PI-K Programmable Isolating Resistance Transmitter.

Programmable Isolating 3 Wire Resistance Input to DC Current or DC Voltage Output Transmitter.

Features.

- **Field Programmable Input and Output Ranges.**
- **Bi-Polar Output Ranges.**
- **Input to Output Isolation 1.6kV.**
- **High Accuracy 0.1%.**
- **Universal AC/DC Power Supply.**
- **Compact DIN Rail Mount Enclosure.**
- **Available Standard or Special Calibration.**

Z495

Ordering Information.

PI-K-X Standard Calibration: Input 0~1kΩ; Output 4~20mA; High Voltage Power Supply.

PI-K - ☐ - ☐ - ☐ - Special Range Special Range Calibration.
IR OR PS

Other PI- models include:
PI-B Bridge / Straingauge;
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.

INPUT RANGES				OUTPUT RANGES			
Resistance (Ω)	IR	Resistance (Ω)	IR	Voltage	OR	Current	OR
0~10Ω	1	0~4.7kΩ	19	0~500mV	A	0~1mA	1
0~20Ω	2	0~5kΩ	20	0~1V	B	0~2mA	2
0~22Ω	3	0~7.5kΩ	21	0~2V	C	0~5mA	3
0~25Ω	4	0~10kΩ	22	0~3V	D	0~10mA	4
0~47Ω	5	0~20kΩ	23	0~4V	E	0~16mA	5
0~50Ω	6	10~50Ω	24	0~5V	F	0~20mA	6
0~75Ω	7	25~75Ω	25	0~6V	G	1~5mA	7
0~100Ω	8	50~100Ω	26	0~8V	H	2~10mA	8
0~200Ω	9	75~225Ω	27	0~10V	I	4~20mA	9
0~220Ω	10	150~250Ω	28	0~12V	J	-1~1mA	10
0~250Ω	11	250~500Ω	29	1~5V	K	-2~2mA	11
0~470Ω	12	500~1000Ω	30	2~10V	L	-5~5mA	12
0~500Ω	13	1~1.5kΩ	31	-1~1V	M	-10~10mA	13
0~750Ω	14	2~4kΩ	32	-2~2V	N	-20~20mA	14
0~1kΩ	15	4~10kΩ	33	-5~5V	O		
0~2kΩ	16	5~15kΩ	34	-10~10V	P		
0~2.2kΩ	17	10~20kΩ	35	-12~12V	Q		
0~2.5kΩ	18	15~20kΩ	36				
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-K-8-1-L 0~100Ω Input; 0~1mA Output; Low Voltage Power Supply.
2/ PI-K-Z-P-H-0/3K 0~3kΩ Input; -10~10V Output; High Voltage Power Supply.

Quality Assurance Programme.

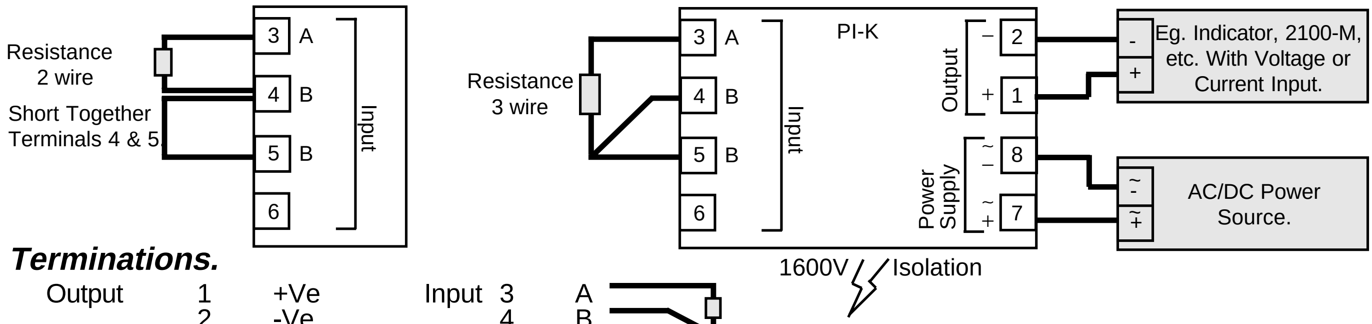
The modern technology and strict procedures of the ISO9001 Quality Assurance Programme applied during design, development, production and final inspection grant long term reliability of the instrument.

