
Total air flow rate CH (MCHX)		m³/h	39000	42000	42000	42000	42000	63000	63000	76000
Total air flow rate HP		m³/h	36000	40000	40000	40000	40000	58000	58000	70000
User-side heat exchanger										
Quantity		n°	1	1	2	1	2	2	2	2
Water flow rate CH	(1)	m³/h	22	25	27	24	26	33	36	40
Pressure drop CH	(1)	kPa	39	35	41	23	28	29	35	34
Water flow rate HP	(1)	m³/h	21	24	26	23	26	31	34	39
Pressure drop HP	(1)	kPa	37	32	37	21	26	26	31	31
Noise levels										
Sound power level cooling	(4)	dB(A)	87	87	87	84	85	87	89	90
Sound power level heating	(5)	dB(A)	87	87	87	84	85	87	89	90
Sound pressure level cooling	(6)	dB(A)	55	55	55	52	53	55	57	58
Sound power level of vers. LN cooling	(4)	dB(A)	85	85	85	82	83	85	87	88
Sound power level of vers. LN heating	(5)	dB(A)	85	85	85	82	83	85	87	88
Sound pressure level of vers. LN cooling	(6)	dB(A)	53	53	53	50	51	53	55	56
Dimensions and weights**										
Length		mm	3200	3200	3200	3200	3200	4200	4200	4200
Depth		mm	1100	1100	1100	1100	1100	1100	1100	1100
Height		mm	1880	2380	2380	2380	2380	2380	2380	2380
Operating weight		kg	1012	1168	1168	1208	1312	1596	1626	1750

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils

- (1) External air temperature of 35°C and user-side heat exchanger water inlet-outlet temperature of 12-7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.
- (4) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.
- (6) Values obtained from the sound power level (conditions: note 4), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

ZETA REV HE

			3.2	4.2	5.2	6.2	7.2	8.2	9.2
ZETA REV HE									
Cooling									
Refrigeration capacity	(1)	kW	42,4	49,2	58,2	63,3	72,2	87,2	100,7
Total absorbed power	(1)	kW	13,1	15,4	18,7	19,4	22,6	27,5	32,1
EER	(1)		3,25	3,20	3,11	3,26	3,19	3,17	3,13
Eurovent efficiency class	(1)		A	A	A	A	A	A	A
ESEER	(8)		4,39	4,35	4,37	4,48	4,36	4,26	4,30
ZETA REV HE /HP									
Cooling									
Refrigeration capacity	(1)	kW	42,5	50,6	57,8	62,5	71,2	86,1	100,3
Total absorbed power	(1)	kW	13,7	16,3	18,6	19,6	22,8	27,6	32,3
EER	(1)		3,10	3,10	3,10	3,18	3,12	3,11	3,10
Eurovent efficiency class	(1)		A	A	A	A	A	A	A
ESEER			4,29	4,30	4,37	4,42	4,32	4,22	4,29
Heating									
Heating capacity	(2)	kW	44,1	51,2	59,2	67,1	74,8	91,4	102,6
Total absorbed power	(2)	kW	13,3	15,3	17,7	20,0	22,3	27,5	31,0
COP	(2)		3,31	3,35	3,35	3,35	3,35	3,32	3,31
Eurovent efficiency class	(2)		A	A	A	A	A	A	A
Compressors									
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(7)	%	50%	50%	50%	50%	50%	50%	43%
Refrigerant charge CH (MCHX)	(3)	kg	4,5	6,5	6,5	8	8	10	10
Refrigerant charge CH (Cu/Al)	(3)	kg	9	10	10,5	14	14	17	17
Refrigerant charge HP	(3)	kg	12	13	21	31	31	31	31
Fans									
Quantity		n°	2	2	2	3	3	2	2
Total air flow rate CH (MCHX)		m³/h	19.000	19.000	19.000	28.000	28.000	39.000	39.000
Total air flow rate HP		m³/h	18.000	18.000	18.000	26.000	26.000	36.000	36.000
User-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	7,3	8,5	10,1	10,9	12,5	15,1	17,4
Pressure drop CH	(1)	kPa	25,0	22,6	28,2	27,1	32,9	44,4	40,9
Water flow rate HP	(1)	m³/h	7,3	8,7	10,0	10,8	12,3	14,9	17,3
Pressure drop HP	(1)	kPa	22,7	20,5	27,6	25,9	31,4	42,8	39,3
Noise levels									
Sound power level cooling	(4)	dB(A)	78	79	79	80	81	82	83
Sound power level heating	(5)	dB(A)	78	79	79	80	81	82	83
Sound pressure level cooling	(6)	dB(A)	46	48	48	48	49	50	51
Sound power level of vers. LN cooling	(4)	dB(A)	76	77	77	78	79	80	81
Sound power level of vers. LN heating	(5)	dB(A)	76	77	77	78	79	80	81
Sound pressure level of vers. LN cooling	(6)	dB(A)	44	46	46	46	47	48	49
Dimensions and weights**									
Length		mm	1.750	1.750	2.200	3.200	3.200	3.200	3.200
Depth		mm	1.000	1.000	1.000	1.100	1.100	1.100	1.100
Height		mm	1.400	1.400	1.740	1.740	1.740	1.880	1.880
Operating weight		kg	450	461	659	857	867	977	1.053

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils

- (1) External air temperature of 35°C and user-side heat exchanger water inlet-outlet temperature of 12-7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.
- (4) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.
- (6) Values obtained from the sound power level (conditions: note 4), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

