

HarmonicDrive®

Flat Hollow Shaft AC Servo Motor

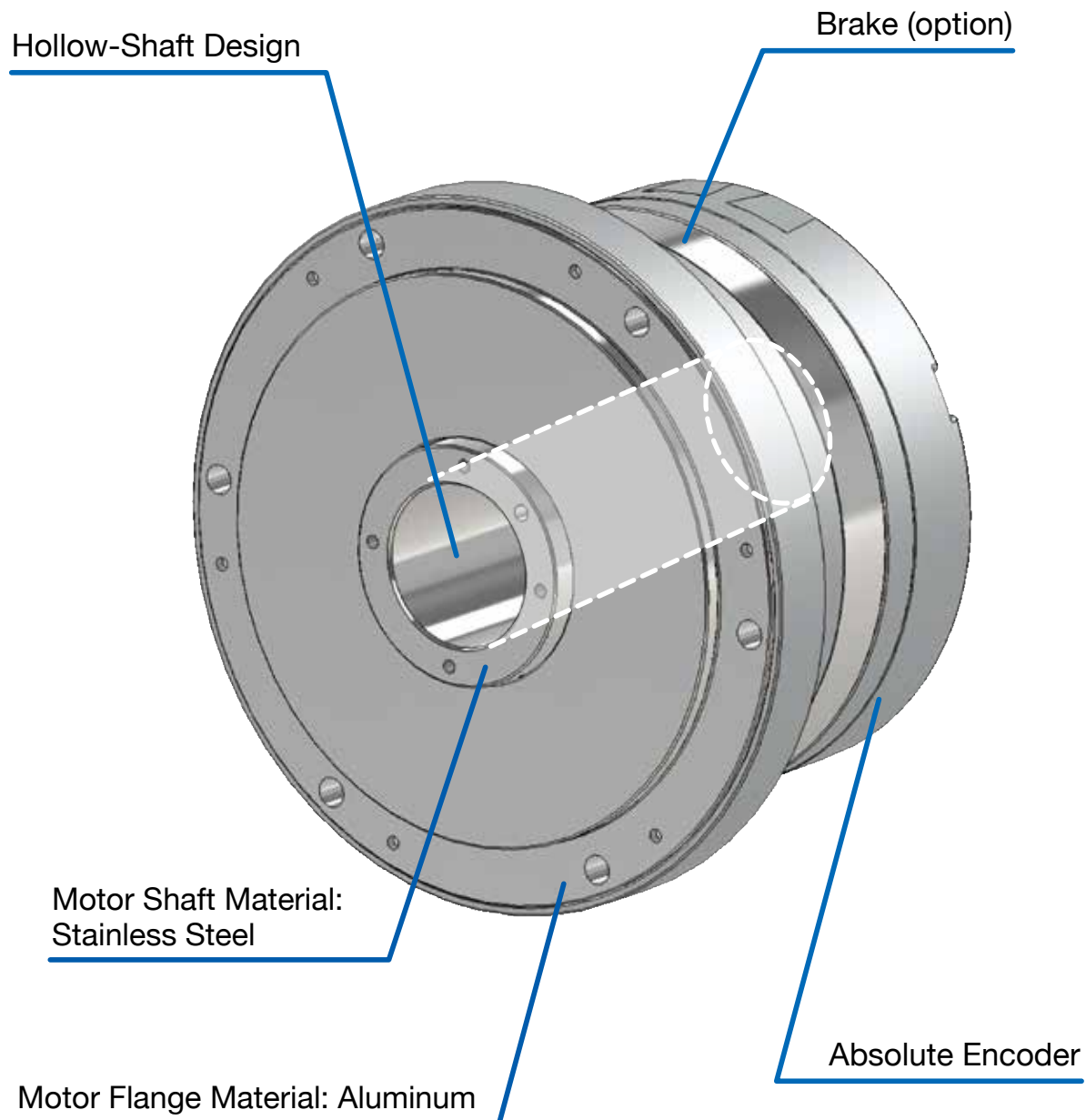
HMA Series



New high-performance, hollow-shaft servo motors are available in five sizes. Flat design features a large through-hole to allow cables, shafts or lasers to pass through the axis of rotation.

