

# RKF Series



Harmonic Drive<sup>®</sup> actuator  
Precision Gearing & Motion Control

# RKF Series



The RKF series is compact and includes high-torque AC servo actuators with high-rotational accuracy, a flange output combining one of our Harmonic Drive® gears and an AC servo motor. The RKF Series is designed to operate with a wide range of third party drivers as well as Harmonic Drive LLC's RTL Series, and REL Series.

## Features

### □ High Resolution

High resolution of maximum 800,000 pulses / revolution (0.00045°/pulse).

### □ High-Positional Accuracy

Our HarmonicDrive® gear unit eliminates backlash caused by gear play, ensuring high-accuracy positioning.

### □ Easy-to-Operate Dedicated Driver

A dedicated driver is set with parameters for a combined actuator. Host system parameters and control parameters can be easily set on a 7-segment LED display.

## Ordering Code

**RKF - 20 A - 50 - E 200**

Model: RKF series

Sizes: 20, 25 and 32

Design Version

Ratios: 50 and 100:1

Encoder type E: Incremental encoder

Encoder resolution: 200: 2000p/revolution

## Specifications

Time rating:	Continuous	Insulation resistance:	DC500V 100M ohm or higher	Ambient humidity:	20 to 80% (no condensation)
Excitation method:	Permanent magnet	Structure:	Totally enclosed, self-cooled	Lubricant:	Grease (Harmonic Grease <sup>®</sup> )
Insulation class:	Class B	Ambient temperature:	0 to 40°C		
Dielectric strength:	AC1000V/min	Storage temperature:	-20°C to +60°C		

Item		Size	RKF-20A		RKF-25A		RKF-32A	
			50	100	50	100	50	100
Rated Output <sup>3</sup>	W		120	111	180	190	310	310
Input Power Supply <sup>3</sup>	V		AC200					
Rated Torque <sup>3</sup>	Nm		19	35	29	59	49	98
	kgfcm		190	360	300	600	500	1000
Rated Rotational Speed <sup>3</sup>	rpm		60	30	60	30	60	30
Continuous Stall Torque <sup>3</sup>	Nm		19	35	29	59	49	98
	kgfcm		190	360	300	600	500	1000
Maximum Momentary Torque <sup>3</sup>	Nm		56	82	98	157	220	330
	kgfcm		570	840	1000	1600	2200	3400
Max. Rotational Speed <sup>3</sup>	rpm		90	45	90	45	90	45
Moment of Inertia <sup>4</sup>	GD <sup>2</sup> /4	kgm <sup>2</sup>	0.098	0.39	0.19	0.77	0.67	2.7
	J	kgfcm <sup>2</sup>	1.0	4.0	2.0	7.9	6.9	27
Allowable Radial Load	N		2000		2500		3900	
	kgf		200		250		400	
Allowable Axial Load	N		880		1100		1600	
	kgf		90		110		160	
Quad Encoder Resolution (At x4) <sup>5</sup>	Pulses/revolution		400,000	800,000	400,000	800,000	400,000	800,000
Mass	kg		2.9		5.0		9.5	
Combined Driver			HA-800-3B-200 HA-520-1R-200		HA-800-3B-200 HA-520-3-200		HA-800-6B-200 HA-520-3-200	

\* 1: The figures in the table are those at the output shaft.

\* 2: The actuator specification is the value when mounted on the following aluminum radiation plate:

RKF-20: 250 x 250 x 12mm

RKF-25, RKF-32: 300 x 300 x 15mm

\* 3: The values are those on temperature rise saturation. The other values are those at 20°C.

\* 4: The moment of inertia is the total of the inertia moments of the motor shaft and HarmonicDrive<sup>®</sup> gear converted into the output shaft side.

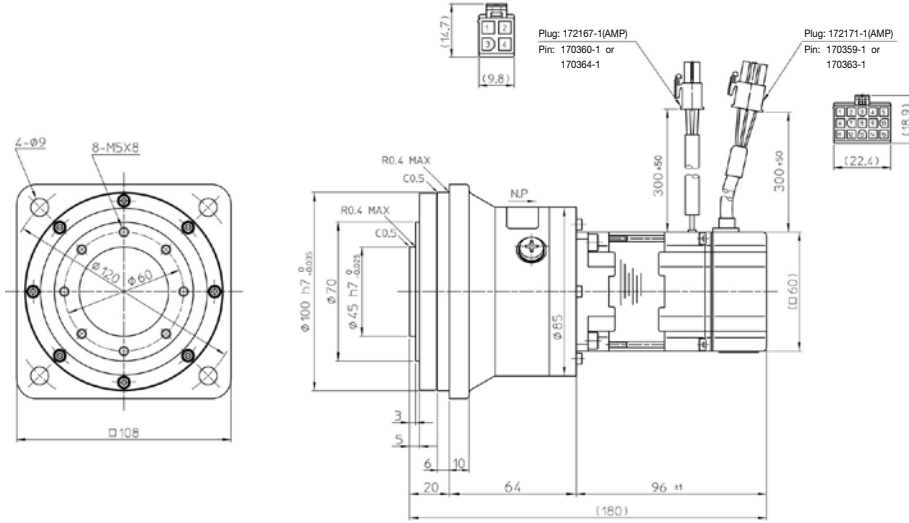
\* 5: Output shaft resolution is calculated using (Motor shaft encoder resolution) 4 x (Reduction ratio).

\* 6: Please check the actuator rotation direction in our technical data sheet.

## Outline Dimensions

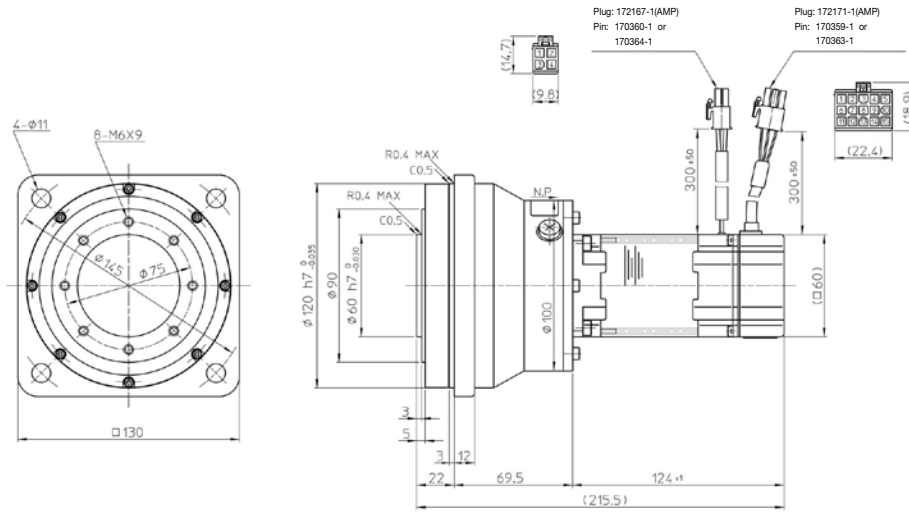
### □ RKF-20A

Unit: mm



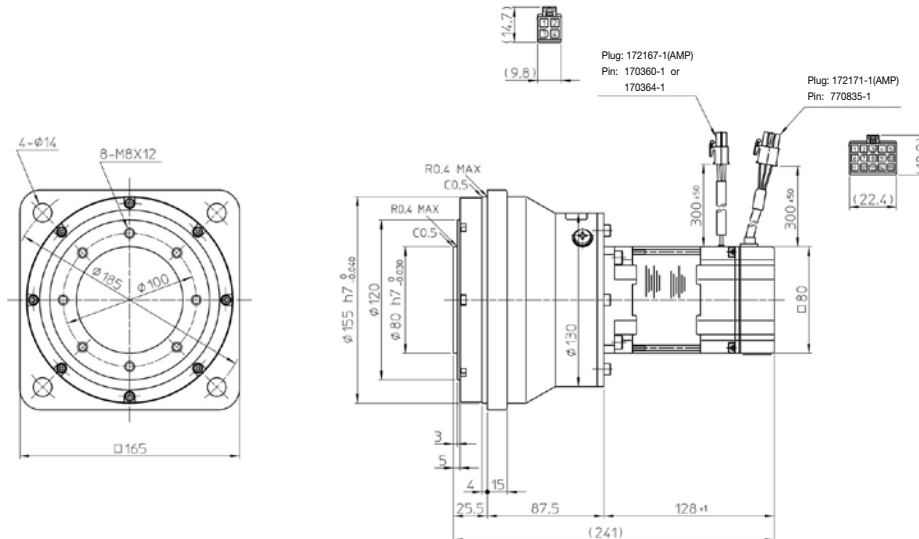
### □ RKF-25A

Unit: mm



### □ RKF-32A

Unit: mm



\* The dimension tolerances that are not specified vary depending on the manufacturing method. Please check the confirmation drawing or contact us for dimension tolerances not shown on the drawing above.

## Positional Accuracy

The one-way positioning accuracy is defined as the maximum positional difference between the commanded position and the actual stop position when a series of positioning moves are performed in the same rotation direction. (Refer to JIS B-6201-1987).

The RKF actuator incorporates a Harmonic Drive® gear which inherently has high rotational position accuracy. Because of the gearing's high ratio, any rotational error at the input (i.e. motor shaft position error or motor feedback error) is reduced by a factor of the ratio (1/ratio) and typically becomes negligible at the output. Therefore most of the error is represented by the transmission error of the Harmonic Drive® gear itself.

Item		Size	RKF-20A	RKF-25A	RKF-32A
One-Way Positional Accuracy	arc sec		90	90	90
	rad		$4.35 \times 10^{-4}$	$4.35 \times 10^{-4}$	$4.35 \times 10^{-4}$
Repeatability	arc sec		±30	±25	±20
	rad		$\pm 1.46 \times 10^{-4}$	$\pm 1.21 \times 10^{-4}$	$\pm 0.97 \times 10^{-4}$

<Measurement conditions, Load: no load, rotational speed: rated value>

## Mechanical Accuracy

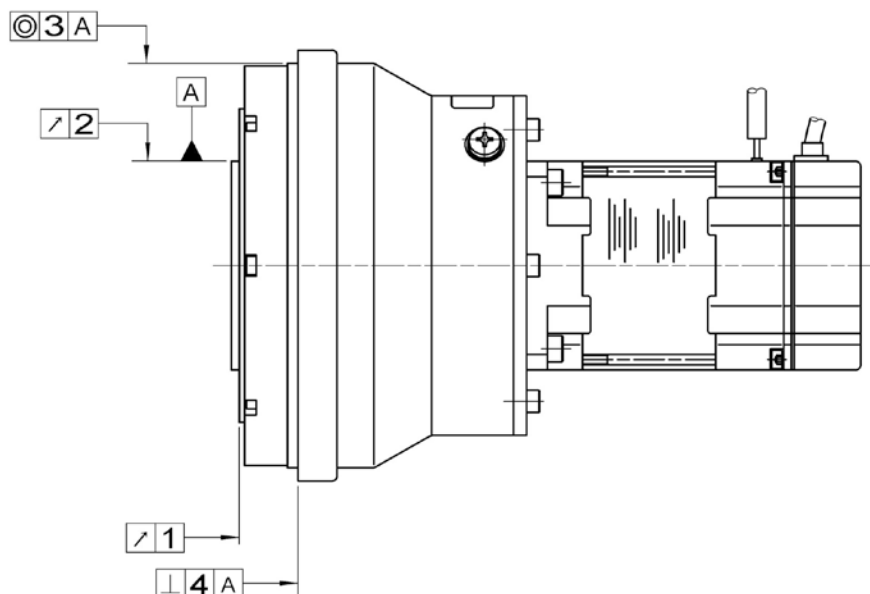
The mechanical accuracies of the output shaft and mounting flange of the RKF series are as follows.

### Mechanical Accuracy

(Unit: mm)

Accuracy Item	RKF-20A	RKF-25A	RKF-32A
1 Output shaft surface runout	0.04	0.04	0.04
2 Output shaft end runout	0.04	0.04	0.04
3 Eccentricity of flange fitting outside diameter	0.06	0.06	0.06
4 Perpendicularity between surface of mounting flange and output shaft	0.06	0.06	0.06

Note: The aforementioned values are T.I.R (total indicator reading) values.

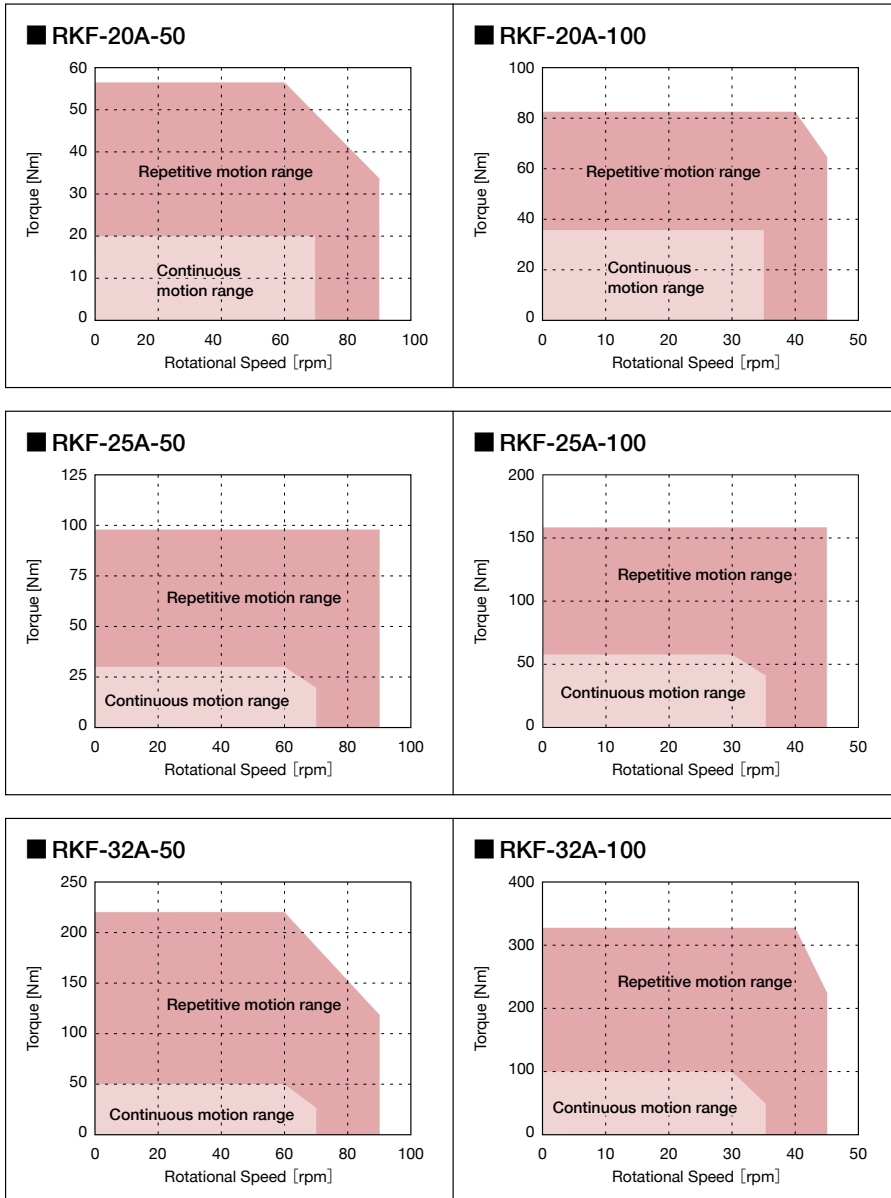


## Operable Range

The following diagrams show the operable range of the RKF series combined with an AC servo driver (HA-520/HA-800).

**Continuous Motion Range:** Range of continuously operable torque-rotational speed.

**Repetitive Motion Range:** Range of “rotational speed - torque” that can be operated momentarily. Normally, this range is used during acceleration and deceleration.



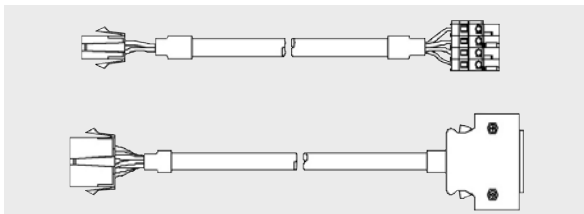
Note 1: The values in the graphs are those when one of the following aluminum radiation plates is mounted.  
 RKF-20: 250x250x12 (mm)  
 RKF-25, RKF-32: 300x300x15 (mm)

## Options

### Extension Cable (For HA-520)

Order Code Example: EWA-M \*\* -A04-WG04 (For motor)  
 EWA-E \*\* -M15-3M36 (For incremental encoder)  
 The cable for connecting the actuator to the servo driver HA-520.

(\*\* indicates the cable length (03 = 3m, 05 = 5m, 10 = 10m).





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