

# *The MICRO SERIES* **PROCESS DISPLAYS**

## **LARGE DIGIT MODELS**

**Mighty-5**



## **DPM MODELS**

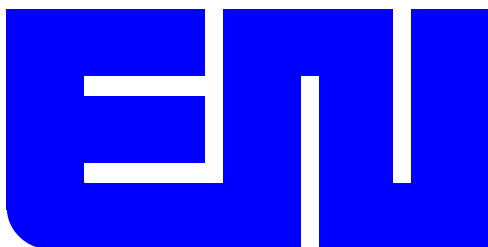
**Micro-P & Mighty-1**



**Mighty-1**



**Micro-P**



**ELECTRO-NUMERICS, INC.**

# Introduction

The Electro-Numerics family of Digital Panel Meters and Large Digit Displays are accurate, solid state instruments designed for years of trouble free operation. Since 1974 we have been manufacturing quality products designed to meet the needs of our customers. Our displays are recognized in the industry as reliable, well designed instruments. From our compact sized 1/8<sup>th</sup> DIN Digital Panel

Meters with 0.56" Led digits to our Large Digit Displays with digit sizes from 1" to 9" viewable to 360 feet, we cover most applications in process measurement and display. This catalog describes our Micro Series of microprocessor-based display/controllers. Contact the factory or your local distributor for a catalog on our other display products.

## Electro-Numerics' Products

### Digital Panel Meters



Micro-P Digital Panel Meter (DPM) with 0.56" Tall Led Digits

Digital Displays with 0.56" Led digits provided in a 1/8 DIN (96 x 45mm) panel mount case. These units are compatible with most sensors and can be scaled to read in engineering units.

### Large Digit Displays



Remote Displays, Counters, Timers and Process Displays

Our family of Large Digit Displays includes many models with digit sizes ranging from 1" Led's to 9" tall electromagnetic characters. The Micro Series large digit displays covered in this catalog, includes the Mighty-1 with 1.0" digits readable at 40 feet and the Mighty-5 with superbright outdoor-readable digits readable at 200 feet.



Mighty-5 Process Indicator with 5" Tall Outdoor Led Digits

Please visit our Web Site at: <http://www.Electronumerics.com>

Call: **1-800-854-8530** or Fax: 951-695-7246 for Applications Assistance

# The Micro Series

## MICRO-P MIGHTY-1 MIGHTY-5

5 Digit (99,999) Process Indicators  
Choice of .56" or 1.0" Indoor or Superbright, 5.0" Outdoor LED Digits



**Micro-P** with 0.56" Led Digits



**Micro-1** with 1.0" Led Digits



**Mighty-5** with 5" Outdoor Led Digits

### FEATURES

- **Bright Displays with 5 Digits (99,999) :**
  - Micro-P:* 0.56" red or green Led's
  - Mighty-1:* 1" red Led's. 40' visibility
  - Mighty-5:* 5" red outdoor Led's. 200' visibility
- **Signal Inputs:**  
DC voltage & current, true rms AC voltage & current, strain gauge, "process" (4/20mA, 0/10V etc.), RTD's, thermocouples and load cells.
- **Three Calibration Methods:**  
Allows easy setup to your transducer or sensor
- **60 Readings Per Second For:**  
Fast control response  
True peak reading  
Analog outputs that track the input
- **Scalable to 5 Digits:**  
Engineering units to +/-99,999. Setup by front panel push-buttons or computer
- **Worldwide Power:**  
85 to 264Vac & 90 to 370 Vdc
- **Isolated 5, 10 or 24 Vdc Output:**  
Provides transmitter excitation
- **Peak Hold and Push-Button Tare:**

### PLUG-IN OPTIONS

- **Dual Setpoint Controller:**  
10 Amp, 240 Vac Form C relays or Isolated transistor outputs
- **Isolated Linearized Analog Outputs:**  
0 to 10 Vdc or 0 to 20 (4/20) mA
- **Isolated Digital Communications:**  
RS-232 for interface and meter setup  
RS-485 to interface with multiple meters  
Parallel BCD output
- **Isolated Low Voltage Power Supply:**  
9 to 37 Vdc and 8 to 28 Vac (not available on Mighty-5)

