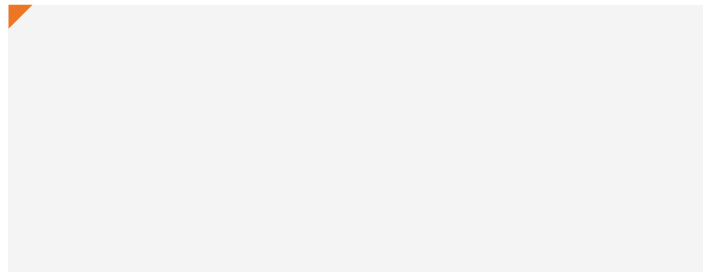


TOWER IQ - COOLING TOWER PACKAGE

1-40 HP (208–230VAC), 1-150HP (380~480 VAC), 3Ø
 Dual Rated for Constant and Variable Torque
 Integrated PID Control



Special Instructions:



FEATURES

- Integrates with an existing automation system or temperature control option for standalone application
 Scalable options to meet any application
 Adequately sized to add other options including spray pump, basin heater control, line reactors, and other critical features.
- FCS P-Series HVAC drive for optimum performance
 Space-vector control for clean sinewave output for efficiency and enhanced motor life
 Automatic energy savings mode
 Dual PID controls. Primary for maintaining temperature, pressure, etc., additional for secondary PID control of external device.
 32 character LCD for easy set up and parameter display.
 Standard kWh metering of energy usage to optimize control
- Multiple PID set points
 Programmable and selectable for maintaining pressure or temperature during different seasons or operating conditions

- Integrated HOA and 3-Contactor Bypass Standard
 Integrated HOA and status indications for simplified operation
 VFD isolating three contactor bypass with disconnect options standard
- Single source control reduces components, increases reliability
 Wide range of options available.
 One connection point for power

Optional Features

- Temperature control option provides complete stand alone operation
 Ideal for retrofit
 Start/stop sequencing for fans, dampers, and spray pumps
 Provides analog output to vary speed of drive
 Accepts direct input from RTD type sensor or thermocouple
 Adjustments for set-points and hysteresis

ORDERING AND SIZING CHARTS

Cooling Tower Control - 3-Phase, 200~230V

HP	FLA	UL Type 3R	3% Line Reactor	Disconnect	Contactor
2	24	CTP3-BYP005-P2/3	VFD-KDRB22L	UTE100ENU FTU 15A	MRC-12B
3	24	CTP3-BYP007-P2/3	VFD-KDRB23L	UTE100ENU FTU 30A	MRC-12B
5	24	CTP3-BYP005-P2/3	VFD-KDRB22L	UTE100ENU FTU 40A	MRC-18B
7.5	24	CTP3-BYP007-P2/3	VFD-KDRB23L	UTE100ENU FTU 50A	MRC-32A
10	32	CTP3-BYP010-P2/3	VFD-KDRD25L	UTE100ENU FTU 60A	MRC-40A
15	46	CTP3-BYP015-P2/3	VFD-KDRD24L	UTE100ENU FTU 100A	MRC-50LA
20	60	CTP3-BYP020-P2/3	VFD-KDRD26L	UTS150NNU FTU 125A	MRC-65LA
25	74	CTP3-BYP025-P2/3	VFD-KDRD22L	UTS150NNU FTU 150A	MRC-85LA
30	88	CTP3-BYP030-P2/3	VFD-KDRD24L	UTS250NNU FTU 175A	MRC-100LA
40	115	CTP3-BYP040-P2/3	VFD-KDRD25L	UTS250NNU FTU 250A	MRC-130LA

