

McSmart MINICHILLER

Air Cooled Chillers and Heat Pumps

from 5 to 40 kW

HFC 407C



MINICHILLER M4AC series

Available in ten sizes, with cooling capacity ranging from 5 to 40 kW, Minichiller is a line of air-cooled chillers, cooling only and heat pump version.

Minichiller by McQuay is the solution for conditioning residential and commercial sites, such as offices, conference room, residence, sports centres and many others.

Characterised by an outstanding commissioning and operation flexibility and reliability, all models within the Minichiller line are equipped with an integrated hydraulic section.

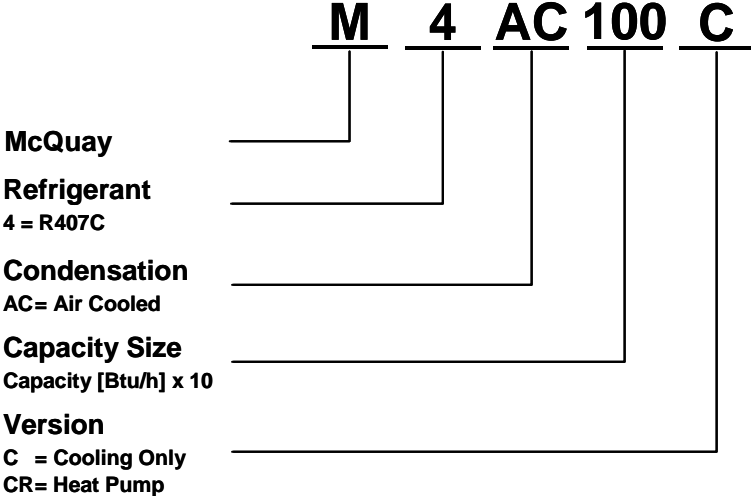
With the use of scroll compressors and axial fans operating at low speed, it is possible to achieve sound emission values able to meet even the most stringent standards.

McQuay Fan Coils, available in all versions - console, wall mounted, ducted, ceiling concealed, cassette convertible - and with a full range of accessories complete the system allowing maximum flexibility in meeting site requirements.



MECHANICAL SPECIFICATIONS

Model Nomenclature



Cabinet

Both panels and frame are made of electro-galvanised steel polyester powder painted, granting maximum corrosion protection. Coil protection grids are installed on all models as standard.

Refrigeration circuit

Models MAC020-060 feature one refrigerant circuits. Models M4AC080-150 feature two independent refrigeration circuits. Such a solution allows both maximum internal redundancy and thus system reliability and efficient operation at partial load when required. Each refrigerant circuit includes compressor, thermostatic valve (Cooling only version) or capillary tube (Heat Pump version), filter-drier, liquid receiver, HP and LP pressure switches, charge connections.

Compressors

Compressors are hermetic scroll type equipped with internal thermal protection and phase protector to prevent from reverse rotation. Characterised by low sound emissions, they are installed on anti-vibration mounts to prevent from potential vibrations. Thanks to the equalisation of internal pressures, they feature also a low start current. The compressors are provided with crank case heater to prevent liquid migration during the off cycle and also to ease the start up of the unit.

Plate heat exchanger

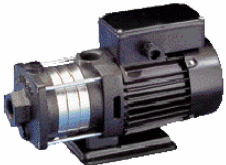
Realised according to the dual circuit technology to optimise counter current thermal heat exchange in cooling operation, it is made of brazed stainless steel plates. The complete heat exchanger is insulated with cell rubber foam to grant prevent from thermal losses. Safe operation is granted through antifreeze protection sensor and heater.

Finned coil

Each unit is equipped with two large heat exchange surface finned coils made of copper tubes and aluminium fins. Copper tubes in staggered rows are mechanical expanded in order to have the best contact with fins and thus optimise heat exchange capability.

Hydraulic section

Hydraulic kit includes one circulating pump, flow switch, water filling/emptying taps and 8 litres expansion vessel and water buffer tank (for single compressor units). For dual-compressor models, a water buffer tank of 130 litres is available in a separated module. Made in steel and coated with anti-condensate insulation, the tank is supplied complete with auto-pressure relief valve and discharge valve.



MECHANICAL SPECIFICATIONS

The circulating pump, mounted on board and factory piped, is multistage horizontal type. It is characterised by a compact and robust design and by low sound emissions. Maximum operating pressure is of 6 bar. Pump has an overload protector. Water piping connections can be made either on the left or on the right side of the unit. Connections are 1-1/4" female thread couplings type for both supply and return pipes.

Fans

Fans are axial type with aluminium blades statically and dynamically balanced, directly coupled to an electric motor with external rotor. They have an IP54 degree of protection and internal thermal protection. The fans are complete with safety protection grilles. Fan speed control is achieved, as option, by means of a continuous fan speed regulator. This ensures also to run the compressors always with optimum working efficiency.

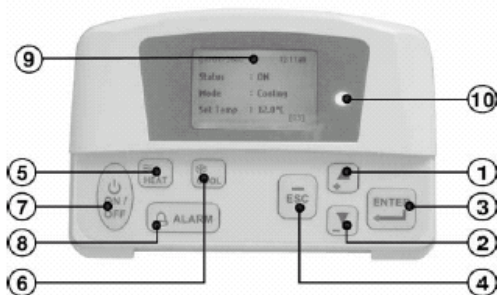
Electric panel

Electrical panel is constructed, designed and tested according to IEC standards. The panel has a degree of protection equivalent to IP54 and can be accessed only by means of special tool.

Microprocessor based Controller

The Minichiller microprocessor based controller can be used either as a single stand-alone or as an extended network system. It has the ability to control single/twin fans and single/twin compressors in the chiller units. The control panel consists of a main board and a wired remote keypad with 8-line graphical LCD display. The 8 keys available in the panel allow the user to do the following tasks:

- Menù selection
- Navigation on the screen
- Modification of the selected value



1 & 2	Navigator key
3	Execute instruction key
4	Cancel instruction key
5	Switching to Cool mode shortcut key
6	Switching to Heat mode shortcut key
7	Toggle ON/OFF
8	Show alarm key
9	Graphical LCD display
10	ON/OFF indicator

During start-up, the panel will have a default configuration [timer schedule, set point, settings, etc] which can be later modified by the user. The control panel comes with a 4-wire-0.5mm shielded cable of 2 meters. Maximum distance for the installation of the remote display is of 500m.

Main Characteristics

Status Viewing:

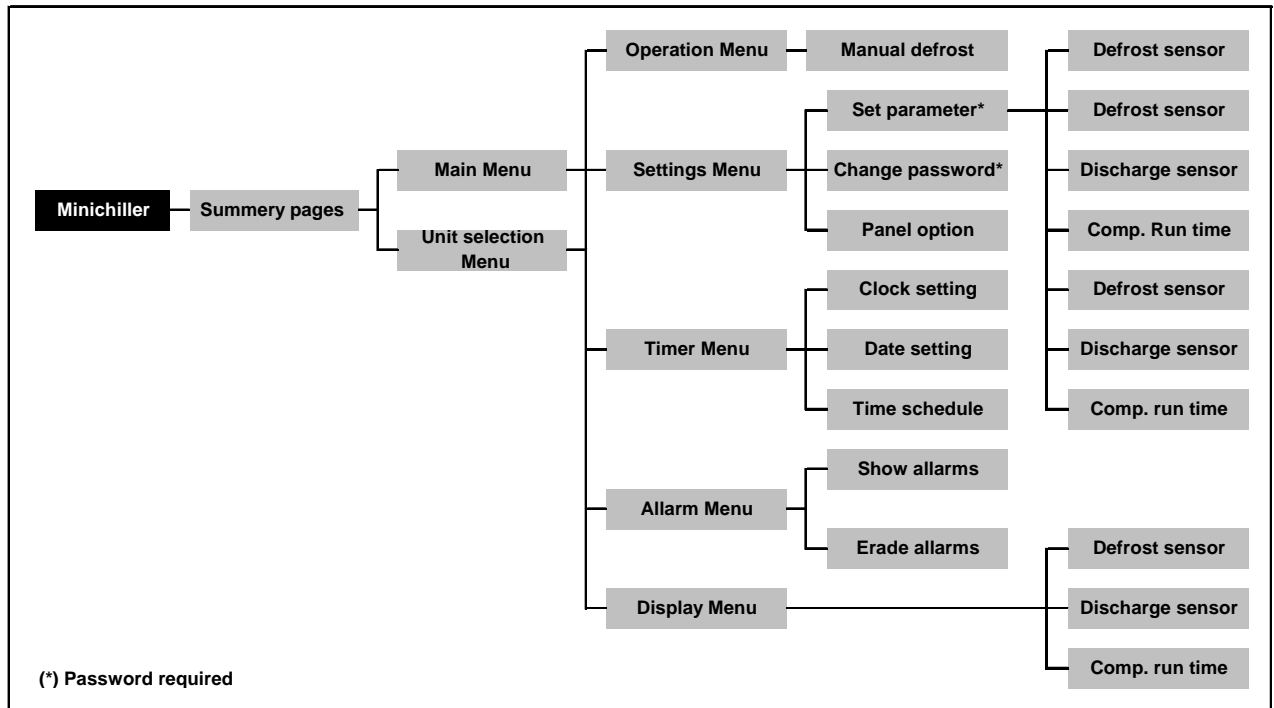
- ON/OFF Status
- Operating Mode (Cooling/Heating/boiler)
- Set Temperature
- Compressor Status (ON/OFF/DEFROST)
- Inlet Water, Outlet air and Panel temperatures
- Advance Parameter temperatures
- Defrost sensor temperatures
- Compressor discharge sensor temperatures
- Compressor run time
- Incoming alarm/fault/error

Status Settings:

- ON/OFF switching
- Operating Mode setting (Cooling/heating/Boiler)
- Setting temperature
- Manual entering defrost
- Advance Parameter settings
- Password changing
- Panel option setting (Backlight, Alarm Buzzer, Screen Saver, Contrast, Brightness, temperature unit)
- Time and Date settings
- 7 day programmable settings


The control Panel needs to be energised with 12Vdc and equipped with the back up battery in order to keep memory of all settings in case of power failure.

Menu Navigation structure



Reference Standards

The units are designed, manufactured and tested in compliance with the European directives 98/37/CEE, 73/23/CEE, 97/23/CEE.

All Minichiller units are  marked.

The Quality management system is approved by RINA in compliance with UNI - EN ISO 9001 standards.

TECHNICAL DATA

COOLING ONLY

MODEL M4AC		020 C	025 C	030 C	040 C	050 C	060 C
Performance¹							
Cooling Capacity	kW	6.2	6.7	7.9	11.7	14.7	15.2
Total Power Input ²	kW	2.6	3.0	3.7	4.9	6.0	6.9
Water Flow Rate	l/s	0.29	0.32	0.38	0.56	0.70	0.73
Available Head Pressure ³	kPa	73	99	89	92	68	70
Lp [Sound Pressure Level] ⁴	dBA	57	57	58	59	59	60
Lw [Sound Power Level] ⁵	dBA	70	70	71	72	72	73
Refrigeration Circuit							
Number of Refrigeration Circuits	nr	1	1	1	1	1	1
Refrigerant	--	R407C	R407C	R407C	R407C	R407C	R407C
Refrigerant Charge for each circuit	kg	1.1	1.9	1.7	3.4	3.4	3.5
Compressor							
Number of Compressors	nr	1	1	1	1	1	1
Type	--	Hermetic Rotary	Hermetic Scroll	Hermetic Scroll	Hermetic Scroll	Hermetic Scroll	Hermetic Scroll
Nominal Power Input [each comp.]	kW	2.30	2.45	3.35	4.32	5.34	6.24
Fan							
Number of Fans	nr	1	1	1	2	2	2
Type	--	Axial					
Wheel Nominal Diameter	mm	460	460	460	460	460	460
Number of Poles	nr	6	6	6	6	6	6
Nominal Power Input [each fan]	kW	0.135	0.135	0.135	0.135	0.135	0.135
Condenser Coil							
Material Tubes/Fins	--	Copper/Aluminium					
Number of Rows	nr	1	2	2	2	2	2
Fins Space	mm	1.6	1.6	1.6	1.6	1.6	1.6
Face Area	m ²	0.65	0.65	0.65	1.17	1.17	1.17
Plate Heat Exchanger							
Type	--	Braze Plate Heat Exchanger					
Nominal Water Flow	L/s	0.29	0.32	0.38	0.56	0.70	0.73
Pressure Drop at nominal flow rate	kPa	40.0	12.5	17.5	40.0	40.0	29.0
Hydraulic Circuit							
Number/Type Pump	nr/--	1 / high head circulator			1 / horizontal multi-stage		
Expansion Vessel Volume	l	2	2	2	2	2	2
Buffer tank volume	--	22	22	22	42	42	42
Water Connections Location	--	Right	Right	Right	Right	Right	Right
Water Connections Diameter	mm	25.4	25.4	25.4	25.4	25.4	25.4
Dimensions & Weights							
Height	mm	800	800	800	1410	1410	1410
Width	mm	1150	1150	1150	1150	1150	1150
Depth	mm	450	450	450	450	450	450
Weight	kg	115.5	122.5	128.0	195.0	196.4	203.2

¹ Nominal conditions: 12/7°C evaporator inlet/outlet water temperature; 35°C outdoor air temperature

² Compressors, fans and water circulating pump power input

³ At nominal operating conditions

⁴ Measured with 35°C outdoor air temperature; 1m from the unit; free field conditions; according to ISO 3744

