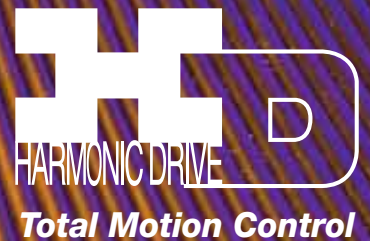


# RSF Mini Series

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

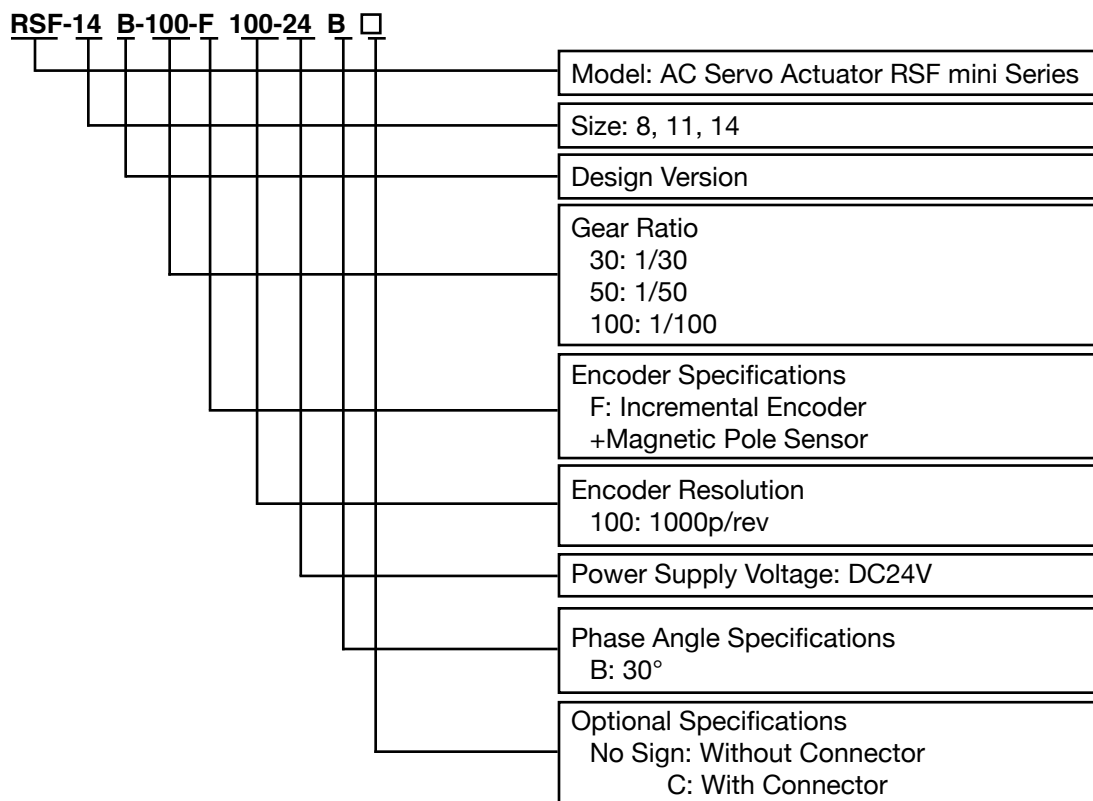
## 1. Applicable Models

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. Specification

Refer the manual of RSF-B mini standard type except the following 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 <sup>2</sup> (Frequency: 10~400 Hz)
Impact resistance	300 m/s <sup>2</sup>

