



## Mini-Max M245 Series Digital Panel Meter

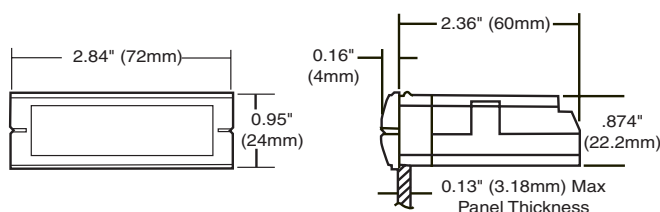
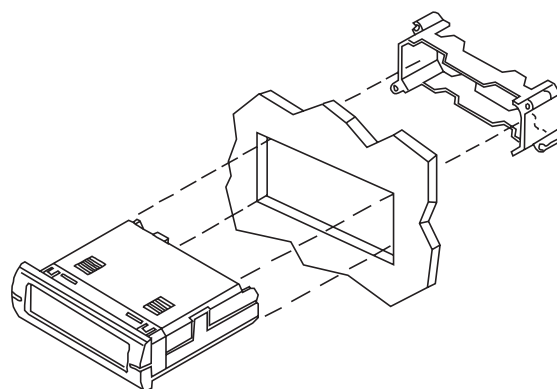
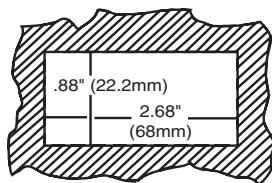
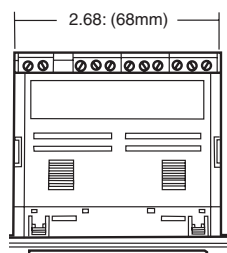
- **Minimum Depth Indicator - Less Than 2.5" (60mm) of Space Required Behind the Panel**
- **Stackable Mounting Bracket Included for Easy Installation**
- **4-1/2 Digit, 0.5" (12.7mm) High LCD Display with Optional Negative Image, Bright Red Backlighting**
- **Limited Range Display Scaling**
- **Standard Screw Terminals for Easy Installation**
- **Five Voltage Ranges: 200mV, 2V, 20V, 200V, 750V**
- **85-250VAC or 9-32VDC Power Supply**



Simpson's Mini-Max Voltage Indicators provide high quality, accuracy and reliability in a compact, 60mm deep case. Units offer 4-1/2 digit, 0.5" (12.7mm) LCD display and are available with a bright red, negative image backlight option. All units feature user-selectable decimal point, auto zero and limited scaling capabilities.

A unique mounting bracket is provided to allow for vertical or horizontal stacking of multiple indicators. All Mini-Max units feature a 3/64 DIN, high-impact plastic case. The standard units have a clear viewing window, and the units with optional negative image, red backlighting have a red window.

### Installation and Panel Cutout



#### Mounting Requirements

Insert the Mini-Max through the panel, and then slide the mounting bracket on to the Mini-Max. The mounting bracket allows Mini-Max units to be stacked side-to-side or top-to-bottom and to maintain the DIN standard panel arrangements in 24mm by 72mm multiples. Panel cutout instructions for stacking multiple units are provided under "stacking features."

## Specifications

### DISPLAY

**Type:** 7-segment LCD  
**Height:** 0.5" (12.7mm)  
**Decimal point:** 3-position programmable  
**Overrange indication:**  
 Most significant digit = "1"  
**Backlighting:** Optional negative image, red LED backlighting  
**Polarity:** Auto with "-" indication, "+" implied

### POWER REQUIREMENTS

**AC Volt:** 85-250VAC @40-440Hz  
**DC Volt:** 9-32VDC

### Power Consumption:

85-250VAC: 2.5VA min/4VA max  
 9-32VDC: 1.5VA min/3VA max

**Rated Circuit to Ground Voltage:** 750Vrms

### ACCURACY @ 25°C

±(0.5% of reading + 50 count)

### ENVIRONMENTAL

**Operating Temperature:** 0 to 55°C  
**Storage Temperature:** -10 to 60°C  
**Relative Humidity:** 0 to 85% non condensing @ 40°C  
**Temperature Coefficient:**  
 (± 0.02% of input ± 0.2 digits)/°C  
**Warmup time:** Less than 20 minutes

