

# TECHNICAL BROCHURE



## REVERSE CYCLE HEAT PUMPS 6kW – 100kW

MANUFACTURED BY:



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## **ENERFLOW ER-MT REVERSE CYCLE HEAT PUMPS: ENERGY EFFICIENT WATER HEATING OR CHILLING UNITS**

The **ENERFLOW ER-MT** series reverse cycle heat pumps/water chillers can either heat or cool water. In the heating mode, the unit extracts heat from ambient air which is then transferred to the water. **ENERFLOW ER-MT** heat pumps are therefore extremely energy efficient as they consume (in the form of electrical power) only a fraction of the energy transferred to the water. In cases where heating is currently being done by means of electrical resistance elements or diesel fired burners, energy costs can be reduced by as much as 80%. When the unit is operated in the reverse mode, heat is extracted from the water and transferred to the ambient air. Even in the cooling mode the units are very energy efficient as the energy input is only a fraction of the energy extracted from the water.

### **APPLICATIONS**

- Bakeries
- Dairies
- Air conditioning
- Any application where both heating and cooling is required on separate occasions

### **THE HEAT PUMP CONCEPT: FREE ENERGY FROM THE AIR**

Heat pumps are recognized as one of the most economical methods for heating water. Two types of energy sources are utilized to produce the required heat output. The **ENERFLOWER-MT** heat pumps obtain up to 80% of the required energy from the air as free energy. The other source is electrical power, the only component which is paid for.

### **EASY INSTALLATION**

Installation is a simple matter of water pipe connections and power supply. The ER-MT models are designed for outdoor as well as indoor applications. The only requirement is access to external air.

### **NO MAINTENANCE**

**ENERFLOW** heat pumps do not require maintenance as is the case with coal and diesel fired boilers. The units are sealed and designed for trouble free operation. Models ER30 – ER100 are equipped

with automatic fault finding light indicators and in the unlikely event of a malfunction the problem will show clearly enabling even an unskilled person to rectify the problem.

### **HIGH INLET WATER TEMPERATURE**

A unique patented heat exchanger enables **ENERFLOW ER-MT** heat pumps to heat water up to a temperature of 60 °C even when the inlet water temperature is as high as 55 °C. The fact that **ENERFLOW** heat pumps can handle high water inlet temperatures is very advantageous, as it enables water in a storage tank to be heated until the temperature at the bottom of the tank is only 5 °C lower than the maximum temperature at the top of the tank. In so doing the energy storage capacity of the tank is maximized.

### **QUIET OPERATION**

Advanced fans, with airfoil blades and a very low noise level, are used on **ENERFLOW** heat pumps. The fan motors are also protected against moisture and dust.

### **REVERSE CYCLE DEFROST**

Reverse cycle defrost, provided on all models, is the most efficient method for defrosting the air heat exchanger. Defrost is accomplished in a very short time period and any liquid refrigerant formed in the air heat exchanger is evaporated in the water heat exchanger before entering the compressor. This eliminates the possibility of any liquid refrigerant, which can damage the compressor, from entering the compressor.

### **FREE COLD AIR OR HOT AIR**

The by-product of **ENERFLOW ER-MT** heat pumps is cold or hot air which can be used for air-conditioning purposes. The cold or hot air can be ducted to any area of choice.

### **HARD WATER**

In areas where hard water scale (i.e. calcium) builds-up and insulate the inside of heat exchangers and produce such loss of efficiency, **M-Tech Industrial** can install a water softener system. The system, once installed on the hot water heat exchanger, operates silently, automatically and permanently never needing

power, salt or chemicals. The system will dissolve any scale and will also neutralize any acid water.

## TECHNOLOGY

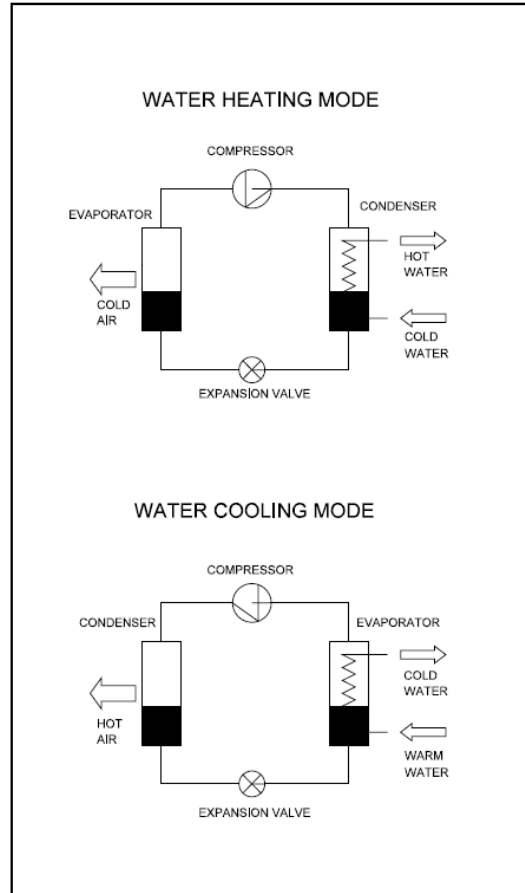
**ENERFLOW ER-MT** reverse cycle heat pumps are the end product of a fine engineering effort piloted by M-Tech Industrial in collaboration with other engineering research institutes. Computer aided design verified by experimental testing supported the project throughout its development and manufacturing phases.

## PRINCIPLE OF OPERATION

**ENERFLOW ER-MT** reverse cycle heat pumps are based on the well known vapour-compression refrigeration cycle, described and illustrated below:

- The refrigerant enters the compressor as vapour at low pressure and temperature.
- It enters the water heat exchanger (in the heating mode) or the air heat exchanger (in the cooling mode) as vapour at a high pressure and temperature.
- The refrigerant is condensed as a result of the heat that is transferred to the water (heating mode) or the air (cooling mode).
- The pressure of the liquid decreases through the expansion valve causing the temperature to drop sharply.
- The liquid at low pressure vaporizes in the air heat exchanger (heating mode) or water heat exchanger (cooling mode) as a result of heat transfer for the air or water.
- The cycle is completed as vapour re-enters the compressor.

## MODES OF OPERATION



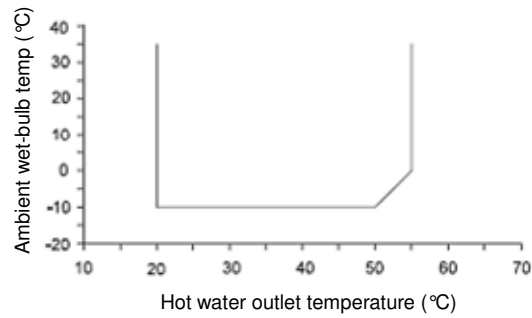
## WARRANTY

M-Tech Industrial warrants this equipment to be free from defects in material and workmanship for a period of 12 months from date of shipment provided the correct water treatment and installation procedures were followed. Any units or part proving defective within this period will be repaired or replaced at our option when returned to our factory, transportation charges pre-paid. M-Tech Industrial will not be responsible for any installation or removal costs.

