



WSAT-EE 17-151

AIR COOLED WATER CHILLER FOR OUTDOOR INSTALLATION

- ✓ Ultra-compact.
- ✓ Top noiselessness.
- ✓ Variable flow-rate circulator.
- ✓ Reduced energy consumption.



WSAT-EE 17 - 151 (R-410A)

Size	Cooling [kW]
17	4.32
21	5.28
25	5.79
31	7.62
41	8.86
51	11.2
61	14.0
71	16.7
81	18.6
91	21.3
101	24.4
121	27.4
131	32.3
151	37.5

The **ELFOENERGY** series chillers represent an important stage in the development of this type of unit. They feature the most up-to-date advances in technology, standing out for:

EFFICIENCY

thanks to its special construction, the **ELFOENERGY** ensures high energy efficiency, in particular during operation at partial loads;

SELF-ADAPTING

the evolved electronics implemented adapt the operating parameters of the chiller to the load conditions of the system it is installed in, optimising consumption, efficiency and the working life of the components;

EASE OF INSTALLATION

each unit is supplied as standard with a complete hydronic assembly and is completely tested in the factory; installation is consequently quick and easy.

Clivet is participating in the EUROVENT Certification Programme "Liquid Chilling Packages". Products are listed in the EUROVENT Directory of Certified Products and in the site www.eurovent-certification.com. Eurovent Chillers Certification Programme covers air cooled packaged chillers up to 600 kW and water cooled packaged chillers up to 1500 kW.



CERTIFIED QUALITY SYSTEM UNI EN ISO 9001:2008

PERFECT FOR RESIDENTIAL

FOR AN IDEAL USE FLEXIBILITY

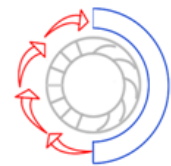


The installation of outdoor units is always a critical aspect in the installation of comfort systems. Having a unit with reduced dimensions is a basic factor to minimize its aesthetic impact and to increase its adaptability to the building features. ELFOENERGY COMPACT is a compact and plain unit, with very reduced dimensions, specifically studied to meet aesthetic requirements and reduced invasivity needs, particularly important for residential buildings. All this, together with the top noiselessness of this unit, makes it ideal for houses, where every reduction in dimensions and noise level of the unit leads to a better system flexibility and comfort quality.

ASSURED OPERATION

EVEN UNDER THE MOST CRITICAL CONDITIONS FOR THE SYSTEM

The special features of ELFOENERGY enable it to overcome autonomously the traditional operating limits. A series of automatically-activated devices assure the unit operation even when the system water is under critical conditions, that would lock the operation of the old generation units: if the water temperature exceeds the max. operating temperatures, the electronic control decrease the water flow rate of the circulator if the external air temperature exceeds the max. operating temperatures, the electronic control forces the fan rotation speed at 100%.

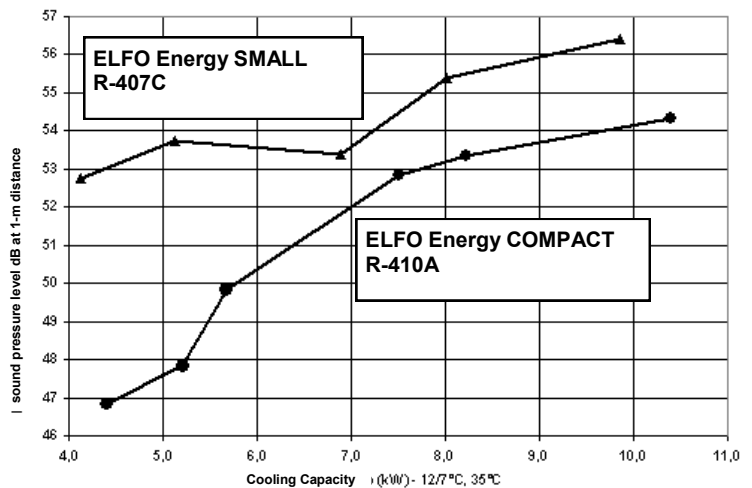


VARYFLOW

TOP NOISELESSNESS

FOR A SUPERIOR COMFORT

The high noiselessness further improves the use flexibility of ELFOENERGY COMPACT, whose installation does not jeopardize the comfort quality. The special building features of ELFOENERGY COMPACT, such as the installation of the fans in aero-dynamically shaped nozzles and the use of special vibration-damper rubber pieces for the compressors, increase the unit efficiency and lower the sound level, thus making it especially noiseless.



NO ACCUMULATION

REDUCED DIMENSIONS, CONSUMPTION AND HEAT DISPERSION



The smart electronics designed to optimize the compressor switching on/off cycles dramatically reduces both the operating transients, the time spent for each compressor switching-on to get the highest yield, and the harmful and expensive pickup currents. The adjustment based on this concept of SLIDING TEMPERATURES steadily searches for the best balance between power to be supplied and energy spent to produce it. In this way the accumulation is no longer needed, with obvious advantages as for electric consumption, space recovery and removal of heat dispersions.

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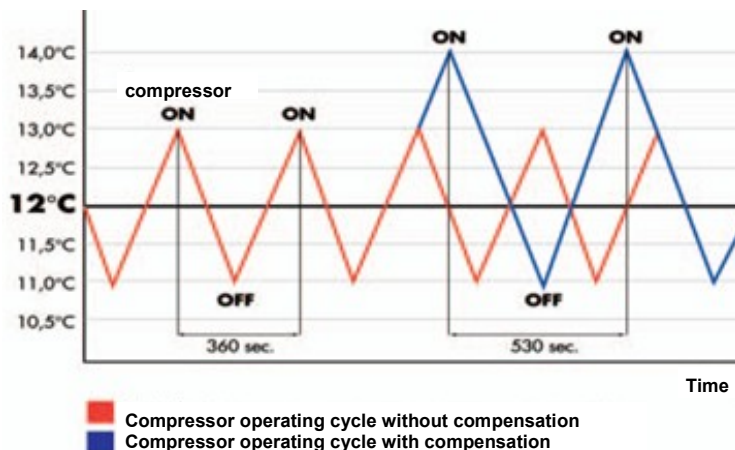
VARIABLE REVOLUTION FAN

Noise is one of the most critical factors of this unit type. The application of special adjustment logic enables to adapt the fan operating speed to the system load and to the external air temperature. This optimizes the energy efficiency, guarantees the lowest possible noise level, above all in the evening and at night, when the air temperature is lower and noise is more annoying.



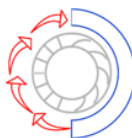
SLIDING TEMPERATURE

The electronic adjustment of ELFOENERGY enables to suit the temperature of the water generated by the unit to the load conditions detected by system according to a SLIDING TEMPERATURE concept that searches for the best balance between power to be supplied and energy spent to produce it. Thus, there is a Dynamic Set Point controlled by the microprocessor. This function also enables to reduce the machine switching-on number and increase its efficiency.



VARIABLE REVOLUTION CIRCULATOR

The variable flow-rate circulator assures the best operation of the unit even under the most critical conditions for the system, and enables to control the summer/winter operation change in reduced times.



VARYFLOW

CONTROL OF INTEGRATIVE ELEMENTS

The electronic control of ELFOENERGY further enables to control an integration element (boiler or electric heaters) during the winter according to a pre-set threshold of temperature detected by the external air probe installed on the unit.

WATER FILTER SUPPLIED AS STANDARD

The standard-supplied water filter completes the accessories and the components ELFOENERGY is standard equipped with.



STANDARD-SUPPLIED USER KEYPAD

ELFOENERGY is supplied complete with remote user keypad, for the best control on the room comfort.

Electric - refrigerating - water alarm signals

Check comfort-economic-test control

SUMMER-WINTER-OFF signals

SUMMER-WINTER-OFF control



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STANDARD UNIT SPECIFICATIONS

COMPRESSOR

From size 17 to 31:

- hermetic rotary compressor. Fitted on rubber antivibration mounts and complete with oil charge and suction filter

From size 41 to 151:

- scroll compressor complete with: overload thermal protection, high refrigerant discharge temperature, rubber antivibration mounts, oil charge.

STRUCTURE

structure made from "aluzink" plate, providing excellent mechanical characteristics and extensive corrosion strength

From size 17 to 51:

- The baseframe, the roof and the nozzle are made of pressed and powder coated RAL 9001 steel plate.

From size 61 to 151:

- base made from galvanized steel plate painted with polyester powder paint, RAL 9001.

PANELLING

External panels in prepainted aluminium especially indicated in outdoor installation due to its superior resistance to corrosion avoiding periodic painting.

Side panels are easily removable and allow complete access to unit components

INTERNAL EXCHANGER

Direct expansion heat exchanger, braze-welded AISI 316 stainless steel plates with large exchange surface and complete with external heat and anti-condensate insulation.

The exchanger comes complete with:

- antifreeze heater to protect the water side exchanger, preventing the formation of frost if the water temperature falls below a set value.

EXTERNAL EXCHANGER

Direct expansion finned exchanger, made from copper pipes in staggered rows and mechanically expanded to the fin collars. The fins are made from aluminium with a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency.

The unit is fitted as standard with coil protection grills.

From size 131 to 151:

(Optional)

FAN

Propeller fans with aluminium pressure die-cast blades, directly driven by single-phase external rotor electric motor complying with VDE 0530/12.84, complete with thermal protection, IP 54 class according to DIN 40 050 norm. The impellers are housed in aerodynamically shaped nozzles to increase the efficiency and minimize the sound level, and protected by fan guards.

REFRIGERANT CIRCUIT

The circuit is complete with:

- filter dryer
- high pressure switch
- low pressure switch
- pressure probes
- expansion device

(thermostatic expansion valve only from size 61 to 151)

ELECTRICAL PANEL

The Power Section includes:

- auxiliary circuit fuse
- compressor and fan fuses

- compressor control contactor

- isolating transformer for auxiliary circuit power supply

The control section includes:

- high refrigerant gas pressure pre-alarm function that in many cases prevents the unit from being shut-down

- compressor overload protection and timer

- relay for remote cumulative fault signal

- possibility of communication with ZONE MASTER system (optional)

- condenser control

REMOTE KEYPAD FOR USER

Control keypad, including:

- ON/OFF and alarm reset buttons

- signal led compressor state

- High or low pressure alarm LED

- Probe fault alarm LED

- Compressor safety alarm LED

- Fan overload alarm LED

- Power signal LED

- Selected function signal LED

- signal led unit in ON

- heating and cooling operating mode buttons

- SLEEP button for optimised night-time operation

The remote keypad connection for user to the unit is set using a 3 x 0.34 mm2 screened cable. Maximum distance 100m.

