

HarmonicDrive®

Ultra-Flat Brushless DC Actuators

FLA Series



Ultra-Flat Actuators Combining a High-Performance Speed Reducer and a Brushless DC Motor

The new ultra-flat, ultra-light brushless actuators combine our high-precision/high-performance reducers with a compact, high-output brushless DC motor. FLA actuators are available with our high-speed, high-efficiency Harmonic Planetary® gearhead or with our high-precision, high-torque Harmonic Drive® reducer. This new series targets a broad customer base and is ideal for wide range of applications such as AGV wheel drives and powered exoskeletons. We offer both 24VDC and 48VDC versions to work with battery-powered applications.



Features

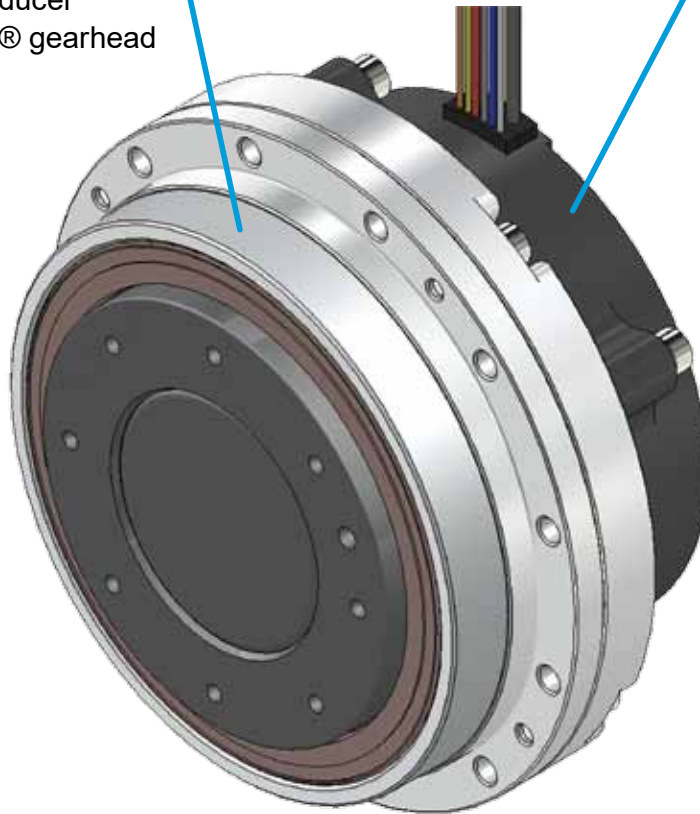
- An ultra-flat shape achieved through dedicated design of a high-performance speed reducer and brushless DC motor.
- A versatile combination offering four models, three speed reduction ratios and two voltage options in the product lineup.
- Light weight achieved through optimal design.

Speed Reducer

HarmonicDrive® reducer
HarmonicPlanetary® gearhead

Brushless DC Motor

Power voltage: 24V
48V



Model and Symbols

FLA - 11 A - 08 HP - H - 24 - SP

(1) (2) (3) (4) (5) (6) (7) (8)

(1)	Series Name	Brushless DC actuator FLA series
(2)	Size	11, 14, 17
(3)	Version Symbols	
(4)	Reduction Ratio	HarmonicPlanetary® planetary speed reducer 08: 1/8 (Size 11 and 14 only) 09: 1/9 (Size 17 and 20 only) HarmonicDrive® speed reducer 50: 1/50 100: 1/100 (Size 11, 14, and 17 only)

(5)	Speed Reducer Type	HP: Planetary speed reducer HarmonicPlanetary® FB: Precision control speed reducer HarmonicDrive®
(6)	Sensor Type	H: Hall sensor
(7)	Input Power Voltage	24: DC24V 48: DC48V
(8)	Special Specification	No symbol: Standard product SP: Special specification

HarmonicDrive® speed reducer



HarmonicPlanetary® planetary speed reducer

Ultra-Flat Shape through
Dedicated Design



Recommended Driver

- Low-Voltage Brushless DC Motor Drive Manufactured by Yaskawa Controls Co.

S Series (Speed Control and Torque Control)

Features

- ◆ Thin and compact configuration
- ◆ The aluminum printed circuit board features excellent heat radiation performance and low cost
- ◆ CAN communication protocol incorporated



F Series (Speed Control and Torque Control)

Features

- ◆ Small footprint
- ◆ High versatility achieved featuring three control systems
- ◆ CANopen communication protocol incorporated



* For detailed specifications of drivers, please contact Yaskawa Controls Co., Ltd.

