ENGINEERING DOCUMENTATION

Ultra-Short Gear Unit

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-HG-S29-F11-R80	DRAFT-08 / 28 Aug 2026	Engineering Integration Reference

Integration Overview

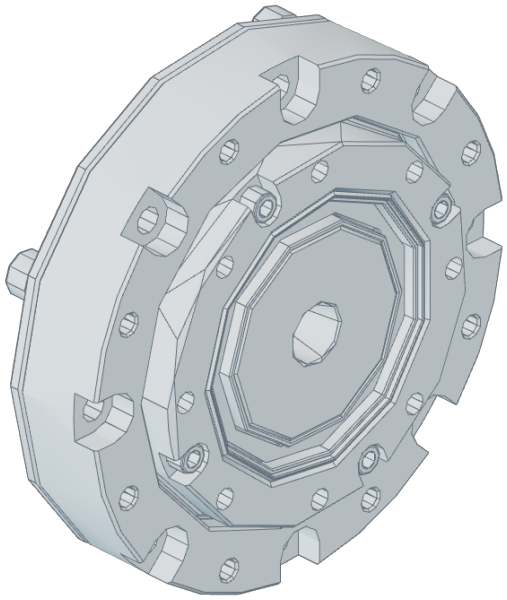
Ultra-Short Gear Unit for compact, coaxial, high-ratio rotary-axis integration. This guide supports interface planning, mounting alignment, duty validation, torsional behavior, lubrication, sealing and commissioning for ES-HG-S29-F11-R80.

Key Integration Facts

INTEGRATION ITEM	VALUE
Reduction Ratio	80
Frame Size	11

3D Orientation Reference

This axonometric reference provides a quick orientation check for the reducer body, input interface and mounting relationship of ES-HG-S29-F11-R80.



Axonometric Orientation View

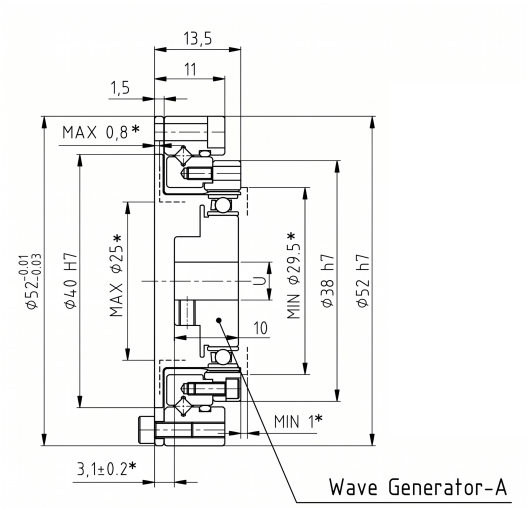
Orientation reference only. Use the exact-SKU parameter table and mechanical drawing for dimensions, hole geometry, fits and machining decisions.

Exact-SKU Interface Cross-Reference

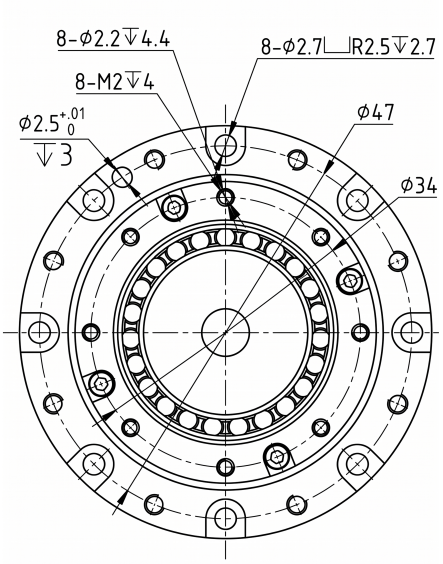
INTEGRATION TOPIC	EXACT-SKU REFERENCE
Reducer envelope and configuration	Frame Size: 11; Reduction Ratio: 80. Confirm hole geometry, datum features and fits in the exact-SKU mechanical drawing.
Torque and speed boundaries	Confirm this interface from the exact-SKU mechanical drawing.
Input and mounting interfaces	Wave Generator options A5 and A6 are defined in the housing and input interface matrix. Confirm hole geometry, datum features and fits in the exact-SKU mechanical drawing.

