

ENGINEERING DOCUMENTATION

Hat Component Set

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-HG-S02-F25-R30	DRAFT-08 / 28 Aug 2026	Engineering Integration Reference

Integration Overview

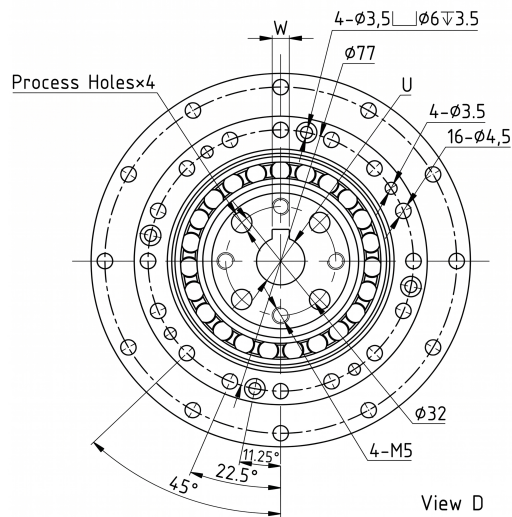
Hat Component Set for compact, coaxial, high-ratio rotary-axis integration. This guide supports interface planning, mounting alignment, duty validation, torsional behavior, lubrication, sealing and commissioning for ES-HG-S02-F25-R30.

Key Integration Facts

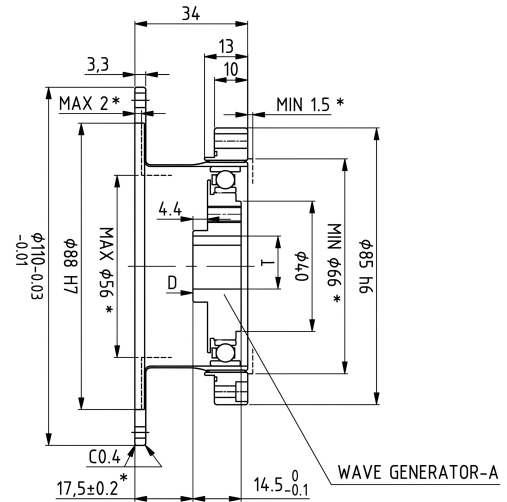
INTEGRATION ITEM	VALUE
Reduction Ratio	30
Frame Size	25

Product Structure & Views

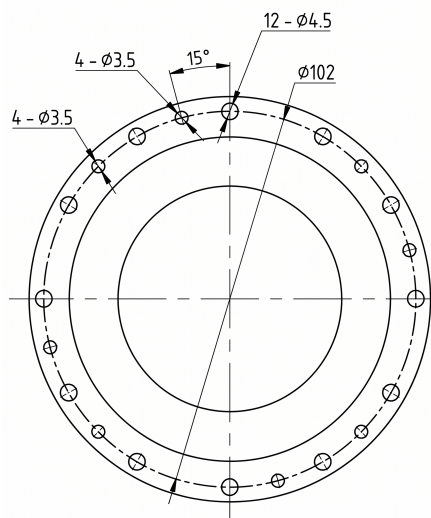
These views present the selected product structure, mounting interfaces and relevant integration geometry for this SKU.



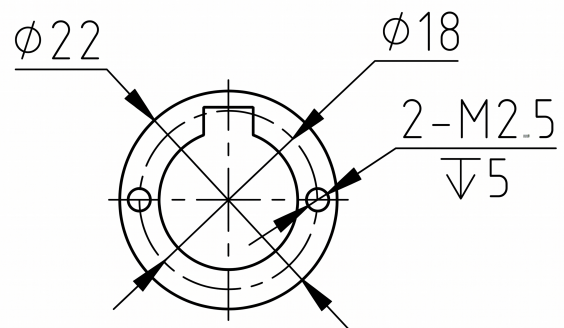
Mechanical View 1



Mechanical View 2



Mechanical View 3



Mechanical View 4

VIEW	FIELD	VALUE
Mechanical View 1	Four counterbored hole size	4 holes diameter 3.5 with counterbore diameter 6 depth 3.5
	Width label W	W label, value not specified in this crop
	Diameter 77 callout	Diameter 77
	Process holes quantity note	Process holes quantity 4
	U label	U label
	Four diameter 3.5 holes	4 holes diameter 3.5
	Sixteen diameter 4.5 holes	16 holes diameter 4.5
	Diameter 32 circular feature	Diameter 32
	Four M5 threaded holes	4 M5 threaded holes
	Angular spacing 11.25 degrees	11.25 degrees
	Angular spacing 22.5 degrees	22.5 degrees
	Angular range 45 degrees	45 degrees
	View D label	View D
	Overall axial width	34 mm
Mechanical View 2	Right step axial width	13 mm
	Right inner step axial width	10 mm
	Left local clearance	3.3 mm
	Maximum permitted clearance	MAX 2 mm
	Minimum permitted clearance	MIN 1.5 mm
	Local step dimension	4.4 mm
	Outer diameter fit dimension	Diameter 110 mm, upper deviation -0.01 mm, lower deviation -0.03 mm
	Bore fit diameter	Diameter 88 H7
	Maximum permitted diameter	MAX diameter 56 mm
	Inner hole diameter	Diameter 40 mm
	Minimum permitted diameter	MIN diameter 66 mm
	Outer diameter tolerance fit	Diameter 85 h6
	Datum identifier D	Datum D
	Chamfer size	Chamfer C0.4 mm
	Component name	Wave generator A
	Axial dimension with unilateral tolerance	14.5 mm, +0/-0.1 mm
	Axial dimension	14.5 mm
	Axial dimension with unilateral tolerance	17.5±0.2*
	Datum T	Datum T
Mechanical View 3	Outer ring 12 mounting holes diameter	12 holes of $\varnothing 5$
	Angular spacing between holes	15°
	Middle ring 4 mounting holes diameter	4 holes of $\varnothing 5$
	Outer diameter	$\varnothing 2$
	Inner ring 4 mounting holes diameter	4 holes of $\varnothing 5$
Mechanical View 4	Outer diameter	$\varnothing 2$
	Inner hole diameter	$\varnothing 8$

VIEW	FIELD	VALUE
Threaded holes	2-M2.5	
Surface roughness	Ra 5	

Housing and Input Interface Dimensions

Housing Size: 25 Reduction Ratio: 30

WAVE GENERATOR	T (MM)	U	W
A11	12.8 +0.10	11 H7	4 JS9/P9
A14	16.3 +0.10	14 H7	5 JS9/P9

Note: Dimensions in mm unless otherwise specified. Refer to the dimensional drawing for feature locations and datum definitions.

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

- 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-S02-F25-R30 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.