

Date: **July 2007**

Supersedes: **none**

# Inverter air to water heat pumps

**McEnergy HPI**

**067.2÷104.2**

**Cooling capacity from 249 to 385 kW**

**Heating capacity from 274 to 412 kW**

**Refrigerant: R-134a**

**HFC 134a**  
ecological refrigerant



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**McQuay**  
Air Conditioning

# McEnergy – Inverter air to water heat pump

McEnergy is the solution for the most stringent requirements of comfort cooling, heating, ice storage and process applications, in 249kW÷385kW range for cooling and 274kW÷412kW range for heating.

It has been designed for minimising energy cost and maximising capacity.

Inverter driven on McQuay Frame3100 single screw compressor allows matching the thermal demand even above the rated values (from 15,5% of nominal load to boost capacity). Rating tables include both nominal and boost capacity values.

## Lower noise – higher flexibility

The compressor allows a constant gas flow. This compression process eliminates completely gas pulsations.

The extremely low noise compressor performance allows the use of McEnergy HPI for all applications.

The quiet operation eliminates noise transmission through the structure and the water piping system.

## Code requirements

The heat pump has been designed and is manufactured in accordance with following European Directives that are equivalent to American Air-Conditioning Industry codes:

Chiller rating	<b>EN 12055</b>
Pressure vessel approval	<b>PED</b>
Electrical Codes	<b>IEC 204-1 CEI 44-5 Elect. &amp; Safety Codes</b>
Machine Safety, Electrical Codes	<b>CEI – EN 60204 – 1</b>
Machinery Directive	<b>98 / 37 / EC as modified</b>
Electromagnetic Compatibility Directive	<b>89 / 336 / EEC as modified</b>
Low-voltage Directive	<b>73 / 23 / EEC as modified</b>
Manufacturing Quality Standard	<b>ISO 9001:2000</b>

## Infinitely variable capacity control

Capacity control is infinitely variable. This modulation allows matching exactly the building load. The result is energy cost decrease, mainly at part-load conditions, where the unit runs most of the time.

Furthermore, with the infinitely variable capacity control, in some cases the inertial tank could be not requested for the water circuit.

## 2 versions

- **ST** Standard version      80,3 ÷ 80,0 dBA
- **LN** Low noise      76,3 ÷ 73,7 dBA

**ST**      Condenser fans rotating at 890 rpm.

**LN**      Condenser fans rotating at 705 rpm in cooling mode and 890 rpm in heating mode; compressors and evaporator sound proof cabinet.

## Compressors serviceability

Inspection covers allows visual inspection of the main screw and the gate-rotor even on side.

## Reliability

Each unit is pressure tested, evacuated and charged with refrigerant. It is then tested at the factory's test bench. For each safety and operating control is verified the correct setting and operation.

# General characteristics

## Cabinet and structure

The cabinet is made of galvanized steel sheet and painted to provide a high resistance to corrosion. The base frame has rings for lifting the unit with ropes for an easy installation. The weight is uniformly distributed along the profiles of the base and this facilitates the arrangement of the unit.

## **Screw compressors with integrated oil separator**

The compressors are semi-hermetic, single-screw type with gate-rotor (made of carbon impregnated engineered composite material).

Each compressor has one inverter managed by the unit microprocessor for infinitely modulating the capacity.

An integrated high efficiency oil separator maximises the oil separation.

Start is inverter type.

## **Ecological HFC 134a refrigerant**

The compressors have been designed to operate with R-134a, ecological refrigerant with zero ODP (Ozone Depletion Potential) and very low GWP (Global Warming Potential) that means low TEWI (Total Equivalent Warming Impact).

## **Evaporator**

The evaporator is shell and tubes, direct expansion, with refrigerant inside the tubes and water outside. The evaporator has 2 refrigerant circuits. An electrical heater prevents freezing down to -28 °C ambient temperature. 10mm closed cell insulation material covers the evaporator. Vessel approval is according to PED.

## **Condenser coils**

McEnergy HPI units are manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into McQuay lanced and rippled aluminium condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase in cooling capacity without increasing the power input.

## **Condenser coil fans**

The condenser fans are helical type with wing-profile blades for achieving better performance. Each fan is protected by a guard. The motors are IP54. Fans thermal relays are supplied as standard.

## **Electronic expansion valve**

McEnergy HPI is equipped with advanced electronic expansion valves for precise control of refrigerant mass flow. McEnergy HPI electronic expansion valve proposes features that makes it unique: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, highly linear flow capacity, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.

## **Electrical control panel**

Power and control are located in two sections of the main panel that is manufactured to ensure protection against all weather conditions.

The power panel is fitted with an interlocked door main isolator to prevent access while power supply is on. Electrical panel is IP54.

The power section includes compressors inverters, fans contactors, fans thermal relays and control circuit transformer.

## **Intelligent Compressor Start Mode**

Control software includes an intelligent compressor start mode that unloads the first compressor to 75% during the start of the second one, in order to reduce inrush current.

## **Certifications**

Every unit is designed, manufactured, tested according to CE mark (89/392).

Quality management system is in compliance with UNI - EN ISO 9001:2000 standards.

## **Water content in cooling circuits**

The cooled water distribution circuits should have minimum water content to avoid excessive compressors start and stop.

In fact, each time the compressor starts up, an excessive quantity of oil goes from the compressor sump and simultaneously there is a rise in the temperature of the compressor motor's stator due to the inrush current during the start-up. To prevent damage to the compressors, McQuay has envisaged the application of a device to limit frequent stops and restarts.

During the span of one hour there will be no more than 6 starts of the compressor. The plant side should therefore ensure that the overall water content allows a more constant functioning of the unit and consequently greater

environmental comfort. The minimum water content per unit should be calculated with a certain approximation using this simplified formula:

$$(1) \quad Q = 35,83 \times \frac{P \text{ (kW)}}{\Delta T (^{\circ}\text{C})}$$

where:

Q = minimum water content per unit expressed in litres

P = minimum cooling capacity of the unit expressed in kW

$\Delta T$  = evaporator entering / leaving water temperature difference expressed in  $^{\circ}\text{C}$

For more accurate determination of quantity of water, it is advisable to contact the designer of the plant.

## MicroTech II C Plus controller

MicroTech II C Plus controller is installed as standard; it can be used to modify unit set-points and check control parameters. A built-in display shows machine's operating status, programmable values, set-points, like temperatures and pressures of water, refrigerant and air. Device controls maximise the chiller energy efficiency and the reliability. A sophisticated software with predictive logic, select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions and maximise energy efficiency. The compressors are automatically rotated to ensure equal operating hours. MicroTech II C Plus protects critical components in response to external signals from its system sensors measuring: motor temperatures, refrigerant gas and oil pressures, correct phase sequence and evaporator.

### Control section - main features

- Management of the compressor capacity slide and fans modulation.
- Chillers enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value,
  - high thermal load,
  - high evaporator entering water temperature (start-up).
- Display of evaporator entering/leaving water temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water cooled temperature regulation. Temperature tolerance = 0,1  $^{\circ}\text{C}$ .
- Compressors and evaporator/condenser pumps hours counter.
- Display of Status Safety Devices.
- Start up numbers and compressors working hours equalization.
- Optimized management of compressors load.
- Fans management according to condensing pressure.
- Automatic re-start in case of power supply interruption (adjustable).
- Soft Load.
- Start at high evaporator water temperature.
- Return Reset.
- AOT Reset (optional).
- Set point Reset (optional).

### Safety for each refrigerant circuit

- High pressure (pressure switch).
- Low pressure (pressure switch).
- Condensation fan Magneto-thermal.
- High Discharge Temperature on the compressor.
- Phase Monitor.
- Low pressure ratio.
- High oil pressure drop.
- Low oil pressure.

## System security

- Phase monitor.
- Freeze protection.

## Regulation type

Proportional + integral + derivative regulation on the leaving water evaporator output probe.

## Condensation

The condensation can be carried out according to temperature or pressure or pressure ratio. The fans can be managed according to ON/OFF mode or to a 0/10 V modulating signal or both (speedtrol).

## MicroTech II C Plus terminal

MicroTech II C Plus built-in terminal has the following features.

- 4-lines by 20-character liquid crystal display back lighting.
- Key-pad consisting of 6 keys.
- Memory to protect the data.
- General faults alarm relays.
- Password access to modify the setting.
- Service report displaying all running hours and general conditions.
- Alarm history memory to allow an easy fault analysis.

## PlantVisor™:

### Solution for tele-maintenance and supervisory

MicroTech II C Plus can be monitored locally or via modem or GSM by PlantVisor™ supervision program. PlantVisor™ is compatible with Windows NT, 2000, XP. It is based on 16 bit WEB technology.

It allows the followings functions.

- Unit status monitoring.
- Circuits status monitoring.
- Set-points modification.
- Alarms display.

## MicroTech II C Plus remote control

MicroTech II C Plus is able to communicate to BMS (Building Management System) if the protocol is one of the following.

- CAREL.
- Modbus.
- LonWorks.
- BacNet point to point.

## Standard accessories (supplied on basic unit)

**Inverter starter** – For low inrush current and reduced starting torque.

**Double set-point** – Dual leaving water temperature set-points.

**Ambient outside temperature sensor and set-point reset.**

**Soft Load.**

**Fans thermal overload relays** - Safety devices against fan motor overloading in addition to the normal protection envisaged by the electrical windings.

**Phase monitor** – The phase monitor controls that phases sequence is correct and controls phase loss.

**Evaporator electric heater** – Electric heater controlled by a thermostat to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.

**Victaulic evaporator water connection** – Hydraulic joint with gasket for an easy and quick water connection.

**Electronic Expansion Valve.**

**Victaulic water connections.**

**General fault relay** – Contactor for alarm warning.

**Discharge line shut off valves** – Installed on the discharge port of the compressor.

**Suction line shut off valve** – Suction shut-off valve installed on the suction port of the compressor to facilitate maintenance operation.

**Hour run meter.**

**Low pressure manometers.**

## Options (on request)

**Partial heat recovery** – Produced with plate to plate heat exchangers installed between the compressor discharge and the condenser coil. These allow hot water to be produced up to a maximum temperature of 55°C.

**Brine version** – Set-point can go down to -8°C.

**Fan speed control device** – This device allows the continuous variation of the fan speed, modifying the air flow according to the external temperature conditions. It allows the unit working with air temperature down to -10°C.

**Fan Silent Mode** - The microprocessor clock switches the fan at low speed according to the client setting (i.e. Night & Day), providing that the ambient temperature/condensing pressure is allowing the speed change. It allows a perfect condensing control down to -10°C.

**Cu-Cu condensing coils** - To give better protection against corrosion by aggressive environments.

**Cu-Cu-Sn condensing coils** - To give better protection against corrosion in aggressive environments and by salty air.

**Alucoat condensing coils** - Fins are protected by a special acrylic paint with a high resistance to corrosion.

**20mm insulation on evaporator.**

**Flow switch** - Supplied separately to be wired and installed on the evaporator water piping (by the customer).

**High pressure manometers.**

**Set-point reset and demand limit.**

**Spreader bars** - Facilitate the lifting of the units keeping the ropes away from the unit's casing.

**Under/Over Voltage** – This device control the voltage value and stop the chiller when this exceeds limits set by customer.

**Alarm from external device** – Microprocessor is able to receive an alarm signal from an external device (pump etc...). User can decide if this alarm signal will stop or not the unit.

**Rubber type antivibration mounts** - Supplied separately, these are positioned under the base of the unit during installation. Ideal to reduce the vibrations when the unit is floor mounted.

**Spring type antivibration mounts** - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

**Witness tests** - Every unit is always tested at the test bench prior to the shipment. On request, a second test can be carried out, at customer's presence, in accordance with the procedures indicated on the test form. (Not available for units with glycol mixtures).

**Kit container.**

**Water circulation pump (low or high lifting)** – Not available for 067.2÷080.2 LN units. Hydronic kit consists of: one centrifugal pump direct driven, expansion tank, water feed circuit with pressure gauge, safety valve. The pump motor is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel.

**Two water circulation pumps (low or high lifting)** – Not available for 067.2÷080.2 LN units. Hydronic kit consists of: two centrifugal pumps direct driven, expansion tank, water feed circuit with pressure gauge, safety valve. The pumps motors are protected by circuit breakers installed in control panel. The kit is assembled and wired to the control panel.

**Inertial tank with cabinet ( 500 l or 1000 l )** – Piping to unit are not included and electric heater power supply has to be provided from external source.

# Installation notes

## Handling

Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base, and block the pushing vehicle away from the unit to prevent damage to the cabinet. Never allow the unit fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

## Location

McEnergy HPI 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 condenser air. The unit should be positioned on solid foundations and perfectly level; 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's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

## Space requirements

McEnergy HPI units are air-cooled, hence it is important to observe the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.

To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation.

Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity. McEnergy HPI performance is less affected in poor air flow situations because of its special condensing coil geometry.

Moreover McQuay unique microprocessor has the ability to calculate the operating environment of the heat pump and the capacity to optimize its performance staying on-line during abnormal conditions.

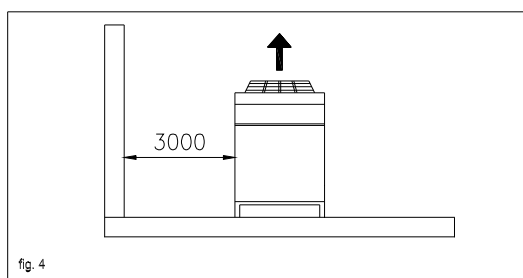
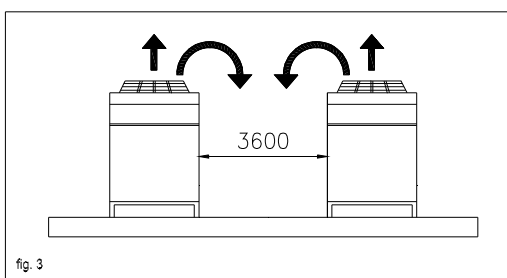
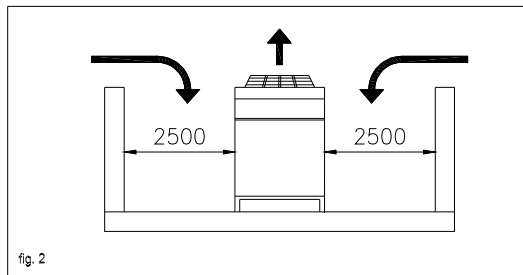
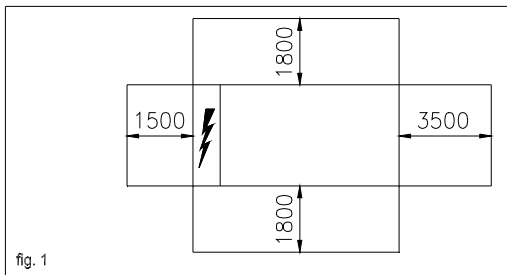
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.

Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.

If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (fig.4). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. Once again, the microprocessor will allow the chiller to stay on line, producing the maximum available capacity, even at less than recommended lateral clearances.

When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (fig.3); strong wind could be the cause of air warm recirculation.

For other installation solutions, consult McQuay technicians.



## Acoustic protection

When noise level must meet special requirements, it is necessary to pay the maximum attention to ensure the perfect insulation of the unit from the support base by applying appropriate vibration-dampening devices on the unit, on the water pipes and on the electrical connections.

