ENGINEERING DOCUMENTATION

Frameless Torque Motor

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-FM-U01-OD091-T2NM-001	DRAFT-08 / 27 Aug 2026	Engineering Integration Reference

Integration Overview

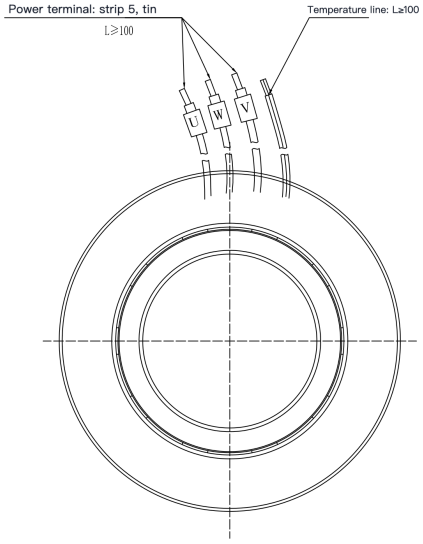
Frameless torque motor for direct integration into a host rotary assembly. This guide supports rotor-stator alignment, air-gap control, bearing and load-path design, thermal extraction, electrical integration and staged commissioning.

Key Integration Facts

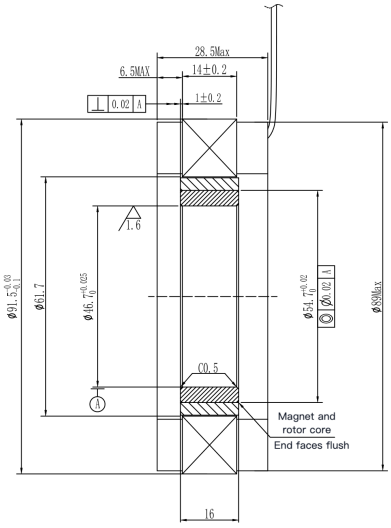
INTEGRATION ITEM	PUBLISHED VALUE
Rated Torque	2 N·m
Rated Speed	3000 rpm
Body Outer Diameter	91 mm
Rotor Inner Diameter	46 mm
Axial Stack Length	14 mm

Product Structure & Views

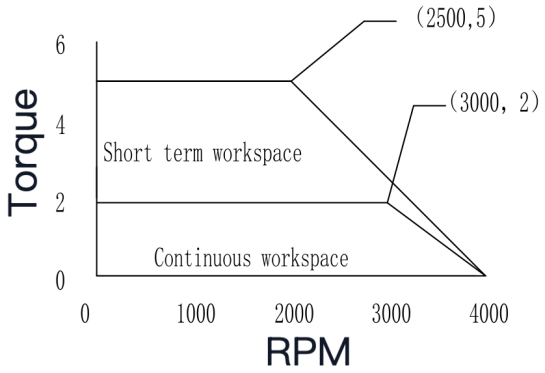
These views present product structure, mounting interfaces and relevant integration geometry for this SKU.



Mechanical View 1



Mechanical View 2



Mechanical View 6

VIEW	FIELD	VALUE
Mechanical View 1	Power terminal preparation requirement	Power terminal: strip insulation 5 mm and tin coating
	Temperature line length requirement	Temperature line length L ≥100 mm
	Power lead length requirement	Power lead length L ≥100 mm
	Power lead phase labels	Power leads labeled U, V and W
Mechanical View 2	Maximum axial height	28.5 max
	Local axial length	14 ±0.2
	Maximum local step distance	6.5 max
	Local spacing	1 ±0.2
	Perpendicularity to datum A	Perpendicularity 0.02 to datum A
	Surface roughness	Ra 1.6
	Inner diameter	Diameter 46.7 +0.025/0
	Outer diameter	Diameter 91.5 -0.03/-0.1
	Fit diameter	Diameter 54 +0.02/0
	Concentricity/coaxiality to datum A	Concentricity/coaxiality diameter tolerance 0.02 to datum A
	Maximum outer diameter	Diameter 89 max
	Intermediate diameter	Diameter 61.7
	Chamfer	Chamfer C0.5
	Datum A	Datum A
	Magnet and rotor core note	Magnet and rotor core
	End faces flush requirement	End faces flush
	Bottom width	16
Mechanical View 6	TN curve coordinate point	Speed 2500 rpm, torque 5 N.m
	Torque axis tick mark	6 N.m torque axis tick
	TN curve coordinate point	Speed 3000 rpm, torque 2 N.m
	Torque axis tick mark	4 N.m torque axis tick
	Vertical axis label	Torque
	Short term workspace	Short term operating region
	Torque axis tick mark	2 N.m torque axis tick
	Continuous workspace	Continuous operating region
	Torque axis tick mark	0 N.m torque axis tick
	Speed axis tick mark	3000 rpm speed axis tick
	Speed axis tick mark	0 rpm speed axis tick
	Speed axis tick mark	1000 rpm speed axis tick
	Speed axis tick mark	2000 rpm speed axis tick
	Speed axis tick mark	4000 rpm speed axis tick
	Horizontal axis label	Rotational speed in rpm

Overall Dimensions and Mounting Interface

PARAMETER	PUBLISHED VALUE	UNIT
Body Outer Diameter	91	mm
Rotor Inner Diameter	46	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	46	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	0.130	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	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	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-OD091-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.