### NOISE REJECTION

**NMRR:** 60dB, 50/60Hz  
**CMRR:** (w/1KΩ unbalanced @ 60Hz): 90dB min

### ANALOG TO DIGITAL CONVERSION

**Technique:** Integrating  
**Rate:** 3 samples/second-typical

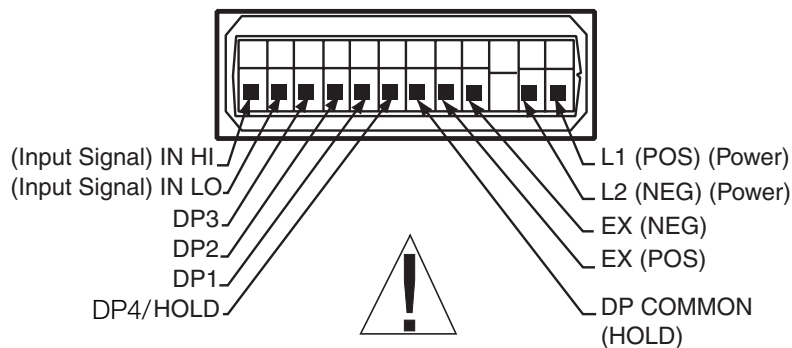
### MECHANICAL

**Bezel:** 0.95" x 2.84" (24mm x 72mm)  
**Depth:** 2.36" (60mm)  
**Panel cutout:** 0.88" x 2.68"  
 (22.2mm x 68mm)  
**Weight:** 3.5oz (99.2g)  
**Case Material:**  
 94-0,UL-rated, glass-filled thermoplastic

### INPUTS: AC Voltage

Range	Resolution	Input Impedance	Maximum Input
200mV	10μV	100MΩ	100V
2V	100μV	10MΩ	750V
20V	1mV	10MΩ	750V
200V	10mV	10MΩ	750V
750V	100mV	10MΩ	750V

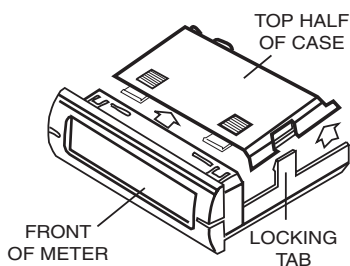
## Wiring Display



These instruments are designed for maximum safety to the operator when mounted in a panel according to instructions. They are not to be used unmounted or for exploratory measurements in unknown circuits.

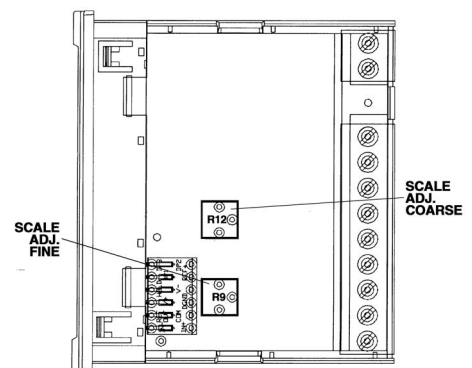
- Decimal Point:** To select a decimal point, connect the appropriate DP pin (DP1, DP2, DP3 or DP4) to the DP COMMON (HOLD). Unused DP inputs may remain unconnected (open).
- Display Hold:** Connect HOLD to DP COMMON (HOLD). If this feature is not required, the DP COMMON (HOLD) pin may remain unconnected (open). Hold is optional on this model, and when equipped, replaces DP4. This feature is available from our modification centers.
- Input Signal:** Connect the IN HI and IN LO to the signal to be monitored.
- Input Power:** Connect power to the L1 and L2 terminals. For AC powered units, L1 and L2 are not polarized. **For 9-32 DC powered units, L1 must be positive with respect to L2.**

## Display Scaling



Using a screwdriver or thumbnail, spread tab on each side of case to unlock top half. Lift rear top half and slide away from front of meter.

Mini-Max indicators have limited range coarse and fine adjustments for display scaling. There are no optional connections required for these to function. The "COARSE" calibration R12 will allow a limited range of scaling values. The meter can be scaled down to 1/2 the value of the input, but not scaled up. Maximum scaling is maximum input or a maximum reading of 1.9999, whichever is lower. Example: a 2 volt input has a maximum reading of 1.9999 counts, so you can't double the 2 volts, but you can make 1 volt to read 1.9999. The "FINE" calibration R9 allows for an approximate range of 1% of the "coarse" calibration. Apply full scale input to the meter. Adjust R12 to be within 1% of the desired scaled value, then use R9 to obtain the final desired result.



