

Integrated Multi-Function

Product	Control/Limit Loops	Mounting	Profiling	Maximum Output	Communication Protocols	Page
EZ-ZONE® RM	152/192	DIN-rail	✓	15A	Standard Bus, EtherNet/IP™, DeviceNet™, PROFIBUS DP, Modbus® TCP, Modbus® RTU	209
EZ-ZONE ST	1/1	DIN-rail	✓	75A	Standard Bus, Modbus® RTU	227
EZ-ZONE PM	2/1	1/32, 1/16, 1/8, 1/4 DIN front panel	✓	15A	Standard Bus, EtherNet/IP™, DeviceNet™, PROFIBUS DP, Modbus® TCP, Modbus® RTU	234
EZ-ZONE PM Express	1/1	1/32, 1/16 DIN front panel		15A	Standard Bus	243
SERIES EHG® SL10	1/1	In-line/Sub panel		10A	Modbus® RTU	247
SERIES EHG	1/0	In-line		10A	N/A	251

Note: The specifications in the table above are best available values in each category. Not all combinations of these values are available in a single model number.

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EZ-ZONE® RM

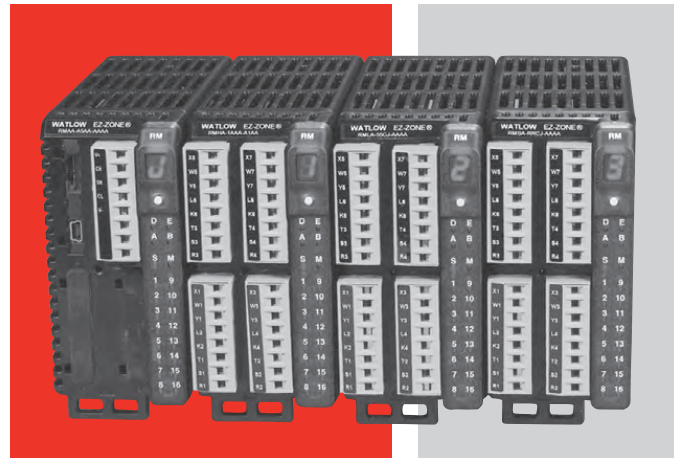
The EZ-ZONE® RM controller simplifies thermal system management. The EZ-ZONE RM controller family is comprised of six module types: an integrated on-off or PID control, monitoring and over/under temperature limit module, a high-density on-off or PID control module, a high-density limit only module, an input/output (I/O) expansion module, a high-density monitor/scanner module and a data logging and field communications access module. A system is configured by connecting any combination of module types to address specific application needs. The EZ-ZONE RM is extremely flexible and scalable allowing mixing and matching of I/O to configure one to 152 control loops and up to 256 monitor points.

Optional integrated controller functions can be combined or ordered in different quantities:

- PID control loops
- Over/under temperature limit control loops
- 10 and 15 ampere power output/heater driver options
- On-board data logging
- Current measurement input
- Sequencer start up and control function
- Programmable timer and counter functions
- Programmable math and logic options
- Multiple communication protocol options
- Mobile configuration with removable secure digital (SD) flash card

Benefits of using an integrated controller solution:

- Reduces wiring time and termination complexity compared with connecting multiple discrete products
- Improves system reliability
- Reduces termination and installation cost
- Eliminates compatibility issues often encountered with using various discrete components and brands
- Reduces troubleshooting time and downtime costs because the system can specifically identify any problems with a sensor, controller, solid state relay (SSR) power output or heater load
- Complete thermal solution saves engineering time and labor costs while shortening project schedules



Features and Benefits

Multiple inputs; from one to 152 PID loops of control or monitor up to 256 analog inputs

- Mix and match I/O to fit any application; from one input with two outputs to 152 analog inputs with 152 outputs, or monitor up to as many as 256 analog inputs all in one system
- Reduces cost because only required loops are purchased
- Allows a common controller platform across many design applications as both loops and outputs can be ordered in single increments

Advanced PID control algorithm

- Offers TRU-TUNE®+ adaptive control to provide tighter control for demanding applications
- Enables auto-tune for fast, efficient start-up

Communication capabilities

- Provides a range of protocol options including universal serial bus (USB) device port, Modbus® RTU, EtherNet/IP™, Modbus® TCP, DeviceNet™ and PROFIBUS

USB Port

- Provides data log retrieval

SPLIT-RAIL control

- Allows modules mounted in separate high-voltage and low-voltage cabinets to function as an integrated system
- Minimizes the length and cost of wire runs and improves system reliability by locating inputs closer to sensors and outputs closer to loads

AUTO CLONE

- Reduces time and configuration complexity by automatically building a new module with the same parameter settings as the replaced module

SENSOR GUARD

- Prevents unplanned process shutdowns and product loss by switching to a backup sensor if the primary sensor fails

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Additional Key Functions

- Configuration communication port (standard bus)
- Removable modules and connectors
- Ring lug and front-screw terminal options
- Profile ramp soak with 400 total steps
- Retransmit and remote set point input virtually inside controller eliminating costs for input/output hardware
- User configuration settings can be stored and recalled
- Thermistor input
- Elevated operating range of 0 to 149°F (-18 to 65°C)
- UL® listed, CSA, CE, RoHS, W.E.E.E. FM, SEMI F47-0200, Class 1, Div. 2 rating on selected models

Common Specifications (Applies to all models)

Line Voltage/Power

- 20.4 to 30.8VAC/VDC, 50/60Hz ±5%
- Any external power supply used should comply with a Class 2 or SELV rating (see specific module specification listing for max. VA power consumption)
- Data retention upon power failure via non-volatile memory
- Compliant with Semi F47-0200, Figure R1-1 voltage sag requirements

Environment

- 0 to 149°F (-18 to 65°C) operating temperature
- -40 to 185°F (-40 to 85°C) storage temperature
- 0 to 90% RH, non-condensing

Functional Operating Range for RMC, RMH, RML and RMS

Type J: -346 to 2192°F (-210 to 1200°C)
Type K: -454 to 2500°F (-270 to 1371°C)
Type T: -454 to 750°F (-270 to 400°C)
Type E: -454 to 1832°F (-270 to 1000°C)
Type N: -454 to 2372°F (-270 to 1300°C)
Type C: 32 to 4200°F (0 to 2315°C)
Type D: 32 to 4200°F (0 to 2315°C)
Type F: 32 to 2449°F (0 to 1343°C)
Type R: -58 to 3214°F (-50 to 1767°C)
Type S: -58 to 3214°F (-50 to 1767°C)
Type B: 32 to 3300°F (0 to 1816°C)
RTD (DIN): -328 to 1472°F (-200 to 800°C)
Process: -1999 to 9999 units

Agency Approvals

- UL®/EN 61010 Listed, File E185611, C-UL® C22.2 #61010ANSI/ISA 12.12.01-2007 Class 1, Div. 2 - Group A, B, C, D temperature code T4 (optional)
- UL® 1604 Class 1, Div. 2 (optional)
- EN 60529 IP20
- UL® 50, NEMA 4X, EN 60529 IP66; 1/16 DIN remote user interface (RUI)
- CSA 610110 CE
- RoHS by design, W.E.E.E.
- FM Class 3545 on limit control versions
- CE

Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE products

Implicit Messaging

Number of data members accessible through implicit messaging

Protocol	RM System	RMC	RMH	RML	RME	RMS	RMA
Ethernet/IP™	100	20	40	40	20	40	20
DeviceNet™	200	20	40	40	20	40	20

User Interface

- Seven-segment LED, address/protocol indicator programmed via push button switch
- Communication activity, 2 LEDs
- Error condition of each loop, 4 LEDs
- Output status indication, 16 LEDs

Maximum System Configuration

- One access module plus up to 16 additional control or expansion modules (any combination), up to 152 loops

Mounting

- DIN-rail specification EN50022, 1.38 x 0.30 in. (35 x 7.5 mm)
- DIN-rail mounted or chassis mounted with customer supplied screws

Wiring Termination—Touch-Safe Terminals

- Right angle and front screw type terminal blocks (slots A, B, D, E)
- Input, power and controller output terminals, touch safe, removable, 12 to 30 AWG

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Programmable Application Blocks

Compare

- Greater than, less than, equal, not equal, greater than or equal, less than or equal

Counters

- Counts up or down, loads predetermined value on the load signal. Output is active when the count value equals or exceeds predetermined target value

Linearization

- Interpolated or stepped relationship

Logic

- And, nand, or, nor, equal, not equal, latch, flip flop

Math

- Average, process scale, deviation scale, differential (subtraction), ratio (divide), add, multiply, absolute difference, min., max., square root, sample and hold, altitude and dew point

Process Value

- Sensor backup, average, crossover, wet/dry bulb, switch over, differential (subtraction), ratio (divide), add, multiply, absolute difference, min., max., square root, altitude, visala and dew point

Special Output Function

- Compressor – turns on-off compressor for one or two loops (cool and dehumidify with single compressor)
- Motorized valve – turns on-off motor open/closed outputs causing valve to represent desired power level
- Sequencer – turns on-off up to four outputs to distribute a single power across all outputs with linear and progressive load wearing

Timers

- On pulse – produces an output of fixed time on the active edge of timer run signal
- Delay – output is a delayed start of timer run and off at same time
- One shot – oven timer
- Retentive – measures timer run signal and output on when accumulated time exceeds target

Variable

- User value for digital or analog variable

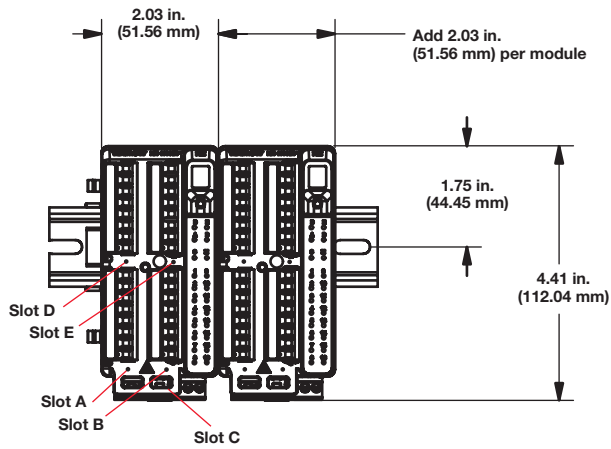
EZ-ZONE RM Family Comparison

	Control Module	High-Density Control Module	High-Density Limit Module	Expansion Module	High-Density Scanner Module
Number of modules per system	1 to 16	1 to 16	1 to 16	1 to 16	1 to 16
Number of PID loops per module	1 to 4	4, 8, 12 or 16	0	0	0
Number of limit loops per module	1 to 4	0	4, 8 or 12	0	0
Number of monitoring points per module	1 to 3	0	0	0	4, 8, 12 or 16
Mechanical relays per module	1 to 8	4 or 8	4, 6 or 8	4, 8 or 12	4 or 8
Digital I/O points per module	6	6 or 12	6 or 7	6, 12, 18 or 24	6, 7 or 12
Actions (events) per module	8	24	16	8	16
Alarms per module	8	24	16	8	16
Compare per module	4	24	16	8	24
Counters per module	4	24	16	8	24
Linearization per module	4	24	16	8	24
Logic per module	4	24	16	8	24
Math per module	8	24	16	8	24
Process value per module	1 to 4	4, 8, 12 or 16	4, 8 or 12	0	4, 8, 12 or 16
Special output function per module	4	0	0	4	0
Timers per module	4	24	16	8	24
Variable per module	8	24	16	8	24

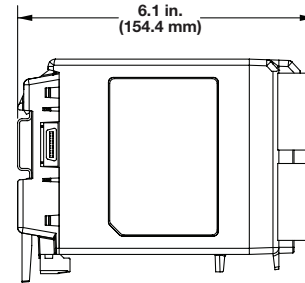
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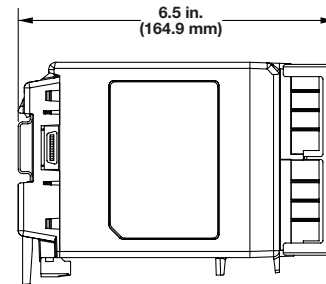
Dimensional Drawings



Front-Screw Connectors

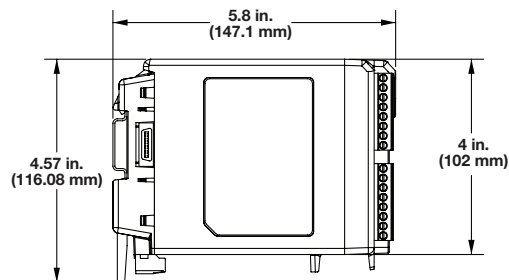


Ring Terminal Connectors



Connector Type	Module Depth in. (mm)
Standard (Right Angle)	5.8 (148)
Straight (Front Screw)	6.1 (155)
Ring Terminal	6.5 (166)

Standard Connectors



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EZ-ZONE RM

Control Module Specifications (RMC)

(Select an RMC module for 1 to 4 loops of control.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Controller

- User-selectable heat/cool, on-off, P, PI, PD, PID or alarm action, not valid for limit controllers

Process PID or Over-temperature Limit Mode Options

- Auto-tune with TRU-TUNE+ adaptive control
- Control sampling rates: input = 10Hz, output = 10Hz (non-divisional)

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE controllers
- Optional EIA 485, Modbus® RTU

Profile Ramp and Soak (RMC only, not available with high-density controller)

- Profile engine affects one to four loops
- 25 profiles and 15 sub-routines, 400 steps total
- Option for battery backup and real time clock is via the access module

Calibration Accuracy

- $\pm 0.1\%$ of span, $\pm 1^\circ\text{C}$. See user manual for details.