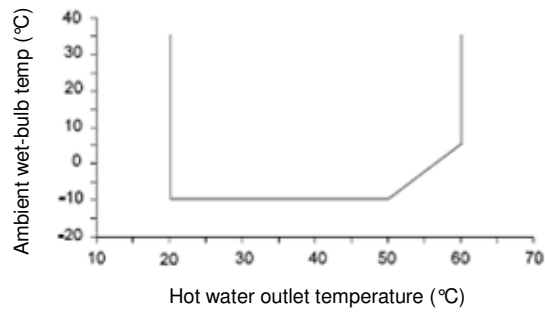
## OPERATING LIMITS

### WATER HEATING MODE

MODELS ER6MT – ER12MT



MODELS ER16MT – ER100MT

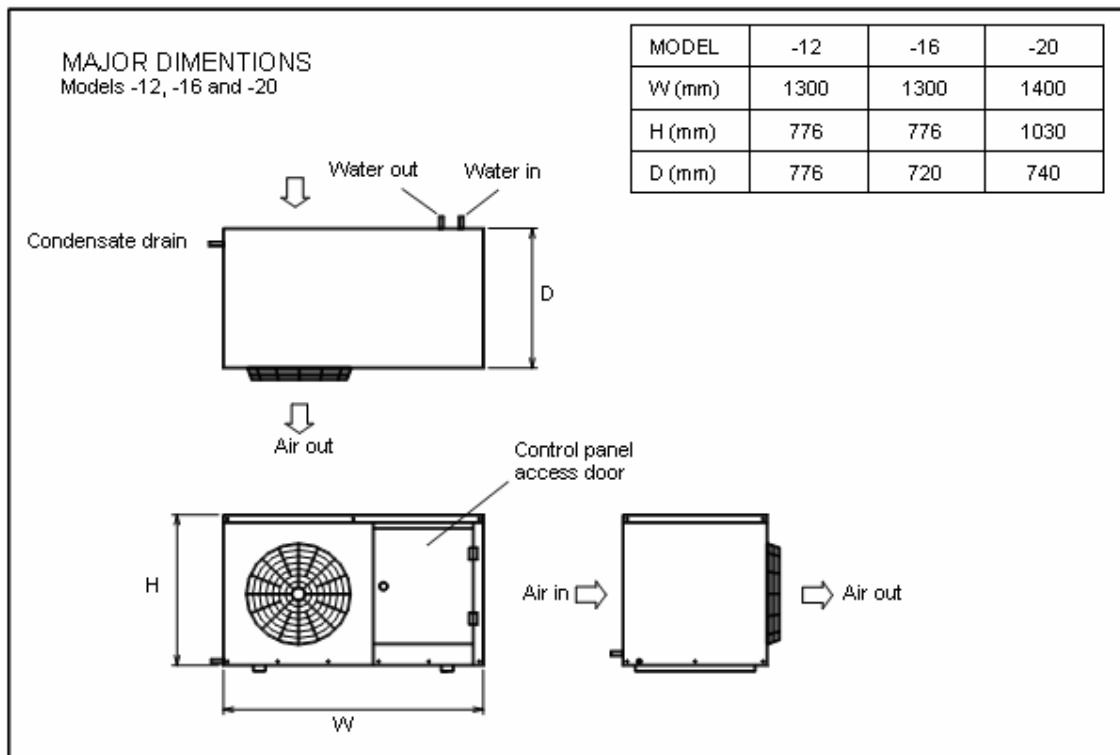
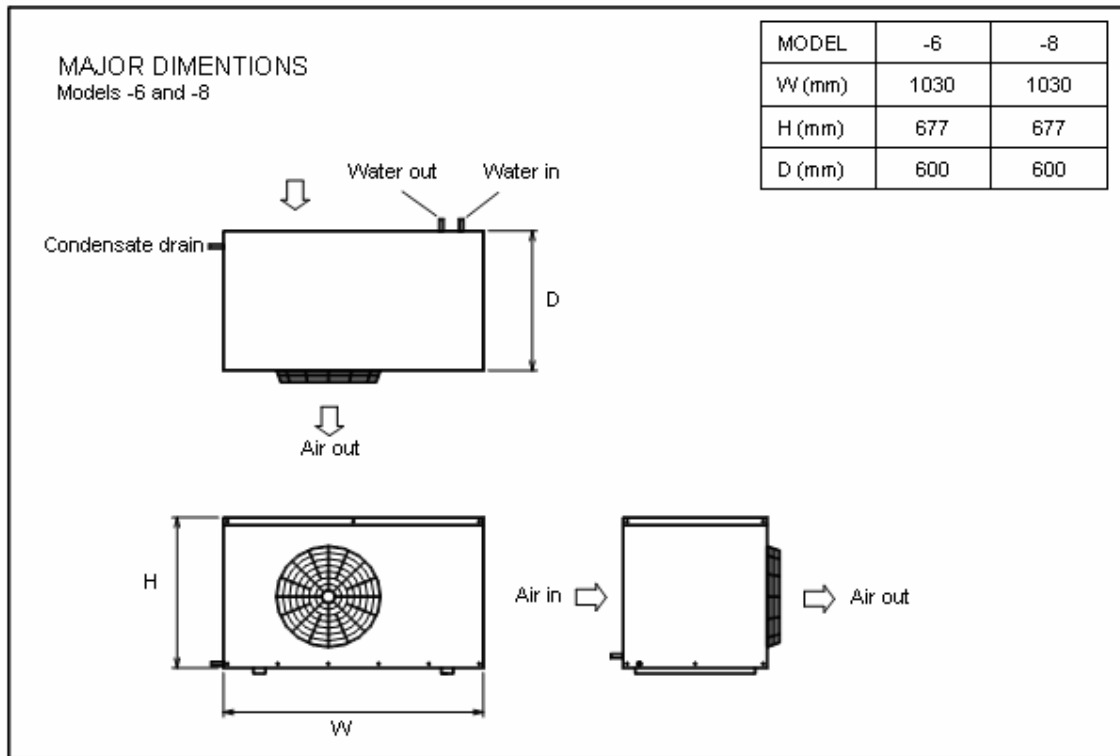


