

Air to water heat pumps

MHP 120.2÷215.2

Cooling capacity from 425 to 719 kW

Heating capacity from 465 to 810 kW

50 Hz - refrigerants: HCFC 22, HFC 407C



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MHP - Air to water heat pumps

McQuay air to water heat pump, equipped with semi-hermetic reciprocating compressors are specifically designed to meet the requirements of consultants and end-users who need more and more efficient machines embracing wider fields of application. "W" shaped condenser coils and careful arrangement of inside parts aimed at obtaining a refrigeration machine extremely compact and space-saver. MHP heat pumps are fully factory assembled, charged with refrigerant, electrically wired, ready for installation and start-up.

Highly flexible design

MHP heat pumps are available in 8 sizes, covering a range from 400 to 720 nominal cooling capacity. The wide number of accessories, added to sophisticated safety and operating control devices, supplied as standard equipment, make this product highly flexible for installation in commercial, house-living or manufacturing facilities.

Low installation costs

The complete assembly of the unit at the factory reduces the cost on installation on site. A rigid steel base frame distributes the weight of the unit to the support points and allows fast handling with lifting ropes. The units are designed with a single point three phase main connection for 400 volts +/- 10%. A 110 volt transformer fitted as standard on the control panel feeds operational devices. Units are supplied complete with a charge of refrigerant and oil.

Code requirements

Electrical equipment, pressure vessels, and safety valves are tested, where necessary, in accordance with the regulations in force in the country of destination, The order must specify the type of test required. For those countries where requested, MHP heat pump units are manufactured in accordance with the President's Decree on "Regulations on Machinery" n. 459/96 and are CE marked, McQuay plants have obtained ISO certification 9001:2000.

Factory testing

Each unit is pressure tested, vacuum tested and charged with the refrigerant required. It is then tested at the factory test bench under the design conditions specified by the customer. Upon request, a second series of tests can be carried on witnesses by the customer. Before shipment, all the units have a final check for pressure leak and refrigerant charge control.

General characteristics

Cabinet and structure

The cabinet is made of galvanized steel sheet and oven-baked painted to provide high resistance to corrosion, even in the presence of humid and particularly aggressive atmosphere. Holes are provided in the base frame of the unit to lift the unit with ropes for an easy transportation on the installation site. The weight uniformly distributed along the base frame facilitates the arrangement of the unit's basement and support structures. Electrical and control equipment is located inside cubicles closed with standard IP54 protection, with key-locked doors and interlock electrically operated.

Compressors

Compressors installed on MHP units are of the semihermetic reciprocating type, consisting of multiple cylinders with suction and discharge valves. The forced lubrication of the crankshaft bearings and of the big end bearings is achieved by using a gear pump which is of reversible type. Each semihermetic compressor crankshaft is statically and dynamically balanced, Each compressor is fitted with oil differential pressure switch, charged with the necessary quantity of lubricant oil and equipped as standard with sump heater, electric motor protection module and discharge shutoff valve.

Evaporator/Condenser

Water heat exchanger is of direct expansion shell and tube type with carbon steel shell and highly efficient seamless copper tubes. Tubes are fixed, mechanically expanded, to a carbon steel header plate. Air cooled condensers are made of copper tubes and special highly efficient rippled aluminum fins arranged in a staggered row pattern (optionally the fins may be in copper, tinned copper or painted with special anticorrosion alucoat paint).

Fans

The fans are of helical type with wing-profile blades to achieve a better performance. The direct coupling with the electrical motor eliminates any problem as regards the application of transmission devices and reduce the vibrations caused by the functioning. The motors are supplied as standard with IP54 protection (Insulation class F) and are of the three phase type; they are protected against overloading and short circuits by circuit breakers located inside the electrical control panel. The fans are located in highly efficient nozzles.

Electrical control panel

The electrical components for both the power and the control are split into two sections on the main panel thus preventing from penetration of dust or water (IP54); control panel has also key-locked doors to avoid unauthorized entry. The electrical control panel complies with IEC204-1 safety norms.

The power section includes:

Contactors, fuses for compressors, thermal relays, fan circuit breakers, overall disconnecting switch with manual controlled door blocking system, auxiliary and control circuit transformer (110 volts).

The control section includes:

Auxiliary transformer for control devices, microprocessor regulator of chilled and heated water temperature (working as heat pump), which carryout the following functions:

Water temperature control.

Regulation of temperature set points.

Compressor delay and start-up sequence device.

Compressors functioning.

Fans on-off control.

Antifreeze heater functioning.

General alarm.

By means of automatic safety and protection devices, the microprocessor controls the main components of the equipment, such as: thermal protection of the electric motor windings, refrigerant gas and oil pressure monitoring, compressor lead-lag sequences and unloading steps. In addition, a calendar clock (optional) allows starting or stopping the unit, according to the system scheduled needs.

Refrigerant circuit.

MHP heat pumps are supplied with a complete charge of refrigerant. The circuit consists of insulated copper pipes on the suction line and includes shut-off valves, filter-driers, moisture indicators, liquid sight glasses, thermostatic expansion valves, four way refrigerant cycle reverse valves, liquid receiver and suction accumulator.

CN version

In addition to standard MHP...ST version, MHP...CN silenced type heat pump units are supplied with sound-proof cabinet for compressors. Cabinets are made of aluminum profiles and easy to remove panels, internally coated with high density acoustic insulation material. Compressors are installed on rubber anti-vibration supports to reduce the transmission of vibrations to the frame.

LN Version

The MHP...LN low-noise heat pump units are supplied with sound-proof compressor cabinets. The cabinets are made of aluminum profiles and easy to remove panels, coated with high density acoustic insulation material. Compressors are installed on rubber anti vibration supports to reduce the transmission of vibrations to the frame. The fans running at lower RPM (only in cooling mode) are controlled by an electronic regulator which provides continuous speed variation. This regulator maintains the functioning of the fans at reduced speed up to an external air temperature of about 38 °C. In order to ensure occasional functioning with higher external air temperature (up to 42°C), the regulator increases the fans

RPM bringing them in line with standard unit figures, supplying cooling load even when air temperature exceeds the limits envisaged for LN version.

Accessories and options

- 02. D partial heat recovery** – Heat recovery is achieved with brazed steel plate exchangers insulated with neoprene.
- 07. Brine version** – This option allows the production of chilled water at low temperatures (only in cooling mode).
- 11. Compressor thermal overload relays.** – Safety devices against compressor motor overloading in addition to the normal thermal protections provided by the electrical windings.
- 15. Phase monitor** – The phase monitor controls the voltage values on the supply line stopping the unit when the calibration threshold is reached (+/-10%). This safety device is automatically reset.
- 16. Ammeter / Voltmeter** – Digital meters of unit drawn amperes and voltage values, installed on the electrical control panel.
- 17. Power factor correction capacitors** – Installed on electrical control panel to ensure the ampere drawn is in line with local regulations.
- 28. 100 Pa ESP fans** – To be used for applications with sound attenuators or when grids or filters are applied to air condenser. Applicable on ST or CN versions only.
- 29. 200 Pa ESP fans** – To be used for applications with sound attenuators or when grids or filters are applied to air condenser. Applicable on ST or CN versions only.
- 30. Speedtrol** – Condensing head pressure control device which changes the fan speed on the last operating fan connected directly with compressor. Allows unit to operate in cooling mode even when ambient air temperature drops from lower than +10°C down to min. -18°C.
- 31. Fan speed regulator** – Condensing head pressure control device which changes continuously all the fans speed. It allows unit to operate in cooling mode when ambient air temperature drops from lower than +10°C. down to min -18C°.
- 32. Condenser coil guards** – Metal protection fixed on external surface of condenser coils.
- 33. Compressor guards** – To prevent unauthorized access to the unit components.
- 34. Cu-Cu condensing coils** – Heat exchanger coils with staggered copper fins to allow better protection against corrosion by aggressive environment.
- 35. Cu-Cu Sn condensing coils** – Heat exchanger coils with staggered copper fins, tinned after manufacture, to allow better protection against corrosion by aggressive environment.
- 36. Alucoat condensing coils** – Heat exchanger coils with staggered aluminum fins protected by a special high resistance to corrosion epoxy paint when working in presence of aggressive environment.
- 40. 20 mm insulation on evaporator** – When operating in particularly moist atmosphere, it is recommended to increase evaporator insulation efficiency to avoid condensation on surface.
- 42. Flow switch** – Supplied separately, to be fixed on water piping and wired on the control panel (customer's care).
- 43. Single pump group** – Assembled and wired pumping group consists of one circulating water pump with shut-off valves, safety valves, and expansion tank with filling valve. Pump motor is protected by circuit breakers and is activated by a two positions selector placed on the control panel.
- 44. Two pumps group** – Assembled and wired pumping group consists of two circulating water pumps with shut-off valves, safety valves, and expansion tank with filling valve. Pumps motors are protected by circuit breakers and are activated by a two positions selector placed on the control panel.
- 60. Suction shut-off valves** – Suction shut-off valves allow to carry-out maintenance or repair operations to compressors avoiding moisture infiltration in cooling circuit, especially when new synthetic oils are used with HFC refrigerant, as they are highly hygroscopic.
- 78. General failure relay.** – Allows to send warning signals in case of unit faulty functioning.
- 80. Spreader bars** – Upon request, spreader bars are supplied to allow easier lifting of MHP unit, keeping the ropes away from unit casing.
- 84. Rubber type anti vibration mounts** – Rubber type anti vibration mounts are supplied separately. They must be placed under the basement of the unit during installation. They are appropriate to eliminate vibration in case of installation on ground or inertial concrete basement.
- 84. Spring type anti vibration mounts** – Spring type anti vibration mounts are supplied separately. They must be placed under the basement of the unit during installation. They are appropriate to eliminate vibration in case of installation on floors or metallic frames.

