Series LR Linear Encoder Read Heads

Non-Guided Guided

- ***TTL quadrature output resolution to 5 microns***
- ***Sine/cosine output interpolatable to 0.25 micron***
- ***Real-time output, no signal delay***
- ***Sealed to NEMA 4/IP66***

The LR Read Head, when combined with a Series LS Scale, creates a rugged linear measurement system proving excellent speed, and resolution characteristics.

Its precision and speed make it ideal for use in motion feedback, electronics assembly and circuit board fabrication applications. Able to withstand the punishment of dirty and high shock/vibration environments, LR/LS systems can deliver high accuracy position control for machinery used in the metalworking, woodworking and material handling industries.

More cost effective than glass scales and optical reflective tapes, models include the choice of quadrature or sine/cosine outputs, and standard Reference (index) output.

Mechanical and Environmental Features

- NEMA 4/IP66 System Integrity
- Maximum immunity to electrical/magnetic interference and shock/vibration
- Easy, fast installation - no special tools
- Guided and non-guided scale configurations

Electrical Features

- Incremental quadrature outputs provide 5 micron (0.0002 inch) measuring steps
- Interpolation of sine/cosine output to 1024x for even higher resolution – 0.25 micron (0.00001 inch) measuring steps
- Accuracy to 10 microns (0.0004 in)
- Slew rate to 20 m/sec (65.6 ft/sec)

Large, noncritical gap requirements provide greater system reliability than enclosed glass scales or magnetic tape systems. A simple installation and startup procedure further reduces total costs over competitive devices.

SPECIFICATIONS

Electrical

Resolution:
Sine/cosine: up to 0.25 micron (0.00001 in), dependent upon customer supplied interpolation;
Quadrature: up to 5 micron (0.0002 in) dependent on model

Readhead Accuracy: 10 micron (0.0004 in)

Input voltage: 5 ±5% VDC

Input current:
Sine/cosine: 80 mA max;
Quadrature: 100 mA max

Output voltage:
Sine/cosine incremental: 1Vpp into 120 Ω load;
Reference: 0.4V peak into 120 Ω load;
Quadrature: RS422A compatible TTL differential line driver

Speed: 20 m/sec (65.6 ft/sec) max

Frequency response: 1MHz max

Cable: High flexure, rated for 1 million cycles min.; 1 pair 0.14mm^2 (28 AWG), plus 3 pair 0.05mm^2 (33 AWG) conductors plus shield

Termination: 9 pin subminiature D style plug, male

Mechanical

Compatible Scales: Series LS Scales, available in various lengths and mounting styles

Gap to scale:
Sine/Cosine Output Models: 0.15 ± 0.1mm (0.006 ± 0.004 in)

TTL Output Models: 0.2 ± 0.15mm (0.008 ± 0.006 in)

Environmental

Operating temperature: 0 to 50 °C (32 to 122 °F)

Shock, 11 msec duration: 2000m/sec/sec (200 G's)

Vibration, 55 to 2000 Hz: 200m/sec/sec (20 G's)

Enclosure rating: IP66 (NEMA Type 4)

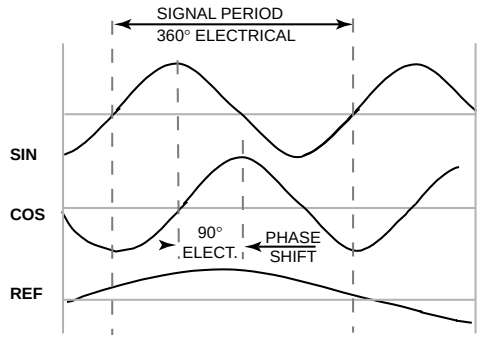
Noise Immunity: Tested to EN50082-2 Heavy Industrial for Electrostatic Discharge, Radio Frequency, Fast Transient, Conducted and Magnetic Interference

ELECTRICAL CONNECTIONS

Wire Color	DB9 Pin	LR001 Signal	LR005 to LR050
YEL	1	$\overline{\text{SIN}}$	$\overline{\text{A}}$
BLU	2	COM	COM
WHT	3	$\overline{\text{COS}}$	$\overline{\text{B}}$
--	4	N/C	N/C
GRY	5	$\overline{\text{REF}}$	$\overline{\text{Z}}$
GRN	6	SIN	A
RED	7	+5 Vdc	+5 Vdc
BRN	8	COS	B
PNK	9	REF	Z

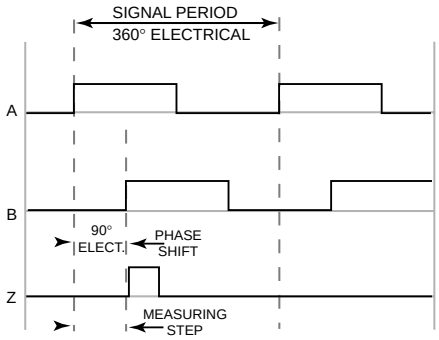
LR Code 2: Output Type

001: Sine/Cosine



Sine/Cosine Output
Compliments not shown for clarity

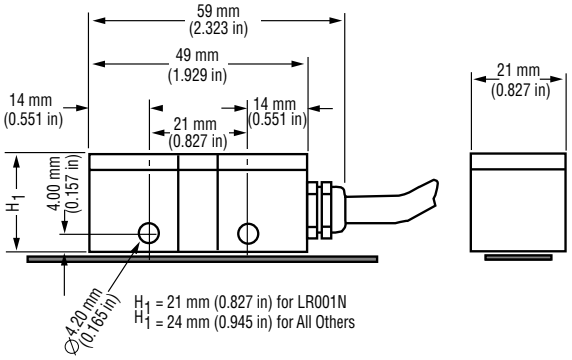
005 to 050: TTL Quadrature



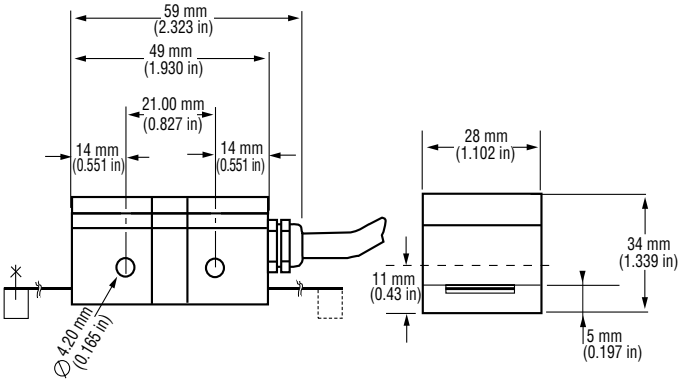
TTL Output
Compliments not shown for clarity

LR Code 3: Housing

N: Non-Guided



G: Guided



Note: See page 10.07 for mounting tolerances relative to read head and scale installation

Code 1: Model	Code 2: Output Type and Resolution (measuring step)	Code 3: Housing	Code 4: Termination
LR	□□□	□	□ □
Ordering Information			
LR Linear encoder readhead	**001** 1 sine/cosine cycle/mm **005** 5 TTL quadrature cycles/mm (50µm measuring step*) **010** 10 TTL quadrature cycles/mm (25µm measuring step*) **025** 25 TTL quadrature cycles/mm (10µm measuring step*) **050** 50 TTL quadrature cycles/mm (5µm measuring step*)	**N** Non-guided Available when Code 2 is 005 to 050 **G** Guided	**D1** Cable exit, 1 meter with DB9 connector **D3** Cable exit, 3 meters with DB9 connector

* After users external X4 multiplication