

MPE

Technical manual for chillers and heat pumps

GB



Air condensed water chillers and heat pumps
PERFORMA MPE series

4 kW - 44,5 kW

R410A

CE

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
=ISO 9001/2000=

 **Galletti**
AIR CONDITIONING

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The technical and dimensional data provided herein may undergo changes in connection with product improvements.

UNIT IDENTIFICATION



The unit data are reported on the rating label in this page

The label shows the following data:

- Series and size of the unit
- Date of manufacture
- Main technical data
- Manufacturer
- The label is applied on the unit, usually on the enclosing panels beside the condenser coil.

IMPORTANT: NEVER REMOVE THE LABEL

- Serial number of the unit
- The serial number permits to identify the technical characteristics and the components installed
- Without this datum it will be impossible to identify the unit correctly

	<p>Galletti S.p.A via L.Romagnoli 12/a 40010 Bentivoglio (BO) Italia</p> <p>Made in Italy CATEGORIA 1</p>
<p>Matricola - Serial number</p> <p>Codice articolo - Code</p> <p>Data di produzione - Date of production</p> <p>Pot.Raffreddamento - Cooling Capacity (W)</p> <p>Pot.Riscaldamento - Heating Capacity (W)</p> <p>Alimentazione - Power supply (kW)</p> <p>Assorbimento elettrico - Power input (kW)</p> <p>Peso - Weight (kg)</p> <p>Max assorbimento elettrico - Max power input (kW)</p> <p>Max corrente esercizio - Max running ampere (kW)</p> <p>Assorbimento elettrico PdC - HP Power input (kW)</p> <p>Refrigerante - Refrigerant</p> <p>Max pressione refrigerante - Max refrigerant press (bar)</p> <p>Max temperature refrigerant - Max refrigerant temperature (°C)</p>	
	

DICHIARAZIONE DI CONFORMITÀ

La Società Galletti S.p.A. con sede in Via Romagnoli 12/a Bentivoglio (Bologna) - Italia, dichiara, sotto la propria responsabilità, che i refrigeratori d'acqua e pompe di calore delle serie:

ECH20, ECH20 H, MCA, MCA H, LCA, LCA H, MCC, MCC H, MCW, MCW-H, MPE, MPEH, MCE, MCEH, MFE, MXE apparecchi per impianti di condizionamento dell'aria destinati ad applicazioni per il condizionamento in ambito civile, sono conformi a quanto prescritto dalle Direttive **CEE 73/23, 89/392, 91/368, 93/44, 93/68, 89/336, 97/23 (PED)**.

Tali apparecchi sono il risultato dell'assemblaggio di componenti [compressori, scambiatori di calore a piastre saldobrasate, ricevitori di liquido, tubazioni, valvole di regolazione e di sicurezza] singolarmente dotati, quando previsto, di certificazione ai sensi delle direttive vigenti: la determinazione della categoria d'appartenenza delle macchine è il frutto dell'analisi dei componenti soggetti alla **PED** e corrisponde alla categoria più alta fra i componenti utilizzati.

Per ogni serie di macchine, la conformità dell'assieme è stata valutata da organismi notificati ed in applicazione delle procedure di valutazione (moduli) ai sensi dell'allegato II della direttiva **97/23 PED**, come riportato nella tabella seguente:

DECLARATION OF CONFORMITY

Galletti S.p.A. with head office in Via Romagnoli 12/a Bentivoglio (Bologna) - Italia, declares herewith under its own responsibility that all water chillers and heat pumps series:

ECH20, ECH20 H, MCA, MCA H, LCA, LCA H, MCC, MCC H, MCW, MCW-H, MPE, MPEH, MCE, MCEH, MFE, MXE units for air-conditioning systems for civil conditioning application, are produced in accordance with following directives: **CEE 73/23, 89/392, 91/368, 93/44, 93/68, 89/336, 97/23 (PED)**.

These units are made by assembly of components (compressors, heat exchangers with braze welded plates, liquid receiver, pipelines, regulating and safety valves), each component, if requested by the law, has its own declaration in accordance with the directives in force: the determination of the units belonging category is the result of the analyse of all components subjected to the **PED** directive and correspond to the highest class between the used components.

For each unit series the conformity of the assembly has been evaluated by notified bodies through the application of procedure for evaluation (forms) according to the annex II of the **97/23 PED** directive, as reported in the following table:

LCA and LCA H (115-300) units are manufactured in the plants of Hiref S.p.a - Galletti Group, Viale Spagna 31/33 Tribano (Padova)

Bentivoglio 30/04/2008

Galletti S.p.A.
Luigi Galletti
President



Serie Range	Grandezza Size	Organismo Notificato Notified body	N° certificato certificate	Procedura di valutazione di conformità Conformity Compliance Module	Categoria PED PED category	
ECH₂O - ECH₂O H	4 - 5 - 6 - 7	1115	N°006 rev. 4 del 06/02/2008	Modulo D1	I	
MCA - MCA H	10/12/2014	1115		Modulo D1	I	
MCA - MCA H	16 -21-25 - 30 -37- 50 -60	1115		Modulo D1	II	
LCA - LCA H	045-050-060-070-080-090-105	1115		Modulo D1	II	
MCC - MCC H	6 - 7 - 9 -12 - 15	1115		Modulo D1	I	
MCC - MCC H	18 - 22 - 25 - 33 -3 7	1115		Modulo D1	II	
MCW - MCW / H	5 - 7 - 10 - 12 - 15	1115		Modulo D1	I	
MCW - MCW / H	18 - 20 - 22 - 2 7- 31 - 39	1115		Modulo D1	II	
MPE - MPEH - MCE - MCEH	4 - 5 - 7 - 8	1115		Modulo D1	I	
MPE - MPEH - MCE - MCEH	9 - 10 -11-13 -15 - 18	1115		Modulo D1	I	
MPE - MPEH - MCE - MCEH	19-20-21-23-24-26-27-28-31-32 34-35-39-40	1115		Modulo D1	II	
MPE - MPEH - MCE - MCEH	T30 - T34 - T40 - T45	1115		Modulo D1	II	
MFE	5 - 6 - 8 - 11 -13 - 16 - 17 - 20 - 23	1115		Modulo D1	I	
MXE	9 - 11 - 14 - 16	1115		Modulo D1	I	
MXE	19 - 21	1115		Modulo D1	II	
LCA - LCA H	115-130-150-180-205-220-235-250-280-300	0398		B.05.0600AP-0101-01-2005	Modulo D1	II



**ATTESTATO APPROVAZIONE SISTEMA GARANZIA QUALITA'
PRODUZIONE**

Production Quality System Approval Certificate

N° 006 Rev. 4 – 97/23/CE- D1

**PASCAL
ORGANISMO NOTIFICATO N. 1115**

Notified Body n. 1115

Pascal, visto l'esito delle verifiche condotte in conformità all'allegato III della direttiva 97/23/CE, Modulo D1, attesta che il sistema qualità applicato dal fabbricante per la fabbricazione, l'ispezione finale e la prova delle attrezzature a pressione di seguito elencate, soddisfa le richieste della direttiva stessa.

Pascal, on the basis of the assessment performed in accordance to the annex III of the directive 97/23/EC, Module D1, attests that the Quality Management System operated by the Manufacturer for manufacture, final inspection and tests of the under listed pressure equipment satisfies the applicable directive provisions

Fabbricante/*Manufacture*

GALLETTI S.p.A.

Via L. Romagnoli, 12/a
40010 Bentivoglio (BO)

Per i seguenti prodotti/ for the following products

REFRIGERATORI D'ACQUA e POMPE DI CALORE

Serie: MCE; MPE; MFE; MXE;
MCC; MCW; ECH₂O; MCA; LCA; UGR S; UGR SE; UGR VE

Prima emissione **12/03/2003**
First emission *data/date*

Emissione corrente **06/02/2008**
Current issue *data/date*


Dr. Maurizio Brancaloni
PASCAL NB 1115

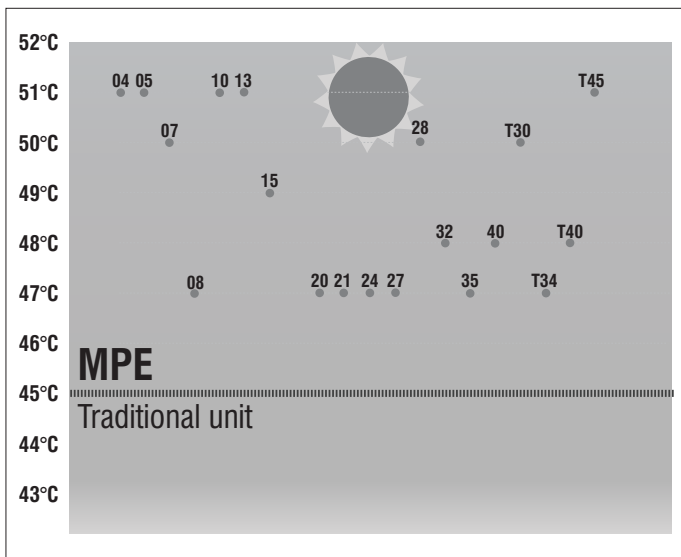

1 THE SERIES

PERFORMA (MPE) water chillers and heat pumps are designed for outdoor installation in both residential and industrial applications. The range uses R410A refrigerant, which assures high levels of performance with relatively low energy consumption and features 19 models in the chiller and heat pump version, with cooling capacities ranging from 4 to 45 kW and heating capacities from 5 to 53 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.

Their generous sizing guarantees the production of chilled water even with outdoor air temperatures as high as 51°C and all models of the range assure an average energy efficiency ratio (EER) of 2.95 in the cooling mode and heating efficiency (COP) of 3.25, corresponding to the Eurovent Energy Efficiency Class A.



EFFICIENCY IN ALL CONDITIONS

The actual thermal load of an air conditioning system is less than 60% of the rated load capacity 90% of the time; the MPE T version with single-circuit dual compressor answers this demand by offering high efficiency during operation under partial load conditions (ESEER > 4) and also guarantees the unit's operation at the worst temperature conditions.

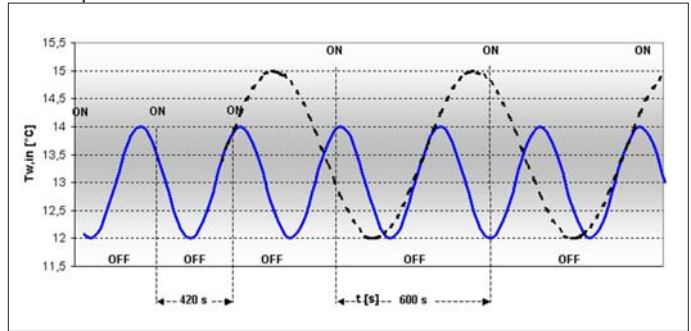
In such conditions the microprocessor controller activates the capacity control mode, doubling the condensing surface available to the single compressor.

The axial-type fans with airfoil-shaped blades and 6- and 8-pole motors with electronic speed control (optional) guarantee quiet operation and optimal performance of the unit in all conditions

SELF-ADAPTIVE

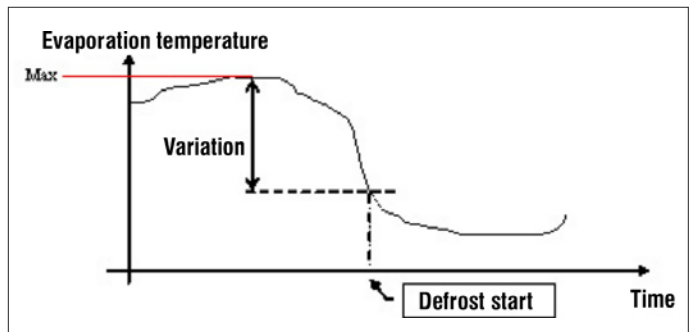
The electronic control system allows the setpoint to be adjusted automatically according to the outdoor temperature in order to reduce consumption and broaden the working temperature range.

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 defrost system (optional feature available with the advanced controller) 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

Painted galvanised sheet steel structure (RAL9002) 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.

Sound insulation, available on request, can further reduce the noise emissions of the unit.

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.
It is housed in the compressor compartment and is easy to reach thanks to the removable perimeter panels.
- Expansion tank.
- Safety 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-type compressor (rotary up to 7 kW) housed in a compartment that can be sound insulated.
- 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 (MPE H).
- Single-acting valves (MPE H).
- Liquid receiver (MPE H)
- High and low pressure switches.
- 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 8mm 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 8mm 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 conditions or keep the unit running even in the harshest winter conditions.

The basic controller comes complete with the MODBUS protocol and enables an immediate connection to ERGO networks.

Main functions

- Control over the temperature of water entering the evaporator.
- Management of the defrosting function (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;
- Option of connecting a remote terminal that duplicates the control functions.

Devices controlled :

- Compressor
- Fans
- Cycle-reversing valve (MPE-H).
- Water circulation pump.
- Antifreeze heating elements (optional)
- Alarm signalling relay

On request, it is possible to install the advanced controller whose functions extend to :

- LAN networks
- 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 hydronic kits
 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)

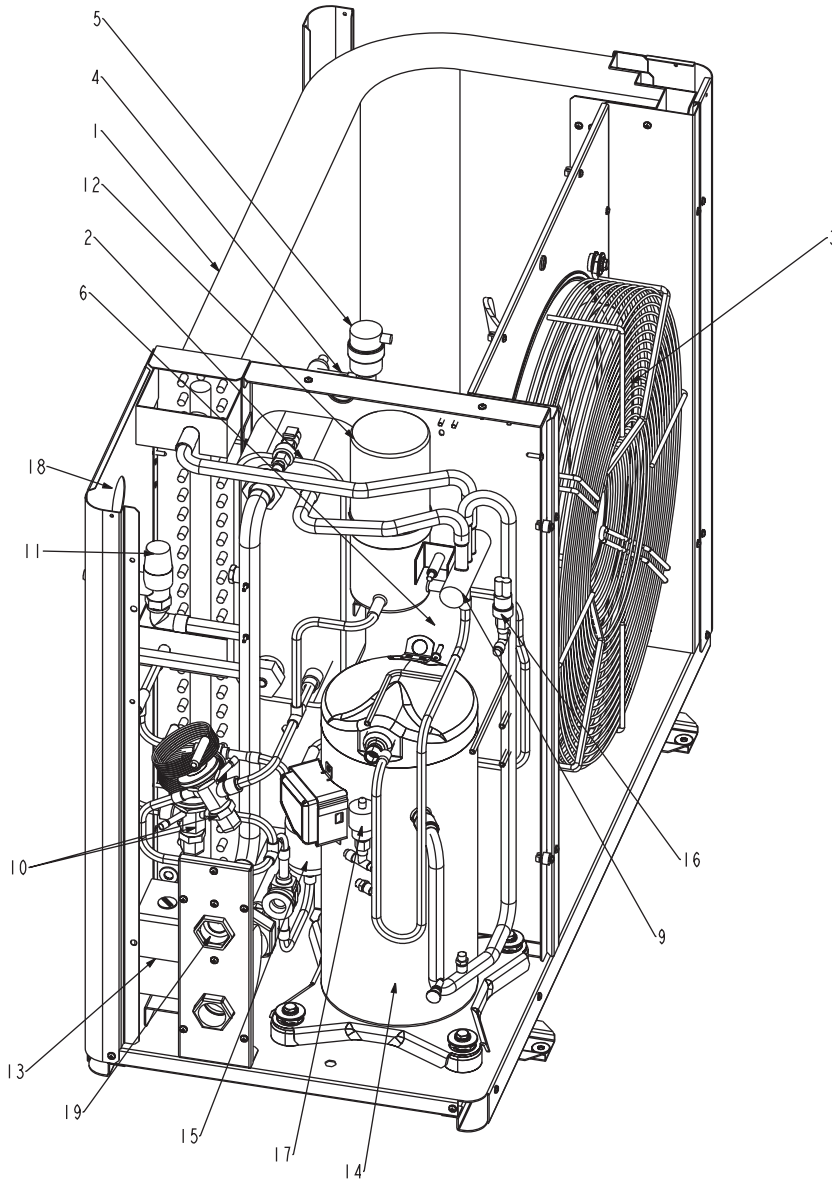
ACCESSORIES AVAILABLE

Remote control boards
 Base vibration dampers
 Metal grilles to protect exchangers



3 LAYOUT OF COMPONENTS

MPE 04 ÷ 08

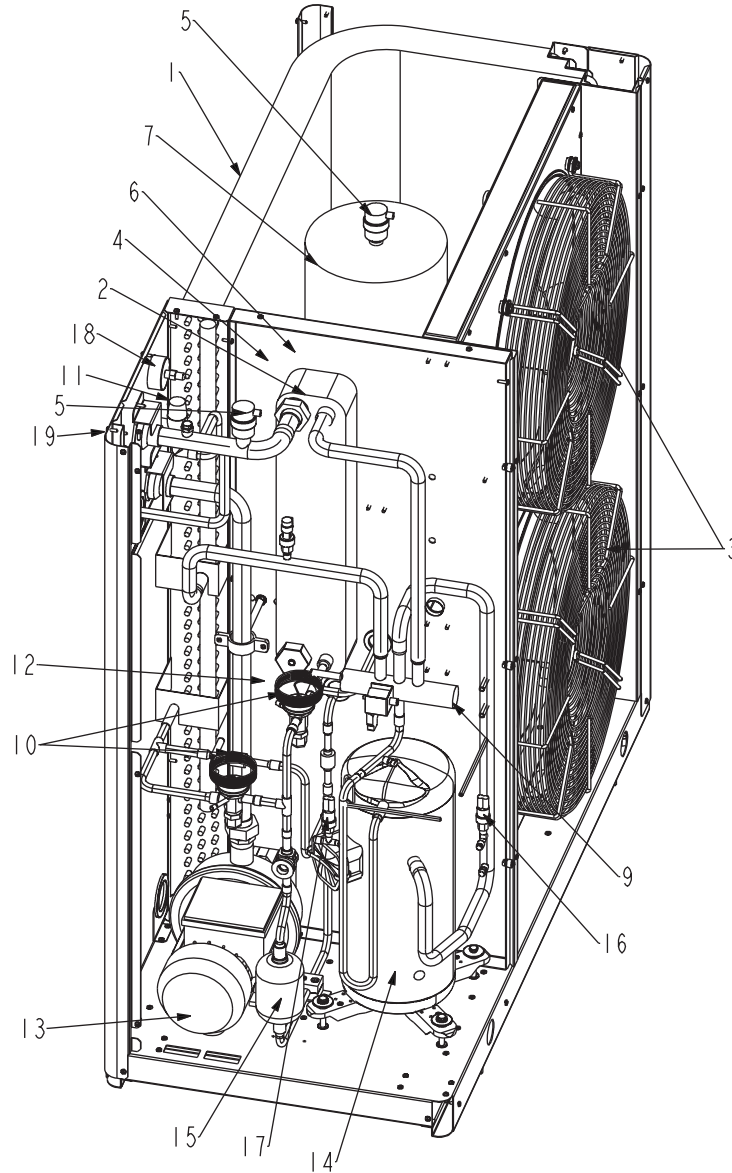


MPE 04 - 08

LEGEND	Description
1	R410A - air exchanger
2	R410A - water exchanger
3	Fans
4	Water differential pressure switch (fan compartment)
5	Automatic air vent valve
6	Expansion tank (fan compartment)
7	Buffer tank (accessory)
8	R410A safety valve
9	4-way valve (MPE H)
10	Thermostatic valves
11	Water safety valve
12	Liquid receiver
13	Circulation pump
14	Compressor
15	Refrigerant filter
16	Low pressure switch and charge inlet
17	High pressure switch and charge inlet
18	Water pressure gauge
19	Water filling point

3 LAYOUT OF COMPONENTS

MPE 10 ÷ 15

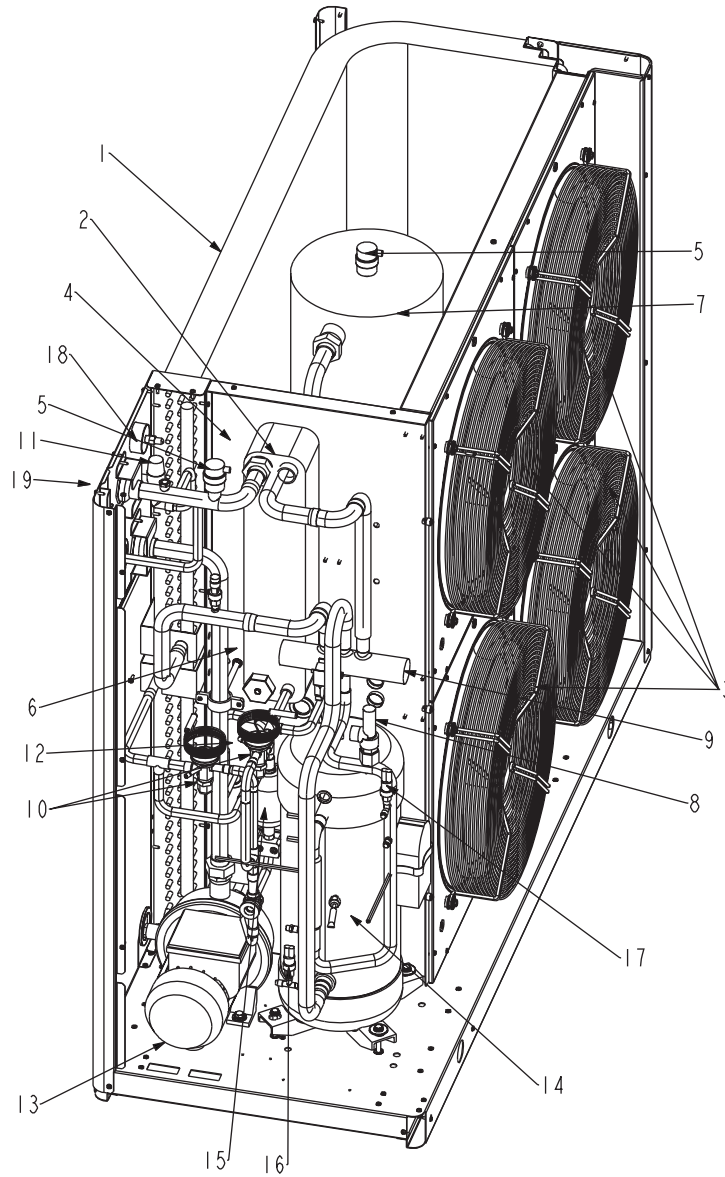


MPE 10 - 15

LEGEND	Description
1	R410A - air exchanger
2	R410A - water exchanger
3	Fans
4	Water differential pressure switch (fan compartment)
5	Automatic air vent valve
6	Expansion tank (fan compartment)
7	Buffer tank (accessory)
8	R410A safety valve
9	4-way valve (MPE H)
10	Thermostatic valves
11	Water safety valve
12	Liquid receiver (fan compartment)
13	Circulation pump
14	Compressor
15	Refrigerant filter
16	Low pressure switch and charge inlet
17	High pressure switch and charge inlet
18	Water pressure gauge
19	Water filling point

