Series 194

Thermistor Sensing Temperature Controller With Remote Indicating Meter Option

FEATURES

- *Relay or Triac outputs*
- *Output to drive Solid State Relay*
- *Lead Break Protection*
- *120, 208, 240 VAC Field Selectable Inputs*
- *Full Transformer Isolation*
- *Remote Indicator Option*
- *Local or Remote Set Point*
- *On/Off or Adjustable Proportioning control Modes*
- *0 to +525˚F (-15 to +270˚C) in five Ranges*
- *Specific Models are UL Component Recognized*

APPLICATIONS

- *Thermoplastic Packaging*
- *Injection Molding*
- *Photographic Processing*
- *Hot Stamp Printing*
- *Compression Molding*
- *Food Processing*
- *Plastic Molding*
- *Sterilization Systems*
- *Hot Melt Glue Applications*
- *Environmental Test Chambers*

DESCRIPTION

The Series 194 Thermistor Sensing Temperature Controller is a versatile, economical solution to virtually any temperature control problem in the 0 to +525˚F (-15 to +270˚C) range. These thermistor sensing controllers provide lead break protection against both open and shorted leads, a choice of relay, triac or SSR driver outputs, plus an optional meter for full scale indication. Field selectable input voltages, local or remote set point adjustment, and flexible mounting options provide additional versatility.

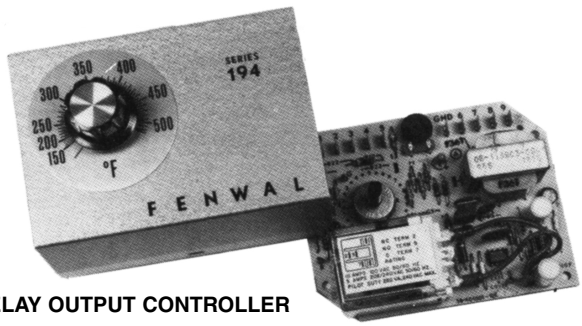
Combined with long-lasting, highly sensitive thermistor sensors, the Series 194 Controller offers low cost, accurate temperature control designed to satisfy your most demanding applications.

CONTROLLER SPECIFICATIONS

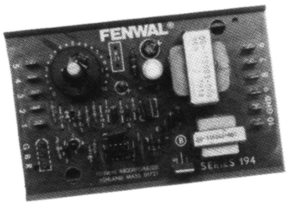
Control Modes On/Off or Adjustable Time Proportioning

Temperature Ranges 0 to +525˚F (-15 to +270˚C) in five overlapping ranges. See Table 2 for standard ranges. For other ranges, consult Fenwal.

Input Power 120, 208 or 240 VAC, ± 10%, 50/60 Hz, field selectable.

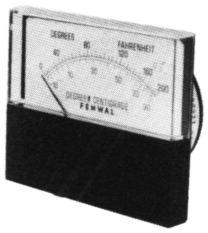


RELAY OUTPUT CONTROLLER



TRIAC OUTPUT CONTROLLER

REMOTE FULL SCALE METER



Output Rated Load

Relay Models: SPDT and DPDT heavy duty relay rated 10 amps at 120 VAC, 5 amps at 208/240 VAC, resistive; 250 VA up to 240 VAC, inductive.

15 Amp Triac Model: Rated per Figure 1 at 120, 208, 240VAC[1]. Inrush: 150 amps. (Peak one cycle surge).

1 Amp Triac Pilot Duty Model: Rated per Figure 1 at 120, 208, 240 VAC. Inrush: 30 amps.

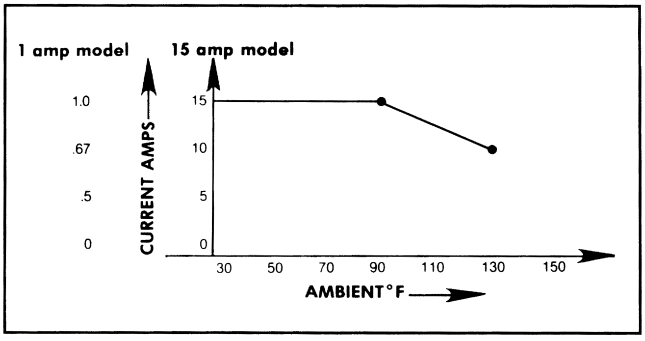


FIGURE 1

[1]**NOTE:** Controller must be mounted to minimum of 2 ft² (0.2m²) 20 gauge metal panel with both sides radiating.

SPECIFICATIONS (Continued)

Vibration Meets requirements of MIL STD 202D, Method 201A.

Ambient Temperature Limits

Relay Model:
Operating: 32 and 130˚F (0 and 55˚C)
Storage: -50 and +165˚F (-45 and +75˚C)

Triac Model:
Operating: 32 and 130˚F (0 and 55˚C)
Storage: -50 and +165˚F (-45 and +75˚C)

Set Point Adjustment Local or remote

Set Point Accuracy Local set point typically ± 5% of span. Remote set point typically ±3% of span.

Ambient Temperature Effect ±2% of span for a change from normal room ambient (77˚F (25˚C)) to the operating limits.

Supply Voltage Effect ±2% of span for a 10% change in line voltage.

Differential (On/Off Models) Typically 0.4˚F (0.2˚C) at mid-range.

Bandwidth (Proportioning Models) Adjustable from 1 to 5% of span, typical.

Cycle Time (Proportioning Models)

Relay Model: 15 seconds typical, 10 seconds minimum fixed.
15 Amp Triac Model: 1 second typical, fixed.
1 Amp Triac Model: 10 seconds typical, fixed.
SSR Driver Model: 1 second typical, fixed.

Lead Break Protection Controller will de-energize its output on lead break. Lead break protection operates when the input is 4MΩ. Controller will also de-energize its output on lead short.

Connections Quick connect terminals. User must supply 1/4 inch quick connect mating terminals for power, thermistor, and remote potentiometer. Connections to indicating meter are 0.093 inch pin connections.

Weight (Approximate):
19-4 with case: 1 pound 10 ounces (735 grams)
19-4 without case: 10 ounces (280 grams)
19-4 Triac: 1 pound 10 ounces (735 grams)

Agency Approvals Relay and triac output models are UL component recognized. File No. E18974. Consult UL for suitability to the application.

REMOTE INDICATING METER SPECIFICATIONS

Temperature Ranges
0 to 212˚F (-15 to +100˚C)
100 to 375˚F (40 to 190˚C)
150 to 525˚F (70 to 270˚C)

Accuracy 3% of span when meter is calibrated to controller.

NOTE: Accuracies are based on nominal Fenwal thermistor resistance curves. Accuracies can be improved through calibration to user's thermal system.

Supply Voltage 12VDC supplied by Series 194 Controller

Ambient Temperature Effect ±2% of span for a change from 32 to 130˚F (0 to 55˚C)

Supply Voltage Effect ±1% of span for a ±10% change in controller line voltage.

Connections Molex connector with 2 foot (61cm) lead wires.

Readability 2.5˚, minor scale divisions. 5˚ on all ranges.

Weight (Approximate): 1 pound 8 ounces (560 grams)

Agency Approvals Some models are UL component recognized, File No. E18974. Consult UL for suitability to the application.

ACCESSORIES

Fenwal also offers remote mounting solid state relays for use with Series 194 Controllers capable of driving a solid state relay (Catalog Number 19-4X407X-X00). Maximum ambient temperature is 135˚F (55˚C).

