DPM 2000

3½ Digit LCD Module

The DPM 2000 uses advanced components and construction techniques to provide an unrivalled combination of high performance, elegant appearance and low cost. The module uses a bandgap reference for extra temperature stability. For single rail operation, the DPM 2000S features a built-in negative rail generator, enabling the meter to measure a signal referenced to its own power supply 0V.

- **15mm (0.6") Digit Height**
- **Programmable Decimal Points**
- **Auto-zero**
- **Auto-polarity**
- **200mV d.c. Full Scale Reading (F.S.R.)**
- **Single Rail Version**



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.

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 10 is open if fitting Ra.

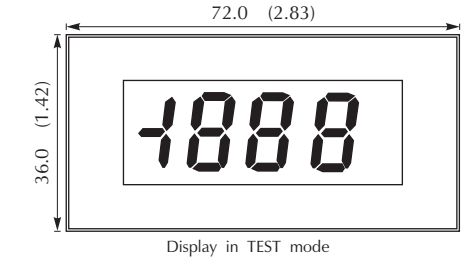
Standard Meter Single Rail Version					Stock Number DPM 2000 DPM 2000S
Specification		**Min.**	**Typ.**	**Max.**	**Unit**
Accuracy (overall error) *			0.05	0.1	% (±1 count)
Linearity				±1	count
Sample rate			3		samples/sec
Operating temperature range		0		50	°C
Temperature stability			30		ppm/°C
Supply voltage (V+ to V-)	DPM 2000	7.5	9	14	V
	DPM 2000S	3.5	5	6.5	
Supply current	DPM 2000		150		µA
	DPM 2000S		500		
Input leakage current (Vin = 0V)			1	10	pA

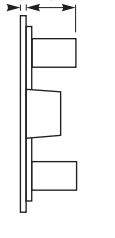
* To ensure maximum accuracy, re-calibrate periodically.

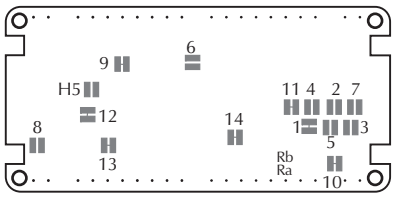
SAFETY

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)

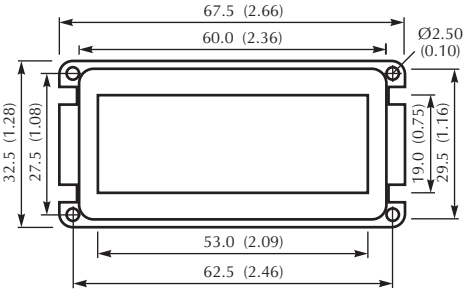


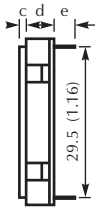


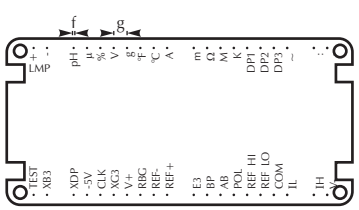


ON BOARD SOLDER LINKS

SCALING RESISTORS







a. 1.00 (0.04)
b. 9.00 (0.35)
c. 1.25 (0.05)
d. 5.50 (0.22)
e. 4.00 (0.16)
f. 0.50 (0.02)
g. 2.54 (0.10)

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PIN FUNCTIONS

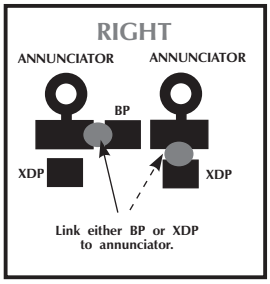
1. V- Negative power supply connection.
2. IH Positive measuring input.] Analogue inputs must be no closer than 1V to either the positive or negative supply. The negative
3. IL Negative measuring input.] supply of an S-type meter is generated internally and mirrors the positive supply voltage.
4. COM 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.
5. REF LO Negative input for reference voltage.
6. REF HI Positive input for reference voltage (connected via Link 1 to REF+).
7. POL Drive for negative (-) annunciator. Internally connected via Link 11 to the annunciator.