ZETA REV HE

			10.2	12.2	13.2	15.2	16.2	14.4	16.4
ZETA REV HE									
Cooling									
Refrigeration capacity	(1)	kW	110,9	127,7	139,0	158,7	179,5	144,5	171,2
Total absorbed power	(1)	kW	35,2	40,8	43,3	50,2	57,4	45,5	54,5
EER	(1)		3,15	3,13	3,21	3,16	3,13	3,18	3,14
Eurovent efficiency class	(1)		A	A	A	A	A	A	A
ESEER	(8)		4,22	4,23	4,27	4,26	4,24	4,3	4,26
ZETA REV HE /HP									
Cooling									
Refrigeration capacity	(1)	kW	111,2	128,5	139,6	160,3	183	145	172,9
Total absorbed power	(1)	kW	35,8	41,5	44,3	51,4	59	46,6	55,7
EER	(1)		3,11	3,10	3,15	3,12	3,1	3,11	3,10
Eurovent efficiency class	(1)		A	A	A	A	A	A	A
ESEER			4,21	4,22	4,23	4,24	4,22	4,28	4,25
Heating									
Heating capacity	(2)	kW	114,9	129,7	147,7	166,5	185	154,3	177,8
Total absorbed power	(2)	kW	34,6	38,7	44,4	50	55,4	46,1	53,1
COP	(2)		3,32	3,35	3,32	3,33	3,34	3,35	3,35
Eurovent efficiency class	(2)		A	A	A	A	A	A	A
Compressors									
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	4/2	4/2
Minimum capacity reduction step	(7)	%	50%	44%	50%	45%	50%	25%	25%
Refrigerant charge CH (MCHX)	(3)	kg	12	13	16	16	16,5	19	21
Refrigerant charge CH (Cu/Al)	(3)	kg	26	26	31	31	34	35	36
Refrigerant charge HP	(3)	kg	43	43,5	57	57	58	64	64
Fans									
Quantity		n°	2	2	3	3	3	3	3
Total air flow rate CH (MCHX)		m³/h	42.000	42.000	63.000	63000	63000	63000	63.000
Total air flow rate HP		m³/h	40.000	40.000	58.000	58000	58000	58000	58.000
User-side heat exchanger									
Quantity		n°	1	1	1	1	1	2	2
Water flow rate CH	(1)	m³/h	19,2	22,1	24,0	27,4	31	25	29,6
Pressure drop CH	(1)	kPa	51,7	48,2	41,5	50,1	46,8	34,1	42,8
Water flow rate HP	(1)	m³/h	19,2	22,2	24,1	27,7	31,6	25	29,9
Pressure drop HP	(1)	kPa	49,0	45,6	39,1	47	43,4	31,9	40,1
Noise levels									
Sound power level cooling	(4)	dB(A)	84	86	87	87	87	84	85
Sound power level heating	(5)	dB(A)	84	86	87	87	87	84	85
Sound pressure level cooling	(6)	dB(A)	52	54	55	55	55	52	53
Sound power level of vers. LN cooling	(4)	dB(A)	82	84	85	85	85	82	83
Sound power level of vers. LN heating	(5)	dB(A)	82	84	85	85	85	82	83
Sound pressure level of vers. LN cooling	(6)	dB(A)	50	52	53	53	53	50	51
Dimensions and weights**									
Length		mm	3.200	3.200	4.200	4200	4200	4200	4.200
Depth		mm	1.100	1.100	1.100	1100	1100	1100	1.100
Height		mm	2.380	2.380	2.380	2380	2380	2380	2.380
Operating weight		kg	1.294	1.350	1.571	1477	1506	1414	1.554

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils

- (1) External air temperature of 35°C and user-side heat exchanger water inlet-outlet temperature of 12-7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.
- (4) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.
- (6) Values obtained from the sound power level (conditions: note 4), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

ZETA REV SLN

			3.2	4.2	5.2	6.2	7.2	8.2	9.2
ZETA REV SLN									
Cooling									
Refrigeration capacity	(1)	kW	40,7	46,1	52,4	62,3	70,7	84,1	95,4
Total absorbed power	(1)	kW	13,8	16,6	19,8	20,2	23,6	27,3	32,1
EER	(1)		2,95	2,77	2,64	3,09	2,99	3,08	2,97
Eurovent efficiency class	(1)		B	C	D	B	B	B	B
ESEER	(8)		4,18	4,14	4,09	4,35	4,24	4,18	4,22
ZETA REV HE /HP									
Cooling									
Refrigeration capacity	(1)	kW	39,2	44,2	50	60	68	81,3	91,8
Total absorbed power	(1)	kW	14,2	17,2	20,5	20,7	24,2	27,8	32,9
EER	(1)		2,77	2,58	2,44	2,9	2,81	2,92	2,79
Eurovent efficiency class	(1)		C	D	E	B	C	B	C
ESEER			4,05	4,05	3,96	4,21	4,14	4,14	4,19
Heating									
Heating capacity	(2)	kW	44,1	51,2	59,2	67,1	74,8	91,4	102,6
Total absorbed power	(2)	kW	13,3	15,3	17,7	20	22,3	27,5	31
COP	(2)		3,31	3,35	3,35	3,35	3,35	3,32	3,31
Eurovent efficiency class	(2)		A	A	A	A	A	A	A
Compressors									
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(7)	%	50%	50%	50%	50%	50%	50%	43%
Refrigerant charge CH (MCHX)	(3)	kg	4,5	6,5	6,5	8	8	10	10
Refrigerant charge CH (Cu/Al)	(3)	kg	9	10	10,5	14	14	17	17
Refrigerant charge HP	(3)	kg	12	13	21	31	31	31	31
Fans									
Quantity		n°	2	2	2	3	3	2	2
Total air flow rate CH (MCHX)		m³/h	19.000	19.000	19.000	28.000	28.000	39.000	39.000
Total air flow rate HP		m³/h	18.000	18.000	18.000	26.000	26.000	36.000	36.000
User-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	7,3	8,5	10,1	10,9	12,5	15,1	17,4
Pressure drop CH	(1)	kPa	25,0	22,6	28,2	27,1	32,9	44,4	40,9
Water flow rate HP	(1)	m³/h	7,3	8,7	10,0	10,8	12,3	14,9	17,3
Pressure drop HP	(1)	kPa	22,7	20,5	27,6	25,9	31,4	42,8	39,3
Noise levels									
Sound power level cooling	(4)	dB(A)	74	75	75	76	77	78	79
Sound power level heating	(5)	dB(A)	74	75	75	76	77	78	79
Sound pressure level cooling	(6)	dB(A)	42	44	44	44	45	46	47
Dimensions and weights**									
Length		mm	1.750	1.750	2.200	3.200	3.200	3.200	3.200
Depth		mm	1.000	1.000	1.000	1.100	1.100	1.100	1.100
Height		mm	1.400	1.400	1.740	1.740	1.740	1.880	1.880
Operating weight		kg	450	461	659	857	867	977	1.053

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils

- (1) External air temperature of 35°C and user-side heat exchanger water inlet-outlet temperature of 12-7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.
- (4) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.
- (6) Values obtained from the sound power level (conditions: note 4), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

