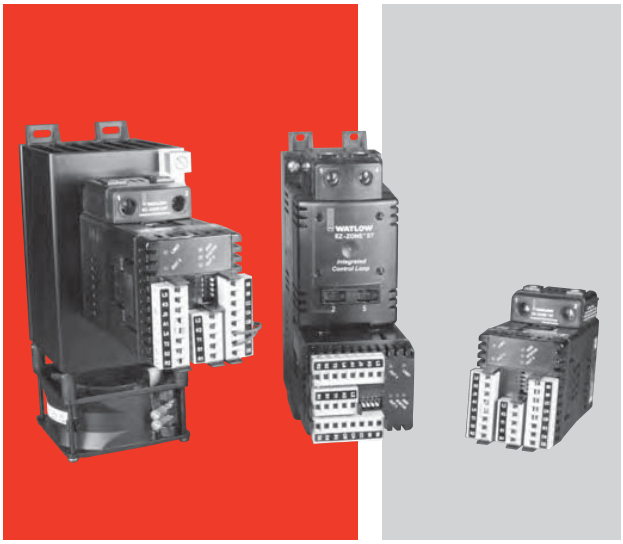
Integrated Multi-Function

EZ-ZONE ST

The EZ-ZONE ST integrated solid state controller from Watlow offers a complete thermal system control solution in a single package. Features include a PID temperature controller connected to a high-amperage solid state relay with the option of adding a properly sized heat sink, an over- and under-temperature limit, a power shut-down contactor and digital communications in one complete and professionally engineered product.

Because the system is modular and scalable, a user only pays for what is needed. Stacking the EZ-ZONE ST integrated controller into multiple configurations enables flexibility to standardize the product platform to solve a wide range of application needs.

This integrated controller also includes 200KA short circuit current rating (SCCR) tested up to 480VAC to minimize damage in the event of a short circuit when used with required fusing.



Features and Benefits

Back panel or DIN-rail mount
- Provides several mounting options

Compact package
- Reduces panel size

Touch-safe package
- Complies with IP2X increasing user safety

±0.1 percent temperature accuracy
- Provides efficient and accurate temperature control

200KA SCCR with proper fusing
- Minimizes damage in the event of a short circuit

Agency approvals: UL®, CSA, CE, RoHS, W.E.E.E.
- Meets applications requiring agency approvals

Three-year warranty
- Ensures Watlow's reliability and product support

Off-the-shelf designed system solution
- Improves system reliability and termination reduction
- Reduces installation cost
- Eliminates incompatibility headaches often encountered with using many different components and brands

Profile capability
- Includes ramp and soak with four files and 40 total steps

Ability to communicate with programmable logic controller (PLC), personal computer (PC) or operator interface terminal (OIT)
- Optional EIA 485 Modbus® RTU
- RUI/communications gateway with optional EIA 232/485 Modbus® RTU, EtherNet/IP™/TCP Modbus®, DeviceNet™ or PROFIBUS DP. Refer to page 351 for further information.

Solid state relay output
- Allows faster cycling, more precise control, increased heater life and improves energy efficiency
- Ability to handle up to 75 amperes
- Uses either zero-cross or phase angle control modes for flexibility to control resistive loads such as nichrome, tungsten or quartz lamps
- Utilizes phase angle control mode to prevent load failure or blowing fuses for tungsten or quartz loads

PID temperature control
- Allows single input/dual output
- Allows standard PID or adaptive TRU-TUNE+ tuning algorithms for demanding controllability requirements

Optional temperature limit
- Increases safety in over- and under-temperature conditions

Optional definite purpose mechanical contactor
- Enables circuit safety shut down driven by limit control or PID alarm output signal

Optional current monitoring feature
- Detects heater current flow and alarm indication of failed solid state relay (SSR) or heater zone

Optional SSR heat sink
- Sized and engineered for specific applications
- Factory supplied heat sink is UL® listed

System diagnostics
- Provides continuous self-monitoring alerts when there is any system trouble to reduce maintenance and service costs

PC Software—EZ-ZONE Configurator
- Wizard style configuration of controller settings
- On-line or off-line recipe editing

