

ENGINEERING DOCUMENTATION

High-Torque Shaft-Input Gear Unit

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-HG-S10-F17-R50	DRAFT-08 / 28 Aug 2026	Engineering Integration Reference

Integration Overview

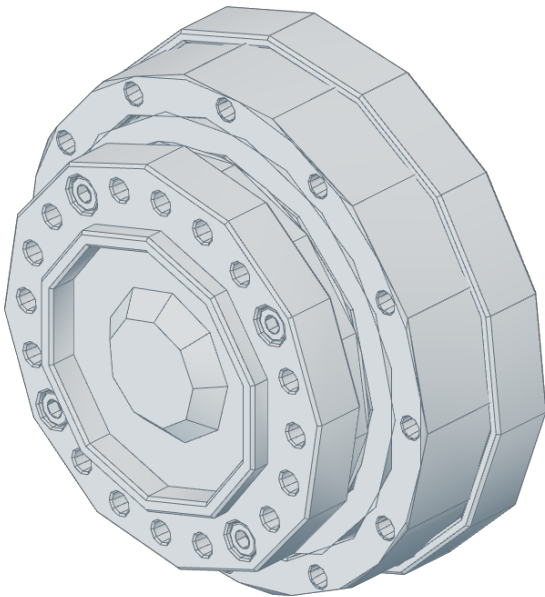
High-Torque Shaft-Input Gear Unit for compact, coaxial, high-ratio rotary-axis integration. This guide supports interface planning, mounting alignment, duty validation, torsional behavior, lubrication, sealing and commissioning for ES-HG-S10-F17-R50.

Key Integration Facts

INTEGRATION ITEM	VALUE
Rated Torque	21 Nm
Instantaneous Maximum Torque	91 Nm
Start/Stop Peak Torque	44 Nm
Reduction Ratio	50
Maximum Input Speed	7300 r/min
Frame Size	17
Weight	0.9 kg

3D Orientation Reference

This axonometric reference provides a quick orientation check for the reducer body, input interface and mounting relationship of ES-HG-S10-F17-R50.



Axonometric Orientation View

Orientation reference only. Use the exact-SKU parameter table and mechanical drawing for dimensions, hole geometry, fits and machining decisions.

Exact-SKU Interface Cross-Reference

INTEGRATION TOPIC	EXACT-SKU REFERENCE
Reducer envelope and configuration	Frame Size: 17; Reduction Ratio: 50; Weight: 0.9 kg. Confirm hole geometry, datum features and fits in the exact-SKU mechanical drawing.
Torque and speed boundaries	Rated Torque: 21 Nm; Start/Stop Peak Torque: 44 Nm; Instantaneous Maximum Torque: 91 Nm; Maximum Input Speed: 7300 r/min. Confirm hole geometry, datum features and fits in the exact-SKU mechanical drawing.
Input and mounting interfaces	Confirm this interface from the exact-SKU mechanical drawing.

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



VIEW	FIELD	VALUE
Mechanical View 2	Overall length	56 mm
	Left section length	17 mm
	Middle section length	36 mm
	Right section length	3 mm
	Center bore section length	23 mm
	Center bore depth	10 mm
	Right flange width	8.5 mm
	Left flange width	16 mm
	Left inner setback	12.5 mm
	Left mounting bore diameter and tolerance	Ø4 h7
	Center bore diameter and tolerance	Ø5 h7
	Right mounting bore diameter and tolerance	Ø0 h7
	Middle section diameter	Ø4
	Center bore diameter (duplicate callout)	Ø5
	Right bore diameter (duplicate callout)	Ø0
	Left bore diameter (duplicate callout)	Ø4
	Possible keyway or hole feature	Ø h6
Mechanical View 3	Mounting hole bolt circle diameter and hole diameter	12 holes Ø.5
	Mounting bolt circle diameter	Ø4
	Countersink specification	M3 countersink depth 6
	Shaft diameter tolerance	3 h8
	Keyway depth	3
	Keyway width	9.2
Mechanical View 4	M3 threaded holes quantity and depth	16 holes, M3 thread, depth 6mm
	Ø.5 holes quantity and depth	16 holes, Ø.5mm diameter, depth 12mm
	Outer circle diameter	Ø4mm
	Hole angular pitch	18°
Mechanical View 6	Outer diameter	Ø80 h7
	Intermediate diameter	Ø64
	Shaft diameter	Ø45 h7
	Step height	3
	Groove width	8.5
	Height dimension	36
	Height dimension	23
	Height dimension	10
	Total height	56
	Bottom height	17
	Center region height	16
	Center region height	12
	Center hole diameter	Ø8 h6

VIEW	FIELD	VALUE
Maximum outer diameter	Ø84 h7	

VIEW	FIELD	VALUE
Mechanical View 7	Mounting hole pattern diameter and hole size	12 holes, $\varnothing 5$ mm each
	Flange outer diameter	$\varnothing 4$ mm
	Center shaft axial deviation	0.5 mm
	Center shaft radial deviation	0.5 mm
Mechanical View 8	Mounting hole diameter and quantity	16 holes of $\varnothing 5$
	Mounting hole depth	Depth 12
	Threaded hole specification and quantity	16 holes of M3 thread
	Threaded hole depth	Depth 6
	Outer diameter	$\varnothing 4$
	Angular spacing of holes	18°

Overall Dimensions and Input Interface

PARAMETER	VALUE	UNIT
Frame Size	17	
Reduction Ratio	50	
Weight	0.9	kg

Input Interface Design Guidance

- Confirm the selected series, frame size, ratio and product form before using dimensions or interface geometry.
- Design the input shaft, key, engagement and axial retention for the verified torque and assembly state.
- Reserve assembly, sealing, inspection and removal access around input, housing and output interfaces.