3 LAYOUT OF COMPONENTS

MPE 18 ÷ 27

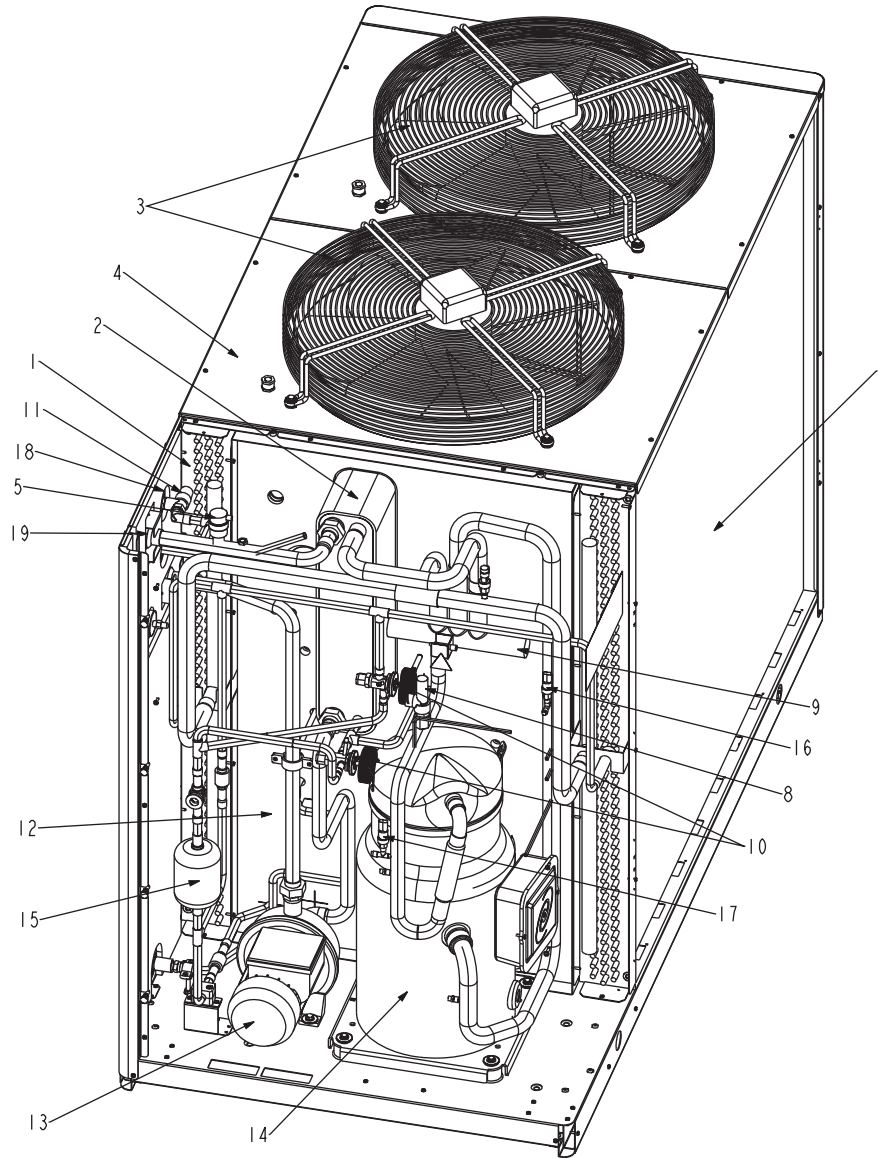


MPE 18 -27

LEGEND	Description
1	R410A - air exchanger
2	R410A - water exchanger
3	Fans
4	Water differential pressure switch (fan compartment)
5	Automatic air vent valve
6	Expansion tank (fan compartment)
7	Buffer tank (accessory)
8	R410A safety valve
9	4-way valve (MPE H)
10	Thermostatic valves
11	Water safety valve
12	Liquid receiver (fan compartment)
13	Circulation pump
14	Compressor
15	Refrigerant filter
16	Low pressure switch and charge inlet
17	High pressure switch and charge inlet
18	Water pressure gauge
19	Water filling point

3 LAYOUT OF COMPONENTS

MPE 28 ÷ 40

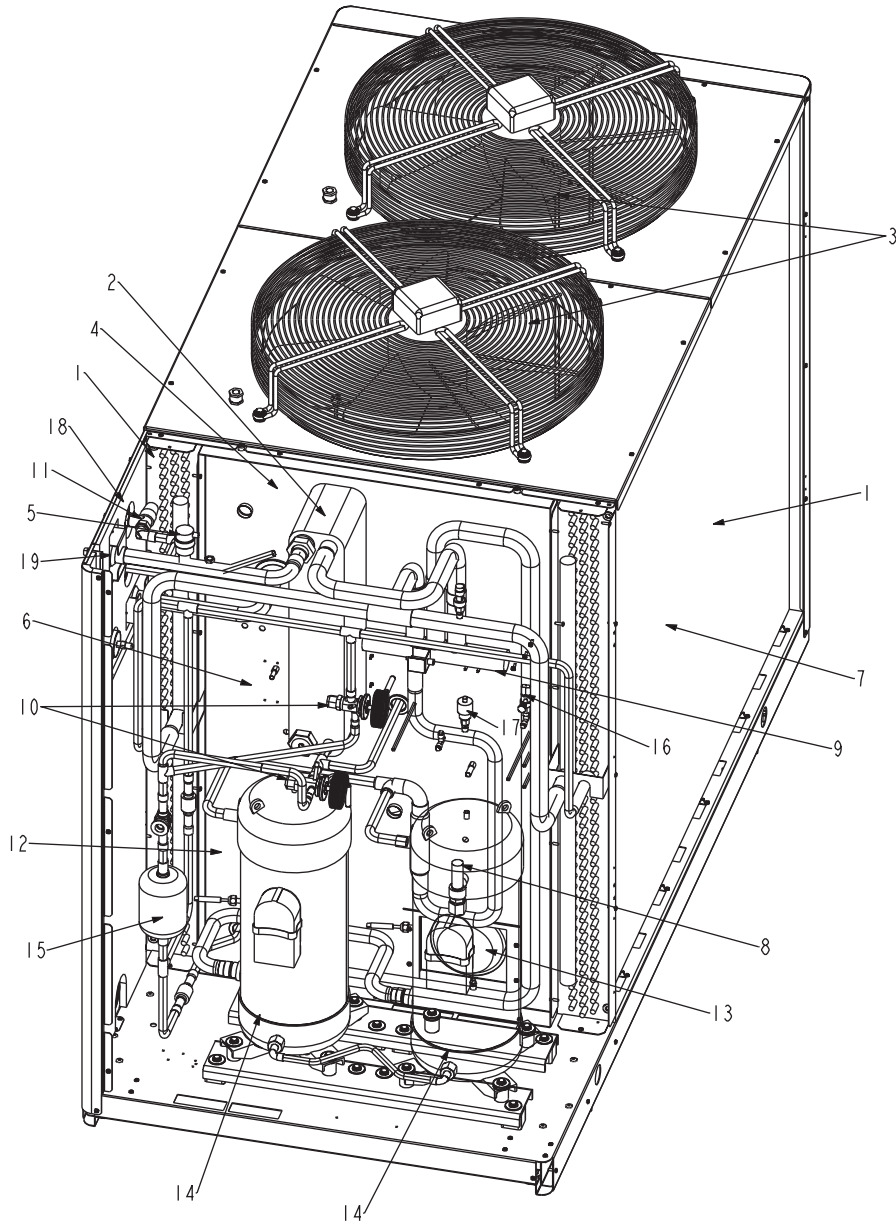


MPE 28 - 40

LEGEND	Description
1	R410A - air exchanger
2	R410A - water exchanger
3	Fans
4	Water differential pressure switch (fan compartment)
5	Automatic air vent valve
6	Expansion tank (fan compartment)
7	Buffer tank (accessory)
8	R410A safety valve
9	4-way valve (MPE H)
10	Thermostatic valves
11	Water safety valve
12	Liquid receiver (fan compartment)
13	Circulation pump
14	Compressor
15	Refrigerant filter
16	Low pressure switch and charge inlet
17	High pressure switch and charge inlet
18	Water pressure gauge
19	Water filling point

3 LAYOUT OF COMPONENTS

MPE 30 ÷ 45 T



MPE 30 - 45 T

LEGEND	Description
1	R410A - air exchanger
2	R410A - water exchanger
3	Fans
4	Water differential pressure switch (fan compartment)
5	Automatic air vent valve
6	Expansion tank (fan compartment)
7	Buffer tank (accessory)
8	R410A safety valve
9	4-way valve (MPE H)
10	Thermostatic valves
11	Water safety valve
12	Liquid receiver (fan compartment)
13	Circulation pump
14	Compressor
15	Refrigerant filter
16	Low pressure switch and charge inlet
17	High pressure switch and charge inlet
18	Water pressure gauge
19	Water filling point

4 MODELS AND CONFIGURATIONS

FIELD OF APPLICATION

MPE air-condensed water chillers and heat pumps have been designed to cool and heat water for air conditioning and heating systems in residential or commercial buildings.

MODELS AND VERSIONS

The MPE series features 19 models of varying capacity in both heat pump and cooling only versions.

All models are charged with R410A refrigerant.

N.B. The choice of some options may preclude the choice of others or make some other fields become mandatory. Contact Galletti S.p.A. for verification

Complete Unit Code	M	P	E	0	0	9	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Version <input type="text" value="0"/>																							
Single compressor																							
Tandem																							
Model (size) <input type="text" value="09"/>																							
Operation <input type="text" value="C"/>																							
Chiller																							
Heat pump																							
Power Supply <input type="text" value="0"/>																							
Standard 400 - 3N - 50																							
Single phase																							
400 - 3N - 50 + thermalmagnetic																							
Single Phase + thermalmagnetic																							
Expansion Valve <input type="text" value="0"/>																							
Standard valve																							
Electronic expansion valve																							
Pump and accessories <input type="text" value="0"/>																							
Not present																							
Pump - vessel - water charge valve																							
Double pump - vessel - water charge valve																							
Buffer tank <input type="text" value="0"/>																							
Not present																							
Present																							
Heat Recover <input type="text" value="0"/>																							
Not present																							
Present with contact for pump																							
Condensing control <input type="text" value="0"/>																							
Not present																							
With modulating air flow																							
Antifreeze kit <input type="text" value="0"/>																							
Not present																							
Present, standard unit																							
Present, unit with pump and vessel																							
Present, unit with pump, vessel and tank																							
Acoustic insulation <input type="text" value="0"/>																							
Not present																							
Sound proofing insulation for compressor housing																							
Refrigerant circuit accessoires <input type="text" value="0"/>																							
Not present																							
Refrigerant gauge																							
Remote control <input type="text" value="0"/>																							
Not present																							
RS485 port (modbus + carel protocol)																							
Simplified																							
Base microprocessor remote control (modbus excluded)																							
ADVANCED microprocessor remote control																							
Special coil <input type="text" value="0"/>																							
Standard																							
Copper / copper heat exchanger																							
Cataphoresis																							
"Blygold"																							
Protection grille <input type="text" value="0"/>																							
Not present																							
Present																							
Compressor options <input type="text" value="0"/>																							
Not present																							
Power factor correction capacitors																							
Soft starter																							
Power factor correction capacitors + soft starter																							
Low temperature air water pressure switch carter heater (chiller), coil cable (PDC)																							
Control panel <input type="text" value="1"/>																							
Basic microprocessor																							
Advanced microprocessor																							

5 TECHNICAL CHARACTERISTICS

5.1 RATED TECHNICAL DATA OF WATER CHILLERS

MPE-C		004 M	005 M	007 M	008 M	008	010 M	010	013	015	018	020
Power supply	V - ph - Hz	230-1-50	230-1-50	230-1-50	230-1-50	400-3-50	230-1-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50
Cooling capacity	kW	4,11	5,10	6,66	8,40	8,40	9,25	9,25	12,90	14,98	17,20	19,61
MPE CB Total power input	kW	1,35	1,70	2,26	3,35	3,09	3,22	3,22	4,16	5,16	6,32	7,12
EER		3,06	3,01	2,95	2,51	2,72	2,87	2,87	3,10	2,90	2,72	2,75
ESEER		3,54	3,39	3,32	2,98	3,36	3,38	3,38	3,69	3,53	3,30	3,21
MPE CP CS Total power input	kW	1,49	1,84	2,40	3,49	3,23	3,59	3,59	4,53	5,53	6,69	7,49
Maximum power input	kW	2,0	2,3	3,0	5,0	5,0	5,1	7,2	8,9	10,5	12,5	13,6
Maximum current absorption	A	9,80	11,60	15,30	24,20	9,20	26,30	14,40	17,40	20,00	24,30	26,20
Starting absorbed current	A	38	44	63	98	49	99	50	65	68	75	104
n° of compressors / circuits		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Refrigerant charge	kg	1,47	1,48	2,04	2,09	2,09	2,87	2,87	3,99	4,11	3,67	4,23
Low/high pressure switch	bar	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42
n° of axial fan		1	1	1	1	1	2	2	2	2	4	4
Air flow	m³/h	3.635	3.635	3.406	3.406	3.406	7.385	7.385	6.939	6.939	9.990	9.990
Water flow	l/s	707	877	1.146	1.445	1.445	1.591	1.591	2.219	2.577	2.958	3.373
Diameter of hydraulic connections	"	1	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
Water side pressure drop	kPa	2	4	6	6	6	34	34	61	38	51	51
Available pressure head	kPa	63	61	57	53	53	116	116	83	103	129	123
Water content excluding optionals	dm³	2	2	2	2	2	3	3	3	3	4	4
Expansion tank	dm³	1	1	1	1	1	5	5	5	5	5	5
Buffer tank	dm³	n.d.	n.d.	n.d.	n.d.	n.d.	30	30	30	30	50	50
Height	mm	758	758	758	758	758	1250	1250	1250	1250	1300	1300
Length	mm	960	960	960	960	960	1220	1220	1220	1220	1565	1565
Depth	mm	450	450	450	450	450	560	560	560	560	600	600
Sound power level	dB(A)	66	66	67	67	67	69	69	69	69	71	71
Sound pressure level	dB(A)	38	38	39	39	39	41	41	41	41	43	43
Transport weight *	kg	98	100	107	110	110	202	202	209	209	260	260
Operating weight *	kg	92,3	94,3	101,3	104,3	104,3	227,5	227,5	234,5	234,5	306,3	296,3
MPE-C		024	027	028	032	035	040		T30	T34	T40	T45
Power supply	V - ph - Hz	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50		400-3-50	400-3-50	400-3-50	400-3-50
Cooling capacity	kW	23,80	26,60	28,10	31,52	35,00	39,67		30,00	34,05	39,57	44,55
MPE CB Total power input	kW	8,10	9,33	8,65	10,06	11,51	12,77		10,43	12,59	13,64	16,38
EER		2,94	2,85	3,25	3,13	3,04	3,11		2,88	2,70	2,90	2,72
ESEER		3,42	3,36	3,77	3,63	3,61	3,68		4,17	4,11	4,15	4,04
MPE CP CS Total power input	kW	8,47	9,70	9,20	10,61	12,06	13,32		10,98	13,14	14,19	16,93
Maximum power input	kW	14,5	18,0	18,3	18,9	21,8	22,4		20,9	24,4	26,6	30,8
Maximum current absorption	A	27,6	33,60	35,50	36,50	41,50	42,50		39,9	45,9	49,70	56,70
Starting absorbed current	A	158	132	133	166	161	163		86	96	127	130
n° of compressors / circuits		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1		2 / 1	2 / 1	2 / 1	2 / 1
Refrigerant charge	kg	5,8	6,0	7,5	7,5	7,8	10,82		7,75	7,8	10,9	10,9
Low/high pressure switch	bar	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42		2 / 42	2 / 42	2 / 42	2 / 42
n° of axial fan		4	4	4	4	4	4		2	2	2	2
Air flow	m³/h	9.307	9.307	16.276	16.276	16.276	15.776		16.276	16.276	15.776	15.776
Water flow	l/s	4.094	4.575	4.833	5.421	6.021	6.823		5.160	5.857	6.806	7.663
Diameter of hydraulic connections	"	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4		1 1/4	1 1/4	1 1/4	1 1/4
Water side pressure drop	kPa	49	34	40	51	41	43		30,01	38	45	57
Available pressure head	kPa	116	124	143	126	130	119		150	134	117	97
Water content excluding optionals	dm³	4	4	6	6	6	6		6	6	6	6
Expansion tank	dm³	5	5	8	8	8	8		8	8	8	8
Buffer tank	dm³	50	50	125	125	125	125		125	125	125	125
Height	mm	1300	1300	1485	1485	1485	1485		1485	1485	1485	1485
Length	mm	1565	1565	1990	1990	1990	1990		1990	1990	1990	1990
Depth	mm	600	600	950	950	950	950		950	950	950	950
Sound power level	dB(A)	72	72	73	73	73	75		72	72	72	72
Sound pressure level	dB(A)	44	44	45	45	45	47		44	44	44	44
Transport weight *	kg	280	285	370	370	390	390		410	410	430	430
Operating weight *	kg	327,3	332,3	492	492	513	513		532	533	553	553

* Weights refer to model with pump and storage reservoir

- Cooling capacity: outdoor air temperature 35°C, water temperature 12°C / 7°C

- Sound power measured according to standards ISO 3741 - ISO 3744 and EN 29614-1

- Sound pressure measured at a distance of 10 m and a height of 1.5 m above the ground in a clear field (fan side).

- The maximum electrical input is the mains electricity 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).

5 TECHNICAL CHARACTERISTICS

5.2 RATED TECHNICAL DATA OF HEAT PUMPS

MPE-H		004 M	005 M	007 M	008 M	008	010 M	010	013	015	018	020
Power supply	V-ph-Hz	230-1-50	230-1-50	230-1-50	230-1-50	400-3-50	230-1-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50
Cooling capacity	kW	4,03	5,00	6,53	8,23	8,23	9,07	9,07	12,64	14,68	16,86	19,22
MPE HB Cooling power input	kW	1,35	1,70	2,26	3,35	3,09	3,22	3,22	4,16	5,16	6,32	7,12
EER		2,99	2,95	2,89	2,46	2,67	2,82	2,82	3,04	2,85	2,67	2,70
ESEER		3,47	3,32	3,26	2,92	3,29	3,31	3,31	3,62	3,46	3,23	3,15
MPE HP - HS Cooling power input	kW	1,49	1,84	2,40	3,49	3,23	3,59	3,59	4,53	5,53	6,69	7,49
Heating capacity	kW	4,72	5,86	7,77	10,21	9,95	10,87	10,87	15,09	17,60	20,03	22,96
MPE HB Heating power input	kW	1,46	1,81	2,41	3,59	3,25	3,62	3,62	4,70	5,49	6,63	7,16
COP		3,24	3,25	3,23	2,85	3,07	3,00	3,00	3,21	3,21	3,02	3,21
MPE HP - HS Heating power input	kW	1,60	1,95	2,55	3,73	3,39	3,99	3,99	5,07	5,86	7,00	7,53
Maximum power input	kW	2,0	2,3	3,0	5,0	5,0	5,1	7,2	8,9	10,5	12,5	13,6
Maximum current absorption	A	9,80	11,60	15,30	24,20	9,20	26,30	14,40	17,40	20,00	24,30	26,20
Starting absorbed current	A	38	44	63	98	49	99	50	65	68	75	104
n° of compressors / circuits		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Refrigerant charge	kg	1,47	1,48	2,04	2,09	2,09	2,87	2,87	3,99	4,11	3,67	4,23
Low/high pressure switch	bar	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42
n° of axial fan		1	1	1	1	1	2	2	2	2	4	4
Air flow	m ³ /h	3.635	3.635	3.406	3.406	3.406	7.385	7.385	6.939	6.939	9.990	9.990
Water flow in cooling mode	l/s	707	877	1.146	1.445	1.445	1.591	1.591	2.219	2.577	2.958	3.373
Water flow in heat pump	l/s	811	1.008	1.337	1.755	1.711	1.869	1.869	2.595	3.027	3.445	3.949
Diameter of hydraulic connections	"	1	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
Water pressure drop (cooling)	kPa	2	4	6	6	6	34	34	61	38	51	51
Water pressure drop (heating)	kPa	3	4	8	8	8	45	45	83	51	69	69
Available pressure head (cooling)	kPa	63	61	57	53	53	116	116	83	103	129	123
Available pressure head (heating)	kPa	62	59	53	48	48	102	102	57	86	104	97
Water content escluding optionals	dm ³	2	2	2	2	2	3	3	3	3	4	4
Expansion tank	dm ³	1	1	1	1	1	5	5	5	5	5	5
Buffer tank	dm ³	n.d.	n.d.	n.d.	n.d.	n.d.	30	30	30	30	50	50
Height	mm	758	758	758	758	758	1250	1250	1250	1250	1300	1300
Length	mm	960	960	960	960	960	1220	1220	1220	1220	1565	1565
Depth	mm	450	450	450	450	450	560	560	560	560	600	600
Sound power level	dB(A)	66	66	67	67	67	69	69	69	69	71	71
Sound pressure level	dB(A)	38	38	39	39	39	41	41	41	41	43	43
Transport weight *	kg	103	105	111,7	115	115	212	212	219	220	273	273
Operating weight *	kg	97,3	99,3	106	109,3	109,3	237,5	237,5	244,5	245,5	319,3	309,3

* Weights refer to model with pump and storage reservoir

- Cooling capacity: outdoor air temperature 35°C, water temperature 12°C / 7°C
- Heating capacity: outdoor air temperature 7°C dry bulb and 6.2°C wet bulb, water temperature 40°C/45°C
- Sound power measured according to standards ISO 3741 - ISO 3744 and EN 29614-1
- Sound pressure measured at a distance of 10 m and a height of 1.5 m above the ground in a clear field (fan side).
- The maximum electrical input is the mains electricity 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).

