DPM 959B

3½ Digit LED Voltmeter

This compact voltmeter is 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 with 19mm (0.75") digit height. 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, ratiometric or floating input modes.

- 19mm (0.75“) Digit Height
- Programmable Decimal Points
- Auto-zero
- Auto-polarity
- 200mV d.c. Full Scale Reading (F.S.R.)



SCALING

Two resistors Ra and Rb may be fitted on the module 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 solder link 10 across Ra is OPEN.

Standard Meter				Stock Number DPM 959B
Specification	Min.	Typ.	Max.	Unit
Accuracy (overall error) *		0.1		% (±1 count)
Linearity			±1	count
Sample rate		2.5		samples/sec
Operating temperature range	0		50	°C
Warm-up time		10		minute
Temperature stability		150		ppm/°C
Supply voltage (V+ to V-)	4.75	5	5.25	V
Supply current		50	90	mA
Input leakage current (Vin = 0V)		1	10	pA

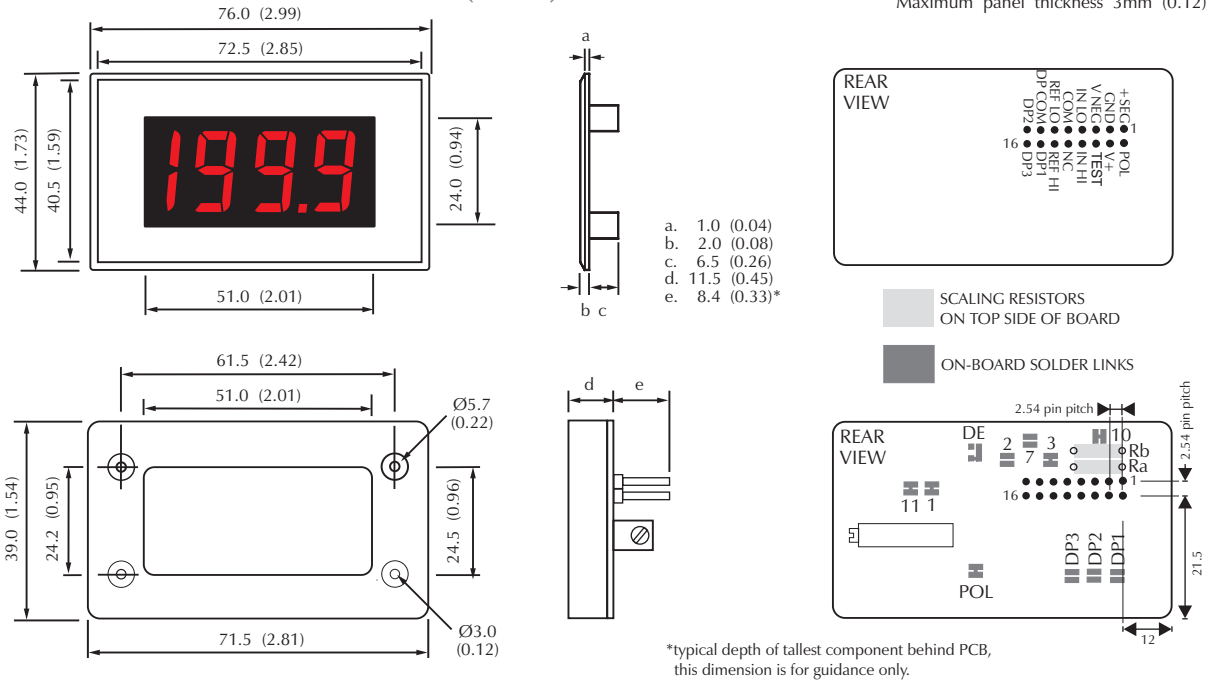
* To ensure maximum accuracy, re-calibrate periodically.

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).