**Table 2 Ability 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	※	Nm	1.8	3.3	4.8	4.5	8.3	11	9.0	18	28
Maximum Speed	※	r/min	200	120	60	200	120	60	200	120	60
Maximum Current	※	A	3.8	3.9	2.9	14.4	15.8	9.4	14.4	17.2	12.3
Allowable Continuous Torque	※	Nm	0.78	1.4	2.0	1.1	2.0	4.0	1.7	3.0	6.0
Allowable Continuous Current	※	A	2.0	2.0	1.5	5.0	4.9	4.9	4.9	4.7	4.7
Allowable Continuous Speed	※	r/min	100	60	30	100	60	30	100	60	30
Continuous torque at stall	※	Nm	0.95	1.7	3.5	1.7	3.0	5.7	2.5	4.5	9.0
		Kgfc <sub>m</sub>	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
		Kgfc <sub>m</sub> /A	6.3	11	21	4.1	6.7	15	7.8	13	27
EMF Constant		V(r/min)	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 <sup>4)</sup>	GD <sup>2</sup> /4	×10 <sup>-2</sup> k·gm <sup>2</sup>	0.06	0.16	0.65	0.18	0.49	2.0	0.41	1.1	4.5
	J	×10 <sup>-2</sup> kgf·cm·s <sup>2</sup>	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 <sup>5)</sup>		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, DEP-090-09			DDP-090-36, DEP-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 for saturated actuator temperature. Other values are for actuator temperature of 20°C.
- 4) The moment of inertia is the total value of the motor shaft and Harmonic Drive™ 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** (build 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

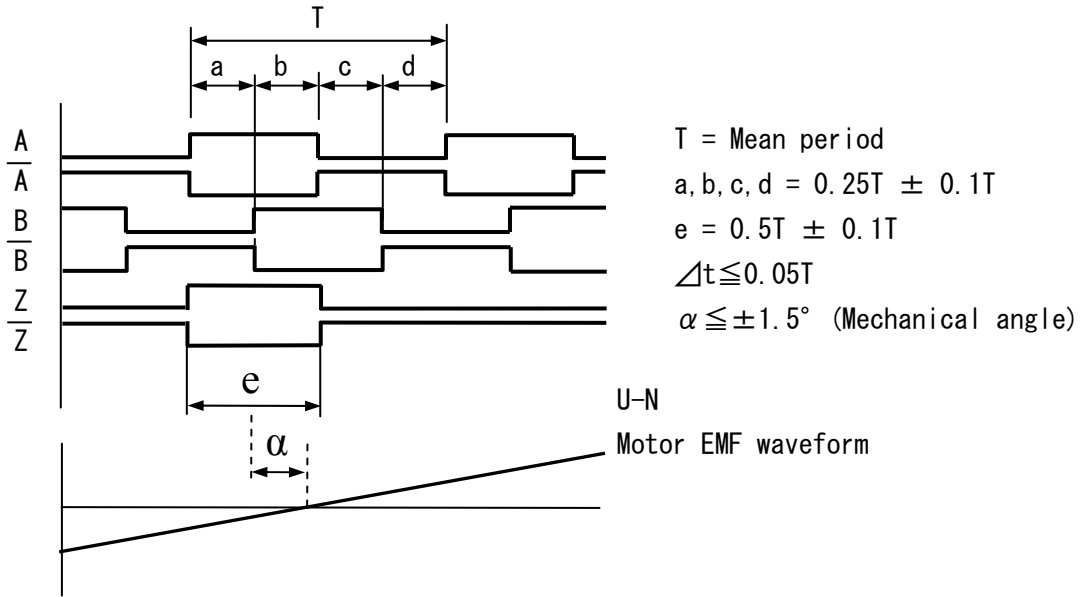


Fig.1 A,B and Z signal and relationship with U-N motor EMF waveform with CW rotation facing the output shaft end

