

# DPM 959

## 3½ Digit LED Module

A compact meter ideally suited to applications where excellent readability under all lighting conditions is required. The meter is fitted with high efficiency LEDs which, together with the integral red filter, give a high contrast display. The meter can be easily scaled by the user to indicate volts, amps or other engineering units and may be used in single-ended, differential, ratio-metric or floating input modes.

- 14.2mm (0.56") Digit Height
- Programmable Decimal Points
- Auto-zero
- Auto-polarity
- 200mV d.c. Full Scale Reading (F.S.R.)
- Bandgap Reference Version Optional
- Display Hold

## SCALING

Two resistors Ra and Rb may be fitted in order to alter the full scale reading (F.S.R.) of the meter - see table.

The meter will need re-calibration by adjusting the calibration potentiometer.

Required F.S.R.	Ra	Rb
2V Note	910k	100k
20V Note	1M	10k
200V Note	1M	1k
2kV Note	1M	100R
200μA	LINK	1k
2mA	LINK	100R
20mA	LINK	10R
200mA	LINK	1R

## NOTE

Ensure that link across Ra is OPEN.



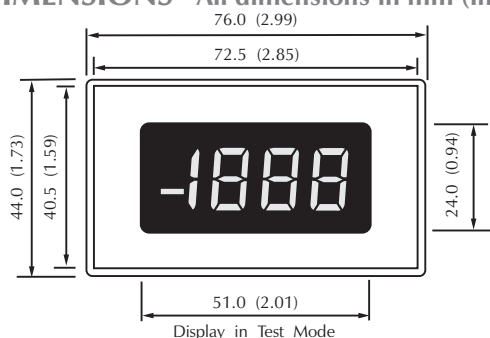
Standard Meter				Stock Number DPM 959
Specification	Min.	Typ.	Max.	Unit
Accuracy (overall error) *		0.05	0.1	% ( $\pm 1$ count)
Linearity			$\pm 1$	count
Sample rate		3		samples/sec
Operating temperature range	0		50	$^{\circ}\text{C}$
Temperature stability		150		ppm/ $^{\circ}\text{C}$
Supply voltage (V+ to V-)	4.5	5	5.5	V
Supply current		120	200	mA
Input leakage current (Vin = 0V)		1	10	pA

\* To ensure maximum accuracy, re-calibrate periodically.

## CONNECTOR SOURCING GUIDE

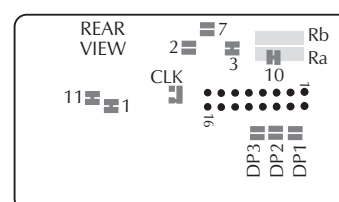
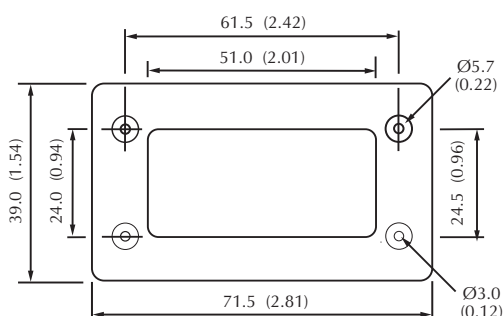
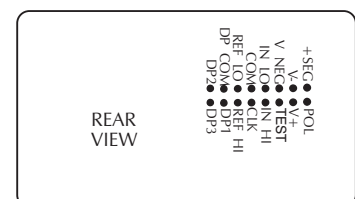
METHOD	Cable mounting IDC supplied with product
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**DIMENSIONS** All dimensions in mm (inches)



- 1.0 (0.04)
- 2.0 (0.08)
- 6.5 (0.26)
- 11.5 (0.45)
- 9.5 (0.37)

Panel cut-out 72 x 40 (2.83 x 1.57)  
Maximum panel thickness 3mm (0.12).



