

HarmonicDrive® AC servo Actuator RSF supermini series FHA-C mini series

Mitsubishi AC Servo
MITSUBISHI SERVO AMPLIFIERS & MOTORS**MELSERVO****+ J4**

Models compatible with collaboration have been added.

HarmonicDrive® A new model of the AC servo actuator that is compatible with MELSERVO-J4 (manufactured by Mitsubishi Electric Corporation) SSCNETIII/H communication has been added, and the collaborative product lineup has been enhanced. Compatibility with the ultra-small RSF supermini series and FHA-C mini series that has a small, flat, and compact shape can further broaden the range of connection network options.

Wider Range of Model Lineups for Your Suitable Selection

RSF supermini series

**Ultra
small**

This is the AC servo actuator consisting of both an ultra-small HarmonicDrive® and an AC servo motor. This series features ultra-small size, lightweight, and high torque, and realizes downsizing of every type of mechanisms. Select from two models: 3 and 5. For model 5, the series equipped with the brake is also available.

■ Configuration

■ Speed reducer model

Standard HarmonicDrive® CSF series

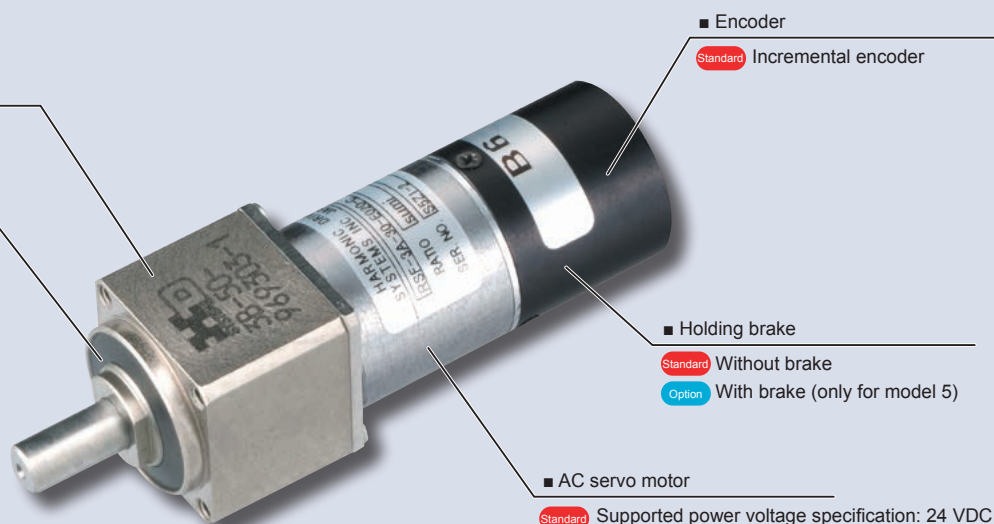
■ Output shaft bearing

Standard 4-point contact ball bearing

47 mm



RSF-3C



■ Encoder

Standard Incremental encoder

■ Holding brake

Standard Without brake

Option With brake (only for model 5)

■ AC servo motor

Standard Supported power voltage specification: 24 VDC

FHA-Cmini series

**Small
size
Flat**

This is the AC servo actuator consisting of both a small HarmonicDrive® and an ultra-flat AC servo motor. The flat and compact shape and hollow-shaft structure simplifies the entire device structure.

The size can be selected from three types: 8, 11, and 14.