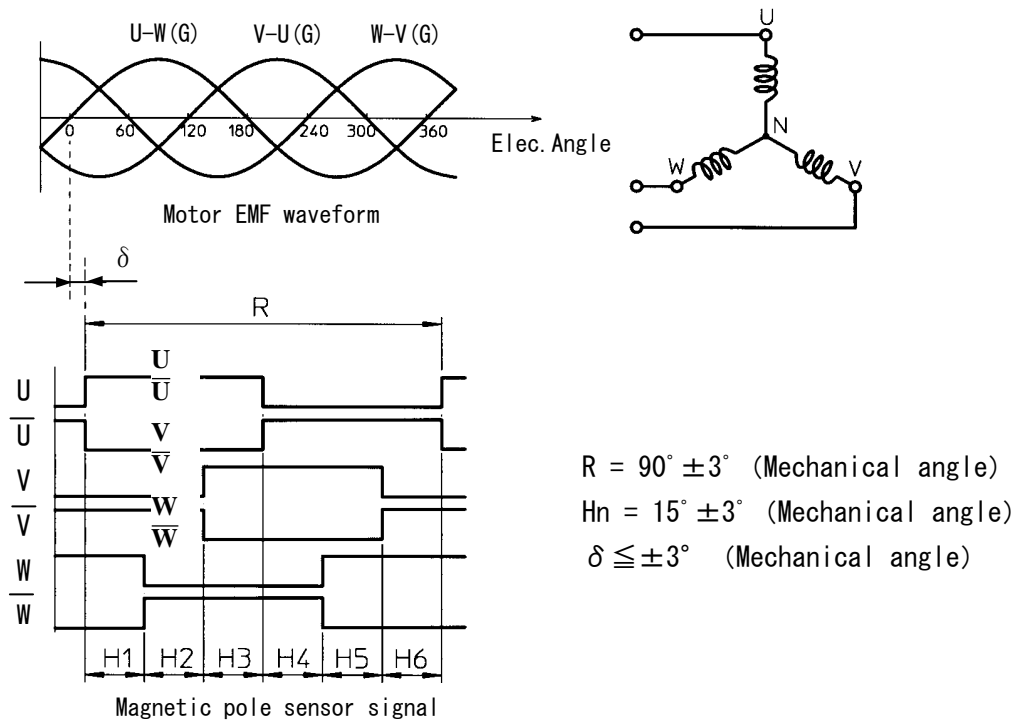


Fig.2 U,V and W signal and relationship with Motor's EMF with CW rotation facing the output shaft end

