

CATEGORY SELECTION GUIDE

AC Servo Motors Category Selection Guide

AC servo motors operate with position feedback and a servo drive as a closed-loop motion system for rotary tasks requiring controlled position, speed and torque. This category covers multiple flange-size, continuous-output, torque, speed and feedback combinations for automation axes, robot joints, packaging, CNC, 3C and logistics equipment; selection should consider continuous and peak duty, load inertia, drive voltage and feedback interface.

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CATEGORY	CURRENT CATALOG	REVISION / ISSUE
AC Servo Motors	17 Product Platforms / 203 SKUs	R11 2026-09-01

CONTENTS

01	Category Scope and Objective
02	Typical Applications and Selection Inputs
03	Product Platform Catalog Navigation
04	Layered Product Platform Selection Path
05	Product Platform Selection Matrix
06	Platform Differences and Engineering Trade-offs
07	SKU Refinement
08	Engineering Information Checklist
09	Engineering Use and Verification Notice

01 | Category Scope and Objective

Item	Current category
Product catalog	17 Product Platforms / 203 SKUs
Suitable use	Closed-loop rotary actuation for automation axes, robot joints and robot peripherals.

02 | Typical Applications and Selection Inputs

Typical applications

Automation axes Closed-loop rotary actuation for machine axes where continuous operating point, peak motion demand and drive pairing must be assessed together.	Robot joints Servo-driven joints where envelope, torque-speed demand, reflected inertia, feedback and holding behavior interact.	Robot peripherals Servo-controlled rotary functions in robot peripherals where repeatable positioning, interface packaging and controlled engineering files are required.
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Inputs to record before shortlisting

01	Mechanical envelope	Record flange envelope, mounting pattern, shaft interface, cable and connector space.
02	Continuous operating point	Record continuous load torque and operating speed at the motor shaft after accounting for the transmission.
03	Peak motion demand	Record acceleration, deceleration, peak torque, peak duration and repetition pattern.
04	Load and inertia	Record load inertia, transmission ratio, reflected inertia, radial and axial shaft loads and required response.
05	Electrical architecture	Record the intended drive, supply or line-voltage context and motor-drive pairing constraints.
06	Feedback and holding	Record position-feedback requirements, absolute or incremental behavior, brake requirement and release behavior.
07	Environment and duty	Record ambient temperature, humidity, altitude, ingress requirement, cooling path and duty cycle.

03 | Product Platform Catalog Navigation

Three Product Platform groups for catalog navigation

The three groups describe Product Platform positioning and intended application focus: Standard for general OEM motion axes, High-Response for higher-dynamic and precision automation axes, and Compact for space-constrained machinery and robot modules. Because frame sizes, operating points and interface options overlap across the groups, first retain candidates by installation envelope and technical requirements. Use the group labels for catalog navigation and application context, not as the first exclusion condition.

 <p>Standard</p> <p>4 Product Platforms and 82 SKUs across 40, 60, 80 and 130 mm frame sizes. The group identifies the general OEM motion-axis positioning; confirm suitability from the required envelope, operating point, feedback and electrical context.</p>	 <p>High-Response</p> <p>6 Product Platforms and 45 SKUs across 60, 80, 110, 130, 150 and 180 mm frame sizes. The group identifies the higher-dynamic and precision automation positioning; compare the available torque, speed, feedback and electrical configurations.</p>	 <p>Compact</p> <p>7 Product Platforms and 76 SKUs across 40, 60, 80, 130 and 180 mm frame sizes. The group identifies the space-constrained machinery and robot-module positioning; verify inertia, torque, feedback, outlet and drive context at SKU level.</p>
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04 | Layered Product Platform Selection Path

Recommended shortlisting sequence

01	Filter the installation envelope Shortlist the frame sizes, mounting interfaces and shaft arrangements that fit the available installation envelope.
02	Match the continuous operating point Compare Rated Torque and Rated Speed together; use Continuous Rated Output Power only as a cross-check.
03	Check peak demand Compare Instantaneous Maximum Torque with the acceleration and short-duration load case, including its duration and repetition.
04	Check load and inertia Use Rotor Inertia and Inertia Level with the application load and motion profile to retain mechanically appropriate candidates.
05	Resolve drive and voltage context Keep Rated Voltage and Rated Line Voltage definitions separate and confirm the intended drive pairing.
06	Resolve feedback and interface Compare Position Feedback Device, Motor Outlet Mode, shaft interface and holding requirements for the retained Product Platforms.
07	Use the Product Platform group as navigation Use Standard, High-Response or Compact to navigate the retained Product Platforms and understand their application positioning; do not use the group label alone to exclude a technically suitable candidate.
08	Move to the exact SKU Use SKU-level parameter values and controlled documents to confirm the final configuration; do not infer missing values from the SKU code.