■ Configuration

■ Speed reducer model

Standard HarmonicDrive® CSF series

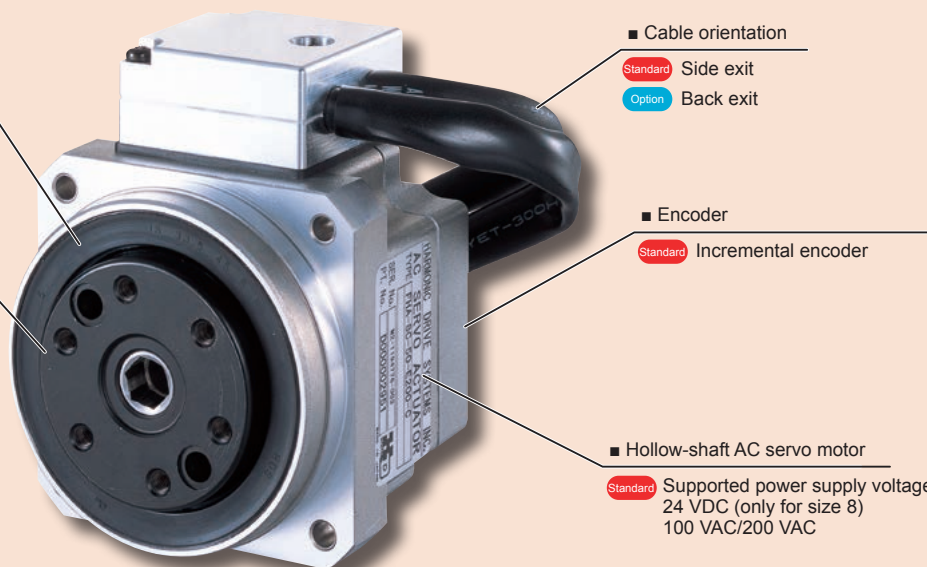
■ Output shaft bearing

Standard Cross roller bearing

48.5 mm



FHA-8C



■ Cable orientation

Standard Side exit

Option Back exit

■ Encoder

Standard Incremental encoder

■ Hollow-shaft AC servo motor

Standard Supported power supply voltage
24 VDC (only for size 8)
100 VAC/200 VAC

■ Features

- This is the AC servo actuator consisting of both the HarmonicDrive® precision control speed reducer and the flat AC servo motor.
- The compact, flat configuration enables compact machine design.
- The FHA-C mini series has a hollow structure and enables simplification of the device.
- The device in which the system is configured by using the "MELSERVO-J4" SSCNET III/H communication enables you to use this product easily.

■ Combinations

The combination of the servo amplifier, actuator, and relay cable is listed below.

Actuator Series	Size	Power supply voltage (V)	Combined servo amplifier	Relay cable ^{*3}
			Compatible with SSCNETIII/H	
RSF supermini	3	DC24	MR-J4W2-0303B6-MX940J ^{*1}	For the encoder: EWA-E**-JST09-A10-M For the motor: EWA-M**-JST04-NC-M For the brake: EWA-B**-JST03-TMC ^{*4}
	5			
FHA-C mini	8	DC24	MR-J4W2-0303B6-MX940J ^{*1}	For the encoder: EWC-E**-A12-A10-M For the motor: EWC-M**-A06-NC-M
	8	AC200	MR-J4-10B-RJ920J ^{*2}	For the encoder: EWC-E**-A12-3M10-M For the motor: EWC-M**-A06-TMC-M
	11			
	14	AC200	MR-J4-20B-RJ920J ^{*2}	
	8	AC100	MR-J4-10B1-RJ920J ^{*2}	
	11			
	14	AC100	MR-J4-20B1-RJ920J ^{*2}	