Universal Input

- Thermocouple, grounded or ungrounded sensors
- $>20\text{M}\Omega$ input impedance
- Max. of $2\text{k}\Omega$ source resistance
- RTD 2- or 3-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve ($0.00385\Omega/\Omega/^\circ\text{C}$)
- Process, $0\text{-}20\text{mA}$ @ 100Ω , or $0\text{-}10\text{VDC}$ @ $20\text{k}\Omega$ input impedance; scalable, $0\text{-}50\text{mV}$
- Potentiometer: 0 to $1,200\Omega$
- Inverse scaling
- Current: input range is 0 to 50mA , 100Ω input impedance
Response time: 1 second max., accuracy $\pm 1\text{mA}$ typical

Thermistor Input

- 0 to $40\text{k}\Omega$, 0 to $20\text{k}\Omega$, 0 to $10\text{k}\Omega$, 0 to $5\text{k}\Omega$
- $2.252\text{k}\Omega$ and $10\text{k}\Omega$ base at 77°F (25°C)

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA
- Max. low state 2V

Dry Contact Input

- Update rate 10Hz
- Min. open resistance $10\text{k}\Omega$, max. closed resistance 50Ω

Current Measurement Input

- Accepts $0\text{-}50\text{mA}$ signal (user programmable range)
- Displayed operating range and resolution can be scaled and are user programmable

Output Hardware

- Switched dc:
 - Max. 32VDC open circuit
 - Max. current 30mA per single output
 - Max. current 40mA per paired outputs (1 & 2, 3 & 4, 5 & 6, 7 & 8)
- Open collector:
 - Max. 30VDC @ 100mA
- 6 digital inputs/outputs:
 - Switched dc, max. 20VDC @ 40mA , 12VDC @ 80mA
 - Open collector, max. 32VDC @ 1.5A , max. 8A per 6 outputs combined
- SSR, Form A, 1A at 50°F (10°C) to 0.5A at 149°F (65°C), 0.5A @ 24VAC min., 264VAC max., opto-isolated, without contact suppression
- Electromechanical relay, Form C, 5A , 24 to 240VAC or 30VDC max., resistive load, $100,000$ cycles at rated load, requires a min. load of 20mA at 24V , 125VA pilot duty
- Electromechanical relay, Form A, 5A , 24 to 240VAC or 30VDC max., resistive load, $100,000$ cycles at rated load, requires a min. load of 20mA at 24V , 125VA pilot duty
- NO-ARC relay, Form A, 15A @ 122°F (50°C), 85 to 264VAC , no VDC, resistive load, 2 million cycles at rated load
- Universal process/retransmit, output range selectable:
 - 0 to 10VDC $\pm 15\text{mV}$ into a min. $1,000\Omega$ load with 2.5mV nominal resolution
 - 0 to 20mA $\pm 30\mu\text{A}$ into max. 800Ω load with $5\mu\text{A}$ nominal resolution
 - Temperature stability is $100\text{ppm}/^\circ\text{C}$

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EZ-ZONE RM

Control Module Ordering Information

Requires 24 to 28VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

① ②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭ ⑮
EZ-ZONE Rail Mount	Control Module	Input 1 Primary Function	Output 1 and 2 Hardware Options	Input 2	Output 3 and 4 Hardware Options	Input 3	Output 5 and 6 Hardware Options	Input 4	Output 7 and 8 Hardware Options	Connector Style	Enhanced Options	Additional Options
RM	C											

④ Input 1 Primary Function	
1 =	Control with universal input
2 =	Control with thermistor input
3 =	Ramp/Soak control with universal input (R/S applies to all loops in module)
4 =	Ramp/Soak control with thermistor input (R/S applies to all loops in module)
5 =	Limit with universal input (only valid Output 1 and 2, options will be B, F, L)
6 =	Limit with thermistor input (only valid Output 1 and 2, options will be B, F, L)
7 =	Current transformer input (not valid Output 1 and 2, options are A, B, N, P, R, S, T)
9 =	Custom

⑤ Output 1 and 2 Hardware Options		
	Output 1	Output 2
A =	None	None
B =	None	Mechanical relay 5A, Form A
U =	Switched dc/open collector	None
D =	Switched dc/open collector	NO-ARC 15A power control
E =	Switched dc/open collector	Switched dc
F =	Switched dc/open collector	Mechanical relay 5A, Form A
G =	Switched dc/open collector	SSR Form A, 0.5A
H =	Mechanical relay 5A, Form C	None
J =	Mechanical relay 5A, Form C	NO-ARC 15A power control
K =	Mechanical relay 5A, Form C	Switched dc
L =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
M =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
N =	Universal process	None
P =	Universal process	Switched dc
R =	Universal process	Mechanical relay 5A, Form A
S =	Universal process	SSR Form A, 0.5A
T =	None	SSR Form A, 0.5A
Y =	SSR Form A, 0.5A	NO-ARC 15A power control
Z =	SSR Form A, 0.5A	SSR Form A, 0.5A

⑥ Input 2	
A =	None
1 =	Control with universal input
2 =	Control with thermistor input
5 =	Limit with universal input (only valid Output 3 and 4, options will be B, F, L)
6 =	Limit with thermistor input (only valid Output 3 and 4, options will be B, F, L)
7 =	Current transformer input (not valid Output 3 and 4, options are N, P, R, S)
R =	Auxiliary 2nd input (universal input)
P =	Auxiliary 2nd input (thermistor input)

⑦ Output 3 and 4 Hardware Options		
	Output 3	Output 4
A =	None	None
B =	None	Mechanical relay 5A, Form A
U =	Switched dc/open collector	None
D =	Switched dc/open collector	NO-ARC 15A power control
E =	Switched dc/open collector	Switched dc
F =	Switched dc/open collector	Mechanical relay 5A, Form A
G =	Switched dc/open collector	SSR Form A, 0.5A
H =	Mechanical relay 5A, Form C	None
J =	Mechanical relay 5A, Form C	NO-ARC 15A power control
K =	Mechanical relay 5A, Form C	Switched dc
L =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
M =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
N =	Universal process	None
P =	Universal process	Switched dc
R =	Universal process	Mechanical relay 5A, Form A
S =	Universal process	SSR Form A, 0.5A
T =	None	SSR Form A, 0.5A
Y =	SSR Form A, 0.5A	NO-ARC 15A power control
Z =	SSR Form A, 0.5A	SSR Form A, 0.5A

⑧ Input 3	
A =	None
1 =	Control with universal input
2 =	Control with thermistor input
5 =	Limit with universal input (only valid Output 5 and 6, options will be B, F, L)
6 =	Limit with thermistor input (only valid Output 5 and 6, options will be B, F, L)
7 =	Current transformer input (not valid Output 5 and 6, options are N, P, R, S)
R =	Auxiliary 2nd input (universal input)
P =	Auxiliary 2nd input (thermistor input)

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EZ-ZONE RM

Control Module Ordering Information (Continued)

Requires 24 to 28VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

① ②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭ ⑮
EZ-ZONE Rail Mount	Control Module	Input 1 Primary Function	Output 1 and 2 Hardware Options	Input 2	Output 3 and 4 Hardware Options	Input 3	Output 5 and 6 Hardware Options	Input 4	Output 7 and 8 Hardware Options	Connector Style	Enhanced Options	Additional Options
RM	C											

⑨ Output 5 and 6 Hardware Options		
	Output 5	Output 6
A =	None	None
B =	None	Mechanical relay 5A, Form A
U =	Switched dc/open collector	None
D =	Switched dc/open collector	NO-ARC 15A power control
E =	Switched dc/open collector	Switched dc
F =	Switched dc/open collector	Mechanical relay 5A, Form A
G =	Switched dc/open collector	SSR Form A, 0.5A
H =	Mechanical relay 5A, Form C	None
J =	Mechanical relay 5A, Form C	NO-ARC 15A power control
K =	Mechanical relay 5A, Form C	Switched dc
L =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
M =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
N =	Universal process	None
P =	Universal process	Switched dc
R =	Universal process	Mechanical relay 5A, Form A
S =	Universal process	SSR Form A, 0.5A
T =	None	SSR Form A, 0.5A
Y =	SSR Form A, 0.5A	NO-ARC 15A power control
Z =	SSR Form A, 0.5A	SSR Form A, 0.5A

⑪ Output 7 and 8 Hardware Options		
	Output 7	Output 8
A =	None	None
B =	None	Mechanical relay 5A, Form A
U =	Switched dc/open collector	None
D =	Switched dc/open collector	NO-ARC 15A power control
E =	Switched dc/open collector	Switched dc
F =	Switched dc/open collector	Mechanical relay 5A, Form A
G =	Switched dc/open collector	SSR Form A, 0.5A
H =	Mechanical relay 5A, Form C	None
J =	Mechanical relay 5A, Form C	NO-ARC 15A power control
K =	Mechanical relay 5A, Form C	Switched dc
L =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
M =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
N =	Universal process	None
P =	Universal process	Switched dc
R =	Universal process	Mechanical relay 5A, Form A
S =	Universal process	SSR Form A, 0.5A
T =	None	SSR Form A, 0.5A
Y =	SSR Form A, 0.5A	NO-ARC 15A power control
Z =	SSR Form A, 0.5A	SSR Form A, 0.5A
C =	6 digital inputs/outputs (valid option only if Input 4 selection = A)	

⑩ Input 4	
A =	None
1 =	Control with universal input
2 =	Control with thermistor input
5 =	Limit with universal input (only valid Output 7 and 8, options will be B, F, L)
6 =	Limit with thermistor input (only valid Output 7 and 8, options will be B, F, L)
7 =	Current transformer input (not valid Output 7 and 8, options are N, P, R, S)
R =	Auxiliary 2nd input (universal input)
P =	Auxiliary 2nd input (thermistor input)

⑫ Connector Style	
A =	Right angle screw connector (standard)
F =	Front screw connector (slots A, B, D and E only)

⑬ Enhanced Options	
A =	Standard bus
1 =	Standard bus and Modbus® RTU 485 (selectable via dipswitch)

⑭ ⑮ Additional Options	
Firmware, overlays, parameter settings	
AA =	Standard
AB =	Replacement connectors hardware only for the entered part number. Additional cost for the model can be disregarded as you are only ordering replacement connectors.
12 =	Class 1, Div. 2 (not available with integrated limit controller or mechanical relay options)
XX =	Custom

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EZ-ZONE RM

High-Density Control Module Specifications (RMH)

(Select an RMH module for 4 to 16 loops of control.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Controller

- User-selectable heat/cool, on-off, P, PI, PD, PID or alarm action, not valid for limit controllers

Process PID Options

- Auto-tune with TRU-TUNE+ adaptive control
- Control sampling rates: input = 10Hz, output = 10Hz (non-divisional)

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE controllers
- Optional EIA 485, Modbus® RTU

Calibration Accuracy

- $\pm 0.1\%$ of span, $\pm 1^\circ\text{C}$. See user manual for details.

Universal Input

- Thermocouple, grounded or ungrounded sensors
- $>20\text{M}\Omega$ input impedance
- Max. of $2\text{k}\Omega$ source resistance
- RTD 2-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve ($0.00385\Omega/\Omega/^\circ\text{C}$)
- Process, 0-20mA @ 100Ω , or 0-10VDC @ $20\text{k}\Omega$ input impedance; scalable, 0-50mV

Thermistor Input

- 0 to $40\text{k}\Omega$, 0 to $20\text{k}\Omega$, 0 to $10\text{k}\Omega$, 0 to $5\text{k}\Omega$
- 2.252k Ω and 10k Ω base at 77°F (25°C)

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA

Dry Contact Input

- Update rate 10Hz
- Min. open resistance $10\text{k}\Omega$, max. closed resistance 50Ω

Output Hardware

- 6 digital inputs/outputs:
 - Switched dc, max. 20VDC @ 40mA, 12VDC @ 80mA
 - Open collector, max. 32VDC @ 1.5A, max. 8A per 6 outputs combined
- Electromechanical relay, Form A, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000 cycles at rated load, requires a min. load of 20mA at 24V, 125VA pilot duty

Tri-Process (Three universal process/retransmit outputs)

- Output range selections: 0 to 10VDC into a min. $4\text{k}\Omega$ load
- 0 to 20mA into max. 400Ω load

Quad SSR

- Four SSRs at 2A each. SSRs are grouped in 2-pairs with each sharing a common. See table

Ambient Temp.	Maximum Current Per Relay	
	1 Quad SSR Card	More than 1 Quad SSR Card
-18 to 20°C	2A	1.5A
20 to 65°C	1A	0.75A

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High-Density Control Module Ordering Information

Requires 24 to 28VAC/VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

1 2 EZ-ZONE Rail Mount	3 Control Module	4 Connector Style	5 Slot A	6 Slot B	7 Slot D	8 Slot E	9 Future Option	10 Enhanced Options	11 12 Additional Options
RM	H		-				-	A	

4 Connector Style/Custom Product	
A =	Right angle screw connector (standard)
F =	Front screw connector
S =	Custom

5 Slot A	
1 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with control loops
2 =	4 thermistor inputs with control loops

6 Slot B	
A =	None
1 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with control loops
2 =	4 thermistor inputs with control loops

7 Slot D	
A =	None
1 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with control loops
2 =	4 thermistor inputs with control loops
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common.

8 Slot E	
A =	None
1 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with control loops
2 =	4 thermistor inputs with control loops
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common.

10 Enhanced Options	
A =	Standard bus
1 =	Standard bus and Modbus® RTU 485 (user-selectable)

11 12 Additional Options	
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only for the entered part number
XX =	Custom

Integrated Multi-Function

EZ-ZONE RM

High-Density Limit Module Specifications (RML)

(Select an RML module for 4 to 12 safety limits.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE controllers
- Optional EIA 485, Modbus® RTU

Calibration Accuracy

- $\pm 0.1\%$ of span, $\pm 1^\circ\text{C}$. See user manual for details.

Universal Input

- Thermocouple, grounded or ungrounded sensors
- $>20\text{M}\Omega$ input impedance
- Max. of $2\text{k}\Omega$ source resistance
- RTD 2-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve ($0.00385\Omega/\Omega/^\circ\text{C}$)
- Process, 0-20mA @ 100Ω , or 0-10VDC @ $20\text{k}\Omega$ input impedance; scalable, 0-50mV

Thermistor Input

- 0 to $40\text{k}\Omega$, 0 to $20\text{k}\Omega$, 0 to $10\text{k}\Omega$, 0 to $5\text{k}\Omega$
- 2.252k Ω and 10k Ω base at 77°F (25°C)

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA

Dry Contact Input

- Update rate 10Hz
- Min. open resistance $10\text{k}\Omega$, max. closed resistance 50Ω

Output Hardware

- 6 digital inputs/outputs:
 - Switched dc, max. 20VDC @ 40mA, 12VDC @ 80mA
 - Open collector, max. 32VDC @ 1.5A, max. 8A per 6 outputs combined
- Electromechanical relay, Form A, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000 cycles at rated load, requires a min. load of 20mA at 24V, 125VA pilot duty

Integrated Multi-Function

EZ-ZONE RM

High-Density Limit Module Ordering Information

Requires 24 to 28VAC/VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

① ② EZ-ZONE Rail Mount RM	③ Limit Module L	④ Connector Style 	-	⑤ Slot A 	⑥ Slot B 	⑦ Slot D 	⑧ Slot E 	-	⑨ Future Option A	⑩ Enhanced Options 	⑪ ⑫ Additional Options
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④ Connector Style/Custom Product	
A =	Right angle screw connector (standard)
F =	Front screw connector
S =	Custom

⑤ Slot A	
5 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with limit control loops
6 =	4 thermistor inputs with limit control loops

⑥ Slot B	
A =	None
5 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with limit control loops
6 =	4 thermistor inputs with limit control loops

⑦ Slot D	
A =	None
5 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with limit control loops
6 =	4 thermistor inputs with limit control loops
J =	4 mechanical relay 5A, Form A
C =	6 digital I/O*

⑧ Slot E	
J =	4 mechanical relay 5A, Form A
B =	1 digital input and 2 mechanical relays, 5A (1 Form A and 1 Form C)*

⑩ Enhanced Options	
A =	Standard bus
1 =	Standard bus and Modbus® RTU 485* (user-selectable)

⑪ ⑫ Additional Options	
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only for the entered part number
XX =	Custom

* Reset limits via digital input, EZ key on RUI or communications commands

Integrated Multi-Function

EZ-ZONE RM

Expansion Module Specifications (RME)

(Select an RME module for additional inputs and outputs and higher amperage outputs.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE products

Wiring Termination—Touch Safe Terminals

- Right angle and front-screw type terminal blocks (slots A, B, D, E)
 - Input, power and controller output terminals, touch safe, removable, 12 to 30 AWG
- Ring lug terminal blocks (slots A and D only)
 - Input, power and controller output terminals are touch safe and removable

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA

Dry Contact

- Min. open resistance 100k Ω
- Max. closed resistance 50 Ω

Output Hardware (6 digital inputs/outputs)

- Update rate 10Hz
- Switched dc
 - Output voltage 20VDC max.
 - Max. supply current source 40mA at 20VDC and 80mA at 12VDC
- Open collector
 - Switched voltage max. 32VDC
 - Max. switched current per output 2.5A
 - Max. switched current for all six outputs combined 10A

Dual Solid State Relay

- Two SSR board options, Form A, 10A max. each SSRs combined @ 24VAC min., 264VAC max., opto-isolated, without contact suppression, max. resistive load 10A per output at 240VAC, max. 20A per card at 122°F (50°C), max. 12A per card at 149°F (65°C)

Four Mechanical Relay

- Four electro mechanical relays, Form A, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000 cycles at rated load. Requires a min. load of 20mA at 24V, 125VA pilot duty

Tri-Process (Three universal process/retransmit outputs)

- Output range selections: 0 to 10VDC into a min. 4K Ω load
- 0 to 20mA into max. 400 Ω load

Quad SSR

- Four SSRs at 2A each. SSRs are grouped in 2-pairs with each sharing a common. See table.

