ACCORRONI
Climate Technology

Chillers and heat pumps

RPE 19÷44 - HPE 18÷40

TECHNICAL MANUAL

RPE 19÷44 - HPE 18÷40

ORIGINAL INSTRUCTIONS

The water chillers and heat pumps comply with directive 2014/68//EC (PED).

1 SERIES

Water chillers and heat pumps of the series MPE are designed for outdoor installation in both residential and commercial applications.
The range uses R410A refrigerant, which assures high levels of performance with relatively low energy consumption and features 18 models in the chiller versionand 25 in heat pump verision, with cooling capacities ranging from 4 to 75 kW.

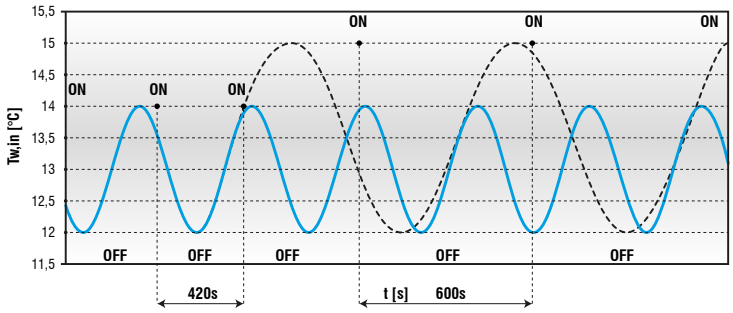
BEYOND CONVENTIONAL WORKING LIMITS

The finned block heat exchangers have been optimised for R410A and use 8 mm copper pipes, which permit a better heat exchange and quiet operation of the fans.

SELF - ADAPTIVE

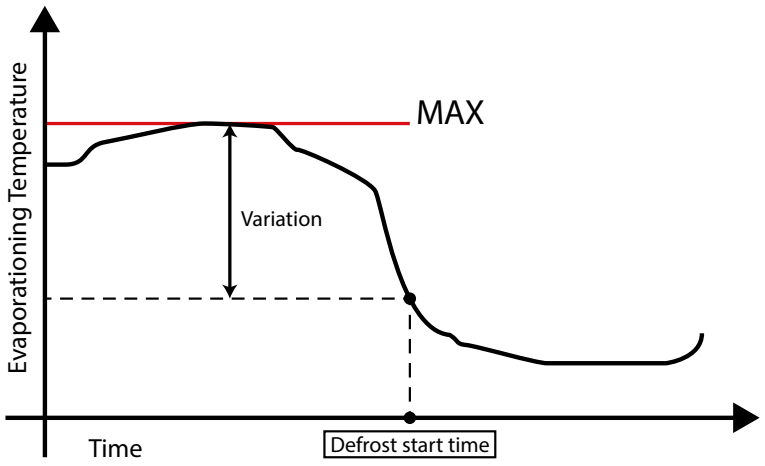
The electronic control system allows the setpoint to be adjusted automatically according to the outdoor temperature in order to reduce consumption and broaden the working temperature range.

The unit can also function in systems with a low water content, even without the use of a storage reservoir, thanks to the automatic adjustment which limits the number of compressor starts and thus extends the life of the compressors themselves.



SMART DEFROST SYSTEM

The exclusive smart defrost system can correctly identify an impairment of performance in the outdoor exchanger due to the formation of ice and minimise the process time in relation to normal operation of the unit.



2 CONSTRUCTIVE FEATURES

STRUCTURE

Galvanised sheet steel structure treated with a polyester powder coating (RAL9002) suitable for outdoor applications, for an attractive look and effective resistance to corrosive agents.
Fastening devices are made of non-oxidizable materials, or carbon steel that has undergone surface-passivating treatments.
The compressor compartment is completely sealed and may be accessed on 3 sides thanks to easy-to-remove panels that greatly simplify maintenance and/or inspection.
On request acoustic insulation can reduce the unit noise emissions

CUSTOMISED HYDRAULIC KIT

— High head pump made entirely of stainless steel, already configured for use with mixtures of water and ethylene glycol up to 35% and provided with internal thermal protection.
— Expansion vessel
— Security valve
— Filling cock (included).
— Automatic vent valve.
— Water differential pressure switch and outlet water temperature probe with anti-freeze thermostat function.
— Mechanical Y filter supplied as a standard feature on all models to protect the evaporator (included).

COOLING CIRCUIT

— Scroll compressors in tandem configuration or trio, with optional acoustical insulation Frame 3 e 4). The levels of efficiency, reliability and noise of such components are the state of the art for the scroll compressor. .
— Brazed plate heat exchangers made of stainless steel and optimised for use with R410A.
— Finned block condenser with 8 mm copper piping and aluminium fins, characterised by ample heat exchange surfaces.
— Dehydrating filter.
— Flow indicator with humidity indicator.
— Thermostatic valve with external equalisation and integrated MOP function.
— Cycle reversing valve (only MPE H)
— Check valve (MPE H)
— Liquid receiver (MPE H)
— High and low pressure switch
— Water safety valve
— Schrader valves for checks and/or maintenance
— Refrigerant pressure gauges (optional)

FAN DRIVE ASSEMBLY

Electric fan with 6/8-pole external rotor motor directly keyed to the axial fan, with internal thermal protection on the windings, complete with safety grille and dedicated supporting structure.
The fan is housed in a special compartment having a profile designed to optimise ventilation.
The use of finned block heat exchangers with 8 mm diameter pipes reduces pressure drops on the air side, thus significantly improving the noise levels of the units.
The condensation control system continuously and automatically regulates the fan speed, further limiting the noise emissions of the unit during nighttime operation and under partial load conditions.

FINNED BLOCK HEAT EXCHANGER

Made of 8 mm diameter copper pipes and aluminium fins, generously sized.
The special engineering of the heat exchangers allows defrost cycles to be carried out at maximum speed in the models with heat pump operation, which brings clear benefits in terms of the integrated efficiency of the whole cycle.

ELECTRONIC MICROPROCESSOR CONTROL

The electronic control enables the complete control of the **MPE** unit. It can be easily accessed through a polycarbonate flap with IP65 protection rating.
The self-adaptive logic enables the unit to operate even in systems where the water content is low, without the use of an inertial water storage reservoir. By reading the outdoor air temperature, it can automatically change the setpoint to adapt it to the outdoor load
The basic controller comes complete with the MODBUS protocol and enablesan immediate connection to GARDA networks.

Main functions:
— Control over the temperature of water entering the evaporator.
— Control over the temperature of water entering the evaporator. (**MPE H**)
— Control of fan speed (optional)

— Complete alarm management.
— Dynamic control of the setpoint according to the outdoor air temperature.
— Can be connected to an RS485 serial line for supervisory / teleassistance operation
— Setup for connection to a remote terminal that duplicates the functions of the electronic control

Devices controlled
— Compressor
— Fans
— Cycle reversing valve (**MPE H**)
— Water circulation pump
— Antifreeze heating element (optional)
— Alarm signalling relay

On request, it is possible to install the advanced controller whose functions extend to:
— LAN networks
— Modulation of the pump group, defrost (Smart Defrost System).

ELECTRIC CONTROL BOARD

The electric control board is constructed and wired in accordance with EEC Directive 73/23, Directive 89/336 on electromagnetic compatibility and related standards. Made of steel sheet, it is also protected by the enclosing panels of the machine.

OPTIONS

— Incorporable hydraulic kit
— Condensation control
— Low noise execution
— Refrigerant pressure gauges
— Antifreeze heating elements on the water circuit
— Electronic thermostatic valve
— Heat recovery 25% (chiller)
— Special exchangers (hydrophilic treatment, copper-copper, cataphoresis, anti-corrosion)

3 CONFIGURATION OPTIONS

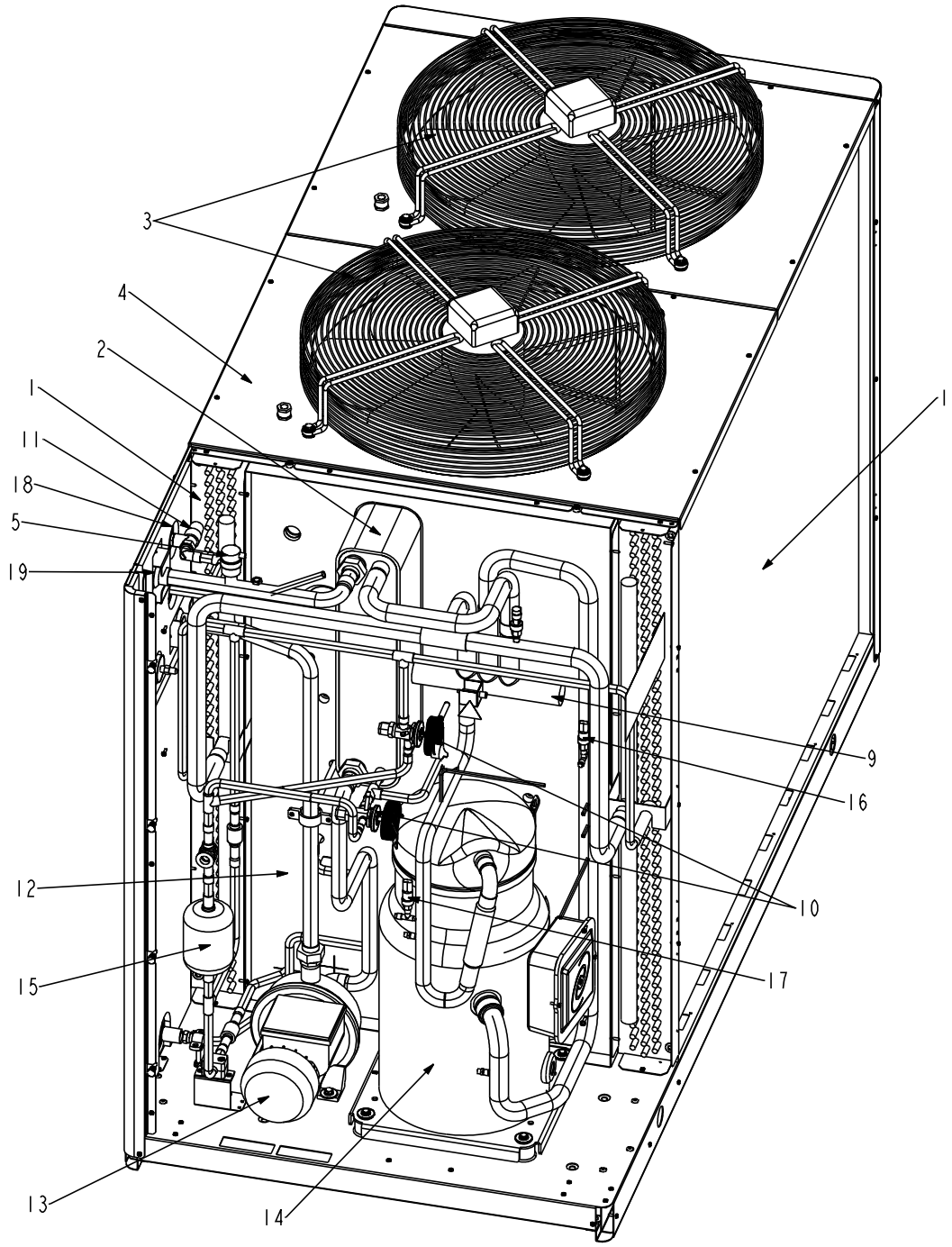
The MPE series consists of 18 models in cooling only version and 25 in reversible heat pump version. All models operates with R410A refrigerant.

