Installation Manual

Linear Displacement Transducers

TDMTPAA

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Introduction

The TDMTPAA is an accurate programmable, auto-tuning, noncontact, linear displacement transducer in an economical, low profile package. The transducer utilizes our field proven Magnetostrictive technology to give absolute position, repeatable to 0.001% of the programmable sensing distance. The streamlined anodized aluminum extrusion houses the sensing element and electronics. The magnet moves over the sensing element that determines the position and converts it to an analog output. The transducer can be ordered with 0 to 10 VDC or 4 to 20 mA output. All units are provided with a standard 5 pin 12mm Euro Micro connector.

Units can be ordered in span lengths up to 72 inches long in 1 inch increments. The optional slide magnet is designed to move effortlessly along the transducer in guide tracks, or the standard floating magnet assembly can be positioned up to 1/4" above the unit. A variety of hardware is available for attaching the magnet slide to the moving portion of the process.

The TDMTPAA has a few truly unique features. One feature is the LDT's auto-tuning capability, the ability to sense a magnet other than the standard slide magnet and adjust its signal strength accordingly. Another optional feature is that the analog output is programmable over the entire active stroke length. The active stroke area of the LDT lies between the Null and Dead zones.

The TDMTPAA LDT offers a unique diagnostic capability. The normal analog output indicates the position of the magnet within the programmed Span. If the magnet moves beyond the programmed Zero & Span positions, the analog output will be either 3.9mA or 20.1mA for current models and -.1VDC or 10.1VDC for voltage output models. If there is a loss of magnet, the output will be 3.8mA on current units and 10.2VDC on voltage units.

Mounting

The transducer can be mounted vertically or horizontally using the supplied TDMTPAA mounting brackets. The mounting brackets slide in the grooves on the lower part of the extrusion and clamp down when tightened. It is recommended to use one mounting bracket on each end and every three feet between.

Ferro-magnetic material, which is material readily magnetized, should be placed no closer than .25" from the sensing surface of the LDT.

Magnet Assembly

In building the part number you selected the desired magnet assembly and programmability option. Magnet choices were the Floating Magnet or Slide Magnet assemblies. When using the Floating Magnet assembly TDMTPAA, the magnet should be installed within ¼" of the sensing surface. The magnet assembly should also be installed in such a manner that it remains an even distance from the aluminum extrusion throughout the entire stroke. Improperly installed magnets can result in output signal non-linearity, or loss of Magnet signal.

Wiring

Once the LDT has been installed, wiring connections can be made. The TDMTPAA uses an industry standard 5 pin 12mm Euro style cordset with a shield, tied to the coupling nut. To reduce electrical noise, the shield must be properly used. Connect the cable's shield to the controller system Ground. The cable shield is connected at the connector end. Always observe proper grounding techniques and isolate high voltage (i.e. 120/240VAC) from low voltage (24 VDC cables).

Warning: Do not use molded cordsets with LEDs!

It is preferable that the cable between the LDT and the interface device be one continuous run. If you are using a junction box, it is highly recommended that the splice junction box be free of AC and/or DC transient-producing lines. The shield should be carried through the splice and terminated at the interface device end.

NOTE: When grounding the LDT, a single earth ground should be connected to the Power Supply Common (circuit ground). The LDT Power Supply Common should be connected to the Power Supply Common (-) terminal. The LDT power supply (+VDC) should be connected to the power supply positive terminal (+). The LDT cable shield should be tied to earth ground at the power supply. The LDT analog common should not be connected to earth ground and should be used for connection to interface devices only.

