


# Series 543

## Thermocouple Sensing Temperature Controller

---

### FEATURES

- *Low Cost*
- *Field Selectable Power Inputs*
- *Single or Double Pole Relay Outputs*
- *FM Approved High Limit Protector* 
- *Specific Models UL Component Recognized*

### APPLICATIONS

- *Food Processing*
- *Plastics Processing*
- *Packaging Machinery*
- *Laboratory Equipment*
- *Dip Tanks*
- *Degreasers*
- *Plating Equipment*
- *Cooking Equipment*
- *OSHA-Related High Limit Protection*
- *Automatic Solder Devices*

### DESCRIPTION

These Fenwal Series 543 Thermocouple Sensing instruments are available in three versions. On/Off controllers, time proportioning controllers, and high temperature limit protectors with manual reset. Each features selectable input voltages and relay output. All versions are available in a compact case with local set point adjustment. The proportioning controller is also available without the case and with remote set point adjustment for custom installation.

The FM approved high limit protector has a recessed screwdriver, set point adjustment, a visible dial, and a manual reset button. It is specifically designed to satisfy OSHA-related requirements for overheat protection. Relay output is de-energized below set point. In the event of an overheat condition, the protector will trigger an alarm or shut down the process. The instrument cannot be manually reset until the process temperature drops below the set point. To satisfy FM requirements, the protector must be powered from the same source as the controller or heater.

The Series 543 instruments operate with standard Type J or K thermocouples. See Table 2 for specific temperature ranges.

### SPECIFICATIONS

#### Control Modes

- On/Off
- Time Proportioning
- High Limit Protector

#### Supply Voltage

- 120, 208 or 240 VAC  $\pm$  10%, 50/60 Hz, field selectable

#### Output

- Resistive: 10 A at 120 VAC or 5 A at 240 VAC
- Pilot Duty: 250 VA, 240 VAC maximum

#### Power Dissipation

- 5 watts  $\pm$  1 watt, nominal

#### Ambient Temperature Limits

- Operating: 32 and 135°F (0 and 55°C)
- Storage: -25 and +165°F (-32 and +75°C)

#### Set Point Accuracy

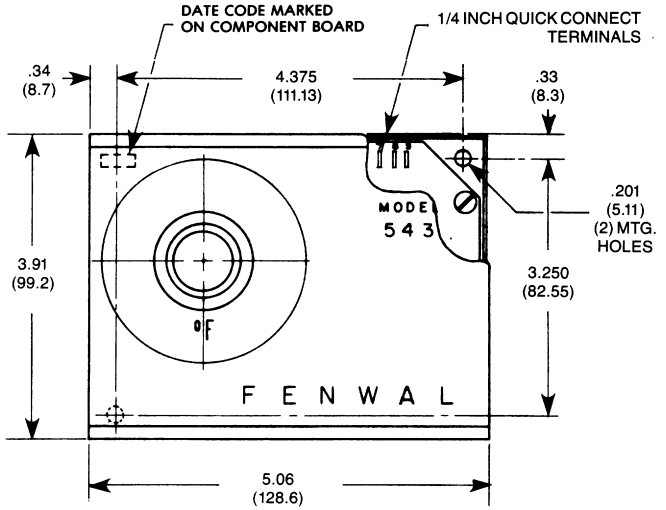
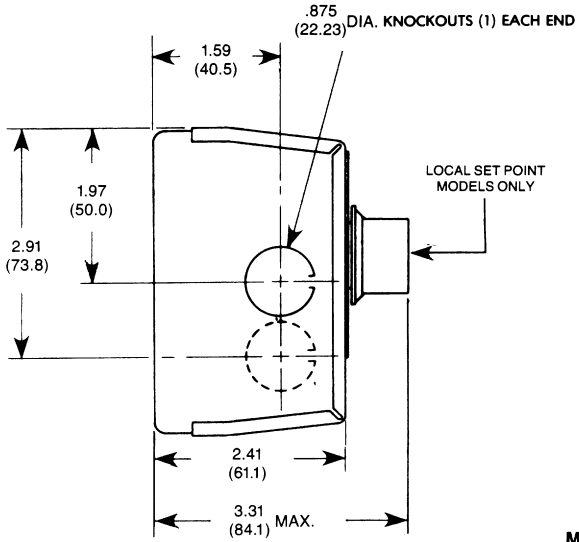
- On/Off Control:  $\pm$ 4% of span, typical.
- Proportional Control:  $\pm$ 2% of span for remote set point and  $\pm$ 4% of span for local set point
- High Limit Protector:  $\pm$ 5% of span

**Note:** Accuracy is based on National Bureau of Standards Thermocouple Characteristics at 77°F(25°C) ambient temperature and nominal line voltage.

