Step-Servo/Stepper motors Selection Flow

Step1: Select a motor based on the calculated required speed and torque. Refer the speed-torque characteristics chart from the product site







Ex) Required Speed = 2,000 rpm and Required Torque = 0.5 Nm, AZ66AC can be selected.

Step2: Confirm the rotor inertia Jo and the load inertia JL ratio. Refer the speed-torque characteristics chart from the product site

Request Information				
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	This packa products. Please cor	ge part number has t	een discontinued. V	Ve are now offering these as com rt numbers.
		Unit of Measure M	etric 🗸	
Specifications Driv	er Specifications	Speed-Torque	Dimensions	System
Product Line	Oriental Motor®			
Frame Size	60 mm			
Motor Length	72 mm			
Speed-Torque Characteristics	Beerd - Small Description (Mor	nua (dunt)		
Labian Tanana 191	Speed - Torque	Characteristics		
Possilution (Possilution	0.36 °/Pulse			
Setting: 1000 P/R)				

AZCOAD Alaba Star Detrain Free Abardute Samar Starson Mater and Drive Declara

Inertia Ratio(Reference)

Product	Inertia ratio
Step-Servo	30 Max.
Stepper	30 Max.

Inertia Ratio

```
Where JL: Load inertia

\geq \frac{J_{L}}{J_{O} \times i^{2}}Jo: Rotor inertia
```

i: gear ratio

Ex) Calculated Load inertia = $1,480 \times 10^{-7} \text{ kgm}^2$ Jo of selected motor = $370 \times 10^{-7} \text{ kgm}^2$ Gear ratio of selected motor = 1 (no gearhead)

Inertia ratio = $9,500 \times 10^{-7} / (370 \times 10^{-7} \times 1^2)$ = $25.7 \le 30$

If the ratio is below 30, consider a larger motor or higher gear ratio

Servo motors Selection Flow

Step1: Select a motor size from based on the Required torque and the RMS torque Refer the specification from the product site

AZX Series Servo Motors Equipped with Mechanical Absolute Encoder

These servo motors are equipped with a battery-free absolute encoder. They are suitable for continuous speed control or positioning applications with a large amount of travel since they achieve high torque in the high speed range. The basic operations are the same as the AZ Series, making combined use of equipment easy.



Stepper Motor I	ineun	Urivers & Acce	ssones Syst	em Part Numb	Downloads	& Reference		
Output Power	Moto	r Types	Available C	ptions	Rated	Torque	Max. Instanta	neous Torque
	Round Sh	aft (No Gear)			180 oz-in	1.27 N·m	540 oz-in	3.82 N·m
0 W (1/2 HP) Serv Motors	Planeta	iry Geared	Electromagne	tic Brake	50 ~ 220 lb-in	5.72 ~ 25.7 N·m	151 ~ 680 lb-in	17.1 ~ 77.2 N·m
5	Round Sh	aft (No Gear)	Electromagne	dic Brake	270 oz-in	1.91 N-m	540 ~ 1020 oz-in	3.82 ~ 7.16 N·m
00 W (4/5 HP) Serv Motors	Planeta	ny Geared			370 lb-in	43.1 N·m	152 ~ 1400 lb-in	17.2 ~ 162 N·m

Required Torque ≤ Max. Instantaneous torque

RMS Torque ≤ Rated Torque

Ex) Required Torque = 30.0 Nm, RMS Torque = 10.0 Nm 400W or larger can be selected

Next, check the permissible inertia

Step2: Select the gear ratio based on the required speed and the permissible inertia