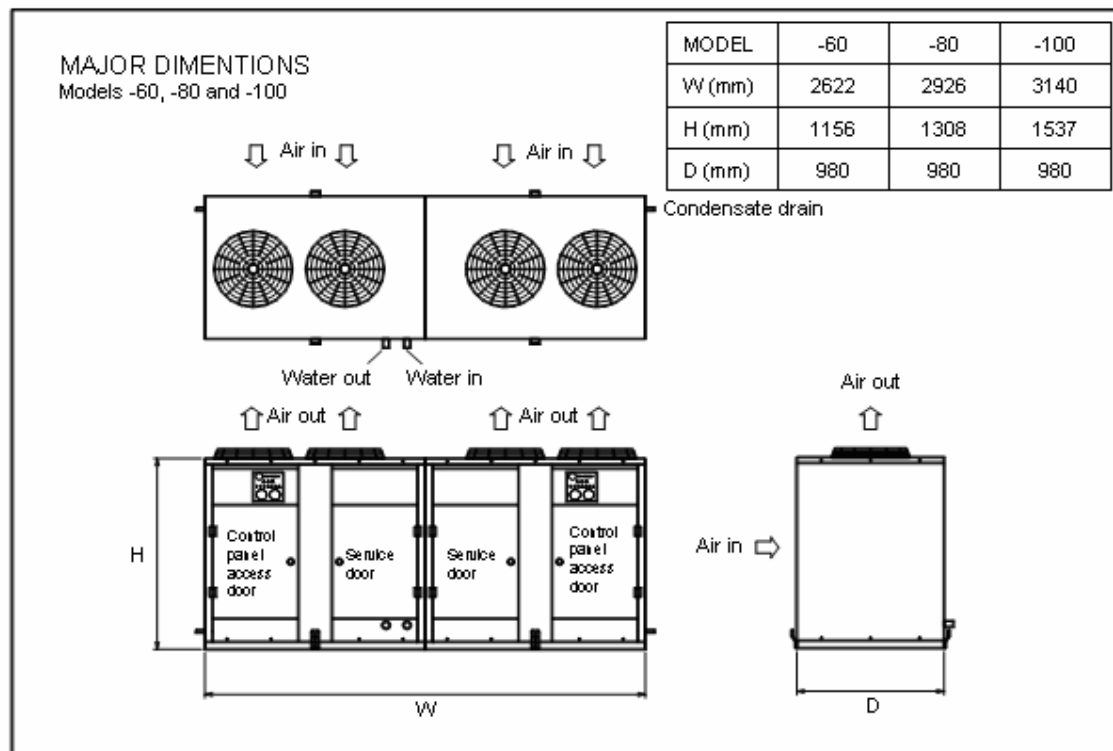
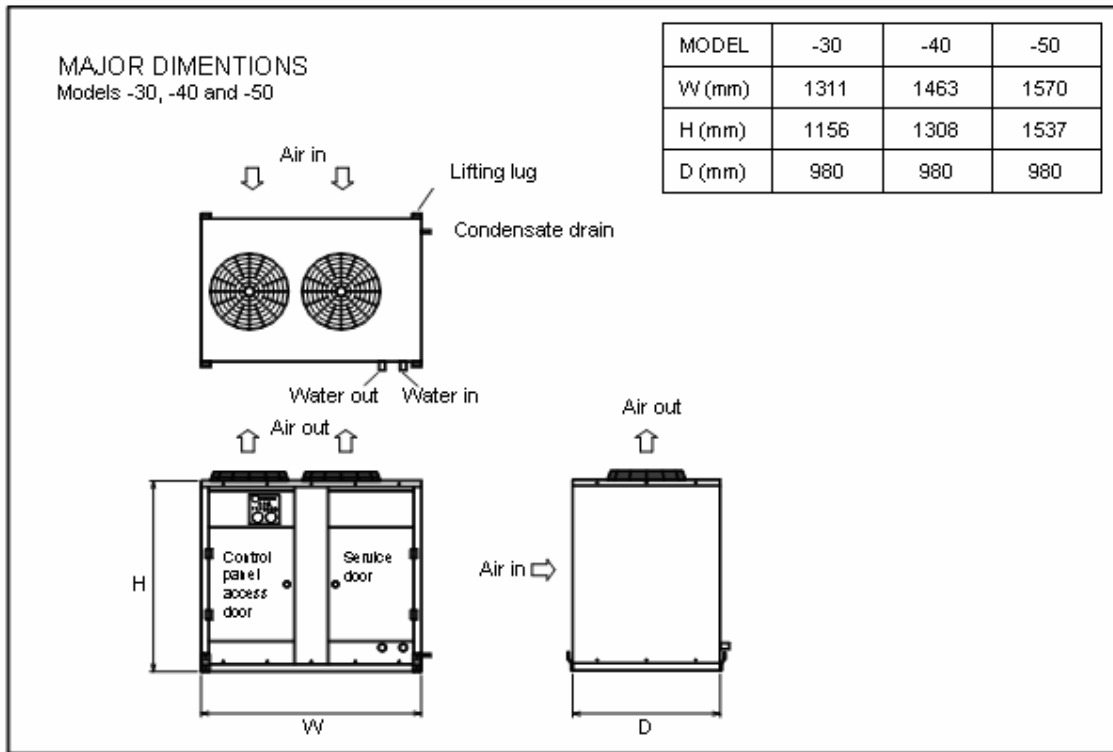
Note: Operating limits are based on a water temperature rise of 5°C

### WATER COOLING MODE

Ambient temperature : Max 42 °C

Cold water outlet temperature : Min 6 °C





**SPECIFICATIONS: ENERFLOW ER-MT HOT WATER HEAT PUMPS**

MODEL		ER6MT	ER8MT	ER12MT	ER16MT	ER20MT	
<b>HEATING CAPACITY</b>		(Water 55°C out, air 15°C WB)					
Heating	kW	5.5	7.0	9.8	13.7	18.3	
Water flow	l/min	15.6	19.8	28.2	39.0	52.2	
COP		3.2	3.2	3.2	3.3	3.3	
<b>COOLING CAPACITY</b>		(15°C in, 10°C out, air 30°C DB)					
Cooling capacity	kW	4.1	5.2	7.3	10.5	14	
Water flow	l/min	11.8	14.9	21	30.1	40.2	
Cooling COP		2.7	2.8	2.9	2.9	2.9	
<b>ELECTRICAL (50 Hz)</b>							
Phases		1	1	1	3	3	
Voltage	Volt	240	240	240	380	380	
Power (Max cont.)	kW	1.9	2.4	3.5	5	6.4	
Current (Max cont.)	Amps	8.6	10.3	16.7	10.3	10.9	
<b>CAPACITY STEPS</b>		100 -0	100 -0	100 -0	100 -0	100 -0	
<b>CASING</b>		Stainless Steel					
Dimension HxWxD	mm	677x1030 x600	677x1030 x600	776x1300 x720	776x1300 x720	1030x1400 x740	
<b>COMPRESSOR</b>		Hermetically sealed reciprocating					
No. of cylinders		2	2	2	4	4	
Displacement 50 Hz	m <sup>3</sup> /h	5.7	7	10	13.6	17.7	
Speed	rpm	2900	2900	2900	2900	2900	
Oil charge	Fl oz	24	36	55	70	70	
Oil type		Caltex Capella WF32					
<b>HEAT EXCHANGER (WATER)</b>		Fluted tube					
<b>HEAT EXCHANGER (AIR)</b>							
(Rows x Columns) x No.		3 x 24 x 1	3 x 24 x 1	3 x 28 x 1	4 x 28 x 1	4 x 36 x 1	
Number of circuits		3	3	4	6	8	
Fin patch	mm	2.5	2.5	2.5	2.5	2.5	
Face area	m <sup>2</sup>	0.28	0.35	0.51	0.51	0.66	
<b>FAN</b>		Axial flow					
Fan speed	rpm	1250	1250	900	1100	1350	
Fan diameter	mm	350	350	500	500	500	
Air flow	m <sup>3</sup> /min	40	44	79	80	122	
Face velocity	m/s	2.4	2.1	2.6	2.6	3.1	
Power input	kW	0.2	0.2	0.32	0.5	0.7	
Noise level	dB 3m	56	56	73	79	83	
<b>REFRIGERANT</b>		R22					
Control		Thermostatic expansion valve					
No. of circuits		1	1	1	1	1	
Charge	kg	2	3	4	5	6	
<b>DEFROSTING METHOD</b>		Reverse cycle (Optional)					
<b>PIPE CONNECTION</b>							
Water inlet/outlet	mm	19.1	19.1	19.1	25.4	25.4	
Drain	mm	12.7	12.7	12.7	19.1	19.1	
<b>MACHINE WEIGHT</b>		kg	120	150	200	250	300

