



FEATURES

- **Compact, Robust, Economical**
- **Up to 256 Pulses Per Revolution (PPR) in a 1" Square Sealed Package**
- **Bearing Model for Long Life Applications**
- **Low Profile Housing Style**
- **Two Channel Quadrature Output**
- **Pin or Cable Output**

BENEFITS

- **Compact Size, Higher Resolution**
- **Excellent in Motor Control Applications**
- **Low Profile**
- **Longer Life**
- **Excellent Performance in Harsh Environments**

The Electroswitch 900 Series offers a full line of low cost, rugged optical encoders with incremental output. Well suited for industrial motion and position sensing applications, their low profile and high resolution also make them ideal for panel mounted applications. A two-channel quadrature code allows the encoder to detect the direction, magnitude and speed of the input motion applied to its shaft.

APPLICATIONS

MOTOR CONTROL DEVICES

Control of motor circuits is accomplished by linking encoder to motor shaft

- Material Handling Equipment
- Machine Tools
- Conveyor Belts
- Printing Equipment
- Elevators
- Factory Automation

FLOW CONTROL DEVICES

Fluid flow can be metered by the encoder attached to displacement turbine and other styles of meters and pumps

- Manufacturing Process Controls
- Valve and Flow controls
- Fuel Pumps

AUDIO/ENTERTAINMENT

Frequency Select for Professional and High End Audio Applications

- Mixing Consoles
- High End Amplifiers
- Lighting Controls (intensity select)

AVIONICS

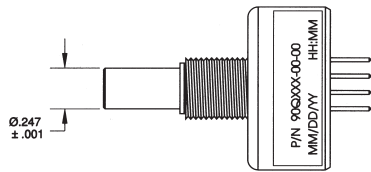
- Altitude Positioning
- Missile Firing and Guidance
- In-flight Refueling
- Auto Pilot Controls

MEDICAL

- Infusion Pump Flow
- Dispensing Equipment
- Automated Vial Sampling Equipment
- Dialysis Machines
- Ventilators

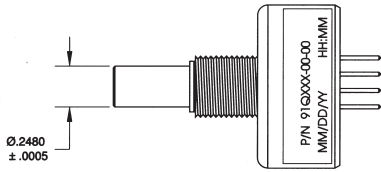
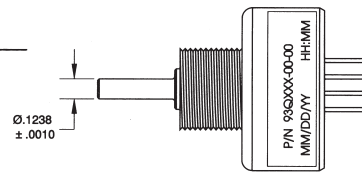
INDUSTRIAL POSITION SENSING AND POSITION CONTROL

- Off Road / Construction Equipment
- Lift Trucks
- Welding Machines



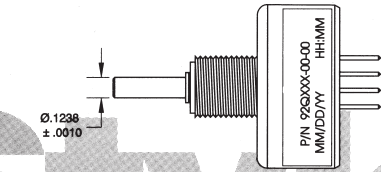
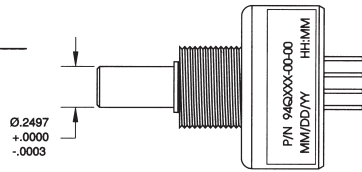
90 Series
Die Cast Shaft
Sleeve Bearing

93 Series
Stainless Steel Shaft
Sealed Ball Bearing



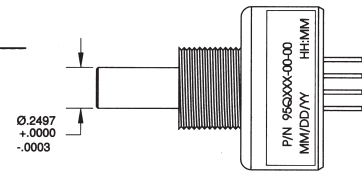
91 Series
Stainless Steel Shaft
Sealed Sleeve
Bearing

94 Series
Stainless Steel Shaft
Ball Bearing

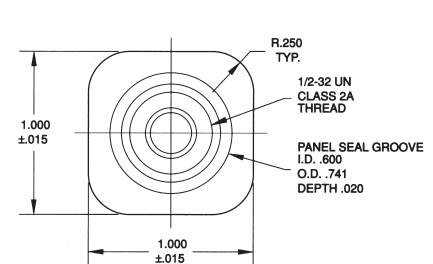
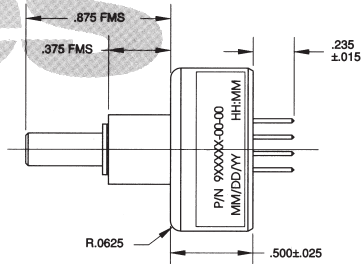
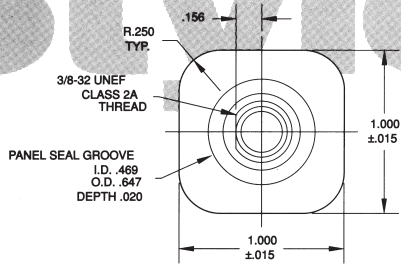


