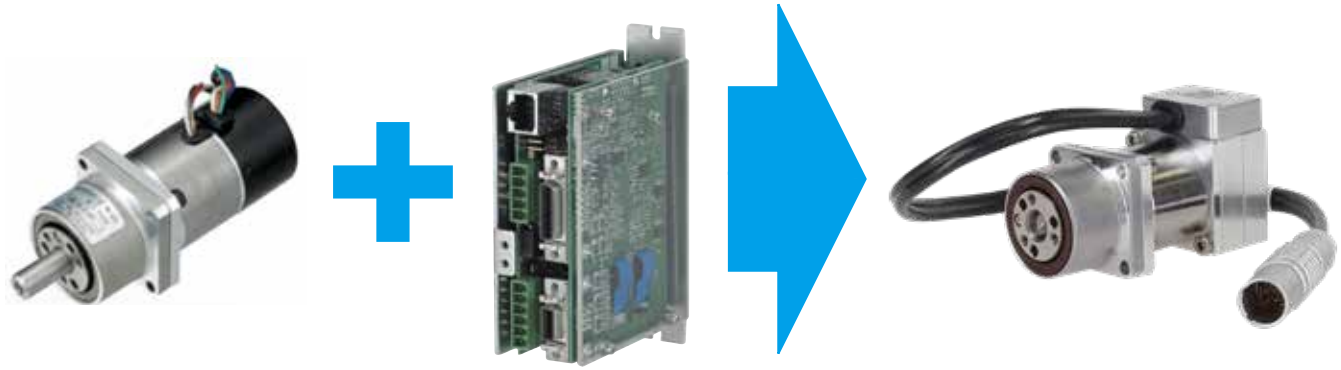
NEW!

HarmonicDrive®

Two New Integrated Actuators

RSF-5B Supermini Actuator and RSA-8A Mini Actuator with Integrated Servo Drives

Mini Actuator with Integrated Servo Drive



Standard Mini Actuator | Full Size Servo Drive | RSF-5B Mini Actuator WITH Drive

The compact RSF-5B and RSA-8A mini actuators with zero backlash Harmonic Drive® gears have high torque density with exceptional accuracy and repeatability. The actuators feature an integrated servo drive utilizing CANopen® communication. This evolutionary product eliminates the need for an external drive and greatly simplifies cabling while retaining high-positional accuracy and torsional stiffness in a compact housing.

Since it communicates via CANopen, only 4 conductors are needed: CANH, CANL, +24VDC, 0VDC. A single-turn 14bit (16384 cpr) absolute encoder has been integrated.

