

AC SERVO SYSTEMS

SANMOTION G

200 VAC 30 W to 1.5 kW
100 VAC 30 to 200 W

AC servo systems

Ver. 1
English



SANMOTION G

AC SERVO SYSTEMS

Next-Level Servo System That
Combines Powerful Performance and
User-Friendliness



Servo Motors

Lineup

200 V class

Low-inertia models: 40 to 100 mm sq., 50 W to 1.5 kW

Medium-inertia models: 40 to 130 mm sq., 30 W to 1.5 kW

100 V class

Low-inertia models: 40 to 60 mm sq., 50 to 200 W

Medium-inertia models: 40 to 60 mm sq., 30 to 200 W

Motor length up to
22% shorter

High-resolution
encoder up to
27-bit

Max. speed
6500 min⁻¹

Newly developed holding
brake with increased
reliability

Servo Amplifiers

Lineup

Analog/Pulse

EtherCAT

200 V class: 10, 20, 30, 50 A

100 V class: 10, 20, 30 A

Speed frequency response
3.5 kHz
(1.6 times higher)

Positioning settling time
shortened to
1/3

System status monitoring and
preventive maintenance
with various
diagnostic functions

Advanced tuning to
automatically adjust
to optimal parameters



Contents

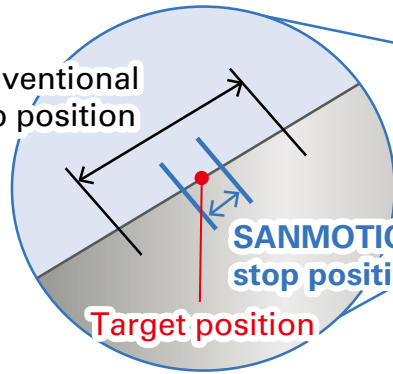
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The Servo System That Delivers What Customers Desire

Want high-precision, stable positioning

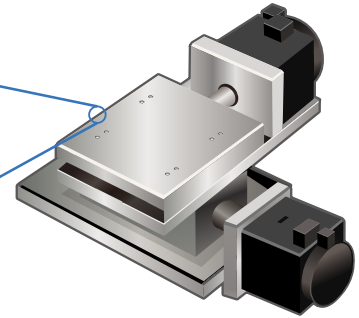
This product comes with a **23-bit** encoder as standard (64 times that of our conventional model*), and even an encoder with a maximum of 27-bit high resolution can be selected as an option. The high-resolution encoder enables high-precision and stable positioning.

Conventional stop position



SANMOTION G's stop position

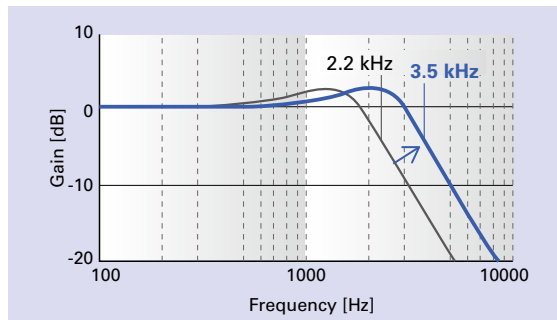
Target position



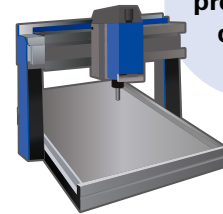
Conventional product*
17-bit: 131,072 P/R

SANMOTION G
23-bit: 8,388,608 P/R
27-bit: 134,217,728 P/R

Want to improve processing quality with high-response control



Increased processing quality

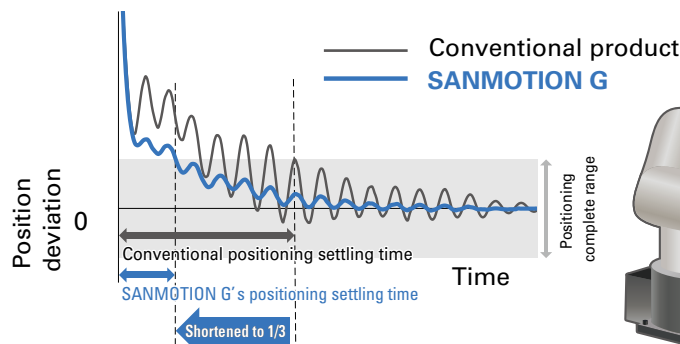


With newly developed current control, speed frequency response has been increased to **3.5 kHz** (1.6 times higher than our conventional product*).

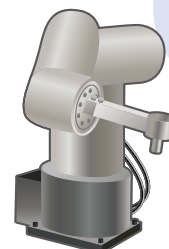
This helps improve the processing quality of machinery.

Need a quick positioning

By accurately detecting and compensating for Coulomb friction, viscous friction, and the force of gravity, the positioning settling time has been made **1/3** that of our conventional product.*

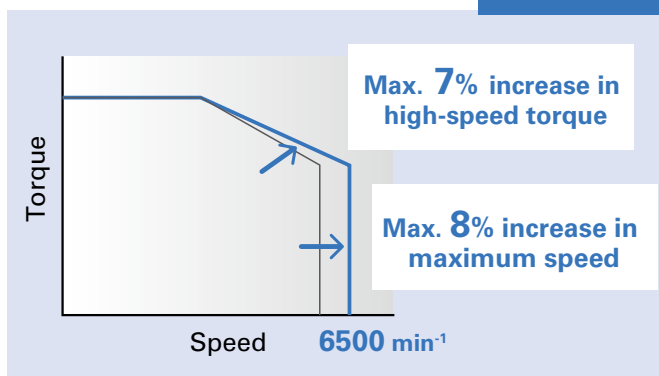


Quick positioning



* Conventional product: SANMOTION R AC servo systems

Want a faster motor without size increase



Faster motor speed while maintaining the motor size and precision, which is essential for robots



The servo motor's maximum speed has been increased from 6000 min⁻¹ to **6500 min⁻¹** compared to our conventional product.* Also, the new PWM control has increased the maximum output torque at high speeds by approximately 7%, expanding the motor output range by up to 15%.

This enables the equipment to speed up without using a larger motor while achieving low cogging and low heat generation as well.

Want to make your equipment smaller and lighter



By optimizing the electromagnetic field and the brake structure, the motor length and mass have been reduced compared to our conventional product.*

Motor length	Without brake: 12.2% shorter
	With brake : 11.9% shorter
Motor mass	Without brake: 10.5% lighter
	With brake : 11.4% lighter

The average value of all low- and medium-inertia servo motor models

With optimized thermal design and smaller components used, the servo amplifier has been made 5% lighter than the conventional product.*

Want to make your system more efficient

Compared to our conventional product,* power consumption of servo motors and holding brakes has been reduced by up to **8.4%** and **44%**, respectively. The servo amplifier's power loss has been reduced by up to **26%** in the main circuit thanks to the latest power device used and up to **16%** in the control circuit thanks to a high-efficiency LSI (large-scale integrated) circuit.



* Conventional product: SANMOTION R AC servo systems

Want equipment startup to be faster

This product is equipped with the **advanced tuning** that ensures automatic tuning of parameters by precisely measuring resonance, friction, and load inertia of mechanical systems.

Servo gain and filter can be **automatically adjusted** to stabilize operation and shorten the settling time based on the results of frequency characteristic measurement, which is **11 times more accurate** than the conventional product.*

Startup time of equipment can be shortened and its performance can be increased.

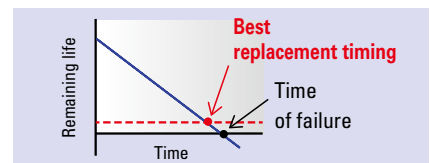
Automatic calculation of the overshoot value and settling time



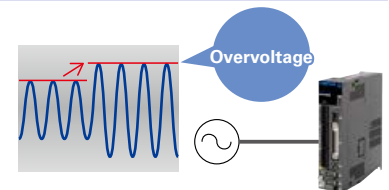
Displays measurement waveforms

Want to enhance monitoring to prevent failures

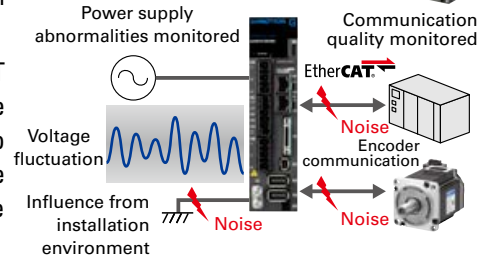
Failure of holding brake and electronic components can be prevented by **predicting the remaining life of the holding brake**, in systems where braking is needed, and by **optimally controlling the inrush current limiting circuit**.



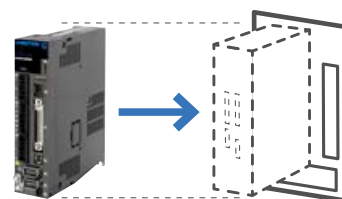
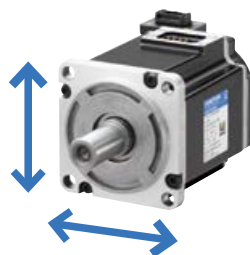
The monitoring of the main circuit input voltage and the detection of overvoltage in the control circuit power supply can be performed. Early identification of faults can help **shorten system downtime**.



The quality of encoder and EtherCAT communication can be diagnosed. The impact on communication quality due to noise and installation environments can be monitored, contributing to improving the **environmental durability** of the system.



Want to replace your current system without a hassle



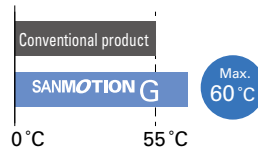
With the motor flange size, output shaft shape, amplifier dimensions, mounting, interface, and functionality fully compatible with our conventional SANMOTION R series, **replacement can be done smoothly**.

* Conventional product: SANMOTION R AC servo systems

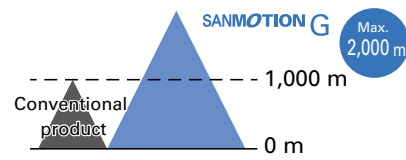
Want to use equipment at high temperatures and high altitudes

Compared to the conventional product,* **the operating temperature range and operating altitude have been expanded**, enabling use in severe environments in various regions.

Operating temperature range (Servo amplifiers)



Operating altitude (Servo amplifiers and servo motors)



Note: Output values might be derated.

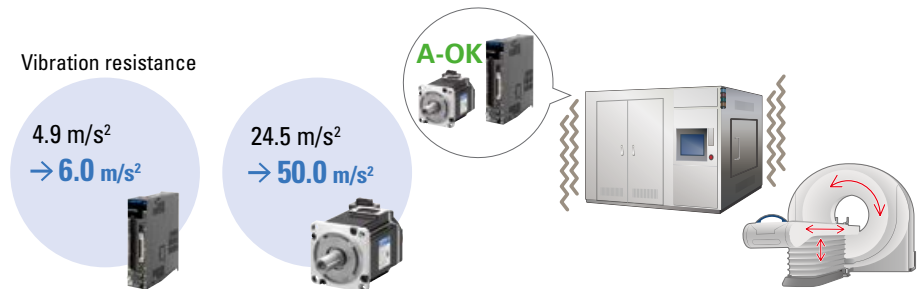
Want to use for equipment with vibration

Compared to the conventional product,* the **vibration resistance** of the servo amplifier and servo motor have been increased approximately **20%** and **2 times**, respectively. This makes it even more suitable for equipment with high levels of vibration such as CT scanners and press machines.

Vibration resistance

4.9 m/s²
→ **6.0 m/s²**

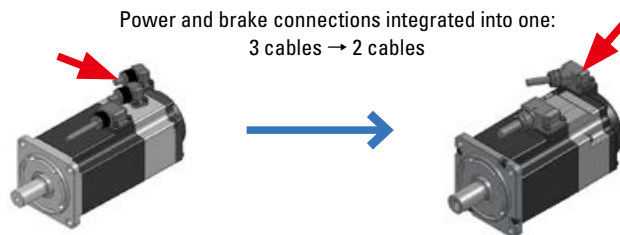
24.5 m/s²
→ **50.0 m/s²**



Want to simplify cable connection

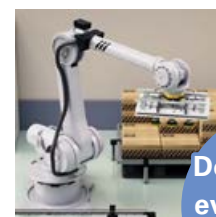
40 to 86 mm sq. servo motors use a connector that **integrates power and brake connections**. This reduces the number of parts and makes wiring easier. 100 to 130 mm sq. servo motors use press-lock connectors for easy wiring.

Power and brake connections integrated into one:
3 cables → 2 cables



Want to increase the holding brake reliability

The newly developed holding brake features enhanced environmental resistance, and the holding torque does not decrease even at high temperatures and high humidity. This is a **safe and reliable brake** that causes little wear on the friction material even when the motor idles or brakes abruptly.



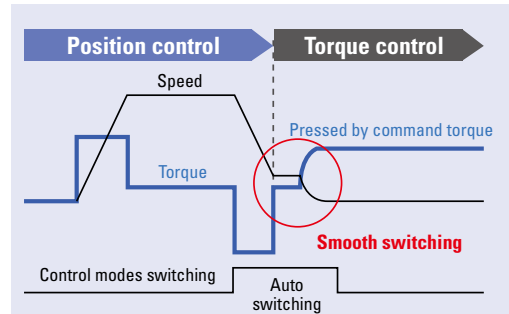
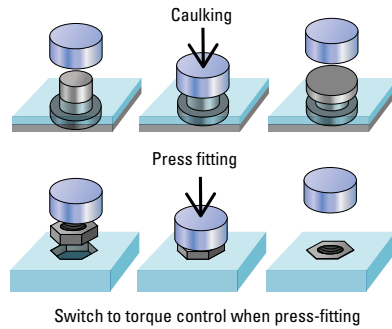
Does not fall even at high temperatures

* Conventional product: SANMOTION R AC servo systems

Want to smoothly switch from position control to torque control

Control modes can be **switched smoothly in real time**.

This improves shock mitigation during control modes switching (from position control to torque control) and controllability during pressing.



Want to monitor servo amplifier status

The amplifier status is visually displayed on the PC screen, allowing user to intuitively check the status.

Axis selection

Servo ON / Alarm status display

I/O settings and status display

GPIO monitor

OUT1	The output is ON while motor excitation	Invalid
OUT2	The output is ON while power supply ON	Valid

Want to save test run settings

The new software will provide expanded setting retention functions for test runs while maintaining the operability of the existing setup software, SANMOTION MOTOR SETUP SOFTWARE. (Under development)

Jog operation

Positioning operation

No.	Direction	Feeding velocity [min-1]	Accel/Decel time [ms]	Torque limit value [N]	Number of positioning pulses [pulse]	Rest time [ms]
1	Positive	1000	100	120.0	0	1000

.prj

Store and manage test run operation settings in a project file

Want to create a system that conforms to safety standards

It complies with **ISO 13849-1 (Cat3, PL=e)** and **IEC 61508 (SIL3)**, making it easy to build safety systems for equipment.

It also complies with various regulations required to obtain safety standards for equipment.

(For the compliance with safety standards of linear servo motors, contact us for details)



For servo amplifiers only

Water and dust protection

Our servo motors are highly resistant to water and dust ingress with an IP67 rating, ensuring normal operation even in severe environments.

IP **6** **7**

Protection against dust		Protection against water	
6	Complete protection against dust	7	Protection against temporary immersion in water

Protection does not cover the shaft seal part. Protection rating is for when connectors are mounted.

EtherCAT communication

EtherCAT is a 100 Mbps high-speed fieldbus system. It contributes to shortening machine cycle time. This highly versatile EtherCAT is compatible with Ethernet, which makes it possible to build a system where various machines co-exist. Also, the EtherCAT conformance test certificate from a trusted third party has been acquired.