DIMENSIONS All dimensions in mm (inches)

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



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PIN FUNCTIONS

1. +SEG] Use to indicate positive polarity- see "VARIOUS OPERATING MODES" for details.
2. POL] To completely disable the negative polarity sign, cut solder link POL.
3. GND Negative power supply connection (0V).
4. V+ Positive power supply connection (+5V).
5. V NEG Output from negative rail generator (-5V nom). This is an inversion of V+.
6. TEST When taken to V+ all segments, except decimal points, should light i.e. "1888".
7. IN LO] Negative measuring input.] Analogue inputs must be no closer than 1.5V to the positive or negative supply.
8. IN HI] Positive measuring input.] The negative supply is generated internally and mirrors the positive supply voltage.
9. COM Ground for analogue section of the A/D converter, it is actively held at 3.05V below V+ and must not be allowed to sink excessive current (>100µA) by, for instance, connecting to a higher voltage.
10. NC Do not connect.
11. REF LO Negative input for reference voltage. (Connected via Link 3 to COM.)
12. REF HI Positive input for reference voltage. (Connected via Link 1 to internal reference.)
13. DP COM Connect to Pins 14, 15 or 16 to illuminate the required decimal point, alternatively use the on-board solder links DP1, 2 or 3.
14. DP1 Connect to Pin 13 to display DP1 (199.9).
15. DP2 Connect to Pin 13 to display DP2 (19.99).
16. DP3 Connect to Pin 13 to display DP3 (1.999).

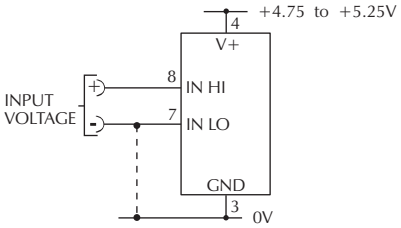
SOLDER LINKS

1.	Normally closed.	Open this link to disable the internal reference. Then apply an external reference to REF HI (pin 12).
2.	Normally open.	Close this link to connect IN LO (pin 7) to COM (pin 9).
3.	Normally closed.	Open this link to disconnect COM (pin 9) from REF LO (pin 11).
7.	Normally open.	Close this link connect IN LO (pin 7) to GND (pin 3).
10.	Normally closed.	Open this link when fitting scaling resistor Ra.
DP1-2-3.	Normally open.	Close one of these links to display decimal points DP1 (199.9), DP2 (19.99) or DP3 (1.999) respectively.
POL.	Normally closed.	Open this link to disable the polarity sign. See Pin Functions 1 and 2 above.

VARIOUS OPERATING MODES

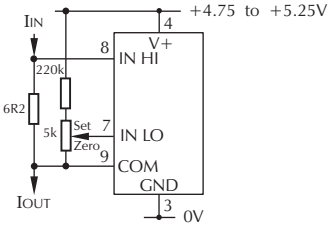
ON-BOARD SOLDER LINKS: In order to quickly and easily change operating modes for different applications the meter has several on-board solder links. They are designed to be easily opened (cut) or shorted (soldered). Do not connect more than one meter to the same power supply if the meters cannot use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





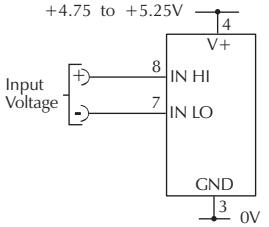
Check solder link 2 is OPEN.

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



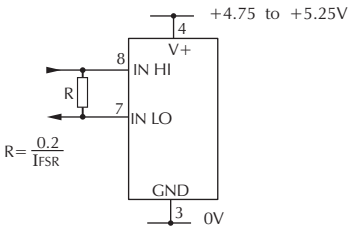
Check solder link 2 is OPEN.

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



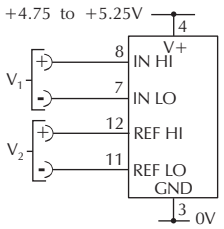
Check solder link 2 is SHORTED.

Operation with input floating with respect to power supply.



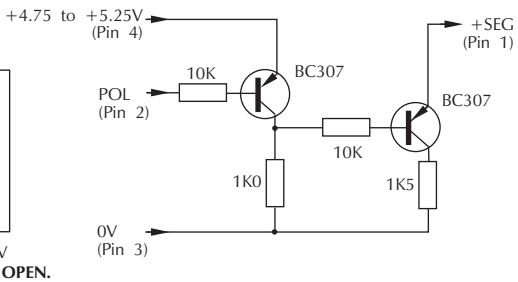
Check solder links 2 & 3 are SHORTED.

Measuring current.
Supply MUST be isolated.



Check solder 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.



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