5 TECHNICAL CHARACTERISTICS

5.2 RATED TECHNICAL DATA OF HEAT PUMPS

MPE-H		024	027	028	032	035	040		T30	T34	T40	T45
Power supply	V-ph-Hz	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50		400-3-50	400-3-50	400-3-50	400-3-50
Cooling capacity	kW	23,32	26,07	27,54	30,89	34,30	38,88		29,40	33,37	38,78	43,66
MPE HB Cooling power input	kW	8,10	9,33	8,65	10,06	11,51	12,77		10,43	12,59	13,64	16,38
EER		2,88	2,79	3,18	3,07	2,98	3,04		2,82	2,65	2,84	2,67
ESEER		3,35	3,29	3,70	3,56	3,54	3,61		4,09	4,03	4,06	3,96
MPE HP - HS Cooling power input	kW	8,47	9,70	9,20	10,61	12,06	13,32		10,98	13,14	14,19	16,93
Heating capacity	kW	27,15	29,98	31,37	35,58	39,28	45,17		34,51	39,41	46,49	52,72
MPE HB Heating power input	kW	8,11	8,89	9,14	10,42	11,57	13,14		10,86	12,80	13,97	16,26
COP		3,35	3,37	3,43	3,41	3,39	3,44		3,18	3,08	3,33	3,24
MPE HP - HS Heating power input	kW	8,48	9,26	9,69	10,97	12,12	13,69		11,41	13,35	14,52	16,81
Maximum power input	kW	14,5	18,0	18,3	18,9	21,8	22,4		20,9	24,4	26,6	30,8
Maximum current absorption	A	27,6	33,60	35,50	36,50	41,50	42,50		39,9	45,9	49,70	56,70
Starting absorbed current	A	158	132	133	166	161	163		86	96	127	130
n° of compressors / circuits		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1		2 / 1	2 / 1	2 / 1	2 / 1
Refrigerant charge	kg	5,8	6,0	7,5	7,5	7,8	10,8		7,8	7,8	10,9	10,9
Low/high pressure switch	bar	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42	2 / 42		2 / 42	2 / 42	2 / 42	2 / 42
n° of axial fan		4	4	4	4	4	4		2	2	2	2
Air flow	m ³ /h	9.307	9.307	16.276	16.276	16.276	15.776		16.276	16.276	15.776	15.776
Water flow in cooling mode	l/s	4.094	4.575	4.833	5.421	6.021	6.823		5.160	5.857	6.806	7.663
Water flow in heat pump	l/s	4.670	5.156	5.396	6.120	6.756	7.769		5.935	6.779	7.996	9.067
Diameter of hydraulic connections	"	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4		1 1/4	1 1/4	1 1/4	1 1/4
Water pressure drop (cooling)	kPa	49	34	40	51	41	43		30	38	45	57
Water pressure drop (heating)	kPa	62	43	49	63	50	54		39	51	57	73
Available pressure head (cooling)	kPa	116	124	143	126	130	119		150	134	117	97
Available pressure head (heating)	kPa	95	107	128	107	113	99		133	112	93	67
Water content escluding optionals	dm ³	4	4	6	6	6	6		6	6	6	6
Expansion tank	dm ³	5	5	8	8	8	8		8	8	8	8
Buffer tank	dm ³	50	50	125	125	125	125		125	125	125	125
Height	mm	1300	1300	1485	1485	1485	1485		1485	1485	1485	1485
Length	mm	1565	1565	1990	1990	1990	1990		1990	1990	1990	1990
Depth	mm	600	600	950	950	950	950		950	950	950	950
Sound power level	dB(A)	72	72	73	73	73	75		72	72	72	72
Sound pressure level	dB(A)	44	44	45	45	45	47		44	44	44	44
Transport weight *	kg	295	300	400	400	420	420		430	430	450	450
Operating weight *	kg	342,3	347,3	522	522	543	543		552	553	573	573

* Weights refer to model with pump and storage reservoir

- Cooling capacity: outdoor air temperature 35°C, water temperature 12°C / 7°C
- Heating capacity: outdoor air temperature 7°C dry bulb and 6.2°C wet bulb, water temperature 40°C/45°C
- Sound power measured according to standards ISO 3741 - ISO 3744 and EN 29614-1
- Sound pressure measured at a distance of 10 m and a height of 1.5 m above the ground in a clear field (fan side).
- The maximum electrical input is the mains electricity 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).

6 PERFORMANCE

6.1 MPE-C COOLING CAPACITIES

Tbs₁ Air inlet temperature (dry bulb)
Tw in/out Water inlet/outlet temperature
PF Cooling capacity
PA Total power input including pump

	Tbs ₁		20		25		30		35		40		45	
	Tw in [°C]	Tw out [°C]	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW
MPE 004 M	10	5	4,5	1,17	4,3	1,25	4,09	1,36	3,84	1,48	3,59	1,59	3,32	1,71
	11	6	4,6	1,17	4,5	1,25	4,23	1,37	3,97	1,48	3,71	1,60	3,43	1,72
	12	7	4,8	1,16	4,6	1,25	4,4	1,37	4,11	1,49	3,84	1,61	3,55	1,73
	13	8	5,0	1,15	4,8	1,25	4,5	1,37	4,25	1,50	3,96	1,62	3,67	1,75
	14	9	5,2	1,14	4,9	1,25	4,7	1,38	4,4	1,50	4,10	1,63	3,79	1,76
	15	10	5,4	1,14	5,1	1,25	4,8	1,38	4,5	1,51	4,23	1,64	3,92	1,77
	16	11	5,5	1,13	5,3	1,25	5,0	1,38	4,7	1,51	4,37	1,65	4,05	1,78
MPE 005 M	10	5	5,6	1,47	5,4	1,58	5,12	1,70	4,81	1,82	4,47	1,95	4,09	2,09
	11	6	5,8	1,47	5,6	1,58	5,27	1,70	4,95	1,83	4,60	1,96	4,22	2,11
	12	7	6,0	1,47	5,7	1,59	5,4	1,71	5,10	1,84	4,74	1,98	4,36	2,12
	13	8	6,2	1,47	5,9	1,59	5,6	1,72	5,25	1,85	4,89	1,99	4,50	2,14
	14	9	6,3	1,47	6,1	1,59	5,7	1,72	5,4	1,86	5,04	2,01	4,64	2,16
	15	10	6,5	1,47	6,2	1,59	5,9	1,73	5,6	1,87	5,19	2,02	4,78	2,18
	16	11	6,7	1,47	6,4	1,60	6,1	1,73	5,7	1,88	5,35	2,03	4,94	2,19
MPE 007 M	10	5	7,5	1,93	7,1	2,06	6,7	2,20	6,3	2,37	5,87	2,54	5,44	2,74
	11	6	7,7	1,93	7,3	2,07	6,9	2,22	6,5	2,38	6,04	2,56	5,60	2,76
	12	7	7,9	1,94	7,5	2,07	7,1	2,23	6,7	2,40	6,2	2,58	5,77	2,79
	13	8	8,2	1,94	7,7	2,08	7,3	2,24	6,9	2,41	6,4	2,60	5,94	2,81
	14	9	8,4	1,94	8,0	2,08	7,5	2,25	7,1	2,43	6,6	2,62	6,12	2,84
	15	10	8,7	1,94	8,2	2,09	7,8	2,26	7,3	2,44	6,8	2,64	6,30	2,86
	16	11	8,9	1,94	8,5	2,10	8,0	2,27	7,5	2,46	7,0	2,66	6,5	2,89
MPE 008 M	10	5	9,7	2,58	9,1	2,85	8,5	3,18	7,9	3,56	7,2	4,00	6,5	4,49
	11	6	10,0	2,59	9,4	2,87	8,8	3,20	8,1	3,59	7,5	4,03	6,8	4,53
	12	7	10,3	2,61	9,7	2,89	9,1	3,22	8,4	3,61	7,7	4,06	7,0	4,57
	13	8	10,6	2,62	10,0	2,90	9,3	3,24	8,7	3,64	7,9	4,09	7,2	4,60
	14	9	11,0	2,64	10,3	2,92	9,6	3,27	8,9	3,67	8,2	4,13	7,4	4,64
	15	10	11,3	2,66	10,6	2,95	9,9	3,29	9,2	3,70	8,4	4,16	7,6	4,68
	16	11	11,7	2,67	11,0	2,97	10,2	3,32	9,5	3,73	8,7	4,20	7,8	4,72
MPE 008	10	5	9,8	2,30	9,2	2,55	8,5	2,86	7,9	3,20	7,2	3,58	6,5	4,01
	11	6	10,1	2,31	9,5	2,57	8,8	2,88	8,2	3,22	7,5	3,61	6,8	4,04
	12	7	10,4	2,32	9,8	2,59	9,1	2,90	8,4	3,25	7,7	3,64	7,0	4,07
	13	8	10,7	2,34	10,1	2,61	9,4	2,92	8,7	3,27	8,0	3,66	7,2	4,10
	14	9	11,1	2,35	10,4	2,63	9,7	2,94	9,0	3,30	8,2	3,69	7,4	4,13
	15	10	11,4	2,37	10,7	2,65	10,0	2,97	9,2	3,33	8,4	3,72	7,6	4,16
	16	11	11,7	2,39	11,0	2,67	10,3	2,99	9,5	3,35	8,7	3,75	7,9	4,19
MPE 010 M	10	5	10,5	2,86	9,9	3,03	9,2	3,28	8,6	3,58	8,0	3,92	7,4	4,31
	11	6	11,0	2,85	10,3	3,03	9,6	3,28	8,9	3,58	8,3	3,93	7,7	4,32
	12	7	11,4	2,85	10,7	3,03	9,9	3,29	9,2	3,59	8,6	3,94	8,0	4,34
	13	8	11,9	2,84	11,1	3,04	10,3	3,30	9,6	3,60	8,9	3,95	8,3	4,35
	14	9	12,4	2,83	11,5	3,04	10,7	3,30	10,0	3,61	9,2	3,96	8,6	4,36
	15	10	12,8	2,83	11,9	3,05	11,1	3,31	10,3	3,62	9,6	3,97	8,9	4,38
	16	11	13,3	2,83	12,4	3,05	11,5	3,31	10,7	3,63	10,0	3,99	9,2	4,39
MPE 010	10	5	3,6	3,55	9,9	3,03	9,2	3,28	8,6	3,58	8,0	3,92	7,4	4,31
	11	6	3,6	3,55	10,3	3,03	9,6	3,28	8,9	3,58	8,3	3,93	7,7	4,32
	12	7	3,6	3,55	10,7	3,03	9,9	3,29	9,2	3,59	8,6	3,94	8,0	4,34
	13	8	3,6	3,55	11,1	3,04	10,3	3,30	9,6	3,60	8,9	3,95	8,3	4,35
	14	9	3,6	3,55	11,5	3,04	10,7	3,30	10,0	3,61	9,2	3,96	8,6	4,36
	15	10	3,6	3,55	11,9	3,05	11,1	3,31	10,3	3,62	9,6	3,97	8,9	4,38
	16	11	3,6	3,55	12,4	3,05	11,5	3,31	10,7	3,63	10,0	3,99	9,2	4,39
MPE 013	10	5	15,1	3,48	14,0	3,75	13,0	4,09	12,0	4,50	11,1	4,96	10,3	5,5
	11	6	15,6	3,48	14,5	3,77	13,4	4,11	12,4	4,52	11,5	4,98	10,6	5,5
	12	7	16,1	3,50	15,0	3,78	13,9	4,13	12,8	4,54	11,9	5,01	11,0	5,5
	13	8	16,7	3,51	15,5	3,80	14,3	4,15	13,3	4,56	12,3	5,0	11,4	5,6
	14	9	17,2	3,52	16,0	3,81	14,8	4,17	13,8	4,58	12,8	5,1	11,8	5,6
	15	10	17,8	3,53	16,5	3,83	15,3	4,19	14,2	4,60	13,2	5,1	12,2	5,6
	16	11	18,4	3,55	17,1	3,85	15,9	4,21	14,7	4,63	13,7	5,1	12,7	5,7
	17	12	19,0	3,56	17,6	3,86	16,4	4,23	15,2	4,65	14,1	5,1	13,1	5,7

6 PERFORMANCE

6.1 MPE-C COOLING CAPACITIES

Tbs₁ Air inlet temperature (dry bulb)
 Tw in/out Water inlet/outlet temperature
 PF Cooling capacity
 PA Total power input including pump

	Tbs ₁		20		25		30		35		40		45	
	Tw in [°C]	Tw out [°C]	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW
MPE 015	10	5	17,8	4,11	16,4	4,48	15,1	4,93	14,0	5,5	12,9	6,1	11,9	6,8
	11	6	18,3	4,13	16,9	4,50	15,6	4,96	14,4	5,5	13,3	6,1	12,3	6,8
	12	7	18,9	4,15	17,5	4,53	16,2	4,99	14,9	5,5	13,8	6,1	12,7	6,9
	13	8	19,5	4,17	18,1	4,55	16,7	5,02	15,4	5,6	14,3	6,2	13,2	6,9
	14	9	20,2	4,20	18,7	4,58	17,3	5,05	16,0	5,6	14,7	6,2	13,6	6,9
	15	10	20,8	4,22	19,3	4,61	17,8	5,1	16,5	5,6	15,3	6,3	14,1	7,0
	16	11	21,5	4,24	19,9	4,64	18,4	5,1	17,1	5,7	15,8	6,3	14,6	7,0
MPE 018	10	5	20,5	5,01	18,9	5,4	17,4	6,0	16,1	6,6	14,8	7,3	13,7	8,2
	11	6	21,1	5,03	19,5	5,5	18,0	6,0	16,6	6,6	15,3	7,4	14,1	8,2
	12	7	21,8	5,06	20,2	5,5	18,6	6,0	17,2	6,7	15,9	7,4	14,6	8,3
	13	8	22,5	5,08	20,8	5,5	19,2	6,1	17,8	6,7	16,4	7,5	15,1	8,3
	14	9	23,2	5,11	21,5	5,6	19,9	6,1	18,4	6,8	17,0	7,5	15,7	8,4
	15	10	24,0	5,14	22,2	5,6	20,5	6,2	19,0	6,8	17,6	7,6	16,2	8,4
	16	11	24,7	5,17	22,9	5,6	21,2	6,2	19,6	6,9	18,2	7,6	16,8	8,5
MPE 020	10	5	21,9	5,63	20,7	6,1	19,5	6,7	18,5	7,4	17,5	8,1	16,6	9,0
	11	6	22,5	5,65	21,3	6,2	20,1	6,8	19,0	7,4	18,0	8,2	17,1	9,0
	12	7	23,2	5,66	21,9	6,2	20,7	6,8	19,6	7,5	18,5	8,3	17,5	9,1
	13	8	23,9	5,69	22,6	6,2	21,4	6,8	20,2	7,6	19,1	8,3	18,0	9,2
	14	9	24,6	5,72	23,3	6,3	22,0	6,9	20,8	7,6	19,6	8,4	18,6	9,3
	15	10	25,4	5,75	24,0	6,3	22,6	7,0	21,4	7,7	20,2	8,5	19,1	9,4
	16	11	26,1	5,79	24,7	6,4	23,3	7,0	22,0	7,8	20,8	8,6	19,6	9,5
MPE 024	10	5	26,7	6,39	25,3	6,9	23,9	7,6	22,3	8,3	20,7	9,1	19,1	10,0
	11	6	27,5	6,44	26,1	7,0	24,6	7,7	23,0	8,4	21,4	9,2	19,7	10,1
	12	7	28,4	6,50	27,0	7,1	25,4	7,7	23,8	8,5	22,1	9,3	20,3	10,2
	13	8	29,3	6,56	27,8	7,1	26,2	7,8	24,5	8,5	22,8	9,4	20,9	10,3
	14	9	30,2	6,62	28,7	7,2	27,0	7,9	25,3	8,6	23,4	9,5	21,5	10,4
	15	10	31,2	6,68	29,5	7,3	27,8	7,9	26,0	8,7	24,1	9,5	22,2	10,5
	16	11	32,1	6,74	30,4	7,3	28,6	8,0	26,8	8,8	24,8	9,6	22,8	10,6
MPE 027	10	5	30,5	7,44	28,8	8,1	26,9	8,8	25,0	9,7	23,0	10,6	20,9	11,7
	11	6	31,4	7,51	29,7	8,2	27,8	8,9	25,8	9,8	23,7	10,7	21,5	11,8
	12	7	32,4	7,58	30,6	8,3	28,6	9,0	26,6	9,9	24,4	10,8	22,1	11,9
	13	8	33,4	7,66	31,5	8,3	29,5	9,1	27,3	10,0	25,1	10,9	22,7	12,0
	14	9	34,5	7,73	32,5	8,4	30,3	9,2	28,1	10,1	25,8	11,0	23,3	12,1
	15	10	35,5	7,81	33,4	8,5	31,2	9,3	28,9	10,2	26,5	11,2	24,0	12,2
	16	11	36,5	7,89	34,4	8,6	32,1	9,4	29,7	10,3	27,2	11,3	24,6	12,3
MPE 028	10	5	31,5	7,06	29,9	7,6	28,2	8,3	26,4	9,1	24,4	9,9	22,4	10,9
	11	6	32,6	7,10	30,9	7,7	29,1	8,4	27,2	9,1	25,2	10,0	23,2	11,0
	12	7	33,7	7,15	31,9	7,7	30,1	8,4	28,1	9,2	26,1	10,1	23,9	11,0
	13	8	34,8	7,20	33,0	7,8	31,0	8,5	29,0	9,3	26,9	10,1	24,6	11,1
	14	9	35,9	7,25	34,0	7,9	32,0	8,6	29,9	9,3	27,7	10,2	25,4	11,2
	15	10	37,0	7,31	35,1	7,9	33,0	8,6	30,9	9,4	28,6	10,3	26,2	11,3
	16	11	38,2	7,36	36,2	8,0	34,1	8,7	31,8	9,5	29,4	10,4	27,0	11,4
MPE 032	10	5	35,1	8,06	33,3	8,7	31,5	9,5	29,6	10,4	27,5	11,5	25,4	12,6
	11	6	36,3	8,12	34,4	8,8	32,5	9,6	30,5	10,5	28,4	11,5	26,2	12,7
	12	7	37,4	8,18	35,6	8,9	33,6	9,7	31,5	10,6	29,3	11,6	27,1	12,8
	13	8	38,6	8,25	36,7	9,0	34,7	9,8	32,5	10,7	30,3	11,7	27,9	12,9
	14	9	39,9	8,31	37,9	9,0	35,8	9,9	33,5	10,8	31,2	11,8	28,8	13,0
	15	10	41,1	8,38	39,1	9,1	36,9	9,9	34,6	10,9	32,2	11,9	29,7	13,1
	16	11	42,4	8,45	40,3	9,2	38,0	10,0	35,6	11,0	33,1	12,0	30,6	13,2
MPE 035	10	5	39,6	8,95	37,6	9,8	35,3	10,7	32,9	11,8	30,3	13,1	27,5	14,5
	11	6	40,9	9,03	38,8	9,8	36,5	10,8	34,0	11,9	31,2	13,2	28,3	14,6
	12	7	42,2	9,10	40,0	9,9	37,6	10,9	35,0	12,0	32,2	13,3	29,2	14,7
	13	8	43,5	9,18	41,2	10,0	38,8	11,0	36,1	12,1	33,1	13,4	30,0	14,8
	14	9	44,9	9,27	42,5	10,1	39,9	11,1	37,1	12,2	34,1	13,5	30,9	15,0
	15	10	46,3	9,36	43,8	10,2	41,1	11,2	38,2	12,4	35,1	13,6	31,7	15,1
	16	11	47,6	9,45	45,1	10,3	42,3	11,3	39,3	12,5	36,1	13,8	32,6	15,2
	17	12	49,1	9,54	46,4	10,4	43,5	11,4	40,4	12,6	37,0	13,9	33,5	15,3

6 PERFORMANCE

6.1 MPE-C COOLING CAPACITIES

Tbs₁ Air inlet temperature (dry bulb)
Tw in/out Water inlet/outlet temperature
PF Cooling capacity
PA Total power input including pump

