



DM-500

3½ DIGIT, LED DISPLAY

MINI PANEL METER

PRODUCT DATA SHEET

OBSOLETE PRODUCT
Not available for sale

FEATURES

- Ultra-small size (0.89"H x 1.80"W x 1.89"D)
- DIN case and panel cutout
- 3½ Digit, bright LED (0.3" character) display
- +5V dc-powered
- Low power consumption, 60 mA typical
- Single-ended and differential inputs
- Dual-slope A/D conversion
- Multi-ranged selection
- 200 Hour burn-in and 1 year warranty
- Low cost

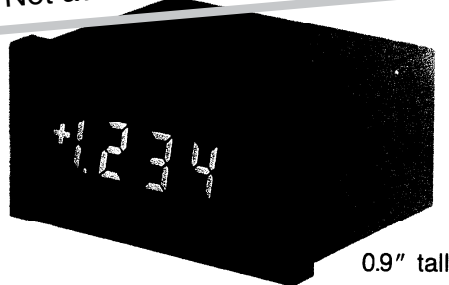


Photo Depicts Actual Size

VISIBILITY, COMPACT DIN SIZE, AND POWER EFFICIENCY COMBINE TO MAKE THIS ULTRA-SMALL PANEL METER IDEAL FOR APPLICATIONS SUCH AS PORTABLE INSTRUMENTS WHERE LOW POWER CONSUMPTION IS CRITICAL.

GENERAL DESCRIPTION

The DM-500 is a low cost, ultra-small 3½ digit, 5V dc-powered digital panel meter (DPM). This panel meter uses a seven-segment light emitting diode (LED) display with 0.3" (8.0mm) tall characters. These high-efficiency, brilliant red LED characters provide high visibility for distant and angular viewing even under bright ambient light conditions. This DPM is contained in a lightweight, compact, easily-mounted DIN case suited for portable instruments while also allowing for higher packing density on test panel faces.

The DM-500 operates in either single-ended or differential modes. DATEL ships each unit ready for single-ended operation, with differential operation easily user-selectable. In either mode, the DM-500's provide high noise immunity. In the differential mode, the DM-500 accurately measures very small signals in the presence of much larger common-mode voltages. The high input impedance (typically 1000 Mohms) will not load down sensitive input circuits. The DM-500 panel meters employ conventional dual-slope A/D conversion techniques, with autozeroing further enhancing this versatile meter.

The DM-500 accurately measures dc voltages or current. Voltage ranges from as low as ± 199.9 mV (full-scale) to as high as ± 199.9

V dc are offered. Current ranges are offered from $\pm 199.9 \mu\text{A}$ to ± 199.9 mA. Each model is designed with overvoltage protection.

Overrange measurement conditions will blank the displays. As shown in Figure 1, the DM-500 accepts a hold signal from the user, inhibiting continuous sampling. When powered up, the DM-500 displays the last data sampled, acting as a temporary signal sample storage and display device. Other display functions include autopolarity, selectable decimal point, and display blanking.

Mounting the DM-500 mini panel meter is extremely easy. The housing it is contained in incorporates locking mechanisms as part of its construction. Once the proper-sized hole has been created, simply sliding the DM-500 into the hole engages the locking mechanisms.

The DM-500 will properly flush-mount onto panels of 1.5, $\pm .06$ inches (3, $\pm .012$ mm) in thickness.

The DM-500 is a compact, high-quality panel meter fully tested for 200 hours before leaving the factory and fully warranted for one year.

3½ DIGIT, LED DISPLAY MINI PANEL METER

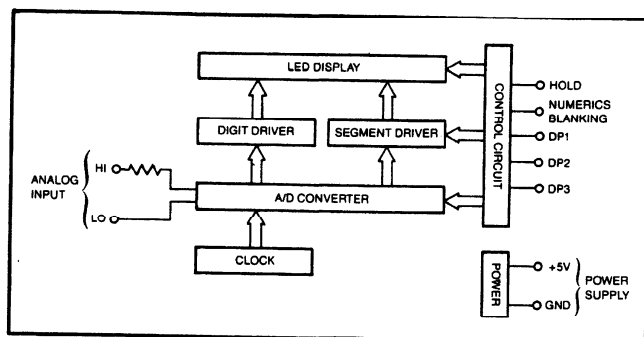


Figure 1. DM-500 Simplified Block Diagram

Pin Connections

- 1 Input LO
- 2 Input HI
- 3 Hold
- 4 Blanking Numericals
- 5 Decimal Point 1
- 6 Decimal Point 2
- 7 Decimal Point 3
- 8 +5V dc Power
- 9 GND

Note: Input LO (Pin 1) and Power GND (Pin 9) are internally connected.