										Printable Page	Download PDF	🖂 Email This Pag
		These servo motors ar • 400 W (1/2 HP)	re equipped with a	a <mark>battery-free abs</mark>	olute sensor. The	ey are suitable for positionin	ng applications with a larg	ge amount of travel, sinc	e they achieve	high torque in the high s	speed range.	
		Max Speed: 5,500	r/min									
0	0.	AC Input	ed Type									
F		Electromagnetic Br	ake Type Availab	le								
1												
-												
	Item #	Rated	Motor	Rated	Max	Permissible	Permissible	Gear/Shaft	Gear	Fx)	Requ	ired S
	item #	Power	Size	Torque	(rpm)	Speed Range	Load Inertia	Туре	(X:1)		nequ	in cu s
											Requ	ired T
_		400 W		1 27			14.7×10-4	Round Shaft				
	AZXM040AC	(1/2 HP)	60 mm	N·m	5500	1.75	kg·m²	(No Gear)	-		RMS	Torqu
-	A77M040AC DS5	400 W	00 mm	5.72		0 1100 r/min	0.027 kg m2	Planetary 5.1	anetary E 1		Load	inerti
	ALAIISTOACT 35	(1/2 HP)	90 1111	N-m	-	0~11001/1111	0.037 kg·m	Gear (PS)	5.1			
כ	AZXM940AC-P\$10	400 W (1/2 HP)	90 mm	11.4 N-m	-	0 ~ 550 r/min	0.147 kg-m ²	Planetary Gear (PS)	10:1		Dorm	iccihl
_		(112111)								_	I CIIII	1331010
	47YM0404C D625	400 W	22/20/20	25.7			250.0005	Planetary				
	AZAW940AC-P525	100 110	90 mm		-	0 ~ 220 r/min	0.919 ka m ²	C (DO)	25:1			

(x) Required Speed = 110 rpm, Required Torque = 30.0 Nm, RMS Torque = 10.0 Nm Load inertia = 0.310 kgm²

Permissible load inertia = 0.919 kgm²

AZXM940AC-PS25 can be selected If the permissible inertia is smaller than the load inertia, check with the larger motors

AC motors Selection Flow

Step1: Select a motor size based on the calculated required speed and torque. Refer the Permissible Torque chart from the product site



Step2: Select gear ratio based on the required speed. Refer the specification chart from the product site

40 W (1/19 HP) World K Series Single-Phase AC Motors & Gear Motors

											🔳 Prin	table Pa
	The Wor available • 40 W	ld K Series AC as a round shi (1/19 HP)	motors & aft motor	gear motors only or with	offer a wid a parallel sh	e selection wi aft gearhead	ith reliabl	e performar	nce, global ag	ency appro	ovals and co	nform to
	 3.54 i 	n. (90 mm) Fra	me Size									
	• 3.15	n. (80 mm) Fra	me Size [2-Pole, High	Speed]							
	Rated	1 Torque										
	Roun	d Shaft = 44 oz	-in (315 n	nN·m)								
	 Parallel Shaft Gear = 6.8 ~ 88 lb-in (0.77 ~ 10 N·m) 											
Motor & gearhead ship separately	 Right-Angle Gear = 3 4 ~ 88 lb-in (0.39 ~ 10 N·m) 											
L.	Lead	Lead Wire, Conduit Box or Terminal Box Types										
Request Information Com Clear oltage (VAC)	ipare Items	♀ Search	h by Spec Frame Size	Output Power	Voltage (VAC)	Shaft/Gear Type	Gear Ratio (X:1)	Output Shaft	Output Shaft Diameter	Туре	Rated Torque	Rated Speer (rpm)
☐ 5IK40GN- AW2TU / 90 mm 5GN50RAA	40 W (1/19 HP)	Single- Phase 110/115 VAC	An 5 G	Right- gle Solid Shaft earhead	<mark>50 :1</mark>	Imper	ial	3/8 in.	Termii Box	nal t	7.8 N-m	36
☐ 5IK40GN- AW2TU / 90 mm 5GN60RAA	40 W (1/19 HP)	Single- Phase 110/115 VAC	An 5 G	Right- gle Solid Shaft earhead	60 :1	Imper	ial	3/8 in.	Termi Box	nal I I	9.4 N∙m	30
5IK40GN- AW2TU / 90 mm 5GN75RAA	40 W (1/19 HP)	Single- Phase 110/115	An	Right- gle Solid Shaft	75 :1	Imper	ial	3/8 in.	Termii Box	nal 10	0 <mark>N</mark> ∙m	24

Ex) Required Speed = 30 rpm and Required Torque = 9.2 Nm,

Gear ratio 60 can be selected.