⁵ 35°C outdoor air temperature; calculated according to ISO 3744

TECHNICAL DATA

COOLING ONLY

MODEL M4AC		080 C	100 C	120 C	150 C
Performance¹					
Cooling Capacity	kW	21.7	25.8	33.7	40.2
Total Power Input ²	kW	9.4	10.8	12.2	14.9
Water Flow Rate	l/s	1.04	1.23	1.61	1.92
Available Head Pressure ³	kPa	220	194	194	177
Lp [Sound Pressure Level] ⁴	dBA	62	64	67	70
Lw [Sound Power Level] ⁵	dBA	77	80	83	85
Refrigeration Circuit					
Number of Refrigeration Circuits	nr	2	2	2	2
Capacity Control	%	0-50-100	0-50-100	0-50-100	0-50-100
Refrigerant	--	R407C	R407C	R407C	R407C
Refrigerant Charge for each circuit	kg	4.0	3.9	5.6	6.0
Compressor					
Number of Compressors	nr	2	2	2	2
Type	--	Hermetic Scroll			
Nominal Power Input [each comp.]	kW	3.90	4.60	5.30	6.24
Fan					
Number of Fans	nr	2	2	2	2
Type	--	Axial			
Wheel Nominal Diameter	mm	600	600	600	600
Number of Poles	nr	8	8	8	6
Nominal Power Input [each fan]	kW	0.12	0.12	0.20	0.45
Condenser Coil					
Material Tubes/Fins	--	Copper/Aluminium			
Number of Rows	nr	2	2	2	2
Fins Space	mm	1.8	1.8	1.8	1.8
Face Area	m ²	2.5	2.5	2.5	2.5
Plate Heat Exchanger					
Type	--	Braze Plate Heat Exchanger			
Nominal Water Flow	L/s	1.08	1.31	1.67	2.00
Pressure Drop at nominal flow rate	kPa	74	82	76	75
Hydraulic Circuit					
Number/Type Pump	nr/--	1 / horizontal multi-stage			
Expansion Vessel Volume	l	8	8	8	8
Water Connections Location	--	Right	Right	Right	Right
Water Connections Diameter	mm	42	42	42	42
Dimensions & Weights					
Height	mm	1,260	1,260	1,260	1,260
Width	mm	1,500	1,500	1,800	1,800
Depth	mm	900	900	1,150	1,150
Weight	kg	350	360	480	560

¹ Nominal conditions: 12/7°C evaporator inlet/outlet water temperature; 35°C outdoor air temperature

² Compressors, fans and water circulating pump power input

³ At nominal operating conditions

⁴ Measured with 35°C outdoor air temperature; 1m from the unit; free field conditions according to ISO 3744

⁵ 35°C outdoor air temperature; calculated according to ISO 3744

HEAT PUMP

MODEL M4AC		020 CR	025 CR	030 CR	040 CR	050 CR	060 CR
Performance¹							
Cooling							
Cooling Capacity	kW	5.0	6.5	7.3	11.7	13.5	15.0
Total Power Input ²	kW	2.6	3.1	3.8	4.9	5.5	6.5
Water Flow Rate	l/s	0.24	0.31	0.35	0.56	0.64	0.71
Available Head Pressure ³	kPa	87	101	94	92	82	75
Heating⁴							
Heating Capacity	kW	5.9	7.5	9.5	13.2	15.0	17.6
Total Power Input ²	kW	2.7	2.8	4.0	5.0	5.7	6.3
Water Flow Rate	l/s	0.28	0.36	0.46	0.63	0.71	0.84
Available Head Pressure ³	kPa	77	93	76	75	64	35
Lp [Sound Pressure Level] ²	dBA	57	57	58	59	59	60
Lw [Sound Power Level] ⁶	dBA	70	70	71	72	72	73
Refrigeration Circuit							
Number of Refrigeration Circuits	nr	1	1	1	1	1	1
Refrigerant	--	R407C	R407C	R407C	R407C	R407C	R407C
Refrigerant Charge for each circuit	kg	1.5	1.8	1.6	3.0	3.5	4.0
Compressor							
Number of Compressors	nr	1	1	1	1	1	1
Type	--	Hermetic Rotary	Hermetic Scroll	Hermetic Scroll	Hermetic Scroll	Hermetic Scroll	Hermetic Scroll
Nominal Power Input [each comp.]	kW	2.29/2.37	2.76/2.42	3.48/3.71	4.23/4.39	4.86/5.11	5.89/5.64
Fan							
Number of Fans	nr	1	1	1	2	2	2
Type	--	Axial					
Wheel Nominal Diameter	mm	460	460	460	460	460	460
Number of Poles	nr	6	6	6	6	6	6
Nominal Power Input [each fan]	kW	0.135	0.135	0.135	0.135	0.135	0.135
Condenser Coil							
Material Tubes/Fins	--	Copper/Aluminium					
Number of Rows	nr	1	2	2	2	2	2
Fins Space	mm	1.6	1.6	1.6	1.6	1.6	1.6
Face Area	m ²	0.65	0.65	0.65	1.17	1.17	1.17
Plate Heat Exchanger							
Type	--	Braze Plate Heat Exchanger					
Pressure Drop at nominal flow rate	kPa	28/37	11/16	15/25	40/46	35/41	28/38
Hydraulic Circuit							
Number/Type Pump	nr/--	1 / high head circulator			1 / horizontal multi-stage		
Expansion Vessel Volume	l	2	2	2	5	5	5
Buffer tank volume	--	22	22	22	42	42	42
Water Connections Location	--	Right	Right	Right	Right	Right	Right
Water Connections Diameter	mm	25.4	25.4	25.4	25.4	25.4	25.4
Dimensions & Weights							
Height	mm	800	800	800	1410	1410	1410
Width	mm	1150	1150	1150	1150	1150	1150
Depth	mm	450	450	450	450	450	450
Weight	kg	115.5	122.5	128.0	195.0	196.4	203.2

¹ Nominal conditions: 12/7°C evaporator inlet/outlet water temperature; 35°C outdoor air temperature

² Compressor, fans and water circulating pump power input

³ At nominal operating conditions

⁴ Nominal conditions: 40/45 °C condenser inlet/outlet water temperature; 7°C db/6°C wb outdoor air temperature

⁵ Measured with 35°C outdoor air temperature; 1m from the unit; free field conditions; according to ISO 3744

⁶ 35°C outdoor air temperature; calculated according to ISO 3744

HEAT PUMP

MODEL		M4AC 080 CR	M4AC 100 CR	M4AC 120 CR	M4AC 150 CR
Performance					
Cooling¹					
Cooling Capacity	kW	21.7	25.8	32.2	38.7
Total Power Input ²	kW	10.0	11.0	12.7	15.5
Water Flow Rate	l/s	1.04	1.23	1.58	1.85
Available Head Pressure ³	kPa	220	194	201	183
Heating⁴					
Heating Capacity	kW	26.4	28.7	35.6	40.0
Total Power Input ²	kW	10.0	11.1	12.8	16.2
Water Flow Rate	l/s	1.26	1.37	1.65	1.91
Available Head Pressure ³	kPa	194	164	190	168
Lp [Sound Pressure Level] ⁵	dB(A)	62	64	67	70
Lw [Sound Power Level] ⁶	dB(A)	77	80	83	85
Refrigeration Circuit					
Number of Refrigeration Circuits	nr	2	2	2	2
Capacity Control	%	0-50-100	0-50-100	0-50-100	0-50-100
Refrigerant	--	R407C	R407C	R407C	R407C
Refrigerant Charge for each circuit	kg	4.0	3.3	5.8	6.1
Compressor					
Number of Compressors	nr	2	2	2	2
Type	--	Hermetic Scroll			
Nominal Power Input [each comp.]	kW	3.90	4.80	5.30	6.24
Fan					
Number of Fans	nr	2	2	2	2
Type	--	Axial			
Wheel Nominal Diameter	mm	600	600	600	600
Number of Poles	nr	8	8	8	6
Nominal Power Input [each fan]	kW	0.12	0.12	0.20	0.45
Condenser Coil					
Material Tubes/Fins	--	Copper/Aluminium			
Number of Rows	nr	2	2	2	2
Fins Space	mm	1.8	1.8	1.8	1.8
Face Area	m ²	2.5	2.5	2.5	2.5
Plate Heat Exchanger					
Type	--	Braze Plate Heat Exchanger			
Pressure Drop at nominal flow rate	kPa	74	82	76	75
Hydraulic Circuit					
Number/Type Pump	nr/--	1 / horizontal multi-stage			
Expansion Vessel Volume	l	8	8	8	8
Water Connections Location	--	Right/Left	Right/Left	Right/Left	Right/Left
Water Connections Diameter	mm	42	42	42	42
Dimensions & Weights					
Height	mm	1,260	1,260	1,260	1,260
Width	mm	1,500	1,500	1,800	1,800
Depth	mm	900	900	1,150	1,150
Weight	kg	350	360	480	560

¹ Nominal conditions: 12/7°C evaporator inlet/outlet water temperature; 35°C outdoor air temperature

² Compressors, fans and water circulating pump power input

³ At nominal operating conditions

⁴ Nominal conditions: 40/45°C condenser inlet/outlet water temperature; 7°C db/6°C wb outdoor air temperature

⁵ Measured with 35°C outdoor air temperature; 1m from the unit; free field conditions; according to ISO 3744

