**DYNAPAR**™
Headquarters: 1675 Delany Road • Gurnee, IL 60031-1282 • USA
**Visit us at www.dynapar.com**

**Customer Service:**
Tel.: +1.800.873.8731
Fax: +1.847.662.4150
custserv@dynapar.com

**Technical Support**
Tel.: +1.800.234.8731
Fax: +1.847.782.5277
dynapar.techsupport@dynapar.com

# Encoder Installation Manual
## *Dynapar*™ *brand*
## SERIES F10
## For Stepper & Small Servo Motors

**Document No.:** 702453-0001
**Revision Level:** D
**October 20, 2016**

✓ **RoHS**

## DESCRIPTION

The Dynapar brand Series F10 encoder provides high performance, cost effective feedback for stepper and servo motor applications. The F10 offers compact package dimensions and flying leads for a low-profile installation.  A size 10 servo ring allows easy mounting and replacement of pancake resolvers with high tolerance to motor shaft movement and 360 degrees of adjustment to align the signal outputs to the shaft position.

## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental with commutation option, Optical

**Resolution:** 1024 or 2048 PPR incremental with 6 pole commutation channels

**Accuracy:** Incremental: ±2.5 arc-mins. max. edge to any edge; Commutation: ±6 arc-mins. max.

**Phasing for CCW rotation of motor shaft** : A leads B by 90° and U leads V leads W by 120 °.

**Minimum edge separation:** A to B is 45°

**Index to U channel:** +/- 1 °mech. index pulse center to U channel edge.

**Index Pulse Width:** 90° gated A and B high

### ELECTRICAL

**Input Power Requirements:** 5±10% VDC at 100 mA max (incremental and commutation), excluding output load

**Output Signals:**
Incremental: 26LC31 Differential Line Driver, sink / source 40 mA max.
Commutation: Open Collector w/2.0 kΩ pull-ups, 8 mA sink max.; or 26LC31 Differential Line Driver, sink / source 40 mA max.

**Frequency Response:** 300 kHz, max.

**Termination:** Flying leads, stranded 26 AWG, twisted pair, PVC insulation, 6.5" length ±0.5"

### MECHANICAL

**Bore Diameter:** 6mm

**Bore Dia. Tolerance:** +0.001"/-0.000" (+0.025 mm/-0.000 mm)

**Dimensions:** Outside Diameter : 1.25" (31.7mm), max.; Height: 0.89" (24.1mm), max.

**Mating Shaft Runout:** 0.002" (0.05 mm) max. (Includes shaft perpendicularity to mounting surface)

**Mating Shaft Axial movement:** ±0.010" (±0.25 mm)

**Mounting:** 1.030" (26.16mm) servo ring with integral flexure (size 10 pancake resolver equivalent)

**Acceleration:** 100,000 rad/sec.$^2$ max.

**Velocity:** 5,000 RPM continuous; 12,000 RPM peak

**Moment of Inertia:** 2.22X10$^{-5}$ in-oz-sec.$^2$ (1.6 gm-cm$^2$)

**Housing & Cover Material:** Housing: cast aluminum; Servo Ring: glass reinforced engineering resin; Hub: brass; Disc: 0.030" (0.76mm) thick glass

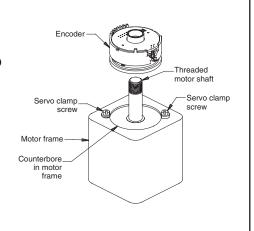**Weight:** 1.6 oz. (45 gm) typ.

### ENVIRONMENTAL

**Operating Temperature:** 0° to +120°C

**Storage Temperature:** 0° to +120°C

**Shock:** 50 Gs for 6 msec duration

**Vibration:** 2.5 Gs at 5 to 2000 Hz
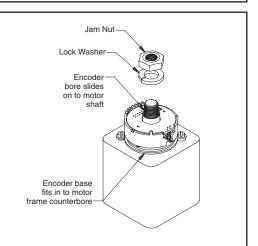
**Humidity**: 90% (non-condensing)

**Servo ring mounting with integral flexure is size 10 pancake resolver equivalent**
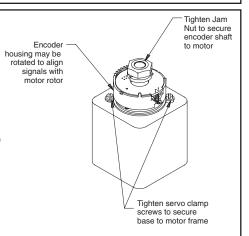
# INSTALLATION INSTRUCTIONS (See figures Below)

1) Slide encoder onto motor shaft an allow base ring to seat onto motor housing.

