

EZ-ZONE® PM PANEL MOUNT CONTROLLER

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

The EZ-ZONE® PM panel mount controller from Watlow® 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 1/2, 1/6, 1/8 or 1/4 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 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 to IP2X requirements

Consistent termination labeling 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

- Provides product support and reliability



Features and Benefits - Optional

Integrated PID and limit controller

- Reduces wiring time and termination complexity compared to 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 amperes resistive loads direct
- 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 handle complex process problems such as cascade, ratio, differential, square-root, motorized valve control without slidewire feedback, wet-bulb/dry-bulb, compressor control algorithm and peltier loads

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 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 40 total steps, battery back-up and real time clock

Retransmit Output

- Supports industry needs for product process recording



ISO 9001



WIN-EZPM-0609

Specifications

Line Voltage/Power

- 85 to 264VAC, 47 to 63Hz
- 20 to 28VAC, +10/-15%; 50/60Hz, ±5%
- 12 to 40VDC
- 10VA max. power consumption
- Data retention upon power failure via nonvolatile 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: ±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 ± 5°F (25 ± 3°C)
- Accuracy span: 1000°F (540°C) min.
- Temperature stability: ±0.1°F/°F (±0.1°C/°C) rise in ambient max.

Agency Approvals

- UL® Listed to UL® 61010-1 File E185611
- UL® Reviewed to CSA C22.2 No. 61010-1-04
- UL® 50 Type 4X, NEMA 4X indoor locations, IP66 front panel seal
- FM Class 3545 File 3029084 temperature limit switches
- CE-See Declaration of Conformity RoHS and W.E.E.E. complaint
- ODVA-EtherNet/IP™ Compliance
- UL® Listed to ANSI/ISA 12.1201-2001 File E184390
- This equipment is suitable for use in Class 1, Div. 2, Groups A, B, C and D or non-hazardous locations only. Temperature Code T4A

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 Back-up

- Accuracy (typical): ±30 PPM at 77°F (25°C)
- +30/-100 PPM at -4 to 149°F (-20 to 65°C)
- Battery type: lithium (recycle properly)
- Battery typical life: three cumulative years of unpowered life at 77°F (25°C)

Isolated Serial Communications

- EIA 232/485, Modbus® RTU
- EtherNet/IP™/Modbus® TCP (ODVA certified)
- 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
 - >20MΩ input impedance
 - 3μA open sensor detection
 - Max. of 20KΩ source resistance
- RTD 2- or 3-wire, platinum, 100Ω and 1000Ω @ 0°C calibration to DIN curve (0.00385 Ω/Ω/°C)
- Process, 0-20mA @ 100Ω, or 0-10VDC @ 20kΩ input impedance; scalable, 0-50mV, 0-1000Ω
- Inverse scaling

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 built in

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: -346 to 2192°F (-210 to 1200°C)
- Type K: -328 to 2500°F (-200 to 1370°C)
- Type T: -328 to 750°F (-200 to 400°C)
- Type E: -328 to 1832°F (-200 to 1000°C)
- Type N: -328 to 2372°F (-200 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 2543°F (0 to 1395°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

2 Digital Input/Output Option (2 DIO)

- 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 10KΩ
 - Max. closed resistance 50Ω
 - Max. short circuit 20mA
- Digital output update rate 10Hz
 - Output voltage 24V, current limit, Output 6 = 10mA max., Output 5 = 3 pole DIN-A-MITE® or 24mA max.

6 Digital Input/Output Option (6 DIO)

- Digital input or output
 - Update rate 10Hz
- Switched DC
 - Output voltage 12 to 24VDC, controller automatically adjusts based on current draw
 - Max. supply current source 40mA at 20VDC and 80mA at 12VDC
 - Max. low state 2V
- Open Collector
 - Max. switched voltage is 32VDC
 - Max. switched current per output is 2.5A
 - Max. switched current for all 6 outputs is 10A

Output Hardware

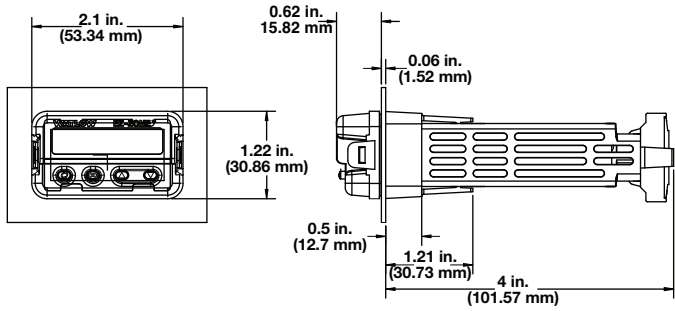
- Switched dc = 22 to 32VDC @ 30mA
- Switched dc/open collector = 30VDC max. @100mA max. current sink
- Solid state relay (SSR), Form A, 0.5A @ 24VAC min., 264VAC max., opto-isolated, without contact suppression
- Electromechanical relay, Form C, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000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

