

Replacing a Watlow Series 93 Temperature Controller with a Watlow EZ-ZONE[®] PM6 Series Controller

Key Words

- Thermo Scientific SOLA II sulfur online analyzer
- Temperature controller
- Wiring
- Configuration

Purpose

The Thermo Scientific SOLA II sulfur online analyzer uses a temperature controller to control the temperatures of the pyrolyzer furnace and analyzer oven. The original Watlow Series 93 temperature controller has been replaced by the Watlow EZ-ZONE[®] PM6 series controller.

Both controllers are shown in Figure 1. They are similar in size, but the EZ-ZONE PM6 is wired and configured differently. This technical bulletin provides basic instructions for wiring and configuration of the EZ-ZONE PM6.

Note: This technical bulletin is meant to be used as a guide when installing the EZ-ZONE PM6 into a SOLA II system. For complete operating information, refer to the manufacturer's user manual.



Figure 1. Watlow Series 93 (left) and Watlow EZ-ZONE PM6 series (right)

Wiring

! The product's installation and operation must comply with the product's safety certification as well as meet local codes and regulations. Contact Thermo Fisher Scientific with any questions.

⚡ Ensure that power is off and the area is non-hazardous before performing this procedure.

The controller and its physical housing will need to be replaced. Refer to the following for controller terminal connections and wiring diagrams.

- [Figure 2](#) shows the controller's rear termination.
- [Tables 1](#) and [2](#) list the terminal definitions for slots A and C.
- [Figure 3](#) shows the wiring for the Series 93 controller in a SOLA II system.
- [Figure 4](#) shows the wiring for the EZ-ZONE PM6 controller in a SOLA II system.

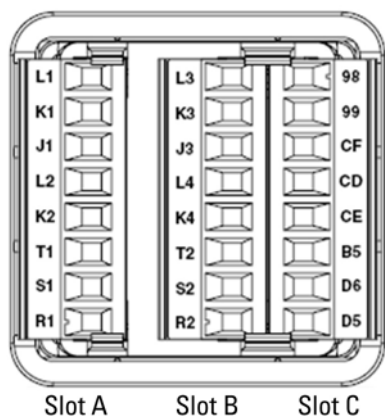


Figure 2. EZ-ZONE PM6 rear terminal connections

Table 1. Terminal definitions for slot A

Output		Terminal Function	Configuration
1	2		
X1		common (Any switched DC output can use this common.)	Switched dc/open collector
W1		dc- (open collector)	Output 1: PM___C_-_AAAA__
Y1		dc+	
	W2	dc-	Switched dc
	Y2	dc+	Output 2: PM___C-AAAA__
F1		voltage or current –	Universal Process
G1		voltage +	Output 1: PM___F_-_AAAA__
H1		current +	
L1		normally open	Mechanical Relay 5A, Form C
K1		common	Output 1: PM___E_-_AAAA__
J1		normally closed	
	L2	normally open	NO-ARC 15 A, Form A
	K2	common	Output 2: PM[4, 6, 8, 9]___H-AAAA__
	L2	normally open	Mechanical Relay 5A, Form A
	K2	common	Output 2: PM___J-AAAA__
L1	L2	normally open	Solid-state Relay 0.5 A, Form A
K1	K2	common	Output 1: PM___K_-_AAAA__ Output 2: PM___K-AAAA__
Inputs			
1			
T1		S2 (RTD) or current +	Universal / Thermistor Input
S1		S3 (RTD), thermocouple -, current -, volts -, or potentiometer wiper, thermistor	Input 1: all configurations
R1		S1 (RTD), thermocouple + or volts +, thermistor	