» Configuration options

1	**Expansion valve**
0	Mechanical
A	Electronic
2	**Water pump and accessories**
1	LP pump + expansion vessel
2	LP run and standby double pump + expansion vessel
3	**Water buffer tank**
0	Absent
S	Selected
4	**Partial heat recovery**
0	Absent
D	Desuperheater with pump activation contact
5	**Air flow modulation**
C	Condensation control by phase-cut fans
E	Condensation control performed by EC fans
6	**Antifreezing kit**
0	Absent
E	Evaporator
P	Evaporator and water pump
S	Evaporator, water pump and water buffer tank
7	**Acoustic insulation and attenuation**
0	Absent
1	Compressor compartment acoustic insulation
2	Compressor sound blanket
3	Compressor compartment acoustic insulation and sound blanket
8	**Refrigerant pipework accessories**
0	Absent
M	Refrigerant pressure gauges
9	**Remote control / Serial communication**
0	Absent
2	RS485 serial board (Carel / Modbus protocol)
B	BACNET IP / PCOWEB serial board (advanced controller required)
F	BACNET MS/TP / PCONET board (advanced control required)
G	BACNET IP / PCOWEB serial board + supervision software Gweb (advanced controller required)
L	LON FTT10 serial board (advanced controller required)
M	Remote simplified user panel for standard controller
S	Remote simplified user panel
X	Remote simplified user panel for advanced controller
10	**Special coils / Protective treatments**
0	Standard
B	Pre-painted fins with epoxy painting
C	Cataphoresis
R	Copper-copper
11	**Outdoor finned coil heat exchanger protection**
0	Absent
G	Outdoor finned coil heat exchanger protection grille
12	**Compressors options**
0	Absent
1	Power factor capacitors
2	Soft starter
3	Power factor capacitors + soft starter
4	Crankcase compressor heater (CHILLER), outdoor coil trace heater (HP)
13	**Onboard controller**
1	Basic
2	Advanced
3	Advanced + GSM modem board
4	Advanced + clock card

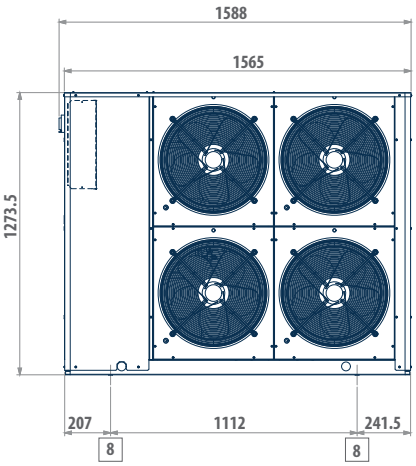
4 DIMENSIONS

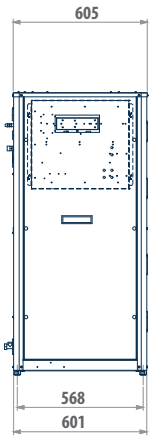
» **HPE** 28 - 40

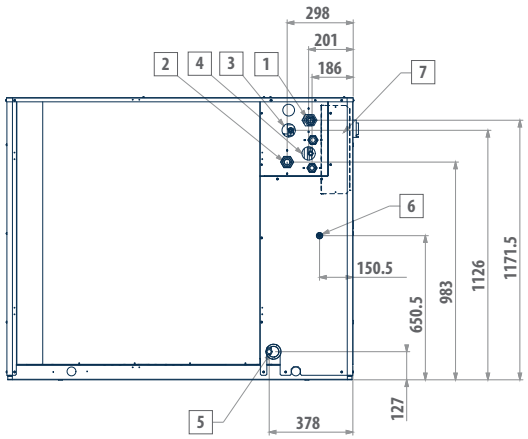


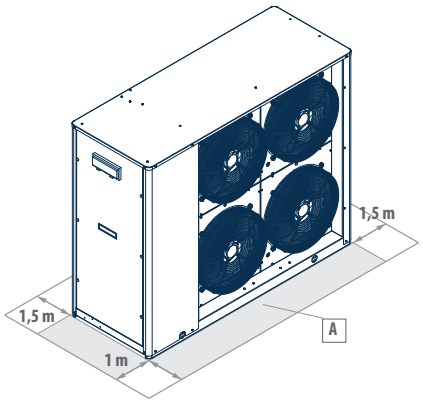
DESCRIPTION

1 R410A-air heat-exchanger
2 R410A-water heat-exchanger
3 Fans
4 Water differential pressure switch (fan housing)
5 Automatic air purge valve
6 Expansion vessel (fan housing)
7 Buffer tank (accessory)
8 -
9 4 Way valve (MPE H)
10 Thermostatic valve
11 Water safety valve
12 Liquid receiver (fan housing)(MPE H)
13 Circulation pump
14 Compressor
15 Refrigerant filter
16 Low pressure switch and charge port
17 High pressure switch and charge port
18 Water gauge
19 Water charge





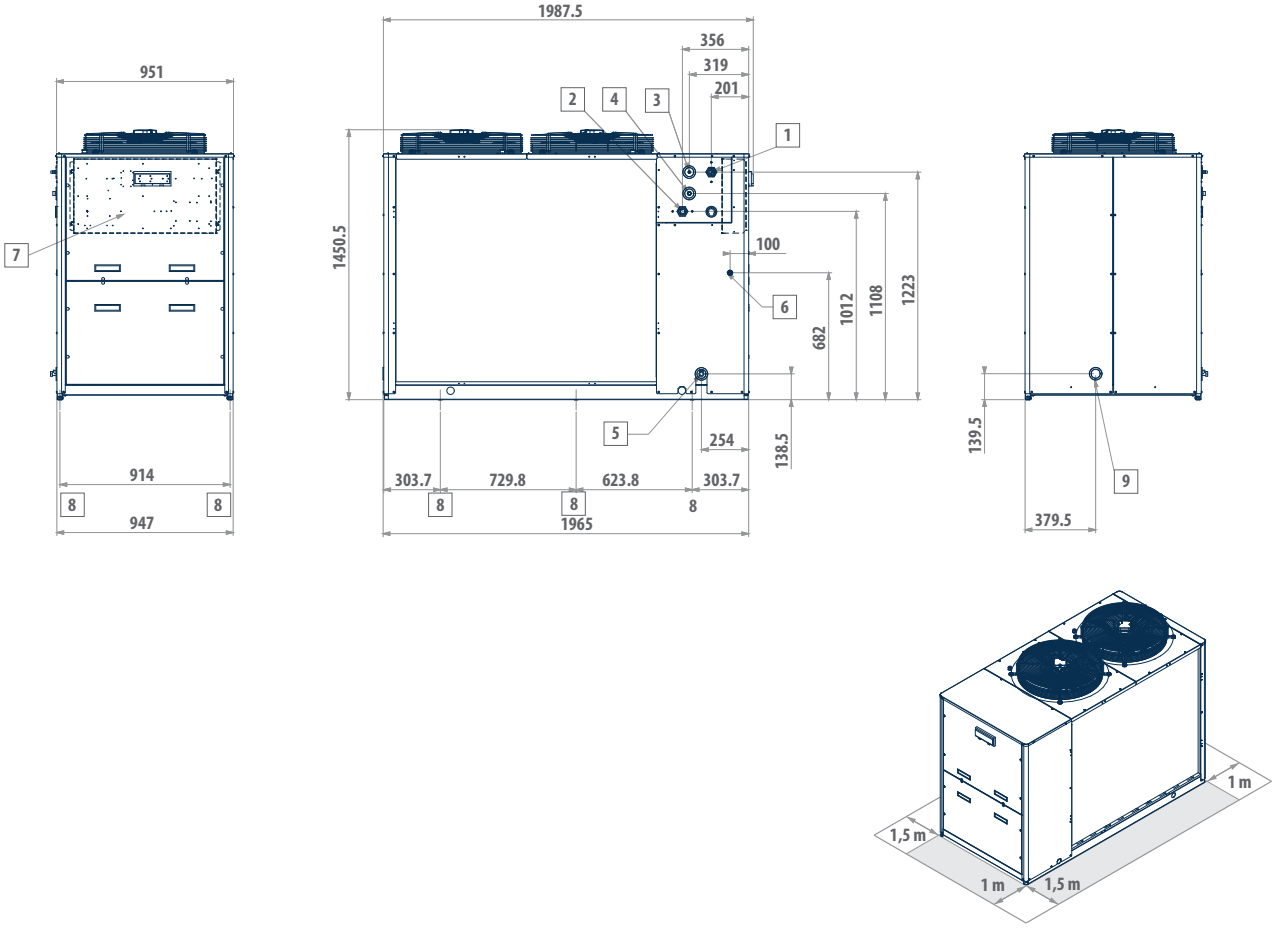




LEGENDA

1 Ingresso acqua 1" 1/4 femmina
2 Uscita acqua 1" 1/4 femmina
3 Scarico valvola di sicurezza con portagomma
4 Alimentazione acqua 1/2" maschio (rubinetto optional)
5 Scarico acqua 1/2" femmina
6 Alimentazione elettrica Ø 28 mm
7 Quadro elettrico
8 Antivibranti

» RPE HPE 28 - 40 ;



LEGENDA

1 Ingresso acqua 1" 1/4 femmina
2 Uscita acqua 1" 1/4 femmina
3 Scarico valvola di sicurezza con portagomma
4 Alimentazione acqua 1/2" maschio (rubinetto optional)
5 Scarico acqua 1/2" femmina
6 Alimentazione elettrica Ø 37 mm
7 Quadro elettrico
8 Antivibranti