	Tbs ₁		20		25		30		35		40		45	
	Tw in [°C]	Tw out [°C]	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW
MPE 040	10	5	44,9	9,90	42,5	10,8	39,9	11,9	37,2	13,1	34,3	14,5	31,3	16,1
	11	6	46,4	9,96	43,9	10,9	41,2	12,0	38,4	13,2	35,5	14,6	32,4	16,2
	12	7	47,9	10,02	45,3	11,0	42,6	12,1	39,7	13,3	36,6	14,7	33,4	16,3
	13	8	49,4	10,09	46,8	11,0	44,0	12,2	41,0	13,4	37,8	14,8	34,5	16,4
	14	9	51,0	10,16	48,3	11,1	45,3	12,2	42,2	13,5	39,0	14,9	35,5	16,5
	15	10	52,6	10,23	49,8	11,2	46,8	12,3	43,6	13,6	40,2	15,0	36,6	16,6
	16	11	54,3	10,30	51,3	11,3	48,2	12,4	44,9	13,7	41,4	15,2	37,7	16,7
MPE 030 T	10	5	35,7	8,14	33,0	8,9	30,5	9,8	28,1	10,8	25,9	12,1	23,9	13,5
	11	6	36,9	8,18	34,1	8,9	31,5	9,8	29,0	10,9	26,8	12,2	24,7	13,6
	12	7	38,1	8,23	35,2	9,0	32,5	9,9	30,0	11,0	27,7	12,2	25,6	13,6
	13	8	39,3	8,27	36,4	9,0	33,6	10,0	31,1	11,1	28,7	12,3	26,5	13,7
	14	9	40,5	8,31	37,6	9,1	34,8	10,0	32,1	11,1	29,7	12,4	27,4	13,8
	15	10	41,8	8,36	38,8	9,1	35,9	10,1	33,2	11,2	30,7	12,5	28,4	13,9
	16	11	43,2	8,41	40,1	9,2	37,1	10,2	34,3	11,3	31,7	12,6	29,3	14,0
MPE 034 T	10	5	40,6	9,60	37,5	10,5	34,6	11,6	31,9	12,9	29,4	14,4	27,1	16,1
	11	6	41,9	9,66	38,7	10,6	35,7	11,7	33,0	13,0	30,4	14,6	28,1	16,3
	12	7	43,2	9,72	40,0	10,7	36,9	11,8	34,1	13,1	31,4	14,7	29,0	16,4
	13	8	44,6	9,78	41,3	10,7	38,1	11,9	35,2	13,2	32,5	14,8	30,0	16,5
	14	9	46,0	9,84	42,6	10,8	39,4	12,0	36,4	13,3	33,6	14,9	31,0	16,6
	15	10	47,4	9,91	43,9	10,9	40,7	12,1	37,6	13,5	34,7	15,0	32,1	16,8
	16	11	48,9	9,98	45,4	11,0	42,0	12,2	38,8	13,6	35,9	15,1	33,2	16,9
MPE 040 T	10	5	44,1	10,55	41,7	11,5	39,4	12,7	37,3	14,0	35,3	15,5	33,5	17,1
	11	6	45,5	10,56	43,0	11,6	40,7	12,8	38,4	14,1	36,4	15,6	34,4	17,3
	12	7	46,9	10,60	44,3	11,6	41,9	12,8	39,6	14,2	37,4	15,7	35,4	17,4
	13	8	48,3	10,64	45,7	11,7	43,2	12,9	40,8	14,3	38,5	15,9	36,4	17,6
	14	9	49,8	10,69	47,0	11,8	44,4	13,0	42,0	14,4	39,7	16,0	37,5	17,8
	15	10	51,3	10,75	48,5	11,9	45,8	13,1	43,2	14,6	40,8	16,2	38,6	17,9
	16	11	52,8	10,83	49,9	12,0	47,1	13,2	44,5	14,7	42,0	16,3	39,6	18,1
MPE 045 T	10	5	49,7	12,45	47,0	13,7	44,4	15,0	42,0	16,6	39,8	18,4	37,7	20,4
	11	6	51,2	12,49	48,4	13,7	45,8	15,2	43,3	16,8	41,0	18,6	38,8	20,6
	12	7	52,7	12,54	49,8	13,8	47,1	15,3	44,6	16,9	42,1	18,8	39,9	20,8
	13	8	54,3	12,61	51,3	13,9	48,5	15,4	45,9	17,1	43,4	19,0	41,0	21,0
	14	9	55,9	12,70	52,8	14,0	49,9	15,6	47,2	17,3	44,6	19,2	42,1	21,3
	15	10	57,6	12,79	54,4	14,2	51,4	15,7	48,5	17,4	45,8	19,4	43,3	21,5
	16	11	59,3	12,90	56,0	14,3	52,9	15,9	49,9	17,6	47,1	19,6	44,5	21,7
	17	12	61,0	13,02	57,6	14,4	54,4	16,0	51,3	17,8	48,4	19,8	45,7	22,0

6 PERFORMANCE

6.2 MPE-H COOLING CAPACITIES

Tbs₁ Air inlet temperature (dry bulb)
 Tw in/out Water inlet/outlet temperature
 PF Cooling capacity
 PA Total power input including pump

	Tbs ₁		20		25		30		35		40		45	
	Tw in [°C]	Tw out [°C]	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW
MPE 004 MH	10	5	4,4	1,17	4,2	1,25	4,01	1,36	3,77	1,48	3,51	1,59	3,25	1,71
	11	6	4,6	1,17	4,4	1,25	4,14	1,37	3,90	1,48	3,63	1,60	3,36	1,72
	12	7	4,7	1,16	4,5	1,25	4,3	1,37	4,03	1,49	3,76	1,61	3,48	1,73
	13	8	4,9	1,15	4,7	1,25	4,4	1,37	4,16	1,50	3,89	1,62	3,60	1,75
	14	9	5,1	1,14	4,8	1,25	4,6	1,38	4,3	1,50	4,01	1,63	3,72	1,76
	15	10	5,3	1,14	5,0	1,25	4,7	1,38	4,4	1,51	4,15	1,64	3,84	1,77
	16	11	5,4	1,13	5,2	1,25	4,9	1,38	4,6	1,51	4,28	1,65	3,97	1,78
MPE 005 MH	10	5	5,5	1,47	5,3	1,58	5,01	1,70	4,71	1,82	4,38	1,95	4,01	2,09
	11	6	5,7	1,47	5,4	1,58	5,16	1,70	4,85	1,83	4,51	1,96	4,14	2,11
	12	7	5,9	1,47	5,6	1,59	5,3	1,71	4,99	1,84	4,65	1,98	4,27	2,12
	13	8	6,0	1,47	5,8	1,59	5,5	1,72	5,14	1,85	4,79	1,99	4,41	2,14
	14	9	6,2	1,47	5,9	1,59	5,6	1,72	5,3	1,86	4,94	2,01	4,54	2,16
	15	10	6,4	1,47	6,1	1,59	5,8	1,73	5,5	1,87	5,09	2,02	4,69	2,18
	16	11	6,6	1,47	6,3	1,60	6,0	1,73	5,6	1,88	5,24	2,03	4,84	2,19
MPE 007 MH	10	5	7,3	1,93	6,9	2,06	6,5	2,20	6,2	2,37	5,75	2,54	5,33	2,74
	11	6	7,5	1,93	7,1	2,07	6,7	2,22	6,3	2,38	5,92	2,56	5,49	2,76
	12	7	7,8	1,94	7,4	2,07	6,9	2,23	6,5	2,40	6,1	2,58	5,65	2,79
	13	8	8,0	1,94	7,6	2,08	7,2	2,24	6,7	2,41	6,3	2,60	5,82	2,81
	14	9	8,2	1,94	7,8	2,08	7,4	2,25	6,9	2,43	6,5	2,62	6,00	2,84
	15	10	8,5	1,94	8,0	2,09	7,6	2,26	7,1	2,44	6,7	2,64	6,18	2,86
	16	11	8,7	1,94	8,3	2,10	7,8	2,27	7,3	2,46	6,9	2,66	6,4	2,89
MPE 008 MH	10	5	9,5	2,58	8,9	2,85	8,3	3,18	7,7	3,56	7,1	4,00	6,4	4,49
	11	6	9,8	2,59	9,2	2,87	8,6	3,20	8,0	3,59	7,3	4,03	6,6	4,53
	12	7	10,1	2,61	9,5	2,89	8,9	3,22	8,2	3,61	7,5	4,06	6,8	4,57
	13	8	10,4	2,62	9,8	2,90	9,2	3,24	8,5	3,64	7,8	4,09	7,0	4,60
	14	9	10,8	2,64	10,1	2,92	9,4	3,27	8,7	3,67	8,0	4,13	7,2	4,64
	15	10	11,1	2,66	10,4	2,95	9,7	3,29	9,0	3,70	8,2	4,16	7,5	4,68
	16	11	11,4	2,67	10,7	2,97	10,0	3,32	9,3	3,73	8,5	4,20	7,7	4,72
MPE 008 H	10	5	9,6	2,30	9,0	2,55	8,4	2,86	7,7	3,20	7,1	3,58	6,4	4,01
	11	6	9,9	2,31	9,3	2,57	8,6	2,88	8,0	3,22	7,3	3,61	6,6	4,04
	12	7	10,2	2,32	9,6	2,59	8,9	2,90	8,2	3,25	7,6	3,64	6,8	4,07
	13	8	10,5	2,34	9,9	2,61	9,2	2,92	8,5	3,27	7,8	3,66	7,1	4,10
	14	9	10,8	2,35	10,2	2,63	9,5	2,94	8,8	3,30	8,0	3,69	7,3	4,13
	15	10	11,2	2,37	10,5	2,65	9,8	2,97	9,0	3,33	8,3	3,72	7,5	4,16
	16	11	11,5	2,39	10,8	2,67	10,1	2,99	9,3	3,35	8,5	3,75	7,7	4,19
MPE 010 MH	10	5	10,3	2,86	9,7	3,03	9,1	3,28	8,4	3,58	7,8	3,92	7,3	4,31
	11	6	10,8	2,85	10,1	3,03	9,4	3,28	8,7	3,58	8,1	3,93	7,5	4,32
	12	7	11,2	2,85	10,5	3,03	9,8	3,29	9,1	3,59	8,4	3,94	7,8	4,34
	13	8	11,7	2,84	10,9	3,04	10,1	3,30	9,4	3,60	8,7	3,95	8,1	4,35
	14	9	12,1	2,83	11,3	3,04	10,5	3,30	9,8	3,61	9,1	3,96	8,4	4,36
	15	10	12,6	2,83	11,7	3,05	10,9	3,31	10,1	3,62	9,4	3,97	8,7	4,38
	16	11	13,0	2,83	12,1	3,05	11,3	3,31	10,5	3,63	9,8	3,99	9,1	4,39
MPE 010 H	10	5	3,5	3,55	9,7	3,03	9,1	3,28	8,4	3,58	7,8	3,92	7,3	4,31
	11	6	3,5	3,55	10,1	3,03	9,4	3,28	8,7	3,58	8,1	3,93	7,5	4,32
	12	7	3,5	3,55	10,5	3,03	9,8	3,29	9,1	3,59	8,4	3,94	7,8	4,34
	13	8	3,5	3,55	10,9	3,04	10,1	3,30	9,4	3,60	8,7	3,95	8,1	4,35
	14	9	3,5	3,55	11,3	3,04	10,5	3,30	9,8	3,61	9,1	3,96	8,4	4,36
	15	10	3,5	3,55	11,7	3,05	10,9	3,31	10,1	3,62	9,4	3,97	8,7	4,38
	16	11	3,5	3,55	12,1	3,05	11,3	3,31	10,5	3,63	9,8	3,99	9,1	4,39
MPE 013 H	10	5	14,8	3,48	13,7	3,75	12,7	4,09	11,7	4,50	10,9	4,96	10,1	5,5
	11	6	15,3	3,48	14,2	3,77	13,1	4,11	12,2	4,52	11,3	4,98	10,4	5,5
	12	7	15,8	3,50	14,7	3,78	13,6	4,13	12,6	4,54	11,7	5,01	10,8	5,5
	13	8	16,3	3,51	15,2	3,80	14,1	4,15	13,0	4,56	12,1	5,0	11,2	5,6
	14	9	16,9	3,52	15,7	3,81	14,5	4,17	13,5	4,58	12,5	5,1	11,6	5,6
	15	10	17,4	3,53	16,2	3,83	15,0	4,19	14,0	4,60	12,9	5,1	12,0	5,6
	16	11	18,0	3,55	16,7	3,85	15,6	4,21	14,4	4,63	13,4	5,1	12,4	5,7
	17	12	18,6	3,56	17,3	3,86	16,1	4,23	14,9	4,65	13,9	5,1	12,9	5,7

6 PERFORMANCE

6.2 MPE-H COOLING CAPACITIES

Tbs₁ Air inlet temperature (dry bulb)
Tw in/out Water inlet/outlet temperature
PF Cooling capacity
PA Total power input including pump

	Tbs ₁		20		25		30		35		40		45	
	Tw in [°C]	Tw out [°C]	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW
MPE 015 H	10	5	17,4	4,11	16,1	4,48	14,8	4,93	13,7	5,5	12,6	6,1	11,6	6,8
	11	6	18,0	4,13	16,6	4,50	15,3	4,96	14,1	5,5	13,0	6,1	12,0	6,8
	12	7	18,5	4,15	17,2	4,53	15,8	4,99	14,6	5,5	13,5	6,1	12,5	6,9
	13	8	19,1	4,17	17,7	4,55	16,4	5,02	15,1	5,6	14,0	6,2	12,9	6,9
	14	9	19,8	4,20	18,3	4,58	16,9	5,05	15,6	5,6	14,4	6,2	13,3	6,9
	15	10	20,4	4,22	18,9	4,61	17,5	5,1	16,2	5,6	14,9	6,3	13,8	7,0
	16	11	21,0	4,24	19,5	4,64	18,1	5,1	16,7	5,7	15,5	6,3	14,3	7,0
MPE 018 H	10	5	20,1	5,01	18,5	5,4	17,1	6,0	15,7	6,6	14,5	7,3	13,4	8,2
	11	6	20,7	5,03	19,1	5,5	17,7	6,0	16,3	6,6	15,0	7,4	13,9	8,2
	12	7	21,4	5,06	19,8	5,5	18,3	6,0	16,8	6,7	15,5	7,4	14,3	8,3
	13	8	22,1	5,08	20,4	5,5	18,9	6,1	17,4	6,7	16,1	7,5	14,8	8,3
	14	9	22,8	5,11	21,1	5,6	19,5	6,1	18,0	6,8	16,6	7,5	15,4	8,4
	15	10	23,5	5,14	21,8	5,6	20,1	6,2	18,6	6,8	17,2	7,6	15,9	8,4
	16	11	24,2	5,17	22,5	5,6	20,8	6,2	19,2	6,9	17,8	7,6	16,4	8,5
MPE 020 H	10	5	21,4	5,63	20,2	6,1	19,1	6,7	18,1	7,4	17,1	8,1	16,2	9,0
	11	6	22,1	5,65	20,9	6,2	19,7	6,8	18,7	7,4	17,7	8,2	16,7	9,0
	12	7	22,7	5,66	21,5	6,2	20,3	6,8	19,2	7,5	18,2	8,3	17,2	9,1
	13	8	23,4	5,69	22,2	6,2	20,9	6,8	19,8	7,6	18,7	8,3	17,7	9,2
	14	9	24,1	5,72	22,8	6,3	21,6	6,9	20,4	7,6	19,2	8,4	18,2	9,3
	15	10	24,9	5,75	23,5	6,3	22,2	7,0	21,0	7,7	19,8	8,5	18,7	9,4
	16	11	25,6	5,79	24,2	6,4	22,8	7,0	21,6	7,8	20,4	8,6	19,2	9,5
MPE 024 H	10	5	26,1	6,39	24,8	6,9	23,4	7,6	21,9	8,3	20,3	9,1	18,7	10,0
	11	6	27,0	6,44	25,6	7,0	24,1	7,7	22,6	8,4	21,0	9,2	19,3	10,1
	12	7	27,9	6,50	26,4	7,1	24,9	7,7	23,3	8,5	21,6	9,3	19,9	10,2
	13	8	28,7	6,56	27,2	7,1	25,7	7,8	24,0	8,5	22,3	9,4	20,5	10,3
	14	9	29,6	6,62	28,1	7,2	26,5	7,9	24,8	8,6	23,0	9,5	21,1	10,4
	15	10	30,5	6,68	28,9	7,3	27,3	7,9	25,5	8,7	23,7	9,5	21,7	10,5
	16	11	31,5	6,74	29,8	7,3	28,1	8,0	26,3	8,8	24,3	9,6	22,3	10,6
MPE 027 H	10	5	29,9	7,44	28,2	8,1	26,4	8,8	24,5	9,7	22,5	10,6	20,4	11,7
	11	6	30,8	7,51	29,1	8,2	27,2	8,9	25,3	9,8	23,2	10,7	21,0	11,8
	12	7	31,8	7,58	30,0	8,3	28,0	9,0	26,0	9,9	23,9	10,8	21,7	11,9
	13	8	32,8	7,66	30,9	8,3	28,9	9,1	26,8	10,0	24,6	10,9	22,3	12,0
	14	9	33,8	7,73	31,8	8,4	29,7	9,2	27,6	10,1	25,3	11,0	22,9	12,1
	15	10	34,8	7,81	32,7	8,5	30,6	9,3	28,4	10,2	26,0	11,2	23,5	12,2
	16	11	35,8	7,89	33,7	8,6	31,5	9,4	29,1	10,3	26,7	11,3	24,1	12,3
MPE 028 H	10	5	30,9	7,06	29,3	7,6	27,6	8,3	25,8	9,1	24,0	9,9	22,0	10,9
	11	6	31,9	7,10	30,3	7,7	28,5	8,4	26,7	9,1	24,7	10,0	22,7	11,0
	12	7	33,0	7,15	31,3	7,7	29,5	8,4	27,6	9,2	25,5	10,1	23,4	11,0
	13	8	34,1	7,20	32,3	7,8	30,4	8,5	28,4	9,3	26,3	10,1	24,2	11,1
	14	9	35,2	7,25	33,3	7,9	31,4	8,6	29,3	9,3	27,2	10,2	24,9	11,2
	15	10	36,3	7,31	34,4	7,9	32,4	8,6	30,2	9,4	28,0	10,3	25,7	11,3
	16	11	37,4	7,36	35,5	8,0	33,4	8,7	31,2	9,5	28,9	10,4	26,4	11,4
MPE 032 H	10	5	34,4	8,06	32,7	8,7	30,9	9,5	29,0	10,4	27,0	11,5	24,9	12,6
	11	6	35,5	8,12	33,8	8,8	31,9	9,6	29,9	10,5	27,9	11,5	25,7	12,7
	12	7	36,7	8,18	34,9	8,9	32,9	9,7	30,9	10,6	28,8	11,6	26,5	12,8
	13	8	37,9	8,25	36,0	9,0	34,0	9,8	31,9	10,7	29,7	11,7	27,4	12,9
	14	9	39,1	8,31	37,1	9,0	35,0	9,9	32,9	10,8	30,6	11,8	28,2	13,0
	15	10	40,3	8,38	38,3	9,1	36,1	9,9	33,9	10,9	31,5	11,9	29,1	13,1
	16	11	41,6	8,45	39,5	9,2	37,2	10,0	34,9	11,0	32,5	12,0	29,9	13,2
MPE 035 H	10	5	38,8	8,95	36,8	9,8	34,6	10,7	32,3	11,8	29,7	13,1	26,9	14,5
	11	6	40,1	9,03	38,0	9,8	35,7	10,8	33,3	11,9	30,6	13,2	27,8	14,6
	12	7	41,4	9,10	39,2	9,9	36,9	10,9	34,3	12,0	31,5	13,3	28,6	14,7
	13	8	42,7	9,18	40,4	10,0	38,0	11,0	35,3	12,1	32,5	13,4	29,4	14,8
	14	9	44,0	9,27	41,7	10,1	39,1	11,1	36,4	12,2	33,4	13,5	30,2	15,0
	15	10	45,3	9,36	42,9	10,2	40,3	11,2	37,4	12,4	34,4	13,6	31,1	15,1
	16	11	46,7	9,45	44,2	10,3	41,5	11,3	38,5	12,5	35,3	13,8	31,9	15,2
	17	12	48,1	9,54	45,5	10,4	42,7	11,4	39,6	12,6	36,3	13,9	32,8	15,3

6 PERFORMANCE

6.2 MPE-H COOLING CAPACITIES

Tbs₁ Air inlet temperature (dry bulb)
 Tw in/out Water inlet/outlet temperature
 PF Cooling capacity
 PA Total power input including pump

