

PI-T Programmable Isolating Thermocouple Transmitter

Programmable Isolating Thermocouple Input to DC Current or DC Voltage Output Transmitter.

Features

- Available for J, K, N, R, S, & T Thermocouples.
- Field Programmable Input and Output Ranges.
- Bi-Polar Input and Output Ranges.
- Isolated Input to Output 1.6kV.
- High Accuracy.
- Linear With Temperature.
- Internal Cold Junction Compensation.
- Universal AC/DC Power Supply.
- Compact DIN Rail Mount Enclosure.
- Available Standard or Special Calibration.



Other PI- models include:
 PI-B Bridge / Strain Gauge;
 PI-D DC; mA, mV, V.
 PI-F Frequency;
 PI-K Resistance;
 PI-M Maths Computing;
 PI-N RTD Differential Pt100;
 PI-P Potentiometer;
 PI-R RTD Pt100;
 PI-S Relay Dual Setpoint;
 PI-T Thermocouple.

Ordering Information.

PI-T-X Standard Calibration: Input Type K; 0~1200C; Output 4~20mA ; Upscale Break; High Voltage Power Supply.

PI-T - - - - - - Special Range Special Range Calibration.
 TT IR OR SB PS

| THERMOCOUPLE TYPE | | INPUT TEMPERATURE RANGES | | | | | | | | OUTPUT RANGES | | | | SENSOR BREAK | | |
|-------------------|----|--------------------------|----|-----------|----|--------|----|-----------|----|---------------|----------------------|----------|----|--------------|----|--|
| Max Range | TT | deg C | IR | deg C | IR | deg F | IR | deg F | IR | Voltage | OR | Current | OR | State | SB | |
| 0~800C | J | 0~100 | 1 | -50~50 | 17 | 0~200 | 41 | -100~100 | 57 | 0~500mV | A | 0~1mA | 1 | Upscale | US | |
| 0~1500F | J | 0~125 | 2 | -100~0 | 18 | 0~250 | 42 | -200~0 | 58 | 0~1V | B | 0~2mA | 2 | Downscale | DS | |
| | | 0~150 | 3 | -100~100 | 19 | 0~300 | 43 | -200~200 | 59 | 0~2V | C | 0~5mA | 3 | | | |
| 0~1200C | K | 0~200 | 4 | -100~200 | 20 | 0~400 | 44 | -200~400 | 60 | 0~3V | D | 0~10mA | 4 | | | |
| 0~2200F | K | 0~250 | 5 | 50~150 | 21 | 0~500 | 45 | 100~300 | 61 | 0~4V | E | 0~16mA | 5 | | | |
| | | 0~300 | 6 | 100~200 | 22 | 0~600 | 46 | 200~400 | 62 | 0~5V | F | 0~20mA | 6 | | | |
| 0~1200C | N | 0~400 | 7 | 200~400 | 23 | 0~800 | 47 | 400~800 | 63 | 0~6V | G | 1~5mA | 7 | | | |
| 0~2200F | N | 0~500 | 8 | 200~600 | 24 | 0~1000 | 48 | 400~1200 | 64 | 0~8V | H | 2~10mA | 8 | | | |
| | | 0~600 | 9 | 400~800 | 25 | 0~1200 | 49 | 800~1600 | 65 | 0~10V | I | 4~20mA | 9 | | | |
| 0~1700C | R | 0~750 | 10 | 400~1200 | 26 | 0~1500 | 50 | 800~2400 | 66 | 0~12V | J | -1~1mA | 10 | | | |
| 0~3100F | R | 0~800 | 11 | 400~1600 | 27 | 0~1600 | 51 | 800~3200 | 67 | 1~5V | K | -2~2mA | 11 | | | |
| | | 0~1000 | 12 | 500~800 | 28 | 0~2000 | 52 | 1000~1600 | 68 | 2~10V | L | -5~5mA | 12 | | | |
| 0~1700C | S | 0~1200 | 13 | 500~1000 | 29 | 0~2400 | 53 | 1000~2000 | 69 | -1~1V | M | -10~10mA | 13 | | | |
| 0~3100F | S | 0~1400 | 14 | 600~1200 | 30 | 0~2800 | 54 | 1000~2400 | 70 | -2~2V | N | -20~20mA | 14 | | | |
| | | 0~1600 | 15 | 600~1600 | 31 | 0~3000 | 55 | 1200~3000 | 71 | -5~5V | O | | | | | |
| -100~200C | T | 0~1700 | 16 | 1000~1700 | 32 | 0~3200 | 56 | 1200~3200 | 72 | -10~10V | P | | | | | |
| -150~400F | T | | | | | | | | | -12~12V | Q | | | | | |
| | | | | | | | | | | | | | | | | |
| | | Special Input Range | | | | | | | | Z | Special Output Range | | | | Z | |

