Product Manual	511 B – 08/10 A
	Date: **October 2008**
	Supersedes: **None**

Inverter Air cooled screw chillers

McEnergy Inverter
SSE (Standard Seasonal Efficiency) – XSE (High Seasonal Efficiency) 094.2÷147.2
Cooling capacity from 329 to 515 kW
Refrigerant: R-134a

McQuay is participating in the Eurovent Certification Programme. Product are as listed in the Eurovent Directory of Certified Products and on the web site www .eurovent-certification. com

Features and benefits

High part load efficiency

McEnergy Invert is the result of careful design, aimed to optimizing the seasonal energy efficiency of chillers, with the objective of bringing down operating costs and improving profitability, effectiveness and economical management.
Per European Seasonal Energy Efficiency Ratio (ESSER), chillers operate at design conditions only three percent of the time. As a result better part load efficiencies are required at part load conditions in a chiller water applications. McEnergy Inverter maximize chiller efficiency by optimizing single screw compressor operation dramatically reducing the electric power consumption when the motor speed slows.

Seasonal quietness

Very low noise levels in part load conditions are achieved by varying the fan speed, but especially thanks to the variation of compressor frequency, which ensure the minimum noise level at all the time.

Quick comfort conditions

The ability to vary the output power in direct relation to the cooling requirements of the system, allow the possibility to achieve building comfort conditions much faster at start-up.

Low starting current

No current spikes at start-up. The starting current is always lower than current absorbed in the maximum operating conditions (FLA).

Power factor always > 0.95

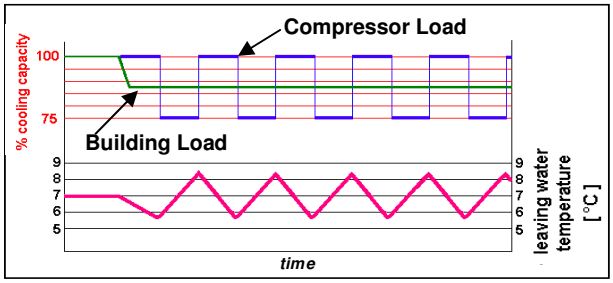
McEnergy Inverter can operate always > 0.95 power factor, which can allows building owners avoid power factor penalties and decreases electrical losses in cable and transformers.

Redundancy

McEnergy Inverter has two truly independent refrigerant circuits in every size, in order to assure maximum safety for any maintenance, whether planned or not.

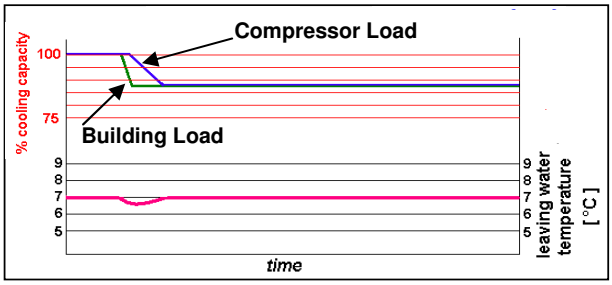
Infinitely capacity control

Cooling capacity control is infinitely variable by means of a Inverter driven screw compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 27% (one compressor unit), down to 13,5% (two compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with steps capacity control (4 steps)

With a compressor load step control in fact, the compressor capacity, at partial loads, will be too high or too low compared to the building cooling load. The result is an increase in chiller energy costs, particularly at the part-load conditions at which the chiller operates most of the time.



Units with stepless regulation offer benefits that the units with step regulation are unable to match. The ability to follow the system energy demand at any time and the possibility to provide steady outlet water temperature without deviations from the set-point, are the two points that allow you to understand how the optimum operating conditions of a system can be met only through the use of a unit with step-less regulation.

Code requirements – Safety and observant of laws/directives

All water cooled units are designed and manufactured in accordance with applicable selections of the following which are equivalent to American Air-conditioning industry applicable codes:

Rating of chillers	EN 12055
Construction of pressure vessel	Pressure Equipment 97/23/EC (PED)
Machinery Directive	98/37/EC
Low Voltage	2006/95/EC
Electromagnetic Compatibility	2004/108/EC
Electrical & Safety codes	IEC 60204–1
Manufacturing Quality Stds	UNI – EN ISO 9001:2000

Certifications

All units manufactured by McQuay Italia S.p.A. are CE marked, complying with European directives in force, concerning manufacturing and safety. On request units can be produced complying with laws in force in non European countries (ASME, GOST, etc.), and with other applications, such as naval (RINA, etc.).

Versions

McEnergy Inverter is available in two different Seasonal Efficiency Versions:

SSE: Standard Seasonal Efficiency
7 sizes to cover a range from 329 up to 515 kW with an ESEER up to 4.62

XSE: High Seasonal Efficiency
7 sizes to cover a range from 329 up to 515 kW with an ESEER up to 5.01

The ESEER (European Seasonal Energy Efficiency Ratio) is a weighed formula enabling to take into account the variation of EER with the load rate and the variation of air inlet condenser temperature.

$$ESEER = A \times EER_{100\%} + B \times EER_{75\%} + C \times EER_{50\%} + D \times EER_{25\%}$$

	A	B	C	D
Coefficient	0.03 (3%)	0.33 (33%)	0.41 (41%)	0.23 (23%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Noise Configuration

McEnergy Inverter is available in many different Noise level configurations:

ST: Standard Noise
Condenser fan rotating at 700 rpm, rubber antivibration on compressor

LN: Low Noise
Condenser fan rotating at 700 rpm, rubber antivibration on compressor, sound proof cabinet for each compressor

XN: Extra Low Noise (available only for XSE version)
Condenser fan rotating at 700 rpm, rubber antivibration on compressor, one sound proof cabinet for compressor and evaporator, suction muffler

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 units are supplied with optimised shell and tubes evaporator pass that allows a perfect oil circulation and so a perfect oil return to the compressor. It is direct expansion with refrigerant inside the tubes and water outside (shell side) with carbon steel tube sheets, with straight copper tubes that are spirally wound internally for higher efficiencies, expanded on the tube plates. The external shell is covered with a 10mm closed cell insulation material. Each evaporator has 2 circuits, one for each compressor and is manufactured in accordance to PED approval. The evaporator water outlet connections are provided with Victaulic Kit.

Condenser coils

The condenser is 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 overload relays are supplied as standard.

Electronic expansion valve

The unit is equipped with the most advanced electronic expansion valves to achieve precise control of refrigerant mass flow. As today's system requires improved energy efficiency, tighter temperature control, wider range of operating conditions and incorporate features like remote monitoring and diagnostics, the application of electronic expansion valves becomes mandatory. 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.
EEXV strength point is the capacity to work with lower ΔP between high and low pressure side, than a thermostatic expansion valve. The electronic expansion valve allows the system to work with low condenser pressure (winter time) without any refrigerant flow problems and with a perfect chilled water leaving temperature control.

Refrigerant Circuit

Each unit has 2 independent refrigerant circuits and each one includes:

- Compressor with integrated oil separator
- Oil pressure transducer
- High and pressure switches
- High pressure transducer
- Low pressure transducer
- Moisture liquid indicator
- High efficiency oil separator
- Replaceable core filter-drier

- Electronic expansion valve
- Suction line shut off valve
- Discharge line shut off valve

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.

Power Section

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

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, Inverter, 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°C.
- Compressors and evaporator 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 (transducer).
- 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 a 0/10 V modulating signal.

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.

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.

Standard accessories (supplied on basic unit)

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

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.

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

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

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.

Electronic Expansion Valve.

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.

Low pressure manometers.

Hour run meter.

General fault relay – Contactor for alarm warning.

Options (on request)

Total heat recovery – Produced with shell and tube heat exchangers to produce hot water up to +55° C. The heat exchangers are mounted on the refrigerant circuits parallel to the condenser coils to remove all the condensation heat.

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.

20mm insulation on evaporator.

Condenser coil guards

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.

Hydronic Kit (one water circulation pump – low or high lift) – Hydronic kit consists of: one centrifugal pump direct driven, expansion vessel 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.

Hydronic kit (two water circulation pumps – low or high lift) – Hydronic kit consists of: two centrifugal pumps direct driven, expansion vessel, 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.

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

Current limit display

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 and alarm from external device.

Ambient outside temperature sensor and set-point reset.

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.

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.

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).

Acoustic test.

Supervising systems (on request)

PlantVisor^{TM}:
Solution for tele-maintenance and supervisory

MicroTech II C Plus can be monitored locally or via modem or GSM by PlantVisor^{TM} supervision program.

PlantVisorTM is compatible with all Windows based systems.

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) based on the most common protocols as:

- CARELNative
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4)
- Ethernet TCP/IP and SNM.

Chiller Sequencing

MicroTech II control family allows an easy plug-in sequencing technology based on digital or serial field panel

MCS (McQuay Chiller Sequences)

Digital Step Inverter to sequence and rotate up to 11 chillers, based on 1 or 2 configurable input sensors. A very interesting low level full configurable digital field system. Monitorable by Plant Visor.

CSC III (Chiller System Controller III)

Serial sequences for up to 6 chillers. Full featured field serial device to sequence, optimize and monitor a little group of McQuay chillers. Monitorable by Plant Visor.

Nomenclature

McEnergy Inverter **XSE** **094** **.2** **ST** **134**

McEnergy Inverter Air cooled screw chiller

SSE Standard Seasonal Efficiency
XSE High Seasonal Efficiency

094.2 ÷ 147.2 Unit size

2 N° of compressors

ST Standard Noise version
LN Low Noise version
XN Extra Low Noise version

134 Refrigerant R 134A

Specifications

TECHNICAL SPECIFICATIONS			Version SSE	94.2	102.2	113.2	122.2
Capacity	Cooling			329	358	395	423
Capacity control	Type			Stepless			
	Minimum capacity		%	13.5%	13.5%	13.5%	13.5%
Unit power input	Cooling		kW	120	136	147	159
EER				2,74	2,63	2,68	2,66
ESEER				4,59	4,60	4,55	4,59
Casing	Colour			RAL7032			
	Material			Galvanized and painted steel sheet			
Dimensions	Unit	Height	mm	2355	2355	2355	2355
		Width	mm	2224	2224	2224	2224
		Depth	mm	4352	4352	5252	5252
Weight ST	Unit		kg	4190	4190	4590	4590
	Operating Weight		kg	4440	4440	4840	4840
Weight LN	Unit		Kg	4340	4340	4740	4740
	Operating Weight		kg	4590	4590	4990	4990
Water heat exchanger	Type			Single Pass Shell&Tube			
	Water volume		l	271	264	264	256
	Nominal water flow rate	Cooling	l/min	943	1026	1132	1213
	Nominal Water pressure drop	Cooling	kPa	60	61	72	67
	Insulation material			Closed cell foam elastomer			
Air heat exchanger	Type			Louvered fins			
Fan	Type			Axial			
	Drive			VFD driven			
	Diameter		mm	800	800	800	800
	Nominal air flow		m³/min	1960	1960	2450	2450
	Model	Quantity		8	8	10	10
		Speed in cooling	rpm	700	700	700	700
		Motor output in cool.	W	1133	1133	1133	1133
Compressor	Type			Semi-hermetic single screw compressor			
	Oil charge		l	26	26	26	26
	Quantity			2	2	2	2
Sound level (ST)	Sound Power	Cooling	dBA	102,8	102,8	103,2	103,2
	Sound Pressure	Cooling	dBA	83,0	83,0	83,0	83,0
Sound level (LN)	Sound Power	Cooling	dBA	96,9	96,9	97,3	97,3
	Sound Pressure	Cooling	dBA	77,0	77,0	77,0	77,0
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a
	Refrigerant charge		kg	80	80	100	100
	N. of circuits			2	2	2	2
Piping connections	Evaporator water inlet/outlet			168,3	168,3	168,3	168,3
Safety devices	High discharge pressure (pressure switch)						
Safety devices	High discharge pressure (transducer)						
Safety devices	Low suction pressure (transducer)						
Safety devices	Compressor overload (Kriwan)						
Safety devices	High discharge temperature						
Safety devices	Low oil pressure						
Safety devices	Low pressure ratio						
Safety devices	High oil pressure drop						
Safety devices	Phase monitor						
Safety devices	Emergency stop						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						

TECHNICAL SPECIFICATIONS			Version SSE	131.2	139.2	147.2
Capacity	Cooling		kW	459	488	515
Capacity control	Type			Stepless		
	Minimum capacity		%	13.5%	13.5%	13.5%
Unit power input	Cooling		kW	168	181	193
EER				2,74	2,71	2,67
ESEER				4,57	4,70	4,60
Casing	Colour			RAL7032		
	Material			Galvanized and painted steel sheet		
Dimensions	Unit	Height	mm	2355	2355	2355
		Width	mm	2224	2224	2224
		Depth	mm	6152	6152	6152
Weight ST	Unit		kg	5070	5070	5070
	Operating Weight		kg	5320	5320	5320
Weight LN	Unit		Kg	5220	5220	5220
	Operating Weight		kg	5470	5470	5470
Water heat exchanger	Type			Single Pass Shell&Tube		
	Water volume		l	256	248	248
	Nominal water flow rate	Cooling	l/min	1316	1399	1476
	Nominal Water pressure drop	Cooling	kPa	78	69	76
	Insulation material			Closed cell foam elastomer		
Air heat exchanger	Type			Louvered fins		
Fan	Type			Axial		
	Drive			VFD driven		
	Diameter		mm	800	800	800
	Nominal air flow		m³/min	2940	2940	2940
	Model	Quantity		12	12	12
		Speed in cooling	rpm	700	700	700
		Motor output in cool.	W	1133	1133	1133
Compressor	Type			Semi-hermetic single screw compressor		
	Oil charge		l	26	26	26
	Quantity			2	2	2
Sound level (ST)	Sound Power	Cooling	dBA	103,6	103,6	103,6
	Sound Pressure	Cooling	dBA	83,5	83,5	83,5
Sound level (LN)	Sound Power	Cooling	dBA	98,2	98,2	98,2
	Sound Pressure	Cooling	dBA	77,5	77,5	77,5
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a
	Refrigerant charge		kg	120	120	120
	N. of circuits			2	2	2
Piping connections	Evaporator water inlet/outlet			168.3	168.3	168.3
Safety devices	High discharge pressure (pressure switch)					
Safety devices	High discharge pressure (transducer)					
Safety devices	Low suction pressure (transducer)					
Safety devices	Compressor overload (Kriwan)					
Safety devices	High discharge temperature					
Safety devices	Low oil pressure					
Safety devices	Low pressure ratio					
Safety devices	High oil pressure drop					
Safety devices	Phase monitor					
Safety devices	Emergency stop					
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.					