Selection outcome

Technical shortlisting produces one or more candidate frame sizes and Product Platforms. Product Platform group labels provide catalog navigation and application-positioning context; continue to SKU refinement before confirming the exact SKU and its controlled engineering documents.

05 | Product Platform Selection Matrix

Product Platform groups, frame sizes and available SKU parameter ranges

Values shown are available across multiple SKUs within each Product Platform and are not necessarily mutually combinable. Use SKU-level parameters to confirm an exact configuration.

Group	Frame (mm)	Product Platform	SKU Count	Continuous Rated Output Power (W)	Rated Torque (N·m)	Instantaneous Maximum Torque (N·m)	Rated Speed (rpm)	Position Feedback Device
Standard	40	ES-SM-A01-040S	8	50 / 100	0.16 / 0.32	0.48 / 0.96	3000	23-bit multi-turn communication optical absolute encoder / Single-turn communication magnetic encoder
	60	ES-SM-A01-060S	16	200 / 400	0.64 / 1.27	1.92 / 3.81	3000	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder / Single-turn communication magnetic encoder / Single-turn communication optical encoder
	80	ES-SM-A01-080S	8	750	2.39	7.17	3000	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder / Single-turn communication magnetic encoder / Single-turn communication optical encoder
	130	ES-SM-A01-130D	50	1000 / 1500 / 2000 / 3000	4.78 / 7.16 / 9.55 / 14.33	14.34 / 20 / 21.5 / 28.65 / 30 / 43	1000 / 2000	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder / Single-turn communication magnetic encoder / Single-turn communication optical encoder
High-Response	60	ES-SM-A02-060S	8	200 / 400	0.64 / 1.27	1.92 / 3.82	3000	2500 PPR incremental encoder
	80	ES-SM-A02-080S	6	750 / 1000	2.39 / 3.18	7.17 / 9.48	3000	2500 PPR incremental encoder
	110	ES-SM-A02-110D	11	1050 / 1250 / 1260 / 1570 / 1880	4 / 5 / 6	12 / 15 / 18	2000 / 3000	2500 PPR incremental encoder
	130	ES-SM-A02-130D	7	1050 / 1570 / 2100 / 3000	5 / 7.5 / 10 / 14.3	12.5 / 18.75 / 25 / 35.75	2000	2500 PPR incremental encoder
	150	ES-SM-A02-150D	5	2300 / 3000 / 3800	11.1 / 14.3 / 18	27.5 / 35.75 / 45	2000	2500 PPR incremental encoder
	180	ES-SM-A02-180D	8	3500 / 4400 / 5500 / 7500	22 / 28 / 35 / 48	55 / 70 / 87.5 / 120	1500	2500 PPR incremental encoder / S-MT37 rotary transformer
Compact	40	ES-SM-A03-040	8	50 / 100	0.16 / 0.32	0.56 / 1.11	3000	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder
	60	ES-SM-A03-060D	8	200 / 400	0.64 / 1.27	2.26 / 4.45	3000	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder
		ES-SM-A03-060S	8	200 / 400	0.64 / 1.27	1.92 / 3.81	3000	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder
	80	ES-SM-A03-080D	8	750 / 1000	2.39 / 3.18	7.17 / 9.54	3000	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder
		ES-SM-A03-080S	8	750 / 1000	2.39 / 3.18	7.17 / 9.54	3000	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder
	130	ES-SM-A03-130G	16	850 / 1300 / 1800 / 2400	5.39 / 8.27 / 11.45 / 15.2	16.2 / 24.81 / 28.625 / 38	1500	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder
	180	ES-SM-A03-180G	20	3000 / 3500 / 4400 / 5500 / 7500	19.1 / 22.3 / 28 / 35 / 47.8	57.3 / 66.9 / 70 / 87.5 / 119.5	1500	17-bit multi-turn communication magnetic absolute encoder / 23-bit multi-turn communication optical absolute encoder