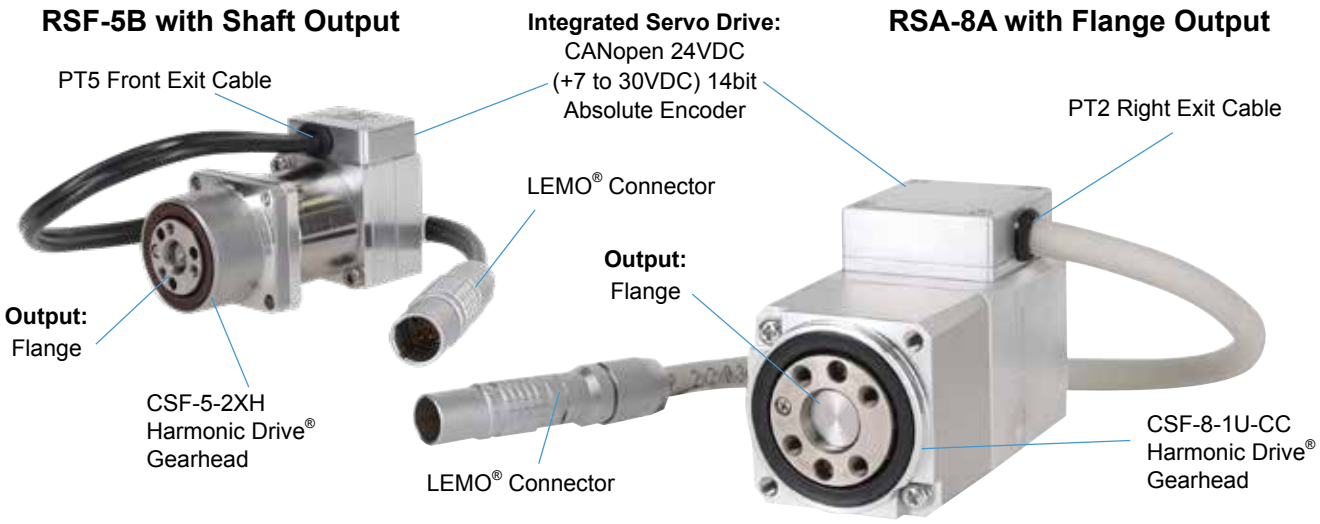
Features

- Actuator + Integrated Servo Drive with CANopen® Communication
- 24VDC Nominal Supply Voltage (7VDC to 30VDC range)
- Single Cable with only 4 conductors is needed: CANH, CANL, +24VDC, 0VDC
- Zero Backlash Harmonic Drive® Gearing
- Replaceable flex-rated cable assembly with front and rear exiting options (RSF-5B)
- Flex-rated cable assembly with 4 exit options (RSA-8A)
- Input Sensing Encoder: 14 bit resolution (16,384 cpr)
- Control Modes: Torque, Velocity, Position, CSP, CSV, CST
- Harmonic Drive® HDL Software

Options:

- Flex-rated extension cables with sealed connectors

Mini Actuators with Integrated Servo Drives



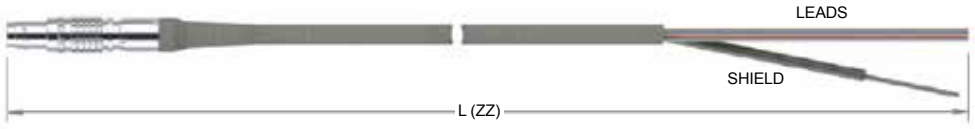
Ordering Code (Mini Actuator with Integrated Drive)

RSA	-	8	A	-	50	-	IDT14b	-		PT1	-	SP
1		2	3		4		5		6	7		8

1	**Model**	RSF Supermini Series	RSA Mini Series
2	**Size**	5	8
3	**Design Version**	B	A
4	**Gear Ratio**	30, 50, 100	
5	**Encoder Type and Resolution**	IDT14b - Integrated Drive *14bit resolution absolute encoder on motor input*	
6	**Output**	Blank - Shaft Output F - Flange Output	
7	**Cable Exit Options**	PT1 - Rear exit cable PT5 - Front exit cable	PT1 - Rear exit cable PT2 - Right exit cable PT3 - Left exit cable PT5 - Front exit cable
8	**Special Specification**	Blank – Standard Product SP ____ – Special Specification Code	

Optional Extension Cable 3 Lengths Available **(ZZ)**: 3m (**03**), 5m (**05**), 10m (**10**)

