

## EZ-ZONE® PM Controllers Take the Pain Out of Solving Your Thermal Loop Requirements

Watlow's EZ-ZONE® PM panel mount controller offers control options to reduce system complexity and the cost of thermal loop ownership. You can order the EZ-ZONE PM as a PID controller, an over/under limit controller or these functions can be combined into an integrated controller. You now have the 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. A number of serial communication options are available to support your connectivity needs.

Because the EZ-ZONE PM controller is highly scalable you only pay for what you need. This controller is available in ½ or ⅙ DIN panel mount packages. If you are looking for a PID controller, an over/under limit controller or an integrated controller, the EZ-ZONE PM will make your life easier.

### Features and Benefits - Standard

#### Advanced PID control algorithm

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

#### Configuration communications with software

- Saves time and improves reliability of controller setup

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

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

#### Memory for saving and restoring parameter settings

- Reduces service calls and down time

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

- Assures prompt product acceptance
- Reduces end product documentation costs

#### P3T armor sealing system

- Complies to NEMA 4X, IP66
- Allows controller to be cleaned and washed down
- UL® 50 independent certification to NEMA 4X specification

#### Touch-safe package

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

#### Consistent Termination Labeling (CTL) connection system

- Allows removable cage clamp connectors
- Provides consistent termination labeling

#### 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

- Demonstrates Watlow's reliability and product support

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### Features and Benefits - Optional

#### Integrated PID and limit controller

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

#### High amperage power control output

- Drives 15 amp resistive loads direct
- Reduces component count
- Saves panel space and simplifies wiring
- Reduces 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, and DeviceNet™
- Supports network connectivity to a PC or PLC

#### Class I div. 2

- UL® 1604 rated for use in hazardous locations

#### Remote set point operation

- Supports efficient 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 four files and 40 total steps

#### Retransmit

- Supports industry needs for product process recording



ISO 9001



Registered Company  
Winona, Minnesota USA

WIN-EZPM-1007

UL® is a registered trademark of Underwriter's Laboratories Inc.

Modbus® is a registered trademark of Schneider Automation Incorporated.

EtherNet/IP™ is a trademark of Open DeviceNet Vendors Association.

## Specifications

### Line Voltage/Power

- 85 to 264V~(ac), 47 to 63Hz
- 20 to 28V~(ac), +10/-15 percent; 50/60Hz, ±5 percent
- 12 to 40V=(dc)
- 10VA maximum power consumption
- Data retention upon power failure via nonvolatile memory
- Compliant with SEMI F47-0200, Figure R1-1 voltage sag requirements @ 24V~(ac) or higher

### Environment

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

### Accuracy

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

### Agency Approvals

- UL®/EN 61010 Listed
- UL® 1604 Class I div. 2 on non mechanical relay units
- UL® 50, NEMA 4X, EN 60529 IP66
- CSA 610110 CE
- RoHS, W.E.E.E.
- Limit version features FM Class 3545

### 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
- Input and output capacity per controller type ordering information

### Serial Communications

- Isolated communications
  - EIA 232/485, Modbus® RTU
  - EtherNet/IP™/Modbus® TCP (ODVA certified)
  - Future options include DeviceNet™ and 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
  - >20M input impedance
  - 3µA open sensor detection
  - Maximum of 20 source resistance
- RTD 2- or 3-wire, platinum, 100 and 1000 @ 0°C calibration to DIN curve (0.00385 / °C)
- Process, 0-20mA @ 100 , or 0-10V=(dc) @ 20k input impedance; scalable, 0-50mV, 0-1000
- Inverse scaling

### Digital Input

- Update rate 10Hz
- DC voltage
  - Maximum input 36V at 3mA
  - Minimum high state 3V at 0.25mA
  - Maximum low state 2V
- Dry contact
  - Minimum open resistance 10K
  - Maximum closed resistance 50
  - Maximum short circuit 20mA

### Digital Output

- Update rate 10Hz
- Output voltage 24V, current limit, Output 6 = 10mA maximum, Output 5 = 3 pole DIN-A-MITE® or 24 mA maximum

### Current Measurement

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

### Functional Operating Range

- Type J: -210 to 1200°C (-346 to 2192°F)
- Type K: -200 to 1370°C (-328 to 2500°F)
- Type T: -200 to 400°C (-328 to 750°F)
- Type E: -200 to 1000°C (-328 to 1832°F)
- Type N: -200 to 1300°C (-328 to 2372°F)
- Type C: 0 to 2315°C (32 to 4200°F)
- Type D: 0 to 2315°C (32 to 4200°F)
- Type F: 0 to 1395°C (32 to 2543°F)
- Type R: -50 to 1767°C (-58 to 3214°F)
- Type S: -50 to 1767°C (-58 to 3214°F)
- Type B: 0 to 1816°C (32 to 3300°F)
- RTD (DIN): -200 to 800°C (-328 to 1472°F)
- Process: -1999 to 9999 units