Cooling Tower Control - 3-Phase, 380~480V

HP	FLA	UL Type 3R	3% Line Reactor	Output Reactor	Disconnect	Contactor
2	12	CTP3-BYP002-P4/3	VFD-KDRA3L	VFD-KDRA3P	UTE100ENU FTU 15A	MRC-9B
3	12	CTP3-BYP003-P4/3	VFD-KDRA4L	VFD-KDRA4P	UTE100ENU FTU 15A	MRC-9B
5	12	CTP3-BYP005-P4/3	VFD-KDRA3L	VFD-KDRA3P	UTE100ENU FTU 15A	MRC-12B
7.5	12	CTP3-BYP007-P4/3	VFD-KDRA4L	VFD-KDRA4P	UTE100ENU FTU 30A	MRC-12B
10	16	CTP3-BYP010-P4/3	VFD-KDRA5L	VFD-KDRB1P	UTE100ENU FTU 30A	MRC-18B
15	24	CTP3-BYP015-P4/3	VFD-KDRB2L	VFD-KDRD1P	UTE100ENU FTU 50A	MRC-32A
20	30	CTP3-BYP020-P4/3	VFD-KDRB1L	VFD-KDRD2P	UTE100ENU FTU 60A	MRC-32A
25	39	CTP3-BYP025-P4/3	VFD-KDRD1L	VFD-KDRD3P	UTE100ENU FTU 80A	MRC-40A
30	45	CTP3-BYP030-P4/3	VFD-KDRD2L	VFD-KDRD4P	UTE100ENU FTU 100A	MRC-50LA
40	61	CTP3-BYP040-P4/3	VFD-KDRC1L	VFD-KDRC1L	UTS150NNU FTU 125A	MRC-65LA
50	75	CTP3-BYP050-P4/3	VFD-KDRF2L	VFD-KDRF2L	UTS150NNU FTU 150A	MRC-75LA
60	91	CTP3-BYP060-P4/3	VFD-KDRF4L	VFD-KDRF4L	UTS250NNU FTU 175A	MRC-85LA
75	110	CTP3-BYP075-P4/3	VFD-KDRF3L	VFD-KDRF3L	TS250NU ATU 250 200A	MRC-130LA

Cooling Tower Options

Basin Heater Contactor

kW			Max Amps	Basin Heater
208V	230V	480V		
3/4	3/4	2	2.5	CTP-9/HI-2.5
1	1.5	3	4.0	CTP-9/HI-4
2	2	4	6.0	CTP-9/HI-6
2.5	3	6	8.0	CTP-9/HI-8
3	3.5	8	10.0	CTP-18/HI-10
4	5	10	13.0	CTP-18/HI-13
6	6.5	14	17.0	CTP-18/HI-17
7.5	8.5	18	22.0	CTP-32/HI-22
9	10	21	26.0	CTP-32/HI-26
11	12	26	32.0	CTP-32/HI-32

Spray Pump Starter

3 Phase HP			Spray Pump
208V	230V	460V	
1/2	1/2	1	CTP-9/H-2.5
3/4	3/4	2	CTP-9/H-4
1	1.5	3	CTP-9/H-6
2	2	5	CTP-9/H-8
2	3	5	CTP-18/H-10
3	3	7.5	CTP-18/H-13
3	5	10	CTP-18/H-17
5	7.5	15	CTP-32/H-22
7.5	7.5	15	CTP-32/H-26
7.5	10	20	CTP-32/H-32

Panel Options

Part Number	Description
CTP-RPL*	Run Pilot Light (Green Standard)
CTP-BPL*	Bypass Pilot Light (Amber Standard)
CTP-FPL*	Fault Pilot Light (Red Standard)
CTP-OFF*	Off Pilot Light (Red Standard)
CTP-TC	Temperature Controller
CTP-3TC	3-Stage Temperature Controller
CTP-60HTR	60W Panel Space Heater
CTP-150HTR	150W Panel Space Heater
CTP-250HTR	250W Panel Space Heater
CTP-MHTR	Motor Heater
TIGA1B00	Immersion Temperature Sensor, 2.5"

* Select 24V or 120V based on package control voltage.
For UL Type 1 select 24V. For UL Type 3R & 12 select 120V.

Specification Table

Tower IQ Specifications

Protective Functions	
Alarm	Alarm Stall, Overload, Temperature sensor fault
Trip	Overvoltage, Undervoltage, Overcurrent, Inverter overheat, Motor overheat, I/O phase loss, Fuse open, Ground fault, External fault 1, 2, Option fault, Overload, Speed command loss, Hardware fault, Communication error, etc.
Input / Output Voltage	3 phase 200 – 230V (-15%,+10%) 50 -60Hz, 3 phase 480V (-15%,+10%) 50 -60Hz
Power Rating	7.5 HP to 400 HP
Efficiency	> 95%
Control Input	0-10 VDC, 4-20 mA, keypad, or digital input from communication card
Communication Options	BACnet, Modbus, LonWorks, N2, or RS485
Environmental	Package: UL Type 3R for outdoor or UL Type 12: Ambient temperature up to 110°F; UL type indoor humidity up to 90%RH non-condensing. Drive: Ambient temperature up to 122°F
Programmable I/O	8 digital inputs, 4 digital outputs, 2 analog outputs
Options	
Spray Pump Starter	1 HP to 20 HP (output voltage matches panel main voltage)
Basin Heater	4 kW to 25 kW (output voltage matches panel main voltage)
De-Icer	Digital input for fan reverse

