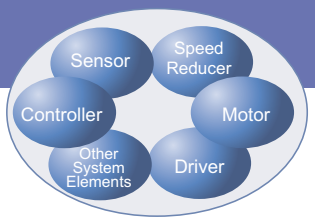


HarmonicDrive®

FHA-C-PR offers High-Precision Rotary Positioning

New! FHA-C Series low-profile, hollow shaft, brushless servo actuators achieve high-position rotary positioning with improved one-way and bi-directional repeatability. FHA-C-PR are are now available in 4 new models with 5 reduction ratios.

We improved the one way and bi-directional positioning repeatability of the FHA-C series to offer an optimal solution for those applications that require increased accurate positioning.

Improved One-way and Bi-directional Repeatability

■ One-Way Repeatability

(Unit: arc-sec)

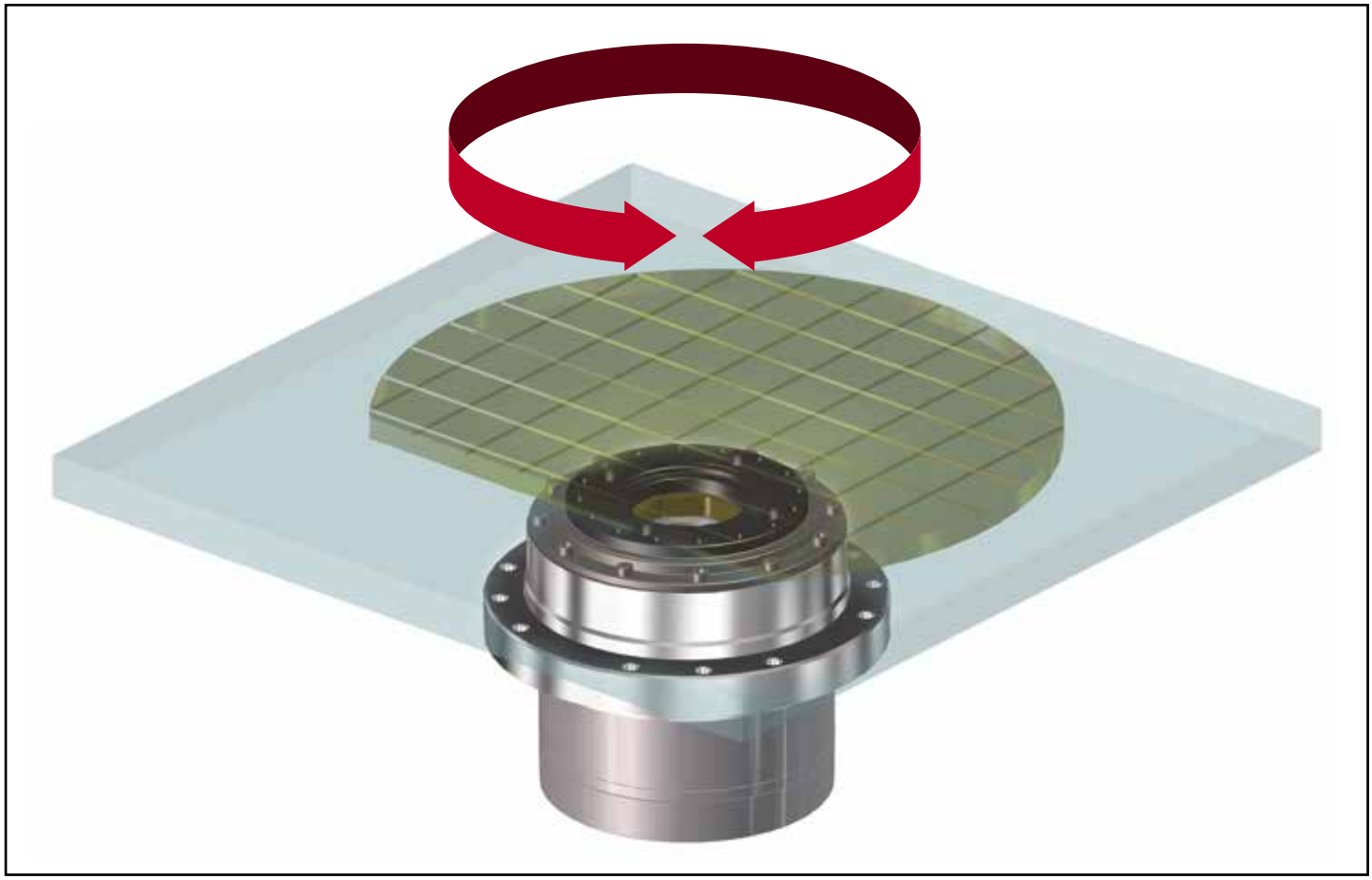
Gear ratio \ Model	FHA-17C-PR	FHA-25C-PR	FHA-32C-PR	FHA-40C-PR
50:1	±5	±5	±4	±4
80:1				
100:1				
120:1				
160:1				

■ Bi-directional Repeatability

(Unit: arc-sec)

Gear ratio \ Model	FHA-17C-PR	FHA-25C-PR	FHA-32C-PR	FHA-40C-PR
50:1	75	60	50	50
80:1	30	25	20	20
100:1				
120:1				
160:1				

The FHA-C-PR is optimal for rotary applications that require high repeatability.



■ Ordering Code

FHA - 17 C - 50 - E 250 - PR

- Model: AC servo actuator FHA series
- Size: 17, 25, 32, 40
- Design Version:
- Reduction ratio: 50, 80, 100, 120, 160
- Encoder type E: Incremental encoder
- Encoder resolution 250: 2500p/rev
- Option Symbols

■ Special options

Option specification	Option descriptions	Symbol
Power supply voltage 100V	Available for FHA-17C / 25C / 32C	A
Motor shaft brake	For holding motor shaft	B
With connector	For motor (IP-20), for encoder (IP-40)	C
Cable extension	5m long motor cable and encoder cable	F5

Option specification	Option descriptions	Symbol
Cable exit direction	rear exit	K
Position sensor	Origin and end limits	L
High positioning accuracy	Improved one-way and Bi-directional repeatability	PR

Note: Contact us when using 2 or more options.

■ FHA-C-PR Specifications

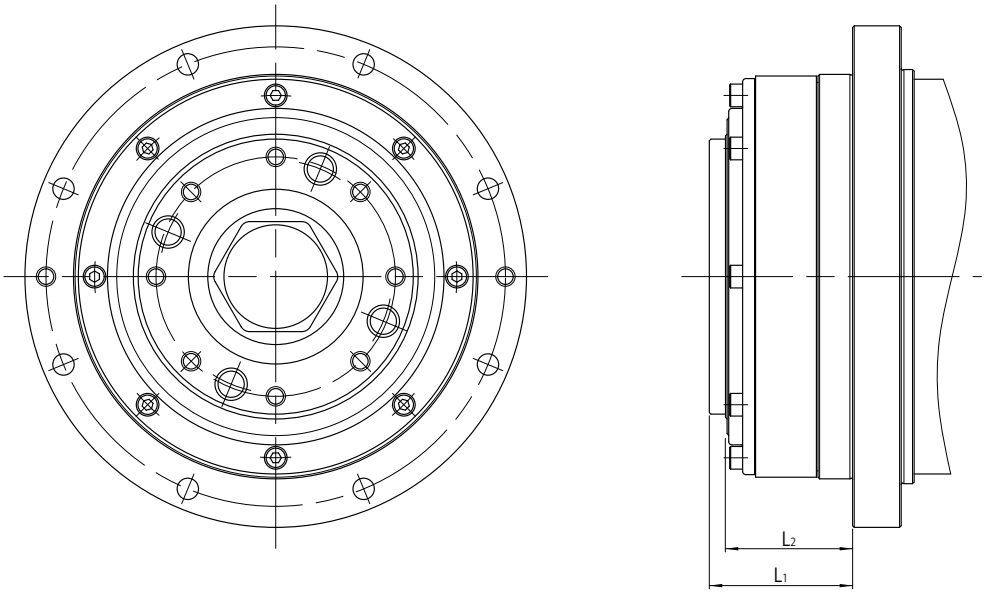
"200V" and "100V" in the table are referred to as the 200V specification (standard) and the 100V specification (option), respectively.

Item		Model Ratio	FHA-17C-xx-E250-PR					FHA-25C-xx-E250-PR					FHA-32C-xx-E250-PR					FHA-40C-xx-E250-PR				
			50	80	100	120	160	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160
Maximum torque *1		N·m	39	51	57	60	64	150	213	230	247	260	281	364	398	432	453	500	659	690	756	820
Maximum speed *1		rpm	96	60	48	40	30	90	56	45	37	28	80	50	40	33	25	70	43	35	29	22
Torque constant *1	200 V	$N·m/A_{rms}$	21	33	42	50	67	22	36	45	54	72	27	43	54	64	86	31	51	64	76	102
	100 V	$N·m/A_{rms}$	11	17	21	25	33	11	17	22	26	36	16	26	33	39	52	-	-	-	-	-
Maximum Current *1	200 V	A_{rms}	2.1	1.7	1.6	1.4	1.1	7.3	6.4	5.6	5.0	4.0	11.4	9.2	8.0	7.4	5.9	17.3	14.0	11.8	10.9	9.0
	100 V	A_{rms}	4.2	3.4	3.2	2.7	2.2	15	13	11	10	8.0	18	16	16	12	12	-	-	-	-	-
EMF voltage constant	200 V	V/(rpm)	2.3	3.7	4.7	5.6	7.5	2.5	4.1	5.1	6.1	8.1	3.0	4.8	5.9	7.2	9.5	3.6	5.7	7.2	8.6	11.4
	100 V	V/(rpm)	1.2	1.9	2.4	2.8	3.8	1.3	2.0	2.6	2.9	4.1	1.5	2.9	3.0	4.4	4.8	-	-	-	-	-
Phase resistance	200 V	Ω (20°C)	7.9					2.6					1.0					0.73				
	100 V	Ω (20°C)	2.0					0.65					0.25					-				
Phase inductance	200 V	mH	6.0					2.6					1.3					1.5				
	100 V	mH	1.5					0.65					0.33					-				
Moment of Inertia	$(GD^2/4)$	$kg·m^2$	0.21	0.53	0.83	1.2	2.1	0.90	2.3	3.5	5.2	9.2	2.1	5.3	8.2	12	21	5.5	14	22	32	56
	(J)	$kgf·cm·s^2$	2.1	5.4	8.5	12	21	9	23	37	53	94	21	54	84	121	215	56	143	223	321	569
Allowable radial load		kN	2.9					4.9					9.5					14.7				
Allowable axial load		kN	9.8					14.7					24.5					39.2				
Max. moment capacity		N·m	188					370					530					690				
Moment stiffness		N·m/rad	220×10^3					490×10^3					790×10^3					1400×10^3				
		kgf·m/arc min	6.5					15					23					42				
One-way positioning accuracy		arc-sec	60	40	40	40	40	40	30	30	30	30	40	30	30	30	30	40	30	30	30	30
One-way repeatability		arc-sec	±5					±5					±4					±4				
Bi-directional repeatability		arc-sec	75	30	30	30	30	60	25	25	25	25	50	20	20	20	20	50	20	20	20	20
Motor encoder			2500 pulse/revolution																			
Quad encoder resolution *2		Pulse/Rev	500000	800000	1000000	1200000	1600000	500000	800000	1000000	1200000	1600000	500000	800000	1000000	1200000	1600000	500000	800000	1000000	1200000	1600000
Mass *3		kg	2.8					4.7					7.1					13.6				
Enclosure			Totally enclosed self-cooling type (IP44)																			
Environment conditions			Operating temperature: 0 to 40°C/Storage temperature: -20 to 60°C Operating humidity:/storage humidity: 20 to 80% RH (no condensation) Vibration resistance: 24.5 m/s^2 (frequency: 10 to 400 Hz) / shock resistance: 294 m/s^2 Do not expose to dust, metal powder, corrosive gas, flammable gas, or oil mist. Use indoors, and do not expose to direct sunlight. Altitude: 1000 m or lower above sea level																			
Motor insulation			Insulation resistance: 100MΩ or higher (500 VDC) Dielectric strength voltage: 1500 VAC/min Insulation class: Type F																			
Orientation			All position																			
Recommended drives		100VAC	RTL-230-18, REL-230-18					RTL-230-36, REL-230-36		RTL-230-18, REL-230-18			RTL-230-36, REL-230-36		RTL-230-18, REL-230-18			–				
			HA-800A-3B-100										HA-800A-6B-100									
		200VAC	RTL-230-18, REL-230-18															RTL-230-36, REL-230-36		RTL-230-18, REL-230-18		
			HA-800A-3B-200										HA-800A-6B-200									
		24VDC	DDP-090-36, DEP-090-36					–					–					–				

The values in the table above show typical values for the output shaft.
*1: They are typical characteristics in the case of combinations with our driver (driven with the ideal sine wave). (Ambient temperature: 25ºC)
*2: The output axis resolution is obtained by (Motor shaft encoder resolution multiplied by four) x (Reduction ratio).
*3: Mass (without brake)

External Dimensions

Compared to the standard FHA-C series, only the dimensions of L_1 and L_2 differ for the FHA-C-PR as shown. All other dimensions are the same. Refer to the "General Catalog for Mechatronics Products," "FHA-C Series Technical Manual," and "Confirmation Drawing."



(Unit: mm)

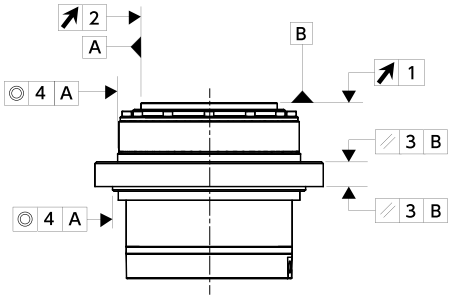
Actuator model	FHA-17C-PR	FHA-25C-PR	FHA-32C-PR	FHA-40C-PR
Dimension L_1	35	44.3	46	58.5
Dimension L_2	29.5	39.3	41	51.5

Mechanical Accuracy

The FHA-C-PR mechanical accuracies of the output shaft and mounting flange are shown below:

(Unit: mm)

Feature	FHA-17C-PR	FHA-25C-PR	FHA-32C-PR	FHA-40C-PR
1. Output shaft surface runout	0.010	0.012	0.012	0.014
2. Output shaft axial runout	0.010	0.012	0.012	0.014
3. Parallelism between output shaft and mounted surface	0.040	0.050	0.050	0.060
4. Concentricity between output shaft and fitting part	0.040	0.050	0.050	0.060



Note: For information on the measurement method, refer to the "FHA-C Series Technical Manual."
Note: Values are based on the Total Indicator Reading (T.I.R.).

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