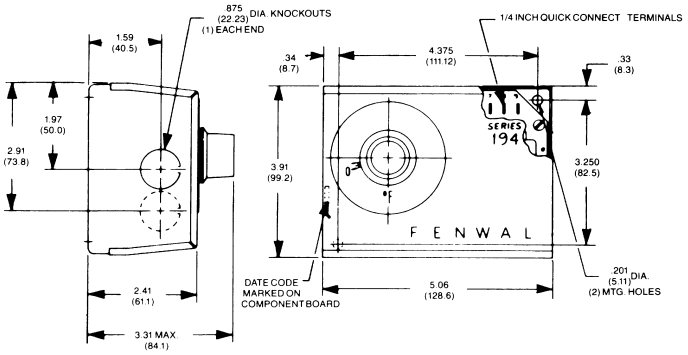
Table 1. Solid State Relays

Relay	Current Rating	Part Number
Solid State	10 amps at 240 VAC* 45 amps at 240 VAC**	55-090000-001 55-090000-003
Solid State With Heatsink	10 amps at 240 VAC 20 amps at 240 VAC	55-090000-011 55-090000-013

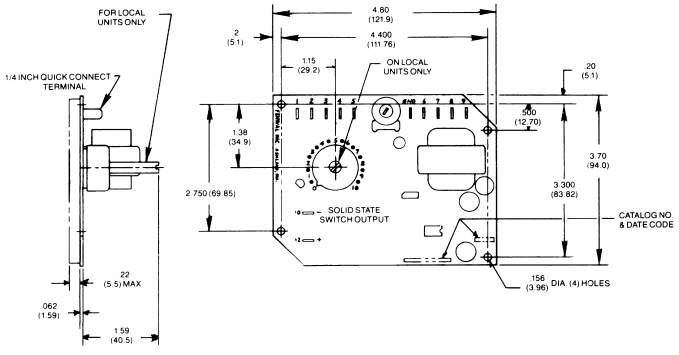
**Mounted on a 6 x 6 in (15 x 15 cm) Metal Plate*
***Mounted on a 12 x 12 in (30 x 30 cm) Metal Plate*
Specifications subject to change without notice.
WARNING: *Operation outside specifications could result in failure of the Fenwal product and other equipment with injury to people and property.*

OUTLINE DIMENSIONS

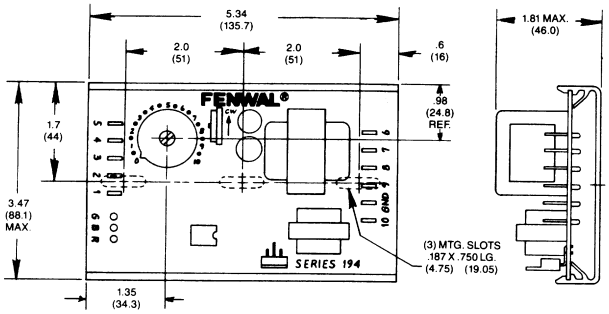
RELAY MODEL



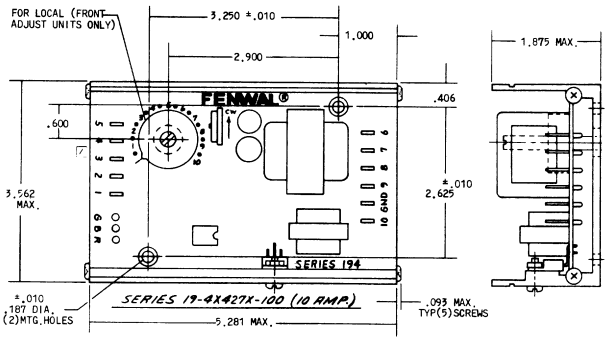
OUTPUT TO DRIVE SSR MODEL



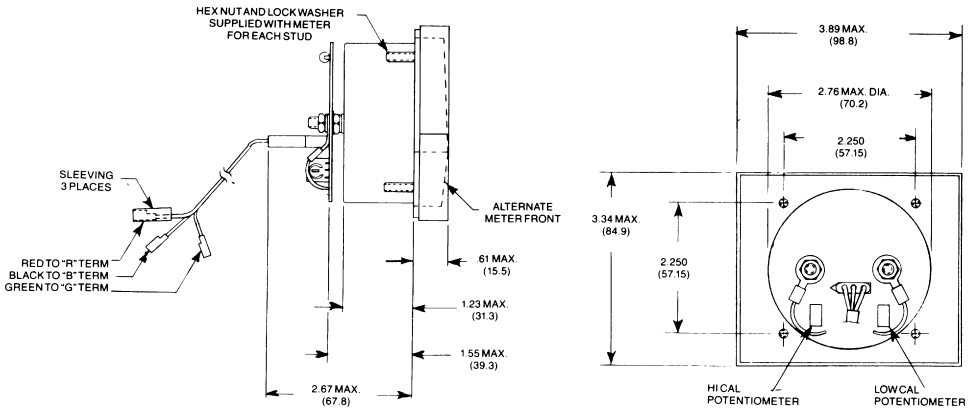
1 AMP TRIAC MODEL



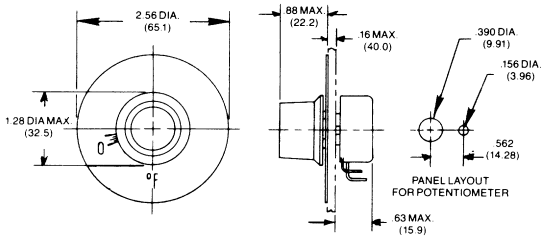
15 AMP TRIAC MODEL



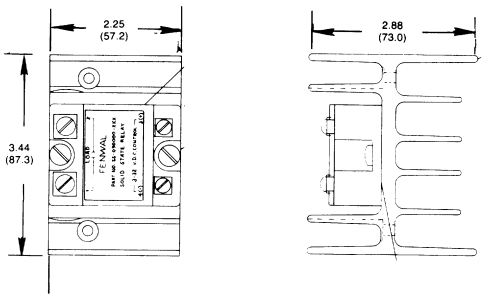
REMOTE INDICATING METER



REMOTE POTENTIOMETER



REMOTE MOUNTING SOLID STATE RELAYS



inch
(mm)

HOW TO ORDER

HOW TO ORDER CONTROLLERS

Order a Series 194 Controller by catalog number specifying type of controller, output, setpoint adjustment, and enclosure. Also specify the temperature range by selecting a dial from Table 2.

Part No. 19 - 4 X 4 X X X - X 0 0

TYPE
0= Proportioning
2= On/Off

OUTPUT
00=Relay, SPDT
01= DPDT
07= Output to Drive SSR**

ENCLOSURE
100= Without
200= With*

SET POINT ADJUSTMENT
5= Local
7= Remote

*Triac units are not available with enclosure
**Not available if "Type 2 = On/Off" is selected.

Table 2 Dial Part Numbers

Relay	For Matched or Noncalibrated Probes	Part Number
0 to 200˚F	06-231013-002	–
0 to 220˚F	–	06-231013-057
100 to 375˚F	06-231013-013	–
100 to 375˚F	06-231013-068*	–
150 to 525˚F	06-231013-004	–
-70 to +50˚F	06-231013-011	–
-10 to +100˚F	06-231013-012	–
40 to 190˚F	06-231013-013	–
70 to 270˚F	06-231013-014	–

**For use with noncalibrated probe only.*

NOTE:
Arbitrary 0 to 10 dial available – Part Number 06-231013-021

Example: Controller 19-404207-100 with Dial 06-23103-004 is a proportional controller with 1 amp Triac output, remote set point adjustment, without enclosure, and with a 150 to 525˚F dial for matched or noncalibrated probes.