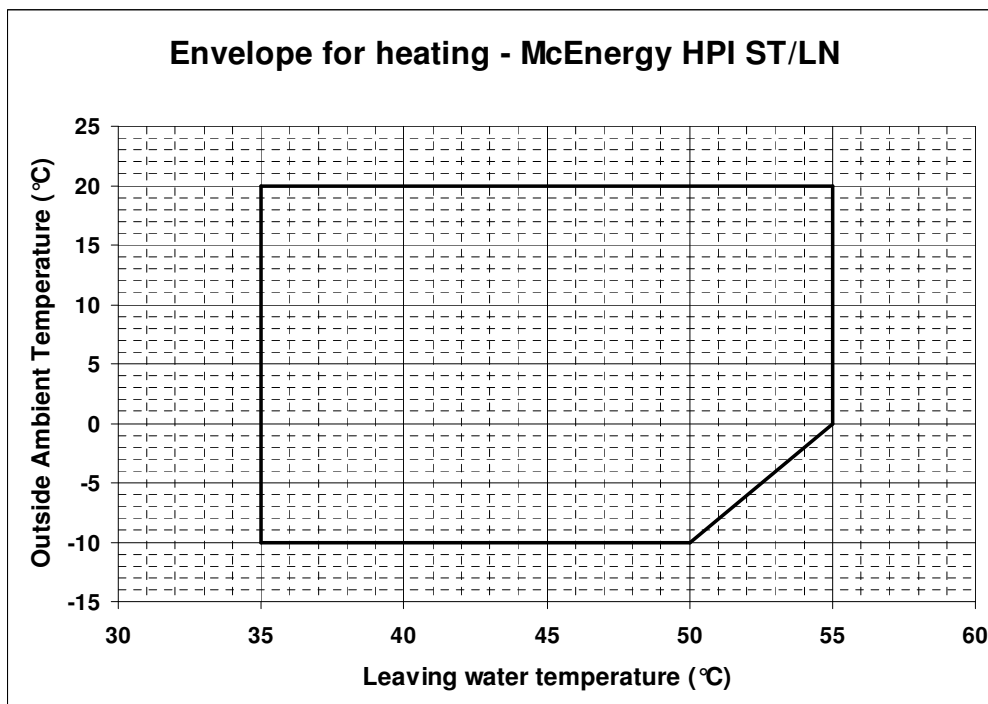
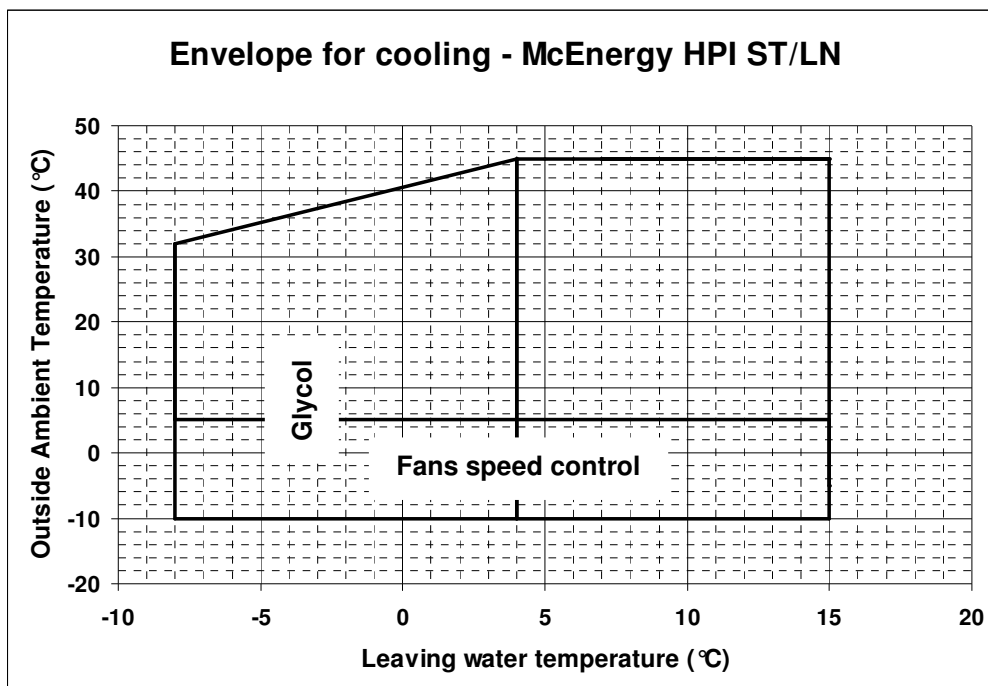
## Storing

The environment conditions have to be in the following limits:

Minimum ambient temperature	:	-20°C
Maximum ambient temperature	:	+57°C
Maximum R.H.	:	95% not condensing

## Operating limits – McEnergy HPI

Max evaporator $\Delta T$	°C	8
Min evaporator $\Delta T$	°C	4





**Table 1 – Evaporator fouling factors**

Fouling factors m <sup>2</sup> °C / kW	Cooling capacity correction factor	Power input correction factor	COP correction factor
0,0176	1,000	1,000	1,000
0,0440	0,978	0,986	0,992
0,0880	0,957	0,974	0,983
0,1320	0,938	0,962	0,975

**Table 2 – 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 cap. 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 3 – Ethylene glycol and low ambient temperature correction factors**

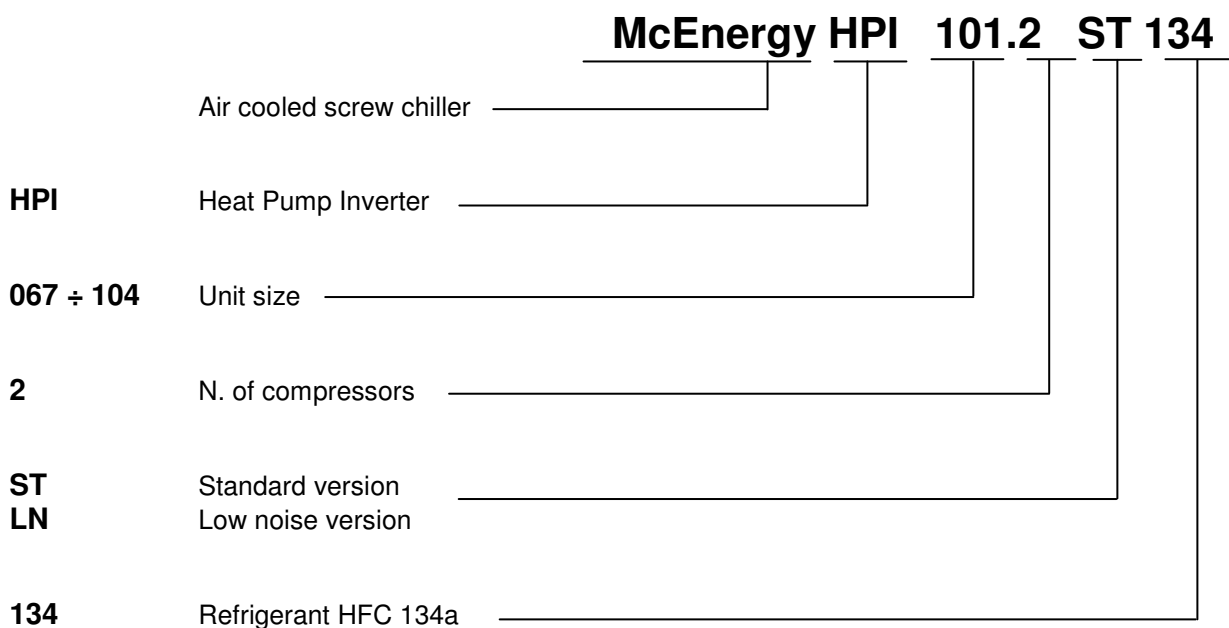
Air ambient temperature °C	-3	-8	-15	-23	-35
% of ethylene glycol by weight	10	20	30	40	50
Cooling capacity correction factor	0,991	0,982	0,972	0,961	0,946
Power input correction factor	0,996	0,992	0,986	0,976	0,966
Flow rate correction factor	1,013	1,040	1,074	1,121	1,178
Water pressure drops correction factor	1,070	1,129	1,181	1,263	1,308

**Table 4 – Low temperature operation performance factors**

Ethylene glycol/water leaving 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 compressors correction factor	0,95	0,94	0,92	0,89	0,87	0,84
Min. % of ethylene glycol	10	20	20	30	30	30

Low temperature operation performance factors must be applied to the nominal performance data to have the adjusted value (12/7°C, design ambient temperature).

**Nomenclature**



# Specifications

TECHNICAL SPECIFICATIONS				McEnergy HPI ST	067.2	075.2	080.2	086.2
Capacity	Cooling		kW	255	275	298	321	
	Heating		kW	274	306	330	341	
Capacity control	Type			Stepless				
	Minimum capacity		%	15,5	15,5	15,5	15,5	
Unit power input	Cooling		kW	89,8	99,3	108	116	
	Heating		kW	89,5	99,1	108	117	
EER				2,84	2,77	2,76	2,77	
COP				3,06	3,09	3,06	2,91	
ESEER				4,12	4,08	3,99	3,98	
Casing	Colour			RAL7032				
	Material			Galvanized and painted steel sheet				
Dimensions	Unit	Height	mm	2335	2335	2335	2335	
		Width	mm	2254	2254	2254	2254	
		Depth	mm	3547	3547	3547	4783	
Weight	Unit		kg	3370	3370	3370	4020	
	Operating Weight		kg	3500	3500	3500	4150	
Water heat exchanger	Type			Shell and tube				
	Water volume		l	138	138	138	133	
	Nominal water flow rate	Cooling	l/min	731	788	854	920	
		Heating	l/min	785	877	946	978	
	Nominal Water pressure drop	Cooling	kPa	60	65	74	50	
Heating		kPa	69	79	90	56		
Insulation material				Closed cell foam elastomer				
Air heat exchanger	Type			Louvred fins – Grooved tubes				
Fan	Type			Axial				
	Drive			Direct drive				
	Diameter		mm	800	800	800	800	
	Nominal air flow		m³/min	1932	1914	1908	2580	
	Model	Quantity		6	6	6	8	
		Speed in cooling	rpm	890	890	890	890	
		Motor output in cool.	W	1730	1730	1730	1730	
		Speed in heating	rpm	890	890	890	890	
Motor output in heat.		W	1730	1730	1730	1730		
Compressor	Type			Semi-hermet. single screw compr.				
	Oil charge		l	26	26	26	26	
	Quantity			2	2	2	2	
Sound level	Sound Power	Cooling	dBA	99,5	99,5	99,5	100,4	
		Heating	dBA	99,5	99,5	99,5	100,4	
	Sound Pressure	Cooling	dBA	80,0	80,0	80,0	80,3	
		Heating	dBA	80,0	80,0	80,0	80,3	
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a	
	Refrigerant charge		kg	76	76	84	96	
	N. of circuits			2	2	2	2	
Piping connections	Evaporator water inlet/outlet			5"	5"	5"	5"	
Safety devices	High pressure (pressure switch)							
Safety devices	Low pressure (pressure switch)							
Safety devices	Condensation fan magneto-thermal							
Safety devices	High discharge temperature on the compressor							
Safety devices	Phase monitor							
Safety devices	Low pressure ratio							
Safety devices	High oil pressure drop							
Safety devices	Low oil pressure							
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.							
	Heating capacity, unit power input in heating and COP are based on the following conditions: condenser 40°C/45°C; ambient 7°CDB/6°CWB.							

ELECTRICAL SPECIFICATIONS		McEnergy HPI ST	067.2	075.2	080.2	086.2	
Power Supply	Phase		3~	3~	3~	3~	
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
Maximum		%	+10%	+10%	+10%	+10%	
Unit	Maximum starting current		A	173	174	174	207
	Nominal running current cooling		A	142	156	169	183
	Nominal running current heating		A	142	155	168	186
	Maximum running current		A	208	208	208	246
	Maximum current for wires sizing		A	229	229	229	270
Fans	Nominal running current in cooling		A	19,8	19,8	19,8	26,4
	Nominal running current in heating		A	19,8	19,8	19,8	26,4
Compressor	Phase		3~	3~	3~	3~	
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	188	188	188	219
Starting method		Inverter					
Notes	Allowed voltage tolerance $\pm 10\%$ . Voltage unbalance between phases must be within $\pm 3\%$ .						
	Nominal current in cooling mode is referred to installation with 25kA short circuit current and is based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						
	Nominal current in heating mode is referred to installation with 25kA short circuit current and is based on the following conditions: condenser 40°C/45°C; ambient 7°CDB/6°CWB.						
	Maximum starting current: starting current of biggest compressor + 75% of maximum current of the other compressor + fans current for the circuit at 75%.						
Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.							

TECHNICAL SPECIFICATIONS				McEnergy HPI ST	090.2	101.2	104.2
Capacity	Cooling		kW	343	368	385	
	Heating		kW	361	397	412	
Capacity control	Type			Stepless			
	Minimum capacity		%	15,5	15,5	15,5	
Unit power input	Cooling		kW	123	132	142	
	Heating		kW	123	131	139	
EER				2,79	2,79	2,71	
COP				2,93	3,03	2,96	
ESEER				4,00	4,08	3,81	
Casing	Colour			RAL7032			
	Material			Galvaniz. and painted steel sheet			
Dimensions	Unit	Height	mm	2335	2335	2335	
		Width	mm	2254	2254	2254	
		Depth	mm	4783	4783	4783	
Weight	Unit		kg	4020	4020	4020	
	Operating Weight		kg	4150	4150	4150	
Water heat exchanger	Type			Shell and tube			
	Water volume		l	133	128	128	
	Nominal water flow rate	Cooling	l/min	983	1055	1104	
		Heating	l/min	1035	1138	1181	
	Nominal Water pressure drop	Cooling	kPa	53	60	65	
		Heating	kPa	58	69	74	
Insulation material			Closed cell foam elastomer				
Air heat exchanger	Type			Louvred fins – Grooved tubes			
Fan	Type			Axial			
	Drive			Direct drive			
	Diameter		mm	800	800	800	
	Nominal air flow		m³/min	2580	2568	2544	
	Model	Quantity		8	8	8	
		Speed in cooling	rpm	890	890	890	
		Motor output in cool.	W	1730	1730	1730	
		Speed in heating	rpm	890	890	890	
	Motor output in heat.	W	1730	1730	1730		
Compressor	Type			Semi-hermet. single screw compr.			
	Oil charge		l	26	26	26	
	Quantity			2	2	2	
Sound level	Sound Power	Cooling	dBA	100,4	100,4	100,4	
		Heating	dBA	100,4	100,4	100,4	
	Sound Pressure	Cooling	dBA	80,3	80,3	80,3	
		Heating	dBA	80,3	80,3	80,3	
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	
	Refrigerant charge		kg	104	104	104	
	N. of circuits			2	2	2	
Piping connections	Evaporator water inlet/outlet			5"	5"	5"	
Safety devices	High pressure (pressure switch)						
Safety devices	Low pressure (pressure switch)						
Safety devices	Condensation fan magneto-thermal						
Safety devices	High discharge temperature on the compressor						
Safety devices	Phase monitor						
Safety devices	Low pressure ratio						
Safety devices	High oil pressure drop						
Safety devices	Low oil pressure						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						
	Heating capacity, unit power input in heating and COP are based on the following conditions: condenser 40°C/45°C; ambient 7°CDB/6°CWB.						

ELECTRICAL SPECIFICATIONS			McEnergy HPI ST	090.2	101.2	104.2
Power Supply	Phase			3~	3~	3~
	Frequency		Hz	50	50	50
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
Maximum		%	+10%	+10%	+10%	
Unit	Maximum starting current		A	230	231	231
	Nominal running current cooling		A	193	209	220
	Nominal running current heating		A	192	205	219
	Maximum running current		A	276	276	276
	Maximum current for wires sizing		A	304	304	304
Fans	Nominal running current in cooling		A	26,4	26,4	26,4
	Nominal running current in heating		A	26,4	26,4	26,4
Compressor	Phase			3~	3~	3~
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
	Maximum running current		A	250	250	250
Starting method		Inverter				
Notes	Allowed voltage tolerance $\pm 10\%$ . Voltage unbalance between phases must be within $\pm 3\%$ .					
	Nominal current in cooling mode is referred to installation with 25kA short circuit current and is based on the following conditions: evaporator 12 °C/7 °C; ambient 35 °C.					
	Nominal current in heating mode is referred to installation with 25kA short circuit current and is based on the following conditions: condenser 40 °C/45 °C; ambient 7 °CDB/6 °CWB.					
	Maximum starting current: starting current of biggest compressor + 75% of maximum current of the other compressor + fans current for the circuit at 75%.					
Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.						