ELECTRICAL SPECIFICATIONS			Version SSE	94.2	102.2	113.2	122.2
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	232	250	251	278
	Nominal running current cooling		A	194	220	239	258
	Maximum running current		A	322	322	328	358
	Maximum current for wires sizing		A	355	355	361	394
	Min displacement power factor at nominal conditions			0,98	0,98	0,98	0,98
Fans	Nominal running current in cooling		A	22,4	22,4	28,0	28,0
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	150+150	150+150	150+150	150+150
	Starting method			Inverter			

ELECTRICAL SPECIFICATIONS			Version SSE	131.2	139.2	147.2
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	297	311	316
	Nominal running current cooling		A	273	292	312
	Maximum running current		A	394	394	394
	Maximum current for wires sizing		A	433	433	433
	Min displacement power factor at nominal conditions			0,98	0,98	0,98
Fans	Nominal running current in cooling		A	33,6	33,6	33,6
Compressor	Phase			3	3	3
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
	Maximum running current		A	180+180	180+180	180+180
	Starting method			Inverter		

Notes	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + 75% of maximum current of the other compressor + fans current for the circuit at 75%.
	Maximum starting current referred to installation with 25kA short circuit current
	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; compressors + fans current.
	Maximum Running Current is referred to installation with 25kA short circuit and is based on max compressor absorbed current in its envelope
	Maximum unit current for wires sizing is referred to installation with 25kA short circuit current and is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.
	Minimum displacement power factor is referred to installation with 25kA short circuit

TECHNICAL SPECIFICATIONS				Version XSE	94.2	102.2	113.2	122.2
Capacity	Cooling				329	358	395	423
Capacity control	Type				Stepless			
	Minimum capacity			%	13.5%	13.5%	13.5%	13.5%
Unit power input	Cooling			kW	118	135	145	157
EER					2,78	2,66	2,73	2,70
ESEER					4,79	4,82	4,78	4,84
Casing	Colour				RAL7032			
	Material				Galvanized and painted steel sheet			
Dimensions	Unit	Height		mm	2355	2355	2355	2355
		Width		mm	2224	2224	2224	2224
		Depth		mm	4352	4352	5252	5252
Weight ST	Unit			kg	4190	4190	4590	4590
	Operating Weight			kg	4440	4440	4840	4840
Weight LN	Unit			Kg	4340	4340	4740	4740
	Operating Weight			Kg	4590	4590	4990	4990
Weight XN	Unit			Kg	4390	4390	4790	4790
	Operating Weight			kg	4640	4640	5040	5040
Water heat exchanger	Type				Single Pass Shell&Tube			
	Water volume			l	271	264	264	256
	Nominal water flow rate	Cooling		l/min	943	1026	1132	1213
	Nominal Water pressure drop	Cooling		kPa	60	61	72	67
	Insulation material				Closed cell foam elastomer			
Air heat exchanger	Type				Louvered fins			
Fan	Type				Axial			
	Drive				DC Inverter (Brushless)			
	Diameter			mm	800	800	800	800
	Nominal air flow			m³/min	1960	1960	2450	2450
	Model	Quantity			8	8	10	10
		Speed in cooling		rpm	700	700	700	700
		Motor output in cool.		W	900	900	900	900
Compressor	Type				Semi-hermetic single screw compressor			
	Oil charge			l	26	26	26	26
	Quantity				2	2	2	2
Sound level (ST)	Sound Power	Cooling		dBA	102,8	102,8	103,2	103,2
	Sound Pressure	Cooling		dBA	83,0	83,0	83,0	83,0
Sound level (LN)	Sound Power	Cooling		dBA	96,9	96,9	97,3	97,3
	Sound Pressure	Cooling		dBA	77,0	77,0	77,0	77,0
Sound level (XN)	Sound Power	Cooling		dBA	92,9	92,9	93,3	93,3
	Sound Pressure	Cooling		dBA	73,0	73,0	73,0	73,0
Refrigerant circuit	Refrigerant type				R-134a	R-134a	R-134a	R-134a
	Refrigerant charge			kg	80	80	100	100
	N. of circuits				2	2	2	2
Piping connections	Evaporator water inlet/outlet				168.3	168.3	168.3	168.3
Safety devices	High discharge pressure (pressure switch)							
Safety devices	High discharge pressure (transducer)							
Safety devices	Low suction pressure (transducer)							
Safety devices	Compressor overload (Kriwan)							
Safety devices	High discharge temperature							
Safety devices	Low oil pressure							
Safety devices	Low pressure ratio							
Safety devices	High oil pressure drop							
Safety devices	Phase monitor							
Safety devices	Emergency stop							
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.							

TECHNICAL SPECIFICATIONS			Version XSE	131.2	139.2	147.2
Capacity	Cooling		kW	459	488	515
Capacity control	Type			Stepless		
	Minimum capacity		%	13.5%	13.5%	13.5%
Unit power input	Cooling		kW	165	178	190
EER				2,79	2,75	2,71
ESEER				4,81	5,01	4,84
Casing	Colour			RAL7032		
	Material			Galvanized and painted steel sheet		
Dimensions	Unit	Height	mm	2355	2355	2355
		Width	mm	2224	2224	2224
		Depth	mm	6152	6152	6152
Weight ST	Unit		kg	5070	5070	5070
	Operating Weight		kg	5320	5320	5320
Weight LN	Unit		Kg	5220	5220	5220
	Operating Weight		Kg	5470	5470	5470
Weight XN	Unit		Kg	5270	5270	5270
	Operating Weight		kg	5520	5520	5520
Water heat exchanger	Type			Single Pass Shell&Tube		
	Water volume		l	256	248	248
	Nominal water flow rate	Cooling	l/min	1316	1399	1476
	Nominal Water pressure drop	Cooling	kPa	78	69	76
	Insulation material			Closed cell foam elastomer		
Air heat exchanger	Type			Louvered fins		
Fan	Type			Axial		
	Drive			DC Inverter (Brushless)		
	Diameter		mm	800	800	800
	Nominal air flow		m³/min	2940	2940	2940
	Model	Quantity		12	12	12
		Speed in cooling	rpm	700	700	700
		Motor output in cool.	W	900	900	900
Compressor	Type			Semi-hermetic single screw compressor		
	Oil charge		l	26	26	26
	Quantity			2	2	2
Sound level (ST)	Sound Power	Cooling	dBA	103,6	103,6	103,6
	Sound Pressure	Cooling	dBA	83,5	83,5	83,5
Sound level (LN)	Sound Power	Cooling	dBA	98,2	98,2	98,2
	Sound Pressure	Cooling	dBA	77,5	77,5	77,5
Sound level (XN)	Sound Power	Cooling	dBA	94,2	94,2	94,2
	Sound Pressure	Cooling	dBA	73,5	73,5	73,5
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a
	Refrigerant charge		kg	120	120	120
	N. of circuits			2	2	2
Piping connections	Evaporator water inlet/outlet			168.3	168.3	168.3
Safety devices	High discharge pressure (pressure switch)					
Safety devices	High discharge pressure (transducer)					
Safety devices	Low suction pressure (transducer)					
Safety devices	Compressor overload (Kriwan)					
Safety devices	High discharge temperature					
Safety devices	Low oil pressure					
Safety devices	Low pressure ratio					
Safety devices	High oil pressure drop					
Safety devices	Phase monitor					
Safety devices	Emergency stop					
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.					

ELECTRICAL SPECIFICATIONS			Version XSE	94.2	102.2	113.2	122.2
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	232	244	251	278
	Nominal running current cooling		A	183	209	225	244
	Maximum running current		A	311	311	314	344
	Maximum current for wires sizing		A	342	342	345	378
Fans	Nominal running current in cooling		A	11.2	11.2	14.0	14.0
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	150+150	150+150	150+150	150+150
	Starting method			Inverter			

ELECTRICAL SPECIFICATIONS			Version XSE	131.2	139.2	147.2
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	297	302	316
	Nominal running current cooling		A	256	275	295
	Maximum running current		A	377	377	377
	Maximum current for wires sizing		A	414	414	414
Fans	Nominal running current in cooling		A	33.6	33.6	33.6
Compressor	Phase			3	3	3
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
	Maximum running current		A	180+180	180+180	180+180
	Starting method			Inverter		

Notes	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + 75% of maximum current of the other compressor + fans current for the circuit at 75%.
	Maximum starting current referred to installation with 25kA short circuit current
	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; compressors + fans current.
	Maximum Running Current is referred to installation with 25kA short circuit and is based on max compressor absorbed current in its envelope
	Maximum unit current for wires sizing is referred to installation with 25kA short circuit current and is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.
	Minimum displacement power factor is referred to installation with 25kA short circuit

Sound pressure level

McEnergy Inverter SSE / XSE - ST

Unit size	Sound pressure level at 1 m from the unit in semispheric free field (rif. 2 x 10^{-5} Pa)									Power
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
94.2	79.1	77.8	79.0	77.6	80.0	76.1	65.6	56.6	**83.0**	**102.8**
102.2	79.1	77.8	79.0	77.6	80.0	76.1	65.6	56.6	**83.0**	**102.8**
113.2	79.1	77.8	79.0	77.6	80.0	76.1	65.6	56.6	**83.0**	**103.2**
122.2	79.1	77.8	79.0	77.6	80.0	76.1	65.6	56.6	**83.0**	**103.2**
131.2	79.6	78.3	79.5	78.1	80.6	76.6	65.6	56.6	**83.5**	**103.6**
139.2	79.6	78.3	79.5	78.1	80.6	76.6	65.6	56.6	**83.5**	**103.6**
147.2	79.6	78.3	79.5	78.1	80.6	76.6	65.6	56.6	**83.5**	**103.6**

Note: The values are according to ISO 3744 and are referred to: evaporator 12/7° C, air ambient 35° C, full load operation.

McEnergy Inverter SSE / XSE - LN

Unit size	Sound pressure level at 1 m from the unit in semispheric free field (rif. 2 x 10^{-5} Pa)									Power
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
94.2	78.4	73.5	73.5	71.8	73.9	69.9	59.6	50.7	**77.0**	**96.9**
102.2	78.4	73.5	73.5	71.8	73.9	69.9	59.6	50.7	**77.0**	**96.9**
113.2	78.4	73.5	73.5	71.8	73.9	69.9	59.6	50.7	**77.0**	**97.3**
122.2	78.4	73.5	73.5	71.8	73.9	69.9	59.6	50.7	**77.0**	**97.3**
131.2	78.4	74.0	74.0	72.3	74.4	70.3	60.1	50.7	**77.5**	**98.2**
139.2	78.4	74.0	74.0	72.3	74.4	70.3	60.1	50.7	**77.5**	**98.2**
147.2	78.4	74.0	74.0	72.3	74.4	70.3	60.1	50.7	**77.5**	**98.2**

Note: The values are according to ISO 3744 and are referred to: evaporator 12/7° C, air ambient 35° C, full load operation.

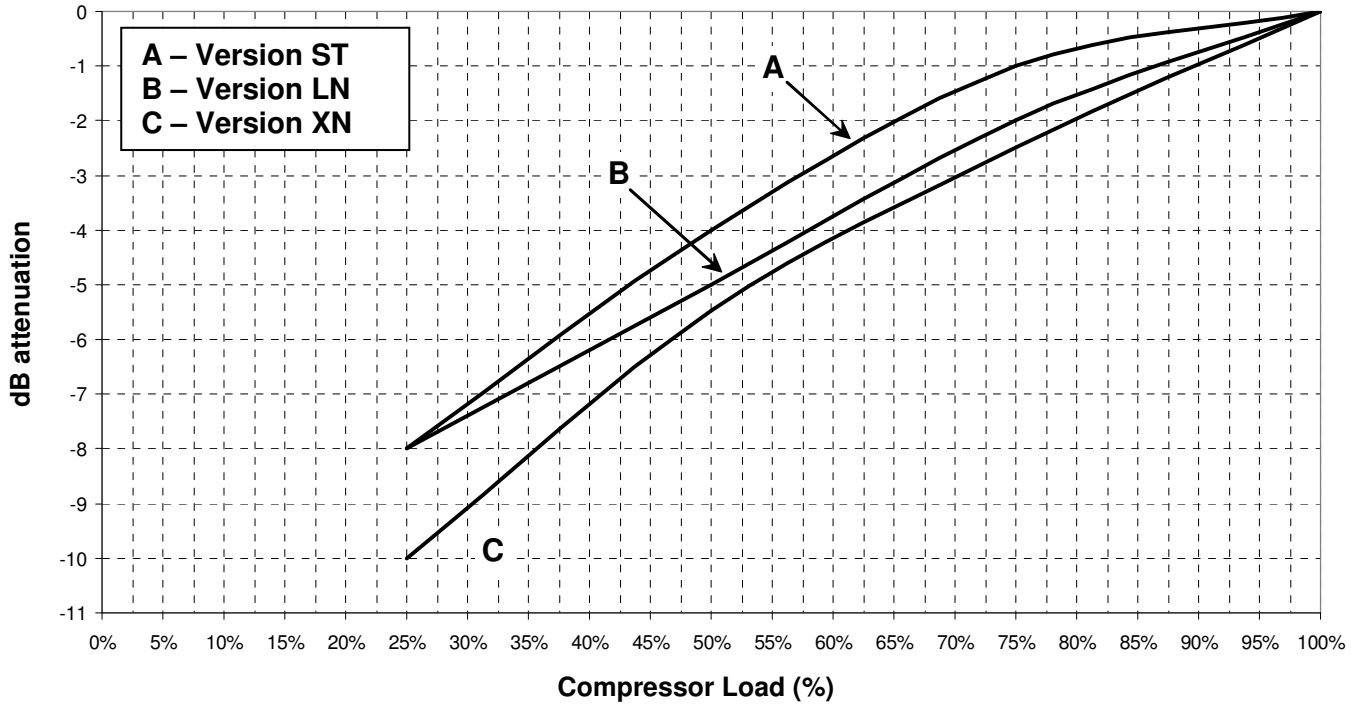
McEnergy Inverter XSE - XN

Unit size	Sound pressure level at 1 m from the unit in semispheric free field (rif. 2 x 10^{-5} Pa)									Power
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
94.2	77.0	70.8	70.0	68.0	69.8	65.6	55.6	46.7	**73.0**	**92.9**
102.2	77.0	70.8	70.0	68.0	69.8	65.6	55.6	46.7	**73.0**	**92.9**
113.2	77.0	70.8	70.0	68.0	69.8	65.6	55.6	46.7	**73.0**	**93.3**
122.2	77.0	70.8	70.0	68.0	69.8	65.6	55.6	46.7	**73.0**	**93.3**
131.2	77.3	71.3	70.5	68.7	70.3	66.1	56.0	46.8	**73.5**	**94.2**
139.2	77.3	71.3	70.5	68.7	70.3	66.1	56.0	46.8	**73.5**	**94.2**
147.2	77.3	71.3	70.5	68.7	70.3	66.1	56.0	46.8	**73.5**	**94.2**

