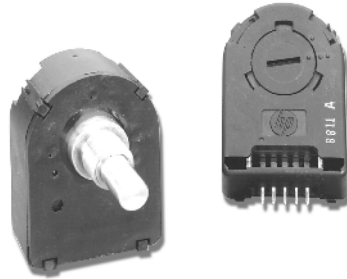


# HEDS-5700 Series

## Panel Mount Optical Encoders



## Data Sheet



### Description

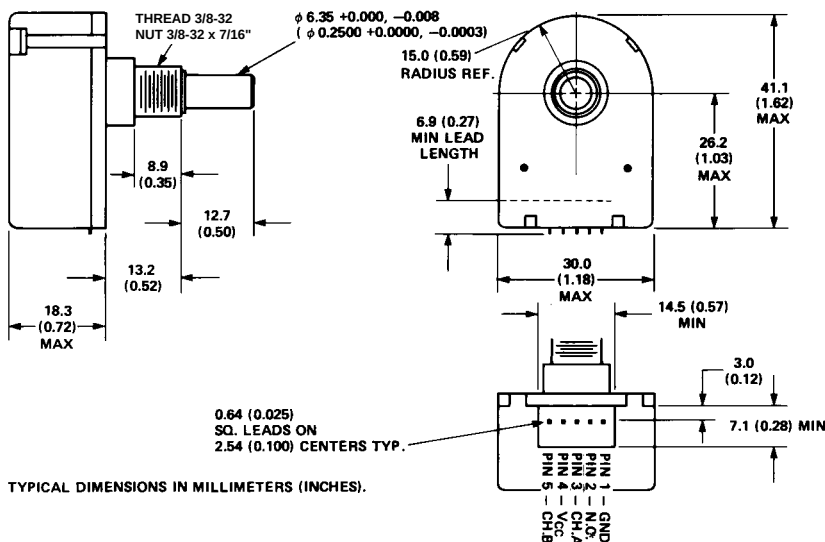
The HEDS-5700 series is a family of low cost, high performance, optical incremental encoders with mounted shafts and bushings. The HEDS-5700 is available with tactile feedback for hand operated panel mount applications, or with a free spinning shaft for applications requiring a pre-assembled encoder for position sensing.

The encoder contains a collimated LED light source and special detector circuit which allows for high resolution, excellent encoding performance, long rotational life, and increased reliability. The unit outputs two digital waveforms which are 90 degrees out of phase to provide position and direction information. The HEDS-5740 Series provides a third Index Channel.

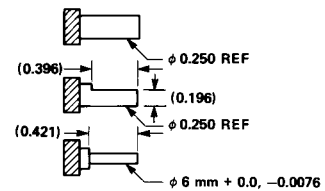
### Features

- Two channel quadrature output with optional index pulse
- Available with or without static drag for manual or mechanized operation
- High resolution: up to 512 CPR
- Long rotational life: > 1 million revolutions
- -20 to 85°C operating temperature range
- TTL quadrature output
- Single 5 V supply
- Available with color coded leads

### Package Dimensions



#### SHAFT OPTIONS



| OPTIONAL WIRING<br>COLOR CODE TABLE |                 |
|-------------------------------------|-----------------|
| COLOR                               | OUTPUT          |
| WHITE                               | A               |
| BROWN                               | B               |
| RED                                 | V <sub>CC</sub> |
| BLACK                               | GND             |
| BLUE                                | I               |
| (THREE<br>CHANNEL)                  |                 |

\*Note: For the HEDS-5700, Pin # 2 is a No Connect.  
For the HEDS-5740, Pin # 2 is Channel I, the index output.

The HEDS-5700 is quickly and easily mounted to a front panel using the threaded bushing, or it can be directly coupled to a motor shaft (or gear train) for position sensing applications.

#### Applications

The HEDS-5700 with the static drag option is best suited for applications requiring digital

information from a manually operated knob. Typical front panel applications include instruments, CAD/CAM systems, and audio/video control boards.

The HEDS-5700 without static drag (free spinning) is best suited for low speed, mechanized operations. Typical applications are copiers, X-Y

tables, and assembly line equipment.

Note: Avago Technologies encoders are not recommended for use in safety critical applications. Eg. ABS braking systems, power steering, life support systems and critical care medical equipment. Please contact sales representative if more clarification is needed.

#### Absolute Maximum Ratings

| Parameter                  | Symbol   | Min. | Max.     | Units | Notes         |
|----------------------------|----------|------|----------|-------|---------------|
| Storage Temperature        | $T_s$    | -40  | +85      | °C    |               |
| Operating Temperature      | $T_a$    | -20  | +85      | °C    |               |
| Vibration                  |          |      | 20       | g     | 20 Hz - 2 kHz |
| Supply Voltage             | $V_{CC}$ | -0.5 | 7        | V     |               |
| Output Voltage             | $V_O$    | -0.5 | $V_{CC}$ | V     |               |
| Output Current per Channel | $I_O$    | -1   | 5        | mA    |               |
| Shaft Load – Axial         |          |      | 1        | lb    |               |
| – Radial                   |          |      | 1        |       |               |

#### Recommended Operating Conditions

| Parameter               | Symbol   | Min. | Max. | Units | Notes                          |
|-------------------------|----------|------|------|-------|--------------------------------|
| Temperature             | T        | -20  | +85  | °C    | Noncondensing Atmosphere       |
| Supply Voltage          | $V_{CC}$ | 4.5  | 5.5  | V     | Ripple < 100 mV <sub>p-p</sub> |
| Rotational Speed – Drag |          |      | 300  | RPM   |                                |
| – Free Spinning         |          |      | 2000 |       |                                |

