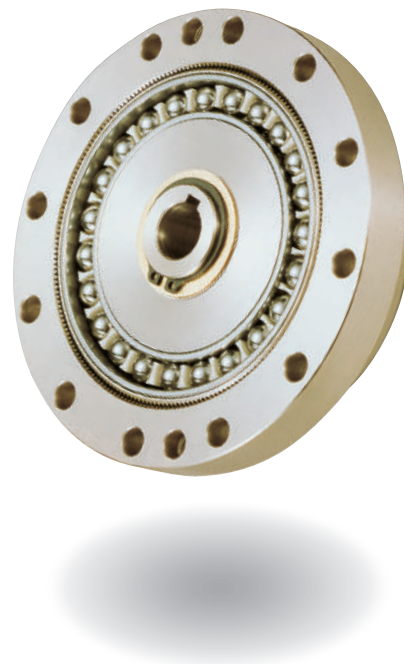


Harmonic Drive®



PRODUCT GUIDE

產品導覽

FINE MECHANICS & TOTAL *motion* CONTROL



ISO14001
ISO9001

卓越的技術結晶，就在眼前，觸手可及。

HarmonicDrive®

是一台獨特的諧波齒輪傳動機構。

不管是機械手臂、半導體製造設備還是 FA 設備，

甚至到孕育著人類夢想的外太空，都看得到

HarmonicDrive® 參與其中。

此外還應用於許多能夠進行精密動作
的機電產品。

在光學測量儀、醫療設備、印刷設備等

產業及科學技術中也擔任重要的角色。

Harmonic Drive Systems 將以肩負起

21 世紀為目標，持續開發新技術，

未來也將為提升世界技術貢獻己力，不屈不撓的向前邁進。

Excellent Technology Clusters in a Wide Range of Industries

HarmonicDrive® products are unique wave motion gears that play important roles in robots, semiconductor manufacturing systems, factory automation equipment...

as well as in aerospace equipment that foster the dreams of humanity.

We offer a variety of mechanical electronic products that bring about high precision motion control in optical measuring equipment, medical equipment, printing machines and other systems.

Our products offer many advantages in the fields of industrial and scientific technology.

Harmonic Drive Systems Inc. is making every effort to develop supportive technologies for the 21st century, thereby contributing to the advancement of global technology.



HarmonicDrive®

特徵 Features

●高旋轉精度、高定位精度 ●小型、輕量 ●高減速比 ●高轉矩容量 ●無背隙 ●高效率 ●運轉時安靜

High rotational and positioning accuracy, compact and light weight, high reduction ratio, high torque capacity, non-backlash, high efficiency, silent operation

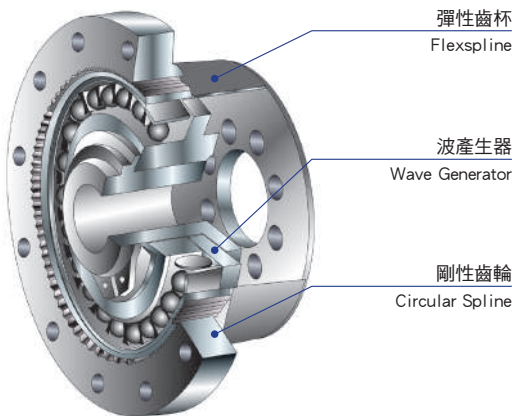
結構 Structure

作為諧波齒輪傳動機構誕生的 HarmonicDrive，是結合活用金屬彈性力學所獨創的動作原理，以及僅由 3 個基本零件（波產生器、彈性齒杯、剛性齒輪）所構成的產品，有著其他諧波齒輪傳動機構所沒有的優秀特徵。

Driven by a unique operating principle applying metal elastodynamics and comprising only three basic parts (a wave generator, flexspline and a circular spline), our HarmonicDrive wave motion gearing (registered trademark) excel with superb characteristics that are not found in other wave motion gearing products.

HarmonicDrive® 單機（元件型）的結構

Structure of HarmonicDrive® Unit (Component Type)



彈性齒杯 Flexspline

為薄杯狀的金屬彈性體零件。在薄杯開口部外圍刻有齒槽。彈性齒杯的底部稱為隔板，一般會安裝在輸出軸上。

The Flexspline is a non-rigid, thin cylindrical cup with external teeth, with a slightly smaller pitch diameter than the Circular Spline. The bottom of the Flexspline is called the diaphragm, and is usually mounted onto the output shaft.

波產生器 Wave Generator

是在橢圓凸輪外圍嵌有薄的滾珠軸承，整體呈橢圓形狀的零件。軸承的內輪雖固定在凸輪上，但外輪可透過滾珠產生彈性變形。一般來說，本零件會安裝在輸入軸上。

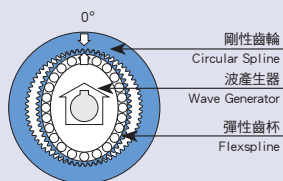
The Wave Generator is a thin raced ball bearing fitted onto an elliptical hub serving as a high efficiency torque converter, and is generally mounted onto the input shaft.

剛性齒輪 Circular Spline

本零件為剛性環狀零件。內圍刻有與彈性齒杯同樣大小的齒槽，齒數比彈性齒杯多 2 個。一般會固定在護殼上。

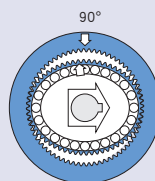
The Circular Spline is a rigid ring with internal teeth of the same size as the Flexspline, but the Circular Spline has two more teeth than the Flexspline and is generally mounted onto the housing.

動作原理 Operating Principle



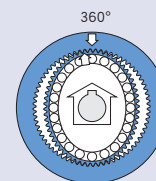
組合 3 個基本零件。彈性齒杯因波產生器而彎折成橢圓狀，並以橢圓長軸部份與剛性齒輪咬合，短軸部份則完全未咬合。

There are three main components. The Flexspline is bent into an elliptical shape by the Wave Generator; and the teeth of the long axis of the ellipse engage with the Circular Spline, whereas the teeth of the short axis are completely separated.



固定剛性齒輪，並使波產生器（輸入）朝順時針方向旋轉後，彈性齒杯會產生彈性變形，並逐漸移動至能夠和剛性齒輪的齒槽啮合的位置。

As the Circular Spline is fixed in place and Wave Generator (input) rotates in a clockwise direction, the Flexspline deforms elastically and the position where the gears mesh with the Circular Spline moves in turn.



波產生器旋轉 1 圈
One Turn of Wave Generator

由於波產生器旋轉 1 圈時，由於彈性齒杯的齒槽數量比剛性齒輪還少 2 片，因此朝波產生器的旋轉方向的反方向，即逆時針方向僅移動齒輪差 2 個的量。

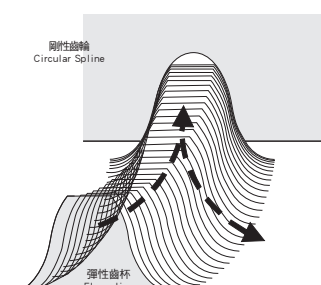
一般而言，會將此動作作為輸出利用。
For each rotation of the Wave Generator, the Flexspline rotates backwards by only two teeth from its original position, or in other words in the reverse direction relative to the Wave Generator. This motion is generally retrieved as the output.

齒輪動作及啮合 Tooth behavior and engagement

HarmonicDrive® 與一般齒輪轉動方式不同，其獨特的齒輪動作（動作原理），具有無背隙，微小角度傳送（單脈衝傳送）、定位精確等優點。

由於是 180° 對稱的兩處，且全齒數 30% 以上的齒輪同時咬合，可以傳達高轉矩。

Unlike the motion of ordinary gears, the unique tooth behavior (operating principle) of the HarmonicDrive® makes non-backlash motion possible, as well as infinitesimal angular feeding (one-pulse feeding) and high positioning accuracy. More than 30% of all teeth simultaneously engage in two locations in 180° symmetry, allowing for high torque capability.



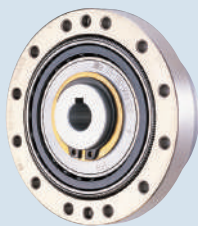
精密控制用減速機

HarmonicDrive®

HarmonicDrive® Precision
Control Speed Reducers

減速機
Speed Reducers

CSG 系列 CSG Series



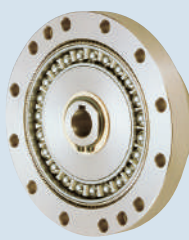
元件／杯型高轉矩型
Component/Cup Type - High-torque Type
8 頁

CSD 系列 CSD Series



元件／杯型超薄轉矩型
Component/Cup Type - Super Flat Type
9 頁

CSF 系列 CSF Series



元件／杯型標準型
Component/Cup Type - Standard Type
10 頁

SHG 系列 SHG Series SHF 系列 SHF Series



元件／帽型高轉矩型
Component/Silk Hat Type - High-torque Type
11 頁 (SHG)
元件／帽型標準型
Component/Silk Hat Type - Standard Type
12 頁 (SHF)

FBS-2UH 系列 FBS-2UH Series



模組／小外徑、大中空型
Unit/smaller outer diameter, large hollow Type
22 頁

FB 系列 FB Series



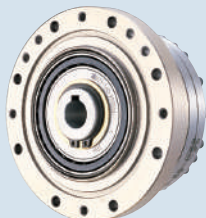
元件／平板標準型
Component/Pancake Standard Type
23 頁

FR 系列 FR Series



CSG 系列 CSG Series

CSG-2UH



模組／高轉矩、輕量型
Unit/High-torque & Light weight Type
13 頁

CSG-2UK



模組／密封結構、高轉矩型
Unit/Sealed Structure, High-torque Type
14 頁

CSD 系列 CSD Series

CSD-2UH



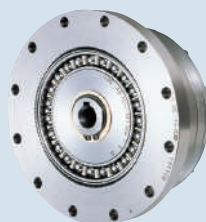
模組／超薄、高負載容量型
Unit/Super Flat, High Load Capacity Type
15 頁

CSD-2UF



CSF 系列 CSF Series

CSF-2UH



模組／標準、輕量型
Unit/Standard & Light weight Types
16 頁

SHG-2UH/SHF-2UH
中空型 Hollow Type



SHG/SHF 系列 SHG/SHF Series

SHG-2UJ/SHF-2UJ
輸入軸型 Shaft Input Type



模組／高轉矩中空軸、輕量型
Unit/High-torque, Hollow Shaft, Light weight Types
17 頁 (SHG)
模組／中空軸、輕量型
Unit/Hollow Shaft, Light weight Types
18 頁 (SHF)

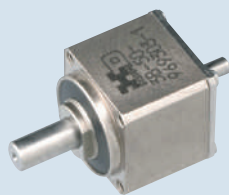
SHG-2SH/SHF-2SH
SHG-2SO/SHF-2SO
簡易型 Simple Type



CSF supermini 系列 CSF supermini Series



減速機型／小容量型
Gear Head Type/Small Capacity Type
19 頁



模組／小型雙軸型
Unit/Compact Double Shaft Type
19 頁

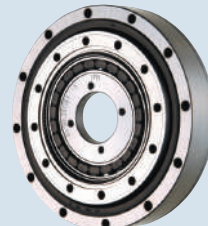
SHD 系列 SHD Series

SHD-2UH



模組／超薄、中空型
Unit/Super Flat, Hollow Type
21 頁

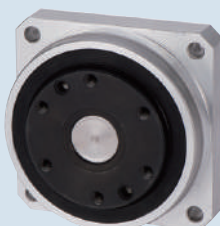
SHD-2SH



簡易模組／超薄、中空型
Simple Unit/Super Flat, Hollow Type
21 頁

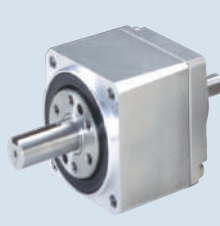
CSF mini 系列 CSF mini Series

CSF-2UP



模組／超薄、高剛性型
Unit/Super Flat, High stiffness type
20 頁

CSF-1U



模組／小型雙軸型
Unit/Compact Double Shaft Type
20 頁

CSF-2XH



減速機型／小容量型
Gear Head Type/Small Capacity Type
20 頁

FD 系列 FD Series



模組／相位調整用模組標準型
Unit/Phase Adjusting Unit Standard Type
23 頁

伺服馬達用高性能減速機系列
HarmonicGearhead®

HarmonicGearhead®
High-performance Gear Heads for
Servo Motors Series

減速機
Speed Reducers

HPGP/HPG 系列 HPGP/HPG Series



行星齒輪減速機／高轉矩、標準減速機型
Planetary Gear Speed Reducer / High Torque, Standard Gear Head Types
25 頁

HPG-R 系列 HPG-R Series



行星齒輪減速機／螺旋齒輪型
Planetary gear Reducer/Helical gear type
26 頁

CSG-GH/CSF-GH 系列
CSG-GH/CSF-GH Series



減速機型／高轉矩型／標準型
Gear Head/High-Torque Type/Standard Type
24 頁

HPG-RA 系列 HPG-RA Series



行星齒輪減速機／直交軸型
Planetary gear Speed Reducer/Orthogonal Shaft Types
27 頁

HPG-U1 系列 HPG-U1 Series



行星齒輪減速機／輸入軸模組型
Planetary gear Speed Reducer/Shaft Input Unit Types
28 頁

HPF 系列 HPF Series



行星齒輪減速機／中空軸模組型
Planetary gear Speed Reducer/Hollow Shaft Unit Types
29 頁

HP-F 系列 HP-F Series



行星齒輪減速機／減速機型
Planetary gear Speed Reducer/Gear Head type
30 頁

旋轉型致動器 Rotary Actuators

SHA 系列 (CG 型)
SHA Series (CG Type)



AC 伺服馬達／中空軸薄型
AC Servo Motors/Hollow Shaft, Flat Type

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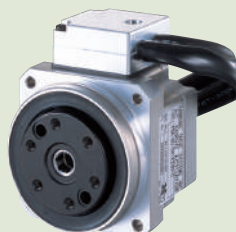
SHA 系列 (SG/HP 型)
SHA Series (SG/HP Type)



AC 伺服馬達／中空軸薄型
AC Servo Motors/Hollow Shaft, Flat Type

33 頁

FHA-C mini 系列
FHA-C mini Series



AC 伺服馬達／小型、中空軸、薄型
AC Servo Motors/Compact Hollow Shaft, Flat Type

34 頁

FHA-C 系列
FHA-C Series



AC 伺服馬達／中空軸薄型
AC Servo Motors/Hollow Shaft, Flat Type

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RSF supermini 系列
RSF supermini Series



AC 伺服馬達／超小圓筒型
AC Servo Motors/Super Compact Cylinder Type

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RSF-B mini 系列
RSF-B mini Series



AC 伺服馬達／小圓筒型
AC Servo Motors/Compact Cylinder Type

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RSF/RKF 系列
RSF/RKF Series



AC 伺服馬達／小圓筒型
AC Servo Motors/Compact Cylinder Type

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RH 系列
RH Series



DC 伺服馬達／小圓筒型
DC Servo Motors/Compact Cylinder Type

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FLA 系列
FLA Series



無刷 DC 伺服馬達 / 超薄型、輕量型
DC Servo Motors/Ultra-flat, Ultra-light Type

40 頁

線性致動器 Linear Actuators

LBC 系列
LBC Series



AC 伺服馬達／高推力定位型
AC Servo Motors/High-thrust Positioning Type

41 頁

LA 系列
LA Series



DC 伺服馬達／低推力定位型
DC Servo Motors/Low-thrust Positioning Type

41 頁

LAH-46 系列
LAH-46 Series



DC 伺服馬達／中推力定位型
DC Servo Motors/Medium-thrust Positioning Type

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KDU 系列
KDU Series



直接驅動馬達／高精度型
Direct Drive Motor/High Precision Type

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HMA 系列
HMA Series



AC 伺服馬達／薄型、中空型
AC Servo Motor/Flat Hollow Shaft Type

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馬達
Motors

LSA 系列
LSA Series



高精度、高回應
High Accuracy, High Response

44 頁

Galvano 式光學掃描器
Optical Galvano Scanners

微型編碼器系列
Micro Encoder Series



超小型 / 高解析度
Super-compact Encoders, Micro Encoders

45 頁

感測器系統
Sensor Systems

Harmonicsyn®

HA-800A 系列
HA-800A Series



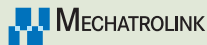
AC 伺服馬達用
For AC Servo Motors
位置、速度、轉矩控制
Position, speed and torque control

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HA-800B 系列
HA-800B Series



AC 伺服馬達用
For AC Servo Motors
對應開放式現場網路
Open Field Network



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HA-800C 系列
HA-800C Series



AC 伺服馬達用
For AC Servo Motors
對應開放式現場網路
Open Field Network



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伺服驅動器
Servo Drivers

HA-680 系列
HA-680 Series



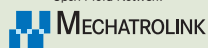
AC 伺服馬達用
For AC Servo Motors
位置、速度、轉矩控制
Position, speed and torque control

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HA-680ML 系列
HA-680ML Series



AC 伺服馬達用
For AC Servo Motors
對應開放式現場網路
Open Field Network



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HA-770 系列
HA-770 Series



直接驅動馬達
Direct Drive Motor
位置控制專用
For Position Control Only

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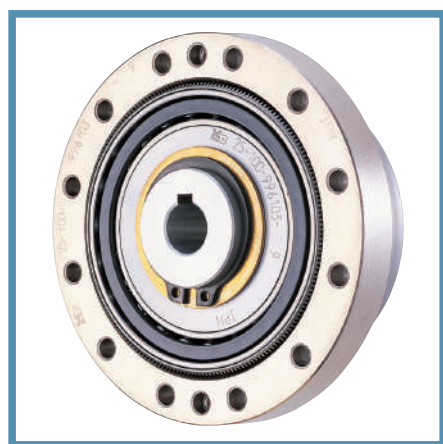
HA-360 系列
HA-360 Series



DC 伺服馬達用
For DC Servo Motors
位置控制專用
For Position Control Only

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CSG 系列 CSG Series



追求高負載容量、高可靠性，轉矩容量較 CSF 系列提升了 30%。
另外，亦備有易於組裝的模組（13 頁）。

To realize a high load capacity and high reliability, the torque capacity of this series has been increased by 30% compared to the CSF series.

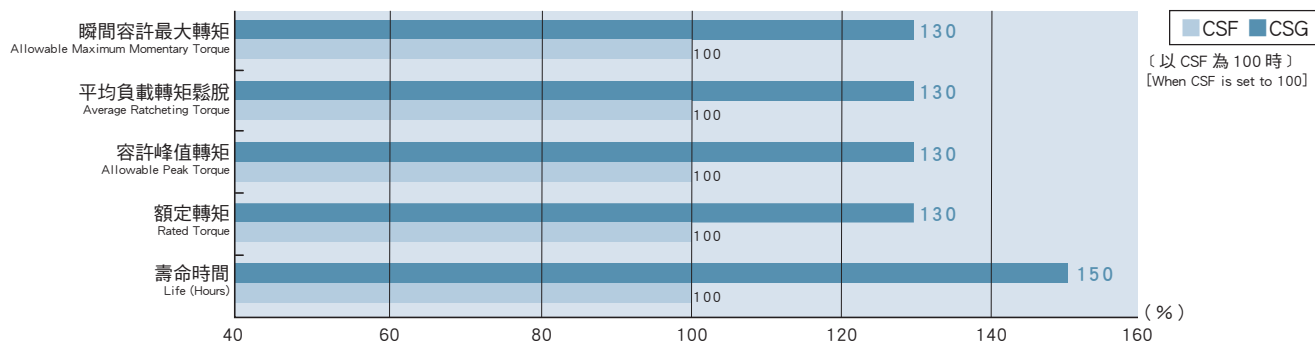
Units that are easy to mount are also available. (See page 13.)

- | | |
|----------------|--|
| ■ 設計輕巧、簡單 | ■ Compact and simple design |
| ■ 高轉矩容量 | ■ High torque capacity |
| ■ 高剛性 | ■ High stiffness |
| ■ 無背隙 | ■ Non-backlash |
| ■ 優異的定位精度及旋轉精度 | ■ High positioning and rotational accuracy |

壽命：10,000 小時 Life:10,000h

■ 特徵比較 高轉矩 HarmonicDrive® CSG 系列 vs CSF 系列

Feature Comparison: High Torque HarmonicDrive® CSG Series vs. CSF Series



■ CSG 系列額定表 CSG Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
14	50	7.0	0.7	23	2.3	46	4.7
	80	10	1.0	30	3.1	61	6.2
	100	10	1.0	36	3.7	70	7.2
17	50	21	2.1	44	4.5	91	9.0
	80	29	2.9	56	5.7	113	12
	100	31	3.2	70	7.2	143	15
20	120	31	3.2	70	7.2	112	11
	50	33	3.3	73	7.4	127	13
	80	44	4.5	96	9.8	165	17
	100	52	5.3	107	10.9	191	20
	120	52	5.3	113	11.5	191	20
25	160	52	5.3	120	12.2	191	20
	50	51	5.2	127	13	242	25
	80	82	8.4	178	18	332	34
	100	87	8.9	204	21	369	38
	120	87	8.9	217	22	395	40
32	160	87	8.9	229	23	408	42
	50	99	10	281	29	497	51
	80	153	16	395	40	738	75
	100	178	18	433	44	841	86
	120	178	18	459	47	892	91
	160	178	18	484	49	892	91

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
40	50	178	18	523	53	892	91
	80	268	27	675	69	1270	130
	100	345	35	738	75	1400	143
	120	382	39	802	82	1530	156
45	160	382	39	841	86	1530	156
	50	229	23	650	66	1235	126
	80	407	41	918	94	1651	168
	100	459	47	982	100	2041	208
50	120	523	53	1070	109	2288	233
	160	523	53	1147	117	2483	253
	80	484	49	1223	125	2418	247
	100	611	62	1274	130	2678	273
58	120	688	70	1404	143	2678	273
	160	688	70	1534	156	3185	325
	80	714	73	1924	196	3185	325
	100	905	92	2067	211	4134	422
65	120	969	99	2236	228	4329	441
	160	969	99	2392	244	4459	455
	80	969	99	2743	280	4836	493
	100	1236	126	2990	305	6175	630
	120	1236	126	3263	333	6175	630
	160	1236	126	3419	349	6175	630

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 木材、輕金屬、塑膠加工機械
- 印刷電路製造設備

- Robots
- Humanoid robots
- Metal machining tools
- Printing, bookbinding and paper processing machines
- Wood, light metal and plastic working machines
- Printed circuit board manufacturing machines

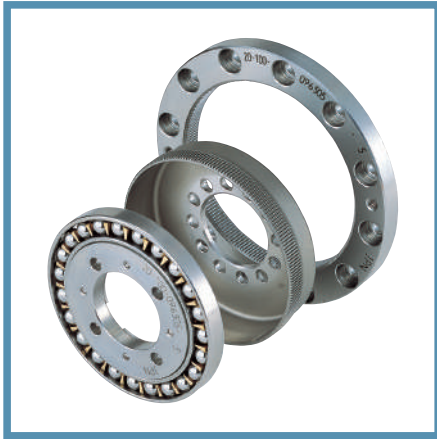
精密控制用減速機
HarmonicDrive®
綜合型錄

Reducer for Precision Control
General Catalog of
HarmonicDrive®

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

CSD 系列 CSD Series



HarmonicDrive® CSD 系列為了回應市場需求，大膽採取了精巧的設計。
為可組裝進設備的元件型產品，備有系列產品共 7 個型號。
另外，亦備有易於組裝的模組（15 頁）。

In response to market needs, we have considerably downsized the products in our HarmonicDrive® CSD Series. Seven compact component-type models for mounting on devices have been added to the series.
Units that are easy to mount are also available. (See page 15.)

- 超薄型形狀
- 中空結構
- 高定位精度

- Super thin
- Hollow structure
- High positioning precision

壽命：7,000 小時 Life:7,000h

CSD 系列額定表 CSD Series Ratings

項目 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的額定轉矩 Rated Torque at 2000r/min		起動、停止時的容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
14	50	3.7	0.38	12	1.2	24	2.4
	80	5.4	0.55	16	1.6	31	3.2
	100	5.4	0.55	19	1.9	31	3.2
17	50	11	1.1	23	2.3	48	4.9
	80	15	1.5	29	3.0	55	5.6
	100	16	1.6	37	3.8	55	5.6
	120	16	1.6	37	3.8	55	5.6
20	50	17	1.7	39	4.0	69	7.0
	80	24	2.4	51	5.2	76(65)	7.7(6.6)
	100	28	2.9	57	5.8	76(65)	7.7(6.6)
	120	28	2.9	60	6.1	76(65)	7.7(6.6)
	160	28	2.9	64	6.5	76(65)	7.7(6.6)
25	50	27	2.8	69	7.0	127	13
	80	44	4.5	96	9.8	152(135)	15(14)
	100	47	4.8	110	11	152(135)	15(14)
	120	47	4.8	117	12	152(135)	15(14)
	160	47	4.8	123	13	152(135)	15(14)
32	50	53	5.4	151	15	268	27
	80	83	8.5	213	22	359(331)	37(34)
	100	96	9.8	233	24	359(331)	37(34)
	120	96	9.8	247	25	359(331)	37(34)
	160	96	9.8	261	27	359(331)	37(34)
40	50	96	9.8	281	29	480	49
	80	144	15	364	37	685(580)	70(59)
	100	185	19	398	41	694(580)	71(59)
	120	205	21	432	44	694(580)	71(59)
	160	206	21	453	46	694(580)	71(59)
50	50	172	18	500	51	1000	102
	80	260	27	659	67	1300	133
	100	329	34	686	70	1440(1315)	147(134)
	120	370	38	756	77	1441	147(134)
	160	370	38	823	84	1577(1315)	161(134)

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人

- Robots
- Humanoid robots

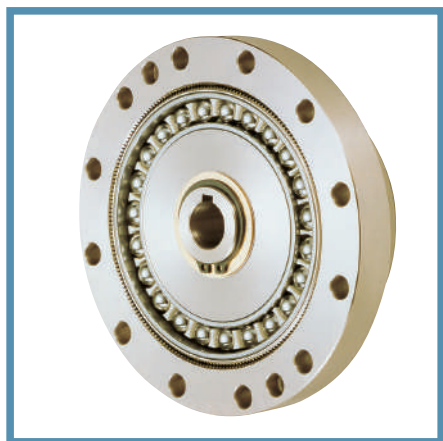
精密控制用減速機
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CSF 系列 CSF Series



為了節省空間，軸向長度較舊機型減少約 1/2。
另外，亦備有易於組裝的模組（16 頁）。

In order to reduce the size of the products in this series, axial length has been reduced to about one half compared to the previous series.

Units that are easy to mount are also available. (See page 16.)

- | | |
|----------------|--|
| ■ 體積精巧 | ■ Compact |
| ■ 高轉矩容量 | ■ High torque capacity |
| ■ 高剛性 | ■ High stiffness |
| ■ 無背隙 | ■ Non-backlash |
| ■ 優異的定位精度及旋轉精度 | ■ High positioning and rotational accuracy |
| ■ 輸出輸入軸位於同軸 | ■ Coaxial input and output |

壽命：7,000 小時 Life:7,000h

CSF 系列額定表 CSF Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
8	30	0.9	0.09	1.8	0.18	3.3	0.34
	50	1.8	0.18	3.3	0.34	6.6	0.67
	100	2.4	0.25	4.8	0.49	9.0	0.92
11	30	2.2	0.22	4.5	0.46	8.5	0.87
	50	3.5	0.36	8.3	0.85	17	1.7
	100	5.0	0.51	11	1.1	25	2.6
14	30	4.0	0.41	9.0	0.92	17	1.7
	50	5.4	0.55	18	1.8	35	3.6
	80	7.8	0.8	23	2.4	47	4.8
17	100	7.8	0.8	28	2.9	54	5.5
20	30	8.8	0.9	16	1.6	30	3.1
	50	16	1.6	34	3.5	70	7.1
	80	22	2.2	43	4.4	87	8.9
25	100	24	2.4	54	5.5	108	11
	120	24	2.4	54	5.5	86	8.8
32	30	15	1.5	27	2.8	50	5.1
	50	25	2.5	56	5.7	98	10
	80	34	3.5	74	7.5	127	13
40	100	40	4.1	82	8.4	147	15
	120	40	4.1	87	8.9	147	15
	160	40	4.1	92	9.4	147	15
50	30	27	2.8	50	5.1	95	9.7
	50	39	4.0	98	10	186	19
	80	63	6.4	137	14	255	26
65	100	67	6.8	157	16	284	29
	120	67	6.8	167	17	304	31
	160	67	6.8	176	18	314	32
80	30	54	5.5	100	10	200	20
	50	76	7.8	216	22	382	39
	80	118	12	304	31	568	58
100	100	137	14	333	34	647	66
	120	137	14	353	36	686	70
	160	137	14	372	38	686	70
125	50	137	14	402	41	686	70
	80	206	21	519	53	980	100
	100	265	27	568	58	1080	110
160	120	294	30	617	63	1180	120
	160	294	30	647	66	1180	120

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
45	50	176	18	500	51	950	97
	80	313	32	706	72	1270	130
	100	353	36	755	77	1570	160
50	120	402	41	823	84	1760	180
	160	402	41	882	90	1910	195
58	50	245	25	715	73	1430	146
	80	372	38	941	96	1860	190
	100	470	48	980	100	2060	210
65	120	529	54	1080	110	2060	210
	160	529	54	1180	120	2450	250
75	50	353	36	1020	104	1960	200
	80	549	56	1480	151	2450	250
	100	696	71	1590	162	3180	325
85	120	745	76	1720	176	3330	340
	160	745	76	1840	188	3430	350
100	50	490	50	1420	145	2830	289
	80	745	76	2110	215	3720	380
	100	951	97	2300	235	4750	485
125	120	951	97	2510	256	4750	485
	160	951	97	2630	268	4750	485
160	50	872	89	2440	249	4870	497
	80	1320	135	3430	350	6590	672
	100	1700	173	4220	431	7910	807
200	120	1990	203	4590	468	7910	807
	160	1990	203	4910	501	7910	807
250	50	1180	120	3530	360	6660	680
	80	1550	158	3990	407	7250	740
	100	2270	232	5680	580	9020	920
315	120	2570	262	6160	629	9800	1000
	160	2700	276	6840	698	11300	1150
400	50	1580	161	4450	454	8900	908
	80	2380	243	6060	618	11600	1180
	100	2940	300	7350	750	14100	1440
500	120	3180	324	7960	812	15300	1560
	160	3550	362	9180	937	15500	1580

主要採用市場

Main adoption markets

- | | |
|---|--|
| <ul style="list-style-type: none"> ● 機械手臂 ● 人形機器人 ● 金屬工具機 ● 印刷、裝訂、紙工機械 ● 半導體製造設備 ● 測量、分析、測試設備 ● 醫療機械 ● 光學相關設備 ● 望遠鏡 ● 木材、輕金屬、塑膠加工機械 ● 能源相關 ● 製紙機械 | <ul style="list-style-type: none"> ● Robots ● Humanoid robots ● Metal machine tools ● Printing, bookbinding and paper processing machines ● Semiconductor manufacturing systems ● Measurement, analytical and test systems ● Medical equipment ● Optical machines ● Telescopes ● Wood, light metal and plastic working machines ● Energy ● Paper-making machines |
|---|--|

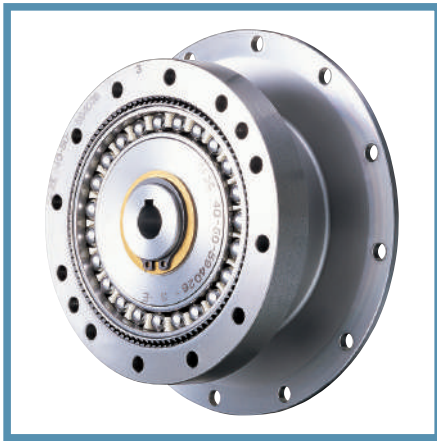
精密控制用減速機
HarmonicDrive®
綜合型錄

Reducer for Precision Control
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For more details, please refer to the separate catalog shown above.