PI-K Rev2 Specifications.

Resistance Input		3 Wire Resistance.
		Lead Wire Resistance = 10Ω/Wire Max.
		Field Programmable Zero From 5Ω to 20kΩ.
		Field Programmable Span From 10Ω to 20kΩ.
		Suitable for 2 Wire Connection. (Offset Calibration Needed.)
	- Excitation	0.8mA for Input < 2kΩ. 0.08mA for Input >= 2kΩ.
Output	- Voltage	Field Programmable From 500mVdc to ±12Vdc.
		Maximum Output Drive = 10mA.
	- Current	Field Programmable From 1mAdc to ±20mAdc.
		Maximum Output Drive = 10Vdc. (500Ω @ 20mA.)
Power	-H	85~264Vac/dc; 50/60Hz; 5VA.
	-M	22~85Vac/dc; 50/60Hz; 5VA.
	-L	10~28Vac/dc; 50/60Hz; 5VA.
	-Circuit Sensitivity	<±0.001%/V FSO Typical.
Accurate to		<±0.1% FSO Typical.
Linearity & Repeatability		<±0.1% FSO Typical.
Ambient Drift		<±0.01%/C FSO Typical.
Noise Immunity		125dB CMRR Average. (1600Vdc Limit.)
MC 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.
Response Time		200msec Typical. (10 to 90% 50msec Typical.)
Operating Temperature & Humidity		0~60C. (Storage Temp. -20~80C.) 5~85% RH Max. Non-Condensing.
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.

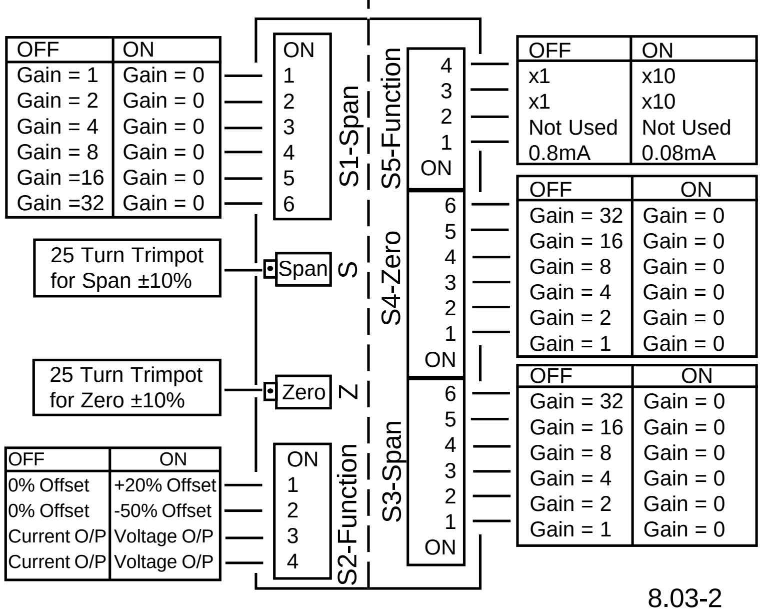
Examples of Input Connection.



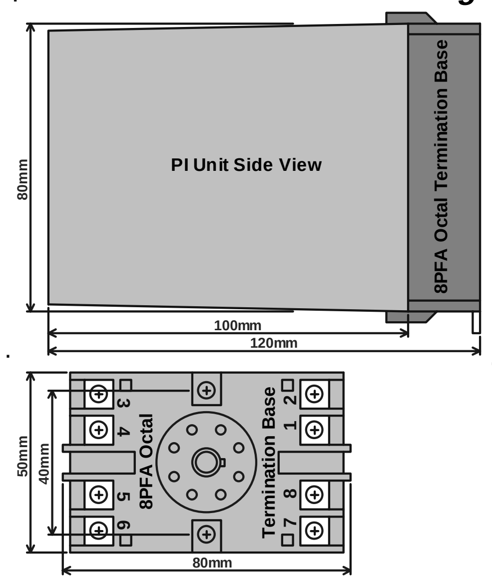
Terminations.