Selection procedures

The procedure for selecting cooling capacity, heating capacity and compressors power absorption of MHP units is reported below:

1. "Standard ratings in cooling mode" and Standard rating in heating mode" tables show the functioning data of the single unit, with different figures on external air temperature and leaving water temperature through the water heater exchanger.
2. Although the data can be interpolated, extrapolation is not permitted. For conditions other than those shown in the tables, contact McQuay Product Group.
3. The performance of the MHP units refers to 5°C of water temperature drop. The increase or reduction of the flow rate produce respectively a reduction or an increase in the performance which is negligible. To ensure the correct functioning of the exchanger, it is advisable to maintain water temperature drop between 3 and 8°, and, in any case, check that water pressure drop ratings in the exchanger do not fall outside the limits indicated in the diagram of "Pressure drop water side".
4. The performance figures are based on fouling factor of 0,044 m²C/kW. In the event of different values, refer to correction coefficients shown in table 2 "Fouling Factors".
5. The performance is influenced by air density. Table 3 "Altitude correction factors" shows performance correction factors for relevant altitudes.
6. The power absorbed values given in the standard performance tables refer to compressors only.
7. To obtain the flow resistance through the exchanger, use the diagram "Pressure drop water side".
8. The use of ethylene glycol to protect the evaporator and the hydraulic circuit from freezing when the external temperature is below 0°C when the unit is switched off, affect units performance. Cooling capacity, coolant flow and pressure drop variations are in accordance with the correction coefficients given in "Ethylene glycol and low ambient temperature correction factors" table 5. Ethylene glycol must be used also when the heat pump unit has to cool the liquid at temperatures below +4°C as described in section "Selection example of an MHP group for low temperatures".

Example of selection of an MHP unit

Data:

Cooling capacity required: 470 kW

Summer maximum ambient air temperature: +35°C

Temperature of chilled water: from 12 to 7°C

Winter minimum ambient air temperature: +5°C

Temperature of hot water from 40 to 45°C

Refrigerant R-407C

Fouling factor: 0,132 m²C/kW

Altitude above sea level: 600 m.

1. The correction coefficient for fouling 0,132 m²C/kW is: 0,975.
2. The correction coefficient for installation at 600 m. above sea level is: 0,986.
3. Corrected cooling capacity is : 470 kW / 0,975 / 0,986 = 489 kW
4. The cooling unit to satisfy this capacity is MHP.145.2.ST.407. This unit will have the following operating data.
Cooling capacity (summer): 496,2 x 0,975 x 0,986 = 477 kW
Power absorbed by compressors (summer): 158,3 kW x 0,986 x 1,009 = 157,1 kW
Chilled water flow rate: 477 kW / 4,186 / (12 - 7) = 22,8 l/s
Heating capacity (winter): 493,4 kW x 0,975 x 0,986 = 474,3 kW
Power absorbed by compressors (winter): 140,8 kW x 0,986 x 1,009 = 140,1 kW
Hot water flow rate: assuming that water flow rating in the system is always the same, both in summer and in winter, it will be necessary to evaluate water temperature drop as follows: 474,3 kW / 4,186 / 22,8 l/s = 4,97°C; therefore, heated water temperature will be from 40,03°C to 45°C.
Pressure drop is indicated in the relevant diagram, in the contact point between water flow coordinate (abscissa) of 22,8 l/s and the straight line corresponding to the MHP 145.2: the value must be read on the ordinate and it is equal to 24 Pa.

Selection example of an MHP unit for low temperatures.

This example concerns an MHP unit which has to cool a brine solution of water and ethylene glycol at a temperature below +4°C. In this case, besides the application of coefficients concerning the ethylene glycol percentage reported on table 4, it is necessary to use the correction coefficients reported in the table 5 "Correction coefficients for low temperatures solutions" to determine cooling capacity, power absorbed by compressors, flow rate and pressure drop.

Data:

Cooling capacity required: 300 kW

Maximum ambient air temperature (summer): +35°C

Temperature of cooled solution: from 0 to -4°C

Minimum ambient air temperature (winter): +5°C

Temperature of hot water: from 40 to 45°C

Refrigerant R-407C

Fouling factor: 0,132 m²°C/kW

Altitude above sea level: 600 m.

Quantity of glycol in the circuit: 30% in weight.

1. The correction coefficient for fouling is 0,132 m²°C/kW è : 0,975.
2. The correction coefficient for installation at 600 m. above sea level is: 0,986.
3. The correction coefficient for glycol presence is: 0,961.
4. The correction coefficient for the solution at - 4°C is: 0,670.
5. The correction coefficient for solution flow is: 1,074
6. The correction coefficient for solution pressure drop is: 1,181
7. Cooling capacity must be corrected as follows: 300 kW / 0,975 / 0,986 / 0,961 / 0,670 = 485 kW
8. Unit suitable to satisfy this performance is the MHP.145.2.ST.407. This unit will have the following ratings.
Cooling capacity (summer): 496,2 x 0,975 x 0,986 x 0,961 x 0,670 = 307 kW
Power absorbed by compressors (summer): 158,3 kW x 0,986 x 1,009 x 0,986 x 0,890 = 138,2 kW
Chilled solution flow rate: 307 kW / 4,186 / (0 - (-4)) x 1,074 = 19,7 l/s
Heating capacity (winter): 493,4 kW x 0,975 x 0,986 x 0,972 = 461 kW
Power absorbed by compressors (winter) 140,8 kW x 0,986 x 1,009 x 0,986 = 138,1 kW
Hot water flow rate: Assuming that water flow rating in the system is always the same, both in summer and in winter, it will be necessary to evaluate water temperature drop as follows: 461 kW / 4,186 / 19,5 l/s / 1,074 = 5,7°C;
Therefore, heated water temperature will be from 39,3°C to 45°C.
Pressure drop is indicated in the relevant diagram at page 15, in the contact point between water flow coordinate (abscissa) of 19,5 l/s and the straight line corresponding to the group MHP 145.2: the value must be read on the ordinate and it is equal to 18,5 kPa x 1,181 = 28,1 kPa.

Water content in the system

Water circuits system must have at least a minimum water content to avoid excessive on/off operation of the compressors. In fact, each time the compressor starts up, there is an excessive quantity of oil going from the compressor sump to the circuit and simultaneously there is a rise in the temperature of the compressor motor due to the inrush current during the start up. The expected minimum quantity of water may be calculated with a certain tolerance using this formula:

$$(1) Q = (P \times p) / 25$$

Where:

Q = Minimum content in the system expressed in liters.

P = Total cooling capacity of the cooling unit expressed in W.

p = minimum capacity percentage allowed by MHP unloading system.

Thus, a plant equipped with a MHP 145.2.ST.407 unit with two compressors and 4 unloading steps giving 470 kW cooling capacity, should have a minimum content of water calculated on the basis of the minimum cooling capacity, which for this type of equipment is 25% of nominal capacity:

$$Q = (470.000 W \times 0,25) / 25 = 4700 l.$$

For a more accurate determination of the quantity of water, it is advisable to contact the designer of the plant. When the sum of the water content inside the evaporator, piping of the hydraulic circuit and the terminals (coils, exchanger, etc.) is lower than the value calculated, it is recommended to apply a inertial tank on the plant itself (option 45).

Installation notes

Handling

All moving and handling may damage the unit if some conditions are not scrupulously observed. The units should be lifted with a crane using long ropes anchored to the holes the unit base frame and by using the upper spacer bars (see accessory 80) to prevent the ropes from damaging the condenser coils.

Location

The MHP units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condensation air. The units must be positioned on solid foundations and perfectly leveled. In the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit footprint should be laid. Furthermore, this base should be sufficiently robust to withstand the unit weight entioned in the technical data table.

When the units are positioned in areas which are easily accessible by persons or animals, it is recommended to fit guards to protect condenser coil fins (option 32) and compressor/heat exchanger compartment (option 33).

Space requirements

The MHP units are aircooled, hence it is important to observe the minimum distances to ensure optimal ventilation to the coil. Limitations of space reducing the air flow could cause significant reductions in capacity, an increase in energy consumption and, in some cases, even the stop of the unit for high pressure. Standard propeller fans have an external static pressure very limited. Eventually, 100 and 200 Pa ESP fans can be supplied to meet particular needs (see options 28 and 29). In any case, care should be taken to avoid that the output air does not recycle itself inside the condenser coils. Position the unit to provide proper distance between coils and existing obstacles, in order to favor ventilation and facilitate inspections. When two or more MHP units are placed side by side, it is recommended that condenser coils be at least 3000 mm distant from each other. Smaller distances could cause the recycle of hot air. If the units are located in places surrounded by walls or obstacles of the same height as the units themselves, it is important to keep a distance from the obstacles of at least 2000 mm. In case the obstacle is higher than the unit, keep a distance between the two of 3000 mm. For other installation solutions, consult McQuay technicians.

