WATLOW

QUICK START GUIDE

PM PLUS™

1/4 DIN CONTROLLER

For model numbers:

PM4 _ _ [E, F or C] [J, C or H] - _ _ _ _ [P,V] _ _

11-19649 2427-4538

More product information: www.watlow.com
User guide: www.watlow.com/kb/pmp
Technical assistance: us.support@watlow.com

Document 11-19649 Rev. - 2427-4538 January 2025

CONTROLLER INTERFACE

Home
- Return to the **Home** screen from anywhere.

Right
- Open the **Operation** list from the **Home** page.
- Advance to the next list or parameter

Left
- Go back to the previous list.

Up / Down
- Increament or decrement a number.
- Scroll up or down in a list.
- Select a list, parameter or value

F1 / F2
- Perform the user-programmable function chosen with the associated **Action** block.

1 - MOUNT TO PANEL

1. Make the panel cutout using the measurements in Figure 1.
2. Remove the green terminal connectors and the mounting collar assembly.
3. Insert the controller into the panel cutout from the front.
4. Orient the collar base so the flat side faces front and the screw openings are on the sides (see figure 2), then slide the base over the back of the controller.

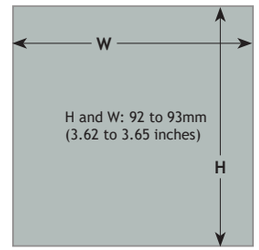


Figure 1

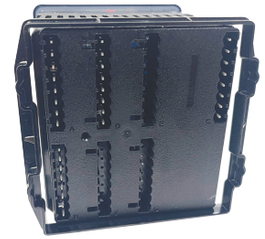


Figure 2

5. Slide the mounting bracket over the controller with the screws aligned to the collar base. Push the bracket gently but firmly until the hooks snap into the slots in the case.
6. Tighten the four #6-19 x 1.5 in. screws (two on each side) with a Phillips screwdriver until the device is flush with the panel (3 to 4 in-lbs torque). See figure 3.
7. Reinstall the terminal connectors in their original locations. (Or first connect field wiring as indicated in this guide and then reinstall the connectors.)

Figure 3

NOTE: Mounting requires access to the back of the panel.

2 - CONNECT THE SENSOR INPUT

Connect your sensors as indicated in the diagram for your sensor type. Figure 4 illustrates a thermocouple connection.

Thermocouple

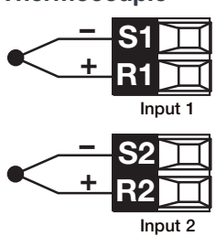
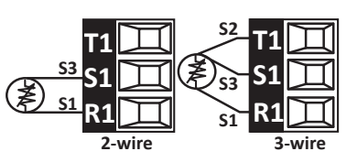


Figure 4: Thermocouple

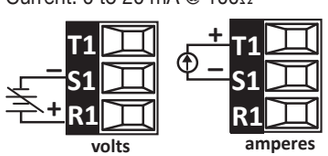
Platinum 100Ω or 1000Ω RTD

20Ω max. round trip lead resistance



Process Voltage or Current

Voltage: 0 to 50 mV or
0 to 10V@ 20kΩ
Current: 0 to 20 mA @ 100Ω



3 - WIRE OUTPUT 1

Refer to the wiring diagram for your model number and connect outputs to the terminals as indicated.

