Series 955QD

Gemco Brik™ with Qudrature Output

Linear Displacement Transducer

Installation, Programming and Maintenance Manual

The Brik
Series 955QD

A Linear Displacement Transducer

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Preface

This manual is divided into three parts. Part 1 provides the hardware overview for the 955QD Linear Displacement Transducers (LDT). Part 2 provides instructions for installing the LDT's to a mounting bracket. Part 3 provides an overview and wiring instructions for the 955QD Quadrature Output LDT. To further assist you, a glossary is provided at the back of the manual.

⚠ **Disconnect Power Before Servicing. The Gemco 955QD LDT Contains No Serviceable Components. Consult Factory for Repair or Replacement.**

Version 1.0

AMETEK Automation & Process Technologies has checked the accuaracy 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.

Contents

Chapter 1: Hardware Overview

The Series 955QD Brik with Quadrature Output is an accurate, auto-tuning, non-contact, linear displacement transducer in an economical, low profile package. The transducer utilizes our field proven magnetostrictive technology to give absolute position, repeatable to .01% 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 incremental outputs.

The 955QD has a truly unique feature. The 955QD LDT has auto-tuning capability, the ability to sense a magnet other than the standard slide magnet and adjust its signal strength accordingly. See chapter 3.5 (Features).

There is an indicator LED that is located at the connector end of the probe and provides visual status information regarding the operation of the probe. Green indicates proper or normal operation. Red indicates the loss of the magnetic signal or a probe failure. The LED flashes yellow/red or yellow/green when it is in the AGC (Automatic Gain Control) mode. This is a special setup mode used to calibrate the probe for the magnetic field of the magnet in the floating magnet assembly or ring magnet of a cylinder. When the probe is in the normal mode of operation, the LED with remain illuminated continuously.

Green: **Magnet is present and within the active programmed range.**

Red: **Fault, the LDT has lost its signal from the magnet or the magnet has moved into the Null or Dead zone.**

Yellow: **Used when setting ACG, yellow appears in short bursts combined with either red or green when in the AGC mode**

NOTE: The series number on your LDT is a record of all the specific characteristics that make up your unit. This includes what interface type it is, its output signal and range, the type of connector the unit uses, and stroke length. For a translation of the model number, see Section 3.8: Catalog Numbering System.

The 955QD Brik with Quadrature Output is a linear displacement transducer. It provides an A quad B digital output signal that is proportional to the position of the slide magnet assembly along the length of the probe. The quadrature output makes it possible to have a direct interface to virtually any incremental encoder input or counter card, eliminating costly absolute encoder converters and special PLC interface modules.

The 955QD Brik with Quadrature Output LDT can be ordered with 1 to 9999 cycles per inch of output resolution. The transducer features an input to re-zero the probe “on the fly”. Another unique feature is the “Burst” mode; an input on the transducer triggers a data transfer of all the incremental position data relative to the transducer’s absolute zero position. This is how incremental can provide absolute functionality. The “Burst” input can be used to achieve absolute position updates when power is restored to the system or anytime an update is needed to re-zero or home the machine without having to move the machine.

1.1: Dimension Drawing for 955QD LDT

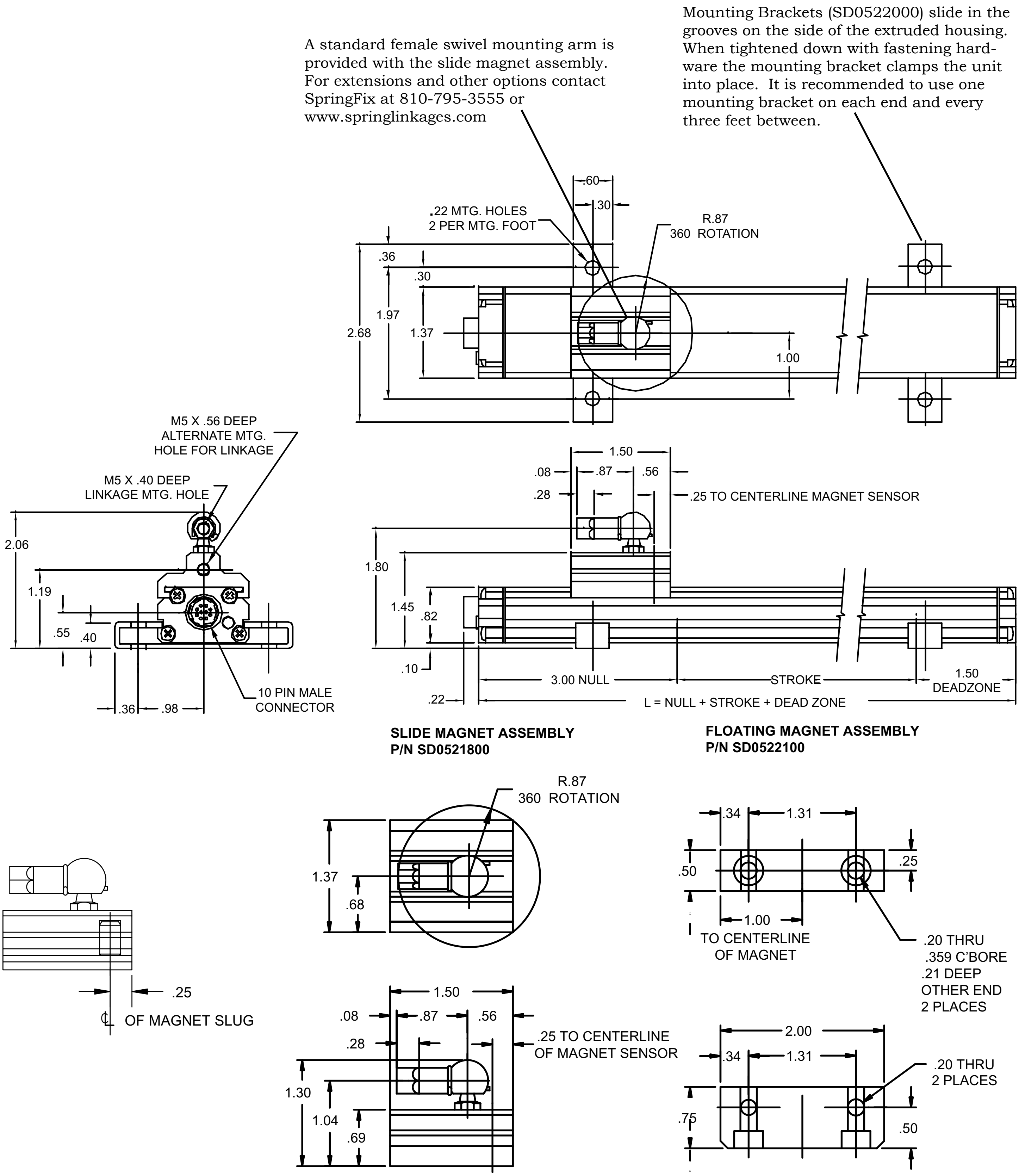


Figure 1-1: The Brik with Quadrature Output LDT
Drawing D0245400

Chapter 2: Installing the LDT

Mounting Instructions

The Series 955QD can be mounted vertically or horizontally using SD0522000 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 in between.