P-Drive Specifications

Output ratings	Voltage (V)	Three phase, 200~230V, Three phase, 380~480V
	Frequency (Hz)	0~120Hz
Input ratings	Voltage (V)	Three phase, 200~230V (-15%, +10%), Three phase, 380~480V (-15%, +10%)
	Frequency (Hz)	50~60Hz (±5%)
	Input Power Factor	<.98 from no load to full load
Operation	Drive Efficiency	>96%
	Control method	V/F control, Sensorless vector control
	Frequency setting resolution	Digital reference: 0.01Hz (below 99Hz) & 0.1Hz (100Hz and over); Analog reference: 0.06Hz at 60Hz
	Frequency setting accuracy	Digital: 0.01% of maximum output frequency; Analog: 0.1% of maximum output frequency
	V/F ratio	Linear, Square, User V/F
	Overload capacity	1 minute at 120%, 10 seconds at 150% (with inverse characteristic proportional to time)
	Torque boost	Auto, Manual (0~15%)
	Multi-function input terminals	Total 8 inputs (programmable)
	Analog output	0~10V linear
	Input signal	Operator control
Frequency setting		Analog: 0~10V, 4~20mA, additional port for Sub-Board (0~10V); Digital: Keypad, Communication
Start signal		Forward, Reverse
Multi-step operation		Setting up to 17 speeds (using multi-function terminal)
Multi-step accel/decel time		0.1~6000 seconds. Maximum 8 pre-defined steps using multi-function terminals
Operational functions		DC braking, Frequency limit, Frequency jump, Second motor function, Slip compensation, Reverse rotation prevention, Auto restart, Inverter bypass, Auto-tuning, Dual PID control
Emergency stop		Stops output from inverter
Auto operation		Operates from internal sequence by setting multi-function terminal (5 way x 8 step)
Jog		Digital input programmable to jog frequency
Fault reset	Resets fault signal when protective function is active	
Output signal	Operational status	Frequency detection, Overload alarm, Stall, Overvoltage, Undervoltage, Inverter overheat, Run, Stop, Constant speed, Speed search, Fault output, Inverter bypass, Auto-operation sequence
	Indicator	Output frequency, Output current, Output voltage, DC voltage, Output torque (output voltage: 0~10V)
Protective functions	Trip	Overvoltage, Undervoltage, Overcurrent, Inverter overheat, Motor overheat, I/O phase loss, Fuse open, Ground fault, External fault 1, 2, Option fault, Overload, Speed command loss, Hardware fault, Communication error, etc.
	Alarm	Stall, Overload Temperature sensor fault
Operating environment	Ambient temperature	-10~40° C (50° C when derated 20%) or 14~104° F (122° F when derated 20%)
	Storage temperature	-20~65° C or -4~149.5° F
	Humidity	Less than 95% Relative Humidity maximum (non-condensing)
	Vibration	Below 5.9m ² /sec (=0.6g)
	Altitude	Below 1,000m (3,300ft): Derate VFD by 10% for every additional 1,000m
	Application site	Pollution degree 2. No corrosive gas, combustible gas, oil mist or dust



SUBMITTED EQUIPMENT SCHEDULE

Package #1

Qty	Tower IQ Model	HP	Voltage	Configuration	Enclosure
Qty	Basin Heater Contactor (Optional)	kW			
Qty	Spray Pump Starter (Optional)	HP			

CTP-TC - Optional Temp. Controller
CTP-3TC - 3-Stage Temp. Controller
CTP-XXHTR - Panel Heater
CTP-MHTR - Motor Heater
VFD-KDRXXL - 3% Line Reactor
VFD-KDRXXP - 3% Output Reactor
TIGA1B00 - Immersion Temperature Sensor

Package #2

Qty	Tower IQ Model	HP	Voltage	Configuration	Enclosure
Qty	Basin Heater Contactor (Optional)	kW			
Qty	Spray Pump Starter (Optional)	HP			

