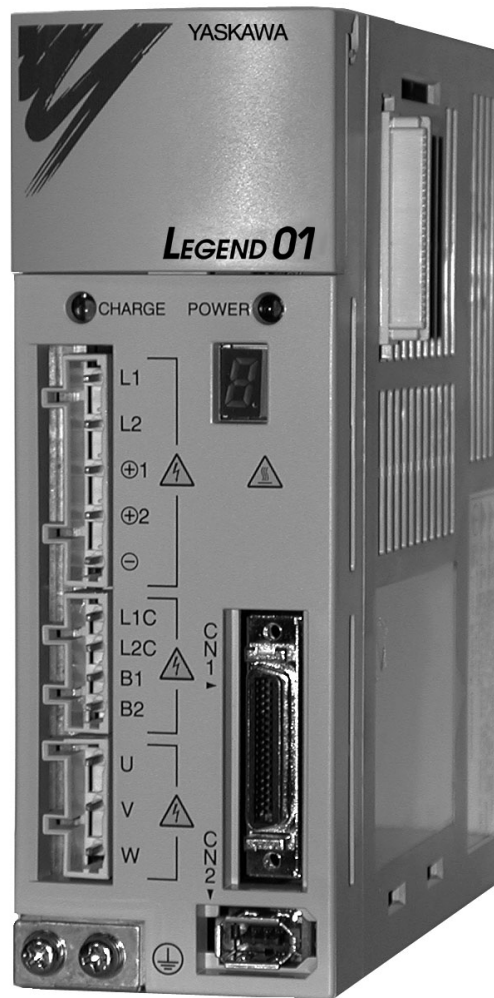




LEGEND Digital Torque Amplifier SGD G Product Catalog Supplement

Simply the world's best, easiest to use Digital Torque Amplifier.

**Plug -and-Play
Linear or
Rotary Motors**

**Status, Diagnostic
Display**

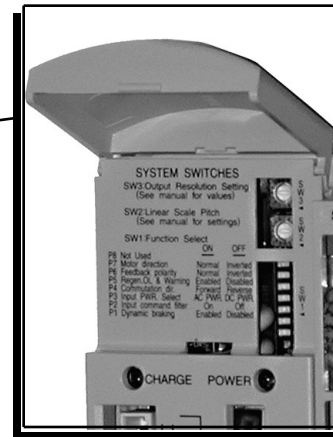
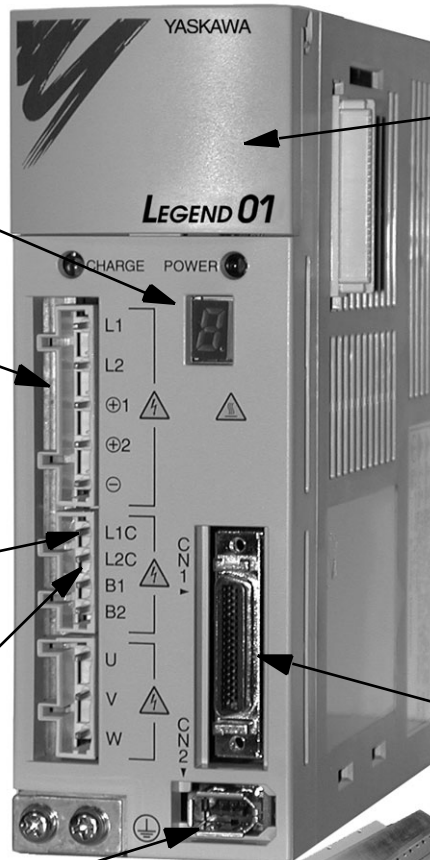
**Main Power
90 - 253 VAC
1Ø, 3Ø
127-357 VDC**

**90 - 253 VAC
Control Power**

**Internal/External
Regeneration**

**Serial Motor Encoder
Connection**

**Sigma II Servo Motors
100W - 1.5Kw
Serial Encoders**



***Linear/Rotary
Motor Select**

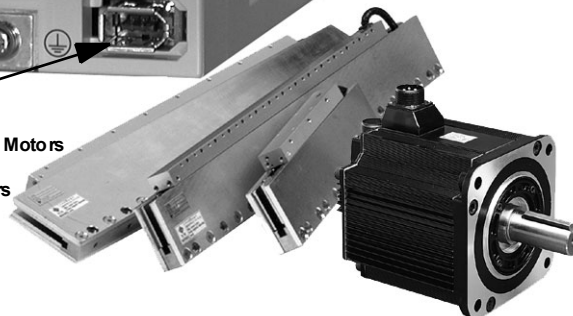
***Encoder Output
Resolution**

***Dynamic Braking
On/Off**

***AC/DC Power**

***Motor Direction**

**Stand-alone
Servo interface
0 ± 10V Analog + I/O**



Product Overview.....	4 - 9
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LEGEND Digital Torque System

SGMAH Servomotors	11 - 26
SGMPH Servomotors	27 - 44
SGMPH Gearmotors.....	45 - 54
SGMGH Servomotors.....	55 - 66
SGMGH Gearmotors	67 - 76
SGMSH Servomotors	77 - 88
SGDG LEGEND Digital Torque Amplifier	89 - 110

Product Overview

Yaskawa provides a full lineup of servomotors for your LEGEND Digital Torque Amplifier. Choose the best drives for your needs and specifications.

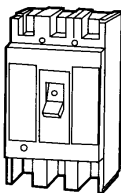
Servomotor									
Series		Description	Applications						
Small-capacity	SGMAH (3000rpm/5000rpm max) 	High Speed Series Large torque required at low inertia.	Chip Mounters	PCB Drilling Machines		Robots			
	SGMPH (3000rpm/5000rpm max) 	Flat Series Short L-length. Good for installation in compact spaces.							
Medium-capacity	SGMGH (1500rpm/3000rpm max) 	General Purpose High speed rotation required without load.			Packaging Machines		Material Handling Equipment		
	SGMSH (3000rpm/5000rpm max) 	High Speed Series High torque required at low inertia.	Chip Mounters	PCB Drilling Machines					

Servomotor		Digital Torque Amplifier Type SGD ^G -***	Page
Peak Torque	Capacity	90 - 253 Vac	
up to 1,010oz • in	30W	01GT	11-26
	50W		
	100W		
	200W	04GT	
	400W		
	750W		
up to 2,027oz • in	100W	01GT	27-54
	200W	04GT	
	400W		
	750W	10GT	
	1500W	15GT	
up to 207in • lb	0.45kW	10GT	55-80
	0.85kW		
	1.3kW	15GT	
up to 130in • lb	1.0kW	10GT	81-92
	1.5kW	15GT	



Single-phase
30W to 1500W (90 to 253V_{ac})

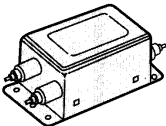
Molded-case Circuit Breaker (MCCB)



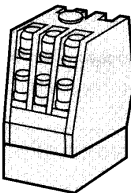
Protects the power line by shutting the circuit OFF when overcurrent is detected.

Noise Filter (optional)

Used to eliminate external noise from the power line.



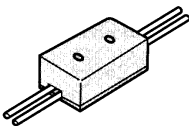
Magnetic Contactor



Turns the servo ON and OFF. Install a surge suppressor on the magnetic contactor.

Holding Brake Power Supply

(customer supplied)
Used only for SGM* servomotor with a holding brake.



Power Supply
Single-phase, 230VAC

Molded-case Circuit Breaker

Noise Filter

Magnetic Contactor

Brake Power Supply

Host Controller

Connect the SGD digital torque amplifier to a Yaskawa host controller or one made by other vendors. (Analog input)



SGDG
Digital Torque Amplifier
Type SGD-01GT
to -04GT

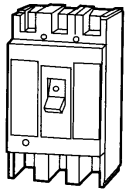
Required for servomotor with a brake.



SGMPH Servomotor

Three-phase 0.5kW to 1.3kW (170 to 253V_{ac})

Molded-case Circuit Breaker (MCCB)

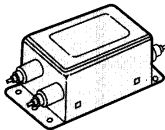


Protects the power line by shutting the circuit OFF when overcurrent is detected.

Molded-case Circuit Breaker

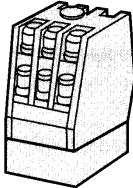
Noise Filter (optional)

Used to eliminate external noise from the power line.



Noise Filter

Magnetic Contactor



Turns the servo ON and OFF. Install a surge suppressor on the magnetic contactor.

Magnetic Contactor

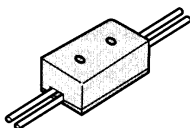
Host Controller

Connect the SGD digital torque amplifier to a Yaskawa host controller or one made by other vendors. (Analog input, pulse train input available)



Holding Brake Power Supply

(customer supplied)
Used for SGM* servomotor with a brake



Brake Power Supply

B1 B2

Regenerative Resistor (option)

SGDG Digital Torque Amplifier
Type SGD-10GT to -15GT



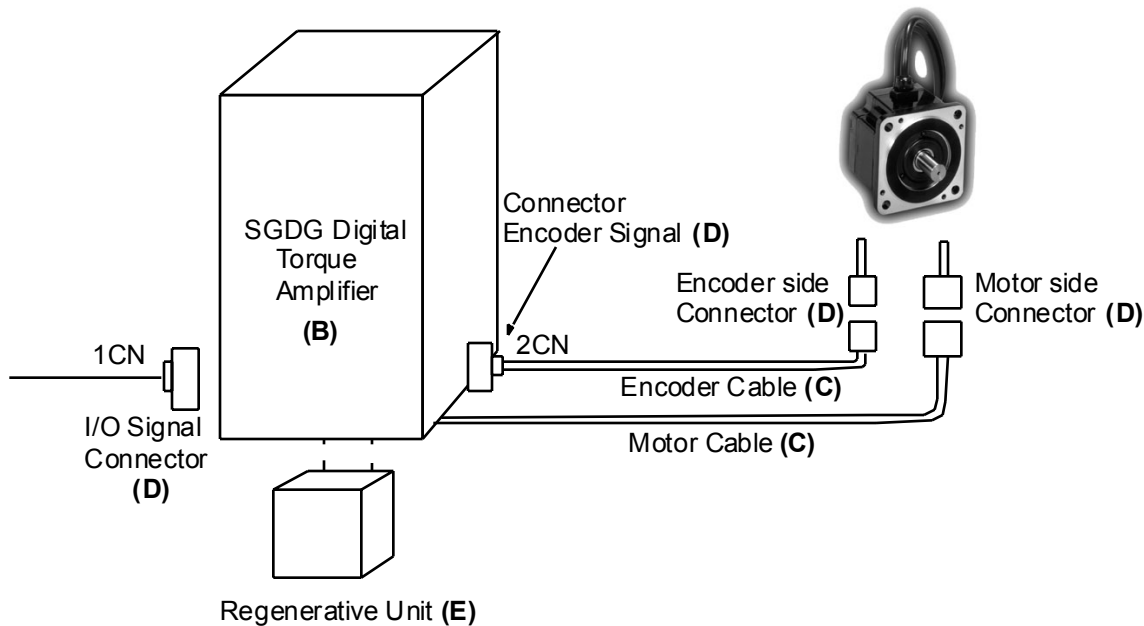
SGMSH Servomotor



NOTES:

Selecting Your LEGEND System

For your convenience, each motor series in this selection guide includes a diagram to help you select and identify the components necessary for your system. Each item is letter-coded and cross-referenced in the option tables on the following pages.



1. First, select the **AC servomotor** suited for your application using the Yaskawa Servomotor Sizing Software or the Sigma Servomotor Data Sheets. Using the tab indicators in this guide, locate the section describing the type of servomotor you selected.
2. Then select a compatible **amplifier** using the LEGEND Digital Torque Amplifier Selection Table in the appropriate servomotor section of this guide.
3. Yaskawa offers **pre-wired power and encoder cables** with correctly matched, high quality connectors attached to permit correct interconnection. Refer to the Pre-wired Cable Selection Table to select the correct cable assembly from the list of standard cable lengths.
4. Solder-type **connectors** without cables are also available. Refer to the appropriate Servomotor Connector Selection Table to select the connector kit to be used with the selected servomotor or encoder (with or without brake).
5. Refer to the Peripheral Device Selection Table to select **peripheral equipment** to be used with the servo amplifier (i.e., regenerative unit, etc.).
6. Specify technical product manual YEA-SIA-LGD-1.2 on your LEGEND AC Servo System purchase order. One manual is available at no charge with each purchase order. The manual can also be downloaded at no charge from Yaskawa's Web site at www.yaskawa.com.

Each table includes a column labeled "Item Class," which classifies the availability of the specified option. Following are descriptions of the codes used:

Stock: Normally 3 to 5 days lead time for most order quantities. 3 to 5 weeks maximum if temporary outages occur. For critical lead times or requirements for larger quantity shipments, check with your Yaskawa inside sales representative.

Limited Stock: Typically, small quantities are available from stock. These items will likely change to stock items as the order demand increases. For critical lead times or requirements for larger quantity shipments, check with your Yaskawa inside sales representative.

Non-Stock: Normal delivery: 12 to 16 weeks.

NOTES:

Super High Power Rate Series SGMAH Servomotors

- With Incremental Encoder

Rated Output: 30W, 50W, 100W,
200W, 400W, 750W

SGMAH
Servomotors



For Additional Information	Page(s)
SGMAH Ratings & Specifications	12
SGMAH Speed/Torque Curves	13
SGMAH Dimensions	14 - 21
SGMAH Selection/Ordering Information	22 - 26
SGDG Ratings & Specifications	95
SGDG Dimensions	96 - 99

Design Features

1. Compact

- Small sized motor
- Five frame sizes (including NEMA 23 and 34 Flanges): up to 1010oz·in peak torque
- Smaller installation space for more compact machine designs.

2. High Speed

- High power rating
- High power is achieved by minimizing the inertia of the motor
- This increases the acceleration/deceleration rate and reduces positioning time
- Maximum rotation speed of 5000rpm
- Increases maximum rotation speed and shortens positioning time
- Rated speed of 3,000rpm

3. Encoder (reduced wiring serial encoder)

- 13-bit (2048 x 4) incremental encoder standard

4. Enclosure

- Totally enclosed, self-cooled IP55 (not including shaft)
- Optional shaft seals are available.

5. Application Emphasis

- Compact, high torque to inertia ratio
- Chip mounters
- PCB drilling machines
- Robots
- Conveyors
- Packaging

6. Low Noise

- Adopting the IGBT power element eliminates irritating “metallic” sounds

7. Certified International Standards

- UL, cUL recognized (File #: E165827), CE compliance

Servomotor Ratings and Specifications

SGMAH Servomotors

Time Rating:	Continuous	Enclosure:	Totally-enclosed, self-cooled	Excitation:	Permanent magnet
Insulation:	Class B	Ambient Temperature:	0 to 40°C	Drive Method:	Direct drive
Vibration:	15µm or less	Ambient Humidity:	20 to 80% (non-condensing)	Mounting:	Flange-mounted
Withstand Voltage:	1500V _{ac}	Rated Rotation Speed:	3000rpm	Applicable Encoder:	13-bit incremental
Insulation Resistance:	10MΩ minimum at 500V _{DC}	Maximum Rotation Speed:	5000rpm		

System Voltage	MOTOR SGMAH-	Rated Output	Rated Torque		Instantaneous Peak Torque		Continuous Rated Current	Maximum Peak Current	Rated Angular Acceleration	Rated Power Rate*
		W (hp)	oz • in	N • m	oz • in	N • m	A _{rms}	A _{rms}	rad/s ²	kW/s
100V _{ac}	A3□	30 (0.04)	13.5	0.095	40.5	0.29	0.66	2.0	57500	3.49
	A5□	50 (0.07)	22.6	0.159	67.7	0.48	0.95	2.9	72300	11.5
	01□	100 (0.13)	45.1	0.318	135	0.96	2.4	7.2	87400	27.8
	02□	200 (0.27)	90.1	0.637	270	1.91	3.0	9.0	60100	38.2
200V _{ac}	A3□	30 (0.04)	13.5	0.095	40.5	0.29	0.44	1.3	57500	5.49
	A5□	50 (0.07)	22.6	0.159	67.7	0.48	0.64	2.0	72300	11.5
	01□	100 (0.13)	45.1	0.318	135	0.96	0.91	2.8	87400	27.8
	02□	200 (0.27)	90.1	0.637	270	1.91	2.1	6.5	60100	38.2
	04□	400 (0.53)	181	1.27	542	3.82	2.8	8.5	73600	93.7
	08□	750 (1.01)	338	2.39	1010	7.1	4.4	13.4	35600	85.1

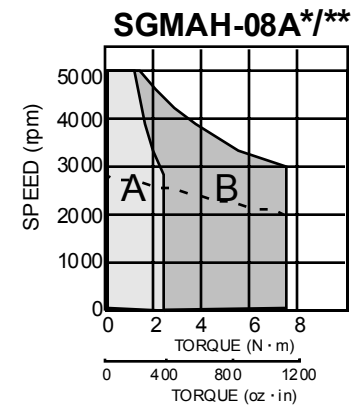
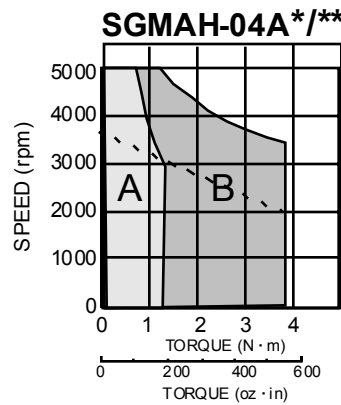
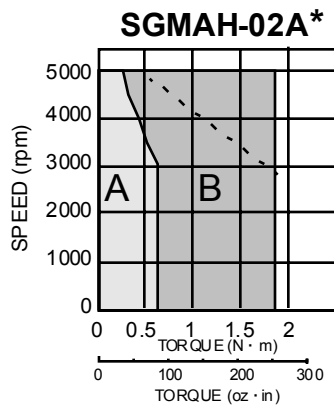
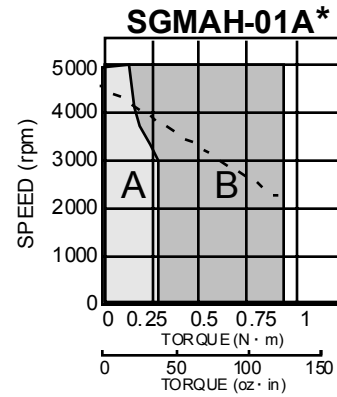
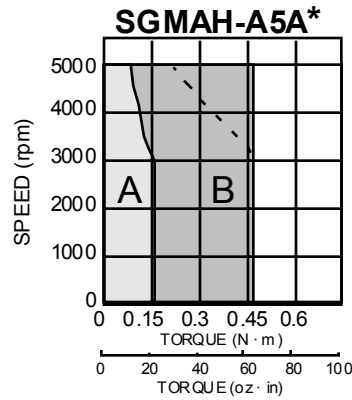
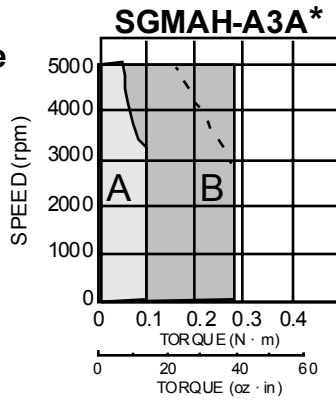
* Values when the servomotor is combined with an SGD digital torque amplifier.

System Voltage	MOTORS SGMAH-	Moment of Inertia				Holding Brake (at 20°C)				Allowable Load Inertia*
		Motor without Brake		Motor with Brake		Capacity	Torque	Coil Resistance	Rated Current	
		oz • in • s ² × 10 ⁻³	kg _f • m ² × 10 ⁻⁴	oz • in • s ² × 10 ⁻³	kg _f • m ² × 10 ⁻⁴	W	N • m	Ω	A	
100V _{ac}	A3□	0.235	0.0166	0.355	0.0251	6	2.0	96	0.25	0.63
	A5□	0.312	0.0220	0.432	0.0305	6	2.0	96	0.25	0.78
	01□	0.515	0.0364	0.635	0.0449	6	3.5	96	0.25	1.20
	02□	1.50	0.106	2.321	0.164	6.5	15	89	0.27	3.69
200V _{ac}	A3□	0.235	0.0166	0.355	0.0251	6	2.0	96	0.25	0.63
	A5□	0.312	0.0220	0.432	0.0305	6	2.0	96	0.25	0.78
	01□	0.515	0.0364	0.635	0.0449	6	3.5	96	0.25	1.20
	02□	1.50	0.106	2.321	0.164	6.5	15	89	0.27	3.69
	04□	2.45	0.173	3.271	0.231	6.5	15	89	0.27	3.82
	08□	9.52	0.671	11.5	0.811	6	25	96	0.25	13.4

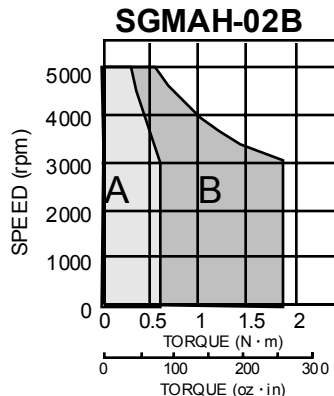
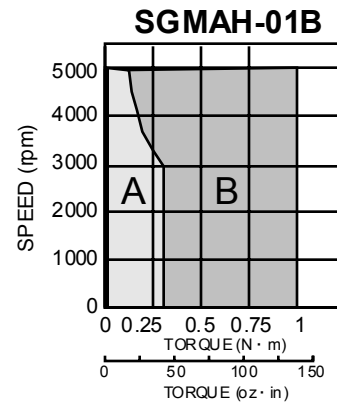
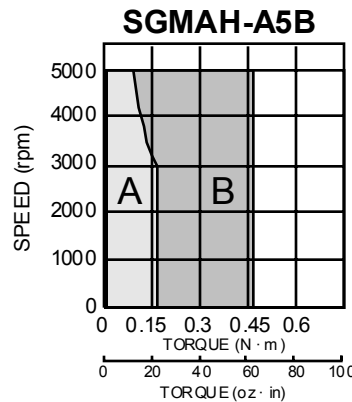
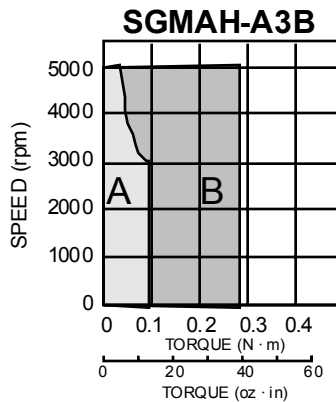
- * Values apply to motors without brake.
- J_L (allowable load inertia) shows the range requiring no exterior regenerative unit. When these values are exceeded, application may be restricted or a regenerative unit may be required.

Speed / Torque Curves

200V
Single Phase



100V



**A : CONTINUOUS
DUTY ZONE**

**B : INTERMITTENT
DUTY ZONE**

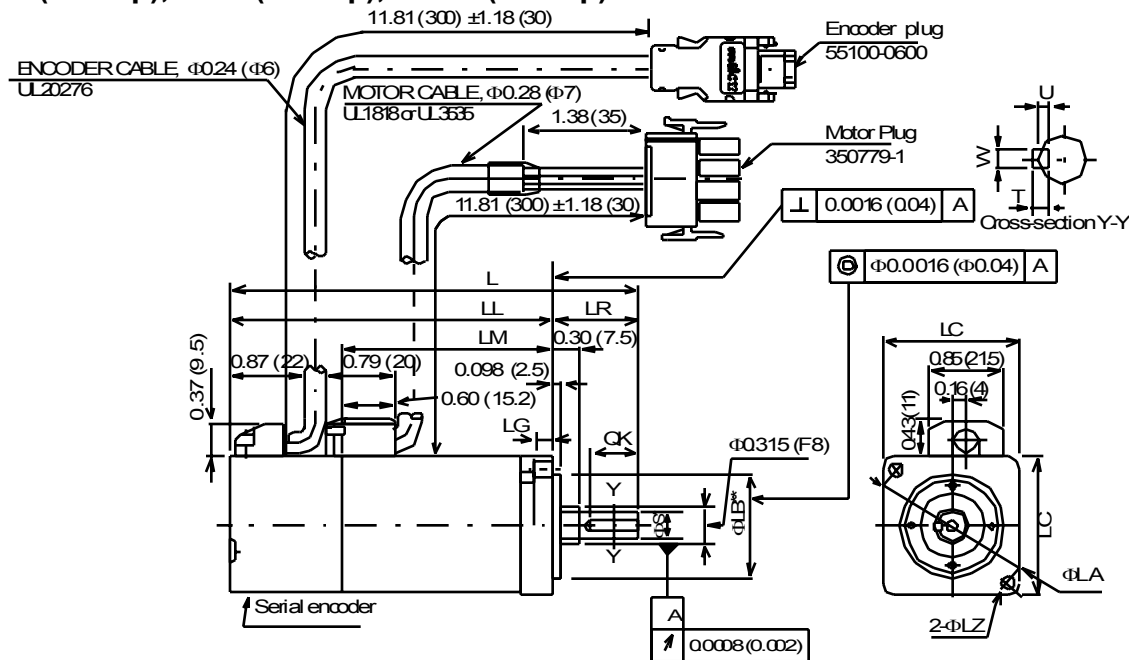
*The peak torque available for these motors with LEGEND AC amps and 100VAC Systems are shown in dashed lines. The Continuous Duty rating curve is the same as shown, except with speed limitations (up to the crossover point with derated Peak Torque Rating (dashed lines)).

**The speed torque shown is applicable for either 200VAC Single-Phase or 200VAC Three-Phase

Dimensions in inches (mm)

(1) 13-Bit Incremental Encoder, without Brake

- 30W (0.04hp), 50W (0.07hp), 100W (0.13hp)

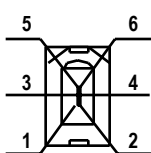


Type SGMAH-†	QK	U	W	T	L	LL	LM	LR	LG	LC	ΦLA	ΦLZ	ΦS*	ΦLB**	Output W (hp)	Approx. Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
A3□□F2□	Without Keyway				3.72 (94.5)	2.74 (69.5)	1.44 (36.5)	0.98 (25)	0.20 (5)	1.57 (40)	1.81 (46)	0.17 (4.3)	0.24 (6)	1.18 (30)	30 (0.04)	0.66 (0.3)	15 (68)	12 (54)
A3□□F4□	0.55 (14)	0.047 (12)	0.079 (2)	0.079 (2)											50 (0.07)	0.88 (0.4)		
A5□□F2□	Without Keyway				4.02 (102)	3.03 (77)	1.73 (44)								100 (0.13)	1.10 (0.5)		
A5□□F4□	0.55 (14)	0.047 (12)	0.079 (2)	0.079 (2)														
01□□F2□	Without Keyway				4.7 (119.5)	3.72 (94.5)	2.42 (61.5)						0.31 (8)					
01□□F4□	0.55 (14)	0.07 (1.8)	0.12 (3)	0.12 (3)														

† Some motor dimensions vary for motors with the optional shaft seal: see p. 18 for details.

Specified Tolerances				
Dimension	*ΦS		**ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.2362	+0.0000-0.0003	1.181	+0.0000-0.0008
	0.3150	+0.0000-0.0004		
mm	6.000	+0.000-0.008	30.000	+0.000-0.021
	8.000	+0.000-0.009		

Encoder Plug



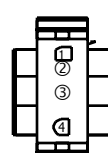
Encoder Connection		
Pin	Output	Wire Color
1	PG 5V	Red
2	PG 0V	Black
3	—	—
4	—	—
5	Data +	Light Blue
6	Data -	White/Light Blue

Plug: 55100-0600 (Molex)

Mating connector:

Socket: 54280-0600

Motor Plug



Motor Connection		
Pin	Output	Wire Color
2	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG (Frame Ground)	Green/Yellow

Plug: 350779-1 (AMP)

Pin: 350561-3 or 350690-3 (Nos. 1 to 3)

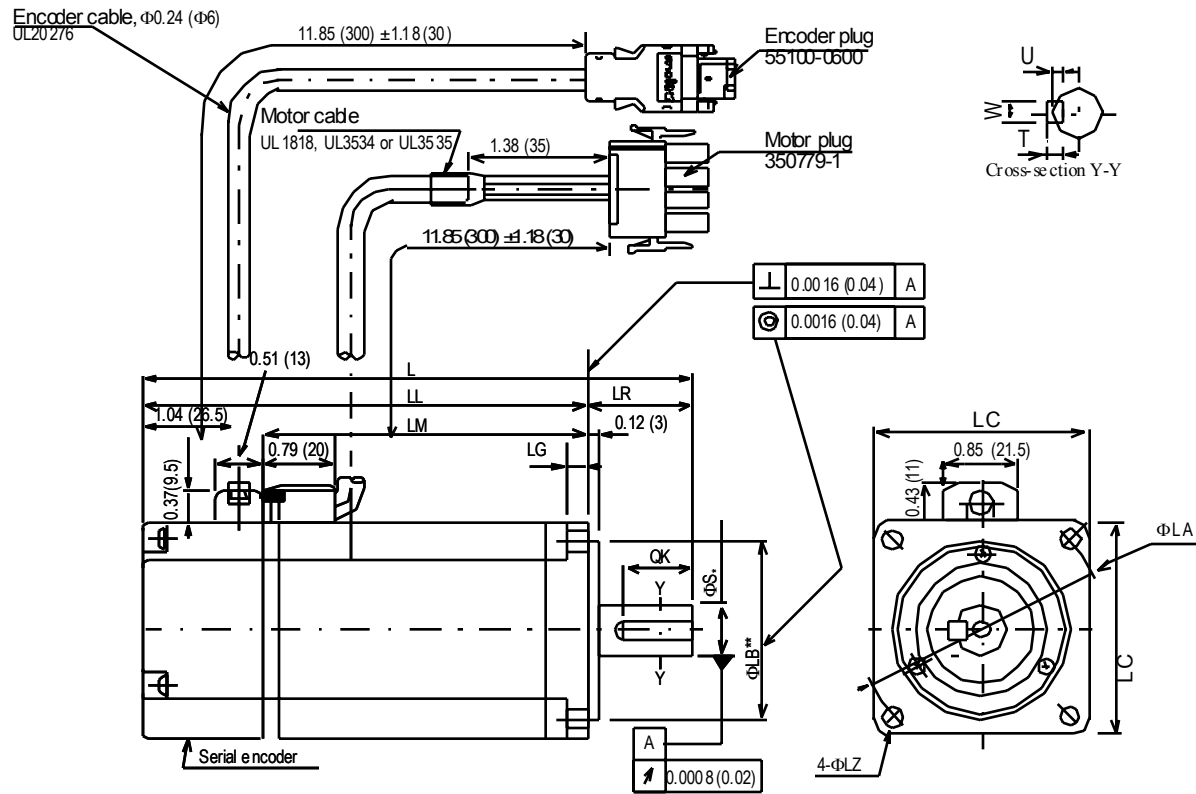
Ground pin: 770210-1 (No 4)

Mating connector:

Cap: 350780-1

Socket: 350570-3 or 350689-3

- 200W (0.27hp), 400W (0.53hp), 750W (1.01hp)



Type SGMAH-	L	LL	LM	LR	LG	LC	ϕLA	ϕLZ	ϕS^*	ϕLB^{**}	QK	U	W	T	Output W (hp)	Approximate Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
02A□F4□	4.98 (126.5)	3.8 (96.5)	2.46 (62.5)	1.18 (30)	0.24 (6)	2.36 (60)	2.76 (70)	0.22 (5.5)	0.55 (14)	1.97 (50)	0.79 (20)	0.12 (3)	0.2 (5)	0.2 (5)	200 (0.27)	2.43 (1.1)	55 (245)	17 (74)
04A□F4□	6.08 (154.5)	4.9 (124.5)	3.56 (90.5)												400 (0.53)	3.75 (1.7)		
08A□F4□	7.28 (185)	5.71 (145)	4.37 (111)	1.57 (40)	0.31 (8)	3.15 (80)	3.54 (90)	0.28 (7)	0.63 (16)	2.76 (70)	1.18 (30)	0.12 (3)	0.2 (5)	0.2 (5)	750 (1.01)	7.5 (3.4)	88 (392)	33 (147)

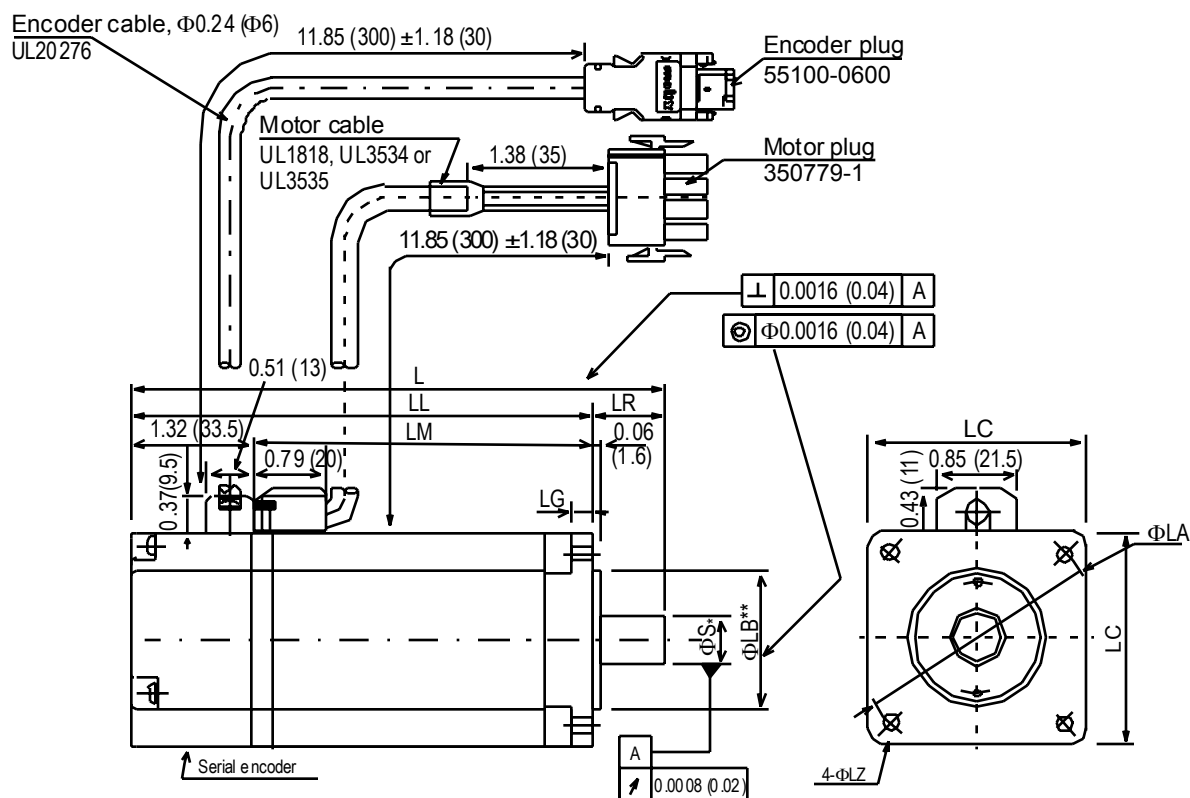
* Please see the following table for dimension tolerances.