Ferro-magnetic material, (material readily magnetized) should be placed no closer than .25” from the sensing surface of the LDT.

Mounting the Magnet Assembly

Before mounting the magnet assembly, you should consider the following:

- Ferromagnetic material should not be placed closer that 0.25” from the LDT’s sensing surface. Failure to do so could cause erratic operation. Non-ferrous materials, such as brass, copper, aluminum, non-magnetic stainless steel or plastics, can be in direct contact with the magnet assembly and sensing surface without producing any adverse results.

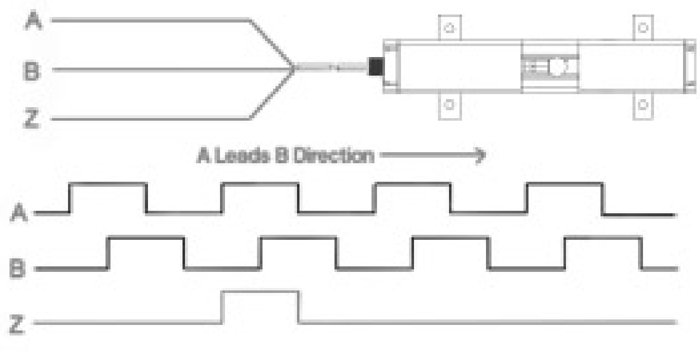
- Minimal clearance between the LDT’s sensing surface and the magnet assembly through the full stroke is required. Stress between the magnet and the rod can cause flexing of the extrusion. This may appear as non-linearity of the LDT’s output.

- When using the Floating Magnet assembly (SD0522100), the magnet should be installed within 3/8” 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.

Chapter 3: 955QD Overview

3.1: Quadrature Output

A new method of interfacing magnetostrictive transducers offers customers an interface as common as analog with the speed and accuracy of pulsed type signaling. The Gemco 955QD LDT provides quadrature output directly from the transducer to the controller (see drawing below). The output from the transducer can be wired directly to any incremental encoder input card, without the need for a special converter module or PLC interface card designed specifically for use with a pulse output magnetostrictive transducer.



The quadrature output provides absolute position data in engineering units. This means that the need for the calibration constant (wire speed) programming has been removed, thereby eliminating the possibility of having an improperly calibrated system. The output signal wires are driven by differential line drivers, similar to the drivers used in most magnetostrictive pulse type transducers, providing a high degree of noise immunity.

A unique feature of this transducer is a "burst" mode of operation. An input on the transducer triggers a data transfer of all the incremental position data relative to the transducer's absolute zero position. This can be used to achieve absolute position updates when power is restored to the system or anytime an update is needed to re-zero or home the machine. Additionally, another input to the transducer can be used to establish a "zero" position for the transducer.

3.2: Signal Connection Application Note

Overview

This application note will attempt to clarify the input and output signals of the 955QD quadrature probe.

Inputs

The quadrature probe has two inputs, the "zero" and "burst" inputs. These inputs are "single ended". That is, the connection for each input consists of only one wire, the corresponding signal wire. For these (single ended) inputs, the signal is measured with reference to the power supply ground, which is sometimes referred to as "common".

The quadrature probe is available with either +24VDC level signal thresholds or TTL level thresholds. The signal voltage level required to activate the input for the +24 VDC level signal is proportional to the power supply voltage that the customer is supplying to the probe. This level is approximately 41% of the power supply voltage. For example, if the power supply voltage powering the probe is exactly 24VDC, the threshold voltage would be approximately 9.84 volts.

The TTL level threshold signals are activated when these inputs exceed the typical TTL level threshold, which is 2.0VDC.

Additionally, for the 24VDC level signals, the customer can specify either a “sourcing” or “sinking” type of input. A “sourcing” input type is pulled high internal to the probe. To activate a “sourcing” input, the customer must pull the signal lower than the threshold voltage to activate the input. A “sourcing” input is usually driven by a “sinking” output or a switch connected to ground. A “sinking” input type is pulled low internal to the probe. To activate a “sinking” input, the customer must pull the signal higher than the threshold voltage to activate the input. A “sinking” input is usually driven by a “sourcing” output or a switch connected to the power supply.

It is important that the customer drive the signal levels much greater or lower than the threshold voltages. Asserting a signal with a voltage level close to the threshold voltage could induce multiple activations of that input (or none at all) and therefore produce unexpected results or probe readings.

Outputs

The quadrature probe has three outputs, the “A”, “B” and “Z” outputs. These outputs are “differential” (also known as “balanced”). That is, the connection for each output consists of two signal wires. These are typically described as the “+” and “-” signals. For example, the “A” channel consists of “A+” and “A-”. The same applies to the B and Z channels. For these (differential) outputs, the signal is measured with reference to the other signal (i.e. the difference or differential). For example; if the “A+” signal voltage is greater than the “A-” signal, channel “A” is a logic “1”. Conversely, if the “A+” signal voltage is lower than the “A-” signal, channel “A” is a logic “0”. Again, this applies to the B and Z channels as well. Differential type signals are much less prone to interference caused by electrical noise or ground loops more often found in single ended signal connections.

The differential outputs of the A, B and Z channels are at RS-422 signal levels on option D (output drivers) units. RS-422 is a well known TIA/EIA standard and common interface type for incremental encoders. The RS-422 receiver channel (on the PLC or controller side of the connection) typically has what is referred to as a termination resistor connected across the “+” and “-” signal pins. The value of the termination resistor is (by RS-422 specifications) typically 100 ohms. However, some receivers will work with greater resistance values and some with no termination resistor at all. For proper signal integrity, especially at higher data rates (i.e. quadrature pulse frequency), a termination resistor of no greater than 1Kohm is recommended.

Driving Single Ended Inputs

A differential output can also be used to drive single ended inputs. Special consideration must be given to these types of applications. It should be noted the main signal requirements for an RS-422 signal is the differential voltage of the “+” relative to the “-” signals and not necessarily the voltage level of any one of these signals with respect to ground (or common). To meet the RS-422 specification, this differential voltage only needs to be +/- 0.2 volts. However, an RS-422 driver will typically drive either the “+” or “-” signal to around 3.8 volts with respect to ground. This voltage is more than sufficient to drive TTL level inputs as well as other low level inputs. The input voltage level specifications of the PLC or controller being used should be consulted for the actual level required.

When using PLS’s or controllers that are not TTL compatible output driver option “L” should be used. Option “L” uses a 0L7272 line driver I.C. The output from this driver will be 1 volt less than the LDT’s input power.

When physically connecting a differential output to a single ended input, only use the “+” signal, leaving the “-” signal unconnected. **Do NOT connect the “-” signals to ground.** The “A+, “B+” and “Z+” signals should be connected to their corresponding inputs. Insulate and tie back the “-” signals. See figure 3-5, Single Ended Interface.