HYDRAULIC CIRCUIT

- diaphragm expansion vessel

- water side safety valve

- drain valve

- STEAL-MESH FILTER

From size 17 to 51:

- Flow Switch

- variable flow-rate circulator

From size 61 to 151:

- differential pressure switch, water side

- Centrifugal pump

ACCESSORIES

- copper / aluminium condenser coils with acrylic lining

- copper / aluminium condenser coils with Fin Guard (Silver) treatment

- Copper/copper condenser coil

- unit without hydronic assembly

From size 31 to 151:

- phase monitor

- - -

- Disposal for inrush current reduction

- serial communication module to supervisor (MODBUS)

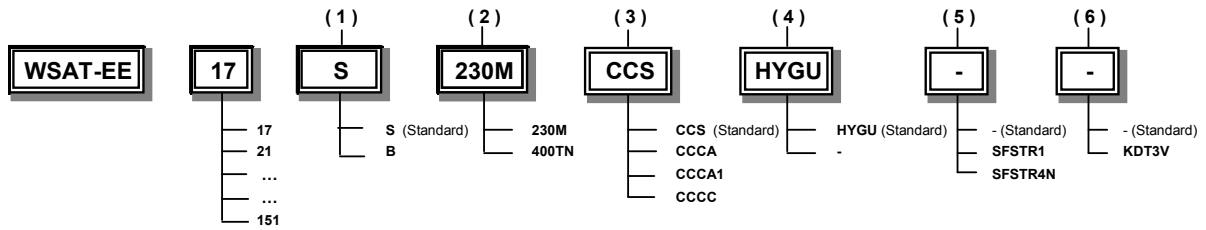
- set point compensation according to the outside enthalpy

- set point compensation with outside temperature probe

- Double temperature control kit, set point compensation with 4-20mA, 3 ways valve.

- Rubber antivibration mounts

CONFIGURATION CODE



(1) LOW TEMPERATURE

Low temperature: not required(-)
standard

Water low temperature(B)

From size 61 to 151:
this version permits units operation with glycol solution temperature from +5°C to -8°C.

(2) VOLTAGE

Supply voltage 230/1/50(230M)

From size 17 to 31:
Standard power supply

Supply voltage 400/3/50+N(400TN)

From size 41 to 151:
Standard power supply

(3) CONDENSING COIL

Standard condenser coil(CCS)

Copper / aluminium condenser coil with acrylic lining(CCCA)

Copper / aluminium condenser coil with Fin Guard treatment (Silver)

(CCCA1)

Copper /copper condenser coil(CCCC)

(4) HYDRONIC GROUP UTILITY SIDE

hydronic group utility side(HYGU)

standard

Hydronic group utility side: not required(-)

(5) SOFT STARTER

Disposal for inrush current reduction: not required(-)
standard

disposal for inrush current reduction, for unit 230/1/50(SFSTR1)

From size 17 to 51:

disposal for inrush current reduction, for unit 400/3/50+N(SFSTR4N)

From size 61 to 151:

(6) ADDITIONAL CARDS

Additional cards: not required(-)

Double temperature control kit, set point compensation with 4-20mA, 3 ways valve control(kDT3V)

Double temperature control kit, set point compensation with 4-20mA, 3 ways valve control

GENERAL TECHNICAL SPECIFICATIONS

Size	17	21	25	31	41	51	61	71	81	91	101	121	131	151
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COOLING

Cooling capacity	1	kW	4.32	5.28	5.79	7.62	8.86	11.2	14	16.7	18.6	21.3	24.4	27.4	32.3	37.5
Compressor power input	1	kW	1.84	2.22	2.47	3.07	2.96	4.2	4.96	6.53	6.73	7.81	9.26	10.6	11.1	13.7
Total power input	2	kW	1.89	2.28	2.53	3.23	3.12	4.34	5.27	6.84	7.03	8.11	9.56	11	11.51	14.13
EER	3		2.29	2.32	2.29	2.36	2.84	2.58	2.66	2.44	2.65	2.62	2.55	2.49	2.81	2.65
ESEER			2.56	2.62	2.54	2.65	3.34	3.03	3.07	2.82	3.08	2.97	2.96	2.85	3.19	3

COMPRESSOR

Type of compressors	4		ROT	ROT	ROT	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	
No. of Compressors		Nr	1	1	1	1	1	1	1	1	1	1	1	1	1	
Std Capacity control steps		Nr	1	1	1	1	1	1	1	1	1	1	1	1	1	
Refrigerant charge (C1)	5	kg	1.5	1.6	1.6	2.4	2.8	2.9	3.2	3.7	4.9	5.7	7	7.7	8.3	9.5
Refrigerant circuits		Nr	1	1	1	1	1	1	1	1	1	1	1	1	1	1

INTERNAL EXCHANGER

Type of internal exchanger	6		PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	
No. of internal exchangers		Nr	1	1	1	1	1	1	1	1	1	1	1	1	1	
Water flow rate (Internal Exchanger)	1	l/s	0.21	0.25	0.28	0.36	0.42	0.53	0.67	0.8	0.89	1.02	1.16	1.31	1.54	1.79
Useful pump discharge head	1	kPa	44	37	32	53	51	33	147.1	139.3	127	116.5	129.8	155	138.6	121.1
Water content		l	1	1	1	1.2	1.4	1.4	1.1	1.5	1.5	1.8	2.1	2.4	2.7	3.1

EXTERNAL SECTION FANS

Type of fans	7		AX	AX	AX	AX	AX	AX	AX	AX	AX	AX	AX	AX	AX	
Number of fans		Nr	1	1	1	2	2	2	2	2	2	2	2	2	2	
Standard air flow	1	l/s	655	655	655	1247	1310	1310	1924	1924	2191	2191	2085	2554	2865	2865
Installed unit power		kW	0.05	0.06	0.06	0.08	0.08	0.07	0.16	0.16	0.15	0.15	0.15	0.22	0.21	0.21

CONNECTIONS

Water fittings			1" GAS	1" GAS	1" GAS	1" GAS	1" GAS	1" GAS	1" GAS	1" GAS	1" GAS	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
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HYDRAULIC CIRCUIT

Max water side pressure		kPa	550	550	550	550	550	550	550	550	550	550	550	550	550	550
Safety valve calibration		kPa	600	600	600	600	600	600	600	600	600	600	600	600	600	600

EXPANSION VESSEL

Expansion vessel capacity		l	1	1	1	1	1	1	5	5	5	5	5	5	5	5
No. of expansion vessels		Nr	1	1	1	1	1	1	1	1	1	1	1	1	1	1

POWER SUPPLY

Standard power supply		V	230/1/50	230/1/50	230/1/50	230/1/50	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N
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NOISE LEVELS

Sound pressure level (1 m)		dB(A)	49	50	51	53	53	54	62	62	63	63	63	64	65	66
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DIMENSIONS

Length		mm	800	800	800	800	800	800	1087	1087	1373	1373	1373	1373	1710	1710
Depth		mm	300	300	300	300	300	300	411	411	555	555	555	555	684	684
Height		mm	643	643	643	930	1244	1244	1175	1175	1225	1225	1225	1225	1477	1477
Packing volume		m ³	0.2	0.2	0.2	0.4	0.5	0.5	0.7	0.7	0.7	0.7	0.7	1.1	1.1	2.1

STANDARD UNIT WEIGHTS

Shipping weight		kg	60	68	68	83	105	113	122	124	171	175	194	200	268	273
Operating weight		kg	58	66	66	80	102	110	118	120	166	170	189	195	261	266

Shown datas are referred to units working in perfect installation and exchangers' cleaning conditions.

(1) data referred to the following conditions :

internal exchanger water = 12/7°C

external exchanger air intake 35°C

(2) Total input is obtained from compressor input + fan input

(3) EER calculated as the relationship between cooling capacity and total absorbed power.

(4) ROT = rotary compressor

SCROLL = scroll compressor

(5) Nominal values

(6) PHE = plates

(7) AX = axial-flow fan

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VOLTAGE: 230/1/50

ELECTRICAL DATA

Size			17	21	25	31	41	51
F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS								
F.L.A. - Pump		A	0.95	0.95	0.95	1.18	1.18	1.18
F.L.A. - Total		A	11.82	14.77	15.44	20.66	24.46	32.06
L.R.A. LOCKED ROTOR AMPERES								
L.R.A. - Compressor 1		A	43	62	62	88	97	130
F.L.I. FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITION								
F.L.I. - Pump		kW	0.2	0.2	0.2	0.27	0.27	0.27
F.L.I. - Total		kW	2.58	3.19	3.34	4.74	5.02	6.03
M.I.C. MAXIMUM INRUSH CURRENT								
M.I.C. - Value		A	44.49	63.49	63.49	90.26	99.26	132.26

power supply 230/1/50 Hz +/-6%
 The pump is included in the total values calculation
 for non standard voltage please contact Clivet technical office
 The units are compliant with the provisions of European standards CEI EN 60204 and CEI EN 60335.