| POWER SUPPLY | | PS |
|---|--|----|
| High Voltage Power Supply: 85~264Vac/dc | | H |
| Mid Voltage Power Supply: 22~85Vac/dc | | M |
| Low Voltage Power Supply: 10~28Vac/dc | | L |

Note: Power supply H is field selectable for M, and M for H. Power supply L must be ordered separately.

Ordering Examples:

- 1/ PI-T-K-7-9-US-H PI-T; Type K; 0~400C In; 4~20mA Output; Upscale Break; High Voltage Power Supply.
- 2/ PI-T-R-55-I-DS-L PI-T; Type R; 0~3000F In; 0~10V Output; Downscale Break; Low Voltage Power Supply.

Quality Assurance Programme.

The modern technology and strict procedures of the ISO9001 Quality Assurance Programme applied during design, development, production and final inspection grant long term reliability of the instrument.

PI-T Rev2 Specifications.

Input

Note 1: The input range must be within the specified **min / max range** of the thermocouple type.

Note 2: Each PI-T is only rangeable within the specified 'Thermocouple Type'.

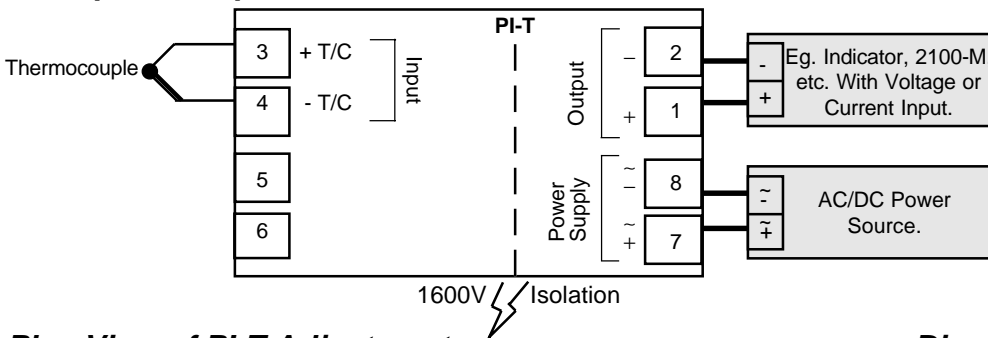
| Thermocouple Type | | | Field Programmable Input Ranges | | | | | | | | Linearity and Accuracy: %, ±1C (±2F) |
|-------------------|-------------------------|-------------------------|---------------------------------|---------|---------|---------|-----------------------|---------|---------|---------|---|
| Type | Specification Range (C) | Specification Range (F) | Zero Offset | | | | Span (Max. In - Zero) | | | | |
| | | | Min.(C) | Max.(C) | Min.(F) | Max.(F) | Min.(C) | Max.(C) | Min.(F) | Max.(F) | |
| J | 0-800 | 0-1500 | 0 | 600 | 0 | 1100 | 200 | 800 | 400 | 1500 | 0.25 |
| K | 0-1200 | 0-2200 | 0 | 1000 | 0 | 1800 | 200 | 1200 | 400 | 2200 | 0.25 |
| N | 0-1200 | 0-2200 | 0 | 1000 | 0 | 1800 | 200 | 1200 | 400 | 2200 | 0.25 |
| R | 400-1700 | 750-3100 | 0 | 1300 | 0 | 2400 | 400 | 1700 | 750 | 3100 | 0.5 |
| S | 400-1700 | 750-3100 | 0 | 1300 | 0 | 2400 | 400 | 1700 | 750 | 3100 | 0.5 |
| T | -100-200 | -150-400 | -100 | 100 | -150 | 200 | 100 | 300 | 200 | 550 | 0.5 |