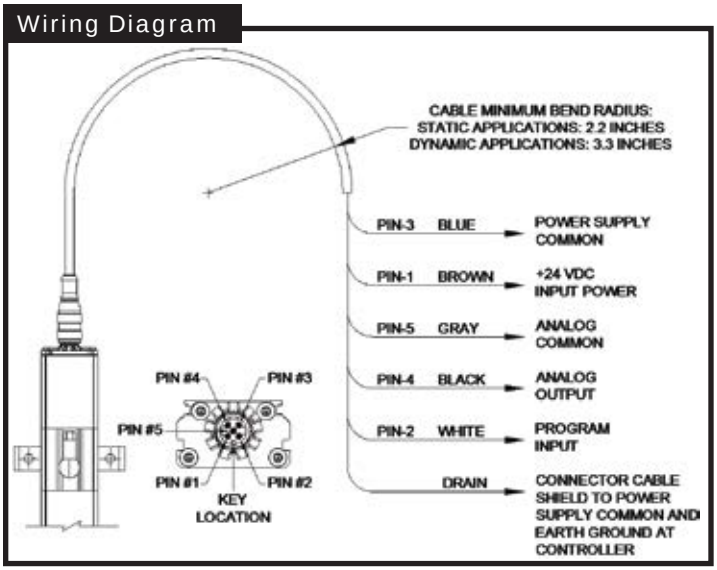
The power supply should be dedicated to the LDT to prevent noise and external loads from affecting it. When powering up more than one LDT on a single power supply, each unit will draw approximately 1.1 watts.

The LDT generates an analog output based on position. The TDMTPAA offers 16-Bits of resolution, and if the optional was ordered, is fully programmable over the entire active stroke length. Keep in mind that there is a 2.75" Null Zone at the connector end of the LDT and a 2.75" Dead Band at the other end of the LDT that the magnet must stay out of at all times. The units come fully programmed from the factory and do not require re-programming unless desired. The analog output is referenced to the analog common terminal and should not be referenced to any of the other common terminals.

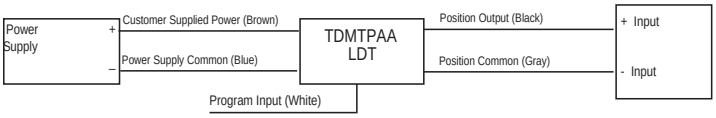
Typical Wiring

There are two common methods for wiring the TDMTPAA to a customer supplied interface device, such as a PLC or panel meter. The two different methods are commonly referred to as Single Ended Input or Differential Input. Differential Input is the preferred wiring method. With the Differential Input, the Analog Common wire is connected to the customer supplied input device and the Power Supply Common is wired separately to the customers supplied power source. When wired using the Differential method, the electrical noise and voltage offset errors produced by the currents running through the Power Supply Common are eliminated. The Power Supply Common and Analog Common are internally connected inside of the TD MTPAA LDT.

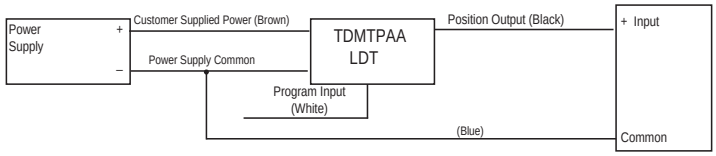
Wiring Diagram



Differential Input



Single Ended Input



Automatic Gain Control

The Automatic Gain Control feature will automatically search and find the magnet on power up. If power is applied without a magnet on the LDT, turn power off and place magnet within the active stroke area. Re-apply power. If using the Floating magnet option, the magnet should be placed within ¼" of the LDT's sensing surface, and must be within the active region of the LDT when power is applied.

Setting ZERO & SPAN

If the programming feature was ordered the TDMTPAA is programmable over the entire active stroke length of the LDT. The unit can easily be changed in the field from a 0 to 10VDC to a 10 to 0VDC or 4 to 20mA to a 20 to 4mA. Keep in mind that there is a 3.03" Null area at the connector end of the LDT and a 2.75" Dead zone at the other end of the LDT that the magnet must stay out of at all times.