VOLTAGE: 400/3/50+N

ELECTRICAL DATA

Size			31	41	51	61	71	81	91	101	121	131	151
F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS													
F.L.A. - Pump		A	1.18	1.18	1.18	3.2	3.2	3.2	3.2	1.45	1.58	1.58	1.58
F.L.A. - Total		A	9.11	9.86	12.56	15.68	18.78	19.98	20.98	23.43	26.06	28.87	33.87
L.R.A. LOCKED ROTOR AMPERES													
L.R.A. - Compressor 1		A	33	48	64	74	101	95	111	118	118	140	173
F.L.I. FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITION													
F.L.I. - Pump		kW	0.27	0.27	0.27	0.66	0.66	0.66	0.66	0.61	0.82	0.82	0.82
F.L.I. - Total		kW	4.46	4.86	6.33	7.6	9.2	10.05	11.15	12.9	14.6	15.85	18.2
M.I.C. MAXIMUM INRUSH CURRENT													
M.I.C. - Value		A	35.26	49.08	65.08	78.48	105.48	99.48	115.48	120.73	121.26	143.26	176.26

power supply 400/3/50 (+ NEUTRAL) +/- 6%
 Maximum Phase Unbalance: 2%
 The pump is included in the total values calculation
 for non standard voltage please contact Clivet technical office
 The units are compliant with the provisions of European standards CEI EN 60204 and CEI EN 60335.

OPERATING LIMITS (COOLING)

Size			17	21	25	31	41	51	61	71	81	91	101	121	131	151
EXTERNAL EXCHANGER																
Max air intake temperature	1	°C	50	49	48	50	49	49	49	47	47	48	47	47	49	47
Min. air intake temperature	2	°C	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
INTERNAL EXCHANGER																
Max water inlet temperature	3	°C	22	22	22.5	23	20	20	22	22	22	22	22	22	23	23
Min. water outlet temperature	4	°C	3	3	3	3	3	3	3	3	3	3	3	3	3	3

difference between inlet / outlet water temperature = 5°C
 Delta temperature min/max=3/8°C
 ATTENTION: IN CASE OF PREDOMINANT WINDS, WINDBREAK BARRIERS ARE NECESSARY.
 Data refer to unit operating with fans at max. flow-rate. It follows an energy efficiency increase, but also a sound pressure increase of about 2/3 dB(A).

- (1) internal exchanger water = 12/7°C
- (2) Data referred to still air
- (3) external exchanger air intake 30°C
- Maximum exchanger inlet water temperature 32°C during max. 15 minutes, thanks to the variable flow rate device for the circulator (standard). (size 61-71-81-91-101-121)
- (4) Antifreeze (std)

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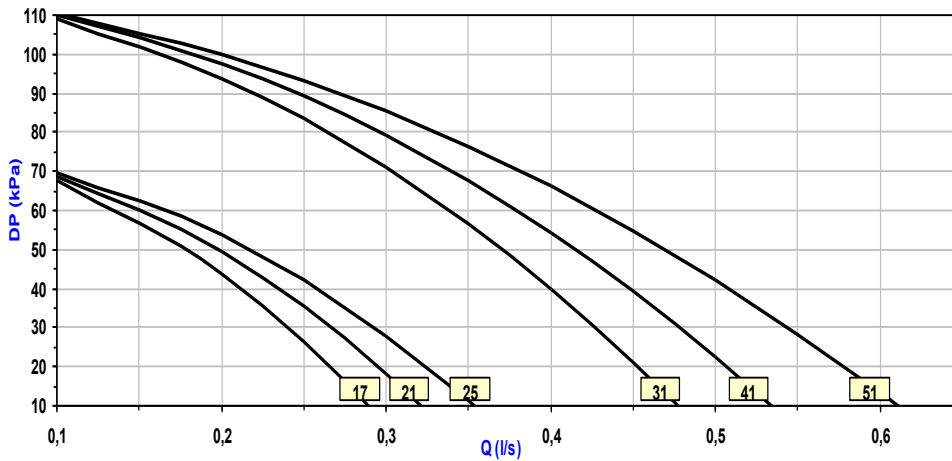
SOUND LEVELS

Size	Sound Power Level (dB)								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
17	67	68	62	61	55	50	39	29	49	61
21	69	68	62	61	57	51	42	36	49	62
25	72	70	65	63	58	54	47	39	51	64
31	73	70	67	64	63	57	49	46	53	67
41	74	71	68	65	64	58	50	46	53	68
51	75	70	68	67	65	59	52	46	55	69
61	86	81	80	72	72	65	56	49	62	77
71	86	81	80	73	72	65	57	49	62	77
81	86	81	81	76	72	66	57	50	63	78
91	86	81	81	75	71	66	58	51	63	78
101	86	84	77	75	73	69	62	56	63	78
121	87	83	82	77	74	68	62	55	64	80
131	87	81	86	77	74	69	59	52	65	81
151	84	81	88	79	72	69	55	48	66	82

Measures according to ISO 3744 regulations, with respect to the EUROVENT 8/1 certification.
The sound pressure is measured at 1 m from the external surface of the unit in open field conditions.
data referred to the following conditions :
Internal exchanger water = 12/7 °C; outdoor air temperature 35°C

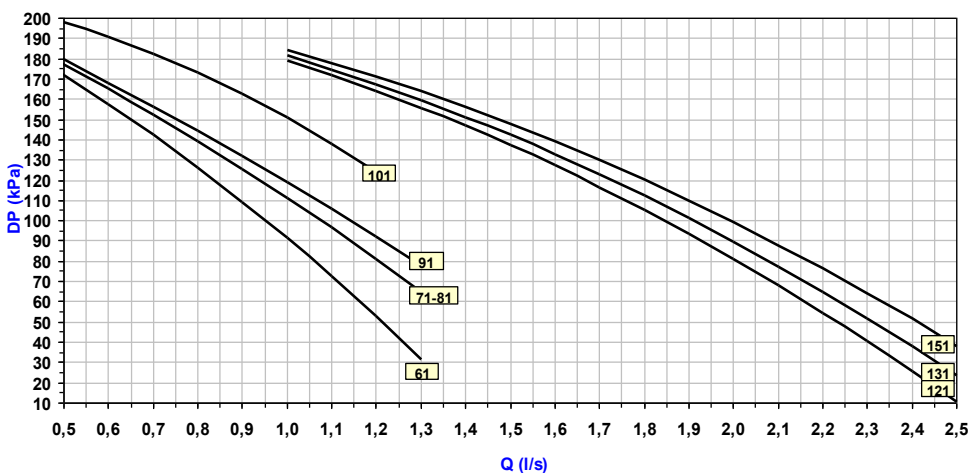
PUMP PERFORMANCE

PUMP PERFORMANCE(1)



CURVE OF DISCHARGE HEAD WITH HYDRONIC ASSEMBLY
DP[KPA]=USEFUL DISCHARGE HEAD
Q[L/S]= WATER-FLOW RATE
THE HEADS ARE INTENDED AS AVAILABLE AT THE UNIT CONNECTIONS

PUMP PERFORMANCE(2)



CURVE OF DISCHARGE HEAD WITH HYDRONIC ASSEMBLY
DP[KPA]=USEFUL DISCHARGE HEAD
Q[L/S]= WATER-FLOW RATE
THE HEADS ARE INTENDED AS AVAILABLE AT THE UNIT CONNECTIONS

CORRECTION FACTOR FOR ANTIFREEZE SOLUTIONS

% ethylene glycol by weight			5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature		°C	-2.0	-3.9	-6.5	-8.9	-11.8	-15.6	-19.0	-23.4
Safety temperature		°C	3.0	1.0	-1.0	-4.0	-6.0	-10.0	-14.0	-19.0
Cooling Capacity Factor		Nr	0.995	0.990	0.985	0.981	0.977	0.974	0.971	0.968
Compressor input Factor		Nr	0.997	0.993	0.990	0.988	0.986	0.984	0.982	0.981
Internal exchanger Glycol solution flow Factor		Nr	1.003	1.010	1.020	1.033	1.050	1.072	1.095	1.124
Pressure drop Factor		Nr	1.029	1.060	1.090	1.118	1.149	1.182	1.211	1.243

The correction factors shown refer to water and glycol ethylene mixes used to prevent the formation of frost on the exchangers in the water circuit during inactivity in winter.

FOULING CORRECTION FACTOR

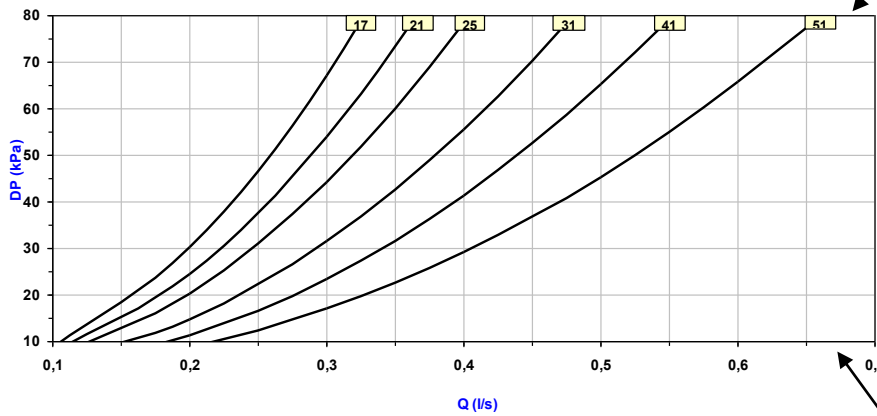
m ² °C/W	INTERNAL EXCHANGER	
	F1	FK1
0.44 x 10 ⁻⁴	1.00	1.00
0.88 x 10 ⁻⁴	0.97	0.99
1.76 x 10 ⁻⁴	0.94	0.98

The cooling performance values provided in the tables are based on the external exchanger having clean plates (fouling factor 1). For different fouling factor values, multiply the performance by the coefficients shown in the table.

F1 = Cooling capacity correction factors

FK1 = Compressor power input correction factor

INTERNAL EXCHANGER PRESSURE DROP

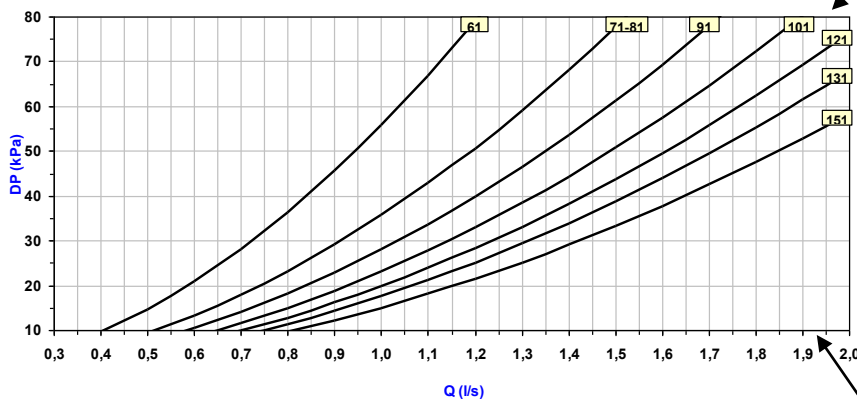


EXCHANGER PRESSURE DROP LIMIT. WARNING: DON'T USE OVER THIS LIMIT

UNIT WITHOUT HYDRONIC ASSEMBLY
DP = PRESSURE DROP
Q = WATER FLOW

EXCHANGER PRESSURE DROP LIMIT. WARNING: DON'T USE BELOW THIS LIMIT.

