

# Hercules Encoders

## Series 1000/3000

### Hall Effect Incremental Rotary Shaft Encoders

- Enclosure: Series 1000-2.25" Cube  
Series 3000-3"x3"x1.5"  
NEMA 12/13 or NEMA 4 type Sealing  
Flush or Flanged Base
- Inherent Anti-Jitter Circuitry prevents false outputs due to machine vibration
- Internally and Externally Shielded ABEC 5 Stainless Steel Bearings
- Low Supply Current Requirement - 15 mA typical per encoder, at 24Vdc
- Operating Voltage Flexibility - 8 to 28 Vdc or 5 Vdc TTL Output
- Ideally suited for low PPR needs in dirty environments, wide temperature ranges

## Specifications

### Mechanical

|                             |                                  |
|-----------------------------|----------------------------------|
| Shaft Speed                 | 6000 RPM maximum                 |
| Shaft Direction             | Bidirectional                    |
| Standard Shaft Sizes (Dia.) | .2497", .3747"                   |
| Shaft Extension(s)          | 0.80" with .50x.05" flat         |
| Shaft Seals                 | Neoprene or PTFE Options         |
| Mounting                    | Refer to dimensional drawings    |
| Bearings                    | ABEC 5 Shielded                  |
| Radial Loading              | 30 lbs. Operating                |
| Axial Loading               | 15 lbs. Operating                |
| Accuracy                    | ±1.0° of Shaft Rotation Typical  |
| Housing                     | Black Anodized Aluminum          |
| Weight (1000)               | Standard: 14 oz., Sealed: 19 oz. |
| Weight (3000)               | Standard: 17 oz., Sealed: 26 oz. |
| Connector                   | 6 Pin MS3102 or 18" Cable Out    |

### Electrical

|                           |   |
|---------------------------|---|
| Pulse Rate                | 10 kHz, up to 200 kHz                                     |
| Outputs                   | NPN w/pullup; NPN open collector; PNP sourcing            |
| Output Ratings            |   |
| Open Collector Transistor | 40 Vdc maximum  |
| Supply Voltage            | 8 to 28 Vdc<br>5 Vdc with 5V TTL output                   |
| Supply Current            | 15 mA maximum   |
| Current Sinking           | 250 mA maximum  |
| Output Duty Cycle         | 50/50 w/ ±20% typical tolerance<br>Tighter to ±5% by spec |
| Rise/Fall Times           | 1 µsec typical, other options available                   |

### Environmental

|                        |                                      |
|------------------------|--------------------------------------|
| Operating Temp. (1000) | -20° to +70° C (-4° to +158° F)      |
| Operating Temp. (3000) | -40° to +85° C (-40° to +185° F)     |
| Shock                  | 50 g's for 11 Milliseconds           |
| Vibration              | 5 to 2000 Hertz at 20 g's            |
| Humidity               | 100% Relative Humidity               |
| Enclosures (Sealed)    | NEMA 4 equiv. - Water-tight          |
| (Std)                  | NEMA 12/13 equiv. — Dust-, Oil-Tight |

### Electrical Connections

| Function  | 6 Pin | Cable Out | Color |
|-----------|-------|-----------|-------|
| +V        | B     | D         | Red   |
| Common    | A     | F         | Black |
| Channel A | D     | A         | Blue  |
| Channel B | E     | B         | Brown |
| Index     | C     | C         | White |



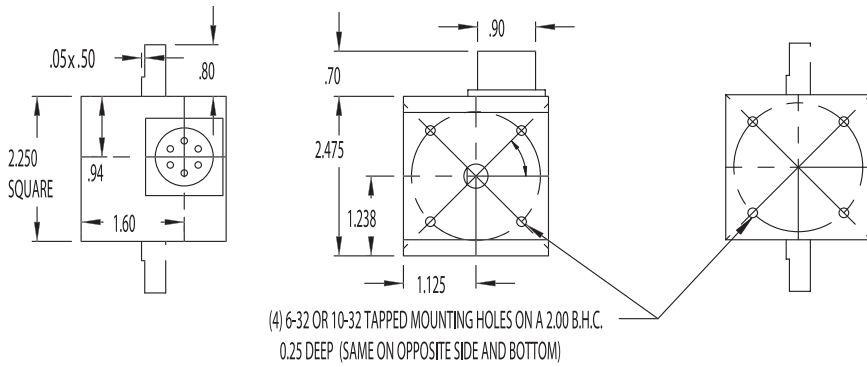
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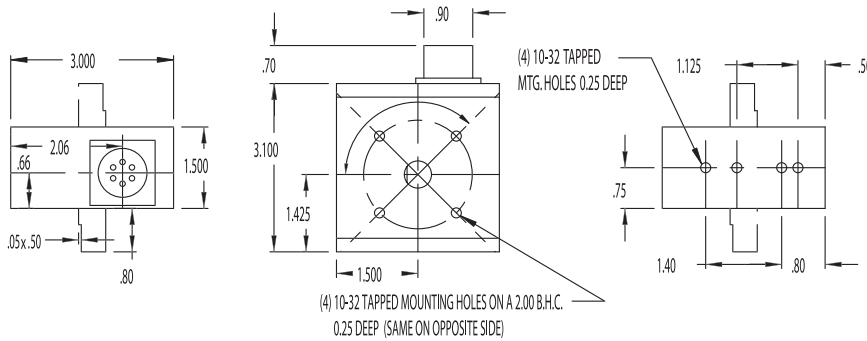
For the latest specifications visit our website  
[www.herculesencoders.com](http://www.herculesencoders.com)

