

CATEGORY SELECTION GUIDE

Ultra-Precision Planetary Gearbox Category Selection Guide

Ultra-precision planetary gearboxes use one or more planetary reduction stages to reduce servo-motor speed and increase usable output torque within a compact coaxial drivetrain. This guide narrows 16 Product Platforms and 363 SKUs by installation envelope, servo-motor fit, reduction ratio, stage count, continuous and peak torque, backlash, torsional rigidity and external load requirements.

CATEGORY SELECTION GUIDE

CATEGORY	CURRENT CATALOG	REVISION / ISSUE
Ultra-Precision Planetary Gearboxes	16 Product Platforms / 363 SKUs	R02 2026-09-03

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01 | Category Scope and Objective

Product catalog and suitable use

Item	Category scope
Product catalog	16 Product Platforms / 363 SKUs
Suitable use	Compact coaxial servo reduction where installation envelope, motor fit, ratio, continuous and peak torque, positioning response, backlash, rigidity and external shaft loads must be considered together.

02 | Operating Principle and Typical Applications

Planetary reduction principle

A servo motor drives the input member and planet gears distribute load around an internal ring gear to produce a lower-speed, higher-torque coaxial output. One-, two- and, where recorded, three-stage configurations extend the available ratio and packaging choices. The selected Product Platform must still be matched to the exact motor interface, output connection and operating load.

Typical applications

Servo positioning axes For rotary axes that need compact speed reduction, torque multiplication and controlled positioning while preserving a coaxial motor-to-output layout.	Robotic and automation rotary joints For articulated or automated mechanisms where envelope, continuous torque, peak events, backlash, rigidity and external shaft loads define the usable drivetrain.	Indexing and motion-transfer axes For repetitive indexing or motion-transfer duties where ratio, stage count, input speed, service cycle and output connection must be resolved as one system.
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03 | Application Record Checklist

Record before shortlisting

01	Installation envelope	Record allowable frame size, flange space, total length, output-shaft geometry and assembly clearances.
02	Servo motor	Record motor power, shaft geometry, pilot and bolt pattern, motor adapter interface, rated speed and peak torque.
03	Motion profile	Record input speed, target output speed, reduction ratio, acceleration, deceleration, dwell time and cycles per operating period.
04	Torque demand	Separate continuous output torque from acceleration, deceleration, emergency-stop and other short-duration peak events.
05	Precision and stiffness	Record permitted backlash, positioning response and torsional-rigidity requirement at the output.
06	External loads	Record radial load, axial load, load direction and the distance from the output mounting reference to the load application point.
07	Duty and life	Record operating hours, duty pattern, expected life, shock frequency, reversals and thermal environment.
08	Integration conditions	Record mounting orientation, alignment, lubrication, sealing, coupling method and required controlled engineering documents.

04 | Product Platform Catalog

Current Product Platforms

The complete 16-platform catalog is shown as a compact directory. Use the selection matrix for parameter comparison and the SKU section only after retaining a candidate Product Platform.

	Ultra-Precision Planetary Gearbox Product Platform 01 4 SKUs		Ultra-Precision Planetary Gearbox Product Platform 02 5 SKUs		Ultra-Precision Planetary Gearbox Product Platform 03 3 SKUs
	Ultra-Precision Planetary Gearbox Product Platform 04 5 SKUs		Ultra-Precision Planetary Gearbox Product Platform 05 6 SKUs		Ultra-Precision Planetary Gearbox Product Platform 06 58 SKUs
	Ultra-Precision Planetary Gearbox Product Platform 07 5 SKUs		Ultra-Precision Planetary Gearbox Product Platform 08 36 SKUs		Ultra-Precision Planetary Gearbox Product Platform 09 117 SKUs
	Ultra-Precision Planetary Gearbox Product Platform 10 25 SKUs		Ultra-Precision Planetary Gearbox Product Platform 11 23 SKUs		Ultra-Precision Planetary Gearbox Product Platform 12 6 SKUs
	Ultra-Precision Planetary Gearbox Product Platform 13 9 SKUs		Ultra-Precision Planetary Gearbox Product Platform 14 16 SKUs		Ultra-Precision Planetary Gearbox Product Platform 15 7 SKUs
	Ultra-Precision Planetary Gearbox Product Platform 16 38 SKUs				