3.3: Quadrature Output Resolution and Speed

The internal resolution of the 955QD Gemco LDT is 0.001". This would be represented to the encoder input device by specifying an output resolution of 1,000 cycles per inch for the transducer. Although the typical resolution is 1,000 cycles per inch (CPI), the transducer can be ordered with virtually any CPI setting.

For a typical rotary type shaft encoder with incremental quadrature output, the output frequency of the pulses is governed by the resolution of the encoder (pulses per turn) and the rotational speed (RPM) of the encoder. The output pulses rate from the LDT transducer is fixed and is controlled internally and can be specified by the customer. The output frequency must be specified so that it does not exceed the maximum pulse rate of the encoder input card the sensor is connected to. The output pulse frequency range can be ordered from 10KHz to 1MHz.

3.4: 955QD Wiring Connections

Once the LDT 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 grounding and shielding)
- LDT Input/Output Connections

Power Supply/Ground Connections

The 955QD Brik standard cable is Alpha 6334, a multi-conductor cable. 10 conductors of 24ga, with an aluminum/polyester/aluminum foil with drain wire plus an overall braid of tinned copper shield. Cable O.D. is .270. 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 end. Always observe proper grounding techniques such as single point grounding and isolating high voltage (i.e. 120/240 VAC) from low voltage (10 - 30 VDC cables). Whenever possible, this cable should be run in conduit by itself.

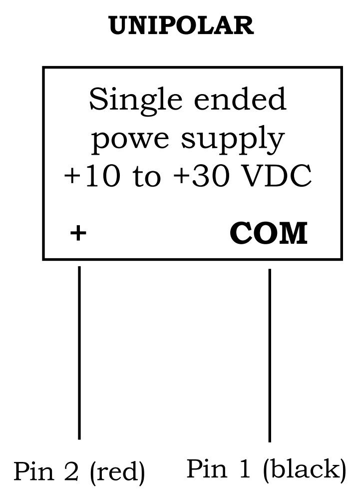
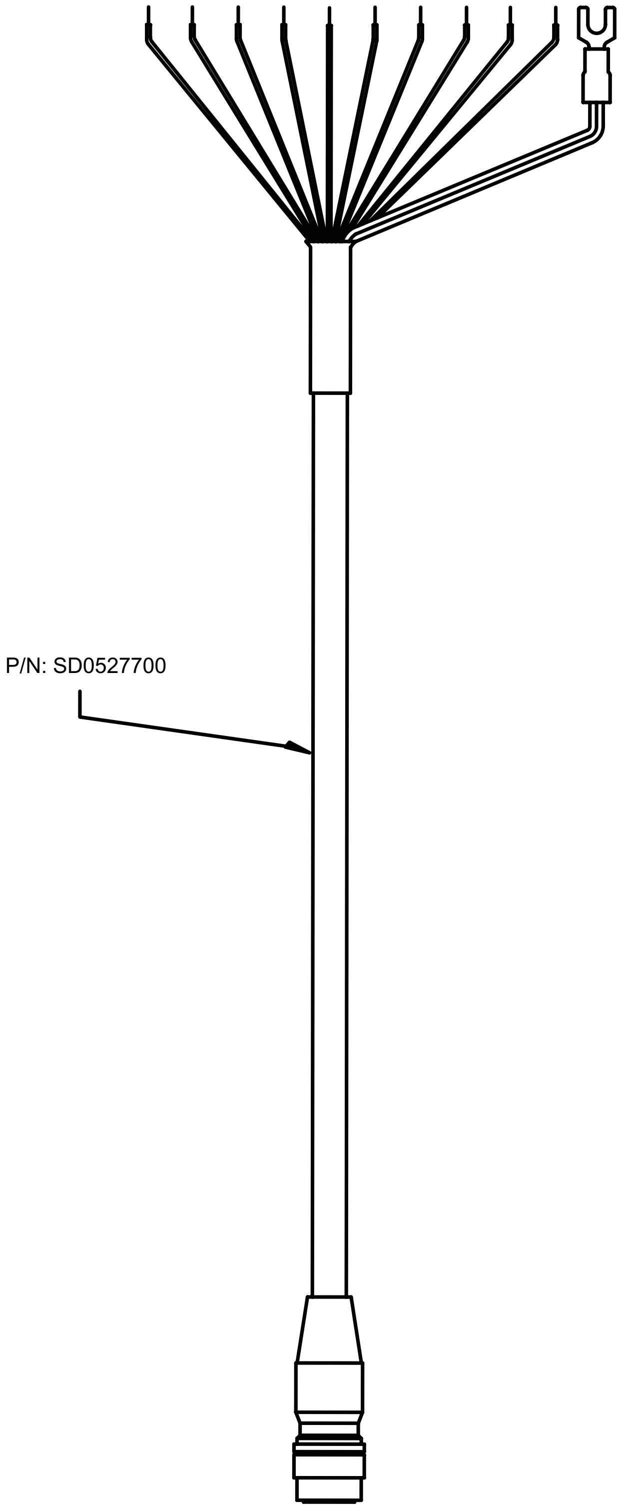
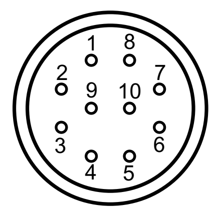


Figure 3-1: Power Supply Wiring

WARNING: Do not route the Brik with Quadrature Output cable near high voltage sources.



