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TRANSDUCER DISPLAY MODULE
OPERATOR'S MANUAL

Revision 03/12

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Introduction

The *Transducer Display Module* is designed to provide a quick-read display for strain-gage based load cells and transducers. It provides bridge excitation and signal amplification and calculates loads for display in pounds or Newtons. A shunt resistor is provided for calibration, along with external adjustments for offset, sensitivity and gain. The peak detect feature allows for the temporary storage and recall of maximum and minimum values.

Features

- Precision low drift bridge excitation supply of 10 Volts.
- Powers resistive bridges of 250 Ω and greater.
- Precision, low noise, differential amplifier.
- Externally adjustable gains of 50.02, 99.04, 197.08, 394.7 V/V.
- Amplified signal is at high-level voltage.
- Wide signal bandwidth (20kHz standard).
- Shunt calibration resistance of 100kΩ.
- Peak detect/hold feature

STARTUP GUIDE

Below is a step-by-step guide for the most common uses of the *Transducer Display Module*.

1. Connect the Power and Transducer Bridge cables.
    a. (optional) Connect the AnalogOut to your meter or data acquisition.

2. Power on the unit.

3. With Shunt *OFF* and Display set to *V*, *lb* or *N*, adjust the Offset until the display reads zero.

4. Select the Gain (see *Gain Calculation, p.5*).
    a. After switching gains you may have to turn Shunt *OFF* and re-adjust the Offset.

5. With Shunt *ON* and Display set to *lb* or *N*, adjust Sensitivity until the displayed value matches the listed shunt value. For an Michigan Scientific transducer, this value is listed on transducer Quick Reference Sheet.

    -OR-

    (Not recommended) Using the calculation from the *Transducer Sensitivity with Amplifiers* section of the Quick Reference Sheet, find your transducer's nominal sensitivity. With Display set to *lb/V*, adjust Sensitivity until this value is reached.

6. Turn Shunt *OFF* and use transducer as specified. If using the peak detect feature, push RESET to clear the values that were stored during the shunting and offset adjustment.

GAIN CALCULATION

The LED display will saturate at voltages beyond +/-5V. To choose the gain to maximize the display resolution without saturating, refer to the calculation below.

$$Shunt\_voltage = Shunt\_calibration\_load \times (\frac{Full\_scale\_voltage}{Load\_capacity})$$

Shunt_calibration_load = 100K shunt value from Transducer Calibration Sheet
Full_scale_voltage = 4.5V or less (to allow for some overloading)
Load_capacity = Load capacity of the transducer OR expected full-scale load

Once Shunt_voltage is calculated, turn Display to *V* and Shunt to *ON*. Increase Gain until the displayed voltage is close to Shunt_voltage without going over (or with only going slightly over).

QUICK REFERENCE

Back Panel

Power:

The *TDM* requires 9-18V DC. The standard cable included with the *TDM* allows easy connection to vehicle power or a desktop DC power supply. The fuse size is 5x20mm and is rated to 1 amp.

Pin	Signal
A	Power+
B	Ground

Shunt:

The shunt resistor is invoked via the switch. The shunt resistor value is 100kΩ and is connected between P+ and S+.

Bridge:

The bridge connector is a PT02E10-6S-023 and connects to PT06A-10-6P(SR) or equivalent.

Pin	Signal
A	Power+
B	Signal+
C	Signal-
D	Power-

AnalogOut:

The standard BNC connector outputs the strain signal after amplification and offset adjustment. The voltage range of the AnalogOut is +/-11V and the bandwidth is 20kHz.

Front Panel

Display:

V	Bridge signal in Volts
lb	Bridge signal in Pounds
N	Bridge signal in Newtons
lb/V	Sensitivity in Pounds/Volts

Offset:

The range of the Offset adjustment +/- 1.667V.

Sensitivity:

The range of the Sensitivity adjustment is 0 to 2184 lb/V (0 to 9716 N/V).

Gain:

1x	50.02 V/V
2x	99.04 V/V
4x	197.08 V/V
8x	394.7 V/V

Specification

PARAMETER	SPECIFICATION
BRIDGE EXCITATION	
Type	DC Constant Voltage (Bipolar excitation)
Magnitude	±5.0 V (10 volts total)
Accuracy	0.05%
Temperature Coefficient	0.0005 % / °C (0.00028 % / °F) Max
CALIBRATION	
Shunt Resistance	100k ohm
Shunt Accuracy	0.10%
GAIN	Externally adjustable
Values (V/V)	50.02, 99.04, 197.08, 394.7
Accuracy	±0.50 % typ (±1.00 % max)
Temperature Coefficient	0.0025 % / °C (0.0014 % / °F)
OUTPUT	
Range	±11 V Max
Frequency Response -3dB	20 kHz
POWER REQUIREMENTS	
Voltage @ 25°C	9-18 VDC
Current	350 mA max
ENVIRONMENT	
Specification & Operation	-40 to +85 °C (-40 to +185 °F)
MECHANICAL	
Weight	1 lb 3 oz.
Length	6.25 in
Height	2.625 in
Width	4.1875 in

PEAK DETECT

- The peak detect features are operated by the switches on the left side of the TDM unit. The three-position rocker switch selects whether the TDM is displaying the MAX stored value (forward position), MIN stored value (back position) or live data (middle position).

- Peak values are not stored permanently and will be reset if the TDM is powered off.

- Peak detect is always running while the TDM is powered on. The RESET button sets MAX and MIN to the current value.

- When viewing MAX or MIN, the display switch can be used to view the peak values in Volts, Pounds or Newtons. The peak values are stored as volts, so if the Sensitivity is changed, the peak values will change as well if being viewed as Pounds or Newtons.
  - Example: MAX(volts) = 2V, Sensitivity = 100 lbs/V → MAX(pounds) = 200 lbs
    MAX(volts) = 2V, Sensitivity = 150 lbs/V → MAX(pounds) = 300 lbs

- Adjusting the Offset or Gain will not change the peak values unless the adjustment moves the current value outside the bounds of the stored peaks.
  - Example 1: MAX = 100mV, MIN = -100mV, Current value = 0V
    50mV offset added → MAX = 100mV, MIN = -100mV
    150mV offset added → MAX = **150mV**, MIN = -100mV
  - Example 2: MAX = 3V, Gain = 1x, Current value = 1V
    Gain changed to 2x → Current value = 2V, MAX = 3V
    Gain changed to 4x → Current value = 4V, MAX = **4V**

Always set the Gain, Offset, and Sensitivity and do the shunt calibration first, then press RESET to clear the peak values that were stored during adjustment.