| | |
|--------------------------------------|--|
| Impedances | 1MΩ Min. Input Impedance. 100Ω Max. Thermocouple Lead Resistance. |
| Output - Voltage | Field Programmable From ±500mVdc to ±12Vdc. Maximum Output Drive = 10mA. |
| Output - Current | Field Programmable From ±1mAdc to ±20mAdc. Maximum Output Drive = 10Vdc. (500Ω @ 20mA.) |
| Power -H | 85~264Vac/dc; 50/60Hz; 5VA. |
| Power -M | 22~85Vac/dc; 50/60Hz; 5VA. |
| Power -L | 10~28Vac/dc; 50/60Hz; 5VA. |
| -Circuit Sensitivity | <±0.001%/V FSO Typical. |
| Cold Junction Compensation Accuracy. | <0.03C/C (0.06F/F) Typical. |
| Repeatability | <±0.1% FSO Typical. |
| Ambient Drift | <±0.01%/C FSO Typical. |
| Noise Immunity | 125dB CMRR Average. (1600Vdc Limit.) |
| EMC Compliances | Emissions EN 55022-A. Immunity EN 50082-1, <1% Effect FSO Typical. |
| Safety Compliance | EN 60950 |
| Mains Isolation | 250Vac. |
| Isolation Test Voltages | Mains to Input/Output 3kVac 50Hz for 1min; Input to Output 1.6kVdc for 1min. |
| Operating Temperature & Humidity | 0~60C. (Storage Temp. -20~80C.) 5~85% RH Max. Non-Condensing. |
| Response Time | 200msec Typical. (From 10 to 90% 50msec Typical.) |
| Dimensions and Mounting | L=80, W=50, H=120mm. Mounts on 35mm Symetrical Mounting Rail. |

Product Liability. This information describes our products. It does not constitute guaranteed properties and is not intended to affirm the suitability of a product for a particular application. Due to ongoing research and development, designs, specifications, and documentation are subject to change without notification. Regrettably, omissions and exceptions cannot be completely ruled out. No liability will be accepted for errors, omissions or amendments to this specification. Technical data are always specified by their average values and are based on Standard Calibration Units at 25C, unless otherwise specified. Each product is subject to the 'Conditions of Sale'.

Warning: These products are not designed for use in, and should not be used for patient connected applications. In any critical installation an independant fail-safe back-up system must always be implemented.

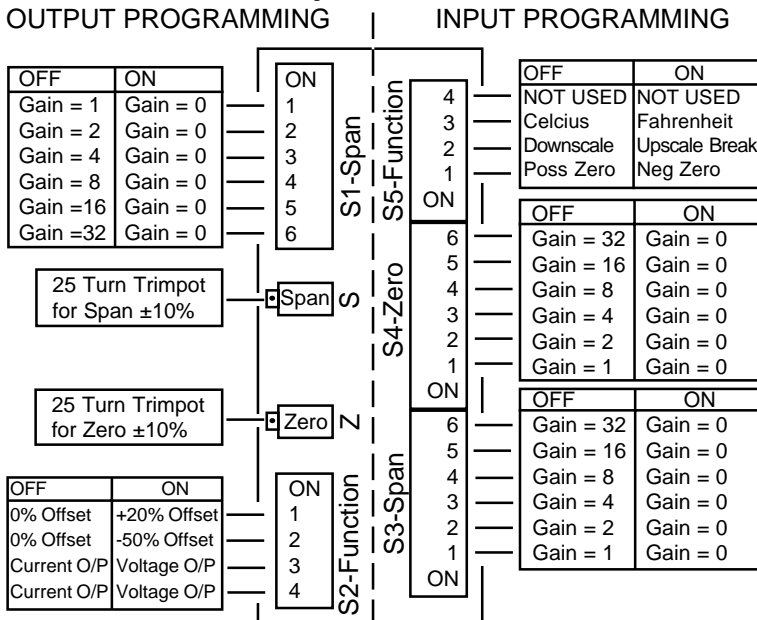
Examples of Input Connections.