Note: The values are according to ISO 3744 and are referred to: evaporator 12/7° C, air ambient 35° C, full load operation.

Sound Pressure and Sound Power attenuation for different compressor load

McEnergy Inverter SSE – ST / LN --- XSE – ST / LN / XN



Sound pressure correction factors for different distances

McEnergy Inverter SSE / XSE – ST / LN / XN

Unit size	Distance (m)					
	1	5	10	15	20	25
94.2	0,0	-7,7	-12,4	-15,5	-17,7	-19,5
102.2	0,0	-7,7	-12,4	-15,5	-17,7	-19,5
113.2	0,0	-7,4	-12,1	-15,1	-17,4	-19,2
122.2	0,0	-7,4	-12,1	-15,1	-17,4	-19,2
131.2	0,0	-7,2	-11,8	-14,8	-17,1	-18,8
139.2	0,0	-7,2	-11,8	-14,8	-17,1	-18,8
147.2	0,0	-7,2	-11,8	-14,8	-17,1	-18,8

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

Note
Sound pressure in open field conditions on reflecting surface (directivity factor Q=2)

Operating limits

McEnergy Inverter SSE – XSE

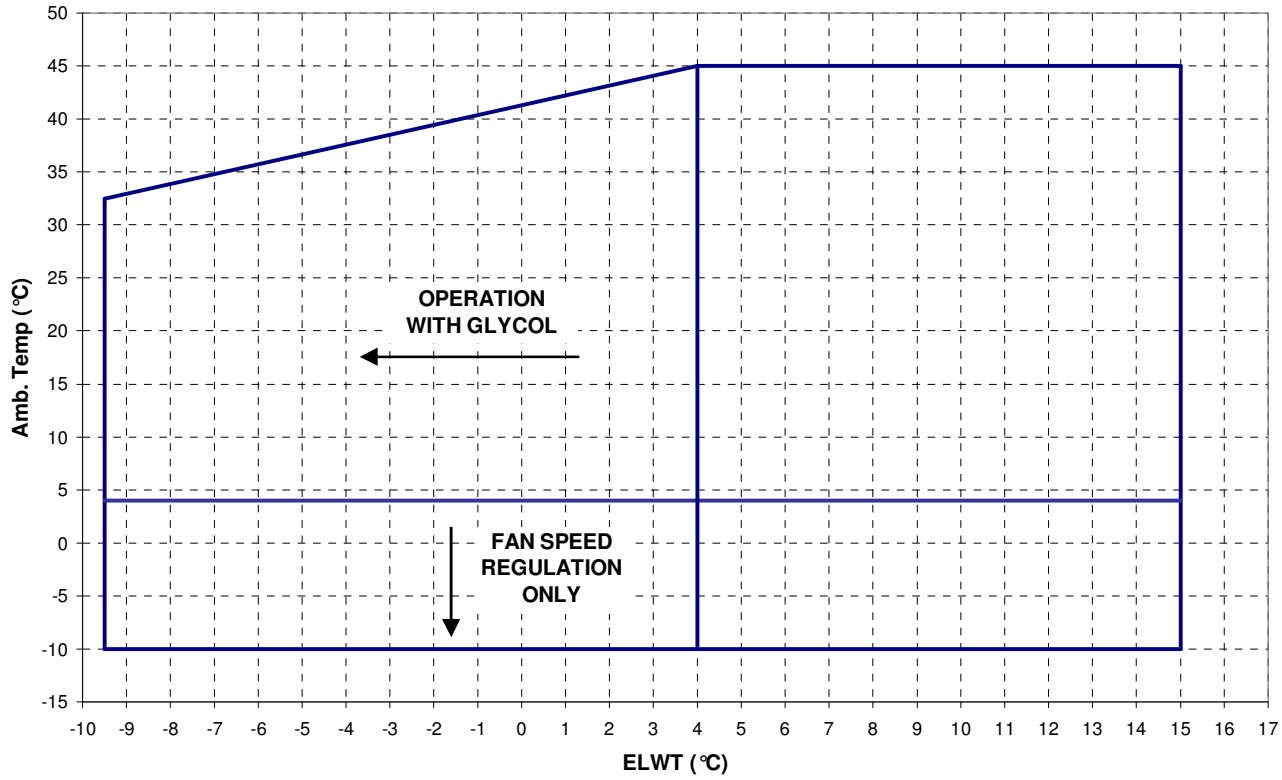


Table 1 – Operating limits

Max evaporator water ΔT	**°C**	8
Min evaporator water ΔT	**°C**	4

Table 2 – Evaporator fouling factors

Fouling factors m^2°C / kW	Cooling capacity correction factor	Power input correction factor	EER 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 4 – 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 5 – Low temperature operation performance factors

Ethylene glycol/water leaving temperature °C	3	2	0	-2	-4	-6	-8
Cooling capacity correction factor	0,842	0,785	0,725	0,670	0,613	0,562	0,842
Power input compressors correction factor	0,95	0,94	0,92	0,89	0,87	0,84	0,95
Min. % of ethylene glycol	10	20	20	30	30	30	10

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:

$$M\ (liters) = (0.1595 \times \Delta T(°C) + 3.0825) \times P(kW)$$

where:
M = minimum water content per unit expressed in litres
P = cooling capacity of the unit expressed in kW
ΔT = evaporator entering / leaving water temperature difference expressed in °C

This formula is valid for:
- 2 compressors unit
- standard microprocessor parameters

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

Standard ratings

McEnergy Inverter SSE 094.2 ST – LN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter SSE 094.2 ST - LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	344	355	366	377	388	400	412	424	436	448	461	474
				P. I. (kW)	86.3	87.2	88.1	89.0	89.9	90.9	91.8	92.7	93.7	94.6	95.6	96.6
			Boost	C. C. (kW)	401	413	425	438	451	464	477	491	505	519	534	549
				P. I. (kW)	110	112	113	114	116	117	118	120	121	123	124	126
		25	Rated	C. C. (kW)	330	341	351	362	373	384	396	407	419	431	443	455
				P. I. (kW)	95.7	96.8	97.8	98.8	99.9	101	102	103	104	105	106	108
			Boost	C. C. (kW)	384	396	408	420	433	445	458	471	484	497	511	526
				P. I. (kW)	123	124	125	127	128	130	131	133	134	136	138	140
		30	Rated	C. C. (kW)	315	326	336	346	357	368	379	390	401	412	424	435
				P. I. (kW)	105	107	108	109	110	111	113	114	115	116	118	119
			Boost	C. C. (kW)	366	378	389	401	413	424	436	448	461	473	486	499
				P. I. (kW)	136	138	139	141	142	144	146	147	149	151	153	155
		35	Rated	C. C. (kW)	299	309	319	329	339	349	359	370	380	391	402	413
				P. I. (kW)	116	117	119	120	121	123	124	125	127	128	130	131
			Boost	C. C. (kW)	346	357	367	378	389	401	412	423	435	446	454	462
				P. I. (kW)	152	153	155	157	158	160	162	164	166	168	167	166
		40	Rated	C. C. (kW)	280	289	299	308	317	327	337	347	356	366	377	387
				P. I. (kW)	129	130	131	133	134	136	137	139	141	142	144	145
			Boost	C. C. (kW)	319	329	336	343	353	360	370	377	385	395	402	406
				P. I. (kW)	167	169	168	166	168	167	169	167	166	168	167	163
		45	Rated	C. C. (kW)	258	266	275	279	283	286	290	293	296	299	305	307
				P. I. (kW)	144	145	147	142	138	134	131	127	123	119	118	115
			Boost	C. C. (kW)	267	271	275	279	283	286	290	293	296	299	305	307
				P. I. (kW)	155	151	147	142	138	134	131	127	123	119	118	115

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter SSE 102.2 ST – LN

Leaving water temp. (°C)				4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter SSE 103.2 ST - LN AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	378	390	402	414	426	439	452	465	478	491	505	519
			P. I. (kW)	97.9	99.0	100	101	103	104	105	106	107	109	110	111
		Boost	C. C. (kW)	439	452	466	480	493	507	522	537	551	567	582	597
			P. I. (kW)	126	128	130	131	133	135	136	138	140	142	144	146
	25	Rated	C. C. (kW)	362	374	385	397	409	421	434	446	459	472	485	498
			P. I. (kW)	108	110	111	112	114	115	116	118	119	121	122	123
		Boost	C. C. (kW)	420	433	446	459	472	486	497	508	519	533	545	557
			P. I. (kW)	140	142	144	146	148	150	150	150	151	153	153	154
	30	Rated	C. C. (kW)	345	356	368	379	390	402	414	425	437	450	462	474
			P. I. (kW)	119	121	122	124	125	127	128	130	131	133	135	136
		Boost	C. C. (kW)	396	406	416	428	438	449	459	472	483	493	504	517
			P. I. (kW)	153	153	153	155	156	156	157	159	159	160	160	162
	35	Rated	C. C. (kW)	326	337	347	358	369	380	391	402	413	425	436	446
			P. I. (kW)	132	133	135	136	138	140	142	143	145	147	149	149
		Boost	C. C. (kW)	362	371	382	392	402	413	423	433	445	453	463	471
			P. I. (kW)	160	160	162	163	163	165	166	166	168	167	168	167
	40	Rated	C. C. (kW)	304	314	324	332	343	351	362	370	379	388	395	403
			P. I. (kW)	146	148	150	150	152	152	154	154	154	154	153	151
		Boost	C. C. (kW)	325	334	343	350	361	368	377	386	393	401	407	411
			P. I. (kW)	167	168	168	167	169	167	168	168	167	166	163	158
	45	Rated	C. C. (kW)	266	273	278	283	286	290	293	297	301	303	307	308
			P. I. (kW)	146	144	141	138	134	130	126	123	121	117	114	110
		Boost	C. C. (kW)	270	274	278	283	286	290	293	297	301	303	307	308
			P. I. (kW)	150	146	141	138	134	130	126	123	121	117	114	110

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter SSE 113.2 ST – LN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter SSE 112.2 ST - LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	414	427	440	454	467	481	495	510	524	539	554	570
				P. I. (kW)	106	107	109	110	111	112	113	115	116	117	118	120
			Boost	C. C. (kW)	482	496	511	526	541	557	574	590	607	624	642	659
				P. I. (kW)	136	138	139	141	143	144	146	148	150	152	154	156
		25	Rated	C. C. (kW)	398	410	423	436	449	462	476	490	504	518	532	547
				P. I. (kW)	118	119	120	122	123	124	126	127	128	130	131	133
			Boost	C. C. (kW)	462	476	490	505	519	534	549	565	581	597	614	624
				P. I. (kW)	151	153	155	156	158	160	162	164	166	168	171	170
		30	Rated	C. C. (kW)	380	392	404	417	429	442	455	468	481	495	509	522
				P. I. (kW)	129	131	132	134	135	137	138	140	142	143	145	147
			Boost	C. C. (kW)	440	453	467	476	485	499	508	518	527	541	551	561
				P. I. (kW)	168	169	171	170	169	171	171	170	169	171	170	169
		35	Rated	C. C. (kW)	360	371	383	395	407	419	431	444	456	469	482	495
				P. I. (kW)	143	144	146	147	149	151	153	154	156	158	160	162
			Boost	C. C. (kW)	396	404	416	425	434	446	455	464	476	485	494	507
				P. I. (kW)	171	169	171	170	169	171	170	169	171	170	169	171
		40	Rated	C. C. (kW)	337	348	359	370	381	392	404	415	423	431	443	452
				P. I. (kW)	158	160	161	163	165	167	169	171	170	168	170	169
			Boost	C. C. (kW)	349	357	368	376	387	396	404	415	423	431	443	452
				P. I. (kW)	170	169	171	170	171	170	169	171	170	168	170	169
		45	Rated	C. C. (kW)	296	306	313	323	330	334	338	342	345	348	355	357
				P. I. (kW)	159	161	160	161	160	155	151	146	142	137	136	132
			Boost	C. C. (kW)	296	306	313	323	330	334	338	342	345	348	355	357
				P. I. (kW)	159	161	160	161	160	155	151	146	142	137	136	132