EXCHANGER PRESSURE DROP LIMIT. WARNING: DON'T USE OVER THIS LIMIT



EXCHANGER PRESSURE DROP LIMIT. WARNING: DON'T USE BELOW THIS LIMIT.

UNIT WITHOUT HYDRONIC ASSEMBLY
DP = PRESSURE DROP
Q = WATER FLOW

B108B08CB300

COOLING PERFORMANCE

Size	To (°C)	EXTERNAL EXCHANGER AIR INTAKE TEMPERATURE (°C)													
		25		30		32		35		40		43		46	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
17	6	4.70	1.56	4.46	1.69	4.36	1.74	4.20	1.83	3.92	1.97	3.74	2.06	3.56	2.15
	7	4.83	1.56	4.59	1.70	4.48	1.76	4.32	1.84	4.04	1.99	3.86	2.08	3.68	2.17
	8	4.97	1.57	4.71	1.71	4.61	1.77	4.45	1.86	4.16	2.01	3.98	2.10	3.80	2.20
	9	5.10	1.58	4.85	1.72	4.74	1.78	4.57	1.87	4.29	2.02	4.11	2.12	3.92	2.22
	10	5.24	1.59	4.98	1.73	4.87	1.79	4.70	1.88	4.41	2.04	4.23	2.14	4.04	2.24
	11	5.38	1.60	5.12	1.74	5.01	1.81	4.84	1.90	4.54	2.06	4.36	2.16	4.17	2.26
21	6	5.76	1.86	5.44	2.02	5.31	2.09	5.12	2.20	4.79	2.38	4.59	2.50	4.39	2.63
	7	5.92	1.87	5.60	2.04	5.47	2.11	5.27	2.22	4.94	2.41	4.74	2.53	4.53	2.65
	8	6.09	1.89	5.76	2.06	5.63	2.13	5.43	2.24	5.09	2.43	4.88	2.55	4.68	2.68
	9	6.27	1.90	5.93	2.07	5.80	2.15	5.59	2.26	5.25	2.45	5.04	2.58	4.82	2.70
	10	6.45	1.92	6.11	2.09	5.97	2.16	5.76	2.28	5.41	2.48	5.19	2.60	4.98	2.73
	11	6.64	1.93	6.29	2.11	6.15	2.18	5.93	2.30	5.57	2.50	5.36	2.63	5.14	2.76
25	6	6.30	2.10	5.97	2.27	5.84	2.34	5.64	2.45	5.30	2.64	5.10	2.76	4.90	2.88
	7	6.47	2.12	6.13	2.29	5.99	2.36	5.79	2.47	5.45	2.67	5.24	2.79	5.03	2.91
	8	6.64	2.13	6.30	2.31	6.16	2.38	5.95	2.50	5.60	2.69	5.39	2.82	5.17	2.94
	9	6.82	2.15	6.47	2.33	6.33	2.40	6.11	2.52	5.75	2.72	5.54	2.84	5.32	2.97
	10	7.01	2.16	6.65	2.35	6.50	2.42	6.28	2.54	5.92	2.74	5.70	2.87		
	11	7.20	2.18	6.83	2.37	6.68	2.44	6.46	2.56	6.09	2.77	5.86	2.90		
31	6	8.34	2.59	7.88	2.82	7.69	2.91	7.40	3.04	6.92	3.27	6.63	3.40	6.33	3.53
	7	8.58	2.61	8.11	2.84	7.92	2.93	7.62	3.07	7.13	3.30	6.82	3.43	6.52	3.57
	8	8.83	2.63	8.35	2.86	8.15	2.96	7.85	3.10	7.34	3.33	7.02	3.46	6.71	3.60
	9	9.09	2.66	8.59	2.89	8.39	2.98	8.08	3.12	7.55	3.36	7.23	3.50	6.90	3.64
	10	9.35	2.68	8.84	2.91	8.63	3.01	8.31	3.15	7.77	3.39	7.44	3.53	7.10	3.67
	11	9.62	2.70	9.10	2.94	8.88	3.03	8.56	3.18	8.00	3.42	7.65	3.56	7.30	3.71
41	6	9.68	2.37	9.15	2.65	8.93	2.77	8.60	2.95	8.04	3.27	7.70	3.47	7.36	3.68
	7	9.97	2.39	9.42	2.67	9.20	2.78	8.86	2.96	8.29	3.28	7.95	3.48	7.60	3.69
	8	10.3	2.40	9.69	2.68	9.47	2.80	9.12	2.98	8.55	3.30	8.20	3.50	7.85	3.70
	9	10.5	2.42	9.97	2.70	9.74	2.82	9.39	3.00	8.81	3.31	8.45	3.51	8.09	3.71
	10	10.8	2.44	10.3	2.72	10.0	2.84	9.66	3.02	9.07	3.33	8.71	3.53	8.34	3.73
	11	11.1	2.45	10.5	2.74	10.3	2.85	9.94	3.03	9.33	3.35	8.96	3.54	8.59	3.74
51	6	12.2	3.35	11.5	3.75	11.3	3.91	10.9	4.18	10.2	4.64	9.79	4.93	9.38	5.23
	7	12.5	3.38	11.8	3.77	11.6	3.94	11.2	4.20	10.5	4.65	10.1	4.93	9.69	5.22
	8	12.8	3.41	12.2	3.80	11.9	3.97	11.5	4.22	10.8	4.66	10.4	4.93		
	9	13.2	3.44	12.5	3.83	12.2	3.99	11.8	4.24	11.1	4.67	10.7	4.94		
	10	13.5	3.47	12.8	3.86	12.5	4.02	12.1	4.26	11.4	4.68	11.0	4.94		
	11	13.9	3.50	13.2	3.89	12.9	4.04	12.5	4.28	11.8	4.69	11.4	4.94		
61	6	15.2	4.00	14.4	4.44	14.1	4.63	13.6	4.92	12.7	5.44	12.2	5.77	11.7	6.11
	7	15.6	4.04	14.8	4.48	14.5	4.66	14.0	4.96	13.1	5.47	12.6	5.80	12.0	6.14
	8	16.0	4.08	15.2	4.51	14.9	4.70	14.4	4.99	13.5	5.50	12.9	5.83	12.4	6.17
	9	16.4	4.11	15.6	4.55	15.3	4.74	14.8	5.02	13.8	5.54	13.3	5.86	12.7	6.20
	10	16.9	4.15	16.0	4.59	15.7	4.77	15.1	5.06	14.2	5.57	13.6	5.89	13.0	6.23
	11	17.3	4.18	16.4	4.62	16.1	4.81	15.5	5.09	14.6	5.60	14.0	5.92	13.4	6.25

kWf = Cooling capacity in kW
 kWe = Compressor power input in kW
 To = Internal exchanger water outlet temperature in °C
 Performances in function of the inlet/outlet water temperature differential = 5°C
 The performance refers to rated air flow.
 Data listed in the tables are based on plate exchangers without fouling and clean coils. For different situation it is necessary to use adequate correction factors.