TECHNICAL SPECIFICATIONS		McEnergy HPI LN	067.2	075.2	080.2	086.2	
Capacity	Cooling	kW	249	269	289	310	
	Heating	kW	274	306	330	341	
Capacity control	Type		Stepless				
	Minimum capacity	%	15,5	15,5	15,5	15,5	
Unit power input	Cooling	kW	88,6	99,9	111	114	
	Heating	kW	89,5	99,1	108	117	
EER			2,81	2,69	2,60	2,72	
COP			3,06	3,09	3,06	2,91	
ESEER			4,06	4,05	3,99	3,93	
Casing	Colour		RAL7032				
	Material		Galvanized and painted steel sheet				
Dimensions	Unit	Height	mm	2335	2335	2335	2335
		Width	mm	2254	2254	2254	2254
		Depth	mm	3547	3547	3547	4783
Weight	Unit	kg	3340	3340	3340	4350	
	Operating Weight	kg	3830	3830	3830	4480	
Water heat exchanger	Type		Shell and tube				
	Water volume	l	138	138	138	133	
	Nominal water flow rate	Cooling	l/min	714	771	828	889
		Heating	l/min	785	877	946	978
	Nominal Water pressure drop	Cooling	kPa	58	63	71	47
		Heating	kPa	69	79	90	56
Insulation material			Closed cell foam elastomer				
Air heat exchanger	Type		Louvred fins – Grooved tubes				
Fan	Type		Axial				
	Drive		Direct drive				
	Diameter	mm	800	800	800	800	
	Nominal air flow	m <sup>3</sup> /min	1470	1446	1434	1962	
	Model	Quantity		6	6	8	8
		Speed in cooling	rpm	705	705	705	705
		Motor output in cool.	W	900	900	900	900
		Speed in heating	rpm	890	890	890	890
Motor output in heat.		W	1730	1730	1730	1730	
Compressor	Type		Semi-hermet. single screw compr.				
	Oil charge	l	26	26	26	26	
	Quantity		2	2	2	2	
Sound level	Sound Power	Cooling	dBA	93,2	93,2	93,2	94,2
		Heating	dBA	95,6	95,6	95,6	96,4
	Sound Pressure	Cooling	dBA	73,7	73,7	73,7	74,1
		Heating	dBA	76,1	76,1	76,1	76,3
Refrigerant circuit	Refrigerant type		R-134a	R-134a	R-134a	R-134a	
	Refrigerant charge	kg	76	76	84	96	
	N. of circuits		2	2	2	2	
Piping connections	Evaporator water inlet/outlet		5"	5"	5"	5"	
Safety devices	High pressure (pressure switch)						
Safety devices	Low pressure (pressure switch)						
Safety devices	Condensation fan magneto-thermal						
Safety devices	High discharge temperature on the compressor						
Safety devices	Phase monitor						
Safety devices	Low pressure ratio						
Safety devices	High oil pressure drop						
Safety devices	Low oil pressure						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						
	Heating capacity, unit power input in heating and COP are based on the following conditions: condenser 40°C/45°C; ambient 7°CDB/6°CWB.						

ELECTRICAL SPECIFICATIONS			McEnergy HPI LN	067.2	075.2	080.2	086.2
Power Supply	Phase			3~	3~	3~	3~
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
Maximum		%	+10%	+10%	+10%	+10%	
Unit	Maximum starting current		A	173	174	174	207
	Nominal running current cooling		A	143	159	174	185
	Nominal running current heating		A	142	155	168	186
	Maximum running current		A	208	208	208	245
	Maximum current for wires sizing		A	229	229	229	270
Fans	Nominal running current in cooling		A	16,2	16,2	16,2	21,6
	Nominal running current in heating		A	19,8	19,8	19,8	26,4
Compressor	Phase			3~	3~	3~	3~
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	188	188	188	219
Starting method		Inverter					
Notes	Allowed voltage tolerance $\pm 10\%$ . Voltage unbalance between phases must be within $\pm 3\%$ .						
	Nominal current in cooling mode is referred to installation with 25kA short circuit current and is based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						
	Nominal current in heating mode is referred to installation with 25kA short circuit current and is based on the following conditions: condenser 40°C/45°C; ambient 7°CDB/6°CWB.						
	Maximum starting current: starting current of biggest compressor + 75% of maximum current of the other compressor + fans current for the circuit at 75%.						
Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.							

TECHNICAL SPECIFICATIONS				McEnergy HPI LN	090.2	101.2	104.2
Capacity	Cooling		kW	331	356	373	
	Heating		kW	361	397	412	
Capacity control	Type			Stepless			
	Minimum capacity		%	15,5	15,5	15,5	
Unit power input	Cooling		kW	121	133	143	
	Heating		kW	123	131	139	
EER				2,74	2,68	2,61	
COP				2,93	3,03	2,96	
ESEER				3,96	4,06	3,78	
Casing	Colour			RAL7032			
	Material			Galvaniz. and painted steel sheet			
Dimensions	Unit	Height	mm	2335	2335	2335	
		Width	mm	2254	2254	2254	
		Depth	mm	4783	4783	4783	
Weight	Unit		kg	4350	4350	4350	
	Operating Weight		kg	4480	4480	4480	
Water heat exchanger	Type			Shell and tube			
	Water volume		l	133	128	128	
	Nominal water flow rate	Cooling	l/min	949	1021	1069	
		Heating	l/min	1035	1138	1181	
	Nominal Water pressure drop	Cooling	kPa	50	56	62	
		Heating	kPa	58	69	74	
Insulation material			Closed cell foam elastomer				
Air heat exchanger	Type			Louvred fins – Grooved tubes			
Fan	Type			Axial			
	Drive			Direct drive			
	Diameter		mm	800	800	800	
	Nominal air flow		m³/min	1962	2046	2244	
	Model	Quantity		8	8	8	
		Speed in cooling	rpm	705	705	705	
		Motor output in cool.	W	900	900	900	
		Speed in heating	rpm	890	890	890	
Motor output in heat.		W	1730	1730	1730		
Compressor	Type			Semi-hermet. single screw compr.			
	Oil charge		l	26	26	26	
	Quantity			2	2	2	
Sound level	Sound Power	Cooling	dBA	94,2	94,2	94,2	
		Heating	dBA	96,4	96,4	96,4	
	Sound Pressure	Cooling	dBA	74,1	74,1	74,1	
		Heating	dBA	76,3	76,3	76,3	
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	
	Refrigerant charge		kg	104	104	104	
	N. of circuits			2	2	2	
Piping connections	Evaporator water inlet/outlet			5"	5"	5"	
Safety devices	High pressure (pressure switch)						
Safety devices	Low pressure (pressure switch)						
Safety devices	Condensation fan magneto-thermal						
Safety devices	High discharge temperature on the compressor						
Safety devices	Phase monitor						
Safety devices	Low pressure ratio						
Safety devices	High oil pressure drop						
Safety devices	Low oil pressure						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						
	Heating capacity, unit power input in heating and COP are based on the following conditions: condenser 40°C/45°C; ambient 7°CDB/6°CWB.						



ELECTRICAL SPECIFICATIONS		McEnergy HPI LN	090.2	101.2	104.2	
Power Supply	Phase		3~	3~	3~	
	Frequency		Hz	50	50	50
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
Maximum		%	+10%	+10%	+10%	
Unit	Maximum starting current		A	230	231	231
	Nominal running current cooling		A	197	213	227
	Nominal running current heating		A	192	205	219
	Maximum running current		A	276	276	276
	Maximum current for wires sizing		A	304	304	304
Fans	Nominal running current in cooling		A	21,6	21,6	21,6
	Nominal running current in heating		A	26,4	26,4	26,4
Compressor	Phase		3~	3~	3~	
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
	Maximum running current		A	250	250	250
Starting method						
Notes	Allowed voltage tolerance $\pm 10\%$ . Voltage unbalance between phases must be within $\pm 3\%$ .					
	Nominal current in cooling mode is referred to installation with 25kA short circuit current and is based on the following conditions: evaporator 12°C/7°C; ambient 35°C.					
	Nominal current in heating mode is referred to installation with 25kA short circuit current and is based on the following conditions: condenser 40°C/45°C; ambient 7°CDB/6°CWB.					
	Maximum starting current: starting current of biggest compressor + 75% of maximum current of the other compressor + fans current for the circuit at 75%.					
Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.						

## Sound levels McEnergy HPI ST in cooling and heating

Unit size	Sound pressure level at 1 m from the unit in semispheric free field (rif. $2 \times 10^{-5}$ Pa)									Power
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
067.2	74,9	73,5	73,7	72,8	79,0	67,2	58,6	49,8	80,0	99,5
075.2	74,9	73,5	73,7	72,8	79,0	67,2	58,6	49,8	80,0	99,5
080.2	74,9	73,5	73,7	72,8	79,0	67,2	58,6	49,8	80,0	99,5
086.2	75,2	73,8	74,0	73,1	79,3	67,5	58,9	50,1	80,3	100,4
090.2	75,2	73,8	74,0	73,1	79,3	67,5	58,9	50,1	80,3	100,4
101.2	75,2	73,8	74,0	73,1	79,3	67,5	58,9	50,1	80,3	100,4
104.2	75,2	73,8	74,0	73,1	79,3	67,5	58,9	50,1	80,3	100,4

Note: The values are according to ISO 3744 and are referred to units without pumps kit.

## Sound levels McEnergy HPI LN in cooling

Unit size	Sound pressure level at 1 m from the unit in semispheric free field (rif. $2 \times 10^{-5}$ Pa)									Power
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
067.2	74,2	70,5	69,0	67,7	72,3	62,0	53,6	44,4	73,7	93,2
075.2	74,2	70,5	69,0	67,7	72,3	62,0	53,6	44,4	73,7	93,2
080.2	74,2	70,5	69,0	67,7	72,3	62,0	53,6	44,4	73,7	93,2
086.2	74,6	70,9	69,4	68,1	72,7	62,4	54,0	44,8	74,1	94,2
090.2	74,6	70,9	69,4	68,1	72,7	62,4	54,0	44,8	74,1	94,2
101.2	74,6	70,9	69,4	68,1	72,7	62,4	54,0	44,8	74,1	94,2
104.2	74,6	70,9	69,4	68,1	72,7	62,4	54,0	44,8	74,1	94,2

Note: The values are according to ISO 3744 and are referred to units without pumps kit.

## Sound levels McEnergy HPI LN in heating

Unit size	Sound pressure level at 1 m from the unit in semispheric free field (rif. $2 \times 10^{-5}$ Pa)									Power
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
067.2	77,8	73,8	72,0	70,5	74,5	64,8	56,5	47,2	76,1	95,6
075.2	77,8	73,8	72,0	70,5	74,5	64,8	56,5	47,2	76,1	95,6
080.2	77,8	73,8	72,0	70,5	74,5	64,8	56,5	47,2	76,1	95,6
086.2	77,9	73,9	72,1	70,6	74,7	65,0	56,6	47,4	76,3	96,4
090.2	77,9	73,9	72,1	70,6	74,7	65,0	56,6	47,4	76,3	96,4
101.2	77,9	73,9	72,1	70,6	74,7	65,0	56,6	47,4	76,3	96,4
104.2	77,9	73,9	72,1	70,6	74,7	65,0	56,6	47,4	76,3	96,4

Note: The values are according to ISO 3744 and are referred to units without pumps kit.

## Sound pressure correction factor for different distances

### McEnergy HPI ST/LN

Unit size	Distance (m)					
	1	5	10	15	20	25
067.2	0	-7,9	-12,7	-15,8	-18,1	-19,8
075.2	0	-7,9	-12,7	-15,8	-18,1	-19,8
080.2	0	-7,9	-12,7	-15,8	-18,1	-19,8
086.2	0	-7,5	-12,2	-15,3	-17,5	-19,3
090.2	0	-7,5	-12,2	-15,3	-17,5	-19,3
101.2	0	-7,5	-12,2	-15,3	-17,5	-19,3
104.2	0	-7,5	-12,2	-15,3	-17,5	-19,3

Note: The values are dB(A) (pressure level).

# Standard ratings in cooling mode McEnergy HPI 067.2 ST

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15			
McEnergy HPI 067.2 ST	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	264	272	280	288	296	305	313	322	331	340	349	358
			P. I. (kW)	68,0	68,8	69,7	70,6	71,5	72,4	73,3	74,3	75,2	76,2	77,2	78,1	
		Boost	C. C. (kW)	360	372	384	394	404	413	421	429	436	443	450	456	
		P. I. (kW)	114	117	120	122	123	124	124	124	124	123	122	121		
	25	Rated	C. C. (kW)	255	262	270	278	286	294	302	311	319	328	337	346	
		P. I. (kW)	73,6	74,5	75,5	76,4	77,3	78,3	79,3	80,3	81,3	82,3	83,4	84,4		
	Boost	C. C. (kW)	341	352	361	370	379	386	394	401	407	413	419	425		
	P. I. (kW)	121	124	125	126	127	127	127	127	126	125	124	123	122		
	30	Rated	C. C. (kW)	244	252	259	267	275	283	291	299	308	316	325	333	
		P. I. (kW)	79,9	80,9	81,8	82,8	83,8	84,8	85,9	86,9	88,0	89,0	90,1	91,2		
	Boost	C. C. (kW)	319	328	337	344	352	359	365	371	377	383	388	394		
	P. I. (kW)	126	128	128	129	129	128	128	127	126	125	124	123	123		
	35	Rated	C. C. (kW)	233	240	248	255	263	271	279	287	295	303	311	320	
		P. I. (kW)	86,8	87,8	88,8	89,8	90,8	91,9	93,0	94,1	95,2	96,3	97,4	98,5		
	Boost	C. C. (kW)	294	302	309	316	323	329	335	341	346	352	357	363		
	P. I. (kW)	128	129	129	129	129	128	127	127	126	124	124	124	123		
	40	Rated	C. C. (kW)	221	228	236	243	251	258	266	274	282	290	298	306	
		P. I. (kW)	94,3	95,3	96,3	97,4	98,4	99,5	101	102	103	104	105	106		
	Boost	C. C. (kW)	265	272	278	285	291	297	302	308	313	319	325	330		
	P. I. (kW)	126	127	127	127	126	126	125	124	123	123	122	122	122		
45	Rated	C. C. (kW)	209	216	223	230	237	245	252	260	267	275	283	291		
	P. I. (kW)	102	103	104	106	107	108	109	110	111	112	114	115			
Boost	C. C. (kW)	231	237	244	249	255	261	267	273	278	284	290	297			
P. I. (kW)	120	121	121	121	120	120	119	119	119	118	118	118	119			

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

## Standard ratings in cooling mode McEnergy HPI 075.2 ST

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15		
McEnergy HPI 075.2 ST	20	Rated	C. C. (kW)	287	294	302	310	319	328	337	346	355	365	374	383
			P. I. (kW)	75,5	75,9	76,6	77,4	78,4	79,5	80,6	81,7	82,8	83,7	84,6	85,2
		Boost	C. C. (kW)	377	385	394	403	412	422	431	440	448	456	462	467
			P. I. (kW)	121	121	122	123	123	124	125	126	126	126	125	123
	25	Rated	C. C. (kW)	273	281	289	297	306	315	325	334	343	353	362	371
			P. I. (kW)	79,9	80,6	81,6	82,7	84,0	85,3	86,7	88,1	89,5	90,8	91,9	92,8
		Boost	C. C. (kW)	351	357	365	373	382	391	399	407	415	422	428	432
			P. I. (kW)	124	123	123	124	124	125	125	126	126	126	125	124
	30	Rated	C. C. (kW)	262	270	278	287	295	304	314	323	332	341	350	359
			P. I. (kW)	87,5	88,3	89,4	90,6	92,0	93,4	94,9	96,4	97,8	99,2	100	101
		Boost	C. C. (kW)	325	331	338	345	353	361	369	377	384	390	396	400
			P. I. (kW)	126	126	125	125	126	126	126	127	126	126	124	123
	35	Rated	C. C. (kW)	252	260	267	275	284	292	301	310	318	327	335	344
			P. I. (kW)	96,5	97,2	98,1	99,3	101	102	103	105	106	107	108	109
		Boost	C. C. (kW)	299	304	310	317	324	331	339	346	353	359	364	368
			P. I. (kW)	128	127	126	126	126	126	126	127	126	126	125	123
	40	Rated	C. C. (kW)	240	247	254	261	269	276	284	292	300	308	315	323
			P. I. (kW)	105	105	106	107	108	109	110	111	112	113	114	114
		Boost	C. C. (kW)	270	274	279	285	292	299	306	313	319	325	330	334
			P. I. (kW)	127	125	125	124	124	124	124	125	124	124	123	121
45	Rated	C. C. (kW)	222	228	234	241	247	254	261	268	274	281	287	294	
		P. I. (kW)	111	111	111	112	112	113	113	114	114	115	115	115	
	Boost	C. C. (kW)	235	239	244	249	256	262	269	275	282	287	292	296	
		P. I. (kW)	121	120	119	119	118	119	119	119	119	119	118	116	

