ENGINEERING DOCUMENTATION

Simple High-Torque Hollow Shaft Gear Unit

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-HG-S18-F40-R100	DRAFT-08 / 28 Aug 2026	Engineering Integration Reference

Integration Overview

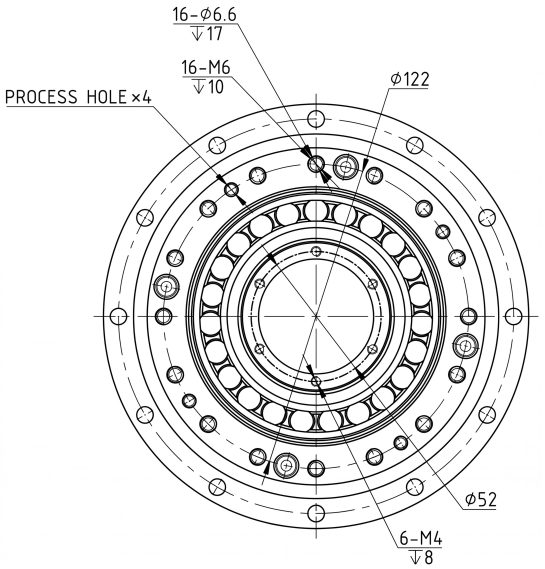
Simple High-Torque Hollow Shaft Gear Unit for compact, coaxial, high-ratio rotary-axis integration. This guide supports interface planning, mounting alignment, duty validation, torsional behavior, lubrication, sealing and commissioning for ES-HG-S18-F40-R100.

Key Integration Facts

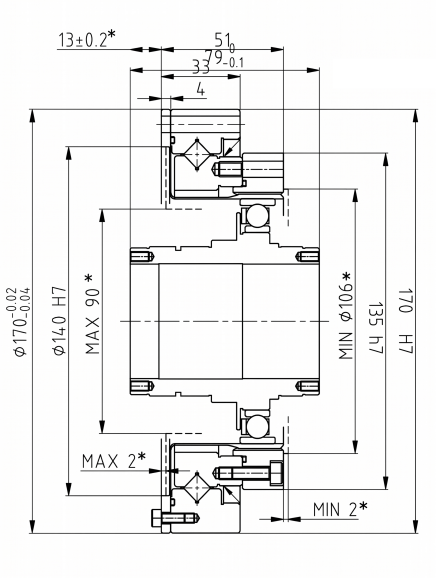
INTEGRATION ITEM	VALUE
Rated Torque	345 N·m
Instantaneous Maximum Torque	1400 N·m
Start/Stop Peak Torque	738 N·m
Backlash	≤20 arc sec
Reduction Ratio	100
Maximum Input Speed	4000 r/min
Frame Size	40
Weight	5.4 kg

Product Structure & Views

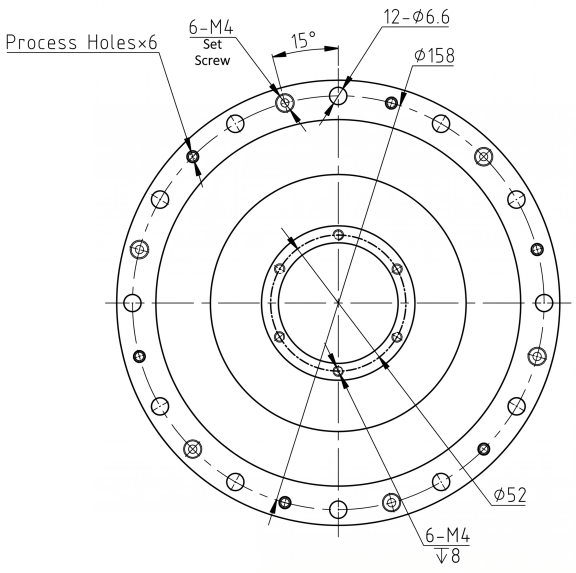
These views present the selected product structure, mounting interfaces and relevant integration geometry for this SKU.