06 | Platform Differences and Engineering Trade-offs

How overlapping Product Platforms differ

40 mm frame size Two Product Platforms share the available 50 / 100 output-power values and 0.16 / 0.32 rated-torque values. Their instantaneous maximum torque, feedback options, outlet mode and protection statements differ, so frame and power alone do not complete the shortlist.	60 mm frame size Four Product Platforms share the available 200 / 400 output-power values and 0.64 / 1.27 rated-torque values. Use instantaneous maximum torque, inertia level, feedback device, outlet mode and voltage definition to distinguish them.
80 mm frame size Four Product Platforms cover available 750 and 1000 output-power values. Their feedback devices, inertia levels, maximum-torque values and electrical definitions separate otherwise overlapping candidates.	110 to 150 mm frame sizes The retained Product Platforms span different rated-speed, torque, voltage and feedback combinations. Select by the required operating point and electrical architecture rather than flange size alone.
180 mm frame size Two Product Platforms cover higher torque and output values with different feedback and inertia choices. Peak demand, response, drive context and mechanical loads still require SKU-level verification.	High SKU count within one Product Platform The 130 mm AC Servo Motor Product Platform ES-SM-A01-130D contains 50 SKUs. Refine it by rated torque, rated speed, instantaneous maximum torque, feedback device, voltage definition, rotor inertia and interface details instead of listing every SKU as a separate recommendation.

07 | SKU Refinement

Parameters used to move from Product Platform to SKU

Standard parameter	Refinement role
Flange Size	Use the available installation envelope as the first mechanical filter.
Continuous Rated Output Power	Use only with the required continuous torque and speed; power alone does not define suitability.
Rated Torque	Compare against the continuous motor-shaft operating point.
Instantaneous Maximum Torque	Cross-check acceleration and short-duration peak demand, including duration and repetition.
Rated Speed	Confirm the required axis speed after transmission ratio is defined.
Position Feedback Device	Confirm drive compatibility, absolute or incremental behavior, resolution and commissioning requirements.
Rated Voltage	Use the stated motor voltage definition only within the applicable drive architecture.
Rated Line Voltage	Keep line-voltage context distinct from motor rated voltage and DC-bus terminology.
Inertia Level	Use as an initial response and tuning discriminator, then calculate reflected inertia for the application.
Rotor Inertia	Use the exact SKU value in the load-to-motor inertia assessment.
Motor Outlet Mode	Confirm connector access, cable routing and matching harness definition.
Protection Grade	Confirm the exact stated condition, including any shaft-end qualification.

Lightweight SKU confirmation sequence

01	Retain one or more Product Platforms Keep every Product Platform whose flange envelope, continuous operating point and electrical context remain compatible.
02	Filter by operating point Use the exact SKU values for Rated Torque, Rated Speed and Continuous Rated Output Power.
03	Filter by peak and response Use Instantaneous Maximum Torque, Rotor Inertia and Inertia Level with the application motion profile.
04	Filter by feedback and wiring Confirm Position Feedback Device, Motor Outlet Mode and the intended drive or harness interface.
05	Confirm the SKU Confirm the remaining SKU against its parameter set, controlled drawings, Datasheet and Dimensional & Integration Guide.

08 | Engineering Information Checklist

Record before RFQ or engineering evaluation

01	Motion function	Axis function, direction, transmission, positioning requirement and required motion profile.
02	Continuous duty	Continuous torque, operating speed, duty cycle and thermal operating period.
03	Peak duty	Peak torque, peak duration, repetition rate, acceleration and deceleration.
04	Load and inertia	Load inertia, reflected inertia, radial load, axial load and external moments where applicable.
05	Mechanical interface	Flange envelope, mounting pattern, shaft interface, coupling and installation orientation.
06	Electrical context	Drive candidate, supply or line-voltage definition, current demand and cable length.
07	Feedback	Absolute or incremental behavior, resolution, communication and commissioning needs.
08	Holding behavior	Vertical-axis or holding requirement, brake release logic and emergency-state expectation.
09	Environment	Temperature, humidity, altitude, ingress exposure, cooling path and contamination conditions.
10	Required documents	Datasheet, Dimensional & Integration Guide, 2D drawing, connector definition and controlled 3D resources.

09 | Engineering Use and Verification Notice

Controlled engineering documents

01	SKU Product Datasheet	Use the current document for exact SKU parameters and configuration verification.
02	Dimensional & Integration Guide	Use the applicable guide and 2D drawing for envelope, mounting, shaft, connector and installation details.
03	Controlled 3D resources	Request STEP or native CAD for the exact SKU and document revision through the controlled engineering-file process.

Final verification statement

This guide supports preliminary Product Platform and SKU selection. Before design freeze, procurement or use, verify the exact SKU, mechanical and electrical interfaces, feedback and control configuration, application loads, environmental conditions and current controlled engineering documents. Do not derive missing torque, compatibility or performance values from the SKU code, Product Platform name, adjacent SKU or a single rated value. When information differs, the current controlled SKU documentation governs the engineering decision.