HOW TO ORDER REMOTE INDICATING METERS

Order a remote indicating meter for a Series 194 Controller by catalog number as follows:

Temperature Range	Catalog Number
0 to 212˚F (-15 to +100˚C)	19-450032-100
100 to 375˚F (40 to 190˚C)	19-450033-100
150 to 525˚F (70 to 270˚C)	19-450034-100

Notes:

1. For maximum accuracy when ordering a Series 194 Controller and Remote Indicating Meter, specify Modification 19-992033-00X and advise probe catalog number.
2. Specify all components (controller, dial, remote indicating meter, and thermistor probe) in a Series 194 system separately.
   Example:19-404205-100 controller with 06-231010-004 dial, 28-232103-305 probe, and 19-450034-100 remote indicating meter.

HOW TO ORDER THERMISTOR PROBES

Refer to page 49.

KIDDE-FENWAL, INC.
400 MAIN STREET, ASHLAND, MA 01721
TEL: (508) 881-2000 FAX: (508) 881-6729
www.fenwalcontrols.com

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Series 195

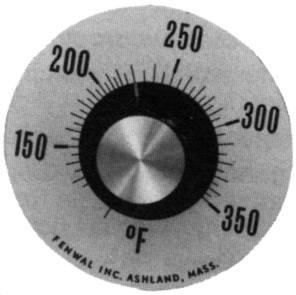
Thermistor Sensing Temperature Controller

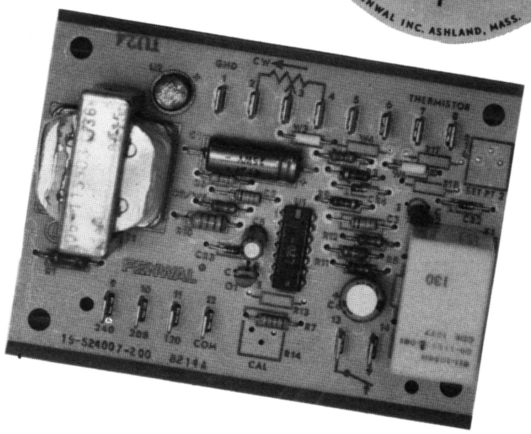
FEATURES

- *Low Cost*
- *Isolated Transformer Control Circuit*
- *Lead Break Protection*
- *120, 208, 240 VAC Field Selectable Inputs*
- *Output to Drive Solid State Relay*
- *25 to 450˚F (0 to 230˚C) in 8 ranges*
- *All Models UL Component Recognized*

APPLICATIONS

- *Photographic Processing*
- *Commercial Cooking*
- *Plastic Molding*
- *Hot Stamp Printing*
- *Sterilization Systems*
- *Hot Melt Glue Application*





DESCRIPTION

The Fenwal Series 195 controller was designed primarily with the OEM manufacturer in mind. It brings to the marketplace a temperature controller at a very affordable price.

Available with isolated transformer control circuits, this controller offers a choice of two outputs: relay and output to drive a solid state relay. the control mode is On/Off.

The units are printed circuit board-type with 1/4 inch quick connect terminals for all connections. Mounting is accomplished quickly and with ease, using either of the mounting options: snap track or standoff eyelets. The temperature sensor is remote mounted for convenience and safety. Long distances can be spanned economically using standard insulated copper wire for thermistor leads.

SPECIFICATIONS

Temperature Ranges

25 to 175˚F 0 to 80˚C
75 to 270˚F 30 to 130˚C
125 to 350˚F 50 to 175˚C
200 to 450˚F 90 to 230˚C
Consult Fenwal for other ranges

Control Mode On/Off

Input Power Field selectable 120, 208, or 240 VAC ± 15%, 50/60 Hz

Output Load

SPST Relay
Resistive:7.5A at 120 VAC; 5 A at 240 VAC: or 28VDC
Pilot Duty: 360 VA at 240 VAC, 180 VA at 120 VAC
Output to Drive SSR: 3 VDC minimum with 1kΩ load

Ambient Temperature Limits

Operating: 32 and 150˚F (0 and 65˚C)
Storage: -25 and +165˚F (-30 and +75˚C)

Ambient Temperature Effect Control point will remain within ±1˚F for any change within the ambient temperature limits.

Supply Voltage Effect Control point will remain within ±0.5˚F for a line voltage variation of 15%

Set Point Accuracy ±5% of span

Differential 1˚F nominal, 2˚F maximum at midrange

Repeatability 0.5% of span

Agency Approvals Some models are UL component recognized, File No. E18974. Consult UL for suitability to the application.

Lead Break Protection Controller will de-energize its output on sensor lead break. Lead break protection operates when the sensor resistance is above 500KΩ.

Vibration Meets MIL STD 202E, Method 201A (Horizontally mounted track)

Weight (Approximate): 6 ounces (168 grams)

Specifications subject to change without notice

WARNING: Operation outside specifications could result in failure of the Fenwal product and other equipment with injury to people and property.

OPTIONS

NOTE: Options are subject to minimum quantity restrictions, consult Fenwal.

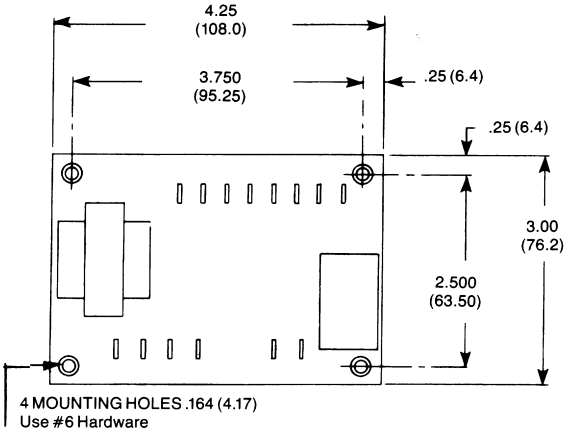
Output to Drive Solid State Relays

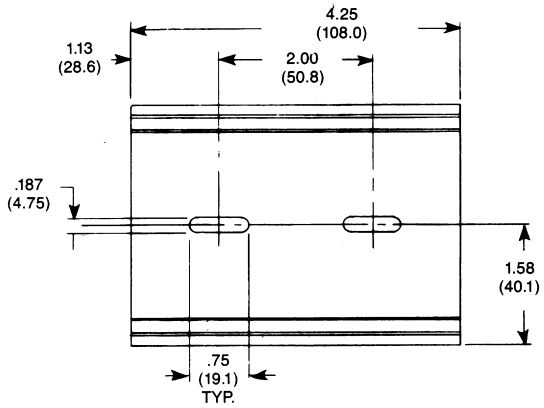
DC voltage output to operate a 3-32 VDC input solid state relay.

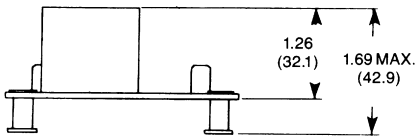
Local Uncalibrated Set Point Adjustment

Either a single or multiturn local potentiometer replaces remote potentiometer for temperature setting. May be preset at customer's option.