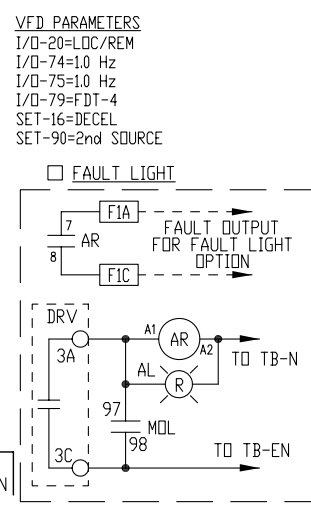
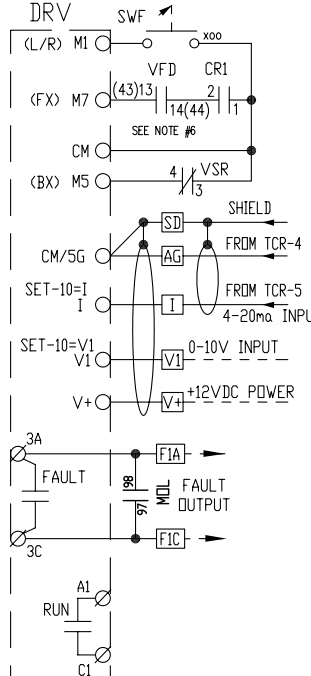
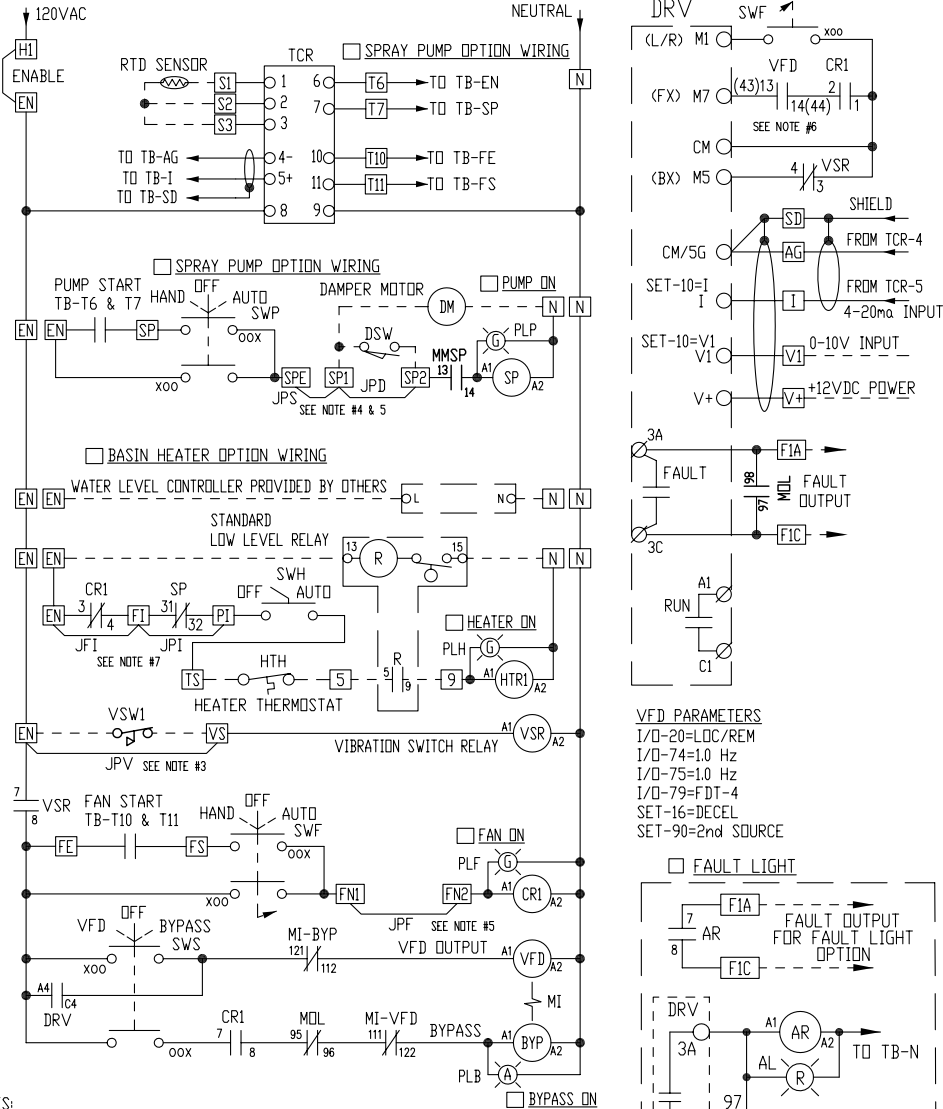
CTP-TC - Optional Temp. Controller
CTP-3TC - 3-Stage Temp. Controller
CTP-XXHTR - Panel Heater
CTP-MHTR - Motor Heater
VFD-KDRXXL - 3% Line Reactor
VFD-KDRXXP - 3% Output Reactor
TIGA1B00 - Immersion Temperature Sensor