Toll-free telephone: 0120-854-388 (+81-120-854-388)
Email address for technical consultation: cmec@yaskawa.co.jp

Specification

■ Type FLA-HP (HarmonicPlanetary® Planetary Speed Reducer)

DC24V

Item		Model	FLA-11A-08HP	FLA-14A-08HP	FLA-17A-09HP	FLA-20A-09HP
Driver Input Power Voltage	V		DC24			
Maximum Torque*1	Nm		1.8	3.7	7.3	12.1
Allowable Continuous Torque**2	Nm		0.6	1.2	3	4.1
Maximum Speed*1	r/min		500	500	500	400
Allowable Continuous Speed**2	r/min		100	100	100	100
Maximum Current*1	A		8.7	18.0	26.2	31.4
Allowable Continuous Current**2	A		3.0	6.0	10.4	10.7
Moment of Inertia (GD ² /4)	kgm ²		0.00013	0.00039	0.001	0.0026
Reduction Ratio			1:8	1:8	1:9	1:9
Allowable Moment Load	Nm		1.2	1.6	2.0	2.4
Moment Rigidity	Nm/rad		2.0 x 10 ³	3.3 x 10 ³	4.4 x 10 ³	5.1 x 10 ³
Motor Position Sensor			Hall sensor			
Positioning Resolution per Motor Rotation	pls/rev		30	30	30	48
Output Shaft Resolution	pls/rev		240	240	270	432
Weight	g		390	620	870	1,060
Installation Direction			Can be installed in any direction			
Protective Structure			Fully enclosed self-cooling type (IP40)			

DC48V

Item		Model	FLA-11A-08HP	FLA-14A-08HP	FLA-17A-09HP	FLA-20A-09HP
Driver Input Power Voltage	V		DC48			
Maximum Torque*1	Nm		1.8	3.7	7.3	12.1
Allowable Continuous Torque**2	Nm		0.6	1.2	3	4.1
Maximum Speed*1	r/min		500	500	500	400
Allowable Continuous Speed**2	r/min		100	100	100	100
Maximum Current*1	A		4.5	9.6	13.6	17.8
Allowable Continuous Current**2	A		1.6	3.0	5.3	6.0
Moment of Inertia (GD ² /4)	kgm ²		0.00013	0.00039	0.001	0.0026
Reduction Ratio			1:8	1:8	1:9	1:9
Allowable Moment Load	Nm		1.2	1.6	2.0	2.4
Moment Rigidity	Nm/rad		2.0 x 10 ³	3.3 x 10 ³	4.4 x 10 ³	5.1 x 10 ³
Motor Position Sensor			Hall sensor			
Positioning Resolution per Motor Rotation	pls/rev		30	30	30	48
Output Shaft Resolution	pls/rev		240	240	270	432
Weight	g		390	620	870	1,060
Installation Direction			Can be installed in any direction			
Protective Structure			Fully enclosed self-cooling type (IP40)			

The above values are typical values on the output shaft.

*1: A typical characteristic when one of the following drivers is combined.

F Series: FLA-11A or FLA-14A

S Series: FLA-17A or FLA-20A

*2: The value during saturation of temperature rise when mounted on an aluminum heat radiation board of a size described below.

(Heat radiation board dimensions: Size 11: 220 x 220 x 8mm, Size 14: 250 x 250 x 10mm, Size 17: 280 x 280 x 12mm, Size 20: 300 x 300 x 15mm)

■ Type FLA-FB (HarmonicDrive® Speed Reducer)

DC24V

Item		Model	FLA-11A-xxFB		FLA-14A-xxFB		FLA-17A-xxFB		FLA-20A-xxFB
			50	100	50	100	50	100	50
Driver Input Power Voltage	V	DC24							
Maximum Torque ^{*1}	Nm	6.7	11	11.2	18.2	23	34	33	
Allowable Continuous Torque ^{*1,2}	Nm	1.7	2.4	2.6	3.8	7.9	11.4	13	
Maximum Speed ^{*1}	r/min	100	50	100	50	100	50	80	
Allowable Continuous Speed ^{*1,2}	r/min	60	30	60	30	60	30	50	
Maximum Current ^{*1}	A	6.0	5.0	9.7	8.7	18.4	14.3	19.2	
Allowable Continuous Current ^{*1,2}	A	1.9	1.7	3.0	2.5	6.8	5.3	8.7	
Moment of Inertia (GD ² /4)	kgm ²	0.0073	0.029	0.019	0.077	0.048	0.19	0.12	
Reduction Ratio		1:50	1:100	1:50	1:100	1:50	1:100	1:50	
Allowable Moment Load	Nm	1.2		1.6		2.0		2.4	
Moment Rigidity	Nm/rad	2.0 x 10 ³		3.3 x 10 ³		4.4 x 10 ³		5.1 x 10 ³	
Motor Position Sensor		Hall sensor							
Positioning Resolution per Motor Rotation	pls/rev	30		30		30		48	
Output Shaft Resolution	pls/rev	1,500	3,000	1,500	3,000	1,500	3,000	2,400	
Weight	g	420		720		940		1,170	
Installation Direction		Can be installed in any direction							
Protective Structure		Fully enclosed self-cooling type (IP40)							

