

HarmonicDrive®

# Flat Shape, Hollow Shaft AC Servo Actuator SHA-SG Series



## Size 45 added to our SHA-SG Series

SHA-SG Series AC Servo Actuators provide high torque and high positional accuracy. These hollow shaft servo actuators utilize Harmonic Drive® precision strain wave gears combined with a brushless servomotor and magnetic absolute encoder. The new size 45 fits perfectly between the size 40 and size 58, both in terms of dimensions and max torque ratings, offering the design engineer more options.

## Ordering Code

SHA 45 A 101 SG - D 16 A 200 - 10 S17b A - C □ - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

1.	Model Name	AC servo actuator SHA Series
2.	Size	45
3.	Version Symbol	A
4.	Reduction Ratio	51 : 51:1 81 : 81:1 101 : 101:1 121 : 121:1 161 : 161:1
5.	Gearhead	Harmonic Drive® SHG Series
6.	Motor Version	D: Size 45
7.	Motor Size	16: Size 45
8.	Brake	A: Without brake B: With brake

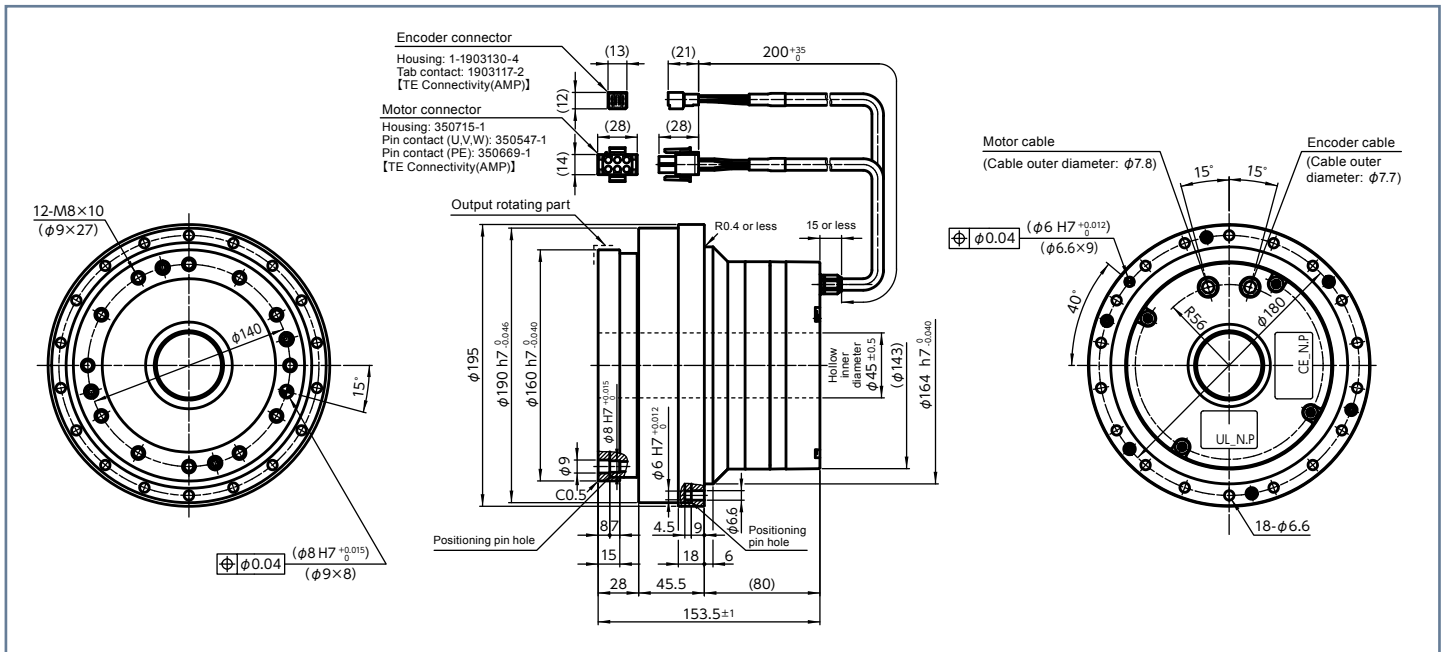
9.	Voltage Rating	200: 200VAC
10.	Encoder Format	10: A-Format (2.5Mbps, 1 to 1 connection)
11.	Encoder and Resolution	S17b - 17bit Absolute encoder; (Nikon-A format)
12.	Encoder Phase Angle	A: 0 degrees
13.	Connector Specifications	C: Standard connectors included N: No connectors included
14.	Options	L: Origin & End Limit Sensor Y: Side Exiting Cables
15.	Special Specifications	Blank: Standard product SP: Special-specification code