CONNECTOR PLUG - EXPLODED VIEW



10 PIN CONNECTOR
(AS VIEWED AT
SOLDER SIDE
4X SIZE

CABLE WIRE COLOR	CONN. PIN DESIG.
BLACK	1
RED	2
GREEN	3
BROWN	4
BLUE	5
ORANGE	6
YELLOW	7
WHITE	8
VIOLET	9
GRAY	10

Figure 3-2: Power Supply Wiring

Series 955QD Wiring Diagram

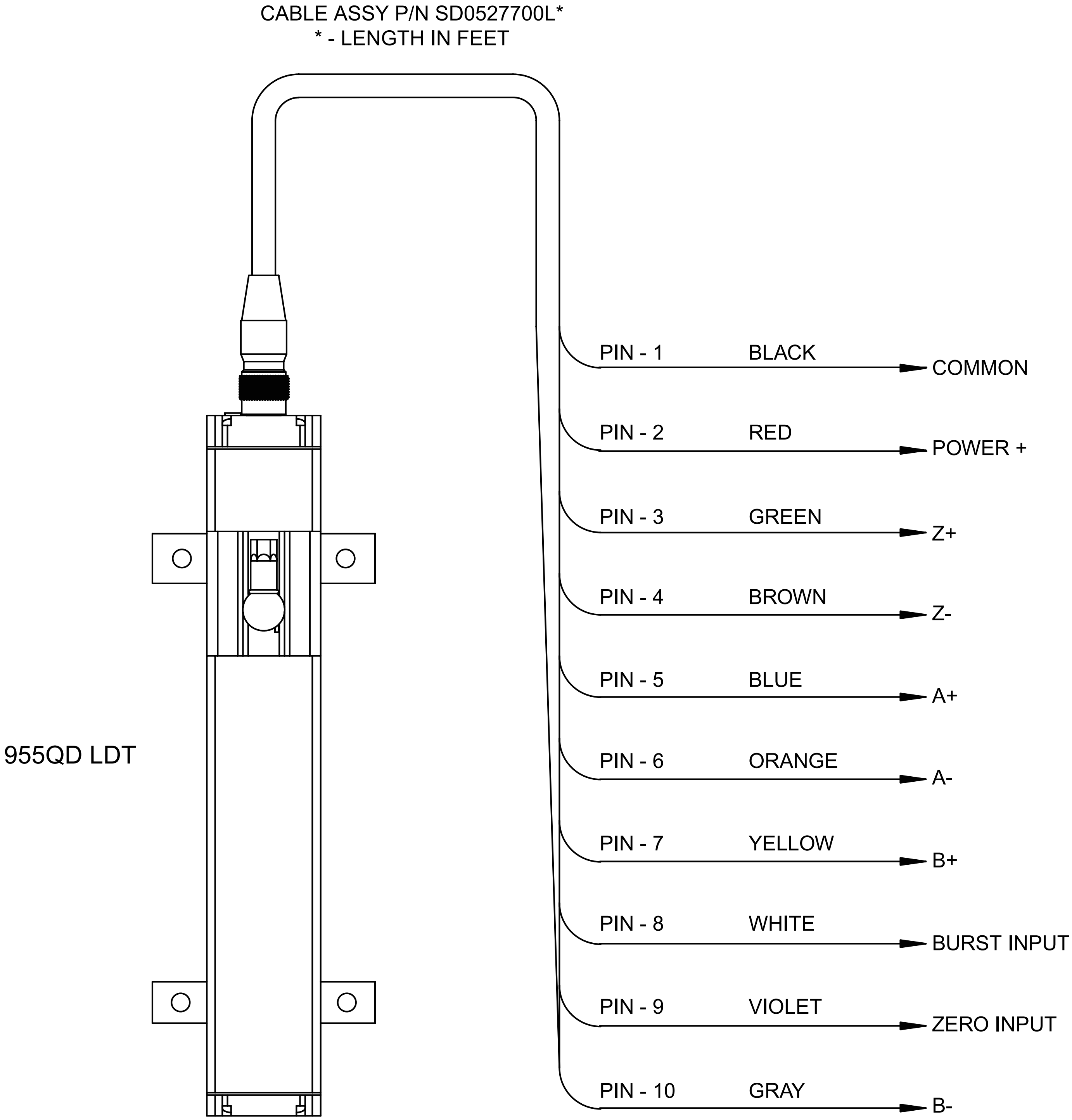
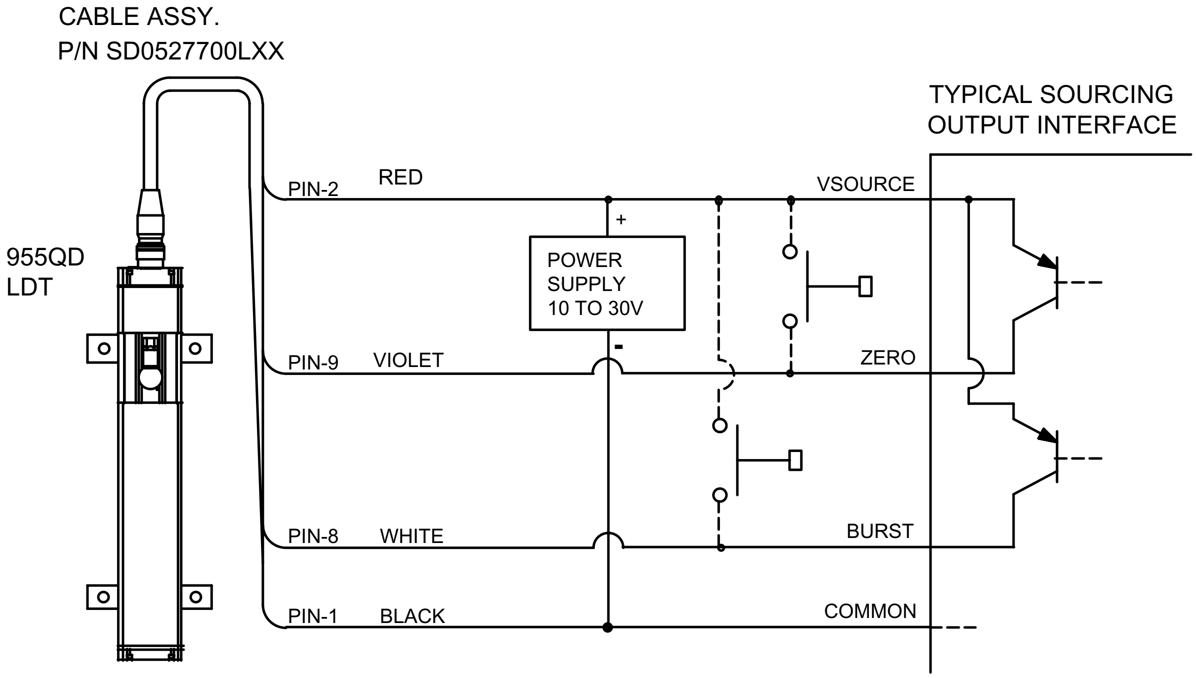
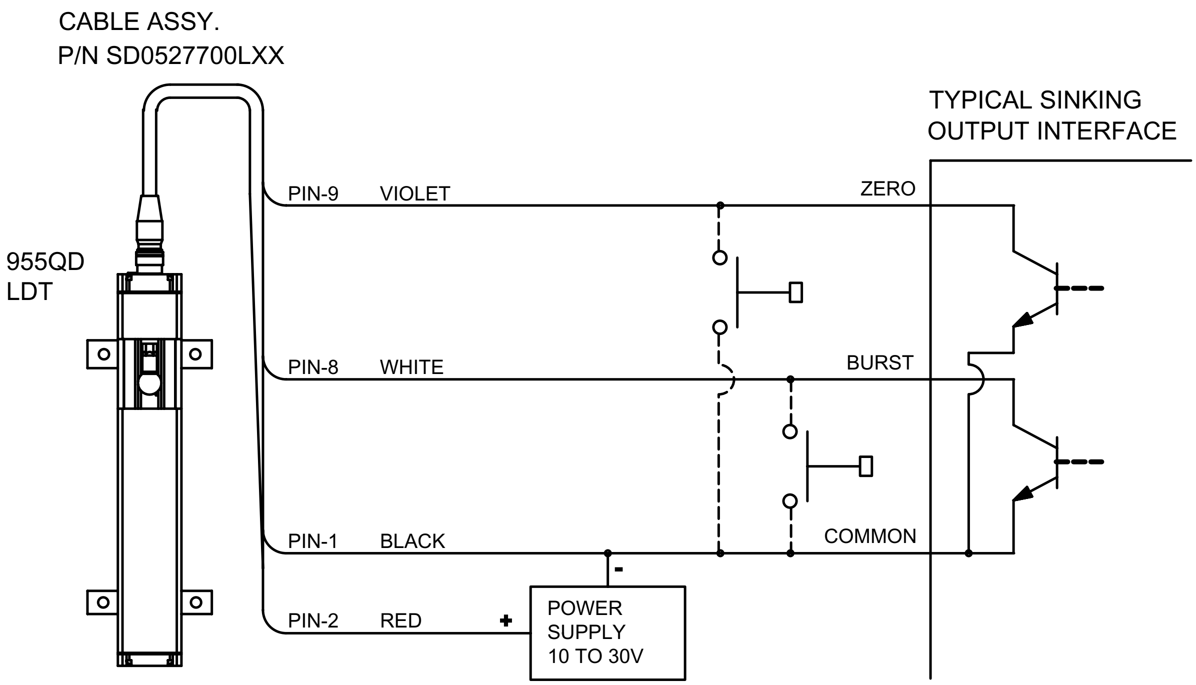