ZETA REV SLN

			10.2	12.2	13.2	15.2	16.2	14.4	16.4
ZETA REV SLN									
Cooling									
Refrigeration capacity	(1)	kW	106,3	117,2	136,6	153,7	169,8	141,5	162,1
Total absorbed power	(1)	kW	36,2	42,3	44,3	51,7	59,9	47,1	57
EER	(1)		2,93	2,77	3,08	2,97	2,84	3,01	2,84
Eurovent efficiency class	(1)		B	C	B	B	C	B	C
ESEER	(8)		4,16	4,02	4,18	4,15	4,07	4,25	4,17
ZETA REV HE /HP									
Cooling									
Refrigeration capacity	(1)	kW	102,2	112,2	131,9	148	163,1	137,3	157,1
Total absorbed power	(1)	kW	37,1	43,5	45,2	52,9	61,3	47,7	57,8
EER	(1)		2,75	2,58	2,92	2,8	2,66	2,88	2,72
Eurovent efficiency class	(1)		C	D	B	C	D	C	C
ESEER			4,1	3,9	4,07	4,05	3,97	4,21	4,13
Heating									
Heating capacity	(2)	kW	114,9	129,7	147,7	166,5	185	154,3	177,8
Total absorbed power	(2)	kW	34,6	38,7	44,4	50	55,4	46,1	53,1
COP	(2)		3,32	3,35	3,32	3,33	3,34	3,35	3,35
Eurovent efficiency class	(2)		A	A	A	A	A	A	A
Compressors									
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	4/2	4/2
Minimum capacity reduction step	(7)	%	50%	44%	50%	45%	50%	25%	25%
Refrigerant charge CH (MCHX)	(3)	kg	12	13	16	16	16,5	19	21
Refrigerant charge CH (Cu/Al)	(3)	kg	26	26	31	31	34	35	36
Refrigerant charge HP	(3)	kg	43	43,5	57	57	58	64	64
Fans									
Quantity		n°	2	2	3	3	3	3	3
Total air flow rate CH (MCHX)		m³/h	42.000	42.000	63.000	63000	63000	63000	63.000
Total air flow rate HP		m³/h	40.000	40.000	58.000	58000	58000	58000	58.000
User-side heat exchanger									
Quantity		n°	1	1	1	1	1	2	2
Water flow rate CH	(1)	m³/h	19,2	22,1	24,0	27,4	31	25	29,6
Pressure drop CH	(1)	kPa	51,7	48,2	41,5	50,1	46,8	34,1	42,8
Water flow rate HP	(1)	m³/h	19,2	22,2	24,1	27,7	31,6	25	29,9
Pressure drop HP	(1)	kPa	49,0	45,6	39,1	47	43,4	31,9	40,1
Noise levels									
Sound power level cooling	(4)	dB(A)	80	82	83	83	83	80	81
Sound power level heating	(5)	dB(A)	80	82	83	83	83	80	81
Sound pressure level cooling	(6)	dB(A)	48	50	51	51	51	48	49
Dimensions and weights**									
Length		mm	3.200	3.200	4.200	4200	4200	4200	4.200
Depth		mm	1.100	1.100	1.100	1100	1100	1100	1.100
Height		mm	2.380	2.380	2.380	2380	2380	2380	2.380
Operating weight		kg	1.294	1.350	1.571	1477	1506	1414	1.554

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils

(1) External air temperature of 35°C and user-side heat exchanger water inlet-outlet temperature of 12-7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.

(7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

ZETA REV LE

			3.2	4.2	5.2	6.2	7.2	8.2	9.2	10.2	12.2
ZETA REV LE											
Cooling											
Refrigeration capacity	(1)	kW	45,7	51,2	58,1	67,5	73,5	92,1	104,5	115,2	131,2
Total absorbed power	(1)	kW	14,3	17,3	21,0	21,3	25,3	27,3	32,5	37,8	43,2
EER	(1)		3,21	2,96	2,77	3,17	2,9	3,38	3,22	3,05	3,03
ZETA REV LE /HP											
Cooling											
Refrigeration capacity	(1)	kW	45,3	50,8	59,4	66,7	72,6	92,3	102,2	110,8	128,9
Total absorbed power	(1)	kW	14,6	17,8	20,7	21,9	26,0	28,2	33,8	40,2	44,8
EER	(1)		3,1	2,86	2,88	3,04	2,8	3,28	3,02	2,76	2,88
Heating											
Heating capacity	(2)	kW	42,4	46,7	55,3	64,7	71,9	87,4	96,3	103,9	122,9
Total absorbed power	(2)	kW	11,0	12,4	14,2	15,8	17,7	21,3	24,1	26,9	32,0
COP	(2)		3,85	3,76	3,89	4,08	4,06	4,11	3,99	3,86	3,85
Compressors											
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(7)	%	50%	50%	50%	50%	50%	50%	43%	50%	44%
Fans											
Quantity		n°	2	2	2	2	2	3	3	3	2
Total air flow rate CH (MCHX)		m³/h	18.000	18.000	17.000	19.000	19.000	28.000	28.000	28.000	39.000
Total air flow rate HP		m³/h	16.000	16.000	15.000	18.000	18.000	26.000	26.000	26.000	36.000
Noise levels											
Sound power level cooling	(4)	dB(A)	78	79	79	80	81	82	83	84	86
Sound power level heating	(5)	dB(A)	78	79	79	80	81	82	83	84	86
Sound pressure level cooling	(6)	dB(A)	46	48	48	48	49	50	51	52	54
Sound power level of vers. LN cooling	(4)	dB(A)	76	77	77	78	79	80	81	82	84
Sound power level of vers. LN heating	(5)	dB(A)	76	77	77	78	79	80	81	82	84
Sound pressure level of vers. LN cooling	(6)	dB(A)	44	46	46	46	47	48	49	50	52
Dimensions and weights**											
Length		mm	1.750	1.750	1.750	2.200	2.200	3.200	3.200	3.200	3.200
Depth		mm	1.000	1.000	1.000	1.000	1.000	1.100	1.100	1.100	1.100
Height		mm	1.400	1.400	1.400	1.740	1.740	1.740	1.740	1.740	1.880
Operating weight		kg	418	425	425	534	548	767	772	780	926

Partly completed machinery: conformity with Ecodesign depends on the combination with the remote heat exchanger. CE marked units.

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils

(1) External air temperature 35°C, evaporating temperature 7,5°C.

(2) External air temperature 7°C DB, 6°C WB, condensing temperature 40°C.