## Specifications

Item	Type	SHA45A				
		51	81	101	121	161
Combined drive		HA-800□-24D/E-200				
Compatible HDLLC drive				REL-230-40	REL-230-40	REL-230-36
Limit for peak torque <sup>*1</sup>	N·m	650	918	982	1070	1147
	kgf·m	66.3	93.6	100	109	117
Allowable continuous torque <sup>*1,2</sup>	N·m	174	290	363	437	523
	kgf·m	17.7	29.6	37.0	44.6	53.3
Max. rotational speed <sup>*1</sup>	rpm	74.5	46.9	37.6	31.4	23.6
Torque constant <sup>*1</sup>	N·m/A <sub>rms</sub>	25	41	51	61	81
	kgf·m/A <sub>rms</sub>	2.6	4.1	5.2	6.2	8.2
Limit for peak current <sup>*1</sup>	A <sub>rms</sub>	36.5	29.9	25.9	24.5	19.3
Allowable continuous current <sup>*1,2</sup>	A <sub>rms</sub>	10	10	10	10	9.2
Inductive voltage constant <sup>*3</sup>	V/(rpm)	2.9	4.6	5.7	6.8	9.1
Phase resistance (20°C)	Ω	0.19				
Phase inductance	mH	1.2				
Moment of Inertia (without brake)	GD <sup>2</sup> /4	6.8	17	27	38	68
	J	69	175	272	390	690
Moment of Inertia (with brake)	GD <sup>2</sup> /4	7.9	20	31	45	79
	J	81	204	316	454	804
Allowable moment load	N·m	1127				
	kgf·m	115				
Moment stiffness	N·m/rad	257×10 <sup>4</sup>				
	kgf·m/arc-min	76.3				
One-way positioning accuracy	arc-sec	50	40	40	40	40
Encoder type		Absolute Encoder				
Encoder resolution of input shaft	Single-turn	2 <sup>17</sup> (131072)				
	Multi-turn	2 <sup>16</sup> (65536)				
Output shaft resolution	Pulse/rev	6684672	10616832	13238272	15859712	21102592
Mass (without brake)	kg	12.4				
Mass (with brake)	kg	13.2				
Ambient environment specification		Operating temperature: 0 to 40°C, storage temperature: -20 to 60°C Operating/storage humidity: 20 to 80% RH (non-condensing) Vibration resistance: 25 m/s <sup>2</sup> (frequency: 10 to 400 Hz), impact resistance: 300 m/s <sup>2-5</sup> No dust, metal powder, corrosive gases, flammable gases, oil mist, or other similar materials. For indoor use. Exposure to direct sunlight must be avoided. Altitude: 1,000 m or less				
Motor insulation		Motor Insulation: 100 MΩ or higher (500 VDC) Dielectric strength: 1500 VAC/min Insulation class: A				
Mounting direction		Can be installed in any direction.				
Protective structure		Totally enclosed self-cooling type (IP54)				

The values in the table above show typical values at the output shaft.  
<sup>\*1</sup> Typical characteristics when used with our drive.  
<sup>\*2</sup> This is the value at a saturated temperature when installed on the aluminum heatsink of 500x500x25 [mm].  
<sup>\*3</sup> This is the value of the phase EMF constant multiplied by 3.  
<sup>\*4</sup> The detection range of the multi revolution detector is from -32768 to 32767.  
<sup>\*5</sup> This value is not ensured if vibrations or shocks are applied continuously for hours.

