



## HD25 Features

- NEMA size 25 package
- Anodized black aluminum housing
- 64 to 10,000 cycles per revolution (CPR)
- 256 to 40,000 pulses per revolution (PPR)
- 2-channel quadrature output with optional index
- Single-ended or differential outputs
- Sealed IP65 option



## HD25 Product Description

The HD25 is a rugged optical incremental shaft encoder designed for heavy-duty industrial applications. The housing, machined from a solid billet aluminum block and finished with black anodizing, conforms to the industrial standard size 25 package. Size 25 encoders are widely used and considered the backbone of feedback devices found in factory automation and industrial applications. The HD25 will drop directly into existing applications to provide a superior solution at a competitive cost.

## Mechanical Drawings

**HD25 Industrial Incremental Shaft Encoder**

RELEASE DATE: 7/11/2017

**7-PIN CONNECTOR**

4.02 [102.1]

**10-PIN CONNECTOR**

4.23 [107.3]

2.65 [67.3]

2.06 [52.4]

4X  $\phi$ .22 [5.5] THRU

R.21 TYP [5.3]

3.11 [78.9]

1.93 [49]

.25 [6.4]

.25 [6.4]

.88 [22.2]

$\phi$  1.250<sup>+0.000</sup><sub>-.001</sub> [31.74<sup>0</sup><sub>-0.03</sub>]

$\phi$  .3748<sup>+0.0000</sup><sub>-.0004</sub> [9.5<sup>0</sup><sub>0</sub>]

OPTIONAL SHAFT FLAT .80 [20.3]  $\nabla$ .03 [0.8]

.30 [7.6]

**US DIGITAL** 1400 NE 136th Avenue  
Vancouver, Washington 98684, USA

info@usdigital.com  
www.usdigital.com

Local: 360.260.2468  
Toll-free: 800.736.0194

UNITS: INCHES [MM]  
METRIC SHOWN FOR REFERENCE ONLY



## Specifications

### ENVIRONMENTAL

Parameter	Value
Operating Temperature	
Low voltage version, CPR < 3600	-40C to 100C
High voltage version, CPR < 3600	-40C to 85C
Low voltage version, CPR ≥ 3600	-25C to 100C
High voltage version, CPR ≥ 3600	-25C to 85C
Humidity	
Non-sealed	98% non-condensing
Sealed	100% condensing (NEMA IP65)
Vibration (10 to 2kHz, sinusoidal)	20G
Shock (6 milliseconds, half-sine)	75G
Electrostatic Discharge	
Single-ended (-S version), IEC 61000-4-2	± 4 kV
Differential (-D version), Human Body Model	± 2 kV



## MECHANICAL

Parameter	Value
Size	NEMA size 25
Housing and Cover Material	Anodized aluminum
Shaft Material	Stainless steel
Weight	17 oz.
Shaft Diameter	0.3748 in. (+0.0000 in. -0.0003 in.)
Shaft Optional Flat Size	.08 in. long x .03 in. deep
Max. Acceleration	100000 rad / sec <sup>2</sup>
Max. Shaft Speed (1) Non-sealed (mechanical) Sealed (mechanical)	15000 rpm 6000 rpm
Shaft Torque Non-sealed Sealed	< 0.5 in-oz 3.5 in-oz typical
Max. Shaft Load Axial Radial	40 lb. 35 lb.
Max. Shaft Runout	0.0003 in. T.I.R.
Bearing Life @ 4 Pound Load	2.3 x 10 <sup>9</sup> revolutions
Moment of Inertia	2.8 x 10 <sup>-4</sup> oz-in-sec <sup>2</sup>
Technical Bulletin TB1001 - Shaft and Bore Tolerances	Download ( <a href="https://www.usdigital.com/support/resources/reference/technical-docs/technical-bulletins/shaft-and-bore-tolerances-tb1001/">https://www.usdigital.com/support/resources/reference/technical-docs/technical-bulletins/shaft-and-bore-tolerances-tb1001/</a> )

(1) The maximum speed due to electrical considerations is dependent on the CPR. See the EM1 (<https://www.usdigital.com/products/encoders/incremental/modules/em1/>) and EM2 (<https://www.usdigital.com/products/encoders/incremental/modules/em2/>) product pages.

## PHASE RELATIONSHIP

B leads A for clockwise shaft rotation, and A leads B for counterclockwise rotation viewed from the shaft side of the encoder.