FUNCTIONAL SPECIFICATIONS

(Typical at +25 degrees Celsius, unless otherwise noted)

Voltage-type Models

Model Number	Range	Input Z	Input V Max.
DM-500-0	$\pm 199.9 \text{ mV}$	$1000 \text{ M}\Omega$	$\pm 100 \text{ V}$
DM-500-1	$\pm 1.999 \text{ V}$	$1000 \text{ M}\Omega$	$\pm 100 \text{ V}$
DM-500-2	$\pm 19.99 \text{ V}$	$\approx 10 \text{ M}\Omega$	$\pm 250 \text{ V}$
DM-500-3	$\pm 199.9 \text{ V}$	$\approx 10 \text{ M}\Omega$	$\pm 500 \text{ V}$

Current-type Models

Model Number	Range	Internal R	Max. Current
DM-500-7	$\pm 199.9 \mu\text{A}$	$1 \text{ K}\Omega$	$\pm 10 \text{ mA}$
DM-500-6	$\pm 1.999 \text{ mA}$	100Ω	$\pm 50 \text{ mA}$
DM-500-5	$\pm 19.99 \text{ mA}$	10Ω	$\pm 150 \text{ mA}$
DM-500-4	$\pm 199.9 \text{ mA}$	1Ω	$\pm 500 \text{ mA}$

Common Specifications:

Accuracy $\pm 0.1\%$ of reading +1 digit
A/D Conversion Dual-slope with autozeroing circuit
Sampling Rate 2.5 samples/second
Input Configuration Single-ended. Differential input can be applied after cutting etch.

Gain Temperature Coefficient Less than $+100 \text{ ppm}/^\circ\text{C}$
Zero Temperature Coefficient Autozeroed ± 1 count over 0 to $+50^\circ\text{C}$

Bias Current 20 pA typical
Common Mode Rejection Ratio 50dB typical
Common Mode Voltage Range $\pm 0.5\text{V}$, $\pm 1\text{V}$ dc maximum
Noise Rejection NMR 40dB typical at 50/60 Hz
External Controls Hold and numerical blanking capabilities

Display Red, 7-segment LED, 0.3 inch (8.0 mm) tall characters

Displayed Characters ± 1999
Decimal point location Switched under external control
Polarity Signs + and - signs automatically displayed
Polarity Disable (blanking) Available by cutting a part of the etch

Overrange All digits blank (+ or - sign stays on depending on overrange polarity)

Power Supply +5V dc, $\pm 5\%$, 60 mA typical, 80 mA maximum. +7V dc supply maximum

Cutout Dimensions $0.89'' (22.7\text{mm})\text{H} \times 1.80'' (45.7\text{mm})\text{W} \times 1.89'' (48\text{mm})\text{D}$

Weight 1.22 ounces (35 grams)
Operating Temperature Range 0°C to $+50^\circ\text{C}$
Operating Humidity Less than 85%
Storage Temperature Range -20°C to $+70^\circ\text{C}$

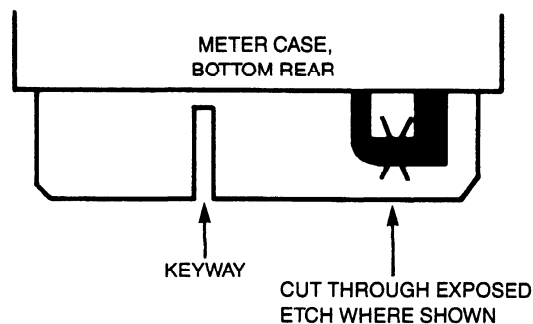
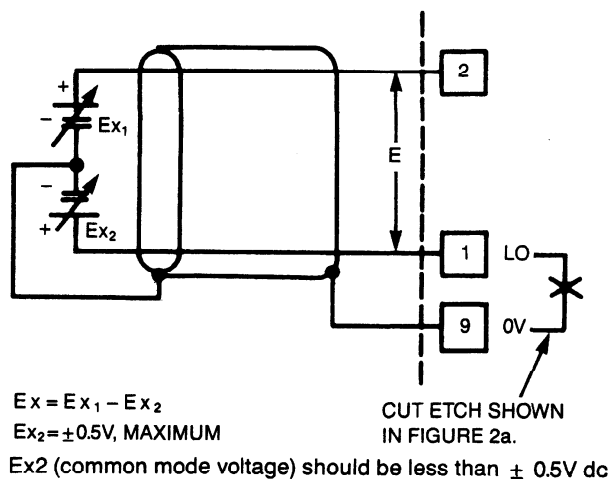
OPERATING INSTRUCTIONS**Power Supply**

Use a well regulated power source. When using a battery, tie a $100\mu\text{F}$ to $1000\mu\text{F}$ capacitor between the power terminals. Maximum supply voltage is +7V dc.

