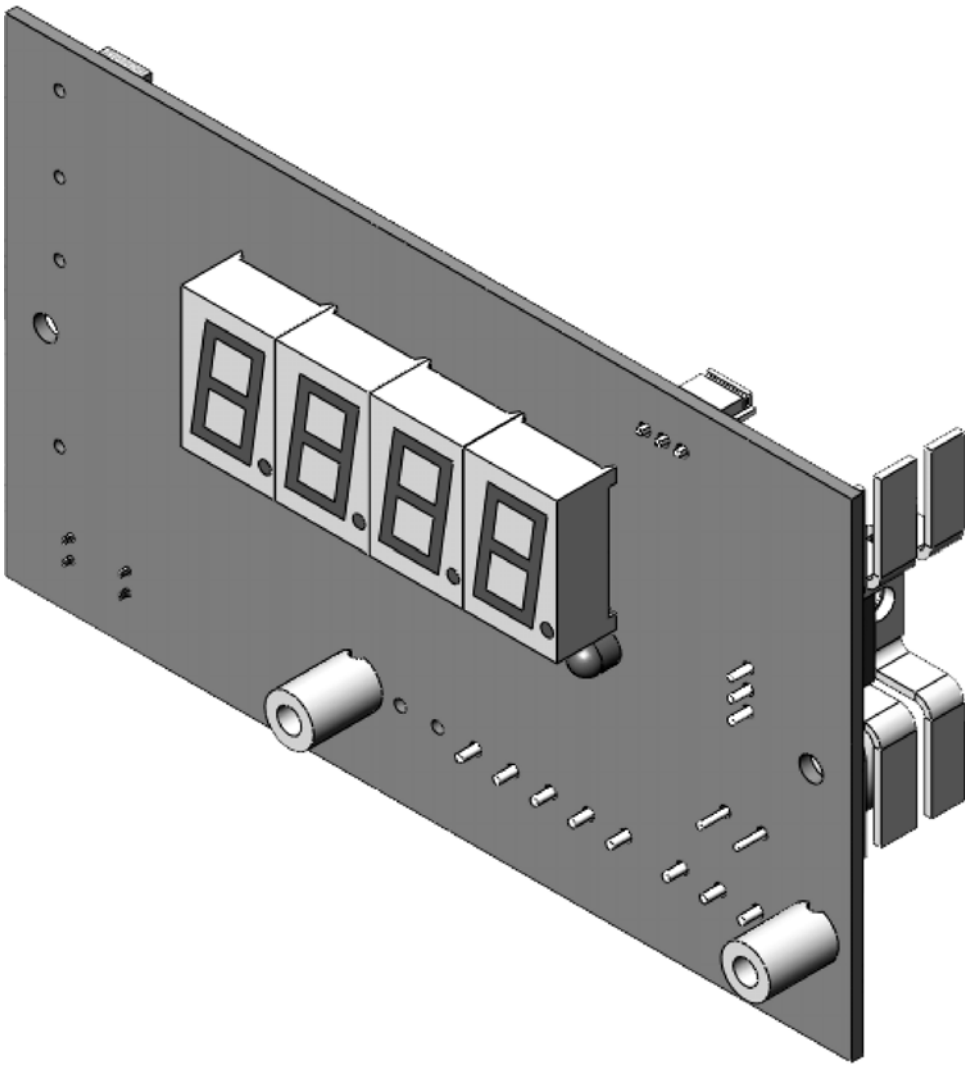
DOVER FLEXO ELECTRONICS, INC.
ISO 9001 CERTIFIED

# 4-Digit Digital Tension Meter
# DTM4D

## Option Insert
**DOC 801-2289**



## GENERAL DESCRIPTION

The DM (Digital Tension Meter) is designed to provide a 4 digit tension readout. It can be fed from any DFE tension amplifier, indicator, or controller with a 0-1mA OR 0-10V output signal representing tension. The DM displays a tension reading based on the input signal and a full scale tension value that can be adjusted to any integer from 1 to 8000 with four push-buttons located on the back of the board. The meter can display up to 15% over-range and 9% under-range. When tension goes over-range the display flashes and when it goes negative a minus symbol appears in front of the displayed reading.

