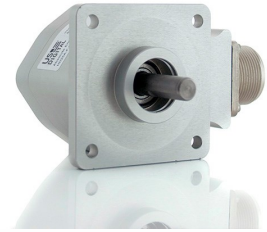




## HD25A Features

- NEMA size 25 package
- Anodized milled aluminum housing with O-ring housing seal
- 3/8 in. diameter shaft
- Up to 15 devices on a single 6-pin telephone-type cable
- 12-bit resolution
- 7 milliseconds update time
- EEPROM stores downloadable parameters
- Field programmable resolution (2 to 4,096 CPR)
- Remotely updatable firmware



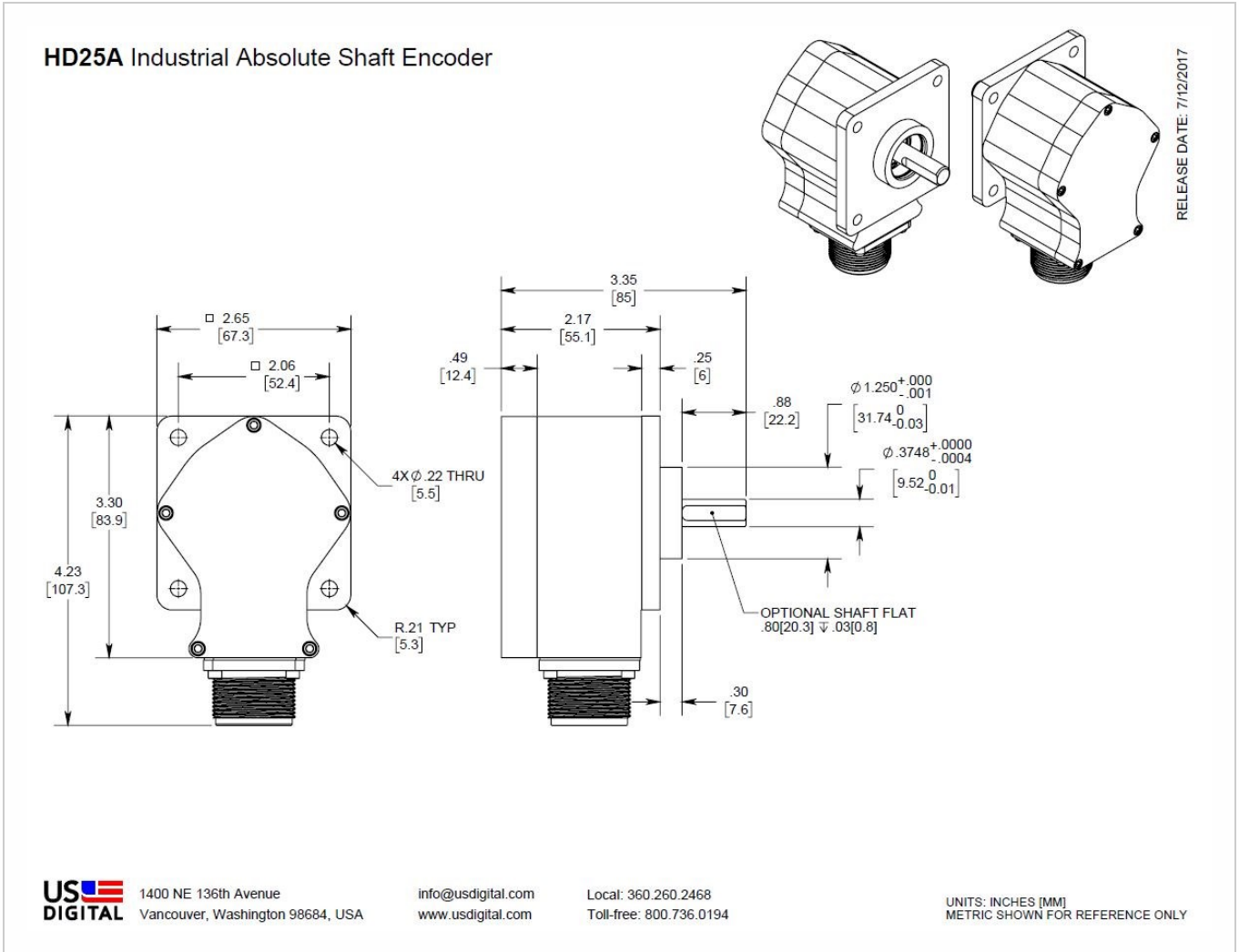
## HD25A Product Description

The HD25A is a NEMA 25 sized absolute encoder designed for industrial applications. The HD25A optical encoder is a 12-bit absolute rotary position sensor, which reports a shaft angle within a single 360-degree rotation of a shaft. Unlike incremental, sometimes called relative style encoders, the HD25A provides true (absolute) shaft position, eliminating the need for a home or zero cycle after a supply voltage power cycle. The HD25A communicates over a RS 485-style serial bus utilizing US Digital's SEI (Serial Encoder Interface) which allows for simple, quick, and convenient networking of multiple SEI devices on a single network. PLCs, motion controllers, and computers can also reside on the SEI bus as well by use of US Digital's SEI to USB interface device. For complete information about the SEI bus please refer to the SEI Communications Protocol (<https://www.usdigital.com/support/resources/reference/user-guides/sei-absolute-encoder-communications-protocol/>) webpage.

The HD25A also provides an analog output. The analog output provides a maximum voltage range of 0 to 4.095 volts with 12-bit resolution. The output voltage can be scaled by simple SEI commands to provide user-defined voltage ranges. From the factory, the analog output voltage is set to 0 to 3.599 VDC range. Please note that with the HD25A analog output option only one device may reside on an SEI bus.



## Mechanical Drawings



## Specifications

### ENVIRONMENTAL

| Parameter                              | Value       | Units |
|--|-------------|-------|
| Operating Temperature                  | -25C to 70C | C     |
| Vibration (5 to 2kHz)                  | 20          | G     |
| Shock, 11 mSec                         | 60          | G     |
| Electrostatic Discharge, IEC 61000-4-2 | ± 4         | kV    |