92 Series
Die Cast Shaft
Ball Bearing

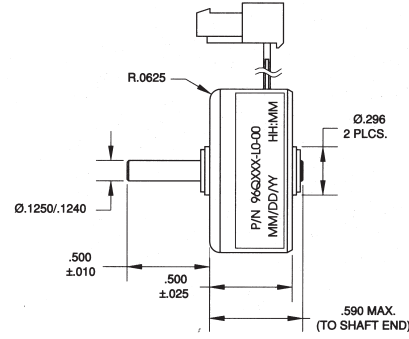
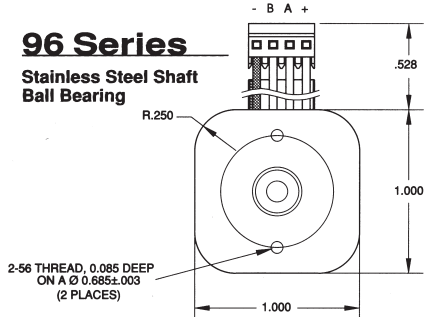
95 Series
Stainless Steel Shaft
Sealed Ball Bearing



Styles



96 Series
Stainless Steel Shaft
Ball Bearing

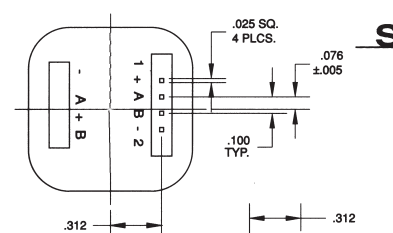


Notes:
All dimensions in inches unless otherwise specified.

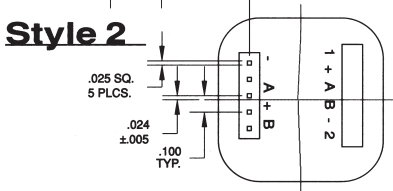
Hardware:
All standard product comes with the following mounting hardware:

- Nut
Hexagon machine screw nut, UNEF thread
Thickness: .093 ± .006
- Lockwasher
Internal tooth
Thickness: .022

Pin Out Styles

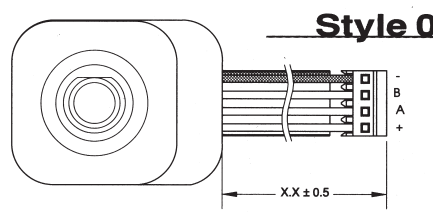


Style 0

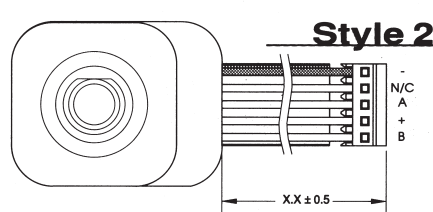


Style 2

Cabin Styles

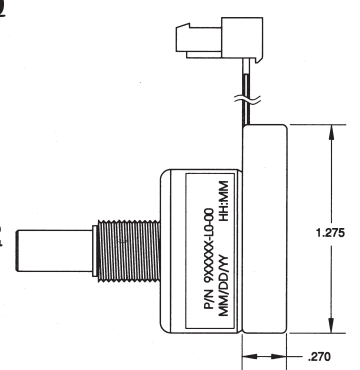


Style 0



Style 2

Note: 4" cable and connector standard.



Electrical Specifications

Parameter	Minimum	Typical	Maximum	Units
Vcc Range	4.75	5	5.25	V
<i>For 200 & 256 ppr only</i>	4.8	5	5.2	V
Supply Current @ 5V (Output Low) No Load		30	50	mA
VOH @ 100mA (Vcc = 5V)	3.0	4		V
VOL @ 16mA (Vcc = 4.75V)		290	700	mV
Pull-Up Resistor	7.5	10.5	13.5	KOhm
Output Rise Time (CL-15pF)		500		nS
Output Fall Time (CL-15pF)		14		nS
Output: 2-bit gray code, Channel A leads Channel B by 90° with clockwise rotation				
Power Consumption: 250mW max.				