PM4 _ _ C _ - _ _ _ _ _ _ _: Switched DC or Open Collector

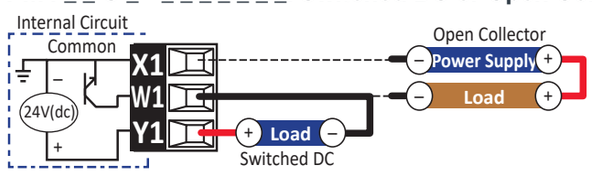
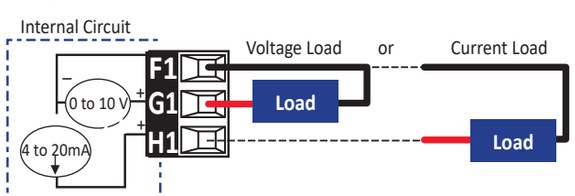


Figure 5: Universal Process Output

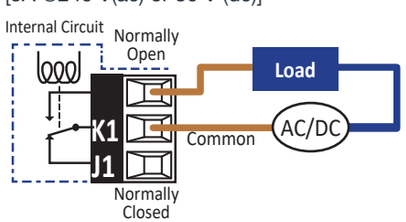
PM4 _ _ F _ - _ _ _ _ _ _ _: Universal Process

0 to 20 mA: 800 Ω max. load or 0 to 10V: 1kΩ min. load



PM4 _ _ E _ - _ _ _ _ _ _ _: Form C Relay

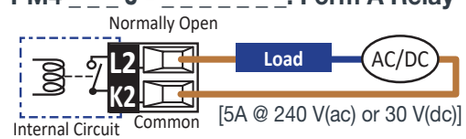
[5A @240 V(ac) or 30 V (dc)]



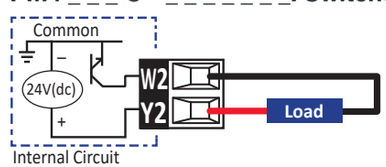
4 - WIRE OUTPUT 2

Refer to the wiring diagram for your model number and connect outputs to the terminals as indicated.

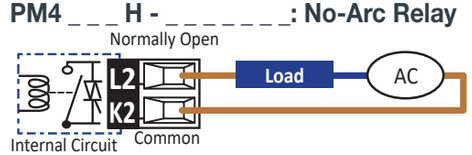
PM4 _ _ _ J - _ _ _ _ _ _ _: Form A Relay



PM4 _ _ _ C - _ _ _ _ _ _ _: Switched DC

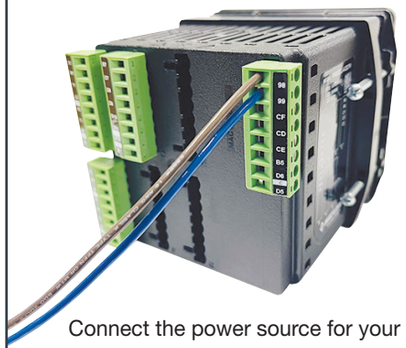


PM4 _ _ _ H - _ _ _ _ _ _ _: No-Arc Relay



5 - CONNECT POWER

Connect power to terminals 98 and 99.



Connect the power source for your model:

PM4 _ [1,2,3,4] _ _ - _ _ _ _ _ _ _

1 or 2: 120-240 V (ac)
3 or 4: 24 V (ac or dc)

CAUTION
Do not connect high voltage to a controller that requires low voltage.

6 - SET UP THE SENSORS

Repeat for other sensors

Sensor Types
- Thermocouple
- Millivolts
- Volts
- Milliamp
- 100Ω RTD
- 1000Ω RTD
- Potentiometer

1. Tap ***Home*** for the **Home** screen.
2. Tap ***Right*** to open the **Operations** list.
3. Select **Setup** (use ***Up / Down*** as needed) and tap ***Right***.
4. Select **Analog Input** and tap ***Right***.
5. Select **Analog Input 1, Analog Input 2** or **Analog Input 3** and tap ***Right***.
6. Select **Sensor Type** and tap ***Right***.
7. Select your sensor and tap ***Right***.

For a thermocouple:
- Scroll to the type: **J, K, N, R, S,** or **T** and tap ***Right***.

For an RTD:
- Tap ***Left*** to return to **Sensor Type.**
- Select **RTD Lead** and tap ***Right.***
- Select **2** or **3** as needed for your sensor and tap ***Right***.