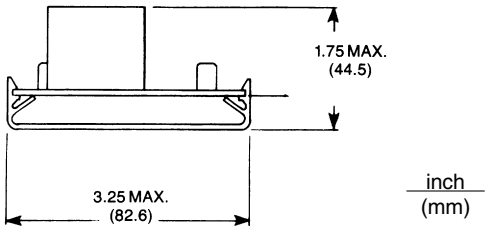
OUTLINE DIMENSIONS







STANDOFF MOUNTING



SNAP TRACK MOUNTING

HOW TO ORDER

	Example		
1. Specify controller quantity			
2. Specify controller catalog number per Table 1.	500	19-524007-200	06-231013-076
3. Specify dial part number per Table 2.	(qty)	(catalog number)	(dial part number)
4. Specify thermistor probe quantity	500	28-230103-302	
5. Specify thermistor probe per Table 3.	(qty)	(probe part number)	

Table 1

Output	Mounting	
	Standoff	Snap track
Relay	19-524007-100	19-524007-200

Table 2

Mounting	
Standoff	Snap track
25 to 175˚F	06-231013-074
75 to 270˚F	06-231013-075
125 to 350˚F	06-231013-076
200 to 450˚F	06-231013-077

1 to 10 arbitrary dial – Part 06-231013-021

Table 3

Temperature Range	Probe Length (in.)	Cartridge Probe		Coupling Head Probe	
		Noncalibrated Probe	Precision Low Temp. Assembly	Noncalibrated Probe	Precision Low Temp. Assembly
25 to 175˚F	3	–	28-432106-304	–	28-432806-304
		–	28-430106-304	–	28-430806-304
75 to 270˚F	1 1/2	–	28-430103-313	–	28-430803-313
	3	–	28-430106-313	–	28-430806-313
125 to 350˚F	1 1/2	28-230103-302	–	28-230803-302	–
	3	28-230106-302	–	28-230806-302	–
200 to 450˚F	1 1/2	28-230103-305	–	28-230803-305	–
	3	28-230106-305	–	28-230806-305	–

Refer to Thermostor Probe Section of this catalog for more information on thermistor probes.

KIDDE-FENWAL, INC.
400 MAIN STREET, ASHLAND, MA 01721
TEL: (508) 881-2000 FAX: (508) 881-6729
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SERIES 58

Thermocouple or RTD Sensing Temperature Controller

58.01.2

FEATURES

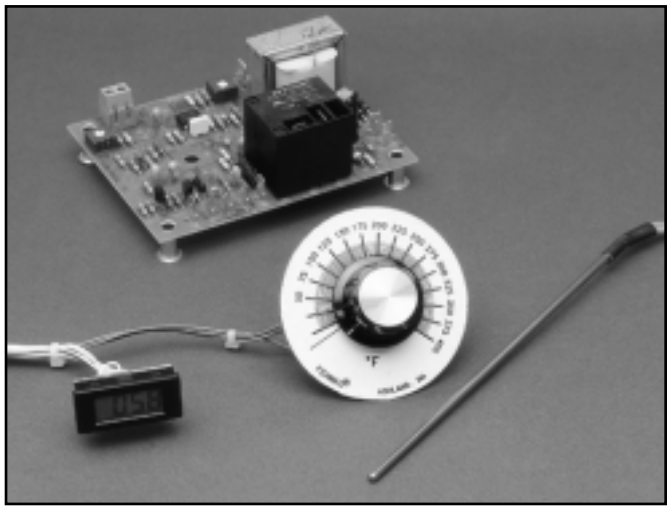
- *On/Off control mode*
- *Power Supply: 120/208/240 VAC field selectable; 24 VDC*
- *Temperature Ranges: Eight overlapping ranges from 0°F to 2000°F and equivalent °C*
- *Sensors: Type T, J or K thermocouple 100 Ohm RTD/DIN, 1000 Ohm RTD/DIN*
- *Outputs: Relay or output to drive solid state relay*
- *Set Point Adjustment: Local, remote or reverse shaft*
- *Sensor Failure: The controller output will de-energize upon an open or short RTD and open Thermocouple*
- *Agency Approvals: UL, cUL recognized*
- *Warranty: 2 years*
- *Remote Indicator Option: LCD meter*
- *Made in U.S.A.*

APPLICATIONS

- *Food Service*
- *Thermoplastic Packaging*
- *Pipe Fusion*
- *Laminating*
- *Hot Melt Glue*
- *Sterilization Systems*
- *Industrial Machinery*

DESCRIPTION

The Series 58 temperature controller is a versatile yet economical solution for applications requiring precise control. Type J, K or T thermocouples, 100 Ohm or 1,000 Ohm RTD sensors can be used with this controller. The controller provides lead break protection and protects against shorted RTD leads. A choice of relay or SSR driver outputs with an optional LCD meter for full scale indication are also featured. The control mode is on/off with a local setpoint Adjustable from the front or rear of the board. An optional remote setpoint adjustment is available.



SPECIFICATIONS

ON-OFF Mode

Differential: 3% of span maximum

Time Proportioning Mode

Bandwidth: Adjustable from 6-10% of span
Cycle Time: SSR driver output: 1 second typical

Outputs Rating

Relay: 2A, 120 VAC, SPDT, resistive
20A, 120 VAC, SPST, resistive
15A, 120 VAC, SPDT, resistive

SSR Output: On Voltage: 6 VDC min.
Off Voltage: 0 VDC
Load resistance: 1K Ohm

Power Supply

24VDC, ±10%, 120/208/240 VAC, +10%/-15%, 50/60 Hz

Input Power

3 Watts

Set Point Accuracy

3% of dial span for remote standpoint models
15% of dial span for local setpoint models

Set Point Stability

The control point will remain within ± 0.25% of dial span for line voltage variation of ± 15% from nominal

ADDITIONAL SPECIFICATIONS

Environmental Specifications

Ambient:	-13°F to 158°F (-25°C to 70°C), storage
Temperature:	-13°F to 185°F (-25°C to 85°C), storage
Humidity:	10% to 95% RH, operating (non-condensing)
	10% to 100% RH, storage (condensing)
Vibration:	Meets requirements of MIL STD202F

Construction and Installation

Mounting:	Eyelets, mounting holes or snap track
Connection:	TC: #8 screw terminals
	All others: 1/4 quick connect
Weight:	Approximately 10 oz.