E108E008CE-00

COOLING PERFORMANCE

Size	To (°C)	EXTERNAL EXCHANGER AIR INTAKE TEMPERATURE (°C)													
		25		30		32		35		40		43		46	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
71	6	18.2	5.30	17.3	5.87	16.9	6.10	16.3	6.47	15.2	7.12	14.5	7.52	13.9	7.95
	7	18.7	5.37	17.7	5.93	17.3	6.16	16.7	6.53	15.6	7.17	15.0	7.57	14.3	7.98
	8	19.2	5.43	18.2	5.99	17.8	6.22	17.2	6.58	16.1	7.22	15.4	7.61		
	9	19.7	5.49	18.7	6.05	18.3	6.28	17.6	6.64	16.5	7.27	15.8	7.66		
	10	20.2	5.55	19.2	6.11	18.7	6.34	18.1	6.70	17.0	7.33	16.3	7.72		
	11	20.7	5.61	19.7	6.16	19.2	6.40	18.6	6.76	17.4	7.39	16.7	7.78		
81	6	20.3	5.43	19.2	6.02	18.8	6.28	18.1	6.68	16.9	7.39	16.1	7.84	15.4	8.31
	7	20.9	5.48	19.8	6.08	19.3	6.33	18.6	6.73	17.4	7.42	16.6	7.87	15.8	8.33
	8	21.4	5.54	20.3	6.13	19.9	6.38	19.1	6.77	17.8	7.46	17.0	7.90	16.2	8.35
	9	22.0	5.59	20.9	6.18	20.4	6.43	19.6	6.82	18.3	7.50	17.5	7.93	16.6	8.37
	10	22.6	5.65	21.4	6.23	20.9	6.48	20.2	6.86	18.8	7.53	17.9	7.96	17.0	8.39
	11	23.1	5.70	22.0	6.28	21.5	6.53	20.7	6.91	19.3	7.57	18.4	7.98	17.5	8.41
91	6	22.9	6.45	21.8	7.08	21.3	7.34	20.7	7.75	19.5	8.45	18.8	8.89	18.1	9.34
	7	23.5	6.51	22.4	7.14	21.9	7.41	21.3	7.81	20.1	8.51	19.5	8.95	18.8	9.40
	8	24.1	6.58	23.0	7.21	22.5	7.47	21.9	7.87	20.7	8.58	20.1	9.01		
	9	24.8	6.64	23.6	7.28	23.1	7.54	22.5	7.94	21.3	8.65	20.7	9.09		
	10	25.4	6.71	24.2	7.35	23.8	7.61	23.1	8.02	22.0	8.73	21.3	9.18		
	11	26.0	6.78	24.8	7.42	24.4	7.68	23.7	8.10	22.6	8.82	21.9	9.28		
101	6	26.7	7.54	25.2	8.34	24.6	8.67	23.7	9.19	22.1	10.1	21.0	10.7	20.0	11.2
	7	27.4	7.61	25.9	8.41	25.3	8.75	24.4	9.26	22.7	10.2	21.7	10.7	20.6	11.3
	8	28.1	7.69	26.6	8.49	26.0	8.82	25.0	9.33	23.4	10.2	22.3	10.8	21.3	11.3
	9	28.9	7.76	27.3	8.56	26.7	8.89	25.7	9.40	24.0	10.3	22.9	10.8	21.9	11.4
	10	29.6	7.83	28.0	8.63	27.4	8.96	26.4	9.47	24.6	10.4	23.6	10.9	22.5	11.5
	11	30.3	7.90	28.8	8.69	28.1	9.02	27.1	9.54	25.3	10.4	24.2	11.0	23.0	11.6
121	6	30.0	8.72	28.4	9.58	27.7	9.94	26.7	10.5	24.8	11.5	23.7	12.1	22.5	12.7
	7	30.8	8.80	29.2	9.65	28.5	10.0	27.4	10.6	25.5	11.5	24.3	12.1	23.1	12.8
	8	31.6	8.87	29.9	9.72	29.2	10.1	28.1	10.6	26.1	11.6	24.9	12.2	23.7	12.8
	9	32.5	8.95	30.7	9.79	29.9	10.1	28.8	10.7	26.8	11.6	25.5	12.2	24.2	12.8
	10	33.3	9.02	31.5	9.86	30.7	10.2	29.5	10.7	27.4	11.7	26.1	12.3	24.7	12.9
	11	34.1	9.10	32.2	9.93	31.4	10.3	30.2	10.8	28.0	11.7	26.6	12.3	25.2	12.9
131	6	35.0	9.14	33.3	10.0	32.5	10.4	31.4	11.0	29.5	12.0	28.3	12.7	27.1	13.4
	7	35.9	9.23	34.2	10.1	33.4	10.5	32.3	11.1	30.3	12.1	29.1	12.8	27.9	13.5
	8	36.9	9.33	35.1	10.2	34.3	10.6	33.2	11.2	31.2	12.2	30.0	12.9	28.7	13.5
	9	37.9	9.42	36.0	10.3	35.2	10.7	34.1	11.3	32.0	12.3	30.8	12.9	29.5	13.6
	10	38.8	9.52	36.9	10.4	36.2	10.8	35.0	11.3	32.9	12.3	31.6	13.0	30.3	13.6
	11	39.8	9.61	37.8	10.5	37.1	10.9	35.8	11.4	33.8	12.4	32.5	13.0	31.1	13.7
151	6	39.9	11.2	38.1	12.3	37.5	12.8	36.4	13.6	34.8	15.0	33.8	15.8	32.8	16.7
	7	40.9	11.3	39.2	12.5	38.5	12.9	37.5	13.7	35.8	15.1	34.8	15.9	33.8	16.8
	8	42.0	11.4	40.3	12.6	39.5	13.1	38.5	13.8	36.7	15.2	35.7	16.0	34.6	16.9
	9	43.1	11.5	41.3	12.7	40.6	13.2	39.5	13.9	37.7	15.3	36.6	16.1	35.5	17.0
	10	44.2	11.6	42.4	12.8	41.6	13.3	40.5	14.0	38.6	15.3	37.4	16.2	36.2	17.1
	11	45.4	11.8	43.4	12.9	42.7	13.4	41.5	14.1	39.5	15.4	38.2	16.3	37.0	17.2

kWf = Cooling capacity in kW
 kWe = Compressor power input in kW
 To = Internal exchanger water outlet temperature in °C
 Performances in function of the inlet/outlet water temperature differential = 5°C
 The performance refers to rated air flow.
 Data listed in the tables are based on plate exchangers without fouling and clean coils. For different situation it is necessary to use adequate correction factors.

B108B008CB00

ACCESSORIES

Each accessory is marked by a configuration code, e.g. CMMBX.

If the last letter is X, it means that the accessory is provided separately. If the code does not contain the letter X, the accessory is installed at the factory.

(CCCC -)Copper / copper condenser coils

The copper/copper condensing coil allows a better resistance to the natural agent like salt and sulphurous vapours.

Configuration Detail

(CCCA -)Copper / aluminium condenser coils with acrylic lining

The copper/aluminium evaporator coils with acrylic lining can be used in the room where the ambient air contains a concentration of salt and other not very aggressive agents.

Configuration Detail

(CCCA1 -)Copper / aluminium condenser coils with Fin Guard (Silver) treatment

The Fin Guard Silver, for finned exchanger, is a polyurethane vernish waterproof (for waterworks, see and discharge water). It is also resistant to oil products and other different solvents. It hasn't any effects on the air side pressure drops.

Configuration Detail

(-)Unit without hydronic assembly

The unit can be requested without circulating pump, expansion vessel, safety valve water side and filling assembly.

Configuration Detail

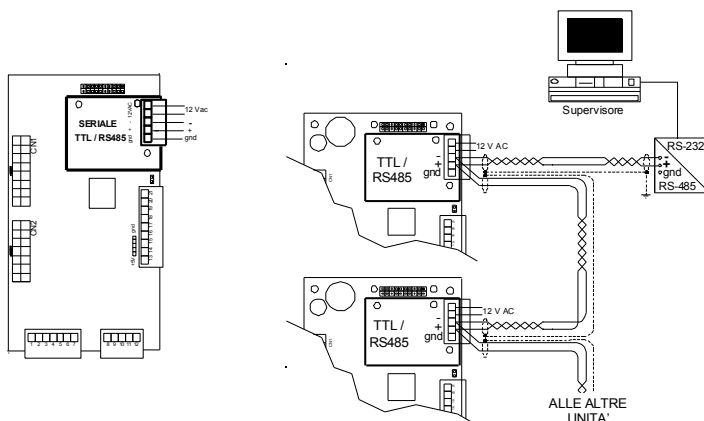
(PMX -)Phase monitor

The phase monitor allows to check the right presence of electric supply phases for 400/3/50 units.

separately supplied accessories

(CMMBX -)Serial communication module to supervisor (MODBUS)

The serial communication module to supervisor (MODBUS) is connected with the principal module through a comb connection (see lay-out on electrical panel). In this way the remote assistance and supervision are available through standard MODBUS protocol. It is possible to connect to a single supervisor system up to 127 units. The connection to PC must be obtained through a converter RS485/232; the serial port RS232 admits as maximum a 10 m length. The serial communication module to supervisor (MODBUS) is necessary when the unit is connected to ELFOCONTROL.



separately supplied accessories

B108E008CEB00

(SPC3X -)Set point compensation with according to outdoor enthalpy

It allows to modulate the unit set point according to the external enthalpy. By energy efficiency optimization, it optimizes also the defrosting times during winter operation. The humidity probe is electronically connected to the main control module present in the unit.



separately supplied accessories

(SPCX-)Set point compensation with outside temperature

Set point compensation by air temperature probe varies the value of the set point according to the outside air temperature, allowing energy savings. The probe is connected to the principal unit control module and the connection cable length is of 20 metres.



separately supplied accessories

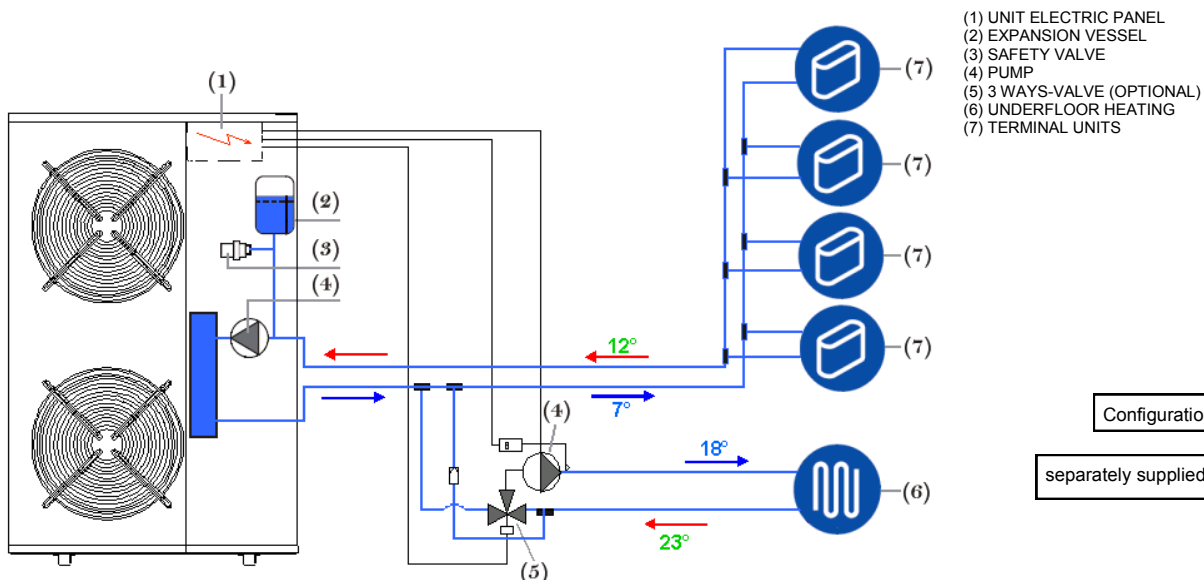
(KDT3V, KDT3VX -)Double temperature control kit, set point compensation with 4-20mA, 3 ways valve.

This accessory may wither be installed at the factory or provided separately.