Operator Interface

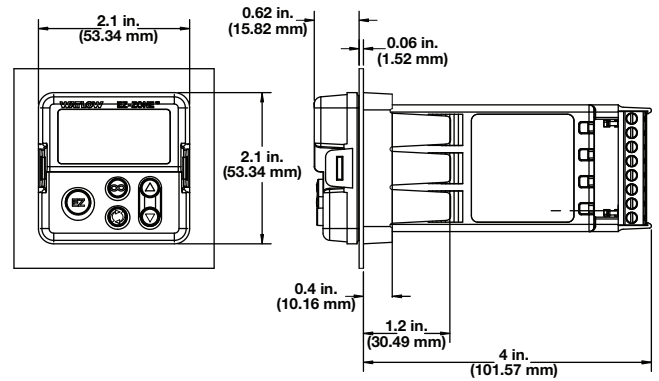
- Dual 4 digit, 7 segment LED displays
- Advance, infinity, up and down keys, plus optional programmable EZ-KEY(s) depending on model size
- Typical display update rate 1Hz
- RESET key substituted for infinity on all models including the limit control

Dimensional Drawings

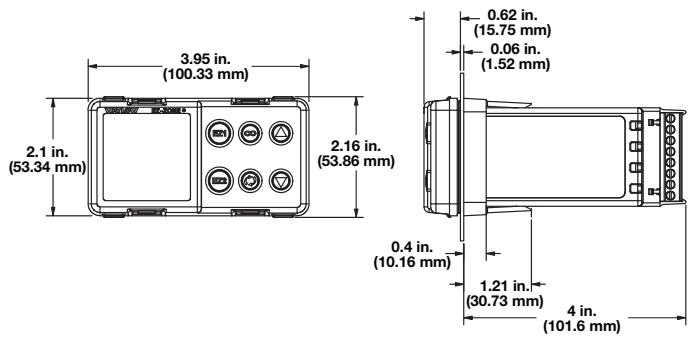
EZ-ZONE PM 1/32 DIN



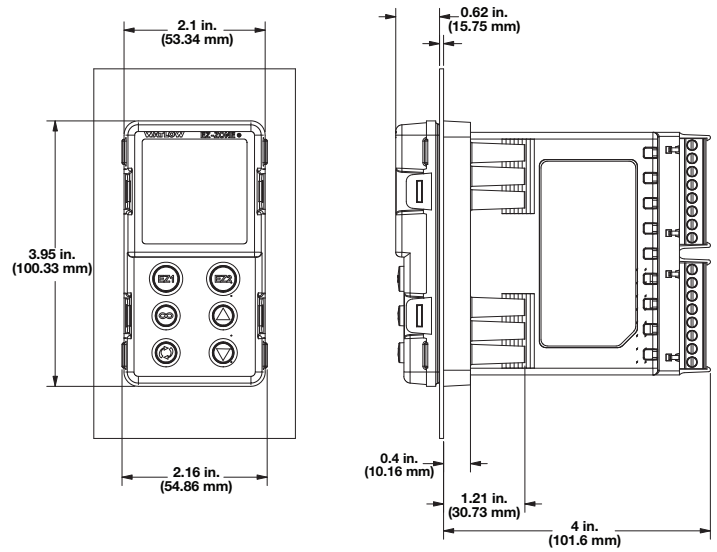
EZ-ZONE PM 1/6 DIN



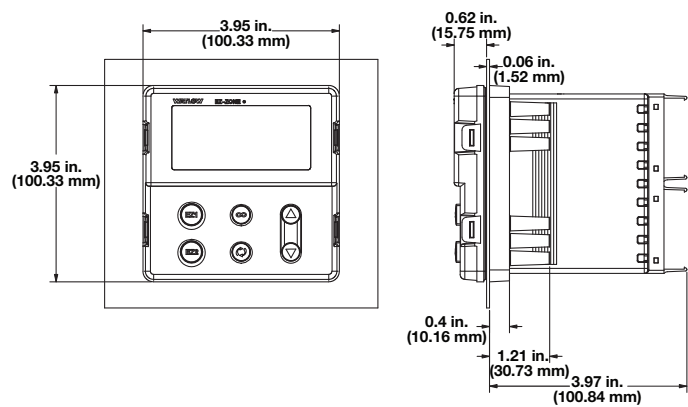
EZ-ZONE PM 1/8 DIN - Horizontal



EZ-ZONE PM 1/8 DIN - Vertical



EZ-ZONE PM 1/4 DIN



EZ-ZONE Comparison Chart

	PM ½ DIN	PM ⅓ DIN	PM ⅛ DIN	PM ¼ 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 Back-Up and Real Time Clock	None	None	Yes	Yes
Quantity Range of Digital Inputs/Outputs (DIO)	0 to 2	0 to 2	0 to 8	0 to 8
Quantity Range Number of Outputs	1 to 4	1 to 6	1 to 12	1 to 12
Integrated Limit Loops	1 Limit must be ordered as separate device	1	1	1
Integrated Power Output/Heat Sink	5A mechanical relay	Qty. 1 15A NO-ARC hybrid relay up to 230VAC	Qty. 2 15A NO-ARC hybrid relay up to 230VAC	Qty. 2 15A NO-ARC hybrid relay up to 230VAC
Integrated Current Measurement	None	Accepts 0-50mA signal from external current transformer	Accepts 0-50mA signal from external current transformer	Accepts 0-50mA signal from external current transformer
Integrated Standard Bus Communications	Yes	Yes	Yes	Yes
Field Bus Communications	Modbus® RTU 485	Modbus® RTU 232/485, EtherNet/IP™, Modbus® TCP, DeviceNet™, Profibus DP	Modbus® RTU 232/485, EtherNet/IP™, Modbus® TCP, DeviceNet™, Profibus DP	Modbus® RTU 232/485, EtherNet/IP™, Modbus® TCP, DeviceNet™, Profibus DP
10 Point Calibration Offset	None	None	Yes	Yes
Cascade/Ratio/Differential/Square-Root	None	None	Yes	Yes
Integrated Sensor Compensation Curves - Altitude (Pressure) and Vaisalla RH	None	None	Yes	Yes
