

# LPN-DP Differential Pressure Transmitter

Programmable Differential Pressure Input to 4~20mA Loop Powered Output Transmitter.

## Features.

- Very Low Pressure Resolution.
- Fine Zero & Span Adjustment.
- Coarse Zero & Span Adjustment Via Dip Switches.
- 3~15psi Pneumatic P to I using 100kPa Model.
- Temperature Compensation.
- IP67 Enclosure.
- Fast Response Time.
- High Accuracy & Linearity.
- Compact Size.
- Selectable 5 Second Dampening.
- Reverse Polarity Protection.



Z495

## Description.

The LPN-DP Series Differential Pressure Transmitters provide a very cost effective solution for pressure applications that require high accuracy over very low operating pressure ranges. The sensor is a solid state device and hence offers reliability and long life. The series is designed for use with non-corrosive, non-ionic working fluids such as air, dry gases and the like. (Fluids must generally be compatible with plastic, aluminium, RTV, Silicon and Glass.)

The LPN-DP can be used to measure bipolar differential, gauge pressure or vacuum. The LPN-DP-3/15psi can be used as a P to I to measure industry standard 3/15psi pneumatic sensors. The LPN-DP-BAR can also be used to measure atmospheric pressure from 900~1100mbar.

## Ordering Information.

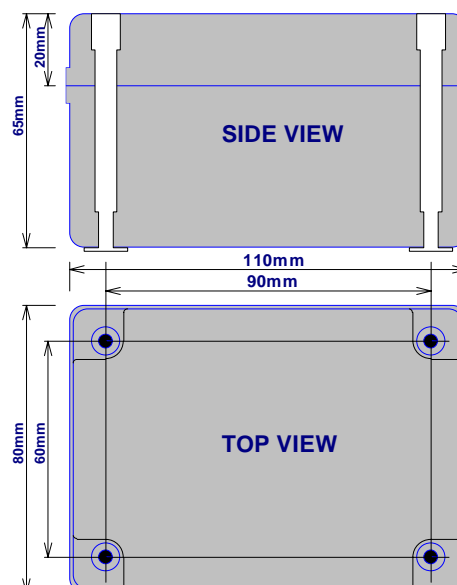
Model	<b>LPN-DP-100mm</b>	Differential Range within $\pm 20$ to $\pm 125$ mm W.G.
	<b>LPN-DP-250mm</b>	Differential Range within $\pm 100$ to $\pm 250$ mm W.G.
	<b>LPN-DP-1000mm</b>	Differential Range within $\pm 250$ to $\pm 1000$ mm W.G.
	<b>LPN-DP-40kPa</b>	Differential Range within $\pm 10$ to $\pm 40$ kPa.
	<b>LPN-DP-100kPa</b>	Differential Range within $\pm 40$ to $\pm 100$ kPa.
	<b>LPN-DP-BAR</b>	900~1100mbar absolute.
	<b>LPN-DP-3/15psi</b>	3 to 15psi input.

Note: Other higher ranges available on request.

## Typical Applications.

- HVAC monitoring of
  - Filter Differential Pressures
  - Fan Static Pressures
  - Clean Room Pressures
  - Variable Air Volume Systems
  - Velocity Pressures
- Analytical Instruments.
- Liquid Level Measurement.
- Leak Detection.
- General Automation.

## Enclosure Dimensions. (mm)



## 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.

**LPN-DP Specifications.** (Note: from Serial No. 0142001 onwards.)

Input

PRESSURE TYPE	INPUT				
	LPN-DP 100mmWG	LPN-DP 250mmWG	LPN-DP 1000mmWG	LPN-DP 40kPa	LPN-DP 100kPa
MAXIMUM PRESSURE DIFFERENTIAL	125mmWG (5" WG)	250mmWG (10" WG)	1000mmWG (40" WG)	40kPa (6psi)	100kPa (15psi)
MAXIMUM PROOF PRESSURE	5000mmWG (200" WG)	5000mmWG (200" WG)	140kPa (20psi)	140kPa (20psi)	200kPa (30psi)
MAXIMUM COMMON MODE PRESSURE	7000mmWG (275" WG)	7000mmWG (275" WG)	340kPa (50psi)	340kPa (50psi)	340kPa (50psi)

