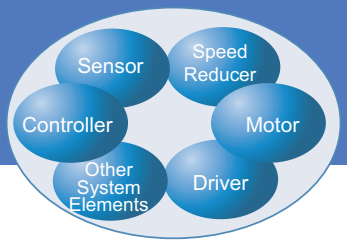


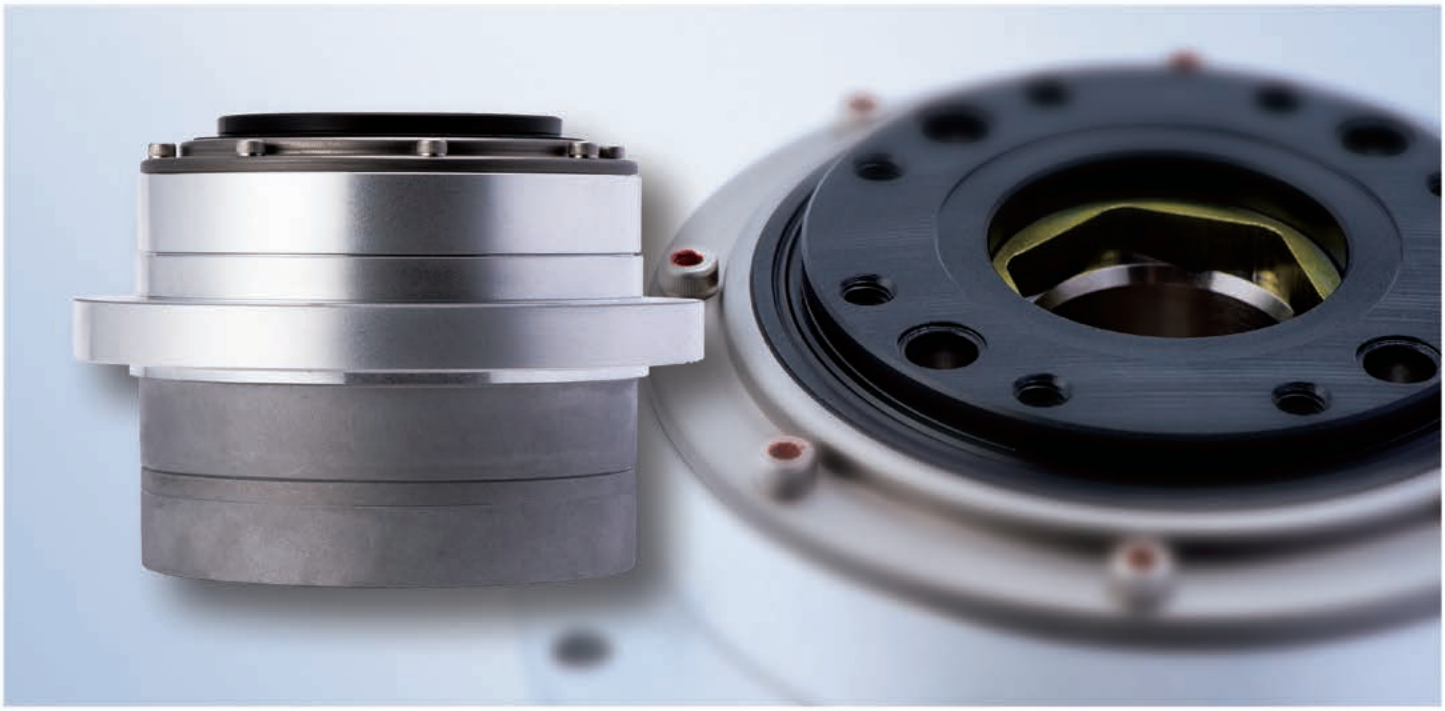
HarmonicDrive®

Flat Shape and Hollow Shaft Design AC Servo Actuator FHA-C Series

High Positioning Accuracy FHA-C-PR Type (Option)

**To the AC servo actuator FHA-C series,
the high positioning accuracy specification (option) has been added to its lineup.**

The high positioning accuracy specification type has been added to the AC Servo Actuator FHA-C series, so that its lineup has been further enriched.
We standardized the repeatability and bi-directional positioning accuracies of the FHA-C series to offer you an optimal use for your various types of applications requiring further accurate positioning. We recommend this type for alignment application that requires high positioning accuracy.



Standardization of Repeatability and Bi-directional Positioning Accuracy

■ Repeatability

(Unit: arc-sec)

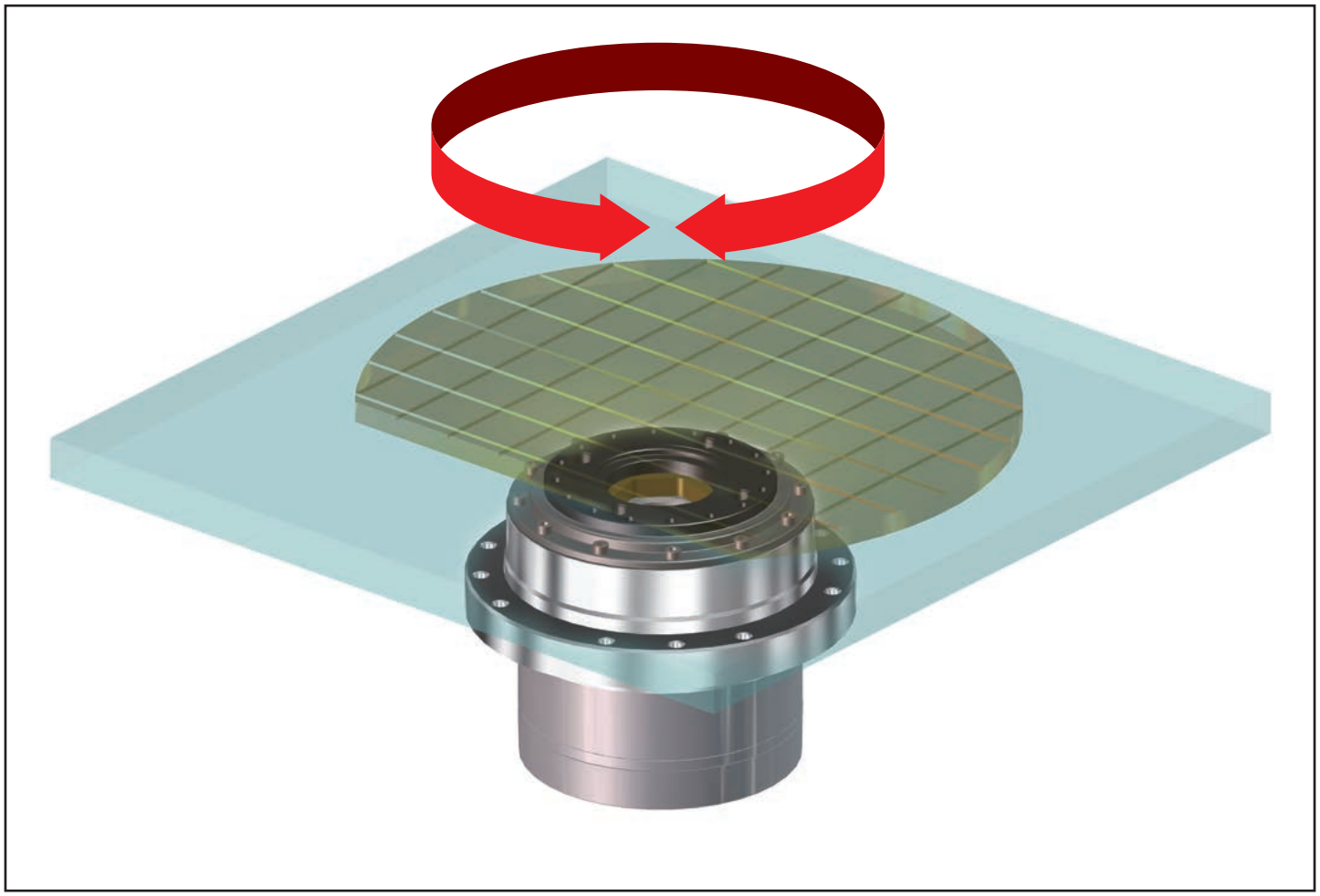
Gear ratio \ Type	FHA-17C-PR	FHA-25C-PR	FHA-32C-PR	FHA-40C-PR
1:50	±5	±5	±4	±4
1:80				
1:100				
1:120				
1:160				

■ Bi-directional Positioning Accuracy

(Unit: arc-sec)

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

The FHA-C-PR type is optimal for the alignment application because it enables the high positioning accuracy.



■ Ordering Code

FHA - 17 C - 50 - E 250 - PR

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

■ Details of special options

Option specification	Option descriptions	Symbol
Power supply voltage 100V	Applicable to 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 length for each motor cable and encoder cable	F5

Option specification	Option descriptions	Symbol
Cable exit direction	from back bracket face	K
Position sensor	Origin and end limits	L
High positioning accuracy	Standardization of Repeatability and Bi-directional positioning accuracy	PR

Note: Contact our sales and marketing office when using the options in the combinations of two or more types.

■ Specification

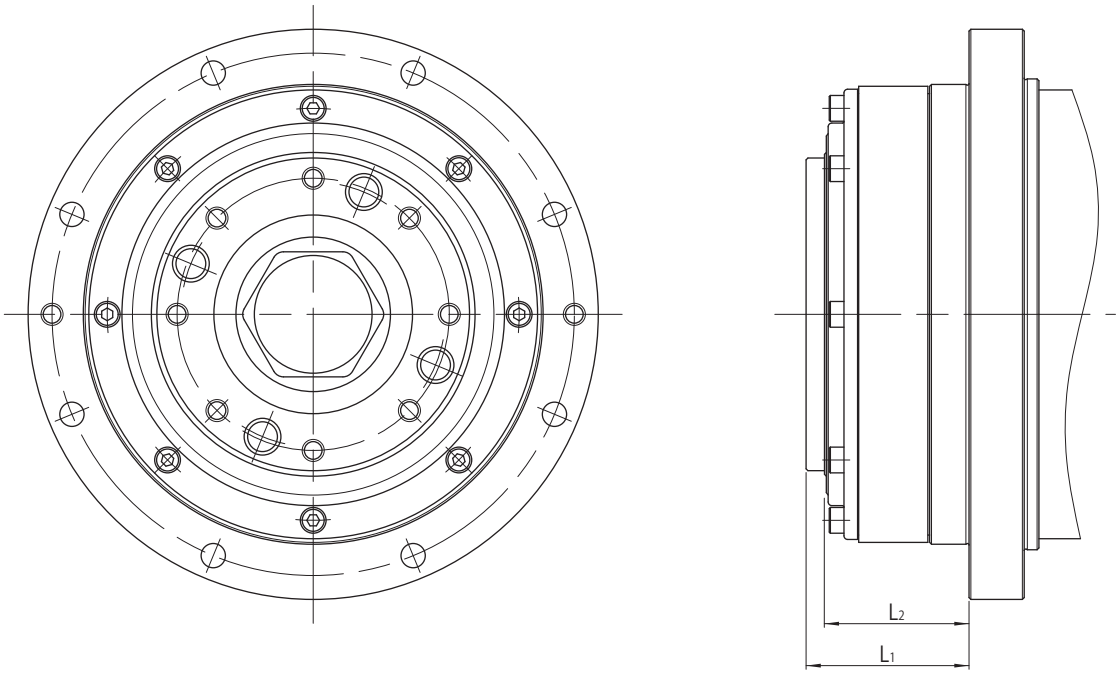
The FHA-C-PR type actuator specification is shown below.
"200V" and "100V" in the table are referred to as the 200V specification (standard) and the 100V specification (option), respectively.

			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
		kgf·m	4.0	5.2	5.8	6.1	6.5	15.3	21.7	23.5	25.2	26.5	28.7	37.1	40.6	44.1	46.2	51.0	67.2	70.4	77.1	83.7
Maximum speed *1		r/min	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	21	33	42	50	67	22	36	45	54	72	27	43	54	64	86	31	51	64	76	102
		kgf·m/A	2.1	3.4	4.3	5.1	6.8	2.3	3.7	4.6	5.5	7.3	2.8	4.4	5.5	6.5	8.8	3.2	5.2	6.5	7.8	10.4
	100 V	N·m/A	11	17	21	25	33	11	17	22	26	36	16	26	33	39	52	-	-	-	-	-
		kgf·m/A	1.1	1.7	2.2	2.6	3.4	1.2	1.7	2.3	2.7	3.7	1.6	2.7	3.4	4.0	5.3	-	-	-	-	-
Maximum Current *1	200 V	A	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	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/(r/min)	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/(r/min)	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
Reduction ratio			1:50	1:80	1:100	1:120	1:160	1:50	1:80	1:100	1:120	1:160	1:50	1:80	1:100	1:120	1:160	1:50	1:80	1:100	1:120	1:160
Permissible radial load		kN	2.9					4.9					9.5					14.7				
		kgf	300					500					970					1500				
Permissible axial load		kN	9.8					14.7					24.5					39.2				
		kgf	1000					1500					2500					4000				
Max. moment capacity		N·m	188					370					530					690				
		kgf·m	19					38					54					70				
Moment stiffness		N·m/rad	220 x 10^3					490 x 10^3					790 x 10^3					1400 x 10^3				
		kgf·m/arc min	6.5					15					23					42				
One-way positioning accuracy		Second	60	40	40	40	40	40	30	30	30	30	40	30	30	30	30	40	30	30	30	30
Repeatability		Second	±5					±5					±4					±4				
Bi-directional positioning accuracy		Second	75	30	30	30	30	60	25	25	25	25	50	20	20	20	20	50	20	20	20	20
Motor position detector			2500 pulse/revolution																			
Output shaft resolution (with quadrature encoder) *2		Pulse/Revolution	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				
Protective structure			Totally enclosed self-cooling type (IP44)																			
Ambient environment specification			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																			
Combination servo driver	200 V		HA-800*-3C-200					HA-800*-3C-200					HA-800*-6C-200					HA-800*-6C-200				
	100 V		HA-800*-3C-100					HA-800*-6C-100					HA-800*-6C-100					-				

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: 25°C)
*2: The output axis resolution is obtained by (Motor shaft encoder resolution multiplied by four) x (Reduction ratio).
*3: Mass (without brake)

External Dimension

Compared to the FHA-C series standard type, only the dimensions of L_1 and L_2 of the high positioning accuracy specification of the FHA-C-PR type differ as shown in the following drawing; however, the other dimensions are the same as those of the standard type.
Refer to the "General Catalog for Mechatronics Products," "FHA-C Series Technical Manual," and "Confirmation Drawing."



(Unit: mm)

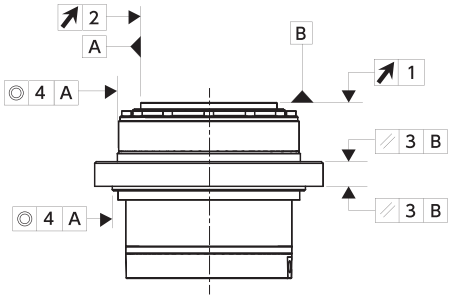
Actuator model	FHA-17C-PR	FHA-25C-PR	FHA-32C-PR	FHA-40C-PR
Dimension L_1	35	44.3	46	58.5
Dimension L_2	29.5	39.3	41	51.5

Mechanical Accuracy

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

(Unit: mm)

Accuracy Item	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.).

* Please contact our sales department with any questions.

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