Figure 3-3: Wiring Diagram
Drawing E0238500

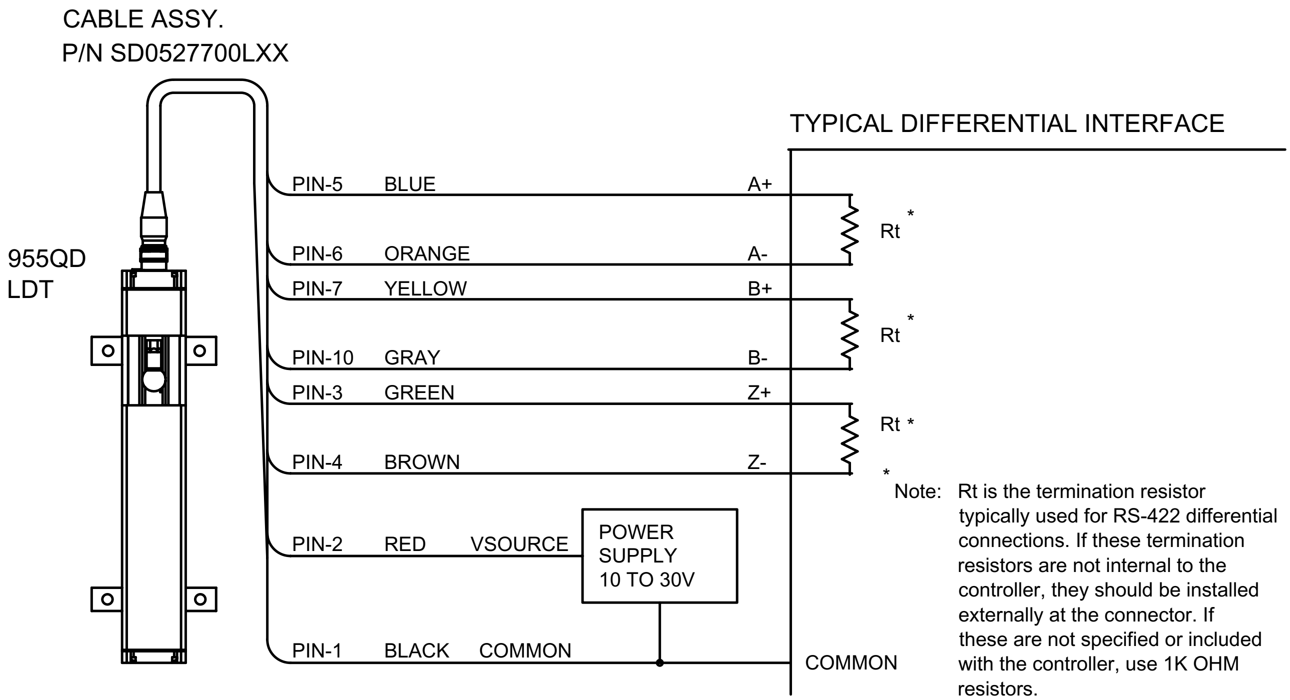


INPUT CONNECTION FOR 955QD LDT WITH SINKING INPUT

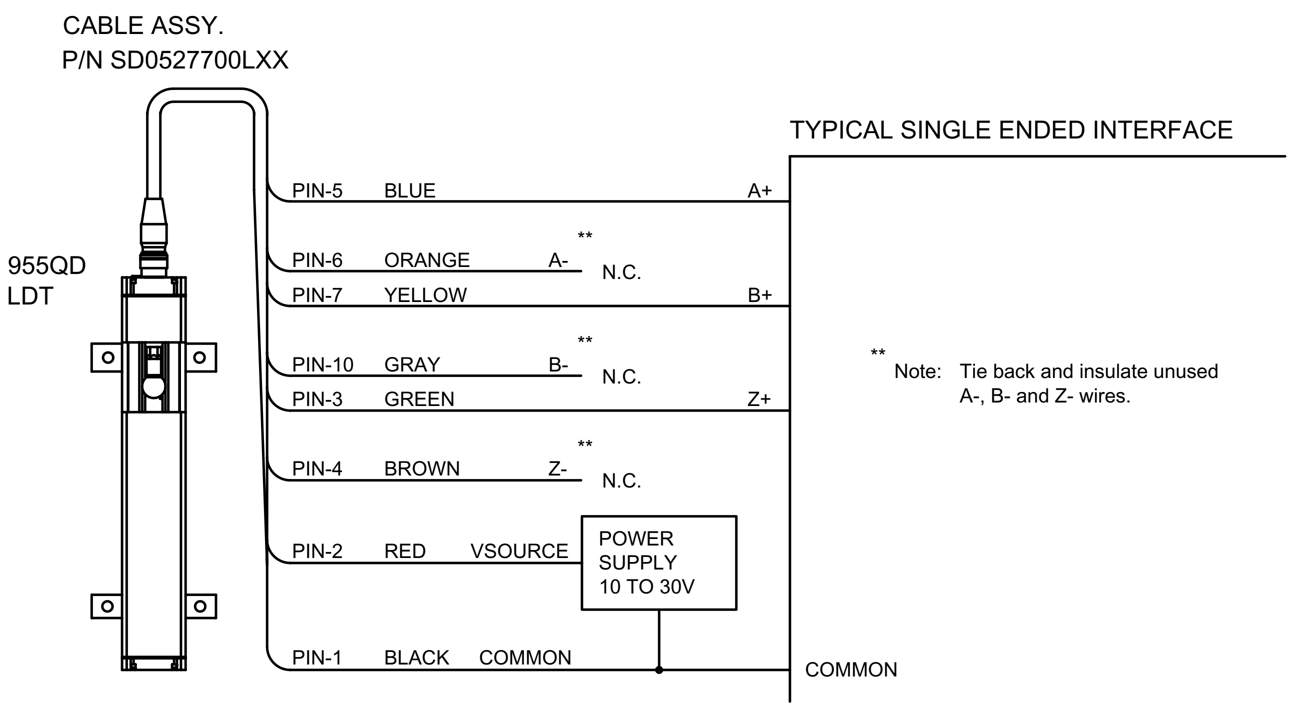


INPUT CONNECTION FOR 955QD LDT WITH SOURCING INPUT

Figure 3-4: Input Signal Connections for 955 Quadrature LDT
Drawing E0238400



OUTPUT CONNECTION FOR 955QD LDT WITH DIFFERENTIAL INTERFACE



OUTPUT CONNECTION FOR A 955QD LDT WITH SINGLE ENDED INTERFACE

Figure 3-5: Output Signal Connections for 955 Quadrature LDT
Drawing E0238300

3.5: Features

Automatic Gain Control

The Automatic Gain Control feature is only used when sensing a magnet other than the standard SD0521800 slide magnet. If you are using the standard slide magnet, skip this operation.

When using the Floating Magnet assembly (SD0522100), the magnet should be installed within 3/8" 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.

To set the Automatic Gain Control (AGC) level for the probe follow these steps.

NOTE: Before starting, it is important to determine the input type of the LDT in question. On input type "E" or "T"" take input pins 8 and 9 to pin 2 (Input Power). On input type "C" take input pins 8 and 9 to pin 1 (common).

1. Place magnet assembly close to the dead zone (but within the active region) of the probe.

NOTE: The north pole of the magnet should always be pointed towards the probe.

2. Power down the probe.

3. Short "BURST IN" (pin 8) and "ZERO INPUT" (Pin 9) to ground (Pin 1) for input type "C" or to input power (pin 2) for input type "E" or "T".