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



Compact and high-thrust linear servo motors

Linear servo motors with direct, straight-line drive and high thrust are available.



Fully closed-loop control

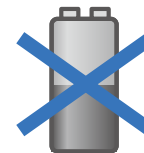
A fully closed-loop control is possible by using information from two encoders: e.g., a linear encoder mounted on the load machine and a high-resolution motor-mounted encoder. This achieves high responsiveness even when the motor axis and load are highly skewed.

High-precision battery-less absolute encoder

Our servo motors come with a high-precision battery-less absolute encoder as standard.

It does not use batteries, which require periodic replacement, eliminating cumbersome maintenance work and export procedures.

We offer various encoders that help select the best encoder for your machine. See the table below.



No need to concern about battery life or export procedures

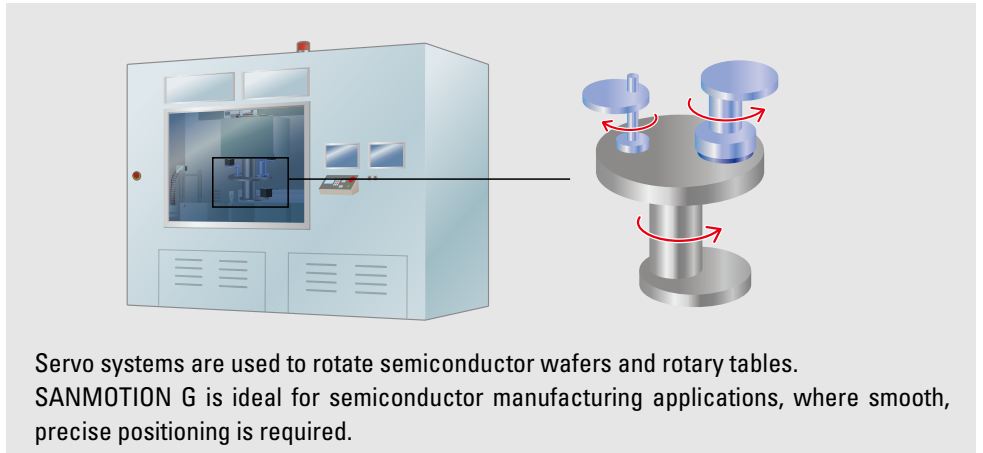
Type (Encoder model no. in parentheses)	Standard				Customization
	Single-turn resolution	Multi-turn resolution	Baud rate	Absolute angular accuracy	
Battery-less absolute encoder (Model No. GAER) This is a high-precision battery-less optical multi-turn encoder. It reduces maintenance because it doesn't need batteries, which require maintenance.	8388608 (23-bit)	65536 (16-bit)	4.0 Mbps	Approx. 0.167°	<ul style="list-style-type: none"> • Single-turn resolution: 131072 (17-bit), 1048576 (20-bit), 134217728 (27-bit) • Baud rate: 2.5 Mbps • Absolute angular accuracy: Under 0.0167°
Single-turn absolute encoder (Model No. GAEN) This is a thin profile, optical single-turn encoder. It achieves wire saving particularly for systems that currently use incremental encoders, and helps downsize the systems.	8388608 (23-bit)	–	4.0 Mbps	Approx. 0.167°	<ul style="list-style-type: none"> • Single-turn resolution: 131072 (17-bit), 1048576 (20-bit), 134217728 (27-bit) • Baud rate: 2.5 Mbps • Absolute angular accuracy: Under 0.0167°

Contact us for more information on other encoders.

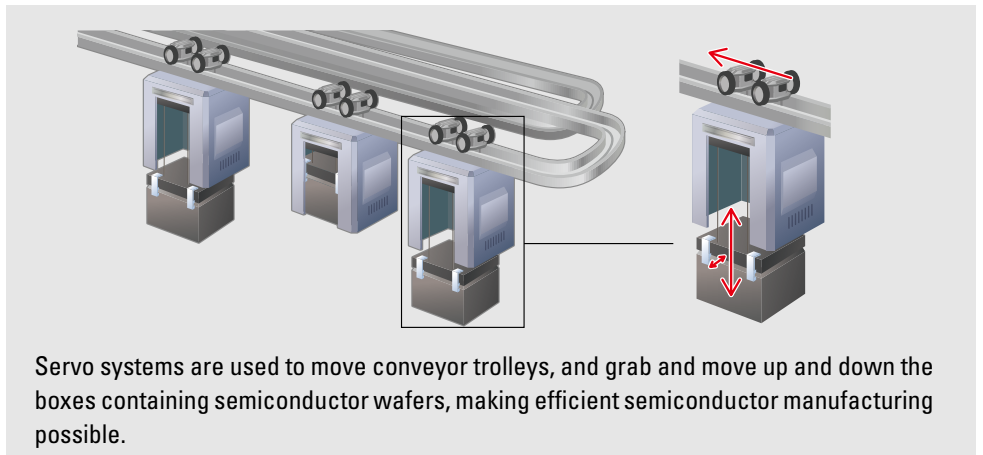
Application Examples

In semiconductor factories
CMP equipment
 Used for polishing and flattening semiconductor wafers

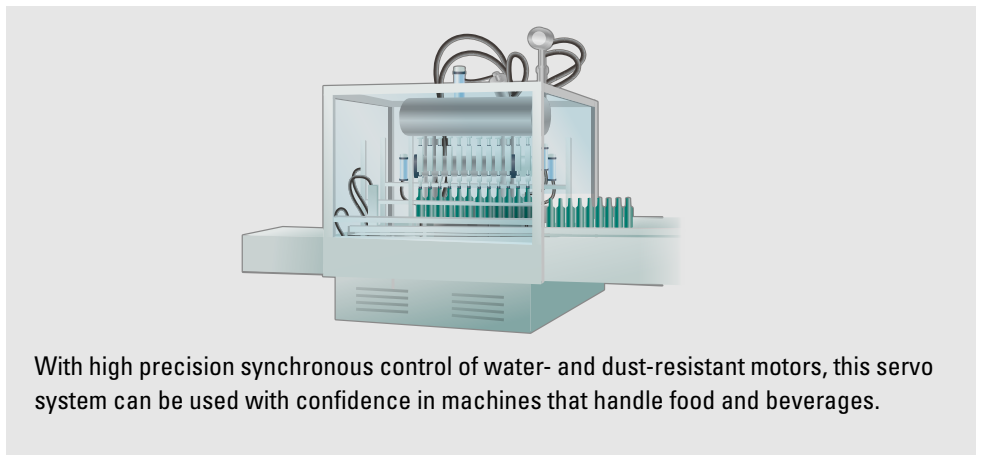
(chemical mechanical polishing equipment)



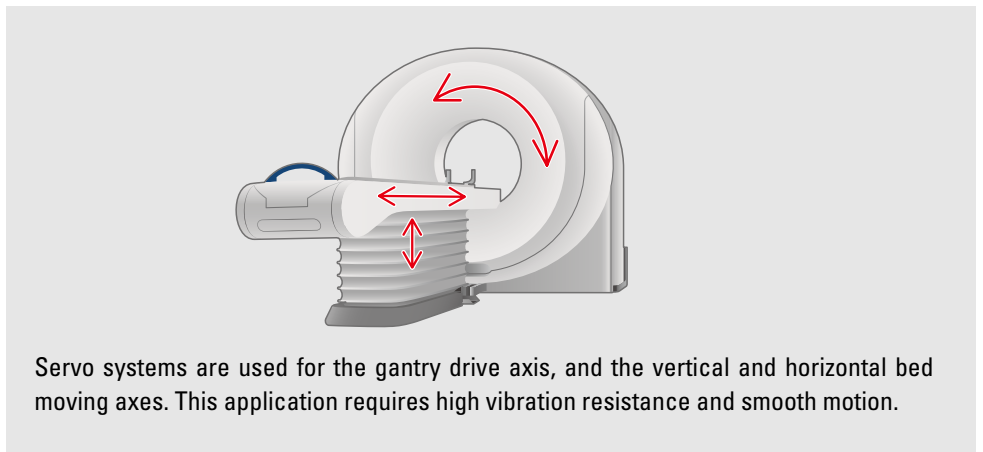
In semiconductor factories
Overhead conveyor
 Automatic conveyor equipment that is suspended from and moves along the guide rails installed overhead



In food/beverage factories
Filling machine
 Used to fill containers with liquids



In hospitals
CT scanner
 Used to perform a scan of a patient to create cross-sectional images of the body by using a rotating X-ray tube and a row of detectors



Lineup

Servo motor	Input voltage	Flange size [mm]	Rated output [kW]
Low-inertia servo motor These motors feature high-acceleration drive and high torque even at high speeds. They are suitable for injection molding machines and general industrial machinery.	200 V	40 sq.	0.05 0.1 0.15
		60 sq.	0.2 0.4 0.6
		80 sq.	0.75 1
		100 sq.	1 1.5
	100 V	40 sq.	0.05 0.1
		60 sq.	0.2

Medium-inertia servo motor These motors feature compact size, light weight, and high efficiency. These are ideal for robots, injection molding machines, and industrial machines.	200 V	40 sq.	0.03 0.05 0.1 0.15
		60 sq.	0.1 0.2 0.4 0.6
		80 sq.	0.2 0.4 0.75 1
		86 sq.	0.75 1
		100 sq.	0.75 1 1.5
		130 sq.	0.55 1.2
	100 V	40 sq.	0.03 0.05 0.1
		60 sq.	0.1 0.2

Linear servo motor	Input voltage	Rated thrust [N]
Flat type with core	200 V	140 200 260 310 340
Center magnet type with core	200 V	350

Servo amplifier	Features	Amplifier capacity [A]	Compatible servo motor rated output [kW]
Analog/Pulse	This servo amplifier can enhance the value of combined equipment by increasing responsiveness and ensuring safety with a variety of safety functions. This general-purpose interface enables torque/speed control by analog voltage command and position control by pulse command.	200 VAC class 10, 20, 30, 50	0.03 to 1.5
		100 VAC class 10, 20, 30	0.03 to 0.2
EtherCAT	EtherCAT, a high-speed fieldbus, is an open network with high versatility and widely used with high-precision industrial equipment. It can be used in combination with our SANMOTION C motion controller. For more information, see the SANMOTION C catalog.	200 VAC class 10, 20, 30, 50	0.03 to 1.5
		100 VAC class 10, 20, 30	0.03 to 0.2

Standard Model Number List

Contact us for specifications of models that are not listed.

200 V

Low-inertia Servo Motor

Standard specifications... Ingress protection: IP67, standards conformity: UL, cUL, CE, UKCA

Motor flange size	Rated output	Model no.				Page	Compatible servo amplifier capacity
		Battery-less absolute encoder		Single-turn absolute encoder			
		Without holding brake	With holding brake	Without holding brake	With holding brake		
40 mm sq.	50 W	GAM1A4005F0XRK□	GAM1A4005F0CRK□	GAM1A4005F0XNK□	GAM1A4005F0CNK□	p. 18	10 A
	100 W	GAM1A4010F0XRK□	GAM1A4010F0CRK□	GAM1A4010F0XNK□	GAM1A4010F0CNK□	p. 18	10 A
	150 W	GAM1A4015F0XRK□	GAM1A4015F0CRK□	GAM1A4015F0XNK□	GAM1A4015F0CNK□	p. 18	20 A
60 mm sq.	200 W	GAM1A6020F0XRK□	GAM1A6020F0CRK□	GAM1A6020F0XNK□	GAM1A6020F0CNK□	p. 20	20 A
	400 W	GAM1A6040F0XRK□	GAM1A6040F0CRK□	GAM1A6040F0XNK□	GAM1A6040F0CNK□	p. 20	20 A
	600 W	GAM1A6060F0XRK□	GAM1A6060F0CRK□	GAM1A6060F0XNK□	GAM1A6060F0CNK□	p. 20	50 A
80 mm sq.	750 W	GAM1A8075V0XRK□	GAM1A8075V0CRK□	GAM1A8075V0XNK□	GAM1A8075V0CNK□	p. 22	30 A
		GAM1A8075F0XRK□	GAM1A8075F0CRK□	GAM1A8075F0XNK□	GAM1A8075F0CNK□	p. 22	50 A
	1 kW	GAM1A8100F0XRK□	GAM1A8100F0CRK□	GAM1A8100F0XNK□	GAM1A8100F0CNK□	p. 22	50 A
100 mm sq.	1 kW	GAM1AA100H0XRK□*	GAM1AA100H0CRK□*	GAM1AA100H0XNK□*	GAM1AA100H0CNK□*	p. 24	30 A
		GAM1AA100F0XRK□	GAM1AA100F0CRK□	GAM1AA100F0XNK□	GAM1AA100F0CNK□	p. 24	50 A
	1.5 kW	GAM1AA150H0XRK□*	GAM1AA150H0CRK□*	GAM1AA150H0XNK□*	GAM1AA150H0CNK□*	p. 24	30 A
		GAM1AA150F0XRK□	GAM1AA150F0CRK□	GAM1AA150F0XNK□	GAM1AA150F0CNK□	p. 24	50 A

Note: The □ symbol in the model number denotes the following:

- 0: Circular shaft (without key) without oil seal
- 1: Circular shaft (without key) with oil seal
- 2: Keyway shaft without oil seal
- 3: Keyway shaft with oil seal

The motor outputs may be derated to 90 to 95% of the rated values due to the combined brake and oil seal.

* GAM1AA100H0, GAM1AA150H0...When using a single-phase input power supply for the servo amplifier, make sure that the servo motor output is 750 W or less by adjusting the torque and speed.

