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TURCK

EZ-track®
LTX R10 Series Analog Manual

Manual

EZ-track™ Contents

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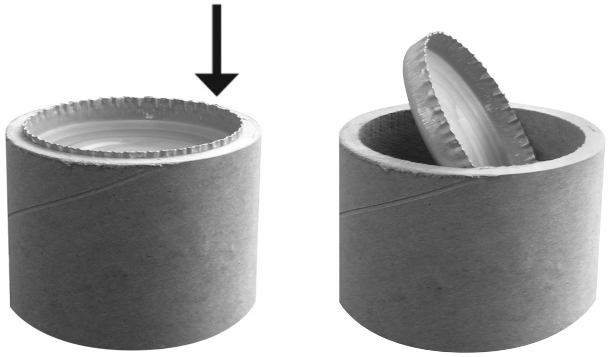
* Refer to Diagnostic LED table on page 15 for a complete list of LED colors and functions.

Note:
Turck has checked the accuracy of this manual at the time it was approved for printing. However, this manual may not provide all possible ways of installing and maintaining the LDT. Any errors found in this manual or additional possibilities to the installation and maintenance of the LDT will be added in subsequent editions. Any comments you may have for the improvement of this manual are welcomed.

Unpacking
Carefully remove the contents of the shipping carton and check each item on the packing slip before destroying the packing materials. Any damage must be reported to the shipping company. If you do not receive all of the parts, contact Turck at 763-553-7300. Most probes are shipped in a Tube. To remove the metal end cap, use a large, flat blade screw driver or a metal rod and tap on the inner edge of the cap until it pivots. Grab the cap and pull it out. Use caution as the edge of the metal cap may be sharp. If you have an RMA warranty claim, pack the probe in a shipping tube or with stiff reinforcement to prevent the probe from being bent in transit.



Chapter 1: LTX R10 Analog Overview

The LTX R10 is a magnetostrictive Linear Displacement Transducer (LDT) for highly accurate continuous machine positioning in a variety of industrial applications.

This sensor is built to withstand the most severe environmental conditions and is completely absolute. This means that power loss will not cause the unit to lose position information or require re-zeroing. The non-contact design allows this device to be used in highly repetitive applications without mechanical wear.

The LTX R10 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 magnet and adjust its signal strength accordingly. Another feature is that the analog output is programmable over the entire active stroke length. The active stroke area lies between the Null Zone and Dead Band.

There is a diagnostic LED located at the connector end of the probe that remains green while a good magnet signal is present and when the magnet is in the programmed stroke area. The LED turns yellow when the magnet is out of the programmed active range, but still within the active stroke area. The LED turns RED if there is a loss of magnet and the output will go to 0 volts on a voltage unit and 3.8mA on current model units.

The LTX R10 LDT with a 4 to 20mA output offers a unique diagnostic capability. The normal 4 to 20mA output indicates the position of the magnet within the programmed span. If the position of the magnet is outside the set span, the output is either 3.9mA or 20.1mA. If the magnet moves into the Null or Dead Zones or there is a loss of magnet the output will be 3.8mA. This feature is only available on units with a current output. On voltage units the voltage output will be 0 volts below the programmed zero point and 10volts above the programmed Span.

All units can easily be changed in the field from a 0-10VDC to a 10-0VDC or a 4-20mA to a 20-4mA.

Note:
The part number on the LDT is a record of the characteristics that make up your specific unit. For a translation of the part number, see section 3.5: Part Number Key.

