

AVATAR INSTRUMENTS TSS OPERATING MANUAL

DESCRIPTION The TSS is a two wire, solid state temperature control for use with low mass self-sensing heaters, such as Alumel, Balco, Nickel or Tungsten heating elements. The TSS provides instantaneous response to temperature settings or load changes with no thermal lag or overshoot. Fail Safe protection is intrinsic to the two wire self-sensing control. Heater life is increased due to the TSS's superior firing resolution. Speed of response is 0.01 seconds.

OPERATION The TSS can use a manual potentiometer to adjust the desired temperature setpoint in standard form. A 4-20mA command signal from a temperature control or PLC can be used for Cascade Control using the "CC" option. The TSS uses the heating element itself as an RTD (resistance temperature detector). The TSS will keep the element temperature at a constant resistance/temperature no matter what the air flow or load. In a no load condition, the TSS provides a safe idle output temperature. This provides a pre-heat condition that provides faster output to full operation setpoint. A TSS with a temperature range of 400 to 700 degrees Fahrenheit will always maintain a minimum element temperature of no less than 400 F. The maximum element temperature would be no higher than 700 F.



WARNING: FIRE HAZARD!! Even the best electronic components CAN FAIL SHORTED, KEEPING FULL POWER ON! Provide a completely SEPARATE (redundant) OVER TEMPERATURE SHUTDOWN MEANS to switch power off if safe temperature is exceeded.



WARNING: HIGH VOLTAGE!! This control must be installed in a GROUNDED enclosure by a qualified electrician. Provide a safety interlock on door to remove power before gaining access to device.

INSTALLATION It is important to note that each TSS is matched exactly to the heating element. Element material, resistance and line voltage must be checked before applying power to TSS. If any of these parameters are not matched, heater may burn out within 20 seconds or less in worst case.

Check resistance of heating element with an ohm meter. Remember, the test leads on your meter will also have some resistance. Put meter leads together and check resistance first. Subtract the lead resistance from the reading across the heater. On some Balco heaters, the difference between a 2.2 and a 4.5 Ohm element can be mistaken if lead resistance is not factored in to your pre installation checks.

Make sure line voltage is the same as voltage listed on TSS serial tag. Again, TSS is line voltage specific.

ELECTRICAL CONNECTIONS See "WIRING DIAGRAM" on back. Try to use 14-10 gauge wire to hook up heater to TSS. Smaller wire size will add resistance to what the TSS measures from the heater. In turn this will effect the accuracy of the temperature output. Make sure all wiring connections are tight. Again, a correct resistance reading is key to making system work properly.

WARNING: Setpoint potentiometer leads are on line voltage.

OPTIONS

"CC" CASCADE CONTROL: 4-20 mA Input from temperature control or PLC to change setpoint. Add "CC" to part number.