The DM is designed to be powered from either a customer supplied 24VDC power supply OR 5VDC originating from another specified DFE product's power supply. The meter utilizes isolated tension inputs to keep the tension signal ground floating in reference to the power supply ground when used with DFE amplifiers, indicators or controllers with isolated tension outputs. This prevents ground loop and ground noise issues associated with using common power and signal grounds in industrial environments.

⚠ **WARNING:** The isolated input is designed to prevent ground loops and noise. It is not intended or approved for safety isolation of hazardous voltages. Do not install unit where isolated circuit and chassis ground are more than **40Vpk** differential.

The DM also has Dual Cal capability which allows it to display a tension reading based on two different full tension scale values selectable by an input terminal.

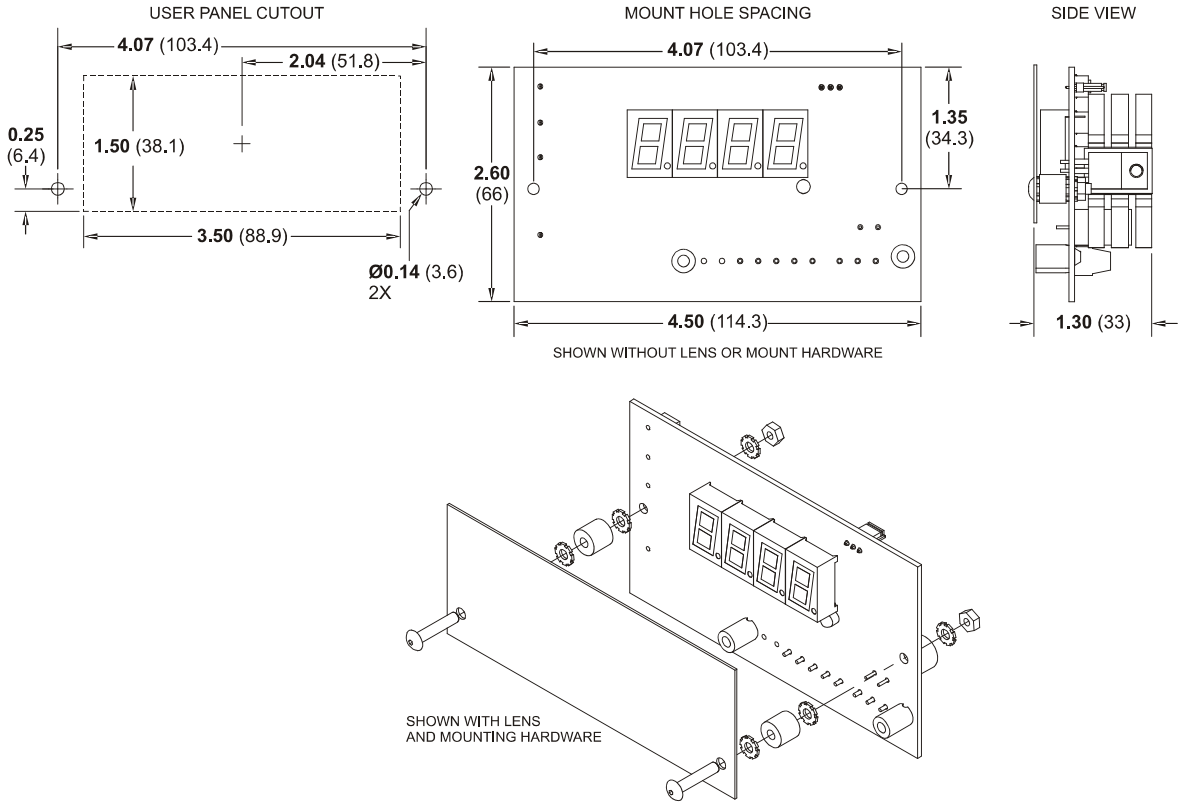



***Figure 1*** **- DIGITAL METER DIMENSIONS AND PANEL CUTOUT DIMENSIONS**

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Input: Voltage | . . . . . | 24 Vdc +/- 10% **OR** 5Vdc +/- 6% |
| Current | . . . . . | 0.1Adc @ 24V. 0.3Adc internal fusing. |
| | . . . . . | 0.085Adc @ 5V. 0.3Adc internal fusing. |
| Weight: | . . . . . | 0.15 lbs (0.07 kg) (Board Only) |
| Tension Signal Input: | . . . . . | 0-1mA **OR** 0-10V (9% Under & 15% Over Range) |
| 0-1mA Input Impedance: | . . . . . | 50 Ohms |
| 0-10V Input Impedance: | . . . . . | 10k Ohms |
| Accuracy: | . . . . . | Max error of 2% over temperature range. 0.2% Typical. |

