

ENGINEERING DOCUMENTATION

Simple High-Torque Hollow Shaft Gear Unit

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-HG-S18-F17-R50	DRAFT-08 / 28 Aug 2026	Engineering Integration Reference

Integration Overview

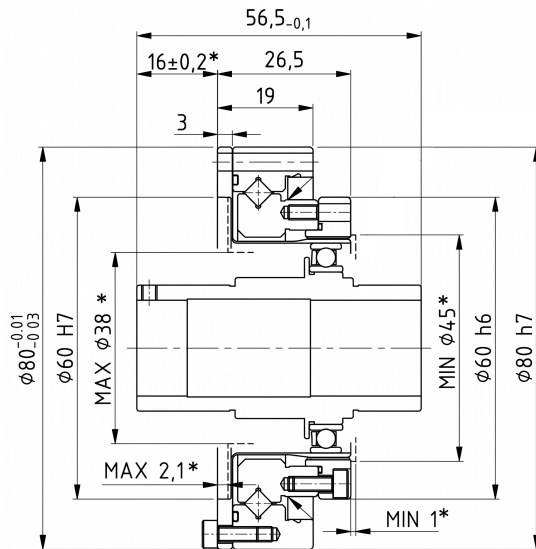
Simple High-Torque Hollow Shaft Gear Unit for compact, coaxial, high-ratio rotary-axis integration. This guide supports interface planning, mounting alignment, duty validation, torsional behavior, lubrication, sealing and commissioning for ES-HG-S18-F17-R50.

Key Integration Facts

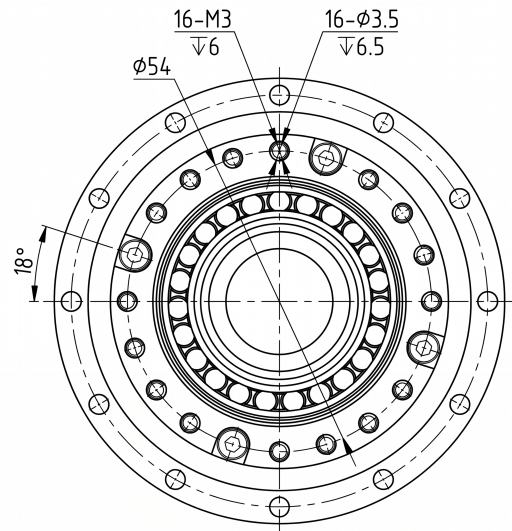
INTEGRATION ITEM	VALUE
Rated Torque	21 Nm
Instantaneous Maximum Torque	91 Nm
Start/Stop Peak Torque	44 Nm
Backlash	±0 arc sec
Reduction Ratio	50
Maximum Input Speed	7300 r/min
Frame Size	17
Weight	0.62 kg

Product Structure & Views

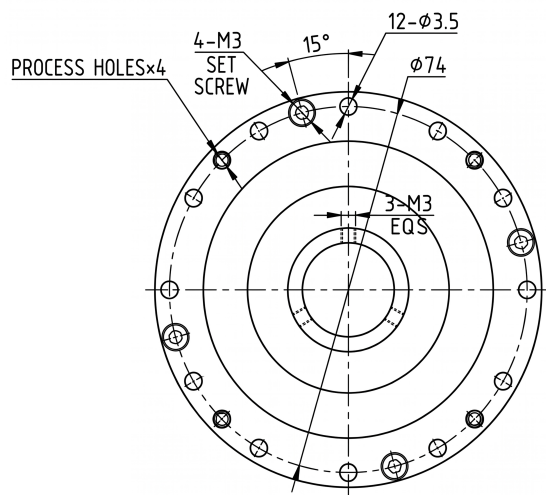
These views present the selected product structure, mounting interfaces and relevant integration geometry for this SKU.



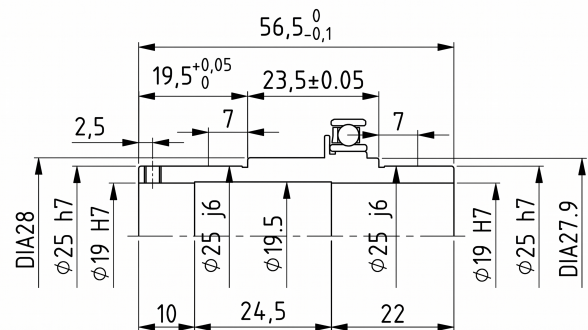
Mechanical View 1



Mechanical View 2



Mechanical View 3



Mechanical View 4

VIEW	FIELD	VALUE
Mechanical View 1	Overall length	56.5 +0/-0.1
	Left-side axial length	16 ±0.2
	Intermediate axial length	26.5
	Internal axial length	19
	Step width	3
	Left mounting outer diameter tolerance	Ø0 -0.01/-0.03
	Left bore fit diameter	Ø0 H7
	Maximum left clearance diameter	MAX Ø8
	Minimum right clearance diameter	MIN Ø5
	Right shaft fit diameter	Ø0 h6
	Right outer diameter fit	Ø0 h7
	Maximum clearance	MAX 2.1
	Minimum clearance	MIN 1
Mechanical View 2	Threaded mounting holes quantity, thread size and depth	16 × M3 threaded holes, depth 6
	Hole quantity, diameter and depth	16 × Ø3.5 holes, depth 6.5
	Hole pitch circle diameter	Pitch circle diameter Ø54
	Angular spacing of repeated holes	18 degree angular spacing
Mechanical View 3	Twelve diameter 3.5 holes	12 × Ø.5 holes
	Four M3 set screws	4 × M3 set screws
	Angular spacing	15 degrees
	Pitch circle diameter	Ø4 pitch circle diameter
	Process holes quantity	4 process holes
	Three equally spaced M3 holes	3 × M3 equally spaced
Mechanical View 4	Overall Length	56.5 0/-0.1 mm
	Mounting Section Length 1	19.5 +0.05/0 mm
	Central Section Length	23.5±0.05 mm
	End Projection Length	2.5 mm
	Upper Spacing 1	7 mm
	Upper Spacing 2	7 mm
	Leftmost Shaft Diameter	Ø8 mm
	Second Shaft Diameter h7	Ø5 h7
	Third Bore Diameter H7	Ø9 H7
	Fourth Shaft Diameter j6	Ø5 j6
	Central Shaft Diameter	Ø9.5 mm
	Sixth Shaft Diameter j6	Ø5 j6
	Seventh Bore Diameter H7	Ø9 H7
	Eighth Shaft Diameter h7	Ø5 h7
	Rightmost Diameter	Ø7.9 mm
	Lower Section Length 1	10 mm
	Lower Section Length 2	24.5 mm

VIEW	FIELD	VALUE
Lower Section Length 3	22 mm	

Overall Dimensions and Input Interface

PARAMETER	VALUE	UNIT
Frame Size	17	
Reduction Ratio	50	
Weight	0.62	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	6.7	
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
Backlash	±0	arc sec
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-S18-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.