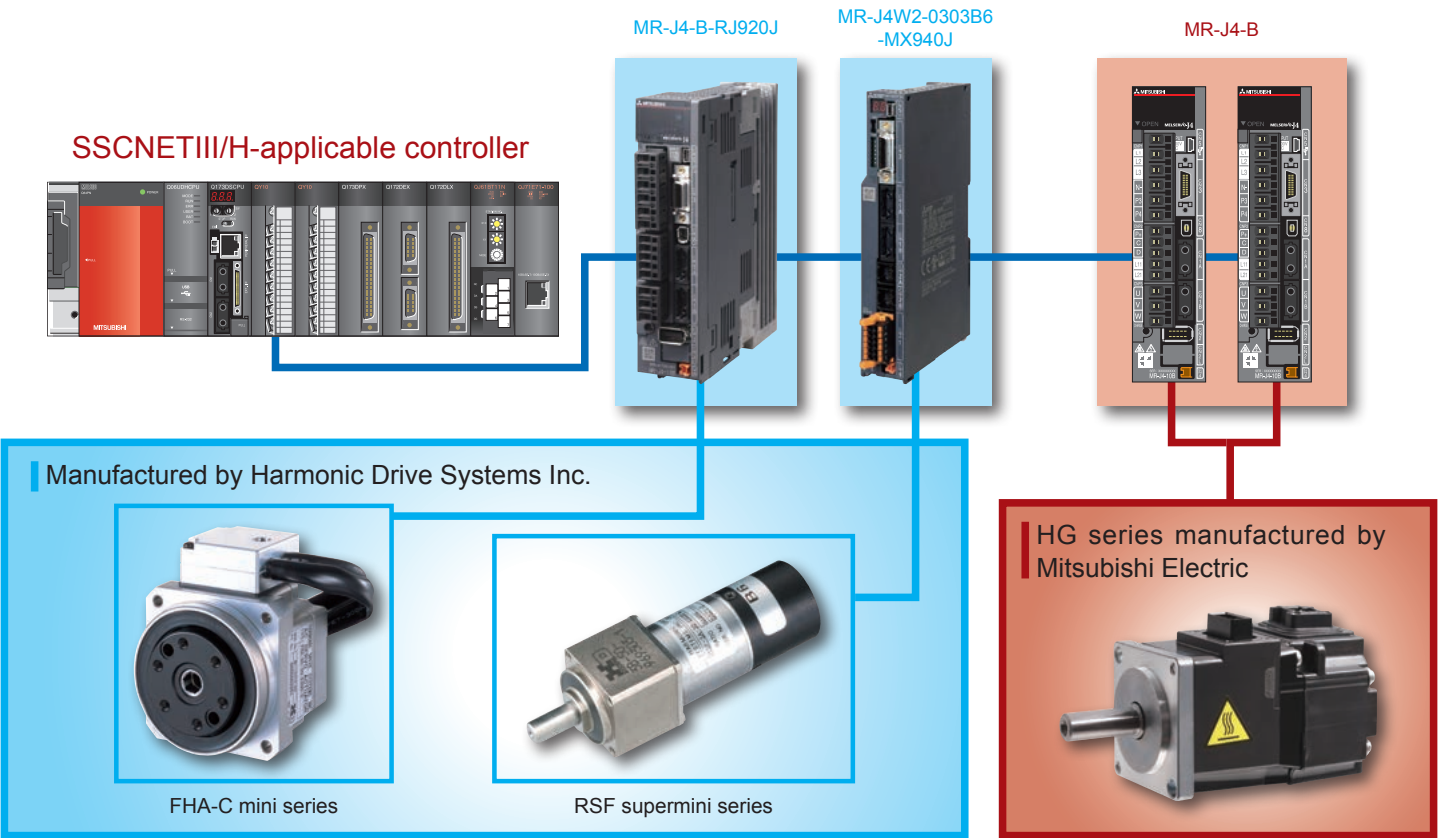
*1: For detailed materials of the servo amplifier, please ask Mitsubishi Electric Corporation to provide the product specifications (Material Number: BCN-B72000-227).

*2: For detailed materials of the servo amplifier, please ask Mitsubishi Electric Corporation to provide the product specifications (Material Number: BCN-B72000-230).

3: "" in the model code indicates the cable length (03 = 3 m, 05 = 5 m, and 10 = 10 m).

*4: RSF-3 with brake option is not available.

■ SSCNETIII/H System Image



■ Ordering Code

RSF supermini series

RSF	-	5	B	-	50	-	E	050	-	CJ	-	SP
(1)		(2)	(3)		(4)		(5)	(6)		(7)		(8)

(1)	Series	AC servo actuator RSF series	
(2)	Size	3,5	
(3)	Version symbol		
(4)	Reduction ratio		
	30	1/30	
	50	1/50	
	100	1/100	
(5)	Encoder type		
	E	Incremental encoder	

(6)	Motor-shaft encoder resolution	
	020	200 pulse/rev (size 3)
	050	500 pulse/rev (size 5)
(7)	Option:	
	C	With connectors (Standard)
	B	With brake (only for size 5)
	J	Specification for combination with the servo amplifier manufactured by Mitsubishi Electric Corporation
(8)	Special specifications (not available for the standard product)	

FHA-Cmini series

FHA	-	8	C	-	30	-	D200	-	C	□	J	□	-	SP
(1)		(2)	(3)		(4)		(5)		(6)	(7)	(8)	(9)		(10)