   A. Apply power to the probe, the LED flashes Yellow and Red for one second
   B. The LED will change from flashing yellow and red to flashing yellow and green once it has found the magnet.

NOTE: If the LED never changes to flashing yellow and green; the magnet signal is too weak. Remove power from the LDT and move the magnet closer.

NOTE: When the probe is in AGC mode, the output will be inactive.

The AGC is now complete.

To place the probe back into the normal operating mode follow these steps:

1. Power down the probe

2. Remove "BURST IN" pin (Pin 8) and "ZERO INPUT" pin (Pin 9) from power or ground.

3. Apply power to the probe.

The probe is now in the normal operating mode.

LED Colors

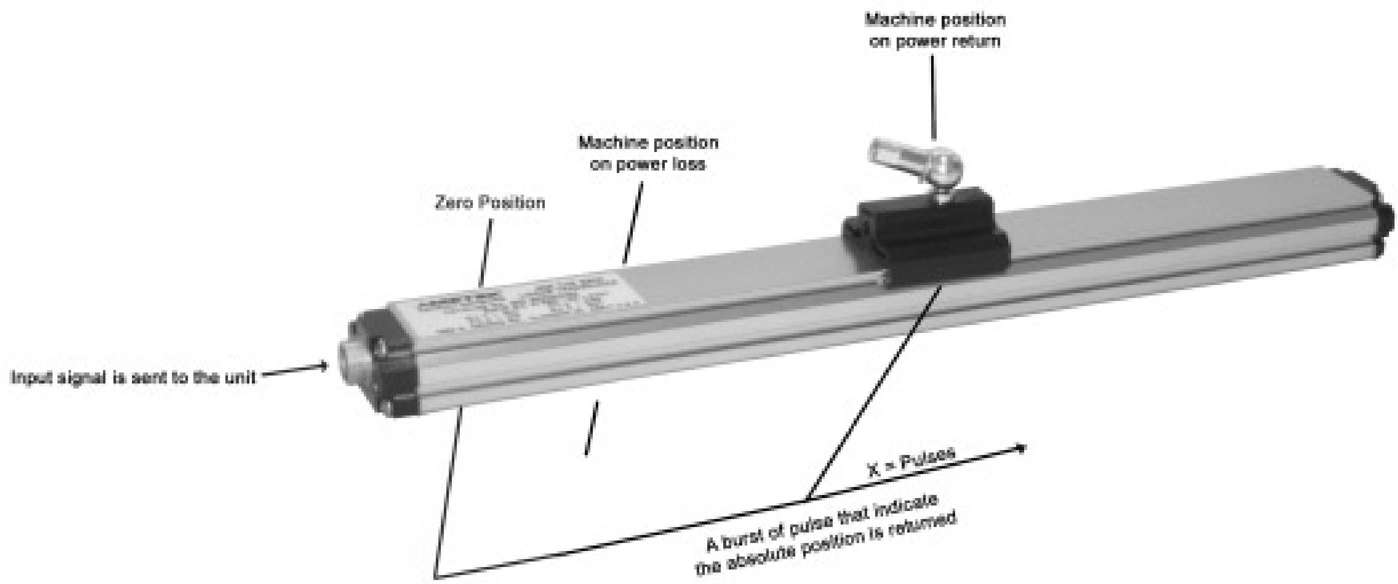
Green: Magnet is present and within the active range.

Red: Fault, the LDT has lost its signal from the magnet or the magnet has moved into the Null or Dead Zone.

Yellow: The LDT is in the AGC mode, yellow appears in short bursts combined with either red or green when in the AGC mode.

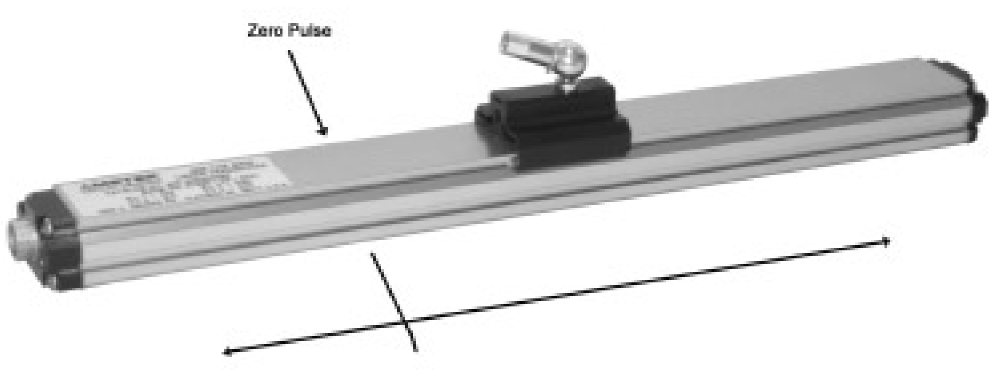
Burst Mode

This feature enables the system to be absolute even though data transfer is through “incremental” method. In the event of power failure, the controller can be programmed to automatically send a signal to the probe, which will then respond with the current position data. An input signal to the probe will cause a “burst” of data, representing the absolute position, to be fed back to the controller.