Encoder

Threaded motor shaft

Servo clamp screw
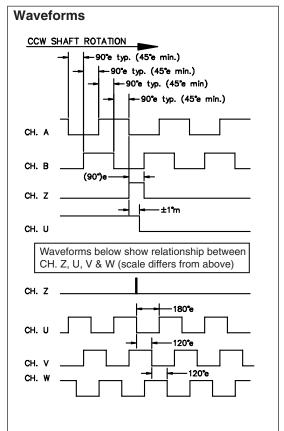
Servo clamp screw

Motor frame

Counterbore in motor frame

2) Install washer and jam nut and tighten (50 in-lbs [5 N-m] max.).

3) Attach wire leads to drive termination (See Electrical Connections, left).

Jam Nut

Lock Washer

Encoder bore slides on to motor shaft

Encoder base fits in to motor frame counterbore

4) Adjust commutation signals by rotating encoder housing.

5) Tighten servo clamp screws onto base ring (torque depends on clamp screw used).

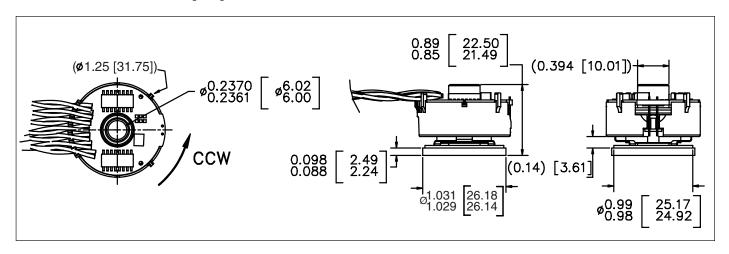Tighten Jam Nut to secure encoder shaft to motor

Encoder housing may be rotated to align signals with motor rotor

Tighten servo clamp screws to secure base to motor frame

## Waveforms

CCW SHAFT ROTATION

90°e typ. (45°e min.)
90°e typ. (45°e min.)
90°e typ. (45°e min)
90°e typ. (45°e min.)

CH. A

CH. B          (90°)e

CH. Z

CH. U          ±1°m

Waveforms below show relationship between CH. Z, U, V & W (scale differs from above)

CH. Z

CH. U          180°e

CH. V          120°e

CH. W          120°e

### Electrical Connections

| Function* | Cable Wire Color |
|-----------|------------------|
| VCC | RED |
| GND | BLACK |
| A⁻ | BLUE/BLACK |
| A | BLUE |
| B⁻ | GREEN/BLACK |
| B | GREEN |
| Z⁻ | VIOLET/BLACK |
| Z | VIOLET |
| U⁻ | BROWN/BLACK |
| U | BROWN |
| V⁻ | GRAY/BLACK |
| V | GRAY |
| W⁺ | WHITE/BLACK |
| W | WHITE |

* Function availability dependant on Model

# DIMENSIONS - Inches [mm]

(⌀1.25 [31.75])

⌀0.2370 / 0.2361 [⌀6.02 / 6.00]

CCW

0.098 / 0.088 [2.49 / 2.24]

0.89 / 0.85 [22.50 / 21.49]

(0.394 [10.01])

(0.14) [3.61]

⌀1.031 / 1.029 [26.18 / 26.14]

⌀0.99 / 0.98 [25.17 / 24.92]

# ORDERING

## Ordering Information
To order, complete the model number with code numbers from the table below:

| Code 1: Model | Code 2: PPR, Poles | Code 3: Mount | Code 4: Electrical | Code 5: Bore | Code 6: Termination |
|---|---|---|---|---|---|
| **F10** | ☐☐☐☐/☐ | **0** | ☐ | **4** | **0** |
| | | Ordering Information | | | |
| **F10** Size 10 Commutating Encoder | Incremental channels only<br>**1024/0**<br>**2048/0**<br><br>Incremental plus Commutation channels<br>**2048/6** | **0** Servo mount 1.030 Diameter x .095 thick | Available when Code 2 is XXXX/0<br>**3** 5V in, line driver out incremental only<br><br>Available when Code 2 is XXXX/6<br>**6** 5V in, line driver out for incremental; 5V in, open collector out for commutation<br>**9** 5V in, line driver out for incremental; 5V in, line driver out for commutation | **4** 6mm thru bore | **0** 6.5" ±0.5" Twisted Pair Flying Leads |