Description
CBL-D**ZZ**-L004-N



Specifications RSF-5B Supermini with Integrated Servo Drive

Item \ Ratio			RSF-5B		
			30	50	100
Maximum torque		Nm	0.5	0.9	1.4
Allowable continuous torque		Nm	0.18	0.29	0.44
Maximum output speed		rpm	333	200	100
Allowable continuous output speed		rpm	150	90	45
Torque constant		Nm/A_{rms}	0.3	0.54	1.1
Motor maximum current		A_{rms}	2.3	2.2	1.7
Motor allowable continuous current		A_{rms}	1.11	0.92	0.76
Input power supply voltage		V	24VDC (+7 to +30VDC)		
EMF constant		V/(rpm)	0.04	0.07	0.13
Phase resistance		Ω(20°C)	0.82		
Phase inductance		mH	0.27		
Number of poles			8		
Moment of inertia	$GD^2/4$	kgm^2	$7.09x10^{-5}$	$1.97x10^{-4}$	$7.88x10^{-4}$
Allowable radial load	N		90		
Moment Stiffness	Nm/rad		7.41×10^2		
Output shaft resolution (Note) 1	counts/rev		491,520	819,200	1,638,400
One-way positioning accuracy	arc min		4	3	3
Mass		g	77		
Enclosure			Totally enclosed self-cooled		
Ambient environment specification			Use temperature: 0 to 40°C/Storage temperature: -20 to +60°C, Use humidity and storage humidity: 20 to 80%RH (non-condensing). Free from dust, dirt, metallic powder, corrosive gas, flammable gas, oil mist, and others. Avoid outdoor use or direct sunlight. Altitude: 1,000 m or less. Motor insulation: 100 MΩ (500 VDC) or higher. Dielectric strength: 1500 VAC/1 min. Insulation class: B		
Mounting direction			Can be installed in any direction		

* The table shows typical output values.
1. Motor ABS encoder resolutions are obtained by [motor encoder resolution] x [reduction ratio].

Specifications RSA-8A Mini with Integrated Servo Drive

Item \ Ratio			RSA-8A		
			30	50	100
Maximum torque		Nm	1.8	3.3	4.8
Allowable continuous torque		Nm	0.7	1.2	2.0
Maximum output speed		rpm	283.3	170.0	85.0
Allowable continuous output speed		rpm	116.7	70.0	35.0
Torque constant		Nm/A_{rms}	0.7	1.2	2.0
Motor maximum current		A_{rms}	4.0	4.0	3.5
Motor allowable continuous current		A_{rms}	2.05	2.0	1.7
Input power supply voltage		V	24VDC (+7 to +30VDC)		
EMF constant		V/(rpm)	0.051	0.085	0.170
Phase resistance		Ω(20°C)	0.8		
Phase inductance		mH	0.285		
Number of poles			14		
Moment of inertia	$GD^2/4$	kgm^2	$7.74x10^{-4}$	$2.15x10^{-3}$	$8.60x10^{-3}$
Allowable moment load	Nm		3.46		
Moment Stiffness	Nm/rad		2.76×10^3		
Output shaft resolution (Note) 1	counts/rev		491,520	819,200	1,638,400
One-way positioning accuracy	arc min		2	2	2
Mass		g	200 (190 with F option)		
Enclosure			Totally enclosed self-cooled		
Ambient environment specification			Use temperature: 0 to 40°C/Storage temperature: -20 to +60°C, Use humidity and storage humidity: 20 to 80%RH Free from dust, dirt, metallic powder, corrosive gas, flammable gas, oil mist, and others. Avoid outdoor use or direct sunlight. Altitude: 1,000 m or less. Motor insulation: 100 MΩ (500 VDC) or higher. Dielectric strength: 1500 VAC/1 min. Insulation class: B		
Mounting direction			Can be installed in any direction		

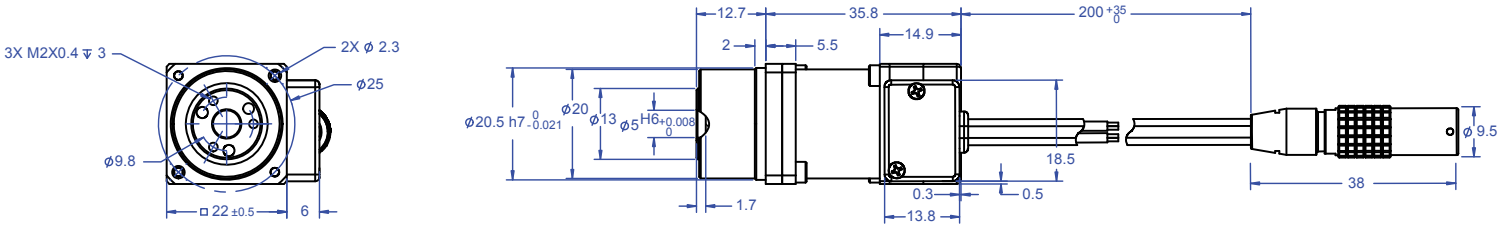
* The table shows typical output values.
1. Motor ABS encoder resolutions are obtained by [motor encoder resolution] x [reduction ratio].