⁶ 35°C outdoor air temperature; calculated according to ISO 3744

CAPACITY PERFORMANCE

COOLING ONLY

Leaving Water Temperature [°C]		Outdoor Air temperature [°C]																			
		25				30				35				40				46			
		Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa
020C	5	5.6	2.3	0.27	80	5.4	2.5	0.26	83	5.4	2.6	0.26	83	4.9	2.8	0.23	88	4.5	3.0	0.21	92
	6	6.0	2.3	0.29	75	5.8	2.5	0.28	79	5.7	2.6	0.27	79	5.2	2.8	0.25	85	4.8	3.1	0.23	89
	7	6.4	2.3	0.31	70	6.1	2.5	0.29	74	6.2	2.6	0.29	73	5.5	2.8	0.26	85	5.1	3.1	0.26	83
	8	6.9	2.3	0.33	65	6.5	2.5	0.31	69	6.3	2.6	0.30	71	5.8	2.9	0.28	78	5.4	3.1	0.26	83
	9	7.3	2.4	0.35	59	6.9	2.5	0.33	64	6.7	2.6	0.32	67	6.1	2.9	0.29	74	5.7	3.1	0.27	80
	10	7.7	2.4	0.37	53	7.3	2.5	0.35	59	6.9	2.7	0.33	64	6.5	2.9	0.31	70	6.0	3.1	0.28	76
025C	5	7.7	2.3	0.37	91	6.8	2.6	0.32	99	6.1	2.9	0.29	104	5.0	3.2	0.24	111	3.9	3.5	0.18	117
	6	7.9	2.4	0.38	89	7.0	2.7	0.33	97	6.4	2.9	0.31	101	5.3	3.3	0.25	109	4.1	3.6	0.20	116
	7	8.1	2.4	0.39	87	7.2	2.7	0.35	95	6.7	3.0	0.32	99	5.6	3.3	0.27	108	4.4	3.7	0.21	114
	8	8.3	2.4	0.39	85	7.5	2.8	0.36	93	7.0	3.0	0.33	97	5.9	3.4	0.28	106	4.7	3.8	0.23	113
	9	8.5	2.5	0.40	83	7.7	2.8	0.37	91	7.3	3.1	0.35	95	6.1	3.5	0.29	104	5.0	4.0	0.24	111
	10	8.6	2.5	0.41	81	7.9	2.9	0.38	89	7.5	3.1	0.36	93	6.4	3.6	0.31	102	5.3	4.1	0.25	109
030C	5	8.2	3.0	0.39	88	7.5	3.4	0.36	94	7.0	3.6	0.33	97	6.0	4.2	0.29	104	5.2	4.6	0.25	109
	6	8.4	3.1	0.40	86	7.8	3.4	0.37	91	7.3	3.7	0.35	94	6.5	4.2	0.31	100	5.8	4.7	0.28	105
	7	8.6	3.1	0.41	83	8.1	3.5	0.39	88	7.9	3.7	0.38	89	7.0	4.3	0.34	97	6.4	4.7	0.31	101
	8	8.9	3.2	0.42	81	8.4	3.5	0.40	85	8.0	3.7	0.38	88	7.5	4.3	0.36	93	7.0	4.8	0.33	97
	9	9.1	3.2	0.44	79	8.8	3.6	0.42	82	8.4	3.8	0.40	85	8.0	4.3	0.38	89	7.6	4.8	0.36	92
	10	9.4	3.3	0.45	76	9.1	3.6	0.43	79	8.6	3.8	0.41	84	8.5	4.4	0.41	84	8.2	4.8	0.39	87
040C	5	11.7	3.7	0.56	93	11.2	4.2	0.53	99	10.8	4.6	0.52	102	10.0	5.2	0.48	111	9.2	6.2	0.44	118
	6	12.2	3.8	0.58	88	11.7	4.3	0.56	93	11.4	4.7	0.54	96	10.6	5.3	0.51	105	9.9	6.2	0.47	112
	7	12.7	3.9	0.61	82	12.2	4.4	0.58	87	11.7	4.9	0.56	92	11.3	5.4	0.54	98	10.6	6.3	0.51	105
	8	13.2	3.9	0.63	75	12.7	4.5	0.61	81	12.5	4.7	0.60	83	11.9	5.5	0.57	91	11.3	6.3	0.54	98
	9	13.7	4.0	0.65	69	13.3	4.5	0.63	74	13.0	5.1	0.62	76	12.5	5.6	0.60	84	12.0	6.4	0.57	90
	10	12.1	4.1	0.68	62	13.8	4.6	0.66	67	13.6	5.3	0.65	70	13.1	5.7	0.63	76	12.7	6.4	0.61	82
050C	5	14.9	4.8	0.71	66	13.9	5.4	0.67	78	13.2	5.9	0.63	86	12.0	6.7	0.57	100	10.8	7.4	0.52	111
	6	15.3	4.8	0.73	60	14.5	5.4	0.69	71	13.8	6.0	0.66	78	12.9	6.7	0.61	90	11.9	7.5	0.57	101
	7	15.8	4.8	0.75	54	15.1	5.5	0.72	63	14.7	6.0	0.70	70	13.7	6.8	0.66	80	12.9	7.5	0.62	90
	8	16.2	4.9	0.77	48	15.7	5.5	0.75	56	15.1	6.0	0.72	62	14.6	6.8	0.70	70	14.0	7.7	0.67	78
	9	16.7	4.9	0.80	42	16.3	5.6	0.78	48	15.8	6.0	0.75	54	15.5	6.9	0.74	58	15.0	7.8	0.72	65
	10	17.1	4.9	0.82	36	16.8	5.6	0.80	39	16.4	6.0	0.78	46	16.3	6.9	0.78	46	16.1	7.9	0.77	51
060C	5	15.4	5.6	0.73	70	14.5	6.3	0.69	82	13.8	6.9	0.66	93	12.9	7.7	0.62	105	12.0	8.6	0.57	117
	6	15.8	5.6	0.75	64	15.0	6.3	0.72	75	14.3	6.9	0.68	84	13.6	7.8	0.65	95	12.8	8.7	0.61	107
	7	16.1	5.7	0.77	58	15.5	6.4	0.74	67	15.2	6.9	0.73	70	14.3	7.9	0.68	86	13.6	8.8	0.65	96
	8	16.5	5.7	0.79	51	16.0	6.5	0.76	60	15.5	6.9	0.74	67	15.0	8.0	0.72	76	14.4	8.9	0.69	85
	9	16.9	5.7	0.81	45	16.5	6.5	0.79	52	16.1	6.9	0.77	58	15.7	8.1	0.75	65	15.2	9.0	0.73	73
	10	17.3	5.8	0.83	38	17.0	6.6	0.81	43	16.6	6.9	0.79	50	16.4	8.2	0.78	54	16.0	9.1	0.76	60
080C	5	22.6	5.6	1.08	215	21.5	6.4	1.03	221	20.6	6.9	0.98	226	19.3	7.3	0.92	233	15.0	8.5	0.72	257
	6	23.3	6.0	1.11	211	22.4	6.8	1.07	216	21.3	7.4	1.02	222	20.0	7.8	0.95	229	15.5	9.1	0.74	254
	7	23.6	6.3	1.13	209	22.6	7.2	1.08	215	21.7	7.8	1.04	220	20.4	8.2	0.97	227	16.1	9.5	0.77	251
	8	23.9	6.7	1.14	207	22.9	7.6	1.09	213	22.0	8.2	1.05	218	20.8	8.6	0.99	225	16.2	9.9	0.77	250
	9	24.4	7.2	1.17	204	23.4	8.2	1.12	210	22.6	8.8	1.08	215	21.4	9.2	1.02	221	16.5	10.5	0.79	249
	10	25.1	7.8	1.20	201	23.9	8.8	1.14	208	23.0	9.8	1.10	212	22.1	9.8	1.05	218	17.2	11.2	0.82	245
100C	5	25.8	6.5	1.23	194	25.2	7.5	1.20	201	24.5	8.2	1.17	208	23.2	8.7	1.11	222	18.9	10.0	0.90	267
	6	26.6	7.0	1.27	186	26.2	8.1	1.25	190	25.3	8.7	1.21	200	24.0	9.2	1.15	214	19.5	10.6	0.93	260
	7	27.1	7.3	1.30	180	26.5	8.5	1.26	187	25.8	9.2	1.23	194	24.5	9.7	1.17	208	20.3	11.1	0.97	252
	8	27.4	7.8	1.31	177	26.8	8.9	1.28	184	26.2	9.7	1.25	190	25.0	10.1	1.19	203	20.4	11.6	0.97	251
	9	27.9	8.4	1.33	172	27.4	9.7	1.31	178	26.9	10.4	1.29	183	25.7	10.8	1.23	195	20.9	12.3	1.00	246
	10	28.6	9.1	1.37	164	27.9	10.4	1.33	172	27.3	11.5	1.31	178	26.5	11.6	1.26	187	21.5	13.1	1.03	239
120C	5	33.6	7.4	1.61	194	33.0	8.3	1.58	198	32.0	9.1	1.53	202	30.4	9.6	1.45	210	26.3	11.5	1.25	230
	6	34.7	7.9	1.66	189	34.3	8.9	1.64	191	33.0	9.7	1.58	197	31.4	10.2	1.50	205	27.2	12.2	1.30	225
	7	35.2	8.4	1.68	187	34.7	9.4	1.66	189	33.7	10.2	1.61	194	32.0	10.7	1.53	202	28.0	12.9	1.34	222
	8	35.7	8.9	1.71	185	35.1	9.9	1.68	187	34.2	10.7	1.63	192	32.7	11.2	1.56	199	28.3	13.3	1.35	220
	9	36.3	9.5	1.74	182	35.8	10.7	1.71	184	35.2	11.5	1.68	187	33.7	12.0	1.61	194	28.9	14.2	1.38	217
	10	37.3	10.3	1.78	177	36.6	11.5	1.75	180	35.7	12.8	1.71	184	34.7	12.8	1.66	190	29.9	15.0	1.43	212
150C	5	41.7	8.9	1.99	170	40.5	9.9	1.93	176	38.2	10.9	1.82	185	37.0	11.5	1.77	191	31.8	14.0	1.52	213
	6	43.0	9.6	2.05	165	42.0	10.7	2.01	169	39.4	11.6	1.88	180	38.2	12.2	1.82	185	32.9	14.8	1.57	208
	7	43.8	10.1	2.09	162	42.6	11.3	2.04	166	40.2	12.2	1.92	177	39.0	12.8	1.86	182	34.0	15.6	1.62	203
	8	44.2	10.7	2.11	160	43.1	11.9	2.06	164	40.8	12.8	1.95	174	39.8	13.4	1.90	179	34.2	16.2	1.63	202
	9	45.0	11.5	2.15	156	43.8	12.8	2.09	161	41.9	13.7	2.00	170	41.0	14.3	1.96	173	35.3	17.4	1.69	198
	10	46.2	12.4	2.21	151	44.9	13.8	2.14	157	42.6	15.3	2.03	167	42.2	15.3	2.01	168	36.2	18.2	1.73	194

Cool: Cooling capacity
 PI: Compressor Power Input
 WF: Water Flow
 AHP: Available Head pressure
 Interpolation between points is permissible; extrapolation is not permitted

CAPACITY PERFORMANCE

HEAT PUMP

Leaving Water Temperature [°C]		Outdoor Air temperature [°C]																			
		25				30				35				40				46			
		Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa
020CR	5	4.6	2.3	0.22	91	4.4	2.5	0.21	93	4.3	2.6	0.21	95	4.0	2.8	0.19	97	3.6	3.0	0.17	99
	6	4.9	2.3	0.23	88	4.7	2.5	0.22	90	4.6	2.6	0.22	92	4.2	2.8	0.20	95	3.9	3.0	0.18	97
	7	5.2	2.3	0.25	85	4.9	2.5	0.24	88	5.0	2.6	0.24	87	4.5	2.8	0.21	92	4.1	3.1	0.20	95
	8	5.5	2.4	0.26	81	5.3	2.5	0.25	84	5.1	2.6	0.25	85	4.7	2.8	0.23	90	4.3	3.1	0.21	93
	9	5.9	2.4	0.28	77	5.6	2.5	0.27	81	5.4	2.6	0.26	82	5.0	2.9	0.24	87	4.6	3.1	0.22	91
10	6.2	2.4	0.30	73	5.9	2.5	0.28	77	5.6	2.7	0.27	80	5.2	2.9	0.25	85	4.8	3.1	0.23	89	
025CR	5	7.4	2.4	0.35	94	6.5	2.7	0.31	101	5.9	3.0	0.28	106	4.8	3.3	0.23	112	3.7	3.6	0.18	118
	6	7.5	2.5	0.36	92	6.7	2.8	0.32	99	6.1	3.0	0.29	103	5.1	3.4	0.24	111	4.0	3.8	0.19	117
	7	7.7	2.5	0.37	90	6.9	2.8	0.33	98	6.5	3.1	0.31	101	5.3	3.5	0.25	109	4.2	3.9	0.20	115
	8	7.9	2.5	0.38	89	7.1	2.9	0.34	96	6.7	3.1	0.32	99	5.6	3.6	0.27	107	4.5	4.0	0.22	114
	9	8.1	2.6	0.39	87	7.4	2.9	0.35	94	6.9	3.2	0.33	97	5.9	3.7	0.28	106	4.8	4.1	0.23	112
10	8.3	2.6	0.40	85	7.6	3.0	0.36	92	7.2	3.2	0.34	95	6.1	3.8	0.29	104	5.1	4.2	0.24	111	
030CR	5	8.1	3.1	0.39	88	7.3	3.5	0.35	94	6.6	3.7	0.32	99	5.7	4.3	0.27	106	4.8	4.8	0.23	111
	6	8.3	3.2	0.40	86	7.5	3.6	0.36	93	6.9	3.8	0.33	97	6.0	4.4	0.29	104	5.0	4.8	0.2	109
	7	8.5	3.3	0.41	85	7.8	3.6	0.37	91	7.3	3.8	0.35	94	6.2	4.4	0.30	102	5.3	4.9	0.26	108
	8	8.7	3.3	0.42	83	8.0	3.7	0.38	89	7.5	3.9	0.36	93	6.5	4.4	0.31	101	5.6	4.9	0.27	106
	9	8.9	3.4	0.42	81	8.2	3.7	0.39	88	7.8	3.9	0.37	90	6.8	4.5	0.32	99	5.9	5.0	0.28	104
10	9.1	3.7	0.43	80	8.4	3.8	0.40	86	8.0	3.9	0.38	88	7.0	4.5	0.34	97	6.2	5.0	0.30	103	
040CR	5	11.7	3.7	0.56	93	11.2	4.2	0.53	99	10.8	4.5	0.52	102	10.0	5.1	0.48	111	9.2	6.0	0.44	118
	6	12.2	3.7	0.58	88	11.7	4.2	0.56	93	11.4	4.6	0.54	96	10.6	5.2	0.51	105	9.9	6.1	0.47	112
	7	12.7	3.8	0.61	82	12.2	4.3	0.58	87	11.7	4.9	0.56	92	11.3	5.3	0.54	98	10.6	6.1	0.51	105
	8	13.2	3.9	0.63	75	12.7	4.4	0.61	81	12.5	4.6	0.60	83	11.9	5.4	0.57	91	11.3	6.2	0.54	98
	9	13.7	3.9	0.65	69	13.3	4.5	0.63	74	13.0	5.1	0.62	76	12.5	5.5	0.60	84	12.0	6.3	0.57	90
10	14.1	4.0	0.68	62	13.8	4.5	0.66	67	13.6	5.2	0.65	70	13.1	5.6	0.63	76	12.7	6.3	0.61	82	
050CR	5	13.7	4.4	0.66	81	12.8	5.0	0.61	91	12.1	5.4	0.58	99	11.0	6.1	0.53	109	10.0	6.8	0.48	119
	6	14.1	4.4	0.67	76	13.4	5.0	0.64	85	12.7	5.5	0.61	92	11.8	6.1	0.57	101	10.9	6.9	0.52	110
	7	14.5	4.4	0.69	71	13.9	5.0	0.66	79	13.5	5.5	0.64	82	12.6	6.2	0.60	93	11.9	7.0	0.57	101
	8	14.9	4.5	0.71	66	14.4	5.1	0.69	72	13.9	5.5	0.66	77	13.4	6.3	0.64	84	12.8	7.1	0.61	91
	9	15.3	4.5	0.73	60	15.0	5.1	0.71	65	14.5	5.5	0.69	69	14.2	6.3	0.68	74	13.8	7.1	0.66	79
10	15.7	4.5	0.75	55	15.6	5.1	0.74	58	15.1	5.5	0.72	62	15.0	6.4	0.72	64	14.8	7.2	0.71	68	
060CR	5	15.1	5.4	0.72	74	14.3	5.9	0.68	86	13.5	6.5	0.64	97	12.7	7.1	0.61	108	11.7	7.7	0.56	120
	6	15.5	5.4	0.74	68	14.8	5.9	0.70	79	14.1	6.5	0.67	88	13.4	7.1	0.64	99	12.5	7.7	0.60	110
	7	15.8	5.4	0.76	63	15.2	6.0	0.77	72	15.0	6.5	0.71	75	14.0	7.1	0.67	90	13.3	7.7	0.64	100
	8	16.2	5.4	0.77	56	15.7	6.0	0.75	64	15.2	6.5	0.73	71	14.7	7.1	0.70	80	14.1	7.7	0.67	89
	9	16.6	5.4	0.79	50	16.2	6.0	0.77	57	15.7	6.5	0.75	63	15.4	7.1	0.73	70	14.9	7.8	0.71	77
10	17.0	5.4	0.81	44	16.7	6.0	0.80	49	16.3	6.6	0.78	54	16.1	7.1	0.77	59	15.7	7.8	0.75	65	
080CR	5	21.0	5.7	1.00	223	20.7	7.1	0.99	225	20.5	7.4	0.98	226	19.4	7.8	0.93	232	16.8	8.9	0.80	247
	6	21.7	6.1	1.04	220	21.4	7.6	1.02	221	21.2	7.9	1.01	222	20.1	8.3	0.96	228	17.4	9.4	0.83	244
	7	22.1	6.5	1.06	217	21.9	8.0	1.05	219	21.7	8.3	1.04	220	20.6	8.7	0.98	226	18.0	10.0	0.86	240
	8	22.5	6.8	1.08	215	22.3	8.4	1.06	216	22.1	8.7	1.06	217	20.9	9.1	1.00	224	18.3	10.3	0.87	239
	9	23.0	7.4	1.10	212	22.8	9.1	1.09	214	22.6	9.3	1.08	215	21.5	9.8	1.03	221	18.5	11.0	0.88	238
10	23.7	8.0	1.13	209	23.5	9.7	1.12	210	23.4	10.4	1.12	210	22.1	10.4	1.06	217	19.1	11.6	0.91	234	
100CR	5	25.5	6.6	1.22	197	24.8	8.4	1.19	204	24.4	8.8	1.16	209	23.1	9.3	1.10	223	20.0	10.5	0.96	255
	6	25.9	7.1	1.24	194	25.5	9.0	1.22	198	25.2	9.4	1.20	200	23.9	9.8	1.14	214	20.9	11.1	1.00	246
	7	26.9	7.4	1.29	183	26.3	9.5	1.25	189	25.8	9.8	1.23	194	24.5	10.3	1.17	208	21.3	11.7	1.02	242
	8	27.4	7.9	1.31	177	26.8	9.9	1.28	184	26.3	10.3	1.26	189	24.9	10.8	1.19	204	21.6	12.1	1.03	238
	9	28.0	8.5	1.34	171	27.3	10.7	1.31	178	26.9	11.1	1.28	183	25.5	11.6	1.22	197	22.3	13.0	1.06	232
10	28.8	9.3	1.38	162	28.2	11.5	1.35	170	27.8	12.3	1.33	173	26.3	12.4	1.26	189	23.0	13.8	1.10	224	
120CR	5	32.5	7.6	1.55	200	31.3	9.4	1.50	169	30.5	9.8	1.46	210	28.9	10.4	1.38	217	24.5	12.0	1.17	238
	6	33.3	8.2	1.59	196	32.3	10.1	1.54	206	31.5	10.5	1.51	205	29.9	11.0	1.43	212	25.5	12.7	1.22	233
	7	34.1	8.6	1.63	192	33.0	10.6	1.58	201	32.2	11.0	1.54	201	30.6	11.6	1.46	209	25.9	13.4	1.24	231
	8	34.5	9.1	1.65	190	33.6	11.2	1.60	197	32.9	11.6	1.57	198	31.1	12.1	1.49	207	26.1	13.8	1.25	231
	9	35.3	9.7	1.69	186	34.3	12.0	1.64	195	33.6	12.4	1.60	195	31.9	13.0	1.53	203	26.9	14.8	1.29	227
10	36.6	10.7	1.75	180	35.5	12.9	1.70	191	34.8	13.8	1.66	189	32.9	13.9	1.57	198	27.9	15.7	1.3	22	
150CR	5	38.4	8.9	1.83	184	37.3	10.6	1.78	185	36.6	11.1	1.75	192	34.6	11.7	1.65	200	31.3	13.7	1.50	215
	6	39.7	9.5	1.90	179	38.6	11.4	1.85	189	37.8	11.9	1.81	187	35.9	12.5	1.72	195	32.3	14.5	1.54	210
	7	40.4	10.1	1.93	176	39.4	12.0	1.88	183	38.7	12.5	1.85	183	36.7	13.1	1.75	192	33.3	15.3	1.59	206
	8	41.4	10.6	1.98	172	40.3	12.6	1.92	180	39.4	13.1	1.88	180	37.3	13.7	1.78	189	33.4	15.9	1.60	205
	9	42.3	11.4	2.02	168	41.2	13.6	1.97	176	40.3	14.0	1.93	176	38.3	14.7	1.83	185	34.5	16.8	1.65	201
10	43.8	12.5	2.09	162	42.6	14.6	2.03	173	41.7	15.6	1.99	170	39.5	15.7	1.89	180	35.7	17.9	1.70	196	

