PI-D Programmable Isolating DC Transmitter.

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

Features.

- **Field Programmable Input and Output Ranges.**
- **Bi-Polar Input and Output Ranges.**
- **Input to Output Isolation 1.6kV.**
- **High Accuracy 0.1%.**
- **Universal AC/DC Power Supply.**
- **Selectable 3second Input Damping.**
- **Transmitter Power Supply Standard.**
- **Compact DIN Rail Mount Enclosure.**
- **Available Standard or Special Calibration.**

TECHNOLOGY & QUALITY AWARD

REGISTERED ISO9001 MANUFACTURER

Z495

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.

Ordering Information.

PI-D-X Standard Programmable Calibration: Input 4~20mA; Output 4~20mA; High Voltage Power Supply.

PI-D - ☐ - ☐ - ☐ - Special Programmable Calibration.
IR OR PS

INPUT RANGES				OUTPUT RANGES			
Voltage	**IR**	**Current**	**IR**	**Voltage**	**OR**	**Current**	**OR**
0~10mV	A	0~200µA	1	0~500mV	A	0~1mA	1
0~20mV	B	0~500µA	2	0~1V	B	0~2mA	2
0~50mV	C	0~1mA	3	0~2V	C	0~5mA	3
0~100mV	D	0~2mA	4	0~3V	D	0~10mA	4
0~200mV	E	0~5mA	5	0~4V	E	0~16mA	5
0~500mV	F	0~10mA	6	0~5V	F	0~20mA	6
0~1V	G	0~20mA	7	0~6V	G	1~5mA	7
0~2V	H	0~50mA	8	0~8V	H	2~10mA	8
0~4V	I	0~100mA	9	0~10V	I	4~20mA	9
0~5V	J	1~5mA	10	0~12V	J	-1~1mA	10
0~10V	K	2~10mA	11	1~5V	K	-2~2mA	11
0~20V	L	4~20mA	12	2~10V	L	-5~5mA	12
0~50V	M	10~50mA	13	-1~1V	M	-10~10mA	13
0~100V	N	-1~1mA	14	-2~2V	N	-20~20mA	14
0~150V	O	-10~10mA	15	-5~5V	O		
1~2V	P	-20~20mA	16	-10~10V	P		
1~5V	Q	20~4mA *	17	-12~12V	Q		
2~10V	R	50~10mA *	18				
-1~1V	S						
-5~5V	T						
-10~10V	U						
Special Input Range			Z	Special Output Range			Z

Ranges with '*' beside them must have the polarity of their connections reversed.

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-D-K-1-L   0~10V Input; 0~1mA Output; Low Voltage Power Supply.
2/ PI-D-Z-P-H-0/8V   0~8V Input; -10~10V Output; High Voltage Power Supply.

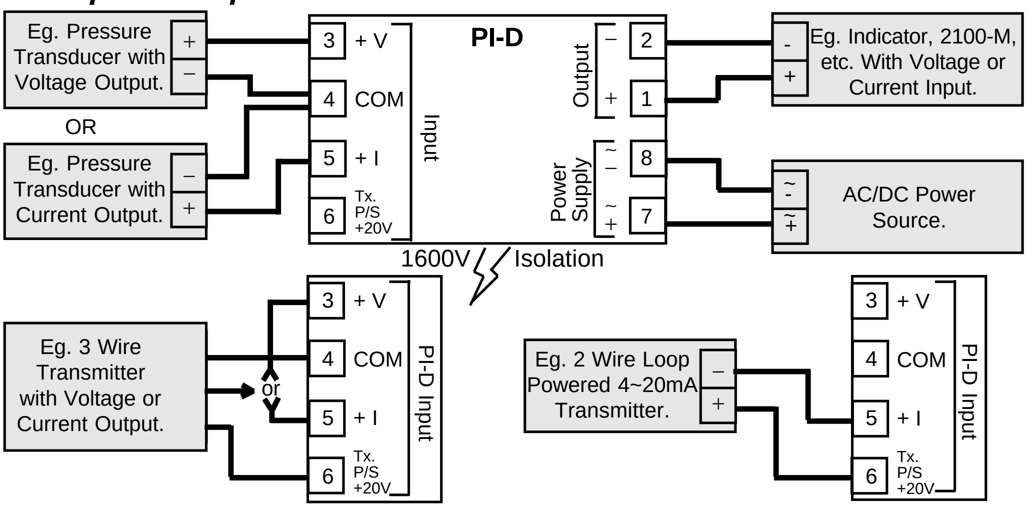
Quality Assurance Programme.

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-D Rev2 Specifications.