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

## Standard ratings in cooling mode McEnergy HPI 080.2 ST

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15		
McEnergy HPI 080.2 ST	20	Rated	C. C. (kW)	310	319	328	337	347	356	366	376	385	395	404	413
			P. I. (kW)	81,1	82,1	83,2	84,5	85,8	87,1	88,3	89,5	90,5	91,3	91,9	92,1
		Boost	C. C. (kW)	396	401	408	417	427	437	447	457	466	473	479	482
			P. I. (kW)	126	124	123	123	124	126	127	128	129	128	127	124
	25	Rated	C. C. (kW)	295	304	313	322	332	341	351	361	371	381	390	400
			P. I. (kW)	86,3	87,2	88,4	89,7	91,1	92,6	94,2	95,7	97,1	98,4	99,5	100
		Boost	C. C. (kW)	365	369	375	382	391	400	410	419	427	435	440	443
			P. I. (kW)	126	123	122	122	122	123	124	125	126	125	124	121
	30	Rated	C. C. (kW)	285	293	301	310	319	329	339	348	358	368	378	388
			P. I. (kW)	95,5	96,2	97,1	98,4	99,8	101	103	105	106	108	109	111
		Boost	C. C. (kW)	336	339	344	351	359	367	376	385	393	400	406	409
			P. I. (kW)	127	124	122	122	122	123	124	125	125	125	124	121
	35	Rated	C. C. (kW)	275	282	290	298	306	315	324	334	343	353	363	372
			P. I. (kW)	106	106	107	108	109	110	112	113	115	117	118	120
		Boost	C. C. (kW)	308	310	314	320	327	336	344	353	361	368	374	378
			P. I. (kW)	128	124	122	122	122	123	124	125	125	125	125	123
	40	Rated	C. C. (kW)	261	267	274	281	288	296	305	313	322	332	341	347
			P. I. (kW)	115	115	115	115	116	117	118	119	121	122	124	124
		Boost	C. C. (kW)	277	278	282	288	295	303	312	320	329	336	343	347
			P. I. (kW)	127	123	121	120	121	122	123	124	125	126	125	124
45	Rated	C. C. (kW)	239	243	247	252	259	268	275	283	291	300	308	315	
		P. I. (kW)	120	119	117	116	117	118	119	120	121	122	124	124	
	Boost	C. C. (kW)	242	243	247	252	259	268	277	286	295	303	310	315	
		P. I. (kW)	122	119	117	116	117	118	120	121	123	124	124	124	

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

# Standard ratings in cooling mode McEnergy HPI 086.2 ST

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15		
McEnergy HPI 086.2 ST	20	Rated	C. C. (kW)	331	341	351	361	371	381	391	402	412	423	434	446
			P. I. (kW)	87,6	88,9	90,1	91,1	92,0	92,9	93,8	94,8	95,8	96,9	98,1	99,6
		Boost	C. C. (kW)	441	452	463	474	484	495	505	516	526	536	547	557
			P. I. (kW)	142	143	143	144	145	146	147	148	148	149	149	149
	25	Rated	C. C. (kW)	317	327	337	347	357	367	378	388	398	409	420	432
			P. I. (kW)	94,0	95,5	96,8	98,0	99,1	100	101	102	104	105	106	108
		Boost	C. C. (kW)	410	420	430	440	449	459	468	478	487	497	506	516
			P. I. (kW)	145	146	146	147	147	147	148	148	148	149	148	148
	30	Rated	C. C. (kW)	305	315	325	334	344	354	364	374	384	395	406	417
			P. I. (kW)	103	104	105	107	108	109	110	111	113	114	116	117
		Boost	C. C. (kW)	379	388	397	406	415	424	432	441	449	458	467	476
			P. I. (kW)	148	148	148	148	148	149	149	149	149	149	148	148
	35	Rated	C. C. (kW)	292	302	311	321	330	339	349	359	369	379	389	400
			P. I. (kW)	112	114	115	116	117	118	119	121	122	123	125	126
		Boost	C. C. (kW)	347	355	363	371	380	388	395	403	412	420	428	436
			P. I. (kW)	149	149	148	148	148	148	148	148	148	148	147	147
	40	Rated	C. C. (kW)	278	287	296	305	313	322	331	340	350	359	369	379
			P. I. (kW)	122	124	125	126	127	128	128	129	131	132	133	135
		Boost	C. C. (kW)	311	319	327	334	342	349	357	364	372	379	387	395
			P. I. (kW)	147	146	146	146	146	146	146	146	145	145	145	145
45	Rated	C. C. (kW)	261	269	277	285	293	301	309	317	326	334	343	351	
		P. I. (kW)	132	133	134	134	135	136	136	137	138	139	140	140	
	Boost	C. C. (kW)	271	278	285	293	300	307	314	321	328	336	343	351	
		P. I. (kW)	140	140	140	140	140	140	140	140	140	140	140	140	

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

## Standard ratings in cooling mode McEnergy HPI 090.2 ST

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15			
McEnergy HPI 090.2 ST	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	354	365	375	386	396	407	418	429	441	452	464	475
			P. I. (kW)	92,4	93,5	94,6	95,8	96,9	98,1	99,3	101	102	103	104	106	
		Boost	C. C. (kW)	480	487	497	509	523	537	552	565	578	589	597	603	
		P. I. (kW)	158	156	155	157	159	162	166	168	170	171	170	166		
	25	Rated	C. C. (kW)	342	352	362	372	383	393	404	415	426	437	448	460	
		P. I. (kW)	100	102	103	104	105	106	108	109	110	112	113	115		
		Boost	C. C. (kW)	453	459	467	478	490	503	516	528	539	548	555	559	
		P. I. (kW)	166	163	162	163	164	166	169	171	172	171	169	164		
	30	Rated	C. C. (kW)	328	338	348	358	368	378	389	400	410	421	432	444	
		P. I. (kW)	109	110	112	113	114	116	117	118	120	121	122	124		
		Boost	C. C. (kW)	422	427	434	444	455	466	478	489	499	508	513	516	
		P. I. (kW)	170	167	165	165	166	168	170	171	172	171	168	163		
	35	Rated	C. C. (kW)	313	323	333	343	353	363	373	383	394	405	415	426	
		P. I. (kW)	119	120	121	123	124	125	127	128	129	131	132	134		
		Boost	C. C. (kW)	386	391	398	407	417	428	439	450	459	467	472	473	
		P. I. (kW)	170	167	165	165	166	168	169	171	171	170	167	161		
	40	Rated	C. C. (kW)	298	307	317	326	336	346	356	366	377	387	397	408	
		P. I. (kW)	129	130	132	133	134	136	137	139	140	142	143	145		
		Boost	C. C. (kW)	347	351	358	367	377	388	399	409	418	425	430	432	
		P. I. (kW)	166	163	162	162	163	165	167	168	169	168	165	160		
45	Rated	C. C. (kW)	281	290	300	309	319	328	338	348	358	368	378	389		
	P. I. (kW)	140	142	143	144	146	147	149	150	152	153	155	157			
	Boost	C. C. (kW)	303	307	315	324	334	345	357	367	376	384	389	391		
	P. I. (kW)	158	155	155	156	158	160	163	165	166	165	163	158			

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

## Standard ratings in cooling mode McEnergy HPI 101.2 ST

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15		
McEnergy HPI 101.2 ST	20	Rated	C. C. (kW)	382	393	404	416	428	439	451	463	476	488	499	511
			P. I. (kW)	99,7	101	102	104	105	107	108	109	111	112	113	114
		Boost	C. C. (kW)	504	517	530	542	554	566	577	587	597	606	614	622
			P. I. (kW)	162	164	166	167	168	169	169	169	168	168	166	164
	25	Rated	C. C. (kW)	366	377	388	399	411	423	435	447	459	471	483	495
			P. I. (kW)	107	108	110	111	113	114	116	118	119	121	122	124
		Boost	C. C. (kW)	469	481	493	504	515	525	535	545	555	564	572	580
			P. I. (kW)	166	167	168	169	169	170	170	169	169	168	167	166
	30	Rated	C. C. (kW)	353	363	373	384	396	407	419	431	443	455	467	479
			P. I. (kW)	118	119	120	121	123	124	126	128	130	132	133	135
		Boost	C. C. (kW)	435	445	455	465	475	485	494	504	513	522	531	540
			P. I. (kW)	169	169	170	170	170	170	170	170	170	169	169	168
	35	Rated	C. C. (kW)	339	348	358	368	379	390	401	413	425	436	448	460
			P. I. (kW)	129	130	131	132	134	135	137	139	141	142	144	146
		Boost	C. C. (kW)	398	407	415	424	433	442	451	461	470	479	489	498
			P. I. (kW)	170	169	169	168	168	168	168	168	168	168	168	168
	40	Rated	C. C. (kW)	322	330	339	349	359	369	380	391	402	413	425	436
			P. I. (kW)	140	141	141	142	143	145	146	148	150	152	153	155
		Boost	C. C. (kW)	357	364	372	380	388	396	405	414	424	433	443	453
			P. I. (kW)	167	165	165	164	164	163	163	164	164	164	165	166
45	Rated	C. C. (kW)	299	306	314	323	332	342	352	362	372	382	392	403	
		P. I. (kW)	149	149	149	150	150	152	153	154	156	157	158	160	
	Boost	C. C. (kW)	311	317	323	330	337	345	353	362	372	382	392	403	
		P. I. (kW)	159	157	156	155	154	154	154	155	156	157	158	160	

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.



## Standard ratings in cooling mode McEnergy HPI 104.2 ST

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15			
McEnergy HPI 104.2 ST	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	399	411	423	435	446	458	469	481	493	505	518	532
			P. I. (kW)	106	108	109	111	112	112	113	114	115	116	118	120	
		Boost	C. C. (kW)	512	530	544	555	564	572	578	584	591	599	608	620	
		P. I. (kW)	165	170	172	173	172	169	166	163	161	159	158	160		
	25	Rated	C. C. (kW)	379	392	404	416	428	440	452	464	476	489	502	517	
		P. I. (kW)	112	115	117	118	120	121	122	124	125	127	129	132		
		Boost	C. C. (kW)	470	488	502	513	522	529	536	543	550	559	570	583	
		P. I. (kW)	165	170	172	173	172	170	167	165	163	162	162	165		
	30	Rated	C. C. (kW)	365	377	389	401	413	424	436	448	460	472	486	500	
		P. I. (kW)	123	126	128	129	131	132	134	135	137	139	141	144		
		Boost	C. C. (kW)	431	447	460	471	479	487	494	501	509	518	530	544	
		P. I. (kW)	165	169	171	172	171	169	167	165	164	163	165	168		
	35	Rated	C. C. (kW)	351	363	374	385	396	407	418	429	440	453	465	479	
		P. I. (kW)	137	139	141	142	143	144	146	147	148	150	152	155		
		Boost	C. C. (kW)	392	407	419	429	437	443	450	457	465	475	487	502	
		P. I. (kW)	164	168	170	170	169	168	166	164	163	163	165	169		
	40	Rated	C. C. (kW)	335	345	355	365	375	385	394	404	415	425	437	449	
		P. I. (kW)	150	151	153	153	154	155	155	156	157	158	160	162		
		Boost	C. C. (kW)	353	367	377	386	392	398	404	411	419	429	441	457	
		P. I. (kW)	163	167	168	168	166	164	162	161	160	160	162	167		
45	Rated	C. C. (kW)	312	321	329	338	345	351	356	362	369	379	391	407		
	P. I. (kW)	161	161	162	161	161	160	157	155	154	155	157	162			
	Boost	C. C. (kW)	314	325	334	341	346	351	356	362	369	379	391	407		
	P. I. (kW)	162	164	165	164	162	160	157	155	154	155	157	162			

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

## Standard ratings in cooling mode McEnergy HPI 067.2 LN

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15		
McEnergy HPI 067.2 LN	20	Rated	C. C. (kW)	260	267	275	283	291	299	307	316	324	333	341	350
			P. I. (kW)	65,8	66,7	67,7	68,6	69,6	70,7	71,7	72,8	73,8	75,0	76,1	77,2
		Boost	C. C. (kW)	351	361	369	377	384	390	396	402	408	415	423	431
			P. I. (kW)	117	119	121	121	121	120	119	118	117	117	117	118
	25	Rated	C. C. (kW)	250	257	265	272	280	288	296	304	313	321	329	338
			P. I. (kW)	71,8	72,7	73,7	74,8	75,8	76,9	78,0	79,1	80,3	81,4	82,6	83,8
		Boost	C. C. (kW)	323	332	341	349	355	362	368	374	380	387	395	405
			P. I. (kW)	116	119	120	120	120	120	119	118	118	118	119	121
	30	Rated	C. C. (kW)	239	246	254	261	269	277	284	292	300	308	317	325
			P. I. (kW)	78,3	79,3	80,3	81,4	82,5	83,6	84,8	86,0	87,1	88,4	89,6	90,8
		Boost	C. C. (kW)	297	306	314	322	328	334	340	346	353	360	368	378
			P. I. (kW)	117	119	121	121	121	120	120	119	119	119	121	123
	35	Rated	C. C. (kW)	228	235	242	249	257	264	272	280	287	295	303	311
			P. I. (kW)	85,3	86,4	87,5	88,6	89,7	90,9	92,1	93,3	94,6	95,8	97,1	98,4
		Boost	C. C. (kW)	272	281	288	295	301	306	312	318	324	331	339	349
			P. I. (kW)	118	120	121	121	121	121	120	119	119	120	121	123
	40	Rated	C. C. (kW)	216	222	229	237	244	251	258	266	274	281	289	297
			P. I. (kW)	93,0	94,1	95,2	96,4	97,6	98,8	100	101	103	104	105	106
		Boost	C. C. (kW)	246	254	261	267	272	277	282	287	293	300	308	317
			P. I. (kW)	118	120	120	120	120	119	118	117	117	117	119	121
45	Rated	C. C. (kW)	203	209	216	223	230	237	244	252	258	264	272	280	
		P. I. (kW)	101	102	104	105	106	107	109	110	111	111	112	114	
	Boost	C. C. (kW)	219	226	231	236	241	245	249	253	258	264	272	280	
		P. I. (kW)	115	116	117	116	115	114	112	111	111	111	112	114	

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

## Standard ratings in cooling mode McEnergy HPI 075.2 LN

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15			
McEnergy HPI 075.2 LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	280	288	296	304	313	321	330	338	347	356	365	374
			P. I. (kW)	73,3	74,5	75,5	76,6	77,6	78,7	79,7	80,8	81,9	83,2	84,5	85,9	
		Boost	C. C. (kW)	357	367	375	383	390	396	402	408	414	421	428	436	
		P. I. (kW)	118	120	121	121	120	120	119	118	117	116	116	117		
	25	Rated	C. C. (kW)	267	275	284	292	300	309	317	326	334	343	352	361	
		P. I. (kW)	78,7	80,1	81,4	82,7	83,9	85,1	86,3	87,5	88,8	90,1	91,5	93,0		
	Boost	C. C. (kW)	329	338	347	354	361	367	373	380	386	393	400	409		
	P. I. (kW)	117	119	121	121	121	120	119	119	118	118	119	120			
	30	Rated	C. C. (kW)	257	265	273	281	289	297	305	314	322	330	339	348	
		P. I. (kW)	86,9	88,4	89,8	91,1	92,4	93,7	94,9	96,1	97,3	98,6	100	101		
	Boost	C. C. (kW)	302	311	319	327	333	339	345	351	358	365	372	381		
	P. I. (kW)	118	120	121	121	121	121	120	120	119	119	120	122			
	35	Rated	C. C. (kW)	245	253	261	269	276	284	292	300	307	315	323	331	
		P. I. (kW)	95,8	97,3	98,6	99,9	101	102	103	104	105	107	108	109		
	Boost	C. C. (kW)	275	284	292	298	305	310	316	322	328	335	342	351		
	P. I. (kW)	118	120	121	121	121	121	120	120	119	119	120	122			
	40	Rated	C. C. (kW)	231	238	245	253	260	267	274	281	288	295	302	309	
		P. I. (kW)	103	104	106	107	108	108	109	110	111	112	112	113		
	Boost	C. C. (kW)	247	256	263	269	274	280	285	290	296	302	309	318		
	P. I. (kW)	117	118	119	119	119	119	118	117	117	117	117	118	119		
45	Rated	C. C. (kW)	210	217	223	230	236	242	248	254	260	266	272	279		
	P. I. (kW)	107	108	109	109	110	110	111	111	111	111	111	112			
Boost	C. C. (kW)	218	225	231	236	241	246	250	255	260	266	272	280			
P. I. (kW)	113	115	115	115	114	113	112	111	111	111	111	111	113			