(4) unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and evaporating temperature 7.5°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) unit operating at nominal operating capacity, without any accessories, with external air temperature of 7°C (6°C wb) and condensing temperature 40°C. Values obtained from measures taken according to standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

** Basic unit without included accessories

ZETA REV LE

			13.2	15.2	16.2	14.4	16.4	18.4	20.4	24.4
ZETA REV LE										
Cooling										
Refrigeration capacity	(1)	kW	140,4	164,4	177,7	153	171	209,9	235	263,2
Total absorbed power	(1)	kW	49,8	55,3	64,9	49,4	60,6	64,6	75,3	86,3
EER	(1)		2,82	2,97	2,74	3,09	2,82	3,25	3,12	3,05
ZETA REV LE /HP										
Cooling										
Refrigeration capacity	(1)	kW	138,1	158,8	168,8	148,3	165,2	206,4	224,4	252,4
Total absorbed power	(1)	kW	51,3	58,1	68,0	51,8	63,5	68,3	80,7	91,7
EER	(1)		2,69	2,73	2,48	2,86	2,6	3,02	2,78	2,75
Heating										
Heating capacity	(2)	kW	133	154,8	167,9	145	163	196	212,9	237,1
Total absorbed power	(2)	kW	35,3	39,7	44,1	36,4	42,2	49,8	55,4	63,8
COP	(2)		3,77	3,89	3,81	3,98	3,86	3,94	3,84	3,72
Compressors										
Compressors/Circuits		n°/n°	2/1	2/1	2/1	4/2	4/2	4/2	4/2	4/2
Minimum capacity reduction step	(7)	%	50%	45%	50%	25%	25%	21%	25%	22%
Fans										
Quantity		n°	2	2	2	2	2	3	3	4
Total air flow rate CH (MCHX)		m³/h	39.000	42.000	42.000	42.000	42.000	63.000	63.000	76.000
Total air flow rate HP		m³/h	36.000	40.000	40.000	40.000	40.000	58.000	58.000	70.000
Noise levels										
Sound power level cooling	(4)	dB(A)	87	87	87	84	85	87	89	90
Sound power level heating	(5)	dB(A)	87	87	87	84	85	87	89	90
Sound pressure level cooling	(6)	dB(A)	55	55	55	52	53	55	57	58
Sound power level of vers. LN cooling	(4)	dB(A)	85	85	85	82	83	85	87	88
Sound power level of vers. LN heating	(5)	dB(A)	85	85	85	82	83	85	87	88
Sound pressure level of vers. LN cooling	(6)	dB(A)	53	53	53	50	51	53	55	56
Dimensions and weights**										
Length		mm	3.200	3.200	3.200	3.200	3.200	4.200	4.200	4.200
Depth		mm	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
Height		mm	1.880	2.380	2.380	2.380	2.380	2.380	2.380	2.380
Operating weight		kg	960	1104	1136	1102	1250	1529	1547	1671

Partly completed machinery: conformity with Ecodesign depends on the combination with the remote heat exchanger. CE marked units.

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils

(1) External air temperature 35°C, evaporating temperature 7,5°C.

(2) External air temperature 7°C DB, 6°C WB, condensing temperature 40°C.

(4) unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and evaporating temperature 7.5°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) unit operating at nominal operating capacity, without any accessories, with external air temperature of 7°C (6°C wb) and condensing temperature 40°C. Values obtained from measures taken according to standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

** Basic unit without included accessories

ECODESIGN

INTRODUCTION

The Ecodesign/ErP Directive (2009/125/EC) lays down new standards for more efficient energy use.

The Directive contains various regulations; as regards chiller products and heat pumps, the regulations of interest are the following:

- Regulation 2013/813, for small heat pumps ($P_{\text{design}} \leq 400$ kW)
- Regulation 2016/2281, for chillers and heat pumps with $P_{\text{design}} > 400$ kW
- Regulation 2013/811, for heat pumps with $P_{\text{design}} \leq 70$ kW.

The last-mentioned regulation (2013/811) regards the labelling (Ecolabel certification) of small heat pumps.

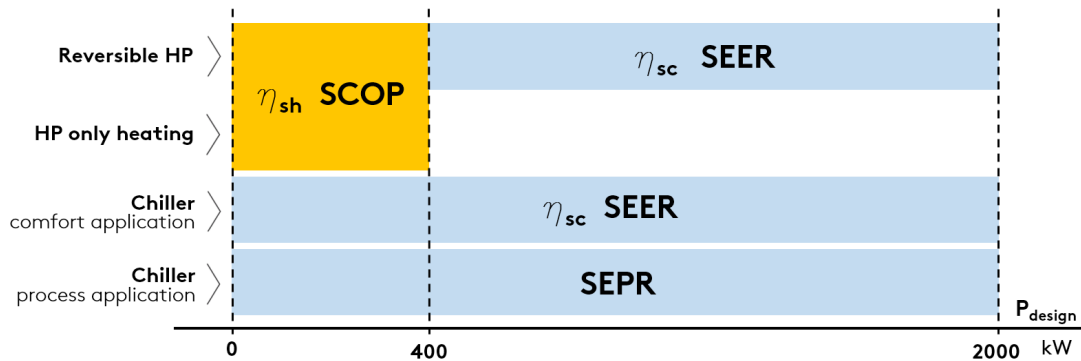
The other two regulations (2013/813 and 2016/2281) set seasonal efficiency targets that the products must comply with to be sold and installed in the European Union (essential requirement for CE marking).

These efficiency limits are defined through ratios, which are respectively:

- η_{sh} (SCOP), with reference to regulation 2013/813
- η_{sc} (SEER) for comfort applications and SEPR for process applications, with reference to regulation 2016/2281.

As regards regulation 2016/2281, with effect from 1st January 2021, the required minimum efficiency limit will be raised (Tier 2) from the current threshold (Tier 1).

The figure below schematically illustrates the correspondence between product and reference energy ratio.



Some notes and clarifications:

For comfort applications, regulation 2016/2281 sets the η_{sc} (SEER) ratio in two different operating conditions:

- SEER calculated with machine inlet/outlet water temperature of 12/7°C (low temperature application),
- SEER calculated with machine inlet/outlet water temperature of 23/18°C (medium temperature application).

The minimum efficiency requirement is the same, but can be met at condition 12/7°C or at condition 23/18°C, depending on the application envisaged for the machine.

Regulation 2013/813 distinguishes two different types: at low temperature and at medium temperature.

The following refer to the application at low temperature: (low temperature application) all heat pumps whose maximum delivery temperature for heating purposes is lower than 52°C with source at temperature of -7°C and -8°C wet bulb (air-water unit) or inlet 10°C (water-water unit), at the reference design conditions for an average climate. For these, the efficiency ratio is "low temperature application" (outlet water temperature 35°C).

For all the other heat pumps, the efficiency ratio is related to "medium temperature application" (outlet water temperature 55°C).

The ratios must be calculated according to the reference European heating season in average climatic conditions.

The minimum efficiency requirements set by the regulations are indicated below.