Input	-Voltage	Field Programmable From 10mV to 150Vdc and Bipolar.
		Minimum Input Resistance = 200kΩ.
		Maximum Over-range = 170Vdc Continuous.
	- Current	Field Programmable From 200μA to 100mAdc and Bipolar.
		Input Resistance = 25Ω.
		Maximum Over-range = 120mAdc Continuous.
	-Transmitter P/S	20Vdc±5% Common to Input Com. (Terminal 4.)
		Max Load = 30mA.
		Ripple < 20mV Typical at 30mA Load.
Output	-Voltage	Field Programmable From 500mV to ±12Vdc.
		Maximum Output Drive = 10mA.
	-Current	Field Programmable From 1mA to ±20mAdc.
		Maximum Output Drive = 10Vdc. (500Ω @ 20mA.)
Power	-H	85~264Vac/dc; 50/60Hz; 5VA.
	-M	22~85Vac/dc; 50/60Hz; 5VA. 32Vac Min. When Using 20V TX. P/S.
	-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.)
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.
Response Time		200msec Typical. (From 10 to 90% 50msec Typical.)
Operating Temperature & Humidity		0~60C. (Storage Temperature -20~80C.) 5~85%RH max. Non-Condensing.
Dimensions and Mounting		L=80, W=50, H=120mm. Mounts on 35mm Symetrical Mounting Rail.

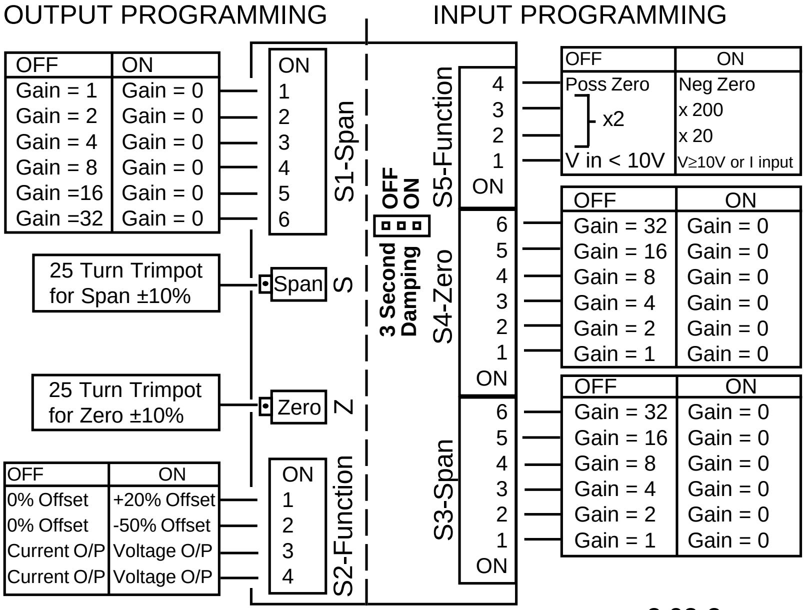
Examples of Input Connection.



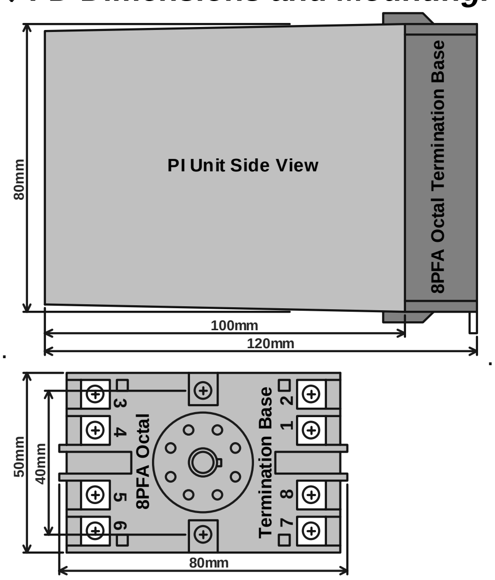
Terminations.

Output	1	+Ve
	2	-Ve
Input	3	+ V
	4	COM
	5	+ I
	6	Tx. P/S 20V
P/S	7	Neutral/+DC
	8	Phase/-DC

Plan View of PI-D Adjustments.



PI-D Dimensions and Mounting.



PI-D 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 = $\dfrac{24}{\text{Pregain x (Signal High - Signal Low)}}$

Zero Gain = 10 x Pregain x Signal Low.

If Zero is 1/ Positive, put S5-4 OFF.
2/ Negative, put S5-4 ON.

	EFFECTIVE INPUT RANGE (ie Signal High - Signal Low)	S5-1	S5-2	S5-3	PREGAIN
VOLTAGE INPUT	10mV <= Range <= 20mV	0	0	0	200
	20mV < Range <= 200mV	0	0	1	20
	200mV < Range <= 2V	0	1	1	2
	2V < Range <= 20V	1	0	1	0.2
	20V < Range <= 150V	1	1	1	0.02
CURRENT INPUT	200µA <= Range <= 800µA	1	0	0	5000
	800µA < Range <= 8mA	1	0	1	500
	8mA < Range <= 50mA	1	1	1	50

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 (ie, gains of 4 + 8 + 16 = 28) OFF 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-D enclosure.