RSF-5B Supermini Outline Dimensions

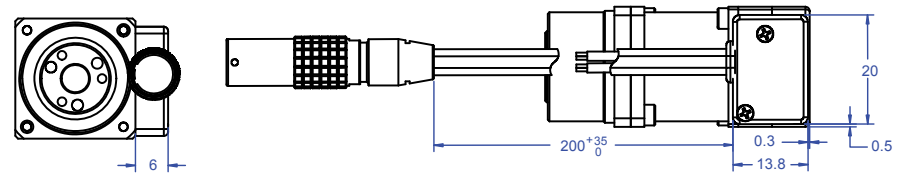
FLANGE OUTPUT

[mm]

PT1 rear exit cable

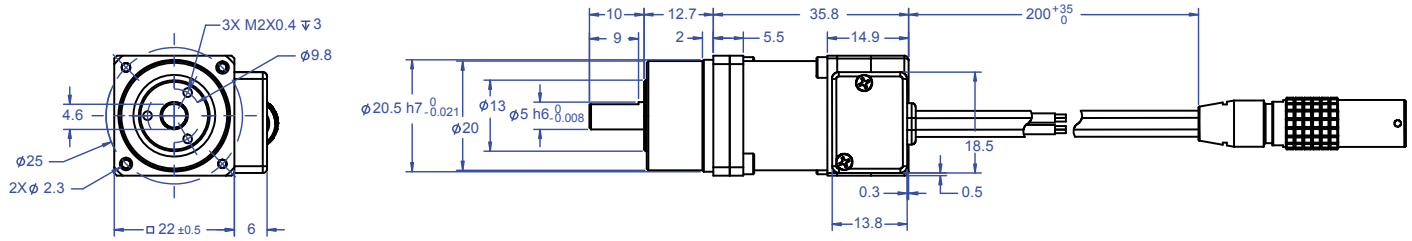


PT5 front exit cable

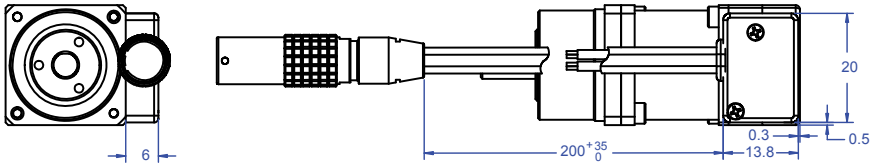


SHAFT OUTPUT

PT1 rear exit cable



PT5 front exit cable

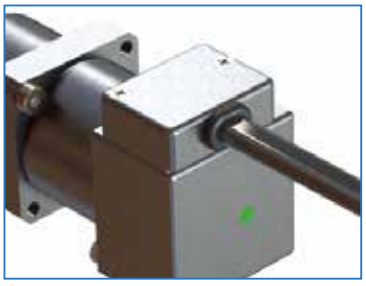


RSF-5B Exit Options

Cable housing dimensions and mounting dimensions are the same for both PT options.

Key

- **PT1** Pigtail cable, rear exit (opposite output)
- **PT5** Pigtail cable, front exit