# External Dimensions

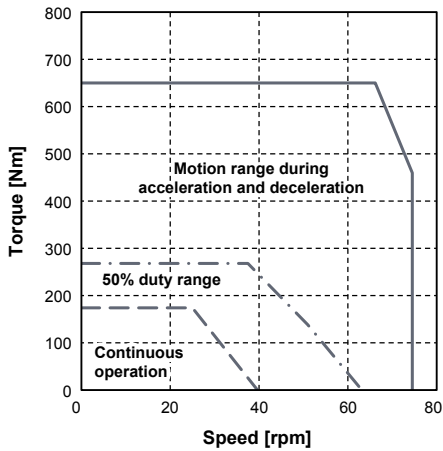


# Operating Range

## SHA45A-SG

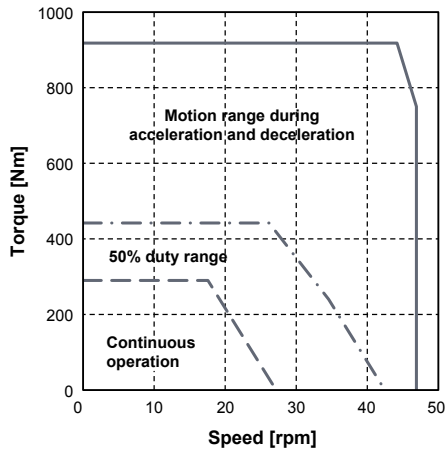
Reduction Ratio: 51

Aluminum heatsink: 500\*500\*25mm



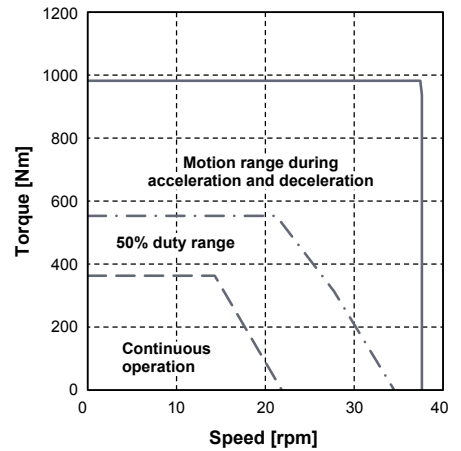
Reduction Ratio: 81

Aluminum heatsink: 500\*500\*25mm



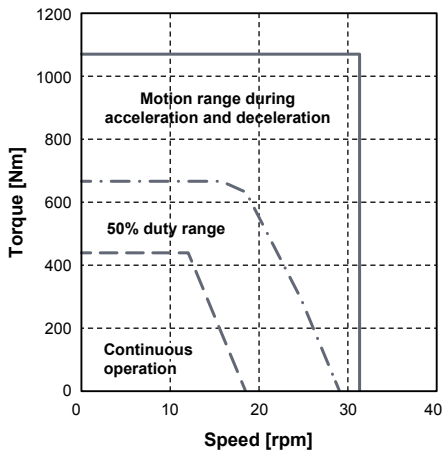
Reduction Ratio: 101

Aluminum heatsink: 500\*500\*25mm



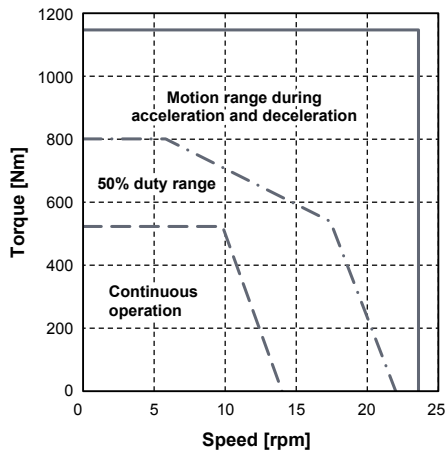
Reduction Ratio: 121

Aluminum heatsink: 500\*500\*25mm







Reduction Ratio: 161

Aluminum heatsink: 500\*500\*25mm



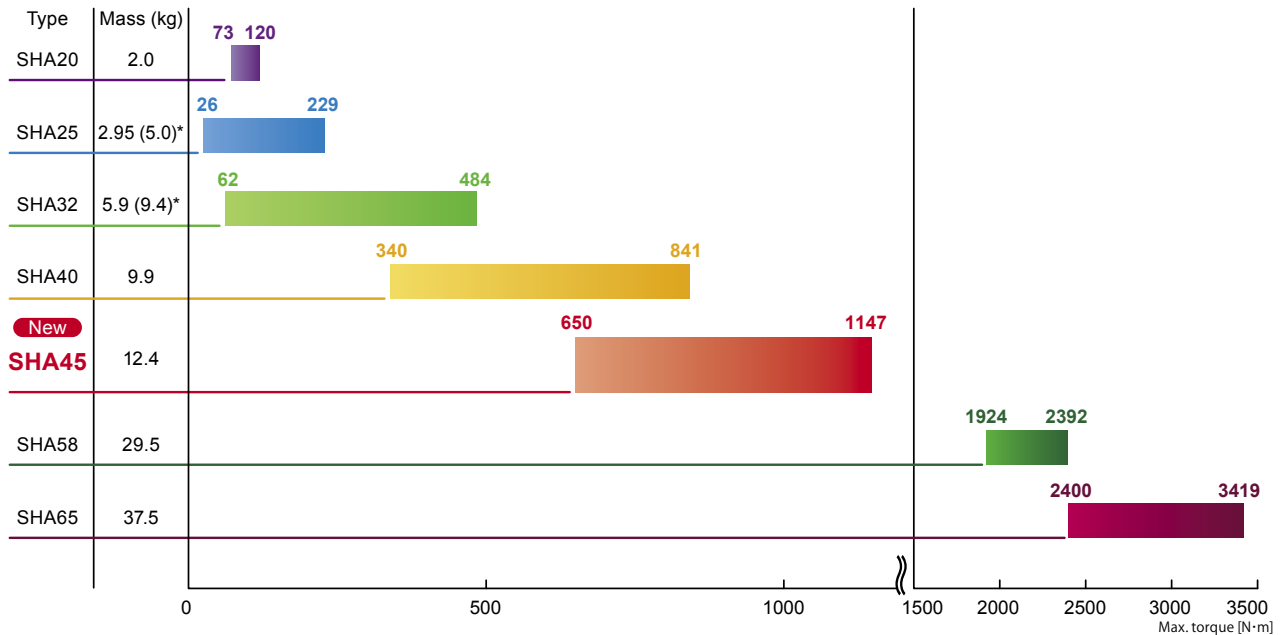
## Drives and Cables

Drives for SHA45A	
<b>General I/O command type</b> Control modes (for position, speed, and current) supported	HA - 800A - 24D/E - 200
	HA - 800B - 24D/E - 200
	HA - 800C - 24D/E - 200
 	REL-230-36/REL-230-40

Extension Cables for SHA45A	
Motor wire	EWD - MB ** - A06 - TMC
Encoder wire	EWD - S ** - A08 - 3M14

The cable length is indicated by "\*" in cable product codes. Three lengths are offered: 3-, 5-, and 10-meter (the codes are "03", "05", "10", respectively).

## Maximum Torque



\*The figures shown in parentheses indicate the mass when SHA uses HPF HarmonicPlanetary® gearhead.

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