Agency Approval

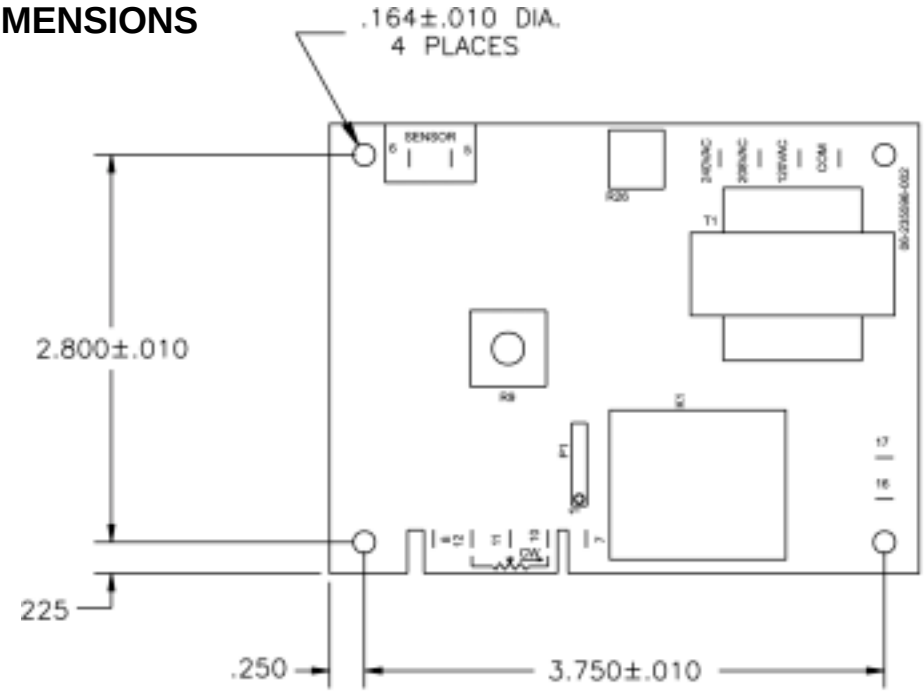
UL recognized:	File E18974
cUL recognized:	File E18974
CE Compliant :	Future

Meter

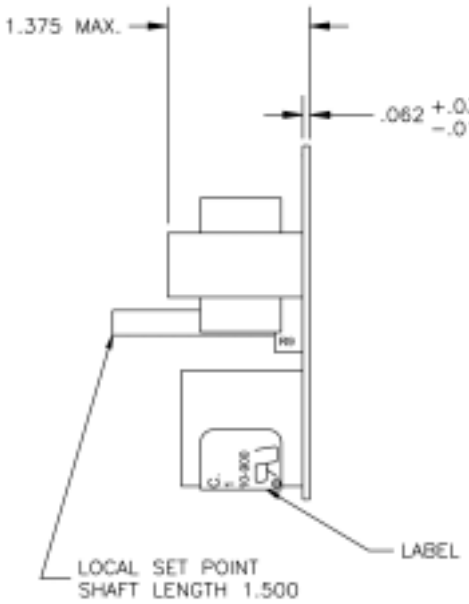
Accuracy:	3% of span
LCD Display:	3 1/2 Digit
Height:	.67 inch
Cable length:	12” or 24”

OUTLINE DIMENSIONS

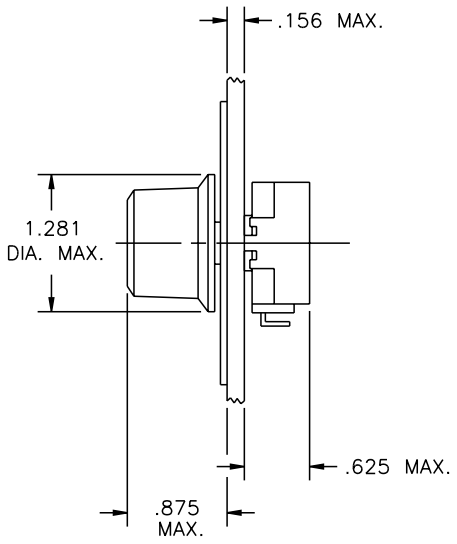
Front View



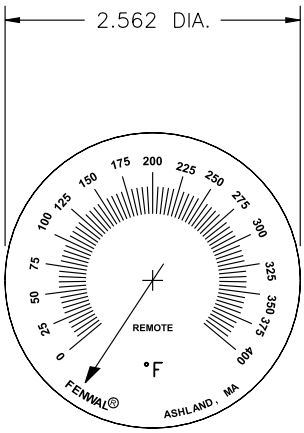
Side View



REMOTE POTENTIOMETER

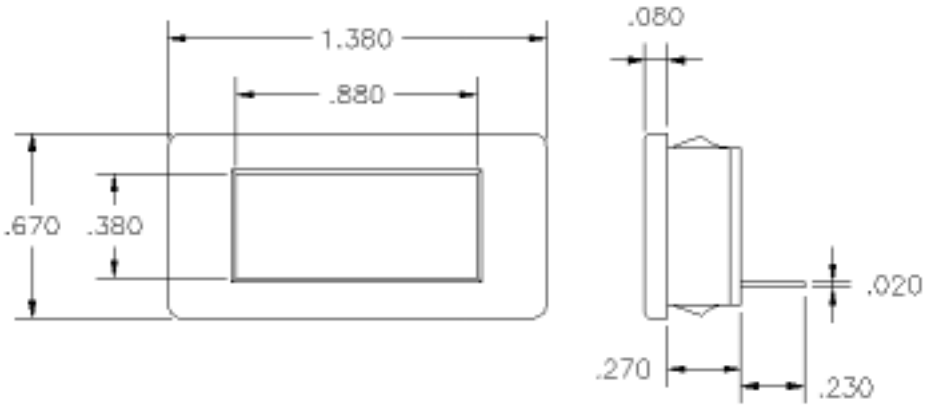


SETPOINT DIAL



OPTIONAL LCD REMOTE INDICATING DISPLAY

Part Numbers 58-90001000-012 (12” cable) and 58-90001000-024 (24” cable)



HOW TO ORDER

CONTROLLER

58 - X X X X 0 X X 0 - X XX

INPUT SENSOR
0 - Thermocouple
2 - RTD

CONTROL MODE
1 - On/off, fixed differential

LINE VOLTAGE
1 - 120/208/240 VAC
3 - 24 VDC

OUTPUT
2 - 2A, SPDT
3 - 20A, SPST
4 - 15A SPDT
5 - SSR driver

0

TEMPERATURE ADJUSTMENT
1 - Local setpoint, front adjustment
2 - Local setpoint, reverse adjustment
3 - Remote setpoint

MOUNTING
1 - Mounting holes only
2 - Eyelets
3 - Snap Track

0

DIAL GRADUATIONS
1 - °F scale
2 - °C scale

RANGES

01	0 to 400°F	0 to 205°C	Type T
02	0 to 400°F	0 to 205°C	Type J
03	0 to 800°F	0 to 425°C	Type J
06	0 to 2000°F	0 to 1095°C	Type K
08	0 to 1200°F	0 to 650°C	Type J
62	0 to 400°F	0 to 205°C	100 ohm RTD
63	0 to 800°F	0 to 425°C	100 ohm RTD
64	0 to 1000°F	0 to 525°C	100 ohm RTD
65	0 to 400°F	0 to 205°C	1000 ohm RTD
66	0 to 800°F	0 to 425°C	1000 ohm RTD
67	0 to 1000°F	0 to 525°C	1000 ohm RTD

REMOTE INDICATING METER
58-90001000-012 with 12” cable
58-90001000-012 with 24” cable

400 MAIN STREET, ASHLAND, MA 01721
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P/N 58.01.2 9/13/02

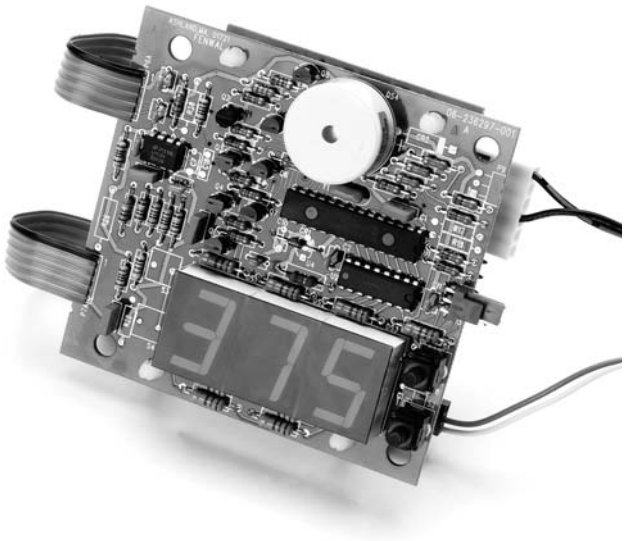
SERIES 59

Microprocessor Temperature Controller with Digital Display and RTD, Thermistor or Thermocouple Sensing

