OEM 1B-LED

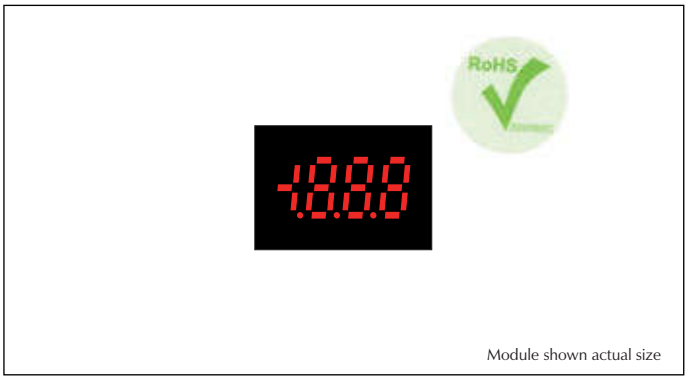
3½ Digit LED Voltmeter Module

PRODUCT DESCRIPTION

This low cost sub-miniature LED voltmeter module is ideally suited for high volume applications. It features an exceptionally large display in a miniature package and includes auto-zero and user-selectable decimal points. The use of low current display technology means this LED product can be considered for battery powered applications. The OEM 1B-LED is dimensionally compatible with its LCD counterpart, the OEM 1B. Connection to the module is via two rows of pins.

FEATURES

- 8mm (0.31") Digit Height
- 200mV d.c. Full Scale Reading
- 50mA (typ) @ +5V d.c. Power Supply
- Auto-zero and Auto-polarity
- User Selectable Decimal Points
- DIL Pin Connection
- Size compatible with OEM 1B (LCD module)



Module shown actual size

TYPICAL APPLICATIONS

- High Volume, Low Cost Systems
- Power Supply Monitoring
- Handheld Indication
- Panel-Mount Indication

ORDERING INFORMATION

	Stock Number
Standard Meter	OEM1B - LED

ELECTRICAL SPECIFICATIONS

Specification	Min.	Typ.	Max.	Unit
Accuracy (overall error) *		0.05	0.1	% (±1 count)
Linearity			±1	count
Sample rate		2.5		samples/sec
Operating temperature range	0		50	°C
Temperature stability		150		ppm/°C
Warm-up time		10		minutes
Supply voltage	4.75	5	5.25	V d.c.
Supply current **		50	100	mA
Input leakage current		1	10	pA

* To ensure maximum accuracy, re-calibrate periodically.

** Depends on reading and temperature.

Unless otherwise noted, specifications apply at T_A=25°C, V_{supply}=5Vd.c. (f_{clock}=40kHz) and are tested with the module configured for floating input mode.

SAFETY

To comply with the Low Voltage Directive (LVD 93/68/EEC), input voltages to the module's pins must not exceed 60Vdc. The user must ensure that the incorporation of the panel meter 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).

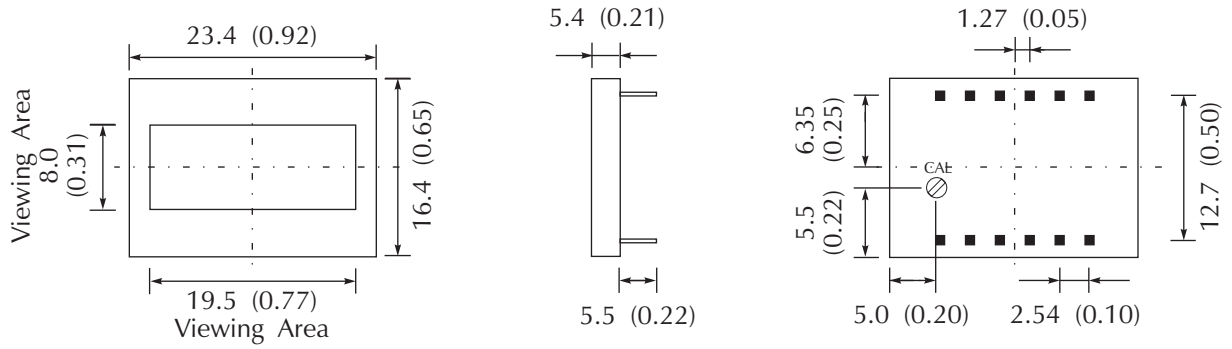
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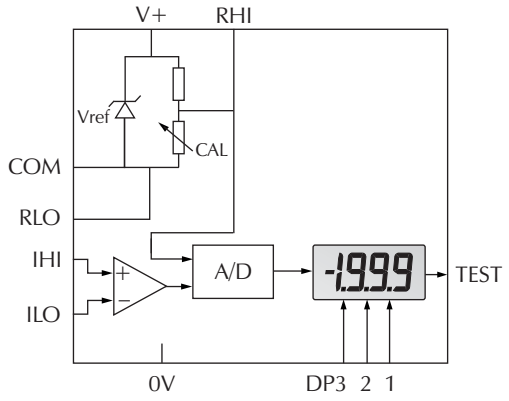
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DIMENSIONS