SHG 系列 SHG Series



追求高負載容量、高可靠性，轉矩容量較 SHF 系列提升了 30%。
另外，亦備有易於組裝的模組（17 頁）。

To realize a high load capacity and high reliability, the torque capacity of this series has been increased by 30% compared to the SHF series.

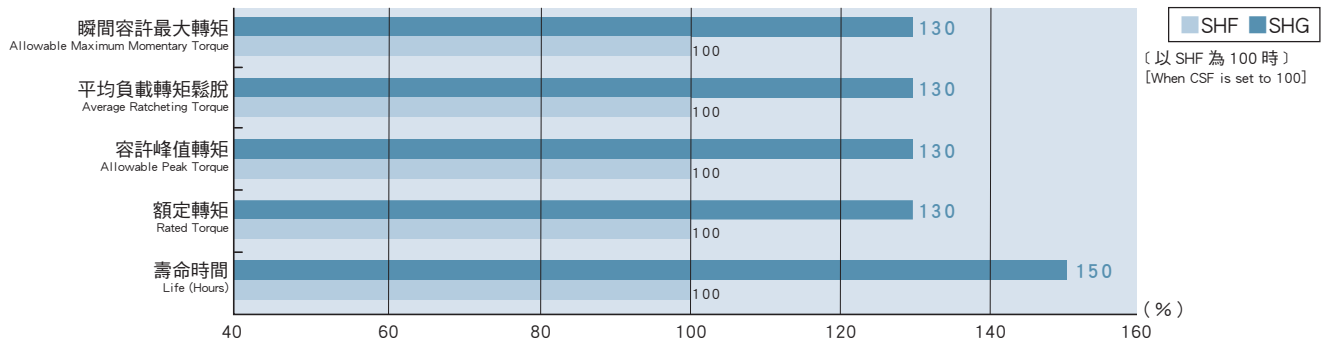
Units that are easy to mount are also available. (See page 17.)

- | | |
|--|---|
| <ul style="list-style-type: none"> ■ 大口徑中空孔、薄型 ■ 無背隙 ■ 優異的定位精度及旋轉精度 ■ 輸出輸入軸位於同軸 ■ 設計輕巧、簡單 ■ 高轉矩容量 ■ 高剛性 | <ul style="list-style-type: none"> ■ Large bore with hollow hole, flat shape ■ Non-backlash ■ Excellent positioning and rotational accuracies ■ Coaxial input and output shaft ■ Compact and simple design ■ High torque capacity ■ High stiffness |
|--|---|

壽命：10,000 小時 Life:10,000h

■ 特徵比較 高轉矩 HarmonicDrive® SHG 系列 vs SHF 系列

Feature Comparison: High Torque HarmonicDrive® SHG Series vs. SHF Series



■ SHG 系列額定表 SHG Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
14	50	7.0	0.7	23	2.3	46	4.7
	80	10	1.0	30	3.1	61	6.2
	100	10	1.0	36	3.7	70	7.2
17	50	21	2.1	44	4.5	91	9.0
	80	29	2.9	56	5.7	113	12
	100	31	3.2	70	7.2	143	15
20	120	31	3.2	70	7.2	112	11
	50	33	3.3	73	7.4	127	13
	80	44	4.5	96	9.8	165	17
	100	52	5.3	107	10.9	191	20
	120	52	5.3	113	11.5	191	20
25	160	52	5.3	120	12.2	191	20
	50	51	5.2	127	13	242	25
	80	82	8.4	178	18	332	34
	100	87	8.9	204	21	369	38
	120	87	8.9	217	22	395	40
32	160	87	8.9	229	23	408	42
	50	99	10	281	29	497	51
	80	153	16	395	40	738	75
	100	178	18	433	44	841	86
	120	178	18	459	47	892	91
	160	178	18	484	49	892	91

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
40	50	178	18	523	53	892	91
	80	268	27	675	69	1270	130
	100	345	35	738	75	1400	143
	120	382	39	802	82	1530	156
45	160	382	39	841	86	1530	156
	50	229	23	650	66	1235	126
	80	407	41	918	94	1651	168
	100	459	47	982	100	2041	208
50	120	523	53	1070	109	2288	233
	160	523	53	1147	117	2483	253
	80	484	49	1223	125	2418	247
	100	611	62	1274	130	2678	273
58	120	688	70	1404	143	2678	273
	160	688	70	1534	156	3185	325
	80	714	73	1924	196	3185	325
	100	905	92	2067	211	4134	422
65	120	969	99	2236	228	4329	441
	160	969	99	2392	244	4459	455
	80	969	99	2743	280	4836	493
	100	1236	126	2990	305	6175	630
	120	1236	126	3263	333	6175	630
	160	1236	126	3419	349	6175	630

主要採用市場

Main adoption markets

- | | |
|---|--|
| <ul style="list-style-type: none"> ● 機械手臂 ● 人形機器人 ● 金屬工具機 ● 金屬加工機械 ● 印刷、裝訂、紙工機械 ● 木材、輕金屬、塑膠加工機械 ● 印刷電路製造設備 | <ul style="list-style-type: none"> ● Robots ● Humanoid robots ● Metal machine tools ● Metal working machines ● Printing, bookbinding and paper processing machines ● Wood, light metal and plastic machine tools ● Printed circuit board manufacturing machines |
|---|--|

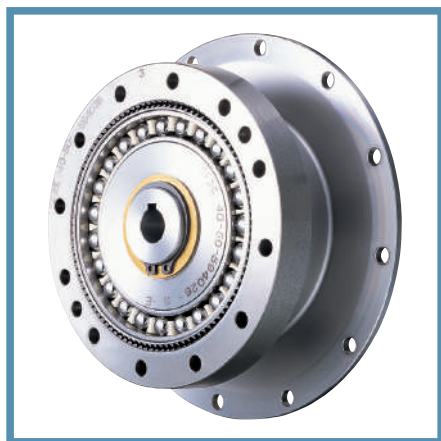
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For more details, please refer to the separate catalog shown above.

SHF 系列 SHF Series



大口徑中空孔的薄型設計不僅節省機器、設備的放置空間，並且節省總成本。另外，亦備有易於組裝的模組（18 頁）。

To minimize the space used by machines and systems and to offer an overall reduction in cost, the SHF series features a large bore with hollow hole and flat shape. Units that can be easily mounted are also available. (See page 18.)

- 大口徑中空孔、薄型
- 設計輕巧、簡單
- 無背隙
- 高轉矩容量
- 優異的定位精度及旋轉精度
- 高剛性
- 輸出輸入軸位於同軸
- Large bore with hollow hole, flat shape
- Compact and simple design
- Non-backlash
- High torque capacity
- High positioning and rotational accuracy
- High stiffness
- Coaxial input and output shaft

壽命：7,000 小時 Life:7,000h

SHF 系列額定表 SHF Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
14	30	4.0	0.41	9.0	0.92	17	1.7
	50	5.4	0.55	18	1.8	35	3.6
	80	7.8	0.8	23	2.4	47	4.8
	100	7.8	0.8	28	2.9	54	5.5
17	30	8.8	0.9	16	1.6	30	3.1
	50	16	1.6	34	3.5	70	7.1
	80	22	2.2	43	4.4	87	8.9
	100	24	2.4	54	5.5	110	11
20	120	24	2.4	54	5.5	86	8.8
	30	15	1.5	27	2.8	50	5.1
	50	25	2.5	56	5.7	98	10
	80	34	3.5	74	7.5	127	13
	100	40	4.1	82	8.4	147	15
	120	40	4.1	87	8.9	147	15
25	160	40	4.1	92	9.4	147	15
	30	27	2.8	50	5.1	95	9.7
	50	39	4.0	98	10	186	19
	80	63	6.4	137	14	255	26
	100	67	6.8	157	16	284	29
	120	67	6.8	167	17	304	31
32	160	67	6.8	176	18	314	32
	30	54	5.5	100	10	200	20
	50	76	7.8	216	22	382	39
	80	118	12	304	31	568	58
	100	137	14	333	34	647	66
	120	137	14	353	36	686	70
32	160	137	14	372	38	686	70

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
40	50	137	14	402	41	686	70
	80	206	21	519	53	980	100
	100	265	27	568	58	1080	110
	120	294	30	617	63	1180	120
	160	294	30	647	66	1180	120
45	50	176	18	500	51	950	97
	80	313	32	706	72	1270	130
	100	353	36	755	77	1570	160
	120	402	41	823	84	1760	180
	160	402	41	882	90	1910	195
50	50	245	25	715	73	1430	146
	80	372	38	941	96	1860	190
	100	470	48	980	100	2060	210
	120	529	54	1080	110	2060	210
	160	529	54	1180	120	2450	250
58	50	353	36	1020	104	1960	200
	80	549	56	1480	151	2450	250
	100	696	71	1590	162	3180	325
	120	745	76	1720	176	3330	340
	160	745	76	1840	188	3430	350

主要採用市場

Main adoption markets

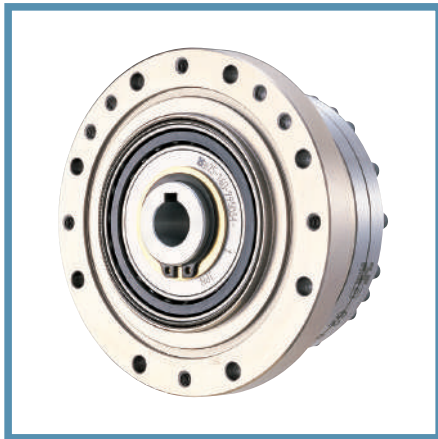
- 機械手臂
- 人形機器人
- 金屬工具機
- 金屬加工機械
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械
- Robots
- Humanoid robots
- Metal machine tools
- Metal working machines
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines

精密控制用減速機
HarmonicDrive®
綜合型錄Reducer for Precision Control
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For more details, please refer to the separate catalog shown above.

CSG 系列 CSG Series



追求高負載容量、高可靠性，轉矩容量較 CSF 系列提升了 30%。
CSG 系列產品新增輕量型。（質量較標準品輕 30%）

To realize a high load capacity and high reliability, the torque capacity has been increased by 30% compared to the CSF series.

A lightweight type has been added to the CSG series lineup. (Compared with the previous type, weight has been reduced by 30%)

- 高轉矩容量
- 高剛性
- 設計輕巧、簡單
- 無背隙
- 優異的定位精度及旋轉精度
- 輸出輸入軸位於同軸
- 輕量
- High torque capacity
- High stiffness
- Compact and simple design
- Non-backlash
- High positioning and rotational accuracies
- Coaxial input and output
- Light Weight

壽命：10,000 小時 Life:10,000h

CSG 系列額定表 CSG Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
14	50	7.0	0.7	23	2.3	46	4.7
	80	10	1.0	30	3.1	61	6.2
	100	10	1.0	36	3.7	70	7.2
17	50	21	2.1	44	4.5	91	9.0
	80	29	2.9	56	5.7	113	12
	100	31	3.2	70	7.2	143	15
20	50	33	3.3	73	7.4	127	13
	80	44	4.5	96	9.8	165	17
	100	52	5.3	107	10.9	191	20
25	50	51	5.2	127	13	242	25
	80	82	8.4	178	18	332	34
	100	87	8.9	204	21	369	38
32	50	99	10	281	29	497	51
	80	153	16	395	40	738	75
	100	178	18	433	44	841	86
40	50	178	18	459	47	842	86
	80	268	27	675	69	1270	130
	100	345	35	738	75	1400	143
45	50	229	23	650	66	1235	126
	80	407	41	918	94	1651	168
	100	459	47	982	100	2041	208
50	50	523	53	1070	109	2288	233
	80	484	49	1223	125	2418	247
	100	611	62	1274	130	2678	273
58	50	688	70	1404	143	2678	273
	80	714	73	1924	196	3185	325
	100	905	92	2067	211	4134	422
65	50	969	99	2236	228	4329	441
	80	969	99	2743	280	4836	493
	100	1236	126	2990	305	6175	630
120	50	1236	126	3263	333	6175	630
	80	1236	126	3419	349	6175	630
	100	1236	126	3419	349	6175	630

主軸承規格 Main Bearing Specifications

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load				容許力矩負載 Mc		力矩剛性 Km	
	基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co		Allowable Moment Load Mc		Moment Stiffness Km	
	× 10 ² N	kgf	× 10 ² N	kgf	N-m	kgf-m	× 10 ⁴ N-m/rad	kgf-m/arc-min
14	47	480	60.7	620	41 (33.6)	4.2 (3.4)	4.38 (3.6)	1.3 (1.1)
17	52.9	540	75.5	770	64 (52.5)	6.5 (5.3)	7.75 (6.4)	2.3 (1.9)
20	57.8	590	90	920	91 (74.6)	9.3 (7.6)	12.8 (10.5)	3.8 (3.1)
25	96	980	151	1540	156 (128)	16 (13.1)	24.2 (19.8)	7.2 (5.9)
32	150	1530	250	2550	313 (257)	32 (26.2)	53.9 (44.2)	16 (13.1)
40	213	2170	365	3720	450 (369)	46 (37.7)	91 (74.6)	27 (22.1)
45	230	2350	426	4340	686 (563)	70 (57.4)	141 (116)	42 (34.4)
50	348	3550	602	6140	759 (622)	77 (63.5)	171 (140)	51 (48.5)
58	518	5290	904	9230	1180 (838)	120 (85.4)	283 (201)	84 (59.6)
65	556	5670	1030	10500	1860 (1525)	190 (156)	404 (331)	120 (108)

- ※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。
基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。
※ 力矩剛性的值為平均值。
※ （ ）內的數值為 CSG 系列輕量型的數值。
※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated bearing life of one million revolutions.
※ "Basic static rated load" is a static load that applies a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and a track.
※ The moment stiffnesses are mean values.
※ The values in brackets are the values of the Lightweight Type of the CSG Series.

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 木材、輕金屬、塑膠加工機械
- 印刷電路製造設備
- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Wood, light metal and plastic machine tools
- Printed circuit board manufacturing machines



精密控制用減速機
HarmonicDrive®
綜合型錄

Reducer for Precision Control
General Catalog of
HarmonicDrive®

詳細內容請參閱本型錄。
For more details, please refer to the separate catalog shown above.

CSG 系列 CSG Series



採用密封結構，是一款容易設計又使用簡便的產品。

建議運用在工具機及一般工業機械的工件運送和驅動工具庫等各機構部位。

This product provides ease of designing and handling by incorporating a sealed structure.

Consider the use of this series for mechanical sections such as the work conveyers and magazine drivers of machine tools, or in general industrial machines.

- | | |
|--|---|
| <ul style="list-style-type: none"> ■ 高轉矩容量 ■ 高剛性 ■ 設計輕巧、簡單 ■ 無背隙 ■ 優異的定位精度及旋轉精度 ■ 密封結構 | <ul style="list-style-type: none"> ■ High torque capacity ■ High stiffness ■ Compact and simple design ■ Non-backlash ■ High positioning and rotational accuracies ■ Sealed structure |
|--|---|

壽命：10,000 小時 Life:10,000h

CSG 系列額定表 CSG Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
25	50	51	5.2	127	13	242	25
	80	82	8.4	178	18	332	34
	100	87	8.9	204	21	369	38
	120	87	8.9	217	22	382	39
	160	87	8.9	229	23	382	39
32	50	99	10	281	29	497	51
	80	153	16	395	40	738	75
	100	178	18	433	44	841	86
	120	178	18	459	47	842	86
	160	178	18	484	49	842	86
40	50	178	18	523	53	892	91
	80	268	27	675	69	1270	130
	100	345	35	738	75	1400	143
	120	382	39	802	82	1488	152
	160	382	39	841	86	1488	152

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
45	50	229	23	650	66	1235	126
	80	407	41	918	94	1651	168
	100	459	47	982	100	2041	208
	120	523	53	1070	109	2288	233
	160	523	53	1147	117	2483	253
58	80	714	73	1924	196	3185	325
	100	905	92	2067	211	4134	422
	120	969	99	2236	228	4329	441
	160	969	99	2392	244	4459	455
65	80	969	99	2743	280	4836	493
	100	1236	126	2990	305	6175	630
	120	1236	126	3263	333	6175	630
	160	1236	126	3419	349	6175	630

主軸承規格 Main Bearing Specifications

項目 Item 型 號 Model No.	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
	基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co					
	× 10 ³ N	kgf	× 10 ³ N	kgf	N·m	kgf·m	× 10 ⁴ N·m/rad	kgf·m/arc-min
25	96	980	151	1540	128	13.1	19.8	5.9
32	150	1530	250	2550	257	26.2	44.2	13.1
40	213	2170	365	3720	369	37.7	74.6	22.1
45	230	2350	426	4340	563	57.4	116	34.4
58	518	5290	904	9230	838	85.4	201	59.6
65	556	5670	1030	10500	1525	156	331	108

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。

基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。

※ 力矩剛性的值為平均值。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated bearing life of one million revolutions.

※ "Basic static rated load" is a static load that applies a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and a track.

※ The moment stiffnesses are mean values.

主要採用市場

Main adoption markets

- | | |
|---|--|
| <ul style="list-style-type: none"> ● 金屬工具機 ● 金屬加工機械 ● 包裝、捆包機械 ● 製紙機械 ● 木材、輕金屬、塑膠加工機械 | <ul style="list-style-type: none"> ● Metal machine tools ● Metal working machines ● Crating and packaging machines ● Paper-making machines ● Wood, light metal and plastic working machines |
|---|--|



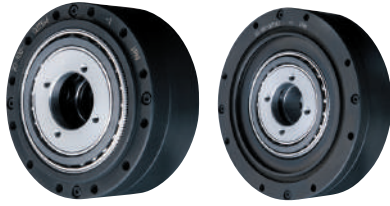
精密控制用減速機
HarmonicDrive®
綜合型錄

Reducer for Precision Control
General Catalog of
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詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

CSD 系列 CSD Series



CSD-2UH

CSD-2UF

HarmonicDrive® CSD 系列為了回應市場需求，大膽採取了精巧的設計。

CSD-2UH 的轉矩容量較相同等級的 CSF 系列更精巧。

CSD-2UF 為中空結構，和 SHD 系列同型號的產品相比，輸出端軸承的負載容量約為其 2 倍。

In response to market needs, we have considerably downsized the products in our HarmonicDrive® CSD Series.

The CSD-2UH is more compact than the CSF series of the equivalent torque capacity.

The CSD-2UF has a hollow structure with an output side bearing that has around twice the load capacity as large as the same model no. product from the SHD series.

- 超薄型形狀
- 中空結構
- 高定位精度
- 高負載容量

- Super thin
- Hollow structure
- High positioning precision
- High load capacity

壽命：7,000 小時 Life:7,000h

CSD 系列額定表 CSD Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的額定轉矩 Rated Torque at 2000r/min				起動、停止時的容許峰值轉矩 Allowable Peak Torque at Start and Stop				瞬間容許最大轉矩 Allowable Maximum Momentary Torque			
		N·m		kgf·m		N·m		kgf·m		N·m		kgf·m	
		CSD-2UH	CSD-2UF	CSD-2UH	CSD-2UF	CSD-2UH	CSD-2UF	CSD-2UH	CSD-2UF	CSD-2UH	CSD-2UF	CSD-2UH	CSD-2UF
14	50	3.7	3.7	0.38	0.38	12	12	1.2	1.2	24	24	2.4	2.4
	80	5.4	5.4	0.55	0.55	16	16	1.6	1.6	35	35	3.6	3.6
	100	5.4	5.4	0.55	0.55	19	19	1.9	1.9	35	35	3.6	3.6
17	50	11	11	1.1	1.1	23	23	2.3	2.3	48	48	4.9	4.9
	80	15	15	1.5	1.5	29	29	3.0	3.0	61	61	6.2	6.2
	100	16	16	1.6	1.6	37	37	3.8	3.8	71	71	7.2	7.2
	120	16	16	1.6	1.6	37	37	3.8	3.8	71	71	7.2	7.2
20	50	17	17	1.7	1.7	39	39	4.0	4.0	69	69	7.0	7.0
	80	24	24	2.4	2.4	51	51	5.2	5.2	89	89	9.1	9.1
	100	28	28	2.9	2.9	57	57	5.8	5.8	95	95	9.7	9.7
	120	28	28	2.9	2.9	60	60	6.1	6.1	95	95	9.7	9.7
	160	28	28	2.9	2.9	64	64	6.5	6.5	95	95	9.7	9.7
25	50	27	27	2.8	2.8	69	69	7.0	7.0	127	127	13	13
	80	44	44	4.5	4.5	96	96	9.8	9.8	179	179	18	18
	100	47	47	4.8	4.8	110	110	11	11	184	184	19	19
	120	47	47	4.8	4.8	117	117	12	12	204	204	21	21
	160	47	47	4.8	4.8	123	123	13	13	204	204	21	21
32	50	53	53	5.4	5.4	151	151	15	15	268	268	27	27
	80	83	83	8.5	8.5	213	213	22	22	398	398	41	41
	100	96	96	9.8	9.8	233	233	24	24	420	420	43	43
	120	96	96	9.8	9.8	247	247	25	25	445	445	45	45
40	160	96	96	9.8	9.8	261	261	27	27	445	445	45	45
	50	96	96	9.8	9.8	281	281	29	29	480	480	49	49
	80	144	144	15	15	364	364	37	37	686	686	70	70
	100	185	185	19	19	398	398	41	41	700	700	71	71
	120	205	205	21	21	432	432	44	44	765	765	78	78
50	160	206	206	21	21	453	453	46	46	765	765	78	78
	50	172	-	18	-	500	-	51	-	1000	-	102	-
	80	260	-	27	-	659	-	67	-	1300	-	133	-
	100	329	-	34	-	686	-	70	-	1440	-	147	-
	120	370	-	38	-	756	-	77	-	1565	-	160	-
50	160	370	-	38	-	823	-	84	-	1715	-	175	-

主軸承規格 Main Bearing Specifications

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load								容許力矩負載 Mc Allowable Moment Load Mc				力矩剛性 Km Moment Stiffness Km			
	基本動額定負載 C Basic Dynamic Rated Load C				基本靜額定負載 Co Basic Static Rated Load Co				N·m		kgf·m		×10 ⁴ N·m/rad		kgf·m/arc-min	
	×10 ⁴ N	kgf	×10 ⁴ N	kgf	×10 ⁴ N	kgf	×10 ⁴ N	kgf	CSD-2UH	CSD-2UF	CSD-2UH	CSD-2UF	CSD-2UH	CSD-2UF	CSD-2UH	CSD-2UF
14	47	57.8	480	590	60.7	90	620	920	41	91	4.2	9.3	4.38	12.8	1.3	3.8
17	52.9	104	540	1060	75.5	163	770	1670	64	124	6.5	12.6	7.75	15.4	2.3	4.6
20	57.8	146	590	1490	90	220	920	2250	91	187	9.3	19.1	12.8	25.2	3.8	7.5
25	96	218	980	2230	151	358	1540	3660	156	258	16	26.3	24.2	39.2	7.2	11.6
32	150	382	1530	3900	250	654	2550	6680	313	580	32	59.1	53.9	100	16	29.6
40	213	433	2170	4410	365	816	3720	8330	450	849	46	86.6	91	179	27	53.2
50	348	-	3550	-	602	-	6140	-	759	-	77	-	171	-	51	-

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。

基本靜額定負載是指在承受最大負載的轉動軌道與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated bearing life of one million revolutions.

"Basic static rated load" is a static load that applies a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and a track.

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 木材、輕金屬、塑膠加工機械
- 印刷電路製造設備
- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Wood, light metal and plastic working machines
- Printed circuit board manufacturing machines



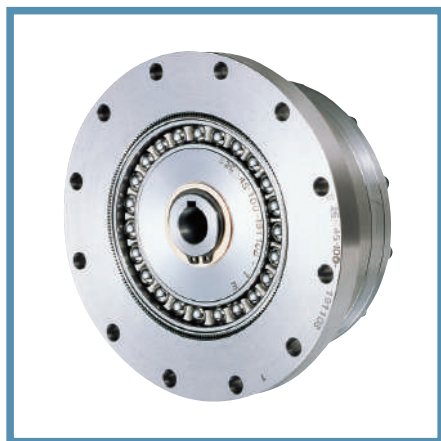
精密控制用減速機
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Reducer for Precision Control
General Catalog of
HarmonicDrive®

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

CSF 系列 CSF Series



為了節省空間，軸向長度減少約 1/2。

CSF 系列產品新增輕量型。（質量較標準品輕約 30%）

In order to reduce the size of the products in this series, the axial length has been reduced to about one half.
A lightweight type has been added to the CSF series lineup.

(Weight reduced about 30% compared with standard products)

- 設計輕巧、簡單
- 高轉矩容量
- 高剛性
- 無背隙
- 優異的定位精度及旋轉精度
- 輸出輸入軸位於同軸
- 輕量

- Compact and simple design
- High torque capacity
- High stiffness
- Non-backlash
- High positioning and rotational accuracies
- Coaxial input and output
- Light Weight

壽命：7,000 小時 Life:7,000h

CSF 系列額定表 CSF Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
14	30	4.0	0.41	9.0	0.92	17	1.7
	50	5.4	0.55	18	1.8	35	3.6
	80	7.8	0.8	23	2.4	47	4.8
	100	7.8	0.8	28	2.9	54	5.5
17	30	8.8	0.9	16	1.6	30	3.1
	50	16	1.6	34	3.5	70	7.1
	80	22	2.2	43	4.4	87	8.9
	100	24	2.4	54	5.5	108	11
20	120	24	2.4	54	5.5	86	8.8
	30	15	1.5	27	2.8	50	5.1
	50	25	2.5	56	5.7	98	10
	80	34	3.5	74	7.5	127	13
25	100	40	4.1	82	8.4	147	15
	120	40	4.1	87	8.9	147	15
	160	40	4.1	92	9.4	147	15
	30	27	2.8	50	5.1	95	9.7
32	50	39	4.0	98	10	186	19
	80	63	6.4	137	14	255	26
	100	67	6.8	157	16	284	29
	120	67	6.8	167	17	304	31
40	160	67	6.8	176	18	314	32
	30	54	5.5	100	10	200	20
	50	76	7.8	216	22	382	39
	80	118	12	304	31	568	58
50	100	137	14	333	34	647	66
	120	137	14	353	36	686	70
	160	137	14	372	38	686	70

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
40	50	137	14	402	41	686	70
	80	206	21	519	53	980	100
	100	265	27	568	58	1080	110
	120	294	30	617	63	1180	120
45	160	294	30	647	66	1180	120
	50	176	18	500	51	950	97
	80	313	32	706	72	1270	130
	100	353	36	755	77	1570	160
50	120	402	41	823	84	1760	180
	160	402	41	882	90	1910	195
	50	122	12	715	73	1430	146
	80	372	38	941	96	1860	190
58	100	470	48	980	100	2060	210
	120	529	54	1080	110	2060	210
	160	529	54	1180	120	2450	250
	50	176	18	1020	104	1960	200
65	80	549	56	1480	151	2450	250
	100	696	71	1590	162	3180	325
	120	745	76	1720	176	3330	340
	160	745	76	1840	188	3430	350
65	50	245	25	1420	145	2830	289
	80	745	76	2110	215	3720	380
	100	951	97	2300	235	4750	485
	120	951	97	2510	256	4750	485
65	160	951	97	2630	268	4750	485

主軸承規格 Main Bearing Specifications

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
	基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co					
	×10 ⁴ N	kgf	×10 ⁴ N	kgf	N-m	kgf-m	×10 ⁴ N-m/rad	kgf-m/arc-min
14	47	480	60.7	620	41 (33.6)	4.2 (3.4)	4.38 (3.6)	1.3 (1.1)
17	52.9	540	75.5	770	64 (52.5)	6.5 (5.3)	7.75 (6.4)	2.3 (1.9)
20	57.8	590	90	920	91 (74.6)	9.3 (7.6)	12.8 (10.5)	3.8 (3.1)
25	96	980	151	1540	156 (128)	16 (13.1)	24.2 (19.8)	7.2 (5.9)
32	150	1530	250	2550	313 (257)	32 (26.2)	53.9 (44.2)	16 (13.1)
40	213	2170	365	3720	450 (369)	46 (37.7)	91 (74.6)	27 (22.1)
45	230	2350	426	4340	686 (563)	70 (57.4)	141 (116)	42 (34.4)
50	348	3550	602	6140	759 (622)	77 (63.5)	171 (140)	51 (48.5)
58	518	5290	904	9230	1180 (838)	120 (85.4)	283 (201)	84 (59.6)
65	556	5670	1030	10500	1860 (1525)	190 (156)	404 (331)	120 (108)

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。

基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。

※ 力矩剛性的值為平均值。

※ () 內的數值為 CSF 系列輕量型的數值。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated bearing life of one million revolutions.

