

Model 88-PRO

Loop Powered Digital Meter



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1. ORDERING GUIDE, 88-PRO

- 88-PRO**..... 88-loop powered meter, 3.5 digit LCD display with two selectable dummy zeros, plug-in screw terminal connectors.

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3. INTRODUCTION, 88-PRO

Loop powered. The 88-PRO is a process meter which may be connected directly to a 4-20 mA, 10-50 mA or 1-5 mA current loop, with no need for additional power. The meter is powered directly by the current loop, developing a maximum voltage drop of 2.5 V.

Display in engineering units. The 88-PRO is compatible with a large number of industrial transducers and transmitters to display process variables such as temperature, pressure, flow, weight, pH, humidity etc. Zero and span are adjustable for readout in engineering units. There is an INVERT facility, so that an increasing input signal gives a reducing display, for example, 4-20 mA = 100.0 to 0.0. The 88-PRO also provides two jumper-selectable dummy right-hand zero to extend the maximum reading from the default of ± 1999 to ± 19990 or ± 199900 .

Easy to install and set up. The 88-PRO fits in a standard 1/8 DIN panel cutout and only requires 93 mm (3.66") behind the panel. There are only two signal connections: signal in and signal out. These are made via a detachable screw terminal connector. All range-selection jumpers as well as the meter's zero and span adjustments are from the rear of the meter, avoiding the need to open the case.

4. RECEIVING & UNPACKING YOUR METER

Your meter was carefully tested and inspected prior to shipment. Should the meter be damaged in shipment, notify the freight carrier immediately. In the event the meter is inoperable, return it to the place of purchase for repair or replacement. Please include a detailed description of the problem.

5. SAFETY CONSIDERATIONS



Warnings: Use of this meter in a manner other than specified may impair the protection of the device and subject the user to a hazard. Visually inspect the unit for signs of damage. If the unit is damaged, do not attempt to operate.

Lethal voltages may be present on the circuit board and connector, as the current loop may be electrically floating at a high voltage. Do not touch any circuitry or an exposed connector when the current loop is connected.

Adjustments to jumper settings must be made with power removed.

Use an insulating screwdriver when making adjustments and the current loop is connected.



Do not operate the meter in the presence of flammable gases or fumes, as such an environment constitutes an explosion hazard.

Even though current loop signal wiring provides good noise immunity, avoid running signal wires in the same conduit or tray as power wiring. This is because power wiring may radiate appreciable amounts of noise.

Operating environment:



Class II (double insulated) equipment designed for use in Pollution degree 2.

Symbols used:



Caution (refer to accompanying documents)



Earth (ground) terminal.



Caution, risk of electric shock.



Both direct and alternating current.



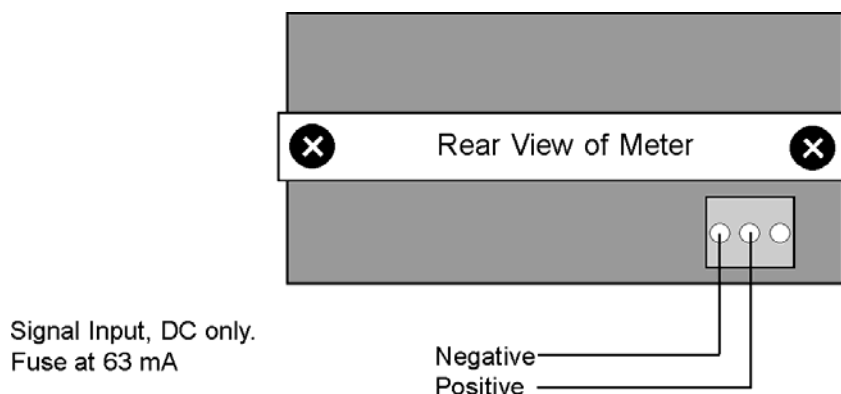
Protected throughout by double insulation or reinforced insulation.

6. PANEL REQUIREMENTS

The 88-PRO is designed to be panel mounted in a 1/8 DIN panel cutout, which measures 45 mm high and 92 mm wide. The meter requires a depth of 80 mm behind the panel. The back of the meter should be in a secure enclosure to prevent inadvertent contact with the rear terminals, which may be at an elevated voltage.

