

# LPI-pH pH Transmitter.

Isolating pH Voltage Input  
to 4~20mA Output  
Loop Powered Transmitter.

## Features.

- Isolated Input to Output 2.0kV.
- Bi-Polar pH Cell Input.
- IP67 Rated Enclosure.
- Liquid Crystal Display (LCD) 0~14.00pH.
- High Accuracy.
- 40~200mV Output Test Signal
- Low Cost.
- Easy to Install.
- Reverse Polarity Protection.
- Internally Accessible, Finger Adjustable, **SLOPE & OFFSET** Adjustments.
- Selectable, Automatic or Fixed Probe Temperature Compensation.
- Corrosion Proofed Circuit Boards & Components by Isonel 642. (Except terminals & DIP Switch.)



Other LPI- models include:

LPI-B :Bridge / Strain gauge;

LPI-D :DC;

LPI-F :Frequency;

LPI-K :Resistance;

LPI-N :Differential Pt100 RTD;

LPI-P :Potentiometer;

LPI-R :Pt100 RTD;

LPI-T :Thermocouple;

NOTE: These other models do not include LCDs, and have DIN rail mount enclosures.

LPI-DO2 :DO2, LCD Display;

LPI-ORP :ORP, LCD Display;

## Description.

The LPI-pH is a loop powered, isolated, pH Cell input, to 4~20mA output transmitter, with integral Pt100 RTD temperature compensation, and LCD of 0~14.00pH.

The LPI-pH is the device to choose when a pH probe is installed in a corrosive, damp, high earth current or electrically noisy environment. The IP67 rating of the transmitter enclosure, together with the corrosion proofed circuit board, give the LPI-pH high immunity to damp and corrosion, allowing it to be mounted close to the pH probe. Having the transmitter close to the pH probe means that the highly sensitive pH probe output signal is amplified and turned into a robust 4~20mA signal before noise exposure from long cable runs can effect it.

The unit also features internally accessible, finger adjustable, 15 turn slope and offset adjustments, for easy calibration of the pH sensor, in conjunction with the LCD.

The 4~20mA output from the LPI-pH can be run for long distances to better environments where standard process controllers can be used safely. The LPI-pH fills a niche where it has often been necessary to install low IP rated, dedicated pH instruments in an aggressive environment.

## Ordering Information.

**LPI-pH**

Standard Unit: 0~14pH In, 4~20mA Out, with LCD.

## Quality Assurance Programme.

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

### LPI-pH Specifications.

Input	-pH	-379.0~379.0mV. Standard Calibration (pH Probe @ 20C).
	-Temperature	Pt100 RTD, 0~100C
pH Input Impedance		10 <sup>12</sup> Ω
Default Temperature Compensation <sup>1)</sup>		20C (See Note 1.)
Slope Adjustment Range		200~420mV Standard Calibration.
Offset Adjustment Range		±10% Standard Calibration.
Display	-Display.	12.5mm, 3½ Digit, LCD.
	-Resolution	0.01pH.

### General Specifications.

Output	-mA	2 wire 4~20mA. (Loop Powered.)
	-mV Test	40~200mV ±1% @ 4~20mA. Other Test Voltages Available. e.g. 1~5V.
		Note. mV Test Increases Power Supply & Decreases Load Resistance.
Power Supply		11~33Vdc.
Supply Voltage Sensitivity		<±0.005%/V FSO.
Output Load Resistance		650Ω @ 24Vdc. (50Ω/V Above 11Vdc.)
Maximum Output Current		Limited to <28mA.

Accurate to		<±0.1% FSO Typical.
Linearity & Repeatability		<±0.1% FSO Typical.
Ambient Drift		<±0.02%/C FSO Typical.
Noise Immunity		125dB CMRR Average. (2.0kV RMS Limit.)
EMC Compliances		Emissions EN 55022-A. Immunity EN 50082-1, <1% Effect FSO Typical.
Isolation Test Voltages		2000Vac/dc Input to Output for 1min.
Operating Temperature		0~70C.
Storage Temperature		-20~80C.
Operating Ambient Humidity		5~85%RH Max. Non-condensing.
Construction	-Enclosure	IP67 Rated, Impact Resistant, Polycarbonate,
	-Glands	IP68 Rated Nylon, Rated to UL94-V2 to Take 3~6mm Cable Size.
	-Dimensions	L=140, W=80, H=65mm, excluding glands.

