

ENGINEERING DOCUMENTATION

# Rotary Servo Motor

Dimensional & Integration Guide

| DOCUMENT                          | REVISION / ISSUE       | STATUS                            |
|-----------------------------------|------------------------|-----------------------------------|
| DIG-ES-SM-A03-040-TOP16NM-50W-002 | DRAFT-08 / 27 Aug 2026 | Engineering Integration Reference |

Integration Overview

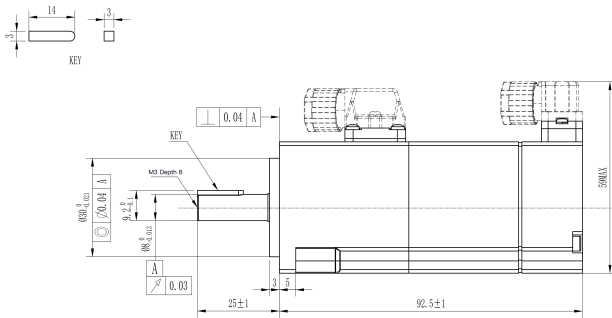
Closed-loop rotary servo motor for specified motion axes. This guide supports mechanical mounting, shaft and coupling integration, feedback and brake planning, cable routing, thermal validation and staged commissioning.

Key Integration Facts

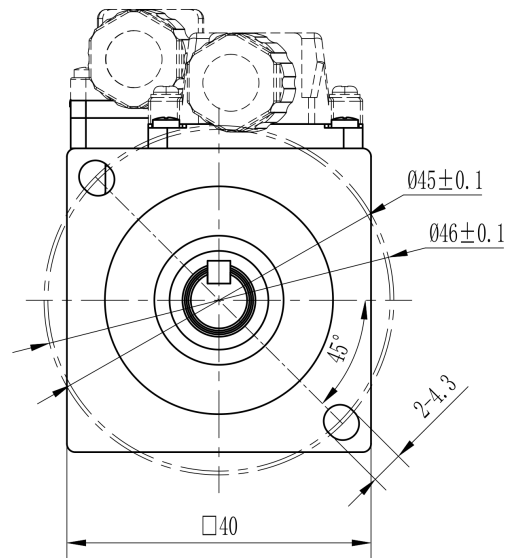
| INTEGRATION ITEM | PUBLISHED VALUE |
|------------------|-----------------|
| Rated Torque     | 0.16 Nm         |
| Rated Speed      | 3000 rpm        |
| Rated Voltage    | 220 VAC         |
| Flange Size      | 40 mm           |

## Product Structure & Views

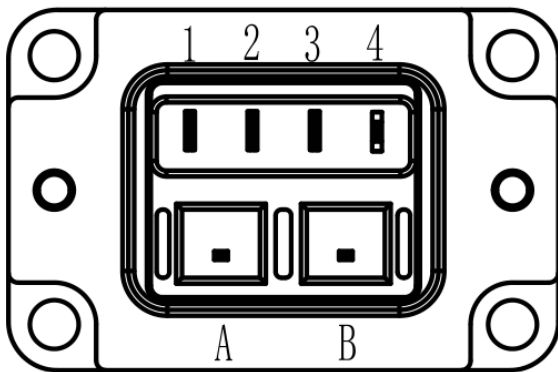
These views present product structure, mounting interfaces and relevant integration geometry for this SKU.