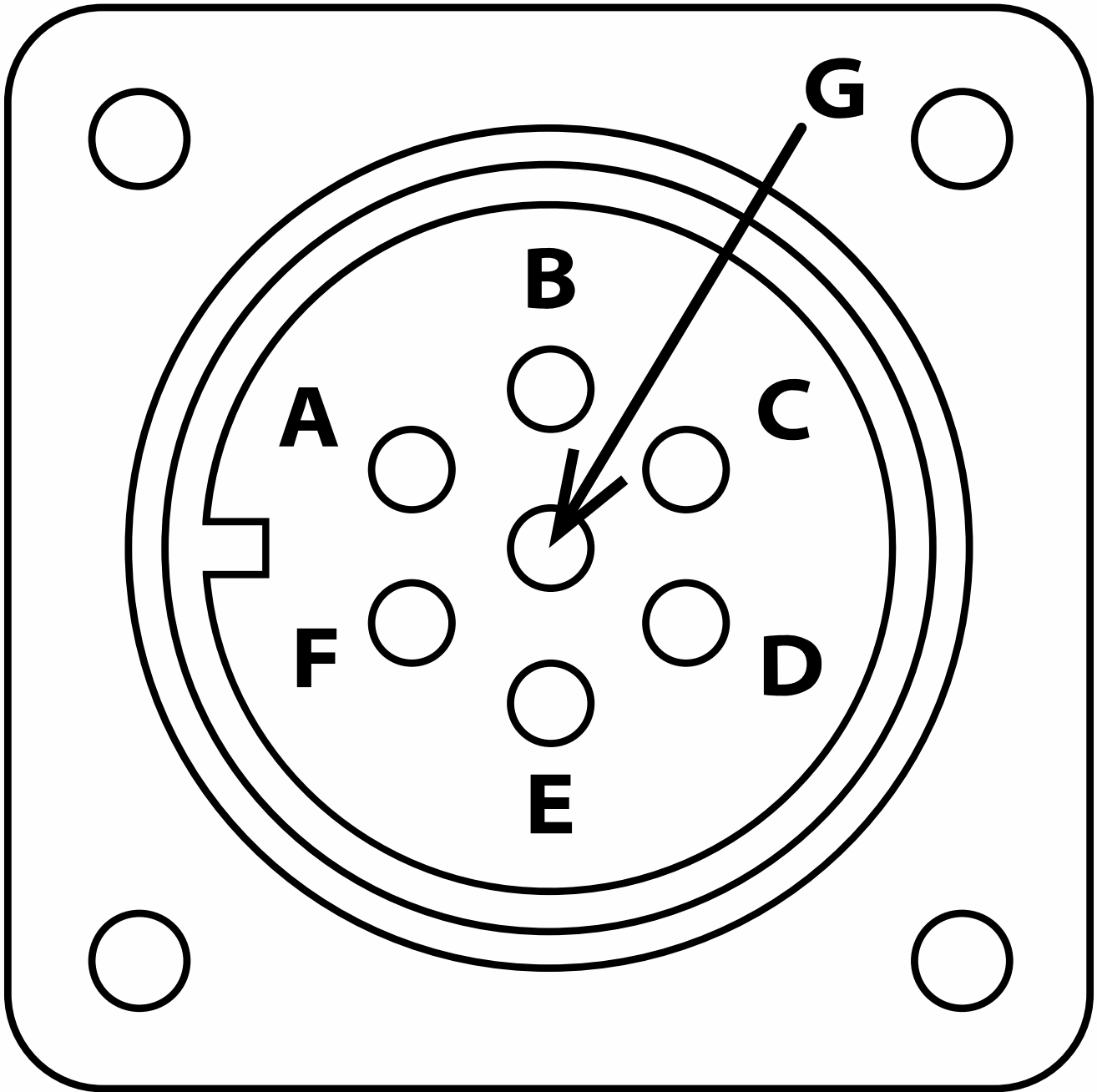
## ELECTRICAL

- Specifications apply over the entire operating temperature range.
- Typical values are specified at 25°C.
- Output driver IC: ET7272B
- For complete details, see the EM1 (<https://www.usdigital.com/products/encoders/incremental/modules/em1/>) and EM2 (<https://www.usdigital.com/products/encoders/incremental/modules/em2/>) product pages.

PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITIONS
Supply Voltage (Vs)					
Low Voltage Version	4.5	5.0	5.5	V	
High Voltage Version	9.5		30		
Supply Current			138	mA	
Low-level Output		0.4	0.5	V	I <sub>OL</sub> = 20mA
High-level Output		V <sub>s</sub> - 2.0		V	I <sub>OH</sub> = -20mA
Output Rise/Fall Time		700	980	nS	

## 7-PIN CONNECTOR PIN-OUT

PIN	DESCRIPTION
A	A channel
B	B channel
C	Index
D	+VDC
E	Case ground
F	Common
G	NC

