

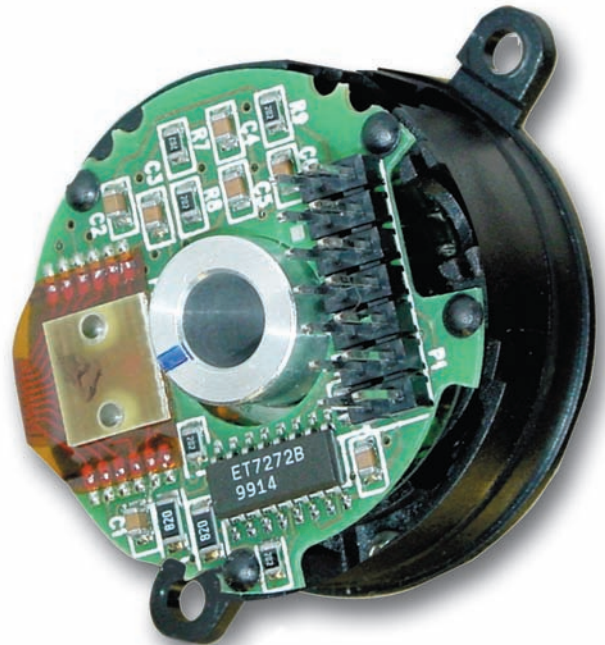
# SERIES M15

# Dynapar™ brand

## For Stepper & Small Servo Motors

### Key Features

- **Modular Encoder with Easy Installation Requiring No Special Gapping Tools or Parts**
- **Phased Array Sensor Technology Allowing .030" Axial Shaft Play**
- **Wide -20 to 120C Operating Temperature Range**



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental

**Resolution:** (pulses/revolution)

Incremental: 200 to 1024 PPR;

Commutation: 4, 6, or 8 pole

**Accuracy:**

Incremental:  $\pm 5$  arc-mins. max. edge to edge;

Commutation:  $\pm 6$  arc-mins. max.

**Sense:** (viewing encoder mounting surface)

Incremental: A leads B by  $90^\circ$  for CCW rotation of motor shaft;

Commutation: U leads V, V leads W by  $120^\circ$  for CW rotation of motor shaft

**Phasing:**

Incremental:  $90^\circ \pm 18^\circ$  electrical

Commutation: 8 Pole:  $30^\circ$ ; 6 Pole:  $40^\circ$ ; 4 Pole:  $60^\circ$  mechanical

Index to U Channel:  $\pm 1^\circ$  mechanical - Index center to U channel edge

**Symmetry:**

Incremental:  $180^\circ \pm 18^\circ$  electrical

Commutation: 8 Pole:  $45^\circ$ ; 6 Pole:  $60^\circ$ ; 4 Pole:  $90^\circ$  mechanical

**Index Pulse Width:**  $180^\circ \pm 36^\circ$  electrical (Gated with B low) standard

### ELECTRICAL

**Input Power Requirements:**

Incremental: 5 or 12 VDC  $\pm 10\%$  at 100 mA max.

(excluding output load);

Incremental w/Commutation: 5 or 12 VDC  $\pm 10\%$  at 120 mA max. (excluding output load)

**Output Signals:**

7272 Line Driver: 40 mA sink/source max.;

Open Collector w/2.0 k $\Omega$  pull-ups: 16 mA sink max.

**Frequency Response:** 200 kHz min.

**Termination:**

Connector: PCB mounted dual row head with 0.1" x 0.1" pin spacing, 10 pins (incremental only), 14 pins (w/commutation);

Cable: conductors - 28 AWG, stranded (7/36), insulation - black, PVC; Shield: aluminum/polyester foil plus tinned, copper drain wire (28 AWG, 7/36)

**Noise Immunity:** Conforms to EN50082-1 Light Industrial for Electro-Static Discharge, Radio Frequency Interference, Electrical Fast Transients, and Magnetic Fields (for models or applications with shielded cable)

### MECHANICAL

**Weight:**

Connector: 0.8 oz. (23 gm) typ.

Connector w/cover: 1.0 oz. (28 gm) typ.

Cable: 1.3 oz (37 gm) typ.

Cable w/cover: 1.5 oz. (43 gm) typ.

**Dimensions:**

Outside Diameter: 1.60" (40.7 mm) max. w/cover,

1.50" (38.2 mm) max. without cover;

Height: 1.27" (32.3 mm) max. (w/cover, excluding connector);

Emitter to Detector Gap: 0.070" (1.8 mm) min.