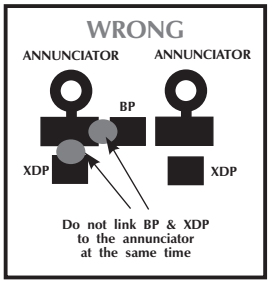
8, 10, 15, 19 Outputs for autoranging applications.

9. BP LCD back plane drive waveform.
11. REF+ Positive output from internal reference (connected via Link 1 to REF HI).
12. REF- Negative output from internal reference. MUST be tied to a suitable ground return to bias bandgap (normally COM).
13. R BG Ouput of bandgap reference (1.22V nom).
14. V+ Positive power supply connection.
16. CLOCK Clock output. May be used for systems timing or as an input to override the internal oscillator and control the sample rate.
17. -5V Output from negative rail generator circuit (DPM 2000S only). This is an inversion of V+.
18. XDP Connect to required annunciators/DPs (see Special Note - Annunciators).
20. TEST Connect to V+ to momentarily turn on segments as illustrated. It should not be operated for more than a few seconds as the D.C. voltage applied to the LCD may 'burn' the display. This pin is 5V (nom) 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.

SPECIAL NOTE - ANNUNCIATORS.

The DPM annunciators (DPs, °C, etc.) can be displayed either by connecting to XDP or by applying a solder blob link to the XDP pads located under the annunciator input pads. However, as these annunciators are normally 'floating', under certain conditions they may appear when not wanted. To suppress unwanted annunciators, apply a solder blob to the backplane pads located in-between the annunciator input pads. If the annunciators are being switched, connect them via MΩ resistor to the BP (Pin 9), 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.
Note - if suppressing POL (-) annunciator by direct connection to BP then Link 11 MUST be cut first.

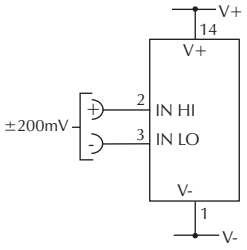




VARIOUS OPERATING MODES

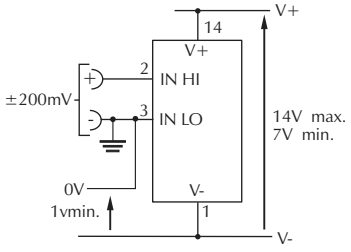
ON-BOARD LINKS: In order to quickly and easily change operating modes for different applications, the meter has several on-board links. They are designed to be easily opened (cut) or shorted (soldered). Do not connect more than one meter to the same power supply if the meters cannot use the same signal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





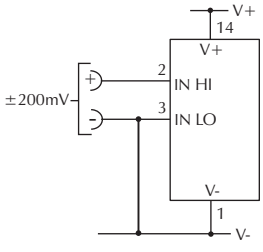
Check Links 2, 3 & 4 are SHORTED.

Measuring a floating voltage source of 200mV full scale.



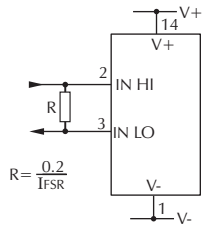
Check Links 3 & 4 are SHORTED.

Split supply operation (DPM 2000).



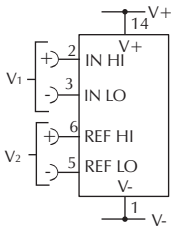
Check Links 3 & 4 are SHORTED.

Measuring a single ended input referenced to supply (DPM 2000S).



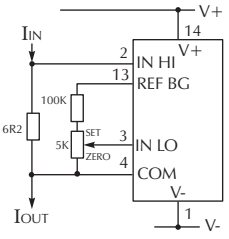
Check Links 2, 3 & 4 are SHORTED.

Measuring current (supply MUST be isolated).



Check Link 1 is OPEN.

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



Check Links 3 & 4 are SHORTED.

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