

ENGINEERING DOCUMENTATION

Frameless Torque Motor

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
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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	3.6 Nm
Rated Speed	2400 rpm
Body Outer Diameter	127 mm
Rotor Inner Diameter	65 mm
Axial Stack Length	18 mm
Weight	1.31 kg

VIEW	FIELD	VALUE
Mechanical View 1	Outer Diameter Maximum	∅23 mm (Max)
	Inner Diameter Minimum	∅7 mm (Min)
	Shaft Diameter	∅5 +0.028/0 mm
	Shaft Extension Length	20 mm
	Mounting Face Thickness	18 +0.2/-0.3 mm
	End Face Maximum Height	27 mm (Max)
	Chamfer	0.5 mm X 45°
	Stator/Rotor Positioning Dimension	1±0.2 mm
	End Face Flush Requirement	Magnet and rotor core end faces must be flush
	Local Maximum Dimension	9 mm (Max)
	Overall Length	86 +0.03/-0.02 mm
	Flange Outer Diameter	∅27 0/-0.07 mm
	Parallelism Tolerance	Parallelism 0.6 mm relative to datum A
	Datum A	Datum A
Mechanical View 4	Power cable specification	Power cable with 5mm strip length and tinning
	Power cable minimum length	L≥800
	Temperature cable specification	Temperature sensing cable
	Temperature cable minimum length	L≥800
	Phase U identification	Phase U terminal
	Phase W identification	Phase W terminal
	Phase V identification	Phase V terminal
	Torque unit label	Torque in Newton-meters
Mechanical View 6	Maximum Continuous Torque	4 Nm
	Maximum Intermittent Torque	10.8 Nm
	Continuous Operating Speed Range	0-2100 rpm
	Maximum Speed	3250 rpm
	Rated Speed	2400 rpm
	Intermittent Torque at 2400 rpm	3.6 Nm at 2400 rpm
	Torque Scale	0-12 Nm
	Speed Scale	0-4000 rpm
	Intermittent working zone	Intermittent operation zone
	Continuous working zone	Continuous operation zone
	Speed axis label	Rotational speed in revolutions per minute

Overall Dimensions and Mounting Interface

PARAMETER	PUBLISHED VALUE	UNIT
Body Outer Diameter	127	mm
Rotor Inner Diameter	65	mm
Axial Stack Length	18	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	65	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	4.46	kgcm ²
Weight	1.31	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	0.161	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	3.6	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	2400	rpm
Rated Torque	3.6	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

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|----|--|
| 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](#)

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01. This Dimensional & Integration Guide applies only to EmbodyStack SKU ES-FM-U01-OD127-TTBDNM-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.