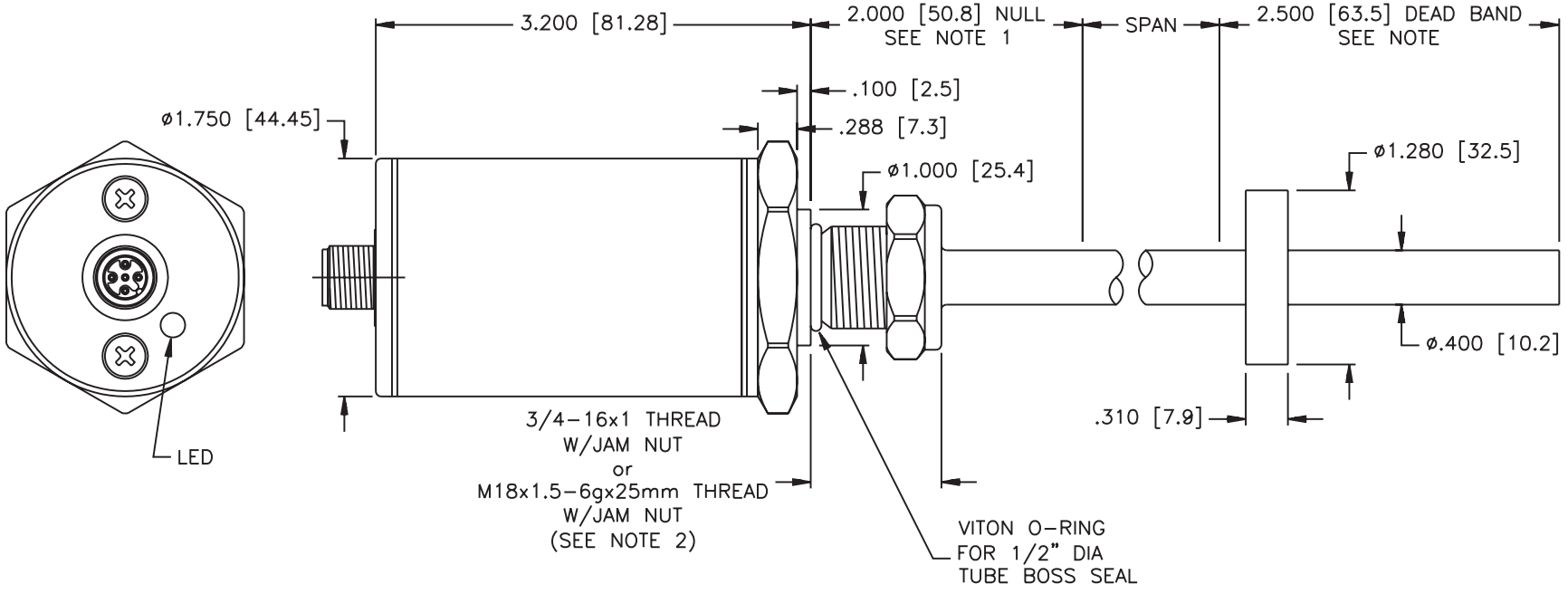
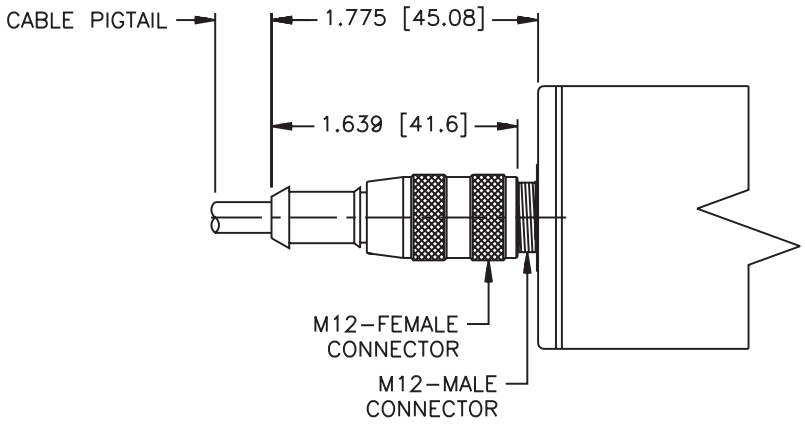
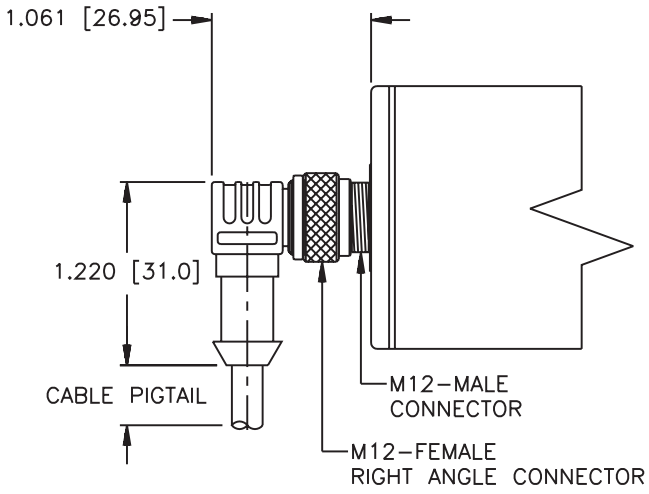


Figure 1-1 LTX R10 Analog Dimension Drawing

NOTES: UNLESS OTHERWISE SPECIFIED

1. DRAWING SHOWS STANDARD NULL & DEAD BAND. IF A NON-STANDARD NULL OR DEAD BAND IS SPECIFIED THESE DIMENSIONS MUST BE ADJUSTED ACCORDINGLY.
2. FOR ENGLISH THREAD TYPE, RAISED FACE FEATURE COMPLIES WITH SAE J1926-1.





Chapter 2: Installing the EZ-track

Before installing the LDT, the following should be considered:

- If a mounting bracket is used that is made of ferromagnetic material (a material readily magnetized), it should be placed no closer than 0.25" from the LDT's rod end.
- To minimize the effects of magnetic flux distortion (which could cause an inaccurate measurement of the magnet's position), ferromagnetic material should not be placed closer than 0.25" from the magnet.
- Non-ferrous materials, such as brass, copper, aluminum, non-magnetic stainless steel, or plastics, can be in direct contact with the magnet assembly and rod end without producing any adverse results.

2.1: Installing the EZ-track to a Mounting Bracket
Parts discussed in this section can be found in Figures 1-1 and 2-1.

1. Unscrew the EZ-track's jam nut from the threads protruding from the hex mounting base.
2. Insert the EZ-track's rod end into the mounting bracket's hole. The mounting bracket may contain a 3/4-16 UNF-2B threaded hole. In this case, screw the EZ-track into this hole using the threads protruding from the hex mounting base.
3. Once the EZ-track is in place, screw the jam nut back onto the threads of the hex mounting base. Use the 1.75" hex mounting base on the head assembly to tighten the EZ-track to the bracket.

NOTE:
Do not use the black aluminum cover of the head assembly to tighten the EZ-track within the bracket (see Figure 2-1). This may damage the EZ-track and will void your warranty. To tighten the EZ-track within the bracket, use the 1.75" hex mounting base on the head assembly.