Cool: Cooling capacity
 PI: Compressor Power Input
 WF: Water Flow
 AHP: Available Head pressure
 Interpolation between points is permissible; extrapolation is not permitted

CAPACITY PERFORMANCE

HEAT PUMP

Leaving Water Temperature [°C]		Outdoor Air temperature [°C]																			
		-5				0				7				10				15			
		Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa	Cool kW	PI kW	WF L/s	AHP kPa
020CR	35	4.7	2.2	0.22	91	5.5	2.2	0.26	82	6.6	2.3	0.32	69	7.1	2.4	0.34	60	8.0	2.4	0.38	48
	40	4.3	2.3	0.20	94	5.1	2.4	0.24	86	6.3	2.5	0.30	72	6.8	2.6	0.32	65	7.6	2.6	0.37	53
	45	3.9	2.5	0.19	97	4.8	2.6	0.23	90	6.0	2.7	0.28	76	6.5	2.8	0.31	70	7.3	2.9	0.35	58
	50	3.5	2.6	0.17	100	4.4	2.7	0.21	93	5.6	2.9	0.27	81	6.1	3.0	0.29	74	7.0	3.1	0.33	62
	55	3.1	2.8	0.15	103	4.0	2.9	0.19	96	5.3	3.1	0.25	87	5.8	3.2	0.28	78	6.7	3.3	0.32	67
025CR	35	5.7	2.1	0.27	107	6.8	2.1	0.32	99	8.1	2.1	0.39	89	8.6	2.2	0.41	81	9.6	2.1	0.46	71
	40	5.6	2.4	0.27	107	6.6	2.4	0.32	100	7.8	2.5	0.37	92	8.3	2.5	0.41	81	9.6	2.1	0.46	71
	45	5.6	2.7	0.27	108	6.4	2.7	0.31	102	7.5	2.8	0.36	93	8.0	2.8	0.38	88	8.7	2.8	0.42	80
	50	5.5	2.9	0.26	108	6.2	3.0	0.30	103	7.2	3.1	0.34	96	7.6	3.1	0.37	91	8.3	3.1	0.40	85
	55	5.4	3.2	0.26	108	6.1	3.3	0.29	104	6.9	3.4	0.33	98	7.3	3.4	0.35	94	7.9	3.5	0.38	89
030CR	35	6.6	3.0	0.31	100	8.0	3.0	0.38	89	10.0	3.1	0.48	75	10.8	3.1	0.52	61	12.3	3.2	0.59	44
	40	6.4	3.4	0.31	101	7.9	3.5	0.38	90	9.9	3.6	0.47	76	10.7	3.3	0.51	62	12.2	3.6	0.58	45
	45	6.3	3.9	0.30	102	7.7	3.9	0.37	91	9.8	4.0	0.47	76	10.6	4.1	0.51	63	12.1	4.1	0.58	46
	50	6.2	4.3	0.29	103	7.6	4.4	0.36	93	9.6	4.5	0.46	78	10.5	4.5	0.50	65	12.0	4.6	0.57	47
	55	6.0	4.8	0.29	104	7.4	4.8	0.36	94	9.5	4.9	0.45	80	10.4	5.0	0.50	66	11.9	5.1	0.57	49
040CR	35	9.9	3.7	0.47	112	11.7	3.8	0.56	93	14.2	4.0	0.68	62	15.3	4.0	0.73	46	17.1	4.2	0.82	17
	40	9.3	4.2	0.44	118	11.2	4.3	0.54	99	13.9	4.5	0.66	66	15.1	4.6	0.72	49	17.0	4.7	0.81	19
	45	8.6	4.8	0.41	124	10.7	4.9	0.51	104	13.6	5.0	0.65	75	14.8	5.1	0.71	52	16.9	5.2	0.81	20
	50	8.0	5.3	0.38	129	10.2	5.4	0.49	109	13.3	5.6	0.63	79	14.6	5.6	0.70	56	16.8	5.7	0.80	22
	55	7.4	5.9	0.35	134	9.7	5.9	0.46	114	13.0	6.1	0.62	83	14.4	6.2	0.69	59	16.7	6.2	0.80	24
050CR	35	10.6	4.2	0.51	113	12.7	4.3	0.60	93	15.5	4.4	0.74	58	16.8	4.4	0.80	40	18.8	4.5	0.90	9
	40	10.5	4.9	0.50	114	12.5	5.0	0.60	94	15.4	5.0	0.74	61	16.6	5.1	0.79	42	18.7	5.1	0.89	11
	45	10.4	5.6	0.49	116	12.4	5.6	0.59	95	15.3	5.7	0.73	64	16.5	5.4	0.79	44	18.6	5.7	0.89	13
	50	10.2	6.3	0.49	117	12.3	6.3	0.59	97	15.2	6.0	0.72	66	16.4	6.3	0.78	46	18.4	6.3	0.88	15
	55	10.1	7.0	0.48	118	12.2	7.0	0.58	98	15.0	7.0	0.72	68	16.3	6.9	0.78	48	18.3	6.9	0.87	17
060CR	35	13.8	5.2	0.66	93	15.8	5.3	0.75	63	18.6	5.3	0.89	23	19.8	5.3	0.95	-9	21.8	5.3	1.04	-51
	40	13.3	5.8	0.64	99	15.4	5.9	0.74	69	18.3	5.9	0.87	28	19.5	5.9	0.93	-3	21.6	5.9	1.03	-46
	45	12.9	6.5	0.62	105	15.0	6.5	0.72	75	18.0	6.5	0.86	35	19.2	6.5	0.92	3	21.3	6.6	1.02	-40
	50	12.5	7.1	0.60	110	14.6	7.1	0.70	81	17.6	7.1	0.84	38	18.9	7.2	0.90	8	21.1	7.2	1.01	-35
	55	12.1	7.7	0.58	115	14.3	7.7	0.68	86	17.3	7.8	0.83	43	18.6	7.8	0.89	14	20.8	7.8	1.00	-30
080CR	35	18.6	7.4	0.89	237	25.1	6.7	1.20	201	27.7	7.2	1.32	186	28.3	7.7	1.35	183	29.5	8.2	1.41	176
	40	18.2	7.3	0.87	240	24.5	7.5	1.17	204	26.9	7.9	1.29	191	27.9	8.1	1.33	185	29.1	8.4	1.39	178
	45	17.7	7.8	0.85	242	24.0	7.9	1.15	207	26.4	8.4	1.26	194	27.4	8.5	1.31	188	28.5	8.9	1.36	181
	50	17.2	7.9	0.82	245	23.5	8.0	1.12	210	25.9	8.7	1.24	196	26.9	9.0	1.28	191	28.0	9.3	1.34	184
	55	16.4	8.0	0.78	249	22.4	8.2	1.07	216	24.9	9.1	1.19	202	26.1	9.2	1.25	195	27.2	9.6	1.30	189
100CR	35	19.2	7.4	0.91	264	27.3	7.6	1.31	178	30.2	8.2	1.44	149	30.8	8.7	1.47	142	32.2	9.3	1.54	127
	40	18.7	8.3	0.89	269	26.7	8.6	1.28	185	29.3	9.0	1.40	158	30.4	9.2	1.45	146	31.7	9.6	1.51	133
	45	18.1	9.1	0.86	275	26.1	9.2	1.25	191	28.7	9.5	1.37	164	29.8	9.7	1.42	152	31.1	9.8	1.48	139
	50	17.7	9.2	0.84	280	25.6	9.5	1.22	197	28.2	9.9	1.34	170	29.2	10.3	1.40	158	30.5	10.6	1.46	145
	55	16.8	9.4	0.80	288	24.4	9.7	1.17	209	27.1	10.3	1.30	181	28.4	10.5	1.36	167	29.6	10.9	1.42	154
120CR	35	22.7	8.4	1.09	247	32.9	8.6	1.57	198	36.3	9.3	1.73	182	37.1	9.9	1.77	178	38.7	10.6	1.85	170
	40	21.9	9.4	1.04	251	32.2	9.7	1.54	202	35.3	10.2	1.69	187	36.6	10.5	1.75	180	38.1	10.9	1.82	173
	45	21.7	10.1	1.04	252	31.5	10.4	1.50	205	34.6	10.8	1.65	190	35.9	11.0	1.72	184	37.4	11.2	1.79	176
	50	20.9	10.4	1.00	256	30.8	10.7	1.47	208	33.9	11.2	1.62	193	35.2	11.7	1.68	187	36.7	12.0	1.15	180
	55	20.0	10.7	0.95	260	29.4	11.0	1.40	215	32.7	11.7	1.56	199	34.2	11.9	1.64	192	35.7	12.4	1.71	185
150CR	35	26.3	10.3	1.26	236	38.1	10.8	1.82	186	42.0	11.6	2.01	169	42.9	12.4	2.05	165	44.8	13.2	2.14	157
	40	25.6	11.6	1.22	239	37.2	12.2	1.78	189	40.8	12.7	1.95	174	42.4	13.1	2.03	167	43.6	2.11	160	160
	45	25.2	12.2	1.20	240	36.4	12.8	1.74	193	40.0	13.5	1.91	178	41.5	13.8	1.98	171	43.3	14.0	2.03	164
	50	24.5	12.4	1.17	243	35.6	13.0	1.70	196	39.2	14.0	1.87	181	40.7	14.6	1.94	175	42.5	15.0	2.03	167
	55	23.1	12.6	1.10	249	34.0	13.3	1.62	203	37.8	14.7	1.81	187	39.6	14.9	1.89	179	41.3	15.5	1.97	172

Cool: Cooling capacity

PI: Compressor Power Input

WF: Water Flow

AHP: Available Head pressure

Interpolation between points is permissible; extrapolation is not permitted

PERFORMANCE ADJUSTMENT FACTORS

Glycol Mixture Factor Corrections

The water mixtures are used as a thermal carrier fluid, in very cold climates with temperatures below 0°C. The use of low freezing point mixtures leads to a deviation from nominal values of the main thermodynamic characteristics of the unit.