**Material:**

Base, Housing, & Cover: high temperature, glass filled polymer;

Hub: Aluminum; Disk: 0.030" thick glass

**Finish:**

Base & Housing: black;

Cover: RAL 7010 (dark grey)

**Moment of Inertia:**  $3.40 \times 10^{-5}$  in-oz sec.<sup>2</sup> (2.4 gm-cm<sup>2</sup>)

cm<sup>2</sup>)

**Hub Diameters:** 1/8", 1/4", 3/8", 3/16", 6 mm,

8 mm, 10 mm nominal

**Hub Dia. Tolerance:**  $+0.001"/-0.000"$  ( $+0.026$  mm/ $-0.000$  mm)

**Mating Shaft Length:** 0.45" (12 mm) min.; 0.85" (22 mm) max. inside cover

**Mating Shaft Runout:** 0.002" (0.05 mm) max.

(Includes shaft perpendicularity to mounting surface)

**Mating Shaft Endplay:**  $+0.015"/-0.015"$  ( $+0.38$  mm/ $-0.38$  mm) nominal ("+" indicates away from mounting face)

**Mounting:**

Base: (2) #4-40 (M2.5) #1 Phillips fillister head cap screw on 1.812" (46 mm) B.C., or (2) #2-56 (M2.0)

hex socket cap screw on 1.28" (32.5 mm) B.C.;

0.01" (0.254 mm) true position to shaft.

Shaft: split hub w/collar clamp, #2-56 hex socket cap screw (5/64" hex wrench included)

**Electrical/Mechanical Alignment Range:**  $\pm 15^\circ$  mechanical

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

**Velocity:** 12,000 RPM max.

### ENVIRONMENTAL

**Operating Temperature:**  $0^\circ$  to  $120^\circ$ C

**Storage Temperature:**  $-40^\circ$  to  $85^\circ$ C

**Shock:** 50 G's for 11 msec duration

**Vibration:** 2.5 G's at 5 to 2000 Hz

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

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



#### Satellite Locations:

- **North America:** North Carolina, South Carolina, Connecticut, Massachusetts, New York, Canada, British Virgin Islands
- **West Indies:** St. Kitts
- **Europe:** United Kingdom, Italy, France, Germany, Spain, Slovakia
- **South America:** Brazil
- **Asia:** China, Japan, Korea, Singapore

**Worldwide Brands:** NorthStar™ • Acuro™ • Dynapar™ • Hengstler™ • Harowe™

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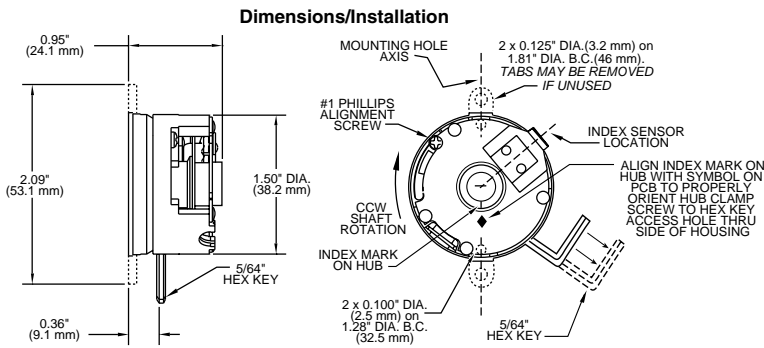
#### Technical Support

Tel.: +1.800.234.8731

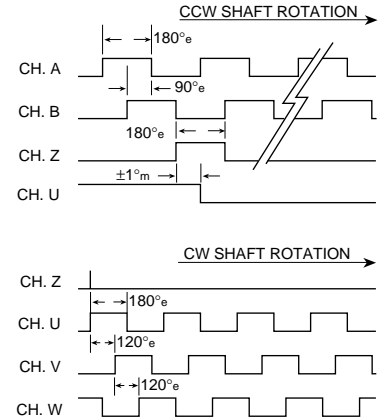
Fax: +1.847.782.5277

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**Output Waveforms (For clarity, compliments are not shown.)**