**MECHANICAL**

| Parameter  | Value  |
|--|--|
| Size   | NEMA 25  |
| Housing and Cover Material   | Anodized aluminum  |
| Weight   | 16.91 oz.  |
| Shaft Material   | Stainless steel  |
| Shaft Diameter   | 0.3748 in. (+0.0000 in. -0.0004 in.)   |
| Shaft Optional Flat Size   | 0.80 in. long x 0.03 in. deep  |
| Max. Acceleration  | 100000 rev / sec <sup>2</sup>  |
| Max. Shaft Speed<br>Non-sealed (mechanical)<br>Sealed (mechanical) | 15000 RPM<br>6000 RPM  |
| Max. Shaft Torque<br>Non-sealed<br>Sealed                          | < 0.5 in-oz<br>3.5 in-oz typical   |
| Max. Shaft Load<br>Axial<br>Radial                                 | 40 lb.<br>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> ) |



**ELECTRICAL**

- Specifications apply over entire operating temperature range.
- Typical values are specified at Vcc = 12V and 25C.

| Parameter                                 | Min.  | Typ.  | Max.  | Units   |
|---|-------|-------|-------|---------|
| Supply Voltage                            | 7.5   | 12    | 16    | V       |
| Supply Current                            |       |       |       |         |
| Active                                    |       | 14    | 18.5  | mA      |
| Sleep                                     |       |       | 2.5   |         |
| Analog Output Impedance                   |       | 51    |       | Ohms    |
| Zero Scale Analog Voltage                 | 0     | 2     | 12    | mV      |
| Full Scale Analog Voltage                 | 4.066 | 4.095 | 4.124 | V       |
| Output Noise (Analog version)             |       | 10    |       | mV rms  |
| Differential Nonlinearity                 | -1.0  |       | 1.0   | LSB     |
| Absolute Accuracy (SEI interface version) |       | 0.18  | 0.25  | Degrees |
| Angle tracking speed                      |       |       |       |         |
| Single-turn mode                          |       |       | 3600  | RPM     |
| Multi-turn mode                           |       |       | 1800  |         |
| Position Update Rate (1)                  |       |       | 7     | msec.   |

(1) The internal microcontroller takes a snapshot of the disk every 7 msec. and stores the position in memory. It responds immediately to a "report position request" by sending the most recently computed position.