The units come fully programmed from the factory and do not require re-programming unless desired. The units are 100% absolute and will not lose programmed parameters on power loss. The Zero and Span points can be programmed in any order and anywhere within the LDT's active sensor area.
NOTE 1: Zero or Span can be adjusted individually without setting the other.
NOTE 2: Zero = 0V on 0-10 VDC units and 4mA on 4-20mA units. There is a timing sequence that is used to unlock the probe for programming. This is to ensure that the Span cannot be accidentally re-programmed by someone in the field.

Before programming the Zero or Span, the program input must be connected to the Power Supply Common for a minimum of 2 seconds and no more than 6 seconds, and then released for 1 second. The LDT programming sequence is now unlocked and will remain an unlocked unit until either the Zero or Span is programmed or the 10 second programming sequence times out. During the unlock mode either the Zero or Span can be programmed by momentarily connecting the Program Input to either the Power Supply Common or Power Supply +. NOTE: The LDT must be unlocked to program the Zero and unlocked again to program the Span. Once either the Zero or Span is programmed, the LDT will go back into the locked mode. To program the Zero or Span, the program input must be connected to the Power Supply Common for 4 seconds, and then released for 1 second. Within the next 5 seconds, you can program either the Zero or the Span by momentarily connecting the Program Input to either the Power Supply Common or Power Supply +VDC. Cap off white wire after programming.

WARNING: During normal operation, electrically insulate the White Program wire to prevent accidental setting of Span.

Manual Setting ZERO & SPAN

To set the Zero and Span position, follow these steps:

1. Apply power to the LDT
2. Place magnet assembly where Zero is to be located, but within the active region of the probe.
3. Short the Program Input pin (white wire) to the Power Supply Common for 4 seconds. Remove the short for 1 second. Within 5 seconds, short the Programming Input pin (white wire) to the Power Supply Common. This completes the Zero programming process.
4. Place magnet assembly where Span is to be located, but within the active region of the probe.
5. Short the Program Input pin (white wire) to the Power Supply Common for 4 seconds. Remove the short for 1 second. Within 5 seconds, short the Programming Input pin (white wire) to the Power Supply +VDC. This completes the programming process. Cap off white wire after programming to prevent accidental shorts.

Optional In-Line Programmer

The PROG-XX is a remote programmer that can help simplify the programming process. The programmer is a portable device that can be temporarily or permanently installed in series with the TDMTPAA LDT.

1. Remove the 5 pin cordset to the LDT.
2. Attach the existing cordset to the programmer.
3. Attach the other end to the LDT.
4. Apply power to the LDT.
5. Place magnet assembly where Zero is to be located, but within the active region of the probe.
6. Push the Zero button for 4 seconds. Release the button for 1 second. Within 5 seconds, push the Zero button again.
7. Place magnet assembly where Span is to be located, but within the active region of the probe.
8. Push the Zero button for 4 seconds. Release the Zero button for 1 second. Within 5 seconds, push the Span button.

