# DPM 3

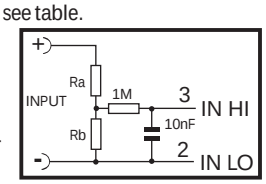
3½ Digit Subminiature LCD Module

The DPM 3 is the largest in our sub-miniature series of meters but still uses the same miniaturisation techniques to produce a very compact instrument. The snap-in integral bezel makes installation easy. For single rail operation, the DPM 3S features a built in negative rail generator, enabling the meter to measure a signal referenced to its own power supply 0V.

- **11mm (0.43“) Digit Height**
- **Programmable Decimal Points**
- **Auto-zero**
- **Auto-polarity**
- **200mV d.c. Full Scale Reading (F.S.R.)**


## SCALING

A potential divider may be used to alter the full scale reading (F.S.R.) of the meter - see table.




**NOTES**

The meter will have to be re-calibrated by adjusting the calibration potentiometer at the rear of the module.

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

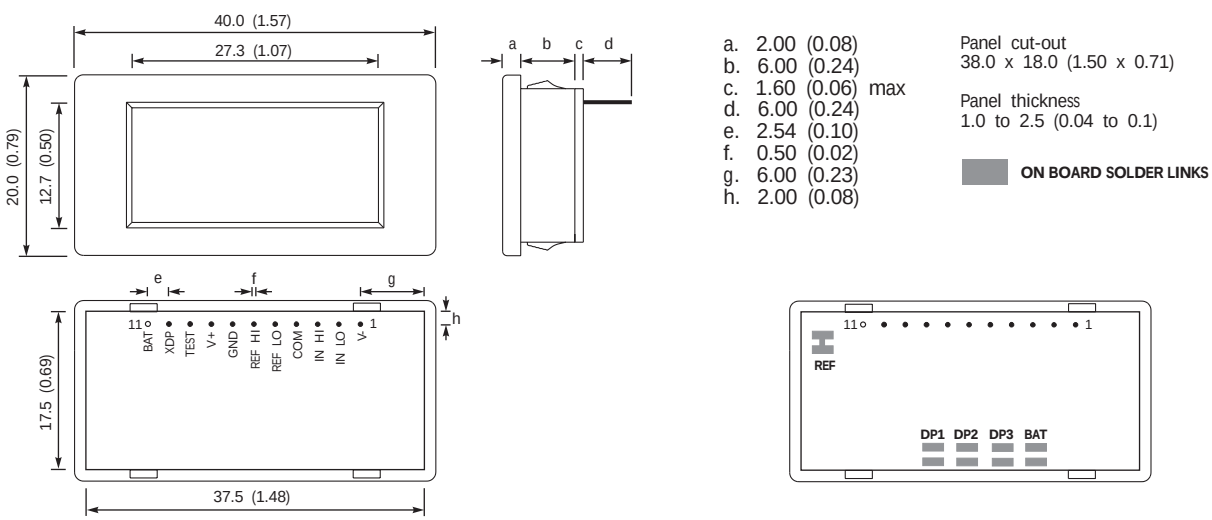
**NOTE**

Ensure that Ra is rated for high voltage use.

| Standard Meter<br>Single Rail Version | | | | | Stock Number<br>DPM 3<br>DPM 3S |
|---|---|---|---|---|---|
| **Specification** | | **Min.** | **Typ.** | **Max.** | **Unit** |
| Accuracy (overall error) * | | | 0.1 | | % (±1 count) |
| Linearity | | | | ±1 | count |
| Sample rate | | | 3 | | samples/sec |
| Operating temperature range | | 0 | | 50 | °C |
| Temperature stability | DPM 3 | | 200 | | ppm/°C |
| | DPM 3S | | 100 | | |
| Supply voltage | DPM 3 | 7 | 9 | 14 | V |
| | DPM 3S | 3 | 5 | 7 | |
| Supply current | DPM 3 | | 150 | | µA |
| | DPM 3S | | 250 | | |
| Input leakage current (Vin = 0V) | | | 1 | 10 | pA |

* To ensure maximum accuracy, re-calibrate periodically.