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

## Standard ratings in cooling mode McEnergy HPI 080.2 LN

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15		
McEnergy HPI 080.2 LN	20	Rated	C. C. (kW)	300	309	318	326	335	344	352	361	370	379	389	399
			P. I. (kW)	80,6	82,0	83,2	84,3	85,4	86,4	87,4	88,5	89,7	91,0	92,5	94,2
		Boost	C. C. (kW)	368	380	389	397	404	409	414	418	423	428	434	441
			P. I. (kW)	121	124	126	126	125	124	122	120	118	117	116	116
	25	Rated	C. C. (kW)	285	294	303	312	321	330	339	347	356	366	375	385
			P. I. (kW)	85,4	87,2	88,8	90,3	91,7	93,0	94,3	95,6	97,0	98,5	100	102
		Boost	C. C. (kW)	335	347	356	364	370	376	381	386	392	397	404	412
			P. I. (kW)	118	121	123	123	123	122	121	119	118	117	117	118
	30	Rated	C. C. (kW)	275	284	293	301	310	319	327	336	344	353	362	371
			P. I. (kW)	95,3	97,2	99,0	101	102	103	105	106	107	109	110	112
		Boost	C. C. (kW)	306	317	326	334	340	346	351	356	362	368	375	384
			P. I. (kW)	117	120	122	122	122	121	120	119	118	118	118	120
	35	Rated	C. C. (kW)	264	272	281	289	297	305	312	320	328	336	344	352
			P. I. (kW)	106	108	109	111	112	113	114	115	116	117	118	119
		Boost	C. C. (kW)	278	288	297	304	310	316	321	326	331	338	345	354
			P. I. (kW)	116	119	121	122	122	121	120	119	118	118	118	120
	40	Rated	C. C. (kW)	247	254	262	269	276	283	288	293	298	304	312	320
			P. I. (kW)	113	114	116	116	117	118	117	116	115	115	116	118
		Boost	C. C. (kW)	249	259	266	273	278	283	288	293	298	304	312	320
			P. I. (kW)	115	118	119	119	119	118	117	116	115	115	116	118
45	Rated	C. C. (kW)	217	225	231	237	242	247	251	255	260	265	272	278	
		P. I. (kW)	111	113	113	113	113	112	111	110	109	109	109	109	
	Boost	C. C. (kW)	217	225	232	238	242	247	251	255	260	265	272	281	
		P. I. (kW)	111	113	114	114	113	112	111	110	109	109	109	111	

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

# Standard ratings in cooling mode McEnergy HPI 086.2 LN

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15			
McEnergy HPI 086.2 LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	324	332	341	351	361	371	381	391	402	412	422	432
			P. I. (kW)	85,2	85,9	86,7	87,8	89,0	90,3	91,6	93,0	94,3	95,5	96,6	97,6	
		Boost	C. C. (kW)	423	432	442	452	461	470	479	488	496	503	510	515	
		P. I. (kW)	142	143	144	144	145	145	145	144	144	142	141	138		
	25	Rated	C. C. (kW)	308	317	326	336	346	356	366	377	387	398	408	418	
		P. I. (kW)	90,9	91,9	93,1	94,4	95,9	97,5	99,1	101	102	104	105	106		
	Boost	C. C. (kW)	388	397	405	414	423	432	440	449	457	464	471	476		
	P. I. (kW)	141	141	142	142	142	142	142	142	142	141	140	139	137		
	30	Rated	C. C. (kW)	296	304	314	323	333	343	353	364	374	384	394	404	
		P. I. (kW)	100	101	102	104	105	107	109	110	112	114	115	117		
	Boost	C. C. (kW)	357	365	372	380	389	397	405	414	421	429	436	442		
	P. I. (kW)	142	142	142	142	142	142	142	142	142	141	141	140	139		
	35	Rated	C. C. (kW)	284	292	301	310	319	329	339	348	358	368	377	387	
		P. I. (kW)	111	111	113	114	115	117	119	120	122	123	125	126		
	Boost	C. C. (kW)	327	334	340	348	355	363	371	379	387	395	402	408		
	P. I. (kW)	143	142	142	142	142	142	142	142	142	142	141	141	141		
	40	Rated	C. C. (kW)	269	277	285	293	302	311	319	328	337	346	355	363	
		P. I. (kW)	121	121	122	123	125	126	127	128	130	131	132	133		
	Boost	C. C. (kW)	295	300	306	313	320	327	335	343	350	358	365	372		
	P. I. (kW)	142	141	140	139	139	139	139	139	139	139	140	140	140		
45	Rated	C. C. (kW)	249	256	263	270	278	285	293	301	308	316	323	330		
	P. I. (kW)	129	129	129	130	131	131	132	132	133	134	135	135			
Boost	C. C. (kW)	257	261	266	272	278	286	293	301	308	316	323	330			
P. I. (kW)	136	134	133	132	132	132	132	132	132	133	134	135	135			

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

# Standard ratings in cooling mode McEnergy HPI 090.2 LN

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15		
McEnergy HPI 090.2 LN	20	Rated	C. C. (kW)	345	355	365	375	385	396	406	417	427	438	449	460
			P. I. (kW)	89,7	90,9	92,2	93,5	94,8	96,2	97,6	99,0	100	102	103	105
		Boost	C. C. (kW)	457	472	485	496	506	514	521	528	535	541	548	555
			P. I. (kW)	158	163	166	167	167	166	164	162	160	157	155	154
	25	Rated	C. C. (kW)	332	342	351	361	371	382	392	402	413	424	434	445
			P. I. (kW)	98,0	99,3	101	102	103	105	106	108	109	111	112	114
		Boost	C. C. (kW)	422	435	447	457	466	473	480	487	494	501	508	517
			P. I. (kW)	158	162	164	164	164	163	161	159	158	156	155	154
	30	Rated	C. C. (kW)	318	327	337	347	357	367	377	387	397	408	418	429
			P. I. (kW)	107	108	110	111	113	114	116	117	119	120	122	124
		Boost	C. C. (kW)	390	402	412	421	429	436	443	450	457	465	473	482
			P. I. (kW)	159	162	164	164	163	162	161	159	158	157	157	158
	35	Rated	C. C. (kW)	303	312	322	331	341	351	360	370	380	391	401	411
			P. I. (kW)	117	118	120	121	123	124	126	127	129	131	132	134
		Boost	C. C. (kW)	358	368	377	385	393	400	406	413	421	429	439	449
			P. I. (kW)	160	162	163	163	162	161	159	158	158	158	159	161
	40	Rated	C. C. (kW)	287	296	305	315	324	333	343	353	362	372	382	392
			P. I. (kW)	128	129	131	132	134	135	137	139	140	142	144	145
		Boost	C. C. (kW)	323	332	340	347	354	361	367	375	383	392	402	414
			P. I. (kW)	158	159	159	159	158	157	156	155	155	156	158	162
45	Rated	C. C. (kW)	270	279	288	297	306	315	323	330	339	349	361	372	
		P. I. (kW)	139	141	142	144	145	147	147	147	148	150	154	158	
	Boost	C. C. (kW)	282	290	297	303	309	316	323	330	339	349	361	374	
		P. I. (kW)	150	151	151	150	149	148	147	147	148	150	154	159	

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

# Standard ratings in cooling mode McEnergy HPI 101.2 LN

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15			
McEnergy HPI 101.2 LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	372	381	391	402	413	424	436	448	460	472	484	495
			Boost	P. I. (kW)	98,4	99,0	99,9	101	103	104	106	108	110	112	113	115
		25	Rated	C. C. (kW)	473	482	492	502	512	523	533	543	552	561	570	577
			Boost	P. I. (kW)	158	158	158	159	159	160	160	160	160	160	159	158
	30	Rated	C. C. (kW)	355	365	376	387	398	409	420	432	444	455	467	478	
			P. I. (kW)	106	107	108	110	112	114	116	117	119	121	123	124	
		Boost	C. C. (kW)	435	444	453	463	473	483	493	502	511	520	528	535	
			P. I. (kW)	157	157	157	157	158	158	159	159	159	159	158	156	
	35	Rated	C. C. (kW)	341	351	361	372	383	394	405	417	428	438	449	459	
			P. I. (kW)	116	118	120	121	123	125	127	129	131	132	134	135	
		Boost	C. C. (kW)	400	409	418	427	436	446	455	465	473	482	489	496	
			P. I. (kW)	158	158	158	158	159	159	160	160	160	160	159	157	
	40	Rated	C. C. (kW)	325	335	346	356	367	378	388	399	409	419	428	438	
			P. I. (kW)	128	129	131	133	135	137	139	140	142	143	144	144	
		Boost	C. C. (kW)	366	374	383	391	401	410	419	428	436	444	451	458	
			P. I. (kW)	159	159	159	159	160	160	160	161	161	161	160	158	
	45	Rated	C. C. (kW)	306	316	326	336	346	356	366	375	385	394	402	410	
			P. I. (kW)	137	139	141	143	145	146	148	149	150	151	151	151	
		Boost	C. C. (kW)	330	337	345	354	362	371	380	388	397	404	411	418	
			P. I. (kW)	157	157	157	157	158	158	159	159	159	159	159	157	
50	Rated	C. C. (kW)	280	289	299	308	318	327	336	344	352	360	367	373		
		P. I. (kW)	143	145	147	149	150	152	153	153	154	154	153	152		
	Boost	C. C. (kW)	288	295	303	311	319	328	336	344	352	360	367	373		
		P. I. (kW)	151	150	151	151	152	152	153	153	154	154	153	152		

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.

# Standard ratings in cooling mode McEnergy HPI 104.2 LN

Leaving water temp. (°C)		4	5	6	7	8	9	10	11	12	13	14	15		
McEnergy HPI 104.2 LN	20	Rated	C. C. (kW)	390	399	408	419	431	443	455	468	480	493	505	518
			P. I. (kW)	106	106	106	107	109	110	112	115	117	119	121	123
		Boost	C. C. (kW)	477	486	496	506	516	527	538	549	561	574	587	600
			P. I. (kW)	157	157	156	157	157	158	159	160	162	164	166	168
	25	Rated	C. C. (kW)	371	380	391	402	414	427	439	451	464	476	487	498
			P. I. (kW)	112	113	115	116	118	121	123	125	127	129	131	132
		Boost	C. C. (kW)	438	447	456	465	475	485	494	505	515	526	537	548
			P. I. (kW)	156	156	156	156	156	156	156	157	158	158	159	160
	30	Rated	C. C. (kW)	356	366	377	389	401	413	425	436	448	459	469	479
			P. I. (kW)	124	126	128	130	132	135	137	139	141	142	143	143
		Boost	C. C. (kW)	404	413	422	431	440	449	457	466	475	484	494	503
			P. I. (kW)	159	159	159	158	158	158	158	158	158	158	158	158
	35	Rated	C. C. (kW)	339	350	361	373	384	396	407	417	428	437	446	454
			P. I. (kW)	137	139	141	143	146	148	150	151	153	153	153	153
		Boost	C. C. (kW)	370	379	388	397	405	414	422	430	438	445	453	461
			P. I. (kW)	161	161	161	161	161	161	161	160	160	159	158	157
	40	Rated	C. C. (kW)	317	327	338	349	359	370	380	389	397	404	410	416
			P. I. (kW)	146	148	150	152	154	156	157	158	159	158	156	155
		Boost	C. C. (kW)	332	341	350	359	367	375	383	390	397	404	410	416
			P. I. (kW)	158	159	160	160	160	160	160	159	159	158	156	155
45	Rated	C. C. (kW)	282	292	302	312	321	329	336	343	349	355	360	365	
		P. I. (kW)	146	148	150	152	152	152	152	152	151	150	148	146	
	Boost	C. C. (kW)	283	294	303	312	321	329	336	343	349	355	360	365	
		P. I. (kW)	148	149	151	152	152	152	152	152	151	150	148	146	

**Notes:** C.C. (cooling capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency. 10% glycol is recommended for units running in the shaded areas.



# Standard ratings in heating mode McEnergy HPI 067.2÷075.2 ST/LN

Leaving water temp. (°C)		35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50			
McEnergy HPI 067.2 ST/LN	AIR AMBIENT TEMPERATURE (°C)	12	Rated	H. C. (kW)	323	322	321	321	320	320	319	319	318	318	317	316	316	315	315	314
			Boost	P. I. (kW)	79,2	80,5	81,8	83,2	84,6	86,0	87,5	89,0	90,6	92,1	93,7	95,3	97,0	98,6	100	102
		7	Rated	H. C. (kW)	451	446	441	435	429	423	417	410	403	397	390	383	377	371	365	360
			Boost	P. I. (kW)	128	128	128	128	127	126	126	125	124	124	123	122	122	122	121	121
		0	Rated	H. C. (kW)	278	278	278	277	277	276	276	276	275	275	274	274	274	273	273	272
			Boost	P. I. (kW)	75,2	76,5	77,8	79,2	80,5	82,0	83,4	84,9	86,4	88,0	89,5	91,1	92,7	94,4	96,0	97,7
	-5	Rated	H. C. (kW)	391	389	387	384	380	376	372	368	363	359	354	349	344	340	336	332	
		Boost	P. I. (kW)	120	121	122	123	124	124	124	124	125	125	125	125	125	125	125	125	
	-10	Rated	H. C. (kW)	226	226	225	225	225	225	224	224	224	224	224	223	223	223	222	222	
		Boost	P. I. (kW)	71,0	72,3	73,5	74,9	76,2	77,6	79,1	80,5	82,0	83,5	85,0	86,6	88,2	89,8	91,4	93,0	
	-10	Rated	H. C. (kW)	317	318	319	319	318	316	314	312	309	307	304	300	297	294	291	288	
		Boost	P. I. (kW)	111	113	116	118	119	121	122	123	124	124	125	125	126	126	126	127	
-10	Rated	H. C. (kW)	194	193	193	193	193	193	192	192	192	192	192	192	191	191	191	191		
	Boost	P. I. (kW)	68,9	70,2	71,5	72,8	74,1	75,5	76,9	78,3	79,8	81,3	82,8	84,4	85,9	87,5	89,1	90,7		
-10	Rated	H. C. (kW)	273	275	277	278	278	277	276	275	273	271	268	265	262	259	256	253		
	Boost	P. I. (kW)	106	110	112	115	117	119	120	122	123	123	124	125	125	125	125	125		
-10	Rated	H. C. (kW)	164	164	164	164	163	163	163	163	163	163	163	162	162	162	162	162		
	Boost	P. I. (kW)	67,6	68,9	70,1	71,4	72,8	74,1	75,5	77,0	78,4	79,9	81,4	82,9	84,5	86,0	87,6	89,2		
-10	Rated	H. C. (kW)	234	238	240	241	242	242	241	240	238	236	233	230	226	223	219	215		
	Boost	P. I. (kW)	104	108	111	114	116	118	120	121	122	123	123	123	123	123	123	123		
McEnergy HPI 075.2 ST/LN	AIR AMBIENT TEMPERATURE (°C)	12	Rated	H. C. (kW)	360	359	359	358	357	357	356	355	355	354	353	352	352	351	350	349
			Boost	P. I. (kW)	87,7	89,2	90,7	92,3	93,8	95,5	97,1	98,8	100	102	104	106	108	109	111	113
		7	Rated	H. C. (kW)	459	455	450	444	439	433	427	421	415	409	403	397	391	386	380	375
			Boost	P. I. (kW)	123	123	124	124	124	124	124	123	123	123	123	123	123	123	123	123
		0	Rated	H. C. (kW)	311	311	310	310	309	309	308	308	307	307	306	306	305	304	304	303
			Boost	P. I. (kW)	83,2	84,7	86,2	87,7	89,2	90,8	92,4	94,1	95,7	97,4	99,1	101	103	104	106	108
	-5	Rated	H. C. (kW)	418	415	411	407	402	397	392	387	382	376	371	366	361	355	351	346	
		Boost	P. I. (kW)	124	125	125	126	126	126	127	127	127	127	127	127	127	127	127	127	
	-5	Rated	H. C. (kW)	253	253	252	252	252	251	251	251	250	250	250	249	249	248	248	248	
		Boost	P. I. (kW)	78,1	79,5	81,0	82,5	84,0	85,5	87,1	88,7	90,4	92,0	93,7	95,4	97,2	99,0	101	103	
	-5	Rated	H. C. (kW)	353	351	349	346	343	339	335	331	327	322	318	313	309	304	300	296	
		Boost	P. I. (kW)	121	122	123	124	124	125	125	125	126	126	126	126	126	126	126	126	
-5	Rated	H. C. (kW)	217	217	216	216	216	216	215	215	215	214	214	214	214	213	213	213		
	Boost	P. I. (kW)	75,3	76,7	78,1	79,6	81,1	82,7	84,2	85,8	87,4	89,1	90,8	92,5	94,2	96,0	97,8	99,6		
-5	Rated	H. C. (kW)	306	305	304	302	300	297	294	290	287	283	279	275	271	267	263	259		
	Boost	P. I. (kW)	117	119	120	121	122	123	123	123	124	124	124	124	124	124	125	125		
-10	Rated	H. C. (kW)	184	183	183	183	183	182	182	182	182	182	181	181	181	181	180	180		
	Boost	P. I. (kW)	73,2	74,6	76,0	77,5	79,0	80,5	82,1	83,7	85,3	87,0	88,6	90,3	92,1	93,8	95,6	97,4		
-10	Rated	H. C. (kW)	263	263	263	262	260	258	256	253	250	247	243	240	236	233	229	225		
	Boost	P. I. (kW)	115	117	119	120	121	122	123	123	124	124	124	124	124	124	124	124		