## SPECIFICATIONS *continued.....*

| | | |
|---|---|---|
| Tension Meter Scales: | . . . . . | Standard Scales: 0-1, 5, 10, 25, 50, 75, 100, 150, 200, 250, 300, 400, 500, 750, 1000, 1500, 2000, 2500, 3000, 4000, 5000, 6000, 7000, 8000 |
| | . . . . . | Custom Scale: Any Integer: 1-8000 |
| Ambient Temperature Range: | . . | 32°F to 104°F (0°C to 40°C) |

## ELECTRICAL CONNECTIONS

All electrical connections should already be made at the factory. If needed, wire the power supply as described in the drawing below. **Be sure to wire the shield lead to a proper chassis ground.** The DM is designed to be powered from either a customer supplied 24VDC power supply OR a 5VDC power rail from a specified DFE product's power supply.

**!!CAUTION:** The unit should NOT be wired to both a 24VDC and 5VDC power supply simultaneously.

Wire the DFE amplifier, indicator or controller's 0-1mA OR 0-10V tension signal wires as shown.

**!!CAUTION:** The unit should NOT be wired to both a 0-1mA and 0-10VDC tension signal simultaneously.

Keep in mind that the meter is designed to provide an isolated input signal ground when used in combination with a DFE amplifier, indicator or controller with isolated outputs. Shorting the 0-1mA or 0-10V signal return with the power ground will defeat this isolation.

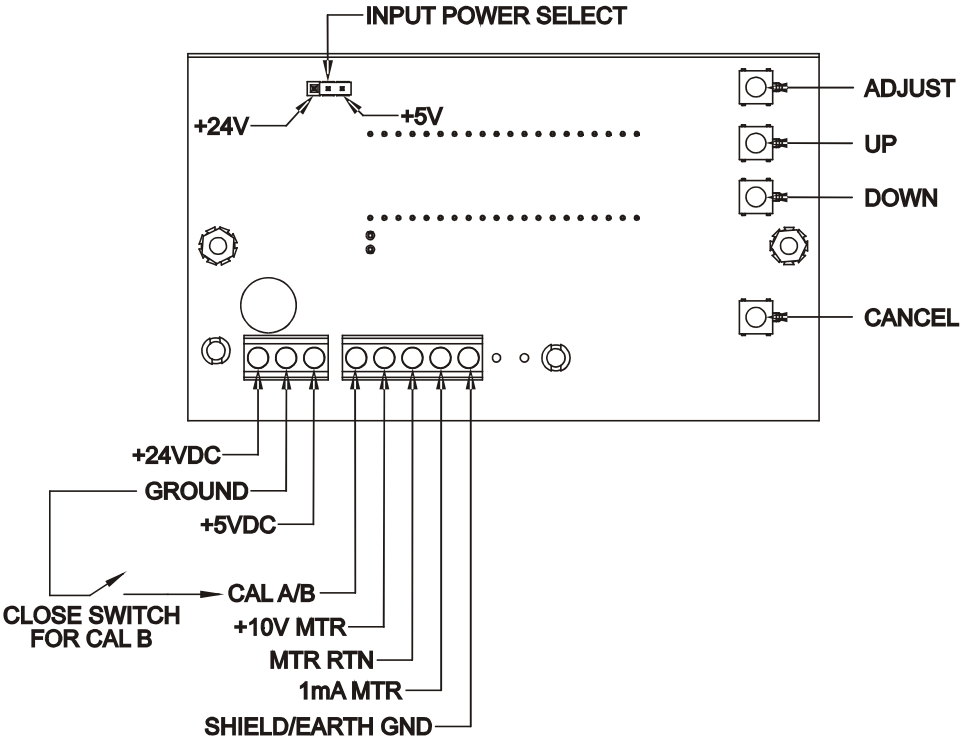



***Figure 2*** **- DIGITAL METER BOARD WITH CONNECTIONS AND ADJUSTMENTS**

### 1. POWER VOLTAGE SELECTION

The power voltage selection jumper (JP901) should be set to the utilized power voltage as follows:

24VDC - Jumper on JP901, pins 1-2. 5VDC - Jumper on JP901, pins 2-3.

### 2. DUAL CAL

If Dual Cal functionality is desired, wire it as shown in the drawing above. The switch should be capable of handling 5V at 5mA of current. When pulled to ground, the meter will display the tension readout based on the CAL B scale value.

## CHANGING THE SCALE

The tension scale is set at the factory and is based on the maximum tension desired by the customer. Use the following procedure only if you want to change the tension scale value. The full scale value can be programmed to any integer value from 1 to 8000.

The meter's displayed output will be represented by the input tension signal percentage multiplied by the full scale value. For example, when utilizing a 0-1mA input signal with a full scale value of 100, a 0.5mA signal will cause a displayed output of ( 0.5mA / 1mA ) x 100 = 50

As another example, when utilizing a 0-10V signal with a full scale of 50, a 5V signal will cause a displayed output of ( 5V / 10V ) x 50 = 25

A full scale value should be selected as the maximum value for full scale tension output of the amplifier, indicator or controller. The format of the displayed output will depend on the programmed scale value. Smaller scales will display the tension with more decimal places as shown in the table below.

| Full Scale Values | Display Format | Example Readout |
|---|---|---|
| Full Scale = 1 | 2 Decimal Places | 0.57 |
| 1 < Full Scale <= 25 | 1 Decimal Place | 13.2 |
| 25 < Full Scale | No Decimal Places | 68 |

The full scale value can be programmed with the 4 buttons located on the back right side of the Meter as shown on the previous page.

**Adjusting the full scale value is accomplished as follows:**

1. With power applied to the meter, press and hold the ADJUST button for 2 seconds. This will cause the meter to enter the Full Scale Adjust Mode. "CAL A" will be displayed and the status LED will turn on. Pressing the UP or DOWN buttons will navigate between "CAL A" and "CAL B" to select which scale is to be programmed. Note: Pressing CANCEL will exit out of Full Scale Adjust Mode and return to Tension Display Mode.

   While in the menu system, pressing CANCEL at any time will return the unit to Tension Display Mode.

2. After selecting the desired CAL (A or B) for which you want to program the scale, press and hold the ADJUST key for 2 seconds to enter the Scale Select Menu. The currently saved scale value will be displayed or the default value of 100 will be displayed if no prior value has been programmed. The UP and DOWN buttons can be used to cycle through the standard scale values (listed under Specifications). If a non-standard custom scale value is desired, scroll up past 8000 until "non" (for non-standard) is displayed and press and hold the ADJUST key for 2 seconds. This will take you to the Non-Standard Scale Select Menu where the UP and DOWN buttons can be used to select any tension scale value from 1 to 8000. If it is desired to return to the Standard Scale Select Menu, scroll up past 8000 until "Std" (for standard) is displayed and press and hold the ADJUST button for 2 seconds.

   While in either the Standard or Non-Standard Scale Select Menu, the UP or DOWN buttons can be held down to automatically scroll through scale values. When the UP or DOWN button is continuously held for 5 seconds after the automatic scrolling has begun in the Non-Standard Scale Select Menu, the speed of the scrolling will increase. When held for another 5 seconds after this, the speed of the scrolling will increase once again until the button is released.

3. Once the desired full scale value has been navigated to with the UP and DOWN buttons, press and hold the ADJUST button for 2 seconds. The unit will then save the new full scale value and return to Tension Display Mode. When a new value has been successfully saved the status LED will flash for 2 seconds.

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