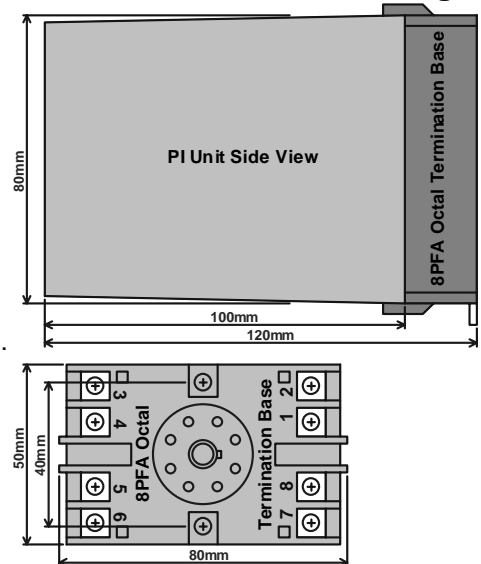
Terminations.

| | | |
|--------|---|-------------|
| Output | 1 | +Ve |
| | 2 | -Ve |
| Input | 3 | +T/C |
| | 4 | -T/C |
| P/S | 7 | Neutral/+DC |
| | 8 | Phase/-DC |

Plan View of PI-T Adjustments.



Dimensions and Mounting.



PI-T Input Programming.

Always set **OUTPUT range first**, then INPUT range.

If the required input range is not listed in the table below, use the following formulae to calculate the correct Zero and Span DIP switch settings.

| Thermocouple Type Gain Values | | | | | | |
|-------------------------------|------|------|------|--------|--------|------|
| | J | K | N | R | S | T |
| Y (SPAN) | 6000 | 6000 | 6000 | 16000 | 16000 | 3000 |
| Z (ZERO) | 25 | 25 | 25 | 33.333 | 33.333 | 2 |

SPAN = Maximum Input - Zero Offset

deg C SPAN GAIN = $\frac{Y}{SPAN}$

deg F SPAN GAIN = $\frac{2 \times Y}{SPAN}$

deg C ZERO GAIN = $\frac{Zero\ Offset}{Z}$

deg F ZERO GAIN = $\frac{Zero\ Offset}{2 \times Z}$

If Zero is: 1/ Positive, put S5-1 OFF. 2/ Negative, put S5-1 ON.

Sensor Fail: 1/ For downscale sensor fail drive put S1-8 OFF. 2/ For upscale sensor fail drive put S1-8 ON.

e.g. For Type K 200~600C: SPAN = 600 - 200 = 400C. ZERO OFFSET= 200C.

1/ From the tables, SPAN GAIN = $\frac{6000}{400} = 15 = 1+2+4+8+0+0 \Rightarrow S3 = 0\ 0\ 0\ 0\ 1\ 1$

2/ ZERO GAIN = $\frac{200}{25} = 8 = 0+0+0+8+0+0 \Rightarrow S4 = 1\ 1\ 1\ 0\ 1\ 1$

3/ Positive Zero => **S5-1 OFF** Upscale Sensor Fail => **S5-2 ON**

| Gain Value | 1 | 2 | 4 | 8 | 16 | 32 |
|----------------|---|---|---|---|----|----|
| DIP Switch No. | 1 | 2 | 3 | 4 | 5 | 6 |

So if a gain value of 28 is required, put DIP switch No's 3, 4, 5 OFF (ie, gains of 4 + 8 + 16 = 28) and all the other DIP switches ON.

DIP switches and Pots are accessed by removing the small rectangular lid on the top of the PI-T enclosure.