Specified Tolerances				
Dimension	* ϕS		** ϕLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.5512	+0.0000-0.0004	1.9685	+0.0000-0.0010
	0.6299	+0.0000-0.0004	2.7559	+0.0000-0.0012
mm	14.000	+0.000-0.011	50.000	+0.000-0.025
	16.000	+0.000-0.011	70.000	+0.000-0.030

LEGEND System Components

SGMAH
Servomotors

- 200W (0.27hp), 400W (0.54hp) with NEMA 23* Flange/Pilot

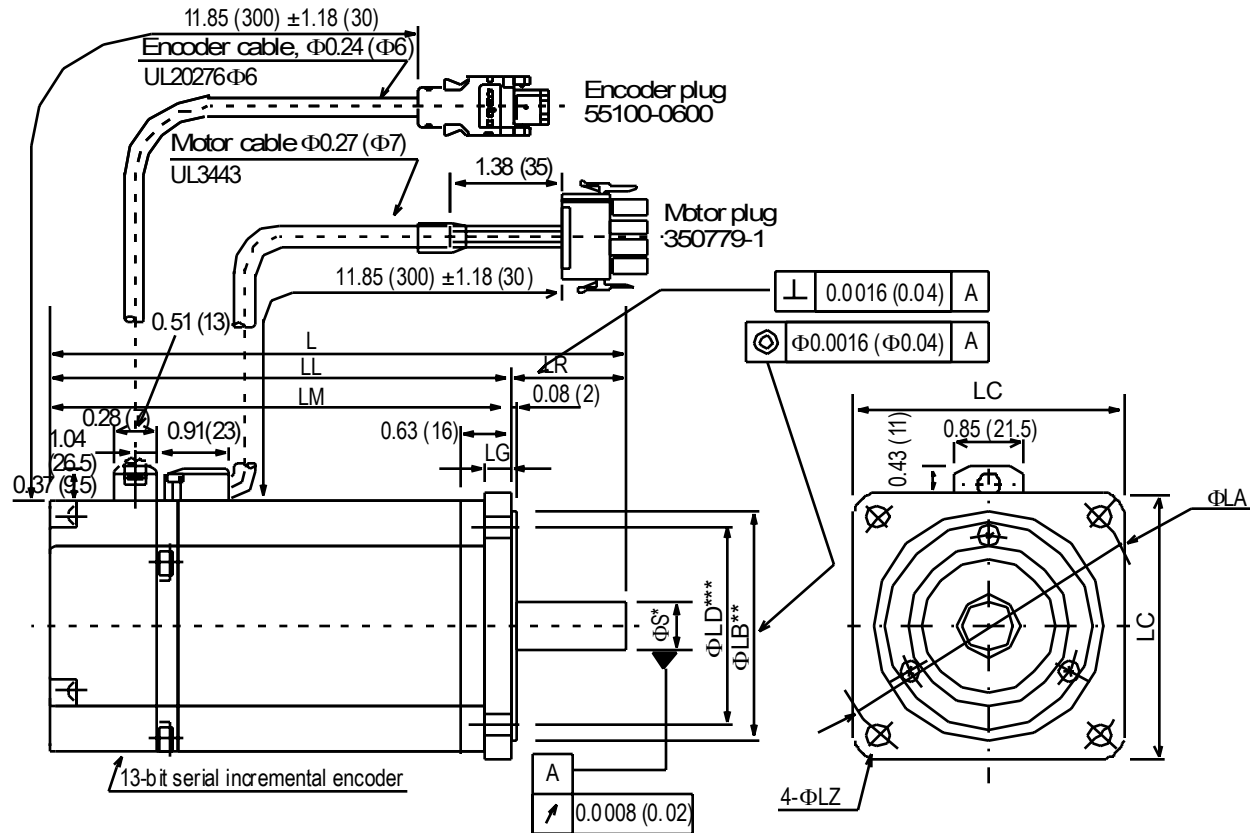


Type SGMAH-	L	LL	LM	LR	LG	LC	ΦLA	ΦLZ	ΦS^*	ΦLB^{**}	Output W (hp)	Approximate Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
02□AN21	4.67 (118.5)	3.9 (98.5)	2.56 (65)	0.79 (20)	0.24 (6)	2.36 (60)	2.63 (66.7)	0.18 (4.5)	0.50 (12.7)	1.5 (38.1)	200 (0.27)	2.43 (1.1)	55 (245)	17 (74)
04□AN21	5.77 (146.5)	5.0 (126.5)	3.66 (93)								400 (0.53)	3.75 (1.7)		

Specified Tolerances				
Dimension	$^*\Phi S$		$^{**}\Phi LB$	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.5000	+0 -0.00043	1.5000	+0.0000 -0.00098
mm	12.7	+0 -0.011	38.1	+0.000 -0.025

* For servo application torques: shaft diameter is 0.5in (12.7mm) rather than 0.25 (6.35mm), as is in typical NEMA 23.

• 750W (1.01hp) with NEMA 34* Flange/Pilot

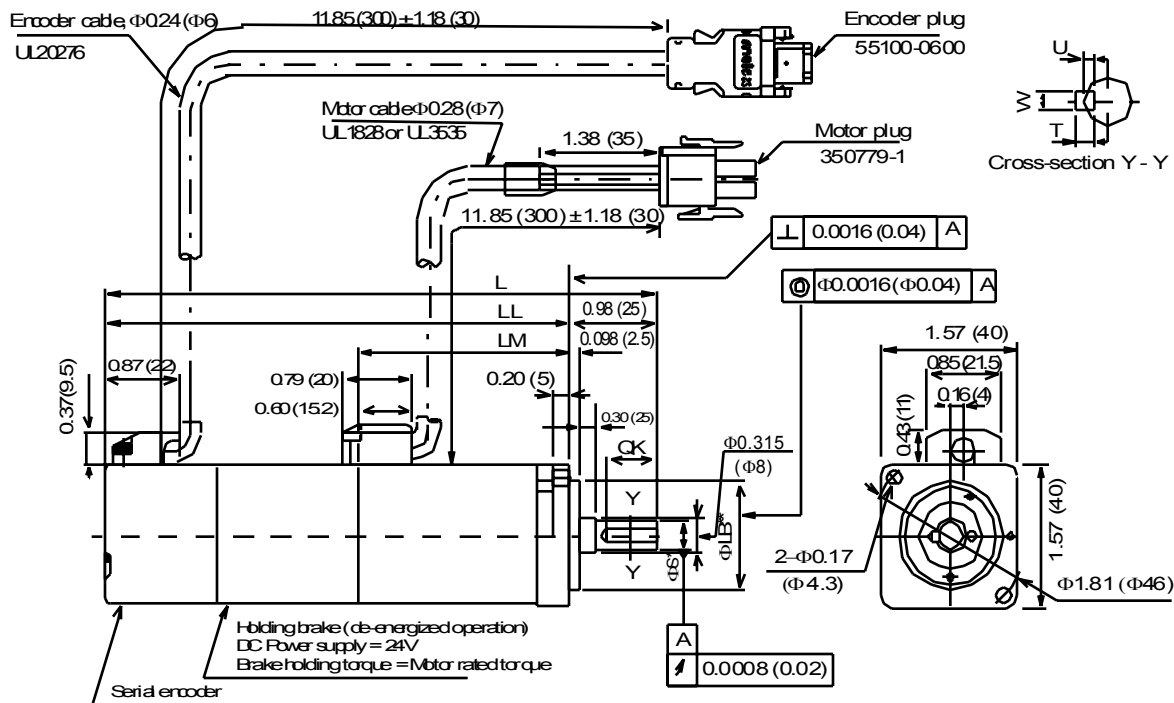


Type SGMAH-	L	LL	LM	LR	LG	LC	ΦLA	ΦLZ	ΦS*	ΦLB**	ΦLD***	Output W (hp)	Approx Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
08AAN21	7.20 (183)	5.75 (146)	4.43 (112.5)	1.46 (37)	0.31 (8)	3.35 (85)	3.87 (98.4)	0.28 (7)	0.63 (16)	2.87 (73)	2.60 (66)	750 (1.01)	7.5 (3.4)	88 (392)	33 (147)

Specified Tolerances						
Dimension	*ΦS		**ΦLB		**ΦLD	
Unit	Diameter	Tolerance	Diameter	Tolerance	Diameter	Tolerance
in	0.625	+0.0000-0.00043	2.874	+0.0000 -0.0012	2.598	+0.0012 -0
mm	15.875	+0.000 -0.011	73.000	?	66.000	+0.003 -0

* For servo application torques: shaft diameter is 0.0.625in (15.875mm) rather than 0.375 (9.525mm), as is in typical NEMA 34.

(2) 13-Bit Incremental Encoder, with Brake

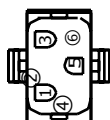


Type SGMAH-	U	W	T	L	LL	LM	ΦS*	ΦLB**	QK	Output W (hp)	Approximate Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
A3□□F2C	0.047 (1.2)	0.079 (2)	0.12 (3)	4.96 (126)	3.98 (101)	1.44 (36.5)	0.24 (6)	1.18 (30)	0.55 (14)	30 (0.04)	1.32 (0.6)	15 (68)	12 (54)
A3□□F4C				5.26 (133.5)	4.27 (108.5)	1.73 (44.0)				50 (0.07)	1.54 (0.7)		
A5□□F2C				6.3 (160)	5.31 (135)	2.42 (61.5)			0.55 (14)	100 (0.13)	1.76 (0.8)		
A5□□F4C	0.07 (1.8)	0.12 (3)	0.12 (3)	6.3 (160)	5.31 (135)	2.42 (61.5)	0.31 (8)						

Specified Tolerances				
Dimension	* ΦS		** ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.2362	+0.0000-0.0003	1.181	+0.0000 -0.0008
	0.3150	+0.0000-0.0004		
mm	6.000	+0.000 -0.008	30.000	+0.000 -0.021
	8.000	+0.000 -0.009		

Connector Specifications:

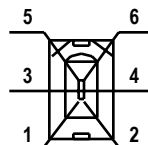
Motor Plug



Motor Connection		
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG (Frame Ground)	Green/Yellow
5	Brake Terminal	Red
6	Brake Terminal	Black

Plug: 350715-1 (AMP)
Pin: 350561-3 or 350690-3 (except No. 4)
Ground pin: 770210-1 (No. 4)
Mating connector:
Cap: 350781-1
Socket: 350570-3 or 350689-3

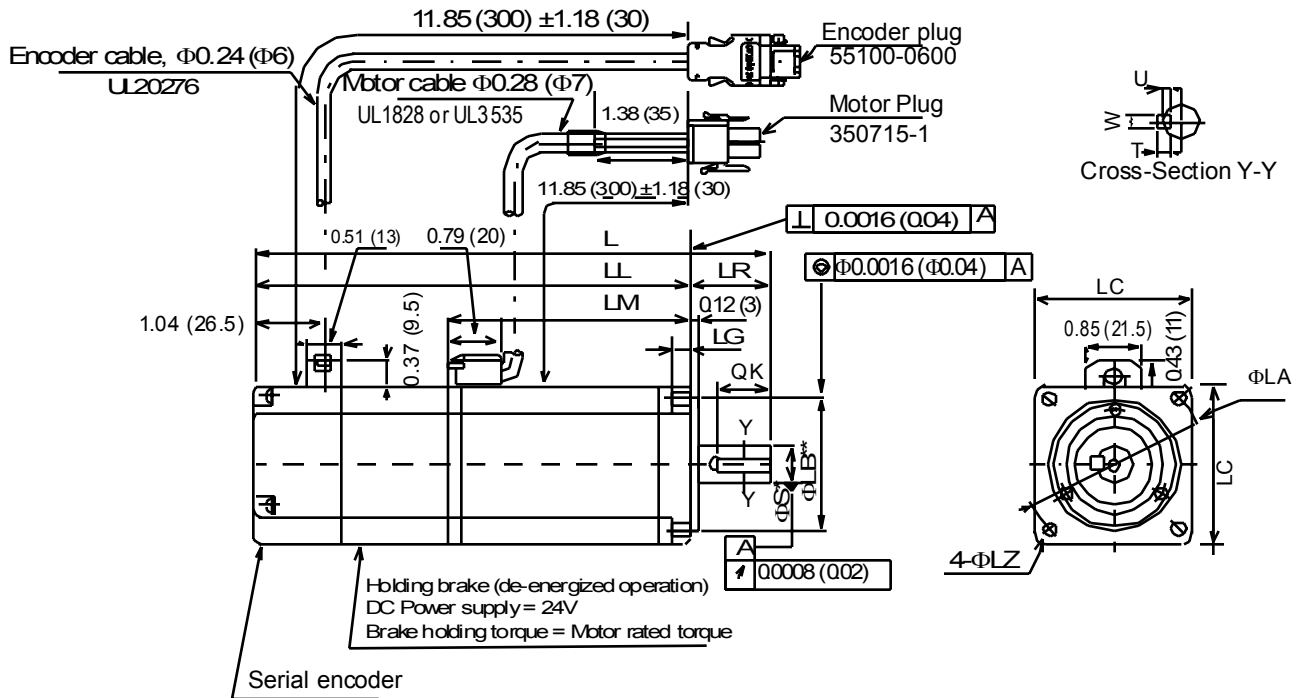
Encoder Plug



Encoder Connection		
1	PG 5V	Red
2	PG 0V	Black
3	—	—
4	—	—
5	Data +	Light Blue
6	Data -	White/Light Blue

Plug: 55100-0600 (Molex)
Mating connector:
Socket: 54280-0600

- 200W (0.27hp), 300W (0.40hp), 400W (0.53hp), 750W (1.01hp)



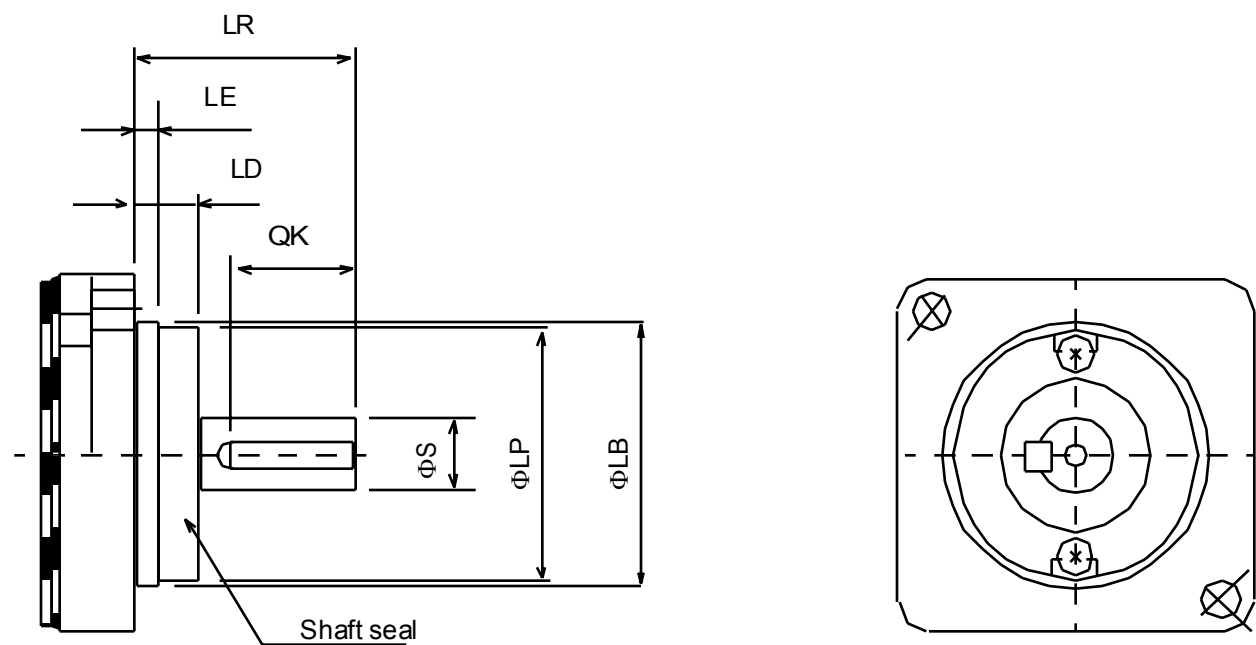
Type SGMAH-	U	W	T	L	LL	LM	LR	LG	LC	ΦLA	ΦLZ	ΦS^*	ΦLB^{**}	QK	Output W (hp)	Approximate Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
02A□F4C	0.12 (3)	0.2 (5)		6.54 (166)	5.35 (136)	2.46 (62.5)	1.18 (30)	0.24 (6)	2.36 (60)	2.76 (70)	0.22 (5.5)	0.55 (14)	1.97 (50)	0.79 (20)	200 (0.27)	3.53 (1.6)	55 (245)	17 (74)
04A□F4C				7.64 (194)	6.46 (164)	3.56 (90.5)									400 (0.53)	4.85 (2.2)		
08A□F4C				9.04 (229.5)	7.46 (189.5)	4.37 (111)	1.57 (40)	0.31 (8)	3.15 (80)	3.54 (90)	0.28 (7)	0.64 (16)	2.76 (70)	1.18 (30)	750 (1.01)	9.48 (4.3)	88 (392)	33 (147)

Specified Tolerances				
Dimension	$^*\Phi S$		$^{**}\Phi LB$	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.5512	+0.0000-0.0004	1.9685	+0 -0.0010
	0.6299	+0.0000-0.0004	2.7558	+0 -0.0012
mm	14.000	+0.000 -0.011	50.000	+0 -0.025
	16.000	+0.000 -0.011	70.00	+0 -0.03

Dimension Modifications for Motors with Optional Shaft Seal

SGMAH
Servomotors

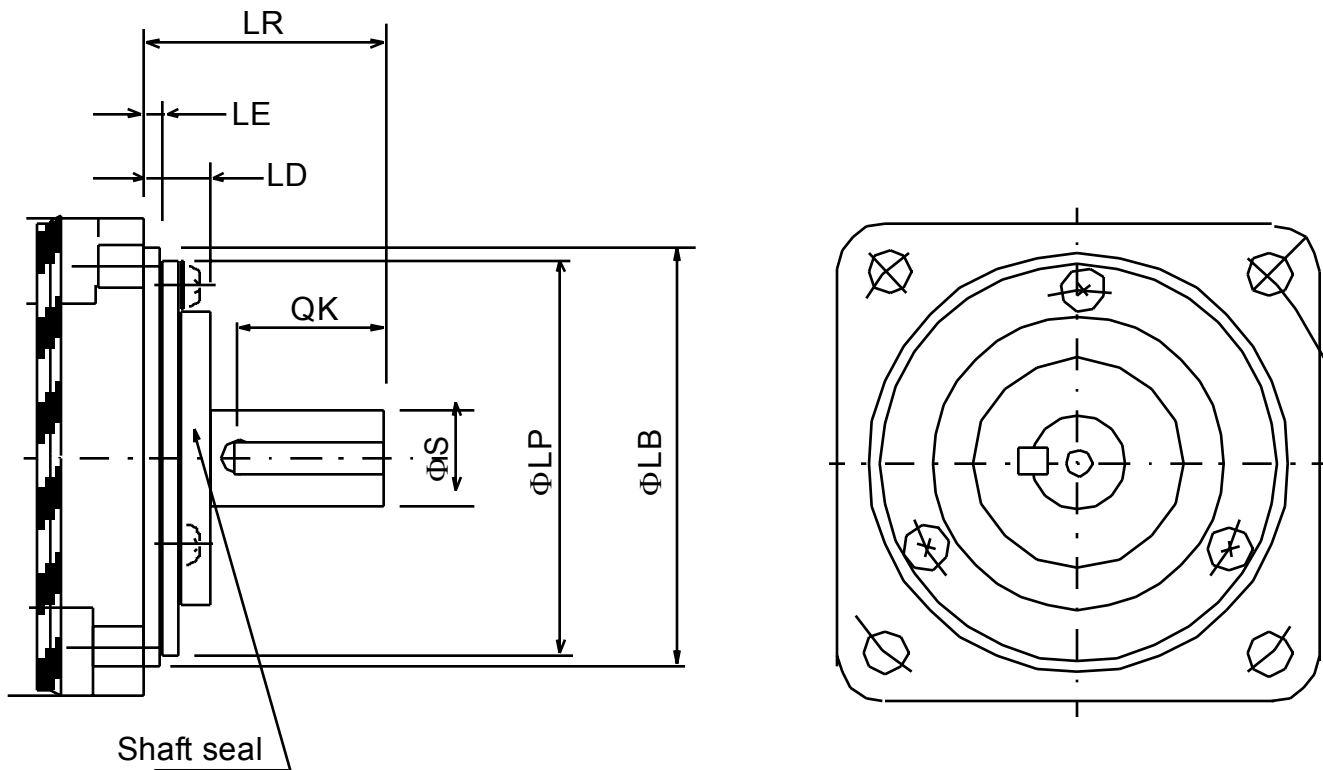
- 30W (0.04hp), 50W (0.07hp), 100W (0.13hp)



Type SGMAH-	QK	ΦLB*	ΦS*	LE	LR	LD	ΦLP
A3	0.55 (14)	1.18 (30)	0.236 (6)	0.10 (2.5)	0.98 (25)	0.30 (7.5)	1.14 (28)
A5							
01							

* Tolerances for diameters LB and S are the same as those for motors without shaft seals.

- 200W (0.27hp), 400W (0.53hp), 750W (1.01hp)



Type SGMAH-	QK	ϕLB^*	ϕS^*	LE	LR	LD	ϕLP
02	0.55 (14)	1.97 (50)	0.55 (14)	0.12 (3)	1.18 (30)	0.39 (10)	1.89 (48)
04							
08	0.98 (25)	2.76 (70)	0.63 (16)		1.57 (40)	0.43 (11)	2.60 (66)

* Tolerances for diameters LB and S are the same as those for motors without shaft seals.

Torque Reduction Factor for SGMAH motors equipped with a shaft seal:

Servo Motor Model	A3	A5	01	02	04	08
Torque Reduction Factor	70%	80%	90%	90%	95%	95%

For example: The SGMAH-A3 continuous and peak torque rating should be reduced to 70% of the listed catalog specification.

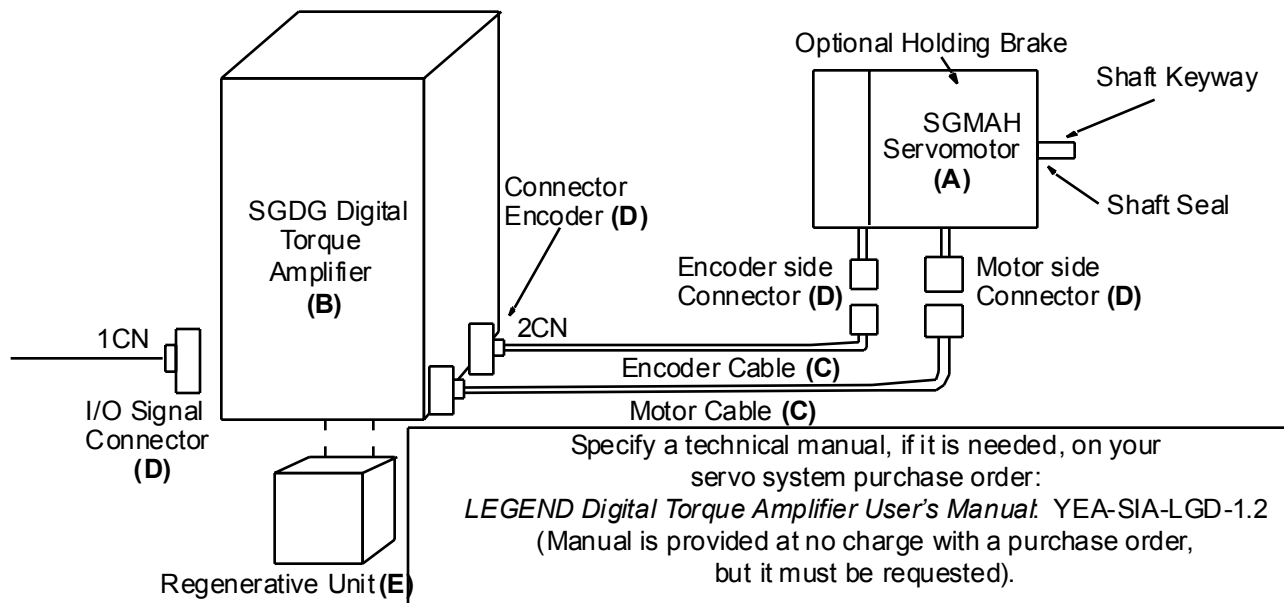
To specify a motor with a shaft seal, refer to the motor part number explanation on the following page.

Selecting Your SGMAH LEGEND System

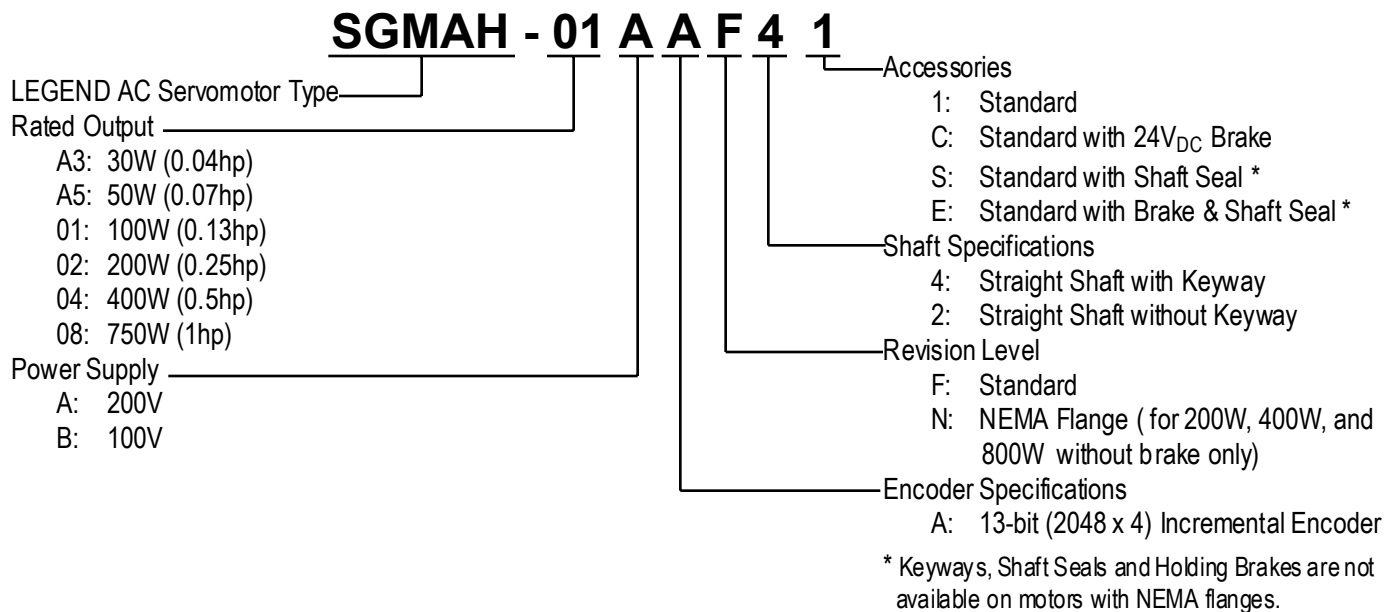
First, select the AC servomotor suited for your application using SigmaSize: the Yaskawa servomotor sizing software, available at no charge. (Request SigmaSize software via e-mail, at: literature@yaskawa.com).

Use the diagram below to locate and identify the components of your system. Each item is letter-coded and cross-referenced in the option tables on the following pages.

System Configuration



Model Number Designation



Servomotor & Amplifier Selection

Use the table below to select the recommended SGMAH LEGEND AC servomotor and amplifier.

Motors Used with 13-bit Incremental Encoders (5000rpm* Maximum)					Amplifier			
Description System Voltage Construction	Peak Torque* (oz • in)	Rated Torque* (oz • in)	Motor Inertia (oz • in • s ² ×10 ⁻³)	Motor MODEL NUMBER (A)	Amplifier MODEL NUMBER (B)*		Motor & Amplifier Item Class	
					Single-Phase SGDG	3-Phase SGDG-		
200V Straight Shaft with- out Keyway	40.5	13.5	0.235	SGMAH-A3AAF21	01GT	—	Stock	
			0.355	SGMAH-A3AAF2C		—		
	67.7	22.6	0.312	SGMAH-A5AAF21		—		
			0.432	SGMAH-A5AAF2C		—		
	135	45.1	0.515	SGMAH-01AAF21		—	Stock	
			0.635	SGMAH-01AAF2C		—		
0.515			SGMAH-01AAF41	—				
0.635			SGMAH-01AAF4C	—				
200V Straight Shaft with Keyway	270	90.1	1.50	SGMAH-02AAF41	04GT	—		
			2.321	SGMAH-02AAF4C		—		
	542	181	2.45	SGMAH-04AAF41	10GT	—		
			3.271	SGMAH-04AAF4C		—		
	1010	338	9.52	SGMAH-08AAF41	10GT	—		
			11.5	SGMAH-08AAF4C		—		
200V Straight Shaft without Keyway NEMA Flange	135	45.1	0.515	SGMAH-01AAF21**	01GT	—		
			0.635	SGMAH-01AAF2C**	01GT	—		
	270	90.1	1.50	SGMAH-02AAN21***	04GT	—		
	542	181	2.45	SGMAH-04AAN21***	04GT	10GT		
	1010*	338*	9.52	SGMAH-08AAN21****	10GT*	10GT		
100V Straight Shaft without Keyway	40.5	13.5	0.235	SGMAH-A3BAF21	01GT	—	Stock	
			0.355	SGMAH-A3BAF2C		—		
	67.7	22.6	0.312	SGMAH-A5BAF21		—		
			0.432	SGMAH-A5BAF2C		—		
	135	45.1	0.515	SGMAH-01BAF21	04GT	—		
			0.635	SGMAH-01BAF2C		—		
0.515			SGMAH-01BAF41	—				
0.635			SGMAH-01BAF4C	—				
100V Straight Shaft with Keyway	270	90.1	1.50	SGMAH-02BAF41		—	Stock	
			2.321	SGMAH-02BAF4C		—		
100V Straight Shaft without Keyway NEMA Flange	135	45.1	0.515	SGMAH-01BAF21**		—	—	Stock
			0.635	SGMAH-01BAF2C**				
	270	90.1	1.50	SGMAH-02BAAN21***				

Notes: 24V_{DC} brakes for SGMAH AC servomotors are standard. Contact a local source for 24V_{DC} power supplies.

Motor power and encoder cables are factory pre-wired with approximately 13" lead length with amplifier mating connectors.

Use the tables on the following pages to specify mating connectors or pre-wired cables available in various lengths.

For technical information, request Yaskawa User's Manual number YEA-SIA-LGD-1.2.

* Reference the previously listed speed/torque (force) curves for performance with the applied system voltage and phase(s). For more detailed SGD amplifier specifications and dimensions, refer to pages 95 to 99.

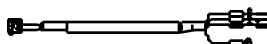
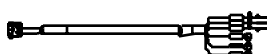
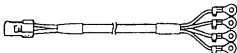
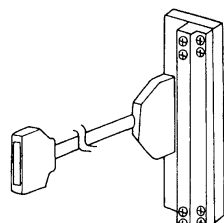
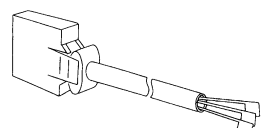
** Use NEMA 23 adapter flange (see peripheral device selection)

*** NEMA 23 flange and pilot (see SGMAH Dimension)

**** NEMA 34 flange and pilot (see SGMAH Dimension)

Pre-wired Cable Selection

Use the table below to select pre-wired cables for your SGMAH AC servomotor.

Cable Description (C)		Motor Size (kW)	Part Number*	Comments	Item Class	
Power Cable without Brake		All	JZSP-CMM00-□□(A)	These cables are available in five lengths. Use two digits in the part number's last place: 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	Stock**	
Power Cable with Brake			JZSP-CMM10-□□(A)			
Shielded Power Cable without Brake***			BAHCE-□□(A)		Limited Stock	
Shielded Power Cable with Brake***			BAHBCE-□□(A)			
Encoder Cable	—		JZSP-CMP00-□□(A)	These cables are available in any length. For example, to order one FR-RMCT-SB cable, 16m long, specify: quantity: 16 part no.: FR-RMCT-SB	Stock	
Encoder Cable (for applications up to 20m) Only for Solder Connections			FR-RMCT-SB			
Encoder Cable (for applications from >20 to <50m maximum) Only for Solder Connections			UL20276-SB			
Input/Output 1CN Cable & Transition Terminal Block			JUSP-TA36P	35mm DIN rail mountable; the cable length is 0.5 meters.	Stock	
Input/Output 1CN Cable with Pigtail Leads			CKI-SGDG-□□	Use the following key to specify required cable length (last digit of part number): 01: 1m (standard) 02: 2m 03: 3m		

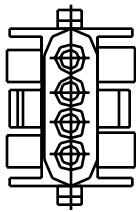
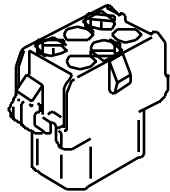
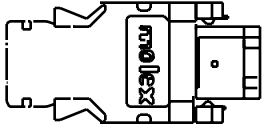
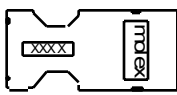
* The "(A)" at the end of the cable part number indicates the revision level. Revision level may be subject to change prior to this catalog reprinting.

** Standard cable lengths are Stock items; non-standard cable lengths are Limited Stock items.

*** Use these power cables where it is important to meet CE (EMC) requirements.

Connector Selection

Use the table below to select mating connectors or kits for your SGMAH AC servomotor.

Connector Description (D)		Motor Size (kW)	Part Number	Comments	Item Class
Motor Power Mating Connector (without Brake)		All	JZSP-CMM9-1	These connector kits include pin and socket. Requires use of Amp Crimp Tool (90548-1). (See below).	Stock
Motor Power Mating Connector (with Brake)			JZSP-CMM9-2		
Amp Crimp Tool	—		90548-1	Crimp tool for Motor Power Connector (JZSP-CMM9-□)	Limited Stock
2CN Amplifier Mating Connector			JZSP-CMP9-1	—	Stock
Motor Encoder Mating Connector			JZSP-CMP9-2	—	
1CN Mating Connector			DP9420007	for SGD8 I/O 36-pin	

Peripheral Device Selection

Use the table below to select peripheral devices for your SGMAH AC servomotor.

Component Description (E)		Part Number	Comments	Item Class
External Regenerative Unit*	50Ω, 60W for 100 W and 400W amps.	JUSP-RG08D	This is a general purpose regenerative unit.	Stock
	25Ω 300W for 400W* and 1.5kW amps	RH500N25_ohmK	Caution: Proper setup is necessary to avoid equipment damage.	
NEMA Flange Adapter		SGM-N23	For 30, 50, and 100W SGMAH motors only. Complies to NEMA 23 mounting standard.	

Note Refer to the SGDg digital torque amplifier section of this catalog for additional specifications, and the *LEGEND Digital Torque Amplifier User's Manual* (YEA-SIA-LGD-1.2) for proper resistor sizing guidelines.