If the length of the EZ-track's rod end is less than 30", skip to the sub-section: Mounting the Magnet Assembly.

Installing Support Brackets
It is recommended that a support bracket be used with EZ-tracks having a rod 30-71 inches in length. Supporting the end of the rod will minimize operational errors and protect against damage due to shock and vibration. If the length of the EZ-track's rod is 72" or longer, it is recommended that additional support brackets be used. These additional support brackets must be made of a non-ferrous material. Because these additional support brackets will interfere with the magnet's movement, a special split-type magnet assembly must be used. To order a split magnet (P/N SPM-AL-R10) and support brackets (P/N MB-R10), contact the factory at 800-544-7769.
To install a support bracket for an EZ-track having a rod 30-71 inches in length, perform step 4a. If the rod is longer than 71", perform step 4b.

4a. If the support bracket is made of a ferromagnetic material (material readily magnetized), install the support bracket no closer than 0.25" from where the EZ-track's dead band ends and the area of stroke begins. Continue to the sub-section: Mounting the Magnet Assembly.

To install two or more support brackets for a EZ-track having a rod 72" or longer in length, perform the following steps:

4b. Install support brackets at increments of 48" throughout the EZ-track's rod. Support brackets placed within the Null Zone and area of stroke or closer than 0.25" to the beginning of these areas must be made of a non-ferrous material.

Mounting the Magnet Assembly
Before mounting the magnet assembly, the following should be considered:

- Ferromagnetic material should not be placed closer than 0.25" from the EZ-track's magnet assembly or rod end. Failure to do so could cause erratic operations.
- Minimal clearance between the EZ-track's rod and the magnet assembly through the full stroke is required. Stress between the magnet and the rod can cause flexing of the mounting brackets. This may result in non-linearity.
- EZ-tracks using a split magnet assembly must keep the diameter of the magnet assembly around the rod throughout the complete stroke. The diameter of this magnet assembly should not be more than 0.2" away from the rod. Split magnet assemblies outside of this range will cause signal loss.

To install the magnet assembly, perform the following steps:

1. Slide the magnet assembly over the EZ-track rod.
2. Mount the magnet to the non-ferrous, movable portion of the device being controlled using non-ferrous screws.

2.2: Installing the EZ-track in a Hydraulic Cylinder
Before installing an EZ-track in a hydraulic cylinder, note the following considerations. Items discussed in this section are found in Figures 1-1 and 2-2.

- A non-ferrous spacer must be used to separate the magnet assembly from the head of the piston rod. See Figure 2-2.
- The magnet should not be closer than 2.0" from the base of the EZ-track's hex head when the piston rod is fully retracted. In instances where space restraints exist, it may be required to countersink the magnet into the piston rod. Two magnets are available for mounting to the piston: the standard 1.29" in diameter (P/N STM-AL-R10) four-hole magnet and the 1.0" magnet (P/N CM-R10) designed exclusively for countersunk mounting applications. The 1.0" magnet must be secured with a snap ring.
- An O-ring is provided at the base of the EZ-track's mounting hex for pressure sealing. The O-ring seal was designed to meet MIL-STD-MS33656. Refer to SAE J514 or SAE J1926/1 for machinging of mating surfaces.