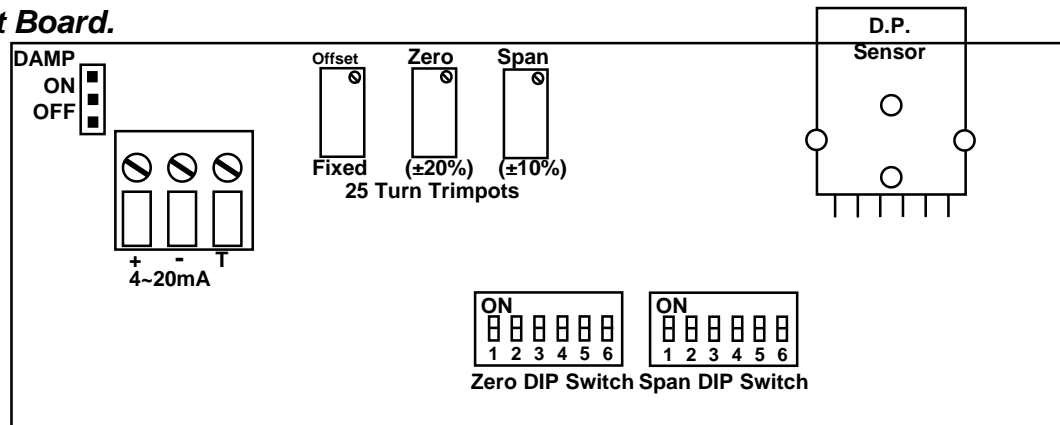
Note 1. Proof Pressure and Common mode pressure MUST be within the maximum pressure specified or warranty will be void.  
 Note 2. Proof pressure is the pressure above which devices will not return to guaranteed specifications.

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		8~33Vdc (Loop Powered).
Maximum Output Current		30mA.
Supply Voltage Sensitivity		<±0.01%/V FSO.
Output Load Resistance		800Ω @ 24Vdc (50Ω/V above 8Vdc).
Pressure Fittings		Hi / Lo Pressure Connections by 4mm 'Push-fit'.
Combined Linearity & Hysteresis		±0.2% FSO
Temperature Drift		±0.02%/C FSO (0~50C)
Repeatability		±0.2% FSO.
Long Term Stability of Offset & Span		±0.5% FSO (Based on a one year period)
Temperature Range		0~50C Compensated. 0~70C Operating.
Maximum Fluid Temperature Range		-40~85C
Humidity Limits		5~85%RH Max. Non-condensing.
EMC Compliances		Emissions EN 55022-A. Immunity EN 50082-1, <1% Effect FSO Typ.
Dimensions		L=140, W=80, H=65mm, excluding glands.
Corrosion Proofed		Circuit Boards and Components by Isonel 642 (Except DIP Switches, DP Sensor and Terminals.)

**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, for maximum sensor pressure range 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.

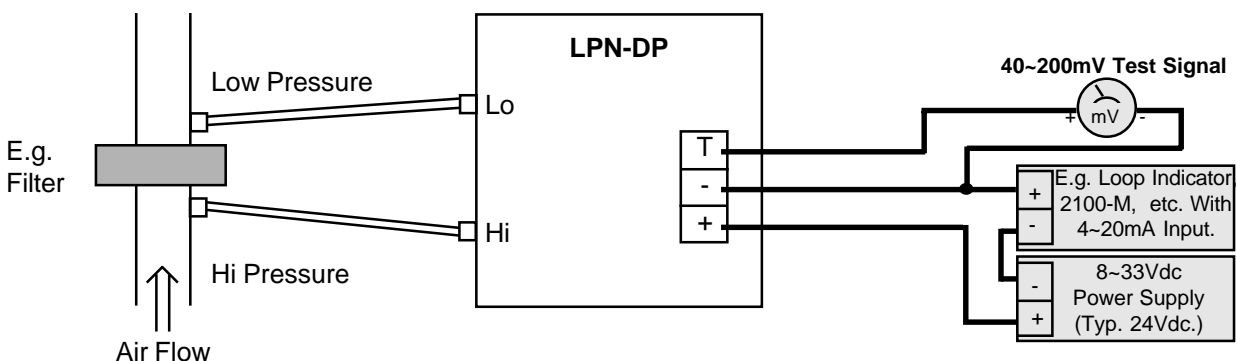
**Layout of Circuit Board.**



Note 1: Do not adjust the OFFSET trimpot. This is factory set.

Note 2: To Select 5sec damping shift the jumper to 'ON'.

**Terminations.**



Note: The LPN-DP-BAR has only the 'Hi' port fitted, and measures atmospheric pressure.

**LPN-DP Input Programming.**

**Note: Does not apply to LPN-DP-BAR.**

DIP switches are accessed by removing the lid off the LPN-DP. If the required input range<sup>1)</sup> is not listed in the table below, use the following formulae to calculate the correct **Zero** and **Span** DIP switch settings.

<b>Gain Value</b>	1	2	4	8	16	32
<b>DIP Switch No.</b>	1	2	3	4	5	6

**SPAN = Maximum Input - Zero Offset**

e.g. For 300~800mmWG => ZERO OFFSET = 300mmWG      SPAN = 800 - 300 = 500mmWG .