Standard specifications... Ingress protection: IP67, standards conformity: UL, cUL, CE, UKCA

Motor flange size	Rated output	Model no.				Page	Compatible servo amplifier capacity
		Battery-less absolute encoder		Single-turn absolute encoder			
		Without holding brake	With holding brake	Without holding brake	With holding brake		
40 mm sq.	30 W	GAM2A4003F0XRK□	GAM2A4003F0CRK□	GAM2A4003F0XNK□	GAM2A4003F0CNK□	p. 28	10 A
	50 W	GAM2A4005F0XRK□	GAM2A4005F0CRK□	GAM2A4005F0XNK□	GAM2A4005F0CNK□	p. 28	10 A
	100 W	GAM2A4010F0XRK□	GAM2A4010F0CRK□	GAM2A4010F0XNK□	GAM2A4010F0CNK□	p. 28	10 A
	150 W	GAM2A4015V0XRK□	GAM2A4015V0CRK□	GAM2A4015V0XNK□	GAM2A4015V0CNK□	p. 28	10 A
		GAM2A4015F0XRK□	GAM2A4015F0CRK□	GAM2A4015F0XNK□	GAM2A4015F0CNK□	p. 28	20 A
60 mm sq.	100 W	GAM2A6010F0XRK□	GAM2A6010F0CRK□	GAM2A6010F0XNK□	GAM2A6010F0CNK□	p. 30	10 A
	200 W	GAM2A6020F0XRK□	GAM2A6020F0CRK□	GAM2A6020F0XNK□	GAM2A6020F0CNK□	p. 30	20 A
	400 W	GAM2A6040F0XRK□	GAM2A6040F0CRK□	GAM2A6040F0XNK□	GAM2A6040F0CNK□	p. 30	20 A
	600 W	GAM2A6060V0XRK□	GAM2A6060V0CRK□	GAM2A6060V0XNK□	GAM2A6060V0CNK□	p. 30	30 A
		GAM2A6060F0XRK□	GAM2A6060F0CRK□	GAM2A6060F0XNK□	GAM2A6060F0CNK□	p. 30	50 A
80 mm sq.	200 W	GAM2A8020F0XRK□	GAM2A8020F0CRK□	GAM2A8020F0XNK□	GAM2A8020F0CNK□	p. 32	20 A
	400 W	GAM2A8040F0XRK□	GAM2A8040F0CRK□	GAM2A8040F0XNK□	GAM2A8040F0CNK□	p. 32	20 A
	750 W	GAM2A8075V0XRK□	GAM2A8075V0CRK□	GAM2A8075V0XNK□	GAM2A8075V0CNK□	p. 32	30 A
		GAM2A8075F0XRK□	GAM2A8075F0CRK□	GAM2A8075F0XNK□	GAM2A8075F0CNK□	p. 32	50 A
	1 kW	GAM2A8100F0XRK□	GAM2A8100F0CRK□	GAM2A8100F0XNK□	GAM2A8100F0CNK□	p. 32	50 A
86 mm sq.	750W	GAM2A9075F0XRK□	GAM2A9075F0CRK□	GAM2A9075F0XNK□	GAM2A9075F0CNK□	p. 34	50 A
	1 kW	GAM2A9100H0XRK□*	GAM2A9100H0CRK□*	GAM2A9100H0XNK□*	GAM2A9100H0CNK□*	p. 34	30 A
		GAM2A9100F0XRK□	GAM2A9100F0CRK□	GAM2A9100F0XNK□	GAM2A9100F0CNK□	p. 34	50 A
100 mm sq.	750 W	GAM2AA075F0XRK□	GAM2AA075F0CRK□	GAM2AA075F0XNK□	GAM2AA075F0CNK□	p. 36	30 A
	1 kW	GAM2AA100F0XRK□	GAM2AA100F0CRK□	GAM2AA100F0XNK□	GAM2AA100F0CNK□	p. 36	50 A
	1.5 kW	GAM2AA150H0XRK□	GAM2AA150H0CRK□	GAM2AA150H0XNK□	GAM2AA150H0CNK□	p. 36	50 A
		GAM2AA150F0XRK□	GAM2AA150F0CRK□	GAM2AA150F0XNK□	GAM2AA150F0CNK□	p. 36	50 A
130 mm sq.	550 W	GAM2AB055D0XRK□	GAM2AB055D0CRK□	GAM2AB055D0XNK□	GAM2AB055D0CNK□	p. 38	30 A
	1.2 kW	GAM2AB120B0XRK□*	GAM2AB120B0CRK□*	GAM2AB120B0XNK□*	GAM2AB120B0CNK□*	p. 38	30 A
		GAM2AB120H0XRK□	GAM2AB120H0CRK□	GAM2AB120H0XNK□	GAM2AB120H0CNK□	p. 38	50 A
		GAM2AB120D0XRK□	GAM2AB120D0CRK□	GAM2AB120D0XNK□	GAM2AB120D0CNK□	p. 38	50 A

Note: The □ symbol in the model number denotes the following:

0: Circular shaft (without key) without oil seal

1: Circular shaft (without key) with oil seal

2: Keyway shaft without oil seal

3: Keyway shaft with oil seal

The motor outputs may be derated to 80 to 95% of the rated values due to the combined brake and oil seal.

* GAM2A9100H0, GAM2AB120B0...When using a single-phase input power supply for the servo amplifier, make sure that the servo motor output is 750 W or less by adjusting the torque and speed.

Standard Model Number List

200 V Linear Servo Motor

Type	Model no.				Page	Compatible servo amplifier capacity
	Coil		Magnet rail			
	Without hall sensor	With hall sensor	Without magnet cover	With magnet cover		
Flat type with core	DS025CC1ANAA△00	DS025CC1ANEA△00	DS025MC□□□A00	DS025MC□□□B00	p. 44	20 A
	DS035CC1ANAA△00	DS035CC1ANEA△00	DS035MC□□□A00	DS035MC□□□B00	p. 45	30 A
	DS045CC1ANAA△00	DS045CC1ANEA△00	DS045MC□□□A00	DS045MC□□□B00	p. 45	30 A
	DS055CC1ANAA△00	DS055CC1ANEA△00	DS055MC□□□A00	DS055MC□□□B00	p. 45	30 A
	DS065CC1ANAA△00	DS065CC1ANEA△00	DS065MC□□□A00	DS065MC□□□B00	p. 45	50 A
	DS050CD1ANAA△00	DS050CD1ANEA△00	DS050MD□□□A00	DS050MD□□□B00	p. 46	30 A
Center magnet type with core	DT030CD1ANAA△00	DT030CD1ANEA△00	DT030M□□□A00	DT030M□□□B00	p. 47	30 A

Note 1: The △ symbol in the model number denotes the following:

1: Cable length 300 mm 2: Cable length 600 mm

Note 2: The □ symbols in the model number denote the following:

064: Magnet rail length 64 mm 128: Magnet rail length 128 mm 256: Magnet rail length 256 mm 512: Magnet rail length 512 mm

A model with a 64 mm magnet rail length is not available for the center magnet type.

200 V Servo Amplifier

Analog/Pulse Input Type Standard specifications... Standards conformity: UL, cUL, CE, UKCA, KC mark (KC mark applies to servo amplifiers only)

Input voltage	GPO	Regenerative resistor	STO function	Amplifier capacity	Model no.	Page	
						Specifications	Dimensions
200 VAC class 200 to 240 VAC 3-/single-phase	Sinking type	Built-in	✓ (Without delay circuit)	10 A	GADSA01AA22	p. 52	p. 54
				20 A	GADSA02AA22	p. 52	p. 54
				30 A	GADSA03AA22	p. 52	p. 54
				50 A	GADSA05AA22	p. 52	p. 54
		External	✓ (Without delay circuit)	10 A	GADSA01LA22	p. 52	p. 54
				20 A	GADSA02LA22	p. 52	p. 54
				30 A	GADSA03LA22	p. 52	p. 54
				50 A	GADSA05LA22	p. 52	p. 54
	Sourcing type	Built-in	✓ (Without delay circuit)	10 A	GADSA01AB22	p. 52	p. 54
				20 A	GADSA02AB22	p. 52	p. 54
				30 A	GADSA03AB22	p. 52	p. 54
				50 A	GADSA05AB22	p. 52	p. 54
		External	✓ (Without delay circuit)	10 A	GADSA01LB22	p. 52	p. 54
				20 A	GADSA02LB22	p. 52	p. 54
				30 A	GADSA03LB22	p. 52	p. 54
				50 A	GADSA05LB22	p. 52	p. 54

EtherCAT Interface Type Standard specifications... Standards conformity: UL, cUL, CE, UKCA, KC mark (KC mark applies to servo amplifiers only)

Input voltage	GPO	Regenerative resistor	STO function	Amplifier capacity	Model no.	Page	
						Specifications	Dimensions
200 VAC class 200 to 240 VAC 3-/single-phase	Sinking/ Sourcing type	Built-in	✓ (with delay circuit)	10 A	GADSA01AH24	p. 60	p. 61
				20 A	GADSA02AH24	p. 60	p. 61
				30 A	GADSA03AH24	p. 60	p. 61
				50 A	GADSA05AH24	p. 60	p. 61
		External	✓ (with delay circuit)	10 A	GADSA01LH24	p. 60	p. 61
				20 A	GADSA02LH24	p. 60	p. 61
				30 A	GADSA03LH24	p. 60	p. 61
				50 A	GADSA05LH24	p. 60	p. 61

100 V

Low-inertia Servo Motor

Standard specifications... Ingress protection: IP67, standards conformity: UL, cUL, CE, UKCA

Motor flange size	Rated output	Model no.				Page	Compatible servo amplifier capacity
		Battery-less absolute encoder		Single-turn absolute encoder			
		Without holding brake	With holding brake	Without holding brake	With holding brake		
40 mm sq.	50 W	GAM1E4005F0XRK□	GAM1E4005F0CRK□	GAM1E4005F0XNK□	GAM1E4005F0CNK□	p. 26	20 A
	100 W	GAM1E4010F0XRK□	GAM1E4010F0CRK□	GAM1E4010F0XNK□	GAM1E4010F0CNK□	p. 26	20 A
60 mm sq.	200 W	GAM1E6020F0XRK□	GAM1E6020F0CRK□	GAM1E6020F0XNK□	GAM1E6020F0CNK□	p. 27	30 A

100 V

Medium-inertia Servo Motor

Standard specifications... Ingress protection: IP67, standards conformity: UL, cUL, CE, UKCA

Motor flange size	Rated output	Model no.				Page	Compatible servo amplifier capacity
		Battery-less absolute encoder		Single-turn absolute encoder			
		Without holding brake	With holding brake	Without holding brake	With holding brake		
40 mm sq.	30 W	GAM2E4003F0XRK□	GAM2E4003F0CRK□	GAM2E4003F0XNK□	GAM2E4003F0CNK□	p. 40	10 A
	50 W	GAM2E4005F0XRK□	GAM2E4005F0CRK□	GAM2E4005F0XNK□	GAM2E4005F0CNK□	p. 40	20 A
	100 W	GAM2E4010F0XRK□	GAM2E4010F0CRK□	GAM2E4010F0XNK□	GAM2E4010F0CNK□	p. 40	20 A
60 mm sq.	100 W	GAM2E6010F0XRK□	GAM2E6010F0CRK□	GAM2E6010F0XNK□	GAM2E6010F0CNK□	p. 41	20 A
	200 W	GAM2E6020F0XRK□	GAM2E6020F0CRK□	GAM2E6020F0XNK□	GAM2E6020F0CNK□	p. 41	30 A

Note: The □ symbol in the model number denotes the following:

- 0: Circular shaft (without key) without oil seal
- 1: Circular shaft (without key) with oil seal
- 2: Keyway shaft without oil seal
- 3: Keyway shaft with oil seal

Standard Model Number List

100 V

Servo Amplifier

Analog/Pulse Input Type Standard specifications... Standards conformity: UL, cUL, CE, UKCA, KC mark (KC mark applies to servo amplifiers only)

Input voltage	GPO	Regenerative resistor	STO function	Amplifier capacity	Model no.	Page	
						Specifications	Dimensions
100 VAC class 100 to 120 VAC Single-phase	Sinking type	Built-in	✓ (Without delay circuit)	10 A	GADSE01AA22	p. 52	p. 54
				20 A	GADSE02AA22	p. 52	p. 54
				30 A	GADSE03AA22	p. 52	p. 54
		External	✓ (Without delay circuit)	10 A	GADSE01LA22	p. 52	p. 54
				20 A	GADSE02LA22	p. 52	p. 54
				30 A	GADSE03LA22	p. 52	p. 54
	Sourcing type	Built-in	✓ (Without delay circuit)	10 A	GADSE01AB22	p. 52	p. 54
				20 A	GADSE02AB22	p. 52	p. 54
				30 A	GADSE03AB22	p. 52	p. 54
		External	✓ (Without delay circuit)	10 A	GADSE01LB22	p. 52	p. 54
				20 A	GADSE02LB22	p. 52	p. 54
				30 A	GADSE03LB22	p. 52	p. 54

EtherCAT Interface Type Standard specifications... Standards conformity: UL, cUL, CE, UKCA, KC mark (KC mark applies to servo amplifiers only)

Input voltage	GPO	Regenerative resistor	STO function	Amplifier capacity	Model no.	Page	
						Specifications	Dimensions
100 VAC class 100 to 120 VAC Single-phase	Sinking/ Sourcing type	Built-in	✓ (with delay circuit)	10 A	GADSE01AH24	p. 60	p. 61
				20 A	GADSE02AH24	p. 60	p. 61
				30 A	GADSE03AH24	p. 60	p. 61
		External	✓ (with delay circuit)	10 A	GADSE01LH24	p. 60	p. 61
				20 A	GADSE02LH24	p. 60	p. 61
				30 A	GADSE03LH24	p. 60	p. 61

STO delay circuit of servo amplifiers

Two types are available: "without delay circuit" and "with delay circuit" between the input circuits of safety input 1 (HWGOFF1)/ safety input 2 (HWGOFF2) and the control signal blocking circuit.

For vertical axis applications, models with a delay circuit can prevent the motor shaft from falling due to a delay in the holding brake when the STO function is activated.

Servo amplifier model no.	Delay circuit (Delay time)
GADS□□□□□□2	Without delay circuit (0 to 20 ms)
GADS□□□□□□4	With delay circuit (200 to 700 ms)

Note 1: Even models without delay circuit have delay of up to 20 ms before the STO function is activated due to a delay in the input circuit.

Note 2: Holding brake excitation signal and servo motor holding brake are not safety-related parts.

Servo Motors

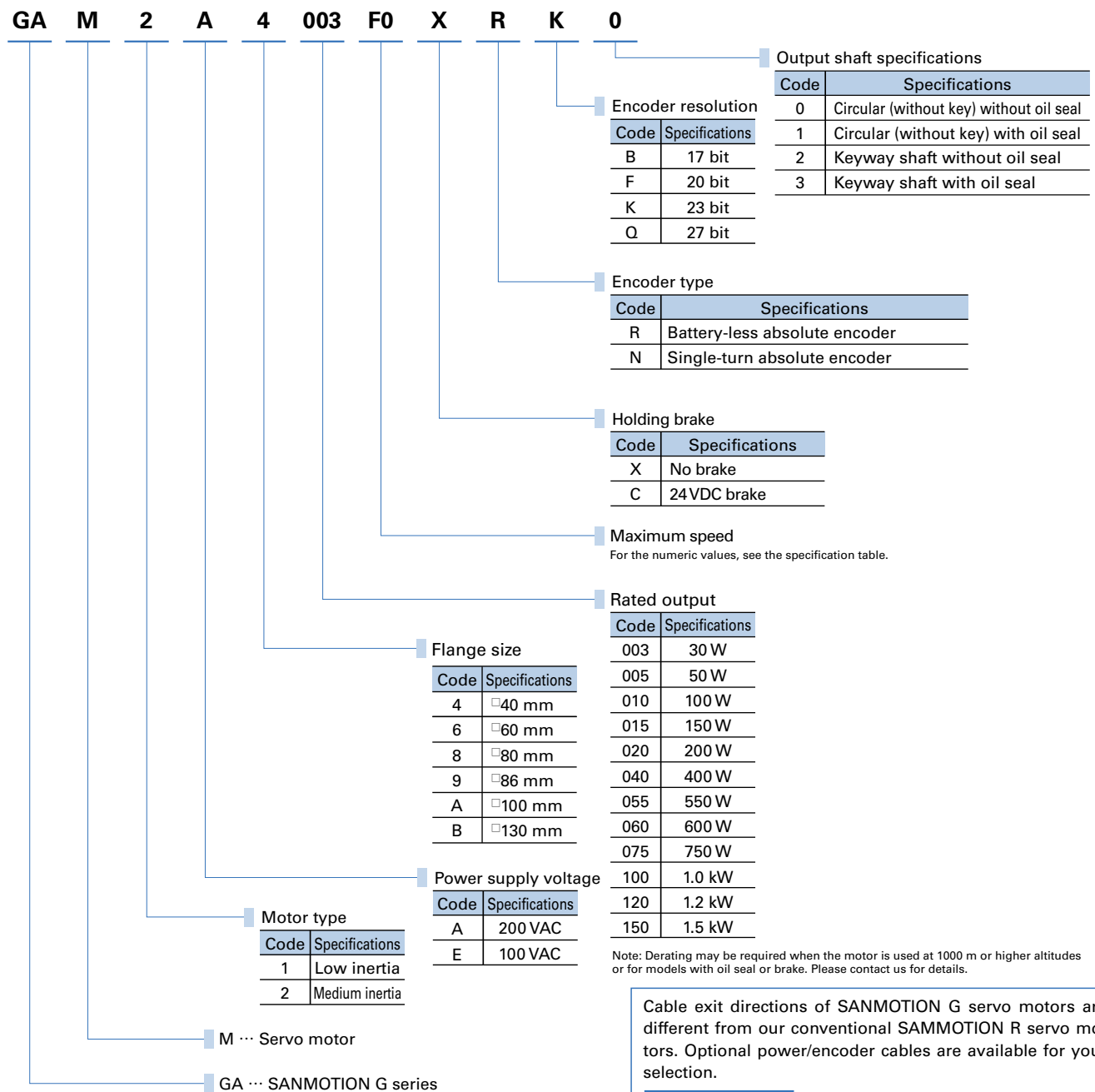
Rotary motors

Output capacity: 30 W to 1.5 kW

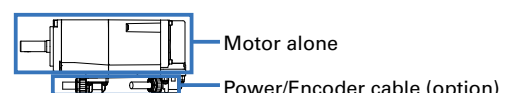


How to read model numbers

Note that not all possible combinations of field values may yield valid products. Also, some of the values listed below are for options. Refer to the Standard Model Number List section for standard models with valid model numbers.



