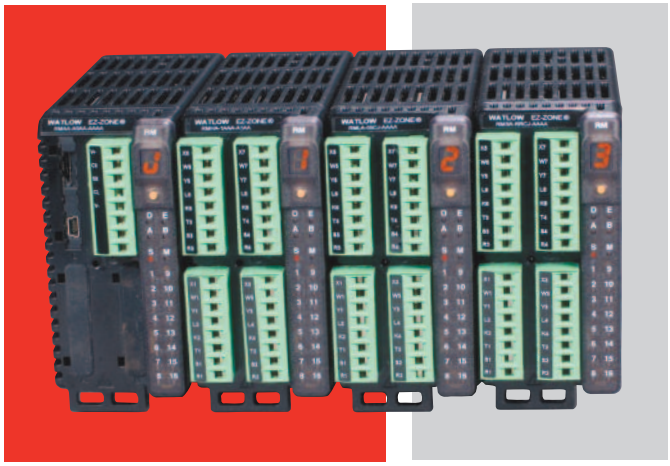
# EZ-ZONE® RM MULTI-LOOP CONTROLLER

## EZ-ZONE® RM Introduces High-Density Modules Which Integrate Temperature, Process, Limit and Power Control from 1 to 152 Loops



The EZ-ZONE® RM controller family offers products that simplify thermal system management. The EZ-ZONE RM family is comprised of six module types: an integrated on or off PID control, monitoring and over/under temperature limit module, a high-density on or off 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 you to mix and match I/O to configure 1 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 inputs
- Sequencer start up and control functions
- Programmable timer and counter functions
- Programmable math and logic functions
- Multiple communication protocols
- Mobile configuration with removable secure digital (SD) flash card

**Benefits of using an integrated controller solution:**

- Reduces wiring time and termination complexity compared to 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 to the operator 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 1 to 152 PID loops of control or monitor up to 256 analog inputs**

- Mix and match I/O to fit any application; from 1 input with 2 outputs to 152 analog inputs with 152 outputs, or monitor up to as many as 256 analog inputs all in one system
- Saves money because only required loops are purchased
- Allows a common controller platform across many design applications since 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**

- Saves time and reduces complexity by automatically configuring 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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Winona, Minnesota USA



WIN-EZRM-0710

## 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 modules)

### 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, 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; ⅛ 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

## 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

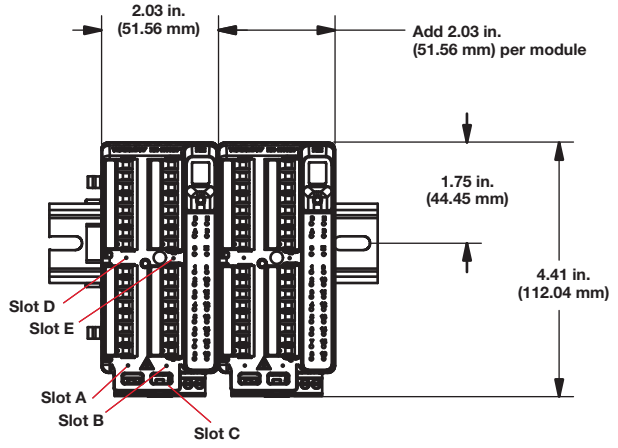
### Variable

- User value for digital or analog variable

### EZ-ZONE RM Family Comparison

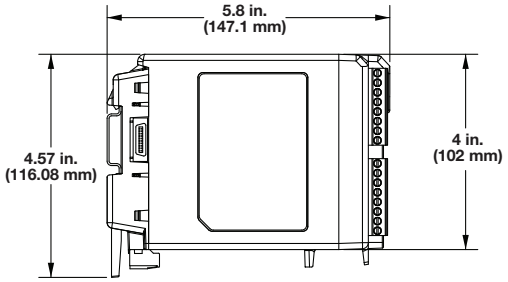
| | Control Module | High-Density Control Module | High-Density Limit Module | Expansion Module | High-Density Scanner Module |
|---|---|---|---|---|---|
| Number of modules per system | 1 to 16 | 1 to 16 | 1 to 16 | 1 to 16 | 1 to 16 |
| Number of PID loops per module | 1 to 4 | 4, 8, 12 or 16 | 0 | 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 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 | 1 to 24 | 0 | 0 | 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 |