Diagram with the three-way valve located on the water supply, from the unit towards the system

This kit can be used to manage some of the main accessories supplied with the unit. It is especially useful for controlling a 3-way hot water valve, for managing two different set points depending on the water use, i.e. radiating panels and fan coils, and for activating set point compensation via a 4-20mA signal. It consists of an expansion board connected to the electronics in the standard unit. It can be used for:

- 1) The management of the various elements (circulating pump, mixer valve and delivery sensor) in order to ensure the correct water temperature when supplying the radiating panels. This accessory controls the mixer valve on the basis of the climatic curve parameters set in the unit microprocessor, and operates on the basis of the EXTERNAL air. Humidity control and all additional regulations/controls are excluded from the Clivet supply.
- 2) Dynamic set point variation on the basis of a WATER RESET signal (4-20 mA) from an external device.



Configuration Detail

separately supplied accessories

B108B008CB00

(SFSTR4N, SFSTR1 -)Disposal for inrush current reduction

(SFSTR1 -)disposal for inrush current reduction, for unit 230/1/50

(SFSTR4N -)disposal for inrush current reduction, for unit 400/3/50+N (only for sizes from 61 to 151)

Starting up a motor directly can overload the electricity network, with start-up currents up to 8 times the nominal current. Thanks to the breakaway current reduction device, start-up takes place gradually, with the start-up current being limited during this period of time. The start-up current can therefore be reduced to 3.5 - 4 times the nominal current, meaning that the power systems and protection devices can be sized with lower parameters.

Configuration Detail

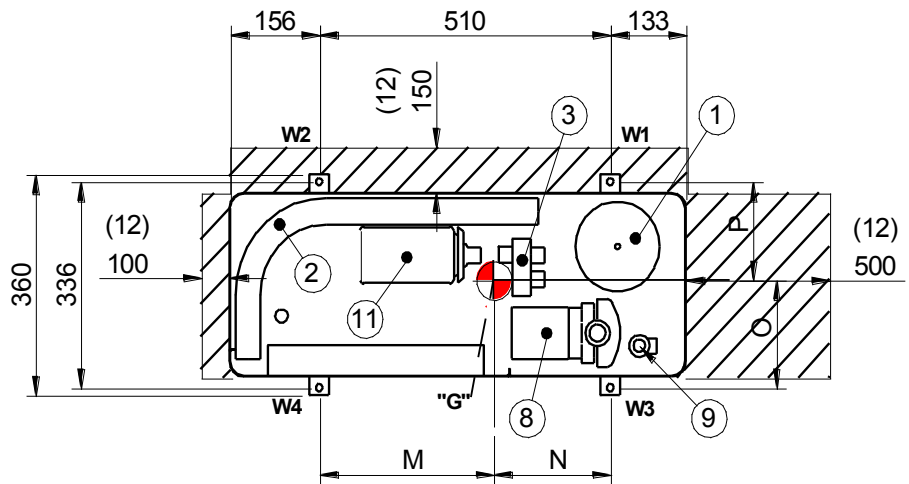
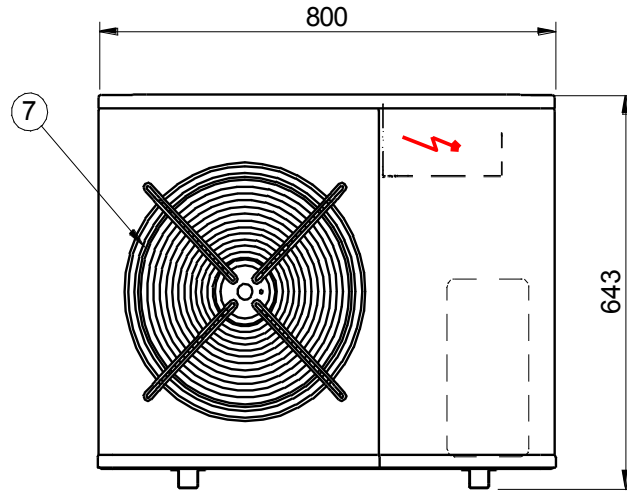
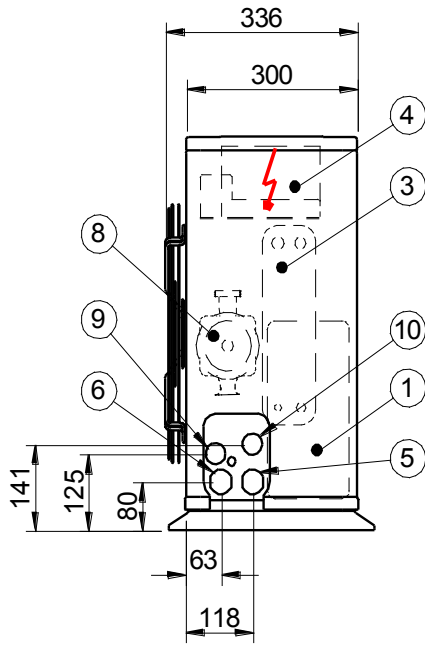
(AMRX -)Rubber antivibration mounts

The rubber antivibration mounts reduce the vibrations of compressor during its operation and they are installed at the base toe.

separately supplied accessories

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DIMENSIONAL DRAWING

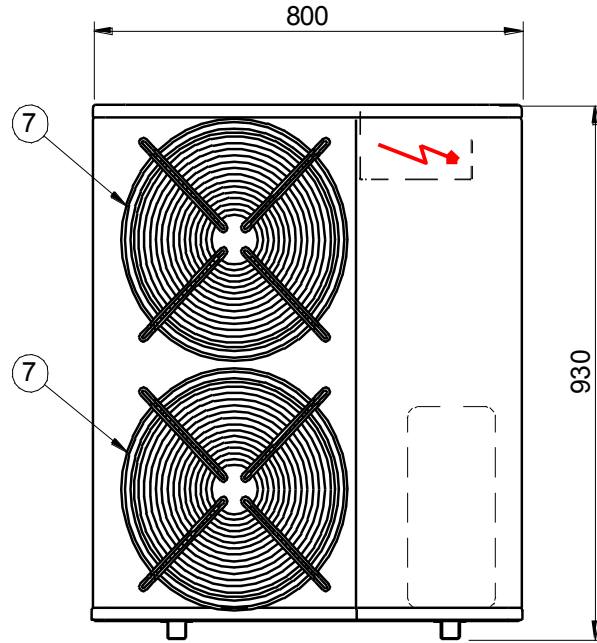
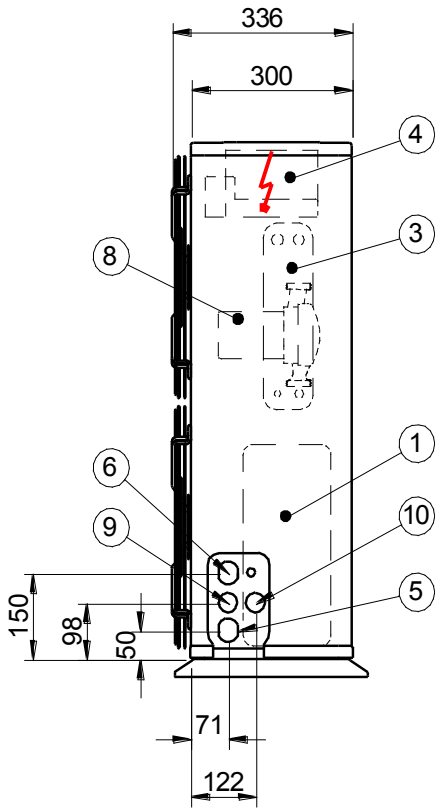


- (1) COMPRESSOR
- (2) EXTERNAL EXCHANGER
- (3) INTERNAL EXCHANGER
- (4) ELECTRICAL PANEL
- (5) WATER INLET 1" GAS
- (6) WATER OUTLET 1" GAS
- (7) FAN
- (8) PUMP
- (9) WATER SIDE SAFETY VALVE
- (10) POWER INPUT
- (11) EXPANSION VESSEL
- (12) CLEARANCE ACCESS RECOMMENDED ("G") BARYCENTRE

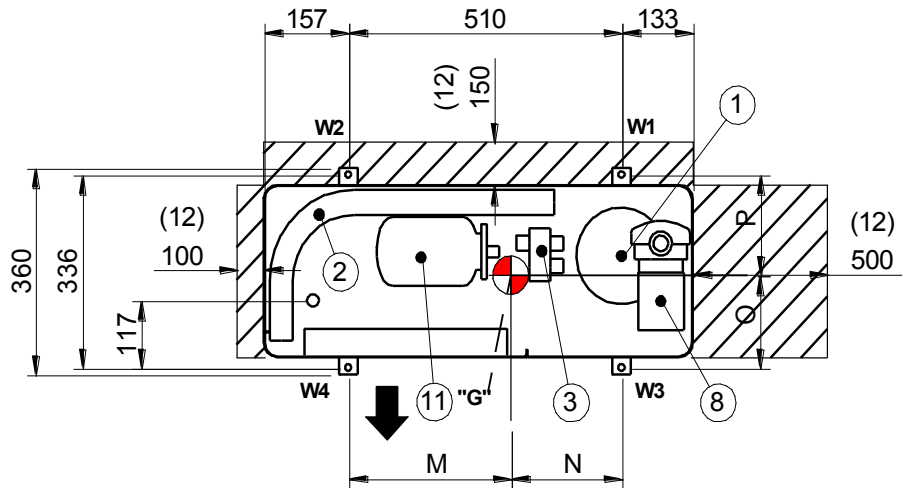
Size		17	21	25
M	mm	331	350	351
N	mm	179	160	159
O	mm	171	179	178
P	mm	165	157	158
Length	mm	800	800	800
Depth	mm	300	300	300
Height	mm	643	643	643
W1	kg	19	24	24
W2	kg	11	11	11
W3	kg	18	21	21
W4	kg	10	10	10
Operating weight	kg	58	66	66
Shipping weight	kg	60	68	68