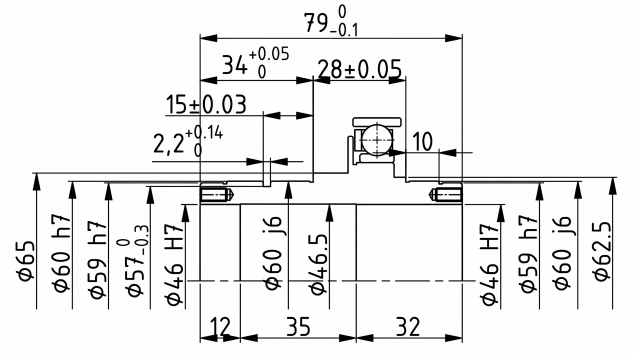
Mechanical View 1



Mechanical View 2



Mechanical View 3



Mechanical View 4

VIEW	FIELD	VALUE
Mechanical View 1	Mounting hole diameter	16 holes, Ø6.6 mm
	Mounting hole surface finish depth	17
	Threaded mounting holes	16 holes, M6 thread
	Threaded hole surface finish depth	10
	Process holes quantity	4 process holes
	Outer flange diameter	Ø122 mm
	Inner mounting circle diameter	Ø52 mm
	Lower mounting holes	6 holes, M4 thread
	Lower mounting holes surface finish depth	8

VIEW	FIELD	VALUE
Mechanical View 2	End projection or step distance	13 ±0.2
	Axial length	51
	Axial length with unilateral tolerance	79 +0/-0.1
	Axial length	33
	Outer diameter fit dimension	Diameter 170, upper deviation -0.02, lower deviation -0.04
	Diameter fit H7	Diameter 140 H7
	Maximum envelope dimension	Maximum 90
	Minimum diameter clearance	Minimum diameter 106
	Diameter fit h7	Diameter 135 h7
	Diameter fit H7	Diameter 170 H7
	Maximum clearance or offset	Maximum 2
	Minimum clearance or offset	Minimum 2
	Mechanical Dimension	4
Mechanical View 3	Process Holes	6 process holes
	Set Screw Thread	6-M4
	Set Screw Description	Set Screw
	Hole Angular Spacing	15°
	Bolt Hole Diameter and Quantity	12-⌀6.6
	Outer Diameter	⌀158
	Center Bore Diameter	⌀52
	Lower Flange Set Screw Thread	6-M4
	Surface Roughness	Ra 8
Mechanical View 4	Overall axial length	79 mm, upper deviation 0, lower deviation -0.1
	Axial step length	34 mm, upper deviation +0.05, lower deviation 0
	Axial step length	28 mm +/-0.05
	Axial length	15 mm +/-0.03
	Local groove or clearance width	2.2 mm, upper deviation +0.14, lower deviation 0
	Local axial distance	10 mm
	Diameter with unilateral tolerance	Diameter 57 mm, upper deviation 0, lower deviation -0.3
	Diameter fit	Diameter 60 mm, tolerance class j6
	Diameter fit	Diameter 59 mm, tolerance class h7
	Diameter	Diameter 62.5 mm
	Outer Fit Diameter	Ø59 h7
	Bore Fit Diameter	Ø46 H7
	Outer Fit Diameter	Ø60 j6
	Left outside diameter	Diameter 65
	Bottom left segment length	12 mm
	Bottom center segment length	35 mm
	Bottom right segment length	32 mm
	Outer Fit Diameter	Ø60 h7

VIEW	FIELD	VALUE
Middle Cylindrical Diameter	Ø46.5	

Overall Dimensions and Input Interface

PARAMETER	VALUE	UNIT
Frame Size	40	
Reduction Ratio	100	
Weight	5.4	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	345	N·m
Allowable Average Torque	484	
Start/Stop Peak Torque	738	
Instantaneous Maximum Torque	1400	
Starting Torque	34	
Maximum Input Speed	4000	r/min
Average Input Speed		

CONDITION	VALUE	UNIT
frame_size: 40; reduction_ratio: 100; size: 40	3000	r/min
frame_size: 40; reduction_ratio: 100	3500	

Design Life	15000	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	345 N·m	Use as the selected continuous output rating under validated duty and thermal conditions.
Allowable Average Torque	484 N·m	Calculate the actual time-weighted output torque over the complete cycle.
Start/Stop Peak Torque	738 N·m	Transient start/stop boundary; include acceleration and deceleration events.
Instantaneous Maximum Torque	1400 N·m	Short-duration shock boundary only; do not use as a normal operating point.
Maximum Input Speed	4000 r/min	Maximum input-speed boundary; also verify motor and thermal limits.
Average Input Speed	Configuration-dependent (2 records)	Validate the time-weighted average input speed over the complete duty cycle.
Design Life	15000 h	Design reference only; actual life depends on torque, speed, shock, lubrication and installation.

Transmission Accuracy and Torsional Rigidity

PARAMETER	VALUE	UNIT
Backlash	≤20	arc sec
Angle Transmission Accuracy	1	arcmin
Hysteresis Loss		
Torsional Rigidity K1	13	×10⁴N·m/rad
Torsional Rigidity K2	20	
Torsional Rigidity K3	23	
Torsional Rigidity T1	54	N·m
Torsional Rigidity T2	196	

- 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-F40-R100 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.