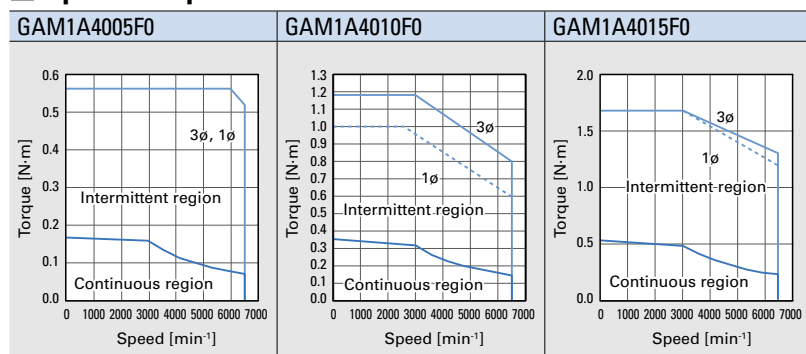
Cable exit directions of SANMOTION G servo motors are different from our conventional SAMMOTION R servo motors. Optional power/encoder cables are available for your selection.



40 mm sq.

Servo motor model no.			GAM1A4005F0	GAM1A4010F0	GAM1A4015F0	
	Symbol	Unit				
★ Rated output	P _R	kW	0.05	0.10	0.15	
★ Rated torque	T _R	N · m	0.159	0.318	0.48	
★ Continuous torque at stall	T _S	N · m	0.167	0.353	0.525	
★ Peak torque at stall	T _P	N · m	0.56	1.18	1.67	
★ Rated speed	N _R	min ⁻¹	3000	3000	3000	
★ Maximum speed	N _{max}	min ⁻¹	6500	6500	6500	
★ Rated armature current	I _R	Arms	0.81	1.0	1.7	
★ Continuous armature current at stall	I _S	Arms	0.81	1.05	1.8	
★ Peak armature current at stall	I _P	Arms	2.9	4.1	6.4	
Torque constant	K _T	N · m/Arms	0.244	0.372	0.327	
Phase resistance	R _φ	Ω	7.0	6.9	3.9	
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0153	0.0259	0.0354
	With brake			0.0218	0.0324	0.0419
Encoder inertia*	J _S		0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	17	39	65
	With brake			12	31	55
Servo motor mass*	Without brake	W _E	kg	0.38	0.52	0.66
	With brake			0.57	0.71	0.85
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6	250 × 250 × 6	305 × 305 × 12	
Holding brake static friction torque	T _b	N·m	0.48 or greater	0.48 or greater	0.48 or greater	
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%	24 DC ±10%	
Holding brake current consumption	I _b	A	0.26	0.26	0.26	
Holding brake engage time		ms	30 or less	30 or less	30 or less	
Holding brake release time (varistor)		ms	20 or less	20 or less	20 or less	
Holding brake release time (diode)		ms	100 or less	100 or less	100 or less	
Compatible servo amplifier model no.	—		GADSA01 (10 A)	GADSA01 (10 A)	GADSA02 (20 A)	

Speed-Torque Characteristics



3φ: When the power supply voltage is 3-phase
 1φ: When the power supply voltage is single-phase

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

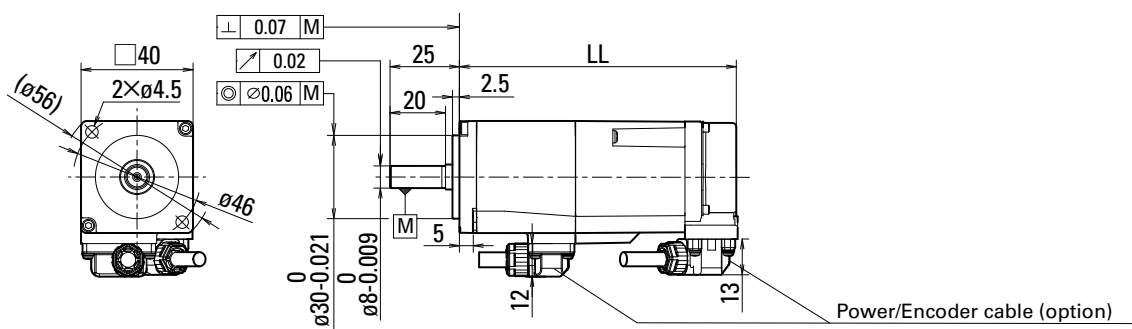
Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

■ Dimensions [Unit: mm]



Servo motor model no.	Without oil seal		With oil seal	
	Without brake	With brake	Without brake	With brake
GAM1□4005	LL	LL	LL	LL
GAM1□4010	74.5	103	79.5	108
GAM1□4015	93.5	122	98.5	127
GAM1□4015	112.5	141	117.5	146

Options

■ **Power/Encoder cable** Front and rear cable exits are directed to the output shaft direction and the opposite direction, respectively.

Cable model no.		Cable exit direction	Cable length [m]
Power	Encoder		
GSSF0100S	GESF0100S	Front	1
GSSR0100S	GESR0100S	Rear	1
GSSF0300S	GESF0300S	Front	3
GSSR0300S	GESR0300S	Rear	3
GSSF0500S	GESF0500S	Front	5
GSSR0500S	GESR0500S	Rear	5

Plug specifications

■ **Motor power / holding brake plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.		Compatible wire diameter (including insulation)		Compatible wire size (AWG)	
			Power	Brake	Power	Brake	Power	Brake
Front	JN16FE06SS1	ø5.2 to 5.6 mm	JN16S10K4A1		ø1.1 to 1.55 mm		22	24
Rear	JN16FE06SS2							

■ **Encoder plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

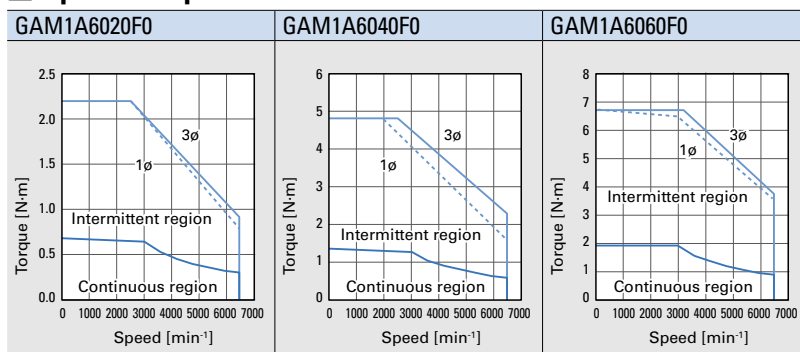
Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.	Compatible wire diameter (including insulation)	Compatible wire size (AWG)
Front	JN16FS09SS1	ø4.9 to 5.6 mm	JN-24S-C2B-B1-10000	ø0.7 to 0.9 mm	26
Rear	JN16FS09SS2				

Note: See the catalogs and instruction manuals issued by the connector manufacturer (Japan Aviation Electronics Industry, Ltd.) for handling and safety precautions.

60 mm sq.

Servo motor model no.			GAM1A6020F0	GAM1A6040F0	GAM1A6060F0	
	Symbol	Unit				
★ Rated output	P _R	kW	0.2	0.4	0.6	
★ Rated torque	T _R	N · m	0.637	1.27	1.91	
★ Continuous torque at stall	T _S	N · m	0.686	1.37	1.91	
★ Peak torque at stall	T _P	N · m	2.2	4.8	6.7	
★ Rated speed	N _R	min ⁻¹	3000	3000	3000	
★ Maximum speed	N _{max}	min ⁻¹	6500	6500	6500	
★ Rated armature current	I _R	Arms	1.51	2.8	5.1	
★ Continuous armature current at stall	I _S	Arms	1.52	2.8	4.7	
★ Peak armature current at stall	I _P	Arms	5.8	12.0	20.5	
Torque constant	K _T	N · m/Arms	0.519	0.544	0.456	
Phase resistance	R _φ	Ω	3.8	1.5	0.71	
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.121	0.213	0.287
	With brake			0.182	0.272	0.348
Encoder inertia*	J _S		0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	34	76	127
	With brake			22	59	105
Servo motor mass*	Without brake	W _E	kg	0.94	1.4	1.9
	With brake			1.4	1.8	2.3
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6	250 × 250 × 6	305 × 305 × 12	
Holding brake static friction torque	T _b	N·m	1.37 or greater	1.37 or greater	1.91 or greater	
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%	24 DC ±10%	
Holding brake current consumption	I _b	A	0.29	0.29	0.32	
Holding brake engage time		ms	30 or less	30 or less	40 or less	
Holding brake release time (varistor)		ms	20 or less	20 or less	20 or less	
Holding brake release time (diode)		ms	120 or less	120 or less	120 or less	
Compatible servo amplifier model no.	—		GADSA02 (20 A)	GADSA02 (20 A)	GADSA05 (50 A)	

Speed-Torque Characteristics



Note: GAM1A6040* and GAM1A6060* models may be derated with brake or oil seal.

3φ: When the power supply voltage is 3-phase

1φ: When the power supply voltage is single-phase

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

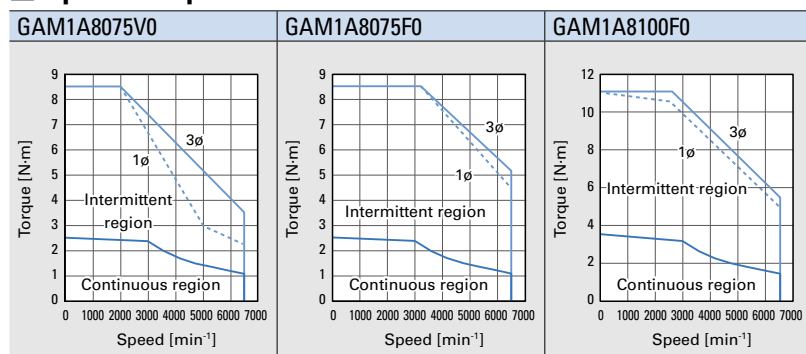
* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.



80 mm sq.

Servo motor model no.			GAM1A8075V0	GAM1A8075F0	GAM1A8100F0	
	Symbol	Unit				
★ Rated output	PR	kW	0.75	0.75	1.0	
★ Rated torque	TR	N · m	2.39	2.39	3.18	
★ Continuous torque at stall	TS	N · m	2.55	2.55	3.50	
★ Peak torque at stall	TP	N · m	8.5	8.5	11.1	
★ Rated speed	NR	min ⁻¹	3000	3000	3000	
★ Maximum speed	N _{max}	min ⁻¹	6500	6500	6500	
★ Rated armature current	IR	Arms	4.2	5.9	6.8	
★ Continuous armature current at stall	IS	Arms	4.1	5.7	6.8	
★ Peak armature current at stall	IP	Arms	15.5	22.0	26.5	
Torque constant	KT	N · m/Arms	0.670	0.501	0.561	
Phase resistance	R _φ	Ω	0.61	0.32	0.31	
Rotor inertia	Without brake	JM	×10 ⁻⁴ kg·m ² (GD2/4)	0.739	0.739	0.959
	With brake			0.936	0.936	1.16
Encoder inertia*	JS		0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	QR	kW/s	77	77	105
	With brake			61	61	88
Servo motor mass*	Without brake	WE	kg	2.9	2.9	3.5
	With brake			3.7	3.7	4.3
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6	250 × 250 × 6	305 × 305 × 12	
Holding brake static friction torque	Tb	N·m	3.18 or greater	3.18 or greater	3.18 or greater	
Holding brake rated voltage	Vb	V	24 DC ±10%	24 DC ±10%	24 DC ±10%	
Holding brake current consumption	Ib	A	0.33	0.33	0.33	
Holding brake engage time		ms	50 or less	50 or less	50 or less	
Holding brake release time (varistor)		ms	30 or less	30 or less	30 or less	
Holding brake release time (diode)		ms	200 or less	200 or less	200 or less	
Compatible servo amplifier model no.	—		GADSA03 (30 A)	GADSA05 (50 A)	GADSA05 (50 A)	

Speed-Torque Characteristics



Note: GAM1A8075* models may be derated with brake or oil seal.

3φ: When the power supply voltage is 3-phase

1φ: When the power supply voltage is single-phase

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

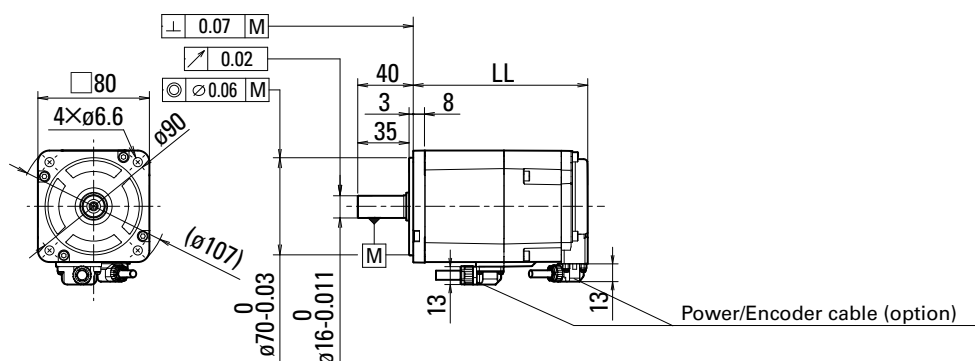
Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

■ Dimensions [Unit: mm]



Servo motor model no.	Without oil seal		With oil seal	
	Without brake	With brake	Without brake	With brake
GAM1□8075	125	155.5	132	162.5
GAM1□8100	153	183.5	160	190.5

Options

■ **Power/Encoder cable** Front and rear cable exits are directed to the output shaft direction and the opposite direction, respectively.