5 TECHNICAL FEATURES

5.1 RPE WATER CHILLERS RATED TECHNICAL DATA

» **RPE** water chillers rated technical data

RPE						019	023	027
Power supply		V-ph-Hz					400 - 3 - 50	
Cooling capacity	(1)(E)	kW				19,70	22,50	26,40
Total power input	(1)(E)	kW				6,61	7,53	9,50
Absorbed rated current	(1)	A				13,11	14,68	16,67
EER	(1)(E)					2,98	2,99	2,78
SEER	(2)(E)					3,80	3,80	3,80
Eurovent efficiency class	(1)(E)					B	B	C
Maximum current absorption		A				24	26	32
Star up current		A				105	133	133
Startup current with soft starter		A				72	110	91
Compressors / circuits							1 / 1	
no. of axial fans						4	4	4
Air flow rate	(3)	m^3/h				9990	9307	9307
Water flow	(1)	l/h				3406	3883	4560
Water pressure drop	(1)(E)	kPa				51	49	34
Available pressure head - LP pumps	(1)	kPa				124	94	111
Buffer tank volume		dm^3				50	50	50
Expansion vessel volume		dm^3				5	5	5
Unit connections diameter		"				1 1/4	1 1/4	1 1/4
Height		mm				1274	1274	1274
Depth		mm				605	605	605
Length		mm				1588	1588	1588
Sound power level	(4)(E)	dB(A)				71	72	72
Sound pressure level	(5)	dB(A)				43	43	44
Refrigerant charge		kg				4,2	5,8	6,0
Transport weight unit with pump and tank		kg				281	297	313
Operating weight unit with pump and full tank		kg				317	333	350

(1) Outdoor air temperature 35°C, water temperature 12°C / 7°C (EN14511:2013)
(2) I valori di efficienza η in riscaldamento e raffreddamento si calcolano rispettivamente con le seguenti formule: [η = SCOP / 2,5 - F(1) - F(2)] e [η = SEER / 2,5 - F(1) - F(2)]. Per maggiori informazioni fare riferimento all'approfondimento tecnico "DIRETTIVA ErP 2009/125/EC" nelle pagine introduttive del catalogo o alla normativa EN14825:2017.
(3) Outdoor air temperature 35°C, water temperature 12°C / 7°C (14511:2013)
(4) Sound power level measured according to ISO 9614
(5) Sound pressure measured at a distance of 10 m in a free field with a directivity factor of 2

» **RPE** water chillers rated technical data

RPE			028		032		035	040
Power supply		V-ph-Hz	400 - 3 - 50					
Cooling capacity	(1)(E)	kW	27,90		31,20		34,80	39,40
Total power input	(1)(E)	kW	8,91		10,40		11,70	13,10
Absorbed rated current	(1)	A	16,36		18,59		20,92	22,94
EER	(1)(E)		3,13		3,00		2,97	3,01
SEER	(2)(E)		3,99		3,98		3,82	3,87
Eurovent efficiency class	(1)(E)		A		B		B	B
Maximum current absorption		A	32		34		38	40
Star up current		A	134		166		162	164
Startup current with soft starter		A	91		114		111	112
Compressors / circuits			1 / 1		1 / 1		1 / 1	1 / 1
no. of axial fans			2					
Air flow rate	(3)	m^3/h	16276		16276		16276	15776
Water flow	(1)	l/h	4835		5412		6000	6821
Water pressure drop	(1)(E)	kPa	40		51		41	43
Available pressure head - LP pumps	(1)	kPa	139		123		126	115
Buffer tank volume		dm^3	125		125		125	125
Expansion vessel volume		dm^3	8		8		8	8
Unit connections diameter		"	1 1/4					
Height		mm	1451		1451		1451	1451
Depth		mm	951		951		951	951
Length		mm	1988		1988		1988	1988
Sound power level	(4)(E)	dB(A)	73		73		73	75
Sound pressure level	(5)	dB(A)	45		45		45	47
Refrigerant charge		kg	7,5		7,5		7,8	10,8
Transport weight unit with pump and tank		kg	427		456		487	516
Operating weight unit with pump and full tank		kg	534		563		595	624

(1) Outdoor air temperature 35°C, water temperature 12°C / 7°C (EN14511:2013)
(2) I valori di efficienza η in riscaldamento e raffreddamento si calcolano rispettivamente con le seguenti formule: [η = SCOP / 2,5 - F(1) - F(2)] e [η = SEER / 2,5 - F(1) - F(2)]. Per maggiori informazioni fare riferimento all'approfondimento tecnico "DIRETTIVA ErP 2009/125/EC" nelle pagine introduttive del catalogo o alla normativa EN14825:2017.
(3) Outdoor air temperature 35°C, water temperature 12°C / 7°C (14511:2013)
(4) Sound power level measured according to ISO 9614
(5) Sound pressure measured at a distance of 10 m in a free field with a directivity factor of 2

» **HPE** heat pumps rated technical data

HPE					**018**	**020**	**024**		**028**
Power supply		V-ph-Hz				400 - 3 - 50			
Cooling capacity	(1)(E)	kW			16,70	19,00	23,10		27,30
Total power input	(1)(E)	kW			6,40	7,31	8,19		8,81
Absorbed rated current	(1)	A			11,87	13,11	14,68		16,36
EER	(1)(E)				2,61	2,60	2,82		3,10
SEER	(2)(E)				3,17	3,14	3,32		3,71
Heating capacity	(3)(E)	kW			20,20	23,30	27,50		31,70
Absorbed rated current	(3)	A			12,31	13,17	14,68		17,10
COP	(3)(E)				2.93	3.15	3.27		3.37
Eurovent efficiency class	(3)(E)				C	B	A		A
Total power input	(3)(E)	kW			6,89	7,40	8,41		9,71
SCOP	(2)(E)				3,22	3,22	3,44		3,60
Energy efficiency					126,0	126,0	135,0		141,0
Heating energy efficiency class	(4)(E)					A+			
Maximum current absorption		A			22	24	26		32
Star up current		A			76	105	159		134
Startup current with soft starter		A			51	72	110		91
Air flow rate	(5)	m^3/h			9990	9990	9307		16276
Water flow	(1)	l/h			2892	3317	4000		4722
Water pressure drop	(1)(E)	kPa			49	50	42		31
Available pressure head - LP pumps	(1)	kPa			130	124	109		139
Air flow rate	(6)	m^3/h			9990	9990	9307		16276
Water flow	(3)	l/h			3480	3976	4720		5438
Water pressure drop	(3)	kPa			70	70	62		49
Compressors / circuits						1 / 1			
Buffer tank volume		dm^3			50	50	50		125
Expansion vessel volume		dm^3			5	5	5		8
Unit connections diameter		"			1 1/4	1 1/4	1 1/4		1 1/4
Height		mm			1274	1274	1274		1451
Depth		mm			605	605	605		951
Length		mm			1588	1588	1588		1988
Sound power level	(7)(E)	dB(A)			71	71	72		73
Sound pressure level	(8)	dB(A)			43	43	44		45
Refrigerant charge		kg			3,7	4,2	5,8		7,5
Transport weight unit with pump and tank		kg			265	281	297		427
Operating weight unit with pump and full tank		kg			301	317	333		534

(1) Outdoor air temperature 35°C, water temperature 12°C / 7°C (EN14511:2013)
(2) I valori di efficienza η in riscaldamento e raffreddamento si calcolano rispettivamente con le seguenti formule: [η = SCOP / 2,5 - F(1) - F(2)] e [η = SEER / 2,5 - F(1) - F(2)]. Per maggiori informazioni fare riferimento all'approfondimento tecnico "DIRETTIVA ErP 2009/125/EC" nelle pagine introduttive del catalogo o alla normativa EN14825:2017.
(3) Outdoor air temperature dry bulb 7°C / wet bulb 6°C, water temperature 40°C / 45°C (EN14511:2013)
(4) Seasonal energy efficiency class for LOW TEMPERATURE room heating under AVERAGE climatic conditions [EUROPEAN REGULATION No 811/2013]
(5) Outdoor air temperature 35°C, water temperature 12°C / 7°C (14511:2013)
(6) Outdoor air temperature dry bulb 7°C / wet bulb 6°C, water temperature 40°C / 45°C (14511:2013)
(7) Sound power level measured according to ISO 9614
(8) Sound pressure measured at a distance of 10 m in a free field with a directivity factor of 2

» **HPE** heat pumps rated technical data

HPE				**032**		**035**	**040**		
Power supply		V-ph-Hz		400 - 3 - 50		400 - 3 - 50	400 - 3 - 50		
Cooling capacity	(1)(E)	kW		30,60		34,10	38,60		
Total power input	(1)(E)	kW		10,20		11,60	13,10		
Absorbed rated current	(1)	A		18,59		20,92	22,94		
EER	(1)(E)			3,00		2,94	2,95		
SEER	(2)(E)			3,58		3,58	3,66		
Heating capacity	(3)(E)	kW		35,90		39,60	45,60		
Absorbed rated current	(3)	A		19,17		21,01	23,52		
COP	(3)(E)			3.36		3.31	3.38		
Eurovent efficiency class	(3)(E)			A		A	A		
Total power input	(3)(E)	kW		10,70		11,90	13,50		
SCOP	(2)(E)			3,64		3,70	3,64		
Energy efficiency				143,0		146,0	143,0		
Heating energy efficiency class	(4)(E)					A+			
Maximum current absorption		A		34		38	40		
Star up current		A		166		162	164		
Startup current with soft starter		A		114		111	112		
Air flow rate	(5)	m^3/h		16276		16276	15776		
Water flow	(1)	l/h		5309		5873	6686		
Water pressure drop	(1)(E)	kPa		49		39	42		
Available pressure head - LP pumps	(1)	kPa		120		126	115		
Air flow rate	(6)	m^3/h		16276		16276	15776		
Water flow	(3)	l/h		6190		6809	7675		
Water pressure drop	(3)	kPa		64		51	53		
Compressors / circuits				1 / 1		1 / 1	1 / 1		
Buffer tank volume		dm^3		125		125	125		
Expansion vessel volume		dm^3		8		8	8		
Unit connections diameter		"		1 1/4		1 1/4	1 1/4		
Height		mm		1451		1451	1451		
Depth		mm		951		951	951		
Length		mm		1988		1988	1988		
Sound power level	(7)(E)	dB(A)		73		73	75		
Sound pressure level	(8)	dB(A)		45		45	47		
Refrigerant charge		kg		7,5		7,8	10,8		
Transport weight unit with pump and tank		kg		456		487	516		
Operating weight unit with pump and full tank		kg		563		595	624		

(1) Outdoor air temperature 35°C, water temperature 12°C / 7°C (EN14511:2013)
(2) I valori di efficienza η in riscaldamento e raffreddamento si calcolano rispettivamente con le seguenti formule: [η = SCOP / 2,5 - F(1) - F(2)] e [η = SEER / 2,5 - F(1) - F(2)]. Per maggiori informazioni fare riferimento all'approfondimento tecnico "DIRETTIVA ErP 2009/125/EC" nelle pagine introduttive del catalogo o alla normativa EN14825:2017.
(3) Outdoor air temperature dry bulb 7°C / wet bulb 6°C, water temperature 40°C / 45°C (EN14511:2013)
(4) Seasonal energy efficiency class for LOW TEMPERATURE room heating under AVERAGE climatic conditions [EUROPEAN REGULATION No 811/2013]
(5) Outdoor air temperature 35°C, water temperature 12°C / 7°C (14511:2013)
(6) Outdoor air temperature dry bulb 7°C / wet bulb 6°C, water temperature 40°C / 45°C (14511:2013)
(7) Sound power level measured according to ISO 9614
(8) Sound pressure measured at a distance of 10 m in a free field with a directivity factor of 2

7 CALCULATION FACTORS

7.1 CHANGE IN OPERATING PARAMETERS WITH DT OTHER THAN 5°C

After identifying the unit's performance in the terms of the desired outlet water temperature, correct the value by multiplying it by the following corrective coefficients.