Features

- Hollow-shaft design to pass cables, pipes or lasers through the axis of rotation
- Flat design
- Five models with rated output from 163 to 1320 W
- Optional brake available without change in dimensions



Ordering Code

HMA **B** **09** **A** **200** - **10** **S17b** **A** - **C** - **SP**
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)

(1)	Model Name	AC servo motor HMA series
(2)	Motor Version Symbol	A: Size 21A B: Size 09, 12, 15 C: Size 08
(3)	Size	08, 09, 12, 15, 21A
(4)	Brake	A: Without brake B: With brake
(5)	Applied Servo Driver Input Voltage	100: 100 VAC (Only size 09 is compatible with 100 VAC) 200: 200 VAC

(6)	Encoder Format	10: A-format 2.5 Mbps, 1:1 connection
(7)	Encoder Resolution	S17b: 17-bit absolute encoder
(8)	Encoder Phase Angle	Phase difference between the motor U phase and the encoder origin A: 0 degrees
(9)	Connector Specification	C : With standard connectors N : Without connectors
(10)	Option Symbols	Y : Side exiting cable
(11)	Special Specifications	No symbol: Standard product SP: Special specification code

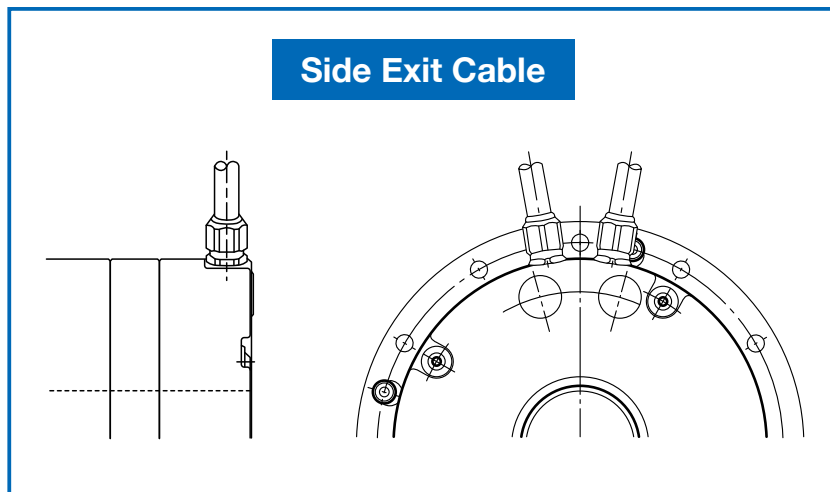
Option:

□ Side Exit Cable (Option: Y)

Cables (motor and encoder cable) exit from the side of the motor.

Use this option when there is not enough space in the rear of housing when installing a motor.

For size 08, contact us. Size 21A is not compatible.



Motor Specifications

Model			Item	HMAC08	HMAB09		HMAB12	HMAB15	HMAA21A
Combined driver				REL-230-18	REL-230-18	REL-230-36	REL-230-36	HA-800□-24D-E-200	HA-800□-24D-E-200
Input power supply voltage		V		200	200	100	200	200	200
Rated output		W		163	251		406	754	1320
Instantaneous maximum torque ¹		N•m		1.8	3.0		6.6	13	33
Rated torque ^{*1, *2}		N•m		0.52	0.80		1.55	3.60	12.6
Maximum speed ^{*1}		rpm		6,000	5,600	4,800	4,800	4,000	3,000
Rated speed		rpm		3,000	3,000		2,500	2,000	1,000
Instantaneous maximum current ^{*1}		A _{rms}		6.5	8.9	15.4	18	29	55
Rated current ^{*1, *2}		A _{rms}		2.1	2.5	4.3	4.2	7.8	20.0
Torque constant ^{*1}		N•m/A _{rms}		0.35	0.41	0.24	0.44	0.54	0.72
EMF constant ^{*3}		V/(rpm)		0.037	0.043	0.025	0.046	0.057	0.075
Phase resistance (20°C)		Ω		1.43	1.2	0.4	0.33	0.19	0.028
Phase inductance		mH		2.5	3.0	1.0	1.4	1.2	0.29
Moment of Inertia () indicates with brake	GD ² /4	×10 ⁻⁴ kg•m ²		0.734 (0.828)	1.78 (2.16)		6.45 (6.83)	15.8 (19.8)	125 (141)
	J	×10 ⁻⁴ kgf•cm•s ⁻²		7.49 (8.45)	18.2 (22.1)		65.8 (69.7)	161 (202)	1280 (1444)
Allowable radial load (static)		N		800	800		1200	2400	4500
		kgf		81.6	81.6		122	245	459
Allowable axial load (static)		N		1900	2400		3600	5000	14000
		kgf		194	245		367	510	1429
Rated radial load (At the rated speed)		N		175	185		233	530	1040
		kgf		17.9	18.9		23.8	54.1	106.1
Rated axial load (At the rated speed)		N		100	105		130	180	880
		kgf		10.2	10.7		13.3	18.4	89.8
Encoder type				Absolute encoder					
Encoder resolution capability	Single turn motor revolution			2 ¹⁷ (131,072)					
	Multi-turn revolution counter ⁴			2 ¹⁶ (65,536)					
Weight () indicates with brake		kg		1.4 (1.5)	2.0 (2.1)		3.4 (3.8)	5.5 (6.2)	17.5 (19.7)
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 ² (frequency: 10 to 400 Hz) / impact resistance: 300 m/s ² Vibration resistance: 25 m/s ² (frequency: 10 to 400 Hz) / impact resistance: 300 m/s ² No dust, metal powder, corrosive gas, flammable gas, oil mist, or other similar material. Place indoors without being exposed to direct sunlight. Altitude: 1,000 m or less					
Motor insulation				Insulation resistance: 100 MΩ (500 VDC) or higher Dielectric strength voltage: 1500 VAC/min Insulation class: A					
Mounting Direction				Can be installed in any direction					
Protection structure				Totally enclosed self-cooled type (IP54)					

The values in the table above show typical values.

*1: When tested with HA-800.

*2: This is the value for saturated temperature when installed on the next aluminum heatsink of the following size:

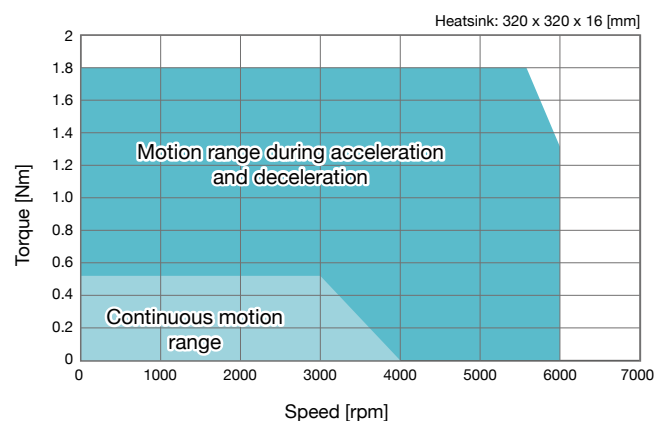
HMAC08: 320 x 320 x 16 [mm], HMAB09: 350 x 350 x 18 [mm], HMAB12: 400 x 400 x 20 [mm], HMAB15: 500 x 500 x 25 [mm], HMAA21A: 650 x 650 x 30 [mm]

*3: This is the value of the phase EMF constant multiplied by 3.

*4: The range of the multi revolution counter is from -32,768 to 32,767.

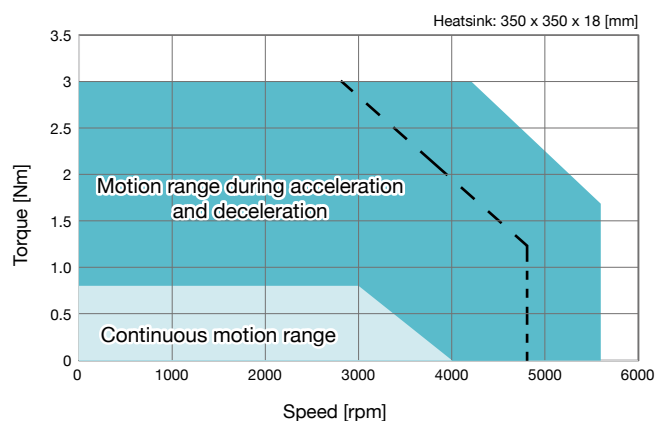
Operable Range

HMAC08

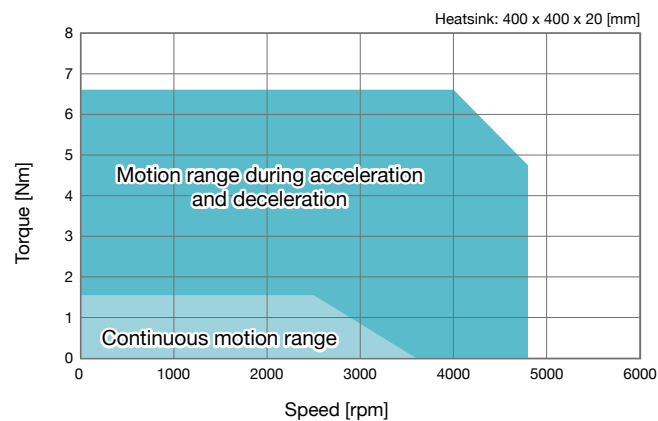


HMAB09

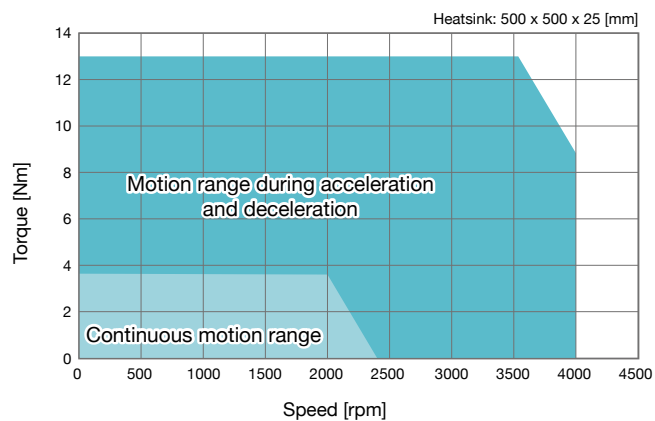
* The dashed line indicates 100-VAC specifications.



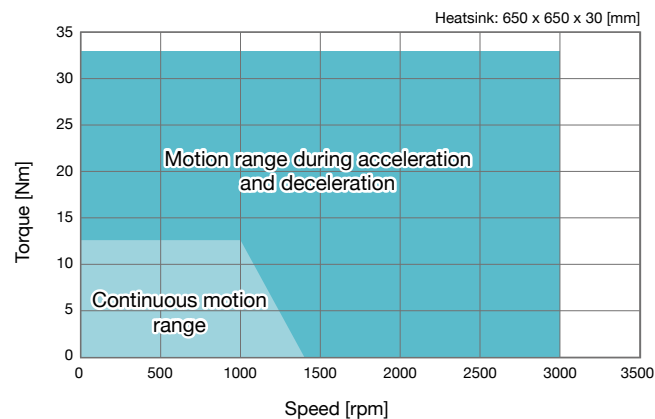
HMAB12



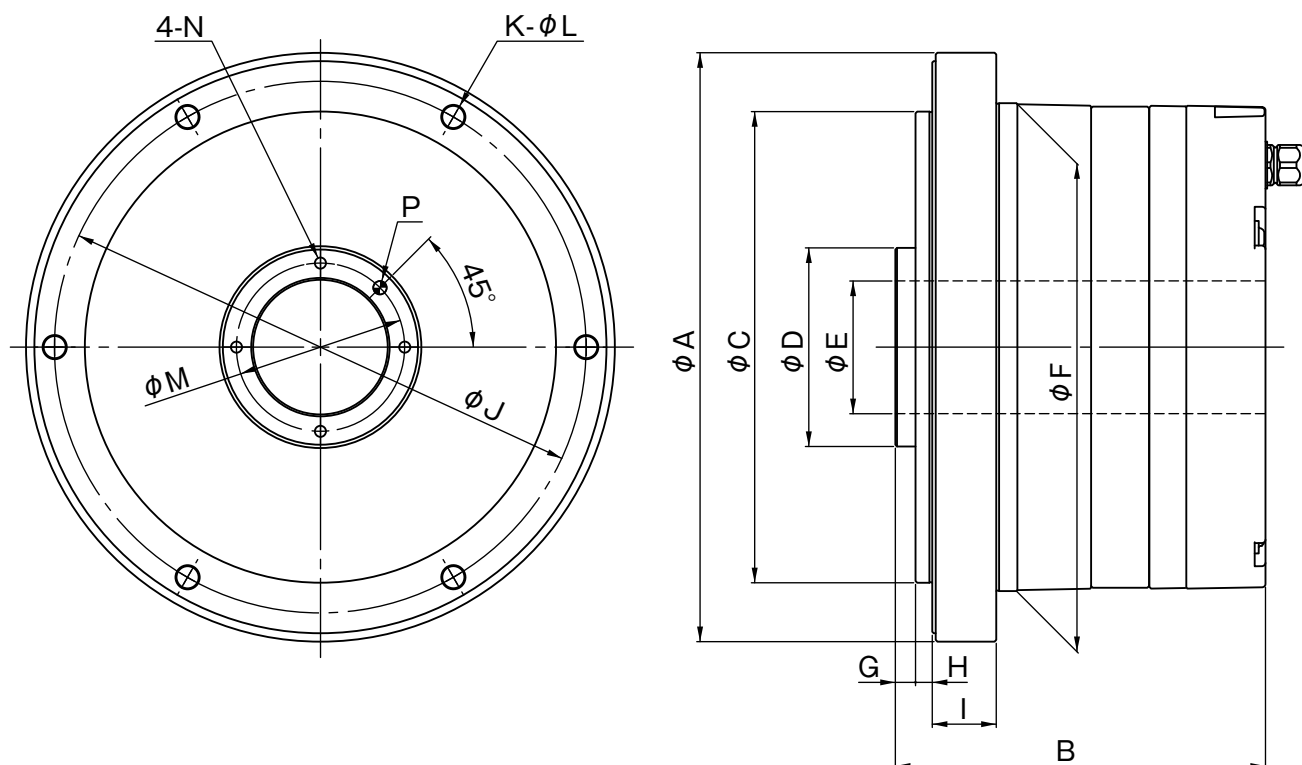
HMAB15



HMAA21A



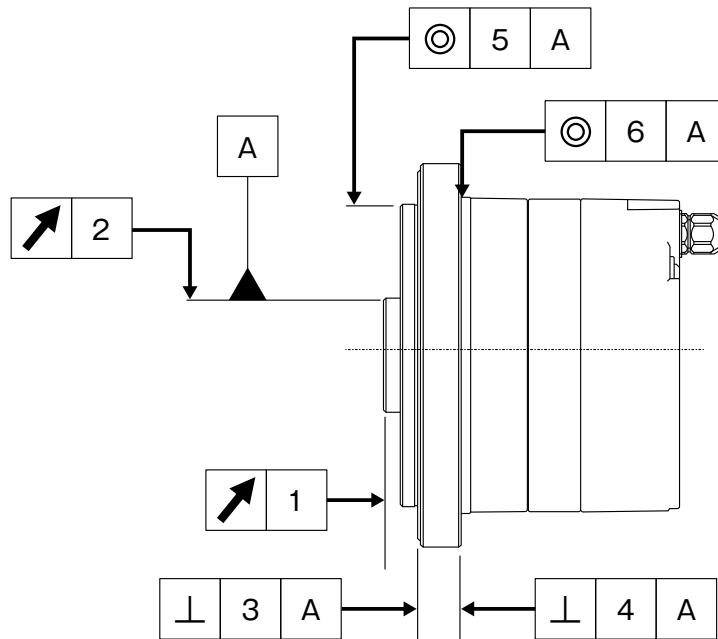
Outline Dimensions



(Unit: mm)

Dimension	HMAC08	HMAB09	HMAB12	HMAB15	HMAA21A
ϕA	94	114	146	175	247
B	89	88.5	95.5	110	157
ϕC	75 h7	90 h7	114 h7	140 h7	200 h7
ϕD	28 h6	34 h6	43 h6	59 h6	88 h6
ϕE (hollow diameter)	16	22	30	40	60
ϕF	77 h7	94 h7	122 h7	145 h7	210 h7
G	5	5	5	6	8
H	5	5	5	5	8
I	13	13	15	19	39
ϕJ	84	102	132	158	226
K	6	6	6	6	8
ϕL	3.4	4.5	5.5	6.6	9.0
ϕM	22	28	36	50	74
N	M3X6	M3X6	M3X6	M4X8	M5X10
P	$\phi 3$ H7X5	$\phi 3$ H7X5	$\phi 3$ H7X5	$\phi 4$ H7X7	$\phi 5$ H7X8

Mechanical Accuracy



(Unit :mm)

Accuracy Item	HMAC08	HMAB09	HMAB12	HMAB15	HMAA21A
1. Output shaft surface runout	0.020	0.020	0.020	0.040	0.040
2. Output shaft radial runout	0.020	0.020	0.020	0.040	0.040
3. Mounting surface squareness to the output shaft	0.080	0.080	0.080	0.090	0.100
4. Mounting surface squareness to the output shaft	0.060	0.065	0.065	0.085	0.090
5. Concentricity between the output shaft and actuator mounting diameter	0.050	0.050	0.050	0.050	0.060
6. Concentricity between the output shaft and actuator mounting diameter	0.045	0.045	0.045	0.055	0.065

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