The *Micro-P*, *Mighty-1* and *Mighty-5* digital displays are state-of-the-art instruments for a wide range of monitoring and control applications. By simple front panel push-button setup, these displays can indicate DC Voltage or Current, True RMS Voltage or Current, Strain Gauges, Process Signals, RTD & Thermocouple temperature as well as Load Cells. All this at the price of meters with much less capability! Input signals may be directly displayed as voltage, current or temperature or scaled to a full five digits from 0 to 99,999 to read directly in engineering units such as ft-lbs, rpm, psi, etc. Three calibration methods are provided allowing these units to be connected directly to a transducer and scaled automatically or setup by known values entered through the front panel push-buttons. No calibration equipment is required when changing ranges; all standard ranges are digitally pre-calibrated at the factory.

Temperature scales (Celsius or Fahrenheit) are selectable from the front panel and one of seven thermocouples or two RTD's curves may be selected. These displays take up to 60 readings per second for fast control response, true peak reading capability, and an analog output that accurately tracks the signal input. An adaptive digital filter that can automatically select the best time constant for minimum noise yet respond rapidly to signal input changes is standard. The peak & valley value of the input signal can be displayed by a push of a button on the front panel and push-button tare allows the meter display to be set to zero for any input signal level.

The Micro-Series provides isolated 5, 10, or 24 Vdc output to power strain gauges and transmitters, eliminating the need for an external supply.

These displays have two alarm indicators with the setpoints programmed by front panel push-buttons. Option cards with dual open collector transistors or 10 amp form-C relays may be added to provide control outputs. The outputs can be set to operate above or below the setpoints in a latched or non-latching mode and with band deviation.

Analog Outputs of 0 to 10 V or 0 to 20 mA (4/20 mA) are available to drive chart recorders, remote displays or for transmission to a central control room. The outputs are scaled through the front panel push buttons.

Adding RS-232 or RS-485 enables the displays to communicate with PLC's or computers. Baud rates can be set from 300 to 19,200. Configuration software provided with these options makes meter setup even easier. Three state, parallel BCD outputs are also available.

The Micro Series can be provided in an extended operating mode. With an extended version signal conditioner card installed, these displays may be programmed to *linearize nonlinear signal inputs* and/or operate in a *rate-of-change* mode. Rate-of-change will display the time rate-of-change of the signal input.

Windows based data logging and monitoring software is available for connection of 1 to 32 meters with a serial communications card installed. This software allows monitoring the process values, setpoints and peak values and provides several methods of graphical display.

## ORDERING GUIDE

One entry required per block. For example, model M4R0HH2SG is a MIGHTY-4, large digit strain-gauge meter with red 4" Led display, high level power supply and RS232 communication. Note: Default ranges are shown below. All ranges, except temperature, can be scaled to read in engineering units. Add -SC option if required.

### Display Color & Digit Size

**MR** ..... Micro-P, Red 0.56" Led  
**MG** ..... Micro-P, Green 0.56" Led  
**M1R** ..... Mighty-1, Red 1" Led

**Mighty-5** (Red, 5" outdoor Leds):

**M5W** ..... Wall Mount, NEMA-4X case  
**M5B** ..... Bracket Mount, NEMA-4X case

*For extended features, add "E" to the part number i.e. MRE.*

### Display Power (except Mighty-5)

**0** ..... 85 to 264 Vac & 90 to 370 Vdc  
**1** ..... 8 to 28 Vac & 9 to 37 Vdc  
*Mighty-5 requires no entry, "0" is standard.*

### Analog Output (optional)

**H** ..... None  
**J** ..... 0 to 10 Vdc  
**K** ..... 0 to 20 or 4/20 mA

### Setpoint Output (optional)

**H** ..... None  
**R** ..... Dual 10 A relay output  
**C** ..... Open collector output

### Digital Interface (optional)

**H** ..... None  
**2** ..... RS-232  
**4** ..... RS-485  
**B** ..... Parallel BCD

### Signal Conditioners (select one)

#### dc Volts

**MVI1** ..... 200.00m V = 200.00  
**MVI2** ..... 2.0000 V = 2.0000  
**MVI3** ..... 20.000 V = 20.000  
**MVI4** ..... 200.00 V = 200.00  
**MVI5** ..... 660.0 V = 660.0