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter SSE 122.2 ST – LN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter SSE 121.2 ST - LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	445	459	473	488	503	517	533	548	563	579	595	612
				P. I. (kW)	115	116	117	119	120	121	123	124	125	127	128	130
			Boost	C. C. (kW)	518	533	549	565	582	599	616	633	651	669	688	706
				P. I. (kW)	147	149	151	153	155	157	159	161	163	165	167	170
		25	Rated	C. C. (kW)	427	441	455	468	483	497	511	526	541	556	572	587
				P. I. (kW)	127	128	130	131	133	134	136	137	139	141	142	144
			Boost	C. C. (kW)	496	511	526	542	558	573	589	606	623	640	654	668
				P. I. (kW)	164	166	168	170	172	174	176	178	181	183	184	185
		30	Rated	C. C. (kW)	408	421	434	447	461	475	488	502	517	531	546	560
				P. I. (kW)	140	141	143	145	146	148	150	152	153	155	157	159
			Boost	C. C. (kW)	472	486	499	511	523	533	543	558	568	578	590	604
				P. I. (kW)	182	184	185	185	186	185	184	186	185	184	185	186
		35	Rated	C. C. (kW)	386	398	411	423	436	449	462	475	489	502	516	530
				P. I. (kW)	154	156	158	159	161	163	165	167	169	171	173	175
			Boost	C. C. (kW)	424	435	444	455	467	476	487	499	508	520	531	541
				P. I. (kW)	185	185	184	185	185	184	184	185	184	184	185	184
		40	Rated	C. C. (kW)	360	372	384	395	407	420	432	442	455	464	474	485
				P. I. (kW)	171	173	175	177	179	181	183	183	186	184	185	185
			Boost	C. C. (kW)	373	384	394	404	413	425	434	442	455	464	474	485
				P. I. (kW)	184	185	185	185	184	186	185	183	186	184	185	185
		45	Rated	C. C. (kW)	318	324	331	337	345	349	353	356	361	366	369	371
				P. I. (kW)	174	170	169	165	164	159	154	149	146	143	138	134
			Boost	C. C. (kW)	318	324	331	337	345	349	353	356	361	366	369	371
				P. I. (kW)	174	170	169	165	164	159	154	149	146	143	138	134

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter SSE 131.2 ST – LN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter SSE 130.2 ST - LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	480	496	511	527	542	559	575	592	609	626	644	661
				P. I. (kW)	121	122	124	125	126	127	129	130	131	133	134	135
			Boost	C. C. (kW)	560	577	594	611	629	647	666	686	705	726	746	767
				P. I. (kW)	154	156	158	160	162	164	165	168	170	172	174	176
		25	Rated	C. C. (kW)	461	476	491	506	521	537	553	569	585	602	619	636
				P. I. (kW)	134	136	137	139	140	141	143	145	146	148	149	151
			Boost	C. C. (kW)	537	553	570	587	604	622	639	657	676	695	714	734
				P. I. (kW)	172	174	175	177	180	182	184	186	188	191	193	196
		30	Rated	C. C. (kW)	441	455	469	484	499	514	529	544	560	576	592	608
				P. I. (kW)	148	149	151	153	154	156	158	159	161	163	165	167
			Boost	C. C. (kW)	512	528	544	560	576	592	609	620	631	642	660	671
				P. I. (kW)	190	192	195	197	199	201	204	203	202	200	203	202
		35	Rated	C. C. (kW)	418	431	445	459	473	487	502	516	531	546	561	576
				P. I. (kW)	162	164	166	168	170	172	174	176	178	180	182	184
			Boost	C. C. (kW)	469	484	494	504	519	529	544	555	565	581	591	602
				P. I. (kW)	201	203	202	200	203	201	204	202	201	203	202	201
		40	Rated	C. C. (kW)	392	404	417	430	443	457	470	484	498	512	526	540
				P. I. (kW)	180	182	184	186	188	190	192	194	196	199	201	203
			Boost	C. C. (kW)	414	427	437	450	459	469	483	492	506	516	526	540
				P. I. (kW)	201	203	201	204	202	201	203	201	204	202	201	203
		45	Rated	C. C. (kW)	354	362	374	383	395	400	405	409	414	418	421	429
				P. I. (kW)	193	191	193	191	193	188	182	177	172	167	162	160
			Boost	C. C. (kW)	354	362	374	383	395	400	405	409	414	418	421	429
				P. I. (kW)	193	191	193	191	193	188	182	177	172	167	162	160

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter SSE 139.2 ST – LN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter SSE 139.2 ST - LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	512	528	544	561	578	595	612	630	648	667	686	705
				P. I. (kW)	130	131	133	134	136	137	139	140	142	143	145	146
			Boost	C. C. (kW)	596	614	632	651	670	689	709	730	751	772	793	811
				P. I. (kW)	166	168	170	172	174	177	179	181	183	186	188	189
		25	Rated	C. C. (kW)	491	507	523	539	555	572	589	606	623	640	658	677
				P. I. (kW)	144	146	147	149	150	152	154	156	157	159	161	163
			Boost	C. C. (kW)	571	589	606	621	636	654	669	685	704	720	737	754
				P. I. (kW)	185	187	189	190	190	193	193	194	196	197	198	198
		30	Rated	C. C. (kW)	469	485	500	515	531	547	563	579	595	612	629	646
				P. I. (kW)	159	160	162	164	166	168	170	171	173	175	177	179
			Boost	C. C. (kW)	531	547	561	575	591	606	617	634	646	657	672	687
				P. I. (kW)	196	198	199	199	202	202	201	203	202	201	202	203
		35	Rated	C. C. (kW)	445	459	474	488	503	518	533	549	562	577	590	604
				P. I. (kW)	175	177	179	181	183	185	187	189	189	192	192	192
			Boost	C. C. (kW)	480	495	505	516	531	542	555	568	579	592	606	616
				P. I. (kW)	201	203	202	200	203	201	202	202	201	202	202	201
		40	Rated	C. C. (kW)	414	426	439	451	462	476	488	502	514	526	541	553
				P. I. (kW)	191	192	194	194	194	196	197	199	199	200	202	202
			Boost	C. C. (kW)	425	437	449	459	470	482	494	506	516	528	541	553
				P. I. (kW)	202	202	203	201	201	202	202	203	201	201	202	202
		45	Rated	C. C. (kW)	364	372	384	393	404	411	421	426	433	437	440	444
				P. I. (kW)	192	191	193	191	191	187	188	182	179	173	168	162
			Boost	C. C. (kW)	364	372	384	393	404	411	421	426	433	437	440	444
				P. I. (kW)	192	191	193	191	191	187	188	182	179	173	168	162

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter SSE 147.2 ST – LN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter SSE 147.2 ST - LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	541	558	575	592	610	628	646	665	684	703	724	745
				P. I. (kW)	139	140	142	143	145	147	148	150	151	153	155	157
			Boost	C. C. (kW)	628	647	667	686	706	728	749	771	793	815	837	852
				P. I. (kW)	178	180	182	185	187	189	192	194	197	199	202	201
		25	Rated	C. C. (kW)	519	536	552	569	586	604	621	639	657	676	694	714
				P. I. (kW)	154	155	157	159	161	163	164	166	168	170	172	174
			Boost	C. C. (kW)	603	621	639	652	664	683	696	709	729	743	756	770
				P. I. (kW)	198	200	203	202	201	203	202	201	204	203	202	201
		30	Rated	C. C. (kW)	496	512	528	544	560	577	594	611	628	645	663	681
				P. I. (kW)	169	171	173	175	177	179	181	183	185	188	190	192
			Boost	C. C. (kW)	547	563	575	587	604	616	627	645	657	669	681	699
				P. I. (kW)	201	204	203	201	204	203	201	204	203	201	200	203
		35	Rated	C. C. (kW)	470	485	500	515	531	547	562	578	590	606	617	628
				P. I. (kW)	187	189	191	193	195	198	200	202	201	203	202	200
			Boost	C. C. (kW)	488	503	514	525	541	551	567	578	590	606	617	628
				P. I. (kW)	201	203	202	200	203	201	204	202	201	203	202	200
		40	Rated	C. C. (kW)	435	445	459	469	479	494	504	518	528	539	554	564
				P. I. (kW)	203	201	204	202	200	203	201	203	202	200	202	201
			Boost	C. C. (kW)	435	445	459	469	479	494	504	518	528	539	554	564
				P. I. (kW)	203	201	204	202	200	203	201	203	202	200	202	201
		45	Rated	C. C. (kW)	372	381	393	402	415	424	437	441	450	454	458	461
				P. I. (kW)	192	190	192	190	193	191	193	187	185	179	174	168
			Boost	C. C. (kW)	372	381	393	402	415	424	437	441	450	454	458	461
				P. I. (kW)	192	190	192	190	193	191	193	187	185	179	174	168

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter XSE 094.2 ST – LN – XN

Leaving water temp. (°C)				4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter XSE 094.2 ST – LN - XN AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	344	355	366	377	388	400	412	424	436	448	461	474
			P. I. (kW)	84.4	85.3	86.2	87.1	88.0	89.0	89.9	90.8	91.8	92.7	93.7	94.7
		Boost	C. C. (kW)	401	413	425	438	451	464	477	491	505	519	534	549
			P. I. (kW)	108	110	111	112	114	115	116	118	119	121	122	124
	25	Rated	C. C. (kW)	330	341	351	362	373	384	396	407	419	431	443	455
			P. I. (kW)	93.8	94.9	95.9	96.9	98.0	99.1	100	101	102	104	105	106
		Boost	C. C. (kW)	384	396	408	420	433	445	458	471	484	497	511	526
			P. I. (kW)	121	122	124	125	126	128	130	131	133	134	136	138
	30	Rated	C. C. (kW)	315	326	336	346	357	368	379	390	401	412	424	435
			P. I. (kW)	104	105	106	107	108	109	111	112	113	115	116	117
		Boost	C. C. (kW)	366	378	389	401	413	424	436	448	461	473	486	499
			P. I. (kW)	134	136	137	139	140	142	144	146	147	149	151	153
	35	Rated	C. C. (kW)	299	309	319	329	339	349	359	370	380	391	402	413
			P. I. (kW)	114	116	117	118	119	121	122	124	125	127	128	130
		Boost	C. C. (kW)	346	357	367	378	389	397	404	416	423	431	442	450
			P. I. (kW)	150	151	153	155	157	156	155	157	156	155	156	156
	40	Rated	C. C. (kW)	280	289	299	308	317	327	337	347	356	366	377	387
			P. I. (kW)	127	128	130	131	132	134	136	137	139	140	142	144
		Boost	C. C. (kW)	319	329	336	343	353	360	370	377	385	395	402	406
			P. I. (kW)	165	167	166	164	166	165	167	166	164	166	165	161
	45	Rated	C. C. (kW)	258	266	275	279	283	286	290	293	296	299	305	307
			P. I. (kW)	142	143	145	141	137	133	129	125	121	118	116	113
		Boost	C. C. (kW)	267	271	275	279	283	286	290	293	296	299	305	307
			P. I. (kW)	154	149	145	141	137	133	129	125	121	118	116	113

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter XSE 102.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter XSE 103.2 ST - LN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	378	390	402	414	426	439	452	465	478	491	505	519
				P. I. (kW)	96.0	97.1	98.3	99.4	101	102	103	104	106	107	108	109
			Boost	C. C. (kW)	439	452	466	480	493	507	522	537	551	567	582	597
				P. I. (kW)	124	126	128	129	131	133	135	136	138	140	142	144
		25	Rated	C. C. (kW)	362	374	385	397	409	421	434	446	459	472	485	498
				P. I. (kW)	106	108	109	110	112	113	114	116	117	119	120	122
			Boost	C. C. (kW)	420	433	446	459	472	486	497	508	519	533	545	557
				P. I. (kW)	138	140	142	144	146	148	148	148	149	151	151	152
		30	Rated	C. C. (kW)	345	356	368	379	390	402	414	425	437	450	462	474
				P. I. (kW)	117	119	120	122	123	125	126	128	130	131	133	135
			Boost	C. C. (kW)	396	406	416	428	438	449	459	472	483	493	504	517
				P. I. (kW)	151	151	152	153	154	154	155	157	157	158	158	160
		35	Rated	C. C. (kW)	326	337	347	358	369	380	391	402	413	425	436	446
				P. I. (kW)	130	131	133	135	136	138	140	141	143	145	147	147
			Boost	C. C. (kW)	362	371	382	392	402	413	423	433	445	453	463	471
				P. I. (kW)	158	159	161	161	161	163	164	164	166	165	166	165
		40	Rated	C. C. (kW)	304	314	324	332	343	351	362	370	379	388	395	403
				P. I. (kW)	144	146	148	148	150	150	152	152	152	152	151	149
			Boost	C. C. (kW)	325	334	343	350	361	368	377	386	393	401	407	411
				P. I. (kW)	165	166	166	165	167	165	166	166	165	164	161	157
		45	Rated	C. C. (kW)	266	273	278	283	286	290	293	297	301	303	307	308
				P. I. (kW)	144	142	139	137	132	128	124	122	119	115	112	108
			Boost	C. C. (kW)	270	274	278	283	286	290	293	297	301	303	307	308
				P. I. (kW)	148	144	139	137	132	128	124	122	119	115	112	108