**Notes:** H.I. (heating capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency.

# Standard ratings in heating mode McEnergy HPI 080.2÷086.2 ST/LN

Leaving water temp. (°C)		35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50				
McEnergy HPI 080.2 ST/LN	AIR AMBIENT TEMPERATURE (°C)	12	Rated	H. C. (kW)	387	386	386	385	384	384	383	382	382	381	380	380	379	378	377	376	
			Boost	P. I. (kW)	95,0	96,7	98,4	100	102	104	105	107	109	111	113	115	117	119	121	123	
		7	Rated	H. C. (kW)	465	460	455	450	445	439	434	428	422	416	410	404	397	391	384	377	377
			Boost	P. I. (kW)	123	123	124	124	124	124	125	125	125	125	125	124	124	124	124	124	124
		0	Rated	H. C. (kW)	335	334	334	333	333	332	332	331	331	330	330	329	329	328	328	327	327
			Boost	P. I. (kW)	90,2	91,8	93,4	95,1	96,8	98,5	100	102	104	106	108	110	112	114	116	118	
		-5	Rated	H. C. (kW)	428	423	419	414	409	404	399	394	388	383	377	372	366	360	354	347	347
			Boost	P. I. (kW)	127	127	127	127	128	128	128	128	128	128	128	128	128	127	127	127	127
		-10	Rated	H. C. (kW)	272	272	272	272	271	271	271	270	270	270	269	269	269	268	268	268	268
			Boost	P. I. (kW)	84,3	85,9	87,5	89,2	90,8	92,5	94,3	96,0	97,8	99,6	101	103	105	107	109	111	
		McEnergy HPI 086.2 ST/LN	AIR AMBIENT TEMPERATURE (°C)	12	Rated	H. C. (kW)	394	394	394	394	394	394	394	393	393	393	393	393	392	392	392
					Boost	P. I. (kW)	103	104	106	108	110	112	114	116	118	120	122	124	127	129	131
	7			Rated	H. C. (kW)	484	481	479	475	472	467	463	458	453	448	443	437	432	426	420	415
				Boost	P. I. (kW)	149	150	150	151	151	150	150	149	149	148	147	147	146	146	146	147
	0			Rated	H. C. (kW)	340	340	340	340	340	341	341	341	341	341	341	341	341	341	341	341
				Boost	P. I. (kW)	97,6	99,4	101	103	105	107	109	111	113	115	117	119	121	123	126	128
	-5			Rated	H. C. (kW)	428	427	425	424	421	418	415	412	408	404	399	395	390	385	381	376
				Boost	P. I. (kW)	146	147	148	149	149	150	150	149	149	149	148	148	148	148	148	148
	-10			Rated	H. C. (kW)	276	276	277	277	277	277	278	278	278	278	278	278	279	279	279	279
				Boost	P. I. (kW)	92,2	93,9	95,7	97,5	99,4	101	103	105	107	109	111	113	115	118	120	122
	12			Rated	H. C. (kW)	355	356	356	356	355	353	351	349	347	344	340	337	333	329	326	322
				Boost	P. I. (kW)	141	143	145	146	147	148	148	149	149	149	148	148	148	148	148	148
	7		Rated	H. C. (kW)	237	237	237	238	238	238	238	239	239	239	239	240	240	240	240	240	
			Boost	P. I. (kW)	89,2	90,9	92,7	94,5	96,3	98,2	100	102	104	106	108	110	112	114	116	119	
0	Rated		H. C. (kW)	307	309	310	311	310	310	309	307	305	303	300	297	294	290	287	283		
	Boost		P. I. (kW)	137	140	142	144	146	147	147	148	148	148	148	148	148	148	148	148		
-5	Rated		H. C. (kW)	200	201	201	201	202	202	202	203	203	203	203	204	204	204	204	205		
	Boost		P. I. (kW)	86,9	88,7	90,4	92,2	94,1	95,9	97,8	99,8	102	104	106	108	110	112	114	116		
-10	Rated		H. C. (kW)	264	266	268	269	269	269	268	267	266	264	261	258	255	252	249	245		
	Boost		P. I. (kW)	134	137	140	142	144	145	146	147	147	147	147	147	147	147	147	147		

**Notes:** H.I. (heating capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency.

# Standard ratings in heating mode McEnergy HPI 090.2÷101.2 ST/LN

Leaving water temp. (°C)		35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50		
		McEnergy HPI 090.2 ST/LN		AIR AMBIENT TEMPERATURE (°C)															
12		Rated	H. C. (kW)	415	415	416	416	416	416	416	416	417	417	417	417	417	417	417	
		Boost	P. I. (kW)	108	110	112	114	116	118	120	122	124	126	129	131	133	136	138	141
7		Rated	H. C. (kW)	514	516	516	515	513	510	506	501	496	490	485	479	473	467	462	458
		Boost	P. I. (kW)	164	167	170	171	171	171	171	170	169	168	167	165	164	164	164	164
0		Rated	H. C. (kW)	359	359	359	359	360	360	360	361	361	361	361	362	362	362	362	362
		Boost	P. I. (kW)	102	104	106	108	110	112	114	116	119	121	123	125	128	130	132	135
-5		Rated	H. C. (kW)	450	454	456	456	456	454	452	449	445	441	436	432	428	424	420	417
		Boost	P. I. (kW)	158	162	165	167	169	170	170	170	169	169	168	168	167	167	168	168
-10		Rated	H. C. (kW)	291	292	292	293	293	294	294	295	295	295	296	296	296	297	297	297
		Boost	P. I. (kW)	96,4	98,3	100	102	104	106	108	110	112	114	117	119	121	123	126	128
-15		Rated	H. C. (kW)	369	374	378	380	381	381	380	378	376	374	371	368	365	363	360	359
		Boost	P. I. (kW)	149	154	157	161	163	164	166	166	167	167	167	167	167	168	169	170
-20		Rated	H. C. (kW)	250	251	251	252	252	253	253	253	254	254	255	255	256	256	256	257
		Boost	P. I. (kW)	93,1	95,0	96,9	98,8	101	103	105	107	109	111	113	115	118	120	122	125
-25		Rated	H. C. (kW)	317	323	328	331	332	333	333	332	330	328	326	324	322	320	318	317
		Boost	P. I. (kW)	143	148	153	156	159	161	162	163	164	164	165	165	166	166	167	169
-30		Rated	H. C. (kW)	212	213	213	214	214	215	215	216	216	217	217	217	218	218	219	219
		Boost	P. I. (kW)	90,7	92,6	94,5	96,4	98,3	100	102	104	106	108	111	113	115	117	120	122
-35		Rated	H. C. (kW)	272	278	283	286	288	289	289	289	287	286	284	282	280	278	276	275
		Boost	P. I. (kW)	139	145	149	153	156	159	160	162	162	163	164	164	165	165	166	168
-40		Rated	H. C. (kW)	465	465	464	463	461	460	459	457	456	455	454	454	454	454	455	456
		Boost	P. I. (kW)	116	118	120	122	124	126	128	130	132	135	137	140	142	145	147	150
-45		Rated	H. C. (kW)	585	580	574	567	561	555	548	541	535	528	521	515	509	502	497	491
		Boost	P. I. (kW)	170	170	169	168	168	168	167	167	167	167	167	166	166	166	166	165
-50		Rated	H. C. (kW)	403	403	403	402	402	401	400	399	398	397	397	397	397	397	398	399
		Boost	P. I. (kW)	110	112	114	116	118	120	122	125	127	129	131	134	136	139	141	144
-55		Rated	H. C. (kW)	517	513	510	506	502	497	493	488	483	478	473	469	464	459	455	451
		Boost	P. I. (kW)	165	165	166	166	166	167	167	167	168	168	168	168	168	168	168	168
-60		Rated	H. C. (kW)	327	327	328	328	328	327	327	326	326	325	325	325	325	326	326	328
		Boost	P. I. (kW)	103	105	107	109	111	114	116	118	120	122	124	127	129	132	134	137
-65		Rated	H. C. (kW)	428	427	426	424	422	420	417	414	411	408	405	401	398	395	392	389
		Boost	P. I. (kW)	159	160	161	163	164	165	166	167	168	168	169	169	170	170	169	169
-70		Rated	H. C. (kW)	279	280	281	281	281	281	281	281	280	280	280	279	279	280	280	281
		Boost	P. I. (kW)	99,3	101	103	105	108	110	112	114	116	118	120	123	125	127	130	133
-75		Rated	H. C. (kW)	370	370	370	370	369	367	365	363	361	358	355	352	349	346	344	341
		Boost	P. I. (kW)	155	157	159	161	162	164	165	166	167	168	169	169	169	169	169	168
-80		Rated	H. C. (kW)	236	238	239	239	240	240	239	239	239	238	238	238	237	238	238	239
		Boost	P. I. (kW)	96,4	98,5	101	103	105	107	109	111	113	115	117	120	122	124	127	130
-85		Rated	H. C. (kW)	318	319	319	319	318	317	315	313	311	309	306	303	300	297	293	290
		Boost	P. I. (kW)	152	154	156	158	160	162	164	165	166	167	168	168	168	167	167	166

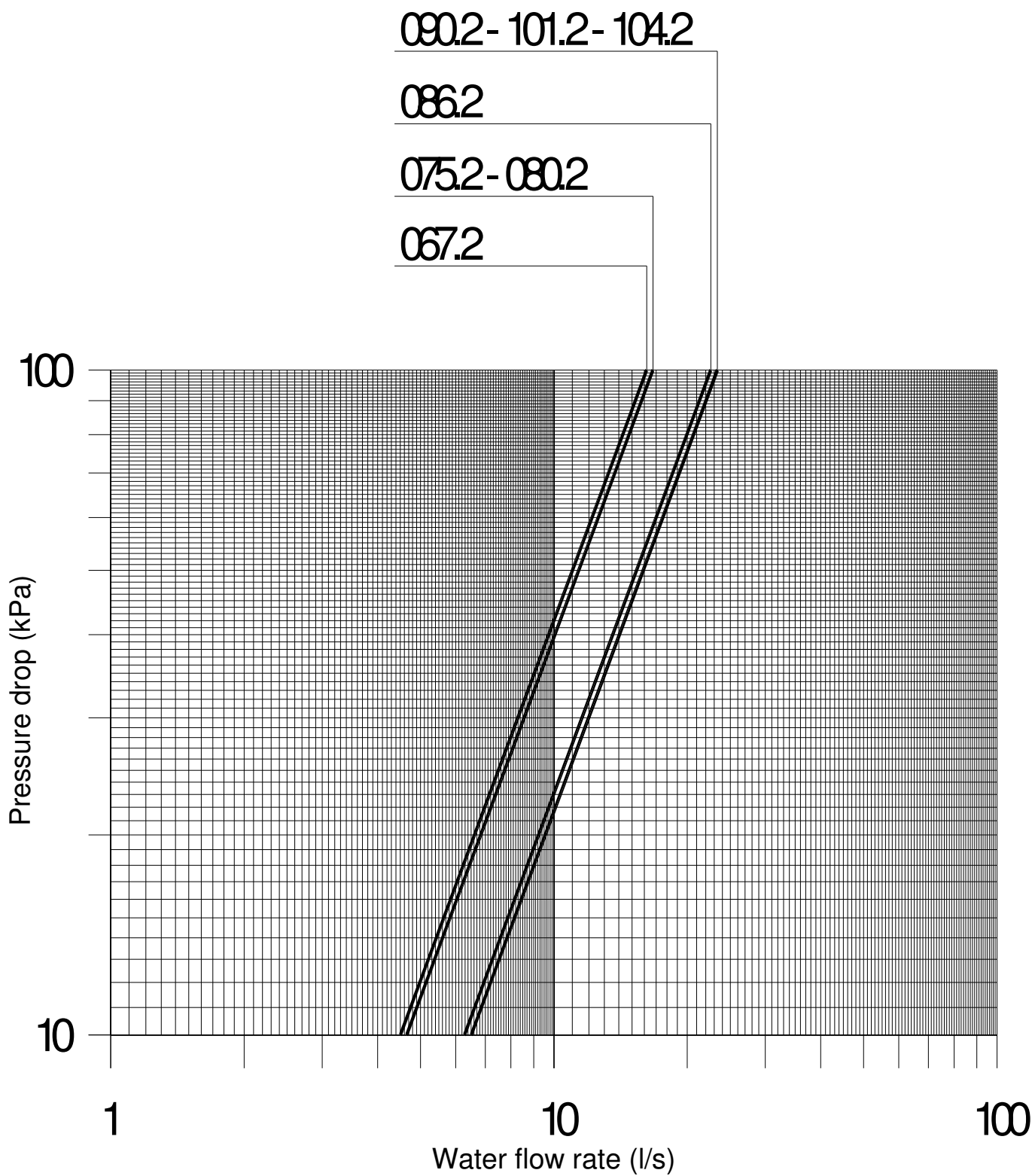
Notes: H.I. (heating capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency.