Acoustic protection

The low noise levels of the MHP units allow to satisfy a great number of applications and abide to most stringent local regulations, thanks to the availability of three versions with different sound levels: Standard version (ST), CN version and silenced version (LN). When the noise level must meet special requirements, it will be necessary to pay the maximum attention to ensure a perfect insulation of the unit applying appropriate vibration dampening devices on the support base and vibration isolators on all water piping electrical wiring. The possibility to get high ESP fans (option 28 and 29 for version ST and CN only) allows the application of sound attenuators on the fans.

Condensation drain

The coils are fitted with a drain pan, with a coupling where to connect condensation discharge piping.

Table 1 – Operating limits

Cooling mode		HCFC 22			HFC 407C		
		ST	CN	LN	ST	CN	LN
Maximum air ambient temperature	°C	42	42	40	42	42	40
Minimum air ambient temperature	°C	10	10	10	10	10	10
Max. entering evapor. water temp. (without glycol)	°C	15	15	15	15	15	15
Min. leaving evapor. water temp. (without glycol)	°C	4	4	4	6	6	6
Min. leaving evapor. water temp. (with glycol)	°C	-8	-8	-8	-5	-5	-5
Maximum evaporator ΔT	°K	6	6	6	6	6	6
Minimum evaporator ΔT	°K	4	4	4	4	4	4
Max. entering desuperheater water temperature	°C	45	45	45	45	45	45
Min. leaving desuperheater water temperature	°C	40	40	40	40	40	40
Maximum desuperheater ΔT	°K	6	6	6	6	6	6
Minimum desuperheater ΔT	°K	4	4	4	4	4	4
Heating mode		HCFC 22			HFC 407C		
		ST	CN	LN	ST	CN	LN
Maximum air ambient temperature	°C	15	15	15	15	15	15
Minimum air ambient temperature	°C	-5	-5	-5	-5	-5	-5
Maximum entering hot water temperature	°C	45	45	45	40	40	40
Minimum entering hot water temperature	°C	25	25	25	25	25	25
Maximum leaving hot water temperature	°C	50	50	50	45	45	45
Minimum leaving hot water temperature	°C	28	28	28	28	28	28
Maximum hot water ΔT	°K	6	6	6	6	6	6
Minimum hot water ΔT	°K	4	4	4	4	4	4

Table 2 – Fouling factor

Fattore di sporcamento m ² °C / kW	Coefficiente correttivo capacità frigorifera	Coefficiente correttivo potenza assorbita
0,0440	1,000	1,000
0,1320	0,975	0,986
0,3080	0,919	0,939

Table 3 – Altitude correction factors

Elevation above sea level (m)	0	300	600	900	1200	1500	1800
Barometric pressure (mbar)	1013	977	942	908	875	843	812
Cooling capacity correction factor	1,000	0,993	0,986	0,979	0,973	0,967	0,960
Power input correction factor	1,000	1,005	1,009	1,015	1,021	1,026	1,031

Table 4 – Ethylene glycol correction factors

Air ambient temperature °C	-3	-8	-14	-22	-33
Suggested % of ethylene glycol	10	20	30	40	50
Cooling capacity correction factor	0,991	0,982	0,972	0,961	0,946
Power input correction factor	0,996	0,992	0,986	0,976	0,966
Water flow rate correction factor	1,013	1,040	1,074	1,121	1,178
Water pressure drop correction factor	1,070	1,129	1,181	1,263	1,308

Table 5 – Low temperature solution correction factors

Leaving solution temperature °C	2	0	-2	-4	-6	-8
Cooling capacity correction factor	0,842	0,785	0,725	0,670	0,613	0,562
Power input correction factor	0,95	0,94	0,92	0,89	0,87	0,84
Ethylene glycol min. %	10	20	20	30	30	30
Max. leaving desuperheater water temperature	48	46	45	44	43	42
Max. ambient temperature °C	42	40	39	38	37	36

Nomenclature

MHP 120 . 2 ST 022

Air to water heat pump

Size: 120 Ton (1 Ton=3.52kW)

Compressors n° 2

Version:
 ST Standard
 CN Sound proof cabinet around compressors
 LN Low noise (only in cooling mode)

Refrigerant
 022 HCFC 22
 407 HFC 407C

Physical data MHP ST, CN 120.2÷215.2

MHP ST/CN unit size		120.2	135.2	145.2	161.2	171.2	185.2	200.2	215.2
Cooling cap. (HFC407C) (1)	kW	391,5	431,2	471,4	488,9	546,7	581,8	622,3	662,7
Power input (HFC407C) (1)	kW	132,7	147,3	158,3	177,7	183,5	197,5	212,2	227,0
Heating cap. (HFC407C) (2)	KW	414,0	466,3	504,3	542,3	582,2	622,1	672,9	723,6
Power input (HFC407C) (2)	KW	119,1	133,8	145,2	156,6	167,5	178,4	193,6	208,8
Cooling cap. (HCFC 22) (1)	KW	403,6	444,5	486,0	504,0	563,6	599,7	641,4	683,2
Power input (HCFC 22) (1)	KW	132,7	147,3	158,3	177,7	183,5	197,5	212,2	227,0
Heating cap. (HCFC 22) (2)	KW	438,4	493,7	533,9	574,2	616,0	659,6	713,0	764,4
Power input (HCFC 22) (2)	KW	113,0	127,0	138,0	149,0	159,0	169,0	184,0	198,0
McQuay compressors Refrigerant circuits N°		904+806 2	806+806 2	806+906 2	906+906 2	906+808 2	808+808 2	808+908 2	908+908 2
Reduction steps N°	Std	4	4	4	4	4	4	4	4
Fans N° / fan motor power Total air flow	KW m3/s	8/2,1 50,7	8/2,1 50,7	8/2,1 50,7	8/2,1 50,7	8/2,1 49,9	8/2,1 49,1	10/2,1 63,3	10/2,1 63,3
Evap. N° / water volume	l	1/131	1/128	1/162	1/160	1/158	1/156	1/153	1/150
Unit lenght	mm	5000	5000	5000	5000	5000	5000	6070	6070
Unit width	mm	2230	2230	2230	2230	2230	2230	2230	2230
Unit height	mm	2350	2350	2350	2350	2350	2350	2350	2350
Operating weight (ST)	kg	4488	4488	4562	4562	4762	4762	5640	5640
Shipping weight (ST)	kg	4357	4357	4400	4400	4600	4600	5455	5455

Physical data MHP LN 120.2÷215.2

MHP LN unit size		120.2	135.2	145.2	161.2	171.2	185.2	200.2	215.2
Cooling cap. (HFC407C) (1)	kW	375,8	413,9	452,6	476,3	524,9	558,5	597,4	643,9
Power input (HFC407C) (1)	kW	136,7	151,7	163,0	182,5	189,0	203,4	218,6	233,5
Heating cap. (HFC407C) (2)	KW	414,0	466,3	504,3	542,3	582,2	622,1	672,9	723,6
Power input (HFC407C) (2)	KW	119,1	133,8	145,2	156,6	167,5	178,4	193,6	208,8
Cooling cap. (HCFC 22) (1)	KW	387,4	426,7	466,5	491,1	541,1	575,8	615,8	663,8
Power input (HCFC 22) (1)	KW	136,7	151,7	163,0	182,5	189,0	203,4	218,6	233,5
Heating cap. (HCFC 22) (2)	KW	438,4	493,7	533,9	574,2	616,0	659,6	713,0	764,4
Power input (HCFC 22) (2)	KW	113,0	127,0	138,0	149,0	159,0	169,0	184,0	198,0
McQuay compressors Refrigerant circuits N°		904+806 2	806+806 2	806+906 2	906+906 2	906+808 2	808+808 2	808+908 2	908+908 2
Reduction steps N°	Std	4	4	4	4	4	4	4	4
Fans N° / fan motor power Total air flow	KW m3/s	8/1,2 40,4	8/1,2 40,4	8/1,2 40,4	8/1,2 40,4	8/1,2 39,3	8/1,2 38,2	10/1,2 50,5	10/1,2 50,5
Evap. N° / water volume	l	1/131	1/128	1/162	1/160	1/158	1/156	1/153	1/150
Unit lenght	mm	5000	5000	5000	5000	5000	5000	6070	6070
Unit width	mm	2230	2230	2230	2230	2230	2230	2230	2230
Unit height	mm	2350	2350	2350	2350	2350	2350	2350	2350
Operating weight (ST)	kg	4788	4788	4862	4862	5062	5062	5840	5840
Shipping weight (ST)	kg	4657	4657	4700	4700	4900	4900	5655	5655

Note: (1) Nominal unit capacity referred to 12/7 °C in/out water temperature; 35 °C air ambient temperature.
 (2) Heating capacity referred to 40/45°C in/out hot water temp. and 7°C, 90%R.H. air ambient.