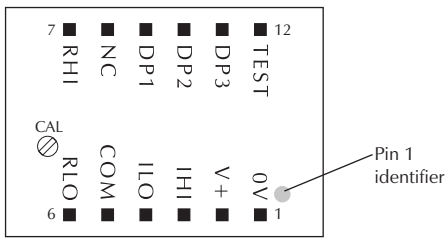
All dimensions in mm (inches)



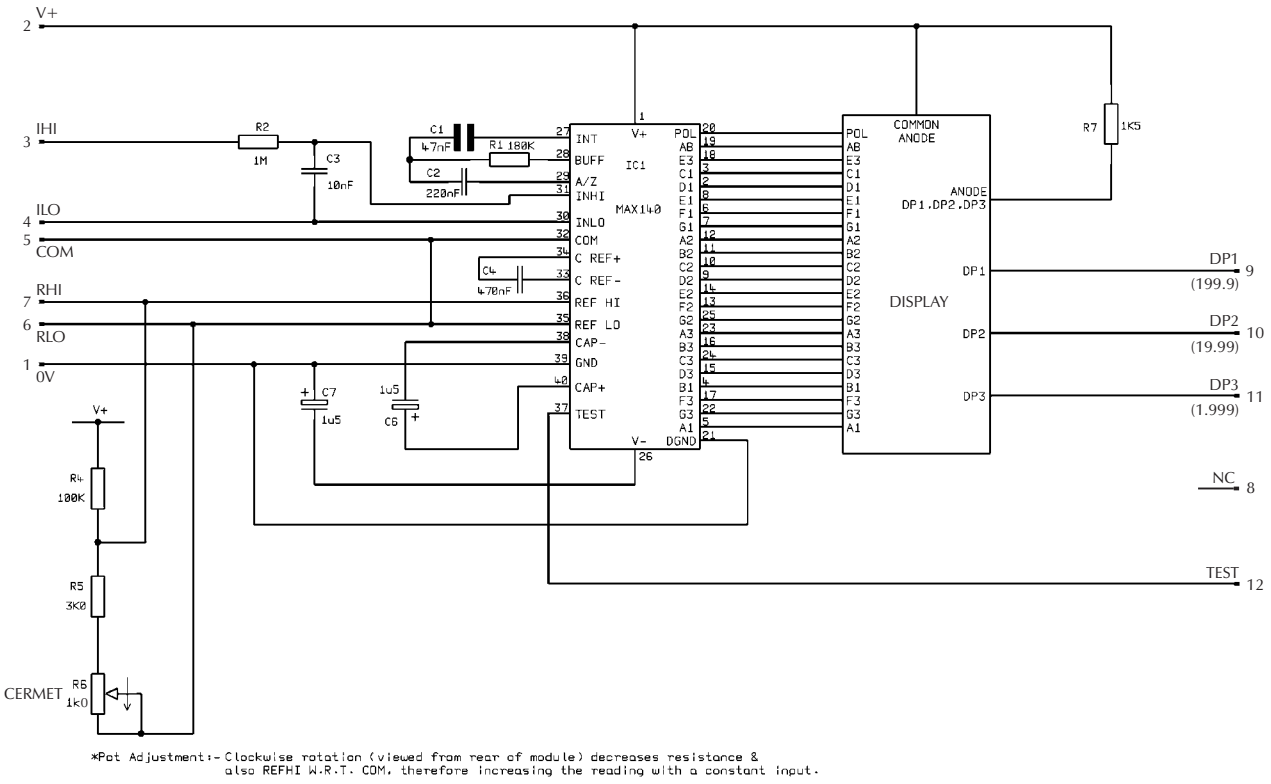
FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION (rear view)



CIRCUIT DIAGRAM



PIN FUNCTIONS

1. 0V — Negative power supply to the meter.
2. V+ — Positive power supply to the meter.
3. IHI — Positive measuring input.
   IHI must be no closer than 1.5V to either the positive or negative supply (see Note).
4. ILO — Negative measuring input.
   ILO must be no closer than 1.5V to the positive supply (see Note).
5. COM — Ground for the analogue section of the A/D converter. It is actively held at 3.05V (nom.) below V+ and must not be allowed to sink excessive current (>100µA) by, for instance, connecting to a higher voltage.
6. RLO — Negative input for the reference voltage.
7. RHI — Positive input for the reference voltage.
8. NC — Not connected.
9. DP1 — Connect to 0V to display DP1 (199.9).
10. DP2 — Connect to 0V to display DP2 (19.99).
11. DP3 — Connect to 0V to display DP3 (1.999).
12. TEST — Connect to V+ to display all segments, except the decimal points.