Difference between water inlet temperature and water outlet temperature	Corrective coefficient of cooling/ heating capacity	Correction coefficient of electrical input	Correction coefficient of water flow rate	Correction coefficient of pressure drop
3	0,975	1	1,63	2,64
4	0,990	1	1,24	1,53
5	1,000	1	1,00	1,00
6	1,015	1	0,85	0,72
7	1,030	1	0,74	0,54
8	1,040	1	0,65	0,42

7.2 WATER AND GLYCOL MIXTURE

Based on the minimum outlet water temperature, you can derive the percentage of ethylene glycol and the corrective coefficient using the table below.

Percentage of ethylene glycol (%)	0%	10%	20%	30%	40%
Minimum temperature of water produced (°C)	5	2	-5	-10	-15
Mixture freezing temperature (°C)	0	-4	-14	-18	-24
Capacity correction factor	1	1,00	0,99	0,99	0,98
Water flow rate correction factor	1	1,05	1,09	1,14	1,20
Pressure drop correction factor	1	1,16	1,35	1,58	1,86

⚠ **IMPORTANT!** The use of propylene glycol is not admitted with standard pumps. For further information, contact the manufacturer.

8 SOUND LEVELS

» Sound levels **RPE**

RPE	125 Hz (1)	250 Hz (1)	500 Hz (1)	1000 Hz (1)	2000 Hz (1)	4000 Hz (1)	8000 Hz (1)	LwA (2)	Sound power level, low-noise version (3)
	dB	dB	dB	dB	dB	dB	dB	dB(A)	dB(A)
019	76,6	70,3	69,7	65,6	58,4	53,4	49,6	71	69
023	77,5	71,1	70,5	66,5	59,2	54,2	50,5	72	70
028 - 032	78,4	72,1	71,5	67,4	60,2	55,2	51,5	73	71
035	78,8	72,4	71,8	67,8	60,5	55,6	51,8	73	71
040	80,4	74,0	73,4	69,4	62,1	57,2	53,4	75	72

1. Sound power level by octave band, not weighted
2. Total sound power level, weighted A
3. Sound power level measured according to ISO 9614

» Sound levels **RPE**

RPE	125 Hz (1)	250 Hz (1)	500 Hz (1)	1000 Hz (1)	2000 Hz (1)	4000 Hz (1)	8000 Hz (1)	LwA (2)	Sound power level, low-noise version (3)
	dB	dB	dB	dB	dB	dB	dB	dB(A)	dB(A)
018	76,8	70,5	69,9	65,8	58,6	53,6	49,8	71	69
020	76,6	70,3	69,7	65,6	58,4	53,4	49,6	71	69
024	77,5	71,1	70,5	66,5	59,2	54,2	50,5	72	70
028 - 032	78,4	72,1	71,5	67,4	60,2	55,2	51,5	73	71
035	78,8	72,4	71,8	67,8	60,5	55,6	51,8	73	71
040	80,4	74,0	73,4	69,4	62,1	57,2	53,4	75	73

1. Sound power level by octave band, not weighted
2. Total sound power level, weighted A
3. Sound power level measured according to ISO 9614

9 OPERATING LIMITS

The graphs below illustrate the operating limits of MPE units (in the case of continuous operation) in relation to the outlet water temperature and outdoor air temperature.

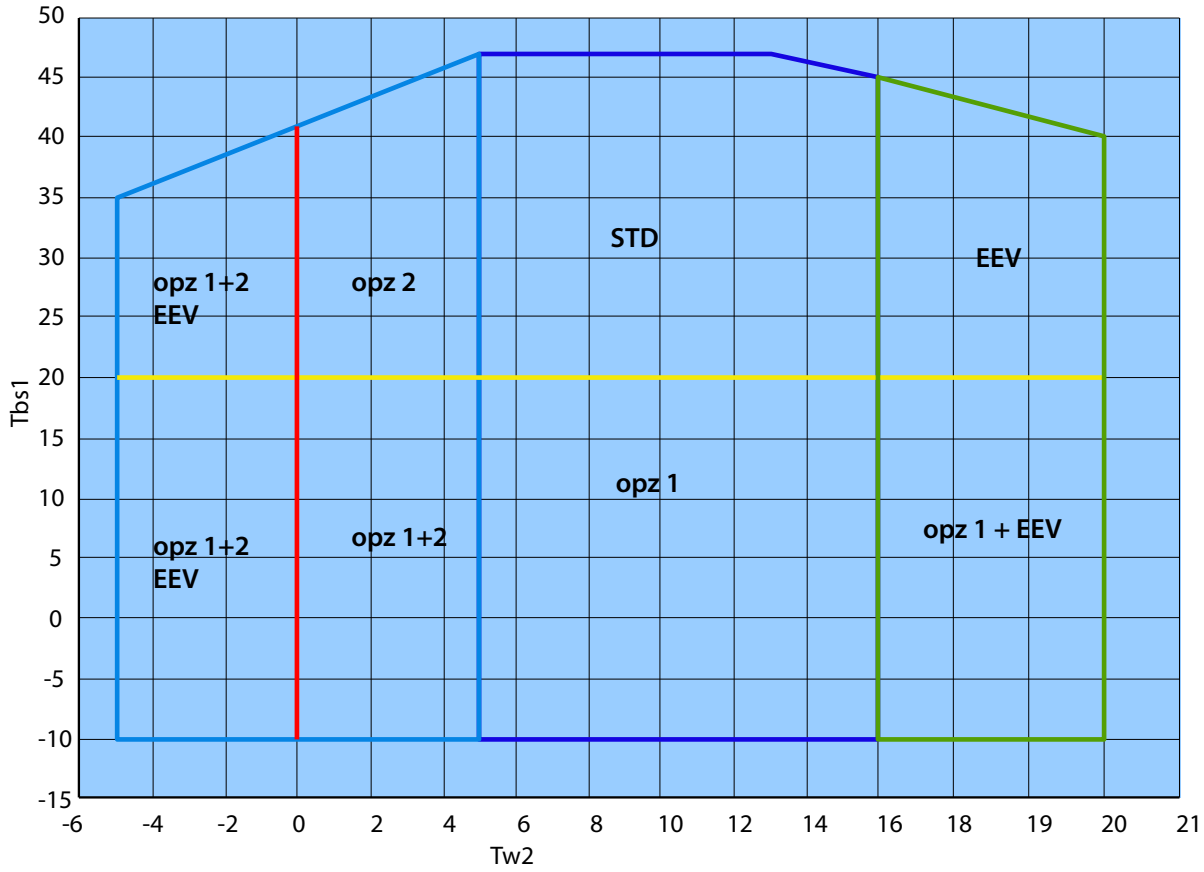
Operating limits	Water chiller		Heat pump	
	MIN	MAX	MIN	MAX
Inlet air temperature (°C)	8	20	22	42
Outlet water temperature (°C)	5	16	25	53[1]
Temperature difference on the water side (°C)	3	8	3	8
Outdoor air temperature (°C)	20[2]	47	-10	20[3]

1. Value achievable only for outdoor air temperatures above 0 ° C.
2. Condensation control: T external air min -10 °C.
3. Evaporation control. outdoor air temperature max 35°C

⚠ **WARNING** The units are designed to work with water and air temperatures falling within the range defined by the operating limits. Attempting to operate the units beyond these limits could cause irreparable damage to the units themselves.