Ambient Temp.	Maximum Current Per Relay	
	1 Quad SSR Card	More than 1 Quad SSR Card
-18 to 20°C	2A	1.5A
20 to 65°C	1A	0.75A

Integrated Multi-Function

EZ-ZONE RM

Expansion Module Ordering Information

Requires 24 to 28VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

① ②	③	④	⑤	⑥	⑦	⑧	⑨ ⑩	⑪ ⑫
EZ-ZONE Rail Mount	Expansion Module	Connector Style/Custom Product	Slot A	Slot B	Slot D	Slot E	Future Options	Additional Options
RM	E						AA	

④ Connector Style/Custom Product	
A =	Right angle screw connector (standard)
F =	Front screw connector (slots A, B, D and E only)
R =	Ring lug connector (if ordered, then slots B and E must be = A)
S =	Custom

⑤ Slot A	
A =	None
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
K =	2 SSRs, Form A, 10A max. each (if ordered, then slot B must be = A)
L =	4 SSRs at 2 each SSR's grouped in 2-pairs with each pair sharing a common

⑥ Slot B	
A =	None
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
L =	4 SSRs at 2 each SSR's grouped in 2-pairs with each pair sharing a common

⑦ Slot D	
A =	None
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
K =	2 SSRs, Form A, 10A max. each (if ordered, then slot E must be = A)
L =	4 SSRs at 2 each SSR's grouped in 2-pairs with each pair sharing a common

⑧ Slot E	
A =	None
C =	6 digital I/O
F =	3 universal process/retransmit outputs
L =	4 SSRs at 2 each SSR's grouped in 2-pairs with each pair sharing a common
T =	Quad inputs for external current transformers. Can do either single-phase or three-phase system measurement for all hardware outputs ordered within the expansion module (future option, contact factory).

⑪ ⑫ Additional Options	
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only, for the entered part number. Additional cost for the model can be disregarded as you are only ordering replacement connectors.
12 =	Class 1, Div. 2 (not available with integrated limit controller or mechanical relay options)
XX =	Custom

Integrated Multi-Function

EZ-ZONE RM

High-Density Scanner Module Specifications (RMS)

(Select an RMS module for 4 to 16 auxiliary analog inputs.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all EZ-ZONE controllers
- Optional EIA 485, Modbus® RTU

Calibration Accuracy

- $\pm 0.1\%$ of span, $\pm 1^\circ\text{C}$. See user manual for details.

Universal Input

- Thermocouple, grounded or ungrounded sensors
- $>20\text{M}\Omega$ input impedance
- Max. of $2\text{k}\Omega$ source resistance
- RTD 2-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve ($0.00385\Omega/\Omega/^\circ\text{C}$)
- Process, $0\text{-}20\text{mA}$ @ 100Ω , or $0\text{-}10\text{VDC}$ @ $20\text{k}\Omega$ input impedance; scalable, $0\text{-}50\text{mV}$

Thermistor Input

- 0 to $40\text{k}\Omega$, 0 to $20\text{k}\Omega$, 0 to $10\text{k}\Omega$, 0 to $5\text{k}\Omega$
- $2.252\text{k}\Omega$ and $10\text{k}\Omega$ base at 77°F (25°C)

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA

Dry Contact Input

- Update rate 10Hz
- Min. open resistance $10\text{k}\Omega$, max. closed resistance 50Ω

Output Hardware

- 6 digital inputs/outputs:
 - Switched dc, max. 20VDC @ 40mA , 12VDC @ 80mA
 - Open collector, max. 32VDC @ 1.5A , max. 8A per 6 outputs combined
- Electromechanical relay, Form A, 5A , 24 to 240VAC or 30VDC max., resistive load, $100,000$ cycles at rated load, requires a min. load of 20mA at 24V , 125VA pilot duty

Integrated Multi-Function

EZ-ZONE RM

High-Density Scanner Module Ordering Information

Requires 24 to 28VAC/VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

1 2 EZ-ZONE Rail Mount	3 Scanner Module	4 Connector Style	5 Slot A	6 Slot B	7 Slot D	8 Slot E	9 Future Option	10 Enhanced Options	11 12 Additional Options
RM	S		-				-	A	

4 Connector Style/Custom Product	
A =	Right angle screw connector (standard)
F =	Front screw connector
S =	Custom

5 Slot A	
R =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) without control loops
P =	4 thermistor inputs without control loops

6 Slot B	
A =	None
R =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) without control loops
P =	4 thermistor inputs without control loops

7 Slot D	
A =	None
R =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) without control loops
P =	4 thermistor inputs without control loops
J =	4 mechanical relay 5A, Form A
C =	6 digital I/O

8 Slot E	
A =	None
R =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) without control loops
P =	4 thermistor inputs without control loops
J =	4 mechanical relay 5A, Form A
C =	6 digital I/O
B =	1 digital input and 2 mechanical relays, 4A

10 Enhanced Options	
A =	Standard bus
1 =	Standard bus and Modbus® RTU 485 (user-selectable)

11 12 Additional Options	
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only, for the entered part number.
XX =	Custom

Integrated Multi-Function

EZ-ZONE RM

Access Module Specifications (RMA)

(Select an RMA module for communication protocol options, datalogging and automatic configuration backup.)

Line Voltage/Power

- Power consumption: 4 W, 9VA
- Any external power supply used should comply with a Class 2 or SELV rating

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication connection to all EZ-ZONE products

Additional Communication Options

- EIA 232/485, Modbus® RTU
- EtherNet/IP™, Modbus® TCP, 10 BASE-T/100 BASE-TX
- DeviceNet™
- PROFIBUS DP (future option, contact factory)
- USB, controller recognized as a device

Note: If an access module is present, all other modules must have Modbus® disabled in order to achieve communications with all of the modules.

USB

- USB 1.1 device only
- Mini USB connector type
- Recognized as a mass storage device

Real Time Clock with Battery Backup

- Accuracy (typical): +/- 30ppm at 77°F (25°C)
- +30/-100ppm overtemperature operating range
- Battery type and typical lifetime rating: 10 years at 77°F (25°C)
- Lithium battery used, recycle properly

Data Logging

- 200 points
- File storage on-board module
- Common separated value (CSV) file type
- Export files via removable SD micro memory card or USB communications port

Memory Card

- Removable SD micro card
- 2G SD memory card provided, also accepts other storage space amounts
- -4 to 185°F (-20 to 85°C) ambient rating, non-volatile memory
- Information access to configuration files and the ability to store module auto-configuration settings and datalog files if options have been ordered

Auto-configuration File Backup

- Limited memory can support up to four modules
- Limited memory is fixed on board
- Unlimited memory can support up to 16 modules
- Unlimited memory utilizes removable SD micro card option

Note: All module parameters are backed up in memory except for USER SET 1 and USER SET 2 parameter settings and address.

Integrated Multi-Function

EZ-ZONE RM

Access Module Ordering Information

Requires 24 to 28VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

① ② EZ-ZONE Rail Mount	③ Access Module	④ Connector Style	-	⑤ Future Options	⑥ Comms. Options	⑦ Ramp/ Soak Functions	⑧ System Config. & Data Logging Options	-	⑨ ⑩ Future Options	⑪ ⑫ Additional Options
RM	A			A					AA	

④ Connector Style	
A =	Right angle screw connector (standard)
F =	Front screw connector (slots B and E only)
S =	Custom

⑥ Communication Options	
A =	None
2 =	Modbus® RTU 232/485
3 =	EtherNet/IP™, Modbus®/TCP
5 =	DeviceNet™
6 =	PROFIBUS DP

⑦ Ramp and Soak Functions	
A =	None
B =	Battery backup and real time clock for profile ramp and soak

⑧ System Configuration and Data Logging Options					
Order Option	USB "Device" Communication	Limited Auto-Configuration File Backup for Up to 4 Modules	Unlimited Auto-Configuration File Backup for Up to 16 Modules	On-Board Data Logging	Mobile Data (2G SD Card)
A		✓			
B			✓		✓
Y	✓		✓		✓
D	✓		✓	✓	✓

USB Device Configuration: USB access to configuration files (and data log files if data logging option is ordered) stored via on-board SD memory card. PC access to product via standard bus protocol.

Auto-Configuration Backup: Limited fixed on board memory can support backing up configuration files for a maximum of four modules. The unlimited option utilizes a SD memory card to enable configuration file backup for up to 16 modules. Feature can be used for cloning configuration files to multiple modules or for easy field replacement to limit downtime.

Data Logging: Data log files stored on 2G SD memory card. Data files can be exported via USB communication port transfer or removing SD card into external card reader. Watlow reserves the right to ship a larger memory amount at any point in time.

Mobile Data: Transfer configuration files (and data logging files if data logging option is ordered) via removable SD memory card.

⑪ ⑫ Additional Options	
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only, for the entered part number. Additional cost for the model can be disregarded as you are only ordering replacement connectors.
12 =	Class 1, Div. 2 (not available with integrated limit controller or mechanical relay options)
XX =	Custom

Compatible Accessories

Basic Remote User Interface (RUI) EZKB

The EZ-ZONE Remote User Interface (RUI and communications gateway) can be utilized as a communication gateway device to save cost, space and wiring when digital communications is being used with two or more EZ-ZONE controllers. The EZ-ZONE RUI can also serve as a display for showing all parameter values for up to 16 EZ-ZONE controllers, again saving cost, space and wiring expenses. See page 351.



Integrated Multi-Function

EZ-ZONE RM

Compatible Accessories (Continued)

EZ-ZONE Configurator Software



The EZ-ZONE configurator software is used to set up Watlow EZ-ZONE products in one simple process. It works without requiring the purchase of any communication options because it uses the standard bus communications protocol that is included with all EZ-ZONE products. EZ-ZONE configurator can be used for on-line and off-line configurations and downloading previously saved setups. It is available as a FREE download at www.watlow.com. See page 377.

SpecView



SpecView from Watlow is designed for industrial users and includes features such as data logging, trending and support for bar code readers and touch screens. Errors are reduced for any process by creating application-specific screens. The software provides a historical replay option, easy-to-use recipe features and remote access options, including LAN, Internet and modem. See page 364.

Operator Interface Terminals (OIT)



Silver Series touchscreen operator interface terminals provide a customizable user interface and log and graph data for Watlow controllers and other devices. A Silver Series operator interface terminal paired with Watlow controllers, is the perfect solution for industrial processes or machine control applications. See page 345.

Power Supplies - See page 395

- AC/DC power supply converter 90-264VAC to 24VDC volts.
- P/N 0847-0299-0000 – 31 W
- P/N 0847-0300-0000 – 60 W
- P/N 0847-0301-0000 – 91 W

EZ-ZONE RM Product Documentation

- User's manual – DVD, P/N 0601-0001-0000
Note: Printed manuals are available for order on www.watlow.com under download center.

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

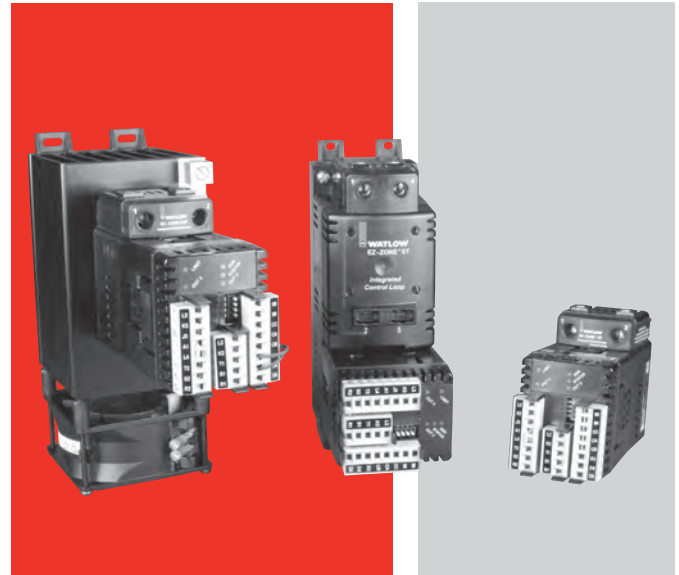
- Improves system reliability and termination reduction
- Reduces installation cost
- Eliminates incompatibility headaches often encountered with using many different components and brands

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

Integrated Multi-Function

EZ-ZONE ST

Specifications

Line Voltage/Power

- 100 to 240VAC, +10/-15%; (85-264VAC), 50/60Hz, $\pm 5\%$
- 24VAC/VDC, +10/-15%; 50/60Hz, $\pm 5\%$
- 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: $\pm 0.1\%$ of span, $\pm 1^\circ\text{C}$ @ the calibrated ambient temperature and rated line voltage
 - Types R, S, B: 0.2%
 - Type T below -50°C : 0.2%
- Calibration ambient temperature @ $77^\circ\text{F} \pm 5^\circ\text{F}$ ($25^\circ\text{C} \pm 3^\circ\text{C}$)
- Accuracy span: 1000°F (540°C) min.
- Temperature stability: $\pm 0.1^\circ\text{F}/^\circ\text{F}$ ($\pm 0.1^\circ\text{C}/^\circ\text{C}$) 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
 - $>20\text{M}\Omega$ input impedance
 - Max. of 20Ω source resistance
- RTD 2- or 3-wire, platinum, 100Ω and 1000Ω @ 0°C calibration to DIN curve ($0.00385\Omega/^\circ\text{C}$)
- Process, 0-20mA @ 100Ω , or 0-10VDC @ $20\text{k}\Omega$ 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 $\pm 1\text{A}$, max. error $\pm 3\text{A}$
- 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