Environmental Specifications

Parameter	Minimum	Typical	Maximum	Units
Operating Temperature: Vcc = 5V	-40	25	85	°C
<i>For 200 & 256 ppr only</i>	0	20	50	°C
Storage Temperature Range: -55°C to +105°C, per MIL STD 202F Method 107G Test Condition A except 105°C max				
Humidity: MIL STD 202F Method 103B Condition A				
Solderability: 95% coverage				

Mechanical Specifications

Vibration: Harmonic motion with amplitude of 15g, varied from 10 to 2000 Hz for 12 hours, per MIL STD 202F Method 204D Condition B

Shock: 100g for 6 ms half sine wave with velocity change of 12.3 ft/s, per MIL STD 202F Method 213B Condition C

Rotational Torque: Sleeve bearing: < 1 in. oz. max., Ball bearing: < .25 in. oz. max., higher for sealed unit.

Operating Speed: Sleeve bearing: 200 RPM max., Ball bearing: 3,000 RPM max.

Shaft End Play: 0.005 max.

Shaft Radial Play: 0.010 max. @ .75 from mounting surface

Shaft Push In Force: 50 lbs. max.

Shaft Pull Out Force: 25 lbs. max.

Bushing Mounting Torque: 10 in. lb. max.

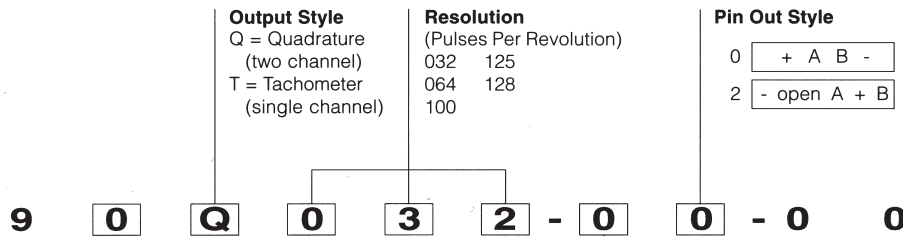
Weight: 1.1 oz. (90Q128-00-00)

Terminal Strength: 3 lbs. max. applied perpendicular to the terminals

Rotational Speed, Rotational Life and Shaft Side Load Rating:
(Load placed at end of standard shaft)

Series Number	Rotational Life	Rotational Speed Rating	Side Load Rating
90	5,000,000 +	200 rpm	0.25 lb.
91	10,000,000 +	300 rpm	0.50 lb.
92	100,000,000 +	3,000 rpm	0.25 lb.
93	100,000,000 +	3,000 rpm	5.0 lb.
94	100,000,000 +	3,000 rpm	5.0 lb.
95	100,000,000 +	3,000 rpm	5.0 lb.
96	100,000,000 +	3,000 rpm	3.0 lb.

Ordering Information



Output Style
Q = Quadrature (two channel)
T = Tachometer (single channel)

Resolution
(Pulses Per Revolution)
032 125
064 128
100

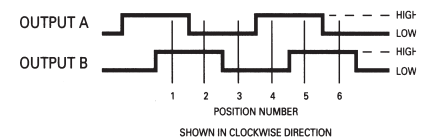
Pin Out Style
0 + A B -
2 - open A + B

Shaft and Bearing Style
0: 1/4" dia. shaft, sleeve bearing, 3/8" dia. bushing
1: 1/4" dia. shaft, sealed sleeve bearing, 3/8" dia. bushing
2: 1/8" dia. shaft, ball bearing, 3/8" dia. bushing
3: 1/8" dia. shaft, sealed ball bearing, 1/2" dia. bushing
4: 1/4" dia. shaft, ball bearing, 1/2" dia. bushing
5: 1/4" dia. shaft, sealed ball bearing, 1/2" dia. bushing
6: 1/8" dia. shaft, internal ball bearing

Termination
0: Straight Pins (see drawing)
4: Standard 4" cable and connector
L: Custom cable length
Example: 8 = 8" cable length

Custom Configurations Available

Two Channel Waveform



Electrical Schematic