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter XSE 113.2 ST – LN – XN

McEnergy Inverter XSE 112.2 ST – LN – XN	AIR AMBIENT TEMPERATURE (°C)			Leaving water temp. (°C)	4	5	6	7	8	9	10	11	12	13	14	15
		20	Rated	C. C. (kW)	414	427	440	454	467	481	495	510	524	539	554	570
				P. I. (kW)	104	105	106	107	108	110	111	112	113	114	116	117
			Boost	C. C. (kW)	482	496	511	526	541	557	574	590	607	624	642	659
				P. I. (kW)	133	135	137	138	140	142	144	146	147	149	151	153
		25	Rated	C. C. (kW)	398	410	423	436	449	462	476	490	504	518	532	547
				P. I. (kW)	115	116	118	119	120	122	123	125	126	127	129	130
			Boost	C. C. (kW)	462	476	490	505	519	534	549	565	581	597	614	624
				P. I. (kW)	148	150	152	154	156	158	160	162	164	166	168	167
		30	Rated	C. C. (kW)	380	392	404	417	429	442	455	468	481	495	509	522
				P. I. (kW)	127	128	130	131	133	134	136	138	139	141	142	144
			Boost	C. C. (kW)	440	453	467	476	485	499	508	518	527	541	551	561
				P. I. (kW)	165	167	169	168	167	169	168	167	166	168	167	167
		35	Rated	C. C. (kW)	360	371	383	395	407	419	431	444	456	469	482	495
				P. I. (kW)	140	142	143	145	147	148	150	152	154	156	157	159
			Boost	C. C. (kW)	396	404	416	425	434	446	455	464	476	485	494	507
				P. I. (kW)	168	167	169	168	167	169	168	166	168	167	166	168
		40	Rated	C. C. (kW)	337	348	359	370	381	392	404	415	423	431	443	452
				P. I. (kW)	155	157	159	161	163	164	166	168	167	166	168	167
			Boost	C. C. (kW)	349	357	368	376	387	396	404	415	423	431	443	452
				P. I. (kW)	168	166	168	167	169	168	166	168	167	166	168	167
		45	Rated	C. C. (kW)	296	306	313	323	330	334	338	342	345	348	355	357
				P. I. (kW)	157	159	157	159	157	153	148	144	139	135	133	129
			Boost	C. C. (kW)	296	306	313	323	330	334	338	342	345	348	355	357
				P. I. (kW)	157	159	157	159	157	153	148	144	139	135	133	129

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter XSE 122.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter XSE 121.2 ST – LN – XN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	445	459	473	488	503	517	533	548	563	579	595	612
				P. I. (kW)	112	113	115	116	117	119	120	121	123	124	126	127
			Boost	C. C. (kW)	518	533	549	565	582	599	616	633	651	669	688	706
				P. I. (kW)	145	147	148	150	152	154	156	158	160	163	165	167
		25	Rated	C. C. (kW)	427	441	455	468	483	497	511	526	541	556	572	587
				P. I. (kW)	124	126	127	129	130	132	133	135	137	138	140	141
			Boost	C. C. (kW)	496	511	526	542	558	573	589	606	623	640	654	668
				P. I. (kW)	161	163	165	167	169	171	174	176	178	181	182	182
		30	Rated	C. C. (kW)	408	421	434	447	461	475	488	502	517	531	546	560
				P. I. (kW)	137	139	140	142	144	145	147	149	151	153	155	156
			Boost	C. C. (kW)	472	486	499	511	523	533	543	558	568	578	590	604
				P. I. (kW)	179	181	182	182	183	182	181	184	183	182	182	183
		35	Rated	C. C. (kW)	386	398	411	423	436	449	462	475	489	502	516	530
				P. I. (kW)	151	153	155	157	159	161	163	165	167	169	171	173
			Boost	C. C. (kW)	424	435	444	455	467	476	487	499	508	520	531	541
				P. I. (kW)	182	183	182	182	183	182	182	183	181	182	183	182
		40	Rated	C. C. (kW)	360	372	384	395	407	420	432	442	455	464	474	485
				P. I. (kW)	168	170	172	174	176	178	180	181	183	182	182	183
			Boost	C. C. (kW)	373	384	394	404	413	425	434	442	455	464	474	485
				P. I. (kW)	182	182	182	183	182	184	182	181	183	182	182	183
		45	Rated	C. C. (kW)	318	324	331	337	345	349	353	356	361	366	369	371
				P. I. (kW)	172	168	166	163	161	156	151	147	143	140	136	131
			Boost	C. C. (kW)	318	324	331	337	345	349	353	356	361	366	369	371
				P. I. (kW)	172	168	166	163	161	156	151	147	143	140	136	131

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter XSE 131.2 ST – LN – XN

McEnergy Inverter XSE 130.2 ST – LN – XN	AIR AMBIENT TEMPERATURE (°C)			Leaving water temp. (°C)	4	5	6	7	8	9	10	11	12	13	14	15
		20	Rated	C. C. (kW)	480	496	511	527	542	559	575	592	609	626	644	661
				P. I. (kW)	118	119	121	122	123	125	126	127	129	130	131	133
			Boost	C. C. (kW)	560	577	594	611	629	647	666	686	705	726	746	767
				P. I. (kW)	152	153	155	157	159	161	163	165	167	169	171	173
		25	Rated	C. C. (kW)	461	476	491	506	521	537	553	569	585	602	619	636
				P. I. (kW)	131	133	134	136	137	139	140	142	143	145	146	148
			Boost	C. C. (kW)	537	553	570	587	604	622	639	657	676	695	714	734
				P. I. (kW)	169	171	173	175	177	179	181	183	185	188	190	193
		30	Rated	C. C. (kW)	441	455	469	484	499	514	529	544	560	576	592	608
				P. I. (kW)	145	146	148	150	151	153	155	156	158	160	162	164
			Boost	C. C. (kW)	512	528	544	560	576	592	609	620	631	642	660	671
				P. I. (kW)	187	189	192	194	196	198	201	200	199	198	200	199
		35	Rated	C. C. (kW)	418	431	445	459	473	487	502	516	531	546	561	576
				P. I. (kW)	160	161	163	165	167	169	171	173	175	177	179	181
			Boost	C. C. (kW)	469	484	494	504	519	529	544	555	565	581	591	602
				P. I. (kW)	198	200	199	197	200	198	201	199	198	201	199	198
		40	Rated	C. C. (kW)	392	404	417	430	443	457	470	484	498	512	526	540
				P. I. (kW)	177	179	181	183	185	187	189	191	193	196	198	200
			Boost	C. C. (kW)	414	427	437	450	459	469	483	492	506	516	526	540
				P. I. (kW)	198	200	199	201	199	198	200	199	201	199	198	200
		45	Rated	C. C. (kW)	354	362	374	383	395	400	405	409	414	418	421	429
				P. I. (kW)	190	188	190	188	190	185	179	174	169	164	159	157
			Boost	C. C. (kW)	354	362	374	383	395	400	405	409	414	418	421	429
				P. I. (kW)	190	188	190	188	190	185	179	174	169	164	159	157

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

McEnergy Inverter XSE 139.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter XSE 139.2 ST – LN – XN	AIR AMBIENT TEMPERATURE (°C)	20	Rated	C. C. (kW)	512	528	544	561	578	595	612	630	648	667	686	705
				P. I. (kW)	127	128	130	131	133	134	136	137	139	140	142	143
			Boost	C. C. (kW)	596	614	632	651	670	689	709	730	751	772	793	811
				P. I. (kW)	164	165	167	169	172	174	176	178	180	183	185	186
		25	Rated	C. C. (kW)	491	507	523	539	555	572	589	606	623	640	658	677
				P. I. (kW)	141	143	144	146	148	149	151	153	154	156	158	160
			Boost	C. C. (kW)	571	589	606	621	636	654	669	685	704	720	737	754
				P. I. (kW)	182	184	186	187	187	190	190	191	193	194	195	195
		30	Rated	C. C. (kW)	469	485	500	515	531	547	563	579	595	612	629	646
				P. I. (kW)	156	157	159	161	163	165	167	169	171	173	175	177
			Boost	C. C. (kW)	531	547	561	575	591	606	617	634	646	657	672	687
				P. I. (kW)	193	195	196	196	199	199	198	201	199	198	199	200
		35	Rated	C. C. (kW)	445	459	474	488	503	518	533	549	562	577	590	604
				P. I. (kW)	172	174	176	178	180	182	184	186	186	189	189	189
			Boost	C. C. (kW)	480	495	505	516	531	542	555	568	579	592	606	616
				P. I. (kW)	198	200	199	198	200	199	199	200	198	199	199	198
		40	Rated	C. C. (kW)	414	426	439	451	462	476	488	502	514	526	541	553
				P. I. (kW)	189	189	191	191	191	193	194	196	196	197	199	199
			Boost	C. C. (kW)	425	437	449	459	470	482	494	506	516	528	541	553
				P. I. (kW)	199	199	200	198	198	199	199	200	198	199	199	199
		45	Rated	C. C. (kW)	364	372	384	393	404	411	421	426	433	437	440	444
				P. I. (kW)	190	188	190	188	188	185	185	179	176	170	165	160
			Boost	C. C. (kW)	364	372	384	393	404	411	421	426	433	437	440	444
				P. I. (kW)	190	188	190	188	188	185	185	179	176	170	165	160

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

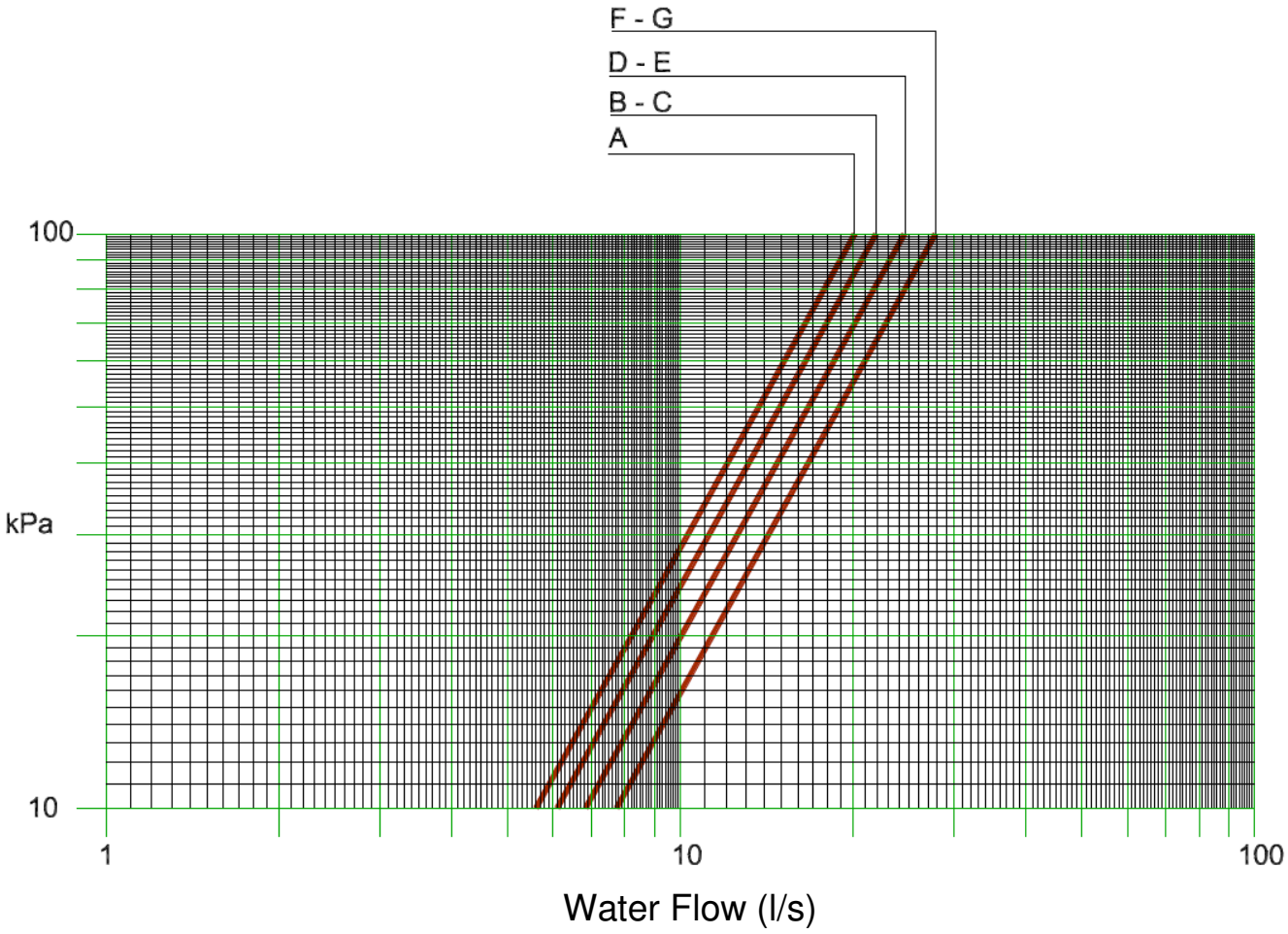
McEnergy Inverter XSE 147.2 ST – LN – XN

McEnergy Inverter XSE 147.2 ST – LN – XN	AIR AMBIENT TEMPERATURE (°C)			Leaving water temp. (°C)	4	5	6	7	8	9	10	11	12	13	14	15
		20	Rated	C. C. (kW)	541	558	575	592	610	628	646	665	684	703	724	745
				P. I. (kW)	136	137	139	140	142	144	145	147	149	150	152	154
			Boost	C. C. (kW)	628	647	667	686	706	728	749	771	793	815	837	852
				P. I. (kW)	175	177	179	182	184	186	189	191	194	196	199	198
		25	Rated	C. C. (kW)	519	536	552	569	586	604	621	639	657	676	694	714
				P. I. (kW)	151	153	154	156	158	160	161	163	165	167	169	171
			Boost	C. C. (kW)	603	621	639	652	664	683	696	709	729	743	756	770
				P. I. (kW)	195	197	200	199	198	200	199	198	201	200	199	198
		30	Rated	C. C. (kW)	496	512	528	544	560	577	594	611	628	645	663	681
				P. I. (kW)	166	168	170	172	174	176	178	180	183	185	187	189
			Boost	C. C. (kW)	547	563	575	587	604	616	627	645	657	669	681	699
				P. I. (kW)	199	201	200	198	201	200	199	201	200	199	197	200
		35	Rated	C. C. (kW)	470	485	500	515	531	547	562	578	590	606	617	628
				P. I. (kW)	184	186	188	190	192	195	197	199	198	200	199	198
			Boost	C. C. (kW)	488	503	514	525	541	551	567	578	590	606	617	628
				P. I. (kW)	198	200	199	197	200	198	201	199	198	200	199	198
		40	Rated	C. C. (kW)	435	445	459	469	479	494	504	518	528	539	554	564
				P. I. (kW)	200	198	201	199	197	200	198	200	199	197	200	198
			Boost	C. C. (kW)	435	445	459	469	479	494	504	518	528	539	554	564
				P. I. (kW)	200	198	201	199	197	200	198	200	199	197	200	198
		45	Rated	C. C. (kW)	372	381	393	402	415	424	437	441	450	454	458	461
				P. I. (kW)	189	187	189	188	190	188	190	184	182	177	171	165
			Boost	C. C. (kW)	372	381	393	402	415	424	437	441	450	454	458	461
				P. I. (kW)	189	187	189	188	190	188	190	184	182	177	171	165

Notes: C.C. (cooling capacity) - P.I. (unit power input). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor. Rated conditions are for compressors running at nominal frequency. Boost conditions are for compressors running at maximum frequency. Boost conditions are automatically enabled when air ambient temperature is above 35°C. Boost conditions with air ambient temperature below 35°C can be enabled by digital input (standard unit is not programmed to get boost conditions below 35°C).