Integrated Multi-Function

EZ-ZONE ST

Specifications for Mechanical Contactor

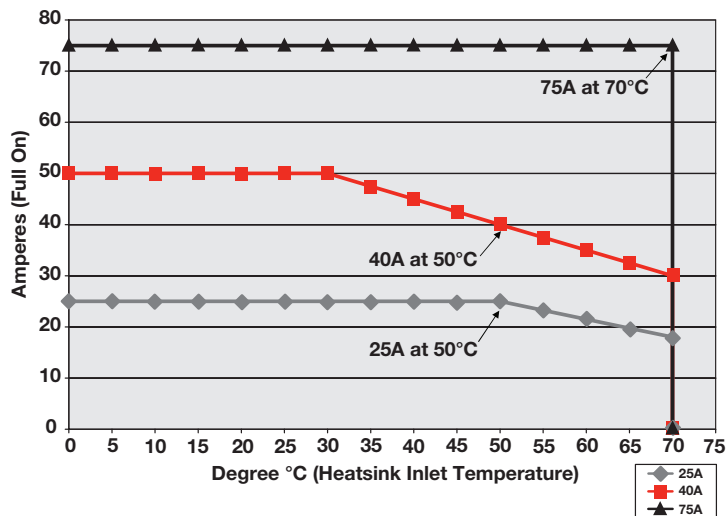
- Insulation class: UL[®] Class B 266°F (130°C)
- Min. load of 100 watts
- Duty cycle: continuous

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	25 Amps	40 Amps	75 Amps
Current output (50°C)	25 Amps	40 Amps	75 Amps
One-cycle surge current	600Apk	850Apk	1350Apk
Max. I ² t for fusing	1500A ² s	3000A ² s	7560A ² s
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

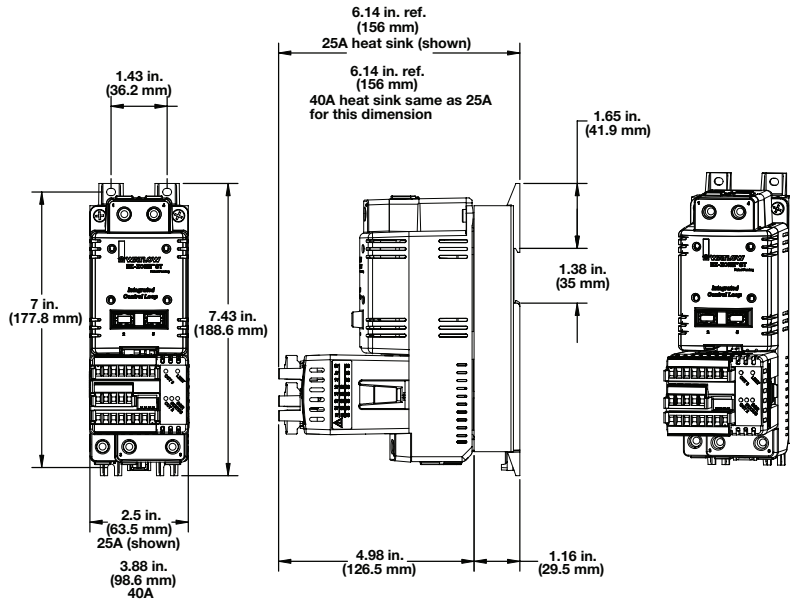
120/240VAC	
Output voltage range	100 to 240VAC
Over voltage rating	600Vpk
Input voltage range	2.7 to 10VDC

277/600VAC	
Output voltage range	260 to 600VAC
Over voltage range	1200Vpk
Input voltage range	2.8 to 10VDC

Integrated Multi-Function

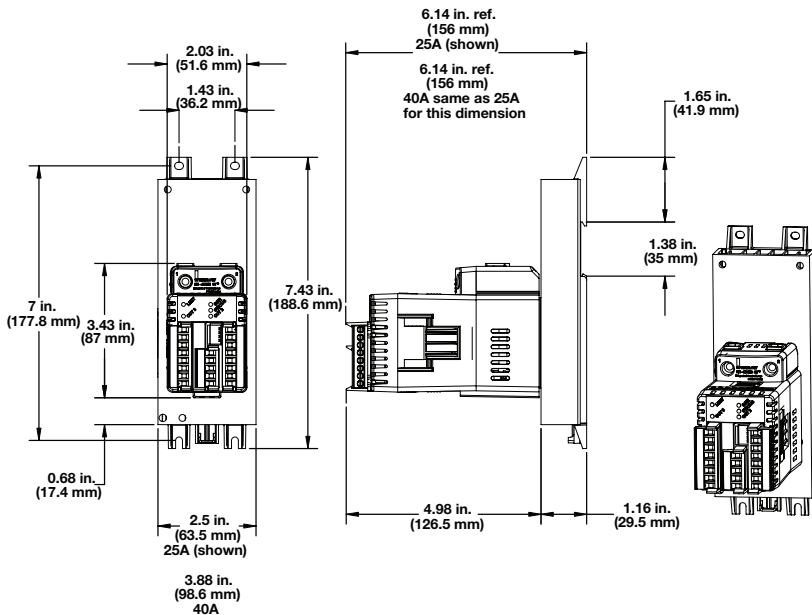
EZ-ZONE ST

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

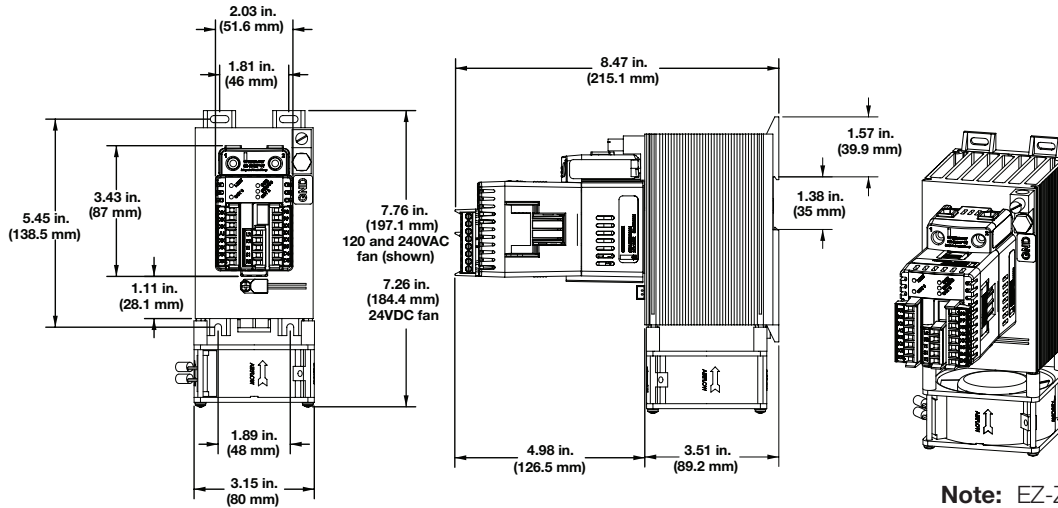


Note: EZ-ZONE ST must be mounted vertically (as shown) to meet amp/ambient performance curve.

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

Integrated Multi-Function

EZ-ZONE ST

Ordering Information

Part Number

① ②	③	④	⑤ ⑥	⑦	⑧	⑨	⑩	⑪ ⑫
ST	Integrated PID Controller	Integrated Limit Controller	Mech. Cont. & Pwr Supply	Comm.	SSR	Heat Sink/DIN-Rail Mtg.	Firmware	Customization

③ Integrated PID Controller				
	Output 1*	Output 2	Total of 2 Digital I/O Points	Current Measurement
K =	SSR drive	0.5A SSR	No	No
B =	SSR drive	0.5A SSR	Yes	No
P =	SSR drive	0.5A SSR	No	Yes
E =	SSR drive	0.5A SSR	Yes	Yes
H =	SSR drive	5A mechanical relay	No	No
D =	SSR drive	5A mechanical relay	Yes	No
J =	SSR drive	5A mechanical relay	No	Yes
C =	SSR drive	5A mechanical relay	Yes	Yes

* Output 1 is dedicated to providing the command signal to the internal SSR.

Note: If 75A heat sink is selected below, then 1 digital I/O will be factory set and fixed as the SSR over-temperature digital input.

④ Integrated Limit Controller	
A =	None
L =	Limit control module with output 3, 5A Form C mechanical relay; with output 4, 2A Form A mechanical relay
B =	No limit control module but access to coil connection on mechanical contactor

⑤ ⑥ Mechanical Contactor and Power Supply Options	
AH =	No contactor and universal high voltage power supply 100-240VAC/VDC
AL =	No contactor and universal low voltage power supply 24-28VAC/VDC
B1 =	Single pole, 40A Watlow contactor, 24VAC power supply
B2 =	Single pole, 40A Watlow contactor, 110/120VAC power supply
B3 =	Single pole, 40A Watlow contactor, 208/240VAC power supply
F1 =	Dual pole, 40A Watlow contactor, 24VAC power supply
F2 =	Dual pole, 40A Watlow contactor, 110/120VAC power supply
F3 =	Dual pole, 40A Watlow contactor, 208/240VAC power supply

⑦ Communications	
A =	Standard bus used to connect to Watlow PC software, RUI, other EZ-ZONES
M =	485 Modbus® RTU (needed to communicate to third-party devices) and standard bus. User selectable

⑧ SSR	
B =	Zero cross 10A (24 to 240VAC output)
C =	Zero cross 25A (24 to 240VAC output)
D =	Zero cross 40A (24 to 240VAC output)
E =	Zero cross 50A (24 to 240VAC output)
K =	Zero cross 75A (24 to 240VAC output)
F =	Zero cross 90A (24 to 240VAC output)
G =	Zero cross 25A (48 to 600VAC output)
H =	Zero cross 40A (48 to 600VAC output)
L =	Zero cross 75A (48 to 600VAC output)
J =	Zero cross 90A (48 to 600VAC output)
M =	Phase angle 25A (100 to 240VAC output)
N =	Phase angle 40A (100 to 240VAC output)
P =	Phase angle 75A (100 to 240VAC output)
R =	Phase angle 25A (260 to 600VAC output)
S =	Phase angle 40A (260 to 600VAC output)
T =	Phase angle 75A (260 to 600VAC output)

Note: EZ-ZONE ST phase angle is designed to work with tungsten or quartz loads. The EZ-ZONE ST should not be used with globars, molybdenum, graphite or transformer loads.

⑨ Heat Sinks/DIN-Rail Mounting Bracket	
A =	None
B =	25A
C =	40A
D =	75A 24VDC fan cooled
E =	75A 115VAC fan cooled
F =	75A 240VAC fan cooled

Note: If heat sink option D, E or F is selected you must also order integrated PID controller options B, E, D or C. 75A heat sink option includes SSR over-temperature thermostat shut-down feature.

⑩ Firmware	
A =	Standard Watlow
P =	Profile ramp and soak (40 total steps, 1 to 4 profiles total)
S =	Custom

⑪ ⑫ Customization (logo, parameters, hardware, firmware)	
AA =	Standard
XX =	Letters to be determined, contact factory

Note: Maximum rating of final configured product is determined by the lowest component rating of either the mechanical contactor, solid-state relay or heat sink. Maximum UL® rating for product is 75A

Integrated Multi-Function

EZ-ZONE ST

Compatible Accessories

Basic Remote User Interface (RUI) EZKB



The EZ-ZONE Remote User Interface (RUI and communications gateway) can be utilized as a communication gateway device to save cost, space and wiring when digital communications are being used with two or more EZ-ZONE controllers. The EZ-ZONE RUI can also serve as a display for showing all parameter values for up to 16 EZ-ZONE controllers, again saving cost, space and wiring expenses. See page 351.

EZ-ZONE Configurator Software



The EZ-ZONE configurator software is used to set up Watlow EZ-ZONE products in one simple process. It works without requiring the purchase of any communication options because it uses the standard bus communications protocol that is included with all EZ-ZONE products. EZ-ZONE configurator can be used for on-line and off-line configurations and downloading previously saved setups. It is available as a FREE download at www.watlow.com. See page 377.

Operator Interface Terminals (OIT)



Silver Series touchscreen operator interface terminals provide a customizable user interface and log and graph data for Watlow controllers and other devices. A Silver Series operator interface terminal paired with Watlow controllers, is the perfect solution for industrial processes or machine control applications. See page 345.

SpecView



SpecView from Watlow is designed for industrial users and includes features such as data logging, trending and support for bar code readers and touch screens. Errors are reduced for any process by creating application-specific screens. The software provides a historical replay option, easy-to-use recipe features and remote access options, including LAN, Internet and modem. See page 364.

Integrated Multi-Function

EZ-ZONE PM

The EZ-ZONE PM panel mount controller offers control options that reduce system complexity and thermal loop ownership cost. It can be ordered as a PID controller, an over/under limit controller or its functions can be combined into an integrated controller. An option to integrate a high amperage power controller output with a high-performance PID controller and an over/under limit controller in one space-saving, panel mount package is also available. Many communications options are offered to support connectivity needs.

Because the EZ-ZONE PM controller is highly scalable, pay only for what is needed. This controller is available in 1/32, 1/16, 1/8 and 1/4 DIN panel mount packages. The EZ-ZONE PM controller is easy to use and is ideal for PID, over/under limit or integrated controller needs.