	Tbs ₁		20		25		30		35		40		45	
	Tw in [°C]	Tw out [°C]	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW	PF kW	PA kW
MPE 040 H	10	5	44,0	9,90	41,6	10,8	39,1	11,9	36,5	13,1	33,7	14,5	30,7	16,1
	11	6	45,4	9,96	43,0	10,9	40,4	12,0	37,7	13,2	34,8	14,6	31,7	16,2
	12	7	46,9	10,02	44,4	11,0	41,7	12,1	38,9	13,3	35,9	14,7	32,7	16,3
	13	8	48,4	10,09	45,8	11,0	43,1	12,2	40,1	13,4	37,0	14,8	33,8	16,4
	14	9	50,0	10,16	47,3	11,1	44,4	12,2	41,4	13,5	38,2	14,9	34,8	16,5
	15	10	51,6	10,23	48,8	11,2	45,8	12,3	42,7	13,6	39,4	15,0	35,9	16,6
	16	11	53,2	10,30	50,3	11,3	47,2	12,4	44,0	13,7	40,5	15,2	36,9	16,7
MPE 030 TH	17	12	54,8	10,38	51,8	11,4	48,7	12,5	45,3	13,8	41,7	15,3	38,0	16,9
	10	5	35,0	8,14	32,3	8,9	29,8	9,8	27,5	10,8	25,4	12,1	23,4	13,5
	11	6	36,1	8,18	33,4	8,9	30,8	9,8	28,5	10,9	26,3	12,2	24,2	13,6
	12	7	37,3	8,23	34,5	9,0	31,9	9,9	29,4	11,0	27,2	12,2	25,1	13,6
	13	8	38,5	8,27	35,6	9,0	33,0	10,0	30,4	11,1	28,1	12,3	25,9	13,7
	14	9	39,7	8,31	36,8	9,1	34,1	10,0	31,5	11,1	29,1	12,4	26,9	13,8
	15	10	41,0	8,36	38,0	9,1	35,2	10,1	32,5	11,2	30,1	12,5	27,8	13,9
MPE 034 TH	16	11	42,3	8,41	39,2	9,2	36,4	10,2	33,6	11,3	31,1	12,6	28,7	14,0
	17	12	43,7	8,46	40,5	9,3	37,6	10,2	34,8	11,4	32,2	12,7	29,7	14,1
	10	5	39,8	9,60	36,7	10,5	33,9	11,6	31,2	12,9	28,8	14,4	26,6	16,1
	11	6	41,1	9,66	37,9	10,6	35,0	11,7	32,3	13,0	29,8	14,6	27,5	16,3
	12	7	42,4	9,72	39,2	10,7	36,2	11,8	33,4	13,1	30,8	14,7	28,4	16,4
	13	8	43,7	9,78	40,4	10,7	37,4	11,9	34,5	13,2	31,9	14,8	29,4	16,5
	14	9	45,1	9,84	41,7	10,8	38,6	12,0	35,7	13,3	32,9	14,9	30,4	16,6
MPE 040 TH	15	10	46,5	9,91	43,1	10,9	39,9	12,1	36,8	13,5	34,0	15,0	31,4	16,8
	16	11	47,9	9,98	44,4	11,0	41,2	12,2	38,1	13,6	35,2	15,1	32,5	16,9
	17	12	49,4	10,05	45,9	11,1	42,5	12,3	39,3	13,7	36,4	15,3	33,6	17,1
	10	5	43,2	10,55	40,9	11,5	38,7	12,7	36,6	14,0	34,6	15,5	32,8	17,1
	11	6	44,6	10,56	42,1	11,6	39,8	12,8	37,7	14,1	35,6	15,6	33,7	17,3
	12	7	45,9	10,60	43,4	11,6	41,0	12,8	38,8	14,2	36,7	15,7	34,7	17,4
	13	8	47,3	10,64	44,7	11,7	42,3	12,9	40,0	14,3	37,8	15,9	35,7	17,6
MPE 045 TH	14	9	48,8	10,69	46,1	11,8	43,6	13,0	41,1	14,4	38,9	16,0	36,7	17,8
	15	10	50,2	10,75	47,5	11,9	44,9	13,1	42,4	14,6	40,0	16,2	37,8	17,9
	16	11	51,7	10,83	48,9	12,0	46,2	13,2	43,6	14,7	41,2	16,3	38,8	18,1
	17	12	53,3	10,91	50,3	12,1	47,5	13,4	44,9	14,8	42,3	16,5	39,9	18,3
	10	5	48,7	12,45	46,0	13,7	43,5	15,0	41,2	16,6	39,0	18,4	37,0	20,4
	11	6	50,2	12,49	47,4	13,7	44,8	15,2	42,4	16,8	40,1	18,6	38,0	20,6
	12	7	51,7	12,54	48,9	13,8	46,2	15,3	43,7	16,9	41,3	18,8	39,1	20,8
MPE 045 TH	13	8	53,2	12,61	50,3	13,9	47,5	15,4	44,9	17,1	42,5	19,0	40,2	21,0
	14	9	54,8	12,70	51,8	14,0	48,9	15,6	46,2	17,3	43,7	19,2	41,3	21,3
	15	10	56,4	12,79	53,3	14,2	50,4	15,7	47,6	17,4	44,9	19,4	42,4	21,5
	16	11	58,1	12,90	54,9	14,3	51,8	15,9	48,9	17,6	46,2	19,6	43,6	21,7
	17	12	59,7	13,02	56,4	14,4	53,3	16,0	50,3	17,8	47,5	19,8	44,8	22,0

6 PERFORMANCE

6.3 MPE-H HEATING CAPACITIES

Tbs₁ Air inlet temperature (dry bulb)
Tw in/out Water inlet/outlet temperature
PT Heating capacity
PA Total power input including pump
RH Relative humidity

	Tbs ₁ / RH		-5 °C / 90 %		0 °C / 90 %		7 °C / 88 %		15 °C / 80 %		20 °C / 70 %	
	Tw in [°C]	Tw out [°C]	PT kW	PA kW	PT kW	PA kW	PT kW	PA kW	PT kW	PA kW	PT kW	PA kW
MPE 004 MH	25	30	3,14	1,22	4,16	1,26	5,1	1,26	5,8	1,25	6,2	1,24
	30	35	3,11	1,28	4,07	1,35	5,0	1,37	5,6	1,37	6,0	1,37
	35	40	3,06	1,35	3,97	1,44	4,9	1,49	5,4	1,50	5,9	1,50
	40	45	-	-	3,87	1,54	4,7	1,60	5,3	1,62	5,7	1,64
	45	50	-	-	-	-	4,6	1,72	5,1	1,75	5,5	1,77
MPE 005 MH	25	30	4,54	1,51	5,47	1,57	6,5	1,58	7,1	1,58	7,6	1,57
	30	35	4,42	1,57	5,31	1,66	6,3	1,70	6,9	1,71	7,4	1,71
	35	40	4,27	1,63	5,14	1,75	6,1	1,82	6,7	1,84	7,2	1,86
	40	45	-	-	4,94	1,86	5,9	1,95	6,5	1,98	7,0	2,01
	45	50	-	-	-	-	5,6	2,08	6,2	2,13	6,7	2,17
MPE 007 MH	25	30	5,98	1,93	7,18	2,03	8,5	2,07	9,5	2,08	10,1	2,09
	30	35	5,88	2,01	7,00	2,15	8,3	2,22	9,2	2,24	9,8	2,26
	35	40	5,79	2,11	6,81	2,28	8,0	2,38	8,9	2,42	9,5	2,45
	40	45	-	-	6,64	2,43	7,8	2,56	8,6	2,62	9,2	2,65
	45	50	-	-	-	-	7,5	2,75	8,3	2,83	8,9	2,87
MPE 008 MH	25	30	6,79	2,66	8,97	2,69	11,1	2,72	12,4	2,75	13,3	2,76
	30	35	6,71	2,95	8,80	2,99	10,8	3,03	12,0	3,05	12,9	3,07
	35	40	6,64	3,27	8,65	3,33	10,5	3,39	11,7	3,42	12,5	3,44
	40	45	-	-	8,52	3,72	10,3	3,80	11,4	3,84	12,2	3,87
	45	50	-	-	-	-	10,1	4,27	11,1	4,32	11,8	4,35
MPE 008 H	25	30	6,64	2,37	8,81	2,41	10,9	2,44	12,2	2,46	13,1	2,47
	30	35	6,51	2,63	8,59	2,68	10,6	2,72	11,8	2,74	12,7	2,77
	35	40	6,43	2,92	8,38	2,99	10,3	3,04	11,4	3,07	12,3	3,10
	40	45	-	-	8,20	3,34	10,0	3,41	11,0	3,44	11,8	3,47
	45	50	-	-	-	-	9,7	3,81	10,7	3,86	11,4	3,88
MPE 010 MH	25	30	7,31	3,00	9,55	3,06	11,9	3,07	13,5	3,07	14,6	3,06
	30	35	7,14	3,26	9,24	3,32	11,4	3,33	12,9	3,33	14,0	3,33
	35	40	7,06	3,56	9,02	3,62	11,0	3,64	12,5	3,64	13,5	3,64
	40	45	-	-	8,89	3,97	10,8	3,99	12,1	4,00	13,0	4,00
	45	50	-	-	-	-	10,6	4,39	11,8	4,40	12,7	4,4
MPE 010 H	25	30	7,31	3,00	9,55	3,06	11,9	3,07	13,5	3,07	14,6	3,06
	30	35	7,14	3,26	9,24	3,32	11,4	3,33	12,9	3,33	14,0	3,33
	35	40	7,06	3,56	9,02	3,62	11,0	3,64	12,5	3,64	13,5	3,64
	40	45	-	-	8,89	3,97	10,8	4,0	12,1	4,0	13,0	4,0
	45	50	-	-	-	-	10,6	4,4	11,8	4,4	12,7	4,4
MPE 013 H	25	30	10,55	3,69	13,58	3,76	16,6	3,82	18,7	3,9	20,3	3,9
	30	35	10,20	4,03	13,04	4,11	15,9	4,2	17,9	4,2	19,4	4,2
	35	40	9,96	4,43	12,63	4,52	15,3	4,6	17,2	4,6	18,6	4,7
	40	45	-	-	12,34	4,99	14,9	5,1	16,7	5,1	18,0	5,2
	45	50	-	-	-	-	14,6	5,6	16,2	5,7	17,5	5,7
MPE 015 H	25	30	12,22	4,20	15,73	4,29	19,3	4,3	21,7	4,4	23,5	4,4
	30	35	11,79	4,62	15,07	4,71	18,5	4,8	20,7	4,8	22,4	4,8
	35	40	11,52	5,12	14,58	5,21	17,8	5,3	19,9	5,3	21,5	5,3
	40	45	-	-	14,25	5,79	17,2	5,9	19,2	5,9	20,7	5,9
	45	50	-	-	-	-	16,8	6,5	18,7	6,6	20,1	6,6
MPE 018 H	25	30	14,26	5,07	18,30	5,17	22,5	5,2	25,3	5,3	27,3	5,3
	30	35	13,75	5,56	17,54	5,66	21,5	5,7	24,1	5,8	26,1	5,8
	35	40	13,44	6,15	16,97	6,24	20,7	6,3	23,1	6,4	25,0	6,4
	40	45	-	-	16,59	6,92	20,0	7,0	22,4	7,0	24,1	7,1
	45	50	-	-	-	-	19,6	7,8	21,8	7,8	23,4	7,9
MPE 020 H	25	30	17,02	6,79	20,41	6,07	24,3	5,8	27,0	5,8	29,1	5,8
	30	35	16,50	6,94	19,90	6,44	23,7	6,3	26,3	6,3	28,2	6,3
	35	40	16,12	7,17	19,52	6,90	23,2	6,9	25,7	6,9	27,5	7,0
	40	45	-	-	19,30	7,44	22,9	7,5	25,2	7,6	26,9	7,7
	45	50	-	-	-	-	22,6	8,3	24,9	8,4	26,5	8,5
MPE 024 H	25	30	17,65	6,03	23,67	6,29	29,5	6,5	33,1	6,6	35,8	6,7
	30	35	17,35	6,59	23,14	6,85	28,7	7,1	32,2	7,2	34,7	7,3
	35	40	17,12	7,22	22,63	7,50	27,9	7,7	31,2	7,9	33,6	8,0
	40	45	-	-	22,16	8,23	27,2	8,5	30,3	8,6	32,5	8,7
	45	50	-	-	-	-	26,4	9,3	29,3	9,5	31,4	9,6
MPE 027 H	25	30	19,53	6,78	26,28	7,04	32,9	7,3	37,0	7,4	40,0	7,5
	30	35	19,17	7,39	25,63	7,66	31,9	7,9	35,9	8,0	38,7	8,1
	35	40	18,86	8,10	25,01	8,37	30,9	8,6	34,7	8,8	37,4	8,9
	40	45	-	-	24,41	9,19	30,0	9,4	33,5	9,6	36,0	9,7
	45	50	-	-	-	-	29,0	10,4	32,3	10,5	34,6	10,6

6 PERFORMANCE

6.3 MPE-H HEATING CAPACITIES

Tbs₁ Air inlet temperature (dry bulb)
 Tw in/out Water inlet/outlet temperature
 PT Heating capacity
 PA Total power input including pump
 RH Relative humidity

	Tbs ₁ / RH		-5 °C / 90 %		0 °C / 90 %		7 °C / 88 %		15 °C / 80 %		20°C / 70 %	
	Tw in	Tw out	PT	PA	PT	PA	PT	PA	PT	PA	PT	PA
	[°C]	[°C]	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
MPE 028 H	25	30	20,76	6,98	27,84	7,26	34,6	7,5	39,0	7,6	42,1	7,7
	30	35	20,35	7,60	27,12	7,89	33,5	8,1	37,7	8,3	40,7	8,4
	35	40	19,99	8,32	26,41	8,62	32,5	8,9	36,4	9,0	39,2	9,2
	40	45	-	-	25,72	9,46	31,4	9,7	35,1	9,9	37,7	10,0
	45	50	-	-	-	-	30,3	10,7	33,7	10,8	36,1	11,0
MPE 032 H	25	30	23,14	7,81	31,04	8,14	38,7	8,4	43,5	8,6	46,9	8,7
	30	35	22,75	8,53	30,33	8,86	37,6	9,1	42,2	9,3	45,5	9,4
	35	40	22,42	9,35	29,66	9,70	36,6	10,0	40,9	10,2	44,1	10,3
	40	45	-	-	29,02	10,65	35,6	11,0	39,7	11,2	42,6	11,3
	45	50	-	-	-	-	34,6	12,0	38,4	12,2	41,2	12,4
MPE 035 H	25	30	26,00	8,69	34,54	8,89	42,9	9,1	48,2	9,2	52,0	9,3
	30	35	25,59	9,55	33,77	9,75	41,7	10,0	46,8	10,1	50,4	10,2
	35	40	25,24	10,55	33,01	10,76	40,5	11,0	45,3	11,1	48,7	11,2
	40	45	-	-	32,25	11,92	39,3	12,1	43,7	12,3	46,9	12,4
	45	50	-	-	-	-	38,0	13,4	42,1	13,6	45,0	13,7
MPE 040 H	25	30	30,32	10,11	39,97	10,15	49,6	10,3	55,7	10,3	60,2	10,4
	30	35	29,54	11,15	38,88	11,14	48,1	11,2	54,0	11,3	58,2	11,4
	35	40	28,93	12,34	37,86	12,29	46,6	12,4	52,2	12,5	56,2	12,6
	40	45	-	-	36,91	13,60	45,2	13,7	50,4	13,8	54,2	13,9
	45	50	-	-	-	-	43,7	15,1	48,6	15,2	52,1	15,3
MPE 030 TH	25	30	24,49	8,23	31,58	8,38	38,9	8,5	43,7	8,5	47,3	8,6
	30	35	23,59	9,04	30,23	9,19	37,1	9,3	41,7	9,3	45,1	9,4
	35	40	23,02	10,02	29,21	10,16	35,6	10,3	39,9	10,3	43,2	10,4
	40	45	-	-	28,51	11,30	34,5	11,4	38,5	11,5	41,6	11,5
	45	50	-	-	-	-	33,7	12,7	37,5	12,8	40,3	12,8
MPE 034 TH	25	30	27,98	9,49	35,98	9,69	44,2	9,8	49,7	9,9	53,7	9,9
	30	35	27,00	10,47	34,50	10,67	42,2	10,8	47,4	10,9	51,2	10,9
	35	40	26,41	11,64	33,39	11,83	40,6	12,0	45,5	12,1	49,1	12,1
	40	45	-	-	32,67	13,19	39,4	13,3	44,0	13,4	47,4	13,5
	45	50	-	-	-	-	38,6	14,9	42,8	15,0	46,0	15,1
MPE 040 TH	25	30	34,53	12,77	41,65	11,43	49,8	11,0	55,4	10,9	59,5	10,9
	30	35	33,51	13,13	40,61	12,22	48,5	12,0	53,8	12,0	57,7	12,1
	35	40	32,78	13,64	39,86	13,18	47,5	13,2	52,5	13,3	56,2	13,4
	40	45	-	-	39,39	14,30	46,7	14,5	51,5	14,7	55,0	14,8
	45	50	-	-	-	-	46,3	16,0	50,8	16,3	54,1	16,5
MPE 045 TH	25	30	39,27	14,93	47,02	13,30	56,0	12,7	62,1	12,6	66,7	12,7
	30	35	38,08	15,28	45,87	14,18	54,6	13,9	60,4	13,9	64,8	14,0
	35	40	37,23	15,82	45,05	15,26	53,5	15,3	59,1	15,4	63,2	15,5
	40	45	-	-	44,57	16,53	52,7	16,8	58,1	17,0	62,0	17,2
	45	50	-	-	-	-	52,3	18,6	57,4	18,9	61,1	19,1

6.4 INTEGRATED CAPACITIES

In the heat pump operation (heating mode), the actual heating capacities of units may be lower than the values shown in the table, due to defrosting cycles. To obtain the actual heating capacity, multiply the capacity values by the corrective coefficients given below.

Control	Air temperature- dry bulb (°C)			
	-5	0	5	>5
µ chiller2	0,89	0,88	0,94	1
PCO XS	0,91	0,9	0,94	1

7 SOUND LEVEL

LEGEND:

L_{p_A} Total sound pressure level, weighted A, measured in an open field, at a distance of 10 m, with a directivity factor of 2.

L_w Sound power level by octave band, not weighted

L_{w_A} Total sound power level, weighted A

Model	L_w							L_{w_A}		L_{p_A}	
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Total	Low-noise version	Total	Low-noise version
	dB	dB	dB	dB	dB	dB	dB	dB (A)	dB (A)	dB (A)	dB (A)
MPE 004 M	72,0	65,7	65,1	61,0	53,8	48,8	45,0	66,0	64,0	38,0	36,0
MPE 005 M	71,8	65,5	64,9	60,8	53,6	48,6	44,8	66,0	64,0	38,0	36,0
MPE 007 M	73,0	66,6	66,0	62,0	54,7	49,7	46,0	67,0	65,0	39,0	37,0
MPE 008 M	73,0	66,6	66,0	62,0	54,7	49,7	46,0	67,0	65,0	39,0	37,0
MPE 008	72,6	66,3	65,7	61,6	54,4	49,4	45,6	67,0	65,0	39,0	37,0
MPE 010 M	74,4	68,0	67,4	63,4	56,1	51,1	47,4	69,0	67,0	41,0	39,0
MPE 010	74,4	68,0	67,4	63,4	56,1	51,1	47,4	69,0	67,0	41,0	39,0
MPE 013	74,6	68,3	67,7	63,6	56,4	51,4	47,6	69,0	67,0	41,0	39,0
MPE 015	75,3	69,0	68,4	64,3	57,1	52,1	48,3	69,0	67,0	41,0	39,0
MPE 018	76,8	70,5	69,9	65,8	58,6	53,6	49,8	71,0	69,0	43,0	41,0
MPE 020	76,6	70,3	69,7	65,6	58,4	53,4	49,6	71,0	69,0	43,0	41,0
MPE 024	77,5	71,1	70,5	66,5	59,2	54,2	50,5	72,0	70,0	44,0	42,0
MPE 027	77,8	71,4	70,8	66,8	59,6	54,6	50,8	72,0	70,0	44,0	42,0
MPE 028	78,4	72,1	71,5	67,4	60,2	55,2	51,5	73,0	71,0	45,0	43,0
MPE 032	78,4	72,1	71,5	67,4	60,2	55,2	51,5	73,0	71,0	45,0	43,0
MPE 035	78,8	72,4	71,8	67,8	60,5	55,6	51,8	73,0	71,0	45,0	43,0
MPE 040	80,4	74,0	73,4	69,4	62,1	57,2	53,4	75,0	73,0	47,0	45,0
MPE 030 T	78,3	72,0	71,4	67,3	60,1	55,1	51,3	72,0	70,0	44,0	42,0
MPE 034 T	78,3	72,0	71,4	67,3	60,1	55,1	51,3	72,0	70,0	44,0	42,0
MPE 040 T	78,0	71,7	71,1	67,0	59,8	54,8	51,0	72,0	70,0	44,0	42,0
MPE 045 T	78,0	71,7	71,1	67,0	59,8	54,8	51,0	72,0	70,0	44,0	42,0

8 OPERATING LIMITS

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

OPERATING LIMITS	CHILLER		HEAT PUMP	
	MIN	MAX	MIN	MAX
Inlet water temperature (°C)	8	20 ¹	25	42
Outlet water temperature (°C)	5	15	28	50 ²
Thermal differential of water (°C)	3	8	3	8
Outdoor air temperature (°C)	15 ³	45	-5	20

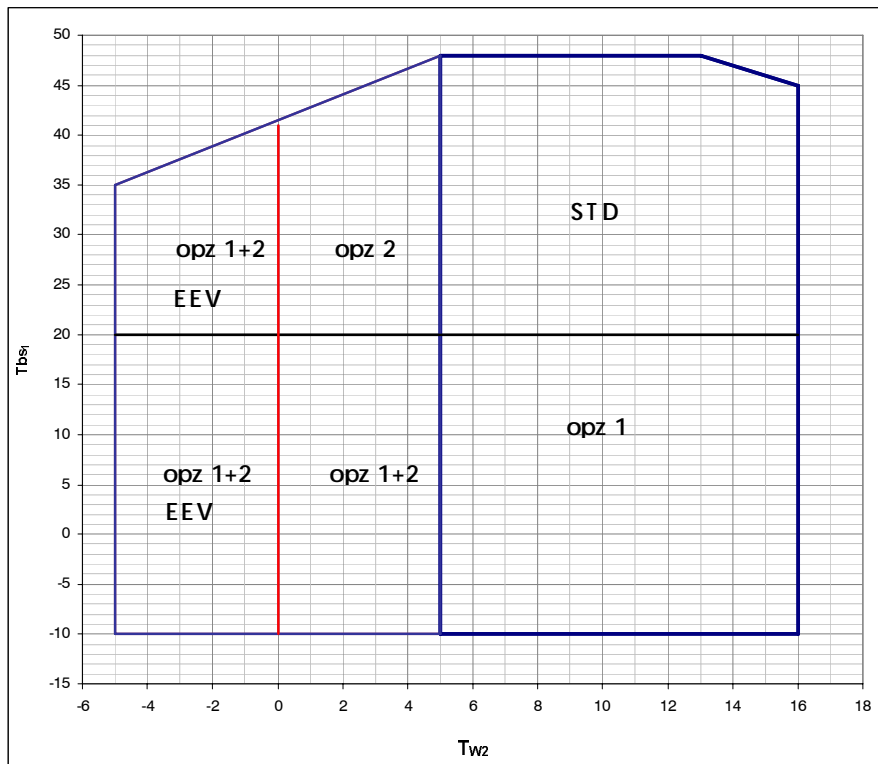
- 1 For transitory periods (e.g. equipment start up) values up to 25 °C are allowed
- 2 Value that may be reached only for outdoor air temperatures exceeding 0°C.
- 3 With condensation control: outdoor air T min - 15°C

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.