REGULATION 2016/2281, comfort application

TYPE OF UNIT		MINIMUM REQUIREMENT			
		Tier 1		Tier 2 (2021)	
SOURCE	Pdesign	η_{sc} [%]	SEER	η_{sc} [%]	SEER
air	< 400kW	149	3,8	161	4,1
air	\geq 400kW	161	4,1	179	4,55
water	< 400kW	196	5,1	200	5,2
water	\geq 400kW and < 1500kW	227	5,875	252	6,5
water	\geq 1500kW	245	6,325	272	7

REGULATION 2016/2281, process application

TYPE OF UNIT		MINIMUM REQUIREMENT	
		Tier 1	Tier 2 (2021)
SOURCE	Pdesign	SEPR	SEPR
air	< 400kW	4,5	5
air	\geq 400kW	5	5,5
water	< 400kW	6,5	7
water	\geq 400kW and < 1500kW	7,5	8
water	\geq 1500kW	8	8,5

REGULATION 2013/813

SOURCE	APPLICATION	MINIMUM REQUIREMENT	
		η_{sh} [%]	SCOP
air	low temperature application	125	3,2
water	low temperature application	125	3,325
air	medium temperature application	110	2,825
water	medium temperature application	110	2,95

The conformity of the product must be checked according to the type of application, whether comfort or process, and at the required outlet water temperature.

The two schematic tables below, respectively for comfort application and for process application, indicate the reference of the required conformity according to the type of product and the set point temperature (reference to regulations 2016/2281 and 2013/813).

Important note: for mixed comfort and process applications, the reference application for conformity is the comfort application.

COMFORT APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
Chiller	< 18°C	SEER/η _{sc} low temperature application	2016/2281
	≥ 18°C	SEER/η _{sc} medium temperature application	2016/2281
Heat pumps (reversible and only heating) P_{design} ≤ 400kW		SCOP/η _{sh}	2013/813
Reversible heat pumps P_{design} > 400kW	< 18°C	SEER/η _{sc} low temperature application	2016/2281
	≥ 18°C	SEER/η _{sc} medium temperature application	2016/2281
Heat pumps only heating P_{design} > 400kW		-	-

- = exemption from Ecodesign

PROCESS APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
Chiller	≥ +2°C , ≤ 12°C	SEPR	2016/2281
	> 12°C	-	-
	> -8°C , < +2°C	-	-

- = exemption from Ecodesign

Some specifications and notes follow.

Partly completed machinery

The term partly completed machinery refers to all units without a user-side or source-side heat exchanger, and therefore to all LC, LE, LC/HP and LE/HP versions. Since these are "non-complete" machines, conformity with Ecodesign depends on combination with the remote heat exchanger.

All the partly completed machinery is CE marked and accompanied by a declaration of conformity. Installation in European Union countries is therefore allowed; correct selection and installation of the remote heat exchanger must be ensured, in accordance with the above cases.

EC fans:

The only option that positively affects the performance of the unit, by increasing its seasonal energy efficiency ratio, is the VEC accessory.

A unit equipped with EC fans has a higher SEER (η_{sc}) than the configuration with standard fans.

ZETA REV RANGE

As specifically regards the Zeta Rev range, the regulations of interest for the various units in various configurations are indicated below.

Zeta Rev:

- chiller version: regulation 2016/2281
- /HP version: regulation 2013/813 (since they are all units with $P_{design} \leq 400$ kW).

Zeta Rev HE and Zeta Rev SLN:

- chiller version: regulation 2016/2281
- /HP version: regulation 2013/813 (since they are all units with $P_{design} \leq 400$ kW).

Zeta Rev LE:

Since these are partly completed machines, conformity with Ecodesign depends on combination with the remote heat exchanger.

All LE units are CE marked.

The tables below give information on the conformity of the units and the seasonal energy performance ratios with regard to the reference regulation.

ZETA REV

			3.2	4.2	5.2	6.2	7.2	8.2	9.2	10.2	12.2
REGULATION 2016/2281											
Pdesign	(1)	kW	40,4	45,3	52,9	59,6	66,7	80,9	92,8	101,9	116,2
COMFORT											
Standard units											
ηsc (12/7)	(1)	%	140,9	139,5	140,7	152,2	151	149,3	150,1	149,9	149
SEER (12/7)	(1)		3,6	3,56	3,59	3,88	3,85	3,81	3,83	3,82	3,8
Compliance Tier 1	(1)		N	N	N	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N	N
ηsc (23/18)	(2)	%	170,3	163,3	165,9	180	177,4	179,9	179,8	176,6	176,9
SEER (23/18)	(2)		4,33	4,16	4,22	4,58	4,51	4,57	4,57	4,49	4,5
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	Y	Y	Y
Units with EC fans (VEC)											
ηsc (12/7)	(1)	%	149,1	149,1	149	155,1	152,9	155,5	157,7	154,9	151,2
SEER (12/7)	(1)		3,8	3,8	3,8	3,95	3,9	3,96	4,02	3,95	3,85
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N	N
PROCESS											
SEPR	(3)		5,66	5,38	5,3	5,53	5,24	5,53	5,54	5,33	5,09
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y	Y	Y	Y
			13.2	15.2	16.2	14.4	16.4	18.4	20.4	24.4	
REGULATION 2016/2281											
Pdesign	(1)	kW	125,1	146,2	159,1	136,8	153,4	189,3	207,7	233,3	
COMFORT											
Standard units											
ηsc (12/7)	(1)	%	142	151,6	143,6	149,4	149,1	154,1	150,8	149,1	
SEER (12/7)	(1)		3,62	3,87	3,66	3,81	3,8	3,93	3,84	3,8	
Compliance Tier 1	(1)		N	Y	N	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N	
ηsc (23/18)	(2)	%	163	180,7	167	176	172,4	182	176,5	173,8	
SEER (23/18)	(2)		4,15	4,59	4,25	4,47	4,39	4,63	4,49	4,42	
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	Y	Y	
Units with EC fans (VEC)											
ηsc (12/7)	(1)	%	149,1	155	149,1	158,8	151,1	163,6	158	160	
SEER (12/7)	(1)		3,8	3,95	3,8	4,05	3,85	4,17	4,03	4,07	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	Y	N	N	
PROCESS											
SEPR	(3)		5,17	5,2	5,1	5,23	5,03	5,42	5,22	5,05	
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y	Y	Y	

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

ZETA REV /HP

			3.2	4.2	5.2	6.2	7.2	8.2	9.2	10.2	12.2
REGULATION 2013/813											
Pdesign	(4)	kW	39,3	43,8	50,9	59,3	64,4	78,6	84,9	93,8	112,2
COMFORT											
Low temperature application											
η_{sh}	(4)	%	129,8	133,1	136,4	135,4	139,3	134,6	136,2	135,2	128,6
SCOP	(4)		3,32	3,40	3,48	3,46	3,56	3,44	3,48	3,46	3,29
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y	Y	Y	Y
REGULATION 2013/811											
Ecolabel	(5)		A+	A+	A+	A+	A+	-	-	-	-
			13.2	14.4	15.2	16.2	16.4	18.4	20.4	24.4	
REGULATION 2013/813											
Pdesign	(4)	kW	123,3	139,3	149,3	133,9	151,1	180,8	195,7	221,9	
COMFORT											
Low temperature application											
η_{sh}	(4)	%	128,3	131,0	134,4	132,4	130,9	127,7	126,5	127,1	
SCOP	(4)		3,28	3,35	3,44	3,39	3,35	3,27	3,24	3,25	
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y	Y	Y	
REGULATION 2013/811											
Ecolabel	(5)		-	-	-	-	-	-	-	-	-

Y = unit in compliance with Ecodesign at the indicated condition.