Next, check the permissible inertia

Step3: Confirm the permissible inertia is greater than the load inertia. Refer the specification chart from the product site



$$J_G > J_L$$

Ex) Calculated load inertia $JL = 980 \times 10^{-4} \text{ kgm}^2$ Permissible inertia $JG = 1,875 \times 10^{-4} \text{ kgm}^2$

If the permissible inertia is smaller than the load inertia, check with the larger motors

Brushless DC motors Selection Flow

Step1: Select a motor size based on the calculated required speed and torque. Refer the Permissible Torque chart from the product site

Brushless DC Motors (BLDC Motors) & Gear Motors > AC Input Brushless DC Motor Speed Control Systems > BMU Series Brushless DC Motors (BLDC Motors) (AC Input)



BMU Series Brushless DC Motors (BLDC Motors) (AC Input)

The BMU Series features a compact, high-power and high-efficiency brushless DC motor and is combined with an easy to use, easy to set speed controller. The entire motor structure features our latest brushless DC motor technology and has been innovated in pursuit of the optimal performance.

The BMU Series has a maximum speed of 4000 r/min. Speed ratio of 1:50 (80 to 4000 r/min) is achieved. Featuring 30 W (1/25 HP), 60 W (1/12 HP), 120 W (1/6 HP), 200 W (1/4 HP), 300 W (2/5 HP) and 400 W (1/2 HP) output power models.

- Speed Control Range: 80 ~ 4000 r/min
- Easy Wiring, Easy Set Up and Simple to Use Controls
- · Parallel Shaft, Right-Angle Hollow Shaft Gear, Hollow Shaft Flat Gear or Round Shaft (no Gear)
- H1 Food-Grade Grease-Compatible gear motors available.
- Imperial or Metric Shafts Available
- IP65, IP66 and IP67 Types Available







Ex) Required Speed = 5 to 60 rpm Required Torque = 9.2 Nm, 60 W or larger motor can be selected

Step2: Select gear ratio based on the required speed. Refer the specification chart from the product site

60 W (1/12 HP) BMU Series Brushless DC Motor Speed Control Systems



Item #	Output Power	Power Supply	Shaft/Gear Type	Gear Ratio (X:1)	Output Shaft Diameter	Degree of Protection (Motor)	Rated Torque	Variable Speed Range (r/min)
BLM460SHP-GFV / GFV4G20S / BMUD60-A2	60 W (1/12 HP)	Single- Phase 100-120 VAC	Parallel Shaft Gearhead (Stainless Steel Shaft)	20 :1	15 mm	IP66	3.6 N∙m	4 ~ 200
BLM460SHP-GFV / GFV4G30S / BMUD60-A2	60 W (1/12 HP)	Single- Phase 100-120	Parallel Shaft Gearhead (Stainless Steel Shaft)	30 :1	15 mm	IP66	5.2 N∙m	2.7 ~ 133
BLM460SHP-GFV / GFV4G50S / BMUD60-A2	60 W (1/12 HP)	Single- Phase 100-120 VAC	Parallel Shaft Gearhead (Stainless Steel Shaft)	50 :1	15 mm	IP66	8.6 <mark>N</mark> ∙m	1.6 ~ 80
BLM460SHP-GFV / GFV4G100S / BMUD60-A2	60 W (1/12 HP)	Single- Phase 100-120 VAC	Parallel Shaft Gearhead (Stainless Steel Shaft)	100 :1	15 mm	IP66	16 N∙m	0.8 ~ 40
BLM460SHP-GFV / GFV4G200S / BMUD60-A2	60 W (1/12 HP)	Single- Phase 100-120	Parallel Shaft Gearhead (Stainless Steel Shaft)	200 :1	15 mm	IP66	16 N∙m	0.4 ~ 20

Ex) Required Speed = 5 to 60 rpm Required Torque = 9.2 Nm

BLM460SHP-GFV/GFV4G50S/BMUD60-A2 can be selected,

then check the permissible inertia

Step3: Confirm the permissible inertia is greater than the load inertia. Refer the specification chart from the product site