Table 2. Terminal definitions for slot C

Output	Terminal Function	Configuration
98	power input: ac or dc+	All
99	power input: ac or dc-	
CC	Standard Bus or Modbus RTU EIA-485 common	Standard Bus or Modbus
CA	Standard Bus or Modbus RTU EIA-485 T-/R-	PM_____1 AAAAA__
CB	Standard Bus or Modbus RTU EIA-485 T+/R+	
CF	Standard Bus EIA-485 common	PM_____A AAAAA__
CD	Standard Bus EIA-485 T-/R-	
CE	Standard Bus EIA-485 T+/R+	
B5	digital input-output common	PM_2_ _- AAAAA__
D6	digital input or output 6	PM_4_ _- AAAAA__
D5	digital input or output 5	

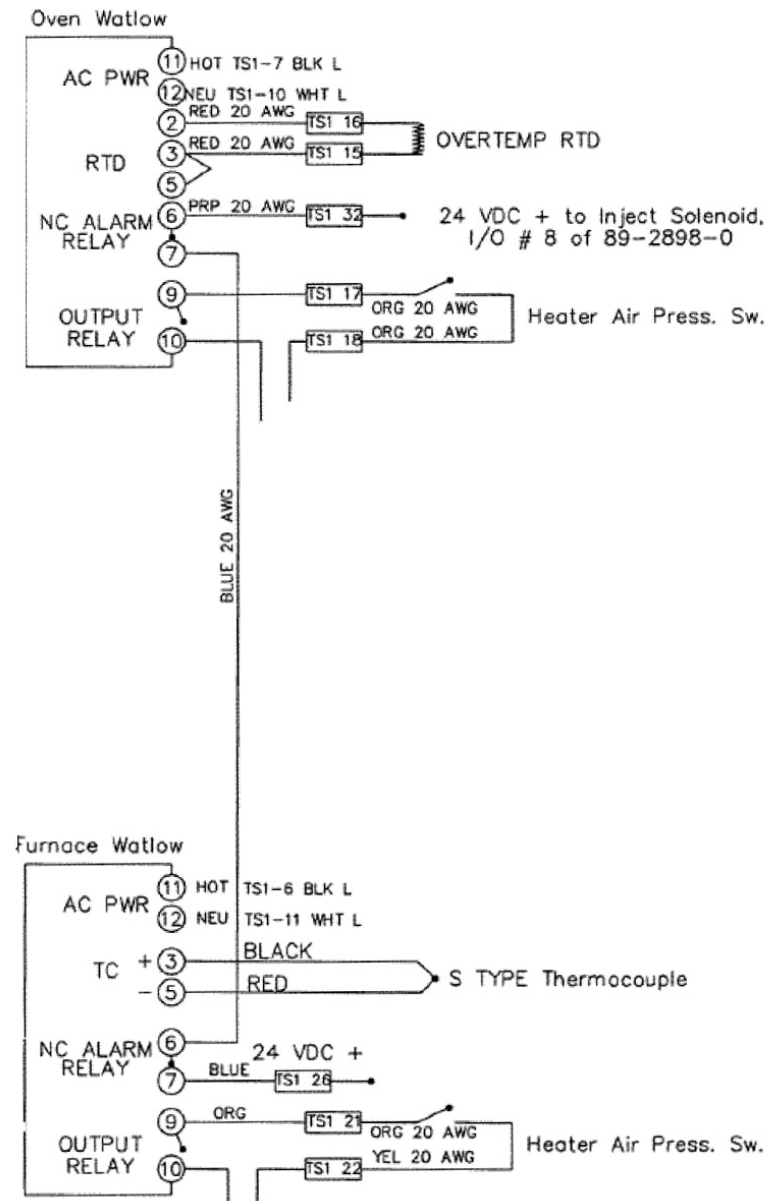


Figure 3. Wiring diagram for Series 93 in a SOLA II system

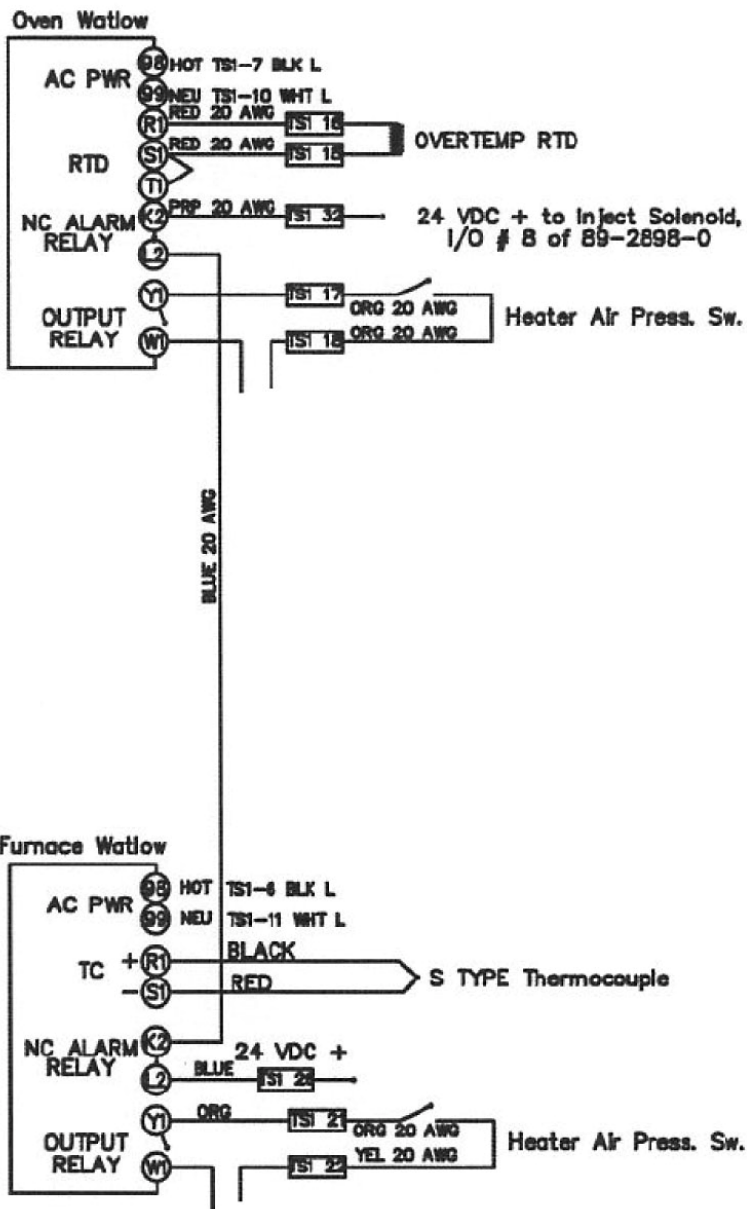


Figure 4. Wiring diagram for EZ-ZONE PM6 in a SOLA II system

Configuration

It is possible to manually configure the controller by viewing the configuration files for Thermo Fisher. The Watlow software used to view these files can be found on the following website:

<http://www.watlow.com/downloads/en/software/ezone.cfm>.

The best option, however, is to upload these files to the controller using a USB-to-RS485 mini-converter. This type of converter is shown in Figure 5 and can be purchased from ULIX (p/n 7942r1-485USBTB-xW-4208ds).

The controller only communicates via 2-wire RS485. The converter needs to be connected to the CD (T-/R-) and CE (T+/R+) on the slot C terminal strip. The terminal definitions for slot C are listed in Table 2.

Please contact Thermo Fisher Technical Support for the relevant Watlow software configuration files.

Configured controllers can be ordered directly from Thermo Fisher. The following part numbers list the various kits available.

- 97-1673-0: Kit, Watlow PM6, 110°C oven (vapor)
- 97-1674-0: Kit, Watlow PM6, 190°C oven (liquid)
- 97-1675-0: Kit, Watlow PM6, pyrolyzer (furnace)



Figure 5. ULIX converter

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