EZ-ZONE ST

Specifications

Line Voltage/Power
- 100 to 240VAC, +10/-15%; (85-264VAC), 50/60Hz, ±5%
- 24VAC/VDC, +10/-15%; 50/60Hz, ±5%
- 12VA max. power consumption without mechanical contactor in system
- 50VA max. power consumption with mechanical contactor used in system, 140VA if using external contactor
- Data retention upon power failure via nonvolatile memory

Environment
- 0 to 158°F (-18 to 70°C) operating temperature
- -40 to 185°F (-40 to 85°C) storage temperature
- 0 to 90% RH, non-condensing

Accuracy
- Calibration accuracy and sensor conformity: ±0.1% of span, ±1°C @ the calibrated ambient temperature and rated line voltage
  - Types R, S, B: 0.2%
  - Type T below -50°C: 0.2%
- Calibration ambient temperature @ 77°F ±5°F (25°C ±3°C)
- Accuracy span: 1000°F (540°C) min.
- Temperature stability: ±0.1°F/°F (±0.1°C/°C) rise in ambient max.

Agency Approvals
- UL®, CSA, CE (zero cross models only), RoHS, W.E.E.E.
- Limit version features FM approval

Controller
- Microprocessor based user-selectable control modes
- PID module: single universal input, 2 outputs
- Limit module: single universal input, 2 outputs
- Two total additional digital input/outputs shared between PID and limit functions
- Control sampling rates: input = 10Hz, outputs = 10Hz
- Isolated EIA 485 Modbus® RTU serial communications

Wiring Termination—Touch Safe Terminals
- Input, power and controller output terminals touch safe removable 12 to 22 AWG
- Power load terminals 6 to 12 AWG
  - Tightening torque: 30 in.-lbs

Universal Input
- Thermocouple, grounded or ungrounded sensors
  - >20MΩ input impedance
  - Max. of 20Ω source resistance
- RTD 2- or 3-wire, platinum, 100Ω and 1000Ω @ 0°C calibration to DIN curve (0.00385Ω/Ω/°C)
- Process, 0-20mA @ 100Ω, or 0-10VDC @ 20kΩ input impedance; scalable, 0-50mV
- Inverse scaling

Digital Input
- Update rate: 1Hz
- Dry contact or dc voltage
  DC voltage
  - Max. input: 36V at 3mA
  - Min. high state: 3V at 0.25mA
  - Max. low state: 2V

  Dry contact
  - Max. short circuit: 13mA
  - Min. open resistance: 500Ω
  - Max. closed resistance: 100Ω

Current Measurement
- Accuracy: typical ±1A, max. error ±3A
- Accuracy and operating range: 0 to 75A

Digital Output
- Update rate: 1Hz
- Output voltage: 24V, current limit 10mA

Allowable Operating Range
Type J: 32 to 1500°F or 0 to 815°C
Type K: -328 to 2500°F or -200 to 1370°C
Type T: -328 to 750°F or -200 to 400°C
Type N: 32 to 2372°F or 0 to 1300°C
Type E: -328 to 1470°F or -200 to 800°C
Type C: 32 to 4200°F or 0 to 2315°C
Type D: 32 to 4200°F or 0 to 2315°C
Type F: 32 to 2543°F or 0 to 1395°C
Type R: 32 to 3200°F or 0 to 1760°C
Type S: 32 to 3200°F or 0 to 1760°C
Type B: 32 to 3300°F or 0 to 1816°C
RTD (DIN): -328 to 1472°F or -200 to 800°C
Process: -1999 to 9999 units

Output Hardware
- User selectable for heat/cool as on-off, P, PI, PD, PID, or alarm action. Not valid for limit controls
- Electromechanical relay. Form A, rated 2A
- SSR drive: 20-28VDC low side open collector switch
- SSR, Form A, 0.5A @ 24VAC min., 264VAC max., opto-isolated, without contact suppression
- Electromechanical relay, Form A, rated 5A, auxiliary output on PID module, output 2
- Electromechanical relay, Form C, rated 5A, auxiliary output on limit module, output 3

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Specifications for Mechanical Contactor