9.1 OPERATING LIMITS IN CHILLER MODE

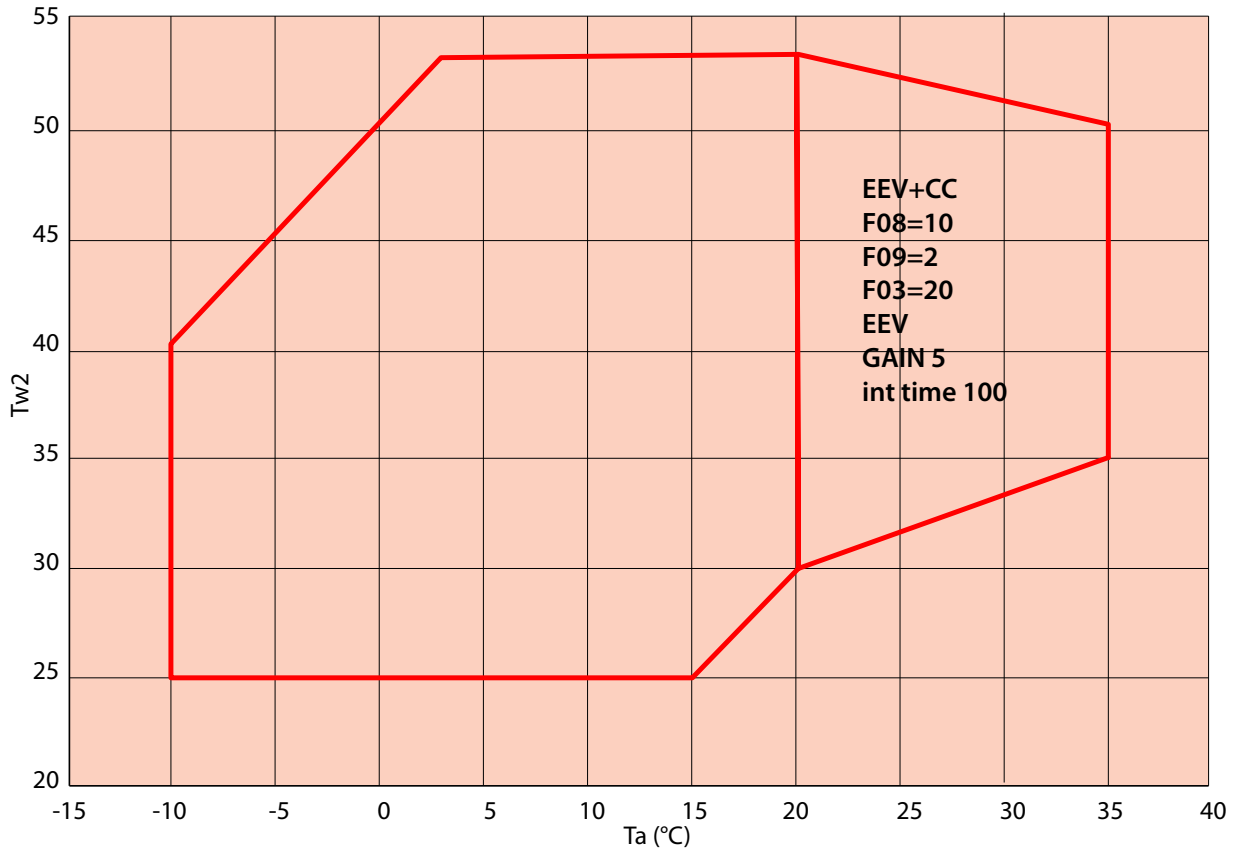
» Operating limits in chiller mode



Tbs1 Outdoor temperature (dry bulb)
Tw2 Outlet water temperature
OPZ 1 Condensing control
OPZ 2 Glycol + low temperature option
OPZ 1+2 Condensation control + glycol + low temperature option
EEV Electronic expansion valve
STD Standard

9.2 OPERATING LIMITS IN HEAT PUMP MODE

» Operating limits in heat pump mode



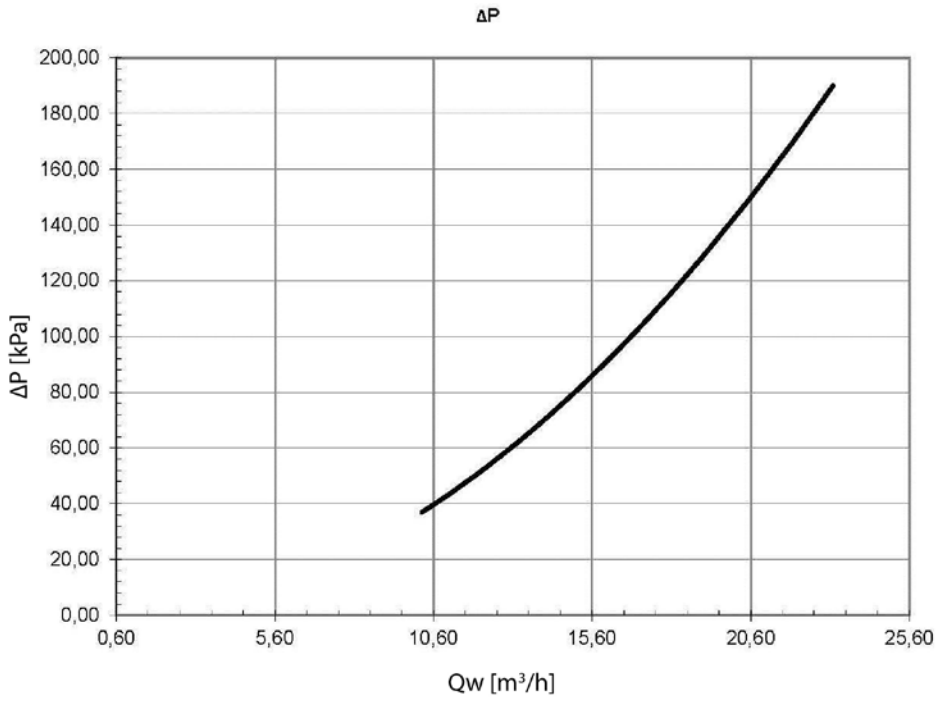
RH Relative humidity of outdoor air
Tbs1 Outdoor temperature (dry bulb)
Tw2 Outlet water temperature
Operating range calculated with temperature difference of 5°C on the water side.

Extended operating envelope in heat pump mode
Heat pump operation within the right area of the extended operating envelope (beyond standard limits) can be allowed only for units equipped with condensation control (or EC fans) and electronic expansion valve
Parameters F08-F093-F03 refer to standard microprocessor controller
Parameters GAIN and INT TIME are regulation parameters; they have to be modified inside the electronic expansion valve driver. Both modifications should only made in the factory or implemented on the field, but only by Galletti S.p.A. authorized personnel.

9.3 THERMAL CARRYING FLUID

The units belonging to the MPEseries can work with mixtures of water and up to 35% ethylene glycol.

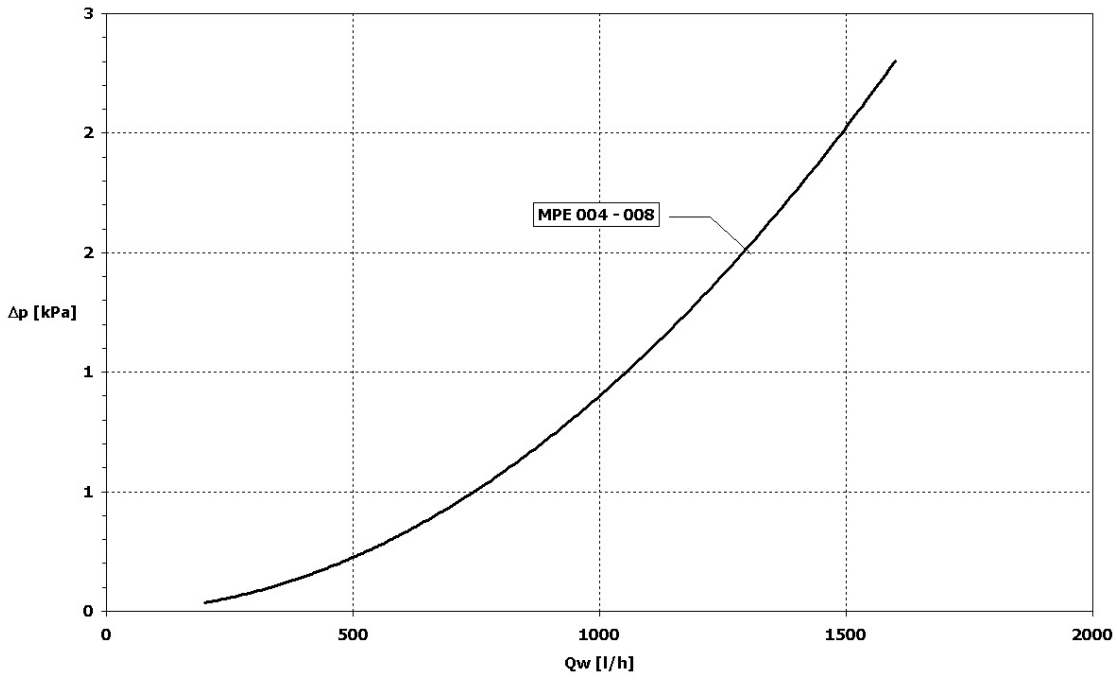
» MPE T76



10.2 Y FILTER PRESSURE DROPS

The table below shows the pressure drops of the Y filter (Δp) as a function of the water flow rate (Qw), assuming an average water temperature of 10 °C,

» MPE H 004 - 008



12 WATER CIRCUIT

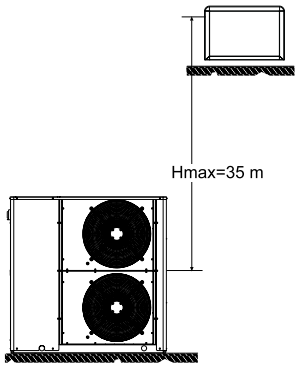
When setting up the water circuit of the unit, it is advisable to follow the directions below and in any case comply with local or national regulations.
Connect the pipes to the chiller using flexible couplings to prevent the transmission of vibrations and to compensate thermal expansions.
Install the following components on the piping:

— Temperature and pressure indicators for routine maintenance and monitoring of the unit. Pressure control on the water side allows to assess the correct functioning of the expansion tank and to detect water leakage in advance.
— Traps on incoming and outgoing pipes for temperature measurements, which can provide a direct reading of the operating temperatures.
— Regulating valves (gate valves) for isolating the unit from the water circuit.
— **Metal mesh filter (supplied), with a mesh size no greater than 1 mm, to be fitted on the inlet pipe to protect the exchanger from scale or impurities present in the pipes.**
— Air vent valves, to be placed at the highest points of the water circuit for the purpose of bleeding air. (The internal pipes of the unit are fitted with small air vent valves for bleeding the unit itself: this operation may only be carried out when the unit is disconnected from the power supply).
— Drainage valve and, where necessary, a drainage tank for emptying out the equipment for maintenance purposes or when the unit is taken out of service at the end of the season. (A 1" drainage valve is provided on the optional water buffer tank: this operation may only be carried out when the unit is disconnected from the power supply).

It is of fundamental importance that the incoming water supply is hooked up to the connection marked "Water Inlet".
Otherwise the evaporator would be exposed to the risk of freezing since the antifreeze thermostat would not be able to perform its function; moreover the reverse cycle would not be respected in the cooling mode, resulting in additional risks of malfunctioning.
The dimensions and position of plumbing connections are shown in the dimension tables at the end of the manual.
The water circuit must be set up in such a way as to guarantee that the nominal flow rate of the water supplied to the evaporator remains constant (+/- 15%) in all operating conditions.
A standard feature of MPE units is a device for controlling the flow rate (flow switch or differential pressure switch) in the water circuit in the immediate vicinity of the evaporator.