240 VOLT LINE: add "-240V" to part number.

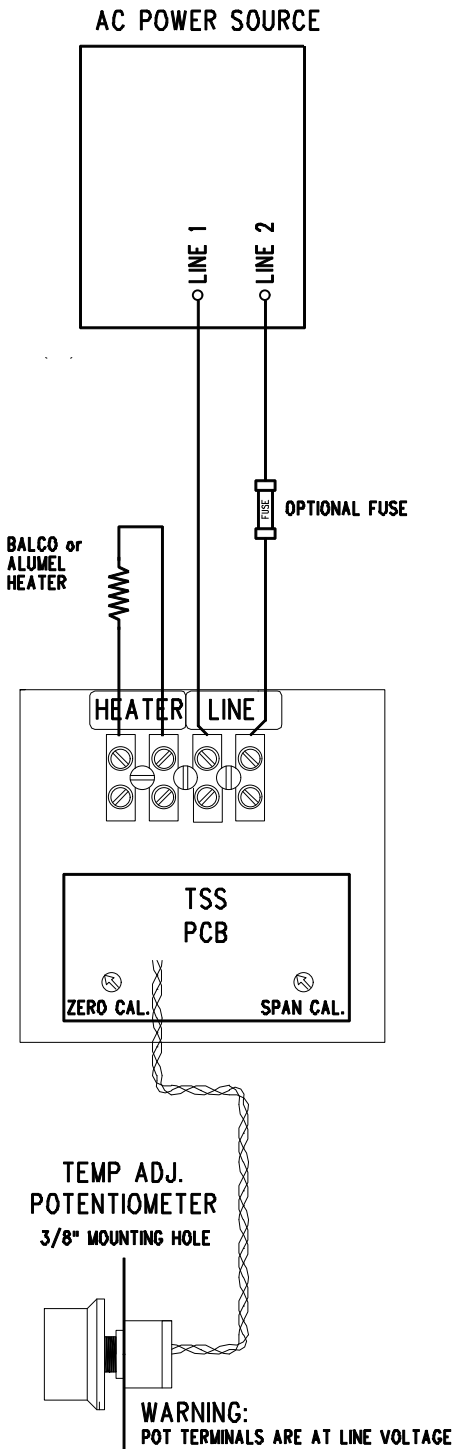
10 TURN POTENTIOMETER: For a 10 turn setpoint potentiometer add "-10" after element type in part number.

ENCLOSURE: For enclosed unit add "-E" to end of part number.

