

PROPORTIONAL TEMPERATURE CONTROLLERS

Starting at:
\$44.75



- **LOW COST PROPORTIONAL CONTROLS**
- **CONTROL RANGES FROM -65°C TO 260°C**
- **SOLID STATE ZERO VOLTAGE CROSSING CIRCUIT**
- **ADJUSTABLE BANDWIDTH AND TEMPERATURE SET POINT**
- **COMPACT SIZE**
- **OEM ORIENTED**



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GENERAL DESCRIPTION

Oven Industries' 140 series of temperature controllers was designed to offer proportional action at the lowest cost consistent with good component quality. Specifically designed for OEM applications, the controllers are completely encased and the very compact modules can easily be adapted for custom installation by the user.

Both 120 VAC and 230 VAC models are available in the 4 amp, 6 amp, 10 amp, and 15 amp control ranges offered. The zero voltage firing, proportional control circuitry is completely solid state to ensure maximum controller and heater life. An operating ambient temperature range of 0°C to +50°C is compatible with most industrial applications.

Control of temperature ranges from -65°C to +260°C (-85°F to +500°F) with standard TX and TP series sensors is indicative of the versatility these controllers offer. Coarse and fine set temperature adjustments afford precise control temperature settings. The adjustable bandwidth control from 2°C to 10°C allows the user to adjust the sensitivity of the controllers to optimize individual thermal systems.

THEORY OF OPERATION

All the controllers in this series employ a unique technique of obtaining proportional control of temperature at economical costs. Referring to the simplified schematic diagram, a thermistor sensor is used in a resistance sensing bridge network with a coarse and fine set temperature adjustment potentiometer. The sensing bridge integrates the sensing thermistor signal and feedback information from the output of the electronics. This signal is an input to a differential amplifier. Zero crossing information is combined with the temperature control signal and the combined signal causes the triac to conduct as the line voltage passes through zero.

Proportional action in this design is derived by sampling the pulses from the control electronics, shaping the sampled pulses, and combining this signal with the sensing bridge signal. Thus, the controller has the ability to supply the correct average power to the load without causing cyclic variation in the temperature at the sensor, meeting the requirement of proportional control.

SPECIFICATIONS:

ACCURACY: To $\pm .15^{\circ}\text{C}$ of set point at the probe

*To $\pm .25^{\circ}\text{C}$ of set point at the probe

CIRCUIT MODE: Proportional, zero voltage firing

BANDWIDTH CONTROL: Adjustable from 2°C to 10°C.

VOLTAGE AND POWER RATINGS: Single phase, 60Hz.

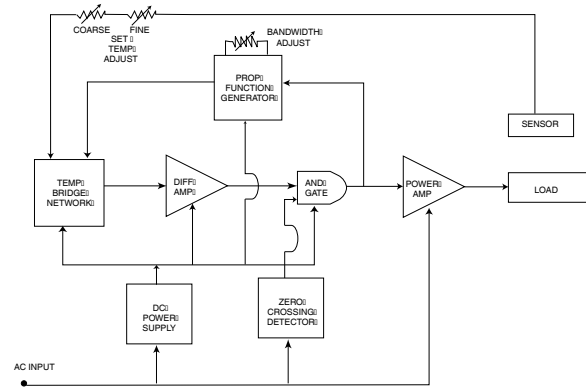
CONTROL RANGE:

From -20°C to +110°C (-4°F to +230°F)

*From -65°C to +260°C (-85°C to +500°F)

TEMPERATURE SET POINT CONTROL:

Coarse and Fine Potentiometers



LINE VOLTAGE	MAXIMUM POWER	MAXIMUM CURRENT	PROBE SERIES	MODEL NUMBER	PRICE 1 - 9 UNITS	PRICE "P" SUFFIX
120 VAC	480 WATTS	4AMPS	TP	5C1-140	\$44.75	\$54.75
120VAC	480 WATTS	4 AMPS	TX	*5CX-140	\$44.75	\$54.75
208/230 VAC	920 WATTS	4 AMPS	TP	5C1-141	\$51.00	\$61.00
208/230 VAC	920 WATTS	4 AMPS	TX	*5CX-141	\$51.00	\$61.00
120 VAC	720 WATTS	6 AMPS	TP	5C1-142	\$48.50	\$58.50
120 VAC	720 WATTS	6 AMPS	TX	*5CX-142	\$48.50	\$58.50
208/230 VAC	1,380 WATTS	6 AMPS	TP	5C1-143	\$55.50	\$65.50
208/230 VAC	1,380 WATTS	6 AMPS	TX	*5CX-143	\$55.50	\$65.50
120 VAC	1,200 WATTS	10 AMPS	TP	5C1-144	\$51.25	\$61.25
120 VAC	1,200 WATTS	10 AMPS	TX	*5CX-144	\$51.25	\$61.25
208/230 VAC	2,300 WATTS	10 AMPS	TP	5C1-145	\$59.00	\$69.00
208/230 VAC	2,300 WATTS	10 AMPS	TX	*5CX-145	\$59.00	\$69.00
120 VAC	1,800 WATTS	15 AMPS	TP	5C1-146	\$58.50	\$68.50
120 VAC	1,800 WATTS	15 AMPS	TX	*5CX-146	\$58.50	\$68.50
208/230 VAC	3,450 WATTS	15 AMPS	TP	5C1-147	\$66.00	\$76.00
208/230 VAC	3,450 WATTS	15 AMPS	TX	*5CX-147	\$66.00	\$76.00

NOTE: (*) Specifications apply to models similarly marked.

"A" Suffix indicates a unit wired for remote set temp.

"P" Suffix indicates open sensor protection.

HEAT SINK CONSIDERATIONS

To calculate the heat sinking required for your application, the internal power dissipation of the controller must be considered.

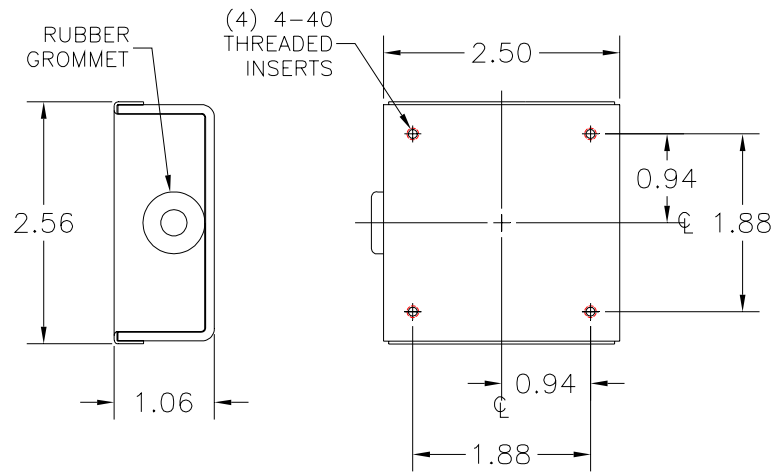
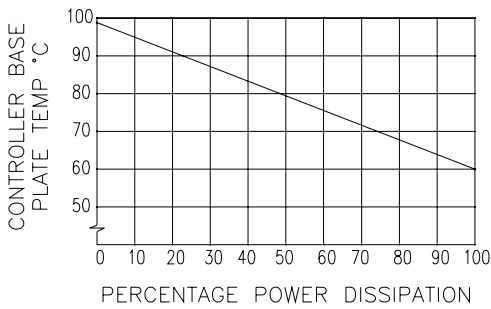
Idle circuit power dissipation under no load conditions is 2.5 watts for 120 VAC units and 4.0 watts for 208/230 VAC units. For each ampere of load current, an additional 1.4 watts of power is dissipated by the controller.

Example: Model 5C1-144 and a 1000 watt heater.
 Load current = 8.3 amperes or 83% of maximum power rating
 Basic controller dissipation: 2.5 watts
 Total controller dissipation: $2.5 + (8.3 \times 1.4) = 14.12$ watts

From the derating curve, the base plate temperature may not exceed 65°C with the controller dissipating 14.12 watts.