Electrical data MHP ST, CN, LN 120.2÷215.2

MHP ST/CN/LN unit size		120.2	135.2	145.2	161.2	171.2	185.2	200.2	215.2
Standard voltage supply		400V - 3f - 50 Hz (1)							
Maximum compr. absorbed current (FLA) (2)	A	277,0	310,0	333,0	356,0	388,0	420,0	445,0	470,0
Maximum biggest compressor inrush current	A	585,0	585,0	620,0	620,0	750,0	750,0	750,0	750,0
Fans absorbed current	A	22,8	22,8	30,4	30,4	30,4	30,4	38,0	38,0
Maximum unit absorbed current	A	299,8	332,8	363,4	386,4	418,4	450,4	483,0	508,0
Maximum unit inrush current	A	718,4	751,4	790,2	813,2	943,2	975,2	979,0	1004,0

Note: (1) Allowed voltage tolerance $\pm 10\%$.

(2) Absorbed current at maximum conditions.

(3) #1 compressor full load absorbed current + #2 compressor inrush current.

Sound pressure level MHP ST 120.2÷215.2

MHP ST unit size	Sound pressure level at 1 m from unit in semispheric free field (ref. $2 \times 10^{-5} \text{ N/m}^2$)								
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
120.2	76,5	78,5	79,5	79,5	78,0	74,5	71,0	69,5	82,5
135.2	76,5	78,5	79,5	79,5	78,0	74,5	71,0	69,5	82,5
145.2	77,5	79,5	80,5	80,5	79,0	75,5	72,0	70,5	83,5
161.2	77,5	79,5	80,5	80,5	79,0	75,5	72,0	70,5	83,5
171.2	77,5	79,5	80,5	80,5	79,0	75,5	72,0	70,5	83,5
185.2	77,5	79,5	80,5	80,5	79,0	75,5	72,0	70,5	83,5
200.2	77,5	79,5	80,5	81,5	80,0	76,0	72,0	70,5	83,5
215.2	77,5	79,5	80,5	81,5	80,0	76,0	72,0	70,5	83,5

Sound pressure level MHP CN 120.2÷215.2

MHP ST unit size	Sound pressure level at 1 m from unit in semispheric free field (ref. $2 \times 10^{-5} \text{ N/m}^2$)								
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
120.2	73,5	75,5	76,5	76,5	75,0	71,5	68,0	66,5	79,5
135.2	73,5	75,5	76,5	76,5	75,0	71,5	68,0	66,5	79,5
145.2	74,5	76,5	77,5	77,5	76,0	72,5	69,0	67,5	80,5
161.2	74,5	76,5	77,5	77,5	76,0	72,5	69,0	67,5	80,5
171.2	74,5	76,5	77,5	77,5	76,0	72,5	69,0	67,5	80,5
185.2	74,5	76,5	77,5	77,5	76,0	72,5	69,0	67,5	80,5
200.2	74,5	76,5	77,5	78,5	77,0	73,0	69,0	67,5	80,5
215.2	74,5	76,5	77,5	78,5	77,0	73,0	69,0	67,5	80,5

Sound pressure level MHP LN 120.2÷215.2

MHP ST unit size	Sound pressure level at 1 m from unit in semispheric free field (ref. $2 \times 10^{-5} \text{ N/m}^2$)								
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
120.2	74,0	75,0	74,5	71,5	68,5	64,5	59,5	52,5	74,0
135.2	74,0	75,0	74,5	71,5	68,5	64,5	59,5	52,5	74,0
145.2	75,0	76,0	75,5	72,5	69,5	65,5	60,5	53,5	75,0
161.2	75,0	76,0	75,5	72,5	69,5	65,5	60,5	53,5	75,0
171.2	75,0	76,0	75,5	72,5	69,5	65,5	60,5	53,5	75,0
185.2	75,0	76,0	75,5	72,5	69,5	65,5	60,5	53,5	75,0
200.2	75,0	76,0	75,5	72,5	69,5	65,5	60,5	53,5	75,0
215.2	75,0	76,0	75,5	72,5	69,5	65,5	60,5	53,5	75,0

Note: Average sound pressure level rated in accordance with ISO 3744, free field semispheric conditions.

Sound pressure levels for LN version are referred to cooling mode at 12/7 °C evaporator water temperatures and 35°C air ambient temperature.

Standard ratings MHP ST, CN 120.2 ÷ 215.2 (HCFC 22)

MHP unit size	Leaving water temp. (°C)	AMBIENT TEMPERATURE °C											
		25		28		30		35		40		42	
		Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)
MHP ST 120.2	4	405,5	112,7	394,4	116,9	387,1	119,7	368,6	126,8	349,4	133,6	341,7	136,3
	5	418,2	114,5	406,9	118,8	399,4	121,7	380,2	128,8	360,4	135,5	352,5	138,3
	6	430,9	116,4	419,3	120,8	411,5	123,7	391,8	130,8	371,5	137,5	363,3	140,2
	7	443,1	118,5	431,1	122,9	423,2	125,8	403,6	132,7	382,6	139,5	374,1	142,3
	8	455,7	120,4	443,6	124,7	435,5	127,7	415,4	134,6	393,8	141,5	385,1	144,2
	9	468,5	121,9	456,1	126,5	447,8	129,5	426,6	136,7	405,1	143,3	396,5	146,0
MHP ST 135.2	4	446,5	125,1	434,4	129,7	426,5	132,9	405,9	140,7	384,8	148,2	376,3	151,2
	5	460,6	127,1	448,1	131,9	439,9	135,1	418,8	142,9	396,9	150,4	388,3	153,5
	6	474,6	129,2	461,8	134,0	453,3	137,3	431,5	145,1	409,1	152,7	400,1	155,7
	7	488,0	131,5	474,9	136,4	466,1	139,6	444,5	147,3	421,3	154,9	412,0	157,9
	8	502,0	133,6	488,6	138,4	479,7	141,7	457,5	149,4	433,7	157,0	424,2	160,0
	9	516,0	135,3	502,4	140,4	493,1	143,8	469,8	151,7	446,1	159,1	436,7	162,0
MHP ST 145.2	4	488,2	134,4	475,0	139,5	466,3	142,8	443,8	151,2	420,8	159,3	411,4	162,6
	5	503,6	136,6	490,0	141,8	480,9	145,2	457,8	153,6	434,0	161,7	424,5	164,9
	6	518,9	138,8	504,9	144,1	495,6	147,2	471,9	156,0	447,3	164,1	437,5	167,3
	7	533,5	141,3	519,2	146,6	509,7	150,1	486,0	158,3	460,7	166,4	450,5	169,7
	8	548,8	143,6	534,2	148,8	524,4	152,3	500,3	160,6	474,2	168,7	463,8	172,0
	9	564,3	145,4	549,3	150,9	539,2	154,5	513,7	163,1	487,8	171,0	477,5	174,1
MHP ST 161.2	4	506,3	150,9	492,6	156,6	483,5	160,3	460,2	169,8	436,2	178,9	426,6	182,5
	5	522,1	153,4	508,1	159,1	498,7	163,0	474,7	172,5	450,0	181,5	440,1	185,2
	6	538,1	155,9	523,6	161,7	514,0	165,6	489,3	175,1	463,8	184,2	453,6	187,8
	7	553,3	158,7	538,4	164,5	528,5	168,5	504,0	177,7	477,7	186,9	467,1	190,5
	8	569,1	161,2	553,9	167,1	543,8	171,0	518,7	180,3	491,7	189,4	480,9	193,1
	9	585,1	163,3	569,5	169,4	559,2	173,5	532,7	183,1	505,8	191,9	495,0	195,5
MHP ST 171.2	4	566,2	155,8	550,9	161,6	540,7	165,5	514,7	175,3	487,9	184,7	477,2	188,4
	5	584,0	158,4	568,3	164,3	557,7	168,3	531,0	178,0	503,3	187,4	492,3	191,2
	6	601,8	160,9	585,6	167,0	574,8	171,0	547,2	180,8	518,7	190,2	507,4	193,9
	7	618,7	163,8	602,1	169,9	591,0	173,9	563,6	183,5	534,2	192,9	522,5	196,7
	8	636,5	166,4	619,5	172,5	608,2	176,5	580,2	186,1	550,0	195,6	537,9	199,4
	9	654,4	168,6	637,0	174,9	625,4	179,1	595,7	189,0	565,7	198,2	553,8	201,8
MHP ST 185.2	4	602,5	167,8	586,2	174,0	575,3	178,2	547,7	188,7	519,2	198,8	507,8	202,9
	5	621,4	170,5	604,7	176,9	593,5	181,2	565,0	191,7	535,6	201,8	523,8	205,8
	6	640,4	173,2	623,1	179,8	611,6	184,1	582,3	194,6	552,0	204,7	539,9	208,8
	7	658,4	176,4	640,8	182,9	628,9	187,2	599,7	197,5	568,5	207,7	555,9	211,8
	8	677,3	179,1	659,2	185,7	647,1	190,0	617,4	200,4	585,2	210,6	572,3	214,6
	9	696,4	181,5	677,8	188,3	665,5	192,8	633,9	203,5	602,0	213,3	589,2	217,3
MHP ST 200.2	4	644,4	180,2	627,0	187,0	615,4	191,4	585,8	202,8	555,3	213,6	543,1	217,9
	5	664,6	183,2	646,8	190,0	634,8	194,6	604,3	205,9	572,9	216,8	560,2	221,1
	6	684,9	186,1	666,4	193,1	654,2	197,8	622,7	209,1	590,3	220,0	577,4	224,3
	7	704,2	189,5	685,2	196,5	672,7	201,2	641,4	212,2	608,0	223,1	594,6	227,5
	8	724,4	192,5	705,0	199,5	692,2	204,2	660,3	215,3	625,9	226,2	612,1	230,6
	9	744,8	195,0	724,9	202,3	711,7	207,1	678,0	218,6	643,8	229,2	630,1	233,4
MHP ST 215.2	4	686,3	192,8	667,8	200,0	655,4	204,8	623,9	216,9	591,4	228,5	578,5	233,1
	5	707,8	196,0	688,8	203,3	676,0	208,2	643,5	220,3	610,1	231,9	596,7	236,5
	6	729,4	199,1	709,8	206,6	696,7	211,6	663,3	223,7	628,8	235,3	614,9	239,9
	7	750,0	202,7	729,9	210,2	716,4	215,2	683,2	227,0	647,5	238,7	633,3	243,4
	8	771,5	205,9	750,9	213,4	737,2	218,4	703,2	230,3	666,6	242,0	651,9	246,7
	9	793,3	208,6	772,1	216,4	758,0	221,6	722,1	233,9	685,7	245,2	671,2	249,7