05 | Technical Selection Path

Recommended shortlisting sequence

01	Filter the installation envelope Use frame size, flange geometry, output connection and available length to remove mechanically incompatible choices.
02	Match the servo motor Match compatible servo-motor power and motor adapter interface, then verify shaft, pilot and bolt-pattern geometry.
03	Resolve ratio and stage count Derive the required output speed from motor speed, then shortlist the recorded reduction ratio and number of reduction stages.
04	Check continuous torque Compare the calculated continuous output torque requirement with Rated Output Torque or the applicable continuous output-torque field recorded for the exact SKU.
05	Check peak and emergency events Check acceleration, deceleration, start-stop and emergency events against the recorded peak or instantaneous torque fields for the exact SKU.
06	Check backlash and rigidity Use Backlash for lost-motion screening and Torsional Rigidity for load-dependent angular-deflection screening.
07	Check external loads and input speed Check Permissible Radial Load, Permissible Axial Load and the applicable input-speed limit using the correct load application point and duty context.
08	Use Product Platform, then confirm SKU After technical screening, use the Product Platform as catalog navigation and resolve the exact combination of frame, motor fit, ratio, stage, torque and precision into one SKU.

Selection outcome

The outcome of this path is a technically credible Product Platform shortlist and an exact SKU candidate. Product Platform numbering is catalog navigation, not a performance ranking.

06 | Product Platform Selection Matrix

Published standard-parameter shortlist

Numeric spans are derived only from published standard display values recorded for SKUs in each Product Platform. Multiple values identify available SKU-level choices and are not necessarily mutually combinable. "Not stated" means the current standard parameter set does not provide that field for the Product Platform; it is not a zero value.

Product Platform	SKUs	Frame Size	Compatible Servo Motor Power	Reduction Ratio	Number of Reduction Stages	Rated Output Torque	Backlash
Product Platform 01· ES-PG-C36-S001	4	60 / 90	400 / 750	Not stated	1 / 2	18–135 numeric span	10 / 15
Product Platform 02· ES-PG-C36-S002	5	60 / 90 / 120	400 / 750 / 1000	Not stated	1 / 2	Not stated	Not stated
Product Platform 03· ES-PG-C36-S003	3	60 / 90	400 / 750	Not stated	1 / 2	18–135 numeric span	10 / 15
Product Platform 04· ES-PG-C36-S004	5	60 / 90 / 120	400 / 750 / 1000	Not stated	1 / 2	Not stated	Not stated
Product Platform 05· ES-PG-C36-S005	6	64	200 / 400 / 750	Not stated	1 / 2	40 / 42 / 48 / 50 / 60	4 / 6
Product Platform 06· ES-PG-C36-S006	58	64 / 90 / 110 / 140	100–3000 numeric span	25 / 50	1 / 2	40–650 numeric span	1 / 3 / 5 / 7
Product Platform 07· ES-PG-C36-S007	5	60 / 90 / 115 / 142	400 / 750 / 1000 / 3000	Not stated	1 / 2	30–640 numeric span	5 / 7
Product Platform 08· ES-PG-C36-S008	36	60 / 90 / 115 / 142 / 180	100–4000 numeric span	Not stated	1 / 2	36–1200 numeric span	2 / 4 / 6 / 7 / 9
Product Platform 09· ES-PG-C36-S009	117	42–220 numeric span	50–7500 numeric span	3 / 5 / 10 / 20 / 25 / 40	1 / 2	14–2000 numeric span	1 / 3 / 5 / 7
Product Platform 10· ES-PG-C36-S010	25	40 / 60 / 80 / 120 / 160	50–2000 numeric span	Not stated	1 / 2 / 3	Not stated	Not stated
Product Platform 11· ES-PG-C36-S011	23	40 / 60 / 80 / 120	50 / 200 / 400 / 750 / 1000 / 1500	Not stated	1 / 2 / 3	Not stated	Not stated
Product Platform 12· ES-PG-C36-S012	6	115 / 142 / 190	750 / 1000 / 2000 / 4000	Not stated	1 / 2	125–1800 numeric span	8 / 12
Product Platform 13· ES-PG-C36-S013	9	60 / 80 / 120	200 / 400 / 750 / 1000	Not stated	1 / 2 / 3	Not stated	Not stated
Product Platform 14· ES-PG-C36-S014	16	60 / 80 / 120	200 / 400 / 750 / 1000 / 1500	Not stated	1 / 2 / 3	Not stated	Not stated
Product Platform 15· ES-PG-C36-S015	7	70 / 90 / 120	400 / 750 / 1000	Not stated	1 / 2	40–330 numeric span	1 / 3 / 5 / 7
Product Platform 16· ES-RD-C36-S001	38	52 / 78 / 98 / 125	50–5000 numeric span	3–81 numeric span	1 / 2	0.255–91.3 numeric span	3 / 5 / 8 / 10 / 12 / 15