#### dc Amperes

**MCI1** ..... 2.0000 mA = 2.0000  
**MCI2** ..... 20.000 mA = 20.000  
**MCI3** ..... 200.00 mA = 200.00  
**MCI4** ..... 5.000 A = 5.000

#### True RMS Volts

**MTV1** ..... 200.00 mV = 200.00  
**MTV2** ..... 2.0000 V = 2.0000  
**MTV3** ..... 20.000 V = 20.000  
**MTV4** ..... 200.00 V = 200.00  
**MTV5** ..... 660.0 V = 660.0

#### 100 Ohm Platinum RTD's

**M385C** ..... -202 to 850 °C  
**M385F** ..... -331 to 1562 °F  
**M392C** ..... -202 to 850 °C  
**M392F** ..... -331 to 1562 °F

#### Thermocouples

**MJC** ..... -210 to 760 °C  
**MJF** ..... -347 to 1400 °F  
**MKC** ..... -244 to 1372 °C  
**MKF** ..... -408 to 2501 °F  
**MNC** ..... -246 to 1300 °C  
**MNF** ..... -411 to 2372 °F  
**MTC** ..... -257 to 400 °C

#### Thermocouples (cont.)

**MTF** ..... -430 to 752 °F  
**MEC** ..... -240 to 1000 °C  
**MEF** ..... -400 to 1830 °F  
**MSC** ..... -46 to 1768 °C  
**MSF** ..... -51 to 3214 °F  
**MRC** ..... -45 to 1768 °C  
**MRF** ..... -49 to 3213 °F

#### Process Signals

**E** ..... 0/20mA, 4/20mA, 1/5V etc.  
*Scalable with 5, 10 or 24V excitation*

**Default:** 4/20mA=20,000, 10V excitation

#### Strain Gauges and Potentiometers

**SG** ..... 200mV, 2V & 20V  
*Scalable with 5, 10 or 24V excitation*

**Default:** 200mV=20,000, 10V excitation

#### Load Cells & 6 Wire Ratio

**LC** ..... 20, 50, 100, 250 & 500mV  
*Scalable, with 10V excitation*

**Default:** 20mV = 20,000, 10V excit.

### Special Configuration

**SC** Specify when configurations or scalings other than those defaults shown above are required.

## ELECTRICAL SPECIFICATIONS

### Display

Type ..... 5 Digit, 7-segment  
 Digit size ..... Micro-P: 0.56", Mighty-1: 1",  
 Mighty-5: 5" (discrete Led's in a 7-segment format)  
 Type ..... All except Mighty-5 are bright indoor Led's  
 Mighty-5 digits are super-bright, daylight readable  
 Color ..... Red or Green (Micro-P only)  
 Range ..... -99,999 to +99,999

CMR from DC to 60 Hz ..... 130 dB  
 NMR to 50/60Hz Line ..... 90 dB with min. filtering

### Environmental

Operating Temperature ..... 0°C to 55°C  
 Storage Temperature ..... -40°C to 85°C  
 Relative Humidity ..... 95% at 40°C, non-condensing

### A to D Conversion

Rate ..... 60/s at 60 Hz operation, 50/s at 50 Hz operation  
 Output Update Rate ..... 56/s at 60 Hz, 47/s at 50 Hz  
 Display Update Rate ..... 3.5/s at 60 Hz, 3/s at 50 Hz

### Enclosure

Micro-P ..... 1/8 DIN plastic w/ sealed front, 92 x 45mm cutout  
 Mighty-1 ..... Aluminum w/ sealed front, 183 x 90.5mm cutout  
 Mighty-5 ..... Aluminum, NEMA-4X, surface or bracket mount

### Accuracy at 25°C

DC Volts, Amps, Strain (ratio) ..... 0.01% FS +/-1 count  
 Thermocouple ..... 0.2°C max.  
 RTD ..... 0.04°C max.  
 True RMS (1 to 100%FS) ..... 0.05%FS, 10 Hz to 10 kHz  
 Load Cell ..... 0.01%FS +/-1 count  
 Span Tempco ..... 0.003% of reading/°C  
 Zero Tempco ..... 0.1 counts/°C  
 Reference Junction ..... 0.03 degree/degree