* For SGDg-04 applications requiring additional regenerative capacity beyond the JUISP-RG08D capacity, specify SGDg-04GTy22P and QTY 2 of RH500N25_ohmK. Resistors must be used in series to provide 600W (before derating) of increased capacity.

Flat Series

SGMPH Servomotors - With Incremental Encoder

Rated Output: 100W, 200W, 400W,
750W, 1500W



For Additional Information	Page(s)
SGMPH Ratings & Specifications	28
SGMPH Speed/Torque Curves	29
SGMPH Dimensions	30 - 38
SGMPH Selection/Ordering Information	39 - 43
SGDG Ratings & Specifications	95
SGDG Dimensions	96 - 99

Design Features

1. Compact

- The length is about 1/2 of conventional motors
- Enhanced withstand load since motor output shaft bearing size is upgraded
- Up to 5000rpm maximum speed

2. Enhanced Environmental Resistance

- Water resistance, IP67 standard (not including the shaft)
- Optional shaft seal available
- Reinforced lead-out cable access

3. Encoder (reduced wiring serial encoder)

- 13-bit (2,048ppr x 4) incremental encoder standard

4. Application Emphasis

- Chip mounters
- PCB drilling machines
- Robots
- Conveyor
- Packaging

5. Certified International Standards

- UL, cUL recognized, (File #: E165827), CE compliance

Servomotor Ratings and Specifications

Time Rating:	Continuous	Enclosure:	Totally-enclosed, self-cooled	Excitation:	Permanent magnet
Insulation:	Class B	Ambient Temperature:	0 to 40°C	Drive Method:	Direct drive
Vibration:	15 μ m or less	Ambient Humidity:	20 to 80% (non-condensing)	Mounting:	Flange-mounted
Withstand Voltage:	1500V _{ac}	Rated Rotation Speed:	3000rpm	Applicable Encoder:	13-bit Incremental
Insulation Resistance:	500V _{DC} 10M Ω or more	Maximum Rotation Speed:	5000rpm		

Applied Voltage	MOTORS: SGMPH-	Rated Output	Rated Torque		Instantaneous Peak Torque		Continuous Rated Current*	Maximum Peak Current*	Rated Angular Acceleration	Rated Power Rate
		W (hp)	oz · in	N · m	oz · in	N · m	A _{rms}	A _{rms}	rad/s ²	kW/s
200V _{ac}	01□	100 (0.13)	45.1	0.318	135	0.96	0.89	2.8	64800	20.4
	02□	200 (0.27)	90.1	0.637	270	1.91	2.0	6.0	33000	21.0
	04□	400 (0.54)	180	1.27	542	3.82	2.6	8.0	38500	49.0
	08□	750 (1.01)	338	2.39	1010	7.1	4.1	13.9	11400	27.0
	15□	1500 (2.01)	676	4.77	2027	14.3	7.5	23.0	11900	56.7
100V _{ac}	01□	100 (0.13)	45.1	0.318	135	0.96	2.2	7.1	64800	20.4
	02□	200 (0.27)	90.1	0.637	270	1.91	2.7	8.4	33000	21.0

* Values are calculated when the servomotor is combined with an SGD servo amplifier.

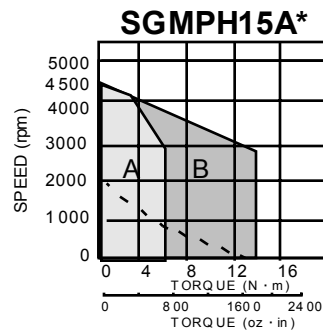
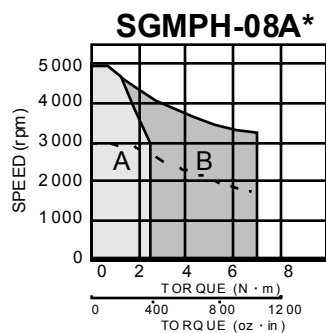
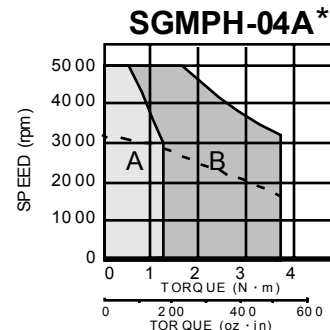
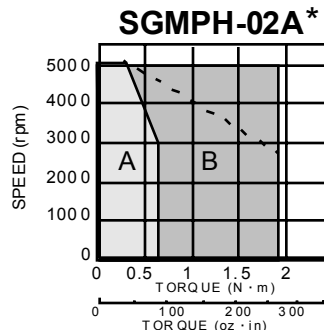
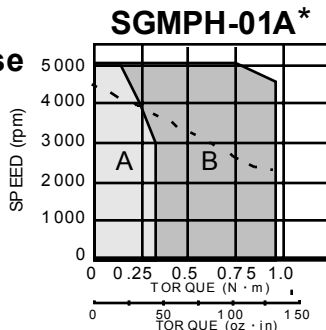
System Voltage	MOTORS SGMPH-	Moment of Inertia				Holding Brake (at 20°C)			Allowable Load Inertia *
		Motor without Brake		Motor with Brake		Capacity	Coil Resistance	Rated Current	
		oz · in · s ² × 10 ⁻³	kg _f · m ² × 10 ⁻⁴	oz · in · s ² × 10 ⁻³	kg _f · m ² × 10 ⁻⁴	W	Ω	A	
200V _{ac}	01□	0.695	0.0491	1.106	0.0781	6	96	0.25	1.20
	02□	2.73	0.193	4.274	0.302	5	115	0.21	3.69
	04□	4.69	0.331	6.234	0.44	7.6	76	0.32	3.82
	08□	29.7	2.10	42.09	2.975	7.5	77	0.31	13.4
	15□	56.9	4.02	69.29	4.895	10	58	0.42	24.1
100V _{ac}	01□	0.695	0.0491	1.106	0.0781	6	96	0.25	1.20
	02□	2.73	0.193	4.274	0.302	5	115	0.21	3.69

* Allowable load inertia (J_L) shows the range requiring no exterior regenerative unit. When these values are exceeded, application may be restricted or a regenerative unit may be required. Values are calculated when the servomotor is combined with an SGD servo amplifier.

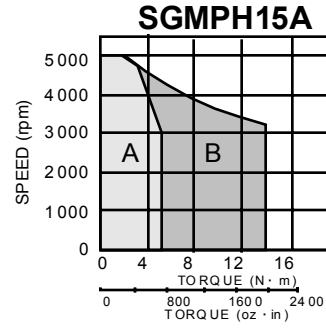
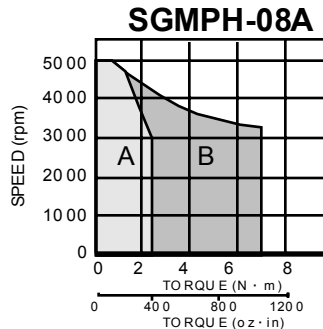
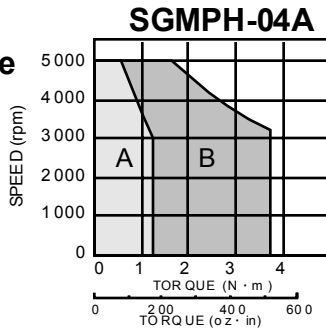
MOTORS SGMPH-	Servomotor Capacity W	Holding Brake	
		Holding Torque	
		oz-in	kg _f · cm
01□	100	69.5	5.0
02□	200	139	10
04□	400	279	20
08□	750	514	37
15□	1500	1015	73

Speed / Torque Curves

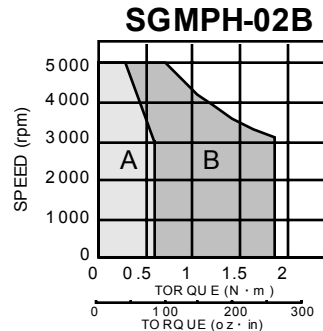
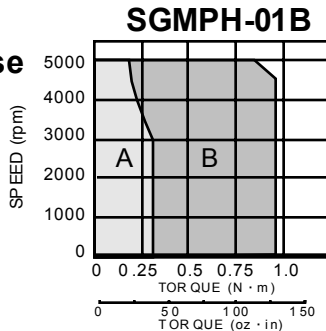
200V Single-Phase



200V Three-Phase



100V Single-Phase

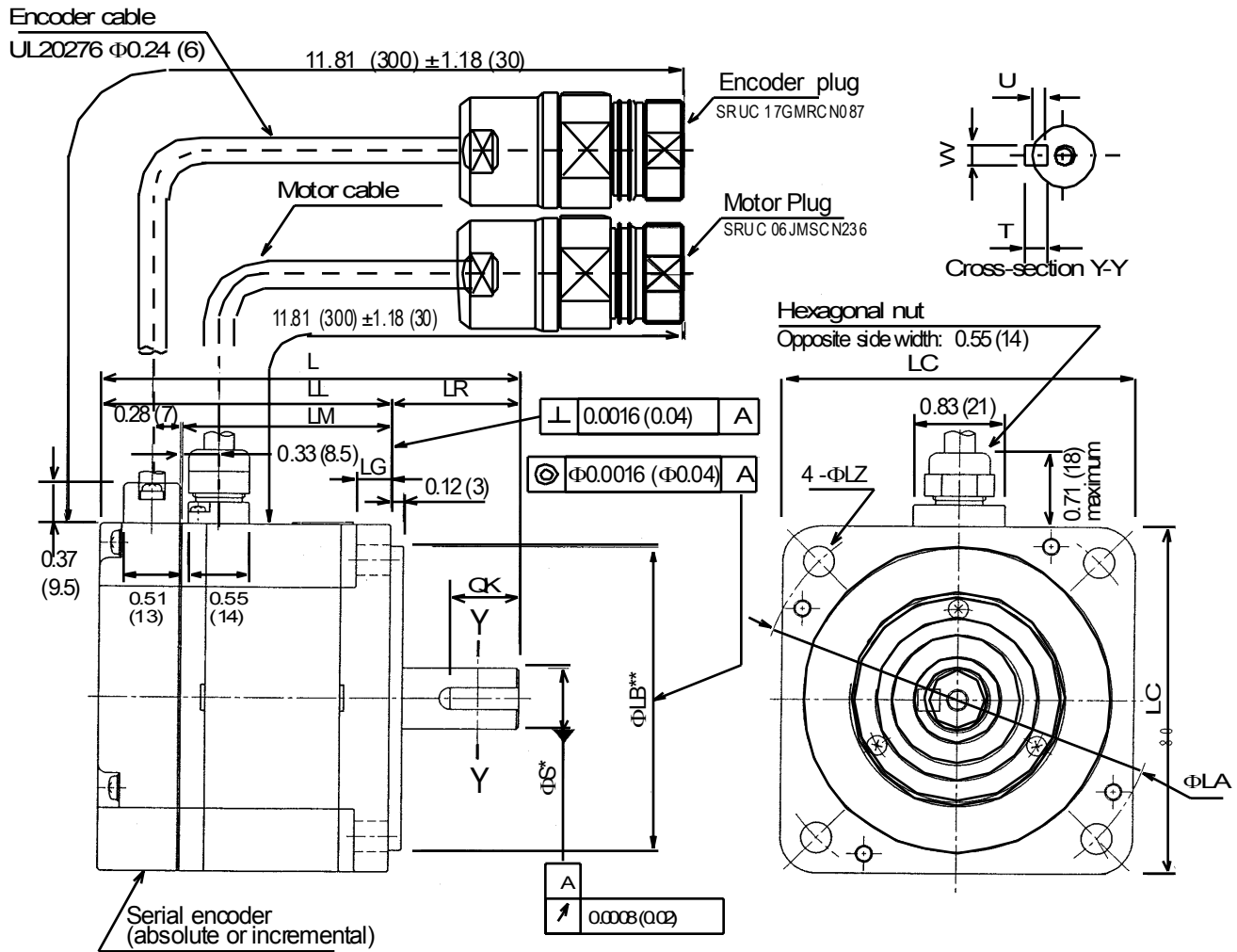


* The peak torque available for these motors with LEGEND AC amps and 100VAC Systems are shown in dashed lines. The Continuous Duty rating curve is the same as shown, except with speed limitations (up to the crossover point with derated Peak Torque Rating (dashed lines)).

**A : CONTINUOUS
DUTY ZONE**

**B : INTERMITTENT
DUTY ZONE**

- 200W (0.27hp), 400W (0.53hp)



SGMPH
Servomotors

Type SGMPH-	L	LL	LM	LR	LG	LC	Φ LA	Φ LZ	Φ S*	Φ LB**	Key				Voltage V	Output W (hp)	Torque in·lb (N·m)	Time Rating	Rated Speed (rpm)	Approx Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
											QK	U	W	T								
02□□E41 D	3.82 (97)	2.64 (67)	1.89 (48.1)	1.18 (30)	0.31 (8)	3.15 (80)	3.54 (90)	0.28 (7)	0.551 (14)	2.76 (70)	0.63 (16)	0.12 (3)	0.20 (5)	0.20 (5)	200	200 (0.27)	5.64 (0.637)	Continuous	3000	3.09 (1.4)	55.1 (245)	15.4 (68)
04□□E41 D	4.61 (117)	3.46 (87)	2.68 (68.1)													400 (0.53)	11.2 (1.27)			4.63 (2.1)		

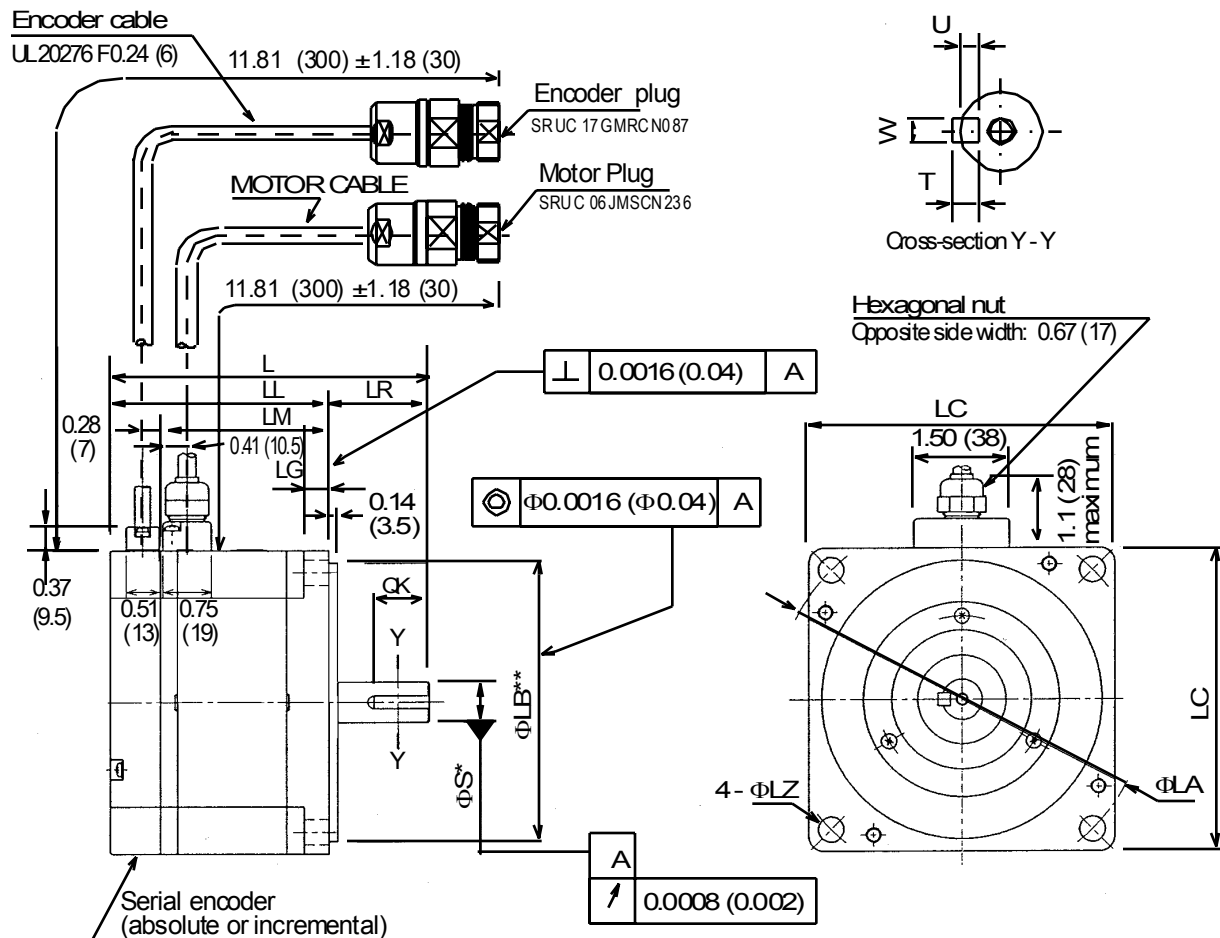
Note: The quoted allowable radial load is the value at a position 0.98in (25mm) from the mounting surface.

Specified Tolerances				
Dimension	* Φ S		** Φ LB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.5512	+0.0000-0.0004	2.7559	+0.0000 -0.0012
mm	14.000	+0.000 -0.011	70.000	+0.000 -0.030

Interconnection Connector Specifications: See page 25.

LEGEND System Components

• 750W (1.01hp)



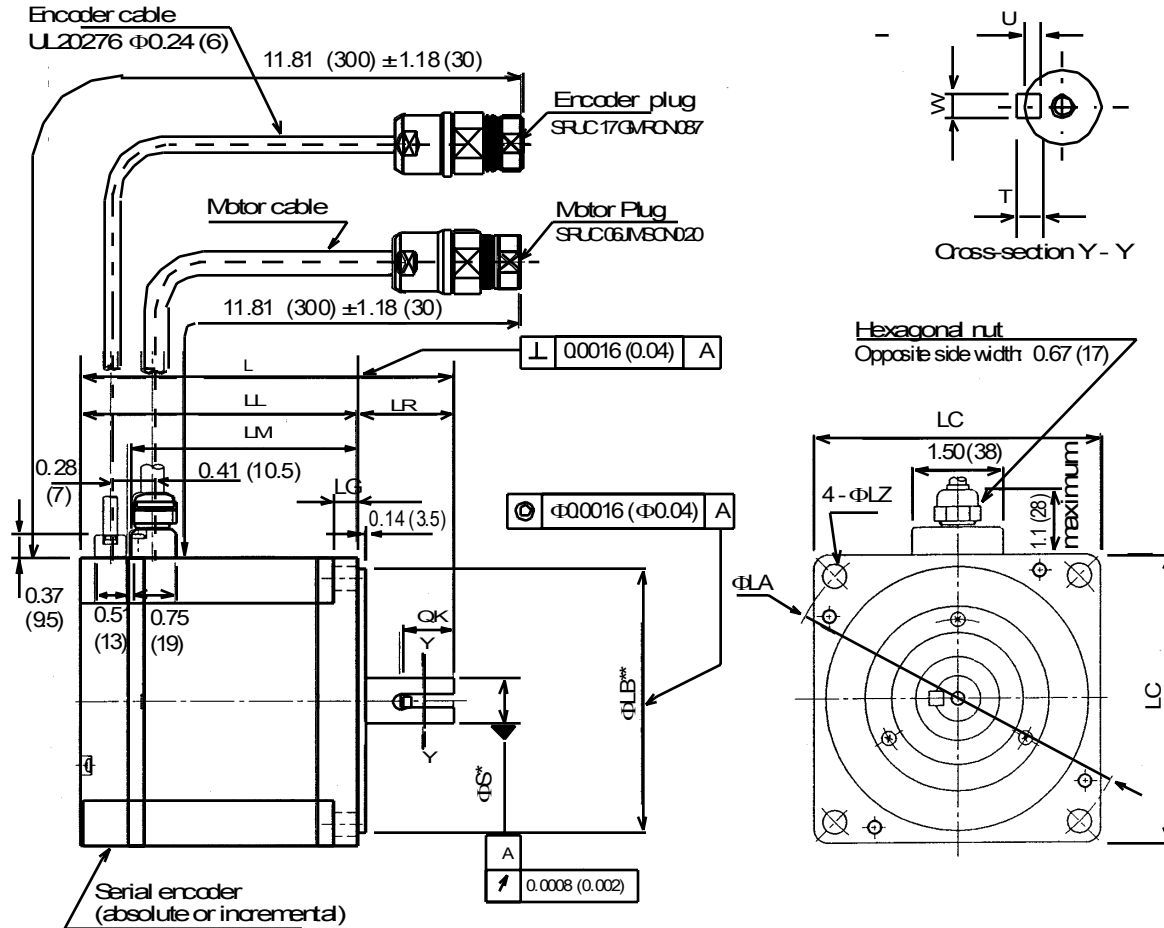
Type SGMPH-	L	LL	LM	LR	LG	LC	ΦLA	ΦLZ	ΦS*	ΦLB**	Key				Voltage V	Output W (hp)	Torque in·lb (N·m)	Time Rating	Rated Speed (rpm)	Approx Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
											QK	U	W	T								
08□□E4 1D	4.98 (126.5)	3.41 (86.5)	2.63 (66.7)	1.57 (40)	0.39 (10)	4.72 (120)	5.71 (145)	0.39 (10)	0.63 (16)	4.33 (110)	0.87 (22)	0.12 (3)	0.20 (5)	0.20 (5)	200	750 (1.01)	21.1 (2.39)	Contin- uous	3000	9.26 (4.2)	88.1 (392)	330 (147)

Note: The quoted allowable radial load is the value at a position 1.38in (35mm) from the motor mounting surface.

Specified Tolerances				
Dimension	*ΦS		**ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.6299	+0.0000-0.0004	4.3307	+0.0000-0.0014
mm	16.000	+0.000-0.011	110.000	+0.000-0.035

Interconnection Connector Specifications: See page 25.

• 1500W (2.0hp)



SGMPH
Servomotors

Type SGMPH-	L	LL	LM	LR	LG	LC	ΦLA	ΦLZ	ΦS*	ΦLB**	Key				Voltage V	Output W (hp)	Torque in·lb (N·m)	Time Rating	Rated Speed (rpm)	Approx Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
											QK	U	W	T								
15 □□E41D	6.08 (154.5)	4.51 (114.5)	3.73 (94.7)	1.57 (40)	0.39 (10)	4.72 (120)	5.71 (145)	0.39 (10)	0.75 (19)	4.33 (110)	0.87 (22)	0.14 (3.5)	0.24 (6)	0.24 (6)	200	1500 (2.0)	42.1 (4.77)	Continuous	3000	14.55 (6.6)	110 (490)	33.0 (147)

Note: The quoted allowable radial load is the value at a position 1.38in (35mm) from the motor mounting surface.

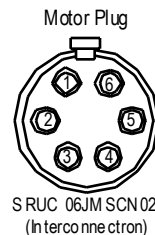
Specified Tolerances				
Dimension	*ΦS		**ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.7480	+0.0000-0.0005	4.3307	+0.0000-0.0014
mm	19.000	+0.000-0.013	110.000	+0.000-0.035

Interconnection Connector Specifications



Incremental Terminal Specifications		
Pin Number	Description	Color
3	Data +	Blue
4	Data -	Blue/White
1, 2, 5-7, 10-17	Free	—
8	+5V (Power Supply)	Red
9	0V (Power Supply)	Black
Connector Case	FG (Frame Ground)	Shield wire

Mating Connector: SPNA17HFRON16900E3
(Interconnection)



Motor Wiring Specifications		
Pin No.	Description	Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
6	FG (Frame Ground)	Green/Yellow

Mating Connector: SPNA06KFSDN169
(Interconnection)

(2) 13-Bit Incremental Encoder, with Brake

- **100W (0.13hp)**



Note: The quoted allowable radial load is the value at a position 0.79in (20mm) from the motor mounting surface.

Specified Tolerances				
Dimension	*ΦS		**ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.3150	+0.0000-0.0004	1.9685	+0.0000-0.0010
mm	8.000	+0.000-0.009	50.000	+0.000-0.025

Interconnection Connector Specifications



Incremental Terminal Specifications		
Pin Number	Description	Color
3	Data +	Blue
4	Data-	Blue/White
1, 2, 5, 7, 10 - 17	Free	-
8	+5V (Power Supply)	Red
9	0V (Power Supply)	Black
Connector Case	FG (Frame Ground)	Shield wire

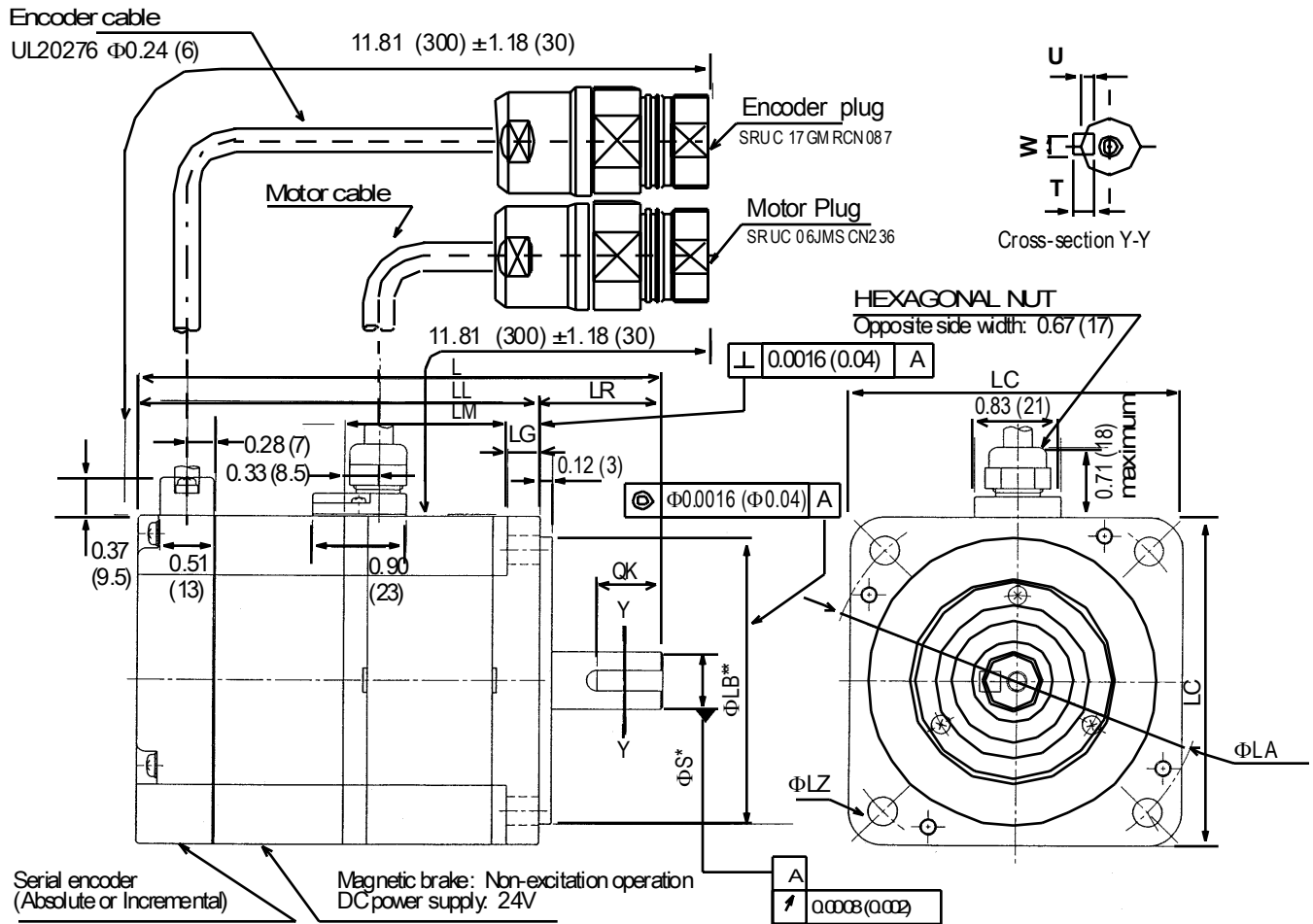
Mating Connector: SPNA17HFRON16900E3
(Interconnectron)



Motor Wiring Specifications		
Pin Number	Description	Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Holding Brake	Black
5	Holding Brake	Black
6	FG (Frame Ground)	Green/Yellow

Mating Connector: SPNA06KFSBN16918
(Interconnectron)

- 200W (0.27hp), 400W (0.53hp)



Type SGMPH-	L	LL	LM	LR	LG	LC	ΦLA	ΦLZ	ΦS^*	ΦLB^{**}	Key				Voltage V	Output W(hp)	Torque in·lb (Nm)	Time Rating	Rated Speed (rpm)	Approx Mass lb(kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
											QK	U	W	T								
02□□E4 CD	5.06 (128.1)	3.88 (98.5)	1.89 (48.1)	1.18 (30)	0.31 (8)	3.15 (80)	3.54 (90)	0.28 (7)	0.551 (14)	2.756 (70)	0.63 (16)	0.12 (3)	0.20 (5)	0.20 (5)	200	200 (0.27)	5.64 (0.637)	Contin- uous	3000	4.2 (1.9)	55.1 (245)	15.4 (68)
04□□E4 CD	5.85 (148.5)	4.67 (118.5)	2.68 (68.1)												400	400 (0.53)	11.2 (1.27)			5.7 (2.6)		

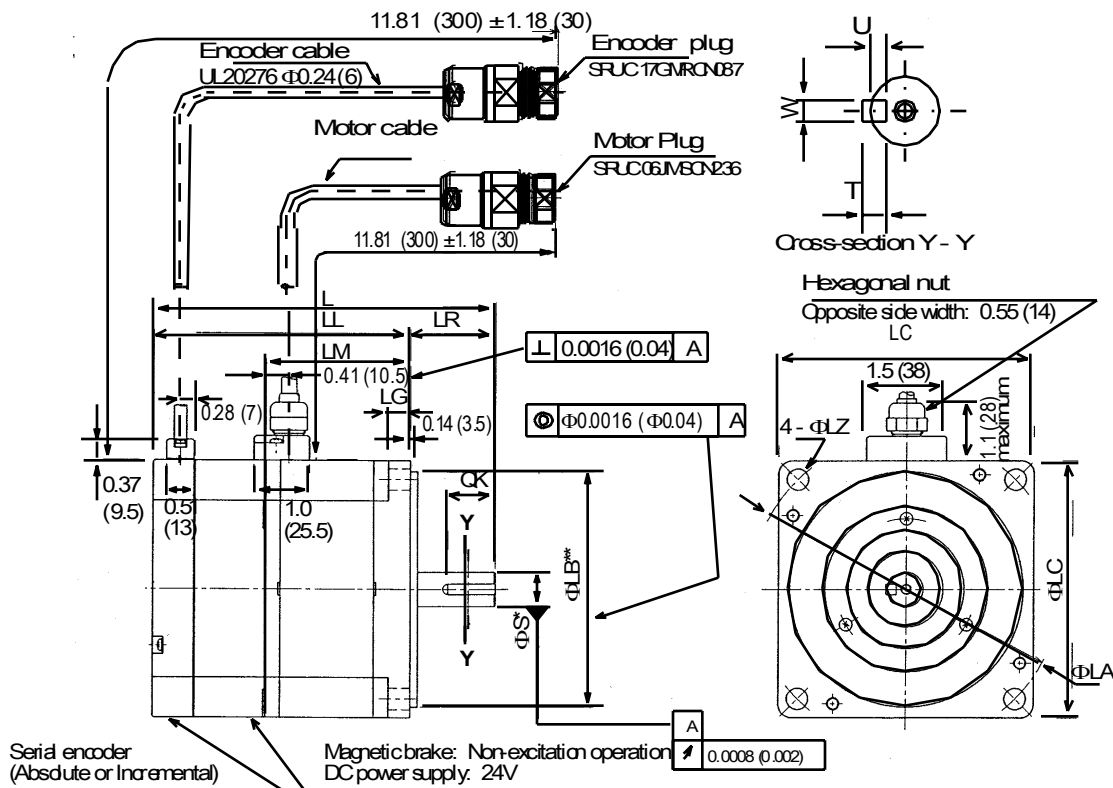
Note: The quoted allowable radial load is the value at a position 0.98in (25mm) from the motor mounting surface.

Specified Tolerances				
Dimension	ΦS		ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.5512	+0.0000-0.0004	2.7559	+0.0000-0.0012
mm	14.000	+0.000-0.011	70.000	+0.000-0.030

Interconnection Connector Specifications: See page 25.

LEGEND System Components

- 750W (1.01hp)



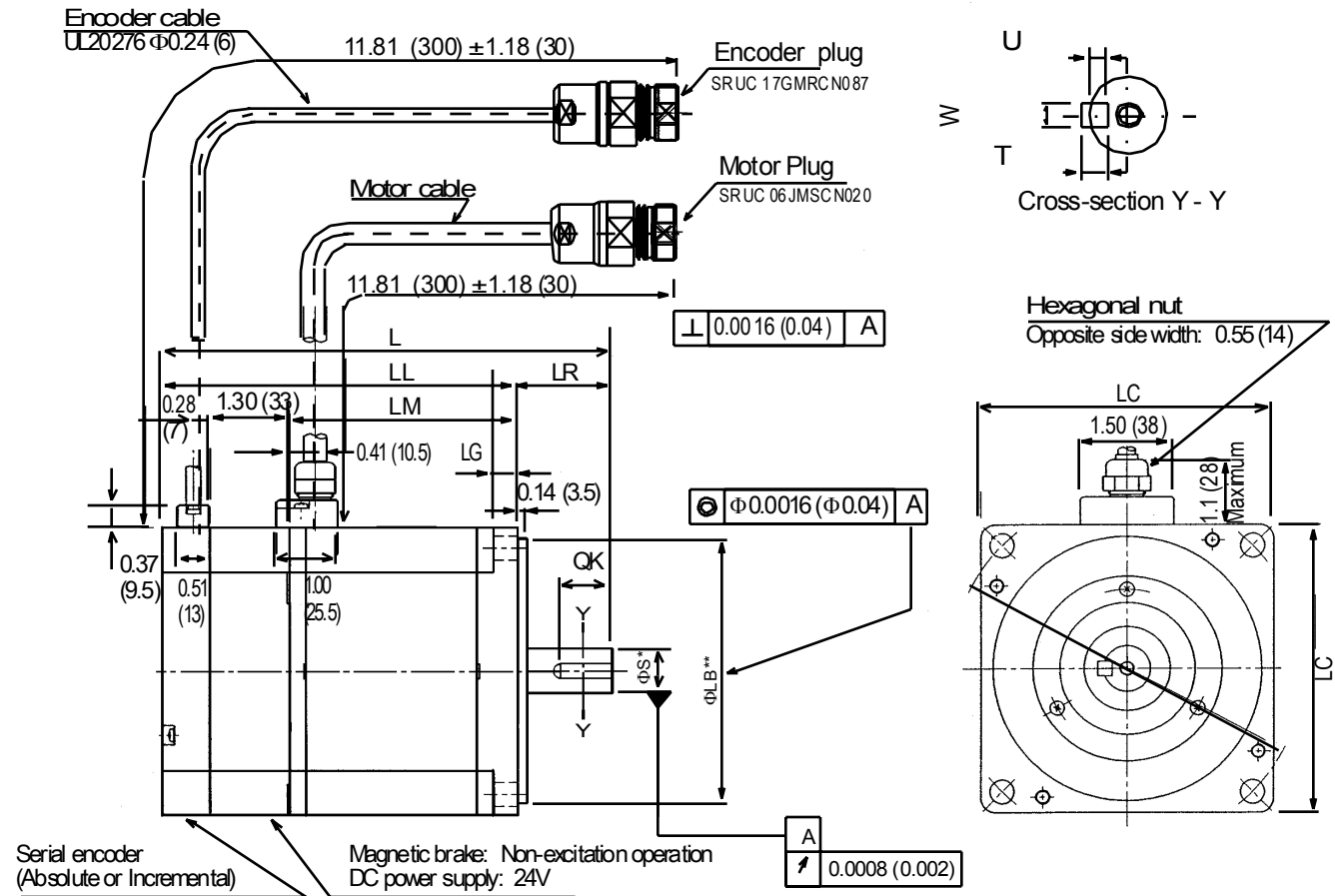
Type SGMPH-	L	LL	LM	LR	LG	LC	ϕLA	ϕLZ	ϕS^*	ϕLB^{**}	Key				Voltage V	Output W (hp)	Torque int'l b (N·m)	Time Rating	Rated Speed (rpm)	Approx Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
											QK	U	W	T								
08□□E4 CD	6.42 (163)	4.84 (123)	2.63 (66.7)	1.57 (40)	0.39 (10)	4.72 (120)	5.71 (145)	0.39 (10)	0.63 (16)	4.33 (110)	0.87 (22)	0.12 (3)	0.20 (5)	0.20 (5)	200	750 (1.01)	21.15 (2.39)	Contin- uous	3000	12.6 (5.7)	88.1 (392)	33.0 (14.7)

Note: The quoted allowable radial load is the value at a position 1.38in (35mm) from the motor mounting surface.