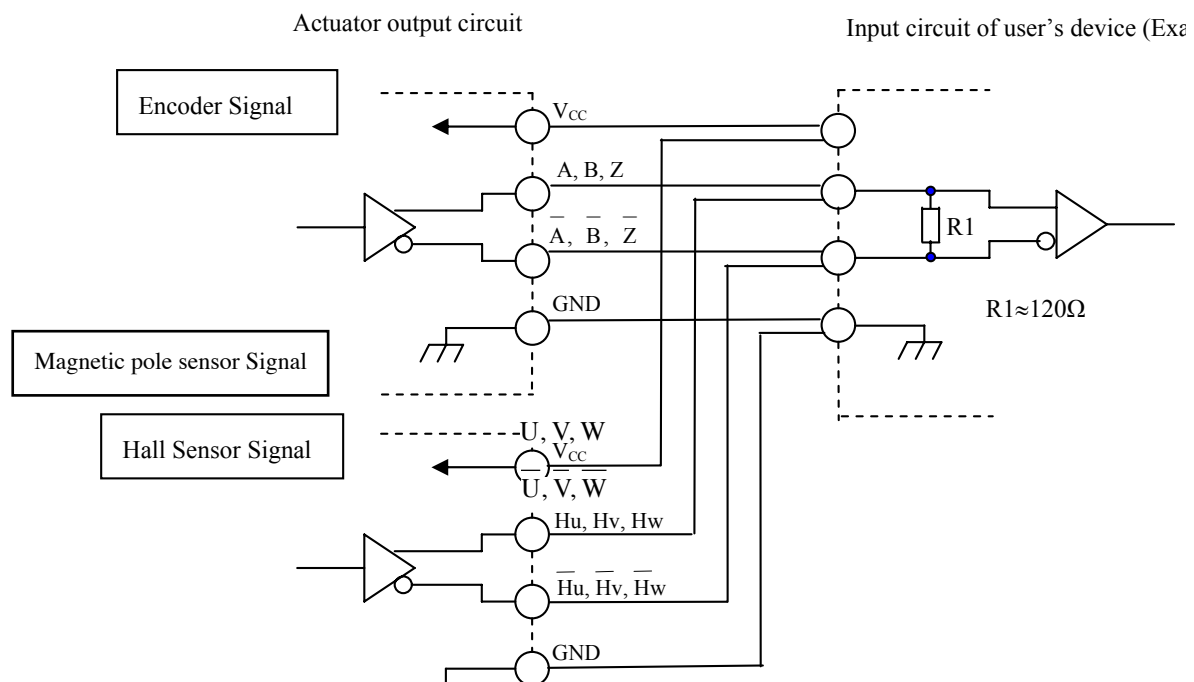
### • Color code for leads

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

**Table 5 Color code**

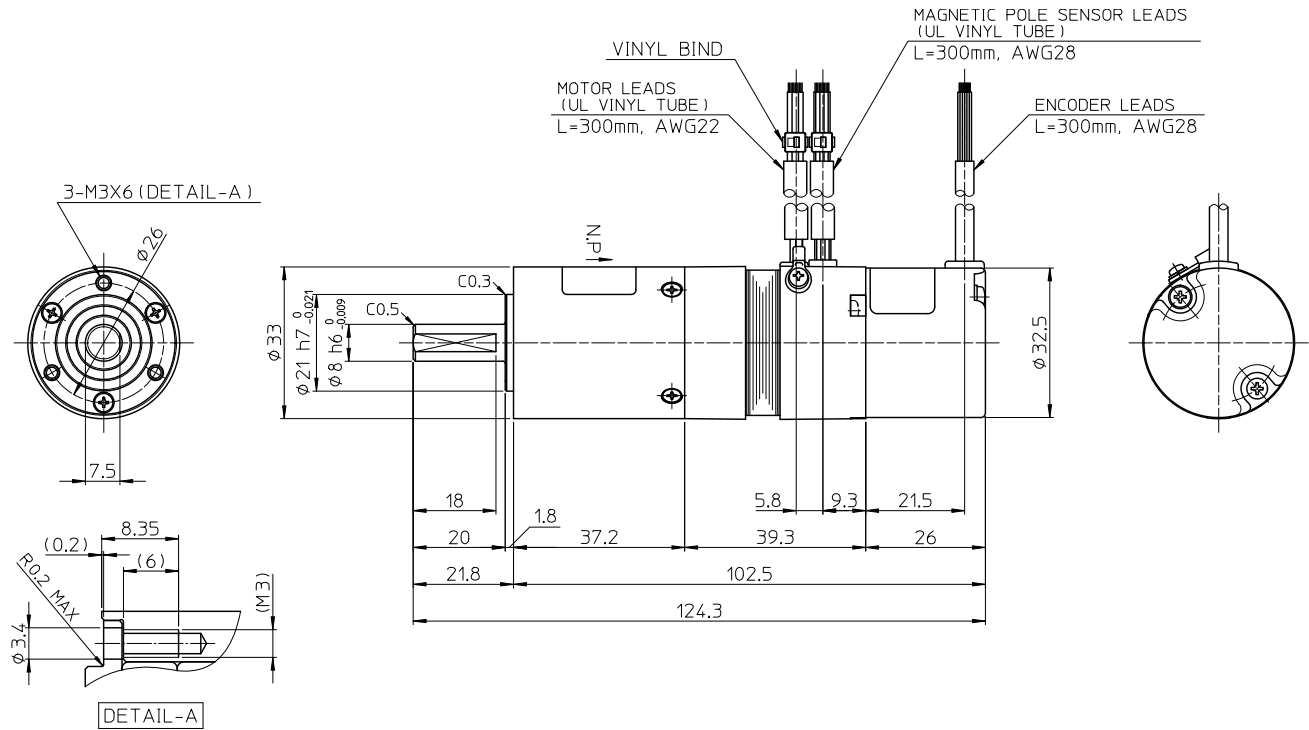
Motor leads		Hall sensor leads		Encoder leads	
Color	Signal	Color	Signal	Color	Signal
Red	U	Brown	U	Brown	A
White	V	Blue	U	Blue	A
Black	W	Red	V	Red	B
		Green	$\bar{V}$	Green	$\bar{B}$
		Yellow	W	Yellow	Z
		Orange	W	Orange	Z
		White	+5V (Vcc)	White	+5V (Vcc)
		Black	0V (GND)	Black	0V (GND)
				Shield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