Cable model no.		Cable exit direction	Cable length [m]
Power	Encoder		
GMSF0100S	GESF0100S	Front	1
GMSR0100S	GESR0100S	Rear	1
GMSF0300S	GESF0300S	Front	3
GMSR0300S	GESR0300S	Rear	3
GMSF0500S	GESF0500S	Front	5
GMSR0500S	GESR0500S	Rear	5

Plug specifications

■ **Motor power / holding brake plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.		Compatible wire diameter (including insulation)		Compatible wire size (AWG)	
			Power	Brake	Power	Brake	Power	Brake
Front	JN16FG06SS1	φ6.3 to 6.9 mm	JN16S25H3A1	JN16S10K4A1	φ1.2 to 1.85 mm	φ1.1 to 1.55 mm	19	23
Rear	JN16FG06SS2							

■ **Encoder plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

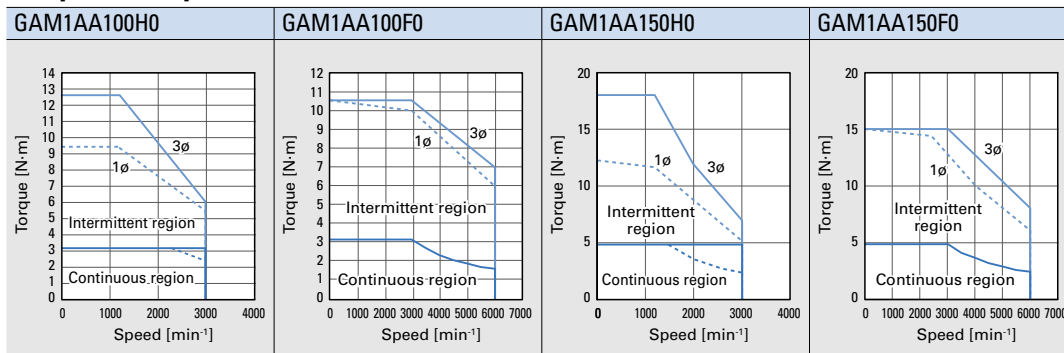
Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.	Compatible wire diameter (including insulation)	Compatible wire size (AWG)
Front	JN16FS09SS1	φ4.9 to 5.6 mm	JN-24S-C2B-B1-10000	φ0.7 to 0.9 mm	26
Rear	JN16FS09SS2				

Note: See the catalogs and instruction manuals issued by the connector manufacturer (Japan Aviation Electronics Industry, Ltd.) for handling and safety precautions.

100 mm sq.

Servo motor model no.			GAM1AA100H0	GAM1AA100F0	GAM1AA150H0	GAM1AA150F0	
	Symbol	Unit					
★ Rated output	P _R	kW	1.0	1.0	1.5	1.5	
★ Rated torque	T _R	N · m	3.2	3.2	4.8	4.8	
★ Continuous torque at stall	T _S	N · m	3.2	3.2	4.9	4.9	
★ Peak torque at stall	T _P	N · m	12.6	10.5	18.0	15.0	
★ Rated speed	N _R	min ⁻¹	3000	3000	3000	3000	
★ Maximum speed	N _{max}	min ⁻¹	3000	6000	3000	6000	
★ Rated armature current	I _R	Arms	4.5	7.7	5.2	8.7	
★ Continuous armature current at stall	I _S	Arms	3.8	7.4	3.8	8.2	
★ Peak armature current at stall	I _P	Arms	16.3	26.5	15.5	26.5	
Torque constant	K _T	N · m/Arms	0.971	0.456	1.35	0.642	
Phase resistance	R _φ	Ω	1.40	0.27	1.26	0.26	
Rotor inertia	Without brake	J _M	×10-4kg·m ² (GD2/4)	1.33	1.33	1.98	1.98
	With brake			1.66	1.66	2.31	2.31
Encoder inertia*	J _S		0.0025	0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	77	77	116	116
	With brake			62	62	100	100
Servo motor mass*	Without brake	W _E	kg	3.8	3.8	5.0	5.0
	With brake			5.3	5.3	6.6	6.6
Size of heat dissipation aluminum plate	—	mm	400 × 400 × 20	400 × 400 × 20	400 × 400 × 20	400 × 400 × 20	
Holding brake static friction torque	T _b	N·m	8 or greater	8 or greater	8 or greater	8 or greater	
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%	24 DC ±10%	24 DC ±10%	
Holding brake current consumption	I _b	A	0.67	0.67	0.67	0.67	
Holding brake engage time		ms	100 or less	100 or less	100 or less	100 or less	
Holding brake release time (varistor)		ms	30 or less	30 or less	30 or less	30 or less	
Holding brake release time (diode)		ms	200 or less	200 or less	200 or less	200 or less	
Compatible servo amplifier model no.	—		GADSA03 (30 A)	GADSA05 (50 A)	GADSA03 (30 A)	GADSA05 (50 A)	

Speed-Torque Characteristics



3φ: When the power supply voltage is 3-phase

1φ: When the power supply voltage is single-phase (the rated output of GAM1AA100H and GAM1AA150H0 are 750 W)

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

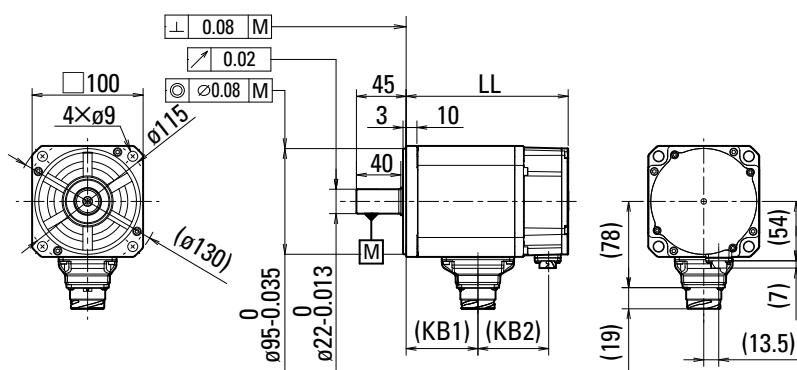
Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

■ Dimensions [Unit: mm] The LL value does not change with or without oil seal.



Servo motor model no.	Without brake		With brake		Without brake		With brake	
	LL	LL	KB1	KB2	KB1	KB2	KB1	KB2
GAM1□A100	132.5	169	61	53	61	90	61	90
GAM1□A150	156.5	193	85	53	85	90	85	90

Options

■ Power/Encoder cable

Cable model no.			Cable length [m]
Power (without brake)	Power (with brake)	Encoder	
GPPB0100S	GQP B0100SB	RS-CA9-01-R	1
GPPB0300S	GQP B0300SB	RS-CA9-03-R	3
GPPB0500S	GQP B0500SB	RS-CA9-05-R	5

Plug specifications

■ Motor power / holding brake plug (motor side) Manufacturer: Japan Aviation Electronics Industry, Ltd.

Holding brake	Receptacle mfr. part no.	Pin assignment					Recommended motor power cable size (U, V, W, and ground)	
		U phase	V phase	W phase	Ground	Brake	mm ²	AWG No.
None	JL10-2E20-4PE-B	A	B	C	D	—	2.0	14
Yes	JL10-2E20-18PE-B	F	I	B	E, D	G, H	2.0	14

Holding brake	Plug mfr. part no.		Cable clamp	
	Straight	Angled	Mfr. part no.	Compatible cable outer diameter
None	JL10-6A20-4SE-EB	JL10-8A20-4SE-EB	JL04V-2022CK(14)-R	ø12.9 to 16 mm
Yes	JL10-6A20-18SE-EB	JL10-8A20-18SE-EB	JL04V-2022CK(14)-R	ø12.9 to 16 mm

■ Encoder plug (motor side) Manufacturer: Japan Aviation Electronics Industry, Ltd.

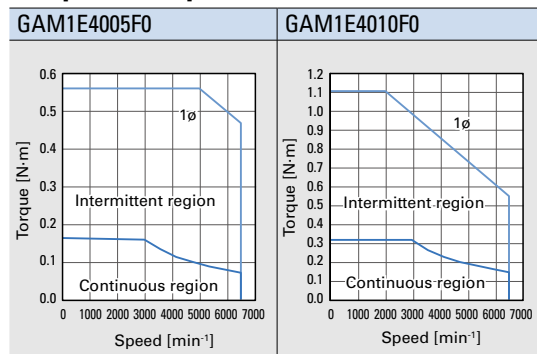
Receptacle mfr. part no.	Plug mfr. part no.		Compatible cable diameter	Contact Size	Classification	Applicable socket contact	
	Straight	Angled				Mfr. part no.	Compatible wire size
JN2AS10ML2-R	JN2DS10SL1-R	JN2FS10SL1-R	ø5.7 to 7.3 mm	#22	Manual crimping tool Type	JN1-22-20S-R-PKG100	AWG 20
	JN2DS10SL2-R	JN2FS10SL2-R	ø6.5 to 8.0 mm			JN1-22-22S-PKG100	AWG 25 to 21
	JN2DS10SL3-R	JN2FS10SL3-R	ø3.5 to 5.0 mm			JN1-22-26S-PKG100	AWG 28 to 26
			Soldering type			JN1-22-22F-PKG100	AWG 20 or smaller

Note: See the catalogs and instruction manuals issued by the connector manufacturer (Japan Aviation Electronics Industry, Ltd.) for handling and safety precautions.

40 mm sq.

Servo motor model no.			GAM1E4005F0	GAM1E4010F0
	Symbol	Unit		
★ Rated output	P _R	kW	0.05	0.1
★ Rated torque	T _R	N · m	0.159	0.318
★ Continuous torque at stall	T _S	N · m	0.167	0.318
★ Peak torque at stall	T _P	N · m	0.56	1.11
★ Rated speed	N _R	min ⁻¹	3000	3000
★ Maximum speed	N _{max}	min ⁻¹	6500	6500
★ Rated armature current	I _R	Arms	1.35	1.75
★ Continuous armature current at stall	I _S	Arms	1.35	1.70
★ Peak armature current at stall	I _P	Arms	5.5	6.8
Torque constant	K _T	N · m/Arms	0.140	0.209
Phase resistance	R _θ	Ω	2.30	2.30
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0153
	With brake			0.0218
Encoder inertia*	J _S		0.0025	0.0025
★ Rated power rate	Without brake	Q _R	kW/s	17
	With brake			12
Servo motor mass*	Without brake	W _E	kg	0.38
	With brake			0.57
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6	250 × 250 × 6
Holding brake static friction torque	T _b	N·m	0.48 or greater	0.48 or greater
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%
Holding brake current consumption	I _b	A	0.26	0.26
Holding brake engage time		ms	30 or less	30 or less
Holding brake release time (varistor)		ms	20 or less	20 or less
Holding brake release time (diode)		ms	100 or less	100 or less
Compatible servo amplifier model no.	—		GADSE02 (20 A)	GADSE02 (20 A)

Speed-Torque Characteristics



Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

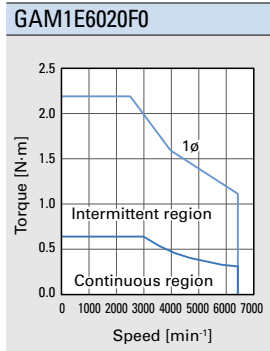
* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

Dimensions/Options/Plug specifications Common to 40 mm sq. 200 V servo motors on p. 19

60 mm sq.

Servo motor model no.			GAM1E6020F0
	Symbol	Unit	
★ Rated output	P _R	kW	0.2
★ Rated torque	T _R	N · m	0.637
★ Continuous torque at stall	T _S	N · m	0.637
★ Peak torque at stall	T _P	N · m	2.2
★ Rated speed	N _R	min ⁻¹	3000
★ Maximum speed	N _{max}	min ⁻¹	6500
★ Rated armature current	I _R	Arms	3.8
★ Continuous armature current at stall	I _S	Arms	3.6
★ Peak armature current at stall	I _P	Arms	15.5
Torque constant	K _T	N · m/Arms	0.203
Phase resistance	R _θ	Ω	0.62
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)
	With brake		
Encoder inertia*	J _S		
★ Rated power rate	Without brake	Q _R	kW/s
	With brake		
Servo motor mass*	Without brake	W _E	kg
	With brake		
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6
Holding brake static friction torque	T _b	N·m	1.37 or greater
Holding brake rated voltage	V _b	V	24 DC ±10%
Holding brake current consumption	I _b	A	0.29
Holding brake engage time		ms	30 or less
Holding brake release time (varistor)		ms	20 or less
Holding brake release time (diode)		ms	120 or less
Compatible servo amplifier model no.	—		GADSE03 (30 A)

Speed-Torque Characteristics



Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

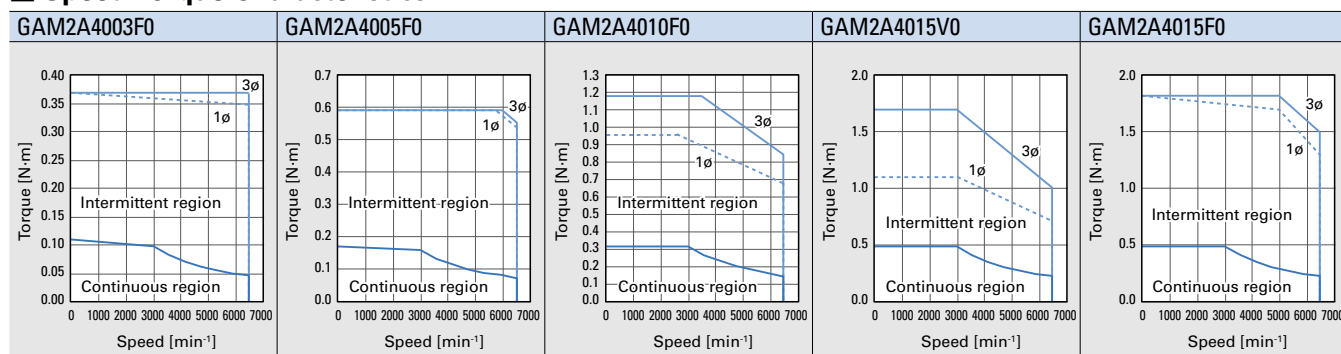
Dimensions/Options/Plug specifications Common to 60 mm sq. 200 V servo motors on p. 21



40 mm sq.

Servo motor model no.			GAM2A4003F0	GAM2A4005F0	GAM2A4010F0	GAM2A4015V0	GAM2A4015F0	
	Symbol	Unit						
★ Rated output	P _R	kW	0.03	0.05	0.10	0.15	0.15	
★ Rated torque	T _R	N · m	0.098	0.159	0.318	0.48	0.48	
★ Continuous torque at stall	T _S	N · m	0.108	0.167	0.318	0.48	0.48	
★ Peak torque at stall	T _P	N · m	0.37	0.59	1.18	1.7	1.81	
★ Rated speed	N _R	min ⁻¹	3000	3000	3000	3000	3000	
★ Maximum speed	N _{max}	min ⁻¹	6500	6500	6500	6500	6500	
★ Rated armature current	I _R	Arms	0.65	0.79	0.99	1.20	1.95	
★ Continuous armature current at stall	I _S	Arms	0.65	0.80	0.96	1.20	1.90	
★ Peak armature current at stall	I _P	Arms	2.3	2.9	3.6	4.3	7.2	
Torque constant	K _T	N · m/Arms	0.183	0.235	0.367	0.441	0.281	
Phase resistance	R _ø	Ω	10.9	9.3	9.0	8.0	3.3	
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0233	0.0324	0.0600	0.0876	0.0876
	With brake			0.0303	0.0394	0.0670	0.0946	0.0946
Encoder inertia*	J _S		0.0025	0.0025	0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	4.1	7.8	17	26	26
	With brake			3.2	6.4	15	24	24
Servo motor mass*	Without brake	W _E	kg	0.25	0.29	0.40	0.50	0.50
	With brake			0.44	0.48	0.60	0.69	0.69
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6	250 × 250 × 6	250 × 250 × 6	305 × 305 × 12	305 × 305 × 12	
Holding brake static friction torque	T _b	N·m	0.48 or greater	0.48 or greater	0.48 or greater	0.48 or greater	0.48 or greater	
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%	24 DC ±10%	24 DC ±10%	24 DC ±10%	
Holding brake current consumption	I _b	A	0.26	0.26	0.26	0.26	0.26	
Holding brake engage time		ms	30 or less	30 or less	30 or less	30 or less	30 or less	
Holding brake release time (varistor)		ms	20 or less	20 or less	20 or less	20 or less	20 or less	
Holding brake release time (diode)		ms	100 or less	100 or less	100 or less	100 or less	100 or less	
Compatible servo amplifier model no.	—		GADSA01 (10 A)	GADSA01 (10 A)	GADSA01 (10 A)	GADSA01 (10 A)	GADSA02 (20 A)	

Speed-Torque Characteristics



3ø: When the power supply voltage is 3-phase
 1ø: When the power supply voltage is single-phase

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

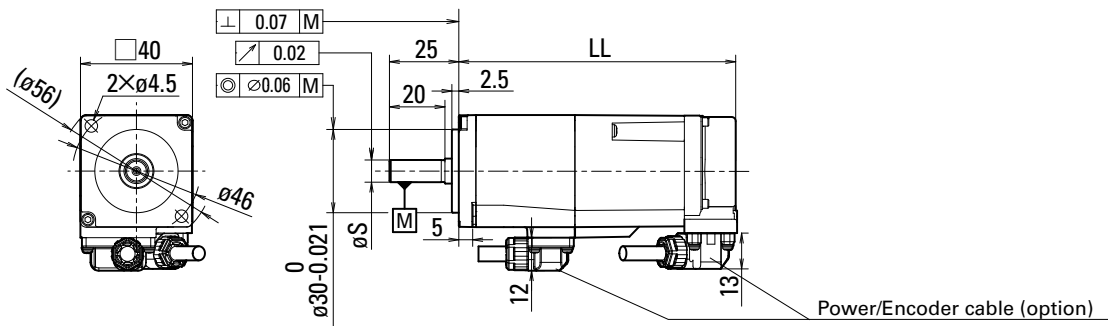
Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

■ Dimensions [Unit: mm]



Servo motor model no.	Without oil seal		With oil seal		S
	Without brake	With brake	Without brake	With brake	
GAM2□4003	LL	LL	LL	LL	6 ⁰ _{-0.008}
GAM2□4005	51.5	84	56.5	89	8 ⁰ _{-0.009}
GAM2□4010	55.5	88	60.5	93	8 ⁰ _{-0.009}
GAM2□4015	68	100.5	73	105.5	8 ⁰ _{-0.009}
GAM2A4015	80.5	113	85.5	118	8 ⁰ _{-0.009}

Options

■ **Power/Encoder cable** Front and rear cable exits are directed to the output shaft direction and the opposite direction, respectively.