Ethylene glycol [% in weight]	0	10	20	30	40	50
Freezing temperature	0	-3	-8	-15	-23	-35
Cooling capacity	1	0.991	0.982	0.972	0.961	0.946
Fluid volume flow rate	1	1.013	1.040	1.074	1.121	1.178
Pressure drop fluid side	1	1.070	1.129	1.181	1.263	1.308
Compressor power input	1	0.996	0.992	0.986	0.976	0.966

Fouling Factor Corrections

Unit performance are given considering a plate heat exchanger fouling factor of $0.044 \times 10^{-3} \text{ m}^2\text{C/W}$. For different fouling factor values, performances should be adjusted according to the parameters shown below.

Fouling Factor [$10^{-3} \text{ m}^2\text{C/W}$]	Correction Factors	
	Cooling Capacity	Compressor Power Input
0.0176	1.023	1.014
0.0440	1	1
0.0880	0.979	0.988
0.1320	0.959	0.976

Sea Level Factor Corrections

Unit performance are given considering sea level conditions. For different altitudes, performances should be adjusted according to the parameters shown below.

Elevation above sea level [m]	Correction Factors	
	Cooling Capacity	Compressor Power Input
0	1	1
300	0.993	1.005
600	0.986	1.009
1200	0.973	1.021
1800	0.960	1.031

OPERATING RANGE & SAFETY DEVICE SETTINGS

Operating range

Outdoor air temperature ¹ [C]:	17 to 46 °C
Outdoor air temperature ¹ [H]:	-7 to 21 °C
Outdoor air temperature ² [C]:	-10 to 46°C
Outdoor air temperature ² [H]:	-7 to 21 °
Inlet Water temperature [C]:	9 to 15°C
Inlet Water temperature [H]:	30 to 50°C
Outlet Water temperature [C] ³ :	4 to 10°C
Outlet Water temperature [H]:	35 to 55°C

Maximum fluid flow:

M4AC020: 1.23m ³ /h;	M4AC060: 3.16m ³ /h;
M4AC025: 1.36m ³ /h;	M4AC080: 6.50m ³ /h;
M4AC030: 1.67m ³ /h;	M4AC100: 7.00m ³ /h;
M4AC040: 2.45m ³ /h;	M4AC120: 8.00m ³ /h
M4AC050: 2.82m ³ /h;	M4AC150: 10.00m ³ /h

Glycol percentage:	30%
Hydraulic working pressure:	3 bar
Voltage:	
M4AC020-030 Models	230+/-10%
M4AC040-150 Models	400+/-10%

Storing conditions : -20 to 45°C

Safety Device Settings

High Pressure Switch:	30 bar
Low Pressure Switch:	0.5 bar
Hydraulic Kit Safety Valve:	6 bar

Low Fluid Temperature Operation Range

Fluid leaving temperature [°C]	2	0	-2	-4	-5
Min % of ethylene	10	20	20	30	30
Max outdoor temperature [°C]	41	38	35	32	30
Min Outdoor temperature [°C]					
With fan speed control	-5	-5	-3	-1	0
W/o fan speed control	17	18	20	22	23

- Without continuous fan speed regulator;
 - With continuous fan speed regulator;
 - For values below 4°C and down to -5°C, see table "Low Fluid Temperature Operation Range"
- C Cooling
H Heating

SOUND LEVELS

Sound Pressure Level [Lp]

Sound Pressure Values for each octave band frequency are measured with unit on full load operation, free field hemispheric conditions and 1m distance from the unit in accordance with ISO 3744 average method.

MODEL M4AC	Octave Band Frequency [Hz]								SPL [dBA]
	63	125	250	500	1000	2000	4000	8000	
Sound Pressure Level [db]									Lp [dBA]
Cooling only									
020C	54	56	58	56	53	46	40	33	57
025C	54	57	59	56	53	46	40	33	57
030C	57	59	60	57	53	47	40	34	58
040C	57	59	60	58	54	50	42	35	59
050C	57	60	61	58	54	50	43	36	59
060C	58	60	62	59	55	51	44	37	60
080C	57	60	57	58	58	53	50	46	62
100C	60	62	50	60	59	55	51	48	64
120C	62	65	61	63	62	57	54	50	67
150C	65	68	64	66	65	60	56	52	70
Heat Pump									
020CR	54	56	58	56	53	46	40	33	57
025CR	54	57	59	56	53	46	40	33	57
030CR	57	59	60	57	53	47	40	34	58
040CR	57	59	60	58	54	50	42	35	59
050CR	57	60	61	58	54	50	43	36	59
060CR	58	60	62	59	55	51	44	37	60
080CR	57	60	57	58	58	53	50	46	62
100CR	60	62	50	60	59	55	51	48	64
120CR	62	65	61	63	62	57	54	50	67
150CR	65	68	64	66	65	60	56	52	70

Sound Power Level [Lw]

Sound Power Values for each octave band frequency are calculated in accordance with ISO 3744 procedure.

MODEL M4AC	Octave Band Frequency [Hz]								PWL [dBA]
	63	125	250	500	1000	2000	4000	8000	
Sound Pressure Level [db]									Lw [dBA]
Cooling only									
020C	69	71	72	68	65	60	52	45	70
025C	69	71	72	68	65	60	52	46	70
030C	70	73	73	68	66	60	53	46	71
040C	70	72	72	70	67	62	56	50	72
050C	71	73	72	70	67	63	56	50	72
060C	71	73	73	71	68	63	56	50	73
080C	74	76	72	74	73	69	64	61	77
100C	77	79	75	77	76	72	67	63	80
120C	81	84	78	80	79	74	69	65	83
150C	82	85	80	82	81	76	71	67	85
Heat Pump									
020CR	69	71	72	68	65	60	52	45	70
025CR	69	71	72	68	65	60	52	46	70
030CR	70	73	73	68	66	60	53	46	71
040CR	70	72	72	70	67	62	56	50	72
050CR	71	73	72	70	67	63	56	50	72
060CR	71	73	73	71	68	63	56	50	73
080CR	74	76	72	74	73	69	64	61	77
100CR	77	79	75	77	76	72	67	63	80
120CR	81	84	78	80	79	74	69	65	83
150CR	82	85	80	82	81	76	71	67	85

ELECTRICAL DATA

COOLING ONLY

MODEL		M4AC 020 C	M4AC 025 C	M4AC 030 C
Power Supply	V/f/Hz	220-240/1/50	220-240/1/50	220-240/1/50
Total Nominal Power Input	kW	2.62	2.96	3.69
Fan Power Input (each)	kW	0.14	0.14	0.14
Compressor Power Input (each)	kW	2.30	2.45	3.35
Pump Power Input	kW	0.27	0.27	0.27
Operating Current	A	12.7	13.6	17.5
Fan Nominal Operating Current (each)	A	0.67	0.67	0.67
Comp. Nominal Operating Current (each)	A	11.0	11.30	15.90
Pump Nominal Operating Current	A	1.19	1.19	1.19
Full Load Ampere	A	13.0	18.5	21.5
Locked Rotor Ampere	A	57	82	114
Power Cable				
Cross Section Area	mm ²	10	10	10
Quantity	n°	3	3	3

MODEL		M4AC 040 C	M4AC 050 C	M4AC 060 C
Power Supply	V/f/Hz	380-415/3/50	380-415/3/50	380-415/3/50
Total Nominal Power Input	kW	4.94	5.97	6.88
Fan Power Input (each)	kW	0.14	0.14	0.14
Compressor Power Input (each)	kW	4.32	5.34	6.24
Pump Power Input	kW	0.32	0.35	0.35
Operating Current	A	9.29	10.22	12.93
Fan Nominal Operating Current (each)	A	0.67	0.67	0.67
Comp. Nominal Operating Current (each)	A	8.06	8.97	11.06
Pump Nominal Operating Current	A	0.71	0.77	0.77
Full Load Ampere	A	12.5	13.5	14.4
Locked Rotor Ampere	A	65	74	101
Power Cable				
Cross Section Area	mm ²	5	5	5
Quantity	n°	5	5	5

MODEL		M4AC 080 C	M4AC 100 C	M4AC 120 C	M4AC 150 C
Power Supply	V/f/Hz	400/3/50	400/3/50	400/3/50	400/3/50
Total Nominal Power Input	kW	9.44	10.77	12.19	14.89
Fan Power Input (each)	kW	0.28	0.28	0.38	0.75
Compressor Power Input (each)	kW	3.92	4.58	5.12	6.10
Pump Power Input	kW	1.05	1.05	1.20	1.20
Operating Current	A	17.30	18.10	25.30	29.40
Fan Nominal Operating Current (each)	A	1.20	1.20	1.80	3.40
Comp. Nominal Operating Current (each)	A	7.30	8.60	10.30	11.50
Pump Nominal Operating Current	A	1.10	1.10	2.50	2.50
Full Load Ampere	A	26.30	23.10	28.60	38.20
Locked Rotor Ampere	A	65.00	74.00	76.00	95.00
Power Cable					
Cross Section Area	mm ²	6	6	6	6
Quantity	n°	5	5	5	5

ELECTRICAL DATA

HEAT PUMP

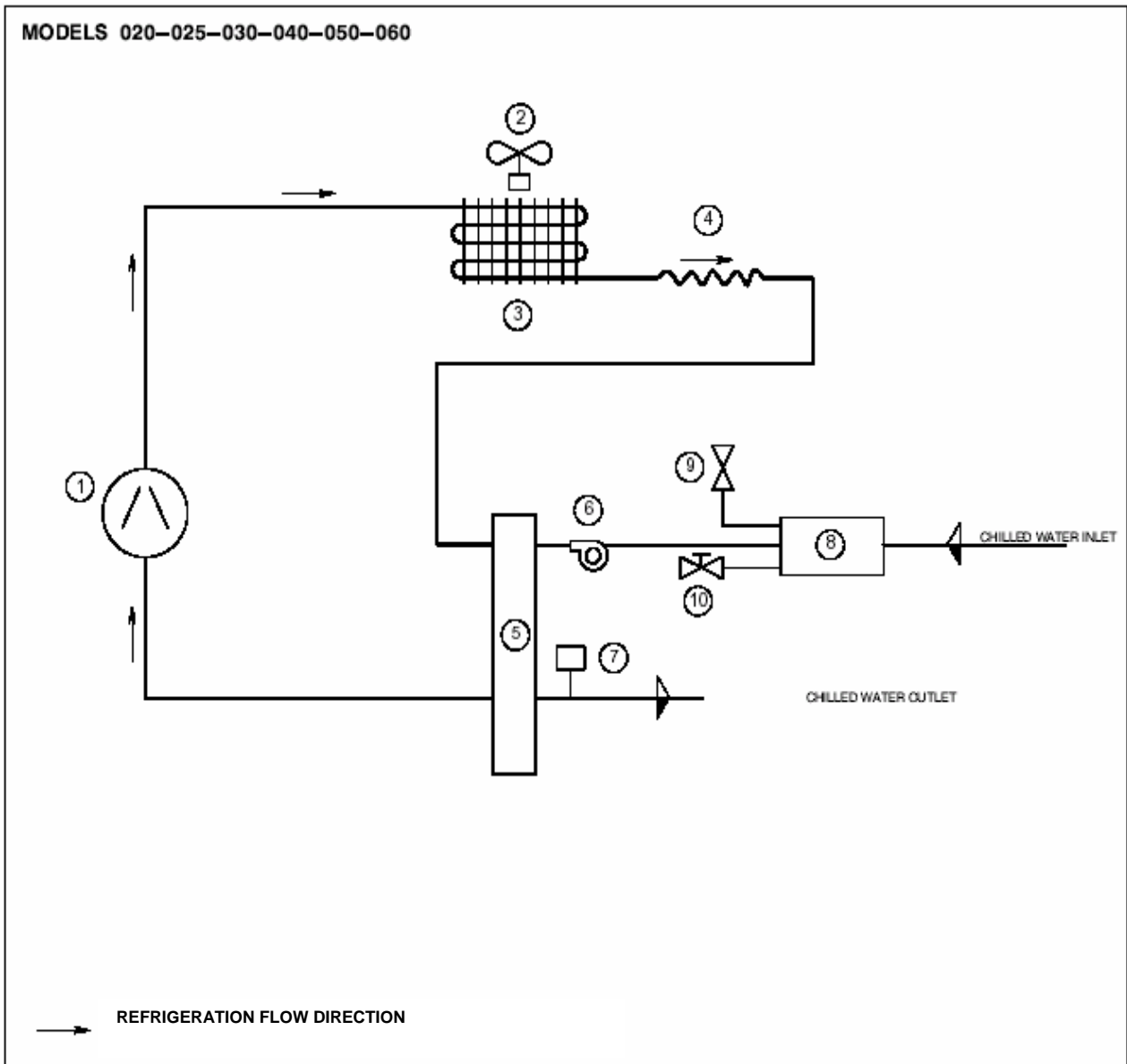
MODEL		M4AC 020 CR	M4AC 025 CR	M4AC 030 CR
Power Supply	V/f/Hz	220-240/1/50	220-240/1/50	220-240/1/50
Cooling				
Total Nominal Power Input	kW	2.61	3.09	3.82
Operating Current	A	12.69	14.30	19.29
Compressor Power Input (each)	kW	2.29	2.76	3.48
Comp. Nominal Operating Current (each)	A	11.20	12.80	17.70
Heating				
Total Nominal Power Input	kW	2.69	2.75	4.00
Operating Current	A	13.00	14.10	20.20
Compressor Power Input (each)	kW	2.37	2.42	3.71
Comp. Nominal Operating Current (each)	A	11.50	12.60	18.40
Fan Power Input (each)	kW	0.14	0.14	0.14
Pump Power Input	kW	0.27	0.27	0.27
Fan Nominal Operating Current (each)	A	0.67	0.67	0.67
Pump Nominal Operating Current	A	1.20	1.20	1.20
Full Load Ampere	A	13.0	18.50	21.5
Locked Rotor Ampere	A	57	82	114
Power Cable				
Cross Section Area	mm ²	10	10	10
Quantity	n°	3	3	3