Note:

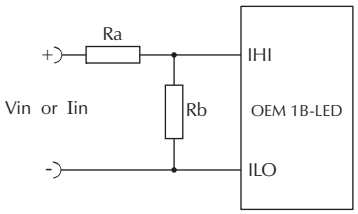
A negative supply is generated internally and mirrors the positive supply. For example: if V+ is +5V, then the internally generated V- is -5V. When measuring with the input referenced to the same supply rail as that of the panel meter, then the limitations on the input range are (V- + 1.5V) to (V+ - 1.5V).

EXTERNAL SCALING

Two external resistors Ra and Rb may be used to alter the full scale reading (FSR) of the meter - see table. The meter will have to be re-calibrated by adjusting the calibration potentiometer on the rear of the module.

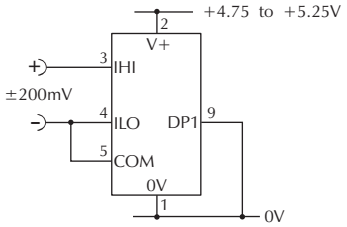
	FSR	Ra	Rb
Voltage Vin	2V	910k	100k
	20V	1M	10k
	200V	1M	1k
	2000V*	1M	100R
Current Iin	200µA	0R	1k
	2mA	0R	100R
	20mA	0R	10R
	200mA	0R	1R

*Ensure that Ra is rated for high voltage use.

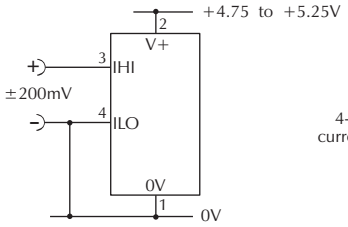


APPLICATIONS

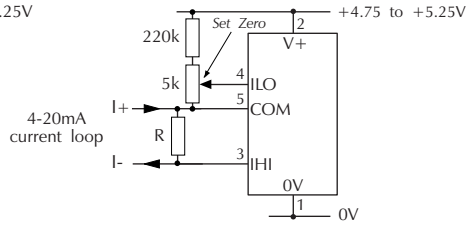
Do not connect more than one meter to the same power supply if the meters cannot use the same signal ground. Taking any input beyond the power supply rails will damage the meter.



Measuring an input voltage referenced to a floating supply, i.e. the input voltage and the meter's power supply are isolated from each other.
Circuit shows DP1 enabled.



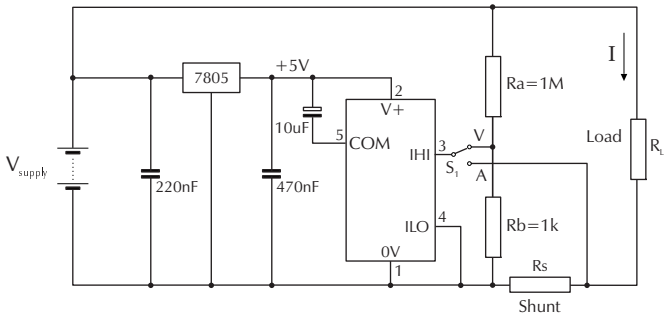
Measuring a single ended input voltage referenced to supply, i.e. the input voltage and the meter's power supply share the same 0V rail.



Measuring a 4-20mA loop current.

$$R = \frac{\text{Reading at 20mA}}{160}$$

The meter's power supply must be isolated from the 4-20mA current loop.

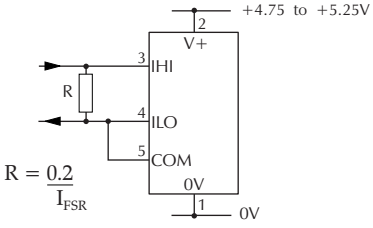


Measuring supply voltage and current to a load.

S_1 selects between voltage and current measurement.

Ra and Rb shown scaled for $200V_{FSR}$ $\quad Rs = \frac{200mV}{I_{FSR}}$ (e.g. 0.1Ω / 400mW for 2A full scale)

Display DP1, DP2 or DP3, by connecting to 0V, as required.



Measuring current.
The meter's supply is isolated from the current being measured.