Package #3

Qty	Tower IQ Model	HP	Voltage	Configuration	Enclosure
Qty	Basin Heater Contactor (Optional)	kW			
Qty	Spray Pump Starter (Optional)	HP			

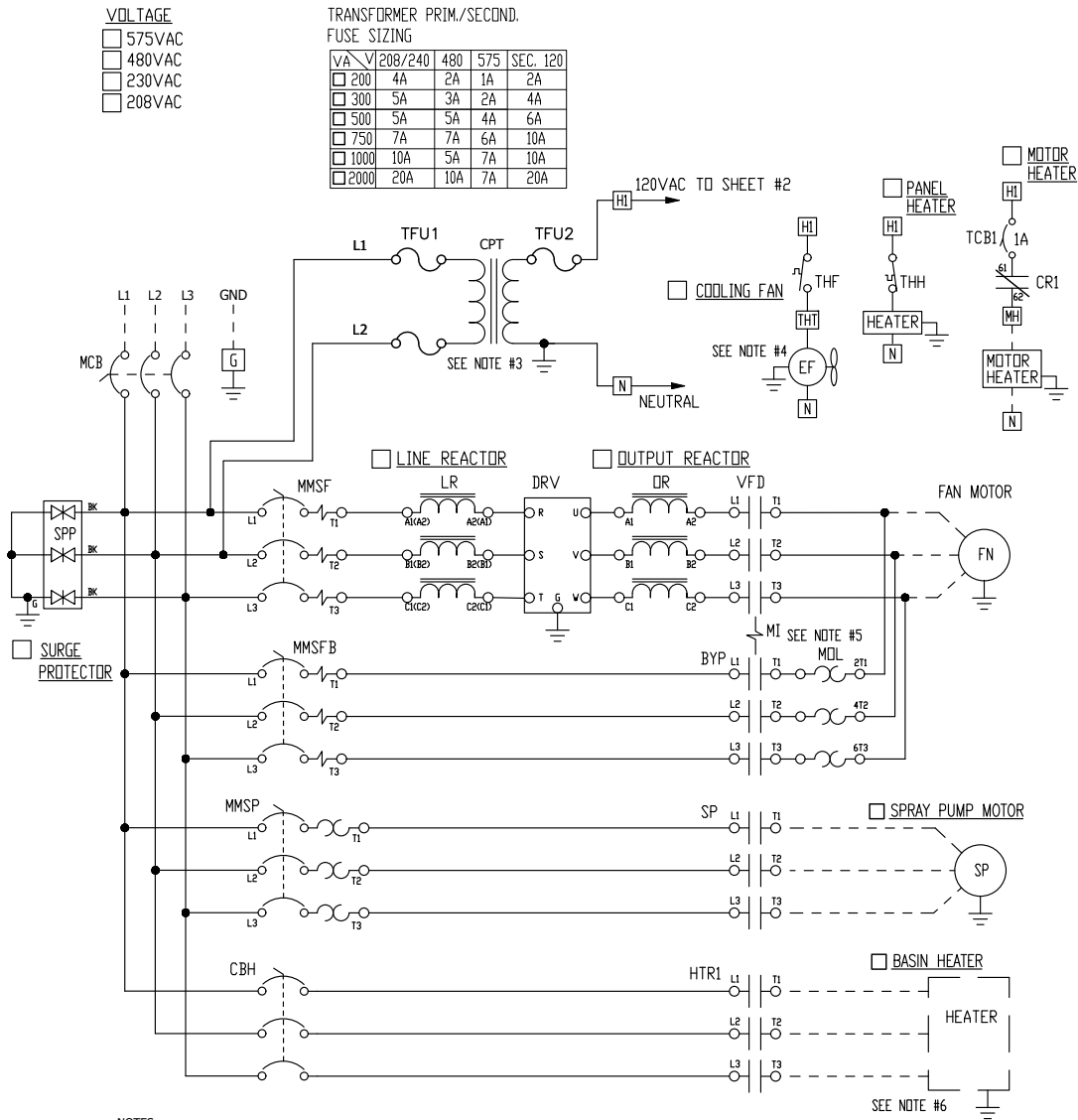
CTP-TC - Optional Temp. Controller
CTP-3TC - 3-Stage Temp. Controller
CTP-XXHTR - Panel Heater
CTP-MHTR - Motor Heater
VFD-KDRXXL - 3% Line Reactor
VFD-KDRXXP - 3% Output Reactor
TIGA1B00 - Immersion Temperature Sensor