Specifications	Driver Functions	Speed-Torque	Dimensions	Product Number	System	
Lead Time ¹	E	stimated Ship: 03/04/2025				
Motor Type	E	Brushless DC Motor				
Motor Frame Size 🝙	٤	0 mm				$J_c > J_r$
Output Power	e	60 W (1/12 HP)			G L	
Power Supply	s	Single-Phase 100-120 VAC				
Shaft/Gear Type	F	Parallel Shaft Gearhead (Stainless Steel Shaft)				Ex) Calculated load inertia JL = 980 x 10 ⁻⁴ kgm ²
Gear Ratio (X:1)	Ę	50 :1				Permissible inertia JG= 2,200 x 10 ⁻⁴ kgm ²
Output Shaft Diameter	r 1	5 mm				
Rated Torque ?	٤	.6 N·m				If the permissible inertia is smaller than the
Electromagnetic Brak	e M	lot Equipped				load inertia, check with the larger motors
Variable Speed Range	e (r/min) 1	1.6 ~ 80				Ibau mertia, check with the larger motors
Permissible Load Iner	tia	2200 x 10 ⁻⁴ kg·m ²				
	•	*When instantaneous stop or instantaneous bi-directional operation is performed = 550 x 10 ⁻⁴ kg·m ²				
Permissible Radial Lo	ad 1	0 mm from Shaft End = 450				
	2	0 mm from Shaft End = 550	N			

Other Considerations

AC motors and BL motors

Product	Induction motor	Reversible motor	Electromagnetic brake motor	Brake Pack	Low Speed Synchronous motor	BLDC motors
Overrun at the motor shaft (rev)	30-40	5-6	2-3	1-1.5	0 (±10 degrees)	Up to 30
Duty Cycle	Continuous	30 min	30 min (continuous ¹)	-	Continuous	Continuous

Stepper motors and Servo motors

Product	AZ Series	ies AR Series RK2 PKP 5-phase		PKP 2-phase	AZX Series	NX series	
Resolution	0.36 °/pulse (default value)	0.36 °/pulse (default value)	0.72°/pulse	0.72 °/pulse (0.36 °/pulse) ²	1.8 °/pulse (0.9°/pulse) ²	0.36 °/pulse (default value)	0.36 °/pulse (default value)
Stopping accuracy	AZM14/AZM15/AZM24/ AZM26 : ±5 arc min (±0.083°) AZM46: ±4 arc min (±0.067°) AZM66/AZM69/AZM98/AZM911: ±3 arc min (±0.05°)	ARM14/ARM15: ±5 arc min (±0.083°) ARM24/ARM26/ARM46: ±4 arc min (±0.067°) ARM66/ARM69/ARM98: ±3 arc min (±0.05°)	±3 arc min (±0.05°) ³	Standard type: ±3 min (±0.05°) ³ PK513: ±10 min (±0.17°) High resolution type: ±2 min(±0.034°)	±3 arc min (±0.05°) ³ PKP21/PKP242/PKP262: ±5 arc min (±0.083°) PK26□J, PK26□JD: ±2 arc min (±0.034°)	0.03° (reference value only)	0.03° (reference value only)
Duty Cycle	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
Feedback System	Mechanical absolute encoder	Resolver	Incremental Encoder ⁴	Incremental Magnetic encoder ⁴	Incremental Magnetic Encoder ⁴	Mechanical absolute encoder	Absolute Encoder

Gearhead Backlash

Gearhead type	Harmonic HG	Harmonic Planetary HPG	Planetary PN	Planetary PS	Planetary PLE	Spur SG/TS/TH
Backlash	0.025° or less (lost motion)	0.05 °	0.034°	0.15° or less	0.2° or less	1.5° or less

1. Three phase AC motors equipped with the electromagnetic brake can operate continuously

2. Basic step angle for high resolution type

3. This is the value at full step and no load (this value will vary depending on load)

4. Adding an encoder to the motor is optional