

RSF Series



Total Motion Control

Harmonic Drive™ actuator

Precision Gearing & Motion Control

RSF Series

The RSF series includes compact and high-torque AC servo actuators with a high rotational accuracy, a shaft output combining a speed reducer Harmonic Drive™ for precision control and an AC servo motor. Combined with a dedicated servo driver that fully demonstrates the performance of this RSF series of implements; compact machines and equipment with a high rotational accuracy.



Features

- **High resolution**

High resolution of maximum 800,000 pulses/revolution (0.00045°/pulse) using a Harmonic Drive™.

- **High positional accuracy**

The Harmonic Drive™ eliminates backlash caused by gear play, assuring 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.

Models and Symbols

RSF - 17 A - 50 - E 200

Type: AC servo actuator RSF series

Model Nos.: 17, 20, 25 and 32

Version symbol

Harmonic Drive™ reduction ratios: 50 and 100

Encoder type E: incremental encoder

Encoder resolution 200: 2000p/revolution

RSF Series

Specification

Time rating:	Continuous	Insulation resistance:	DC500V 100M ohm or higher	Ambient humidity:	20~80% (no condensation)
Excitation method:	Permanent magnet	Structure:	Totally enclosed, self-cooled	Resistance to vibration:	25m/s ²
Insulation class:	Class B	Ambient temperature:	0 to 40°C	Lubricant:	Grease (Harmonic grease)
Dielectric strength:	AC1000V /min	Storage temperature:	-20°C to +60°C		

Item		Model	RSF-17A		RSF-20A		RSF-25A		RSF-32A	
			50	100	50	100	50	100	50	100
Rated Output	*3	W	62	62	120	111	180	190	310	310
Input Power Supply	*3	V	AC200V							
Rated Torque	*3	Nm	9.8	20	19	35	29	59	49	98
		Inlb	87	177	168	310	257	522	434	867
Rated Rotational Speed	*3	r/min	60	30	60	30	60	30	60	30
Continuous Stall Torque	*3	Nm	9.8	20	19	35	29	59	49	98
		Inlb	87	177	168	310	257	522	434	867
Maximum Momentary Torque	*3	Nm	34	54	56	82	98	157	220	330
		Inlb	301	478	496	726	867	1389	1947	2921
Max. Rotational Speed	*3	r/min	90	45	90	45	90	45	90	45
Moment of Inertia	*4	(GD ² /4)kgm ²	0.047	0.19	0.098	0.39	0.19	0.77	0.67	2.7
		(J)kgfcm ²	0.48	1.9	1.0	4.0	2.0	7.9	6.9	27
Reduction Ratio			50	100	50	100	50	100	50	100
Permissible Radial Load		N	780		1400		2900		4400	
		Lbf	175		315		652		989	
Permissible Thrust Load		N	780		1370		2900		4400	
		Lbf	175		308		652		989	
Detector Resolution (At x4) *5		Pulses/revolution	400,000	800,000	400,000	800,000	400,000	800,000	400,000	800,000
Mass		Kg	2.1		2.9		4.7		8.7	
Servo Drive Combinations		AC 200	RTL-230-18, REL-230-18							
			HA-520-1R-200		HA-520-1R-200		HA-520-3-200		HA-655-4B-200	
			HA-655-2B-200		HA-655-2B-200		HA-655-2B-200			

* 1: The aforementioned values are those at the output shaft including the Harmonic Drive™ efficiency.

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

RSF-17, RSF-20	250 x 250 x 12mm
RSF-25, RSF-32	300 x 300 x 15mm

* 3: The values are those recorded during temperature rise saturation, while the other values are those at 20°C.

* 4: The moment of inertia is the total of moments of inertia of the motor shaft and Harmonic Drive™ converted into the output shaft side

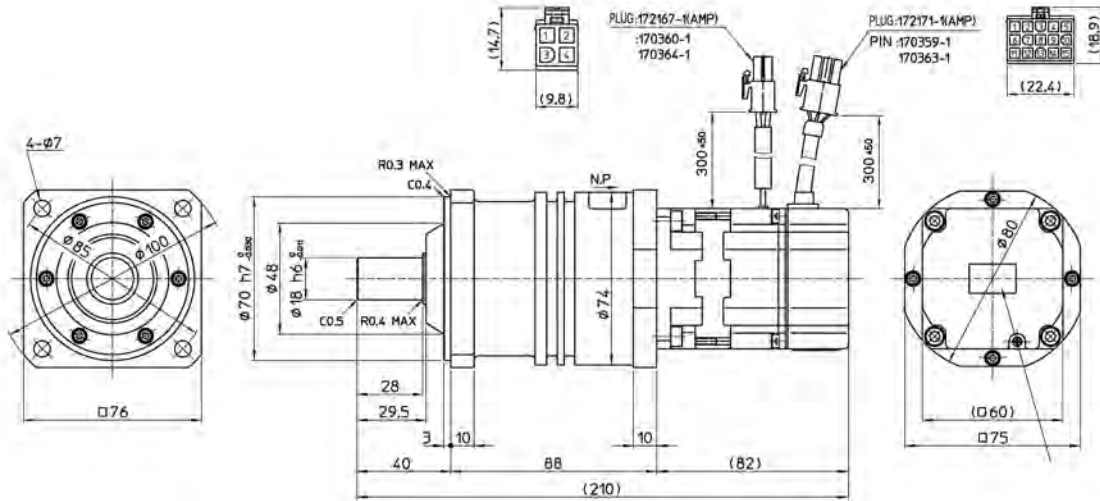
* 5: Detector resolution is calculated by (Motor shaft encoder resolution) x 4 x (Reduction ratio).

RSF Series

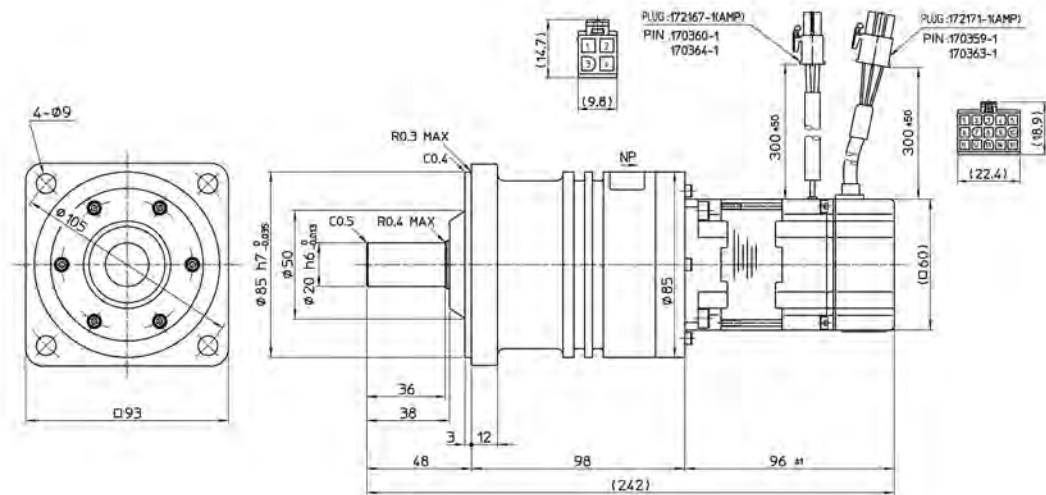
External Dimensions

■ RSF-17A

In mm



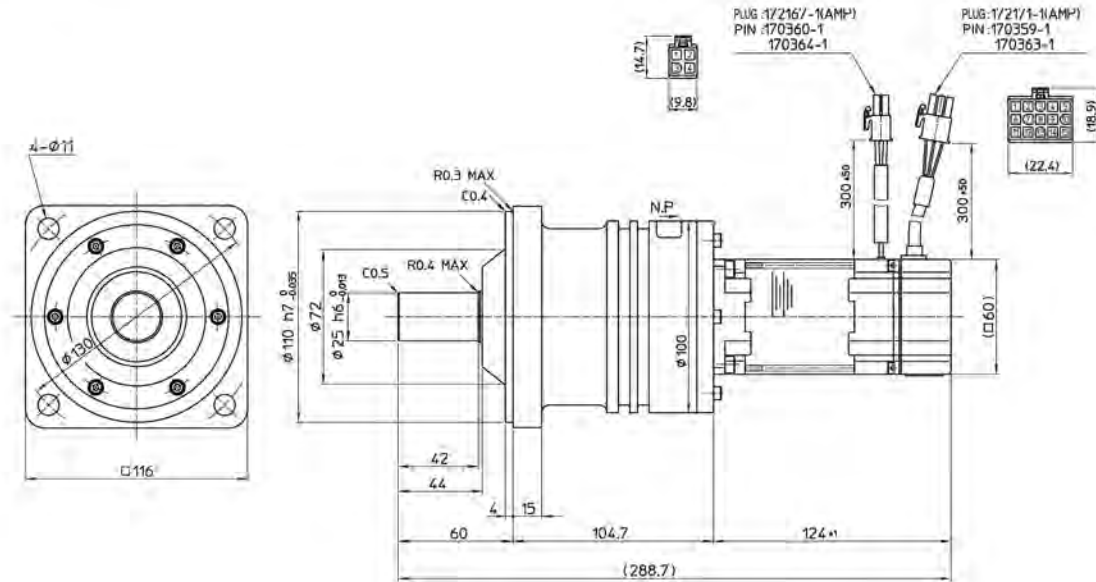
■ RSF-20A



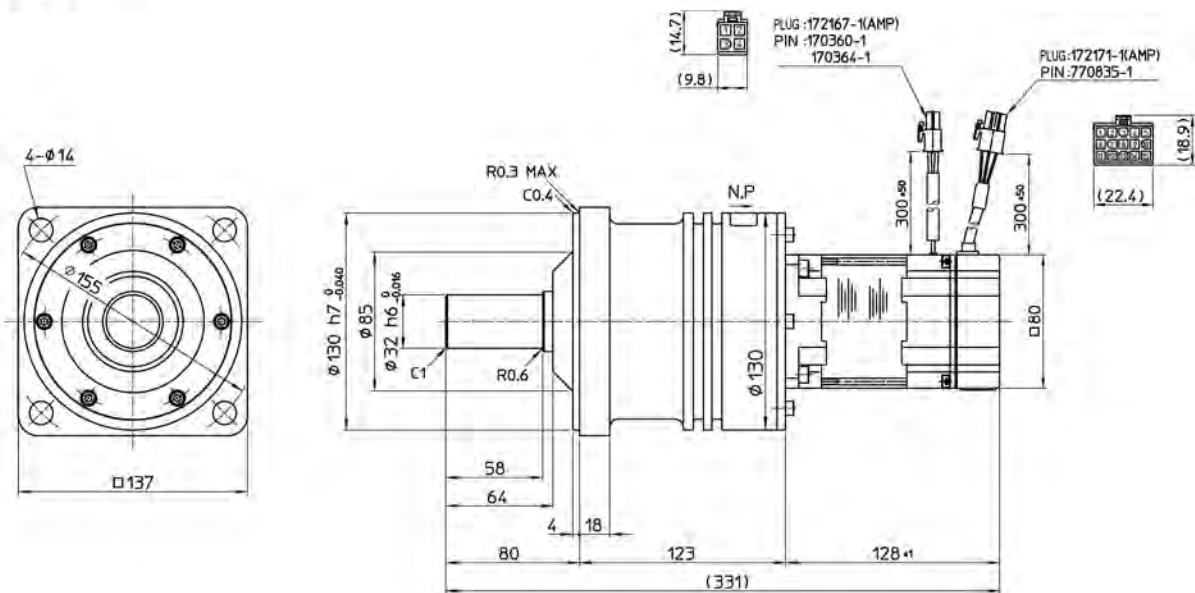
* Please confirm dimensions and shape against the illustrated specifications issued by us and accompanying the delivered product.

■RSF-25A

In mm



■RSF-32A



* Please confirm dimensions and shape against the illustrated specifications issued by us and accompanying the delivered product.

RSF Series

Positional accuracy

The “uni-directional positional accuracy,” and “repeatability” are shown below. The following values represent typical values. (Source: JIS [Japanese Industrial Standards] B 6201:1987).

The RSF series contains a speed reducer Harmonic Drive™ for precision control and positioning errors of the motor shaft are therefore compressed to 1/50 or 1/100 by speed reduction. In reality, angular transmission errors of the speed reducer determine the positional accuracy. The measured values of angular transmission errors of the speed reducer are therefore shown as the positional accuracies of the RSF Series.

Item	Model	RSF-17A	RSF-20A	RSF-25A	RSF-32A
Uni-directional Positional accuracy	arc sec	120	90	90	90
	rad	5.82×10^{-4}	4.35×10^{-4}	4.35×10^{-4}	4.35×10^{-4}
Repeatability	arc sec	±30	±30	±25	±20
	rad	$\pm 1.46 \times 10^{-4}$	$\pm 1.46 \times 10^{-4}$	$\pm 1.21 \times 10^{-4}$	$\pm 0.97 \times 10^{-4}$

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

Mechanical Accuracy

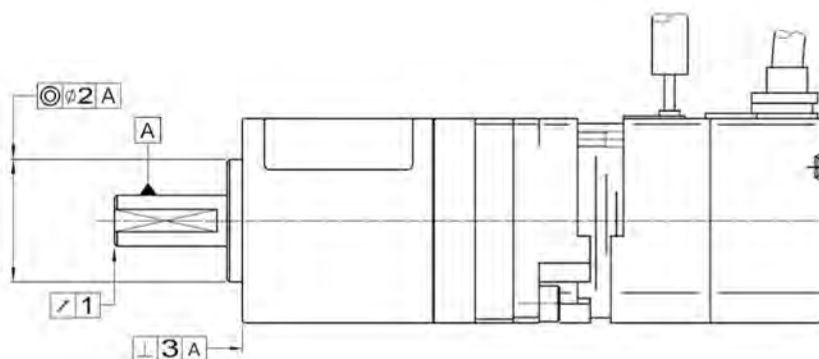
The mechanical accuracies of the output shaft and mounting flange of the RSF series are as follows.

Mechanical Accuracy

in mm

Accuracy Item	RSF-17A	RSF-20A	RSF-25A	RSF-32A
1 Output shaft surface runout	0.04	0.04	0.04	0.04
2 Concentricity of output shaft and fitting part	0.06	0.06	0.06	0.06
3 Perpendicularity between the output shaft and mounting surface	0.06	0.06	0.06	0.06

* The aforementioned values are TIR (total indicator reading) values.

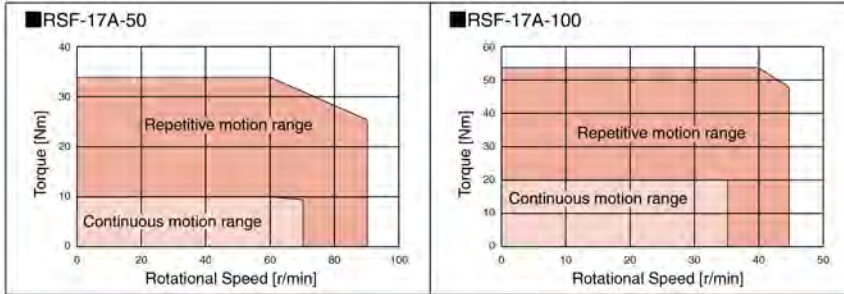


Operable Range

The following diagrams show the operable range of the RSF series combined with an AC servo driver (HA-520/HA-655-1B).

Continuous motion range: Range of continuously operable torque-rotational speed .

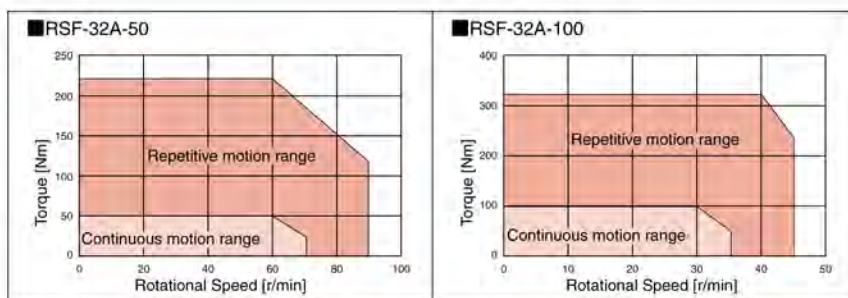
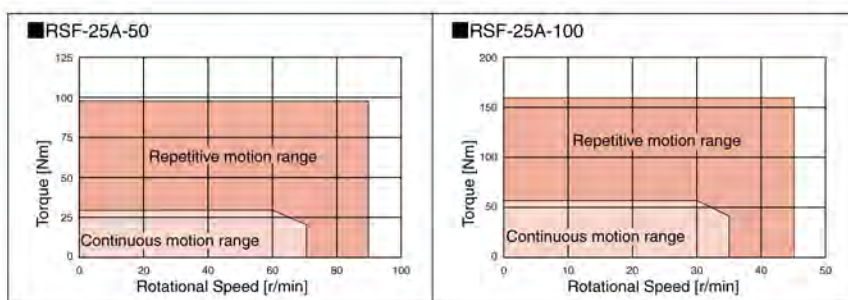
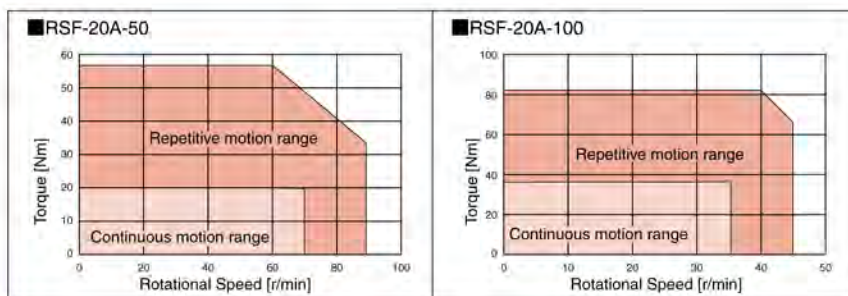
Repetitive motion range: Range of "rotational speed - torque" that can be operated momentarily. Normally, this range is used during acceleration and deceleration.



Note 1: The values in the graphs are those when mounted on the following aluminum radiation plate:
 RSF-17: 250 x 250 x 12mm

RSF Series

Operable Range



Note 1: The values in the graphs are those when mounted on the following aluminum radiation plate:

RSF-20 250 x 250 x 12mm
RSF-25, RSF32 300 x 300 x 15mm

Note 2: Please consult Harmonic Drive LLC if your mode of motions is uni-directional continuous motion also in the continuous motion range.

Options

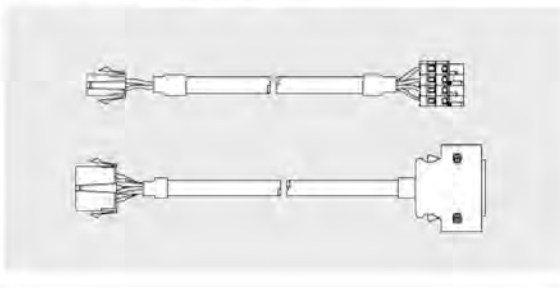
Relay Cable (For HA-520)

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.
Standard cable lengths are 3, 5 and 10m.



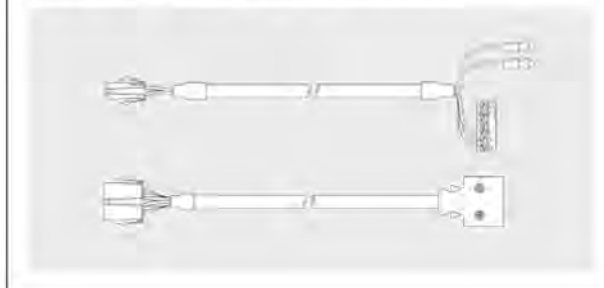
Relay Cable (For HA-655-1B)

Order Code Example:

EWA-M * * -A04-TN (For motor)

EWA-E * * -A15-3M14 (For incremental encoder)

The cable for connecting the actuator to the servo driver HA-655-1B.
Standard cable lengths are 3, 5 and 10m.





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