※ "Basic static rated load" is a static load that applies a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and a track.

※ The moment stiffnesses are mean values.

※ The values in brackets are the values of the Lightweight Type of the CSF Series.

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 能源相關
- 製紙機械

- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic working machines
- Energy
- Paper-making machines



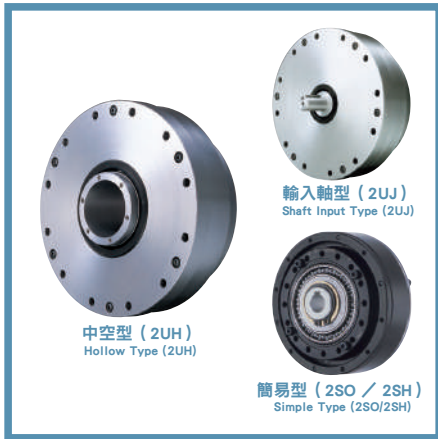
精密控制用減速機
HarmonicDrive®
綜合型錄

Reducer for Precision Control
General Catalog of
HarmonicDrive®

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

SHG 系列 SHG Series



追求高負載容量、高可靠性，轉矩容量較 SHF 系列提升了 30%。
SHG 系列產品新增輕量型。（質量較標準品輕 20%）

To realize a high load capacity and high reliability, the torque capacity of this series has been increased by 30% compared to the SHF series.

A lightweight type has been added to the SHG series lineup. (Compared with the previous type, weight has been reduced by 20%)

- 大口徑中空孔、薄型
- 無背隙
- 優異的定位精度及旋轉精度
- 輸出輸入軸位於同軸
- 設計輕巧、簡單
- 高轉矩容量
- 高剛性
- 輕量
- Large bore with hollow hole, flat shape
- Non-backlash
- Excellent positioning and rotational accuracies
- Coaxial input and output shaft
- Compact and simple design
- High torque capacity
- High stiffness
- Light Weight

壽命：10,000 小時 Life:10,000h

SHG 系列額定表 SHG Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
14	50	7.0	0.7	23	2.3	46	4.7
	80	10	1.0	30	3.1	61	6.2
	100	10	1.0	36	3.7	70	7.2
17	50	21	2.1	44	4.5	91	9.0
	80	29	2.9	56	5.7	113	12
	100	31	3.2	70	7.2	143	15
20	120	31	3.2	70	7.2	112	11
	50	33	3.3	73	7.4	127	13
	80	44	4.5	96	9.8	165	17
	100	52	5.3	107	10.9	191	20
25	120	52	5.3	113	11.5	191	20
	160	52	5.3	120	12.2	191	20
	50	51	5.2	127	13	242	25
	80	82	8.4	178	18	332	34
32	100	87	8.9	204	21	369	38
	120	87	8.9	217	22	395	40
	160	87	8.9	229	23	408	42
	50	99	10	281	29	497	51
40	80	153	16	395	40	738	75
	100	178	18	433	44	841	86
	120	178	18	459	47	892	91
	160	178	18	484	49	892	91

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
40	50	178	18	523	53	892	91
	80	268	27	675	69	1270	130
	100	345	35	738	75	1400	143
	120	382	39	802	82	1530	156
45	160	382	39	841	86	1530	156
	50	229	23	650	66	1235	126
	80	407	41	918	94	1651	168
	100	459	47	982	100	2041	208
50	120	523	53	1070	109	2288	233
	160	523	53	1147	117	2483	253
	80	484	49	1223	125	2418	247
	100	611	62	1274	130	2678	273
58	120	688	70	1404	143	2678	273
	160	688	70	1534	156	3185	325
	80	714	73	1924	196	3185	325
	100	905	92	2067	211	4134	422
65	120	969	99	2236	228	4329	441
	160	969	99	2392	244	4459	455
	80	969	99	2743	280	4836	493
	100	1236	126	2990	305	6175	630
65	120	1236	126	3263	333	6175	630
	160	1236	126	3419	349	6175	630

主軸承規格 Main Bearing Specifications

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
	基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co					
	×10 ³ N	kgf	×10 ³ N	kgf	N-m	kgf-m	×10 ⁴ N-m/rad	kgf-m/arc-min
14	58	590	86	880	74	7.6	8.5	2.5
17	104	1060	163	1670	124	12.6	15.4	4.6
20	146	1490	220	2250	187	19.1	25.2	7.5
25	218	2230	358	3660	258	26.3	39.2	11.6
32	382	3900	654	6680	580	59.1	100	29.6
40	433	4410	816	8330	849	86.6	179	53.2
45	776	7920	1350	13800	1127	115	257	76.3
50	816	8330	1490	15300	1487	152	351	104
58	874	8920	1710	17500	2180	222	531	158
65	1300	13300	2230	22700	2740	280	741	220

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。

基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated bearing life of one million revolutions.

"Basic static rated load" is a static load that applies a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and a track.

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 金屬加工機械
- 印刷、裝訂、紙工機械
- 木材、輕金屬、塑膠加工機械
- 印刷電路製造設備

- Robots
- Humanoid robots
- Metal machine tools
- Metal working machines
- Printing, bookbinding and paper processing machines
- Wood, light metal and plastic machine tools
- Printed circuit board manufacturing machines



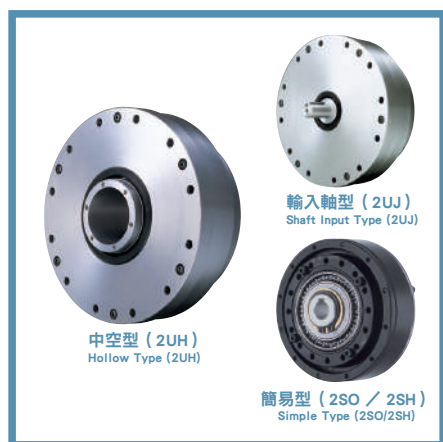
精密控制用減速機
HarmonicDrive®
綜合型錄

Reducer for Precision Control
General Catalog of
HarmonicDrive®

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

SHF 系列 SHF Series



大口徑中空孔的薄型設計不僅節省機器、設備的放置空間，並且節省總成本。
SHF 系列產品新增輕量型。（質量較標準品輕 20%）

To minimize the space used by machines and systems and to offer an overall reduction in cost, the SHF series features a large bore with hollow hole and flat shape.

A lightweight type has been added to the SHF series lineup. (Compared with the previous type, weight has been reduced by 20%)

- 大口徑中空孔、薄型
- 無背隙
- 優異的定位精度及旋轉精度
- 輸出輸入軸位於同軸
- 設計輕巧、簡單
- 高轉矩容量
- 高剛性
- 輕量

- Large bore with hollow hole, flat shape
- Non-backlash
- High positioning and rotational accuracies
- Coaxial input and output
- Compact and simple design
- High torque capacity
- High stiffness
- Light Weight

壽命：7,000 小時 Life:7,000h

SHF 系列額定表 SHF Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
11	50	3.5	0.36	8.3	0.85	17	1.73
	100	5.0	0.51	11	1.12	25	2.55
14	30	4.0	0.41	9.0	0.92	17	1.7
	50	5.4	0.55	18	1.8	35	3.6
	80	7.8	0.8	23	2.4	47	4.8
17	100	7.8	0.8	28	2.9	54	5.5
	30	8.8	0.9	16	1.6	30	3.1
	50	16	1.6	34	3.5	70	7.1
	80	22	2.2	43	4.4	87	8.9
20	100	24	2.4	54	5.5	110	11
	120	24	2.4	54	5.5	86	8.8
	30	15	1.5	27	2.8	50	5.1
	50	25	2.5	56	5.7	98	10
	80	34	3.5	74	7.5	127	13
25	100	40	4.1	82	8.4	147	15
	120	40	4.1	87	8.9	147	15
	160	40	4.1	92	9.4	147	15
	30	27	2.8	50	5.1	95	9.7
25	50	39	4.0	98	10	186	19
	80	63	6.4	137	14	255	26
	100	67	6.8	157	16	284	29
	120	67	6.8	167	17	304	31
	160	67	6.8	176	18	314	32

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
32	30	54	5.5	100	10	200	20
	50	76	7.8	216	22	382	39
	80	118	12	304	31	568	58
	100	137	14	333	34	647	66
	120	137	14	353	36	686	70
	160	137	14	372	38	686	70
40	50	137	14	402	41	686	70
	80	206	21	519	53	980	100
	100	265	27	568	58	1080	110
	120	294	30	617	63	1180	120
	160	294	30	647	66	1180	120
45	50	176	18	500	51	950	97
	80	313	32	706	72	1270	130
	100	353	36	755	77	1570	160
	120	402	41	823	84	1760	180
	160	402	41	882	90	1910	195
50	50	245	25	715	73	1430	146
	80	372	38	941	96	1860	190
	100	470	48	980	100	2060	210
	120	529	54	1080	110	2060	210
	160	529	54	1180	120	2450	250
58	50	176	18	1020	104	1960	200
	80	549	56	1480	151	2450	250
	100	696	71	1590	162	3180	325
	120	745	76	1720	176	3330	340
	160	745	76	1840	188	3430	350

主軸承規格 Main Bearing Specifications

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
	基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co					
	× 10 ³ N	kgf	× 10 ³ N	kgf	N-m	kgf-m	× 10 ⁴ N-m/rad	kgf-m/arc-min
11	52.9	540	75.5	770	74	7.6	6.5	1.8
14	58	590	86	880	74	7.6	8.5	2.5
17	104	1060	163	1670	124	12.6	15.4	4.6
20	146	1490	220	2250	187	19.1	25.2	7.5
25	218	2230	358	3660	258	26.3	39.2	11.6
32	382	3900	654	6680	580	59.1	100	29.6
40	433	4410	816	8330	849	86.6	179	53.2
45	776	7920	1350	13800	1127	115	257	76.3
50	816	8330	1490	15300	1487	152	351	104
58	874	8920	1710	17500	2180	222	531	158

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。

基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated bearing life of one million revolutions.

"Basic static rated load" is a static load that applies a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and a track.

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 金屬加工機械
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械

- Robots
- Humanoid robots
- Metal machine tools
- Metal working machines
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines



精密控制用減速機
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For more details, please refer to the separate catalog shown above.

CSF supermini 系列 CSF supermini Series



致力追求節省空間，世界上最小的 HarmonicDrive®。
體積超小型，實現無背隙、高定位精度及旋轉精度。

We have created the world's smallest HarmonicDrive® component, in the pursuit of a more compact design.
The super small size of this series offers non-backlash, as well as high precision positioning and high rotational accuracy.

- 無背隙、高定位精度及旋轉精度
- 小型、輕量、高轉矩容量
- 高負載容量
- 主軸採用小型 4 點接觸滾珠軸承
- 減速比範圍廣、形狀可配合用途區分
- Non-backlash, high positioning and rotational accuracy
- Compact, lightweight, high torque capacity
- High load capacity
- Compact 4-point contact ball bearing mounted in main shaft
- Versatile reduction ratio range and shapes available to meet your needs

壽命：7,000 小時 Life:7,000h

CSF supermini 系列額定表 CSF supermini Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的額定轉矩 Rated Torque at 2000r/min	起動、停止時的容許峰值轉矩 Allowable Peak Torque at Start and Stop	瞬間容許最大轉矩 Allowable Maximum Momentary Torque
		N·m	N·m	N·m
3	30	0.06	0.13	0.22
	50	0.11	0.21	0.41
	100	0.15	0.3	0.57

4 點接觸滾珠軸承規格 4-point Contact Ball Bearing Specifications

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load		容許力矩負載 Mc Allowable Moment Load Mc	力矩剛性 Km Moment Stiffness Km
	基本動額定負載 C Basic Dynamic Rated Load C	基本靜額定負載 Co Basic Static Rated Load Co		
	× 10 ³ N	× 10 ³ N	N·m	N·m / rad
3	6.65	4.24	0.27	0.9 × 10 ²

主要採用市場

Main adoption markets

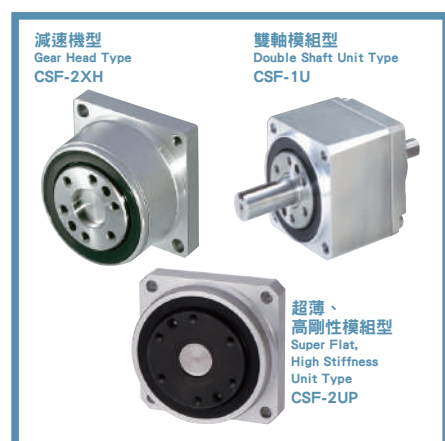
- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械
- 包裝、捆包機械
- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines



精密控制用減速機
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For more details, please refer to the separate catalog shown above.

CSF mini 系列 CSF mini Series



將 HarmonicDrive® 的小型型號加工為容易使用的模組化產品。
可選擇採用小型 4 點接觸滾珠軸承的 2XH、1U 型或採用交叉滾柱軸承的 2UP 型。

An integrated unit-type product that makes the compact HarmonicDrive® models easier to use.
Select either the 2XH type, which uses a compact 4-point contact ball bearing, or the 2UP type, which uses a cross roller bearing with the 1U type.

- 無背隙、高定位精度及旋轉精度
- 小型、輕量、高轉矩容量
- 高負載容量
- 減速比範圍廣、形狀可配合用途區分
- Non-backlash; offers high positioning and rotational accuracy
- Compact, lightweight, high torque capacity
- High load capacity
- Versatile reduction ratio range and shapes available to meet your needs

壽命：7,000 小時 Life:7,000h

CSF mini 系列額定表 CSF mini Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的額定轉矩 Rated Torque at 2000r/min	起動、停止時的容許峰值轉矩 Allowable Peak Torque at Start and Stop	瞬間容許最大轉矩 Allowable Maximum Momentary Torque
		N·m	N·m	N·m
5	30	0.25	0.5	0.9
	50	0.4	0.9	1.8
	100	0.6	1.4	2.7
8	30	0.9	1.8	3.3
	50	1.8	3.3	6.6
	100	2.4	4.8	9.0
11	30	2.2	4.5	8.5
	50	3.5	8.3	17
	100	5.0	11	25
14	30	4.0	9.0	17
	50	5.4	18	35
	80	7.8	23	47
	100	7.8	28	54

※ CSF-2UP 型僅型號 8 號、11 號、14 號。此外，型號 14 號不支援減速比 80。

※ Only model numbers 8, 11, and 14 are available for the CSF-2UP type. Model number 14 is not compatible with reduction ratio 80.

4 點接觸滾珠軸承規格 4-point Contact Ball Bearing Specifications

CSF-2XH / CSF-1U

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load		容許力矩負載 Mc Allowable Moment Load Mc	力矩剛性 Km Moment Stiffness Km
	基本動額定負載 C Basic Dynamic Rated Load C	基本靜額定負載 Co Basic Static Rated Load Co		
	× 10 ³ N	× 10 ³ N	N·m	N·m / rad
5	9.14	7.63	0.89	7.41 × 10 ²
8	21.6	19.0	3.46	2.76 × 10 ³
11	38.9	35.4	6.6	7.41 × 10 ³
14	61.2	58.5	13.2	1.34 × 10 ⁴

主軸承規格 Main Bearing Specifications

CSF-2UP

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load		容許力矩負載 Mc Allowable Moment Load Mc	力矩剛性 Km Moment Stiffness Km
	基本動額定負載 C Basic Dynamic Rated Load C	基本靜額定負載 Co Basic Static Rated Load Co		
	× 10 ³ N	× 10 ³ N	N·m	N·m / rad
8	58	80	15	2.0 × 10 ⁴
11	65	99	40	4.0 × 10 ⁴
14	74	128	75	8.0 × 10 ⁴

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械
- 包裝、捆包機械
- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines

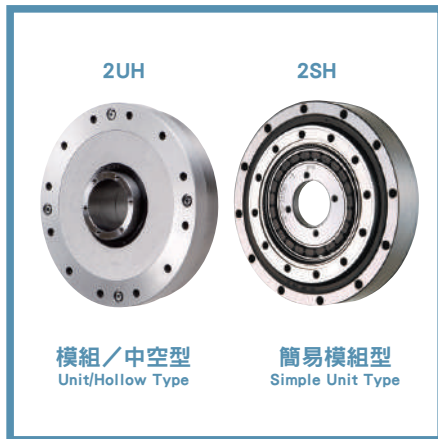


精密控制用減速機
HarmonicDrive®
綜合型錄

Reducer for Precision Control
General Catalog of
HarmonicDrive®

詳細內容請參閱本型錄。
For more details, please refer to the separate catalog shown above.

SHD 系列 SHD Series



簡易模組型在輸出端組裝力矩剛性高的交叉滾柱軸承，備有系列產品共 6 個型號。並且於陣容中新增了全模組型。

A simple unit type comprised of a cross roller bearing of high moment stiffness on the output side. Six models are available in the series.

A full unit type has been added to the lineup.

- 超薄型形狀 Super flat shape
- 中空結構 Hollow structure
- 高定位精度 High positioning precision
- 輕量 Light Weight
- 可選擇模組或簡易模組，讓設計更自由 Select between unit and single unit types for greater design flexibility

壽命：7,000 小時 Life:7,000h

SHD 系列額定表 SHD Series Ratings

項目 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的額定轉矩 Rated Torque at 2000r/min		起動、停止時的容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
14	50	3.7	0.38	12	1.2	23	2.3
	80	5.4	0.55	16	1.6	35	3.6
	100	5.4	0.55	19	1.9	35	3.6
17	50	11	1.1	23	2.3	48	4.9
	80	15	1.5	29	3.0	61	6.2
	100	16	1.6	37	3.8	71	7.2
	120	16	1.6	37	3.8	71	7.2
20	50	17	1.7	39	4.0	69	7.0
	80	24	2.4	51	5.2	89	9.1
	100	28	2.9	57	5.8	95	9.7
	120	28	2.9	60	6.1	95	9.7
	160	28	2.9	64	6.5	95	9.7
25	50	27	2.8	69	7.0	127	13
	80	44	4.5	96	9.8	179	18
	100	47	4.8	110	11	184	19
	120	47	4.8	117	12	204	21
	160	47	4.8	123	13	204	21
32	50	53	5.4	151	15	268	27
	80	83	8.5	213	22	398	41
	100	96	9.8	233	24	420	43
	120	96	9.8	247	25	445	45
	160	96	9.8	261	27	445	45
40	50	96	9.8	281	29	480	49
	80	144	15	364	37	686	70
	100	185	19	398	41	700	71
	120	205	21	432	44	765	78
	160	206	21	453	46	765	78

主軸承規格 Main Bearing Specifications

項目 Item 型 號 Model No.	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
	基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co					
	× 10 ³ N	kgf	× 10 ³ N	kgf	N·m	kgf·m	× 10 ³ N·m/rad	kgf·m/arc-min
14	29	296	43	438	37	3.8	7.08	2.1
17	52	530	81	826	62	6.3	12.7	3.8
20	73	744	110	1122	93	9.5	21	6.2
25	109	1111	179	1825	129	13.2	31	9.2
32	191	1948	327	3334	290	29.6	82.1	24.4
40	216	2203	408	4160	424	43.2	145	43

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。
基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated life of the bearing of one million revolutions.
"Basic static rated load" is a static load that achieves a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and track.

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 半導體製造設備
- FPD 製造設備
- 航太設備
- Robots
- Humanoid robots
- Semiconductor manufacturing systems
- Flat panel display manufacturing systems
- Space equipment



精密控制用減速機
HarmonicDrive®
綜合型錄

Reducer for Precision Control
General Catalog of
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FBS-2UH 系列 FBS-2UH Series



Harmonic Drive® 的新設計產品，特色為大中空孔、小外徑結構。

此次所開發出的新結構模組產品，是讓 Harmonic Drive® 特徵之一的中空孔結構達到極致，並將外徑控制在最小尺寸。

藉由採用新設計的 Harmonic Drive®FBS 型，實現極具特徵的形狀。

對具有電纜處理問題之機械手臂前端軸和各種機械裝置來說，在設計上更加精巧且節省空間。

This HarmonicDrive® features large hollow shaft and smaller outer diameter as a new design.

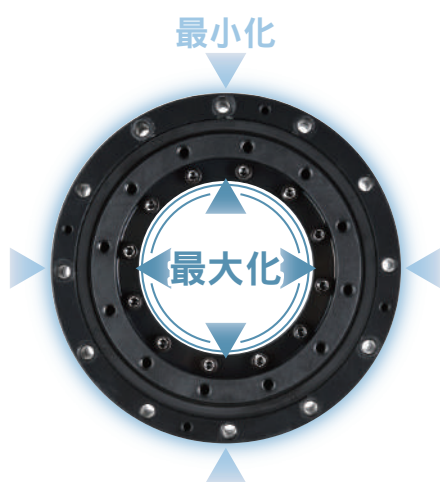
Fully seeking the hollow shaft, one of the HarmonicDrive® features, we've developed the new-design unit with the fully-reduced outer diameter.

The newly-designed HarmonicDrive® FBS type has been adopted to realize the characteristic shape.

This series provides the robot edge shaft or mechanical devices that are facing the challenge of cable layout with more compact- and smaller-footprint-design.

- 中空徑與外徑的比率較以往產品增加 20%
- 每個型號都實現對最大中空徑、最小外徑的追求
- 新增 2 種型號和 3 種減速比
- 採用新設計的 Harmonic Drive®FBS 型
- Ratio of the hollow-shaft diameter to the outer diameter has increased 20% compared with the previous products.
- The maximum hollow-shaft diameter and minimum outer diameter have been pursued for each size.
- 2 types of the size and 3 types of the speed reduction ratio have been added to the product lineup.
- The newly designed HarmonicDrive® FBS type has been adopted.

壽命：5,000 小時 Life:5,000h



■ 中空徑與外徑比率 Ratio of the Hollow-Shaft Diameter to the Outer Diameter

型號 Size	中空徑 Hollow-shaft diameter	外徑 Outer diameter	比率 diameter
25	41mm	93mm	44%
32	55.1mm	113mm	49%

■ FBS-2UH 系列額定表 FBS-2UH Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		起動、停止時的 容許峰值轉矩 Limit for repeated peak torque		平均負載轉矩的 容許最大值 Limit for average torque		瞬間容許最大轉矩 Limit for momentary peak torque		容許最高 輸入轉速 Allowable maximum input speed	容許平均 輸入轉速 Allowable average input speed	慣性力矩 (1/4GD2) Moment of inertia (1/4GD2)
		N·m	kgf·m	N·m	kgf·m	N·m	kgf·m	N·m	kgf·m	r/min	r/min	kg·cm ²
25	30	15	1.5	25	2.5	24	2.4	50	5.1	3600	2500	1.0
	50	22	2.2	47	4.8	35	3.6	93	9.5			
	100	37	3.8	70	7.1	59	6.0	100	10.2			
32	30	30	3.1	48	4.9	48	4.9	96	9.8	3600	2300	3.3
	50	43	4.4	92	9.4	67	6.8	151	15.4			
	100	56	5.7	106	10.8	89	9.1	151	15.4			

■ 主軸承規格 Main Bearing Specifications

項目 Item 型 號 Model No.	轉子節圓直徑 Pitch Circle	偏移量 Offset	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
	dp	R	基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co					
	m	m	× 10 ³ N	kgf	× 10 ³ N	kgf	N·m	kgf·m	× 10 ⁴ N·m/rad	kgf·m/arc-min
25	0.070	0.011	73	744	110	1122	93	9.5	21	6.2
32	0.086	0.0121	109	1111	179	1825	129	13.2	31	9.2

主要採用市場

Main adoption markets

- 機械手臂
- 金屬工具機
- 金屬加工機械
- 印刷、裝訂、紙工機械
- 木材、輕金屬、塑膠加工機械
- 包裝、捆包機械
- 印刷電路製造設備

- Robots
- Metal machine tools
- Metal working machines
- Printing, bookbinding and paper processing machines
- Wood, light metal and plastic working machines
- Crating and packaging machines
- Printed circuit board manufacturing machines



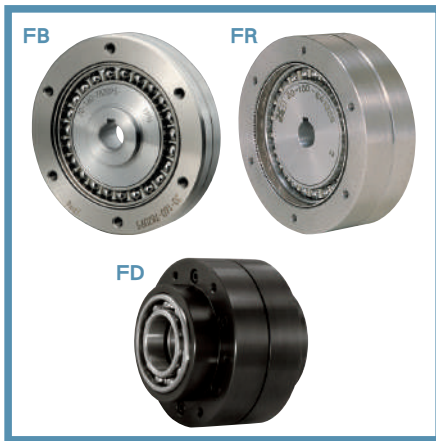
大中空軸減速機模組型 FBS-2UH 系列

Large-hollow-shaft Speed Reducer Unit FBS-2UH Series

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

FB,FR 系列 FB,FR Series / FD 系列 FD Series



FB、FR 系列是平薄型組裝用的減速裝置。
FD 系列會在運轉中對相位進行微調。
無背隙設計，可配合需求製成中空結構。

The FB and FR series are designed flat and thin as a component to be installed.
The FD series allow phase adjustment during operation.
The hollow structure type with non-backlash is also available upon request.

壽命：3,000 小時 Life:3,000h

FB,FR,FD 系列額定表 FB,FR,FD Series Ratings

項目 Item 型號 Model No.	減速比 Reduction Ratio	FB 系列 FB Series		FR 系列 FR Series		FD 系列 FD Series	
		輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		輸入 3500r/min 時的 額定轉矩 Rated Torque at 3500r/min	
		N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
14	50	2.6	0.27	4.4	0.45	—	—
	88	4.9	0.5	5.9	0.6	—	—
	100	5.9	0.6	7.8	0.8	—	—
	110	5.9	0.6	7.8	0.8	—	—
20	50	14	1.4	25	2.5	—	—
	80	17	1.7	34	3.5	29	3.0
	100	22	2.2	40	4.1	30	3.1
	128	24	2.4	40	4.1	31	3.2
25	160	24	2.4	40	4.1	32	3.3
	50	23	2.3	39	4.0	—	—
	80	31	3.2	56	5.7	46	4.7
	100	39	4.0	67	6.8	49	5.0
32	120	39	4.0	67	6.8	52	5.3
	160	39	4.0	67	6.8	54	5.5
	200	—	—	67	6.8	55	5.6
	50	44	4.5	76	7.8	—	—
40	78	63	6.4	108	11	98	10
	100	82	8.4	137	14	108	11
	131	82	8.4	137	14	108	11
	157	82	8.4	137	14	108	11
40	200	—	—	137	14	108	11
	260	—	—	137	14	108	11
	50	88	9.0	137	14	—	—
	80	118	12	196	20	196	20
40	100	157	16	255	26	235	24
	128	167	17	294	30	235	24
	160	167	17	294	30	235	24
	200	—	—	294	30	235	24
40	258	—	—	294	30	235	24

項目 Item 型號 Model No.	減速比 Reduction Ratio	FB 系列 FB Series		FR 系列 FR Series		FD 系列 FD Series	
		輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		輸入 2000r/min 時的 額定轉矩 Rated Torque at 2000r/min		輸入 3500r/min 時的 額定轉矩 Rated Torque at 3500r/min	
		N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
50	80	216	22	363	37	353	36
	100	284	29	470	48	441	45
	120	304	31	559	57	441	45
	160	304	31	559	57	441	45
65	200	—	—	559	57	441	45
	242	—	—	559	57	441	45
	78	—	—	745	76	—	—
	104	—	—	1070	109	—	—
80	132	—	—	1070	109	—	—
	158	—	—	1070	109	—	—
	208	—	—	1070	109	—	—
	260	—	—	1070	109	—	—
100	80	—	—	1320	135	—	—
	96	—	—	1660	169	—	—
	128	—	—	2300	235	—	—
	160	—	—	2350	240	—	—
100	194	—	—	2350	240	—	—
	258	—	—	2350	240	—	—
	320	—	—	2350	240	—	—
	80	—	—	2330	238	—	—
100	100	—	—	3200	327	—	—
	120	—	—	3890	397	—	—
	160	—	—	4470	456	—	—
	200	—	—	4470	456	—	—
100	242	—	—	4470	456	—	—
	320	—	—	4470	456	—	—

主要採用市場

Main adoption markets

- 印刷、裝訂、紙工機械
- 能源相關
- 包裝、捆包機械

- Printing, bookbinding and paper processing machines
- Energy
- Grating and packaging machines



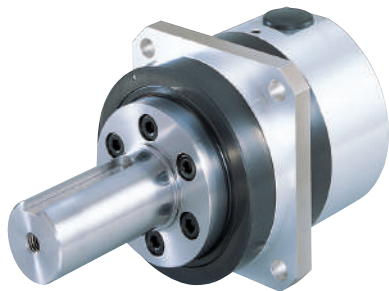
精密控制用減速機 HarmonicDrive® 綜合型錄

Reducer for Precision Control
General Catalog of
HarmonicDrive®

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

CSG-GH/CSF-GH 系列 CSG-GH/CSF-GH Series



即使是不習慣操作 HarmonicDrive® 的使用者也能輕鬆操作，實現高精度定位。

These two series offer simple handling with high-precision positioning. Ideal for users unfamiliar with how to use HarmonicDrive® products.