8.1 OPERATING LIMITS IN CHILLER MODE

- TBS1 Outdoor temperature (dry bulb)
- Tw2 Water outlet temperature
- OPZ 1 Condensation control
- OPZ 2 Glycol + low temperature option
- OPZ 1+2 Condensation control + glycol + low temperature option
- EEV Electronic valve
- STD Standard



8 OPERATING LIMITS

6.2 OPERATING LIMITS IN HEAT PUMP MODE

- RH Relative humidity of outdoor air
- Tbs1 Outdoor temperature (dry bulb)
- Tw2 Water outlet temperature



8.3 THERMAL CARRIER FLUID

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

9 CALCULATION FACTORS

9.1 CHANGE IN OPERATING PARAMETERS WITH ΔT 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.

ΔT_w	$C_{PF/PT}$	C_{PA}	C_{Qw}	$C_{\Delta p w1}$
3	0,975	1	1,63	2,64
4	0,99	1	1,24	1,53
5	1	1	1	1
6	1,015	1	0,85	0,72
7	1,03	1	0,74	0,54
8	1,04	1	0,65	0,42

LEGEND

- ΔT_w Difference between water inlet temperature and water outlet temperature
- $C_{PF/PT}$ Corrective coefficient of cooling/heating capacity
- C_{PA} Correction coefficient of electrical input
- C_{Qw} Correction coefficient of water flow rate
- $C_{\Delta p w1}$ Correction coefficient of pressure drop

9.2 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 temp. of water produced	5°C	2°C	-5°C	-10°C	-15°C
Mixture freezing temp. (°C)	0°C	-4°C	-14°C	-18°C	-24°C
Capacity correction factor	1,000	0,998	0,994	0,989	0,983
Water flow rate correction factor	1,000	1,047	1,094	1,140	1,199
Pressure drop correction factor	1,000	1,157	1,352	1,585	1,860



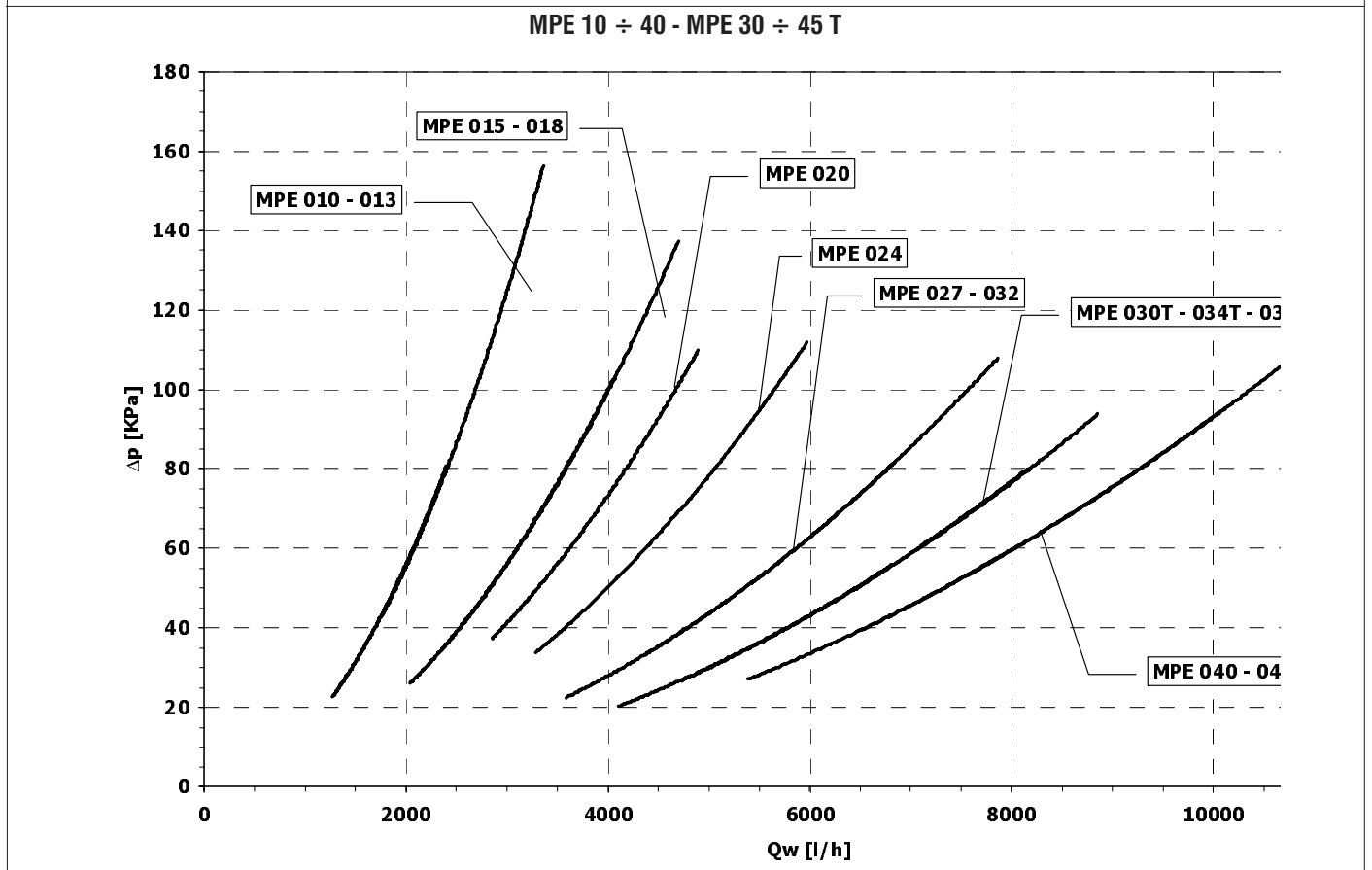
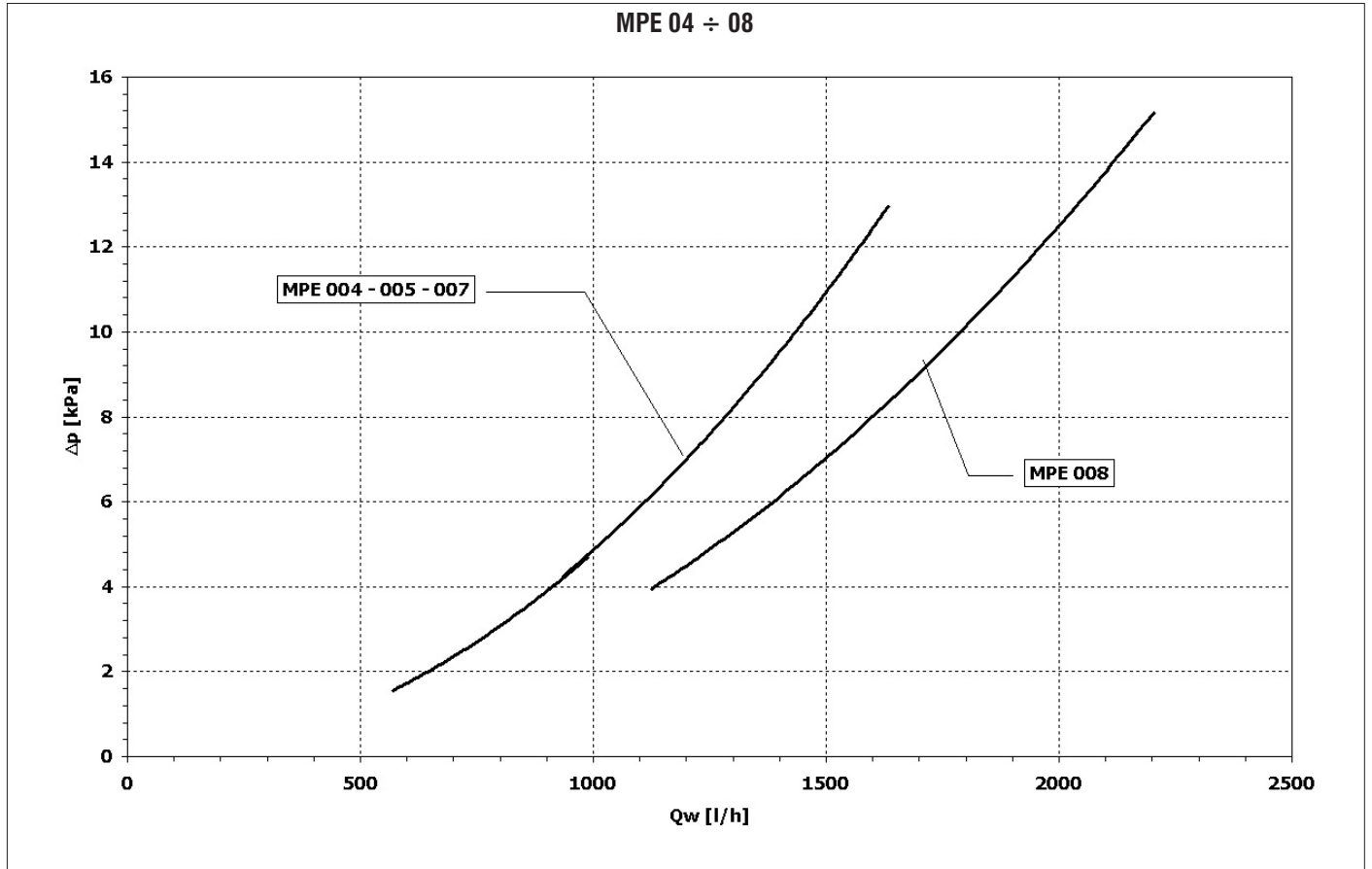
WARNING:

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

10 PRESSURE DROPS

The diagram shows the evaporator pressure drops (Δp) as a function of the water flow rate (Q_w), assuming an average water temperature of 10°C.

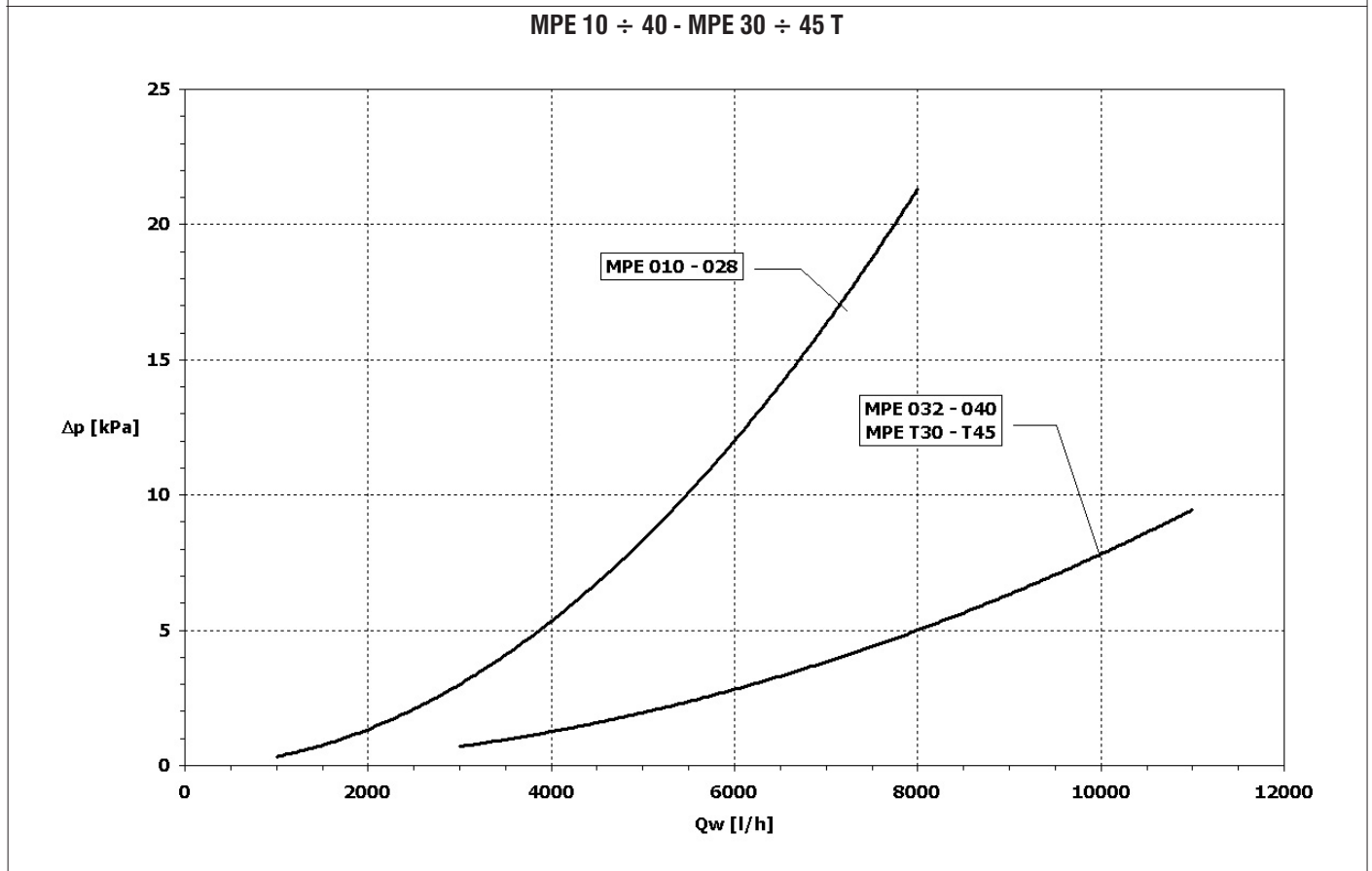
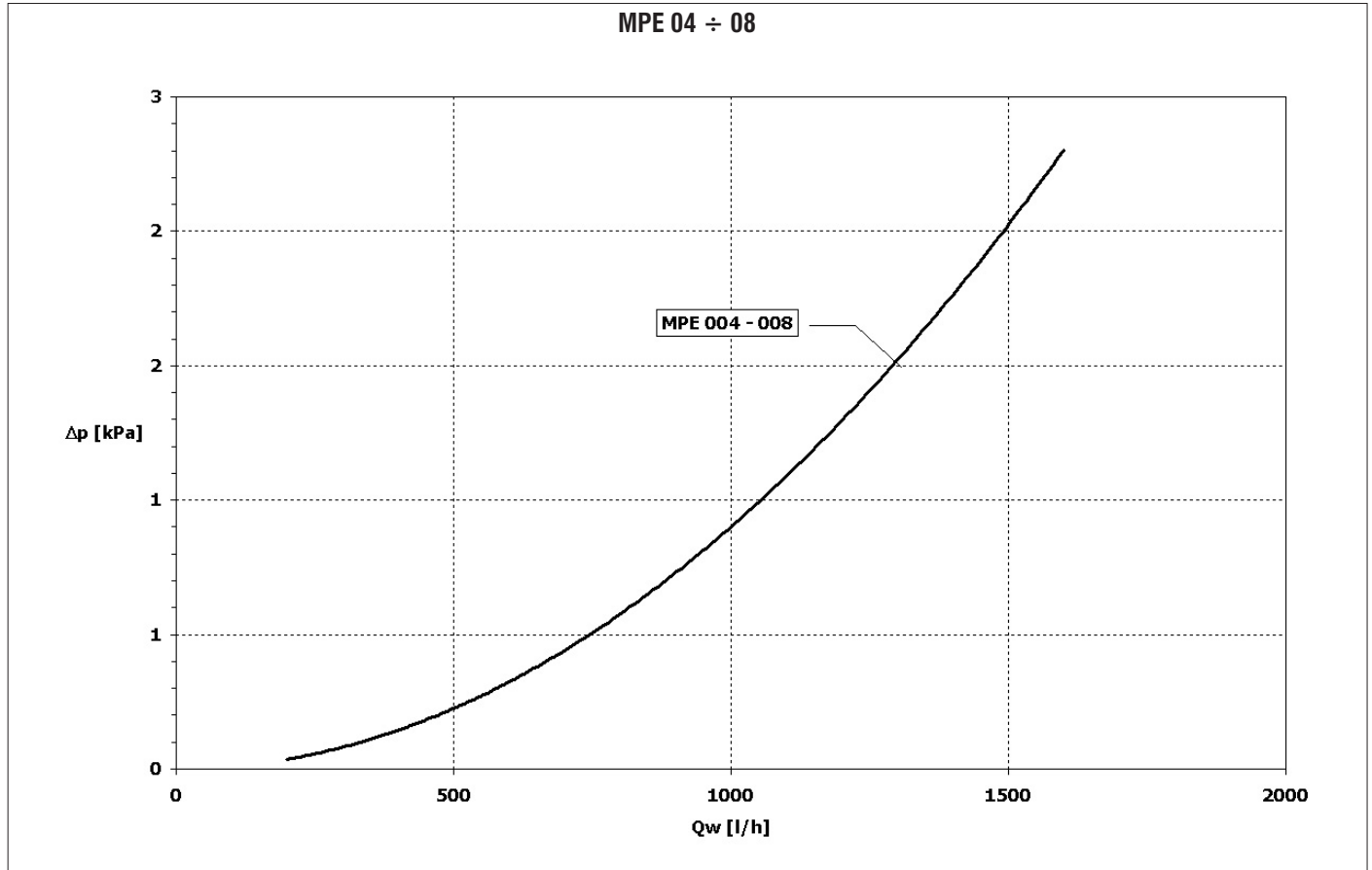
10.1 PRESSURE DROPS ON THE WATER SIDE



10 PRESSURE DROPS

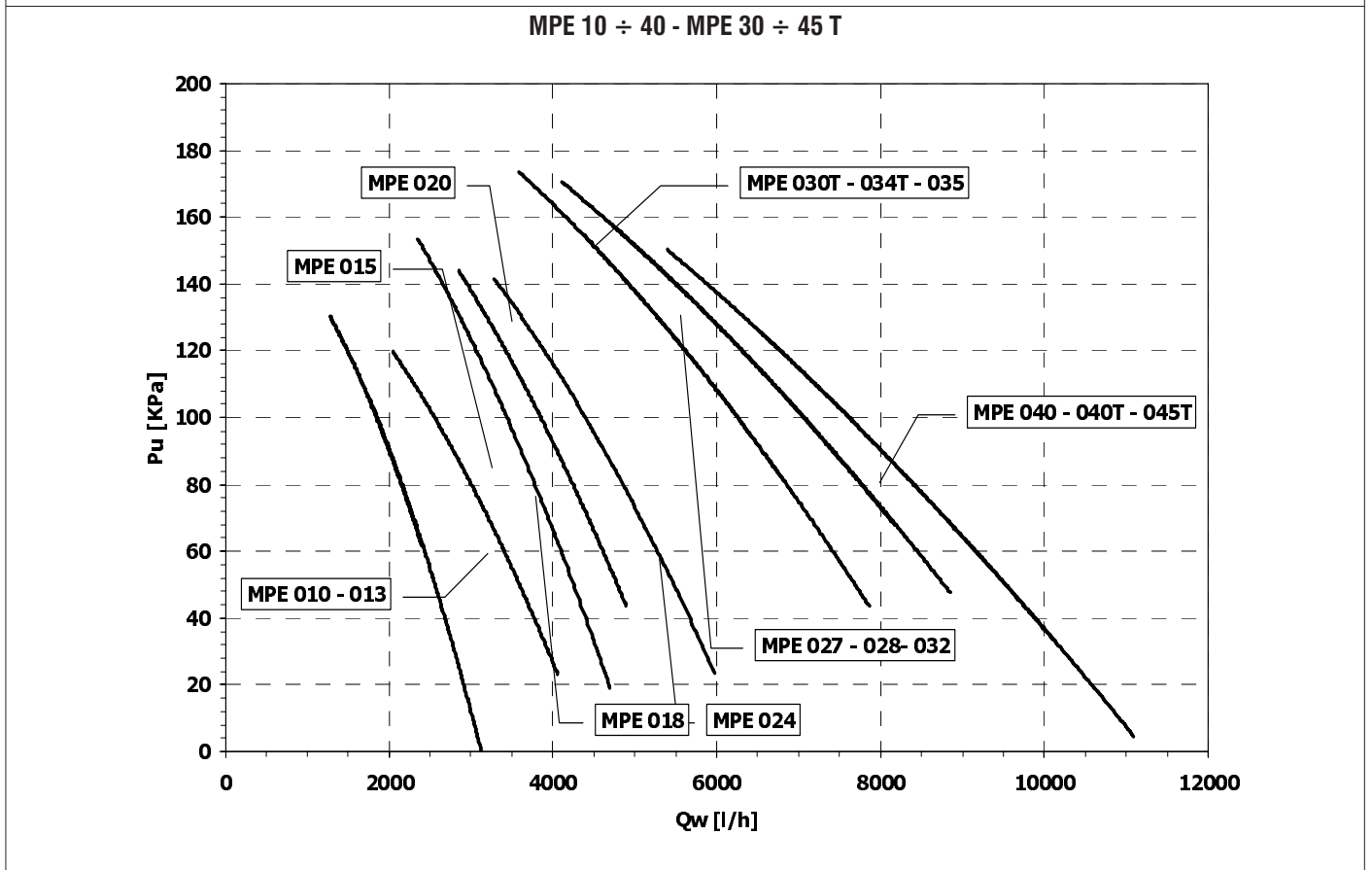
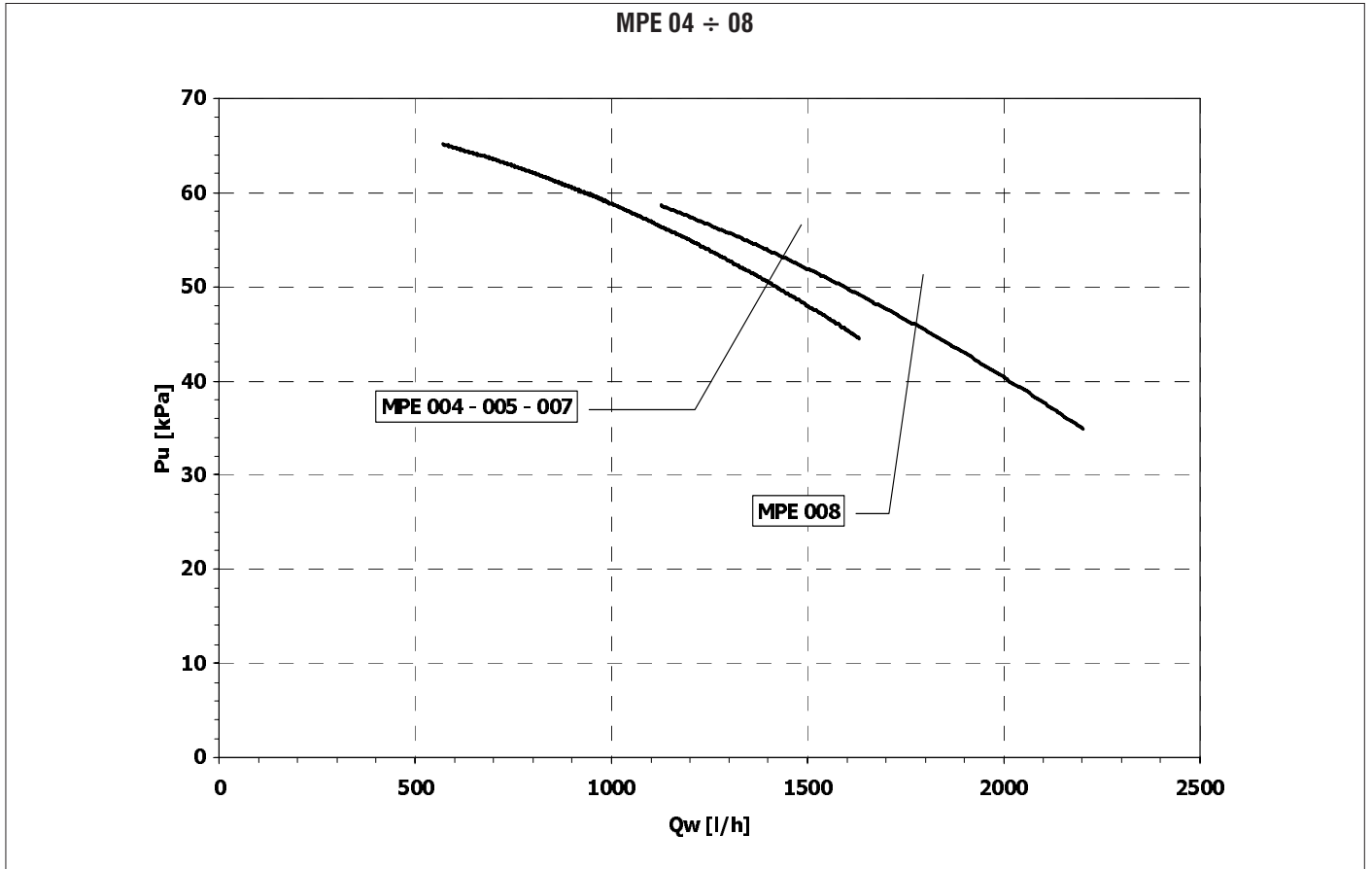
10.2 PRESSURE DROPS OF Y FILTER

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



11 AVAILABLE HEAD OF THE UNIT

The diagram below shows the available head (**Pu**) of the unit as a function of the water flow rate (**Qw**), assuming an average water temperature of 10°C, net of pressure drops.
 Pressure drops of the Y filter are not counted.