## SCALING RESISTORS ON TOPSIDE OF BOARD

ON-BOARD SOLDER LINKS

## PIN FUNCTIONS

- |            |   |
|------------|---|
| 1. +SEG    | } Use to indicate positive polarity- see "VARIOUS OPERATING MODES" for details.   |
| 2. POL     |   |
| 3. V-      |   |
| 4. V+      | Negative power supply connection (0V).  |
| 5. VNEG    | Positive power supply connection (+5V).   |
| 6. TEST    | Output from negative rail generator, approximately 2.8V below V- (maximum load 1mA).  |
| 7. IN LO   | When taken to V+ all segments, except decimal points, should light i.e. "-1888".  |
| 8. IN HI   | Negative measuring differential input. ] Analogue inputs must be no closer than 1V to either the positive or negative supply.   |
| 9. COM     | Positive measuring differential input. ] The negative supply is generated internally and mirrors the positive supply voltage.   |
| 10. CLK/   | Ground for analogue section of the A/D converter, it is actively held at 2.8V below V+ and must not be allowed to sink excessive current (>100µA) by, for instance, connecting to a higher voltage. |
| HOLD       | May be used to override the internal oscillator and control the sample rate.  |
| 11. REF LO | The CLK link must be made as shown. If taken to V+ the reading will be held.  |
| 12. REF HI | Negative input for reference voltage. (Connected via Link 3 to COM.)  |
| 13. DP COM | Positive input for reference voltage. (Connected via Link 1 to internal reference.)   |
| 14. DP1    | Connect to Pins 14, 15 or 16 to illuminate required decimal point, alternatively use the on-board links.  |
| 15. DP2    | 199.9   |
| 16. DP3    | 19.99   |
|            | 1.999   |

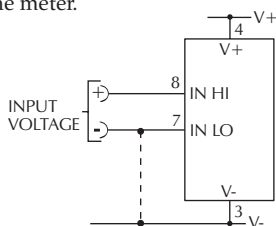


## SAFETY

To comply with the Low Voltage Directive (LVD 93/68/EEC), input voltages to the module's pins must not exceed 60Vdc. If voltages to the measuring inputs do exceed 60Vdc, then fit scaling resistors externally to the module. The user must ensure that the incorporation of the DPM into the user's equipment conforms to the relevant sections of BS EN 61010 (Safety Requirements for Electrical Equipment for Measuring, Control and Laboratory Use).

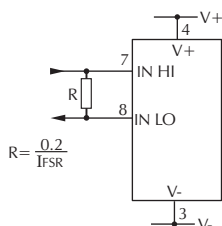
## VARIOUS OPERATING MODES

**ON-BOARD LINKS:** In order to quickly and easily change operating modes for different applications the meter has several on-board links. They are designed to be easily opened (cut) or shorted (soldered). Do not connect more than one meter to the same power supply if the meters cannot use the same signal ground. Taking any input beyond the power supply rails will damage the meter.



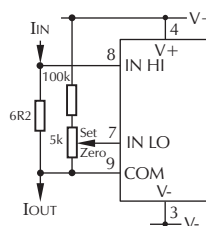
Check Link 2 is OPEN.

Operation with input referenced to panel meter supply (Single ended mode). Preferably link IN LO to V- at signal source (to reduce loop noise), otherwise make link 7.

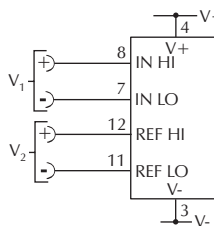


Check Links 2 & 3 are SHORTED.

Measuring current (supply MUST be isolated).

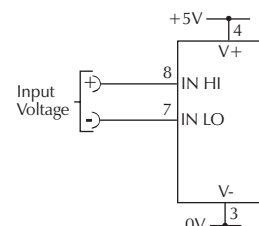


Measuring 4-20mA to read 0-999 (supply MUST be isolated).



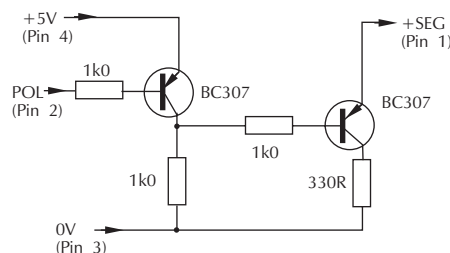
Check Links 1 & 3 are OPEN.

Measuring the ratio of two voltages.  
Reading =  $1000 V_1/V_2$   
 $50mV < V_2 < 200mV$   
 $V_1 < 2V_2$ .



Check Link 2 is SHORTED.

Operation with input floating with respect to power supply.



The above circuit can be used to indicate both positive and negative polarity, by illuminating either the + or - segment on the meter.