### Output Hardware

- Switched dc = 22 to 32V=(dc) @ 30mA
- Switched dc/open collector = 30V=(dc) maximum @100mA maximum current sink
- Solid state relay (SSR), Form A, 0.5A @ 24V~(ac) minimum, 264V~(ac) maximum, opto-isolated, without contact suppression
- Electromechanical relay, Form C, 5A, 24 to 240V~(ac) or 30V=(dc) maximum, resistive load, 100,000 cycles at rated load
- Electromechanical relay, Form A, 5A, 24 to 240V~(ac) or 30V=(dc) maximum, resistive load, 100,000 cycles at rated load
- NO-ARC relay, Form A, 15A, 24 to 240V~(ac), no V=(dc), resistive load, 2 million cycles at rated load
- Universal process/retransmit, Output range selectable:
  - 0 to 10V=(dc) into a minimum 1,000 load
  - 0 to 20mA into maximum 800 load

### Operator Interface

- Dual 4 digit, 7 segment LED displays
- Advance, infinity, up and down keys plus an EZ-KEY programmable function key (not available in ½ DIN)
- Typical display update rate 1Hz

# PID Model Ordering Information

- Universal Sensor Input, Configuration Communications
- TRU-TUNE™+ Adaptive Tune, Red Green Seven Segment Displays

## Code Number

**PM** = EZ-ZONE PM controller

**Package Size**

- 3 = 1/32 DIN
- 6 = 1/16 DIN

## Primary Function

- C = PID controller
- R = Ramp and soak
- S = Custom firmware

## Power Supply, Digital I/O

- 1 = 100 to 240V~(ac)
- 2 = 100 to 240V~(ac) plus 2 digital I/O points
- 3 = 20 to 28V~(ac) or 12 to 40V=(dc)
- 4 = 20 to 28V~(ac) or 12 to 40V=(dc), plus 2 digital I/O points

## Output 1 and 2 Hardware Options

### Output 1

- CA = Switched dc/open collector
- CH = Switched dc/open collector
- CC = Switched dc/open collector
- CJ = Switched dc/open collector
- CK = Switched dc/open collector
- EA = Mechanical relay 5A, Form C
- EH = Mechanical relay 5A, Form C
- EC = Mechanical relay 5A, Form C
- EJ = Mechanical relay 5A, Form C
- EK = Mechanical relay 5A, Form C
- FA = Universal process
- FC = Universal process
- FJ = Universal process
- FK = Universal process
- AK = None
- KH = SSR Form A, 0.5A
- KK = SSR Form A, 0.5A

### Output 2

- None
- NO-ARC 15A power control (1/16 DIN only)
- Switched dc
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- None
- NO-ARC 15A power control (1/16 DIN only)
- Switched dc
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- None
- Switched dc
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- SSR Form A, 0.5A
- NO-ARC 15A power control (1/16 DIN only)
- SSR Form A, 0.5A

## Additional Communication Options, Standard Bus Always Included

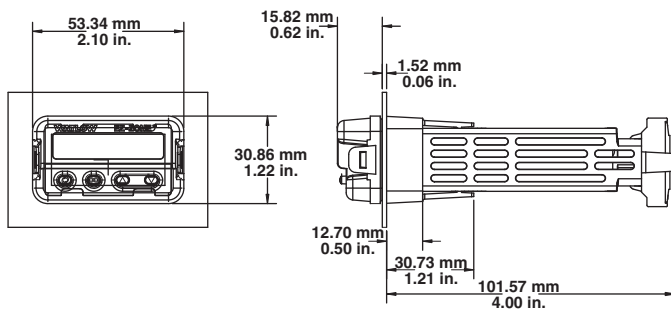
- A = None
- 1 = EIA 485 Modbus® RTU

## Additional Options

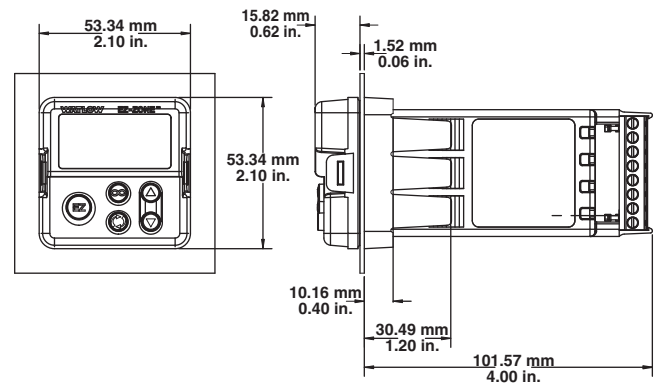
- AA = Standard EZ-ZONE PM face plate
- 12 = Class I div. 2 (not available with mechanical relay output types)
- Firmware, overlays, parameter settings