Specified Tolerances				
Dimension	* ϕS		** ϕLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.6299	+0.0000-0.0004	4.3307	+0.0000-0.0014
mm	16.000	+0.000-0.011	110.000	+0.000-0.035

Interconnection Connector Specifications: See page 25.

• 1500W (2.0hp)

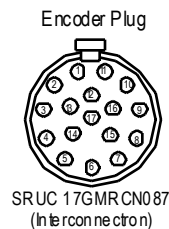


Type SGMPH-	L	LL	LM	LR	LG	LC	ΦLA	ΦLZ	ΦS^*	ΦLB^{**}	Key				Voltage V	Output W (hp)	Torque in·lb (N·m)	Time Rating	Rated Speed (rpm)	Approx Mass lb (kg)	Allowable Radial Load lb (N)	Allowable Thrust Load lb (N)
15□□E4CD	7.40 (188)	5.83 (148)	3.73 (94.7)	1.57 (40)	0.39 (10)	4.72 (120)	5.71 (145)	0.39 (10)	0.75 (19)	4.33 (110)	0.87 (22)	0.14 (3.5)	0.24 (6)	0.24 (6)	200	1500 (2.02)	42.1 (4.77)	Contin- uous	3000	17.9 (8.1)	110 (490)	33.0 (147)

Note: The quoted allowable radial load is the value at a position 1.38in (35mm) from the motor mounting surface.

Specified Tolerances				
Dimension	ΦS		ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.7480	+0.0000-0.0005	2.7559	+0.0000-0.0014
mm	19.000	+0.000-0.013	70.000	+0.000-0.035

Interconnection Connector Specifications



Incremental Terminal Specifications		
Pin Number	Description	Color
3	Data +	Blue
4	Data -	Blue/White
1, 2, 5 - 7, 10 - 17	Free	—
8	+5V (Power Supply)	Red
9	0V (Power Supply)	Black
Connector Case	FG (Frame Ground)	Shield wire

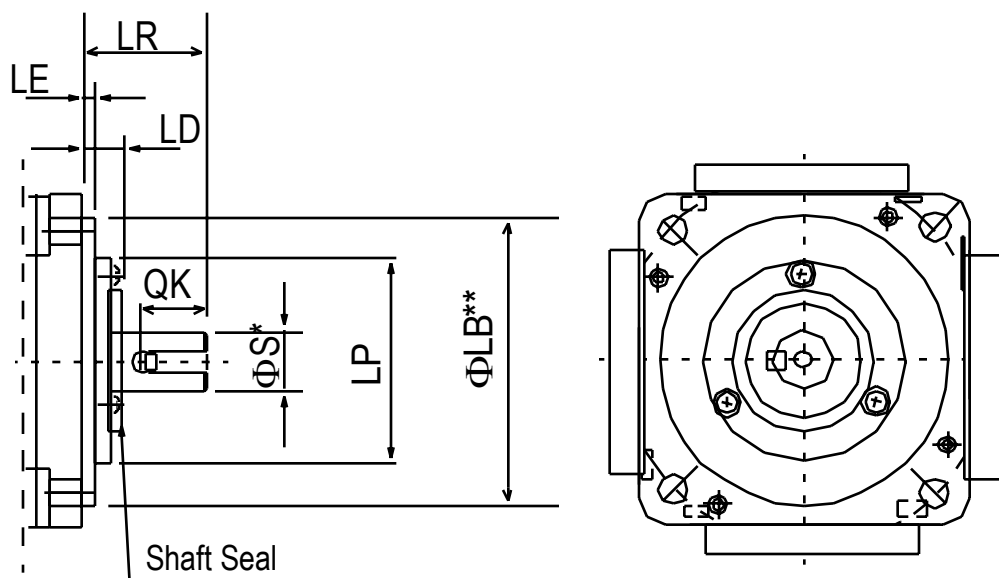
Mating Connector: SPNA17HFRON16900E3
(Interconnection)



Motor Wiring Specifications		
Pin No.	Description	Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Holding Brake	Black
5	Holding Brake	Black
6	FG (Frame Ground)	Green/Yellow

Mating Connector: SPNA06KFSDN169
(Interconnection)

Dimension Modifications for Motors with Optional Shaft Seal



Type SGMPH-	QK	ΦLB*	ΦS*	LE	LR	LD	ΦLP
01	0.55 (14)	1.97 (50)	0.31 (8)	0.12 (3)	0.98 (25)	0.28 (7)	1.54 (39)
02	0.64 (16)	2.76 (70)	0.55 (14)		1.18 (30)	0.39 (10)	1.93 (49)
04							
08	0.87 (22)	4.33 (110)	0.63 (16)	0.14 (3.5)	1.57 (40)	0.41 (10.5)	3.03 (77)
15			0.75 (19)				

*Refer to the following table for tolerances for diameters LB and S.

Specified Tolerances				
Dimension	*ΦS		**ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.3150	+0.0000-0.0004	1.9685	+0.0000-0.0010
	0.5512	+0.0000-0.0004	2.7559	+0.0000-0.0014
	0.6299	+0.0000-0.0004	4.3307	+0.0000-0.0014
	0.7480	+0.0000-0.0005		
mm	8.000	+0.000 -0.009	50.000	+0.000 -0.025
	14.000	+0.000 -0.011	70.000	+0.000 -0.035
	16.000	+0.000 -0.011	110.000	+0.000 -0.035
	19.000	+0.000 -0.013		

Torque Reduction Factor for SGMPH motors equipped with a shaft seal:

Servomotor Model	01	02	04	08	15
Torque Reduction Factor	90%	90%	95%	95%	95%

For Example: The SGMPH-01 continuous and peak torque rating should be reduced to 90% of the listed catalog specification.

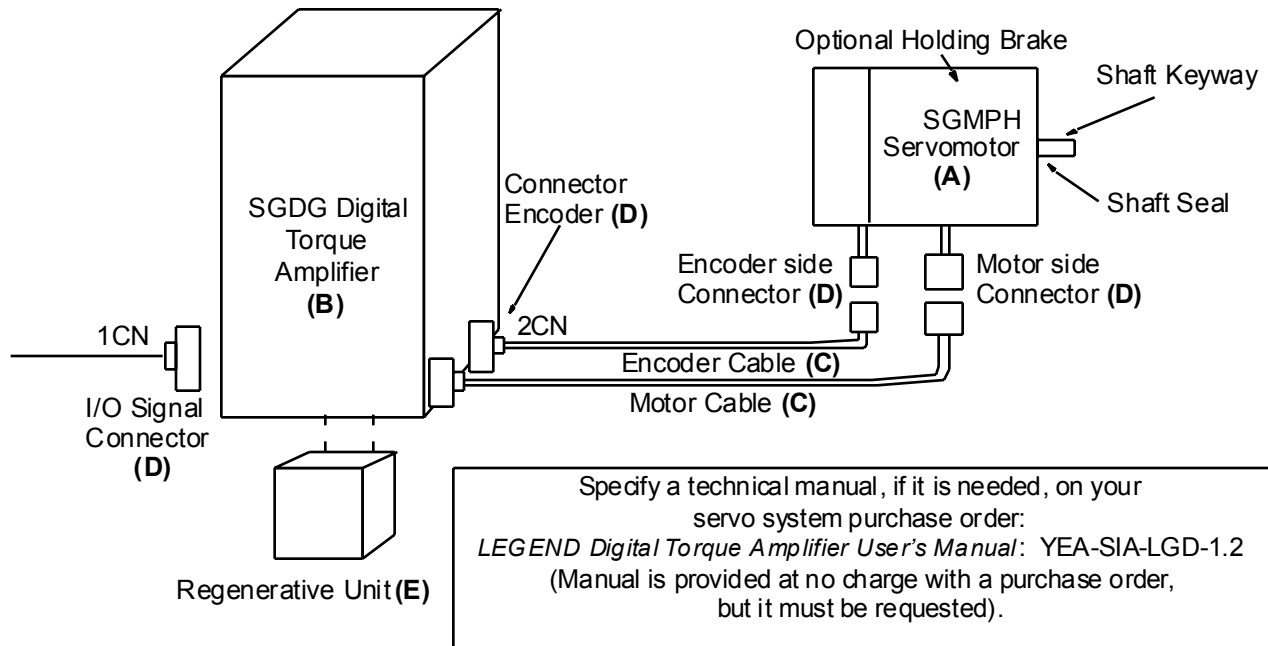
To specify a motor with a shaft seal, refer to the motor part number explanation on the following page.

Selecting Your SGMPH LEGEND System

First, select the AC servomotor suited for your application using SigmaSize: the Yaskawa servomotor sizing software, available at no charge. (Request SigmaSize software via e-mail, at: literature@yaskawa.com).

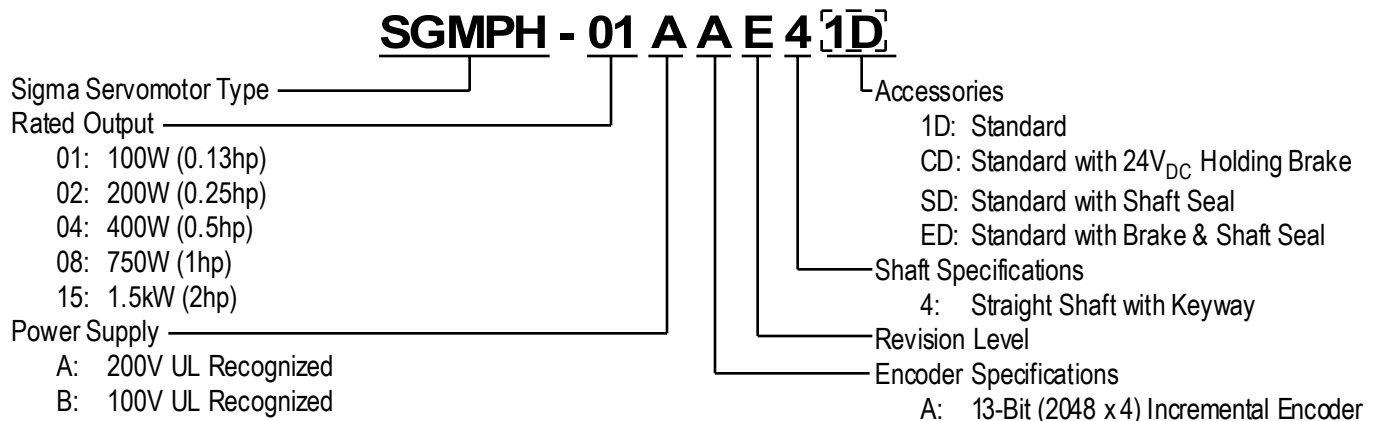
Use the diagram below to locate and identify the components of your system. Each item is letter-coded and cross-referenced in the option tables on the following pages.

System Configuration



SGMPH
Servomotors

Model Number Designation



Servomotor & Amplifier Selection

Use the table below to select the appropriate SGMPH AC servomotor and amplifier.

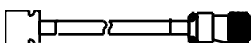
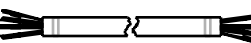
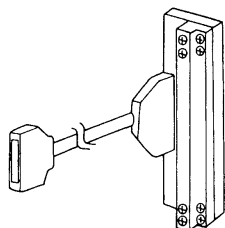
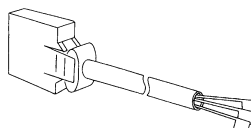
Description System Voltage and Construction	Peak Torque* (oz • in)	Rated Torque* (oz • in)	Motor Inertia (oz • in • s ² x10 ⁻³)	Motor MODEL # (A)	Amplifier MODEL # (B)*		Motor & Amplifier Item Class
					1-Phase SGDG-	3-Phase SGDG-	
200V 13-Bit Incremental Encoder Straight Shaft with Keyway 5000rpm* Pre-wired with Heavy Duty Connectors	135	45.1	0.917	SGMPH-01AAE41D	01GT	—	Stock
			1.46	SGMPH-01AAE4CD			
	270	90.1	2.96	SGMPH-02AAE41D	04GT	—	
			4.35	SGMPH-02AAE4CD			
	542	181	4.92	SGMPH-04AAE41D		10GT	
			6.31	SGMPH-04AAE4CD			
	1010	338	29.9	SGMPH-08AAE41D	10GT		
			35.7	SGMPH-08AAE4CD			
	2027*	676*	57.1	SGMPH-15AAE41D	15GT*	15GT	
			67.8	SGMPH-15AAE4CD			
100V, 1-Phase 13-Bit Incremental Encoder Straight Shaft with Keyway 5000rpm* Pre-wired with Heavy Duty Connectors	135	45.1	0.917	SGMPH-01BAE41D	04GT	—	
			1.46	SGMPH-01BAE4CD			
	270	90.1	2.96	SGMPH-02BAE41D		—	
			4.35	SGMPH-02BAE4CD			

Notes: 24V_{DC} brakes for SGMPH LEGEND AC servomotors are standard. Contact a local source for 24V_{DC} power supplies. Motor power and encoder cables are factory pre-wired with approximately 13" lead length with heavy duty mating connectors. Use the tables on the following page to specify mating connectors and/or various cable lengths. For technical information, request Yaskawa User's Manual number YEA-SIA-LGD-1.2.

* Reference the previously listed speed/torque (force) curves for performance with the applied system voltage and phase(s). For more detailed SGD amplifier specifications and dimensions, refer to pages 95 to 99.

Pre-wired Cable Selection

Use the table below to select pre-wired cables for your SGMPH AC servomotor.

Cable Description (C)		Motor Size (kW)	Part Number*	Comments	Item Class
Power Cable with Interconnection Connectors (without Brake)		0.1, 0.2, 0.4, 0.8	B4ICE-□□(A)	These UL and CE compliant cables are available in five lengths. Use two digits in the part number's last place: 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	Stock**
		1.5	B5ICE-□□(A)		
Power Cable with Interconnection Connectors (with Brake) (IP67)		0.1, 0.2, 0.4, 0.8	B4IBCE-□□(A)		
		1.5	B5IBCE-□□(A)		
Encoder Cable with Interconnection Connector (IP67)		All	A1ICE-□□(A)		
Encoder Cable (for applications up to 20m) Only for Solder Connections			FR-RMCT-SB	These cables are available in any length. For example, to order one FR-RMCT-SB cable, 16m long, specify: quantity: 16 part no.: FR-RMCT-SB	
Encoder Cable (for applications from >20 to <50m) Only for Solder Connections			UL20276-SB		
Input/Output 1CN Cable & Transition Terminal Block			JUSP-TA36P	35mm DIN rail mountable; the cable length is 0.5 meters.	
Input/Output 1CN Cable with Pigtail Leads			.CKI-SGDG--□□	Use the following key to specify required cable length (last digit of part number): 01: 1m (standard) 02: 2m 03: 3m	

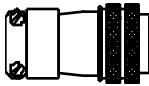
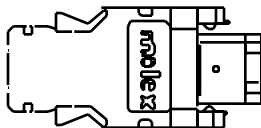
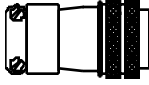
* The "(A)" at the end of the cable part number indicates the revision level. Revision level may be subject to change prior to this catalog reprinting.

** Standard cable lengths are Stock items; non-standard cable lengths are Limited Stock items.

*

Connector Selection

Use the table below to select mating connectors or kits for your SGMPH AC servomotor.

Connector Description (D)		Motor Size (kW)	Part Number	Comments	Item Class
Interconnectron Connector for Motor Power Cable (with or without Brake) (IP67)		0.1, 0.2, 0.4, 0.8, 1.5	FIN07S-B2	Solder Cup	Stock
2CN Amplifier Mating Connector			JZSP-CMP9-1	—	
Interconnectron Connector for Encoder Cable (IP67)			FIN17C-A2	Gauge: 24 - 18AWG Requires Crimp Tool B150 and positioner.	
1CN Mating Connector		All	DP9420007	—	
Interconnectron Crimp Tool	—		B150	—	Limited Stock
Positioner	—		B055/A	—	

SGMPH
Servomotors

Peripheral Device Selection

Use the table below to select peripheral devices for your SGMPH AC servomotor.

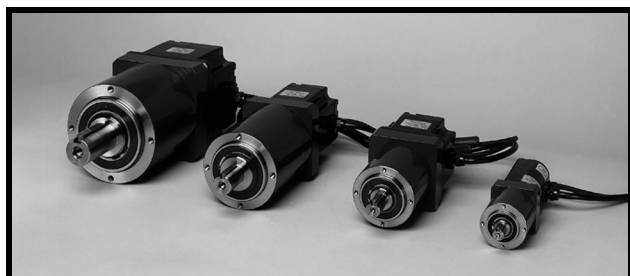
Component Description (E)		Part Number	Comments	Item Class
External Regenerative Unit*	50Ω, 60W, or 100W and 400W	JUSP-RG08D	This is a general purpose regenerative unit.	Stock
	25Ω, 300W for 400W* and 1.5kW amp	RH500N25_ohmK	Caution: Proper set-up is necessary to avoid equipment damage.	

* For SGD-04 application requiring additional regenerative capacity beyond the JUSP-RG08D capacity, specify SGD-04GT22P and QTY 2 of RH500N25_ohmK. Resistors must be used in series to provide 600W (before derating) of increased capacity.

NOTES:

SGMPH Gearmotors - With Incremental Encoder

Rated Output : 100W, 200W, 400W,
750W, 1500W



For Additional Information	Page(s)
SGMPH Gearmotor Ratings & Specifications	46 - 47
SGMPH Gearmotor Dimensions	48 - 49
SGMPH Gearmotor Selection/Ordering Information	50 - 54
SGDG Ratings & Specifications	95
SGDG Dimensions	96 - 99

Design Features

1. Compact

- Fits in limited mounting space

2. Torque

- 40.9 to 3540in·lb peak torque
- Cost-effective solution for low speed and high torque applications
- Uses improved Sigma II motor technology

3. Encoders

- 13-Bit incremental encoder standard

4. Enclosure

- Totally enclosed, self-cooled IP67 (not including shaft)

5. Application Emphasis

- Compact, high torque to inertia ratio
- Chip mounters
- PCB drilling machines
- Robots
- Conveyors
- Packaging

6. Certified International Standards

- UL, cUL recognized (File #: E165827), CE compliance

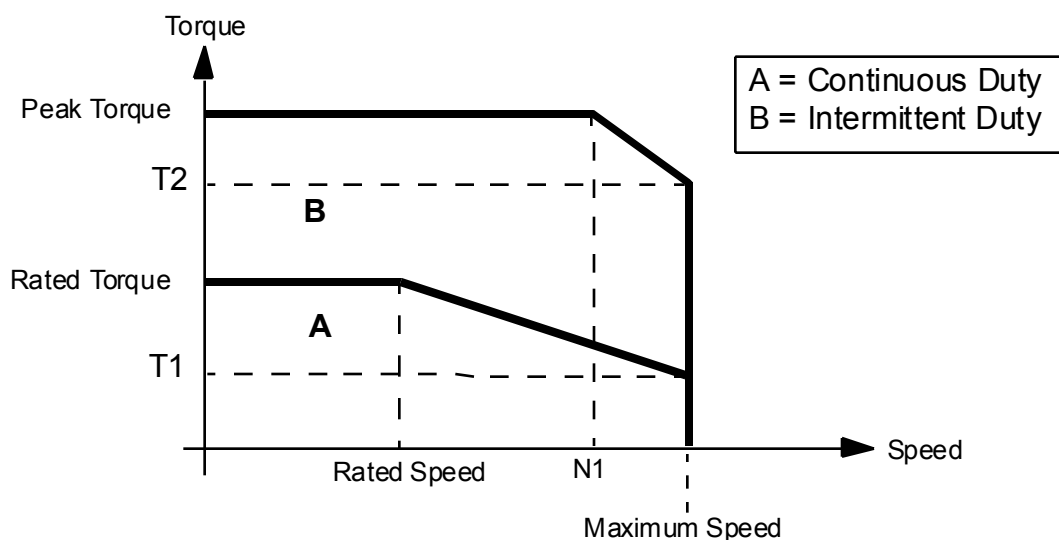
Gearmotor Ratings and Specifications

GEARMOTOR Part Number	Rated Torque** (in • lb)	Peak Torque** (in • lb)	Rated Speed** (rpm)	Maximum Speed** (rpm)	Speed N1 (rpm)	Torque T1 (in • lb)	Torque T2 (in • lb)
SG05SA-PE01□□	13.67	40.93	600	1000	900	8.59	34.34
SG10SA-PE01□□	27.34	81.84	300	500	450	17.17	68.68
SG25SA-PE01□□	66.95	200.39	120	200	180	42.04	168.16
SG50SA-PE01□□	133.89	283.00	60	100	90	84.08	336.32
SG1ASA-PE01□□	267.78	637.00	30	50	45	168.16	672.65
SG05SA-PE02□□	27.34	81.84	600	1000	1000/600	17.17	81.8/36.2*
SG10SA-PE02□□	54.68	163.69	300	500	500/300	34.34	163.7/72.4*
SG25SA-PE02□□	133.89	283.00	120	200	200/120	84.08	283/177*
SG50SA-PE02□□	267.78	708.00	60	100	100/60	168.16	708/354.7*
SG1ASAPE02□□	535.56	1593.00	26	48	50/30	336.32	1593/704.4*
SG05SA-PE04□□	54.81	164.42	600	1000	640	34.34	77.27
SG10SA-PE04□□	109.61	283.00	300	500	320	68.68	154.53
SG25SA-PE04□□	268.38	708.00	120	200	128	168.16	378.36
SG50SA-PE04□□	536.75	1610.25	52	96	64	336.32	756.73
SG1ASA-PE04□□	1073.50	2832.00	20	36	32	672.65	1513.45
SG05SA-PE08□□	102.34	306.04	600	1000	640	51.51	51.51
SG10SA-PE08□□	204.67	612.07	300	500	320	103.02	103.02
SG25SA-PE08□□	501.13	1498.63	104	192	128	252.24	252.24
SG50SA-PE08□□	1002.25	2997.25	40	72	64	504.48	504.48
SG05SA-PE15□□	205.16	614.50	520	960	640	103.02	103.02
SG10SA-PE15□□	410.31	1228.99	260	480	320	206.04	206.04
SG25SA-PE15□□	1004.63	3009.13	80	144	128	504.48	504.48
SG50SA-PE15□□	2009.25	3540.00	40	72	64	1008.97	1008.97

* Values for 100V Gearmotor

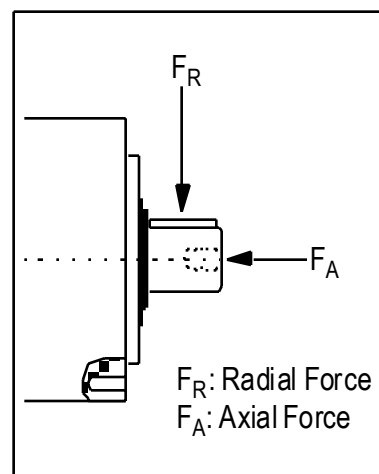
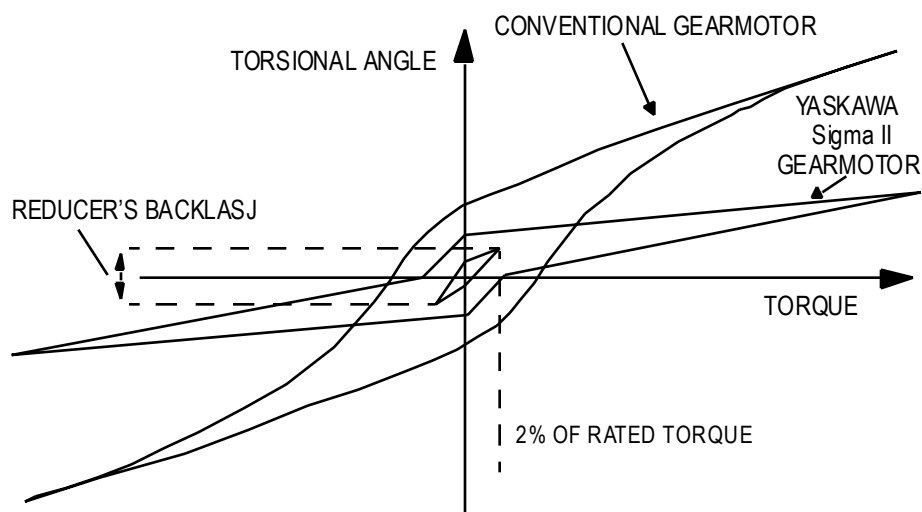
** To achieve the speed/torque performance listed, use only the gearmotor/amp combinations and system supply as specified on page 51.

- Note:
1. These performance ratings apply when duty cycles are 60% or less, and when the gearmotor runs for 1,000 cycles per hour or less. Contact your Yaskawa representative when duty cycles exceed 60%, and when the gearmotor runs for more than 1,000 cycles per hour.
 2. Rated Speed is at 20°C ambient temperature. Reduce Rated Speed by 20% at 40°C ambient temperature.
 3. For right-angle gearmotors, please consult the factory for availability.

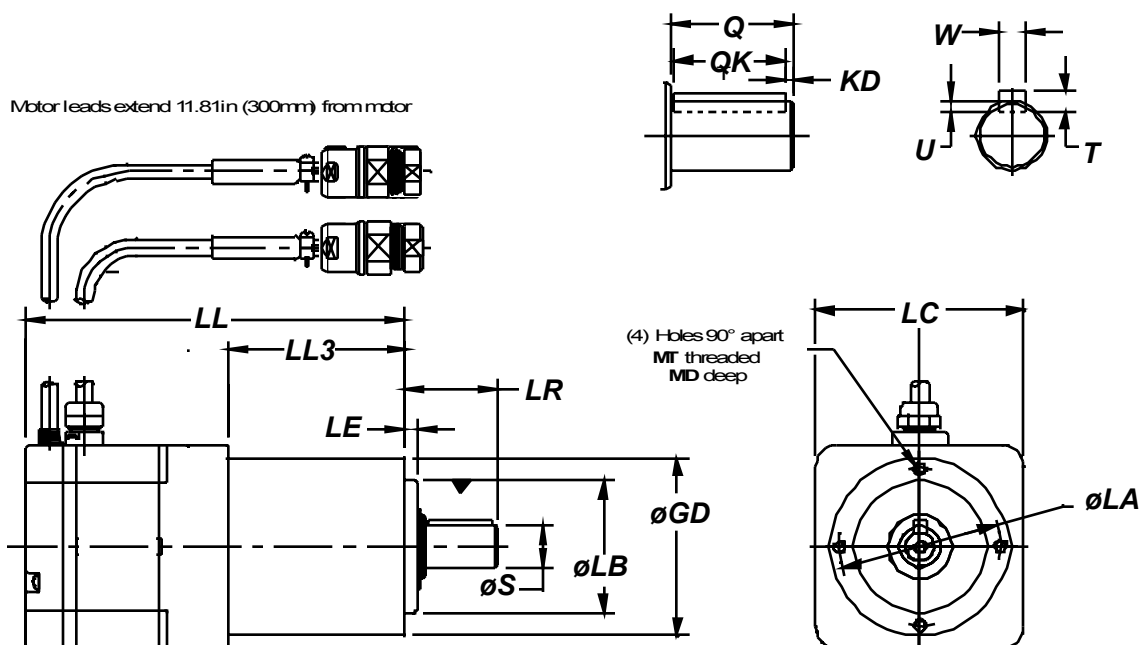


Gearmotor Mechanical Ratings

GEARMOTOR Part Number	Gearhead Backlash (arc min)	Gearhead Maximum Radial Load (lb _f)	Gearhead Maximum Axial Load (lb _f)	Gearhead Inertia (in • lb • s ²)	Gearmotor Weight (lb)				
SG05SA-PE01□□	<10	146	158	0.000052	3.24				
SG10SA-PE01□□									
SG25SA-PE01□□		326	349	0.00025	6.39				
SG50SA-PE01□□									
SG1ASA-PE01□□						540	428	0.0016	12.79
SG05SA-PE02□□	<10	326	349	0.00025	7.28				
SG10SA-PE02□□					7.94				
SG25SA-PE02□□		540	428	0.0016	14.34				
SG50SA-PE02□□									
SG1ASA-PE02□□						1035	900	0.0049	27.79
SG05SA-PE04□□	<10	326	349	0.00025	8.82				
SG10SA-PE04□□									
SG25SA-PE04□□		540	428	0.0016	15.88				
SG50SA-PE04□□						1035	900	0.0049	29.33
SG1ASA-PE04□□						1687	1350	0.0047	50.83
SG05SA-PE08□□	<10	540	428	0.0016	19.18				
SG10SA-PE08□□									
SG25SA-PE08□□		1035	900	0.0049	34.84				
SG50SA-PE08□□						1687	1350	0.0047	56.34
SG05SA-PE15□□	<10	1035	900	0.0048	34.40				
SG10SA-PE15□□									
SG25SA-PE15□□		1687	1350	0.0047	60.75				
SG50SA-PE15□□									

SGMPH
Gearmotors


Dimensions in inches (mm)



GEARMOTOR	LL3	LL	LE	LR	LB	GD	S	LC	LA	MT	MD	Q	QK	KD	W	T	U
SG05SA-PE01□A	1.988 (50)	5.177 (131.5)	0.158 (4)	0.965 (24.5)	1.378 (35)	1.969 (50)	0.472 (12)	2.362 (60)	1.732 (44)	M4 x 0.7	0.315 (8)	0.709 (18)	0.551 (14)	0.079 (2)	0.158 (4)	0.158 (4)	0.098 (2.5)
SG10SA-PE01□A																	
SG25SA-PE01□A	3.465 (88)	6.772 (172)		1.417 (36)	2.047 (52)	2.756 (70)	0.630 (16)	2.756 (70)	2.441 (62)	M5 x 0.8	0.394 (10)	1.102 (28)	0.984 (25)		0.197 (5)	0.197 (5)	0.118 (3)
SG50SA-PE01□A																	
SG1ASA-PE01□A	4.193 (106.5)	7.500 (190.5)		1.811 (46)	2.677 (68)	3.543 (90)	0.866 (22)	3.543 (90)	3.150 (80)	M6 x 1.0	0.472 (12)	1.417 (36)	1.260 (32)		0.236 (6)	0.236 (6)	0.138 (3.5)
SG05SA-PE02□A	2.677 (68)	6.181 (157)	0.197 (5)	1.417 (36)	2.047 (52)	2.756 (70)	0.630 (16)	3.150 (80)	2.441 (62)	M5 x 0.8	0.394 (10)	1.102 (28)	0.984 (25)		0.197 (5)	0.197 (5)	0.118 (3)
SG10SA-PE02□A	3.465 (88)	6.969 (177)												0.079 (2)			
SG25SA-PE02□A																	
SG50SA-PE02□A	4.193 (106.5)	7.697 (195.5)		1.811 (46)	2.677 (68)	3.543 (90)	0.866 (22)	3.543 (90)	3.150 (80)	M6 x 1.0	0.472 (12)	1.417 (36)	1.260 (32)		0.236 (6)	0.236 (6)	0.138 (3.5)
SG1ASA-PE02□A	5.295 (134.5)	9.036 (229.5)	0.236 (6)	2.756 (70)	3.543 (90)	4.724 (120)	1.260 (32)	4.724 (120)	4.252 (108)	M8 x 1.25	0.630 (16)	2.284 (58)	1.969 (50)		0.158 (4)	0.394 (10)	0.315 (8)
SG05SA-PE04□A	2.677 (68)	6.969 (177)		1.417 (36)	2.047 (52)	2.756 (70)	0.630 (16)	3.150 (80)	2.441 (62)	M5 x 0.8	0.394 (10)	1.102 (28)	0.984 (25)		0.197 (5)	0.197 (5)	0.118 (3)
SG10SA-PE04□A	4.193 (106.5)	8.484 (215.5)	0.197 (5)	1.811 (46)	2.677 (68)	3.543 (90)	0.866 (22)	3.543 (90)	3.150 (80)	M6 x 1.0	0.472 (12)	1.417 (36)	1.260 (32)		0.236 (6)	0.236 (6)	0.138 (3.5)
SG50SA-PE04□A	5.295 (134.5)	9.823 (250)	0.236 (6)	2.756 (70)	3.543 (90)	4.724 (120)	1.260 (32)	4.724 (120)	4.252 (108)	M8 x 1.25	0.630 (16)	2.284 (58)	1.969 (50)	0.158 (4)	0.394 (10)	0.315 (8)	0.197 (5)
SG1ASA-PE04□A	6.024 (153)	10.551 (268.0)	0.315 (8)	3.819 (97)	4.724 (120)	6.102 (155)	1.575 (40)		5.512 (140)	M10 x 1.5	0.787 (20)	3.228 (82)	2.756 (70)	0.236 (6)	0.472 (12)		
SG05SA-PE08□A	3.150 (80)	7.815 (198.5)	0.197 (5)	1.811 (46)	2.677 (68)	3.543 (90)	0.866 (22)		3.150 (80)	M6 x 1.0	0.472 (12)	1.417 (36)	1.260 (32)	0.079 (2)	0.236 (6)	0.236 (6)	0.138 (3.5)
SG10SA-PE08□A																	
SG25SA-PE08□A	5.295 (134.5)	9.803 (249)	0.236 (6)	2.756 (70)	3.543 (90)	4.724 (120)	1.260 (32)		4.252 (108)	M8 x 1.25	0.630 (16)	2.284 (58)	1.969 (50)	0.158 (4)	0.394 (10)		
SG50SA-PE08□A	6.024 (153)	10.532 (267.5)	0.315 (8)	3.819 (97)	4.724 (120)	6.102 (155)	1.575 (40)		5.512 (140)	M10 x 1.5	0.787 (20)	3.228 (82)	2.756 (70)	0.236 (6)	0.472 (12)	0.315 (8)	0.197 (5)
SG05SA-PE15□A	4.016 (102)	9.626 (244.5)	0.236 (6)	2.756 (70)	3.543 (90)	4.724 (120)	1.260 (32)		4.252 (108)	M8 x 1.25	0.630 (16)	2.284 (58)	1.969 (50)	0.158 (4)	0.394 (10)		
SG10SA-PE15□A																	
SG25SA-PE15□A	6.024 (153)	11.634 (295.5)	0.315 (8)	3.819 (97)	4.724 (120)	6.012 (155)	1.575 (40)		5.512 (140)	M10 x 1.5	0.787 (20)	3.228 (82)	2.756 (70)	0.236 (6)	0.472 (12)		
SG50SA-PE15□A																	