Mounting, Alignment and Fastener Control

- Keep mounting faces flat, clean and free of burrs, debris and coating buildup.
- Control concentricity, tilt and axial position of input and housing datums.
- Tighten fasteners in a staged diagonal sequence and verify free, even rotation during assembly.

Torque, Speed and Duty Boundaries

PARAMETER	VALUE	UNIT
Rated Torque	21	Nm
Allowable Average Torque	34	
Start/Stop Peak Torque	44	
Instantaneous Maximum Torque	91	
Starting Torque	9.7	
Maximum Input Speed	7300	r/min
Average Input Speed	3500	
Design Life	10000	h

- Calculate torque and speed from acceleration, constant-speed, deceleration, dwell and reversal portions of the complete cycle.
- Treat start/stop peak and instantaneous maximum torque as transient boundaries.
- Validate life against actual torque, speed, shock frequency, lubrication, temperature, alignment and external loading.

Torque, Speed and Life Boundaries

PARAMETER	VALUE	INTEGRATION REQUIREMENT
Rated Torque	21 Nm	Use as the selected continuous output rating under validated duty and thermal conditions.
Allowable Average Torque	34 Nm	Calculate the actual time-weighted output torque over the complete cycle.
Start/Stop Peak Torque	44 Nm	Transient start/stop boundary; include acceleration and deceleration events.
Instantaneous Maximum Torque	91 Nm	Short-duration shock boundary only; do not use as a normal operating point.
Maximum Input Speed	7300 r/min	Maximum input-speed boundary; also verify motor and thermal limits.
Average Input Speed	3500 r/min	Validate the time-weighted average input speed over the complete duty cycle.
Design Life	10000 h	Design reference only; actual life depends on torque, speed, shock, lubrication and installation.

Transmission Accuracy and Torsional Rigidity

PARAMETER	VALUE	UNIT
Angle Transmission Accuracy	1.5	arcmin
Hysteresis Loss	2	
Torsional Rigidity K1	0.81	×10 ⁴ Nm/rad
Torsional Rigidity K2	1.1	
Torsional Rigidity K3	1.3	
Torsional Rigidity T1	3.9	Nm
Torsional Rigidity T2	12	

- Installed positioning depends on reducer behavior, datum control, structural stiffness, motor and encoder errors and thermal growth.
- Use stiffness regions and transition torques when evaluating compliance, resonance, control gain and reversal.

Lubrication, Sealing and Thermal Control

- Use the specified lubricant, fill method and quantity for the exact configuration; do not mix incompatible lubricants.
- Provide compatible sealing at input, output and housing interfaces without distorting the reducer.
- Validate lubricant distribution and temperature for orientation, speed, load cycle and enclosure.
- Prevent chips, fibers, residue and moisture from entering gear or bearing cavities.

Output Bearing and External Load Path

- Calculate radial, axial and moment loads including offset, acceleration, gravity, process force, impact and emergency stops.
- Do not infer permissible external load from reducer torque capacity or frame size.
- Avoid forcing, impact, misalignment or host distortion through the output support during installation and operation.

Integration Checklist

- | | |
|----|---|
| 01 | Confirm the selected series, frame size, ratio and product form for this SKU. |
| 02 | Verify available dimensions and interface geometry without substituting a nearby configuration. |
| 03 | Check mounting-face flatness, concentricity, tilt, reliefs, cleanliness and support stiffness. |
| 04 | Verify input shaft, key, engagement length and axial retention. |
| 05 | Use staged diagonal tightening and verify free, even rotation. |
| 06 | Calculate average, start/stop peak and shock torque over the complete cycle. |
| 07 | Validate average and maximum input speed, design life and thermal condition. |
| 08 | Evaluate backlash, angular accuracy, hysteresis and stiffness for the control system. |
| 09 | Confirm lubricant, fill quantity, orientation, sealing and contamination controls. |
| 10 | Validate output radial, axial and moment loads using applicable bearing data. |

[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-HG-S10-F17-R50 and supports preliminary dimensional evaluation and integration. It is not a manufacturing drawing, reducer selection approval, bearing-load approval, lubrication specification, machinery risk assessment, safety validation or integration planning document. Before design freeze, assembly or commissioning, verify all dimensions, datum geometry, fits, interfaces, retention, fasteners, torque and speed duty, shock cases, torsional behavior, external loads, lubrication, sealing, temperature, contamination and maintenance requirements against the current EmbodyStack engineering data for this exact SKU. Validate the complete reducer, motor, host structure, output load, motion cycle, guarding, fault cases and applicable regulatory requirements under intended operating conditions.