**Note:** Any physical damage to the meter during calibration will void the warranty.

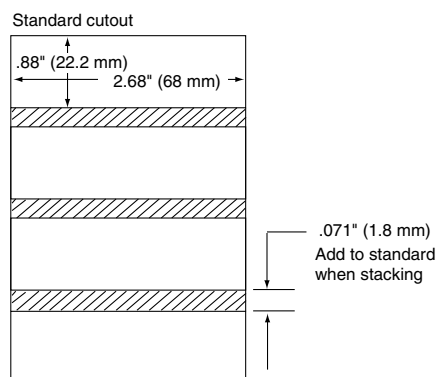
## Stacking Features

The mounting clips, included with every Mini-Max, can be connected together. Multiple units can be mounted in a single opening, allowing perfect alignment.

To punch one hole for multiple units, be sure to adjust the standard panel cutout dimensions as shown here; otherwise the meters will not fit properly in the hole.

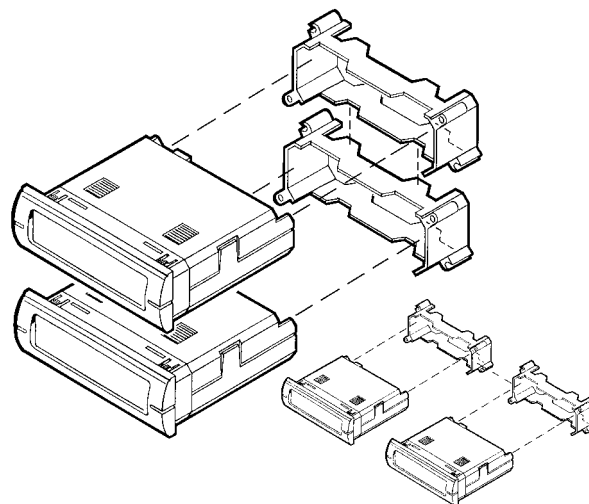
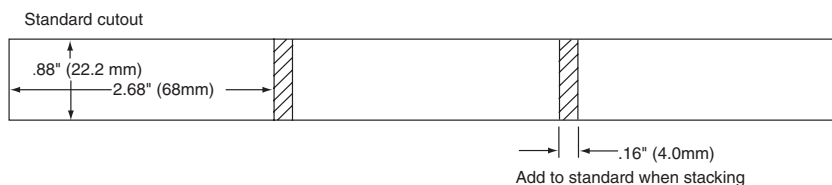
Mounting multiple units is quick and easy. Install the first meter (bottom unit first if stacking vertically). Position the next mounting clip snugly against the first one, and slide the second meter into place. Repeat for remaining units.

### Vertical



### Vertical

### Horizontal

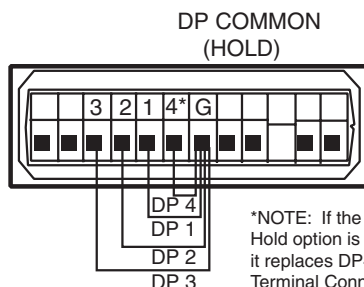


### Horizontal

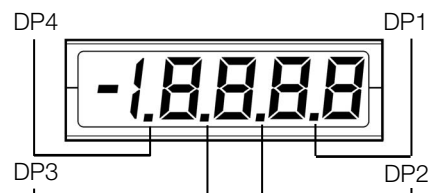
## Backlight Option and Decimal Point Selection

Negative image, bright red backlighting is available in the Mini-Max. This illumination allows the unit to be read in low light areas. Backlighting power is supplied by the Mini-Max, so no additional external power is required.

Decimal point selection is accomplished by connecting the appropriate DP terminal to the DP Common terminal.

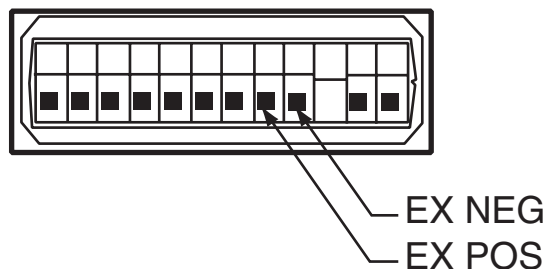


\*NOTE: If the Display Hold option is ordered, it replaces DP4 on the Terminal Connector.