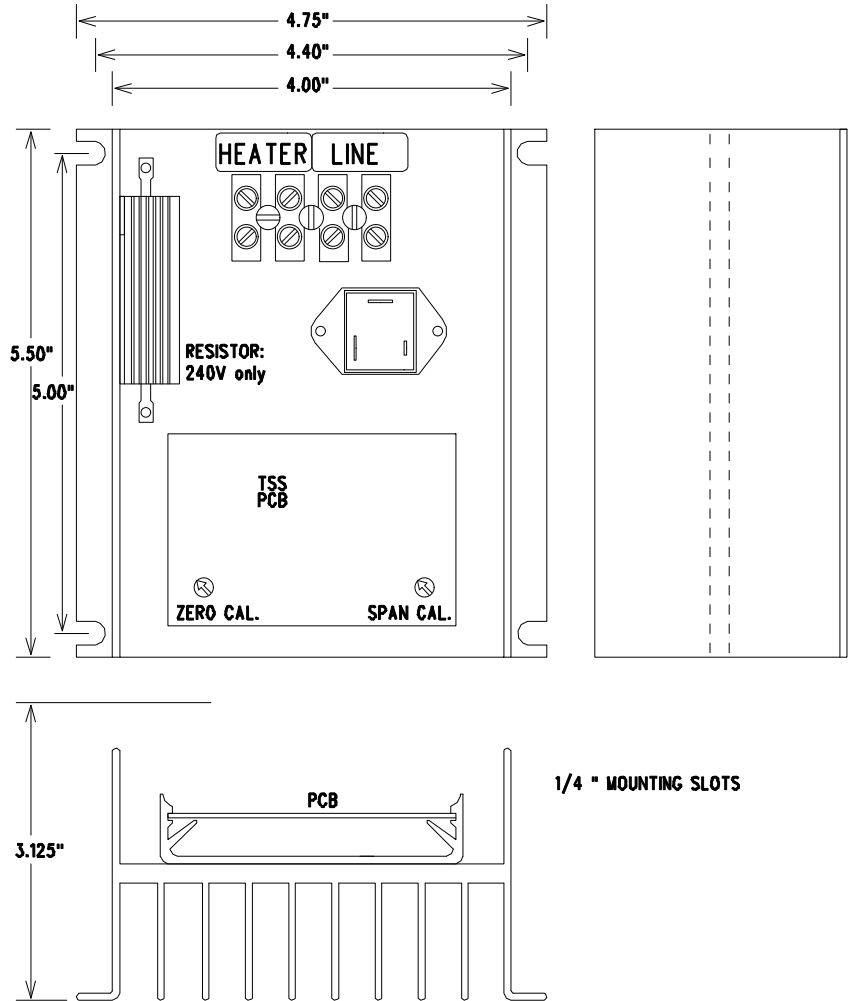
WARRANTY

All Avatar Instruments products carry a full three year, from date of purchase, parts and labor warranty against component failure and defects in workmanship. In the event your controller fails to perform properly, **contact Avatar to obtain a return authorization number.** Controllers sent to Avatar for warranty service that have no apparent defect will be treated as a standard repair and a \$50.00 charge will be applied. Avatar will repair or replace any unit that failed due to defective parts or assembly. This warranty DOES NOT cover damage due to shipping, abuse, misapplication or operation beyond specified rating. Further more fuses and improperly fused TRIAC's are NOT COVERED by this warranty. Avatar is not responsible for any subsequent or other damage experienced in use of this device.

WIRING DIAGRAM:



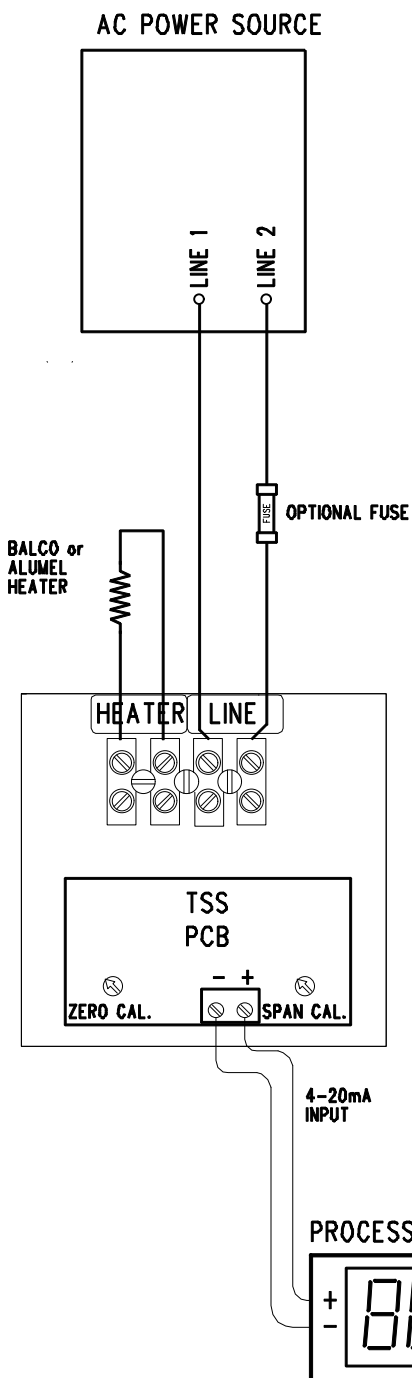
PHYSICAL DIMENSIONS



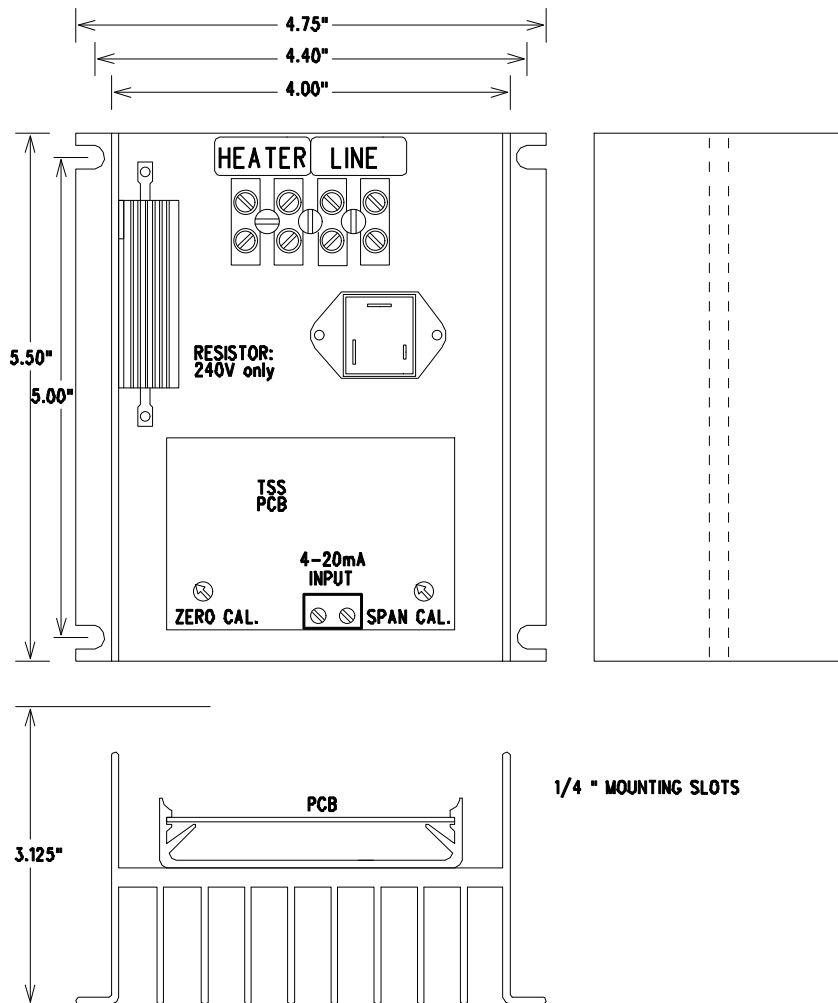
SPECIFICATIONS:

- | | |
|---|-------------------------------------|
| INPUT SIGNAL | 100K potentiometer |
| SUPPLY VOLTAGE | 120/240 VAC, 50/60 Hz |
| POWER CONSUMPTION | 1.5 watts per amp |
| CURRENT RATING (vertically mounted) | 25 amps max. |
| OPERATING TEMPERATURE (ambient) | 0-50 degrees centigrade |
| FUSE REQUIREMENTS (TRIAC protection) | semi-conductor/ sub cycle rectifier |
| RESPONSE TIME | 10mS |
| CONTROL METHOD | phase angle or zero voltage |
| OUTPUT VOLTAGE | depending on application |
| INPUT ISOLATION | 1-98% of supply voltage |
| | pot terminals are at line voltage |

WIRING DIAGRAM:



PHYSICAL DIMENSIONS

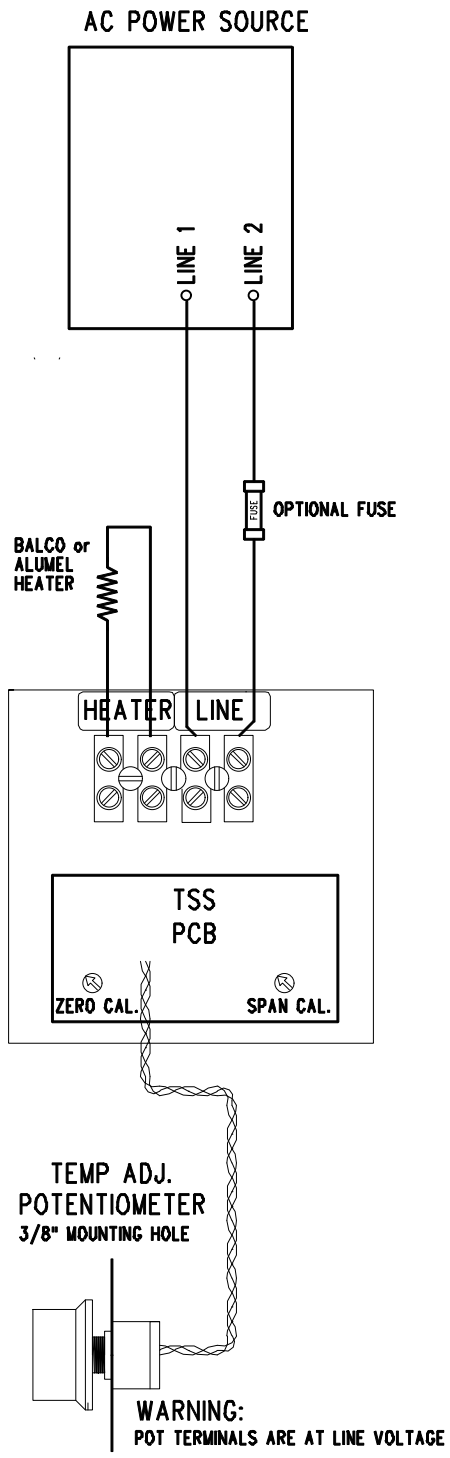


SPECIFICATIONS:

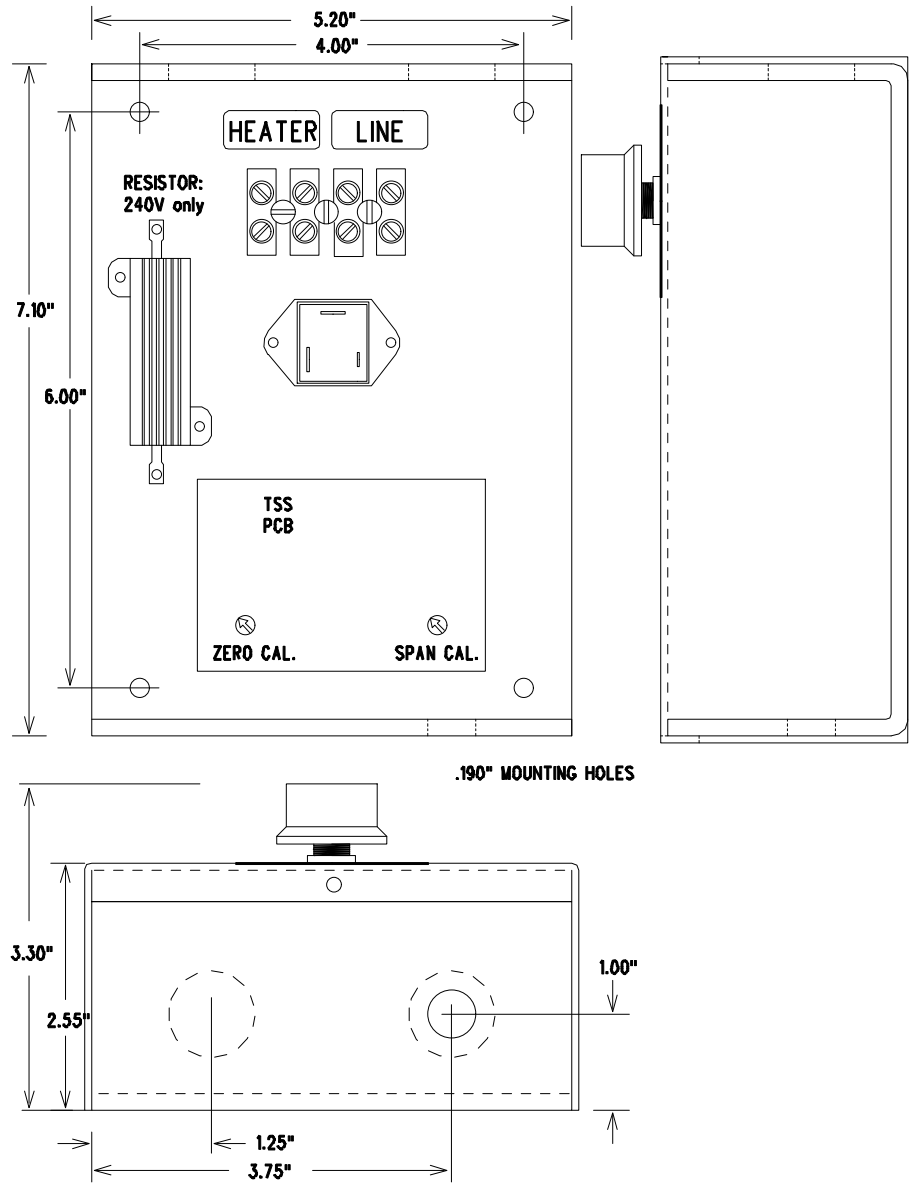
INPUT SIGNAL
SUPPLY VOLTAGE
POWER CONSUMPTION
CURRENT RATING (vertically mounted)
OPERATING TEMPERATURE (ambient)
FUSE REQUIREMENTS (TRIAC protection)
RESPONSE TIME
CONTROL METHOD
OUTPUT VOLTAGE
INPUT ISOLATION