Cable model no.		Cable exit direction	Cable length [m]
Power	Encoder		
GSSF0100S	GESF0100S	Front	1
GSSR0100S	GESR0100S	Rear	1
GSSF0300S	GESF0300S	Front	3
GSSR0300S	GESR0300S	Rear	3
GSSF0500S	GESF0500S	Front	5
GSSR0500S	GESR0500S	Rear	5

Plug specifications

■ **Motor power / holding brake plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.		Compatible wire diameter (including insulation)		Compatible wire size (AWG)	
			Power	Brake	Power	Brake	Power	Brake
Front	JN16FE06SS1	ø5.2 to 5.6 mm	JN16S10K4A1		ø1.1 to 1.55 mm		22	24
Rear	JN16FE06SS2							

■ **Encoder plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.	Compatible wire diameter (including insulation)	Compatible wire size (AWG)
Front	JN16FS09SS1	ø4.9 to 5.6 mm	JN-24S-C2B-B1-10000	ø0.7 to 0.9 mm	26
Rear	JN16FS09SS2				

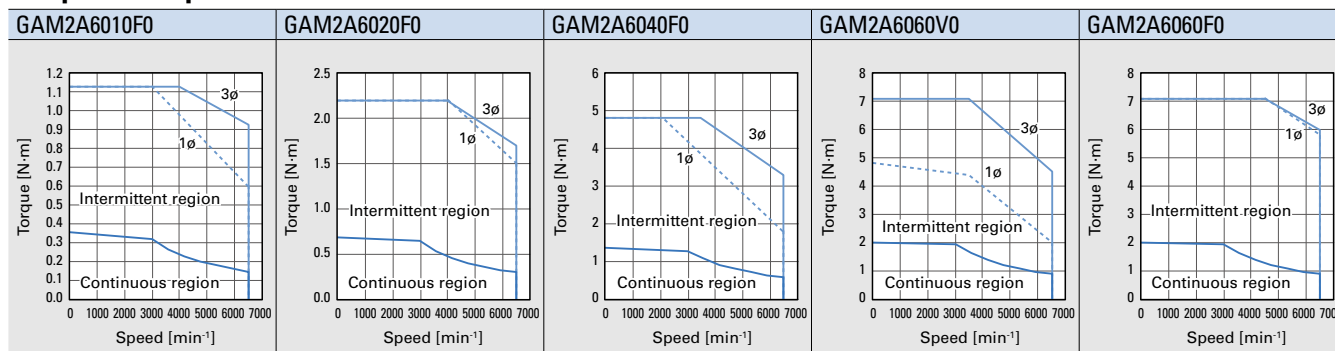
Note: See the catalogs and instruction manuals issued by the connector manufacturer (Japan Aviation Electronics Industry, Ltd.) for handling and safety precautions.



60 mm sq.

Servo motor model no.			GAM2A6010F0	GAM2A6020F0	GAM2A6040F0	GAM2A6060V0	GAM2A6060F0	
	Symbol	Unit						
★ Rated output	P _R	kW	0.1	0.2	0.4	0.6	0.6	
★ Rated torque	T _R	N · m	0.318	0.637	1.27	1.91	1.91	
★ Continuous torque at stall	T _S	N · m	0.353	0.686	1.37	2.0	2.0	
★ Peak torque at stall	T _P	N · m	1.13	2.2	4.8	7.1	7.1	
★ Rated speed	N _R	min ⁻¹	3000	3000	3000	3000	3000	
★ Maximum speed	N _{max}	min ⁻¹	6500	6500	6500	6500	6500	
★ Rated armature current	I _R	Arms	1.02	1.65	2.9	4.1	5.8	
★ Continuous armature current at stall	I _S	Arms	1.06	1.70	2.9	4.0	5.7	
★ Peak armature current at stall	I _P	Arms	3.3	5.5	10.8	15	21	
Torque constant	K _T	N · m/Arms	0.395	0.456	0.521	0.539	0.384	
Phase resistance	R _ø	Ω	5.3	2.6	1.38	0.92	0.50	
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.143	0.247	0.466	0.685	0.685
	With brake			0.201	0.306	0.524	0.743	0.743
Encoder inertia*	J _S		0.0025	0.0025	0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	7.1	16	35	53	53
	With brake			5.0	13	31	49	49
Servo motor mass*	Without brake	W _E	kg	0.59	0.80	1.3	1.6	1.6
	With brake			0.88	1.2	1.6	2.0	2.0
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6	250 × 250 × 6	250 × 250 × 6	305 × 305 × 12	305 × 305 × 12	
Holding brake static friction torque	T _b	N·m	0.36 or greater	1.37 or greater	1.37 or greater	1.91 or greater	1.91 or greater	
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%	24 DC ±10%	24 DC ±10%	24 DC ±10%	
Holding brake current consumption	I _b	A	0.27	0.29	0.29	0.32	0.32	
Holding brake engage time		ms	30 or less	30 or less	30 or less	40 or less	40 or less	
Holding brake release time (varistor)		ms	20 or less	20 or less	20 or less	20 or less	20 or less	
Holding brake release time (diode)		ms	120 or less	120 or less	120 or less	120 or less	120 or less	
Compatible servo amplifier model no.	—		GADSA01 (10 A)	GADSA02 (20 A)	GADSA02 (20 A)	GADSA03 (30 A)	GADSA05 (50 A)	

Speed-Torque Characteristics



Note: GAM2A6040* and GAM2A6060* models may be derated with brake or oil seal.

3ø: When the power supply voltage is 3-phase

1ø: When the power supply voltage is single-phase

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

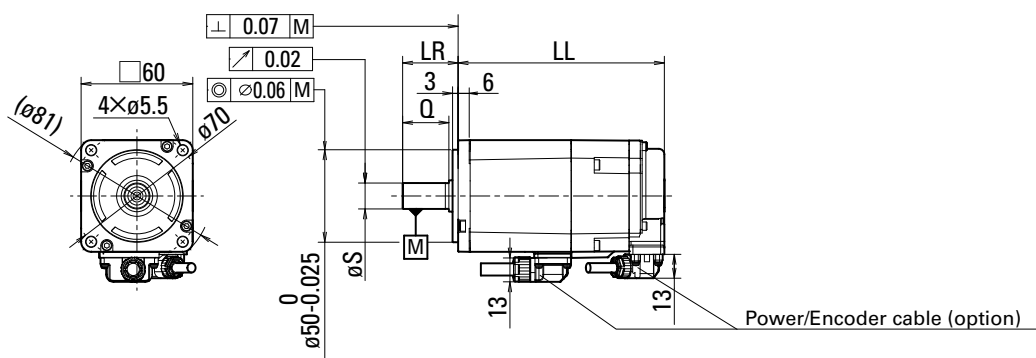
Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

■ Dimensions [Unit: mm]



Servo motor model no.	Without oil seal		With oil seal		LR	Q	S
	Without brake	With brake	Without brake	With brake			
GAM2□6010	LL	LL	LL	LL	25	20	8 ⁰ _{-0.009}
GAM2□6020	55.5	77.5	62.5	84.5	30	25	14 ⁰ _{-0.011}
GAM2A6040	65.5	91.5	72.5	98.5	30	25	14 ⁰ _{-0.011}
GAM2A6060	85.5	111.5	92.5	118.5	30	25	14 ⁰ _{-0.011}
	115.5	143.5	122.5	150.5			

Options

■ **Power/Encoder cable** Front and rear cable exits are directed to the output shaft direction and the opposite direction, respectively.

Cable model no.		Cable exit direction	Cable length [m]
Power	Encoder		
GMSF0100S	GESF0100S	Front	1
GMSR0100S	GESR0100S	Rear	1
GMSF0300S	GESF0300S	Front	3
GMSR0300S	GESR0300S	Rear	3
GMSF0500S	GESF0500S	Front	5
GMSR0500S	GESR0500S	Rear	5

Plug specifications

■ **Motor power / holding brake plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.		Compatible wire diameter (including insulation)		Compatible wire size (AWG)	
			Power	Brake	Power	Brake	Power	Brake
Front	JN16FG06SS1	ø6.3 to 6.9 mm	JN16S25H3A1	JN16S10K4A1	ø1.2 to 1.85 mm	ø1.1 to 1.55 mm	19	23
Rear	JN16FG06SS2							

■ **Encoder plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.	Compatible wire diameter (including insulation)	Compatible wire size (AWG)
Front	JN16FS09SS1	ø4.9 to 5.6 mm	JN-24S-C2B-B1-10000	ø0.7 to 0.9 mm	26
Rear	JN16FS09SS2				

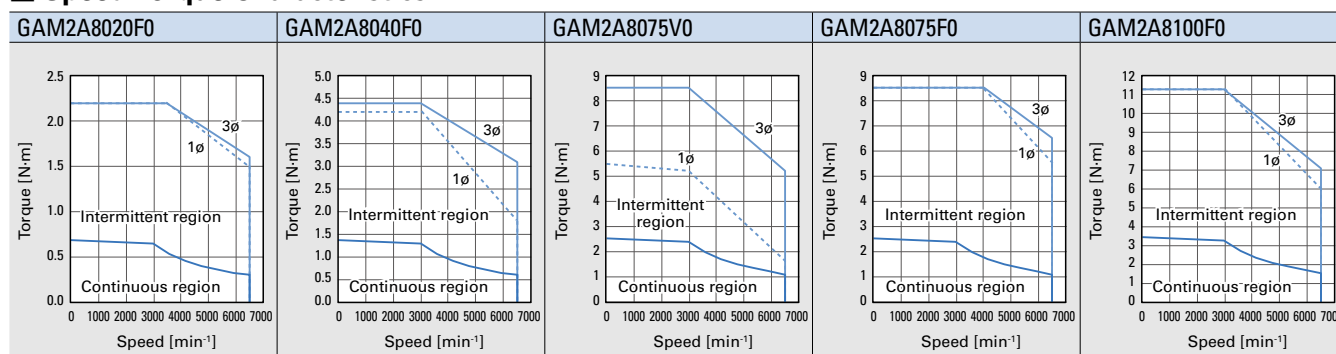
Note: See the catalogs and instruction manuals issued by the connector manufacturer (Japan Aviation Electronics Industry, Ltd.) for handling and safety precautions.



80 mm sq.

Servo motor model no.			GAM2A8020F0	GAM2A8040F0	GAM2A8075V0	GAM2A8075F0	GAM2A8100F0	
	Symbol	Unit						
★ Rated output	P _R	kW	0.2	0.4	0.75	0.75	1.0	
★ Rated torque	T _R	N · m	0.637	1.27	2.39	2.39	3.18	
★ Continuous torque at stall	T _S	N · m	0.686	1.37	2.55	2.55	3.39	
★ Peak torque at stall	T _P	N · m	2.2	4.4	8.5	8.5	11.3	
★ Rated speed	N _R	min ⁻¹	3000	3000	3000	3000	3000	
★ Maximum speed	N _{max}	min ⁻¹	6500	6500	6500	6500	6500	
★ Rated armature current	I _R	Arms	1.53	2.8	4.3	5.9	6.2	
★ Continuous armature current at stall	I _S	Arms	1.59	2.9	4.4	5.9	6.3	
★ Peak armature current at stall	I _P	Arms	5.8	9.7	16	21.4	23	
Torque constant	K _T	N · m/Arms	0.476	0.530	0.625	0.464	0.579	
Phase resistance	R _ø	Ω	2.9	1.25	0.65	0.38	0.45	
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.409	0.805	1.56	1.56	1.96
	With brake			0.596	0.992	1.76	1.76	2.16
Encoder inertia*	J _S		0.0025	0.0025	0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	9.9	20	37	37	52
	With brake			6.8	16	32	32	47
Servo motor mass*	Without brake	W _E	kg	1.2	1.5	2.2	2.2	2.5
	With brake			1.8	2.1	3.0	3.0	3.3
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6	250 × 250 × 6	250 × 250 × 6	250 × 250 × 6	305 × 305 × 12	
Holding brake static friction torque	T _b	N·m	1.37 or greater	1.37 or greater	3.18 or greater	3.18 or greater	3.18 or greater	
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%	24 DC ±10%	24 DC ±10%	24 DC ±10%	
Holding brake current consumption	I _b	A	0.32	0.32	0.33	0.33	0.33	
Holding brake engage time		ms	50 or less	50 or less	50 or less	50 or less	50 or less	
Holding brake release time (varistor)		ms	30 or less	30 or less	30 or less	30 or less	30 or less	
Holding brake release time (diode)		ms	200 or less	200 or less	200 or less	200 or less	200 or less	
Compatible servo amplifier model no.	—		GADSA02 (20 A)	GADSA02 (20 A)	GADSA03 (30 A)	GADSA05 (50 A)	GADSA05 (50 A)	

Speed-Torque Characteristics



Note: GAM2A8075* and GAM2A8100* models may be derated with brake or oil seal.