1/ From the tables, ZERO GAIN = 300 X 0.048 = 14<sup>2)</sup> = 0+2+4+8+0+0<sup>2)</sup> => **1 0 0 0 1 0<sup>2)</sup>**  
 2/ From the tables, SPAN GAIN =  $\frac{6000}{500}$  = 12 = 0+0+4+8+0+0 => **1 1 0 0 1 1**

- Notes:** <sup>1)</sup> The input range must be within the specified **maximum range** of the pressure sensor module.  
<sup>2)</sup> Set DIP SWITCH ZERO-6 **ON** for a NEGATIVE ZERO OFFSET, and **OFF** for a POSTIVE ZERO OFFSET.

**Important: It is necessary to calibrate the unit once a range has been selected on the DIP switches. (Refer to 'COMMISSIONING'.)**

**LPN-DP Input Programming Table.**

NOTE: Switch Status: 1=ON 0=OFF.

MODEL	Zero Formula	Span Formula
100mm	0.24 X mmWG	1200 SPAN(mmWG)
250mm	0.12 X mmWG	2400 SPAN(mmWG)
1000mm	0.048 X mmWG	6000 SPAN(mmWG)
40kPa	0.6 X kPa	480 SPAN(kPa)
100kPa	0.24 X kPa	1200 SPAN(kPa)

100mmWG	250mmWG	1000mmWG	40kPa	100kPa	ZERO						SPAN						
					1	2	3	4	5	6	1	2	3	4	5	6	
0~20	--	--	--	--	1	1	1	1	1	1	1	1	1	0	0	0	0
0~25	--	--	0~10	--	1	1	1	1	1	1	1	1	1	1	1	0	0
0~30	--	--	0~12	--	1	1	1	1	1	1	1	1	1	1	0	1	0
0~40	--	--	0~16	0~40	1	1	1	1	1	1	1	1	1	0	0	0	1
0~50	0~100	0~250	0~20	0~50	1	1	1	1	1	1	1	1	1	1	0	0	1
0~60	0~120	0~300	0~24	0~60	1	1	1	1	1	1	1	1	1	0	1	0	1
0~75	0~150	0~375	0~30	0~75	1	1	1	1	1	1	1	1	1	1	1	0	1
0~80	0~160	0~400	0~32	0~80	1	1	1	1	1	1	1	1	0	0	0	1	1
0~100	0~200	0~500	0~40	0~100	1	1	1	1	1	1	1	1	1	0	0	1	1
0~125	0~250	0~600	--	--	1	1	1	1	1	1	1	1	1	0	1	0	1
--	--	0~750	--	--	1	1	1	1	1	1	1	1	1	1	0	1	1
--	--	0~1000	--	--	1	1	1	1	1	1	1	1	1	0	0	1	1
20~100	40~200	100~500	8~40	20~100*	0	1	0	1	1	0	0	0	0	0	0	1	1
50~100	100~200	250~500	20~40	50~100	1	1	0	0	1	0	1	1	1	0	0	0	1
-12.5~12.5	--	--	-5~5	-12.5~12.5	0	0	1	1	1	1	1	1	1	1	1	0	0
-25~25	-50~50	-125~125	-10~10	-25~25	1	0	0	1	1	1	1	1	1	1	0	0	1
-25~75	-50~150	-125~375	-10~30	-25~75	1	0	0	1	1	1	1	1	1	0	0	1	1
-100~100	-200~200	-500~500	-40~40	-100~100	1	1	1	0	0	0	1	1	1	0	0	1	1

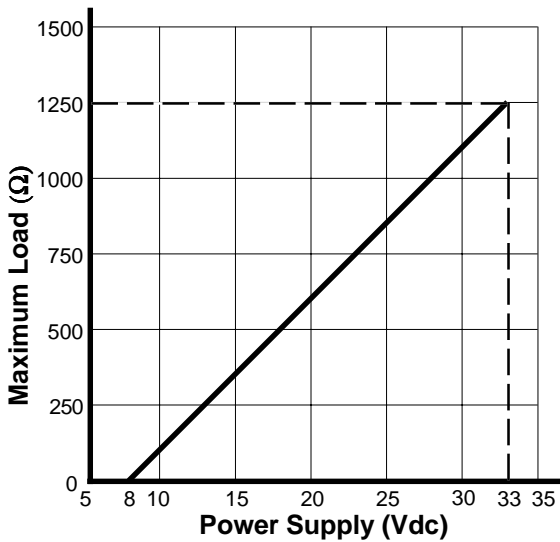
\* For 3~15psi input use 20~100kPa DIP switch selection.