- 高轉矩型 (CSG-GH 系列)
- 標準型 (CSF-GH 系列)
- 輕鬆安裝於各公司的伺服馬達
- 產品種類豐富
- 優良密封結構
- 無背隙
- 高力矩容量

- High-torque type (CSG-GH Series)
- Standard type (CSF-GH Series)
- Easy mounting on servo motors manufactured by various manufacturers
- Wide array of variations
- Excellent sealed structure
- Non-backlash
- High moment capacity

壽命：CSG-GH 10,000 小時 Life: CSG-GH 10,000h
CSF-GH 7,000 小時 CSF-GH 7,000h

CSG-GH/CSF-GH 系列額定表 CSG-GH/CSF-GH Series Ratings

型號 Model No.	項目 Item	減速比 Reduction Ratio	輸入 2000r/min 時的額定轉矩 Rated Torque at 2000r/min		起動、停止時的容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
			N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
14		50	7 (5.4)	0.7 (0.55)	23 (18)	2.3 (1.8)	46 (35)	4.7 (3.6)
		80	10 (7.8)	1.0 (0.80)	30 (23)	3.1 (2.4)	61 (47)	6.2 (4.8)
		100	10 (7.8)	1.0 (0.80)	36 (28)	3.7 (2.9)	70 (54)	7.2 (5.5)
20		50	33 (25)	3.3 (2.5)	73 (56)	7.4 (5.7)	127 (98)	13 (10)
		80	44 (34)	4.5 (3.5)	96 (74)	9.8 (7.5)	165 (127)	17 (13)
		100	52 (40)	5.3 (4.1)	107 (82)	10.9 (8.4)	191 (147)	20 (15)
		120	52 (40)	5.3 (4.1)	113 (87)	11.5 (8.9)	191 (147)	20 (15)
32		160	52 (40)	5.3 (4.1)	120 (92)	12.2 (9.4)	191 (147)	20 (15)
		50	99 (76)	10 (7.8)	281 (216)	29 (22)	497 (382)	51 (39)
		80	153 (118)	16 (12)	395 (304)	40 (31)	738 (568)	75 (58)
		100	178 (137)	18 (14)	433 (333)	44 (34)	812 (647)	83 (66)
45		120	178 (137)	18 (14)	459 (353)	47 (36)	812 (686)	83 (70)
		160	178 (137)	18 (14)	484 (372)	49 (38)	812 (686)	83 (70)
		50	229 (176)	23 (18)	650 (500)	66 (51)	1235 (950)	126 (97)
		80	407 (313)	41 (32)	918 (706)	94 (72)	1651 (1270)	168 (130)
65		100	459 (353)	47 (36)	982 (755)	100 (77)	2033 (1570)	207 (160)
		120	523 (402)	53 (41)	1070 (823)	109 (84)	2033 (1760)	207 (180)
		160	523 (402)	53 (41)	1147 (882)	117 (90)	2033 (1910)	207 (195)
		80	969 (745)	99 (76)	2743 (2110)	280 (215)	4836 (3720)	493 (380)
65		100	1236 (951)	126 (97)	2990 (2300)	305 (235)	5174 (4750)	528 (485)
		120	1236 (951)	126 (97)	3263 (2510)	333 (256)	5174 (4750)	528 (485)
		160	1236 (951)	126 (97)	3419 (2630)	349 (268)	5174 (4750)	528 (485)

※ () 內的數值為 CSF-GH 系列產品的數值。

※ The value in parentheses is the value of the CSF-GH series.

主軸承規格 Main Bearing Specifications

型號 Model No.	項目 Item	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
		基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co		N·m	kgf·m	× 10 ⁴ N·m/rad	kgf·m/arc-min
14		5110	521	7060	720	27	2.76	3.0	0.89
20		10600	1082	17300	1765	145	14.8	17	5.0
32		20500	2092	32800	3347	258	26.3	42	12
45		41600	4245	76000	7755	797	81.3	100	30
65		81600	8327	149000	15204	2156	220	323	96

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。

基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力 (4kN/mm²) 之靜態負載。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated life of the bearing of one million revolutions.

"Basic static rated load" is a static load that achieves a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and track.

對應伺服馬達容量 Supported Servo Motor Capacity

馬達製造商 Motor Manufacturer	安川電機 Yaskawa Electric Corporation	三菱電機 Mitsubishi Electric Corporation	FANUC Fanuc Corporation	Panasonic Panasonic Corporation	山洋電氣 Sanyo Denki Co., Ltd.	多摩川精機 Tamagawa Seiki Co., Ltd.	富士電機 Fuji Electric Co., Ltd.	歐姆龍 Omron Corporation	東芝機械 Toshiba Machine Co., Ltd.	Keyence Keyence Corporation
對應輸出 (W) Output (W)	30 ~ 5000	30 ~ 5000	50 ~ 4500	50 ~ 5000	30 ~ 4500	30 ~ 6000	50 ~ 5000	30 ~ 5000	30 ~ 10000	50 ~ 4400

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械
- 包裝、捆包機械

- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines



伺服馬達用高性能
減速機系列
High-performance Gear Heads
for Servo Motors series

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

HPGP/HPG 系列 HPGP/HPG Series



行星齒輪減速機產品新增提升轉矩的 HPGP 系列。
(轉矩較 HPG 提升約 33%)

We have added an Extra High-torque Type HPGP to our Planetary Gear Speed Reducer Series.
(33% added torque compared to the HPG series)

- | | |
|--|--|
| <ul style="list-style-type: none"> ■ 高精度行星齒輪減速機 ■ 可配合短交期
(備有可在 1 週內出貨的產品) ■ 高轉矩容量 ■ 高力矩容量 ■ 輕鬆安裝於各公司的伺服馬達 ■ 小背隙：3 分以下 (1 分以下為特殊對應) ■ 高效率：達 90% 以上
(僅型號 11、14 為 85%) | <ul style="list-style-type: none"> ■ High-precision planetary gear speed reducers ■ Short delivery time (some models can be delivered in one week) ■ High torque capacity ■ High moment capacity ■ Easy mounting on servo motors manufactured by various manufacturers ■ Small backlash: Less than 3 minutes (special specification for less than 1 minute available) ■ High efficiency: 90% or higher.
(85% only for models 11 and 14) |
|--|--|

壽命：20,000 小時 Life:20,000h

HPGP/HPG 系列額定表 HPGP/HPG Series Ratings

項目 Item 型 號 Model No.	減速比 Reduction Ratio	輸入 3000r/min 時的 額定轉矩 Rated Torque at 3000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
11	5	3.4(2.5)	0.35(0.26)	10(7.8)	1.0(0.8)	20 (20)	2.0 (2.0)
	9	(2.5)	(0.26)	(3.9)	(0.4)		
	21	4.6(3.4)	0.47(0.35)	13 (9.8)	1.3 (1.0)		
	37	4.6(3.4)	0.47(0.35)				
	45	4.6(3.4)	0.47(0.35)				
14	3	(2.9)	(0.3)	(15)	(1.5)	(37)	(3.8)
	5	7.8(5.9)	0.8(0.6)	30 (23)	3.1 (2.3)	56 (56)	5.7 (5.7)
	11	10(7.8)	1.0(0.8)				
	15	12(9.0)	1.2(0.9)				
	21	12 (8.8)	1.2(0.9)				
	33	13(10)	1.3(1.0)				
45	13(10)	1.3(1.0)					
20	3	(8.8)	(0.9)	(64)	(6.5)	(124)	(13)
	5	21(16)	2.1(1.6)	133 (100)	14 (10)	217 (217)	22 (22)
	11	26(20)	2.7(2.0)				
	15	32(24)	3.3(2.4)				
	21	33(25)	3.4(2.5)				
	33	39(29)	4.0(3.0)				
45	39(29)	4.0(3.0)					

※ () 內的數值為 HPG 系列產品的數值。

※ Values in parentheses are HPG series values.

項目 Item 型號 Model No.	減速比 Reduction Ratio	輸入 3000r/min 時的 額定轉矩 Rated Torque at 3000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N-m	kgf-m	N-m	kgf-m	N-m	kgf-m
32	3	(31)	(3.2)	(225)	(23)	(507)	(52)
	5	87(66)	8.9(6.7)	400 (300)	41 (31)	650 (650)	66 (66)
	11	104(88)	11(9.0)				
	15	122(92)	12(9.4)				
	21	130(98)	13(10)				
50	33	143(108)	13(11)	1130 (850)	115 (87)	1850 (1850)	189 (189)
	45	143(108)	15(11)				
	3	(97)	(9.9)				
	5	226(170)	23(17)				
	11	226(200)	27(20)				
65	15	306(230)	31(24)	2920 (2200)	300 (225)	4500 (4500)	460 (460)
	21	346(260)	35(27)				
	33	359(270)	37(28)				
	45	359(270)	37(28)				
	4	665(500)	68(51)				
65	5	705(530)	72(54)	2920 (2200)	300 (225)	4500 (4500)	460 (460)
	12	798(600)	81(61)				
	15	971(730)	99(75)				
	20	1060(800)	109(81)				
	25	1130(850)	115(87)				
65	40	(640)	(66)	2920 (2200)	300 (225)	4500 (4500)	460 (460)
	50	(750)	(77)				
	65	(1000)	(100)				

主軸承規格 Main Bearing Specifications

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
	基本動態額定負載 C Basic Dynamic Rated Load C		基本靜態額定負載 Co Basic Static Rated Load Co					
	N	kgf	N	kgf	N-m	kgf-m	× 10 ⁴ N-m/rad	kgf-m/arc-min
11	3116	318	4087	417	9.5	0.97	0.88	0.26
14	5110	521	7060	720	32.3	3.3	3.0	0.9
20	10600	1082	17300	1765	183	17.3	16.8	5.0
32	20500	2092	32800	3347	452	46.1	42.1	12.5
50	41600	4245	76000	7755	1076	110	100	29.7
65	90600	9245	148000	15102	3900	398	364	108

※ 基本動態額定負載是指軸承的基本動態壽命可達 100 萬次旋轉的固定靜止徑向負載。

基本靜態額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力 (4kN/mm²) 之靜態負載。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated life of the bearing of one million revolutions.

"Basic static rated load" is a static load that achieves a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and track.

對應伺服馬達容量 Supported Servo Motor Capacity

馬達製造商 Motor Manufacturer	安川電機 Yaskawa Electric Corporation	三菱電機 Mitsubishi Electric Corporation	FANUC Fanuc Corporation	Panasonic Panasonic Corporation	山洋電氣 Sanyo Denki Co., Ltd.	多摩川精機 Tamagawa Seiki Co., Ltd.	富士電機 Fuji Electric Co., Ltd.	歐姆龍 Omron Corporation	東芝機械 Toshiba Machine Co., Ltd.	Keyence Keyence Corporation
對應輸出 (W) Output (W)	10 ~ 15000	10 ~ 7000	50 ~ 14000	50 ~ 15000	30 ~ 20000	30 ~ 15000	50 ~ 5000	30 ~ 15000	30 ~ 20000	50 ~ 4400

主要採用市場

Main adoption markets

- | | |
|--|---|
| <ul style="list-style-type: none"> ● 機械手臂 ● 人形機器人 ● 金屬工具機 ● 金屬加工機械 ● 印刷、裝訂、紙工機械 ● 半導體製造設備 ● 望遠鏡 ● 木材、輕金屬、塑膠加工機械 ● 製紙機械 ● 包裝、捆包機械 ● 通訊設備 ● 印刷電路製造設備 | <ul style="list-style-type: none"> ● Robots ● Humanoid robots ● Metal machine tools ● Metal working machines ● Printing, bookbinding and paper processing machines ● Semiconductor manufacturing systems ● Telescopes ● Wood, light metal and plastic machine tools ● Paper-making machines ● Crating and packaging machines ● Communication equipment ● Printed circuit board manufacturing machines |
|--|---|



伺服馬達用高性能
減速機系列
High-performance Gear Heads
for Servo Motors series

詳細內容請參閱本型錄。
For more details, please refer to the separate catalog shown above.

HPG-R 系列 HPG-R Series



- 螺旋齒輪促進靜音化以及轉矩扭力提升
- 減速比 3、4、5、6、7、8、9、10 等低減速比完備
- 可配合短交期（備有可在 1 週內出貨的產品）
- 高力矩容量
- 高效率
- 輕鬆安裝於各公司的伺服馬達

- Improved noise reduction and torque capacity through the use of a helical gear
- Full range of low reduction ratios (3, 4, 5, 6, 7, 8, 9, and 10) are added to the lineup
- Quick delivery available (some products can be delivered within a week)
- High moment capacity
- High efficiency
- Easy installation on servo motors of many manufacturers

壽命：20,000 小時 Life:20,000h

HPG-R 系列額定表 HPG-R Series Ratings

型號 Model No.	項目 Item	減速比 Reduction Ratio	輸入 3000r/min 時的額定轉矩 Rated Torque at 3000r/min		起動、停止時的容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
			N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
11		4	2.8	0.3	10	1.0	20	2.0
		5	2.9	0.3	10	1.0		
		6	2.9	0.3	10	1.0		
		7	3.1	0.3	9.0	0.9		
		8	3.1	0.3	7.0	0.7		
		9	3.1	0.3	6.0	0.6		
		10	3.4	0.3	5.0	0.5		
14		3	4.0	0.4	20	2.0	37	3.8
		4	7.0	0.7	30	3.1		
		5	7.2	0.7	30	3.1		
		6	7.3	0.7	30	3.1		
		7	7.8	0.8	26	2.7		
		8	7.8	0.8	20	2.0		
		9	7.9	0.8	17	1.7		
20		10	8.5	0.9	15	1.5	56	5.7
		3	11	1.1	90	9.2		
		4	23	2.3	133	14		
		5	23	2.4	133	14		
		6	23	2.4	126	13		
		7	25	2.5	108	11		
		8	25	2.5	84	8.6		
32		9	25	2.6	73	7.4	124	13
		10	27	2.8	65	6.6		
		3	50	5.1	290	30		
		4	77	7.9	400	41		
		5	80	8.2	400	41		
		6	80	8.2	390	40		
		7	85	8.7	330	34		
32		8	85	8.7	260	27	217	22
		9	86	8.8	220	22		
		10	92	9.4	200	20		
		3	50	5.1	290	30		
		4	77	7.9	400	41		
		5	80	8.2	400	41		
		6	80	8.2	390	40		
32		7	85	8.7	330	34	507	52
		8	85	8.7	260	27		
		9	86	8.8	220	22		
		10	92	9.4	200	20		
		3	50	5.1	290	30		
		4	77	7.9	400	41		
		5	80	8.2	400	41		
32		6	80	8.2	390	40	650	66
		7	85	8.7	330	34		
		8	85	8.7	260	27		
		9	86	8.8	220	22		
		10	92	9.4	200	20		
		3	50	5.1	290	30		
		4	77	7.9	400	41		

主軸承規格 Main Bearing Specifications

型號 Model No.	項目 Item	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
		基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co		N·m	kgf·m	× 10 ⁴ N·m/rad	kgf·m/arc-min
11		3116	318	4087	417	9.5	0.97	0.88	0.26
14		5110	521	7060	720	32.3	3.3	3.0	0.9
20		10600	1082	17300	1765	183	18.7	16.8	5.0
32		20500	2092	32800	3347	452	46.1	42.1	12.5

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。

基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated life of the bearing of one million revolutions.

※ "Basic static rated load" is a static load that achieves a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and track.

對應伺服馬達容量 Supported Servo Motor Capacity

馬達製造商 Motor Manufacturer	安川電機 Yaskawa Electric Corporation	三菱電機 Mitsubishi Electric Corporation	FANUC Fanuc Corporation	Panasonic Panasonic Corporation	山洋電氣 Sanyo Denki Co.,Ltd	多摩川精機 Tamagawa Seiki Co.,Ltd	富士電機 Fuji Electric Co.,Ltd	歐姆龍 Omron Corporation	東芝機械 Toshiba Machine Co.,Ltd	Keyence Keyence Corporation
對應輸出 (W) Output (W)	30 ~ 5000	50 ~ 5000	50 ~ 4500	50 ~ 5000	30 ~ 5000	30 ~ 5000	50 ~ 3000	50 ~ 5000	30 ~ 4500	50 ~ 2900

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械
- 包裝、捆包機械

- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines



伺服馬達用高性能減速機系列

High-performance Gear Heads for Servo Motors series

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

HPG-RA 系列 HPG-RA Series



- 高精度行星齒輪減速機
- 可配合短交期
- 高轉矩容量
- 高力矩容量
- 輕鬆安裝於各公司的伺服馬達
- 小背隙：3 分以下

- High-precision planetary gear
- Short delivery
- High torque capacity
- High moment capacity
- Easy mounting on servo motors manufactured by various manufacturers
- Small backlash: Less than 3 minutes

壽命：20,000 小時 Life:20,000h

HPG-RA 系列額定表 HPG-RA Series Ratings

型號 Model No.	項目 Item	直交部型式 Orthogonal Part Type	減速比 Reduction Ratio	輸入 3000r/min 時的額定轉矩 Rated Torque at 3000r/min		起動、停止時的容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
				N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
32	RA3		5	66	6.7	150	15	200	20
			11	88	9.0			440	45
			15	92	9.4			600	61
			21	98	10			650	66
			33	108	11				
			45	108	11				
50	RA3		5	150	15	150	15	200	20
			11	200	20	330	34	440	45
			15	230	24	450	46	600	61
			21	260	27	630	64	840	86
			33	270	28	850	87	1320	135
			45	270	28			1800	184
	RA5		5	170	17	400	41	500	51
			11	200	20			1100	112
			15	230	24			1500	153
			21	260	27		87	1850	189
			33	270	28				
			45	270	28				
65	RA5		5	400	41	400	41	500	51
			12	600	61	960	98	1200	122
			15	730	75	1200	122	1500	153
			20	800	82	1600	163	2000	204
			25	850	87	2000	204	2500	255
			40	640	65	1900	194	4000	408
			50	750	77	2200	224	4500	460

主軸承規格 Main Bearing Specifications

型 號 Model No.	項 目 Item	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
		基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co					
		N	kgf	N	kgf	N·m	kgf·m	×10 ⁴ N·m/rad	kgf·m/arc-min
32		20500	2092	32800	3347	452	46.1	42.1	12.5
50		41600	4245	76000	7755	1076	110	100	29.7
65		90600	9245	148000	15102	3900	398	364	108

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。

基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated life of the bearing of one million revolutions.

"Basic static rated load" is a static load that achieves a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and track.

對應伺服馬達容量 Supported Servo Motor Capacity

馬達製造商 Motor Manufacturer	安川電機 Yaskawa Electric Corporation	三菱電機 Mitsubishi Electric Corporation	FANUC Fanuc Corporation	Panasonic Panasonic Corporation	山洋電氣 Sanyo Denki Co.,Ltd	富士電機 Fuji Electric Co.,Ltd	東芝機械 Toshiba Machine Co.,Ltd
對應輸出 (W) Output (W)	850 ~ 7500	1000 ~ 7000	1200 ~ 2500	1000 ~ 5000	1000 ~ 5500	850 ~ 5000	1500 ~ 10000

主要採用市場

Main adoption markets

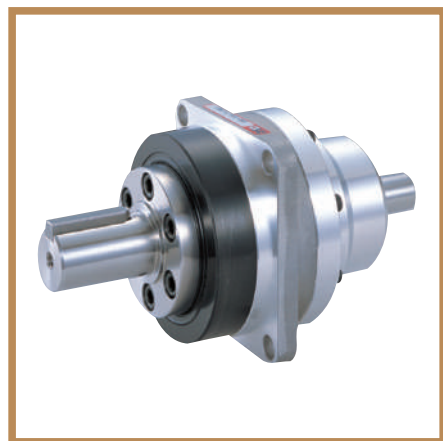
- 機械手臂
- 人形機器人
- 金屬工具機
- 金屬加工機械
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械
- 包裝、捆包機械
- 通訊設備
- 印刷電路製造設備
- Robots
- Humanoid robots
- Metal machine tools
- Metal working machines
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines
- Communication equipment
- Printed circuit board manufacturing machines



伺服馬達用高性能
減速機系列
High-performance Gear Heads
for Servo Motors series

詳細內容請參閱本型錄。
For more details, please refer to the separate catalog shown above.

HPG-U1 系列 HPG-U1 Series



- 高精度行星齒輪減速機
- 可配合短交期
(備有可在 1 週內出貨的產品)
- 高轉矩容量
- 高力矩容量
- 小背隙：3 分以下 (1 分以下為特殊對應)
- High-precision planetary gear
- Short delivery time
(some models can be delivered in one week)
- High torque capacity
- High moment capacity
- Small backlash: Less than 3 minutes
(special specification for less than 1 minute available)

壽命：20,000 小時 Life:20,000h

HPG-U1 系列額定表 HPG-U1 Series Ratings

項目 Item 型 號 Model No.	減速比 Reduction Ratio	輸入 3000r/min 時的 額定轉矩 Rated Torque at 3000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
11	5	2.5	0.26	5.0	0.51	20	2.0
	9	2.5	0.26	3.9	0.4		
	21	3.4	0.35	6.0	0.61		
	37	3.4	0.35				
45	3.4	0.35					
14	3	2.9	0.3	15	1.5	37	3.8
	5	5.9	0.6	23	2.3	56	5.7
	11	7.8	0.8				
	15	9.0	0.9				
	21	8.8	0.9				
	33	10	1.0				
45	10	1.0					
20	3	8.8	0.9	64	6.5	124	13
	5	16	1.6	100	10	217	22
	11	20	2.0				
	15	24	2.4				
	21	25	2.5				
	33	29	3.0				
	45	29	3.0				

項目 Item 型 號 Model No.	減速比 Reduction Ratio	輸入 3000r/min 時的 額定轉矩 Rated Torque at 3000r/min		起動、停止時的 容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
		N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
32	3	31	3.2	225	23	507	52
	5	66	6.7	300	31	650	66
	11	88	9.0				
	15	92	9.4				
	21	98	10				
	33	108	11				
45	108	11					
50	3	97	9.9	657	67	1850	189
	5	170	17	850	87		
	11	200	20				
	15	230	24				
	21	260	27				
	33	270	28				
45	270	28					
65	4	500	51	2200	225	4500	460
	5	530	54				
	12	600	61				
	15	730	75				
	20	800	81				
	25	850	87				
	40	640	66	1900	194		
	50	750	77	2200	225		

主軸承規格 Main Bearing Specifications

項目 Item 型號 Model No.	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
	基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co		容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
	N	kgf	N	kgf	N·m	kgf·m	× 10 ⁴ N·m/rad	kgf·m/arc-min
11	3116	318	4087	417	9.5	0.97	0.88	0.26
14	5110	521	7060	720	32.3	3.3	3.0	0.9
20	10600	1082	17300	1765	183	18.7	16.8	5.0
32	20500	2092	32800	3347	452	46.1	42.1	12.5
50	41600	4245	76000	7755	1076	110	100	29.7
65	90600	9245	148000	15102	3900	398	364	108

※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜徑向負載。

基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力 (4kN/mm²) 之靜態負載。

※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated life of the bearing of one million revolutions.

※ "Basic static rated load" is a static load that achieves a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and track.

主要採用市場

Main adoption markets

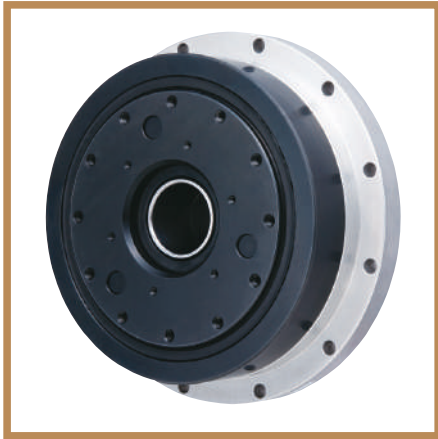
- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械
- 包裝、捆包機械
- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines

伺服馬達用高性能
減速機系列High-performance Gear Heads
for Servo Motors series

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

HPF 系列 HPF Series



- 中空軸結構（輸出輸入軸位於同軸）
- 高速（25 號最高轉速為 500r/min、32 號為 430r/min）
- 型號分別為 25 號、32 號兩種，減速比為 1/11 一種
- 小背隙：3 分以下
- Hollow axial structure (coaxial input and output)
- High speed (maximum rotational speed: 500r/min on model 25, 430r/min on model 32)
- Model numbers are 25 and 32. Reduction ratio is 1/11 only.
- Small backlash: Less than 3 minutes

壽命：20,000 小時 Life:20,000h

HPF 系列額定表 HPF Series Ratings

型號 Model No.	項目 Item	減速比 Reduction Ratio	中空直徑 Hollow diameter	輸入 3000r/min 時的額定轉矩 Rated Torque at 3000r/min		起動、停止時的容許峰值轉矩 Allowable Peak Torque at Start and Stop		瞬間容許最大轉矩 Allowable Maximum Momentary Torque	
				N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
25		11	φ 25	21	2.1	100	10.2	170	17.3
32			φ 30	44	4.5	220	22.4	450	45.9

主軸承規格 Main Bearing Specifications

型號 Model No.	項目 Item	基本額定負載 Basic Rated Load				容許力矩負載 Mc Allowable Moment Load Mc		力矩剛性 Km Moment Stiffness Km	
		基本動額定負載 C Basic Dynamic Rated Load C		基本靜額定負載 Co Basic Static Rated Load Co					
		N·m	kgf·m	N·m	kgf·m	N·m	kgf·m	N·m	kgf·m
25		11400	1163	20300	2071	410	41.8	37.9	11.3
32		22500	2296	39900	4071	932	95	86.1	25.7

- ※ 基本動額定負載是指軸承的基本動額定壽命可達 100 萬次旋轉的固定靜止徑向負載。
基本靜額定負載是指在承受最大負載的轉動體與軌道的接觸部位中央上，給予一定水準的接觸應力（4kN/mm²）之靜態負載。
- ※ "Basic dynamic rated load" is a constant static radial load that achieves a basic dynamic rated life of the bearing of one million revolutions.
"Basic static rated load" is a static load that achieves a contact stress of a constant level (4kN/mm²) at the center of a contact zone between the rolling element receiving a maximum load and track.

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械
- 包裝、捆包機械
- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines

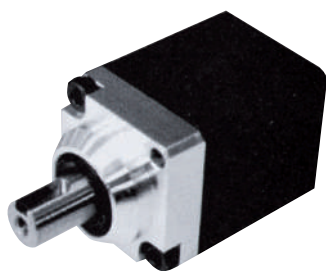


伺服馬達用高性能
減速機系列
High-performance Gear Heads
for Servo Motors series

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HP-F 系列 HP-F Series

小容量型 Small Capacity Type



HP-F 型是專為小型馬達（5W ～ 20W）開發，具有精密控制功能的行星減速機。

The HP-F type gear heads are planetary gear heads for precision control specially developed for small motors (5W to 20W).

壽命：20,000 小時 Life:20,000h

HP-F 系列額定表 HP-F Series Ratings

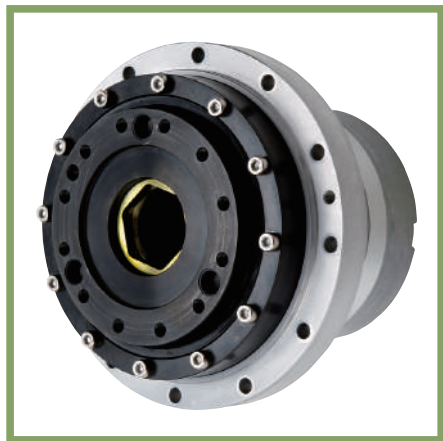
型號 Model No.	項目 Item	減速比 Reduction Ratio	外觀尺寸 External Dimensions	額定轉矩 Rated Torque	起動、停止時的峰值轉矩 Peak Torque at Start and Stop	瞬間容許最大轉矩 Allowable Maximum Momentary Torque	質量 Weight
			mm	N·m	N·m	N·m	kg
HP-8F		5	□ 25	0.40	2.56	5.88	0.12
		16		1.07	2.55		0.15
		25		1.57	2.26		0.15

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 金屬工具機
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- 製紙機械
- 包裝、捆包機械
- Robots
- Humanoid robots
- Metal machine tools
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines

SHA 系列 (CG 型) SHA Series (CG Type)



結合了薄型、精密控制用減速機 HarmonicDrive® 與超薄型 AC 伺服馬達的 AC 伺服致動器。
大幅提升 SHA 系列 SG 型的輸出軸面偏移精度。
滿足工作台式旋轉驅動部位對機械精度的需求和校準調節機構等需要高精度的需求。

The servo actuators in this series are comprised of HarmonicDrive® components for precise motion control and super flat AC servo motors.

Output shaft surface runout precision is considerably improved on the SHA series, SG type.

Meets high precision requirements for table pivoting drive or alignment adjustment mechanisms that require mechanical precision.