**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'.

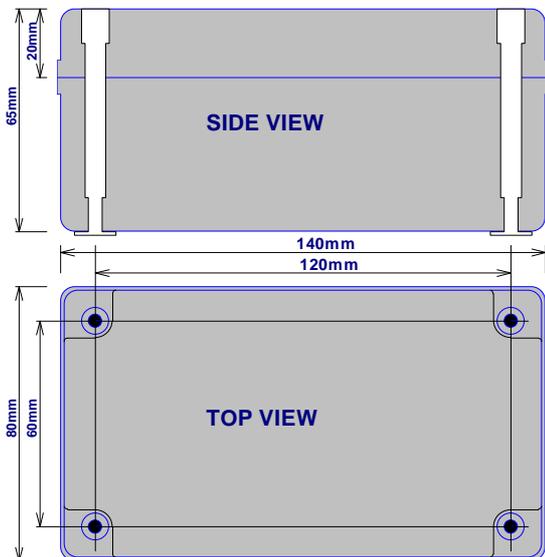
**Warning:** These products are not designed for use in, and should not be used for patient connected applications. In any critical installation an independent fail-safe back-up system must always be implemented.

### Terminations.

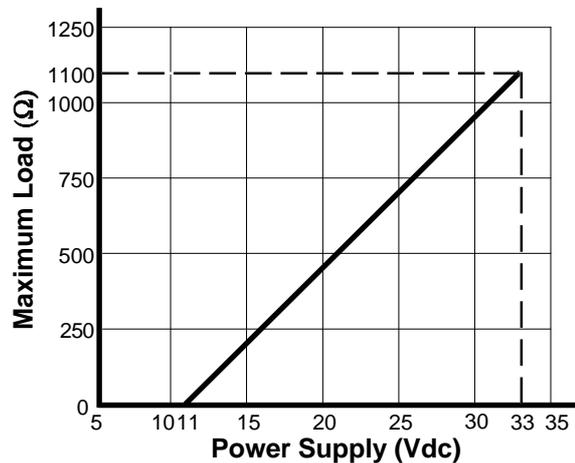
RTD Input		pH Input		Output	
1	A	3	pH +mV	5	+mA
2	B	4	pH -mV *	6	-mA
				7	mV TEST

\* NOTE. Terminal 3 needs to be positive with respect to terminal 4 with the probe in an **alkaline** solution.