PT1 Rear Exit

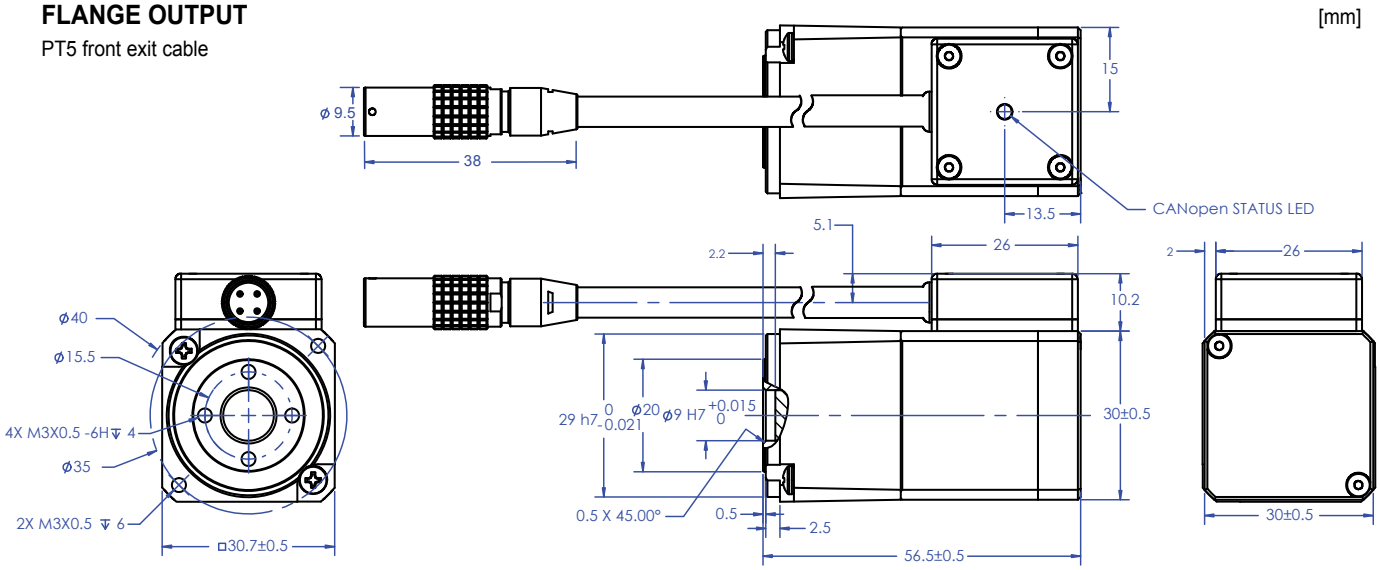
PT5 Front Exit

RSA-8A Mini Outline Dimensions

FLANGE OUTPUT

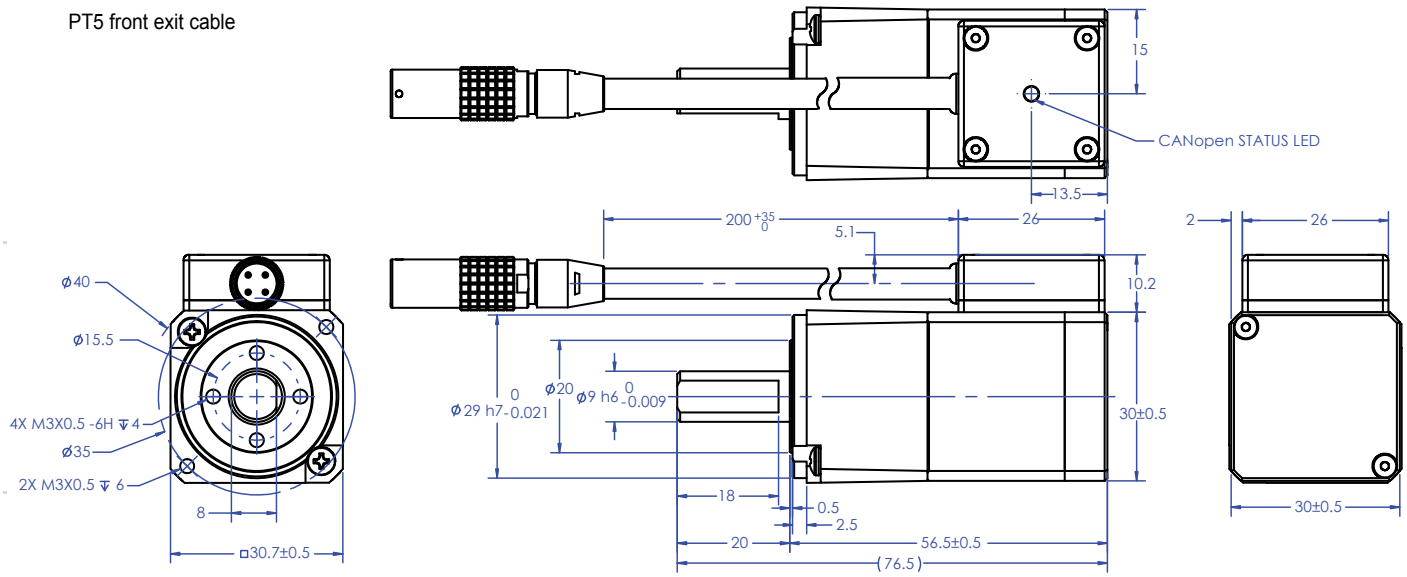
PT5 front exit cable

[mm]



SHAFT OUTPUT

PT5 front exit cable

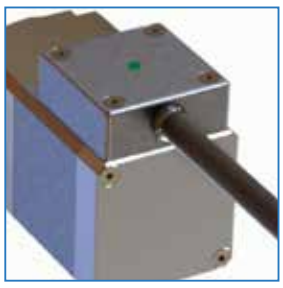


RSA-8A Exit Options

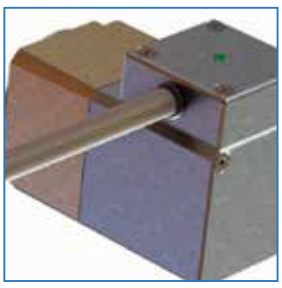
Cable housing dimensions and mounting dimensions are the same for all PT options.

Key

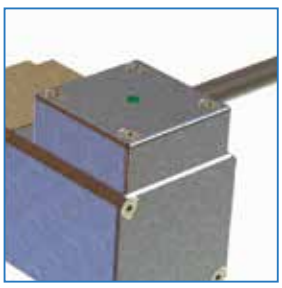
- **PT1** Pigtail cable, rear exit (opposite output)
- **PT2** Pigtail cable, right exit (of output side)
- **PT3** Pigtail cable, left exit (of output side)
