

**Monitor and control temperature** in heating and cooling applications with the Series TCS Thermocouple Switch. The Series TCS offers a wide temperature range, two selectable alarm sets, and an internal buzzer indicating alarm condition or error. The user can define set point, heating/cooling regulation, cycle time, alarm configuration, load status, and ambient probe adjustment. The thermocouple switch features password protection and error/alarm messaging. Temperature and output status is indicated on the bright red LED display. Use the configuration key (sold separately) to quickly program multiple units. The Series TCS includes a fitting clip for panel mounting, gasket, rear terminal cover and instruction manual.

### INSTALLATION

**Note:** Unit must be mounted away from vibration, impacts, water and corrosive gases.

- Cut hole in panel 2.80 x 1.14 inches (71 x 29 mm).
- Apply silicone (or rubber gasket) around the perimeter of the hole to prevent leakage.
- Insert unit into hole of panel.
- Slide removable fitting clips onto unit from the back until secure to panel.
- Remove back cover to wire unit.
- Wiring diagram is displayed on the top of the unit.
- (Note: PROBE CABLE LENGTH MUST NOT EXCEED 238 ft (100 m). DO NOT INSTALL PROBE CABLE NEAR POWER CABLES).
- Replace cover once wiring is complete.

### SPECIFICATIONS

**Probe Range:** 32 to 999°F (0 to 700°C) for Type J thermocouple; 32 to 999°F (0 to 999°C) for Type K or S thermocouples.

**Input:** Type J, K or S thermocouple.

**Output:** SPDT relay rated 16A @ 240 VAC resistive.

**Horsepower Rating (HP):** 1 HP.

**Control Type:** ON/OFF.

**Power Requirements:** 115 VAC, 230 VAC, 12 VAC/VDC or 24 VAC/VDC (depending on model).

**Accuracy:** ±1% FS.

**Display:** 3-digit, red, 1/2" (12.7 mm) digits, plus sign.

**Resolution:** 1°.

**Memory Backup:** Nonvolatile memory.

**Temperature Limits:**

Ambient: 32 to 158°F (0 to 70°C);

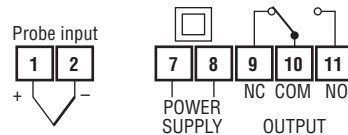
Storage Temperature: -4 to 176°F (-20 to 80°C).

**Weight:** 2.3 oz (65 g).

**Front Panel Rating:** IP64.

**Agency Approvals:** CE, cUR, UR.

### WIRING DIAGRAM



## PARAMETERS

	Description	Units	Range
<b>SP</b>	Set Point	Degrees	r1 to r2
<b>r0</b>	Differential or Hysteresis	Degrees	1 to 99°
<b>r1</b>	Lower Value Set Point	Degrees	0 to 999°
<b>r2</b>	Higher Value Set Point	Degrees	0 to 999°
<b>d0</b>	Heating or Cooling Control	Option	Ht/Co
<b>c0</b>	Min. Stop Time for Load	Minutes	0 to 59
<b>c2</b>	Load Status During Probe Error	0/1	Off/On
<b>P1</b>	Ambient Probe Adjustment	Degrees	-10 to 10°
<b>P5</b>	Ambient Probe Type	Option	tcJ, tch, tcS
<b>P6</b>	Probe Response	Numeric	0 to 3
<b>H5</b>	Parameter Access code	Numeric	0 to 255 (Set at 0 from factory)
<b>A0</b>	Alarm 1 Hysteresis	Degrees	1 to 999°
<b>A1</b>	Alarm 1 Threshold	Degrees	0 to 999°
<b>A2</b>	Alarm 1 Exclusion Time	Seconds	0 to 999
<b>A3</b>	Alarm 1 Configuration	Option	0, 1, or 2
<b>A4</b>	Alarm 2 Hysteresis	Degrees	1 to 999°
<b>A5</b>	Alarm 2 Threshold	Degrees	0 to 999°
<b>A6</b>	Alarm 2 Exclusion Time	Seconds	0 to 999
<b>A7</b>	Alarm 2 Configuration	Option	0, 1, or 2

## PARAMETER DESCRIPTIONS

**SP=** Set Point- Desired Regulation Temperature

**r0=** Differential or Hysteresis

**r1=** Lower Set Point Limit

**r2=** Higher Set Point Limit

**d0=** Heating or Cooling Control-Regulation cycles only performed, neither defrosting nor continuous cycles exist. **Heating:** To choose Heating Control: Set  $d0=Ht$  (The output is active when  $TS1$  (temperature of ambient probe) is less than or equal to Set Point.)

