

Hercules Encoders

Series 4000

Heavy Duty Incremental Rotary Shaft Encoder

- Enclosure: SLIMLINE — 3" x 3" x 1½" Space-Saver NEMA 12/13 or NEMA 4 type Sealing — Flush or Flanged Base Styles
- Inherently Anti-Jitter Circuitry, Shatterproof Metal Code Discs
- Internally and Externally Shielded ABEC 5 Stainless Steel Bearings, Mounted Internally
- Low Supply Current Requirement — 30milliamps typical per encoder, maximum of 50 mA
- Operating Voltage Flexibility — 8 to 28 Vdc or 5 Vdc TTL Output, 5V or 8-15V with Line Driver
- Operating Temperature Rating designed for extremes, from -40° to +85° C (-40° to +185° F)



14

H e r c u l e s

Specifications

Mechanical

| | |
|-----------------------------|--|
| Shaft Speed | 6000 RPM maximum |
| Shaft Direction | Bidirectional |
| Standard Shaft Sizes (Dia.) | .2497", .3747", .4997" |
| 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 | (3/8") 30 lbs. Operating (1/2") 70 lbs. Operating |
| Axial Loading | (3/8") 15 lbs. Operating (1/2") 35 lbs. Operating |
| Accuracy | ±0.1° of Shaft Rotation Typical |
| Housing | Black Anodized Aluminum |
| Weight | 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 Line Drivers (5 Vdc/ TTL level, 8 to 15 Vdc) All line drivers have complementary outputs. |
| Output Ratings | |
| Open Collector Transistor | 40 Vdc maximum |
| Line Drivers 8-15 Vdc | 15 Vdc maximum |
| 5 Vdc TTL | 5.5 Vdc maximum |
| Supply Voltage | 8 to 28 Vdc 5 Vdc with 5V TTL level output |
| Supply Current | 30 mA typical, 50 mA maximum |
| Current Sinking | 250 mA maximum |
| Output Duty Cycle | 50/50 w/ ±20% typical tolerance Tighter to ±5% by spec |
| Pulsed Outputs | 5-10 µsec or 25-35 µsec |
| Rise/Fall Times | 1 µsec typical, other options available |
| | See Wiring Diagrams for Pin Outs |

Environmental

| | |
|---------------------|--------------------------------------|
| Operating Temp. | -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 type — Water-tight |
| (Std) | NEMA 12/13 equiv. — Dust-, Oil-Tight |

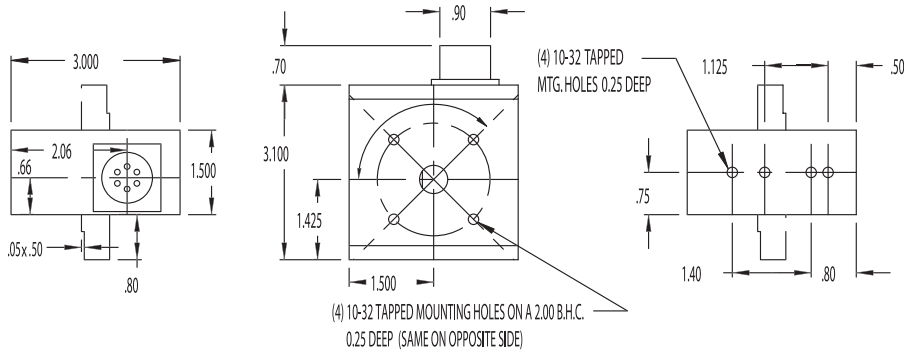
Electrical Connections

| Function | Pin | Color |
|-------------------|-----|-------|
| +V | B | Red |
| Common | A | Black |
| Channel A | D | Blue |
| Channel B | E | Brown |
| Channel \bar{A} | C | White |
| Channel \bar{B} | F | Green |

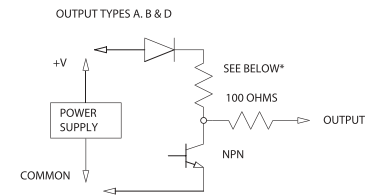
For the latest specifications visit our website
www.herculesencoders.com

Dimensional Drawings

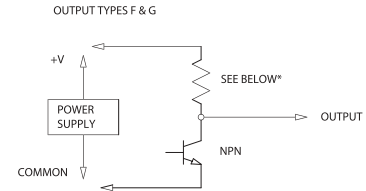
Series 4000 Standard *call for sealed dimensions*



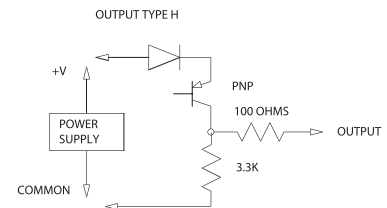
Wire Drawings



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

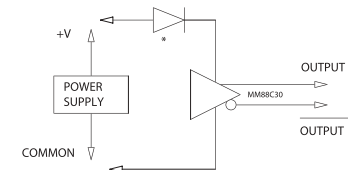


+5 Vdc
*3.3K Pullup on "F", Not installed on "G"



+8 TO +28Vdc

OUTPUT TYPES K & L



+8 TO +15Vdc on "L", +5V on "K"
*Only installed on "L"

Ordering Information

Series **4 4 2 1** Encoder Type **A** Channel Outputs **Q** Channel Types **0600**

Series

1=1/4" (0.2497")
3=3/8" (0.3747)
4=1/2" (0.4997)

Shaft Diameter

1=Single
2=Double

Shaft Extension

1=10-32 BHC on Shaft Ends & Base
2=Flanged Base (BHC on Shaft Ends)

Mounting Type

Encoder Type

_=Standard Encoder
S=Sealed (Elastomer)
T=Sealed (PTFE)

Channel Outputs

A=NPN 3.3K Pullup
B=NPN Open Collector
D=NPN 1.5K Pullup
F=5Vdc TTL NPN w/Pullup
G=5Vdc TTL NPN OC
H=PNP Sourcing Output
K=5Vdc Line Driver
L=8 to 15 Vdc Line Driver

Channel Types

S=Single Output
Q=Quadrature Output
P=1st Output CW Pulses
2nd Output CCW Pulses
U=1st Output Pulse Train
2nd Output Logic High for CW Rotation. Low for CCW Rotation

PPR (Pulses per Revolution)

For all Channel Types

| | | | | | | |
|------|------|------|------|------|------|------|
| 0025 | 0030 | 0050 | 0060 | 0075 | 0090 | 0093 |
| 0096 | 0100 | 0120 | 0125 | 0128 | 0135 | 0150 |
| 0180 | 0186 | 0192 | 0200 | 0210 | 0240 | 0250 |
| 0256 | 0270 | 0300 | 0360 | 0372 | 0400 | 0420 |
| 0480 | 0500 | 0512 | 0540 | 0600 | 0720 | 0840 |
| 0960 | 1000 | 1024 | | | | |

Added Channel Types "S" "P" "U" (Square Wave)

0384 0744 0800 1080 1200 1440 1680 1920 2000 2048

Added "S" "P" "U" (5-10 & 25-35 μSec Pulses)

0768 1488 1600 2160 2400 2880 3360 3840 4000 4096

Consult factory for PPR not listed