Product Structure & Views

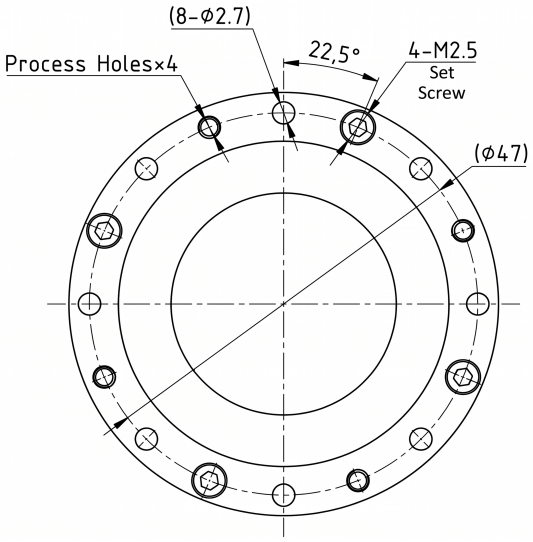
These views present the selected product structure, mounting interfaces and relevant integration geometry for this SKU.



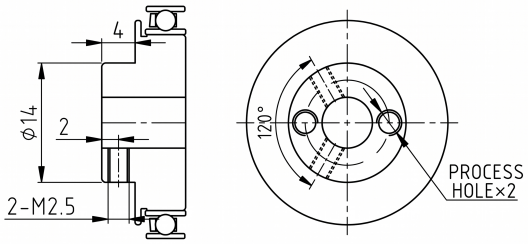
Mechanical View 1



Mechanical View 2



Mechanical View 3



Mechanical View 4

VIEW	FIELD	VALUE
Mechanical View 1	Top overall length	13.5
	Top inner length	11
	Step or edge offset	1.5
	Maximum clearance or offset	MAX 0.8
	Left-side diameter with negative tolerance	Diameter 52 with upper deviation -0.01 and lower deviation -0.03
	Bore fit diameter	Diameter 40 H7
	Maximum diameter limit	MAX diameter 25
	Minimum diameter limit	MIN diameter 29.5
	Shaft fit diameter	Diameter 38 h7
	Outer diameter fit	Diameter 52 h7
	Local length	10
	Minimum clearance	MIN 1
	Thickness or offset with tolerance	3.1 ±0.2
	Component label	Wave Generator-A
	Label U	U label; value not specified
Mechanical View 2	8 holes diameter 2.2 depth 4.4	8 holes, diameter 2.2, depth 4.4
	8 M2 threaded holes depth 4	8 M2 threaded holes, depth 4
	8 holes diameter 2.7 with R2.5 feature depth 2.7	8 holes, diameter 2.7, R2.5 feature, depth 2.7
	Diameter 2.5 hole tolerance	Diameter 2.5, tolerance +0.01/0
	Diameter 2.5 hole depth	Depth 3 for associated Ø2.5 hole
	Diameter 47 circular feature	Diameter 47
	Diameter 34 circular feature	Diameter 34
Mechanical View 3	8 holes diameter 2.7	8 × Ø2.7 holes
	Angular spacing	22.5 degrees
	Set screw threaded holes	4 × M2.5 set screw threaded holes
	Process holes quantity	4 process holes
	Reference diameter 47	Reference Ø47
Mechanical View 4	Local width dimension	4 mm
	Shaft or cylindrical diameter	Diameter 14 mm
	Local length dimension	2 mm
	Hole angular spacing or pattern angle	120 degrees
	Process hole quantity	Process holes, quantity 2
	Threaded hole size and quantity	2 × M2.5 threaded holes

Overall Dimensions and Input Interface

PARAMETER	VALUE	UNIT
Frame Size	11	
Reduction Ratio	80	

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	2	arc min
Hysteresis Loss	2.5	
Torsional Rigidity K1	0.073	×10⁴N·m/rad
Torsional Rigidity K2	0.077	
Torsional Rigidity K3	0.1	
Torsional Rigidity T1	0.29	N·m
Torsional Rigidity T2	0.75	

- 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-S29-F11-R80 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.