(1)	Series	AC servo actuator FHA-C mini series	
(2)	Size	8, 11, 14	
(3)	Version symbol		
(4)	Reduction ratio		
	30	1/30	
	50	1/50	
	100	1/100	
(5)	Encoder type and resolution		
	D	Incremental encoder	
	Resolution	2000 pulse/rev	

(6)	With connectors (Standard)	
(7)	Input power supply voltage	
	Blank	100-VAC and 200-VAC specifications
	E	24-VDC specifications (only for size 8)
(8)	Combined servo amplifier	
	J	Specification for combination with the servo amplifier manufactured by Mitsubishi Electric Corporation
(9)	Cable pulling direction	
	Blank	Side exit (Standard)
	K	Back exit (Option)
(10)	Special specifications (not available for the standard product)	

■ Specification

RSF supermini series

Item		Model	RSF-3C			RSF-5B		
		30	50	100	30	50	100	
Maximum torque ^{*2}		N·m	0.13	0.21	0.30	0.5	0.9	1.4
Allowable continuous torque ^{*2} (running at allowable continuous speed)		N·m	0.03	0.07	0.11	0.18	0.29	0.44
Allowable continuous stall torque		N·m	0.04	0.08	0.12	0.28	0.44	0.65
Maximum speed		r/min	243	146	73	243	146	73
Allowable continuous speed (output shaft)		r/min	150	90	45	150	90	45
Input power supply voltage (amplifier)		V	DC24±10%			DC24±10%		
Moment of Inertia (GD ² /4)	Without brake	kg·m ²	0.11 × 10 ⁻⁴	0.29 × 10 ⁻⁴	1.17 × 10 ⁻⁴	0.66 × 10 ⁻⁴	1.83 × 10 ⁻⁴	7.31 × 10 ⁻⁴
	With brake		-			0.11 × 10 ⁻³	0.31 × 10 ⁻³	1.23 × 10 ⁻³
Reduction ratio			30	50	100	30	50	100
Allowable radial load (value at center of output shaft)		N	36			90		
Allowable thrust load		N	130			270		
Encoder type			Incremental encoder					
Encoder resolution ^{*4}		pulse/rev	200 [800]			500 [2000]		
Actuator resolution ^{*4}		pulse/rev	[24000]	[40000]	[80000]	[60000]	[100000]	[200000]
One-way positioning accuracy		arc-min	10			4	3	3
Brake	Input power supply voltage	V	-			DC24±10%		
	Holding torque	N·m	-			0.18	0.29	0.44
Weight ^{*5}	Without brake	g	31			66		
	With brake	g	-			86		

FHA-Cmini series

Model		FHA-8C			FHA-11C			FHA-14		
		30	50	100	30	50	100	30	50	100
Item										
Maximum torque ^{*2}	N·m	1.8	3.3	4.8	4.5	8.3	11	9.0	18	28
Allowable continuous torque ^{*2}	N·m	0.75	1.5	2	1.8	2.9	4.2	3.5	4.7	6.8
Maximum speed	r/min	193	116	58	193	116	58	193	116	58
Allowable continuous speed	r/min	117	70	35	117	70	35	100	60	30
Input power supply voltage (amplifier)	V	AC200 (three phases/single phase), AC100 (single phase), DC24±10%			AC200 (three phase/single phase), AC100 (single phase)					
Moment of Inertia (GD ² /4)	kg·m ²	0.0026	0.0074	0.029	0.0060	0.017	0.067	0.018	0.050	0.20
Reduction ratio		30	50	100	30	50	100	30	50	100
Allowable moment load	N·m	15			40			75		
Moment Stiffness	N·m/rad	2 x 10 ⁴			4 x 10 ⁴			8 x 10 ⁴		
Encoder type		Incremental encoder								
Encoder resolution *4	pulse/rev	2000 [8000]								
Actuator resolution *4	pulse/rev	[240000]	[400000]	[800000]	[240000]	[400000]	[800000]	[240000]	[400000]	[800000]
One-way positioning accuracy	arc-sec	150	120	120	120	90	90	120	90	90
Mass	kg	0.40			0.62			1.2		

*1: The values in the above table indicate the values for the output shaft.

*2: This value is obtained when combining (driven with the ideal sine wave) with the J4 servo amplifier MR-J4-**B-RJ920J (100-V and 200-V specifications) and MR-J4W2-0303B6-MX940J (24-V specifications).