Standard ratings MHP LN 120.2 ÷ 215.2 (HCFC 22)

MHP unit size	Leaving water temp. (°C)	AMBIENT TEMPERATURE °C											
		25		28		30		35		40		42	
		Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)
MHP LN 120.2	4	389,2	116,1	378,7	120,4	371,6	123,3	353,8	130,6	343,1	135,0	335,4	137,6
	5	401,5	118,0	390,6	122,4	383,4	125,3	365,0	132,6	353,9	137,0	346,0	139,6
	6	413,6	119,9	402,5	124,4	395,1	127,4	376,1	134,7	364,7	139,1	356,5	141,7
	7	425,3	122,0	413,9	126,6	406,3	129,6	387,4	136,7	376,1	140,9	367,3	143,7
	8	437,5	124,0	425,8	128,5	418,1	131,5	398,8	138,7	387,2	143,0	378,1	145,7
	9	449,8	125,6	437,9	130,3	429,9	133,4	409,5	140,8	397,3	145,3	388,9	147,6
MHP LN 135.2	4	428,6	128,8	417,1	133,6	409,1	136,8	389,7	144,9	377,9	149,8	369,4	152,7
	5	442,1	130,9	430,3	135,8	422,3	139,1	401,9	147,2	389,8	152,1	381,0	155,0
	6	455,6	133,0	443,4	138,1	435,2	141,4	414,3	149,5	401,8	154,3	392,7	157,2
	7	468,4	135,4	455,9	140,5	447,5	143,8	426,7	151,7	414,3	156,4	404,5	159,5
	8	481,8	137,6	469,0	142,6	460,5	145,9	439,3	153,9	426,6	158,7	416,3	161,7
	9	495,4	139,4	482,2	144,6	473,5	148,1	451,1	156,3	437,6	161,2	428,4	163,8
MHP LN 145.2	4	468,7	138,5	456,0	143,6	447,5	147,1	426,1	155,8	413,2	161,0	403,8	164,1
	5	483,5	140,7	470,3	146,0	461,7	149,5	439,5	158,2	426,2	163,4	416,7	166,5
	6	498,2	143,0	484,8	148,4	475,9	152,0	453,0	160,7	439,2	165,9	429,4	169,0
	7	512,2	145,6	498,5	151,0	489,3	154,6	466,5	163,0	453,0	168,1	442,2	171,4
	8	526,9	147,9	512,8	153,3	503,4	156,9	480,2	165,4	466,4	170,5	455,2	173,8
	9	541,7	149,8	527,3	155,4	517,7	159,1	493,1	168,0	478,4	173,3	468,4	176,1
MHP LN 161.2	4	493,3	155,0	479,9	160,8	471,1	164,7	448,4	174,4	434,8	180,2	418,8	184,2
	5	508,8	157,5	495,0	163,4	485,9	167,4	462,6	177,1	448,6	183,0	432,1	187,0
	6	524,3	160,1	510,2	166,1	500,7	170,1	476,7	179,8	462,3	185,7	445,3	189,7
	7	539,1	163,0	524,6	169,0	514,9	173,0	491,1	182,5	476,7	188,2	458,6	192,5
	8	554,5	165,5	539,7	171,6	529,8	175,6	505,5	185,2	490,8	190,9	472,1	195,1
	9	570,1	167,7	555,0	174,0	544,8	178,2	519,0	188,0	503,5	194,0	485,5	197,7
MHP LN 171.2	4	543,6	160,5	528,9	166,5	519,1	170,5	494,1	180,5	479,2	186,6	468,4	190,2
	5	560,7	163,1	545,5	169,2	535,4	173,3	509,7	183,4	494,3	189,4	483,2	193,0
	6	577,7	165,7	562,2	172,0	551,9	176,1	525,3	186,2	509,4	192,3	498,0	195,9
	7	594,0	168,7	578,1	175,0	567,4	179,1	541,1	189,0	525,4	194,8	512,9	198,7
	8	611,0	171,4	594,7	177,6	583,9	181,8	557,0	191,7	540,8	197,6	528,0	201,4
	9	628,2	173,6	611,5	180,1	600,3	184,5	571,9	194,7	554,8	200,8	543,1	204,1
MHP LN 185.2	4	578,4	172,8	562,8	179,2	552,3	183,5	525,8	194,4	509,9	200,9	498,5	204,8
	5	596,6	175,6	580,5	182,2	569,8	186,6	542,4	197,4	525,9	203,9	514,1	207,8
	6	614,7	178,4	598,2	185,2	587,2	189,6	559,0	200,5	542,1	207,0	529,9	210,9
	7	632,1	181,7	615,1	188,4	603,7	192,9	575,8	203,4	559,0	209,8	545,8	213,9
	8	650,2	184,5	632,8	191,2	621,3	195,7	592,7	206,4	575,5	212,8	561,8	216,9
	9	668,5	186,9	650,7	193,9	638,9	198,6	608,6	209,6	590,4	216,2	577,9	219,7
MHP LN 200.2	4	618,6	185,6	601,9	192,6	590,7	197,2	562,4	208,8	545,3	215,8	533,1	220,0
	5	638,0	188,7	620,8	195,7	609,4	200,5	580,1	212,1	562,5	219,1	549,9	223,3
	6	657,5	191,7	639,8	198,9	628,0	203,7	597,8	215,4	579,7	222,4	566,8	226,5
	7	676,0	195,2	657,9	202,4	645,7	207,2	615,8	218,6	597,8	225,4	583,7	229,8
	8	695,4	198,2	676,8	205,5	664,4	210,3	633,8	221,7	615,5	228,6	600,9	233,0
	9	715,0	200,8	696,0	208,4	683,2	213,4	650,8	225,2	631,5	232,3	618,2	236,1
MHP LN 215.2	4	666,8	198,3	648,8	205,7	636,8	210,7	606,2	223,1	602,9	230,6	567,7	235,4
	5	687,8	201,6	669,2	209,1	656,8	214,2	625,3	226,6	606,4	234,1	585,8	238,9
	6	708,7	204,8	689,7	212,5	677,0	217,7	644,4	230,1	624,9	237,6	603,6	242,4
	7	728,7	208,5	709,1	216,2	696,1	221,4	663,8	233,5	644,4	240,8	621,7	245,9
	8	749,6	211,8	729,6	219,5	716,2	224,7	683,2	236,9	663,5	244,2	639,9	249,3
	9	770,6	214,6	750,1	222,6	736,4	227,9	701,6	240,6	680,7	248,2	658,3	252,6

Standard ratings MHP ST, CN 120.2 ÷ 215.2 (HFC 407C)