DC48V

Item		Model	FLA-11A-xxFB		FLA-14A-xxFB		FLA-17A-xxFB		FLA-20A-xxFB
			50	100	50	100	50	100	50
Driver Input Power Voltage	V	DC48							
Maximum Torque ^{*1}	Nm	6.7	11	11.2	18.2	23	34	33	
Allowable Continuous Torque ^{*1,2}	Nm	1.7	2.4	2.6	3.8	7.9	11.4	13	
Maximum Speed ^{*1}	r/min	100	50	100	50	100	50	80	
Allowable Continuous Speed ^{*1,2}	r/min	60	30	60	30	60	30	50	
Maximum Current ^{*1}	A	3.1	2.6	4.8	4.2	9.4	7.2	10.7	
Allowable Continuous Current ^{*1,2}	A	1.0	0.8	1.5	1.2	3.4	2.9	5.1	
Moment of Inertia (GD ² /4)	kgm ²	0.0073	0.029	0.019	0.077	0.048	0.19	0.12	
Reduction Ratio		1:50	1:100	1:50	1:100	1:50	1:100	1:50	
Allowable Moment Load	Nm	1.2		1.6		2.0		2.4	
Moment Rigidity	Nm/rad	2.0 x 10 ³		3.3 x 10 ³		4.4 x 10 ³		5.1 x 10 ³	
Motor Position Sensor		Hall sensor							
Positioning Resolution per Motor Rotation	pls/rev	30		30		30		48	
Output Shaft Resolution	pls/rev	1,500	3,000	1,500	3,000	1,500	3,000	2,400	
Weight	g	420		720		940		1,170	
Installation Direction		Can be installed in any direction							
Protective Structure		Fully enclosed self-cooling type (IP40)							

The above values are typical values on the output shaft.

*1: A typical characteristic when one of the following drivers is combined.

F Series: FLA-11A or FLA-14A

S Series: FLA-17A or FLA-20A

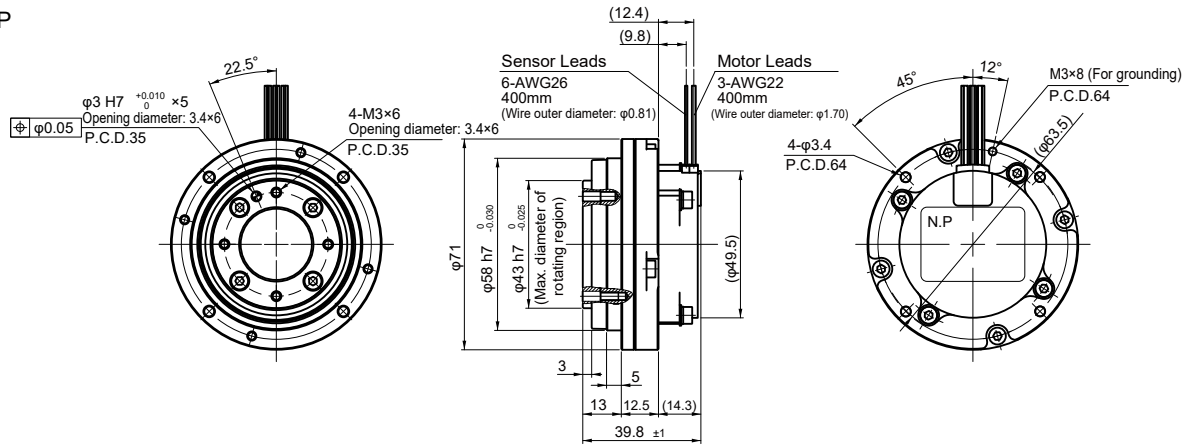
*2: The value during saturation of temperature rise when mounted on an aluminum heat radiation board of a size described below.