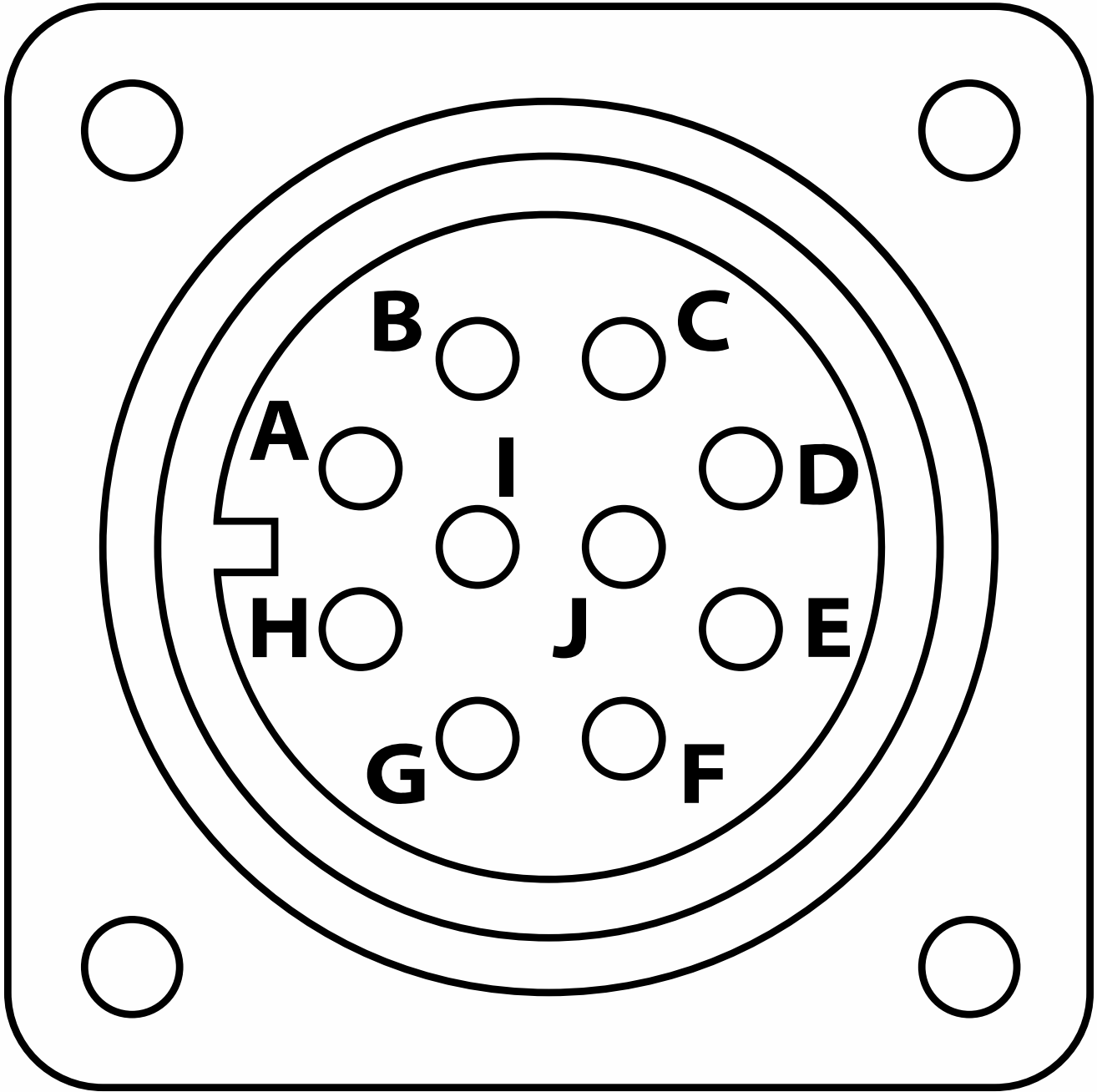


10-PIN CONNECTOR PIN-OUT



# HD25 Industrial Rugged Metal Optical Encoder

PIN	DESCRIPTION
A	A+ channel
B	B+ channel
C	Index+
D	+VDC
E	NC
F	Common
G	Case ground
H	A- channel
I	B- channel
J	Index-



## Notes

- Cables and connectors are not included and must be ordered separately.
- US Digital® warrants its products against defects in materials and workmanship for two years. See complete warranty (<https://www.usdigital.com/company/warranty>) for details.



## Configuration Options

HD25	CPR (Cycles Per Revolution)	Shaft Type	Shaft Seal	Voltage	Index	Output
	64	N ( <i>Shaft without Flat</i> )	N ( <i>Non-Sealed</i> )	L ( <i>Low Voltage</i> )	IE ( <i>Index</i> )	S ( <i>Single-Ended</i> )
	100	F ( <i>Shaft with Flat</i> )	S ( <i>Sealed</i> )	H ( <i>High Voltage</i> )	NE ( <i>Non-Index</i> )	D ( <i>Differential</i> )
	200					
	400					
	500					
	512					
	1000					
	1024					
	1800					
	2000					
	2048					
	2500					
	3600					
	4000					
	4096					
	5000					
	7200					
	8000					
	8192					
	10000					

**PLEASE NOTE: This chart is for informational use only.** Certain product configuration combinations are not available. Visit the HD25 product page (<https://www.usdigital.com/products/HD25>) for pricing and additional information.