Zero Pulse

By sending a signal to the probe at any point in the stroke, a new zero point can be established. When using the burst input, the absolute position provided will be relative to the programmed zero position. In probes with volatile storage the zero point will be kept until a new zero pulse is sent or until the probe loses power. Probes with nonvolatile storage will store the zero position even if you lose power. The nonvolatile zero can be set 100,000 times; the volatile zero can be set an infinite number of times.



The type of signal needed for the Burst and Zero inputs:

E = Sinking (PLC Sourcing Outputs)
C = Sourcing (PLC Sinking Outputs)
T = TTL

See section 3.9: Specifications for more information or see figure 3.4

3.6: 955QD

Frequency or Pulse Rate

Selecting the proper frequency in the LDT's part number is very important. The internal clock inside of the 955QD interrogates the LDT approximately every 1 millisecond on LDT's less than 60" in length and approximately every 2 milliseconds on the units greater than 60" in length. The LDT transmits the incremental pulses at a fixed rate; all incremental pulses must be transmitted before the LDT will interrogate itself again. The frequency or pulse rate of the 955QD is factory set to 10KHz - 1.00MHz, consult part number for your model. The input for the PLC or display will determine the frequency needed.

Example: If your PLC High Speed counter card or display accepts a 1MHz encoder input, the choices are:

F1 - 10KHz
F2 = 25KHz
F3 = 50KHz
F4 = 75KHz
F5 = 100KHz
F6 = 150KHz
F7 = 250KHz
F8 = 500KHz
F9 = 1.00MHz

NOTE: If your controller's maximum input frequency falls between two available frequencies, choose the lower frequency.

Output Drivers

The 955QD Brik uses a 0L7272 line driver IC. Your LDT was configured at the factory for either a TTL level output or a 10 - 30VDC level output. Refer to label on LDT for your output type.

D = Differential RS-422 line driver, TTL compatible

L = Differential line driver 10 - 30VDC
V out = V in (LDT Power) -1 volt

Option D has a 5 volt TTL level output regardless of input power.

Option L has an output of 1 volt less than probe input power.
This option is used when driving input cards that are not TTL compatible.

3.7: Troubleshooting for 955QD

Troubleshooting describes common problems that may occur when installing the LDT and offers possible solutions to these problems. If, after reading this appendix, you are unable to resolve a problem, contact our technical support department at 248-435-0700. Troubleshooting is divided into the following two groups:

- General Checks
- Power Supply

General Checks

Make sure that the magnet is located within the LDT's 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 extrusion. Non-captive magnet assemblies should be situated so that the magnet is no further than 3/8" from the sensing surface at any point in the floating magnet assembly's movement.

NOTE: Ferromagnetic material (material readily magnetized) should be located no closer than 0.25" from the sensing surface of the LDT. This includes mounting brackets, magnet spacers, magnet brackets, and mounting screws. Ferromagnetic material can distort the magnetic field, causing adverse operation or failure of the LDT.

Check all LDT wires for continuity and/or shorts. 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.

Power Supply Check

This section will help you to determine if your power supply is adequate for the LDT to operate properly, or if the LDT's cable has a short or open.

In order for the 955QD to operate properly, the external power supply must provide a level between 10 to 30 VDC. A power supply providing voltage above this specified range may damage the LDT. A power supply providing power below this specified range will not be sufficient to power the LDT. When powering more than one Brik on a single power supply, remember that each Brik requires three (3) watts of power maximum (1 watt typical). The amount of current draw will vary based on the input voltage used. To calculate the current draw for a particular LDT, divide the LDT wattage by the input voltage. For example, 3 watts divided by 24 VDC equals 125mA.

If your LDT is not operating properly, the LDT's cable may have an open or short, or the power supply is not supplying sufficient power. To verify this, perform the following steps:

1. Turn the power supply off
2. Remove the mating connector from the LDT
3. Turn the power supply on
4. Using a digital voltmeter, check pins 1 (GND) and 2 (+) from the mating end of the cable for a level between +10 and +30 VDC.

If reading is between 10 and 30 VDC, turn power supply off and go to step 7. If reading is below 10 VDC, either your power supply is not providing enough power or the LDT's cable possibly has a short/open. Readings of no voltage or minimal voltage (less than 5 volts) may be due to short/open in the cable. If reading is *not* between 10 and 30 VDC, go to step 5. If reading is above 30 VDC, adjust power supply or replace.

5. Turn the power supply off.

6. Check the continuity of the individual wires of the cable between the power supply and the LDT. 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 LDT.

8. Turn power supply on.

9. Using a digital voltmeter, check the power supply's "+" and "-" terminals for a voltage between 10 and 30 VDC.

Low voltage readings may indicate a power supply with a wattage (current) rating that is too low. (Each LDT requires 3 watts). If the cabling checks out in step 6 and your voltage is below 10 VDC, check your power supply current rating. If voltage is between 10 to 30 VDC and the LDT is still inoperative, contact factory.

3.8: Catalog Numbering System for 955QD

955QD—0120—H—1000—E—F7—M1—N—D—X

The Series 955QD
The Brik
with Quadrature Output

Stroke in Inches
Insert stroke in inches to 0.1 inch. Enter as a four-place number. Example: 12.0 in stroke entered as 0120. To convert a metric stroke in millimeters, multiply millimeter value by 0.03937 to arrive at inch value.

Connector Style
H = HRS Environmental Connector
Consult factory for others

Output Resolution
Cycles per inch, maximum internal resolution is 0.001 inches
1000 standard (available range is 0001 through 9999)

Input Type
E = Sinking (typically used with sourcing output type)
C = Sourcing (typically used with sinking output type)
T = TTL Level

Quadrature Cycle Output Frequency Range
F1 = 10 KHz F2 = 25 KHz F3 = 50 KHz F4 = 75 KHz
F5 = 100 KHz F6 = 150 KHz F7 = 250 KHz F8 = 500 KHz F9 = 1.00 MHz
Consult our Technical Support for other output frequencies.

Output Mode
M1 = X1 Quadrature, Consult factory for other output modes

Zero Offset Storage
V = Volatile (nonretentive) N= Nonvolatile (retentive, 100,000 storage cycles maximum)

Output Drivers
D = Differential RS422 line driver, TTL compatible
L = Differential line driver 10 - 30VDC, V out = V in (LDT Power) -1 volt

Options
X = None

NOTE: Contact our Technical Support Department for custom configurations.