Tolerances for standard (SG) gearmotors

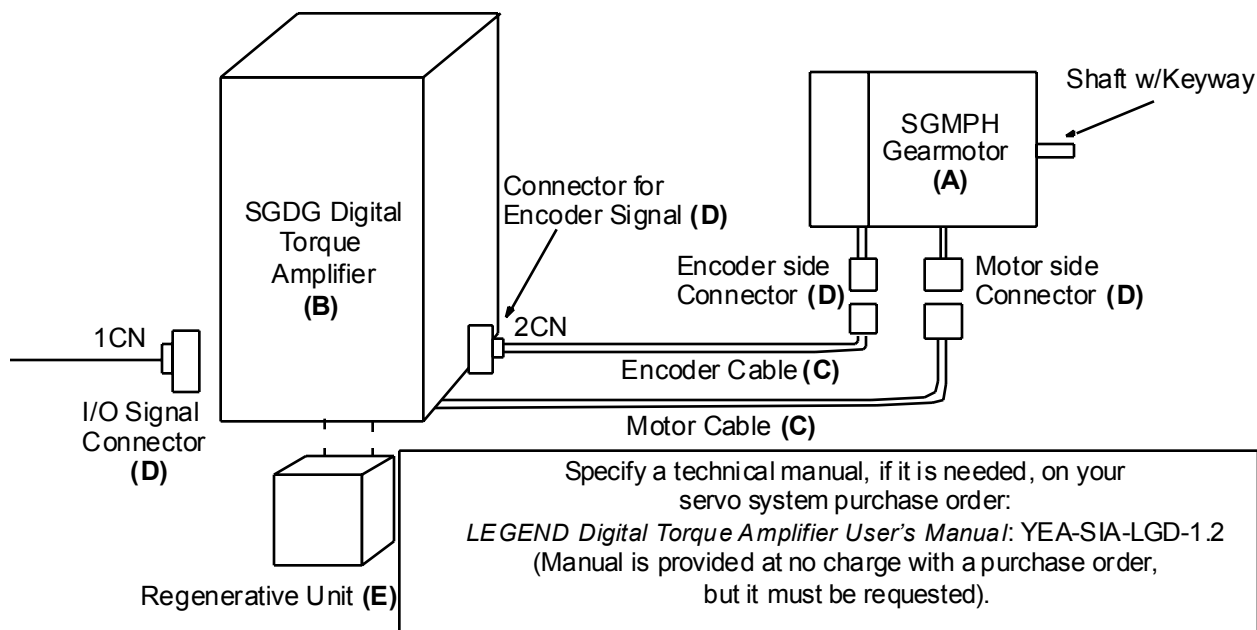
Dimension	ΦS		ΦLB		W	
Unit	Diameter	Tolerance	Diameter	Tolerance	Width	Tolerance
in	0.472, 0.630	+0.00047 +0.00004	1.378	+0.00000 -0.00063	0.158, 0.197, 0.236	+0.00000 -0.00118
	0.866	+0.00059 +0.00008	2.047, 2.677	+0.00000 -0.00075	0.39370	+0.00000 -0.00142
	1.25984, 1.57480	+0.00071 +0.00008	3.5433, 4.724	+0.00000 -0.00087	0.47244	+0.00000 -0.00169
mm	12, 26	+0.012 +0.001	35	+0.000 -0.016	4, 5, 6	+0.000 -0.030
	22	+0.015 +0.002	52, 68	+0.000 -0.019	10	+0.000 -0.036
	32, 40	+0.018 +0.002	90, 120	+0.000 -0.022	12	+0.000 -0.043

Selecting Your SGMPH Gearmotor System

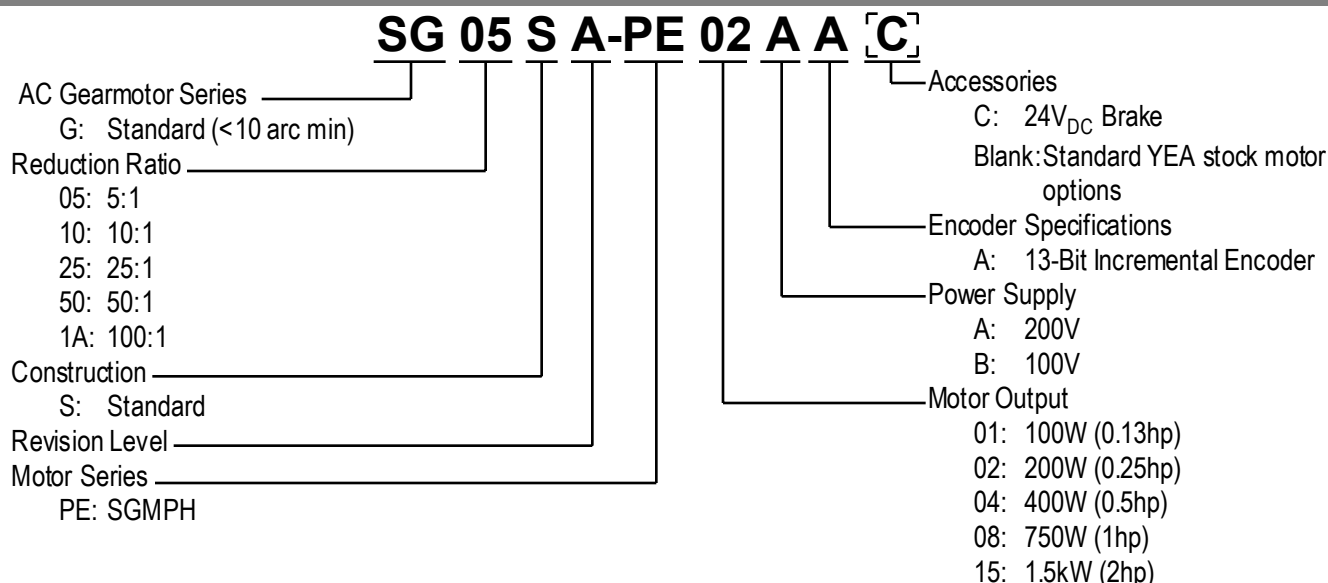
First, select the AC gearmotor suited for your application using SigmaSize: the Yaskawa servomotor sizing software, available at no charge. (Request SigmaSize software via e-mail, at: literature@yaskawa.com).

Use the diagram below to locate and identify the components of your system. Each item is letter-coded and cross-referenced in the option tables on the following pages.

System Configuration



Model Number Designation



Gearmotor & Amplifier Selection

Use the table below to select the appropriate SGMPH LEGEND AC gearmotor and amplifier.

Gearmotor (A)					Gearhead only		Amplifier MODEL # (B)* SGDG-	Gear Motor Item Class	Amplifier Item Class
MODEL #	Rated Torque* (in • lb)	Peak Torque* (in • lb)	Rated Speed* (rpm)	Maximum Speed* (rpm)	Inertia (in • lb • s ²)	Gear Ratio			
SG05SA-PE01AA	13.67	40.93	600	1000	0.000052	5:1	01GT*	3-5 Week Leadtime for Assembly	Stock
SG10SA-PE01AA	27.34	81.84	300	500		10:1			
SG25SA-PE01AA	66.95	200.39	120	200	0.00025	25:1			
SG50SA-PE01AA	133.89	283.00	60	100		50:1			
SG1ASA-PE01AA	267.78	637.00	30	50	0.0016	100: 1			
SG05SA-PE02AA	27.34	81.84	600	1000	0.00025	5:1	04GT*		
SG10SA-PE02AA	54.68	163.69	300	500		10:1			
SG25SA-PE02AA	133.89	283.00	120	200		25:1			
SG50SA-PE02AA	267.78	708.00	60	100	0.0016	50:1			
SG1ASA-PE02AA	535.56	1593.00	26	48	0.0049	100: 1			
SG05SA-PE04AA	54.81	164.42	600	1000	0.00025	5:1			
SG10SA-PE04AA	109.61	283.00	300	500		10:1			
SG25SA-PE04AA	268.38	708.00	120	200	0.0016	25:1			
SG50SA-PE04AA	536.75	1610.25	52	96		50:1			
SG1ASA-PE04AA	1073.50	2832.00	20	36	0.0047	100: 1			
SG05SA-PE08AA	102.34	306.04	600	1000	0.0016	5:1	10GT**		
SG10SA-PE08AA	204.67	612.07	300	500		10:1			
SG25SA-PE08AA	501.13	1498.63	104	192	0.0049	25:1			
SG50SA-PE08AA	1002.25	2997.25	40	72	0.0047	50:1			
SG05SA-PE15AA	205.16	614.50	520	960	0.0048	5:1	15GT**		
SG10SA-PE15AA	410.31	1228.99	260	480		10:1			
SG25SA-PE15AA	1004.63	3009.13	80	144	0.0047	25:1			
SG50SA-PE15AA	2009.25	3540.00	40	72	0.0047	50:1			
SG05SA-PE01BA	13.67	40.93	600	1000	0.000052	5:1	04GT***		
SG10SA-PE01BA	27.34	81.84	300	500		10:1			
SG25SA-PE01BA	66.95	200.39	120	200	0.00025	25:1			
SG50SA-PE01BA	133.89	283.00	60	100		50:1			
SG1ASA-PE01BA	267.78	637.00	30	50	0.0016	100: 1			
SG05SA-PE02BA	27.34	81.84	600	1000	0.00025	5:1			
SG10SA-PE02BA	54.68	163.69	300	500		10:1			
SG25SA-PE02BA	133.89	283.00	120	200		25:1			
SG50SA-PE02BA	267.78	708.00	60	100		0.0016		50:1	
SG1ASA-PE02BA	535.56	1593.00	26	48	0.0049	100: 1			

Notes: 24V_{DC} Brakes for SGMPH AC gearmotors are standard. Contact a local source for 24V_{DC} power supplies.

Use the tables on the following page to specify mating connectors or pre-wired cables in different lengths.

* Reference the previously listed speed/torque curves for performance.

For more detailed SGDG amplifier specifications and dimensions, refer to pages 95 - 99.

To achieve the performance (speed/torque) listed, the AC supply to the LEGEND AC must be

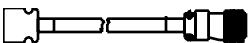
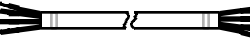
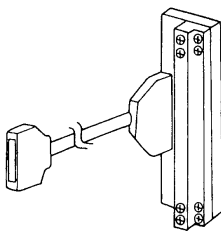
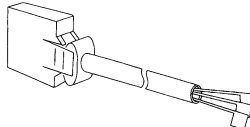
* 200 - 230 VAC 1 phase 10% - 15% 60, 50Hz

** 200 - 230 VAC 3 phase 10% - 15% 60, 50Hz

*** 100-115 VAC 1 phase 10% - 15% 60, 50Hz

Pre-wired Cable Selection

Use the table below to select pre-wired cables for your SGMPH AC gearmotor.

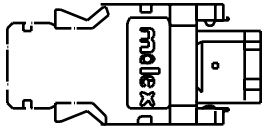
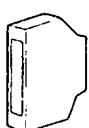
Cable Description (C)		Motor Size (kW)	Part Number*	Comments	Item Class
Power Cable with Interconnectron Connectors (without Brake)		0.1, 0.2, 0.4, 0.8	B4ICE-□□(A)	These UL and CE compliant cables are available in five lengths. Use the following key to specify needed cable length (last two digits of the part number): 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	Stock**
		1.5	B5ICE-□□(A)		
Power Cable with Interconnectron Connectors (with Brake)		0.1, 0.2, 0.4, 0.8	B4IBCE-□□(A)		
		1.5	B5IBCE-□□(A)		
Encoder Cable with Interconnectron Connector		All	A1ICE-□□(A)		
Encoder Cable (for applications up to 20m) Only for Solder Connections			FR-RMCT-SB	These cables are available in any length. For example, to order one FR-RMCT-SB cable, 16m long, specify: quantity: 16 part no.: FR-RMCT-SB	
Encoder Cable (for applications from >20 to <50m) Only for Solder Connections			UL20276-SB		
Input/Output 1CN Cable & Transition Terminal Block			JUSP-TA36P	35mm DIN rail mountable; the cable length is 0.5 meters.	
Input/Output 1CN Cable with Pigtail Leads			CKI-SGDG-□□	Use the following key to specify required cable length (last digit of part number): 01: 1m (standard) 02: 2m 03: 3m	

* The "(A)" at the end of the cable part number indicates the revision level. Revision level may be subject to change prior to this catalog reprinting.

** Standard cable lengths are Stock items; non-standard cable lengths are Limited Stock items.

Connector Selection

Use the table below to select mating connectors or kits for your SGMPH AC gearmotor.

Connector Description (D)		Motor Size (kW)	Part Number	Comments	Item Class
Interconnectron Connector for Motor Power Cable (with or without Brake)		0.1, 0.2, 0.4, 0.8, 1.5	FIN07S-B2	IP67 Mated Solder Cup	Stock
2CN Amplifier Mating Connector			JZSP-CMP9-1	—	
Interconnectron Connector for Encoder Cable			FIN17C-A2	IP67 Mated Gauge: 24 - 18 AWG Requires Crimp Tool B150 and positioner.	
1CN Mating Connector		All	DP9420007	—	
Interconnectron Crimp Tool	—		B150	—	Limited Stock
Positioner	—		B055/A	—	

Peripheral Device Selection

Use the table below to select peripheral devices for your SGMPH LEGEND AC gearmotor.

Component Description(E)		Part Number	Comments	Item Class
External Regenerative Unit*	50 ohms 120 watt for 01, 04, 1.0 amps	RH220BN50_ohmJ	This is a general purpose regenerative unit.	Stock
	25 ohms 300 watt for 1.5 amp	RH500N25_ohmK	Caution: Proper set-up is necessary to avoid equipment damage.	

- * For an alternate solution, specify the individual resistor part number RH500N25_OHMK in necessary series or parallel connection. Refer to the SGDg servo amplifier section of this catalog (pages 95 to 99) for additional specifications, and the *LEGEND Digital Torque Amplifier User's Manual* (YEA-SIA-LGD-1.2) for proper resistor sizing guidelines.

General Purpose

SGMGH Servomotors - With Incremental Encoder

Rated Output: 0.45kW, 0.85kW, 1.3kW



For Additional Information	Page(s)
SGMGH Ratings & Specifications	56
SGMGH Speed/Torque Curves	57
SGMGH Dimensions	58 - 59
SGMGH Selection/Ordering Information	60 - 65
SGDG Ratings & Specifications	95 -
SGDG Dimensions	96 - 99

Design Features

1. Compact

- Small sized motor
- Compatible with previous generation G series motors
- Ten types of rated outputs ranging from 0.79 to 207in · lb of peak torque
- Optional built-in holding brake available

2. Higher Speed and Acceleration

- Up to 3000rpm maximum
- High torque to inertia ratio

3. Encoders

- 17-bit incremental encoder (standard)

4. Enhanced Environmental Resistance

- Totally enclosed, self-cooled IP67 (excluding shaft)
- Shaft seal (optional)

5. Application Emphasis

- Machine tools and woodworking machines
- Packaging machines
- Gantry Robots
- Press Automation
- Thermoforming

6. Certified International Standards

- UL, cUL recognized (File #: E165827) CE compliance

Servomotor Ratings and Specifications

Time Rating:	Continuous	Enclosure:	Totally-enclosed, self-cooled	Instantaneous Maximum Speed*:	
Insulation:	Class F		IP67 (except for shaft opening)		0.45 to 1.5kW: 3000rpm
Vibration:	15 μ m or less	Ambient Temperature:	0 to 40°C	Excitation:	Permanent magnet
Withstand Voltage:	1500V _{ac}	Ambient Humidity:	20 to 80% (non-condensing)	Drive Method:	Direct drive
Insulation Resistance:	10M Ω minimum at 500V _{DC}	Rated Speed*:	1500rpm	Mounting:	Flange-mounted

* Values when the servomotor is combined with an SGD G digital torque amplifier.

MOTORS: SGMGH-	Rated Output*	Rated Torque*		Instantaneous Peak Torque*		Rated Current*	Instantaneous Maximum Current*
	kW (hp)	N • m	lb _f • in (kg _f • cm)	N • m	lb _f • in (kg _f • cm)	A _{rms}	A _{rms}
05A□A	0.45 (0.6)	2.84	25 (29)	8.92	79 (91)	3.8	11
09A□A	0.85 (1.1)	5.39	48 (55)	13.8	122 (141)	7.1	17
13A□A	1.3 (1.7)	8.34	74 (85)	23.3	207 (238)	10.7	28

* Values when the servomotor is combined with an SGD G digital torque amplifier.

MOTORS SGMGH-	Torque Constant	Moment of Inertia		Holding Brake (at 20°C)					Allowable Load Inertia	Rated Power Rate*	Rated Angular Acceleration*	Inertia Time Constant	Inductive Time Constant
				Capacity	Torque	Coil Resistance	Rated Current	Additional Inertia					
	$\frac{\text{lb}_f \cdot \text{in}}{\text{A}_{\text{rms}}}$ $\left(\frac{\text{N} \cdot \text{m}}{\text{A}_{\text{rms}}}\right)$	lb • in • s ² × 10 ⁻³	kg _f • m ² × 10 ⁻⁴	W	N • m	W	A	g _f • cm • s ²	kg _f • m ² × 10 ⁴	kW/s	rad/s ²	ms	ms
05A□A	7.3 (0.82)	6.41	7.24	9.85	4.41	58.5	0.41	1.85	36.2	11.2	3930	5.0	5.1
09A□A	7.3 (0.83)	12.3	13.9		12.7				69.5	20.9	3880	3.1	5.3
13A□A	7.4 (0.84)	18.2	20.5						103	33.8	4060	2.8	6.3

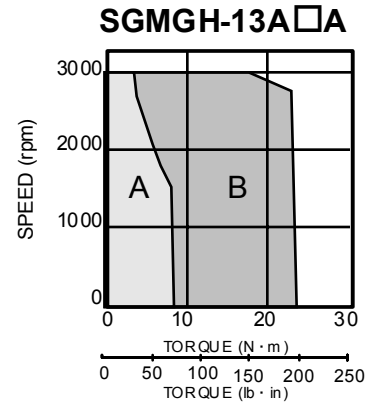
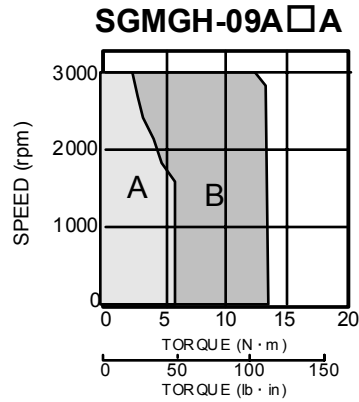
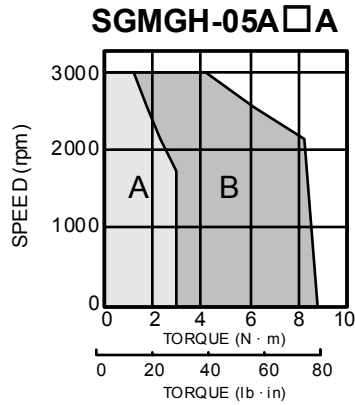
* Values when the servomotor is combined with an SGD G digital torque amplifier at an armature winding temperature of 100°C.

** These characteristics can be obtained when the following heat sinks (steel plates) are used for cooling purposes:

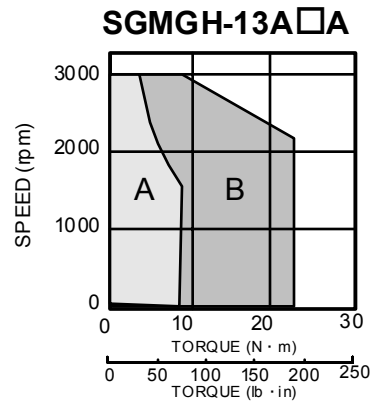
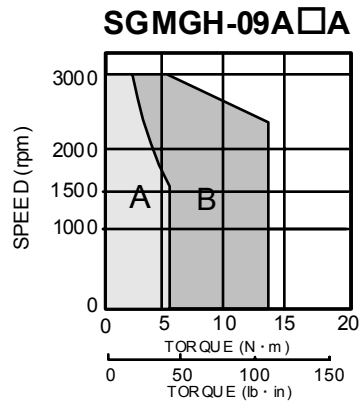
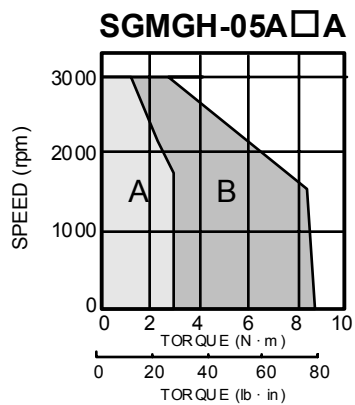
Type 05A□A to 13A□A: 15.75 × 15.75 × 0.79 (in) (400 × 400 × 20 (mm))

Speed / Torque Curves

200V Three-phase System:



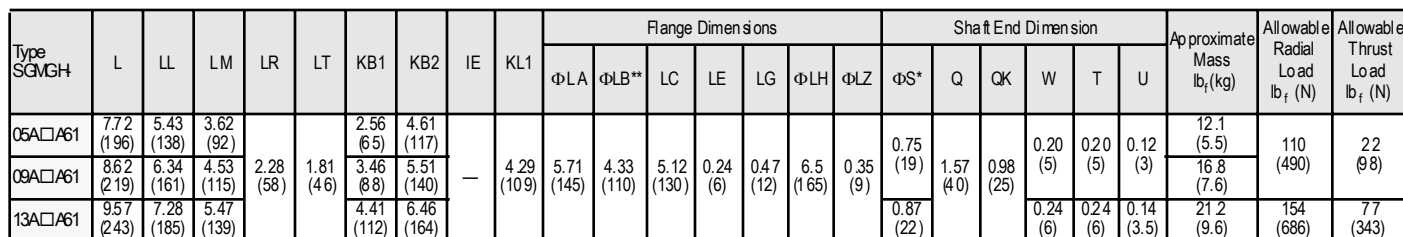
200V Single-phase System:



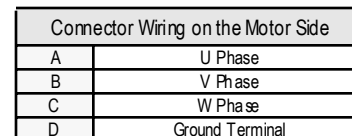
A : CONTINUOUS
DUTY ZONE

B : INTERMITTENT
DUTY ZONE

(1) 17-Bit Incremental Encoder



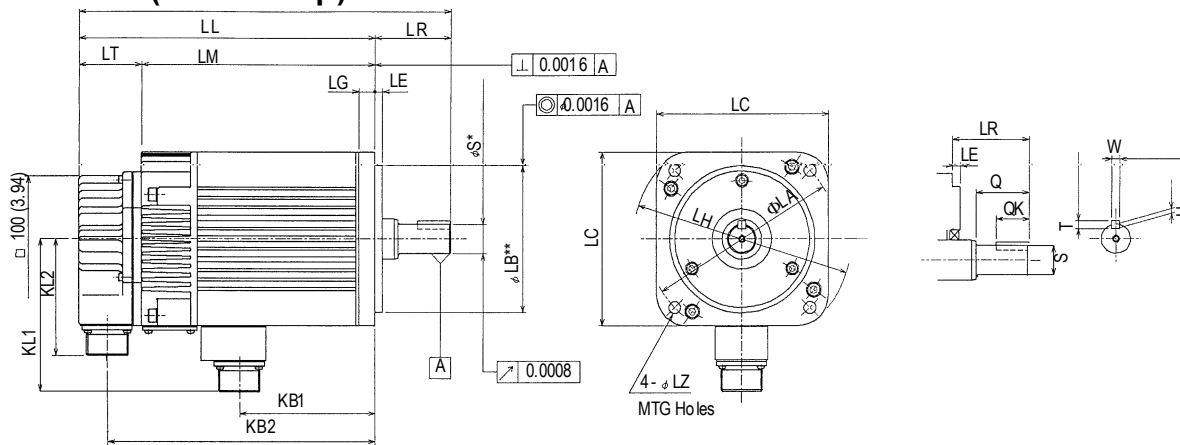
Specified Tolerances				
Dimension	*ΦS		**ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.7480, 0.8661	+0.0000-0.0005	43.307	+0.0000 -0.0014
mm	19.000, 22.000	+0.000 -0.013	110.000	+0.000 -0.035



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(2) 17-Bit Incremental Encoder. with Brake

- 0.5 to 4.4kW (0.7 to 5.9hp)

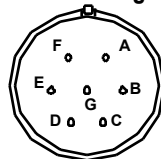


Type SGMGH-	L	LL	LM	LR	LT	KB1	KB2	KL1	KL2	Flange Dimension s						Shaft End Dimension					Approximate Mass lb _f (kg)	Allowable Radial Load lb _f (N)	Allowable Thrust Load lb _f (N)		
										ΦLA	ΦLB**	LC	LE	LG	ΦLH	ΦLZ	ΦS*	Q	QK	W				T	U
05A□A6C	9.21 (234)	6.93 (176)	5.08 (129)	2.28 (58)	1.85 (47)	2.2 (56)	6.1 (155)	4.72 (120)	3.46 (88)	5.71 (145)	4.33 (110)	5.12 (130)	0.24 (6)	0.47 (12)	6.5 (165)	0.35 (9)	0.75 (19)	1.57 (40)	0.98 (25)	0.20 (5)	0.20 (5)	0.12 (3)	16.5 (7.5)	110 (490)	22 (98)
09A□A6C	10.12 (257)	7.83 (199)	5.98 (152)			3.11 (79)	7.01 (178)			21.2 (9.6)															
13A□A6C	11.06 (281)	8.78 (223)	6.93 (176)			4.06 (103)	7.95 (202)			26.5 (12)	0.87 (22)	0.24 (6)	0.24 (6)	0.14 (3.5)											

- Note:
- Dimensions are the same when using either incremental or absolute encoders.
 - Tolerances on the dimensions of flange type LB and of shaft extensions S are based on JIS (Japanese Industrial Standard) B0401 "Limits and Fits for Engineering."

Specified Tolerances				
Dimension	*φS		*φLB	
	Diameter	Tolerance	Diameter	Tolerance
in	0.7480, 0.8661	+0.0000-0.0005	4.3307	+0.0000-0.0014
mm	19.000, 22.000	+0.000-0.013	110.000	+0.000-0.035

Motor Plug



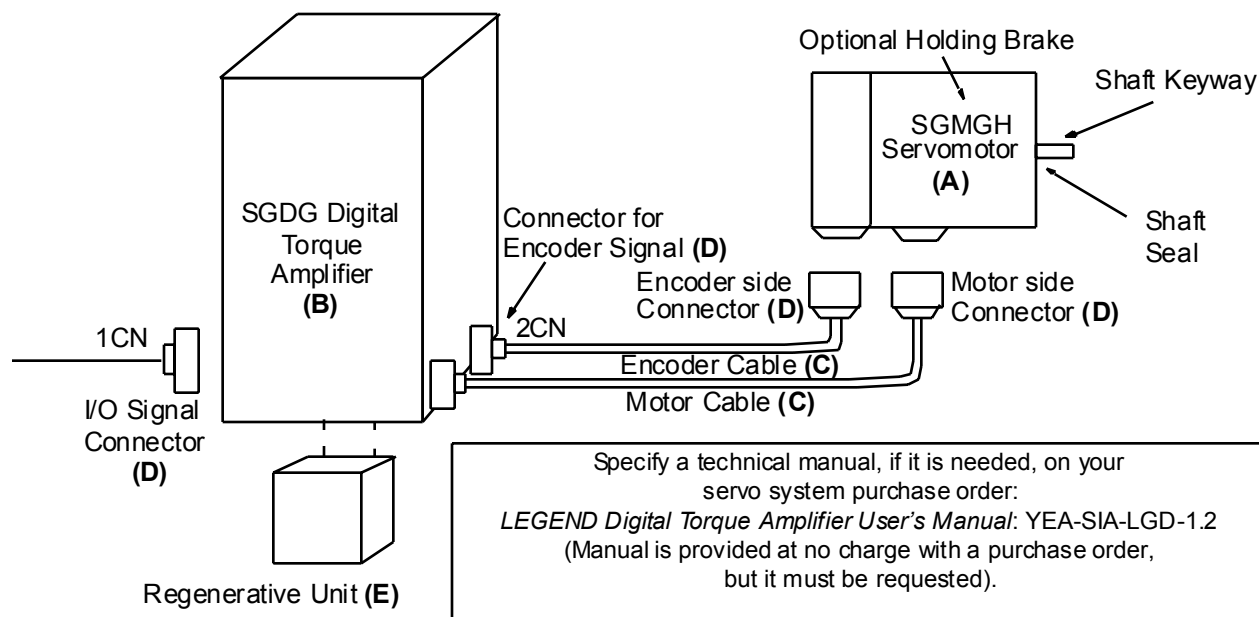
Connector Wiring on the Motor Side			
A	U Phase	E	Brake Terminal
B	V Phase	F	Brake Terminal
C	W Phase	G	—
D	FG (Frame Ground)		

Selecting Your SGMGH LEGEND System

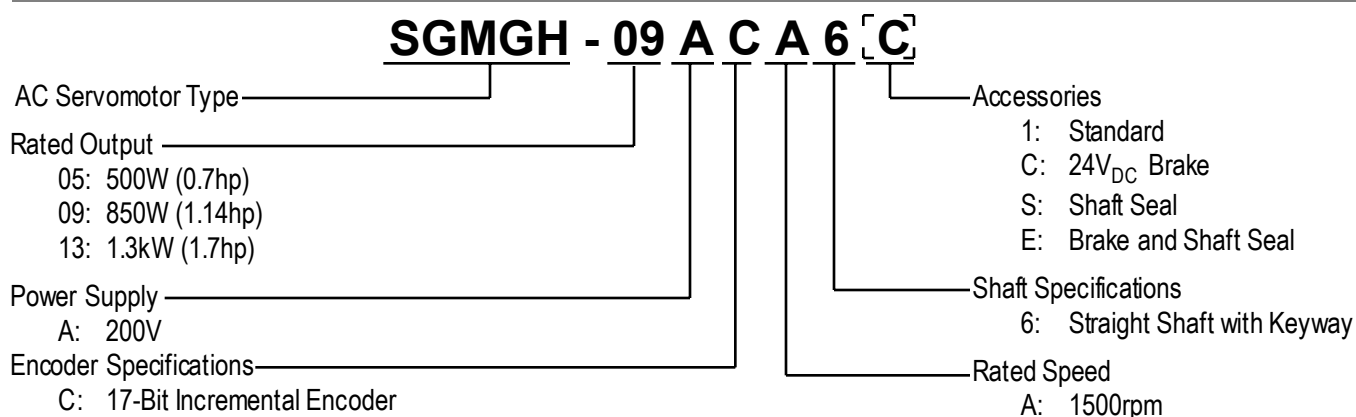
First, select the AC servomotor suited for your application using SigmaSize: the Yaskawa servomotor sizing software, available at no charge. (Request SigmaSize software via e-mail, at: literature@yaskawa.com).

Use the diagram below to locate and identify the components of your system. Each item is letter-coded and cross-referenced in the option tables on the following pages.

System Configuration



Model Number Designation



Servomotor & Amplifier Selection

Use the table below to select the appropriate SGMGH AC servomotor and amplifier.

Description	Peak Torque* (in • lb)	Rated Torque* (in • lb)	Motor Inertia (in • lb • s ² x 10 ⁻³)	Motor MODEL # (A)	Amplifier MODEL # (B)* Analog/Digital Input SGDG-	Motor & Amplifier Item Class
200V 17-bit Incremental Encoder Straight Shaft with Keyway 3000rpm* maximum MS Connectors	79	25	6.41	SGMGH-05ACA61	10GT*	Stock
			8.26	SGMGH-05ACA6C		
	122	48	12.30	SGMGH-09ACA61		
			14.15	SGMGH-09ACA6C		
	207	74	18.2	SGMGH-13ACA61	15GT*	
			20.1	SGMGH-13ACA6C		

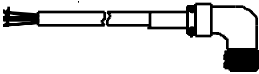
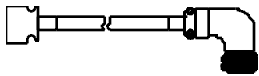
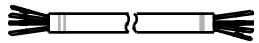
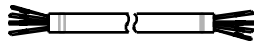
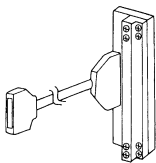
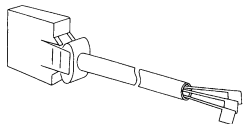
Note: 24V_{DC} brakes for SGMGH AC servomotors are standard. Contact a local source for 24V_{DC} power supplies.

For technical information, request Yaskawa manual number YEA-SIA-LGD-1.2.

- * The speed/torque specifications listed above are achievable when applied with 200V 3 phase systems. Reference the previously listed speed/torque (force) curves for performance with any other applied voltages and phase(s). For more detailed SGDG amplifier specifications and dimensions, refer to pages 95 to 99.

Pre-wired Cable Selection

Use the table below to select pre-wired cables for your SGMGH AC servomotor.

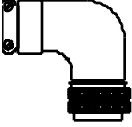
Cable Description (C)		Motor Size (kW)	Part Number*		Comments	Item Class
			without Brake	with Brake		
Power Cable with Connectors (IP67)		0.5, 0.9, 1.3	B1E-□□(A)	B1BE-□□(A)	Use the following key to specify needed cable length (last two digits of the part number): 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	Stock**
Encoder Cable (IP67)		All	JZSP-CMP02-□□(B)		These cables are available in five lengths. Use two digits in the part number's last place: 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	
Encoder Cable (for applications up to 20m). Only for solder connections			FR-RMCT-SB		These cables are available in any length.	
Encoder Cable (for applications from >20 to <50m) Only for solder connections			UL20276-SB		For example, to order one FR-RMCT-SB cable, 16m long, specify: quantity: 16 part no.: FR-RMCT-SB	
Input/Output 1CN Cable & Transition Terminal Block			JUSP-TA36P		35 mm DIN rail mountable; the cable length is 0.5m.	
Input/Output 1CN Cable with Pigtail Leads			CKI-SGDG-□□		Use the following key to specify needed cable length (last digit of part number): 01: 1m (standard) 02: 2m 03: 3m	

* The "(A)" at the end of the cable number indicates the revision level. The revision level may be subject to change prior to this catalog's reprinting.

** Standard cable lengths are Stock items; non-standard cable lengths are Limited Stock items.

Connector Selection

Use the table below to select mating connectors for each SGMGH AC servomotor.

