DPM 400

3½ Digit LCD Module

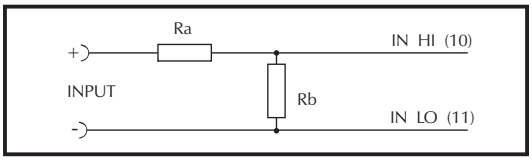
A unique compact LCD meter, ideally suited to low or high volume applications. The meter has a 28 pin DIL integrated circuit format and can be plugged directly into a DIL socket or panel mounted using the snap in bezel provided. The low profile bezel incorporates a flat reverse printed window, giving a superb appearance that cannot be damaged or removed by contact.

- 10mm (0.4") Digit Height
- Programmable Decimal Points
- Auto-zero
- Auto-polarity
- 200mV d.c. Full Scale Reading (F.S.R.)
- Annunciators



SCALING

Two resistors can be used fitted in order to alter the full scale reading of the meter - see table.
The meter will have to be re-calibrated by adjusting the calibration potentiometer CAL.



Required F.S.R.	Ra	Rb
2V	910k	100k
20V	1M	10k
200V	1M	1k
2kV Note	1M	100R
200µA	0R	1k
2mA	0R	100R
20mA	0R	10R
200mA	0R	1R

Note
Ensure Ra is rated for high voltage use.

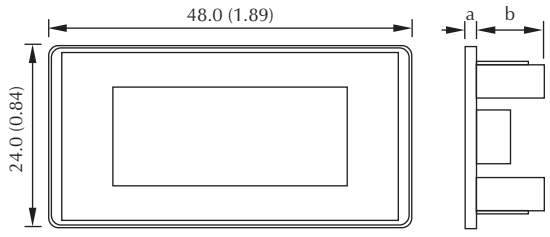
Standard Meter				Stock Number DPM 400
Specification	Min.	Typ.	Max.	Unit
Accuracy (overall error) *		0.05	0.1	% (±1 count)
Linearity			±1	count
Sample rate		3		samples/sec
Operating temperature range	0		50	°C
Temperature stability		100		ppm/°C
Supply voltage (V+ to V-)	7	9	14	V
Low battery threshold		7.5		V
Supply current		150		µA
Input leakage current (Vin= 0V)		1	10	pA

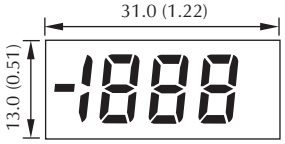
* To ensure maximum accuracy, re-calibrate periodically.

CONNECTOR SOURCING GUIDE

METHOD	28 Pin DIL IC Socket

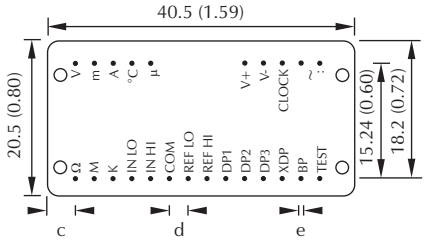
DIMENSIONS All dimensions in mm (inches)



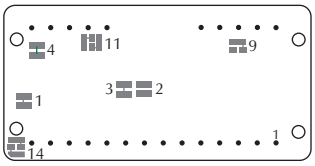


Display in TEST mode
Panel cut-out 45 x 22 (1.77 x 0.87)

a.	1.50	(0.06)
b.	9.00	(0.35)
c.	3.70	(0.15)
d.	2.54	(0.10)
e.	0.50	(0.02)
f.	5.00	(0.20)
g.	1.60	(0.06)
h.	4.00	(0.16)







ON BOARD SOLDER LINKS

PANEL FITTING

Fit the bezel to the front of the panel and then locate the meter into the bezel from behind. Alternatively the meter and bezel may be assembled before fitting into the front of the panel but care must be taken not to use excessive force.