## Dimensional Drawings

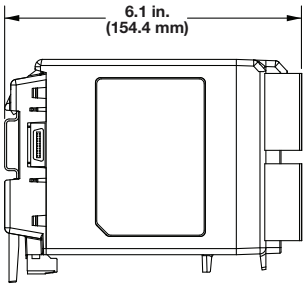



| Connector Type | Module Depth in. (mm) |
|---|---|
| **Standard (Right Angle)** | 5.8 (148) |
| **Straight (Front Screw)** | 6.1 (155) |
| **Ring Terminal** | 6.5 (166) |

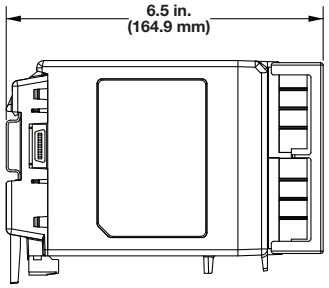
### Standard Connectors




### Front-Screw Connectors




### Ring Terminal Connectors



## 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)

**Serial Communications**

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

**Additional Communication Option**

- 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**

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

**Universal Input**

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

**Thermistor Input**

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

**Digital Input**

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

**Dry Contact Input**

- Update rate 10Hz
- Min. open resistance 10kΩ
- Max. closed resistance 50Ω
- Max. short circuit 13mA

**Current Measurement Input**

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

**Output Hardware**

- Switched dc:
  - Max. 32 VDC 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. 30 VDC @ 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 ±15mV into a min. 1,000Ω load with 2.5mV nominal resolution
  - 0 to 20mA ±30µA into max. 800Ω load with 5µA nominal resolution
  - Temperature stability is 100ppm/°C

# Control Module Ordering Information

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

**Code Number**

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

## 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 |

## 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) |

## 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)** | |

## 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 model 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 |

## 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)

**Serial Communications**

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

**Additional Communication Option**

- EIA 485, Modbus® RTU

**Calibration Accuracy**

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

**Universal Input**

- Thermocouple, grounded or ungrounded sensors
- >20MΩ input impedance
- Max. of 2kΩ source resistance
- RTD 2-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve (0.00385Ω/Ω/°C)
- Process, 0-20mA @100Ω, or 0-10VDC @ 20kΩ input impedance; scalable, 0-50mV

**Thermistor Input**

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

**Digital Input**

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

**Dry Contact Input**

- Update rate 10Hz
- Min. open resistance 10kΩ
- Max. closed resistance 50Ω
- Max. short circuit 13mA

**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

## High-Density Control Module Ordering Information

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

**Code Number**

| ①② EZ-ZONE Rail Mount | ③ Control Module | ④ Connector Style | | ⑤ Slot A | ⑥ Slot B | ⑦ Slot D | ⑧ Slot E | | ⑨ Future Options | ⑩ Enhanced Options | ⑪⑫ 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 |
| J | = | 4 mechanical relay 5A, Form A |
| C | = | 6 digital I/O |

**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 |
| J | = | 4 mechanical relay 5A, Form A |
| C | = | 6 digital I/O |

**⑨ Future Options**

| | | |
|---|---|---|
| A | = | Standard |

**⑩ Enhanced Options**

| | | |
|---|---|---|
| A | = | Standard Bus |
| 1 | = | Standard Bus and Modbus® RTU 485 (user-selectable) |

**⑪⑫ Additional Options**

**Firmware, Overlays, Parameter Settings**

| | | |
|---|---|---|
| AA | = | Standard |
| AB | = | Replacement connectors hardware only for the entered model number |
| XX | = | Custom |

## 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

**Serial Communications**

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

**Additional Communication Option**

- EIA 485, Modbus® RTU

**Calibration Accuracy**

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

**Universal Input**

- Thermocouple, grounded or ungrounded sensors
- >20MΩ input impedance
- Max. of 2kΩ source resistance
- RTD 2-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve (0.00385Ω/Ω/°C)
- Process, 0-20mA @100Ω, or 0-10VDC @ 20kΩ input impedance; scalable, 0-50mV

**Thermistor Input**

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

**Digital Input**

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

**Dry Contact Input**

- Update rate 10Hz
- Min. open resistance 10kΩ
- Max. closed resistance 50Ω
- Max. short circuit 13mA

**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

## High-Density Limit Module Ordering Information

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

**Code Number**

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

**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)* |

**⑨ Future Options**

| | | |
|---|---|---|
| A | = | Standard |

**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 model number |
| XX | = | Custom |

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

## 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
- DC voltage
- Max. input 36V at 3mA
- Min. high state 3V at 0.25mA
- Max. low state 2V