### Operating Power

Voltage (standard) ..... 85 to 264 Vac, 90 to 370 Vdc  
 Voltage (optional except Mighty-5) ..... 8 to 28 Vac, 9 to 37 Vdc  
 Frequency ..... DC and 47 to 440 Hz

### Excitation Power Supplies

Outputs ..... 5 Vdc, +/-5%, 100mA max.; 10 Vdc, +/-5%,  
 120 mA max.; 24 Vdc, +/-5%, 50 mA max.  
 Isolation (power ground) ..... Safety-rated to 250 Vac,  
 4.2 kVp per High Voltage Test

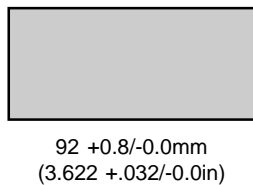
### Noise Rejection

CMV from DC to 60 Hz ..... Safety-rated to 250 Vac,  
 4.2 kVp per High Voltage Test

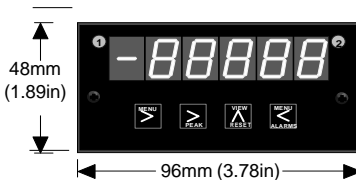
## MECHANICAL SPECIFICATIONS

### MICRO-P (1/8 DIN DPM)

#### Panel Cutout

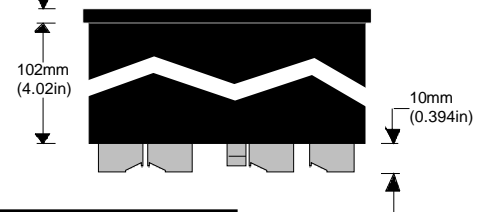


#### Front View



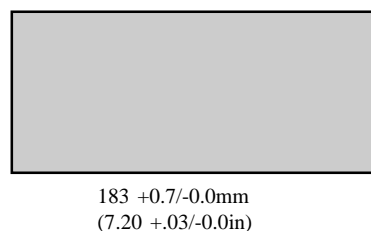
5mm (0.197in)

#### Top View

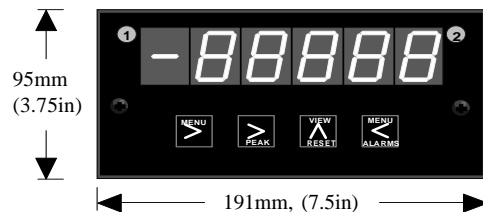


### MIGHTY-1

#### Panel Cutout

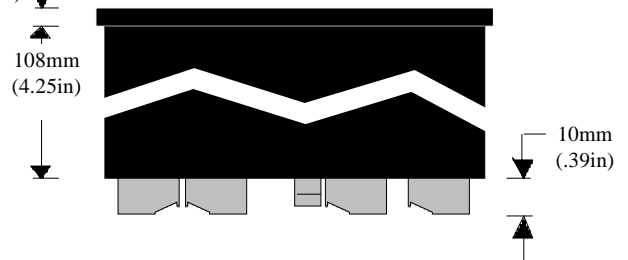


#### Front View

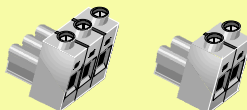


13mm (.50in)