59.01.2

FEATURES

- Microprocessor-based
  – no cumbersome menus
- Large 3-digit LED display
  – permits easy viewing from a distance
- 4 sensor versions:
  – RTD, Thermistor, Thermocouple or Solid State
- Adjustable differential and setpoint offset values
  – more stable control and less frequent cycling
- LED status light
  – indicates when unit is heating or cooling
- Sensor failure detection
  – shuts down control
- Conformal coating protection
- Factory pre-set or field-adjustable units available
- Low cost alternative to DIN controllers
- UL and C UL Approved



APPLICATIONS

- Deep fat fryers
- Commercial ovens
- Laminating equipment
- Plastic machinery
- Packaging machines
- Industrial machinery
- Hot melt systems
- Commercial freezers and refrigerators
- Any 24/120/208/240VAC application requiring temperature control for heating or cooling

DESCRIPTION

The Series 59 is a microprocessor based temperature controller designed for easy installation and accurate operation. The unit is available as either a 24 VAC/VDC, or a 120/208/240 VAC field selectable On/Off controller with a large 3-digit LED display permitting easy viewing from a distance. Thermocouple, RTD, Solid-State or Thermistor sensors are supported. The controller is configured at manufacture for a specific sensor type and temperature range. A mechanical relay or an output for driving an external solid-state-relay (SSR Driver) is available. Adjustable differential and setpoint offset values allow for more stable control and less frequent cycling. Temperature offset values may be entered via pushbutton switches to calibrate the controller. A LED output status indicator will light whenever the unit is heating or cooling. The controller displays an error message when a failed temperature sensor is detected and de-energizes the output relay or SSR driver

AGENCY APPROVALS

c UL us **File #: E18974 Vol. 1**

The Series 59 is certified to UL Standard 873, Temperature Indicating and Regulating Equipment, as a temperature regulating device. UL has confirmed that the Series 59 meets the requirements of CSA Standard CAN C22.2 No. 24-93, Temperature Indicating and Regulating Equipment, as a temperature regulating device and of ANSI Z21.23 for Gas Appliance Approval.

SPECIFICATIONS

Input Type and Ratings

Thermocouple:	Type J standard
Thermistor:	10000 Ohm @ 25°C standard
RTD:	1000 Ohm platinum, 2 wire RTD standard

Displayed Temperature

For RTD, Thermistor or Solid-State Sensor Input Controller:

Display Resolution:	1°F or 1°C
Accuracy:	0.4% of span ± 1°

For Thermocouple Input Controller:

Display Resolution:	1°F or 1°C
Accuracy:	0.6% of span ± 1°

Output Ratings

Relay SPST:	30A Resistive @ 120VAC or 240VAC, 100,000 cycles
Relay SPDT:	15A Resistive @ 120VAC or 240VAC 100,000 cycles
Relay SPDT:	5A Resistive @ 120VAC or 240VAC 100,000 cycles 1A pilot duty @ 24/120/240 VAC
SSR Driver:	+12V, 100 Ohm source 20 ±4 milliamp current limit

Power Supply

Voltage:	120/208/240 VAC, +10%/-15% at 50/60 Hz 24 VAC Nominal (18 - 30 VAC) at 50/60 Hz 24 VDC Nominal (18 - 30 VDC)
Input power:	5.5 Watts maximum

ADDITIONAL SPECIFICATIONS

Environmental Specifications

Temperature: Operating: 0ºF to +175ºF
(-18ºC to +80ºC)
Storage: -40ºF to +175ºF
(-40ºC to +80ºC)
Humidity: Operating: 95% RH max.
(Non-condensing)

Other Options:

On-board buzzer or alarm driver
Remote switch inputs
Default temperature scale (°F/°C)
Custom thermistor compatibility
Custom temperature ranges

OPERATIONAL SPECIFICATIONS

Pushbutton operation

Note: The standard Series 59 displays the process temperature (Prº) by default. Other models may display the set point (SPº) by default. Consult part number configuration on back page to select model. On power up, the controller will display either ºF or ºC to indicate the temperature scale.

Standard Series 59 operation

1. By simultaneously pressing the UP and DOWN buttons, the set point, set point offset, On/Off differential (hysteresis), temperature offset, temperature scale selection and default display selection are displayed and can then be altered
2. Before displaying a value, the controller indicates the function it will display as follows:

Display	Description
SPF	Set point (ºF standard, SPC for ºC)
SPO	Set point offset
ºFd	On/Off differential (ºF standard, ºCd for ºC)
ºFO	Temperature offset (ºF standard, ºCO for ºC)
F-C	Select temperature scale (ºF or ºC)
dEF	Select default display (Prº or SPº)

3. When the UP and DOWN buttons are depressed simultaneously, the controller advances to the next function code after 2.5 seconds.

To Change the Set Point

1. Depress the UP and DOWN buttons simultaneously. Once **SPF** (or **SPC)** is displayed, release the buttons. While the value is displayed, but within 5 seconds, press and release the UP or DOWN button to increase or decrease the set point value.
2. To rapidly advance the adjustment of the set point, press and hold either the UP or the DOWN button and the value will increase or decrease 10 degrees per second.
3. The display returns to normal operation automatically after 5 seconds.

To Change the Set Point Offset

The set point offset setting is used in conjunction with the on/off differential setting. If the differential setting is set to 4ºF and the setpoint is set to 100ºF the control output will turn off (heat control) at 100ºF and turn back on at 96ºF with the set point offset is set to 0ºF. By setting the set point offset to 2ºF, the control output will turn off at 102ºF and turn back on at 98ºF.

1. Depress the UP and DOWN buttons simultaneously. Once SPO is displayed, release the buttons. While the offset value is displayed, but within 5 seconds, press and release the UP or DOWN button to increase or decrease the value.
2. The display returns to normal operation automatically after 5 seconds.
3. In order for the control to cycle around the set point, the set point offset should be one half the value of the differential

To Change the On/Off Differential (Hysteresis)

The on/off differential is the control deadband, a temperature range near the set point in which the control does not change the call-for-heat (or cool) output. The control will energize the output when the measured temperature drops below the differential value (or above for cooling applications). To adjust the On/Off differential:

1. Depress the UP and DOWN buttons simultaneously. Once **ºFd** (or **ºCd**) is displayed, release the buttons. While the value is displayed, but within 5 seconds, press and release the UP or DOWN button to increase or decrease the differential value.
2. The display returns to normal operation automatically after 5 seconds.

To Change the Temperature (Sensor) Offset

While the control will accurately sense the process temperature, there may be an occasion when it is desirable to calibrate the controller in its application. This can be accomplished by changing the temperature offset. The desired offset will adjust the displayed temperature scale to more closely match an external reference.
(Desired Offset = Desired Reading - Displayed Value)

1. Depress the UP and DOWN buttons simultaneously. Once **ºFO** (or **ºCO**) is displayed, release the buttons. While the offset value is displayed, but within 5 seconds, press and release the UP or DOWN button to increase or decrease the value.
2. The display returns to normal operation automatically after 5 seconds.

