

MPI DC WATER CHILLERS AND HEAT PUMPS INVERTER DC

- > R410A
- > CONTINUOUS MODULATION OF CAPACITY FROM 30% TO 100%
- > WATER PRODUCED UP TO 58°C
- > HEAT PUMP OPERATION AT TEMPERATURES AS LOW AS -15°
- > SCROLL OR TWIN ROTARY COMPRESSOR WITH PERMANENT MAGNETS ELECTRIC SYNCHRONOUS MOTOR
- > ELECTRONIC EXPANSION VALVE
- > MODULATING HYDRAULIC PUMP

The actual thermal load of an air conditioning system is less than 60% of the rated load capacity 90% of the time.

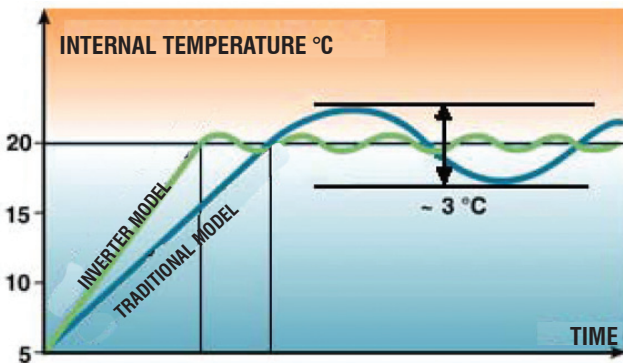
In low-powered installations with a small number of indoor units and a low water content, operation under partial load conditions is particularly critical. In order to ensure that the system works correctly, it is thus necessary to vary the power output by the chiller.

The inverter controller acts on the compressor rpm by modulating the refrigerant mass, cooling capacity and input power.

The operating logic of MPI DC units allows an accurate adjustment of the outlet water temperature according to the thermal load conditions:

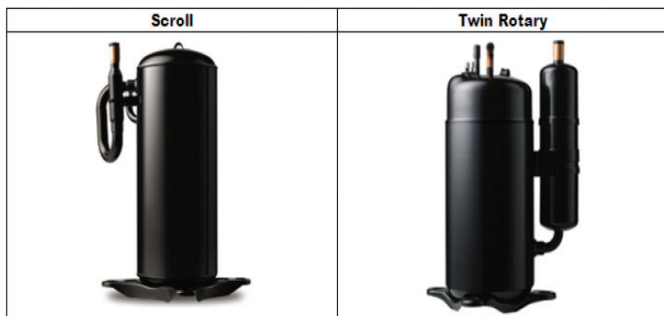
The PID control algorithm makes it possible to regulate the water temperature within +/- 15%.

The inverter controller allows to adjust the capacity and the input of the compressor to the actual thermal load and makes it possible to considerably reduce electrical intakes at the compressor start-up (reduction of starting currents) and during the operation under partial loads.



The spinning airtight scroll compressors (for models from MPI014 DC to MPI029 DC) or Twin Rotary compressors (for models from MPI08 DC to MPI010 DC) are equipped with motor protection against overheating and overcurrents.

Mounted on anti-vibration supports, complete with oil charge, they are enclosed in a soundproofed compartment and equipped with an automatically controlled oil heating system to avoid oil dilution by the refrigerant when the compressor is stopped.



The compressor motor is a permanent magnets, brushless, alternating current motor controlled by a trapezoidal wave driver operating in the frequency field ranging from 30 to 120 Hz (BLDC "Brushless Direct Current" Technology)

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 condensation control adjusts fan speed to actual operating conditions. This results in better working conditions, reduction of sound levels under partial load conditions and possibility of operating in cooling mode beyond conventional working limits (up to an outdoor air temperature of -10°C).



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

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 HYDRONIC KITS

- High head modulating 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

- BLDC-type compressor housed in a compartment that can be sound insulated.
- Brazed plate heat exchangers made of AISI 316 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
- Electronically controlled electric thermostatic valve, with external equalisation and integrated MOP function
- Cycle-reversing valve (MPI DC H)
- Single-acting valves (MPI DC H)
- Liquid receiver (MPI DC 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-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.

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 MPI DC unit. It can be easily accessed through a polycarbonate flap with IP65 protection rating.



The modulation of capacity enables the unit to operate even in systems where the water content is low, without the use of an inertial water buffer tank. 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.

Main functions:

- Continuous modulation of compressor capacity
- Control of outlet temperature
- Control over the temperature of water entering the evaporator
- Defrosting management (MPI DC-H)
- Control of fan speed
- 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
- Control of pump speed

Devices controlled:

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

ELECTRIC CONTROL BOARD

Electric control board constructed and wired in accordance with the Directive on electromagnetic compatibility and related standards. Made of steel sheet, it is also protected by the enclosing panels of the unit.