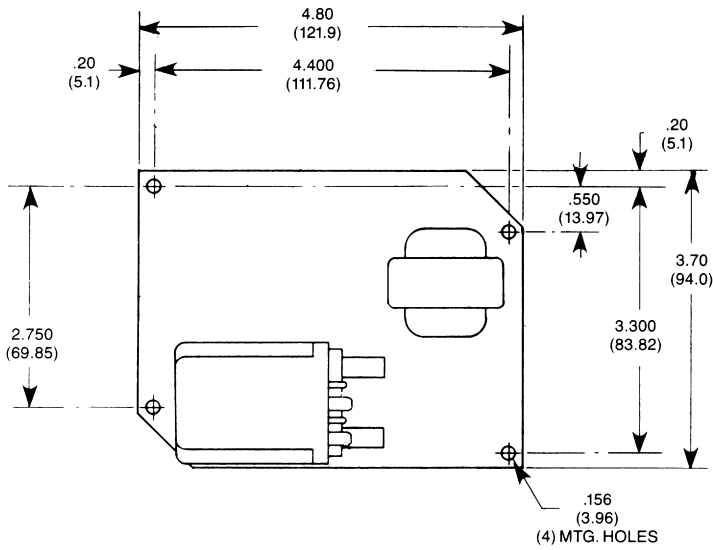
#### Ambient Temperature Effect

Control point will remain within  $\pm$ 1% of span with ambient changes from 77°F (25°C) to ambient temperature limits.

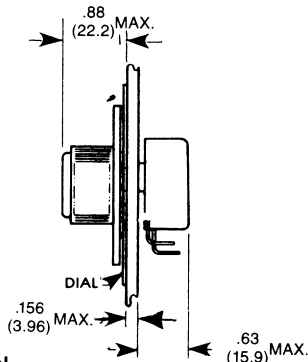
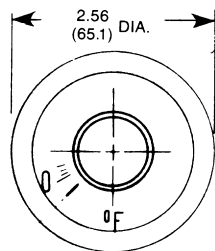
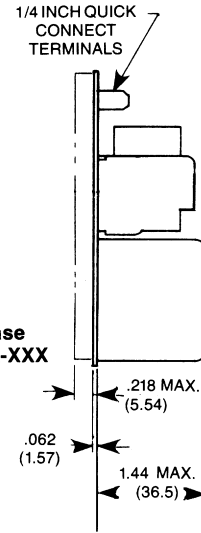
# OUTLINE DIMENSIONS



**Model with Case**  
Cat. No. 54-30XX2X-XXX



**Model without case**  
Cat. No. 54-30XX1X-XXX



**For use with Remote Set Point Model**  
Cat. No. 54-303113-XXX

inch  
(mm)

---

**Supply Voltage Effect**

On/Off and Proportional Control: Control point will remain within  $\pm 0.5\%$  of span with line and load voltage changes of  $\pm 10\%$  from nominal  
High Limit Protector: Control point will remain within  $\pm 0.25\%$  of span with line voltage change of  $\pm 10\%$  from nominal.

**Agency Approvals**

On/Off and Proportional Control: UL Component Recognized File No. E18974. Consult UL for suitability to the application  
High Limit Protector: FM Approved

**Cycle Time (Proportioning Control)**

Approximately 15 seconds at 50% power

**Bandwidth (Proportional Control)**

Adjustable 1 to 5% of span, except 0.5 to 3% of span on 0 to 2000°F range

**Differential (On/Off Control)**

0.25% of span, typical

**Vibration**

Meets requirements of MIL-STD 202D, Method 201

**Lead Break Protection**

On/Off and Proportional Control: Output will de-energize upon an open thermocouple (500 k $\Omega$  or greater)  
High Limit Protector: Output energized upon an open thermocouple.

**Thermocouple Lead Length**

Accuracy shall remain within specifications for thermocouple lead length up to the equivalent of 150 ohms resistance.

**Connections**

Supply Voltage: 1/4 inch quick connects  
Load: 3/16 inch quick connects  
Thermocouple: #8 screws  
Remote Potentiometer: 1/4 inch quick connects

**Weight (approximate)**

With case: 1 pound, 10 ounces (735 grams)  
Without case: 10 ounces (280 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.*

---

**HOW TO ORDER**

1. Specify basic catalog number of desired instrument from Table 1
2. Select temperature range from Table 2 and add appropriate 3-digit suffix to catalog number specified in Step 1

**TABLE 1**

Instrument Type	SPDT Relay	DPDT Relay
On/Off Control	54-301121-XXX	—
Proportional Control	*54-301113-XXX 54-303121-XXX	— —
High Limit Protector	54-302121-XXX	54-302421-XXX

\*without case, remote set point

**TABLE 2**

Instrument Type	SPDT Relay	Thermo-couple Type	Suffix Number
On/Off and Proportional Control	0 to 400°F	J	-102
	0 to 800°F	J	-103
	0 to 1000°F	J	-104
	0 to 2000°F	K	-106
High Limit Protector	0 to 800°F	J	-103
	0 to 2000°F	K	-106



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

The literature is provided for informational purposes only. KIDDE-FENWAL, INC. assumes no responsibility for the products suitability for a particular application. The product must be properly applied to perform as described herein. If you need more information on this product, or if you have a question, contact KIDDE-FENWAL, INC., Ashland, MA 01721 (508) 881-2000.