Temperature Scale Selection ºF or ºC

The control can display either ºF or ºC, the default setting is ºF. To change the temperature scale:

1. Depress the UP and DOWN buttons simultaneously. Once **F-C** is displayed, release the buttons. While the value is displayed, but within 5 seconds, press and release the UP or DOWN button to change the value.
2. The display returns to normal operation automatically after 5 seconds.
3. All temperature parameters will be displayed in the temperature scale selected.

Default Display Option

The Series 59 can be programmed to display either process temperature (**Prº**) or set point (**SPº**) during normal operation. To change this setting:

1. Depress the UP and DOWN buttons simultaneously. Once **dEF** is displayed, release the buttons. While the current default value is displayed, but within 5 seconds, press and release the UP or DOWN button to change to either process temperature (**Prº**) or setpoint (**SPº**).
2. The display returns to normal operation automatically after 5 seconds.

NOTE: The Series 59 is also available from the factory with the set point displayed as default, rather than the process temperature. These models are identified by their part number. Consult part number configuration on back page to determine model. The functional operation is the same as the standard model, except for the following:

1. To temporarily display the process temperature, depress the UP and DOWN buttons simultaneously. Once ºF (or ºC) is displayed, release the buttons. The temperature value is displayed for thirty-seconds then the display reverts automatically to the set point value.

Program Retention Jumper

The Series 59 has a jumper JP10 (see Figure 4) that allows the user to make changes to the control settings. The control is shipped with the jumper on pins 1 and 2 to prevent unintended changes to the factory default settings. With the jumper in this position, the user can view either the setpoint or process temperature and can only change the setpoint. The jumper must be either removed or placed on pins 2 and 3 before other control parameters can be viewed or altered.

Function Value Retention and Factory Defaults

1. All settings are stored in memory and are retained indefinitely during power interruptions.
2. At power-up, the stored values are reinstated.
3. When an Operator changes a value, all values are reinstated.
4. The controller is shipped with the set point to OFF, the set point offset at 2ºF (1ºC), the on/off differential at 4ºF (2ºC) and the temperature offset at 0ºF (0ºC). Other values can be pre-loaded to meet specific customer requirements.
5. Operator must select a setpoint to enable control.

Sensor **Failure (Lead Break Detection)**

The controller de-energizes the output relay or SSR driver whenever it detects a failed sensor. The controller then displays **Prb** to indicate there is a probe or temperature sensor problem.

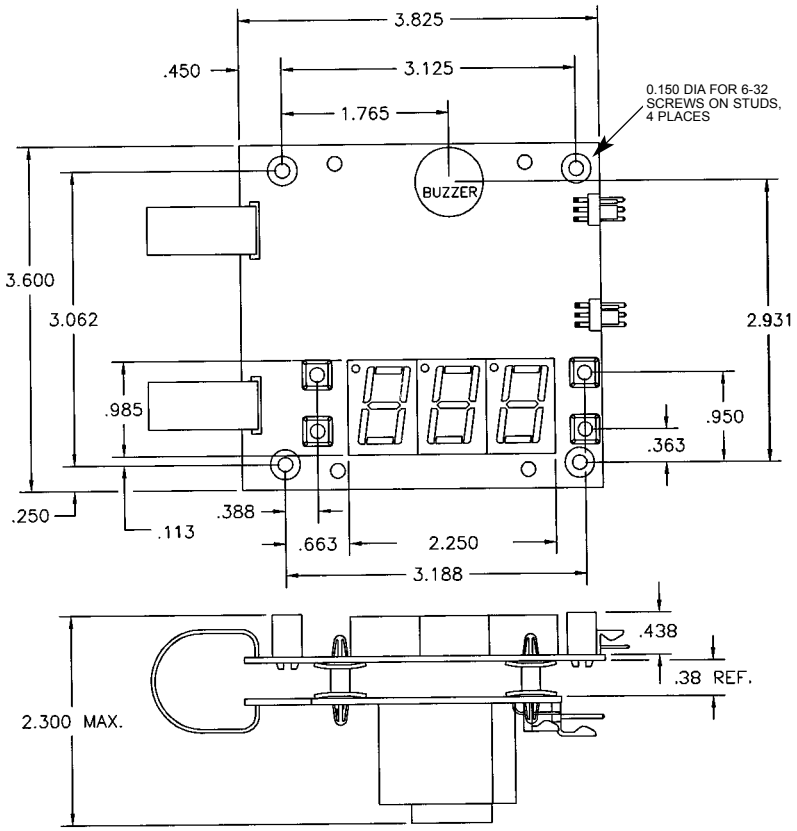
Mounting

Four plastic standoffs with clearance holes for 6-32 screws or studs are provided for mounting the controller to the backside of a panel. Refer to Figure 1 for the mounting dimensions.

WARNING: *ESD sensitive equipment. Severe damage to the controller may result from Electrostatic Discharge Voltage levels. Personnel must be properly grounded when handling controllers.*

CONTROL DIMENSIONS

FIGURE 1



WIRING INFORMATION

FIGURE 2: Thermistor, Solid-State

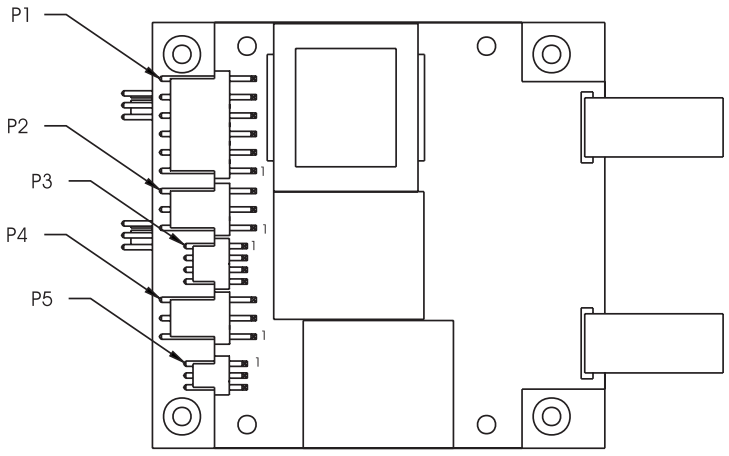
P1 AC POWER
- PIN 1 = INPUT VOLTAGE
- PIN 2 = TO EXT. PWR. SW.
- PIN 3 = 240 (OR 24 VAC)
- PIN 4 = 208 VAC
- PIN 5 = 120 VAC
- PIN 6 = POWER GROUND

P2 RELAY 1 CONTACT
- PIN 1 = COMMON
- PIN 2 = NC CONTACT
- PIN 3 = NO CONTACT

P3 SOLID-STATE RELAY DRIVERS
- PIN 1 = SSR-DRIVER 1
- PIN 2 = SSR-1 RTN
- PIN 3 = SSR-DRIVER 2
- PIN 4 = SSR-2 RTN

P4 RELAY 2 CONTACT
- PIN 1 = COMMON
- PIN 2 = NC CONTACT
- PIN 3 = NO CONTACT

P5 SENSOR INPUT
- PIN 1 = SSS+ INPUT
- PIN 2 = RTD+ INPUT OR SSS-
- PIN 3 = RTD+ INPUT (GND)