Inputs

Single-ended inputs—Apply the input voltage (or current) between pins 1 (Input LO) and 2 (Input HI). Pin 1 is internally tied to Pin 9 (GND). In electrically noisy environments, use a shielded cable for inputs, tying the shield to Pin 1.

Differential inputs—Cut the etch shown in Figure 2a, applying the input signal as shown in Figure 2b.

**Figure 2a. Location of Etch****Figure 2b. Typical Differential Input Configuration****Decimal Point Location**

XXX.X Connect Pins 5 and 8
 XX.XX Connect Pins 6 and 8
 X.XXX Connect Pins 7 and 8

Hold Function

A display remains constantly on when Pin 3 (Hold) is connected to Pin 9 (GND).

Numerical Blanking

To blank the numbers on the display, tie Pin 4 (Blanking Numericals) to Pin 9.

Polarity Sign Blanking

Remove the front panel and cut the + or - jumper wires to disable displaying the polarity of the input signal.

CALIBRATION

Calibration is suggested once every six months. See Figure 3.

Procedure:

1. Allow the DM-500 to warm up for at least five minutes.
2. Ensure that the meter's environment is +23°C, humidity at less than 84%.
3. Apply a voltage or current to the input close to positive full scale.
4. Adjust the full scale adjustment potentiometer for a reading identical to that of the voltage source.

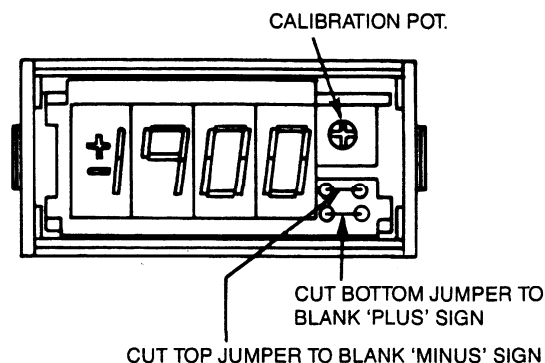
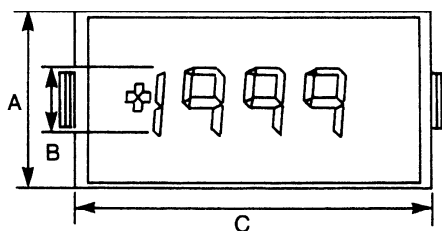
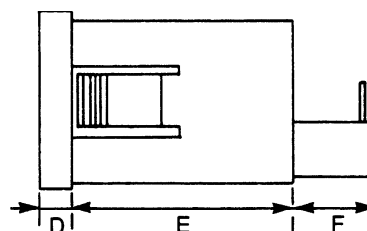


Figure 3. Locations of Jumpers and Calibration Potentiometer

MECHANICAL DIMENSIONS INCHES (mm)

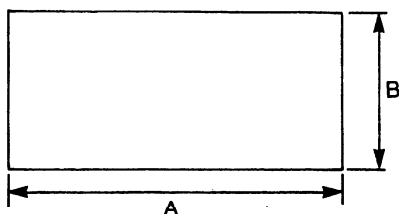


A: 0.94 (24)
B: 0.31 (8.0)
C: 1.89 (48)



D: 0.20 (5)
E: 1.22 (31)
F: 0.47 (12)

PANEL CUTOUT DIMENSIONS



INCHES

A: 1.80 (+0.01, -0)

B: 0.89 (+0.01, -0)

mm

45.7 (+0.3, -0)

22.7 (+0.3, -0)

ORDERING INFORMATION

To Order, Specify: DM-500—

*Range, Full Scale

199.9mV	0
1.999V	1
19.99V	2
199.9V	3
199.9mA	4
19.99mA	5
1.999mA	6
199.9μA	7

Connector included with meter.

*Standard configuration is DM-500-1; other configurations available.