

# SERIES F18

# Dynapar™ brand

## For Stepper & Small Servo Motors

### Key Features

- **Under 2.0" Diameter Package with High 10,000PPR Capability**
- **Easy to Install Hollowshaft and Spring Tether Design**
- **Up to 120°C Temperature Range Doesn't Limit Motor Performance**



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

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

**Resolution:** 500, 512, 1000, 1024, 2000, 2048, 2500, 4096, 5000, 8192, 10,000 PPR incremental with 4, 6, 8 or 12 pole commutation channels

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

**Phasing for CCW rotation of motor shaft** (viewing encoder cover): A leads B by  $90^\circ$  and U leads V leads W by  $120^\circ$ .

**Minimum edge separation** A to B is  $45^\circ$ .

**Index to U channel:**  $\pm 1^\circ$  mech. index pulse center to U channel edge.

**Index Pulse Width:**  $90^\circ$  gated A and B high; ( $180^\circ$  gated B high gating options available - consult factory)

### ELECTRICAL

**Input Power Requirements:**  $5 \pm 10\%$  VDC at 150 mA max (incremental only); 175 mA max. (incremental and commutation), excluding output load

#### Output Signals:

Line Driver: sink / source 40 mA max.,  
Open Collector Incremental ( $\leq 2048$  PPR): 16 mA sink max.  
Open Collector Commutation: 30 mA sink max. (2.0 k $\Omega$  pull-ups in encoder)

#### Frequency Response:

PPR  $\leq 2048$ : 250 kHz; PPR  $> 2048$ : 500 kHz

**Termination:** 16 pin, fully shielded, 2mm pitch, double row header. Accessory mating cable assembly available: 26 AWG twisted pair, jacketed and shielded with copper drain wire

### MECHANICAL

**Weight:** 4 oz. (110 gm) typ.

**Dimensions:** Outside Diameter with cover: 1.96" (49.8mm), without cover 1.85" (47.0mm); Outside collar height 1.71" (43.4mm), inside collar height 1.50" (38.1mm)

**Material:** Bearing housing: aluminum;  
Cover: high temperature, glass filled polymer;

Hub: Brass; Disk: 0.030" thick glass

**Finish:** Cover: RAL 7010 (dark grey)

**Moment of Inertia:**  $5.3 \times 10^{-4}$  in-oz sec.<sup>2</sup> (37.3 gm-cm<sup>2</sup>)

**Hub Diameters:** 1/4", 3/8", 7/16", 1/2", 6mm, 8mm, 10mm, 12mm standard

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

**Mating Shaft Length:** 1.62" (41 mm) minimum for outside shaft collar. 0.50 inch minimum for inside shaft collar

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

**Mating Shaft Axial movement:**  $\pm 0.060$ " ( $\pm 1.52$  mm)

**Mounting:** Four standard configurations are available for tethers. A choice of U.S. and Metric screws are included. Mounting holes should be 0.01" (0.254 mm) true position to shaft for best encoder operation.

**Shaft clamp:** 2 #6-32 set screws in collar around hub shaft (will not mar shaft)

Electrical/Mechanical Alignment Range:  $\pm 15^\circ$  mechanical typical (see tether options)

**Acceleration:** 100,000 rad/sec.<sup>2</sup> max.

**Max. Velocity:** RPM = (Frequency / PPR) x 60; or 12,000 RPM, whichever is less;

**Bearing Life:**  $[(3.6 \times 10^9) / \text{RPM}]$  Hours; e.g. 605,000 hours @ 6,000 RPM

*(Based on bearing manufacturer's suggested calculation for 6803ZZ with 37N equivalent dynamic load - including preload and tether reaction loads - at 6000 RPM continuous with adequate lubrication)*

### ENVIRONMENTAL

**Operating Temperature:**  $0^\circ$  to  $+120^\circ\text{C}$

**Storage Temperature:**  $-40^\circ$  to  $+120^\circ\text{C}$

**Shock:** 100 Gs for 6 msec duration

**Vibration:** 2.5 Gs at 5 to 2000 Hz

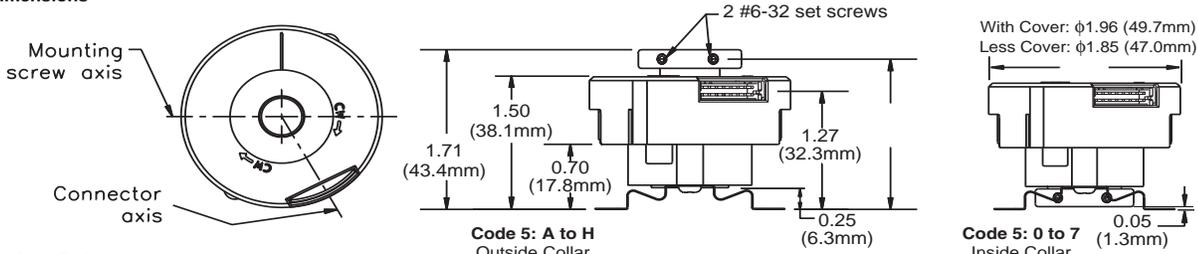
**Relative Humidity:** 90% non-condensing