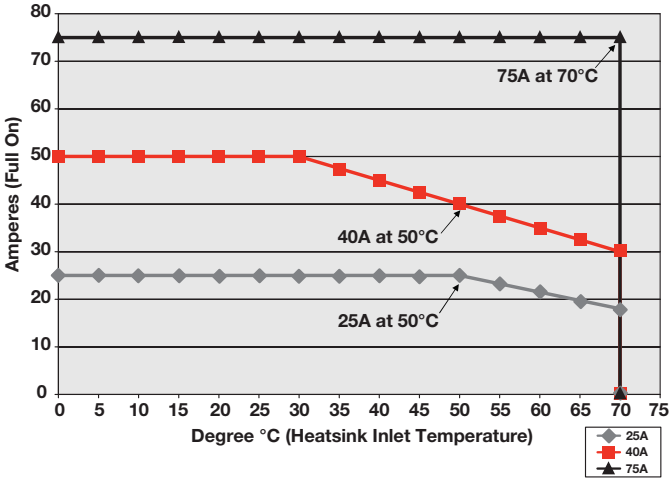
- Insulation class: UL® Class B 266°F (130°C)
- Min. load of 100 watts
- Duty cycle: continuous

Contact Ratings

Full Load Amperes	Number of Poles	Line Voltage	Locked Rotor Amps	Resistive Amp Rating	Max. Horsepower	
					Voltage	Single-Phase
40	2	240/277	240	50	120	2
		480	200	50	240	3
		600	160	50		

EZ-ZONE ST Solid State Relay with Heat Sink Specifications

Temperature and SSR Amperage Performance Curve
Watlow 25, 40 and 75 Ampere Solid State Relays



All Versions			
Current output (50°C)	25 Amps	40 Amps	75 Amps
One-cycle surge current	600Apk	850Apk	1350Apk
Max. I^2t for fusing	1500A^2s	3000A^2s	7560A^2s
Thermo resistance	0.35°C/W	0.2°C/W	0.14°C/W
Base plate temperature (max.)	116°C	115°C	112°C
Forward voltage drop	1.3Vpk	1.3Vpk	1.3Vpk
Min. holding current	150mA	150mA	250mA
Frequency	47 to 63Hz	47 to 63Hz	47 to 63Hz

Time Proportioned Models	
Off-state leakage	1mA
Max. off-state dv/dt	500V/µsec
120/240VAC	
Output voltage range	24 to 280VAC
Over voltage rating	600Vpk
Input voltage range	0 to 28VDC
277/600VAC	
Output voltage range	48 to 660VAC
Over voltage range	1200Vpk
Input voltage range	0 to 28VDC

Phase Angle Models	
Off-state leakage	6mA
Max. off-state dv/dt	200V/µsec
120/240VAC	
Output voltage range	100 to 240VAC
Over voltage rating	600Vpk
Input voltage range	2.7 to 10VDC
277/600VAC	
Output voltage range	260 to 600VAC
Over voltage range	1200Vpk
Input voltage range	2.8 to 10VDC

Thermal Devices, Inc. Mount Airy, Maryland USA www.thermaldevices.com

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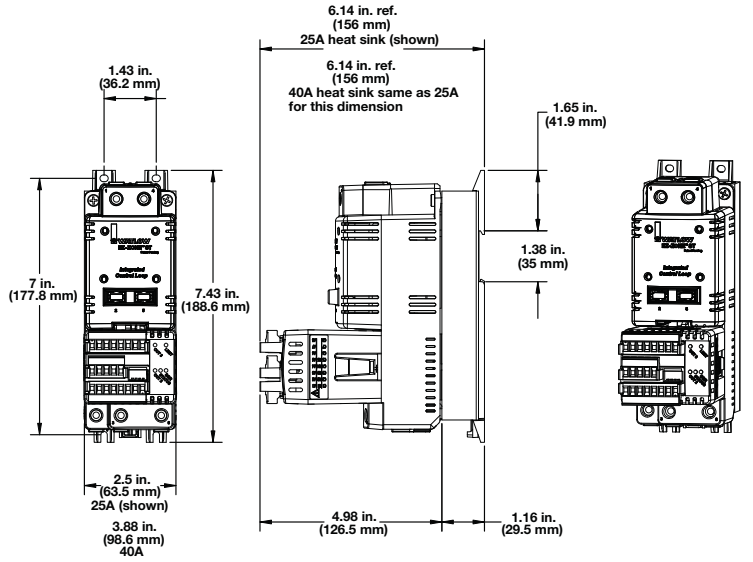
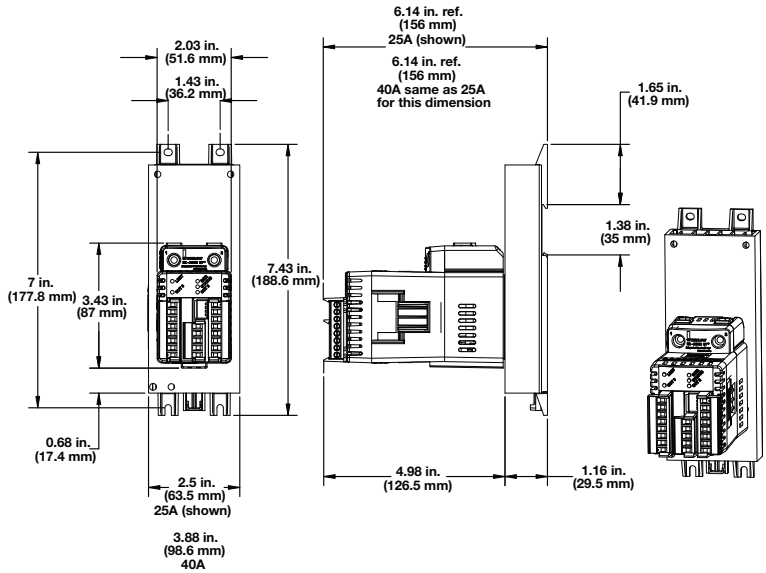
EZ-ZONE ST with Definite Purpose Mechanical Contactor—Dimensional Drawing