CONTROL POWER CIRCUITS



- NOTES:
1. DASHED LINE INDICATES A FIELD WIRING
 2. CHECKED BOX INDICATES A SELECTED OPTION
 3. REMOVE JUMPER JPV IF VIBRATION SWITCH IS USED
 4. REMOVE JUMPER JPD IF DAMPER LIMIT SWITCH IS USED
 5. REMOVE JUMPERS JPS & JPI IF INTERLOCKS ARE USED
 6. AUX. CONTACT *43, 44 & 31, 32* ARE USED FOR CONTACTORS SIZE 22 OR BELOW & *13, 14 & 21, 22* ARE USED FOR CONTACTORS SIZE 32 OR ABOVE
 7. REMOVE JUMPER JFI IF FAN/BASIN HEATER INTERLOCK IS USED.
REMOVE JUMPER JPI IF SPRAY PUMP/BASIN HEATER INTERLOCK IS USED AND OPTION SPRAY PUMP IS ORDERED.

MAIN POWER CIRCUITS



- NOTES:**
1. DASHED LINE INDICATES A FIELD WIRING
 2. CHECKED BOX INDICATES A SELECTED OPTION
 3. SET TRANSFORMER JUMPERS TO PROPER VOLTAGE
 4. NUMBER OF COOLING FANS DEPEND ON ENCLOSURE SIZE
 5. "MI" IS A MECHANICAL INTERLOCK FOR BYP AND VFD CONTACTORS
 6. CONNECT BASIN HEATERS IN PARALLEL IF MORE THAN ONE INSTALLED, NOT TO EXCEED DESIGN KW RATING

COMPONENT SPECIFICATIONS

The following section details the various components' sizing and ratings. To locate your component part numbers for the EMS reference the sizing information table above.

THREE POLE CONTACTORS



3-POLE CONTACTOR SPECIFICATIONS

Type				MRC-9A	MRC-12B	MRC-18B	MRC-22B	MRC-32LA	MRC-40LA
Frame Size				22AF				40AF	
Terminal Type				Screw				Screw	
Number of poles				3 pole				3 pole	
Rated operation voltage, Ue				690V				690V	
Rated insulation voltage, Ui				690V				1000V	
Rated frequency				50/60Hz				50/60Hz	
Rated impulse withstand voltage, Uimp				6kV				8kV	
Max. operating rate in operating cycles per hour (AC3)				1800 operations per hour				1800 operations per hour	
Durability	Mechanical			15 mil. operations				12 mil. operations	
	Electrical			2.5 mil. operations				2 mil. operations	
Current and power	AC-1, Thermal current	A		25	25	40	40	50	60
		200/240V	kW	2.5	3.5	4.5	5.5	7.5	11
		A		11	13	18	22	32	40
		380/440V	kW	4	5.5	7.5	11	15	18.5
	AC-3	A		9	12	18	22	32	40
		500/550V	kW	4	7.5	7.5	15	18.5	22
		A		7	12	13	20	28	32
		690V	kW	4	7.5	7.5	15	18.5	22
A		6	9	9	18	20	23		
UL rating (50/60Hz)	Continuous current		A	25	25	32	32	50	60
	Single Phase	110~120V	HP	0.5	0.75	1	2	2	3
		220~240V	HP	1.5	2	3	3	5	7.5
	Three Phase	200~208V	HP	2	3	5	7.5	7.5	15
		220~240V	HP	3	5	7.5	7.5	10	15
		440~480V	HP	5	7.5	10	10	20	30
		550~600V	HP	7.5	10	15	15	25	30
NEMA size			00	—	0	—	1	—	
Size and weight	MRC	Weight	lbs	0.73 lbs				0.88 lbs	
		Size (WxHxD)	in	1.77 x 2.89 x 3.39 in				1.77 x 3.27 x 3.54 in	
	MRD	Weight	lbs	1.12 lbs				2.65 lbs	
		Size (WxHxD)	in	1.77 x 2.89 x 4.63 in				1.77 x 3.27 x 4.61 in	
Auxiliary (standard)				1NO & 1NC				1NO & 1NC	
Auxiliary	Side mount			MA-1				MA-1	
	Front mount			CA-2, CA-4				CA-2, CA-4	



*Minimum conduct current of auxiliary contactor is DC 17V 5mA
 **10A max, Not motor duty rated.