## DIMENSIONS All dimensions in mm (inches)




a. 2.00 (0.08)
b. 6.00 (0.24)
c. 1.60 (0.06) max
d. 6.00 (0.24)
e. 2.54 (0.10)
f. 0.50 (0.02)
g. 6.00 (0.23)
h. 2.00 (0.08)

Panel cut-out
38.0 x 18.0 (1.50 x 0.71)

Panel thickness
1.0 to 2.5 (0.04 to 0.1)

**ON BOARD SOLDER LINKS**

## PANEL FITTING

Locate the meter by passing it through the front of the panel cut-out and gently push until the rear of the bezel is flush with the panel (DO NOT PUSH ON THE LCD). The snap-in lugs will now automatically hold the meter firmly in position.

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## PIN FUNCTIONS

1. V- DPM 3 - negative power supply connection.
   DPM3S - no connection.
2. IN LO Negative measuring input. Analogue inputs must be no closer than 1V to either the positive or negative supply.
3. IN HI Positive measuring input. The negative supply of the DPM 3S is generated internally and mirrors the positive supply voltage.
4. COM Ground for analogue section of 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.
5. REF LO Negative input for reference voltage.
6. REF HI Positive input for reference voltage (connected via Link REF to internal reference).
7. GND DPM 3 - no connection.
   DPM 3S - 0V power supply connection.
8. V+ Positive power supply.
9. TEST. Connect to V+ to display segments '-1888'. 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 normally at 5V below V+ and is the ground for the digital section of the meter.
10. XDP Annunciator Drive Waveform, this is an inversion of the LCD backplane signal.
11. BAT Pin not factory fitted. Connecting this pin to XDP (pin 10) will turn the battery annunciator on (ensure Link BAT is open when driving annunciator). See Applications for low battery sensing circuit.

## ON BOARD LINKS

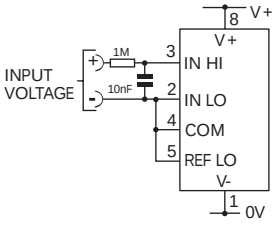
On board links can be made with a solder link to implement features.
DP1 Make to turn on DP1 (199.9).
DP2 Make to turn on DP2 (19.99).
DP3 Make to turn on DP3 (1.999).
REF Factory made - Connects internal reference to REF HI. It should only be cut if an external reference is used.

## 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).

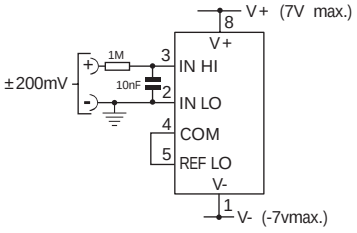
## VARIOUS OPERATING MODES

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. Input filter should be as close as possible to the meter. Taking any input beyond the power supply rails will damage the meter.

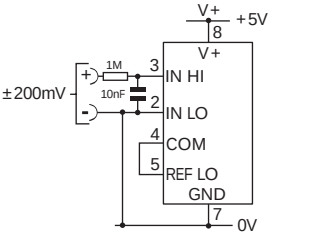

**Check Link REF is SHORTED.**

Measuring a floating voltage source of 200mV full scale (DPM 3).



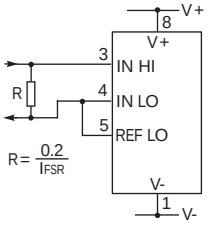

**Check Link REF is SHORTED.**

Split supply operation (DPM 3).

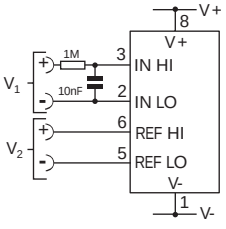



**Check Link REF is SHORTED.**

Measuring a single ended input referenced to supply (DPM 3S ).

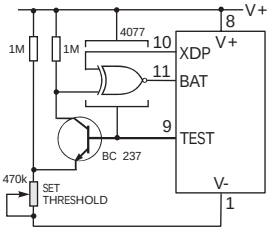



Measuring current. Supply MUST be isolated (DPM 3).




**Check Link REF is OPEN.**

Measuring the ratio of two voltages.
Reading = 1000 $V_1/V_2$
50mV < $V_2$ < 200mV
$V_1 < 2V_2$. (DPM 3)




**Check Link BAT is OPEN.**

Driving battery annunciator with associated logic and low battery detection circuitry.