ENGINEERING DOCUMENTATION

High-Torque Cup Unit Type I

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-HG-S05-F32-R80	DRAFT-08 / 28 Aug 2026	Engineering Integration Reference

Integration Overview

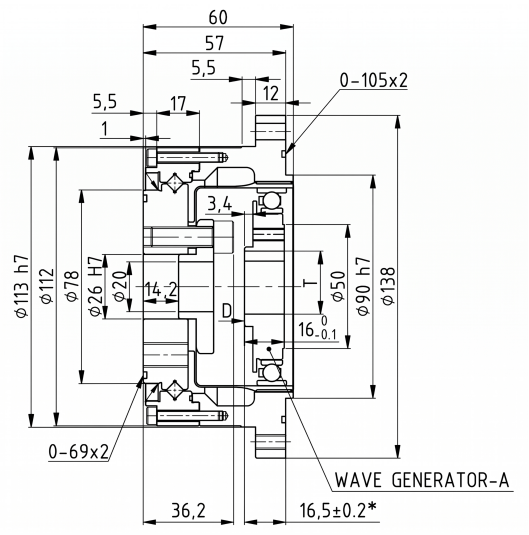
High-Torque Cup Unit Type I for compact, coaxial, high-ratio rotary-axis integration. This guide supports interface planning, mounting alignment, duty validation, torsional behavior, lubrication, sealing and commissioning for ES-HG-S05-F32-R80.

Key Integration Facts

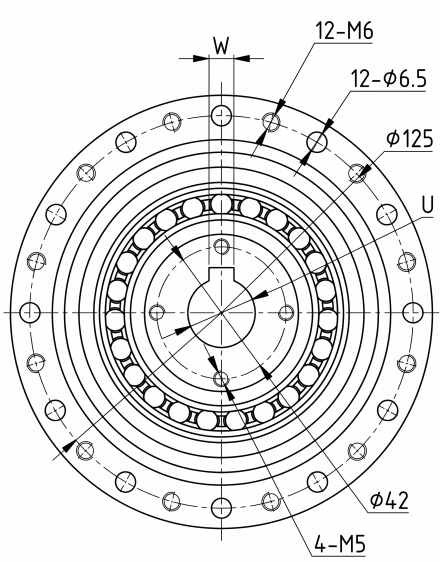
INTEGRATION ITEM	VALUE
Rated Torque	153 N·m
Instantaneous Maximum Torque	738 N·m
Start/Stop Peak Torque	395 N·m
Backlash	≤20 arc sec
Reduction Ratio	80
Maximum Input Speed	4800 r/min
Frame Size	32
Weight	3.11 kg

Product Structure & Views

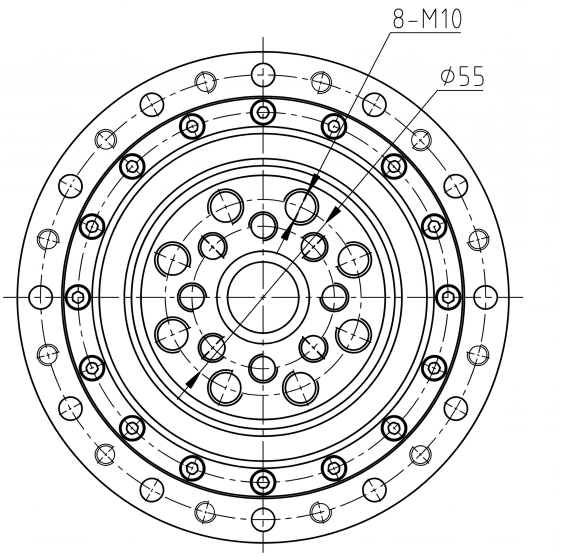
These views present the selected product structure, mounting interfaces and relevant integration geometry for this SKU.



