

SERIES M53

Dynapar™ brand

For Stepper & Small Servo Motors

Key Features

- 2.0" Diameter Modular Encoder with Easy Installation Requiring No Special Gapping Tools or Parts
- Phased Array Sensor Technology Allowing .020" Axial Shaft Play
- Up to 2048 PPR with Commutation Tracks

SSM
Servo Small Motor



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical
Resolution: (pulses/revolution)
 Incremental: 500 to 2048 PPR
 Commutation: 4, 6 or 8 pole
Accuracy:
 Incremental: ± 5 arc-mins. max. edge to edge;
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: $90^\circ \pm 18^\circ$ electrical
 Commutation: 8 Pole: 30° ; 6 Pole: 40° ; 4 Pole: 60° 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° ;
 6 Pole: 60° ; 4 Pole: 90° mechanical
Index Pulse Width: $90^\circ \pm 36^\circ$ electrical (Gated with A high and B low)

ELECTRICAL

Input Power Requirements:
 Incremental: 5 VDC or 12 VDC $\pm 10\%$ at 100 mA max. (excluding output load);
 Commutation: 5 VDC or 12 VDC $\pm 10\%$ at 75 mA max. (excluding output load)

ELECTRICAL (CONT.)

Output Signals:
 7272 Push-Pull: 40mA, sink or source
 7272 Differential Line Driver: 40 mA, sink or source
Frequency Response: 200 kHz min.
Termination:
Connector: PCB mounted dual row head with 0.1" x 0.1" pin spacing, 10 pins (incremental only), 16 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)

MECHANICAL

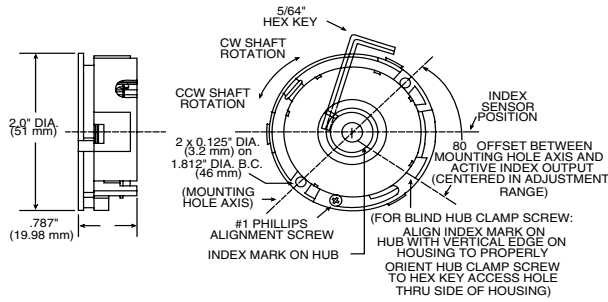
Dimensions:
 Outside Diameter: 2.1" (53 mm) max. w/cover, 2.0" (51 mm) max. without cover; Height: 0.8" (20.3 mm) (w/cover, excluding connector);
 Emitter to Detector Gap: 0.070" (1.8 mm) min.
Hub Diameters: 1/4", 3/8", 7/16", 1/2", 6 mm, 8 mm, 10 mm, 12 mm nominal
Mounting Configuration:
 Base: (2) #4-40 (M2.5) #1 Phillips fillister head cap screw on 1.812" (46 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)
Hub Dia. Tolerance: $+0.001"/-0.000"$ ($+0.026$ mm/ -0.000 mm)
Mating Shaft Length: 0.45" (12 mm) min. blind hub clamp screw, 0.65" (16.5 mm) exposed hub clamp screw; 0.75" (19 mm) max. inside cover

Mating Shaft Runout: 0.002" (0.05 mm) max. (Includes shaft perpendicularity to mounting surface)
Mating Shaft Endplay: $+0.011"/-0.008"$ ($+0.30$ mm/ -0.21 mm) nominal ("+" indicates away from mounting face)
Electrical/Mechanical Alignment Range: $\pm 15^\circ$ mechanical
Acceleration: 100,000 rad/sec.² max.
Velocity: 12,000 RPM max.
Moment of Inertia: 6.64×10^{-6} in-oz sec.² (4.7 gm-cm²)
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)
Weight:
 Connector: 1 oz. (28 gm) typ.
 Connector w/cover: 1.5 oz. (43 gm) typ.
 Cable: 2.5 oz (71 gm) typ.
 Cable w/cover: 3 oz. (85 gm) typ.

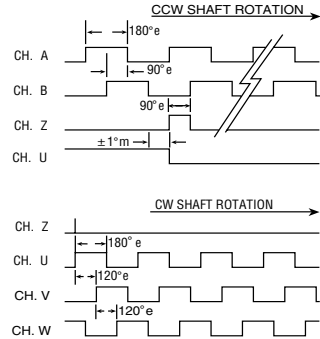
ENVIRONMENTAL

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: Up to 90% (non-condensing)
Enclosure Rating: NEMA 1 / IP50 dirt-tight (for models with cover)

Dimensions/Installation



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

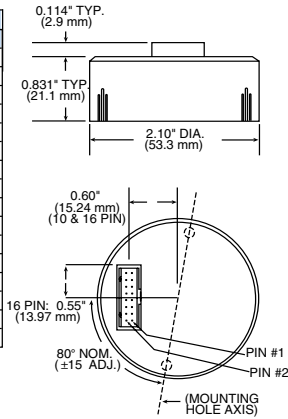


Code 6: Terminations (Not all signals present on all models)

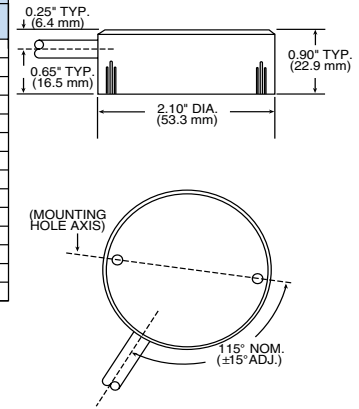
0: 16 Pin JST connector 1-8: Shielded Cable with JST connector

A-H: Shielded Cable

| Pin | 16 Pin |
|-----|--------|
| 1 | Vcc |
| 2 | U |
| 3 | GND |
| 4 | V |
| 5 | A |
| 6 | W |
| 7 | A' |
| 8 | NC |
| 9 | B |
| 10 | U' |
| 11 | B' |
| 12 | V' |
| 13 | Z |
| 14 | W' |
| 15 | Z' |
| 16 | NC |



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



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 Bore | Code 6: Termination |
|---------------|--|--------------------------|--------------------------|--------------------------|--------------------------|
| M53 | <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

| | | | | | |
|---------------------------------------|---------------------------------------|---|--|---|---|
| M53 Size 20 Commutating Modular | Incremental channels only | 0 No Cover 1 Radial Exit Cover (for Shielded Cable) 2 Axial Exit (for Shielded Cable with JST Connector) | 0 5V in, open collector out incremental only 1 12V in, open collector out incremental only 3 5V in, line driver out incremental only A 12V in, 5V line driver out incremental only B 12V in, 12V line driver out incremental only Available when Code 2 is XXXX/4, XXXX/6, or XXXX/8 6 5V in, line driver out incremental open collector out Comm 9 5V in, line driver out incremental line driver out Comm C 12V in, 5V line driver out incremental, open collector D 12V in, 12V line driver out incremental, open collector E 12V in, 5V line driver out incremental, 5V line driver out Comm out Comm out Comm F 12V in, 12V line driver out incremental, 12V line driver out Comm | Exposed hub clamp screw: 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 | Available when Code 3 is 0 or 2: 0 JST connector 1-8 Shielded cable with connector; 1=1 ft., 2=2 ft., etc. Available when Code 3 is 0 or 1: A-H Shielded cable; A=1 ft., B=2 ft., etc. |
| | Incremental plus Commutation channels | 0500/4 2000/4 0500/6 2000/8 0500/8 1000/4 2048/4 1000/6 2048/6 1000/8 2048/8 1024/4 1024/6 1024/8 | | | |