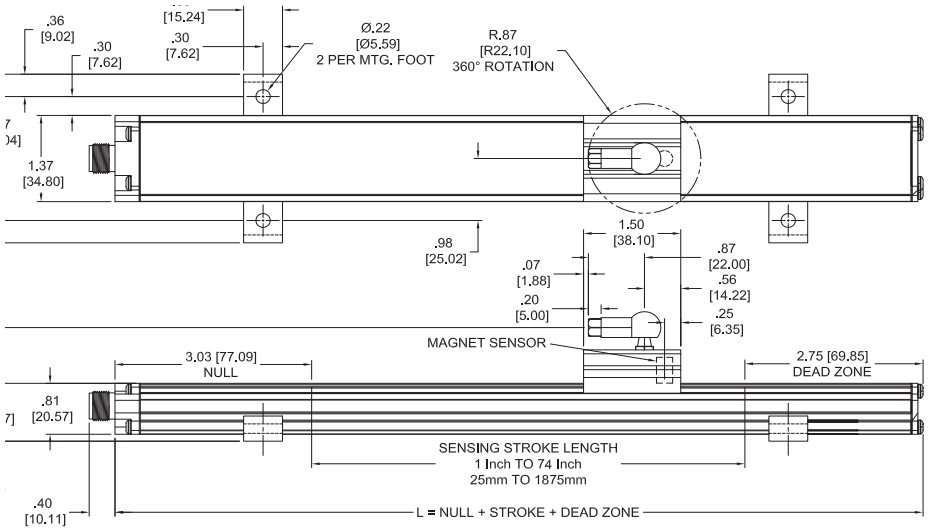
Optional Remote Tester & Programmer

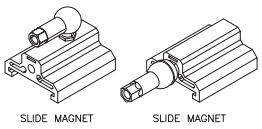
To help simplify the programming process we offer a battery operated remote tester / programmer. It is available in either a voltage or current model. P/N PROG-010 is designed for voltage units while PROG-420 is for current units. These units are typically used to demonstrate the functionality of the LDT in the field; however, they can be used as a handy troubleshooting / programming device.

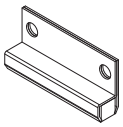
1. Attach the 5 pin Euro connector to the LDT.
2. Push the toggle switch to the ON position to power the LDT.
3. Place magnet assembly where Zero is to be located, but within the active region of the probe.
4. Push the black Zero button for 4 seconds, release for 1 second. Within 5 seconds, push the Zero button again. This completes the Zero programming process.
5. Place magnet assembly where Span is to be located, but within the active region of the probe.
6. Push the black Zero button for 4 seconds, release for 1 second. Within 5 seconds, push the Span button.

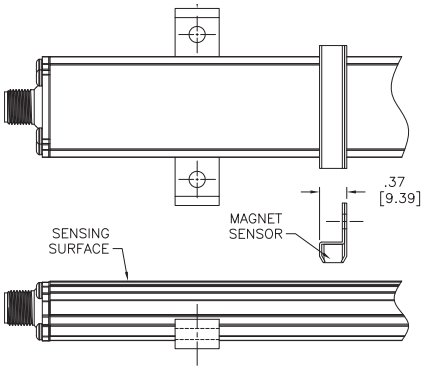
NOTE: This time the Span button is pushed for the final programming step. This completes the programming process.

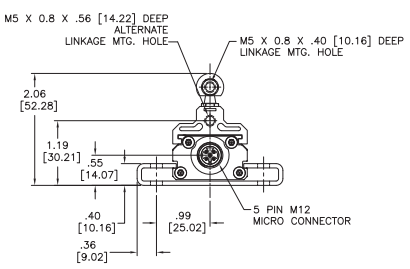
Dimensions

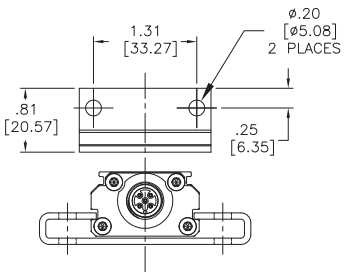












Specifications	
General Specifications	
Connector	5-pin 12mm Euro Micro
Displacement	1” to 72” in 1” Increments
Electrical Specifications	
Input Voltage	24 VDC ±20%
Current Draw	1.1W (44mA typical)
Dead Band	2.75”
Null Zone	2.75”
Non-linearity	less than ± 0.03% of stroke or ± 0.013”, whichever is greater
Repeatability	0.001%
Hysteresis	less than 0.001”
Operating Temperature:	-40ºC to 85ºC
Analog Output Specifications	
Voltage Output Minimum Load Resistance Output Current	2K Ohms Guaranteed 5mA minimum for voltage units
Analog Ripple	1 mV maximum
Current Output Maximum Load Resistance	500 Ohms
Update Time	1ms
Resolution	
Internal	.00006”
Output	16-bit
Output Type	
Voltage Output	0V to 10V, 10V to 0V
Current Output	4mA to 20mA, 20mA to 4mA
Enclosure Rating - IP-67	
Approvals - CE (EMC)	
Note: Specifications are based on a 48” stroke with floating magnet and 1/8” gap.	