- **PT5** Pigtail cable, front exit



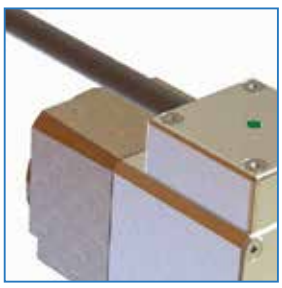
PT1 Rear Exit



PT2 Right Exit



PT3 Left Exit



PT5 Front Exit

Operating Range

The graphs show the operating range for RSF-5 and RSA-8 Mini Series actuators with an integrated drive.

Continuous Motion Range

The range allows continuous operation of the actuator.

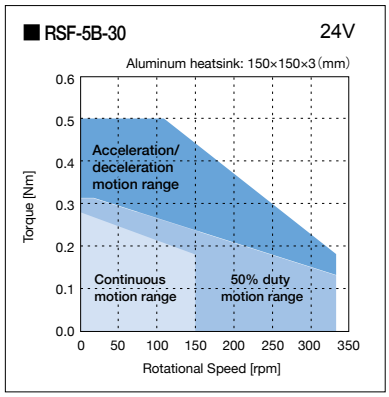
50% Duty Motion Range

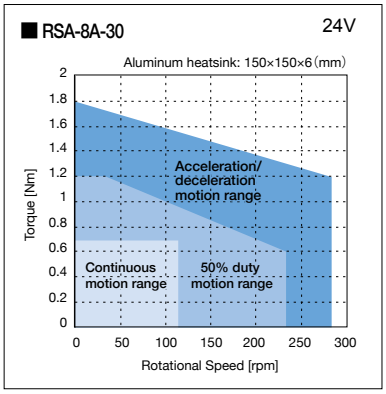
This range indicates the torque/speed where 50% duty cycle operation is permitted (the ratio of operating time and delay time is 50:50).