07 | Torque, Precision and Load Trade-offs

Ratio, stage count and speed Higher reduction may require additional stages and changes output speed, package length and efficiency. Confirm the exact ratio-stage combination and input-speed limit at SKU level.	Continuous torque versus peak events Rated Output Torque supports continuous screening; acceleration, deceleration and emergency events require the applicable peak or instantaneous torque fields. Do not substitute one for the other.
Backlash versus torsional rigidity Backlash describes lost motion around torque reversal, while torsional rigidity governs angular deflection under load. A low backlash value does not by itself establish high loaded positioning stiffness.	Radial and axial load context Permissible radial and axial loads depend on the stated measurement point and operating condition. Shaft load checks must include overhung distance, direction and any bending moment created by the application.

08 | SKU Refinement and Integration Checklist

Five-step SKU refinement

Use these five dimensions after the Product Platform shortlist. Parameter values remain SKU-specific and must not be recombined across rows.

Refinement step	Initial filter	Confirm at SKU	Selection purpose
Installation and motor fit	Frame Size / Compatible Servo Motor Power	Motor Adapter Interface	Retain SKUs that fit the machine envelope and the intended servo motor before comparing performance.
Ratio and architecture	Reduction Ratio	Number of Reduction Stages	Select the ratio and stage combination as one SKU configuration; do not infer combinations from platform-level value spans.
Torque and speed	Rated Output Torque	Recommended Input Speed / Maximum Input Speed	Match the continuous operating point first, then confirm input-speed limits and transient requirements for the same SKU.
Precision behavior	Backlash	Torsional Rigidity	Confirm backlash and rigidity together for reversal, settling and positioning requirements.
External load path	Permissible Radial Load	Permissible Axial Load	Confirm the output-bearing load path and both allowable load directions for the selected SKU and installation.

Integration checklist

01	Confirm the exact SKU against continuous torque, peak events, input speed, duty cycle and expected service life.
02	Confirm frame, output geometry, motor adapter, shaft fit, alignment, fasteners, clearances and the complete external load path.
03	Confirm backlash and torsional rigidity under the actual reversal and load conditions, not as interchangeable precision claims.
04	Confirm lubrication state, sealing, mounting orientation and maintenance requirements for the selected SKU and installation.
05	Obtain the current SKU Product Datasheet, Dimensional & Integration Guide, 2D drawing and controlled 3D resources required by the project.

09 | Engineering Use and Verification Notice

Controlled engineering documents

01	SKU Product Datasheet	Use the current datasheet for exact-SKU ratings, limits, units and stated operating conditions.
02	Dimensional & Integration Guide	Use the current guide for dimensions, tolerances, motor adapter, output connection, alignment, lubrication, sealing and installation details.
03	2D and controlled 3D resources	Use released 2D drawings and controlled STEP or native CAD resources for interface validation and packaging checks.

Final verification statement

Before design freeze, verify the selected SKU against its current datasheet and Dimensional & Integration Guide, including frame and flange dimensions, motor-shaft fit, reduction ratio and stage count, continuous and peak torque, backlash, torsional rigidity, radial and axial loads, input speed, lubrication, sealing, mounting orientation and controlled drawing/CAD revision. Values not stated in the standard parameter set must be resolved from the controlled engineering documents; they must not be inferred from the public SKU code or from another Product Platform.