12.1 WATER CONTENT AND CHARGING OF EXPANZION TANK SYSTEM

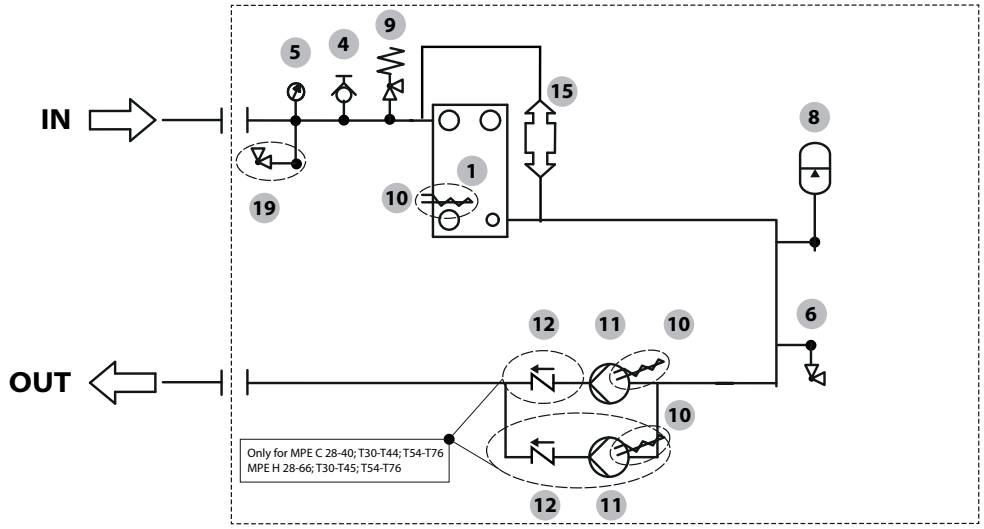
In models without a water storage reservoir it is necessary to assure that the content of water within the system does not fall below 3.5 litres/kW in the case of cooling-only models and 4.5 litres/kW in the case of heat pump models. This level is necessary to prevent the water temperature from falling below the indoor unit enabling threshold during defrost cycles.
N.B. kW in reference to rated capacity
The expansion tank is pre-charged to a pressure of 1.5 bars, sufficient for systems with a maximum height difference (H in the figure at the side) of 13 metres.
For greater height differences, refer to the table below in order to adjust the charging pressure of the expansion tank accordingly.
In no case should you exceed the maximum height difference Hmax = 35 m.



Models	Height difference of system (m)	Charging pressure of expansion tank	Maximum system water content
RPE19 - 027 ; HPE 018 - 024	1,7	1,7	145
	15	1,5	133
	20	2,7	105
	25	2,2	77
	30	3,1	49
HPE 28 - 40	<13	1,5	231
	15	1,7	213
	20	2,2	168
	25	2,7	124
	30	3,1	79

12.2 WATER CIRCUIT

» MPE (evaporator and pump)

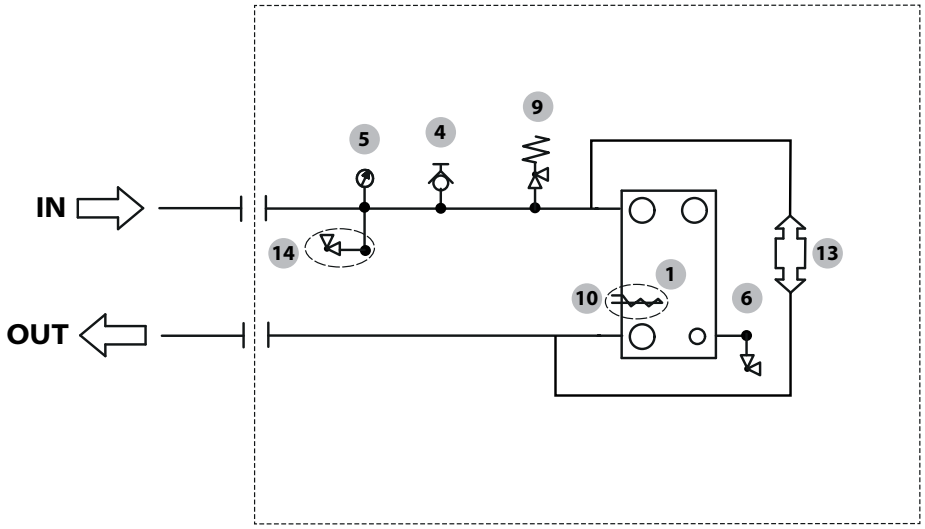


LEGEND

1 Evaporator
2 -
3 -
4 Air purge valve
5 Pressure gauge
6 Drain
7 -
8 Expansion vessel
9 Security valve
10 Antifreeze electric heating
11 Hydraulic pump
12 Clapet valve
13 -
14 -
15 Differential pressure switch
16 -
17 -
18 -
19 Water charge

------ Internal and external borderline
———— OPTIONAL

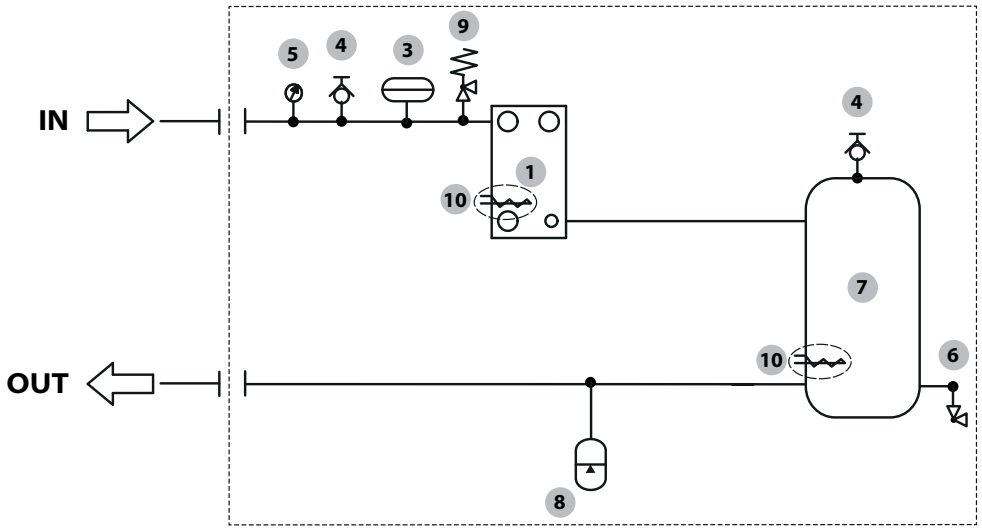
» RPE HPE (evaporator)



LEGEND

1 Evaporator
2 -
3 -
4 Air purge valve
5 Pressure gauge
6 Drain
7 -
8 -
9 Security valve
10 Antifreeze electric heating
11 -
12 -
13 Differential pressure switch
------ Internal and external borderline
———— OPTIONAL

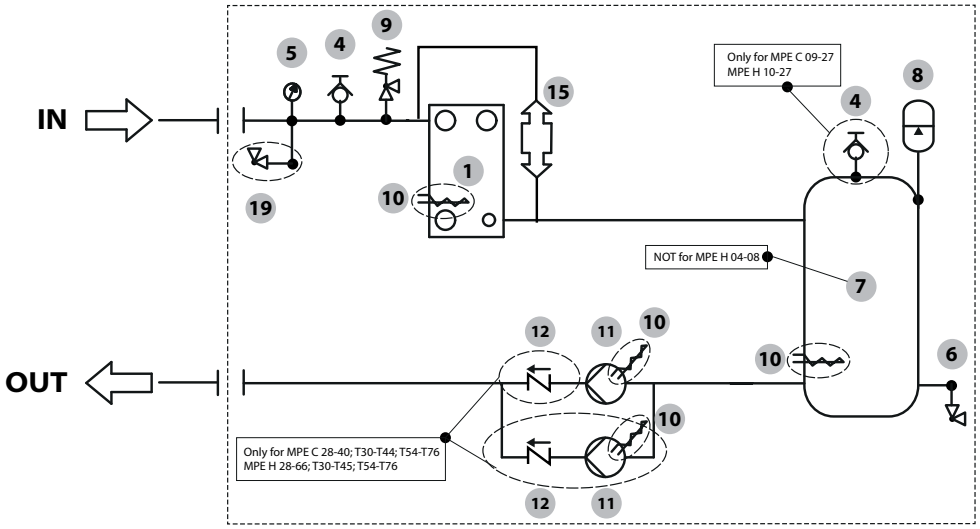
» RPE HPE (evaporator and tank)



LEGEND

1 Evaporator
2 -
3 Flow switch
4 Air purge valve
5 Pressure gauge
6 Drain
7 Buffer tank
8 Expansion vessel
9 Security valve
10 Antifreeze electric heating
------ Internal and external borderline
———— OPTIONAL

» **RPE HPE** (evaporator, pump and tank)



LEGEND

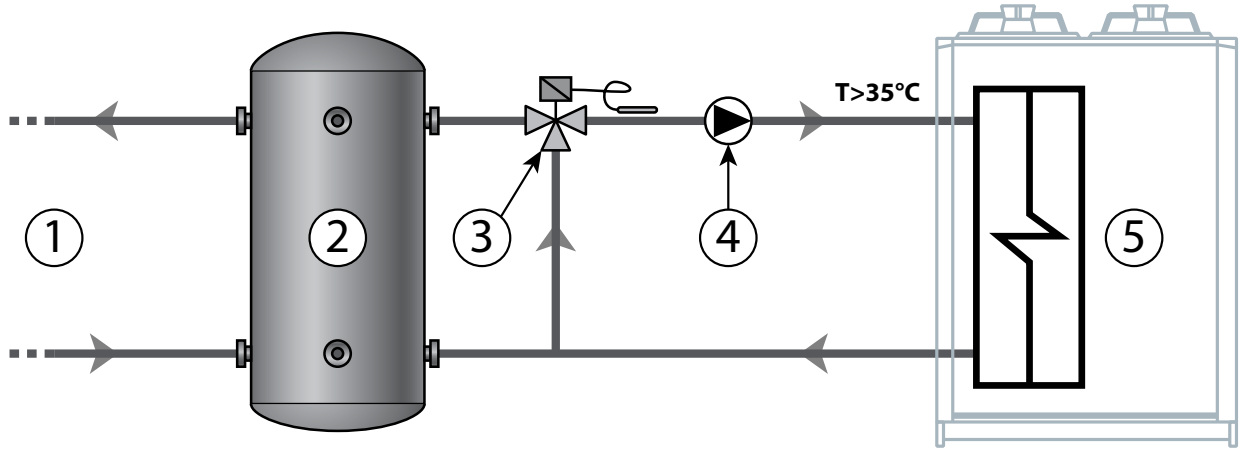
1 Evaporator
2 -
3 -
4 Air purge valve
5 Pressure gauge
6 Drain
7 Buffer tank
8 Expansion vessel
9 Security valve
10 Antifreeze electric heating
11 Hydraulic pump
12 Clapet valve
13 -
14 -
15 Differential pressure switch
16 -
17 -
18 -
19 Water charge

------ Internal and external borderline
———— OPTIONAL

12.3 DESUPERHEATER

12.3.1 Recommended water circuit

The partial heat recovery option is provided by a braze-welded plate heat exchanger placed in series on the compressor delivery (typically in series in relation to the finned pack condenser). Its size is designed to limit pressure drops on the refrigerant side to a minimum.
All units equipped with a heat recovery kit have modulating condensation control as a standard feature. To prevent unbalances from occurring in the cooling circuit in the event of start-ups with very low water temperatures at the recuperator inlet (<35°C), the recovery system water circuit should be configured as shown in the following figure. A low recuperator inlet water temperature would cause low condensation temperatures and thus an insufficient pressure differential on the expansion valve with the consequent risk of tripping the safety devices.