# Dimensional Drawings

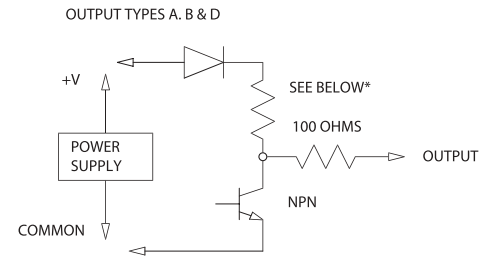
## Series 1000 Standard *call for sealed dimensions*



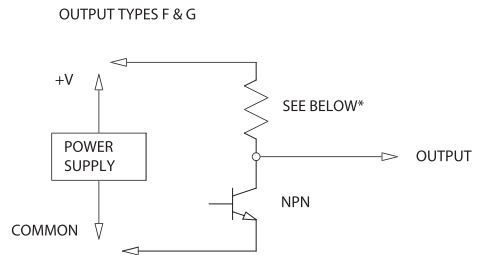
## Series 3000 Standard *call for sealed dimensions*



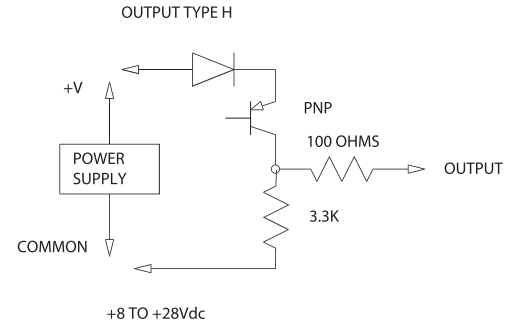
# Wire Drawings



+8 to +28Vdc \*Maxium of 18Vdc for "D" output  
\*3.3K pullup on "A", Not installed on "B", 1.5K on "D"



+5 Vdc  
\*3.3K Pullup on "F", Not installed on "G"



# Ordering Information

|  |   |                |                |                |  |                |                  |                   |   |
|--|---|----------------|----------------|----------------|--|----------------|------------------|-------------------|---|
| <b>Series</b> _____  | <b>1</b> _____  | <b>3</b> _____ | <b>2</b> _____ | <b>1</b> _____ | <b>A</b> _____   | <b>Q</b> _____ | <b>030</b> _____ | <b>AQ12</b> _____ |   |
| <b>Shaft Diameter</b><br>1=1/4" (0.2497")<br>3=3/8" (0.3747) | <b>Encoder Type</b><br>_ = Standard Encoder<br>S = Sealed (Elastomer)<br>T = Sealed (PTFE)  |                |                |                | <b>Channel Outputs</b><br>A = NPN w/Pullup Res.<br>B = NPN Open Collector<br>D = 1.5K Pullup, No Ser. R (18V Max)<br>F = 5Vdc w/Pullup Res.<br>G = 5Vdc Open Collector<br>H = PNP Sourcing Outputs |                |                  |                   | <b>PPR (Pulses per Revolution)</b><br><b>Channel Types "S" and "Q"</b><br>001 002 003 004<br>005 006 007 008<br>009 010 012 015<br>018 020 025 030<br><b>Added Channel Types "S" (Square Wave)</b><br>014 016 024   |
| <b>Shaft Extension</b><br>1=Single<br>2=Double               | <b>Mounting Type</b><br>0=6-32 BHC on Ends<br>1=10-32 BHC on Shaft<br>Ends & Base<br>2=Flanged Base<br>(10-32 BHC on Shaft Ends)<br>3=No Holes on Base<br>(10-32 BHC on Ends) |                |                |                | <b>Channel Types</b><br>S=Single Channel<br>Q=Quadrature Outputs<br>I=Index Pulse  |                |                  |                   | <b>Optional Index Channel or Add. Encoder</b><br>(Same types of Channel Outputs)<br><i>Order the Secondary Channel like a Primary Channel</i>   |
| <b>Series</b> _____  | <b>3</b> _____  | <b>3</b> _____ | <b>1</b> _____ | <b>1</b> _____ | <b>A</b> _____   | <b>Q</b> _____ | <b>030</b> _____ |                   |   |
| <b>Shaft Diameter</b><br>1=1/4" (0.2497")<br>3=3/8" (0.3747) | <b>Encoder Type</b><br>_ = Standard Encoder<br>S = Sealed (Elastomer)<br>T = Sealed (PTFE)  |                |                |                | <b>Channel Outputs</b><br>A = NPN w/Pullup Res.<br>B = NPN Open Collector<br>D = 1.5K Pullup, No Ser. R (18V Max)<br>F = 5Vdc w/Pullup Res.<br>G = 5Vdc Open Collector<br>H = PNP Sourcing Outputs |                |                  |                   | <b>PPR (Pulses per Revolution)</b><br><b>Channel Types "S" and "Q"</b><br>001 002 003 004 005<br>006 007 008 009 010<br>012 013 014 015 016<br>018 020 024 025 030<br>050 060<br><b>Added Channel Types "S" (Square Wave)</b><br>026 028 032 036 040<br>048 100 120 |
| <b>Shaft Extension</b><br>1=Single<br>2=Double               | <b>Mounting Type</b><br>1=10-32 BHC on Shaft<br>Ends & Base<br>2=Flanged Base<br>(BHC on Shaft Ends)<br>3=No Holes on Base<br>(BHC on Shaft Ends)                             |                |                |                | <b>Channel Types</b><br>S=Single Channel<br>Q=Quadrature Outputs   |                |                  |                   |   |