#### Top View



#### Connectors (all models)

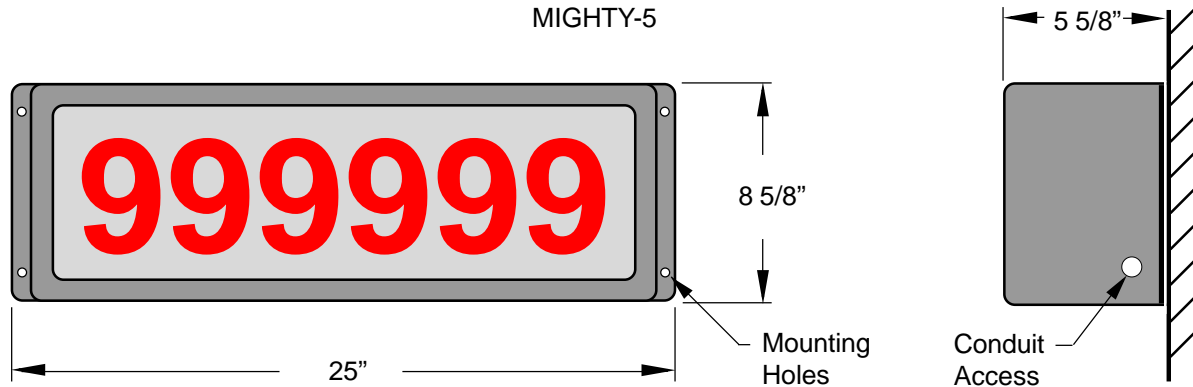


Wiring is simplified with screw terminal connectors that plug into mating printed circuit board jacks at the rear of the displays.

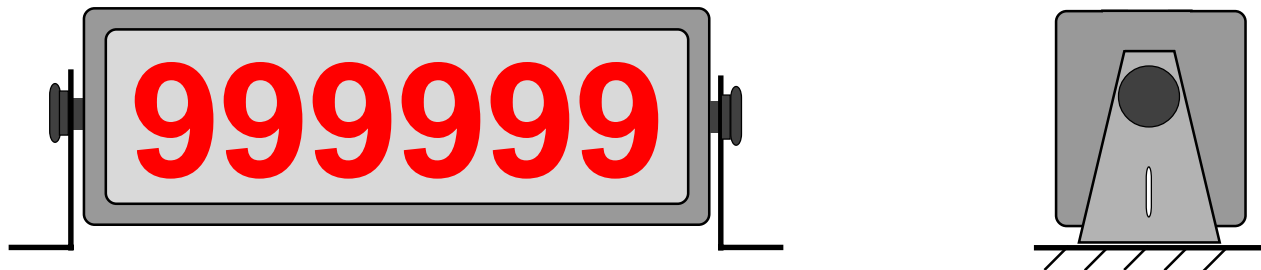


## MECHANICAL SPECIFICATIONS (Cont.)

MIGHTY-5



**Option 1:** Wall Mount Back Panel  
Model M5W



**Option 2:** Universal Mounting Brackets  
Model M5B

## WARRANTY & SERVICE

### LIMITED PRODUCT WARRANTY:

Electro-Numerics Incorporated warrants these products to be free of defects in material and workmanship for two years from date of shipment to original customer. This warranty on materials and workmanship may be considered as unconditional provided that, in the opinion of Electro-Numerics, the equipment has not been mechanically, environmentally or electrically abused and has been installed, maintained and operated within the limits of rated or normal usage. Defective products must be sent, transportation charges prepaid with notice of the defect, to our plant in Temecula CA. This warranty is limited, at the option of Electro-Numerics, to repair, replacement, or an appropriate credit adjustment not to exceed the original equipment sales price. All warranty freight charges are F.O.B., our plant, Temecula, CA. Electro-Numerics assumes no liability in connection with the

sales of its products beyond that stated above and is not responsible for any incidental or consequential loss or damage which might result from a failure of any Electro-Numerics' product.

### SERVICE:

Products being returned for service should be sent, freight prepaid, to Electro-Numerics, Inc., 42213 Sarah Way, Temecula, CA, U.S.A. to the attention of the Repair Department with a full description of the problem or reason for return. All items sent in for service are subject to a minimum evaluation charge of \$65.00 in the event that the product is found to be out-of-warranty or, if under warranty, not in need of additional service. Out-of-Warranty service and repair charges will be quoted on a case-by-case basis. All repaired products will be shipped to you F.O.B., Temecula, CA.

## CONDITIONS OF SALE

### Freight:

F.O.B Temecula, California. Insurance and handling charges are added to all shipments. Handling charges are computed at 1% of the shipment product cost with \$1 minimum & \$7 maximum.

### Prices:

Prices published in catalogs, price lists or on the Internet are not offers to sell and are subject to change without notice. General price information should be specifically confirmed. Product listings, specifications and manufacturing details are subject to change without notice.



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