SHA 系列 (CG 型) 額定表 SHA Series (CG Type) Ratings

項目 Item		型式 Model	SHA20A					SHA25A					SHA32A					SHA40A				
			50	80	100	120	160	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160
最大轉矩 ※2 Maximum Torque※2	N·m	73	96	107	113	120	127	178	204	217	229	281	395	433	459	484	333(523)	548(675)	686(738)	802	841	
	kgf·m	7.4	9.8	10.9	11.5	12.2	13	18.2	20.8	22.1	23.4	28.7	40.3	44.2	46.8	49.4	34.0(53.4)	55.9(68.9)	70.0(75.3)	81.8	85.8	
最高轉速 Maximum Positioning Speed	r/min	120	75	60	50	37.5	112 (96)	70 (60)	56 (48)	46.7 (40)	35 (30)	96	60	48	40	30	80	50	40	33.3	25	
轉矩常數 Torque Constant	N·m/A	16	26	33	39	53	19(10.9)	31(17.7)	38(22)	46(27)	61(35)	20	33	41	49	66	25	40	50	60	80	
	kgf·m/A	1.7	2.7	3.4	4.0	5.4	1.9(1.1)	3.1(1.8)	3.9(2.3)	4.7(2.7)	6.3(3.6)	2.1	3.4	4.2	5.0	6.7	2.5	4.1	5.1	6.1	8.2	
最大電流 ※2 Maximum Current※2	A	6.1	5.0	4.6	4.1	3.4	8.7 (15.1)	7.6 (13.2)	7.0 (12.2)	6.3 (11)	5.2 (9.0)	17.7	15.4	13.7	12.2	10	18 (27.2)	18 (22)	18 (19.6)	17.6 (18)	14.3 (14.7)	
	慣性力矩 (無制動器) Moment of Inertia (Without Brake)	GD ² /4 J	kg·m ² kgf·cm ²	0.21 2.1	0.53 5.4	0.82 8.0	1.2 12	2.1 22	0.5 5.1	1.3 13	2.0 20	2.9 29	5.1 52	1.7 17	4.3 44	6.7 68	9.7 99	17 175	4.8 49	12 124	19 194	27 280
慣性力矩 (有制動器) Moment of Inertia (With Brake)	GD ² /4 J	kg·m ² kgf·cm ²	0.23 2.4	0.6 6.1	0.94 9.6	1.3 14	2.4 24	0.6 6.1	1.5 16	2.4 24	3.4 35	6.1 62	2.0 20	5.1 52	7.9 81	11 116	20 207	5.8 59	15 150	23 235	33 338	59 601
	容許力矩負載 Allowable Moment Load	N·m kgf·m	187 19.1					258 26.3					580 59.2					849 86.6				
力矩剛性 Moment Stiffness	N·m/rad	25.2×10 ⁴					39.2×10 ⁴					100×10 ⁴					179×10 ⁴					
	kgf·m/rad	7.5					11.6					29.6					53.2					
單一方定位精度 One-way Positioning Accuracy	秒 arc-sec	60	50	50	50	50	50	40	40	40	40	40	30	30	30	30	40	30	30	30	30	
編碼器類型 Encoder Method	17bit 絕對編碼器 17-bit absolute encoder																					
馬達旋轉 1 次的編碼器解析度 Encoder Resolution per Motor Revolution	2 ¹⁷ (131072)																					
馬達多旋轉檢測 Motor Multi-turn Counter	2 ¹⁶ (65536)																					
輸出軸解析度 Output Resolution	脈衝 / 旋轉 Pulses/rotation	6553600	10485760	13107200	15728640	20971520	6553600	10485760	13107200	15728640	20971520	6553600	10485760	13107200	15728640	20971520	6553600	10485760	13107200	15728640	20971520	
輸入電源電壓 Power Supply	V	AC200					AC100 或 AC200 AC100 or AC200					AC200										
質量 (無制動器) Weight (Without Brake)	kg	2.6					3.95					7.7					13.0					
質量 (有制動器) Weight (With Brake)	kg	2.7					4.1					8.0					13.8					
保護結構 Protective Structure	全封閉自冷型 (保護等級等同 IP54: 保護等級的詳細內容請參閱「技術資料」。) Totally enclosed self-cooling type (Protection code IP54 Equivalent: See "Technical document" for protection code details)																					
周圍環境條件 Environmental Conditions	使用溫度: 0 ~ 40℃ / 儲存溫度: -20 ~ +60℃、使用濕度 / 儲存濕度: 20 ~ 80% RH (不結露)、耐振動: 25m/s ² (頻率: 10 ~ 400Hz) / 耐撞擊: 300 m/s ² ※3、無粉塵、金屬粉、腐蝕性氣體、易燃性氣體、油霧等, 室內使用、陽光直射不到之處, 海拔 1000m 以下 Operating temperature: 0 to 40℃ / Storage temperature: -20 to +60℃ / Storage humidity: 20 to 80% RH (avoid dew condensation) / Resistance to vibration: 25m/s ² (Frequency: 10 to 400Hz) / Shock resistance: 300m/s ² ※3. Avoid exposure to dust, metal powder, corrosive gas, flammable gas and oil mist. Use this product indoors. Do not expose to direct sunlight. Use at altitudes of 1,000m above sea level or lower.																					
安裝方向 Mounting Direction	可全方向安裝 All directions																					
安全規格 Safety Standards	CE 標章、UL 認證、TUV 認證 CE marking, UL certification, TUV certification																					

※1 上表的值顯示輸出軸的代表值。

※2 為與本公司驅動器組合 (透過理想正弦波驅動) 時的代表特性。

※3 耐振動、耐撞擊相關測試條件請參閱技術資料。

※4 SHA25 () 內的數值為輸入電源電壓 AC100V 的值。

※5 SHA40 () 內的數值為組合 HA-800 □-24 (額定輸出電流 24A) 後的值。

※1 Table above shows the representative value for the output shaft.

※2 The characteristic is representative when combined with a driver (driven by perfect sine wave) of Harmonic Drive Systems.

※3 Please refer to the technical information on testing conditions for resistance to vibration and shock.

※4 The value in parentheses () of SHA 25 is the value when the input power voltage is AC100V.

※5 The value in parentheses () of SHA 40 is the value when combined with HA-800 □-24 driver (rated output current 24A).

主要採用市場

Main adoption markets

- 機械手臂
- 金屬工具機
- 金屬加工機械
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 木材、輕金屬、塑膠加工機械
- 包裝、捆包機械
- FPD 製造設備
- 通訊設備
- 印刷電路製造設備

- Robots
- Metal machine tools
- Metal working machines
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Wood, light metal and plastic machine tools
- Crating and packaging machines
- Flat panel display manufacturing systems
- Communication equipment
- Printed circuit board manufacturing machines



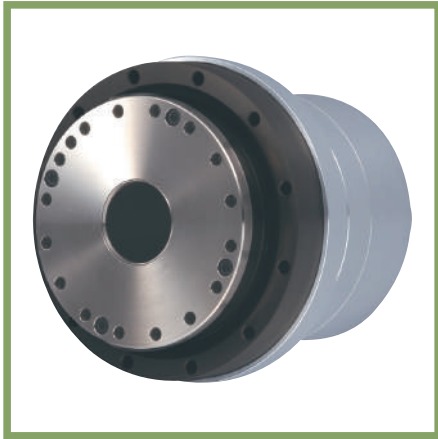
機電產品綜合型錄

General Catalog for
Mechanical Electronic Products

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

SHA 系列 (SG/HP 型) SHA Series(SG/HP Type)



結合了薄型、精密控制用減速機 HarmonicDrive® 與超薄型 AC 伺服馬達的 AC 伺服致動器。其特徵為前所未見的薄度及精巧，還有中空開孔結構。不僅薄度及精巧程度前所未見，中空開孔結構更是一大特色。將配線、配管、雷射光等通過致動器中央部的貫穿孔，即可輕易完成整個機械、裝置的結構。另一項特徵是選擇種類多樣，能因應使用需求挑選輸出軸承、減速機、馬達捲線等零組件。

與小型多功能的專用驅動器 HA-800 組合使用，更正確、精確地控制 SHA 系列的動作。

The servo actuators in this series are comprised of HarmonicDrive® components for precise motion control and super flat AC servo motors.

The body width is less than half of old models and has a large through hole in the center of the shaft through which electric cables, air pipes, and even laser beams can pass to simplify the entire structure of the machine and system.

Furthermore, this design allows you to select an output bearing, a reduction gear and motor winding to fit your needs and features numerous variations.

This series can be combined with dedicated HA-800 drivers that offer a compact and multifunctional design to accurately and precisely control the operations of the SHA Series.

SHA 系列 (SG/HP 型) 額定表 SHA Series(SG/HP Type) Ratings

項目 Item	型式 Model	SHA20A					SHA25A					SHA32A					SHA40A					SHA58A					SHA65A														
		51	81	101	121	161	11	51	81	101	121	161	11	51	81	101	121	161	51	81	101	121	161	81	101	121	161	81	101	121	161										
最大轉矩 Maximum Torque ^{※2}	N·m	73	96	107	113	120	26	127	178	204	217	229	62	281	395	433	459	484	340(523)	560(675)	686(738)	802	841	1924	2067	2236	2392	2400	2990	3263	3419										
	kgf·m	7.4	9.8	10.9	11.5	12.2	2.7	13	18.2	20.8	22.1	23.4	6.3	28.7	40.3	44.2	46.8	49.4	34.7(53.4)	57.1(68.9)	70.7(75.3)	81.8	85.8	196	211	228	244	245	305	333	349										
最高轉速 Maximum Positioning Speed	r/min	117.6	74.1	59.4	49.6	37.3	509.1	109.8 (94.1)	69.1 (59.3)	55.4 (47.5)	46.3 (39.7)	34.8 (29.8)	436.4	94.1	59.3	47.5	39.7	29.8	78.4	49.4	39.6	33.1	24.8	37.0	29.7	24.8	18.6	34.6	27.7	23.1	17.4										
轉矩常數 Torque Constant	N·m/A	16.5	27	33	40	53	4.2	19(11)	31(17.9)	39(22)	46(27)	62(36)	4.5	21	33	42	50	66	25	41	51	61	81	54	68	81	108	54	68	81	108										
	kgf·m/A	1.7	2.7	3.4	4.1	5.4	0.43	2.0(1.1)	3.2(1.8)	4.0(2.3)	4.7(2.7)	6.3(3.6)	0.46	2.1	3.4	4.2	5.1	6.8	2.6	4.1	5.2	6.2	8.2	5.5	6.9	8.3	11	5.5	6.9	8.3	11										
最大電流 ^{※2} Maximum Current ^{※2}	A	6.0	4.9	4.5	4.0	3.4	8.9	8.6 (14.9)	7.5 (13.0)	7.0 (12.1)	6.3 (10.9)	5.2 (9.0)	19	17.3	15.2	13.5	12.2	9.9	18 (26.7)	18 (21.8)	18 (19.4)	17.9	14.6	45	39	36	30	55	55	51	41										
慣性力矩（無制動器） Moment of Inertia (Without Brake)	GD ² /4 kg·m ²	0.23	0.58	0.91	1.3	2.3	0.029	0.56	1.42	2.2	3.2	5.6	0.092	2.0	5.1	8.0	11	20	5.0	13	20	28	50	96	149	214	379	110	171	245	433										
	J kgf·cm ²	2.4	6.0	9.3	13	24	0.296	5.7	14.4	22	32	57	0.939	21	52	81	117	207	51	130	202	290	513	980	1520	2180	3870	1120	1740	2500	4420										
慣性力矩（有制動器） Moment of Inertia (With Brake)	GD ² /4 kg·m ²	0.26	0.65	1.0	1.4	2.6	0.034	0.66	1.66	2.6	3.7	6.6	0.107	2.3	5.9	9.2	13	23	6.1	15	24	34	61	106	165	237	420	120	187	268	475										
	J kgf·cm ²	2.6	6.6	1.0	15	26	0.347	6.7	17	26	38	67	1.087	24	60	94	135	238	62	157	244	350	619	1090	1690	2420	4290	1230	1910	2740	4850										
容許力矩負載 Allowable Moment Load	N·m	187					410					932					580					849					2180														
	kgf·m	19.1					41.8					26.3					95					59.1					86.6					222									
力矩剛性 Moment Stiffness	N·m/rad	25.2×10 ⁴					37.9×10 ⁴					39.2×10 ⁴					86.1×10 ⁴					100×10 ⁴					179×10 ⁴					531×10 ⁴					741×10 ⁴				
	kgf·m/rad	7.5					11.3					11.6					25.7					29.6					53.2					158					220				
編碼器類型 Encoder Method	17bit 絕對編碼器 17bit absolut encoder																																								
馬達旋轉 1 次的編碼器解析度 Encoder Resolution per Motor Revolution	2 ¹⁷ （131072）																																								
馬達多旋轉檢測 Motor Multi-turn Counter	2 ¹⁶ （65536）																																								
輸出軸解析度 Output Resolution	脈衝 / 旋轉 Pulses/rotation	6684672	10616832	13238272	15859712	21102592	1441792	6684672	10616832	13238272	15859712	21102592	1441792	6684672	10616832	13238272	15859712	21102592	6684672	10616832	13238272	15859712	21102592	10616832	13238272	15859712	21102592	10616832	13238272	15859712	21102592										
輸入電源電壓 Power Supply	V	AC200					AC200	AC100 或 AC200 AC100 or AC200					AC200	AC200																											
質量（無制動器） Weight (Without Brake)	kg	2.0					5.0	2.95					9.4	5.9					9.9					29.5					37.5												
質量（有制動器） Weight (With Brake)	kg	2.1					5.1	3.1					9.7	6.2					10.7					32					40												
保護結構 Protective Structure	全封閉自冷型（保護等級等同 IP54：保護等級的詳細內容請參閱「技術資料」。） Totally enclosed self-cooling type (Protection code IP54 Equivalent: See "Technical document" for the detail of the protection code.)																																								
周圍環境條件 Environmental Conditions	使用溫度：0～40℃／儲存溫度：-20～+60℃、使用濕度／儲存濕度：20～80% RH（不結露）、耐振動：25m/s ² （頻率：10～400Hz）／耐撞擊：300 m/s ² 、無粉塵、金屬粉、腐蝕性氣體、易燃性氣體、油霧等，室內使用、陽光直射不到之處，海拔 1000m 以下 Operating temperature: 0 to 40°C / Storage temperature: -20 to +60°C / Storage humidity: 20 to 80% RH (avoid dew condensation) / Resistance to vibration: 25m/s ² (Frequency: 10 to 400Hz) / Shock resistance: 300m/s ² . Avoid exposure to dust, metal powder, corrosive gas, flammable gas and oil mist. Use this product indoors. Do not expose to direct sunlight. Use at altitudes of 1,000m above sea level or lower.																																								
安裝方向 Mounting Direction	可全方向安裝 All directions																																								
安全規格 Safety Standards	CE 標章、UL 認證、TUV 認證 CE marking, UL certification, TUV certification																																								

※1 上表的值顯示輸出軸的代表值。

※2 與 HA-800 驅動器組合時的值。

※3 SHA25 () 內的數值為輸入電源電壓 AC100V 的值。

※4 SHA40 () 內的數值為組合 HA-800 □-24 (額定輸出電流 24A) 後的值。

※5 組合驅動器請參閱第 50-51 頁「致動器與伺服驅動器組合」。

※6 當減速比是 1:11，應與中空行星式減速機 HPF 系列組合使用。

※1 Table above shows the representative value for the output shaft.

※2 Values are in combination with an HA-800 driver.

※3 The value in parentheses () of SHA 25 is the value when the input power voltage is AC100V.

※4 The value in parentheses () of SHA 40 is the value when combined with HA-800 □-24 driver (rated output current 24A).

※5 For a combination driver, refer to "Actuator and Driver Combinations" on pages 50-51.

※6 Reduction ratio 1:11 is when combined with the hollow planetary speed reducer HPF series.

主要採用市場

Main adoption markets

- 機械手臂
- 金屬工具機
- 金屬加工機械
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 木材、輕金屬、塑膠加工機械
- 包裝、捆包機械
- FPD 製造設備
- 通訊設備
- 印刷電路製造設備

- Robots
- Metal machine tools
- Metal working machines
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Wood, light metal and plastic machine tools
- Crating and packaging machines
- Flat panel display manufacturing systems
- Communication equipment
- Printed circuit board manufacturing machines



機電產品綜合型錄

General Catalog for Mechanical/Electronic Products

詳細內容請參閱本型錄。
For more details, please refer to the separate catalog shown above.

FHA-C mini 系列 FHA-C mini Series



結合了薄型、精密控制用減速機 HarmonicDrive® 與超薄型 AC 伺服馬達的 AC 伺服致動器。增加輸入電源 DC24V 的新規格。

特徵為前所未見的厚度及精巧長度，還有中空開孔結構。將配線、配管、雷射光等通過此貫穿孔，即可輕易完成整個機械、裝置的結構。

小型多功能的專用驅動器能正確且精密地控制 FHA-C mini 系列的動作。

The servo actuators in this series are comprised of HarmonicDrive® components for precise motion control and super-flat AC servo motors.

The body width is less than half of old models and has a large through hole in the center of the shaft through which electric cables, air pipes, and even laser beams can pass to simplify the entire structure of the machine and system.

Dedicated compact and multifunctional drivers are used to accurately and precisely control the operations of the FHA-C mini Series.

FHA-C mini 系列額定表 FHA-C mini Series Ratings

項目 Item			型 式 Model	FHA-8C			FHA-11C			FHA-14C		
				30	50	100	30	50	100	30	50	100
最大轉矩 Maximum Torque※2 ※5		N·m		1.8	3.3	4.8	4.5	8.3	11	9.0	18	28
		kgf·m		0.18	0.34	0.49	0.46	0.85	1.1	0.92	1.8	2.9
最高轉速 Maximum Positioning Speed		r/min		200	120	60	200	120	60	200	120	60
轉矩常數 Torque Constant	100V· 200V	N·m/A	3.9	6.7	14	3.8	6.6	13	4.2	7.2	15	
		kgf·m/A	0.4	0.68	1.4	0.39	0.67	1.4	0.43	0.74	1.5	
	24V	N·m/A	0.8	1.3	2.7	0.8	1.3	2.6	0.8	1.4	2.9	
		kgf·m/A	0.08	0.13	0.28	0.08	0.13	0.27	0.08	0.14	0.3	
最大電流 Maximum Current※2 ※5		100V· 200V	A	0.61	0.64	0.48	1.5	1.6	1.1	2.9	3.2	2.4
		24V	A	3.0	3.3	2.4	7.8	8.2	5.6	14.8	16.4	12.3
慣性力矩 Moment of Inertia※3		GD ² /4	kg·m ²	0.0026	0.0074	0.029	0.006	0.017	0.067	0.018	0.05	0.2
		J	kgf·cm ²	0.027	0.075	0.3	0.061	0.17	0.68	0.18	0.51	2.0
減速比 Reduction Ratio				30	50	100	30	50	100	30	50	100
容許力矩負載 Allowable Moment Load		N·m		15			40			75		
		kgf·m		1.5			4.1			7.7		
力矩剛性 Moment Stiffness		N·m/rad		2×10 ⁴			4×10 ⁴			8×10 ⁴		
		kgf·m/rad		0.2×10 ⁴			0.4×10 ⁴			0.8×10 ⁴		
輸出軸解析度 (4 倍頻時) ※4 Output Shaft Resolution (at X4)※4		脈衝 / 旋轉 Pulses/rotation		240000 (3932160)	400000 (6553600)	800000 (13107200)	240000 (3932160)	400000 (6553600)	800000 (13107200)	240000 (3932160)	400000 (6553600)	800000 (13107200)
輸入電源電壓 Power Supply		V		DC24V 或 AC100 或 AC200 DC24V or AC100 or AC200								
質量 Weight		kg		0.4(0.5)			0.62(0.75)			1.2(1.3)		
保護結構 Protective Structure			全封閉自冷型 (等同 IP44) Totally closed, self-cooling type (IP44 Equivalent)									
周圍環境條件 Environmental Conditions			使用溫度：0～40℃／儲存溫度：-20～+60℃ 使用濕度、儲存濕度：20～80% RH (不結露) 耐振動：25m/s ² (頻率：10～400Hz)／耐撞擊：300m/s ² 無粉塵、金屬粉、腐蝕性氣體、易燃性氣體、油霧等 室內使用、陽光直射不到之處 海拔 1000m 以下 絕緣阻抗：100MΩ 以上 (DC500V) 絕緣耐壓：AC1500V/1min 絕緣等級：B 級 絕對編碼器 抗磁性干擾：0.01 特士拉 Operating temperature: 0 to 40°C / Storage temperature: -20 to +60°C / Operating and storage humidity: 20 to 80% RH (avoid condensation) / Vibration resistance: 25m/s ² (frequency: 10 to 400Hz) / Shock resistance: 300m/s ² / Indoor/Install indoors / Avoid dust, metal powder, corrosive gas, inflammable gas, oil mist, other foreign matter and direct sunshine. Use at altitudes of 1,000m above sea level or lower. Insulation resistance: 100MΩ or higher (DC 500V). Dielectric strength: AC 1500V/1min. Insulation class: Class B absolute encoder; magnetic noise resistance: 0.01 tesla									
安裝方向 Mounting Direction			可全方向安裝 All directions									
安全規格 Safety Standards			CE 標章 CE Marking									
組合驅動器 Driver in Combination		100V·200V		HA800-1								
		DC24V(INC)※6		HA-680-4-24						HA-680-6-24		
		DC24V(ABS)※6		山洋電氣 (株) 製的 RF2H21A0AHD RF2H21A0AHD manufactured by Sanyo Denki CO., LTD								

※1 上表的值顯示輸出軸的代表值。

※2 與 HA-800、HA-680 及山洋電氣 (股) 製的 RF2H21A0AHD 伺服驅動器組合時的值。

※3 慣性力矩是將馬達軸與 HarmonicDrive® 的慣性力矩合計值換算成輸出側之值。

※4 輸出軸解析度為增量編碼器 (馬達軸編碼器 4 倍頻時解析度) × (減速比) 所得的值，絕對編碼器為 (馬達軸編碼器解析度) × (減速比) 之值。

※5 () 內的值，為與山洋電氣 (股) 製造的 RF2H21A0AHD 組合時的值。

※6 INC 表示增量編碼器，ABS 表示絕對編碼器。

※1 The figures in the table are those at the output shaft.

※2 The values in parentheses are obtained when connected to the RF2H21A0AHD manufactured by Sanyo Denki CO., LTD.

※3 The moment of inertia is the total value of the motor shaft and HarmonicDrive® moment of inertia values converted to the output side.

※4 The output shaft resolution is (Motor Shaft Encoder Resolution at X4) × (Reduction Ratio) for the incremental encoder, and (Motor Shaft Encoder Resolution) × (Reduction Ratio) for the absolute encoder.

※5 The values in parentheses are obtained when connected to the RF2H21A0AHD manufactured by Sanyo Denki CO., LTD.

※6 'INC' indicates incremental encoder, 'ABS' indicates absolute encoder.

* 關於致動器的旋轉方向請參閱技術資料。

* See the technical information for details on rotation directions of actuators.

主要採用市場

Main adoption markets

- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- FPD 製造設備
- 通訊設備
- 印刷電路製造設備
- 飛機相關
- 玻璃、陶瓷製造設備

- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Telescopes
- Wood, light metal and plastic machine tools
- Flat panel display manufacturing systems
- Communication equipment
- Printed circuit board manufacturing machines
- Aircraft Technology
- Glass and ceramic manufacturing systems



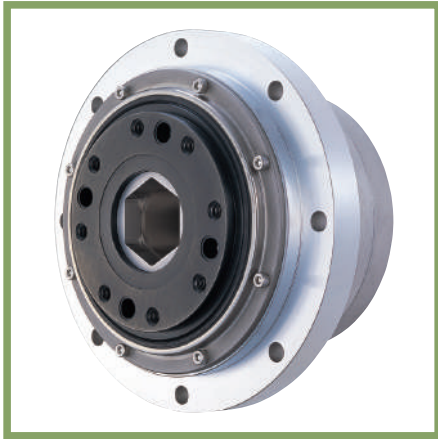
機電產品綜合型錄

General Catalog for
Mechanical Electronic Products

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For more details, please refer to the separate catalog shown above.

FHA-C 系列 FHA-C Series



結合了薄型、精密控制用減速機 HarmonicDrive® 與超薄型 AC 伺服馬達的 AC 伺服致動器。其特徵為前所未見的薄度及精巧，還有中空開孔結構。不僅薄度及精巧程度前所未見，中空開孔結構更是一大特色。將配線、配管、雷射光等通過致動器中央部的貫穿孔，即可輕易完成整個機械、裝置的結構。

小型多功能的專用驅動器 HA-800 系列，能正確且精密地控制 FHA-C 系列的動作。

The servo actuators in this series are comprised of HarmonicDrive® components for precise motion control and super-flat AC servo motors.

The body width is less than half of old models and has a large through hole in the center of the shaft through which electric cables, air pipes, and even laser beams can pass to simplify the entire structure of the machine and system.

Dedicated compact and multifunctional HA-800 drivers are used to accurately and precisely control the operations of the FHA-C Series.

FHA-C 系列額定表 FHA-C Series Ratings

項 目 Item		型式 Model	FHA-17C			FHA-25C			FHA-32C			FHA-40C			
			50	100	160	50	100	160	50	100	160	50	100	160	
最大轉矩 ※2 Maximum Torque※2		N·m		39	57	64	150	230	260	281	398	453	500	690	820
		kgf·m		4.0	5.8	6.5	15.3	23.5	26.5	28.7	40.6	46.2	51.0	70.4	83.7
最高轉速 Maximum Positioning Speed		r/min		96	48	30	90	45	28	80	40	25	70	35	22
轉矩常數 Torque Constant		N·m/A		21	42	67	22	45	72	27	54	86	31	64	102
		kgf·m/A		2.1	4.3	6.8	2.3	4.6	7.3	2.8	5.5	8.8	3.2	6.5	10.4
最大電流 ※2 Maximum Current※2		A		2.1	1.6	1.1	7.3	5.6	4.0	11.4	8.0	5.9	17.3	11.8	9.0
慣性力矩 Moment of Inertia		GD ² /4	kg·m ²	0.17	0.67	1.7	0.81	3.2	8.3	1.8	7.1	18.1	4.9	19.5	50
		J	kgf·cm·s ²	1.7	6.9	17	8.3	33	85	18	72	185	50	200	510
減速比 Reduction Ratio				50	100	160	50	100	160	50	100	160	50	100	160
容許力矩負載 Allowable Moment Load		N·m		188			370			530			690		
		kgf·m		19			38			54			70		
力矩剛性 Moment Stiffness		N·m/rad		220×10 ³			490×10 ³			790×10 ³			1400×10 ³		
		kgf·m/rad		22×10 ³			50×10 ³			80×10 ³			140×10 ³		
輸出軸解析度 (4 倍頻時) ※3 Output Shaft Resolution (at X4)※3		脈衝 / 旋轉 Pulses/rotation		500000	1000000	1600000	500000	1000000	1600000	500000	1000000	1600000	500000	1000000	1600000
輸入電源電壓 Power Supply		V		AC 200			AC 200			AC 200			AC 200		
質量 Weight		kg		2.5			4.0			6.5			12		
保護結構 Protective Structure		全封閉自冷型 (等同 IP44) Totally closed, self-cooling (IP44 Equivalent)													
周圍環境條件 Environmental Conditions		使用溫度：0～40℃ 儲存溫度：-20～+60℃ 使用濕度、儲存濕度：20～80% RH (不結露) 絕緣阻抗：100MΩ (DC500V) 絕緣耐壓：AC1500V/1min 耐振動：24.5m/s ² (頻率：10～400Hz) 耐撞擊：294m/s ² 無粉塵、金屬粉、腐蝕性氣體、油霧等。 室內使用、陽光直射不到之處。海拔 1000m 以下 Operating temperature: 0 to 40℃ / Storage temperature: -20 to +60℃ / Operating and storage humidity: 20 to 80% RH (avoid condensation) / Insulation resistance: 100MΩ (DC 500V) / Dielectric strength: AC 1500V/1min / Vibration resistance: 24.5m/s ² (frequency: 10 to 400Hz). Shock resistance: 294m/s ² . Install indoors. Avoid dust, metal powder, corrosive gas, oil mist, other foreign matter and direct sunshine. Altitude 1000m or less.													
安裝方向 Mounting Direction		可全方向安裝 All directions													
安全規格 Safety Standards		CE 標章、UL 認證 CE marking, UL certification													
組合驅動器 Driver in Combination		HA-800-3C								HA-800-6C					

※1 上表的值顯示輸出軸的代表值。

※2 與 HA-800 伺服驅動器組合時的值。

※3 輸出軸解析度為 (馬達軸編碼器 4 倍頻時解析度) × (減速比) 之值。

※1 The figures in the table are those at the output shaft.

※2 The figures are measured when combined with an HA-800 servo driver.

※3 Output shaft resolution is obtained by the formula (motor shaft encoder resolution when multiplied by 4) × (reduction ratio).

主要採用市場

Main adoption markets

- 機械手臂
- 金屬工具機
- 金屬加工機械
- 印刷、裝訂、紙工機械
- 半導體製造設備
- 木材、輕金屬、塑膠加工機械
- 包裝、捆包機械
- FPD 製造設備
- 通訊設備
- 印刷電路製造設備

- Robots
- Metal machine tools
- Metal working machines
- Printing, bookbinding and paper processing machines
- Semiconductor manufacturing systems
- Wood, light metal and plastic machine tools
- Crating and packaging machines
- Flat panel display manufacturing systems
- Communication equipment
- Printed circuit board manufacturing machines



機電產品綜合型錄

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Mechanical/Electronic Products

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

RSF supermini 系列 RSF supermini Series



RSF supermini 系列組合了精密控制用減速機 HarmonicDrive® 與 AC 伺服馬達，是小型、高轉矩、高旋轉精度的 AC 伺服致動器。另外，RSF-5B 還將有制動器的致動器列為標準產品。藉著搭配能充分發揮 AC 伺服致動器性能的 DC24V 電源專用 AC 伺服驅動器 HA-680，才能推出此款擁有高旋轉精度，以及精巧設計的機器設備。

The RSF-5B is a compact and high-torque AC servo actuator series with a high rotational accuracy, combining a HarmonicDrive® speed reducer for precision control and an AC servo motor. An actuator with brake is part of the standard lineup. Combined with a dedicated AC servo driver HA-680 for DC 24V power supply, which fully demonstrates the performance of this AC servo actuator, these products make compact machines and equipment with a high rotational accuracy a reality.

RSF supermini 系列額定表 RSF supermini Series Ratings

項 目 Item		致動器型式 Actuator Model	RSF-3C			RSF-5B			
			30	50	100	30	50	100	
輸入電源電壓（驅動器） Power Supply Voltage (Driver)		V	DC24±10%			DC24±10%			
容許連續電流 Allowable Continuous Current		A	0.65	0.66	0.56	1.11	0.92	0.76	
容許連續轉矩（容許連續轉速運轉時） Allowable Continuous Torque (During Operation at Allowable Continuous Rotation Speed)		N·m	0.03	0.07	0.11	0.18	0.29	0.44	
		kgf·cm	0.31	0.68	1.08	1.83	2.95	4.48	
容許連續轉速（輸出軸） Allowable Continuous Rotation Speed (Output Shaft)		r/min	150	90	45	150	90	45	
容許連續失速轉矩 Allowable Continuous Stall Torque		N·m	0.04	0.08	0.12	0.28	0.44	0.65	
		kgf·cm	0.41	0.82	1.22	2.85	4.48	6.62	
瞬間最大電流 Instantaneous Maximum Current		A	1.5	1.4	1.1	2.3	2.2	1.7	
最大轉矩 ※2 Maximum Torque※2		N·m	0.13	0.21	0.3	0.5	0.9	1.4	
		kgf·cm	1.27	2.05	2.94	5.1	9.17	14.3	
最高轉速 Maximum Positioning Speed		r/min	333	200	100	333	200	100	
轉矩常數 Torque Constant		N·m/A	0.11	0.18	0.4	0.3	0.54	1.1	
		kgf·cm/A	1.12	1.84	4.08	3.06	5.51	11.22	
感應電壓常數 EMF Constant		V(r/min)	0.015	0.025	0.05	0.04	0.07	0.13	
相阻抗（at 20℃） Phase Resistance (at 20℃)		Ω	1.34			0.82			
相電感 Phase Inductance		mH	0.18			0.27			
慣性力矩 ※3 Moment of Inertia※3		GD ² /4	kg·m ²	0.11×10 ⁻⁴	0.29×10 ⁻⁴	1.17×10 ⁻⁴	0.66×10 ⁻⁴ (0.11×10 ⁻³)	1.83×10 ⁻⁴ (0.31×10 ⁻³)	7.31×10 ⁻⁴ (1.23×10 ⁻³)
		J	kgf·cm·s ²	1.07×10 ⁻⁴	2.98×10 ⁻⁴	11.9×10 ⁻⁴	0.67×10 ⁻³ (1.13×10 ⁻³)	1.87×10 ⁻³ (3.15×10 ⁻³)	7.45×10 ⁻³ (12.6×10 ⁻³)
減速比 Reduction Ratio			30	50	100	30	50	100	
容許徑向負載（輸出軸中位數） Allowable Radial Load (Output Shaft Central Value)		N	36			90			
		kgf	3.6			9.1			
容許推力負載 Allowable Thrust Load		N	130			270			
		kgf	13.2			27.5			
編碼器脈衝數（馬達軸） Encoder Pulses (Motor Shaft)		脈衝 Pulses	200			500			
編碼器解析度（輸出軸：4 倍頻時）※4 Encoder Resolution (Output shaft: when multiplied by 4)※4		脈衝 / 旋轉 Pulses/rotation	24000	40000	80000	60000	100000	200000	
輸入電源電壓 Power Supply	輸入電源電壓 Input Power Supply Voltage	V	——			DC24±10%			
	保持轉矩 Retention Torque	N·m	——			0.18	0.29	0.44	
		kgf·cm	——			1.83	2.95	4.48	
質量 Weight	無制動器 Without Brake	g	31.0（除箱位濾波器）			66.0（除箱位濾波器）			
	有制動器 With Brake	g	——			86.0（除箱位濾波器）			
組合驅動器 Driver in Combination			HA-680-4B-24/HA-680ML-4B-24						

※1 上表的值顯示輸出軸的代表值。

※2 上表的值是與組合驅動器（HA-680-4B-24）組合時的值。其他驅動器相關資訊，請參閱機電產品綜合型錄。

※3 慣性力矩是將馬達軸與 HarmonicDrive® 的慣性力矩合計值換算成輸出側之值。（ ）內為有制動器時的值。

※4 編碼器解析度是（馬達軸編碼器 4 倍頻時解析度）×（減速比）之值。

※1 The table above shows typical output values of actuators.