Features and Benefits

Integrated PID and limit controller

- Reduces wiring time and termination complexity compared with connecting discrete products
- Decreases required panel space
- Lowers installation costs
- Increases user and equipment safety for over/under temperature conditions

High amperage power control output

- Drives 15 ampere resistive loads directly
- Reduces component count
- Decreases cost of ownership

Current monitoring

- Detects heater current flow and provides alarm indication of a failed output device or heater load

Serial communication capabilities

- Provides a wide range of protocol choices including Modbus® RTU, EtherNet/IP™, Modbus® TCP, PROFIBUS DP and DeviceNet™
- Supports network connectivity to a PC or PLC

Dual-channel controller

- Provides two PID controllers in one space-saving package

Enhanced control options

- Easily handles complex process problems such as cascade, ratio, differential, square-root, motorized valve control without slidewire feedback, wet-bulb/dry-bulb, compressor control and peltier loads

Advanced PID control algorithm

- Offers TRU-TUNE®+ adaptive control to provide tighter control for demanding applications
- Provides auto-tune for fast, efficient startup



Configuration communications with software

- Includes Watlow standard bus communications and EZ-ZONE configurator software
- Saves time and improves reliability of controller setup

Ten-point linearization curve

- Improves sensor accuracy

Built-in sensor compensation curves

- Saves cost of buying compensated sensors
- Includes Vaisala RH and altitude (pressure) curves

Remote set point operation

- Supports convenient set point manipulation from a remote device such as a master control or PLC

Profile capability

- Offers pre-programmed process control
- Allows ramp/soak programming with 40 total steps, battery backup and real time clock

Retransmit Output

- Supports industry needs for recording

Factory Mutual (FM) approved over/under limit with auxiliary outputs

- Increases user and equipment safety for over/under temperature conditions

Integrated Multi-Function

EZ-ZONE PM

Features and Benefits (Continued)

Memory for saving and restoring parameter settings

- Decreases service calls and time down

Agency approvals: UL® listed, CSA, CE, RoHS, W.E.E.E., FM, SEMI F47-0200, Class 1, Div. 2 rating on selected models

- Assures prompt product acceptance
- Reduces end product documentation costs

Touch-safe package

- Increases safety for installer/operator
- Complies with IP2X requirements

Consistent termination labeling connection system

- Simplifies switching between products
- Speeds up user's system documentation

EZ-KEY

- Enables simple, one-touch operation of user-defined, repetitive activities

Programmable menu system

- Reduces setup time and increases operator efficiency

Three-year warranty

- Provides product support and reliability

Specifications

Controller

- User-selectable heat/cool, on-off, P, PI, PD, PID or alarm action, not valid for limit controllers
- Auto-tune with TRU-TUNE+ adaptive control algorithm
- Control sampling rates: input = 10Hz, outputs = 10Hz

Profile Ramp/Soak - Real Time Clock and Battery Backup

- 4 profiles, 40 total steps
- Accuracy (typical): ± 30 PPM at 77°F (25°C)
 $+30/-100$ PPM at -4 to 149°F (-20 to 65°C)
- Battery type/typical life: lithium, three cumulative years unpowered at 77°F (25°C)

Isolated Serial Communications

- EIA 232/485, Modbus® RTU
- EtherNet/IP™/Modbus® TCP
- DeviceNet™
- PROFIBUS DP

Wiring Termination—Touch-Safe Terminals

- Input, power and controller output terminals are touch safe, removable, 12 to 22 AWG

Universal Input

- Thermocouple, grounded or ungrounded sensors greater than 20M Ω input impedance, 3 μ A open sensor detection, 2k Ω source resistance max.
- RTD 2- or 3-wire, platinum, 100 Ω and 1000 Ω @ 32°F (0°C) calibration to DIN curve (0.00385 Ω /°C)
- Process, 0-20mA @ 100 Ω , or 0-10VDC @ 20k Ω , 0-50mV at 20M Ω , 0-1000 Ω potentiometer; scalable; inverse scaling

Functional Operating Range

Type J: -346 to 2192°F (-210 to 1200°C)
Type K: -454 to 2500°F (-270 to 1371°C)
Type T: -454 to 750°F (-270 to 400°C)
Type E: -454 to 1832°F (-270 to 1000°C)
Type N: -454 to 2372°F (-270 to 1300°C)
Type C: 32 to 4200°F (0 to 2315°C)
Type D: 32 to 4200°F (0 to 2315°C)
Type F: 32 to 2449°F (0 to 1343°C)
Type R: -58 to 3214°F (-50 to 1767°C)
Type S: -58 to 3214°F (-50 to 1767°C)
Type B: 32 to 3300°F (0 to 1816°C)
RTD (DIN): -328 to 1472°F (-200 to 800°C)
Process: -1999 to 9999 units

Accuracy

- Calibration accuracy and sensor conformity: $\pm 0.1\%$ of span, $\pm 1^\circ\text{C}$ @ 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 $\pm 5^\circ\text{F}$ (25°C $\pm 3^\circ\text{C}$)
- Accuracy span: 1000°F (540°C) min.
- Temperature stability: $\pm 0.1^\circ\text{F}/^\circ\text{F}$ ($\pm 0.1^\circ\text{C}/^\circ\text{C}$) rise in ambient max.

Thermistor Input

- 0 to 40k Ω , 0 to 20k Ω , 0 to 10k Ω , 0 to 5k Ω
- 2.252k Ω and 10k Ω base at 77°F (25°C)
- Linearization curves built-in

Current Transformer Input

- Accepts 0-50mA signal (user-programmable range)
- Displayed operating range and resolution can be scaled and are user-programmable

Digital Inputs (DC Voltage)

- Max. input: 36V at 3mA
- Logic: min. high state 3V at 0.25mA, max. low state 2V

Integrated Multi-Function

EZ-ZONE PM

Specifications (Continued)

Digital Inputs (Dry Contact)

- Logic: min. open resistance 10k Ω , max. closed resistance 50 Ω
- Max. short circuit: 20mA

2 Digital I/O (ordered with power supply option)

- Update rate: 10Hz
- Input type: user-selectable, dc voltage or dry contact
- Output type: switched dc
- Output voltage: 24V
- Output 5: 24mA max. or drive one 3-pole DIN-A-MITE[®]
- Output 6: 10mA max.

6 Digital I/O (ordered with communications option)

- Update rate: 10Hz
- Input type: user-selectable, dc voltage or dry contact
- Output type: user-selectable, switched dc or open collector
- Switched dc output voltage: 12 to 24VDC, depending on current draw
- Switched dc max. supplied current: 40mA at 20VDC and 80mA at 12VDC
- Switched dc max. low state: 2V
- Open collector max. switched voltage: 32VDC
- Open collector max. switched current: 1.5A per output; 8A total for all 6 outputs

Output Hardware

- Switched dc: 22 to 32VDC @ 30mA max. per single output and 40mA max. total per paired outputs (1 & 2, 3 & 4)
- Open collector: 30VDC max. @ 100mA max.
- SSR, Form A, 24 to 240VAC, 1A at 50°F (10°C) to 0.5A at 149°F (65°C) resistive load, 264VAC max., opto-isolated, without contact suppression, 120/240VAC @ 20VA pilot duty
- Electromechanical relay, Form A, 24 to 240VAC or 30VDC max., 5A resistive load, 100,000 cycles at rated load, 120/240 @ 125VA or 24VAC @ 25VA pilot duty
- Electromechanical relay, Form C, 24 to 240VAC or 30VDC max., 5A resistive load, 100,000 cycles at rated load, 120/240 @ 125VA or 24VAC @ 25VA pilot duty
- NO-ARC relay, Form A, 85 to 264VAC, 15A @ 122°F (50°C), resistive load, no VDC, 2,000,000 cycles at rated load
- Universal process output: range selectable; 0 to 10VDC \pm 15mV into a min. 1,000 Ω load with 2.5mV nominal resolution; 0 to 20mA \pm 30 μ A into max. 800 Ω load with 5 μ A nominal resolution; temperature stability 100ppm/°C

Operator Interface

- Dual 4-digit, 7-segment LED displays
- Advance, infinity, up and down keys, plus 1 or 2 programmable EZ-KEY(s) depending on model size
- Typical display update rate: 1Hz
- RESET key substituted for infinity on all models with limit controller

Line Voltage/Power

- High voltage option: 85 to 264VAC, 47 to 63Hz
- Low voltage option: 20 to 28VAC, +10/-15%; 50/60Hz, \pm 5% or 12 to 40VDC
- Max. power consumption: 10VA (¹/₃₂ and ¹/₁₆ DIN); 14VA (¹/₈ and ¹/₄ DIN)
- Data retention upon power failure via nonvolatile memory
- Compliant with SEMI F47-0200, Figure R1-1 voltage sag requirements @ 24VAC or higher

Environment

- Operating temperature: 0 to 149°F (-18 to 65°C)
- Storage temperature: -40 to 185°F (-40 to 85°C)
- Relative humidity: 0 to 90% RH, non-condensing

Agency Approvals

- cULus[®] UL/EN/CSA C22.2 No 61010-1 Listed, File E185611
- CSA C22.2 No. 24, File 158031 (¹/₃₂ and ¹/₁₆ DIN sizes)
- UL[®] 50 4X indoor locations, NEMA 4X, IP66 front seal
- cULus[®] ANSI/ISA 12.12.01-2007, CSA-C22.2 No. 213-1987, Class 1, Div. 2, Groups A, B, C and D, temperature code T4A, File E184390 (optional)
- FM Class 3545 (limit controls)
- CE, RoHS by design, W.E.E.E.
- EtherNet/IP[™] and DeviceNet[™] ODVA Conformance Tested

Integrated Multi-Function

EZ-ZONE PM

Comparison of Available Features

	1/32 DIN	1/16 DIN	1/8 DIN	1/4 DIN
PID Loops	1	1	1 to 2	1 to 2
Profile Ramp/Soak	40 total steps	40 total steps	40 total steps	40 total steps
Profile Battery Backup and Real Time Clock	None	None	Yes	Yes
Number of Digital Inputs/Outputs	0 to 2	0 to 2	0 to 8	0 to 8
Number of Outputs	1 to 4	1 to 6	1 to 12	1 to 12
Integrated Safety Limits	Limit must be ordered as separate device	1	1	1
Maximum Power Output	5A mechanical relay	15A NO-ARC	15A NO-ARC	15A NO-ARC
Current Measurement	None	Accepts 0-50mA signal from external current transformer		
Standard Bus Communications	Yes	Yes	Yes	Yes
Field Bus Communications	Modbus® RTU 485	Modbus® RTU 232/485, EtherNet/IP™, Modbus® TCP, DeviceNet™, PROFIBUS DP		
10-Point Calibration Offset	Yes	Yes	Yes	Yes
Ratio, Differential and Square-Root	None	Yes	Yes	Yes
Sensor Compensation Curves - Altitude (Pressure) and Vaisalla RH	None	Yes	Yes	Yes
Motorized Valve Control (without Feedback)	None	Yes	Yes	Yes
Wet Bulb/Dry Bulb	None	Yes	Yes	Yes
Cascade	None	None	Yes	Yes

Compatible Accessories

EZ-ZONE Configurator Software

The EZ-ZONE configurator software is used to set up Watlow EZ-ZONE products in one simple process. It works without requiring the purchase of any communication options because it uses the standard bus communications protocol that is included with all EZ-ZONE products. EZ-ZONE configurator can be used for on-line and off-line configurations and downloading previously saved setups. It is available as a FREE download at www.watlow.com. See page 377.



Operator Interface Terminals (OIT)



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SpecView

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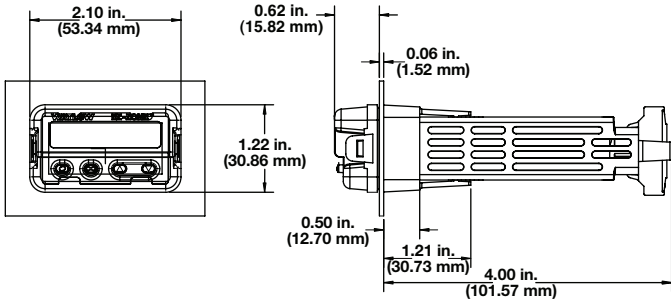


Integrated Multi-Function

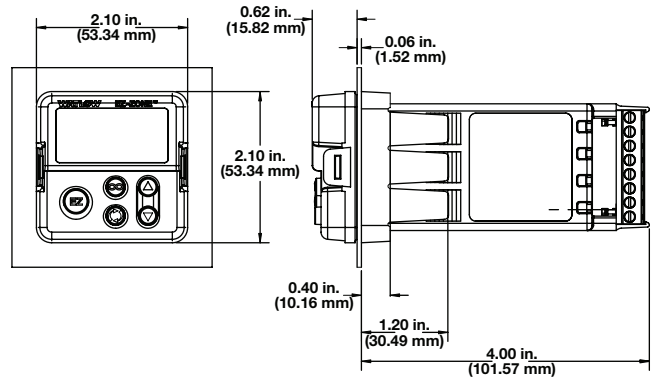
EZ-ZONE PM

Dimensional Drawings

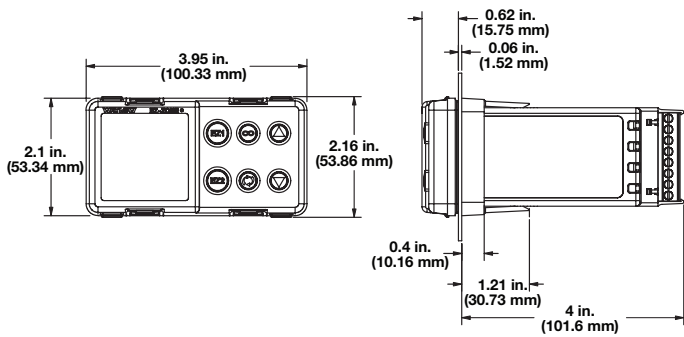
EZ-ZONE PM 1/32 DIN



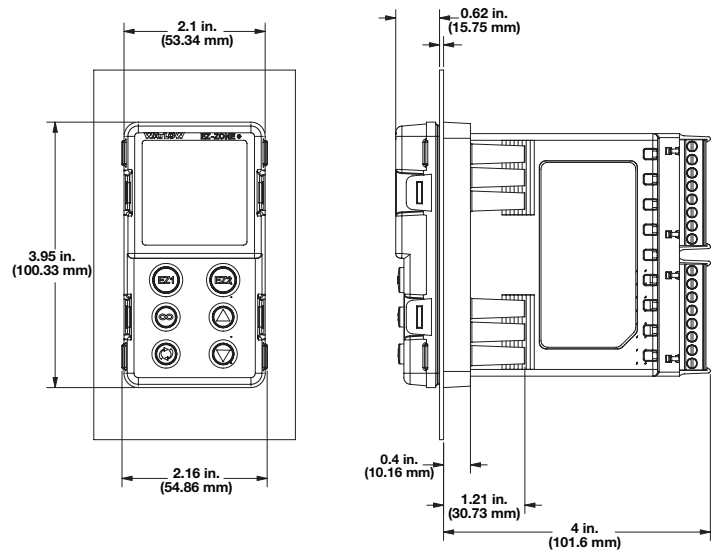
EZ-ZONE PM 1/16 DIN



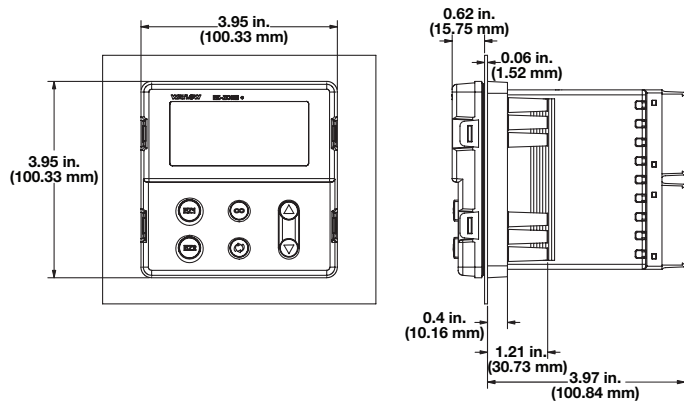
EZ-ZONE PM 1/8 DIN - Horizontal



EZ-ZONE PM 1/8 DIN - Vertical



EZ-ZONE PM 1/4 DIN



Integrated Multi-Function

EZ-ZONE PM

PID Model Ordering Information

Universal Sensor Input, Standard Bus Communications, TRU-TUNE+ Adaptive Tune, Red and Green Seven-Segment Displays

Part Number

① ②	③	④	⑤	⑥ ⑦	⑧	⑨ ⑩ ⑪	⑫	⑬ ⑭
	Package Size	Primary Function	Power Supply, Digital I/O	Output 1 and 2 Hardware Options	Add'l Comm. Options	Future Options	Isolated Input Options	Custom Options
PM					-	AAA		

③ Package Size	
3 =	1/32 DIN
6 =	1/16 DIN
8 =	1/8 DIN vertical
9 =	1/8 DIN horizontal
4 =	1/4 DIN

