

# Hercules Encoders

## Series 4000HR

### Heavy Duty Incremental Rotary Shaft Encoder

- Enclosure: Slimline - 3" x 3" x 1 1/2" Space-Saver
- NEMA 12/13 or NEMA 4 type Sealing - Flush or Flanged Base Styles
- Inherently Anti-Jitter Circuitry, Shatterproof Code Disks
- Internally and Externally shielded ABEC 5 Stainless Steel Bearings, Mounted Internally
- Low Supply Current Requirement - 50 milliamps typical per encoder, maximum of 80 mA
- Operating Voltage Flexibility - 8 to 28 Vdc or 5 Vdc Output, 5V or 8-15V with Line Driver
- Operating Temperature Rating designed for extremes, from -40° to +85°C (-40° to +185°F)



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## Specifications

### Mechanical

Shaft Speed	1500 RPM maximum
Shaft Direction	Bidirectional
Standard Shaft Sizes (Dia.)	.2497", .3747"
Shaft Extension(s)	0.80" with .50 x .05" flat
Shaft Seals	Neoprene or PTFE Options
Mounting	Refer to dimensional drawings
Bearings	ABEC 5 Shielded
Radial Loading	(3/8") 30 lbs. Operating
Axial Loading	(3/8") 15 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 125 kHz
Outputs	NPN w/ pullup; NPN open collector; PNP sourcing Line Driver (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	50 mA typical, 80 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

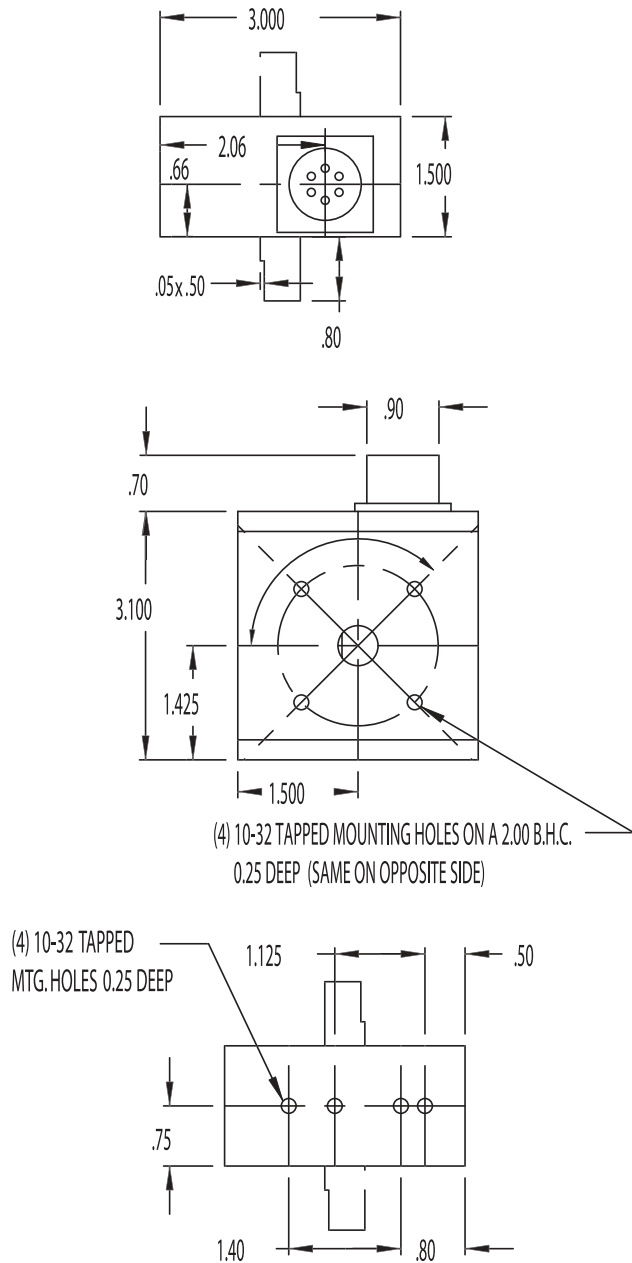
### Electrical Connections

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](http://www.herculesencoders.com)

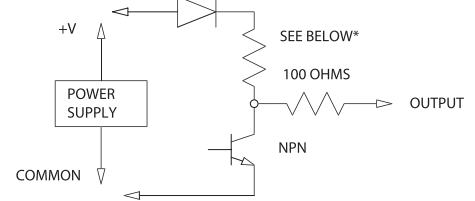
# Dimensional Drawings

Series 4000HR Standard *call for sealed dimensions*



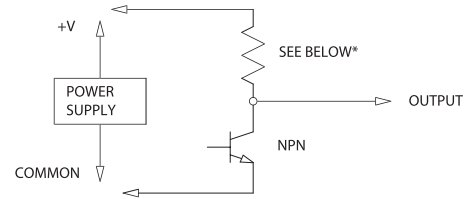
# Wire Drawings

OUTPUT TYPES A, B & D



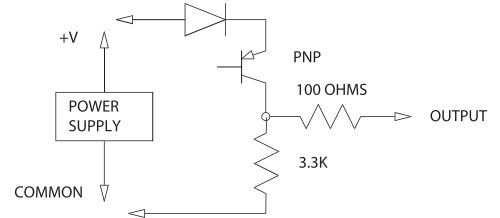
+8 to +28Vdc \*Maximum of 18Vdc for "D" output  
\*3.3K pullup on "A", Not installed on "B", 1.5K on "D"

OUTPUT TYPES F & G



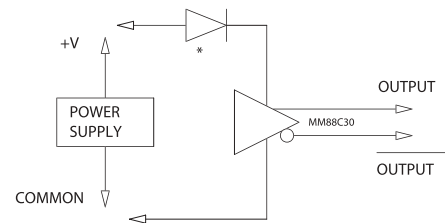
+5 Vdc  
\*3.3K Pullup on "F", Not installed on "G"

OUTPUT TYPE H



+8 TO +28Vdc

OUTPUT TYPES K & L



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

# Ordering Information

Series 4 X X X —

Encoder Type  
—Standard Encoder  
S=Sealed (Elastomer)  
T=Sealed (PTFE)

Mounting Type  
1=10-32 BHC on shaft ends and base  
2=Flanged base (BHC on shaft ends)

Shaft Diameter  
1=1/4" (0.2497")  
3=3/8" (0.3747")

Shaft Extension  
1=Single  
2=Double

Channel Outputs X X 4096

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

PPR (Pulses per Revolution)

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