*3: The values show typical values.

*4: The values in brackets indicate the resolution when combining with the servo amplifier with quadrature.

*5: The weight does not include that of the clamp filter. The weight of the clamp filter is 6 g per unit.

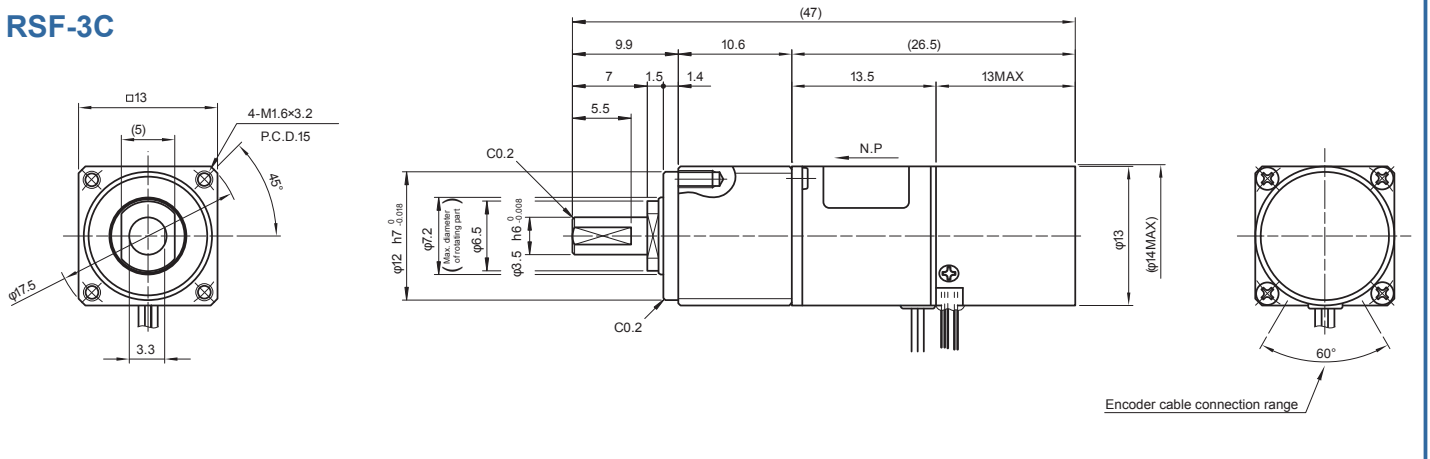
(Note) For details of terms, refer to the technical manual in the Harmonic Drive® general catalog.

