

muRata**Ps**

Murata Power Solutions

PRODUCT DATA SHEET

DM-500
3½ DIGIT, LED DISPLAY
MINI PANEL METER**OBSOLETE PRODUCT**

Contact Factory for Replacement Model

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

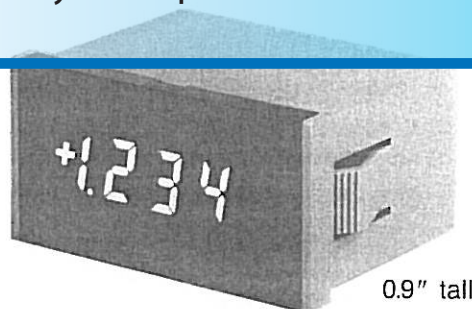


Photo Depicts Actual Size

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, ± 0.06 inches (3, ± 0.12 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.

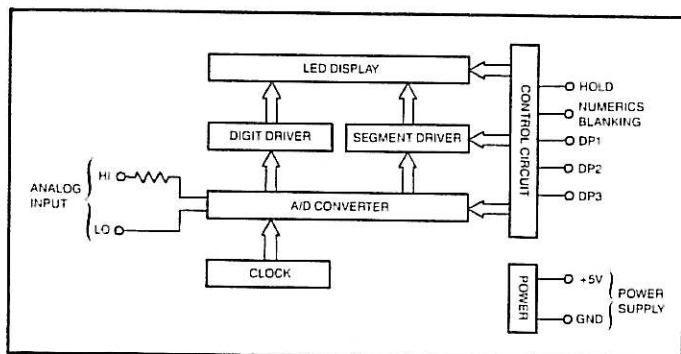


Figure 1. DM-500 Simplified Block Diagram

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 M Ω	$\pm 100 \text{ V}$
DM-500-1	$\pm 1.999 \text{ V}$	1000 M Ω	$\pm 100 \text{ V}$
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 K Ω	$\pm 10 \text{ mA}$
DM-500-6	$\pm 1.999 \text{ mA}$	100 Ω	$\pm 50 \text{ mA}$
DM-500-5	$\pm 19.99 \text{ mA}$	10 Ω	$\pm 150 \text{ mA}$
DM-500-4	$\pm 199.9 \text{ mA}$	1 Ω	$\pm 500 \text{ mA}$

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 Coefficiency ... Less than +100 ppm/ $^{\circ}\text{C}$
 Zero Temperature Coefficiency ... 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" (22.7mm)H x 1.80" (45.7mm)W x 1.89" (48mm)D

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

OPERATING INSTRUCTIONS

Power Supply

Use a well regulated power source. When using a battery, tie a 100 μF to 1000 μF 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.

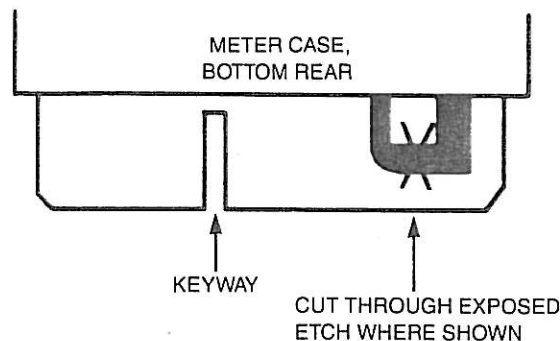


Figure 2a. Location of Etch

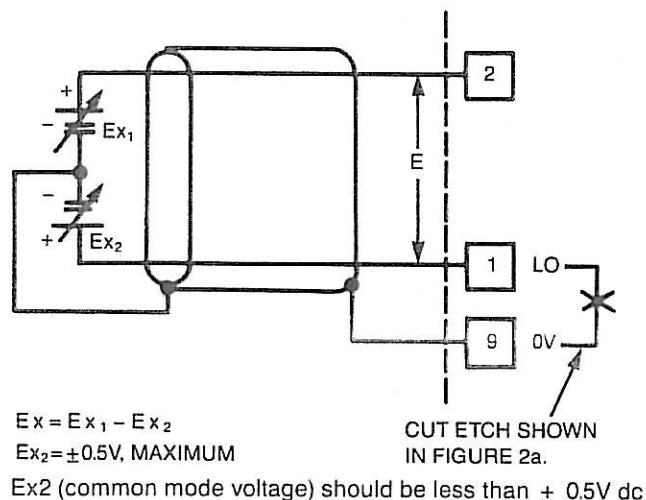


Figure 2b. Typical Differential Input Configuration

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.

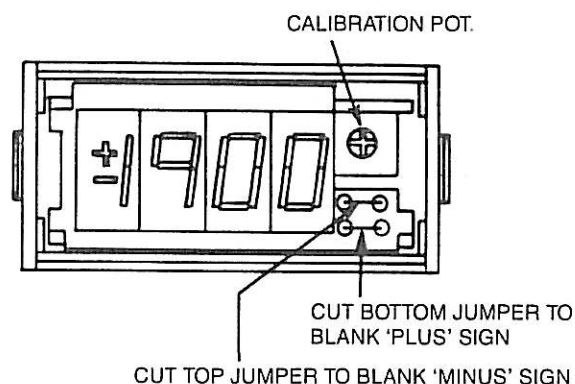
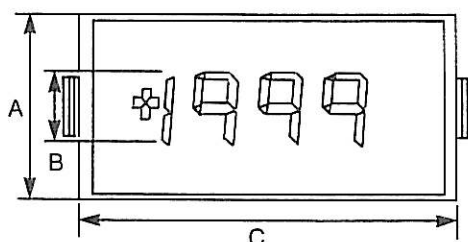
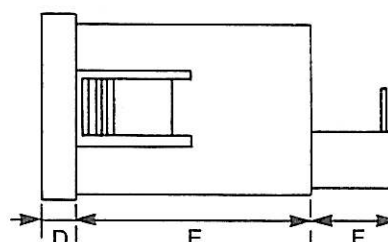


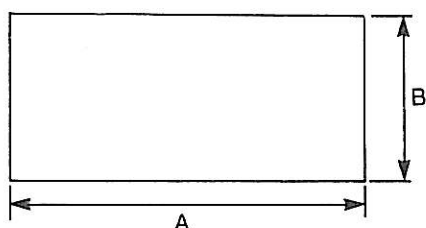
Figure 3. Locations of Jumpers and Calibration Potentiometer

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	mm
A: 1.80 (+ 0.01, - 0)	45.7 (+ 0.3, - 0)
B: 0.89 (+ 0.01, - 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.

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ISO 9001 and 14001 REGISTERED

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