3ø: When the power supply voltage is 3-phase

1ø: When the power supply voltage is single-phase

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

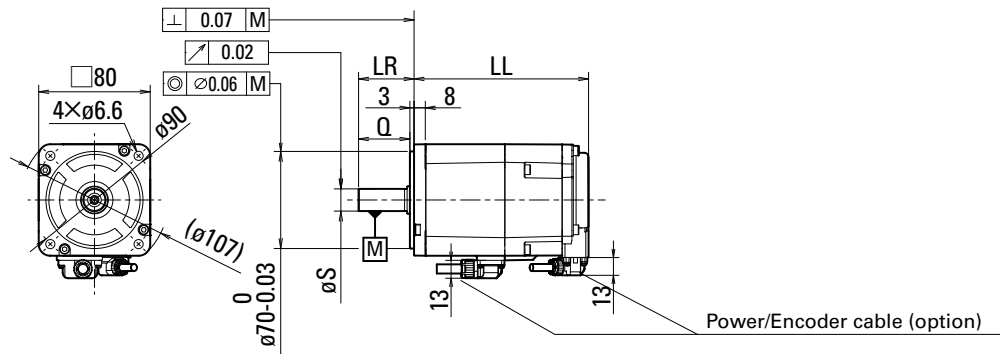
Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

■ Dimensions [Unit: mm]



Servo motor model no.	Without oil seal		With oil seal		LR	Q	S
	Without brake	With brake	Without brake	With brake			
GAM2□8020	63	86.5	70	93.5	30	25	14 ⁰ _{-0.011}
GAM2□8040	72.5	96.5	79.5	103.5	30	25	14 ⁰ _{-0.011}
GAM2□8075	92	126	99	133	40	35	16 ⁰ _{-0.011}
GAM2□8100	102	135.5	109	142.5	40	35	16 ⁰ _{-0.011}

Options

■ **Power/Encoder cable** Front and rear cable exits are directed to the output shaft direction and the opposite direction, respectively.

Cable model no.		Cable exit direction	Cable length [m]
Power	Encoder		
GMSF0100S	GESF0100S	Front	1
GMSR0100S	GESR0100S	Rear	1
GMSF0300S	GESF0300S	Front	3
GMSR0300S	GESR0300S	Rear	3
GMSF0500S	GESF0500S	Front	5
GMSR0500S	GESR0500S	Rear	5

Plug specifications

■ **Motor power / holding brake plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.		Compatible wire diameter (including insulation)		Compatible wire size (AWG)	
			Power	Brake	Power	Brake	Power	Brake
Front	JN16FG06SS1	ø6.3 to 6.9 mm	JN16S25H3A1	JN16S10K4A1	ø1.2 to 1.85 mm	ø1.1 to 1.55 mm	19	23
Rear	JN16FG06SS2							

■ **Encoder plug (motor side)** Manufacturer: Japan Aviation Electronics Industry, Ltd.

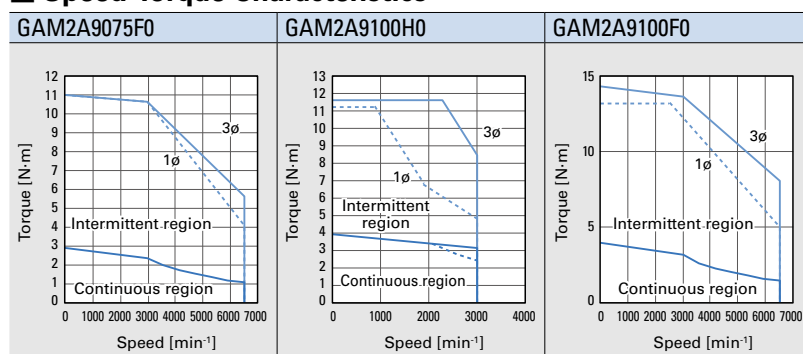
Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.	Compatible wire diameter (including insulation)	Compatible wire size (AWG)
Front	JN16FS09SS1	ø4.9 to 5.6 mm	JN-24S-C2B-B1-10000	ø0.7 to 0.9 mm	26
Rear	JN16FS09SS2				

Note: See the catalogs and instruction manuals issued by the connector manufacturer (Japan Aviation Electronics Industry, Ltd.) for handling and safety precautions.

86 mm sq.

Servo motor model no.			GAM2A9075F0	GAM2A9100H0	GAM2A9100F0	
	Symbol	Unit				
★ Rated output	P _R	kW	0.75	1.0	1.0	
★ Rated torque	T _R	N·m	2.38	3.18	3.18	
★ Continuous torque at stall	T _S	N·m	2.94	3.92	3.92	
★ Peak torque at stall	T _P	N·m	11.0	11.6	14.3	
★ Rated speed	N _R	min ⁻¹	3000	3000	3000	
★ Maximum speed	N _{max}	min ⁻¹	6500	3000	6500	
★ Rated armature current	I _R	Arms	4.7	4.6	6.0	
★ Continuous armature current at stall	I _S	Arms	5.5	4.7	6.8	
★ Peak armature current at stall	I _P	Arms	23.5	15.5	25.7	
Torque constant	K _T	N·m/Arms	0.547	0.825	0.582	
Phase resistance	R _φ	Ω	0.62	0.85	0.44	
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	1.57	2.45	2.45
	With brake			1.87	2.75	2.75
Encoder inertia*	J _S		0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	36	41	41
	With brake			30	37	37
Servo motor mass*	Without brake	W _E	kg	2.7	3.4	3.4
	With brake			3.5	4.2	4.2
Size of heat dissipation aluminum plate	—	mm	305 × 305 × 12	305 × 305 × 12	305 × 305 × 12	
Holding brake static friction torque	T _b	N·m	3.92 or greater	3.92 or greater	3.92 or greater	
Holding brake rated voltage	V _b	V	24 DC ± 10%	24 DC ± 10%	24 DC ± 10%	
Holding brake current consumption	I _b	A	0.34	0.34	0.34	
Holding brake engage time		ms	50 or less	50 or less	50 or less	
Holding brake release time (varistor)		ms	30 or less	30 or less	30 or less	
Holding brake release time (diode)		ms	200 or less	200 or less	200 or less	
Compatible servo amplifier model no.	—		GADSA05 (50 A)	GADSA03 (30 A)	GADSA05 (50 A)	

Speed-Torque Characteristics



Note: GAM2A9100* models may be derated with brake or oil seal.

3φ: When the power supply voltage is 3-phase

1φ: When the power supply voltage is single-phase (the rated output of GAM2A9100H0 is 750 W)

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

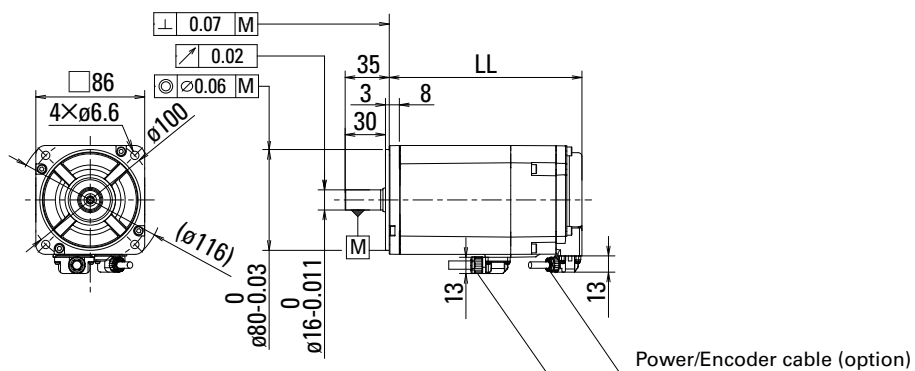
Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

■ Dimensions [Unit: mm] The LL value does not change with or without oil seal.



	Without brake	With brake
Servo motor model no.	LL	LL
GAM2□9075	104.5	130
GAM2□9100	127	153

Options

■ Power/Encoder cable

Front and rear cable exits are directed to the output shaft direction and the opposite direction, respectively.

Cable model no.		Cable exit direction	Cable length [m]
Power	Encoder		
GMSF0100S	GESF0100S	Front	1
GMSR0100S	GESR0100S	Rear	1
GMSF0300S	GESF0300S	Front	3
GMSR0300S	GESR0300S	Rear	3
GMSF0500S	GESF0500S	Front	5
GMSR0500S	GESR0500S	Rear	5

Plug specifications

■ Motor power / holding brake plug (motor side)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.		Compatible wire diameter (including insulation)		Compatible wire size (AWG)	
			Power	Brake	Power	Brake	Power	Brake
Front	JN16FG06SS1	ø6.3 to 6.9 mm	JN16S25H3A1	JN16S10K4A1	ø1.2 to 1.85 mm	ø1.1 to 1.55 mm	19	23
Rear	JN16FG06SS2							

■ Encoder plug (motor side)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Cable exit direction	Plug mfr. part no.	Compatible cable diameter	Contact mfr. part no.	Compatible wire diameter (including insulation)	Compatible wire size (AWG)
Front	JN16FS09SS1	ø4.9 to 5.6 mm	JN-24S-C2B-B1-10000	ø0.7 to 0.9 mm	26
Rear	JN16FS09SS2				

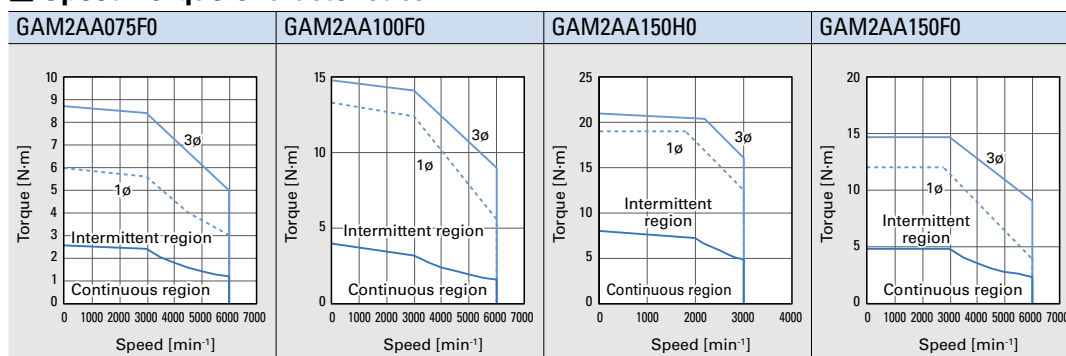
Note: See the catalogs and instruction manuals issued by the connector manufacturer (Japan Aviation Electronics Industry, Ltd.) for handling and safety precautions.



100 mm sq.

Servo motor model no.			GAM2AA075F0	GAM2AA100F0	GAM2AA150H0	GAM2AA150F0	
	Symbol	Unit					
★ Rated output	P _R	kW	0.75	1.0	1.5	1.5	
★ Rated torque	T _R	N·m	2.39	3.18	7.2	4.8	
★ Continuous torque at stall	T _S	N·m	2.55	3.92	8.0	4.9	
★ Peak torque at stall	T _P	N·m	8.7	14.7	21.0	14.7	
★ Rated speed	N _R	min ⁻¹	3000	3000	2000	3000	
★ Maximum speed	N _{max}	min ⁻¹	6000	6000	3000	6000	
★ Rated armature current	I _R	Arms	4.5	5.5	8.3	8.6	
★ Continuous armature current at stall	I _S	Arms	4.6	6.2	8.9	8.5	
★ Peak armature current at stall	I _P	Arms	16.3	26.5	25.5	26.5	
Torque constant	K _T	N·m/Arms	0.639	0.665	0.983	0.633	
Phase resistance	R _φ	Ω	0.69	0.32	0.43	0.16	
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	2.36	3.97	6.10	6.10
	With brake			2.69	4.30	6.45	6.45
Encoder inertia*	J _S		0.0025	0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	24	25	85	38
	With brake			21	24	80	36
Servo motor mass*	Without brake	W _E	kg	3.3	4.1	5.9	5.9
	With brake			4.1	4.9	7.5	7.5
Size of heat dissipation aluminum plate	—	mm	305 × 305 × 12	305 × 305 × 12	400 × 400 × 20	400 × 400 × 20	
Holding brake static friction torque	T _b	N·m	3.92 or greater	3.92 or greater	8 or greater	8 or greater	
Holding brake rated voltage	V _b	V	24 DC ± 10%	24 DC ± 10%	24 DC ± 10%	24 DC ± 10%	
Holding brake current consumption	I _b	A	0.36	0.36	0.67	0.67	
Holding brake engage time		ms	50 or less	50 or less	100 or less	100 or less	
Holding brake release time (varistor)		ms	30 or less	30 or less	30 or less	30 or less	
Holding brake release time (diode)		ms	200 or less	200 or less	200 or less	200 or less	
Compatible servo amplifier model no.	—		GADSA03 (30 A)	GADSA05 (50 A)	GADSA05 (50 A)	GADSA05 (50 A)	

Speed-Torque Characteristics



3φ: When the power supply voltage is 3-phase

1φ: When the power supply voltage is single-phase

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

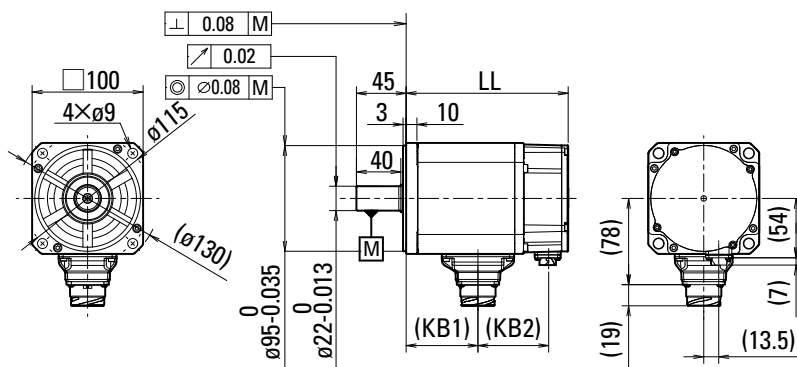
Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

■ Dimensions [Unit: mm] The LL value does not change with or without oil seal.



Servo motor model no.	Without brake		With brake		Without brake		With brake	
	LL	LL	KB1	KB2	KB1	KB2	KB1	KB2
GAM2□A075	111	129	47.5	45	47.5	63		
GAM2□A100	128	146	64.5	45	64.5	63		
GAM2□A150	161	205.5	97.5	45	97.5	90		

Options

■ Power/Encoder cable

Cable model no.			Cable length [m]
Power (without brake)	Power (with brake)	Encoder	
GPPB0100S	GQPBO100SB	RS-CA9-01-R	1
GPPB0300S	GQPBO300SB	RS-CA9-03-R	3
GPPB0500S	GQPBO500SB	RS-CA9-05-R	5

Plug specifications

■ Motor power / holding brake plug (motor side) Manufacturer: Japan Aviation Electronics Industry, Ltd.

Holding brake	Receptacle mfr. part no.	Pin assignment					Recommended motor power cable size (U, V, W, and ground)	
		U phase	V phase	W phase	Ground	Brake	mm ²	AWG No.
None	JL10-2E20-4PE-B	A	B	C	D	—	2.0	14
Yes	JL10-2E20-18PE-B	F	I	B	E, D	G, H	2.0	14

Holding brake	Plug mfr. part no.		Cable clamp	
	Straight	Angled	Mfr. part no.	Compatible cable outer diameter
None	JL10-6A20-4SE-EB	JL10-8A20-4SE-EB	JL04V-2022CK(14)-R	ø12.9 to 16 mm
Yes	JL10-6A20-18SE-EB	JL10-8A20-18SE-EB	JL04V-2022CK(14)-R	ø12.9 to 16 mm

■ Encoder plug (motor side) Manufacturer: Japan Aviation Electronics Industry, Ltd.

