ENGINEERING DOCUMENTATION

High-Torque Hollow Shaft Gear Unit

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-HG-S09-F50-R160	DRAFT-08 / 28 Aug 2026	Engineering Integration Reference

Integration Overview

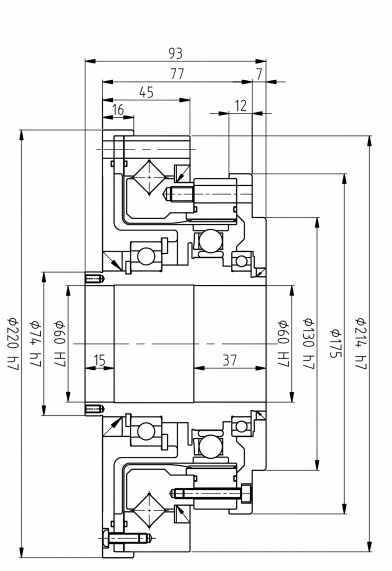
High-Torque Hollow Shaft Gear Unit for compact, coaxial, high-ratio rotary-axis integration. This guide supports interface planning, mounting alignment, duty validation, torsional behavior, lubrication, sealing and commissioning for ES-HG-S09-F50-R160.

Key Integration Facts

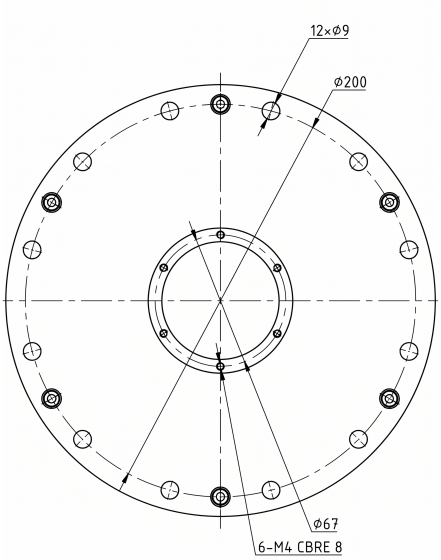
INTEGRATION ITEM	VALUE
Reduction Ratio	160
Frame Size	50

Product Structure & Views

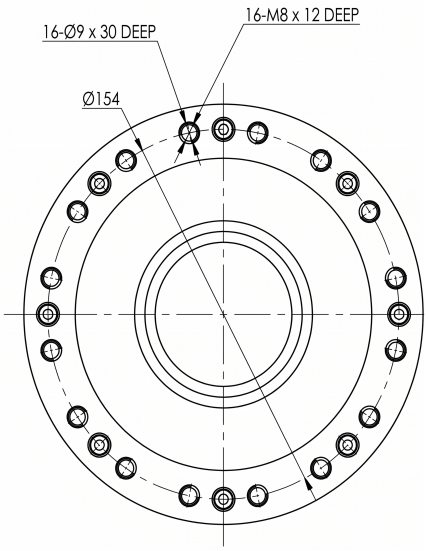
These views present the selected product structure, mounting interfaces and relevant integration geometry for this SKU.



Mechanical View 1



Mechanical View 2



Mechanical View 3

VIEW	FIELD	VALUE
Mechanical View 1	Upper overall width	93 mm
	Upper inner width	77 mm
	Upper left step length	45 mm
	Upper right step offset	12 mm
	Upper left small step width	16 mm
	Left outer fit diameter	Diameter 220 h7
	Right outer fit diameter	Diameter 214 h7
	Right intermediate fit diameter	Diameter 130 h7
	Right bore fit diameter	Diameter 60 H7
	Left intermediate fit diameter	Diameter 74 h7
	Left bore fit diameter	Diameter 60 H7
	Intermediate diameter	Diameter 175
	Lower left local width	15 mm
	Lower right length	37 mm
Mechanical View 2	Outer bolt-hole quantity and diameter	12 holes, diameter 9 mm
	Outer diameter	Diameter 200 mm
	Inner mounting bolt circle diameter	Bolt circle diameter 67 mm
	Inner threaded holes with counterbore specification	6× M4 threaded holes, counterbore 8 mm
Mechanical View 3	Threaded hole quantity, thread size and depth	16 threaded holes, M8, 12 mm deep
	Hole quantity, diameter and depth	16 holes, Ø9 mm, 30 mm deep
	Bolt circle diameter	Ø154 mm bolt circle diameter

Overall Dimensions and Input Interface

PARAMETER	VALUE	UNIT
Frame Size	50	
Reduction Ratio	160	

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

- 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.

Transmission Accuracy and Torsional Rigidity

PARAMETER	VALUE	UNIT
Angle Transmission Accuracy	1	arcmin
Hysteresis Loss		
Torsional Rigidity K1	25	×10⁴N·m/rad
Torsional Rigidity K2	40	
Torsional Rigidity K3	44	
Torsional Rigidity T1	108	N·m
Torsional Rigidity T2	382	

- 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-S09-F50-R160 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.