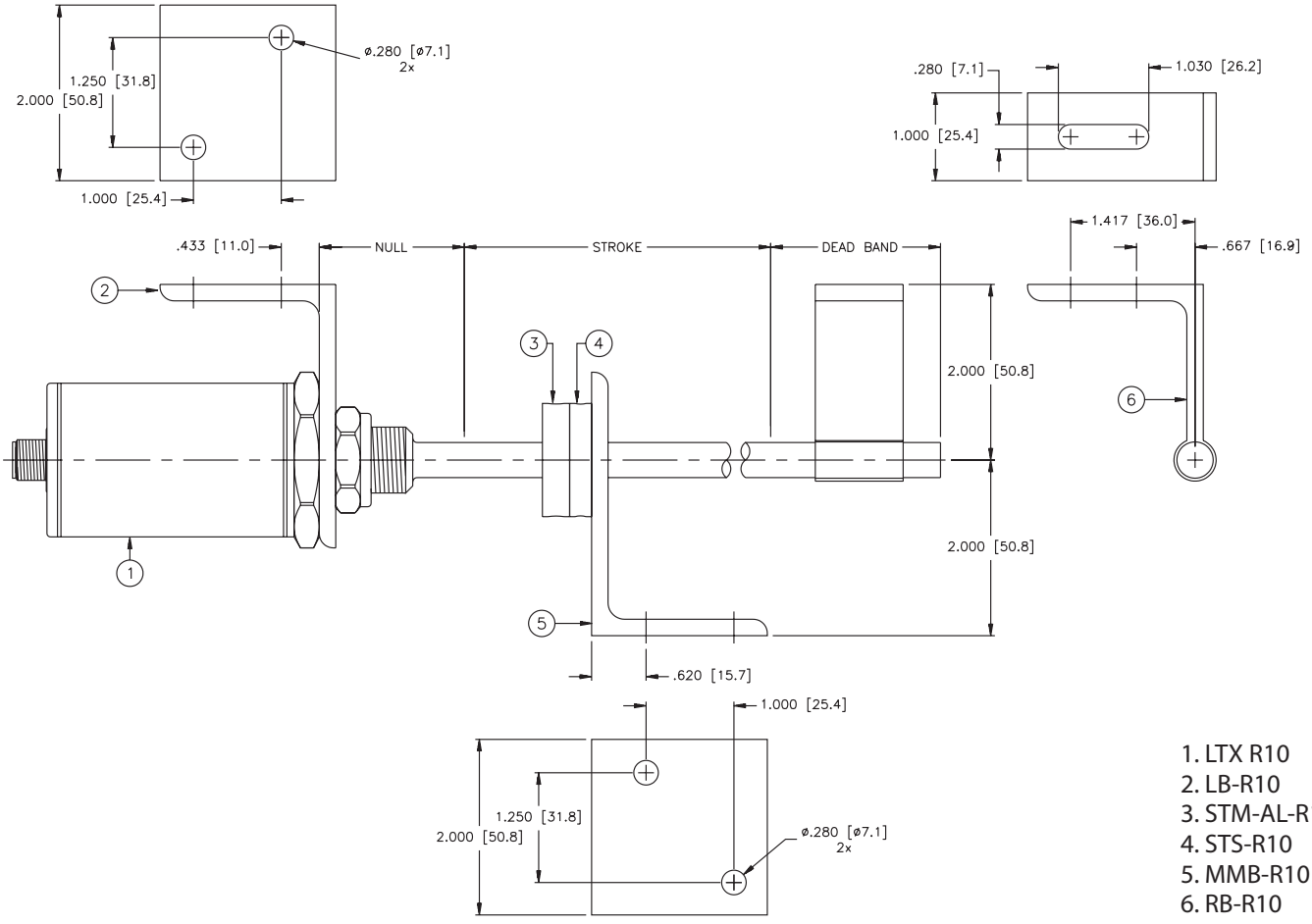


Figure 2-1: Mounting the EZ-track

- A chamfered rod bushing in front of the magnet may be required. It is recommended that a chamfered rod bushing be used with EZ-tracks having a rod 60.0" or longer. This bushing will prevent wear on the magnet assembly (wear occurs as the piston retracts from extended lengths). This rod bushing should be manufactured from a hight wear polymer, such as PTFE.
- It is recommended the bore for the cylinder piston rod have an inside diameter of at least 0.50". The EZ-track rod has an outside diameter of 0.405". Use standard practices for machining and mounting these components. Consult the cylinder manufacturer for details on applicable SAE or military specifications.

It may be necessary to perform machining and mounting operations on the hydraulic cylinder before installing the EZ-track. Consult the information and specifications provided by the cylinder manufacturer before beginning the following steps:

1. Unscrew the EZ-track's jam nut from the threads protruding from the hex mounting base.
2. Position the non-ferrous spacer against the piston face, followed by the magnet, and then the chamfered rod bushing if the EZ-track's rod is 60.0" or longer in length.
3. Insert non-ferrous screws through the chamfered rod bushing (if used), magnet, and non-ferrous spacer. Secure items by tightening screws.

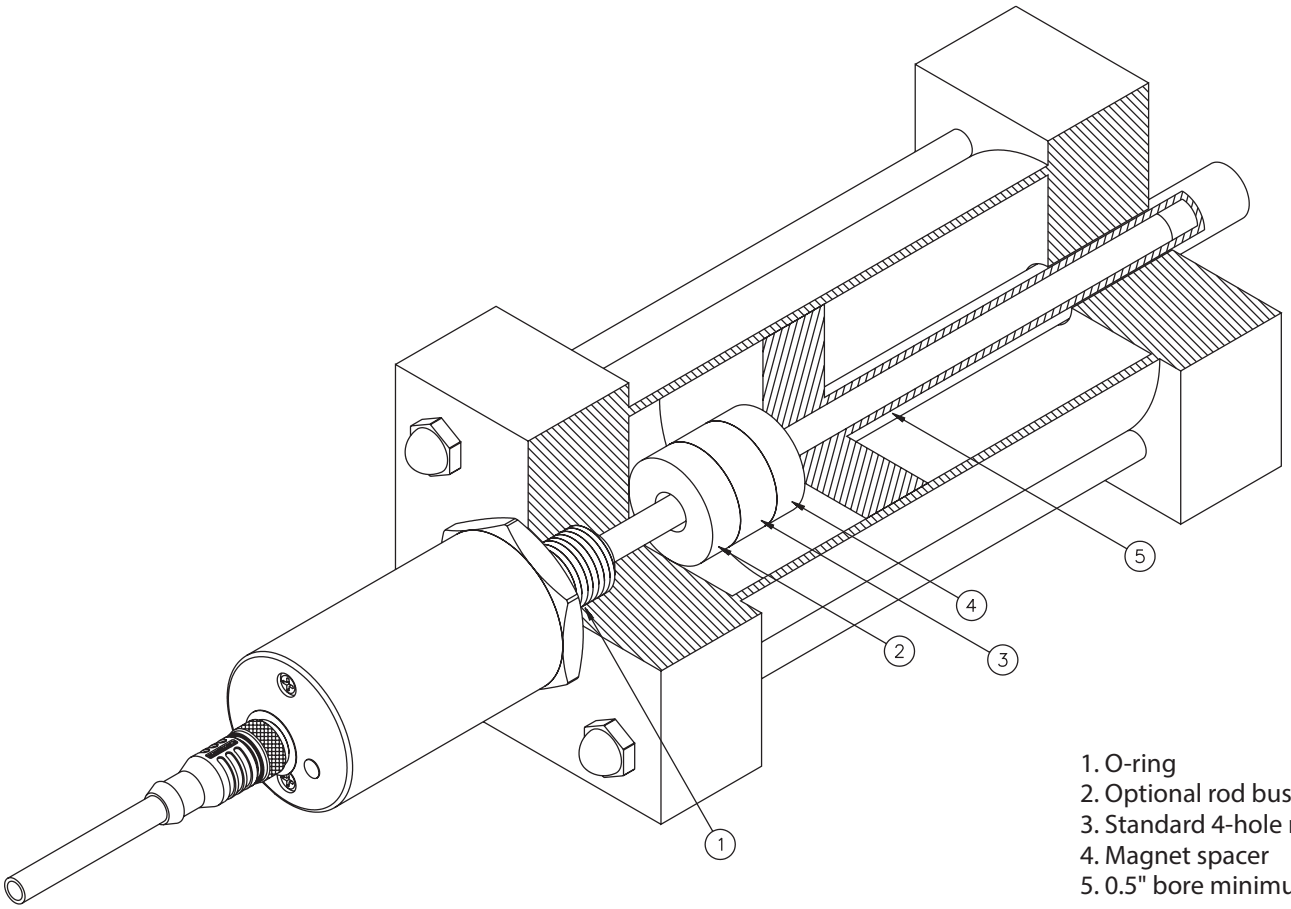
If the leading edge of the magnet will come closer than 2.0" from the base of the EZ-track's hex head when the piston rod is fully retracted, it will be necessary to counter bore the magnet assembly into the piston rod. Both the standard 1.29" four-hole magnet assembly (P/N STM-AL-R10) and the 1.0" magnet assembly (P/N CM-R10) are designed for counter bored mounting applications. If it has a 1.0" magnet assembly, a snap ring will be needed to hold it in place.