- Note: (a) Enter the Zero or Span gain value into the appropriate Zero or Span DIP switch.
 (b) If the ZERO GAIN exceeds 63, then the input range must be factory calibrated.

PI-T Input Range Programming Table.

Note: Switch status: 1 = ON, 0 = OFF, X = DON'T CARE.

| INPUT RANGE (C) | INPUT RANGE (F) | T H E R M O C O U P L E T Y P E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-----------------|---------------------------------|---|---|---|---|---|---------|---|---|---|---|---|-----------|---------|---|---|---------|---|--------|----|---------|---|---|---------|---|---|----|---|---|---|---|---|---|---|---|---|---|---|
| | | Types J, K, N | | | | | | | | | | | | Type R, S | | | | | | Type T | | | | | | | | | | | | | | | | | | | |
| | | S3-SPAN | | | | | | S4-ZERO | | | | | | S5 | S3-SPAN | | | S4-ZERO | | | S5 | S3-SPAN | | | S4-ZERO | | | S5 | | | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | | |
| 0~100 | 0~200 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | | |
| 0~125 | 0~250 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | | |
| 0~150 | 0~300 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | | |
| 0~200 | 0~400 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | | |
| 0~250 | 0~500 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| 0~300 | 0~600 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| 0~400 | 0~800 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 0~500 | 0~1000 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 0~600 | 0~1200 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 0~750 | 0~1500 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 0~800 | 0~1600 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 0~1000 | 0~2000 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 0~1200 | 0~2400 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 0~1400 | 0~2800 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 0~1600 | 0~3200 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 0~1700 | | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | - | - | - | - | - | - | - | - | - | - | - | - | - |
| -50~50 | -100~100 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | |
| -100~100 | -200~200 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | |
| -100~200 | -200~400 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | |
| 100~200 | 200~400 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | - | - | - | - | - | - | - | - | - | - | - | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | |
| 200~500 | 400~1000 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 500~800 | 1000~1600 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 600~1200 | 1200~2400 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1000~1700 | | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | - | - | - | - | - | - | - | - | - | - | - | - | - |

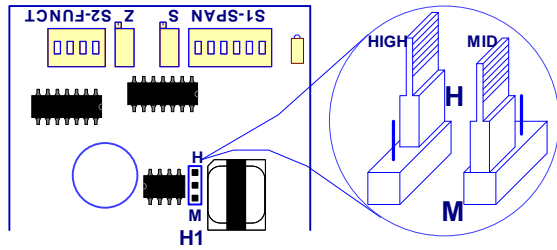
S5 - Function Switch

| | |
|------|--|
| S5-1 | Refer to S5-1 in Thermocouple Type above. |
| S5-2 | For upscale sensor fail drive switch S5-2 ON. For downscale sensor fail drive switch S5-2 OFF. |
| S5-3 | For Fahrenheit set S5-3 ON. For Celcius set S5-3 OFF. |

PI-T H1 Power Supply Jumper Settings.



WARNING: High Voltages Maybe Present.
Only adjust jumper with power disconnected.



| Power Supply Jumper Settings | |
|------------------------------|-----------------------------|
| H1 | Power Supply Voltage Range |
| H | Link for High: 85~264Vac/dc |
| M | Link for Mid: 22~85Vac/dc |

Notes:

- 1/ H1 is approx 4cm (1½") behind the 'S' trimpot.
- 2/ Exceeding voltage ranges may damage the unit.
- 3/ Ensure the enclosure label is correctly labelled for the jumper position.
- 4/ Adjust H1 jumper with a pair of needle nose pliers.
- 5/ Low Voltage Power Supply version is fixed, and has no jumper.
This must be ordered separately.

Output Range Programming Table.