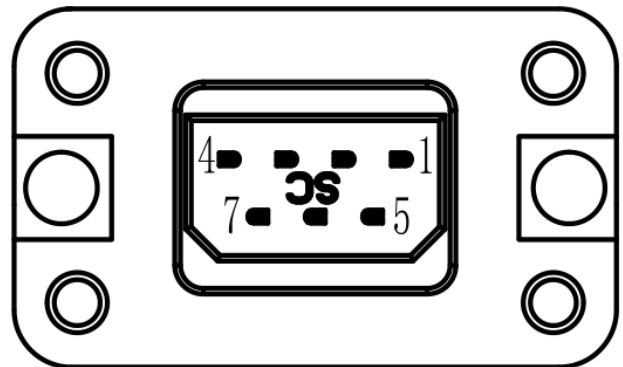
Mechanical View 1



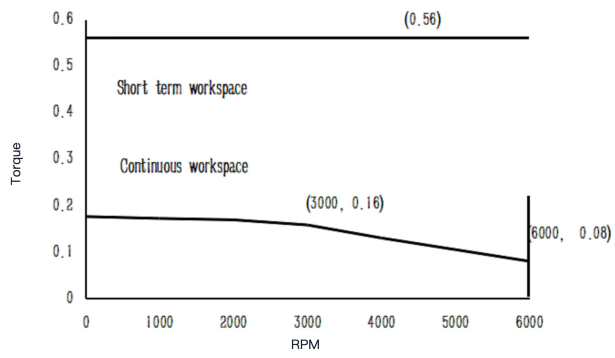
Mechanical View 2



Mechanical View 5



Mechanical View 8



Mechanical View 10

| VIEW               | FIELD                                  | VALUE                                         |
|--------------------|----------------------------------------|-----------------------------------------------|
| Mechanical View 1  | Key length                             | 14 mm                                         |
|                    | Key label                              | Key                                           |
|                    | Upper geometric tolerance with datum A | Geometric tolerance 0.04 relative to datum A  |
|                    | Key callout label                      | Key callout                                   |
|                    | Threaded hole size and depth           | M3 threaded hole, depth 6 mm                  |
|                    | Maximum overall height                 | 59 mm maximum                                 |
|                    | Datum A reference                      | Datum A                                       |
|                    | Diameter geometric tolerance           | Diameter tolerance zone 0.04 mm               |
|                    | Shaft diameter                         | Diameter 30 mm, +0/-0.021 mm                  |
|                    | Small shaft diameter                   | Diameter 8 mm, +0/-0.013 mm                   |
|                    | Datum A                                | Datum A                                       |
|                    | End step length                        | 5 mm                                          |
|                    | End offset length                      | 3 mm                                          |
|                    | Geometric tolerance value              | Geometric tolerance 0.03 mm                   |
|                    | Main body length                       | 92.5 ± 1 mm                                   |
|                    | Front axial length                     | 25 ± 1 mm                                     |
|                    | Key Height                             | 3 mm                                          |
|                    | Key Width                              | 3 mm                                          |
|                    | Keyway slot dimension                  | 9.2 mm, +0/-0.1 mm                            |
| Mechanical View 2  | Central shaft interface diameter       | Diameter 45 ±0.1                              |
|                    | Outer concentric interface diameter    | Diameter 46 ±0.1                              |
|                    | Square mounting face size              | Square 40                                     |
|                    | Mounting hole angular position         | 45 degrees                                    |
|                    | Mounting Holes                         | 2-4.3                                         |
| Mechanical View 5  | Connector terminal numbers             | Visible connector terminal labels/1 2, 3, 4   |
|                    | Connector interface labels             | Visible connector interface labels: A, B      |
| Mechanical View 8  | Feedback connector marking             | SC connector marking                          |
|                    | Feedback connector pin number 5        | Pin 5                                         |
|                    | Connector pin number                   | Pin label: 1                                  |
|                    | Connector pin number                   | Pin label: 4                                  |
|                    | Connector pin number                   | Pin label: 7                                  |
| Mechanical View 10 | Torque axis maximum scale              | Torque scale maximum 0.6                      |
|                    | Maximum torque callout                 | Maximum torque callout 0.56                   |
|                    | Torque axis scale ticks                | Torque axis ticks: 0, 0.1, 0.2, 0.3, 0.4, 0.5 |
|                    | Torque axis label                      | Y-axis label: Torque                          |
|                    | Short term workspace region            | Short term workspace operating region         |

| VIEW                          | FIELD                                                       | VALUE |
|-------------------------------|-------------------------------------------------------------|-------|
| Continuous workspace region   | Continuous workspace operating region                       |       |
| Rated operating point         | Operating point: speed 3000 RPM, torque 0.16                |       |
| Maximum speed operating point | Operating point: speed 6000 RPM, torque 0.08                |       |
| Speed axis scale ticks        | Speed axis ticks: 0, 1000, 2000, 3000, 4000, 5000, 6000 RPM |       |
| Speed axis unit label         | X-axis unit: RPM                                            |       |

## Overall Dimensions and Mounting Interface

| PARAMETER   | PUBLISHED VALUE | UNIT |
|-------------|-----------------|------|
| Flange Size | 40              | mm   |

- Confirm the mounting face, locating feature, shaft geometry, fastener engagement and removal clearance against the applicable exact-SKU drawing.
- Mount the motor on a flat, rigid interface and avoid using fasteners to pull a misaligned assembly into position.