(4) User-side heat exchanger water inlet/outlet temperature 30/35, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

(5) Energy efficiency class with reference to regulation 2013/811, note 4 conditions (low temperature applications).

ZETA REV HE

			3.2	4.2	5.2	6.2	7.2	8.2	9.2
REGULATION 2016/2281									
Pdesign	(1)	kW	42,4	49,2	58,2	63,3	72,2	87,2	100,7
COMFORT									
Standard units									
η_{sc}	(1)	%	154,2	155,5	153,2	159,6	157,8	151,3	153,6
SEER	(1)		3,93	3,96	3,91	4,06	4,02	3,86	3,92
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
Units with EC fans (VEC)									
η_{sc}	(1)	%	164,9	164,2	160,3	173,6	167,2	157	159,2
SEER	(1)		4,20	4,18	4,08	4,42	4,26	4,00	4,06
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	N	Y	Y	N	N
PROCESS									
SEPR	(3)		6,01	5,92	5,93	6	5,68	5,5	5,54
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y	Y
			10.2	12.2	13.2	15.2	16.2	14.4	16.4
REGULATION 2016/2281									
Pdesign	(1)	kW	110,9	127,7	139,0	158,7	179,5	144,5	171,2
COMFORT									
Standard units									
η_{sc}	(1)	%	151	151,9	155,2	157,8	152,5	153,7	150,6
SEER	(1)		3,85	3,87	3,96	4,02	3,89	3,92	3,84
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
Units with EC fans (VEC)									
η_{sc}	(1)	%	159,6	157,2	163,8	165,8	163,5	173,4	165,2
SEER	(1)		4,07	4,01	4,17	4,22	4,16	4,41	4,20
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	Y	Y	Y	Y	Y
PROCESS									
SEPR	(3)		5,51	5,51	5,4	5,54	5,49	5,51	5,27
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

ZETA REV HE /HP

			3.2	4.2	5.2	6.2	7.2	8.2	9.2
REGULATION 2013/813									
Pdesign	(4)	kW	41,7	47,4	54	63,6	70,6	85,2	96,8
COMFORT									
Low temperature application									
ηsh	(4)	%	134,1	137,8	140,4	139,6	139,3	127,7	132,0
SCOP	(4)		3,43	3,52	3,59	3,57	3,56	3,27	3,38
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y	Y
REGULATION 2013/811									
Ecolabel	(5)		A+	A+	A+	A+	-	-	-
			10.2	12.2	13.2	15.2	16.2	14.4	16.4
REGULATION 2013/813									
Pdesign	(4)	kW	108,9	120,3	138,6	171,8	148,2	156,9	169,4
COMFORT									
Low temperature application									
ηsh	(4)	%	132,9	134,5	129,5	134,9	133,6	128,0	129,2
SCOP	(4)		3,40	3,44	3,31	3,45	3,42	3,28	3,31
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y	Y
REGULATION 2013/811									
Ecolabel	(5)		-	-	-	-	-	-	-

Y = unit in compliance with Ecodesign at the indicated condition.

(4) User-side heat exchanger water inlet/outlet temperature 30/35°C, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

(5) Energy efficiency class with reference to regulation 2013/811, note 4 conditions (low temperature applications).

ZETA REV SLN

			3.2	4.2	5.2	6.2	7.2	8.2	9.2
REGULATION 2016/2281									
Pdesign	(1)	kW	39,2	44,2	50,0	60,0	68,0	81,3	91,8
COMFORT									
Standard units									
η_{sc}	(1)	%	151,0	150,2	149,1	156,4	153,7	149,9	152,1
SEER	(1)		3,85	3,83	3,80	3,99	3,92	3,82	3,88
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
Units with EC fans (VEC)									
η_{sc}	(1)	%	162,8	163,0	159,1	171,6	166,0	155,8	157,2
SEER	(1)		4,14	4,15	4,05	4,36	4,22	3,97	4,01
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	N	Y	Y	N	N
PROCESS									
SEPR	(3)		6,01	5,92	5,93	6	5,68	5,5	5,54
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y	Y
			10.2	12.2	13.2	15.2	16.2	14.4	16.4
REGULATION 2016/2281									
Pdesign	(1)	kW	102,2	112,2	131,9	148,0	163,1	137,3	157,1
COMFORT									
Standard units									
η_{sc}	(1)	%	149,2	150,4	153,2	155,0	149,9	152,6	150,2
SEER	(1)		3,81	3,84	3,91	3,95	3,82	3,89	3,83
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
Units with EC fans (VEC)									
η_{sc}	(1)	%	158,4	155,8	163,0	164,8	162,4	172,2	163,7
SEER	(1)		4,03	3,97	4,15	4,19	4,13	4,38	4,17
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	Y	Y	Y	Y	Y
PROCESS									
SEPR	(3)		5,51	5,51	5,4	5,54	5,49	5,51	5,27
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

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			3.2	4.2	5.2	6.2	7.2	8.2	9.2
REGULATION 2013/813									
Pdesign	(4)	kW	41,7	47,4	54	63,6	70,6	85,2	96,8
COMFORT									
Low temperature application									
ηsh	(4)	%	134,1	137,8	140,4	139,6	139,3	127,7	132,0
SCOP	(4)		3,43	3,52	3,59	3,57	3,56	3,27	3,38
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y	Y
REGULATION 2013/811									
Ecolabel	(5)		A+	A+	A+	A+	-	-	-
			10.2	12.2	13.2	15.2	16.2	14.4	16.4
REGULATION 2013/813									
Pdesign	(4)	kW	108,9	120,3	138,6	171,8	148,2	156,9	169,4
COMFORT									
Low temperature application									
ηsh	(4)	%	132,9	134,5	129,5	134,9	133,6	128,0	129,2
SCOP	(4)		3,40	3,44	3,31	3,45	3,42	3,28	3,31
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y	Y
REGULATION 2013/811									
Ecolabel	(5)		-	-	-	-	-	-	-

Y = unit in compliance with Ecodesign at the indicated condition.