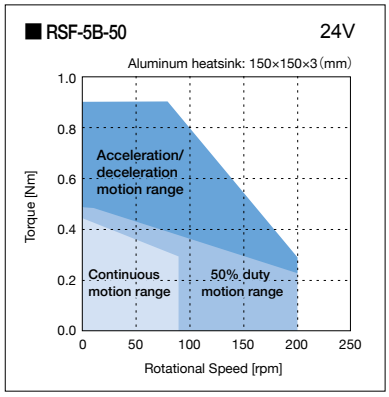
Motion Range During Acceleration and Deceleration

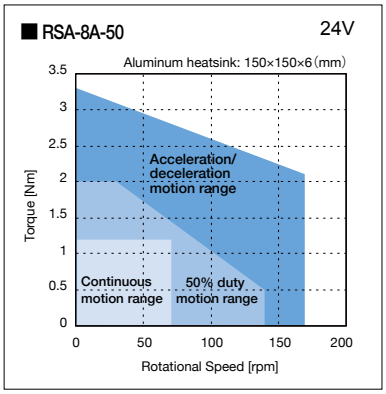
This range indicates the torque/speed which the actuator can be operated momentarily. The range allows instantaneous operation such as during acceleration and deceleration.

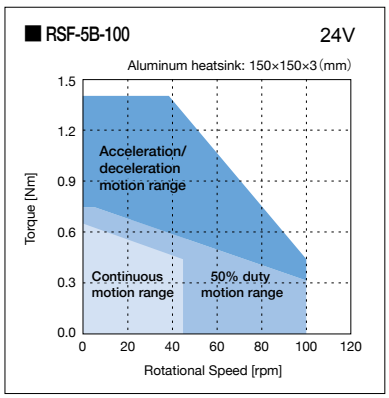
The continuous and 50% duty motion ranges shown on each graph are measured when the actuator is mounted to an aluminum heatsink as specified.

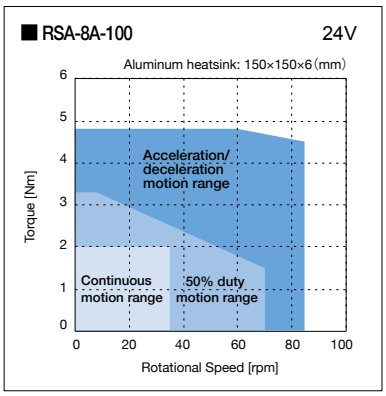








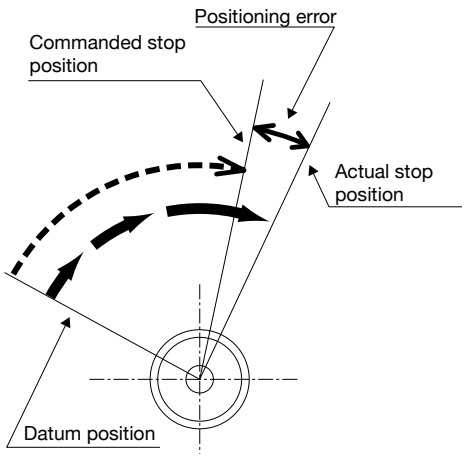




One-Way Positional Accuracy

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 RSF Supermini 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.