※2 The values in the table above are obtained when in combination with the combined driver (HA-680-4B-24). See the General Catalog for Mechanical Electronic Products for other drivers.

※3 The moment of inertia is the total value of the motor shaft and HarmonicDrive® moment of inertia values converted to the output side. The values in parentheses are for equipment with a brake.

※4 The encoder resolution is (motor shaft encoder resolution when multiplied by 4) × (reduction ratio).

主要採用市場

Main adoption markets

- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- FPD 製造設備
- 通訊設備
- 印刷電路製造設備
- 玻璃、陶瓷製造設備

- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Telescopes
- Wood, light metal and plastic machine tools
- Flat panel display manufacturing systems
- Communication equipment
- Printed circuit board manufacturing machines
- Glass and ceramic manufacturing systems



機電產品綜合型錄
General Catalog for
Mechanical Electronic Products

詳細內容請參閱本型錄。
For more details, please refer to the separate catalog shown above.

RSF-B mini 系列 RSF-B mini Series



搭載了精密控制用減速裝置 HarmonicDrive® 的 RSF-B mini 系列，和以高容量馬達單體直接驅動的方式相比，相同的外觀尺寸下輸出轉矩更高，能達成高轉矩的目標。
另外可以藉由組合專用 AC 伺服馬達，使用更小、更輕量的產品。

The RSF-B mini series features an integrated HarmonicDrive® component for precision control and is considerably high in output torque in relation to the external dimensions with a high torque, compared to the direct driving method for a single high capacity motor.

Also, this series allows smaller and more lightweight products with a dedicated AC servo motor.

RSF-B mini 系列額定表 RSF-B mini Series Ratings

項 目 Item		致動器型式 Actuator Model	RSF-8B			RSF-11B			RSF-14B			
			30	50	100	30	50	100	30	50	100	
輸入電源電壓（驅動器）Power Supply Voltage (Driver)		V	DC24±10%									
容許連續電流 Allowable Continuous Current		A	2.0	2.0	1.5	5.0	4.9	4.9	4.9	4.7	4.7	
容許連續轉矩（容許連續轉速運轉時） Allowable Continuous Torque (During Operation at Allowable Continuous Rotation Speed)		N·m	0.78	1.4	2.0	1.1	2.0	4.0	1.7	3.0	6.0	
		kgf·cm	7.8	14	20	11	20	41	17	31	61	
容許連續轉速（輸出軸） Allowable Continuous Rotation Speed (Output Shaft)		r/min	100	60	30	100	60	30	100	60	30	
容許連續失速轉矩 Allowable Continuous Stall Torque		N·m	0.95	1.7	3.5	1.7	3.0	5.7	2.5	4.5	9.0	
		kgf·cm	9.3	17	36	17	31	58	26	46	92	
瞬間最大電流 Instantaneous Maximum Current		A	3.8	3.9	2.9	14.4	15.8	9.4	14.4	17.2	12.3	
最大轉矩 ※2 Maximum Torque※2		N·m	1.8	3.3	4.8	4.5	8.3	11	9.0	18	28	
		kgf·cm	18	34	49	46	85	112	92	184	286	
最高轉速 Maximum Positioning Speed		r/min	200	120	60	200	120	60	200	120	60	
轉矩常數 Torque Constant		N·m/A	0.62	1.1	2.1	0.4	0.66	1.5	0.76	1.3	2.6	
		kgf·cm/A	6.3	11	21	4.1	6.7	15	7.8	13	27	
感應電壓常數 EMF Constant		V/(r/min)	0.07	0.11	0.22	0.04	0.07	0.15	0.08	0.13	0.28	
相阻抗（at 20℃） Phase Resistance (at 20℃)		Ω	0.93			0.19			0.26			
相電感 Phase Inductance		mH	0.45			0.10			0.19			
慣性力矩 ※3 Moment of Inertia※3		GD ² /4	kg·m ²	0.06×10 ⁻²	0.16×10 ⁻²	0.65×10 ⁻²	0.18×10 ⁻²	0.49×10 ⁻²	2.0×10 ⁻²	0.41×10 ⁻²	1.1×10 ⁻²	4.5×10 ⁻²
		J	kgf·cm·s ²	0.6×10 ⁻²	1.7×10 ⁻²	6.6×10 ⁻²	1.8×10 ⁻²	5.0×10 ⁻²	20×10 ⁻²	4.1×10 ⁻²	11×10 ⁻²	46×10 ⁻²
減速比 Reduction Ratio			1:30	1:50	1:100	1:30	1:50	1:100	1:30	1:50	1:100	
容許徑向負載（輸出軸中位數） Allowable Radial Load (Output Shaft Central Value)		N	196			245			392			
		kgf	20			25			40			
容許推力負載 Allowable Thrust Load		N	98			196			392			
		kgf	10			20			40			
編碼器脈衝數（馬達軸） Encoder Pulses (Motor Shaft)		脈衝 Pulses	1000									
編碼器解析度（輸出軸：4 倍頻時） ※4 Encoder resolution (Output shaft: when multiplied by 4)※4		脈衝 / 旋轉 Pulses/rotation	120000	200000	400000	120000	200000	400000	120000	200000	400000	
質量 Weight		g	300			500			800			
組合驅動器 Driver in Combination			HA-680-4B-24/HA-680ML-4B-24			HA-680-6B-24/HA-680ML-6B-24						

※1 上表的值顯示輸出軸的代表值。

※2 上表的值是與組合驅動器（HA-680-4B-24）組合時的值。其他驅動器相關資訊，請參閱機電產品綜合型錄。

※3 慣性力矩是將馬達軸與 HarmonicDrive® 的慣性力矩合計值換算成輸出側之值。（ ）內為有制動器時的值。

※4 編碼器解析度是（馬達軸編碼器 4 倍頻時解析度）×（減速比）之值。

※1 The table above shows typical output values of actuators.

※2 The values in the table above are obtained when in combination with the combined driver (HA-680-4B-24). See the General Catalog for Mechanical Electronic Products for other drivers.

※3 The moment of inertia is the total value of the motor shaft and HarmonicDrive® moment of inertia values converted to the output side. The values in parentheses are for equipment with a brake.

※4 The encoder resolution is (motor shaft encoder resolution when multiplied by 4) × (reduction ratio).

主要採用市場

Main adoption markets

- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- FPD 製造設備
- 通訊設備
- 印刷電路製造設備
- 玻璃、陶瓷製造設備

- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Telescopes
- Wood, light metal and plastic machine tools
- Flat panel display manufacturing systems
- Communication equipment
- Printed circuit board manufacturing machines
- Glass and ceramic manufacturing systems



機電產品綜合型錄
General Catalog for
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RSF、RKF 系列 RSF·RKF Series



組合了精密控制用減速機 HarmonicDrive® 與 AC 伺服馬達，高轉矩、高旋轉精度、設計精巧的 AC 伺服致動器。

最適合做為追求節省空間的機器、設備的定位驅動動力。

The AC servo actuators in the RSF-RKF series are comprised of a HarmonicDrive® component for precise motion control and an AC servo motor, featuring high torque and high rotational accuracy in a compact design.

The RSF-RKF series AC servo actuators are best suited as positioning drives for machines and systems that require a more compact design.

RSF、RKF 系列額定表 RSF·RKF Series Ratings

項 目 Item		型式 Model	RSF-17A		RSF-20A/RKF-20A		RSF-25A/RKF-25A		RSF-32A/RKF-32A	
		50	100	50	100	50	100	50	100	
額定輸出 ※3 Rated Output※3		W	62	62	120	111	180	190	310	310
輸入電源電壓 ※3 Power Supply Voltage※3		V	AC200							
額定轉矩 ※3 Rated Torque※3		N·m	9.8	20	19	35	29	59	49	98
		kgf·cm	100	200	190	360	300	600	500	1000
額定轉速 ※3 Rated Positioning Speed※3		r/min	60	30	60	30	60	30	60	30
容許連續失速轉矩 ※3 Allowable Continuous Stall Torque※3		N·m	9.8	20	19	35	29	59	49	98
		kgf·cm	100	200	190	360	300	600	500	1000
瞬間最大轉矩 ※3 Maximum Maximum Torque※3		N·m	34	54	56	82	98	160	220	330
		kgf·cm	350	550	570	840	1000	1600	2200	3400
最高轉速 ※3 Maximum Positioning Speed※3		r/min	90	45	90	45	90	45	90	45
慣性力矩 ※4 Moment of Inertia※4		kg·m ²	0.047	0.19	0.098	0.39	0.19	0.77	0.67	2.7
		kgf·cm·s ⁻²	0.48	1.9	1.0	4.0	2.0	7.9	6.9	27
減速比 Reduction Ratio			50	100	50	100	50	100	50	100
容許徑向負載 Allowable Radial Load		N	780		RSF=1400/RKF=2000		RSF=2900/RKF=2500		RSF=4400/RKF=3900	
		kgf	80		RSF=140/RKF=200		RSF=300/RKF=250		RSF=450/RKF=400	
容許推力負載 Allowable Thrust Load		N	780		RSF=1370/RKF=880		RSF=2900/RKF=1100		RSF=4400/RKF=1600	
		kgf	80		RSF=140/RKF=90		RSF=300/RKF=110		RSF=450/RKF=160	
檢出器解析度（4 倍頻時）※5 Detector Resolution (At ×4)※5		脈衝 / 旋轉 Pulses/rotation	400000	800000	400000	800000	400000	800000	400000	800000
質量 Weight		kg	2.1		RSF=2.9/RKF=2.9		RSF=4.7/RKF=5.0		RSF=8.7/RKF=9.5	
周圍環境條件 Driver in Combination			時間額定：連續 勵磁方式：永磁式 絕緣等級：B 級 絕緣耐壓：AC100V/1 分鐘 絕緣阻抗：DC500V 100MΩ 以上 環境溫度：0 ～ 40℃ 儲存溫度：-20 ～ +60℃環境濕度：20 ～ 80% RH（不結露） 耐振動：25m/s ² Time Constant: Continuous / Excitation System: Permanent magnet type / Insulation class: Class B / Dielectric strength: AC 100V/1min. / Insulation resistance: DC 500V 100MΩ or higher / Ambient temperature: 0 to 40℃ / Storage temperature: -20 to +60℃ / Ambient humidity: 20 to 80% RH (avoid condensation) / Vibration resistance: 25m/s ²							
組合驅動器 Driver in Combination			HA-800-3B		HA-800-3B		HA-800-3B		HA-800-6B	

※1 致動器規格標示了所有輸出軸的數值，為包含 HarmonicDrive® 效率的值。

※2 致動器規格為將致動器安裝到下列鋁散熱片時的值。

RSF-8 ~ 14: 150×150×6(mm) RSF-17、RSF-20: 250×250×12(mm) RSF-25、RSF-32: 300×300×15(mm)

※3 各值為溫度上升最大限度時的值。其他值表示在 20℃ 時的數值。

※4 慣性力矩是將馬達軸與 HarmonicDrive® 的慣性力矩合計值換算成輸出軸之值。

※5 檢出器解析度為（馬達軸編碼器 4 倍頻時解析度）×（減速比）之值。

※1 Values are at the output shaft and include efficiency of HarmonicDrive® component.

※2 Values are when the actuator is mounted on the following aluminum heat radiation plates: RSF-8 to 14: 150×150×6mm; RSF-17 and RSF-20: 250×250×12mm; RSF-25 and RSF-32: 300×300×15mm.

※3 The values in the table are measured when temperature rise is saturated. The other values are measured at 20°C.

※4 Moment of inertia is the total value of motor inertia at the motor shaft and HarmonicDrive® component that is converted at output shaft.

※5 The quad encoder resolution is obtained by the formula (motor shaft encoder resolution when multiplied by 4) × (reduction ratio)

主要採用市場

Main adoption markets

- 機械手臂
- 金屬工具機
- 金屬加工機械
- 半導體製造設備
- 木材、輕金屬、塑膠加工機械
- 包裝、捆包機械
- FPD 製造設備
- 通訊設備
- 印刷電路製造設備
- 玻璃、陶瓷製造設備

- Robots
- Metal machine tools
- Metal working machines
- Semiconductor manufacturing systems
- Wood, light metal and plastic machine tools
- Crating and packaging machines
- Flat panel display manufacturing systems
- Communication equipment
- Printed circuit board manufacturing machines
- Glass and ceramic manufacturing systems



機電產品綜合型錄
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For more details, please refer to the separate catalog shown above.

RH 系列 RH Series



組合了精密控制用減速機 HarmonicDrive® 與 DC 伺服馬達，高旋轉精度的小型、高轉矩的 DC 伺服致動器。

最適合做為追求高精度及節省空間的機器、設備的定位驅動動力。

The DC servo actuator RH series is comprised of HarmonicDrive® components for precision motion control and a DC servo motor, featuring a high torque, high rotational accuracy and a compact design. The RH series DC servo actuators are best suited as positioning drive sources for machines and systems that require a more compact design.

RH 系列額定表 RH Series Ratings

項目 Item	型 式 Model	RH-5A			RH-8D		RH-11D		RH-14D	
		8802	5502	4402	6006	3006	6001	3001	6002	3002
額定輸出 Rated Output	W	1.5	1.7	1.4	8.6	6.2	13.6	12.3	20.3	18.5
額定電壓 Rated Voltage	V	12	12	12	24	24	24	24	24	24
瞬間最大轉矩 Maximum Momentary Torque	N·m	0.39	0.59	0.69	2.7	3.5	4.9	7.8	14	20
	kgf·cm	4.0	6.0	7.0	27	36	50	80	140	200
最大連續失速轉矩 Allowable Continuous Stall Torque	N·m	0.24	0.39	0.43	1.5	2.3	2.5	4.4	5.4	7.8
	kgf·cm	2.4	4.0	4.4	15	23	25	45	55	80
額定轉矩 Rated Torque	N·m	0.16	0.29	0.29	1.4	2.0	2.2	3.9	3.2	5.9
	kgf·cm	1.6	3.0	3.0	14	20	22	40	33	60
最高轉速 Maximum Positioning Speed	r/min	180	110	90	100	50	100	50	100	50
額定轉速 Rated Positioning Speed	r/min	88	55	44	60	30	60	30	60	30
瞬間最大電流 Maximum Momentary Current	A	0.83	0.78	0.77	1.6	1.1	2.4	2.1	5.4	4.1
額定電流 Rated Current	A	0.5	0.5	0.5	1.0	0.8	1.3	1.3	1.8	1.8
轉矩常數 Torque Constant	N·m/A	0.69	1.11	1.38	2.1	4.2	2.46	4.91	2.92	5.76
	kgf·cm/A	7.06	11.3	14.1	21.4	42.9	25.1	50.1	29.8	58.8
慣性力矩 Moment of Inertia	kg·m ²	6.3×10^{-4}	16×10^{-4}	25×10^{-4}	37×10^{-4}	150×10^{-4}	110×10^{-4}	430×10^{-4}	210×10^{-4}	810×10^{-4}
	kgf·cm·s ²	0.007	0.016	0.026	0.04	0.15	0.11	0.44	0.21	0.83
容許推力負載 Allowable Thrust Load	N	29	29	29	98	98	196	196	392	392
	kgf	3.0	3.0	3.0	10	10	20	20	40	40
減速比 Reduction Ratio		50	80	100	50	100	50	100	50	100
質量 Weight	kg	0.09	0.09	0.09	0.3	0.3	0.5	0.5	0.77	0.77
周圍環境條件 Environmental Conditions		時間規定：連續 保護結構：全開自冷 環境溫度：0 ~ 40°C 環境濕度：35 ~ 80% RH（不結露） Time constant: Continuous Protection: Totally closed, self-cooling Ambient temperature: 0 to 40°C Ambient humidity: 35 to 80% RH (avoid condensation)								
組合驅動器※1 Driver in Combination※1		HS-360-1A			HS-360-1B		HS-360-1C		HS-360-1D	

※1 ※ 與 HS-360 組合時，編碼器為線驅動器規格。

※1 The encoder uses the line driver specs when the HS-360 is combined.

主要採用市場

Main adoption markets

- 半導體製造設備
- 測量、分析、測試設備
- 醫療機械
- 光學相關設備
- 製紙機器
- 包裝、捆包機械
- FPD 製造設備
- 通訊設備
- 飛機相關

- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Medical equipment
- Optical machines
- Paper-making machines
- Crating and packaging machines
- Flat panel display manufacturing systems
- Communication equipment
- Aircraft Technology



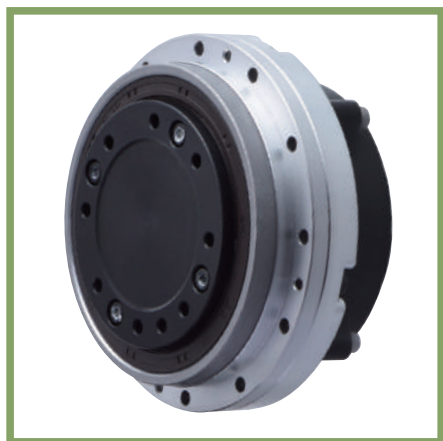
機電產品綜合型錄

General Catalog for
Mechanical Electronic Products

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

FLA 系列 FLA Series



組合小型、高輸出的無刷 DC 馬達與高精度、高性能減速機，開發薄型、輕量的無刷 DC 致動器並完成標準化。豐富了減速機種類的陣容，包括特徵為高速、高效率的行星減速機 HarmonicPlanetary®，與高精度、高輸出轉矩為特徵的精密控制用減速機 HarmonicDrive®。支援可使用電池驅動的 DC24V 以及電源電壓 DC48V。

The new ultra-flat, ultra-light brushless actuators combine our high-precision and high-performance reducers with a compact, high-output brushless DC motor.

FLA actuators are available with our high speed, high-efficiency HarmonicPlanetary® gearhead or with our high-precision, high-torque HarmonicDrive® reducer.

We offer both 24VDC and 48VDC versions to work with battery-powered applications.

FLA 系列額定表 FLA Series Ratings

項 目 Item			型 式 Model	FLA-11A-08HP	FLA-14A-08HP	FLA-17A-09HP	FLA-20A-09HP	FLA-11A-xxFB		FLA-14A-xxFB		FLA-17A-xxFB		FLA-20A-xxFB	
							50	100	50	100	50	100	50		
最大轉矩 ^{※1} Maximum Torque ^{※1}			N·m	1.8	3.7	7.3	12.1	6.7	11	11.2	18.2	23	34	33	
容許連續轉矩 ^{※1※2} Allowable Continuous Torque ^{※1※2}			N·m	0.6	1.2	3.0	4.1	1.7	2.4	2.6	3.8	7.9	11.4	13	
最高轉速 ^{※1} Maximum Speed ^{※1}			r/min	500	500	500	400	100	50	100	50	100	50	80	
容許連續轉速 ^{※1※2} Allowable Continuous Rotation Speed ^{※1※2}			r/min	100	100	100	100	60	30	60	30	60	30	50	
最大電流 ^{※1} Maximum Current ^{※1}			A	DC24V	8.7	18.0	26.2	31.4	6.0	5.0	9.7	8.7	18.4	14.3	19.2
				DC48V	4.5	9.6	13.6	17.8	3.1	2.6	4.8	4.2	9.4	7.2	10.7
容許連續電流 ^{※1※2} Allowable Continuous Current ^{※1※2}			A	DC24V	3.0	6.0	10.4	10.7	1.9	1.7	3.0	2.5	6.8	5.3	8.7
				DC48V	1.6	3.0	5.3	6.0	1.0	0.8	1.5	1.2	3.4	2.9	5.1
慣性力矩 Moment of Inertia			GD ² /4	kg·m ²	0.00013	0.00039	0.001	0.0026	0.0073	0.029	0.019	0.077	0.048	0.19	0.12
減速比 Reduction Ratio					1 ∶ 8	1 ∶ 8	1 ∶ 9	1 ∶ 9	1:50	1:100	1:50	1:100	1:50	1:100	1:50
容許力矩負載 Allowable Moment Load			N·m	1.2	1.6	2.0	2.4	1.2		1.6		2.0		2.4	
力矩剛性 Moment Stiffness			N·m/rad	2.0 × 10 ³	3.3 × 10 ³	4.4 × 10 ³	5.1 × 10 ³	2.0 × 10 ³		3.3 × 10 ³		4.4 × 10 ³		5.1 × 10 ³	
輸出軸解析度 Output Shaft Resolution			脈衝 / 旋轉 pls/rev	240	240	270	432	1500	3000	1500	3000	1500	3000	2400	
質量 Weight			g	390	620	870	1060	420		720		940		1170	
安裝方向 Installation Direction				可全方向安裝 Can be installed in any direction											
保護結構 Protective Structure				全封閉自冷型 (IP40) Fully enclosed self-cooling type (IP40)											

上表的值顯示輸出軸的代表值。

※1 與下列驅動器組合時的代表特性。

F series: FLA-11A, FLA-14A

S series: FLA-17A, FLA-20A

※2 當安裝於上表所示尺寸的鋁製散熱板時，溫度上升到最大限度時的數值。

(散熱板尺寸 型號 11: 220×220×8[mm]，型號 14: 250×250×10[mm]，型號 17: 280×280×12[mm]，型號 20: 300×300×15[mm])

The above values are typical values on the output shaft.

※1 The characteristics shown below are typical in combination with a driver.

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

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

※2 These are the values when the product is mounted onto an aluminum heat dispersion panel during saturated temperature increase.

(Heat dispersion panel dimensions: Model No. 11: 220 x 220 x 8mm, Model No. 14: 250 x 250 x 10mm, Model No. 17: 280 x 280 x 12mm, Model No. 20: 300 x 300 x 15mm)

建議驅動器 Recommended Driver

YASKAWA CONTROLS CO., LTD. 製低電壓無刷 DC 馬達驅動器

Low-Voltage Brushless DC Motor Drive Manufactured by Yaskawa Controls CO., LTD

● S series (速度控制・轉矩控制) S Series (Speed Control and Torque Control)

● F series (速度控制・轉矩控制) F Series (Speed Control and Torque Control)

主要採用市場

Main adoption markets

- 人形機器人
- 木材、輕金屬、塑膠加工機械
- 製紙機器
- 包裝、捆包機械
- 通訊設備
- 飛機相關
- 玻璃、陶瓷製造設備

- Humanoid Robots
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines
- Communication equipment
- Aircraft Technology
- Glass and ceramic manufacturing systems



新產品快訊 Vol.31
超薄無刷 DC 致動器
FLA 系列

New Product News Vol.31
Ultra-Flat Brushless DC Actuators
FLA Series

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

LBC、LA、LAH 系列 LBC·LA·LAH Series



採用擁有優異旋轉精度的精密控制用減速機 HarmonicDrive® 及超精密的螺絲，實現微米、次微米等級的定位，滿足高解析度且精密的測量或檢查設備、光學儀器、半導體或液晶製造設備等的定位需求。

The LBC/LA/LAH Series uses a HarmonicDrive® reducer for precision control with superior rotational accuracy and an ultra-precise screw, which makes positioning possible down to the micron and sub-micron—a requirement for precise, high-resolution measuring and inspection devices, optical devices, semiconductors, LCD manufacturing equipment and so on.

LBC	／ AC 伺服馬達／高推力定位型 AC Servo Motors High-thrust Positioning Type
LA	／ DC 伺服馬達／低推力定位型 DC Servo Motors Low-thrust Positioning Type
LAH-46	／ DC 伺服馬達／中推力定位型 DC Servo Motors Medium-thrust Positioning Type

LBC 系列額定表 LBC Series Ratings

型 式 Model	項目 Item	驅動 Drive	行程 (mm) Stroke(mm)	最大推力 (N) Maximum Driving Force (N)	解析度 (μm) Resolution(μm)	最大進給速度 (mm/s) Maximum Feed Speed (mm/s)	單一方向定位 Uni-directional Positioning Accuracy	反覆定位 Positional Repeatability	外觀 (mm) External Dimensions (mm)	全長 (mm)※1 Total Length (mm)※1
LBC-25A-5D6K		AC 馬達 AC Servo Motor	50	6000	0.32	20	—	±5 μm 以下 ±5 μm or less	φ 136	328
LBC-25A-5D12K		AC 馬達 AC Servo Motor	50	12000	0.16	10				

※1 輸出軸縮入時的狀態。

※1 Indicates the length when the output shaft is pulled in.

LA 系列額定表 LA Series Ratings

型 式 Model	項目 Item	驅動 Drive	行程 (mm) Stroke(mm)	最大推力 (N) Maximum Driving Force (N)	解析度 (μm) Resolution(μm)	最大進給速度 (mm/s) Maximum Feed Speed (mm/s)	單一方向定位 Uni-directional Positioning Accuracy	反覆定位 Positional Repeatability	外觀 (mm) External Dimensions (mm)	全長 (mm)※1 Total Length (mm)※1
LA-30B-10-F		DC 馬達 DC Servo Motor	10	49	0.0174	0.9	2 μm 以下／ 行程 40 μm 2 μm or less/ 40 μm stroke	±0.1 μm 以下／ 行程 1mm ±0.1 μm or less/ 1mm stroke	□ 28	143
LA-32-30-F		DC 馬達 DC Servo Motor	30	49	0.0174	0.9				

※1 輸出軸縮入時的狀態。

※1 Indicates the length when the output shaft is pulled in.

LAH 系列額定表 LAH Series Ratings

型 式 Model	項目 Item	驅動 Drive	行程 (mm) Stroke(mm)	最大推力 (N) Maximum Driving Force (N)	解析度 (μm) Resolution(μm)	最大進給速度 (mm/s) Maximum Feed Speed (mm/s)	單一方向定位 Uni-directional Positioning Accuracy	反覆定位 Positional Repeatability	外觀 (mm) External Dimensions (mm)	全長 (mm)※1 Total Length (mm)※1
LAH-46-1002-F		DC 馬達 DC Servo Motor	10	390	0.069	3.7	4 μm 以下／ 行程 0.2mm 4 μm or less/ 0.2mm stroke	±0.5 μm 以下／ 行程 1mm ±0.5 μm or less/ 1mm stroke	□ 47	185
LAH-46-3002-F		DC 馬達 DC Servo Motor	30	390	0.069	3.7				

※1 輸出軸縮入時的狀態。

※1 Indicates the length when the output shaft is pulled in.

主要採用市場

Main adoption markets

- 金屬工具機
- 半導體製造設備
- 望遠鏡
- 木材、輕金屬、塑膠加工機械
- FPD 製造設備
- 通訊設備
- 印刷電路製造設備
- 玻璃、陶瓷製造設備

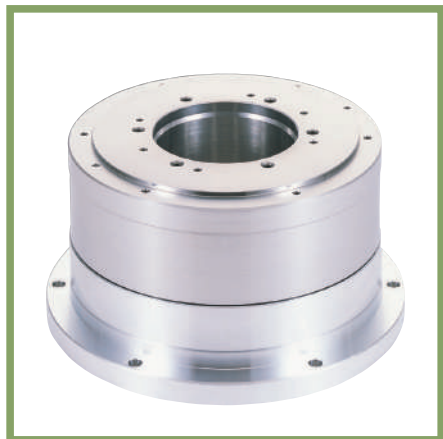
- Metal machine tools
- Semiconductor manufacturing systems
- Telescopes
- Wood, light metal and plastic machine tools
- Flat panel display manufacturing systems
- Communication equipment
- Printed circuit board manufacturing machines
- Glass and ceramic manufacturing equipment



機電產品綜合型錄
General Catalog for
Mechanical Electronic Products

詳細內容請參閱本型錄。
For more details, please refer to the separate catalog shown above.

KDU 系列 KDU Series



KDU 系列是以超高解析度【1,184 萬分割／旋轉】實現高精度定位【絕對定位精度 10 秒、反覆定位精度 ± 0.5 秒】的直接驅動馬達。另外配合輸出轉矩，準備 2 種機型以供選擇。

The KDU series are direct driver motors that offer high-precision positional accuracy [Absolute position accuracy: 10 arcs/s; repeatability: ± 0.5 arcs/s] at super high resolution [11.84 million divisions/revolution]. Two types are available according to output torque.