PM - A A A A

## EZ-ZONE PM 1/32 DIN Dimensional Drawing



## EZ-ZONE PM 1/16 DIN Dimensional Drawing



## Limit Model Ordering Information

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

### Code Number

**PM** = EZ-ZONE PM controller

**Package Size**

3 = 1/2 DIN

6 = 1/6 DIN

**Primary Function**

L = Limit controller

D = Custom firmware

**Power Supply, Digital I/O**

1 = 100 to 240V~(ac)

2 = 100 to 240V~(ac) plus 2 digital I/O points

3 = 20 to 28V~(ac) or 12 to 40V=(dc)

4 = 20 to 28V~(ac) or 12 to 40V=(dc), plus 2 digital I/O points

**Output 1 and 2 Hardware Options**

#### Output 1

AJ = None

CJ = Switched dc/open collector

EJ = Mechanical relay 5A, Form C

#### Output 2

Mechanical relay 5A, Form A

Mechanical relay 5A, Form A

Mechanical relay 5A, Form A

**Additional Communication Options, Standard Bus Always Included**

A = None

1 = EIA 485 Modbus® RTU

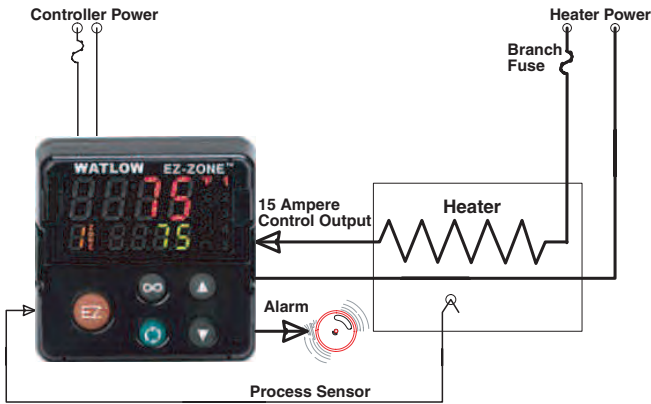
**Additional Options**

AA = Standard EZ-ZONE PM face plate

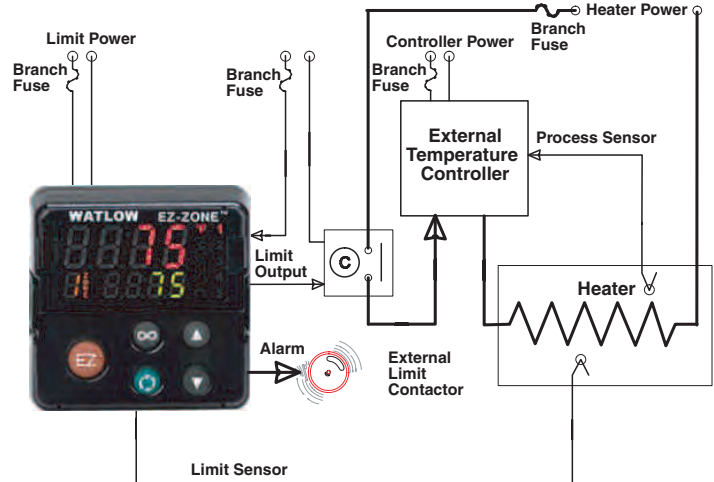
Firmware, overlays, parameter settings

## Typical Block Diagrams

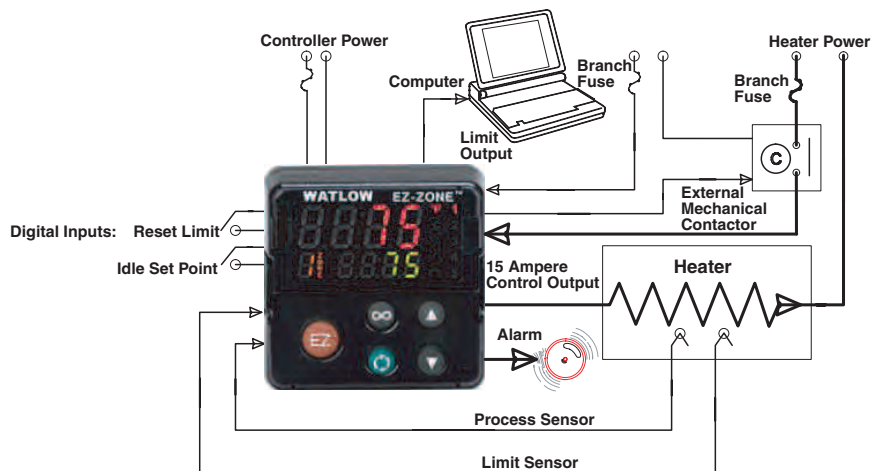
### EZ-ZONE PM PID Model



### EZ-ZONE PM Limit Model



### EZ-ZONE PM Integrated PID Model



# Integrated PID Controller Model Ordering Information

- Universal Sensor Input, Configuration Communications
- TRU-TUNE™+ Adaptive Tune, Red Green Seven Segment Displays