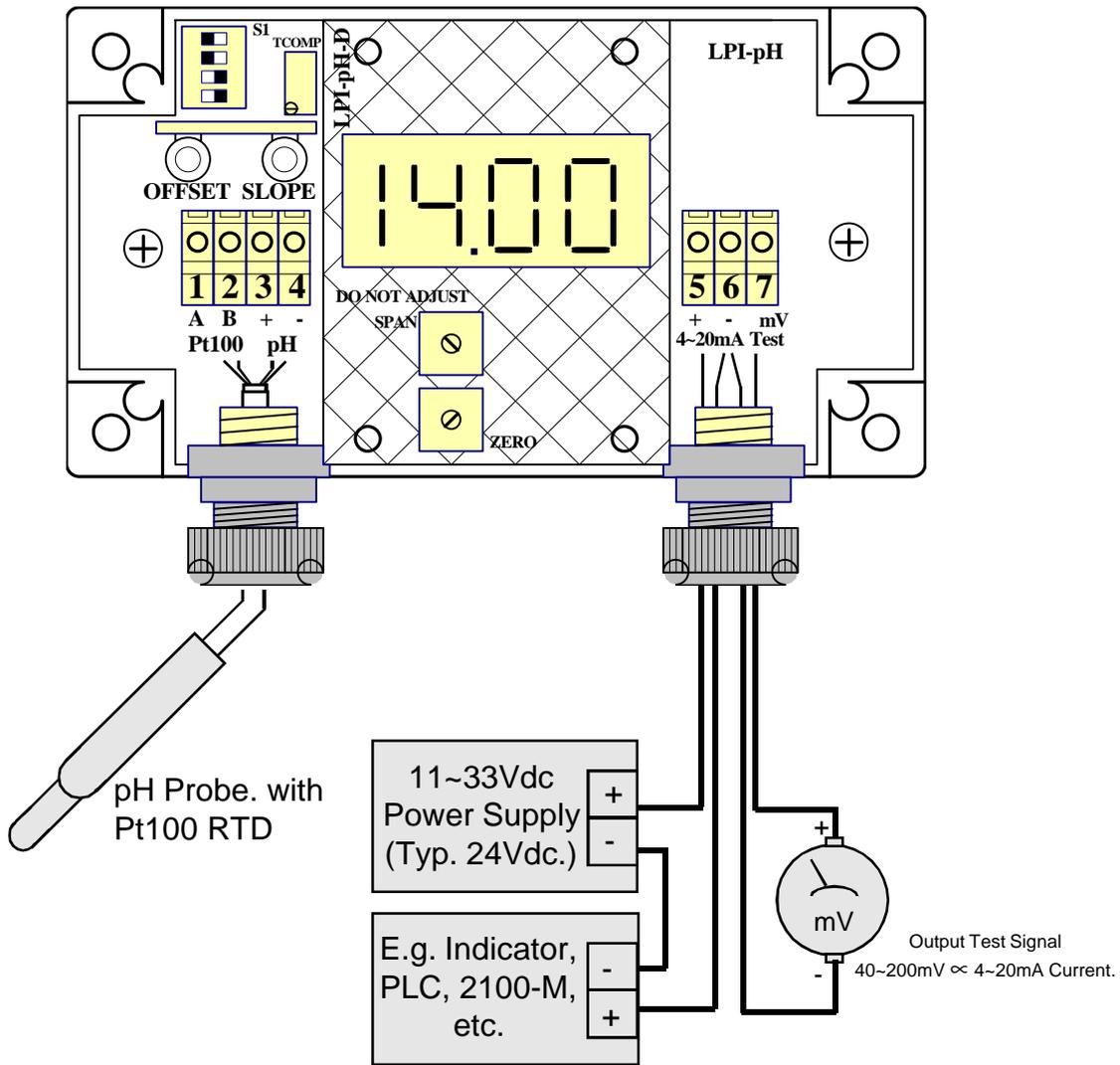
### Enclosure Dimensions. (mm)



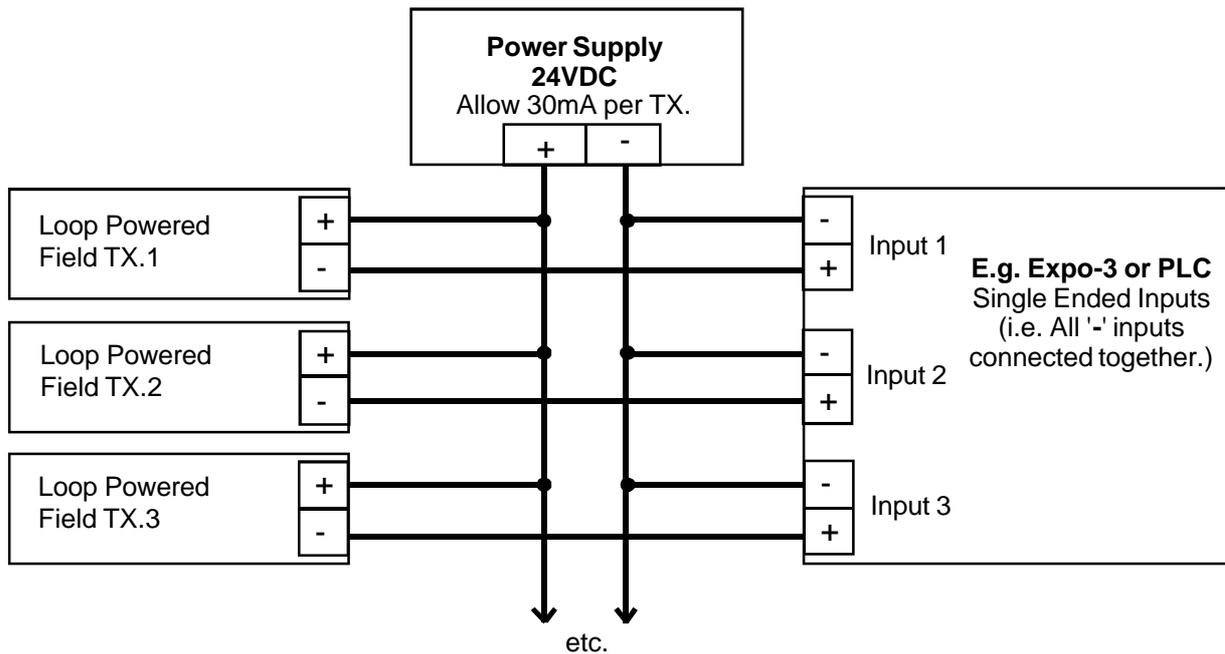
### Maximum Load Vs Power Supply.