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.

It is recommended to install the following components on the pipes:

- Temperature and pressure indicators for routine maintenance and monitoring of the unit. Checking the pressure on the water side will enable you to verify whether the expansion tank is working efficiently and to promptly detect any water leaks within the equipment.
- 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 SYSTEM WATER CONTENT AND CHARGING OF EXPANSION TANK

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

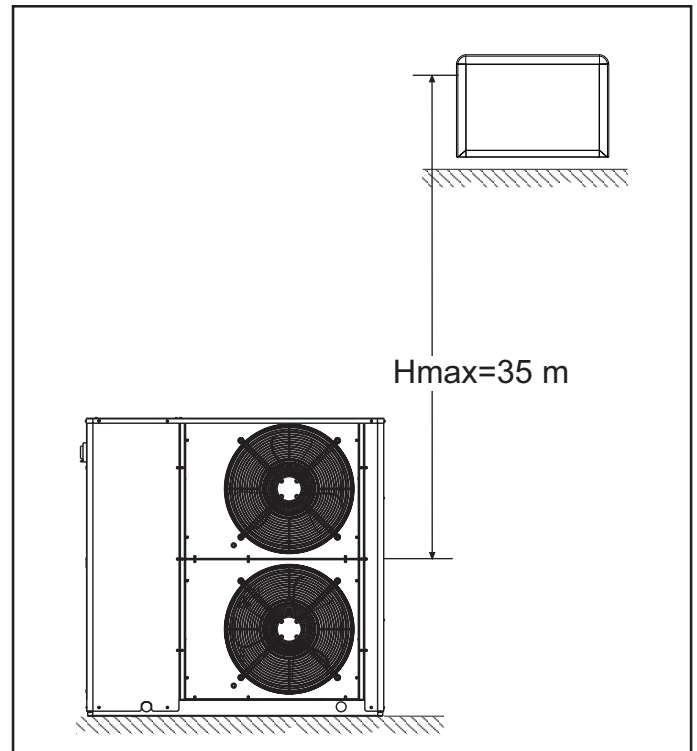
The expansion tank is pre-charged to a pressure of 1.5 bars, sufficient for systems with a maximum height difference (H in the figure at the side) of 13 metres.

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 $H_{max} = 35$ m.

Models	H (m)	p_i (bar)	C_{max} (l)
MPE 004-008	<5	0,7	38
	7	0,9	36
	10	1,2	32
	13	1,5	29
	15	1,7	27
MPE 010-027	<13	1,5	145
	15	1,7	133
	20	2,2	105
	25	2,7	77
	30	3,1	49
MPE 028-040 T30-T45	<13	1,5	231
	15	1,7	213
	20	2,2	168
	25	2,7	124
	30	3,1	79

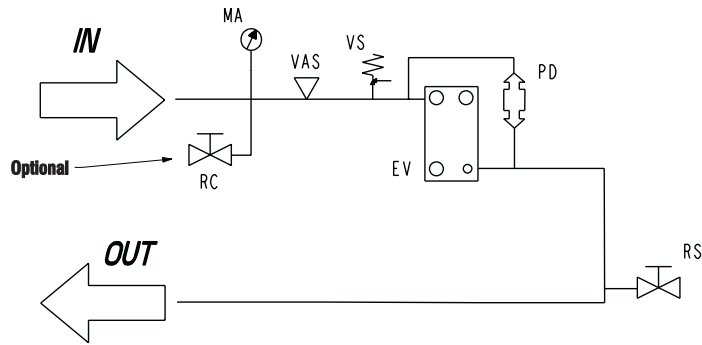
LEGEND	
H	Height difference of system
p_i	Charging pressure of expansion tank
C_{max}	Maximum system water content



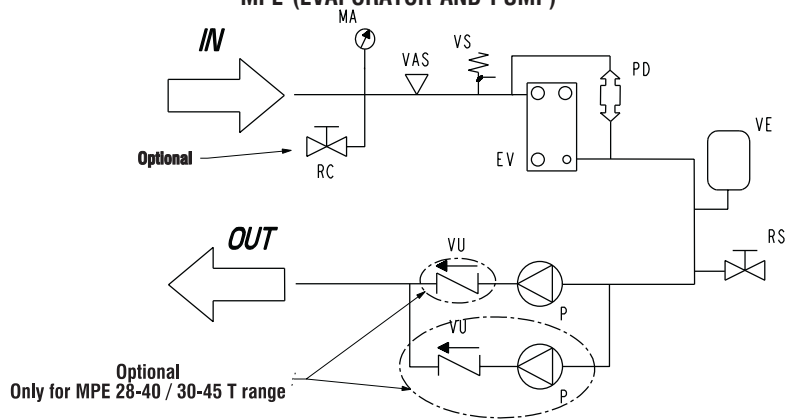
12 WATER CIRCUIT

PLUMBING DIAGRAMS

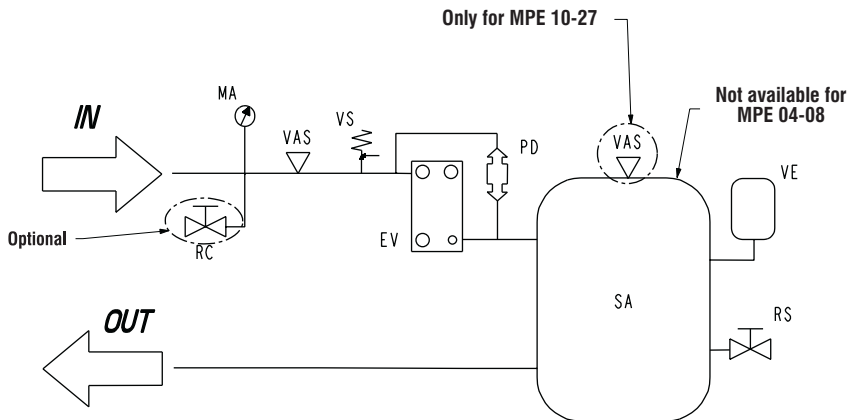
MPE (EVAPORATOR)



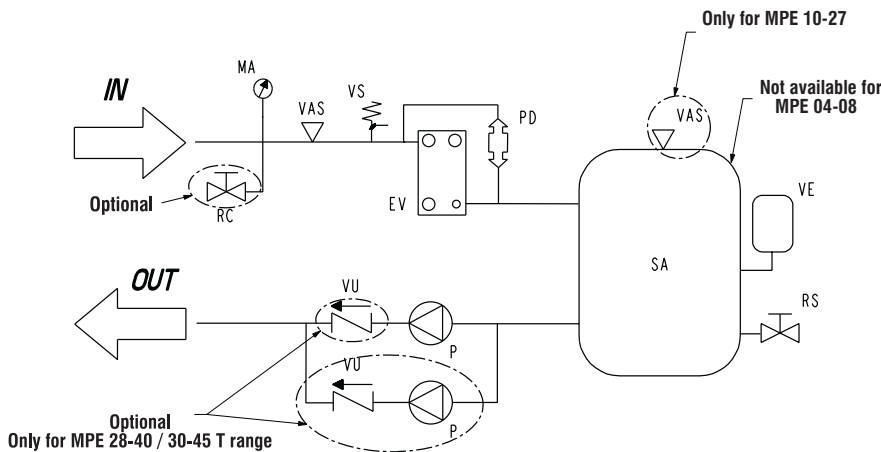
MPE (EVAPORATOR AND PUMP)



MPE (EVAPORATOR AND TANK)



MPE (EVAPORATOR, PUMP AND TANK)



LEGEND OF PLUMBING DIAGRAMS

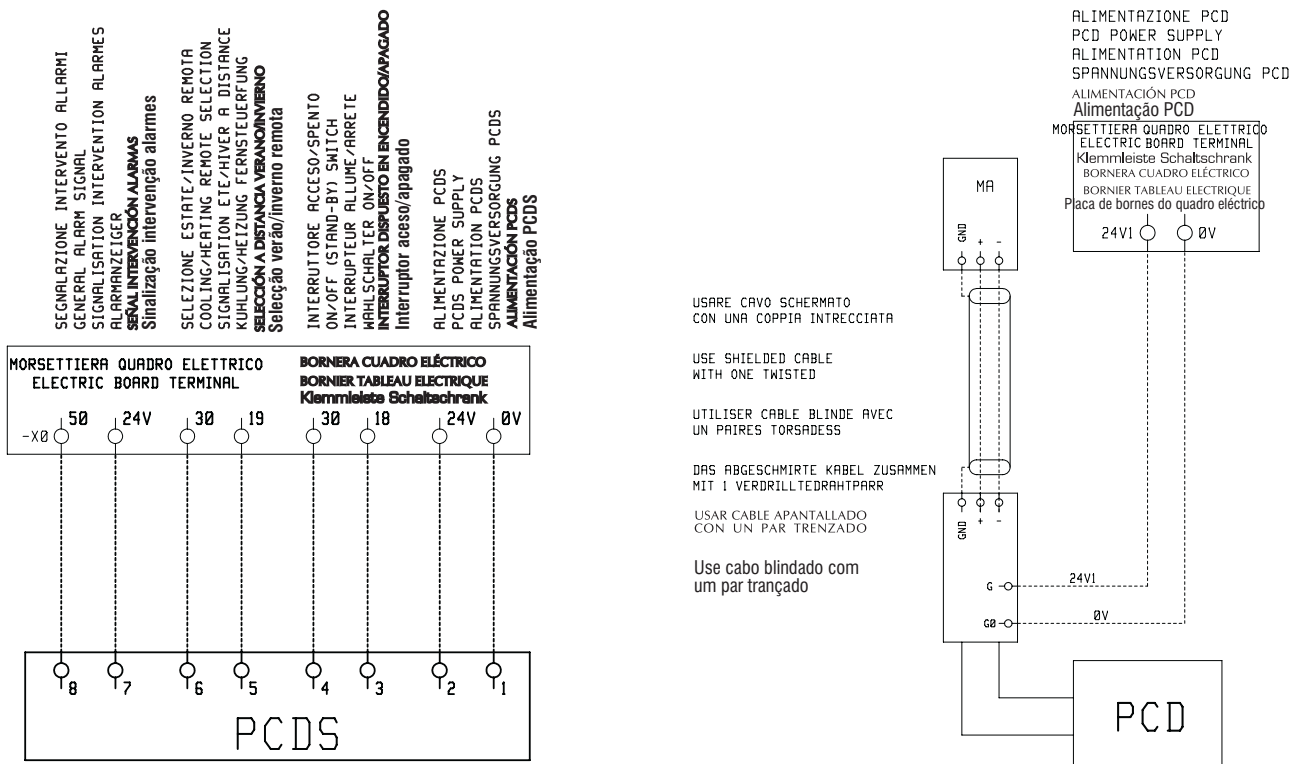
VS	Safety valve
EV	Evaporator
PD	Differential pressure switch
MA	Water pressure gauge
VAS	Air vent valve
VE	Expansion tank
P	Pump
RS	Drainage valve
RC	Water filling cock
VU	Check valve
SA	Buffer tank

13 ELECTRICAL DATA AND CONNECTIONS

MPE		004M	005M	007M	008 M	008	010 M	010	013	015	018	020
Maximum power input	kW	2,0	2,3	3,0	5,0	5,0	5,1	7,2	8,9	10,5	12,5	13,6
Maximum current absorption	A	9,8	11,6	15,3	24,2	9,2	26,3	14,4	17,4	20,0	24,3	26,2
Starting absorbed current	A	38	44	63	98	49	99	50	65	68	75	104
Fan motor rated power	kW	0,135	0,135	0,135	0,135	0,135	0,135	0,135	0,135	0,135	0,135	0,135
Fan motor rated current	A	0,64	0,64	0,64	0,64	0,64	0,64	0,64	0,64	0,64	0,64	0,64
Pump motor rated power	kW	0,14	0,14	0,14	0,14	0,14	0,37	0,37	0,37	0,37	0,37	0,37
Pump motor rated current	A	0,58	0,58	0,58	0,58	0,58	2,00	2,00	2,00	2,00	2,00	2,00
Power supply	V/f/Hz	230-1-50	230-1-50	230-1-50	230-1-50	400-3N-50	230-1-50	400-3N-50				
Auxiliary power supply	V/f/Hz	230-1-50										
Power cables	mm ²	4	4	6	6	4	6	4	4	4	6	6
PCD connecting cables	mm ²	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22
PCDS connecting cables	mm ²	1	1	1	1	1	1	1	1	1	1	1
Safety fuse F	A	16	16	20	25	10	32	16	20	20	25	25
Circuit breaker IL	A	20	20	25	25	16	32	20	25	25	25	25
MPE		024	027	028	032	035	040	T30	T34	T40	T45	
Maximum power input	kW	14,5	18,0	18,3	18,9	21,8	22,4	20,9	24,4	26,6	30,8	
Maximum current absorption	A	27,6	33,6	35,5	36,5	41,5	42,5	39,9	45,9	49,7	56,7	
Starting absorbed current	A	158	132	133	166	161	163	86	96	127	130	
Fan motor rated power	kW	0,135	0,135	0,320	0,320	0,320	0,320	0,320	0,320	0,320	0,320	
Fan motor rated current	A	0,64	0,64	1,75	1,75	1,75	1,75	1,75	1,75	1,75	1,75	
Pump motor rated power	kW	0,37	0,37	0,55	0,55	0,55	0,55	0,55	0,55	0,55	0,55	
Pump motor rated current	A	2,00	2,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	
Power supply	V/f/Hz	400-3N-50										
Auxiliary power supply	V/f/Hz	230-1-50										
Power cables	mm ²	10	10	10	10	10	10	10	10	16	16	
PCD connecting cables	mm ²	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	AWG22	
PCDS connecting cables	mm ²	1	1	1	1	1	1	1	1	1	1	
Safety fuse F	A	32	32	32	32	40	40	40	40	50	50	
Circuit breaker IL	A	32	40	40	40	50	50	50	50	63	63	

The maximum electrical input is the mains electricity 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/mm² approx.

DIAGRAM SHOWING ELECTRICAL CONNECTIONS BETWEEN MPE AND PCDS / PCD REMOTE CONTROL PANEL

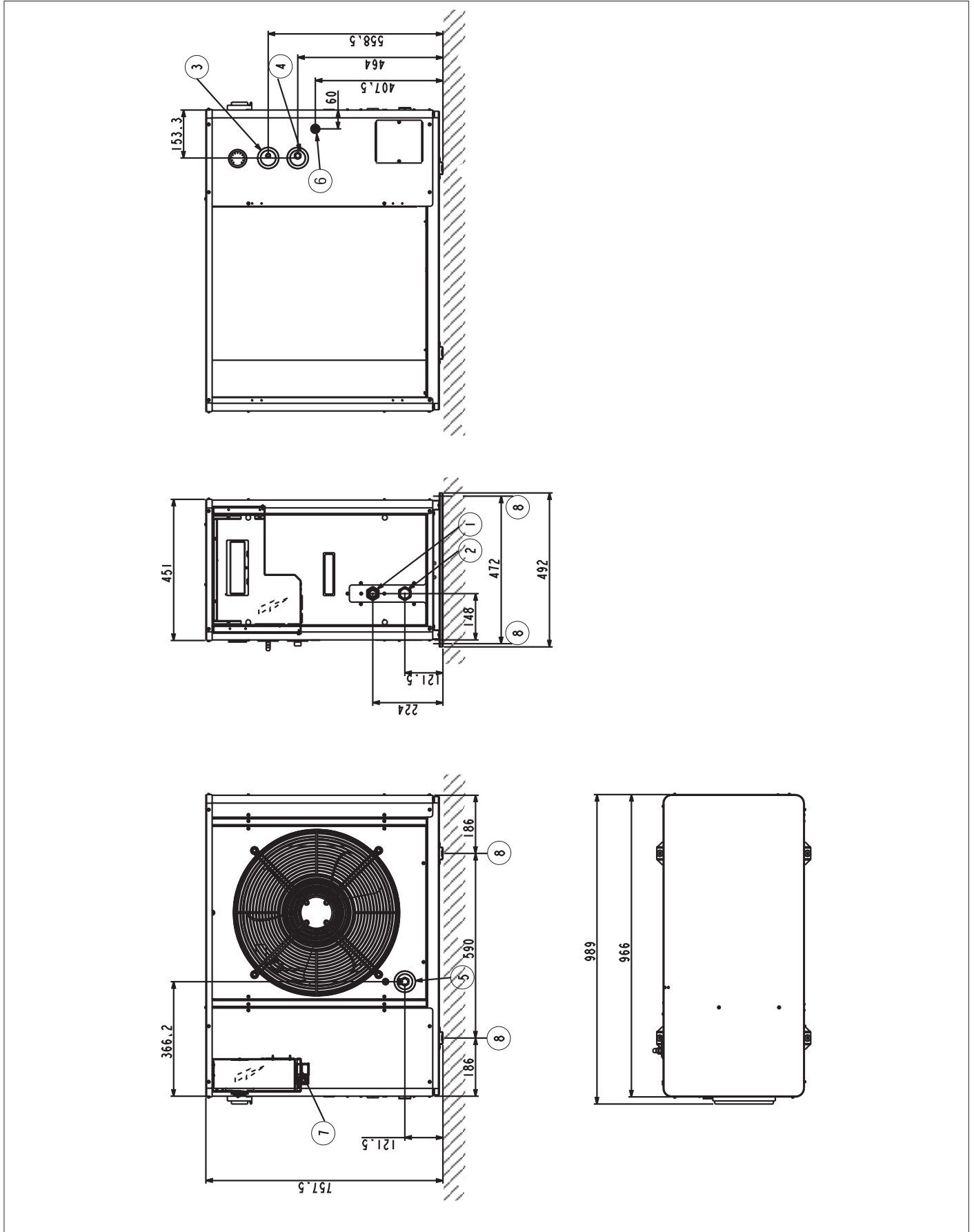


Note: Should the unit go into an alarm status, a voltage of 24V will be present on the terminals of the electric control panel; where an interface with a voltage-free contact is desired, a relay must be fitted by the installer.