④ Primary Function	
Options B and E are not available with 1/32 DIN (PM3) or 1/16 DIN (PM6) models	
C =	PID controller with universal input
R =	PID controller with universal input and profiling ramp/soak
B =	PID controller with universal input and profiling ramp/soak and battery back-up with real time clock
J =	PID controller with thermistor
N =	PID controller with thermistor input and profiling ramp/soak
E =	PID controller with thermistor input and profiling ramp/soak and battery back-up with real time clock
S =	Custom firmware

⑤ Power Supply, Digital Inputs/Outputs (I/O)	
1 =	100 to 240VAC
2 =	100 to 240VAC plus 2 digital I/O points
3 =	20 to 28VAC or 12 to 40VDC
4 =	20 to 28VAC or 12 to 40VDC, plus 2 digital I/O points

⑥ ⑦ Output 1 and 2 Hardware Options		
PM3: CH, EH and KH are not valid options for 1/32 DIN package type		
	Output 1	Output 2
CA =	Switched dc/open collector	None
CH =	Switched dc/open collector	NO-ARC 15A power control
CC =	Switched dc/open collector	Switched dc
CJ =	Switched dc/open collector	Mechanical relay 5A, Form A
CK =	Switched dc/open collector	SSR Form A, 0.5A
EA =	Mechanical relay 5A, Form C	None
EH =	Mechanical relay 5A, Form C	NO-ARC 15A power control
EC =	Mechanical relay 5A, Form C	Switched dc
EJ =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
EK =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
FA =	Universal process	None
FC =	Universal process	Switched dc
FJ =	Universal process	Mechanical relay 5A, Form A
FK =	Universal process	SSR Form A, 0.5A
AK =	None	SSR Form A, 0.5A
KH =	SSR Form A, 0.5A	NO-ARC 15A power control
KK =	SSR Form A, 0.5A	SSR Form A, 0.5A

⑧ Additional Communication Options	
Standard bus always included	
A =	None
1 =	EIA 485 Modbus® RTU

⑫ Isolated Input Options	
A =	None
D =	Isolated input 1

⑬ ⑭ Custom Options	
Firmware, overlays, parameter settings	
AA =	Standard EZ-ZONE PM face plate
12 =	Class 1, Div. 2 (not available with mechanical relay Output types E, H or J)

Integrated Multi-Function

EZ-ZONE PM

Limit Model Ordering Information

Universal Sensor Input, Standard Bus Communications, Red and Green Seven-Segment Displays

Part Number

① ②	③	④	⑤	⑥ ⑦	⑧	⑨ ⑩ ⑪	⑫	⑬ ⑭
	Package Size	Primary Function	Power Supply, Digital I/O	Output 1 and 2 Hardware Options	Add'l Comm. Options	Future Options	Isolated Input Options	Custom Options
PM					-	AAA		

③ Package Size	
3 =	1/32 DIN
6 =	1/16 DIN
8 =	1/8 DIN vertical
9 =	1/8 DIN horizontal
4 =	1/4 DIN

④ Primary Function	
L =	Limit controller with universal input
M =	Limit controller with thermistor input
D =	Custom firmware

⑤ Power Supply, Digital Inputs/Outputs (I/O)	
1 =	100 to 240VAC
2 =	100 to 240VAC plus 2 digital I/O points
3 =	20 to 28VAC or 12 to 40VDC
4 =	20 to 28VAC or 12 to 40VDC, plus 2 digital I/O points

⑥ ⑦ Output 1 and 2 Hardware Options		
	Output 1	Output 2
AJ =	None	Mechanical relay 5A, Form A
CJ =	Switched dc/open collector	Mechanical relay 5A, Form A
EJ =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A

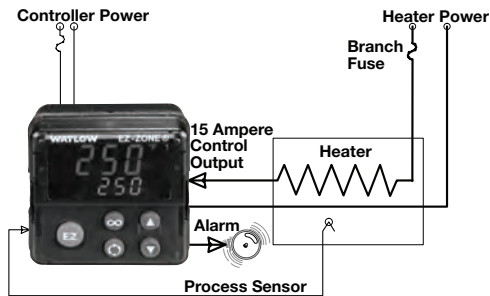
⑧ Additional Communication Options	
Standard bus always included	
A =	None
1 =	EIA 485 Modbus® RTU

⑫ Isolated Input Options	
A =	None
D =	Isolated input 1

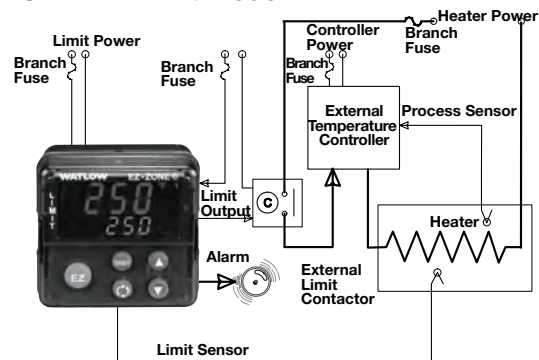
⑬ ⑭ Custom Options	
Firmware, overlays, parameter settings	
AA =	Standard EZ-ZONE PM face plate

Typical Block Diagrams

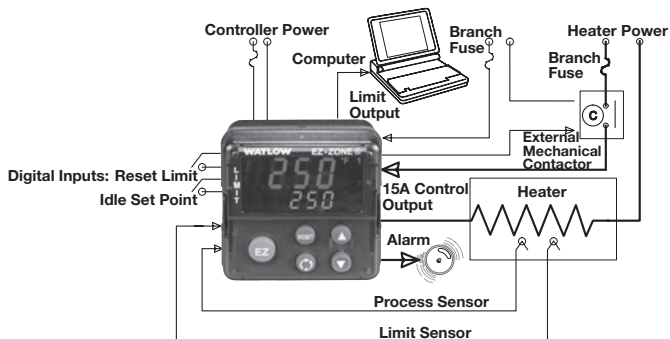
EZ-ZONE PM PID Model



EZ-ZONE PM Limit Model



EZ-ZONE PM Integrated PID Model



Integrated Multi-Function

EZ-ZONE PM

Integrated PID Controller Model Ordering Information

Universal Sensor Input, Standard Bus Communications, TRU-TUNE+ Adaptive Tune, Red and Green Seven-Segment Displays

Part Number

① ②	③	④	⑤	⑥ ⑦	⑧	⑨	⑩ ⑪	⑫	⑬ ⑭
	Package Size	Primary Function	Power Supply, Digital I/O	Output 1 and 2 Hardware Options	Comm. Options or Add'l Digital I/O	Auxiliary Control Functions	Output 3 and 4 Hardware Options	Additional Options	Custom Options
PM					-				

③ Package Size	
6 =	1/16 DIN
8 =	1/8 DIN vertical
9 =	1/8 DIN horizontal
4 =	1/4 DIN

④ Primary Function	
Options B and E are not available with 1/16 DIN (PM6) models	
C =	PID controller with universal input
R =	PID controller with universal input and profiling ramp/soak
B =	PID controller with universal input and profiling ramp/soak and battery back-up with real time clock
J =	PID controller with thermistor input
N =	PID controller with thermistor input and profiling ramp/soak
E =	PID controller with thermistor input and profiling ramp/soak and battery back-up with real time clock
S =	Custom firmware

⑤ Power Supply, Digital Inputs/Outputs (I/O)	
1 =	100 to 240VAC
2 =	100 to 240VAC plus 2 digital I/O points
3 =	20 to 28VAC or 12 to 40VDC
4 =	20 to 28VAC or 12 to 40VDC, plus 2 digital I/O points

⑥ ⑦ Output 1 and 2 Hardware Options		
	Output 1	Output 2
CA =	Switched dc/open collector	None
CH =	Switched dc/open collector	NO-ARC 15A power control
CC =	Switched dc/open collector	Switched dc
CJ =	Switched dc/open collector	Mechanical relay 5A, Form A
CK =	Switched dc/open collector	SSR Form A, 0.5A
EA =	Mechanical relay 5A, Form C	None
EH =	Mechanical relay 5A, Form C	NO-ARC 15A power control
EC =	Mechanical relay 5A, Form C	Switched dc
EJ =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
EK =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
FA =	Universal process	None
FC =	Universal process	Switched dc
FJ =	Universal process	Mechanical relay 5A, Form A
FK =	Universal process	SSR Form A, 0.5A
AK =	None	SSR Form A, 0.5A
KH =	SSR Form A, 0.5A	NO-ARC 15A power control
KK =	SSR Form A, 0.5A	SSR Form A, 0.5A

⑧ Communication Options or Additional Digital Inputs/Outputs (I/O)	
Standard bus always included	
A =	None
1 =	EIA 485 Modbus® RTU
2 =	EIA 232/485 Modbus® RTU
3 =	EtherNet/IP™/Modbus® TCP
5 =	DeviceNet™
6 =	PROFIBUS DP
C =	6 digital I/O (not available on 1/16 DIN models)
D =	6 digital I/O and EIA 485 Modbus® RTU (not available on 1/16 DIN models)

⑨ Auxiliary Control Functions	
A =	None
C =	2nd PID channel with universal input - not available on 1/16 DIN models
J =	2nd PID channel with thermistor input - not available on 1/16 DIN models
R =	Auxiliary 2nd input (universal input)
P =	Auxiliary 2nd input (thermistor input)
T =	Current transformer input (not valid Output 3 and 4 selections = FA, FC, FJ and FK)
L =	Integrated limit controller with universal input (only valid Output 3 and 4 selections = CJ, EJ and AJ)
M =	Integrated limit controller with thermistor input (only valid Output 3 and 4 selections = CJ, EJ and AJ)
1/16 DIN Models: If communication options 2 thru 6 is ordered in previous digit, then Option A must be ordered here.	
All Models: Auxiliary input supports remote set point, backup sensor ratio, differential and wet-bulb/dry-bulb input.	

⑩ ⑪ Output 3 and 4 Hardware Options		
	Output 3	Output 4
AA =	None	None
AJ =	None	Mechanical relay 5A, Form A
AK =	None	SSR Form A, 0.5A
CA =	Switched dc/open collector	None
CC =	Switched dc/open collector	Switched dc
CH =	Switched dc/open collector	NO-ARC 15A power control
CJ =	Switched dc/open collector	Mechanical relay 5A, Form A
CK =	Switched dc/open collector	SSR Form A, 0.5A
EA =	Mechanical relay 5A, Form C	None
EC =	Mechanical relay 5A, Form C	Switched dc
EH =	Mechanical relay 5A, Form C	NO-ARC 15A power control
EJ =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
EK =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
FA =	Universal process	None
FC =	Universal process	Switched dc
FJ =	Universal process	Mechanical relay 5A, Form A
FK =	Universal process	SSR Form A, 0.5A
KH =	SSR Form A, 0.5A	NO-ARC 15A power control
KK =	SSR Form A, 0.5A	SSR Form A, 0.5A
1/16 DIN Models: If communication options 2 thru 6 is ordered in previous digit, then Option AA must be ordered here.		
1/16 DIN Models: Output options CH, EH and KH are not valid.		

⑫ Additional Options	
A =	Standard
C =	Enhanced firmware which includes compressor control, cascade, ratio, differential, square-root and motorized valve control without feedback.
D =	Standard with isolated input 1, input 2 is always isolated
F =	Enhanced firmware with isolated input 1, input 2 is always isolated
Note: Auxiliary control function C or J required for cascade control	

⑬ ⑭ Custom Options	
AA =	Standard EZ-ZONE PM face plate
12 =	Class 1, Div. 2 (not available with integrated limit Option "L" or "M", or with Output types E, H, or J)

Integrated Multi-Function

EZ-ZONE PM

Enhanced Limit Model Ordering Information

Universal Sensor Input, Configuration Communications, Red and Green Seven-Segment Displays

Part Number

① ②	③	④	⑤	⑥ ⑦	⑧	⑨	⑩ ⑪	⑫	⑬ ⑭
	Package Size	Primary Function	Power Supply, Digital I/O	Output 1 and 2 Hardware Options	Add'l Comm. Options	Future Option	Output 3 and 4 Hardware Options	Isolated Input Options	Custom Options
PM					-	A			

③ Package Size	
6 =	1/16 DIN
8 =	1/8 DIN vertical
9 =	1/8 DIN horizontal
4 =	1/4 DIN

④ Primary Function	
L =	Limit controller with universal input
M =	Limit controller with thermistor input
D =	Custom firmware

⑤ Power Supply, Digital Inputs/Outputs (I/O)	
1 =	100 to 240VAC
2 =	100 to 240VAC plus 2 digital I/O points
3 =	20 to 28VAC or 12 to 40VDC
4 =	20 to 28VAC or 12 to 40VDC, plus 2 digital I/O points

⑥ ⑦ Output 1 and 2 Hardware Options		
	Output 1	Output 2
AJ =	None	Mechanical relay 5A, Form A
CJ =	Switched dc/open collector	Mechanical relay 5A, Form A
EJ =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A

⑧ Additional Communication Options	
Standard bus always included	
A =	None
1 =	EIA 485 Modbus® RTU
2 =	EIA 232/485 Modbus® RTU
3 =	EtherNet/IP™ Modbus® TCP
5 =	DeviceNet™
6 =	PROFIBUS DP

⑩ ⑪ Output 3 and 4 Hardware Options		
	Output 3	Output 4
AA =	None	None
AJ =	None	Mechanical relay 5A, Form A
AK =	None	SSR Form A, 0.5A
CA =	Switched dc/open collector	None
CC =	Switched dc/open collector	Switched dc
CJ =	Switched dc/open collector	Mechanical relay 5A, Form A
CK =	Switched dc/open collector	SSR Form A, 0.5A
EA =	Mechanical relay 5A, Form C	None
EC =	Mechanical relay 5A, Form C	Switched dc
EJ =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
EK =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
FA =	Universal process	None
FC =	Universal process	Switched dc
FJ =	Universal process	Mechanical relay 5A, Form A
FK =	Universal process	SSR Form A, 0.5A
KK =	SSR Form A, 0.5A	SSR Form A, 0.5A

¹/₁₆ DIN Models: If communication options 2 thru 6 is ordered in previous digit, then Option AA must be ordered here.

⑫ Isolated Input Options	
A =	None
D =	Isolated input 1

⑬ ⑭ Custom Options	
Firmware, overlays, parameter settings	
AA =	Standard EZ-ZONE PM face plate

Integrated Multi-Function

EZ-ZONE PM Express

The EZ-ZONE PM Express panel mount controller is an industry-leading PID controller that allows optimal performance utilizing simple control and menu functionality without complex features. It is ideal for basic applications and usage levels.

The EZ-ZONE PM Express is the next generation controller to follow the legacy of Watlow's SERIES 93, SERIES 935 AND SERIES SD controllers that offer easy-to-use features to perform many basic applications. The EZ-ZONE PM Express includes one universal input and an option for up to two outputs and is available in $\frac{1}{2}$ and $\frac{1}{6}$ DIN panel mount packages. It can be ordered as a PID process controller or as a dedicated over and under-temperature limit controller.