Notes:
(a) Enter ranges with their exponential value: Eg. Enter 20mA as 20 x 10^{-3}; Enter 100mV as 100 x 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.
(d) If your *GAIN ZERO* exceeds **63**, then your input range will need to be factory calibrated.

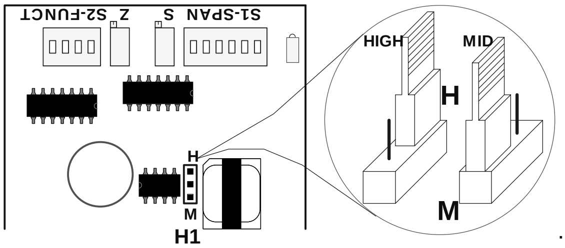
PI-D Input Range Programming Table.

Notes:
1/ Switch status 1 = ON, 0 = OFF, X = DON'T CARE.
2/ Input ranges with '*' beside them reverse the polarity of the input connections.
3/ Input ranges with '#' beside them require more adjustment with the Zero and Span trimpots.

Input Range	S3-SPAN						S4-ZERO						S5-FUNCTION			
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4
0~10mV	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	x
0~20mV	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	x
0~50mV	1	1	1	0	0	1	1	1	1	1	1	1	0	0	1	x
0~100mV	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	x
0~200mV	1	0	0	1	1	1	1	1	1	1	1	1	0	0	1	x
0~500mV	1	1	1	0	0	1	1	1	1	1	1	1	0	1	1	x
0~1V	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	x
0~2V	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	x
0~4V	1	0	0	0	0	1	1	1	1	1	1	1	1	0	1	x
0~5V	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	x
0~10V	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1	x
0~20V	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	x
0~50V	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	x
0~100V	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	x
0~150V	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	x
1~5V	1	0	0	0	0	1	1	0	1	1	1	1	1	0	1	0
2~10V	0	0	0	0	1	1	1	1	0	1	1	1	1	0	1	0
-1~1V	1	0	0	1	1	1	1	1	0	1	0	1	0	1	1	1
-5~5V	1	1	0	0	1	1	1	0	1	0	1	1	1	0	1	1
-10~10V	1	0	0	1	1	1	1	1	0	1	0	1	1	0	1	1
0~200µA	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	x
0~500µA#	1	0	1	0	1	1	1	1	1	1	1	1	1	0	0	x
0~1mA	1	1	1	1	0	0	1	1	1	1	1	1	1	0	1	x
0~2mA	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	x
0~5mA#	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	x
0~10mA	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	x
0~20mA	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	x
0~40mA	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	x
0~50mA#	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	x
1~5mA	1	1	0	0	1	1	0	1	0	1	1	1	1	0	1	0
2~10mA	1	0	0	1	1	1	1	0	1	0	1	1	1	0	1	0
4~20mA	1	0	0	0	0	1	1	0	1	1	1	1	1	1	1	0
10~50mA	1	1	0	0	1	1	0	1	0	1	1	1	1	1	1	0
-1~1mA	1	1	1	0	0	1	0	1	0	1	1	1	1	0	1	1
-10~10mA	1	1	1	0	0	1	0	1	0	1	1	1	1	1	1	1
-20~20mA	1	1	0	0	1	1	1	0	1	0	1	1	1	1	1	1
* 20~4mA	1	0	0	0	0	1	1	0	1	0	1	1	1	1	1	1
* 50~10mA	1	1	0	0	1	1	0	1	1	0	0	1	1	1	1	1

PI-D 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-D 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-D.

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, symetrical, 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-D 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 3 wire transmitters 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-D loop and allow five minutes for it to stabilize.
(2) Take a low (approx 10%) and high (approx 90%) reading of the variable being measured by the transducer supplying the signal to the PI-D, and ensure that this agrees with the level being indicated by the PLC or indicator, etc, that the PI-D is connected into. Adjust for any difference using the Zero and Span Pots in the top of the PI-D enclosure with a small screw driver until the two levels agree. (Clockwise to increase the output reading and anti-clockwise to decrease the output reading.)

MAINTENANCE.
(1) Repeat (2) of Commissioning.
(2) Do it regularly - at least once every 12 months.

Intech INSTRUMENTS LTD
www.intech.co.nz
Christchurch Ph: +64 3 343 0646
Central Ph: 06 876 0034
Auckland Ph: 09 827 1930
Email: sales@intech.co.nz