#### Electrical Characteristics Over Recommended Operating Range, Typical at 25°C

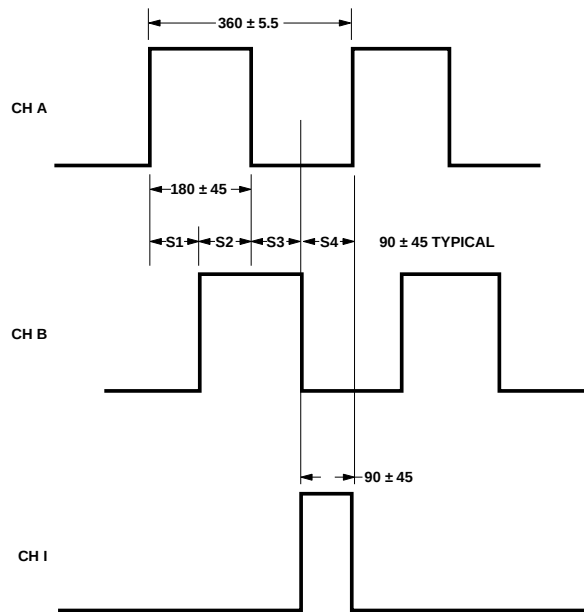
| Parameter                 | Symbol   | Min. | Typ. | Max. | Units | Notes                     |
|---------------------------|----------|------|------|------|-------|---------------------------|
| Supply Current            | $I_{CC}$ |      | 17   | 40   | mA    | Two Channel               |
|                           |          |      | 57   | 85   |       | Three Channel             |
| High Level Output Voltage | $V_{OH}$ | 2.4  |      |      | V     | $I_{OH} = -40 \mu A$ Max. |
| Low Level Output Voltage  | $V_{OL}$ |      |      | 0.4  | V     | $I_{OL} = 3.2$ mA         |

**Note:** If more source current is required, use a 3.2 K pullup resistor on each output.

## Mechanical Characteristics

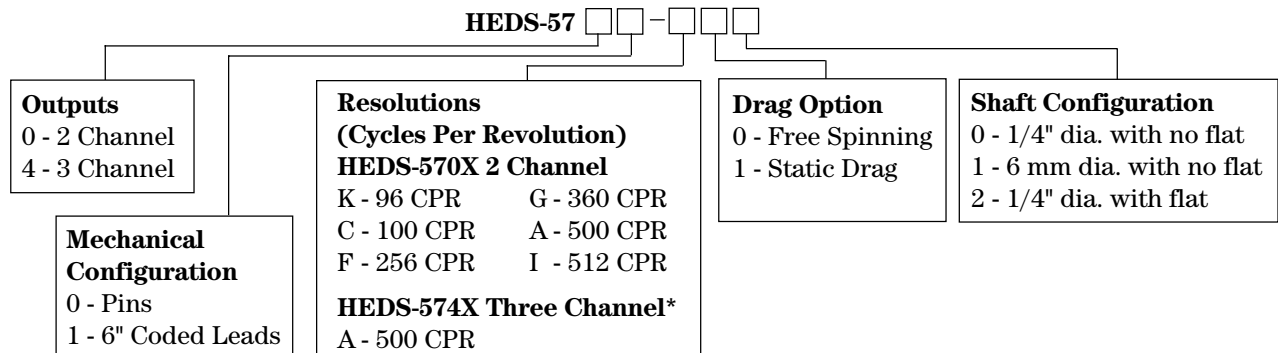
| Parameter              |                 | Min.             | Typ. | Max. | Units       | Notes            |
|------------------------|-----------------|------------------|------|------|-------------|------------------|
| Starting Torque        | – Static Drag   |                  | 0.47 |      | oz in       |                  |
|                        | – Free Spinning |                  |      | 0.14 |             |                  |
| Dynamic Drag           | – Static Drag   |                  | 1.1  |      | oz in       | 100 RPM          |
|                        | – Free Spinning |                  | 0.70 |      |             | 2000 RPM         |
| Rotational Life        | – Static Drag   | $1 \times 10^6$  |      |      | Revolutions | 1 lb Load        |
|                        | – Free Spinning | $12 \times 10^6$ |      |      | Revolutions | 4 oz Radial Load |
| Mounting Torque of Nut |                 |                  |      | 13   | lb in       |                  |

## Output Waveforms



NOTE:  
ALL VALUES ARE IN ELECTRICAL DEGREES, WHERE  $360^\circ = 1$  CYCLE OF RESOLUTION.  
ERRORS ARE WORST CASE OVER ONE REVOLUTION.  
CH B LEADS CH A FOR COUNTERCLOCKWISE ROTATION.  
CH A LEADS CH B FOR CLOCKWISE ROTATION.

## Ordering Information



\*Please contact factory for other resolutions.

|            |   | 00 | 01 | 02 | 10 | 11 | 12 |
|------------|---|----|----|----|----|----|----|
| HEDS-5700# | A |    | *  | *  | *  |    |    |
|            | C |    | *  | *  | *  | *  |    |
|            | F | *  |    |    |    | *  | *  |
|            | G | *  |    |    |    |    |    |
|            | I | *  | *  | *  | *  |    | *  |
|            | K |    | *  |    | *  |    |    |
| HEDS-5701# | A | *  |    | *  |    |    | *  |
|            | C |    |    |    | *  |    |    |
|            | F | *  | *  |    | *  | *  |    |
|            | G | *  |    |    |    |    |    |
|            | H |    | *  |    |    |    | *  |
|            | I |    |    | *  |    |    |    |
| HEDS-5740# | A |    |    | *  |    |    |    |

For product information and a complete list of distributors, please go to our website: [www.avagotech.com](http://www.avagotech.com)

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5988-5856EN April 10, 2006