B108B008CB00

DIMENSIONAL DRAWING



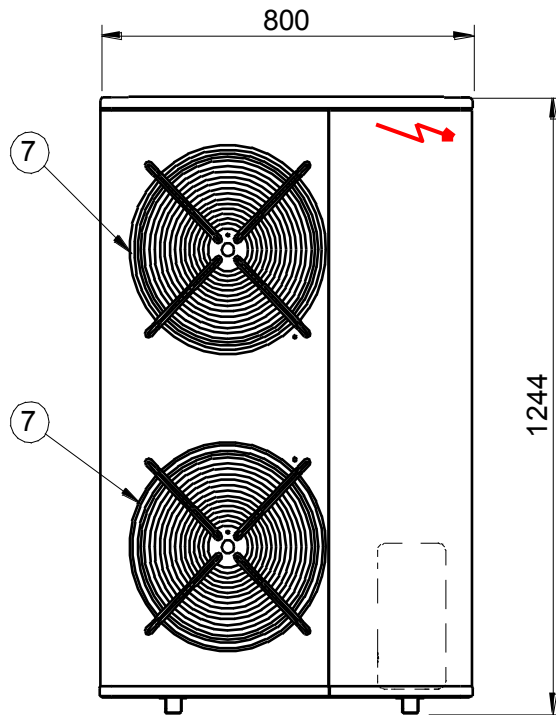
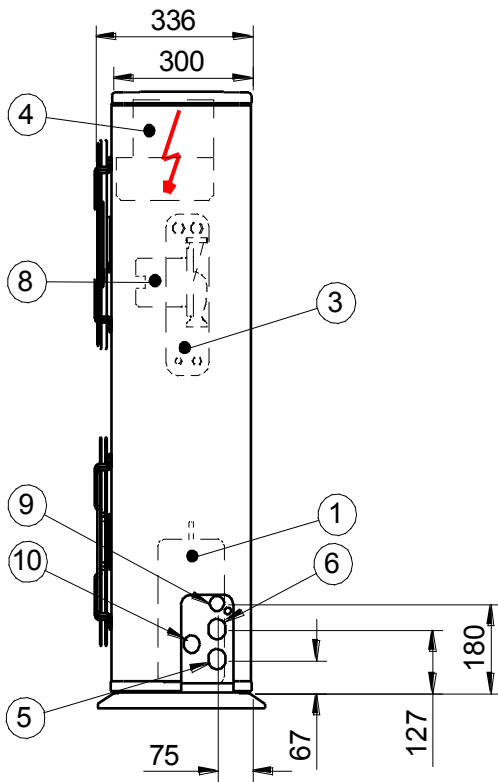
- (1) COMPRESSOR
- (2) EXTERNAL EXCHANGER
- (3) INTERNAL EXCHANGER
- (4) ELECTRICAL PANEL
- (5) WATER OUTLET 1" GAS
- (6) WATER INLET 1" GAS
- (7) FAN
- (8) PUMP
- (9) WATER SIDE SAFETY VALVE
- (10) POWER INPUT
- (11) EXPANSION VESSEL
- (12) CLEARANCE ACCESS RECOMMENDED ("G") BARYCENTRE



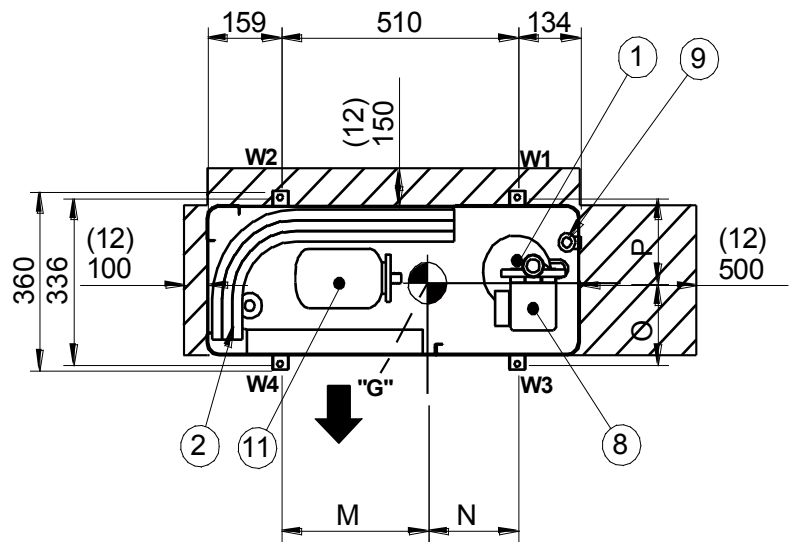
Size		31
M	mm	358
N	mm	152
O	mm	167
P	mm	169
Length	mm	800
Depth	mm	300
Height	mm	930
W1	kg	28
W2	kg	12
W3	kg	28
W4	kg	12
Operating weight	kg	80
Shipping weight	kg	83

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DIMENSIONAL DRAWING



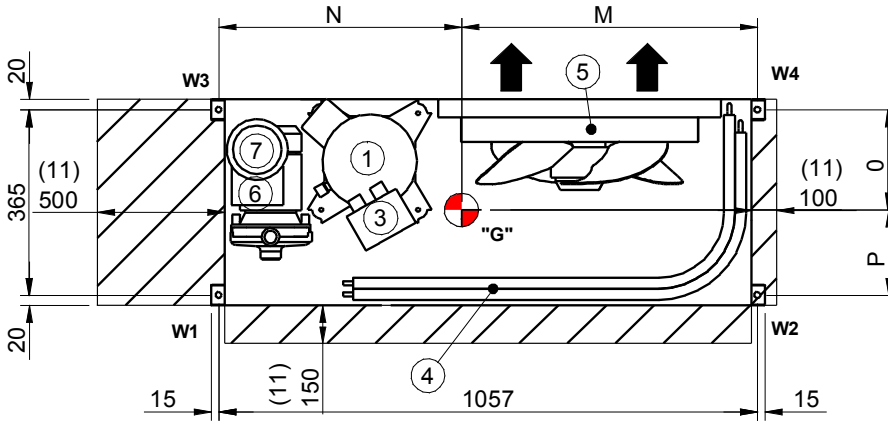
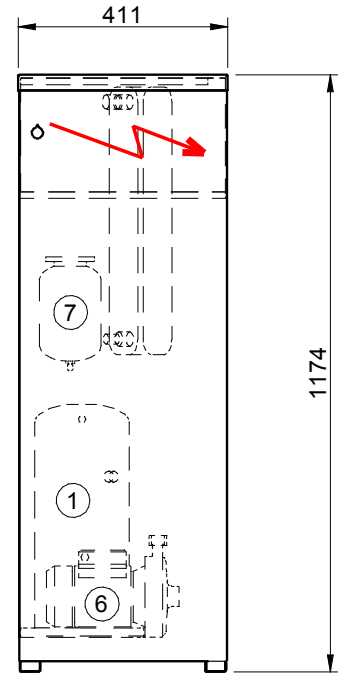
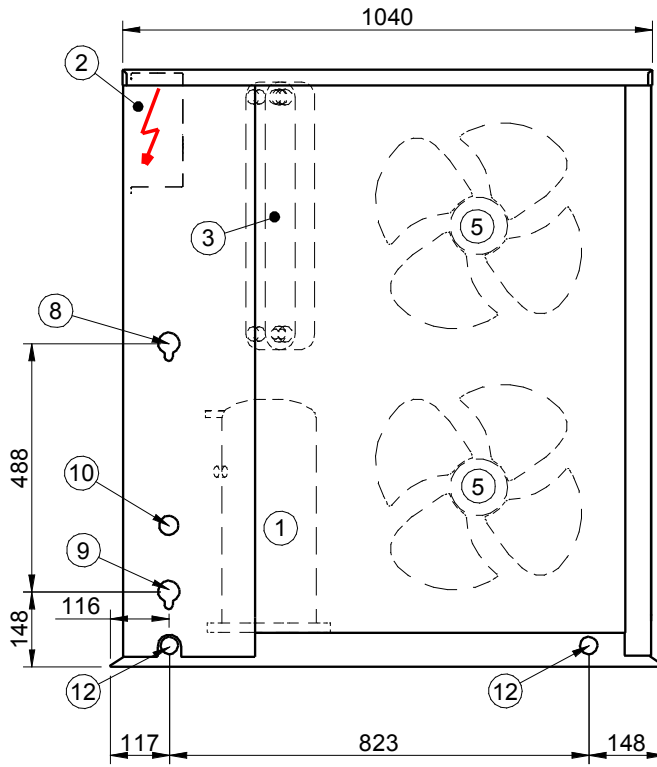
- (1) COMPRESSOR
- (2) EXTERNAL EXCHANGER
- (3) INTERNAL EXCHANGER
- (4) ELECTRICAL PANEL
- (5) WATER OUTLET 1" GAS
- (6) WATER INLET 1" GAS
- (7) FAN
- (8) PUMP
- (9) WATER SIDE SAFETY VALVE
- (10) POWER INPUT
- (11) EXPANSION VESSEL
- (12) CLEARANCE ACCESS RECOMMENDED
- ("G") BARYCENTRE



Size		41	51
M	mm	352	367
N	mm	158	143
O	mm	148	148
P	mm	188	188
Length	mm	800	800
Depth	mm	300	300
Height	mm	1244	1244
W1	kg	31	35
W2	kg	14	14
W3	kg	39	44
W4	kg	18	17
Operating weight	kg	102	110
Shipping weight	kg	105	113