KDU 系列額定表 KDU Series Ratings

項目 Item	型式 Model	KDU	
		-13SB	-13WB
最大轉矩 ※2 Maximum Torque ^{※2}	N·m	7.0	15.0
	kgf·m	0.7	1.5
最高轉速 Maximum Positioning Speed	r/min	127	127
轉矩常數 Torque Constant	N·m/A	3.1	6.5
	kgf·m/A	0.32	0.66
輸入電源電壓 Power Supply	V	AC100/AC200	
感應電壓常數 EMF Constant	V/(r/min)	0.33	0.68
線路阻抗 Line Resistance	Ω (20°C)	9.1	14.0
線路電感 Line Inductance	mH	19	35
慣性力矩 Moment of Inertia	kg·m ²	0.0047	0.0065
	kgf·cm·s ²	0.048	0.066
力矩剛性 Moment Stiffness	GD ² /4 N·m/rad	2.4×10^5	
	J kgf·m/rad	0.2×10^4	
馬達位置檢出器 Motor Position Sensor	Pulses/rotation	增量編碼器 A、B 相位矩形波：11,840,000 Z 相脈衝訊號 Incremental encoder rectangular wave of phases A and B: 11,840,000-pulse signal of phase Z	
反覆定位精度 ※3 Positional Repeatability Precision ^{※3}	arc-sec	± 0.5	
絕對定位精度 ※3 Absolute Positioning Accuracy ^{※3}	arc-sec	10 (經角度位置校正) ^{※4} 10 (Angular position corrected) ^{※4}	
質量 Weight	kg	4.0	5.0
保護結構 Protective Structure		全封閉自冷型 (等同 IP40) Totally-enclosed self-cooled type (IP40 or equivalent)	
周圍環境條件 Environmental Conditions		使用溫度：10 ~ 30°C / 儲存溫度：-10 ~ +60°C、(※3) 使用濕度 / 儲存濕度：20 ~ 80% RH (不結露) 搬運、安裝時耐振動：25m/s ² (頻率：10 ~ 400Hz) / 搬運、安裝時耐撞擊：300m/s ² 無粉塵、金屬粉、腐蝕性氣體、易燃性氣體、油霧等，室內使用、陽光直射不到之處，海拔 1000m 以下 Operating temperature: 10 ~ 30°C / Storage temperature: -10 ~ +60°C ^{※3} / Operating humidity/storage humidity: 20 ~ 80% RH or less (avoid condensation) Resistance to vibration during delivery/installation: 25m/s ² (frequency: 10 to 400Hz) / Resistance to impact during delivery/installation: 300m/s ² Avoid exposure to powder or dust, metal powder, corrosive gases, flammable gas/oil mist, etc. / To be used indoors. Do not expose to direct sunlight. For use at altitudes 1000m and lower.	
馬達絕緣 Motor Insulation		絕緣阻抗：100M Ω 以上 (DC500V) Insulation Resistance: 100M Ω or more	絕緣耐壓：AC1500V/1min Insulation Strength: AC1500V / 1min 絕緣等級：B 級 Insulation Class: Class B
安裝方向 Mounting Direction		輸出軸朝上 Output shaft facing upward	

※1 上表值為輸出軸的值。

※2 與 HA-770 伺服驅動器組合時的值。

※3 反覆定位精度、絕對定位精度的值是以輸出軸朝上的安裝方向為條件，並於溫度 23 $\pm$ 0.3°C、濕度 50% 之測量環境的值。

※4 是依據 HA-770 伺服驅動器角度位置校正的值。

※1 The table above shows output values of the output shaft.

※2 The values in the table above are obtained when connected to the HA-770 servo driver.

※3 The repeatability and absolute repeatability are the values measured in an environment of 23 $\pm$ 0.3°C in temperature, 50% RH in humidity and with the output shaft facing upward in mounting direction.

※4 Value after angular position of the HA-770 servo driver is corrected.

主要採用市場

Main adoption markets

- 半導體製造設備
- 測量、分析、測試設備
- 光學相關設備
- FPD 製造設備

- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Optical machines
- Flat panel display manufacturing systems



機電產品綜合型錄

General Catalog for
Mechanical Electronic Products

詳細內容請參閱本型錄。
For more details, please refer to the separate catalog shown above.

HMA 系列 HMA Series



我們結合了本公司精巧、薄型、中空開孔之產品特徵，推出了伺服馬達的標準品。透過中心開孔的設備結構，實現了機構的精巧設計，並降低了成本。

This series offers the advantages of our products, including a compact size, flat shape, and hollow shaft. The HMA Series servo motors offers these features, and have been added to our product lineup as a standard product. The device configuration containing the hollow shaft offers a mechanism with a reduction of size and cost.

HMA 系列額定表 HMA Series Ratings

項目 Item		型式 Model	HMAC08	HMAB09		HMAB12	HMAB15	HMAA21A
輸入電源電壓 Input Power Supply Voltage		V	200	200	100	200	200	200
瞬間最大轉矩 Instantaneous Maximum Torque ^{※1}		N·m	1.8	3.0		6.6	13	33
		kgf·m	0.18	0.31		0.67	1.33	3.37
最高轉速 Maximum Speed ^{※1}		r/min	6000	5600	4800	4800	4000	3000
瞬間最大電流 Instantaneous Maximum Current ^{※1}		A	6.5	8.9	15.4	18	29	55
轉矩常數 Torque Constant ^{※1}		N·m/A	0.35	0.41	0.24	0.44	0.54	0.72
		kgf·m/A	0.036	0.042	0.024	0.045	0.055	0.073
感應電壓常數 EMF Constant ^{※2}		V/(r/min)	0.037	0.043	0.025	0.046	0.057	0.075
相阻抗 (20℃) Phase Resistance (20℃)		Ω	1.43	1.2	0.4	0.33	0.19	0.028
相電感 Phase Inductance		mH	2.5	3.0	1.0	1.4	1.2	0.29
慣性力矩 () 代表有制動器 Moment of Inertia () Indicates Models Equipped With a Brake	GD ² /4	× 10 ⁻⁴ kg·m ²	0.734 (0.828)	1.78 (2.16)		6.45 (6.83)	15.8 (19.8)	125 (141)
	J	× 10 ⁻⁴ kgf·cm ²	7.49 (8.45)	18.2 (22.1)		65.8 (69.7)	161 (202)	1280 (1444)
容許徑向負載 (靜止時) Allowable Radial Load (Static)		N	800	800		1200	2400	4500
		kgf	81.6	81.6		122	245	459
容許軸向負載 (靜止時) Allowable Axial Load (Static)		N	1900	2400		3600	5000	14000
		kgf	194	245		367	510	1429
編碼器類型 Encoder Type			絕對編碼器 Absolute encoder					
編碼器解析度 Encoder Resolution Capability	單旋轉部 Single turn motor revolution		2 ¹⁷ (131072)					
	多旋轉部 Multi-revolution counter ^{※3}		2 ¹⁶ (65536)					
質量 () 代表有制動器 Weight () Indicates Models Equipped With a Brake		kg	1.4 (1.5)	2.0 (2.1)		3.4 (3.8)	5.5 (6.2)	17.5 (19.7)
周圍環境條件 Ambient Environment Specifications			使用溫度：0 ~ 40℃ / 儲存溫度：-20 ~ +60℃ 使用濕度 / 儲存濕度：20 ~ 80% RH (不結露) 耐振動：25m/s ² (頻率：10 ~ 400Hz) / 耐撞擊：300 m/s ² 無粉塵、金屬粉、腐蝕性氣體、易燃性氣體、油霧等， 室內使用、陽光直射不到之處，海拔1000m 以下 Operating temperature: 0 to 40°C / Storage temperature: -20 to +60°C Operating/storage humidity: 20 to 80% RH (avoid condensation) Vibration resistance: 25 m/s ² (frequency: 10 to 400 Hz) / Impact resistance: 300 m/s ² Avoid dust, metal powder, corrosive gas, flammable gas, oil mist, or other similar material. Place indoors without being exposed to direct sunlight. Altitude: 1,000 m or less					
馬達絕緣 Motor Insulation			絕緣阻抗：100M Ω 以上 (DC500V) 絕緣耐壓：AC1500V/1min 絕緣等級：A 級 Insulation resistance: 100 MΩ (500 VDC) or higher Dielectric strength voltage: 1500 VAC/min Insulation class: A					
安裝方向 Mounting Direction			可全方向安裝 Can be installed in any direction.					
保護結構 Protection Structure			全封閉自冷型 (IP54) Totally enclosed self-cooled type (IP54)					
組合驅動器 Combined Driver			HA-800 □ -3D/E-200	HA-800 □ -3D/E-200	HA-800 □ -6D/E-100	HA-800 □ -6D/E-200	HA-800 □ -24D/E-200	HA-800 □ -24D/E-200

上表中的數值為代表值。

※1 為與本公司驅動器組合 (透過理想正弦波驅動) 時的代表特性。

※2 這是相位感應電壓常數乘以 3 倍的數值。

※3 多旋轉計算範圍為 -32,716 ~ 32,767。

The values in the table above show typical values.

※1 These are typical characteristics when the product is combined with our driver (driven with the ideal sine wave).

※2 This is the value of the phase EMF constant multiplied by 3.

※3 The range of the multi revolution counter is from -32,768 to 32,767.

主要採用市場

Main adoption markets

- 金屬工具機
- 印刷、裝訂、紙工機械
- 測量、分析、測試設備
- 木材、輕金屬、塑膠加工機械
- 製紙機器
- 包裝、捆包機械

- Metal machine tools
- Printing, bookbinding and paper processing machines
- Measurement, analytical and test systems
- Wood, light metal and plastic machine tools
- Paper-making machines
- Crating and packaging machines



新產品快訊 Vol.32
薄型中空 AC 伺服馬達
HMA 系列
New Product News Vol.32
Flat Hollow Shaft AC Servo Motor
HMA Series

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

LSA 系列 LSA Series



可進行高回應、高精度光學掃描的電流式掃描器 LSA 系列，是結合了本公司生產的小型馬達及獨家開發的光學感測技術所推出的產品。藉由與專用的驅動器組合，可依指令訊號進行連續掃描（Scanning）、任意定位（Random Access）等的最佳掃描。

The Optical Galvano Scanners LSA series for high-response and high-accuracy optical scanning are comprised of an unique compact motor and optical sensor. When combined with a dedicated driver, this series allows continuous scanning, random access and other optimal scanning in accordance with command signals.

LSA 系列額定表 LSA Series Ratings

項目 Item		型 式 Model	LSA-10A-30
最大偏轉角 Maximum Angular Runout		度 Degrees	±15
轉子慣性力矩 Rotor Moment of Inertia		$\text{g}\cdot\text{cm}^2$	1.9
轉矩常數 Torque Constant		$\text{N}\cdot\text{m}/\text{A}$	0.0077
線圈阻抗 Coil Resistance		Ω	0.28
線圈電感 Coil Inductance		mH	0.098
感測器直線性（滿刻度時） Sensor Linearity (at full scale)		%	±0.06
感測器角度靈敏度 Sensor Angle Sensitivity		V/度 V/deg	0.275
偏移偏差 Offset Drift		$\mu\text{rad}/^\circ\text{C}$	25
刻度偏差 Scale Drift		$\%/^\circ\text{C}$	0.005
位置重現性（除偏移／刻度偏差）※1 Position Reproducibility (excluding offset/scale drift)※1		μrad	5
1°步距回應 負載條件：（ $1\text{g}\cdot\text{cm}^2$ ）※2 1°step Response Load Condition: ($1\text{g}\cdot\text{cm}^2$)※2		ms	0.5
感測器電源電壓 Sensor Power Supply		V	5±5%、-15±5%
感測器消耗電壓 Sensor Power Consumption	5V±5%	mA	90 (Max)
	-15V±5%	mA	120 (Max)
質量 Weight		g	180

※1 角度全部以機械角表示。

※2 為與本公司標準驅動器組合時的值。

※1 All angles are mechanical angles.

※2 Values are combinations with a standard Harmonic driver.

主要採用市場

Main adoption markets

- 金屬加工機械
- 測量、分析、測試設備
- 光學相關設備
- 通訊設備
- 玻璃、陶瓷製造設備

- Metal working machines
- Measurement, analytical and test systems
- Optical machines
- Communication equipment
- Glass and ceramic manufacturing systems



機電產品綜合型錄

General Catalog for
Mechanical Electronic Products

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

微型編碼器系列 Micro Encoder Series



微型編碼器系列是具有矩形波 3 頻道輸出功能的超小型、高解析度的增量編碼器。

Our micro encoder series feature incremental encoders with compact resolution, enabling a function for output at three shortwave channels (wavelengths).

微型編碼器系列額定表 Micro Encoder Series Ratings

項目 Item	型式 Model	MES-6- ☐ PC 脈衝數 Number of Pulses	ME ☐ -9- ☐ P ☐ 脈衝數 Number of Pulses 軸形狀 S= 單軸 H= 中空軸 Shaft Shapes: S= Single shaft H= Hollow shaft
電源電壓 Power Supply		DC5V±10%	DC5V±10%
消耗電流 Current Consumption		30mA 以下 (無負載時) 30mA or less (under no load)	40mA 以下 (無負載時) 40mA or less (under no load)
檢出方式 Detection System		增量型 Incremental	增量型 Incremental
輸出脈衝數 (標準) [脈衝數 / 轉] Number of Output Pulses(Standard) [Number of Pulses/Number of Revolutions]		100 200 300 360	100 200 300 360 500 1000
輸出相 Output Phases		A、B、Z 相 A, B and Z phases	A、B、Z 相 (Z = 「H」) A, B and Z phases (Z = "H")
輸出形態 Output Mode		矩形波 開路集極輸出 Short wave (short wavelengths) open collector output	矩形波 開路集極輸出 Short wave (short wavelengths) open collector output
最高回應頻率 (回應脈衝數) Maximum Response Frequency (Number of Response Pulses)		100kHz	100kHz
輸出相位差 Output Phase Difference		A、B 相位差 90°±45° (T/4±T/8) Z 相 T±T/2 (參閱輸出波形圖) Difference between A and B Phases 90° ±45° (T/4 ±T/8), Z Phase ±T/2 (See output waveform diagram)	A、B 相位差 90°±45° (T/4±T/8) Z 相 T±T/2 (參閱輸出波形圖) Difference between A and B Phases 90° ±45° (T/4 ±T/8), Z Phase ±T/2 (See output waveform diagram)
容許最高轉速 (機械性) Allowable Maximum Positioning Speed (Mechanical)		6000r/min	6000r/min
使用環境溫度 / 濕度 Operating Temperature and Humidity		0°C～60°C RH35%～90% 不結露 Avoid condensation	0°C～60°C RH35%～90% 不結露 Avoid condensation
保存環境溫度 Ambient Storage Temperature		-20°C～80°C	-20°C～80°C
質量 Weight		5g	10g

主要採用市場

Main adoption markets

- 機械手臂
- 人形機器人
- 半導體製造設備
- 測量、分析、測試設備
- 光學相關設備
- 通訊設備

- Robots
- Humanoid robots
- Semiconductor manufacturing systems
- Measurement, analytical and test systems
- Optical machines
- Communication equipment



機電產品綜合型錄

General Catalog for
Mechanical Electronic Products

詳細內容請參閱本型錄。

For more details, please refer to the separate catalog shown above.

HA-800 系列 HA-800 Series



泛用 I/O 指令型

HA-800A

MECHATROLINK

HA-800B

CC-Link

HA-800C

與致動器組合的相關資訊，請參閱第 50-51 頁。

See pages 50-51 for combination with the actuator.

伺服驅動器規格 Servo Driver Specifications

AC 伺服驅動器 HA-800A 系列 AC Servo Drivers HA-800A Series

項目 Item	型式 Model	HA-800 □ -1	HA-800 □ -3	HA-800 □ -6	HA-800 □ -24
額定電流※ Rated Current※		1.5A	3.0A	6.0A	24.0A
最大電流※ Maximum Current※		4.0A	9.5A	19.0A	55.0A
電源電壓 Power Supply	主回路※ Main Circuit※ 控制回路※ Control Circuit※	AC100 ~ 115V (單相) 或 AC200 ~ 230V (單相/三相) +10 ~ -15% AC100~115V (Single phase) or AC200~230V (Single phase/3 phases) +10 ~ -15%			AC200 ~ 230V (三相) +10 ~ -15% AC200~230V(3 phases) +10 ~ -15%
電源頻率 Power Supply Frequency		50/60Hz			AC200 ~ 230V (單相) +10 ~ -15% AC200~230V(Single phase) +10 ~ -15%
周圍環境條件 Environmental Conditions		使用溫度：0 ~ 50℃ 儲存溫度：-20 ~ +65℃ 使用、儲存濕度：95% RH 以下且不結露 耐振動：4.9 m/s ² (10 ~ 55Hz) 耐撞擊：98m/s ² 空氣環境：無金屬粉、粉塵、油霧、腐蝕性氣體 Operating temperature: 0 to 50°C / Storage temperature: -20 to +65°C / Operating/Storage humidity: 95% RH or less; avoid condensation. Resistance to vibration: 4.9m/s ² (Frequency: 10 to 55Hz) / Shock resistance: 98m/s ² / Ambient atmosphere: There should be avoid dust, metal powder, corrosive gas, flammable gas and oil mist.			
控制模式 Control Mode		位置控制、速度控制、轉矩控制 (可藉 I/O 切換) Position control, speed control, torque control (can be changed from the I/O)			
位置指令脈衝 Position Command Pulse		線驅動器式：最大回應頻率 2 脈衝方式、1 脈衝方式：1MHz、2 相脈衝方式：200kHz 開路集極式：最大回應頻率 200kHz Line driver type: maximum response frequency, 2-pulse system, 1-pulse system: 1MHz, 2-phase pulse system: 200kHz Open collector type: maximum response frequency 200kHz			
監控端子 Monitor Terminal		3ch 馬達轉速、電流指令、泛用輸出 (參數選擇) 3ch motor rpm, current command, general-purpose output (parameter selection)			
再生處理 Regenerative Processing	外部再生阻抗 附安裝端子 External regenerative resistance Mounting terminal attached	內建再生阻抗 附外部再生阻抗安裝端子 Regenerative resistance installed Mounting terminal for the external regenerative resistance attached			
再生阻抗吸收電力 Regenerative Resistance Absorption Power		—	3W Max	8W Max	90W Max
防止衝擊電流功能 Surge Current Suppression Function		內建 (藉由監視主回路電壓，CPU 控制) Built-in (CPU control by the main circuit voltage monitoring)			
質量 Weight		1kg		1.2kg	5.8kg

※ 依組合致動器的規格設定。

※ Set according to the specification of the combined actuator.

HA-800B (對應 MECHATROLINK) 通訊規格
HA-800B(MECHATROLINK Compatible) Communication Specifications

項目 Item	規格 Specifications
MECHATROLINK 版本 MECHATROLINK Version	MECHATROLINK- II
傳送速度 Transmission Speed	10Mbps
最大傳送距離 Maximum Transmission Distance	50m
最小站間距離 Minimum Distance Between Channels	0.5m
傳送媒體 Transmission Medium	附 2 芯屏蔽雙絞線 Shielded twisted pair cable (Two-core)
連接站數 Number of Connected Stations	最多 30 個子站 Max.: 30 slave stations
佈局 Topology	匯流排 Bus
通訊週期 Communication Cycle	1, 1.5, 2, 3, 4, 5ms
通訊方式 Communication Method	主控制器、從屬控制器完全同步式 Master-slave full synchronization
編碼 Encoding	曼徹斯特編碼 Manchester encoding
數據長度 Data Length	可選擇 17 位元組 / 32 位元組 17 bytes/32 bytes, selectable
連接台數※ Number of Connectable Units※	最多 30 台 Max.: 30 units

※1 進行 17 台以上的通訊以及 16 台總延長距離超過 30m 時，需要中繼器。

最多可連接台數受限於通訊週期、重試次數等的設定。

※2 詳細內容請參閱 MECHATROLINK 協會網頁 (http://www.mechatrolink.org/jp/index_jp.html)。

※3 上位控制器請使用 MP2300 (安川電機)。

※4 請務必使用專用電纜。請勿使用市售的 USB 電纜。

※1 A repeater is required when communicating with 17 units or more, or when the total extended distance is 30m or longer during communication with 16 units or more. The maximum number of connectable units is restricted by communication cycle and number of retries settings.

For details, please see MECHATROLINK Association website (<http://www.mechatrolink.org/en/index.html>)

※2 Use MP2300 (Yaskawa Electric) for the upper controller.

※3 Be sure to use the dedicated cable. Do not use a commercially available USB cable.

HA-800C (對應 CC-Link) 通訊規格
HA-800C(CC-Link Compatible) Communication Specifications

項目 Item	規格 Specifications
適用 CC-Link 版本 Compatible CC-Link Version	Ver1.10
站種類 Station Type	遙控裝置站 Remote device station
通訊速度 Communication Speed	10M/5M/2.5M/625K/156Kbps
通訊方式 Communication Method	廣播查詢方式 Broadcast polling method
同步方式 Synchronization Method	框架同步方式 Frame synchronization method
編碼方式 Encoding Method	NRZI
傳送路線形式 Transmission Path Format	匯流排形式 (按照 EIA RS-485) Bus format (EIA RS-485 compliant)
錯誤控制方式 Error Control Method	CRC (X ¹⁶ +X ¹² +X ⁵ +1)
連接電纜 Connection Cable	對應 CC-Link Ver1.10 電纜 (附屏蔽 3 芯雙絞電纜) CC-Link, Ver1.10 compatible cable (Shielded twisted pair cable (Three-core))
傳送格式 Transmission Format	按照 HDLC HDLC compliant
遙控站號 Remote Channel	1 ~ 64
占用站數 Number of Occupied Stations	1 站、2 站 1 station, 2station
通訊速度 Communication Speed	156kbps 625kbps 2.5Mbps 5Mbps 10Mbps
電纜長度 Cable Length	最大電纜總延長 Maximum Total Cable Extension 1200m 900m 400m 160m 100m
站間電纜長 Cable Length Between Stations	0.2m 以上 0.2m or longer
連接台數 Number of Connectable Unit	僅遙控裝置站即可與最多 42 台的其他機器共用 Maximum 42 units with remote device station only, can be shared with other devices.

※ 混合有對應 CC-Link Ver1.00 的電纜時，電纜總延長與站間電纜長為 Ver1.00 規格。

※ When CC-Link Ver 1.00 compatible cable coexists: The total cable extension and the inter-office cable length will follow the specifications of Ver 1.00.

HA-680/HA-680ML 系列 HA-680/HA-680ML Series



與致動器組合的相關資訊，請參閱第 50-51 頁。
See pages 50-51 for combination with the actuator.

伺服驅動器規格 Servo Driver Specifications

AC 伺服驅動器 (DC24V 電源) HA-680 系列 AC Servo Drivers (DC24V) HA-680 Series

項目 Item	型式 Model	HA-680-4-24	HA-680-6-24
額定電流※ Rated Current※		1.8A	3.9A
最大電流※ Maximum Current※		3.4A	8.4A
電源電壓 Power Source Voltage	主回路 Main Circuit	DC24V(20 ~ 28V)	
	控制回路 Control Circuit	DC24V(20 ~ 28V)	
控制方式 Control System		正弦波 PWM 控制、切換頻率：12.5kHz Sine wave PWM control, switching frequency: 12.5kHz	
控制模式 Control Mode		位置控制、速度控制、轉矩控制 Position control, speed control, torque control	
質量 Weight		230g	

※ 額定電流及最大電流隨搭配的致動器組合而異。

※ The rated current and maximum current will vary depending on the combination with an actuator.

AC 伺服驅動器 (DC24V 電源) HA-680ML 系列 AC Servo Drivers (DC24V) HA-680ML Series

項目 Item	型式 Model	HA-680ML-4-24 / HA-680ML-6-24	HA-680ML-4B-24 / HA-680ML-6B-24
電源電壓 Power Source Voltage	主回路 Main Circuit	DC24V(20 ~ 28V)	
	控制回路 Control Circuit	DC24V(20 ~ 28V)	
控制方式 Control System		正弦波 PWM 式、切換頻率：12.5kHz Sine wave PWM method, switching frequency: 12.5kHz	
編碼器 Encoder		4 條線規格 串聯傳送方式 線驅動器輸入 4-line spec., serial transmission method, line driver input	14 條線規格 線驅動器輸入 14-line spec., line driver input
輸入 / 輸出訊號 Input/Output Signal		DI：5 點 (利用光電耦合器絕緣) DO：4 點 (利用光電耦合器絕緣) DI: 5 Points (Insulation by photo-coupler), DO: 4 Points (Insulation by photo-coupler)	
編碼器監視 Encoder Monitor		A、B、Z 相線驅動器輸出 Phases A, B, Z line driver output	
控制模式 Control Mode		位置控制 Position control	
質量 Weight		260g	

※ 額定電流及最大電流隨搭配的致動器組合而異。

※ The rated current and maximum current will vary depending on the combination with an actuator.

HA-680ML (對應 MECHATROLINK) 通訊規格 HA-680ML (MECHATROLINK Compatible) Communication Specifications

項目 Item	規格 Specifications
MECHATROLINK 版本 MECHATROLINK Version	MECHATROLINK- II
傳送速度 Transmission Speed	10Mbps
最大傳送距離 Maximum Transmission Distance	50m
最小站間距離 Minimum Distance Between Channels	0.5m
傳送媒體 Transmission Medium	附 2 芯屏蔽雙絞線 Shielded twisted pair cable (Two-core)
連接站數 Number of Connected Stations	最多 30 個子站 Max.: 30 slave stations
佈局 Topology	匯流排 Bus
通訊週期 Communication Cycle	1,2,3,4,5ms
通訊方式 Communication Method	主控制器、從屬控制器完全同步式 Master-slave full synchronization
編碼 Encoding	曼徹斯特編碼 Manchester encoding
數據長度 Data Length	可選擇 17 位元組 / 32 位元組 17 bytes/32 bytes, selectable
連接台數※ Number of Connectable Units※	最多 30 台 Max.: 30 units

※ 進行 17 台以上的通訊及 16 台總延長距離超過 30m 時，需要中繼器。

※ 最多可連接台數受限於通訊週期、重試次數等的設定。

※ 詳細內容請參閱 MECHATROLINK 協會網頁 (http://www.mechatrolink.org/jp/index_jp.html)。

※ A repeater is required when communicating with 17 units or more, or when the total extended distance is 30m or longer during communication with 16 units or more. The maximum number of connectable units is restricted via communication cycle and number of retries settings. For details, please see MECHATROLINK Association website (<http://www.mechatrolink.org/en/index.html>).

HA-770 系列 HA-770 Series



與致動器組合的相關資訊，請參閱第 50-51 頁。

See pages 50-51 for combination with the actuator.

■ 伺服驅動器規格 Servo Driver Specifications

▶ 直接驅動馬達用 HA-770 系列 Direct Drive Motor HA-770 Series

項目 Item	HA-770-2
額定電流 ※ Rated Current [※]	1.8A
最大電流 ※ Maximum Current [※]	10A
電源電壓 Power Source Voltage	AC100V ~ 115V (單相) +10% ~ -15% 50/60Hz AC200V ~ 230V (單相) +10% ~ -15% 50/60Hz AC100V ~ 115V(Single-phase)+10% ~ -15% 50/60Hz AC200V ~ 230V(Single-phase)+10% ~ -15% 50/60Hz
位置指令脈衝 Position Command Pulse	線驅動器式：最大回應頻率 2 脈衝方式、1 脈衝方式：1MHz 2 相脈衝方式：200kHz Line driver system: Maximum response frequency Two-pulse system, One-pulse system: 1MHz, Two-phase pulse system: 200kHz
控制方式 Control System	正弦波 PWM 方式、切換頻率：25kHz Sine wave PWM system, switching frequency: 25kHz
控制模式 Control Mode	位置控制 Position control
質量 Weight	0.8kg

※ 額定電流及最大電流隨搭配的致動器組合而異。

※ The rated current and maximum current will vary depending on the combination with an actuator.

▶ 各伺服驅動器共通規格 Common Specifications to Servo Driver Series

周圍條件 Environmental Conditions	使用溫度：0 ~ 50°C 儲存溫度：-20 ~ +85°C 使用、儲存濕度：95% RH 以下且不結露 耐振動：4.9m/s ² (0 ~ 55Hz) 耐撞擊：98m/s ² 空氣環境：無金屬粉、塵埃、油霧、腐蝕性氣體 Operating temperature: 0 to 50°C / Storage temperature: -20 to +85°C / Operating and storage humidity: 95% RH or lower (avoid condensation) / Vibration resistance: 4.9m/s ² (frequency: 0 to 55Hz) / Shock resistance: 98m/s ² / do not expose to metal powder and chips, dust, oil mist or corrosive gas.
結構／安裝方法 Structure and Mounting Direction	全封閉自冷式／基礎安裝（壁面安裝） Totally closed, self cooling type; base mount (Mounted on wall)

HS-360 系列 HS-360 Series



與致動器組合的相關資訊，請參閱第 50-51 頁。

See pages 50-51 for combination with the actuator.

■ 伺服驅動器規格 Servo Driver Specifications

► DC 伺服驅動器 HS-360 系列 DC Servo Drivers HS-360 Series

型 式 Model	HS-360-1A	HS-360-1B	HS-360-1C	HS-360-1D	HS-360-3
額定電流※ Rated Current※	1.0A		1.4A		3.2A
最大電流※ Maximum Current※	1.0A	2.6A	3.7A	4.2A	10A
電源電壓 Power Source Voltage	AC100V (單相) ±10% AC100V (Single phase) ±10%				
適用位置感測器 Encoder	增量編碼器 (A、B、Z 相輸出)、線驅動器式 Incremental encoder (A, B and Z phase output), line driver system				
控制方式 Control System	PWM 控制 (控制元件: IPM)、切換頻率: 12.5kHz PWM control (control device: IPM), switching frequency: 12.5kHz				
控制模式 Control Mode	位置控制 Position control				
質量 Weight	0.8kg	0.8kg	0.8kg	0.8kg	1.1kg

※ 額定電流及最大電流隨搭配的致動器組合而異。

※ The rated current and maximum current will vary depending on the combination with an actuator.

