

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	2 Nm
Rated Speed	3000 rpm
Body Outer Diameter	85 mm
Rotor Inner Diameter	42 mm
Axial Stack Length	18 mm

VIEW	FIELD	VALUE
Mechanical View 1	Section view identifier	Section G-G
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Mechanical View 2	Top step axial length	18 mm, +0.15/-0.25
	Left maximum axial distance	5 MAX
	Right maximum axial distance	11 MAX
	Power line strip/tin length and minimum lead length	Power line: strip and tin 5 mm; L ≥100 mm
	Small step thickness	1 mm ±0.2
	Maximum outside dimension	80 MAX
	Minimum internal or mounting dimension	57 MIN
	Datum cylindrical diameter	Diameter 42.500 mm, +0.021/0
	Overall height or diameter dimension	84.98 mm, 0/-0.07
	Concentricity or positional geometric tolerance to datum A	Geometric tolerance 0.05 relative to datum A
	Perpendicularity tolerance to datum A	Perpendicularity 0.02 to datum A
	Datum A	Datum A
	Bottom width	20
Mechanical View 5	Y-axis scale - Torque 7 Nm	7
	Y-axis scale - Torque 6 Nm	6
	Y-axis scale - Torque 5 Nm	5
	Y-axis scale - Torque 4 Nm	4
	Y-axis scale - Torque 3 Nm	3
	Y-axis scale - Torque 2 Nm	2
	Y-axis scale - Torque 1 Nm	1
	Y-axis label - Torque	Torque
	X-axis scale - Speed 0 rpm	0
	X-axis scale - Speed 1000 rpm	1000
	X-axis scale - Speed 2000 rpm	2000
	X-axis scale - Speed 3000 rpm	3000
	X-axis scale - Speed 4000 rpm	4000
	X-axis scale - Speed 5000 rpm	5000
	X-axis label - Speed RPM	RPM
	Short-term workspace upper boundary point	3300 rpm at 6 N·m
	Operating zone transition point	3000 rpm at 2 N·m
	Maximum speed endpoint	5000 rpm at 0 N·m
	Short-term operating zone label	Short term workspace
	Continuous operating zone label	Continuous workspace

Overall Dimensions and Mounting Interface

PARAMETER	PUBLISHED VALUE	UNIT
Body Outer Diameter	85	mm
Rotor Inner Diameter	42	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	42	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

- 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	0.105	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	2	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	2	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-OD085-T2NM-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.