Evaporator water pressure drop

McEnergy Inverter SSE – XSE

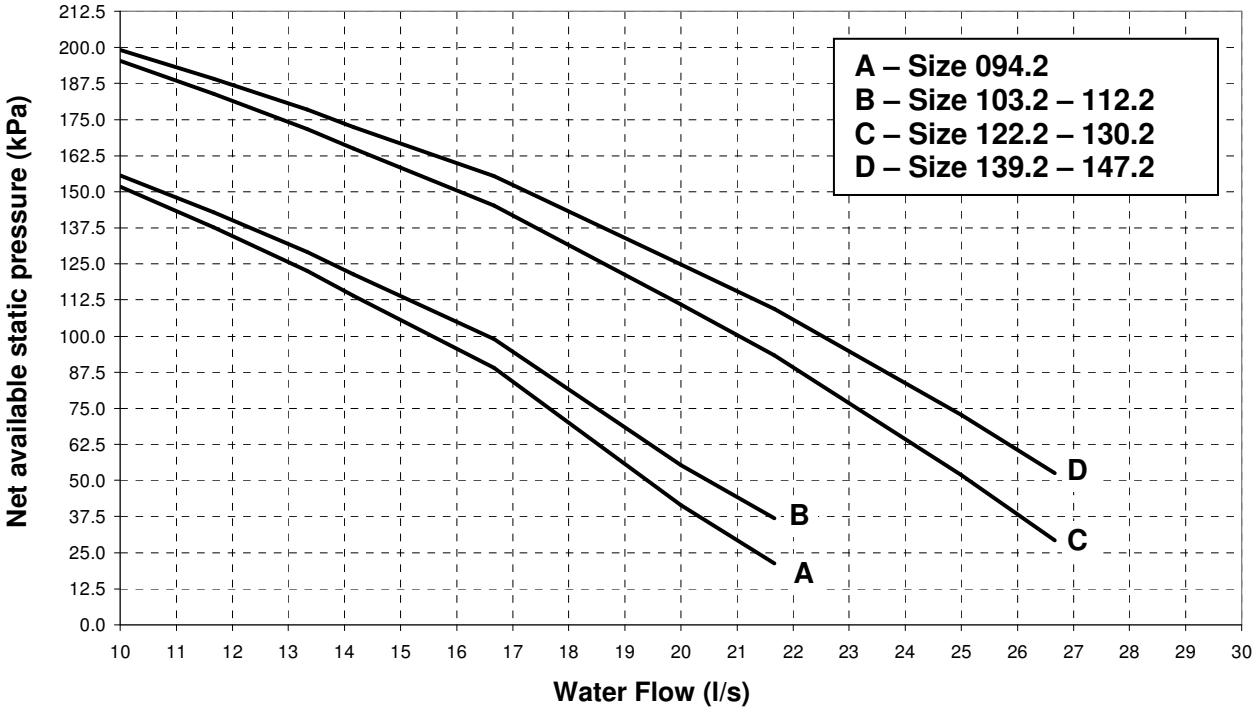


Ref	A	B	C	D	E	F	G
Size	094.2	103.2	112.2	122.2	130.2	139.2	147.2

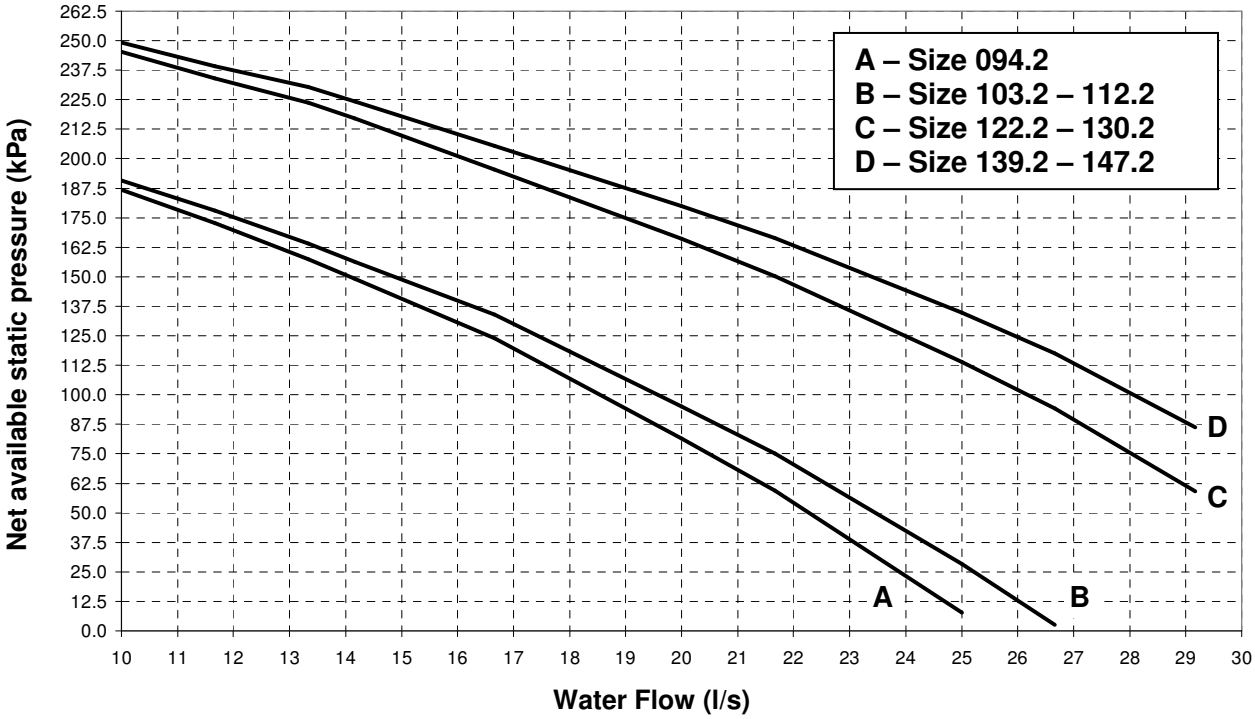
Hydronic Kit (Option on request)

McEnergy Inverter SSE – XSE

Hydronic Kit (one water circulation pump – low lift)



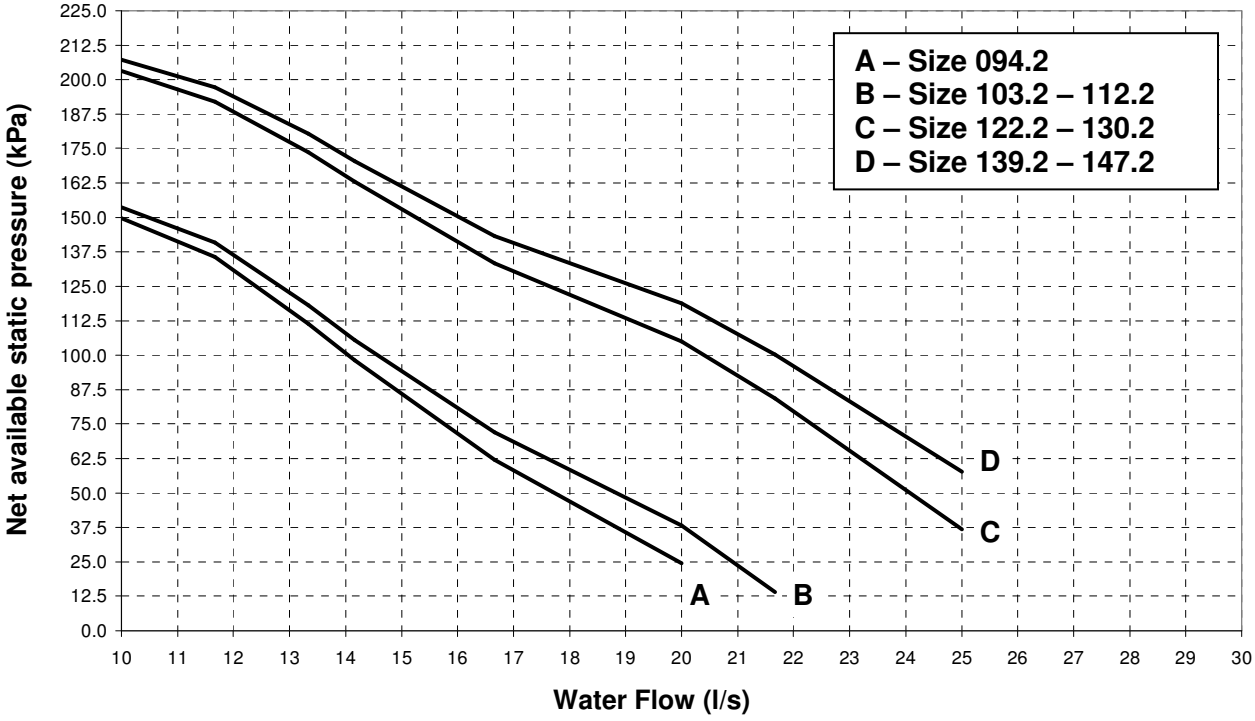
Hydronic Kit (one water circulation pump – high lift)



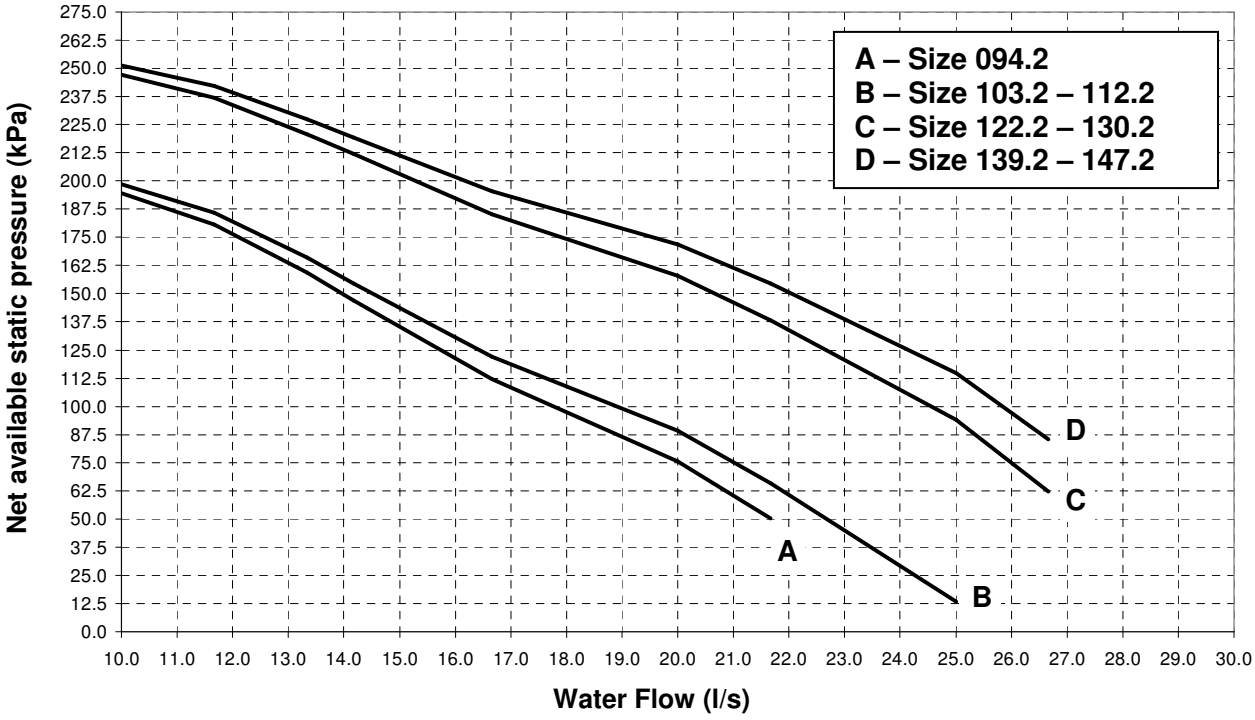
Net available static pressure: pump available static pressure less evaporator pressure drop

McEnergy Inverter SSE – XSE

Hydronic Kit (two water circulation pump – low lift)



Hydronic Kit (two water circulation pump – high lift)