OPTIONS

- Water storage
- Low noise execution
- Refrigerant pressure gauges
- Antifreeze heating elements on the water circuit
- Special exchangers (hydrophilic treatment, copper-copper, cataphoresis, anti-corrosion)



ACCESSORIES AVAILABLE

- Remote control boards
- Base vibration dampers
- Metal grilles to protect exchangers
- EC fans

RATED TECHNICAL DATA OF WATER CHILLERS

MPI DC - C		010 M	014	018	023	029
Power supply	V-ph-Hz	230-1-50	400-3N-50	400-3N-50	400-3N-50	400-3N-50
Rated cooling capacity	kW	10,6	14,3	18,2	22,9	29,1
Total power input	kW	3,35	4,78	7,63	7,77	12,3
EER (rated capacity)		3,16	2,99	2,39	2,95	2,37
Total input power with pump	kW	3,6	5,3	8,2	8,3	12,9
Maximum power input	kW	5,6	7,1	10,7	10,8	21,9
Maximum absorbed current	A	26,6	20,0	22,0	28,5	43,0
Starting current	A	10	10	10	10	10
No. of compressors / circuits		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Refrigerant charge	kg	3,5	4,1	4,1	5,7	5,7
High / low pressure switch	bar.g	42 / 2	42 / 2	42 / 2	42 / 2	42 / 2
No. of axial fans		2	2	2	4	4
Air flow rate	m ³ /h	6.939	6.939	6.939	11.438	11.438
Water flow rate	l/h	1826	2454	3132	3935	4992
Diameter of water connections	inches	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
Pressure drop, water side	kPa	23	35	35	36	36
Available head	kPa	130	120	120	98	98
Water content, excluding optionals	dm ³	3,0	3,0	3,0	5,0	5,0
Expansion tank	dm ³	5	5	5	5	5
Buffer tank	dm ³	30	30	30	50	50
Height	mm	1250	1250	1250	1300	1300
Length	mm	1220	1220	1220	1565	1565
Depth	mm	560	560	560	600	600
Sound power level	dB(A)	70	71	71	74	74
Sound pressure level	dB(A)	42	43	43	46	46
Transport weight*	kg	210	210	210	285	285
Operating weight*	kg	235	235	235	335	335

* Weights refer to model with pump and buffer tank

- 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 power 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).

RATED TECHNICAL DATA OF HEAT PUMPS

MPI DC - H		008 M	010 M	014	018	023	029
Power supply	V-ph-Hz	230-1-50	230-1-50	400-3N-50	400-3N-50	400-3N-50	400-3N-50
Rated cooling capacity	kW	7,96	10,4	14,0	17,9	22,5	28,5
Total power input	kW	2,62	3,35	4,78	7,63	7,77	12,3
EER (rated capacity)		3,04	3,10	2,93	2,35	2,90	2,32
Total input power with pump	kW	2,8	3,6	5,3	8,2	8,3	12,9
Rated heating capacity	kW	8,89	11,5	15,7	21,6	24,6	33,7
Total power input in heating mode	kW	2,81	3,56	4,96	7,48	7,86	11,7
COP (rated capacity)		3,16	3,23	3,17	2,89	3,13	2,88
Total input power with pump in heating mode	kW	3,0	4,1	5,5	8,0	8,4	12,3
Maximum power input	kW	4,1	5,6	7,1	10,7	10,8	21,9
Maximum absorbed current	A	16	26,6	20,0	22,0	28,5	43,0
Starting current	A	10	10	10	10	10	10
No. of compressors / circuits		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Refrigerant charge	kg	2,1	4,1	4,4	4,4	6,0	6,0
High / low pressure switch	bar	42 / 2	42 / 2	42 / 2	42 / 2	42 / 2	42 / 2
No. of axial fans		1	2	2	2	4	4
Air flow rate	m ³ /h	4680	6939	6.939	6.939	11.438	11.438
Water flow rate in cooling mode	l/h	1367	1.789	2.407	3.072	3.861	4.898
Water flow rate in heating mode	l/h	1545	1.974	2.727	3.752	4.273	5.853
Diameter of water connections	"	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
Water pressure drop (cooling)	kPa	6	22	33	33	34	34
Water pressure drop (heating)	kPa	7	23	36	36	40	40
Available head (cooling)	kPa	93	130	120	120	98	98
Available head (heating)	kPa	95	120	110	110	80	80
Water content, excluding optionals	dm ³	2	3	3	3	5	5
Expansion tank	dm ³	1	5	5	5	5	5
Buffer tank	dm ³	19,5	30	30	30	50	50
Height	mm	758	1250	1250	1250	1300	1300
Length	mm	1241	1220	1220	1220	1565	1565
Depth	mm	582	560	560	560	600	600
Sound power level	dB(A)	68	70	71	71	74	74
Sound pressure level	dB(A)	40	42	43	43	46	46
Transport weight*	kg	144	220	220	220	300	300
Operating weight*	kg	153	240	240	240	347	347

* Weights refer to model with pump and buffer tank

- 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 power 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).