**SPECIFICATIONS: ENERFLOW ER-MT HOT WATER HEAT PUMPS**

MODEL		ER30MT	ER40MT	ER50MT	ER60MT	ER80MT	ER100MT	
<b>HEATING CAPACITY</b>		(Water 55°C out, air 15°C WB)						
Heating	kW	29.1	38.2	48.1	58.2	76.4	96.1	
Water flow	l/min	83.5	109.6	138.0	166.9	219.1	275.6	
COP		3.6	3.7	3.5	3.6	3.7	3.5	
<b>COOLING CAPACITY</b>		(15°C in, 10°C out, air 30°C DB)						
Cooling capacity	kW	21.3	28.2	35.5	42.6	56.5	71	
Water flow	l/min	61.1	81	101.9	122.3	162.2	203.8	
Cooling COP		2.8	2.9	2.8	2.8	2.9	2.8	
<b>ELECTRICAL</b>								
Phases		3	3	3	3	3	3	
Voltage	Volt	380	380	380	380	380	380	
Power (Max cont.)	kW	9.9	12.5	16.4	19.8	25	32.8	
Current (Max cont.)	Amps	20	24.2	35	40	48.4	70	
<b>CAPACITY STEPS</b>		100 – 0	100 – 0	100 – 0	100 – 50 – 0	100 – 50 – 0	100 – 50 – 0	
<b>CASING</b>		Stainless Steel						
Dimension HxWxD	mm	1156x1311 x980	1308x1463 980	1537x1570 x980	1156x2622 x980	1308x2926 x980	1537x3140 x980	
<b>COMPRESSOR</b>		Hermetically sealed reciprocating						
No. of cylinders		4	4	4	4x2	4x2	4x2	
Displacement 50 Hz	m <sup>3</sup> /h	30.9	38.6	46.3	30.9 x 2	38.6 x 2	46.3 x 2	
Speed	rpm	2900	2900	2900	2900	2900	2900	
Oil charge	Fl oz	128	128	128	128 x 2	128 x 2	128 x 2	
Oil type		Caltex Capella WF32						
<b>HEAT EXCHANGER (WATER)</b>		Fluted tube						
<b>HEAT EXCHANGER (AIR)</b>		(Rows x Columns) x No.						
		4 x 39 x 1	4 x 45 x 1	4 x 54 x 1	4 x 39 x 2	4 x 45 x 2	4 x 54 x 2	
Number of circuits		13	15	18	13 x 2	15 x 2	18 x 2	
Fin patch	mm	2.5	2.5	2.5	2.5	2.5	2.5	
Face area	m <sup>2</sup>	0.98	1.31	1.72	0.98 x 2	1.31 x 2	1.72 x 2	
<b>FAN</b>		Axial flow						
Fan speed	rpm	1100	1350	1350	1100	1350	1350	
Fan diameter	mm	500 x 2	500 x 2	500 x 2	500 x 4	500 x 4	500 x 4	
Air flow	m <sup>3</sup> /min	156	241	267	312	482	534	
Face velocity	m/s	2.7	3.1	2.6	2.7	3.1	2.6	
Power input	kW	0.5 x 2	0.7 x 2	0.7 x 2	0.5 x 4	0.7 x 4	0.7 x 4	
Noise level	dB 3m	79	83	83	79	83	83	
<b>REFRIGERANT</b>		R22						
Control		Thermostatic expansion valve						
No. of circuits		1	1	1	2	2	2	
Charge	kg	7	8	9	7 x 2	8 x 2	9 x 2	
<b>DEFROSTING METHOD</b>		Reverse cycle (Optional)						
<b>PIPE CONNECTION</b>								
Water inlet/outlet	mm	31.8	38.1	38.1	38.1	50.8	50.8	
Drain	mm	19.1	19.1	19.1	19.1	19.1	19.1	
<b>MACHINE WEIGHT</b>		kg	350	400	450	700	800	900

**HEATING CAPACITY: WATER HEATING MODE (ER6MT - ER20MT)**

Q = Heat output (kW)

P = Power input, including fan, excluding pump (kW )

COP = Coefficient of performance (Q/P)

Twat = Hot water outlet temperature (°C)

Twb = Ambient air wet-bulb temperature (°C)