Note: EZ-ZONE ST must be mounted vertically (as shown) to meet amp/ambient performance curve.

EZ-ZONE ST with 25 or 40A Heat Sink, without Definite Purpose Mechanical Contactor—Dimensional Drawing

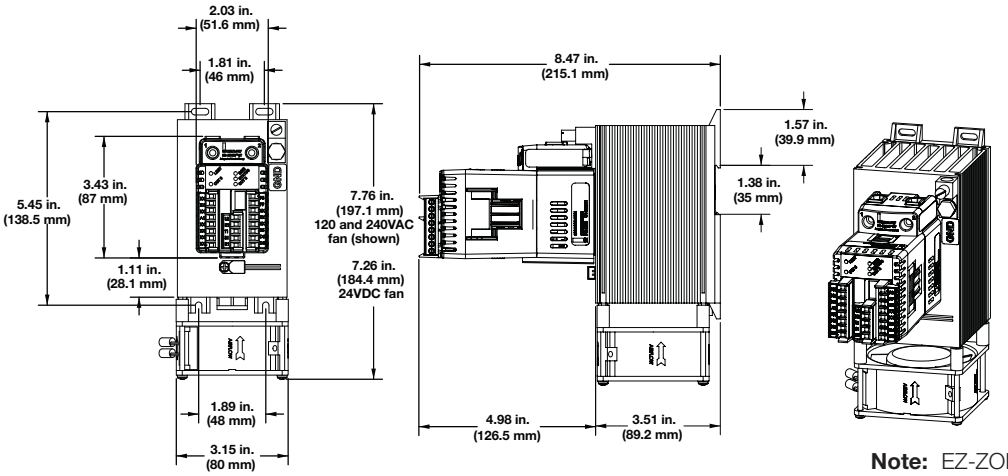


Note: EZ-ZONE ST must be mounted vertically (as shown) to meet amp/ambient performance curve.

Integrated Multi-Function

EZ-ZONE ST

EZ-ZONE ST with 75A Heat Sink, without Definite Purpose Mechanical Contactor—Dimensional Drawing



Note: EZ-ZONE ST must be mounted vertically (as shown) to meet amp/ambient performance curve.

Communications

Selecting the right communications ordering option for the EZ-ZONE ST:

					
Correct Ordering Option Letter	**Connecting To**	**Another EZ-ZONE Product**	**RUI, EZ-ZONE Configurator, SpecView**	**Third Party Device (PLC, PC, Touch Panel, etc.)**	**Silver Series Operator Interface Terminal**
Option A*			Yes		
Option M**				Yes - Via Modbus®	Yes - Via Modbus®
Option A*		Yes	Yes		
Option M**		Yes		Yes - Via Modbus®	Yes - Via Modbus®

*A = Standard bus used to connect to Watlow PC software, RUI, other EZ-ZONEs

**M = Modbus® RTU (needed to communicate to third-party devices) and standard bus. User selectable