4. Insert the EZ-track's rod into the hole of the hydraulic cylinder's mounting bracket.

The protective plug may need to be removed from the hydraulic cylinder before inserting the EZ-track. The end cap should contain a 3/4-16 UNF-2B threaded hole (M18 x 1.5 for metric units). Screw the EZ-track into this hole using the threads protruding from the EZ-track's hex mounting base.

WARNING:
Do not use the black aluminum cover of the head assembly to tighten the EZ-track within the bracket (see Figure 2-1). This may damage the EZ-track and will void your warranty. To tighten the EZ-track within the bracket, use the 1.75" hex mounting base on the head assembly.

With the EZ-track properly installed inside the hydraulic cylinder, it may be necessary to assemble parts of the hydraulic cylinder. For assistance in this task, refer to the information provided by the cylinder manufacturer.



1. O-ring
2. Optional rod bushing
3. Standard 4-hole magnet
4. Magnet spacer
5. 0.5" bore minimum

Figure 2-2: Mounting EZ-track in a Hydraulic Cylinder

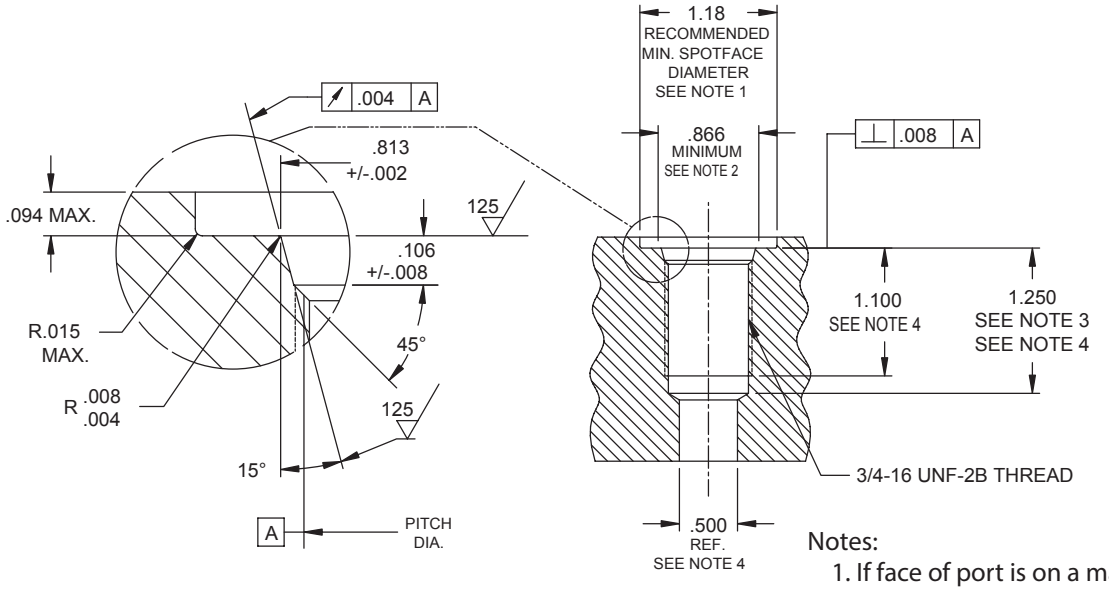


Figure 2-3: Port Detail (SAE J1926/1)

Notes:

1. If face of port is on a machined surface, dimensions 1.180 and .094 need not apply as long as R.008/.0004 is maintained to avoid damage to the o-ring during assembly.
2. Measure perpendicularity to A at this diameter.
3. This dimension applies when tap drill cannot pass through entire boss.
4. This dimension does not conform to SAE J1926-1.