Hot water outlet temperature is 5°C higher than inlet temperature

UNIT	Twat→	40			45			50			55			60		
	Twb	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP
ER6MT	-5.0	2.9	1.2	2.5	2.8	1.2	2.3	2.6	1.2	2.1	2.5	1.3	2.0	2.4	1.3	1.9
	0.0	3.6	1.3	2.8	3.5	1.3	2.6	3.3	1.4	2.4	3.2	1.4	2.3	3.0	1.4	2.1
	5.0	4.4	1.4	3.2	4.2	1.4	3.0	4.0	1.5	2.7	3.9	1.5	2.5	3.7	1.6	2.3
	10.0	5.2	1.4	3.6	5.0	1.5	3.3	4.8	1.6	3.1	4.6	1.6	2.8	4.4	1.7	2.6
	15.0	6.1	1.5	4.0	5.9	1.6	3.7	5.7	1.7	3.4	5.5	1.7	3.1	5.2	1.8	2.9
	20.0	7.1	1.6	4.5	6.9	1.7	4.1	6.6	1.8	3.8	6.4	1.9	3.4	6.1	2.0	3.1
ER8MT	-5.0	3.6	1.5	2.4	3.4	1.5	2.2	3.3	1.6	2.1	3.1	1.6	2.0	3.0	1.6	1.8
	0.0	4.5	1.6	2.8	4.4	1.7	2.6	4.2	1.7	2.4	4.0	1.8	2.3	3.8	1.8	2.1
	5.0	5.5	1.7	3.2	5.3	1.8	3.0	5.1	1.9	2.8	4.9	1.9	2.6	4.7	2.0	2.4
	10.0	6.6	1.8	3.7	6.4	1.9	3.4	6.1	2.0	3.1	5.9	2.1	2.9	5.7	2.1	2.7
	15.0	7.7	1.9	4.1	7.5	2.0	3.8	7.2	2.1	3.5	7.0	2.2	3.2	6.7	2.3	2.9
	20.0	9.1	2.0	4.6	8.8	2.1	4.2	8.5	2.2	3.9	8.2	2.3	3.5	7.9	2.4	3.3
ER12MT	-5.0	4.9	2.1	2.4	4.7	2.1	2.2	4.5	2.2	2.1	4.4	2.2	2.0	4.2	2.3	1.9
	0.0	6.2	2.2	2.8	6.0	2.3	2.6	5.8	2.4	2.4	5.6	2.5	2.3	5.3	2.5	2.1
	5.0	7.5	2.4	3.1	7.3	2.5	2.9	7.1	2.6	2.7	6.8	2.7	2.5	6.6	2.8	2.4
	10.0	8.9	2.5	3.5	8.7	2.6	3.3	8.4	2.8	3.0	8.2	2.9	2.8	8.0	3.0	2.6
	15.0	10.5	2.6	4.0	10.2	2.8	3.7	10.0	3.0	3.4	9.7	3.1	3.1	9.5	3.3	2.9
	20.0	12.3	2.8	4.4	12.0	3.0	4.1	11.7	3.1	3.7	11.4	3.3	3.4	11.1	3.5	3.2
ER16MT	-5.0	7.1	2.6	2.7	6.6	2.7	2.5	6.0	2.6	2.3	5.4	2.6	2.1	5.0	2.6	1.9
	0.0	8.9	2.9	3.0	8.5	3.0	2.8	7.9	3.1	2.6	7.4	3.1	2.4	6.8	3.1	2.2
	5.0	10.8	3.2	3.4	10.3	3.3	3.1	9.8	3.4	2.9	9.3	3.5	2.6	8.8	3.6	2.4
	10.0	12.9	3.5	3.7	12.4	3.6	3.4	11.9	3.8	3.2	11.3	3.9	2.9	10.8	4.0	2.7
	15.0	15.2	3.7	4.1	14.7	3.9	3.8	14.1	4.1	3.5	13.5	4.3	3.2	12.9	4.4	2.9
	20.0	17.7	3.9	4.5	17.2	4.2	4.1	16.6	4.4	3.8	16.0	4.6	3.5	15.3	4.8	3.2
ER20MT	-5.0	9.6	3.5	2.7	8.9	3.5	2.5	8.2	3.5	2.4	7.6	3.5	2.2	7.1	3.5	2.0
	0.0	11.9	3.9	3.1	11.4	4.0	2.9	10.7	4.0	2.7	10.0	4.1	2.5	9.4	4.1	2.3
	5.0	14.3	4.2	3.4	13.8	4.4	3.1	13.2	4.5	2.9	12.5	4.6	2.7	11.8	4.7	2.5
	10.0	17.0	4.6	3.7	16.4	4.8	3.5	15.8	4.9	3.2	15.1	5.1	3.0	14.4	5.2	2.7
	15.0	20.0	4.9	4.1	19.4	5.1	3.8	18.7	5.4	3.5	18.0	5.6	3.2	17.2	5.8	3.0
	20.0	23.4	5.2	4.5	22.6	5.5	4.1	21.9	5.8	3.8	21.1	6.0	3.5	20.3	6.3	3.2

**HEATING CAPACITY: WATER HEATING MODE (ER30MT - ER 100MT)**

Q = Heat output (kW)

P = Power input, including fan, excluding pump (kW )

COP = Coefficient of performance (Q/P)

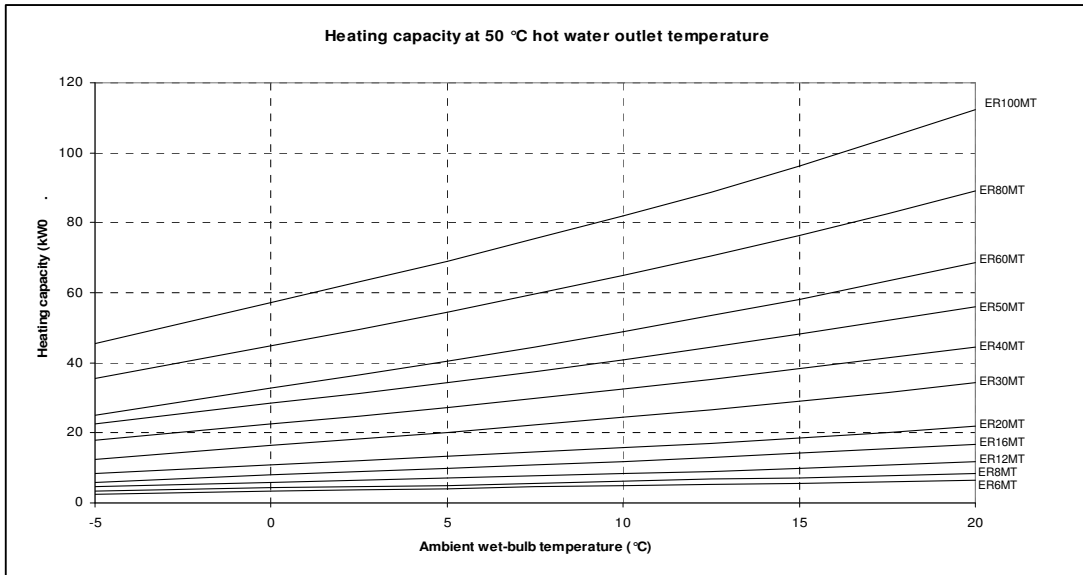
Twat = Hot water outlet temperature (°C)

Twb = Ambient air wet-bulb temperature (°C)

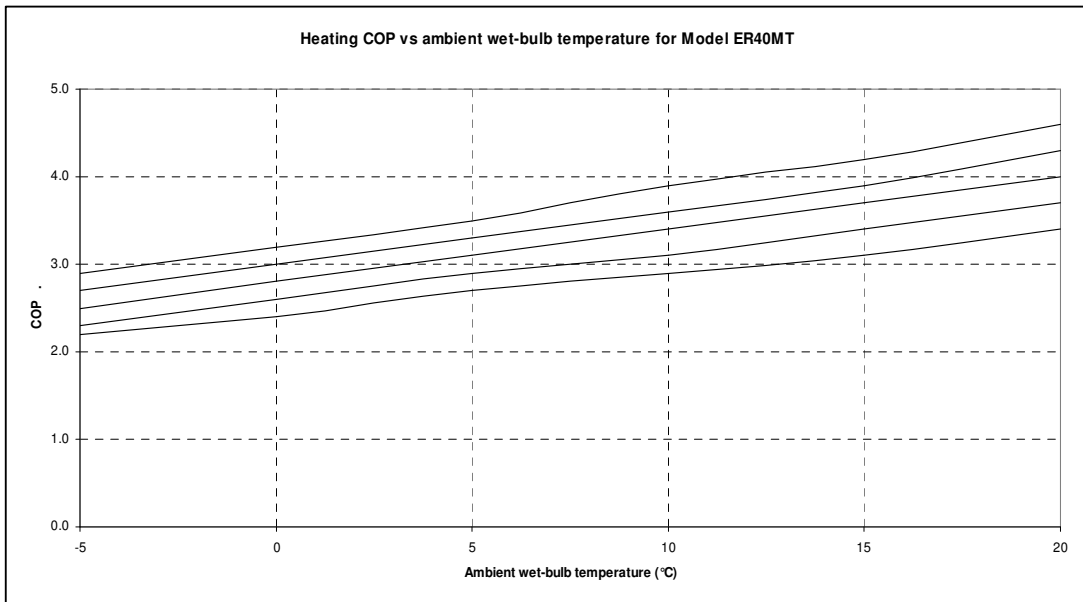
Hot water outlet temperature is 5°C higher than inlet temperature