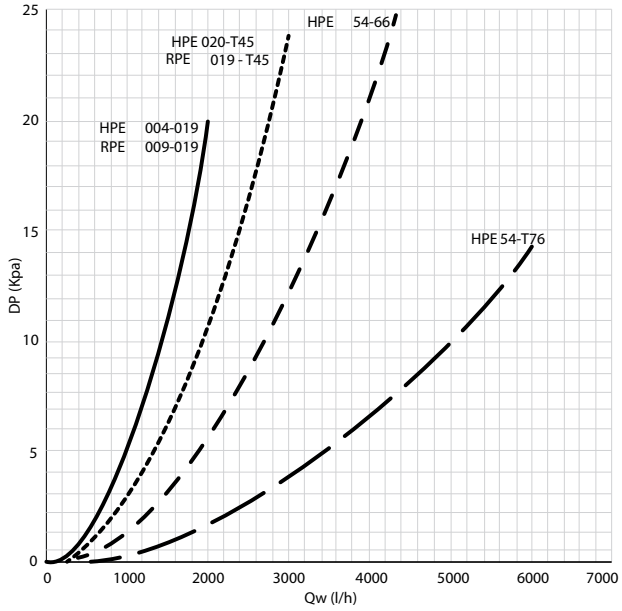


1 Utility side
2 Buffer tank
3 Mixing valve
4 Circulation pump
5 On-board desuperheater

The bulb of the 3-way mixer valve is placed at the de-superheater exchanger inlet. By mixing the hot water produced by the recovery with colder water from the tank, it reduces the time needed for the system to reach full operating capacity to a few moments.
A buffer tank must be placed between the unit and the utility since the demand for hot water and its availability are not simultaneous, because it needs the compressors to be running.
Note that the heat recovery capacity is tied to the delivered cooling capacity and therefore decreases proportionately in partial load situations: this aspect should be taken into account when choosing the size of the storage tank.
The partial heat recovery option is supplied only with the de-superheater exchanger. The other components of the circuit laid out in the previous figure are not included in the supply.

12.3.2 Water pressure drop

» Water pressure drop desuperheater



12.3.3 Heating capacities corrective factors

» De-Superheather heating capacities corrective factors

Air temperature (K)	Inlet water temperature / Outlet water temperature		
-	40/50	50/55	50/60
30	0,92	0,71	0,63
35	0,93	0,76	0,69
40	0,94	0,79	0,74

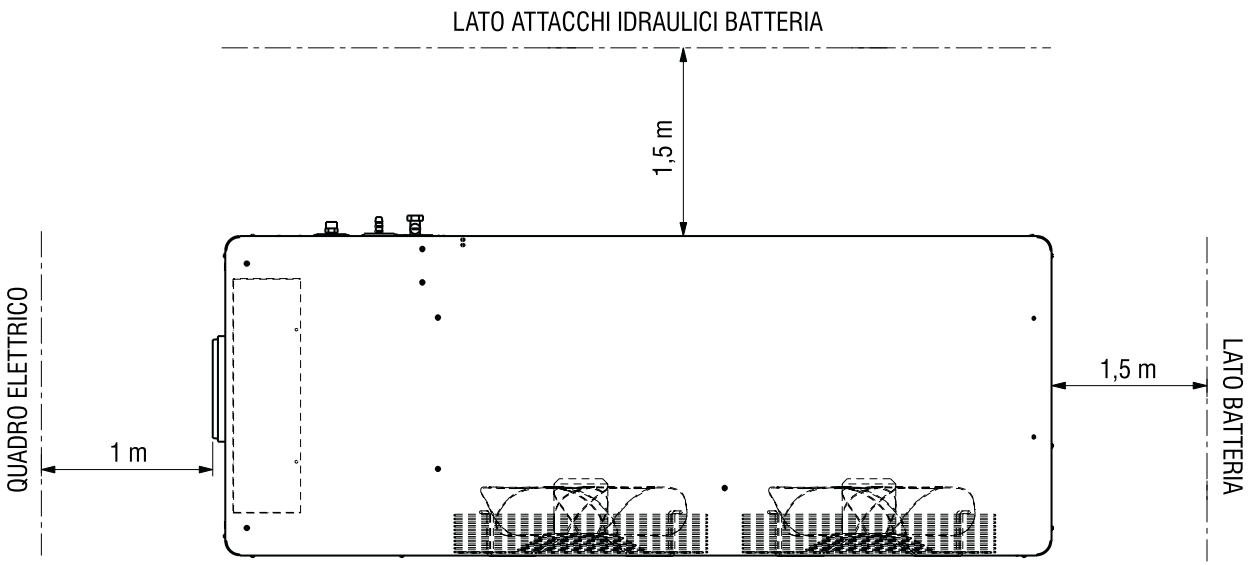
13 INSTALLATION CLEARANCE REQUIREMENTS

To guarantee the proper functioning of the unit and access for maintenance purposes, it is necessary to comply with the mini-mum installation clearance requirements shown in figures installation space rpe 18 - 27 , installation space hpe 28-40 -.

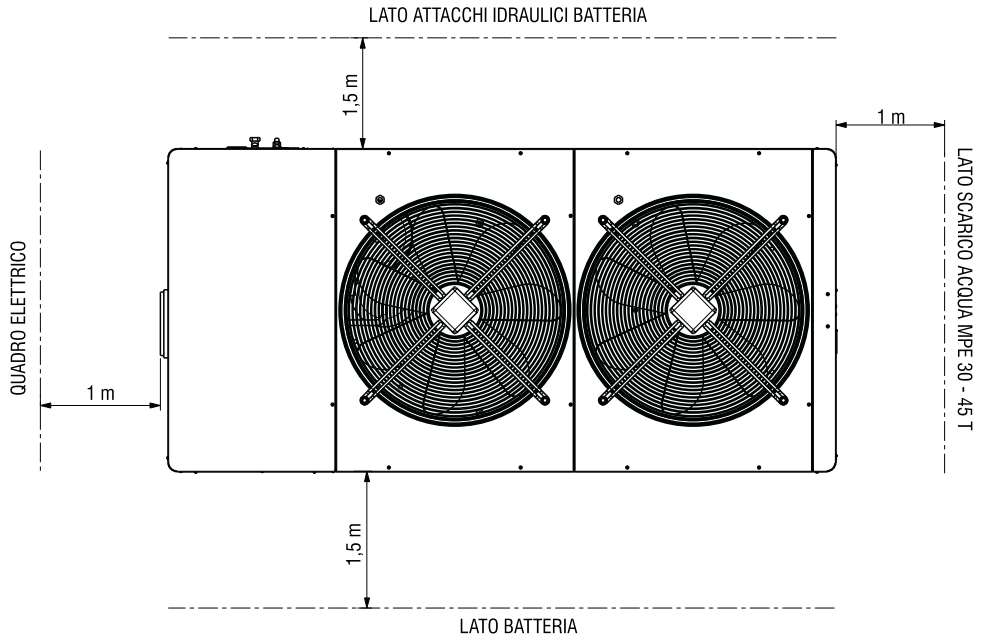
— Verify that there are no obstacoles in front of the fans air outlet.
— Avoid any and all situations of backflow of hot air between air outlet and inlet of the unit.
— If even only one of the above conditions is not fulfilled, please contact the manufacturer to check for feasibility.
— In the design of the MPE series, special care has been taken to minimise noise and vibrations transmitted to the ground.
— Even greater insulation may be obtained, however, by using vibration damping base supports (available as optional accessories).
— If vibration damping base supports are adopted, it is strongly recommended also to use vibration damping couplings on the water pipes.
— Whenever the unit is to be sited on unstable ground (various types of soil, gardens, etc.) it is a good idea to provide a supporting base of adequate dimensions.

⚠ **WARNING** Heat pump units produce condensation while operating in the heating mode.

» **RPE** 18 - 27



» **RPE HPE** 28 - 40


LATO ATTACCHI IDRAULICI BATTERIA
1,5 m
1 m
QUADRO ELETTRICO
1 m
LATO SCARICO ACQUA MPE 30 - 45 T
1,5 m
LATO BATTERIA

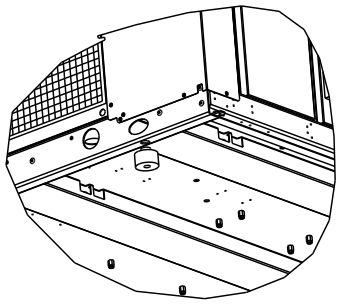
14 SITING AND DAMPERS

It is important to bear in mind the following aspects when choosing the best site for installing the unit:

— Size and origin of water pipes;
— Location of the power supply;
— Solidity of the supporting surface;
— Avoid obstacles to the outflow of air from the fan which could cause back suction (see section on 15 Dimensions p. 48);
— Direction of prevalent winds: (position the unit so as to prevent prevalent winds from interfering with the fan air flow). Prevalent winds opposing the fan air flow will result in a maximum air temperature below the value indicated in the operating limits;
— Avoid the possible reverberation of sound waves; do not install the unit in narrow or cramped spaces;
— Ensure adequate accessibility for maintenance or repairs (see section on 15 Dimensions p. 48).

This appliance is not intended to be used by children or persons with physical, sensorial or mental problems, inexpert or unprepared, without supervision. Be careful that children do not approach the appliance.

» Vibration dumpers



RPE HPE	DAMPERS
18 - 27	4
28 - 40	6

16 ELECTRICAL DATA

16.1 ELECTRICAL CONNECTIONS

All operations must be performed by qualified service personnel in accordance with current laws and regulations. For any electrical work on the unit, refer to the electric diagrams supplied with the unit. It is recommended to make sure that:

— The characteristics of the mains power supply are adequate for the electrical inputs specified in the table of electrical data.