3.9: Specifications for 955QD

General Specifications:

Null Zone	3.00”
Dead Zone	1.50”
Extrusion Assembly	Anodized Aluminum with gasket seals, IP 67
Connector	HRS-Style Standard (quick connect/disconnect) Connector
Sensor Length	Up to 14’
Agency Approval	CE
Shock and Vibration	
Random Vibration	MIL-STD 810E, 10Grms random, 20Hz - 2K Hz
Shock	Tested to 40G

Electromagnetic Compatibility

IEC 801-2, Level 3 (Electrostatic discharge requirements)
IEC 801-4, Level 3 (Electrical fast transient/burst requirements)

Electrical Specifications

Input Voltage	
Unipolar	10 to 30 VDC
Current Draw	3 watts maximum, (1 watt, typical)
Nonlinearity	Less than 0.05%
Repeatability	+/- 0.001% of full stroke or +/- 0.001” (0.0254 mm), whichever is greater
Operating Temperature	-20° to 70° C
Storage Temperature	-40° to 85° C

Drivers

Option D

1. Quadrature A: RS-422 differential
2. Quadrature B: RS-422 differential
3. Zero (index) position RS-422 differential
   maximum 5 volts, minimum 2 volts into a 50 ohm load

Option L

1. Quadrature A: differential line driver
2. Quadrature B: differential line driver
3. Zero (index) position differential line driver
   Maximum 30 VDC, min 10 VDC, driver 0L7272
   V out = V in (LDT Power) - 1 volt

Digital Input

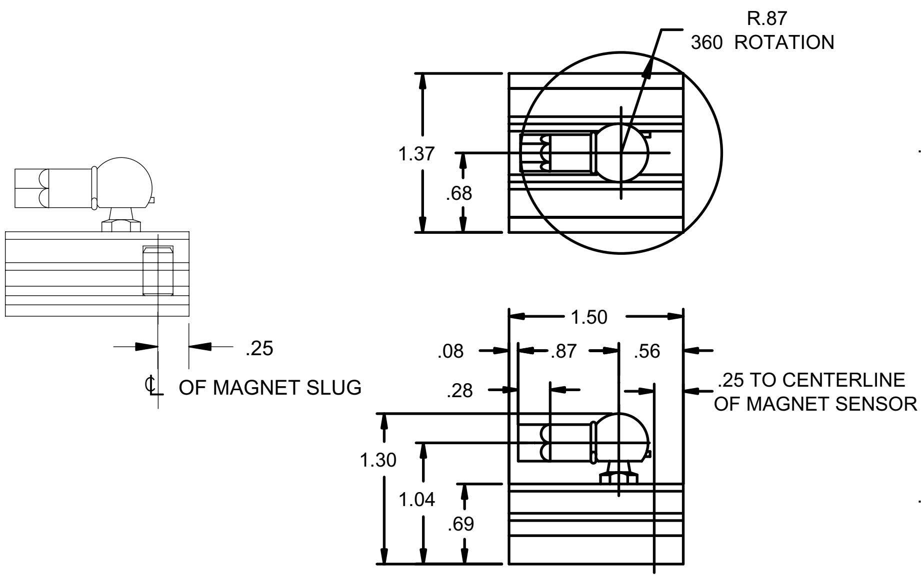
1. Zero position set: 5 - 30 volts Source or Sink
2. Burst mode input: 5 - 30 volts Source or Sink

Input impedance:	5 K ohms
Sink threshold:	Input <0.41* Power Supply Voltage i.e. : 0.41 x 24 VDC Power Supply = <9.84 VDC
Source threshold:	Input > 0.41 * Power Supply Voltage i.e. : 0.41 x 24 VDC Power Supply = >9.84 VDC
TTL threshold:	Input > 2.1 Volts

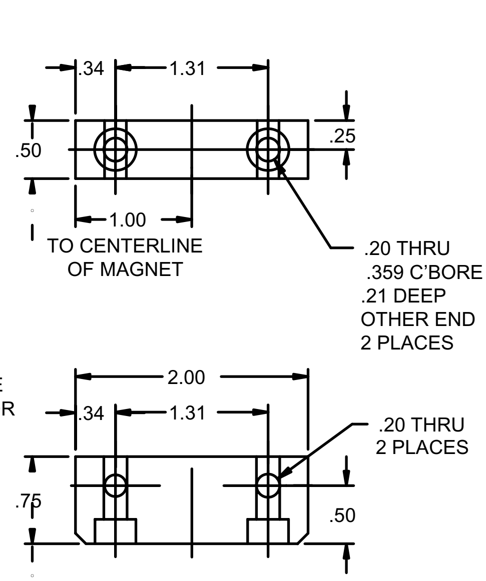
Response Time
Approximately 1 ms for less than 60”
Approximately 2 ms for over 60”

3.10 Accessories

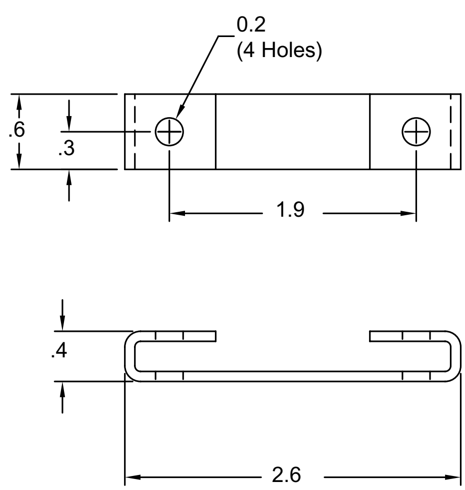
SLIDE MAGNET ASSEMBLY
P/N SD0521800



FLOATING MAGNET ASSEMBLY
P/N SD0522100



Mounting Foot
P/N: SD0522000



Cable
P/N: SD0527700L__

Glossary

Active Stroke Area	The area on the extrusion between the Null and Dead Zone on which the magnet assembly moves.
Burst Input	An input signal to the probe will cause a "burst" of data, representing the absolute position to be fed to the controller.
Dead Zone	An area usually 1.5" from the end of the extrusion where sensing of the magnet is not possible.
Floating Magnet	A non-ferrous assembly that contains the magnet that moves across the LDT's sensing surface in a non-contact manner.
Incremental	A relative position feedback device whose signal is always referenced to the zero position. The LDT produces a digital, square wave pulse train that is fed into an up/down counter chip or clock to derive position.
Input Type	Used to determine input type for "burst" and "zero" modes. i.e.; sinking, sourcing or TTL.
Non-volatile	Position is held in memory and will not be lost on power down.
Null Zone	An area usually covering 3.00" on the extrusion beginning at the connector end.
Output Driver	Used to determine output type of A, B and Z.
Output Resolution	Used to determine amount of pulses per inch.
Quadrature	Two output channels out of phase by 90 electrical degrees.
Quadrature Cycle Output Frequency	The frequency at which the pulse rate is transmitted out of the probe.
RS-422 Differential	Differential line driver.
Slide Magnet Assembly	A non-ferrous assembly that moves across the LDT's sensing surface.
Unipolar	A power supply that provides a single voltage.
Volatile	Position held in memory that is lost on power down.
Wire Speed	The average time it takes a pulse to travel one inch on the wire.
Zero Pulse	By sending a signal to the probe at any time in the stroke a new zero point can be established.

Notes:

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