UNIT	Twat→	40			45			50			55			60		
	Twb	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP
ER30MT	-5.0	14.6	5.2	2.8	13.6	5.3	2.6	12.5	5.3	2.4	11.5	5.2	2.2	10.5	5.1	2.0
	0.0	18.3	5.8	3.1	17.4	6.0	2.9	16.4	6.1	2.7	15.3	6.1	2.5	14.1	6.1	2.3
	5.0	22.2	6.4	3.5	21.2	6.6	3.2	20.2	6.8	3.0	19.1	6.9	2.8	17.9	7.0	2.5
	10.0	26.6	6.9	3.8	25.5	7.2	3.5	24.4	7.5	3.3	23.2	7.7	3.0	22.0	7.9	2.8
	15.0	31.6	7.5	4.2	30.3	7.8	3.9	29.1	8.1	3.6	27.8	8.5	3.3	26.4	8.7	3.0
	20.0	37.2	8.1	4.6	35.8	8.5	4.2	34.3	8.8	3.9	32.8	9.2	3.6	31.3	9.6	3.3
ER40MT	-5.0	20.1	6.9	2.9	19.0	7.1	2.7	17.8	7.1	2.5	16.5	7.1	2.3	15.4	7.1	2.2
	0.0	24.7	7.7	3.2	23.6	7.9	3.0	22.5	8.0	2.8	21.3	8.2	2.6	19.9	8.2	2.4
	5.0	29.4	8.3	3.5	28.4	8.6	3.3	27.2	8.8	3.1	26.0	9.1	2.9	24.7	9.3	2.7
	10.0	34.8	9.0	3.9	33.7	9.3	3.6	32.4	9.6	3.4	31.1	10.0	3.1	29.7	10.2	2.9
	15.0	40.8	9.6	4.2	39.5	10.0	3.9	38.2	10.4	3.7	36.7	10.8	3.4	35.2	11.2	3.1
	20.0	47.7	10.3	4.6	46.2	10.8	4.3	44.6	11.2	4.0	43.0	11.7	3.7	41.3	12.2	3.4
ER50MT	-5.0	25.4	9.0	2.8	24.2	9.2	2.6	22.7	9.3	2.4	21.3	9.3	2.3	19.8	9.3	2.1
	0.0	31.2	10.0	3.1	30.0	10.3	2.9	28.6	10.5	2.7	27.1	10.7	2.5	25.4	10.8	2.4
	5.0	37.2	10.9	3.4	35.8	11.2	3.2	34.4	11.6	3.0	32.9	11.9	2.8	31.3	12.1	2.6
	10.0	43.9	11.7	3.7	42.4	12.2	3.5	40.9	12.6	3.2	39.3	13.0	3.0	37.5	13.4	2.8
	15.0	51.4	12.6	4.1	49.8	13.1	3.8	48.1	13.7	3.5	46.2	14.2	3.3	44.3	14.6	3.0
	20.0	60.0	13.6	4.4	58.1	14.2	4.1	56.1	14.8	3.8	54.1	15.4	3.5	51.9	15.9	3.3
ER60MT	-5.0	29.1	10.4	2.8	27.2	10.5	2.6	25.1	10.5	2.4	22.9	10.4	2.2	20.9	10.3	2.0
	0.0	36.7	11.6	3.1	34.8	11.9	2.9	32.8	12.1	2.7	30.6	12.3	2.5	28.2	12.3	2.3
	5.0	44.4	12.8	3.5	42.5	13.2	3.2	40.4	13.5	3.0	38.2	13.8	2.8	35.8	14.1	2.5
	10.0	53.3	13.9	3.8	51.1	14.4	3.5	48.9	14.9	3.3	46.5	15.4	3.0	44.0	15.8	2.8
	15.0	63.1	15.0	4.2	60.7	15.6	3.9	58.2	16.3	3.6	55.5	16.9	3.3	52.8	17.5	3.0
	20.0	74.3	16.1	4.6	71.6	16.9	4.2	68.6	17.7	3.9	65.7	18.4	3.6	62.6	19.2	3.3
ER80MT	-5.0	40.1	13.9	2.9	38.0	14.1	2.7	35.5	14.2	2.5	33.1	14.2	2.3	30.8	14.2	2.2
	0.0	49.3	15.3	3.2	47.2	15.7	3.0	45.0	16.1	2.8	42.5	16.3	2.6	39.8	16.4	2.4
	5.0	58.8	16.6	3.5	56.7	17.2	3.3	54.4	17.7	3.1	51.9	18.1	2.9	49.3	18.5	2.7
	10.0	69.6	17.9	3.9	67.3	18.6	3.6	64.8	19.3	3.4	62.3	19.9	3.1	59.5	20.5	2.9
	15.0	81.6	19.2	4.2	79.0	20.1	3.9	76.4	20.9	3.7	73.5	21.6	3.4	70.4	22.4	3.1
	20.0	95.3	20.6	4.6	92.3	21.5	4.3	89.2	22.5	4.0	86.0	23.4	3.7	82.6	24.3	3.4
ER100MT	-5.0	50.9	18.1	2.8	48.3	18.4	2.6	45.4	18.6	2.4	42.5	18.6	2.3	39.7	18.6	2.1
	0.0	62.4	20.0	3.1	59.9	20.5	2.9	57.2	21.0	2.7	54.2	21.3	2.5	50.9	21.5	2.4
	5.0	74.3	21.7	3.4	71.7	22.4	3.2	68.9	23.2	3.0	65.9	23.7	2.8	62.6	24.2	2.6
	10.0	87.8	23.4	3.7	84.9	24.4	3.5	81.9	25.3	3.2	78.5	26.0	3.0	75.1	26.8	2.8
	15.0	102.8	25.2	4.1	99.6	26.3	3.8	96.1	27.4	3.5	92.4	28.3	3.3	88.6	29.3	3.0
	20.0	120.1	27.1	4.4	116.2	28.3	4.1	112.2	29.5	3.8	108.2	30.7	3.5	103.8	31.8	3.3

## ER-MT Series: Water heating mode



## ER-MT Series: Water heating mode



**COOLING CAPACITY: WATER COOLING MODE (ER6MT - ER 20MT)**

Q = Cooling capacity (kW)

P = Power input, including fan, excluding pump (kW )

COP = Coefficient of performance (Q/P)