## Shaft, Coupling and Load Path

| PARAMETER     | PUBLISHED VALUE | UNIT               |
|---------------|-----------------|--------------------|
| Rotor Inertia | 0.025 ( )       | Kg-cm <sup>2</sup> |

- Align the driven shaft and coupling before tightening; validate radial, axial and moment loads against applicable bearing-load data.
- Do not hammer, uncontrolled press-fit or transmit installation force through the motor bearings.

## Electrical, Feedback and Brake Integration

| PARAMETER                | PUBLISHED VALUE                                           | UNIT |
|--------------------------|-----------------------------------------------------------|------|
| Rated Voltage            | 220                                                       | VAC  |
| Position Feedback Device | 17-bit multi-turn communication magnetic absolute encoder |      |

- Use only the current winding, feedback, brake and connector definitions for this exact SKU.
- Verify drive compatibility, polarity, current limits, feedback direction and brake sequencing before enabling torque.

## Thermal, Duty and Environmental Conditions

| PARAMETER             | PUBLISHED VALUE | UNIT |
|-----------------------|-----------------|------|
| Rated Torque          | 0.16            | Nm   |
| Operating Temperature | -20 40          | °C   |

- Validate winding and housing temperature under the installed duty cycle, ambient condition, mounting heat path and enclosure airflow.
- Published peak values are transient boundaries and must not be treated as continuous operating ratings.

## Cable Routing, Grounding and EMC

| PARAMETER                | PUBLISHED VALUE                                           | UNIT |
|--------------------------|-----------------------------------------------------------|------|
| Position Feedback Device | 17-bit multi-turn communication magnetic absolute encoder |      |

- Provide strain relief and bend radius through the full machine motion envelope.
- Separate motor power, brake and feedback wiring and terminate shields according to the specified system grounding architecture.

## Commissioning and Motion Validation

| PARAMETER    | PUBLISHED VALUE | UNIT |
|--------------|-----------------|------|
| Rated Speed  | 3000            | rpm  |
| Rated Torque | 0.16            | Nm   |

- Commission at low energy with the transmission unloaded or safely restrained, then confirm direction, feedback polarity, brake final integration, current limit and fault response.
- Validate the complete axis through intended acceleration, speed, load, stop and fault cycles during integration planning.

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## Integration Checklist

- |    |                                                                                    |
|----|------------------------------------------------------------------------------------|
| 01 | Confirm the exact SKU, 2D drawing and applicable wiring data.                      |
| 02 | Verify mounting, shaft, coupling, alignment, fasteners and removal clearance.      |
| 03 | Validate radial and axial loads, inertia, acceleration and credible shock cases.   |
| 04 | Confirm drive, winding, feedback, brake and connector compatibility.               |
| 05 | Set current, speed, acceleration and thermal limits from the installed duty cycle. |
| 06 | Verify cable routing, shielding, grounding, strain relief and bend radius.         |
| 07 | Commission at low energy before validating the full machine cycle.                 |

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[View SKU Product Datasheet](#)   [Request controlled 2D drawing](#)   [Request controlled STEP review](#)   [Request a Quote](#)

### Engineering Use and Verification Notice

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**01.** This Dimensional & Integration Guide applies only to EmbodyStack SKU ES-SM-A03-040-TOP16NM-50W-002 and is intended for dimensional evaluation and preliminary integration. It is not a applicable manufacturing drawing, wiring definition, application approval, machinery risk assessment, safety validation or integration planning document. Before design freeze, machining, wiring or energization, verify all dimensions, tolerances, mounting and locating features, load boundaries, electrical interfaces, thermal conditions, cabling, grounding, protection, commissioning and applicable regulatory requirements against the applicable EmbodyStack engineering data for this exact SKU. Where this guide and applicable product documentation differ, the applicable product documentation governs. Validate the complete installed system under intended duty cycles, loads, accelerations, environmental conditions and credible fault cases.