Net available static pressure: pump available static pressure less evaporator pressure drop

Hydronic Kit - Technical Specification (one and two water circulation pump)

TECHNICAL SPECIFICATIONS	094.2	103.2	112.2	122.2	130.2	139.2	147.2
Pump reference	A	B	B	C	C	D	D
Motor Power							
Low lifting (kW)	4.0	4.0	4.0	5.5	5.5	5.5	5.5
High lifting (kW)	5.5	5.5	5.5	7.5	7.5	7.5	7.5
Ampere							
Low lifting (A)	8.0	8.0	8.0	10.1	10.1	10.1	10.1
High lifting (A)	10.1	10.1	10.1	13.7	13.7	13.7	13.7
Electric protection (IP)	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54
Voltage (V / Ph / Hz)	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Expansion vessels (Liters)	8	8	8	8	8	8	8
Safety valve (Bar)	6	6	6	6	6	6	6

Total heat recovery (Option on request)

McEnergy Inverter SSE 094.2 ST – LN --- XSE 094.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter 094.2	CONDENSER WATER TEMPERATURE (°C)	30/35	Rated	C. C. (kW)	321	331	342	353	365	376	388	399	411	423	436	448
				P. I. (kW)	85	85	86	87	88	89	89	90	91	92	93	93
				H.C (kW)	406	416	428	440	453	465	477	489	502	515	529	541
		35/40	Rated	C. C. (kW)	305	315	326	336	347	358	369	380	392	403	415	427
				P. I. (kW)	94	95	96	97	98	98	99	100	101	102	103	104
				H.C (kW)	399	410	422	433	445	456	468	480	493	505	518	531
		40/45	Rated	C. C. (kW)	287	297	307	317	327	337	348	359	370	381	392	403
				P. I. (kW)	105	106	107	108	109	110	111	112	113	114	115	116
				H.C (kW)	392	403	414	425	436	447	459	471	483	495	507	519
		45/50	Rated	C. C. (kW)	266	275	284	294	303	313	323	333	344	351	354	358
				P. I. (kW)	118	119	120	121	122	123	124	125	126	125	122	119
				H.C (kW)	384	394	404	415	425	436	447	458	470	476	476	477
		50/55	Rated	C. C. (kW)	178	179	180	184	184	187	186	189	191	189	191	193
				P. I. (kW)	83	80	78	77	75	74	72	71	70	67	67	66
				H.C (kW)	261	259	258	261	259	261	258	260	261	256	258	259

Notes: C.C. (cooling capacity) - P.I. (unit power input) – H.C (heating capacity). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor, heat recovery heat exchanger fouling factor 0,0440 m^2 °C/kW. Rated conditions are for compressors running at nominal frequency.

McEnergy Inverter SSE 102.2 ST – LN --- XSE 102.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter 102.2	CONDENSER WATER TEMPERATURE (°C)	30/35	Rated	C. C. (kW)	356	367	379	392	404	417	429	443	456	469	483	497
				P. I. (kW)	94	95	96	97	98	99	100	101	102	103	104	104
				H.C (kW)	450	462	475	489	502	516	529	544	558	572	587	601
		35/40	Rated	C. C. (kW)	338	349	361	372	384	396	409	421	434	447	460	473
				P. I. (kW)	105	106	107	108	109	110	111	112	113	114	115	116
				H.C (kW)	443	455	468	480	493	506	520	533	547	561	575	589
		40/45	Rated	C. C. (kW)	317	328	339	350	362	373	385	397	409	421	433	446
				P. I. (kW)	117	118	119	120	121	123	124	125	126	127	129	130
				H.C (kW)	434	446	458	470	483	496	509	522	535	548	562	576
		45/50	Rated	C. C. (kW)	293	304	314	324	335	346	355	362	370	374	378	381
				P. I. (kW)	131	132	134	135	136	137	137	136	135	131	128	125
				H.C (kW)	424	436	448	459	471	483	492	498	505	505	506	506
		50/55	Rated	C. C. (kW)	187	191	191	193	197	196	199	201	199	201	202	204
				P. I. (kW)	86	85	82	81	80	77	76	76	73	72	71	70
				H.C (kW)	273	276	273	274	277	273	275	277	272	273	273	274

Notes: C.C. (cooling capacity) - P.I. (unit power input) – H.C (heating capacity). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor, heat recovery heat exchanger fouling factor 0,0440 m^2 °C/kW. Rated conditions are for compressors running at nominal frequency.

McEnergy Inverter SSE 113.2 ST – LN --- XSE 113.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter 113.2	CONDENSER WATER TEMPERATURE (°C)	30/35	Rated	C. C. (kW)	386	399	411	425	438	451	465	479	493	508	523	538
				P. I. (kW)	104	105	106	107	108	109	110	111	112	113	114	115
				H.C (kW)	490	504	517	532	546	560	575	590	605	621	637	653
		35/40	Rated	C. C. (kW)	367	379	391	404	416	429	443	456	470	483	497	511
				P. I. (kW)	115	116	117	119	120	121	122	123	125	126	127	128
				H.C (kW)	482	495	508	523	536	550	565	579	595	609	624	639
		40/45	Rated	C. C. (kW)	344	356	368	380	392	404	417	429	442	455	468	482
				P. I. (kW)	129	130	131	132	134	135	136	138	139	140	142	143
				H.C (kW)	473	486	499	512	526	539	553	567	581	595	610	625
		45/50	Rated	C. C. (kW)	318	329	340	351	363	374	383	387	391	395	399	403
				P. I. (kW)	145	146	147	148	150	151	150	146	142	139	135	132
				H.C (kW)	463	475	487	499	513	525	533	533	533	534	534	535
		50/55	Rated	C. C. (kW)	197	201	201	205	208	207	210	212	209	211	213	214
				P. I. (kW)	91	90	87	86	85	82	81	80	77	76	75	74
				H.C (kW)	288	291	288	291	293	289	291	292	286	287	288	288

Notes: C.C. (cooling capacity) - P.I. (unit power input) – H.C (heating capacity). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor, heat recovery heat exchanger fouling factor 0,0440 m^2 °C/kW. Rated conditions are for compressors running at nominal frequency.

McEnergy Inverter SSE 122.2 ST – LN --- XSE 122.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter 122.2	CONDENSER WATER TEMPERATURE (°C)	30/35	Rated	C. C. (kW)	415	429	443	457	471	486	501	516	531	546	562	578
				P. I. (kW)	112	113	115	116	117	118	119	120	122	123	124	125
				H.C (kW)	527	542	558	572	588	604	620	636	653	669	686	703
		35/40	Rated	C. C. (kW)	394	407	420	434	448	462	476	490	505	519	534	550
				P. I. (kW)	125	126	127	129	130	131	132	134	135	137	138	139
				H.C (kW)	519	533	547	563	578	593	608	624	640	656	672	689
		40/45	Rated	C. C. (kW)	370	382	395	408	421	434	447	461	475	489	503	517
				P. I. (kW)	139	141	142	143	145	146	148	149	151	152	154	155
				H.C (kW)	509	523	537	551	566	580	595	610	626	641	657	672
		45/50	Rated	C. C. (kW)	341	353	365	377	387	395	402	407	411	413	417	421
				P. I. (kW)	156	158	159	161	161	159	156	152	148	143	140	136
				H.C (kW)	497	511	524	538	548	554	558	559	559	556	557	557
		50/55	Rated	C. C. (kW)	207	209	211	212	213	216	219	219	218	219	221	222
				P. I. (kW)	96	93	91	89	87	86	85	83	81	80	79	78
				H.C (kW)	303	302	302	301	300	302	304	302	299	299	300	300

Notes: C.C. (cooling capacity) - P.I. (unit power input) – H.C (heating capacity). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor, heat recovery heat exchanger fouling factor 0,0440 m^2 °C/kW. Rated conditions are for compressors running at nominal frequency.

McEnergy Inverter SSE 131.2 ST – LN --- XSE 131.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter 131.2	CONDENSER WATER TEMPERATURE (°C)	30/35	Rated	C. C. (kW)	443	457	472	487	502	518	534	550	566	582	599	616
				P. I. (kW)	121	122	123	124	126	127	128	130	131	132	134	135
				H.C (kW)	564	579	595	611	628	645	662	680	697	714	733	751
		35/40	Rated	C. C. (kW)	420	434	448	462	477	492	507	522	537	553	569	585
				P. I. (kW)	134	136	137	138	140	141	143	144	146	147	149	150
				H.C (kW)	554	570	585	600	617	633	650	666	683	700	718	735
		40/45	Rated	C. C. (kW)	394	407	420	434	448	462	476	490	505	520	535	550
				P. I. (kW)	150	151	153	154	156	157	159	161	162	164	166	167
				H.C (kW)	544	558	573	588	604	619	635	651	667	684	701	717
		45/50	Rated	C. C. (kW)	363	375	388	400	410	415	420	425	429	433	437	441
				P. I. (kW)	168	170	171	173	171	167	162	158	154	150	147	143
				H.C (kW)	531	545	559	573	581	582	582	583	583	583	584	584
		50/55	Rated	C. C. (kW)	217	217	221	219	222	225	228	224	226	227	229	229
				P. I. (kW)	100	97	96	93	92	90	89	86	85	84	82	81
				H.C (kW)	317	314	317	312	314	315	317	310	311	311	311	310

Notes: C.C. (cooling capacity) - P.I. (unit power input) – H.C (heating capacity). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor, heat recovery heat exchanger fouling factor 0,0440 m^2 °C/kW. Rated conditions are for compressors running at nominal frequency.

McEnergy Inverter SSE 139.2 ST – LN --- XSE 139.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter 139.2	CONDENSER WATER TEMPERATURE (°C)	30/35	Rated	C. C. (kW)	472	488	503	519	536	552	569	586	603	621	638	656
				P. I. (kW)	130	131	133	134	136	137	138	140	141	143	144	146
				H.C (kW)	602	619	636	653	672	689	707	726	744	764	782	802
		35/40	Rated	C. C. (kW)	448	463	478	493	508	524	540	556	573	589	606	623
				P. I. (kW)	145	146	148	149	151	152	154	155	157	159	160	162
				H.C (kW)	593	609	626	642	659	676	694	711	730	748	766	785
		40/45	Rated	C. C. (kW)	420	434	448	462	477	492	507	522	538	553	567	583
				P. I. (kW)	161	163	165	166	168	170	171	173	175	177	177	179
				H.C (kW)	581	597	613	628	645	662	678	695	713	730	744	762
		45/50	Rated	C. C. (kW)	382	395	407	420	430	435	438	443	448	452	456	459
				P. I. (kW)	178	179	179	181	179	175	169	164	160	156	152	148
				H.C (kW)	560	574	586	601	609	610	607	607	608	608	608	607
		50/55	Rated	C. C. (kW)	227	226	230	231	235	234	237	236	238	239	240	241
				P. I. (kW)	105	102	101	98	97	95	93	91	90	89	87	86
				H.C (kW)	332	328	331	329	332	329	330	327	328	328	327	327

Notes: C.C. (cooling capacity) - P.I. (unit power input) – H.C (heating capacity). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor, heat recovery heat exchanger fouling factor 0,0440 m^2 °C/kW. Rated conditions are for compressors running at nominal frequency.

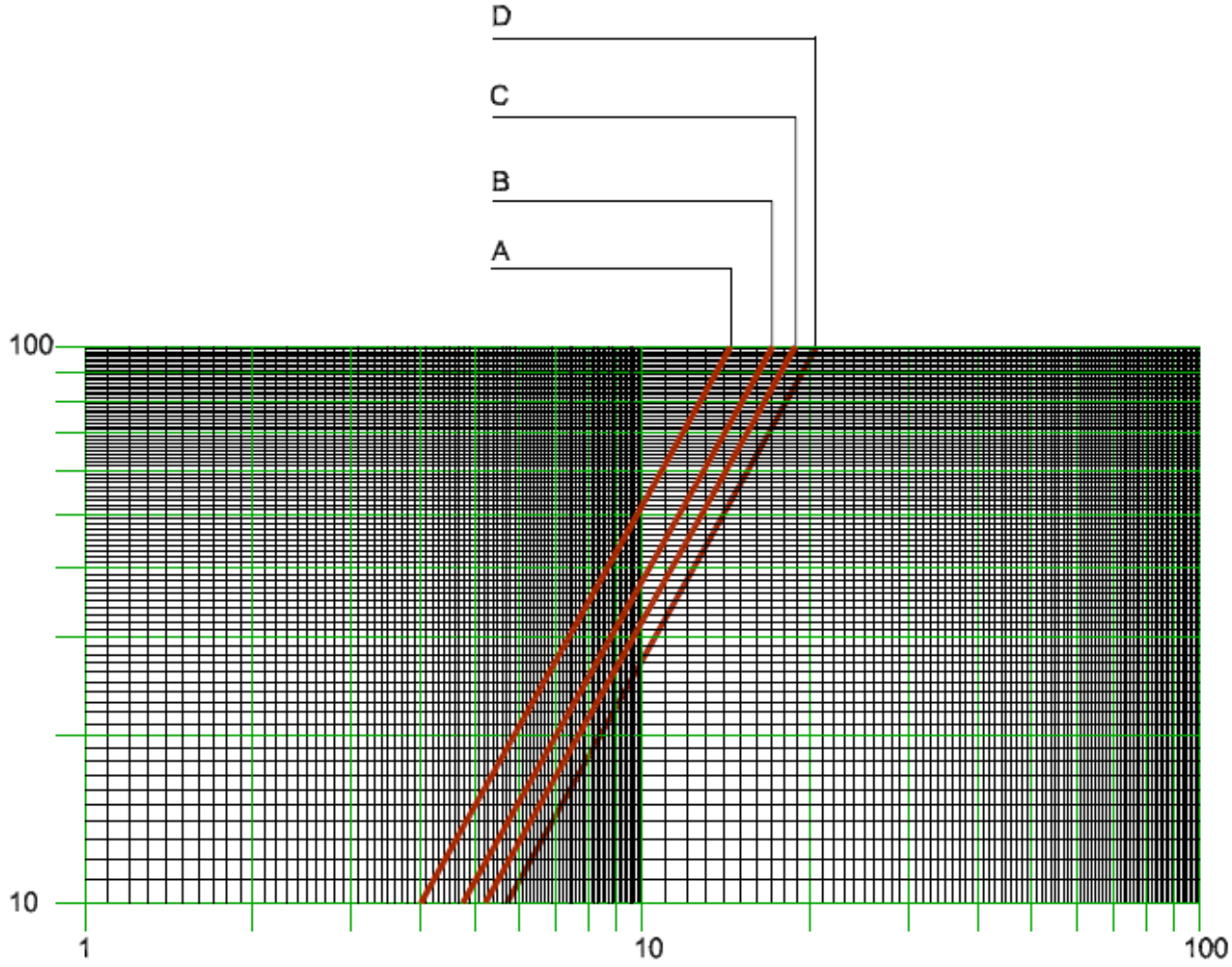
McEnergy Inverter SSE 147.2 ST – LN --- XSE 147.2 ST – LN – XN