7. ELECTRICAL CONNECTIONS

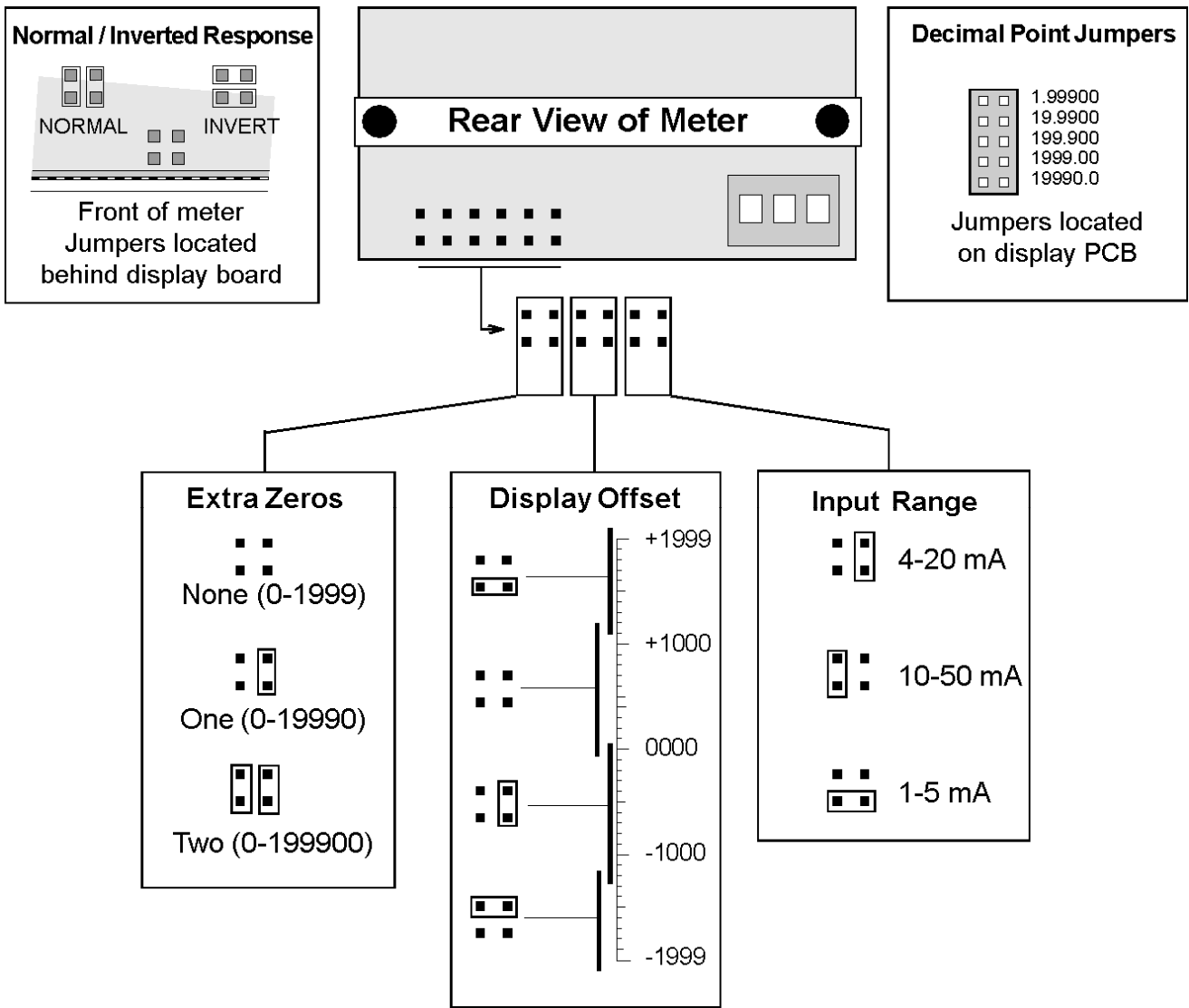
The 88-PRO derives its power from the current loop with a maximum voltage drop of 2.5V. No separate power connection is required. The loop current should not exceed 55 mA under any circumstances.



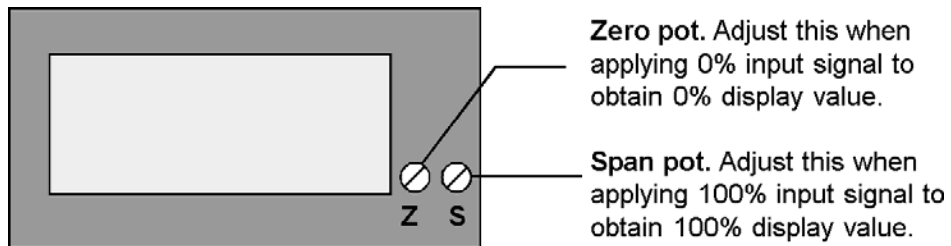
IMPORTANT: Do not run signal wires adjacent to power-carrying cables. Such cables may radiate appreciable amounts of electromagnetic energy, which could interfere with the signals being measured. Use screened cable in its own separate conduit or tray. Connect the screen to a clean earth point as near to the meter as possible.