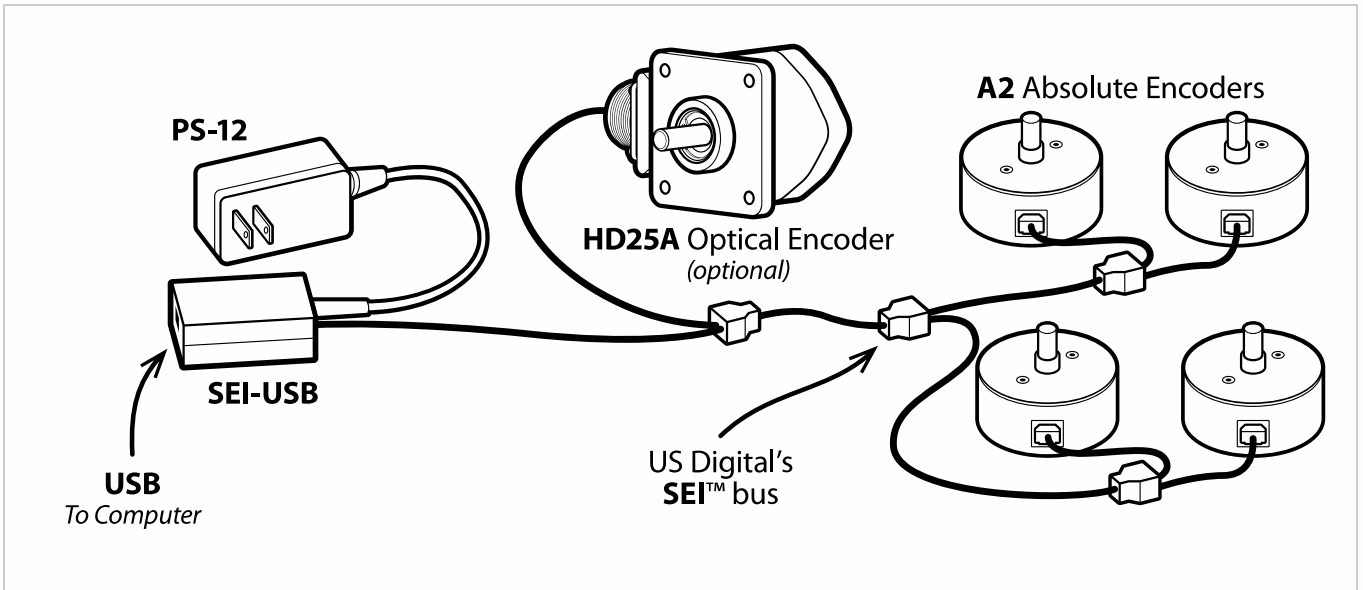
**DEFAULT SETTINGS**

| Parameter     | Default value | Volatile?    |
|---------------|---------------|--------------|
| SEI address   | 0             | Non-volatile |
| Resolution    | 3600          | Non-volatile |
| Origin offset | 0             | Non-volatile |
| Baud rate     | 9600          | Volatile     |
| Mode          | 0             | (1)          |

(1) Mode is always restored from non-volatile EEPROM on power-up; however, there are separate SEI commands for setting the RAM copy only, or both the RAM copy and the non-volatile EEPROM copy. For an explanation of the Mode bits see SEI Absolute Encoder Communications Protocol (<https://www.usdigital.com/support/resources/reference/user-guides/sei-absolute-encoder-communications-protocol/>).

