

Series F18 Commutating

- Premium servo motor feedback in a compact, reliable, and easy-to-install package
- Outside diameter 1.96" (50 mm)
- Resolution to 10,000 PPR for low speed smoothness
- Frequency response to 500 kHz
- Operation to 120°C doesn't limit machine performance



MOTOR MOUNT

APPLICATION/INDUSTRY

The Dynapar brand Series F18 encoder provides high performance, cost effective feedback for stepper and servo motor controls. The F18 offers compact package dimensions and a pluggable pin header.

DESCRIPTION

A compliant tether allows easy mounting with high tolerance to motor shaft movement and 30 degrees of adjustment to align the signal outputs to the shaft position.

A superior optical configuration allows for generous internal component clearance eliminating potential damage at high ambient operating temperatures. High temperature rated grease is standard for extended bearing life. No special tools are required for installation.

The use of optically-generated signals for Brushless DC (BLDC) servo control provides higher accuracy and reliability by eliminating the hysteresis found in competitive units with hall effect sensors, ensuring maximum performance and reliability of the servo system.

FEATURES AND BENEFITS

- The F18 design operates up to 120°C. The high temperature materials, phased array sensor, and low current requirements stabilize the output signals over a wide range of input voltage, ambient temperature, or output frequencies.
- The F18 features a clamping system, available in top or bottom locations, which does not mar the shaft, will not loosen over time and provides superior clamping force.
- For fast, easy installation a slot is provided on the encoder hollow shaft, which when is aligned to molded mark on cover, sets the index. The housing may be rotated to allow further adjustment of the index, or fine alignment of the commutation channels to the BLDC motor windings.
- The F18 outputs are protected from short circuits and operate on 5 VDC power.

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: ±2.5 arc-mins. max. edge to any edge; Commutation: ±6 arc-mins. max.
 Phasing for CCW rotation of motor shaft (viewing encoder cover): 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; (180° gated B high gating options available - consult factory)

ELECTRICAL

Input Power Requirements: 5±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 (2048 PPR): 16 mA sink max.
 Open Collector Commutation: 30 mA sink max. (2.0 kΩ pull-ups in encoder)
 Frequency Response:
 PPR ≤ 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

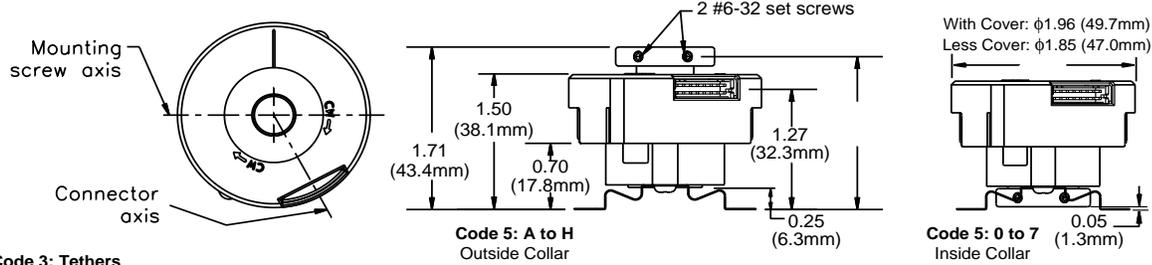
Weight: 4 oz. (110 gm) typ.
 Dimensions: Outside Diameter with cover: 1.96" (49.8mm), without cover 1.85" (47.0mm); Outside collar height 1.71" (43.4mm), inside collar height 1.50" (38.1mm)
 Material: Bearing housing: aluminum; Cover: high temperature, glass filled polymer; Hub: Brass; Disk: 0.030" thick glass
 Finish: Cover: RAL 7010 (dark grey)
 Moment of Inertia: 5.3X10⁻⁴ in-oz sec.² (37.3 gm-cm²)
 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: ±0.060" (±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: ±15° mechanical typical (see tether options)
 Acceleration: 100,000 rad/sec.² max.
 Max. Velocity: RPM = (Frequency / PPR) x 60; or 12,000 RPM, whichever is less;
 Bearing Life: [(3.6 X 10⁹) / 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