Chapter 3: Wiring

3.1 Wiring Connections

Once the EZ-track has been installed, wiring connections can be made. There are two groups of connections you will need to make. They are as follows:

- Power Supply Connections (including ground and shield)
- EZ-track Input/Output Connections

The RKC 4.5T-*/S618 is an industry standard 5-pin M12 ***eurofast®*** cordset with a shield. To reduce electrical noise, the shield must be properly used. Connect the cable's shield to the controller system GND. The cable shield is NOT connected at the transducer rod. Always observe proper grounding techniques such as single point grounding and isolating high voltage (i.e. 120/240 VAC) from low voltage (7-30 VDC cables).

Diagnostic LED	
LED Color	Description
None	No power to LDT
Green	Magnet signal detected and within programmed range
Yellow	Magnet signal detected, but magnet is outside of programmed range. **Note:** Magnet can be programmed in this range if desired
Red	No magnet signal detected. Make sure magnet is on the rod and within the active area. Move magnet back into the range and cycle power

WARNING:
Do not use molded cordsets with LEDs.

It is preferable that the cable between the EZ-track 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 EZ-track, a single earth ground should be connected to the Power Supply Common (circuit ground). The EZ-track Power Supply Common should be connected to the Power Supply Common (-) terminal. The EZ-track power supply (+VDC) should be connected to the power supply positive terminal (+).
The EZ-track cable shield should be tied to earth ground at the power supply. The EZ-track analog common should not be connected to earth ground and should be used for connection to interface devices only. For assistance, refer to your EZ-track's wiring drawing in this chapter.

In order for the LTX to operate properly, the external power supply must provide a voltage between 7-30 VDC. The power supply must be rated at one watt minimum. The power supply should provide less than 1% ripple with 10% regulation.

WARNING:
Do not route the LTX cable near high voltage sources.

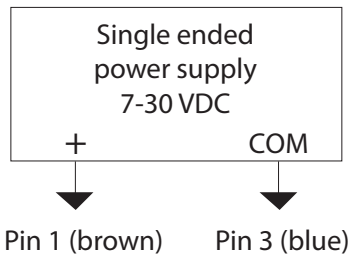


Figure 3-1: Power Supply Wiring

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

3.1.1: LU (Voltage)

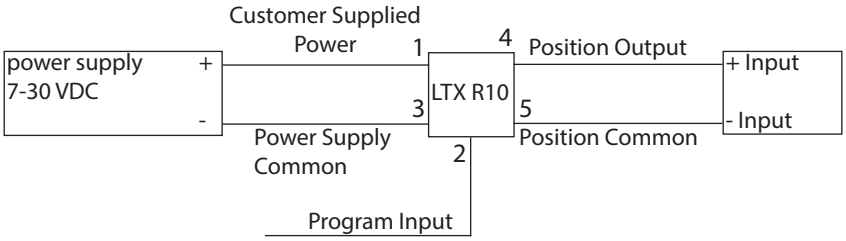
The EZ-track generates a voltage output based on position. The LTX R10 offers 16 Bits of resolution, and is fully programmable over the entire active stroke length. Keep in mind that there is a 2" Null Zone at the connector end of the EZ-track and a 2.5" Dead Band at the other end of the EZ-track that 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.

3.1.2: LI (Current)

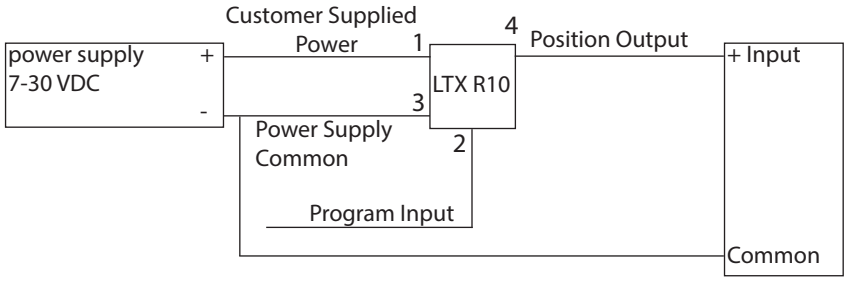
The EZ-track generates a current output based on position. The LTX R10 offers 16 Bits of resolution, and is fully programmable over the entire active stroke length of the EZ-track. Keep in mind that there is a 2" Null Zone at the connector end of the EZ-track and a 2.5" Dead Band at the other end of the EZ-track 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.

Typical Wiring
Figure 3-2 shows two common methods for wiring the LTX 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 Position 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 Position Common are internally connected inside of the R10 LTX.



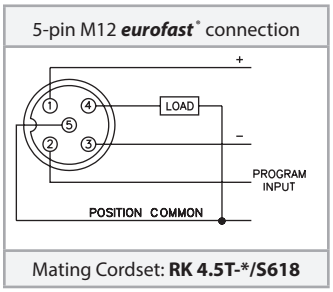
Differential Input (preferred wiring)



Single Ended Input (alternative wiring)

Figure 3-2: Current Sourcing

Wiring Diagram:
R10 Analog



1. = Brown
2. = White
3. = Blue
4. = Black
5. = Gray

The LTX R10 is current sourcing which allows the current to flow from the EZ-track into the users equipment.