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DIMENSIONAL DRAWING

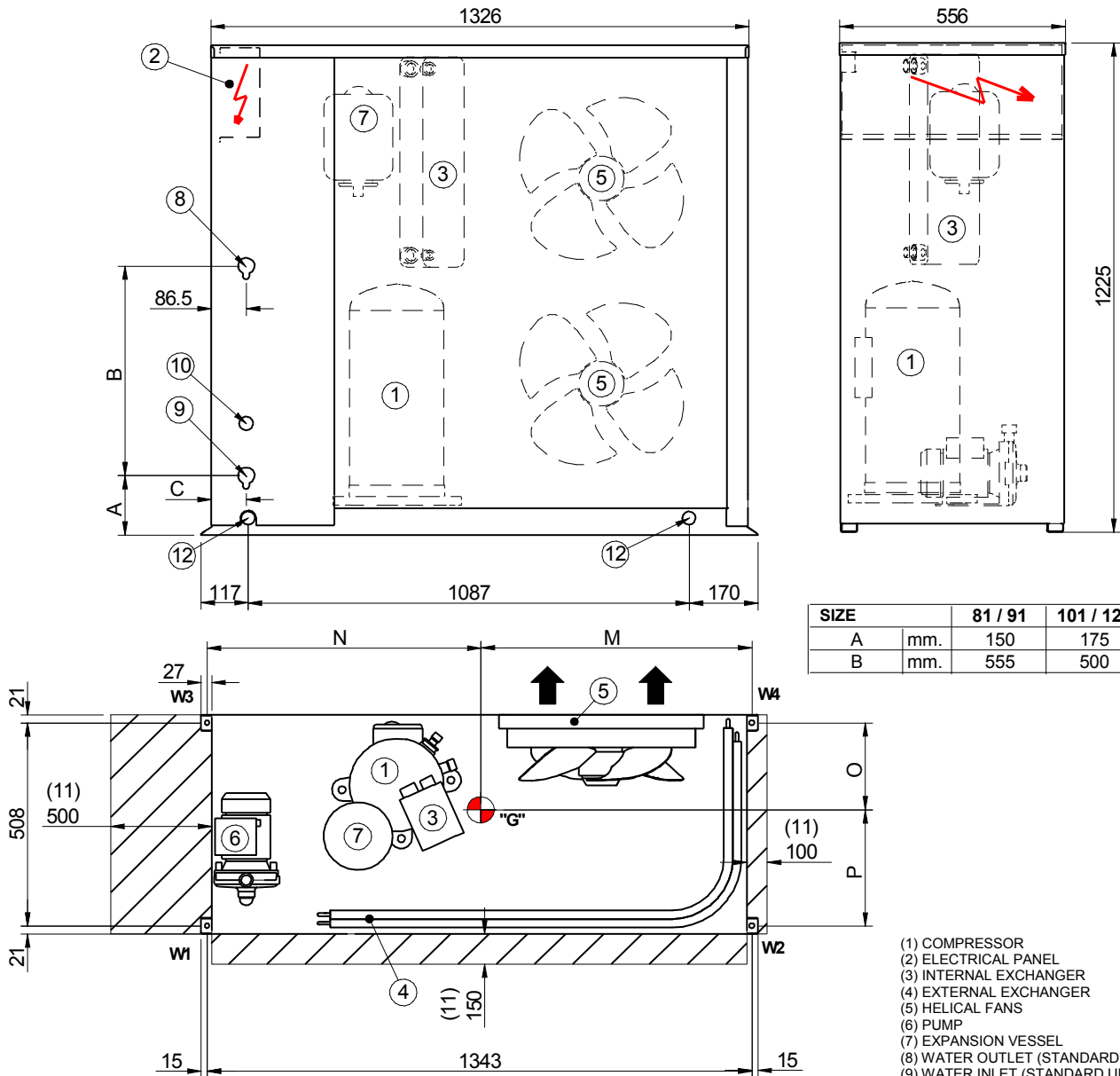


- (1) COMPRESSOR
- (2) ELECTRICAL PANEL
- (3) INTERNAL EXCHANGER
- (4) EXTERNAL EXCHANGER
- (5) HELICAL FANS
- (6) PUMP
- (7) EXPANSION VESSEL
- (8) WATER OUTLET (STANDARD UNIT)
- (9) WATER INLET (STANDARD UNIT)
- (10) POWER INPUT
- (11) CLEARANCE ACCESS RECOMMENDED
- (12) LIFTING HOLES
- ("G") BARYCENTRE

Size		61	71
M	mm	630	633
N	mm	427	424
O	mm	143	143
P	mm	222	222
Length	mm	1087	1087
Depth	mm	411	411
Height	mm	1175	1175
W1	kg	43	44
W2	kg	29	29
W3	kg	27	28
W4	kg	19	19
Operating weight	kg	118	120
Shipping weight	kg	122	124

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DIMENSIONAL DRAWING



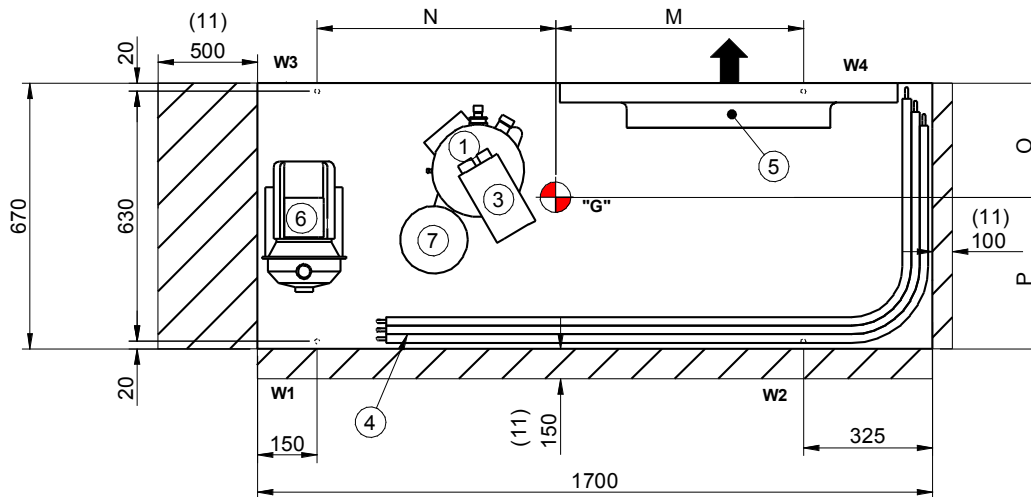
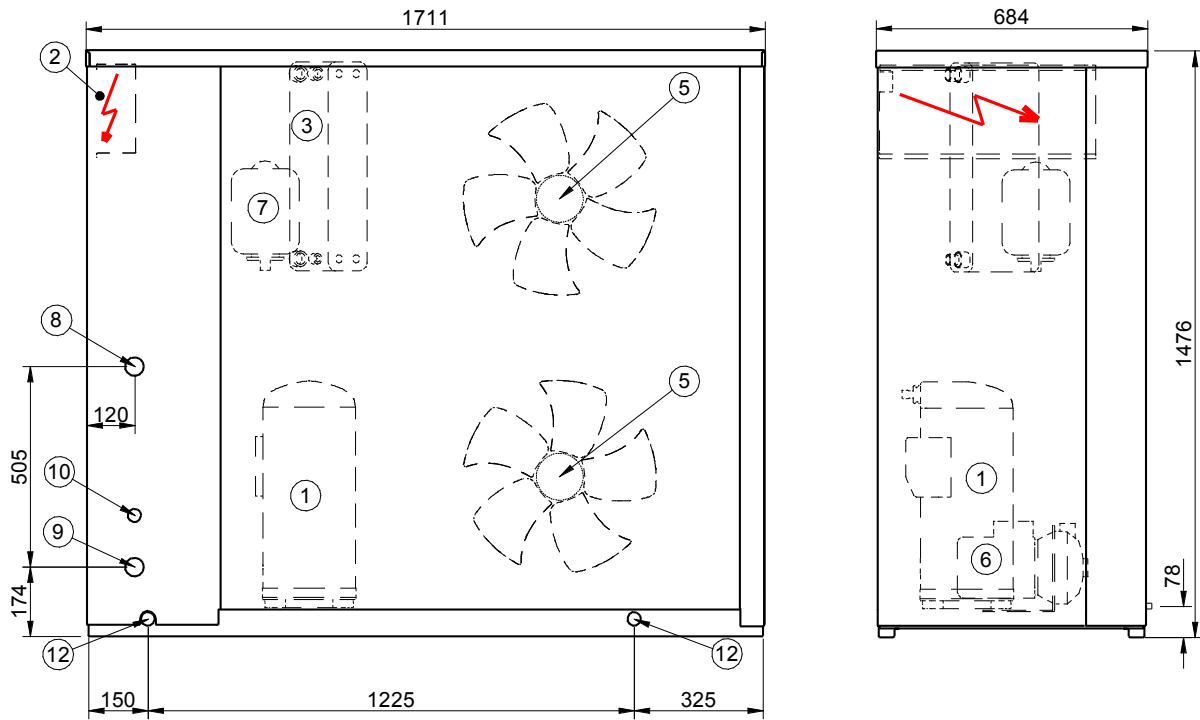
SIZE		81 / 91	101 / 121
A	mm.	150	175
B	mm.	555	500

- (1) COMPRESSOR
- (2) ELECTRICAL PANEL
- (3) INTERNAL EXCHANGER
- (4) EXTERNAL EXCHANGER
- (5) HELICAL FANS
- (6) PUMP
- (7) EXPANSION VESSEL
- (8) WATER OUTLET (STANDARD UNIT)
- (9) WATER INLET (STANDARD UNIT)
- (10) POWER INPUT
- (11) CLEARANCE ACCESS RECOMMENDED
- (12) LIFTING HOLES
- ("G") BARYCENTRE

Size		81	91	101	121
M	mm	745	763	755	756
N	mm	598	580	588	587
O	mm	225	216	228	231
P	mm	283	292	280	277
Length	mm	1373	1373	1373	1373
Depth	mm	555	555	555	555
Height	mm	1225	1225	1225	1225
W1	kg	54	56	58	60
W2	kg	41	42	46	46
W3	kg	40	41	48	50
W4	kg	31	31	37	39
Operating weight	kg	166	170	189	195
Shipping weight	kg	171	175	194	200

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DIMENSIONAL DRAWING



- (1) COMPRESSOR
- (2) ELECTRICAL PANEL
- (3) INTERNAL EXCHANGER
- (4) EXTERNAL EXCHANGER
- (5) HELICAL FANS
- (6) PUMP
- (7) EXPANSION VESSEL
- (8) WATER OUTLET (STANDARD UNIT)
- (9) WATER INLET (STANDARD UNIT)
- (10) POWER INPUT
- (11) CLEARANCE ACCESS RECOMMENDED
- (12) LIFTING HOLES
- ("G") BARYCENTRE

Size		131	151
M	mm	696	699
N	mm	524	521
O	mm	290	290
P	mm	380	380
Length	mm	1710	1710
Depth	mm	684	684
Height	mm	1477	1477
W1	kg	91	94
W2	kg	57	57
W3	kg	70	71
W4	kg	43	44
Operating weight	kg	261	266
Shipping weight	kg	268	273

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