- Notes:
- 1/ Switch status 1 = ON 0 = OFF.
 - 2/ Output ranges with '*' beside them reverse the polarity of the output connections.

| Output Range (V) | S1-SPAN | | | | | | S2-Function | | | | Output Range (I) | S1-SPAN | | | | | | S2-Function | | | |
|------------------|---------|---|---|---|---|---|-------------|---|---|---|------------------|---------|---|---|---|---|---|-------------|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | | |
| 0~500mV | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0~1mA | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0~1V | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0~2mA | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0~2V | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0~5mA | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0~3V | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0~10mA | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0~4V | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0~16mA | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0~5V | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0~20mA | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0~6V | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1~5mA | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 0~8V | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2~10mA | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 0~10V | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 4~20mA | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 0~12V | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | -1~1mA | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| 1~5V | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | -2~2mA | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| 2~10V | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | -5~5mA | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| -1~1V | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | -10~10mA | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| -2~2V | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | -20~20mA | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| -5~5V | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0~10mA * | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| -10~10V | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0~20mA * | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| -12~12V | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | | | | | | | | | | | |
| 0~-5V * | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | | | | | | | | | | | |
| 0~-10V * | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | | | | | | | | | | | |

The Proper Installation & Maintenance of PI-T.

Note. All power and signals must be de-energised before connecting any wiring, altering any jumpers or DIP switches, or inserting or removing the PI unit from its base.

MOUNTING.

- (1) Mount in a clean environment in an electrical cabinet on DIN or EN mounting rail.
- (2) Draft holes must have minimum free air space of 20mm. Foreign matter must not enter or block draft holes.
- (3) Do not subject to vibration or excess temperature or humidity variations.
- (4) Avoid mounting in cabinets with power control equipment.
- (5) To maintain compliance with the EMC Directives the LPI-T is to be mounted in a fully enclosed steel cabinet. The cabinet must be properly earthed, with appropriate input / output entry points and cabling.

WIRING.

- (1) A readily accessible disconnect device and a 1A, 250Vac overcurrent device, must be in the power supply wiring.
- (2) All output cables should be good quality overall screened INSTRUMENTATION CABLE with the screen earthed at one end only. (eg. Austral Standard Cables B5102ES.)
- (3) It is recommended that you do not ground current loops and use power supplies with ungrounded outputs.
- (4) Lightning arrestors should be used on inputs and outputs when there is a danger from this source.

THERMOCOUPLES.

- (1) Avoid locating the thermocouple where it will be in a direct flame.
- (2) Never insert a porcelain or refractory tube suddenly in a hot area. Pre-heat gradually while installing.
- (3) Locate it where the average temperature will be measured. It should be representative of the mass.
- (4) Immerse the thermocouple enough so that the measuring junction is entirely in the temperature to be measured: nine to ten times the diameter of the protection tube is recommended. Heat that is conducted away from the junction causes an error in reading.
- (5) If the thermocouple is mounted horizontally and the temperature is above the softening point of the tube, a support should be provided to prevent the tube sagging. Otherwise install the tube vertically.
- (6) Keep the junction head and cold junction in the approximation of the ambient temperature. Especially in the Noble Metal Class.

EXTENSION WIRE.

- (1) Use the correct thermocouple extension or compensation cable. i.e. Thermocouple type, insulation type, correct colour coding.
- (2) If possible install extension or compensation cable in a grounded conduit. Never run electrical wires in the same conduit.
- (3) All wires that must be spliced should be soldered, or the correct termination block used.

COMMISSIONING.

- (1) Once all the above conditions have been met and the wiring checked apply power to the PI-T and allow five minutes to stabilize.
- (2) If the input range has been altered from factory setting, the PI-T should be re-calibrated.
- (3) Due to the limits of error in a standard thermocouple probe and extension wire, an error can occur. (eg. For Type K an error of 2.2C or 0.75% of Span can occur. (which ever is greater)) To remove this error use a calibration standard thermocouple at the same immersion depth and adjust the Zero Pot on the top of the PI-T enclosure with a small screwdriver until the two levels agree. (Clockwise to increase the output reading and anti-clockwise to decrease the output reading.)

MAINTENANCE.

- (1) Replace defective protection tubes.
- (2) Check out extension and compensating cable circuits.
- (3) Repeat (3) of Commissioning.
- (4) Do it regularly - at least once every 6 months.

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