3-POLE CONTACTOR SPECIFICATIONS (CONT.)

Type				MRC-50LA		MRC-65LA	MRC-75LA	MRC-85LA	MRC-100LA	MRC-130LA
Frame Size				40AF			100AF			150AF
Terminal Type				Screw			Lug			Lug
Number of poles				3 pole			3 pole			3 pole
Rated operation voltage, Ue				690V			690V			690V
Rated insulation voltage, Ui				1000V			1000V			1000V
Rated frequency				50/60Hz			50/60Hz			50/60Hz
Rated impulse withstand voltage, Uimp				8kV			6kV			8kV
Max. operating rate in operating cycles per hour (AC3)				1800 operations per hour			1800 operations per hour			1800 operations per hour
Durability	Mechanical			12 mil. operations			12 mil. operations			5 mil. operations
	Electrical			2 mil. operations			2 mil. operations			1 mil. operations
Current and power	AC-1, Thermal current		A	70	100	110	135	160	160	
	AC-3	200/240V	kW	15	18.5	22	25	30	37	
			A	55	65	75	85	105	130	
		380/440V	kW	22	30	37	45	55	60	
			A	50	65	75	85	105	130	
	500/550V	kW	30	33	37	45	55	60		
		A	43	60	64	75	85	90		
	690V	kW	30	33	37	45	45	55		
A		28	35	42	45	65	60			
UL rating (50/60Hz)	Continuous current		A	70	100	110	135	160	160	
	Single Phase	110~120V	HP	3	5	5	7.5	10	10	
		220~240V	HP	10	15	15	15	20	20	
	Three Phase	200~208V	HP	20	25	25	30	30	40	
		220~240V	HP	25	30	30	40	40	40	
		440~4 80V	HP	40	50	50	60	75	5	
	550~600V	HP	50	60	60	75	75	75		
NEMA size			2	—	—	3	—	—		
Size and weight	MRC	Weight	lbs	1.98 lbs			3.53 lbs			5.29 lbs
		Size (WxHxD)	in	2.17 x 4.17 x 4.69 in			2.76 x 5.51 x 5.35 in			
	MRD	Weight	lbs	2.65 lbs			5.73 lbs			3.74 x 622 x 5.13 in
		Size (WxHxD)	in	2.17 x 4.17 x 5.76 in			2.76 x 5.51 x 6.78 in			
Auxiliary (standard)							1NO & 1NC			1NO & 1NC
Auxiliary	Side mount			MA-1			MA-1			MA-1
	Front mount			CA-2, CA-4			CA-2, CA-4			CA-2, CA-4

COMPONENT SPECIFICATIONS

The following section details the various components' sizing and ratings. To locate your component part numbers for the EMS reference the sizing information table above.