## Excitation Output

Excitation output is available in the Mini-Max for powering external transmitters or transducers. Excitation is available from the EX POS and EX NEG terminals. This source is isolated from the measurement input as well as the input power circuits. The voltages available are 12VDC or 24VDC, with a maximum load current of 25 milliamps. This feature eliminates the need to mount an external DC power source for transducers or sensors used in your application.



Do not exceed an excitation load current of 25mA!

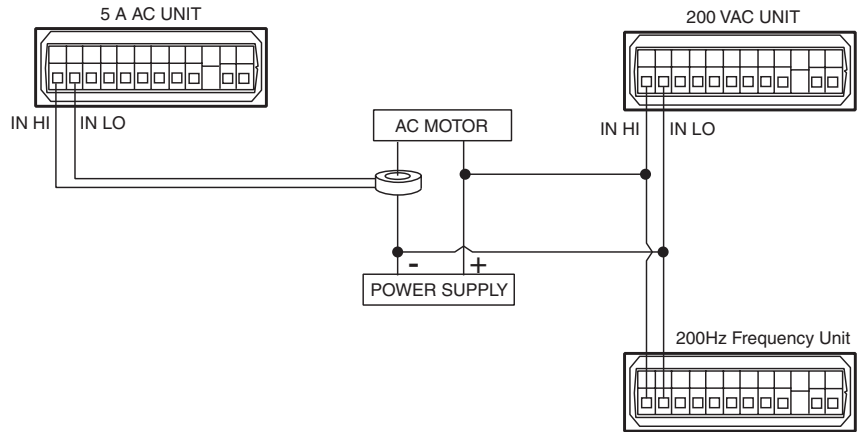
## Application Example

A company needs to monitor the power supply voltage (120VAC), load current (50 amps) and frequency (60Hz) of an AC motor.

**Voltage:** A Mini-Max 200 Volt AC meter is installed in parallel with the power supply.

**Current:** A Mini-Max 5 Amp AC meter is attached to a 50:5 amp Donut Current Transformer. The meter must be scaled to display 50.00 when 5 amps are applied. R9 and R12 are adjusted until the correct value is displayed. The meter is connected to the Donut, and the negative line is fed through the donut.

**Frequency:** A Mini-Max 200Hz Frequency meter is installed in parallel with the power supply. The wiring for the volt meter can be split to the frequency meter as long as the voltage will not exceed 750 volts AC. [Note: Frequency available in model M235 only.]



## Ordering Information

Your Mini-Max Voltage Indicator can be configured by making an entry for each box

Basic Unit	Display	DPM Power Supply	Range	Excitation Output
M245 4-1/2 Digit Indicator	0 1 Non Backlight Negative Image Red	0 2 85-250VAC 9-32VDC	31 200mV 32 2V 33 20V 34 200V 35 750V	0 None 1 12VDC 2 24VDC

**Note:** Display hold feature is configured at the factory only. Must specify at time of order.

**Note:** Special scaling is available from the factory at the time of ordering.

## Safety Symbols

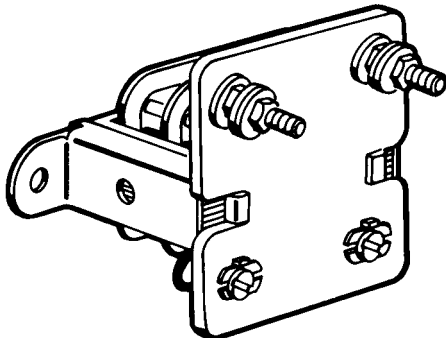


The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury.



The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly adhered to, could result in damage to or destruction of part or all of the instrument.

## Accessories



Model 186 Current Transformers easily convert a current signal (up to 50A) into a 0-10 AC volt signal and transmit the signal over a long distance. This allows remote monitoring of a process or application.

These units can be coupled with a Donut Current Transformer if a high current rating (up to 1999 amps) is to be monitored at a remote location.

### Ordering Information

Range	VA	Cat. Number
0-5 amp	0.75	01312
0-10 amp	1.45	01314
0-15 amp	1.05	01315
0-20 amp	1.04	01316
0-25 amp	1.50	01317
0-30 amp	1.10	01318
0-40 amp	1.09	01319
0-50 amp	1.90	01321
0-100mA	0.50	01295
0-500mA	0.53	01304