**Example of Input Connections.**



**Example of Multiple Transmitters Connected into Single Ended Inputs.**



## Temperature Compensation Selection.

S1				MODE
1	2	3	4	
1	1	0	0	Automatic Temperature Compensation.
0	0	1	1	Fixed 20C Temperature Compensation.

### The Proper Installation & Maintenance of LPI-pH

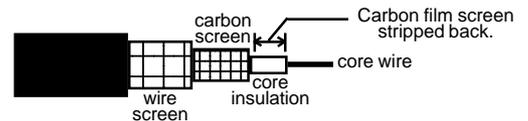
All power and signals must be de-energised before connecting any wiring, or altering any Jumpers or Dip Switches.

#### MOUNTING.

- (1) Mount the LPI-pH as close as possible to the pH probe. DO NOT extend the length of the pH probe cable.
- (2) Mount in a situation not exceeding the requirements of IP67.
- (3) Do not mount the LPI-pH where direct sunlight will fall on the LCD.
- (4) Ensure all cables entering the enclosure are glanded and sealed
- (5) Do not subject to vibration or excess temperature or humidity variations.
- (6) Avoid mounting in cabinets with power control equipment.
- (7) To maintain compliance with the EMC Directives the LPI-pH must 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) Cabling for the pH probe should be low leakage, overall screened type, designed for pH applications. This cable should be kept as short as possible.
- (2) When terminating the pH cable, the carbon film screen must be stripped back from the end of the core insulation to prevent the the cell from being shorted out.
- (3) All other cables should be good quality overall screened instrumentation cable with the screen earthed at one end only.
- (4) Signal cables should be laid a minimum distance of 300mm from any power cables.
- (5) For 2 wire current loops and 2 wire voltage signals or 2 wire current signals, Austral Standard Cables B5102ES is recommended.
- (6) It is recommended that you do not ground current loops and use power supplies with ungrounded outputs.
- (7) Lightning arrestors should be used when there is a danger from this source.
- (8) 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 LPI-pH loop and allow five minutes for it to stabilize.
- (2) If high precision results are required the transmitter must be trimmed against the pH probe it is connected to. To do this carry out the following procedure:
  - a/ Insert the pH probe into a 7.0pH traceable buffer. Wait for the probe to settle to the buffer temperature. Adjust the '*OFFSET*' Pot (shown on the previous page) for 12.0mA, or 7.0pH on the monitoring equipment.
  - b/ Rinse the probe in clean, distilled water, and insert into:
    - 4.0pH traceable buffer if the probe is to be used for predominantly **acid** conditions;
    - 10.0pH traceable buffer if the probe is to be used for predominantly **alkaline** conditions.Adjust the '*SLOPE*' Pot to obtain the following mA or pH readings as appropriate:
    - For 4.0pH adjust to 8.57mA or 4.0pH;
    - For 10.0pH adjust for 15.42mA or 10.0pH.

#### MAINTENANCE.

- (1) Repeat (2) of Commissioning.
- (2) Do it regularly. Refer to pH probe data for regularity, but at least once every six months.
- (3) Please contact the Service Dept. if it is suspected that adjustment of temperature compensation is necessary.

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