The EZ-ZONE PM Express is a valuable addition to the EZ-ZONE PM controller family which also includes the EZ-ZONE PM integrated controller and the EZ-ZONE PM standard version.

Features and Benefits

Simplified menu

- Fits basic applications with a user-friendly interface supported by two menus and a streamlined list of parameters
- Eliminates complexity often experienced with more advanced controllers and unnecessary features
- Reduces training costs and user programming errors

PID auto-tune

- Provides auto-tune for fast, efficient startup

Standard bus communications

- Allows easy product configuration via PC communications protocol and free software
- Saves time, simplifies programming process and improves reliability of controller setup

Factory Mutual (FM) approved over and under limit with auxiliary outputs

- Increases user and equipment safety for over and under-temperature conditions

Agency approvals: UL® listed, CSA, CE, RoHS, W.E.E.E., FM, SEMI F47-0200, Class 1, Div. 2 rating on selected models

- Assures prompt product acceptance
- Reduces end product documentation costs

Front panel removable

- Saves time and labor for replacements and troubleshooting



P3T armor sealing system

- Complies with NEMA 4X, IP66 specifications
- Allows controller to be cleaned and washed
- Certified UL® 50 independent to NEMA 4X specification

Touch-safe package

- Increases installer and operator safety
- Complies with IP2X requirements

Consistent Termination Labeling (CTL) connection system

- Simplifies switching between products
- Speeds up user's system documentation

Three-year warranty

- Demonstrates Watlow's reliability and product support

High-amperage power control output

- Drives 15 ampere resistive loads direct
- Reduces component count
- Saves panel space and simplifies wiring
- Reduces cost of ownership

Class 1, Div. 2

- Rated UL® 1604 for use in hazardous locations
- Saves agency and component costs

Integrated Multi-Function

EZ-ZONE PM Express

Specifications

Line Voltage/Power

- 85 to 264VAC, 47 to 63Hz
- 20 to 28VAC, +10/-15%; 50/60Hz, $\pm 5\%$
- 12 to 40VDC
- 10VA max. power consumption
- Data retention upon power failure via non-volatile memory
- Compliant with SEMI F47-0200, Figure R1-1 voltage sag requirements @ 24VAC or higher

Environment

- 0 to 149°F (-18 to 65°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: $\pm 0.1\%$ of span, $\pm 1^\circ\text{C}$ @ the calibrated ambient temperature and rated line voltage
 - Type S: 0.2%
 - Type T below -50°C : 0.2%
- Calibration ambient temperature @ $77^\circ\text{F} \pm 5^\circ\text{F}$ ($25^\circ\text{C} \pm 3^\circ\text{C}$)
- Accuracy span: 1000°F (540°C) min.
- Temperature stability: $\pm 0.1^\circ\text{F}/^\circ\text{F}$ ($\pm 0.1^\circ\text{C}/^\circ\text{C}$) rise in ambient max.

Agency Approvals

- cULus® UL/EN/CSA C22.2 No 61010-1 Listed, File E185611
- CSA C22.2 No. 24, File 158031 ($1/32$ and $1/16$ DIN sizes)
- UL® 50 4X indoor locations, NEMA 4X, IP66 front seal
- cULus® ANSI/ISA 12.12.01-2007, CSA-C22.2 No. 213-1987, Class 1, Div. 2, Groups A, B, C and D, temperature code T4A, File E184390 (optional)
- CE, RoHS by design, W.E.E.E.

Controller

- User selectable heat/cool, on-off, P, PI, PD, PID or alarm action, not valid for limit controllers
- Auto-tune with control algorithm
- Control sampling rates: input = 10Hz, outputs = 10Hz
- Input and output capacity per controller type ordering information

Serial Communications

- Isolated communications
- Standard bus configuration protocol

Wiring Termination—Touch-Safe Terminals

- Input, power and controller output terminals are touch safe, removable, 12 to 22 AWG

Universal Input

- Thermocouple, grounded or ungrounded sensors, greater than $20\text{M}\Omega$ input impedance, $2\text{k}\Omega$ source resistance max.
 - Non-isolated to switched dc and process output
- RTD 2- or 3-wire, platinum, 100Ω @ 0°C calibration to DIN curve ($0.00385 \Omega/\Omega/^\circ\text{C}$)
- Process, 4-20mA @ 100Ω , or 0-10VDC @ $20\text{k}\Omega$ input impedance; scalable

Functional Operating Range

Type J: -346 to 2192°F (-210 to 1200°C)
Type K: -454 to 2500°F (-270 to 1371°C)
Type T: -454 to 750°F (-270 to 400°C)
Type E: -454 to 1832°F (-270 to 1000°C)
Type N: -454 to 2372°F (-270 to 1300°C)
Type C: 32 to 4200°F (0 to 2315°C)
Type D: 32 to 4200°F (0 to 2315°C)
Type F: 32 to 2449°F (0 to 1343°C)
Type R: -58 to 3214°F (-50 to 1767°C)
Type S: -58 to 3214°F (-50 to 1767°C)
Type B: 32 to 3300°F (0 to 1816°C)
RTD (DIN): -328 to 1472°F (-200 to 800°C)
Process: -1999 to 9999 units

Output Hardware

- Switched dc = 22 to 32VDC @ 30mA
- Open collector = 30VDC max. @ 100mA max. current sink
- Solid state relay (SSR), Form A, 0.5A @ 24VAC min., 264VAC max., opto-isolated, without contact suppression
- Electromechanical relay, Form C, 24 to 240VAC or 30VDC max., 5A resistive load, 100,000 cycles at rated load
- Electromechanical relay, Form A, 24 to 240VAC or 30VDC max., 5A resistive load, 100,000 cycles at rated load
- NO-ARC relay, Form A, 24 to 240VAC, 15A @ 122°F (50°C), resistive load, no VDC, 2 million cycles at rated load
- Universal process output: range selectable; 0 to 10VDC $\pm 15\text{mV}$ into a min. $1,000\Omega$ load with 2.5mV nominal resolution; 4 to 20mA $\pm 30\mu\text{A}$ into max. 800Ω load with $5\mu\text{A}$ nominal resolution; temperature stability 100ppm/ $^\circ\text{C}$

Operator Interface

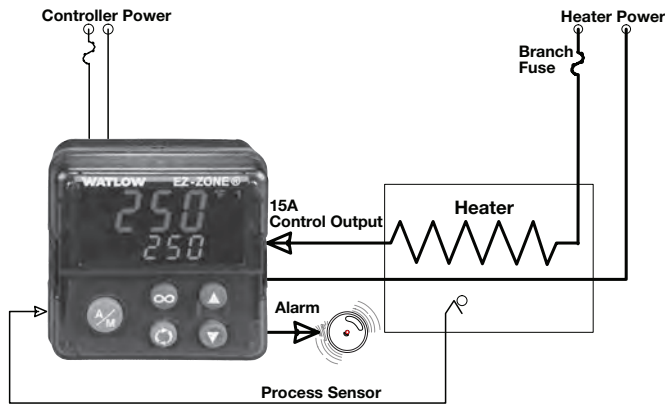
- Dual 4 digit, 7 segment LED displays
- Typical display update rate 1Hz
- Advance, infinity (RESET), up and down keys plus an A/M-KEY (not available in $1/32$ DIN)
- A/M-KEY automatically programmed as an auto/manual transfer mode function on PID models.

Integrated Multi-Function

EZ-ZONE PM Express

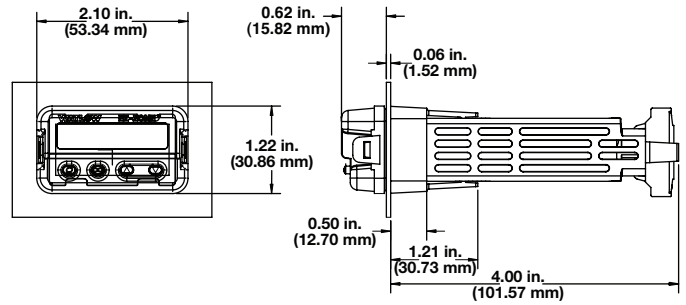
Typical Block Diagrams

EZ-ZONE PM EXPRESS PID Model

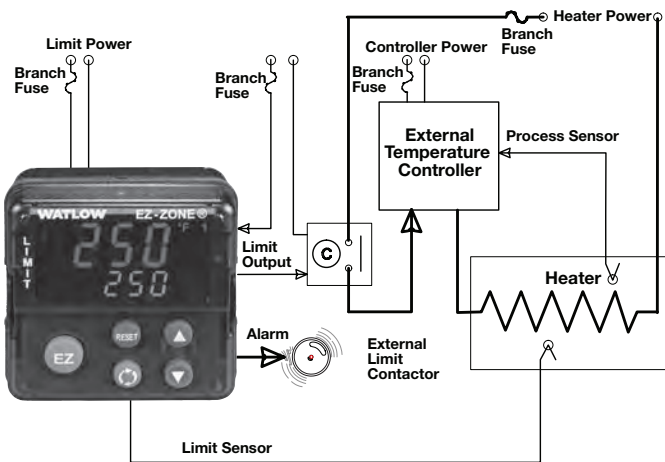


Dimensional Drawings

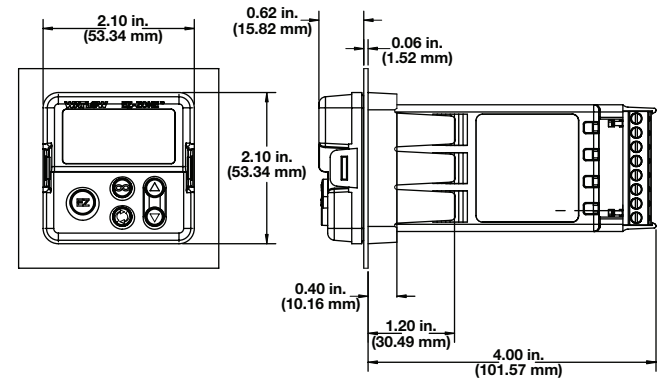
EZ-ZONE PM 1/32 DIN



EZ-ZONE PM EXPRESS Limit Model



EZ-ZONE PM 1/16 DIN



Integrated Multi-Function

EZ-ZONE PM Express

Ordering Information

Universal Sensor Input, Standard Bus Communications, Dual Line Red over Green Seven-Segment Displays

Part Number

① ②	③	④	⑤	⑥ ⑦	⑧ ⑨ ⑩ ⑪	⑫	⑬ ⑭
	Package Size	Primary Function	Power Supply	Output 1 and 2 Hardware Options	Future Options	Menu Type	Add'l Options
PM					AAAA	B	

③ Package Size	
3 =	1/32 DIN
6 =	1/16 DIN
8 =	1/8 DIN vertical (future option)
9 =	1/8 DIN horizontal (future option)
4 =	1/4 DIN (future option)

④ Primary Function	
C =	PID controller with universal input
L =	Limit controller with universal input (only valid Output 1 and 2 selections = AJ, CJ or EJ)

⑤ Power Supply	
1 =	100 to 240VAC
3 =	20 to 28VAC or 12 to 40VDC

⑥ ⑦ Output 1 and 2 Hardware Options		
	Output 1	Output 2
AJ =	None	Mechanical relay 5A, Form A
CA =	Switched dc/open collector	None
CH =	Switched dc/open collector	NO-ARC 15A power control
CC =	Switched dc/open collector	Switched dc
CJ =	Switched dc/open collector	Mechanical relay 5A, Form A
CK =	Switched dc/open collector	SSR Form A, 0.5A
EA =	Mechanical relay 5A, Form C	None
EH =	Mechanical relay 5A, Form C	NO-ARC 15A power control
EC =	Mechanical relay 5A, Form C	Switched dc
EJ =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
EK =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
FA =	Universal process	None
FC =	Universal process	Switched dc
FJ =	Universal process	Mechanical relay 5A, Form A
FK =	Universal process	SSR Form A, 0.5A
AK =	None	SSR Form A, 0.5A
KH =	SSR Form A, 0.5A	NO-ARC 15A power control
KK =	SSR Form A, 0.5A	SSR Form A, 0.5A

⑫ Menu Type	
B =	PM Express with English manual

⑬ ⑭ Additional Options	
AA =	Standard EZ-ZONE PM face plate
AB =	EZ-ZONE logo, no Watlow name
AC =	No logo, no Watlow name
12 =	Class 1, Div. 2 (not available with mechanical relay Output types E, H or J)

Integrated Multi-Function

SERIES EHG® SL10

The SERIES EHG® SL10 integrated, multi-function controller is a key component to a powerful system that includes a heater, an adjustable set point temperature controller, a high/low temperature alert, a power switching device and a high temperature safety limit. Its agency recognized controller/safety limit meets UL® 1998 and CE 60730 requirements.

An optional display/communications module can be easily added in the field to provide a digital display indication, an adjustment of set point, RS485 Modbus® communications and other Human Machine Interface (HMI) features. As a scalable system, only what is needed can be purchased.

The EHG SL10 controllers' easy to install, compact design, inherent reliability and integrated limit functions offer unmatched value. It is designed for easy integration with Watlow heaters to simplify engineering, reduce component count for new equipment and decrease ownership cost. For original equipment manufacturers (OEMs), the EHG SL10 controller's CE, Semi-S2 compliance and UL® recognition reduces time and costs associated with global agency testing and validation. U.S. Patent Number 8,044,329.