**Pressure Conversion Table.**

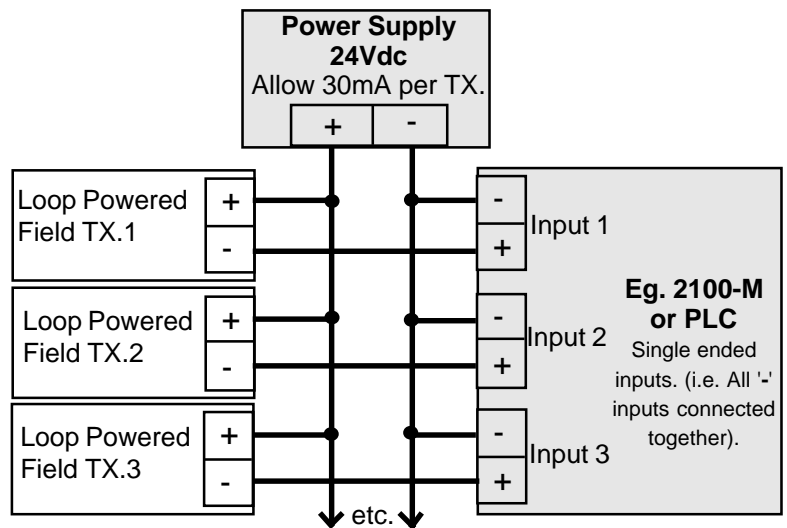
	Kpa	mm H2O	in. H2O	mm Hg	in. Hg	PSI	mBar	Atm.
1 KPa =	1.0000	101.973	4.0147	7.5006	0.2953	0.14504	10	0.0098687
1mm H2O = (1)	0.009806	1.0000	0.03937	0.07355	0.0028958	0.0014223	0.09806	0.000096787
1in. H2O = (2)	0.2491	25.400	1.0000	1.8683	0.073554	0.036127	2.491	0.0024581
1mm Hg = (3)	0.13332	13.595	0.53525	1.0000	0.039370	0.019337	1.3332	0.0013158
1in. Hg = (4)	3.3864	345.32	13.596	25.400	1.0000	0.4912	33.864	0.033421
1PSI = (5)	6.8947	703.08	27.680	51.715	2.036	1.0000	68.947	0.068041
1mBar =	0.100	10.1973	0.40147	0.75006	0.02953	0.01450	1.0000	0.00098692
1Atm =	101.33	10332	406.81	760.00	29.921	14.697	1013.3	1.0000

- Notes: 1. at 4C                      2. at 39F  
 3. at 0C                         4. at 32F

## Maximum Load Vs Power Supply.



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



## The Proper Installation & Maintenance of LPN-DP.

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

### MOUNTING.

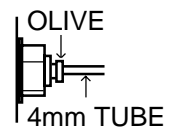
- (1) Do not subject to vibration or excess temperature or humidity variations.
- (2) Avoid mounting next to or in cabinets with power control equipment.
- (3) To maintain compliance with the EMC Directives the LPN-DP is to be mounted in a fully enclosed steel cabinet. The cabinet must be properly earthed, with appropriate input / output entry points and cabling.

### WIRING.

- (1) All cables should be good quality overall screened INSTRUMENTATION CABLE with the screen earthed at one end only.
- (2) Signal Cables should be laid a minimum distance of 300mm from any power cables.
- (3) For 2 wire current loops Austral Standard Cables B5102ES is recommended. For three wire transmitters and RTD's Austral Standard Cables B5103ES is recommended.
- (4) It is recommended that you do not ground current loops and use power supplies with ungrounded outputs.
- (5) Lightning arrestors should be used when there is a danger from this source.
- (6) Refer to diagrams for connection information.

### PRESSURE CONNECTIONS.

- (1) Use 4mm OD tubing. (eg U-Flex PU2.5 X 4mm)
- (2) Push the tube into the pneumatic bulkhead fitting as far as it will go. (approx. 12mm.)
- (3) To seal the tube ensure the small olive in the fitting is pulled away from the fitting.
- (4) To remove tubing press the olive against the fitting, and pull tube out.



### COMMISSIONING.

- (1) Once all the above conditions have been carried out and the wiring checked, apply power to the LPN-DP loop and allow five minutes for it to stabilize.
- (2) Take a low and high reading of the variable being measured by the transducer supplying the signal to the LPN-DP, and ensure that this agrees with the level being indicated by the PLC or Indicator, etc, that the LPN-DP is connected into. Adjust for any difference using the Zero and Span Pots in the LPN-DP enclosure with a small screwdriver until the two levels agree.

**Important: Do not adjust the OFFSET Pot. This is factory set.**

- (3) **It is necessary to calibrate the unit once a range has been selected on the DIP switches.**
  - (a) Simulate the 0% Pressure and adjust the Zero Pot until the output reading reads the 0% Output level.
  - (b) Simulate the 100% Pressure and adjust the Span Pot until the output reading reads the 100% Output level.
  - (c) Repeat (a) and (b) until no more adjustments are necessary.
- (4) Write the Range in the space provided on the circuit board.

### MAINTENANCE.

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

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