MHP unit size	Leaving water temp. (°C)	AMBIENT TEMPERATURE °C											
		25		28		30		35		40		42	
		Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)
MHP ST 120.2	4*	393,3	112,7	382,7	116,9	375,5	119,7	357,5	126,8	338,9	133,6	331,5	136,3
	5*	405,7	114,5	394,7	118,8	387,4	121,7	368,8	128,8	349,6	135,5	128,7	359,9
	6	418,0	116,4	406,7	120,8	399,3	123,7	380,1	130,8	360,3	137,5	352,4	140,2
	7	429,8	118,5	418,2	122,9	410,5	125,8	391,5	132,7	371,1	139,5	362,9	142,3
	8	442,0	120,4	430,3	124,7	422,4	127,7	403,0	134,6	382,0	141,5	373,5	144,2
	9	454,5	121,9	442,4	126,5	451,4	129,5	413,7	136,7	392,9	143,3	384,6	146,0
MHP ST 135.2	4*	433,1	125,1	421,4	129,7	413,6	132,9	393,8	140,7	373,3	148,2	365,1	151,2
	5*	446,8	127,1	434,7	131,9	426,6	135,1	406,1	142,9	385,0	150,4	376,6	153,5
	6	460,4	129,2	448,4	134,0	439,8	137,3	418,6	145,1	396,8	152,7	388,1	155,7
	7	473,4	131,5	460,7	136,4	452,1	139,6	431,2	147,3	408,7	154,9	399,7	157,9
	8	486,9	133,6	473,9	138,4	465,2	141,7	443,8	149,4	420,7	157,0	411,4	160,0
	9	500,6	135,3	487,3	140,4	478,4	143,8	455,7	151,7	432,7	159,1	423,6	162,0
MHP ST 145.2	4*	473,6	134,4	460,8	139,5	452,2	142,8	430,5	151,2	408,1	159,3	399,1	162,6
	5*	488,5	136,6	475,3	141,8	466,5	145,2	444,1	153,6	420,9	161,7	411,7	164,9
	6	503,3	138,8	489,8	144,1	480,8	147,5	457,7	156,0	433,9	164,1	424,4	167,3
	7	517,6	141,3	503,6	146,6	494,4	150,1	471,4	158,3	446,8	166,4	437,0	169,7
	8	532,3	143,6	518,1	148,8	508,6	152,3	485,3	160,6	460,0	168,7	449,8	172,0
	9	547,3	145,4	532,8	150,9	523,1	154,5	498,3	163,1	473,2	171,0	463,1	174,1
MHP ST 161.2	4*	491,1	150,9	477,8	156,6	468,9	160,3	446,4	169,8	423,1	178,9	413,8	182,5
	5*	506,5	153,4	492,9	159,1	483,7	163,0	460,5	172,5	436,5	181,5	426,9	185,2
	6	521,9	155,9	507,9	161,7	498,6	165,6	474,5	175,1	449,9	184,2	440,0	187,8
	7	536,7	158,7	522,2	164,5	512,6	168,5	488,9	177,7	463,3	186,9	453,2	190,5
	8	552,0	161,2	537,2	167,1	527,4	171,0	503,2	180,3	477,0	189,4	466,5	193,1
	9	567,5	163,3	552,4	169,4	542,4	173,5	516,7	183,1	490,7	191,9	480,2	195,5
MHP ST 171.2	4*	549,2	155,8	534,4	161,6	524,5	165,5	499,3	175,3	473,3	184,7	462,8	188,4
	5*	566,5	158,4	551,2	164,3	541,0	168,3	515,0	178,0	488,2	187,4	477,5	191,2
	6	583,8	160,9	568,0	167,0	557,6	171,0	530,8	180,8	503,2	190,2	492,1	193,9
	7	600,2	163,8	584,1	169,9	573,3	173,9	546,7	183,5	518,2	192,9	506,8	196,7
	8	617,4	166,4	600,9	172,5	590,0	176,5	562,8	186,1	533,4	195,6	521,7	199,4
	9	634,8	168,6	617,9	174,9	606,6	179,1	577,9	189,0	548,7	198,2	537,1	201,8
MHP ST 185.2	4*	584,4	167,8	568,7	174,0	558,1	178,2	531,2	188,7	503,6	198,8	492,6	202,9
	5*	602,8	170,5	586,5	176,9	575,7	181,2	548,1	191,7	519,6	201,8	508,2	205,8
	6	621,2	173,2	604,5	179,8	593,3	184,1	564,8	194,6	535,4	204,7	523,7	208,8
	7	638,7	176,4	621,5	182,9	610,1	187,2	581,8	197,5	551,4	207,7	539,3	211,8
	8	656,9	179,1	639,4	185,7	627,8	190,0	598,9	200,4	567,6	210,6	555,2	214,6
	9	675,5	181,5	657,5	188,3	645,5	192,8	614,9	203,5	584,0	213,3	571,5	217,3
MHP ST 200.2	4*	625,1	180,2	608,2	187,0	597,0	191,4	568,2	202,8	538,7	213,6	526,8	217,9
	5*	644,7	183,2	627,4	190,0	615,8	194,6	586,2	205,9	555,7	216,8	543,4	221,1
	6	664,3	186,1	646,5	193,1	634,5	197,8	604,0	209,1	572,7	220,0	560,1	224,3
	7	683,1	189,5	664,7	196,5	652,6	201,2	622,2	212,2	589,8	223,1	576,7	227,5
	8	702,6	192,5	683,8	199,5	671,4	204,2	640,5	215,3	607,1	226,2	593,8	230,6
	9	722,5	195,0	703,2	202,3	690,4	207,1	657,7	218,6	624,5	229,2	611,2	233,4
MHP ST 215.2	4*	665,7	192,8	647,7	200,0	635,7	204,8	605,2	216,9	573,6	228,5	561,1	233,1
	5*	686,6	196,0	668,1	203,3	655,8	208,2	624,2	220,3	591,8	231,9	578,8	236,5
	6	707,6	199,1	688,6	206,6	675,8	211,6	643,4	223,7	609,9	235,3	596,5	239,9
	7	727,5	202,7	708,0	210,2	694,9	215,2	662,7	227,0	628,1	238,7	614,3	243,4
	8	748,3	205,9	728,4	213,4	715,1	218,4	682,1	230,3	646,6	242,0	632,3	246,7
	9	769,5	208,6	748,9	216,4	735,3	221,6	700,4	233,9	665,1	245,2	651,0	249,7

Note: (*) Add 10% ethylene glycol.

Standard ratings MHP LN 120.2 ÷ 215.2 (HFC 407C)

MHP unit size	Leaving water temp. (°C)	AMBIENT TEMPERATURE °C											
		25		28		30		35		40		42	
		Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)
MHP LN 120.2	4*	377,5	116,1	367,3	120,4	360,5	123,3	343,1	130,6	332,9	135,0	325,3	137,6
	5*	389,4	118,0	379,0	122,4	371,9	125,3	354,1	132,6	343,2	137,0	335,6	139,6
	6	401,2	119,9	390,5	124,4	383,2	127,4	364,8	134,7	353,8	139,1	345,8	141,7
	7	412,6	122,0	401,5	126,6	394,2	129,6	375,8	136,7	364,8	140,9	356,3	143,7
	8	424,4	124,0	413,1	128,5	405,6	131,5	386,8	138,7	375,6	143,0	366,8	145,7
MHP LN 135.2	4*	415,8	128,8	404,5	133,6	396,8	136,8	378,0	144,9	366,6	149,8	358,2	152,7
	5*	428,8	130,9	417,3	135,8	409,6	139,1	389,9	147,2	378,1	152,1	369,6	155,0
	6	441,9	133,0	430,1	138,1	422,2	141,4	401,9	149,5	389,7	154,3	381,0	157,2
	7	454,4	135,4	442,2	140,5	434,1	143,8	413,9	151,7	401,9	156,4	392,4	159,5
	8	467,4	137,6	455,0	142,6	446,7	145,9	426,1	153,9	413,7	158,7	403,8	161,7
MHP LN 145.2	4*	454,7	138,5	442,3	143,6	434,2	147,1	413,3	155,8	400,8	161,0	391,7	164,1
	5*	468,9	140,7	456,2	146,0	447,8	149,5	426,3	158,2	413,3	163,4	404,1	166,5
	6	483,3	143,0	470,3	148,4	461,6	152,0	439,4	160,7	426,0	165,9	416,5	169,0
	7	496,9	145,6	483,6	151,0	474,6	154,6	452,6	163,0	439,4	168,1	428,9	171,4
	8	511,1	147,9	497,4	153,3	488,3	156,9	465,8	165,4	452,4	170,5	441,6	173,8
MHP LN 161.2	4*	478,5	155,0	465,5	160,8	457,0	164,7	434,9	174,4	421,8	180,2	406,2	184,2
	5*	493,5	157,5	480,2	163,4	471,4	167,4	448,7	177,1	435,1	183,0	419,1	187,0
	6	508,5	160,1	494,9	166,1	485,7	170,1	462,4	179,8	448,4	185,7	431,9	189,7
	7	523,0	163,0	508,8	169,0	499,4	173,0	476,3	182,5	462,4	188,2	444,8	192,5
	8	537,9	165,5	523,5	171,6	514,0	175,6	490,3	185,2	476,0	190,9	457,9	195,1
MHP LN 171.2	4*	527,3	160,5	513,0	166,5	503,5	170,5	479,3	180,5	464,8	186,6	454,4	190,2
	5*	543,9	163,1	529,2	169,2	519,4	173,3	494,4	183,4	479,5	189,4	468,6	193,0
	6	560,4	165,7	545,3	172,0	535,3	176,1	509,5	186,2	494,1	192,3	483,1	195,9
	7	576,2	168,7	560,7	175,0	550,4	179,1	524,9	189,0	509,6	194,8	497,5	198,7
	8	592,7	171,4	576,8	177,6	566,4	181,8	540,3	191,7	524,6	197,6	512,1	201,4
MHP LN 185.2	4*	561,0	172,8	545,9	179,2	535,8	183,5	510,1	194,4	494,6	200,9	483,6	204,8
	5*	578,7	175,6	563,1	182,2	552,7	186,6	526,1	197,4	510,2	203,9	498,8	207,8
	6	596,3	178,4	580,3	185,2	569,6	189,6	542,2	200,5	525,8	207,0	514,0	210,9
	7	613,1	181,7	596,7	188,4	585,6	192,9	558,5	203,4	542,2	209,8	529,4	213,9
	8	630,7	184,5	613,8	191,2	602,7	195,7	574,9	206,4	558,2	212,8	545,0	216,9
MHP LN 200.2	4*	600,1	185,6	583,9	192,6	572,9	197,2	545,5	208,8	529,0	215,8	517,2	220,0
	5*	618,9	188,7	602,2	195,7	591,2	200,5	562,7	212,1	545,6	219,1	533,3	223,3
	6	637,7	191,7	620,6	198,9	609,2	203,7	579,9	215,4	562,3	222,4	549,8	226,5
	7	655,8	195,2	638,1	202,4	626,3	207,2	597,4	218,6	579,9	225,4	566,2	229,8
	8	674,5	198,2	656,5	205,5	644,5	210,3	614,8	221,7	597,1	228,6	582,8	233,0
MHP LN 215.2	4*	646,8	198,3	629,3	205,7	617,7	210,7	588,1	223,1	573,7	230,6	550,7	235,4
	5*	667,2	201,6	649,1	209,1	637,2	214,2	606,6	226,6	588,2	234,1	568,2	238,9
	6	687,4	204,8	669,0	212,5	656,6	217,7	625,1	230,1	606,2	237,6	585,5	242,4
	7	706,9	208,5	687,8	216,2	675,2	221,4	643,8	233,5	625,1	240,8	603,1	245,9
	8	727,0	211,8	707,8	219,5	694,7	224,7	662,7	236,9	643,5	244,2	620,7	249,3
9	747,6	214,6	727,6	222,6	714,3	227,9	680,5	240,6	660,3	248,2	638,5	252,6	

