

ENGINEERING DOCUMENTATION

Frameless Torque Motor

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-FM-U01-OD104-T4NM-001	DRAFT-08 / 27 Aug 2026	Engineering Integration Reference

Integration Overview

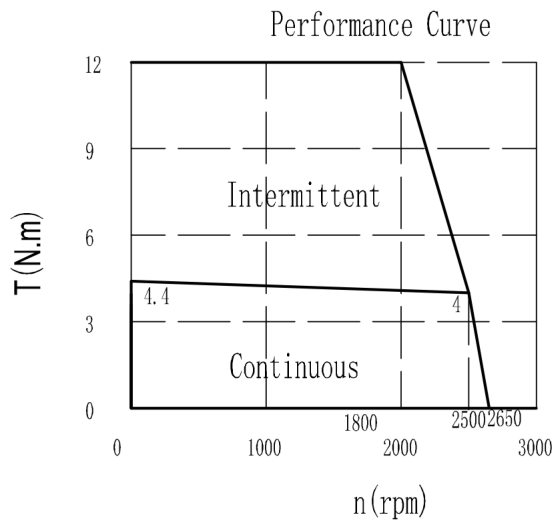
Frameless torque motor for direct integration into a host rotary assembly. This guide supports rotor-stator alignment, air-gap control, bearing and load-path design, thermal extraction, electrical integration and staged commissioning.

Key Integration Facts

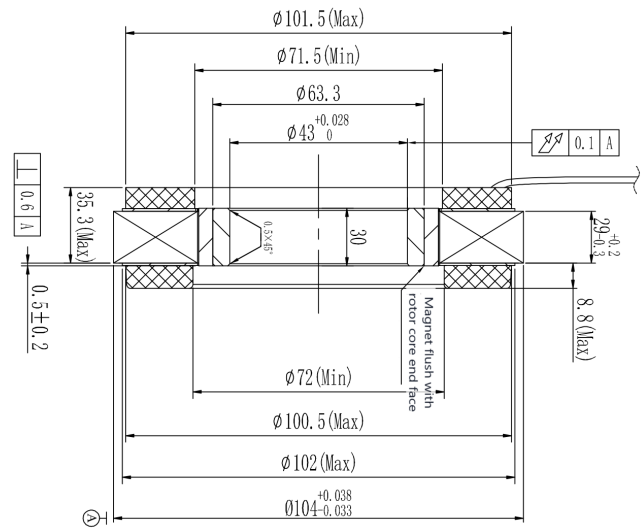
INTEGRATION ITEM	PUBLISHED VALUE
Rated Torque	4 Nm
Rated Speed	2500 rpm
Body Outer Diameter	104 mm
Rotor Inner Diameter	43 mm
Axial Stack Length	29 mm
Weight	1.51 kg

Product Structure & Views

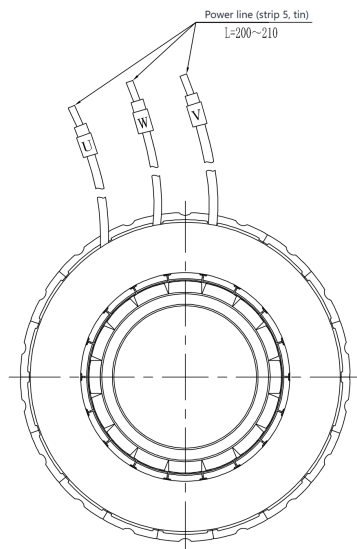
These views present product structure, mounting interfaces and relevant integration geometry for this SKU.



Mechanical View 1



Mechanical View 3



Mechanical View 5

VIEW	FIELD	VALUE
Mechanical View 1	Chart title	Performance Curve
	Torque axis label	Torque T in N.m
	Speed axis label	Rotational speed n in rpm
	Continuous operating region	Continuous operation region
	Intermittent operating region	Intermittent operation region
	Continuous torque callout	4.4 N.m
	Torque callout	4 N.m
	Speed tick values	Speed axis tick/callout values: 0, 1000, 1800, 2000, 2500, 2650, 3000 rpm
	Torque tick values	Torque axis tick values: 0, 3, 6, 9, 12 N.m
Mechanical View 3	Maximum outside diameter	Diameter 101.5 maximum
	Minimum internal diameter	Diameter 71.5 minimum
	Rotor bore diameter	Diameter 63.3
	Fit diameter with tolerance	Diameter 43 with upper deviation +0.028 and lower deviation 0
	Geometric tolerance relative to datum A	Geometric tolerance 0.1 relative to datum A; characteristic symbol not OCR-captured
	Geometric tolerance relative to datum A	Geometric tolerance 0.6 relative to datum A; characteristic symbol not OCR-captured
	Maximum axial height	35.3 maximum
	Central axial length	30
	Right-side axial dimension with tolerance	29 with upper deviation +0.2 and lower deviation -0.3
	Chamfer	Chamfer 0.5 by 45 degrees
	End clearance or step dimension	0.5 ±0.2
	Maximum right-side height	8.8 maximum
	Magnet and rotor core end-face requirement	Magnet flush with rotor core end face
	Lower minimum diameter	Diameter 72 minimum
	Maximum outside diameter	Diameter 100.5 maximum
	Maximum outside diameter	Diameter 102 maximum
	Outside diameter with tolerance	Diameter 104 with upper deviation +0.038 and lower deviation -0.033
	Datum A	Datum A
Mechanical View 5	Power line end treatment	Power line, strip length 5 mm, tinned end
	Power line length range	L = 200 to 210
	Phase lead label V	Lead label V
	Phase lead label W	Lead label W
	Phase lead label U	Lead label U

Overall Dimensions and Mounting Interface

PARAMETER	PUBLISHED VALUE	UNIT
Body Outer Diameter	104	mm
Rotor Inner Diameter	43	mm
Axial Stack Length	29	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	43	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	4.2	kgcm ²
Weight	1.51	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	0.196	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	4	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	2500	rpm
Rated Torque	4	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](#)

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01. This Dimensional & Integration Guide applies only to EmbodyStack SKU ES-FM-U01-OD104-T4NM-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.