## Standard ratings in heating mode McEnergy HPI 104.2 ST/LN

Leaving water temp. (°C)		35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50				
McEnergy HPI 104.2 ST/LN	AIR AMBIENT TEMPERATURE (°C)	12	Rated	H. C. (kW)	488	488	487	485	484	482	480	478	476	475	474	474	475	477	480		
				P. I. (kW)	123	125	127	129	132	134	136	138	141	143	146	148	151	154	157	160	
			Boost	H. C. (kW)	591	585	579	572	565	559	552	545	538	531	524	517	511	504	497	490	
				P. I. (kW)	172	171	170	169	169	168	168	168	168	168	168	167	167	166	166	164	
			7	Rated	H. C. (kW)	421	421	421	420	419	418	416	415	414	412	412	411	412	413	415	417
					P. I. (kW)	117	119	121	123	125	128	130	132	134	137	139	142	144	147	150	153
		Boost		H. C. (kW)	523	518	513	508	503	498	492	487	482	476	471	465	460	454	449	443	
				P. I. (kW)	168	167	167	167	167	167	167	167	167	168	168	168	167	167	166	165	
		0		Rated	H. C. (kW)	342	343	344	344	344	343	342	341	340	339	339	338	339	340	341	344
					P. I. (kW)	110	112	114	116	118	121	123	125	127	130	132	135	137	140	143	146
			Boost	H. C. (kW)	443	439	436	432	428	424	420	416	412	408	405	401	397	393	389	385	
				P. I. (kW)	166	166	166	167	167	168	168	169	169	170	170	170	170	169	169	167	
	-5		Rated	H. C. (kW)	293	295	296	297	297	297	296	295	294	293	293	292	293	293	295	297	
				P. I. (kW)	106	108	110	112	114	117	119	121	123	126	128	131	133	136	139	141	
		Boost	H. C. (kW)	390	387	384	381	378	375	371	368	365	362	358	355	352	349	345	342		
			P. I. (kW)	165	166	166	167	167	168	169	169	170	170	171	171	170	170	169	168		
		-10	Rated	H. C. (kW)	247	249	251	252	252	252	252	251	250	250	249	248	248	249	250	251	
				P. I. (kW)	102	104	107	109	111	113	116	118	120	123	125	127	130	132	135	138	
	Boost		H. C. (kW)	336	333	331	328	325	322	319	317	314	311	308	305	302	299	297	294		
			P. I. (kW)	163	164	164	165	166	166	167	168	168	169	169	169	168	168	167	165		

**Notes:** H.I. (heating capacity) and P.I. (unit power input) are referred to 0,0176m<sup>2</sup> °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency; boost is referred to compressors running at maximum frequency.

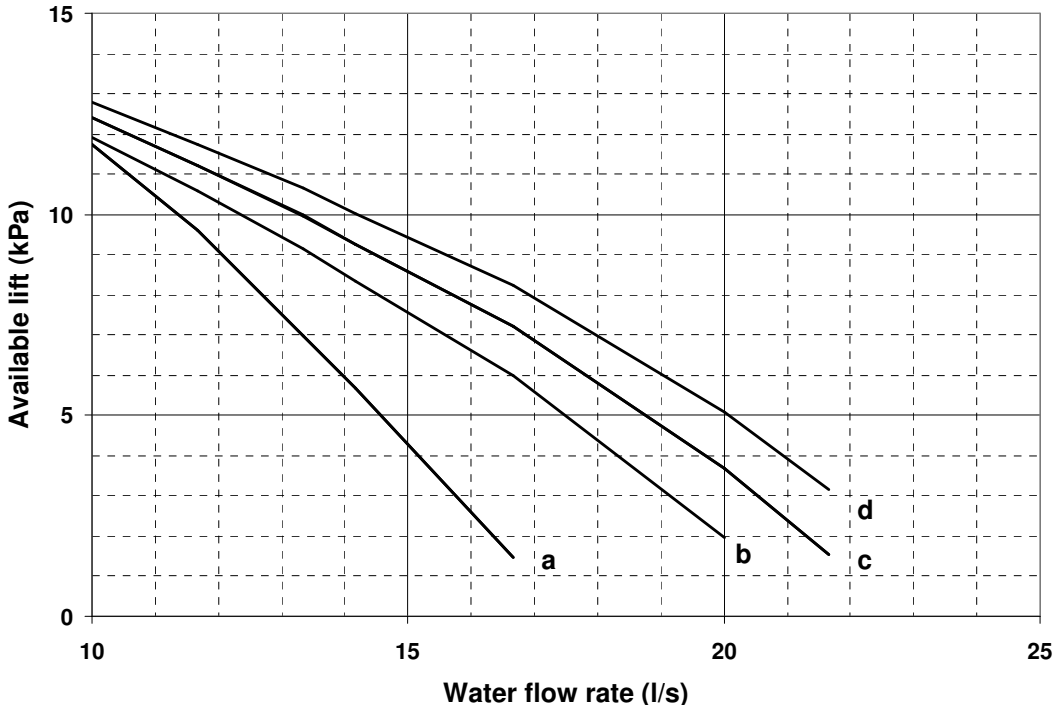
# Evaporator pressure drop McEnergy HPI ST/LN



# Low lift water pumps kit (option on request)

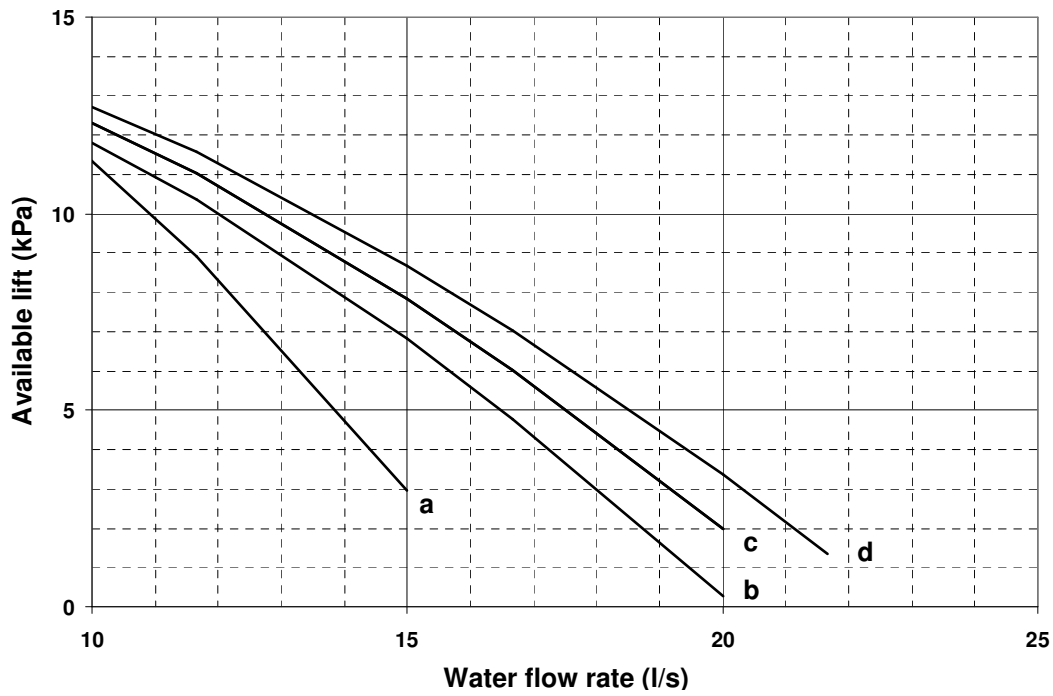
## Lift diagrams for McEnergy HPI ST/LN

McEnergy HPI ST/LN with low lift single pump



- |   |                     |   |                           |
|---|---------------------|---|---------------------------|
| a | 067.2 ST – 075.2 ST | c | 086.2 ST/LN – 090.2 ST/LN |
| b | 080.2 ST            | d | 101.2 ST/LN – 104.2 ST/LN |

McEnergy HPI ST/LN with low lift double pump

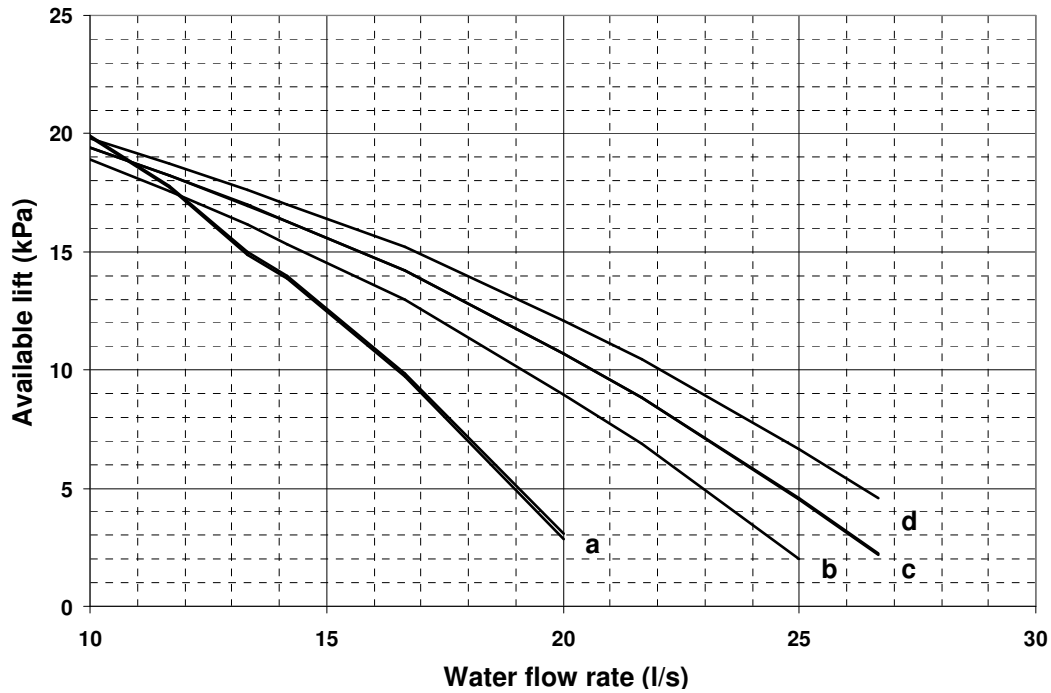


- |   |                     |   |                           |
|---|---------------------|---|---------------------------|
| a | 067.2 ST            | c | 086.2 ST/LN – 090.2 ST/LN |
| b | 075.2 ST – 080.2 ST | d | 101.2 ST/LN – 104.2 ST/LN |

# High lift water pumps kit (option on request)

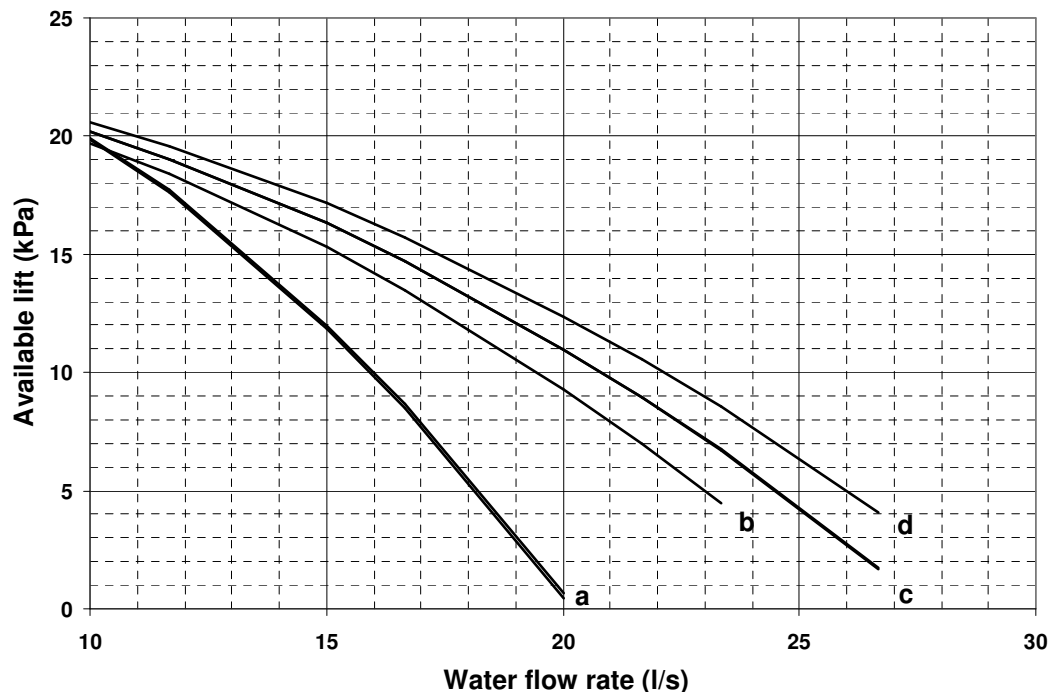
## Lift diagrams for McEnergy HPI ST/LN

McEnergy HPI ST/LN with high lift single pump



- |   |                     |   |                           |
|---|---------------------|---|---------------------------|
| a | 067.2 ST – 075.2 ST | c | 086.2 ST/LN – 090.2 ST/LN |
| b | 080.2 ST            | d | 101.2 ST/LN – 104.2 ST/LN |

McEnergy HPI ST/LN with high lift double pump



- |   |                     |   |                           |
|---|---------------------|---|---------------------------|
| a | 067.2 ST – 075.2 ST | c | 086.2 ST/LN – 090.2 ST/LN |
| b | 080.2 ST            | d | 101.2 ST/LN – 104.2 ST/LN |

## Water pumps kit (option on request) – Electrical data

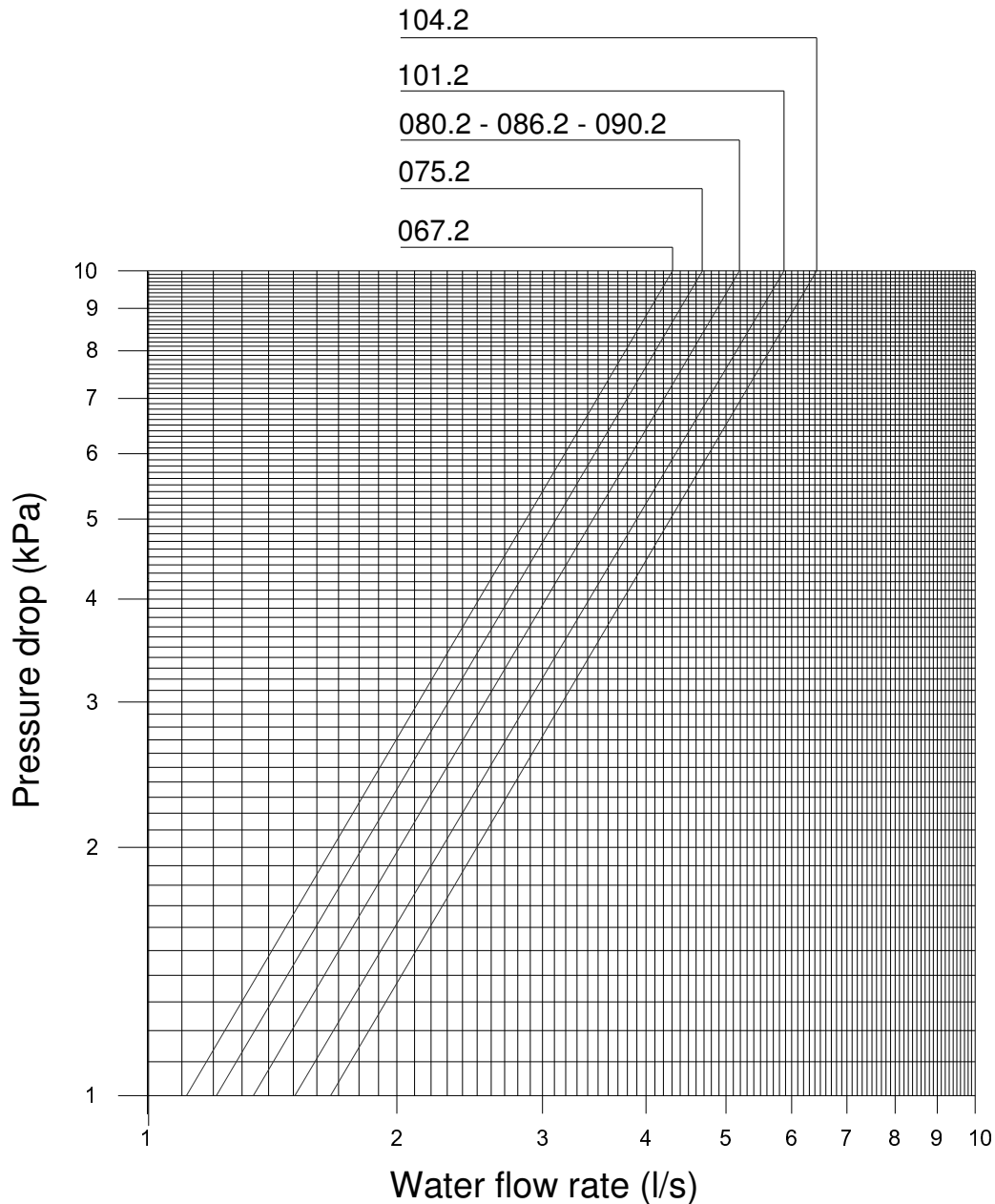
Unit model		Pump type	Pump motor power kW		Current A		Voltage 3 ph / 50 Hz
Size	Version		low lift	high lift	low lift	high lift	
067.2	ST	single/ double	2,2	4,0	5,0	8,1	380÷415 V
075.2	ST	single	2,2	4,0	5,0	8,1	380÷415 V
075.2	ST	double	3,0	4,0	6,0	8,1	380÷415 V
080.2 – 104.2	ST	single/ double	3,0	5,5	6,0	10,1	380÷415 V
086.2 – 104.2	LN	single/ double	3,0	5,5	6,0	10,1	380÷415 V