■ External dimensions

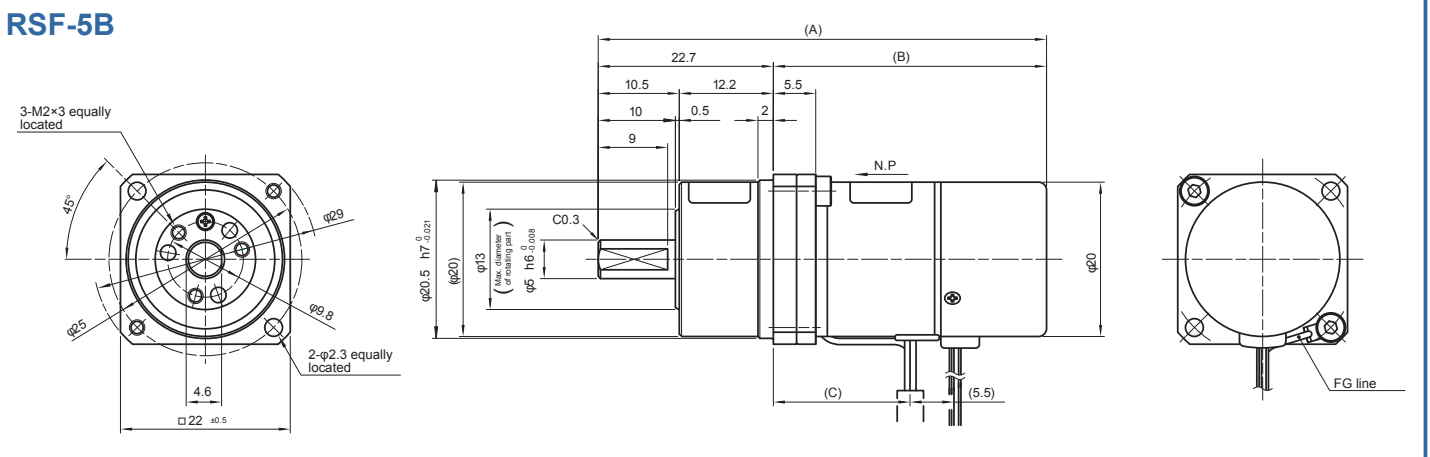
RSF supermini series

Unit: mm

RSF-3C



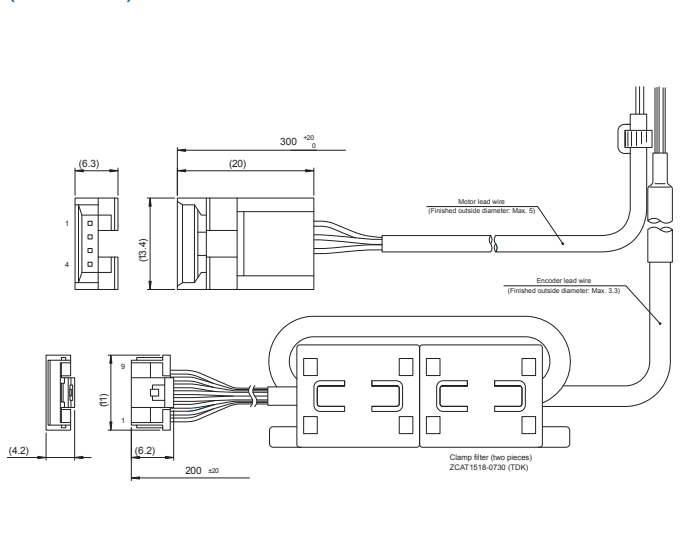
RSF-5B



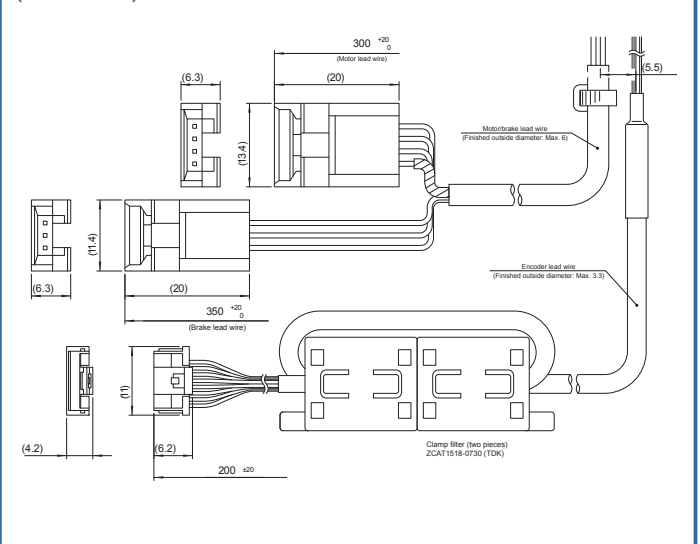
Dimension table

	A	B	C
RSF-5B (without brake)	58.1	35.4	18
RSF-5B (with brake)	69.1	46.4	29

Lead wire of the motor and encoder (RSF-3C)



Lead wire of the motor, encoder, and brake (RSF-5B)