Twat = Chilled water outlet temperature (°C)

Tamb = Ambient air dry-bulb temperature (°C)

Chilled water outlet temperature is 5°C lower than inlet temperature

UNIT	Tamb→	20.0			25.0			30.0			35.0			40.0		
	Twat	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP
ER6MT	-5.0	2.5	1.1	2.3	2.4	1.2	2.0	2.2	1.2	1.8	2.0	1.2	1.6	1.8	1.3	1.4
	0.0	3.2	1.2	2.7	3.0	1.3	2.4	2.8	1.3	2.1	2.6	1.4	1.9	2.4	1.4	1.7
	5.0	3.9	1.3	3.1	3.6	1.3	2.7	3.4	1.4	2.4	3.2	1.5	2.2	2.9	1.5	1.9
	10.0	4.7	1.3	3.5	4.4	1.4	3.1	4.1	1.5	2.7	3.8	1.6	2.5	3.6	1.6	2.2
	15.0	5.5	1.4	3.8	5.2	1.5	3.4	4.9	1.6	3.1	4.6	1.7	2.7	4.3	1.7	2.4
	20.0	6.4	1.5	4.2	6.1	1.6	3.8	5.7	1.7	3.4	5.4	1.8	3.0	5.0	1.9	2.7
ER8MT	-5.0	3.2	1.4	2.3	3.0	1.4	2.1	2.7	1.5	1.8	2.5	1.6	1.6	2.3	1.6	1.4
	0.0	3.9	1.5	2.7	3.7	1.5	2.4	3.5	1.6	2.1	3.2	1.7	1.9	3.0	1.7	1.7
	5.0	4.9	1.6	3.1	4.6	1.6	2.8	4.3	1.7	2.5	4.0	1.8	2.2	3.7	1.9	2.0
	10.0	5.9	1.6	3.6	5.5	1.8	3.2	5.2	1.8	2.8	4.9	1.9	2.5	4.6	2.0	2.3
	15.0	7.0	1.7	4.0	6.6	1.9	3.5	6.2	2.0	3.2	5.9	2.1	2.8	5.5	2.2	2.5
	20.0	8.2	1.9	4.4	7.8	2.0	3.9	7.3	2.1	3.5	6.9	2.2	3.1	6.5	2.3	2.8
ER12MT	-5.0	4.4	1.9	2.3	4.1	2.0	2.1	3.8	2.1	1.9	3.6	2.1	1.7	3.3	2.2	1.5
	0.0	5.5	2.0	2.7	5.1	2.1	2.4	4.8	2.2	2.2	4.5	2.3	2.0	4.2	2.4	1.8
	5.0	6.7	2.1	3.2	6.3	2.2	2.8	6.0	2.4	2.5	5.6	2.5	2.3	5.3	2.6	2.0
	10.0	8.1	2.2	3.6	7.7	2.4	3.2	7.3	2.5	2.9	6.9	2.7	2.6	6.5	2.8	2.3
	15.0	9.7	2.4	4.0	9.2	2.5	3.6	8.7	2.7	3.2	8.2	2.9	2.9	7.8	3.0	2.6
	20.0	11.4	2.5	4.5	10.8	2.7	4.0	10.3	2.9	3.6	9.8	3.1	3.2	9.2	3.3	2.8
ER16MT	-5.0	6.8	2.6	2.6	6.2	2.7	2.3	5.7	2.7	2.1	5.2	2.8	1.9	4.7	2.8	1.6
	0.0	8.3	2.8	3.0	7.7	2.9	2.6	7.2	3.1	2.3	6.6	3.1	2.1	6.0	3.2	1.9
	5.0	10.1	3.1	3.3	9.4	3.2	2.9	8.8	3.3	2.6	8.1	3.5	2.3	7.5	3.6	2.1
	10.0	12.0	3.3	3.6	11.3	3.5	3.2	10.5	3.7	2.9	9.8	3.8	2.6	9.1	3.9	2.3
	15.0	14.0	3.6	3.9	13.2	3.8	3.5	12.4	4.0	3.1	11.6	4.2	2.8	10.8	4.3	2.5
	20.0	16.3	3.9	4.2	15.4	4.1	3.7	14.5	4.3	3.3	13.6	4.5	3.0	12.7	4.8	2.7
ER20MT	-5.0	9.0	3.4	2.6	8.4	3.5	2.4	7.7	3.6	2.1	7.1	3.7	1.9	6.5	3.7	1.7
	0.0	11.0	3.7	3.0	10.3	3.9	2.7	9.6	4.0	2.4	8.9	4.1	2.2	8.2	4.2	1.9
	5.0	13.2	4.0	3.3	12.4	4.2	3.0	11.7	4.4	2.7	10.9	4.5	2.4	10.1	4.7	2.2
	10.0	15.7	4.4	3.6	14.8	4.6	3.2	14.0	4.8	2.9	13.1	5.0	2.6	12.2	5.1	2.4
	15.0	18.4	4.7	3.9	17.4	5.0	3.5	16.4	5.2	3.2	15.4	5.4	2.9	14.4	5.6	2.6
	20.0	21.3	5.1	4.2	20.2	5.4	3.8	19.1	5.6	3.4	18.0	5.9	3.1	16.9	6.1	2.7

## COOLING CAPACITY: WATER COOLING MODE (ER30MT – ER100MT)

Q = Cooling capacity (kW)

P = Power input, including fan, excluding pump (kW)

COP = Coefficient of performance (Q/P)

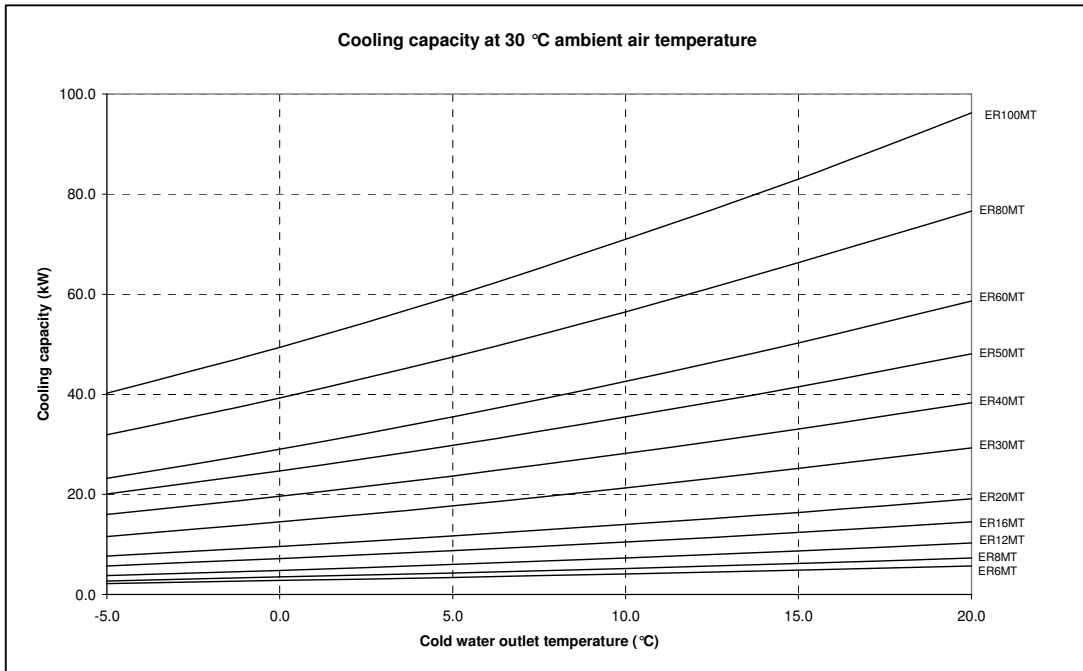
Twat = Chilled water outlet temperature (°C)