## Code Number

PM 6 - - - - - A

PM = EZ-ZONE PM controller

## Package Size

6 = 1/6 DIN

## Primary Function

- C = PID controller
- R = Ramp and soak
- S = Custom firmware

## Power Supply, Digital I/O

- 1 = 100 to 240V~(ac)
- 2 = 100 to 240V~(ac) plus 2 digital I/O points
- 3 = 20 to 28V~(ac) or 12 to 40V=(dc)
- 4 = 20 to 28V~(ac) or 12 to 40V=(dc), plus 2 digital I/O points

## Output 1 and 2 Hardware Options

### Output 1

- CA = Switched dc/open collector
- CH = Switched dc/open collector
- CC = Switched dc/open collector
- CJ = Switched dc/open collector
- CK = Switched dc/open collector
- EA = Mechanical relay 5A, Form C
- EH = Mechanical relay 5A, Form C
- EC = Mechanical relay 5A, Form C
- EJ = Mechanical relay 5A, Form C
- EK = Mechanical relay 5A, Form C
- FA = Universal process
- FC = Universal process
- FJ = Universal process
- FK = Universal process
- AK = None
- KH = SSR Form A, 0.5A
- KK = SSR Form A, 0.5A

### Output 2

- None
- NO-ARC 15A power control
- Switched dc
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- None
- NO-ARC 15A power control
- Switched dc
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- None
- Switched dc
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- NO-ARC 15A power control
- SSR Form A, 0.5A

## 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 (future option)

## Auxiliary Control Functions

(If communications Options 2 thru 6 were ordered above then Option A must be ordered here)

- A = None
- R = Remote set point 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)

## Output 3 and 4 Hardware Options

(If communications Options 2 thru 6 were ordered above, then Option AA must be ordered here)

### Output 3

- AA = None
- AJ = None
- AK = None
- CA = Switched dc/open collector
- CC = Switched dc/open collector
- CJ = Switched dc/open collector
- CK = Switched dc/open collector
- EA = Mechanical relay 5A, Form C
- EC = Mechanical relay 5A, Form C
- EJ = Mechanical relay 5A, Form C
- EK = Mechanical relay 5A, Form C
- FA = Universal process
- FC = Universal process
- FJ = Universal process
- FK = Universal process
- KK = SSR Form A, 0.5A

### Output 4

- None
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- None
- Switched dc
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- None
- Switched dc
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- None
- Switched dc
- Mechanical relay 5A, Form A
- SSR Form A, 0.5A
- SSR Form A, 0.5A

## Future Options

## Additional Options

- AA = Standard EZ-ZONE PM face plate
- 12 = Class I div. 2 (not available with integrated limit option "L" or mechanical relay output types)
- Firmware, overlays, parameter settings

## Enhanced Limit Model Ordering Information

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

### Code Number

PM = EZ-ZONE PM controller

### Package Size

6 = 1/6 DIN

### Primary Function

L = Limit controller  
D = Custom firmware

### Power Supply, Digital I/O

1 = 100 to 240V~(ac)  
2 = 100 to 240V~(ac) plus 2 digital I/O points  
3 = 20 to 28V~(ac) or 12 to 40V=(dc)  
4 = 20 to 28V~(ac) or 12 to 40V=(dc), plus 2 digital I/O points

### Output 1 and 2 Hardware Options

#### Output 1

AJ = None  
CJ = Switched dc/open collector  
EJ = Mechanical relay 5A, Form C

#### Output 2

Mechanical relay 5A, Form A  
Mechanical relay 5A, Form A  
Mechanical relay 5A, Form A

### 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 (future option)

### Output 3 and 4 Hardware Options

(If communications options 2 thru 6 were ordered above, then option AA must be ordered here)

#### Output 3

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

#### Output 4

None  
Mechanical relay 5A, Form A  
SSR Form A, 0.5A  
None  
Switched dc  
Mechanical relay 5A, Form A  
SSR Form A, 0.5A  
None  
Switched dc  
Mechanical relay 5A, Form A  
SSR Form A, 0.5A  
None  
Switched dc  
Mechanical relay 5A, Form A  
SSR Form A, 0.5A  
SSR Form A, 0.5A

### Future Options

#### Additional Options

AA = Standard EZ-ZONE PM face plate  
Firmware, overlays, parameter settings

PM 6 - A A

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