Motorized Valve Control (without Feedback)	None	None	Yes	Yes
Wet Bulb/Dry Bulb	None	None	Yes	Yes

PID Model Ordering Information

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

Code Number

PM - - AAAA

PM = EZ-ZONE PM controller

Package Size

- 3 = 1/2 DIN
- 6 = 1/6 DIN
- 8 = 1/8 DIN vertical
- 9 = 1/8 DIN horizontal
- 4 = 1/4 DIN

Primary Function

Options B and E are not available with 1/2 DIN (PM3) or 1/6 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

Power Supply, Digital 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

Output 1 and 2 Hardware Options

PM3: CH, EH and KH are not valid options for 1/2 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 |

Additional Communication Options, Standard Bus Always Included

- A = None
- 1 = EIA 485 Modbus® RTU

Future Option

- AAAA = None

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)

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Modbus® is a registered trademark of Schneider Automation Inc.

DeviceNet™ and EtherNet/IP™ are trademarks of Open DeviceNet Vendors Association.

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
- 8 = 1/8 DIN vertical
- 9 = 1/8 DIN horizontal
- 4 = 1/4 DIN

Primary Function

- L = Limit controller with universal input
- M = Limit controller with thermistor input
- D = Custom firmware

Power Supply, Digital 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

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 |

Additional Communication Options, Standard Bus Always Included

- A = None
- 1 = EIA 485 Modbus® RTU

Future Option

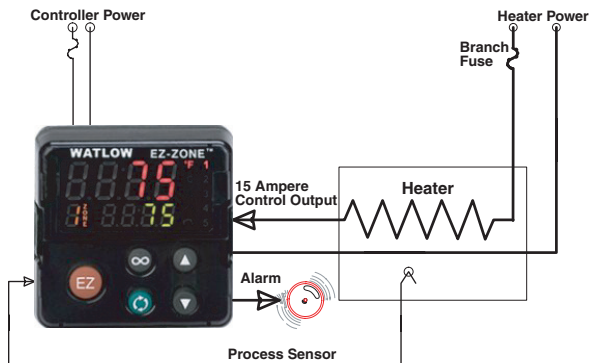
AAAA = None

Custom Options

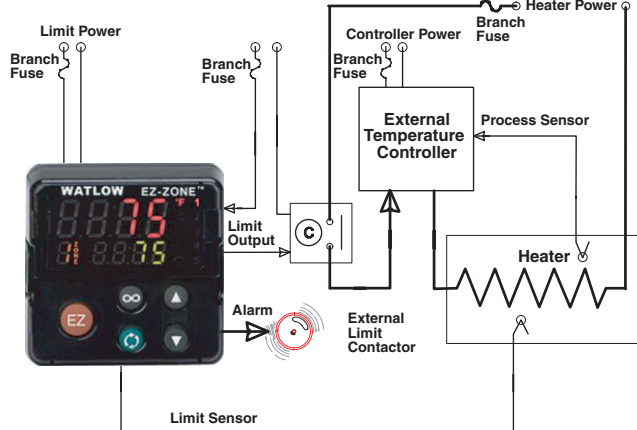
- Firmware, overlays, parameter settings
- AA = Standard EZ-ZONE PM face plate