Output	1	+Ve	Input	3	A
	2	-Ve		4	B
				5	B
P/S	7	Neutral/+DC		6	NOT USED
	8	Phase/-DC			

Plan View of PI-K Adjustments.



PI-K Dimensions and Mounting.



PI-K Input Programming.

Always set **OUTPUT range first**, then INPUT range.
If the input range is not listed in the programming table, use the following formulae to work out the Zero and Span DIP switch settings for gain.

Span Gain = $\dfrac{600 \times \text{Pregain}}{\text{Resist High} - \text{Resist Low}}$

Zero Gain = $\dfrac{\text{Resist Low}}{5 \times \text{Pregain}}$

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

EFFECTIVE INPUT RANGE (ie Resist High - Resist Low)	S5-1	S5-2	S5-3	S5-4	PREGAIN
10Ω <= Range < 200Ω	0	0	1	1	1
200Ω <= Range < 2kΩ	0	0	0	0	10
2kΩ <= Range <= 20kΩ	1	0	0	0	100

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-K enclosure

Note: (a) Enter Ranges with their exponential value. Eg. Enter 2kΩ as 2×10^3.
(b) Use the same pregain value in both the Span and Zero gain formulae.
(c) Enter the Zero or Span gain value into the appropriate Zero or Span DIP switch.

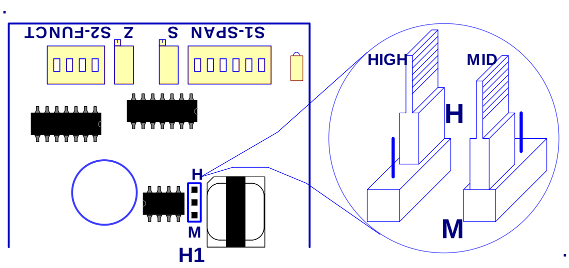
PI-K Input Range Programming Table.

Notes: 1/ Switch status 1 = ON, 0 = OFF, X = DON'T CARE.
2/ Input ranges with '*' beside them require more adjustment by the Zero & Span trimpot.

Input Range Resist (Ω)	S3-Span						S4-Zero						S5-Function			
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4
0~10Ω	1	1	0	0	0	0	1	1	1	1	1	1	0	0	1	1
0~20Ω	1	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1
0~22Ω *	0	0	1	0	0	1	1	1	1	1	1	1	0	0	1	1
0~25Ω	1	1	1	0	0	1	1	1	1	1	1	1	0	0	1	1
0~47Ω *	0	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1
0~50Ω	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1
0~75Ω	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1
0~100Ω	1	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1
0~200Ω	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0
0~220Ω *	0	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0
0~250Ω	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0
0~470Ω *	0	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
0~500Ω	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
0~750Ω	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0
0~1kΩ	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
0~2kΩ	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0
0~2.2kΩ *	0	0	1	0	0	1	1	1	1	1	1	1	1	0	0	0
0~2.5kΩ	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0
0~4.7kΩ *	0	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0
0~5kΩ	1	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0
0~7.5kΩ	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0
0~10kΩ	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
0~20kΩ	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
10~50Ω	0	0	0	0	1	1	1	0	1	1	1	1	0	0	1	1
25~75Ω	1	1	0	0	1	1	0	1	0	1	1	1	0	0	1	1
50~100Ω	1	1	0	0	1	1	1	0	1	0	1	1	0	0	1	1
75~225Ω	1	1	0	1	1	1	0	0	0	0	1	1	0	0	1	1
150~250Ω	1	0	0	1	1	1	1	0	0	0	0	1	0	0	1	1
250~500Ω	1	1	1	0	0	1	0	1	0	1	1	1	0	0	0	0
500Ω~1000Ω	1	1	0	0	1	1	1	0	1	0	1	1	0	0	0	0
1~1.5kΩ	1	1	0	0	1	1	1	1	0	1	0	1	0	0	0	0
2k~4k	1	0	0	0	0	1	1	1	0	1	1	1	1	0	0	0
4k~10k	1	0	1	0	1	1	1	1	1	0	1	1	1	0	0	0
5k~15k	1	0	0	1	1	1	1	0	1	0	1	1	1	0	0	0
10k~20k	1	0	0	1	1	1	1	1	0	1	0	1	1	0	0	0
15k~20k	1	1	0	0	1	1	1	0	0	0	0	1	1	0	0	0

PI-K 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.