**Enclosure Rating:** NEMA 1 / IP40 (for models with cover)

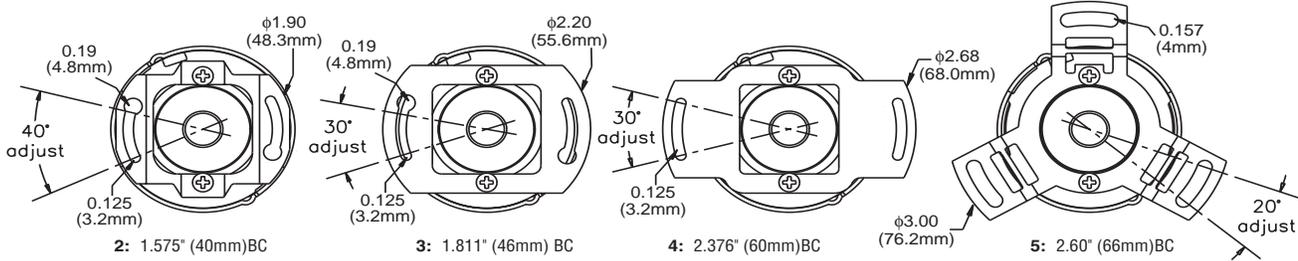


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**Dimensions**



**Code 3: Tethers**



**Electrical Connections**

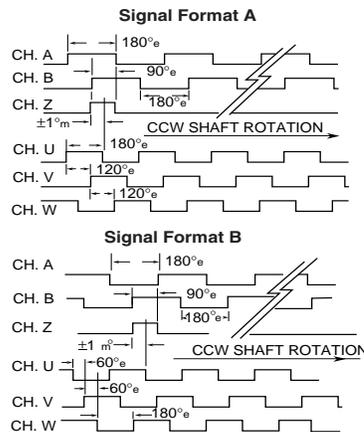
Pin	Function*	Cable Wire Color
1	VCC	RED
2	U	Brown
3	GND	BLACK
4	V	GRAY
5	A	BLUE
6	W	WHITE
7	A	BLUE/BLACK
8	NONE	NONE
9	B	GREEN
10	U	BROWN/BLACK
11	B	GREEN/BLACK
12	V	GRAY/BLACK
13	Z	VIOLET
14	W	WHITE/BLACK
15	Z	VIOLET/BLACK
16	NONE	NONE

\* Function availability dependant on Model

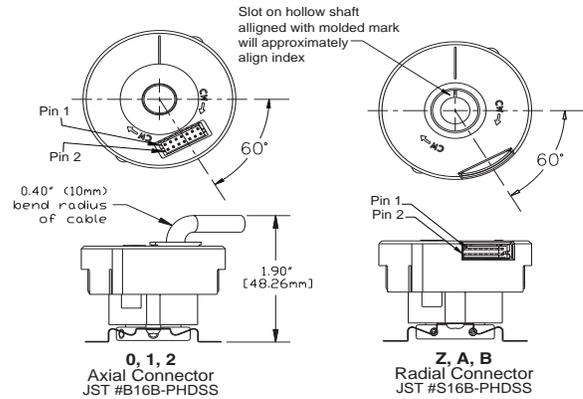
**Mating Cable Assembly:**

Incremental only, 111752-000x  
Incremental + Comm., 111753-000x  
x= length in feet

**Output Waveforms**



**Code 6: Termination**



**Ordering Information**

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

Code 1: Model	Code 2: PPR, Poles	Code 3: Tether	Code 4: Electrical	Code 5: Shaft/Bore	Code 6: Termination
<b>F18</b>	□□□□/□	□	□	□	□

**Ordering Information**

F18	Size 18 Commutating Encoder	Incremental channels only		0 No Tether 2 2 #2 on 1.575" Diameter 3 2 #4 on 1.811" Diameter 4 2 #4 on 2.376" Diameter 5 3 #4 on 2.60" Diameter 7 2 M2.5 on 40 mm Diameter 8 2 M3 on 46 mm Diameter 9 2 M3 on 60 mm Diameter A 3 M3 on 66 mm Diameter	Available when Code 2 is ≤ 2048/0 0 5V in, open collector out incremental only C 5V in, open collector out incremental only - reverse phase Available when Code 2 is XXXX/0 3 5V in, line driver out incremental only D 5V in, line driver out incremental only - reverse phase Available when Code 2 is XXXX/4, XXXX/6, XXXX/8 or XXXX/C 6 5V in, line driver out for incremental; 5V in, open collector out for commutation E 5V in, line driver out for incremental; 5V in, open collector out for commutation - reverse phase 9 5V in, line driver out for incremental; 5V in, line driver out for commutation F 5V in, line driver out for incremental; 5V in, line driver out for commutation - reverse phase	Inside Collar: 0 1/4 in. 1 3/8 in. 2 7/16 in. 3 1/2 in. 4 6 mm 5 8 mm 6 10 mm 7 12 mm Outside Collar: A 1/4 in. B 3/8 in. C 7/16 in. D 1/2 in. E 6 mm F 8 mm G 10 mm H 12 mm	Code			Length
		Connector/Cable	Wire				Pigtail			
		0500/0	2500/0				0	Z	N/A	None
		0512/0	4096/0				1	A	J	1 Ft.
		1000/0	5000/0				2	B	K	2 Ft.
		1024/0	8192/0				3	C	L	3 Ft.
		2000/0	10E3/0*				4	D	M	4 Ft.
		2048/0	*= 10000/0				5	E	N	5 Ft.
		0500/†	2500/†				6	F	P	6 Ft.
		0512/8	4096/†				7	G	Q	7 Ft.
		1000/†	5000/†				8	H	R	8 Ft.
		1024/†	8192/†							
		2000/†	10E3/†*							
		2048/†	*= 10000/†							

† Available with 4, 6, 8 or 12 pole. (12 pole is designated by character "C")  
Examples: 1024/8 is 1024PPR, 8 pole; 2000/C is 2000PPR, 12 pole

**CONNECTION OPTIONS**  
You may choose an integral connector mounted in axial or radial position. Available with or without mating connector/cable. Alternatively, a direct-solder pigtail cable is offered.