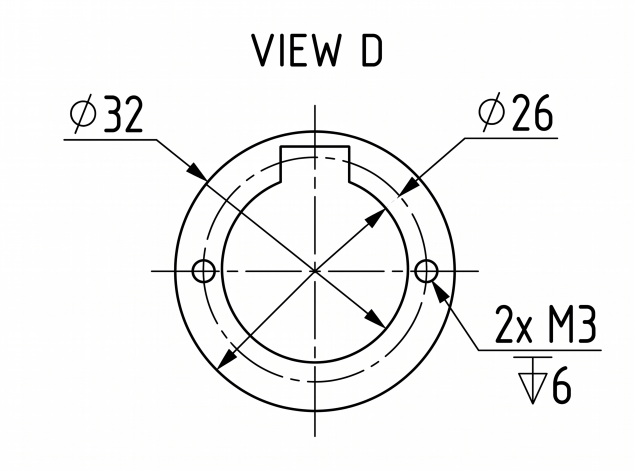
Mechanical View 1



Mechanical View 2



Mechanical View 3



Mechanical View 4

VIEW	FIELD	VALUE
Mechanical View 1	Overall height	60
	Internal height	57
	Upper step dimension	5.5
	Upper mounting pattern callout	0-105 x2
	Upper axial dimension	12
	Left step dimension	5.5
	Left upper axial dimension	17
	Small step dimension	1
	Internal clearance dimension	3.4
	Diameter 113 fit dimension	Dia. 113 h7
	Diameter 20 dimension	Dia. 20
	Diameter 138 dimension	Dia. 138
	Diameter 50 dimension	Dia. 50
	Diameter 112 dimension	Dia. 112
	Diameter 78 dimension	Dia. 78
	Diameter 90 fit dimension	Dia. 90 h7
	Datum D	Datum D
	Dimension 16 unilateral tolerance	16 +0/-0.1
	Lower mounting pattern callout	0-69 x2
	Diameter 26 fit dimension	Dia. 26 H7
	Local width	14.2
	Bottom axial distance	36.2
	Bottom axial dimension with tolerance	16.5 ± 0.2 mm
	Reference label	WAVE GENERATOR-A
	Parameter T	T, value not specified in this crop
Mechanical View 2	Outer mounting hole thread specification	12 holes, M6 thread
	Outer mounting hole diameter	12 holes, Φ6.5 mm diameter
	Outer bolt circle diameter (PCD)	Φ125 mm
	Label/identifier U	U
	Inner bolt circle diameter (PCD)	Φ42 mm
	Inner mounting hole thread specification	4 holes, M5 thread
	Dimension identifier W	W (dimension not specified)
Mechanical View 3	Mounting hole specification	8 × M10 threaded holes
	Hole diameter	Φ15
Mechanical View 4	View identifier	View D
	Outer diameter	Φ92
	Inner diameter / Bore diameter	Φ26
	Mounting holes specification	2×M3 threaded holes
	Position tolerance	Position tolerance 6

Housing and Input Interface Dimensions

Housing Size: 32 **Reduction Ratio:** 80 **Weight:** 3.11 kg

WAVE GENERATOR	T (MM)	U	W
A14	16.3 +0.10	14 H7	5 JS9/P9
A19	21.8 +0.10	19 H7	6 JS9/P9
A22	24.8 +0.10	22 H7	
	25.3 +0.10		8 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

PARAMETER	VALUE	UNIT
Rated Torque	153	N·m
Allowable Average Torque	217	
Start/Stop Peak Torque	395	
Instantaneous Maximum Torque	738	
Starting Torque	21	
Maximum Input Speed	4800	r/min
Average Input Speed	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	153 N·m	Use as the selected continuous output rating under validated duty and thermal conditions.
Allowable Average Torque	217 N·m	Calculate the actual time-weighted output torque over the complete cycle.
Start/Stop Peak Torque	395 N·m	Transient start/stop boundary; include acceleration and deceleration events.
Instantaneous Maximum Torque	738 N·m	Short-duration shock boundary only; do not use as a normal operating point.
Maximum Input Speed	4800 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	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	arc min
Hysteresis Loss		
Torsional Rigidity K1	6.7	N·m/rad
Torsional Rigidity K2	11	
Torsional Rigidity K3	12	
Torsional Rigidity T1	29	N·m
Torsional Rigidity T2	108	

- 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-S05-F32-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.