3.2: Features

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 EZ-track, the LED will turn RED indicating no magnet signal is detected. Turn power off and place magnet within the active stroke area. Re-apply power.

Diagnostic LED	
LED Color	Description
None	No power to EZ-track
Green	Magnet signal detected and within programmed range.
Yellow	Magnet signal detected, but magnet is outside of programmed range. NOTE: Magnet can be programmed in this range if desired.
Red	No magnet signal detected. Make sure magnet is on the rod and within the active area. Move magnet back into the range and cycle power.

3.3: Setting Zero & Span Position

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 EZ-track's active sensor area.

Note:
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, then released for 1 second. The LTX 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 +VDC.

Note:
The EZ-track must be unlocked to program the Zero and unlocked again to program the Span. Once either the Zero or Span is programmed the EZ-track 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, 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.

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

Manual Setting of Zero & Span
To set the Zero and Span position, follow these steps:

1. Apply power to the EZ-track.
2. Place magnet assembly where Zero is to be located, but within the active region of the probe.
3. Short the Program Input pin to the Power Supply Common for 4 seconds. Remove the short for 1 second. Within 5 seconds, short the Programming Input pin 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 to the Power Supply Common for 4 seconds. Remove the short for 1 second. Within 5 seconds, short the Programming Input pin to the Power Supply +VDC.

This completes the programming process.

Optional Remote Tester & Programmer

The battery operated remote tester / programmer is available in either a voltage or current model. P/N TB2-LDT is designed for voltage units while TB2-LDT-LI is for current units. These units are typically used to demonstrate the functionality of the Ez-track in the field, however, they can be used as a handy troubleshooting / programming device.

1. Attach the 5 pin ***eurofast®*** connector to the LTX R10.
2. Push the On switch to the ON position to power the Ez-track.
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.

Optional In-Line Programmer

The RP-Q21 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 LTX.

1. Remove the 5 pin cordset to the Ez-track.
2. Attach the existing cordset to the RP-Q21 programmer.
3. Attach the other end to the Ez-track.
4. Apply power to the Ez-track.
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.

3.4 Specifications

General Specifications	
Rod End	316 Stainless Steel, 0.405" (10.29 mm) outer diameter
Mounting Hex	316 Stainless Steel, 1.75" (44.45 mm) across flats, IP68
Mounting Threads	3/4" (19.05 mm) x 16 x 1.00" (25.4 mm) with ESNA jam nut and O-ring seal. Optional M18x1.5 Metric threads
Head Assembly	Thick wall aluminum cover with Viton O-ring standard, gasket seal at the base and connector exit, IP68 IEC 600529, stainless steel cover optional
Head Enclosure	3.2" (81.3 mm) long with 1.75" (44.45 mm) diameter.
Connector	5 pin M12 ***eurofast®***
Displacement	1" to 300"
Dead Band	2.50" (63.5 mm) standard (cannot be less than 2.25")
Null Zone	2.00" (50.8 mm) standard (cannot be less than 1.5")
Linearity	Less than +/- 0.01% or +/- 0.005", whichever is greater. (+/- 0.002" typical)
Repeatability	Equal to Resolution
Hysteresis	0.001"
Operating Temperature Head (Electronics) Guide Tube	 -40° to 185° F (-40° to 85° C) -40° to 221° F (-40° to 105° C)
Storage Temperature	-40° to 221° F (-40° to 105° C)
Operating Pressure	3,000 psi constant, 8,000 psi spike
Guide Tube Pressure	5,000 psi constant, 10,000 psi spike
Shock & Vibration Shock Vibration	 1,000 Gs (lab tested) IEC 60068-2-27 30 Gs (lab tested) IEC 60068-2-6
Zero & Span Adjustability	Factory set at Null Zone & Dead Band locations. Field re-settable at any location within active stroke
Approvals	CE, 89/336/EEC (EMC)

Electrical Specifications	
Input Voltage	7-30 VDC
Current Draw	One watt, 40mA at 24 VDC typical
Specifications are subject to change and based on a typical 48" stroke length	

Analog Specifications				
Temperature Drift Position Output	 3.1 ppm/° F/" of stroke 3.1 ppm/° F for Voltage output 9.2 ppm/° F for Current output			
Analog Output Loading	Voltage output minimum load resistance: 2K ohms Current output: Guaranteed 5 mA minimum for voltage units Maximum load resistance: 500 ohms			
Analog Ripple	<1 mV maximum (position output)			
Update Time	Stroke Length L ≤ 2″ 2″ < L ≤ 12″ 12″ < L ≤ 30″ 30″ < L ≤ 50″ 50″ < L ≤ 100″	Update Time 0.5 ms 1 ms 2 ms 3 ms 4 ms	Stroke Length 100″ < L ≤ 150″ 150″ < L ≤ 180″ 180″ < L ≤ 250″ 250″ < L ≤ 300″	Update Time 5 ms 6 ms 7 ms 8 ms
Resolution Internal Output	 0.00006" (1.524 microns) 16-Bit			
Position Output	0-10 VDC, 16 Bits (65,535) resolution 4-20mA, 16 Bits (65,535) resolution			