7 - SET UP OUTPUTS

Repeat for all outputs

Output Functions
- Heat Power
- Cool Power
- Event A
- Event B
- Alarm
- Off

1. Tap ***Home*** for the **Home** screen.
2. Tap ***Right*** to open the **Operations** list.
3. Select **Setup** (use ***Up / Down*** as needed) and tap ***Right***.
4. Select **Output** tap ***Right***.
5. Select **Output 1** (or desired output) and tap ***Right***.
6. Select **Function** and tap ***Right***.
7. Scroll to the desired function and tap ***Left***
8. Set the settings for that output function:

For alarm outputs:
- Select **Output Function Instance**, then choose the alarm: **1, 2, 3** or **4**.

For a control loop heat output:
- If you have a relay output, a switched DC output, or a process output with a 0 to 10 V signal; then there is no need to change any settings, since the default settings should apply.
- To set up a 4 to 20 mA process output, set **Output Type** to **Milliamps**, set **Ouptut Function** to **Heat Power**, **Output Function Instance** to **1**, **Scale Low** to **4.00**, **Scale High** to **20.00**, **Range Low** to **0.0** and **Range High** to **100.0.**

8 - SET UP ALARMS

Repeat for other alarms

Alarm Types

Process: alarm set points are set directly

Deviation: alarm set points are relative to the control loop's set point.

Off: no alarm occurs

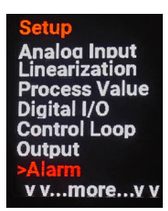
Alarm Sides

High: alarm when process is above high alarm set point.

Low: alarm when process is below low alarm set point.

Both: high and low alarms are active.

Alarm sides allow you to set a high alarm, a low alarm, or both.



Alarm Type
1. Tap ***Home*** for the **Home screen**.
2. Tap ***Right*** to open the **Operations** list.
3. Select **Setup** (use ***Up / Down*** as needed) and tap ***Right***.
4. Select **Alarm** tap ***Right***.
5. Select **Alarm 1**, **Alarm 2, Alarm 3** or **Alarm 4** and tap ***Right***.
6. Select **Type,** and tap ***Right***.
7. Select **Off, Process Alarm** or **Deviation Alarm** and tap ***Left***.

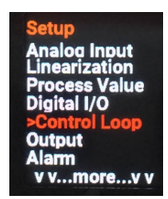
Alarm Sides
1. Scroll to **Alarm Sides** and tap ***Right***.
2. Scroll to the desired option: **Both, High** or **Low** and tap ***Left***.
3. Set the alarm setpoint(s): **Low Set Point** and/or **High Set Point**, as necessary for your sides selection.

9 - CONTROL LOOP MODE, SET POINT, AUTOTUNE

NOTES: By default the control loop Heat algorithim is enabled for PID control and the Cool algorithim is OFF. To enable, go to Control Loop.

CAUTION: Autotune turns on the loop's heat output until the process value exceeds 90% of the set point, then turns the output off and repeats this. When finished the loop controls at the set point. Before starting Autotune, consider if it is safe to do so.

The system must be operational for autotuning to select PID settings.



Control Mode
1. Tap ***Home*** for the **Home screen**.
2. Tap ***Right*** to open the **Operations** list.
3. Select **Setup** (use ***Up / Down*** as needed) and tap ***Right***.
4. Select **Control Loop** and tap ***Right***.
5. Select the control loop (if there is more than one) and tap ***Right***.
6. Scroll to **Control Mode** and tap ***Right***.
7. Select **Off, Auto** or **Manual** and tap ***Right***.
   Auto: loop adjusts output so process matches set point.
   Manual: user sets control loop output in percent power.
   Off: no control loop output

Control Loop Set Point
1. Tap ***Home*** or the **Home screen**.
2. Use ***Up / Down*** to set the set point.

Autotune
1. On the **Setup** list scroll to and select **Control Loop**.
2. Scroll to and select **AutoTune.**
3. Select **Yes.**