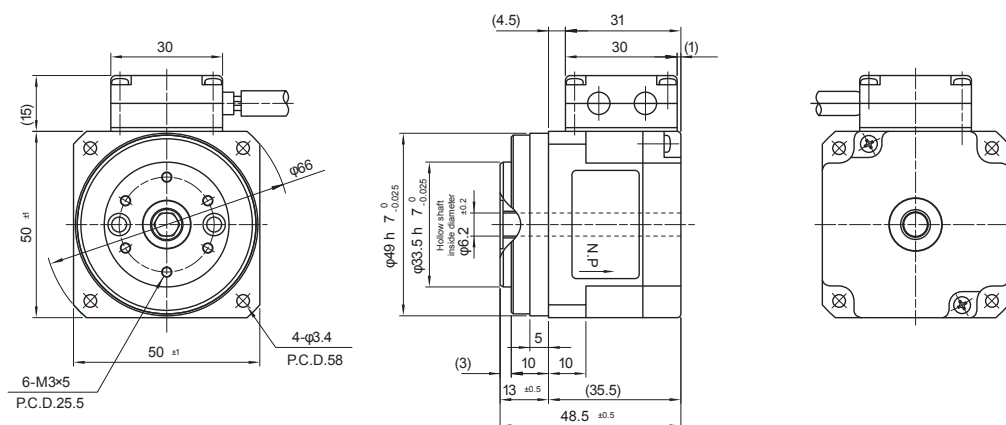


* Brake lead wires are not provided for RSF-5B without brake.