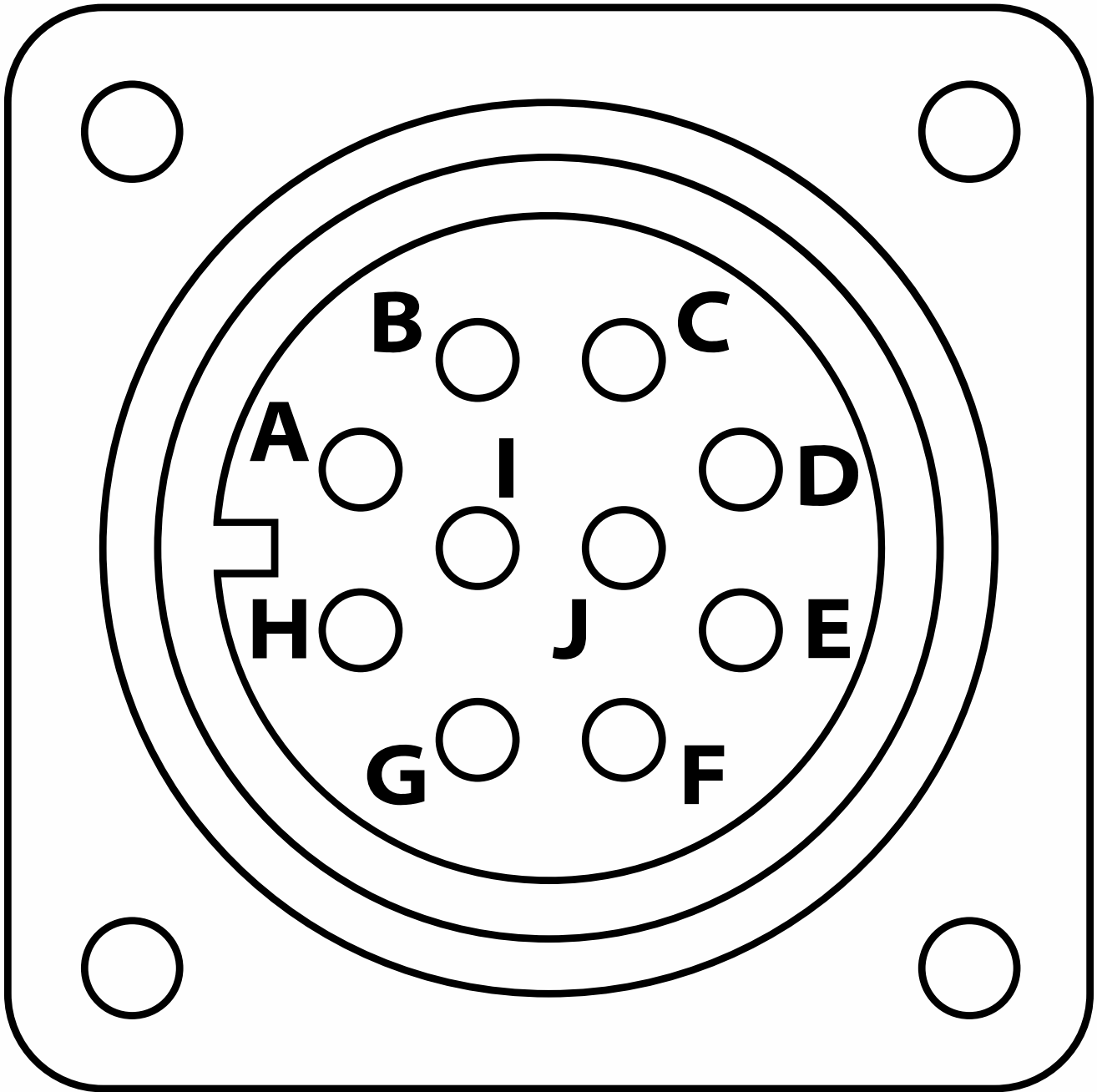


### SEI NETWORK



### ANALOG OUTPUT

### PIN-OUTS





| PIN | DESCRIPTION |
|-----|-------------|
| A   | Data H      |
| B   | Busy+       |
| C   | Analog+     |
| D   | Power       |
| E   | NC          |
| F   | Ground      |
| G   | Case Ground |
| H   | Data L      |
| I   | Busy-       |
| J   | Analog-     |

## PRODUCT CHANGE NOTIFICATIONS

| Title                                   | Date      | Description  | Download  |
|---|-----------|--|---|
| A2/HD25A Product Lines Detector Upgrade | 8/18/2014 | As part of our ongoing continuous improvement efforts, US Digital is updating our A2 and HD25A product lines design by utilizing surface mount devices for the detector and LED. Previously these were through hole devices. This change is transparent with the exception of minor cosmetic differences for the A2 kit style encoder, and Spacer Tool used in kit assembly process. | Download<br>( <a href="https://www.usdigital.com/support/resources/product-change-notifications/pcn-4537-a2-hd25a-product-lines-detector-upgrade/">https://www.usdigital.com/support/resources/product-change-notifications/pcn-4537-a2-hd25a-product-lines-detector-upgrade/</a> ) |

## 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.