Connector Description (D)		Motor Size (kW)	Part Number		Comments	Item Class
			without Brake	with Brake		
MS Connector for Motor Power Cable*		0.5, 0.9, 1.3	MS3106B18-10S	MS3106B20-15S	Straight-type connector	Stock
			MS3108B18-10S	MS3108B20-15S	L-type connector	
			MS3057-10A	MS3057-12A	Cable clamp	
MS Connector for Encoder Cable		All	MS3106B20-29S		Straight-type connector	
			MS3108B20-29S		L-type connector	
			MS3057-12A		Cable clamp	
1CN Mating Connector			DP9420007		Can use 1CN for analog speed and torque monitor service checks.	
2CN Encoder Mating Connector			JZSP-CMP9-1		—	

* Choose either a straight or L-type connector and the associated cable clamp for a complete assembly. For example, L-type connector MS3108B18-10S is compatible with cable clamp MS3057-10A. MS connectors listed in the table are nonenvironmental.

Peripheral Device Selection

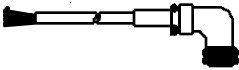
Use the table below to select peripheral devices for each SGMGH AC servomotor.

Component Description (E)		Part Number	Comments	Item Class
External Regenerative Unit*	50 ohms 120 watt for 1.0 amp	RH120 50ohmJ	This is a general purpose regenerative unit.	Stock
	25 ohms 300 watt for 1.5 amp	RH500N25_ohmK	Caution: Proper set-up is necessary to avoid equipment damage.	

* Refer to the SGDg servo amplifier section of this catalog for additional specifications, and the *LEGEND Digital Torque Amplifier User's Manual* (YEA-SIA-LGD-1.2) for proper resistor sizing guidelines.

CE Pre-wired Cable Selection

Use the table below to select shielded pre-wired power cables for your SGMGH AC servomotor.

Cable Description (C)		Motor Size (kW)	Part Number*		Comments	Item Class
			without Brake	with Brake		
Power Cable with Connectors IP67		0.5, 0.9, 1.3	B1CE-□□(A)	B1BCE-□□(A)	Use the following key to specify needed cable length (last two digits of the part number): 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	Limited Stock

* The "(A)" at the end of the cable number indicates the revision level, which may be subject to change prior to this catalog's reprinting.

CE Connector Selection

Use the table below to select mating connectors for your SGMGH AC servomotor.

Connector Description (D)		Motor Size (kW)	Part Number		Comments**	Item Class
			without Brake	with Brake		
Connector for Motor Power Cable*		1.0, 1.5, 2.0	CE05-8A18-10SD-B-BAS CE3057-10A-1(D265)	CE05-8A20-15SD-B-BAS CE3057-12A-1(D265)	L-type connector Cable clamp	Limited Stock
Connector for Encoder Cable			CE02-6A20-29NSW and CE20BA-S and CE3057-12A-3(D265)		L-type connector (plug and back shell) and Cable clamp (diameters 0.265 to 0.394in)	

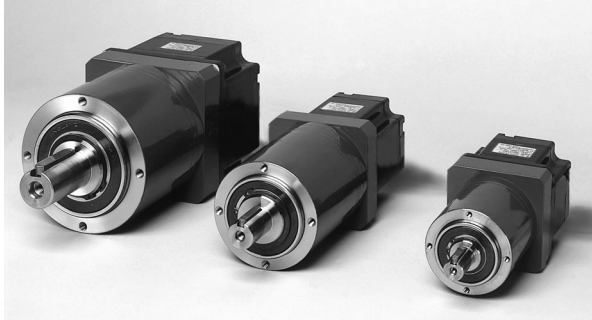
* Choose the connector and the associated cable clamp for a complete assembly. Connectors listed in this table are environmentally sealed.

** Connectors are manufactured by DDK and listed here with the largest standard cable clamp available.

NOTES:

SGMGH Gearmotors (1500rpm) - With Incremental Encoder

Rated Output: 0.45kW, 0.85kW,
1.3kW



For Additional Information	Page(s)
SGMGH Gearmotor Ratings & Specifications	68 - 69
SGMGH Gearmotor Dimensions	70
SGMGH Gearmotor Selection/Ordering Information	71 - 76

Design Features

1. Compact

- Fits in limited mounting space
- High torque to inertia ratio

2. Torque

- 383 to 3540in·lb peak torque
- Uses time-proven, Sigma motor technology

3. Encoders

- 17-Bit incremental encoder (standard)

4. Enhanced Environmental Resistance

- Totally enclosed, self-cooled IP67 (not including shaft)

5. Application Emphasis

- Machine tools, woodworking machines, and thermoforming machines
- Roll feeders
- Press automation
- Gantry robots
- PCB drilling machines
- Packaging machines

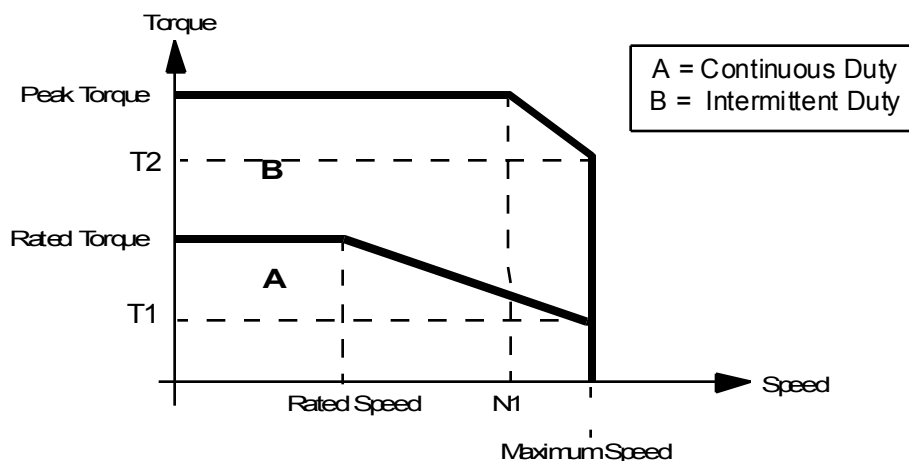
6. Certified International Standards

- cUL recognized (File #: E165827), CE compliance

Gearmotor Ratings and Specifications

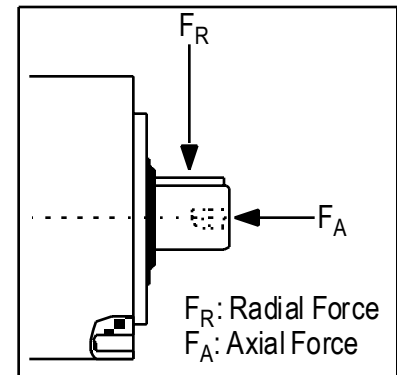
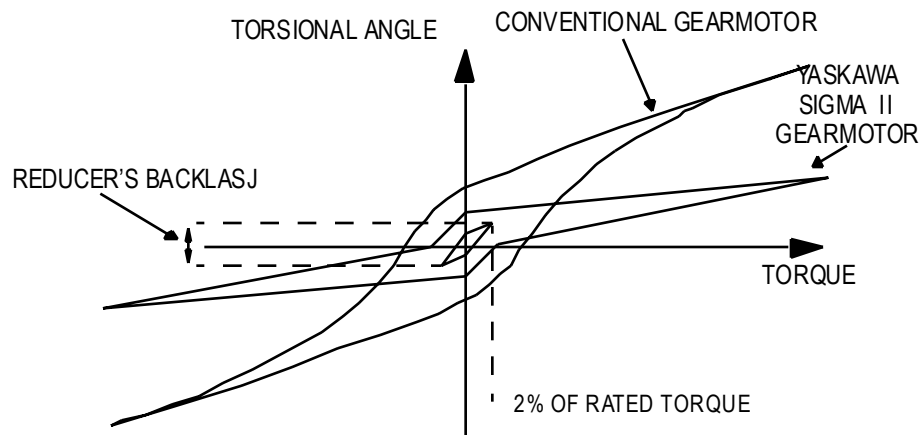
GEARMOTOR Part Number	Rated Torque* (in · lb)	Peak Torque* (in · lb)	Rated Speed* (rpm)	Maximum Speed* (rpm)	Speed N1 (rpm)	Torque T1 (in · lb)	Torque T2 (in · lb)
Standard SGMGH Gearmotors							
SG05SA-GA05AC	122	383	300	600	440	61	206
SG10SA-GA05AC	244	637	150	300	220	122	412
SG25SA-GA05AC	597	1770	60	120	88	298	1009
SG50SA-GA05AC	1194	3540	30	60	44	597	2018
SG05SA-GA09AC	231	592	300	600	560	116	498
SG10SA-GA09AC	463	1,185	150	300	280	232	996
SG25SA-GA09AC	1133	2901	60	120	112	568	2438
SG50SA-GA09AC	2266	3540	30	60	60	1135	3540
SG05SA-GA13AC	358	1000	300	600	550	179	721
SG10SA-GA13AC	716	1593	150	300	275	358	1442
SG25SA-GA13AC	1753	3540	60	120	110	877	3531

* To achieve the speed/torque performance listed, use only the gearmotor/amp combinations and system supply as specified on page 72.

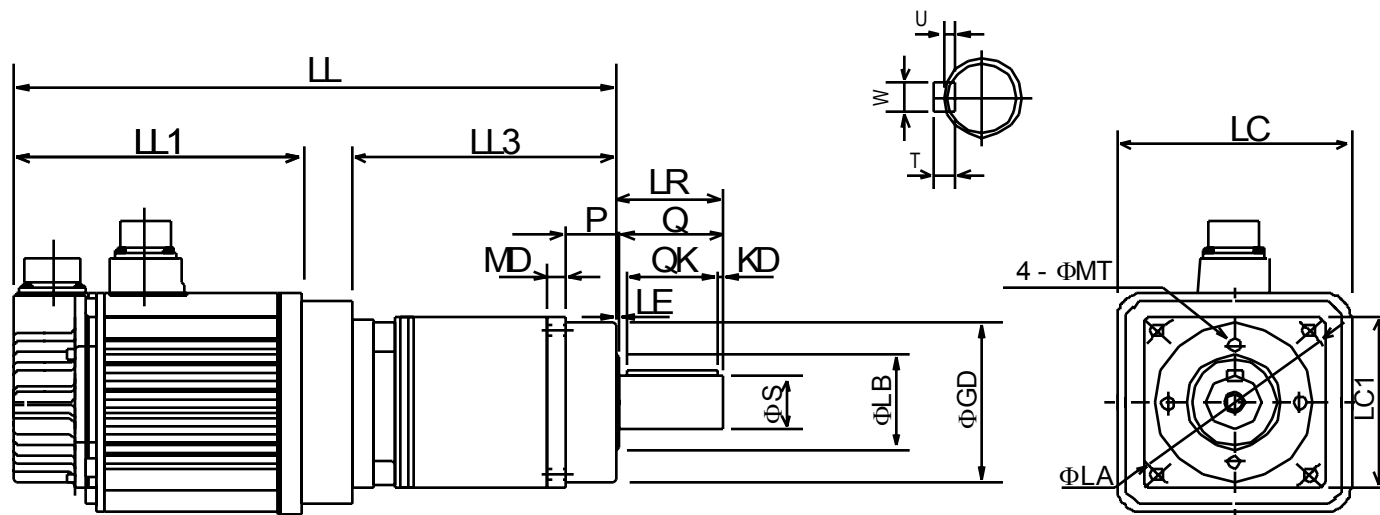


Gearmotor Mechanical Ratings

GEARMOTOR Part Number	Gearhead Backlash (arc min)	Gearhead Maximum Radial Load (lb _f)	Gearhead Maximum Axial Load (lb _f)	Gearhead Inertia (lb · in · s ²)	Gearmotor Weight (lb)
Standard SGMGH Gearmotors					
SG05SA-GA05AC	<10	540	428	0.0016	21.14
SG10SA-GA05AC					
SG25SA-GA05AC		1035	900	0.0049	36.80
SG50SA-GA05AC		1687	1350	0.0047	58.30
SG05SA-GA09AC		540	428	0.0016	25.84
SG10SA-GA09AC		1035	900	0.0048	36.65
SG25SA-GA09AC		1687	1350	0.0047	63.00
SG50SA-GA09AC					
SG05SA-GA13AC		1035	900	0.0048	41.05
SG10SA-GA13AC					
SG25SA-GA13AC		1687	1350	0.047	67.40



Dimensions in inches (mm)



• Standard SGMGH Gearmotors

GEARMOTOR	LL1	LL3	LL	LE	LR	ΦLB	ΦGD	ΦS	P	LC	LC1	ΦLA	ΦMT*	MD*	Q	QK	KD	W	T	U	
SG05SA-GA05AC	5.43 (138)	3.15 (80)	10.63 (270)	0.20 (5)	1.81 (46)	2.68 (68)	3.54 (90)	0.87 (22)	N/A	5.12 (130)	N/A	3.15 (80)	M6 x 1.0	0.47 (12)	1.42 (36)	1.26 (32)	0.08 (2)	0.24 (6)	0.24 (6)	0.14 (3.5)	
SG10SA-GA05AC		5.30 (134.5)	12.62 (320.5)	0.24 (6)	2.76 (70)	3.54 (90)	4.72 (120)	1.26 (32)				4.25 (108)	M8 x 1.25	0.63 (16)	2.28 (58)	1.97 (50)	0.16 (4)	0.39 (10)	0.32 (8)	0.20 (5)	
SG25SA-GA05AC		6.02 (153)	13.35 (339)	0.32 (8)	3.82 (97)	4.72 (120)	6.10 (155)	1.58 (40)				5.51 (140)	M10 x 1.5	0.79 (20)	3.23 (82)	2.76 (70)	0.24 (6)	0.47 (12)			
SG50SA-GA05AC		3.15 (80)	11.54 (293)	0.20 (5)	1.81 (46)	2.68 (68)	3.54 (90)	0.87 (22)				3.15 (80)	M6 x 1.0	0.47 (12)	1.42 (36)	1.26 (32)	0.08 (2)	0.24 (6)			0.24 (6)
SG05SA-GA09AC	4.02 (102)	12.24 (311)	0.24 (6)	2.76 (70)	3.54 (90)	4.72 (120)	1.26 (32)	4.25 (108)				M8 x 1.25	0.63 (16)	2.28 (58)	1.97 (50)	0.16 (4)	0.39 (10)	0.32 (8)			0.20 (5)
SG10SA-GA09AC	6.02 (153)	14.25 (362)	0.32 (8)	3.82 (97)	4.72 (120)	6.10 (155)	1.58 (40)	5.51 (140)				M10 x 1.5	0.79 (20)	3.23 (82)	2.76 (70)	0.24 (6)	0.47 (12)				
SG25SA-GA09AC	4.02 (102)	13.19 (335)	0.24 (6)	2.76 (70)	3.54 (90)	4.72 (120)	1.26 (32)	4.25 (108)				M8 x 1.25	0.63 (16)	2.28 (58)	1.97 (50)	0.16 (4)	0.39 (10)				
SG50SA-GA09AC	6.02 (153)	15.20 (386)	0.32 (8)	3.82 (97)	4.72 (120)	6.10 (155)	1.58 (40)	5.51 (140)				M10 x 1.5	0.79 (20)	3.23 (82)	2.76 (70)	0.24 (6)	0.47 (12)				
SG05SA-GA13AC	7.28 (185)	4.02 (102)	13.19 (335)	0.24 (6)	2.76 (70)	3.54 (90)	4.72 (120)	1.26 (32)				4.25 (108)	M8 x 1.25	0.63 (16)	2.28 (58)	1.97 (50)	0.16 (4)	0.39 (10)	0.32 (8)	0.20 (5)	
SG10SA-GA13AC		6.02 (153)	15.20 (386)	0.32 (8)	3.82 (97)	4.72 (120)	6.10 (155)	1.58 (40)				5.51 (140)	M10 x 1.5	0.79 (20)	3.23 (82)	2.76 (70)	0.24 (6)	0.47 (12)			
SG25SA-GA13AC																					

Note:* For Standard (SG) Gearmotors only: 4 x ΦMT threaded holes to a depth of dimension MD, set 90° apart.

Specified Tolerances for Standard (SG) Gearmotor Models:

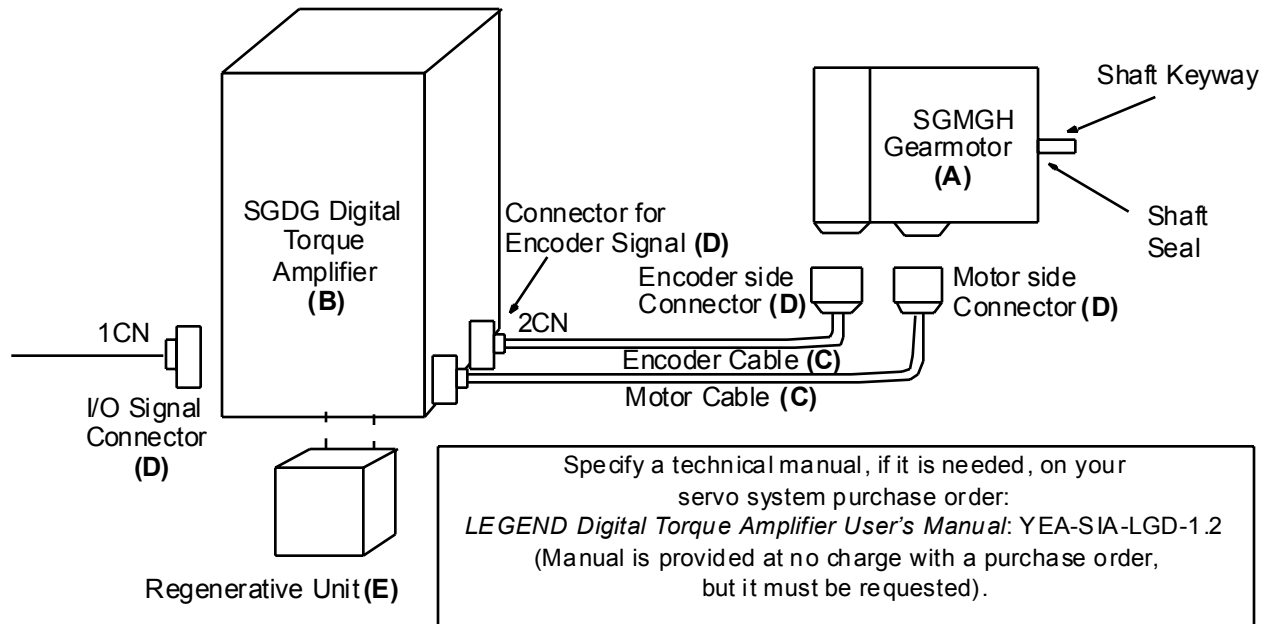
Dimension	ΦS		ΦLB		W	
Unit	Diameter	Tolerance	Diameter	Tolerance	Width	Tolerance
in	0.866	+0.00059 +0.00008	2.677	+0.00000 -0.00075	236	+0.00000 -0.00118
	1.260,	+0.00071 +0.00008	3.54331,	+0.00000 -0.00087	0.39370	+0.00000 -0.00142
	1.575		4.72441		0.47244	+0.00000 -0.00169
mm	22	+0.015 +0.002	68	+0.000 -0.019	6	+0.000 -0.030
	32,	+0.018 +0.002	90,	+0.000 -0.022	10	+0.000 -0.036
	40		20		12	+0.000 -0.043

Selecting Your SGMGH Gearmotor System

First, select the AC gearmotor suited for your application using SigmaSize: the Yaskawa servomotor sizing software, available at no charge. (Request SigmaSize software via e-mail, at: literature@yaskawa.com).

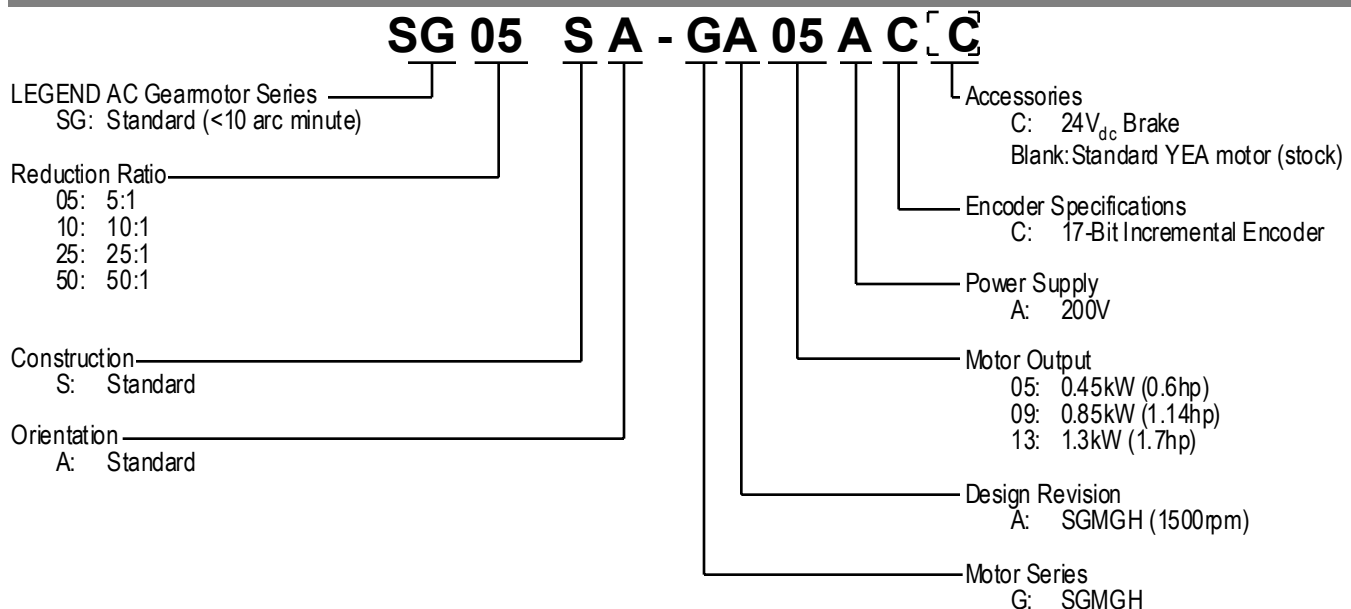
Use the diagram below to locate and identify the components of your system. Each item is letter-coded and cross-referenced in the option tables on the following pages.

System Configuration



SGMGH
Gearmotors

Model Number Designation



Gearmotor & Amplifier Selection

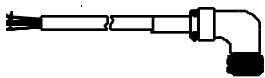
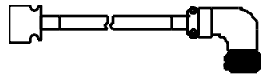
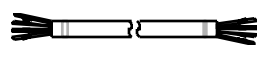
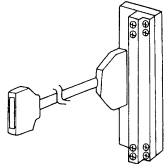
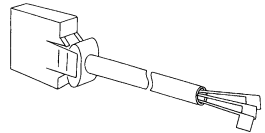
Use this table below to select the appropriate SGMGH AC gearmotor and amplifier. See notes on page 75.

Description	Rated Torque* (in • lb)	Peak Torque* (in • lb)	Rated Speed* (rpm)	Maximum Speed* (rpm)	Gear Ratio	Gearmotor Model Number (A)	Amplifier MODEL # SGDG- (B)	Motor and Amplifier Item Class
200V* 17-bit Incremental Encoder Straight Shaft with Keyway MS connectors	122	383	300	600	5:1	SG05SA-GA05AC	10GT**	Gear Motor: 3-5 Week Leadtime for Assembly
	244	637	150	300	10:1	SG10SA-GA05AC		
	597	1770	60	120	25:1	SG25SA-GA05AC		
	1194	3540	30	60	50:1	SG50SA-GA05AC		
	231	592	300	600	5:1	SG05SA-GA09AC		
	463	1185	150	300	10:1	SG10SA-GA09AC		
	1133	2901	60	120	25:1	SG25SA-GA09AC		
	2266	3540	30	60	50:1	SG50SA-GA09AC		
	358	1000	300	600	5:1	SG05SA-GA13AC	15GT**	Amplifier: Stock
	716	1593	150	300	10:1	SG10SA-GA13AC		

- Notes: 1. These performance ratings apply when duty cycles are 60% or less, and when the gearmotor runs for 1,000 cycles per hour or less. Contact your Yaskawa representative when duty cycles exceed 60%, and when the gearmotor runs for more than 1,000 cycles per hour.
2. Rated Speed is at 20°C ambient temperature. Reduce Rated Speed by 20% at 40°C ambient temperature.
3. For right-angle gearmotors, please consult the factory for availability.
4. 24V_{DC} brakes for SGMGH LEGEND AC gearmotors are standard. Contact a local source for 24V_{DC} power supplies.
5. For technical information, request Yaskawa manual number YEA-SIA-LGD-1.2.
- * To achieve the speed/torque performance listed above, use only with 200-230VAC 3 phase 10%-15% systems. For more detailed SGDG amplifier specifications and dimensions, refer to pages 91 to 95.

Pre-wired Cable Selection

Use the table below to select pre-wired cables for your SGMGH AC gearmotor.

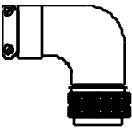
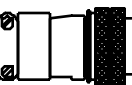
Cable Description (C)		Motor Size (kW)	Part Number*		Comments	Item Class
			without Brake	with Brake		
Power Cable with Connectors (IP67)		0.5, 0.9, 1.3	B1E-□□(A)	B1BE-□□(A)	Use the following key to specify needed cable length (last two digits of the part number): 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	Stock**
Encoder Cable		All	JZSP-CMP02-□□(B)		These cables are available in five lengths. Use two digits in the part number's last place: 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	
Encoder Cable (for applications up to 20m) Only for Solder Connections			FR-RMCT-SB		These cables are available in any length.	
Encoder Cable (for applications from >20 to <50m) Only for Solder Connections			UL20276-SB		For example: to order one FR-RMCT-SB cable, 16m long, specify: quantity: 16 part no.: FR-RMCT-SB.	
Input/Output 1CN Cable & Transition Terminal Block			JUSP-TA36P		35 mm DIN rail mountable; the cable length is 0.5m.	
Input/Output 1CN Cable with Pigtail Leads			CKI-SGDG-□□		Use the following key to specify needed cable length (last digit of part number): 01: 1m (standard) 02: 2m 03: 3m	

* The "(A)" at the end of the cable number indicates the revision level. The revision level may be subject to change prior to this catalog's reprinting.

** Standard cable lengths are Stock items; non-standard cable lengths are Limited Stock items.

Connector Selection

Use the table below to select mating connectors for your SGMGH AC gearmotor.

Connector Description (D)		Motor Size (kW)	Part Number		Comments	Item Class
			without Brake	with Brake		
MS Connector for Motor Power Cable *		0.5, 0.9, 1.3	MS3106B18-10S	MS3106B20-15S	Straight-type connector	Stock
			MS3108B18-10S	MS3108B20-15S	L-type connector	
			MS3057-10A	MS3057-12A	Cable clamp	
MS Connector for Encoder Cable		All	MS3106B20-29S		Straight-type connector	
			MS3108B20-29S		L-type connector	
			MS3057-12A		Cable clamp	
1CN Mating Connector			DP9420007		Can use 1CN for analog speed and torque monitor service checks.	
2CN Encoder Mating Connector			JZSP-CMP9-1		—	

* Choose either a straight or L-type connector and the associated cable clamp for a complete assembly. For example, L-type connector MS3108B18-10S is compatible with cable clamp MS3057-10A.

Peripheral Device Selection

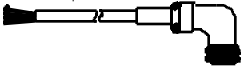
Use the table below to select peripheral devices for your SGMGH AC gearmotor.

Component Description (E)		Part Number	Comments	Item Class
External Regenerative Unit*	50Ω 120 watt for 1.0 amp	RH120 50ohmJ	This is a general purpose regenerative unit.	Stock
	25Ω 300 watt for 1.5 amp	RH500N25_ohmK	Caution: Proper set-up is necessary to avoid equipment damage.	

- * For an alternate solution, specify the individual resistor part number RH500N25_OHMK in necessary series or parallel connection. Refer to the SGDg servo amplifier section of this catalog for additional specifications, and the *LEGEND Digital Torque Amplifier User's Manual* (YEA-SIA-LGD-1.2) for proper resistor sizing guidelines.

CE Pre-wired Cable Selection

Use the table below to select shielded pre-wired power cables for your SGMGH AC gearmotor.

Cable Description (C)		Motor Size (kW)	Part Number*		Comments	Item Class
			without Brake	with Brake		
Power Cable with Connectors (IP67)		0.5, 0.9, 1.3	B1CE-□□(A)	B1BCE-□□(A)	Use the following key to specify needed cable length (last two digits of the part number): 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	Limited Stock

* The "(A)" at the end of the cable number indicates the revision level. The revision level may be subject to change prior to this catalog's reprinting.

CE Connector Selection

Use the table below to select mating connectors for your SGMGH AC gearmotor.

Connector Description (D)		Motor Size (kW)	Part Number		Comments**	Item Class
			without Brake	with Brake		
Connector for Motor Power Cable*		1.0, 1.5, 2.0	CE05-8A18-10SD-B-BAS CE3057-10A-1(D265)	CE05-8A20-15SD-B-BAS CE3057-12A-1(D265)	L-type connector Cable clamp	Limited Stock
Connector for Encoder Cable			CE02-6A20-29NSW and CE20BA-S and CE3057-12A-3(D265)		L-type connector (plug and back shell) and Cable clamp (diameters 0.265 to 0.394in)	

* Choose the connector and the associated cable clamp for a complete assembly. The connectors listed in the table are suitable for IP67 environments.

** Connectors are manufactured by DDK and listed here with the largest standard cable clamp available.

Super High Power Rate Series

SGMSH Servomotors - With Incremental Encoder

Rated Output: 1.0kW, 1.5kW



For Additional Information	Page(s)
SGMSH Ratings & Specifications	78
SGMSH Speed/Torque Curves	79
SGMSH Dimensions	80 - 81
SGMSH Selection/Ordering Information	82 - 87
SGDG Ratings & Specifications	91
SGDG Dimensions	92 - 95

Design Features

1. Compact

- Small sized motor
- Six frame sizes: up to 130in·lb peak torque

2. High Speed

- Rated Speed: 3000rpm
- Maximum Speed: 5000rpm

3. Encoders

- 17-bit incremental encoder standard

4. Enclosure

- Totally enclosed, self-cooled IP67 (excluding shaft)
- IP67 with shaft seal (option)

5. Application Emphasis

- High torque to inertia ratio
- Chip mounters
- PCB drilling machines
- Robots
- Conveyors
- Packaging

6. Certified International Standards

- UL, cUL recognized (File #: E165827), CE compliance

Servomotor Ratings and Specifications

Time Rating:	Continuous	Enclosure:	Totally-enclosed, self-cooled	Instantaneous Maximum Speed:	
Insulation:	Class F		IP67 (except for shaft opening)		5000rpm
Vibration:	15 μ m or less	Ambient Temperature:	0 to 40°C	Excitation:	Permanent magnet
Withstand Voltage:	1500V _{ac}	Ambient Humidity:	20 to 80% (non-condensing)	Drive Method:	Direct drive
Insulation Resistance:	10M Ω minimum at 500V _{DC}	Rated Speed:	3000rpm	Mounting:	Flange-mounted
				Painting Color:	Muncell notation N1.5

Amplifier System Voltage	MOTORS: SGMSH-	Rated Output*	Rated Torque*		Instantaneous Peak Torque*		Rated Current*	Instantaneous Maximum Current*
		kW (hp)	N • m	kg _f • cm (lb • in)	N • m	kg _f • cm (lb • in)	A _{rms}	A _{rms}
200V _{ac}	10A□A	1.0 (1.3)	3.18	32.4 (28.2)	9.54	97.2 (84.4)	5.7	17
	15A□A	1.5 (2.0)	4.9	50 (43.4)	14.7	150 (130)	9.7	28

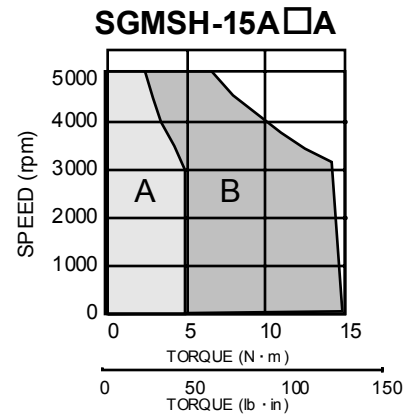
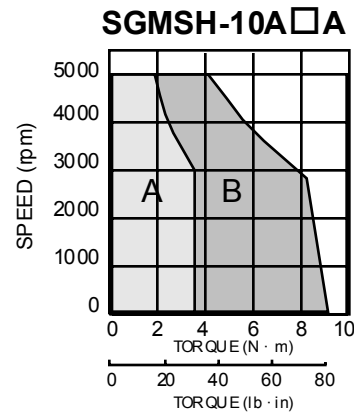
MOTORS SGMSH-	Torque Constant	Moment of Inertia		Holding Brake (at 20°C)					Allowable Load Inertia	Rated Power Rate*	Rated Angular Acceleration*	Inertia Time Constant	Inductive Time Constant
				Capacity	Torque	Coil Resistance	Rated Current	Additional Inertia					
	$\frac{\text{lb}_f \cdot \text{in}}{\text{A}_{\text{rms}}} \left(\frac{\text{N} \cdot \text{m}}{\text{A}_{\text{rms}}} \right)$	$\frac{\text{lb}_f \cdot \text{in} \cdot \text{s}^2}{\times 10^{-3}}$	$\frac{\text{kg}_f \cdot \text{m}^2}{\times 10^{-4}}$	W	N • m	W	A	$\frac{\text{lb}_f \cdot \text{in} \cdot \text{s}^2}{\times 10^{-3}}$	$\frac{\text{kg}_f \cdot \text{m}^2}{\times 10^{-4}}$	kW/s	rad/s ²	ms	ms
10A□A	5.6 (0.64)	1.54	1.74	7.0	7.84	820	0.29	0.219	8.7	57.9	18250	0.87	7.1
15A□A	5.0 (0.56)	2.19	2.47						12.4	97.2	19840	0.71	7.7

* These items and torque-speed characteristics quoted in combination with an SGDg digital torque amplifier at an armature winding temperature of 20°C.

