Series HSD25 Harsh-Duty Optical Hub Shaft Encoder

DESCRIPTION

The HSD25 Harsh-Duty Optical Hub Shaft Encoder accepts up to 0.75" diameter shafts and operates reliably from -40 to +100°C. The Hard Anodized finish encoder exceeds IP66/IP67 and NEMA 6 enclosure requirements. It is available in Stainless Steel to meet NEMA 4x and 6P requirements and its sealed housing allows operation when washdown and high pressure steam or caustic chemicals are required. Innovative packaging techniques enable it to operate in high shock and vibration environments.

The HSD25 is available in an Intrinsically Safe version certified to ATEX EEx ia IIB T4 when used with the appropriate IS barrier.

STANDARD OPERATING CHARACTERISTICS

Code: Incremental
Resolution: 1 to 3600 PPR (pulses/revolution)
Format: Two channel quadrature (AB) with optional Index (Z), and complementary outputs
Phase Sense: A leads B for CW shaft rotation viewing the shaft clamp end of the encoder
Quadrature Phasing: 90° ± 15° electrical
Symmetry: 180° ± 15° electrical
Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

DATA AND INDEX

Not all complements shown. A shown for reference

(180°ELEC) (90°ELEC)

Data A
Data A
Data B
Index

A Leads B CCW

ELECTRICAL

Input Power: 5-26VDC, 50 mA max., not including output loads. ATEX: 5VDC, 7-26VDC
Outputs: 2N2222, ET7272, ET7273
Frequency Response: 125 kHz (data & index)
Termination: 6, 7, or 10 pin MS Connector; 18" (0.46m) cable exit w/ seal
Mating Connector: 6 pin, style MS3106A-14S-6S (MCN-N4); 7 pin, style MS3106A-16S-1S (MCN-N5); 10 pin, style MS3106A-18-1S (MCN-N6)

MECHANICAL

Shaft Material: 303 stainless steel (passivated)
Bore Diameter: 3/8", 10mm, 1/2", 5/8", 3/4".
Insulated inserts provided
Bore runout: 0.0005 TIR at midpoint
Starting torque: 2.5 in-oz. maximum (at 25°C)
Bearings: 61805-2RZ
Bearing life: 5 x 10^8 revs at rated shaft Loading, 5 x 10^11 revs at 10% of rated shaft loading. (manufacturers’ specs)
Housing and cover: Hard Anodized Aluminum. Also available in Electroless Nickel finish and Stainless Steel. Tether Available
Disc material: Metal or mylar
Weight: 20 ounces, typical

ENVIRONMENTAL

Operating Temperature: -40 to 100°C
Operating Temperature ATEX: -40 to 80°C
Storage temperature: -40 to 100°C
Shock: 50Gs for 11msec duration
Vibration: 5 to 2000Hz @ 20 Gs
Humidity: 100%
Enclosure Rating: NEMA 4X, NEMA 6, IP66, IP67 (NEMA 6P upon request)
IMPORTANT ENCODER INSTALLATION INFORMATION

Mounting the Encoder: The encoder should be mounted such that its shaft is in close as possible alignment with the axis of the driving machine or motor shaft.

**CAUTION: The loads applied to the encoder shaft must be in accordance with the specifications of this device.**

Important Wiring Instructions: Use of shielded cable is recommended for all encoder installations. The shield should be connected to signal-ground at the receiving device only. *Connecting the shield at both ends can cause grounding problems that degrade system performance.*

If possible, run the encoder cable through a dedicated conduit (not shared with other wiring). Use of conduit will protect the cable from physical damage and provide a degree of electrical isolation. Do not run the cable in close proximity to other conductors that carry current to heavy loads such as motors, motor starters, contactors, solenoids, etc. This practice can induce electrical transients in the encoder cable, potentially interfering with reliable data transmission.

Refer to Electrical Connections table for wiring information. To avoid possible damage, do not connect or disconnect the encoder connector or wiring while power is applied to the system.

**CAUTION: Unused encoder signal wires must be individually insulated and under no circumstances be in contact with ground, voltage sources, or other signal lines.**
Dimensions

inches [mm]

Standard Housing

Dual Redundant Outputs

Bore Diameter

Hub Shaft Cavity Maximum Depth

1.40 [35.56]

0.60 [15.24]

Ø2.32 [58.93]

Ø2.00 [50.80]

0.86 [21.84]

2.91 [73.91]

3.77 [95.76]

2.40 [60.96]

Ø1.98 [50.29]

Ø1.98 [50.29]

Bottom View

Bottom View

4-40 x .25 Deep

4 Places - 90° Apart

4-40 x .25 Deep

90° Apart

Ø1.98

[50.29]

45°

45°

Single Point Tether

Slotted Tether
## Wiring Information

6, 7 & 10 Pin MS Connectors and Cables

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. HSD25 models with direct cable exit carry the color coding as shown in the right hand column.

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**Note:** Tether may be required for proper encoder operation and may be supplied by the customer or ordered as the following accessories:
- 113317-0001 Single Point Tether Kit
- 113318-0001 Slotted Tether Kit

## Models Information

### Code 1: Model
- F
- N/C
- A
- Z

### Code 2: PPR

### Code 3: Size
- 23
- 24
- 25

### Code 4: Format
- 0
- 1
- 2
- 3

### Code 5: Output
- 0
- 1
- 2
- 3

### Code 6: Termination
- 0
- 1
- 2
- 3

### Code 7: Safety
- 0
- 1
- 2
- 3

### Code 8: Housing/Tether
- Stainless Housing, slotted tether
- Stainless Housing, redundant outputs/stuffed tether
- ATEX Type 1: ATEX Certified; 5V in, 5V out only
- ATEX Type 2: ATEX Certified; 7-26V in, 7-26V out

**Note:** When selecting ATEX models, ATEX voltages replace those shown in Code 5.