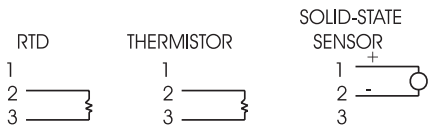


FIGURE 3: Thermocouple

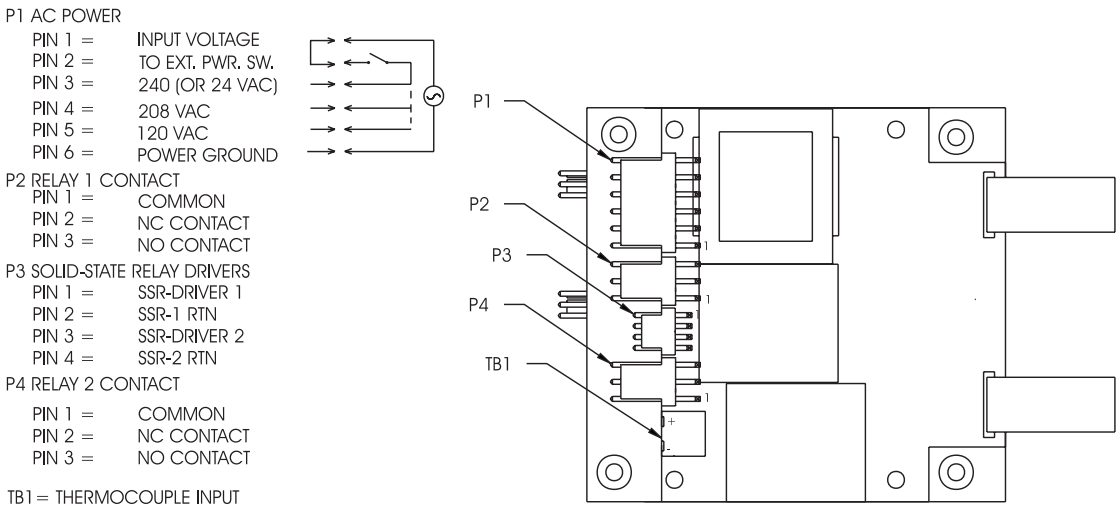


FIGURE 4: Parameter Lock Jumper and Optional Alarm Driver

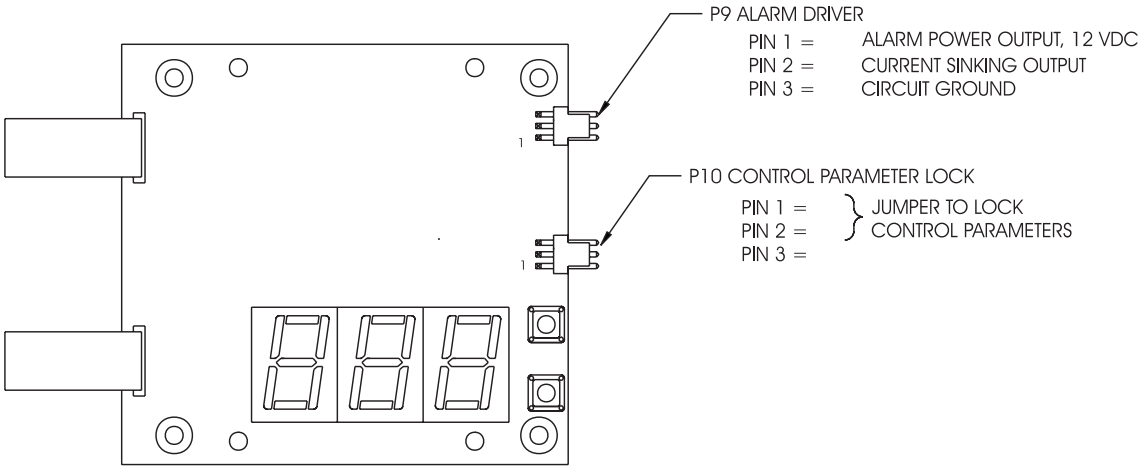
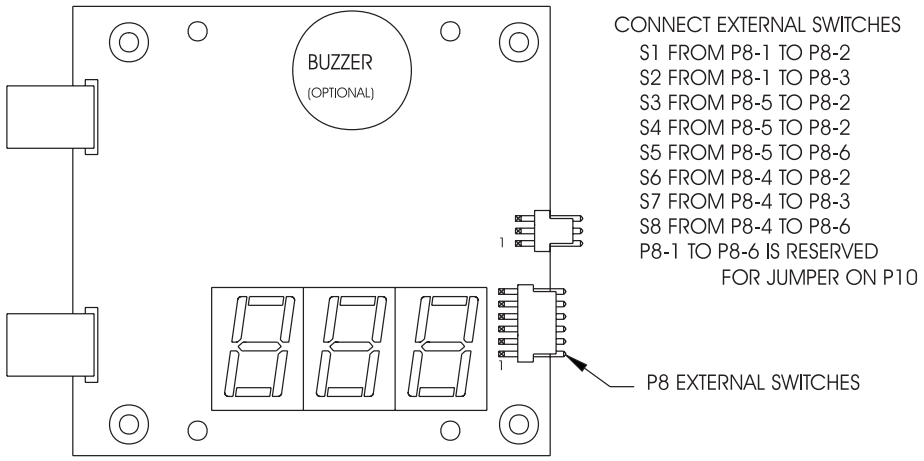


FIGURE 5: Optional External Switch



HOW TO ORDER

59 - X X X X X X X X - X X X

SENSOR TYPE
1 - Thermistor
2 - RTD
3 - Thermocouple
4 - Solid State Sensor
9 - Custom Sensor

CONTROL MODE
1 - Heating Control
2 - Cooling Control
3 - Heating or Cooling Control (2 relays)

LINE VOLTAGE
1 - 120/208/240 VAC
3 - 24 VAC / 24 VDC

OUTPUT TYPE
1 - 30A Relay, SPST
2 - 15A Relay, SPDT
4 - 5A Relay, SPDT
5 - SSR Driver

DISPLAY OPTIONS
1 - Display process temperature as default
2 - Display set point as default

USER INTERFACE
1 - Integral pushbuttons
2 - Connector for inputs from external-switches

ALARM OPTIONS
0 - None
1 - ON BOARD BUZZER
2 - ALARM DRIVER OUTPUT

DEFAULT TEMPERATURE SCALE
1 - °F scale
2 - °C scale

TEMPERATURE RANGES
000 - 1000 OHM RTD OR TYPE J THERMOCOUPLE, 0°F to 400°F (-17°C to 205°C)
001 - 1000 OHM RTD OR TYPE J THERMOCOUPLE, 200°F to 600°F (93°C to 316°C)
002 - 1000 OHM RTD OR TYPE J THERMOCOUPLE, 400°F to 800°F (204°C to 427°C)
003 - 1000 OHM RTD OR TYPE J THERMOCOUPLE, 600°F to 999°F (315°C to 537°C)
004 - 1000 OHM RTD OR TYPE J THERMOCOUPLE, 150°F to 550°F (65°C to 288°C)
005 - 10K THERMISTOR, -67°F to 266°F (-55°C to 130°C)
006 - 100K THERMISTOR, 150°F to 400°F (65°C to 205°C)
007 - SOLID STATE SENSOR, -67°F to 266°F (-55°C to 130°C)
9XX - OEM SPECIAL, USED FOR CUSTOM CONFIGURATIONS

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P/N 59.01.2

Printed in U.S.A. TAG 1/30/04