14 OVERALL DIMENSIONS MPE 04 ÷ 08

Legend:

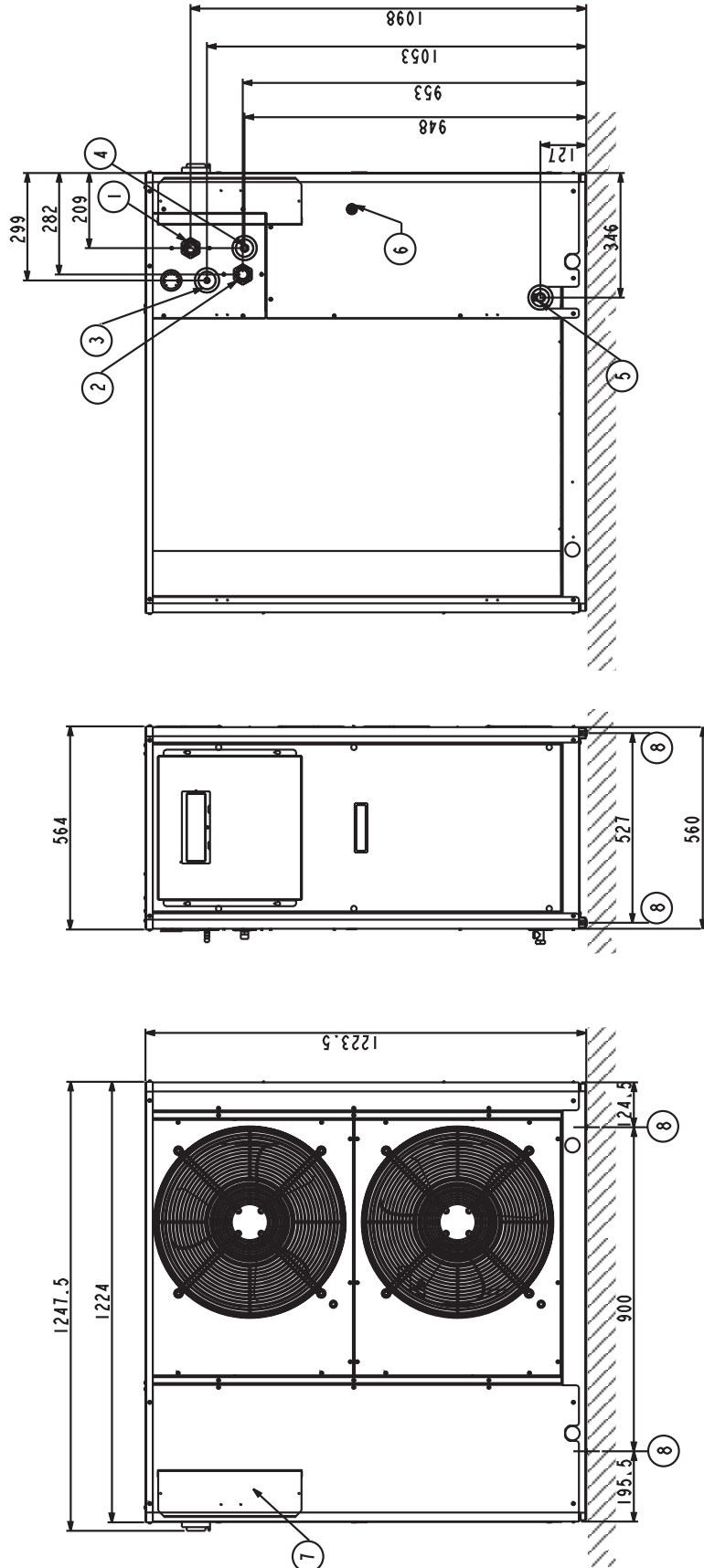
- | | | | |
|---|--|---|--|
| 1 | Water inlet 1" female | 5 | Water drainage 1/2" female |
| 2 | Water outlet 1" female | 6 | Power supply Ø 28 mm |
| 3 | Safety valve discharge outlet provided with rubber ring holder | 7 | Electric control board |
| 4 | Water supply 1/2" male (optional tap) | 8 | Fastening points for vibration dampers (accessory) |



14 OVERALL DIMENSIONS MPE 10 ÷ 15

Legend:

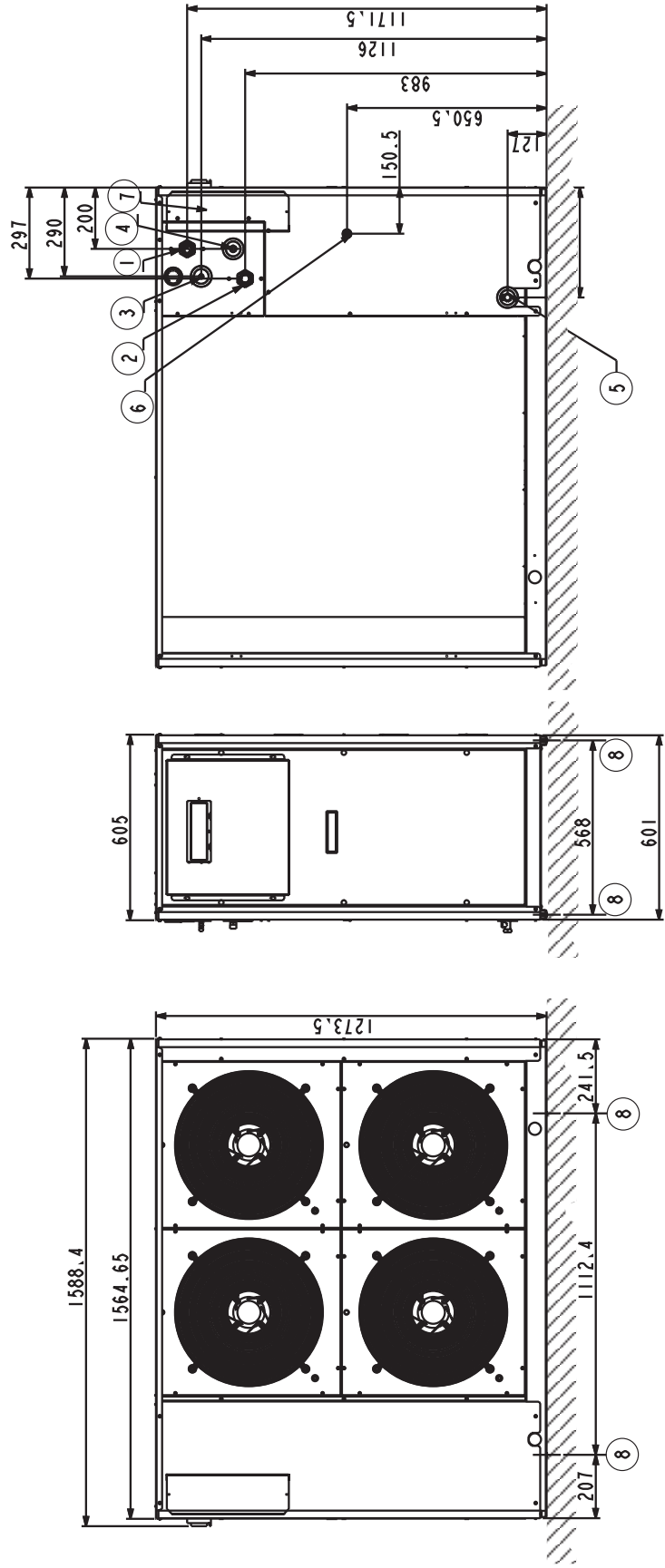
- | | | | |
|---|--|---|--|
| 1 | Water inlet 1" ¼ female | 5 | Water drainage ½" female |
| 2 | Water outlet 1" ¼ female | 6 | Power supply Ø 28 mm |
| 3 | Safety valve discharge outlet provided with rubber ring holder | 7 | Electric control board |
| 4 | Water supply ½" male (optional tap) | 8 | Fastening points for vibration dampers (accessory) |



14 OVERALL DIMENSIONS MPE 18 ÷ 27

Legend:

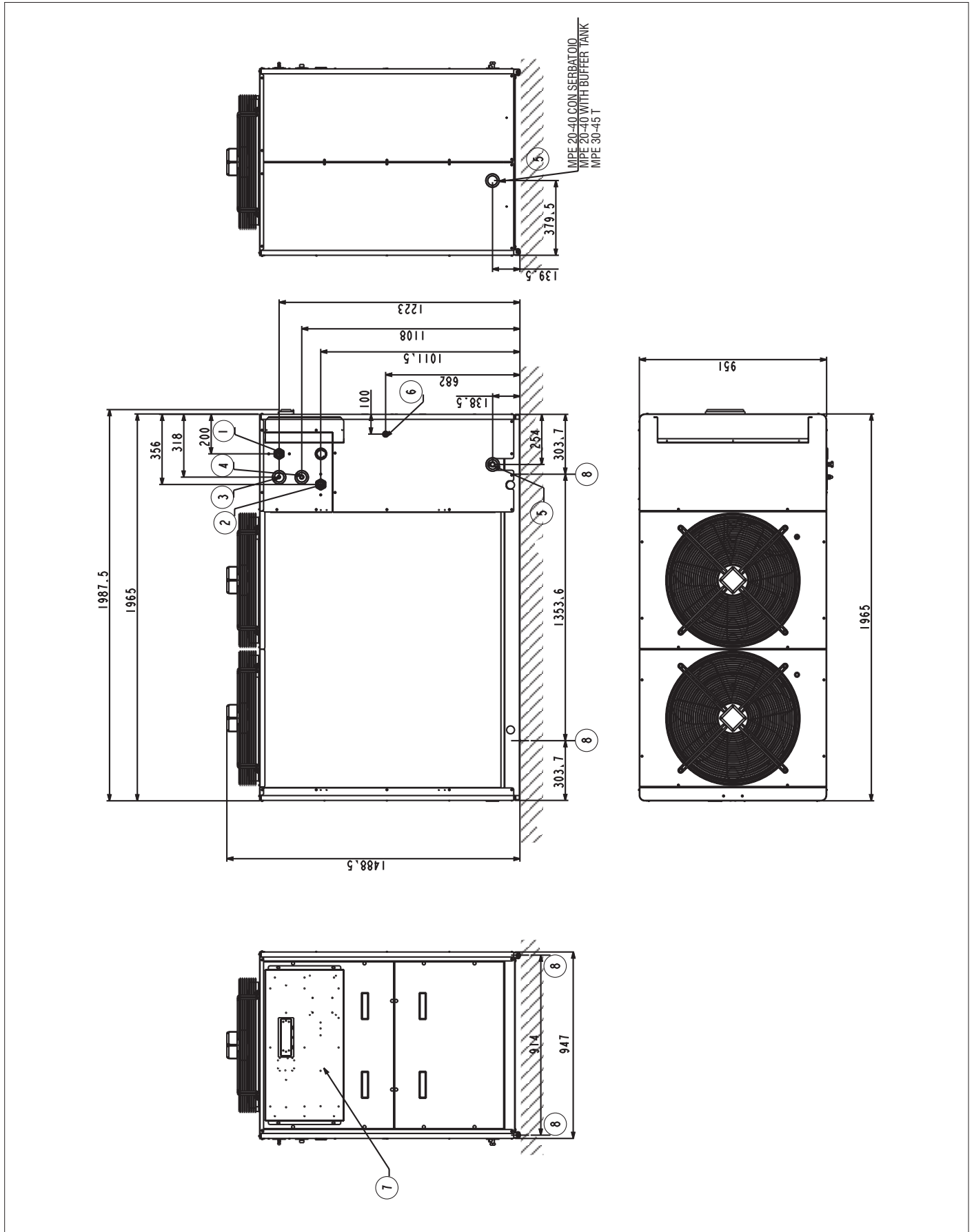
- | | | | |
|---|--|---|--|
| 1 | Water inlet 1" ¼ female | 5 | Water drainage ½" female |
| 2 | Water outlet 1" ¼ female | 6 | Power supply Ø 28 mm |
| 3 | Safety valve discharge outlet provided with rubber ring holder | 7 | Electric control board |
| 4 | Water supply ½" male (optional tap) | 8 | Fastening points for vibration dampers (accessory) |



14 OVERALL DIMENSIONS MPE 28 ÷ 40 - MPE 30 ÷ 45 T

Legend:

- | | | | |
|---|--|---|--|
| 1 | Water inlet 1" ¼ female | 5 | Water drainage ½" female |
| 2 | Water outlet 1" ¼ female | 6 | Power supply Ø 37 mm |
| 3 | Safety valve discharge outlet provided with rubber ring holder | 7 | Electric control board |
| 4 | Water supply ½" male (optional tap) | 8 | Fastening points for vibration dampers (accessory) |



15 INSTALLATION CLEARANCE REQUIREMENTS

To guarantee the proper functioning of the unit and access for maintenance purposes, it is necessary to comply with the minimum installation clearance requirements shown in figures 1, 2, 3 and 4.

There must be no obstacles blocking the path of the air flow from the fans. 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.

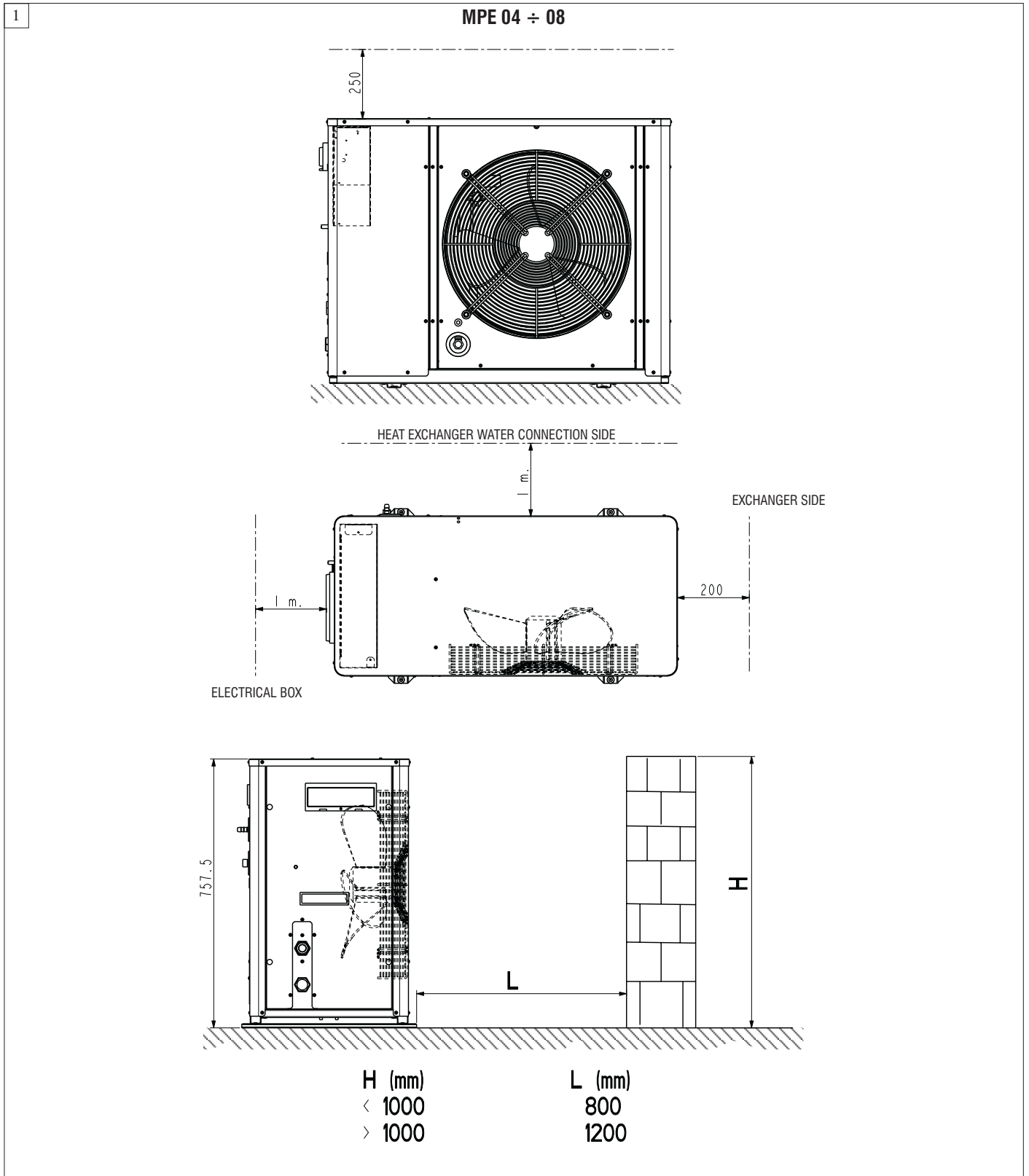
In the design of the MPE series, special care has been taken to minimise noise and vibrations transmitted to the ground.

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.

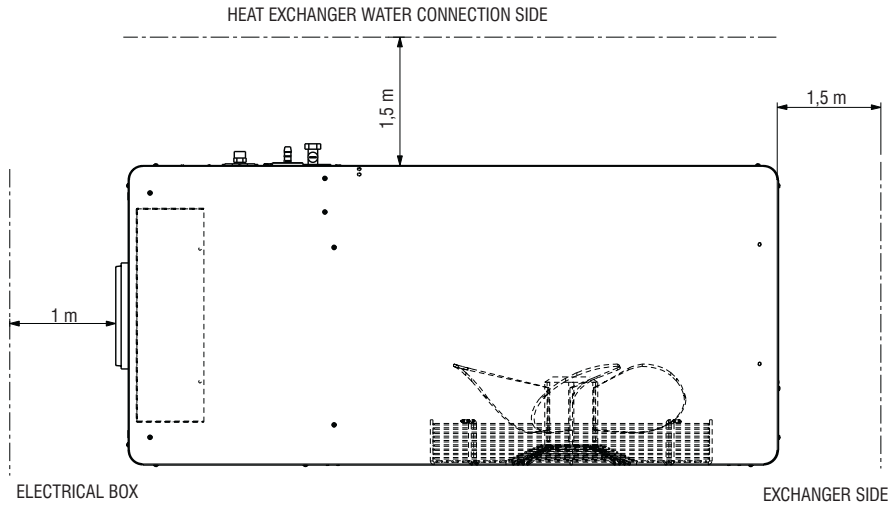
Warning: heat pump units produce condensation while operating in the heating mode.



15 INSTALLATION CLEARANCE REQUIREMENTS

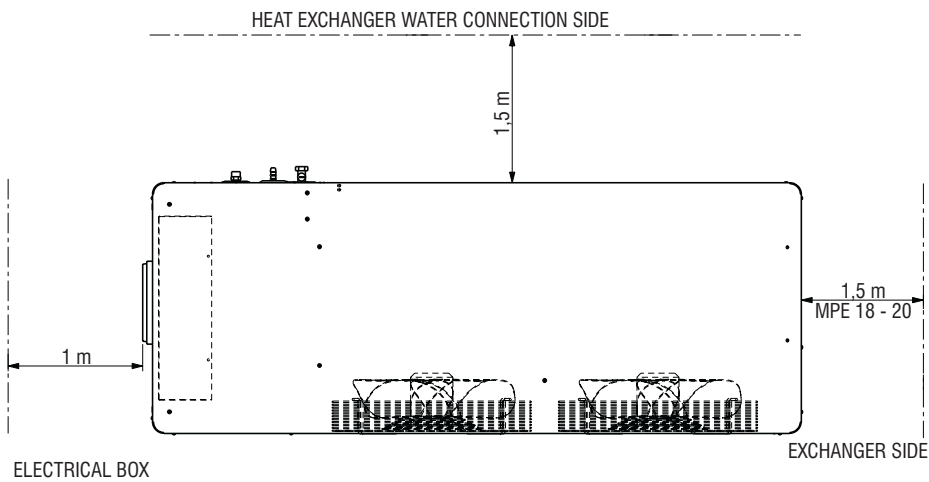
2

MPE 10 ÷ 15



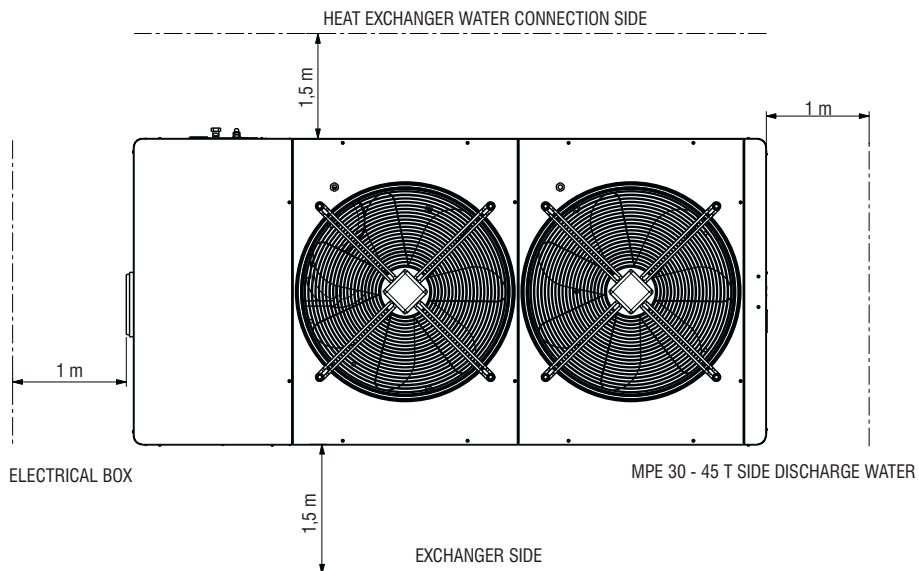
3

MPE 18 ÷ 27



4

MPE 28 ÷ 40 / 30 ÷ 45 T



16 SITING

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

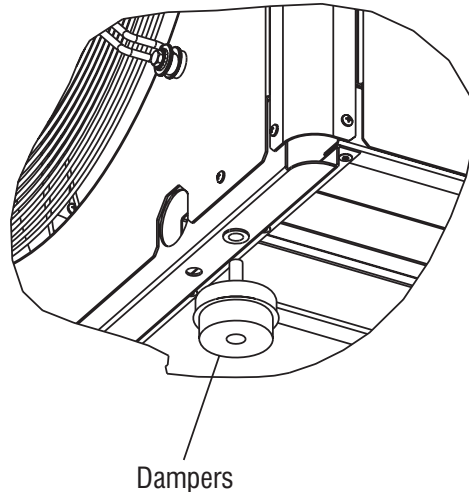
- size and origin of water pipes;
- location of the power supply;
- solidity of the supporting surface;
- avoid obstacles to the outflow of air from the fan which could cause back suction (see section on "installation clearance requirements");
- direction of prevalent winds: (position the unit so that prevalent winds do not alter the fan air flow).

A prevalent wind blowing from a direction opposite to the fan air flow will reduce the maximum air temperature to a lower value than specified in the operating limits, a wind blowing in the same direction as the fan air flow will increase the minimum air temperature to a higher value than specified in the operating limits.

Also in the heat pump mode, wind may have the effect of reducing the unit's operating range.

- 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 "installation clearance requirements").

16.1 POSITIONING OF VIBRATION DAMPERS (ACCESSORY)



MPE	CODE	NO. OF VIBRATION DAMPERS
04 - 08	1701552	4
10 - 15	RYPAMCA10	4
18 - 27	RYPAMCA10	4
28 - 40 / 30 - 45 T	RYPAMCA50	6



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