ENGINEERING DOCUMENTATION

# Frameless Torque Motor

Dimensional & Integration Guide

| DOCUMENT | REVISION / ISSUE | STATUS |
|---|---|---|
| DIG-ES-FM-U01-OD127-TTBDNM-002 | DRAFT-08 / 27 Aug 2026 | Engineering Integration Reference |

## Integration Overview

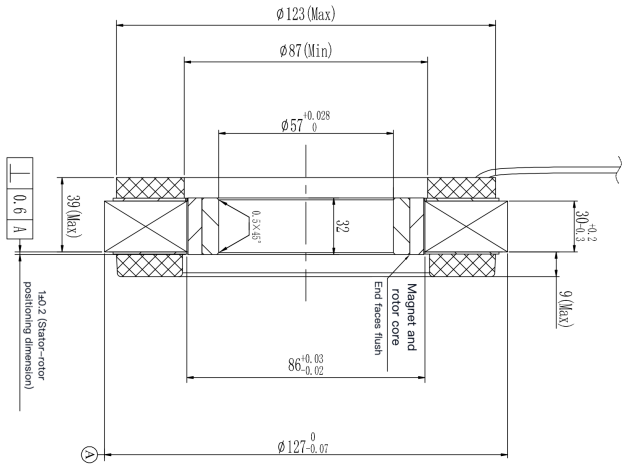
Frameless torque motor for direct integration into a host rotary assembly. This guide supports rotor-stator alignment, air-gap control, bearing and load-path design, thermal extraction, electrical integration and staged commissioning.

## Key Integration Facts

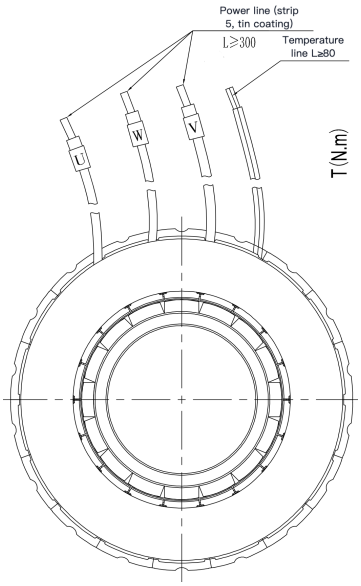
| INTEGRATION ITEM | PUBLISHED VALUE |
|---|---|
| Rated Torque | 6.37 N·m |
| Rated Speed | 2400 rpm |
| Body Outer Diameter | 127 mm |
| Rotor Inner Diameter | 57 mm |
| Axial Stack Length | 30 mm |
| Weight | 2.18 kg |

# Product Structure & Views

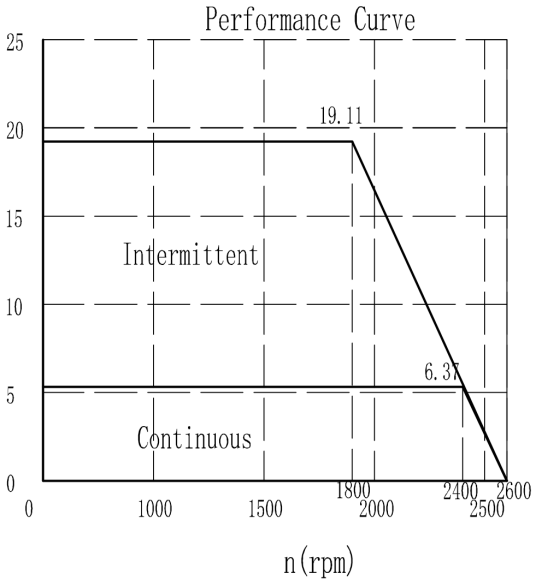
These views present product structure, mounting interfaces and relevant integration geometry for this SKU.




Mechanical View 1




Mechanical View 4




Mechanical View 6

| VIEW | FIELD | VALUE |
|---|---|---|
| Mechanical View 1 | Maximum Outer Diameter | ϕ123 Max |
| | Minimum Inner Diameter | ϕ87 Min |
| | Shaft Diameter | ϕ57 +0.028/0 |
| | Chamfer | 0.5×45° |
| | Maximum Height | 39 Max |
| | Stator–Rotor Positioning Dimension | 1±0.2 |
| | Magnet and Rotor Core End Faces Flush | Flush |
| | Axial Length | 86 +0.03/−0.02 |
| | Housing Diameter | ϕ127 0/−0.07 |
| | End Length | 30 +0.2/−0.3 |
| | Maximum Boss Height | 9 Max |
| | Internal Dimension | 32 |
| | Perpendicularity Tolerance | 0.6 A |
| | Datum A | Datum A |
| Mechanical View 4 | Power line wire specification | Strip insulation 5 mm, apply tin coating |
| | Power line minimum length | L ≥300 mm |
| | Temperature sensor line minimum length | L ≥80 mm |
| | Terminal label U | Terminal U |
| | Terminal label W | Terminal W |
| | Terminal label V | Terminal V |
| | Torque specification | Torque in N·m |
| Mechanical View 6 | Chart title | Performance Curve |
| | Vertical axis torque tick values | Torque axis tick values: 0 to 25 |
| | Horizontal axis speed tick values | Speed axis tick values: 0, 1000, 1500, 1800, 2000, 2400, 2500, 2600 rpm |
| | Horizontal axis label | Rotational speed n in rpm |
| | Intermittent operating region | Intermittent operating region |
| | Continuous operating region | Continuous operating region |
| | Intermittent torque plateau value | 19.11 N.m torque callout on intermittent curve |
| | Continuous torque plateau value | 6.37 N.m torque callout on continuous curve |

## Overall Dimensions and Mounting Interface

| PARAMETER | PUBLISHED VALUE | UNIT |
|---|---|---|
| Body Outer Diameter | 127 | mm |
| Rotor Inner Diameter | 57 | mm |
| Axial Stack Length | 30 | 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 | 57 | 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 | 6.7 | kg·cm² |
| Weight | 2.18 | 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 | 0.2 | N·m/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 | 6.37 | N·m |

- 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 | 2400 | rpm |
| Rated Torque | 6.37 | N·m |

- 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-OD127-TTBDNM-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.