MODEL		M4AC 040 CR	M4AC 050 CR	M4AC 060 CR
Power Supply	V/f/Hz	380-415/3/50	380-415/3/50	380-415/3/50
Cooling				
Total Nominal Power Input	kW	4.85	5.47	6.53
Operating Current	A	9.13	9.59	12.77
Compressor Power Input (each)	kW	4.23	4.86	5.89
Comp. Nominal Operating Current (each)	A	7.90	8.30	11.50
Heating				
Total Nominal Power Input	kW	5.00	5.66	6.28
Operating Current	A	9.23	9.96	12.67
Compressor Power Input (each)	kW	4.39	5.11	5.64
Comp. Nominal Operating Current (each)	A	8.00	8.60	11.40
Fan Power Input (each)	kW	0.14	0.14	0.14
Pump Power Input	kW	0.33	0.35	0.36
Fan Nominal Operating Current (each)	A	0.67	0.67	0.67
Pump Nominal Operating Current	A	0.74	0.77	0.80
Full Load Ampere	A	12.5	13.5	14.4
Locked Rotor Ampere	A	65	74	101
Power Cable				
Cross Section Area	mm ²	5	5	5
Quantity	n°	5	5	5

MODEL		M4AC 080 CR	M4AC 100 CR	M4AC 120 CR	M4AC 150 CR
Power Supply	V/f/Hz	400/3/50	400/3/50	400/3/50	400/3/50
Cooling					
Total Nominal Power Input	kW	10.0	11.0	12.7	15.5
Operating Current	A	16.5	18.5	25.9	29.3
Compressor Power Input (each)	kW	4.19	4.70	5.37	6.20
Comp. Nominal Operating Current (each)	A	7.3	8.6	10.3	11.5
Heating					
Total Nominal Power Input	kW	10.0	11.1	12.8	16.2
Operating Current	A	16.9	18.5	25.5	30.5
Compressor Power Input (each)	kW	4.20	4.75	5.42	6.75
Comp. Nominal Operating Current (each)	A	7.3	8.6	10.3	11.5
Fan Power Input (each)	kW	0.28	0.28	0.38	0.75
Pump Power Input	kW	1.05	1.05	1.20	1.20
Fan Nominal Operating Current (each)	A	1.20	1.20	1.80	3.40
Pump Nominal Operating Current	A	1.1	1.1	2.5	2.5
Full Load Ampere	A	26.3	23.1	28.6	38.2
Locked Rotor Ampere	A	65.0	74.0	76.0	95.0
Power Cable					
Cross Section Area	mm ²	6	6	6	6
Quantity	n°	5	5	5	5

REFRIGERANT & HYDRAULIC CIRCUIT

COOLING ONLY

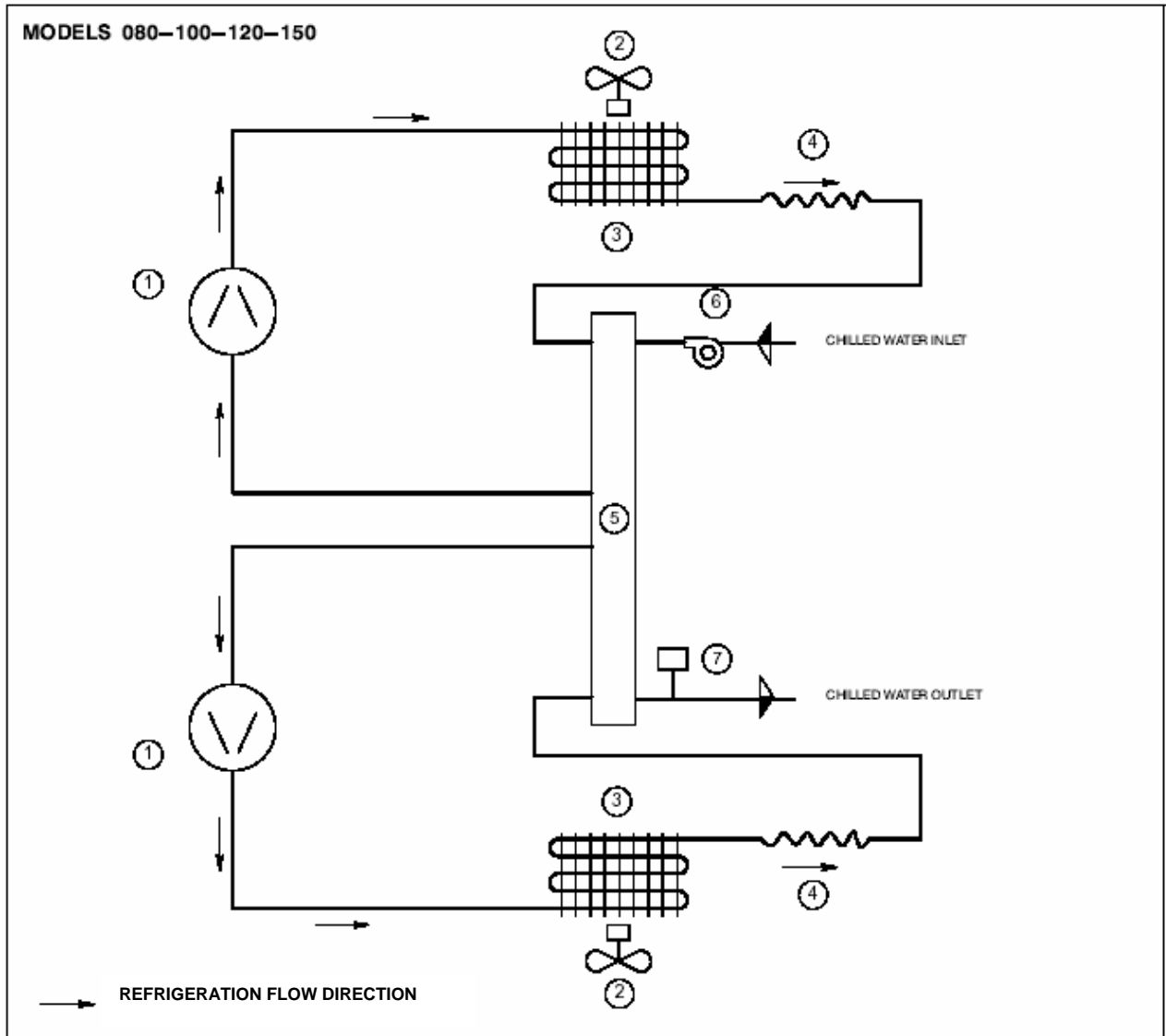


POS.	DESCRIPTION
1	Compressor
2	Condenser Fan
3	Condenser
4	Thermostatic Valve
5	Plate Heat Exchanger

POS.	DESCRIPTION
6	Water Pump
7	Water Flow Switch
8	Water Storage Tank
9	Auto-pressure Relief + Air Vent
10	Drain Valve

REFRIGERANT & HYDRAULIC CIRCUIT

COOLING ONLY

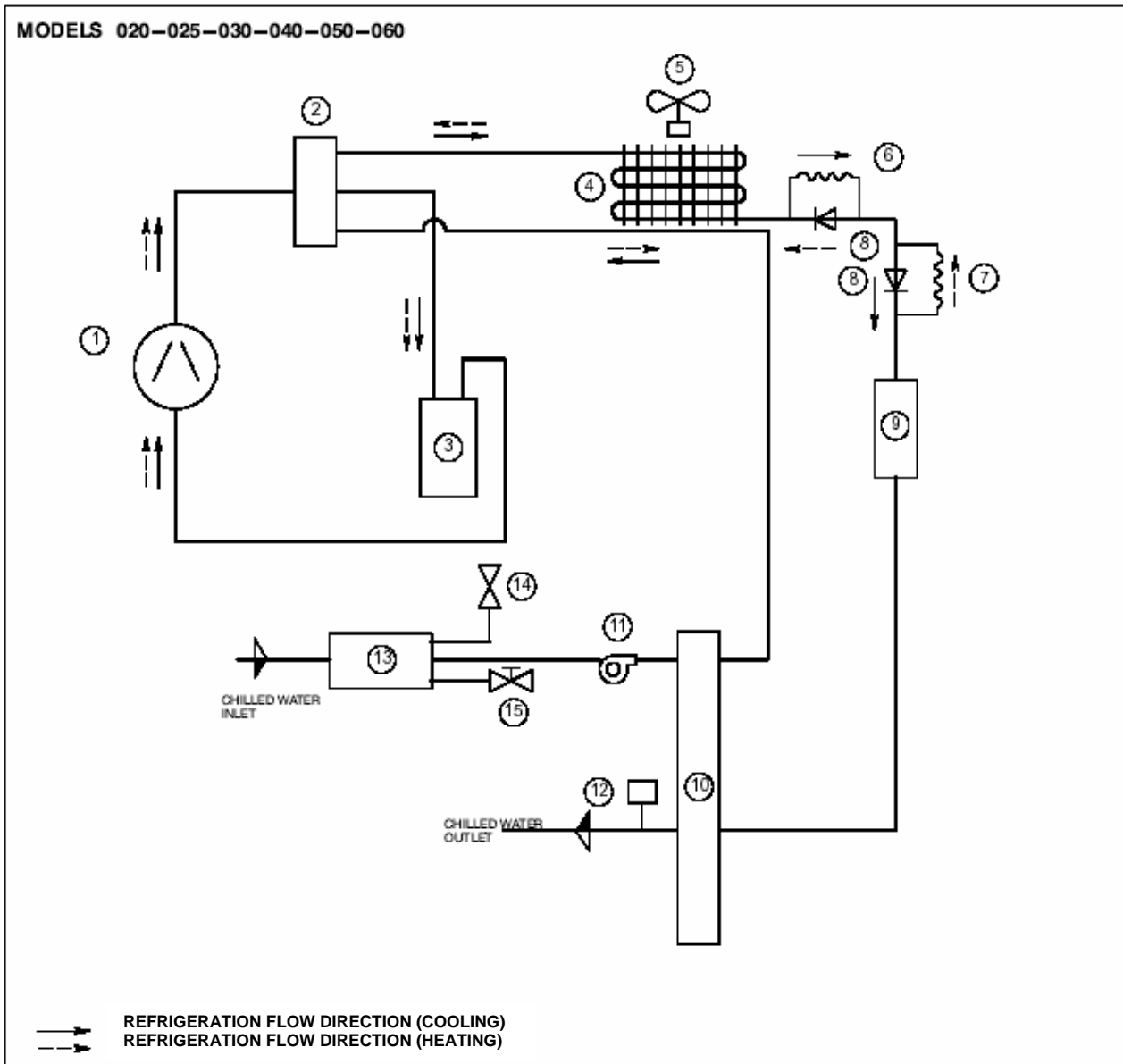


POS.	DESCRIPTION
1	Compressor
2	Condenser Fan
3	Condenser
4	Thermostatic Valve

POS.	DESCRIPTION
5	Plate Heat Exchanger
6	Water Pump
7	Water Flow Switch

REFRIGERANT & HYDRAULIC CIRCUIT

HEAT PUMP

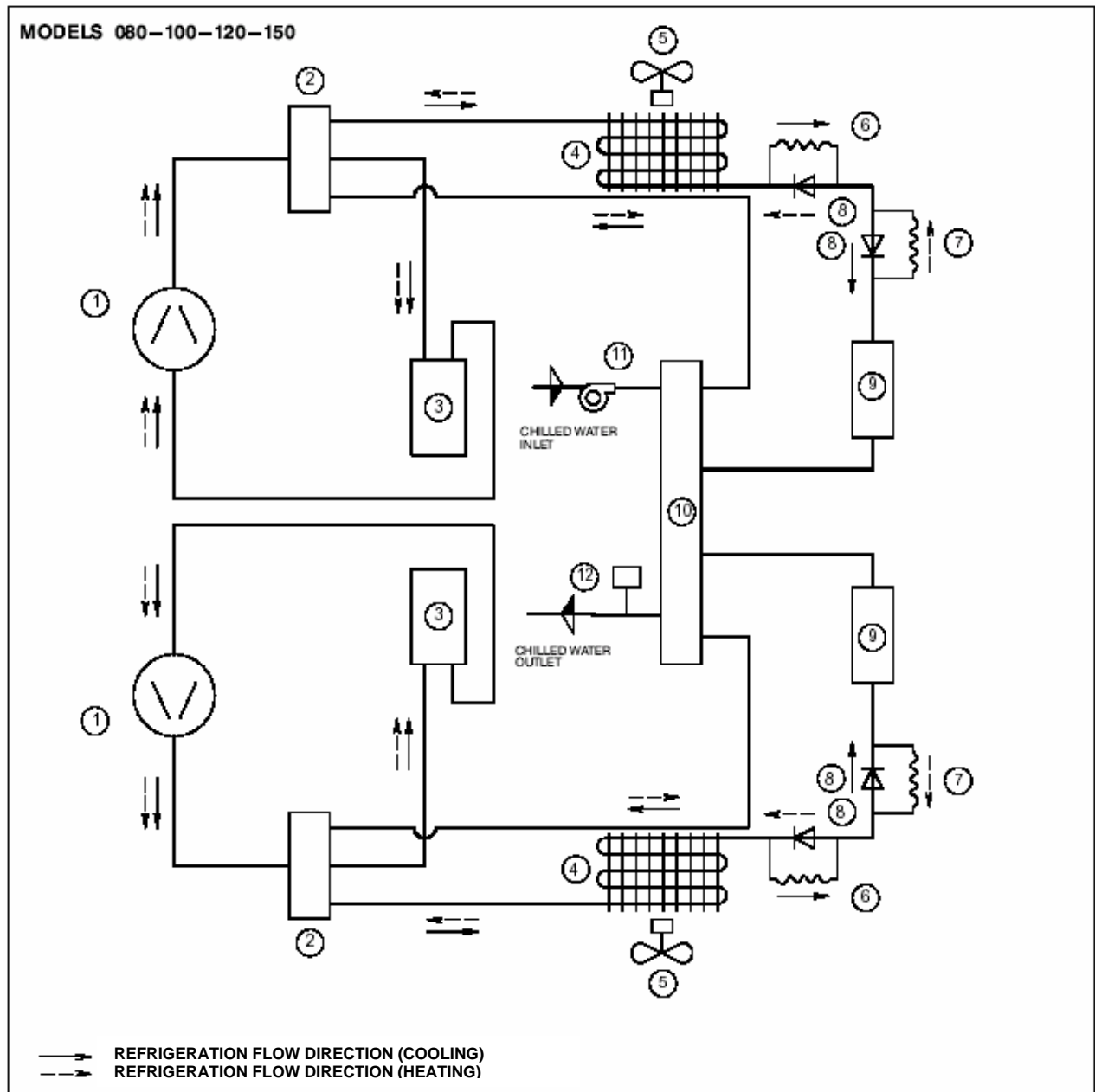


POS.	DESCRIPTION
1	Compressor
2	Four-way Valve
3	Accumulator
4	Finned Coil
5	Finned Coil Fan
6	Capillary Tube (Cooling)
7	Capillary Tube (Heating)
8	Check Valve