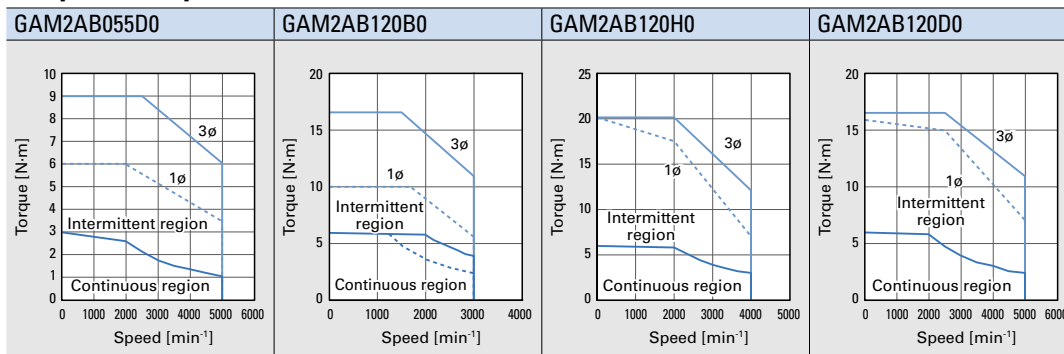
Receptacle mfr. part no.	Plug mfr. part no.		Compatible cable diameter	Contact size	Classification	Applicable socket contact	
	Straight	Angled				Mfr. part no.	Compatible wire size
JN2AS10ML2-R	JN2DS10SL1-R	JN2FS10SL1-R	ø5.7 to 7.3 mm	#22	Manual crimping tool type	JN1-22-20S-R-PKG100	AWG 20
	JN2DS10SL2-R	JN2FS10SL2-R	ø6.5 to 8.0 mm			JN1-22-22S-PKG100	AWG 25 to 21
	JN2DS10SL3-R	JN2FS10SL3-R	ø3.5 to 5.0 mm			JN1-22-26S-PKG100	AWG 28 to 26
					Soldering type	JN1-22-22F-PKG100	AWG 20 or smaller

Note: See the catalogs and instruction manuals issued by the connector manufacturer (Japan Aviation Electronics Industry, Ltd.) for handling and safety precautions.

130 mm sq.

Servo motor model no.			GAM2AB055D0	GAM2AB120B0	GAM2AB120H0	GAM2AB120D0	
	Symbol	Unit					
★ Rated output	P _R	kW	0.55	1.2	1.2	1.2	
★ Rated torque	T _R	N · m	2.6	5.8	5.8	5.8	
★ Continuous torque at stall	T _S	N · m	3.0	6.0	6.0	6.0	
★ Peak torque at stall	T _P	N · m	9.0	16.5	20.0	16.5	
★ Rated speed	N _R	min ⁻¹	2000	2000	2000	2000	
★ Maximum speed	N _{max}	min ⁻¹	5000	3000	4000	5000	
★ Rated armature current	I _R	Arms	4.3	5.2	6.7	8.7	
★ Continuous armature current at stall	I _S	Arms	4.7	5.2	6.6	8.6	
★ Peak armature current at stall	I _P	Arms	16.3	15.5	26.5	26.0	
Torque constant	K _T	N · m/Arms	0.702	1.26	0.971	0.756	
Phase resistance	R _φ	Ω	0.64	0.71	0.40	0.24	
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	4.36	7.78	7.78	7.78
	With brake			5.43	8.86	8.86	8.86
Encoder inertia*	J _S		0.0025	0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	16	43	43	43
	With brake			12	38	38	38
Servo motor mass*	Without brake	W _E	kg	4.2	5.5	5.5	5.5
	With brake			5.8	7.1	7.1	7.1
Size of heat dissipation aluminum plate	—	mm	305 × 400 × 20	400 × 400 × 20	400 × 400 × 20	400 × 400 × 20	
Holding brake static friction torque	T _b	N·m	13 or greater	13 or greater	13 or greater	13 or greater	
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%	24 DC ±10%	24 DC ±10%	
Holding brake current consumption	I _b	A	0.39	0.39	0.39	0.39	
Holding brake engage time		ms	100 or less	100 or less	100 or less	100 or less	
Holding brake release time (varistor)		ms	30 or less	30 or less	30 or less	30 or less	
Holding brake release time (diode)		ms	200 or less	200 or less	200 or less	200 or less	
Compatible servo amplifier model no.	—		GADSA03 (30 A)	GADSA03 (30 A)	GADSA05 (50 A)	GADSA05 (50 A)	

Speed-Torque Characteristics



3φ: When the power supply voltage is 3-phase

1φ: When the power supply voltage is single-phase (the rated output of GAM2AB120B0 is 750 W)

Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

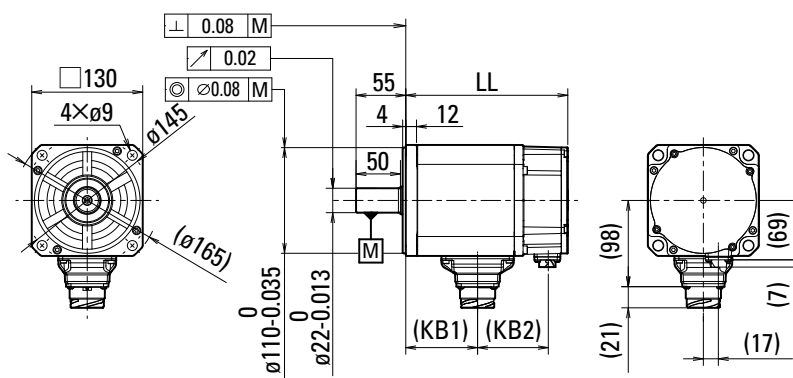
Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

■ Dimensions [Unit: mm] The LL value does not change with or without oil seal.



Servo motor model no.	Without brake	With brake	Without brake		With brake	
	LL	LL	KB1	KB2	KB1	KB2
GAM2□B055	96.5	121.5	42.5	35	42.5	59
GAM2□B120	110.5	135.5	56.5	35	56.5	59

Options

■ Power/Encoder cable

Power (without brake)	Cable model no.		Encoder	Cable length [m]
	Power (with brake)			
GRPB0100S	GRPB0100SB		RS-CA9-01-R	1
GRPB0300S	GRPB0300SB		RS-CA9-03-R	3
GRPB0500S	GRPB0500SB		RS-CA9-05-R	5

Plug specifications

■ Motor power / holding brake plug (motor side) Manufacturer: Japan Aviation Electronics Industry, Ltd.

Holding brake	Receptacle mfr. part no.	Pin assignment					Recommended motor power cable size (U, V, W, and ground)	
		U phase	V phase	W phase	Ground	Brake	mm ²	AWG No.
None	JL10-2E24-11PE-B	D	E	F	G, H	—	2.0	14
Yes	JL10-2E24-11PE-B	D	E	F	G, H	A, B	2.0	14

Holding brake	Plug mfr. part no.		Cable clamp	
	Straight	Angled	Mfr. part no.	Compatible cable outer diameter
None/Yes	JL10-6A24-11SE-EB	JL10-8A24-11SE-EB	JL04V-2428CK(17)-R	ø15 to 18 mm

■ Encoder plug (motor side) Manufacturer: Japan Aviation Electronics Industry, Ltd.

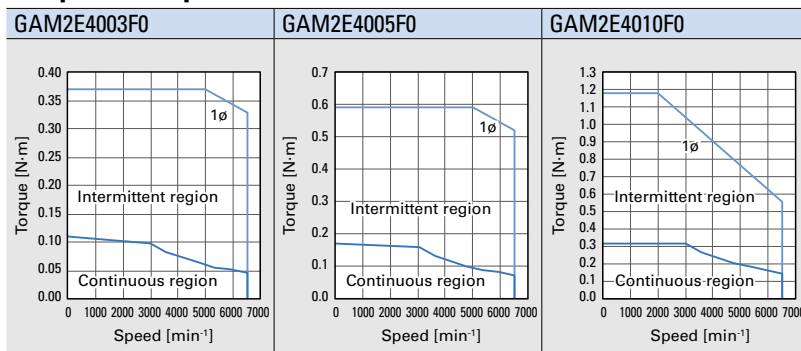
Receptacle Mfr. part no.	Plug mfr. part no.		Compatible cable diameter	Contact size	Classification	Applicable socket contact	
	Straight	Angled				Mfr. part no.	Compatible wire size
JN2AS10ML2-R	JN2DS10SL1-R	JN2FS10SL1-R	ø5.7 to 7.3 mm	#22	Manual crimping tool type	JN1-22-20S-R-PKG100	AWG 20
	JN2DS10SL2-R	JN2FS10SL2-R	ø6.5 to 8.0 mm			JN1-22-22S-PKG100	AWG 25 to 21
	JN2DS10SL3-R	JN2FS10SL3-R	ø3.5 to 5.0 mm			JN1-22-26S-PKG100	AWG 28 to 26
					Soldering type	JN1-22-22F-PKG100	AWG 20 or smaller

Note: See the catalogs and instruction manuals issued by the connector manufacturer (Japan Aviation Electronics Industry, Ltd.) for handling and safety precautions.

40 mm sq.

Servo motor model no.			GAM2E4003F0	GAM2E4005F0	GAM2E4010F0	
	Symbol	Unit				
★ Rated output	P _R	kW	0.03	0.05	0.1	
★ Rated torque	T _R	N · m	0.098	0.159	0.318	
★ Continuous torque at stall	T _S	N · m	0.108	0.167	0.318	
★ Peak torque at stall	T _P	N · m	0.37	0.59	1.18	
★ Rated speed	N _R	min ⁻¹	3000	3000	3000	
★ Maximum speed	N _{max}	min ⁻¹	6500	6500	6500	
★ Rated armature current	I _R	Arms	1.00	1.62	1.98	
★ Continuous armature current at stall	I _S	Arms	1.00	1.58	1.92	
★ Peak armature current at stall	I _P	Arms	3.5	5.8	7.2	
Torque constant	K _T	N · m/Arms	0.123	0.117	0.183	
Phase resistance	R _ø	Ω	4.5	2.33	2.25	
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0233	0.0324	0.0600
	With brake			0.0303	0.0394	0.0670
Encoder inertia*	J _S		0.0025	0.0025	0.0025	
★ Rated power rate	Without brake	Q _R	kW/s	4.1	7.8	17
	With brake			3.2	6.4	15
Servo motor mass*	Without brake	W _E	kg	0.25	0.29	0.40
	With brake			0.44	0.48	0.60
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6	250 × 250 × 6	250 × 250 × 6	
Holding brake static friction torque	T _b	N·m	0.48	0.48	0.48	
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%	24 DC ±10%	
Holding brake current consumption	I _b	A	0.26	0.26	0.26	
Holding brake engage time		ms	30 or less	30 or less	30 or less	
Holding brake release time (varistor)		ms	20 or less	20 or less	20 or less	
Holding brake release time (diode)		ms	100 or less	100 or less	100 or less	
Compatible servo amplifier model no.	—		GADSE01 (10 A)	GADSE02 (20 A)	GADSE02 (20 A)	

Speed-Torque Characteristics



Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

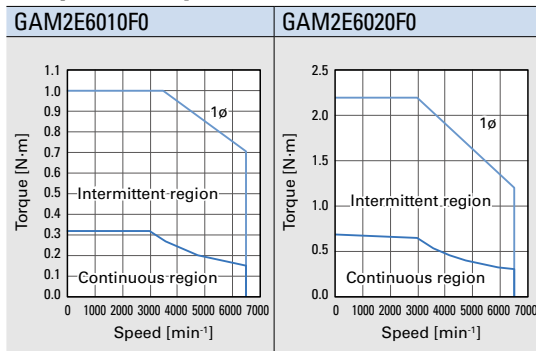
Dimensions/Options/Plug specifications

Common to 40 mm sq. 200 V servo motors on p. 29

60 mm sq.

Servo motor model no.			GAM2E6010F0	GAM2E6020F0
	Symbol	Unit		
★ Rated output	P _R	kW	0.1	0.2
★ Rated torque	T _R	N · m	0.318	0.637
★ Continuous torque at stall	T _S	N · m	0.318	0.686
★ Peak torque at stall	T _P	N · m	1.0	2.2
★ Rated speed	N _R	min ⁻¹	3000	3000
★ Maximum speed	N _{max}	min ⁻¹	6500	6500
★ Rated armature current	I _R	Arms	2.05	3.3
★ Continuous armature current at stall	I _S	Arms	1.97	3.4
★ Peak armature current at stall	I _P	Arms	5.8	11.1
Torque constant	K _T	N · m/Arms	0.197	0.228
Phase resistance	R _ø	Ω	1.33	0.66
Rotor inertia	Without brake	J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.143
	With brake			0.201
Encoder inertia*	J _S		0.0025	0.0025
★ Rated power rate	Without brake	Q _R	kW/s	7.1
	With brake			5.0
Servo motor mass*	Without brake	W _E	kg	0.59
	With brake			0.88
Size of heat dissipation aluminum plate	—	mm	250 × 250 × 6	250 × 250 × 6
Holding brake static friction torque	T _b	N·m	0.36 or greater	1.37 or greater
Holding brake rated voltage	V _b	V	24 DC ±10%	24 DC ±10%
Holding brake current consumption	I _b	A	0.27	0.29
Holding brake engage time		ms	30 or less	30 or less
Holding brake release time (varistor)		ms	20 or less	20 or less
Holding brake release time (diode)		ms	120 or less	120 or less
Compatible servo amplifier model no.	—		GADSE02 (20 A)	GADSE03 (30 A)

Speed-Torque Characteristics



Note 1: Speed-torque characteristics curves and values in the row with a black star symbol (★) are the values after thermal equilibrium is established. All other values are at a temperature of 20°C.

Note 2: All values are typical values. Torque constant is the value when mounted on the heat dissipation aluminum plate in the table.

Note 3: The holding brake cannot be used for dynamic braking. Holding brake engage/release time denotes the delay time of holding brake activation.

Values of holding brake engage/release time vary depending on the circuit used. Please check the delay time on the actual equipment before use.

* The encoder inertia and servo motor mass values are when equipped with a battery-less absolute encoder. Contact us for more information on other encoders.

Dimensions/Options/Plug specifications

Common to 60 mm sq. 200 V servo motors on p. 31

Servo motor specification

Motor duty rating	Continuous
Thermal class	F
Dielectric strength	100 VAC power supply: 1500 VAC for 1 min 200 VAC power supply: 1500 VAC for 1 min
Insulation resistance	10 MΩ min. at 500 VDC
Protection	Totally Enclosed Non-Ventilated
Operating ambient temperature	0 to 40°C
Storage temperature	-20 to 65°C (non-condensing)
Operating and storage humidity	20 to 90% (non-condensing)
Operating altitude	2000 m max.*
Vibration class	V15
Excitation system	Permanent magnet
Mounting	Flange
Installation locations	Indoors (not exposed to direct sunlight) A location free of corrosive gases, flammable gases, powder dust, and other substances that are detrimental to the used machines and motors.
Protection rating	IP67

*When used in environments above 1000 m in altitude, derating may be required. Please contact us for limitations such as continuous rating.

Signal names and pin numbers of servo motor and encoder

(Common to analog/pulse and EtherCAT types)

Battery-less absolute encoder

Single-turn absolute encoder

Servo amplifier connector X3 or X4		Servo motor			
Terminal no. (Plug pin no.)	Signal name	For 40 to 86 mm sq. motors (Plug pin no.)	For 100 to 130 mm sq. motors (Plug pin no.)	Description	Remarks ⁽¹⁾
1	5V	2	9	Power supply	Twisted pair (Recommended)
2	SG	3	10	Common power supply	
3	–	–	–	–	–
4	–	–	–	–	–
5	(NC)	–	–	No connection ⁽³⁾	–
6	(NC)	–	–	No connection ⁽³⁾	–
7	ES+	6	1	Serial communication signal	Twisted pair
8	ES-	7	2		
9	(NC)	–	–	No connection ⁽³⁾	–
10	(NC)	–	–	No connection ⁽³⁾	–
⁽²⁾	Ground	1	7	Shielded	–

(1) Use shielded twisted pair cables.

(2) Connect the shielded cables to the metal case (ground) of the encoder connectors (X3, X4) of the servo amplifier and the ground of the motor encoder, respectively.

(3) Please make sure to leave pins 5, 6, 9, and 10 unconnected.

Note: Contact us if the cable length is to be longer than 10 m and 25 m for 40 to 86 mm sq. models and 100 to 130 mm sq. models, respectively.
Contact us for more information on other encoders.