4-20 mA
120/240 VAC, 50/60 Hz
1.5 watts per amp
25 amps max.
0-50 degrees centigrade
semi-conductor/ sub cycle rectifier
10mS
phase angle or zero voltage
depending on application
1-98% of supply voltage
2500 V

WIRING DIAGRAM:



PHYSICAL DIMENSIONS

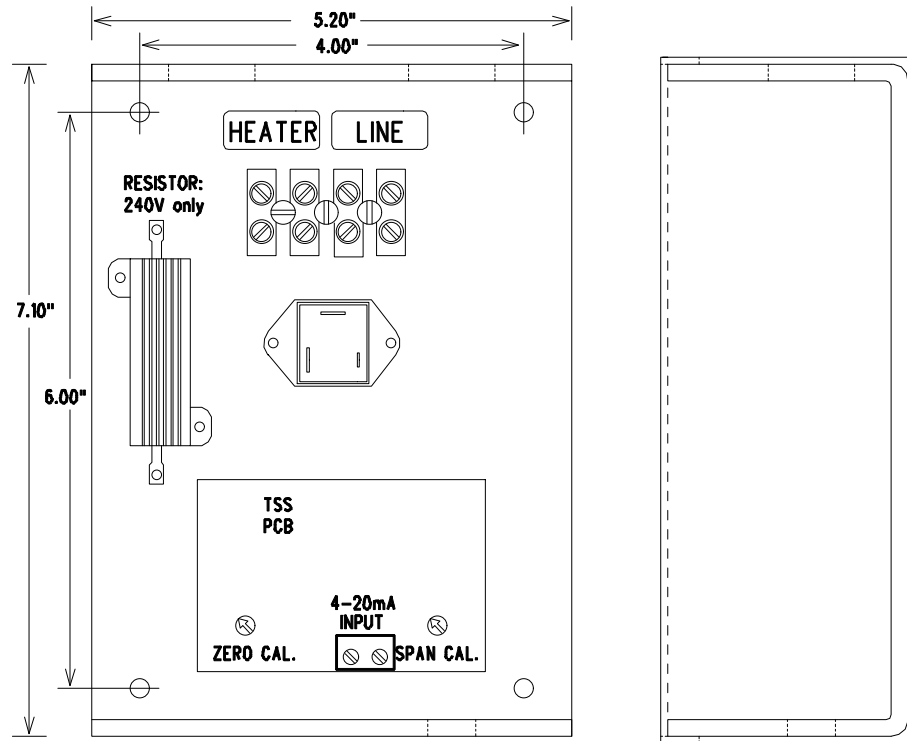
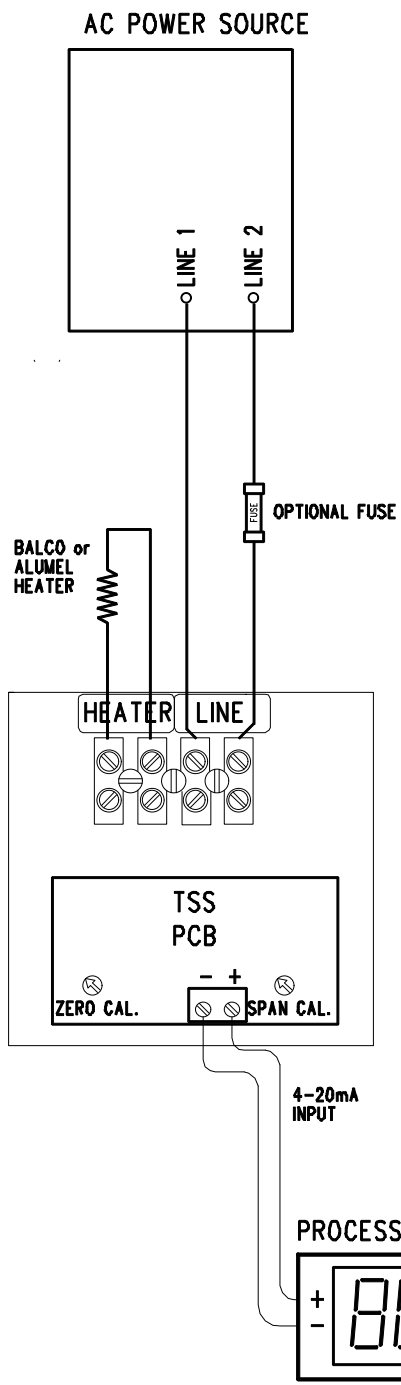