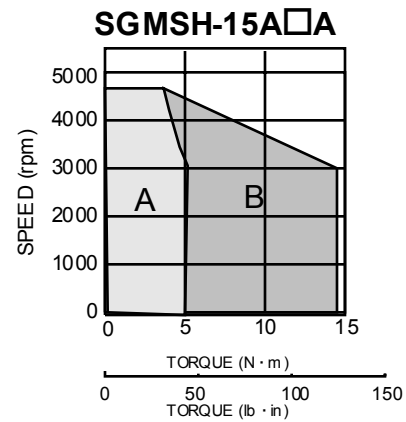
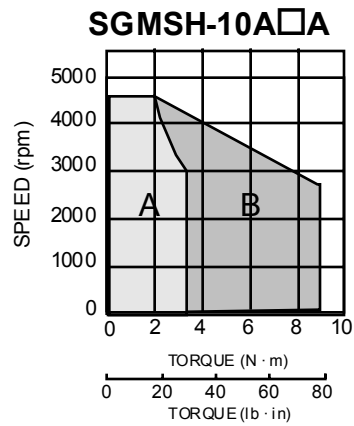
Note: These characteristics can be obtained when the following heat sinks (steel plates) are used for cooling purposes:
Type 10A□A to 15A□A: (11.81 × 11.81 × 0.47 (in)) (300 × 300 × 12 (mm))

Speed / Torque Curves

200V Three-phase System



200V Single-phase System

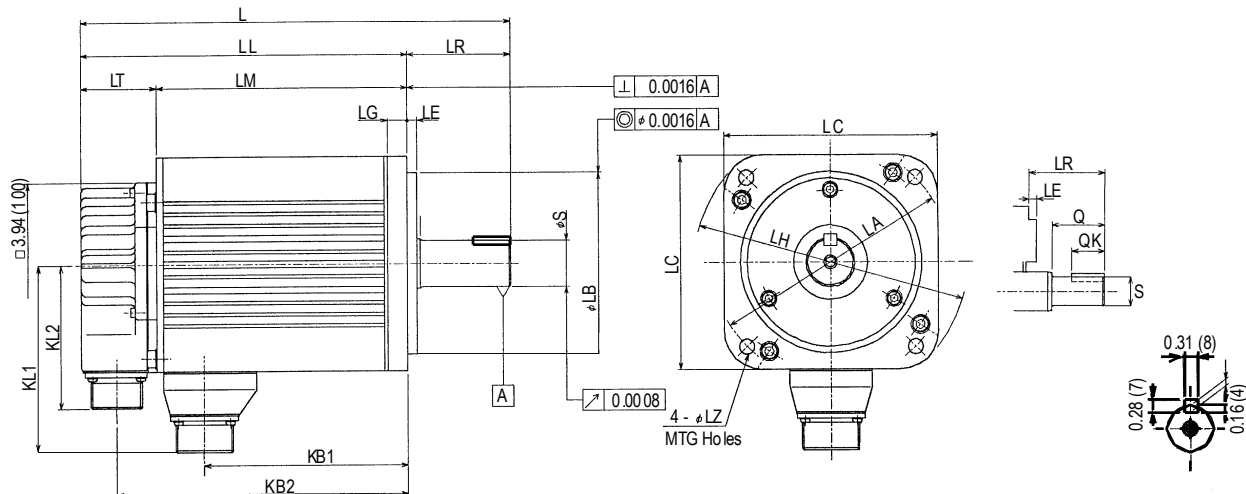


A : CONTINUOUS DUTY ZONE

B : INTERMITTENT DUTY ZONE

Dimensions in inches (mm)

(1) 17-bit Incremental Encoder

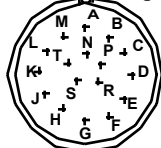


Type SGMSH-	L	LL	LM	LR	LT	KB1	KB2	KL 1	KL 2	Flange Dimensions						Shaft End Dimension			Approximate Mass lb _f (kg)	Allowable Radial Load lb _f (N)	Allowable Thrust Load lb _f (N)	
										ΦLA	ΦLB **	LC	LE	LG	ΦLH	ΦLZ	ΦS*	Q				QK
10A □A61	7.64 (194)	5.87 (149)	4.06 (103)	1.77 (45)	1.81 (46)	2.99 (76)	5.04 (128)	3.78 (96)	3.43 (87)	4.53 (115)	3.74 (95)	3.94 (100)	0.12 (3)	0.39 (10)	5.12 (130)	0.28 (7)	0.94 (24)	1.57 (40)	1.26 (32)	10.1 (4.6)	154 (686)	44 (196)
15A □A61	8.66 (220)	6.89 (175)	5.08 (129)			4.02 (102)	6.06 (154)															

Note: 1. Dimensions are the same when using either incremental or absolute encoders.
2. Tolerances on the dimensions of flange type LB and shaft extensions S are based on JIS (Japanese Industrial Standard) B0401 "Limits and Fits for Engineering."

Specified Tolerances				
Dimension	$^{*}\phi S$		$^{**}\phi LB$	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.9449	+0.0000-0.0005	3.7402	+0.0000-0.0014
mm	24.000	+0.000 -0.013	95.000	+0.000 -0.035

Encoder Plug

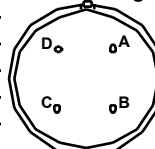


MS3102A20-29P

Connector Wiring on the Incremental Encoders			
A	—	K	—
B	—	L	—
C	Data +	M	—
D	Data -	N	—
E	—	P	—
F	—	R	—
G	0V	S	—
H	+5V _{dc}	T	—
J	FG (Frame Ground)		

Non-Environmental Mating Connector:
MS3108B20-29S (L Type)
MS3106B20-29S (Straight Type)
Cable Clamp: MS3057-12A

Motor Plug

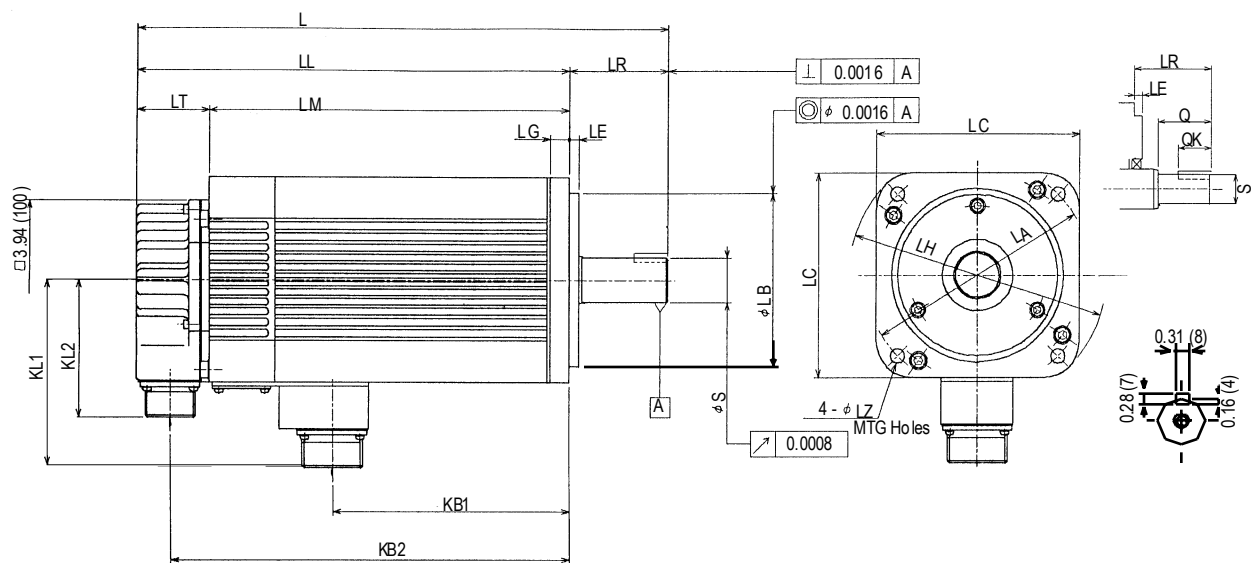


MS3102A22-22P

Connector Wiring on the Motor Side

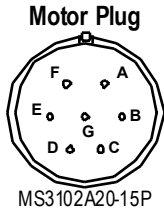
A	U Phase
B	V Phase
C	W Phase
D	Ground Terminal

(2) 17-bit Incremental, with Brake



Type SGMSH-	L	LL	LM	LR	LT	KB1	KB2	KL1	KL2	Flange Dimensions						Shaft End Dimension			Approximate Mass lb _f (kg)	Allowable Radial Load lb _f (N)	Allowable Thrust Load lb _f (N)	
										ΦLA	ΦLB**	LC	LE	LG	FLH	ΦLZ	ΦS*	Q				QK
10AαA6C	9.37 (238)	7.6 (193)	5.79 (147)	1.77 (45)	1.81 (46)	2.64 (67)	6.77 (172)	3.94 (100)	3.43 (87)	4.53 (115)	3.74 (95)	3.94 (100)	0.12 (3)	0.39 (10)	5.12 (130)	0.28 (7)	0.94 (24)	1.57 (40)	1.26 (32)	13.2 (6.0)	154 (686)	44 (196)
15AαA6C	10.39 (264)	8.62 (219)	6.81 (173)	1.77 (45)		3.66 (93)	7.8 (198)															

Specified Tolerances				
Dimension	*ΦS		**ΦLB	
Unit	Diameter	Tolerance	Diameter	Tolerance
in	0.9449	+0.0000-0.0005	3.7402	+0.0000-0.0014
mm	24.000	+0.000-0.013	95.000	+0.000-0.035



Connector Wiring on the Motor Side			
A	U Phase	E	Brake Terminal
B	V Phase	F	Brake Terminal
C	W Phase	G	—
D	FG (Frame Ground)		

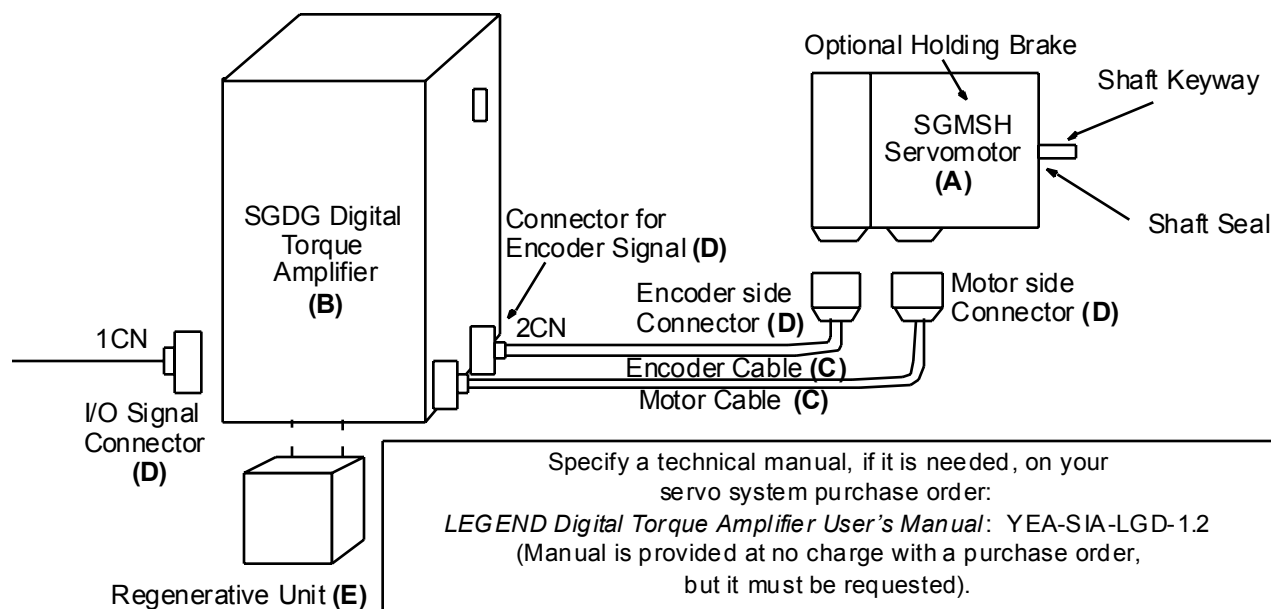
SGMSH
Servomotors

Selecting Your SGMSH AC Servo System

First, select the AC servomotor suited for your application using SigmaSize: the Yaskawa servomotor sizing software, available at no charge. (Request SigmaSize software via e-mail, at: literature@yaskawa.com).

Use the diagram below to locate and identify the components of your system. Each item is letter-coded and cross-referenced in the option tables on the following pages.

System Configuration



Model Number Designation

SGMSH - 10 A C A 6 [1]

AC Servomotor Type	10	A	C	A	6	[1]	Accessories
Rated Output	10: 1.0kW (1.3hp) 15: 1.5kW (2.0hp)						1: Standard C: 24V _{DC} Brake S: Shaft Seal E: Shaft Seal and Brake
Power Supply	A: 200V						Shaft Specifications
Encoder Specifications	C: 17-bit Incremental Encoder						6: Straight Shaft with Keyway
							Rated Speed
							A: 3000rpm

Servomotor & Amplifier Selection

Use the table below to select the appropriate SGMSH AC servomotor and amplifier.

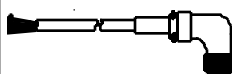
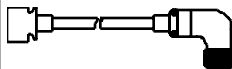
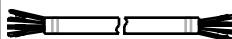
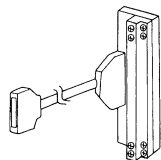
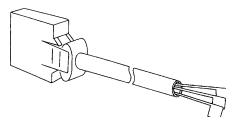
Description	Peak Torque* (in • lb)	Rated Torque* (in • lb)	Motor Inertia (in • lb • s ² X 10 ⁻³)	Motor MODEL # (A)	Amplifier MODEL # (B)* Analog/Digital Input SGDG-	Motor & Amplifier Item Class
200V, 17-bit Incremental Encoder Straight Shaft with Keyway 5000rpm* maximum MS Connectors	84.4	28.2	1.54	SGMSH-10ACA61	10GT*	Stock
			1.76	SGMSH-10ACA6C		
	130	43	2.19	SGMSH-15ACA61	15GT*	
			2.41	SGMSH-15ACA6C		

Note: 24V_{DC} brakes for SGMSH AC servomotors are standard. Contact a local source for 24V_{DC} power supplies.
For technical information, request Yaskawa User's Manual number YEA-SIA-LGD-1.2.

- * The speed/torque specifications listed above are achievable when applied with 200V 3 phase systems. Reference the previously listed speed/torque (force) curves for performance with any other applied voltages and phase(s). For more detailed SGD amplifier specifications and dimensions, refer to pages 91 to 95.

Pre-wired Cable Selection

Use the table below to select pre-wired cables for your SGMSH AC servomotor.

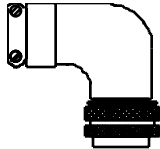
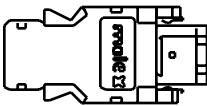
Cable Description (C)		Motor Size (kW)	Part Number*		Comments	Item Class
			without Brake	with Brake		
Power Cable with L-type Connectors (IP67)		1.0, 1.5	B1E-□□(A)	B1BE-□□(A)	Use the following key to specify needed cable length (last two digits of the part number): 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	Stock**
Encoder Cable (IP67)		All	JZSP-CMP02-□□(B)		These cables are available in five lengths. Use two digits in the part number's last place: 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	
Encoder Cable (for applications up to 20m) Only for Solder Connections			FR-RMCT-SB		These cables are available in any length.	
Encoder Cable (for applications from >20 to <50m) Only for Solder Connections			UL20276-SB		For example, to order one FR-RMCT-SB cable, 16m long, specify: quantity: 16 part no.: FR-RMCT-SB	
Input/Output 1CN Cable & Transition Terminal Block			JUSP-TA50P		35mm DIN rail mountable; the cable length is 0.5m.	
Input/Output 1CN Cable with Pigtail Leads		CKI-SGDG-□□		Use the following key to specify required cable length (last digit of part number): 01: 1m (standard) 02: 2m 03: 3m		

* The "(A)" at the end of the cable number indicates the revision level. The revision level may be subject to change prior to this catalog's reprinting.

** Standard cable lengths are Stock items; non-standard cable lengths are Limited Stock items.

Connector Selection

Use the table below to select mating connectors for your SGM SH AC servomotor.

Connector Description (D)		Motor Size (kW)	Part Number		Comments	Item Class
			without Brake	with Brake		
MS Connector for Motor Power Cable *		1.0, 1.5	MS3106B18-10S	MS3106B20-15S	Straight-type connector	Stock
			MS3108B18-10S	MS3108B20-15S	L-type connector	
			MS3057-10A	MS3057-12A	Cable clamp	
			MS3106B20-29S		Straight-type connector	
			MS3108B20-29S		L-type connector	
MS Connector for Encoder Cable		All	MS3057-12A		Cable clamp	
1CN Mating Connector			DP9420007		—	
2CN Encoder Mating Connector			JZSP-CMP9-1		—	

* Choose either a straight or L-type connector and the associated cable clamp for a complete assembly.

Peripheral Device Selection

Use the table below to select peripheral devices for your SGMSH AC servomotor.

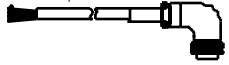
Component Description (E)		Part Number	Comments	Item Class
External Regenerative Unit*	50Ω 120 watt for 1.0 amp	RH120 50ohmJ	This is a general purpose regenerative unit.	Stock
	25Ω 300 watt for 1.5 amp	RH500N25_ohmK	Caution: Proper set-up is necessary to avoid equipment damage.	

* Refer to the SGD servo amplifier section of this catalog for additional specifications, and the *LEGEND Digital Torque Amplifier User's Manual* (YEA-SIA-LGD-1.2) for proper resistor sizing guidelines

CE Pre-wired Cable Selection

Use the table below to select shielded pre-wired cables for your SGMSH AC servomotor. These are suitable for IP67 environments.

Use the standard encoder cable MS3057-12A listed on page 85.

Cable Description (C)		Motor Size (kW)	Part Number*		Comments	Item Class
			without Brake	with Brake		
Power Cable with Connectors (IP67)		1.0, 1.5	B1CE-□□(A)	B1BCE-□□(A)	Use the following key to specify required cable length (last digit of part number): 03: 3m 05: 5m 10: 10m (standard) 15: 15m 20: 20m	Limited Stock

* The "(A)" at the end of the cable number indicates the revision level. The revision level may be subject to change prior to this catalog's reprinting.

CE/IP67 Connector Selection

Use the table below to select mating connectors for your SGMSH AC servomotor

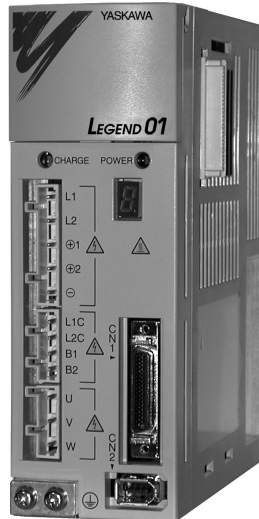
Connector Description (D)		Motor Size (kW)	Part Number		Comments**	Item Class
			without Brake	with Brake		
Connector for Motor Power Cable*		1.0, 1.5, 2.0	CE05-8A18-10SD-B-BAS CE3057-10A-1(D265)	CE05-8A20-15SD-B-BAS CE3057-12A-1(D265)	L-type connector Cable clamp	Limited Stock
Connector for Encoder Cable			CE02-6A20-29NSW and CE20BA-S and CE3057-12A-3(D265)		L-type connector (plug and back shell) and Cable clamp (diameters 0.265 to 0.394in)	

* Connectors are manufactured by DDK and listed here with the largest standard cable clamp available.

** Choose the connector and the associated cable clamp for a complete assembly. The connectors listed in the table are suitable for IP67 environments.

NOTES:

SGDG Digital Torque Amplifiers - For Analog Command/Torque Control



For Additional Information	Page(s)
SGDG Ratings & Specifications	91
SGDG Dimensions	92 - 95
Accessories	103 - 110
Peripherals	106 - 120
SGMAH Servomotors	11 - 26
SGMPH Servomotors	27 - 44
SGMPH Gearmotors	45 - 54
SGMGH Servomotors	55 - 66
SGMGH Gearmotors	67 - 76
SGMSH Servomotors	77 - 88

Design Features

1. Improved Performance

- Higher bandwidth response (1.5KHz torque loop frequency response)

2. Faster, simplified control system designs

- Built-in AC supply.....direct connect with wide voltage range compatibility (90 - 253V_{ac})
Optional DC Bus 127VDC to 357VAC (Maximum)
- Simplified, Pre-engineered motor/amp compatibility, guaranteed speed/torque (force) performance and system protection.
- Compatible with Sigma II servomotors and linear motors

3. Easier start-up and installation

- No programming, tuning, or parameter adjustments
- Self checking protective diagnostic and display..... for motor, amp, system wiring and power supply monitoring that saves time during installation and helps reduce costly service calls and replacement.
- Scaleable linear encoder feedback (rotary switch setting)
- Scaleable position feedback for upper controller
- Easy to read status monitors:
 - Two LED status lights
 - One seven-segment display
- Automatic determination of motor settings at connection

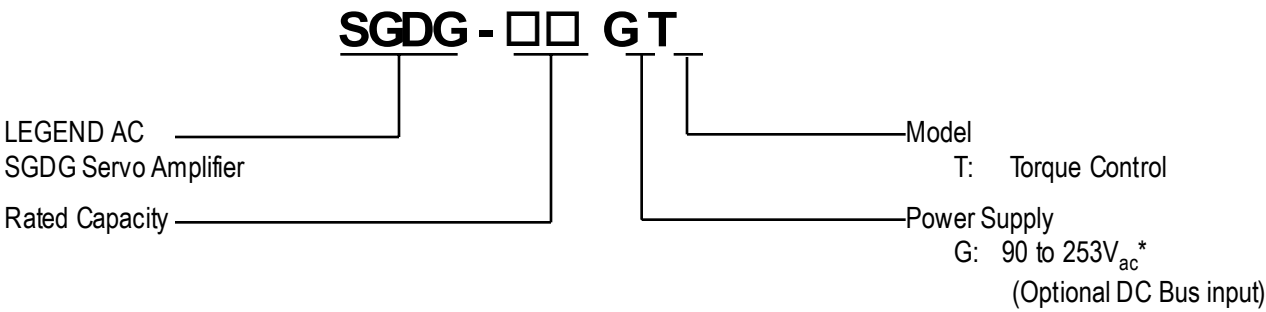
4. Additional functionality with ready-to-install application modules

- Single axis motion controller (future)

5. Certified International Standards

- UL, cUL listed (File #: E147823), CE compliance

Model Number Designation



Amplifier Model	Output kW (HP)	AC Supply Phases
01	0.10 (0.13)	1
04	0.40 (0.54)	
10	1.0 (1.3)	1 or 3
15	1.5 (2.0)	

IMPORTANT:

* While the amplifier has a wide voltage range capability, choice of system voltage and phase(s) determines the achievable motor speed and torque specifications. Specify your motor and amp “system” with the torque and speed requirements. Speed/torque (force) curves are published with each motor listing in this catalog.

SGDG Amplifier Ratings and Specifications

Basic Specifications	Input Power Supply	Main Circuit*	Single-phase: AC90 ~ 253V _{ac} Three-phase: AC170 ~ 253V _{ac} Optional DC bus input: 127V _{DC} (minimum) to 357V _{DC} (maximum)
		Control Circuit	Single-phase AC 90 ~ 253V _{ac}
	Control Mode		Three-phase, full-wave rectification IGBT PWM (sinusoidal commutation)
	Feedback		Serial incremental encoder
	Location	Ambient**/Storage Temperature	0 to 55 °C / -20 to 85 °C
		Ambient/Storage Humidity	90% or less (no-condensing)
		Vibration/Shock Resistance	4.9m/s ² /9.8m/s ²
	Structure		Base mounted (duct ventilation available as option) and flat mount type
Torque Control Mode	Input Signal Torque Reference	Reference Voltage	0 to ±10V at peak torque (forward rotation with positive reference). Resolution: 16 bit analog to digital conversion.
		Input Impedance	Approximately 14kΩ
		Circuit Time Constant	Approximately 47μs
I/O Signals	Position Output	Encoder Output Form	Phases A, B and C: Line driver output
		Encoder Output	Choices: set with rotary switch: • Binary: 512, 1024, 2098,...32768 • Decimal: 1000, 2500, 5000, 6000, 10,000, 20,000, or 25,000
	Sequence Input		Servo ON, Dynamic Brake OFF*** w/choice of Photocoupler input 12V-24 _{dc} (primary) or 5 Vdc TTL inputs (effective logic is "High")
	Monitors	Torque Monitor	5V/Maximum torque or force
		Speed Monitor	1V/1000rpm or 1000 mm/sec
	Sequence Output	—	Servo run, alarm (Photocoupler output: 12V-24vdc)
Built-in Functions	Regenerative Processing		Incorporated.
	Protection		Overcurrent, overload, regenerative error, main circuit voltage error, heat sink overheat, power open phase, overflow, overspeed, encoder error, encoder disconnected, overrun, CPU error, switch setting error, linear motor scale polarity error.
	LED and Alarm Output Display		POWER, CHARGE, one 7-segment LED display
	Others		Automatic servomotor ID

Notes: * When 1Kw and 1.5Kw amps are used with single phase power input, the continuous power rating must be derated to 70%. Reference speed/torque curves for the selected motor for de-ratings.

** Use the amplifier within the ambient temperature range. When enclosed, the temperatures inside the cabinet must not exceed the specified range.

*** Regarding: "DB (Dynamic Brake) OFF Function".

(1) The dynamic brake function is always ON when the main power is not applied.

(2) The dynamic brake function is always ON when the logic control power is not applied.

(3) The dynamic brake state during SVOFF can be selected with SWI-1 (ON or OFF).

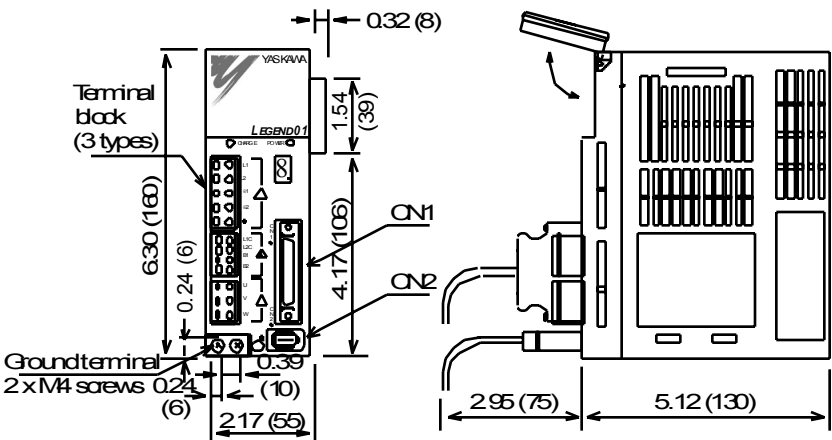
(4) When SVOFF or an alarm state occurs during move, the dynamic braking function can be enabled or disabled by the state of DBOFF input signal at the CNI connector.

WARNING! If the DB is disabled, the load will coast free.

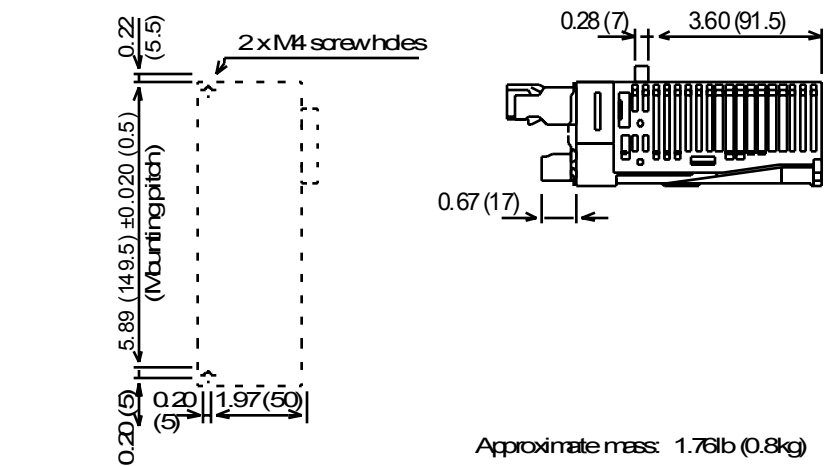
Dimensions in inches (mm)

SGDG Digital Torque Amplifier (Standard)

- SGDG-01GT (90V to 253V Single-phase, 30 to 100W)



Mounting Hole Diagram



Approximate mass: 1.76lb (0.8kg)

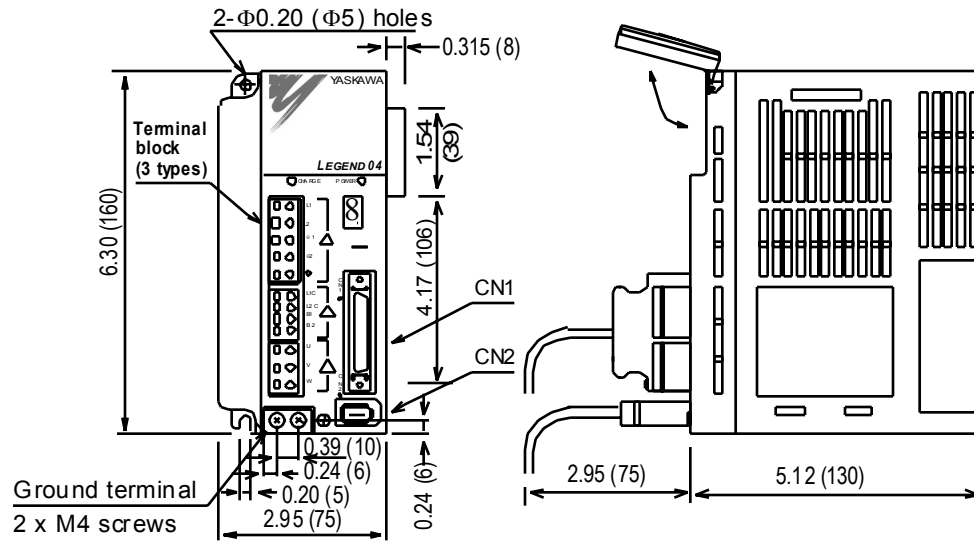
Connectors on the amplifier (supplied):

Connector Symbol	Amplifier Receptacle	Manufacturer
CN1	10236-52A2JL	3M Company
CN2	53460-0611	Molex Co.

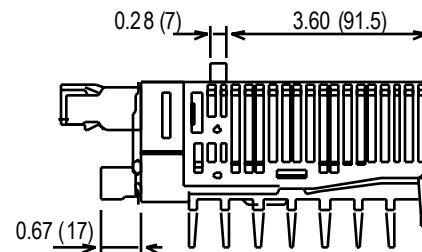
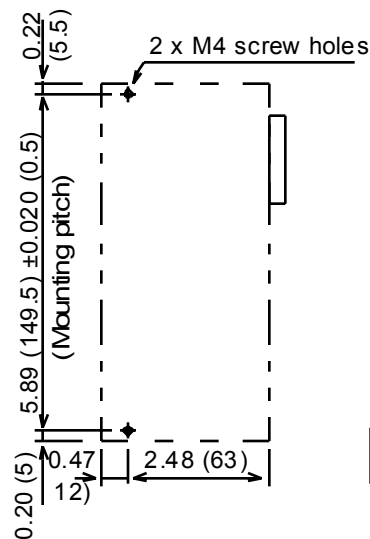
User needs to obtain the following:

Connector Symbol	Mating Connector	Manufacturer
1CN	10136-3000VE connector 10336-52A0-008 case	3M Company
2CN	55100-0600	Molex Co.

- SGD-04GT (90V to 253V Single-phase, 200W to 400W)



Mounting Hole Diagram

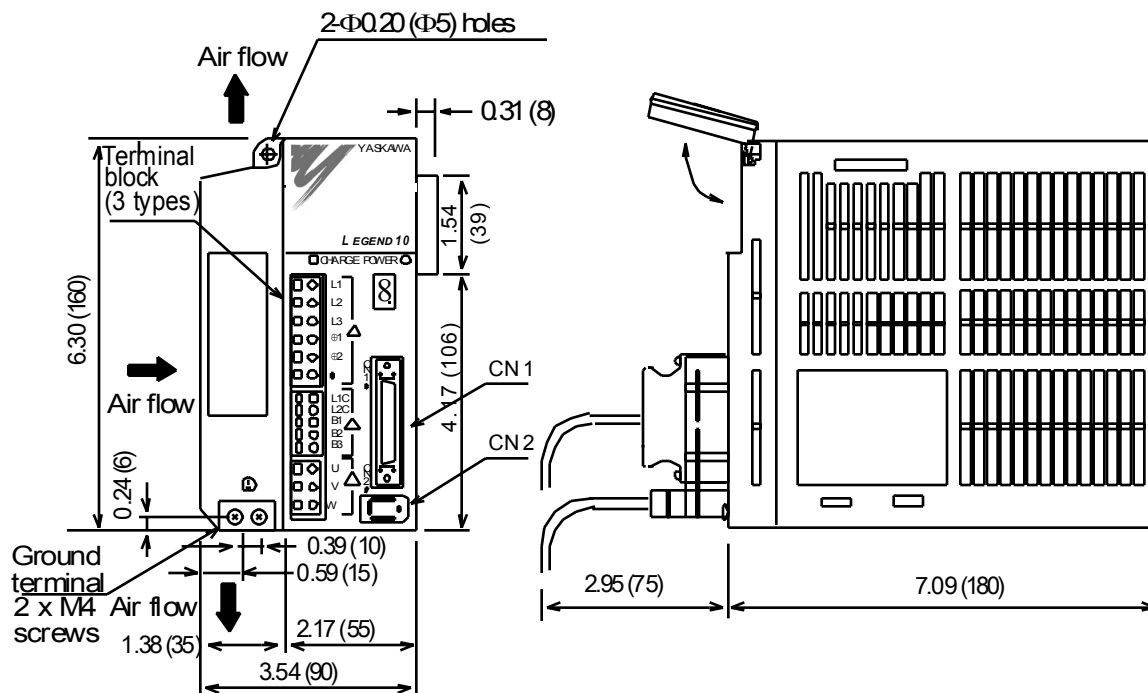


Mating connectors: see page 92.

