ENGINEERING DOCUMENTATION

Frameless Torque Motor

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-FM-U01-OD104-T2P3NM-001	DRAFT-08 / 27 Aug 2026	Engineering Integration Reference

Integration Overview

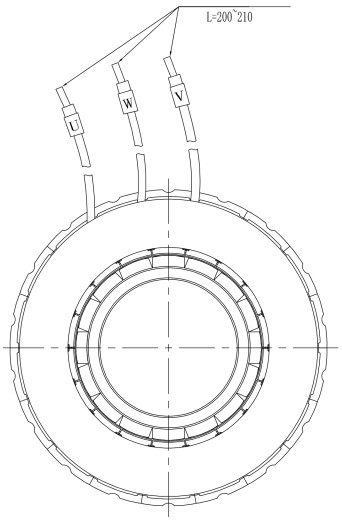
Frameless torque motor for direct integration into a host rotary assembly. This guide supports rotor-stator alignment, air-gap control, bearing and load-path design, thermal extraction, electrical integration and staged commissioning.

Key Integration Facts

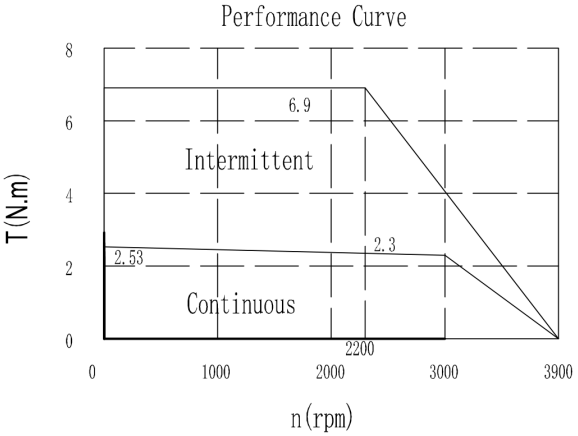
INTEGRATION ITEM	PUBLISHED VALUE
Rated Torque	2.3 N·m
Rated Speed	3000 rpm
Body Outer Diameter	104 mm
Rotor Inner Diameter	55 mm
Axial Stack Length	14 mm
Weight	0.7 kg

Product Structure & Views

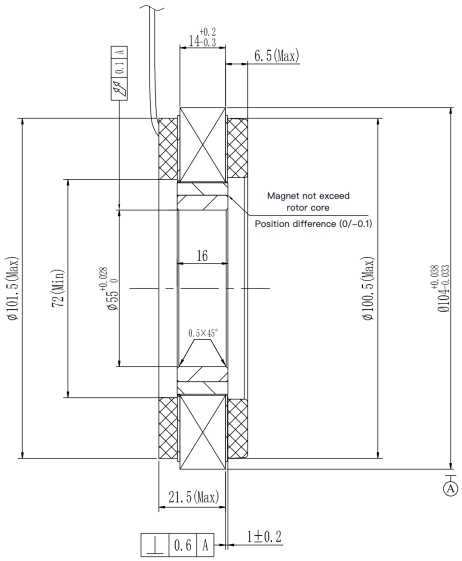
These views present product structure, mounting interfaces and relevant integration geometry for this SKU.



Mechanical View 2



Mechanical View 3



Mechanical View 4

VIEW	FIELD	VALUE
Mechanical View 2	Power line length	200~210 mm
	V phase terminal identification	V phase
	W phase terminal identification	W phase
	U phase terminal identification	U phase
Mechanical View 3	Chart title	Performance curve
	Torque axis	Torque T in N.m
	Torque scale ticks	Torque scale ticks: 0, 2, 4, 6, 8 N.m
	Speed axis	Rotational speed n in rpm
	Speed scale ticks	Speed scale ticks: 0, 1000, 2000, 3000, 3900 rpm
	Intermittent operating region	Intermittent operating curve region
	Continuous operating region	Continuous operating curve region
	Intermittent peak torque callout	Intermittent torque limit callout: 6.9 N.m
	Continuous torque callout	Continuous torque callouts: 2.53 N.m and 2.3 N.m
	Knee speed callout	Curve knee speed callout: 2200 rpm
Mechanical View 4	Connector width	14 +0.2/-0.3 mm
	Connector height maximum	6.5 mm Max
	Positional tolerance	Position tolerance 0.1 mm
	Datum A	Datum A
	Magnet position requirement	Magnet shall not exceed rotor core
	Position difference	Position difference 0/-0.1 mm
	Shaft diameter	16 mm
	Outer diameter maximum (left side)	Φ01.5 mm Max
	Outer diameter maximum (right side)	Φ00.5 mm Max
	Shaft diameter (with positive tolerance)	Φ5 +0.028/0 mm
	Hole diameter (with bilateral tolerance)	Φ04 +0.038/-0.033 mm
	Axial length minimum	72 mm Min
	Chamfer	0.5 mm X 45°
	Mounting boss height maximum	21.5 mm Max
	Mounting dimension	1±0.2 mm
	Perpendicularity tolerance to datum A	Perpendicularity 0.6 mm relative to datum A

Overall Dimensions and Mounting Interface

PARAMETER	PUBLISHED VALUE	UNIT
Body Outer Diameter	104	mm
Rotor Inner Diameter	55	mm
Axial Stack Length	14	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	55	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	1.5	kg·cm²
Weight	0.7	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	0.134	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	2.3	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	3000	rpm
Rated Torque	2.3	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-OD104-T2P3NM-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.