⚠ **WARNING** Before carrying out any job on electrical parts, make sure the power supply is disconnected. Check that the mains electricity supply is compatible with the specifications (voltage, number of phases, frequency) shown on the unit rating plate. The supply voltage may not undergo fluctuations exceeding ±5% of the rated voltage. The electrical connections must be made in accordance with the wiring diagram provided with the unit and the regulations in force.

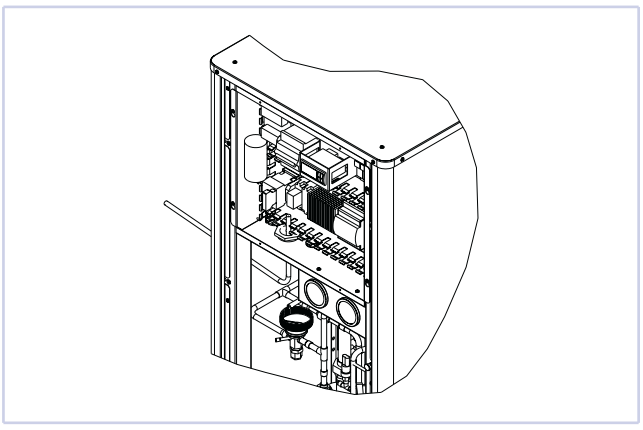
⚠ **WARNING** Never attempt to modify internal electrical connections: any undue modifications will immediately invalidate the warranty.

An all-pole circuit breaker must be used on the electric panel upstream, conform to IEC Standards (contacts must be open at least of 3 mm), with suitable interruption capacity and differential protection, according to the electrical data tables in 16.2 Electrical data paragraph, described below, and installed as close as possible to the device.

For the machine power supply line, use H07RN-F rubber flexible cables, with section as indicated in the tables in section 16.2 Electrical data . For the cable passage, use sheaths and channels suitable for outdoor installation. Provide a line switch and delayed-type fuses with features as indicated in the tables in section 16.2 Electrical data paragraph. To access the electric control board it is necessary to remove the inspection panel (figure 16.1 Access to electrical control board) by taking out the screws; introduce the power cable into the unit through the bushing on the side panel; then bring it to the electric control board through the cable holder provided.

Tighten the wires securely to the terminals and clamp the cable in place with the cable holder (figure 16.1 Access to electrical control board).

To preserve the protection degree of the machine, use a cable gland compatible with the sheath or power cable diameter, in correspondence to the unit side panel hole.



An earth connection is mandatory: connect the earthing wire to the terminal provided on the electric control board (see the electric control board layout supplied with the unit), marked ⏚.

If you wish to include:

— a remote on/off switch

— a remote switch for changing over between the cooling and heating mode (MPE H only),

— a remote alarm indicator

It is a good idea to do so at this stage of the installation procedure, by connecting the switches or PCDS remote control (accessory) to the electric control board terminals as directed in section 16.2 Electrical data and using the unit wiring diagram as your reference.

16.2 ELECTRICAL DATA

» RPE HPE

RPE HPE				019	023	027	028	032	035
Maximum power input		kW		13,60	14,50	18,00	18,30	18,90	21,80
Maximum current absorption		A		24	26	32	32	34	38
Star up current		A		105	133	133	134	166	162
Startup current with soft starter		A		72	110	91	91	114	111
Fan motor rated power		kW		0,14	0,14	0,14	0,32	0,32	0,32
Fan motor rated current		A		0,64	0,64	0,64	1,75	1,75	1,75
Pump motor rated power - LP pumps		kW		0,37	0,37	0,37	0,55	0,55	0,55
Pump motor rated current - LP pumps		A		2,00	2,00	2,00	3,00	3,00	3,00
Power supply		V-ph-Hz		400 - 3 - 50					
Auxiliary power supply		V-ph-Hz		230 - 1 - 50					
Cross-section area of power cables	(1)	mm^2		6,0	10,0	10,0	10,0	10,0	10,0
PCD connecting cables		mm^2		AWG22					
PCDS connecting cables		mm^2		1	1	1	1	1	1
Safety fuse F		A		25	32	32	32	32	40
Circuit breaker IL		A		25	32	32	32	40	40

(1) The shown section is to be considered as the minimum recommended section. The cables must be chosen in compliance with CEI - UNEL 35024/1. standard.

RPE HPE					040						
Maximum power input		kW			22,40						
Maximum current absorption		A			40						
Star up current		A			164						
Startup current with soft starter		A			112						
Fan motor rated power		kW			0,32						
Fan motor rated current		A			1,75						
Pump motor rated power - LP pumps		kW			0,55						
Pump motor rated current - LP pumps		A			3,00						
Power supply		V-ph-Hz									
Auxiliary power supply		V-ph-Hz									
Cross-section area of power cables	(1)	mm^2			10,0						
PCD connecting cables		mm^2									
PCDS connecting cables		mm^2			1						
Safety fuse F		A			40						
Circuit breaker IL		A			50						

(1) The shown section is to be considered as the minimum recommended section. The cables must be chosen in compliance with CEI - UNEL 35024/1. standard.

— The maximum input power is the mains power that must be available in order for the unit to work.
— The maximum current absorption refers to the current that will trigger the internal safety devices of the unit. It is the maximum current allowed in the unit This value may never be exceeded; it must be used as a reference for determining the size of the power supply line and the related safety devices (refer to the wiring diagram supplied with the units). Cross-section area of cables: 4 A/mm^2 approx.

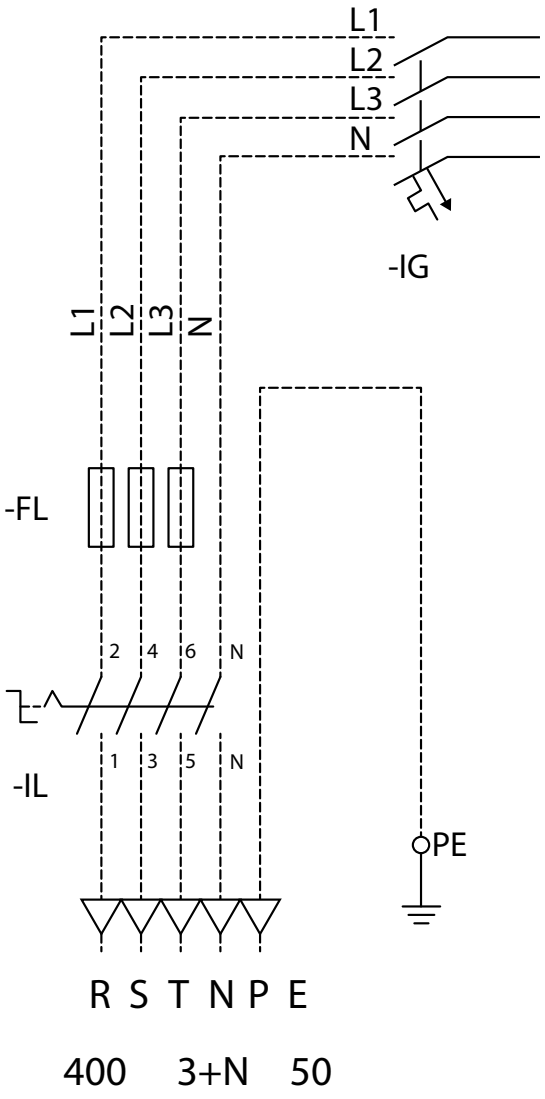
» HPE

HPE		018	020	024	028	032	035	040
Maximum power input	kW	12,50	13,60	14,50	18,30	18,90	21,80	22,40
Maximum current absorption	A	22	24	26	32	34	38	40
Star up current	A	76	105	159	134	166	162	164
Startup current with soft starter	A	51	72	110	91	114	111	112
Fan motor rated power	kW	0,14	0,14	0,14	0,32	0,32	0,32	0,32
Fan motor rated current	A	0,64	0,64	0,64	1,75	1,75	1,75	1,75
Pump motor rated power - LP pumps	kW	0,37	0,37	0,37	0,55	0,55	0,55	0,55
Pump motor rated current - LP pumps	A	2,00	2,00	2,00	3,00	3,00	3,00	3,00
Power supply	V-ph-Hz	400 - 3 - 50						
Auxiliary power supply	V-ph-Hz	230 - 1 - 50						
PCD connecting cables	mm^2	AWG22						
PCDS connecting cables	mm^2	1	1	1	1	1	1	1
Safety fuse F	A	25	25	32	32	32	40	40
Circuit breaker IL	A	25	25	32	32	40	40	50

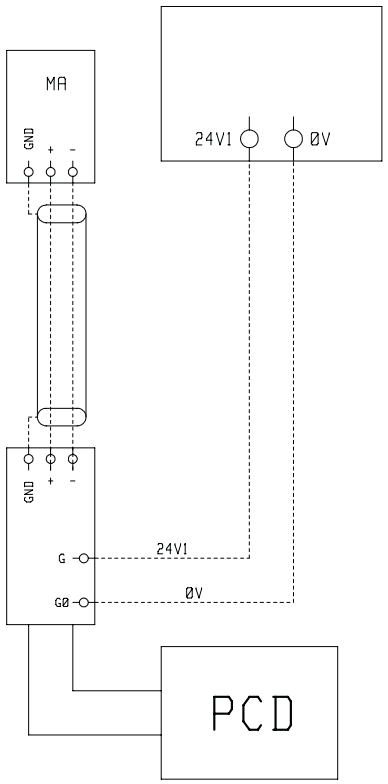
(1) The shown section is to be considered as the minimum recommended section. The cables must be chosen in compliance with CEI - UNEL 35024/1. standard.

— The maximum input power is the mains power that must be available in order for the unit to work.
— The maximum current absorption refers to the current that will trigger the internal safety devices of the unit. It is the maximum current allowed in the unit This value may never be exceeded; it must be used as a reference for determining the size of the power supply line and the related safety devices (refer to the wiring diagram supplied with the units). Cross-section area of cables: 4 A/mm^2 approx.

» Main electrical connection of units



» PCD remote control panel electrical connection diagram



» PCDS remote control panel electrical connection diagram

NOTE: On the terminal block of the electric control panel a voltage of 24V will be present at the 50/24V terminals in the event of an alarm; if it is desired to interface with a voltage-free contact, a relay must be applied for this purpose by the installer

ACCORRONI Climate Technology

A2B Accorroni E.G. s.r.l.
Via d'Ancona, 37 - 60027 Osimo (An) - Tel. 071.723991
web site: www.accorroni.it - e-mail: a2b@accorroni.it