► 各伺服驅動器共通規格 Common Specifications for Servo Driver Series

周圍條件 Environmental Conditions	使用溫度: 0 ~ 50°C 儲存溫度: -20 ~ +85°C 使用、儲存濕度: 95% RH 以下且不結露 耐振動: 4.9m/s ² (0 ~ 55Hz) 耐撞擊: 98m/s ² 空氣環境: 無金屬粉、塵埃、油霧、腐蝕性氣體 Operating temperature: 0 to 50°C / Storage temperature: -20 to +85°C / Operating and storage humidity: 95% RH or lower (avoid condensation) / Vibration resistance: 4.9m/s ² (frequency: 0 to 55Hz) / Shock resistance: 98m/s ² / do not expose to metal powder and chips, dust, oil mist or corrosive gas.
結構／安裝方法 Structure and Mounting Direction	全封閉自冷式／基礎安裝 (壁面安裝) Totally closed, self cooling type; base mount (Mounted on wall)

致動器與伺服驅動器組合

Actuator and Driver Combinations

■ 致動器與驅動器組合表 Actuator and Driver Combinations

► 旋轉致動器 HA-800 系列組合表 Rotary Actuator and HA-800 Series Combinations

系列名稱 Series	型號 Model No.	電源電壓 (V) Power Source Voltage AC: 200/100 DC: 24	組合驅動器 Combined Driver		
			泛用 I/O 指令型 General-purpose I/O command type	對應 MECHATROLINK-II MECHATROLINK-II support	對應 CC-Link CC-Link support
SHA	20	200	HA-800A-3D/E-200	HA-800B-3D/E-200	HA-800C-3D/E-200
	25	100	HA-800A-6D/E-100	HA-800B-6D/E-100	HA-800C-6D/E-100
		200	HA-800A-3D/E-200	HA-800B-3D/E-200	HA-800C-3D/E-200
	32	200	HA-800A-6D/E-200	HA-800B-6D/E-200	HA-800C-6D/E-200
	40	200	HA-800A-6D/E-200	HA-800B-6D/E-200	HA-800C-6D/E-200
	40	200	HA-800A-24D/E-200	HA-800B-24D/E-200	HA-800C-24D/E-200
	58	200	HA-800A-24D/E-200	HA-800B-24D/E-200	HA-800C-24D/E-200
FHA-C mini (INC)	8	200	HA-800A-1C-200	HA-800B-1C-200	HA-800C-1C-200
	11	200	HA-800A-1C-200	HA-800B-1C-200	HA-800C-1C-200
	14	200	HA-800A-1C-200	HA-800B-1C-200	HA-800C-1C-200
	8	100	HA-800A-1C-100	HA-800B-1C-100	HA-800C-1C-100
	11	100	HA-800A-1C-100	HA-800B-1C-100	HA-800C-1C-100
	14	100	HA-800A-1C-100	HA-800B-1C-100	HA-800C-1C-100
	14	100	HA-800A-1C-100	HA-800B-1C-100	HA-800C-1C-100
FHA-C mini (ABS)	8	200	HA-800A-1D-200	HA-800B-1D-200	HA-800C-1D-200
	11	200	HA-800A-1D-200	HA-800B-1D-200	HA-800C-1D-200
	14	200	HA-800A-1D-200	HA-800B-1D-200	HA-800C-1D-200
	8	100	HA-800A-1D-100	HA-800B-1D-100	HA-800C-1D-100
	11	100	HA-800A-1D-100	HA-800B-1D-100	HA-800C-1D-100
	14	100	HA-800A-1D-100	HA-800B-1D-100	HA-800C-1D-100
FHA-C (INC)	17	200	HA-800A-3C-200	HA-800B-3C-200	HA-800C-3C-200
	25	200	HA-800A-3C-200	HA-800B-3C-200	HA-800C-3C-200
	32	200	HA-800A-6C-200	HA-800B-6C-200	HA-800C-6C-200
	40	200	HA-800A-6C-200	HA-800B-6C-200	HA-800C-6C-200
FHA-C (ABS)	17	200	HA-800A-3A-200	HA-800B-3A-200	HA-800C-3A-200
	25	200	HA-800A-3A-200	HA-800B-3A-200	HA-800C-3A-200
	32	200	HA-800A-6A-200	HA-800B-6A-200	HA-800C-6A-200
	40	200	HA-800A-6A-200	HA-800B-6A-200	HA-800C-6A-200
FHA-C (INC)	17	100	HA-800A-3C-100	HA-800B-3C-100	HA-800C-3C-100
	25	100	HA-800A-6C-100	HA-800B-6C-100	HA-800C-6C-100
	32	100	HA-800A-6C-100	HA-800B-6C-100	HA-800C-6C-100
FHA-C (ABS)	17	100	HA-800A-3A-100	HA-800B-3A-100	HA-800C-3A-100
	25	100	HA-800A-6A-100	HA-800B-6A-100	HA-800C-6A-100
	32	100	HA-800A-6A-100	HA-800B-6A-100	HA-800C-6A-100
RSF	17	200	HA-800A-3B-200	HA-800B-3B-200	HA-800C-3B-200
RSF/RKF	20	200	HA-800A-3B-200	HA-800B-3B-200	HA-800C-3B-200
	25	200	HA-800A-3B-200	HA-800B-3B-200	HA-800C-3B-200
	32	200	HA-800A-6B-200	HA-800B-6B-200	HA-800C-6B-200

※ (INC) 表示增量編碼器，(ABS) 表示絕對編碼器。

※ (INC) indicates incremental encoder, (ABS) indicates absolute encoder.

致動器與驅動器組合表 Actuator and Driver Combinations

► 旋轉致動器 HA-680/HA-690/HA-520/HS-360 系列組合表 Rotary Actuator and HA-680/HA-770/HS-360 Series Combinations

系列名稱 Series	型號 Model No.	電源電壓 (V) Power Source Voltage AC: 200/100 DC: 24	組合驅動器 Combined Driver	
			泛用 I/O 指令型 General-purpose I/O command type	對應 MECHATROLINK-II MECHATROLINK-II support
FHA-C mini (INC) ^{※1}	8	24	HA-680-4-24	HA-680-4-24ML
	11	24	HA-680-4-24	HA-680-4-24ML
	14	24	HA-680-6-24	HA-680-6-24ML
FHA-C mini (ABS) ^{※1}	8	24	山洋電氣 (株) 製的 RF2H21A0AHD RF2H21A0AHD manufactured by Sanyo Denki CO., LTD	-
	11	24	山洋電氣 (株) 製的 RF2H21A0AHD RF2H21A0AHD manufactured by Sanyo Denki CO., LTD	-
	14	24	山洋電氣 (株) 製的 RF2H21A0AHD RF2H21A0AHD manufactured by Sanyo Denki CO., LTD	-
RSF super mini	3	24	HA-680-4B-24	HA-680ML-4B-24
	5	24	HA-680-4B-24	HA-680ML-4B-24
RSF-B mini	8	24	HA-680-4B-24	HA-680ML-4B-24
	11	24	HA-680-6B-24	HA-680ML-6B-24
	14	24	HA-680-6B-24	HA-680ML-6B-24
RSF	17	200	HA-800-3B-200	-
	20	200	HA-800-3B-200	-
	25	200	HA-800-3B-200	-
RH ^{※2}	5	12	HS-360-1A	-
	8	24	HS-360-1B	-
	11	24	HS-360-1C	-
	14	24	HS-360-1D	-

※1 (INC) 表示增量編碼器，(ABS) 表示絕對編碼器。

※2 RH 系列和伺服驅動器 HS-360 系列組合使用時，致動器應採用線驅動器規格產品。

※1 (INC) indicates incremental encoder, (ABS) indicates absolute encoder.

※2 The actuator will require a line driver type when combined with RH series and a servo driver in the HS-360 series.

► 直接驅動馬達 Direct Drive Motor

系列名稱 Series	型號 Model No.	組合驅動器 Combined Driver
KDU	13	HA-770-2

► Galvano 式光學掃描器 Optical Galvano Scanners

系列名稱 Series	型號 Model No.	組合驅動器 Combined Driver
LSA	10	PSM-130

► 線性致動器 Linear Actuators

系列名稱 Series	型號 Model No.	組合驅動器 Combined Driver
LA [※]	30	HS-360-1A-100
	32	HS-360-1A-100
LAH [※]	46	HS-360-1A-100
LBC	25	HA-800A-3B

※ LA、LAH 系列和伺服驅動器 HS-360 系列組合使用時，致動器應採用線驅動器規格產品。

※ The actuator will require a line driver type when combined with the LA/LAH series and a servo driver in the HS-360 series.

應用案例

Applications

機械手臂 Robots



工業用機械手臂
娛樂型機器人
機械手臂相關設備

Industrial robots
Amusement robots
Robot peripheral equipment

關節驅動
手動驅動
移動軸驅動
分度工作台
周邊設備

Indirect drives
Hand drives
Traveling shaft drives
Indexing tables
Peripheral equipment

CSG	HP-F
CSD	SHA
CSF	FHA-C
SHG	RSF
SHF	微型編碼器 Micro Encoder
SHD	
FBS-2UH	
HPGP	
HPG	
HPF	

人形機器人 Humanoid Robots



提供：Toyota Motor Corporation
Courtesy of Toyota Motor Corporation



提供：本田技研工業株式會社
Courtesy of Honda Motor Company

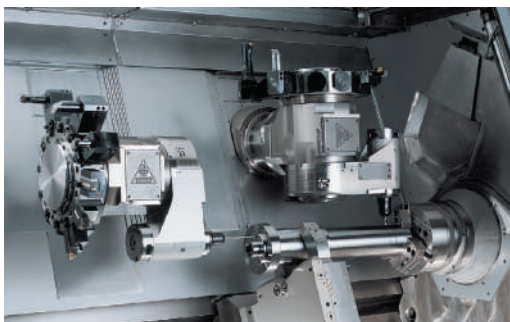
人形機器人
Humanoid robots

關節驅動
手動驅動
視覺感測器驅動
轉矩感測器驅動

Indirect drives
Hand drives
Vision sensor drives
Torque sensing drives

CSG	FLA
CSD	
CSF	
SHG	
SHF	
SHD	
HPGP	
HPG	
微型編碼器 Micro Encoder	

金屬工具機 Metal Machine Tools



綜合加工機
車床
NC 車床
工件搬運設備
拋光機
EDM 設備

Machining centers
Turning centers
NC lathes
Work transfer systems
Grinders
EDM systems

工具旋轉器驅動
工具換刀器驅動
刀具庫驅動
工件定位設備
旋轉平台驅動
工具定位設備驅動
直接傳動軸驅動
各軸驅動

Tool revolver drives
Tool changer drives
Tool magazine drives
Work positioning equipment
Rotary table drives
Tool positioning equipment drives
Direct transmission shaft drives
Shaft drives

CSG	RSF
CSF	LAH
SHG	HMA
SHF	
FBS-2UH	
HPGP	
HPG	
HPF	
SHA	
FHA-C	

金屬加工機械 Metal Working Machines



彎捲機
滾軋機
壓合機
工件搬運設備

Bending machines
Rolling machines
Presses
Work transfer systems

彎曲加工部驅動
工件定位設備驅動
工件反轉設備

Bent work drives
Work positioning machine drives
Work reversing machines

SHG	HMA
SHF	
FBS-2UH	
HPGP	
HPG	
HPF	
SHA	
FHA-C	
RSF	
LSA	

印刷、裝訂、紙工機械 Printing, Bookbinding and Paper Processing Machines



印刷機
摺紙機
紙張交換機
紙張定位設備
造紙機

Printing presses
Folding machines
Paper changing machines
Paper positioning machines
Paper machines

張力控制設備
刀片定位設備
相位調整裝置
紙張正反控制設備
滾柱位置調節設備
滾柱高度調節

Tension controllers
Cutting blade positioning machines
Phase adjusting machines
Paper surface/back controlling machines
Roller position adjusting machines
Roller height adjustment

CSG	HPF
CSF	SHA
SHG	FHA-C
SHF	HMA
FBS-2UH	
FB	
FR	
FD	
HPGP	
HPG	

半導體製造設備 Semiconductor Manufacturing Systems



光罩生產設備
晶圓生產設備
晶圓加工設備
組裝設備
檢查設備
工件搬運設備

Mask and reticle manufacturing equipment
Wafer fabrication systems
Wafer processing systems
Assembly systems
Inspection systems
Work transfer systems

搬運設備
各部位定位驅動
分度工作台
直接傳動工作台
工件反轉設備
張力控制設備
艙口開關驅動

Transfer systems
Positioning drives
Indexing tables
Direct transmission tables
Work reversing machines
Tension controllers
Hatch opening/closing drives

CSF	RSF supermini
SHF	RSF-B mini
SHD	RSF
HPGP	RH
HPG	RP-B
HPF	LA
HP-F	LAH
SHA	KDU
FHA-C mini	微型編碼器
FHA-C	Micro Encoder

測量、分析、測試設備 Measurement, Analytical and Test Systems



光分析設備
3D 測量儀
金屬拉伸試驗機
土柱強度試驗機

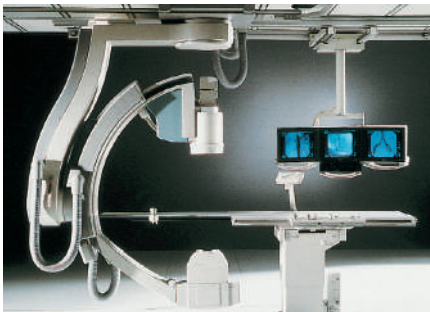
Photometric equipment
Three-dimensional measuring instruments
Metal tensile test machines
Soil-column yield strength test machines

搬運設備
各部位定位驅動
稜鏡定位驅動
分度工作台
直接傳動工作台
工件反轉設備

Transfer systems
Positioning drives
Prism positioning drives
Indexing tables
Direct transmission tables
Work reversing machines

CSF	LSA
SHF	微型編碼器
HPF	Micro Encoder
HP-F	HMA
FHA-C mini	
RSF supermini	
RSF-B mini	
RH	
RP-B	
KDU	

醫療機械 Medical Equipments



3D 機械手
X 光攝影、CT、NMR 設備
X 光片顯影機及輸出機
手術輔助機械手臂

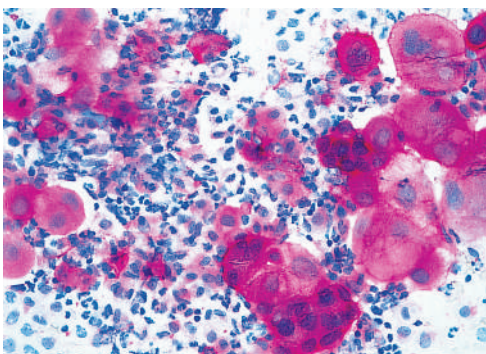
Three-dimensional manipulators
X-ray photographing and CT-NMR systems
X-ray film developing and take-off machines
Surgical operation assistant robots

精密關節驅動
床鋪升降、傾斜驅動
定位工作台驅動

Precision joint drives
Bed lifting and inclination drives
Positioning table drives

CSF
SHF
FHA-C mini
RSF-B mini
RH
RP-B

光學相關設備 Optical Machines



X 光分析設備
光學元件檢查設備
雷射振盪器
光學測量儀
表面檢查設備
光碟製造設備
雷射雕刻機
雷射振盪器

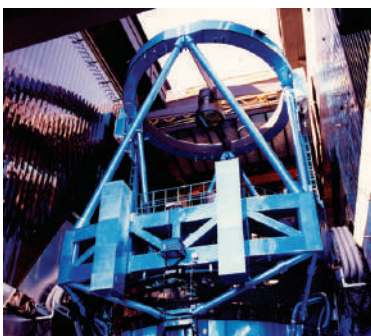
X-ray analytical systems
Optical component inspection systems
Laser oscillation machines
Optical measuring instruments
Surface inspection systems
Optical disc manufacturing systems
Laser markers

定位工作台驅動
透鏡定位驅動
雷射反射鏡驅動
稜鏡驅動
探針驅動
感測器定位驅動

Positioning table drives
Lens positioning drives
Laser mirror drives
Prism drives
Probe drives
Sensor positioning drives

CSF	微型編碼器
SHF	Micro Encoder
HPF	
HP-F	
FHA-C mini	
RSF supermini	
RH	
RP-B	
KDU	
LSA	

望遠鏡 Telescopes



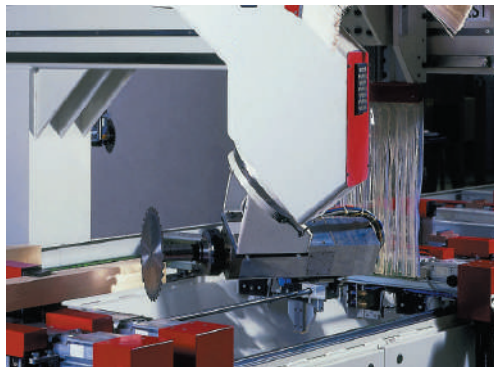
聚光鏡調節機構
電磁波測微器調節機構
主鏡位置控制裝置
維修用機械手臂

Condenser mirror adjusting mechanisms
Electromagnetic wave micrometer adjusting mechanisms
Primary mirror position control systems
Robot arms for maintenance servicing

X-Y-Z 軸驅動
關節驅動機構
X, Y, Z axis drives
Indirect drive mechanisms

CSF
SHF
HPGP
HPG
FHA-C mini
RSF supermini
RSF-B mini
LA
LAH
LBC

木材、輕金屬、塑膠加工機械 Wood, Light Metal and Plastic Machine Tools



木工機械

5 軸綜合加工機
大型 3D 加工機
工件搬運設備

Woodworking machines
5-shaft machining centers
Large 3-dimension processing machines
Work transfer systems

銑頭驅動

工具旋轉器驅動
工具換刀器驅動
刀具庫驅動
工件定位設備
旋轉平台驅動
工具定位設備驅動
直接傳動軸驅動
各軸驅動

Milling head drives
Tool revolver drives
Tool changer drives
Tool magazine drives
Work positioning machines
Rotary table drives
Tool positioning machine drives
Direct transmission shaft drives
Shaft drives

CSG
CSF
SHG
SHF
FBS-2UH
HPGP
HPG
HPF
SHA
FHA-C mini
FHA-C

RSF supermini
RSF-B mini
RSF
LAH
FLA
HMA

能源相關 Energy



Courtesy of Halliburton/Sperry Drilling Services

鑽油機械手臂
風力發電
太陽能發電

Oil digging robots
Wind power electric power
Photovoltaics

挖掘角度定位驅動
推進器角度定位驅動
聚光板定位驅動

Digging angle positioning drives
Propeller angle positioning drives
Condensing board positioning drives

CSF
FR

製紙機械 Paper-making Machines



製紙機
瓦楞紙箱製造印刷機

Paper-making machines
Corrugated fiberboard box making and printing machines

塗裝流程滾輪定位驅動
紙張厚度調整機構驅動
切刀定位
切刀移動驅動

Coating-process roller positioning drives
Paper thickness adjusting mechanism drives
Cutter knife positioning
Cutter knife traveling drives

CSF
SHF
HPGP
HPG
RH
RP-B
FLA
HMA

包裝、捆包機械 Crating and Packaging Machines



封口機
標籤印刷機
標籤貼合機
機械手臂
工件搬運設備

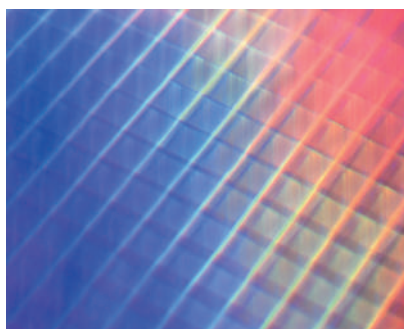
Sealing machines
Label printing machines
Label attaching machines
Robots
Work transfer systems

軸同步驅動
滾柱同步驅動
關節驅動
台車驅動

Shaft synchronizing drives
Roll synchronizing drives
Joint drives
Trolley drives

CSF
SHF
FBS-2UH
FB
FR
FD
HPGP
HPG
SHA
FHA-C
RSF
RH
FLA
HMA

FPD 製造設備 Flat Panel Display Manufacturing Systems



陣列製程設備
母片製程設備
組裝製程設備
工件搬運設備

Array process equipment
Cell process equipment
Assembly process equipment
Work transfer systems

搬運設備
各部位定位驅動
分度工作台
直接傳動工作台
工件反轉設備
張力控制設備
艙口開關驅動
關節驅動
台車驅動

Transfer systems
Parts positioning drives
Indexing tables
Direct transmission tables
Work reversing machines
Tension controllers
Hatch opening/closing drives
Joint drives
Trolley drives

CSF
SHF
SHD
HPGP
HPG
HPF
HP-F
SHA
FHA-C mini
FHA-C
RSF supermini
RSF-B mini
RSF
RH
RP-B
LA
LAH
KDU

通訊設備 Communication Equipment



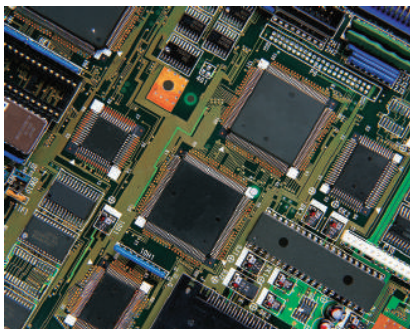
天線
傳聲器
攝影機
波長雙工器
Antennas
Microphones
Cameras
Wavelength duplexers

雲台驅動
升降軸驅動
稜鏡驅動
Pan head drives
Lifter shaft drives
Prism drives

HPGP
HPG
SHA
FHA-C mini
FHA-C
RSF supermini
RSF-B mini
RSF
RH
RP-B

LA
LSA
微型編碼器
Micro Encoder
FLA

印刷電路製造設備 Printed Circuit Board Manufacturing Machines



電子零件插裝機
錫膏印刷機
分配機
電路板檢查設備
搬運系統
Electronic component insertion machines
Cream solder printing machines
Dispensers
Board inspection systems
Transfer systems

銑頭驅動
工具旋轉器驅動
工具換刀器驅動
刀具庫驅動
工件定位設備
旋轉平台驅動
工具定位設備驅動
直接傳動軸驅動
各軸驅動
Milling head drives
Tool revolver drives
Tool changer drives
Tool magazine drives
Work positioning machines
Rotary table drives
Tool positioning machine drives
Direct transmission shaft drives
Shaft drives

CSG
CSF
SHG
SHF
FBS-2UH
HPGP
HPG
SHA
FHA-C mini
FHA-C
RSF supermini
RSF-B mini

RSF
LAH

航太設備 Space Equipment



Rover image created by Dan Maas, copyright of Cornell and provided courtesy NASA/JPL-Caltech.

天線
太陽能電池葉片
機械手臂
Antennas
Solar cell paddles
Robots

雲台驅動
各部位關節驅動
移動台車驅動
Pan head drive
Joint drive
Traveling trolley drive

CSF
SHF
SHD

飛機相關 Aircraft Technology



飛行練習器
貨物搬運系統
偵察攝影機
閥
Flight simulators
Cargo handling and transfer systems
Reconnaissance cameras
Valves

各部位關節驅動
雲台驅動
閥門開關
閥門定位
移動台車驅動
Indirect drive of units
Pan head drives
Valve opening and closing
Valve positioning
Traveling trolley drives

CSF
HPGP
HPG
FHA-C mini
RH
FLA

玻璃、陶瓷製造設備 Glass and Ceramic Manufacturing Systems



陶瓷成型機
玻璃拋光機
玻璃切割機
Ceramic forming machines
Glass polishing machines
Sheet glass cutting machines

閥門開關
閥門定位
移動台車驅動
Valve opening and closing
Valve positioning
Traveling trolley drives

CSF
SHF
HPGP
HPG
FHA-C mini
RSF supermini
RSF-B mini
RSF
LSA

FLA

採用本公司產品的主要用途

Major applications in which our products are used

滿足廣大領域的多樣需求

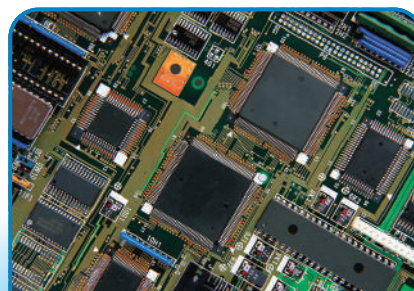
We respond to diverse needs in a wide variety of areas



機械手臂
Robots



人形機器人
Humanoid Robots



印刷電路製造設備
Printed Circuit Board Manufacturing Machines



印刷、裝訂、紙工機械
Printing, Bookbinding and Paper



金屬加工機械
Processing Machines



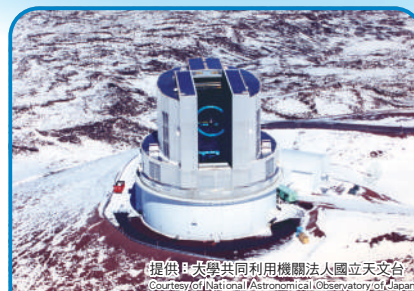
飛機相關
Aircraft



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Measurement, Analytical and Test Systems



包裝、捆包機械
Crating and Packaging Machines



望遠鏡
Telescopes



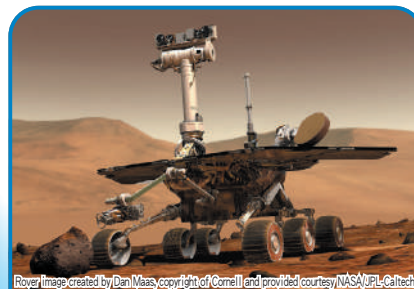
玻璃、陶瓷製造設備
Glass and Ceramic Manufacturing Systems



金屬工具機
Metal Working Machines



醫療機械
Medical Equipments



航太設備
Space Equipment



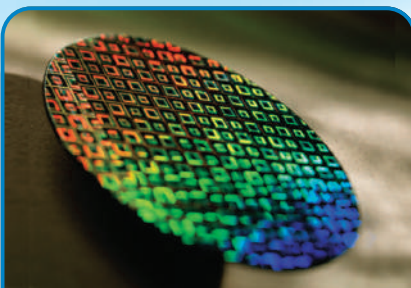
光學相關設備
Optical Machines



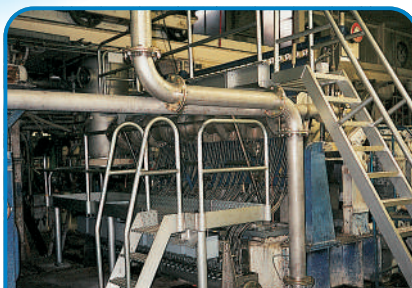
木材、輕金屬、塑膠加工機械
Wood, Light Metal and Plastic Machine Tools



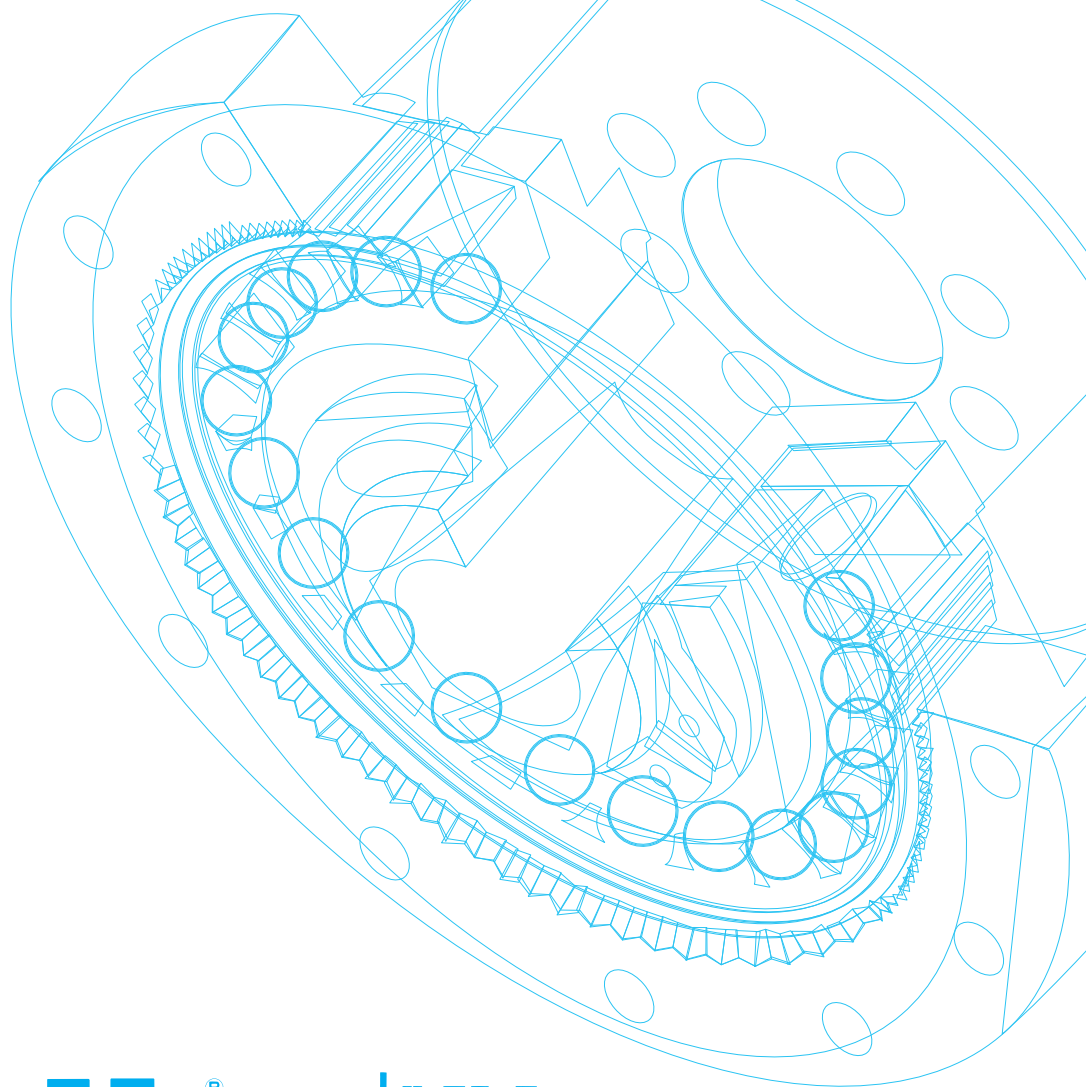
通訊設備
Communication Equipment



半導體製造設備
Semiconductor Manufacturing Systems



製紙機械
Paper-making Machines



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「HarmonicDrive®」為表示本公司產品之註冊商標。一般或學術上稱為「諧波齒輪傳動機構」。

本型錄內容為截至 2020 年 3 月為止的最新資料。
NO.2003-33R-GUIDE-TW



本型錄使用環保植物油墨列印。