### • Output circuit and example for receiving signal

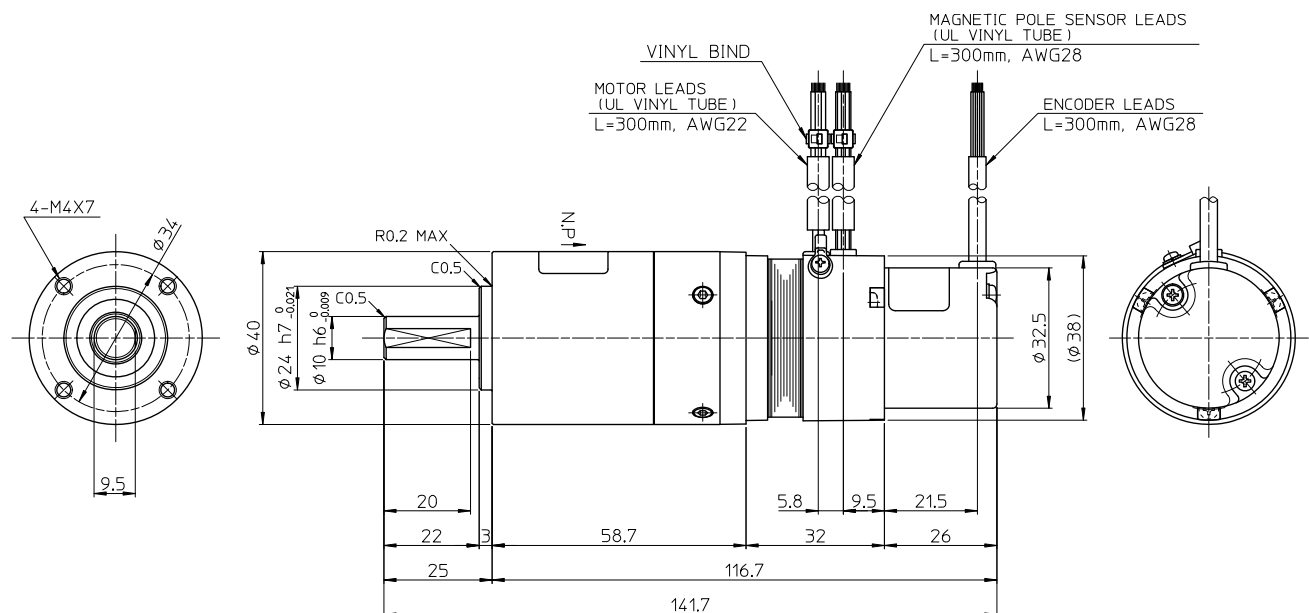


## 4. External Dimensions

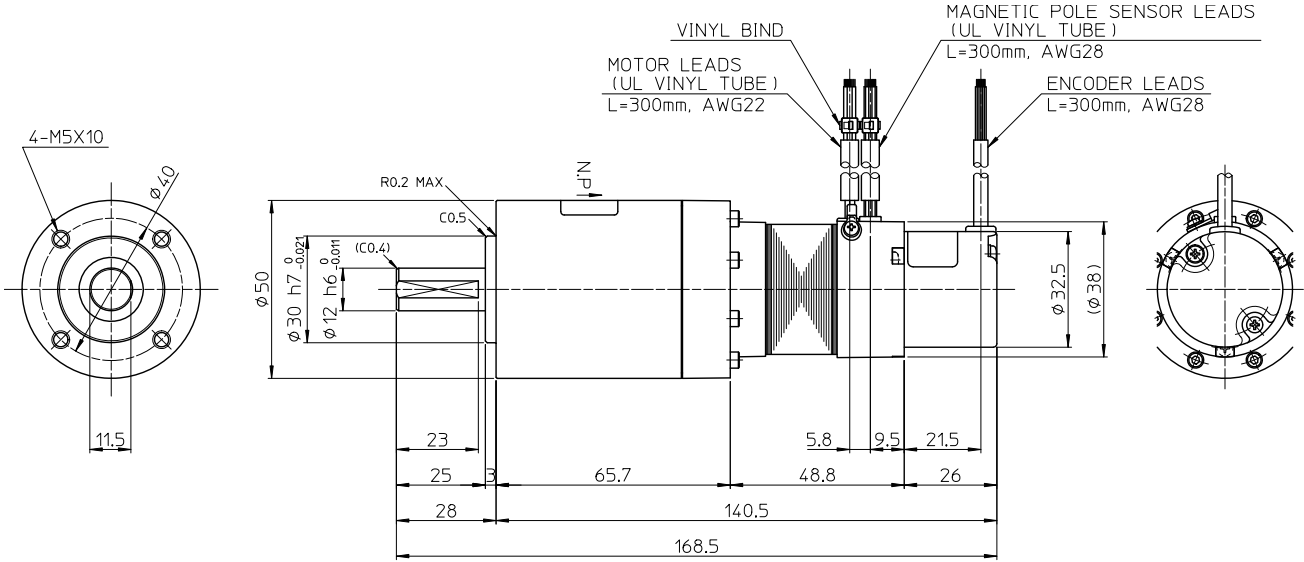