8. ADJUSTMENT & CALIBRATION

The 88-PRO offers wide scalability to suit most process measurements. It is a 3-1/2 digit meter, to which one or two fixed zeros may be added after the active digits. This provides a X10 or X100 multiplication factor, allowing readings up to 199900. Inverted operation is also possible, where 4 mA produces the maximum reading and 20 mA produces the minimum reading.



The display offset range is the reading range you can obtain by adjusting the Zero potentiometer, with the input at 0% (e.g., 4 mA). Once all the jumpers have been set, you may begin to carry out a calibration of the meter.



9. DECLARATION OF CONFORMITY

Declaration Number: 88-PRO Iss. 2
Issue Date: 21 April 1997
Products Covered: 88-PRO
Title: 1/8 DIN loop powered DPM

This is to confirm that the Products covered by this declaration have been designed and manufactured to meet the following specifications:

EN55022:1987 Conducted Emissions:	Class B
EN55022:1987 Radiated Emissions :	Class B
IEC801-2:1984 Electro-Static Discharge Immunity:	8 kV Air
IEC801-3:1984 Radiated Electromagnetic field Immunity:	3 V/m

These products conform to the applicable sections of the following standards:

EN50081-1:1992 (normative)
EN50082-1:1992 (normative)

These products comply with the requirements of Council Directive 89/336/EEC relating to Electromagnetic Compatibility, and are designed to meet 72/23/EEC safety directive.

To confirm EMC compliance, representative models within the range have been independently tested and certified by Marconi Instruments EMC Department.

Marconi Certificate #:	TC96/0029B
Marconi Certificate Issue #:	1
Marconi Certificate Issue Date:	14 February 1996

Conditions

The meters are permitted a worst case error of 1% of the A/D range during electromagnetic disturbance and must recover automatically when disturbance ceases without the need for human intervention, such as resetting, power-down. etc. The meters must be installed in adherence to the following conditions :

- Signal cabling shall be routed separately to power carrying cabling (includes relay output wiring).
- All signal cabling shall be screened. The screen shall only be terminated to the power earth terminal.
- This certificate applies only to meters carrying Serial Numbers 701001 or higher.

10. SPECIFICATIONS, 88-PRO

Electrical

Input signal.....	4-20 mA, 10-50 mA or 1-5 mA current loop, jumper selectable
Maximum current.....	55 mA
Resolution	1 part in 2000
Input resistance, max	12.5 Ohms
CMRR	120 dB, DC to 100 Hz
NMRR	50 dB, 40 to 60 Hz
Open circuit input response.....	Display blanks
Speed of response	0.5 sec time constant
Decimal point selection	Jumper selection behind bezel
Accuracy	$\pm 0.1\%$ of reading ± 1 count
Zero tempco	± 0.2 count/ $^{\circ}\text{C}$
Span tempco	$\pm 0.015\%$ / $^{\circ}\text{C}$
A/D technique.....	Dual-slope integration
Conversion rate.....	2-1/2 readings per second
Integration time	100 ms
Power source	Input current times maximum voltage drop of 2.5V

Display

Display type.....	Reflective LCD
Digit color	Black on light gray background
Digit height	12.7 mm

Mechanical

Panel cutout	1/8 DIN bezel
Bezel size.....	48 mm high x 96 mm wide
Cutout Size.....	45 mm high x 92 mm wide
Depth behind panel	80 mm
Weight	100 g
Case material	Polycarbonate, UL rating 94V-0

Environmental

Operating temperature	-10 to +50 $^{\circ}\text{C}$
Storage temperature	-20 to +70 $^{\circ}\text{C}$
Humidity	90 % at 50 $^{\circ}\text{C}$, non condensing
Installation class.....	II
Pollution degree	2

11. WARRANTY

Laurel Electronics Inc. warrants its products against defects in materials or workmanship for a period of one year from the date of purchase.

In the event of a defect during the warranty period, the unit should be returned, freight prepaid (and all duties and taxes) by the Buyer, to the authorized Laurel distributor where the unit was purchased. The distributor, at its option, will repair or replace the defective unit. The unit will be returned to the buyer with freight charges prepaid by the distributor.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from:

1. Improper or inadequate maintenance by Buyer.
2. Unauthorized modification or misuse.
3. Operation outside the environmental specifications of the product.
4. Mishandling or abuse.

The warranty set forth above is exclusive and no other warranty, whether written or oral, is expressed or implied. Laurel specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

EXCLUSIVE REMEDIES

The remedies provided herein are Buyer's sole and exclusive remedies. In no event shall Laurel be liable for direct, indirect, incidental or consequential damages (including loss of profits) whether based on contract, tort, or any other legal theory.