UTS CIRCUIT BREAKER

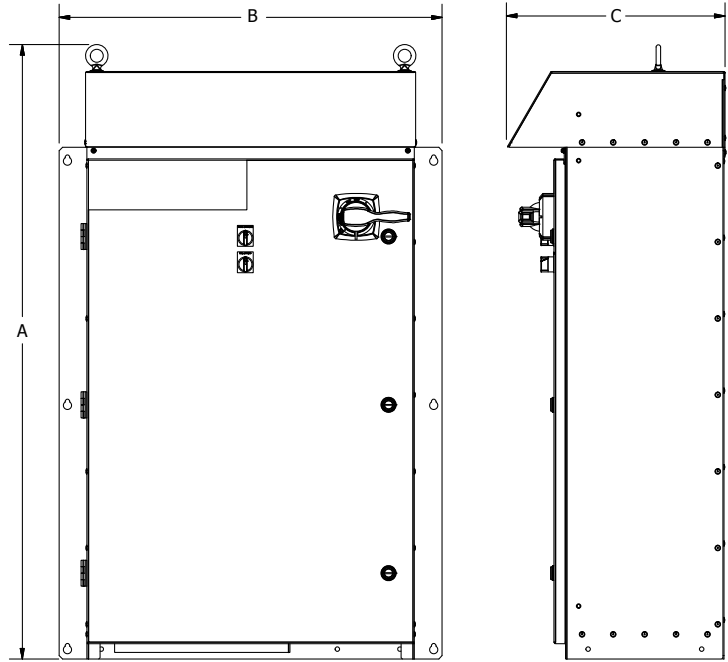


MOLDED CASE CIRCUIT BREAKER SPECIFICATIONS

UTE/S Series (FMU)		UTE15-100		UTS250	
Frame size		100AF		250AF	
Rated current In	A	15, 20, 30, 40, 50, 60, 70, 80, 100		128-160, 160-200, 200-250	
Number of poles		3		3	
Rated operational voltage, Ue A	V	600		600	
UL interrupting rating	kA	NU		NU	
AC 50/60Hz	120V	50		—	
	240V	50		65	
	480V	25		35	
	600V	—		18	
Reference standard	UL489		UL489		
Available breaker types		Fixed thermal, fixed magnetic, FTU		—	
		—		Adjustable-thermal, fixed-magnetic, FMU	
Accessories		—		—	
		AX - Auxiliary switch		AX - Auxiliary switch	
		AL - Alarm switch		AL - Alarm switch	
		SHT - Shunt trip		SHT - Shunt trip	
		UVT - Undervoltage trip		UVT - Undervoltage trip	
		EHU - Extended rotary handle		EHU - Extended rotary handle	
		FH - Flange handle		FH - Flange handle	
		PL, PHL - Locking devices (removable, fixed)		PL, PHL - Locking devices (removable, fixed)	
	MIT - Mechanical interlock device		MIT - Mechanical interlock device		
Weight 3-pole lbs (kg)		2.33lbs (1.06kg)		4.49lbs (2.04kg)	
Basic dimension, WxHxD 3-Pole		2.99 x 5.12 x 3.44in (76 x 130 x 87.5mm)		4.13 x 7.48 x 3.44in (105 x 190 x 87.5mm)	

COOLING TOWER PANEL DIMENSIONS

NEMA 3R Enclosure	H x W x D, (A x B x C)
CTP3-BYP002-P2/3- CTP3-BYP007-P2/3	36.5" x 26" x 16.5"
CTP3-BYP002-P4/3- CTP3-BYP007-P4/3	36.5" x 26" x 16.5"
CTP3-BYP010-P2/3- CTP3-BYP020-P2/3	41.5" x 29" x 16.56"
CTP3-BYP010-P4/3- CTP3-BYP020-P4/3	41.5" x 29" x 16.56"
CTP3-BYP025-P2/3 CTP3-BYP025-P4/3	46.5" x 29" x 16.56"
CTP3-BYP030-P2/3- CTP3-BYP040-P2/3	51.5" x 34" x 20.6"
CTP3-BYP030-P4/3- CTP3-BYP060-P4/3	51.5" x 34" x 20.6"
CTP3-BYP040-P2/3 CTP3-BYP075-P4/3	56.5" x 39" x 20.6"



TEMPERATURE CONTROL OPTION



Standard Temperature Control Features

- **Advanced Control Functions**
 PID Plus Self Tuning; PID Plus Fuzzy Control; Autotuning
- **NEMA 4X Faceplate with Large LED Display**
 4-digit, red and green display
 Waterproof faceplate conforms to NEMA-4X/IP66
- **Multiple Inputs**
 Choose between thermocouple/RTD and 4-20mA/0-5V inputs
- **Single or Dual Control Outputs**
 Relay, SSR driver or 4-20mA
- **Ramp/Soak Function**
 Up to 16 ramp/soak segments or two 8-segment patterns, a standard feature
- **Programmable Alarms Option**
 2 programmable SPST relays with On/Off delay function
 Remote Setpoint Option
 Change setpoint with a 1-5V signal
- **Analog Retransmission Option**
 4-20mA retransmission of PV, SV, MV, DV Digital Input Option
 Change between 2 setpoints; Change between ramp/soak and standby; Start/reset the ramp/soak; Start/stop the auto tuning; Cancel the alarm latch; Start the incorporated timer
- **Timer Function**
 On-delay or off-delay timer activated with digital input; Up to 2 timer outputs can be obtained
- **Heater Burnout Alarm Option**
 If heater burns out, alarm goes off