(Heat radiation board dimensions: Size 11: 220 x 220 x 8mm, Size 14: 250 x 250 x 10mm, Size 17: 280 x 280 x 12mm, Size 20: 300 x 300 x 15mm)

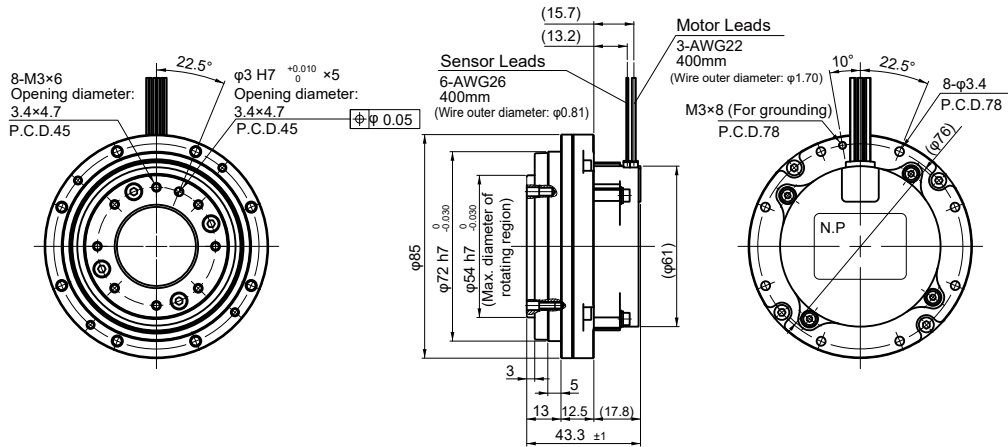
Outline Dimensions

Type FLA-HP

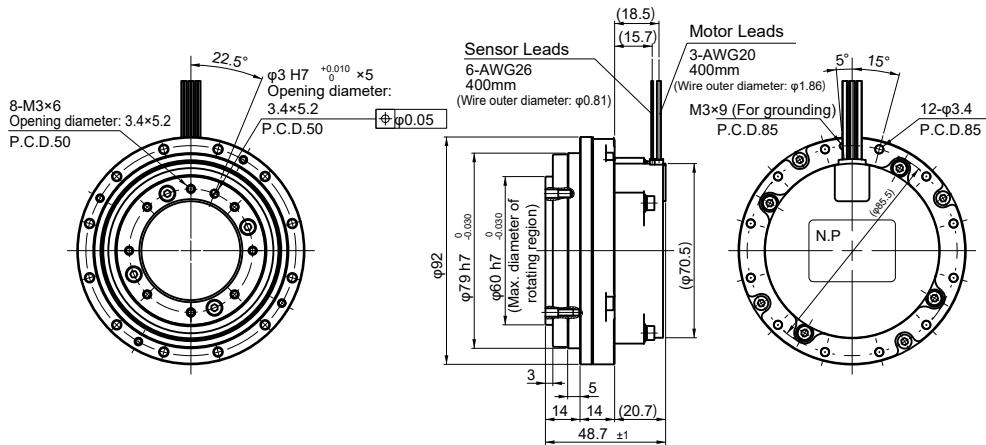
FLA-11A-HP



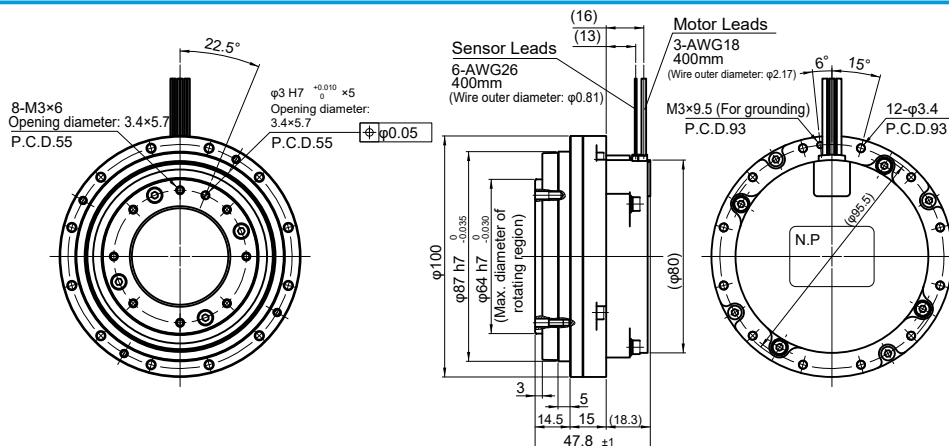
FLA-14A-HP



FLA-17A-HP

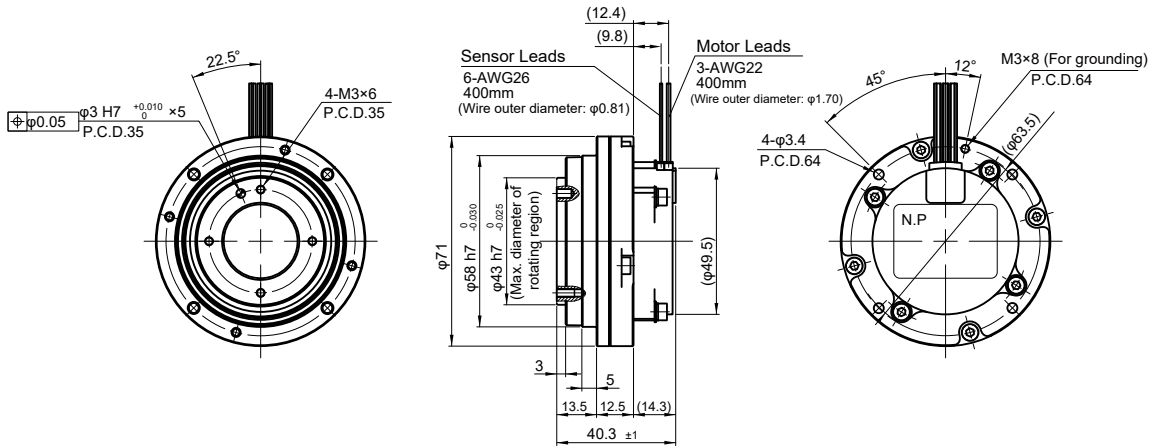


FLA-20A-HP

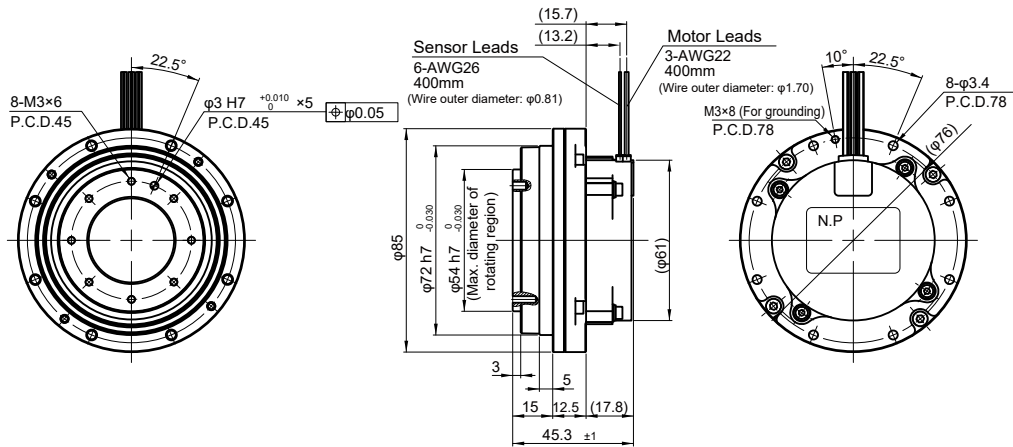


Type FLA-FB

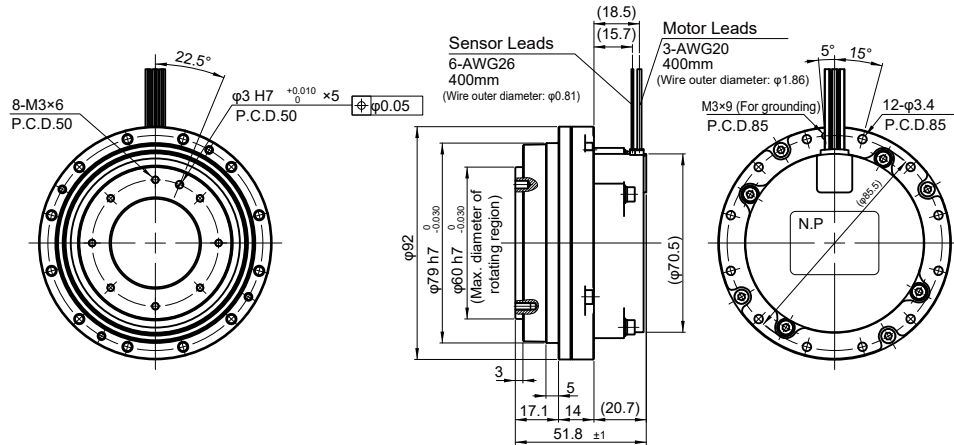
FLA-11A-FB



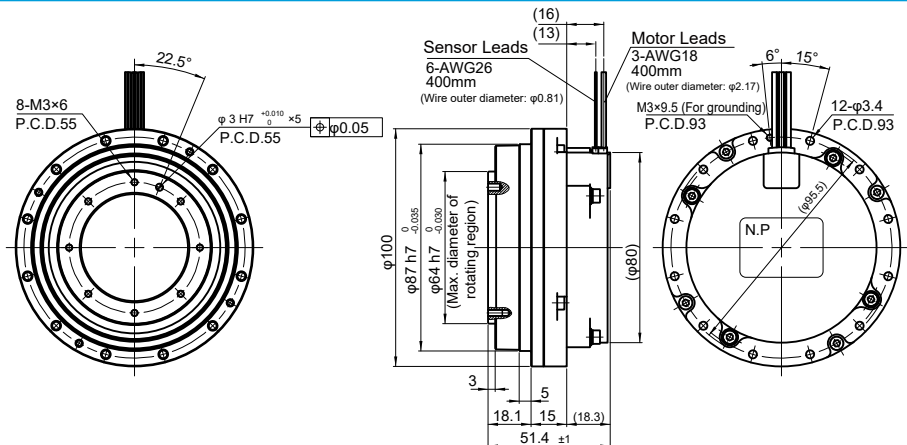
FLA-14A-FB



FLA-17A-FB



FLA-20A-FB





■ Please contact our sales department with any questions.

Head Office

Ichigo Omori Building 7F, 6-25-3 Minami-Oi,
Shinagawa-ku, Tokyo 140-0013 JAPAN
Phone: +81-3-5471-7800 / FAX: +81-3-5471-7811