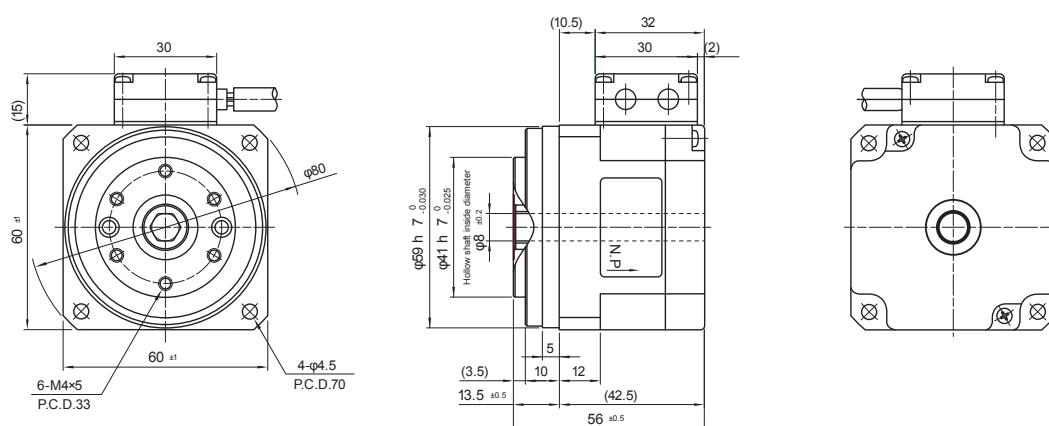
FHA-Cmini series

Unit: mm

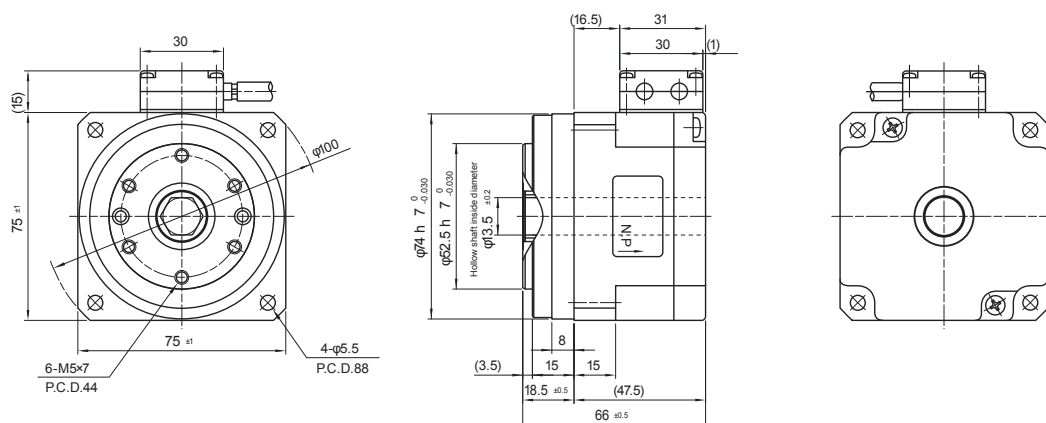
FHA-8C



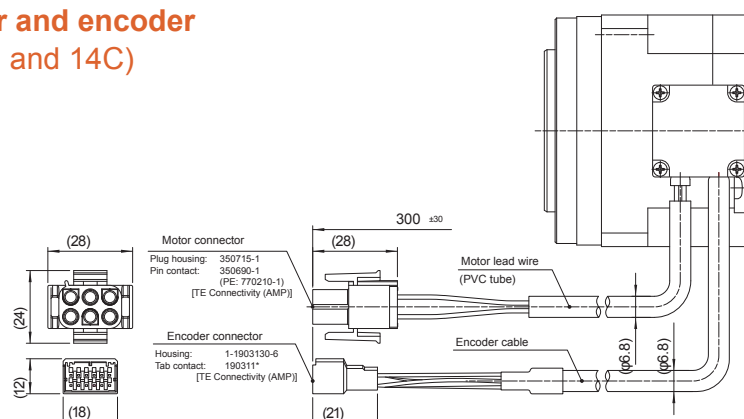
FHA-11C



FHA-14C

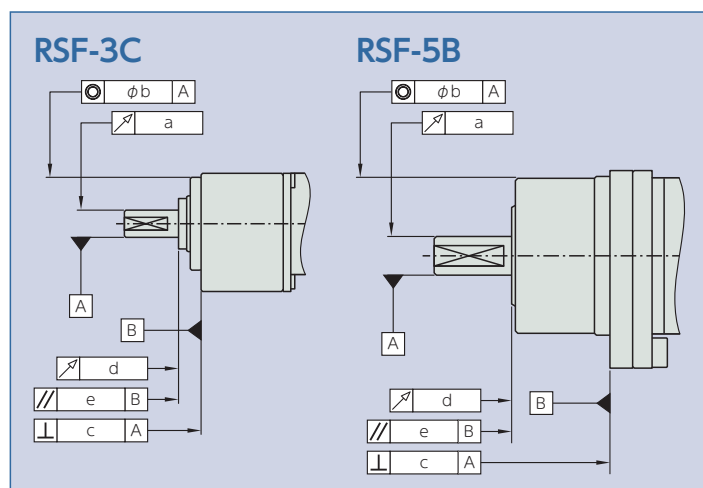


Lead wire of the motor and encoder (Common to FHA-8, 11, and 14C)



■ Mechanical Accuracy

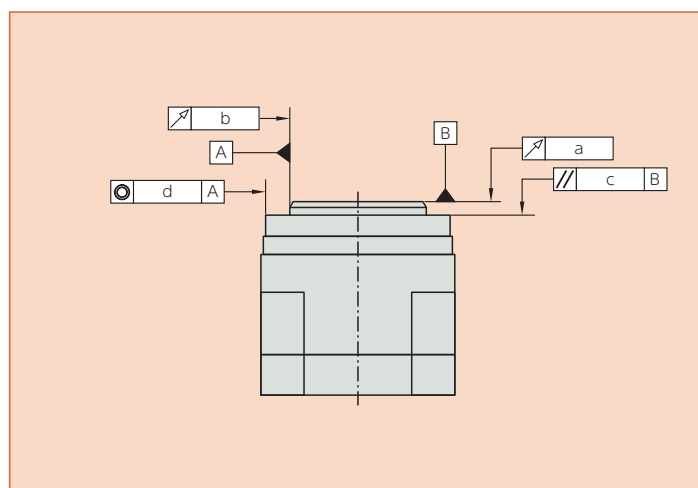
RSF supermini series



Symbol	Accuracy item	Accuracy value	
		RSF-3C	RSF-5B
a	Output shaft tip runout	0.03	0.03
b	Installation pilot concentricity	0.02	0.04
c	Installation surface perpendicularity	0.02	0.02
d	Output flange runout	0.005	0.005
e	Parallelism between the installation surface and the output flange	0.015	0.015

(T.I.R* Unit: mm)

FHA-Cmini series



Symbol	Accuracy item	Accuracy value
		FHA-8/11/14C
a	Output shaft surface runout	0.010
b	Output shaft axial runout	0.010
c	Parallelism between the output shaft and the mounted surface	0.040
d	Concentricity between the output shaft and the pilot	0.040

(T.I.R* Unit: mm)

* Total indicator reading (T.I.R): Indicates the total amount of reading of the dial gauge when the measured part is rotated one turn.

* Although a highly reliable oil seal is used in the output shaft, complete leakage prevention is not ensured. Customers must take actions to protect from grease or oil depend on the application..



■ Please contact our sales department with any questions.

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The academic or generic term of our "HarmonicDrive" products is "strain wave gearing."

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