(4) User-side heat exchanger water inlet/outlet temperature 30/35°C, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

(5) Energy efficiency class with reference to regulation 2013/811, note 4 conditions (low temperature applications).

INSTALLATION ADVICE

The units described in this document are, by nature, strongly affected by the characteristics of the system, the working conditions and the installation site.

Remember that the unit must be installed by a qualified and skilled technician, and in compliance with the national legislation in force in the destination country.

The installation must be done in such a way that it will be possible to carry out all routine and non-routine maintenance operations.

Before starting any work, you must carefully read the "Installation, operation and maintenance manual" of the machine and do the necessary safety checks to prevent any malfunctioning or hazards.

We give some advice below that will allow you to increase the efficiency and reliability of the unit and therefore of the system into which it is inserted.

Water characteristics

To preserve the life of the exchangers, the water is required to comply with some quality parameters and it is therefore necessary to make sure its values fall within the ranges indicated in the following table:

Total hardness	2,0 ÷ 6,0 °f
Langelier index	- 0,4 ÷ 0,4
pH	7,5 ÷ 8,5
Electrical conductivity	10 ÷ 500 µS/cm
Organic elements	-
Hydrogen carbonate (HCO₃⁻)	70 ÷ 300 ppm
Sulphates (SO₄²⁻)	< 50 ppm
Hydrogen carbonate / Sulphates (HCO₃⁻/SO₄²⁻)	> 1
Chlorides (Cl⁻)	< 50 ppm
Nitrates (NO₃⁻)	< 50 ppm
Hydrogen sulphide (H₂S)	< 0,05 ppm
Ammonia (NH₃)	< 0,05 ppm
Sulphites (SO₃), free chlorine (Cl₂)	< 1 ppm
Carbon dioxide (CO₂)	< 5 ppm
Metal cations	< 0,2 ppm
Manganese ions (Mn⁺⁺)	< 0,2 ppm
Iron ions (Fe²⁺ , Fe³⁺)	< 0,2 ppm
Iron + Manganese	< 0,4 ppm
Phosphates (PO₄³⁻)	< 2 ppm
Oxygen	< 0,1 ppm

Installation of water filters on all the hydraulic circuits is obligatory.

The supply of the most suitable filters for the unit can be requested as accessory. In this case, the filters are supplied loose and must be installed by the customer following the instructions given in the installation, operation and maintenance manual.

Glycol mixtures

With temperatures below 5°C, it is mandatory to work with water and anti-freeze mixtures, and also change the safety devices (anti-freeze, etc.), which must be carried out by qualified authorised personnel or by the manufacturer.

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
Ethylene glycol	%	6	22	30	36	41	46	50	53	56
Propylene glycol	%	15	25	33	39	44	48	51	54	57

The quantity of antifreeze should be considered as % on weight

Minimum water content in the system

For correct operation of the unit, it is necessary to ensure a buffering on the system such as to comply with the minimum operating time considering the greater between the minimum OFF time and the minimum ON time. In short, these contribute to limiting the number of times the compressors are switched on per hour and to preventing undesired deviations from the set point of the delivered water temperature.

The following experimental formula allows the minimum water volume of the system to be calculated:

$$V_{min} = \frac{P_{tot} \cdot 1.000}{N} \cdot \frac{300}{\Delta T \cdot \rho \cdot c_p} + P_{tot} \cdot 0,25$$

where

V_{min} is the minimum water content of the system [l]

P_{tot} is the total cooling capacity of the machine [kW]

N: number of capacity reduction steps

ΔT : differential allowed on the water temperature. Unless otherwise specified, this value is considered to be 2.5K

ρ : density of the heat-carrying fluid. Unless otherwise specified, the density of water is considered

c_p : specific heat of the heat-carrying fluid. Unless otherwise specified, the specific heat of water is considered

Considering the use of water and grouping together some terms, the formula can be re-written as follows:

$$V_{min} = \frac{P_{tot}}{N} \cdot 17,2 + P_{tot} \cdot 0,25$$

N is equal to the number of compressors installed in the unit.

Larger amounts of water are in any case always preferable, because they allow a smaller number of starts and switch-offs of the compressors, less wear of them and an increase in the efficiency of the system as a consequence of a reduction in the number of transients.

It should also be pointed out that, for air-water units working in heat pump mode, the minimum amount of water must consider the need of the unit to carry out defrosting. Having an adequate buffering volume will allow prevention of too high drifts of the delivered water temperature at the end of the defrost cycle.

Installation site

To determine the best installation site for the unit and its orientation, you should pay attention to the following points:

- compliance with the clearance spaces indicated in the official dimensional drawing of the unit must be guaranteed so as to ensure accessibility for routine and non-routine maintenance operations
- you should consider the origin of the hydraulic pipes and their diameters because these affect the radiuses of curvature and therefore the spaces needed for installing them
- you should consider the position of the cable inlet on the electrical control panel of the unit as regards the origin of the power supply
- if the installation includes several units side by side, you should consider the position and dimensions of the manifolds of the user-side exchangers and of any recovery exchangers
- if the installation includes several units side by side, you should consider that the minimum distance between units is 3 metres
- you should avoid all obstructions that can limit air circulation to the source-side exchanger or that can cause recirculation between air supply and intake
- you should consider the orientation of the unit to limit, as far as possible, exposure of the source-side exchanger to solar radiation
- if the installation area is particularly windy, the orientation and positioning of the unit must be such as to avoid air recirculation on the coils. If necessary, we advise making windbreak barriers in order to prevent malfunctioning.

Once the best position for the unit has been identified, you must check that the support slab has the following characteristics:

- its dimensions must be proportionate to those of the unit: if possible, longer and wider than the unit by at least 30 cm and 15/20cm higher than the surrounding surface
- it must be able to bear at least 4 times the operating weight of the unit
- it must allow level installation of the unit: although the unit is installed on a horizontal base, make slopes in the support surface to convey rain water or defrost water to drains, wells or in any case to places where it cannot generate an accident hazard due to ice formation. All heat pump version units are equipped with discharge manifolds for the condensed water; these can be manifolded to facilitate condensate discharge.

The units are designed and built to reduce to a minimum the level of vibration transmitted to the ground, but it is in any case advisable to use rubber or spring anti-vibration mounts, which are available as accessory and should be requested when ordering.