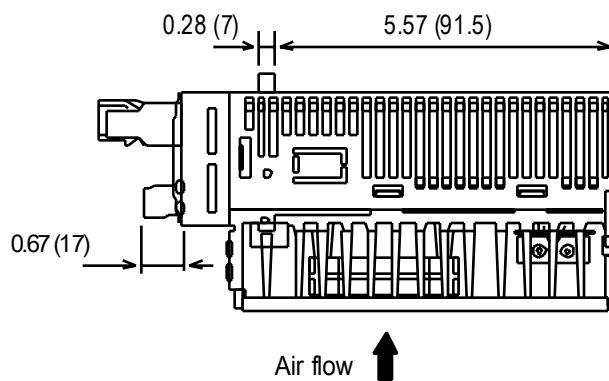
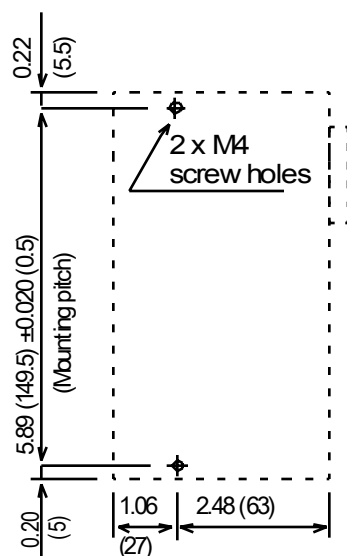
Approximate mass: 2.43lb (1.1kg)

LEGEND Digital Torque Amplifiers

- SGD-10GT (170V to 253V, 0.5 to 1.0kW)



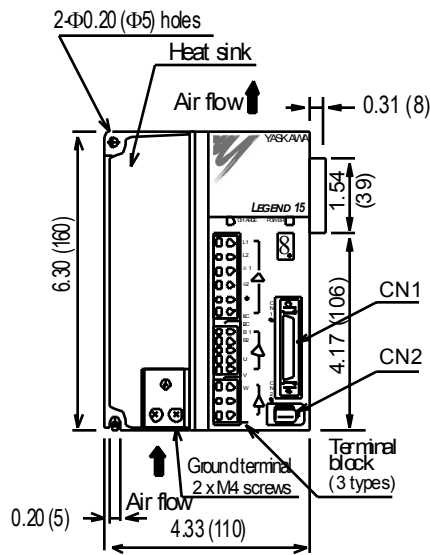
Mounting Hole Diagram



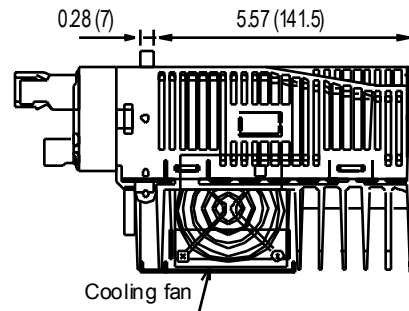
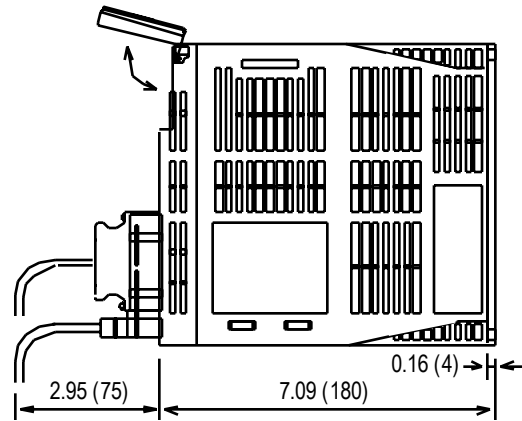
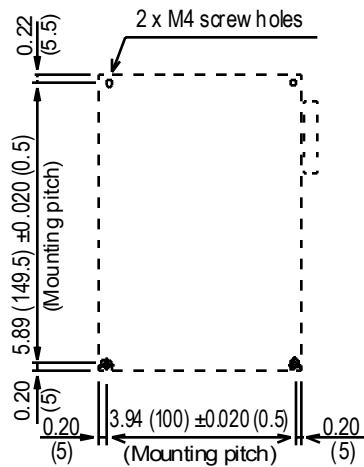
Approximate mass: 3.75lb (1.7kg)

Mating connectors: see page 92.

- SGD-15GT (173V to 253V 1.5kW)



Mounting Hole Diagram



Approximate mass: 6.17lb (2.8kg)

Mating connectors: see page 92.

Amplifier Switch Settings

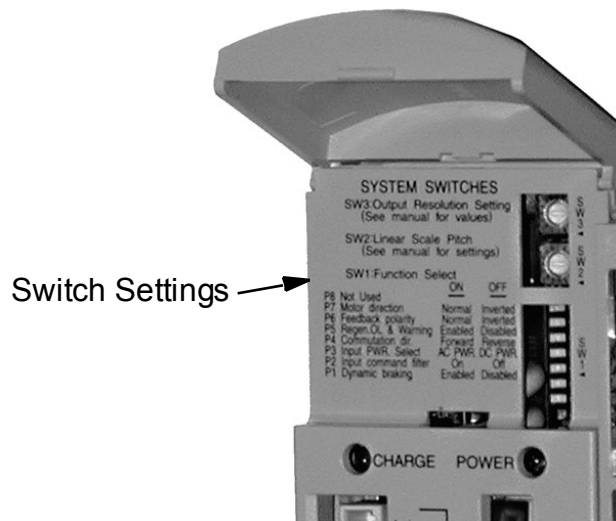
- SW1 Function Selection Switch (dip switches)**

Switch No.	Function	At OFF	At ON	Default Setting
1	Status After DB Stop During Base Block	Release DB after motor stop	Continue DB after motor stop	ON
2	Torque Reference Filter	No	Yes	ON
3	Input Power Selection	DC-Power Input Compatible	AC-Power Input Compatible	ON
4	Linear Scale Polarity Reversal	B-Phase progression: U, V, W direction	A-Phase progression: U, V, W direction	ON (enable only when linear motor is used)
5	Regen overload alarm or warning	No	Yes	ON
6	Feedback pulse B phase reversal	Reversed	Not reversed	ON
7	Command Direction Reversal	Reversed	Not reversed	ON
8	Not used			ON

- SW2 Linear Scale Pitch Setting (rotary switches)**

Setting	Linear Scale Pitch Setting	Setting	Linear Scale Pitch Setting
0*	0 μ m	8	Not used
1	2 μ m	9	Not used
2	4 μ m	A	Not used
3	20 μ m	B	Not used
4	40 μ m	C	Not used
5	800 μ m	D	Not used
6	1000 μ m	E	Not used
7	Not used	F	Not used

* default setting



- SW3 Encoder Division Ratio Setting (rotary switches)**

For a 13-bit Rotary Motor

Setting	Encoder Division Ratio Setting**	Setting	Encoder Division Ratio Setting**
0*	8192 P/R	8	3000 P/R
1	8000 P/R	9	2500 P/R
2	7200 P/R	A	2048 P/R
3	6000 P/R	B	2000 P/R
4	5000 P/R	C	1800 P/R
5	4096 P/R	D	1600 P/R
6	4000 P/R	E	1000 P/R
7	3600 P/R	F	Not used

* The default factory setting.

** Post quadrature @ the host controller.

For a 17-bit Rotary Motor

Setting	Encoder Division Ratio Setting**	Setting	Encoder Division Ratio Setting**
0*	65536 P/R	8	30,000 P/R
1	64000 P/R	9	24,000 P/R
2	60000 P/R	A	16,000 P/R
3	50000 P/R	B	131,072 P/R***
4	40000 P/R	C	120,000 P/R***
5	36000 P/R	D	100,000 P/R***
6	32768 P/R	E	80,000 P/R***
7	32000 P/R	F	Not used

* The default factory setting.

** Post quadrature @ the host controller.

*** Max. motor rpm must be limited to 2500 rpm to avoid an "overspeed alarm".

For Linear Motors

Setting	Encoder Division Ratio Setting**	Setting	Encoder Division Ratio Setting**
0*	1/20	8	1/32
1	1/256	9	1/16
2	1/250	A	1/10
3	1/200	B	1/8
4	1/128	C	1/5
5	1/100	D	1/4
6	1/64	E	1/2
7	1/40	F	Not used

* The default factory setting.

** Post quadrature @ the host controller.

Regenerative Resistance

External Regenerative Resistors

Regenerative resistors for servo amplifiers are internally or externally mounted, as shown in the following table. They can be mounted externally on all servo amplifiers, but are especially effective when regenerative energy exceeds the servo amplifier's capacity.

When mounted externally, be sure to remove the jumper between B2 and B3 (for 10GT and 15GT), which deactivates the internal regenerative resistor, and connect to B1 and B2.

If the power resistor is used at the rated load rate, resistor temperatures will reach 200°C~300°C. Be sure to derate before using. Check with the manufacturer for the load characteristics of the resistor. Use at a load rating of 20% or less when using natural cooling (natural convection cooling), and at 50% or less when forced air cooling is used.

For safety reasons, we recommend the use of resistors with thermostatic switches.

Important: External regeneration resistor sizing and amplifier set-up will be important for proper operation.

Use Yaskawa's *Sigma II Series Servo System User's Manual*: YEA-SIA-S800-32.2 for tips on calculating capacity requirements of external regenerative resistor.

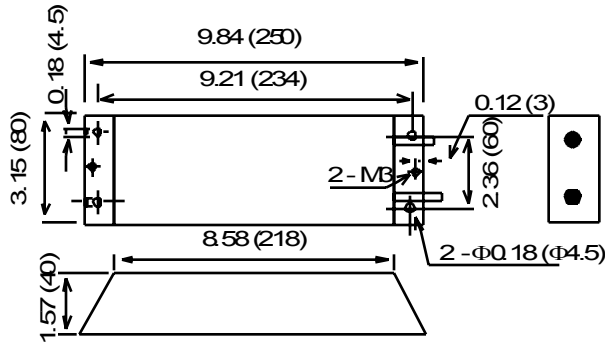
Applicable Amplifier		Regenerative Resistor Mounted in a Amplifier		Regenerative Power Process by Integrated Resistor (W)	Minimum Allowable Resistance (Ω)
		Resistance (Ω)	Capacity* (W)		
200V Single-phase	SGDG-01GT	—	—	—	40
	SGDG-04GT				
200V Three-phase	SGDG-10GT	50	60	12	20
	SGDG-15GT	30	70	14	

* Capacity prior to derating. The regenerative capacity (average) which can be processed is a 20% rating of the regeneration resistor capacity integrated in the Amp.

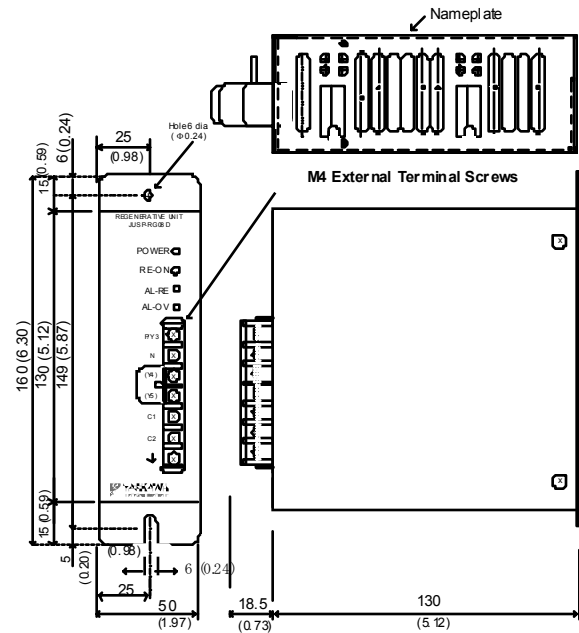
Regenerative Resistance

The following table provides guidelines by example for the selection of regenerative resistors. Please consult the Design and Maintenance section of the Sigma II Series User's Manual (No. YEA-SIA-S800-32.2) for a more detailed description of the selection procedure.

Part # RH500N25_OHMK



JUSP-RG08D



Lead wire: L = 17.72 (450)

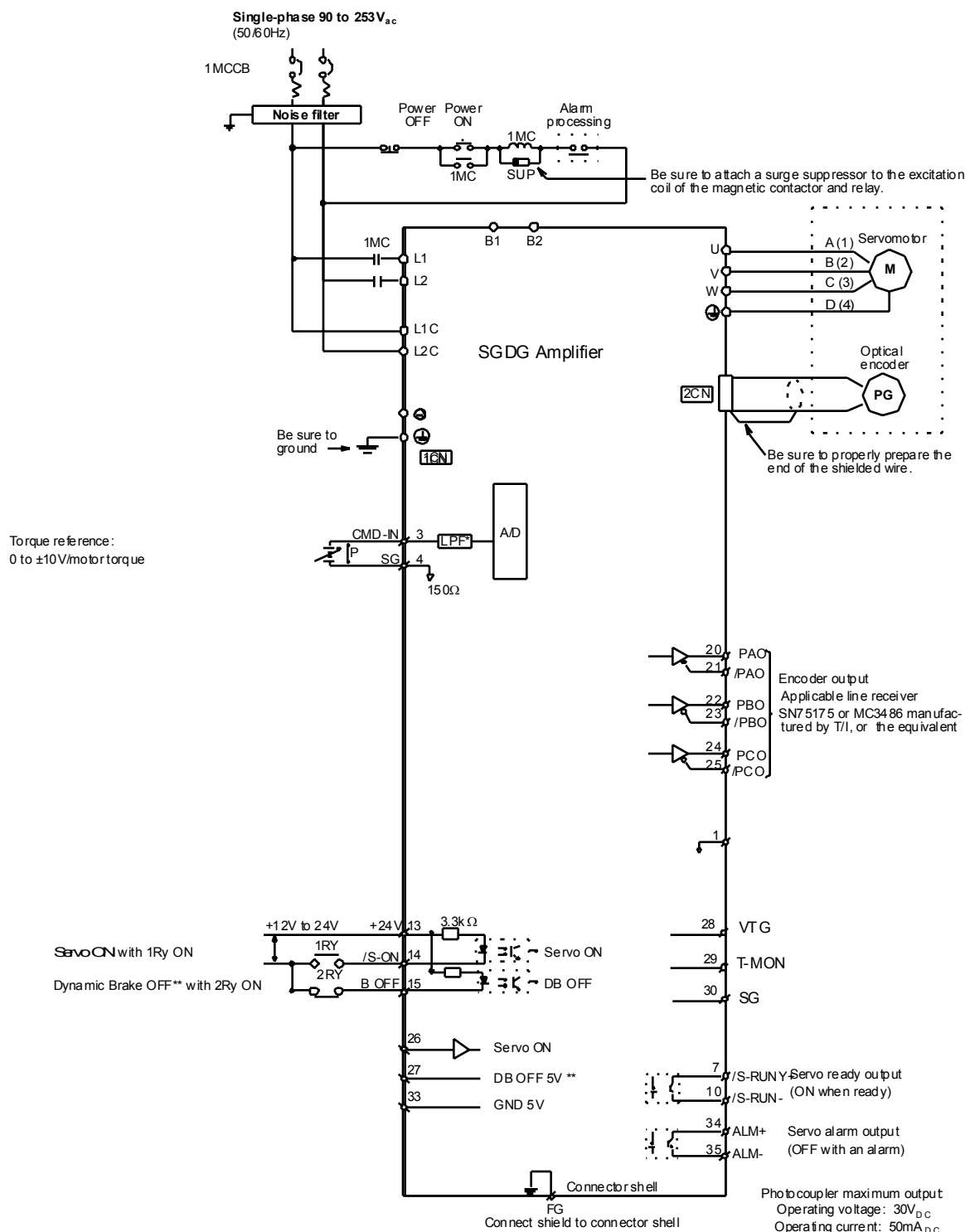
Rated power: 300W

Resistance value: 25Ω

Regenerative Resistor Specifications

Tolerance	J: ±5%, K: ±10%
Temperature Characteristics	±260PPM/°C (20Ω or higher)
Withstand Voltage	ΔR at 2000V _{ac} applied for one minute: ±(0.1% + 0.05Ω)
Insulation Resistance	500V _{dc} 20MΩ @ 500VDC
Short-term Overload	ΔR with ten times the rated power applied for five seconds: ±(2% + 0.05Ω)
Service Life	ΔR in 1000 hours at rated power 90 minutes ON and 30 minutes OFF (±5% + 0.05Ω)
Inflammability	Fire does not occur with 10 times the rated power applied for one minute.
Ambient Temperature Range	-25 to 150°C

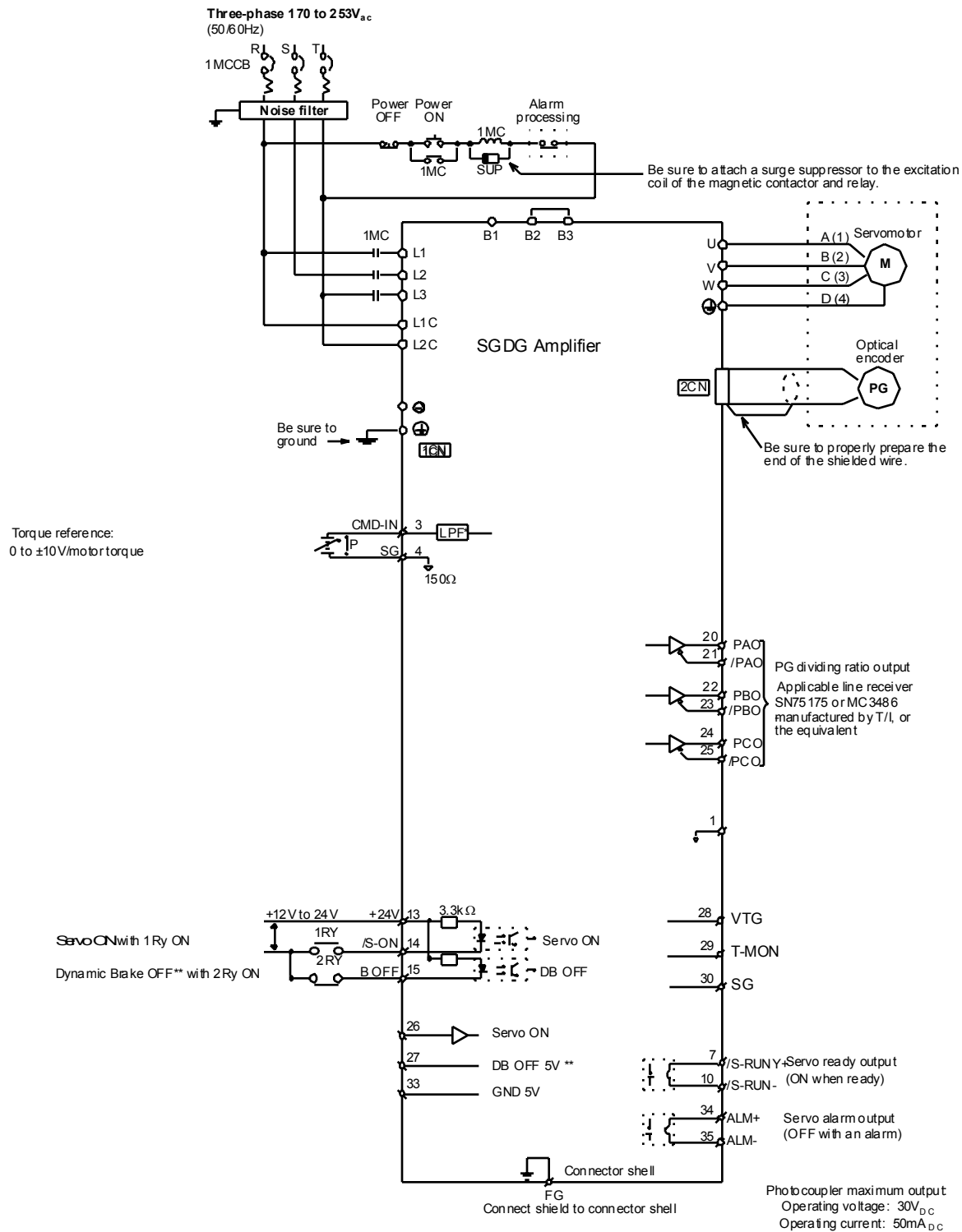
Connection Diagram, Single-phase



*The time constant for the primary filter is $47\mu\text{s}$

jP: Indicates twisted wire pairs.

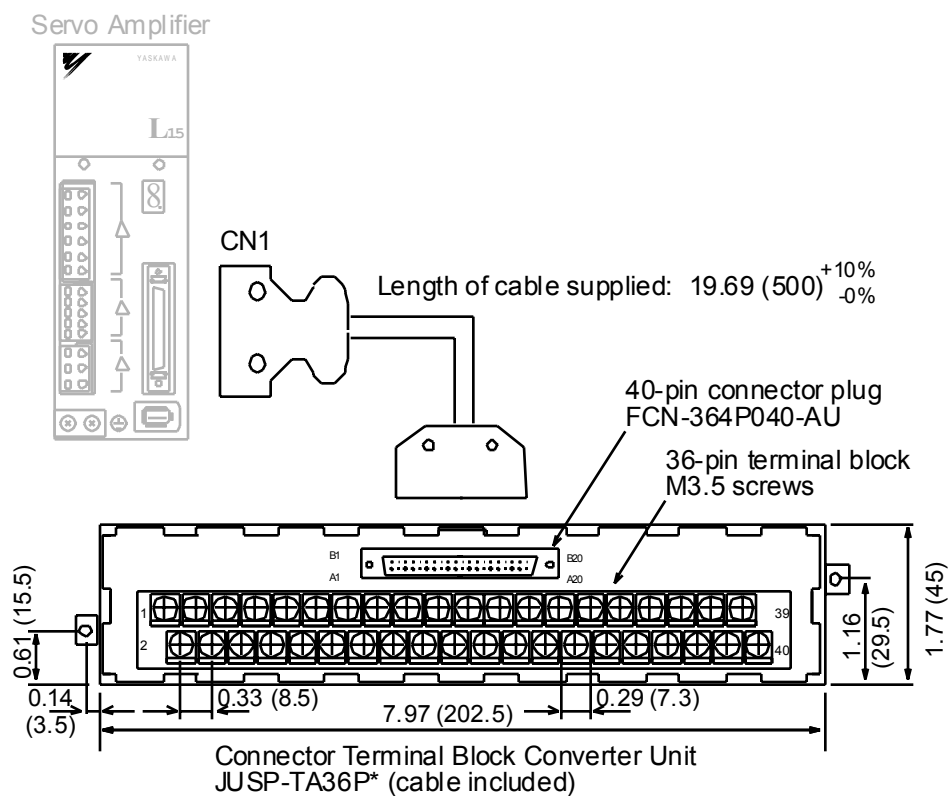
Connection Diagram, Three-phase



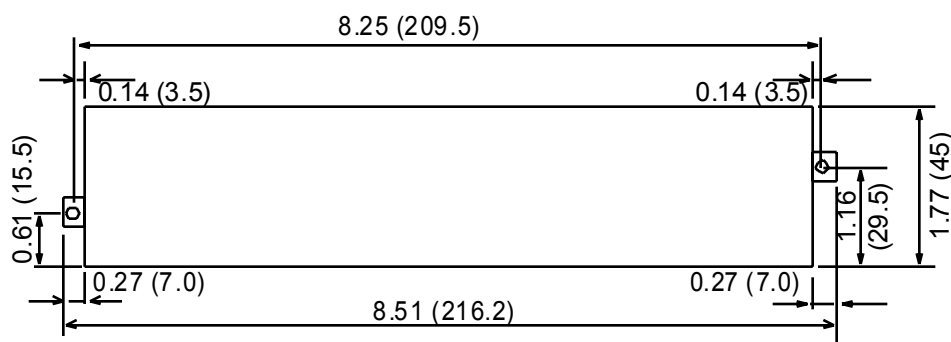
* The time constant for the primary filter is 47μs

⌈P: Indicates twisted wire pairs.

Connector Terminal Block Converter Unit JUSP-TA36P



Mounting Hole Diagram



*Terminal specifications : see the following page

JUSP-TA36P Terminal Block Pin Numbers and Signal Names

SGDG Servo Amplifier			JUSP-TA36P Terminal Block Unit		
Signal Name*		CN1 Pin Number		Connector Number	Terminal Block Number
—		1		A1	1
SG		2		B1	2
T-REF		3		A2	3
SG		4		B2	4
—		5		A3	5
SG		6		B3	6
RUN		7		A4	7
—		8		B4	8
—		9		A5	9
RUN		10		B5	10
—		11		A6	11
—		12		B6	12
+24V _{IN}		13		A7	13
/S-ON		14		B7	14
DB OFF		15		A8	15
—		16		B8	16
—		17		A9	17
—		18		B9	18
SG		19		A10	19
PAO		20		B10	20
/PAO		21		A11	21
PBO		22		B11	22
/PBO		23		A12	23
PCO		24		B12	24
/PCO		25		A13	25
/S-ON 5V		26		B13	26
—		27		A14	27
VTG		28		B14	28
T-MON		29		A15	29
—		30		B15	30
—		31		A16	31
—		32		B16	32
SG		33		A17	33
ALM+		34		B17	34
ALM-		35		A18	35
—		36		B18	36
Connector Case					

Cable: Supplied with the terminal block
 ‡P: Indicates twisted pair wires.

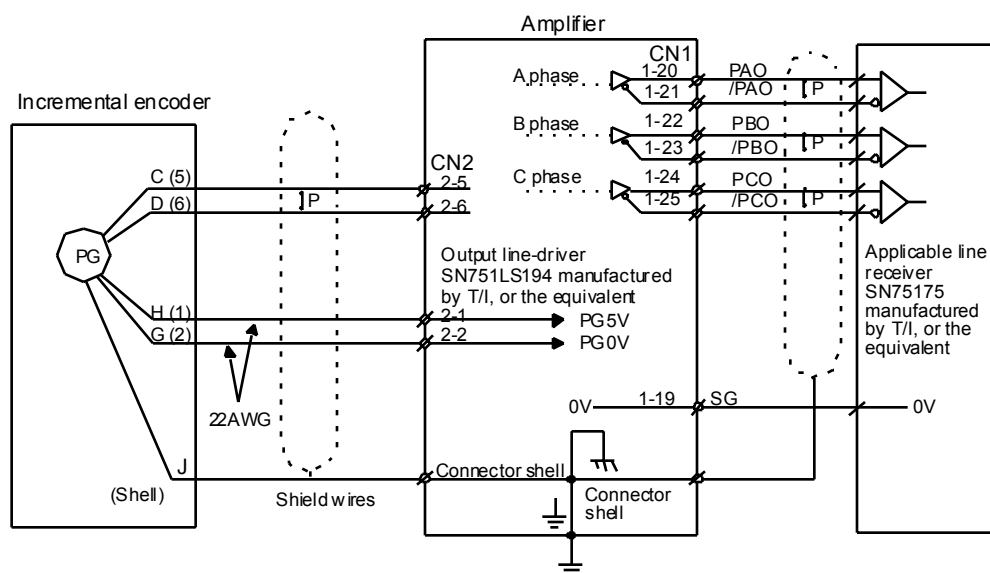
* Use the connection diagrams on the previous pages for more functional details of recommended wiring.

Connection Diagram

Connection Example

The following diagrams show the procedure for wiring a digital torque amplifier to an incremental encoder.

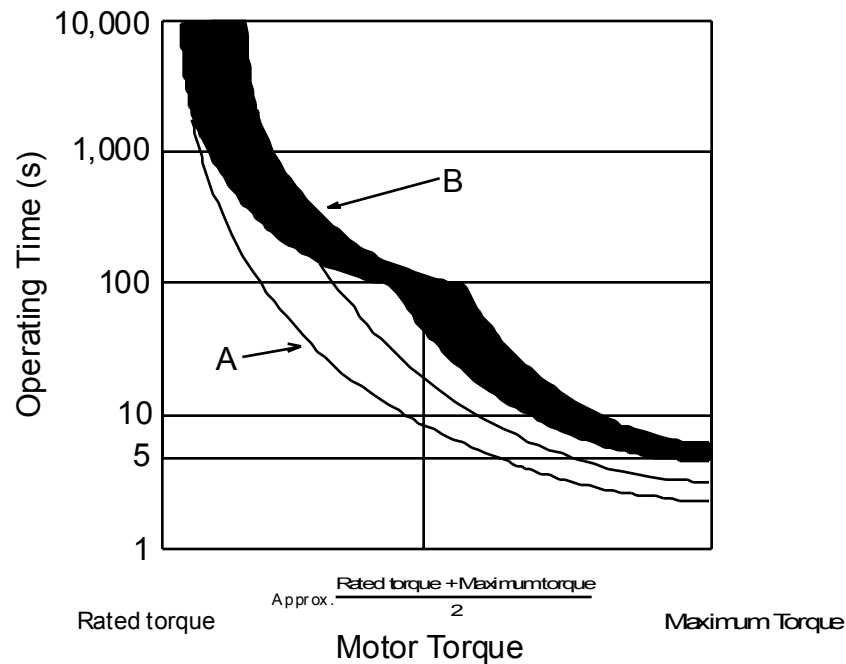
Connecting an encoder (CN2) and output signals from the servo amplifier (CN1)



Overload Characteristics

Digital Torque amplifiers have a built-in overload protection function that protects the amplifiers and servomotors from overload. Allowable power for the amplifiers is limited by the overload protective function, as shown in the figure below.

The overload detection level is set under hot start conditions at a servomotor ambient temperature of 40°C.



Note: The overload protection characteristics of A and B in the figure are applicable when the servo amplifier is combined with one of the following servomotors:

- A: SGMAH or SGMPH servomotor with a maximum capacity of 400W.
- B: Other servomotors similar to the SGMAH, SGMPH, SGMGH, and SGMSJ.

Cable Specifications and Peripheral Devices

Ratings and specifications for peripheral devices, as well as cable specifications for digital torque amplifiers are summarized in the tables below.



CAUTION

Wiring Precautions

- **Do not bundle or run power and signal lines together in the same duct.**
Keep power and signal lines at least 11.81" (30cm) apart.
- **Use twisted pair or shielded multi-core twisted pair wires for signal and encoder (PG) feedback lines.**
- **The maximum lengths for signal lines are as follows:**
 - Maximum of 9.84ft (300cm) for reference input lines.
 - Maximum of 65.6ft (20m) for PG feedback lines.
 - Use a cable with 164 ft (50m) specifications for distances over 65.6ft (20m).

Cable Specifications

The following table provides wire size specifications:

External Terminal Name		SGDG Terminal Symbol	Wire Size AWG [in ² (mm ²)]	
			01GT	04GT
	Main circuit power input terminals	L1, L2 (Single Phase)	16 AWG [HIV 0.002 (1.25)]	14 AWG [0.003 (2.0)]
	Servomotor connection terminals	U, V, W	16 AWG [HIV 0.002 (1.25)]	
	Control power supply terminals	L1C, L2C		
	Control I/O signal connector	CN1	Twisted pair or shielded twisted pair wires Core wire at least 28 AWG [0.0002 (0.12)], tinned, annealed copper twisted wires Finished cable dimensions: maximum Φ 0.63in (16mm) for CN1 and Φ 0.27in (6.8mm) for CN2.	
	PG signal connector	CN2		
	Ground terminal		14 AWG [HIV 0.003 (2.0)]	

Cable Specifications (cont'd)

External Terminal Name		SGDG Terminal Symbol	Wire Size AWG [in ² (mm ²)	
			10GT	15GT
Main circuit power input terminals	L1, L2, L3 (Three-phase)	U, V, W	14 AWG [HIV 0.003 (2.0)]	
Servomotor connection terminals				
Control power supply terminals	L1C, L2C		16 AWG [HIV 0.002 (1.25)]	
Control I/O signal connector	CN1		Twisted pair or shielded twisted pair wires Core wire at least 28 AWG [0.0002 (0.12)], tinned, annealed copper twisted wires Finished cable dimensions: maximum $\Phi 0.63$ in (16mm) for CN1 and $\Phi 0.27$ in (6.8mm) for CN2.	
PG signal connector	CN2			
Ground terminal			14 AWG [HIV 0.003 (2.0)]	

- Notes:
1. Wire sizes were selected for three cables per bundle at 40°C ambient temperature with the rated current.
 2. Use cables with a minimum withstand voltage of 600V for main circuits.
 3. If cables are bundled in PVC or metal ducts, consider the reduction ratio of the allowable current.
 4. Use heat-resistant cable under high ambient or panel temperatures where normal vinyl cable will rapidly deteriorate.

The following table shows types of cables. It is used in conjunction with the preceding tables.

Cable Type		Temperature Rating of Conductor °C
Name	Composition	
PVC	Standard polyvinyl chloride cable	—
IV	600V PVC cable	60
HIV	Temperature-resistant vinyl cable	75

The following table specifies the appropriate cables for CN1 and CN2 amplifier connectors.

Wire sizes were selected with the expectation of three cables per bundle, at an ambient temperature of 40°C, at the rated current level.

Connector Name	Signal	Description	Specification
Control I/O Signal Connector	CN1	Cable	Use twisted pair or shielded twisted pair wire.
		Applicable wire	(AWG): 24, 26, 28, 30
		Finished cable Dimension	Φ0.63 (Φ16.0) maximum
PG Signal Connector	CN2	Cable	Use Yaskawa cable, or shielded twisted pair wire.
		Applicable wire	(AWG): 24, 26, 28, 30 Use 22 AWG [0.0005in ² (0.34mm ²)] for the encoder power supply and 26 AWG [0.0002 in ² (0.14mm ²)] for other signals. These conditions permit wiring distances up to 65.6ft (20m).
		Finished cable Dimension	Φ0.27 (Φ6.8) maximum

Peripheral Device Types and Capacities

Main Circuit Power Supply	Amplifier Model		Control Power Required (W)	Applicable Servomotor	Power Supply				Recommended Noise Filter**		Motor Magnetic Contactor		
	Capacity (kW)	SGDG-			Capacity per Amplifier (kVA)	Rated Main Power (A _{rms})	Maximum Inrush Current (A _{rms})	MCCB or Fuse Capacity* (A _{rms})	Model	Specifications			
Single- phase 100V	0.10	01GT	13	SGMAH-A3B	0.15	1.1	28	4	Fn2070-6/07	Single-phase 250V _{ac} 6A	(10A) or equivalent		
				SGMAH-A5B	0.25	1.8							
		04GT		SGMAH-01B	0.40	2.0							
	SGMPH-01B												
	0.20			SGMAH-02B	0.60	5.2							
		SGMPH-02B											
Single- phase 200V		0.10		01GT	SGMAH-A3A	0.20		0.82	4	Fn2070-6/07		Single-phase 250V _{ac} 6A	
				SGMAH-A5A	0.25	1.1							
				SGMAH-01A	0.40	2.0							
				SGMPH-01A									
	0.20	04GT		SGMAH-02A	0.75	3.4							
				SGMPH-02A									
0.40	SGMAH-04A			1.2	5.5								
	SGMPH-04A												
Three- phase 200V	0.5	10GT		15	SGMAH-08 SGMPH-08	2.1		11.0	28	11	Fn2070-16/07	Single-phase 250V _{ac} 16A	(20A) or equivalent
					SGMPH-15	4.0		19.0				19	
	1.0		SGMGH-05A□A		1.4	4.0		4		Fn258L-16/07	Three-phase 480V _{ac} 16A		(20A) or equivalent
			SGMAH-08A		1.9	5.4							
			SGMPH-08A					2.3				7.0	
			SGMGH-09A□A										
SGMSJ-10A													
1.5	15GT	SGMPH-15A	3.2		9.5			10					
		SGMGH-13A□A											
		SGMSJ-15A											

* Size per local code requirements. Typical fuse interrupting characteristics at 25°C: 200% for 2s minimum; 700% for 0.01s minimum.

** The Fn□□□□ noise filter is manufactured by Schaffner Corporation. Specifications are available at: www.schaffner.com.

Peripheral Device Manufacturers

J.S.T. Corporation

1957 South Lakeside Drive
Waukegan, Illinois 60085

Phone (847) 473-1957
<http://www.jst.com>

Molex (Headquarters)

(Note: not selling 2CN serial
encoder connector in the US)
2222 Wellington Court
Lisle, Illinois 60532

Phone: (630) 527-4474
Fax: (630) 548-2897

(Connector information is not
available from Molex or Yaskawa)

For literature requests or Molex
support for the 2CN connector,
the Chicago area distributor is TTI.
Ask for the Yaskawa inside sales
representative.
1-800-CALLTTI
(1-800-225-5884)

Schaffner EMC Inc.

52 Mayfield Ave.
Edison, New Jersey 08837

Phone: 1-800 367-5566
(732) 225-9533
Fax: (732) 225-4789
<http://www.shaffner.com>

TDK Corporation of America

1600 Feehanville Dr.
Mount Prospect, Illinois 60056

Phone: (847) 803-6100
Fax: (847) 803-6296

Tokin America

32950 Alvarado-Niles Rd.
Suite 500
Union City, California 94507

Phone: (510) 324-4110
Fax: (510) 324-1762
<http://www.tokin.com>



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