Features and Benefits

Extended temperature range -0.4 to 999°F (-18 to 537°C)

- Ideal for demanding environments

Process controller and safety limit in one package

- Meets UL® 1998 and CE 60730 requirements
- Eliminates the need for a thermal fuse on a heater
- Eliminates replacement of heater when fuse fails

Optional display/communications module

- Allows easy upgrade on to base device
- Offers low cost field upgrade
- Provides easy, snap-on installation

Accurate and flexible temperature process controller

- Replaces problematic bi-metal thermostats with accurate electronic temperature process controller
- Allows easy change of process parameters

Extended set point/process range

- Supports broader applications

Ambient operating temperature range 32 to 158°F (0 to 70°C)

- Increases reliability when mounting in harsh temperature environments or in close proximity to heaters



Integrated high/low temperature alert signal relay

- Provides dry contact output to activate external alarm or process function
- Signals control status with three integrated LEDs
- Allows a signal of up to two amperes 30VAC/VDC, Form A to alert if process temperature is out of range limits

Health check diagnostics

- Monitors maximum heater process temperature, maximum ambient temperature and thermocouple operation
- Provides health check signal to inform operator that the process is working correctly

Universal power supply

- Allows an input of 85 to 264VAC, 50/60Hz
- Provides safe control of up to 2400 watts with 10 amperes switching in both controller and safety limit

Can be switched from on-off and PID algorithm

- Increases product life (on-off control is default)
- Offers selectable PID control algorithm for tighter temperature uniformity

Universal 1/8 turn mounting bracket

- Allows mounting to most surfaces
- Provides flexible mounting—either horizontally or vertically

Typical Applications

Semiconductor processing

- Gas delivery lines

Life sciences

- Laboratory equipment
- Medical equipment
- Pharmaceutical

Foodservice equipment

- Warming and serving equipment
- Food holding cabinets

Integrated Multi-Function

SERIES EHG SL10

Technical Information

Specifications

Operational

- Two, Type K thermocouple inputs - process temperature control and safety limit
- Process temperature output - 10A NO-ARC relay
- Safety limit alarm - 10A relay
- High/low temperature alert - 2A 30VAC/VDC, Form A (single pole, normally open contact)
- On-off temperature controller algorithm, upgraded via communications to PID algorithm (min. cycle time 30 seconds)

Standard Molex® connectors

- Controllers are integral to the heater and are supplied by Watlow

Power

- Isolated universal power supply 85 to 264VAC, 50/60Hz
- Up to 2400 W with 10A switching capability

NO-ARC Relay

- 10A switching
- 4.5 million cycles

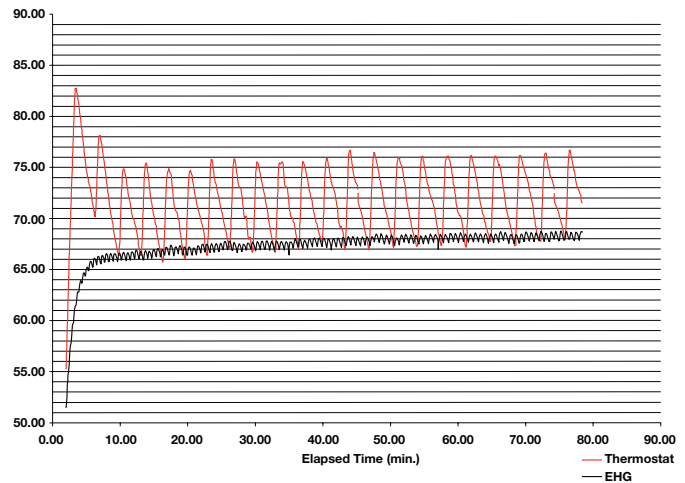
Environmental

- Ambient operating temperature range 32 to 158°F (0 to 70°C)

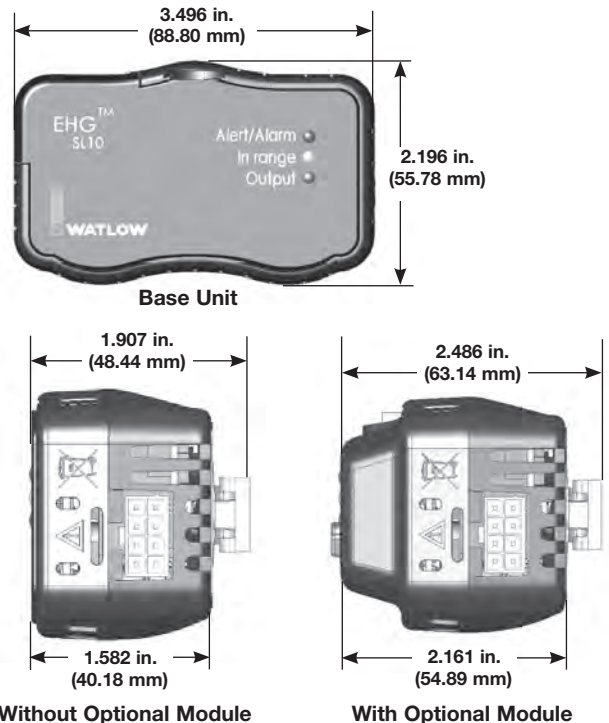
Agency Approvals

- UL® 1998/ C-UL®
- CE 60730
- Semi-S2

SERIES EHG Versus Thermostat (typical application)



Dimensions



Switching Device Comparison Chart

	T-Stat	Solid State Relay	Watlow NO-ARC Relay
Amperage at 77°F (25°C)	10A	10A	10A
Amperage at 158°F (70°C)	10A	De-rate significantly and add heat sink and air cooling	10A
Output device life at 10A	Rated 100,000 at 158°F (70°C)	Greater than 10 million cycles at 77°F (25°C)	Greater than 4.5 million cycles at 158°F (70°C)

Integrated Multi-Function

SERIES EHG SL10

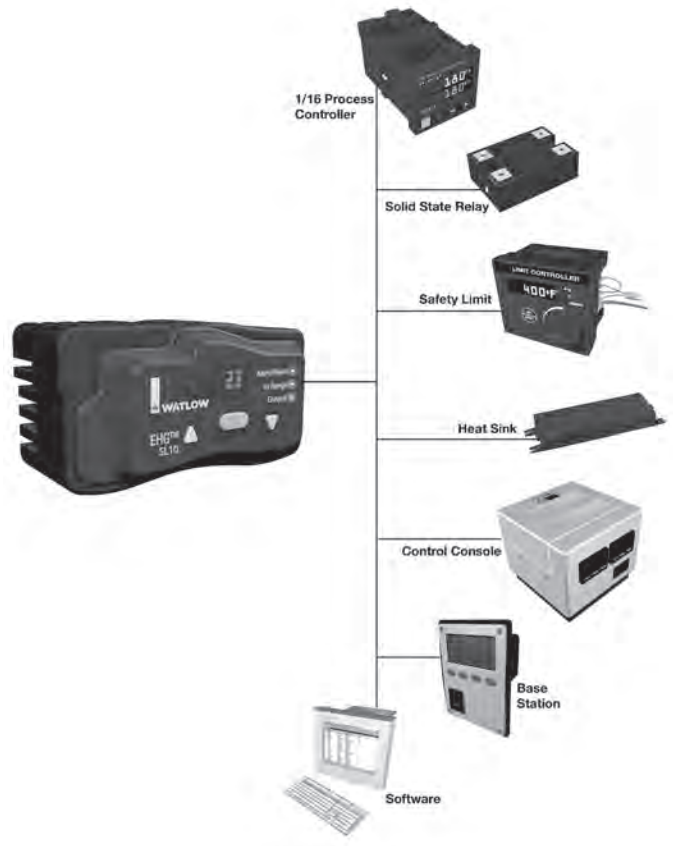
Technical Information (Continued)

EHG SL10 Software

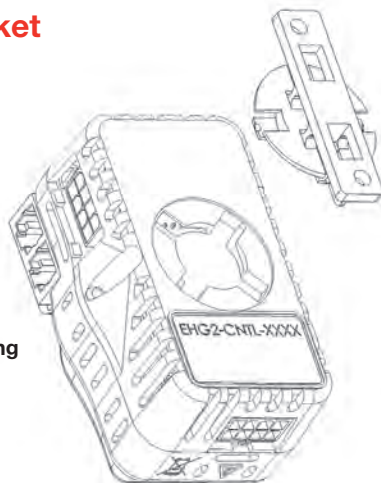
With the addition of an optional communication module, the EHG SL10 can be managed, monitored and manipulated via software. Change set points, label devices, change tuning parameters, check health status and much more all with the click of a key.



Reduces System Complexity and Cost



Mounting Bracket



The EHG SL10 mounting enables the controller to be mounted in four angles.



The EHG SL10 can be "daisy-chained" for gas line and other assemblies.





Integrated Multi-Function

SERIES EHG SL10

Technical Information (Continued)

Optional Upgrade Modules

These upgrade modules are easy to install. There is no need to reconfigure, rewire or reorder the base unit. A technician is not needed for the installation, resulting in a seamless, cost-efficient system that can be upgraded.

		Diagnostics Memory Control Parameters	Ability to Change Temperature Parameters	Field Adjustable Set Point	3-Digit 7-Segment LED Display Illuminated	Diagnostic LED's	User Interface Software	Modbus® RTU Communication	RS 485
Base Unit		✓	✓			✓			
Optional Display Module		✓	✓	✓	✓	✓			
Optional Communication Module		✓	✓	✓		✓	✓	✓	✓
Optional Display and Communication Module		✓	✓	✓	✓	✓	✓	✓	✓

Ordering Information

Part Number

1 2 3 4 5 6	7 8 9
265 EG2	Base/Module

7 8 9	Base/Module
001	Base unit
007	Display module
008	Communications module
002	Display with communications module
023	Base unit (extended temperature range)
020	Display module (extended temperature range)
022	Communications module (extended temperature range)
021	Display with communications module (extended temperature range)

Additional cables for wiring parallel heater circuits (daisy-chaining) in gas line and other assemblies

- 4800-0012 - Long cable
- 4800-0022 - Long terminating cable
- 4800-0011 - Short cable
- 4800-0021 - Short terminating cable

Compatible Accessories

Operator Interface Terminals (OIT)



Silver Series touchscreen operator interface terminals provide a customizable user interface and log and graph data for Watlow controllers and other devices. A Silver Series operator interface terminal paired with Watlow controllers, is the perfect solution for industrial processes or machine control applications. See page 345.

Integrated Multi-Function

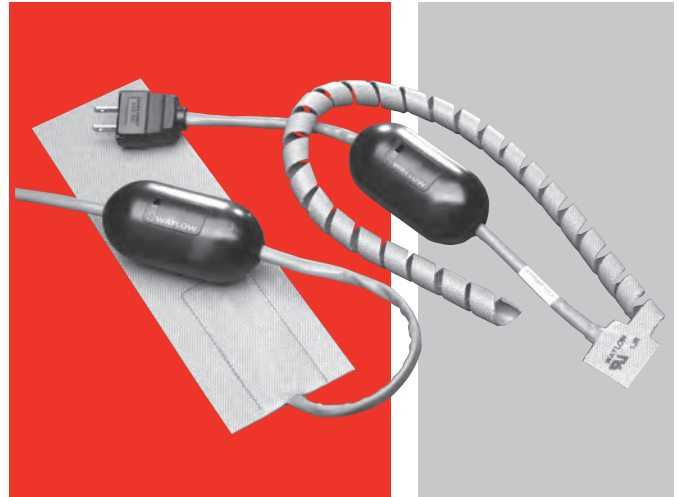
SERIES EHG

Many applications requiring a fixed temperature set point rely on a mechanical thermostat for thermal control. Thermostats have proven, however, to be inadequate for many applications due to long-term reliability issues, such as 100,000 cycle rating and poor temperature control.

The SERIES EHG thermal solution includes a compact temperature control, thermocouple sensor and power switching device integrated into the heater's power cord. The SERIES EHG reduces system costs and lasts substantially longer than a conventional thermostat solution.

The evolution of miniature microprocessor technology and Watlow switching technology fostered development of a small, versatile temperature control and thermocouple sensor that is integrated with Watlow silicone rubber heater products. This device senses the temperature via input from a thermocouple strategically placed on the heater mat. The microprocessor is programmed prior to shipment with an application specific set point. This results in quick delivery of a custom, integrated system.

The small thermocouple mass provides superior response to changes in process temperature enabling higher watt density silicone rubber heater designs. These features offer an integrated custom set point temperature controller with superior life span, faster heat-up rates and improved accuracy. The SERIES EHG System has been tested to over four million cycles at rated amperage. Depending on the application, Watlow's power switching design can last up to 40 times longer than a conventional thermostat.



Features and Benefits

Long operational life

- Improves system reliability

Tight temperature control

- Ensures process accuracy

Small sensor footprint

- Fits with almost any heater
- Responds quickly to temperature changes
- Controls high watt densities in low mass applications

Reduced system cost

- A single EHG control can be configured with multiple heaters

Pre-wired, in line control

- Simplifies installation
- Two wire power connection

Durable housing with built-in strain relief

- Protects electronics
- Low risk of mechanical damage

Manufactured with proven Watlow components

- Assures reliable system performance

Integrated Multi-Function

SERIES EHG

Technical Information

Specifications

Operational

- SERIES EHG silicone rubber heater UL[®] recognized to 428°F (220°C) operating temperature
- Factory programmed fixed set point
- On-off control with 6°F (3°C) switching hysteresis
- Temperature band LED indicator ON between -68 and +68°F (-20 and +20°C) of set point

Electrical

- Voltage rating: 120 or 240VAC – 30/+10%, 50/60Hz
- Silicone rubber heater watt densities up to 80 W/in² (12.5 W/cm²) dependent on application temperature
- SERIES EHG system UL[®] recognized to 10A max.

Sensor

- Type K thermocouple

Mechanical

- Control dimensions 3.75 in. (95 mm) long by 1.75 in. (45 mm) diameter
- Heater per silicone rubber heater specifications

Agencies

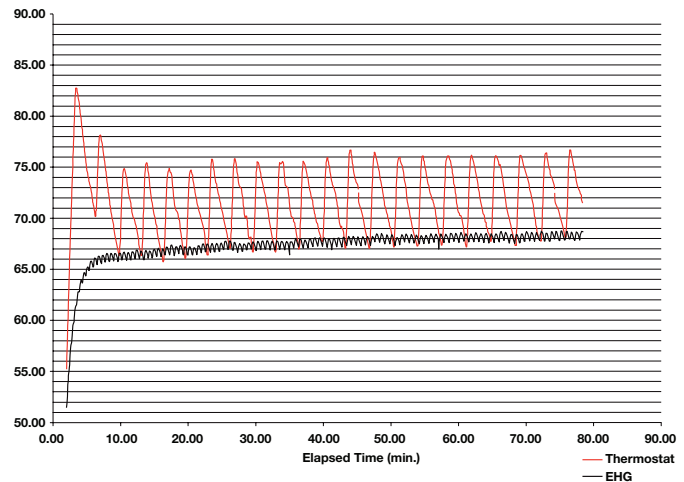
- Silicone rubber heater: UL[®] recognized File #E52951
- SERIES EHG control: TUV File DE 3-3068 to EN 61010-1:2001, UL[®] File E43684 to UL[®] 873 temperature indicating and regulating equipment

Environmental

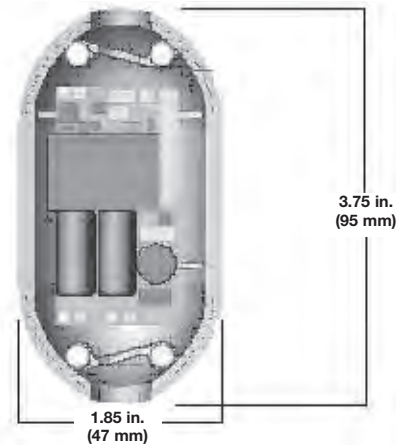
- Control operating temperature range 32 to 158°F (0 to 70°C)
- Control storage temperature range -40 to 158°F (-40 to 70°C)

Contact your Watlow representative for custom configurations.

SERIES EHG Versus Thermostat (typical application)



Dimensions



Integrated SERIES EHG System Versus Integrated Thermostat System

	Integrated EHG System	Integrated Thermostat System	SERIES EHG Benefit
Life comparison at rated amperage 10A load	Tested to greater than 4,000,000 cycles with	Rated 100,000 cycles	Longer product life of SERIES EHG system and high application reliability
Switch hysteresis	6°F (3°C)	15°F (8°C)	Provides superior process control
Improved response time reduces overshoot on start-up	6°F (3°C) typical	25°F (14°C) typical	Responds to temperature changes faster than a thermostat
Warranty	2 years for material and workmanship	1 year on material and workmanship	Warranty can be extended due to longer life cycle
Zero Cross Switching	SERIES EHG has zero cross switching	Random switching during sign wave cycle	Reduces the possibility of electrical mechanical interference (EMI)