Note: (*) Add 10% ethylene glycol.

Heating ratings MHP (HCFC 22)

MHP unit size	Leaving water temp. (°C)	AMBIENT TEMPERATURE °C									
		-5		0		5		7		10	
		Heating capacity (kW)	Power input (kW)	Heating capacity (kW)	Power input (kW)	Heating capacity (kW)	Power input (kW)	Heating capacity (kW)	Power input (kW)	Heating capacity (kW)	Power input (kW)
MHP ST 120.2	35	332,8	87,8	385,9	94,7	441,1	101,6	463,5	104,4	498,1	108,1
	40	321,4	89,8	374,0	98,1	429,2	105,7	451,1	108,7	485,8	113,0
	45	308,3	92,1	360,8	101,2	416,0	109,6	438,4	113,0	472,7	117,9
	50	293,7	94,4	347,3	104,4	402,1	113,6	424,0	117,3	458,1	118,2
MHP ST 135.2	35	374,7	98,7	434,5	106,4	496,7	114,2	521,9	117,3	560,9	121,5
	40	361,9	101,0	421,2	110,2	483,4	118,7	508,1	122,2	547,1	127,0
	45	347,1	103,5	406,3	113,8	468,5	123,2	493,7	127,0	532,2	132,5
	50	330,8	106,0	391,0	117,3	452,8	127,6	477,4	131,8	515,9	132,8
MHP ST 145.2	35	405,3	107,2	469,9	115,6	537,1	124,1	564,3	127,5	606,5	132,1
	40	391,3	109,7	455,4	119,8	522,6	129,0	549,4	132,8	591,5	138,0
	45	375,3	112,5	439,4	123,6	506,6	133,9	533,9	138,0	575,5	143,9
	50	357,7	115,2	422,8	127,5	489,6	138,7	516,2	143,2	557,9	144,3
MHP ST 161.2	35	435,8	115,8	505,4	124,9	577,7	134,0	606,9	137,7	652,3	142,6
	40	420,9	118,5	489,9	129,3	562,2	139,3	590,9	143,4	636,2	149,0
	45	403,7	121,4	472,6	133,5	544,9	144,5	574,2	149,0	619,1	155,4
	50	384,7	124,4	454,8	137,7	526,6	149,7	555,3	154,7	600,0	155,9
MHP ST 171.2	35	467,5	123,5	542,0	133,2	619,6	142,9	651,1	146,9	699,8	152,2
	40	451,5	126,4	525,4	138,0	603,0	148,7	633,8	153,0	682,5	159,0
	45	433,0	129,6	506,9	142,5	584,5	154,2	616,0	159,0	664,0	165,8
	50	412,7	132,8	487,8	146,9	564,8	159,8	595,6	165,0	643,9	166,3
MHP ST 185.2	35	500,6	131,3	580,4	141,6	663,6	151,9	697,2	156,2	749,3	161,7
	40	483,4	134,4	562,6	146,7	645,7	158,0	678,7	162,6	730,8	169,0
	45	463,7	137,7	542,8	151,4	625,9	163,9	659,6	169,0	711,0	176,3
	50	441,9	141,1	522,4	156,2	604,9	169,8	637,9	175,4	689,3	176,8
MHP ST 200.2	35	541,2	143,0	627,4	154,2	717,2	165,4	753,6	170,0	810,0	176,1
	40	522,6	146,3	608,2	159,7	698,0	172,0	733,6	177,0	790,0	184,0
	45	501,2	150,0	586,8	164,9	676,6	178,5	713,0	184,0	768,5	191,9
	50	477,7	153,6	564,6	170,0	653,8	184,9	689,4	191,0	745,1	192,5
MHP ST 215.2	35	580,2	153,8	672,6	165,9	768,9	178,0	807,9	183,0	868,3	189,5
	40	560,3	157,4	652,0	171,9	748,4	185,1	786,6	190,5	846,9	198,0
	45	537,4	161,4	629,0	177,4	725,4	182,1	764,4	198,0	824,0	206,5
	50	512,2	165,3	605,4	183,0	700,9	199,0	739,1	205,5	798,8	207,1

Heating ratings MHP (HFC 407C)