**Dry Contact**

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

**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 option, 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

## Expansion Module Ordering Information

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

**Code Number**

| ① ② EZ-ZONE Rail Mount | ③ Expansion Module | ④ Connector Style/ Custom Product | | ⑤ Slot A | ⑥ Slot B | ⑦ Slot D | ⑧ Slot E | | ⑨ ⑩ Future Options | ⑪ ⑫ 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 |
| J | = | 4 mechanical relay 5A, Form A |
| K | = | 2 SSRs, Form A, 10A max. each **(if ordered, then slots B must be = A)** |

**⑥ Slot B**

| | | |
|---|---|---|
| A | = | None |
| C | = | 6 Digital I/O |
| J | = | 4 Mechanical relay 5A, Form A |

**⑦ Slot D**

| | | |
|---|---|---|
| A | = | None |
| C | = | 6 digital I/O |
| J | = | 4 mechanical relay 5A, Form A |
| K | = | 2 SSRs, Form A, 10A max. each **(if ordered, then slot E must be = A)** |

**⑧ Slot E**

| | | |
|---|---|---|
| A | = | None |
| C | = | 6 digital I/O |
| 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) |

**⑨ ⑩ Future Options**

| | | |
|---|---|---|
| AA | = | Standard |

**⑪ ⑫ Additional Options**

**Firmware, Overlays, Parameter Settings**

| | | |
|---|---|---|
| AA | = | Standard |
| AB | = | Replacement connectors hardware only, for the entered model 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 |

## 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

**Serial Communications**

- Isolated communications
- All modules ship with standard bus protocol for configuration and communication with all EZ-ZONE controllers

**Additional Communication Option**

- EIA 485, Modbus® RTU

**Calibration Accuracy**

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

**Universal Input**

- Thermocouple, grounded or ungrounded sensors
- >20MΩ input impedance
- Max. of 2kΩ source resistance
- RTD 2-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve (0.00385Ω/Ω/°C)
- Process, 0-20mA @100Ω, or 0-10VDC @ 20kΩ input impedance; scalable, 0-50mV

**Thermistor Input**

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

**Digital Input**

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

**Dry Contact Input**

- Update rate 10Hz
- Min. open resistance 10kΩ
- Max. closed resistance 50Ω
- Max. short circuit 13mA

**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

## High-Density Scanner Module Ordering Information

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

**Code 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 Options | 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 |

**⑨ Future Options**

| | | |
|---|---|---|
| A | = | Standard |

**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 model number |
| XX | = | Custom |

## 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

**Serial Communications**

- Isolated 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.

## Access Module Ordering Information

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

**Code 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 |

**⑤ Future Options**

| | | |
|---|---|---|
| A | = | Standard |

**⑥ Communications Options**

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

**⑦ Ramp/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.

**⑨ ⑩ Future Options**

| | | |
|---|---|---|
| AA | = | Standard |

**⑪ ⑫ Additional Options**

**Firmware, Overlays, Parameter Settings**

| | | |
|---|---|---|
| AA | = | Standard |
| AB | = | Replacement connectors hardware only, for the entered model 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 |

# Accessories

## Specifications for Basic Remote User Interface (RUI) EZKB

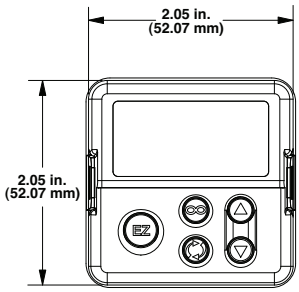
### Operator Interface

- Dual 4 digit, 7 segment LED displays
- Forward, backward, up and down keys plus a customer programmable function key - EZ key
- Typical display update rate: 1Hz
- Agency approved to IP65/NEMA 4X
- Standard bus ships with all units. Options: EIA 232/485 Modbus® RTU, EtherNet/IP™/TCP Modbus® or DeviceNet™, PROFIBUS DP

### Line Voltage/Power

- 100 to 240VAC, +10/-15%; (85-264VAC) 50/60Hz, ±5%
- 24VAC/VDC, +10/-15%; 50/60Hz, ±5%

Basic RUI




Front View

**Depth Dimensions for RUI:** long case 4 in. (101.6 mm), short case 2.33 in. (59.10 mm)

## 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.

## 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.

## 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.

## Accessories *(continued)*

### Power Supplies

- 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 – electronic CD P/N 0601-0001-0000
  User's manual – printed hard copy P/N 0600-0061-0000
  User's manual (RMH) – printed hard copy P/N 0600-0074-0000
  User's manual (RML) – printed hard copy P/N 0600-0075-0000
  User's manual (RMS) – printed hard copy P/N 0600-0071-0000
- Controller support tools - electronic CD P/N 0500-3080-0000



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**Taiwan,** +886 7 288 5168 • **United Kingdom,** +44 (0) 115 964 0777