Tamb = Ambient air dry-bulb temperature (°C)

Chilled water outlet temperature is 5°C lower than inlet temperature

UNIT	Tamb→	20.0			25.0			30.0			35.0			40.0		
	Twat	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP
ER30MT	-5.0	13.6	5.2	2.6	12.6	5.4	2.3	11.6	5.5	2.1	10.5	5.6	1.9	9.5	5.6	1.7
	0.0	16.8	5.8	2.9	15.6	6.0	2.6	14.5	6.2	2.4	13.3	6.3	2.1	12.2	6.4	1.9
	5.0	20.4	6.4	3.2	19.1	6.6	2.9	17.7	6.8	2.6	16.4	7.0	2.3	15.1	7.2	2.1
	10.0	24.4	7.0	3.5	22.9	7.3	3.1	21.3	7.5	2.8	19.9	7.7	2.6	18.3	8.0	2.3
	15.0	28.5	7.7	3.7	26.9	8.0	3.4	25.2	8.3	3.0	23.4	8.5	2.7	21.8	8.8	2.5
	20.0	33.1	8.4	4.0	31.2	8.7	3.6	29.3	9.1	3.2	27.3	9.4	2.9	25.4	9.7	2.6
ER40MT	-5.0	18.4	6.8	2.7	17.2	7.1	2.4	16.0	7.3	2.2	14.7	7.4	2.0	13.5	7.5	1.8
	0.0	22.3	7.5	3.0	21.0	7.8	2.7	19.6	8.0	2.4	18.3	8.2	2.2	16.9	8.4	2.0
	5.0	26.8	8.2	3.3	25.2	8.5	3.0	23.7	8.8	2.7	22.2	9.1	2.5	20.7	9.3	2.2
	10.0	31.7	8.9	3.6	30.0	9.3	3.2	28.2	9.6	2.9	26.5	9.9	2.7	24.8	10.2	2.4
	15.0	37.0	9.7	3.8	35.1	10.1	3.5	33.1	10.5	3.2	31.2	10.8	2.9	29.2	11.2	2.6
	20.0	42.6	10.5	4.1	40.5	11.0	3.7	38.3	11.4	3.4	36.1	11.8	3.0	33.9	12.3	2.8
ER50MT	-5.0	23.0	8.8	2.6	21.6	9.2	2.4	20.1	9.4	2.1	18.6	9.6	1.9	17.1	9.8	1.7
	0.0	28.0	9.7	2.9	26.3	10.1	2.6	24.7	10.4	2.4	23.0	10.7	2.2	21.3	10.9	1.9
	5.0	33.6	10.6	3.2	31.7	11.1	2.9	29.8	11.5	2.6	27.9	11.8	2.4	26.0	12.2	2.1
	10.0	39.8	11.6	3.4	37.7	12.1	3.1	35.5	12.5	2.8	33.3	12.9	2.6	31.1	13.3	2.3
	15.0	46.4	12.6	3.7	44.0	13.2	3.3	41.5	13.6	3.0	39.1	14.1	2.8	36.6	14.6	2.5
	20.0	53.6	13.8	3.9	50.9	14.4	3.5	48.1	14.9	3.2	45.3	15.5	2.9	42.4	16.0	2.7
ER60MT	-5.0	27.2	10.5	2.6	25.2	10.8	2.3	23.2	11.0	2.1	21.1	11.2	1.9	18.9	11.2	1.7
	0.0	33.6	11.6	2.9	31.3	12.0	2.6	29.0	12.3	2.4	26.7	12.6	2.1	24.4	12.8	1.9
	5.0	40.8	12.7	3.2	38.2	13.2	2.9	35.5	13.6	2.6	32.9	14.0	2.3	30.2	14.3	2.1
	10.0	48.8	14.0	3.5	45.7	14.5	3.1	42.6	15.0	2.8	39.7	15.5	2.6	36.7	15.9	2.3
	15.0	57.1	15.3	3.7	53.8	15.9	3.4	50.3	16.5	3.0	46.9	17.1	2.7	43.5	17.6	2.5
	20.0	66.2	16.8	4.0	62.4	17.5	3.6	58.6	18.1	3.2	54.7	18.8	2.9	50.8	19.5	2.6
ER80MT	-5.0	36.7	13.6	2.7	34.3	14.1	2.4	31.9	14.5	2.2	29.5	14.8	2.0	26.9	15.0	1.8
	0.0	44.6	15.0	3.0	41.9	15.5	2.7	39.3	16.0	2.4	36.6	16.5	2.2	33.8	16.8	2.0
	5.0	53.5	16.4	3.3	50.5	17.0	3.0	47.5	17.6	2.7	44.5	18.1	2.5	41.4	18.6	2.2
	10.0	63.4	17.8	3.6	59.9	18.5	3.2	56.5	19.2	2.9	53.0	19.9	2.7	49.6	20.4	2.4
	15.0	74.0	19.4	3.8	70.1	20.2	3.5	66.3	20.9	3.2	62.4	21.7	2.9	58.4	22.4	2.6
	20.0	85.3	21.1	4.1	81.0	21.9	3.7	76.6	22.8	3.4	72.2	23.7	3.0	67.8	24.5	2.8
ER100MT	-5.0	45.9	17.7	2.6	43.1	18.3	2.4	40.2	18.9	2.1	37.2	19.3	1.9	34.2	19.6	1.7
	0.0	55.9	19.4	2.9	52.7	20.2	2.6	49.4	20.9	2.4	46.1	21.4	2.2	42.7	21.9	1.9
	5.0	67.2	21.3	3.2	63.5	22.1	2.9	59.6	22.9	2.6	55.7	23.6	2.4	51.9	24.3	2.1
	10.0	79.5	23.2	3.4	75.3	24.1	3.1	71.0	25.0	2.8	66.6	25.9	2.6	62.2	26.6	2.3
	15.0	92.8	25.3	3.7	88.0	26.3	3.3	83.0	27.3	3.0	78.1	28.3	2.8	73.1	29.2	2.5
	20.0	107.3	27.5	3.9	101.8	28.7	3.5	96.2	29.8	3.2	90.6	30.9	2.9	84.9	32.0	2.7

## ER-MT Series: Water cooling mode



## ER-MT Series: Water cooling mode

