

# SERIES M15

**Dynapar™ brand**

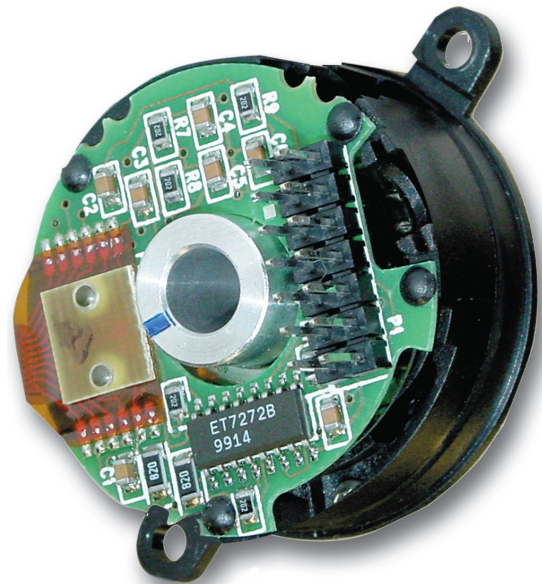
## For Stepper & Small Servo Motors

### 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**



SSM  
Servo Small Motor



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental  
**Resolution:** (pulses/revolution)  
 Incremental: 200 to 1024 PPR;  
 Commutation: 4, 6, or 8 pole  
**Accuracy:**  
 Incremental: ±5 arc-mins. max. edge to edge;  
 Commutation: ±6 arc-mins. max.  
**Sense:** (viewing encoder mounting surface)  
 Incremental: A leads B by 90° for CCW rotation of motor shaft;  
 Commutation: U leads V, V leads W by 120° for CW rotation of motor shaft  
**Phasing:**  
 Incremental: 90° ±18° electrical  
 Commutation: 8 Pole: 30°; 6 Pole: 40°; 4 Pole: 60° mechanical  
 Index to U Channel: ±1° mechanical - Index center to U channel edge  
**Symmetry:**  
 Incremental: 180° ±18° electrical  
 Commutation: 8 Pole: 45°; 6 Pole: 60°; 4 Pole: 90° mechanical  
**Index Pulse Width:** 180° ±36° electrical (Gated with B low) standard

### ELECTRICAL

**Input Power Requirements:**  
 Incremental: 5 VDC ±10% at 100 mA max. (excluding output load);  
 Incremental w/Commutation: 5 VDC ±10% at 120 mA max. (excluding output load)  
**Output Signals:**  
 7272 Line Driver: 40 mA sink/source max.;  
 Open Collector w/2.0 kΩ 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 x 10<sup>-6</sup> in-oz sec.<sup>2</sup> (2.4 gm-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:** ±15° mechanical  
**Acceleration:** 100,000 rad/sec.<sup>2</sup> max.  
**Velocity:** 12,000 RPM max.

### ENVIRONMENTAL

**Operating Temperature:** 0° to 120°C  
**Storage Temperature:** -40° to 85°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)



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### Customer Service:

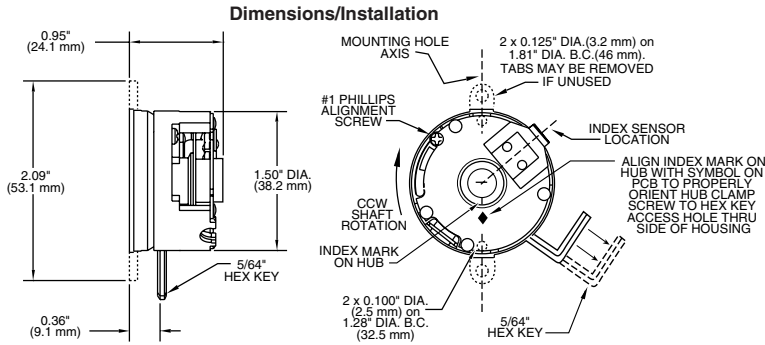
Tel.: +1.800.873.8731  
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### Technical Support

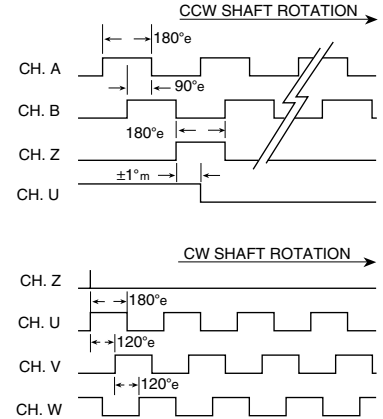
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### European Sales Representative

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

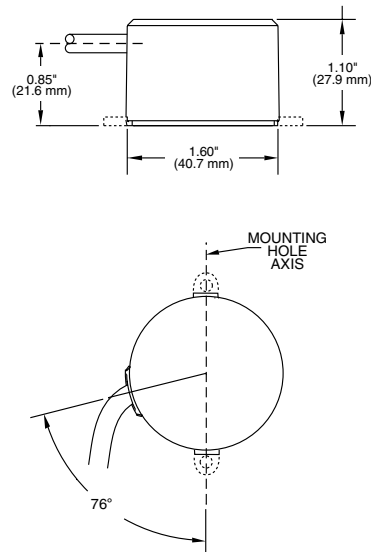


**Installation Instructions:**

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

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

**A-H:** Shielded Cable



| 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           |

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