PI-K 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			
	1	2	3	4	5	6	1	2	3	4
0~500mV	0	1	1	1	1	1	0	0	1	1
0~1V	1	0	1	1	1	1	0	0	1	1
0~2V	1	1	0	1	1	1	0	0	1	1
0~3V	1	0	0	1	1	1	0	0	1	1
0~4V	1	1	1	0	1	1	0	0	1	1
0~5V	1	0	1	0	1	1	0	0	1	1
0~6V	1	1	0	0	1	1	0	0	1	1
0~8V	1	1	1	1	0	1	0	0	1	1
0~10V	1	1	0	1	0	1	0	0	1	1
0~12V	1	1	1	0	0	1	0	0	1	1
1~5V	1	1	1	0	1	1	1	0	1	1
2~10V	1	1	1	1	0	1	1	0	1	1
-1~1V	1	1	0	1	1	1	0	1	1	1
-2~2V	1	1	1	0	1	1	0	1	1	1
-5~5V	1	1	0	1	0	1	0	1	1	1
-10~10V	1	1	1	0	1	0	0	1	1	1
-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

Output Range (I)	S1-SPAN						S2-Function			
	1	2	3	4	5	6	1	2	3	4
0~1mA	0	1	1	1	1	1	0	0	0	0
0~2mA	1	0	1	1	1	1	0	0	0	0
0~5mA	0	1	0	1	1	1	0	0	0	0
0~10mA	1	0	1	0	1	1	0	0	0	0
0~16mA	1	1	1	1	0	1	0	0	0	0
0~20mA	1	1	0	1	0	1	0	0	0	0
1~5mA	1	1	0	1	1	1	1	0	0	0
2~10mA	1	1	1	0	1	1	1	0	0	0
4~20mA	1	1	1	1	0	1	1	0	0	0
-1~1mA	1	0	1	1	1	1	0	1	0	0
-2~2mA	1	1	0	1	1	1	0	1	0	0
-5~5mA	1	0	1	0	1	1	0	1	0	0
-10~10mA	1	1	0	1	0	1	0	1	0	0
-20~20mA	1	1	1	0	1	0	0	1	0	0
0~-10mA *	1	0	1	0	1	1	0	0	0	0
0~-20mA *	1	1	0	1	0	1	0	0	0	0

The Proper Installation & Maintenance of PI-K.

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 it's base.

MOUNTING.

(1) Mount in a clean environment in an electrical cabinet on 35mm Symmetrical 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 PI-B is to be mounted in a fully enclosed steel cabinet. The cabinet must be properly earthed, with appropriate input / output entry points, filtering, and cabling.

WIRING.

(1) A readily accessible disconnect device and a 1A, 250Vac overcurrent device, must be in the power supply wiring.
(2) All cables should be good quality overall screened INSTRUMENTATION CABLE with the screen earthed at one end only.
(3) Signal cables should be laid a minimum distance of 300mm from any power cables.
(4) For 2 wire current loops, 2 wire voltage signals or 2 wire current signals, Austral Standard Cables B5102ES is recommended. For three wire transmitters, RTD's, and Resistance Sensors, Austral Standard Cables B5103ES is recommended.
(5) It is recommended that you do not ground current loops and use power supplies with ungrounded outputs.
(6) Lightning arrestors should be used when there is a danger from this source.
(7) Refer to diagrams for connection information.

COMMISSIONING.

(1) Once all the above conditions have been carried out and the wiring checked apply power to the PI-K loop and allow five minutes for it to stabilize.
(2) Due to differences in cable resistance in the resistance sensor legs or errors within the resistance sensor itself a small error may occur (usually less than 1%). To remove this error take a low (approx 10%) and a high (approx 90%) reading of the variable being measured by the transducer supplying the signal to the PI-K, and ensure that this agrees with the level being indicated by the PLC or indicator, etc. that the PI-K is connected into. Adjust for any difference using the Zero and Span Pots in the top of the PI-K 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) Repeat (2) of the commisioning instructions.
(2) Do it regularly - at least once every 12 months.

Intech INSTRUMENTS LTD
www.intech.co.nz
Christchurch Ph: +64 3 343 0646
Auckland Ph: 09 827 1930
Email: sales@intech.co.nz