### RSF-8B-XXX-F100-24B



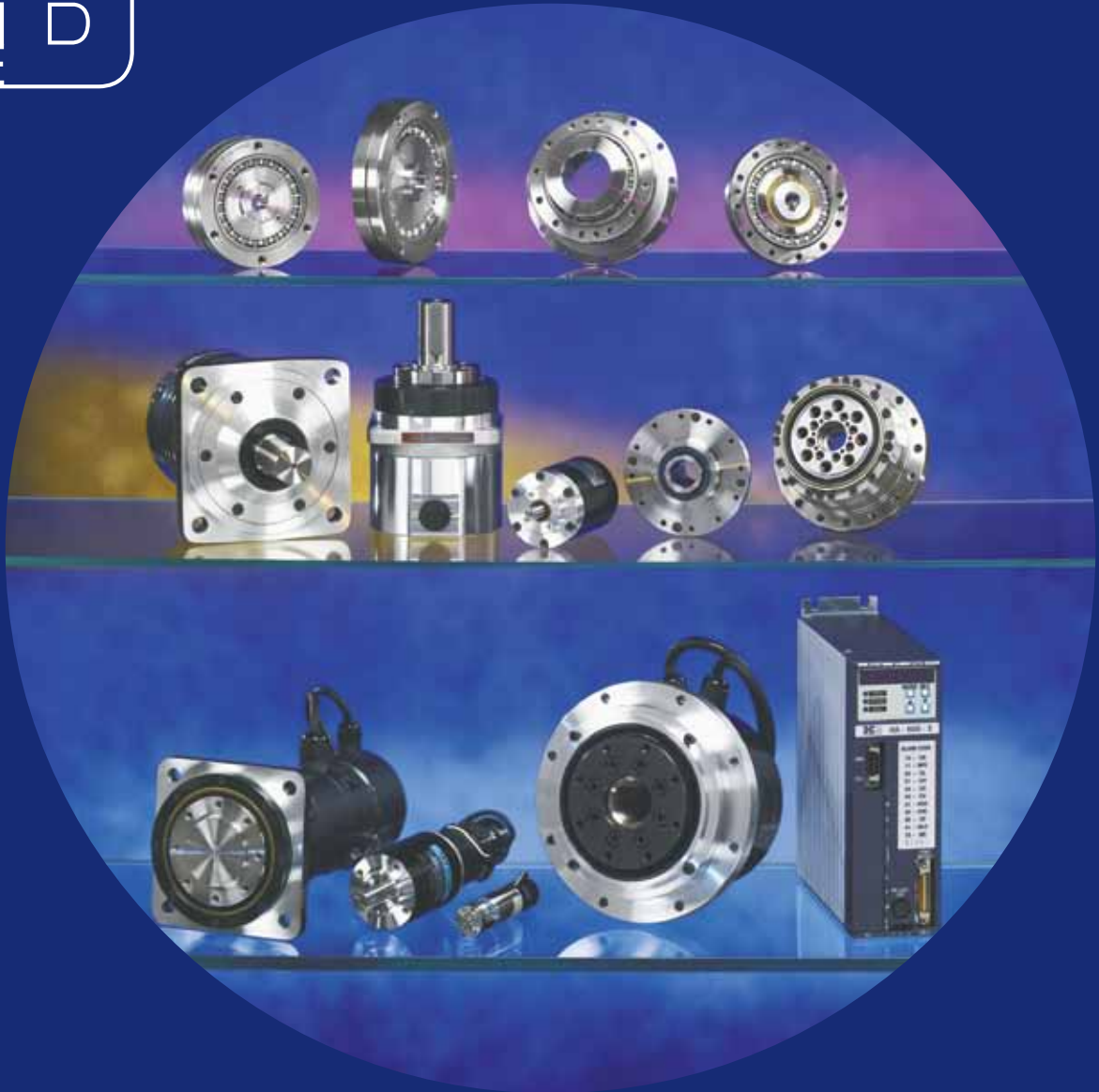
### RSF-11B-XXX-F100-24B



RSF-14B-XXX-F100-24B







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