Overseas Division

1856-1 Hotakamaki, Azumino-shi, Nagano
399-8305 JAPAN
Phone: +81-263-83-6935 / FAX: +81-263-83-6901

Tokyo Office

Ichigo Omori Building 2F, 6-25-3 Minami-Oi,
Shinagawa-ku, Tokyo 140-0013 JAPAN
Phone: +81-3-5471-7830 / FAX: +81-3-5471-7836

Tokyo Office, Kitakanto Team

Ichigo Omori Building 2F, 6-25-3 Minami-Oi,
Shinagawa-ku, Tokyo 140-0013 JAPAN
Phone: +81-3-6410-8485 / FAX: +81-3-6410-8486

Koshin Office

1856-1 Hotakamaki, Azumino-shi, Nagano
399-8305 JAPAN
Phone: +81-263-83-6910 / FAX: +81-263-83-6911

Chubu Office

TM21-2F, 21 Terugaoka Meito-ku, Nagoya-shi,
Aichi 465-0042 JAPAN
Phone: +81-52-773-7451 / FAX: +81-52-773-7462

Kansai Office

Shin-Osaka Ueno Toyo Building 3F, 7-4-17 Nishi-nakajima,
Hakata-ku, Fukuokashi, Fukuoka 812-0011 JAPAN
Phone: +81-6-6885-5720 / FAX: +81-6-6885-5725

Kyushu Office

NMF Hakata-ekimae Building 7F, 1-15-20 Hakata-ekimae,
Hakata-ku, Fukuokashi, Fukuoka 812-0011 JAPAN
Phone: +81-92-451-7208 / FAX: +81-92-481-2493

Hotaka Plant

1856-1 Hotakamaki, Azumino-shi, Nagano
399-8305 JAPAN
Phone: +81-263-83-6800 / FAX: +81-263-83-6901

Harmonic Drive AG

Hoenbergstrasse 14 D-65555 Limburg a.d. Lahn
GERMANY
Phone: +49-6431-5008-0 / FAX: +49-6431-5008-119

Harmonic Drive L.L.C.

247 Lynnfield Street, Peabody, MA 01960
U.S.A.
Phone: +1-978-532-1800 / FAX: +1-978-532-9406

Harmonic Drive Systems (Shanghai) Co., Ltd.

Rm206, 1#, No.641, Tianshan Rd, Changning District,
Shanghai, 200336, CHINA
Phone: +86-21-6237-5656 / FAX: +86-21-3250-7268

<http://www.hds.co.jp>

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