MECHANICAL CONFIGURATON

DERATING CURVE



STANDARD SENSORS

Model with a 5C1 prefix use TP series sensor probes
 Models with 5CX prefix use TX series sensor probes

TP SERIES PROBES

Base Model	Temperature Range °C	Temperature Range °F	Lead Colors
TP10	-20° to +10°	-4° to +50°	Brown-Brown
TP20	0° to +30°	+32° to +86°	Red-Red
TP30	+20° to +50°	+68° to +122°	Orange-Orange
TP40	+40° to +72°	+104° to +158°	Yellow-Yellow
TP50	+60° to +90°	+140° to +194°	Green-Green
TP60	+80° to +110°	+176° to +230°	Blue-Blue

TX SERIES PROBES

Base Model	Temperature Range °C	Temperature Range °F	Lead Colors
TX0	-40 to +120°	-40 to +248°	White-Black
TX0A	-65° to +25°	-85° to +77°	Orange-Black
TX1	-10 to +150°	+14° to +302°	Brown-Brown
TX1A	+30° to +200°	+86° to +392°	Green-Black
TX2	+80° to +260°	+176 to +500°	Red-Black

INSTALLATION NOTES

Mount the controller to an appropriate heat sinking surface. Avoid mounting the controller to a thermal insulating surface which may cause excessive internal temperatures and damage the unit. Attach a means of measuring temperature at the point where control is desired. It is very important to mount the sensor probe as close to the heater as possible to reduce the thermal time constant between the sensor and the heater.

Adjust the set temperature adjustments to the approximate centers of rotation. Turn the bandwidth control full counterclockwise and then clockwise approximately 1/8th turn. Connect a lamp or other voltage indicating device across the load. Apply power to the unit and observe that the load is energized. The load voltage will be uninterrupted until the load temperature approaches the controller's set temperature.

Proportional control operation near the set temperature is indicated by the load voltage being turned on and off by the controller approximately once every second. Longer on or off periods indicate the need for wider bandwidth adjustment (clockwise) until the controller is in complete proportional control of the load.

Optimum setting of the bandwidth control is that point which reduces temperature excursion of the load to a minimum. Observe the temperature of the load. If temperature excursions are noted, gradually increase (clockwise) the bandwidth setting until the smallest load temperature excursion is obtained. NOTE: Full counterclockwise setting may be optimum, if no temperature excursions are noted.

NOTE: Since the sensor is not isolated from the AC line voltage, caution should be taken to insure that sensor leads are not grounded.

OVEN INDUSTRIES CAN DESIGN AND CUSTOMIZE CONTROL SYSTEMS TO FIT YOUR APPLICATION.

Oven Industries, Inc. is a full service manufacturing facility specializing in electronics and thermal system applications. This includes conducting research and development to meet our customer's requirements, followed by the design and engineering efforts, including software development, to produce prototypes to today's leading edge electronics. Our design engineering staff and production facilities qualify us for prototype production as well as volume manufacturing of electronic controls ranging from simple On/off type, to proportional, and complex microprocessor-based products.

Our unique capabilities and design expertise have solved a wide variety of problems for a wide variety of customers. **WHAT CAN WE DO FOR YOU?**

GENERAL INFORMATION

Terms: Net 30 days
FOB Mechanicsburg, Pennsylvania
Code Identification Number: 21302

WARRANTY: All units are warranted to be free from defects and to operate within specifications for one year from date of shipment, if the controller is not subjected to misuse and has not been tampered with. Please contact the factory or your area representative for shipping instructions on warranty units prior to returning.

We make every effort to keep prices as accurate as possible, however, we reserve the right to change prices and specifications without notice.

PRICES & INFORMATION ON OTHER MODELS ARE AVAILABLE ON OUR WEB SITE AT www.ovneind.com or FROM OUR REPRESENTATIVE IN YOUR AREA: