

RSF Mini Series

RSF Brushless Servo Actuator



Harmonic Drive[®] actuator

P r e c i s i o n G e a r i n g & M o t i o n C o n t r o l

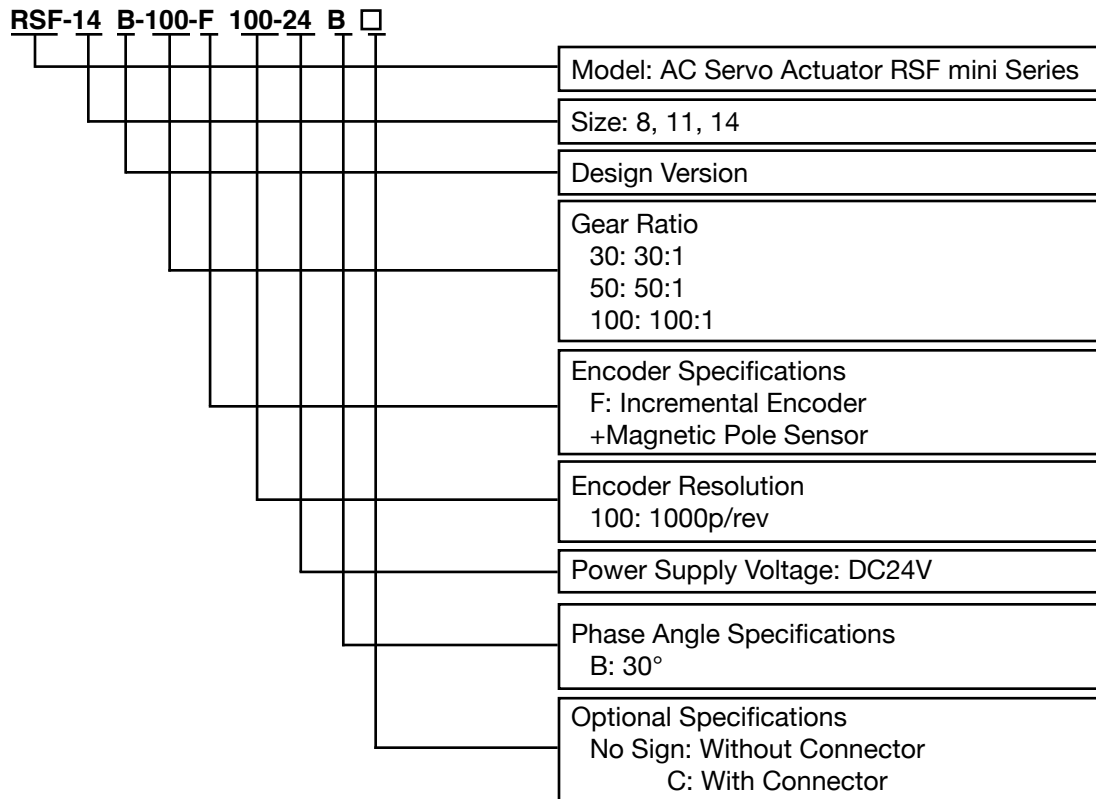
1. Applicable Models

This Specification applies to the RSF-B mini Series with parallel encoder and supply voltage DC 24V.

The sizes available are:

- 1) RSF-8B-XXX-F100-24B
- 2) RSF-11B-XXX-F100-24B
- 3) RSF-14B-XXX-F100-24B

2. Model Ordering Code



3. Specifications

3-1 Actuator

Table 1 General specifications of RSF-8B/11B/14B

Item	Environmental Conditions
Operate temperature	0~40 °C
Storage temperature	-20~60 °C
Operate / Storage humidity	20~80%RH (No condensation)
Vibration resistance	25 m/s ² (Frequency: 10~400 Hz)
Impact resistance	300 m/s ²

Table 2 Specifications

Item		Model	RSF-8B			RSF-11B			RSF-14B		
			30	50	100	30	50	100	30	50	100
Power Supply Voltage		V	DC24								
Maximum Torque *3		Nm	1.8	3.3	4.8	4.5	8.3	11	9.0	18	28
Maximum Speed *3		rpm	200	120	60	200	120	60	200	120	60
Maximum Current *3		A	3.8	3.9	2.9	14.4	15.8	9.4	14.4	17.2	12.3
Allowable Continuous Torque *3		Nm	0.78	1.4	2.0	1.1	2.0	4.0	1.7	3.0	6.0
Allowable Continuous Current *3		A	2.0	2.0	1.5	5.0	4.9	4.9	4.9	4.7	4.7
Allowable Continuous Speed *3		rpm	100	60	30	100	60	30	100	60	30
Continuous torque at stall *3		Nm	0.95	1.7	3.5	1.7	3.0	5.7	2.5	4.5	9.0
		KgfcM	9.2	16	36	17	31	58	26	46	92
Torque Constant		Nm/A	0.62	1.1	2.1	0.40	0.66	1.5	0.76	1.3	2.6
		KgfcM/A	6.3	11	21	4.1	6.7	15	7.8	13	27
EMF Constant		V(rpm)	0.07	0.11	0.22	0.04	0.07	0.15	0.08	0.13	0.28
Phase Resistance		Ω (25°C)	0.93			0.19			0.26		
Phase Inductance		mH	0.45			0.10			0.19		
Moment of Inertia ⁴⁾	GD ² /4	×10 ⁻² k·gm ²	0.06	0.16	0.65	0.18	0.49	2.0	0.41	1.1	4.5
	J	×10 ⁻² kgf·cm·s ²	0.60	1.7	6.6	1.8	5.0	20	4.1	11	46
Allowable Radial Load		N	196			245			392		
		kgf	20			25			40		
Allowable Thrust Load		N	98			196			392		
		kgf	10			20			40		
One-Way Positioning Accuracy		arc/sec	180	150	150	150	120	120	150	120	120
Quad Encoder Resolution ⁵⁾		p/rev	120000	200000	400000	120000	200000	400000	120000	200000	400000
Mass		kg	0.3			0.5			0.8		
Servo Drive Combinations		DC24V	DCJ-055-09, DDP-090-09			DDP-090-36					
			HA-680-4B-24			HA-680-6B-24					

1) The table shows output values of the actuator.

2) All specifications are applicable for actuators mounted on an aluminum heat sink of size: 150 x 150 x 6(mm)

3) Values indicated by an asterisk (*) are those for the saturated temperature rise. Other values indicate the temperature at 20°C. All values are typical.

4) The moment of inertia is the total value of the motor shaft and gear moment of inertia values converted to the output side.

5) Quad encoder resolution is (motor shaft encoder resolution) x 4 x (gear ratio).

3-2 Encoder Specifications

Table 3 Magnetic pole sensor (buildt in the motor)

Item	Unit	Specification
Signal		U, $\bar{U}$, V, $\bar{V}$, W, $\bar{W}$
Power supply voltage	V	DC +5 $\pm$ 5%
Current consumption	mA	250 max
Output circuit form		Line driver

Table 4 Encoder

Item	Unit	Specification
Type		Incremental, rectangular wave, 8-wires
Signal		A, $\bar{A}$, B, $\bar{B}$, Z, $\bar{Z}$
Resolution	p/rev	1000
Power supply voltage	V	DC +5 $\pm$ 5%
Current consumption	mA	170 max
Output circuit form		Line driver

• Singal waveform

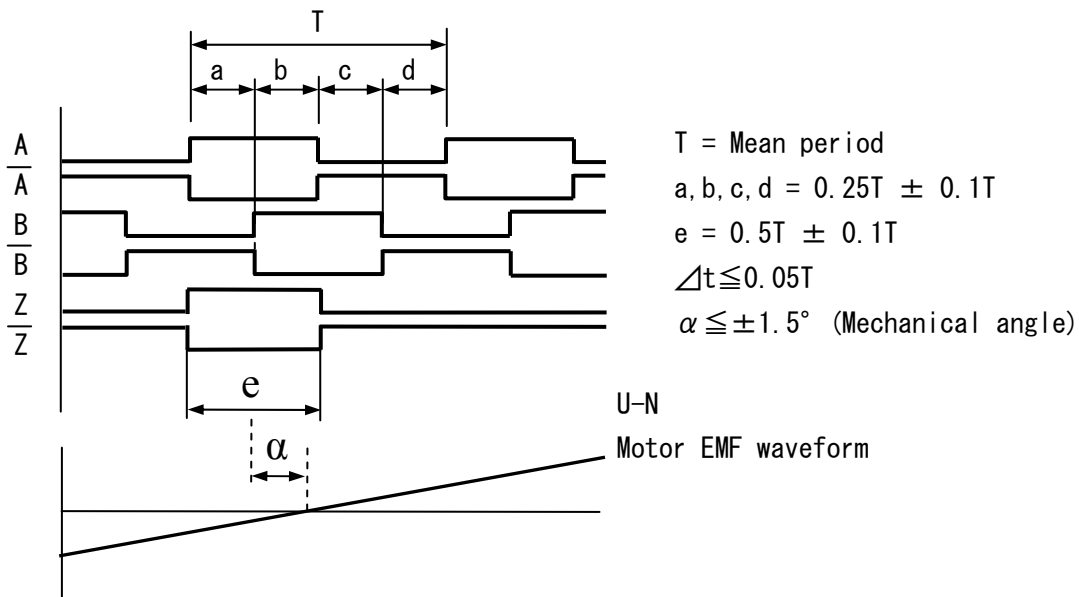


Fig.1 A,B and Z signal and relationship with U-N motor EMF waveform with CW rotation facing the output shaft end

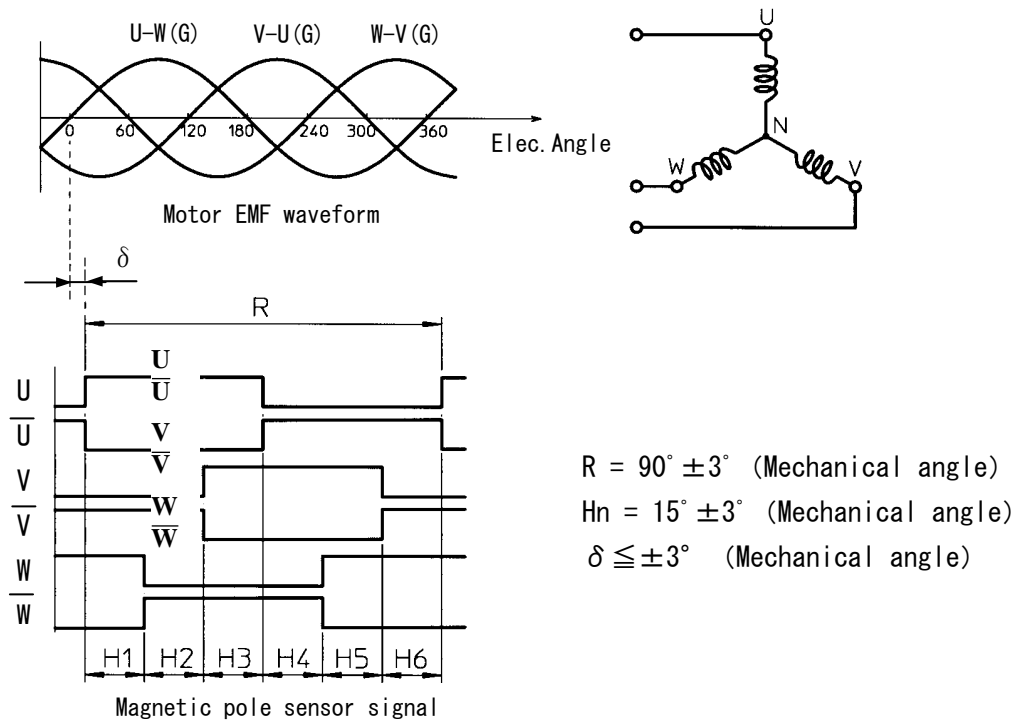


Fig.2 U,V and W signal and relationship with Motor's EMF with CW rotation facing the output shaft end

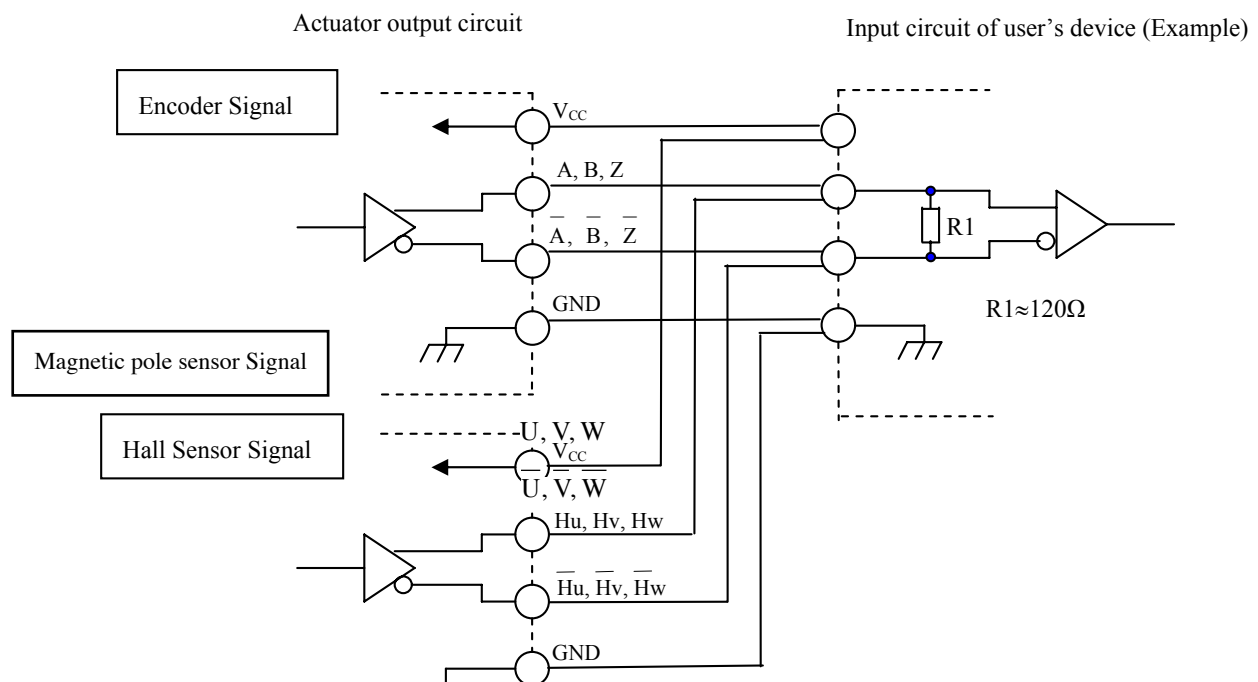
- **Color code for leads**

Color code for motor, encoder and magnetic pole sensor leads shown in Table 5

Table 5 Color code

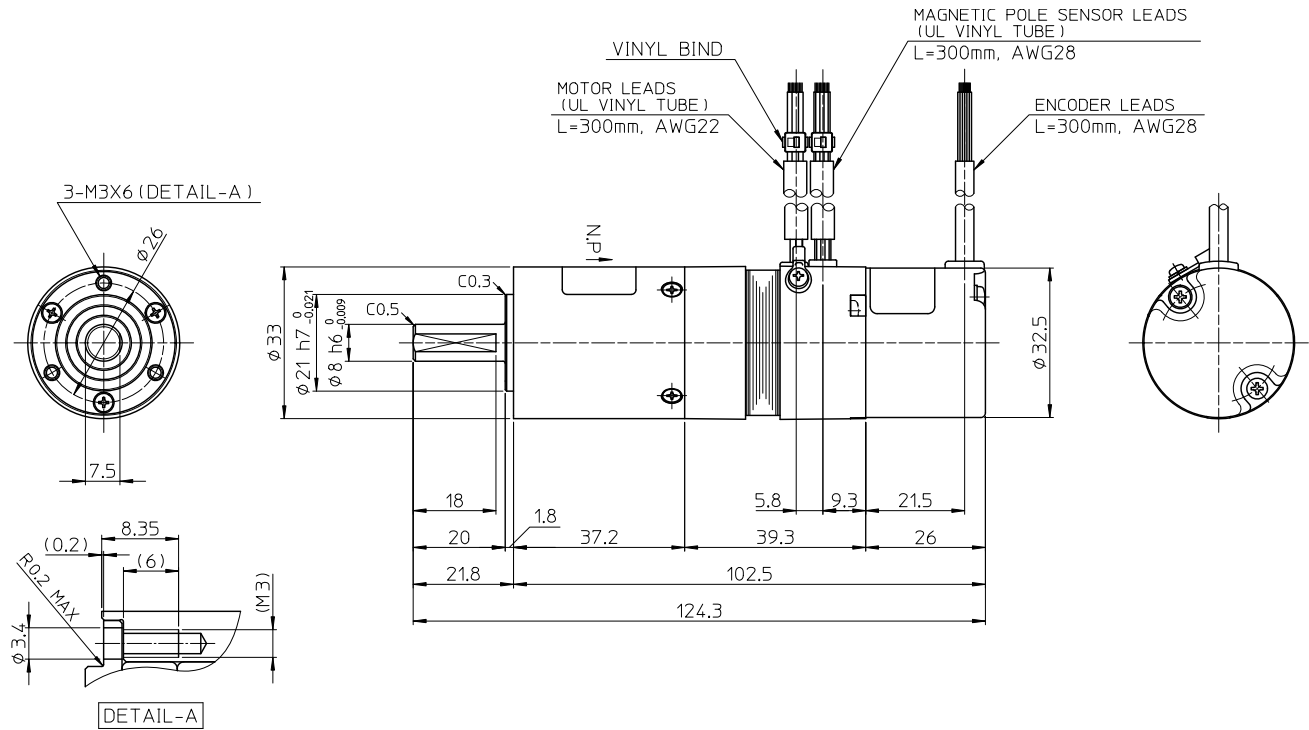
Motor leads		Hall sensor leads		Encoder leads	
Color	Signal	Color	Signal	Color	Signal
Red	U	Brown	U	Brown	A
White	V	Blue	$\bar{U}$	Blue	$\bar{A}$
Black	W	Red	V	Red	B
Green	PE	Green	$\bar{V}$	Green	$\bar{B}$
		Yellow	W	Yellow	Z
		Orange	$\bar{W}$	Orange	$\bar{Z}$
		White	+5V (Vcc)	White	+5V (Vcc)
		Black	0V (GND)	Black	0V (GND)
				Shield	Floating

- **Output circuit and example for receiving signal**

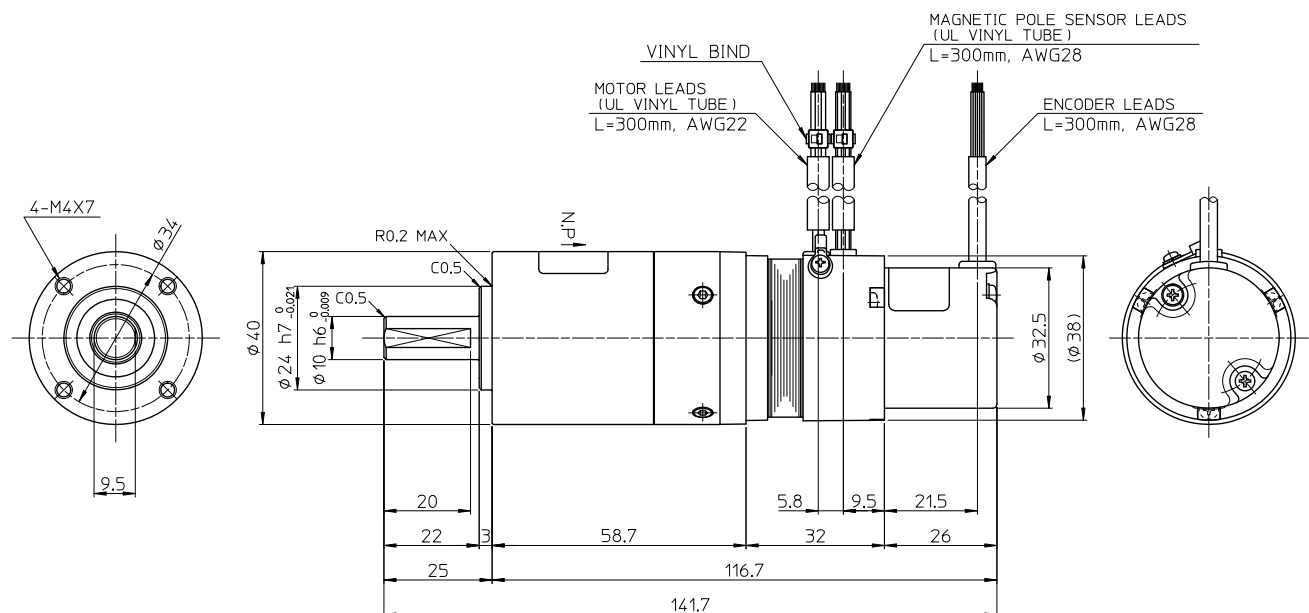


4. External Dimensions

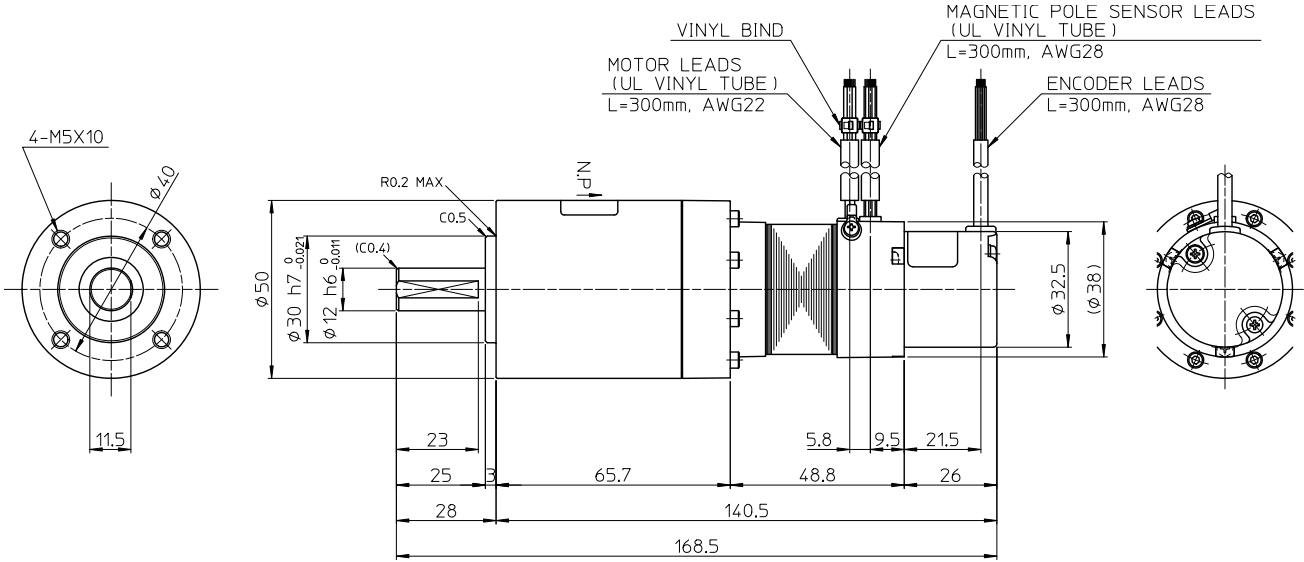
RSF-8B-XXX-F100-24B



RSF-11B-XXX-F100-24B



RSF-14B-XXX-F100-24B



Torque-speed characteristics

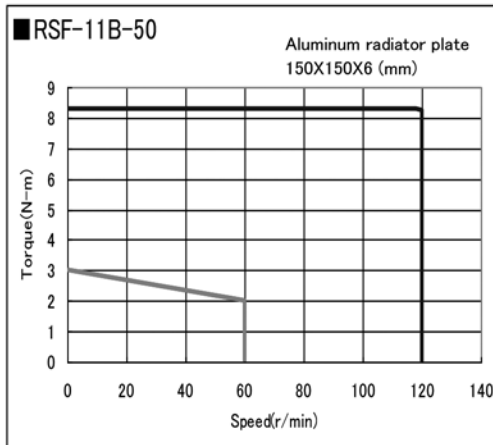
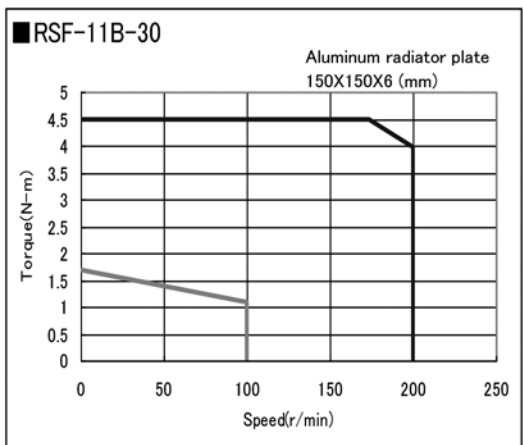
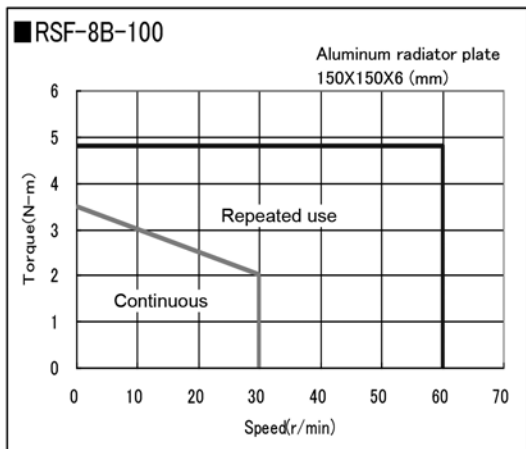
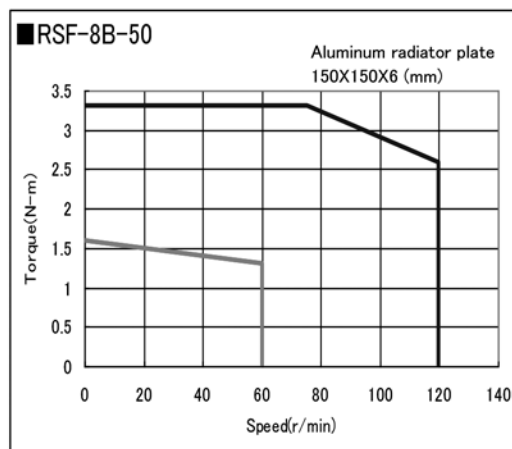
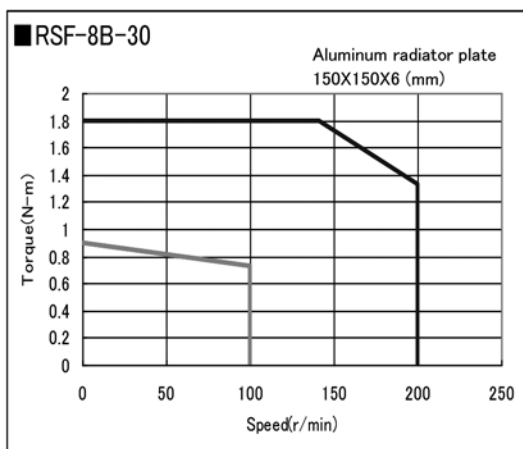
The following graphs show the usable ranges of the RSF-B mini series actuators combined with the dedicated AC servo driver HA-680 by the power voltage 24VDC input.

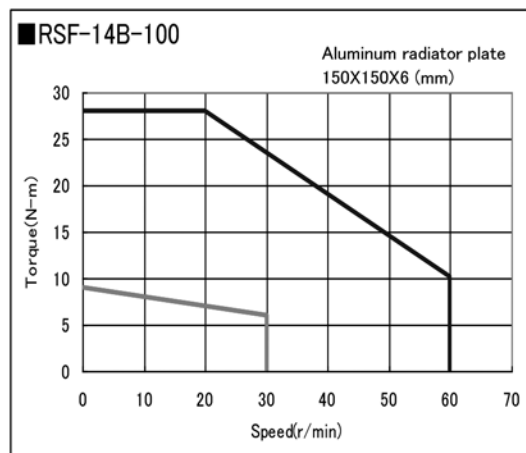
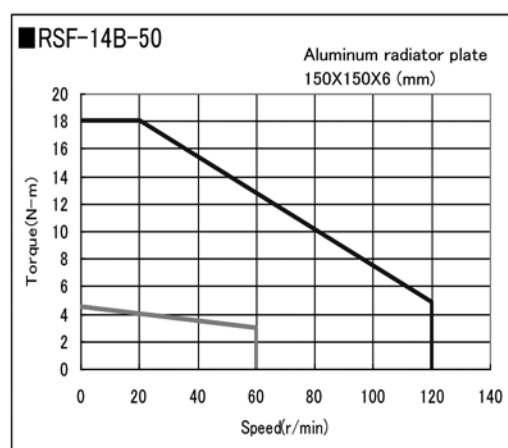
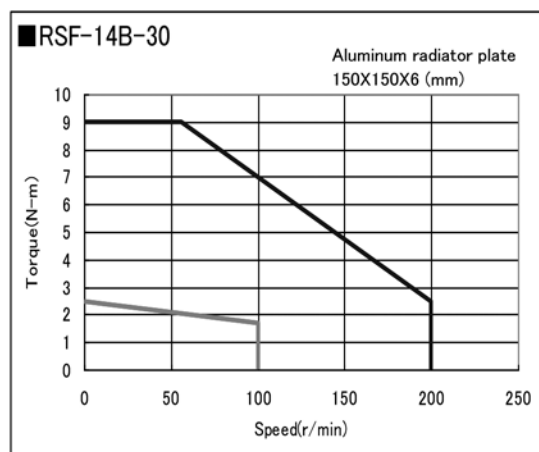
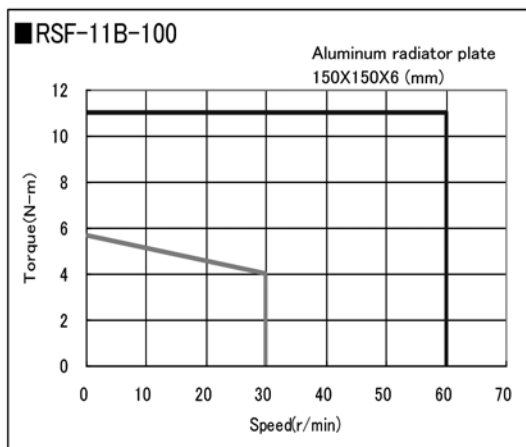
1) Continuous duty range:

The range allows continuous operation for the actuator.

2) Repeated use range:

The range allows repeated operation for the actuator. This range is used for acceleration and deceleration.





Note: Even in the continuous range, if it is used continuously in one direction, please consult with us.



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