POS.	DESCRIPTION
9	Liquid Receiver
10	Plate Heat Exchanger
11	Water Pump
12	Water Flow Switch
13	Water storage Tank
14	Auto-Pressure Relief + Air Vent
15	Drain Valve

REFRIGERANT & HYDRAULIC CIRCUIT

HEAT PUMP

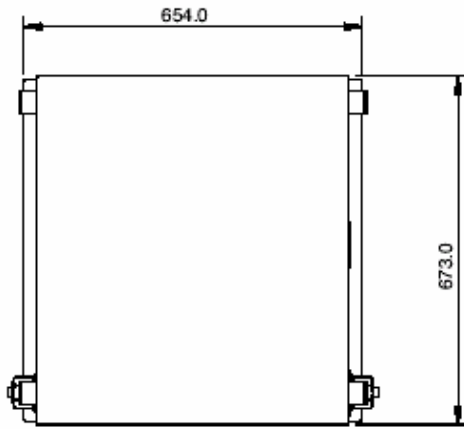


POS.	DESCRIPTION
1	Compressor
2	Four-way Valve
3	Accumulator
4	Finned Coil
5	Finned Coil Fan
6	Capillary Tube (Cooling)

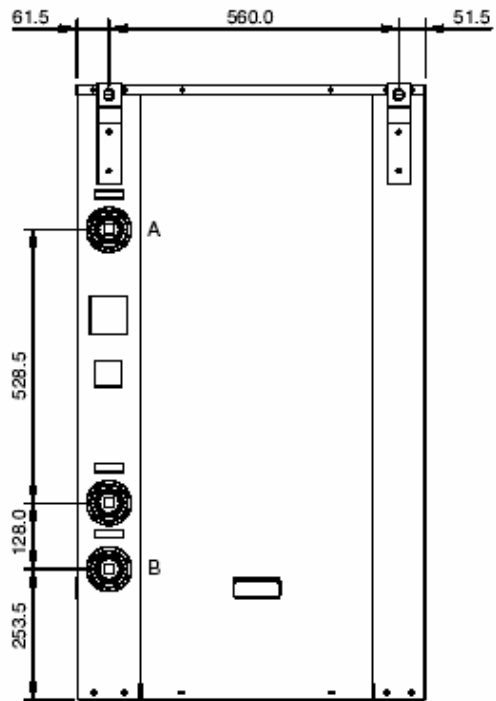
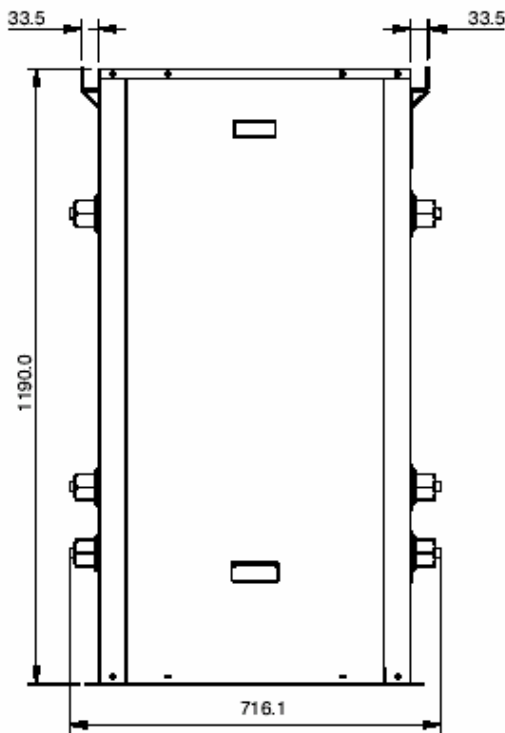
POS.	DESCRIPTION
7	Capillary Tube (Heating)
8	Check Valve
9	Liquid Receiver
10	Plate Heat Exchanger
11	Water Pump
12	Water Flow Switch

DIMENSIONAL DATA & CLEARANCES

WATER BUFFER TANK (080-100-120-150 MODELS)

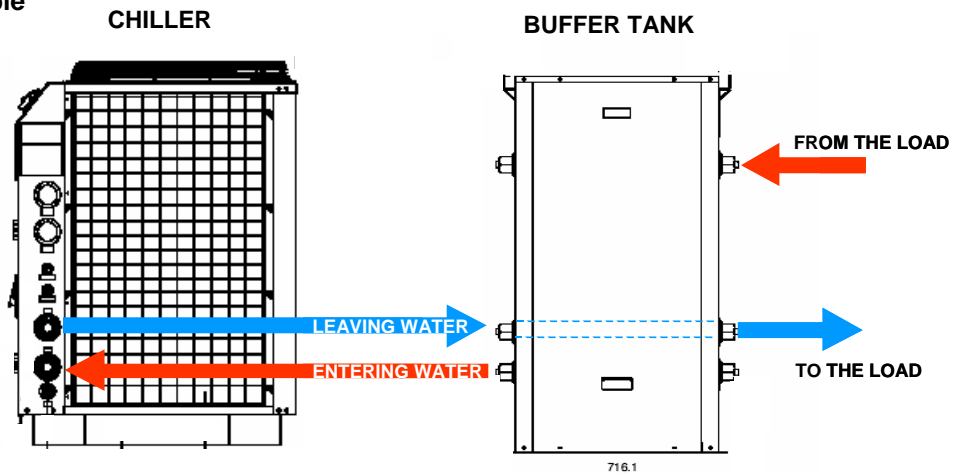


Legend	Dimensions
(A) Chilled Water Inlet	1 ¼" BSPT
(B) Chilled Water Outlet	1 ¼" BSPT