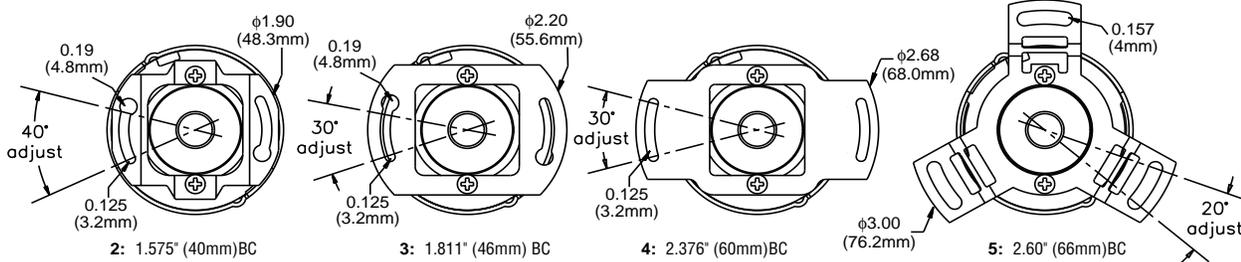
Operating Temperature: 0° to +120°C
 Storage Temperature: -40° to +120°C
 Shock: 100 Gs for 6 msec duration
 Vibration: 2.5 Gs at 5 to 2000 Hz
 Relative Humidity: 90% non-condensing
 Enclosure Rating: NEMA 1 / IP40 (for models with cover)

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Dimensions



Code 3: Tethers



Electrical Connections

Output Waveforms

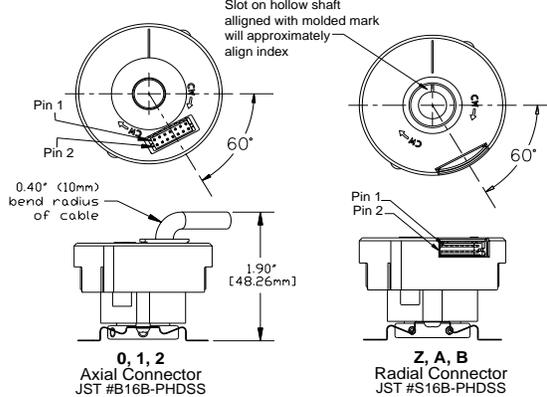
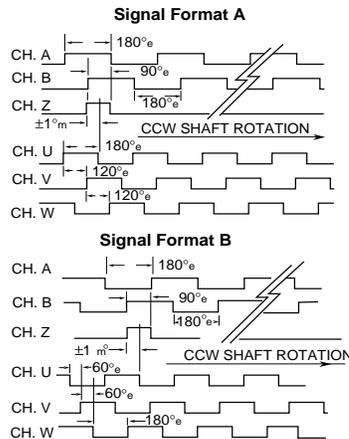
Code 6: Termination

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



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
F18	□□□□/□	□	□	□	□

Ordering Information

F18	Size 18 Commutating Encoder	Incremental channels only		Code 3: Tether	Code 4: Electrical	Code 5: Shaft/Bore	Code 6: Termination			Length
		Code 2: PPR	Code 2: Poles				Connector/Cable	Wire	Pigtails	
		0500/0	2500/0	0 No Tether	Available when Code 2 is ≤ 2048/0	Inside Collar:	0	1/4 in.		
		0512/0	4096/0	2 2 #2 on 1.575" Diameter	0 5V in, open collector out incremental only	1	3/8 in.			
		1000/0	5000/0	3 2 #4 on 1.811" Diameter	C 5V in, open collector out incremental only - reverse phase	2	7/16 in.			
		1024/0	8192/0	4 2 #4 on 2.376" Diameter	Available when Code 2 is XXXX/0	3	1/2 in.			
		2000/0	10E3/0*	5 3 #4 on 2.60" Diameter	3 5V in, line driver out incremental only	4	6 mm			
		2048/0	* = 10000/0	7 2 M2.5 on 40 mm Diameter	D 5V in, line driver out incremental only - reverse phase	5	8 mm			
		Incremental plus Commutation channels		8 2 M3 on 46 mm Diameter	Available when Code 2 is XXXX/4, XXXX/6, XXXX/8 or XXXX/C	6	10 mm			
		0500/†	2500/†	9 2 M3 on 60 mm Diameter	6 5V in, line driver out for incremental; 5V in, open collector out for commutation	7	12 mm			
		0512/†	4096/†	8 2 M3 on 46 mm Diameter	E 5V in, line driver out for incremental; 5V in, open collector out for commutation - reverse phase	Outside Collar:	A	1/4 in.		
		1000/†	5000/†	9 2 M3 on 60 mm Diameter	9 5V in, line driver out for incremental; 5V in, line driver out for commutation	B	3/8 in.			
		1024/†	8192/†	A 3 M3 on 66 mm Diameter	F 5V in, line driver out for incremental; 5V in, line driver out for commutation - reverse phase	C	7/16 in.			
		2000/†	10E3/†*			D	1/2 in.			
		2048/†	* = 10000/†			E	6 mm			
		Examples: 1024/8 is 1024PPR, 8 pole; 2000/C is 2000PPR, 12 pole				F	8 mm			
						G	10 mm			
						H	12 mm			

† Available with 4, 6, 8 or 12 pole. (12 pole is designated by character "C")

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.

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