SPECIFICATIONS:

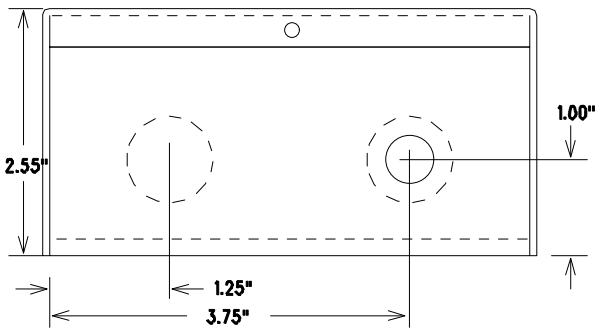
- | | |
|--------------------------------------|--|
| INPUT SIGNAL | 100K potentiometer |
| SUPPLY VOLTAGE | 120/240 VAC, 50/60 Hz |
| POWER CONSUMPTION | 1.5 watts per amp |
| CURRENT RATING (vertically mounted) | 25 amps max. |
| OPERATING TEMPERATURE (ambient) | 0-50 degrees centigrade |
| FUSE REQUIREMENTS (TRIAC protection) | semi-conductor/ sub cycle rectifier |
| RESPONSE TIME | 10mS |
| CONTROL METHOD | phase angle or zero voltage depending on application |
| OUTPUT VOLTAGE | 1-98% of supply voltage |
| INPUT ISOLATION | pot terminals are at line voltage |

WIRING DIAGRAM:

PHYSICAL DIMENSIONS



.190" MOUNTING HOLES



SPECIFICATIONS:

- INPUT SIGNAL 4-20mA
- SUPPLY VOLTAGE 120/240 VAC, 50/60 Hz
- POWER CONSUMPTION 1.5 watts per amp
- CURRENT RATING (vertically mounted) 25 amps max.
- OPERATING TEMPERATURE (ambient) 0-50 degrees centigrade
- FUSE REQUIREMENTS (TRIAC protection) semi-conductor/ sub cycle rectifier
- RESPONSE TIME 10mS
- CONTROL METHOD phase angle or zero voltage depending on application
- OUTPUT VOLTAGE 1-98% of supply voltage
- INPUT ISOLATION 2500V