

## ENGINEERING DOCUMENTATION

# Frameless Torque Motor

## Dimensional &amp; Integration Guide

| DOCUMENT                        | REVISION / ISSUE       | STATUS                            |
|---------------------------------|------------------------|-----------------------------------|
| DIG-ES-FM-U01-OD057-TOP24NM-001 | DRAFT-08 / 27 Aug 2026 | Engineering Integration Reference |

## Integration Overview

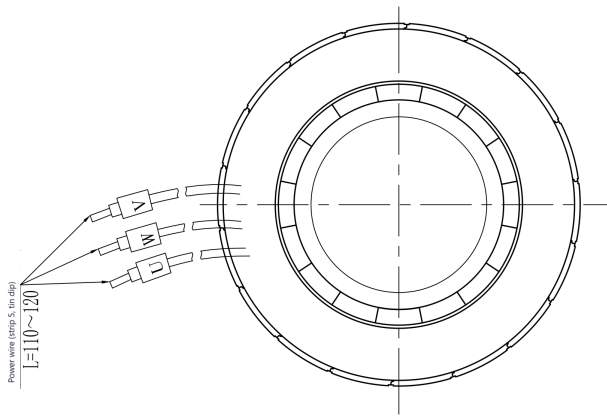
Frameless torque motor for direct integration into a host rotary assembly. This guide supports rotor-stator alignment, air-gap control, bearing and load-path design, thermal extraction, electrical integration and staged commissioning.

## Key Integration Facts

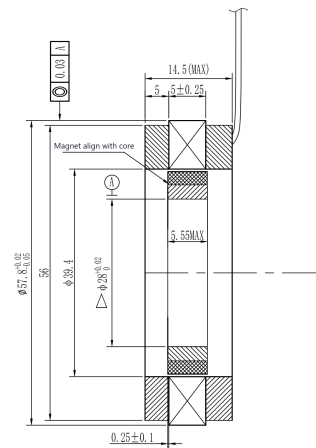
| INTEGRATION ITEM     | PUBLISHED VALUE |
|----------------------|-----------------|
| Rated Torque         | 0.24 Nm         |
| Rated Speed          | 3000 rpm        |
| Body Outer Diameter  | 57 mm           |
| Rotor Inner Diameter | 28 mm           |
| Axial Stack Length   | 5 mm            |
| Weight               | 0.11 kg         |

## Product Structure & Views

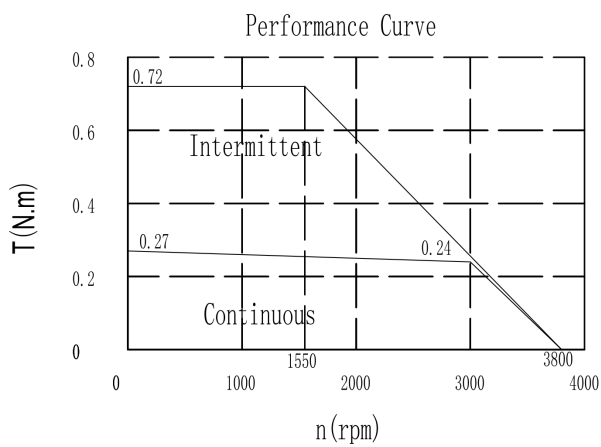
These views present product structure, mounting interfaces and relevant integration geometry for this SKU.