$TS1 <= SP$ . It then disconnects when  $TS1 >= SP - r0$ . **Cooling:** To choose Cooling Control: Set  $d0=Co$  (The output is activated when  $TS1 >= SP + r0$ .) The display will switch off when  $TS1 <= SP$ .

**c0=** Minimum Time Between Start to Stop.

**c2=** Load Status During Probe Error. In the event of an open or short circuited probe, the unit will connect or disconnect the load as defined by this parameter.

**P1=** Ambient Probe Calibration. Offset degrees to adjust ambient probe. If the probe is not placed in the exact point that is to be measured, use a standard thermometer and adjust the difference with parameter.

**P5=** Ambient Probe Type. (tcJ = Type J, tch = Type K, tcS = Type S.)

**P6=** Probe Response Rate. (0 = 8 sec, 1 = 4 sec, 2 = 2 sec, 3 = 1 sec.)

**H5=** Access to Probe Parameters. (The code is set to 0 from the factory.)

**A0=** Alarm 1 Hysteresis. The differential associated with A1 parameter.

**A1=** Alarm 1 Threshold. Number of degrees to the working set point that initiates an alarm condition.

**A2=** Alarm 1 Exclusion Time. The amount of time the alarm is disabled from instrument activation.

**A3=** Alarm 1 Configuration. Determines the alarm type: A3=0 alarm is disabled; A3=1 alarm is activated if the ambient temperature  $\geq SP + A1$  and deactivated if  $< SP + A1 - A0$ ; A3=2 alarm is activated if the ambient temperature  $\leq SP + A1$  and deactivated if  $> SP + A1 - A0$ .

**A4=** Alarm 2 Hysteresis. The differential associated with A5 parameter.

**A5=** Alarm 2 Threshold. Number of degrees to the working set point that initiates an alarm condition.

**A6=** Alarm 2 Exclusion Time. The amount of time the alarm is disabled from instrument activation.

**A7=** Alarm 2 Configuration. Determines the alarm type: A7=0 alarm is disabled; A7=1 alarm is activated if the ambient temperature  $\geq SP + A5$  and deactivated if  $< SP + A5 - A4$ ; A7=2 alarm is activated if the ambient temperature  $\leq SP + A5$  and deactivated if  $> SP + A5 - A4$ .

## PARAMETER PROGRAMMING

**Set Point (SP) is the only parameter the user can access without code protection.**

- Press SET. SP text will appear on the display.
- Press SET again. The real value is shown on the display.
- The value can be modified with the UP and DOWN arrows.
- Press SET to enter any new values.
- Press SET and DOWN at the same time to quit programming or wait one minute and the display will automatically exit programming mode.

*\*The keyboard code can be reset to ZERO by turning off the controller and turning it on again while keeping the SET key depressed.*

### Access to all code protected parameters.

- Press SET for 8 seconds. The access code value 00 is shown on the display. (Unit comes with code set at 00 from factory).
- With the UP and DOWN arrows, code can be set to user needs.
- Press SET to enter the code. If code is correct, the first parameter label is shown on the display (SP).
- Move to the desired parameter with the UP and DOWN keys.
- Press SET to view the value on the display.
- The value can be modified with the UP and DOWN arrows.
- Press SET to enter the value and exit to text parameter.
- Repeat until all necessary parameters are modified.
- Press SET and DOWN at the same time to quit programming or wait one minute and the display will automatically exit programming mode.

## BUZZER

In the event of alarm or error condition, the internal buzzer is activated. To silence the buzzer, press and hold the SET and Down keys.

## LED INDICATIONS

**OUT** This indicates the load is connected. The system waits for the programmed minimum stop time of the load.

## DISPLAY MESSAGES

In normal operation, the probe temperature will be shown on the display. In case of alarm or error, the following messages will be shown:

- **Er** = Memory Error
- **--** = Short-Circuit Probe Error (output determined by c2).
- **oo** = Open Probe Error (output determined by c2).

## MAINTENANCE/REPAIR

After final installation of the TCS Series Digital Thermocouple Switch, no routine maintenance is required. A periodic check of system calibration is recommended. The devices are not field repairable and should be returned to the factory if recalibration or other service is required. After first obtaining a Returned Goods Authorization (RGA) number, send the material, freight prepaid, to the following address. Please include a clear description of the problem plus any application information available.

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