One-Way Positioning Accuracy

Item \ Size		RSF-5B			RSA-8A		
		30	50	100	30	50	100
One-Way Positional Accuracy	arc min	4	3	3	2	2	2
	rad	1.20×10^{-3}	0.87×10^{-3}	0.87×10^{-3}	5.82×10^{-4}	5.82×10^{-4}	5.82×10^{-4}

Output Bearing Specifications

Size	Pitch Circle	Offset	Basic Rated Load		Allowable moment load	Moment stiffness	Allowable radial load	Allowable axial load
	dp	R	Basic dynamic rated load	Basic static rated load				
	mm	mm	$\times10^2$ N	$\times10^2$ N	Nm	Nm/rad	N	N
5	13.5	4.85	9.14	7.63	0.89	7.41×10^2	90	270
8	20.5	7.3	21.6	19.0	3.46	2.76×10^3	200	630

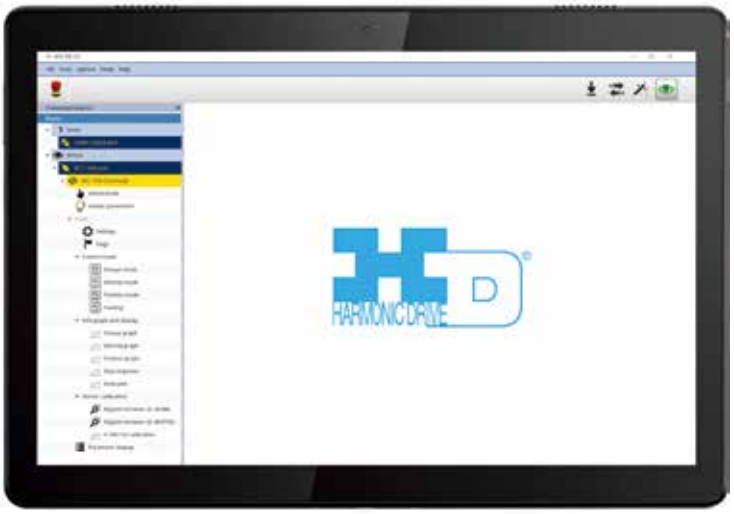
* The value of the moment stiffness is the average value.

HDL-IDE 3.0 Software:

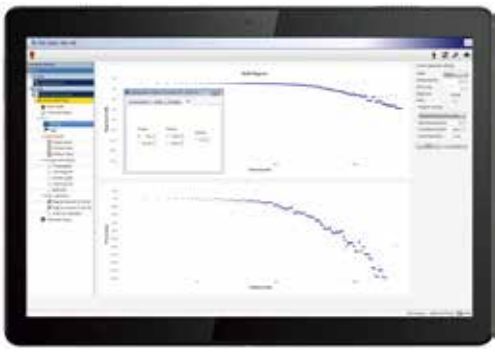
HDL-IDE 3.0 software provides the ability to setup or commission the RSF-5B and RSA-8A Integrated actuator without connecting to a CANopen master controller. A single actuator can connect to a personal computer or laptop with a CAN communication converter, a termination resistor and a power supply. All 256 parameters, including the tuning parameters and 256 general user variables can be set and stored to be recognized by the CANopen master controller operating the specific application. The following are some of the features included in HDL-IDE 3.0 software:

Features

- Torque Mode and Graph
- Velocity Mode and Graph
- Position Mode and Graph
- Homing Mode
  - Limit Switch
  - Current Position
  - Hardstop Homing
- Step Response
- Bode Plot
- Parameter List
- Virtual Mode (shown)



Bode Plot and Settings



Torque Mode

Velocity Mode

Position Mode

Actuators with an Integrated Servo Drive

An integrated actuator from Harmonic Drive eliminates the need for a separate servo drive to be connected to the system. RSF-5B-IDT and RSA-8A-IDT join the new Integrated Actuator product category, along with 3 models of FHA-IDT, sizes 8, 11 and 14.

- Mitigates cable management concerns
- No encoder cables connected to the servo drive and therefore no wire harnesses or cable tracks and associated electrical noise concerns
- Reduction in number of potential failures with less connections
- Simplifies the control hardware saving cabinet space
- Eliminate the need for a separate drive
- Matched motor and drive for optimal performance and simple system integration
- Lower complete solution cost with less cabling and installation time

FHA-C Mini Actuator with Servo Drive

The functionality of a full size servo drive is seamlessly integrated into a mini actuator from Harmonic Drive.

The Servo Drive is Inside!

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