Mechanical View 3



Mechanical View 4



Mechanical View 6

| VIEW              | FIELD                                            | VALUE                                                                             |
|-------------------|--------------------------------------------------|-----------------------------------------------------------------------------------|
| Mechanical View 3 | V phase power wire label                         | V phase label                                                                     |
|                   | W phase power wire label                         | W phase label                                                                     |
|                   | U phase power wire label                         | U phase label                                                                     |
|                   | Power wire length                                | L = 110 to 120 mm                                                                 |
|                   | Power wire processing note                       | Power wire, strip length 5 mm, tin dip                                            |
| Mechanical View 4 | Geometric tolerance relative to datum A          | Geometric tolerance 0.03 relative to datum A; symbol visible but not OCR-detected |
|                   | Upper maximum axial dimension                    | 14.5 maximum                                                                      |
|                   | Upper left axial distance                        | 5                                                                                 |
|                   | Upper axial thickness tolerance                  | 5 ±0.25                                                                           |
|                   | Magnet-to-core alignment note                    | Magnet align with core                                                            |
|                   | Datum A                                          | Datum A                                                                           |
|                   | Internal maximum width                           | 5.55 maximum                                                                      |
|                   | Outer diameter tolerance                         | Diameter 57.8 +0.02/-0.05                                                         |
|                   | Overall body height or length                    | 56                                                                                |
|                   | Intermediate diameter                            | Diameter 39.4                                                                     |
|                   | Inner bore or shaft interface diameter tolerance | Diameter 28 +0.02/0                                                               |
|                   | Bottom clearance or offset                       | 0.25 ±0.1                                                                         |
| Mechanical View 6 | Chart title                                      | Performance Curve                                                                 |
|                   | Torque vertical axis                             | Torque T in N.m                                                                   |
|                   | Speed horizontal axis                            | Rotational speed n in rpm                                                         |
|                   | Torque axis tick values                          | Torque scale ticks: 0, 0.2, 0.4, 0.6, 0.8 N.m                                     |
|                   | Speed axis tick values                           | Speed scale ticks: 0, 1000, 2000, 3000, 4000 rpm                                  |
|                   | Intermittent operating region                    | Intermittent operating region                                                     |
|                   | Continuous operating region                      | Continuous operating region                                                       |
|                   | Maximum torque callout                           | Maximum/intermittent torque callout: 0.72 N.m                                     |
|                   | Continuous torque curve start callout            | Continuous curve start torque callout: 0.27 N.m                                   |
|                   | Rated torque callout                             | Rated/continuous torque callout: 0.24 N.m                                         |
|                   | Break-point speed callout                        | Break-point speed callout: 1550 rpm                                               |
|                   | End speed callout                                | End speed callout: 3800 rpm                                                       |

## Overall Dimensions and Mounting Interface

| PARAMETER            | PUBLISHED VALUE | UNIT |
|----------------------|-----------------|------|
| Body Outer Diameter  | 57              | mm   |
| Rotor Inner Diameter | 28              | mm   |
| Axial Stack Length   | 5               | mm   |

- Confirm the stator, rotor, bore, axial stack, locating and retention geometry against the applicable exact-SKU drawing.
- The host housing and shaft must provide the required datum control without distorting the active motor components.

## Rotor, Stator and Air-Gap Alignment

| PARAMETER            | PUBLISHED VALUE | UNIT |
|----------------------|-----------------|------|
| Rotor Inner Diameter | 28              | mm   |

- Control concentricity, axial position, runout and operating air gap through the complete tolerance and temperature range.
- Prevent contact, magnetic debris, impact and assembly forces from damaging the rotor or stator.

## Bearing, Load Path and Retention

| PARAMETER     | PUBLISHED VALUE | UNIT              |
|---------------|-----------------|-------------------|
| Rotor Inertia | 0.088           | kgcm <sup>2</sup> |
| Weight        | 0.11            | kg                |

- The host bearing system must carry radial, axial and moment loads; do not infer bearing capability from motor torque or diameter.
- Provide positive rotor retention and verify overspeed, imbalance, shock and fault torque cases.

## Electrical and Feedback Integration

| PARAMETER            | PUBLISHED VALUE | UNIT |
|----------------------|-----------------|------|
| Torque Constant      | 0.12            | Nm/A |
| Number of Pole Pairs | 8 pole pairs    |      |

- Match the winding, drive current, voltage, commutation and feedback system to the exact SKU.
- Use current phase, sensor and insulation definitions; do not infer pin or phase identity from this guide.

## Thermal Path and Duty Cycle

| PARAMETER    | PUBLISHED VALUE | UNIT |
|--------------|-----------------|------|
| Rated Torque | 0.24            | Nm   |

- Design a verified heat path from the stator into the host structure and validate temperatures under the intended duty cycle.
- Peak torque and current are transient boundaries and require coordinated drive protection.

## Assembly and Commissioning Validation

| PARAMETER    | PUBLISHED VALUE | UNIT |
|--------------|-----------------|------|
| Rated Speed  | 3000            | rpm  |
| Rated Torque | 0.24            | Nm   |

- Check free rotation, air gap, retention, insulation and sensor alignment before energization.
- Commission at low energy, confirm commutation and direction, then validate the complete joint through intended load and fault cases.

---

## Integration Checklist

- |    |                                                                              |
|----|------------------------------------------------------------------------------|
| 01 | Confirm the exact SKU, 2D package and applicable assembly data.              |
| 02 | Verify stator, rotor, bore, stack, datums, retention and operating air gap.  |
| 03 | Validate host bearings, shaft, housing stiffness, runout and thermal growth. |
| 04 | Confirm winding, drive, feedback, commutation and insulation compatibility.  |
| 05 | Establish and validate the stator-to-housing thermal path.                   |
| 06 | Check free rotation and insulation before low-energy commissioning.          |
| 07 | Validate full load, speed, temperature and credible fault cases.             |

---

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

### Engineering Use and Verification Notice

---

**01.** This Dimensional & Integration Guide applies only to EmbodyStack SKU ES-FM-U01-OD057-TOP24NM-001 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.