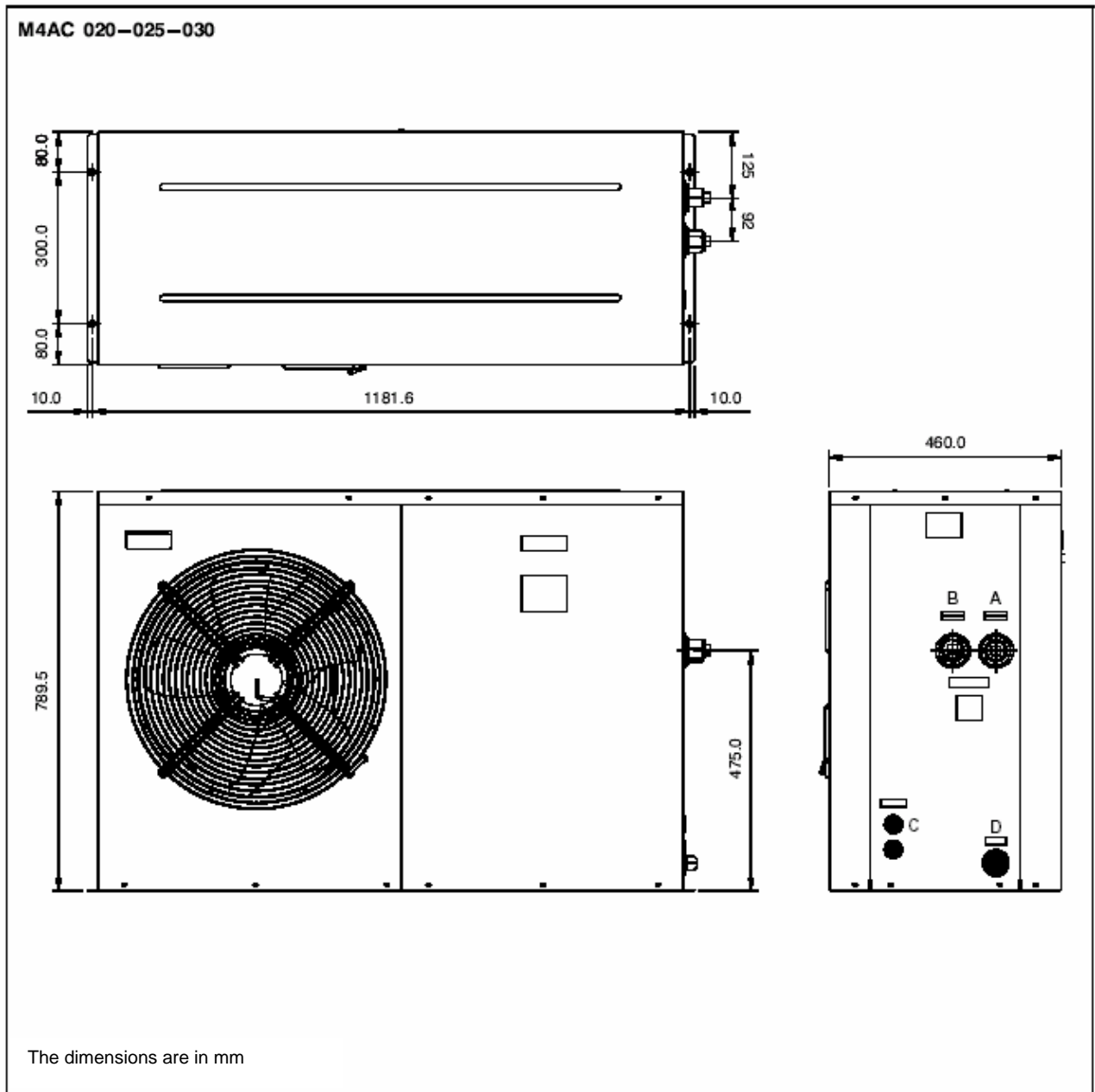


The dimensions are in mm

Connection Example

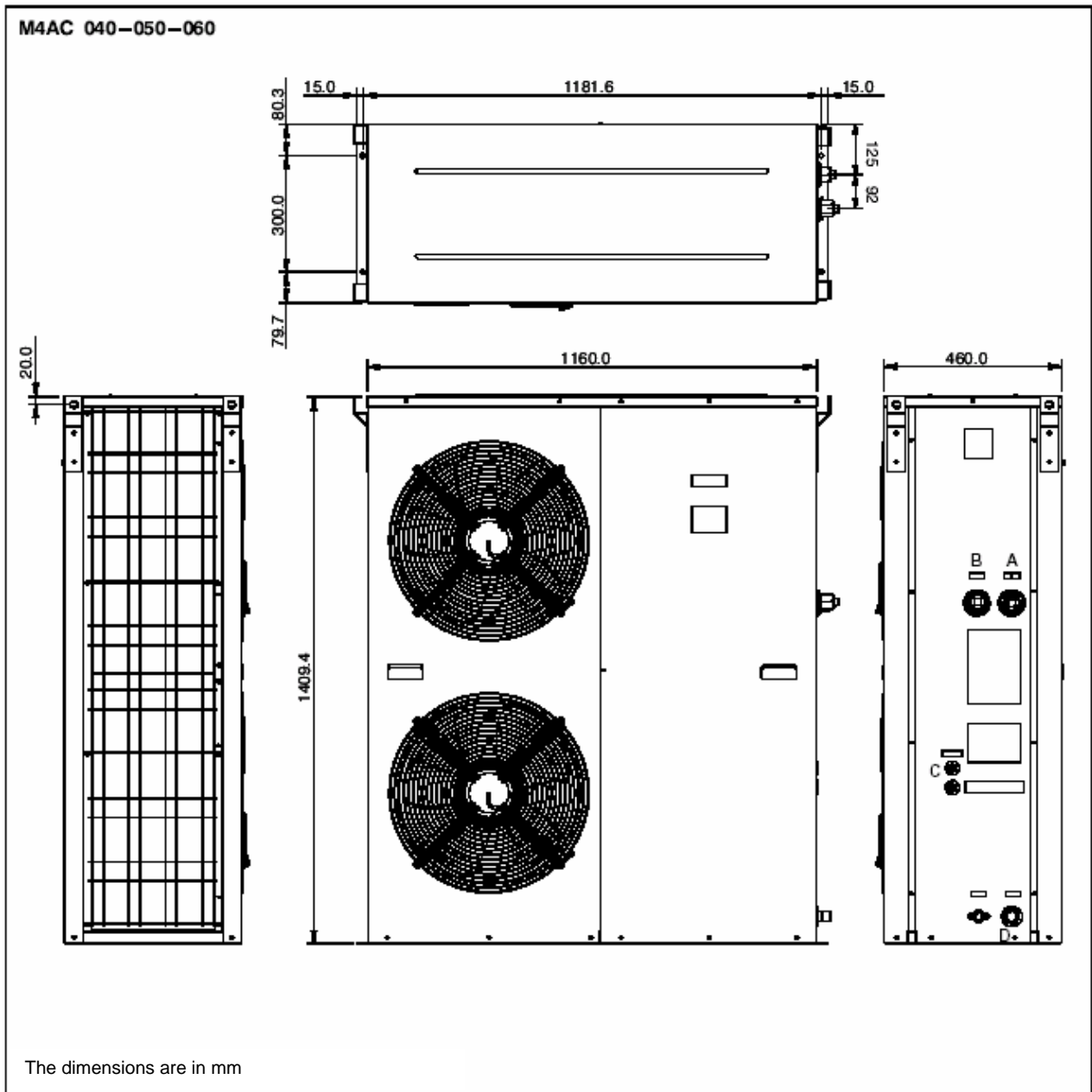


DIMENSIONAL DATA & CLEARANCES



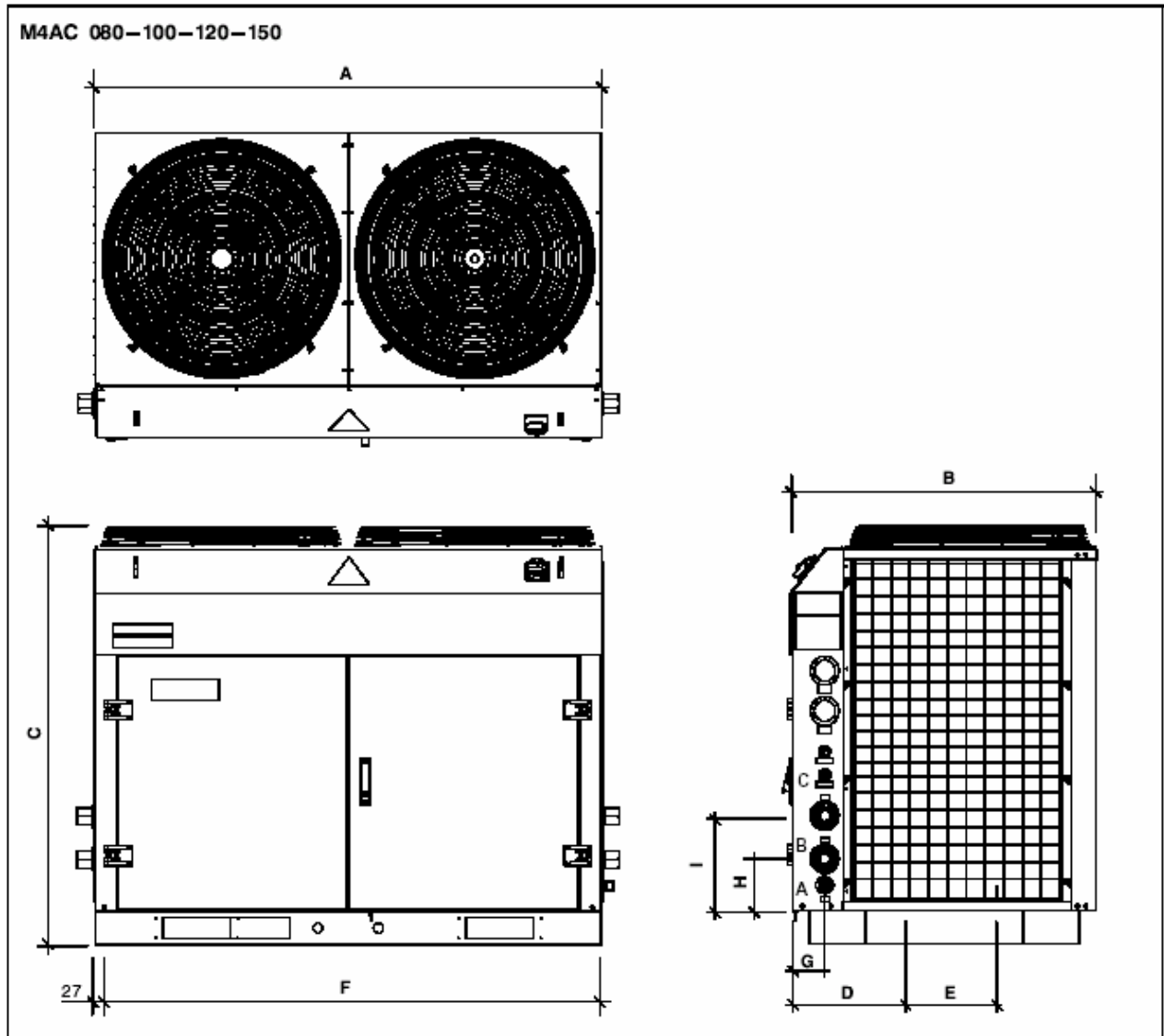
Legend	Dimensions
(A) Chilled Water Inlet	1 ¼" BSPT
(B) Chilled Water Outlet	1 ¼" BSPT
(C) Power Supply cable	
(D) Drain	

DIMENSIONAL DATA & CLEARANCES



Legend	Dimensions
(A) Chilled Water Inlet	1 ¼" BSPT
(B) Chilled Water Outlet	1 ¼" BSPT
(C) Power Supply cable	
(D) Drain	

DIMENSIONAL DATA & CLEARANCES

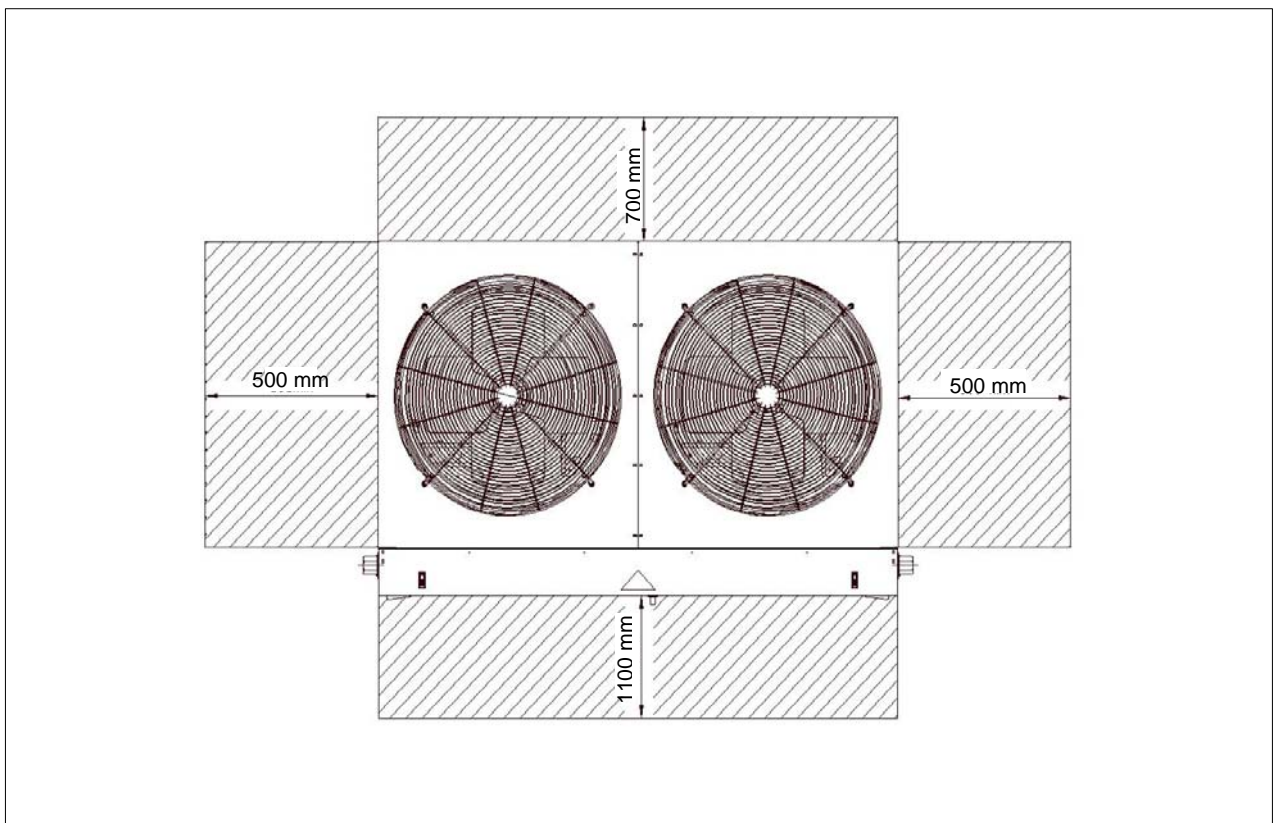
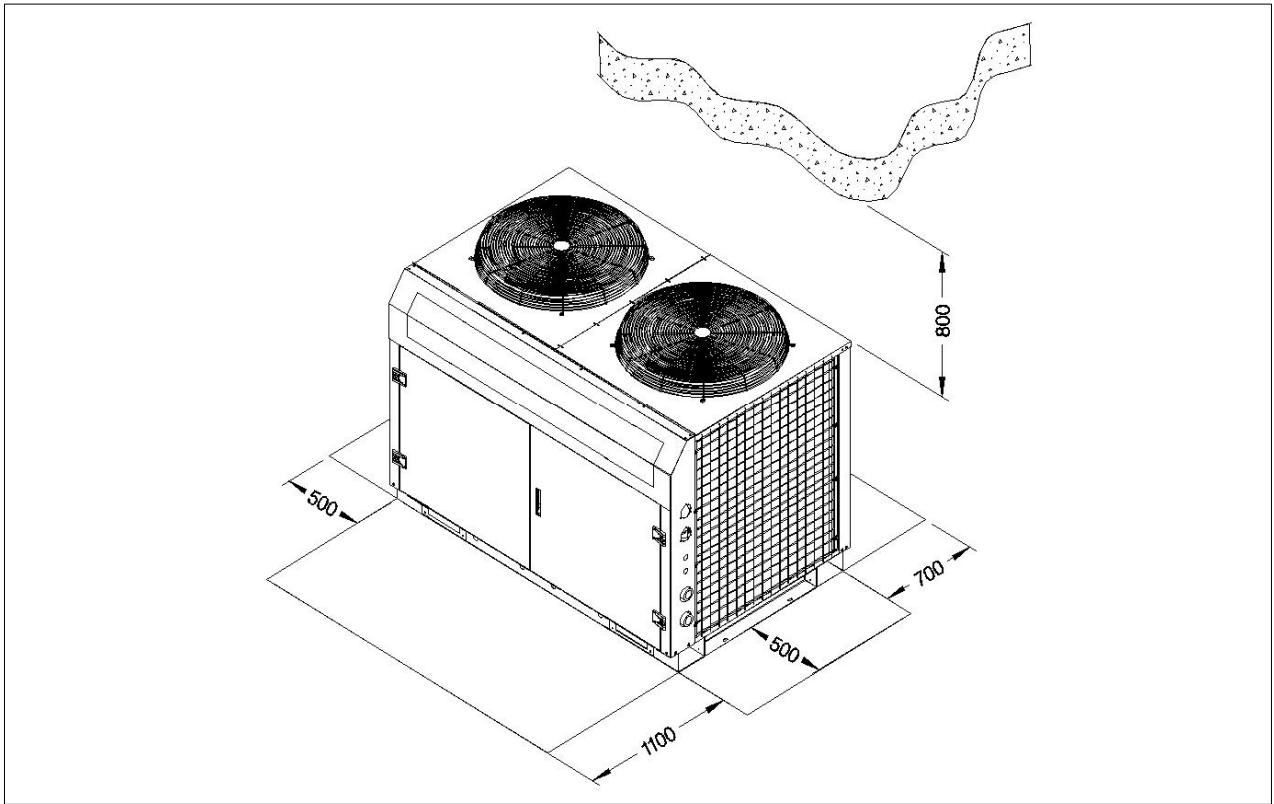


MODEL		M4AC 080 C/CR	M4AC 100 C/CR	M4AC 120 C/CR	M4AC 150 C/CR
A [width]	mm	1500	1500	1800	1800
B [depth]	mm	900	900	1150	1150
C [height]	mm	1260	1260	1260	1260
D	mm	297.5	297.5	347.5	347.5
E [mounting hole]	mm	307.5	307.5	307.5	307.5
F [mounting hole]	mm	1446	1446	1546	1546
G [water connections]	mm	100	100	100	100
H [water conn. - INT]	mm	265	265	265	265
I [water conn. - OUT]	mm	385	385	385	385

Legend	Dimensions
(A) Chilled Water Inlet	1 ¼" BSPT
(B) Chilled Water Outlet	1 ¼" BSPT
(C) Power Supply cable	
(D) Drain	

DIMENSIONAL DATA & CLEARANCES

Clearances for correct unit operation and maintenance are indicated in the pictures below.



We reserve the right to make changes in design and construction at any time without notice, thus the cover picture is not binding.



McQuay Italia S.p.A.

S.S. Nettunense, km 12+300 – 00040 Cecchina (Roma) – Italia
tel. +39 06 937311; fax +39 06 9374014

[www .mcquayeuropa.com](http://www.mcquayeuropa.com) - info @mcquayeuropa.com