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PIN FUNCTIONS

1. TEST — Connect to V+ to display segments as illustrated. It should not be operated for more than a few seconds as the DC voltage applied to the LCD may 'burn' the display. This pin is normally at 5V below V+ and is the ground for the digital section of the meter. It can be used to power external logic up to a maximum of 1mA.
2. BP — LCD backplane drive waveform.
3. XDP — Connect to required annunciators/DPs (see note).
4. DP3 — 1.999
5. DP2 — 19.99
6. DP1 — 199.9
7. REF HI — Positive input for reference voltage (connected via link 1 to internal reference).
8. REF LO — Negative input for reference voltage (connected via link 3 to COM).
9. COM — The ground for the analogue section of the A/D converter, held actively at 2.8V (nom.) below V+. COM must not be allowed to sink excessive current (>100µA) by connecting it directly to a higher voltage.
10. IN HI — Positive measuring input.
11. IN LO — Negative measuring input.

Analogue inputs must be no closer than 1V to either the positive or negative supply.

24. V+ — Positive power supply.
25. V- — Negative power supply.
26. CLOCK — Clock output may be used for systems timing or as an input to override the internal oscillator and control the sample rate.

SPECIAL NOTE: ANNUNCIATORS

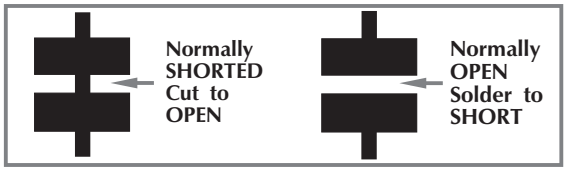
The DPM annunciators (DPs, °C, etc.) can be shown by connecting them to XDP. However, as these annunciators are normally 'floating' under certain conditions they may appear when not wanted. To suppress unwanted annunciators link them to the backplane (BP). If the annunciators are being switched, connect them via a 1M resistor to the BP (pin 2). The annunciators will then operate normally when connected to XDP. Ensure that an annunciator is NOT connected directly to the XDP and BP at the same time.

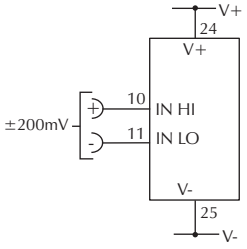
SAFETY

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

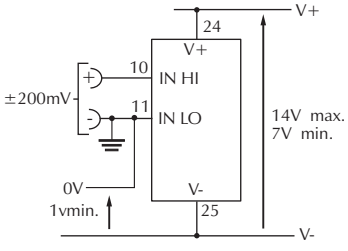
ON-BOARD LINKS: In order to quickly and easily change operating modes for different applications the meter has several on-board links. They are designed to be easily opened (cut) or shorted (soldered). Do not connect more than one meter to the same power supply if the meters cannot use the same signal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



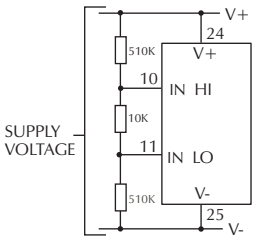


Check Link 2 is SHORTED.

Measuring a floating voltage source of 200mV full scale.

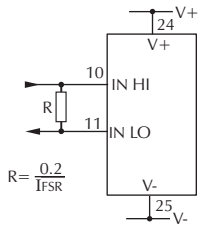


Split supply operation.



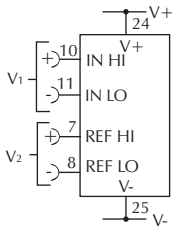
Check Link 2 is OPEN.

Measuring a supply voltage (min. 7V, max. 14V).



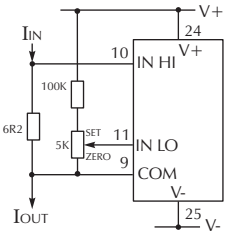
Check Link 2 is SHORTED.

Measuring current
(supply MUST be isolated).



Check Link 1, 3 & 4 are OPEN.

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



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