Typical Block Diagrams

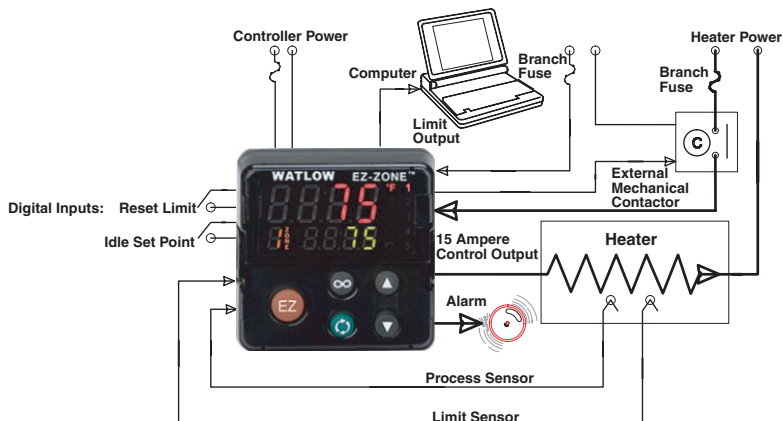
EZ-ZONE PM PID Model



EZ-ZONE PM Limit Model



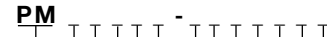
EZ-ZONE PM Integrated PID Model



Integrated PID Controller Model Ordering Information

- Universal Sensor Input, Standard Bus Configuration Communications Included On All Models
- TRU-TUNE+ Adaptive Tune, Red Green Seven Segment Displays

Code Number



PM = EZ-ZONE PM controller

Package Size

- 6 = 1/6 DIN
- 8 = 1/8 DIN Vertical
- 9 = 1/8 DIN Horizontal
- 4 = 1/4 DIN

Primary Function

Options B and E are not available with 1/6 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

Power Supply, Digital 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

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
- SSR Form A, 0.5A
- NO-ARC 15A power control
- SSR Form A, 0.5A

Communication Options or Additional Digital Inputs/Outputs (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 inputs/outputs-not available on 1/6 DIN (PM6)
- D = 6 digital inputs/outputs and EIA 485 Modbus® RTU-not available on 1/6 DIN (PM6)

Auxiliary Control Functions

- A = None
- C = 2nd PID channel with universal input - not available on 1/2 DIN (PM6) models
- J = 2nd PID channel with thermistor input - not available on 1/2 DIN (PM6) models
- R = Auxillary 2nd input (universal input)
- P = Auxillary 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)
- 1/6 DIN (PM6): If communications options 2 thru 6 were ordered in previous digit then Option A must be ordered here
- 1/6 DIN (PM6): Auxillary input = remote set point or back-up sensor
- 1/6 DIN (PM 8/9) or 1/4 DIN (PM4): Auxillary input = remote set point, back-up sensor, ratio, differential, wet-bulb/dry-bulb input

Output 3 and 4 Hardware Options

Output 3

- AA = None
- AJ = None
- AK = None
- CA = Switched dc/open collector
- CC = Switched dc/open collector
- CH = 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
- EH = 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
- KH = SSR Form A, 0.5A
- KK = SSR Form A, 0.5A

Output 4

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

1/6 DIN (PM6): If communication options 2 thru 6 were ordered above then Option AA must be ordered here

1/6 DIN (PM6): Output options CH, EH and KH are not valid the 1/6 package type, only available with 1/6 DIN (PM 8/9) or 1/4 DIN (PM4)

Additional Options

- A = Standard
- C = Enhanced firmware which includes compressor control, cascade, ratio, differential, square-root and motorized valve control without feedback. Option not available with 1/6 DIN (PM6).

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)

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
- 8 = 1/8 DIN vertical
- 9 = 1/8 DIN horizontal
- 4 = 1/4 DIN

Primary Function

- L = Limit controller with universal input
- M = Limit controller with thermistor input
- D = Custom firmware

Power Supply, Digital 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

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

- A = None

Output 3 and 4 Hardware Options

(PM6 models only: 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
- SSR Form A, 0.5A

Future Option

- A = None

Custom Options

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

PM - A A

To be automatically connected to the nearest North American Technical Sales Office:

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