3.5 Part number key: Analog R10 rod style series

Part Number Key: LTX Analog R10 Rod Style Series

A	B	C		D		E	F	G		H
LTX	12	E	-	R10	-	LI	0	X3	-	H1151

A	Type
LTX	Linear Transducer

B	Measuring Span
*	Length of Measuring Span

C	Units of Measurement
E	Inches
M	Millimeters

D	Housing Size, Material
R10	10 mm Rod, Aluminum
ER10	10 mm Rod, Stainless Steel

E	Output Configuration
LI	Current
LU	Voltage

F	Output Type	
	Current	Voltage
0	4-20 mA	0 to 10 V
1	20-4 mA	10 to 0 V
2		-10 to 10 V
3		10 to -10 V
4		0 to 5 V
5		5 to 0 V
6		-5 to 5 V
7		5 to -5 V

G	Number of LEDs
X3	3 Diagnostic LEDs

H	Type of Connection
H1151	5-pin M12 ***eurofast***® Connector

NOTE: Contact our Application Support at 1-800-544-7769 for custom configurations.

Accessories

Standard 4-Hole Magnet - AI	STM-AL-R10
Standard 4-Hole Magnet - SS	STM-SS-R10
Standard Magnet Spacer	STS-R10
Split Magnet - AI	SPM-AL-R10
Split Magnet - SS	SPM-SS-R10
Split Magnet Spacer	SPS-R10
Cylinder Magnet	CM-R10
Mounting Bracket Kit	MB-R10

Rod Support Bracket	RB-R10
Magnet Mount Bracket	MMB-R10
Egg Shape Float - SS	EF-R10
Miniature Float - SS	MF-R10
2 meter Cable, Straight Cordset	RK-4.5T-2/S618
4 meter Cable, Straight Cordset	RK-4.5T-4/S618
2 meter Cable, Right Angle Cordset	WK-4.5T-2/S618
4 meter Cable, Right Angle Cordset	WK-4.5T-4/S618

Appendix A: Troubleshooting

A Tri-color LED is conveniently located next to the connector to help with set-up and diagnostics.

Diagnostic LED			
LED Color	Description	LI output value	LU output value
None	No power to EZ-track		
Green	Magnet signal detected and within programmed range.	Analog value between 4-20 mA	Analog value between 0-10 Volt
Yellow	Magnet signal detected, but magnet is outside of programmed range.	3.9 mA or 20.1mA	locked at 0 Volt or locked at 10 Volt
Red	No magnet detected or magnet is located in the null or dead band. Make sure magnet is on the rod and within the active area. Reposition the magnet within the programmed span and cycle power.	3.8mA	0 Volt

If a problem exists after reading this section, please contact our application support department.

General Checks
Make sure that the magnet is located within the EZ-track's active stroke area. Keep in mind that the EZ-track is programmable over the entire active stroke area. Captive magnet assemblies should be positioned so that they can move freely over the entire area of the active stroke without binding or pushing on the rod end. Non-captive magnet assemblies should be situated so that the magnet is no farther than 0.2" from the rod at any point in the magnet assembly's movement.

Note:
Ferromagnetic material (material readily magnetized) should be located no closer than 0.25" from the magnet or EZ-track rod end. This includes mounting brackets, magnet spacers, magnet brackets, and mounting screws. Ferromagnetic material can distort the magnetic field, causing adverse operation or even failure of the EZ-track.

Check all EZ-track wires for continuity and/or shorts. It is preferred that the cable between the EZ-track 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.

Power Supply Checks
This section will help you to determine if your power supply is adequate for the EZ-track to operate properly, or if the EZ-track's cable has a short or open.

In order for the LTX R10 to operate properly, the external power supply must provide a level between 7-30 VDC. A power supply providing voltage above this specified range may damage the EZ-track. A power supply providing power below this specified range will not be sufficient to power the EZ-track. When powering more than one LTX R10 on a single power supply, remember that each unit requires approximately one watt of power. The amount of current draw will vary based on the input voltage used. To calculate the current draw for a particular EZ-track, divide the EZ-track wattage by the input voltage. For example, 1 watt divided by 24 VDC equals 41.6 mA.

If the EZ-track is not operating properly, the EZ-track's cable may have an open or short, or the power supply is not supplying sufficient power. To verify this:

1. Turn the power supply off.
2. Remove the mating connector from the EZ-track.
3. Turn the power supply on.
4. Using a digital voltmeter, check across Power Supply Common and customer supplied power (+VDC) on the mating end of the cable for a level between 7 and 30 VDC

Appendix A: Troubleshooting

5.Turn the power supply off.

6. Check the continuity of the individual wires of the cable between the power supply and the EZ-track. Check for continuity from one end of the cable to the other. Also, verify that no shorts exist between pins.

7. Reconnect the mating connector to the EZ-track.

8. Turn power supply on.

9. Using a digital voltmeter, check the power supply's"+" and"-" terminals for a voltage between 7 and 30 VDC.

Low voltage readings may indicate a power supply with a wattage (current) rating that is too low. (Each EZ-track requires approximately 1 watt). If the cabling checks out in step 6 and your voltage is below 7 VDC, check your power supply current rating. If voltage is between 7 to 30 VDC and the EZ-track is still inoperative, contact factory.

* See Section 3.4 page 13: Specifications for more information on power consumption.

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