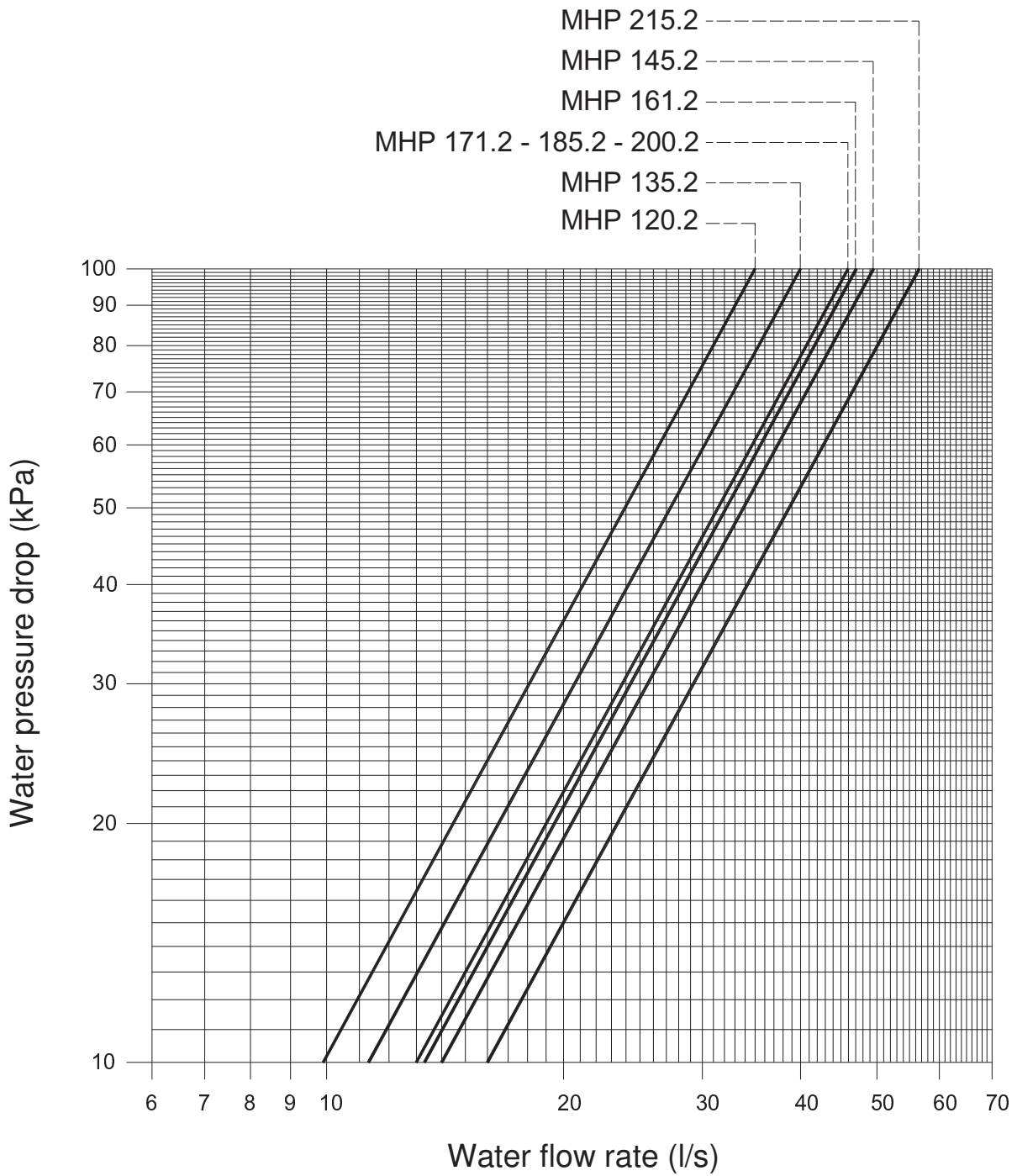
MHP unit size	Leaving water temp. (°C)	AMBIENT TEMPERATURE °C									
		-5		0		5		7		10	
		Heating capacity (kW)	Power input (kW)	Heating capacity (kW)	Power input (kW)	Heating capacity (kW)	Power input (kW)	Heating capacity (kW)	Power input (kW)	Heating capacity (kW)	Power input (kW)
MHP ST 120.2	35	314,3	92,5	364,3	99,8	416,5	107,1	437,6	110,0	470,4	114,0
	40	303,5	94,7	353,2	103,4	405,4	111,4	426,0	114,6	458,7	119,1
	45	291,1	97,1	340,8	106,7	392,9	115,5	414,0	119,1	446,3	124,2
MHP ST 135.2	35	354,0	104,0	410,3	112,1	469,1	120,3	492,9	123,6	529,7	128,0
	40	341,8	106,4	397,8	116,1	456,5	125,1	479,9	128,7	516,7	133,8
	45	327,9	109,0	383,7	119,9	442,5	129,8	466,3	133,8	502,7	139,6
MHP ST 145.2	35	382,8	112,8	443,8	121,7	507,4	130,5	533,1	134,2	572,9	139,0
	40	369,7	115,4	430,2	126,0	493,7	135,8	519,0	139,7	558,8	145,2
	45	354,5	118,3	415,1	130,1	478,6	140,8	504,3	145,2	543,7	151,4
MHP ST 161.2	35	411,7	121,7	477,2	131,2	545,6	140,8	573,3	144,7	616,1	149,9
	40	397,6	124,5	462,6	135,9	531,0	146,4	558,1	150,6	600,9	156,6
	45	381,3	127,6	446,4	140,3	514,7	151,9	542,3	156,6	584,7	163,3
MHP ST 171.2	35	441,9	130,1	512,4	140,4	585,7	150,6	615,4	154,8	661,3	160,3
	40	426,8	133,2	496,6	145,4	570,0	156,6	599,1	161,1	645,1	167,5
	45	409,2	136,5	479,2	150,1	552,5	162,5	582,2	167,5	627,6	174,7
MHP ST 185.2	35	472,1	138,6	547,4	149,5	625,7	160,4	657,5	164,8	706,6	170,7
	40	456,0	141,8	530,6	154,9	609,0	166,8	640,1	171,6	689,2	178,4
	45	437,3	145,4	512,0	159,8	590,3	173,0	622,1	178,4	670,6	186,1
MHP ST 200.2	35	510,7	150,4	592,1	162,2	676,9	174,0	711,2	178,9	764,4	185,3
	40	493,1	153,9	573,9	168,0	658,7	181,0	692,4	186,2	745,5	193,6
	45	473,0	157,8	553,8	173,5	638,6	187,8	672,9	193,6	725,4	201,9
MHP ST 215.2	35	549,2	162,2	636,8	175,0	728,0	187,7	763,0	192,9	822,1	199,8
	40	530,4	166,0	617,3	181,2	708,5	195,2	744,7	200,9	801,8	208,8
	45	508,8	170,2	595,6	187,1	686,8	202,5	723,6	208,8	780,1	217,8

Partial heat recovery MHP 120.2÷215.2

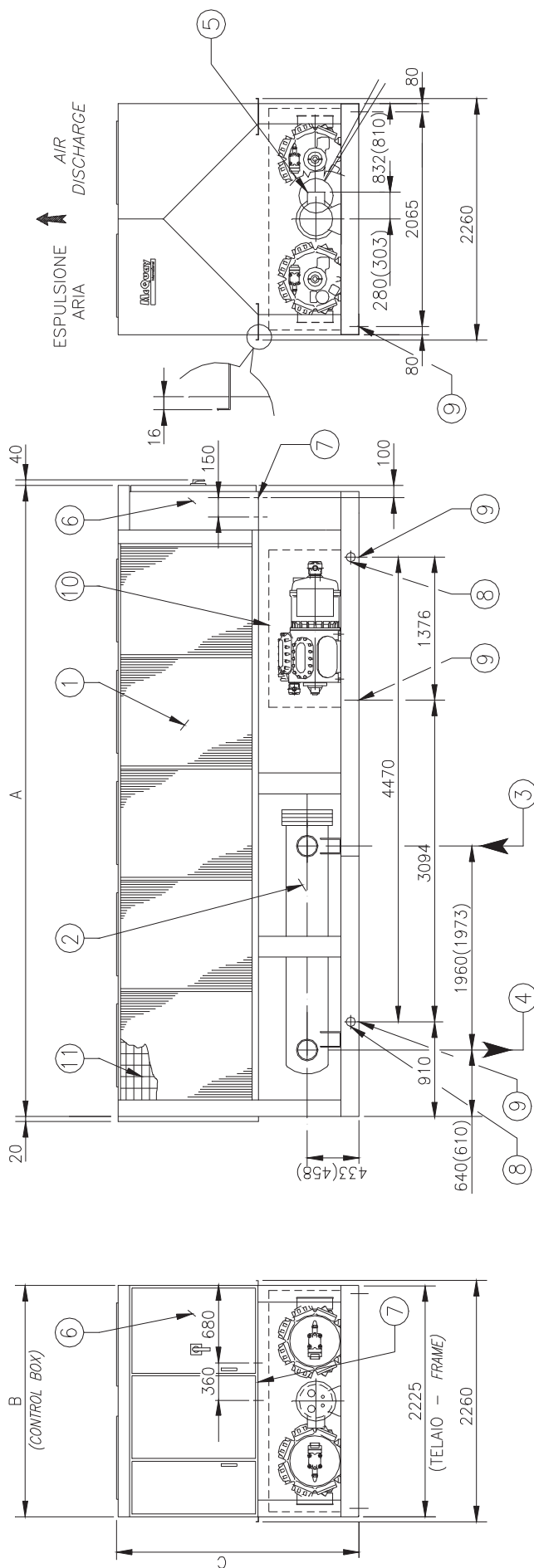
MHP HCFC 22 size		Leaving hot water temperature °C		
		40	45	50
		Heating capacity kW	Heating capacity kW	Heating capacity kW
120.2	7°C ΔT5°C evaporator leaving water temperature 35°C air ambient temperature	95,5	81,1	68,4
135.2		105,2	89,3	75,4
145.2		115,0	97,7	82,4
161.2		119,2	101,3	85,5
171.2		133,3	113,3	95,6
185.2		141,9	120,5	101,7
200.2		151,8	128,9	108,8
215.2		161,6	137,3	115,8

MHP HFC 407C size		Leaving hot water temperature °C		
		40	45	50
		Heating capacity kW	Heating capacity kW	Heating capacity kW
120.2	7°C ΔT5°C evaporator leaving water temperature 35°C air ambient temperature	83,0	68,5	54,1
135.2		91,4	75,4	59,6
145.2		99,9	82,5	65,1
161.2		103,6	85,5	67,5
171.2		115,8	95,7	75,5
185.2		123,3	101,8	80,4
200.2		131,9	108,9	86,0
215.2		140,4	116,0	91,6

Water pressure drop



MHP 120.2 ÷ 215.2 dimensions



Legend

- 1 Condenser coil
- 2 Evaporator
- 3 Evaporator water inlet
- 4 Evaporator water outlet
- 5 5" vertical tube connections for Ø 139,7 tube (MHP 120.2÷135.2)
8" vertical tube connections for Ø 219,1 tube (MHP 145.2÷215.2)
- 6 Operating and control panel
- 7 360x150 slot for power and control connection
- 8 No. 4 ft ring holes Ø 90 mm
- 9 No. 6 socket mounting holes Ø 25 mm
- 10 Sound proof compressor cabinet (std. on CN and LN)
- 11 Compressor protection (optional)

MHP unit size	Dimensions (mm)		
	A	B	C
120.2 ST, CN, LN	5040	2230	2350
135.2 ST, CN, LN	5040	2230	2350
145.2 ST, CN, LN	5040	2230	2350
161.2 ST, CN, LN	5040	2230	2350
171.2 ST, CN, LN	5040	2230	2350
185.2 ST, CN, LN	5040	2230	2350
200.2 ST, CN, LN	5040	2230	2350
215.2 ST, CN, LN	5040	2230	2350

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S.S. Nettunense, km 12+300 – 00040 Cecchina (Roma) Italia – Tel. (06) 937311 – Fax (06) 9374014 – E-mail: info@mcquayeuropa.com
www.mcquayeuropa.com