The anti-vibration mounts must be fixed on before positioning the unit on the ground.

In the event of installation on roofs or intermediate floors, the pipes must be isolated from the walls and ceilings.

It is advisable to avoid installation in cramped places, to prevent reverberations, reflections, resonances and acoustic interactions with elements outside the unit.

It is essential that any work done to soundproof the unit does not affect its correct installation or correct operation and, in particular, does not reduce the air flow rate to the source-side exchanger.

Installations that require the use of treated coils

If the unit has to be installed in an environment with a particularly aggressive atmosphere, coils with special treatments are available as options.

- e-coated microchannel coils (accessory not available for HP units)
- coils with anti-corrosion treatment (accessory available only for HP units or with Cu/Al coil)

A description of the individual accessories is available in the "Description of accessories" section.

The type of coil treatment should be chosen with regard to the environment in which the unit is to be installed, through observation of other structures and machinery with exposed metal surfaces present in the destination environment.

The cross observation criterion is the most valid method of selection currently available without having to carry out preliminary tests or measurements with instruments. The identified reference environments are:

- coastal/marine
- industrial
- urban with a high housing density
- rural

Please note that in cases where different conditions co-exist, even for short periods, the choice must be suitable for preserving the exchanger in the harsher environmental conditions and not in conditions between the worst and best situation.

Particular attention must be given in cases where an environment that is not particularly aggressive becomes aggressive as a consequence of a concomitant cause, for example, the presence of a flue outlet or an extraction fan.

We strongly suggest choosing one of the treatment options if at least one of the points listed below is verified:

- there are obvious signs of corrosion of the exposed metal surfaces in the installation area
- the prevailing winds come from the sea towards the unit
- the environment is industrial with a significant concentration of pollutants
- the environment is urban with a high population density
- the environment is rural with the presence of organic discharges and effluents

In particular, for installations near the coast, the following instructions apply:

- **for installations between 1 and 20 km from the coast of units with microchannel coil, we strongly recommend using the accessory "E-coated microchannel coils"**
- **for installations between 1 and 20 km from the coast of reversible units or units with Cu/Al coils, is strongly recommended using the accessory "Coil treated with anti-corrosion paints"**
- **for distances within a kilometre of the coast, we strongly recommend using the accessory "Coil treated with anti-corrosion paints" for all units**

To protect the exchangers from corrosion and ensure optimal operation of the unit, we advise following the recommendations given in the user, installation and maintenance manual for cleaning the coils.

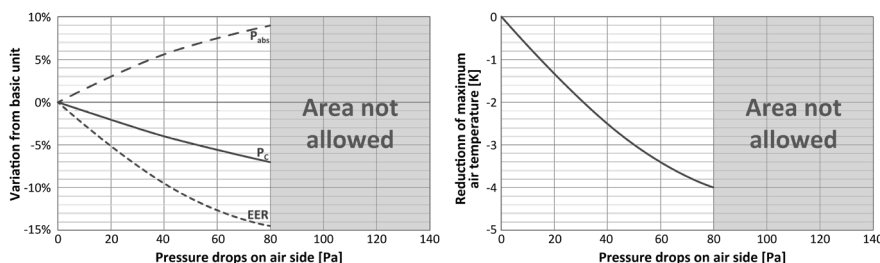
Aeraulic head losses and options available for the ventilating section

With the exception of units for which oversize fans are required, as standard, the units are designed considering that, at the nominal air flow rate, the fans work with null available pressure.

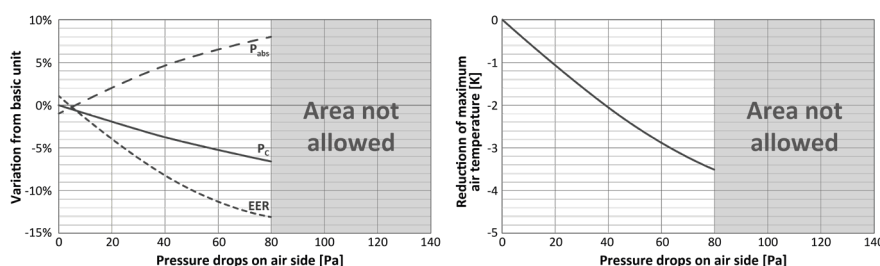
If there are obstacles to free air flow, you should consider the additional aeraulic head losses that will cause a reduction of the air flow rate and a consequent deterioration of performance.

The following diagrams show the trend of cooling capacity (PC), EER, total absorbed power (Pabs) and reduction of the maximum external air temperature in chiller operating mode, depending on the aeraulic head losses that the fans will have to overcome.

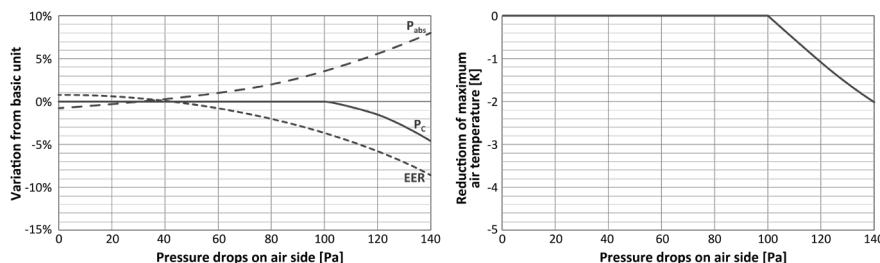
AC fans (Ø 800)



EC fans (Ø 800)



Oversize EC fans (Ø 800)



The indicated values are for the standard machine, without accessories, with AC fans and in any case in the absence of air recirculation.

Example: supposing you expect there to be obstacles that will generate an estimated aeraulic head loss of 60Pa. In this case, there are 3 possibilities:

- use the unit with standard AC fans: compared to ideal conditions, the output power will be reduced by about 5.5%, the total absorbed power will increase by about 7.5%, the EER will be reduced by about 12.5% and the maximum allowed external air temperature for operation at 100% will be reduced by about 3.4K compared to the nominal limit
- use the unit with EC fans: compared to the unit with AC fans working in ideal conditions, the output power will be reduced by about 5%, the total absorbed power will increase by about 6.5%, the EER will be reduced by about 11.5% and the maximum allowed external air temperature for operation at 100% will be reduced by about 2.8K compared to the nominal limit
- use the unit with oversize EC fans: compared to the unit with AC fans working in ideal conditions, the output power of the unit will be unchanged, the total absorbed power will increase by about 1%, the EER will be reduced by about 2% and the maximum external air temperature will remain the one shown in the diagram of the operating limits.

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