Leaving water temp. (°C)					4	5	6	7	8	9	10	11	12	13	14	15
McEnergy Inverter 147.2	CONDENSER WATER TEMPERATURE (°C)	30/35	Rated	C. C. (kW)	500	516	533	549	566	584	601	619	637	656	674	693
				P. I. (kW)	139	141	142	144	145	147	148	150	151	153	154	156
				H.C (kW)	639	657	675	693	711	731	749	769	788	809	828	849
		35/40	Rated	C. C. (kW)	474	490	505	521	538	554	571	588	605	623	640	658
				P. I. (kW)	155	156	158	160	161	163	165	166	168	170	172	173
				H.C (kW)	629	646	663	681	699	717	736	754	773	793	812	831
		40/45	Rated	C. C. (kW)	444	459	474	489	504	520	536	552	568	584	596	612
				P. I. (kW)	173	174	176	178	180	182	183	185	187	189	188	190
				H.C (kW)	617	633	650	667	684	702	719	737	755	773	784	802
		45/50	Rated	C. C. (kW)	401	415	424	438	448	454	459	464	469	473	477	480
				P. I. (kW)	187	189	187	189	187	182	177	173	169	164	160	156
				H.C (kW)	588	604	611	627	635	636	636	637	638	637	637	636
		50/55	Rated	C. C. (kW)	236	235	239	243	246	243	245	247	249	250	251	252
				P. I. (kW)	110	106	105	104	103	99	98	96	95	94	92	91
				H.C (kW)	346	341	344	347	349	342	343	343	344	344	343	343

Notes: C.C. (cooling capacity) - P.I. (unit power input) – H.C (heating capacity). Data are referred to 0,0176 m^2 °C/kW evaporator fouling factor, heat recovery heat exchanger fouling factor 0,0440 m^2 °C/kW. Rated conditions are for compressors running at nominal frequency.

Total heat recovery pressure (Option on request)

Pressure drop McEnergy Inverter SSE – XSE



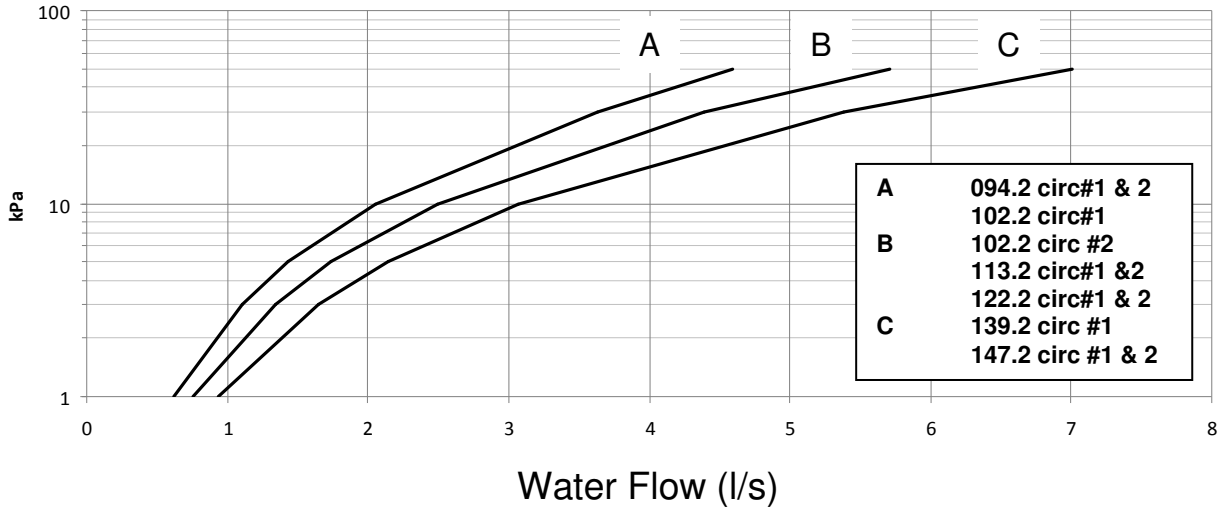
Ref	A	B	C	D
Size	094.2 Circ #1 / #2 102.2 Circ #1	102.2 Circ #2 113.2 Circ #1 / #2 122.2 Circ #1	122.2 Circ #2 131.2 Circ #1 / #2 139.2 Circ #1	139.2 Circ #2 147.2 Circ #1 / #2

Partial heat recovery (Option on request)

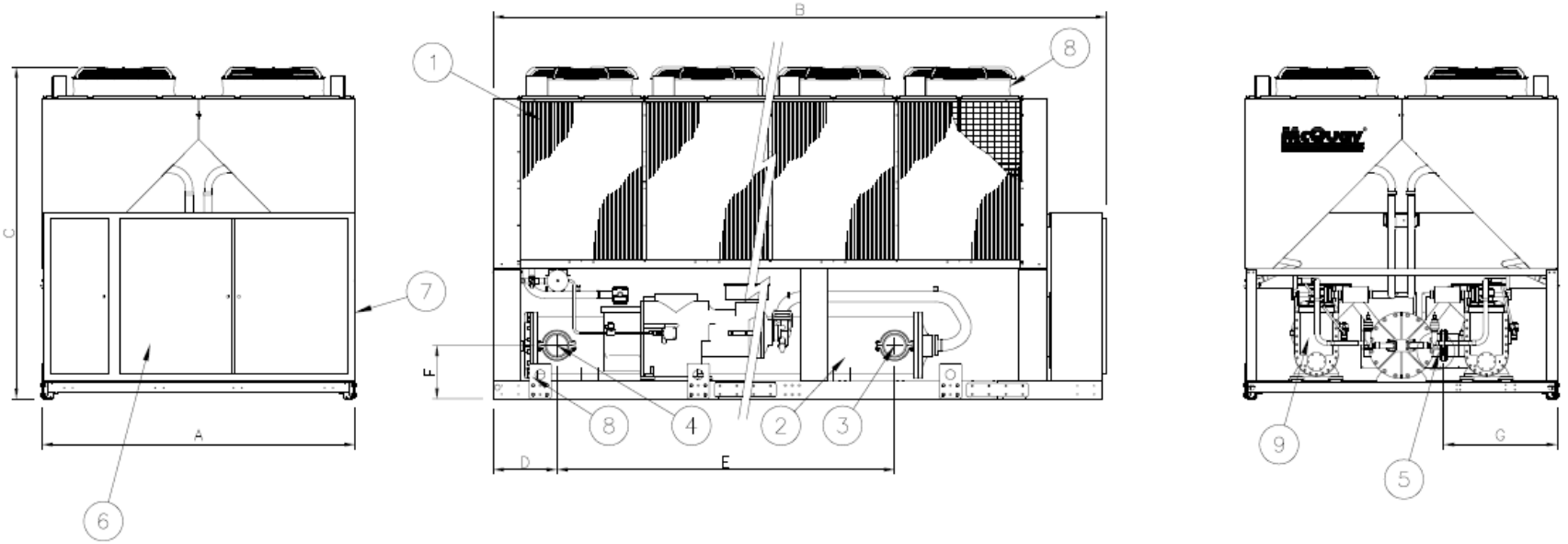
Ratings McEnergy Inverter SSE – XSE

Unit size		HEAT RECOVERY LEAVING WATER TEMPERATURE (°C)		
		45 (ΔT=5°C)	50 (ΔT=5°C)	55 (ΔT=5°C)
		Cooling capacity (kW)	Cooling capacity (kW)	Cooling capacity (kW)
94.2	Evaporator leaving water temp. 7°C - ΔT 5°C ambient temperature 35°C	86	69	52
102.2		95	76	57
113.2		104	83	62
122.2		112	90	67
131.2		120	96	72
139.2		128	102	77
147.2		136	109	82

Pressure drop McEnergy Inverter SSE – XSE



Dimensions McEnergy Inverter ST



Legend

1 – Condenser Coil
2 – Water heat exchanger (evaporator)
3 – Evaporator water inlet
4 – Evaporator water outlet
5 – Victaulic connection for 168.3 O.D. tube
6 – Operating and control panel
7 – 330 x 180 mm slot for power and control connection
8 - Fan
9 - Compressor

	Dimensions							
Size	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**Fans**
094.2	2224	4352	2355	455	2412	379	810	Nr 8
102.2	2224	4352	2355	455	2412	379	810	Nr 8
113.2	2224	5252	2355	455	2412	379	810	Nr 10
122.2	2224	5252	2355	455	2412	379	810	Nr 10
131.2	2224	6152	2355	455	2412	379	810	Nr 12
139.2	2224	6152	2355	455	2412	379	810	Nr 12
147.2	2224	6152	2355	455	2412	379	810	Nr 12

Installation notes

Warning

Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and who are experienced with this type of equipment. Must be avoided the unit installation in places that could be considered dangerous for all the maintenance operations.

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

The 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

The 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.
Moreover McQuay unique microprocessor has the ability to calculate the operating environment of the air cooled chiller 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.

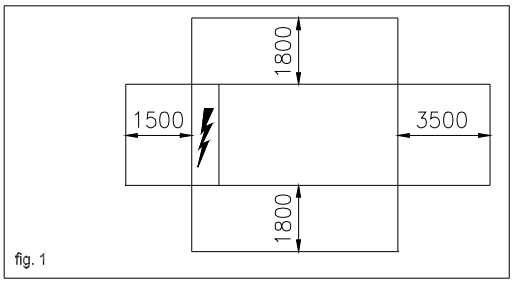


fig. 1

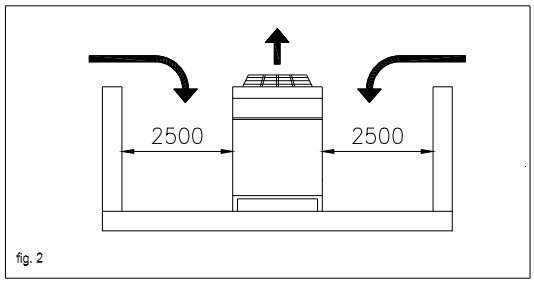


fig. 2

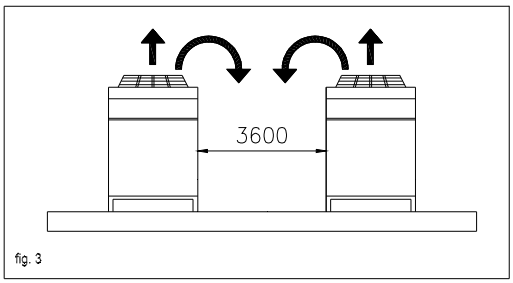


fig. 3

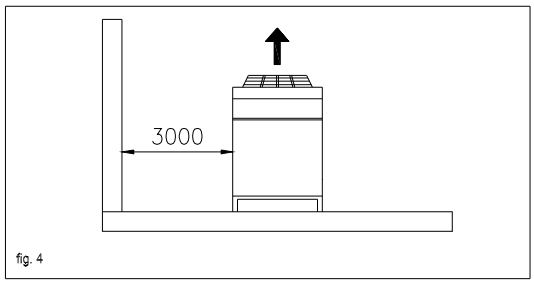


fig. 4

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

Specification

Technical Specification for Air Cooled Screw Chiller

GENERAL

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

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

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 cooled screw chiller: .....
- ✓ Cooling capacity for single air cooled screw chiller: ..... kW
- ✓ Power input for single air cooled screw chiller 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
- ✓ The unit should work with electricity in range 400V ±10%, 3ph, 50Hz without neutral and shall only have one power connection point.

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 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, from 100% down to 27% for each circuit (from 100% down to 13,5% of full load for unit with 2 compressors). The chiller shall be capable of stable operation to a minimum of 13,5% 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 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:
    - o High condenser pressure
    - o Low evaporation refrigerant temperature
    - o High compressor motor amps

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 13.5% without hot-gas bypass.
- ✓ Starting current for the compressor shall not exceed nominal compressor load amps.
- ✓ Unit displacement power factor shall be not less than 0.95 on entire unit capacity range, from 100% down to 13,5%

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 circuit breaker 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, 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 Inverter of the condenser fans, to maintain condensing pressure.
- ✓ 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 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.

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:
    - o in-line single high-pressure pump or
    - o in-line dual high-pressure pump (only for unit without compressor sound proof cabinet) or
    - o in-line single low-pressure pump or
    - o 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 Inverter type.
- ✓ 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: -

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

McQuay partecipa al programma di Certificazione Eurovent. I prodotti interessati figurano nella Guida Eurovent dei Prodotti Certificati.

McQuay is participating in the Eurovent Certification Programme Product are as listed in the Eurovent Directory of Certified Products

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