**Installation Instructions:**

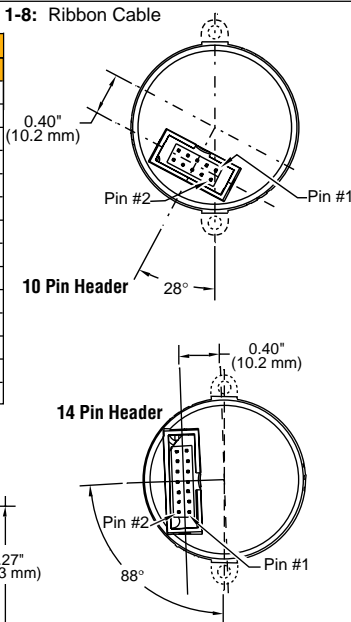
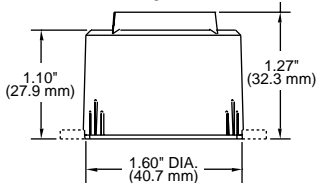
Incremental only models: Drawing #200638-0001  
Commutation models: Drawing #200638-0002

**Code 6: Terminations (Not all signals present on all models)**

Pin	10 Pin		14 Pin	
	O.C.	L.D.	O.C.	L.D.
1	A	—	Vcc	—
2	Vcc	Vcc	U	—
3	GND	GND	U'	—
4	—	—	V	—
5	—	A'	V'	—
6	—	A	W	—
7	—	B'	W'	—
8	B	B	A'	—
9	—	Z'	A	—
10	Z	Z	B	—
11	—	—	B'	—
12	—	—	Z	—
13	—	—	GND	—
14	—	—	Z'	—

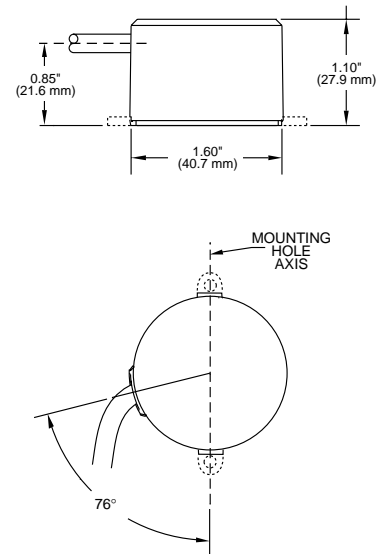
**Mating Cable Assembly:**

10 pin, 109524-000x  
14 pin, 110527-000x  
x = length in feet



Function	Wire Color	
	Incr. Only	Incr. & Comm.
Vcc com	—	RED/WHT
Vcc Inc	RED	RED
GND Inc	BLK	BLK
GND com	—	BLK/WHT
A'	RED/BLK	BLU/BLK
A	GRN	BLU
B'	WHT/BLK	GRN/BLK
B	ORN	GRN
Z'	BLU	VIO/BLK
Z	WHT	VIO
U'	—	BRN/BLK
U	—	BRN
V'	—	GRY/BLK
V	—	GRY
W'	—	WHT/BLK
W	—	WHT

**A-H: Shielded Cable**



**Ordering Information**

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

Code 1: Model	Code 2: PPR, Poles	Code 3: Cover	Code 4: Electrical	Code 5: Hub	Code 6: Termination
<b>M15</b>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> / <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Ordering Information						
<b>M15</b>	Size 15 Commutating Modular	Incremental channels only	<b>0</b> No cover <b>1</b> Enclosed, end-of-shaft mount <b>2</b> Through shaft	<b>0</b> 5V in, open collector out incremental only <b>1</b> 12V in, open collector out incremental only <b>3</b> 5V in, line driver out incremental only  Available when Code 2 is XXXX/4, XXXX/6, or XXXX/8 <b>6</b> 5V in, line driver out incr.; 5V in, open collector out comm. <b>7</b> 5V in, line driver out incr.; 12V in, open collector out comm. <b>9</b> 5V in, line driver out incr.; 5V in, line driver out comm.	<b>0</b> 1/4 in. <b>1</b> 3/8 in. <b>4</b> 6 mm <b>5</b> 8 mm <b>6</b> 10 mm <b>8</b> 3/16 in. <b>9</b> 1/8 in.	Available when Code 4= 0, 1, 3, 6 or 9
		Incremental plus Commutation channels				<b>0200/0</b> <b>1000/0</b> <b>0400/0</b> <b>1024/0</b> <b>0500/0</b>
		<b>0500/6</b> <b>1024/4</b> <b>1000/4</b> <b>1024/6</b> <b>1000/6</b> <b>1024/8</b> <b>1000/8</b>				Available when Code 4= 0 - 9
						<b>A-H</b> Shielded cable; A=1 ft., B=2 ft., etc.