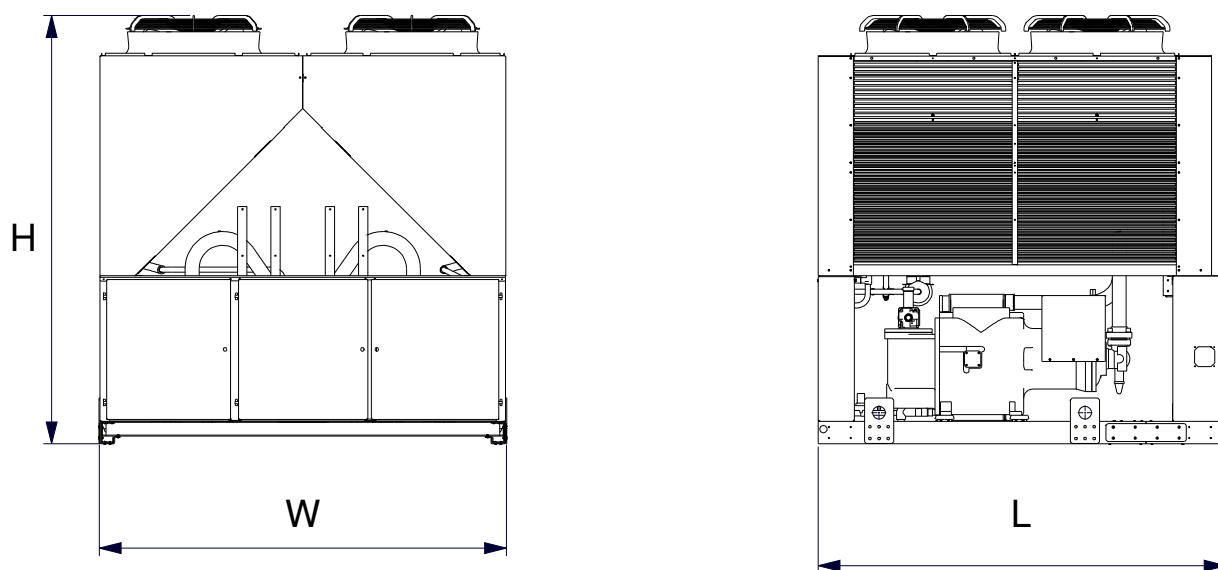
## Partial heat recovery ratings - McEnergy HPI ST/LN

Unit size	Evaporator leaving water temp. 7 °C - ΔT 5°C ambient temperature 35 °C	HEAT RECOVERY LEAVING WATER TEMPERATURE (°C)		
		45 (ΔT=5°C)	50 (ΔT=5°C)	55 (ΔT=5°C)
		Heating capacity (kW)	Heating capacity (kW)	Heating capacity (kW)
067.2		74,3	67,8	57,9
075.2		80,9	76,1	65,4
080.2		88,5	85,2	73,5
086.2		93,5	88,2	75,7
090.2		99,4	91,9	78,6
101.2		106	99,5	85,7
104.2		115	109	94,2

## Partial heat recovery pressure drop - McEnergy HPI ST/LN



## Dimensions



McEnergy HPI ST/LN	Length - L (mm)	Width - W (mm)	Height - H (mm)
067.2 - 075.2 - 080.2	3547	2254	2335
086.2 - 090.2 - 101.2 - 104.2	4783	2254	2335

# Technical Specification for Air to Water Heat Pump Unit

## GENERAL

The air to water heat pump will be designed and manufactured in accordance with following European directives that are equivalent to American Air-Conditioning Industry codes:

Rating of chillers	<b>EN 12055</b>
Construction of pressure vessel	<b>PED</b>
Electrical codes	<b>IEC 204-1 CEI 44-5 Elect. &amp; Safety Codes</b>
Machine Safety, Electrical Codes	<b>CEI – EN 60204 – 1</b>
Machinery Directive	<b>98 / 37 / EC as modified</b>
Electromagnetic compatibility directive	<b>89 / 336 / EEC as modified</b>
Low-voltage Directive	<b>73 / 23 / EEC as modified</b>
Manufacturing Quality Standard	<b>ISO 9001:2000</b>

The unit will be tested at full load in the factory at the nominal working conditions and water temperatures. Before shipment a full test will be held to avoid any losses.

Chiller will be delivered to the job site completely assembled and charged with right refrigerant and oil quantity. Comply with the manufacturer instructions for rigging and handling equipment.

The unit will be able to start up and operate as standard at full load and outside air temperature from .... °C to .... °C with an evaporator leaving fluid temperature between .... °C and 15 °C

All unit's published performances have to be certified by **Eurovent**.

## REFRIGERANT

Only HFC 134a will be accepted.

## PERFORMANCE

- ✓ Number of air to water heat pumps: .....
- ✓ Cooling capacity for single air to water heat pump: ..... kW
- ✓ Power input for single air to water heat pump in cooling mode: ..... kW
- ✓ Shell & tube heat exchanger entering water temperature in cooling mode: ..... °C
- ✓ Shell & tube heat exchanger leaving water temperature in cooling mode: ..... °C
- ✓ Shell & tube heat exchanger water flow: ..... l/s
- ✓ Nominal outside working ambient temperature in cooling mode: ..... °C
  
- ✓ Heating capacity for single air to water heat pump: ..... kW
- ✓ Power input for single air to water heat pump in heating mode: ..... kW
- ✓ Shell & tube heat exchanger entering water temperature in heating mode: ..... °C
- ✓ Shell & tube heat exchanger leaving water temperature in heating mode: ..... °C
- ✓ Shell & tube heat exchanger water flow: ..... l/s
- ✓ Nominal outside working ambient temperature in heating mode: ..... °C
  
- ✓ The unit should work with electricity in range 360÷415 V ±10%, 3ph, 50Hz without neutral and shall only have one power connection point. The control circuit voltage shall be 24 V maximum, supplied by a factory-installed transformer.

## UNIT DESCRIPTION

Chiller shall include as standard not less than: two independent refrigerant circuits, semi-hermetic rotary single screw compressors, air-cooled variable electrical frequency driver for each compressor (VFD), electronic expansion device (EEXV), refrigerant direct expansion shell & tube heat exchanger, air-cooled condenser section, R134a refrigerant, lubrication system, motor starting components, suction line shut-off valve, discharge line shut-off valve, control system and all components necessary for safe and stable unit operation.

Chiller will be factory assembled on a robust base-frame made of zinc coated steel, protected by an epoxy paint.

## NOISE LEVEL AND VIBRATIONS

Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed .....dB(A). The sound pressure levels must be rated in accordance to ISO 3744.

Other types of rating unacceptable. Vibration level should not exceed 2 mm/s.

## DIMENSIONS

Unit dimensions shall not exceed following indications:

- ✓ unit length ..... mm,
- ✓ unit width ..... mm,
- ✓ unit height ..... mm.

## CHILLER COMPONENTS

### Compressors

- ✓ Semi-hermetic, single-screw type with one main helical rotor meshing with gaterotor. The gaterotor will be constructed of a carbon impregnated engineered composite material. The gaterotor supports will be constructed of cast iron.
- ✓ The oil injection shall be used in order to get high EER (Energy Efficiency Ratio) also at high condensing pressure and low sound pressure levels in each load condition.
- ✓ Refrigerant system differential pressure shall provide oil flow throught service replaceble, 0.5 micron, full flow, cartridge type oil filter internal to compressor.  
Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not acceptable.
- ✓ The compressor's oil cooling must be realized, when necessary, by refrigerant liquid injection. External dedicated heat exchanger and additional piping to carry the oil from the compressor to heat exchanger and viceversa will be not accepted.
- ✓ The compressor shall be provided with an integrated, high efficiency, cyclonic type oil separator and with built-in oil filter, cartridge type.
- ✓ The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- ✓ The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- ✓ Shall be present two thermal protection realized by a thermistor for high temperature protection: one temperature sensor to protect electrical motor and another sensor to protect unit and lubricating oil from high discharge gas temperature.
- ✓ The compressor shall be equipped with an electric oil-crankcase heater.
- ✓ Compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

### Cooling and heating capacity control system

- ✓ Each unit will have a microprocessor for the control of compressor slide valve's position and the instantaneous RPM value of the motor.
- ✓ The unit capacity control shall be infinitely modulating, both in cooling and in heating mode, from 100% down to 25% for each compressor (from 100% down to 12,5% of full load for unit with 2 compressors). The chiller shall be capable of stable operation to a minimum of 12,5% of full load without hot gas bypass.
- ✓ Step unloading unacceptable because of evaporator leaving water temperature fluctuation and low unit efficiency at partial load.
- ✓ The system shall stage the unit based on the leaving evaporator water temperature that shall be controlled by a PID (Proportional Integral Derivative) loop.
- ✓ Unit control logic shall to manage frequency level of the compressor electric motor to exactly match plant load request in order to keep constant the set point for delivered chilled or hot water temperature. In this operating condition unit control logic shall modulate electrical frequency level in a range lower and upper the nominal electrical network value fixed at 50 Hz.
- ✓ The microprocessor unit control shall detect conditions that approach protective limits and take self-corrective action prior to an alarm occurring. The system shall automatically reduce chiller capacity when any of the following parameters are outside their normal operating range:
  - High condenser pressure

- Low evaporation refrigerant temperature
- High compressor motor amps
- ✓ Air to water heat pump shall be able to deliver heating capacity (with -5°C outside ambient temperature) higher than, or at least equal to its nominal cooling capacity related at +35°C outside ambient temperature with +7°C for set-point of the leaving evaporator chilled water. In this condition unit shall be able to deliver 45°C hot water .

### **Unit-Mounted Variable Frequency Driver (VFD) and Electrical Requirement**

- ✓ All interconnecting wiring between the VFD and the chiller shall be factory-installed. Customer electrical connection for compressor motor power shall be limited to main power leads to the single point power connection located into electrical panel.
- ✓ The VFD shall be air cooled type. Water cooled design or refrigerant cooled design are not acceptable.
- ✓ The VFD full load efficiency shall meet or exceed 97% at 100% VFD rated ampacity.
- ✓ Base motor frequency shall permit motor to be utilized at nameplate voltage. Adjustable frequency range, monitored by unit's microprocessor control, shall permit a stable unit capacity control down to 12.5% without hot-gas bypass.
- ✓ Starting current for the compressor shall not exceed nominal compressor load amps.
- ✓ Unit power factor shall be not less than 0.95 on entire unit capacity range, from 100% down to 12,5%

### **Evaporator**

- ✓ The units shall be supplied with shell and tubes counter-flow heat exchanger with single refrigerant pass. It will be refrigerant direct expansion type with refrigerant inside the tubes and water outside (shell side). It will include carbon steel tube sheets, with straight copper tubes internally wound for higher efficiencies, expanded on the tube plates.
- ✓ The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, commanded by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (10-mm thick).
- ✓ The evaporator will have 2 circuits, one for each compressor and shall be single refrigerant pass.
- ✓ The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- ✓ Evaporator is manufactured in accordance to PED approval.

### **Condenser coil**

- ✓ The condenser coils are constructed with internally finned seamless copper tubes having a "W" configuration and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins are given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.
- ✓ The coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency of 5-7% without increasing in power absorption.
- ✓ The condenser coil shall be leak-tested and submitted to a pressure test with dry air.

### **Condenser fans**

- ✓ The fans used in conjunction with the condenser coils, shall be helical type with aerofoil blades for higher efficiencies and lower noise. Each fan shall be protected by a fan guard.
- ✓ The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 55°C.
- ✓ They shall have individual overload protection via a disconnect switch.

### **Refrigerant circuit**

- ✓ The unit must have refrigerant circuits completely independent of each other with one compressor and one variable electrical frequency driver per circuit (VFD).
- ✓ Each circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, suction line shut-off valve, 4-way valve to reverse refrigerant cycle into the unit, liquid line shut-off valve with charging connection, replaceable core filter-drier, sight glass with moisture indicator and insulated suction line.

## Condensation control

- ✓ The units will be provided with an automatic control for condensing pressure which ensures the working at low external temperatures down to +10 °C, thanks the ON/OFF of the condenser fans, to maintain condensing pressure. Fan speed control, to allow unit's operation with very low ambient temperature (-18°C), should be available as option.
- ✓ Automatic compressor unloading when abnormal high condensing pressure is detected to prevent the shutdown of the refrigerant circuit (shutdown of the unit) due to a high-pressure fault.

## Low Noise unit options (on request)

- ✓ The unit compressors shall be connected with unit's metal baseframe by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure and so to control the unit noise.
- ✓ The discharge and suction lines shall be provided with mufflers to eliminate vibration and so to reduce the noise unit emission.
- ✓ The chiller shall be provided with an acoustically compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressors sound-proof enclosure shall be internally fitted with flexible, multi layer, high density materials. The middle layer is 3 mm, very high density and high efficiency noise reduction material. The enclosure shall be carefully assembled to avoid decreasing of its noise reduction power.
- ✓ The chiller shall be provided with very low speed condenser fans and with an improved condenser section.

## Hydronic kit options (on request)

- ✓ The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and include the following elements: expansion vessel, centrifugal monocell water pump with three-phase motor equipped with internal over-temperature protection, safety relief valve, filling kit.
- ✓ The water piping shall be protected against corrosion and equipped with drain and purge plugs. The customer connections shall be Victaulic connections. The piping shall be fully insulated to prevent condensation (pump insulation using polyurethane foam).
- ✓ A choice of four pump types shall be available:
  - in-line single high-pressure pump or
  - in-line dual high-pressure pump (only for unit without compressor sound proof cabinet) or
  - in-line single low-pressure pump or
  - in-line dual low-pressure pump (only for unit without compressor sound proof cabinet)

## Control panel

- ✓ Field power connection, control interlock terminals, and unit control system should be centrally located in an electric panel (IP 54). Power and starting controls should be separate from safety and operating controls in different compartments of the same panel.
- ✓ Starting will be star/delta type.
- ✓ Power and starting controls should include fuses and contactors for each compressor winding and fan motors. Operating and safety controls should include energy saving control; emergency stop switch; overload protection for compressor motor; high and low pressure cut-out switch (for each refrigerant circuit); anti-freeze thermostat; cut-out switch for each compressor.
- ✓ All of the information regarding the unit will be reported on a display and with the internal built-in calendar and clock that will switch the unit ON/OFF during day time all year long.
- ✓ The following features and functions shall be included:
  - resetting chilled water temperature by controlling the return water temperature or by a remote 4-20 mA DC signal or by controlling the external ambient temperature;
  - soft load function to prevent the system from operating at full load during the chilled fluid pulldown period;
  - password protection of critical parameters of control;
  - start-to-start and stop-to-star timers to provide minimum compressor off-time with maximum motor protection;
  - communication capability with a PC or remote monitoring;
  - discharge pressure control through intelligent cycling of condenser fans;
  - lead-lag selection by manual or automatically by circuit run hours;
  - double set point for brine unit version;

- scheduling via internal time clock to allow programming of a yearly start-stop schedule accommodating weekends and holidays.

### **Optional High Level Communications Interface**

The controller as a minimum shall be capable of providing the data shown in the above list and document entitled McQuaycomms, using the following options: -

<u>Option A</u>	RS485 Serial card	<u>Option B</u>	RS232 Serial card
<u>Option C</u>	LonWorks interface to FTT10A Transceiver.	<u>Option D</u>	Bacnet Compatible
<u>Option E</u>	Use of Compass Points (manufactured by North Communications) to allow communications with Such as Honeywell, Satchwell, Johnson Controls, Trend etc.		

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